ML11 ML11 PERF EXERCISER AH-S430A-MC FEB 1981
CZMLBA0 FICHE 1 OF 2 COPYRIGHT@ 1981
MADE IN USA

ML11

ML11 PERF EXERCISER
CZMLBA0

AH-S430A-MC
FICHE 2 OF 2

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1                               .SBTTL  USER DOCUMENTATION
                                .REM &
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IDENTIFICATION

PRODUCT CODE: AC-S428A-MC

PRODUCT NAME: CZMLBA0 ML11 PERFORMANCE EXERCISER

PRODUCT DATE: 02-FEB-81

MAINTAINER: STORAGE SYSTEMS DIAGNOSTICS

AUTHOR: MICHELE D. ROSEN

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                        .TITLE  ML11 PERFORMANCE EXERCISER


                        ;DURING INITIAL PROGRAM DEVELOPMENT, IT IS DESIRABLE
                        ;TO TREAT EACH OF THE 4 SKELETON FILES INDIVIDUALLY,
                        ;AND TO ASSEMBLE THEM INTO 4 SEPARATE OBJECT FILES.
                        ;THIS IS DONE TO HASTEN THE PROCESS OF DETECTING AND
                        ;CORRECTING SYNTAX ERRORS.

                        ;WHEN THE TIME COMES, HOWEVER, TO PRODUCE A DIAGNOSTIC
                        ;PACKAGE WHICH WILL BE TAKEN TO A TEST STATION AND RUN,
                        ;THE SKELETONS MUST BE HANDLED DIFFERENTLY.  THEY MUST
                        ;BE ASSEMBLED TOGETHER TO PRODUCE A SINGLE OBJECT FILE.
                        ;A FURTHER RESTRICTION IS THAT THE FLAG 'ONEFILE' MUST
                        ;BE DEFINED (TO INDICATE THAT ALL 4 OF THE SKELETONS
                        ;ARE NOW COMBINED INTO THE REQUIRED SINGLE OBJECT FILE).

                        ;NOTE THAT 'ONEFILE' IS NOT DEFINED WITHIN THE SOURCE
                        ;CODE OF ANY OF THE SKELETONS, BUT THAT IT CAN EASILY
                        ;BE ACCOMPLISHED BY INCLUDING THIS FILE (ONEFILEX.MAC)
                        ;AS PART OF THE INPUT SPECIFICATIONS OF THE ASSEMBLY
                        ;COMMAND LINE.



                        .NLIST TOC

000001                  ONEFILE = 1
```

TABLE OF CONTENTS

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THE ML11 PERFORMANCE EXERCISER IS A BLISS PROGRAM WHICH RUNS UNDER THE PDP-11 DIAGNOSTIC SUPERVISOR AND WHICH EXERCISES UP TO 8 ML11 UNITS ON A SINGLE RH CONTROLLER. AN ML11 UNIT IS A FAST, RANDOM ACCESS, BLOCK MODE MOS MEMORY SYSTEM WITH ECC CAPABILITY. IT IS MADE UP OF 3 CONTROL MODULES AND UP TO 16 ARRAY MODULES. IT IS A MASSBUS DEVICE, AND AS SUCH, CONFORMS TO MASSBUS STANDARDS.

THIS DIAGNOSTIC HAS BEEN WRITTEN FOR USE WITH THE DIAGNOSTIC RUNTIME SERVICES SOFTWARE (SUPERVISOR). THESE SERVICES PROVIDE THE INTERFACE TO THE OPERATOR AND TO THE SOFTWARE ENVIRONMENT. THIS PROGRAM CAN BE USED WITH XXDP+, ACT, APT, SLIDE AND PAPER TAPE. FOR A COMPLETE DESCRIPTION OF THE RUNTIME SERVICES, REFER TO THE XXDP+ USER'S MANUAL. THERE IS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES IN SECTION 2 OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

1. PDP-11 WITH 28K WORDS OF MEMORY
2. CONSOLE TERMINAL
3. RH11 OR RH70 CONTROLLER
4. 1 TO 8 ML11 DRIVES
5. RK05 OR OTHER XXDP+ LOAD MEDIA

1.3 RELATED DOCUMENTS AND STANDARDS

THE HARDWARE DESIGN IS EXPECTED TO CONFORM TO THE STANDARDS SET FORTH IN THE MASSBUS SPECIFICATION (DEC STANDARD 159).

THE FOLLOWING DOCUMENTATION MAY PROVE USEFUL IN LEARNING MORE ABOUT THE ML11:

1. ML11 ENGINEERING SPECIFICATION
2. RWS04 FIXED-HEAD DISK SUBSYSTEM USER'S MANUAL
3. THE ML11 PERFORMANCE EXERCISER'S PROGRAM LISTING
4. THE ML11 LOGIC TEST'S SPECIFICATIONS AND LISTINGS
5. ML11 PROJECT PLAN
6. XXDP+ USER'S MANUAL (CHQUS)
7. PDP-11 DIAGNOSTIC SUPERVISOR DOCUMENTATION (SUPINT, SUPFUN, SUPPRGC)

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

ML11 SUBSYSTEM FAULTS WILL BE DETECTED BUT NOT ISOLATED, SINCE OTHER DIAGNOSTICS WILL BE AVAILABLE FOR TROUBLESHOOTING THE EXACT CAUSE OF FAILURE. A LIST OF AVAILABLE DIAGNOSTIC TOOLS IS INCLUDED IN APPENDIX A OF THE ML11 FUNCTIONAL SPECIFICATION.

1.5 ASSUMPTIONS

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A VERY BRIEF DESCRIPTION OF THOSE PARTS OF THE DIAGNOSTIC RUNTIME SERVICES OF THE PDP-11 DIAGNOSTIC SUPERVISOR WHICH ARE APPLICABLE FOR THIS EXERCISER. CONSULT THE XXDP+ USER'S MANUAL (CHQUS) FOR MORE DETAILS.

2.1 COMMANDS

THE FOLLOWING IS A LIST OF THE 11 COMMANDS AVAILABLE TO THE DRS. ANY COMMAND IS RECOGNIZED BY ITS FIRST 3 CHARACTERS, AND MANY COMMANDS MAY BE MODIFIED BY OPTIONAL SWITCHES WHICH ARE DESCRIBED IN THE NEXT SECTION.

DRS COMMAND	EFFECT
START	START THE DIAGNOSTIC FROM AN INITIAL STATE
RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (AFTER ^C)
PROCEED	CONTINUE FROM AN ERROR HALT
EXIT	RETURN TO THE XXDP+ MONITOR
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME)
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION
DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
FLAGS	TYPE THE STATE OF ALL FLAGS (SEE SECTION 2.3)
ZFLAGS	CLEAR ALL FLAGS (SEE SECTION 2.3)

2.2 SWITCHES

SWITCHES ARE USED TO MODIFY PROGRAM OPERATION, AND ARE APPENDED TO COMMANDS. THE SWITCHES WHICH HAVE MEANING FOR THIS EXERCISER AND INFORMATION ABOUT THEIR USE ARE GIVEN IN THE FOLLOWING TWO TABLES.

SWITCH	EFFECT
/PASS:DDDDD	EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS (SEE SECTION 2.3)
/EOP:DDDDD	REPORT END OF PASS MESSAGE AFTER EVERY DDDDD PASSES ONLY (DDDDD = 1 TO 64000).
/UNITS:LIST	TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED IN THE LIST. LIST EXAMPLE: /UNITS:0:3:5-7 USE UNITS 0,3,5,6,7 (UNIT NUMBERS = 0-7)

EXAMPLE OF SWITCH USAGE:

START/PASS:1000/EOP:100

THE EFFECT OF THIS COMMAND WILL BE:

1. ALL UNITS WILL BE TESTED 1000 TIM
2. THE END OF PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY.

BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH COMMAND.

	PASS	FLAGS	EOP	UNITS
START	X	X	X	X
RESTART	X	X	X	X
CONTINUE	X	X	X	
PROCEED		X		
DROP				X
ADD				X
PRINT				
DISPLAY				X
FLAGS				
ZFLAGS				
EXIT				

2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATION PARAMETERS SUCH AS LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH. FLAGS ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS. THEY REMAIN SET OF CLEARED AS SPECIFED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO DRS COMMAND MODE
LOE	LOOP ON ERROR
IER*	INHIBIT ALL ERROR REPORTS
IBR*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS ERROR TYPE, NUMBER, PC, TEST AND UNIT)
IXR*	INHIBIT EXTENDED ERROR REPORTS (THOSE CALLED BY PRINTX MACRO'S)
PRI	DIRECT MESSAGES TO LINE PRINTER
BOE	"BELL" ON ERROR
ISR	INHIBIT STATISTICAL REPORTS
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE

* ERROR MESSAGES ARE DESCRIBED IN SECTION 4.7

SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS. MORE THAN ONE FLAG MAY BE SPECIFIED WITH THE /FLAGS SWITCH. FOR EXAMPLE, TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS AND TYPE A "BELL" ON ERROR, YOU MAY USE THE FOLLOWING STRING:

```
/FLAGS:LOE:IER:BOE
```

2.4 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE DIAGNOSTIC RUNTIME SERVICES PROMPTS THE USER FOR HARDWARE INFORMATION BY TYPING "CHANGE HW (L) ?". YOU MUST ANSWER "Y" AFTER A START COMMAND UNLESS THE HARDWARE INFORMATION HAS BEEN PRELOADED USING THE SETUP UTILITY (SEE CHAP. 6 OF THE XXDP+ USER'S MANUAL). WHEN YOU ANSWER THIS QUESTION WITH A "Y" THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL). YOU WILL THEN BE ASKED THE FOLLOWING QUESTIONS FOR EACH UNIT:

2.4.1 QUESTIONS AND ANSWERS

1. CSR ADDRESS (172000) 0?

   ANSWER: THE CSR ADDRESS OF THE RH CONTROLLER
   (OCTAL, DEFAULT 172000).

2. INTERRUPT VECTOR (204) 0?

   ANSWER: THE INTERRUPT VECTOR ADDRESS
   (OCTAL, DEFAULT 204).

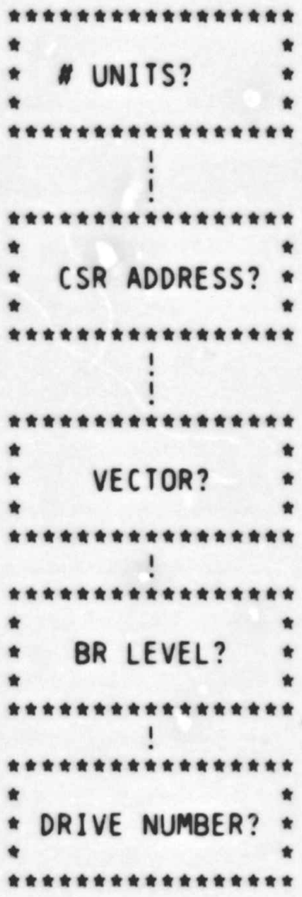
3. BR LEVEL FOR INTERRUPT (5) 0?

   ANSWER: THE BUS REQUEST LEVEL FOR INTERRUPT
   (OCTAL, DEFAULT 5).

4. DRIVE NUMBER (0) 0?

   ANSWER: THE PHYSICAL DRIVE NUMBER(S) OF THE DRIVE(S) TO BE TESTED
   (OCTAL, {0-7}, DEFAULT 0).

2.4.2 SUMMARY OF HARDWARE QUESTION SEQUENCE



2.5 SOFTWARE QUESTIONS

AFTER YOU HAVE ANSWERED THE HARDWARE QUESTIONS, OR AFTER A RESTART OR OR CONTINUE COMMAND, THE RUNTIME SERVICES WILL ASK FOR SOFTWARE PARAMETERS. THESE PARAMETERS WILL GOVERN SOME DIAGNOSTIC SPECIFIC OPERATION MODES. YOU WILL BE PROMPTED BY "CHANGE SW (L) ?" IF YOU WISH TO CHANGE ANY PARAMETERS, ANSWER BY TYPING "Y". THE SOFTWARE QUESTIONS AND THE DEFAULT VALUES ARE DESCRIBED IN THE NEXT PARAGRAPH(S).

INCLUDED IN THIS SECTION ARE QUESTIONS ABOUT PARAMETERS WHICH AFFECT PROGRAM OPERATION. REQUESTS FOR SOFTWARE OPTIONS SHOULD BE DISCUSSED AND INCORPORATED INTO THIS SPECIFICATION AS SOON AS POSSIBLE, AND CERTAINLY BEFORE SIGNOFF TIME.

IF A ^Z (CONTROL-Z) IS TYPED AS THE ANSWER TO ANY QUESTION, THE PROGRAM WILL START TO EXECUTE.

IF A ^C (CONTROL-C) IS TYPED AT ANY TIME, CONTROL WILL RETURN TO THE DIAGNOSTIC SUPERVISOR.

2.5.1 QUESTIONS AND ANSWERS

1. LIMIT RANGE OF SECTORS TO BE TESTED (N) L?

   ANSWER: TO TEST ONLY A CERTAIN RANGE OF SECTORS INSTEAD OF AN ENTIRE UNIT. ALTHOUGH THIS QUESTION IS NOT OPTIONAL, IT SHOULD BE ANSWERED 'NO' UNLESS THE ANSWER TO THE HARDWARE QUESTION "# UNITS ?" WAS 1.
   (LOGICAL, {Y TO TEST PARTIAL UNIT, N FOR ENTIRE UNIT}, DEFAULT N).

THE QUESTIONS WHICH FOLLOW ARE OPTIONAL, AND DEPEND ON AN AFFIRMATIVE ANSWER TO THE PREVIOUS QUESTION:

2. DO YOU KNOW THE EXACT RANGE OF SECTORS TO BE TESTED (N) L?

   ANSWER: THIS DECIDES WHETHER TO ASK FOR SECTOR NUMBERS OR BOARD NUMBER.

   THE NEXT TWO QUESTIONS WILL BE ASKED ONLY IF QUESTION 2 IS ANSWERED YES:

   3. FIRST SECTOR TO TEST (0) 0?

      ANSWER: THE SECTOR NUMBER WHERE TESTING BEGINS
      (OCTAL, {0-7777 FOR ML11A, 0-37777 FOR ML11B},
      DEFAULT 0).

4. LAST SECTOR TO TEST (LAST) 0?

ANSWER: THE LAST SECTOR NUMBER TO BE TESTED
(OCTAL, {0-7777 FOR ML11A, 0-37777 FOR ML11B},
DEFAULT 37777).

THE NEXT QUESTION WILL BE ASKED ONLY IF QUESTION 2 IS ANSWERED NO:

5. WHICH BOARD {1-16} SHOULD BE TESTED (1) D?

ANSWER: THE NUMBER OF THE ONLY BOARD TO BE TESTED
(DECIMAL, {1-16}, DEFAULT 1).

6. THE PROGRAM OPTIONS INCLUDE:

1. ADDRESS CHECK
2. PATTERN TEST
3. UNIQUE DATA CHECK
4. MARCH TEST
5. RANDOMNESS TESTS

DO YOU WANT TO DROP ANY OF THESE FROM THE EXERCISER (N) L?

ANSWER: THIS DECIDES WHETHER TO ASK FOR OPTION NUMBERS.
(LOGICAL, {Y FOR PARTIAL EXERCISER, N FOR COMPLETE EXERCISER}, DEFAULT N).

THE FOLLOWING SET OF QUESTIONS WILL BE ASKED ONLY IF QUESTION 6 IS ANSWERED YES:

7. DROP OPTION 1 (N) L?

8. DROP OPTION 2 (N) L?

9. DROP OPTION 3 (N) L?

10. DROP OPTION 4 (N) L?

11. DROP OPTION 5 (N) L?

12. ENABLE REFRESH MARGINING (N) L?

ANSWER: NORMAL OPERATION IS WITHOUT REFRESH MARGINING.
(LOGICAL, {Y TO ENABLE, N TO DISABLE}, DEFAULT N).

13. DISABLE ERROR CORRECTION (N) L?

ANSWER: NORMAL OPERATION IS WITH ECC ENABLED.
(LOGICAL, {Y TO DISABLE, N TO ENABLE}, DEFAULT N).

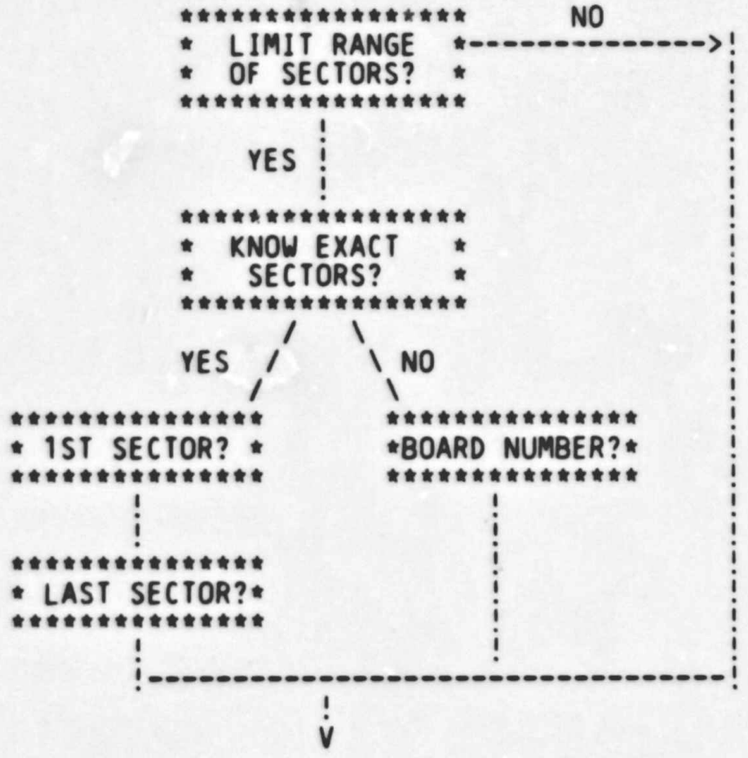
14. ENABLE END OF PASS SUMMARY PRINTOUT (N) L?

ANSWER: NORMAL OPERATION IS WITHOUT END OF PASS SUMMARY PRINTOUT.
(LOGICAL, {Y TO ENABLE, N TO DISABLE PRINTOUT}, DEFAULT N).

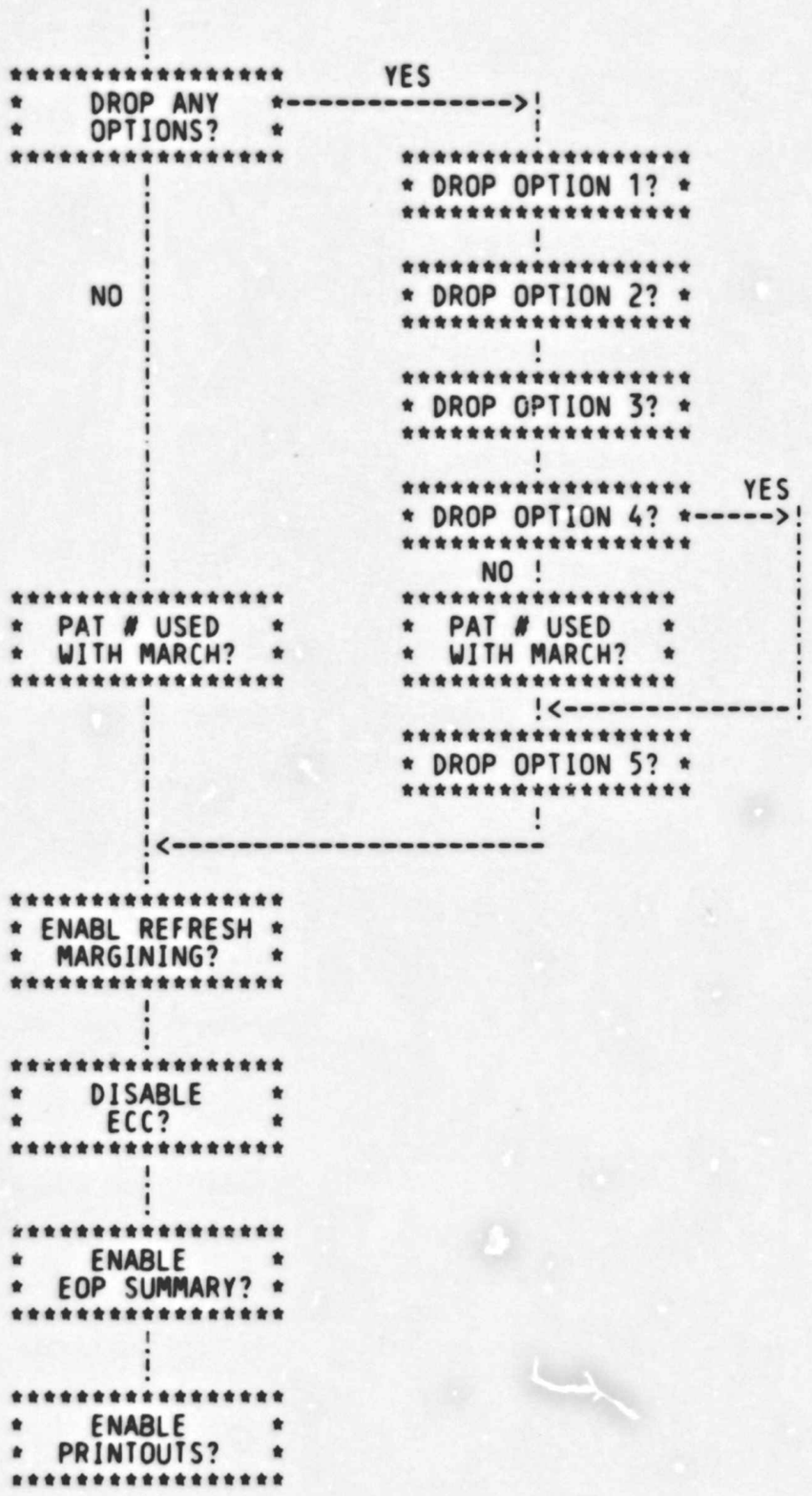
15. ENABLE ERROR PRINTOUTS (N) L?

ANSWER: NORMAL OPERATION IS WITHOUT ERROR PRINTOUTS.
(LOGICAL, {Y TO ENABLE, N TO DISABLE PRINTOUT}, DEFAULT N).

2.5.2 SUMMARY OF SOFTWARE QUESTION SEQUENCE



(CONTINUED ON NEXT PAGE)


DROP ANY OPTIONS?
YES
NO
DROP OPTION 1?
DROP OPTION 2?
DROP OPTION 3?
DROP OPTION 4?
YES
NO
PAT # USED WITH MARCH?
PAT # USED WITH MARCH?
DROP OPTION 5?
ENABL REFRESH MARGINING?
DISABLE ECC?
ENABLE EOP SUMMARY?
ENABLE PRINTOUTS?

2.6 EXTENDED P-TABLE DIALOGUE

WHEN YOU ANSWER THE HARDWARE QUESTIONS, YOU ARE BUILDING ENTRIES IN A TABLE THAT DESCRIBES THE DEVICES UNDER TEST. THE SIMPLEST WAY TO BUILD THIS TABLE IS TO ANSWER ALL QUESTIONS FOR EACH UNIT TO BE TESTED. IF YOU HAVE A MULTIPLEXED DEVICE, SUCH AS A MASS STORAGE CONTROLLER WITH SEVERAL DRIVES OR A COMMUNICATION DEVICE WITH SEVERAL LINES, THE DIALOGUE BECOMES TEDIOUS BECAUSE MOST OF THE ANSWERS ARE REPETITIOUS.

SUPPOSE YOU ARE TESTING A HYPOTHETICAL DEVICE, THE XY11 WHICH IS MADE UP OF ONE CONTROL MODULE WITH 8 UNITS (SUB-DEVICES). THESE 8 UNITS, NUMBERED 0 THROUGH 7, HAVE JUST ONE HARDWARE PARAMETER THAT CAN VARY AMONG UNITS, CALLED THE Q-FACTOR.

THE 3 EXAMPLES WHICH FOLLOW SHOW DIFFERENT WAYS OF ANSWERING THE HARDWARE QUESTIONS TO ACHIEVE IDENTICAL RESULTS. IN EACH EXAMPLE, THERE ARE TO BE 8 XY11'S TESTED WHICH HAVE THE FOLLOWING Q-FACTORS:

UNIT #	Q-FACTOR
0	0
1	1
2	0
3	0
4	0
5	0
6	1
7	1

EXAMPLE 1: ANSWER SEPARATELY FOR EACH UNIT

```
# UNITS (D) ?  8<CR>

UNIT 0
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0<CR>
Q-FACTOR (O) 0 ?  0<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  1<CR>
Q-FACTOR (O) 0 ?  1<CR>

UNIT 2
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  2<CR>
Q-FACTOR (O) 1 ? 0<CR>

UNIT 3
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  3<CR>
Q-FACTOR (O) 0 ?  <CR>
```

```
UNIT 4
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  4<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 5
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  5<CR>
Q-FACTOR (O) 0 ? 1<CR>

UNIT 6
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  6<CR>
Q-FACTOR (O) 1 ? 1<CR>

UNIT 7
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  7<CR>
Q-FACTOR (O) 1 ? <CR>
```

NOTICE THAT THE DEFAULT VALUE FOR THE Q-FACTOR CHANGES WHEN A NON-DEFAULT RESPONSE IS GIVEN. BE CAREFUL WHEN SPECIFYING MULTIPLE UNITS!

AS YOU CAN SEE, THE HARDWARE PARAMETERS DO NOT DIFFER SIGNIFICANTLY FROM UNIT TO UNIT. THE PROCEDURE SHOWN IS NOT VERY EFFICIENT.

EXAMPLE 2: USE THE MULTIPLE SPECIFICATION FEATURE OF THE RUNTIME SERVICES TO MAKE FEWER PASSES THROUGH THE QUESTIONS.

```
# UNITS (D) ?  8<CR>

UNIT 0
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ? 0,1<CR>
Q-FACTOR (O) 0 ?  0,1<CR>

UNIT 2
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  2-5<CR>
Q-FACTOR (O) 1 ?  0<CR>

UNIT 6
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  6,7<CR>
Q-FACTOR (O) 0 ?  1,1<CR>
```

AS YOU CAN SEE IN THE ABOVE DIALOGUE, RUNTIME SERVICES

WILL BUILD AS MANY ENTRIES AS IT CAN WITH THE INFORMATION GIVEN IN ANY ONE PASS THROUGH THE QUESTIONS. THE FIRST PASS BUILDS 2 ENTRIES, BECAUSE 2 SUB-DEVICES AND Q-FACTORS WERE SPECIFIED. THE DRS ASSUMES THAT THE CSR ADDRESS IS 160000 FOR BOTH UNITS. IN THE SECOND PASS, 4 ENTRIES WERE BUILT. THE "-" CONSTRUCT TELLS THE DRS TO INCREMENT THE DATA FROM THE FIRST VALUE TO THE SECOND. IN THIS CASE, "2-5" SPECIFIES SUB-DEVICES 2,3,4, AND 5. THE CSR ADDRESS AND Q-FACTOR FOR THE 4 ENTRIES ARE ASSUMED TO BE 160000 AND 0 RESPECTIVELY SINCE THEY WERE ONLY SPECIFIED ONCE. THE LAST 2 UNITS ARE SPECIFIED IN THE THIRD PASS.

EXAMPLE 3: ACCOMPLISH THE WHOLE PROCESS IN JUST ONE PASS THROUGH THE QUESTIONS.

```
# UNITS  (D) ?  8<CR>

UNIT 1
CSR ADDRESS (0) ?  160000<CR>
SUB-DEVICE # (0) ? 0-7<CR>
Q-FACTOR (0) 0 ? 0,1,0,...,1,1<CR>
```

AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSING A BLANK FIELD) DIRECT THE DRS TO REPEAT THE LAST REPLY.

2.7 QUICK START-UP PROCEDURE

2.7.1 TO START-UP THIS PROGRAM WHEN RUNNING UNDER XXDP+

1. BOOT XXDP+
2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ QUESTIONS
3. TYPE "R NAME", WHERE "NAME" IS THE FILENAME OF THE .BIN OR .BIC FILE FOR THIS PROGRAM
4. TYPE "START"
5. ANSWER THE "CHANGE HW" QUESTION WITH "Y"
6. ANSWER ALL THE HARDWARE QUESTIONS
7. ANSWER THE "CHANGE SW" QUESTION WITH "N"

WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS. THE DEFAULTS ARE DESCRIBED IN SECTIONS 2.3 AND 2.5.

2.7.2 TO START-UP THIS PROGRAM WHEN RUNNING UNDER ACT

THE FILE WHICH WILL BE STARTED MUST, AT SOME TIME, HAVE BEEN CREATED WITH THE 'SETUP' UTILITY PROGRAM. ASSUMING THAT THIS HAS BEEN DONE, THE START-UP PROCEDURE IS THE SAME AS THE ONE IN SECTION 2.7.1.

TO CREATE A FILE USING THE SETUP UTILITY:

1. TYPE "R SETUP"

2. THE TARGET ENVIRONMENT IS ACT, SO TYPE "AC"

3. TYPE THE SETUP COMMAND:
   *SETUP OUTFILE.EXT=INFILE.EXT
   WHERE OUTFILE.EXT = THE NEWLY CREATED FILE
   AND INFILE.EXT = THE RELEASED .BIN FILE

4. YOU WILL HAVE AN OPPORTUNITY TO SET UP A PERMANENT DEFAULT TEST CONFIGURATION BY ANSWERING THE HARDWARE AND SOFTWARE QUESTIONS. ONCE THIS IS DONE, YOU WILL NO LONGER BE FORCED TO ANSWER "Y" TO "CHANGE HW ?" EVERY TIME YOU START THE PROGRAM. YOU WILL ALSO BE ASKED THE LSI AND 50HZ QUESTIONS HERE.

5. TYPE "EXIT"

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED. GENERAL ERROR MESSAGES ARE ALWAYS PRINTED UNLESS THE "IER" FLAG IS SET (SECTION 2.3). THE GENERAL ERROR MESSAGE IS OF THE FORM:

```
NAME TYPE NUMBER ON UNIT NUMBER  TST NUMBER PC:XXXXXX
ERROR MESSAGE
```

WHERE:

NAME = DIAGNOSTIC NAME
TYPE = ERROR TYPE (SYS FATAL, DEV FATAL, HARD OR SOFT)
NUMBER = ERROR NUMBER
UNIT NUMBER = 0 - N (N IS LAST UNIT IN PTABLE)
TST NUMBER = TEST AND SUBTEST WHERE ERROR OCCURRED
PC:XXXXXX = ADDRESS OF ERROR MESSAGE CALL

BASIC ERROR MESSAGES ARE MESSAGES THAT CONTAIN SOME ADDITIONAL

INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS THE "IER" OR "IBR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE.

EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS PRINTED UNLESS THE "IER", "IBR" OR "IXR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR MESSAGE AND AN. ASSOCIATED BASIC ERROR MESSAGES.

3.2 SPECIFIC ERROR MESSAGES

3.2.1 MESSAGES DURING INITIALIZATION

DURING INITIALIZATION, THERE ARE 3 ERROR CONDITIONS WHICH CAN BE DETECTED AND WHICH CAUSE THE DRIVE TO BE DROPPED:

```
CAUSE1  =  '  (NOT POWERED UP)'
CAUSE2  =  '  (NOT AN ML11 UNIT)'
CAUSE3  =  '  (OPERATOR SELECTED TEST LIMITS INCORRECTLY)'
```

THE 'CAUSE3' MESSAGE IS THEN FOLLOWED BY
EITHER: !'TOP SECTOR OF XXXXXX EXCEEDS SYSTEM LIMIT OF YYYYYY'
OR: !'LOW SECTOR OF XXXXXX EXCEEDS TOP SECTOR OF YYYYYY'

3.2.2 MESSAGES DURING TESTING

AFTER INITIALIZATION, THERE ARE 4 ERROR DIAGNOSES WHICH ARE POSSIBLE:

MSG1 = '--> RUN ML11 LOGIC TEST'

THIS MESSAGE APPEARS WHEN AN ML11 SYSTEM ERROR OCCURS. THE USER IS INSTRUCTED TO RUN THE LOGIC TEST TO SEE IF THAT PROGRAM CAN ISOLATE THE REASON FOR THE FAILURE. NOTE THAT THIS MESSAGE IS NOT USED FOR DATA ERRORS.

MSG2 = '--> RUN ML11 PROM MAINTENANCE PROGRAM'

THIS MESSAGE APPEARS WHENEVER ANY OF THE FOLLOWING CONDITIONS IS TRUE:

A) AN ECC HARD ERROR (ECH OR UNC) IS DETECTED

B) AN ARRAY REACHES ITS HARD OR SOFT ERROR THRESHOLD

C) DURING A PERFORMANCE SUMMARY, IF AN ARRAY HAS REACHED OR EXCEEDED ITS HARD OR SOFT ERROR THRESHOLD.

MSG3 = 'SOFT ERROR'

A SOFT ERROR IS A CORRECTABLE DATA ERROR WHICH CAN BE ELIMINATED BY REWRITING AND REREADING.

MSG4 = 'HARD ERROR'

A HARD ERROR IS A CORRECTABLE DATA ERROR WHICH PERSISTS AFTER A REWRITE AND A REREAD.

ANY WRITE COMMAND HAS 3 POSSIBLE ERROR CALLS ASSOCIATED WITH IT:

ERROR POSITION	ERROR TYPE	DIAGNOSTIC MESSAGE	CAUSE OF ERROR/ACTION
1ST	ERRDF	MSG1	ALL 6 RETRIES FAILED FOR AN ML11 SYSTEM ERROR WHICH WAS ORIGINALLY CONSIDERED TO BE NON-FATAL. DROP THE DRIVE.
2ND	ERRDF	MSG1	CONTROLLER FATAL ERROR. DROP THE DRIVE.
3RD	ERRDF	MSG1	DRIVE FATAL ERROR. DROP THE DRIVE.

ANY READ OR WRITE CHECK COMMAND HAS 8 ERROR CALLS ASSOCIATED WITH IT, 5 FOR SYSTEM ERRORS (WHICH RESULT IN DROPPING THE DRIVE) AND 3 FOR HARD AND SOFT DATA ERRORS (WHICH ARE COUNTED ON A PER ARRAY BASIS):

THE SYSTEM ERRORS:

ERROR POSITION	ERROR TYPE	DIAGNOSTIC MESSAGE	CAUSE OF ERROR/ACTION
1ST	ERRDF	MSG1	AFTER A SUCCESSFUL READ COMMAND, THE WRITE AND READ BUFFERS ARE COMPARED. IF THEY DO NOT MATCH PERFECTLY, THEN THE ECC LOGIC FAILED. DROP THE DRIVE.
2ND	ERRDF	MSG1	ALL 6 RETRIES FAILED FOR AN ML11 SYSTEM ERROR WHICH WAS ORIGINALLY CONSIDERED TO BE NON-FATAL. DROP THE DRIVE.
3RD	ERRDF	MSG1	CONTROLLER FATAL ERROR. DROP THE DRIVE.
4TH	ERRDF	MSG1	DRIVE FATAL ERROR. DROP THE DRIVE.
5TH	ERRDF	MSG2	ECC HARD ERROR DETECTED. DROP THE DRIVE.

THE DATA ERRORS:

ERROR POSITION	ERROR TYPE	DIAGNOSTIC MESSAGE	CAUSE OF ERROR/ACTION
6TH	ERRHRD	MSG4	HARD ERROR. DURING ERROR CLASSIFICATION, RETRY FAILED AGAIN (AS IF A DATA ERROR IN THE SAME BIT POSITION). UPDATE THE HARD COUNT FOR THE ASSOCIATED ARRAY AND CHECK THE NEW COUNT AGAINST THE THRESHOLD.
7TH	ERRSOFT	MSG3	SOFT ERROR. DURING ERROR CLASSIFICATION, RETRY FAILED AGAIN (AS IF A DATA ERROR IN A DIFFERENT BIT POSITION). UPDATE THE SOFT COUNT FOR THE ASSOCIATED ARRAY AND CHECK THE NEW COUNT AGAINST THE THRESHOLD.
8TH	ERRSOFT	MSG3	SOFT ERROR. DURING ERROR CLASSIFICATION, RETRY DID NOT PRODUCE ANOTHER DATA ERROR (THE RETRY MAY PASS, OR IT MAY FAIL FOR SOME NEW REASON). UPDATE THE SOFT COUNT FOR THE ASSOCIATED ARRAY AND CHECK THE NEW COUNT AGAINST THE THRESHOLD.

THERE IS A CORRESPONDENCE BETWEEN EVERY NUMBER AND THE PLACE IN THE PROGRAM WHERE THE ERROR WAS DETECTED:

A) THE MOST SIGNIFICANT DIGIT IDENTIFIES THE OPTION NUMBER.

   EXCEPTION: THE COMMAND INTEGRITY ROUTINE IS THOUGHT OF AS OPTION 0, AND SO ALL ITS ERROR NUMBERS WILL APPEAR TO ONLY BE 1 OR 2 SIGNIFICANT DIGITS. TAKE THE 0 TO BE A SIGNIFICANT DIGIT (SEE EXAMPLES).

B) THE 2 LEAST SIGNIFICANT DIGITS ARE THE POSITIONAL NUMBERS TO IDENTIFY WHERE THE ERROR CALL IS LOCATED WITHIN THE OPTION.

C) FOR OPTION 5, THE SECOND MOST SIGNIFICANT DIGIT IS USED TO IDENTIFY WHICH RANDOM TEST IS RUNNING.

EXAMPLES:

1) ERROR NUMBER: 6 => COMMAND INTEGRITY ROUTINE (OPTION 0), ERROR 06

2) ERROR NUMBER: 208 => OPTION 2, ERROR 08

3) ERROR NUMBER: 5311 => OPTION 5, RAND3, ERROR 11

BELOW IS A SUMMARY OF THE ACTUAL ERROR CALLS IN EACH TEST OPTION:

```
!
! THE 'INTEGRITY' ROUTINE:
!

                !WRITE COMMAND:

!ERRDF(1,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 01 ****
!ERRDF(2,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 02 ****
!ERRDF(3,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 03 ****

                !READ COMMAND:

!ERRDF(4,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 04 ****
!ERRDF(5,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 05 ****
!ERRDF(6,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 06 ****
!ERRDF(7,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 07 ****
!ERRDF(8,MSG2,0);    !**** INTEGRITY ROUTINE ERROR 08 ****
!ERRHRD(9,MSG4,0);   !**** INTEGRITY ROUTINE ERROR 09 ****
!ERRSOFT(10,MSG3,0);!**** INTEGRITY ROUTINE ERROR 10 ****
!ERRSOFT(11,MSG3,1);!**** INTEGRITY ROUTINE ERROR 10 ****

                !WRITE CHECK COMMAND:

!ERRDF(12,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 12 ****
!ERRDF(13,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 13 ****
!ERRDF(14,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 14 ****
!ERRDF(15,MSG2,0);   !**** INTEGRITY ROUTINE ERROR 15 ****
!ERRHRD(16,MSG4,0);  !**** INTEGRITY ROUTINE ERROR 16 ****
!ERRSOFT(17,MSG3,8);!**** INTEGRITY ROUTINE ERROR 17 ****
!ERRSOFT(18,MSG3,1);!**** INTEGRITY ROUTINE ERROR 18 ****


!
! OPTION 1:
!

                !WRITE COMMAND:

!ERRDF(101,MSG1,0);    !**** OPTION 1 ERROR 01 ****
!ERRDF(102,MSG1,0);    !**** OPTION 1 ERROR 02 ****
!ERRDF(103,MSG1,0);    !**** OPTION 1 ERROR 03 ****

                !CHECK OR READ:

!ERRDF(104,MSG1,0);    !**** OPTION 1 ERROR 04 ****
!ERRDF(105,MSG1,0);    !**** OPTION 1 ERROR 05 ****
!ERRDF(106,MSG1,0);    !**** OPTION 1 ERROR 06 ****
!ERRDF(107,MSG1,0);    !**** OPTION 1 ERROR 07 ****
!ERRDF(108,MSG2,0);    !**** OPTION 1 ERROR 08 ****
!ERRHRD(109,MSG4,0);   !**** OPTION 1 ERROR 09 ****
!ERRSOFT(110,MSG3,0); !**** OPTION 1 ERROR 10 ****
!ERRSOFT(111,MSG3,0); !**** OPTION 1 ERROR 11 ****
```

```
!
! OPTION 2:
!

                !WRITE COMMAND:

!ERRDF(201,MSG1,0);    !**** OPTION 2 ERROR 01 ****
!ERRDF(202,MSG1,0);    !**** OPTION 2 ERROR 02 ****
!ERRDF(203,MSG1,0);    !**** OPTION 2 ERROR 03 ****

                !CHECK OR READ:

!ERRDF(204,MSG1,0);    !**** OPTION 2 ERROR 04 ****
!ERRDF(205,MSG1,0);    !**** OPTION 2 ERROR 05 ****
!ERRDF(206,MSG1,0);    !**** OPTION 2 ERROR 06 ****
!ERRDF(207,MSG1,0);    !**** OPTION 2 ERROR 07 ****
!ERRDF(208,MSG2,0);    !**** OPTION 2 ERROR 08 ****
!ERRHRD(209,MSG4,0);   !**** OPTION 2 ERROR 09 ****
!ERRSOFT(210,MSG3,0);  !**** OPTION 2 ERROR 10 ****
!ERRSOFT(211,MSG3,1);  !**** OPTION 2 ERROR 10 ****

                !LOOP CHECK OR READ:

!ERRDF(212,MSG1,0);    !**** OPTION 2 ERROR 12 ****
!ERRDF(213,MSG1,0);    !**** OPTION 2 ERROR 13 ****
!ERRDF(214,MSG1,0);    !**** OPTION 2 ERROR 14 ****
!ERRDF(215,MSG1,0);    !**** OPTION 2 ERROR 15 ****
!ERRDF(216,MSG2,0);    !**** OPTION 2 ERROR 16 ****
!ERRHRD(217,MSG4,0);   !**** OPTION 2 ERROR 17 ****
!ERRSOFT(218,MSG3,0);  !**** OPTION 2 ERROR 18 ****
!ERRSOFT(219,MSG3,0);  !**** OPTION 2 ERROR 19 ****

!
! OPTION 3:
!

                !WRITE COMMAND:

!ERRDF(301,MSG1,0);    !**** OPTION 3 ERROR 01 ****
!ERRDF(302,MSG1,0);    !**** OPTION 3 ERROR 02 ****
!ERRDF(303,MSG1,0);    !**** OPTION 3 ERROR 03 ****

                !CHECK OR READ:

!ERRDF(304,MSG1,0);    !**** OPTION 3 ERROR 04 ****
!ERRDF(305,MSG1,0);    !**** OPTION 3 ERROR 05 ****
!ERRDF(306,MSG1,0);    !**** OPTION 3 ERROR 06 ****
!ERRDF(307,MSG1,0);    !**** OPTION 3 ERROR 07 ****
!ERRDF(308,MSG2,0);    !**** OPTION 3 ERROR 08 ****
!ERRHRD(309,MSG4,0);   !**** OPTION 3 ERROR 09 ****
!ERRSOFT(310,MSG3,0);  !**** OPTION 3 ERROR 10 ****
!ERRSOFT(311,MSG3,0);  !**** OPTION 3 ERROR 11 ****
```

```
                !
                ! OPTION 4:
                !

                        !MARCHING UP:

                                !WRITE DATA:

                !ERRDF(401,MSG1,0);    !**** OPTION 4 ERROR 01 ****
                !ERRDF(402,MSG1,0);    !**** OPTION 4 ERROR 02 ****
                !ERRDF(403,MSG1,0);    !**** OPTION 4 ERROR 03 ****

                        !MARCHING UP:

                                !CHECK OR READ DATA:

                !ERRDF(404,MSG1,0);    !**** OPTION 4 ERROR 04 ****
                !ERRDF(405,MSG1,0);    !**** OPTION 4 ERROR 05 ****
                !ERRDF(406,MSG1,0);    !**** OPTION 4 ERROR 06 ****
                !ERRDF(407,MSG1,0);    !**** OPTION 4 ERROR 07 ****
                !ERRDF(408,MSG2,0);    !**** OPTION 4 ERROR 08 ****
                !ERRHRD(409,MSG4,0);   !**** OPTION 4 ERROR 09 ****
                !ERRSOFT(410,MSG3,0);  !**** OPTION 4 ERROR 10 ****
                !ERRSOFT(411,MSG3,0);  !**** OPTION 4 ERROR 11 ****

                                !WRITE COMP:

                !ERRDF(412,MSG1,0);    !**** OPTION 4 ERROR 12 ****
                !ERRDF(413,MSG1,0);    !**** OPTION 4 ERROR 13 ****
                !ERRDF(414,MSG1,0);    !**** OPTION 4 ERROR 14 ****

                        !MARCHING DOWN:

                                !CHECK OR READ COMP:

                !ERRDF(415,MSG1,0);    !**** OPTION 4 ERROR 15 ****
                !ERRDF(416,MSG1,0);    !**** OPTION 4 ERROR 16 ****
                !ERRDF(417,MSG1,0);    !**** OPTION 4 ERROR 17 ****
                !ERRDF(418,MSG1,0);    !**** OPTION 4 ERROR 18 ****
                !ERRDF(419,MSG2,0);    !**** OPTION 4 ERROR 19 ****
                !ERRHRD(420,MSG4,0);   !**** OPTION 4 ERROR 20 ****
                !ERRSOFT(421,MSG3,0);  !**** OPTION 4 ERROR 21 ****
                !ERRSOFT(422,MSG3,0);  !**** OPTION 4 ERROR 22 ****

                                !WRITE DATA:

                !ERRDF(423,MSG1,0);    !**** OPTION 4 ERROR 23 ****
                !ERRDF(424,MSG1,0);    !**** OPTION 4 ERROR 24 ****
                !ERRDF(425,MSG1,0);    !**** OPTION 4 ERROR 25 ****
```

```
                !MARCHING UP:

                        !CHECK OR READ DATA:

        !ERRDF(426,MSG1,0);    !**** OPTION 4 ERROR 26 ****
        !ERRDF(427,MSG1,0);    !**** OPTION 4 ERROR 27 ****
        !ERRDF(428,MSG1,0);    !**** OPTION 4 ERROR 28 ****
        !ERRDF(429,MSG1,0);    !**** OPTION 4 ERROR 29 ****
        !ERRDF(430,MSG2,0);    !**** OPTION 4 ERROR 30 ****
        !ERRHRD(431,MSG4,0);   !**** OPTION 4 ERROR 31 ****
        !ERRSOFT(432,MSG3,0);  !**** OPTION 4 ERROR 32 ****
        !ERRSOFT(433,MSG3,0);  !**** OPTION 4 ERROR 33 ****


        !
        ! OPTION 5:
        !

                !'RAND1' ROUTINE:

                        !WRITE COMMAND:

        !ERRDF(5101,MSG1,0);   !**** OPTION 5, RAND1 ERROR 01 ****
        !ERRDF(5102,MSG1,0);   !**** OPTION 5, RAND1 ERROR 02 ****
        !ERRDF(5103,MSG1,0);   !**** OPTION 5, RAND1 ERROR 03 ****

                        !CHECK OR READ:

        !ERRDF(5104,MSG1,0);   !**** OPTION 5, RAND1 ERROR 04 ****
        !ERRDF(5105,MSG1,0);   !**** OPTION 5, RAND1 ERROR 05 ****
        !ERRDF(5106,MSG1,0);   !**** OPTION 5, RAND1 ERROR 06 ****
        !ERRDF(5107,MSG1,0);   !**** OPTION 5, RAND1 ERROR 07 ****
        !ERRDF(5108,MSG2,0);   !**** OPTION 5, RAND1 ERROR 08 ****
        !ERRHRD(5109,MSG4,0);  !**** OPTION 5, RAND1 ERROR 09 ****
        !ERRSOFT(5110,MSG3,0); !**** OPTION 5, RAND1 ERROR 10 ****
        !ERRSOFT(5111,MSG3,0); !**** OPTION 5, RAND1 ERROR 11 ****

                !'RAND2' ROUTINE:

                        !WRITE COMMAND:

        !ERRDF(5201,MSG1,0);   !**** OPTION 5, RAND2 ERROR 01 ****
        !ERRDF(5202,MSG1,0);   !**** OPTION 5, RAND2 ERROR 02 ****
        !ERRDF(5203,MSG1,0);   !**** OPTION 5, RAND2 ERROR 03 ****

                        !CHECK OR READ:

        !ERRDF(5204,MSG1,0);   !**** OPTION 5, RAND2 ERROR 04 ****
        !ERRDF(5205,MSG1,0);   !**** OPTION 5, RAND2 ERROR 05 ****
        !ERRDF(5206,MSG1,0);   !**** OPTION 5, RAND2 ERROR 06 ****
        !ERRDF(5207,MSG1,0);   !**** OPTION 5, RAND2 ERROR 07 ****
        !ERRDF(5208,MSG2,0);   !**** OPTION 5, RAND2 ERROR 08 ****
        !ERRHRD(5209,MSG4,0);  !**** OPTION 5, RAND2 ERROR 09 ****
        !ERRSOFT(5210,MSG3,0); !**** OPTION 5, RAND2 ERROR 10 ****
        !ERRSOFT(5211,MSG3,0); !**** OPTION 5, RAND2 ERROR 11 ****
```

```
                !'RAND3' ROUTINE:

                        !WRITE COMMAND:

        !ERRDF(5301,MSG1,0);    !**** OPTION 5, RAND3 ERROR 01 ****
        !ERRDF(5302,MSG1,0);    !**** OPTION 5, RAND3 ERROR 02 ****
        !ERRDF(5303,MSG1,0);    !**** OPTION 5, RAND3 ERROR 03 ****

                        !CHECK OR READ:

        !ERRDF(5304,MSG1,0);    !**** OPTION 5, RAND3 ERROR 04 ****
        !ERRDF(5305,MSG1,0);    !**** OPTION 5, RAND3 ERROR 05 ****
        !ERRDF(5306,MSG1,0);    !**** OPTION 5, RAND3 ERROR 06 ****
        !ERRDF(5307,MSG1,0);    !**** OPTION 5, RAND3 ERROR 07 ****
        !ERRDF(5308,MSG2,0);    !**** OPTION 5, RAND3 ERROR 08 ****
        !ERRHRD(5309,MSG4,0);   !**** OPTION 5, RAND3 ERROR 09 ****
        !ERRSOFT(5310,MSG3,0);  !**** OPTION 5, RAND3 ERROR 10 ****
        !ERRSOFT(5311,MSG3,0);  !**** OPTION 5, RAND3 ERROR 11 ****

                !'RAND4' ROUTINE:

                        !WRITE COMMAND:

        !ERRDF(5401,MSG1,0);    !**** OPTION 5, RAND4 ERROR 01 ****
        !ERRDF(5402,MSG1,0);    !**** OPTION 5, RAND4 ERROR 02 ****
        !ERRDF(5403,MSG1,0);    !**** OPTION 5, RAND4 ERROR 03 ****

                        !CHECK OR READ:

        !ERRDF(5404,MSG1,0);    !**** OPTION 5, RAND4 ERROR 04 ****
        !ERRDF(5405,MSG1,0);    !**** OPTION 5, RAND4 ERROR 05 ****
        !ERRDF(5406,MSG1,0);    !**** OPTION 5, RAND4 ERROR 06 ****
        !ERRDF(5407,MSG1,0);    !**** OPTION 5, RAND4 ERROR 07 ****
        !ERRDF(5408,MSG2,0);    !**** OPTION 5, RAND4 ERROR 08 ****
        !ERRHRD(5409,MSG4,0);   !**** OPTION 5, RAND4 ERROR 09 ****
        !ERRSOFT(5410,MSG3,0);  !**** OPTION 5, RAND4 ERROR 10 ****
        !ERRSOFT(5411,MSG3,0);  !**** OPTION 5, RAND4 ERROR 11 ****
```

```
4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH A
SUMMARY WHICH SHOWS THE DIAGNOSTIC'S PERFORMANCE SINCE IT WAS
STARTED.  THE SAME PROGRESS REPORT CAN BE OBTAINED BY STOPPING
THE PROGRAM'S EXECUTION (VIA A ^C) AND BY ISSUING THE 'PRINT'
COMMAND.  A TYPICAL REPORT FOR 2 DRIVES IS SHOWN BELOW:


PERFORMANCE SUMMARY

NUMBER OF MBYTES TRANSFERRED:
 1028 MBYTES WRITTEN
  250 MBYTES READ
 1145 MBYTES WRITE CHECKED

LOGICAL UNIT: 0    DRIVE: 1    SERIAL #: 1234
  SOFT ERROR COUNT:     9
    ARRAY  3:     9
  HARD ERROR COUNT:    11
    ARRAY  0:     6
    ARRAY 10:     2
    ARRAY 15:     3
  TRANSFER RETRIES:     0

LOGICAL UNIT: 1    DRIVE: 1    SERIAL #: 9876
DRIVE DROPPED   (CONTROLLER FATAL ERROR)
  SOFT ERROR COUNT:   100
    ARRAY  1:     9
    ARRAY 13:    10  --> RUN ML11 PROM MAINTENANCE PROGRAM
    ARRAY 14:     1
    ARRAY 15:    80  --> RUN ML11 PROM MAINTENANCE PROGRAM
  HARD ERROR COUNT:     2
    ARRAY 14:     1
    ARRAY 15:     1
  TRANSFER RETRIES:     0


5.0 DEVICE INFORMATION TABLES

AT THE START OF THE PROGRAM, AN AUTOMATIC CHECK OF THE SYSTEM
CONFIGURATION IS MADE AND DEVICE INFORMATION SIMILAR TO THE
FOLLOWING IS PRINTED FOR EACH UNIT:

    LOGICAL UNIT: 0    DRIVE: 0    SERIAL #: 1234
    ML11-A     SECTORS UNDER TEST: 000000 TO 017777
    TRANSFER RATE: 1 MBYTES/SECOND    CSR ADDRESS: 176400


6.0 TEST SUMMARIES

    THERE IS JUST ONE HARDWARE TEST IN THE EXERCISER, AND ITS PURPOSE
    IS TO ACT AS A SCHEDULER TO CALL THE SUBROUTINES WHICH ACTUALLY
    PERFORM ALL OF THE TEST CODE.  THE SUBROUTINES, CALLED OPTIONS, ARE
    DESCRIBED BELOW:
```

6.1 OPTION 1 (OPT1)

PURPOSE: TO CHECK ADDRESSES USING DATA = SECTOR NUMBER. TRANSFERS ARE 4K WORDS IN LENGTH, AND ALL SECTORS ARE TESTED.

THE CODE FOR 'OPT1' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COMPLEMENT FLAG FROM 0 TO 1
: BEGIN 2 (START OF COMPLEMENT FLAG SELECTION LOOP)
: INCR LOGICAL UNIT FROM 0 TO LAST
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS ONE UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : INITIALIZE WRITE AND READ BUFFER POINTERS
: : : : SECTOR = LOWEST
: : : : WHILE SECTOR LEQ HIGHEST DO
: : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
: : : : : GET WRDCNT
: : : : : GENERATE THE PATTERN
: : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
: : : : : END 6 (END OF SECTOR SELECTION LOOP)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
: END 2 (END OF COMPLEMENT FLAG SELECTION LOOP)
RETURN
END 1 (END OF ROUTINE)
```

6.2 OPTION 2 (OPT2)

PURPOSE: TO CHECK ON DATA RELIABILITY USING THE PATTERNS FROM THE PATTERN TABLE.

THE CODE FOR 'OPT2' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY THE ROUTINE IS RUNNING
CHOOSE A MAXIMUM PATTERN NUMBER
INCR COUNT FROM 1 TO (2*MAX)
: BEGIN 2 (START OF PATTERN SELECTION LOOP)
: GENERATE THE PATTERN
: INCR LUN FROM 0 TO LAST
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
: : : : SECTOR = LOWEST
: : : : WHILE SECTOR LEQ HIGHEST DO
: : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
: : : : : GET_WRDCNT
: : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
: : : : : END 6 (END OF SECTOR SELECTION LOOP)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
: IF NOT THE QUICK VERIFY PASS THEN 'LOOP READ' (DESCRIBED BELOW)
: END 2 (END OF PATTERN SELECTION LOOP)
RETURN
END 1 (END OF ROUTINE)
```

```
        THE 'LOOP READ' CODE IN BRIEF:

        BEGIN 11 (START OF LOOP READING SECTION)
        INCR LUN FROM 0 TO LAST
        : BEGIN 12 (START OF LOGICAL UNIT SELECTION LOOP)
        : TESTLOOP2:
        : : BEGIN 13 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
        : : IF UNIT IS ACTIVE
        : : THEN
        : : : BEGIN 14 (START OF TEST FOR AN ACTIVE UNIT)
        : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
        : : : SECTOR = LOWEST
        : : : WHILE SECTOR LEQ HIGHEST DO
        : : : : BEGIN 15 (START OF SECTOR SELECTION LOOP)
        : : : : GET_WRDCNT
        : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
        : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
        : : : : INCR KOUNT FROM 1 TO TIMES
        : : : : : BEGIN 16 (START OF COUNTING LOOP FOR LOOP READING)
        : : : : : DO THE WRITE CHECK OR READ
        : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP2)
        : : : : : END 16 (END OF COUNTING LOOP FOR LOOP READING)
        : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
        : : : : UPDATE SECTOR NUMBER BY # SECTORS IN PREVIOUS TRANSFER
        : : : : END 15 (END OF SECTOR SELECTION LOOP)
        : : : END 14 (END OF TEST FOR AN ACTIVE UNIT)
        : : END 13 (END OF TESTLOOP2)
        : END 12 (END OF LOGICAL UNIT SELECTION LOOP)
        END 11 (END OF LOOP READING SECTION)
```

6.3 OPTION 3 (OPT3)

PURPOSE: TO DO A UNIQUE DATA CHECK ON ALL AVAILABLE UNITS.

THE CODE FOR 'OPT3' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COMPLEMENT FLAG FROM 0 TO 1
: BEGIN 2 (START OF COMPLEMENT FLAG SELECTION LOOP)
: GENERATE THE PATTERN
: INCR LUN FROM 0 TO LAST
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
: : : : SECTOR = LOWEST
: : : : WHILE SECTOR LEQ HIGHEST DO
: : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
: : : : : GET_WRDCNT
: : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
: : : : : END 6 (END OF SECTOR SELECTION LOOP)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
: END 2 (END OF COMPLEMENT FLAG SELECTION LOOP)
RETURN
END 1 (END OF ROUTINE)
```

6.4 OPTION 4 (OPT4)

PURPOSE: TO LOOK FOR INTEREACTIONS BETWEEN SECTORS
USING A MARCH TEST.

THE CODE FOR 'OPT4' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
WORD COUNT = 256
GENERATE A BUFFER OF DATA
GENERATE A BUFFER OF COMP
INITIALIZE POINTERS TO 4 BUFFERS FOR WRITE/READ DATA/COMP
INCR LUN FROM 0 TO LAST
: BEGIN 2 (START OF LOGICAL UNIT SELECTION LOOP)
: TESTLOOP:
: : BEGIN 3 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : IF UNIT IS ACTIVE
: : THEN
: : : BEGIN 4 (START OF TEST FOR AN ACTIVE UNIT)
: : : INCR SECTOR FROM LOWEST TO HIGHEST
: : : : BEGIN 4A (START OF 1ST SECTOR SELECTION LOOP)
: : : : WRITE 'DATA'
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : END 4A (END OF 1ST SECTOR SELECTION LOOP)
: : : CHOOSE WHETHER TO WRITE CHECK OR READ 'DATA'
: : : INCR SECTOR FROM LOWEST TO HIGHEST
: : : : BEGIN 4B (START OF 2ND SECTOR SELECTION LOOP)
: : : : DO THE WRITE CHECK OR READ OF 'DATA'
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : WRITE 'COMP'
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : END 4B (END OF 2ND SECTOR SELECTION LOOP)
: : : CHOOSE WHETHER TO WRITE CHECK OR READ 'COMP'
: : : DECR SECTOR FROM HIGHEST TO LOWEST
: : : : BEGIN 4C (START OF 3RD SECTOR SELECTION LOOP)
: : : : DO THE WRITE CHECK OR READ OF 'COMP'
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : WRITE DATA
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : END 4C (END OF 3RD SECTOR SELECTION LOOP)
: : : CHOOSE WHETHER TO WRITE CHECK OR READ 'DATA'
: : : INCR SECTOR FROM LOWEST TO HIGHEST
: : : : BEGIN 4D (START OF 4TH SECTOR SELECTION LOOP)
: : : : DO THE WRITE CHECK OR READ OF 'DATA'
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : END 4D (END OF 4TH SECTOR SELECTION LOOP)
: : : END 4 (END OF TEST FOR AN ACTIVE UNIT)
: : END 3 (END OF TESTLOOP)
: END 2 (END OF LOGICAL UNIT SELECTION LOOP)
RETURN
END 1 (END OF ROUTINE)
```

6.5 OPTION 5 (OPT5)

PURPOSE: TO EXERCISE THE ML11 SYSTEMS UNDER TEST IN A RANDOM MANNER, SO AS TO SIMULATE THE FLEXIBILITY OF TESTING THAT WOULD BE DONE BY AN OPERATING SYSTEM.

THERE ARE 4 RANDOM TESTS WHICH ARE CALLED BY 'OPT5' TO ACCOMPLISH ALL TESTING. IT IS THE RESPONSIBILITY OF THIS ROUTINE TO DECIDE HOW MANY TIMES THOSE 4 RANDOM TESTS WILL BE EXECUTED. REFER TO 'RAND1' TO 'RAND4' BELOW FOR MORE INFORMATION.

6.5.1 RAND1 ROUTINE

PURPOSE: TO TEST USING RANDOM DATA

THE CODE FOR 'RAND1' IN BRIEF:

```
BEGIN 1  (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COUNT FROM 1 TO REPEAT
: BEGIN 2 (START OF REPEAT LOOP FOR THE ROUTINE)
: GENERATE THE RANDOM PATTERN
: INCR LUN FROM 0 TO LAST
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
: : : : SECTOR = LOWEST
: : : : WHILE SECTOR LEQ HIGHEST DO
: : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
: : : : : GET_WRDCNT
: : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
: : : : : END 6 (END OF SECTOR SELECTION LOOP)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
: END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
RETURN
END 1 (END OF ROUTINE)
```

6.5.2 RAND2 ROUTINE

PURPOSE: TO TEST USING RANDOM DATA AND WORD COUNTS

THE CODE FOR 'RAND2' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COUNT FROM 1 TO REPEAT
: BEGIN 2 (START OF REPEAT LOOP FOR THE ROUTINE)
: INCR LUN FROM 0 TO LAST
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : GENERATE THE RANDOM PATTERN
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : SECTOR = LOWEST
: : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
: : : : WHILE SECTOR LEQ HIGHEST DO
: : : : : BEGIN 6 (START OF A PASS THROUGH ALL SECTORS)
: : : : : CHOOSE A RANDOM WORD COUNT
: : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
: : : : : CALCULATE NEXT STARTING SECTOR (BASED ON WORD COUNT)
: : : : : IF NEXT STARTING SECTOR GTR HIGHEST
: : : : : : THEN ADJUST THE WORD COUNT AND NEXT SECTOR SO THEY FIT
: : : : : : :    WITHIN THE TESTABLE SECTOR LIMITS
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : SECTOR = THE CALCULATED NEXT STARTING SECTOR
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : END 6 (END OF A PASS THROUGH ALL SECTORS)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
: END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
RETURN
END 1 (END OF ROUTINE)
```

6.5.3 RAND3 ROUTINE

PURPOSE: TO TEST USING RANDOM DATA, WORD COUNTS AND SECTORS

THE CODE FOR 'RAND3' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COUNT FROM 1 TO REPEAT
: BEGIN 2 (START OF REPEAT LOOP FOR THIS ROUTINE)
: GENERATE THE RANDOM PATTERN
: INCR LUN FROM 0 TO LAST
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : INITIALIZE BUFFER POINTERS
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : TIMES = (HIGHEST - LOWEST)/2 + 1
: : : : INCR KOUNT FROM 1 TO TIMES
: : : : : BEGIN 6 (START OF COUNTING LOOP FOR SECTOR SELECTION)
: : : : : CHOOSE A RANDOM WORD COUNT
: : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
: : : : : CHOOSE A RANDOM SECTOR
: : : : : CALCULATE WHERE TRANSFER WILL END (BASED ON WORD COUNT)
: : : : : IF CALCULATED VALUE GTR HIGHEST
: : : : : : THEN ADJUST THE WORD COUNT SO IT FITS
: : : : : : :    WITHIN THE TESTABLE SECTOR LIMITS
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE LABEL)
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE LABEL)
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : END 6 (END OF COUNTING LOOP FOR SECTOR SELECTION)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
: END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
RETURN
END 1 (END OF ROUTINE)
```

6.5.4 RAND4 ROUTINE

PURPOSE: TO TEST USING RANDOM DATA, WORD COUNTS, SECTORS AND UNITS

THE CODE FOR 'RAND4' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COUNT FROM 1 TO REPEAT
: BEGIN 2 (START OF REPEAT LOOP FOR THIS ROUTINE)
: GENERATE THE RANDOM PATTERN
: TIMES = NUMBER OF UNITS * 4
: INCR KOUNT FROM 1 TO TIMES
: : BEGIN 3 (START OF COUNTING LOOP FOR UNIT SELECTION)
: : CHOOSE A RANDOM LOGICAL UNIT WHICH IS ACTIVE
: : INITIALIZE BUFFER POINTERS
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : INCR KOUNT2 FROM 1 TO 10
: : : : BEGIN 5 (START OF COUNTING LOOP FOR SECTOR SELECTION)
: : : : CHOOSE A RANDOM WORD COUNT
: : : : SET UP BUFFER POINTERS BEFORE TRANSFER
: : : : CHOOSE A RANDOM SECTOR
: : : : CALCULATE WHERE TRANSFER WILL END (BASED ON WORD COUNT)
: : : : IF CALCULATED VALUE GTR HIGHEST
: : : : : THEN ADJUST THE WORD COUNT SO IT FITS
: : : : : :    WITHIN THE TESTABLE SECTOR LIMITS
: : : : WRITE
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : DO THE WRITE CHECK OR READ
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : END 5 (END OF COUNTING LOOP FOR SECTOR SELECTION)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF COUNTING LOOP FOR UNIT SELECTION)
: END 2 (END OF REPEAT LOOP FOR THIS ROUTINE
RETURN
END 1 (END OF ROUTINE)
                                                    &
```

```
                        .SBTTL  PROGRAM HEADER AND TABLES

                                .ENABL  ABS,AMA
002000                          .       =       2000

                                BGNMOD

                        ;++
                        ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
                        ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
                        ;--

                                POINTER ALL


                                HEADER  CZMLB,A,0,1800.,1
```

103		L$NAME:: .ASCII /C/
132		.ASCII /Z/
115		.ASCII /M/
114		.ASCII /L/
102		.ASCII /B/
000		.BYTE 0
000		.BYTE 0
000		.BYTE 0
101		L$REV:: .ASCII /A/
060		L$DEPO:: .ASCII /0/
000000		L$UNIT:: .WORD T$PTHV
003410		L$TIML:: .WORD 1800.
002264		L$HPCP:: .WORD L$HARD
002440		L$SPCP:: .WORD L$SOFT
002210		L$HPTP:: .WORD L$HW
002222		L$SPTP:: .WORD L$SW
075012		L$LADP:: .WORD L$LAST
000000		L$STA:: .WORD 0
000000		L$CO:: .WORD 0
000001		L$DTYP:: .WORD 1
000000		L$APT:: .WORD 0
002204		L$DTP:: .WORD L$DISPATCH
000000		L$PRIO:: .WORD 0
000000		L$ENVI:: .WORD 0

```
000000                                                  L$EXP1::
                                                                .WORD   0
                                                        L$MREV::
003                                                             .BYTE   C$REVISION
003                                                             .BYTE   C$EDIT
                                                        L$EF::
000000                                                          .WORD   0
000000                                                          .WORD   0
                                                        L$SPC::
000000                                                          .WORD   0
                                                        L$DEVP::
002122                                                          .WORD   L$DVTYP
                                                        L$REPP::
005362                                                          .WORD   L$RPT
                                                        L$EXP4::
000000                                                          .WORD   0
                                                        L$EXP5::
000000                                                          .WORD   0
                                                        L$AUT::
005540                                                          .WORD   L$AU
                                                        L$DUT::
005526                                                          .WORD   L$DU
                                                        L$LUN::
000000                                                          .WORD   0
                                                        L$DESP::
002130                                                          .WORD   L$DESC
                                                        L$LOAD::
104035                                                          EMT     E$LOAD
                                                        L$ETP::
002172                                                          .WORD   L$ERRTBL
                                                        L$ICP::
036004                                                          .WORD   L$INIT
                                                        L$CCP::
074776                                                          .WORD   L$CLEAN
                                                        L$ACP::
005374                                                          .WORD   L$AUTO
                                                        L$PRT::
004014                                                          .WORD   L$PROT
                                                        L$TEST::
000000                                                          .WORD   0
                                                        L$DLY::
000000                                                          .WORD   0
                                                        L$HIME::
000000                                                          .WORD   0
66
77
78                              ;       NAMES OF DEVICES SUPPORTED BY THIS PROGRAM
79                              ;
80                              ;       DEVTYP <ML11>
                                                        L$DVTYP::
115     114     061                             .ASCIZ  /ML11/
                                                        .EVEN
```

```
                                ;
                                ;       TEST DESCRIPTION
                                ;
                                        DESCRIPT <CZMLB ML11 PERFORMANCE EXERCISER>
                                                                        L$DESC::
        103     132     115                                                     .ASCIZ  /CZMLB ML11 PERFORMANCE EXER
                                                                                .EVEN


                                ;
                                ;       THE GLOBAL ERROR TABLE (INFORMATION
                                ;       USED IN A CALL TO THE MACRO "ERROR")
                                ;
                                ERRTBL
                                                                        L$ERRTBL::
    000000                      ERRTYP::        .WORD   0
    000000                      ERRNBR::        .WORD   0
    000000                      ERRMSG::        .WORD   0
    000000                      ERRBLK::        .WORD   0

                                ;++
                                ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRES OF EACH TEST.
                                ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
                                ;--

                                        DISPATCH 1
    000001                                                              .WORD   1
                                                                    L$DISPATCH::
    073024                                                                  .WORD   T1


                                ;++
                                ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                                ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
                                ; IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES,
                                ; AND IS USED AS A "TEMPLATE" FOR BUILDING THE P-TABLES.
                                ;--

                                        BGNHW   DFPTBL
    000004                                                              .WORD   L10000-L$HW/2
                                                                    L$HW::
                                                                    DFPTBL::


 176400                                 .WORD   176400          ;CSR ADDRESS
 000204                                 .WORD   204             ;RH VECTOR ADDRESS
 000005                                 .WORD   5               ;BR LEVEL FOR INTERRUPT
 000000                                 .WORD   0               ;ML11 DRIVE NUMBER

                                        ENDHW
                                                                    L10000:
```

```
                        ;++
                        ; THE DEFAULT SOFTWARE P-TABLE CONTAINS VARIOUS DATA USED BY THE
                        ; PROGRAM AS OPERATIONAL PARAMETERS.  THESE PARAMETERS ARE SET
                        ; UP AT ASSEMBLY TIME AND MAY BE VARIED BY THE OPERATOR AT RUN
                        ; TIME.
                        ;--

                                BGNSW   SFPTBL
000020                                                          .WORD   L10001-L$SW/2
                                                        L$SW::
                                                        SFPTBL::

000000                  LIMIT:: .WORD   0               ;LIMIT RANGE OF SECTORS TO BE TESTED
                                                        ;       0 = NO  1 = YES
000000                  RANGE:: .WORD   0               ;DOES OPERATOR KNOW EXACT SECTOR NUMBERS?
                                                        ;       0 = NO  1 = YES
000000                  LSECT:: .WORD   0               ;LOW SECTOR NUMBER
000000                  TSECT:: .WORD   0               ;TOP SECTOR NUMBER
000000                  ONLY::  .WORD   0               ;ONLY BOARD TO TEST (BOARD #'S ARE 0 TO 15)
000000                  DROPNE:: .WORD  0               ;DROP ANY OPTIONS?      0 = NO  1 = YES
000000                  DROP1:: .WORD   0               ;DROP OPTION #1?        0 = NO  1 = YES
000000                  DROP2:: .WORD   0               ;DROP OPTION #2?        0 = NO  1 = YES
000000                  DROP3:: .WORD   0               ;DROP OPTION #3?        0 = NO  1 = YES
000000                  DROP4:: .WORD   0               ;DROP OPTION #4?        0 = NO  1 = YES
000001                  MARPAT:: .WORD  1               ;PATTERN NUMBER USED FOR MARCH TEST
000000                  DROP5:: .WORD   0               ;DROP OPTION #5?        0 = NO  1 = YES
000000                  REFRESH::.WORD  0               ;ENABLE MARGINING?      0 = NO (LEAVE DISABLED)
                                                        ;                       1 = YES (ENABLE IT)
000000                  ECCDIS:: .WORD  0               ;DISABLE ECC?           0 = NO (LEAVE ENABLED)
                                                        ;                       1 = YES (DISABLE IT)


                        ;************ IMPORTANT NOTE ************
                        ; THE FOLLOWING 2 SOFTWARE PARAMETERS ;
                        ; HAVE NON-STANDARD DEFAULTS.  ERRORS ;
                        ; AND END OF PASS PERFORMANCE SUMMARY ;
                        ; REPORTS WILL ** N O T ** BE PRINTED ;
                        ; UNLESS  THE  OPERATOR  SPECIFICALLY ;
                        ; REQUESTS THE PRINTOUTS VIA SUITABLE ;
                        ; ANSWERS TO THE SOFTWARE QUESTIONS.  ;
                        ;                                     ;
                        ; THIS OPERATING FEATURE WAS INCLUDED ;
                        ; IN THE ML11 PERFORMANCE EXERCISER'S ;
                        ; FUNCTIONAL SPECIFICATION AT THE RE- ;
                        ; QUEST OF FIELD SERVICE.             ;
                        ;*************************************

000000                  EOPSUM:: .WORD  0               ;ENABLE EOP SUMMARIES?  0 = NO PRINTOUT
                                                        ;                       1 = YES
000000                  ERROUT:: .WORD  0               ;ENABLE ERROR PRINTOUTS? 0 = NO PRINTOUT
                                                        ;                       1 = YES
                                ENDSW
                                                        L10001:
```

```
                        ;++
                        ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
                        ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                        ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                        ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                        ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                        ; WITH THE OPERATOR.
                        ;--

                                BGNHRD
000022                                                          .WORD L10002-L$HARD/2
                                                        L$HARD::

                                GPRMA   QH1,0,0,0,177777,YES
000031                                                          .WORD   T$CODE
002330                                                          .WORD   QH1
000000                                                          .WORD   T$LOLIM
177777                                                          .WORD   T$HILIM
                                GPRMA   QH2,2,0,0,377,YES
001031                                                          .WORD   T$CODE
002345                                                          .WORD   QH2
000000                                                          .WORD   T$LOLIM
000377                                                          .WORD   T$HILIM
                                GPRMD   QH3,4,0,7,1,7,YES
002032                                                          .WORD   T$CODE
002367                                                          .WORD   QH3
000007                                                          .WORD   7
000001                                                          .WORD   T$LOLIM
000007                                                          .WORD   T$HILIM
                                GPRMD   QH4,6,0,7,0,7,YES
003032                                                          .WORD   T$CODE
002417                                                          .WORD   QH4
000007                                                          .WORD   7
000000                                                          .WORD   T$LOLIM
000007                                                          .WORD   T$HILIM

                                ENDHRD
                                                                .EVEN
                                                        L10002:

103     123     122     QH1:    .ASCIZ  /CSR ADDRESS?/
111     116     124     QH2:    .ASCIZ  /INTERRUPT VECTOR?/
102     122     040     QH3:    .ASCIZ  /BR LEVEL FOR INTERRUPT?/
104     122     111     QH4:    .ASCIZ  /DRIVE NUMBER?/
                        .EVEN
```

```
                        ;++
                        ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
                        ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                        ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                        ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                        ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                        ; WITH THE OPERATOR.
                        ;--

                                BGNSFT
000103                                                          .WORD L10003-L$SOFT/2
                                                              L$SOFT::

                                GPRML   QS1,0,1,YES
000130                                                          .WORD   T$CODE
002646                                                          .WORD   QS1
000001                                                          .WORD   1
                                XFERF   6$
025044                                                          .WORD   T$CODE
                                GPRML   QS2,2,1,YES
001130                                                          .WORD   T$CODE
002713                                                          .WORD   QS2
000001                                                          .WORD   1
                                XFERF   5$
014044                                                          .WORD   T$CODE
                                GPRMD   QS3,4,0,177777,0,177777,YES
002032                                                          .WORD   T$CODE
003000                                                          .WORD   QS3
177777                                                          .WORD   177777
000000                                                          .WORD   T$LOLIM
177777                                                          .WORD   T$HILIM
                                GPRMD   QS4,6,0,177777,0,177777,YES
003032                                                          .WORD   T$CODE
003033                                                          .WORD   QS4
177777                                                          .WORD   177777
000000                                                          .WORD   T$LOLIM
177777                                                          .WORD   T$HILIM
                                XFER    6$
006004                                                          .WORD   T$CODE
                        5$:     GPRMD   QS5,10,D,37,0,15.,YES
004052                                                          .WORD   T$CODE
003065                                                          .WORD   QS5
000037                                                          .WORD   37
000000                                                          .WORD   T$LOLIM
000017                                                          .WORD   T$HILIM
                        6$:     GPRML   QS6,12,1,YES
005130                                                          .WORD   T$CODE
003132                                                          .WORD   QS6
000001                                                          .WORD   1
                                XFERT   7$
007024                                                          .WORD   T$CODE
```

```
                                GPRMD   QS11,24,D,77,1,10.,YES
012052                                                          .WORD   T$CODE
003532                                                          .WORD   QS11
000077                                                          .WORD   77
000001                                                          .WORD   T$LOLIM
000012                                                          .WORD   T$HILIM
                                XFER    13$
026004                                                          .WORD   T$CODE
                        7$:     GPRML   QS7,14,1,YES
006130                                                          .WORD   T$CODE
003436                                                          .WORD   QS7
000001                                                          .WORD   1
                                GPRML   QS8,16,1,YES
007130                                                          .WORD   T$CODE
003455                                                          .WORD   QS8
000001                                                          .WORD   1
                                GPRML   QS9,20,1,YES
010130                                                          .WORD   T$CODE
003474                                                          .WORD   QS9
000001                                                          .WORD   1
                                GPRML   QS10,22,1,YES
011130                                                          .WORD   T$CODE
003513                                                          .WORD   QS10
000001                                                          .WORD   1
                                XFERT   12$
006024                                                          .WORD   T$CODE
                                GPRMD   QS11,24,D,77,1,10.,YES
012052                                                          .WORD   T$CODE
003532                                                          .WORD   QS11
000077                                                          .WORD   77
000001                                                          .WORD   T$LOLIM
000012                                                          .WORD   T$HILIM
                        12$:    GPRML   QS12,26,1,YES
013130                                                          .WORD   T$CODE
003614                                                          .WORD   QS12
000001                                                          .WORD   1
                        13$:    GPRML   QS13,30,1,YES
014130                                                          .WORD   T$CODE
003633                                                          .WORD   QS13
000001                                                          .WORD   1
                                GPRML   QS14,32,1,YES
015130                                                          .WORD   T$CODE
003665                                                          .WORD   QS14
000001                                                          .WORD   1
                                GPRML   QS15,34,1,YES
016130                                                          .WORD   T$CODE
003717                                                          .WORD   QS15
000001                                                          .WORD   1
                                GPRML   QS16,36,1,YES
017130                                                          .WORD   T$CODE
003764                                                          .WORD   QS16
000001                                                          .WORD   1
                                .EVEN
                                ENDSFT
                                                                .EVEN
                                                        L10003:
```

```
                345     114     111     115  QS1:    .ASCIZ  /LIMIT RANGE OF SECTORS TO BE TESTED?/
                346     104     117     040  QS2:    .ASCIZ  /DO YOU KNOW THE EXACT RANGE OF SECTORS TO BE TESTED?/
                347     106     111     122  QS3:    .ASCIZ  /FIRST SECTOR TO BE TESTED?/
                348     114     101     123  QS4:    .ASCIZ  /LAST SECTOR TO BE TESTED?/
                349     127     110     111  QS5:    .ASCIZ  /WHICH BOARD {0-15} SHOULD BE TESTED?/
                350     124     110     105  QS6:    .ASCII  /THE PROGRAM OPTIONS INCLUDE:/
                351     012     015     040          .ASCII  <12><15>/   1.  ADDRESS CHECK/
                352     012     015     040          .ASCII  <12><15>/   2.  PATTERN TEST/
                353     012     015     040          .ASCII  <12><15>/   3.  UNIQUE DATA CHECK/
                354     012     015     040          .ASCII  <12><15>/   4.  MARCH TEST/
                355     012     015     040          .ASCII  <12><15>/   5.  RANDOMNESS TESTS/
                356     012     015     104          .ASCIZ  <12><15>/DO YOU WANT TO DROP ANY OF THESE FROM THE EXERCISER?/
                357     104     122     117  QS7:    .ASCIZ  /DROP OPTION 1?/ -
                358     104     122     117  QS8:    .ASCIZ  /DROP OPTION 2?/
                359     104     122     117  QS9:    .ASCIZ  /DROP OPTION 3?/
                360     104     122     117  QS10:   .ASCIZ  /DROP OPTION 4?/
                361     120     101     124  QS11:   .ASCIZ  /PATTERN NUMBER {1-10} TO BE USED WITH MARCH TEST?/
                362     104     122     117  QS12:   .ASCIZ  /DROP OPTION 5?/
                363     105     116     101  QS13:   .ASCIZ  /ENABLE REFRESH MARGINING?/
                364     104     111     123  QS14:   .ASCIZ  /DISABLE ERROR CORRECTION?/
                365     105     116     101  QS15:   .ASCIZ  /ENABLE END OF PASS SUMMARY PRINTOUT?/
                366     105     116     101  QS16:   .ASCIZ  /ENABLE ERROR PRINTOUTS?/
                367                             .EVEN
                368
                369
                370
                371                     ;++
                372                     ; THE PROTECTION TABLE IS USED BY THE RUNTIME
                373                     ; SERVICES TO PROTECT THE LOAD MEDIA.
                374                     ;--
                375
                376                             BGNPROT
                                                                                L$PROT::
                377
                378 177777                      -1              ;OFFSET INTO P-TABLE FOR CSR ADDRESS
                379 177777                      -1              ;OFFSET INTO P-TABLE FOR MASSBUS ADDRESS
                380 177777                      -1              ;OFFSET INTO P-TABLE FOR DRIVE NUMBER
                381
                382                             ENDPROT
                383
                397
                398
                399                     $PATCH:: .BLKW  32.     ;THIS LEAVES ROOM FOR THE 22 ML-11 REGISTERS TOO
                400
                407
                408                             ENDMOD
                409
                410
                411
                412
                425
```

```
      4 ;OTS.MAC CONTAINS THE FOLLOWING MODULES AND ROUTINES:
      5 ;
      6 ;    MODULE B16PG1
      7 ;       ROUTINE BL$GT1 -- TO FETCH A FIELD OUT OF A VALUE
      8 ;
      9 ;    MODULE B16PG2
     10 ;       ROUTINE BL$GT2 -- TO FETCH A FIELD OUT OF A VALUE GIVEN THE ADDRESS
     11 ;
     12 ;    MODULE B16PG3
     13 ;       ROUTINE BL$PU1 -- TO STORE A NEW VALUE INTO A FIELD IN AN OLD VALUE
     14 ;
     15 ;    MODULE B16PG4
     16 ;       ROUTINE BL$PU2 -- TO STORE A NEW VALUE INTO A FIELD GIVEN THE ADDRESS
     17 ;
     18 ;    MODULE B16MUL
     19 ;       ROUTINE BL$MUL -- TO MULTIPLY TWO SIGNED INTEGERS
     20 ;       ROUTINE DIVMOD --
     21 ;       ROUTINE BL$DIV -- TO DIVIDE TWO SIGNED INTEGERS
     22 ;       ROUTINE BL$MOD --
     23 ;       ROUTINE BL$SHF --
     24 ;
     25 ;    MODULE B16SAV
     26 ;       ROUTINE $SAVE2 -- TO SAVE 2 REGISTERS (R2, R1)
     27 ;       ROUTINE $SAVE3 -- TO SAVE 3 REGISTERS (R3, R2, R1)
     28 ;       ROUTINE $SAVE4 -- TO SAVE 4 REGISTERS (R4, R3, R2, R1)
     29 ;       ROUTINE $SAVE5 -- TO SAVE 5 REGISTERS (R5, R4, R3, R2, R1)
```

```
1389                                    :\/\/\/\/\/\/\ LEAVE OTS.MAC WITH THE LISTING TURNED ON \/\/\/\/\/\
```

```
                                .SBTTL  'RANDOM NUMBER GENERATOR'

                                ;ROUTINE TO GENERATE 16-BIT PSEUDO RANDOM NUMBERS

                                ;INPUTS:                NONE
                                ;IMPLIED INPUTS:        SEED1, SEED2, SEED3 are global values which will
                                ;                       be used by, but not input to the generator.
                                ;OUTPUTS:               'RANDOM'--WORD CONTAINING RANDOM 16-BIT INTEGER VALUE
                                ;IMPLIED OUTPUTS:       NONE
                                ;CALLING SEQUENCE:      JSR PC,RN

005256  010046                  RN::    MOV     R0,-(SP)
005260  013700  005346                  MOV     SEED2,R0
005264  000241                          CLC
005266  005337  005344                  DEC     SEED1
005272  006100                          ROL     R0
005274  006100                          ROL     R0
005276  063700  005344                  ADD     SEED1,R0
005302  063700  005350                  ADD     SEED3,R0
005306  010037  005346                  MOV     R0,SEED2
005312  006100                          ROL     R0
005314  006100                          ROL     R0
005316  063700  005350                  ADD     SEED3,R0
005322  006100                          ROL     R0
005324  006100                          ROL     R0
005326  010037  005350                  MOV     R0,SEED3
005332  013737  005346  005352          MOV     SEED2,RANDOM            ;SAVE NEW R.N.
005340  012600                          MOV     (SP)+,R0
005342  000207                          RTS     PC


005344  000000                  SEED1:: .WORD   0
005346  001233                  SEED2:: .WORD   1233
005350  007622                  SEED3:: .WORD   7622

005352  000000                  RANDOM:: .WORD  0
```

```
;MLX3                                                    18-Sep-1980 09:39:38    TOPS-20 Bliss-16 V2(206)
;                                                        18-Sep-1980 09:39:31    PA:<ROSEN>MLX3.BLI.1 (1)

;          0001  MODULE MLX3 =
;          0002  BEGIN
;          0003
;          0004  REQUIRE 'BLSMAC.REQ';
;          0943
;          0944  %SBTTL 'REPORT CODING SECTION'
;          0945
;          0946  EXTERNAL ROUTINE
;          0947     EOP: NOVALUE;
;          0948
;          0949  BGNRPT;
;          0950
;          0951  EOP();
;          0952
;          0953  RETURN;
;          0954
;          0955  ENDRPT;

                                    .TITLE  MLX3

                                    .GLOBL  EOP


                                    .SBTTL  LRPT REPORT CODING SECTION

005354  004737  073040      LRPT:   JSR     PC,EOP                          ;                       0951
005360  000207                      RTS     PC                              ;                       0947

                                ; Routine Size:  3 words
                                ; Maximum stack depth per invocation:  0 words


                                    .SBTTL  L$RPT REPORT CODING SECTION

005362  004737  005354      L$RPT:: JSR     PC,LRPT                         ;                       0953
```

```
                                ;MLX3                                                   18-Sep-1980 09:39:38    TOPS
                                ;               REPORT CODING SECTION                   18-Sep-1980 09:39:31    PA:<

005366  104425                          TRAP    25
005370  000207                          RTS     PC

                                ; Routine Size:  4 words
                                ; Maximum stack depth per invocation:  0 words
```

```
     76 ;MLX3                                                    18-Sep-1980 09:39:38    TOPS-20 Bliss-16 V2(206)
     77 ;                 AUTODROP SECTION                       18-Sep-1980 09:39:31    PA:<ROSEN>MLX3.BLI.1 (2)
     78
     79 ;          0956   %SBTTL 'AUTODROP SECTION'
     80 ;          0957
     81 ;          0958   !++
     82 ;          0959   !  THIS SECTION IS OPTIONALLY EXECUTED IMMEDIATELY AFTER THE INITIALIZATION
     83 ;          0960   !  CODE IF THE /ADR FLAG WAS SET.  THE INTENT IS TO EXAMINE THE UNITS UNDER
     84 ;          0961   !  TEST TO SEE IF THEY WILL RESPOND.  THOSE THAT DON'T RESPOND ARE DROPPED.
     85 ;          0962   !
     86 ;          0963   !  THIS FUNCTION IS AN INTEGRAL PART OF THE INITIALIZATION CODE ITSELF, AND
     87 ;          0964   !  THEREFORE A SEPARATE AUTODROP SECTION IS REDUNDANT AND NOT PROVIDED.
     88 ;          0965   !--
     89 ;          0966
     90 ;          0967   BGNAUTO;
     91 ;          0968
     92 ;          0969   RETURN;
     93 ;          0970
     94 ;          0971   ENDAUTO;
     98
     99                                  .SBTTL  LAUTO AUTODROP SECTION
    103 005372  000207              LAUTO: RTS     PC                                  ;                          0955
    104
    105                                 ; Routine Size:  1 word
    106                                 ; Maximum stack depth per invocation:  0 words
    111
    112
    116
    117                                 .SBTTL  L$AUTO AUTODROP SECTION
    121 005374  004737  005372      L$AUTO::JSR     PC,LAUTO                            ;                          0969
    122 005400  104461                      TRAP    61
    123 005402  000207                      RTS     PC
    124
    125                                 ; Routine Size:  4 words
    126                                 ; Maximum stack depth per invocation:  0 words
```

```
     1 ;MLX3                                                    18-Sep-1980 09:39:38    TOPS-20 Bliss-16 V2(206)
     2 ;                 DROP UNIT SECTION                      18-Sep-1980 09:39:31    PA:<ROSEN>MLX3.BLI.1 (3)
     3
     4 ;          0972   %SBTTL 'DROP UNIT SECTION'
     5 ;          0973
     6 ;          0974   !++
     7 ;          0975   !  THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DRIVE TO NO
     8 ;          0976   !  LONGER BE TESTED.  WHEN THIS HAPPENS, THE FOLLOWING ACTIONS WILL BE
     9 ;          0977   !  TAKEN:
    10 ;          0978   !
    11 ;          0979   !  (1) SET THE DRIVE STATUS TO INACTIVE AND SET THE DRIVE'S DROP FLAG.
    12 ;          0980   !
    13 ;          0981   !  (2) DECREMENT THE NUMBER OF ACTIVE DRIVES, AND IF ZERO ABORT PASS.
    14 ;          0982   !--
    15 ;          0983
    16 ;          0984   BGNDU;
    17 ;          0985
    18 ;          0986   EXTERNAL
    19 ;          0987      L$LUN,
    20 ;          0988      DRIVE_STATUS:BITVECTOR[8],
    21 ;          0989      DROPT_DRIVES:BITVECTOR[8],
    22 ;          0990      NUM_DRIVES;
    23 ;          0991
    24 ;          0992
    25 ;          0993   LITERAL
    26 ;          0994      INACTIVE = 0,
    27 ;          0995      ACTIVE = 1;
    28 ;          0996
    29 ;          0997
    30 ;          0998   DRIVE_STATUS[.L$LUN] = INACTIVE;
    31 ;          0999   DROPT_DRIVES[.L$LUN] = ACTIVE;
    32 ;          1000
    33 ;          1001   NUM_DRIVES = .NUM_DRIVES - 1;
    34 ;          1002
    35 ;          1003   IF .NUM_DRIVES EQL 0
    36 ;          1004   THEN  DOCLN;
    37 ;          1005
    38 ;          1006   RETURN;
    39 ;          1007
    40 ;          1008   ENDDU;
    41
    42                                    .GLOBL  L$LUN, DRIVE.STATUS, DROPT.DRIVES
    43                                    .GLOBL  NUM.DRIVES
    44
    45
    46                                    .SBTTL  LDU DROP UNIT SECTION
    47 005404  013700  002074      LDU:   MOV     L$LUN,R0                        ;                    0998
    48 005410  006200                     ASR     R0
    49 005412  006200                     ASR     R0
```

```
                        ;MLX3                                                   18-Sep-1980 09:39:38    TOPS
                        ;               DROP UNIT SECTION                       18-Sep-1980 09:39:31    PA:<

005414  006200                  ASR     R0
005416  062700  032460          ADD     #DRIVE.STATUS,R0
005422  010046                  MOV     R0,-(SP)
005424  013746  002074          MOV     L$LUN,-(SP)
005430  042716  177770          BIC     #177770,(SP)
005434  012746  000001          MOV     #1,-(SP)
005440  005046                  CLR     -(SP)
005442  004737  004502          JSR     PC,BL$PU2
005446  013700  002074          MOV     L$LUN,R0                        ;       0999
005452  006200                  ASR     R0
005454  006200                  ASR     R0
005456  006200                  ASR     R0
005460  062700  032462          ADD     #DROPT.DRIVES,R0
005464  010016                  MOV     R0,(SP)
005466  013746  002074          MOV     L$LUN,-(SP)
005472  042716  177770          BIC     #177770,(SP)
005476  012746  000001          MOV     #1,-(SP)
005502  011646                  MOV     (SP),-(SP)
005504  004737  004502          JSR     PC,BL$PU2
005510  005337  032474          DEC     NUM.DRIVES                      ;       1001
005514  001001                  BNE     1$                              ;       1003
005516  104444                  TRAP    44                              ;       1004
005520  062706  000016  1$:     ADD     #16,SP                          ;       0971
005524  000207                  RTS     PC

                        ; Routine Size:  41 words
                        ; Maximum stack depth per invocation:  7 words


                                .SBTTL  L$DU DROP UNIT SECTION
005526  004737  005404  L$DU::  JSR     PC,LDU                          ;       1006
005532  104453                  TRAP    53
005534  000207                  RTS     PC

                        ; Routine Size:  4 words
                        ; Maximum stack depth per invocation:  0 words
```

```
;MLX3                                                   18-Sep-1980 09:39:38    TOPS-20 Bliss-16 V2(206)
;                ADD UNIT SECTION                       18-Sep-1980 09:39:31    PA:<ROSEN>MLX3.BLI.1 (4)

;          1009  %SBTTL 'ADD UNIT SECTION'
;          1010
;          1011  !++
;          1012  !  THE ADD UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES
;          1013  !  TO BE EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK
;          1014  !  TO THE TEST CYCLE.   SINCE THE INITIALIZATION CODE WILL HAVE
;          1015  !  TO BE EXECUTED IMMEDIATELY AFTER AN 'ADD',  THERE IS NO NEED
;          1016  !  FOR ANY CODE IN THIS SECTION.
;          1017  !--
;          1018
;          1019  BGNAU;
;          1020
;          1021  RETURN;
;          1022
;          1023  ENDAU;
                                        .SBTTL  LAU ADD UNIT SECTION
005536  000207                  LAU:    RTS     PC                              ;                1008

                                ; Routine Size:  1 word
                                ; Maximum stack depth per invocation:  0 words


                                        .SBTTL  L$AU ADD UNIT SECTION
005540  004737  005536          L$AU::  JSR     PC,LAU                          ;                1021
005544  104452                          TRAP    52
005546  000207                          RTS     PC

                                ; Routine Size:  4 words
                                ; Maximum stack depth per invocation:  0 words
;          1024
```

```
;MLX3                                                   18-Sep-1980 09:39:38    TOPS-20 Bliss-16 V2(206)
;               ADD UNIT SECTION                        18-Sep-1980 09:39:31    PA:<ROSEN>MLX3.BLI.1 (4)

;       1025
;       1026  END
;       1027
;       1028  ELUDOM


                        ; OTS external references
                                .GLOBL  BL$PU2




                        ; Size:         62 code + 0 data words
                        ; Run Time:     00:02.7
                        ; Elapsed Time: 00:08.9
                        ; Memory Used:  17 pages
                        ; Compilation Complete

```

23-Oct-1980 15:01:43 TOPS-20 Bliss-16 V2(206)
23-Oct-1980 14:57:05 PA:<ROSEN>MLX4.BLI.1 (1)

```
;MLX4
;
;          0001  MODULE MLX4 =
;          0002  BEGIN
;          0003
;          0004  REQUIRE 'BLSMAC.REQ';
;          1488
;          1489  %SBTTL  'VARIABLES AND CONSTANTS'
;          1490
;          1491  LITERAL
;          1492
;          1493          ONE             = 1,     !NUMBER OF TIMES TO RETRY FOR DATA ERROR
;          1494          SIX             = 6,     !NUMBER OF TIMES TO RETRY FOR SYSTEM ERROR
;          1495          NUM_PATS        = 10,    !NUMBER OF REGULAR PATTERNS
;          1496          NUM_REGS        = 22,    !NUMBER OF ML11 REGISTERS
;          1497          TIMES_TO_LOOP   = 2,     !LOOP READING CONSTANT
;          1498          BUFSIZ          = 256*8,!2048 16-BIT WORDS IN A FULL BUFFER
;          1499                                  !256 = NUMBER OF WORDS IN A SECTOR
;          1500                                  !  8 = NUMBER OF SECTORS IN THE BUFFER
;          1501
;          1502      !
;          1503      !   ML11 DRIVE TYPES:
;          1504      !
;          1505
;          1506          ML11A           = %O'000110',    !16K CHIPS
;          1507          ML11B           = %O'000111',    !64K CHIPS
;          1508
;          1509      !
;          1510      !   FUNCTION CODES:
;          1511      !
;          1512
;          1513          DRV_CLR         = %O'11',
;          1514          WC_CMD          = %O'51',
;          1515          WR_CMD          = %O'61',
;          1516          RD_CMD          = %O'71',
;          1517
;          1518      !
;          1519      !   STATUS CODES:
;          1520      !
;          1521
;          1522          INACTIVE        = 0,
;          1523          ACTIVE          = 1,
;          1524
;          1525      !
;          1526      !   ERROR THRESHOLD VALUES:
;          1527      !
;          1528
;          1529          S16K_LIMIT      = 10,    !SOFT ERROR, 16K ARRAYS
;          1530          H16K_LIMIT      = 10,    !HARD ERROR, 16K ARRAYS
;          1531
;          1532          S64K_LIMIT      = 10,    !SOFT ERROR, 64K ARRAYS
;          1533          H64K_LIMIT      = 10,    !HARD ERROR, 64K ARRAYS
```

```
;MLX4
;                    VARIABLES AND CONSTANTS

;          1534      !
;          1535      ! SUMMARY OF ERROR CODES:
;          1536      !
;          1537
;          1538      !
;          1539      ! THE 'INTEGRITY' ROUTINE:
;          1540      !
;          1541
;          1542                        !WRITE COMMAND:
;          1543
;          1544      !ERRDF(1,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 01 ****
;          1545      !ERRDF(2,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 02 ****
;          1546      !ERRDF(3,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 03 ****
;          1547
;          1548                        !READ COMMAND:
;          1549
;          1550      !ERRDF(4,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 04 ****
;          1551      !ERRDF(5,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 05 ****
;          1552      !ERRDF(6,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 06 ****
;          1553      !ERRDF(7,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 07 ****
;          1554      !ERRDF(8,MSG2,0);    !**** INTEGRITY ROUTINE ERROR 08 ****
;          1555      !ERRHRD(9,MSG4,0);   !**** INTEGRITY ROUTINE ERROR 09 ****
;          1556      !ERRSOFT(10,MSG3,0);!**** INTEGRITY ROUTINE ERROR 10 ****
;          1557      !ERRSOFT(11,MSG3,1);!**** INTEGRITY ROUTINE ERROR 10 ****
;          1558
;          1559                        !WRITE CHECK COMMAND:
;          1560
;          1561      !ERRDF(12,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 12 ****
;          1562      !ERRDF(13,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 13 ****
;          1563      !ERRDF(14,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 14 ****
;          1564      !ERRDF(15,MSG2,0);   !**** INTEGRITY ROUTINE ERROR 15 ****
;          1565      !ERRHRD(16,MSG4,0);  !**** INTEGRITY ROUTINE ERROR 16 ****
;          1566      !ERRSOFT(17,MSG3,8);!**** INTEGRITY ROUTINE ERROR 17 ****
;          1567      !ERRSOFT(18,MSG3,1);!**** INTEGRITY ROUTINE ERROR 18 ****
;          1568
;          1569      !
;          1570      ! OPTION 1:
;          1571      !
;          1572
;          1573                        !WRITE COMMAND:
;          1574
;          1575      !ERRDF(101,MSG1,0);    !**** OPTION 1 ERROR 01 ****
;          1576      !ERRDF(102,MSG1,0);    !**** OPTION 1 ERROR 02 ****
;          1577      !ERRDF(103,MSG1,0);    !**** OPTION 1 ERROR 03 ****
;          1578
;          1579                        !CHECK OR READ:
;          1580
;          1581      !ERRDF(104,MSG1,0);    !**** OPTION 1 ERROR 04 ****
;          1582      !ERRDF(105,MSG1,0);    !**** OPTION 1 ERROR 05 ****
;          1583      !ERRDF(106,MSG1,0);    !**** OPTION 1 ERROR 06 ****
;          1584      !ERRDF(107,MSG1,0);    !**** OPTION 1 ERROR 07 ****
;          1585      !ERRDF(108,MSG2,0);    !**** OPTION 1 ERROR 08 ****
```

```
116 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
117 ;                VARIABLES AND CONSTANTS                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (2)
118
119 ;          1586          !ERRHRD(109,MSG4,0);  !**** OPTION 1 ERROR 09 ****
120 ;          1587          !ERRSOFT(110,MSG3,0); !**** OPTION 1 ERROR 10 ****
121 ;          1588          !ERRSOFT(111,MSG3,0); !**** OPTION 1 ERROR 11 ****
```

```
;MLX4
;                    VARIABLES AND CONSTANTS

                !
                ! OPTION 2:
                !

                                !WRITE COMMAND:

                !ERRDF(201,MSG1,0);    !**** OPTION 2 ERROR 01 ****
                !ERRDF(202,MSG1,0);    !**** OPTION 2 ERROR 02 ****
                !ERRDF(203,MSG1,0);    !**** OPTION 2 ERROR 03 ****

                                !CHECK OR READ:

                !ERRDF(204,MSG1,0);    !**** OPTION 2 ERROR 04 ****
                !ERRDF(205,MSG1,0);    !**** OPTION 2 ERROR 05 ****
                !ERRDF(206,MSG1,0);    !**** OPTION 2 ERROR 06 ****
                !ERRDF(207,MSG1,0);    !**** OPTION 2 ERROR 07 ****
                !ERRDF(208,MSG2,0);    !**** OPTION 2 ERROR 08 ****
                !ERRHRD(209,MSG4,0);   !**** OPTION 2 ERROR 09 ****
                !ERRSOFT(210,MSG3,0);  !**** OPTION 2 ERROR 10 ****
                !ERRSOFT(211,MSG3,1);  !**** OPTION 2 ERROR 10 ****

                                !LOOP CHECK OR READ:

                !ERRDF(212,MSG1,0);    !**** OPTION 2 ERROR 12 ****
                !ERRDF(213,MSG1,0);    !**** OPTION 2 ERROR 13 ****
                !ERRDF(214,MSG1,0);    !**** OPTION 2 ERROR 14 ****
                !ERRDF(215,MSG1,0);    !**** OPTION 2 ERROR 15 ****
                !ERRDF(216,MSG2,0);    !**** OPTION 2 ERROR 16 ****
                !ERRHRD(217,MSG4,0);   !**** OPTION 2 ERROR 17 ****
                !ERRSOFT(218,MSG3,0);  !**** OPTION 2 ERROR 18 ****
                !ERRSOFT(219,MSG3,0);  !**** OPTION 2 ERROR 19 ****

                !
                ! OPTION 3:
                !

                                !WRITE COMMAND:

                !ERRDF(301,MSG1,0);    !**** OPTION 3 ERROR 01 ****
                !ERRDF(302,MSG1,0);    !**** OPTION 3 ERROR 02 ****
                !ERRDF(303,MSG1,0);    !**** OPTION 3 ERROR 03 ****

                                !CHECK OR READ:

                !ERRDF(304,MSG1,0);    !**** OPTION 3 ERROR 04 ****
                !ERRDF(305,MSG1,0);    !**** OPTION 3 ERROR 05 ****
                !ERRDF(306,MSG1,0);    !**** OPTION 3 ERROR 06 ****
                !ERRDF(307,MSG1,0);    !**** OPTION 3 ERROR 07 ****
                !ERRDF(308,MSG2,0);    !**** OPTION 3 ERROR 08 ****
                !ERRHRD(309,MSG4,0);   !**** OPTION 3 ERROR 09 ****
                !ERRSOFT(310,MSG3,0);  !**** OPTION 3 ERROR 10 ****
                !ERRSOFT(311,MSG3,0);  !**** OPTION 3 ERROR 11 ****
```

```
;MLX4
;                    VARIABLES AND CONSTANTS

;          1641
;          1642          !
;          1643          ! OPTION 4:
;          1644          !
;          1645
;          1646                  !MARCHING UP:
;          1647
;          1648                          !WRITE DATA:
;          1649
;          1650          !ERRDF(401,MSG1,0);    !**** OPTION 4 ERROR 01 ****
;          1651          !ERRDF(402,MSG1,0);    !**** OPTION 4 ERROR 02 ****
;          1652          !ERRDF(403,MSG1,0);    !**** OPTION 4 ERROR 03 ****
;          1653
;          1654                  !MARCHING UP:
;          1655
;          1656                          !CHECK OR READ DATA:
;          1657
;          1658          !ERRDF(404,MSG1,0);    !**** OPTION 4 ERROR 04 ****
;          1659          !ERRDF(405,MSG1,0);    !**** OPTION 4 ERROR 05 ****
;          1660          !ERRDF(406,MSG1,0);    !**** OPTION 4 ERROR 06 ****
;          1661          !ERRDF(407,MSG1,0);    !**** OPTION 4 ERROR 07 ****
;          1662          !ERRDF(408,MSG2,0);    !**** OPTION 4 ERROR 08 ****
;          1663          !ERRHRD(409,MSG4,0);   !**** OPTION 4 ERROR 09 ****
;          1664          !ERRSOFT(410,MSG3,0);  !**** OPTION 4 ERROR 10 ****
;          1665          !ERRSOFT(411,MSG3,0);  !**** OPTION 4 ERROR 11 ****
;          1666
;          1667                          !WRITE COMP:
;          1668
;          1669          !ERRDF(412,MSG1,0);    !**** OPTION 4 ERROR 12 ****
;          1670          !ERRDF(413,MSG1,0);    !**** OPTION 4 ERROR 13 ****
;          1671          !ERRDF(414,MSG1,0);    !**** OPTION 4 ERROR 14 ****
;          1672
;          1673                  !MARCHING DOWN:
;          1674
;          1675                          !CHECK OR READ COMP:
;          1676
;          1677          !ERRDF(415,MSG1,0);    !**** OPTION 4 ERROR 15 ****
;          1678          !ERRDF(416,MSG1,0);    !**** OPTION 4 ERROR 16 ****
;          1679          !ERRDF(417,MSG1,0);    !**** OPTION 4 ERROR 17 ****
;          1680          !ERRDF(418,MSG1,0);    !**** OPTION 4 ERROR 18 ****
;          1681          !ERRDF(419,MSG2,0);    !**** OPTION 4 ERROR 19 ****
;          1682          !ERRHRD(420,MSG4,0);   !**** OPTION 4 ERROR 20 ****
;          1683          !ERRSOFT(421,MSG3,0);  !**** OPTION 4 ERROR 21 ****
;          1684          !ERRSOFT(422,MSG3,0);  !**** OPTION 4 ERROR 22 ****
;          1685
;          1686                          !WRITE DATA:
;          1687
;          1688          !ERRDF(423,MSG1,0);    !**** OPTION 4 ERROR 23 ****
;          1689          !ERRDF(424,MSG1,0);    !**** OPTION 4 ERROR 24 ****
;          1690          !ERRDF(425,MSG1,0);    !**** OPTION 4 ERROR 25 ****
;          1691
;          1692                  !MARCHING UP:
```

```
;MLX4
;                    VARIABLES AND CONSTANTS


                                !CHECK OR READ DATA:

        !ERRDF(426,MSG1,0);     !**** OPTION 4 ERROR 26 ****
        !ERRDF(427,MSG1,0);     !**** OPTION 4 ERROR 27 ****
        !ERRDF(428,MSG1,0);     !**** OPTION 4 ERROR 28 ****
        !ERRDF(429,MSG1,0);     !**** OPTION 4 ERROR 29 ****
        !ERRDF(430,MSG2,0);     !**** OPTION 4 ERROR 30 ****
        !ERRHRD(431,MSG4,0);    !**** OPTION 4 ERROR 31 ****
        !ERRSOFT(432,MSG3,0);   !**** OPTION 4 ERROR 32 ****
        !ERRSOFT(433,MSG3,0);   !**** OPTION 4 ERROR 33 ****


        !
        ! OPTION 5:
        !

                !'RAND1' ROUTINE:

                                !WRITE COMMAND:

        !ERRDF(5101,MSG1,0);    !**** OPTION 5, RAND1 ERROR 01 ****
        !ERRDF(5102,MSG1,0);    !**** OPTION 5, RAND1 ERROR 02 ****
        !ERRDF(5103,MSG1,0);    !**** OPTION 5, RAND1 ERROR 03 ****

                                !CHECK OR READ:

        !ERRDF(5104,MSG1,0);    !**** OPTION 5, RAND1 ERROR 04 ****
        !ERRDF(5105,MSG1,0);    !**** OPTION 5, RAND1 ERROR 05 ****
        !ERRDF(5106,MSG1,0);    !**** OPTION 5, RAND1 ERROR 06 ****
        !ERRDF(5107,MSG1,0);    !**** OPTION 5, RAND1 ERROR 07 ****
        !ERRDF(5108,MSG2,0);    !**** OPTION 5, RAND1 ERROR 08 ****
        !ERRHRD(5109,MSG4,0);   !**** OPTION 5, RAND1 ERROR 09 ****
        !ERRSOFT(5110,MSG3,0);  !**** OPTION 5, RAND1 ERROR 10 ****
        !ERRSOFT(5111,MSG3,0);  !**** OPTION 5, RAND1 ERROR 11 ****

                !'RAND2' ROUTINE:

                                !WRITE COMMAND:

        !ERRDF(5201,MSG1,0);    !**** OPTION 5, RAND2 ERROR 01 ****
        !ERRDF(5202,MSG1,0);    !**** OPTION 5, RAND2 ERROR 02 ****
        !ERRDF(5203,MSG1,0);    !**** OPTION 5, RAND2 ERROR 03 ****

                                !CHECK OR READ:

        !ERRDF(5204,MSG1,0);    !**** OPTION 5, RAND2 ERROR 04 ****
        !ERRDF(5205,MSG1,0);    !**** OPTION 5, RAND2 ERROR 05 ****
        !ERRDF(5206,MSG1,0);    !**** OPTION 5, RAND2 ERROR 06 ****
        !ERRDF(5207,MSG1,0);    !**** OPTION 5, RAND2 ERROR 07 ****
        !ERRDF(5208,MSG2,0);    !**** OPTION 5, RAND2 ERROR 08 ****
        !ERRHRD(5209,MSG4,0);   !**** OPTION 5, RAND2 ERROR 09 ****
```

```
291 ;MLX4
292 ;                   VARIABLES AND CONSTANTS
293
294 ;          1745          !ERRSOFT(5210,MSG3,0); !**** OPTION 5, RAND2 ERROR 10 ****
295 ;          1746          !ERRSOFT(5211,MSG3,0); !**** OPTION 5, RAND2 ERROR 11 ****
296 ;          1747
297 ;          1748                  !'RAND3' ROUTINE:
298 ;          1749
299 ;          1750                        !WRITE COMMAND:
300 ;          1751
301 ;          1752          !ERRDF(5301,MSG1,0);   !**** OPTION 5, RAND3 ERROR 01 ****
302 ;          1753          !ERRDF(5302,MSG1,0);   !**** OPTION 5, RAND3 ERROR 02 ****
303 ;          1754          !ERRDF(5303,MSG1,0);   !**** OPTION 5, RAND3 ERROR 03 ****
304 ;          1755
305 ;          1756                        !CHECK OR READ:
306 ;          1757
307 ;          1758          !ERRDF(5304,MSG1,0);   !**** OPTION 5, RAND3 ERROR 04 ****
308 ;          1759          !ERRDF(5305,MSG1,0);   !**** OPTION 5, RAND3 ERROR 05 ****
309 ;          1760          !ERRDF(5306,MSG1,0);   !**** OPTION 5, RAND3 ERROR 06 ****
310 ;          1761          !ERRDF(5307,MSG1,0);   !**** OPTION 5, RAND3 ERROR 07 ****
311 ;          1762          !ERRDF(5308,MSG2,0);   !**** OPTION 5, RAND3 ERROR 08 ****
312 ;          1763          !ERRHRD(5309,MSG4,0);  !**** OPTION 5, RAND3 ERROR 09 ****
313 ;          1764          !ERRSOFT(5310,MSG3,0); !**** OPTION 5, RAND3 ERROR 10 ****
314 ;          1765          !ERRSOFT(5311,MSG3,0); !**** OPTION 5, RAND3 ERROR 11 ****
315 ;          1766
316 ;          1767                  !'RAND4' ROUTINE:
317 ;          1768
318 ;          1769                        !WRITE COMMAND:
319 ;          1770
320 ;          1771          !ERRDF(5401,MSG1,0);   !**** OPTION 5, RAND4 ERROR 01 ****
321 ;          1772          !ERRDF(5402,MSG1,0);   !**** OPTION 5, RAND4 ERROR 02 ****
322 ;          1773          !ERRDF(5403,MSG1,0);   !**** OPTION 5, RAND4 ERROR 03 ****
323 ;          1774
324 ;          1775                        !CHECK OR READ:
325 ;          1776
326 ;          1777          !ERRDF(5404,MSG1,0);   !**** OPTION 5, RAND4 ERROR 04 ****
327 ;          1778          !ERRDF(5405,MSG1,0);   !**** OPTION 5, RAND4 ERROR 05 ****
328 ;          1779          !ERRDF(5406,MSG1,0);   !**** OPTION 5, RAND4 ERROR 06 ****
329 ;          1780          !ERRDF(5407,MSG1,0);   !**** OPTION 5, RAND4 ERROR 07 ****
330 ;          1781          !ERRDF(5408,MSG2,0);   !**** OPTION 5, RAND4 ERROR 08 ****
331 ;          1782          !ERRHRD(5409,MSG4,0);  !**** OPTION 5, RAND4 ERROR 09 ****
332 ;          1783          !ERRSOFT(5410,MSG3,0); !**** OPTION 5, RAND4 ERROR 10 ****
333 ;          1784          !ERRSOFT(5411,MSG3,0); !**** OPTION 5, RAND4 ERROR 11 ****
334 ;          1785
335 ;          1786
336 ;          1787
337 ;          1788      !
338 ;          1789      ! CODES FOR WHY A UNIT WAS DROPPED:
339 ;          1790      !
340 ;          1791
341 ;          1792          CODE_1 = 1,            !DRIVE NOT POWERED UP
342 ;          1793          CODE_2 = 2,            !DRIVE NOT AN ML11 UNIT
343 ;          1794          CODE_3 = 3,            !OPERATOR SET TEST LIMITS INCORRECTLY
344 ;          1795          CODE_4 = 4,            !FAILED ALL RETRIES FOR A NON-FATAL ERROR
345 ;          1796          CODE_5 = 5,            !CONTROLLER FATAL ERROR
```

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;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               VARIABLES AND CONSTANTS                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (3)

;       1797            CODE_6 = 6,             !DRIVE FATAL ERROR
;       1798            CODE_7 = 7,             !ECC HARD ERROR
;       1799            CODE_8 = 8;             !ECC LOGIC FAILED TO DETECT ERROR
;       1800
;       1801
;       1802    OWN
;       1803
;       1804            WBUFF :VECTOR[BUFSIZ] VOLATILE, !IMPORTANT -- WBUFF AND RBUFF MUST
;       1805            RBUFF :VECTOR[BUFSIZ] VOLATILE, !BE CONTIGUOUS AND IN THAT ORDER!!
;       1806
;       1807            WPTR : VOLATILE,
;       1808            RPTR : VOLATILE,
;       1809
;       1810            QUICK : VOLATILE,
;       1811            PATTERN : VOLATILE,
;       1812            DATA_COUNT : VOLATILE,
;       1813            COMP_COUNT : VOLATILE,
;       1814
;       1815            EOP_COUNT : VOLATILE,
;       1816
;       1817            BASE_ADDR,
;       1818            VEC,
;       1819            BR_LEVEL,
;       1820
;       1821            SOFTS: BLOCKVECTOR[8,16],       !COUNTS FOR 8 LUNS, 16 ARRAYS EACH
;       1822            HARDS: BLOCKVECTOR[8,16],       !COUNTS FOR 8 LUNS, 16 ARRAYS EACH
;       1823            TRIES: BLOCKVECTOR[8,16],       !COUNTS FOR 8 LUNS, 16 ARRAYS EACH
;       1824
;       1825            WR_COUNT,                       !# BYTES TRANSFERED VIA 'WRITE'
;       1826            WR_THOUSANDS,                   !THOUSANDS OF BYTES
;       1827            WR_MILLIONS,                    !MILLIONS OF BYTES
;       1828
;       1829            RD_COUNT,                       !# BYTES TRANSFERED VIA 'READ'
;       1830            RD_THOUSANDS,
;       1831            RD_MILLIONS,
;       1832
;       1833            WC_COUNT,                       !# BYTES TRANSFERED VIA 'WRITE CHECK'
;       1834            WC_THOUSANDS,
;       1835            WC_MILLIONS,
;       1836
;       1837            I_AM_DONE,
;       1838            RETRYING,
;       1839            BOARD,
;       1840            BANK;
;       1841
;       1842
;       1843
;       1844    GLOBAL
;       1845
;       1846            ML_REG:VECTOR[NUM_REGS] VOLATILE,
;       1847            PTABLE_ADDR:VECTOR[8] VOLATILE,
;       1848            DRIVE_STATUS:BITVECTOR[8] VOLATILE,
```

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;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                VARIABLES AND CONSTANTS                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (3)

1849            DROPT_DRIVES:BITVECTOR[8] VOLATILE,
1850            WHY_DROPT:VECTOR[8,BYTE],
1851            NUM_DRIVES,
1852            LOW_SECT:VECTOR[8] VOLATILE,
1853            TOP_SECT:VECTOR[8] VOLATILE;
1854
1855
1856
1857    MACRO
1858
1859        !
1860        ! TO CALCULATE THE TEST RANGES FOR A PARTICULAR LOGICAL UNIT:
1861        !
1862
1863            LOWEST  = .LOW_SECT[.LUN]%,             !THE FIRST SECTOR TO TEST
1864            HIGHEST = .TOP_SECT[.LUN]%,             !THE LAST SECTOR TO TEST
1865
1866        !
1867        ! ADDRESS IN MAIN MEMORY THAT CONTAINS THE PHYSICAL DRIVE
1868        ! NUMBER THAT CORRESPONDS TO A PARTICULAR LOGICAL UNIT:
1869        !
1870
1871            DRIVE           = (.PTABLE_ADDR[.LUN] + 6)%,
1872
1873
1874        !
1875        ! ML-11 REGISTER NAMES:
1876        !
1877
1878            MLCS1 = .ML_REG[0]%,    !CONTROL AND STATUS REGISTER 1
1879            MLWC  = .ML_REG[1]%,    !WORD COUNT REGISTER
1880            MLBA  = .ML_REG[2]%,    !UNIBUS ADDRESS REGISTER
1881            MLDA  = .ML_REG[3]%,    !DESIRED ADDRESS REGISTER
1882            MLCS2 = .ML_REG[4]%,    !CONTROL AND STATUS REGISTER 2
1883            MLDS  = .ML_REG[5]%,    !DRIVE STATUS REGISTER
1884            MLER  = .ML_REG[6]%,    !ERROR REGISTER
1885            MLAS  = .ML_REG[7]%,    !ATTENTION SUMMARY REGISTER
1886            MLPA  = .ML_REG[8]%,    !PROM ADDRESS REGISTER
1887            MLDB  = .ML_REG[9]%,    !DATA BUFFER REGISTER
1888            MLMR  = .ML_REG[10]%,   !MAINTENANCE REGISTER
1889            MLDT  = .ML_REG[11]%,   !DRIVE TYPE REGISTER
1890            MLSN  = .ML_REG[12]%,   !SERIAL NUMBER REGISTER
1891            MLE1  = .ML_REG[13]%,   !ECC REGISTER 1
1892            MLE2  = .ML_REG[14]%,   !ECC REGISTER 2
1893            MLD1  = .ML_REG[15]%,   !DATA DIAGNOSTIC REGISTER 1
1894            MLD2  = .ML_REG[16]%,   !DATA DIAGNOSTIC REGISTER 2
1895            MLEE  = .ML_REG[17]%,   !ECC ERROR REGISTER
1896            MLEL  = .ML_REG[18]%,   !ECC ERROR LOCATION REGISTER
1897            MLPD  = .ML_REG[19]%,   !PROM DATA REGISTER
1898            MLBAE = .ML_REG[20]%,   !BUS ADDRESS EXTENSION REGISTER
1899            MLCS3 = .ML_REG[21]%,   !CONTROL AND STATUS REGISTER 3
1900
```

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;MLX4                                   23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                VARIABLES AND CONSTANTS   23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (3)

;
;
;       !
;       ! BIT ASSIGNMENTS:
;       !
;
;       !
;       ! MLCS1 BITS:
;       !
;
;           SC      = (MLCS1)<15,1>%,       !SPECIAL CONDITION
;           TRE     = (MLCS1)<14,1>%,       !TRANSFER ERROR
;           MCPE    = (MLCS1)<13,1>%,       !MASSBUS CONTROL BUS PARITY ERROR
;           DVA     = (MLCS1)<11,1>%,       !DRIVE AVAILABLE
;           RDY     = (MLCS1)<7,1>%,        !READY
;           IE      = (MLCS1)<6,1>%,        !INTERRUPT ENABLE
;           FUNC    = (MLCS1)<0,6>%,        !FUNCTION (COMMAND) CODE AND GO BIT
;
;       !
;       ! MLCS2 BITS:
;       !
;
;           DLT     = (MLCS2)<15,1>%,       !DATA LATE
;           WCE     = (MLCS2)<14,1>%,       !WRITE CHECK ERROR
;           PE      = (MLCS2)<13,1>%,       !PARITY ERROR
;           NED     = (MLCS2)<12,1>%,       !NON-EXISTENT DRIVE
;           NEM     = (MLCS2)<11,1>%,       !NON-EXISTENT MEMORY
;           PGE     = (MLCS2)<10,1>%,       !PROGRAM ERROR
;           MXF     = (MLCS2)<9,1>%,        !MISSED TRANSFER
;           MDPE    = (MLCS2)<8,1>%,        !MASSBUS DATA BUS PARITY ERROR
;           ORDY    = (MLCS2)<7,1>%,        !OUTPUT READY
;           IRDY    = (MLCS2)<6,1>%,        !INPUT READY
;           CLR     = (MLCS2)<5,1>%,        !CONTROLLER CLEAR
;           PAT     = (MLCS2)<4,1>%,        !PARITY TEST
;           BAI     = (MLCS2)<3,1>%,        !UNIBUS ADDRESS INCREMENT INHIBIT
;           UNIT    = (MLCS2)<0,3>%,        !UNIT SELECT
;
;     !
;     ! MLDS BITS:
;     !
;
;           ATA     = (MLDS)<15,1>%,        !ATTENTION ACTIVE
;           ERR     = (MLDS)<14,1>%,        !ERROR SUMMARY
;           MOL     = (MLDS)<12,1>%,        !MEDIUM ON LINE
;           LBT     = (MLDS)<10,1>%,        !LAST BLOCK TRANSFERRED
;           DPR     = (MLDS)<8,1>%,         !DRIVE PRESENT
;           DRY     = (MLDS)<7,1>%,         !DRIVE READY
;           VV      = (MLDS)<6,1>%,         !VOLUME VALID
;
;     !
;     ! MLER BITS:
```

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;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                VARIABLES AND CONSTANTS                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (3)

;          1953      !
;          1954      !
;          1955      !     DCK      = (MLER)<15,1>%,       !DATA CHECK
;          1956      !     UNS      = (MLER)<14,1>%,       !DRIVE UNSAFE
;          1957      !     OPI      = (MLER)<13,1>%,       !OPERATION INCOMPLETE
;          1958      !     IAE      = (MLER)<10,1>%,       !INVALID ADDRESS ERROR
;          1959      !     AOE      = (MLER)<9,1>%,        !ADDRESS OVERFLOW ERROR
;          1960      !     ECH      = (MLER)<6,1>%,        !ECC HARD ERROR
;          1961      !     DPAR     = (MLER)<5,1>%,        !DATA PARITY ERROR
;          1962      !     CPAR     = (MLER)<3,1>%,        !CONTROL PARITY ERROR
;          1963      !     RMR      = (MLER)<2,1>%,        !REGISTER MODIFICATION REFUSED
;          1964      !     ILR      = (MLER)<1,1>%,        !ILLEGAL REGISTER
;          1965      !     ILF      = (MLER)<0,1>%,        !ILLEGAL FUNCTION
;          1966      !
;          1967      !
;          1968      !  MLMR BITS:
;          1969      !
;          1970      !
;          1971      !     SZ       = (MLMR)<11,5>%,       !SYSTEM SIZE (# ARRAY CARDS)
;          1972      !     ARR_TYP  = (MLMR)<10,1>%,       !ARRAY TYPE (0=16K;1=64K CHIPS)
;          1973      !     TRT      = (MLMR)<8,2>%,        !TRANSFER RATE
;          1974      !     REF_MAR  = (MLMR)<7,1>%,        !REFRESH MARGIN
;          1975      !     PROM_RW  = (MLMR)<6,1>%,        !PROM READ/WRITE
;          1976      !     PROM_DIS = (MLMR)<5,1>%,        !PROM DISABLE
;          1977      !     DAT_CLK  = (MLMR)<4,1>%,        !DATA CLOCK
;          1978      !     DAT_DM   = (MLMR)<3,1>%,        !DATA DIAGNOSTIC MODE
;          1979      !     DCK_EN   = (MLMR)<2,1>%,        !DATA CHECK ENABLE
;          1980      !     ECC_DIS  = (MLMR)<1,1>%,        !ECC DISABLE
;          1981      !     ECC_DM   = (MLMR)<0,1>%,        !ECC DIAGNOSTIC MODE
;          1982      !
;          1983      !
;          1984      !  MLSN BITS:
;          1985      !
;          1986      !
;          1987      !     SN3      = (MLSN)<12,4>%,       !HIGH ORDER DECADE
;          1988      !     SN2      = (MLSN)<8,4>%,        !THIRD DECADE
;          1989      !     SN1      = (MLSN)<4,4>%,        !SECOND DECADE
;          1990      !     SN0      = (MLSN)<0,4>%,        !LOW ORDER DECADE
;          1991      !
;          1992      !
;          1993      !  MLEE BITS:
;          1994      !
;          1995      !
;          1996      !     UNC      = (MLEE)<15,1>%,       !UNCORRECTABLE ERROR
;          1997      !     SGL      = (MLEE)<14,1>%,       !SINGLE ERROR
;          1998      !     CRC      = (MLEE)<13,1>%,       !CRC ERROR
;          1999      !     CHAN     = (MLEE)<6,6>%,        !CHANNEL IN ERROR
;          2000      !     EFUN     = (MLEE)<0,6>%;        !ERROR FUNCTION
;          2001
;          2002
;          2003  EXTERNAL
;          2004
```

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;MLX4                                          23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                VARIABLES AND CONSTANTS       23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (3)

;          2005          !
;          2006          !HEADER INFORMATION:
;          2007          !
;          2008
;          2009          L$UNIT, L$LUN,
;          2010
;          2011          !
;          2012          !ALL OF THE SOFTWARE P-TABLE LOCATIONS:
;          2013          !
;          2014
;          2015          LIMIT, RANGE, LSECT, TSECT, ONLY,
;          2016          DROPNE, DROP1, DROP2, DROP3, DROP4, DROP5,
;          2017          MARPAT, REFRESH, ECCDIS, EOPSUM, ERROUT,
;          2018
;          2019          !
;          2020          !RANDOM NUMBER GENERATION VALUES:
;          2021          !
;          2022
;          2023          SEED1, SEED2, SEED3, RANDOM;
;          2024
;          2025
;          2026
;          2027  EXTERNAL ROUTINE
;          2028
;          2029    RN : NOVALUE;          !FOR 16-BIT RANDOM NUMBER GENERATION
;          2030
;          2031
;          2032
;          2033  EQUALS
```

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;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                VARIABLES AND CONSTANTS                23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (4)

;        2034  !+
;        2035  !
;        2036  !  THE PATTERN TABLE:
;        2037  !
;        2038  !
;        2039  !                    R E G U L A R   P A T T E R N S
;        2040  !
;        2041  !  PATTERN                                                    VALUE OF   VALUE OF
;        2042  !  NUMBER              THE TWO ASSOCIATED COUNTS               DATA       COMP
;        2043  !
;        2044  !     1       0 NIBBLES OF DATA, 1024 NIBBLES OF COMP        0101       1010
;        2045  !     2       1 NIBBLE  OF DATA,    1 NIBBLE  OF COMP        0101       1010
;        2046  !     3       4 NIBBLES OF DATA,    4 NIBBLES OF COMP        0101       1010
;        2047  !     4       9 NIBBLES OF DATA,    9 NIBBLES OF COMP        0101       1010
;        2048  !     5    1024 NIBBLES OF DATA, 1024 NIBBLES OF COMP        0101       1010
;        2049  !
;        2050  !     6       0 NIBBLES OF DATA, 1024 NIBBLES OF COMP        0000       1111
;        2051  !     7       1 NIBBLE  OF DATA,    1 NIBBLE  OF COMP        0000       1111
;        2052  !     8       4 NIBBLES OF DATA,    4 NIBBLES OF COMP        0000       1111
;        2053  !     9       9 NIBBLES OF DATA,    9 NIBBLES OF COMP        0000       1111
;        2054  !    10    1024 NIBBLES OF DATA, 1024 NIBBLES OF COMP        0000       1111
;        2055  !
;        2056  !
;        2057  !
;        2058  !                    C O M P L E M E N T   P A T T E R N S
;        2059  !
;        2060  !  PATTERN                                                    VALUE OF   VALUE OF
;        2061  !  NUMBER              THE TWO ASSOCIATED COUNTS               DATA       COMP
;        2062  !
;        2063  !    - 1       0 NIBBLES OF DATA, 1024 NIBBLES OF COMP        1010       0101
;        2064  !    - 2       1 NIBBLE  OF DATA,    1 NIBBLE  OF COMP        1010       0101
;        2065  !    - 3       4 NIBBLES OF DATA,    4 NIBBLES OF COMP        1010       0101
;        2066  !    - 4       9 NIBBLES OF DATA,    9 NIBBLES OF COMP        1010       0101
;        2067  !    - 5    1024 NIBBLES OF DATA, 1024 NIBBLES OF COMP        1010       0101
;        2068  !
;        2069  !    - 6       0 NIBBLES OF DATA, 1024 NIBBLES OF COMP        1111       0000
;        2070  !    - 7       1 NIBBLE  OF DATA,    1 NIBBLE  OF COMP        1111       0000
;        2071  !    - 8       4 NIBBLES OF DATA,    4 NIBBLES OF COMP        1111       0000
;        2072  !    - 9       9 NIBBLES OF DATA,    9 NIBBLES OF COMP        1111       0000
;        2073  !    -10    1024 NIBBLES OF DATA, 1024 NIBBLES OF COMP        1111       0000
;        2074  !-
```

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649 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
650 ;                VARIABLES AND CONSTANTS                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (5)
651
652 ;          2075  FIELD
653 ;          2076     PATMAP =
654 ;          2077        SET
655 ;          2078          COUNT1  = [0,0,16,0],
656 ;          2079          COUNT2  = [1,0,16,0]
657 ;          2080        TES;
658 ;          2081
659 ;          2082
660 ;          2083
661 ;          2084  GLOBAL
662 ;          2085     PATTBL: BLOCKVECTOR [NUM_PATS/2,2] FIELD(PATMAP)
663 ;          2086        PRESET (
664 ;          2087          [0,COUNT1]      = %DECIMAL'0'    ,      !FOR PATTERNS 1, -1, 6, -6
665 ;          2088          [0,COUNT2]      = %DECIMAL'1024',
666 ;          2089
667 ;          2090          [1,COUNT1]      = %DECIMAL'1'    ,      !FOR PATTERNS 2, -2, 7, -7
668 ;          2091          [1,COUNT2]      = %DECIMAL'1'    ,
669 ;          2092
670 ;          2093          [2,COUNT1]      = %DECIMAL'4'    ,      !FOR PATTERNS 3, -3, 8, -8
671 ;          2094          [2,COUNT2]      = %DECIMAL'4'    ,
672 ;          2095
673 ;          2096          [3,COUNT1]      = %DECIMAL'9'    ,      !FOR PATTERNS 4, -4, 9, -9
674 ;          2097          [3,COUNT2]      = %DECIMAL'9'    ,
675 ;          2098
676 ;          2099          [4,COUNT1]      = %DECIMAL'1024',      !FOR PATTERNS 5, -5, 10, -10
677 ;          2100          [4,COUNT2]      = %DECIMAL'1024'
678 ;          2101                );
679 ;          2102
680 ;          2103
681 ;          2104  BIND
682 ;          2105
683 ;          2106        !
684 ;          2107        !  DEFINITIONS OF LOCATIONS WITHIN THE WRITE AND READ BUFFERS:
685 ;          2108        !
686 ;          2109
687 ;          2110           WDBUFF = WBUFF,                  !256-WORD WRITE DATA BUFFER
688 ;          2111           WCBUFF = WBUFF + 512,            !256-WORD WRITE COMP BUFFER
689 ;          2112
690 ;          2113           RDBUFF = RBUFF,                  !256-WORD READ DATA BUFFER
691 ;          2114           RCBUFF = RBUFF + 512,            !256-WORD READ COMP BUFFER
692 ;          2115
693 ;          2116           END_WBUFF = (WBUFF + BUFSIZ*2), !JUST BEYOND END OF FULL WRITE BUFFER
694 ;          2117           END_RBUFF = (RBUFF + BUFSIZ*2), !JUST BEYOND END OF FULL READ  BUFFER
```

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;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                MESSAGES AND PRINT FORMATS             23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (6)

;        2118  %SBTTL  'MESSAGES AND PRINT FORMATS'
;        2119
;        2120        !
;        2121        !  SPECIAL PURPOSE FORMATS (WITH SAMPLE PRINTOUTS):
;        2122        !
;        2123
;        2124           FMT1A    = UPLIT(%ASCIZ'%N%T%S2%D2'),
;        2125                       !'PATTERN NUMBER  XX'
;        2126
;        2127           FMT1B    = UPLIT(%ASCIZ'%S7%T%S%A-%D2'),
;        2128                       !'        PATTERN NUMBER -XX'
;        2129
;        2130           FMT2     = UPLIT(%ASCIZ'%S2%T'),
;        2131                       !'  (NOT POWERED UP)'
;        2132                       !'  (NOT AN ML11 UNIT)'
;        2133                       !'  (OPERATOR SELECTED TEST LIMITS INCORRECTLY)'
;        2134                       !'  (ALL RETRIES FAILED FOR A NON-FATAL ERROR)'
;        2135                       !'  (CONTROLLER FATAL ERROR)'
;        2136                       !'  (DRIVE FATAL ERROR)'
;        2137                       !'  (ECC HARD ERROR)'
;        2138                       !'  UP'
;        2139                       !'  DOWN'
;        2140                       !'  --> RUN ML11 PROM MAINTENANCE PROGRAM'
;        2141
;        2142           FMT3     = UPLIT(%ASCIZ'%N%A**%S%T%S%T%D3%S%A**'),
;        2143                       !'** END PASS  X **'
;        2144
;        2145           FMT4A    = UPLIT(%ASCIZ'%N2%T%A:%S%D1%S4%T%A:%S%D1'),
;        2146                       !'LOGICAL UNIT: X    DRIVE: Y'
;        2147
;        2148           FMT4B    = UPLIT(%ASCIZ'%S4%T%A:%S%O6'),
;        2149                       !'     SERIAL #: ZZZZZZ'
;        2150                       !'     CSR ADDRESS: XXXXXX'
;        2151
;        2152           FMT4C    = UPLIT(%ASCIZ'%S4%T%A:%S%D1%D1%D1%D1'),
;        2153                       !'     SERIAL #: DDDD'
;        2154
;        2155           FMT5     = UPLIT(%ASCIZ'%N%T%S3%ASECTORS UNDER TEST:%S%O6%S%ATO%S%O6'),
;        2156                       !'ML11-X   SECTORS UNDER TEST: XXXXXX TO YYYYYY'
;        2157
;        2158           FMT6     = UPLIT(%ASCIZ'%N%ABEGAN %D4%A WORD%S%T%A AT%S%T%S%O6'),
;        2159                       !'BEGAN YYYY WORD WRITE AT SECTOR ZZZZZZ'
;        2160                       !'BEGAN YYYY WORD READ AT SECTOR ZZZZZZ'
;        2161                       !'BEGAN YYYY WORD WRITE CHECK AT SECTOR ZZZZZZ'
;        2162
;        2163           FMT7     = UPLIT(%ASCIZ'%N%S2%T%A:%S%D5'),
;        2164                       !'  SOFT ERROR COUNT: DDDDD'
;        2165                       !'  HARD ERROR COUNT: DDDDD'
;        2166                       !'  TRANSFER RETRIES: DDDDD'
;        2167
;        2168           FMT8     = UPLIT(%ASCIZ'%N%ATRANSFER RATE: %T%A MBYTES/SECOND'),
;        2169                       !'TRANSFER RATE: X MBYTES/SECOND'
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                MESSAGES AND PRINT FORMATS             23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (6)

;          2170
;          2171          FMT9    = UPLIT(%ASCIZ'%N%S4%AARRAY%D3%A:%S%D5'),
;          2172                      !'    ARRAY XX: YYYYY'
;          2173
;          2174          FMT10A  = UPLIT(%ASCIZ'%N%T%A:%S2%T%S%O6%S2%ABOARD%D3%S2%ABANK%D2'),
;          2175                      !'FAILED:  SECTOR XXXXXX  BOARD YY  BANK Z
;          2176
;          2177          FMT10B  = UPLIT(%ASCIZ'%S2%ABIT%D3'),
;          2178                      !'  BIT QQ'
;          2179
;          2180          FMT11   = UPLIT(%ASCIZ'%N%T%S%O6%A EXCEEDS %T%S%O6'),
;          2181            !'TOP SECTOR OF XXXXXX EXCEEDS SYSTEM LIMIT OF YYYYYY'
;          2182            !'LOW SECTOR OF XXXXXX EXCEEDS TOP SECTOR OF YYYYYY'
;          2183
;          2184          FMT12A  = UPLIT(%ASCIZ'%N%AGOOD DATA: %O6%A AT LOCATION %O6'),
;          2185                      !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
;          2186
;          2187          FMT12B  = UPLIT(%ASCIZ'%N%ABAD DATA:  %O6%A AT LOCATION %O6'),
;          2188                      !'BAD DATA:  XXXXXX AT LOCATION YYYYYY'
;          2189
;          2190          FMT13   = UPLIT(%ASCIZ'%N%AARRAY%D3%S2%T'),
;          2191                      !'ARRAY XX  --> RUN ML11 PROM MAINTENANCE PROGRAM'
;          2192
;          2193          FMT14   = UPLIT(%ASCIZ'%N%D5%S%T'),
;          2194                      !'XXXXX MBYTES WRITTEN'
;          2195                      !'XXXXX MBYTES READ'
;          2196                      !'XXXXX MBYTES WRITE CHECKED'
;          2197
;          2198          FMT15   = UPLIT(%ASCIZ'%S2%T'),
;          2199                      !'  ECH'
;          2200                      !'  NED'
;          2201                      !(ANY OF THE ERROR BITS)
;          2202
;          2203          CRLF    = UPLIT(%ASCIZ'%N'),
;          2204
;          2205      !
;          2206      !   MESSAGE MAPS:
;          2207      !
;          2208
;          2209          SAY1    = UPLIT(%ASCIZ'%N%T'),
;          2210          SAY2    = UPLIT(%ASCIZ'%N%T%S%T'),
;          2211          SAY3    = UPLIT(%ASCIZ'%N%T%S%T%S%T'),
;          2212          SAY4    = UPLIT(%ASCIZ'%N%T%S%T%S%T%S%T'),
;          2213          SAY5    = UPLIT(%ASCIZ'%N%T%S%T%S%T%S%T%S%T'),
;          2214
;          2215      !
;          2216      !   WORDS:
;          2217      !
;          2218
;          2219          WRD2    = UPLIT(%ASCIZ'BEGIN'),
;          2220          WRD3    = UPLIT(%ASCIZ'END'),
;          2221          WRD4    = UPLIT(%ASCIZ'PASS'),
```

```
;MLX4
;                    MESSAGES AND PRINT FORMATS

;          2222          WRD6    = UPLIT(%ASCIZ'ML11-A'),
;          2223          WRD7    = UPLIT(%ASCIZ'ML11-B'),
;          2224          WRD11   = UPLIT(%ASCIZ'DRIVE'),
;          2225          WRD15   = UPLIT(%ASCIZ'SECTOR'),
;          2226          WRD16   = UPLIT(%ASCIZ'WRITE'),
;          2227          WRD17   = UPLIT(%ASCIZ'READ'),
;          2228          WRD18   = UPLIT(%ASCIZ'RETRY'),
;          2229          WRD19   = UPLIT(%ASCIZ'SUCCEEDED'),
;          2230          WRD20   = UPLIT(%ASCIZ'FAILED'),
;          2231          WRD21   = UPLIT(%ASCIZ'DROPPED'),
;          2232          WRD24   = UPLIT(%ASCIZ'UP'),
;          2233          WRD25   = UPLIT(%ASCIZ'DOWN'),
;          2234          WRD34   = UPLIT(%ASCIZ'RUNNING'),
;          2235          WRD35   = UPLIT(%ASCIZ'MARCHING:  '),
;          2236          WRD36   = UPLIT(%ASCIZ'ENABLED'),
;          2237          WRD37   = UPLIT(%ASCIZ'DISABLED'),
;          2238          WRD38   = UPLIT(%ASCIZ'ECC'),
;          2239          WRD40   = UPLIT(%ASCIZ'WITH'),
;          2240          WRD41   = UPLIT(%ASCIZ'AND'),
;          2241
;          2242
;          2243      !
;          2244      !   ML-11 BITS:
;          2245      !
;          2246
;          2247
;          2248          MLB2    = UPLIT(%ASCIZ'NED'),
;          2249          MLB3    = UPLIT(%ASCIZ'NEM'),
;          2250          MLB4    = UPLIT(%ASCIZ'PGE'),
;          2251          MLB5    = UPLIT(%ASCIZ'DLT'),
;          2252          MLB6    = UPLIT(%ASCIZ'WCE'),
;          2253          MLB7    = UPLIT(%ASCIZ'PE'),
;          2254          MLB8    = UPLIT(%ASCIZ'MXF'),
;          2255          MLB9    = UPLIT(%ASCIZ'MDPE'),
;          2256          MLB10   = UPLIT(%ASCIZ'MCPE'),
;          2257          MLB11   = UPLIT(%ASCIZ'UNS'),
;          2258          MLB12   = UPLIT(%ASCIZ'IAE'),
;          2259          MLB13   = UPLIT(%ASCIZ'AOE'),
;          2260          MLB14   = UPLIT(%ASCIZ'RMR'),
;          2261          MLB15   = UPLIT(%ASCIZ'ILR'),
;          2262          MLB16   = UPLIT(%ASCIZ'ILF'),
;          2263          MLB17   = UPLIT(%ASCIZ'OPI'),
;          2264          MLB18   = UPLIT(%ASCIZ'DPAR'),
;          2265          MLB19   = UPLIT(%ASCIZ'CPAR'),
;          2266          MLB20   = UPLIT(%ASCIZ'DCK'),
;          2267          MLB21   = UPLIT(%ASCIZ'ECH'),
;          2268          MLB22   = UPLIT(%ASCIZ'CRC'),
;          2269          MLB23   = UPLIT(%ASCIZ'SGL'),
;          2270          MLB24   = UPLIT(%ASCIZ'UNC'),
;          2271
;          2272
;          2273      !
```

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;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;    - - ------MESSAGES AND PRINT FORMATS                23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (6)

;          2274        !  ROUTINE NAMES:
;          2275        !
;          2276
;          2277
;          2278           RTN0    = UPLIT(%ASCIZ'COMMAND INTEGRITY ROUTINE'),
;          2279           RTN1    = UPLIT(%ASCIZ'OPT1'),
;          2280           RTN2    = UPLIT(%ASCIZ'OPT2'),
;          2281           RTN3    = UPLIT(%ASCIZ'OPT3'),
;          2282           RTN4    = UPLIT(%ASCIZ'OPT4'),
;          2283           RTN5    = UPLIT(%ASCIZ'OPT5'),
;          2284           RTN5A   = UPLIT(%ASCIZ'RAND1'), !RANDOM DATA
;          2285           RTN5B   = UPLIT(%ASCIZ'RAND2'), !DATA & WORD COUNTS
;          2286           RTN5C   = UPLIT(%ASCIZ'RAND3'), !DATA, WORD COUNTS & SECTORS
;          2287           RTN5D   = UPLIT(%ASCIZ'RAND4'), !DATA, WORD COUNTS, SECTORS & UNITS
;          2288
;          2289
;          2290        !
;          2291        !  PHRASES:
;          2292        !
;          2293
;          2294           PHR1    = UPLIT(%ASCIZ'WRITE CHECK'),
;          2295           PHR2    = UPLIT(%ASCIZ'QUICK VERIFY'),
;          2296           PHR3    = UPLIT(%ASCIZ'REFRESH MARGINING'),
;          2297           PHR4    = UPLIT(%ASCIZ'CSR ADDRESS'),
;          2298           PHR5    = UPLIT(%ASCIZ'SOFT ERROR COUNT'),
;          2299           PHR6    = UPLIT(%ASCIZ'TRANSFER RETRIES'),
;          2300           PHR7    = UPLIT(%ASCIZ'LOGICAL UNIT'),
;          2301           PHR8    = UPLIT(%ASCIZ'SERIAL #'),
;          2302           PHR9    = UPLIT(%ASCIZ'PATTERN NUMBER'),
;          2303           PHR10   = UPLIT(%ASCIZ'ERROR BITS SET:'),
;          2304           PHR11   = UPLIT(%ASCIZ'SC SET BUT NO SYSTEM ERRORS FOUND'),
;          2305           PHR12   = UPLIT(%ASCIZ'NUMBER OF MBYTES TRANSFERED:'),
;          2306           PHR13   = UPLIT(%ASCIZ'MBYTES WRITE CHECKED'),
;          2307           PHR14   = UPLIT(%ASCIZ'TOP SECTOR OF'),
;          2308           PHR15   = UPLIT(%ASCIZ'LOW SECTOR OF'),
;          2309           PHR16   = UPLIT(%ASCIZ'SYSTEM LIMIT OF'),
;          2310           PHR17   = UPLIT(%ASCIZ'PERFORMANCE SUMMARY'),
;          2311           PHR18   = UPLIT(%ASCIZ'HARD ERROR COUNT'),
;          2312           PHR19   = UPLIT(%ASCIZ'MBYTES WRITTEN'),
;          2313           PHR20   = UPLIT(%ASCIZ'MBYTES READ'),
;          2314
;          2315
;          2316        !
;          2317        !  TRANSFER RATES:
;          2318        !
;          2319
;          2320           TRT00   = UPLIT(%ASCIZ'2'),
;          2321           TRT01   = UPLIT(%ASCIZ'1'),
;          2322           TRT10   = UPLIT(%ASCIZ'.5'),
;          2323           TRT11   = UPLIT(%ASCIZ'.25'),
;          2324
;          2325        !
```

```
2326        !  DROP MESSAGES:
2327        !
2328
2329           CAUSE1  = UPLIT(%ASCIZ'(NOT POWERED UP)'),
2330           CAUSE2  = UPLIT(%ASCIZ'(NOT AN ML11 UNIT)'),
2331           CAUSE3  = UPLIT(%ASCIZ'(OPERATOR SELECTED TEST LIMITS INCORRECTLY)'),
2332           CAUSE4  = UPLIT(%ASCIZ'(ALL RETRIES FAILED FOR A NON-FATAL ERROR)'),
2333           CAUSE5  = UPLIT(%ASCIZ'(CONTROLLER FATAL ERROR)'),
2334           CAUSE6  = UPLIT(%ASCIZ'(DRIVE FATAL ERROR)'),
2335           CAUSE7  = UPLIT(%ASCIZ'(ECC HARD ERROR)'),
2336           CAUSE8  = UPLIT(%ASCIZ'(ECC LOGIC FAILURE)'),
2337
2338        !
2339        !  DIAGNOSES:
2340        !
2341
2342           MSG0    = UPLIT(%ASCIZ'INTERRUPT DID NOT OCCUR, BUT THE TRANSFER IS COMPLETE'),
2343           MSG1    = UPLIT(%ASCIZ'--> RUN ML11 LOGIC TEST'),
2344           MSG2    = UPLIT(%ASCIZ'--> RUN ML11 PROM MAINTENANCE PROGRAM'),
2345           MSG3    = UPLIT(%ASCIZ'SOFT ERROR'),
2346           MSG4    = UPLIT(%ASCIZ'HARD ERROR'),
2347           MSG5    = UPLIT(%ASCIZ'ECC LOGIC FAILED TO DETECT DATA ERROR');
2348
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               ML11 INTERRUPT SERVICE ROUTINE           23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (7)

;       2349    %SBTTL  'ML11 INTERRUPT SERVICE ROUTINE'
;       2350
;       2351    BGNSRV(SERVICE)
;       2352
;       2353    I_AM_DONE = ACTIVE;
;       2354
;       2355    ENDSRV


                                        .TITLE  MLX4
```

```
1595 010706                     WBUFF:   .BLKW   4000
1596 020706                     RBUFF:   .BLKW   4000
1597 030706                     WPTR:    .BLKW   1
1598 030710                     RPTR:    .BLKW   1
1599 030712                     QUICK:   .BLKW   1
1600 030714                     PATTERN: .BLKW   1
1601 030716                     DATA.COUNT:
1602 030716                              .BLKW   1
1603 030720                     COMP.COUNT:
1604 030720                              .BLKW   1
1605 030722                     EOP.COUNT:
1606 030722                              .BLKW   1
1607 030724                     BASE.ADDR:
1608 030724                              .BLKW   1
1609 030726                     VEC:     .BLKW   1
1610 030730                     BR.LEVEL:
1611 030730                              .BLKW   1
1612 030732                     SOFTS:   .BLKW   200
1613 031332                     HARDS:   .BLKW   200
1614 031732                     TRIES:   .BLKW   200
1615 032332                     WR.COUNT:
1616 032332                              .BLKW   1
1617 032334                     WR.THOUSANDS:
```

```
                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                        ;               ML11 INTERRUPT SERVICE ROUTINE          23-Oct-1980 14:57:05    PA:<

032334                          .BLKW   1
032336                  WR.MILLIONS:
032336                          .BLKW   1
032340                  RD.COUNT:
032340                          .BLKW   1
032342                  RD.THOUSANDS:
032342                          .BLKW   1
032344                  RD.MILLIONS:
032344                          .BLKW   1
032346                  WC.COUNT:
032346                          .BLKW   1
032350                  WC.THOUSANDS:
032350                          .BLKW   1
032352                  WC.MILLIONS:
032352                          .BLKW   1
032354                  I.AM.DONE:
032354                          .BLKW   1
032356                  RETRYING:
032356                          .BLKW   1
032360                  BOARD:  .BLKW   1
032362                  BANK:   .BLKW   1


032364                  ML.REG::.BLKW   26
032440                  PTABLE.ADDR::
032440                          .BLKW   10
032460                  DRIVE.STATUS::
032460                          .BLKB   1
                                .EVEN
032462                  DROPT.DRIVES::
032462                          .BLKB   1
                                .EVEN
032464                  WHY.DROPT::
032464                          .BLKW   4
032474                  NUM.DRIVES::
032474                          .BLKW   1
032476                  LOW.SECT::
032476                          .BLKW   10
032516                  TOP.SECT::
032516                          .BLKW   10
032536  000000          PATTBL::.WORD   0
032540  002000                  .WORD   2000
032542  000001                  .WORD   1
032544  000001                  .WORD   1
032546  000004                  .WORD   4
032550  000004                  .WORD   4
032552  000011                  .WORD   11
032554  000011                  .WORD   11
032556  002000                  .WORD   2000
032560  002000                  .WORD   2000
```

```
                                ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                ;               ML11 INTERRUPT SERVICE ROUTINE          23-Oct-1980 14:57:05    PA:<


                                        .GLOBL  L$UNIT, L$LUN, LIMIT, RANGE, LSECT
                                        .GLOBL  TSECT, ONLY, DROPNE, DROP1, DROP2
                                        .GLOBL  DROP3, DROP4, DROP5, MARPAT, REFRESH
                                        .GLOBL  ECCDIS, EOPSUM, ERROUT, SEED1
                                        .GLOBL  SEED2, SEED3, RANDOM, RN


100000                          BIT15==         -100000
040000                          BIT14==         40000
020000                          BIT13==         20000
010000                          BIT12==         10000
004000                          BIT11==         4000
002000                          BIT10==         2000
001000                          BIT09==         1000
000400                          BIT08==         400
000200                          BIT07==         200
000100                          BIT06==         100
000040                          BIT05==         40
000020                          BIT04==         20
000010                          BIT03==         10
000004                          BIT02==         4
000002                          BIT01==         2
000001                          BIT00==         1
001000                          BIT9==          1000
000400                          BIT8==          400
000200                          BIT7==          200
000100                          BIT6==          100
000040                          BIT5==          40
000020                          BIT4==          20
000010                          BIT3==          10
000004                          BIT2==          4
000002                          BIT1==          2
000001                          BIT0==          1
000040                          EF.START==      40
000037                          EF.RESTART==    37
000036                          EF.CONTINUE==   36
000035                          EF.NEW==        35
000034                          EF.PWR==        34
000340                          PRI07==         340
000300                          PRI06==         300
000240                          PRI05==         240
000200                          PRI04==         200
000140                          PRI03==         140
000100                          PRI02==         100
000040                          PRI01==         40
000000                          PRI00==         0
000004                          EVL==           4
000010                          LOT==           10
000020                          ADR==           20
000040                          IDU==           40
```

```
1730                                    ;MLX4
1731                                    ;               ML11 INTERRUPT SERVICE ROUTINE
1732
1733            000100                  ISR==           100
1734            000200                  UAM==           200
1735            000400                  BOE==           400
1736            001000                  PNT==           1000
1737            002000                  PRI==           2000
1738            004000                  IXE==           4000
1739            010000                  IBE==           10000
1740            020000                  IER==           20000
1741            040000                  LOE==           40000
1742            100000                  HOE==           -100000
1743            010706                  WDBUFF=         WBUFF
1744            011706                  WCBUFF=         WBUFF+1000
1745            020706                  RDBUFF=         RBUFF
1746            021706                  RCBUFF=         RBUFF+1000
1747            020706                  END.WBUFF=      WBUFF+10000
1748            030706                  END.RBUFF=      RBUFF+10000
```

```
 1878
 1879
 1880                                        .SBTTL  SERVICE ML11 INTERRUPT SERVICE ROUTINE
 1881
 1885 032562                                 SERVICE::
 1886 032562  012737  000001  032354                 MOV     #1,I.AM.DONE                    ;                2353
 1887 032570  000002                                 RTI                                     ;                2351
 1888
 1889                                        ; Routine Size:  4 words
 1890                                        ; Maximum stack depth per invocation:  0 words
 1895
 1896
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                ONCE-ONLY CODE                         23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (8)

;        2356  %SBTTL  'ONCE-ONLY CODE'
;        2357
;        2358  ROUTINE CLRTBLS: NOVALUE =
;        2359  BEGIN  !* 1 *
;        2360
;        2361  !++
;        2362  !  ROUTINE:     CLRTBLS
;        2363  !
;        2364  !  PURPOSE:     THIS ROUTINE IS CALLED BY THE INITIALIZATION CODE WHEN
;        2365  !               A 'START' OR 'RESTART' COMMAND HAS BEEN USED TO BEGIN
;        2366  !               THE PROGRAM.  THE PURPOSES OF THE ROUTINE ARE:
;        2367  !
;        2368  !               (1)  TO INITIALIZE STATISTICS TABLES
;        2369  !
;        2370  !               (2)  TO SET ALL DRIVE AND ARRAY STATUS LOCATIONS TO ACTIVE
;        2371  !                    NOTE:  EVEN IF A UNIT WAS DROPPED DURING A PREVIOUS
;        2372  !                           RUN, THE START OR RESTART COMMAND GUARANTEES
;        2373  !                           THAT THE DRIVE WILL ONCE AGAIN BE TESTABLE.
;        2374  !
;        2375  !               (3)  TO ENABLE THE RUNNING OF ALL TEST OPTIONS IF THE
;        2376  !                    OPERATOR WANTED THEM ALL TO RUN.
;        2377  !--
;        2378
;        2379          !+
;        2380          !THIS IS THE CODE FOR PURPOSE 1:
;        2381          !-
;        2382
;        2383  INCR LUN FROM 0 TO (.L$UNIT - 1) DO
;        2384     BEGIN
;        2385     INCR ARRAY FROM 0 TO 15 DO
;        2386        BEGIN
;        2387        SOFTS[.LUN,.ARRAY,0,16,0] = 0;
;        2388        HARDS[.LUN,.ARRAY,0,16,0] = 0;
;        2389        TRIES[.LUN,.ARRAY,0,16,0] = 0;
;        2390        END;
;        2391     END;
;        2392
;        2393  EOP_COUNT = 0;
;        2394  NUM_DRIVES = 0;
;        2395  RETRYING = INACTIVE;
;        2396
;        2397  WR_COUNT = 0;
;        2398  WR_THOUSANDS = 0;
;        2399  WR_MILLIONS = 0;
;        2400
;        2401  RD_COUNT = 0;
;        2402  RD_THOUSANDS = 0;
;        2403  RD_MILLIONS = 0;
;        2404
;        2405  WC_COUNT = 0;
;        2406  WC_THOUSANDS = 0;
;        2407  WC_MILLIONS = 0;
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               ONCE-ONLY CODE                           23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (8)

;          2408
;          2409          !+
;          2410          !THIS IS THE CODE FOR PURPOSE 2:
;          2411          !-
;          2412
;          2413  INCR LUN FROM 0 TO (.L$UNIT - 1) DO
;          2414     BEGIN  !* 2 *
;          2415     L$LUN = .LUN;
;          2416     LOW_SECT[.LUN] = 0;
;          2417     DRIVE_STATUS[.LUN] = ACTIVE;
;          2418     DROPT_DRIVES[.LUN] = INACTIVE;
;          2419     WHY_DROPT[.LUN] = 0;
;          2420     END;   !* 2 *
;          2421
;          2422          !+
;          2423          !THIS IS THE CODE FOR PURPOSE 3:
;          2424          !-
;          2425
;          2426  IF .DROPNE EQL 0
;          2427  THEN
;          2428     BEGIN  !* 3 *
;          2429     DROP1 = 0;
;          2430     DROP2 = 0;
;          2431     DROP3 = 0;
;          2432     DROP4 = 0;
;          2433     DROP5 = 0;
;          2434     END;   !* 3 *
;          2435
;          2436  RETURN;
;          2437
;          2438  END;   !* 1 *
1991
1992                                        .SBTTL  CLRTBLS ONCE-ONLY CODE
1996 032572  004137  005202          CLRTBLS:JSR     R1,$SAVE4                ;                        2358
1997 032576  013704  002012                  MOV     L$UNIT,R4                ;                        2383
1998 032602  005003                          CLR     R3                       ; LUN
1999 032604  000424                          BR      3$
2000 032606  010300                  1$:     MOV     R3,R0                    ; LUN,*                  2387
2001 032610  006300                          ASL     R0
2002 032612  006300                          ASL     R0
2003 032614  006300                          ASL     R0
2004 032616  006300                          ASL     R0
2005 032620  005001                          CLR     R1                       ; ARRAY                  2385
2006 032622  010002                  2$:     MOV     R0,R2                    ;                        2387
2007 032624  060102                          ADD     R1,R2                    ; ARRAY,*
2008 032626  006302                          ASL     R2
```

```
                                ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                ;                       ONCE-ONLY CODE                  23-Oct-1980 14:57:05    PA:<
                                
032630  005062  030732                  CLR     SOFTS(R2)
032634  005062  031332                  CLR     HARDS(R2)               ;                                       2388
032640  005062  031732                  CLR     TRIES(R2)               ;                                       2389
032644  005201                          INC     R1                      ; ARRAY                                 2385
032646  020127  000017                  CMP     R1,#17                  ; ARRAY,*
032652  003763                          BLE     2$
032654  005203                          INC     R3                      ; LUN                                   2383
032656  020304          3$:             CMP     R3,R4                   ; LUN,*
032660  002752                          BLT     1$
032662  005037  030722                  CLR     EOP.COUNT               ;                                       2393
032666  005037  032474                  CLR     NUM.DRIVES              ;                                       2394
032672  005037  032356                  CLR     RETRYING                ;                                       2395
032676  005037  032332                  CLR     WR.COUNT                ;                                       2397
032702  005037  032334                  CLR     WR.THOUSANDS            ;                                       2398
032706  005037  032336                  CLR     WR.MILLIONS             ;                                       2399
032712  005037  032340                  CLR     RD.COUNT                ;                                       2401
032716  005037  032342                  CLR     RD.THOUSANDS            ;                                       2402
032722  005037  032344                  CLR     RD.MILLIONS             ;                                       2403
032726  005037  032346                  CLR     WC.COUNT                ;                                       2405
032732  005037  032350                  CLR     WC.THOUSANDS            ;                                       2406
032736  005037  032352                  CLR     WC.MILLIONS             ;                                       2407
032742  005002                          CLR     R2                      ; LUN                                   2413
032744  000445                          BR      5$
032746  010237  002074          4$:     MOV     R2,L$LUN                ; LUN,*                                 2415
032752  010201                          MOV     R2,R1                   ; LUN,*                                 2416
032754  006301                          ASL     R1
032756  005061  032476                  CLR     LOW.SECT(R1)
032762  010201                          MOV     R2,R1                   ; LUN,*                                 2417
032764  006201                          ASR     R1
032766  006201                          ASR     R1
032770  006201                          ASR     R1
032772  010146                          MOV     R1,-(SP)
032774  062716  032460                  ADD     #DRIVE.STATUS,(SP)
033000  010246                          MOV     R2,-(SP)                ; LUN,*
033002  042716  177770                  BIC     #177770,(SP)
033006  012746  000001                  MOV     #1,-(SP)
033012  011646                          MOV     (SP),-(SP)
033014  004737  004502                  JSR     PC,BL$PU2
033020  010116                          MOV     R1,(SP)                 ;                                       2418
033022  062716  032462                  ADD     #DROPT.DRIVES,(SP)
033026  010246                          MOV     R2,-(SP)                ; LUN,*
033030  042716  177770                  BIC     #177770,(SP)
033034  012746  000001                  MOV     #1,-(SP)
033040  005046                          CLR     -(SP)
033042  004737  004502                  JSR     PC,BL$PU2
033046  105062  032464                  CLRB    WHY.DROPT(R2)           ; *(LUN)                                2419
033052  062706  000016                  ADD     #16,SP                  ;                                       2414
033056  005202                          INC     R2                      ; LUN                                   2413
033060  020204          5$:             CMP     R2,R4                   ; LUN,*
033062  002731                          BLT     4$
033064  005737  002234                  TST     DROPNE                  ;                                       2426
033070  001012                          BNE     6$
```

```
MLX4    MACRO M1113  24-OCT-80 09:59  PAGE 127                                                                    SEQ 0082
CLRTBLS ONCE-ONLY CODE

                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;                       ONCE-ONLY CODE                  23-Oct-1980 14:57:05    PA:<

033072  005037  002236                        CLR     DROP1                           ;                               2429
033076  005037  002240                        CLR     DROP2                           ;                               2430
033102  005037  002242                        CLR     DROP3                           ;                               2431
033106  005037  002244                        CLR     DROP4                           ;                               2432
033112  005037  002250                        CLR     DROP5                           ;                               2433
033116  000207                        6$:     RTS     PC  .                           ;                               2358

                                        ; Routine Size:  107 words
                                        ; Maximum stack depth per invocation:  12 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               ONCE-ONLY CODE                           23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (9)

;          2439  ROUTINE INIT_ADDRESSES(PLOC): NOVALUE =
;          2440  BEGIN  !* 1 *
;          2441
;          2442  !++
;          2443  !  ROUTINE:     INIT_ADDRESSES(PLOC)
;          2444  !
;          2445  !  PURPOSE:     THIS ROUTINE IS CALLED ONLY ONCE DURING THE INITIALIZATION
;          2446  !               CODE, EVEN IF THERE IS MORE THAN ONE DRIVE PRESENT.  THE
;          2447  !               PURPOSES OF THE ROUTINE ARE:
;          2448  !
;          2449  !               (1)  TO OBTAIN HARDWARE P-TABLE INFORMATION FROM
;          2450  !                    MAIN MEMORY WHICH PERTAINS TO ALL DRIVES.
;          2451  !
;          2452  !               (2)  TO SET UP THE ADDRESSES FOR THE 22 ML-11 REGISTERS.
;          2453  !
;          2454  !               (3)  TO SET UP THE INTERRUPT SERVICE ROUTINE AT THE
;          2455  !                    CORRECT PRIORITY, AND LOWER THE CPU PRIORITY TO
;          2456  !                    ALLOW INTERRUPTS TO OCCUR.
;          2457  !
;          2458  !  ARGUMENT:    PLOC = THE POINTER TO THE LOCATION IN MAIN MEMORY WHERE
;          2459  !                      THE HARDWARE P-TABLE IS TO BE FOUND.
;          2460  !--
;          2461
;          2462  LOCAL
;          2463     TEMP, PRIORITY, OFFSET;
;          2464
;          2465           !+
;          2466           !THIS IS THE CODE FOR PURPOSE 1:
;          2467           !-
;          2468
;          2469  BASE_ADDR = .(.PLOC + 0);
;          2470  VEC       = .(.PLOC + 2);
;          2471  BR_LEVEL  = .(.PLOC + 4);
;          2472  PRIORITY  = .BR_LEVEL^5;
;          2473
;          2474  IF .ECCDIS
;          2475  THEN  TEMP = WRD37      !ECC IS DISABLED
;          2476  ELSE  TEMP = WRD36;     !ECC IS ENABLED (NORMAL OPERATION)
;          2477
;          2478  PRINTB(CRLF);
;          2479  PRINTB(SAY5,WRD34,WRD40,WRD38,.TEMP,WRD41);
;          2480     !'RUNNING WITH ECC ENABLED/DISABLED AND'
;          2481
;          2482  IF .REFRESH
;          2483  THEN  TEMP = WRD36      !REFRESH MARGINING IS ENABLED
;          2484  ELSE  TEMP = WRD37;     !REFRESH MARGINING IS DISABLED (NORMAL OPERATION)
;          2485
;          2486  PRINTB(SAY3,WRD40,PHR3,.TEMP);
;          2487     !'WITH REFRESH MARGINING ENABLED/DISABLED'
;          2488  PRINTB(CRLF);
;          2489
;          2490           !+
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               ONCE-ONLY CODE                           23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (9)

;          2491          !THIS IS THE CODE FOR PURPOSE 2:
;          2492          !-
;          2493
;          2494  OFFSET = 0;
;          2495
;          2496  INCR COUNT FROM 0 TO (NUM_REGS - 1) DO
;          2497     BEGIN  !* 2 *
;          2498     ML_REG[.COUNT] = .BASE_ADDR + .OFFSET;
;          2499     OFFSET = .OFFSET + 2;
;          2500     END;   !* 2 *
;          2501
;          2502          !+
;          2503          !THIS IS THE CODE FOR PURPOSE 3:
;          2504          !-
;          2505
;          2506  SETPRI(PRI00);
;          2507  SETVEC(.VEC,SERVICE,.PRIORITY);
;          2508
;          2509  RETURN;
;          2510
;          2511  END;   !* 1 *
2168
2169                                    .SBTTL  INIT.ADDRESSES ONCE-ONLY CODE
2173 033120                        INIT.ADDRESSES:
2174 033120  004137  005202                JSR     R1,$SAVE4                       ;                       2439
2175 033124  016602  000014                MOV     14(SP),R2                       ; PLOC,*                2469
2176 033130  011237  030724                MOV     (R2),BASE.ADDR
2177 033134  016237  000002  030726        MOV     2(R2),VEC                       ;                       2470
2178 033142  016237  000004  030730        MOV     4(R2),BR.LEVEL                  ;                       2471
2179 033150  013746  030730                MOV     BR.LEVEL,-(SP)                  ;                       2472
2180 033154  012746  000005                MOV     #5,-(SP)
2181 033160  004737  005102                JSR     PC,BL$SHF
2182 033164  010003                       MOV     R0,R3                           ; *,PRIORITY
2183 033166  032737  000001  002254        BIT     #1,ECCDIS                       ;                       2474
2184 033174  001403                        BEQ     1$
2185 033176  012701  007022                MOV     #WRD37,R1                       ; *,TEMP                2475
2186 033202  000402                        BR      2$                              ;                       2474
2187 033204  012701  007012          1$:   MOV     #WRD36,R1                       ; *,TEMP                2476
2188 033210  012716  006510          2$:   MOV     #CRLF,(SP)                      ;                       2478
2189 033214  012746  000001                MOV     #1,-(SP)
2190 033220  010600                        MOV     SP,R0                           ; SP,*
2191 033222  104414                        TRAP    14                              ;
2192 033224  012716  007046                MOV     #WRD41,(SP)                     ;                       2479
2193 033230  010146                        MOV     R1,-(SP)                        ; TEMP,*
2194 033232  012746  007034                MOV     #WRD38,-(SP)
2195 033236  012746  007040                MOV     #WRD40,-(SP)
```

```
                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               ONCE-ONLY CODE                          23-Oct-1980 14:57:05    PA:<
                                
033242  012746  006766                        MOV     #WRD34,-(SP)
033246  012746  006574                        MOV     #SAY5,-(SP)
033252  012746  000006                        MOV     #6,-(SP)                                                        :
033256  010600                              , MOV     SP,R0                   ; SP,*
033260  104414                              , TRAP    14
033262  032737  000001  002252                BIT     #1,REFRESH              ;                                       2482
033270  001403                              , BEQ     3$
033272  012701  007012                        MOV     #WRD36,R1               ; *,TEMP                                2483
033276  000402                              , BR      4$                      ;                                       2482
033300  012701  007022                3$:     MOV     #WRD37,R1               ; *,TEMP                                2484
033304  010116                        4$:     MOV     R1,(SP)                 ; TEMP,*                                2486
033306  012746  007370                        MOV     #PHR3,-(SP)
033312  012746  007040                        MOV     #WRD40,-(SP)
033316  012746  006534                        MOV     #SAY3,-(SP)
033322  012746  000004                        MOV     #4,-(SP)
033326  010600                              , MOV     SP,R0                   ; SP,*
033330  104414                              , TRAP    14
033332  012716  006510                        MOV     #CRLF,(SP)              ;                                       2488
033336  012746  000001                        MOV     #1,-(SP)
033342  010600                              , MOV     SP,R0                   ; SP,*
033344  104414                              , TRAP    14
033346  005002                              , CLR     R2                      ; OFFSET                                2494
033350  005000                              , CLR     R0                      ; COUNT                                 2496
033352  010001                        5$:     MOV     R0,R1                   ; COUNT,*                               2498
033354  006301                              , ASL     R1
033356  013704  030724                        MOV     BASE.ADDR,R4
033362  060204                              , ADD     R2,R4                   ; OFFSET,*
033364  010461  032364                        MOV     R4,ML.REG(R1)
033370  062702  000002                        ADD     #2,R2                   ; *,OFFSET                              2499
033374  005200                              , INC     R0                      ; COUNT                                 2496
033376  020027  000025                        CMP     R0,#25                  ; COUNT,*
033402  003763                              , BLE     5$
033404  005000                              , CLR     R0                      ;                                       2506
033406  104441                              , TRAP    41
033410  010316                              , MOV     R3,(SP)                 ; PRIORITY,*                            2507
033412  012746  032562                        MOV     #SERVICE,-(SP)
033416  013746  030726                        MOV     VEC,-(SP)
033422  012746  000003                        MOV     #3,-(SP)
033426  104437                              , TRAP    37
033430  062706  000042                        ADD     #42,SP                  ;                                       2439
033434  000207                              , RTS     PC

                                ; Routine Size:  103 words
                                ; Maximum stack depth per invocation:  22 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               DRIVE IDENTIFICATION ROUTINES            23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (10)

;       2512  %SBTTL  'DRIVE IDENTIFICATION ROUTINES'
;       2513
;       2514  ROUTINE SAYWHO(LUN): NOVALUE =
;       2515  BEGIN
;       2516
;       2517  !++
;       2518  !  ROUTINE:     SAYWHO(LUN)
;       2519  !
;       2520  !  PURPOSE:     TO PRINT OUT AN IDENTIFICATION LINE WHICH INCLUDES:
;       2521  !                  LOGICAL UNIT: X    DRIVE: Y    SERIAL #: ZZZZ
;       2522  !
;       2523  !               THE UNIT'S SERIAL NUMBER IN EITHER BCD OR OCTAL FORMAT.
;       2524  !               BCD WILL BE PRINTED AS LONG AS THE DIGITS ARE ALL VALID.
;       2525  !--
;       2526
;       2527
;       2528  LOCAL
;       2529     D3,D2,D1,D0;
;       2530
;       2531
;       2532  D3 = .SN3;
;       2533  D2 = .SN2;
;       2534  D1 = .SN1;
;       2535  D0 = .SN0;
;       2536
;       2537  PRINTB(FMT4A,PHR7,.LUN,WRD11,.DRIVE);
;       2538     !'LOGICAL UNIT: X    DRIVE: Y'
;       2539
;       2540  IF ((.D3 GTR 9) OR (.D2 GTR 9) OR (.D1 GTR 9) OR (.D0 GTR 9))
;       2541  THEN  PRINTB(FMT4B,PHR8,.MLSN)
;       2542              !'    SERIAL #: ZZZZZZ'
;       2543  ELSE  PRINTB(FMT4C,PHR8,.D3,.D2,.D1,.D0);
;       2544              !'    SERIAL #: DDDD'
;       2545
;       2546  RETURN;
;       2547
;       2548  END;
;2294
;2295                                  .SBTTL  SAYWHO DRIVE IDENTIFICATION ROUTINES
2299 033436  004137  005222  SAYWHO: JSR     R1,$SAVE5                       ;                       2514
2300 033442  017705  176746          MOV     @ML.REG+30,R5                   ; *,D3                  2532
2301 033446  006205                  ASR     R5                              ; D3
2302 033450  006205                  ASR     R5                              ; D3
2303 033452  006205                  ASR     R5                              ; D3
2304 033454  006205                  ASR     R5                              ; D3
2305 033456  000305                  SWAB    R5                              ; D3
```

```
                                ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                ;                DRIVE IDENTIFICATION ROUTINES           23-Oct-1980 14:57:05    PA:<

033460  042705  177760          BIC     #177760,R5              ; *,D3
033464  017704  176724          MOV     @ML.REG+30,R4           ; *,D2                                          2533
033470  000304                  SWAB    R4                      ; D2
033472  042704  177760          BIC     #177760,R4              ; *,D2
033476  117701  176712          MOVB    @ML.REG+30,R1           ; *,D1                                          2534
033502  006201                  ASR     R1                      ; D1
033504  006201                  ASR     R1                      ; D1
033506  006201                  ASR     R1                      ; D1
033510  006201                  ASR     R1                      ; D1
033512  042701  177760          BIC     #177760,R1              ; *,D1
033516  117702  176672          MOVB    @ML.REG+30,R2           ; *,D0                                          2535
033522  042702  177760          BIC     #177760,R2              ; *,D0
033526  016603  000016          MOV     16(SP),R3               ; LUN,*                                         2537
033532  006303                  ASL     R3
033534  016303  032440          MOV     PTABLE.ADDR(R3),R3
033540  016346  000006          MOV     6(R3),-(SP)
033544  012746  006662          MOV     #WRD11,-(SP)
033550  016646  000022          MOV     22(SP),-(SP)            ; LUN,*
033554  012746  007472          MOV     #PHR7,-(SP)
033560  012746  005640          MOV     #FMT4A,-(SP)
033564  012746  000005          MOV     #5,-(SP)
033570  010600                  MOV     SP,R0                   ; SP,*
033572  104414                  TRAP    14
033574  020527  000011          CMP     R5,#11                  ; D3,*                                          2540
033600  003011                  BGT     1$
033602  020427  000011          CMP     R4,#11                  ; D2,*
033606  003006                  BGT     1$
033610  020127  000011          CMP     R1,#11                  ; D1,*
033614  003003                  BGT     1$
033616  020227  000011          CMP     R2,#11                  ; D0,*
033622  003413                  BLE     2$
033624  017746  176564  1$:     MOV     @ML.REG+30,-(SP)        ;                                               2541
033630  012746  007510          MOV     #PHR8,-(SP)
033634  012746  005674          MOV     #FMT4B,-(SP)
033640  012746  000003          MOV     #3,-(SP)
033644  010600                  MOV     SP,R0                   ; SP,*
033646  104414                  TRAP    14
033650  000416                  BR      3$                      ;                                               2540
033652  010246  2$:     MOV     R2,-(SP)                ; D0,*                                          2543
033654  010146                  MOV     R1,-(SP)                ; D1,*
033656  010446                  MOV     R4,-(SP)                ; D2,*
033660  010546                  MOV     R5,-(SP)                ; D3,*
033662  012746  007510          MOV     #PHR8,-(SP)
033666  012746  005712          MOV     #FMT4C,-(SP)
033672  012746  000006          MOV     #6,-(SP)
033676  010600                  MOV     SP,R0                   ; SP,*
033700  104414                  TRAP    14
033702  062706  000006          ADD     #6,SP
033706  062706  000024  3$:     ADD     #24,SP                  ;                                               2514
033712  000207                  RTS     PC

                        ; Routine Size:  87 words
```

```
                        ;MLX4                                   23-Oct-1980 15:01:43    TOPS
                        ;               DRIVE IDENTIFICATION ROUTINES   23-Oct-1980 14:57:05    PA:<
                        ;
                        ; Maximum stack depth per invocation:  19 words
                        ;
                        ;
```

23-Oct-1980 15:01:43 TOPS-20 Bliss-16 V2(206)
23-Oct-1980 14:57:05 PA:<ROSEN>MLX4.BLI.1 (11)

```
;MLX4
;                DRIVE IDENTIFICATION ROUTINES

;          2549  ROUTINE CONFIG(LUN): NOVALUE =
;          2550  BEGIN  !* 1 *
;          2551
;          2552  !++
;          2553  !  ROUTINE:     CONFIG(LUN)
;          2554  !
;          2555  !  PURPOSE:     CONFIG IS CALLED BY THE INITIALIZATION CODE FOR EACH DRIVE
;          2556  !               WHICH SUCCESSFULLY RESPONDS TO A REQUEST FOR ITS HARDWARE
;          2557  !               P-TABLE.  THE PURPOSES OF THIS ROUTINE ARE:
;          2558  !
;          2559  !               (1)  TO CHECK THAT THE DRIVE IS POWERED UP.
;          2560  !
;          2561  !               (2)  TO VERIFY THAT THE DRIVE IS AN ML11 UNIT.
;          2562  !
;          2563  !               (3)  TO VERIFY THAT THE OPERATOR DEFINED TEST RANGES ARE
;          2564  !                    WITHIN THE CALCULATED SYSTEM SIZE.
;          2565  !
;          2566  !               (4)  TO PRINT DRIVE IDENTIFICATION INFORMATION.
;          2567  !
;          2568  !  ARGUMENT:    LUN = THE LOGICAL UNIT NUMBER, COUNTING FROM 0 TO
;          2569  !                     NUMBER OF DRIVES MINUS 1.
;          2570  !--
;          2571
;          2572
;          2573  LOCAL
;          2574     TYPE, TEMP, TOP;
;          2575
;          2576           !+
;          2577           !THIS IS THE CODE FOR PURPOSE 1:
;          2578           !-
;          2579
;          2580  UNIT = .DRIVE;
;          2581  IF .DPR NEQ 1
;          2582  THEN
;          2583     BEGIN
;          2584     PRINTB(FMT4A,PHR7,.LUN,WRD11,.DRIVE);
;          2585        !'LOGICAL UNIT: X    DRIVE: Y'
;          2586     PRINTB(SAY2,WRD11,WRD21);
;          2587        !'DRIVE DROPPED'
;          2588     PRINTB(FMT2,CAUSE1);
;          2589        !'  (NOT POWERED UP)'
;          2590     WHY_DROPT[.LUN] = CODE_1;
;          2591     DOD0(.LUN);
;          2592     RETURN;
;          2593     END;
;          2594
;          2595           !+
;          2596           !THIS IS THE CODE FOR PURPOSE 2:
;          2597           !-
;          2598
;          2599  SAYWHO(.LUN);
;          2600     !'LOGICAL UNIT: X    DRIVE: Y    SERIAL #: ZZZZ'
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                DRIVE IDENTIFICATION ROUTINES          23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (11)

;          2601
;          2602  TYPE = .MLDT;
;          2603
;          2604  IF ((.TYPE NEQ ML11A) AND (.TYPE NEQ ML11B))
;          2605  THEN
;          2606     BEGIN
;          2607     PRINTB(SAY2,WRD11,WRD21);
;          2608        !'DRIVE DROPPED'
;          2609     PRINTB(FMT2,CAUSE2);
;          2610        !'  (NOT AN ML11 UNIT)'
;          2611     WHY_DROPT[.LUN] = CODE_2;
;          2612     DOD0(.LUN);
;          2613     RETURN;
;          2614     END
;          2615  ELSE
;          2616     BEGIN  !* 3 *
;          2617     IF .ARR_TYP EQL 0
;          2618     THEN
;          2619        BEGIN  !* 4 *
;          2620        TYPE = WRD6;
;          2621        TOP = 1;
;          2622        END    !* 4 *
;          2623     ELSE
;          2624        BEGIN  !* 5 *
;          2625        TYPE = WRD7;
;          2626        TOP = 4;
;          2627        END;   !* 5 *
;          2628
;          2629          !+
;          2630          !THIS IS THE CODE FOR PURPOSE 3:
;          2631          !-
;          2632
;          2633     TOP_SECT[.LUN] = (.TOP) * (512) * (.SZ) - 1;
;          2634     IF .LIMIT
;          2635     THEN
;          2636        !+
;          2637        ! THE OPERATOR HAS CHOSEN LIMITS:
;          2638        !-
;          2639        BEGIN  !* 6 *
;          2640        IF .RANGE EQL 0
;          2641        THEN
;          2642           !+
;          2643           !THE BOARD NUMBER (0-15) IS CONTAINED IN 'ONLY'
;          2644           !-
;          2645           BEGIN  !* 10 *
;          2646           IF .TYPE
;          2647           THEN
;          2648              !+
;          2649              !THE CHIPS ARE 64K
;          2650              !-
;          2651              BEGIN  !* 7 *
;          2652              LSECT = 2048 * .ONLY;
```

```
2486 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
2487 ;                  DRIVE IDENTIFICATION ROUTINES         23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (11)
2488
2489 ;          2653                TSECT = .LSECT + 2047;
2490 ;          2654                END    !* 7 *
2491 ;          2655             ELSE
2492 ;          2656                !+
2493 ;          2657                !THE CHIPS ARE 16K
2494 ;          2658                !-
2495 ;          2659                BEGIN  !* 8 *
2496 ;          2660                LSECT = 512 * .ONLY;
2497 ;          2661                TSECT = .LSECT + 511;
2498 ;          2662                END;   !* 8 *
2499 ;          2663
2500 ;          2664             END;   !* 10 *
2501 ;          2665
2502 ;          2666          IF .TSECT LEQA .TOP_SECT[.LUN]
2503 ;          2667          THEN  TOP_SECT[.LUN] = .TSECT
2504 ;          2668          ELSE
2505 ;          2669             BEGIN
2506 ;          2670             PRINTB(SAY2,WRD11,WRD21);
2507 ;          2671                !'DRIVE DROPPED'
2508 ;          2672             PRINTB(FMT2,CAUSE3);
2509 ;          2673                !'  (OPERATOR SELECTED TEST LIMITS INCORRECTLY)'
2510 ;          2674             PRINTB(FMT11,PHR14,.TSECT,PHR16,.TOP_SECT[.LUN]);
2511 ;          2675                !'TOP SECTOR OF XXXXXX EXCEEDS SYSTEM LIMIT OF YYYYYY'
2512 ;          2676             WHY_DROPT[.LUN] = CODE_3;
2513 ;          2677             DOD0(.LUN);
2514 ;          2678             RETURN;
2515 ;          2679             END;
2516 ;          2680
2517 ;          2681          IF .LSECT LEQA .TSECT
2518 ;          2682          THEN  LOW_SECT[.LUN] = .LSECT
2519 ;          2683          ELSE
2520 ;          2684             BEGIN
2521 ;          2685             PRINTB(SAY2,WRD11,WRD21);
2522 ;          2686                !'DRIVE DROPPED'
2523 ;          2687             PRINTB(FMT2,CAUSE3);
2524 ;          2688                !'  (OPERATOR SELECTED TEST LIMITS INCORRECTLY)'
2525 ;          2689             PRINTB(FMT11,PHR15,.LSECT,PHR14,.TSECT);
2526 ;          2690                !'LOW SECTOR OF XXXXXX EXCEEDS TOP SECTOR OF YYYYYY'
2527 ;          2691             WHY_DROPT[.LUN] = CODE_3;
2528 ;          2692             DOD0(.LUN);
2529 ;          2693             RETURN;
2530 ;          2694             END;
2531 ;          2695
2532 ;          2696          END;   !* 6 *
2533 ;          2697
2534 ;          2698             !+
2535 ;          2699             !THIS IS THE CODE FOR PURPOSE 4:
2536 ;          2700             !-
2537 ;          2701
2538 ;          2702       PRINTB(FMT5,.TYPE,LOWEST,HIGHEST);
2539 ;          2703          !'ML11-X     SECTORS UNDER TEST: XXXXXX TO YYYYYY'
2540 ;          2704       SELECTONE .TRT OF
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                DRIVE IDENTIFICATION ROUTINES          23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (11)

;          2705        SET
;          2706      [0] : TEMP = TRT00;
;          2707      [1] : TEMP = TRT01;
;          2708      [2] : TEMP = TRT10;
;          2709      [3] : TEMP = TRT11;
;          2710        TES;
;          2711      PRINTB(FMT8,.TEMP);
;          2712        !'TRANSFER RATE: X MBYTES/SECOND'
;          2713      PRINTB(FMT4B,PHR4,.BASE_ADDR);
;          2714        !'    CSR ADDRESS: XXXXXX'
;          2715      END;   !* 3 *
;          2716
;          2717  RETURN;
;          2718
;          2719  END;   !* 1 *
2563
2564                                        .SBTTL  CONFIG DRIVE IDENTIFICATION ROUTINES
2568 033714  004137  005222          CONFIG: JSR     R1,$SAVE5                       ;                       2549
2569 033720  016603  000016                  MOV     16(SP),R3                       ; LUN,*                 2580
2570 033724  010304                          MOV     R3,R4
2571 033726  006304                          ASL     R4
2572 033730  016401  032440                  MOV     PTABLE.ADDR(R4),R1
2573 033734  016105  000006                  MOV     6(R1),R5
2574 033740  042705  177770                  BIC     #177770,R5
2575 033744  142777  000007  176422          BICB    #7,@ML.REG+10
2576 033752  150577  176416                  BISB    R5,@ML.REG+10
2577 033756  032777  000400  176412          BIT     #400,@ML.REG+12                 ;                       2581
2578 033764  001051                          BNE     1$
2579 033766  016401  032440                  MOV     PTABLE.ADDR(R4),R1              ;                       2584
2580 033772  016146  000006                  MOV     6(R1),-(SP)
2581 033776  012746  006662                  MOV     #WRD11,-(SP)
2582 034002  010346                          MOV     R3,-(SP)
2583 034004  012746  007472                  MOV     #PHR7,-(SP)
2584 034010  012746  005640                  MOV     #FMT4A,-(SP)
2585 034014  012746  000005                  MOV     #5,-(SP)
2586 034020  010600                          MOV     SP,R0                           ; SP,*
2587 034022  104414                          TRAP    14
2588 034024  012716  006744                  MOV     #WRD21,(SP)                     ;                       2586
2589 034030  012746  006662                  MOV     #WRD11,-(SP)
2590 034034  012746  006522                  MOV     #SAY2,-(SP)
2591 034040  012746  000003                  MOV     #3,-(SP)
2592 034044  010600                          MOV     SP,R0                           ; SP,*
2593 034046  104414                          TRAP    14
2594 034050  012716  010102                  MOV     #CAUSE1,(SP)                    ;                       2588
2595 034054  012746  005602                  MOV     #FMT2,-(SP)
2596 034060  012746  000002                  MOV     #2,-(SP)
```

```
2598                                    ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
2599                                    ;       DRIVE IDENTIFICATION ROUTINES                   23-Oct-1980 14:57:05    PA:<
2600
2601 034064  010600                       MOV     SP,R0           ; SP,*
2602 034066  104414                       TRAP    14
2603 034070  112763  000001  032464       MOVB    #1,WHY.DROPT(R3)        ;                       2590
2604 034076  010300                       MOV     R3,R0           ;                               2591
2605 034100  104451                       TRAP    51
2606 034102  062706  000026               ADD     #26,SP          ;                               2581
2607 034106  000207                       RTS     PC              ;                               2583
2608 034110  010346                1$:    MOV     R3,-(SP)        ;                               2599
2609 034112  004737  033436               JSR     PC,SAYWHO
2610 034116  017702  176270               MOV     @ML.REG+26,R2   ; *,TYPE                        2602
2611 034122  020227  000110               CMP     R2,#110         ; TYPE,*                        2604
2612 034126  001435                       BEQ     2$
2613 034130  020227  000111               CMP     R2,#111         ; TYPE,*
2614 034134  001432                       BEQ     2$
2615 034136  012746  006744               MOV     #WRD21,-(SP)    ;                               2607
2616 034142  012746  006662               MOV     #WRD11,-(SP)
2617 034146  012746  006522               MOV     #SAY2,-(SP)
2618 034152  012746  000003               MOV     #3,-(SP)
2619 034156  010600                       MOV     SP,R0           ; SP,*
2620 034160  104414                       TRAP    14
2621 034162  012716  010124               MOV     #CAUSE2,(SP)    ;                               2609
2622 034166  012746  005602               MOV     #FMT2,-(SP)
2623 034172  012746  000002               MOV     #2,-(SP)
2624 034176  010600                       MOV     SP,R0           ; SP,*
2625 034200  104414                       TRAP    14
2626 034202  112763  000002  032464       MOVB    #2,WHY.DROPT(R3)        ;                       2611
2627 034210  010300                       MOV     R3,R0           ;                               2612
2628 034212  104451                       TRAP    51
2629 034214  062706  000016               ADD     #16,SP          ;                               2604
2630 034220  000207                       RTS     PC              ;                               2606
2631 034222  032777  002000  176160 2$:    BIT     #2000,@ML.REG+24        ;                       2617
2632 034230  001005                       BNE     3$
2633 034232  012702  006642               MOV     #WRD6,R2        ; *,TYPE                        2620
2634 034236  012701  000001               MOV     #1,R1           ; *,TOP                         2621
2635 034242  000404                       BR      4$              ;                               2617
2636 034244  012702  006652         3$:   MOV     #WRD7,R2        ; *,TYPE                        2625
2637 034250  012701  000004               MOV     #4,R1           ; *,TOP                         2626
2638 034254  012705  032516         4$:   MOV     #TOP.SECT,R5    ;                               2633
2639 034260  060405                       ADD     R4,R5
2640 034262  010146                       MOV     R1,-(SP)        ; TOP,*                         2616
2641 034264  017701  176120               MOV     @ML.REG+24,R1
2642 034270  006201                       ASR     R1
2643 034272  006201                       ASR     R1
2644 034274  006201                       ASR     R1
2645 034276  000301                       SWAB    R1
2646 034300  042701  177740               BIC     #177740,R1
2647 034304  010146                       MOV     R1,-(SP)
2648 034306  004737  004632               JSR     PC,BL$MUL
2649 034312  000300                       SWAB    R0              ;                               2633
2650 034314  105000                       CLRB    R0
2651 034316  006300                       ASL     R0
2652 034320  010001                       MOV     R0,R1
```

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                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               DRIVE IDENTIFICATION ROUTINES            23-Oct-1980 14:57:05    PA:<

034322  005301                          DEC     R1
034324  010115                          MOV     R1,(R5)
034326  032737  000001  002222          BIT     #1,LIMIT                ;                                                2634
034334  001574                          BEQ     11$
034336  005737  002224                  TST     RANGE                   ;                                                2640
034342  001036                          BNE     6$
034344  032702  000001                  BIT     #1,R2                   ; *,TYPE                                         2646
034350  001417                          BEQ     5$
034352  013700  002232                  MOV     ONLY,R0                 ;                                                2652
034356  000300                          SWAB    R0
034360  105000                          CLRB    R0
034362  006300                          ASL     R0
034364  006300                          ASL     R0
034366  006300                          ASL     R0
034370  010037  002226                  MOV     R0,LSECT
034374  010037  002230                  MOV     R0,TSECT                ; LSECT,*                                        2653
034400  062737  003777  002230          ADD     #3777,TSECT
034406  000414                          BR      6$                      ;                                                2646
034410  013700  002232          5$:     MOV     ONLY,R0                 ;                                                2660
034414  000300                          SWAB    R0
034416  105000                          CLRB    R0
034420  006300                          ASL     R0
034422  010037  002226                  MOV     R0,LSECT
034426  010037  002230                  MOV     R0,TSECT                ; LSECT,*                                        2661
034432  062737  000777  002230          ADD     #777,TSECT
034440  023715  002230          6$:     CMP     TSECT,(R5)              ;                                                2666
034444  101003                          BHI     7$
034446  013715  002230                  MOV     TSECT,(R5)              ;                                                2667
034452  000445                          BR      8$                      ;                                                2666
034454  012746  006744          7$:     MOV     #WRD21,-(SP)            ;                                                2670
034460  012746  006662                  MOV     #WRD11,-(SP)
034464  012746  006522                  MOV     #SAY2,-(SP)
034470  012746  000003                  MOV     #3,-(SP)
034474  010600                          MOV     SP,R0                   ; SP,*
034476  104414                          TRAP    14
034500  012716  010150                  MOV     #CAUSE3,(SP)            ;                                                2672
034504  012746  005602                  MOV     #FMT2,-(SP)
034510  012746  000002                  MOV     #2,-(SP)
034514  010600                          MOV     SP,R0                   ; SP,*
034516  104414                          TRAP    14
034520  011516                          MOV     (R5),(SP)               ;                                                2674
034522  012746  007744                  MOV     #PHR16,-(SP)
034526  013746  002230                  MOV     TSECT,-(SP)
034532  012746  007710                  MOV     #PHR14,-(SP)
034536  012746  006276                  MOV     #FMT11,-(SP)
034542  012746  000005                  MOV     #5,-(SP)
034546  010600                          MOV     SP,R0                   ; SP,*
034550  104414                          TRAP    14
034552  112763  000003  032464          MOVB    #3,WHY.DROPT(R3)        ;                                                2676
034560  010300                          MOV     R3,R0                   ;                                                2677
034562  104451                          TRAP    51
034564  000455                          BR      10$                     ;                                                2666
```

```
                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;       DRIVE IDENTIFICATION ROUTINES                   23-Oct-1980 14:57:05    PA:<
                                        8$:     CMP     LSECT,TSECT                     ;                               2681
                                                BHI     9$                              ;                               2682
                                                MOV     LSECT,LOW.SECT(R4)              ;                               2681
                                                BR      11$                             ;                               2685
                                        9$:     MOV     #WRD21,-(SP)                    ;
                                                MOV     #WRD11,-(SP)
                                                MOV     #SAY2,-(SP)
                                                MOV     #3,-(SP)
                                                MOV     SP,R0                           ; SP,*
                                                TRAP    14
                                                MOV     #CAUSE3,(SP)                    ;                               2687
                                                MOV     #FMT2,-(SP)
                                                MOV     #2,-(SP)
                                                MOV     SP,R0                           ; SP,*
                                                TRAP    14
                                                MOV     TSECT,(SP)                      ;                               2689
                                                MOV     #PHR14,-(SP)
                                                MOV     LSECT,-(SP)
                                                MOV     #PHR15,-(SP)
                                                MOV     #FMT11,-(SP)
                                                MOV     #5,-(SP)
                                                MOV     SP,R0                           ; SP,*
                                                TRAP    14
                                                MOVB    #3,WHY.DROPT(R3)                ;                               2691
                                                MOV     R3,R0                           ;                               2692
                                                TRAP    51
                                        10$:    ADD     #34,SP                          ;                               2681
                                                RTS     PC                              ;                               2684
                                        11$:    MOV     (R5),(SP)                       ;                               2702
                                                MOV     LOW.SECT(R4),-(SP)
                                                MOV     R2,-(SP)                        ; TYPE,*
                                                MOV     #FMT5,-(SP)
                                                MOV     #4,-(SP)
                                                MOV     SP,R0                           ; SP,*
                                                TRAP    14
                                                MOV     @ML.REG+24,R1                   ;                               2704
                                                SWAB    R1
                                                BIC     #177774,R1
                                                BNE     12$
                                                MOV     #TRT00,R0                       ; *,TEMP                        2706
                                                BR      15$                             ;                               2704
                                        12$:    CMP     R1,#1
                                                BNE     13$
                                                MOV     #TRT01,R0                       ; *,TEMP                        2707
                                                BR      15$                             ;                               2704
                                        13$:    CMP     R1,#2
                                                BNE     14$
                                                MOV     #TRT10,R0                       ; *,TEMP                        2708
                                                BR      15$                             ;                               2704
                                        14$:    CMP     R1,#3
                                                BNE     15$
                                                MOV     #TRT11,R0                       ; *,TEMP                        2709
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               DRIVE IDENTIFICATION ROUTINES            23-Oct-1980 14:57:05    PA:<

035036  010016                  15$:    MOV     R0,(SP)                 ; TEMP,*                                        2711
035040  012746  006110                  MOV     #FMT8,-(SP)
035044  012746  000002                  MOV     #2,-(SP)
035050  010600                          MOV     SP,R0                   ; SP,*
035052  104414                          TRAP    14
035054  013716  030724                  MOV     BASE.ADDR,(SP)          ;                                               2713
035060  012746  007412                  MOV     #PHR4,-(SP)
035064  012746  005674                  MOV     #FMT4B,-(SP)
035070  012746  000003                  MOV     #3,-(SP)
035074  010600                          MOV     SP,R0                   ; SP,*
035076  104414                          TRAP    14
035100  062706  000030                  ADD     #30,SP                  ;                                               2549
035104  000207                          RTS     PC

                                        ; Routine Size:  317 words
                                        ; Maximum stack depth per invocation:  20 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                DRIVE IDENTIFICATION ROUTINES          23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (12)

;          2720  ROUTINE DECODE(SECT): NOVALUE =
;          2721  BEGIN
;          2722
;          2723  !++
;          2724  !  ROUTINE:     DECODE(SECT)
;          2725  !
;          2726  !  PURPOSE:     TO INTERPRET THE FIELDS OF THE FAILING SECTOR
;          2727  !               FOR BOTH 16K AND 64K CHIPS.
;          2728  !
;          2729  !  ARGUMENT:    SECT = FAILING SECTOR NUMBER
;          2730  !
;          2731  !  RESULTS:     (1)  BANK = WHICH ROW OF CHIPS (0-4)
;          2732  !
;          2733  !               (2). BOARD = WHICH ARRAY MODULE (0-15)
;          2734  !--
;          2735
;          2736  IF .MLDT
;          2737  THEN    !THE CHIPS ARE 64K
;          2738     BEGIN
;          2739     BANK  = .SECT<9,2>;
;          2740     BOARD = .SECT<11,4>;
;          2741     END
;          2742  ELSE    !THE CHIPS ARE 16K
;          2743     BEGIN
;          2744     BANK  = .SECT<7,2>;
;          2745     BOARD = .SECT<9,4>;
;          2746     END;
;          2747
;          2748  RETURN;
;          2749
;          2750  END;
2829
2830                                        .SBTTL  DECODE DRIVE IDENTIFICATION ROUTINES
* 2834 035106  032777  000001  175276  DECODE: BIT     #1,@ML.REG+26                   ;                       2736
  2835 035114  001415                          BEQ     1$
  2836 035116  016600  000002                  MOV     2(SP),R0                        ; SECT,*                2739
  2837 035122  006200                          ASR     R0
  2838 035124  000300                          SWAB    R0
  2839 035126  042700  177774                  BIC     #177774,R0
  2840 035132  010037  032362                  MOV     R0,BANK
  2841 035136  016600  000002                  MOV     2(SP),R0                        ; SECT,*                2740
  2842 035142  006200                          ASR     R0
  2843 035144  006200                          ASR     R0
  2844 035146  000412                          BR      2$
  2845 035150  016600  000002          1$:     MOV     2(SP),R0                        ; SECT,*                2744
  2846 035154  006100                          ROL     R0
```

```
                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               DRIVE IDENTIFICATION ROUTINES           23-Oct-1980 14:57:05    PA:<

035156  000300                          SWAB    R0
035160  042700  177774                  BIC     #177774,R0
035164  010037  032362                  MOV     R0,BANK
035170  016600  000002                  MOV     2(SP),R0                ; SECT,*                        2745
035174  006200                  2$:     ASR     R0
035176  000300                          SWAB    R0
035200  042700  177760                  BIC     #177760,R0
035204  010037  032360                  MOV     R0,BOARD
035210  000207                          RTS     PC                      ;                               2720

                                        ; Routine Size:  34 words
                                        ; Maximum stack depth per invocation:  0 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               DRIVE IDENTIFICATION ROUTINES            23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (13)

;         2751  ROUTINE ISOLATE : NOVALUE =
;         2752  BEGIN
;         2753
;         2754  !++
;         2755  !  ROUTINE:     ISOLATE
;         2756  !
;         2757  !  PURPOSE:     UPON THE DETECTION OF A DATA ERROR (EITHER RECOVERABLE OR
;         2758  !               NOT) TO EXAMINE THE SECTOR ADDRESS CONTAINED IN THE ECC
;         2759  !               ERROR LOCATION REGISTER AND PINPOINT THE LOCATION OF THE
;         2760  !               ERROR.  THE SECTOR, BOARD (0-15) AND BANK (0-3) WILL BE
;         2761  !               REPORTED.
;         2762  !--
;         2763
;         2764  DECODE(.MLEL);
;         2765  IF .ERROUT
;         2766  THEN  PRINTB(FMT10A,WRD20,WRD15,.MLEL,.BOARD,.BANK);
;         2767          !'FAILED:  SECTOR XXXXXX  BOARD YY  BANK Z'
;         2768  RETURN;
;         2769  END;
;
                                        .SBTTL  ISOLATE DRIVE IDENTIFICATION ROUTINES
035212  017746  175212          ISOLATE:MOV     @ML.REG+44,-(SP)                ;                       ..      2764
035216  004737  035106                  JSR     PC,DECODE
035222  032737  000001  002260          BIT     #1,ERROUT                       ;                               2765
035230  001422                          BEQ     1$
035232  013746  032362                  MOV     BANK,-(SP)                      ;                               2766
035236  013746  032360                  MOV     BOARD,-(SP)
035242  017746  175162                  MOV     @ML.REG+44,-(SP)
035246  012746  006670                  MOV     #WRD15,-(SP)
035252  012746  006734                  MOV     #WRD20,-(SP)
035256  012746  006206                  MOV     #FMT10A,-(SP)
035262  012746  000006                  MOV     #6,-(SP)
035266  010600                          MOV     SP,R0                           ; SP,*
035270  104414                          TRAP    14
035272  062706  000016                  ADD     #16,SP
035276  005726                  1$:     TST     (SP)+                           ;                               2751
035300  000207                          RTS     PC
;
                                ; Routine Size:  28 words
                                ; Maximum stack depth per invocation:  8 words
;
```

```
2925 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
2926 ;                DRIVE IDENTIFICATION ROUTINES           23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (14)
2927
2928 ;          2770  ROUTINE UP_HARD_COUNT(LUN,ARRAY) : NOVALUE =
2929 ;          2771  BEGIN
2930 ;          2772
2931 ;          2773  !++
2932 ;          2774  !  ROUTINE:     UP_HARD_COUNT(LUN,ARRAY)
2933 ;          2775  !
2934 ;          2776  !  PURPOSE:     TO INCREMENT THE HARD ERROR COUNT FOR THE GIVEN
2935 ;          2777  !               ARRAY, AND TO SEE IF THE HARD ERROR THRESHOLD HAS
2936 ;          2778  !               BEEN REACHED.
2937 ;          2779  !
2938 ;          2780  !  ARGUMENTS:   LUN   = LOGICAL UNIT WHICH HAS THE HARD ERROR
2939 ;          2781  !               ARRAY = THE BOARD NUMBER (0-15)
2940 ;          2782  !--
2941 ;          2783
2942 ;          2784  HARDS[.LUN,.ARRAY,0,16,0] = .HARDS[.LUN,.ARRAY,0,16,0] + 1;
2943 ;          2785
2944 ;          2786  IF (((.ARR_TYP EQL 1) AND (.HARDS[.LUN,.ARRAY,0,16,0] EQL H64K_LIMIT))
2945 ;          2787  OR  ((.ARR_TYP EQL 0) AND (.HARDS[.LUN,.ARRAY,0,16,0] EQL H16K_LIMIT)))
2946 ;          2788  THEN
2947 ;          2789     BEGIN
2948 ;          2790     SAYWHO(.LUN);
2949 ;          2791     PRINTB(FMT13,.ARRAY,MSG2);
2950 ;          2792        !'ARRAY XX  --> RUN ML11 PROM MAINTENANCE PROGRAM'
2951 ;          2793     END;
2952 ;          2794
2953 ;          2795  RETURN;
2954 ;          2796  END;
2958
2959                                        .SBTTL  UP.HARD.COUNT DRIVE IDENTIFICATION ROUTINES
2963 035302                          UP.HARD.COUNT:
2964 035302  016600  000004                MOV     4(SP),R0                        ; LUN,*                 2784
2965 035306  006300                        ASL     R0
2966 035310  006300                        ASL     R0
2967 035312  006300                        ASL     R0
2968 035314  006300                        ASL     R0
2969 035316  066600  000002                ADD     2(SP),R0                        ; ARRAY,*
2970 035322  006300                        ASL     R0
2971 035324  062700  031332                ADD     #HARDS,R0
2972 035330  005210                        INC     (R0)
2973 035332  032777  002000  175050        BIT     #2000,@ML.REG+24                ;                       2786
2974 035340  001403                        BEQ     1$
2975 035342  021027  000012                CMP     (R0),#12
2976 035346  001407                        BEQ     2$
2977 035350  032777  002000  175032  1$:   BIT     #2000,@ML.REG+24                ;                       2787
2978 035356  001023                        BNE     3$
2979 035360  021027  000012                CMP     (R0),#12
```

```
                                ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                ;               DRIVE IDENTIFICATION ROUTINES           23-Oct-1980 14:57:05    PA:<

035364  001020                          BNE     3$
035366  016646  000004          2$:     MOV     4(SP),-(SP)             ; LUN,*                                 2790
035372  004737  033436                  JSR     PC,SAYWHO
035376  012716  010542                  MOV     #MSG2,(SP)              ;                                       2791
035402  016646  000004                  MOV     4(SP),-(SP)             ; ARRAY,*
035406  012746  006446                  MOV     #FMT13,-(SP)
035412  012746  000003                  MOV     #3,-(SP)
035416  010600                          MOV     SP,R0                   ; SP,*
035420  104414                          TRAP    14
035422  062706  000010                  ADD     #10,SP                  ;                                       2789
035426  000207              3$:         RTS     PC                      ;                                       2770


                                ; Routine Size:  43 words
                                ; Maximum stack depth per invocation:  4 words
```

```
3005 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
3006 ;                  DRIVE IDENTIFICATION ROUTINES         23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (15)
3007
3008 ;          2797    ROUTINE UP_SOFT_COUNT(LUN,ARRAY) : NOVALUE =
3009 ;          2798    BEGIN
3010 ;          2799
3011 ;          2800    !++
3012 ;          2801    !  ROUTINE:     UP_SOFT_COUNT(LUN,ARRAY)
3013 ;          2802    !
3014 ;          2803    !  PURPOSE:     TO INCREMENT THE SOFT ERROR COUNT FOR THE GIVEN
3015 ;          2804    !               ARRAY, AND TO SEE IF THE SOFT ERROR THRESHOLD HAS
3016 ;          2805    !               BEEN REACHED.
3017 ;          2806    !
3018 ;          2807    !  ARGUMENTS:   LUN   = LOGICAL UNIT WHICH HAS THE SOFT ERROR
3019 ;          2808    !               ARRAY = THE BOARD NUMBER (0-15)
3020 ;          2809    !--
3021 ;          2810
3022 ;          2811    SOFTS[.LUN,.ARRAY,0,16,0] = .SOFTS[.LUN,.ARRAY,0,16,0] + 1;
3023 ;          2812
3024 ;          2813    IF (((.ARR_TYP EQL 1) AND (.SOFTS[.LUN,.ARRAY,0,16,0] EQL S64K_LIMIT))
3025 ;          2814    OR  ((.ARR_TYP EQL 0) AND (.SOFTS[.LUN,.ARRAY,0,16,0] EQL S16K_LIMIT)))
3026 ;          2815    THEN
3027 ;          2816       BEGIN
3028 ;          2817       SAYWHO(.LUN);
3029 ;          2818       PRINTB(FMT13,.ARRAY,MSG2);
3030 ;          2819          !'ARRAY XX  --> RUN ML11 PROM MAINTENANCE PROGRAM'
3031 ;          2820       END;
3032 ;          2821
3033 ;          2822    RETURN;
3034 ;          2823    END;
3038
3039                                    .SBTTL  UP.SOFT.COUNT DRIVE IDENTIFICATION ROUTINES
3043 035430                        UP.SOFT.COUNT:
3044 035430  016600  000004                MOV     4(SP),R0                        ; LUN,*                 2811
3045 035434  006300                        ASL     R0
3046 035436  006300                        ASL     R0
3047 035440  006300                        ASL     R0
3048 035442  006300                        ASL     R0
3049 035444  066600  000002                ADD     2(SP),R0                        ; ARRAY,*
3050 035450  006300                        ASL     R0
3051 035452  062700  030732                ADD     #SOFTS,R0
3052 035456  005210                        INC     (R0)
3053 035460  032777  002000  174722        BIT     #2000,@ML.REG+24                ;                       2813
3054 035466  001403                        BEQ     1$
3055 035470  021027  000012                CMP     (R0),#12
3056 035474  001407                        BEQ     2$
3057 035476  032777  002000  174704  1$:   BIT     #2000,@ML.REG+24                ;                       2814
3058 035504  001023                        BNE     3$
3059 035506  021027  000012                CMP     (R0),#12
```

```
                                ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                ;               DRIVE IDENTIFICATION ROUTINES           23-Oct-1980 14:57:05    PA:<

035512  001020                          BNE     3$
035514  016646  000004         2$:      MOV     4(SP),-(SP)             ; LUN,*                                 2817
035520  004737  033436                  JSR     PC,SAYWHO
035524  012716  010542                  MOV     #MSG2,(SP)              ;                                       2818
035530  016646  000004                  MOV     4(SP),-(SP)             ; ARRAY,*
035534  012746  006446                  MOV     #FMT13,-(SP)
035540  012746  000003                  MOV     #3,-(SP)
035544  010600                          MOV     SP,R0                   ; SP,*
035546  104414                          TRAP    14
035550  062706  000010                  ADD     #10,SP                  ;                                       2816
035554  000207                 3$:      RTS     PC                      ;                                       2797

                                ; Routine Size:  43 words
                                ; Maximum stack depth per invocation:  4 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                INITIALIZATION CODE                     23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (16)

;        2824  %SBTTL  'INITIALIZATION CODE'
;        2825
;        2826  BGNINIT;  !* 1 *
;        2827
;        2828
;        2829  !       INITIALIZATION CODE IS EXECUTED AT THE BEGINNING OF EACH
;        2830  !       PASS, WHEN POWER DOWN/POWER UP HAS OCCURRED, OR WHEN THE
;        2831  !       OPERATOR HAS ISSUED A START, RESTART OR CONTINUE COMMAND.
;        2832  !
;        2833  !       DURING INITIALIZATION, THE 'GPHARD' MACRO IS USED TO GET
;        2834  !       P-TABLE INFORMATION FOR THE LOGICAL UNIT UNDER TEST. THE
;        2835  !       NUMBER OF UNITS  AVAILABLE FOR TESTING IS CONTAINED IN A
;        2836  !       HEADER LOCATION ('L$UNIT').
;        2837  !
;        2838  !       THE CODE WITHIN THE INITIALIZATION SECTION IS DIVIDED
;        2839  !       INTO THREE CATEGORIES:
;        2840  !               1)  ONCE-ONLY CODE WHICH IS EXECUTED
;        2841  !                   ONLY ON THE VERY FIRST PASS (I.E.,
;        2842  !                   WHEN THE OPERATOR HAS JUST TYPED
;        2843  !                   IN THE 'START' COMMAND;
;        2844  !               2)  CODE WHICH SHOULD NOT BE EXECUTED
;        2845  !                   ON THE FIRST PASS, BUT WHICH IS
;        2846  !                   TO BE RUN ON EVERY SUBSEQUENT PASS;
;        2847  !               3)  COMMON CODE WHICH IS TO BE EXECUTED
;        2848  !                   ON EVERY PASS (INCLUDING THE FIRST).
;        2849
;        2850
;        2851  LOCAL
;        2852     PLOC;
;        2853
;        2854
;        2855  IF ((READEF(EF_START)) OR (READEF(EF_RESTART)))
;        2856  THEN    !THIS IS CATEGORY 1 CODE
;        2857     BEGIN  !* 2 *
;        2858     QUICK = 1;
;        2859     CLRTBLS();
;        2860     INCR LUN FROM 0 TO (.L$UNIT-1) DO
;        2861        BEGIN  !* 3 *
;        2862        L$LUN = .LUN;
;        2863        IF GPHARD(.LUN,PLOC) NEQ 0
;        2864        THEN
;        2865           BEGIN  !* 4 *
;        2866           PTABLE_ADDR[.LUN] = .PLOC;
;        2867           IF .NUM_DRIVES EQL 0
;        2868           THEN   INIT_ADDRESSES(.PLOC);
;        2869           NUM_DRIVES = .NUM_DRIVES + 1;
;        2870           DRIVE_STATUS[.LUN] = ACTIVE;
;        2871           CONFIG(.LUN);
;        2872           END    !* 4 *
;        2873        ELSE
;        2874           DRIVE_STATUS[.LUN] = INACTIVE;
;        2875        END;   !* 3 *
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                INITIALIZATION CODE                     23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (16)

;          2876     END    !* 2 *
;          2877
;          2878  ELSE    !THIS IS CATEGORY 2 CODE
;          2879     QUICK = 0;
;          2880
;          2881  !CATEGORY 3 CODE WOULD GO HERE, BUT THERE IS NONE.
;          2882
;          2883  ENDINIT;  !* 1 *

                                        .SBTTL  LINIT INITIALIZATION CODE
035556  004137  005202          LINIT:  JSR     R1,$SAVE4                       ;                       2823
035562  012700  000040                  MOV     #40,R0                          ;                       2855
035566  104447                          TRAP    47
035570  103404                          BCS     1$
035572  012700  000037                  MOV     #37,R0
035576  104447                          TRAP    47
035600  103076                          BHIS    7$
035602  012737  000001  030712  1$:     MOV     #1,QUICK                        ;                       2858
035610  004737  032572                  JSR     PC,CLRTBLS                      ;                       2859
035614  013704  002012                  MOV     L$UNIT,R4                       ;                       2860
035620  005003                          CLR     R3                              ; LUN
035622  000462                          BR      6$
035624  010337  002074          2$:     MOV     R3,L$LUN                        ; LUN,*                 2862
035630  010302                          MOV     R3,R2                           ; LUN,*                 2870
035632  006202                          ASR     R2
035634  006202                          ASR     R2
035636  006202                          ASR     R2
035640  062702  032460                  ADD     #DRIVE.STATUS,R2
035644  010300                          MOV     R3,R0                           ; LUN,*                 2863
035646  104442                          TRAP    42
035650  010001                          MOV     R0,R1                           ; *,PLOC
035652  001432                          BEQ     4$
035654  010300                          MOV     R3,R0                           ; LUN,*                 2866
035656  006300                          ASL     R0
035660  010160  032440                  MOV     R1,PTABLE.ADDR(R0)              ; PLOC,*
035664  005737  032474                  TST     NUM.DRIVES                      ;                       2867
035670  001004                          BNE     3$
035672  010146                          MOV     R1,-(SP)                        ; PLOC,*                2868
035674  004737  033120                  JSR     PC,INIT.ADDRESSES
035700  005726                          TST     (SP)+
035702  005237  032474          3$:     INC     NUM.DRIVES                      ;                       2869
035706  010246                          MOV     R2,-(SP)                        ;                       2870
035710  010346                          MOV     R3,-(SP)                        ; LUN,*
035712  042716  177770                  BIC     #177770,(SP)
035716  012746  000001                  MOV     #1,-(SP)
035722  011646                          MOV     (SP),-(SP)
```

```
                                ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                ;               INITIALIZATION CODE                     23-Oct-1980 14:57:05    PA:<

035724  004737  004502                JSR     PC,BL$PU2
035730  010316                        MOV     R3,(SP)                 ; LUN,*                                 2871
035732  004737  033714                JSR     PC,CONFIG
035736  000411                        BR      5$                      ;                                       2863
035740  010246                4$:     MOV     R2,-(SP)                ;                                       2874
035742  010346                        MOV     R3,-(SP)                ; LUN,*
035744  042716  177770                BIC     #177770,(SP)
035750  012746  000001                MOV     #1,-(SP)
035754  005046                        CLR     -(SP)
035756  004737  004502                JSR     PC,BL$PU2
035762  062706  000010        5$:     ADD     #10,SP                  ;                                       2861
035766  005203                        INC     R3                      ; LUN                                   2860
035770  020304                6$:     CMP     R3,R4                   ; LUN,*
035772  002714                        BLT     2$
035774  000207                        RTS     PC                      ;                                       2855
035776  005037  030712        7$:     CLR     QUICK                   ;                                       2879
036002  000207                        RTS     PC                      ;                                       2823

                                ; Routine Size:  75 words
                                ; Maximum stack depth per invocation:  9 words


                                        .SBTTL  L$INIT INITIALIZATION CODE
036004  004737  035556        L$INIT::JSR     PC,LINIT                ;                                       2879
036010  104411                        TRAP    11
036012  000207                        RTS     PC

                                ; Routine Size:  4 words
                                ; Maximum stack depth per invocation:  0 words
```

```
;          2884  %SBTTL  'GENERATOR FOR OPTION 1'
;          2885
;          2886  ROUTINE GEN1(SECTOR,COMP_FLAG): NOVALUE =
;          2887  BEGIN  !* 1 *
;          2888
;          2889  !++
;          2890  !  ROUTINE:     GEN1(SECTOR,COMP_FLAG)
;          2891  !
;          2892  !  PURPOSE:     TO GENERATE THE ENTIRE 4K-WORD WRITE BUFFER FOR OPTION 1.
;          2893  !               THE GENERATION IS IN 16 GROUPS OF 256 WORDS (THE SIZE
;          2894  !               OF 1 SECTOR).  EACH GROUP OF 256 WORDS RECEIVES THE
;          2895  !               SECTOR ADDRESS WHERE THE WORDS WILL BE TRANSFERRED.
;          2896  !
;          2897  !  ARGUMENTS.   (1)  SECTOR    - CURRENT SECTOR NUMBER.
;          2898  !
;          2899  !               (2)  COMP_FLAG - AN INDICATOR WHICH IS USED TO DECIDE
;          2900  !                                WHETHER THE LOCATION IN THE WRITE BUFFER
;          2901  !                                SHOULD BE COMPLEMENTED.
;          2902  !--
;          2903
;          2904  LOCAL
;          2905     OFFSET;
;          2906
;          2907  OFFSET = 0;
;          2908
;          2909  IF .COMP_FLAG
;          2910  THEN    !GENERATE COMPLEMENT DATA
;          2911     INCR SECT FROM (.SECTOR) TO ((.SECTOR) + 15) DO
;          2912        BEGIN
;          2913        BREAK;
;          2914        INCR COUNT FROM 1 TO 256 DO
;          2915           BEGIN  !* 2A *
;          2916           (WBUFF + (.OFFSET)) = NOT (.SECT);      !COMPLEMENT DATA
;          2917           OFFSET = .OFFSET + 2;
;          2918           END;   !* 2A *
;          2919        END
;          2920
;          2921  ELSE    !GENERATE REGULAR DATA
;          2922     INCR SECT FROM (.SECTOR) TO ((.SECTOR) + 15) DO
;          2923        BEGIN
;          2924        BREAK;
;          2925        INCR COUNT FROM 1 TO 256 DO
;          2926           BEGIN  !* 2B *
;          2927           (WBUFF + (.OFFSET)) =     (.SECT);      !REGULAR DATA
;          2928           OFFSET = .OFFSET + 2;
;          2929           END;   !* 2B *
;          2930        END;
;          2931
;          2932  RETURN;
;          2933
;          2934  END;   !* 1 *
```

```
                                        .SBTTL  GEN1 GENERATOR FOR OPTION 1
036014  004137  005202          GEN1:   JSR     R1,$SAVE4               ;                               2886
036020  005002                          CLR     R2                      ; OFFSET                        2907
036022  016601  000016                  MOV     16(SP),R1               ; SECTOR,*                      2911
036026  010104                          MOV     R1,R4
036030  062704  000017                  ADD     #17,R4
036034  032766  000001  000014          BIT     #1,14(SP)               ; *,COMP.FLAG                   2909
036042  001424                          BEQ     4$
036044  010103                          MOV     R1,R3                   ; *,SECT                        2911
036046  005303                          DEC     R3                      ; SECT
036050  000415                          BR      3$
036052  104422                  1$:     TRAP    22                      ;                               2912
036054  010301                          MOV     R3,R1                   ; SECT,*                        2916
036056  005101                          COM     R1
036060  012700  000001                  MOV     #1,R0                   ; *,COUNT                       2914
036064  010162  010706          2$:     MOV     R1,WBUFF(R2)            ; *,*(OFFSET)                   2916
036070  062702  000002                  ADD     #2,R2                   ; *,OFFSET                      2917
036074  005200                          INC     R0                      ; COUNT                         2914
036076  020027  000400                  CMP     R0,#400                 ; COUNT,*
036102  003770                          BLE     2$
036104  005203                  3$:     INC     R3                      ; SECT                          2911
036106  020304                          CMP     R3,R4                   ; SECT,*
036110  003760                          BLE     1$
036112  000207                          RTS     PC                      ;                               2909
036114  005301                  4$:     DEC     R1                      ;                               2922
036116  000413                          BR      7$
036120  104422                  5$:     TRAP    22                      ;                               2923
036122  012700  000001                  MOV     #1,R0                   ; *,COUNT                       2925
036126  010162  010706          6$:     MOV     R1,WBUFF(R2)            ; SECT,*(OFFSET)                2927
036132  062702  000002                  ADD     #2,R2                   ; *,OFFSET                      2928
036136  005200                          INC     R0                      ; COUNT                         2925
036140  020027  000400                  CMP     R0,#400                 ; COUNT,*
036144  003770                          BLE     6$
036146  005201                  7$:     INC     R1                      ; SECT                          2922
036150  020104                          CMP     R1,R4                   ; SECT,*
036152  003762                          BLE     5$
036154  000207                          RTS     PC                      ;                               2886

                        ; Routine Size:  49 words
                        ; Maximum stack depth per invocation:  5 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               PATTERN NUMBER SELECTION                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (18)

;       2935  %SBTTL  'PATTERN NUMBER SELECTION'
;       2936
;       2937  ROUTINE SELPAT : NOVALUE =
;       2938  BEGIN
;       2939
;       2940  !++
;       2941  !  ROUTINE:     SELPAT
;       2942  !
;       2943  !  PURPOSE:     TO SELECT THE NEXT PATTERN NUMBER IN OPTION 2.
;       2944  !
;       2945  !               THIS ROUTINE AUTOMATICALLY COMPLEMENTS THE CURRENT
;       2946  !               PATTERN NUMBER AND EXAMINES THE SIGN OF THE RESULT.
;       2947  !               IF THE RESULT IS NEGATIVE, THEN IT IS TAKEN TO BE
;       2948  !               THE PATTERN NUMBER OF A COMPLEMENT PATTERN AND A
;       2949  !               'RETURN' IS EXECUTED.  IF, HOWEVER, THE RESULT IS
;       2950  !               POSITIVE, THEN AN ENTIRELY NEW PATTERN NUMBER IS
;       2951  !               REQUIRED.  THE NEW PATTERN NUMBER IS OBTAINED BY
;       2952  !               INCREMENTING THE OLD.
;       2953  !--
;       2954
;       2955
;       2956  PATTERN = -(.PATTERN);
;       2957
;       2958  IF .PATTERN GEQ 0
;       2959  THEN   PATTERN = .PATTERN + 1;
;       2960
;       2961  RETURN;
;       2962
;       2963  END;
3393
3394                                    .SBTTL  SELPAT PATTERN NUMBER SELECTION
3398 036156  005437  030714     SELPAT: NEG     PATTERN                         ;2956
3399 036162  005737  030714             TST     PATTERN                         ;2958
3400 036166  002402                     BLT     1$
3401 036170  005237  030714             INC     PATTERN                         ;2959
3402 036174  000207                1$:  RTS     PC                              ;2937
3403
3404                                    ; Routine Size:  8 words
3405                                    ; Maximum stack depth per invocation:  0 words
3410
3411
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               USING THE PATTERN TABLE                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (19)

;       2964  %SBTTL  'USING THE PATTERN TABLE'
;       2965
;       2966  ROUTINE GETCNTS(PATTERN) =
;       2967  BEGIN
;       2968
;       2969  !++
;       2970  !  ROUTINE:     GETCNTS(PATTERN)
;       2971  !
;       2972  !  PURPOSE:     TO POINT TO THE APPROPRIATE BLOCK OF THE PATTERN
;       2973  !               TABLE AND GRAB THE VALUES WHICH ARE REQUIRED FOR THE
;       2974  !               PATTERN GENERATOR FOR OPTIONS 2 AND 4.
;       2975  !
;       2976  !  ARGUMENT:    PATTERN = THE CURRENT PATTERN NUMBER.
;       2977  !
;       2978  !  RESULTS:     (1)  'VALUE' RECEIVES THE VALUE WHICH IS RETURNED FOR
;       2979  !                    THE SUBROUTINE.  IT IS THE 4-BIT BINARY AMOUNT WHICH
;       2980  !                    WILL BE USED AS THE CONTENTS OF A NIBBLE OF COMPLEMENT
;       2981  !                    DATA.
;       2982  !
;       2983  !               (2)  'DATA_COUNT' RECEIVES THE NUMBER OF NIBBLES OF DATA.
;       2984  !
;       2985  !               (3)  'COMP_COUNT' RECEIVES THE NUMBER OF NIBBLES OF
;       2986  !                    COMPLEMENT DATA.
;       2987  !--
;       2988
;       2989  LOCAL
;       2990     PATNUM, VALUE;
;       2991
;       2992  SELECTONE .PATTERN OF
;       2993     SET
;       2994
;       2995  [1 TO 5] :      BEGIN
;       2996                  PATNUM = .PATTERN - 1;
;       2997                  VALUE  = %B'1010';
;       2998                  END;
;       2999
;       3000  [-5 TO -1] :    BEGIN
;       3001                  PATNUM = -(.PATTERN) - 1;
;       3002                  VALUE  = %B'0101';
;       3003                  END;
;       3004
;       3005  [6 TO 10] :     BEGIN
;       3006                  PATNUM = .PATTERN - 6;
;       3007                  VALUE  = %B'1111';
;       3008                  END;
;       3009
;       3010  [-10 TO -6] :   BEGIN
;       3011                  PATNUM = -(.PATTERN) - 6;
;       3012                  VALUE  = %B'0000';
;       3013                  END;
;       3014     TES;
;       3015
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               USING THE PATTERN TABLE                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (19)

;          3016  DATA_COUNT = .PATTBL[.PATNUM,COUNT1];
;          3017  COMP_COUNT = .PATTBL[.PATNUM,COUNT2];
;          3018
;          3019  RETURN  .VALUE;
;          3020
;          3021  END;


                                        .SBTTL  GETCNTS USING THE PATTERN TABLE
036176  004137  005150          GETCNTS:JSR     R1,$SAVE2                       ;                                       2966
036202  016600  000010                  MOV     10(SP),R0                       ; PATTERN,*                             2992
036206  003410                          BLE     1$
036210  020027  000005                  CMP     R0,#5
036214  003005                          BGT     1$
036216  010001                          MOV     R0,R1                           ; *,PATNUM                              2996
036220  005301                          DEC     R1                              ; PATNUM
036222  012702  000012                  MOV     #12,R2                          ; *,VALUE                               2997
036226  000441                          BR      4$                              ;                                       2992
036230  020027  177773          1$:     CMP     R0,#-5
036234  002410                          BLT     2$
036236  005700                          TST     R0
036240  002006                          BGE     2$
036242  012701  177777                  MOV     #-1,R1                          ; *,PATNUM                              3001
036246  160001                          SUB     R0,R1                           ; *,PATNUM
036250  012702  000005                  MOV     #5,R2                           ; *,VALUE                               3002
036254  000426                          BR      4$                              ;                                       2992
036256  020027  000006          2$:     CMP     R0,#6
036262  002411                          BLT     3$
036264  020027  000012                  CMP     R0,#12
036270  003006                          BGT     3$
036272  010001                          MOV     R0,R1                           ; *,PATNUM                              3006
036274  162701  000006                  SUB     #6,R1                           ; *,PATNUM
036300  012702  000017                  MOV     #17,R2                          ; *,VALUE                               3007
036304  000412                          BR      4$                              ;                                       2992
036306  020027  177766          3$:     CMP     R0,#-12
036312  002407                          BLT     4$
036314  020027  177772                  CMP     R0,#-6
036320  003004                          BGT     4$
036322  012701  177772                  MOV     #-6,R1                          ; *,PATNUM                              3011
036326  160001                          SUB     R0,R1                           ; *,PATNUM
036330  005002                          CLR     R2                              ; VALUE                                 3012
036332  006301                  4$:     ASL     R1                              ;                                       3016
036334  006301                          ASL     R1
036336  016137  032536  030716          MOV     PATTBL(R1),DATA.COUNT
036344  016137  032540  030720          MOV     PATTBL+2(R1),COMP.COUNT         ;                                       3017
036352  010200                          MOV     R2,R0                           ; VALUE,*                               2967
036354  000207                          RTS     PC                              ;                                       2966
```

```
3525                            ;MLX4                                   23-Oct-1980 15:01:43    TOPS
3526                            ;               USING THE PATTERN TABLE 23-Oct-1980 14:57:05    PA:<
3527
3528
3529                            ; Routine Size:  56 words
3530                            ; Maximum stack depth per invocation:  3 words
3535
3536
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                NIBBLE GENERATOR                       23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (20)

        3022  %SBTTL  'NIBBLE GENERATOR'
        3023
        3024  ROUTINE FILLER(BUFFER,WRDCNT,VALUE): NOVALUE =
        3025  BEGIN  !* 1 *
        3026
        3027  !++
        3028  !  ROUTINE:     FILLER(BUFFER,WRDCNT,VALUE)
        3029  !
        3030  !  PURPOSE:     TO LOAD A CHOSEN WRITE BUFFER, ONE NIBBLE AT A TIME, WITH A
        3031  !               PARTICULAR PATTERN, FOR A SPECIFIED NUMBER OF 16-BIT WORDS.
        3032  !               THIS ROUTINE IS THE HEART OF THE GENERATOR FOR OPTIONS 2 AND 4.
        3033  !
        3034  !               THE 'FILLER' ROUTINE IS A LOOP WHICH WILL ALTERNATE BETWEEN
        3035  !               THE TWO COUNTS AND FILL THE APPROPRIATE NUMBER OF NIBBLES OF
        3036  !               THE CHOSEN BUFFER WITH THE CONTENTS OF 'VALUE'.  EVERY TIME
        3037  !               A COUNT IS EXHAUSTED, THE OTHER COUNT IS STARTED UP AGAIN,
        3038  !               AND EACH TIME A NEW COUNT IS BEGUN, 'VALUE' IS COMPLEMENTED.
        3039  !               NOTE THAT THE FIRST COUNT THAT WILL BE USED WILL ALWAYS BE
        3040  !               'DATA_COUNT',  SO THAT THE BUFFER WILL BE REPETITIONS OF:
        3041  !               DATA, COMP, DATA, COMP ...
        3042  !
        3043  !  ARGUMENTS:   (1)  BUFFER = THE STARTING ADDRESS OF THE CHOSEN WRITE BUFFER.
        3044  !
        3045  !               (2)  WRDCNT = THE NUMBER OF WORDS OF PATTERN TO BE GENERATED.
        3046  !
        3047  !               (3)  VALUE = NIBBLE OF DATA TO BE PLACED IN THE WRITE BUFFER
        3048  !--
        3049
        3050  LOCAL
        3051     NIBBLE, OFFSET, FLAG, THE_COUNT;
        3052
        3053  FLAG   = 0;
        3054  OFFSET = 0;
        3055  NIBBLE = 0;
        3056
        3057  WHILE 1 DO
        3058     BEGIN  !* 2 *
        3059     FLAG  = NOT .FLAG;                          !FLIP THE FLAG
        3060     VALUE = NOT .VALUE;                         !AND THE DATA
        3061
        3062     IF .FLAG EQL 0                              !CHOOSE A COUNT
        3063     THEN
        3064        THE_COUNT = .COMP_COUNT
        3065     ELSE
        3066        THE_COUNT = .DATA_COUNT;
        3067
        3068     DECR COUNT FROM .THE_COUNT TO 1 DO                      !EXHAUST THE COUNT
        3069        BEGIN  !* 3 *
        3070        (.BUFFER + (.OFFSET))<.NIBBLE,4,0> = .VALUE;         !LOAD THE NIBBLE
        3071        NIBBLE = (((.NIBBLE) + 4) MOD 16);                   !CHANGE NIBBLE POINTER
        3072        IF .NIBBLE EQL 0
        3073        THEN
```

```
3594 ;MLX4
3595 ;                  NIBBLE GENERATOR
3596
3597 ;          3074           BEGIN  !* 4 *
3598 ;          3075           BREAK;
3599 ;          3076           OFFSET = .OFFSET + 2;
3600 ;          3077           WRDCNT = .WRDCNT - 1;
3601 ;          3078           IF .WRDCNT EQL 0
3602 ;          3079           THEN  RETURN;
3603 ;          3080           END;   !* 4 *
3604 ;          3081       END;   !* 3 *
3605 ;          3082   END;   !* 2 *
3606 ;          3083 END;   !* 1 *
3610
3611                                    .SBTTL  FILLER NIBBLE GENERATOR
3615 036356  004137  005222       FILLER: JSR     R1,$SAVE5                       ;                                3024
3616 036362  005001                      CLR     R1                              ; FLAG                           3053
3617 036364  005005                      CLR     R5                              ; OFFSET                         3054
3618 036366  005002                      CLR     R2                              ; NIBBLE                         3055
3619 036370  005101                 1$:  COM     R1                              ; FLAG                           3059
3620 036372  005166  000016              COM     16(SP)                          ; VALUE                          3060
3621 036376  005701                      TST     R1                              ; FLAG                           3062
3622 036400  001003                      BNE     2$
3623 036402  013704  030720              MOV     COMP.COUNT,R4                   ; *,THE.COUNT                    3064
3624 036406  000402                      BR      3$                              ;                                3062
3625 036410  013704  030716         2$:  MOV     DATA.COUNT,R4                   ; *,THE.COUNT                    3066
3626 036414  010403                 3$:  MOV     R4,R3                           ; THE.COUNT,COUNT                3068
3627 036416  003764                      BLE     1$
3628 036420  010546                 4$:  MOV     R5,-(SP)                        ; OFFSET,*                       3070
3629 036422  066616  000024              ADD     24(SP),(SP)                     ; BUFFER,*
3630 036426  010246                      MOV     R2,-(SP)                        ; NIBBLE,*
3631 036430  012746  000004              MOV     #4,-(SP)
3632 036434  016646  000024              MOV     24(SP),-(SP)                    ; VALUE,*
3633 036440  004737  004502              JSR     PC,BL$PU2
3634 036444  010216                      MOV     R2,(SP)                         ; NIBBLE,*                       3071
3635 036446  062716  000004              ADD     #4,(SP)
3636 036452  012746  000020              MOV     #20,-(SP)
3637 036456  004737  005070              JSR     PC,BL$MOD
3638 036462  010002                      MOV     R0,R2                           ; *,NIBBLE
3639 036464  001011                      BNE     6$                              ;                                3072
3640 036466  104422                      TRAP    22                              ;                                3074
3641 036470  062705  000002              ADD     #2,R5                           ; *,OFFSET                       3076
3642 036474  005366  000032              DEC     32(SP)                          ; WRDCNT                         3077
3643 036500  001003                      BNE     6$                              ;                                3078
3644 036502  062706  000012              ADD     #12,SP                          ;                                3024
3645 036506  000207                 5$:  RTS     PC                              ;                                3079
3646 036510  062706  000012         6$:  ADD     #12,SP                          ;                                3069
3647 036514  005303                      DEC     R3                              ; COUNT                          3068
3648 036516  001340                      BNE     4$
```

```
                        ;MLX4                                   23-Oct-1980 15:01:43    TOPS
                        ;               NIBBLE GENERATOR        23-Oct-1980 14:57:05    PA:<

036520  000723                  BR      1$                      ;                       3057

                        ; Routine Size:  50 words
                        ; Maximum stack depth per invocation:  11 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               GENERATOR FOR OPTION 2                   23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (21)

;          3084  %SBTTL  'GENERATOR FOR OPTION 2'
;          3085
;          3086  ROUTINE GEN2 : NOVALUE =
;          3087  BEGIN
;          3088
;          3089  !++
;          3090  !  ROUTINE:     GEN2
;          3091  !
;          3092  !  PURPOSE:     TO GENERATE THE ENTIRE WRITE BUFFER (WHICH
;          3093  !               WILL BE USED IN CONJUNCTION WITH OPTION 2)
;          3094  !               BASED ON PATTERN TABLE ENTRIES.
;          3095  !--
;          3096
;          3097  LOCAL
;          3098     VALUE;
;          3099
;          3100  VALUE = GETCNTS(.PATTERN);
;          3101  FILLER(WBUFF,BUFSIZ,.VALUE);
;          3102  RETURN;
;          3103  END;
3690
3691                                        .SBTTL  GEN2 GENERATOR FOR OPTION 2
3695 036522  013746  030714          GEN2:  MOV     PATTERN,-(SP)                ;                          3100
3696 036526  004737  036176                 JSR     PC,GETCNTS
3697 036532  012716  010706                 MOV     #WBUFF,(SP)                  ;                          3101
3698 036536  012746  004000                 MOV     #4000,-(SP)
3699 036542  010046                         MOV     R0,-(SP)                     ; VALUE,*
3700 036544  004737  036356                 JSR     PC,FILLER
3701 036550  062706  000006                 ADD     #6,SP                        ;                          3086
3702 036554  000207                         RTS     PC
3703
3704                                ; Routine Size:  14 words
3705                                ; Maximum stack depth per invocation:  3 words
3710
3711
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               GENERATOR FOR OPTION 3                   23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (22)

;          3104  %SBTTL  'GENERATOR FOR OPTION 3'
;          3105
;          3106  ROUTINE GEN3(COMP_FLAG): NOVALUE =
;          3107  BEGIN
;          3108
;          3109  !++
;          3110  !  ROUTINE:     GEN3(COMP_FLAG)
;          3111  !
;          3112  !  PURPOSE:     TO GENERATE THE ENTIRE WRITE BUFFER WHICH WILL BE MADE
;          3113  !               UP OF WORDS WHICH CONTAIN THE UNIQUE COUNT FROM ONE TO
;          3114  !               BUFSIZ.
;          3115  !
;          3116  !  ARGUMENT:    COMP_FLAG - THIS IS AN INDICATOR OF WHETHER OR NOT TO
;          3117  !                           COMPLEMENT EVERY WORD IN THE WRITE BUFFER.
;          3118  !--
;          3119
;          3120  LOCAL
;          3121     OFFSET;
;          3122
;          3123  OFFSET = 0;
;          3124
;          3125  IF .COMP_FLAG
;          3126  THEN    !GENERATE COMPLEMENT DATA
;          3127     INCR COUNT FROM 1 TO BUFSIZ DO
;          3128        BEGIN
;          3129        (WBUFF + (.OFFSET)) = NOT (.COUNT);       !COMPLEMENT DATA
;          3130        OFFSET = .OFFSET + 2;
;          3131        END
;          3132
;          3133  ELSE    !GENERATE REGULAR DATA
;          3134     INCR COUNT FROM 1 TO BUFSIZ DO
;          3135        BEGIN
;          3136        (WBUFF + (.OFFSET)) =     (.COUNT);       !REGULAR DATA
;          3137        OFFSET = .OFFSET + 2;
;          3138        END;
;          3139
;          3140  RETURN;
;          3141
;          3142  END;
;          3758
;          3759                              .SBTTL  GEN3 GENERATOR FOR OPTION 3
;          3763 036556  010146                GEN3:   MOV     R1,-(SP)                ;                                3106
;          3764 036560  005001                        CLR     R1                      ; OFFSET                         3123
;          3765 036562  032766  000001  000004        BIT     #1,4(SP)                ; *,COMP.FLAG                    3125
;          3766 036570  001415                        BEQ     2$
;          3767 036572  012700  000001                MOV     #1,R0                   ; *,COUNT                        3127
```

```
3769                                    ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
3770                                    ;               GENERATOR FOR OPTION 3                  23-Oct-1980 14:57:05    PA:<
3771
3772 036576  010061  010706      1$:     MOV     R0,WBUFF(R1)            ; COUNT,*(OFFSET)                               3129
3773 036602  005161  010706              COM     WBUFF(R1)               ; *(OFFSET)
3774 036606  062701  000002              ADD     #2,R1                   ; *,OFFSET                                      3130
3775 036612  005200                      INC     R0                      ; COUNT                                         3127
3776 036614  020027  004000              CMP     R0,#4000                ; COUNT,*
3777 036620  003766                      BLE     1$
3778 036622  000412                      BR      4$                      ;                                               3125
3779 036624  012700  000001      2$:     MOV     #1,R0                   ; *,COUNT                                       3134
3780 036630  010061  010706      3$:     MOV     R0,WBUFF(R1)            ; COUNT,*(OFFSET)                               3136
3781 036634  062701  000002              ADD     #2,R1                   ; *,OFFSET                                      3137
3782 036640  005200                      INC     R0                      ; COUNT                                         3134
3783 036642  020027  004000              CMP     R0,#4000                ; COUNT,*
3784 036646  003770                      BLE     3$
3785 036650  012601              4$:     MOV     (SP)+,R1                ;                                               3106
3786 036652  000207                      RTS     PC
3787
3788                                    ; Routine Size:  31 words
3789                                    ; Maximum stack depth per invocation:  2 words
3794
3795
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               GENERATOR FOR OPTION 4                   23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (23)

;         3143  %SBTTL  'GENERATOR FOR OPTION 4'
;         3144
;         3145
;         3146  ROUTINE GEN4(MARPAT,BUFFER) : NOVALUE =
;         3147  BEGIN
;         3148
;         3149  !++
;         3150  !  ROUTINE:     GEN4(MARPAT,BUFFER)
;         3151  !
;         3152  !  PURPOSE:     THIS IS THE GENERATOR WHICH IS USED FOR OPTION 4, THE
;         3153  !               MARCH TEST.  IT BEGINS AT THE START OF THE CHOSEN
;         3154  !               BUFFER AND GENERATES 256 WORDS IN THE EXACT WAY THAT
;         3155  !               OPTION 2 DOES.
;         3156  !
;         3157  !  ARGUMENTS:   (1)  MARPAT - THE MARCH PATTERN NUMBER
;         3158  !
;         3159  !               (2)  BUFFER - THE STARTING ADDRESS OF THE CHOSEN BUFFER
;         3160  !--
;         3161
;         3162  LOCAL
;         3163     VALUE;
;         3164
;         3165  VALUE = GETCNTS(.MARPAT);
;         3166  FILLER(.BUFFER,256,.VALUE);
;         3167  RETURN;
;         3168  END;
;
;                              .SBTTL  GEN4 GENERATOR FOR OPTION 4
3834 036654  016646  000004  GEN4:   MOV     4(SP),-(SP)                 ; MARPAT,*          3165
3835 036660  004737  036176          JSR     PC,GETCNTS
3836 036664  016616  000004          MOV     4(SP),(SP)                  ; BUFFER,*          3166
3837 036670  012746  000400          MOV     #400,-(SP)
3838 036674  010046                  MOV     R0,-(SP)                    ; VALUE,*
3839 036676  004737  036356          JSR     PC,FILLER
3840 036702  062706  000006          ADD     #6,SP                       ;                   3146
3841 036706  000207                  RTS     PC
3842
3843                              ; Routine Size:  14 words
3844                              ; Maximum stack depth per invocation:  3 words
3849
3850
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               GENERATOR FOR OPTION 5                   23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (24)

;          3169  %SBTTL  'GENERATOR FOR OPTION 5'
;          3170
;          3171  ROUTINE GEN5 : NOVALUE =
;          3172  BEGIN
;          3173
;          3174  !++
;          3175  !  ROUTINE:     GEN5
;          3176  !
;          3177  !  PURPOSE:     THIS IS THE GENERATOR WHICH IS USED FOR OPTION 5.
;          3178  !               IT BEGINS AT THE START OF THE WRITE BUFFER, AND GENERATES
;          3179  !               A FULL BUFFER OF RANDOM DATA.  THE FIRST 3 WORDS OF THE BUFFER
;          3180  !               RECEIVE THE 3 SEEDS WHICH WERE USED IN THE GENERATION.
;          3181  !--
;          3182  LOCAL
;          3183     OFFSET;
;          3184
;          3185  (WBUFF + 0) = .SEED1;    !THE FIRST 3 WORDS OF THE
;          3186  (WBUFF + 2) = .SEED2;    !WRITE BUFFER RECEIVE THE
;          3187  (WBUFF + 4) = .SEED3;    !3 GENERATING SEEDS.
;          3188  OFFSET = 6;
;          3189
;          3190  INCR COUNT FROM 4 TO BUFSIZ DO
;          3191     BEGIN
;          3192     RN();          !NOTE: USING SIGNED VALUES (FULL 16 BITS)
;          3193
;          3194     BREAK;
;          3195     (WBUFF + .OFFSET) = .RANDOM;
;          3196     OFFSET = .OFFSET + 2;
;          3197     END;
;          3198
;          3199  RETURN;
;          3200  END;
3890
3891                                        .SBTTL  GEN5 GENERATOR FOR OPTION 5
3895 036710  004137  005150          GEN5:  JSR     R1,$SAVE2                    ;                          3171
3896 036714  013737  005344  010706        MOV     SEED1,WBUFF                  ;                          3185
3897 036722  013737  005346  010710        MOV     SEED2,WBUFF+2                ;                          3186
3898 036730  013737  005350  010712        MOV     SEED3,WBUFF+4                ;                          3187
3899 036736  012701  000006              MOV     #6,R1                        ; *,OFFSET                 3188
3900 036742  012702  000004              MOV     #4,R2                        ; *,COUNT                  3190
3901 036746  004737  005256          1$:  JSR     PC,RN                        ;                          3192
3902 036752  104422                      TRAP    22
3903 036754  013761  005352  010706        MOV     RANDOM,WBUFF(R1)             ; *,*(OFFSET)              3195
3904 036762  062701  000002              ADD     #2,R1                        ; *,OFFSET                 3196
3905 036766  005202                      INC     R2                           ; COUNT                    3190
3906 036770  020227  004000              CMP     R2,#4000                     ; COUNT,*
```

```
                                ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                ;               GENERATOR FOR OPTION 5                  23-Oct-1980 14:57:05    PA:<

036774  003764                          BLE     1$
036776  000207                          RTS     PC                              ;                               3171

                                ; Routine Size:  28 words
                                ; Maximum stack depth per invocation:  3 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               SYSTEM ERROR DETECTOR                    23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (25)

;       3201    %SBTTL  'SYSTEM ERROR DETECTOR'
;       3202
;       3203    ROUTINE SYSERR(LUN) =
;       3204    BEGIN  !* 1 *
;       3205
;       3206    !++
;       3207    !  ROUTINE:     SYSERR(LUN)
;       3208    !
;       3209    !  PURPOSE:     (1)  TO SCAN FOR SYSTEM ERRORS AFTER A TRANSFER HAS ENDED.
;       3210    !
;       3211    !               (2)  PRINT ERROR MESSAGES IF APPROPRIATE:
;       3212    !
;       3213    !                    A) ERROR MESSAGES DURING RETRIES WILL NOT
;       3214    !                       BE PRINTED.
;       3215    !
;       3216    !                    B) THE OPERATOR HAS THE ABILITY TO INHIBIT THE
;       3217    !                       PRINTING OF DATA ERRORS, BUT NOT SYSTEM ERRORS.
;       3218    !
;       3219    !               (3)  DECIDE ON A VALUE TO RETURN WHICH WILL INDICATE THE
;       3220    !                    RELATIVE SEVERITY OF THE ERROR.
;       3221    !
;       3222    !  ARGUMENT:    LUN = THE CURRENT LOGICAL UNIT NUMBER
;       3223    !                     [0 TO NUMBER OF DRIVES MINUS 1].
;       3224    !
;       3225    !  RESULT:      VALUE RETURNED FOR THE SUBROUTINE SHOWS TYPE OF ERROR:
;       3226    !                       0 = NO ERRORS AT ALL
;       3227    !                       1 = RETRY ALLOWED FOR THESE TYPES OF ERRORS
;       3228    !                       2 = FATAL CONTROLLER ERROR
;       3229    !                       3 = FATAL DRIVE ERROR
;       3230    !                       4 = UNCORRECTABLE DATA ERROR
;       3231    !                       5 = CORRECTABLE DATA ERROR
;       3232    !
;       3233    !  FIGURE OUT WHICH VALUE TO RETURN BY THE FOLLOWING SCHEME:
;       3234    !
;       3235    !  (1)  IF THERE IS A CHOICE BETWEEN DATA ERROR AND SYSTEM ERROR,
;       3236    !       FIRST CHOOSE THE DATA ERROR.
;       3237    !  (2)  IF THERE IS A CHOICE BETWEEN FATAL AND NON-FATAL ERROR,
;       3238    !       FIRST CHOOSE THE FATAL ERROR.
;       3239    !  (3)  IF THERE IS A CHOICE BETWEEN CONTROLLER ERROR AND DRIVE ERROR,
;       3240    !       FIRST CHOOSE CONTROLLER ERROR.
;       3241    !--
;       3242
;       3243    LABEL
;       3244       PURPOSE_2_CODE;
;       3245
;       3246    LOCAL
;       3247       ERR2,ERR3,ERR4,ERR5,ERR6,ERR7;
;       3248
;       3249    ERR2 = INACTIVE;
;       3250    ERR3 = INACTIVE;
;       3251    ERR4 = INACTIVE;
;       3252    ERR5 = INACTIVE;
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                SYSTEM ERROR DETECTOR                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (25)

;          3253  ERR6 = INACTIVE;
;          3254  ERR7 = INACTIVE;
;          3255
;          3256          !+
;          3257          ! THIS IS THE CODE FOR PURPOSE 1:
;          3258          !-
;          3259
;          3260  IF .SC
;          3261  THEN  !THERE ARE SOME ERRORS -- FIND OUT WHAT KIND
;          3262     BEGIN  !* 2 *
;          3263     IF ((.NED) OR (.NEM) OR (.PGE))
;          3264     THEN  ERR2 = ACTIVE;
;          3265     IF ((.DLT) OR (.PE) OR (.MXF) OR (.MDPE) OR (.MCPE))
;          3266     THEN  ERR3 = ACTIVE;
;          3267     IF ((.WCE) AND (.ECCDIS EQL 0))
;          3268     THEN  ERR3 = ACTIVE;
;          3269     IF ((.UNS) OR (.IAE) OR (.AOE) OR (.RMR) OR (.ILR) OR (.ILF))
;          3270     THEN  ERR4 = ACTIVE;
;          3271     IF ((.OPI) OR (.DPAR) OR (.CPAR))
;          3272     THEN  ERR5 = ACTIVE;
;          3273     IF ((.DCK) OR (.CRC) OR (.SGL))
;          3274     THEN  ERR7 = ACTIVE;
;          3275     IF ((.WCE) AND (.ECCDIS EQL 1))
;          3276     THEN  ERR7 = ACTIVE;
;          3277     IF ((.ECH) OR (.UNC))
;          3278     THEN  ERR6 = ACTIVE;
;          3279     END    !* 2 *
;          3280  ELSE  !THERE ARE NO ERRORS -- RETURN SUCCESSFULLY
;          3281     RETURN 0;     !NO ERRORS AT ALL
;          3282
;          3283          !+
;          3284          ! THIS IS THE CODE FOR PURPOSE 2:
;          3285          !
;          3286          !    LABEL:
;          3287          !       BEGIN 3
;          3288          !       IF RETRYING
;          3289          !       THEN  LEAVE LABEL (NO PRINTOUTS AT ALL)
;          3290          !       ELSE
;          3291          !          BEGIN 4
;          3292          !          IF ERROR PRINTOUTS ARE ALLOWED
;          3293          !          THEN
;          3294          !             BEGIN 5A
;          3295          !             IDENTIFY THE LOGICAL UNIT
;          3296          !             SCAN FOR & PRINT DATA ERRORS
;          3297          !             END   5A
;          3298          !          ELSE
;          3299          !             BEGIN 5B
;          3300          !             IF THERE ARE SYSTEM ERRORS TO REPORT
;          3301          !             THEN  IDENTIFY THE LOGICAL UNIT
;          3302          !             ELSE  LEAVE LABEL
;          3303          !             END  5B
;          3304          !          SCAN FOR & PRINT SYSTEM ERRORS
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                SYSTEM ERROR DETECTOR                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (25)

;          3305          !          END  4
;          3306          !       END  3
;          3307          !-
;          3308
;          3309  PURPOSE_2_CODE:
;          3310     BEGIN  !* 3 *
;          3311     IF .RETRYING
;          3312     THEN  LEAVE PURPOSE_2_CODE   !(NO PRINTOUTS AT ALL)
;          3313     ELSE
;          3314        BEGIN  !* 4 *
;          3315        IF .ERROUT
;          3316        THEN
;          3317           BEGIN  !* 5A *
;          3318           SAYWHO(.LUN);
;          3319           PRINTB(SAY1,PHR10);
;          3320              !'ERROR BITS SET:
;          3321           IF .ERR7
;          3322           THEN
;          3323              BEGIN
;          3324              IF .DCK
;          3325              THEN  PRINTB(FMT15,MLB20);
;          3326              IF .CRC
;          3327              THEN  PRINTB(FMT15,MLB22);
;          3328              IF .SGL
;          3329              THEN  PRINTB(FMT15,MLB23);
;          3330              IF ((.WCE) AND (.ECCDIS EQL 1))
;          3331              THEN  PRINTB(FMT15,MLB6);
;          3332              END;
;          3333           IF .ERR6
;          3334           THEN
;          3335              BEGIN
;          3336              IF .ECH
;          3337              THEN  PRINTB(FMT15,MLB21);
;          3338              IF .UNC
;          3339              THEN  PRINTB(FMT15,MLB24);
;          3340              END;
;          3341           END    !* 5A *
;          3342        ELSE
;          3343           BEGIN  !* 5B *
;          3344           IF ((.ERR2) OR (.ERR3) OR (.ERR4) OR (.ERR5))
;          3345           THEN
;          3346              BEGIN
;          3347              SAYWHO(.LUN);
;          3348              PRINTB(SAY1,PHR10);
;          3349                 !'ERROR BITS SET:
;          3350              END
;          3351           ELSE  LEAVE PURPOSE_2_CODE;
;          3352           END;   !* 5B *
;          3353        IF .ERR2
;          3354        THEN
;          3355           BEGIN
;          3356           IF .NED
```

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```
;MLX4
;                    SYSTEM ERROR DETECTOR

;          3357            THEN  PRINTB(FMT15,MLB2);
;          3358            IF .NEM
;          3359            THEN  PRINTB(FMT15,MLB3);
;          3360            IF .PGE
;          3361            THEN  PRINTB(FMT15,MLB4);
;          3362            END;
;          3363         IF .ERR3
;          3364         THEN
;          3365            BEGIN
;          3366            IF .DLT
;          3367            THEN  PRINTB(FMT15,MLB5);
;          3368            IF ((.WCE) AND (.ECCDIS EQL 0))
;          3369            THEN  PRINTB(FMT15,MLB6);
;          3370            IF .PE
;          3371            THEN  PRINTB(FMT15,MLB7);
;          3372            IF .MXF
;          3373            THEN  PRINTB(FMT15,MLB8);
;          3374            IF .MDPE
;          3375            THEN  PRINTB(FMT15,MLB9);
;          3376            IF .MCPE
;          3377            THEN  PRINTB(FMT15,MLB10);
;          3378            END;
;          3379         IF .ERR4
;          3380         THEN
;          3381            BEGIN
;          3382            IF .UNS
;          3383            THEN  PRINTB(FMT15,MLB11);
;          3384            IF .IAE
;          3385            THEN  PRINTB(FMT15,MLB12);
;          3386            IF .AOE
;          3387            THEN  PRINTB(FMT15,MLB13);
;          3388            IF .RMR
;          3389            THEN  PRINTB(FMT15,MLB14);
;          3390            IF .ILR
;          3391            THEN  PRINTB(FMT15,MLB15);
;          3392            IF .ILF
;          3393            THEN  PRINTB(FMT15,MLB16);
;          3394            END;
;          3395         IF .ERR5
;          3396         THEN
;          3397            BEGIN
;          3398            IF .OPI
;          3399            THEN  PRINTB(FMT15,MLB17);
;          3400            IF .DPAR
;          3401            THEN  PRINTB(FMT15,MLB18);
;          3402            IF .CPAR
;          3403            THEN  PRINTB(FMT15,MLB19);
;          3404            END;
;          3405         END;    !* 4 *
;          3406      END;    !* 3 *
;          3407
;          3408            !*
```

```
;MLX4                                                    23-Oct-1980 15:01:43   TOPS-20 Bliss-16 V2(206)
;               SYSTEM ERROR DETECTOR                    23-Oct-1980 14:57:05   PA:<ROSEN>MLX4.BLI.1 (25)

;         3409          ! THIS IS THE CODE FOR PURPOSE 3:
;         3410          !-
;         3411
;         3412  IF .ERR6                    !UNRECOVERABLE DATA ERROR (NO RETRY ALLOWED)
;         3413  THEN  RETURN 4;
;         3414
;         3415  IF .ERR7                    !RECOVERABLE DATA ERROR (RETRY TO CLASSIFY)
;         3416  THEN  RETURN 5;
;         3417
;         3418  IF .ERR2                    !CONTROLLER FATAL ERROR
;         3419  THEN  RETURN 2;
;         3420
;         3421  IF .ERR4                    !DRIVE FATAL ERROR
;         3422  THEN  RETURN 3;
;         3423
;         3424  IF (.ERR3 OR .ERR5)        !NON-FATAL ERRORS
;         3425  THEN  RETURN 1
;         3426  ELSE
;         3427     BEGIN
;         3428     IF ((.ERROUT) AND (NOT .RETRYING))
;         3429     THEN   PRINTB(SAY1,PHR11);
;         3430               !'SC SET BUT NO SYSTEM ERRORS FOUND'
;         3431     RETURN 1;
;         3432     END;
;         3433
;         3434  END;   !* 1 *
4179
4180                                        .SBTTL  SYSERR SYSTEM ERROR DETECTOR
4184 037000  004137  005222          SYSERR: JSR     R1,$SAVE5                       ;                       3203
4185 037004  005005                          CLR     R5                              ; ERR2                  3249
4186 037006  005004                          CLR     R4                              ; ERR3                  3250
4187 037010  005001                          CLR     R1                              ; ERR4                  3251
4188 037012  005002                          CLR     R2                              ; ERR5                  3252
4189 037014  005046                          CLR     -(SP)                           ; ERR6                  3253
4190 037016  005003                          CLR     R3                              ; ERR7                  3254
4191 037020  005777  173340                  TST     @ML.REG                         ;                       3260
4192 037024  100402                          BMI     1$
4193 037026  000137  041220                  JMP     49$
4194 037032  032777  010000  173334  1$:     BIT     #10000,@ML.REG+10               ;                       3263
4195 037040  001010                          BNE     2$
4196 037042  032777  004000  173324          BIT     #4000,@ML.REG+10
4197 037050  001004                          BNE     2$
4198 037052  032777  002000  173314          BIT     #2000,@ML.REG+10
4199 037060  001402                          BEQ     3$
4200 037062  012705  000001          2$:     MOV     #1,R5                           ; *,ERR2                3264
4201 037066  005777  173302          3$:     TST     @ML.REG+10                      ;                       3265
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               SYSTEM ERROR DETECTOR                    23-Oct-1980 14:57:05    PA:<

037072  100420                          BMI     4$
037074  032777  020000  173272          BIT     #20000,@ML.REG+10
037102  001014                          BNE     4$
037104  032777  001000  173262          BIT     #1000,@ML.REG+10
037112  001010                          BNE     4$
037114  032777  000400  173252          BIT     #400,@ML.REG+10
037122  001004                          BNE     4$
037124  032777  020000  173232          BIT     #20000,@ML.REG
037132  001402                          BEQ     5$
037134  012704  000001          4$:     MOV     #1,R4                   ; *,ERR3                 3266
037140  032777  040000  173226  5$:     BIT     #40000,@ML.REG+10       ;                        3267
037146  001405                          BEQ     6$
037150  005737  002254                  TST     ECCDIS
037154  001002                          BNE     6$
037156  012704  000001                  MOV     #1,R4                   ; *,ERR3                 3268
037162  032777  040000  173210  6$:     BIT     #40000,@ML.REG+14       ;                        3269
037170  001024                          BNE     7$
037172  032777  002000  173200          BIT     #2000,@ML.REG+14
037200  001020                          BNE     7$
037202  032777  001000  173170          BIT     #1000,@ML.REG+14
037210  001014                          BNE     7$
037212  132777  000004  173160          BITB    #4,@ML.REG+14
037220  001010                          BNE     7$
037222  132777  000002  173150          BITB    #2,@ML.REG+14
037230  001004                          BNE     7$
037232  132777  000001  173140          BITB    #1,@ML.REG+14
037240  001402                          BEQ     8$
037242  012701  000001          7$:     MOV     #1,R1                   ; *,ERR4                 3270
037246  032777  020000  173124  8$:     BIT     #20000,@ML.REG+14       ;                        3271
037254  001010                          BNE     9$
037256  132777  000040  173114          BITB    #40,@ML.REG+14
037264  001004                          BNE     9$
037266  132777  000010  173104          BITB    #10,@ML.REG+14
037274  001402                          BEQ     10$
037276  012702  000001          9$:     MOV     #1,R2                   ; *,ERR5                 3272
037302  005777  173072          10$:    TST     @ML.REG+14              ;                        3273
037306  100410                          BMI     11$
037310  032777  020000  173110          BIT     #20000,@ML.REG+42
037316  001004                          BNE     11$
037320  032777  040000  173100          BIT     #40000,@ML.REG+42
037326  001402                          BEQ     12$
037330  012703  000001          11$:    MOV     #1,R3                   ; *,ERR7                 3274
037334  032777  040000  173032  12$:    BIT     #40000,@ML.REG+10       ;                        3275
037342  001406                          BEQ     13$
037344  023727  002254  000001          CMP     ECCDIS,#1
037352  001002                          BNE     13$
037354  012703  000001                  MOV     #1,R3                   ; *,ERR7                 3276
037360  132777  000100  173012  13$:    BITB    #100,@ML.REG+14         ;                        3277
037366  001003                          BNE     14$
037370  005777  173032                  TST     @ML.REG+42
037374  100002                          BPL     15$
037376  012716  000001          14$:    MOV     #1,(SP)                 ; *,ERR6                 3273
```

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                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               SYSTEM ERROR DETECTOR                   23-Oct-1980 14:57:05    PA:<

037402  032737  000001  032356  15$:    BIT     #1,RETRYING                     ;                                       3311
037410  001402                          BEQ     17$                             ;                                       3312
037412  000137  041062          16$:    JMP     43$
037416  032737  000001  002260  17$:    BIT     #1,ERROUT                       ;                                       3315
037424  001552                          BEQ     23$
037426  016646  000020                  MOV     20(SP),-(SP)                    ; LUN,*                                 3318
037432  004737  033436                  JSR     PC,SAYWHO
037436  012716  007542                  MOV     #PHR10,(SP)                     ;                                       3319
037442  012746  006514                  MOV     #SAY1,-(SP)
037446  012746  000002                  MOV     #2,-(SP)
037452  010600                          MOV     SP,R0                           ; SP,*
037454  104414                          TRAP    14
037456  032703  000001                  BIT     #1,R3                           ; *,ERR7                                3321
037462  001473                          BEQ     21$
037464  005777  172710                  TST     @ML.REG+14                      ;                                       3324
037470  100012                          BPL     18$
037472  012746  007172                  MOV     #MLB20,-(SP)                    ;                                       3325
037476  012746  006502                  MOV     #FMT15,-(SP)
037502  012746  000002                  MOV     #2,-(SP)
037506  010600                          MOV     SP,R0                           ; SP,*
037510  104414                          TRAP    14
037512  062706  000006                  ADD     #6,SP
037516  032777  020000  172702  18$:    BIT     #20000,@ML.REG+42               ;                                       3326
037524  001412                          BEQ     19$
037526  012746  007202                  MOV     #MLB22,-(SP)                    ;                                       3327
037532  012746  006502                  MOV     #FMT15,-(SP)
037536  012746  000002                  MOV     #2,-(SP)
037542  010600                          MOV     SP,R0                           ; SP,*
037544  104414                          TRAP    14
037546  062706  000006                  ADD     #6,SP
037552  032777  040000  172646  19$:    BIT     #40000,@ML.REG+42               ;                                       3328
037560  001412                          BEQ     20$
037562  012746  007206                  MOV     #MLB23,-(SP)                    ;                                       3329
037566  012746  006502                  MOV     #FMT15,-(SP)
037572  012746  000002                  MOV     #2,-(SP)
037576  010600                          MOV     SP,R0                           ; SP,*
037600  104414                          TRAP    14
037602  062706  000006                  ADD     #6,SP
037606  032777  040000  172560  20$:    BIT     #40000,@ML.REG+10               ;                                       3330
037614  001416                          BEQ     21$
037616  023727  002254  000001          CMP     ECCDIS,#1
037624  001012                          BNE     21$
037626  012746  007072                  MOV     #MLB6,-(SP)                     ;                                       3331
037632  012746  006502                  MOV     #FMT15,-(SP)
037636  012746  000002                  MOV     #2,-(SP)
037642  010600                          MOV     SP,R0                           ; SP,*
037644  104414                          TRAP    14
037646  062706  000006                  ADD     #6,SP
037652  032766  000001  000006  21$:    BIT     #1,6(SP)                        ; *,ERR6                                3333
037660  001464                          BEQ     25$
037662  132777  000100  172510          BITB    #100,@ML.REG+14                 ;                                       3336
037670  001412                          BEQ     22$
```

```
                                        ;MLX4
                                        ;               SYSTEM ERROR DETECTOR                   23-Oct-1980 15:01:43    TOPS
                                                                                                23-Oct-1980 14:57:05    PA:<
                                                MOV     #MLB21,-(SP)                    ;                               3337
                                                MOV     #FMT15,-(SP)
                                                MOV     #2,-(SP)
                                                MOV     SP,R0                           ; SP,*
                                                TRAP    14
                                                ADD     #6,SP
                                        22$:    TST     @ML.REG+42                      ;                               3338
                                                BPL     25$
                                                MOV     #MLB24,-(SP)                    ;                               3339
                                                MOV     #FMT15,-(SP)
                                                MOV     #2,-(SP)
                                                MOV     SP,R0                           ; SP,*
                                                TRAP    14
                                                ADD     #6,SP
                                                BR      25$                             ;                               3317
                                        23$:    BIT     #1,R5                           ; *,ERR2                        3344
                                                BNE     24$
                                                BIT     #1,R4                           ; *,ERR3
                                                BNE     24$
                                                BIT     #1,R1                           ; *,ERR4
                                                BNE     24$
                                                BIT     #1,R2                           ; *,ERR5
                                                BEQ     16$
                                        24$:    MOV     20(SP),-(SP)                    ; LUN,*                         3347
                                                JSR     PC,SAYWHO
                                                MOV     #PHR10,(SP)                     ;                               3348
                                                MOV     #SAY1,-(SP)
                                                MOV     #2,-(SP)
                                                MOV     SP,R0                           ; SP,*
                                                TRAP    14
                                        25$:    ADD     #6,SP                           ;                               3346
                                                BIT     #1,R5                           ; *,ERR2                        3353
                                                BEQ     28$
                                                BIT     #10000,@ML.REG+10               ;                               3356
                                                BEQ     26$
                                                MOV     #MLB2,-(SP)                     ;                               3357
                                                MOV     #FMT15,-(SP)
                                                MOV     #2,-(SP)
                                                MOV     SP,R0                           ; SP,*
                                                TRAP    14
                                                ADD     #6,SP
                                        26$:    BIT     #4000,@ML.REG+10                ;                               3358
                                                BEQ     27$
                                                MOV     #MLB3,-(SP)                     ;                               3359
                                                MOV     #FMT15,-(SP)
                                                MOV     #2,-(SP)
                                                MOV     SP,R0                           ; SP,*
                                                TRAP    14
                                                ADD     #6,SP
                                        27$:    BIT     #2000,@ML.REG+10                ;                               3360
                                                BEQ     28$
                                                MOV     #MLB4,-(SP)                     ;                               3361
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               SYSTEM ERROR DETECTOR                    23-Oct-1980 14:57:05    PA:<

040150  012746  006502                        MOV     #FMT15,-(SP)
040154  012746  000002                        MOV     #2,-(SP)
040160  010600                                MOV     SP,R0                           ; SP,*
040162  104414                                TRAP    14
040164  062706  000006                        ADD     #6,SP
040170  032704  000001                28$:    BIT     #1,R4                           ; *,ERR3                                3363
040174  001526                                BEQ     34$
040176  005777  172172                        TST     @ML.REG+10                      ;                                       3366
040202  100012                                BPL     29$
040204  012746  007066                        MOV     #MLB5,-(SP)                     ;                                       3367
040210  012746  006502                        MOV     #FMT15,-(SP)
040214  012746  000002                        MOV     #2,-(SP)
040220  010600                                MOV     SP,R0                           ; SP,*
040222  104414                                TRAP    14
040224  062706  000006                        ADD     #6,SP
040230  032777  040000  172136    29$:        BIT     #40000,@ML.REG+10               ;                                       3368
040236  001415                                BEQ     30$
040240  005737  002254                        TST     ECCDIS
040244  001012                                BNE     30$
040246  012746  007072                        MOV     #MLB6,-(SP)                     ;                                       3369
040252  012746  006502                        MOV     #FMT15,-(SP)
040256  012746  000002                        MOV     #2,-(SP)
040262  010600                                MOV     SP,R0                           ; SP,*
040264  104414                                TRAP    14
040266  062706  000006                        ADD     #6,SP
040272  032777  020000  172074    30$:        BIT     #20000,@ML.REG+10               ;                                       3370
040300  001412                                BEQ     31$
040302  012746  007076                        MOV     #MLB7,-(SP)                     ;                                       3371
040306  012746  006502                        MOV     #FMT15,-(SP)
040312  012746  000002                        MOV     #2,-(SP)
040316  010600                                MOV     SP,R0                           ; SP,*
040320  104414                                TRAP    14
040322  062706  000006                        ADD     #6,SP
040326  032777  001000  172040    31$:        BIT     #1000,@ML.REG+10                ;                                       3372
040334  001412                                BEQ     32$
040336  012746  007102                        MOV     #MLB8,-(SP)                     ;                                       3373
040342  012746  006502                        MOV     #FMT15,-(SP)
040346  012746  000002                        MOV     #2,-(SP)
040352  010600                                MOV     SP,R0                           ; SP,*
040354  104414                                TRAP    14
040356  062706  000006                        ADD     #6,SP
040362  032777  000400  172004    32$:        BIT     #400,@ML.REG+10                 ;                                       3374
040370  001412                                BEQ     33$
040372  012746  007106                        MOV     #MLB9,-(SP)                     ;                                       3375
040376  012746  006502                        MOV     #FMT15,-(SP)
040402  012746  000002                        MOV     #2,-(SP)
040406  010600                                MOV     SP,R0                           ; SP,*
040410  104414                                TRAP    14
040412  062706  000006                        ADD     #6,SP
040416  032777  020000  171740    33$:        BIT     #20000,@ML.REG                  ;                                       3376
040424  001412                                BEQ     34$
040426  012746  007114                        MOV     #MLB10,-(SP)                    ;                                       3377
```

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                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;       SYSTEM ERROR DETECTOR                            23-Oct-1980 14:57:05    PA:<

040432  012746  006502                        MOV     #FMT15,-(SP)
040436  012746  000002                        MOV     #2,-(SP)
040442  010600                                MOV     SP,R0                   ; SP,*
040444  104414                                TRAP    14
040446  062706  000006                        ADD     #6,SP
040452  032701  000001                34$:    BIT     #1,R1                   ; *,ERR4                3379
040456  001524                                BEQ     40$
040460  032777  040000  171712                BIT     #40000,@ML.REG+14       ;                       3382
040466  001412                                BEQ     35$
040470  012746  007122                        MOV     #MLB11,-(SP)            ;                       3383
040474  012746  006502                        MOV     #FMT15,-(SP)
040500  012746  000002                        MOV     #2,-(SP)
040504  010600                                MOV     SP,R0                   ; SP,*
040506  104414                                TRAP    14
040510  062706  000006                        ADD     #6,SP
040514  032777  002000  171656        35$:    BIT     #2000,@ML.REG+14        ;                       3384
040522  001412                                BEQ     36$
040524  012746  007126                        MOV     #MLB12,-(SP)            ;                       3385
040530  012746  006502                        MOV     #FMT15,-(SP)
040534  012746  000002                        MOV     #2,-(SP)
040540  010600                                MOV     SP,R0                   ; SP,*
040542  104414                                TRAP    14
040544  062706  000006                        ADD     #6,SP
040550  032777  001000  171622        36$:    BIT     #1000,@ML.REG+14        ;                       3386
040556  001412                                BEQ     37$
040560  012746  007132                        MOV     #MLB13,-(SP)            ;                       3387
040564  012746  006502                        MOV     #FMT15,-(SP)
040570  012746  000002                        MOV     #2,-(SP)
040574  010600                                MOV     SP,R0                   ; SP,*
040576  104414                                TRAP    14
040600  062706  000006                        ADD     #6,SP
040604  132777  000004  171566        37$:    BITB    #4,@ML.REG+14           ;                       3388
040612  001412                                BEQ     38$
040614  012746  007136                        MOV     #MLB14,-(SP)            ;                       3389
040620  012746  006502                        MOV     #FMT15,-(SP)
040624  012746  000002                        MOV     #2,-(SP)
040630  010600                                MOV     SP,R0                   ; SP,*
040632  104414                                TRAP    14
040634  062706  000006                        ADD     #6,SP
040640  132777  000002  171532        38$:    BITB    #2,@ML.REG+14           ;                       3390
040646  001412                                BEQ     39$
040650  012746  007142                        MOV     #MLB15,-(SP)            ;                       3391
040654  012746  006502                        MOV     #FMT15,-(SP)
040660  012746  000002                        MOV     #2,-(SP)
040664  010600                                MOV     SP,R0                   ; SP,*
040666  104414                                TRAP    14
040670  062706  000006                        ADD     #6,SP
040674  132777  000001  171476        39$:    BITB    #1,@ML.REG+14           ;                       3392
040702  001412                                BEQ     40$
040704  012746  007146                        MOV     #MLB16,-(SP)            ;                       3393
040710  012746  006502                        MOV     #FMT15,-(SP)
040714  012746  000002                        MOV     #2,-(SP)
```

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4483                                    ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
4484                                    ;       SYSTEM ERROR DETECTOR                           23-Oct-1980 14:57:05    PA:<
4485
4486 040720  010600                             MOV     SP,R0           ; SP,*
4487 040722  104414                             TRAP    14
4488 040724  062706  000006                     ADD     #6,SP
4489 040730  032702  000001              40$:   BIT     #1,R2           ; *,ERR5                3395
4490 040734  001452                             BEQ     43$
4491 040736  032777  020000  171434             BIT     #20000,@ML.REG+14       ;               3398
4492 040744  001412                             BEQ     41$
4493 040746  012746  007152                     MOV     #MLB17,-(SP)    ;                       3399
4494 040752  012746  006502                     MOV     #FMT15,-(SP)
4495 040756  012746  000002                     MOV     #2,-(SP)
4496 040762  010600                             MOV     SP,R0           ; SP,*
4497 040764  104414                             TRAP    14
4498 040766  062706  000006                     ADD     #6,SP
4499 040772  132777  000040  171400  41$:      BITB    #40,@ML.REG+14  ;                       3400
4500 041000  001412                             BEQ     42$
4501 041002  012746  007156                     MOV     #MLB18,-(SP)    ;                       3401
4502 041006  012746  006502                     MOV     #FMT15,-(SP)
4503 041012  012746  000002                     MOV     #2,-(SP)
4504 041016  010600                             MOV     SP,R0           ; SP,*
4505 041020  104414                             TRAP    14
4506 041022  062706  000006                     ADD     #6,SP
4507 041026  132777  000010  171344  42$:      BITB    #10,@ML.REG+14  ;                       3402
4508 041034  001412                             BEQ     43$
4509 041036  012746  007164                     MOV     #MLB19,-(SP)    ;                       3403
4510 041042  012746  006502                     MOV     #FMT15,-(SP)
4511 041046  012746  000002                     MOV     #2,-(SP)
4512 041052  010600                             MOV     SP,R0           ; SP,*
4513 041054  104414                             TRAP    14
4514 041056  062706  000006                     ADD     #6,SP
4515 041062  032716  000001              43$:   BIT     #1,(SP)         ; *,ERR6                3412
4516 041066  001403                             BEQ     44$
4517 041070  012700  000004                     MOV     #4,R0           ;                       3413
4518 041074  000452                             BR      50$
4519 041076  006003                      44$:   ROR     R3              ; ERR7                  3415
4520 041100  103003                             BCC     45$
4521 041102  012700  000005                     MOV     #5,R0           ;                       3416
4522 041106  000445                             BR      50$
4523 041110  006005                      45$:   ROR     R5              ; ERR2                  3418
4524 041112  103003                             BCC     46$
4525 041114  012700  000002                     MOV     #2,R0           ;                       3419
4526 041120  000440                             BR      50$
4527 041122  006001                      46$:   ROR     R1              ; ERR4                  3421
4528 041124  103003                             BCC     47$
4529 041126  012700  000003                     MOV     #3,R0           ;                       3422
4530 041132  000433                             BR      50$
4531 041134  006004                      47$:   ROR     R4              ; ERR3                  3424
4532 041136  103424                             BLO     48$
4533 041140  006002                             ROR     R2              ; ERR5
4534 041142  103422                             BLO     48$
4535 041144  032737  000001  002260             BIT     #1,ERROUT       ;                       3428
4536 041152  001416                             BEQ     48$
4537 041154  032737  000001  032356             BIT     #1,RETRYING
```

```
4539                                    ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
4540                                    ;       SYSTEM ERROR DETECTOR                           23-Oct-1980 14:57:05    PA:<
4541
4542 041162  001012                             BNE     48$
4543 041164  012746  007562                     MOV     #PHR11,-(SP)                    ;                               3429
4544 041170  012746  006514                     MOV     #SAY1,-(SP)
4545 041174  012746  000002                     MOV     #2,-(SP)
4546 041200  010600                             MOV     SP,R0                           ; SP,*
4547 041202  104414                             TRAP    14
4548 041204  062706  000006                     ADD     #6,SP                                                           -----
4549 041210  012704  000001             48$:    MOV     #1,R4                           ;                               3424
4550 041214  010400                             MOV     R4,R0                           ;                               3204
4551 041216  000401                             BR      50$
4552 041220  005000                     49$:    CLR     R0                              ;                               3203
4553 041222  005726                     50$:    TST     (SP)+
4554 041224  000207                             RTS     PC
4555
4556                                    ; Routine Size:  587 words
4557                                    ; Maximum stack depth per invocation:  13 words
4562
4563
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               DATA COMPARISON ROUTINE                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (26)

;       3435  %SBTTL  'DATA COMPARISON ROUTINE'
;       3436
;       3437  ROUTINE DOUBLE_CHECK(W_POINTER,R_POINTER,COUNT) =
;       3438  BEGIN  !* 1 *
;       3439
;       3440  !++
;       3441  !  ROUTINE:     DOUBLE_CHECK(W_POINTER,R_POINTER,COUNT)
;       3442  !
;       3443  !  PURPOSE:     TO DOUBLE CHECK THE ECC DETECTION LOGIC AFTER A
;       3444  !               SUCCESSFUL READ COMMAND.  THE WRITE AND READ BUFFERS
;       3445  !               ARE COMPARED, AND NO ERRORS SHOULD BE FOUND UNDER
;       3446  !               NORMAL CIRCUMSTANCES.
;       3447  !
;       3448  !  ARGUMENTS:   W_POINTER = POINTER TO THE WRITE BUFFER
;       3449  !               R_POINTER = POINTER TO THE READ BUFFER
;       3450  !               COUNT = THE NUMBER OF WORDS TO COMPARE
;       3451  !
;       3452  !  RESULTS:     VALUE RETURNED IS EITHER:
;       3453  !                       0 = NO ERRORS WERE FOUND
;       3454  !                   N > 0 = ADDRESS IN WRITE BUFFER WHERE ERROR WAS FOUND
;       3455  !--
;       3456
;       3457  LOCAL
;       3458     VALUE, OFFSET, GOOD, BAD;
;       3459
;       3460  LABEL
;       3461     LOOP;
;       3462
;       3463  OFFSET = 0;
;       3464  VALUE = 0;
;       3465
;       3466  LOOP:
;       3467     BEGIN  !* 2 *
;       3468     INCR I FROM 1 TO .COUNT DO
;       3469        BEGIN  !* 3 *
;       3470        GOOD = .(.W_POINTER + .OFFSET);
;       3471        BAD  = .(.R_POINTER + .OFFSET);
;       3472        IF .GOOD EQL .BAD
;       3473        THEN  OFFSET = .OFFSET + 2
;       3474        ELSE
;       3475           BEGIN !* 4 *
;       3476           VALUE = (.W_POINTER + .OFFSET);        !ADDRESS OF GOOD
;       3477           LEAVE LOOP;
;       3478           END;   !* 4 *
;       3479        END;   !* 3 *
;       3480     END;   !* 2 *
;       3481
;       3482  RETURN .VALUE;          !EITHER 0 OR THE ADDRESS OF GOOD DATA
;       3483  END;   !* 1 *
```

```
                                ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                ;               DATA COMPARISON ROUTINE                 23-Oct-1980 14:57:05    PA:<
                                .SBTTL  DOUBLE.CHECK DATA COMPARISON ROUTINE
041226                          DOUBLE.CHECK:
041226  004137  005222                JSR     R1,$SAVE5                       ;                                       3437
041232  005746                      TST     -(SP)
041234  005003                      CLR     R3                              ; OFFSET                                3463
041236  005001                      CLR     R1                              ; VALUE                                 3464
041240  005002                      CLR     R2                              ; I                                     3468
041242  000417                      BR      3$
041244  010304                1$:   MOV     R3,R4                           ; OFFSET,*                              3470
041246  066604  000024              ADD     24(SP),R4                       ; W.POINTER,*
041252  011416                      MOV     (R4),(SP)                       ; *,GOOD
041254  010305                      MOV     R3,R5                           ; OFFSET,*                              3471
041256  066605  000022              ADD     22(SP),R5                       ; R.POINTER,*
041262  011500                      MOV     (R5),R0                         ; *,BAD
041264  021600                      CMP     (SP),R0                         ; *,BAD                                 3472
041266  001003                      BNE     2$
041270  062703  000002              ADD     #2,R3                           ; *,OFFSET                              3473
041274  000402                      BR      3$                              ;                                       3472
041276  010401                2$:   MOV     R4,R1                           ; *,VALUE                               3476
041300  000404                      BR      4$                              ;                                       3477-
041302  005202                3$:   INC     R2                              ; I                                     3468
041304  020266  000020              CMP     R2,20(SP)                       ; I,COUNT
041310  003755                      BLE     1$
041312  010100                4$:   MOV     R1,R0                           ; VALUE,*                               3438
041314  005726                      TST     (SP)+                           ;                                       3437
041316  000207                      RTS     PC

                                ; Routine Size:  29 words
                                ; Maximum stack depth per invocation:  7 word.
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                COMMAND INITIATION AND TERMINATION      23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (27)

;          3484  %SBTTL  'COMMAND INITIATION AND TERMINATION'
;          3485
;          3486  ROUTINE WAITER: NOVALUE =
;          3487  BEGIN
;          3488
;          3489  !+
;          3490  ! THIS ROUTINE DOES NOTHING, BUT IT IS CALLED BY 'START_IT' TO
;          3491  ! WASTE TIME WHILE WAITING TO BEGIN OR END AN ML11 TRANSFER.
;          3492  !-
;          3493
;          3494  BREAK;
;          3495  RETURN;
;          3496  END;

                                .SBTTL  WAITER COMMAND INITIATION AND TERMINATION
041320  104422          WAITER: TRAP    22                                      ;                       3487
041322  000207                  RTS     PC                                      ;                       3486

                        ; Routine Size:  2 words
                        ; Maximum stack depth per invocation:  0 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                COMMAND INITIATION AND TERMINATION      23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (28)

;          3497  ROUTINE START_IT(COMMAND,LUN,WRDCNT,BUFFER,SECTOR) =
;          3498  BEGIN
;          3499
;          3500  !++
;          3501  !  ROUTINE:     START_IT(COMMAND,LUN,WRDCNT,BUFFER,SECTOR)
;          3502  !
;          3503  !  PURPOSE:     TO INITIATE A TRANSFER TO OR FROM THE ML11,
;          3504  !               TO WAIT FOR THE TRANSFER TO COMPLETE, AND TO CALL
;          3505  !               THE 'SYSERR' ROUTINE TO LOOK FOR RESULTING ERRORS.
;          3506  !
;          3507  !  ARGUMENTS:   (1)  COMMAND - THE FUNCTION CODE FOR THE TYPE OF TRANSFER
;          3508  !                              DESIRED.  THIS CODE WILL BE SENT TO THE MLCS1
;          3509  !                              REGISTER TO START THE OPERATION, SINCE IT
;          3510  !                              ALSO CONTAINS THE GO BIT.
;          3511  !
;          3512  !               (2)  LUN     - LOGICAL UNIT NUMBER
;          3513  !
;          3514  !               (3)  WRDCNT  - NUMBER OF 16-BIT WORDS TO TRANSFER
;          3515  !
;          3516  !               (4)  BUFFER  - THE ADDRESS IN MAIN MEMORY OF THE SELECTED
;          3517  !                              WRITE OR READ BUFFER
;          3518  !
;          3519  !               (5)  SECTOR   THE TRANSFER'S STARTING ADDRESS IN THE ML11
;          3520  !
;          3521  !  RESULTS:     VALUES RETURNED ARE IDENTICAL TO THOSE DEFINED ABOVE IN
;          3522  !               THE 'SYSERR' ROUTINE.
;          3523  !--
;          3524
;          3525  LOCAL
;          3526     TEMP, READY_BIT, RTN;
;          3527
;          3528  LABEL
;          3529     LOOP;
;          3530
;          3531           !
;          3532           ! WAIT FOR DRIVE READY:
;          3533           !
;          3534
;          3535  UNIT = .DRIVE;           !SELECT THE UNIT
;          3536  READY_BIT = 0;
;          3537  UNTIL .READY_BIT NEQ 0 DO       !WAIT FOR DRIVE READY
;          3538     BEGIN
;          3539     WAITER();
;          3540     READY_BIT = .MLCS1 AND BIT7;
;          3541     END;
;          3542
;          3543           !
;          3544           ! INITIALIZE BEFORE EACH TRANSFER:
;          3545           !
;          3546
;          3547  CLR    = 1;               !CONTROLLER CLEAR
;          3548  MLCS1 = DRV_CLR;          !DRIVE CLEAR
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                COMMAND INITIATION AND TERMINATION      23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (28)

;          3549  UNIT = .DRIVE;          !PUT BACK THE DRIVE NUMBER
;          3550
;          3551          !
;          3552          ! SET UP THE REQUIRED ENABLE/DISABLE BITS:
;          3553          !
;          3554
;          3555  DCK_EN = 1;             !ALLOW REPORTING OF DATA CHECK ERRORS
;          3556  IF .REFRESH
;          3557  THEN  REF_MAR = 1;      !TURN ON REFRESH MARGINING IF OPERATOR SELECTED IT
;          3558  IF .ECCDIS
;          3559  THEN  ECC_DIS = 1;      !TURN OFF ECC IF OPERATOR SELECTED IT
;          3560
;          3561          !
;          3562          ! SEND REQUIRED INFORMATION TO DEVICE REGISTERS:
;          3563          !
;          3564
;          3565  MLWC = -(.WRDCNT);      !WORD COUNT REGISTER
;          3566  MLBA = .BUFFER;         !BUS ADDRESS REGISTER (ADDRESS IN MAIN MEMORY)
;          3567  MLDA = .SECTOR;         !DESIRED SECTOR ADDRESS REGISTER (ADDRESS IN ML11)
;          3568
;          3569          !
;          3570          ! GO:
;          3571          !
;          3572
;          3573  I_AM_DONE = INACTIVE;
;          3574  TEMP = .COMMAND + BIT6;          !SET THE INTERRUPT ENABLE BIT WHILE LOADING THE
;          3575  MLCS1 = .TEMP;                   !CONTROL AND STATUS REGISTER WITH THE COMMAND
;          3576
;          3577          !
;          3578          ! WAIT FOR DRIVE TO FINISH:
;          3579          !
;          3580
;          3581  LOOP:
;          3582     BEGIN
;          3583     READY_BIT = 0;
;          3584     UNTIL .I_AM_DONE DO
;          3585        BEGIN
;          3586        WAITER();
;          3587        READY_BIT = .MLCS1 AND BIT7;
;          3588        IF ((.READY_BIT NEQ 0) AND (.I_AM_DONE EQL INACTIVE))
;          3589        THEN
;          3590           BEGIN
;          3591           IF (NOT .RETRYING)
;          3592           THEN
;          3593              BEGIN
;          3594              SAYWHO(.LUN);
;          3595              IF .COMMAND EQL WR_CMD
;          3596              THEN  RTN = WRD16;
;          3597              IF .COMMAND EQL RD_CMD
;          3598              THEN  RTN = WRD17;
;          3599              IF .COMMAND EQL WC_CMD
;          3600              THEN  RTN = PHR1;
```

```
 4812 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
 4813 ;                COMMAND INITIATION AND TERMINATION      23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (28)
 4814
 4815 ;          3601              PRINTB(FMT6,.WRDCNT,.RTN,WRD15,.SECTOR);
 4816 ;          3602                 !'BEGAN YYYY WORD (???) AT SECTOR ZZZZZZ'
 4817 ;          3603                 !WHERE (???) IS EITHER 'WRITE', 'READ' OR 'WRITE CHECK'
 4818 ;          3604              PRINTB(SAY1,MSG0);
 4819 ;          3605                 !INTERRUPT DID NOT OCCUR, BUT THE TRANSFER IS COMPLETE
 4820 ;          3606              END;
 4821 ;          3607           LEAVE LOOP;
 4822 ;          3608           END;
 4823 ;          3609        END;
 4824 ;          3610     END;
 4825 ;          3611
 4826 ;          3612  RETURN SYSERR(.LUN);    !PASS ALONG THE ERROR VALUES THAT 'SYSERR' OBTAINED.
 4827 ;          3613
 4828 ;          3614  END;
 4832
 4833                                        .SBTTL  START.IT COMMAND INITIATION AND TERMINATION
 4837 041324                          START.IT:
 4838 041324  004137  005202                JSR     R1,$SAVE4                       ;                       3497
 4839 041330  016604  000022                MOV     22(SP),R4                       ; LUN,*                 3535
 4840 041334  010402                        MOV     R4,R2
 4841 041336  006302                        ASL     R2
 4842 041340  016201  032440                MOV     PTABLE.ADDR(R2),R1
 4843 041344  016103  000006                MOV     6(R1),R3
 4844 041350  042703  177770                BIC     #177770,R3
 4845 041354  142777  000007  171012        BICB    #7,@ML.REG+10
 4846 041362  150377  171006                BISB    R3,@ML.REG+10
 4847 041366  005003                        CLR     R3                              ; READY.BIT             3536
 4848 041370  020707                        CMP     PC,PC                           ;                       3537
 4849 041372  001007                 1$:    BNE     2$
 4850 041374  004737  041320                JSR     PC,WAITER                       ;                       3539
 4851 041400  017703  170760                MOV     @ML.REG,R3                      ; *,READY.BIT           3540
 4852 041404  042703  177577                BIC     #177577,R3                      ; *,READY.BIT
 4853 041410  000770                        BR      1$                              ;                       3537
 4854 041412  152777  000040  170754  2$:   BISB    #40,@ML.REG+10                  ;                       3547
 4855 041420  012777  000011  170736        MOV     #11,@ML.REG                     ;                       3548
 4856 041426  016201  032440                MOV     PTABLE.ADDR(R2),R1              ;                       3549
 4857 041432  016102  000006                MOV     6(R1),R2
 4858 041436  042702  177770                BIC     #177770,R2
 4859 041442  142777  000007  170724        BICB    #7,@ML.REG+10
 4860 041450  150277  170720                BISB    R2,@ML.REG+10
 4861 041454  152777  000004  170726        BISB    #4,@ML.REG+24                   ;                       3555
 4862 041462  032737  000001  002252        BIT     #1,REFRESH                      ;                       3556
 4863 041470  001403                        BEQ     3$
 4864 041472  152777  000200  170710        BISB    #200,@ML.REG+24                 ;                       3557
 4865 041500  032737  000001  002254  3$:   BIT     #1,ECCDIS                       ;                       3558
 4866 041506  001403                        BEQ     4$
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;       COMMAND INITIATION AND TERMINATION               23-Oct-1980 14:57:05    PA:<

041510  152777  000002  170672        BISB    #2,@ML.REG+24                   ;                                        3559
041516  016677  000020  170642  4$:   MOV     20(SP),@ML.REG+2                ; WRDCNT,*                               3565
041524  005477  170636                NEG     @ML.REG+2
041530  016677  000016  170632        MOV     16(SP),@ML.REG+4                ; BUFFER,*                               3566
041536  016677  000014  170626        MOV     14(SP),@ML.REG+6                ; SECTOR,*                               3567
041544  005037  032354                CLR     I.AM.DONE                       ;                                        3573
041550  016601  000024                MOV     24(SP),R1                       ; COMMAND,*                              3574
041554  010102                        MOV     R1,R2                           ; *,TEMP
041556  062702  000100                ADD     #100,R2                         ; *,TEMP
041562  010277  170576                MOV     R2,@ML.REG                      ; TEMP,*                                 3575
041566  005003                        CLR     R3                              ; READY.BIT                              3583
041570  032737  000001  032354  5$:   BIT     #1,I.AM.DONE                    ;                                        3584
041576  001067                        BNE     9$
041600  004737  041320                JSR     PC,WAITER                       ;                                        3586
041604  017703  170554                MOV     @ML.REG,R3                      ; *,READY.BIT                            3587
041610  042703  177577                BIC     #177577,R3                      ; *,READY.BIT
041614  001765                        BEQ     5$                              ;                                        3588
041616  005737  032354                TST     I.AM.DONE
041622  001362                        BNE     5$
041624  032737  000001  032356        BIT     #1,RETRYING                     ;                                        3591
041632  001051                        BNE     9$
041634  010446                        MOV     R4,-(SP)                        ;                                        3594
041636  004737  033436                JSR     PC,SAYWHO
041642  020127  000061                CMP     R1,#61                          ;                                        3595
041646  001002                        BNE     6$
041650  012702  006700                MOV     #WRD16,R2                       ; *,RTN                                  3596
041654  020127  000071        6$:     CMP     R1,#71                          ;                                        3597
041660  001002                        BNE     7$
041662  012702  006706                MOV     #WRD17,R2                       ; *,RTN                                  3598
041666  020127  000051        7$:     CMP     R1,#51                          ;                                        3599
041672  001002                        BNE     8$
041674  012702  007336                MOV     #PHR1,R2                        ; *,RTN                                  3600
041700  016616  000016        8$:     MOV     16(SP),(SP)                     ; SECTOR,*                               3601
041704  012746  006670                MOV     #WRD15,-(SP)
041710  010246                        MOV     R2,-(SP)                        ; RTN,*
041712  016646  000026                MOV     26(SP),-(SP)                    ; WRDCNT,*
041716  012746  006020                MOV     #FMT6,-(SP)
041722  012746  000005                MOV     #5,-(SP)
041726  010600                        MOV     SP,R0                           ; SP,*
041730  104414                        TRAP    14
041732  012716  010424                MOV     #MSG0,(SP)                      ;                                        3604
041736  012746  006514                MOV     #SAY1,-(SP)
041742  012746  000002                MOV     #2,-(SP)
041746  010600                        MOV     SP,R0                           ; SP,*
041750  104414                        TRAP    14
041752  062706  000020                ADD     #20,SP                          ;                                        3593
041756  010446                9$:     MOV     R4,-(SP)                        ;                                        3612
041760  004737  037000                JSR     PC,SYSERR
041764  005726                        TST     (SP)+                           ;                                        3497
041766  000207                        RTS     PC

                        ; Routine Size:  146 words
```

```
                                ;MLX4                                   23-Oct-1980 15:01:43    TOPS
                                ;               COMMAND INITIATION AND TERMINATION      23-Oct-1980 14:57:05    PA:<

                                ; Maximum stack depth per invocation:  13 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               COUNTING BYTES TRANSFERED                23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (29)

;       3615    %SBTTL  'COUNTING BYTES TRANSFERED'
;       3616
;       3617    ROUTINE UP_WR_COUNT(WORD_COUNT) : NOVALUE =
;       3618    BEGIN
;       3619
;       3620    WR_COUNT = .WR_COUNT + (.WORD_COUNT * 2);
;       3621
;       3622    IF .WR_COUNT GEQ 20000
;       3623    THEN
;       3624        BEGIN
;       3625        WR_THOUSANDS = .WR_THOUSANDS + 20;
;       3626        WR_COUNT = .WR_COUNT - 20000;
;       3627        IF .WR_THOUSANDS GEQ 1000
;       3628        THEN
;       3629            BEGIN
;       3630            WR_THOUSANDS = .WR_THOUSANDS - 1000;
;       3631            WR_MILLIONS = .WR_MILLIONS + 1;
;       3632            IF .WR_MILLIONS LSS 0
;       3633            THEN WR_MILLIONS = 0;
;       3634            END;
;       3635        END;
;       3636
;       3637    RETURN;
;       3638    END;
;
                                .SBTTL  UP.WR.COUNT COUNTING BYTES TRANSFERED
041770                  UP.WR.COUNT:
041770  016600  000002          MOV     2(SP),R0                ; WORD.COUNT,*          3620
041774  006300                  ASL     R0
041776  063700  032332          ADD     WR.COUNT,R0
042002  010037  032332          MOV     R0,WR.COUNT
042006  020027  047040          CMP     R0,#47040               ; WR.COUNT,*            3622
042012  002422                  BLT     1$
042014  062737  000024  032334  ADD     #24,WR.THOUSANDS        ;                       3625
042022  162737  047040  032332  SUB     #47040,WR.COUNT         ;                       3626
042030  023727  032334  001750  CMP     WR.THOUSANDS,#1750      ;                       3627
042036  002410                  BLT     1$
042040  162737  001750  032334  SUB     #1750,WR.THOUSANDS      ;                       3630
042046  005237  032336          INC     WR.MILLIONS             ;                       3631
042052  100002                  BPL     1$                      ;                       3632
042054  005037  032336          CLR     WR.MILLIONS             ;                       3633
042060  000207          1$:     RTS     PC                      ;                       3617

                ; Routine Size:  29 words
                ; Maximum stack depth per invocation:  0 words
```

```
4997
4998
```

```
5000 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
5001 ;                  COUNTING BYTES TRANSFERED             23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (30)
5002
5003 ;          3639    ROUTINE UP_RD_COUNT(WORD_COUNT) : NOVALUE =
5004 ;          3640    BEGIN
5005 ;          3641
5006 ;          3642    RD_COUNT = .RD_COUNT + (.WORD_COUNT * 2);
5007 ;          3643
5008 ;          3644    IF .RD_COUNT GEQ 20000
5009 ;          3645    THEN
5010 ;          3646        BEGIN
5011 ;          3647        RD_THOUSANDS = .RD_THOUSANDS + 20;
5012 ;          3648        RD_COUNT = .RD_COUNT - 20000;
5013 ;          3649        IF .RD_THOUSANDS GEQ 1000
5014 ;          3650        THEN
5015 ;          3651            BEGIN
5016 ;          3652            RD_THOUSANDS = .RD_THOUSANDS - 1000;
5017 ;          3653            RD_MILLIONS = .RD_MILLIONS + 1;
5018 ;          3654            IF .RD_MILLIONS LSS 0
5019 ;          3655            THEN RD_MILLIONS = 0;
5020 ;          3656            END;
5021 ;          3657        END;
5022 ;          3658
5023 ;          3659    RETURN;
5024 ;          3660    END;
5028
5029                                    .SBTTL  UP.RD.COUNT COUNTING BYTES TRANSFERED
5033 042062                        UP.RD.COUNT:
5034 042062  016600  000002              MOV     2(SP),R0                        ; WORD.COUNT,*          3642
5035 042066  006300                       ASL     R0
5036 042070  063700  032340              ADD     RD.COUNT,R0
5037 042074  010037  032340              MOV     R0,RD.COUNT
5038 042100  020027  047040              CMP     R0,#47040                       ; RD.COUNT,*            3644
5039 042104  002422                       BLT     1$
5040 042106  062737  000024  032342      ADD     #24,RD.THOUSANDS                ;                       3647
5041 042114  162737  047040  032340      SUB     #47040,RD.COUNT                 ;                       3648
5042 042122  023727  032342  001750      CMP     RD.THOUSANDS,#1750              ;                       3649
5043 042130  002410                       BLT     1$
5044 042132  162737  001750  032342      SUB     #1750,RD.THOUSANDS              ;                       3652
5045 042140  005237  032344              INC     RD.MILLIONS                     ;                       3653
5046 042144  100002                       BPL     1$                              ;                       3654
5047 042146  005037  032344              CLR     RD.MILLIONS                     ;                       3655
5048 042152  000207                1$:   RTS     PC                              ;                       3639
5049
5050                                    ; Routine Size:  29 words
5051                                    ; Maximum stack depth per invocation:  0 words
```

```
5060
5061
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                COUNTING BYTES TRANSFERED              23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (31)

;          3661  ROUTINE UP_WC_COUNT(WORD_COUNT) : NOVALUE =
;          3662  BEGIN
;          3663
;          3664  WC_COUNT = .WC_COUNT + (.WORD_COUNT * 2);
;          3665
;          3666  IF .WC_COUNT GEQ 20000
;          3667  THEN
;          3668     BEGIN
;          3669     WC_THOUSANDS = .WC_THOUSANDS + 20;
;          3670     WC_COUNT = .WC_COUNT - 20000;
;          3671     IF .WC_THOUSANDS GEQ 1000
;          3672     THEN
;          3673        BEGIN
;          3674        WC_THOUSANDS = .WC_THOUSANDS - 1000;
;          3675        WC_MILLIONS = .WC_MILLIONS + 1;
;          3676        IF .WC_MILLIONS LSS 0
;          3677        THEN WC_MILLIONS = 0;
;          3678        END;
;          3679     END;
;          3680
;          3681  RETURN;
;          3682  END;
5091
5092                                    .SBTTL  UP.WC.COUNT COUNTING BYTES TRANSFERED
5096 042154                        UP.WC.COUNT:
5097 042154  016600  000002                MOV     2(SP),R0                        ; WORD.COUNT,*          3664
5098 042160  006300                        ASL     R0
5099 042162  063700  032346                ADD     WC.COUNT,R0
5100 042166  010037  032346                MOV     R0,WC.COUNT
5101 042172  020027  047040                CMP     R0,#47040                       ; WC.COUNT,*            3666
5102 042176  002422                        BLT     1$
5103 042200  062737  000024  032350        ADD     #24,WC.THOUSANDS                ;                       3669
5104 042206  162737  047040  032346        SUB     #47040,WC.COUNT                 ;                       3670
5105 042214  023727  032350  001750        CMP     WC.THOUSANDS,#1750              ;                       3671
5106 042222  002410                        BLT     1$
5107 042224  162737  001750  032350        SUB     #1750,WC.THOUSANDS              ;                       3674
5108 042232  005237  032352                INC     WC.MILLIONS                     ;                       3675
5109 042236  100002                        BPL     1$                              ;                       3676
5110 042240  005037  032352                CLR     WC.MILLIONS                     ;                       3677
5111 042244  000207                  1$:   RTS     PC                              ;                       3661
5112
5113                                    ; Routine Size:  29 words
5114                                    ; Maximum stack depth per invocation:  0 words
```

UP.WC.COUNT COUNTING BYTES TRANSFERED


```
5123
5124
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               ML11 TRANSFER COMMANDS                   23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (32)

;          3683  %SBTTL  'ML11 TRANSFER COMMANDS'
;          3684
;          3685  ROUTINE WRITE(LUN,WRDCNT,BUFFER,SECTOR) =
;          3686  BEGIN
;          3687
;          3688  !++
;          3689  !  ROUTINE:     WRITE(LUN,WRDCNT,BUFFER,SECTOR)
;          3690  !
;          3691  !  PURPOSE:     TO TRANSFER INFORMATION FROM MAIN MEMORY TO THE ML11
;          3692  !               AND TO DECIDE ON THE ADVISABILITY OF A RETRY.
;          3693  !
;          3694  !  ARGUMENTS:   SEE 'START_IT' ROUTINE ABOVE FOR DETAILS
;          3695  !
;          3696  !  RESULTS:     UPON TERMINATION OF THE TRANSFER, ERROR DETECTION OCCURS
;          3697  !               AND THE CONTENTS OF 'VALUE' BECOMES IMPORTANT IN TERMS OF
;          3698  !               WHETHER THE TRANSFER WAS COMPLETELY SUCCESSFUL OR WHETHER A
;          3699  !               RETRY SHOULD OR SHOULD NOT BE PERMITTED.
;          3700  !
;          3701  !               THE VALUES RETURNED FOR THIS SUBROUTINE ARE THE SAME AS
;          3702  !               FOR THE SYSERR ROUTINE ABOVE.
;          3703  !--
;          3704
;          3705  LOCAL
;          3706     VALUE, COMMAND;
;          3707
;          3708  COMMAND = WR_CMD;
;          3709  VALUE = START_IT(.COMMAND,.LUN,.WRDCNT,.BUFFER,.SECTOR);
;          3710
;          3711  IF (NOT .RETRYING)
;          3712  THEN UP_WR_COUNT(.WRDCNT);
;          3713
;          3714  IF .VALUE EQL 0
;          3715  THEN   RETURN 0;          !NO ERRORS AT ALL
;          3716
;          3717  IF ((.ERROUT) AND (NOT .RETRYING))
;          3718  THEN  PRINTB(FMT6,.WRDCNT,WRD16,WRD15,.SECTOR);
;          3719           !'BEGAN YYYY WORD WRITE AT SECTOR ZZZZZZ'
;          3720
;          3721  RETURN .VALUE;
;          3722
;          3723  END;
5173
5174                                    .SBTTL  WRITE ML11 TRANSFER COMMANDS
5178 042246  004137  005150    WRITE:  JSR     R1,$SAVE2                       ;                       3685
5179 042252  012700  000061            MOV     #61,R0                          ; *,COMMAND             3708
5180 042256  010046                    MOV     R0,-(SP)                        ; COMMAND,*             3709
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               ML11 TRANSFER COMMANDS                   23-Oct-1980 14:57:05    PA:<
                                                
042260  016646  000020                        MOV     20(SP),-(SP)            ; LUN,*
042264  016601  000020                        MOV     20(SP),R1               ; WRDCNT,*
042270  010146                              MOV     R1,-(SP)
042272  016646  000020                        MOV     20(SP),-(SP)            ; BUFFER,*
042276  016646  000020                        MOV     20(SP),-(SP)            ; SECTOR,*
042302  004737  041324                        JSR     PC,START.IT
042306  010002                              MOV     R0,R2                   ; *,VALUE
042310  032737  000001  032356                BIT     #1,RETRYING             ;                                                       3711
042316  001004                              BNE     1$
042320  010146                              MOV     R1,-(SP)                ;                                                       3712
042322  004737  041770                        JSR     PC,UP.WR.COUNT
042326  005726                              TST     (SP)+
042330  005702                      1$:     TST     R2                      ; VALUE                                                 3714
042332  001003                              BNE     2$
042334  062706  000012                        ADD     #12,SP                  ;                                                       3715
042340  000433                              BR      4$
042342  032737  000001  002260      2$:     BIT     #1,ERROUT               ;                                                       3717
042350  001423                              BEQ     3$
042352  032737  000001  032356                BIT     #1,RETRYING
042360  001017                              BNE     3$
042362  016646  000022                        MOV     22(SP),-(SP)            ; SECTOR,*                                              3718
042366  012746  006670                        MOV     #WRD15,-(SP)
042372  012746  006700                        MOV     #WRD16,-(SP)
042376  010146                              MOV     R1,-(SP)
042400  012746  006020                        MOV     #FMT6,-(SP)
042404  012746  000005                        MOV     #5,-(SP)
042410  010600                              MOV     SP,R0                   ; SP,*
042412  104414                              TRAP    14
042414  062706  000014                        ADD     #14,SP
042420  062706  000012              3$:     ADD     #12,SP                  ;                                                       3685
042424  010200                              MOV     R2,R0                   ; VALUE,*                                               3686
042426  000207                              RTS     PC
042430  005000                      4$:     CLR     R0                      ;                                                       3685
042432  000207                              RTS     PC

                                        ; Routine Size:  59 words
                                        ; Maximum stack depth per invocation:  14 words
```

```
5229 ;MLX4                                          23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
5230 ;                ML11 TRANSFER COMMANDS        23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (33)
5231
5232 ;          3724  ROUTINE READ(LUN,WRDCNT,BUFFER,SECTOR) =
5233 ;          3725  BEGIN
5234 ;          3726
5235 ;          3727  !++
5236 ;          3728  !  ROUTINE:     READ(LUN,WRDCNT,BUFFER,SECTOR)
5237 ;          3729  !
5238 ;          3730  !  PURPOSE:     TO TRANSFER INFORMATION FROM THE ML11 TO MAIN MEMORY
5239 ;          3731  !               USING A 'READ' COMMAND.
5240 ;          3732  !
5241 ;          3733  !  ARGUMENTS:   SEE 'START_IT' ROUTINE ABOVE FOR DETAILS
5242 ;          3734  !
5243 ;          3735  !  RESULTS:     UPON TERMINATION OF THE TRANSFER, ERROR DETECTION OCCURS
5244 ;          3736  !               AND THE CONTENTS OF 'VALUE' BECOMES IMPORTANT IN TERMS OF
5245 ;          3737  !               WHETHER THE TRANSFER WAS COMPLETELY SUCCESSFUL OR WHETHER A
5246 ;          3738  !               RETRY SHOULD OR SHOULD NOT BE PERMITTED.
5247 ;          3739  !
5248 ;          3740  !               THE VALUES RETURNED FOR THIS SUBROUTINE ARE THE SAME AS
5249 ;          3741  !               FOR THE SYSERR ROUTINE ABOVE.
5250 ;          3742  !--
5251 ;          3743
5252 ;          3744  LOCAL
5253 ;          3745     VALUE, COMMAND;
5254 ;          3746
5255 ;          3747  COMMAND = RD_CMD;
5256 ;          3748  VALUE = START_IT(.COMMAND,.LUN,.WRDCNT,.BUFFER,.SECTOR);
5257 ;          3749
5258 ;          3750  IF (NOT .RETRYING)
5259 ;          3751  THEN UP_RD_COUNT(.WRDCNT);
5260 ;          3752
5261 ;          3753  IF .VALUE EQL 0
5262 ;          3754  THEN    RETURN 0;          !NO ERRORS AT ALL
5263 ;          3755
5264 ;          3756  IF ((.ERROUT) AND (NOT .RETRYING))
5265 ;          3757  THEN  PRINTB(FMT6,.WRDCNT,WRD17,WRD15,.SECTOR);
5266 ;          3758           !'BEGAN YYYY WORD READ AT SECTOR ZZZZZZ'
5267 ;          3759
5268 ;          3760  RETURN .VALUE;
5269 ;          3761
5270 ;          3762  END;
5274
5275                                        .SBTTL  READ ML11 TRANSFER COMMANDS
5279 042434  004137  005150        READ:   JSR     R1,$SAVE2                   ;                       3724
5280 042440  012700  000071                MOV     #71,R0                      ; *,COMMAND             3747
5281 042444  010046                        MOV     R0,-(SP)                    ; COMMAND,*             3748
5282 042446  016646  000020                MOV     20(SP),-(SP)                ; LUN,*
5283 042452  016601  000020                MOV     20(SP),R1                   ; WRDCNT,*
```

```
5285                                    ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
5286                                    ;       ML11 TRANSFER COMMANDS                          23-Oct-1980 14:57:05    PA:<
5287
5288 042456  010146                             MOV     R1,-(SP)
5289 042460  016646  000020                     MOV     20(SP),-(SP)            ; BUFFER,*
5290 042464  016646  000020                     MOV     20(SP),-(SP)            ; SECTOR,*
5291 042470  004737  041324                     JSR     PC,START.IT
5292 042474  010002                             MOV     R0,R2                   ; *,VALUE
5293 042476  032737  000001  032356             BIT     #1,RETRYING             ;                                       3750
5294 042504  001004                             BNE     1$
5295 042506  010146                             MOV     R1,-(SP)                ;                                       3751
5296 042510  004737  042062                     JSR     PC,UP.RD.COUNT
5297 042514  005726                             TST     (SP)+
5298 042516  005702                     1$:     TST     R2                      ; VALUE                                 3753
5299 042520  001003                             BNE     2$
5300 042522  062706  000012                     ADD     #12,SP                  ;                                       3754
5301 042526  000433                             BR      4$
5302 042530  032737  000001  002260     2$:     BIT     #1,ERROUT               ;                                       3756
5303 042536  001423                             BEQ     3$
5304 042540  032737  000001  032356             BIT     #1,RETRYING
5305 042546  001017                             BNE     3$
5306 042550  016646  000022                     MOV     22(SP),-(SP)            ; SECTOR,*                              3757
5307 042554  012746  006670                     MOV     #WRD15,-(SP)
5308 042560  012746  006706                     MOV     #WRD17,-(SP)
5309 042564  010146                             MOV     R1,-(SP)
5310 042566  012746  006020                     MOV     #FMT6,-(SP)
5311 042572  012746  000005                     MOV     #5,-(SP)
5312 042576  010600                             MOV     SP,R0                   ; SP,*
5313 042600  104414                             TRAP    14
5314 042602  062706  000014                     ADD     #14,SP
5315 042606  062706  000012             3$:     ADD     #12,SP                  ;                                       3724
5316 042612  010200                             MOV     R2,R0                   ; VALUE,*                               3725
5317 042614  000207                             RTS     PC
5318 042616  005000                     4$:     CLR     R0                      ;                                       3724
5319 042620  000207                             RTS     PC
5320
5321                                    ; Routine Size:  59 words
5322                                    ; Maximum stack depth per invocation:  14 words
5327
5328
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               ML11 TRANSFER COMMANDS                   23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (34)

;       3763  ROUTINE CHECK(LUN,WRDCNT,BUFFER,SECTOR) =
;       3764  BEGIN
;       3765
;       3766  !++
;       3767  !  ROUTINE:     CHECK(LUN,WRDCNT,BUFFER,SECTOR)
;       3768  !
;       3769  !  PURPOSE:     TO TRANSFER INFORMATION FROM THE ML11 TO MAIN MEMORY
;       3770  !               USING A 'WRITE CHECK' COMMAND.
;       3771  !
;       3772  !  ARGUMENTS:   SEE 'START_IT' ROUTINE ABOVE FOR DETAILS
;       3773  !
;       3774  !  RESULTS:     UPON TERMINATION OF THE TRANSFER, ERROR DETECTION OCCURS
;       3775  !               AND THE CONTENTS OF 'VALUE' BECOMES IMPORTANT IN TERMS OF
;       3776  !               WHETHER THE TRANSFER WAS COMPLETELY SUCCESSFUL OR WHETHER A
;       3777  !               RETRY SHOULD OR SHOULD NOT BE PERMITTED.
;       3778  !
;       3779  !               THE VALUES RETURNED FOR THIS SUBROUTINE ARE THE SAME AS
;       3780  !               FOR THE SYSERR ROUTINE ABOVE.
;       3781  !--
;       3782
;       3783  LOCAL
;       3784     VALUE, COMMAND;
;       3785
;       3786  COMMAND = WC_CMD;
;       3787  VALUE = START_IT(.COMMAND,.LUN,.WRDCNT,.BUFFER,.SECTOR);
;       3788
;       3789  IF (NOT .RETRYING)
;       3790  THEN UP_WC_COUNT(.WRDCNT);
;       3791
;       3792  IF .VALUE EQL 0
;       3793  THEN   RETURN 0;          !NO ERRORS AT ALL
;       3794
;       3795  IF ((.ERROUT) AND (NOT .RETRYING))
;       3796  THEN  PRINTB(FMT6,.WRDCNT,PHR1,WRD15,.SECTOR);
;       3797           !'BEGAN YYYY WORD WRITE CHECK AT SECTOR ZZZZZZ'
;       3798
;       3799  RETURN .VALUE;
;       3800
;       3801  END;
;
;                                .SBTTL  CHECK ML11 TRANSFER COMMANDS
;
5380 042622  004137  005150  CHECK: JSR     R1,$SAVE2                ;                          3763
5381 042626  012700  000051         MOV     #51,R0                   ; *,COMMAND                3786
5382 042632  010046                 MOV     R0,-(SP)                 ; COMMAND,*                3787
5383 042634  016646  000020         MOV     20(SP),-(SP)             ; LUN,*
5384 042640  016601  000020         MOV     20(SP),R1                ; WRDCNT,*
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               ML11 TRANSFER COMMANDS                   23-Oct-1980 14:57:05    PA:<

042644  010146                          MOV     R1,-(SP)
042646  016646  000020                  MOV     20(SP),-(SP)            ; BUFFER,*
042652  016646  000020                  MOV     20(SP),-(SP)            ; SECTOR,*
042656  004737  041324                  JSR     PC,START.IT
042662  010002                          MOV     R0,R2                   ; *,VALUE
042664  032737  000001  032356          BIT     #1,RETRYING             ;                                                        3789
042672  001004                          BNE     1$
042674  010146                          MOV     R1,-(SP)                ;                                                        3790
042676  004737  042154                  JSR     PC,UP.WC.COUNT
042702  005726                          TST     (SP)+
042704  005702                  1$:     TST     R2                      ; VALUE                                                  3792
042706  001003                          BNE     2$
042710  062706  000012                  ADD     #12,SP                  ;                                                        3793
042714  000433                          BR      4$
042716  032737  000001  002260  2$:     BIT     #1,ERROUT               ;                                                        3795
042724  001423                          BEQ     3$
042726  032737  000001  032356          BIT     #1,RETRYING
042734  001017                          BNE     3$
042736  016646  000022                  MOV     22(SP),-(SP)            ; SECTOR,*                                               3796
042742  012746  006670                  MOV     #WRD15,-(SP)
042746  012746  007336                  MOV     #PHR1,-(SP)
042752  010146                          MOV     R1,-(SP)
042754  012746  006020                  MOV     #FMT6,-(SP)
042760  012746  000005                  MOV     #5,-(SP)
042764  010600                          MOV     SP,R0                   ; SP,*
042766  104414                          TRAP    14
042770  062706  000014                  ADD     #14,SP
042774  062706  000012          3$:     ADD     #12,SP                  ;                                                        3763
043000  010200                          MOV     R2,R0                   ; VALUE,*                                                3764
043002  000207                          RTS     PC
043004  005000                  4$:     CLR     R0                      ;                                                        3763
043006  000207                          RTS     PC

                                        ; Routine Size:  59 words
                                        ; Maximum stack depth per invocation:  14 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                ML11 TRANSFER COMMANDS                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (35)

;          3802  ROUTINE CHOOSE =
;          3803  BEGIN
;          3804
;          3805  !++
;          3806  !  ROUTINE:     CHOOSE
;          3807  !
;          3808  !  PURPOSE:     TO DECIDE WHETHER TO DO A 'WRITE CHECK' OR A 'READ'.
;          3809  !               THE 'READ' WILL BE SELECTED APPROXIMATELY 25% OF THE
;          3810  !               TIME.  THIS IS ACCOMPLISHED BY EXAMINING THE MOST AND
;          3811  !               THE LEAST SIGNIFICANT BITS OF A RANDOM NUMBER.  IF
;          3812  !               BOTH ARE SET, THEN 'READ' IS CHOSEN.
;          3813  !
;          3814  !  RESULTS:     THE VALUE RETURNED FOR THIS ROUTINE IS THE ADDRESS OF
;          3815  !               THE CHOSEN COMMAND (EITHER 'READ' OR 'CHECK').
;          3816  !--
;          3817
;          3818  LOCAL
;          3819     VALUE;
;          3820
;          3821  RN();
;          3822
;          3823  IF ((.RANDOM) AND (.RANDOM LSS 0))
;          3824  THEN  VALUE = READ                !CHOOSE THE READ COMMAND
;          3825  ELSE  VALUE = CHECK;              !CHOOSE THE WRITE CHECK COMMAND
;          3826
;          3827  RETURN .VALUE;
;          3828  END;
5464
5465                                    .SBTTL  CHOOSE ML11 TRANSFER COMMANDS
5469 043010  004737  005256          CHOOSE: JSR     PC,RN                           ;                       3821
5470 043014  032737  000001  005352          BIT     #1,RANDOM                       ;                       3823
5471 043022  001406                          BEQ     1$
5472 043024  005737  005352                  TST     RANDOM
5473 043030  002003                          BGE     1$
5474 043032  012700  042434                  MOV     #READ,R0                        ; *,VALUE               3824
5475 043036  000207                          RTS     PC                              ;                       3823
5476 043040  012700  042622          1$:     MOV     #CHECK,R0                       ; *,VALUE               3825
5477 043044  000207                          RTS     PC                              ;                       3802
5478
5479                                    ; Routine Size:  15 words
5480                                    ; Maximum stack depth per invocation:  0 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                ML11 TRANSFER COMMANDS                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (36)

3829  ROUTINE RETRY(TIMES,COMMAND,LUN,WRDCNT,BUFFER,SECTOR) =
3830  BEGIN  !* 1 *
3831
3832
3833  !++
3834  !  ROUTINE:     RETRY(TIMES,COMMAND,LUN,WRDCNT,BUFFER,SECTOR)
3835  !
3836  !  PURPOSE:     (1)  IF THE OPERATOR HAS ALLOWED ERROR PRINTOUTS, AND
3837  !                    IF THE RETRY IS NOT TO CATEGORIZE ERRORS, THEN SAY
3838  !                    THAT THE RETRY IS BEGINNING.
3839  !
3840  !                (2)  REISSUE THE WRITE, WRITE CHECK OR READ COMMAND
3841  !                    UNTIL THE COMMAND SUCCEEDS OR UNTIL ALL PERMITTED
3842  !                    RETRIES HAVE FAILED.
3843  !
3844  !                (3)  IF A 'BEGIN RETRY' MESSAGE WAS PRINTED, THEN A FINAL
3845  !                    MESSAGE ABOUT THE SUCCESS OR FAILURE OF THE RETRIES
3846  !                    SHOULD ALSO BE PRINTED.
3847  !
3848  !                (4)  INCREMENT THE RETRY COUNTER FOR EVERY RETRY DONE
3849  !                    WHICH WAS NOT FOR ERROR CLASSIFICATION.
3850  !
3851  !
3852  !  ARGUMENTS:   (1)  TIMES - THE NUMBER OF RETRIES PERMITTED BEFORE
3853  !                         IT IS CALLED A FAILURE.
3854  !
3855  !                (2)  OTHER ARGUMENTS ARE THE SAME AS FOR 'START_IT'
3856  !                    ROUTINE ABOVE.
3857  !
3858  !  RESULTS:     THE VALUES RETURNED FOR THIS SUBROUTINE ARE THE SAME AS
3859  !               FOR THE SYSERR ROUTINE ABOVE.
3860  !--
3861
3862
3863  LABEL
3864    LOOP;
3865
3866  LOCAL
3867     TEMP, VALUE, COUNT, TBOARD, TBANK;
3868
3869                  !+
3870                  ! THIS IS THE CODE FOR PURPOSE 1:
3871                  !-
3872
3873  RETRYING = ACTIVE;
3874  IF ((.TIMES NEQ 1) AND (.ERROUT))
3875  THEN
3876     BEGIN  !* 2 *
3877     IF .COMMAND EQL WRITE
3878     THEN  PRINTB(SAY3,WRD2,WRD16,WRD18);
3879                !BEGIN WRITE RETRY
3880     IF .COMMAND EQL CHECK
```

```
5542 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
5543 ;                ML11 TRANSFER COMMANDS                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (36)
5544
5545 ;          3881      THEN  PRINTB(SAY3,WRD2,PHR1,WRD18);
5546 ;          3882                  !BEGIN WRITE CHECK RETRY
5547 ;          3883      IF .COMMAND EQL READ
5548 ;          3884      THEN  PRINTB(SAY3,WRD2,WRD17,WRD18);
5549 ;          3885                  !BEGIN READ RETRY
5550 ;          3886      END;    !* 2 *
5551 ;          3887
5552 ;          3888                  !+
5553 ;          3889                  ! THIS IS THE CODE FOR PURPOSE 2:
5554 ;          3890                  !-
5555 ;          3891
5556 ;          3892  LOOP:
5557 ;          3893      BEGIN  !* 3 *
5558 ;          3894      INCR KOUNT FROM 1 TO .TIMES DO
5559 ;          3895          BEGIN  !* 4 *
5560 ;          3896          IF .COMMAND EQL WRITE
5561 ;          3897          THEN
5562 ;          3898              VALUE = WRITE(.LUN,.WRDCNT,.BUFFER,.SECTOR);
5563 ;          3899          IF .COMMAND EQL CHECK
5564 ;          3900          THEN
5565 ;          3901              BEGIN
5566 ;          3902              WRITE(.LUN,.WRDCNT,.BUFFER,.SECTOR);
5567 ;          3903              VALUE = CHECK(.LUN,.WRDCNT,.BUFFER,.SECTOR);
5568 ;          3904              END;
5569 ;          3905          IF .COMMAND EQL READ
5570 ;          3906          THEN
5571 ;          3907              BEGIN
5572 ;          3908              WRITE(.LUN,.WRDCNT,(.BUFFER-BUFSIZ*2),.SECTOR);
5573 ;          3909              VALUE = READ(.LUN,.WRDCNT,.BUFFER,.SECTOR);
5574 ;          3910              END;
5575 ;          3911
5576 ;          3912                  !+
5577 ;          3913                  ! THIS IS THE CODE FOR PURPOSE 3:
5578 ;          3914                  !-
5579 ;          3915
5580 ;          3916          IF .VALUE EQL 0
5581 ;          3917          THEN      !THE RETRY WAS SUCCESSFUL
5582 ;          3918              BEGIN  !* 5 *
5583 ;          3919              IF ((.TIMES NEQ 1) AND (.ERROUT))
5584 ;          3920              THEN
5585 ;          3921                  BEGIN
5586 ;          3922                  PRINTB(SAY2,WRD18,WRD19);
5587 ;          3923                  PRINTB(CRLF);
5588 ;          3924                      !RETRY SUCCEEDED
5589 ;          3925                  END;
5590 ;          3926              COUNT = .KOUNT;
5591 ;          3927              LEAVE LOOP;
5592 ;          3928              END;    !* 5 *
5593 ;          3929          END;    !* 4 *
5594 ;          3930
5595 ;          3931                  !+
5596 ;          3932                  ! FALLS THROUGH HERE IF ALL RETRIES FAILED:
```

```
5598 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
5599 ;                  ML11 TRANSFER COMMANDS                23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (36)
5600
5601 ;          3933                    !-
5602 ;          3934
5603 ;          3935        IF ((.TIMES NEQ 1) AND (.ERROUT))
5604 ;          3936        THEN
5605 ;          3937            BEGIN
5606 ;          3938            PRINTB(SAY2,WRD18,WRD20);
5607 ;          3939            PRINTB(CRLF);
5608 ;          3940                !RETRY FAILED
5609 ;          3941            COUNT = .TIMES;
5610 ;          3942            END;
5611 ;          3943        END;    !* 3 *
5612 ;          3944
5613 ;          3945                    !+
5614 ;          3946                    ! THIS IS THE CODE FOR PURPOSE 4:
5615 ;          3947                    !-
5616 ;          3948
5617 ;          3949    IF .TIMES NEQ 1
5618 ;          3950    THEN
5619 ;          3951        BEGIN
5620 ;          3952        TBOARD = .BOARD;
5621 ;          3953        TBANK = .BANK;
5622 ;          3954        DECODE(.SECTOR);
5623 ;          3955        TRIES[.LUN,.BOARD,0,16,0] = .TRIES[.LUN,.BOARD,0,16,0] + .COUNT;
5624 ;          3956        BOARD = .TBOARD;
5625 ;          3957        BANK = .TBANK;
5626 ;          3958        END;
5627 ;          3959
5628 ;          3960    RETRYING = INACTIVE;
5629 ;          3961    RETURN .VALUE;
5630 ;          3962
5631 ;          3963    END;    !* 1 *
5635
5636                                        .SBTTL  RETRY ML11 TRANSFER COMMANDS
5640 043046  004137  005222          RETRY: JSR     R1,$SAVE5                       ;                       3829
5641 043052  012737  000001  032356        MOV     #1,RETRYING                     ;                       3873
5642 043060  016601  000030                MOV     30(SP),R1                       ; TIMES,*               3874
5643 043064  005046                        CLR     -(SP)
5644 043066  020127  000001                CMP     R1,#1
5645 043072  001472                        BEQ     3$
5646 043074  005216                        INC     (SP)
5647 043076  032737  000001  002260        BIT     #1,ERROUT
5648 043104  001465                        BEQ     3$
5649 043106  016602  000030                MOV     30(SP),R2                       ; COMMAND,*             3877
5650 043112  020227  042246                CMP     R2,#WRITE
5651 043116  001016                        BNE     1$
5652 043120  012746  006714                MOV     #WRD18,-(SP)                    ;                       3878
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               ML11 TRANSFER COMMANDS                   23-Oct-1980 14:57:05    PA:<

5657 043124  012746  006700                    MOV     #WRD16,-(SP)
5658 043130  012746  006622                    MOV     #WRD2,-(SP)
5659 043134  012746  006534                    MOV     #SAY3,-(SP)
5660 043140  012746  000004                    MOV     #4,-(SP)
5661 043144  010600                            MOV     SP,R0                           ; SP,*
5662 043146  104414                            TRAP    14
5663 043150  062706  000012                    ADD     #12,SP
5664 043154  020227  042622           1$:      CMP     R2,#CHECK                       ;                                       3880
5665 043160  001016                            BNE     2$
5666 043162  012746  006714                    MOV     #WRD18,-(SP)                    ;                                       3881
5667 043166  012746  007336                    MOV     #PHR1,-(SP)
5668 043172  012746  006622                    MOV     #WRD2,-(SP)
5669 043176  012746  006534                    MOV     #SAY3,-(SP)
5670 043202  012746  000004                    MOV     #4,-(SP)
5671 043206  010600                            MOV     SP,R0                           ; SP,*
5672 043210  104414                            TRAP    14
5673 043212  062706  000012                    ADD     #12,SP
5674 043216  020227  042434           2$:      CMP     R2,#READ                        ;                                       3883
5675 043222  001016                            BNE     3$
5676 043224  012746  006714                    MOV     #WRD18,-(SP)                    ;                                       3884
5677 043230  012746  006706                    MOV     #WRD17,-(SP)
5678 043234  012746  006622                    MOV     #WRD2,-(SP)
5679 043240  012746  006534                    MOV     #SAY3,-(SP)
5680 043244  012746  000004                    MOV     #4,-(SP)
5681 043250  010600                            MOV     SP,R0                           ; SP,*
5682 043252  104414                            TRAP    14
5683 043254  062706  000012                    ADD     #12,SP
5684 043260  016602  000030           3$:      MOV     30(SP),R2                       ; COMMAND,*                             3896
5685 043264  005004                            CLR     R4                              ; KOUNT                                 3894
5686 043266  000543                            BR      9$
5687 043270  020227  042246           4$:      CMP     R2,#WRITE                       ;                                       3896
5688 043274  001015                            BNE     5$
5689 043276  016646  000026                    MOV     26(SP),-(SP)                    ; LUN,*                                 3898
5690 043302  016646  000026                    MOV     26(SP),-(SP)                    ; WRDCNT,*
5691 043306  016646  000026                    MOV     26(SP),-(SP)                    ; BUFFER,*
5692 043312  016646  000026                    MOV     26(SP),-(SP)                    ; SECTOR,*
5693 043316  004737  042246                    JSR     PC,WRITE
5694 043322  010003                            MOV     R0,R3                           ; *,VALUE
5695 043324  062706  000010                    ADD     #10,SP
5696 043330  020227  042622           5$:      CMP     R2,#CHECK                       ;                                       3899
5697 043334  001027                            BNE     6$
5698 043336  016646  000026                    MOV     26(SP),-(SP)                    ; LUN,*                                 3902
5699 043342  016646  000026                    MOV     26(SP),-(SP)                    ; WRDCNT,*
5700 043346  016646  000026                    MOV     26(SP),-(SP)                    ; BUFFER,*
5701 043352  016646  000026                    MOV     26(SP),-(SP)                    ; SECTOR,*
5702 043356  004737  042246                    JSR     PC,WRITE
5703 043362  016616  000036                    MOV     36(SP),(SP)                     ; LUN,*                                 3903
5704 043366  016646  000034                    MOV     34(SP),-(SP)                    ; WRDCNT,*
5705 043372  016646  000034                    MOV     34(SP),-(SP)                    ; BUFFER,*
5706 043376  016646  000034                    MOV     34(SP),-(SP)                    ; SECTOR,*
5707 043402  004737  042622                    JSR     PC,CHECK
5708 043406  010003                            MOV     R0,R3                           ; *,VALUE
```

```
                                        ;MLX4
                                        ;               ML11 TRANSFER COMMANDS                  23-Oct-1980 15:01:43    TOPS
                                                                                                23-Oct-1980 14:57:05    PA:<

5713 043410  062706  000016                    ADD     #16,SP                          ;                                       3901
5714 043414  020227  042434            6$:     CMP     R2,#READ                        ;                                       3905
5715 043420  001031                            BNE     7$
5716 043422  016646  000026                    MOV     26(SP),-(SP)                    ; LUN,*                                 3908
5717 043426  016646  000026                    MOV     26(SP),-(SP)                    ; WRDCNT,*
5718 043432  016646  000026                    MOV     26(SP),-(SP)                    ; BUFFER,*
5719 043436  162716  010000                    SUB     #10000,(SP)
5720 043442  016646  000026                    MOV     26(SP),-(SP)                    ; SECTOR,*
5721 043446  004737  042246                    JSR     PC,WRITE
5722 043452  016616  000036                    MOV     36(SP),(SP)                     ; LUN,*                                 3909
5723 043456  016646  000034                    MOV     34(SP),-(SP)                    ; WRDCNT,*
5724 043462  016646  000034                    MOV     34(SP),-(SP)                    ; BUFFER,*
5725 043466  016646  000034                    MOV     34(SP),-(SP)                    ; SECTOR,*
5726 043472  004737  042434                    JSR     PC,READ
5727 043476  010003                            MOV     R0,R3                           ; *,VALUE
5728 043500  062706  000016                    ADD     #16,SP                          ;                                       3907
5729 043504  005703                    7$:     TST     R3                              ; VALUE                                 3916
5730 043506  001033                            BNE     9$
5731 043510  032716  000001                    BIT     #1,(SP)                         ;                                       3919
5732 043514  001426                            BEQ     8$
5733 043516  032737  000001  002260            BIT     #1,ERROUT
5734 043524  001422                            BEQ     8$
5735 043526  012746  006722                    MOV     #WRD19,-(SP)                    ;                                       3922
5736 043532  012746  006714                    MOV     #WRD18,-(SP)
5737 043536  012746  006522                    MOV     #SAY2,-(SP)
5738 043542  012746  000003                    MOV     #3,-(SP)
5739 043546  010600                            MOV     SP,R0                           ; SP,*
5740 043550  104414                            TRAP    14
5741 043552  012716  006510                    MOV     #CRLF,(SP)                      ;                                       3923
5742 043556  012746  000001                    MOV     #1,-(SP)
5743 043562  010600                            MOV     SP,R0                           ; SP,*
5744 043564  104414                            TRAP    14
5745 043566  062706  000012                    ADD     #12,SP                          ;                                       3921
5746 043572  010405                    8$:     MOV     R4,R5                           ; KOUNT,COUNT                           3926
5747 043574  000435                            BR      10$                             ;                                       3927
5748 043576  005204                    9$:     INC     R4                              ; KOUNT                                 3894
5749 043600  020401                            CMP     R4,R1                           ; KOUNT,*
5750 043602  003632                            BLE     4$
5751 043604  032716  000001                    BIT     #1,(SP)                         ;                                       3935
5752 043610  001462                            BEQ     11$
5753 043612  032737  000001  002260            BIT     #1,ERROUT
5754 043620  001423                            BEQ     10$
5755 043622  012746  006734                    MOV     #WRD20,-(SP)                    ;                                       3938
5756 043626  012746  006714                    MOV     #WRD18,-(SP)
5757 043632  012746  006522                    MOV     #SAY2,-(SP)
5758 043636  012746  000003                    MOV     #3,-(SP)
5759 043642  010600                            MOV     SP,R0                           ; SP,*
5760 043644  104414                            TRAP    14
5761 043646  012716  006510                    MOV     #CRLF,(SP)                      ;                                       3939
5762 043652  012746  000001                    MOV     #1,-(SP)
5763 043656  010600                            MOV     SP,R0                           ; SP,*
5764 043660  104414                            TRAP    14
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               ML11 TRANSFER COMMANDS                   23-Oct-1980 14:57:05    PA:<

043662  010105                          MOV     R1,R5           ; *,COUNT                                               3941
043664  062706  000012                  ADD     #12,SP          ;                                                       3937
043670  032716  000001          10$:    BIT     #1,(SP)         ;                                                       3949
043674  001430                          BEQ     11$
043676  013701  032360                  MOV     BOARD,R1        ; *,TBOARD                                              3952
043702  013702  032362                  MOV     BANK,R2         ; *,TBANK                                               3953
043706  016646  000020                  MOV     20(SP),-(SP)    ; SECTOR,*                                              3954
043712  004737  035106                  JSR     PC,DECODE
043716  016600  000030                  MOV     30(SP),R0       ; LUN,*                                                 3955
043722  006300                          ASL     R0
043724  006300                          ASL     R0
043726  006300                          ASL     R0
043730  006300                          ASL     R0
043732  063700  032360                  ADD     BOARD,R0
043736  006300                          ASL     R0
043740  060560  031732                  ADD     R5,TRIES(R0)    ; COUNT,*
043744  010137  032360                  MOV     R1,BOARD        ; TBOARD,*                                              3956
043750  010237  032362                  MOV     R2,BANK         ; TBANK,*                                               3957
043754  005726                          TST     (SP)+           ;                                                       3951
043756  005037  032356          11$:    CLR     RETRYING        ;                                                       3960
043762  010300                          MOV     R3,R0           ; VALUE,*                                               3830
043764  005726                          TST     (SP)+           ;                                                       3829
043766  000207                          RTS     PC

                                        ; Routine Size:  233 words
                                        ; Maximum stack depth per invocation:  14 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               TO SET UP BUFFER POINTERS BEFORE A TRANSFER     23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (37)

;         3964  %SBTTL  'TO SET UP BUFFER POINTERS BEFORE A TRANSFER'
;         3965
;         3966  ROUTINE SET_PTRS(WRDCNT): NOVALUE =
;         3967  BEGIN
;         3968
;         3969  !++
;         3970  !  ROUTINE:     SET_PTRS(WRDCNT)
;         3971  !
;         3972  !  PURPOSE:     TO MAKE SURE THAT THE BUFFER POINTERS ARE SUITABLY PLACED
;         3973  !               BEFORE A TRANSFER, SO THAT THEY WILL SUPPORT THE CHOSEN WORD
;         3974  !               COUNT WITHIN THE BUFFER SPACE.
;         3975  !
;         3976  !  ARGUMENT:    WRDCNT = THE NUMBER OF WORDS IN A TRANSFER.
;         3977  !
;         3978  !  RESULTS:     'WPTR' AND 'RPTR' ARE SET BACK TO THE START OF THE BUFFERS
;         3979  !               ONLY IF THE WORD COUNT WON'T FIT.  OTHERWISE, THEY ARE LEFT
;         3980  !               UNCHANGED.
;         3981  !
;         3982  !               NOTE:  THE WRITE BUFFER IS LOCATED BEFORE THE READ BUFFER.
;         3983  !--
;         3984
;         3985  IF (.WPTR + .WRDCNT * 2) GEQA END_WBUFF
;         3986  THEN  WPTR = WBUFF;
;         3987  RPTR = .WPTR + (BUFSIZ * 2);
;         3988  RETURN;
;         3989
;         3990  END;

                                .SBTTL  SET.PTRS TU SET UP BUFFER POINTERS BEFORE A TRANSFER
043770                  SET.PTRS:
043770  016600  000002          MOV     2(SP),R0                        ; WRDCNT,*      3985
043774  006300                  ASL     R0
043776  063700  030706          ADD     WPTR,R0
044002  020027  020706          CMP     R0,#END.WBUFF
044006  103403                  BLO     1$
044010  012737  010706  030706  MOV     #WBUFF,WPTR                     ;               3986
044016  013700  030706  1$:     MOV     WPTR,R0                         ;               3987
044022  062700  010000          ADD     #10000,R0
044026  010037  030710          MOV     R0,RPTR
044032  000207                  RTS     PC                              ;               3966

                        ; Routine Size:  18 words
                        ; Maximum stack depth per invocation:  0 words
```

```
5862
5863
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(20)
;                CHOOSING A WORD COUNT                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (39)

;          3991  %SBTTL  'CHOOSING A WORD COUNT'
;          3992
;          3993  ROUTINE GET_WRDCNT(SECTOR,LAST) =
;          3994  BEGIN
;          3995
;          3996  LOCAL
;          3997     TEMP, WRDCNT;
;          3998
;          3999  TEMP = .LAST - .SECTOR + 1;      !NUMBER OF SECTORS LEFT TO TEST
;          4000
;          4001  IF (BUFSIZ/256) GTR .TEMP        !LESS THAN A FULL BUFFER LEFT?
;          4002  THEN  WRDCNT = .TEMP * 256       !YES -- USE AS LARGE A COUNT AS FITS
;          4003  ELSE  WRDCNT = BUFSIZ;           !NO  -- USE THE ENTIRE BUFFER SIZE
;          4004
;          4005  RETURN .WRDCNT;
;          4006
;          4007  END;

                                        .SBTTL  GET.WRDCNT CHOOSING A WORD COUNT
044034                            GET.WRDCNT:
044034  016600  000002                MOV     2(SP),R0                ; LAST,*                3999
044040  166600  000004                SUB     4(SP),R0                ; SECTOR,*
044044  005200                        INC     R0
044046  020027  000010                CMP     R0,#10                  ; TEMP,*                4001
044052  002003                        BGE     1$
044054  000300                        SWAB    R0                      ;                       4002
044056  105000                        CLRB    R0
044060  000207                        RTS     PC                      ;                       4001
044062  012700  004000          1$:   MOV     #4000,R0                ; *,WRDCNT              4003
044066  000207                        RTS     PC                      ;                       3993

                                  ; Routine Size:  14 words
                                  ; Maximum stack depth per invocation:  0 words
```

```
5914 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
5915 ;                COMMAND INTEGRITY ROUTINE               23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (39)
5916
5917 ;          4008  %SBTTL  'COMMAND INTEGRITY ROUTINE'
5918 ;          4009
5919 ;          4010  ROUTINE INTEGRITY: NOVALUE =
5920 ;          4011  BEGIN  !* 1 *  START OF ROUTINE
5921 ;          4012
5922 ;          4013  !++
5923 ;          4014  !  ROUTINE:     INTEGRITY
5924 ;          4015  !
5925 ;          4016  !  PURPOSE:     TO MAKE SURE THAT THE BASIC ML11 TRANSFER COMMANDS
5926 ;          4017  !               WHICH WILL BE USED BY THE EXERCISER (WRITE,READ,
5927 ;          4018  !               WRITE CHECK) WORK PROPERLY.
5928 ;          4019  !
5929 ;          4020  !  THE CODE FOR 'INTEGRITY' IN BRIEF:
5930 ;          4021  !
5931 ;          4022  !  BEGIN 1 (START OF ROUTINE)
5932 ;          4023  !  SAY ROUTINE IS RUNNING
5933 ;          4024  !  INCR COMPLEMENT FLAG FROM 0 TO 1
5934 ;          4025  !  : BEGIN 2 (START OF COMPLEMENT FLAG SELECTION LOOP)
5935 ;          4026  !  : GENERATE THE PATTERN
5936 ;          4027  !  : INCR LOGICAL UNIT NUMBER FROM 0 TO LAST
5937 ;          4028  !  : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
5938 ;          4029  !  : : TESTLOOP:
5939 ;          4030  !  : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
5940 ;          4031  !  : : : IF UNIT IS ACTIVE
5941 ;          4032  !  : : : THEN
5942 ;          4033  !  : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
5943 ;          4034  !  : : : : SECTOR = LOWEST
5944 ;          4035  !  : : : : GET_WRDCNT
5945 ;          4036  !  : : : : WRITE
5946 ;          4037  !  : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
5947 ;          4038  !  : : : : READ
5948 ;          4039  !  : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
5949 ;          4040  !  : : : : WRITE CHECK
5950 ;          4041  !  : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
5951 ;          4042  !  : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
5952 ;          4043  !  : : : END 4 (END OF LOOP THAT COMPLETELY TESTS 1 UNIT)
5953 ;          4044  !  : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
5954 ;          4045  !  : END 2 (END OF COMPLEMENT FLAG SELECTION LOOP)
5955 ;          4046  !  RETURN
5956 ;          4047  !  END 1 (END OF ROUTINE)
5957 ;          4048  !--
5958 ;          4049
5959 ;          4050  LABEL
5960 ;          4051     LOOP;
5961 ;          4052
5962 ;          4053  LOCAL
5963 ;          4054     VALUE, WRDCNT, OLDSEC, OLDCHN, SECTOR, DBL_VALUE;
5964 ;          4055
5965 ;          4056  PRINTB(SAY2,WRD34,RTN0);
5966 ;          4057     !'RUNNING COMMAND INTEGRITY ROUTINE'
5967 ;          4058
5968 ;          4059  INCR COMP_FLAG FROM 0 TO 1 DO
```

```
5970 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
5971 ;                  COMMAND INTEGRITY ROUTINE             23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (39)
5972 ;
5973 ;          4060      BEGIN  !* 2 *  START OF COMPLEMENT FLAG SELECTION LOOP
5974 ;          4061      GEN3(.COMP_FLAG);
5975 ;          4062      INCR LUN FROM 0 TO (.L$UNIT - 1) DO
5976 ;          4063         BEGIN  !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
5977 ;          4064         LOOP:
5978 ;          4065            BEGIN  !* 4 *  START OF LOOP THAT COMPLETELY TESTS 1 UNIT
5979 ;          4066            IF .DRIVE_STATUS[.LUN] EQL ACTIVE
5980 ;          4067            THEN
5981 ;          4068               BEGIN  !* 5 *  START OF TEST FOR AN ACTIVE UNIT
5982 ;          4069               L$LUN = .LUN;
5983 ;          4070               SECTOR = LOWEST;
5984 ;          4071               WRDCNT = GET_WRDCNT(.SECTOR,HIGHEST);
5985 ;          4072
5986 ;          4073               VALUE = WRITE(.LUN,.WRDCNT,WBUFF,LOWEST);
5987 ;          4074               !+
5988 ;          4075               !  SEE HOW SUCCESSFUL THE WRITE WAS:
5989 ;          4076               !-
5990 ;          4077               SELECTONE .VALUE OF              !SEE 'SYSERR' FOR DEFINITION
5991 ;          4078                  SET                           !OF ERROR # CONTAINED IN 'VALUE'
5992 ;          4079               [1] :
5993 ;          4080                  BEGIN  !* 5A *   RETRY ALLOWED
5994 ;          4081                  IF RETRY(SIX,WRITE,.LUN,.WRDCNT,WBUFF,LOWEST) NEQ 0
5995 ;          4082                  THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
5996 ;          4083                     BEGIN
5997 ;          4084                     WHY_DROPT[.LUN] = CODE_4;
5998 ;          4085                     ERRDF(1,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 01 ****
5999 ;          4086                     DODU(.LUN);
6000 ;          4087                     LEAVE LOOP;              !JUMP JUST BEYOND END OF BLOCK * 4 *
6001 ;          4088                     END;
6002 ;          4089                  END;   !* 5A *
6003 ;          4090               [2] :
6004 ;          4091                  BEGIN  !* 5B *   FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
6005 ;          4092                  WHY_DROPT[.LUN] = CODE_5;
6006 ;          4093                  ERRDF(2,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 02 ****
6007 ;          4094                  DODU(.LUN);
6008 ;          4095                  LEAVE LOOP;              !JUMP JUST BEYOND END OF BLOCK * 4 *
6009 ;          4096                  END;   !* 5B *
6010 ;          4097               [3] :
6011 ;          4098                  BEGIN  !* 5C *   FATAL DRIVE ERROR -- NO RETRY ALLOWED
6012 ;          4099                  ERRDF(3,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 03 ****
6013 ;          4100                  WHY_DROPT[.LUN] = CODE_6;
6014 ;          4101                  DODU(.LUN);
6015 ;          4102                  LEAVE LOOP;              !JUMP JUST BEYOND END OF BLOCK * 4 *
6016 ;          4103                  END;   !* 5C *
6017 ;          4104
6018 ;          4105               TES;
6019 ;          4106
6020 ;          4107               VALUE = READ(.LUN,.WRDCNT,RBUFF,LOWEST);
6021 ;          4108               !+
6022 ;          4109               !  SEE HOW SUCCESSFUL THE READ WAS:
6023 ;          4110               !-
6024 ;          4111               SELECTONE .VALUE OF              !SEE 'SYSERR' FOR DEFINITION
```

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6026 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
6027 ;                COMMAND INTEGRITY ROUTINE               23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (39)
6028
6029 ;          4112                SET                     !OF ERROR # CONTAINED IN 'VALUE'
6030 ;          4113              [0] :
6031 ;          4114                IF (DBL_VALUE = DOUBLE_CHECK(WBUFF,RBUFF,.WRDCNT)) NEQ 0
6032 ;          4115                THEN
6033 ;          4116                    BEGIN
6034 ;          4117                    SAYWHO(.LUN);
6035 ;          4118                    PRINTB(SAY1,MSG5);
6036 ;          4119                        !'ECC LOGIC FAILED TO DETECT DATA ERROR'
6037 ;          4120                    PRINTB(FMT12A,..DBL_VALUE,.DBL_VALUE);
6038 ;          4121                        !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
6039 ;          4122                    DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
6040 ;          4123                    PRINTB(FMT12B,..DBL_VALUE,.DBL_VALUE);
6041 ;          4124                        !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
6042 ;          4125                    WHY_DROPT[.LUN] = CODE_8;
6043 ;          4126                    ERRDF(4,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 04 ****
6044 ;          4127                    DODU(.LUN);
6045 ;          4128                    LEAVE LOOP;    !JUMP JUST BEYOND END OF BLOCK * 4 *
6046 ;          4129                    END;
6047 ;          4130              [1] :
6048 ;          4131                BEGIN  !* 5D *   RETRY ALLOWED
6049 ;          4132                IF RETRY(SIX,READ,.LUN,.WRDCNT,RBUFF,LOWEST) NEQ 0
6050 ;          4133                THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
6051 ;          4134                    BEGIN
6052 ;          4135                    WHY_DROPT[.LUN] = CODE_4;
6053 ;          4136                    ERRDF(5,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 05 ****
6054 ;          4137                    DODU(.LUN);
6055 ;          4138                    LEAVE LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
6056 ;          4139                    END;
6057 ;          4140                END;    !* 5D *
6058 ;          4141              [2] :
6059 ;          4142                BEGIN  !* 5E *   FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
6060 ;          4143                WHY_DROPT[.LUN] = CODE_5;
6061 ;          4144                ERRDF(6,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 06 ****
6062 ;          4145                DODU(.LUN);
6063 ;          4146                LEAVE LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
6064 ;          4147                END;  !* 5E *
6065 ;          4148              [3] :
6066 ;          4149                BEGIN  !* 5F *   FATAL DRIVE ERROR -- NO RETRY ALLOWED
6067 ;          4150                ERRDF(7,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 07 ****
6068 ;          4151                WHY_DROPT[.LUN] = CODE_6;
6069 ;          4152                DODU(.LUN);
6070 ;          4153                LEAVE LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
6071 ;          4154                END;    !* 5F *
6072 ;          4155              [4] :
6073 ;          4156                BEGIN  !* 5G *   UNRECOVERABLE DATA ERROR
6074 ;          4157                ISOLATE();
6075 ;          4158                ERRDF(8,MSG2,0);    !**** INTEGRITY ROUTINE ERROR 08 ****
6076 ;          4159                WHY_DROPT[.LUN] = CODE_7;
6077 ;          4160                DODU(.LUN);
6078 ;          4161                LEAVE LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
6079 ;          4162                END;    !* 5G *
6080 ;          4163              [5] :
```

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6082 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
6083 ;                COMMAND INTEGRITY ROUTINE               23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (39)
6084 ;
6085 ;          4164                 BEGIN  !* 5H *   RECOVERABLE DATA ERROR
6086 ;          4165                 ISOLATE();
6087 ;          4166                 IF .ERROUT
6088 ;          4167                 THEN  PRINTB(FMT10B,.CHAN);
6089 ;          4168                         !'     BIT QQ'
6090 ;          4169                 OLDSEC = .MLEL;
6091 ;          4170                 OLDCHN = .CHAN;
6092 ;          4171                 IF RETRY(ONE,READ,.LUN,.WRDCNT,RBUFF,LOWEST) EQL 5
6093 ;          4172                 THEN
6094 ;          4173                    IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
6095 ;          4174                    THEN
6096 ;          4175                       BEGIN
6097 ;          4176                       IF .ERROUT
6098 ;          4177                       THEN
6099 ;          4178                       ERRHRD(9,MSG4,0);  !**** INTEGRITY ROUTINE ERROR 09 ****
6100 ;          4179                       UP_HARD_COUNT(.LUN,.BOARD);
6101 ;          4180                       END
6102 ;          4181                    ELSE
6103 ;          4182                       BEGIN
6104 ;          4183                       IF .ERROUT
6105 ;          4184                       THEN
6106 ;          4185                       ERRSOFT(10,MSG3,0); !**** INTEGRITY ROUTINE ERROR 10 ****
6107 ;          4186                       UP_SOFT_COUNT(.LUN,.BOARD);
6108 ;          4187                       END
6109 ;          4188                 ELSE
6110 ;          4189                    BEGIN
6111 ;          4190                    IF .ERROUT
6112 ;          4191                    THEN
6113 ;          4192                    ERRSOFT(11,MSG3,0); !**** INTEGRITY ROUTINE ERROR 11 ****
6114 ;          4193                    UP_SOFT_COUNT(.LUN,.BOARD);
6115 ;          4194                    END;
6116 ;          4195                 END;   !* 5H *
6117 ;          4196
6118 ;          4197                 TES;
6119 ;          4198
6120 ;          4199              VALUE = CHECK(.LUN,.WRDCNT,WBUFF,LOWEST);
6121 ;          4200              !+
6122 ;          4201              !  SEE HOW SUCCESSFUL THE WRITE CHECK WAS:
6123 ;          4202              !-
6124 ;          4203              SELECTONE .VALUE OF          !SEE 'SYSERR' FOR DEFINITION
6125 ;          4204                 SET                       !OF ERROR # CONTAINED IN 'VALUE'
6126 ;          4205              [1] :
6127 ;          4206                 BEGIN  !* 5I *   RETRY ALLOWED
6128 ;          4207                 IF RETRY(SIX,CHECK,.LUN,.WRDCNT,WBUFF,LOWEST) NEQ 0
6129 ;          4208                 THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
6130 ;          4209                    BEGIN
6131 ;          4210                    WHY_DROPT[.LUN] = CODE_4;
6132 ;          4211                    ERRDF(12,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 12 ****
6133 ;          4212                    DODU(.LUN);
6134 ;          4213                    LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 4 *
6135 ;          4214                    END;
6136 ;          4215                 END;   !* 5I *
```

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6138 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
6139 ;                  COMMAND INTEGRITY ROUTINE             23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (39)
6140
6141 ;          4216                [2] :
6142 ;          4217                   BEGIN  !* 5J *   FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
6143 ;          4218                   WHY_DROPT[.LUN] = CODE_5;
6144 ;          4219                   ERRDF(13,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 13 ****
6145 ;          4220                   DODU(.LUN);
6146 ;          4221                   LEAVE LOOP;                !JUMP JUST BEYOND END OF BLOCK * 4 *
6147 ;          4222                   END;  !* 5J *
6148 ;          4223                [3] :
6149 ;          4224                   BEGIN  !* 5K *   FATAL DRIVE ERROR -- NO RETRY ALLOWED
6150 ;          4225                   ERRDF(14,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 14 ****
6151 ;          4226                   WHY_DROPT[.LUN] = CODE_6;
6152 ;          4227                   DODU(.LUN);
6153 ;          4228                   LEAVE LOOP;                !JUMP JUST BEYOND END OF BLOCK * 4 *
6154 ;          4229                   END;   !* 5K *
6155 ;          4230                [4] :
6156 ;          4231                   BEGIN  !* 5L *   UNRECOVERABLE DATA ERROR
6157 ;          4232                   ISOLATE();
6158 ;          4233                   ERRDF(15,MSG2,0);   !**** INTEGRITY ROUTINE ERROR 15 ****
6159 ;          4234                   WHY_DROPT[.LUN] = CODE_7;
6160 ;          4235                   DODU(.LUN);
6161 ;          4236                   LEAVE LOOP;                !JUMP JUST BEYOND END OF BLOCK * 4 *
6162 ;          4237                   END;   !* 5L *
6163 ;          4238                [5] :
6164 ;          4239                   BEGIN  !* 5M *   RECOVERABLE DATA ERROR
6165 ;          4240                   ISOLATE();
6166 ;          4241                   IF .ERROUT
6167 ;          4242                   THEN  PRINTB(FMT10B,.CHAN);
6168 ;          4243                           !'     BIT QQ'
6169 ;          4244                   OLDSEC = .MLEL;
6170 ;          4245                   OLDCHN = .CHAN;
6171 ;          4246                   IF RETRY(ONE,CHECK,.LUN,.WRDCNT,WBUFF,LOWEST) EQL 5
6172 ;          4247                   THEN
6173 ;          4248                      IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
6174 ;          4249                      THEN
6175 ;          4250                         BEGIN
6176 ;          4251                         IF .ERROUT
6177 ;          4252                         THEN
6178 ;          4253                         ERRHRD(16,MSG4,0);  !**** INTEGRITY ROUTINE ERROR 16 ****
6179 ;          4254                         UP_HARD_COUNT(.LUN,.BOARD);
6180 ;          4255                         END
6181 ;          4256                      ELSE
6182 ;          4257                         BEGIN
6183 ;          4258                         IF .ERROUT
6184 ;          4259                         THEN
6185 ;          4260                         ERRSOFT(17,MSG3,0); !**** INTEGRITY ROUTINE ERROR 17 ****
6186 ;          4261                         UP_SOFT_COUNT(.LUN,.BOARD);
6187 ;          4262                         END
6188 ;          4263                   ELSE
6189 ;          4264                      BEGIN
6190 ;          4265                      IF .ERROUT
6191 ;          4266                      THEN
6192 ;          4267                      ERRSOFT(18,MSG3,0); !**** INTEGRITY ROUTINE ERROR 18 ****
```

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;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                COMMAND INTEGRITY ROUTINE              23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (39)

;          4268                  UP_SOFT_COUNT(.LUN,.BOARD);
;          4269                  END;
;          4270              END;    !* 5M *
;          4271
;          4272              TES;
;          4273
;          4274          END;    !* 5 *  END OF TEST FOR AN ACTIVE DRIVE
;          4275      END;    !* 4 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
;          4276  END;    !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
;          4277  END;    !* 2 *  END OF COMPLEMENT FLAG SELECTION LOOP
;          4278  RETURN;
;          4279  END;    !* 1 *  END OF ROUTINE

                                .SBTTL  INTEGRITY COMMAND INTEGRITY ROUTINE
044070                  INTEGRITY:
044070  004137  005222          JSR     R1,$SAVE5                       ;                       4010
044074  162706  000012          SUB     #12,SP
044100  012746  007216          MOV     #RTN0,-(SP)                     ;                       4056
044104  012746  006766          MOV     #WRD34,-(SP)
044110  012746  006522          MOV     #SAY2,-(SP)
044114  012746  000003          MOV     #3,-(SP)
044120  010600                  MOV     SP,R0                           ; SP,*
044122  104414                  TRAP    14
044124  005001                  CLR     R1                              ; COMP.FLAG             4059
044126  010146          1$:     MOV     R1,-(SP)                        ; COMP.FLAG,*           4061
044130  004737  036556          JSR     PC,GEN3
044134  013766  002012  000020  MOV     L$UNIT,20(SP)                   ;                       4062
044142  005004                  CLR     R4                              ; LUN
044144  000137  046260          JMP     38$
044150  010400          2$:     MOV     R4,R0                           ; LUN,*                 4066
044152  006200                  ASR     R0
044154  006200                  ASR     R0
044156  006200                  ASR     R0
044160  062700  032460          ADD     #DRIVE.STATUS,R0
044164  010046                  MOV     R0,-(SP)
044166  010446                  MOV     R4,-(SP)                        ; LUN,*
044170  042716  177770          BIC     #177770,(SP)
044174  012746  000001          MOV     #1,-(SP)
044200  005046                  CLR     -(SP)
044202  004737  004244          JSR     PC,BL$GT2
044206  062706  000010          ADD     #10,SP
044212  005300                  DEC     R0
044214  001117                  BNE     6$
044216  010437  002074          MOV     R4,L$LUN                        ; LUN,*                 4069
044222  010400                  MOV     R4,R0                           ; LUN,*                 4070
044224  006300                  ASL     R0
```

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                                ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                ;       COMMAND INTEGRITY ROUTINE                        23-Oct-1980 14:57:05    PA:<
                                
044226  012702  032476                MOV     #LOW.SECT,R2
044232  060002                      ADD     R0,R2
044234  011266  000022              MOV     (R2),22(SP)             ; *,SECTOR
044240  016646  000022              MOV     22(SP),-(SP)            ; SECTOR,*                      4071
044244  016046  032516              MOV     TOP.SECT(R0),-(SP)
044250  004737  044034              JSR     PC,GET.WRDCNT
044254  010003                      MOV     R0,R3                   ; *,WRDCNT
044256  010416                      MOV     R4,(SP)                 ; LUN,*                         4073
044260  010346                      MOV     R3,-(SP)                ; WRDCNT,*
044262  012746  010706              MOV     #WBUFF,-(SP)
044266  011246                      MOV     (R2),-(SP)
044270  004737  042246              JSR     PC,WRITE
044274  010005                      MOV     R0,R5                   ; *,VALUE
044276  020527  000001              CMP     R5,#1                   ; VALUE,*                       4077
044302  001031                      BNE     3$
044304  012746  000006              MOV     #6,-(SP)                ;                               4081
044310  012746  042246              MOV     #WRITE,-(SP)
044314  010446                      MOV     R4,-(SP)                ; LUN,*
044316  010346                      MOV     R3,-(SP)                ; WRDCNT,*
044320  012746  010706              MOV     #WBUFF,-(SP)
044324  011246                      MOV     (R2),-(SP)
044326  004737  043046              JSR     PC,RETRY
044332  062706  000014              ADD     #14,SP
044336  005700                      TST     R0
044340  001446                      BEQ     7$
044342  112764  000004  032464      MOVB    #4,WHY.DROPT(R4)        ; *,*(LUN)                      4084
044350  104455                      TRAP    55                      ;                               4085
044352  000001                      .WORD   1
044354  010512                      .WORD   MSG1
044356  000000                      .WORD   0
044360  010400                      MOV     R4,R0                   ; LUN,*                         4086
044362  104451                      TRAP    51
044364  000431                      BR      5$                      ;                               4087
044366  020527  000002      3$:     CMP     R5,#2                   ; VALUE,*                       4077
044372  001012                      BNE     4$
044374  112764  000005  032464      MOVB    #5,WHY.DROPT(R4)        ; *,*(LUN)                      4092
044402  104455                      TRAP    55                      ;                               4093
044404  000002                      .WORD   2
044406  010512                      .WORD   MSG1
044410  000000                      .WORD   0
044412  010400                      MOV     R4,R0                   ; LUN,*                         4094
044414  104451                      TRAP    51
044416  000414                      BR      5$                      ;                               4095
044420  020527  000003      4$:     CMP     R5,#3                   ; VALUE,*                       4077
044424  001014                      BNE     7$
044426  104455                      TRAP    55                      ;                               4099
044430  000003                      .WORD   3
044432  010512                      .WORD   MSG1
044434  000000                      .WORD   0
044436  112764  000006  032464      MOVB    #6,WHY.DROPT(R4)        ; *,*(LUN)                      4100
044444  010400                      MOV     R4,R0                   ; LUN,*                         4101
044446  104451                      TRAP    51
```

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                                ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                ;       COMMAND INTEGRITY ROUTINE                       23-Oct-1980 14:57:05    PA:<
                                5$:     ADD     #12,SP                  ;                                       4102
                                6$:     BR      8$
                                7$:     MOV     R4,(SP)                 ; LUN,*                                 4107
                                        MOV     R3,-(SP)                ; WRDCNT,*
044462  012746  020706                MOV     #RBUFF,-(SP)
044466  011246                        MOV     (R2),-(SP)
044470  004737  042434                JSR     PC,READ
044474  010005                        MOV     R0,R5                   ; *,VALUE
044476  001072                        BNE     9$                      ;                               4111
044500  012746  010706                MOV     #WBUFF,-(SP)            ;                               4114
044504  012746  020706                MOV     #RBUFF,-(SP)
044510  010346                        MOV     R3,-(SP)                ; WRDCNT,*
044512  004737  041226                JSR     PC,DOUBLE.CHECK
044516  062706  000006                ADD     #6,SP
044522  010066  000032                MOV     R0,32(SP)               ; *,DBL.VALUE
044526  001477                        BEQ     10$
044530  010446                        MOV     R4,-(SP)                ; LUN,*                         4117
044532  004737  033436                JSR     PC,SAYWHO
044536  012716  010640                MOV     #MSG5,(SP)              ;                               4118
044542  012746  006514                MOV     #SAY1,-(SP)
044546  012746  000002                MOV     #2,-(SP)
044552  010600                        MOV     SP,R0                   ; SP,*
044554  104414                        TRAP    14
044556  016616  000040                MOV     40(SP),(SP)             ; DBL.VALUE,*                   4120
044562  017646  000040                MOV     @40(SP),-(SP)           ; DBL.VALUE,*
044566  012746  006332                MOV     #FMT12A,-(SP)
044572  012746  000003                MOV     #3,-(SP)
044576  010600                        MOV     SP,R0                   ; SP,*
044600  104414                        TRAP    14
044602  062766  010000  000046        ADD     #10000,46(SP)           ; *,DBL.VALUE                   4122
044610  016616  000046                MOV     46(SP),(SP)             ; DBL.VALUE,*                   4123
044614  017646  000046                MOV     @46(SP),-(SP)           ; DBL.VALUE,*
044620  012746  006400                MOV     #FMT12B,-(SP)
044624  012746  000003                MOV     #3,-(SP)
044630  010600                        MOV     SP,R0                   ; SP,*
044632  104414                        TRAP    14
044634  112764  000010  032464        MOVB    #10,WHY.DROPT(R4)       ; *,*(LUN)                      4125
044642  104455                        TRAP    55                      ;                               4126
044644  000004                        .WORD   4
044646  010512                        .WORD   MSG1
044650  000000                        .WORD   0
044652  010400                        MOV     R4,R0                   ; LUN,*                         4127
044654  104451                        TRAP    51
044656  062706  000042                ADD     #42,SP                  ;                               4128
044662  000510                8$:     BR      16$
044664  020527  000001        9$:     CMP     R5,#1                   ; VALUE,*                       4111
044670  001033                        BNE     12$
044672  012746  000006                MOV     #6,-(SP)                ;                               4132
044676  012746  042434                MOV     #READ,-(SP)
044702  010446                        MOV     R4,-(SP)                ; LUN,*
044704  010346                        MOV     R3,-(SP)                ; WRDCNT,*
044706  012746  020706                MOV     #RBUFF,-(SP)
```

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                                        ;MLX4                                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               COMMAND INTEGRITY ROUTINE                               23-Oct-1980 14:57:05    PA:<

                                        MOV     (R2),-(SP)
                                        JSR     PC,RETRY
                                        ADD     #14,SP
                                        TST     R0
                                10$:    BNE     11$
                                        JMP     24$
                                11$:    MOVB    #4,WHY.DROPT(R4)                ; *,*(LUN)                      4135
                                        TRAP    55                              ;                               4136
                                        .WORD   5
                                        .WORD   MSG1
                                        .WORD   0
                                        MOV     R4,R0                           ; LUN,*                         4137
                                        TRAP    51
                                        BR      15$                             ;                               4138
                                12$:    CMP     R5,#2                           ; VALUE,*                       4111
                                        BNE     13$
                                        MOVB    #5,WHY.DROPT(R4)                ; *,*(LUN)                      4143
                                        TRAP    55                              ;                               4144
                                        .WORD   6
                                        .WORD   MSG1
                                        .WORD   0
                                        MOV     R4,R0                           ; LUN,*                         4145
                                        TRAP    51
                                        BR      15$                             ;                               4146
                                13$:    CMP     R5,#3                           ; VALUE,*                       4111
                                        BNE     14$
                                        TRAP    55                              ;                               4150
                                        .WORD   7
                                        .WORD   MSG1
                                        .WORD   0
                                        MOVB    #6,WHY.DROPT(R4)                ; *,*(LUN)                      4151
                                        MOV     R4,R0                           ; LUN,*                         4152
                                        TRAP    51
                                        BR      15$                             ;                               4153
                                14$:    CMP     R5,#4                           ; VALUE,*                       4111
                                        BNE     17$
                                        JSR     PC,ISOLATE                      ;                               4157
                                        TRAP    55                              ;                               4158
                                        .WORD   10
                                        .WORD   MSG2
                                        .WORD   0
                                        MOVB    #7,WHY.DROPT(R4)                ; *,*(LUN)                      4159
                                        MOV     R4,R0                           ; LUN,*                         4160
                                        TRAP    51
                                15$:    ADD     #20,SP                          ;                               4161
                                16$:    JMP     37$
                                17$:    CMP     R5,#5                           ; VALUE,*                       4111
                                        BNE     24$
                                        JSR     PC,ISOLATE                      ;                               4165
                                        BIT     #1,ERROUT                       ;                               4166
                                        BEQ     18$
                                        MOV     @ML.REG+42,R0                   ;                               4167
```

```
                                        ;MLX4                                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               COMMAND INTEGRITY ROUTINE                               23-Oct-1980 14:57:05    PA:<

045136  006200                                  ASR     R0
045140  006200                                  ASR     R0
045142  006200                                  ASR     R0
045144  006200                                  ASR     R0
045146  006200                                  ASR     R0
045150  006200                                  ASR     R0
045152  042700  177700                          BIC     #177700,R0
045156  010046                                  MOV     R0,-(SP)
045160  012746  006262                          MOV     #FMT10B,-(SP)
045164  012746  000002                          MOV     #2,-(SP)
045170  010600                                  MOV     SP,R0                           ; SP,*
045172  104414                                  TRAP    14
045174  062706  000006                          ADD     #6,SP
045200  017766  165224  000036  18$:            MOV     @ML.REG+44,36(SP)               ; *,OLDSEC                              4169
045206  017700  165214                          MOV     @ML.REG+42,R0                   ;                                       4170
045212  006200                                  ASR     R0
045214  006200                                  ASR     R0
045216  006200                                  ASR     R0
045220  006200                                  ASR     R0
045222  006200                                  ASR     R0
045224  006200                                  ASR     R0
045226  042700  177700                          BIC     #177700,R0
045232  010066  000034                          MOV     R0,34(SP)                       ; *,OLDCHN
045236  012746  000001                          MOV     #1,-(SP)                        ;                                       4171
045242  012746  042434                          MOV     #READ,-(SP)
045246  010446                                  MOV     R4,-(SP)                        ; LUN,*
045250  010346                                  MOV     R3,-(SP)                        ; WRDCNT,*
045252  012746  020706                          MOV     #RBUFF,-(SP)
045256  011246                                  MOV     (R2),-(SP)
045260  004737  043046                          JSR     PC,RETRY
045264  062706  000014                          ADD     #14,SP
045270  020027  000005                          CMP     R0,#5
045274  001051                                  BNE     21$
045276  027766  165126  000036                  CMP     @ML.REG+44,36(SP)               ; *,OLDSEC                              4173
045304  001034                                  BNE     20$
045306  016646  000034                          MOV     34(SP),-(SP)                    ; OLDCHN,*
045312  017700  165110                          MOV     @ML.REG+42,R0
045316  006200                                  ASR     R0
045320  006200                                  ASR     R0
045322  006200                                  ASR     R0
045324  006200                                  ASR     R0
045326  006200                                  ASR     R0
045330  006200                                  ASR     R0
045332  042700  177700                          BIC     #177700,R0
045336  020026                                  CMP     R0,(SP)+
045340  001016                                  BNE     20$
045342  032737  000001  002260                  BIT     #1,ERROUT                       ;                                       4176
045350  001404                                  BEQ     19$
045352  104456                                  TRAP    56                              ;                                       4178
045354  000011                                  .WORD   11
045356  010624                                  .WORD   MSG4
045360  000000                                  .WORD   0
```

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                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               COMMAND INTEGRITY ROUTINE               23-Oct-1980 14:57:05    PA:<
                                
045362  010446                  19$:    MOV     R4,-(SP)                ; LUN,*                                         4179
045364  013746  032360                  MOV     BOARD,-(SP)
045370  004737  035302                  JSR     PC,UP.HARD.COUNT
045374  000426                          BR      23$                     ;                                               4173
045376  032737  000001  002260  20$:    BIT     #1,ERROUT               ;                                               4183
045404  001415                          BEQ     22$
045406  104457                          TRAP    57                      ;                                               4185
045410  000012                          .WORD   12
045412  010610                          .WORD   MSG3
045414  000000                          .WORD   0
045416  000410                          BR      22$                     ;                                               4186
045420  032737  000001  002260  21$:    BIT     #1,ERROUT               ;                                               4190
045426  001404                          BEQ     22$
045430  104457                          TRAP    57                      ;                                               4192
045432  000013                          .WORD   13
045434  010610                          .WORD   MSG3
045436  000000                          .WORD   0
045440  010446                  22$:    MOV     R4,-(SP)                ; LUN,*                                         4193
045442  013746  032360                  MOV     BOARD,-(SP)
045446  004737  035430                  JSR     PC,UP.SOFT.COUNT
045452  022626                  23$:    CMP     (SP)+,(SP)+             ;                                               4164
045454  010416                  24$:    MOV     R4,(SP)                 ; LUN,*                                         4199
045456  010346                          MOV     R3,-(SP)                ; WRDCNT,*
045460  012746  010706                  MOV     #WBUFF,-(SP)
045464  011246                          MOV     (R2),-(SP)
045466  004737  042622                  JSR     PC,CHECK
045472  010005                          MOV     R0,R5                   ; *,VALUE
045474  020527  000001                  CMP     R5,#1                   ; VALUE,*                                       4203
045500  001031                          BNE     25$
045502  012746  000006                  MOV     #6,-(SP)                ;                                               4207
045506  012746  042622                  MOV     #CHECK,-(SP)
045512  010446                          MOV     R4,-(SP)                ; LUN,*
045514  010346                          MOV     R3,-(SP)                ; WRDCNT,*
045516  012746  010706                  MOV     #WBUFF,-(SP)
045522  011246                          MOV     (R2),-(SP)
045524  004737  043046                  JSR     PC,RETRY
045530  062706  000014                  ADD     #14,SP
045534  005700                          TST     R0
045536  001462                          BEQ     28$
045540  112764  000004  032464          MOVB    #4,WHY.DROPT(R4)        ; *,*(LUN)                                      4210
045546  104455                          TRAP    55                      ;                                               4211
045550  000014                          .WORD   14
045552  010512                          .WORD   MSG1
045554  000000                          .WORD   0
045556  010400                          MOV     R4,R0                   ; LUN,*                                         4212
045560  104451                          TRAP    51
045562  000450                          BR      28$                     ;                                               4213
045564  020527  000002          25$:    CMP     R5,#2                   ; VALUE,*                                       4203
045570  001012                          BNE     26$
045572  112764  000005  032464          MOVB    #5,WHY.DROPT(R4)        ; *,*(LUN)                                      4218
045600  104455                          TRAP    55                      ;                                               4219
045602  000015                          .WORD   15
```

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                                    ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                    ;       COMMAND INTEGRITY ROUTINE                        23-Oct-1980 14:57:05    PA:<
                                            .WORD   MSG1
                                            .WORD   0
                                            MOV     R4,R0                   ; LUN,*                                  4220
                                            TRAP    51
                                            BR      28$                     ;                                        4221
                                    26$:    CMP     R5,#3                   ; VALUE,*                                4203
                                            BNE     27$
                                            TRAP    55                      ;                                        4225
                                            .WORD   16
                                            .WORD   MSG1
                                            .WORD   0
                                            MOVB    #6,WHY.DROPT(R4)        ; *,*(LUN)                               4226
                                            MOV     R4,R0                   ; LUN,*                                  4227
                                            TRAP    51
                                            BR      28$                     ;                                        4228
                                    27$:    CMP     R5,#4                   ; VALUE,*                                4203
                                            BNE     29$
                                            JSR     PC,ISOLATE              ;                                        4232
                                            TRAP    55                      ;                                        4233
                                            .WORD   17
                                            .WORD   MSG2
                                            .WORD   0
                                            MOVB    #7,WHY.DROPT(R4)        ; *,*(LUN)                               4234
                                            MOV     R4,R0                   ; LUN,*                                  4235
                                            TRAP    51
                                    28$:    BR      36$                     ;                                        4236
                                    29$:    CMP     R5,#5                   ; VALUE,*                                4203
                                            BNE     36$
                                            JSR     PC,ISOLATE              ;                                        4240
                                            BIT     #1,ERROUT               ;                                        4241
                                            BEQ     30$
                                            MOV     @ML.REG+42,R0           ;                                        4242
                                            ASR     R0
                                            ASR     R0
                                            ASR     R0
                                            ASR     R0
                                            ASR     R0
                                            ASR     R0
                                            BIC     #177700,R0
                                            MOV     R0,-(SP)
                                            MOV     #FMT10B,-(SP)
                                            MOV     #2,-(SP)
                                            MOV     SP,R0                   ; SP,*
                                            TRAP    14
                                            ADD     #6,SP
                                    30$:    MOV     @ML.REG+44,44(SP)       ; *,OLDSEC                               4244
                                            MOV     @ML.REG+42,R0           ;                                        4245
                                            ASR     R0
                                            ASR     R0
                                            ASR     R0
                                            ASR     R0
                                            ASR     R0
```

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                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;       COMMAND INTEGRITY ROUTINE                        23-Oct-1980 14:57:05    PA:<

046022  006200                          ASR     R0
046024  042700  177700                  BIC     #177700,R0
046030  010066  000042                  MOV     R0,42(SP)               ; *,OLDCHN
046034  012746  000001                  MOV     #1,-(SP)                ;                                                4246
046040  012746  042622                  MOV     #CHECK,-(SP)                                                             \
046044  010446                          MOV     R4,-(SP)                ; LUN,*
046046  010346                          MOV     R3,-(SP)                ; WRDCNT,*
046050  012746  010706                  MOV     #WBUFF,-(SP)
046054  011246                          MOV     (R2),-(SP)
046056  004737  043046                  JSR     PC,RETRY
046062  062706  000014                  ADD     #14,SP
046066  020027  000005                  CMP     R0,#5
046072  001051                          BNE     33$
046074  027766  164330  000044          CMP     @ML.REG+44,44(SP)       ; *,OLDSEC                               4248
046102  001034                          BNE     32$
046104  016600  000042                  MOV     42(SP),R0               ; OLDCHN,*
046110  017702  164312                  MOV     @ML.REG+42,R2
046114  006202                          ASR     R2
046116  006202                          ASR     R2
046120  006202                          ASR     R2
046122  006202                          ASR     R2
046124  006202                          ASR     R2
046126  006202                          ASR     R2
046130  042702  177700                  BIC     #177700,R2
046134  020200                          CMP     R2,R0
046136  001016                          BNE     32$
046140  032737  000001  002260          BIT     #1,ERROUT               ;                                        4251
046146  001404                          BEQ     31$
046150  104456                          TRAP    56                      ;                                        4253
046152  000020                          .WORD   20
046154  010624                          .WORD   MSG4
046156  000000                          .WORD   0
046160  010446                  31$:    MOV     R4,-(SP)                ; LUN,*                                  4254
046162  013746  032360                  MOV     BOARD,-(SP)
046166  004737  035302                  JSR     PC,UP.HARD.COUNT
046172  000426                          BR      35$                     ;                                        4248
046174  032737  000001  002260  32$:    BIT     #1,ERROUT               ;                                        4258
046202  001415                          BEQ     34$
046204  104457                          TRAP    57                      ;                                        4260
046206  000021                          .WORD   21
046210  010610                          .WORD   MSG3
046212  000000                          .WORD   0
046214  000410                          BR      34$                     ;                                        4261
046216  032737  000001  002260  33$:    BIT     #1,ERROUT               ;                                        4265
046224  001404                          BEQ     34$
046226  104457                          TRAP    57                      ;                                        4267
046230  000022                          .WORD   22
046232  010610                          .WORD   MSG3
046234  000000                          .WORD   0
046236  010446                  34$:    MOV     R4,-(SP)                ; LUN,*                                  4268
046240  013746  032360                  MOV     BOARD,-(SP)
046244  004737  035430                  JSR     PC,UP.SOFT.COUNT
```

```
                                ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                ;               COMMAND INTEGRITY ROUTINE               23-Oct-1980 14:57:05    PA:<
                                
046250  022626          35$:    CMP     (SP)+,(SP)+             ;                                               4239
046252  062706  000026  36$:    ADD     #26,SP                  ;                                               4068
046256  005204          37$:    INC     R4                      ; LUN                                           4062
046260  020466  000020  38$:    CMP     R4,20(SP)               ; LUN,*
046264  002002                    BGE     39$
046266  000137  044150            JMP     2$
046272  005726          39$:    TST     (SP)+                   ;                                               4060
046274  005201                    INC     R1                      ; COMP.FLAG                                     4059
046276  020127  000001            CMP     R1,#1                   ; COMP.FLAG,*
046302  003002                    BGT     40$
046304  000137  044126            JMP     1$
046310  062706  000022  40$:    ADD     #22,SP                  ;                                               4010
046314  000207                    RTS     PC

                                ; Routine Size:  587 words
                                ; Maximum stack depth per invocation:  33 words
```

```
6668 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
6669 ;                DEFINITION OF OPTION 1                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (40)
6670 ;
6671 ;          4280  %SBTTL  'DEFINITION OF OPTION 1'
6672 ;          4281
6673 ;          4282  ROUTINE OPT1: NOVALUE =
6674 ;          4283  BEGIN  !* 1 *  START OF ROUTINE
6675 ;          4284
6676 ;          4285  !++
6677 ;          4286  !  ROUTINE:     OPT1
6678 ;          4287  !
6679 ;          4288  !  PURPOSE:     TO CHECK ADDRESSES USING DATA = SECTOR NUMBER.
6680 ;          4289  !               TRANSFERS ARE 4K WORDS IN LENGTH, AND ALL SECTORS
6681 ;          4290  !               ARE TESTED.
6682 ;          4291  !
6683 ;          4292  !  THE CODE FOR 'OPT1' IN BRIEF:
6684 ;          4293  !
6685 ;          4294  !  BEGIN 1 (START OF ROUTINE)
6686 ;          4295  !  SAY ROUTINE IS RUNNING
6687 ;          4296  !  INCR COMPLEMENT FLAG FROM 0 TO 1
6688 ;          4297  !  : BEGIN 2 (START OF COMPLEMENT FLAG SELECTION LOOP)
6689 ;          4298  !  : INCR LOGICAL UNIT FROM 0 TO LAST
6690 ;          4299  !  : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
6691 ;          4300  !  : : TESTLOOP:
6692 ;          4301  !  : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS ONE UNIT)
6693 ;          4302  !  : : : IF UNIT IS ACTIVE
6694 ;          4303  !  : : : THEN
6695 ;          4304  !  : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
6696 ;          4305  !  : : : : INITIALIZE WRITE AND READ BUFFER POINTERS
6697 ;          4306  !  : : : : SECTOR = LOWEST
6698 ;          4307  !  : : : : WHILE SECTOR LEQ HIGHEST DO
6699 ;          4308  !  : : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
6700 ;          4309  !  : : : : : GET WRDCNT
6701 ;          4310  !  : : : : : GENERATE THE PATTERN
6702 ;          4311  !  : : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
6703 ;          4312  !  : : : : : WRITE
6704 ;          4313  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
6705 ;          4314  !  : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
6706 ;          4315  !  : : : : : DO THE WRITE CHECK OR READ
6707 ;          4316  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
6708 ;          4317  !  : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
6709 ;          4318  !  : : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
6710 ;          4319  !  : : : : : END 6 (END OF SECTOR SELECTION LOOP)
6711 ;          4320  !  : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
6712 ;          4321  !  : : : END 4 (END OF TESTLOOP)
6713 ;          4322  !  : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
6714 ;          4323  !  : END 2 (END OF COMPLEMENT FLAG SELECTION LOOP)
6715 ;          4324  !  RETURN
6716 ;          4325  !  END 1 (END OF ROUTINE)
6717 ;          4326  !--
6718 ;          4327
6719 ;          4328  LABEL
6720 ;          4329     LOOP;
6721 ;          4330
6722 ;          4331  LOCAL
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                DEFINITION OF OPTION 1                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (40)

;          4332     VALUE, WRDCNT, COMMAND, PTR, OLDSEC, OLDCHN, SECTOR, DBL_VALUE;
;          4333
;          4334  PRINTB(SAY2,WRD34,RTN1);
;          4335     !'RUNNING OPT1'
;          4336
;          4337  INCR COMP_FLAG FROM 0 TO 1 DO
;          4338     BEGIN  !* 2 *  START OF COMPLEMENT FLAG SELECTION LOOP
;          4339     INCR LUN FROM 0 TO (.L$UNIT - 1) DO
;          4340        BEGIN  !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
;          4341        LOOP:
;          4342           BEGIN  !* 4 *  START OF THE LOOP THAT COMPLETELY TESTS ONE UNIT
;          4343           IF .DRIVE_STATUS[.LUN] EQL ACTIVE
;          4344           THEN
;          4345              BEGIN  !* 5 *  START OF TEST FOR AN ACTIVE UNIT
;          4346              L$LUN = .LUN;
;          4347              WPTR = WBUFF;
;          4348              RPTR = RBUFF;
;          4349              SECTOR = LOWEST;
;          4350              WHILE .SECTOR LEQ HIGHEST DO
;          4351                 BEGIN  !* 6 *  START OF SECTOR SELECTION LOOP
;          4352                 GEN1(.SECTOR,.COMP_FLAG);
;          4353                 WRDCNT = GET_WRDCNT(.SECTOR,HIGHEST);
;          4354                 SET_PTRS(.WRDCNT);
;          4355
;          4356                 VALUE = WRITE(.LUN,.WRDCNT,.WPTR,.SECTOR);
;          4357                 !+
;          4358                 !  SEE HOW SUCCESSFUL THE WRITE WAS:
;          4359                 !-
;          4360                 SELECTONE .VALUE OF        !SEE 'SYSERR' FOR DEFINITION
;          4361                    SET                     !OF ERROR # CONTAINED IN 'VALUE'
;          4362                 [1] :
;          4363                    BEGIN  !* 6A *          RETRY ALLOWED
;          4364                    IF RETRY(SIX,WRITE,.LUN,.WRDCNT,.WPTR,.SECTOR) NEQ 0
;          4365                    THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
;          4366                       BEGIN
;          4367                       WHY_DROPT[.LUN] = CODE_4;
;          4368                       ERRDF(101,MSG1,0);    !**** OPTION 1 ERROR 01 ****
;          4369                       DODU(.LUN);
;          4370                       LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4371                       END;
;          4372                    END;   !* 6A *
;          4373                 [2] :
;          4374                    BEGIN  !* 6B *          FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
;          4375                    WHY_DROPT[.LUN] = CODE_5;
;          4376                    ERRDF(102,MSG1,0);    !**** OPTION 1 ERROR 02 ****
;          4377                    DODU(.LUN);
;          4378                    LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4379                    END;   !* 6B *
;          4380                 [3] :
;          4381                    BEGIN  !* 6C *          FATAL DRIVE ERROR -- NO RETRY ALLOWED
;          4382                    ERRDF(103,MSG1,0);    !**** OPTION 1 ERROR 03 ****
;          4383                    WHY_DROPT[.LUN] = CODE_6;
```

```
6780 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
6781 ;                DEFINITION OF OPTION 1                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (40)
6782 ;
6783 ;          4384                 DODU(.LUN);
6784 ;          4385                 LEAVE LOOP;              !JUMP JUST BEYOND END OF BLOCK * 4 *
6785 ;          4386                 END;   !* 6C *
6786 ;          4387
6787 ;          4388                 TES;
6788 ;          4389
6789 ;          4390               COMMAND = CHOOSE();
6790 ;          4391               IF .COMMAND EQL READ
6791 ;          4392               THEN
6792 ;          4393                  BEGIN
6793 ;          4394                  PTR = .RPTR;
6794 ;          4395                  VALUE = READ(.LUN,.WRDCNT,.RPTR,.SECTOR);
6795 ;          4396                  END
6796 ;          4397               ELSE
6797 ;          4398                  BEGIN
6798 ;          4399                  PTR = .WPTR;
6799 ;          4400                  VALUE = CHECK(.LUN,.WRDCNT,.WPTR,.SECTOR);
6800 ;          4401                  END;
6801 ;          4402               !+
6802 ;          4403               !  SEE HOW SUCCESSFUL THE OPERATION WAS:
6803 ;          4404               !-
6804 ;          4405               SELECTONE .VALUE OF        !SEE 'SYSERR' FOR DEFINITION
6805 ;          4406                  SET                     !OF ERROR # CONTAINED IN 'VALUE'
6806 ;          4407               [0] :
6807 ;          4408                  IF .COMMAND EQL READ
6808 ;          4409                  THEN
6809 ;          4410                     BEGIN
6810 ;          4411                     IF (DBL_VALUE = DOUBLE_CHECK(.WPTR,.RPTR,.WRDCNT)) NEQ 0
6811 ;          4412                     THEN
6812 ;          4413                        BEGIN
6813 ;          4414                        SAYWHO(.LUN);
6814 ;          4415                        PRINTB(SAY1,MSG5);
6815 ;          4416                           !'ECC LOGIC FAILED TO DETECT DATA ERROR'
6816 ;          4417                        PRINTB(FMT12A,..DBL_VALUE,.DBL_VALUE);
6817 ;          4418                           !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
6818 ;          4419                        DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
6819 ;          4420                        PRINTB(FMT12B,..DBL_VALUE,.DBL_VALUE);
6820 ;          4421                           !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
6821 ;          4422                        WHY_DROPT[.LUN] = CODE_8;
6822 ;          4423                        ERRDF(104,MSG1,0);   !**** OPTION 1 ERROR 04 ****
6823 ;          4424                        DODU(.LUN);
6824 ;          4425                        LEAVE LOOP;      !JUMP JUST BEYOND END OF BLOCK * 4 *
6825 ;          4426                        END;
6826 ;          4427                     END;
6827 ;          4428               [1] :
6828 ;          4429                  BEGIN  !* 6D *         RETRY ALLOWED
6829 ;          4430                  IF RETRY(SIX,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) NEQ 0
6830 ;          4431                  THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
6831 ;          4432                     BEGIN
6832 ;          4433                     WHY_DROPT[.LUN] = CODE_4;
6833 ;          4434                     ERRDF(105,MSG1,0);   !**** OPTION 1 ERROR 05 ****
6834 ;          4435                     DODU(.LUN);
```

```
6836 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
6837 ;                DEFINITION OF OPTION 1                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (40)
6838
6839 ;          4436                    LEAVE LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
6840 ;          4437                    END;
6841 ;          4438                 END;   !* 6D *
6842 ;          4439              [2] :
6843 ;          4440                 BEGIN  !* 6E *         FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
6844 ;          4441                 WHY_DROPT[.LUN] = CODE_5;
6845 ;          4442                 ERRDF(106,MSG1,0);    !**** OPTION 1 ERROR 06 ****
6846 ;          4443                 DODU(.LUN);
6847 ;          4444                 LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
6848 ;          4445                 END;   !* 6E *
6849 ;          4446              [3] :
6850 ;          4447                 BEGIN  !* 6F *         FATAL DRIVE ERROR -- NO RETRY ALLOWED
6851 ;          4448                 WHY_DROPT[.LUN] = CODE_6;
6852 ;          4449                 ERRDF(107,MSG1,0);    !**** OPTION 1 ERROR 07 ****
6853 ;          4450                 DODU(.LUN);
6854 ;          4451                 LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
6855 ;          4452                 END;   !* 6F *
6856 ;          4453              [4] :
6857 ;          4454                 BEGIN  !* 6G *         UNRECOVERABLE DATA ERROR
6858 ;          4455                 ISOLATE();
6859 ;          4456                 ERRDF(108,MSG2,0);    !**** OPTION 1 ERROR 08 ****
6860 ;          4457                 WHY_DROPT[.LUN] = CODE_7;
6861 ;          4458                 DODU(.LUN);
6862 ;          4459                 LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
6863 ;          4460                 END;   !* 6G *
6864 ;          4461              [5] :
6865 ;          4462                 BEGIN  !* 6H *         RECOVERABLE DATA ERROR
6866 ;          4463                 ISOLATE();
6867 ;          4464                 IF .ERROUT
6868 ;          4465                 THEN  PRINTB(FMT10B,.CHAN);
6869 ;          4466                             !'    BIT QQ'
6870 ;          4467                 OLDSEC = .MLEL;
6871 ;          4468                 OLDCHN = .CHAN;
6872 ;          4469                 IF RETRY(ONE,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) EQL 5
6873 ;          4470                 THEN
6874 ;          4471                    IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
6875 ;          4472                    THEN
6876 ;          4473                       BEGIN
6877 ;          4474                       IF .ERROUT
6878 ;          4475                       THEN
6879 ;          4476                       ERRHRD(109,MSG4,0);  !**** OPTION 1 ERROR 09 ****
6880 ;          4477                       UP_HARD_COUNT(.LUN,.BOARD);
6881 ;          4478                       END
6882 ;          4479                    ELSE
6883 ;          4480                       BEGIN
6884 ;          4481                       IF .ERROUT
6885 ;          4482                       THEN
6886 ;          4483                       ERRSOFT(110,MSG3,0); !**** OPTION 1 ERROR 10 ****
6887 ;          4484                       UP_SOFT_COUNT(.LUN,.BOARD);
6888 ;          4485                       END
6889 ;          4486                 ELSE
6890 ;          4487                    BEGIN
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                DEFINITION OF OPTION 1                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (40)

;          4488                     IF .ERROUT
;          4489                     THEN
;          4490                     ERRSOFT(111,MSG3,0); !**** OPTION 1 ERROR 11 ****
;          4491                     UP_SOFT_COUNT(.LUN,.BOARD);
;          4492                     END;
;          4493                 END;   !* 6H *
;          4494
;          4495                 TES;
;          4496
;          4497             WPTR = .WPTR + (.WRDCNT * 2);
;          4498             SECTOR = .SECTOR + (.WRDCNT/256);
;          4499             END;   !* 6 *  END OF SECTOR SELECTION LOOP
;          4500         END;   !* 5 *  END OF TEST FOR AN ACTIVE UNIT
;          4501     END;   !* 4 *  END OF LOOP THAT COMPLETELY TESTS ONE UNIT
;          4502 END;   !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
;          4503 END;   !* 2 *  END OF COMPLEMENT FLAG SELECTION LOOP
;          4504 RETURN;
;          4505 END;   !* 1 *  END OF ROUTINE

                                    .SBTTL  OPT1 DEFINITION OF OPTION 1
046316  004137  005222      OPT1:   JSR     R1,$SAVE5                       ;                       4282
046322  162706  000020              SUB     #20,SP
046326  012746  007250              MOV     #RTN1,-(SP)                     ;                       4334
046332  012746  006766              MOV     #WRD34,-(SP)
046336  012746  006522              MOV     #SAY2,-(SP)
046342  012746  000003              MOV     #3,-(SP)
046346  010600                      MOV     SP,R0                           ; SP,*
046350  104414                      TRAP    14
046352  005066  000026              CLR     26(SP)                          ; COMP.FLAG             4337
046356  013766  002012  000012  1$: MOV     L$UNIT,12(SP)                   ;                       4339
046364  005066  000010              CLR     10(SP)                          ; LUN
046370  000137  050170              JMP     29$
046374  016600  000010          2$: MOV     10(SP),R0                       ; LUN,*                 4343
046400  006200                      ASR     R0
046402  006200                      ASR     R0
046404  006200                      ASR     R0
046406  062700  032460              ADD     #DRIVE.STATUS,R0
046412  010046                      MOV     R0,-(SP)
046414  016646  000012              MOV     12(SP),-(SP)                    ; LUN,*
046420  042716  177770              BIC     #177770,(SP)
046424  012746  000001              MOV     #1,-(SP)
046430  005046                      CLR     -(SP)
046432  004737  004244              JSR     PC,BL$GT2
046436  062706  000010              ADD     #10,SP
046442  005300                      DEC     R0
046444  001150                      BNE     7$
```

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                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;       DEFINITION OF OPTION 1                           23-Oct-1980 14:57:05    PA:<
                                
046446  016637  000010  002074          MOV     10(SP),L$LUN            ; LUN,*                                  4346
046454  012737  010706  030706          MOV     #WBUFF,WPTR             ;                                        4347
046462  012737  020706  030710          MOV     #RBUFF,RPTR             ;                                        4348
046470  016601  000010                  MOV     10(SP),R1               ; LUN,*                                  4349
046474  006301                          ASL     R1
046476  016105  032476                  MOV     LOW.SECT(R1),R5         ; *,SECTOR
046502  020561  032516          3$:     CMP     R5,TOP.SECT(R1)         ; SECTOR,*                               4350
046506  003127                          BGT     7$
046510  010546                          MOV     R5,-(SP)                ; SECTOR,*                               4352
046512  016646  000030                  MOV     30(SP),-(SP)            ; COMP.FLAG,*
046516  004737  036014                  JSR     PC,GEN1
046522  010516                          MOV     R5,(SP)                 ; SECTOR,*                               4353
046524  016146  032516                  MOV     TOP.SECT(R1),-(SP)
046530  004737  044034                  JSR     PC,GET.WRDCNT
046534  010003                          MOV     R0,R3                   ; *,WRDCNT
046536  010316                          MOV     R3,(SP)                 ; WRDCNT,*                               4354
046540  004737  043770                  JSR     PC,SET.PTRS
046544  016616  000016                  MOV     16(SP),(SP)             ; LUN,*                                  4356
046550  010346                          MOV     R3,-(SP)                ; WRDCNT,*
046552  013746  030706                  MOV     WPTR,-(SP)
046556  010546                          MOV     R5,-(SP)                ; SECTOR,*
046560  004737  042246                  JSR     PC,WRITE
046564  010004                          MOV     R0,R4                   ; *,VALUE
046566  020427  000001                  CMP     R4,#1                   ; VALUE,*                                4360
046572  001035                          BNE     4$
046574  012746  000006                  MOV     #6,-(SP)                ;                                        4364
046600  012746  042246                  MOV     #WRITE,-(SP)
046604  016646  000030                  MOV     30(SP),-(SP)            ; LUN,*
046610  010346                          MOV     R3,-(SP)                ; WRDCNT,*
046612  013746  030706                  MOV     WPTR,-(SP)
046616  010546                          MOV     R5,-(SP)                ; SECTOR,*
046620  004737  043046                  JSR     PC,RETRY
046624  062706  000014                  ADD     #14,SP
046630  005700                          TST     R0
046632  001456                          BEQ     8$
046634  016602  000024                  MOV     24(SP),R2               ; LUN,*                                  4367
046640  112762  000004  032464          MOVB    #4,WHY.DROPT(R2)
046646  104455                          TRAP    55                      ;                                        4368
046650  000145                          .WORD   145
046652  010512                          .WORD   MSG1
046654  000000                          .WORD   0
046656  016600  000024                  MOV     24(SP),R0               ; LUN,*                                  4369
046662  104451                          TRAP    51
046664  000436                          BR      6$                      ;                                        4370
046666  020427  000002          4$:     CMP     R4,#2                   ; VALUE,*                                4360
046672  001015                          BNE     5$
046674  016602  000024                  MOV     24(SP),R2               ; LUN,*                                  4375
046700  112762  000005  032464          MOVB    #5,WHY.DROPT(R2)
046706  104455                          TRAP    55                      ;                                        4376
046710  000146                          .WORD   146
046712  010512                          .WORD   MSG1
046714  000000                          .WORD   0
```

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                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 1                  23-Oct-1980 14:57:05    PA:<

046716  016600  000024                          MOV     24(SP),R0               ; LUN,*                                 4377
046722  104451                                  TRAP    51
046724  000416                                  BR      6$                      ;                                       4378
046726  020427  000003                  5$:     CMP     R4,#3                   ; VALUE,*                               4360
046732  001016                                  BNE     8$
046734  104455                                  TRAP    55                      ;                                       4382
046736  000147                                  .WORD   147
046740  010512                                  .WORD   MSG1
046742  000000                                  .WORD   0
046744  016602  000024                          MOV     24(SP),R2               ; LUN,*                                 4383
046750  112762  000006  032464                  MOVB    #6,WHY.DROPT(R2)
046756  010200                                  MOV     R2,R0                   ; LUN,*                                 4384
046760  104451                                  TRAP    51
046762  062706  000014                  6$:     ADD     #14,SP                  ;                                       4385
046766  000543                          7$:     BR      13$
046770  004737  043010                  8$:     JSR     PC,CHOOSE               ;                                       4390
046774  010066  000034                          MOV     R0,34(SP)               ; *,COMMAND
047000  005002                                  CLR     R2                      ;                                       4391
047002  020027  042434                          CMP     R0,#READ                ; COMMAND,*
047006  001015                                  BNE     9$
047010  005202                                  INC     R2
047012  013766  030710  000036                  MOV     RPTR,36(SP)             ; *,PTR                                 4394
047020  016646  000024                          MOV     24(SP),-(SP)            ; LUN,*                                 4395
047024  010346                                  MOV     R3,-(SP)                ; WRDCNT,*
047026  013746  030710                          MOV     RPTR,-(SP)
047032  010546                                  MOV     R5,-(SP)                ; SECTOR,*
047034  004737  042434                          JSR     PC,READ
047040  000413                                  BR      10$
047042  013766  030706  000036          9$:     MOV     WPTR,36(SP)             ; *,PTR                                 4399
047050  016646  000024                          MOV     24(SP),-(SP)            ; LUN,*                                 4400
047054  010346                                  MOV     R3,-(SP)                ; WRDCNT,*
047056  013746  030706                          MOV     WPTR,-(SP)
047062  010546                                  MOV     R5,-(SP)                ; SECTOR,*
047064  004737  042622                          JSR     PC,CHECK
047070  010004                          10$:    MOV     R0,R4                   ; *,VALUE
047072  001102                                  BNE     14$                     ;                                       4405
047074  006002                                  ROR     R2                      ;                                       4408
047076  103402                                  BLO     12$
047100  000137  050122                  11$:    JMP     27$
047104  013746  030706                  12$:    MOV     WPTR,-(SP)              ;                                       4411
047110  013746  030710                          MOV     RPTR,-(SP)
047114  010346                                  MOV     R3,-(SP)                ; WRDCNT,*
047116  004737  041226                          JSR     PC,DOUBLE.CHECK
047122  062706  000006                          ADD     #6,SP
047126  010066  000050                          MOV     R0,50(SP)               ; *,DBL.VALUE
047132  001762                                  BEQ     11$
047134  016646  000034                          MOV     34(SP),-(SP)            ; LUN,*                                 4414
047140  004737  033436                          JSR     PC,SAYWHO
047144  012716  010640                          MOV     #MSG5,(SP)              ;                                       4415
047150  012746  006514                          MOV     #SAY1,-(SP)
047154  012746  000002                          MOV     #2,-(SP)
047160  010600                                  MOV     SP,R0                   ; SP,*
```

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                                ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                ;       DEFINITION OF OPTION 1                           23-Oct-1980 14:57:05    PA:<

047162  104414                          TRAP    14
047164  016616  000056                  MOV     56(SP),(SP)             ; DBL.VALUE,*                           4417
047170  017646  000056                  MOV     @56(SP),-(SP)           ; DBL.VALUE,*
047174  012746  006332                  MOV     #FMT12A,-(SP)
047200  012746  000003                  MOV     #3,-(SP)
047204  010600                          MOV     SP,R0                   ; SP,*
047206  104414                          TRAP    14
047210  062766  010000  000064          ADD     #10000,64(SP)           ; *,DBL.VALUE                           4419
047216  016616  000064                  MOV     64(SP),(SP)             ; DBL.VALUE,*                           4420
047222  017646  000064                  MOV     @64(SP),-(SP)           ; DBL.VALUE,*
047226  012746  006400                  MOV     #FMT12B,-(SP)
047232  012746  000003                  MOV     #3,-(SP)
047236  010600                          MOV     SP,R0                   ; SP,*
047240  104414                          TRAP    14
047242  016602  000056                  MOV     56(SP),R2               ; LUN,*                                 4422
047246  112762  000010  032464          MOVB    #10,WHY.DROPT(R2)
047254  104455                          TRAP    55                      ;                                       4423
047256  000150                          .WORD   150
047260  010512                          .WORD   MSG1
047262  000000                          .WORD   0
047264  016600  000056                  MOV     56(SP),R0               ; LUN,*                                 4424
047270  104451                          TRAP    51
047272  062706  000046                  ADD     #46,SP                  ;                                       4425
047276  000522                  13$:    BR      19$
047300  020427  000001          14$:    CMP     R4,#1                   ; VALUE,*                               4405
047304  001035                          BNE     15$
047306  012746  000006                  MOV     #6,-(SP)                ;                                       4430
047312  016646  000046                  MOV     46(SP),-(SP)            ; COMMAND,*
047316  016646  000040                  MOV     40(SP),-(SP)            ; LUN,*
047322  010346                          MOV     R3,-(SP)                ; WRDCNT,*
047324  016646  000056                  MOV     56(SP),-(SP)            ; PTR,*
047330  010546                          MOV     R5,-(SP)                ; SECTOR,*
047332  004737  043046                  JSR     PC,RETRY
047336  062706  000014                  ADD     #14,SP
047342  005700                          TST     R0
047344  001655                          BEQ     11$
047346  016602  000034                  MOV     34(SP),R2               ; LUN,*                                 4433
047352  112762  000004  032464          MOVB    #4,WHY.DROPT(R2)
047360  104455                          TRAP    55                      ;                                       4434
047362  000151                          .WORD   151
047364  010512                          .WORD   MSG1
047366  000000                          .WORD   0
047370  016600  000034                  MOV     34(SP),R0               ; LUN,*                                 4435
047374  104451                          TRAP    51
047376  000460                          BR      18$                     ;                                       4436
047400  020427  000002          15$:    CMP     R4,#2                   ; VALUE,*                               4405
047404  001015                          BNE     16$
047406  016602  000034                  MOV     34(SP),R2               ; LUN,*                                 4441
047412  112762  000005  032464          MOVB    #5,WHY.DROPT(R2)
047420  104455                          TRAP    55                      ;                                       4442
047422  000152                          .WORD   152
047424  010512                          .WORD   MSG1
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 1                   23-Oct-1980 14:57:05    PA:<

                                .WORD   0
000034                          MOV     34(SP),R0       ; LUN,*                                                  4443
                                TRAP    51
                                BR      18$             ;                                                        4444
000003                  16$:    CMP     R4,#3           ; VALUE,*                                                4405
                                BNE     17$
000034                          MOV     34(SP),R2       ; LUN,*                                                  4448
000006  032464                  MOVB    #6,WHY.DROPT(R2)
                                TRAP    55              ;                                                        4449
                                .WORD   153
                                .WORD   MSG1
                                .WORD   0
000034                          MOV     34(SP),R0       ; LUN,*                                                  4450
                                TRAP    51
                                BR      18$             ;                                                        4451
000004                  17$:    CMP     R4,#4           ; VALUE,*                                                4405
                                BNE     20$
035212                          JSR     PC,ISOLATE      ;                                                        4455
                                TRAP    55              ;                                                        4456
                                .WORD   154
                                .WORD   MSG2
                                .WORD   0
000034                          MOV     34(SP),R2       ; LUN,*                                                  4457
000007  032464                  MOVB    #7,WHY.DROPT(R2)
                                MOV     R2,R0           ; LUN,*                                                  4458
                                TRAP    51
000024                  18$:    ADD     #24,SP          ;                                                        4459
000137  050164          19$:    JMP     28$
000005                  20$:    CMP     R4,#5           ; VALUE,*                                                4405
                                BNE     27$
035212                          JSR     PC,ISOLATE      ;                                                        4463
000001  002260                  BIT     #1,ERROUT       ;                                                        4464
                                BEQ     21$
162630                          MOV     @ML.REG+42,R2   ;                                                        4465
                                ASR     R2
                                ASR     R2
                                ASR     R2
                                ASR     R2
                                ASR     R2
                                ASR     R2
177700                          BIC     #177700,R2
                                MOV     R2,-(SP)
006262                          MOV     #FMT10B,-(SP)
000002                          MOV     #2,-(SP)
                                MOV     SP,R0           ; SP,*
                                TRAP    14
000006                          ADD     #6,SP
162564  000040          21$:    MOV     @ML.REG+44,40(SP)       ; *,OLDSEC                               4467
162554                          MOV     @ML.REG+42,R2   ;                                                        4468
                                ASR     R2
                                ASR     R2
                                ASR     R2
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;       DEFINITION OF OPTION 1                           23-Oct-1980 14:57:05    PA:<
                                                ASR     R2
                                                ASR     R2
                                                ASR     R2
                                                BIC     #177700,R2
                                                MOV     R2,42(SP)               ; *,OLDCHN
                                                MOV     #1,-(SP)                ;                                                4469
                                                MOV     46(SP),-(SP)            ; COMMAND,*
                                                MOV     40(SP),-(SP)            ; LUN,*
                                                MOV     R3,-(SP)                ; WRDCNT,*
                                                MOV     56(SP),-(SP)            ; PTR,*
                                                MOV     R5,-(SP)                ; SECTOR,*
                                                JSR     PC,RETRY
                                                ADD     #14,SP
                                                CMP     R0,#5
                                                BNE     24$
                                                CMP     @ML.REG+44,40(SP)       ; *,OLDSEC                                       4471
                                                BNE     23$
                                                MOV     42(SP),R0               ; OLDCHN,*
                                                MOV     @ML.REG+42,R2
                                                ASR     R2
                                                ASR     R2
                                                ASR     R2
                                                ASR     R2
                                                ASR     R2
                                                ASR     R2
                                                BIC     #177700,R2
                                                CMP     R2,R0
                                                BNE     23$
                                                BIT     #1,ERROUT               ;                                                4474
                                                BEQ     22$
                                                TRAP    56                      ;                                                4476
                                                .WORD   155
                                                .WORD   MSG4
                                                .WORD   0
                                22$:            MOV     34(SP),-(SP)            ; LUN,*                                          4477
                                                MOV     BOARD,-(SP)
                                                JSR     PC,UP.HARD.COUNT
                                                BR      26$                     ;                                                4471
                                23$:            BIT     #1,ERROUT               ;                                                4481
                                                BEQ     25$
                                                TRAP    57                      ;                                                4483
                                                .WORD   156
                                                .WORD   MSG3
                                                .WORD   0
                                                BR      25$                     ;                                                4484
                                24$:            BIT     #1,ERROUT               ;                                                4488
                                                BEQ     25$
                                                TRAP    57                      ;                                                4490
                                                .WORD   157
                                                .WORD   MSG3
                                                .WORD   0
                                25$:            MOV     34(SP),-(SP)            ; LUN,*                                          4491
```

```
                                ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                ;                DEFINITION OF OPTION 1                 23-Oct-1980 14:57:05    PA:<

050110  013746  032360                MOV     BOARD,-(SP)
050114  004737  035430                JSR     PC,UP.SOFT.COUNT
050120  022626                26$:    CMP     (SP)+,(SP)+             ;                                       4462
050122  010300                27$:    MOV     R3,R0                   ; WRDCNT,*                              4497
050124  006300                        ASL     R0
050126  063700  030706                ADD     WPTR,R0
050132  010037  030706                MOV     R0,WPTR
050136  010316                        MOV     R3,(SP)                 ; WRDCNT,*                              4498
050140  012746  000400                MOV     #400,-(SP)
050144  004737  005056                JSR     PC,BL$DIV
050150  060500                        ADD     R5,R0                   ; SECTOR,*
050152  010005                        MOV     R0,R5                   ; *,SECTOR
050154  062706  000026                ADD     #26,SP                  ;                                       4351
050160  000137  046502                JMP     3$                      ;                                       4350
050164  005266  000010        28$:    INC     10(SP)                  ; LUN                                   4339
050170  026666  000010  000012  29$:  CMP     10(SP),12(SP)           ; LUN,*
050176  002002                        BGE     30$
050200  000137  046374                JMP     2$
050204  005266  000026        30$:    INC     26(SP)                  ; COMP.FLAG                             4337
050210  026627  000026  000001        CMP     26(SP),#1               ; COMP.FLAG,*
050216  003002                        BGT     31$
050220  000137  046356                JMP     1$
050224  062706  000030        31$:    ADD     #30,SP                  ;                                       4282
050230  000207                        RTS     PC

                                ; Routine Size:  486 words
                                ; Maximum stack depth per invocation:  37 words
```

```
7265 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
7266 ;                DEFINITION OF OPTION 2                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (41)
7267
7268 ;          4506  %SBTTL  'DEFINITION OF OPTION 2'
7269 ;          4507
7270 ;          4508  ROUTINE OPT2: NOVALUE =
7271 ;          4509  BEGIN  !* 1 *  START OF ROUTINE
7272 ;          4510
7273 ;          4511  !++
7274 ;          4512  !  ROUTINE:     OPT2
7275 ;          4513  !
7276 ;          4514  !  PURPOSE:     TO CHECK ON DATA RELIABILITY USING THE PATTERNS FROM
7277 ;          4515  !               THE PATTERN TABLE.
7278 ;          4516  !
7279 ;          4517  !  THE CODE FOR 'OPT2' IN BRIEF:
7280 ;          4518  !
7281 ;          4519  !  BEGIN 1 (START OF ROUTINE)
7282 ;          4520  !  SAY THE ROUTINE IS RUNNING
7283 ;          4521  !  CHOOSE A MAXIMUM PATTERN NUMBER
7284 ;          4522  !  INCR COUNT FROM 1 TO (2*MAX)
7285 ;          4523  !  : BEGIN 2 (START OF PATTERN SELECTION LOOP)
7286 ;          4524  !  : GENERATE THE PATTERN
7287 ;          4525  !  : INCR LUN FROM 0 TO LAST
7288 ;          4526  !  : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
7289 ;          4527  !  : : TESTLOOP:
7290 ;          4528  !  : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
7291 ;          4529  !  : : : IF UNIT IS ACTIVE
7292 ;          4530  !  : : : THEN
7293 ;          4531  !  : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
7294 ;          4532  !  : : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
7295 ;          4533  !  : : : : SECTOR = LOWEST
7296 ;          4534  !  : : : : WHILE SECTOR LEQ HIGHEST DO
7297 ;          4535  !  : : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
7298 ;          4536  !  : : : : : GET_WRDCNT
7299 ;          4537  !  : : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
7300 ;          4538  !  : : : : : WRITE
7301 ;          4539  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
7302 ;          4540  !  : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
7303 ;          4541  !  : : : : : DO THE WRITE CHECK OR READ
7304 ;          4542  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
7305 ;          4543  !  : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
7306 ;          4544  !  : : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
7307 ;          4545  !  : : : : : END 6 (END OF SECTOR SELECTION LOOP)
7308 ;          4546  !  : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
7309 ;          4547  !  : : : END 4 (END OF TESTLOOP)
7310 ;          4548  !  : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
7311 ;          4549  !  : IF NOT THE QUICK VERIFY PASS THEN 'LOOP READ' (DESCRIBED BELOW)
7312 ;          4550  !  : END 2 (END OF PATTERN SELECTION LOOP)
7313 ;          4551  !  RETURN
7314 ;          4552  !  END 1 (END OF ROUTINE)
7315 ;          4553  !--
7316 ;          4554
7317 ;          4555  LABEL
7318 ;          4556     LOOP, LOOP2;
7319 ;          4557
```

```
7321 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
7322 ;                DEFINITION OF OPTION 2                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (41)
7323 ;
7324 ;          4558  LOCAL
7325 ;          4559     WRDCNT, VALUE, TEMP, MAXPAT, OLDSEC, OLDCHN, SECTOR,
7326 ;          4560     PTR, COMMAND, DBL_VALUE;
7327 ;          4561
7328 ;          4562  PRINTB(SAY2,WRD34,RTN2);
7329 ;          4563     !'RUNNING OPT2'
7330 ;          4564
7331 ;          4565  PATTERN = 0;
7332 ;          4566
7333 ;          4567  IF .QUICK NEQ 0
7334 ;          4568  THEN  MAXPAT = 1
7335 ;          4569  ELSE  MAXPAT = NUM_PATS;
7336 ;          4570
7337 ;          4571  INCR COUNT FROM 1 TO (.MAXPAT*2) DO
7338 ;          4572     BEGIN  !* 2 *  START OF PATTERN SELECTION LOOP
7339 ;          4573     SELPAT();
7340 ;          4574     IF .PATTERN GTR 0
7341 ;          4575     THEN
7342 ;          4576        PRINTB(FMT1A,PHR9,.PATTERN)
7343 ;          4577           !'PATTERN NUMBER   XX'
7344 ;          4578     ELSE
7345 ;          4579        BEGIN
7346 ;          4580        TEMP = -(.PATTERN);
7347 ;          4581        PRINTB(FMT1B,PHR9,.TEMP);
7348 ;          4582           !'       PATTERN NUMBER - XX'
7349 ;          4583        END;
7350 ;          4584     GEN2(.PATTERN);
7351 ;          4585     INCR LUN FROM 0 TO (.L$UNIT - 1) DO
7352 ;          4586        BEGIN  !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
7353 ;          4587        LOOP:
7354 ;          4588           BEGIN  !* 4 *  START OF THE LOOP THAT COMPLETELY TESTS 1 UNIT
7355 ;          4589           IF .DRIVE_STATUS[.LUN] EQL ACTIVE
7356 ;          4590           THEN
7357 ;          4591              BEGIN  !* 5 *  START OF TEST FOR AN ACTIVE UNIT
7358 ;          4592              L$LUN = .LUN;
7359 ;          4593              WPTR = WBUFF;
7360 ;          4594              RPTR = RBUFF;
7361 ;          4595              SECTOR = LOWEST;
7362 ;          4596              WHILE .SECTOR LEQ HIGHEST DO
7363 ;          4597                 BEGIN  !* 6 *  START OF SECTOR SELECTION LOOP
7364 ;          4598                 WRDCNT = GET_WRDCNT(.SECTOR,HIGHEST);
7365 ;          4599                 SET_PTRS(.WRDCNT);
7366 ;          4600
7367 ;          4601                 VALUE = WRITE(.LUN,.WRDCNT,.WPTR,.SECTOR);
7368 ;          4602                 !+
7369 ;          4603                 !  SEE HOW SUCCESSFUL THE WRITE WAS:
7370 ;          4604                 !-
7371 ;          4605                 SELECTONE .VALUE OF       !SEE 'SYSERR' FOR DEFINITION
7372 ;          4606                    SET                    !OF ERROR # CONTAINED IN 'VALUE'
7373 ;          4607                    [1] :
7374 ;          4608                       BEGIN  !* 6A *         RETRY ALLOWED
7375 ;          4609                       IF RETRY(SIX,WRITE,.LUN,.WRDCNT,.WPTR,.SECTOR) NEQ 0
```

```
7377 ;MLX4
7378 ;                  DEFINITION OF OPTION 2
7379
7380 ;          4610                    THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
7381 ;          4611                       BEGIN
7382 ;          4612                       WHY_DROPT[.LUN] = CODE_4;
7383 ;          4613                       ERRDF(201,MSG1,0);   !**** OPTION 2 ERROR 01 ****
7384 ;          4614                       DODU(.LUN);
7385 ;          4615                       LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 4 *
7386 ;          4616                       END;
7387 ;          4617                    END;   !* 6A *
7388 ;          4618                 [2] :
7389 ;          4619                    BEGIN  !* 6B *          FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
7390 ;          4620                    WHY_DROPT[.LUN] = CODE_5;
7391 ;          4621                    ERRDF(202,MSG1,0);   !**** OPTION 2 ERROR 02 ****
7392 ;          4622                    DODU(.LUN);
7393 ;          4623                    LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 4 *
7394 ;          4624                    END;   !* 6B *
7395 ;          4625                 [3] :
7396 ;          4626                    BEGIN  !* 6C *          FATAL DRIVE ERROR -- NO RETRY ALLOWED
7397 ;          4627                    ERRDF(203,MSG1,0);   !**** OPTION 2 ERROR 03 ****
7398 ;          4628                    WHY_DROPT[.LUN] = CODE_6;
7399 ;          4629                    DODU(.LUN);
7400 ;          4630                    LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 4 *
7401 ;          4631                    END;   !* 6C *
7402 ;          4632
7403 ;          4633                    TES;
7404 ;          4634
7405 ;          4635                 COMMAND = CHOOSE();
7406 ;          4636                 IF .COMMAND EQL READ
7407 ;          4637                 THEN
7408 ;          4638                    BEGIN
7409 ;          4639                    PTR = .RPTR;
7410 ;          4640                    VALUE = READ(.LUN,.WRDCNT,.RPTR,.SECTOR);
7411 ;          4641                    END
7412 ;          4642                 ELSE
7413 ;          4643                    BEGIN
7414 ;          4644                    PTR = .WPTR;
7415 ;          4645                    VALUE = CHECK(.LUN,.WRDCNT,.WPTR,.SECTOR);
7416 ;          4646                    END;
7417 ;          4647                 !+
7418 ;          4648                 !  SEE HOW SUCCESSFUL THE OPERATION WAS:
7419 ;          4649                 !-
7420 ;          4650                 SELECTONE .VALUE OF       !SEE 'SYSERR' FOR DEFINITION
7421 ;          4651                    SET                    !OF ERROR # CONTAINED IN 'VALUE'
7422 ;          4652                 [0] :
7423 ;          4653                    IF .COMMAND EQL READ
7424 ;          4654                    THEN
7425 ;          4655                       BEGIN
7426 ;          4656                       IF (DBL_VALUE = DOUBLE_CHECK(.WPTR,.RPTR,.WRDCNT)) NEQ 0
7427 ;          4657                       THEN
7428 ;          4658                          BEGIN
7429 ;          4659                          SAYWHO(.LUN);
7430 ;          4660                          PRINTB(SAY1,MSG5);
7431 ;          4661                             !'ECC LOGIC FAILED TO DETECT DATA ERROR'
```

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;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                DEFINITION OF OPTION 2                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (41)

;          4662                         PRINTB(FMT12A,..DBL_VALUE,.DBL_VALUE);
;          4663                            !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
;          4664                         DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
;          4665                         PRINTB(FMT12B,..DBL_VALUE,.DBL_VALUE);
;          4666                            !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
;          4667                         WHY_DROPT[.LUN] = CODE_8;
;          4668                         ERRDF(204,MSG1,0);   !**** OPTION 2 ERROR 04 ****
;          4669                         DODU(.LUN);
;          4670                         LEAVE LOOP;      !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4671                         END;
;          4672                      END;
;          4673                   [1] :
;          4674                      BEGIN  !* 6D *         RETRY ALLOWED
;          4675                      IF RETRY(SIX,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) NEQ 0
;          4676                      THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
;          4677                         BEGIN
;          4678                         WHY_DROPT[.LUN] = CODE_4;
;          4679                         ERRDF(205,MSG1,0);   !**** OPTION 2 ERROR 05 ****
;          4680                         DODU(.LUN);
;          4681                         LEAVE LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4682                         END;
;          4683                      END;   !* 6D *
;          4684                   [2] :
;          4685                      BEGIN  !* 6E *         FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
;          4686                      WHY_DROPT[.LUN] = CODE_5;
;          4687                      ERRDF(206,MSG1,0);   !**** OPTION 2 ERROR 06 ****
;          4688                      DODU(.LUN);
;          4689                      LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4690                      END;   !* 6E *
;          4691                   [3] :
;          4692                      BEGIN  !* 6F *         FATAL DRIVE ERROR -- NO RETRY ALLOWED
;          4693                      ERRDF(207,MSG1,0);   !**** OPTION 2 ERROR 07 ****
;          4694                      WHY_DROPT[.LUN] = CODE_6;
;          4695                      DODU(.LUN);
;          4696                      LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4697                      END;   !* 6F *
;          4698                   [4] :
;          4699                      BEGIN  !* 6G *         UNRECOVERABLE DATA ERROR
;          4700                      ISOLATE();
;          4701                      ERRDF(208,MSG2,0);   !**** OPTION 2 ERROR 08 ****
;          4702                      WHY_DROPT[.LUN] = CODE_7;
;          4703                      DODU(.LUN);
;          4704                      LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4705                      END;   !* 6G *
;          4706                   [5] :
;          4707                      BEGIN  !* 6H *         RECOVERABLE DATA ERROR
;          4708                      ISOLATE();
;          4709                      IF .ERROUT
;          4710                      THEN  PRINTB(FMT10B,.CHAN);
;          4711                               !'    BIT QQ'
;          4712                      OLDSEC = .MLEL;
;          4713                      OLDCHN = .CHAN;
```

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7489 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
7490 ;                DEFINITION OF OPTION 2                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (41)
7491
7492 ;          4714                    IF RETRY(ONE,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) EQL 5
7493 ;          4715                    THEN
7494 ;          4716                       IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
7495 ;          4717                       THEN
7496 ;          4718                          BEGIN
7497 ;          4719                          IF .ERROUT
7498 ;          4720                          THEN
7499 ;          4721                          ERRHRD(209,MSG4,0);  !**** OPTION 2 ERROR 09 ****
7500 ;          4722                          UP_HARD_COUNT(.LUN,.BOARD);
7501 ;          4723                          END
7502 ;          4724                       ELSE
7503 ;          4725                          BEGIN
7504 ;          4726                          IF .ERROUT
7505 ;          4727                          THEN
7506 ;          4728                          ERRSOFT(210,MSG3,0); !**** OPTION 2 ERROR 10 ****
7507 ;          4729                          UP_SOFT_COUNT(.LUN,.BOARD);
7508 ;          4730                          END
7509 ;          4731                    ELSE
7510 ;          4732                       BEGIN
7511 ;          4733                       IF .ERROUT
7512 ;          4734                       THEN
7513 ;          4735                       ERRSOFT(211,MSG3,0); !**** OPTION 2 ERROR 11 ****
7514 ;          4736                       UP_SOFT_COUNT(.LUN..BOARD);
7515 ;          4737                       END;
7516 ;          4738                    END;   !* 6H *
7517 ;          4739
7518 ;          4740                    TES;
7519 ;          4741
7520 ;          4742                 WPTR = .WPTR + (.WRDCNT * 2);
7521 ;          4743                 SECTOR = .SECTOR + (.WRDCNT/256);
7522 ;          4744
7523 ;          4745                 END;   !* 6 *  END OF SECTOR SELECTION LOOP
7524 ;          4746              END;   !* 5 *  END OF TEST FOR AN ACTIVE UNIT
7525 ;          4747           END;   !* 4 *  END OF TESTLOOP
7526 ;          4748        END;   !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
```

```
;
;          4749      IF .QUICK EQL 0
;          4750      THEN
;          4751         BEGIN  !* 11 *  START OF LOOP READING SECTION
;          4752
;          4753         !++
;          4754         !  THIS IS THE 'LOOP READ' SECTION WHICH WAS MENTIONED IN
;          4755         !  THE DOCUMENTATION AT THE BEGINNING OF THIS ROUTINE.  IT
;          4756         !  IS NOT EXECUTED DURING THE QUICK VERIFY PASS, BUT IT IS
;          4757         !  FOR EVERY OTHER PASS THROUGH OPT2.
;          4758         !
;          4759         !  THE CODE IN BRIEF:
;          4760         !
;          4761         !  BEGIN 11 (START OF LOOP READING SECTION)
;          4762         !  INCR LUN FROM 0 TO LAST
;          4763         !  : BEGIN 12 (START OF LOGICAL UNIT SELECTION LOOP)
;          4764         !  : TESTLOOP2:
;          4765         !  : : BEGIN 13 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
;          4766         !  : : IF UNIT IS ACTIVE
;          4767         !  : : THEN
;          4768         !  : : : BEGIN 14 (START OF TEST FOR AN ACTIVE UNIT)
;          4769         !  : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
;          4770         !  : : : SECTOR = LOWEST
;          4771         !  : : : WHILE SECTOR LEQ HIGHEST DO
;          4772         !  : : : : BEGIN 15 (START OF SECTOR SELECTION LOOP)
;          4773         !  : : : : GET_WRDCNT
;          4774         !  : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
;          4775         !  : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
;          4776         !  : : : : INCR KOUNT FROM 1 TO TIMES
;          4777         !  : : : : : BEGIN 16 (START OF COUNTING LOOP FOR LOOP READING)
;          4778         !  : : : : : DO THE WRITE CHECK OR READ
;          4779         !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP2)
;          4780         !  : : : : : END 16 (END OF COUNTING LOOP FOR LOOP READING)
;          4781         !  : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
;          4782         !  : : : : UPDATE SECTOR NUMBER BY # SECTORS IN PREVIOUS TRANSFER
;          4783         !  : : : : END 15 (END OF SECTOR SELECTION LOOP)
;          4784         !  : : : END 14 (END OF TEST FOR AN ACTIVE UNIT)
;          4785         !  : : END 13 (END OF TESTLOOP2)
;          4786         !  : END 12 (END OF LOGICAL UNIT SELECTION LOOP)
;          4787         !  END 11 (END OF LOOP READING SECTION)
;          4788         !--
;          4789
;          4790         INCR LUN FROM 0 TO (.L$UNIT - 1) DO
;          4791            BEGIN  !* 12 *  START OF LOGICAL UNIT SELECTION LOOP
;          4792            LOOP2:
;          4793               BEGIN  !* 13 *  START OF THE 2ND LOOP THAT COMPLETELY TESTS 1 UNIT
;          4794               IF .DRIVE_STATUS[.LUN] EQL ACTIVE
;          4795               THEN
;          4796                  BEGIN  !* 14 *  START OF LOOP THAT TESTS AN ACTIVE UNIT
;          4797                  L$LUN = .LUN;
;          4798                  WPTR = WBUFF;
;          4799                  RPTR = RBUFF;
;          4800                  SECTOR = LOWEST;
```

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7584 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
7585 ;                DEFINITION OF OPTION 2                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (42)
7586
7587 ;          4801                WHILE .SECTOR LEQ HIGHEST DO
7588 ;          4802                   BEGIN  !* 15 *  START OF SECTOR SELECTION LOOP
7589 ;          4803                   WRDCNT = GET_WRDCNT(.SECTOR,HIGHEST);
7590 ;          4804                   SET_PTRS(.WRDCNT);
7591 ;          4805
7592 ;          4806                   COMMAND = CHOOSE();
7593 ;          4807                   INCR KOUNT FROM 1 TO TIMES_TO_LOOP DO
7594 ;          4808                      BEGIN  !* 16 *  START OF COUNTING LOOP FOR LOOP READING
7595 ;          4809                      IF .COMMAND EQL READ
7596 ;          4810                      THEN
7597 ;          4811                         BEGIN
7598 ;          4812                         PTR = .RPTR;
7599 ;          4813                         VALUE = READ(.LUN,.WRDCNT,.RPTR,.SECTOR);
7600 ;          4814                         END
7601 ;          4815                      ELSE
7602 ;          4816                         BEGIN
7603 ;          4817                         PTR = .WPTR;
7604 ;          4818                         VALUE = CHECK(.LUN,.WRDCNT,.WPTR,.SECTOR);
7605 ;          4819                         END;
7606 ;          4820                      !+
7607 ;          4821                      !  SEE HOW SUCCESSFUL THE OPERATION WAS:
7608 ;          4822                      !-
7609 ;          4823                      SELECTONE .VALUE OF           !SEE 'SYSERR' FOR DEFINITION
7610 ;          4824                         SET                        !OF ERROR # CONTAINED IN 'VALUE'
7611 ;          4825                      [0] :
7612 ;          4826                         IF .COMMAND EQL READ
7613 ;          4827                         THEN
7614 ;          4828                            BEGIN
7615 ;          4829                            IF (DBL_VALUE = DOUBLE_CHECK(.WPTR,.RPTR,.WRDCNT)) NEQ 0
7616 ;          4830                            THEN
7617 ;          4831                               BEGIN
7618 ;          4832                               SAYWHO(.LUN);
7619 ;          4833                               PRINTB(SAY1,MSG5);
7620 ;          4834                                  !'ECC LOGIC FAILED TO DETECT DATA ERROR'
7621 ;          4835                               PRINTB(FMT12A,..DBL_VALUE,..DBL_VALUE);
7622 ;          4836                                  !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
7623 ;          4837                               DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
7624 ;          4838                               PRINTB(FMT12B,..DBL_VALUE,..DBL_VALUE);
7625 ;          4839                                  !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
7626 ;          4840                               WHY_DROPT[.LUN] = CODE_8;
7627 ;          4841                               ERRDF(212,MSG1,0);   !**** OPTION 2 ERROR 12 ****
7628 ;          4842                               DODU(.LUN);
7629 ;          4843                               LEAVE LOOP2;      !JUMP JUST BEYOND END OF BLOCK * 4 *
7630 ;          4844                               END;
7631 ;          4845                            END;
7632 ;          4846                      [1] :
7633 ;          4847                         BEGIN  !* 16A * RETRY ALLOWED
7634 ;          4848                         IF RETRY(SIX,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) NEQ 0
7635 ;          4849                         THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
7636 ;          4850                            BEGIN
7637 ;          4851                            WHY_DROPT[.LUN] = CODE_4;
7638 ;          4852                            ERRDF(213,MSG1,0);   !**** OPTION 2 ERROR 13 ****
```

```
7642
7643 ;        4853                        DODU(.LUN);
7644 ;        4854                        LEAVE LOOP2; !JUMP JUST BEYOND END OF BLOCK * 13 *
7645 ;        4855                        END;
7646 ;        4856                    END;   !* 16A *
7647 ;        4857                [2] :
7648 ;        4858                    BEGIN  !* 16B * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
7649 ;        4859                    WHY_DROPT[.LUN] = CODE_5;
7650 ;        4860                    ERRDF(214,MSG1,0);   !**** OPTION 2 ERROR 14 ****
7651 ;        4861                    DODU(.LUN);
7652 ;        4862                    LEAVE LOOP2;    !JUMP JUST BEYOND END OF BLOCK * 13 *
7653 ;        4863                    END;   !* 16B *
7654 ;        4864                [3] :
7655 ;        4865                    BEGIN  !* 16C * FATAL DRIVE ERROR -- NO RETRY ALLOWED
7656 ;        4866                    ERRDF(215,MSG1,0);   !**** OPTION 2 ERROR 15 ****
7657 ;        4867                    WHY_DROPT[.LUN] = CODE_6;
7658 ;        4868                    DODU(.LUN);
7659 ;        4869                    LEAVE LOOP2;    !JUMP JUST BEYOND END OF BLOCK * 13 *
7660 ;        4870                    END;   !* 16C *
7661 ;        4871                [4] :
7662 ;        4872                    BEGIN  !* 16D * UNRECOVERABLE DATA ERROR
7663 ;        4873                    ISOLATE();
7664 ;        4874                    ERRDF(216,MSG2,0);   !**** OPTION 2 ERROR 16 ****
7665 ;        4875                    WHY_DROPT[.LUN] = CODE_7;
7666 ;        4876                    DODU(.LUN);
7667 ;        4877                    LEAVE LOOP2;    !JUMP JUST BEYOND END OF BLOCK * 13 *
7668 ;        4878                    END;   !* 16D *
7669 ;        4879                [5] :
7670 ;        4880                    BEGIN  !* 16E * RECOVERABLE DATA ERROR
7671 ;        4881                    ISOLATE();
7672 ;        4882                    IF .ERROUT
7673 ;        4883                    THEN  PRINTB(FMT10B,.CHAN);
7674 ;        4884                            !'    BIT QQ'
7675 ;        4885                    OLDSEC = .MLEL;
7676 ;        4886                    OLDCHN = .CHAN;
7677 ;        4887                    IF RETRY(ONE,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) EQL 5
7678 ;        4888                    THEN
7679 ;        4889                        IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
7680 ;        4890                        THEN
7681 ;        4891                            BEGIN
7682 ;        4892                            IF .ERROUT
7683 ;        4893                            THEN
7684 ;        4894                            ERRHRD(217,MSG4,0);  !**** OPTION 2 ERROR 17 ****
7685 ;        4895                            UP_HARD_COUNT(.LUN,.BOARD);
7686 ;        4896                            END
7687 ;        4897                        ELSE
7688 ;        4898                            BEGIN
7689 ;        4899                            IF .ERROUT
7690 ;        4900                            THEN
7691 ;        4901                            ERRSOFT(218,MSG3,0); !**** OPTION 2 ERROR 18 ****
7692 ;        4902                            UP_SOFT_COUNT(.LUN,.BOARD);
7693 ;        4903                            END
7694 ;        4904                    ELSE
```

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;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                DEFINITION OF OPTION 2                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (42)

;          4905                          BEGIN
;          4906                          IF .ERROUT
;          4907                          THEN
;          4908                          ERRSOFT(219,MSG3,0); !**** OPTION 2 ERROR 19 ****
;          4909                          UP_SOFT_COUNT(.LUN,.BOARD);
;          4910                          END;
;          4911                      END;   !* 16E *
;          4912
;          4913                      TES;
;          4914
;          4915                  END;   !* 16 *  END OF COUNTING LOOP FOR LOOP READING
;          4916              WPTR = .WPTR + (.WRDCNT * 2);
;          4917              SECTOR = .SECTOR + (.WRDCNT/256);
;          4918              END;   !* 15 *  END OF SECTOR SELECTION LOOP
;          4919          END;   !* 14 *  END OF  TEST FOR AN ACTIVE UNIT
;          4920      END;   !* 13 *  END OF TESTLOOP2
;          4921  END;   !* 12 *  END OF LOGICAL UNIT SELECTION LOOP
;          4922  END;   !* 11 *  END OF LOOP READING SECTION
;          4923  END;   !* 2 *  END OF PATTERN SELECTION LOOP
;          4924  RETURN;
;          4925  END;   !* 1 *  END OF ROUTINE

                                .SBTTL  OPT2 DEFINITION OF OPTION 2
050232  004137  005222      OPT2: JSR     R1,$SAVE5                       ;                       4508
050236  162706  000026            SUB     #26,SP                                                  4562
050242  012746  007256            MOV     #RTN2,-(SP)                     ;
050246  012746  006766            MOV     #WRD34,-(SP)
050252  012746  006522            MOV     #SAY2,-(SP)
050256  012746  000003            MOV     #3,-(SP)
050262  010600                    MOV     SP,R0                           ; SP,*
050264  104414                    TRAP    14
050266  005037  030714            CLR     PATTERN                         ;                       4565
050272  005737  030712            TST     QUICK                           ;                       4567
050276  001403                    BEQ     1$
050300  012705  000001            MOV     #1,R5                           ; *,MAXPAT              4568
050304  000402                    BR      2$                              ;                       4567
050306  012705  000012      1$:   MOV     #12,R5                          ; *,MAXPAT              4569
050312  010566  000032      2$:   MOV     R5,32(SP)                       ; MAXPAT,*              4571
050316  006366  000032            ASL     32(SP)
050322  005066  000030            CLR     30(SP)                          ; COUNT
050326  000137  053532            JMP     62$
050332  004737  036156      3$:   JSR     PC,SELPAT                       ;                       4573
050336  005737  030714            TST     PATTERN                         ;                       4574
050342  003413                    BLE     4$
050344  013746  030714            MOV     PATTERN,-(SP)                   ;                       4576
050350  012746  007522            MOV     #PHR9,-(SP)
```

```
7752                                    ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
7753                                    ;       DEFINITION OF OPTION 2                          23-Oct-1980 14:57:05    PA:<
7754
7755 050354  012746  005550                    MOV     #FMT1A,-(SP)
7756 050360  012746  000003                    MOV     #3,-(SP)
7757 050364  010600                            MOV     SP,R0                   ; SP,*
7758 050366  104414                            TRAP    14
7759 050370  000417                            BR      5$                      ;                               4574
7760 050372  013766  030714  000034  4$:       MOV     PATTERN,34(SP)          ; *,TEMP                        4580
7761 050400  005466  000034                    NEG     34(SP)                  ; TEMP
7762 050404  016646  000034                    MOV     34(SP),-(SP)            ; TEMP,*                        4581
7763 050410  012746  007522                    MOV     #PHR9,-(SP)
7764 050414  012746  005564                    MOV     #FMT1B,-(SP)
7765 050420  012746  000003                    MOV     #3,-(SP)
7766 050424  010600                            MOV     SP,R0                   ; SP,*
7767 050426  104414                            TRAP    14
7768 050430  013716  030714          5$:       MOV     PATTERN,(SP)            ;                               4584
7769 050434  004737  036522                    JSR     PC,GEN2
7770 050440  013766  002012  000030            MOV     L$UNIT,30(SP)           ;                               4585
7771 050446  005005                            CLR     R5                      ; LUN
7772 050450  000137  052136                    JMP     33$
7773 050454  010500                  6$:       MOV     R5,R0                   ; LUN,*                         4589
7774 050456  006200                            ASR     R0
7775 050460  006200                            ASR     R0
7776 050462  006200                            ASR     R0
7777 050464  062700  032460                    ADD     #DRIVE.STATUS,R0
7778 050470  010046                            MOV     R0,-(SP)
7779 050472  010546                            MOV     R5,-(SP)                ; LUN,*
7780 050474  042716  177770                    BIC     #177770,(SP)
7781 050500  012746  000001                    MOV     #1,-(SP)
7782 050504  005046                            CLR     -(SP)
7783 050506  004737  004244                    JSR     PC,BL$GT2
7784 050512  062706  000010                    ADD     #10,SP
7785 050516  005300                            DEC     R0
7786 050520  001127                            BNE     11$
7787 050522  010537  002074                    MOV     R5,L$LUN                ; LUN,*                         4592
7788 050526  012737  010706  030706            MOV     #WBUFF,WPTR             ;                               4593
7789 050534  012737  020706  030710            MOV     #RBUFF,RPTR             ;                               4594
7790 050542  010501                            MOV     R5,R1                   ; LUN,*                         4595
7791 050544  006301                            ASL     R1
7792 050546  016104  032476                    MOV     LOW.SECT(R1),R4         ; *,SECTOR
7793 050552  020461  032516          7$:       CMP     R4,TOP.SECT(R1)         ; SECTOR,*                      4596
7794 050556  003110                            BGT     11$
7795 050560  010446                            MOV     R4,-(SP)                ; SECTOR,*                      4598
7796 050562  016146  032516                    MOV     TOP.SECT(R1),-(SP)
7797 050566  004737  044034                    JSR     PC,GET.WRDCNT
7798 050572  010002                            MOV     R0,R2                   ; *,WRDCNT
7799 050574  010216                            MOV     R2,(SP)                 ; WRDCNT,*                      4599
7800 050576  004737  043770                    JSR     PC,SET.PTRS
7801 050602  010516                            MOV     R5,(SP)                 ; LUN,*                         4601
7802 050604  010246                            MOV     R2,-(SP)                ; WRDCNT,*
7803 050606  013746  030706                    MOV     WPTR,-(SP)
7804 050612  010446                            MOV     R4,-(SP)                ; SECTOR,*
7805 050614  004737  042246                    JSR     PC,WRITE
7806 050620  010003                            MOV     R0,R3                   ; *,VALUE
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 2                   23-Oct-1980 14:57:05    PA:<
                                        
050622  020327  000001                        CMP     R3,#1                   ; VALUE,*                                4605
050626  001031                                BNE     8$
050630  012746  000006                        MOV     #6,-(SP)                ;                                        4609
050634  012746  042246                        MOV     #WRITE,-(SP)
050640  010546                                MOV     R5,-(SP)                ; LUN,*
050642  010246                                MOV     R2,-(SP)                ; WRDCNT,*
050644  013746  030706                        MOV     WPTR,-(SP)
050650  010446                                MOV     R4,-(SP)                ; SECTOR,*
050652  004737  043046                        JSR     PC,RETRY
050656  062706  000014                        ADD     #14,SP
050662  005700                                TST     R0
050664  001446                                BEQ     12$
050666  112765  000004  032464                MOVB    #4,WHY.DROPT(R5)        ; *,*(LUN)                               4612
050674  104455                                TRAP    55                      ;                                        4613
050676  000311                                .WORD   311
050700  010512                                .WORD   MSG1
050702  000000                                .WORD   0
050704  010500                                MOV     R5,R0                   ; LUN,*                                  4614
050706  104451                                TRAP    51
050710  000431                                BR      10$                     ;                                        4615
050712  020327  000002          8$:           CMP     R3,#2                   ; VALUE,*                                4605
050716  001012                                BNE     9$
050720  112765  000005  032464                MOVB    #5,WHY.DROPT(R5)        ; *,*(LUN)                               4620
050726  104455                                TRAP    55                      ;                                        4621
050730  000312                                .WORD   312
050732  010512                                .WORD   MSG1
050734  000000                                .WORD   0
050736  010500                                MOV     R5,R0                   ; LUN,*                                  4622
050740  104451                                TRAP    51
050742  000414                                BR      10$                     ;                                        4623
050744  020327  000003          9$:           CMP     R3,#3                   ; VALUE,*                                4605
050750  001014                                BNE     12$
050752  104455                                TRAP    55                      ;                                        4627
050754  000313                                .WORD   313
050756  010512                                .WORD   MSG1
050760  000000                                .WORD   0
050762  112765  000006  032464                MOVB    #6,WHY.DROPT(R5)        ; *,*(LUN)                               4628
050770  010500                                MOV     R5,R0                   ; LUN,*                                  4629
050772  104451                                TRAP    51
050774  062706  000012          10$:          ADD     #12,SP                  ;                                        4630
051000  000537                  11$:          BR      15$
051002  004737  043010          12$:          JSR     PC,CHOOSE               ;                                        4635
051006  010066  000036                        MOV     R0,36(SP)               ; *,COMMAND
051012  005066  000034                        CLR     34(SP)                  ;                                        4636
051016  020027  042434                        CMP     R0,#READ                ; COMMAND,*
051022  001015                                BNE     13$
051024  005266  000034                        INC     34(SP)
051030  013766  030710  000040                MOV     RPTR,40(SP)             ; *,PTR                                  4639
051036  010546                                MOV     R5,-(SP)                ; LUN,*                                  4640
051040  010246                                MOV     R2,-(SP)                ; WRDCNT,*
051042  013746  030710                        MOV     RPTR,-(SP)
051046  010446                                MOV     R4,-(SP)                ; SECTOR,*
```

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                                        ;MLX4                                                                   23-Oct-1980 15:01:43    TOPS
                                        ;       DEFINITION OF OPTION 2                                          23-Oct-1980 14:57:05    PA:<
                                                JSR     PC,READ
                                                BR      14$
                                13$:    MOV     WPTR,40(SP)             ; *,PTR                                                 4644
                                        MOV     R5,-(SP)                ; LUN,*                                                 4645
                                        MOV     R2,-(SP)                ; WRDCNT,*
                                        MOV     WPTR,-(SP)
                                        MOV     R4,-(SP)                ; SECTOR,*
                                        JSR     PC,CHECK
                                14$:    MOV     R0,R3                   ; *,VALUE
                                        BNE     16$                     ;                                               4650
                                        BIT     #1,44(SP)               ;                                               4653
                                        BEQ     17$
                                        MOV     WPTR,-(SP)              ;                                               4656
                                        MOV     RPTR,-(SP)
                                        MOV     R2,-(SP)                ; WRDCNT,*
                                        JSR     PC,DOUBLE.CHECK
                                        ADD     #6,SP
                                        MOV     R0,54(SP)               ; *,DBL.VALUE
                                        BEQ     17$
                                        MOV     R5,-(SP)                ; LUN,*                                         4659
                                        JSR     PC,SAYWHO
                                        MOV     #MSG5,(SP)              ;                                               4660
                                        MOV     #SAY1,-(SP)
                                        MOV     #2,-(SP)
                                        MOV     SP,R0                   ; SP,*
                                        TRAP    14
                                        MOV     62(SP),(SP)             ; DBL.VALUE,*                                   4662
                                        MOV     @62(SP),-(SP)           ; DBL.VALUE,*
                                        MOV     #FMT12A,-(SP)
                                        MOV     #3,-(SP)
                                        MOV     SP,R0                   ; SP,*
                                        TRAP    14
                                        ADD     #10000,70(SP)           ; *,DBL.VALUE                                   4664
                                        MOV     70(SP),(SP)             ; DBL.VALUE,*                                   4665
                                        MOV     @70(SP),-(SP)           ; DBL.VALUE,*
                                        MOV     #FMT12B,-(SP)
                                        MOV     #3,-(SP)
                                        MOV     SP,R0                   ; SP,*
                                        TRAP    14
                                        MOVB    #10,WHY.DROPT(R5)       ; *,*(LUN)                                      4667
                                        TRAP    55                      ;                                               4668
                                        .WORD   314
                                        .WORD   MSG1
                                        .WORD   0
                                        MOV     R5,R0                   ; LUN,*                                         4669
                                        TRAP    51
                                        ADD     #44,SP                  ;                                               4670
                                15$:    BR      23$
                                16$:    CMP     R3,#1                   ; VALUE,*                                       4650
                                        BNE     19$
                                        MOV     #6,-(SP)                ;                                               4675
                                        MOV     50(SP),-(SP)            ; COMMAND,*
```

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                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 2                   23-Oct-1980 14:57:05    PA:<
                                        ;
051320  010546                          MOV     R5,-(SP)                ; LUN,*
051322  010246                          MOV     R2,-(SP)                ; WRDCNT,*
051324  016646  000060                  MOV     60(SP),-(SP)            ; PTR,*
051330  010446                          MOV     R4,-(SP)                ; SECTOR,*
051332  004737  043046                  JSR     PC,RETRY
051336  062706  000014                  ADD     #14,SP
051342  005700                          TST     R0
051344  001002                  17$:    BNE     18$
051346  000137  052072                  JMP     31$
051352  112765  000004  032464  18$:    MOVB    #4,WHY.DROPT(R5)        ; *,*(LUN)                                      4678
051360  104455                          TRAP    55                      ;                                               4679
051362  000315                          .WORD   315
051364  010512                          .WORD   MSG1
051366  000000                          .WORD   0
051370  010500                          MOV     R5,R0                   ; LUN,*                                         4680
051372  104451                          TRAP    51
051374  000450                          BR      22$                     ;                                               4681
051376  020327  000002          19$:    CMP     R3,#2                   ; VALUE,*                                       4650
051402  001012                          BNE     20$
051404  112765  000005  032464          MOVB    #5,WHY.DROPT(R5)        ; *,*(LUN)                                      4686
051412  104455                          TRAP    55                      ;                                               4687
051414  000316                          .WORD   316
051416  010512                          .WORD   MSG1
051420  000000                          .WORD   0
051422  010500                          MOV     R5,R0                   ; LUN,*                                         4688
051424  104451                          TRAP    51
051426  000433                          BR      22$                     ;                                               4689
051430  020327  000003          20$:    CMP     R3,#3                   ; VALUE,*                                       4650
051434  001012                          BNE     21$
051436  104455                          TRAP    55                      ;                                               4693
051440  000317                          .WORD   317
051442  010512                          .WORD   MSG1
051444  000000                          .WORD   0
051446  112765  000006  032464          MOVB    #6,WHY.DROPT(R5)        ; *,*(LUN)                                      4694
051454  010500                          MOV     R5,R0                   ; LUN,*                                         4695
051456  104451                          TRAP    51
051460  000416                          BR      22$                     ;                                               4696
051462  020327  000004          21$:    CMP     R3,#4                   ; VALUE,*                                       4650
051466  001017                          BNE     24$
051470  004737  035212                  JSR     PC,ISOLATE              ;                                               4700
051474  104455                          TRAP    55                      ;                                               4701
051476  000320                          .WORD   320
051500  010542                          .WORD   MSG2
051502  000000                          .WORD   0
051504  112765  000007  032464          MOVB    #7,WHY.DROPT(R5)        ; *,*(LUN)                                      4702
051512  010500                          MOV     R5,R0                   ; LUN,*                                         4703
051514  104451                          TRAP    51
051516  062706  000022          22$:    ADD     #22,SP                  ;                                               4704
051522  000137  052134          23$:    JMP     32$
051526  020327  000005          24$:    CMP     R3,#5                   ; VALUE,*                                       4650
051532  001157                          BNE     31$
051534  004737  035212                  JSR     PC,ISOLATE              ;                                               4703
```

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                                    ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                    ;       DEFINITION OF OPTION 2                           23-Oct-1980 14:57:05    PA:<
                                    
7979 051540 032737 000001 002260        BIT     #1,ERROUT                       ;                                        4709
7980 051546 001423                      BEQ     25$
7981 051550 017700 160652               MOV     @ML.REG+42,R0                   ;                                        4710
7982 051554 006200                      ASR     R0
7983 051556 006200                      ASR     R0
7984 051560 006200                      ASR     R0
7985 051562 006200                      ASR     R0
7986 051564 006200                      ASR     R0
7987 051566 006200                      ASR     R0
7988 051570 042700 177700               BIC     #177700,R0
7989 051574 010046                      MOV     R0,-(SP)
7990 051576 012746 006262               MOV     #FMT10B,-(SP)
7991 051602 012746 000002               MOV     #2,-(SP)
7992 051606 010600                      MOV     SP,R0                           ; SP,*
7993 051610 104414                      TRAP    14
7994 051612 062706 000006               ADD     #6,SP
7995 051616 017766 160606 000060 25$:   MOV     @ML.REG+44,60(SP)               ; *,OLDSEC                               4712
7996 051624 017700 160576               MOV     @ML.REG+42,R0                   ;                                        4713
7997 051630 006200                      ASR     R0
7998 051632 006200                      ASR     R0
7999 051634 006200                      ASR     R0
8000 051636 006200                      ASR     R0
8001 051640 006200                      ASR     R0
8002 051642 006200                      ASR     R0
8003 051644 042700 177700               BIC     #177700,R0
8004 051650 010066 000056               MOV     R0,56(SP)                       ; *,OLDCHN
8005 051654 012746 000001               MOV     #1,-(SP)                        ;                                        4714
8006 051660 016646 000050               MOV     50(SP),-(SP)                    ; COMMAND,*
8007 051664 010546                      MOV     R5,-(SP)                        ; LUN,*
8008 051666 010246                      MOV     R2,-(SP)                        ; WRDCNT,*
8009 051670 016646 000060               MOV     60(SP),-(SP)                    ; PTR,*
8010 051674 010446                      MOV     R4,-(SP)                        ; SECTOR,*
8011 051676 004737 043046               JSR     PC,RETRY
8012 051702 062706 000014               ADD     #14,SP
8013 051706 020027 000005               CMP     R0,#5
8014 051712 001051                      BNE     28$
8015 051714 027766 160510 000060        CMP     @ML.REG+44,60(SP)               ; *,OLDSEC                               4716
8016 051722 001034                      BNE     27$
8017 051724 016646 000056               MOV     56(SP),-(SP)                    ; OLDCHN,*
8018 051730 017700 160472               MOV     @ML.REG+42,R0
8019 051734 006200                      ASR     R0
8020 051736 006200                      ASR     R0
8021 051740 006200                      ASR     R0
8022 051742 006200                      ASR     R0
8023 051744 006200                      ASR     R0
8024 051746 006200                      ASR     R0
8025 051750 042700 177700               BIC     #177700,R0
8026 051754 020026                      CMP     R0,(SP)+
8027 051756 001016                      BNE     27$
8028 051760 032737 000001 002260        BIT     #1,ERROUT                       ;                                        4719
8029 051766 001404                      BEQ     26$
8030 051770 104456                      TRAP    56                              ;                                        4721
```

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                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 2                  23-Oct-1980 14:57:05    PA:<
                                                .WORD   321
                                                .WORD   MSG4
                                                .WORD   0
                                        26$:    MOV     R5,-(SP)                ; LUN,*                                 4722
                                                MOV     BOARD,-(SP)
                                                JSR     PC,UP.HARD.COUNT
                                                BR      30$                     ;                                       4716
                                        27$:    BIT     #1,ERROUT               ;                                       4726
                                                BEQ     29$
                                                TRAP    57                      ;                                       4728
                                                .WORD   322
                                                .WORD   MSG3
                                                .WORD   0
                                                BR      29$                     ;                                       4729
                                        28$:    BIT     #1,ERROUT               ;                                       4733
                                                BEQ     29$
                                                TRAP    57                      ;                                       4735
                                                .WORD   323
                                                .WORD   MSG3
                                                .WORD   0
                                        29$:    MOV     R5,-(SP)                ; LUN,*                                 4736
                                                MOV     BOARD,-(SP)
                                                JSR     PC,UP.SOFT.COUNT
                                        30$:    CMP     (SP)+,(SP)+             ;                                       4707
                                        31$:    MOV     R2,R0                   ; WRDCNT,*                              4742
                                                ASL     R0
                                                ADD     WPTR,R0
                                                MOV     R0,WPTR
                                                MOV     R2,(SP)                 ; WRDCNT,*                              4743
                                                MOV     #400,-(SP)
                                                JSR     PC,BL$DIV
                                                ADD     R4,R0                   ; SECTOR,*
                                                MOV     R0,R4                   ; *,SECTOR
                                                ADD     #24,SP                  ;                                       4597
                                                JMP     7$                      ;                                       4596
                                        32$:    INC     R5                      ; LUN                                   4585
                                        33$:    CMP     R5,30(SP)               ; LUN,*
                                                BGE     34$
                                                JMP     6$
                                        34$:    TST     QUICK                   ;                                       4749
                                                BEQ     35$
                                                JMP     61$
                                        35$:    MOV     L$UNIT,30(SP)           ;                                       4790
                                                CLR     R5                      ; LUN
                                                JMP     60$
                                        36$:    MOV     R5,R0                   ; LUN,*                                 4794
                                                ASR     R0
                                                ASR     R0
                                                ASR     R0
                                                ADD     #DRIVE.STATUS,R0
                                                MOV     R0,-(SP)
                                                MOV     R5,-(SP)                ; LUN,*
```

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                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 2                   23-Oct-1980 14:57:05    PA:<

052216  042716  177770                        BIC     #177770,(SP)
052222  012746  000001                        MOV     #1,-(SP)
052226  005046                                CLR     -(SP)
052230  004737  004244                        JSR     PC,BL$GT2
052234  062706  000010                        ADD     #10,SP
052240  005300                                DEC     R0
052242  001173                                BNE     41$
052244  010537  002074                        MOV     R5,L$LUN                ; LUN,*                  4797
052250  012737  010706  030706                MOV     #WBUFF,WPTR             ;                        4798
052256  012737  020706  030710                MOV     #RBUFF,RPTR             ;                        4799
052264  010501                                MOV     R5,R1                   ; LUN,*                  4800
052266  006301                                ASL     R1
052270  016104  032476                        MOV     LOW.SECT(R1),R4         ; *,SECTOR
052274  020461  032516          37$:          CMP     R4,TOP.SECT(R1)         ; SECTOR,*               4801
052300  003154                                BGT     41$
052302  010446                                MOV     R4,-(SP)                ; SECTOR,*               4803
052304  016146  032516                        MOV     TOP.SECT(R1),-(SP)
052310  004737  044034                        JSR     PC,GET.WRDCNT
052314  010002                                MOV     R0,R2                   ; *,WRDCNT
052316  010216                                MOV     R2,(SP)                 ; WRDCNT,*               4804
052320  004737  043770                        JSR     PC,SET.PTRS
052324  004737  043010                        JSR     PC,CHOOSE               ;                        4806
052330  010066  000030                        MOV     R0,30(SP)               ; *,COMMAND
052334  012766  000001  000026                MOV     #1,26(SP)               ; *,KOUNT                4807
052342  005066  000024          38$:          CLR     24(SP)                  ;                        4809
052346  026627  000030  042434                CMP     30(SP),#READ            ; COMMAND,*
052354  001015                                BNE     39$
052356  005266  000024                        INC     24(SP)
052362  013766  030710  000032                MOV     RPTR,32(SP)             ; *,PTR                  4812
052370  010546                                MOV     R5,-(SP)                ; LUN,*                  4813
052372  010246                                MOV     R2,-(SP)                ; WRDCNT,*
052374  013746  030710                        MOV     RPTR,-(SP)
052400  010446                                MOV     R4,-(SP)                ; SECTOR,*
052402  004737  042434                        JSR     PC,READ
052406  000412                                BR      40$
052410  013766  030706  000032  39$:          MOV     WPTR,32(SP)             ; *,PTR                  4817
052416  010546                                MOV     R5,-(SP)                ; LUN,*                  4818
052420  010246                                MOV     R2,-(SP)                ; WRDCNT,*
052422  013746  030706                        MOV     WPTR,-(SP)
052426  010446                                MOV     R4,-(SP)                ; SECTOR,*
052430  004737  042622                        JSR     PC,CHECK
052434  010003                  40$:          MOV     R0,R3                   ; *,VALUE
052436  001076                                BNE     42$                     ;                        4823
052440  032766  000001  000034                BIT     #1,34(SP)               ;                        4826
052446  001513                                BEQ     43$
052450  013746  030706                        MOV     WPTR,-(SP)              ;                        4829
052454  013746  030710                        MOV     RPTR,-(SP)
052460  010246                                MOV     R2,-(SP)                ; WRDCNT,*
052462  004737  041226                        JSR     PC,DOUBLE.CHECK
052466  062706  000006                        ADD     #6,SP
052472  010066  000046                        MOV     R0,46(SP)               ; *,DBL.VALUE
052476  001477                                BEQ     43$
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;       DEFINITION OF OPTION 2                           23-Oct-1980 14:57:05    PA:<
                                                MOV     R5,-(SP)                ; LUN,*                                  4832
                                                JSR     PC,SAYWHO
                                                MOV     #MSG5,(SP)              ;                                        4833
                                                MOV     #SAY1,-(SP)
                                                MOV     #2,-(SP)
                                                MOV     SP,R0                   ; SP,*
                                                TRAP    14
                                                MOV     54(SP),(SP)             ; DBL.VALUE,*                            4835
                                                MOV     @54(SP),-(SP)           ; DBL.VALUE,*
                                                MOV     #FMT12A,-(SP)
                                                MOV     #3,-(SP)
                                                MOV     SP,R0                   ; SP,*
                                                TRAP    14
                                                ADD     #10000,62(SP)           ; *,DBL.VALUE                            4837
                                                MOV     62(SP),(SP)             ; DBL.VALUE,*                            4838
                                                MOV     @62(SP),-(SP)           ; DBL.VALUE,*
                                                MOV     #FMT12B,-(SP)
                                                MOV     #3,-(SP)
                                                MOV     SP,R0                   ; SP,*
                                                TRAP    14
                                                MOVB    #10,WHY.DROPT(R5)       ; *,*(LUN)                               4840
                                                TRAP    55                      ;                                        4841
                                                .WORD   324
                                                .WORD   MSG1
                                                .WORD   0
                                                MOV     R5,R0                   ; LUN,*                                  4842
                                                TRAP    51
                                                ADD     #36,SP                  ;                                        4843
                                        41$:    BR      49$
                                        42$:    CMP     R3,#1                   ; VALUE,*                                4823
                                                BNE     45$
                                                MOV     #6,-(SP)                ;                                        4848
                                                MOV     42(SP),-(SP)            ; COMMAND,*
                                                MOV     R5,-(SP)                ; LUN,*
                                                MOV     R2,-(SP)                ; WRDCNT,*
                                                MOV     52(SP),-(SP)            ; PTR,*
                                                MOV     R4,-(SP)                ; SECTOR,*
                                                JSR     PC,RETRY
                                                ADD     #14,SP
                                                TST     R0
                                        43$:    BNE     44$
                                                JMP     57$
                                        44$:    MOVB    #4,WHY.DROPT(R5)        ; *,*(LUN)                               4851
                                                TRAP    55                      ;                                        4852
                                                .WORD   325
                                                .WORD   MSG1
                                                .WORD   0
                                                MOV     R5,R0                   ; LUN,*                                  4853
                                                TRAP    51
                                                BR      48$                     ;                                        4854
                                        45$:    CMP     R3,#2                   ; VALUE,*                                4823
                                                BNE     46$
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 2                   23-Oct-1980 14:57:05    PA:<
                                        MOVB    #5,WHY.DROPT(R5)        ; *,*(LUN)                                       4859
                                        TRAP    55                      ;                                                4860
                                        .WORD   326
                                        .WORD   MSG1
                                        .WORD   0
                                        MOV     R5,R0                   ; LUN,*                                          4861
                                        TRAP    51
                                        BR      48$                     ;                                                4862
                                46$:    CMP     R3,#3                   ; VALUE,*                                        4823
                                        BNE     47$
                                        TRAP    55                      ;                                                4866
                                        .WORD   327
                                        .WORD   MSG1
                                        .WORD   0
                                        MOVB    #6,WHY.DROPT(R5)        ; *,*(LUN)                                       4867
                                        MOV     R5,R0                   ; LUN,*                                          4868
                                        TRAP    51
                                        BR      48$                     ;                                                4869
                                47$:    CMP     R3,#4                   ; VALUE,*                                        4823
                                        BNE     50$
                                        JSR     PC,ISOLATE              ;                                                4873
                                        TRAP    55                      ;                                                4874
                                        .WORD   330
                                        .WORD   MSG2
                                        .WORD   0
                                        MOVB    #7,WHY.DROPT(R5)        ; *,*(LUN)                                       4875
                                        MOV     R5,R0                   ; LUN,*                                          4876
                                        TRAP    51
                                48$:    ADD     #14,SP                  ;                                                4877
                                49$:    JMP     59$
                                50$:    CMP     R3,#5                   ; VALUE,*                                        4823
                                        BNE     57$
                                        JSR     PC,ISOLATE              ;                                                4881
                                        BIT     #1,ERROUT               ;                                                4882
                                        BEQ     51$
                                        MOV     @ML.REG+42,R0           ;                                                4883
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        BIC     #177700,R0
                                        MOV     R0,-(SP)
                                        MOV     #FMT10B,-(SP)
                                        MOV     #2,-(SP)
                                        MOV     SP,R0                   ; SP,*
                                        TRAP    14
                                        ADD     #6,SP
                                51$:    MOV     @ML.REG+44,52(SP)       ; *,OLDSEC                                       4885
                                        MOV     @ML.REG+42,R0           ;                                                4886
                                        ASR     R0
```

```
                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;       DEFINITION OF OPTION 2                           23-Oct-1980 14:57:05    PA:<
                                                ASR     R0
                                                ASR     R0
                                                ASR     R0
                                                ASR     R0
                                                ASR     R0
                                                BIC     #177700,R0
                                                MOV     R0,50(SP)                ; *,OLDCHN
                                                MOV     #1,-(SP)                 ;                                                4887
                                                MOV     42(SP),-(SP)             ; COMMAND,*
                                                MOV     R5,-(SP)                 ; LUN,*
                                                MOV     R2,-(SP)                 ; WRDCNT,*
                                                MOV     52(SP),-(SP)             ; PTR,*
                                                MOV     R4,-(SP)                 ; SECTOR,*
                                                JSR     PC,RETRY
                                                ADD     #14,SP
                                                CMP     R0,#5
                                                BNE     54$
                                                CMP     @ML.REG+44,52(SP)        ; *,OLDSEC                                       4889
                                                BNE     53$
                                                MOV     50(SP),-(SP)             ; OLDCHN,*
                                                MOV     @ML.REG+42,R0
                                                ASR     R0
                                                ASR     R0
                                                ASR     R0
                                                ASR     R0
                                                ASR     R0
                                                ASR     R0
                                                BIC     #177700,R0
                                                CMP     R0,(SP)+
                                                BNE     53$
                                                BIT     #1,ERROUT                ;                                                4892
                                                BEQ     52$
                                                TRAP    56                       ;                                                4894
                                                .WORD   331
                                                .WORD   MSG4
                                                .WORD   0
                                        52$:    MOV     R5,-(SP)                 ; LUN,*                                          4895
                                                MOV     BOARD,-(SP)
                                                JSR     PC,UP.HARD.COUNT
                                                BR      56$                      ;                                                4889
                                        53$:    BIT     #1,ERROUT                ;                                                4899
                                                BEQ     55$
                                                TRAP    57                       ;                                                4901
                                                .WORD   332
                                                .WORD   MSG3
                                                .WORD   0
                                                BR      55$                      ;                                                4902
                                        54$:    BIT     #1,ERROUT                ;                                                4906
                                                BEQ     55$
                                                TRAP    57                       ;                                                4908
                                                .WORD   333
                                                .WORD   MSG3
```

```
                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 2                  23-Oct-1980 14:57:05    PA:<

053406  000000                          .WORD   0
053410  010546                  55$:    MOV     R5,-(SP)                ; LUN,*                                         4909
053412  013746  032360                  MOV     BOARD,-(SP)
053416  004737  035430                  JSR     PC,UP.SOFT.COUNT
053422  022626                  56$:    CMP     (SP)+,(SP)+             ;                                               4880
053424  062706  000010          57$:    ADD     #10,SP                  ;                                               4808
053430  005266  000026                  INC     26(SP)                  ; KOUNT                                         4807
053434  026627  000026  000002          CMP     26(SP),#2               ; KOUNT,*
053442  003002                          BGT     58$
053444  000137  052342                  JMP     38$
053450  010200                  58$:    MOV     R2,R0                   ; WRDCNT,*                                      4916
053452  006300                          ASL     R0
053454  063700  030706                  ADD     WPTR,R0
053460  010037  030706                  MOV     R0,WPTR
053464  010216                          MOV     R2,(SP)                 ; WRDCNT,*                                      4917
053466  012746  000400                  MOV     #400,-(SP)
053472  004737  005056                  JSR     PC,BL$DIV
053476  060400                          ADD     R4,R0                   ; SECTOR,*
053500  010004                          MOV     R0,R4                   ; *,SECTOR
053502  062706  000006                  ADD     #6,SP                   ;                                               4802
053506  000137  052274                  JMP     37$                     ;                                               4801
053512  005205                  59$:    INC     R5                      ; LUN                                           4790
053514  020566  000030          60$:    CMP     R5,30(SP)               ; LUN,*
053520  002002                          BGE     61$
053522  000137  052176                  JMP     36$
053526  062706  000010          61$:    ADD     #10,SP                  ;                                               4572
053532  005266  000030          62$:    INC     30(SP)                  ; COUNT                                         4571
053536  026666  000030  000032          CMP     30(SP),32(SP)           ; COUNT,*
053544  003002                          BGT     63$
053546  000137  050332                  JMP     3$
053552  062706  000036          63$:    ADD     #36,SP                  ;                                               4508
053556  000207                          RTS     PC

                                        ; Routine Size:  875 words
                                        ; Maximum stack depth per invocation:  43 words
```

```
8357 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
8358 ;                DEFINITION OF OPTION 3                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (43)
8359
8360 ;          4926  %SBTTL  'DEFINITION OF OPTION 3'
8361 ;          4927
8362 ;          4928  ROUTINE OPT3: NOVALUE =
8363 ;          4929  BEGIN  !* 1 *  START OF ROUTINE
8364 ;          4930
8365 ;          4931  !++
8366 ;          4932  !  ROUTINE:     OPT3
8367 ;          4933  !
8368 ;          4934  !  PURPOSE:     TO DO A UNIQUE DATA CHECK ON ALL AVAILABLE UNITS.
8369 ;          4935  !
8370 ;          4936  !  THE CODE FOR 'OPT3' IN BRIEF:
8371 ;          4937  !
8372 ;          4938  !  BEGIN 1 (START OF ROUTINE)
8373 ;          4939  !  SAY ROUTINE IS RUNNING
8374 ;          4940  !  INCR COMPLEMENT FLAG FROM 0 TO 1
8375 ;          4941  !  : BEGIN 2 (START OF COMPLEMENT FLAG SELECTION LOOP)
8376 ;          4942  !  : GENERATE THE PATTERN
8377 ;          4943  !  : INCR LUN FROM 0 TO LAST
8378 ;          4944  !  : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
8379 ;          4945  !  : : TESTLOOP:
8380 ;          4946  !  : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
8381 ;          4947  !  : : : IF UNIT IS ACTIVE
8382 ;          4948  !  : : : THEN
8383 ;          4949  !  : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
8384 ;          4950  !  : : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
8385 ;          4951  !  : : : : SECTOR = LOWEST
8386 ;          4952  !  : : : : WHILE SECTOR LEQ HIGHEST DO
8387 ;          4953  !  : : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
8388 ;          4954  !  : : : : : GET_WRDCNT
8389 ;          4955  !  : : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
8390 ;          4956  !  : : : : : WRITE
8391 ;          4957  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
8392 ;          4958  !  : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
8393 ;          4959  !  : : : : : DO THE WRITE CHECK OR READ
8394 ;          4960  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
8395 ;          4961  !  : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
8396 ;          4962  !  : : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
8397 ;          4963  !  : : : : : END 6 (END OF SECTOR SELECTION LOOP)
8398 ;          4964  !  : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
8399 ;          4965  !  : : : END 4 (END OF TESTLOOP)
8400 ;          4966  !  : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
8401 ;          4967  !  : END 2 (END OF COMPLEMENT FLAG SELECTION LOOP)
8402 ;          4968  !  RETURN
8403 ;          4969  !  END 1 (END OF ROUTINE)
8404 ;          4970  !--
8405 ;          4971
8406 ;          4972  LABEL
8407 ;          4973     LOOP;
8408 ;          4974
8409 ;          4975  LOCAL
8410 ;          4976     WRDCNT, VALUE, OLDSEC, OLDCHN, SECTOR, PTR, COMMAND, DBL_VALUE;
8411 ;          4977
```

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```
8413 ;MLX4
8414 ;                  DEFINITION OF OPTION 3
8415 ;
8416 ;          4978  PRINTB(SAY2,WRD34,RTN3);
8417 ;          4979     !'RUNNING OPT3'
8418 ;          4980
8419 ;          4981  INCR COMP_FLAG FROM 0 TO 1 DO
8420 ;          4982     BEGIN  !* 2 *  START OF COMPLEMENT FLAG SELECTION LOOP
8421 ;          4983     GEN3(.COMP_FLAG);
8422 ;          4984     INCR LUN FROM 0 TO (.L$UNIT - 1) DO
8423 ;          4985        BEGIN  !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
8424 ;          4986        LOOP:
8425 ;          4987           BEGIN  !* 4 *  START OF THE LOOP THAT COMPLETELY TESTS 1 UNIT
8426 ;          4988           IF .DRIVE_STATUS[.LUN] EQL ACTIVE
8427 ;          4989           THEN
8428 ;          4990              BEGIN  !* 5 *  START OF TEST FOR AN ACTIVE UNIT
8429 ;          4991              L$LUN = .LUN;
8430 ;          4992              WPTR = WBUFF;
8431 ;          4993              RPTR = RBUFF;
8432 ;          4994              SECTOR = LOWEST;
8433 ;          4995              WHILE .SECTOR LEQ HIGHEST DO
8434 ;          4996                 BEGIN  !* 6 *  START OF SECTOR SELECTION LOOP
8435 ;          4997                 WRDCNT = GET_WRDCNT(.SECTOR,HIGHEST);
8436 ;          4998                 SET_PTRS(.WRDCNT);
8437 ;          4999                 VALUE = WRITE(.LUN,.WRDCNT,.WPTR,.SECTOR);
8438 ;          5000                 !+
8439 ;          5001                 !  SEE HOW SUCCESSFUL THE WRITE WAS:
8440 ;          5002                 !-
8441 ;          5003                 SELECTONE .VALUE OF        !SEE 'SYSERR' FOR DEFINITION
8442 ;          5004                    SET                     !OF ERROR # CONTAINED IN 'VALUE'
8443 ;          5005                 [1] :
8444 ;          5006                    BEGIN  !* 6A *          RETRY ALLOWED
8445 ;          5007                    IF RETRY(SIX,WRITE,.LUN,.WRDCNT,.WPTR,.SECTOR) NEQ 0
8446 ;          5008                    THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
8447 ;          5009                       BEGIN
8448 ;          5010                       WHY_DROPT[.LUN] = CODE_4;
8449 ;          5011                       ERRDF(301,MSG1,0);    !**** OPTION 3 ERROR 01 ****
8450 ;          5012                       DODU(.LUN);
8451 ;          5013                       LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
8452 ;          5014                       END;
8453 ;          5015                    END;    !* 6A *
8454 ;          5016                 [2] :
8455 ;          5017                    BEGIN  !* 6B *          FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
8456 ;          5018                    WHY_DROPT[.LUN] = CODE_5;
8457 ;          5019                    ERRDF(302,MSG1,0);    !**** OPTION 3 ERROR 02 ****
8458 ;          5020                    DODU(.LUN);
8459 ;          5021                    LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
8460 ;          5022                    END;    !* 6B *
8461 ;          5023                 [3] :
8462 ;          5024                    BEGIN  !* 6C *          FATAL DRIVE ERROR -- NO RETRY ALLOWED
8463 ;          5025                    ERRDF(303,MSG1,0);    !**** OPTION 3 ERROR 03 ****
8464 ;          5026                    WHY_DROPT[.LUN] = CODE_6;
8465 ;          5027                    DODU(.LUN);
8466 ;          5028                    LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
8467 ;          5029                    END;    !* 6C *
```

```
8469 ;MLX4
8470 ;                  DEFINITION OF OPTION 3
8471
8472 ;          5030
8473 ;          5031                    TES;
8474 ;          5032
8475 ;          5033                COMMAND = CHOOSE();
8476 ;          5034                IF .COMMAND EQL READ
8477 ;          5035                THEN
8478 ;          5036                    BEGIN
8479 ;          5037                    PTR = .RPTR;
8480 ;          5038                    VALUE = READ(.LUN,.WRDCNT,.RPTR,.SECTOR);
8481 ;          5039                    END
8482 ;          5040                ELSE
8483 ;          5041                    BEGIN
8484 ;          5042                    PTR = .WPTR;
8485 ;          5043                    VALUE = CHECK(.LUN,.WRDCNT,.WPTR,.SECTOR);
8486 ;          5044                    END;
8487 ;          5045                !+
8488 ;          5046                !  SEE HOW SUCCESSFUL THE OPERATION WAS:
8489 ;          5047                !-
8490 ;          5048                SELECTONE .VALUE OF       !SEE 'SYSERR' FOR DEFINITION
8491 ;          5049                    SET                   !OF ERROR # CONTAINED IN 'VALUE'
8492 ;          5050                [0] :
8493 ;          5051                    IF .COMMAND EQL READ
8494 ;          5052                    THEN
8495 ;          5053                        BEGIN
8496 ;          5054                        IF (DBL_VALUE = DOUBLE_CHECK(.WPTR,.RPTR,.WRDCNT)) NEQ 0
8497 ;          5055                        THEN
8498 ;          5056                            BEGIN
8499 ;          5057                            SAYWHO(.LUN);
8500 ;          5058                            PRINTB(SAY1,MSG5);
8501 ;          5059                                !'ECC LOGIC FAILED TO DETECT DATA ERROR'
8502 ;          5060                            PRINTB(FMT12A,..DBL_VALUE,..DBL_VALUE);
8503 ;          5061                                !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
8504 ;          5062                            DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
8505 ;          5063                            PRINTB(FMT12B,..DBL_VALUE,..DBL_VALUE);
8506 ;          5064                                !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
8507 ;          5065                            WHY_DROPT[.LUN] = CODE_8;
8508 ;          5066                            ERRDF(304,MSG1,0);    !**** OPTION 3 ERROR 04 ****
8509 ;          5067                            DODU(.LUN);
8510 ;          5068                            LEAVE LOOP;       !JUMP JUST BEYOND END OF BLOCK * 4 *
8511 ;          5069                            END;
8512 ;          5070                        END;
8513 ;          5071                [1] :
8514 ;          5072                    BEGIN  !* 6D *          RETRY ALLOWED
8515 ;          5073                    IF RETRY(SIX,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) NEQ 0
8516 ;          5074                    THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
8517 ;          5075                        BEGIN
8518 ;          5076                        WHY_DROPT[.LUN] = CODE_4;
8519 ;          5077                        ERRDF(305,MSG1,0);    !**** OPTION 3 ERROR 05 ****
8520 ;          5078                        DODU(.LUN);
8521 ;          5079                        LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
8522 ;          5080                        END;
8523 ;          5081                    END;    !* 6D *
```

```
8525 ;MLX4
8526 ;                  DEFINITION OF OPTION 3
8527
8528 ;          5082                   [2] :
8529 ;          5083                      BEGIN  !* 6E *         FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
8530 ;          5084                      WHY_DROPT[.LUN] = CODE_5;
8531 ;          5085                      ERRDF(306,MSG1,0);    !**** OPTION 3 ERROR 06 ****
8532 ;          5086                      DODU(.LUN);
8533 ;          5087                      LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
8534 ;          5088                      END;   !* 6E *
8535 ;          5089                   [3] :
8536 ;          5090                      BEGIN  !* 6F *         FATAL DRIVE ERROR -- NO RETRY ALLOWED
8537 ;          5091                      ERRDF(307,MSG1,0);    !**** OPTION 3 ERROR 07 ****
8538 ;          5092                      WHY_DROPT[.LUN] = CODE_6;
8539 ;          5093                      DODU(.LUN);
8540 ;          5094                      LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
8541 ;          5095                      END;   !* 6F *
8542 ;          5096                   [4] :
8543 ;          5097                      BEGIN  !* 6G *         UNRECOVERABLE DATA ERROR
8544 ;          5098                      ISOLATE();
8545 ;          5099                      ERRDF(308,MSG2,0);    !**** OPTION 3 ERROR 08 ****
8546 ;          5100                      WHY_DROPT[.LUN] = CODE_7;
8547 ;          5101                      DODU(.LUN);
8548 ;          5102                      LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
8549 ;          5103                      END;   !* 6G *
8550 ;          5104                   [5] :
8551 ;          5105                      BEGIN  !* 6H *         RECOVERABLE DATA ERROR
8552 ;          5106                      ISOLATE();
8553 ;          5107                      IF .ERROUT
8554 ;          5108                      THEN  PRINTB(FMT10B,.CHAN);
8555 ;          5109                                  !'    BIT QQ'
8556 ;          5110                      OLDSEC = .MLEL;
8557 ;          5111                   OLDCHN = .CHAN;
8558 ;          5112                   IF RETRY(ONE,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) EQL 5
8559 ;          5113                   THEN
8560 ;          5114                      IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
8561 ;          5115                      THEN
8562 ;          5116                         BEGIN
8563 ;          5117                         IF .ERROUT
8564 ;          5118                         THEN
8565 ;          5119                         ERRHRD(309,MSG4,0);  !**** OPTION 3 ERROR 09 ****
8566 ;          5120                         UP_HARD_COUNT(.LUN,.BOARD);
8567 ;          5121                         END
8568 ;          5122                      ELSE
8569 ;          5123                         BEGIN
8570 ;          5124                         IF .ERROUT
8571 ;          5125                         THEN
8572 ;          5126                         ERRSOFT(310,MSG3,0); !**** OPTION 3 ERROR 10 ****
8573 ;          5127                         UP_SOFT_COUNT(.LUN,.BOARD);
8574 ;          5128                         END
8575 ;          5129                   ELSE
8576 ;          5130                      BEGIN
8577 ;          5131                      IF .ERROUT
8578 ;          5132                      THEN
8579 ;          5133                      ERRSOFT(311,MSG3,0); !**** OPTION 3 ERROR 11 ****
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;                DEFINITION OF OPTION 3                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (43)

;          5134                      UP_SOFT_COUNT(.LUN,.BOARD);
;          5135                      END;
;          5136                   END;    !* 6H *
;          5137
;          5138                   TES;
;          5139
;          5140                WPTR = .WPTR + (.WRDCNT * 2);
;          5141                SECTOR = .SECTOR + (.WRDCNT/256);
;          5142
;          5143                END;    !* 6 *  END OF SECTOR SELECTION LOOP
;          5144             END;    !* 5 *  END OF TEST FOR AN ACTIVE UNIT
;          5145          END;    !* 4 *  END OF TESTLOOP
;          5146       END;    !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
;          5147    END;    !* 2 *  END OF COMPLEMENT FLAG SELECTION LOOP
;          5148 RETURN;
;          5149 END;    !* 1 *  END OF ROUTINE

                                .SBTTL  OPT3 DEFINITION OF OPTION 3
053560  004137  005222    OPT3: JSR     R1,$SAVE5                ;                          4928
053564  162706  000020          SUB     #20,SP
053570  012746  007264          MOV     #RTN3,-(SP)              ;                          4978
053574  012746  006766          MOV     #WRD34,-(SP)
053600  012746  006522          MOV     #SAY2,-(SP)
053604  012746  000003          MOV     #3,-(SP)
053610  010600                  MOV     SP,R0                    ; SP,*
053612  104414                  TRAP    14
053614  005066  000026          CLR     26(SP)                   ; COMP.FLAG                4981
053620  016646  000026    1$:   MOV     26(SP),-(SP)             ; COMP.FLAG,*              4983
053624  004737  036556          JSR     PC,GEN3
053630  013766  002012  000014  MOV     L$UNIT,14(SP)            ;                          4984
053636  005066  000012          CLR     12(SP)                   ; LUN
053642  000137  055426          JMP     29$
053646  016600  000012    2$:   MOV     12(SP),R0                ; LUN,*                    4988
053652  006200                  ASR     R0
053654  006200                  ASR     R0
053656  006200                  ASR     R0
053660  062700  032460          ADD     #DRIVE.STATUS,R0
053664  010046                  MOV     R0,-(SP)
053666  016646  000014          MOV     14(SP),-(SP)             ; LUN,*
053672  042716  177770          BIC     #177770,(SP)
053676  012746  000001          MOV     #1,-(SP)
053702  005046                  CLR     -(SP)
053704  004737  004244          JSR     PC,BL$GT2
053710  062706  000010          ADD     #10,SP
053714  005300                  DEC     R0
053716  001143                  BNE     7$
```

```
                                        ;MLX4                                                                   23-Oct-1980 15:01:43    TOPS
                                        ;       DEFINITION OF OPTION 3                                          23-Oct-1980 14:57:05    PA:<
                                                                                                                                        4991
053720  016637  000012  002074        MOV     12(SP),L$LUN                    ; LUN,*                         ;                       4992
053726  012737  010706  030706        MOV     #WBUFF,WPTR                     ;                               ;                       4993
053734  012737  020706  030710        MOV     #RBUFF,RPTR                     ;                               ;                       4994
053742  016601  000012                MOV     12(SP),R1                       ; LUN,*
053746  006301                        ASL     R1
053750  016104  032476                MOV     LOW.SECT(R1),R4                 ; *,SECTOR
053754  020461  032516        3$:     CMP     R4,TOP.SECT(R1)                 ; SECTOR,*                      ;       4995
053760  003122                        BGT     7$
053762  010446                        MOV     R4,-(SP)                        ; SECTOR,*                      ;       4997
053764  016146  032516                MOV     TOP.SECT(R1),-(SP)
053770  004737  044034                JSR     PC,GET.WRDCNT
053774  010003                        MOV     R0,R3                           ; *,WRDCNT
053776  010316                        MOV     R3,(SP)                         ; WRDCNT,*                      ;       4998
054000  004737  043770                JSR     PC,SET.PTRS
054004  016616  000016                MOV     16(SP),(SP)                     ; LUN,*                         ;       4999
054010  010346                        MOV     R3,-(SP)                        ; WRDCNT,*
054012  013746  030706                MOV     WPTR,-(SP)
054016  010446                        MOV     R4,-(SP)                        ; SECTOR,*
054020  004737  042246                JSR     PC,WRITE
054024  010005                        MOV     R0,R5                           ; *,VALUE
054026  020527  000001                CMP     R5,#1                           ; VALUE,*                       ;       5003
054032  001035                        BNE     4$
054034  012746  000006                MOV     #6,-(SP)                        ;                               ;       5007
054040  012746  042246                MOV     #WRITE,-(SP)
054044  016646  000030                MOV     30(SP),-(SP)                    ; LUN,*
054050  010346                        MOV     R3,-(SP)                        ; WRDCNT,*
054052  013746  030706                MOV     WPTR,-(SP)
054056  010446                        MOV     R4,-(SP)                        ; SECTOR,*
054060  004737  043046                JSR     PC,RETRY
054064  062706  000014                ADD     #14,SP
054070  005700                        TST     R0
054072  001456                        BEQ     8$
054074  016602  000024                MOV     24(SP),R2                       ; LUN,*                                 5010
054100  112762  000004  032464        MOVB    #4,WHY.DROPT(R2)
054106  104455                        TRAP    55                              ;                               ;       5011
054110  000455                        .WORD   455
054112  010512                        .WORD   MSG1
054114  000000                        .WORD   0
054116  016600  000024                MOV     24(SP),R0                       ; LUN,*                                 5012
054122  104451                        TRAP    51
054124  000436                        BR      6$                              ;                               ;       5013
054126  020527  000002        4$:     CMP     R5,#2                           ; VALUE,*                               5003
054132  001015                        BNE     5$
054134  016602  000024                MOV     24(SP),R2                       ; LUN,*                                 5018
054140  112762  000005  032464        MOVB    #5,WHY.DROPT(R2)
054146  104455                        TRAP    55                              ;                               ;       5019
054150  000456                        .WORD   456
054152  010512                        .WORD   MSG1
054154  000000                        .WORD   0
054156  016600  000024                MOV     24(SP),R0                       ; LUN,*                                 5020
054162  104451                        TRAP    51
054164  000416                        BR      6$                              ;                                       5021
```

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                                    ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                    ;       DEFINITION OF OPTION 3                           23-Oct-1980 14:57:05    PA:<
                                    5$:     CMP     R5,#3                   ; VALUE,*                                5003
                                            BNE     8$
                                            TRAP    55                      ;                                        5025
                                            .WORD   457
                                            .WORD   MSG1
                                            .WORD   0
                                            MOV     24(SP),R2               ; LUN,*                                  5026
                                            MOVB    #6,WHY.DROPT(R2)
                                            MOV     R2,R0                   ; LUN,*                                  5027
                                            TRAP    51
                                    6$:     ADD     #12,SP                  ;                                        5028
                                    7$:     BR      13$
                                    8$:     JSR     PC,CHOOSE               ;                                        5033
                                            MOV     R0,36(SP)               ; *,COMMAND
                                            CLR     R2                      ;                                        5034
                                            CMP     R0,#READ                ; COMMAND,*
                                            BNE     9$
                                            INC     R2
                                            MOV     RPTR,34(SP)             ; *,PTR                                  5037
                                            MOV     24(SP),-(SP)            ; LUN,*                                  5038
                                            MOV     R3,-(SP)                ; WRDCNT,*
                                            MOV     RPTR,-(SP)
                                            MOV     R4,-(SP)                ; SECTOR,*
                                            JSR     PC,READ
                                            BR      10$
                                    9$:     MOV     WPTR,34(SP)             ; *,PTR                                  5042
                                            MOV     24(SP),-(SP)            ; LUN,*                                  5043
                                            MOV     R3,-(SP)                ; WRDCNT,*
                                            MOV     WPTR,-(SP)
                                            MOV     R4,-(SP)                ; SECTOR,*
                                            JSR     PC,CHECK
                                    10$:    MOV     R0,R5                   ; *,VALUE
                                            BNE     14$                     ;                                        5048
                                            ROR     R2                      ;                                        5051
                                            BLO     12$
                                    11$:    JMP     27$
                                    12$:    MOV     WPTR,-(SP)              ;                                        5054
                                            MOV     RPTR,-(SP)
                                            MOV     R3,-(SP)                ; WRDCNT,*
                                            JSR     PC,DOUBLE.CHECK
                                            ADD     #6,SP
                                            MOV     R0,50(SP)               ; *,DBL.VALUE
                                            BEQ     11$
                                            MOV     34(SP),-(SP)            ; LUN,*                                  5057
                                            JSR     PC,SAYWHO
                                            MOV     #MSG5,(SP)              ;                                        5058
                                            MOV     #SAY1,-(SP)
                                            MOV     #2,-(SP)
                                            MOV     SP,R0                   ; SP,*
                                            TRAP    14
                                            MOV     56(SP),(SP)             ; DBL.VALUE,*                            5060
                                            MOV     @56(SP),-(SP)           ; DBL.VALUE,*
```

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                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 3                   23-Oct-1980 14:57:05    PA:<

054434  012746  006332                          MOV     #FMT12A,-(SP)
054440  012746  000003                          MOV     #3,-(SP)
054444  010600                                  MOV     SP,R0                           ; SP,*
054446  104414                                  TRAP    14
054450  062766  010000  000064                  ADD     #10000,64(SP)                   ; *,DBL.VALUE                    5062
054456  016616  000064                          MOV     64(SP),(SP)                     ; DBL.VALUE,*                    5063
054462  017646  000064                          MOV     @64(SP),-(SP)                   ; DBL.VALUE,*
054466  012746  006400                          MOV     #FMT12B,-(SP)
054472  012746  000003                          MOV     #3,-(SP)
054476  010600                                  MOV     SP,R0                           ; SP,*
054500  104414                                  TRAP    14
054502  016602  000056                          MOV     56(SP),R2                       ; LUN,*                          5065
054506  112762  000010  032464                  MOVB    #10,WHY.DROPT(R2)
054514  104455                                  TRAP    55                              ;                                5066
054516  000460                                  .WORD   460
054520  010512                                  .WORD   MSG1
054522  000000                                  .WORD   0
054524  016600  000056                          MOV     56(SP),R0                       ; LUN,*                          5067
054530  104451                                  TRAP    51
054532  062706  000044                          ADD     #44,SP                          ;                                5068
054536  000521                          13$:    BR      19$
054540  020527  000001                  14$:    CMP     R5,#1                           ; /ALUE,*                        5048
054544  001035                                  BNE     15$
054546  012746  000006                          MOV     #6,-(SP)                        ;                                5073
054552  016646  000050                          MOV     50(SP),-(SP)                    ; COMMAND,*
054556  016646  000040                          MOV     40(SP),-(SP)                    ; LUN,*
054562  010346                                  MOV     R3,-(SP)                        ; WRDCNT,*
054564  016646  000054                          MOV     54(SP),-(SP)                    ; PTR,*
054570  010446                                  MOV     R4,-(SP)                        ; SECTOR,*
054572  004737  043046                          JSR     PC,RETRY
054576  062706  000014                          ADD     #14,SP
054602  005700                                  TST     R0
054604  001655                                  BEQ     11$
054606  016602  000034                          MOV     34(SP),R2                       ; LUN,*                          5076
054612  112762  000004  032464                  MOVB    #4,WHY.DROPT(R2)
054620  104455                                  TRAP    55                              ;                                5077
054622  000461                                  .WORD   461
054624  010512                                  .WORD   MSG1
054626  000000                                  .WORD   0
054630  016600  000034                          MOV     34(SP),R0                       ; LUN,*                          5078
054634  104451                                  TRAP    51
054636  000457                                  BR      18$                             ;                                5079
054640  020527  000002                  15$:    CMP     R5,#2                           ; VALUE,*                        5048
054644  001015                                  BNE     16$
054646  016602  000034                          MOV     34(SP),R2                       ; LUN,*                          5084
054652  112762  000005  032464                  MOVB    #5,WHY.DROPT(R2)
054660  104455                                  TRAP    55                              ;                                5085
054662  000462                                  .WORD   462
054664  010512                                  .WORD   MSG1
054666  000000                                  .WORD   0
054670  016600  000034                          MOV     34(SP),R0                       ; LUN,*                          5086
054674  104451                                  TRAP    51
```

```
                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;                DEFINITION OF OPTION 3                 23-Oct-1980 14:57:05    PA:<
                                                         BR      18$                    ;                                5087
                                        16$:             CMP     R5,#3                  ; VALUE,*                        5048
                                                         BNE     17$
                                                         TRAP    55                     ;                                5091
                                                         .WORD   463
                                                         .WORD   MSG1
                                                         .WORD   0
                                                         MOV     34(SP),R2              ; LUN,*                          5092
                                                         MOVB    #6,WHY.DROPT(R2)
                                                         MOV     R2,R0                  ; LUN,*                          5093
                                                         TRAP    51
                                                         BR      18$                    ;                                5094
                                        17$:             CMP     R5,#4                  ; VALUE,*                        5048
                                                         BNE     20$
                                                         JSR     PC,ISOLATE             ;                                5098
                                                         TRAP    55                     ;                                5099
                                                         .WORD   464
                                                         .WORD   MSG2
                                                         .WORD   0
                                                         MOV     34(SP),R2              ; LUN,*                          5100
                                                         MOVB    #7,WHY.DROPT(R2)
                                                         MOV     R2,R0                  ; LUN,*                          5101
                                                         TRAP    51
                                        18$:             ADD     #22,SP                 ;                                5102
                                        19$:             JMP     28$
                                        20$:             CMP     R5,#5                  ; VALUE,*                        5048
                                                         BNE     27$
                                                         JSR     PC,ISOLATE             ;                                5106
                                                         BIT     #1,ERROUT              ;                                5107
                                                         BEQ     21$
                                                         MOV     @ML.REG+42,R2          ;                                5108
                                                         ASR     R2
                                                         ASR     R2
                                                         ASR     R2
                                                         ASR     R2
                                                         ASR     R2
                                                         ASR     R2
                                                         BIC     #177700,R2
                                                         MOV     R2,-(SP)
                                                         MOV     #FMT10B,-(SP)
                                                         MOV     #2,-(SP)
                                                         MOV     SP,R0                  ; SP,*
                                                         TRAP    14
                                                         ADD     #6,SP
                                        21$:             MOV     @ML.REG+44,40(SP)      ; *,OLDSEC                       5110
                                                         MOV     @ML.REG+42,R2          ;                                5111
                                                         ASR     R2
                                                         ASR     R2
                                                         ASR     R2
                                                         ASR     R2
                                                         ASR     R2
                                                         ASR     R2
```

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                                ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                ;       DEFINITION OF OPTION 3                           23-Oct-1980 14:57:05    PA:<

055124  042702  177700                BIC     #177700,R2
055130  010266  000042                MOV     R2,42(SP)               ; *,OLDCHN
055134  012746  000001                MOV     #1,-(SP)                ;                                        5112
055140  016646  000050                MOV     50(SP),-(SP)            ; COMMAND,*
055144  016646  000040                MOV     40(SP),-(SP)            ; LUN,*
055150  010346                        MOV     R3,-(SP)                ; WRDCNT,*
055152  016646  000054                MOV     54(SP),-(SP)            ; PTR,*
055156  010446                        MOV     R4,-(SP)                ; SECTOR,*
055160  004737  043046                JSR     PC,RETRY
055164  062706  000014                ADD     #14,SP
055170  020027  000005                CMP     R0,#5
055174  001052                        BNE     24$
055176  027766  155226  000040        CMP     @ML.REG+44,40(SP)       ; *,OLDSEC                               5114
055204  001035                        BNE     23$
055206  016600  000042                MOV     42(SP),R0               ; OLDCHN,*
055212  017702  155210                MOV     @ML.REG+42,R2
055216  006202                        ASR     R2
055220  006202                        ASR     R2
055222  006202                        ASR     R2
055224  006202                        ASR     R2
055226  006202                        ASR     R2
055230  006202                        ASR     R2
055232  042702  177700                BIC     #177700,R2
055236  020200                        CMP     R2,R0
055240  001017                        BNE     23$
055242  032737  000001  002260        BIT     #1,ERROUT               ;                                        5117
055250  001404                        BEQ     22$
055252  104456                        TRAP    56                      ;                                        5119
055254  000465                        .WORD   465
055256  010624                        .WORD   MSG4
055260  000000                        .WORD   0
055262  016646  000034        22$:    MOV     34(SP),-(SP)            ; LUN,*                                  5120
055266  013746  032360                MOV     BOARD,-(SP)
055272  004737  035302                JSR     PC,UP.HARD.COUNT
055276  000427                        BR      26$                     ;                                        5114
055300  032737  000001  002260  23$:  BIT     #1,ERROUT               ;                                        5124
055306  001415                        BEQ     25$
055310  104457                        TRAP    57                      ;                                        5126
055312  000466                        .WORD   466
055314  010610                        .WORD   MSG3
055316  000000                        .WORD   0
055320  000410                        BR      25$                     ;                                        5127
055322  032737  000001  002260  24$:  BIT     #1,ERROUT               ;                                        5131
055330  001404                        BEQ     25$
055332  104457                        TRAP    57                      ;                                        5133
055334  000467                        .WORD   467
055336  010610                        .WORD   MSG3
055340  000000                        .WORD   0
055342  016646  000034        25$:    MOV     34(SP),-(SP)            ; LUN,*                                  5134
055346  013746  032360                MOV     BOARD,-(SP)
055352  004737  035430                JSR     PC,UP.SOFT.COUNT
055356  022626                26$:    CMP     (SP)+,(SP)+             ;                                        5105
```

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                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 3                  23-Oct-1980 14:57:05    PA:<

055360  010300                  27$:   MOV     R3,R0                   ; WRDCNT,*                                      5140
055362  006300                         ASL     R0
055364  063700  030706                 ADD     WPTR,R0
055370  010037  030706                 MOV     R0,WPTR
055374  010316                         MOV     R3,(SP)                 ; WRDCNT,*                                      5141
055376  012746  000400                 MOV     #400,-(SP)
055402  004737  005056                 JSR     PC,BL$DIV
055406  060400                         ADD     R4,R0                   ; SECTOR,*
055410  010004                         MOV     R0,R4                   ; *,SECTOR
055412  062706  000024                 ADD     #24,SP                  ;                                               4996
055416  000137  053754                 JMP     3$                      ;                                               4995
055422  005266  000012          28$:   INC     12(SP)                  ; LUN                                           4984
055426  026666  000012  000014  29$:   CMP     12(SP),14(SP)           ; LUN,*
055434  002002                         BGE     30$
055436  000137  053646                 JMP     2$
055442  005726                  30$:   TST     (SP)+                   ;                                               4982
055444  005266  000026                 INC     26(SP)                  ; COMP.FLAG                                     4981
055450  026627  000026  000001         CMP     26(SP),#1               ; COMP.FLAG,*
055456  003002                         BGT     31$
055460  000137  053620                 JMP     1$
055464  062706  000030          31$:   ADD     #30,SP                  ;                                               4928
055470  000207                         RTS     PC

                                        ; Routine Size:  485 words
                                        ; Maximum stack depth per invocation:  37 words
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               DEFINITION OF OPTION 4                   23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (44)

;       5150  %SBTTL  'DEFINITION OF OPTION 4'
;       5151
;       5152  ROUTINE OPT4: NOVALUE =
;       5153  BEGIN  !* 1 *  START OF ROUTINE
;       5154
;       5155  !++
;       5156  !  ROUTINE:     OPT4
;       5157  !
;       5158  !  PURPOSE:     TO LOOK FOR INTEREACTIONS BETWEEN SECTORS
;       5159  !               USING A MARCH TEST.
;       5160  !
;       5161  !  THE CODE IN BRIEF:
;       5162  !
;       5163  !  BEGIN 1 (START OF ROUTINE)
;       5164  !  SAY ROUTINE IS RUNNING
;       5165  !  WORD COUNT = 256
;       5166  !  GENERATE A BUFFER OF DATA
;       5167  !  GENERATE A BUFFER OF COMP
;       5168  !  INITIALIZE POINTERS TO 4 BUFFERS FOR WRITE/READ DATA/COMP
;       5169  !  INCR LUN FROM 0 TO LAST
;       5170  !  : BEGIN 2 (START OF LOGICAL UNIT SELECTION LOOP)
;       5171  !  : TESTLOOP:
;       5172  !  : : BEGIN 3 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
;       5173  !  : : IF UNIT IS ACTIVE
;       5174  !  : : THEN
;       5175  !  : : : BEGIN 4 (START OF TEST FOR AN ACTIVE UNIT)
;       5176  !  : : : INCR SECTOR FROM LOWEST TO HIGHEST
;       5177  !  : : : : BEGIN 4A (START OF 1ST SECTOR SELECTION LOOP)
;       5178  !  : : : : WRITE 'DATA'
;       5179  !  : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
;       5180  !  : : : : END 4A (END OF 1ST SECTOR SELECTION LOOP)
;       5181  !  : : : CHOOSE WHETHER TO WRITE CHECK OR READ 'DATA'
;       5182  !  : : : INCR SECTOR FROM LOWEST TO HIGHEST
;       5183  !  : : : : BEGIN 4B (START OF 2ND SECTOR SELECTION LOOP)
;       5184  !  : : : : DO THE WRITE CHECK OR READ OF 'DATA'
;       5185  !  : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
;       5186  !  : : : : WRITE 'COMP'
;       5187  !  : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
;       5188  !  : : : : END 4B (END OF 2ND SECTOR SELECTION LOOP)
;       5189  !  : : : CHOOSE WHETHER TO WRITE CHECK OR READ 'COMP'
;       5190  !  : : : DECR SECTOR FROM HIGHEST TO LOWEST
;       5191  !  : : : : BEGIN 4C (START OF 3RD SECTOR SELECTION LOOP)
;       5192  !  : : : : DO THE WRITE CHECK OR READ OF 'COMP'
;       5193  !  : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
;       5194  !  : : : : WRITE DATA
;       5195  !  : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
;       5196  !  : : : : END 4C (END OF 3RD SECTOR SELECTION LOOP)
;       5197  !  : : : CHOOSE WHETHER TO WRITE CHECK OR READ 'DATA'
;       5198  !  : : : INCR SECTOR FROM LOWEST TO HIGHEST
;       5199  !  : : : : BEGIN 4D (START OF 4TH SECTOR SELECTION LOOP)
;       5200  !  : : : : DO THE WRITE CHECK OR READ OF 'DATA'
;       5201  !  : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
```

```
9008 ;MLX4
9009 ;                DEFINITION OF OPTION 4
9010 ;
9011 ;          5202  !  : : : : END 4D (END OF 4TH SECTOR SELECTION LOOP)
9012 ;          5203  !  : : : END 4 (END OF TEST FOR AN ACTIVE UNIT)
9013 ;          5204  !  : : END 3 (END OF TESTLOOP)
9014 ;          5205  !  : END 2 (END OF LOGICAL UNIT SELECTION LOOP)
9015 ;          5206  !  RETURN
9016 ;          5207  !  END 1 (END OF ROUTINE)
9017 ;          5208  !--
9018 ;          5209
9019 ;          5210  LABEL
9020 ;          5211     LOOP;
9021 ;          5212
9022 ;          5213  LOCAL
9023 ;          5214     VALUE, OLDSEC, OLDCHN, PTR, COMMAND, DBL_VALUE,
9024 ;          5215     WDPTR, RDPTR, WCPTR, RCPTR;
9025 ;          5216
9026 ;          5217  PRINTB(SAY2,WRD34,RTN4);
9027 ;          5218     !;RUNNING OPT4'
9028 ;          5219
9029 ;          5220  GEN4(.MARPAT,WDBUFF);
9030 ;          5221  GEN4((-.MARPAT),WCBUFF);
9031 ;          5222  WDPTR = WDBUFF; !POINTER TO 256-WORD WRITE DATA BUFFER
9032 ;          5223  WCPTR = WCBUFF; !POINTER TO 256-WORD WRITE COMP BUFFER
9033 ;          5224  RDPTR = RDBUFF; !POINTER TO 256-WORD READ  DATA BUFFER
9034 ;          5225  RCPTR = RCBUFF; !POINTER TO 256-WORD READ  COMP BUFFER
9035 ;          5226
9036 ;          5227  INCR LUN FROM 0 TO (.L$UNIT - 1) DO
9037 ;          5228     BEGIN  !* 2 *  START OF LOGICAL UNIT SELECTION LOOP
9038 ;          5229     LOOP:
9039 ;          5230        BEGIN  !* 3 *  START OF THE LOOP THAT COMPLETELY TESTS 1 UNIT
9040 ;          5231        IF .DRIVE_STATUS[.LUN] EQL ACTIVE
9041 ;          5232        THEN
9042 ;          5233           BEGIN  !* 4 *  START OF TEST FOR AN ACTIVE UNIT
9043 ;          5234           L$LUN = .LUN;
9044 ;          5235           PRINTB(SAY1,WRD35);
9045 ;          5236              !'MARCHING'
9046 ;          5237           PRINTB(FMT2,WRD24);
9047 ;          5238              !'  UP'
9048 ;          5239           INCR SECTOR FROM LOWEST TO HIGHEST DO
9049 ;          5240              BEGIN  !* 4A *  START OF 1ST SECTOR SELECTION LOOP
9050 ;          5241              VALUE = WRITE(.LUN,256,.WDPTR,.SECTOR);
9051 ;          5242              !+
9052 ;          5243              !  SEE HOW SUCCESSFUL THE WRITE WAS:
9053 ;          5244              !-
9054 ;          5245              SELECTONE .VALUE OF          !SEE 'SYSERR' FOR DEFINITION
9055 ;          5246                 SET                       !OF ERROR # CONTAINED IN 'VALUE'
9056 ;          5247              [1] :
9057 ;          5248                 BEGIN  !* 4A1 *  RETRY ALLOWED
9058 ;          5249                 IF RETRY(SIX,WRITE,.LUN,256,.WDPTR,.SECTOR) NEQ 0
9059 ;          5250                 THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
9060 ;          5251                    BEGIN
9061 ;          5252                    WHY_DROPT[.LUN] = CODE_4;
9062 ;          5253                    ERRDF(401,MSG1,0);   !**** OPTION 4 ERROR 01 ****
```

```
9064 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
9065 ;                DEFINITION OF OPTION 4                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (44)
9066
9067 ;          5254                    DODU(.LUN);
9068 ;          5255                    LEAVE LOOP;             !JUMP JUST BEYOND END OF BLOCK * 3 *
9069 ;          5256                    END;
9070 ;          5257                 END;   !* 4A1 *
9071 ;          5258              [2] :
9072 ;          5259                 BEGIN  !* 4A2 *  FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
9073 ;          5260                 WHY_DROPT[.LUN] = CODE_5;
9074 ;          5261                 ERRDF(402,MSG1,0);   !**** OPTION 4 ERROR 02 ****
9075 ;          5262                 DODU(.LUN);
9076 ;          5263                 LEAVE LOOP;             !JUMP JUST BEYOND END OF BLOCK * 3 *
9077 ;          5264                 END;   !* 4A2 *
9078 ;          5265              [3] :
9079 ;          5266                 BEGIN  !* 4A3 *  FATAL DRIVE ERROR -- NO RETRY ALLOWED
9080 ;          5267                 ERRDF(403,MSG1,0);   !**** OPTION 4 ERROR 03 ****
9081 ;          5268                 WHY_DROPT[.LUN] = CODE_6;
9082 ;          5269                 DODU(.LUN);
9083 ;          5270                 LEAVE LOOP;             !JUMP JUST BEYOND END OF BLOCK * 3 *
9084 ;          5271                 END;   !* 4A3 *
9085 ;          5272
9086 ;          5273                 TES;
9087 ;          5274
9088 ;          5275              END;   !* 4A *  END OF 1ST SECTOR SELECTION LOOP
9089 ;          5276
9090 ;          5277           PRINTB(FMT2,WRD24);
9091 ;          5278              !'  UP'
9092 ;          5279           COMMAND = CHOOSE();
9093 ;          5280           INCR SECTOR FROM LOWEST TO HIGHEST DO
9094 ;          5281              BEGIN  !* 4B *  START OF 2ND SECTOR SELECTION LOOP
9095 ;          5282              IF .COMMAND EQL READ
9096 ;          5283              THEN
9097 ;          5284                 BEGIN
9098 ;          5285                 PTR = .RDPTR;
9099 ;          5286                 VALUE = READ(.LUN,256,.PTR,.SECTOR);
9100 ;          5287                 END
9101 ;          5288              ELSE
9102 ;          5289                 BEGIN
9103 ;          5290                 PTR = .WDPTR;
9104 ;          5291                 VALUE = CHECK(.LUN,256,.PTR,.SECTOR);
9105 ;          5292                 END;
9106 ;          5293              !+
9107 ;          5294              !  SEE HOW SUCCESSFUL THE OPERATION WAS:
9108 ;          5295              !-
9109 ;          5296              SELECTONE .VALUE OF           !SEE 'SYSERR' FOR DEFINITION
9110 ;          5297                 SET                        !OF ERROR # CONTAINED IN 'VALUE'
9111 ;          5298              [0] :
9112 ;          5299                 IF .COMMAND EQL READ
9113 ;          5300                 THEN
9114 ;          5301                    BEGIN
9115 ;          5302                    IF (DBL_VALUE = DOUBLE_CHECK(.WDPTR,.RDPTR,256)) NEQ 0
9116 ;          5303                    THEN
9117 ;          5304                       BEGIN
9118 ;          5305                       SAYWHO(.LUN);
```

```
9120 ;MLX4
9121 ;                  DEFINITION OF OPTION 4
9122
9123 ;          5306                        PRINTB(SAY1,MSG5);
9124 ;          5307                           !'ECC LOGIC FAILED TO DETECT DATA ERROR'
9125 ;          5308                        PRINTB(FMT12A,..DBL_VALUE,..DBL_VALUE);
9126 ;          5309                           !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
9127 ;          5310                        DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
9128 ;          5311                        PRINTB(FMT12B,..DBL_VALUE,..DBL_VALUE);
9129 ;          5312                           !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
9130 ;          5313                        WHY_DROPT[.LUN] = CODE_8;
9131 ;          5314                        ERRDF(404,MSG1,0);   !**** OPTION 4 ERROR 04 ****
9132 ;          5315                        DODU(.LUN);
9133 ;          5316                        LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 4 *
9134 ;          5317                        END;
9135 ;          5318                     END;
9136 ;          5319                [1] :
9137 ;          5320                   BEGIN  !* 4B1 *  RETRY ALLOWED
9138 ;          5321                   IF RETRY(SIX,.COMMAND,.LUN,256,.PTR,.SECTOR) NEQ 0
9139 ;          5322                   THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
9140 ;          5323                      BEGIN
9141 ;          5324                      WHY_DROPT[.LUN] = CODE_4;
9142 ;          5325                      ERRDF(405,MSG1,0);   !**** OPTION 4 ERROR 05 ****
9143 ;          5326                      DODU(.LUN);
9144 ;          5327                      LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
9145 ;          5328                      END;
9146 ;          5329                   END;   !* 4B1 *
9147 ;          5330                [2] :
9148 ;          5331                   BEGIN  !* 4B2 *  FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
9149 ;          5332                   WHY_DROPT[.LUN] = CODE_5;
9150 ;          5333                   ERRDF(406,MSG1,0);   !**** OPTION 4 ERROR 06 ****
9151 ;          5334                   DODU(.LUN);
9152 ;          5335                   LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
9153 ;          5336                   END;   !* 4B2 *
9154 ;          5337                [3] :
9155 ;          5338                   BEGIN  !* 4B3 *  FATAL DRIVE ERROR -- NO RETRY ALLOWED
9156 ;          5339                   ERRDF(407,MSG1,0);   !**** OPTION 4 ERROR 07 ****
9157 ;          5340                   WHY_DROPT[.LUN] = CODE_6;
9158 ;          5341                   DODU(.LUN);
9159 ;          5342                   LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
9160 ;          5343                   END;   !* 4B3 *
9161 ;          5344                [4] :
9162 ;          5345                   BEGIN  !* 4B4 *  UNRECOVERABLE DATA ERROR
9163 ;          5346                   ISOLATE();
9164 ;          5347                   ERRDF(408,MSG2,0);   !**** OPTION 4 ERROR 08 ****
9165 ;          5348                   WHY_DROPT[.LUN] = CODE_7;
9166 ;          5349                   DODU(.LUN);
9167 ;          5350                   LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
9168 ;          5351                   END;   !* 4B4 *
9169 ;          5352                [5] :
9170 ;          5353                   BEGIN  !* 4B5 *  RECOVERABLE DATA ERROR
9171 ;          5354                   ISOLATE();
9172 ;          5355                   IF .ERROUT
9173 ;          5356                   THEN  PRINTB(FMT10B,,CHAN);
9174 ;          5357                            !'    BIT QQ'
```

```
9176 ;MLX4
9177 ;                  DEFINITION OF OPTION 4
9178
9179 ;          5358                    OLDSEC = .MLEL;
9180 ;          5359                    OLDCHN = .CHAN;
9181 ;          5360                    IF RETRY(ONE,.COMMAND,.LUN,256,.PTR,.SECTOR) EQL 5
9182 ;          5361                    THEN
9183 ;          5362                        IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
9184 ;          5363                        THEN
9185 ;          5364                            BEGIN
9186 ;          5365                            IF .ERROUT
9187 ;          5366                            THEN
9188 ;          5367                            ERRHRD(409,MSG4,0);  !**** OPTION 4 ERROR 09 ****
9189 ;          5368                            UP_HARD_COUNT(.LUN,.BOARD);
9190 ;          5369                            END
9191 ;          5370                        ELSE
9192 ;          5371                            BEGIN
9193 ;          5372                            IF .ERROUT
9194 ;          5373                            THEN
9195 ;          5374                            ERRSOFT(410,MSG3,0); !**** OPTION 4 ERROR 10 ****
9196 ;          5375                            UP_SOFT_COUNT(.LUN,.BOARD);
9197 ;          5376                            END
9198 ;          5377                    ELSE
9199 ;          5378                        BEGIN
9200 ;          5379                        IF .ERROUT
9201 ;          5380                        THEN
9202 ;          5381                        ERRSOFT(411,MSG3,0); !**** OPTION 4 ERROR 11 ****
9203 ;          5382                        UP_SOFT_COUNT(.LUN,.BOARD);
9204 ;          5383                        END;
9205 ;          5384                    END;    !* 4B5 *
9206 ;          5385
9207 ;          5386                    TES;
9208 ;          5387
9209 ;          5388                VALUE = WRITE(.LUN,256,.WCPTR,.SECTOR);
9210 ;          5389                !+
9211 ;          5390                !  SEE HOW SUCCESSFUL THE WRITE WAS:
9212 ;          5391                !-
9213 ;          5392                SELECTONE .VALUE OF             !SEE 'SYSERR' FOR DEFINITION
9214 ;          5393                    SET                         !OF ERROR # CONTAINED IN 'VALUE'
9215 ;          5394                [1] :
9216 ;          5395                    BEGIN  !* 4B6 *  RETRY ALLOWED
9217 ;          5396                    IF RETRY(SIX,WRITE,.LUN,256,.WCPTR,.SECTOR) NEQ 0
9218 ;          5397                    THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
9219 ;          5398                        BEGIN
9220 ;          5399                        WHY_DROPT[.LUN] = CODE_4;
9221 ;          5400                        ERRDF(412,MSG1,0);    !**** OPTION 4 ERROR 12 ****
9222 ;          5401                        DODU(.LUN);
9223 ;          5402                        LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 3 *
9224 ;          5403                        END;
9225 ;          5404                    END;    !* 4B6 *
9226 ;          5405                [2] :
9227 ;          5406                    BEGIN  !* 4B7 *  FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
9228 ;          5407                    WHY_DROPT[.LUN] = CODE_5;
9229 ;          5408                    ERRDF(413,MSG1,0);    !**** OPTION 4 ERROR 13 ****
9230 ;          5409                    DODU(.LUN);
```

```
9234
9235 ;          5410                LEAVE LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
9236 ;          5411                END;   !* 4B7 *
9237 ;          5412             [3] :
9238 ;          5413                BEGIN  !* 4B8 *  FATAL DRIVE ERROR -- NO RETRY ALLOWED
9239 ;          5414                ERRDF(414,MSG1,0);   !**** OPTION 4 ERROR 14 ****
9240 ;          5415                WHY_DROPT[.LUN] = CODE_6;
9241 ;          5416                DODU(.LUN);
9242 ;          5417                LEAVE LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
9243 ;          5418                END;   !* 4B8 *
9244 ;          5419
9245 ;          5420                TES;
9246 ;          5421
9247 ;          5422             END;   !* 4B * END OF 2ND SECTOR SELECTION LOOP
9248 ;          5423
9249 ;          5424          PRINTB(FMT2,WRD25);
9250 ;          5425             !'  DOWN'
9251 ;          5426          COMMAND = CHOOSE();
9252 ;          5427          DECR SECTOR FROM HIGHEST TO LOWEST DO
9253 ;          5428             BEGIN  !* 4C *  START OF 3RD SECTOR SELECTION LOOP
9254 ;          5429             IF .COMMAND EQL READ
9255 ;          5430             THEN
9256 ;          5431                BEGIN
9257 ;          5432                PTR = .RCPTR;
9258 ;          5433                VALUE = READ(.LUN,256,.PTR,.SECTOR);
9259 ;          5434                END
9260 ;          5435             ELSE
9261 ;          5436                BEGIN
9262 ;          5437                PTR = .WCPTR;
9263 ;          5438                VALUE = CHECK(.LUN,256,.PTR,.SECTOR);
9264 ;          5439                END;
9265 ;          5440          !+
9266 ;          5441          !  SEE HOW SUCCESSFUL THE OPERATION WAS:
9267 ;          5442          !-
9268 ;          5443          SELECTONE .VALUE OF           !SEE 'SYSERR' FOR DEFINITION
9269 ;          5444             SET                        !OF ERROR # CONTAINED IN 'VALUE'
9270 ;          5445          [0] :
9271 ;          5446             IF .COMMAND EQL READ
9272 ;          5447             THEN
9273 ;          5448                BEGIN
9274 ;          5449                IF (DBL_VALUE = DOUBLE_CHECK(.WCPTR,.RCPTR,256)) NEQ 0
9275 ;          5450                THEN
9276 ;          5451                   BEGIN
9277 ;          5452                   SAYWHO(.LUN);
9278 ;          5453                   PRINTB(SAY1,MSG5);
9279 ;          5454                      !'ECC LOGIC FAILED TO DETECT DATA ERROR'
9280 ;          5455                   PRINTB(FMT12A,..DBL_VALUE,..DBL_VALUE);
9281 ;          5456                      !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
9282 ;          5457                   DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
9283 ;          5458                   PRINTB(FMT12B,..DBL_VALUE,..DBL_VALUE);
9284 ;          5459                      !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
9285 ;          5460                   WHY_DROPT[.LUN] = CODE_8;
9286 ;          5461                   ERRDF(415,MSG1,0);   !**** OPTION 4 ERROR 15 ****
```

```
9288 ;MLX4
9289 ;                  DEFINITION OF OPTION 4
9290
9291 ;          5462                    DODU(.LUN);
9292 ;          5463                    LEAVE LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
9293 ;          5464                    END;
9294 ;          5465                END;
9295 ;          5466            [1] :
9296 ;          5467                BEGIN  !* 4C1 *  RETRY ALLOWED
9297 ;          5468                IF RETRY(SIX,.COMMAND,.LUN,256,.PTR,.SECTOR) NEQ 0
9298 ;          5469                THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
9299 ;          5470                    BEGIN
9300 ;          5471                    WHY_DROPT[.LUN] = CODE_4;
9301 ;          5472                    ERRDF(416,MSG1,0);   !**** OPTION 4 ERROR 16 ****
9302 ;          5473                    DODU(.LUN);
9303 ;          5474                    LEAVE LOOP;         !JUMP JUST BEYOND END OF BLOCK * 3 *
9304 ;          5475                    END;
9305 ;          5476                END;   !* 4C1 *
9306 ;          5477            [2] :
9307 ;          5478                BEGIN  !* 4C2 *  FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
9308 ;          5479                WHY_DROPT[.LUN] = CODE_5;
9309 ;          5480                ERRDF(417,MSG1,0);   !**** OPTION 4 ERROR 17 ****
9310 ;          5481                DODU(.LUN);
9311 ;          5482                LEAVE LOOP;         !JUMP JUST BEYOND END OF BLOCK * 3 *
9312 ;          5483                END;   !* 4C2 *
9313 ;          5484            [3] :
9314 ;          5485                BEGIN  !* 4C3 *  FATAL DRIVE ERROR -- NO RETRY ALLOWED
9315 ;          5486                ERRDF(418,MSG1,0);   !**** OPTION 4 ERROR 18 ****
9316 ;          5487                WHY_DROPT[.LUN] = CODE_6;
9317 ;          5488                DODU(.LUN);
9318 ;          5489                LEAVE LOOP;         !JUMP JUST BEYOND END OF BLOCK * 3 *
9319 ;          5490                END;   !* 4C3 *
9320 ;          5491            [4] :
9321 ;          5492                BEGIN  !* 4C4 *  UNRECOVERABLE DATA ERROR
9322 ;          5493                ISOLATE();
9323 ;          5494                ERRDF(419,MSG2,0);   !**** OPTION 4 ERROR 19 ****
9324 ;          5495                WHY_DROPT[.LUN] = CODE_7;
9325 ;          5496                DODU(.LUN);
9326 ;          5497                LEAVE LOOP;         !JUMP JUST BEYOND END OF BLOCK * 3 *
9327 ;          5498                END;   !* 4C4 *
9328 ;          5499            [5] :
9329 ;          5500                BEGIN  !* 4C5 *  RECOVERABLE DATA ERROR
9330 ;          5501                ISOLATE();
9331 ;          5502                IF .ERROUT
9332 ;          5503                THEN  PRINTB(FMT10B,.CHAN);
9333 ;          5504                        !'    BIT QQ'
9334 ;          5505                OLDSEC = .MLEL;
9335 ;          5506                OLDCHN = .CHAN;
9336 ;          5507                IF RETRY(ONE,.COMMAND,.LUN,256,.PTR,.SECTOR) EQL 5
9337 ;          5508                THEN
9338 ;          5509                    IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
9339 ;          5510                    THEN
9340 ;          5511                        BEGIN
9341 ;          5512                        IF .ERROUT
9342 ;          5513                        THEN
```

```
;MLX4
;                DEFINITION OF OPTION 4

                                ERRHRD(420,MSG4,0);  !**** OPTION 4 ERROR 20 ****
                                UP_HARD_COUNT(.LUN,.BOARD);
                                END
                            ELSE
                                BEGIN
                                IF .ERROUT
                                THEN
                                ERRSOFT(421,MSG3,0); !**** OPTION 4 ERROR 21 ****
                                UP_SOFT_COUNT(.LUN,.BOARD);
                                END
                        ELSE
                            BEGIN
                            IF .ERROUT
                            THEN
                            ERRSOFT(422,MSG3,0); !**** OPTION 4 ERROR 22 ****
                            UP_SOFT_COUNT(.LUN,.BOARD);
                            END;
                        END;   !* 4C5 *

                        TES;

                    VALUF = WRITE(.LUN,256,.WDPTR,.SECTOR);
                    !+
                    !  SEE HOW SUCCESSFUL THE WRITE WAS:
                    !-
                    SELECTONE .VALUE OF          !SEE 'SYSERR' FOR DEFINITION
                        SET                      !OF ERROR # CONTAINED IN 'VALUE'
                    [1] :
                        BEGIN  !* 4C6 *  RETRY ALLOWED
                        IF RETRY(SIX,WRITE,.LUN,256,.WDPTR,.SECTOR) NEQ 0
                        THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
                            BEGIN
                            WHY_DROPT[.LUN] = CODE_4;
                            ERRDF(423,MSG1,0);   !**** OPTION 4 ERROR 23 ****
                            DODU(.LUN);
                            LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
                            END;
                        END;   !* 4C6 *
                    [2] :
                        BEGIN  !* 4C7 *  FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
                        WHY_DROPT[.LUN] = CODE_5;
                        ERRDF(424,MSG1,0);   !**** OPTION 4 ERROR 24 ****
                        DODU(.LUN);
                        LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
                        END;   !* 4C7 *
                    [3] :
                        BEGIN  !* 4C8 *  FATAL DRIVE ERROR -- NO RETRY ALLOWED
                        ERRDF(425,MSG1,0);   !**** OPTION 4 ERROR 25 ****
                        WHY_DROPT[.LUN] = CODE_6;
                        DODU(.LUN);
                        LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
                        END;   !* 4C8 *
```

```
9402
9403 ;          5566
9404 ;          5567                  TES;
9405 ;          5568
9406 ;          5569               END;   !* 4C *  END OF 3RD SECTOR SELECTION LOOP
9407 ;          5570
9408 ;          5571            PRINTB(FMT2,WRD24);
9409 ;          5572              !'  UP'
9410 ;          5573            COMMAND = CHOOSE();
9411 ;          5574            INCR SECTOR FROM LOWEST TO HIGHEST DO
9412 ;          5575               BEGIN  !* 4D *  START OF 4TH SECTOR SELECTION LOOP
9413 ;          5576               IF .COMMAND EQL READ
9414 ;          5577               THEN
9415 ;          5578                  BEGIN
9416 ;          5579                  PTR = .RDPTR;
9417 ;          5580                  VALUE = READ(.LUN,256,.PTR,.SECTOR);
9418 ;          5581                  END
9419 ;          5582               ELSE
9420 ;          5583                  BEGIN
9421 ;          5584                  PTR = .WDPTR;
9422 ;          5585                  VALUE = CHECK(.LUN,256,.PTR,.SECTOR);
9423 ;          5586                  END;
9424 ;          5587               !+
9425 ;          5588               !  SEE HOW SUCCESSFUL THE OPERATION WAS:
9426 ;          5589               !-
9427 ;          5590               SELECTONE .VALUE OF          !SEE 'SYSERR' FOR DEFINITION
9428 ;          5591                  SET                       !OF ERROR # CONTAINED IN 'VALUE'
9429 ;          5592               [0] :
9430 ;          5593                  IF .COMMAND EQL READ
9431 ;          5594                  THEN
9432 ;          5595                     BEGIN
9433 ;          5596                     IF (DBL_VALUE = DOUBLE_CHECK(.WDPTR,.RDPTR,256)) NEQ 0
9434 ;          5597                     THEN
9435 ;          5598                        BEGIN
9436 ;          5599                        SAYWHO(.LUN);
9437 ;          5600                        PRINTB(SAY1,MSG5);
9438 ;          5601                           !'ECC LOGIC FAILED TO DETECT DATA ERROR'
9439 ;          5602                        PRINTB(FMT12A,..DBL_VALUE,..DBL_VALUE);
9440 ;          5603                           !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
9441 ;          5604                        DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
9442 ;          5605                        PRINTB(FMT12B,..DBL_VALUE,..DBL_VALUE);
9443 ;          5606                           !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
9444 ;          5607                        WHY_DROPT[.LUN] = CODE_8;
9445 ;          5608                        ERRDF(426,MSG1,0);   !**** OPTION 4 ERROR 26 ****
9446 ;          5609                        DODU(.LUN);
9447 ;          5610                        LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 4 *
9448 ;          5611                        END;
9449 ;          5612                     END;
9450 ;          5613               [1] :
9451 ;          5614                  BEGIN  !* 4D1 *  RETRY ALLOWED
9452 ;          5615                  IF RETRY(SIX,.COMMAND,.LUN,256,.PTR,.SECTOR) NEQ 0
9453 ;          5616                  THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
9454 ;          5617                     BEGIN
```

```
;MLX4
;                    DEFINITION OF OPTION 4

;          5618                  WHY_DROPT[.LUN] = CODE_4;
;          5619                  ERRDF(427,MSG1,0);   !**** OPTION 4 ERROR 27 ****
;          5620                  DODU(.LUN);
;          5621                  LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
;          5622                  END;
;          5623               END;   !* 4D1 *
;          5624            [2] :
;          5625               BEGIN  !* 4D2 *  FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
;          5626               WHY_DROPT[.LUN] = CODE_5;
;          5627               ERRDF(428,MSG1,0);   !**** OPTION 4 ERROR 28 ****
;          5628               DODU(.LUN);
;          5629               LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
;          5630               END;   !* 4D2 *
;          5631            [3] :
;          5632               BEGIN  !* 4D3 *  FATAL DRIVE ERROR -- NO RETRY ALLOWED
;          5633               ERRDF(429,MSG1,0);   !**** OPTION 4 ERROR 29 ****
;          5634               WHY_DROPT[.LUN] = CODE_6;
;          5635               DODU(.LUN);
;          5636               LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
;          5637               END;   !* 4D3 *
;          5638            [4] :
;          5639               BEGIN  !* 4D4 *  UNRECOVERABLE DATA ERROR
;          5640               ISOLATE();
;          5641               ERRDF(430,MSG2,0);   !**** OPTION 4 ERROR 30 ****
;          5642               WHY_DROPT[.LUN] = CODE_7;
;          5643               DODU(.LUN);
;          5644               LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
;          5645               END;   !* 4D4 *
;          5646            [5] :
;          5647               BEGIN  !* 4D5 *  RECOVERABLE DATA ERROR
;          5648               ISOLATE();
;          5649               IF .ERROUT
;          5650               THEN  PRINTB(FMT10B,.CHAN);
;          5651                     !'    BIT QQ'
;          5652               OLDSEC = .MLEL;
;          5653               OLDCHN = .CHAN;
;          5654               IF RETRY(ONE,.COMMAND,.LUN,256,.PTR,.SECTOR) EQL 5
;          5655               THEN
;          5656                  IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
;          5657                  THEN
;          5658                     BEGIN
;          5659                     IF .ERROUT
;          5660                     THEN
;          5661                     ERRHRD(431,MSG4,0);  !**** OPTION 4 ERROR 31 ****
;          5662                     UP_HARD_COUNT(.LUN,.BOARD);
;          5663                     END
;          5664                  ELSE
;          5665                     BEGIN
;          5666                     IF .ERROUT
;          5667                     THEN
;          5668                     ERRSOFT(432,MSG3,0); !**** OPTION 4 ERROR 32 ****
;          5669                     UP_SOFT_COUNT(.LUN,.BOARD);
```

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;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               DEFINITION OF OPTION 4                   23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (44)

;          5670                     END
;          5671                 ELSE
;          5672                    BEGIN
;          5673                    IF .ERROUT
;          5674                    THEN
;          5675                    ERRSOFT(433,MSG3,0); !**** OPTION 4 ERROR 33 ****
;          5676                    UP_SOFT_COUNT(.LUN,.BOARD);
;          5677                    END;
;          5678                END;  !* 4D5 *
;          5679
;          5680                TES;
;          5681
;          5682            END;   !* 4D *  END OF 4TH SECTOR SELECTION LOOP
;          5683        END;   !* 4 *  END OF TEST FOR AN ACTIVE UNIT
;          5684    END;   !* 3 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
;          5685 END;   !* 2 *  END OF LOGICAL UNIT SELECTION LOOP
;          5686 RETURN;
;          5687 END;   !* 1 *  END OF ROUTINE

                                .SBTTL  OPT4 DEFINITION OF OPTION 4
055472  004137  005222    OPT4: JSR     R1,$SAVE5                 ;                    5152
055476  162706  000030          SUB     #30,SP
055502  012746  007272          MOV     #RTN4,-(SP)               ;                    5217
055506  012746  006766          MOV     #WRD34,-(SP)
055512  012746  006522          MOV     #SAY2,-(SP)
055516  012746  000003          MOV     #3,-(SP)
055522  010600                  MOV     SP,R0                     ; SP,*
055524  104414                  TRAP    14
055526  013716  002246          MOV     MARPAT,(SP)               ;                    5220
055532  012746  010706          MOV     #WDBUFF,-(SP)
055536  004737  036654          JSR     PC,GEN4
055542  013716  002246          MOV     MARPAT,(SP)               ;                    5221
055546  005416                  NEG     (SP)
055550  012746  011706          MOV     #WCBUFF,-(SP)
055554  004737  036654          JSR     PC,GEN4
055560  012766  010706  000016  MOV     #WDBUFF,16(SP)            ; *,WDPTR            5222
055566  012766  011706  000030  MOV     #WCBUFF,30(SP)            ; *,WCPTR            5223
055574  012766  020706  000026  MOV     #RDBUFF,26(SP)            ; *,RDPTR            5224
055602  012766  021706  000034  MOV     #RCBUFF,34(SP)            ; *,RCPTR            5225
055610  013766  002012  000042  MOV     L$UNIT,42(SP)             ;                    5227
055616  005066  000014          CLR     14(SP)                    ; LUN
055622  000137  062536          JMP     83$
055626  016600  000014    1$:   MOV     14(SP),R0                 ; LUN,*              5231
055632  006200                  ASR     R0
055634  006200                  ASR     R0
055636  006200                  ASR     R0
```

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                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;       DEFINITION OF OPTION 4                           23-Oct-1980 14:57:05    PA:<

055640  062700  032460                        ADD     #DRIVE.STATUS,R0
055644  010046                                MOV     R0,-(SP)
055646  016646  000016                        MOV     16(SP),-(SP)            ; LUN,*
055652  042716  177770                        BIC     #177770,(SP)
055656  012746  000001                        MOV     #1,-(SP)
055662  005046                                CLR     -(SP)
055664  004737  004244                        JSR     PC,BL$GT2
055670  062706  000010                        ADD     #10,SP
055674  005300                                DEC     R0
055676  001160                                BNE     6$
055700  016637  000014  002074                MOV     14(SP),L$LUN            ; LUN,*                                  5234
055706  012746  006776                        MOV     #WRD35,-(SP)            ;                                        5235
055712  012746  006514                        MOV     #SAY1,-(SP)
055716  012746  000002                        MOV     #2,-(SP)
055722  010600                                MOV     SP,R0                   ; SP,*
055724  104414                                TRAP    14
055726  012716  006754                        MOV     #WRD24,(SP)             ;                                        5237
055732  012746  005602                        MOV     #FMT2,-(SP)
055736  012746  000002                        MOV     #2,-(SP)
055742  010600                                MOV     SP,R0                   ; SP,*
055744  104414                                TRAP    14
055746  016600  000026                        MOV     26(SP),R0               ; LUN,*                                  5239
055752  006300                                ASL     R0
055754  012766  032476  000052                MOV     #LOW.SECT,52(SP)
055762  060066  000052                        ADD     R0,52(SP)
055766  012766  032516  000050                MOV     #TOP.SECT,50(SP)
055774  060066  000050                        ADD     R0,50(SP)
056000  017602  000050                        MOV     @50(SP),R2
056004  017604  000052                        MOV     @52(SP),R4              ; *,SECTOR
056010  005304                                DEC     R4                      ; SECTOR
056012  000515                                BR      8$
056014  016646  000026            2$:         MOV     26(SP),-(SP)            ; LUN,*                                  5241
056020  012746  000400                        MOV     #400,-(SP)
056024  016646  000034                        MOV     34(SP),-(SP)            ; WDPTR,*
056030  010446                                MOV     R4,-(SP)                ; SECTOR,*
056032  004737  042246                        JSR     PC,WRITE
056036  010005                                MOV     R0,R5                   ; *,VALUE
056040  020527  000001                        CMP     R5,#1                   ; VALUE,*                                5245
056044  001036                                BNE     3$
056046  012746  000006                        MOV     #6,-(SP)                ;                                        5249
056052  012746  042246                        MOV     #WRITE,-(SP)
056056  016646  000042                        MOV     42(SP),-(SP)            ; LUN,*
056062  012746  000400                        MOV     #400,-(SP)
056066  016646  000050                        MOV     50(SP),-(SP)            ; WDPTR,*
056072  010446                                MOV     R4,-(SP)                ; SECTOR,*
056074  004737  043046                        JSR     PC,RETRY
056100  062706  000014                        ADD     #14,SP
056104  005700                                TST     R0
056106  001455                                BEQ     7$
056110  016600  000036                        MOV     36(SP),R0               ; LUN,*                                  5252
056114  112760  000004  032464                MOVB    #4,WHY.DROPT(R0)
056122  104455                                TRAP    55                      ;                                        5253
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                                        ;MLX4                                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 4                                  23-Oct-1980 14:57:05    PA:<
                                        .WORD   621
                                        .WORD   MSG1
                                        .WORD   0
056130  000000                          MOV     36(SP),R0               ; LUN,*                                 5254
056132  016600  000036                  TRAP    51
056136  104451                          BR      5$                      ;                                       5255
056140  000435                  3$:     CMP     R5,#2                   ; VALUE,*                               5245
056142  020527  000002                  BNE     4$
056146  001015                          MOV     36(SP),R0               ; LUN,*                                 5260
056150  016600  000036                  MOVB    #5,WHY.DROPT(R0)
056154  112760  000005  032464          TRAP    55                      ;                                       5261
056162  104455                          .WORD   622
056164  000622                          .WORD   MSG1
056166  010512                          .WORD   0
056170  000000                          MOV     36(SP),R0               ; LUN,*                                 5262
056172  016600  000036                  TRAP    51
056176  104451                          BR      5$                      ;                                       5263
056200  000415                  4$:     CMP     R5,#3                   ; VALUE,*                               5245
056202  020527  000003                  BNE     7$
056206  001015                          TRAP    55                      ;                                       5267
056210  104455                          .WORD   623
056212  000623                          .WORD   MSG1
056214  010512                          .WORD   0
056216  000000                          MOV     36(SP),R0               ; LUN,*                                 5268
056220  016600  000036                  MOVB    #6,WHY.DROPT(R0)
056224  112760  000006  032464          TRAP    51                      ;                                       5269
056232  104451                  5$:     ADD     #22,SP                  ;                                       5270
056234  062706  000022          6$:     BR      14$
056240  000566                  7$:     ADD     #10,SP                  ;                                       5240
056242  062706  000010          8$:     INC     R4                      ; SECTOR                                5239
056246  005204                          CMP     R4,R2                   ; SECTOR,*
056250  020402                          BLE     2$
056252  003660                          MOV     #WRD24,(SP)             ;                                       5277
056254  012716  006754                  MOV     #FMT2,-(SP)
056260  012746  005602                  MOV     #2,-(SP)
056264  012746  000002                  MOV     SP,R0                   ; SP,*
056270  010600                          TRAP    14
056272  104414                          JSR     PC,CHOOSE               ;                                       5279
056274  004737  043010                  MOV     R0,R1                   ; *,COMMAND
056300  010001                          MOV     @54(SP),36(SP)          ;                                       5280
056302  017666  000054  000036          MOV     @56(SP),R4              ; *,SECTOR
056310  017604  000056                  DEC     R4                      ; SECTOR
056314  005304                          JMP     32$
056316  000137  057666          9$:     CLR     R2                      ;                                       5282
056322  005002                          CMP     R1,#READ                ; COMMAND,*
056324  020127  042434                  BNE     10$
056330  001014                          INC     R2
056332  005202                          MOV     44(SP),R3               ; RDPTR,PTR                             5285
056334  016603  000044                  MOV     32(SP),-(SP)            ; LUN,*                                 5286
056340  016646  000032                  MOV     #400,-(SP)
056344  012746  000400                  MOV     R3,-(SP)                ; PTR,*
056350  010346                          MOV     R4,-(SP)                ; SECTOR,*
056352  010446
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                                                                                                23-Oct-1980 15:01:43    TOPS
                                                                                                23-Oct-1980 14:57:05    PA:<
 9680                                   ;MLX4
 9681                                   ;               DEFINITION OF OPTION 4
 9682
 9683 056354  004737  042434                    JSR     PC,READ
 9684 056360  000412                            BR      11$
 9685 056362  016603  000034           10$:     MOV     34(SP),R3               ; WDPTR,PTR                     5290
 9686 056366  016646  000032                    MOV     32(SP),-(SP)            ; LUN,*                         5291
 9687 056372  012746  000400                    MOV     #400,-(SP)
 9688 056376  010346                            MOV     R3,-(SP)                ; PTR,*
 9689 056400  010446                            MOV     R4,-(SP)                ; SECTOR,*
 9690 056402  004737  042622                    JSR     PC,CHECK
 9691 056406  010005                   11$:     MOV     R0,R5                   ; *,VALUE
 9692 056410  001104                            BNE     15$                     ;                               5296
 9693 056412  006002                            ROR     R2                      ;                               5299
 9694 056414  103402                            BLO     13$
 9695 056416  000137  057432           12$:     JMP     27$                                                     5302
 9696 056422  016646  000044           13$:     MOV     44(SP),-(SP)            ; WDPTR,*
 9697 056426  016646  000056                    MOV     56(SP),-(SP)            ; RDPTR,*
 9698 056432  012746  000400                    MOV     #400,-(SP)
 9699 056436  004737  041226                    JSR     PC,DOUBLE.CHECK
 9700 056442  062706  000006                    ADD     #6,SP
 9701 056446  010066  000060                    MOV     R0,60(SP)               ; *,DBL.VALUE
 9702 056452  001761                            BEQ     12$
 9703 056454  016646  000042                    MOV     42(SP),-(SP)            ; LUN,*                         5305
 9704 056460  004737  033436                    JSR     PC,SAYWHO
 9705 056464  012716  010640                    MOV     #MSG5,(SP)              ;                               5306
 9706 056470  012746  006514                    MOV     #SAY1,-(SP)
 9707 056474  012746  000002                    MOV     #2,-(SP)
 9708 056500  010600                            MOV     SP,R0                   ; SP,*
 9709 056502  104414                            TRAP    14
 9710 056504  016616  000066                    MOV     66(SP),(SP)             ; DBL.VALUE,*                   5308
 9711 056510  017646  000066                    MOV     @66(SP),-(SP)           ; DBL.VALUE,*
 9712 056514  012746  006332                    MOV     #FMT12A,-(SP)
 9713 056520  012746  000003                    MOV     #3,-(SP)
 9714 056524  010600                            MOV     SP,R0                   ; SP,*
 9715 056526  104414                            TRAP    14
 9716 056530  062766  010000  000074           ADD     #10000,74(SP)           ; *,DBL.VALUE                   5310
 9717 056536  016616  000074                    MOV     74(SP),(SP)             ; DBL.VALUE,*                   5311
 9718 056542  017646  000074                    MOV     @74(SP),-(SP)           ; DBL.VALUE,*
 9719 056546  012746  006400                    MOV     #FMT12B,-(SP)
 9720 056552  012746  000003                    MOV     #3,-(SP)
 9721 056556  010600                            MOV     SP,R0                   ; SP,*
 9722 056560  104414                            TRAP    14
 9723 056562  016602  000064                    MOV     64(SP),R2               ; LUN,*                         5313
 9724 056566  112762  000010  032464           MOVB    #10,WHY.DROPT(R2)
 9725 056574  104455                            TRAP    55                      ;                               5314
 9726 056576  000624                            .WORD   624
 9727 056600  010512                            .WORD   MSG1
 9728 056602  000000                            .WORD   0
 9729 056604  016600  000064                    MOV     64(SP),R0               ; LUN,*                         5315
 9730 056610  104451                            TRAP    51
 9731 056612  062706  000050                    ADD     #50,SP                  ;                               5316
 9732 056616  000137  062532           14$:     JMP     82$
 9733 056622  020527  000001           15$:     CMP     R5,#1                   ; VALUE,*                       5296
 9734 056626  001034                            BNE     16$
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                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;       DEFINITION OF OPTION 4                           23-Oct-1980 14:57:05    PA:<

 056630  012746  000006                        MOV     #6,-(SP)                ;                                       5321
 056634  010146                                MOV     R1,-(SP)                ; COMMAND,*
 056636  016646  000046                        MOV     46(SP),-(SP)            ; LUN,*
 056642  012746  000400                        MOV     #400,-(SP)
 056646  010346                                MOV     R3,-(SP)                ; PTR,*
 056650  010446                                MOV     R4,-(SP)                ; SECTOR,*
 056652  004737  043046                        JSR     PC,RETRY
 056656  062706  000014                        ADD     #14,SP
 056662  005700                                TST     R0
 056664  001654                                BEQ     12$
 056666  016602  000042                        MOV     42(SP),R2               ; LUN,*                                 5324
 056672  112762  000004  032464                MOVB    #4,WHY.DROPT(R2)
 056700  104455                                TRAP    55                      ;                                       5325
 056702  000625                                .WORD   625
 056704  010512                                .WORD   MSG1
 056706  000000                                .WORD   0
 056710  016600  000042                        MOV     42(SP),R0               ; LUN,*                                 5326
 056714  104451                                TRAP    51
 056716  000457                                BR      19$                     ;                                       5327
 056720  020527  000002            16$:        CMP     R5,#2                   ; VALUE,*                               5296
 056724  001015                                BNE     17$
 056726  016602  000042                        MOV     42(SP),R2               ; LUN,*                                 5332
 056732  112762  000005  032464                MOVB    #5,WHY.DROPT(R2)
 056740  104455                                TRAP    55                      ;                                       5333
 056742  000626                                .WORD   626
 056744  010512                                .WORD   MSG1
 056746  000000                                .WORD   0
 056750  016600  000042                        MOV     42(SP),R0               ; LUN,*                                 5334
 056754  104451                                TRAP    51
 056756  000437                                BR      19$                     ;                                       5335
 056760  020527  000003            17$:        CMP     R5,#3                   ; VALUE,*                               5296
 056764  001014                                BNE     18$
 056766  104455                                TRAP    55                      ;                                       5339
 056770  000627                                .WORD   627
 056772  010512                                .WORD   MSG1
 056774  000000                                .WORD   0
 056776  016602  000042                        MOV     42(SP),R2               ; LUN,*                                 5340
 057002  112762  000006  032464                MOVB    #6,WHY.DROPT(R2)
 057010  010200                                MOV     R2,R0                   ; LUN,*                                 5341
 057012  104451                                TRAP    51
 057014  000420                                BR      19$                     ;                                       5342
 057016  020527  000004            18$:        CMP     R5,#4                   ; VALUE,*                               5296
 057022  001017                                BNE     20$
 057024  004737  035212                        JSR     PC,ISOLATE              ;                                       5346
 057030  104455                                TRAP    55                      ;                                       5347
 057032  000630                                .WORD   630
 057034  010542                                .WORD   MSG2
 057036  000000                                .WORD   0
 057040  016602  000042                        MOV     42(SP),R2               ; LUN,*                                 5348
 057044  112762  000007  032464                MOVB    #7,WHY.DROPT(R2)
 057052  010200                                MOV     R2,R0                   ; LUN,*                                 5349
 057054  104451                                TRAP    51
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                                        ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 4                  23-Oct-1980 14:57:05    PA:<
                                        19$:    JMP     81$                             ;                               5350
057056  000137  062526                20$:    CMP     R5,#5                           ; VALUE,*                       5296
057062  020527  000005                        BNE     27$
057066  001161                                JSR     PC,ISOLATE                      ;                               5354
057070  004737  035212                        BIT     #1,ERROUT                       ;                               5355
057074  032737  000001  002260                BEQ     21$
057102  001423                                MOV     @ML.REG+42,R2                   ;                               5356
057104  017702  153316                        ASR     R2
057110  006202                                ASR     R2
057112  006202                                ASR     R2
057114  006202                                ASR     R2
057116  006202                                ASR     R2
057120  006202                                ASR     R2
057122  006202                                BIC     #177700,R2
057124  042702  177700                        MOV     R2,-(SP)
057130  010246                                MOV     #FMT10B,-(SP)
057132  012746  006262                        MOV     #2,-(SP)
057136  012746  000002                        MOV     SP,R0                           ; SP,*
057142  010600                                TRAP    14
057144  104414                                ADD     #6,SP
057146  062706  000006                21$:    MOV     @ML.REG+44,52(SP)               ; *,OLDSEC                      5358
057152  017766  153252  000052              MOV     @ML.REG+42,R2                   ;                               5359
057160  017702  153242                        ASR     R2
057164  006202                                ASR     R2
057166  006202                                ASR     R2
057170  006202                                ASR     R2
057172  006202                                ASR     R2
057174  006202                                ASR     R2
057176  006202                                BIC     #177700,R2
057200  042702  177700                        MOV     R2,50(SP)                       ; *,OLDCHN
057204  010266  000050                        MOV     #1,-(SP)                        ;                               5360
057210  012746  000001                        MOV     R1,-(SP)                        ; COMMAND,*
057214  010146                                MOV     46(SP),-(SP)                    ; LUN,*
057216  016646  000046                        MOV     #400,-(SP)
057222  012746  000400                        MOV     R3,-(SP)                        ; PTR,*
057226  010346                                MOV     R4,-(SP)                        ; SECTOR,*
057230  010446                                JSR     PC,RETRY
057232  004737  043046                        ADD     #14,SP
057236  062706  000014                        CMP     R0,#5
057242  020027  000005                        BNE     24$
057246  001052                                CMP     @ML.REG+44,52(SP)               ; *,OLDSEC                      5362
057250  027766  153154  000052              BNE     23$
057256  001035                                MOV     50(SP),R0                       ; OLDCHN,*
057260  016600  000050                        MOV     @ML.REG+42,R2
057264  017702  153136                        ASR     R2
057270  006202                                ASR     R2
057272  006202                                ASR     R2
057274  006202                                ASR     R2
057276  006202                                ASR     R2
057300  006202                                ASR     R2
057302  006202                                BIC     #177700,R2
057304  042702  177700                        CMP     R2,R0
057310  020200
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                                        ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                        ;               DEFINITION OF OPTION 4                   23-Oct-1980 14:57:05    PA:<
                                                BNE     23$
057314  032737  000001  002260                BIT     #1,ERROUT               ;                                        5365
057322  001404                                BEQ     22$
057324  104456                                TRAP    56                      ;                                        5367
057326  000631                                .WORD   631
057330  010624                                .WORD   MSG4
057332  000000                                .WORD   0
057334  016646  000042          22$:          MOV     42(SP),-(SP)            ; LUN,*                                  5368
057340  013746  032360                        MOV     BOARD,-(SP)
057344  004737  035302                        JSR     PC,UP.HARD.COUNT
057350  000427                                BR      26$                     ;                                        5362
057352  032737  000001  002260  23$:          BIT     #1,ERROUT               ;                                        5372
057360  001415                                BEQ     25$
057362  104457                                TRAP    57                      ;                                        5374
057364  000632                                .WORD   632
057366  010610                                .WORD   MSG3
057370  000000                                .WORD   0
057372  000410                                BR      25$                     ;                                        5375
057374  032737  000001  002260  24$:          BIT     #1,ERROUT               ;                                        5379
057402  001404                                BEQ     25$
057404  104457                                TRAP    57                      ;                                        5381
057406  000633                                .WORD   633
057410  010610                                .WORD   MSG3
057412  000000                                .WORD   0
057414  016646  000042          25$:          MOV     42(SP),-(SP)            ; LUN,*                                  5382
057420  013746  032360                        MOV     BOARD,-(SP)
057424  004737  035430                        JSR     PC,UP.SOFT.COUNT
057430  022626                        26$:    CMP     (SP)+,(SP)+             ;                                        5353
057432  016616  000042          27$:          MOV     42(SP),(SP)             ; LUN,*                                  5388
057436  012746  000400                        MOV     #400,-(SP)
057442  016646  000060                        MOV     60(SP),-(SP)            ; WCPTR,*
057446  010446                                MOV     R4,-(SP)                ; SECTOR,*
057450  004737  042246                        JSR     PC,WRITE
057454  010005                                MOV     R0,R5                   ; *,VALUE
057456  020527  000001                        CMP     R5,#1                   ; VALUE,*                                5392
057462  001036                                BNE     28$
057464  012746  000006                        MOV     #6,-(SP)                ;                                        5396
057470  012746  042246                        MOV     #WRITE,-(SP)
057474  016646  000054                        MOV     54(SP),-(SP)            ; LUN,*
057500  012746  000400                        MOV     #400,-(SP)
057504  016646  000074                        MOV     74(SP),-(SP)            ; WCPTR,*
057510  010446                                MOV     R4,-(SP)                ; SECTOR,*
057512  004737  043046                        JSR     PC,RETRY
057516  062706  000014                        ADD     #14,SP
057522  005700                                TST     R0
057524  001456                                BEQ     31$
057526  016602  000050                        MOV     50(SP),R2               ; LUN,*                                  5399
057532  112762  000004  032464                MOVB    #4,WHY.DROPT(R2)
057540  104455                                TRAP    55                      ;                                        5400
057542  000634                                .WORD   634
057544  010512                                .WORD   MSG1
057546  000000                                .WORD   0
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                                                                                                23-Oct-1980 15:01:43    TOPS
                                                                                                23-Oct-1980 14:57:05    PA:<
                                        ;MLX4
                                        ;               DEFINITION OF OPTION 4
                                                                                                                        5401
057550  016600  000050                          MOV     50(SP),R0               ; LUN,*
057554  104451                                  TRAP    51
                                                                                                                        5402
057556  000436                                  BR      30$                     ;
                                                                                                                        5392
057560  020527  000002          28$:            CMP     R5,#2                   ; VALUE,*
057564  001015                                  BNE     29$
                                                                                                                        5407
057566  016602  000050                          MOV     50(SP),R2               ; LUN,*
057572  112762  000005  032464                  MOVB    #5,WHY.DROPT(R2)
                                                                                                                        5408
057600  104455                                  TRAP    55                      ;
057602  000635                                  .WORD   635
057604  010512                                  .WORD   MSG1
057606  000000                                  .WORD   0
                                                                                                                        5409
057610  016600  000050                          MOV     50(SP),R0               ; LUN,*
057614  104451                                  TRAP    51
                                                                                                                        5410
057616  000416                                  BR      30$                     ;
                                                                                                                        5392
057620  020527  000003          29$:            CMP     R5,#3                   ; VALUE,*
057624  001016                                  BNE     31$
                                                                                                                        5414
057626  104455                                  TRAP    55                      ;
057630  000636                                  .WORD   636
057632  010512                                  .WORD   MSG1
057634  000000                                  .WORD   0
                                                                                                                        5415
057636  016602  000050                          MOV     50(SP),R2               ; LUN,*
057642  112762  000006  032464                  MOVB    #6,WHY.DROPT(R2)
                                                                                                                        5416
057650  010200                                  MOV     R2,R0                   ; LUN,*
057652  104451                                  TRAP    51
                                                                                                                        5417
057654  062706  000034          30$:            ADD     #34,SP                  ;
057660  000570                                  BR      39$
                                                                                                                        5281
057662  062706  000016          31$:            ADD     #16,SP                  ;
                                                                                                                        5280
057666  005204                  32$:            INC     R4                      ; SECTOR
057670  020466  000036                          CMP     R4,36(SP)               ; SECTOR,*
057674  003002                                  BGT     33$
057676  000137  056322                          JMP     9$
                                                                                                                        5424
057702  012716  006760          33$:            MOV     #WRD25,(SP)             ;
057706  012746  005602                          MOV     #FMT2,-(SP)
057712  012746  000002                          MOV     #2,-(SP)
057716  010600                                  MOV     SP,R0                   ; SP,*
057720  104414                                  TRAP    14
                                                                                                                        5426
057722  004737  043010                          JSR     PC,CHOOSE               ;
057726  010001                                  MOV     R0,R1                   ; *,COMMAND
                                                                                                                        5427
057730  017666  000062  000042                  MOV     @62(SP),42(SP)          ;
057736  017604  000060                          MOV     @60(SP),R4              ; *,SECTOR
057742  000137  061316                          JMP     58$
                                                                                                                        5429
057746  005002                  34$:            CLR     R2                      ;
057750  020127  042434                          CMP     R1,#READ                ; COMMAND,*
057754  001014                                  BNE     35$
057756  005202                                  INC     R2
                                                                                                                        5432
057760  016603  000056                          MOV     56(SP),R3               ; RCPTR,PTR
                                                                                                                        5433
057764  016646  000036                          MOV     36(SP),-(SP)            ; LUN,*
057770  012746  000400                          MOV     #400,-(SP)
057774  010346                                  MOV     R3,-(SP)                ; PTR,*
057776  010446                                  MOV     R4,-(SP)                ; SECTOR,*
060000  004737  042434                          JSR     PC,READ
060004  000412                                  BR      36$
```

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                                                                                23-Oct-1980 15:01:43    TOPS
                                                                                23-Oct-1980 14:57:05    PA:<
                                ;MLX4
                                ;               DEFINITION OF OPTION 4
                                35$:    MOV     52(SP),R3               ; WCPTR,PTR                     5437
                                        MOV     36(SP),-(SP)            ; LUN,*                         5438
                                        MOV     #400,-(SP)
                                        MOV     R3,-(SP)                ; PTR,*
                                        MOV     R4,-(SP)                ; SECTOR,*
                                        JSR     PC,CHECK
                                36$:    MOV     R0,R5                   ; *,VALUE
                                        BNE     40$                     ;                               5443
                                        ROR     R2                      ;                               5446
                                        BLO     38$
                                37$:    JMP     53$
                                38$:    MOV     62(SP),-(SP)            ; WCPTR,*                       5449
                                        MOV     70(SP),-(SP)            ; RCPTR,*
                                        MOV     #400,-(SP)
                                        JSR     PC,DOUBLE.CHECK
                                        ADD     #6,SP
                                        MOV     R0,64(SP)               ; *,DBL.VALUE
                                        BEQ     37$
                                        MOV     46(SP),-(SP)            ; LUN,*                         5452
                                        JSR     PC,SAYWHO
                                        MOV     #MSG5,(SP)              ;                               5453
                                        MOV     #SAY1,-(SP)
                                        MOV     #2,-(SP)
                                        MOV     SP,R0                   ; SP,*
                                        TRAP    14
                                        MOV     72(SP),(SP)             ; DBL.VALUE,*                   5455
                                        MOV     @72(SP),-(SP)           ; DBL.VALUE,*
                                        MOV     #FMT12A,-(SP)
                                        MOV     #3,-(SP)
                                        MOV     SP,R0                   ; SP,*
                                        TRAP    14
                                        ADD     #10000,100(SP)          ; *,DBL.VALUE                   5457
                                        MOV     100(SP),(SP)            ; DBL.VALUE,*                   5458
                                        MOV     @100(SP),-(SP)          ; DBL.VALUE,*
                                        MOV     #FMT12B,-(SP)
                                        MOV     #3,-(SP)
                                        MOV     SP,R0                   ; SP,*
                                        TRAP    14
                                        MOV     70(SP),R2               ; LUN,*                         5460
                                        MOVB    #10,WHY.DROPT(R2)
                                        TRAP    55                      ;                               5461
                                        .WORD   637
                                        .WORD   MSG1
                                        .WORD   0
                                        MOV     70(SP),R0               ; LUN,*                         5462
                                        TRAP    51
                                        ADD     #54,SP                  ;                               5463
                                39$:    BR      45$
                                40$:    CMP     R5,#1                   ; VALUE,*                       5443
                                        BNE     41$
                                        MOV     #6,-(SP)                ;                               5468
                                        MOV     R1,-(SP)                ; COMMAND,*
```

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10016                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
10017                                   ;       DEFINITION OF OPTION 4                          23-Oct-1980 14:57:05    PA:<
10018
10019 060260  016646  000052                    MOV     52(SP),-(SP)            ; LUN,*
10020 060264  012746  000400                    MOV     #400,-(SP)
10021 060270  010346                            MOV     R3,-(SP)                ; PTR,*
10022 060272  010446                            MOV     R4,-(SP)                ; SECTOR,*
10023 060274  004737  043046                    JSR     PC,RETRY
10024 060300  062706  000014                    ADD     #14,SP
10025 060304  005700                            TST     R0
10026 060306  001655                            BEQ     37$
10027 060310  016602  000046                    MOV     46(SP),R2               ; LUN,*                                 5471
10028 060314  112762  000004  032464            MOVB    #4,WHY.DROPT(R2)
10029 060322  104455                            TRAP    55                      ;                                       5472
10030 060324  000640                            .WORD   640
10031 060326  010512                            .WORD   MSG1
10032 060330  000000                            .WORD   0
10033 060332  016600  000046                    MOV     46(SP),R0               ; LUN,*                                 5473
10034 060336  104451                            TRAP    51
10035 060340  000457                            BR      44$                     ;                                       5474
10036 060342  020527  000002          41$:      CMP     R5,#2                   ; VALUE,*                               5443
10037 060346  001015                            BNE     42$
10038 060350  016602  000046                    MOV     46(SP),R2               ; LUN,*                                 5479
10039 060354  112762  000005  032464            MOVB    #5,WHY.DROPT(R2)
10040 060362  104455                            TRAP    55                      ;                                       5480
10041 060364  000641                            .WORD   641
10042 060366  010512                            .WORD   MSG1
10043 060370  000000                            .WORD   0
10044 060372  016600  000046                    MOV     46(SP),R0               ; LUN,*                                 5481
10045 060376  104451                            TRAP    51
10046 060400  000437                            BR      44$                     ;                                       5482
10047 060402  020527  000003          42$:      CMP     R5,#3                   ; VALUE,*                               5443
10048 060406  001014                            BNE     43$
10049 060410  104455                            TRAP    55                      ;                                       5486
10050 060412  000642                            .WORD   642
10051 060414  010512                            .WORD   MSG1
10052 060416  000000                            .WORD   0
10053 060420  016602  000046                    MOV     46(SP),R2               ; LUN,*                                 5487
10054 060424  112762  000006  032464            MOVB    #6,WHY.DROPT(R2)
10055 060432  010200                            MOV     R2,R0                   ; LUN,*                                 5488
10056 060434  104451                            TRAP    51
10057 060436  000420                            BR      44$                     ;                                       5489
10058 060440  020527  000004          43$:      CMP     R5,#4                   ; VALUE,*                               5443
10059 060444  001021                            BNE     46$
10060 060446  004737  035212                    JSR     PC,ISOLATE              ;                                       5493
10061 060452  104455                            TRAP    55                      ;                                       5494
10062 060454  000643                            .WORD   643
10063 060456  010542                            .WORD   MSG2
10064 060460  000000                            .WORD   0
10065 060462  016602  000046                    MOV     46(SP),R2               ; LUN,*                                 5495
10066 060466  112762  000007  032464            MOVB    #7,WHY.DROPT(R2)
10067 060474  010200                            MOV     R2,R0                   ; LUN,*                                 5496
10068 060476  104451                            TRAP    51
10069 060500  062706  000032          44$:      ADD     #32,SP                  ;                                       5497
10070 060504  000137  062532          45$:      JMP     82$
```

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10072                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
10073                                   ;       DEFINITION OF OPTION 4                          23-Oct-1980 14:57:05    PA:<
10074
10075 060510  020527  000005          46$:    CMP     R5,#5                   ; VALUE,*                                       5443
10076 060514  001161                          BNE     53$
10077 060516  004737  035212                  JSR     PC,ISOLATE              ;                                               5501
10078 060522  032737  000001  002260          BIT     #1,ERROUT               ;                                               5502
10079 060530  001423                          BEQ     47$
10080 060532  017702  151670                  MOV     @ML.REG+42,R2           ;                                               5503
10081 060536  006202                          ASR     R2
10082 060540  006202                          ASR     R2
10083 060542  006202                          ASR     R2
10084 060544  006202                          ASR     R2
10085 060546  006202                          ASR     R2
10086 060550  006202                          ASR     R2
10087 060552  042702  177700                  BIC     #177700,R2
10088 060556  010246                          MOV     R2,-(SP)
10089 060560  012746  006262                  MOV     #FMT10B,-(SP)
10090 060564  012746  000002                  MOV     #2,-(SP)
10091 060570  010600                          MOV     SP,R0                   ; SP,*
10092 060572  104414                          TRAP    14
10093 060574  062706  000006                  ADD     #6,SP
10094 060600  017766  151624  000056  47$:    MOV     @ML.REG+44,56(SP)       ; *,OLDSEC                                      5505
10095 060606  017702  151614                  MOV     @ML.REG+42,R2           ;                                               5506
10096 060612  006202                          ASR     R2
10097 060614  006202                          ASR     R2
10098 060616  006202                          ASR     R2
10099 060620  006202                          ASR     R2
10100 060622  006202                          ASR     R2
10101 060624  006202                          ASR     R2
10102 060626  042702  177700                  BIC     #177700,R2
10103 060632  010266  000054                  MOV     R2,54(SP)               ; *,OLDCHN
10104 060636  012746  000001                  MOV     #1,-(SP)                ;                                               5507
10105 060642  010146                          MOV     R1,-(SP)                ; COMMAND,*
10106 060644  016646  000052                  MOV     52(SP),-(SP)            ; LUN,*
10107 060650  012746  000400                  MOV     #400,-(SP)
10108 060654  010346                          MOV     R3,-(SP)                ; PTR,*
10109 060656  010446                          MOV     R4,-(SP)                ; SECTOR,*
10110 060660  004737  043046                  JSR     PC,RETRY
10111 060664  062706  000014                  ADD     #14,SP
10112 060670  020027  000005                  CMP     R0,#5
10113 060674  001052                          BNE     50$
10114 060676  027766  151526  000056          CMP     @ML.REG+44,56(SP)       ; *,OLDSEC                                      5509
10115 060704  001035                          BNE     49$
10116 060706  016600  000054                  MOV     54(SP),R0               ; OLDCHN,*
10117 060712  017702  151510                  MOV     @ML.REG+42,R2
10118 060716  006202                          ASR     R2
10119 060720  006202                          ASR     R2
10120 060722  006202                          ASR     R2
10121 060724  006202                          ASR     R2
10122 060726  006202                          ASR     R2
10123 060730  006202                          ASR     R2
10124 060732  042702  177700                  BIC     #177700,R2
10125 060736  020200                          CMP     R2,R0
10126 060740  001017                          BNE     49$
```

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10128                                   ;MLX4
10129                                   ;       DEFINITION OF OPTION 4                  23-Oct-1980 15:01:43    TOPS
10130                                                                                   23-Oct-1980 14:57:05    PA:<
10131 060742  032737  000001  002260            BIT     #1,ERROUT                       ;                       5512
10132 060750  001404                            BEQ     48$
10133 060752  104456                            TRAP    56                              ;                       5514
10134 060754  000644                            .WORD   644
10135 060756  010624                            .WORD   MSG4
10136 060760  000000                            .WORD   0
10137 060762  016646  000046            48$:    MOV     46(SP),-(SP)                    ; LUN,*                 5515
10138 060766  013746  032360                    MOV     BOARD,-(SP)
10139 060772  004737  035302                    JSR     PC,UP.HARD.COUNT
10140 060776  000427                            BR      52$                             ;                       5509
10141 061000  032737  000001  002260  49$:     BIT     #1,ERROUT                       ;                       5519
10142 061006  001415                            BEQ     51$
10143 061010  104457                            TRAP    57                              ;                       5521
10144 061012  000645                            .WORD   645
10145 061014  010610                            .WORD   MSG3
10146 061016  000000                            .WORD   0
10147 061020  000410                            BR      51$                             ;                       5522
10148 061022  032737  000001  002260  50$:     BIT     #1,ERROUT                       ;                       5526
10149 061030  001404                            BEQ     51$
10150 061032  104457                            TRAP    57                              ;                       5528
10151 061034  000646                            .WORD   646
10152 061036  010610                            .WORD   MSG3
10153 061040  000000                            .WORD   0
10154 061042  016646  000046            51$:    MOV     46(SP),-(SP)                    ; LUN,*                 5529
10155 061046  013746  032360                    MOV     BOARD,-(SP)
10156 061052  004737  035430                    JSR     PC,UP.SOFT.COUNT
10157 061056  022626                    52$:    CMP     (SP)+,(SP)+                     ;                       5500
10158 061060  016616  000046            53$:    MOV     46(SP),(SP)                     ; LUN,*                 5535
10159 061064  012746  000400                    MOV     #400,-(SP)
10160 061070  016646  000052                    MOV     52(SP),-(SP)                    ; WDPTR,*
10161 061074  010446                            MOV     R4,-(SP)                        ; SECTOR,*
10162 061076  004737  042246                    JSR     PC,WRITE
10163 061102  010005                            MOV     R0,R5                           ; *,VALUE
10164 061104  020527  000001                    CMP     R5,#1                           ; VALUE,*               5539
10165 061110  001036                            BNE     54$
10166 061112  012746  000006                    MOV     #6,-(SP)                        ;                       5543
10167 061116  012746  042246                    MOV     #WRITE,-(SP)
10168 061122  016646  000060                    MOV     60(SP),-(SP)                    ; LUN,*
10169 061126  012746  000400                    MOV     #400,-(SP)
10170 061132  016646  000066                    MOV     66(SP),-(SP)                    ; WDPTR,*
10171 061136  010446                            MOV     R4,-(SP)                        ; SECTOR,*
10172 061140  004737  043046                    JSR     PC,RETRY
10173 061144  062706  000014                    ADD     #14,SP
10174 061150  005700                            TST     R0
10175 061152  001456                            BEQ     57$
10176 061154  016602  000054                    MOV     54(SP),R2                       ; LUN,*                 5546
10177 061160  112762  000004  032464            MOVB    #4,WHY.DROPT(R2)
10178 061166  104455                            TRAP    55                              ;                       5547
10179 061170  000647                            .WORD   647
10180 061172  010512                            .WORD   MSG1
10181 061174  000000                            .WORD   0
10182 061176  016600  000054                    MOV     54(SP),R0                       ; LUN,*                 5543
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10184                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
10185                                   ;       DEFINITION OF OPTION 4                          23-Oct-1980 14:57:05    PA:<
10186
10187 061202  104451                            TRAP    51
10188 061204  000436                            BR      56$                     ;                                       5549
10189 061206  020527  000002              54$:  CMP     R5,#2                   ; VALUE,*                               5539
10190 061212  001015                            BNE     55$
10191 061214  016602  000054                    MOV     54(SP),R2               ; LUN,*                                 5554
10192 061220  112762  000005  032464            MOVB    #5,WHY.DROPT(R2)
10193 061226  104455                            TRAP    55                      ;                                       5555
10194 061230  000650                            .WORD   650
10195 061232  010512                            .WORD   MSG1
10196 061234  000000                            .WORD   0
10197 061236  016600  000054                    MOV     54(SP),R0               ; LUN,*                                 5556
10198 061242  104451                            TRAP    51
10199 061244  000416                            BR      56$                     ;                                       5557
10200 061246  020527  000003              55$:  CMP     R5,#3                   ; VALUE,*                               5539
10201 061252  001016                            BNE     57$
10202 061254  104455                            TRAP    55                      ;                                       5561
10203 061256  000651                            .WORD   651
10204 061260  010512                            .WORD   MSG1
10205 061262  000000                            .WORD   0
10206 061264  016602  000054                    MOV     54(SP),R2               ; LUN,*                                 5562
10207 061270  112762  000006  032464            MOVB    #6,WHY.DROPT(R2)
10208 061276  010200                            MOV     R2,R0                   ; LUN,*                                 5563
10209 061300  104451                            TRAP    51
10210 061302  062706  000040              56$:  ADD     #40,SP                  ;                                       5564
10211 061306  000571                            BR      65$
10212 061310  062706  000016              57$:  ADD     #16,SP                  ;                                       5428
10213 061314  005304                            DEC     R4                      ; SECTOR                                5427
10214 061316  020466  000042              58$:  CMP     R4,42(SP)               ; SECTOR,*
10215 061322  002402                            BLT     59$
10216 061324  000137  057746                    JMP     34$
10217 061330  012716  006754              59$:  MOV     #WRD24,(SP)             ;                                       5571
10218 061334  012746  005602                    MOV     #FMT2,-(SP)
10219 061340  012746  000002                    MOV     #2,-(SP)
10220 061344  010600                            MOV     SP,R0                   ; SP,*
10221 061346  104414                            TRAP    14
10222 061350  004737  043010                    JSR     PC,CHOOSE               ;                                       5573
10223 061354  010001                            MOV     R0,R1                   ; *,COMMAND
10224 061356  017666  000064  000064            MOV     @64(SP),64(SP)          ;                                       5574
10225 061364  017604  000066                    MOV     @66(SP),R4              ; *,SECTOR
10226 061370  005304                            DEC     R4                      ; SECTOR
10227 061372  000137  062512                    JMP     80$
10228 061376  005002              60$:  CLR     R2                      ;                                       5576
10229 061400  020127  042434                    CMP     R1,#READ                ; COMMAND,*
10230 061404  001014                            BNE     61$
10231 061406  005202                            INC     R2
10232 061410  016603  000054                    MOV     54(SP),R3               ; RDPTR,PTR                             5579
10233 061414  016646  000042                    MOV     42(SP),-(SP)            ; LUN,*                                 5580
10234 061420  012746  000400                    MOV     #400,-(SP)
10235 061424  010346                            MOV     R3,-(SP)                ; PTR,*
10236 061426  010446                            MOV     R4,-(SP)                ; SECTOR,*
10237 061430  004737  042434                    JSR     PC,READ
10238 061434  000412                            BR      62$
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10240                                ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
10241                                ;       DEFINITION OF OPTION 4                           23-Oct-1980 14:57:05    PA:<
10242
10243 061436  016603  000044    61$:  MOV   44(SP),R3                ; WDPTR,PTR                                  5584
10244 061442  016646  000042          MOV   42(SP),-(SP)             ; LUN,*                                      5585
10245 061446  012746  000400          MOV   #400,-(SP)
10246 061452  010346                  MOV   R3,-(SP)                 ; PTR,*
10247 061454  010446                  MOV   R4,-(SP)                 ; SECTOR,*
10248 061456  004737  042622          JSR   PC,CHECK
10249 061462  010005          62$:    MOV   R0,R5                    ; *,VALUE
10250 061464  001103                  BNE   66$                      ;                                            5590
10251 061466  006002                  ROR   R2                       ;                                            5593
10252 061470  103402                  BLO   64$
10253 061472  000137  062506    63$:  JMP   79$
10254 061476  016646  000054    64$:  MOV   54(SP),-(SP)             ; WDPTR,*                                    5596
10255 061502  016646  000066          MOV   66(SP),-(SP)             ; RDPTR,*
10256 061506  012746  000400          MOV   #400,-(SP)
10257 061512  004737  041226          JSR   PC,DOUBLE.CHECK
10258 061516  062706  000006          ADD   #6,SP
10259 061522  010066  000070          MOV   R0,70(SP)                ; *,DBL.VALUE
10260 061526  001761                  BEQ   63$
10261 061530  016646  000052          MOV   52(SP),-(SP)             ; LUN,*                                      5599
10262 061534  004737  033436          JSR   PC,SAYWHO
10263 061540  012716  010640          MOV   #MSG5,(SP)               ;                                            5600
10264 061544  012746  006514          MOV   #SAY1,-(SP)
10265 061550  012746  000002          MOV   #2,-(SP)
10266 061554  010600                  MOV   SP,R0                    ; SP,*
10267 061556  104414                  TRAP  14
10268 061560  016616  000076          MOV   76(SP),(SP)              ; DBL.VALUE,*                                5602
10269 061564  017646  000076          MOV   @76(SP),-(SP)            ; DBL.VALUE,*
10270 061570  012746  006332          MOV   #FMT12A,-(SP)
10271 061574  012746  000003          MOV   #3,-(SP)
10272 061600  010600                  MOV   SP,R0                    ; SP,*
10273 061602  104414                  TRAP  14
10274 061604  062766  010000  000104  ADD   #10000,104(SP)           ; *,DBL.VALUE                                5604
10275 061612  016616  000104          MOV   104(SP),(SP)             ; DBL.VALUE,*                                5605
10276 061616  017646  000104          MOV   @104(SP),-(SP)           ; DBL.VALUE,*
10277 061622  012746  006400          MOV   #FMT12B,-(SP)
10278 061626  012746  000003          MOV   #3,-(SP)
10279 061632  010600                  MOV   SP,R0                    ; SP,*
10280 061634  104414                  TRAP  14
10281 061636  016602  000074          MOV   74(SP),R2                ; LUN,*                                      5607
10282 061642  112762  000010  032464  MOVB  #10,WHY.DROPT(R2)
10283 061650  104455                  TRAP  55                       ;                                            5608
10284 061652  000652                  .WORD 652
10285 061654  010512                  .WORD MSG1
10286 061656  000000                  .WORD 0
10287 061660  016600  000074          MOV   74(SP),R0                ; LUN,*                                      5609
10288 061664  104451                  TRAP  51
10289 061666  062706  000060          ADD   #60,SP                   ;                                            5610
10290 061672  000520          65$:    BR    71$
10291 061674  020527  000001    66$:  CMP   R5,#1                    ; VALUE,*                                    5590
10292 061700  001034                  BNE   67$
10293 061702  012746  000006          MOV   #6,-(SP)                 ;                                            5615
10294 061706  010146                  MOV   R1,-(SP)                 ; COMMAND,*
```

```
                                        ;MLX4                                                                    23-Oct-1980 15:01:43    TOPS
                                        ;       DEFINITION OF OPTION 4                                           23-Oct-1980 14:57:05    PA:<
                                                MOV     56(SP),-(SP)            ; LUN,*
                                                MOV     #400,-(SP)
                                                MOV     R3,-(SP)                ; PTR,*
                                                MOV     R4,-(SP)                ; SECTOR,*
                                                JSR     PC,RETRY
                                                ADD     #14,SP
                                                TST     R0
                                                BEQ     63$
                                                MOV     52(SP),R2               ; LUN,*                                                  5618
                                                MOVB    #4,WHY.DROPT(R2)
                                                TRAP    55                      ;                                                        5619
                                                .WORD   653
                                                .WORD   MSG1
                                                .WORD   0
                                                MOV     52(SP),R0               ; LUN,*                                                  5620
                                                TRAP    51
                                                BR      70$                     ;                                                        5621
                                        67$:    CMP     R5,#2                   ; VALUE,*                                                5590
                                                BNE     68$
                                                MOV     52(SP),R2               ; LUN,*                                                  5626
                                                MOVB    #5,WHY.DROPT(R2)
                                                TRAP    55                      ;                                                        5627
                                                .WORD   654
                                                .WORD   MSG1
                                                .WORD   0
                                                MOV     52(SP),R0               ; LUN,*                                                  5628
                                                TRAP    51
                                                BR      70$                     ;                                                        5629
                                        68$:    CMP     R5,#3                   ; VALUE,*                                                5590
                                                BNE     69$
                                                TRAP    55                      ;                                                        5633
                                                .WORD   655
                                                .WORD   MSG1
                                                .WORD   0
                                                MOV     52(SP),R2               ; LUN,*                                                  5634
                                                MOVB    #6,WHY.DROPT(R2)
                                                MOV     R2,R0                   ; LUN,*                                                  5635
                                                TRAP    51
                                                BR      70$                     ;                                                        5636
                                        69$:    CMP     R5,#4                   ; VALUE,*                                                5590
                                                BNE     72$
                                                JSR     PC,ISOLATE              ;                                                        5640
                                                TRAP    55                      ;                                                        5641
                                                .WORD   656
                                                .WORD   MSG2
                                                .WORD   0
                                                MOV     52(SP),R2               ; LUN,*                                                  5642
                                                MOVB    #7,WHY.DROPT(R2)
                                                MOV     R2,R0                   ; LUN,*                                                  5643
                                                TRAP    51
                                        70$:    ADD     #36,SP                  ;                                                        5644
                                        71$:    BR      82$
```

```
10352                                ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
10353                                ;       DEFINITION OF OPTION 4                           23-Oct-1980 14:57:05    PA:<
10354
10355 062136  020527  000005        72$:    CMP     R5,#5                   ; VALUE,*                                5590
10356 062142  001161                        BNE     79$
10357 062144  004737  035212                JSR     PC,ISOLATE              ;                                        5648
10358 062150  032737  000001  002260        BIT     #1,ERROUT               ;                                        5649
10359 062156  001423                        BEQ     73$
10360 062160  017702  150242                MOV     @ML.REG+42,R2           ;                                        5650
10361 062164  006202                        ASR     R2
10362 062166  006202                        ASR     R2
10363 062170  006202                        ASR     R2
10364 062172  006202                        ASR     R2
10365 062174  006202                        ASR     R2
10366 062176  006202                        ASR     R2
10367 062200  042702  177700                BIC     #177700,R2
10368 062204  010246                        MOV     R2,-(SP)
10369 062206  012746  006262                MOV     #FMT10B,-(SP)
10370 062212  012746  000002                MOV     #2,-(SP)
10371 062216  010600                        MOV     SP,R0                   ; SP,*
10372 062220  104414                        TRAP    14
10373 062222  062706  000006                ADD     #6,SP
10374 062226  017766  150176  000062  73$:  MOV     @ML.REG+44,62(SP)       ; *,OLDSEC                               5652
10375 062234  017702  150166                MOV     @ML.REG+42,R2           ;                                        5653
10376 062240  006202                        ASR     R2
10377 062242  006202                        ASR     R2
10378 062244  006202                        ASR     R2
10379 062246  006202                        ASR     R2
10380 062250  006202                        ASR     R2
10381 062252  006202                        ASR     R2
10382 062254  042702  177700                BIC     #177700,R2
10383 062260  010266  000060                MOV     R2,60(SP)               ; *,OLDCHN
10384 062264  012746  000001                MOV     #1,-(SP)                ;                                        5654
10385 062270  010146                        MOV     R1,-(SP)                ; COMMAND,*
10386 062272  016646  000056                MOV     56(SP),-(SP)            ; LUN,*
10387 062276  012746  000400                MOV     #400,-(SP)
10388 062302  010346                        MOV     R3,-(SP)                ; PTR,*
10389 062304  010446                        MOV     R4,-(SP)                ; SECTOR,*
10390 062306  004737  043046                JSR     PC,RETRY
10391 062312  062706  000014                ADD     #14,SP
10392 062316  020027  000005                CMP     R0,#5
10393 062322  001052                        BNE     76$
10394 062324  027766  150100  000062        CMP     @ML.REG+44,62(SP)       ; *,OLDSEC                               5656
10395 062332  001035                        BNE     75$
10396 062334  016600  000060                MOV     60(SP),R0               ; OLDCHN,*
10397 062340  017702  150062                MOV     @ML.REG+42,R2
10398 062344  006202                        ASR     R2
10399 062346  006202                        ASR     R2
10400 062350  006202                        ASR     R2
10401 062352  006202                        ASR     R2
10402 062354  006202                        ASR     R2
10403 062356  006202                        ASR     R2
10404 062360  042702  177700                BIC     #177700,R2
10405 062364  020200                        CMP     R2,R0
10406 062366  001017                        BNE     75$
```

```
10408                                   ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
10409                                   ;       DEFINITION OF OPTION 4                           23-Oct-1980 14:57:05    PA:<
10410
10411 062370  032737  000001  002260            BIT     #1,ERROUT                       ;                                       5659
10412 062376  001404                            BEQ     74$
10413 062400  104456                            TRAP    56                              ;                                       5661
10414 062402  000657                            .WORD   657
10415 062404  010624                            .WORD   MSG4
10416 062406  000000                            .WORD   0
10417 062410  016646  000052            74$:    MOV     52(SP),-(SP)                    ; LUN,*                                 5662
10418 062414  013746  032360                    MOV     BOARD,-(SP)
10419 062420  004737  035302                    JSR     PC,UP.HARD.COUNT
10420 062424  000427                            BR      78$                             ;                                       5656
10421 062426  032737  000001  002260  75$:     BIT     #1,ERROUT                       ;                                       5666
10422 062434  001415                            BEQ     77$
10423 062436  104457                            TRAP    57                              ;                                       5668
10424 062440  000660                            .WORD   660
10425 062442  010610                            .WORD   MSG3
10426 062444  000000                            .WORD   0
10427 062446  000410                            BR      77$                             ;                                       5669
10428 062450  032737  000001  002260  76$:     BIT     #1,ERROUT                       ;                                       5673
10429 062456  001404                            BEQ     77$
10430 062460  104457                            TRAP    57                              ;                                       5675
10431 062462  000661                            .WORD   661
10432 062464  010610                            .WORD   MSG3
10433 062466  000000                            .WORD   0
10434 062470  016646  000052            77$:    MOV     52(SP),-(SP)                    ; LUN,*                                 5676
10435 062474  013746  032360                    MOV     BOARD,-(SP)
10436 062500  004737  035430                    JSR     PC,UP.SOFT.COUNT
10437 062504  022626                    78$:    CMP     (SP)+,(SP)+                     ;                                       5647
10438 062506  062706  000010            79$:    ADD     #10,SP                          ;                                       5575
10439 062512  005204                    80$:    INC     R4                              ; SECTOR                                5574
10440 062514  020466  000064                    CMP     R4,64(SP)                       ; SECTOR,*
10441 062520  003002                            BGT     81$
10442 062522  000137  061376                    JMP     60$
10443 062526  062706  000026            81$:    ADD     #26,SP                          ;                                       5233
10444 062532  005266  000014            82$:    INC     14(SP)                          ; LUN                                   5227
10445 062536  026666  000014  000042    83$:    CMP     14(SP),42(SP)                   ; LUN,*
10446 062544  002002                            BGE     84$
10447 062546  000137  055626                    JMP     1$
10448 062552  062706  000044            84$:    ADD     #44,SP                          ;                                       5152
10449 062556  000207                            RTS     PC
10450
10451                                   ; Routine Size:  1307 words
10452                                   ; Maximum stack depth per invocation:  48 words
10457
10458
```

```
;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               SELECTING A RANDOM WORD COUNT            23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (45)

;       5688  %SBTTL  'SELECTING A RANDOM WORD COUNT'
;       5689
;       5690  ROUTINE RNDWC =
;       5691  BEGIN
;       5692
;       5693  !++
;       5694  !  ROUTINE:     RNDWC
;       5695  !
;       5696  !  PURPOSE:     TO SELECT A RANDOM WORD COUNT WITHIN THE RANGE
;       5697  !               1 TO BUFSIZ.
;       5698  !
;       5699  !  RESULT:      THE VALUE RETURNED WILL BE USED BY THE CALLER
;       5700  !               AS ITS 'WRDCNT'
;       5701  !--
;       5702
;       5703  LOCAL
;       5704     WRDCNT;
;       5705
;       5706  RN();
;       5707
;       5708  RANDOM = .RANDOM AND %O'077777';        !IGNORE SIGN BIT
;       5709
;       5710  WRDCNT = ((.RANDOM MOD BUFSIZ) + 1);    !FORCE THE RANGE
;       5711
;       5712  RETURN .WRDCNT;
;       5713
;       5714  END;

                                        .SBTTL  RNDWC SELECTING A RANDOM WORD COUNT
062560  004737  005256        RNDWC:    JSR     PC,RN                                   ;  5706
062564  042737  100000  005352          BIC     #100000,RANDOM                          ;  5708
062572  013746  005352                  MOV     RANDOM,-(SP)                            ;  5710
062576  012746  004000                  MOV     #4000,-(SP)
062602  004737  005070                  JSR     PC,BL$MOD
062606  005200                          INC     R0
062610  022626                          CMP     (SP)+,(SP)+                             ;  5690
062612  000207                          RTS     PC

                                ; Routine Size:  14 words
                                ; Maximum stack depth per invocation:  2 words
```

```
10515 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
10516 ;                 SELECTING A RANDOM SECTOR              23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (46)
10517
10518 ;          5715  %SBTTL  'SELECTING A RANDOM SECTOR'
10519 ;          5716
10520 ;          5717  ROUTINE RNDSEC(LUN) =
10521 ;          5718  BEGIN
10522 ;          5719
10523 ;          5720  !++
10524 ;          5721  !  ROUTINE:     RNDSEC(LUN)
10525 ;          5722  !
10526 ;          5723  !  PURPOSE:     TO SELECT A RANDOM SECTOR NUMBER WITHIN THE RANGE
10527 ;          5724  !               OF TESTABLE SECTORS (LOWEST TO HIGHEST)
10528 ;          5725  !
10529 ;          5726  !  ARGUMENT:    LUN = THE CURRENT LOGICAL UNIT
10530 ;          5727  !               NOTE: 'LUN' IS REQUIRED TO CALCULATE LOWEST/HIGHEST
10531 ;          5728  !               FOR THE PARTICULAR LOGICAL UNIT.
10532 ;          5729  !
10533 ;          5730  !  RESULT:      THE VALUE RETURNED WILL BE USED BY THE CALLER
10534 ;          5731  !               AS ITS 'SECTOR'.
10535 ;          5732  !--
10536 ;          5733
10537 ;          5734  LOCAL
10538 ;          5735     SECTOR, SIZE;
10539 ;          5736
10540 ;          5737  IF LOWEST EQL HIGHEST
10541 ;          5738  THEN
10542 ;          5739     SECTOR = LOWEST
10543 ;          5740  ELSE
10544 ;          5741     BEGIN
10545 ;          5742     RN();
10546 ;          5743     RANDOM = .RANDOM AND %O'077777';     !IGNORE THE SIGN BIT
10547 ;          5744
10548 ;          5745     SIZE = HIGHEST - LOWEST + 1;
10549 ;          5746     SECTOR = (LOWEST + (.RANDOM MOD .SIZE));     !FORCE RANGE
10550 ;          5747     END;
10551 ;          5748
10552 ;          5749  RETURN .SECTOR;
10553 ;          5750
10554 ;          5751  END;
10558
10559                                        .SBTTL  RNDSEC SELECTING A RANDOM SECTOR
10563 062614  004137  005164          RNDSEC: JSR     R1,$SAVE3                        ;                    5717
10564 062620  016601  000012                  MOV     12(SP),R1                        ; LUN,*              5737
10565 062624  006301                          ASL     R1
10566 062626  012703  032476                  MOV     #LOW.SECT,R3
10567 062632  060103                          ADD     R1,R3
10568 062634  021361  032516                  CMP     (R3),TOP.SECT(R1)
10569 062640  001002                          BNE     1$
```

```
10571                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
10572                                   ;       SELECTING A RANDOM SECTOR                       23-Oct-1980 14:57:05    PA:<
10573
10574 062642  011302                            MOV     (R3),R2                 ; *,SECTOR                              5739
10575 062644  000421                            BR      2$                      ;                                       5737
10576 062646  004737  005256              1$:   JSR     PC,RN                   ;                                       5742
10577 062652  042737  100000  005352            BIC     #100000,RANDOM          ;                                       5743
10578 062660  016101  032516                    MOV     TOP.SECT(R1),R1         ;                                       5745
10579 062664  161301                            SUB     (R3),R1
10580 062666  005201                            INC     R1
10581 062670  013746  005352                    MOV     RANDOM,-(SP)            ;                                       5746
10582 062674  010146                            MOV     R1,-(SP)                ; SIZE,*
10583 062676  004737  005070                    JSR     PC,BL$MOD
10584 062702  061300                            ADD     (R3),R0
10585 062704  010002                            MOV     R0,R2                   ; *,SECTOR
10586 062706  022626                            CMP     (SP)+,(SP)+             ;                                       5741
10587 062710  010200                    2$:     MOV     R2,R0                   ; SECTOR,*                              5718
10588 062712  000207                            RTS     PC                      ;                                       5717
10589
10590                                   ; Routine Size:  32 words
10591                                   ; Maximum stack depth per invocation:  6 words
10596
10597
```

```
10599 ;MLX4                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
10600 ;                SELECTING A RANDOM UNIT 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (47)
10601
10602 ;          5752  %SBTTL  'SELECTING A RANDOM UNIT'
10603 ;          5753
10604 ;          5754  ROUTINE RNDU =
10605 ;          5755  BEGIN  !* 1 *
10606 ;          5756
10607 ;          5757  !++
10608 ;          5758  !  ROUTINE:     RNDU
10609 ;          5759  !
10610 ;          5760  !  PURPOSE:     TO SELECT A RANDOM LOGICAL UNIT NUMBER WITHIN
10611 ;          5761  !                THE RANGE OF TESTABLE UNITS (0 TO .L$UNIT-1)
10612 ;          5762  !--
10613 ;          5763
10614 ;          5764  LOCAL
10615 ;          5765     LUN;
10616 ;          5766
10617 ;          5767  IF .L$UNIT EQL 1
10618 ;          5768  THEN
10619 ;          5769     LUN = 0
10620 ;          5770  ELSE
10621 ;          5771     BEGIN  !* 2 *
10622 ;          5772     RN();
10623 ;          5773     RANDOM = .RANDOM AND %O'077777';      !IGNORE THE SIGN BIT
10624 ;          5774     RANDOM = (.RANDOM MOD .L$UNIT);       !FORCE THE RANGE
10625 ;          5775
10626 ;          5776     !+
10627 ;          5777     ! MAKE SURE THE DRIVE IS ACTIVE.  IF IT ISN'T,
10628 ;          5778     ! THEN FIND THE NEXT AVAILABLE ACTIVE DRIVE:
10629 ;          5779     !-
10630 ;          5780
10631 ;          5781     INCR COUNT FROM 0 TO (.L$UNIT - 1) DO
10632 ;          5782        IF .DRIVE_STATUS[.RANDOM] EQL ACTIVE
10633 ;          5783        THEN
10634 ;          5784           BEGIN
10635 ;          5785           LUN = .RANDOM;
10636 ;          5786           EXITLOOP;
10637 ;          5787           END
10638 ;          5788        ELSE
10639 ;          5789           RANDOM = ((.RANDOM + 1) MOD .L$UNIT);
10640 ;          5790
10641 ;          5791     END;   !* 2 *
10642 ;          5792
10643 ;          5793  RETURN .LUN;
10644 ;          5794
10645 ;          5795  END;   !* 1 *
10649
10650                                  .SBTTL  RNDU SELECTING A RANDOM UNIT
```

```
10655                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
10656                                   ;       SELECTING A RANDOM UNIT                         23-Oct-1980 14:57:05    PA:<
10657
10658 062714  004137  005202            RNDU:   JSR     R1,$SAVE4               ;                                       5754
10659 062720  023727  002012  000001            CMP     L$UNIT,#1               ;                                       5767
10660 062726  001002                            BNE     1$
10661 062730  005004                            CLR     R4                      ; LUN                                   5769
10662 062732  000467                            BR      6$                      ;                                       5767
10663 062734  004737  005256            1$:     JSR     PC,RN                   ;                                       5772
10664 062740  042737  100000  005352            BIC     #100000,RANDOM          ;                                       5773
10665 062746  013746  005352                    MOV     RANDOM,-(SP)            ;                                       5774
10666 062752  013746  002012                    MOV     L$UNIT,-(SP)
10667 062756  004737  005070                    JSR     PC,BL$MOD
10668 062762  010037  005352                    MOV     R0,RANDOM
10669 062766  013703  002012                    MOV     L$UNIT,R3               ;                                       5781
10670 062772  005001                            CLR     R1                      ; COUNT
10671 062774  000443                            BR      4$
10672 062776  013702  005352            2$:     MOV     RANDOM,R2               ;                                       5782
10673 063002  006202                            ASR     R2
10674 063004  006202                            ASR     R2
10675 063006  006202                            ASR     R2
10676 063010  062702  032460                    ADD     #DRIVE.STATUS,R2
10677 063014  010246                            MOV     R2,-(SP)
10678 063016  013746  005352                    MOV     RANDOM,-(SP)
10679 063022  042716  177770                    BIC     #177770,(SP)
10680 063026  012746  000001                    MOV     #1,-(SP)
10681 063032  005046                            CLR     -(SP)
10682 063034  004737  004244                    JSR     PC,BL$GT2
10683 063040  062706  000010                    ADD     #10,SP
10684 063044  005300                            DEC     R0
10685 063046  001003                            BNE     3$
10686 063050  013704  005352                    MOV     RANDOM,R4                       ; *,LUN                         5785
10687 063054  000415                            BR      5$                      ;                                       5786
10688 063056  013746  005352            3$:     MOV     RANDOM,-(SP)            ;                                       5789
10689 063062  005216                            INC     (SP)
10690 063064  013746  002012                    MOV     L$UNIT,-(SP)
10691 063070  004737  005070                    JSR     PC,BL$MOD
10692 063074  010037  005352                    MOV     R0,RANDOM
10693 063100  022626                            CMP     (SP)+,(SP)+
10694 063102  005201                            INC     R1                              ; COUNT                         5781
10695 063104  020103                    4$:     CMP     R1,R3                           ; COUNT,*
10696 063106  002733                            BLT     2$
10697 063110  022626                    5$:     CMP     (SP)+,(SP)+             ;                                       5771
10698 063112  010400                    6$:     MOV     R4,R0                           ; LUN,*                         5755
10699 063114  000207                            RTS     PC                      ;                                       5754
10700
10701                                   ; Routine Size:  65 words
10702                                   ; Maximum stack depth per invocation:  11 words
10707
10708
```

```
10710 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
10711 ;                 TESTING RANDOM DATA                    23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (48)
10712 ;
10713 ;          5796  %SBTTL  'TESTING RANDOM DATA'
10714 ;          5797
10715 ;          5798  ROUTINE RAND1(REPEAT): NOVALUE =
10716 ;          5799  BEGIN  !* 1 *  START OF ROUTINE
10717 ;          5800
10718 ;          5801  !++
10719 ;          5802  !  ROUTINE:     RAND1(REPEAT)
10720 ;          5803  !
10721 ;          5804  !  PURPOSE:     TO TEST USING RANDOM DATA
10722 ;          5805  !
10723 ;          5806  !  ARGUMENT:    REPEAT = NUMBER OF TIMES TO EXECUTE THIS ROUTINE
10724 ;          5807  !                        BEFORE RETURNING TO THE CALLER (OPT5).
10725 ;          5808  !
10726 ;          5809  !      NOTE:    THIS TEST CODE FOLLOWS THE SAME FLOW AS OPT3,
10727 ;          5810  !               BUT USES A RANDOM DATA PATTERN.
10728 ;          5811  !
10729 ;          5812  !  THE CODE FOR 'RAND1' IN BRIEF:
10730 ;          5813  !
10731 ;          5814  !  BEGIN 1  (START OF ROUTINE)
10732 ;          5815  !  SAY ROUTINE IS RUNNING
10733 ;          5816  !  INCR COUNT FROM 1 TO REPEAT
10734 ;          5817  !  : BEGIN 2 (START OF REPEAT LOOP FOR THE ROUTINE)
10735 ;          5818  !  : GENERATE THE RANDOM PATTERN
10736 ;          5819  !  : INCR LUN FROM 0 TO LAST
10737 ;          5820  !  : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
10738 ;          5821  !  : : TESTLOOP:
10739 ;          5822  !  : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
10740 ;          5823  !  : : : IF UNIT IS ACTIVE
10741 ;          5824  !  : : : THEN
10742 ;          5825  !  : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
10743 ;          5826  !  : : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
10744 ;          5827  !  : : : : SECTOR = LOWEST
10745 ;          5828  !  : : : : WHILE SECTOR LEQ HIGHEST DO
10746 ;          5829  !  : : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
10747 ;          5830  !  : : : : : GET_WRDCNT
10748 ;          5831  !  : : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
10749 ;          5832  !  : : : : : WRITE
10750 ;          5833  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
10751 ;          5834  !  : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
10752 ;          5835  !  : : : : : DO THE WRITE CHECK OR READ
10753 ;          5836  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
10754 ;          5837  !  : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
10755 ;          5838  !  : : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
10756 ;          5839  !  : : : : : END 6 (END OF SECTOR SELECTION LOOP)
10757 ;          5840  !  : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
10758 ;          5841  !  : : : END 4 (END OF TESTLOOP)
10759 ;          5842  !  : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
10760 ;          5843  !  : END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
10761 ;          5844  !  RETURN
10762 ;          5845  !  END 1 (END OF ROUTINE)
10763 ;          5846  !--
10764 ;          5847
```

```
10768
10769 ;          5848
10770 ;          5849  LABEL
10771 ;          5850     LOOP;
10772 ;          5851
10773 ;          5852  LOCAL
10774 ;          5853     WRDCNT, VALUE, OLDSEC, OLDCHN, SECTOR, PTR, COMMAND, DBL_VALUE;
10775 ;          5854
10776 ;          5855
10777 ;          5856  PRINTB(SAY1,RTN5A);
10778 ;          5857     !'RAND1'
10779 ;          5858
10780 ;          5859  INCR COUNT FROM 1 TO .REPEAT DO
10781 ;          5860     BEGIN  !* 2 *  START OF REPEAT LOOP FOR THIS ROUTINE
10782 ;          5861     GEN5();                          !FIRST 3 WORDS OF WBUFF ARE THE SEEDS
10783 ;          5862     INCR LUN FROM 0 TO (.L$UNIT - 1) DO
10784 ;          5863        BEGIN  !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
10785 ;          5864        LOOP:
10786 ;          5865           BEGIN  !* 4 *  START OF THE LOOP THAT COMPLETELY TESTS 1 UNIT
10787 ;          5866           IF .DRIVE_STATUS[.LUN] EQL ACTIVE
10788 ;          5867           THEN
10789 ;          5868              BEGIN  !* 5 *  START OF TEST FOR AN ACTIVE UNIT
10790 ;          5869              L$LUN = .LUN;
10791 ;          5870              WPTR = WBUFF;
10792 ;          5871              RPTR = RBUFF;
10793 ;          5872              SECTOR = LOWEST;
10794 ;          5873              WHILE .SECTOR LEQ HIGHEST DO
10795 ;          5874                 BEGIN  !* 6 *  START OF SECTOR SELECTION LOOP
10796 ;          5875                 WRDCNT = GET_WRDCNT(.SECTOR,HIGHEST);
10797 ;          5876                 SET_PTRS(.WRDCNT);
10798 ;          5877                 VALUE = WRITE(.LUN,.WRDCNT,.WPTR,.SECTOR);
10799 ;          5878                 !+
10800 ;          5879                 !  SEE HOW SUCCESSFUL THE WRITE WAS:
10801 ;          5880                 !-
10802 ;          5881                 SELECTONE .VALUE OF        !SEE 'SYSERR' FOR DEFINITION
10803 ;          5882                    SET                     !OF ERROR # CONTAINED IN 'VALUE'
10804 ;          5883                 [1] :
10805 ;          5884                    BEGIN  !* 6A *          RETRY ALLOWED
10806 ;          5885                    IF RETRY(SIX,WRITE,.LUN,.WRDCNT,.WPTR,.SECTOR) NEQ 0
10807 ;          5886                    THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
10808 ;          5887                       BEGIN
10809 ;          5888                       WHY_DROPT[.LUN] = CODE_4;
10810 ;          5889                       ERRDF(5101,MSG1,0);   !**** OPTION 5, RAND1 ERROR 01 ****
10811 ;          5890                       DODU(.LUN);
10812 ;          5891                       LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
10813 ;          5892                       END;
10814 ;          5893                    END;   !* 6A *
10815 ;          5894                 [2] :
10816 ;          5895                    BEGIN  !* 6B *          FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
10817 ;          5896                    WHY_DROPT[.LUN] = CODE_5;
10818 ;          5897                    ERRDF(5102,MSG1,0);   !**** OPTION 5, RAND1 ERROR 02 ****
10819 ;          5898                    DODU(.LUN);
10820 ;          5899                    LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
```

```
10824
10825 ;  5900                    END;   !* 6B *
10826 ;  5901                 [3] :
10827 ;  5902                    BEGIN  !* 6C *        FATAL DRIVE ERROR -- NO RETRY ALLOWED
10828 ;  5903                    ERRDF(5103,MSG1,0);   !**** OPTION 5, RAND1 ERROR 03 ****
10829 ;  5904                    WHY_DROPT[.LUN] = CODE_6;
10830 ;  5905                    DODU(.LUN);
10831 ;  5906                    LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
10832 ;  5907                    END;   !* 6C *
10833 ;  5908
10834 ;  5909                    TES;
10835 ;  5910
10836 ;  5911                 COMMAND = CHOOSE();
10837 ;  5912                 IF .COMMAND EQL READ
10838 ;  5913                 THEN
10839 ;  5914                    BEGIN
10840 ;  5915                    PTR = .RPTR;
10841 ;  5916                    VALUE = READ(.LUN,.WRDCNT,.RPTR,.SECTOR);
10842 ;  5917                    END
10843 ;  5918                 ELSE
10844 ;  5919                    BEGIN
10845 ;  5920                    PTR = .WPTR;
10846 ;  5921                    VALUE = CHECK(.LUN,.WRDCNT,.WPTR,.SECTOR);
10847 ;  5922                    END;
10848 ;  5923                 !+
10849 ;  5924                 !  SEE HOW SUCCESSFUL THE OPERATION WAS:
10850 ;  5925                 !-
10851 ;  5926                 SELECTONE .VALUE OF      !SEE 'SYSERR' FOR DEFINITION
10852 ;  5927                    SET                   !OF ERROR # CONTAINED IN 'VALUE'
10853 ;  5928                 [0] :
10854 ;  5929                    IF .COMMAND EQL READ
10855 ;  5930                    THEN
10856 ;  5931                       BEGIN
10857 ;  5932                       IF (DBL_VALUE = DOUBLE_CHECK(.WPTR,.RPTR,.WRDCNT)) NEQ 0
10858 ;  5933                       THEN
10859 ;  5934                          BEGIN
10860 ;  5935                          SAYWHO(.LUN);
10861 ;  5936                          PRINTB(SAY1,MSG5);
10862 ;  5937                             !'ECC LOGIC FAILED TO DETECT DATA ERROR'
10863 ;  5938                          PRINTB(FMT12A,..DBL_VALUE,..DBL_VALUE);
10864 ;  5939                             !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
10865 ;  5940                          DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
10866 ;  5941                          PRINTB(FMT12B,..DBL_VALUE,..DBL_VALUE);
10867 ;  5942                             !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
10868 ;  5943                          WHY_DROPT[.LUN] = CODE_8;
10869 ;  5944                          ERRDF(5104,MSG1,0);   !**** OPTION 5, RAND1 ERROR 04 ****
10870 ;  5945                          DODU(.LUN);
10871 ;  5946                          LEAVE LOOP;      !JUMP JUST BEYOND END OF BLOCK * 4 *
10872 ;  5947                          END;
10873 ;  5948                       END;
10874 ;  5949                 [1] :
10875 ;  5950                    BEGIN  !* 6D *        RETRY ALLOWED
10876 ;  5951                    IF RETRY(SIX,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) NEQ 0
```

```
;          5952                    THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
;          5953                       BEGIN
;          5954                       WHY_DROPT[.LUN] = CODE_4;
;          5955                       ERRDF(5105,MSG1,0);   !**** OPTION 5, RAND1 ERROR 05 ****
;          5956                       DODU(.LUN);
;          5957                       LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
;          5958                       END;
;          5959                    END;   !* 6D *
;          5960                 [2] :
;          5961                    BEGIN  !* 6E *           FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
;          5962                    WHY_DROPT[.LUN] = CODE_5;
;          5963                    ERRDF(5106,MSG1,0);   !**** OPTION 5, RAND1 ERROR 06 ****
;          5964                    DODU(.LUN);
;          5965                    LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
;          5966                    END;   !* 6E *
;          5967                 [3] :
;          5968                    BEGIN  !* 6F *           FATAL DRIVE ERROR -- NO RETRY ALLOWED
;          5969                    ERRDF(5107,MSG1,0);   !**** OPTION 5, RAND1 ERROR 07 ****
;          5970                    WHY_DROPT[.LUN] = CODE_6;
;          5971                    DODU(.LUN);
;          5972                    LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
;          5973                    END;   !* 6F *
;          5974                 [4] :
;          5975                    BEGIN  !* 6G *           UNRECOVERABLE DATA ERROR
;          5976                    ISOLATE();
;          5977                    ERRDF(5108,MSG2,0);   !**** OPTION 5, RAND1 ERROR 08 ****
;          5978                    WHY_DROPT[.LUN] = CODE_7;
;          5979                    DODU(.LUN);
;          5980                    LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
;          5981                    END;   !* 6G *
;          5982                 [5] :
;          5983                    BEGIN  !* 6H *           RECOVERABLE DATA ERROR
;          5984                    ISOLATE();
;          5985                    IF .ERROUT
;          5986                    THEN  PRINTB(FMT10B,.CHAN);
;          5987                          !'    BIT QQ'
;          5988                    OLDSEC = .MLEL;
;          5989                    OLDCHN = .CHAN;
;          5990                    IF RETRY(ONE,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) EQL 5
;          5991                    THEN
;          5992                       IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
;          5993                       THEN
;          5994                          BEGIN
;          5995                          IF .ERROUT
;          5996                          THEN
;          5997                          ERRHRD(5109,MSG4,0);  !**** OPTION 5, RAND1 ERROR 09 ****
;          5998                          UP_HARD_COUNT(.LUN,.BOARD);
;          5999                          END
;          6000                       ELSE
;          6001                          BEGIN
;          6002                          IF .ERROUT
;          6003                          THEN
```

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10934 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
10935 ;                TESTING RANDOM DATA                     23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (48)
10936
10937 ;          6004                        ERRSOFT(5110,MSG3,0); !**** OPTION 5, RAND1 ERROR 10 ****
10938 ;          6005                        UP_SOFT_COUNT(.LUN,.BOARD);
10939 ;          6006                        END
10940 ;          6007                    ELSE
10941 ;          6008                        BEGIN
10942 ;          6009                        IF .ERROUT
10943 ;          6010                        THEN
10944 ;          6011                        ERRSOFT(5111,MSG3,0); !**** OPTION 5, RAND1 ERROR 11 ****
10945 ;          6012                        UP_SOFT_COUNT(.LUN,.BOARD);
10946 ;          6013                        END;
10947 ;          6014                    END;    !* 6H *
10948 ;          6015
10949 ;          6016                    TES;
10950 ;          6017
10951 ;          6018                WPTR = .WPTR + (.WRDCNT * 2);
10952 ;          6019                SECTOR = .SECTOR + (.WRDCNT/256);
10953 ;          6020
10954 ;          6021                END;    !* 6 *  END OF SECTOR SELECTION LOOP
10955 ;          6022            END;    !* 5 *  END OF TEST FOR AN ACTIVE UNIT
10956 ;          6023        END;    !* 4 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
10957 ;          6024    END;    !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
10958 ;          6025 END;    !* 2 *  END OF REPEAT LOOP FOR THIS ROUTINE
10959 ;          6026 RETURN;
10960 ;          6027 END;    !* 1 *  END OF ROUTINE
10964
10965                                   .SBTTL  RAND1 TESTING RANDOM DATA
10969 063116 004137 005222        RAND1: JSR     R1,$SAVE5                ;                          5798
10970 063122 162706 000020               SUB     #20,SP
10971 063126 012746 007306               MOV     #RTN5A,-(SP)             ;                          5856
10972 063132 012746 006514               MOV     #SAY1,-(SP)
10973 063136 012746 000002               MOV     #2,-(SP)
10974 063142 010600                      MOV     SP,R0                    ; SP,*
10975 063144 104414                      TRAP    14
10976 063146 005066 000024               CLR     24(SP)                   ; COUNT                    5859
10977 063152 000137 064774               JMP     30$
10978 063156 004737 036710        1$:    JSR     PC,GEN5                  ;                          5861
10979 063162 013766 002012 000010        MOV     L$UNIT,10(SP)            ;                          5862
10980 063170 005066 000006               CLR     6(SP)                    ; LUN
10981 063174 000137 064760               JMP     29$
10982 063200 016600 000006        2$:    MOV     6(SP),R0                 ; LUN,*                    5866
10983 063204 006200                      ASR     R0
10984 063206 006200                      ASR     R0
10985 063210 006200                      ASR     R0
10986 063212 062700 032460               ADD     #DRIVE.STATUS,R0
10987 063216 010046                      MOV     R0,-(SP)
10988 063220 016646 000010               MOV     10(SP),-(SP)             ; LUN,*
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10990                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
10991                                   ;       TESTING RANDOM DATA                             23-Oct-1980 14:57:05    PA:<
10992
10993 063224  042716  177770                    BIC     #177770,(SP)
10994 063230  012746  000001                    MOV     #1,-(SP)
10995 063234  005046                            CLR     -(SP)
10996 063236  004737  004244                    JSR     PC,BL$GT2
10997 063242  062706  000010                    ADD     #10,SP
10998 063246  005300                            DEC     R0
10999 063250  001143                            BNE     7$
11000 063252  016637  000006  002074            MOV     6(SP),L$LUN             ; LUN,*                 5869
11001 063260  012737  010706  030706            MOV     #WBUFF,WPTR             ;                       5870
11002 063266  012737  020706  030710            MOV     #RBUFF,RPTR             ;                       5871
11003 063274  016601  000006                    MOV     6(SP),R1                ; LUN,*                 5872
11004 063300  006301                            ASL     R1
11005 063302  016104  032476                    MOV     LOW.SECT(R1),R4         ; *,SECTOR
11006 063306  020461  032516            3$:     CMP     R4,TOP.SECT(R1)         ; SECTOR,*              5873
11007 063312  003122                            BGT     7$
11008 063314  010446                            MOV     R4,-(SP)                ; SECTOR,*              5875
11009 063316  016146  032516                    MOV     TOP.SECT(R1),-(SP)
11010 063322  004737  044034                    JSR     PC,GET.WRDCNT
11011 063326  010003                            MOV     R0,R3                   ; *,WRDCNT
11012 063330  010316                            MOV     R3,(SP)                 ; WRDCNT,*              5876
11013 063332  004737  043770                    JSR     PC,SET.PTRS
11014 063336  016616  000012                    MOV     12(SP),(SP)             ; LUN,*                 5877
11015 063342  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11016 063344  013746  030706                    MOV     WPTR,-(SP)
11017 063350  010446                            MOV     R4,-(SP)                ; SECTOR,*
11018 063352  004737  042246                    JSR     PC,WRITE
11019 063356  010005                            MOV     R0,R5                   ; *,VALUE
11020 063360  020527  000001                    CMP     R5,#1                   ; VALUE,*               5881
11021 063364  001035                            BNE     4$
11022 063366  012746  000006                    MOV     #6,-(SP)                ;                       5885
11023 063372  012746  042246                    MOV     #WRITE,-(SP)
11024 063376  016646  000024                    MOV     24(SP),-(SP)            ; LUN,*
11025 063402  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11026 063404  013746  030706                    MOV     WPTR,-(SP)
11027 063410  010446                            MOV     R4,-(SP)                ; SECTOR,*
11028 063412  004737  043046                    JSR     PC,RETRY
11029 063416  062706  000014                    ADD     #14,SP
11030 063422  005700                            TST     R0
11031 063424  001456                            BEQ     8$
11032 063426  016602  000020                    MOV     20(SP),R2               ; LUN,*                 5888
11033 063432  112762  000004  032464            MOVB    #4,WHY.DROPT(R2)
11034 063440  104455                            TRAP    55                      ;                       5889
11035 063442  011755                            .WORD   11755
11036 063444  010512                            .WORD   MSG1
11037 063446  000000                            .WORD   0
11038 063450  016600  000020                    MOV     20(SP),R0               ; LUN,*                 5890
11039 063454  104451                            TRAP    51
11040 063456  000436                            BR      6$                      ;                       5891
11041 063460  020527  000002            4$:     CMP     R5,#2                   ; VALUE,*               5881
11042 063464  001015                            BNE     5$
11043 063466  016602  000020                    MOV     20(SP),R2               ; LUN,*                 5896
11044 063472  112762  000005  032464            MOVB    #5,WHY.DROPT(R2)
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11046                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
11047                                   ;       TESTING RANDOM DATA                             23-Oct-1980 14:57:05    PA:<
11048
11049 063500  104455                            TRAP    55                      ;                                       5897
11050 063502  011756                            .WORD   11756
11051 063504  010512                            .WORD   MSG1
11052 063506  000000                            .WORD   0
11053 063510  016600  000020                    MOV     20(SP),R0               ; LUN,*                                 5898
11054 063514  104451                            TRAP    51
11055 063516  000416                            BR      6$                      ;                                       5899
11056 063520  020527  000003      5$:           CMP     R5,#3                   ; VALUE,*                               5881
11057 063524  001016                            BNE     8$
11058 063526  104455                            TRAP    55                      ;                                       5903
11059 063530  011757                            .WORD   11757
11060 063532  010512                            .WORD   MSG1
11061 063534  000000                            .WORD   0
11062 063536  016602  000020                    MOV     20(SP),R2               ; LUN,*                                 5904
11063 063542  112762  000006  032464            MOVB    #6,WHY.DROPT(R2)
11064 063550  010200                            MOV     R2,R0                   ; LUN,*                                 5905
11065 063552  104451                            TRAP    51
11066 063554  062706  000012      6$:           ADD     #12,SP                  ;                                       5906
11067 063560  000543      7$:                   BR      13$
11068 063562  004737  043010      8$:           JSR     PC,CHOOSE               ;                                       5911
11069 063566  010066  000032                    MOV     R0,32(SP)               ; *,COMMAND
11070 063572  005002                            CLR     R2                      ;                                       5912
11071 063574  020027  042434                    CMP     R0,#READ                ; COMMAND,*
11072 063600  001015                            BNE     9$
11073 063602  005202                            INC     R2
11074 063604  013766  030710  000030            MOV     RPTR,30(SP)             ; *,PTR                                 5915
11075 063612  016646  000020                    MOV     20(SP),-(SP)            ; LUN,*                                 5916
11076 063616  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11077 063620  013746  030710                    MOV     RPTR,-(SP)
11078 063624  010446                            MOV     R4,-(SP)                ; SECTOR,*
11079 063626  004737  042434                    JSR     PC,READ
11080 063632  000413                            BR      10$
11081 063634  013766  030706  000030  9$:       MOV     WPTR,30(SP)             ; *,PTR                                 5920
11082 063642  016646  000020                    MOV     20(SP),-(SP)            ; LUN,*                                 5921
11083 063646  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11084 063650  013746  030706                    MOV     WPTR,-(SP)
11085 063654  010446                            MOV     R4,-(SP)                ; SECTOR,*
11086 063656  004737  042622                    JSR     PC,CHECK
11087 063662  010005              10$:          MOV     R0,R5                   ; *,VALUE
11088 063664  001102                            BNE     14$                     ;                                       5926
11089 063666  006002                            ROR     R2                      ;                                       5929
11090 063670  103402                            BLO     12$
11091 063672  000137  064712      11$:          JMP     27$
11092 063676  013746  030706      12$:          MOV     WPTR,-(SP)              ;                                       5932
11093 063702  013746  030710                    MOV     RPTR,-(SP)
11094 063706  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11095 063710  004737  041226                    JSR     PC,DOUBLE.CHECK
11096 063714  062706  000006                    ADD     #6,SP
11097 063720  010066  000044                    MOV     R0,44(SP)               ; *,DBL.VALUE
11098 063724  001762                            BEQ     11$
11099 063726  016646  000030                    MOV     30(SP),-(SP)            ; LUN,*                                 5935
11100 063732  004737  033436                    JSR     PC,SAYWHO
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11102                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
11103                                   ;       TESTING RANDOM DATA                             23-Oct-1980 14:57:05    PA:<
11104
11105 063736  012716  010640                    MOV     #MSG5,(SP)              ;                                       5936
11106 063742  012746  006514                    MOV     #SAY1,-(SP)
11107 063746  012746  000002                    MOV     #2,-(SP)
11108 063752  010600                            MOV     SP,R0                   ; SP,*
11109 063754  104414                            TRAP    14
11110 063756  016616  000052                    MOV     52(SP),(SP)             ; DBL.VALUE,*                           5938
11111 063762  017646  000052                    MOV     @52(SP),-(SP)           ; DBL.VALUE,*
11112 063766  012746  006332                    MOV     #FMT12A,-(SP)
11113 063772  012746  000003                    MOV     #3,-(SP)
11114 063776  010600                            MOV     SP,R0                   ; SP,*
11115 064000  104414                            TRAP    14
11116 064002  062766  010000  000060            ADD     #10000,60(SP)           ; *,DBL.VALUE                           5940
11117 064010  016616  000060                    MOV     60(SP),(SP)             ; DBL.VALUE,*                           5941
11118 064014  017646  000060                    MOV     @60(SP),-(SP)           ; DBL.VALUE,*
11119 064020  012746  006400                    MOV     #FMT12B,-(SP)
11120 064024  012746  000003                    MOV     #3,-(SP)
11121 064030  010600                            MOV     SP,R0                   ; SP,*
11122 064032  104414                            TRAP    14
11123 064034  016602  000052                    MOV     52(SP),R2               ; LUN,*                                 5943
11124 064040  112762  000010  032464            MOVB    #10,WHY.DROPT(R2)
11125 064046  104455                            TRAP    55                      ;                                       5944
11126 064050  011760                            .WORD   11760
11127 064052  010512                            .WORD   MSG1
11128 064054  000000                            .WORD   0
11129 064056  016600  000052                    MOV     52(SP),R0               ; LUN,*                                 5945
11130 064062  104451                            TRAP    51
11131 064064  062706  000044                    ADD     #44,SP                  ;                                       5946
11132 064070  000521                    13$:    BR      19$
11133 064072  020527  000001            14$:    CMP     R5,#1                   ; VALUE,*                               5926
11134 064076  001035                            BNE     15$
11135 064100  012746  000006                    MOV     #6,-(SP)                ;                                       5951
11136 064104  016646  000044                    MOV     44(SP),-(SP)            ; COMMAND,*
11137 064110  016646  000034                    MOV     34(SP),-(SP)            ; LUN,*
11138 064114  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11139 064116  016646  000050                    MOV     50(SP),-(SP)            ; PTR,*
11140 064122  010446                            MOV     R4,-(SP)                ; SECTOR,*
11141 064124  004737  043046                    JSR     PC,RETRY
11142 064130  062706  000014                    ADD     #14,SP
11143 064134  005700                            TST     R0
11144 064136  001655                            BEQ     11$
11145 064140  016602  000030                    MOV     30(SP),R2               ; LUN,*                                 5954
11146 064144  112762  000004  032464            MOVB    #4,WHY.DROPT(R2)
11147 064152  104455                            TRAP    55                      ;                                       5955
11148 064154  011761                            .WORD   11761
11149 064156  010512                            .WORD   MSG1
11150 064160  000000                            .WORD   0
11151 064162  016600  000030                    MOV     30(SP),R0               ; LUN,*                                 5956
11152 064166  104451                            TRAP    51
11153 064170  000457                            BR      18$                     ;                                       5957
11154 064172  020527  000002            15$:    CMP     R5,#2                   ; VALUE,*                               5926
11155 064176  001015                            BNE     16$
11156 064200  016602  000030                    MOV     30(SP),R2               ; LUN,*                                 5962
```

```
11158                                  ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
11159                                  ;       TESTING RANDOM DATA                              23-Oct-1980 14:57:05    PA:<
11160
11161 064204  112762  000005  032464         MOVB    #5,WHY.DROPT(R2)
11162 064212  104455                         TRAP    55                      ;                                       5963
11163 064214  011762                         .WORD   11762
11164 064216  010512                         .WORD   MSG1
11165 064220  000000                         .WORD   0
11166 064222  016600  000030                 MOV     30(SP),R0               ; LUN,*                                 5964
11167 064226  104451                         TRAP    51
11168 064230  000437                         BR      18$                     ;                                       5965
11169 064232  020527  000003         16$:    CMP     R5,#3                   ; VALUE,*                               5926
11170 064236  001014                         BNE     17$
11171 064240  104455                         TRAP    55                      ;                                       5969
11172 064242  011763                         .WORD   11763
11173 064244  010512                         .WORD   MSG1
11174 064246  000000                         .WORD   0
11175 064250  016602  000030                 MOV     30(SP),R2               ; LUN,*                                 5970
11176 064254  112762  000006  032464         MOVB    #6,WHY.DROPT(R2)
11177 064262  010200                         MOV     R2,R0                   ; LUN,*                                 5971
11178 064264  104451                         TRAP    51
11179 064266  000420                         BR      18$                     ;                                       5972
11180 064270  020527  000004         17$:    CMP     R5,#4                   ; VALUE,*                               5926
11181 064274  001021                         BNE     20$
11182 064276  004737  035212                 JSR     PC,ISOLATE              ;                                       5976
11183 064302  104455                         TRAP    55                      ;                                       5977
11184 064304  011764                         .WORD   11764
11185 064306  010542                         .WORD   MSG2
11186 064310  000000                         .WORD   0
11187 064312  016602  000030                 MOV     30(SP),R2               ; LUN,*                                 5978
11188 064316  112762  000007  032464         MOVB    #7,WHY.DROPT(R2)
11189 064324  010200                         MOV     R2,R0                   ; LUN,*                                 5979
11190 064326  104451                         TRAP    51
11191 064330  062706  000022         18$:    ADD     #22,SP                  ;                                       5980
11192 064334  000137  064754         19$:    JMP     28$
11193 064340  020527  000005         20$:    CMP     R5,#5                   ; VALUE,*                               5926
11194 064344  001162                         BNE     27$
11195 064346  004737  035212                 JSR     PC,ISOLATE              ;                                       5984
11196 064352  032737  000001  002260         BIT     #1,ERROUT               ;                                       5985
11197 064360  001423                         BEQ     21$
11198 064362  017702  146040                 MOV     @ML.REG+42,R2           ;                                       5986
11199 064366  006202                         ASR     R2
11200 064370  006202                         ASR     R2
11201 064372  006202                         ASR     R2
11202 064374  006202                         ASR     R2
11203 064376  006202                         ASR     R2
11204 064400  006202                         ASR     R2
11205 064402  042702  177700                 BIC     #177700,R2
11206 064406  010246                         MOV     R2,-(SP)
11207 064410  012746  006262                 MOV     #FMT10B,-(SP)
11208 064414  012746  000002                 MOV     #2,-(SP)
11209 064420  010600                         MOV     SP,R0                   ; SP,*
11210 064422  104414                         TRAP    14
11211 064424  062706  000006                 ADD     #6,SP
11212 064430  017766  145774  000034 21$:    MOV     @ML.REG+44,34(SP)       ; *,OLDSEC                              5983
```

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11214                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
11215                                   ;       TESTING RANDOM DATA                             23-Oct-1980 14:57:05    PA:<
11216
11217 064436  017702  145764                    MOV     @ML.REG+42,R2           ;                                       5989
11218 064442  006202                            ASR     R2
11219 064444  006202                            ASR     R2
11220 064446  006202                            ASR     R2
11221 064450  006202                            ASR     R2
11222 064452  006202                            ASR     R2
11223 064454  006202                            ASR     R2
11224 064456  042702  177700                    BIC     #177700,R2
11225 064462  010266  000036                    MOV     R2,36(SP)               ; *,OLDCHN
11226 064466  012746  000001                    MOV     #1,-(SP)                ;                                       5990
11227 064472  016646  000044                    MOV     44(SP),-(SP)            ; COMMAND,*
11228 064476  016646  000034                    MOV     34(SP),-(SP)            ; LUN,*
11229 064502  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11230 064504  016646  000050                    MOV     50(SP),-(SP)            ; PTR,*
11231 064510  010446                            MOV     R4,-(SP)                ; SECTOR,*
11232 064512  004737  043046                    JSR     PC,RETRY
11233 064516  062706  000014                    ADD     #14,SP
11234 064522  020027  000005                    CMP     R0,#5
11235 064526  001052                            BNE     24$
11236 064530  027766  145674  000034            CMP     @ML.REG+44,34(SP)       ; *,OLDSEC                              5992
11237 064536  001035                            BNE     23$
11238 064540  016600  000036                    MOV     36(SP),R0               ; OLDCHN,*
11239 064544  017702  145656                    MOV     @ML.REG+42,R2
11240 064550  006202                            ASR     R2
11241 064552  006202                            ASR     R2
11242 064554  006202                            ASR     R2
11243 064556  006202                            ASR     R2
11244 064560  006202                            ASR     R2
11245 064562  006202                            ASR     R2
11246 064564  042702  177700                    BIC     #177700,R2
11247 064570  020200                            CMP     R2,R0
11248 064572  001017                            BNE     23$
11249 064574  032737  000001  002260            BIT     #1,ERROUT               ;                                       5995
11250 064602  001404                            BEQ     22$
11251 064604  104456                            TRAP    56                      ;                                       5997
11252 064606  011765                            .WORD   11765
11253 064610  010624                            .WORD   MSG4
11254 064612  000000                            .WORD   0
11255 064614  016646  000030          22$:      MOV     30(SP),-(SP)            ; LUN,*                                 5998
11256 064620  013746  032360                    MOV     BOARD,-(SP)
11257 064624  004737  035302                    JSR     PC,UP.HARD.COUNT
11258 064630  000427                            BR      26$                     ;                                       5992
11259 064632  032737  000001  002260  23$:      BIT     #1,ERROUT               ;                                       6002
11260 064640  001415                            BEQ     25$
11261 064642  104457                            TRAP    57                      ;                                       6004
11262 064644  011766                            .WORD   11766
11263 064646  010610                            .WORD   MSG3
11264 064650  000000                            .WORD   0
11265 064652  000410                            BR      25$                     ;                                       6005
11266 064654  032737  000001  002260  24$:      BIT     #1,ERROUT               ;                                       6009
11267 064662  001404                            BEQ     25$
11268 064664  104457                            TRAP    57                      ;                                       6011
```

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11270                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
11271                                   ;       TESTING RANDOM DATA                             23-Oct-1980 14:57:05    PA:<
11272
11273 064666  011767                            .WORD   11767
11274 064670  010610                            .WORD   MSG3
11275 064672  000000                            .WORD   0
11276 064674  016646  000030          25$:      MOV     30(SP),-(SP)            ; LUN,*                                 6012
11277 064700  013746  032360                    MOV     BOARD,-(SP)
11278 064704  004737  035430                    JSR     PC,UP.SOFT.COUNT
11279 064710  022626                  26$:      CMP     (SP)+,(SP)+             ;                                       5983
11280 064712  010300                  27$:      MOV     R3,R0                   ; WRDCNT,*                              6018
11281 064714  006300                            ASL     R0
11282 064716  063700  030706                    ADD     WPTR,R0
11283 064722  010037  030706                    MOV     R0,WPTR
11284 064726  010316                            MOV     R3,(SP)                 ; WRDCNT,*                              6019
11285 064730  012746  000400                    MOV     #400,-(SP)
11286 064734  004737  005056                    JSR     PC,BL$DIV
11287 064740  060400                            ADD     R4,R0                   ; SECTOR,*
11288 064742  010004                            MOV     R0,R4                   ; *,SECTOR
11289 064744  062706  000024                    ADD     #24,SP                  ;                                       5874
11290 064750  000137  063306                    JMP     3$                      ;                                       5873
11291 064754  005266  000006          28$:      INC     6(SP)                   ; LUN                                   5862
11292 064760  026666  000006  000010  29$:      CMP     6(SP),10(SP)            ; LUN,*
11293 064766  002002                            BGE     30$
11294 064770  000137  063200                    JMP     2$
11295 064774  005266  000024          30$:      INC     24(SP)                  ; COUNT                                 5859
11296 065000  026666  000024  000044            CMP     24(SP),44(SP)           ; COUNT,REPEAT
11297 065006  003002                            BGT     31$
11298 065010  000137  063156                    JMP     1$
11299 065014  062706  000026          31$:      ADD     #26,SP                  ;                                       5798
11300 065020  000207                            RTS     PC
11301
11302                                   ; Routine Size:  482 words
11303                                   ; Maximum stack depth per invocation:  35 words
11308
11309
11310 ;          6028
```

```
11312 ;MLX4                                          23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
11313 ;                TESTING RANDOM DATA & WORD COUNTS          23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (49)
11314
11315 ;         6029  %SBTTL  'TESTING RANDOM DATA & WORD COUNTS'
11316 ;         6030
11317 ;         6031  ROUTINE RAND2(REPEAT): NOVALUE =
11318 ;         6032  BEGIN  !* 1 * START OF ROUTINE
11319 ;         6033
11320 ;         6034  !++
11321 ;         6035  !  ROUTINE:     RAND2(REPEAT)
11322 ;         6036  !
11323 ;         6037  !  PURPOSE:     TO TEST ALL UNITS IN A SEQUENTIAL FASHION, BUT
11324 ;         6038  !               USING RANDOM WORD COUNTS
11325 ;         6039  !
11326 ;         6040  !  ARGUMENT:    REPEAT = NUMBER OF TIMES TO EXECUTE THIS ROUTINE
11327 ;         6041  !               BEFORE RETURNING TO THE CALLER (OPT5).
11328 ;         6042  !
11329 ;         6043  !     NOTE:     SINCE ONLY THE WORD COUNTS AND THE DATA ARE RANDOM,
11330 ;         6044  !               THE OTHER TRANSFER VALUES MUST BE SET UP BY THIS
11331 ;         6045  !               ROUTINE.  THESE VALUES INCLUDE:
11332 ;         6046  !                  THE LUN, SECTOR AND BUFFER POINTERS.
11333 ;         6047  !
11334 ;         6048  !  THE CODE FOR 'RAND2' IN BRIEF:
11335 ;         6049  !
11336 ;         6050  !  BEGIN 1 (START OF ROUTINE)
11337 ;         6051  !  SAY ROUTINE IS RUNNING
11338 ;         6052  !  INCR COUNT FROM 1 TO REPEAT
11339 ;         6053  !  : BEGIN 2 (START OF REPEAT LOOP FOR THE ROUTINE)
11340 ;         6054  !  : INCR LUN FROM 0 TO LAST
11341 ;         6055  !  : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
11342 ;         6056  !  : : GENERATE THE RANDOM PATTERN
11343 ;         6057  !  : : TESTLOOP:
11344 ;         6058  !  : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
11345 ;         6059  !  : : : IF UNIT IS ACTIVE
11346 ;         6060  !  : : : THEN
11347 ;         6061  !  : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
11348 ;         6062  !  : : : : SECTOR = LOWEST
11349 ;         6063  !  : : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
11350 ;         6064  !  : : : : WHILE SECTOR LEQ HIGHEST DO
11351 ;         6065  !  : : : : : BEGIN 6 (START OF A PASS THROUGH ALL SECTORS)
11352 ;         6066  !  : : : : : CHOOSE A RANDOM WORD COUNT
11353 ;         6067  !  : : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
11354 ;         6068  !  : : : : : CALCULATE NEXT STARTING SECTOR (BASED ON WORD COUNT)
11355 ;         6069  !  : : : : : IF NEXT STARTING SECTOR GTR HIGHEST
11356 ;         6070  !  : : : : : : THEN ADJUST THE WORD COUNT & NEXT SECTOR SO THEY FIT
11357 ;         6071  !  : : : : : : :    WITHIN THE TESTABLE SECTOR LIMITS
11358 ;         6072  !  : : : : : WRITE
11359 ;         6073  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
11360 ;         6074  !  : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
11361 ;         6075  !  : : : : : DO THE WRITE CHECK OR READ
11362 ;         6076  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
11363 ;         6077  !  : : : : : SECTOR = THE CALCULATED NEXT STARTING SECTOR
11364 ;         6078  !  : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
11365 ;         6079  !  : : : : : END 6 (END OF A PASS THROUGH ALL SECTORS)
11366 ;         6080  !  : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
```

```
11368 ;MLX4                                          23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
11369 ;                TESTING RANDOM DATA & WORD COUNTS   23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (49)
11370 ;
11371 ;          6081  !  : : : END 4 (END TESTLOOP)
11372 ;          6082  !  : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
11373 ;          6083  !  : END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
11374 ;          6084  !  RETURN
11375 ;          6085  !  END 1 (END OF ROUTINE)
11376 ;          6086  !--
11377 ;          6087
11378 ;          6088  LOCAL
11379 ;          6089     WRDCNT, SECTOR, NEXT_SECT, VALUE, OLDSEC, OLDCHN,
11380 ;          6090     PTR, COMMAND, DBL_VALUE;
11381 ;          6091
11382 ;          6092  LABEL
11383 ;          6093     LOOP;
11384 ;          6094
11385 ;          6095  PRINTB(SAY1,RTN5B);
11386 ;          6096     !'RAND2'
11387 ;          6097  INCR COUNT FROM 1 TO .REPEAT DO
11388 ;          6098     BEGIN  !* 2 *  START OF REPEAT LOOP FOR THIS ROUTINE
11389 ;          6099     INCR LUN FROM 0 TO (.L$UNIT - 1) DO
11390 ;          6100        BEGIN  !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
11391 ;          6101        GEN5();   !RANDOM DATA PATTERN
11392 ;          6102        LOOP:
11393 ;          6103           BEGIN  !* 4 *  START OF THE LOOP FOR COMPLETELY TESTING 1 UNIT
11394 ;          6104           IF .DRIVE_STATUS[.LUN] EQL ACTIVE
11395 ;          6105           THEN
11396 ;          6106              BEGIN  !* 5 *  START OF TEST FOR AN ACTIVE UNIT
11397 ;          6107              L$LUN = .LUN;
11398 ;          6108              SECTOR = LOWEST;
11399 ;          6109              WPTR = WBUFF;
11400 ;          6110              RPTR = RBUFF;
11401 ;          6111              WHILE .SECTOR LEQA HIGHEST DO
11402 ;          6112                 BEGIN  !* 6 *  START OF A PASS THROUGH ALL SECTORS
11403 ;          6113                 WRDCNT = RNDWC();        !EXPECT VALUE BETWEEN 1 AND BUFSIZ
11404 ;          6114                 SET_PTRS(.WRDCNT);
11405 ;          6115                 NEXT_SECT = .SECTOR + (.WRDCNT/256);
11406 ;          6116                 IF .SECTOR EQL .NEXT_SECT
11407 ;          6117                 THEN  NEXT_SECT = .NEXT_SECT + 1;
11408 ;          6118                 IF .NEXT_SECT GTRA HIGHEST
11409 ;          6119                 THEN
11410 ;          6120                    BEGIN
11411 ;          6121                    WRDCNT = 256 * (HIGHEST - .SECTOR + 1);
11412 ;          6122                    NEXT_SECT = HIGHEST + 1;
11413 ;          6123                    END;
11414 ;          6124
11415 ;          6125                 VALUE = WRITE(.LUN,.WRDCNT,.WPTR,.SECTOR);
11416 ;          6126                 !+
11417 ;          6127                 !  SEE HOW SUCCESSFUL THE WRITE WAS:
11418 ;          6128                 !-
11419 ;          6129                 SELECTONE .VALUE OF        !SEE 'SYSERR' FOR DEFINITION
11420 ;          6130                    SET                     !OF ERROR # CONTAINED IN 'VALUE'
11421 ;          6131                 [1] :
11422 ;          6132                    BEGIN  !* 6A *          RETRY ALLOWED
```

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11424 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
11425 :                TESTING RANDOM DATA & WORD COUNTS       23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (49)
11426
11427 :          6133                  IF RETRY(SIX,WRITE,.LUN,.WRDCNT,.WPTR,.SECTOR) NEQ 0
11428 :          6134                  THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
11429 :          6135                     BEGIN
11430 :          6136                     WHY_DROPT[.LUN] = CODE_4;
11431 :          6137                     ERRDF(5201,MSG1,0);   !**** OPTION 5, RAND2 ERROR 01 ****
11432 :          6138                     DODU(.LUN);
11433 :          6139                     LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
11434 :          6140                     END;
11435 :          6141                  END;   !* 6A *
11436 :          6142               [2] :
11437 :          6143                  BEGIN  !* 6B *           FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
11438 :          6144                  WHY_DROPT[.LUN] = CODE_5;
11439 :          6145                  ERRDF(5202,MSG1,0);   !**** OPTION 5, RAND2 ERROR 02 ****
11440 :          6146                  DODU(.LUN);
11441 :          6147                  LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
11442 :          6148                  END;   !* 6B *
11443 :          6149               [3] :
11444 :          6150                  BEGIN  !* 6C *           FATAL DRIVE ERROR -- NO RETRY ALLOWED
11445 :          6151                  ERRDF(5203,MSG1,0);   !**** OPTION 5, RAND2 ERROR 03 ****
11446 :          6152                  WHY_DROPT[.LUN] = CODE_6;
11447 :          6153                  DODU(.LUN);
11448 :          6154                  LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
11449 :          6155                  END;   !* 6C *
11450 :          6156
11451 :          6157                  TES;
11452 :          6158
11453 :          6159               COMMAND = CHOOSE();
11454 :          6160               IF .COMMAND EQL READ
11455 :          6161               THEN
11456 :          6162                  BEGIN
11457 :          6163                  PTR = .RPTR;
11458 :          6164                  VALUE = READ(.LUN,.WRDCNT,.RPTR,.SECTOR);
11459 :          6165                  END
11460 :          6166               ELSE
11461 :          6167                  BEGIN
11462 :          6168                  PTR = .WPTR;
11463 :          6169                  VALUE = CHECK(.LUN,.WRDCNT,.WPTR,.SECTOR);
11464 :          6170                  END;
11465 :          6171               !*
11466 :          6172               !  SEE HOW SUCCESSFUL THE OPERATION WAS:
11467 :          6173               !-
11468 :          6174               SELECTONE .VALUE OF        !SEE 'SYSERR' FOR DEFINITION
11469 :          6175                  SET                     !OF ERROR # CONTAINED IN 'VALUE'
11470 :          6176               [0] :
11471 :          6177                  IF .COMMAND EQL READ
11472 :          6178                  THEN
11473 :          6179                     BEGIN
11474 :          6180                     IF (DBL_VALUE = DOUBLE_CHECK(.WPTR,.RPTR,.WRDCNT)) NEQ 0
11475 :          6181                     THEN
11476 :          6182                        BEGIN
11477 :          6183                        SAYWHO(.LUN);
11478 :          6184                        PRINTB(SAY1,MSG5);
```

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11480 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
11481 ;                TESTING RANDOM DATA & WORD COUNTS       23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (49)
11482
11483 ;         6185                        !'ECC LOGIC FAILED TO DETECT DATA ERROR'
11484 ;         6186                    PRINTB(FMT12A,..DBL_VALUE,..DBL_VALUE);
11485 ;         6187                        !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
11486 ;         6188                    DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
11487 ;         6189                    PRINTB(FMT12B,..DBL_VALUE,..DBL_VALUE);
11488 ;         6190                        !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
11489 ;         6191                    WHY_DROPT[.LUN] = CODE_8;
11490 ;         6192                    ERRDF(5204,MSG1,0);   !**** OPTION 5, RAND2 ERROR 04 ****
11491 ;         6193                    DODU(.LUN);
11492 ;         6194                    LEAVE LOOP;      !JUMP JUST BEYOND END OF BLOCK * 4 *
11493 ;         6195                    END;
11494 ;         6196                END;
11495 ;         6197            [1] :
11496 ;         6198               BEGIN  !* 6D *        RETRY ALLOWED
11497 ;         6199               IF RETRY(SIX,..COMMAND,..LUN,..WRDCNT,..PTR,..SECTOR) NEQ 0
11498 ;         6200               THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
11499 ;         6201                  BEGIN
11500 ;         6202                  WHY_DROPT[.LUN] = CODE_4;
11501 ;         6203                  ERRDF(5205,MSG1,0);   !**** OPTION 5, RAND2 ERROR 05 ****
11502 ;         6204                  DODU(.LUN);
11503 ;         6205                  LEAVE LOOP;      !JUMP JUST BEYOND END OF BLOCK * 4 *
11504 ;         6206                  END;
11505 ;         6207               END;   !* 6D *
11506 ;         6208            [2] :
11507 ;         6209               BEGIN  !* 6E *        FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
11508 ;         6210               WHY_DROPT[.LUN] = CODE_5;
11509 ;         6211               ERRDF(5206,MSG1,0);   !**** OPTION 5, RAND2 ERROR 06 ****
11510 ;         6212               DODU(.LUN);
11511 ;         6213               LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
11512 ;         6214               END;   !* 6E *
11513 ;         6215            [3] :
11514 ;         6216               BEGIN  !* 6F *        FATAL DRIVE ERROR -- NO RETRY ALLOWED
11515 ;         6217               ERRDF(5207,MSG1,0);   !**** OPTION 5, RAND2 ERROR 07 ****
11516 ;         6218               WHY_DROPT[.LUN] = CODE_6;
11517 ;         6219               DODU(.LUN);
11518 ;         6220               LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
11519 ;         6221               END;   !* 6F *
11520 ;         6222            [4] :
11521 ;         6223               BEGIN  !* 6G *        UNRECOVERABLE DATA ERROR
11522 ;         6224               ISOLATE();
11523 ;         6225               ERRDF(5208,MSG2,0);   !**** OPTION 5, RAND2 ERROR 08 ****
11524 ;         6226               WHY_DROPT[.LUN] = CODE_7;
11525 ;         6227               DODU(.LUN);
11526 ;         6228               LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
11527 ;         6229               END;   !* 6G *
11528 ;         6230            [5] :
11529 ;         6231               BEGIN  !* 6H *        RECOVERABLE DATA ERROR
11530 ;         6232               ISOLATE();
11531 ;         6233               IF .ERROUT
11532 ;         6234               THEN  PRINTB(FMT10B,,CHAN);
11533 ;         6235                     !'    BIT QQ'
11534 ;         6236               OLDSEC = .MLEL;
```

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11536 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
11537 ;                TESTING RANDOM DATA & WORD COUNTS       23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (49)
11538
11539 ;          6237                    OLDCHN = .CHAN;
11540 ;          6238                    IF RETRY(ONE,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) EQL 5
11541 ;          6239                    THEN
11542 ;          6240                        IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
11543 ;          6241                        THEN
11544 ;          6242                            BEGIN
11545 ;          6243                            IF .ERROUT
11546 ;          6244                            THEN
11547 ;          6245                            ERRHRD(5209,MSG4,0);  !**** OPTION 5, RAND2 ERROR 09 ****
11548 ;          6246                            UP_HARD_COUNT(.LUN,.BOARD);
11549 ;          6247                            END
11550 ;          6248                        ELSE
11551 ;          6249                            BEGIN
11552 ;          6250                            IF .ERROUT
11553 ;          6251                            THEN
11554 ;          6252                            ERRSOFT(5210,MSG3,0); !**** OPTION 5, RAND2 ERROR 10 ****
11555 ;          6253                            UP_SOFT_COUNT(.LUN,.BOARD);
11556 ;          6254                            END
11557 ;          6255                    ELSE
11558 ;          6256                        BEGIN
11559 ;          6257                        IF .ERROUT
11560 ;          6258                        THEN
11561 ;          6259                        ERRSOFT(5211,MSG3,0); !**** OPTION 5, RAND2 ERROR 11 ****
11562 ;          6260                        UP_SOFT_COUNT(.LUN,.BOARD);
11563 ;          6261                        END;
11564 ;          6262                    END;   !* 6H *
11565 ;          6263
11566 ;          6264                        TES;
11567 ;          6265
11568 ;          6266                    SECTOR = .NEXT_SECT;
11569 ;          6267                    WPTR = .WPTR + 2;
11570 ;          6268                    END;   !* 6 *  END OF A PASS THROUGH ALL SECTORS
11571 ;          6269                END;   !* 5 *  END OF TEST FOR AN ACTIVE UNIT
11572 ;          6270            END;   !* 4 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
11573 ;          6271        END;   !* 3 * END OF LOGICAL UNIT SELECTION LOOP
11574 ;          6272    END;   !* 2 *  END OF REPEAT LOOP FOR THIS ROUTINE
11575 ;          6273 RETURN;
11576 ;          6274 END;   !* 1 *  END OF ROUTINE
11580
11581                                        .SBTTL  RAND2 TESTING RANDOM DATA & WORD COUNTS
11585 065022  004137  005222          RAND2: JSR     R1,$SAVE5                          ;                    6031
11586 065026  162706  000022                 SUB     #22,SP
11587 065032  012746  007314                 MOV     #RTN5B,-(SP)                       ;                    6095
11588 065036  012746  006514                 MOV     #SAY1,-(SP)
11589 065042  012746  000002                 MOV     #2,-(SP)
11590 065046  010600                         MOV     SP,R0                              ; SP,*
```

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11592                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
11593                                   ;       TESTING RANDOM DATA & WORD COUNTS               23-Oct-1980 14:57:05    PA:<
11594
11595 065050  104414                            TRAP    14
11596 065052  005066  000016                    CLR     16(SP)                  ; COUNT                                 6097
11597 065056  000137  066642                    JMP     32$
11598 065062  013766  002012  000022  1$:       MOV     L$UNIT,22(SP)           ;                                       6099
11599 065070  005001                            CLR     R1                      ; LUN
11600 065072  000137  066630                    JMP     31$
11601 065076  004737  036710          2$:       JSR     PC,GEN5                 ;                                       6101
11602 065102  010100                            MOV     R1,R0                   ; LUN,*                                 6104
11603 065104  006200                            ASR     R0
11604 065106  006200                            ASR     R0
11605 065110  006200                            ASR     R0
11606 065112  062700  032460                    ADD     #DRIVE.STATUS,R0
11607 065116  010046                            MOV     R0,-(SP)
11608 065120  010146                            MOV     R1,-(SP)                ; LUN,*
11609 065122  042716  177770                    BIC     #177770,(SP)
11610 065126  012746  000001                    MOV     #1,-(SP)
11611 065132  005046                            CLR     -(SP)
11612 065134  004737  004244                    JSR     PC,BL$GT2
11613 065140  062706  000010                    ADD     #10,SP
11614 065144  005300                            DEC     R0
11615 065146  001166                            BNE     9$
11616 065150  010137  002074                    MOV     R1,L$LUN                ; LUN,*                                 6107
11617 065154  010100                            MOV     R1,R0                   ; LUN,*                                 6108
11618 065156  006300                            ASL     R0
11619 065160  016004  032476                    MOV     LOW.SECT(R0),R4         ; *,SECTOR
11620 065164  012737  010706  030706            MOV     #WBUFF,WPTR             ;                                       6109
11621 065172  012737  020706  030710            MOV     #RBUFF,RPTR             ;                                       6110
11622 065200  012766  032516  000020            MOV     #TOP.SECT,20(SP)        ;                                       6111
11623 065206  060066  000020                    ADD     R0,20(SP)
11624 065212  020476  000020          3$:       CMP     R4,@20(SP)              ; SECTOR,*
11625 065216  101142                            BHI     9$
11626 065220  004737  062560                    JSR     PC,RNDWC                ;                                       6113
11627 065224  010003                            MOV     R0,R3                   ; *,WRDCNT
11628 065226  010346                            MOV     R3,-(SP)                ; WRDCNT,*                              6114
11629 065230  004737  043770                    JSR     PC,SET.PTRS
11630 065234  010316                            MOV     R3,(SP)                 ; WRDCNT,*                              6115
11631 065236  012746  000400                    MOV     #400,-(SP)
11632 065242  004737  005056                    JSR     PC,BL$DIV
11633 065246  060400                            ADD     R4,R0                   ; SECTOR,*
11634 065250  010066  000012                    MOV     R0,12(SP)               ; *,NEXT.SECT
11635 065254  020400                            CMP     R4,R0                   ; SECTOR,NEXT.SECT                      6116
11636 065256  001002                            BNE     4$
11637 065260  005266  000012                    INC     12(SP)                  ; NEXT.SECT                             6117
11638 065264  026676  000012  000024  4$:       CMP     12(SP),@24(SP)          ; NEXT.SECT,*                           6118
11639 065272  101415                            BLOS    5$
11640 065274  017600  000024                    MOV     @24(SP),R0              ;                                       6121
11641 065300  160400                            SUB     R4,R0                   ; SECTOR,*
11642 065302  000300                            SWAB    R0                      ;                                       6120
11643 065304  105000                            CLRB    R0
11644 065306  010003                            MOV     R0,R3                   ; *,WRDCNT                              6121
11645 065310  062703  000400                    ADD     #400,R3                 ; *,WRDCNT
11646 065314  017666  000024  000012            MOV     @24(SP),12(SP)          ; *,NEXT.SECT                           6122
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11648                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
11649                                   :       TESTING RANDOM DATA & WORD COUNTS               23-Oct-1980 14:57:05    PA:<
11650
11651 065322  005266  000012                    INC     12(SP)                          ; NEXT.SECT
11652 065326  010116                    5$:     MOV     R1,(SP)                         ; LUN,*                         6125
11653 065330  010346                            MOV     R3,-(SP)                        ; WRDCNT,*
11654 065332  013746  030706                    MOV     WPTR,-(SP)
11655 065336  010446                            MOV     R4,-(SP)                        ; SECTOR,*
11656 065340  004737  042246                    JSR     PC,WRITE
11657 065344  010005                            MOV     R0,R5                           ; *,VALUE
11658 065346  020527  000001                    CMP     R5,#1                           ; VALUE,*                       6129
11659 065352  001031                            BNE     6$
11660 065354  012746  000006                    MOV     #6,-(SP)                        ;                               6133
11661 065360  012746  042246                    MOV     #WRITE,-(SP)
11662 065364  010146                            MOV     R1,-(SP)                        ; LUN,*
11663 065366  010346                            MOV     R3,-(SP)                        ; WRDCNT,*
11664 065370  013746  030706                    MOV     WPTR,-(SP)
11665 065374  010446                            MOV     R4,-(SP)                        ; SECTOR,*
11666 065376  004737  043046                    JSR     PC,RETRY
11667 065402  062706  000014                    ADD     #14,SP
11668 065406  005700                            TST     R0
11669 065410  001446                            BEQ     10$
11670 065412  112761  000004  032464            MOVB    #4,WHY.DROPT(R1)                ; *,*(LUN)                      6136
11671 065420  104455                            TRAP    55                              ;                               6137
11672 065422  012121                            .WORD   12121
11673 065424  010512                            .WORD   MSG1
11674 065426  000000                            .WORD   0
11675 065430  010100                            MOV     R1,R0                           ; LUN,*                         6138
11676 065432  104451                            TRAP    51
11677 065434  000431                            BR      8$                              ;                               6139
11678 065436  020527  000002            6$:     CMP     R5,#2                           ; VALUE,*                       6129
11679 065442  001012                            BNE     7$
11680 065444  112761  000005  032464            MOVB    #5,WHY.DROPT(R1)                ; *,*(LUN)                      6144
11681 065452  104455                            TRAP    55                              ;                               6145
11682 065454  012122                            .WORD   12122
11683 065456  010512                            .WORD   MSG1
11684 065460  000000                            .WORD   0
11685 065462  010100                            MOV     R1,R0                           ; LUN,*                         6146
11686 065464  104451                            TRAP    51
11687 065466  000414                            BR      8$                              ;                               6147
11688 065470  020527  000003            7$:     CMP     R5,#3                           ; VALUE,*                       6129
11689 065474  001014                            BNE     10$
11690 065476  104455                            TRAP    55                              ;                               6151
11691 065500  012123                            .WORD   12123
11692 065502  010512                            .WORD   MSG1
11693 065504  000000                            .WORD   0
11694 065506  112761  000006  032464            MOVB    #6,WHY.DROPT(R1)                ; *,*(LUN)                      6152
11695 065514  010100                            MOV     R1,R0                           ; LUN,*                         6153
11696 065516  104451                            TRAP    51
11697 065520  062706  000012            8$:     ADD     #12,SP                          ;                               6154
11698 065524  000535                    9$:     BR      15$
11699 065526  004737  043010            10$:    JSR     PC,CHOOSE                       ;                               6159
11700 065532  010066  000024                    MOV     R0,24(SP)                       ; *,COMMAND
11701 065536  005002                            CLR     R2                              ;                               6160
11702 065540  020027  042434                    CMP     R0,#READ                        ; COMMAND,*
```

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11704                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
11705                                   ;       TESTING RANDOM DATA & WORD COUNTS               23-Oct-1980 14:57:05    PA:<
11706
11707 065544  001014                            BNE     11$
11708 065546  005202                            INC     R2
11709 065550  013766  030710  000026            MOV     RPTR,26(SP)             ; *,PTR                                 6163
11710 065556  010146                            MOV     R1,-(SP)                ; LUN,*                                 6164
11711 065560  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11712 065562  013746  030710                    MOV     RPTR,-(SP)
11713 065566  010446                            MOV     R4,-(SP)                ; SECTOR,*
11714 065570  004737  042434                    JSR     PC,READ
11715 065574  000412                            BR      12$
11716 065576  013766  030706  000026  11$:      MOV     WPTR,26(SP)             ; *,PTR                                 6168
11717 065604  010146                            MOV     R1,-(SP)                ; LUN,*                                 6169
11718 065606  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11719 065610  013746  030706                    MOV     WPTR,-(SP)
11720 065614  010446                            MOV     R4,-(SP)                ; SECTOR,*
11721 065616  004737  042622                    JSR     PC,CHECK
11722 065622  010005                  12$:      MOV     R0,R5                   ; *,VALUE
11723 065624  001076                            BNE     16$                     ;                                       6174
11724 065626  006002                            ROR     R2                      ;                                       6177
11725 065630  103402                            BLO     14$
11726 065632  000137  066604            13$:    JMP     29$
11727 065636  013746  030706            14$:    MOV     WPTR,-(SP)              ;                                       6180
11728 065642  013746  030710                    MOV     RPTR,-(SP)
11729 065646  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11730 065650  004737  041226                    JSR     PC,DOUBLE.CHECK
11731 065654  062706  000006                    ADD     #6,SP
11732 065660  010066  000032                    MOV     R0,32(SP)               ; *,DBL.VALUE
11733 065664  001762                            BEQ     13$
11734 065666  010146                            MOV     R1,-(SP)                ; LUN,*                                 6183
11735 065670  004737  033436                    JSR     PC,SAYWHO
11736 065674  012716  010640                    MOV     #MSG5,(SP)              ;                                       6184
11737 065700  012746  006514                    MOV     #SAY1,-(SP)
11738 065704  012746  000002                    MOV     #2,-(SP)
11739 065710  010600                            MOV     SP,R0                   ; SP,*
11740 065712  104414                            TRAP    14
11741 065714  016616  000040                    MOV     40(SP),(SP)             ; DBL.VALUE,*                           6186
11742 065720  017646  000040                    MOV     @40(SP),-(SP)           ; DBL.VALUE,*
11743 065724  012746  006332                    MOV     #FMT12A,-(SP)
11744 065730  012746  000003                    MOV     #3,-(SP)
11745 065734  010600                            MOV     SP,R0                   ; SP,*
11746 065736  104414                            TRAP    14
11747 065740  062766  010000  000046            ADD     #10000,46(SP)           ; *,DBL.VALUE                           6188
11748 065746  016616  000046                    MOV     46(SP),(SP)             ; DBL.VALUE,*                           6189
11749 065752  017646  000046                    MOV     @46(SP),-(SP)           ; DBL.VALUE,*
11750 065756  012746  006400                    MOV     #FMT12B,-(SP)
11751 065762  012746  000003                    MOV     #3,-(SP)
11752 065766  010600                            MOV     SP,R0                   ; SP,*
11753 065770  104414                            TRAP    14
11754 065772  112761  000010  032464            MOVB    #10,WHY.DROPT(R1)       ; *,*(LUN)                              6191
11755 066000  104455                            TRAP    55                      ;                                       6192
11756 066002  012124                            .WORD   12124
11757 066004  010512                            .WORD   MSG1
11758 066006  000000                            .WORD   0
```

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11760                                   ;MLX4                                                                   23-Oct-1980 15:01:43    TOPS
11761                                   ;       TESTING RANDOM DATA & WORD COUNTS                               23-Oct-1980 14:57:05    PA:<
11762
11763 066010  010100                            MOV     R1,R0                   ; LUN,*                                         6193
11764 066012  104451                            TRAP    51
11765 066014  062706  000044                    ADD     #44,SP                  ;                                               6194
11766 066020  000506                    15$:    BR      21$
11767 066022  020527  000001              16$:  CMP     R5,#1                   ; VALUE,*                                       6174
11768 066026  001031                            BNE     17$
11769 066030  012746  000006                    MOV     #6,-(SP)                ;                                               6199
11770 066034  016646  000036                    MOV     36(SP),-(SP)            ; COMMAND,*
11771 066040  010146                            MOV     R1,-(SP)                ; LUN,*
11772 066042  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11773 066044  016646  000046                    MOV     46(SP),-(SP)            ; PTR,*
11774 066050  010446                            MOV     R4,-(SP)                ; SECTOR,*
11775 066052  004737  043046                    JSR     PC,RETRY
11776 066056  062706  000014                    ADD     #14,SP
11777 066062  005700                            TST     R0
11778 066064  001662                            BEQ     13$
11779 066066  112761  000004  032464            MOVB    #4,WHY.DROPT(R1)        ; *,*(LUN)                                      6202
11780 066074  104455                            TRAP    55                      ;                                               6203
11781 066076  012125                            .WORD   12125
11782 066100  010512                            .WORD   MSG1
11783 066102  000000                            .WORD   0
11784 066104  010100                            MOV     R1,R0                   ; LUN,*                                         6204
11785 066106  104451                            TRAP    51
11786 066110  000450                            BR      20$                     ;                                               6205
11787 066112  020527  000002              17$:  CMP     R5,#2                   ; VALUE,*                                       6174
11788 066116  001012                            BNE     18$
11789 066120  112761  000005  032464            MOVB    #5,WHY.DROPT(R1)        ; *,*(LUN)                                      6210
11790 066126  104455                            TRAP    55                      ;                                               6211
11791 066130  012126                            .WORD   12126
11792 066132  010512                            .WORD   MSG1
11793 066134  000000                            .WORD   0
11794 066136  010100                            MOV     R1,R0                   ; LUN,*                                         6212
11795 066140  104451                            TRAP    51
11796 066142  000433                            BR      20$                     ;                                               6213
11797 066144  020527  000003              18$:  CMP     R5,#3                   ; VALUE,*                                       6174
11798 066150  001012                            BNE     19$
11799 066152  104455                            TRAP    55                      ;                                               6217
11800 066154  012127                            .WORD   12127
11801 066156  010512                            .WORD   MSG1
11802 066160  000000                            .WORD   0
11803 066162  112761  000006  032464            MOVB    #6,WHY.DROPT(R1)        ; *,*(LUN)                                      6218
11804 066170  010100                            MOV     R1,R0                   ; LUN,*                                         6219
11805 066172  104451                            TRAP    51
11806 066174  000416                            BR      20$                     ;                                               6220
11807 066176  020527  000004              19$:  CMP     R5,#4                   ; VALUE,*                                       6174
11808 066202  001016                            BNE     22$
11809 066204  004737  035212                    JSR     PC,ISOLATE              ;                                               6224
11810 066210  104455                            TRAP    55                      ;                                               6225
11811 066212  012130                            .WORD   12130
11812 066214  010542                            .WORD   MSG2
11813 066216  000000                            .WORD   0
11814 066220  112761  000007  032464            MOVB    #7,WHY.DROPT(R1)        ; *,*(LUN)                                      6226
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11816                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
11817                                   ;       TESTING RANDOM DATA & WORD COUNTS               23-Oct-1980 14:57:05    PA:<
11818
11819 066226  010100                            MOV     R1,R0                   ; LUN,*                                 6227
11820 066230  104451                            TRAP    51
11821 066232  062706  000022            20$:    ADD     #22,SP                  ;                                       6228
11822 066236  000573                    21$:    BR      30$
11823 066240  020527  000005            22$:    CMP     R5,#5                   ; VALUE,*                               6174
11824 066244  001157                            BNE     29$
11825 066246  004737  035212                    JSR     PC,ISOLATE              ;                                       6232
11826 066252  032737  000001  002260            BIT     #1,ERROUT               ;                                       6233
11827 066260  001423                            BEQ     23$
11828 066262  017702  144140                    MOV     @ML.REG+42,R2           ;                                       6234
11829 066266  006202                            ASR     R2
11830 066270  006202                            ASR     R2
11831 066272  006202                            ASR     R2
11832 066274  006202                            ASR     R2
11833 066276  006202                            ASR     R2
11834 066300  006202                            ASR     R2
11835 066302  042702  177700                    BIC     #177700,R2
11836 066306  010246                            MOV     R2,-(SP)
11837 066310  012746  006262                    MOV     #FMT10B,-(SP)
11838 066314  012746  000002                    MOV     #2,-(SP)
11839 066320  010600                            MOV     SP,R0                   ; SP,*
11840 066322  104414                            TRAP    14
11841 066324  062706  000006                    ADD     #6,SP
11842 066330  017766  144074  000046  23$:     MOV     @ML.REG+44,46(SP)       ; *,OLDSEC                              6236
11843 066336  017702  144064                    MOV     @ML.REG+42,R2           ;                                       6237
11844 066342  006202                            ASR     R2
11845 066344  006202                            ASR     R2
11846 066346  006202                            ASR     R2
11847 066350  006202                            ASR     R2
11848 066352  006202                            ASR     R2
11849 066354  006202                            ASR     R2
11850 066356  042702  177700                    BIC     #177700,R2
11851 066362  010266  000050                    MOV     R2,50(SP)               ; *,OLDCHN
11852 066366  012746  000001                    MOV     #1,-(SP)                ;                                       6238
11853 066372  016646  000036                    MOV     36(SP),-(SP)            ; COMMAND,*
11854 066376  010146                            MOV     R1,-(SP)                ; LUN,*
11855 066400  010346                            MOV     R3,-(SP)                ; WRDCNT,*
11856 066402  016646  000046                    MOV     46(SP),-(SP)            ; PTR,*
11857 066406  010446                            MOV     R4,-(SP)                ; SECTOR,*
11858 066410  004737  043046                    JSR     PC,RETRY
11859 066414  062706  000014                    ADD     #14,SP
11860 066420  020027  000005                    CMP     R0,#5
11861 066424  001051                            BNE     26$
11862 066426  027766  143776  000046            CMP     @ML.REG+44,46(SP)       ; *,OLDSEC                              6240
11863 066434  001034                            BNE     25$
11864 066436  016600  000050                    MOV     50(SP),R0               ; OLDCHN,*
11865 066442  017702  143760                    MOV     @ML.REG+42,R2
11866 066446  006202                            ASR     R2
11867 066450  006202                            ASR     R2
11868 066452  006202                            ASR     R2
11869 066454  006202                            ASR     R2
11870 066456  006202                            ASR     R2
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11872                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
11873                                   ;       TESTING RANDOM DATA & WORD COUNTS               23-Oct-1980 14:57:05    PA:<
11874
11875 066460  006202                          ASR     R2
11876 066462  042702  177700                  BIC     #177700,R2
11877 066466  020200                          CMP     R2,R0
11878 066470  001016                          BNE     25$
11879 066472  032737  000001  002260          BIT     #1,ERROUT                       ;               6243
11880 066500  001404                          BEQ     24$
11881 066502  104456                          TRAP    56                              ;               6245
11882 066504  012131                          .WORD   12131
11883 066506  010624                          .WORD   MSG4
11884 066510  000000                          .WORD   0
11885 066512  010146                  24$:    MOV     R1,-(SP)                        ; LUN,*         6246
11886 066514  013746  032360                  MOV     BOARD,-(SP)
11887 066520  004737  035302                  JSR     PC,UP.HARD.COUNT
11888 066524  000426                          BR      28$                             ;               6240
11889 066526  032737  000001  002260  25$:    BIT     #1,ERROUT                       ;               6250
11890 066534  001415                          BEQ     27$
11891 066536  104457                          TRAP    57                              ;               6252
11892 066540  012132                          .WORD   12132
11893 066542  010610                          .WORD   MSG3
11894 066544  000000                          .WORD   0
11895 066546  000410                          BR      27$                             ;               6253
11896 066550  032737  000001  002260  26$:    BIT     #1,ERROUT                       ;               6257
11897 066556  001404                          BEQ     27$
11898 066560  104457                          TRAP    57                              ;               6259
11899 066562  012133                          .WORD   12133
11900 066564  010610                          .WORD   MSG3
11901 066566  000000                          .WORD   0
11902 066570  010146                  27$:    MOV     R1,-(SP)                        ; LUN,*         6260
11903 066572  013746  032360                  MOV     BOARD,-(SP)
11904 066576  004737  035430                  JSR     PC,UP.SOFT.COUNT
11905 066602  022626                  28$:    CMP     (SP)+,(SP)+                     ;               6231
11906 066604  016604  000030          29$:    MOV     30(SP),R4                       ; NEXT.SECT,SECTOR 6266
11907 066610  062737  000002  030706          ADD     #2,WPTR                         ;               6267
11908 066616  062706  000022                  ADD     #22,SP                          ;               6112
11909 066622  000137  065212                  JMP     3$                              ;               6111
11910 066626  005201                  30$:    INC     R1                              ; LUN           6099
11911 066630  020166  000022          31$:    CMP     R1,22(SP)                       ; LUN,*
11912 066634  002002                          BGE     32$
11913 066636  000137  065076                  JMP     2$
11914 066642  005266  000016          32$:    INC     16(SP)                          ; COUNT         6097
11915 066646  026666  000016  000046          CMP     16(SP),46(SP)                   ; COUNT,REPEAT
11916 066654  003002                          BGT     33$
11917 066656  000137  065062                  JMP     1$
11918 066662  062706  000030          33$:    ADD     #30,SP                          ;               6031
11919 066666  000207                          RTS     PC
11920
11921                                   ; Routine Size:  467 words
11922                                   ; Maximum stack depth per invocation:  36 words
```

```
11928 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
11929 ;                TESTING RANDOM SECTORS, DATA, WORD COUNTS    23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (50)
11930 ;
11931 ;         6275  %SBTTL  'TESTING RANDOM SECTORS, DATA, WORD COUNTS'
11932 ;         6276
11933 ;         6277  ROUTINE RAND3(REPEAT): NOVALUE =
11934 ;         6278  BEGIN  !* 1 *  START OF ROUTINE
11935 ;         6279
11936 ;         6280  !++
11937 ;         6281  !  ROUTINE:     RAND3(REPEAT)
11938 ;         6282  !
11939 ;         6283  !  PURPOSE:     TO CHECK RANDOM SECTORS
11940 ;         6284  !
11941 ;         6285  !  ARGUMENT:    REPEAT = NUMBER OF TIMES TO EXECUTE ENTIRE ROUTINE
11942 ;         6286  !
11943 ;         6287  !  THE CODE FOR 'RAND3' IN BRIEF:
11944 ;         6288  !
11945 ;         6289  !  BEGIN 1 (START OF ROUTINE)
11946 ;         6290  !  SAY ROUTINE IS RUNNING
11947 ;         6291  !  INCR COUNT FROM 1 TO REPEAT
11948 ;         6292  !  : BEGIN 2 (START OF REPEAT LOOP FOR THIS ROUTINE)
11949 ;         6293  !  : GENERATE THE RANDOM PATTERN
11950 ;         6294  !  : INCR LUN FROM 0 TO LAST
11951 ;         6295  !  : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
11952 ;         6296  !  : : INITIALIZE BUFFER POINTERS
11953 ;         6297  !  : : TESTLOOP:
11954 ;         6298  !  : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
11955 ;         6299  !  : : : IF UNIT IS ACTIVE
11956 ;         6300  !  : : : THEN
11957 ;         6301  !  : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
11958 ;         6302  !  : : : : TIMES = (HIGHEST - LOWEST)/2 + 1
11959 ;         6303  !  : : : : INCR KOUNT FROM 1 TO TIMES
11960 ;         6304  !  : : : : : BEGIN 6 (START OF COUNTING LOOP FOR SECTOR SELECTION)
11961 ;         6305  !  : : : : : CHOOSE A RANDOM WORD COUNT
11962 ;         6306  !  : : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
11963 ;         6307  !  : : : : : CHOOSE A RANDOM SECTOR
11964 ;         6308  !  : : : : : CALCULATE WHERE TRANSFER WILL END (BASED ON WORD COUNT)
11965 ;         6309  !  : : : : : IF CALCULATED VALUE GTR HIGHEST
11966 ;         6310  !  : : : : : : THEN ADJUST THE WORD COUNT SO IT FITS
11967 ;         6311  !  : : : : : : :    WITHIN THE TESTABLE SECTOR LIMITS
11968 ;         6312  !  : : : : : WRITE
11969 ;         6313  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE LABEL)
11970 ;         6314  !  : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
11971 ;         6315  !  : : : : : DO THE WRITE CHECK OR READ
11972 ;         6316  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE LABEL)
11973 ;         6317  !  : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
11974 ;         6318  !  : : : : : END 6 (END OF COUNTING LOOP FOR SECTOR SELECTION)
11975 ;         6319  !  : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
11976 ;         6320  !  : : : END 4 (END OF TESTLOOP)
11977 ;         6321  !  : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
11978 ;         6322  !  : END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
11979 ;         6323  !  RETURN
11980 ;         6324  !  END 1 (END OF ROUTINE)
11981 ;         6325  !--
11982 ;         6326
```

```
11984 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
11985 ;                TESTING RANDOM SECTORS, DATA, WORD COUNTS    23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (50)
11986
11987 ;         6327  LOCAL
11988 ;         6328     WRDCNT, SECTOR, TIMES, VALUE, OLDSEC, OLDCHN,
11989 ;         6329     PTR, COMMAND, DBL_VALUE;
11990 ;         6330
11991 ;         6331  LABEL
11992 ;         6332     LOOP;
11993 ;         6333
11994 ;         6334  PRINTB(SAY1,RTN5C);
11995 ;         6335     !'RAND3'
11996 ;         6336
11997 ;         6337  INCR COUNT FROM 1 TO .REPEAT DO
11998 ;         6338     BEGIN  !* 2 *  START OF REPEAT LOOP FOR THIS ROUTINE
11999 ;         6339     INCR LUN FROM 0 TO (.L$UNIT - 1) DO
12000 ;         6340        BEGIN  !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
12001 ;         6341        GEN5();
12002 ;         6342        LOOP:
12003 ;         6343           BEGIN  !* 4 *  START OF THE LOOP THAT COMPLETELY TESTS 1 UNIT
12004 ;         6344           IF .DRIVE_STATUS[.LUN] EQL ACTIVE
12005 ;         6345           THEN
12006 ;         6346              BEGIN  !* 5 *  START OF TEST FOR AN ACTIVE UNIT
12007 ;         6347              L$LUN = .LUN;
12008 ;         6348              WPTR = WBUFF;
12009 ;         6349              RPTR = RBUFF;
12010 ;         6350              TIMES = (HIGHEST - LOWEST)/2 + 1;
12011 ;         6351              INCR KOUNT FROM 1 TO .TIMES DO
12012 ;         6352                 BEGIN  !* 6 *  START OF COUNTING LOOP FOR SECTOR SELECTION
12013 ;         6353                 WRDCNT = RNDWC();          !VALUE BETWEEN 1 AND BUFSIZ
12014 ;         6354                 SET_PTRS(.WRDCNT);
12015 ;         6355                 SECTOR = RNDSEC(.LUN);!VALUE BETWEEN LOWEST AND HIGHEST
12016 ;         6356                 IF (.SECTOR + .WRDCNT/256) GTRA HIGHEST
12017 ;         6357                 THEN  WRDCNT = 256 * (HIGHEST - .SECTOR + 1);
12018 ;         6358
12019 ;         6359                 VALUE = WRITE(.LUN,.WRDCNT,.WPTR,.SECTOR);
12020 ;         6360                 !*
12021 ;         6361                 !  SEE HOW SUCCESSFUL THE WRITE WAS:
12022 ;         6362                 !-
12023 ;         6363                 SELECTONE .VALUE OF        !SEE 'SYSERR' FOR DEFINITION
12024 ;         6364                    SET                     !OF ERROR # CONTAINED IN 'VALUE'
12025 ;         6365                 [1] :
12026 ;         6366                    BEGIN  !* 6A *          RETRY ALLOWED
12027 ;         6367                    IF RETRY(SIX,WRITE,.LUN,.WRDCNT,.WPTR,.SECTOR) NEQ 0
12028 ;         6368                    THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
12029 ;         6369                       BEGIN
12030 ;         6370                       WHY_DROPT[.LUN] = CODE_4;
12031 ;         6371                       ERRDF(5301,MSG1,0);    !**** OPTION 5, RAND3 ERROR 01 ****
12032 ;         6372                       DODU(.LUN);
12033 ;         6373                       LEAVE LOOP;          !JUMP JUST BEYOND END OF BLOCK * 4 *
12034 ;         6374                       END;
12035 ;         6375                    END;   !* 6A *
12036 ;         6376                 [2] :
12037 ;         6377                    BEGIN  !* 6B *          FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
12038 ;         6378                    WHY_DROPT[.LUN] = CODE_5;
```

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12040 ;MLX4
12041 ;                 TESTING RANDOM SECTORS, DATA, WORD COUNTS       23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
12042 ;                                                                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (50)
12043 ;         6379                    ERRDF(5302,MSG1,0);    !**** OPTION 5, RAND3 ERROR 02 ****
12044 ;         6380                    DODU(.LUN);
12045 ;         6381                    LEAVE LOOP;            !JUMP JUST BEYOND END OF BLOCK * 4 *
12046 ;         6382                    END;   !* 6B *
12047 ;         6383                [3] :
12048 ;         6384                    BEGIN  !* 6C *         FATAL DRIVE ERROR -- NO RETRY ALLOWED
12049 ;         6385                    ERRDF(5303,MSG1,0);    !**** OPTION 5, RAND3 ERROR 03 ****
12050 ;         6386                    WHY_DROPT[.LUN] = CODE_6;
12051 ;         6387                    DODU(.LUN);
12052 ;         6388                    LEAVE LOOP;            !JUMP JUST BEYOND END OF BLOCK * 4 *
12053 ;         6389                    END;   !* 6C *
12054 ;         6390
12055 ;         6391                    TES;
12056 ;         6392
12057 ;         6393                COMMAND = CHOOSE();
12058 ;         6394                IF .COMMAND EQL READ
12059 ;         6395                THEN
12060 ;         6396                    BEGIN
12061 ;         6397                    PTR = .RPTR;
12062 ;         6398                    VALUE = READ(.LUN,.WRDCNT,.RPTR,.SECTOR);
12063 ;         6399                    END
12064 ;         6400                ELSE
12065 ;         6401                    BEGIN
12066 ;         6402                    PTR = .WPTR;
12067 ;         6403                    VALUE = CHECK(.LUN,.WRDCNT,.WPTR,.SECTOR);
12068 ;         6404                    END;
12069 ;         6405                !+
12070 ;         6406                !  SEE HOW SUCCESSFUL THE OPERATION WAS:
12071 ;         6407                !-
12072 ;         6408                SELECTONE .VALUE OF        !SEE 'SYSERR' FOR DEFINITION
12073 ;         6409                    SET                    !OF ERROR # CONTAINED IN 'VALUE'
12074 ;         6410                [0] :
12075 ;         6411                    IF .COMMAND EQL READ
12076 ;         6412                    THEN
12077 ;         6413                        BEGIN
12078 ;         6414                        IF (DBL_VALUE = DOUBLE_CHECK(.WPTR,.RPTR,.WRDCNT)) NEQ 0
12079 ;         6415                        THEN
12080 ;         6416                            BEGIN
12081 ;         6417                            SAYWHO(.LUN);
12082 ;         6418                            PRINTB(SAY1,MSG5);
12083 ;         6419                                !'ECC LOGIC FAILED TO DETECT DATA ERROR'
12084 ;         6420                            PRINTB(FMT12A,..DBL_VALUE,..DBL_VALUE);
12085 ;         6421                                !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
12086 ;         6422                            DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
12087 ;         6423                            PRINTB(FMT12B,..DBL_VALUE,..DBL_VALUE);
12088 ;         6424                                !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
12089 ;         6425                            WHY_DROPT[.LUN] = CODE_8;
12090 ;         6426                            ERRDF(5304,MSG1,0);    !**** OPTION 5, RAND3 ERROR 04 ****
12091 ;         6427                            DODU(.LUN);
12092 ;         6428                            LEAVE LOOP;        !JUMP JUST BEYOND END OF BLOCK * 4 *
12093 ;         6429                            END;
12094 ;         6430                        END;
```

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12096 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
12097 ;                TESTING RANDOM SECTORS, DATA, WORD COUNTS    23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (50)
12098
12099 ;          6431                [1] :
12100 ;          6432                   BEGIN  !* 6D *          RETRY ALLOWED
12101 ;          6433                   IF RETRY(SIX,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) NEQ 0
12102 ;          6434                   THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
12103 ;          6435                      BEGIN
12104 ;          6436                      WHY_DROPT[.LUN] = CODE_4;
12105 ;          6437                      ERRDF(5305,MSG1,0);   !**** OPTION 5, RAND3 ERROR 05 ****
12106 ;          6438                      DODU(.LUN);
12107 ;          6439                      LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
12108 ;          6440                      END;
12109 ;          6441                   END;   !* 6D *
12110 ;          6442                [2] :
12111 ;          6443                   BEGIN  !* 6E *          FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
12112 ;          6444                   WHY_DROPT[.LUN] = CODE_5;
12113 ;          6445                   ERRDF(5306,MSG1,0);   !**** OPTION 5, RAND3 ERROR 06 ****
12114 ;          6446                   DODU(.LUN);
12115 ;          6447                   LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
12116 ;          6448                   END;
12117 ;          6449                [3] :
12118 ;          6450                   BEGIN  !* 6F *          FATAL DRIVE ERROR -- NO RETRY ALLOWED
12119 ;          6451                   ERRDF(5307,MSG1,0);   !**** OPTION 5, RAND3 ERROR 07 ****
12120 ;          6452                   WHY_DROPT[.LUN] = CODE_6;
12121 ;          6453                   DODU(.LUN);
12122 ;          6454                   LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
12123 ;          6455                   END;   !* 6F *
12124 ;          6456                [4] :
12125 ;          6457                   BEGIN  !* 6G *          UNRECOVERABLE DATA ERROR
12126 ;          6458                   ISOLATE();
12127 ;          6459                   ERRDF(5308,MSG2,0);   !**** OPTION 5, RAND3 ERROR 08 ****
12128 ;          6460                   WHY_DROPT[.LUN] = CODE_7;
12129 ;          6461                   DODU(.LUN);
12130 ;          6462                   LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
12131 ;          6463                   END;   !* 6G *
12132 ;          6464                [5] :
12133 ;          6465                   BEGIN  !* 6H *          RECOVERABLE DATA ERROR
12134 ;          6466                   ISOLATE();
12135 ;          6467                   IF .ERROUT
12136 ;          6468                   THEN  PRINTB(FMT10B,.CHAN);
12137 ;          6469                           !'    BIT QQ'
12138 ;          6470                   OLDSEC = .MLEL;
12139 ;          6471                   OLDCHN = .CHAN;
12140 ;          6472                   IF RETRY(ONE,CHECK,.LUN,.WRDCNT,.WPTR,.SECTOR) EQL 5
12141 ;          6473                   THEN
12142 ;          6474                      IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
12143 ;          6475                      THEN
12144 ;          6476                         BEGIN
12145 ;          6477                         IF .ERROUT
12146 ;          6478                         THEN
12147 ;          6479                         ERRHRD(5309,MSG4,0);  !**** OPTION 5, RAND3 ERROR 09 ****
12148 ;          6480                         UP_HARD_COUNT(.LUN,.BOARD);
12149 ;          6481                         END
12150 ;          6482                      ELSE
```

```
12152 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
12153 ;                TESTING RANDOM SECTORS, DATA, WORD COUNTS    23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (50)
12154
12155 ;          6483                          BEGIN
12156 ;          6484                          IF .ERROUT
12157 ;          6485                          THEN
12158 ;          6486                          ERRSOFT(5310,MSG3,0); !**** OPTION 5, RAND3 ERROR 10 ****
12159 ;          6487                          UP_SOFT_COUNT(.LUN,.BOARD);
12160 ;          6488                          END
12161 ;          6489                       ELSE
12162 ;          6490                          BEGIN
12163 ;          6491                          IF .ERROUT
12164 ;          6492                          THEN
12165 ;          6493                          ERRSOFT(5311,MSG3,0); !**** OPTION 5, RAND3 ERROR 11 ****
12166 ;          6494                          UP_SOFT_COUNT(.LUN,.BOARD);
12167 ;          6495                          END;
12168 ;          6496                       END;   !* 6H *
12169 ;          6497
12170 ;          6498                       TES;
12171 ;          6499
12172 ;          6500                    WPTR = .WPTR + 2;
12173 ;          6501                    END;   !* 6 *  END OF COUNTING LOOP FOR SECTOR SELECTION
12174 ;          6502                 END;   !* 5 *  END OF TEST FOR AN ACTIVE UNIT
12175 ;          6503              END;   !* 4 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
12176 ;          6504           END;   !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
12177 ;          6505        END;   !* 2 *  END OF REPEAT LOOP FOR THIS ROUTINE
12178 ;          6506  RETURN;
12179 ;          6507  END;   !* 1 *  END OF ROUTINE
12183
12184                                          .SBTTL  RAND3 TESTING RANDOM SECTORS, DATA, WORD COUNTS
12188 066670  004137  005222          RAND3:  JSR     R1,$SAVE5                       ;                    6277
12189 066674  162706  000024                  SUB     #24,SP
12190 066700  012746  007322                  MOV     #RTN5C,-(SP)                    ;                    6334
12191 066704  012746  006514                  MOV     #SAY1,-(SP)
12192 066710  012746  000002                  MOV     #2,-(SP)
12193 066714  010600                          MOV     SP,R0                           ; SP,*
12194 066716  104414                          TRAP    14
12195 066720  005066  000030                  CLR     30(SP)                          ; COUNT              6337
12196 066724  000137  070534                  JMP     33$
12197 066730  013766  002012  000012  1$:     MOV     L$UNIT,12(SP)                   ;                    6339
12198 066736  005004                          CLR     R4                              ; LUN
12199 066740  000137  070522                  JMP     32$
12200 066744  004737  036710          2$:     JSR     PC,GEN5                         ;                    6341
12201 066750  010400                          MOV     R4,R0                           ; LUN,*              6344
12202 066752  006200                          ASR     R0
12203 066754  006200                          ASR     R0
12204 066756  006200                          ASR     R0
12205 066760  062700  032460                  ADD     #DRIVE.STATUS,R0
12206 066764  010046                          MOV     R0,-(SP)
```

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12208                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
12209                                   ;       TESTING RANDOM SECTORS, DATA, WORD COUNTS       23-Oct-1980 14:57:05    PA:<
12210
12211 066766  010446                            MOV     R4,-(SP)                ; LUN,*
12212 066770  042716  177770                    BIC     #177770,(SP)
12213 066774  012746  000001                    MOV     #1,-(SP)
12214 067000  005046                            CLR     -(SP)
12215 067002  004737  004244                    JSR     PC,BL$GT2
12216 067006  062706  000010                    ADD     #10,SP
12217 067012  005300                            DEC     R0
12218 067014  001172                            BNE     8$
12219 067016  010437  002074                    MOV     R4,L$LUN                ; LUN,*                                 6347
12220 067022  012737  010706  030706            MOV     #WBUFF,WPTR             ;                                       6348
12221 067030  012737  020706  030710            MOV     #RBUFF,RPTR             ;                                       6349
12222 067036  010400                            MOV     R4,R0                   ; LUN,*                                 6350
12223 067040  006300                            ASL     R0
12224 067042  012766  032516  000010            MOV     #TOP.SECT,10(SP)
12225 067050  060066  000010                    ADD     R0,10(SP)
12226 067054  017646  000010                    MOV     @10(SP),-(SP)
12227 067060  166016  032476                    SUB     LOW.SECT(R0),(SP)
12228 067064  012746  000002                    MOV     #2,-(SP)
12229 067070  004737  005056                    JSR     PC,BL$DIV
12230 067074  010066  000020                    MOV     R0,20(SP)               ; *,TIMES
12231 067100  005266  000020                    INC     20(SP)                  ; TIMES
12232 067104  005066  000012                    CLR     12(SP)                  ; KOUNT                                 6351
12233 067110  000137  070476                    JMP     29$
12234 067114  004737  062560            3$:     JSR     PC,RNDWC                ;                                       6353
12235 067120  010003                            MOV     R0,R3                   ; *,WRDCNT
12236 067122  010346                            MOV     R3,-(SP)                ; WRDCNT,*                              6354
12237 067124  004737  043770                    JSR     PC,SET.PTRS
12238 067130  010416                            MOV     R4,(SP)                 ; LUN,*                                 6355
12239 067132  004737  062614                    JSR     PC,RNDSEC
12240 067136  010001                            MOV     R0,R1                   ; *,SECTOR
12241 067140  010346                            MOV     R3,-(SP)                ; WRDCNT,*                              6356
12242 067142  012746  000400                    MOV     #400,-(SP)
12243 067146  004737  005056                    JSR     PC,BL$DIV
12244 067152  022626                            CMP     (SP)+,(SP)+
12245 067154  060100                            ADD     R1,R0                   ; SECTOR,*
12246 067156  020076  000016                    CMP     R0,@16(SP)
12247 067162  101410                            BLOS    4$
12248 067164  017600  000016                    MOV     @16(SP),R0              ;                                       6357
12249 067170  160100                            SUB     R1,R0                   ; SECTOR,*
12250 067172  000300                            SWAB    R0                      ;                                       6356
12251 067174  105000                            CLRB    R0
12252 067176  010003                            MOV     R0,R3                   ; *,WRDCNT                              6357
12253 067200  062703  000400                    ADD     #400,R3                 ; *,WRDCNT
12254 067204  010416                    4$:     MOV     R4,(SP)                 ; LUN,*                                 6359
12255 067206  010346                            MOV     R3,-(SP)                ; WRDCNT,*
12256 067210  013746  030706                    MOV     WPTR,-(SP)
12257 067214  010146                            MOV     R1,-(SP)                ; SECTOR,*
12258 067216  004737  042246                    JSR     PC,WRITE
12259 067222  010005                            MOV     R0,R5                   ; *,VALUE
12260 067224  020527  000001                    CMP     R5,#1                   ; VALUE,*                               6363
12261 067230  001031                            BNE     5$
12262 067232  012746  000006                    MOV     #6,-(SP)                ;                                       6367
```

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12264                                   ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
12265                                   ;       TESTING RANDOM SECTORS, DATA, WORD COUNTS        23-Oct-1980 14:57:05    PA:<
12266
12267 067236  012746  042246                    MOV     #WRITE,-(SP)
12268 067242  010446                            MOV     R4,-(SP)                ; LUN,*
12269 067244  010346                            MOV     R3,-(SP)                ; WRDCNT,*
12270 067246  013746  030706                    MOV     WPTR,-(SP)
12271 067252  010146                            MOV     R1,-(SP)                ; SECTOR,*
12272 067254  004737  043046                    JSR     PC,RETRY
12273 067260  062706  000014                    ADD     #14,SP
12274 067264  005700                            TST     R0
12275 067266  001446                            BEQ     9$
12276 067270  112764  000004  032464            MOVB    #4,WHY.DROPT(R4)        ; *,*(LUN)                                      6370
12277 067276  104455                            TRAP    55                      ;                                               6371
12278 067300  012265                            .WORD   12265
12279 067302  010512                            .WORD   MSG1
12280 067304  000000                            .WORD   0
12281 067306  010400                            MOV     R4,R0                   ; LUN,*                                         6372
12282 067310  104451                            TRAP    51
12283 067312  000431                            BR      7$                      ;                                               6373
12284 067314  020527  000002            5$:     CMP     R5,#2                   ; VALUE,*                                       6363
12285 067320  001012                            BNE     6$
12286 067322  112764  000005  032464            MOVB    #5,WHY.DROPT(R4)        ; *,*(LUN)                                      6378
12287 067330  104455                            TRAP    55                      ;                                               6379
12288 067332  012266                            .WORD   12266
12289 067334  010512                            .WORD   MSG1
12290 067336  000000                            .WORD   0
12291 067340  010400                            MOV     R4,R0                   ; LUN,*                                         6380
12292 067342  104451                            TRAP    51
12293 067344  000414                            BR      7$                      ;                                               6381
12294 067346  020527  000003            6$:     CMP     R5,#3                   ; VALUE,*                                       6363
12295 067352  001014                            BNE     9$
12296 067354  104455                            TRAP    55                      ;                                               6385
12297 067356  012267                            .WORD   12267
12298 067360  010512                            .WORD   MSG1
12299 067362  000000                            .WORD   0
12300 067364  112764  000006  032464            MOVB    #6,WHY.DROPT(R4)        ; *,*(LUN)                                      6386
12301 067372  010400                            MOV     R4,R0                   ; LUN,*                                         6387
12302 067374  104451                            TRAP    51
12303 067376  062706  000014            7$:     ADD     #14,SP                  ;                                               6388
12304 067402  000535            8$:     BR      14$
12305 067404  004737  043010            9$:     JSR     PC,CHOOSE               ;                                               6393
12306 067410  010066  000040                    MOV     R0,40(SP)               ; *,COMMAND
12307 067414  005002                            CLR     R2                      ;                                               6394
12308 067416  020027  042434                    CMP     R0,#READ                ; COMMAND,*
12309 067422  001014                            BNE     10$
12310 067424  005202                            INC     R2
12311 067426  013766  030710  000036            MOV     RPTR,36(SP)             ; *,PTR                                         6397
12312 067434  010446                            MOV     R4,-(SP)                ; LUN,*                                         6398
12313 067436  010346                            MOV     R3,-(SP)                ; WRDCNT,*
12314 067440  013746  030710                    MOV     RPTR,-(SP)
12315 067444  010146                            MOV     R1,-(SP)                ; SECTOR,*
12316 067446  004737  042434                    JSR     PC,READ
12317 067452  000412                            BR      11$
12318 067454  013766  030706  000036    10$:    MOV     WPTR,36(SP)             ; *,PTR                                         6402
```

```
12320                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
12321                                   ;       TESTING RANDOM SECTORS, DATA, WORD COUNTS       23-Oct-1980 14:57:05    PA:<
12322
12323 067462  010446                            MOV     R4,-(SP)                ; LUN,*                                 6403
12324 067464  010346                            MOV     R3,-(SP)                ; WRDCNT,*
12325 067466  013746  030706                    MOV     WPTR,-(SP)
12326 067472  010146                            MOV     R1,-(SP)                ; SECTOR,*
12327 067474  004737  042622                    JSR     PC,CHECK
12328 067500  010005                    11$:    MOV     R0,R5                   ; *,VALUE
12329 067502  001076                            BNE     15$                     ;                                       6408
12330 067504  006002                            ROR     R2                      ;                                       6411
12331 067506  103402                            BLO     13$
12332 067510  000137  070464            12$:    JMP     28$
12333 067514  013746  030706            13$:    MOV     WPTR,-(SP)              ;                                       6414
12334 067520  013746  030710                    MOV     RPTR,-(SP)
12335 067524  010346                            MOV     R3,-(SP)                ; WRDCNT,*
12336 067526  004737  041226                    JSR     PC,DOUBLE.CHECK
12337 067532  062706  000006                    ADD     #6,SP
12338 067536  010066  000052                    MOV     R0,52(SP)               ; *,DBL.VALUE
12339 067542  001762                            BEQ     12$
12340 067544  010446                            MOV     R4,-(SP)                ; LUN,*                                 6417
12341 067546  004737  033436                    JSR     PC,SAYWHO
12342 067552  012716  010640                    MOV     #MSG5,(SP)              ;                                       6418
12343 067556  012746  006514                    MOV     #SAY1,-(SP)
12344 067562  012746  000002                    MOV     #2,-(SP)
12345 067566  010600                            MOV     SP,R0                   ; SP,*
12346 067570  104414                            TRAP    14
12347 067572  016616  000060                    MOV     60(SP),(SP)             ; DBL.VALUE,*                           6420
12348 067576  017646  000060                    MOV     @60(SP),-(SP)           ; DBL.VALUE,*
12349 067602  012746  006332                    MOV     #FMT12A,-(SP)
12350 067606  012746  000003                    MOV     #3,-(SP)
12351 067612  010600                            MOV     SP,R0                   ; SP,*
12352 067614  104414                            TRAP    14
12353 067616  062766  010000  000066            ADD     #10000,66(SP)           ; *,DBL.VALUE                           6422
12354 067624  016616  000066                    MOV     66(SP),(SP)             ; DBL.VALUE,*                           6423
12355 067630  017646  000066                    MOV     @66(SP),-(SP)           ; DBL.VALUE,*
12356 067634  012746  006400                    MOV     #FMT12B,-(SP)
12357 067640  012746  000003                    MOV     #3,-(SP)
12358 067644  010600                            MOV     SP,R0                   ; SP,*
12359 067646  104414                            TRAP    14
12360 067650  112764  000010  032464            MOVB    #10,WHY.DROPT(R4)       ; *,*(LUN)                              6425
12361 067656  104455                            TRAP    55                      ;                                       6426
12362 067660  012270                            .WORD   12270
12363 067662  010512                            .WORD   MSG1
12364 067664  000000                            .WORD   0
12365 067666  010400                            MOV     R4,R0                   ; LUN,*                                 6427
12366 067670  104451                            TRAP    51
12367 067672  062706  000046                    ADD     #46,SP                  ;                                       6428
12368 067676  000506                    14$:    BR      20$
12369 067700  020527  000001            15$:    CMP     R5,#1                   ; VALUE,*                               6408
12370 067704  001031                            BNE     16$
12371 067706  012746  000006                    MOV     #6,-(SP)                ;                                       6433
12372 067712  016646  000052                    MOV     52(SP),-(SP)            ; COMMAND,*
12373 067716  010446                            MOV     R4,-(SP)                ; LUN,*
12374 067720  010346                            MOV     R3,-(SP)                ; WRDCNT,*
```

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12376                                   ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
12377                                   ;       TESTING RANDOM SECTORS, DATA, WORD COUNTS        23-Oct-1980 14:57:05    PA:<
12378
12379 067722  016646  000056                    MOV     56(SP),-(SP)                    ; PTR,*
12380 067726  010146                            MOV     R1,-(SP)                        ; SECTOR,*
12381 067730  004737  043046                    JSR     PC,RETRY
12382 067734  062706  000014                    ADD     #14,SP
12383 067740  005700                            TST     R0
12384 067742  001662                            BEQ     12$
12385 067744  112764  000004  032464            MOVB    #4,WHY.DROPT(R4)                ; *,*(LUN)                                      6436
12386 067752  104455                            TRAP    55                              ;                                               6437
12387 067754  012271                            .WORD   12271
12388 067756  010512                            .WORD   MSG1
12389 067760  000000                            .WORD   0
12390 067762  010400                            MOV     R4,R0                           ; LUN,*                                         6438
12391 067764  104451                            TRAP    51
12392 067766  000450                            BR      19$                             ;                                               6439
12393 067770  020527  000002          16$:      CMP     R5,#2                           ; VALUE,*                                       6408
12394 067774  001012                            BNE     17$
12395 067776  112764  000005  032464            MOVB    #5,WHY.DROPT(R4)                ; *,*(LUN)                                      6444
12396 070004  104455                            TRAP    55                              ;                                               6445
12397 070006  012272                            .WORD   12272
12398 070010  010512                            .WORD   MSG1
12399 070012  000000                            .WORD   0
12400 070014  010400                            MOV     R4,R0                           ; LUN,*                                         6446
12401 070016  104451                            TRAP    51
12402 070020  000433                            BR      19$                             ;                                               6447
12403 070022  020527  000003          17$:      CMP     R5,#3                           ; VALUE,*                                       6408
12404 070026  001012                            BNE     18$
12405 070030  104455                            TRAP    55                              ;                                               6451
12406 070032  012273                            .WORD   12273
12407 070034  010512                            .WORD   MSG1
12408 070036  000000                            .WORD   0
12409 070040  112764  000006  032464            MOVB    #6,WHY.DROPT(R4)                ; *,*(LUN)                                      6452
12410 070046  010400                            MOV     R4,R0                           ; LUN,*                                         6453
12411 070050  104451                            TRAP    51
12412 070052  000416                            BR      19$                             ;                                               6454
12413 070054  020527  000004          18$:      CMP     R5,#4                           ; VALUE,*                                       6408
12414 070060  001017                            BNE     21$
12415 070062  004737  035212                    JSR     PC,ISOLATE                      ;                                               6458
12416 070066  104455                            TRAP    55                              ;                                               6459
12417 070070  012274                            .WORD   12274
12418 070072  010542                            .WORD   MSG2
12419 070074  000000                            .WORD   0
12420 070076  112764  000007  032464            MOVB    #7,WHY.DROPT(R4)                ; *,*(LUN)                                      6460
12421 070104  010400                            MOV     R4,R0                           ; LUN,*                                         6461
12422 070106  104451                            TRAP    51
12423 070110  062706  000024          19$:      ADD     #24,SP                          ;                                               6462
12424 070114  000137  070520          20$:      JMP     31$
12425 070120  020527  000005          21$:      CMP     R5,#5                           ; VALUE,*                                       6408
12426 070124  001157                            BNE     28$
12427 070126  004737  035212                    JSR     PC,ISOLATE                      ;                                               6466
12428 070132  032737  000001  002260            BIT     #1,ERROUT                       ;                                               6467
12429 070140  001423                            BEQ     22$
12430 070142  017702  142260                    MOV     @ML.REG+42,R2                   ;                                               6463
```

```
                                        ;MLX4                                                                   23-Oct-1980 15:01:43    TOPS
                                        ;       TESTING RANDOM SECTORS, DATA, WORD COUNTS                       23-Oct-1980 14:57:05    PA:<

070146  006202                          ASR     R2
070150  006202                          ASR     R2
070152  006202                          ASR     R2
070154  006202                          ASR     R2
070156  006202                          ASR     R2
070160  006202                          ASR     R2
070162  042702  177700                  BIC     #177700,R2
070166  010246                          MOV     R2,-(SP)
070170  012746  006262                  MOV     #FMT10B,-(SP)
070174  012746  000002                  MOV     #2,-(SP)
070200  010600                          MOV     SP,R0                           ; SP,*
070202  104414                          TRAP    14
070204  062706  000006                  ADD     #6,SP
070210  017766  142214  000042  22$:    MOV     @ML.REG+44,42(SP)               ; *,OLDSEC                              6470
070216  017702  142204                  MOV     @ML.REG+42,R2                   ;                                       6471
070222  006202                          ASR     R2
070224  006202                          ASR     R2
070226  006202                          ASR     R2
070230  006202                          ASR     R2
070232  006202                          ASR     R2
070234  006202                          ASR     R2
070236  042702  177700                  BIC     #177700,R2
070242  010266  000044                  MOV     R2,44(SP)                       ; *,OLDCHN
070246  012746  000001                  MOV     #1,-(SP)                        ;                                       6472
070252  012746  042622                  MOV     #CHECK,-(SP)
070256  010446                          MOV     R4,-(SP)                        ; LUN,*
070260  010346                          MOV     R3,-(SP)                        ; WRDCNT,*
070262  013746  030706                  MOV     WPTR,-(SP)
070266  010146                          MOV     R1,-(SP)                        ; SECTOR,*
070270  004737  043046                  JSR     PC,RETRY
070274  062706  000014                  ADD     #14,SP
070300  020027  000005                  CMP     R0,#5
070304  001051                          BNE     25$
070306  027766  142116  000042          CMP     @ML.REG+44,42(SP)               ; *,OLDSEC                              6474
070314  001034                          BNE     24$
070316  016600  000044                  MOV     44(SP),R0                       ; OLDCHN,*
070322  017702  142100                  MOV     @ML.REG+42,R2
070326  006202                          ASR     R2
070330  006202                          ASR     R2
070332  006202                          ASR     R2
070334  006202                          ASR     R2
070336  006202                          ASR     R2
070340  006202                          ASR     R2
070342  042702  177700                  BIC     #177700,R2
070346  020200                          CMP     R2,R0
070350  001016                          BNE     24$
070352  032737  000001  002260          BIT     #1,ERROUT                       ;                                       6477
070360  001404                          BEQ     23$
070362  104456                          TRAP    56                              ;                                       6479
070364  012275                          .WORD   12275
070366  010624                          .WORD   MSG4
070370  000000                          .WORD   0
```

```
12488                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
12489                                   ;       TESTING RANDOM SECTORS, DATA, WORD COUNTS       23-Oct-1980 14:57:05    PA:<
12490
12491 070372  010446                    23$:    MOV     R4,-(SP)                ; LUN,*                                 6480
12492 070374  013746  032360                    MOV     BOARD,-(SP)
12493 070400  004737  035302                    JSR     PC,UP.HARD.COUNT
12494 070404  000426                    BR      27$                             ;                                       6474
12495 070406  032737  000001  002260    24$:    BIT     #1,ERROUT               ;                                       6484
12496 070414  001415                    BEQ     26$
12497 070416  104457                    TRAP    57                              ;                                       6486
12498 070420  012276                    .WORD   12276
12499 070422  010610                    .WORD   MSG3
12500 070424  000000                    .WORD   0
12501 070426  000410                    BR      26$                             ;                                       6487
12502 070430  032737  000001  002260    25$:    BIT     #1,ERROUT               ;                                       6491
12503 070436  001404                    BEQ     26$
12504 070440  104457                    TRAP    57                              ;                                       6493
12505 070442  012277                    .WORD   12277
12506 070444  010610                    .WORD   MSG3
12507 070446  000000                    .WORD   0
12508 070450  010446                    26$:    MOV     R4,-(SP)                ; LUN,*                                 6494
12509 070452  013746  032360                    MOV     BOARD,-(SP)
12510 070456  004737  035430                    JSR     PC,UP.SOFT.COUNT
12511 070462  022626                    27$:    CMP     (SP)+,(SP)+             ;                                       6465
12512 070464  062737  000002  030706    28$:    ADD     #2,WPTR                 ;                                       6500
12513 070472  062706  000020                    ADD     #20,SP                  ;                                       6352
12514 070476  005266  000012            29$:    INC     12(SP)                  ; KOUNT                                 6351
12515 070502  026666  000012  000020            CMP     12(SP),20(SP)           ; KOUNT,TIMES
12516 070510  003002                    BGT     30$
12517 070512  000137  067114                    JMP     3$
12518 070516  022626                    30$:    CMP     (SP)+,(SP)+             ;                                       6346
12519 070520  005204                    31$:    INC     R4                      ; LUN                                   6339
12520 070522  020466  000012            32$:    CMP     R4,12(SP)               ; LUN,*
12521 070526  002002                    BGE     33$
12522 070530  000137  066744                    JMP     2$
12523 070534  005266  000030            33$:    INC     30(SP)                  ; COUNT                                 6337
12524 070540  026666  000030  000050            CMP     30(SP),50(SP)           ; COUNT,REPEAT
12525 070546  003002                    BGT     34$
12526 070550  000137  066730                    JMP     1$
12527 070554  062706  000032            34$:    ADD     #32,SP                  ;                                       6277
12528 070560  000207                    RTS     PC
12529
12530                                   ; Routine Size:  477 words
12531                                   ; Maximum stack depth per invocation:  38 words
12536
12537
```

```
                6508  %SBTTL  'TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNTS'
                6509
                6510  ROUTINE RAND4(REPEAT): NOVALUE =
                6511  BEGIN  !* 1 *  START OF ROUTINE
                6512
                6513  !++
                6514  !  ROUTINE:     RAND4(REPEAT)
                6515  !
                6516  !  PURPOSE:     TO CHECK RANDOM UNITS
                6517  !
                6518  !  ARGUMENT:    REPEAT = NUMBER OF TIMES TO EXECUTE ENTIRE ROUTINE
                6519  !
                6520  !  THE CODE FOR 'RAND4' IN BRIEF:
                6521  !
                6522  !  BEGIN 1 (START OF ROUTINE)
                6523  !  SAY ROUTINE IS RUNNING
                6524  !  INCR COUNT FROM 1 TO REPEAT
                6525  !  : BEGIN 2 (START OF REPEAT LOOP FOR THIS ROUTINE)
                6526  !  : GENERATE THE RANDOM PATTERN
                6527  !  : TIMES = NUMBER OF UNITS * 4
                6528  !  : INCR KOUNT FROM 1 TO TIMES
                6529  !  : : BEGIN 3 (START OF COUNTING LOOP FOR UNIT SELECTION)
                6530  !  : : CHOOSE A RANDOM LOGICAL UNIT WHICH IS ACTIVE
                6531  !  : : INITIALIZE BUFFER POINTERS
                6532  !  : : TESTLOOP:
                6533  !  : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
                6534  !  : : : INCR KOUNT2 FROM 1 TO 10
                6535  !  : : : : BEGIN 5 (START OF COUNTING LOOP FOR SECTOR SELECTION)
                6536  !  : : : : CHOOSE A RANDOM WORD COUNT
                6537  !  : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
                6538  !  : : : : CHOOSE A RANDOM SECTOR
                6539  !  : : : : CALCULATE WHERE TRANSFER WILL END (BASED ON WORD COUNT)
                6540  !  : : : : IF CALCULATED VALUE GTR HIGHEST
                6541  !  : : : : : THEN ADJUST THE WORD COUNT SO IT FITS
                6542  !  : : : : : :    WITHIN THE TESTABLE SECTOR LIMITS
                6543  !  : : : : WRITE
                6544  !  : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
                6545  !  : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
                6546  !  : : : : DO THE WRITE CHECK OR READ
                6547  !  : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
                6548  !  : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
                6549  !  : : : : END 5 (END OF COUNTING LOOP FOR SECTOR SELECTION)
                6550  !  : : : END 4 (END OF TESTLOOP)
                6551  !  : : END 3 (END OF COUNTING LOOP FOR UNIT SELECTION)
                6552  !  : END 2 (END OF REPEAT LOOP FOR THIS ROUTINE
                6553  !  RETURN
                6554  !  END 1 (END OF ROUTINE)
                6555  !--
                6556
                6557  LOCAL
                6558     LUN, WRDCNT, SECTOR, VALUE, OLDSEC, OLDCHN,
                6559     PTR, COMMAND, DBL_VALUE;
```

```
12595 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
12596 ;                TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (51)
12597
12598 ;          6560
12599 ;          6561  LABEL
12600 ;          6562     LOOP;
12601 ;          6563
12602 ;          6564  PRINTB(SAY1,RTN5D);
12603 ;          6565     !'RAND4'
12604 ;          6566  INCR COUNT FROM 1 TO .REPEAT DO
12605 ;          6567     BEGIN  !* 2 *  START OF REPEAT LOOP FOR THIS ROUTINE
12606 ;          6568     GEN5();
12607 ;          6569     INCR KOUNT FROM 1 TO (.NUM_DRIVES * 4) DO
12608 ;          6570        BEGIN  !* 3 *  START OF COUNTING LOOP FOR UNIT SELECTION
12609 ;          6571        LUN = RNDU();
12610 ;          6572        L$LUN = .LUN;
12611 ;          6573        WPTR = WBUFF;
12612 ;          6574        RPTR = RBUFF;
12613 ;          6575        LOOP:
12614 ;          6576           BEGIN  !* 4 *  START OF LOOP THAT COMPLETELY TESTS 1 UNIT
12615 ;          6577           INCR KOUNT2 FROM 1 TO 10 DO
12616 ;          6578              BEGIN  !* 5 *  START OF COUNTING LOOP FOR SECTOR SELECTION
12617 ;          6579              WRDCNT = RNDWC();   !EXPECT VALUE BETWEEN 1 AND BUFSIZ
12618 ;          6580              SET_PTRS(.WRDCNT);
12619 ;          6581              SECTOR = RNDSEC(.LUN);!EXPECT VALUE BETWEEN LOWEST AND HIGHEST
12620 ;          6582              IF (.SECTOR + .WRDCNT/256) GTRA HIGHEST
12621 ;          6583              THEN  WRDCNT = 256 * (HIGHEST - .SECTOR + 1);
12622 ;          6584
12623 ;          6585              VALUE = WRITE(.LUN,.WRDCNT,.WPTR,.SECTOR);
12624 ;          6586              !+
12625 ;          6587              !  SEE HOW SUCCESSFUL THE WRITE WAS:
12626 ;          6588              !-
12627 ;          6589              SELECTONE .VALUE OF           !SEE 'SYSERR' FOR DEFINITION
12628 ;          6590                 SET                !OF ERROR # CONTAINED IN 'VALUE'
12629 ;          6591              [1] :
12630 ;          6592                 BEGIN  !* 5A *   RETRY ALLOWED
12631 ;          6593                 IF RETRY(SIX,WRITE,.LUN,.WRDCNT,.WPTR,.SECTOR) NEQ 0
12632 ;          6594                 THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
12633 ;          6595                    BEGIN
12634 ;          6596                    WHY_DROPT[.LUN] = CODE_4;
12635 ;          6597                    ERRDF(5401,MSG1,0);   !**** OPTION 5, RAND4 ERROR 01 ****
12636 ;          6598                    DODU(.LUN);
12637 ;          6599                    LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
12638 ;          6600                    END;
12639 ;          6601                 END;  !* 5A *
12640 ;          6602              [2] :
12641 ;          6603                 BEGIN  !* 5B *   FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
12642 ;          6604                 WHY_DROPT[.LUN] = CODE_5;
12643 ;          6605                 ERRDF(5402,MSG1,0);   !**** OPTION 5, RAND4 ERROR 02 ****
12644 ;          6606                 DODU(.LUN);
12645 ;          6607                 LEAVE LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
12646 ;          6608                 END;   !* 5B *
12647 ;          6609              [3] :
12648 ;          6610                 BEGIN  !* 5C *   FATAL DRIVE ERROR -- NO RETRY ALLOWED
12649 ;          6611                 ERRDF(5403,MSG1,0);   !**** OPTION 5, RAND4 ERROR 03 ****
```

```
;       6612                    WHY_DROPT[.LUN] = CODE_6;
;       6613                    DODU(.LUN);
;       6614                    LEAVE LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 4 *
;       6615                    END;    !* 5C *
;       6616
;       6617                    TES;
;       6618
;       6619                COMMAND = CHOOSE();
;       6620                IF .COMMAND EQL READ
;       6621                THEN
;       6622                    BEGIN
;       6623                    PTR = .RPTR;
;       6624                    VALUE = READ(.LUN,.WRDCNT,.RPTR,.SECTOR);
;       6625                    END
;       6626                ELSE
;       6627                    BEGIN
;       6628                    PTR = .WPTR;
;       6629                    VALUE = CHECK(.LUN,.WRDCNT,.WPTR,.SECTOR);
;       6630                    END;
;       6631                !+
;       6632                !   SEE HOW SUCCESSFUL THE OPERATION WAS:
;       6633                !-
;       6634                SELECTONE .VALUE OF             !SEE 'SYSERR' FOR DEFINITION
;       6635                    SET                         !OF ERROR # CONTAINED IN 'VALUE'
;       6636                [0] :
;       6637                    IF .COMMAND EQL READ
;       6638                    THEN
;       6639                        BEGIN
;       6640                        IF (DBL_VALUE = DOUBLE_CHECK(.WPTR,.RPTR,.WRDCNT)) NEQ 0
;       6641                        THEN
;       6642                            BEGIN
;       6643                            SAYWHO(.LUN);
;       6644                            PRINTB(SAY1,MSG5);
;       6645                                !'ECC LOGIC FAILED TO DETECT DATA ERROR'
;       6646                            PRINTB(FMT12A,..DBL_VALUE,.DBL_VALUE);
;       6647                                !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
;       6648                            DBL_VALUE = .DBL_VALUE + BUFSIZ * 2;
;       6649                            PRINTB(FMT12B,..DBL_VALUE,.DBL_VALUE);
;       6650                                !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
;       6651                            WHY_DROPT[.LUN] = CODE_8;
;       6652                            ERRDF(5404,MSG1,0);   !**** OPTION 5, RAND4 ERROR 04 ****
;       6653                            DODU(.LUN);
;       6654                            LEAVE LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
;       6655                            END;
;       6656                        END;
;       6657                [1] :
;       6658                    BEGIN  !* 5D *   RETRY ALLOWED
;       6659                    IF RETRY(SIX,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) NEQ 0
;       6660                    THEN  !THE RETRY FAILED -- SYSTEM FATAL ERROR
;       6661                        BEGIN
;       6662                        WHY_DROPT[.LUN] = CODE_4;
;       6663                        ERRDF(5405,MSG1,0);   !**** OPTION 5, RAND4 ERROR 05 ****
```

```
12709
12710 ;        6664                    DODU(.LUN);
12711 ;        6665                    LEAVE LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
12712 ;        6666                    END;
12713 ;        6667                END;   !* 5D *
12714 ;        6668            [2] :
12715 ;        6669                BEGIN  !* 5E *   FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
12716 ;        6670                WHY_DROPT[.LUN] = CODE_5;
12717 ;        6671                ERRDF(5406,MSG1,0);   !**** OPTION 5, RAND4 ERROR 06 ****
12718 ;        6672                DODU(.LUN);
12719 ;        6673                LEAVE LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
12720 ;        6674                END;   !* 5E *
12721 ;        6675            [3] :
12722 ;        6676                BEGIN  !* 5F *   FATAL DRIVE ERROR -- NO RETRY ALLOWED
12723 ;        6677                ERRDF(5407,MSG1,0);   !**** OPTION 5, RAND4 ERROR 07 ****
12724 ;        6678                WHY_DROPT[.LUN] = CODE_6;
12725 ;        6679                DODU(.LUN);
12726 ;        6680                LEAVE LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
12727 ;        6681                END;   !* 5F *
12728 ;        6682            [4] :
12729 ;        6683                BEGIN  !* 5G *   UNRECOVERABLE DATA ERROR
12730 ;        6684                ISOLATE();
12731 ;        6685                ERRDF(5408,MSG2,0);   !**** OPTION 5, RAND4 ERROR 08 ****
12732 ;        6686                WHY_DROPT[.LUN] = CODE_7;
12733 ;        6687                DODU(.LUN);
12734 ;        6688                LEAVE LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
12735 ;        6689                END;   !* 5G *
12736 ;        6690            [5] :
12737 ;        6691                BEGIN  !* 5H *   RECOVERABLE DATA ERROR
12738 ;        6692                ISOLATE();
12739 ;        6693                IF .ERROUT
12740 ;        6694                THEN  PRINTB(FMT10B,.CHAN);
12741 ;        6695                        !'    BIT QQ'
12742 ;        6696                OLDSEC = .MLEL;
12743 ;        6697                OLDCHN = .CHAN;
12744 ;        6698                IF RETRY(ONE,.COMMAND,.LUN,.WRDCNT,.PTR,.SECTOR) EQL 5
12745 ;        6699                THEN
12746 ;        6700                   IF ((.MLEL EQL .OLDSEC) AND (.CHAN EQL .OLDCHN))
12747 ;        6701                   THEN
12748 ;        6702                      BEGIN
12749 ;        6703                      IF .ERROUT
12750 ;        6704                      THEN
12751 ;        6705                      ERRHRD(5409,MSG4,0);  !**** OPTION 5, RAND4 ERROR 09 ****
12752 ;        6706                      UP_HARD_COUNT(.LUN,.BOARD);
12753 ;        6707                      END
12754 ;        6708                   ELSE
12755 ;        6709                      BEGIN
12756 ;        6710                      IF .ERROUT
12757 ;        6711                      THEN
12758 ;        6712                      ERRSOFT(5410,MSG3,0); !**** OPTION 5, RAND4 ERROR 10 ****
12759 ;        6713                      UP_SOFT_COUNT(.LUN,.BOARD);
12760 ;        6714                      END
12761 ;        6715                ELSE
```

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12763 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
12764 ;                TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (51)
12765
12766 ;          6716                  BEGIN
12767 ;          6717                  IF .ERROUT
12768 ;          6718                  THEN
12769 ;          6719                  ERRSOFT(5411,MSG3,0); !**** OPTION 5, RAND4 ERROR 11 ****
12770 ;          6720                  UP_SOFT_COUNT(.LUN,.BOARD);
12771 ;          6721                  END;
12772 ;          6722               END;    !* 5H *
12773 ;          6723
12774 ;          6724               TES;
12775 ;          6725
12776 ;          6726            WPTR = .WPTR + 2;
12777 ;          6727            END;    !* 5 *  END OF COUNTING LOOP FOR SECTOR SELECTION
12778 ;          6728         END;    !* 4 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
12779 ;          6729      END;    !* 3 *  END OF COUNTING LOOP FOR UNIT SELECTION
12780 ;          6730   END;    !* 2 *  END OF REPEAT LOOP FOR THIS ROUTINE
12781 ;          6731 RETURN;
12782 ;          6732 END;    !* 1 *  END OF ROUTINE
12786
12787                                    .SBTTL  RAND4 TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT
12791 070562  004137  005222      RAND4:  JSR     R1,$SAVE5                       ;                       6510
12792 070566  162706  000024              SUB     #24,SP
12793 070572  012746  007330              MOV     #RTN5D,-(SP)                    ;                       6564
12794 070576  012746  006514              MOV     #SAY1,-(SP)
12795 070602  012746  000002              MOV     #2,-(SP)
12796 070606  010600                      MOV     SP,R0                           ; SP,*
12797 070610  104414                      TRAP    14
12798 070612  005066  000030              CLR     30(SP)                          ; COUNT                 6566
12799 070616  000137  072356              JMP     30$
12800 070622  004737  036710        1$:   JSR     PC,GEN5                         ;                       6568
12801 070626  013766  032474  000014    MOV     NUM.DRIVES,14(SP)               ;                       6569
12802 070634  006366  000014              ASL     14(SP)
12803 070640  006366  000014              ASL     14(SP)
12804 070644  005066  000012              CLR     12(SP)                          ; KOUNT
12805 070650  000560                      BR      8$
12806 070652  004737  062714        2$:   JSR     PC,RNDU                         ;                       6571
12807 070656  010001                      MOV     R0,R1                           ; *,LUN
12808 070660  010137  002074              MOV     R1,L$LUN                        ; LUN,*                 6572
12809 070664  012737  010706  030706    MOV     #WBUFF,WPTR                     ;                       6573
12810 070672  012737  020706  030710    MOV     #RBUFF,RPTR                     ;                       6574
12811 070700  010102                      MOV     R1,R2                           ; LUN,*                 6582
12812 070702  006302                      ASL     R2
12813 070704  012766  000001  000010    MOV     #1,10(SP)                       ; *,KOUNT2              6577
12814 070712  004737  062560        3$:   JSR     PC,RNDWC                        ;                       6579
12815 070716  010004                      MOV     R0,R4                           ; *,WRDCNT
12816 070720  010446                      MOV     R4,-(SP)                        ; WRDCNT,*              6580
12817 070722  004737  043770              JSR     PC,SET.PTRS
```

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12819                                  ;MLX4                                                                    23-Oct-1980 15:01:43    TOPS
12820                                  ;       TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT                  23-Oct-1980 14:57:05    PA:<
12821
12822 070726  010116                           MOV     R1,(SP)                         ; LUN,*                                         6581
12823 070730  004737  062614                    JSR     PC,RNDSEC
12824 070734  010066  000010                    MOV     R0,10(SP)                       ; *,SECTOR
12825 070740  010446                           MOV     R4,-(SP)                        ; WRDCNT,*                                      6582
12826 070742  012746  000400                    MOV     #400,-(SP)
12827 070746  004737  005056                    JSR     PC,BL$DIV
12828 070752  022626                           CMP     (SP)+,(SP)+
12829 070754  066600  000010                    ADD     10(SP),R0                       ; SECTOR,*
12830 070760  020062  032516                    CMP     R0,TOP.SECT(R2)
12831 070764  101411                           BLOS    4$
12832 070766  016200  032516                    MOV     TOP.SECT(R2),R0                 ;                                               6583
12833 070772  166600  000010                    SUB     10(SP),R0                       ; SECTOR,*
12834 070776  000300                           SWAB    R0                              ;                                               6582
12835 071000  105000                           CLRB    R0
12836 071002  010004                           MOV     R0,R4                           ; *,WRDCNT                                      6583
12837 071004  062704  000400                    ADD     #400,R4                         ; *,WRDCNT
12838 071010  010116                  4$:      MOV     R1,(SP)                         ; LUN,*                                         6585
12839 071012  010446                           MOV     R4,-(SP)                        ; WRDCNT,*
12840 071014  013746  030706                    MOV     WPTR,-(SP)
12841 071020  016646  000014                    MOV     14(SP),-(SP)                    ; SECTOR,*
12842 071024  004737  042246                    JSR     PC,WRITE
12843 071030  010005                           MOV     R0,R5                           ; *,VALUE
12844 071032  020527  000001                    CMP     R5,#1                           ; VALUE,*                                       6589
12845 071036  001032                           BNE     5$
12846 071040  012746  000006                    MOV     #6,-(SP)                        ;                                               6593
12847 071044  012746  042246                    MOV     #WRITE,-(SP)
12848 071050  010146                           MOV     R1,-(SP)                        ; LUN,*
12849 071052  010446                           MOV     R4,-(SP)                        ; WRDCNT,*
12850 071054  013746  030706                    MOV     WPTR,-(SP)
12851 071060  016646  000030                    MOV     30(SP),-(SP)                    ; SECTOR,*
12852 071064  004737  043046                    JSR     PC,RETRY
12853 071070  062706  000014                    ADD     #14,SP
12854 071074  005700                           TST     R0
12855 071076  001446                           BEQ     9$
12856 071100  112761  000004  032464           MOVB    #4,WHY.DROPT(R1)                ; *,*(LUN)                                      6596
12857 071106  104455                           TRAP    55                              ;                                               6597
12858 071110  012431                           .WORD   12431
12859 071112  010512                           .WORD   MSG1
12860 071114  000000                           .WORD   0
12861 071116  010100                           MOV     R1,R0                           ; LUN,*                                         6598
12862 071120  104451                           TRAP    51
12863 071122  000431                           BR      7$                              ;                                               6599
12864 071124  020527  000002          5$:      CMP     R5,#2                           ; VALUE,*                                       6589
12865 071130  001012                           BNE     6$
12866 071132  112761  000005  032464           MOVB    #5,WHY.DROPT(R1)                ; *,*(LUN)                                      6604
12867 071140  104455                           TRAP    55                              ;                                               6605
12868 071142  012432                           .WORD   12432
12869 071144  010512                           .WORD   MSG1
12870 071146  000000                           .WORD   0
12871 071150  010100                           MOV     R1,R0                           ; LUN,*                                         6606
12872 071152  104451                           TRAP    51
12873 071154  000414                           BR      7$                              ;                                               6607
```

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12875                                  ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
12876                                  ;       TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT  23-Oct-1980 14:57:05    PA:<
12877
12878 071156  020527  000003          6$:     CMP     R5,#3                   ; VALUE,*                                6589
12879 071162  001014                          BNE     9$
12880 071164  104455                          TRAP    55                      ;                                        6611
12881 071166  012433                          .WORD   12433
12882 071170  010512                          .WORD   MSG1
12883 071172  000000                          .WORD   0
12884 071174  112761  000006  032464          MOVB    #6,WHY.DROPT(R1)        ; *,*(LUN)                               6612
12885 071202  010100                          MOV     R1,R0                   ; LUN,*                                  6613
12886 071204  104451                          TRAP    51
12887 071206  062706  000010          7$:     ADD     #10,SP                  ;                                        6614
12888 071212  000537                  8$:     BR      14$
12889 071214  004737  043010          9$:     JSR     PC,CHOOSE               ;                                        6619
12890 071220  010066  000034                  MOV     R0,34(SP)               ; *,COMMAND
12891 071224  005003                          CLR     R3                      ;                                        6620
12892 071226  020027  042434                  CMP     R0,#READ                ; COMMAND,*
12893 071232  001015                          BNE     10$
12894 071234  005203                          INC     R3
12895 071236  013766  030710  000032          MOV     RPTR,32(SP)             ; *,PTR                                  6623
12896 071244  010146                          MOV     R1,-(SP)                ; LUN,*                                  6624
12897 071246  010446                          MOV     R4,-(SP)                ; WRDCNT,*
12898 071250  013746  030710                  MOV     RPTR,-(SP)
12899 071254  016646  000024                  MOV     24(SP),-(SP)            ; SECTOR,*
12900 071260  004737  042434                  JSR     PC,READ
12901 071264  000413                          BR      11$
12902 071266  013766  030706  000032  10$:    MOV     WPTR,32(SP)             ; *,PTR                                  6628
12903 071274  010146                          MOV     R1,-(SP)                ; LUN,*                                  6629
12904 071276  010446                          MOV     R4,-(SP)                ; WRDCNT,*
12905 071300  013746  030706                  MOV     WPTR,-(SP)
12906 071304  016646  000024                  MOV     24(SP),-(SP)            ; SECTOR,*
12907 071310  004737  042622                  JSR     PC,CHECK
12908 071314  010005                  11$:    MOV     R0,R5                   ; *,VALUE
12909 071316  001076                          BNE     15$                     ;                                        6634
12910 071320  006003                          ROR     R3                      ;                                        6637
12911 071322  103402                          BLO     13$
12912 071324  000137  072304          12$:    JMP     28$
12913 071330  013746  030706          13$:    MOV     WPTR,-(SP)              ;                                        6640
12914 071334  013746  030710                  MOV     RPTR,-(SP)
12915 071340  010446                          MOV     R4,-(SP)                ; WRDCNT,*
12916 071342  004737  041226                  JSR     PC,DOUBLE.CHECK
12917 071346  062706  000006                  ADD     #6,SP
12918 071352  010066  000046                  MOV     R0,46(SP)               ; *,DBL.VALUE
12919 071356  001762                          BEQ     12$
12920 071360  010146                          MOV     R1,-(SP)                ; LUN,*                                  6643
12921 071362  004737  033436                  JSR     PC,SAYWHO
12922 071366  012716  010640                  MOV     #MSG5,(SP)              ;                                        6644
12923 071372  012746  006514                  MOV     #SAY1,-(SP)
12924 071376  012746  000002                  MOV     #2,-(SP)
12925 071402  010600                          MOV     SP,R0                   ; SP,*
12926 071404  104414                          TRAP    14
12927 071406  016616  000054                  MOV     54(SP),(SP)             ; DBL.VALUE,*                            6646
12928 071412  017646  000054                  MOV     @54(SP),-(SP)           ; DBL.VALUE,*
12929 071416  012746  006332                  MOV     #FMT12A,-(SP)
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12931                                   ;MLX4                                                                   23-Oct-1980 15:01:43    TOPS
12932                                   ;       TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT                 23-Oct-1980 14:57:05    PA:<
12933
12934 071422  012746  000003                    MOV     #3,-(SP)
12935 071426  010600                            MOV     SP,R0                           ; SP,*
12936 071430  104414                            TRAP    14
12937 071432  062766  010000  000062            ADD     #10000,62(SP)                   ; *,DBL.VALUE                   6648
12938 071440  016616  000062                    MOV     62(SP),(SP)                     ; DBL.VALUE,*                   6649
12939 071444  017646  000062                    MOV     @62(SP),-(SP)                   ; DBL.VALUE,*
12940 071450  012746  006400                    MOV     #FMT12B,-(SP)
12941 071454  012746  000003                    MOV     #3,-(SP)
12942 071460  010600                            MOV     SP,R0                           ; SP,*
12943 071462  104414                            TRAP    14
12944 071464  112761  000010  032464            MOVB    #10,WHY.DROPT(R1)               ; *,*(LUN)                      6651
12945 071472  104455                            TRAP    55                              ;                               6652
12946 071474  012434                            .WORD   12434
12947 071476  010512                            .WORD   MSG1
12948 071500  000000                            .WORD   0
12949 071502  010100                            MOV     R1,R0                           ; LUN,*                         6653
12950 071504  104451                            TRAP    51
12951 071506  062706  000042                    ADD     #42,SP                          ;                               6654
12952 071512  000507                  14$:      BR      20$
12953 071514  020527  000001          15$:      CMP     R5,#1                           ; VALUE,*                       6634
12954 071520  001032                            BNE     16$
12955 071522  012746  000006                    MOV     #6,-(SP)                        ;                               6659
12956 071526  016646  000046                    MOV     46(SP),-(SP)                    ; COMMAND,*
12957 071532  010146                            MOV     R1,-(SP)                        ; LUN,*
12958 071534  010446                            MOV     R4,-(SP)                        ; WRDCNT,*
12959 071536  016646  000052                    MOV     52(SP),-(SP)                    ; PTR,*
12960 071542  016646  000040                    MOV     40(SP),-(SP)                    ; SECTOR,*
12961 071546  004737  043046                    JSR     PC,RETRY
12962 071552  062706  000014                    ADD     #14,SP
12963 071556  005700                            TST     R0
12964 071560  001661                            BEQ     12$
12965 071562  112761  000004  032464            MOVB    #4,WHY.DROPT(R1)                ; *,*(LUN)                      6662
12966 071570  104455                            TRAP    55                              ;                               6663
12967 071572  012435                            .WORD   12435
12968 071574  010512                            .WORD   MSG1
12969 071576  000000                            .WORD   0
12970 071600  010100                            MOV     R1,R0                           ; LUN,*                         6664
12971 071602  104451                            TRAP    51
12972 071604  000450                            BR      19$                             ;                               6665
12973 071606  020527  000002          16$:      CMP     R5,#2                           ; VALUE,*                       6634
12974 071612  001012                            BNE     17$
12975 071614  112761  000005  032464            MOVB    #5,WHY.DROPT(R1)                ; *,*(LUN)                      6670
12976 071622  104455                            TRAP    55                              ;                               6671
12977 071624  012436                            .WORD   12436
12978 071626  010512                            .WORD   MSG1
12979 071630  000000                            .WORD   0
12980 071632  010100                            MOV     R1,R0                           ; LUN,*                         6672
12981 071634  104451                            TRAP    51
12982 071636  000433                            BR      19$                             ;                               6673
12983 071640  020527  000003          17$:      CMP     R5,#3                           ; VALUE,*                       6634
12984 071644  001012                            BNE     18$
12985 071646  104455                            TRAP    55                              ;                               6677
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12987                                   ;MLX4                                                                   23-Oct-1980 15:01:43    TOPS
12988                                   ;       TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT                 23-Oct-1980 14:57:05    PA:<
12989
12990 071650  012437                            .WORD   12437
12991 071652  010512                            .WORD   MSG1
12992 071654  000000                            .WORD   0
12993 071656  112761  000006  032464            MOVB    #6,WHY.DROPT(R1)        ; *,*(LUN)                      6678
12994 071664  010100                            MOV     R1,R0                   ; LUN,*                         6679
12995 071666  104451                            TRAP    51
12996 071670  000416                            BR      19$                     ;                               6680
12997 071672  020527  000004          18$:      CMP     R5,#4                   ; VALUE,*                       6634
12998 071676  001017                            BNE     21$
12999 071700  004737  035212                    JSR     PC,ISOLATE              ;                               6684
13000 071704  104455                            TRAP    55                      ;                               6685
13001 071706  012440                            .WORD   12440
13002 071710  010542                            .WORD   MSG2
13003 071712  000000                            .WORD   0
13004 071714  112761  000007  032464            MOVB    #7,WHY.DROPT(R1)        ; *,*(LUN)                      6686
13005 071722  010100                            MOV     R1,R0                   ; LUN,*                         6687
13006 071724  104451                            TRAP    51
13007 071726  062706  000020          19$:      ADD     #20,SP                  ;                               6688
13008 071732  000137  072336          20$:      JMP     29$
13009 071736  020527  000005          21$:      CMP     R5,#5                   ; VALUE,*                       6634
13010 071742  001160                            BNE     28$
13011 071744  004737  035212                    JSR     PC,ISOLATE              ;                               6692
13012 071750  032737  000001  002260            BIT     #1,ERROUT               ;                               6693
13013 071756  001423                            BEQ     22$
13014 071760  017703  140442                    MOV     @ML.REG+42,R3           ;                               6694
13015 071764  006203                            ASR     R3
13016 071766  006203                            ASR     R3
13017 071770  006203                            ASR     R3
13018 071772  006203                            ASR     R3
13019 071774  006203                            ASR     R3
13020 071776  006203                            ASR     R3
13021 072000  042703  177700                    BIC     #177700,R3
13022 072004  010346                            MOV     R3,-(SP)
13023 072006  012746  006262                    MOV     #FMT10B,-(SP)
13024 072012  012746  000002                    MOV     #2,-(SP)
13025 072016  010600                            MOV     SP,R0                   ; SP,*
13026 072020  104414                            TRAP    14
13027 072022  062706  000006                    ADD     #6,SP
13028 072026  017766  140376  000036  22$:      MOV     @ML.REG+44,36(SP)       ; *,OLDSEC                      6696
13029 072034  017703  140366                    MOV     @ML.REG+42,R3           ;                               6697
13030 072040  006203                            ASR     R3
13031 072042  006203                            ASR     R3
13032 072044  006203                            ASR     R3
13033 072046  006203                            ASR     R3
13034 072050  006203                            ASR     R3
13035 072052  006203                            ASR     R3
13036 072054  042703  177700                    BIC     #177700,R3
13037 072060  010366  000040                    MOV     R3,40(SP)               ; *,OLDCHN
13038 072064  012746  000001                    MOV     #1,-(SP)                ;                               6698
13039 072070  016646  000046                    MOV     46(SP),-(SP)            ; COMMAND,*
13040 072074  010146                            MOV     R1,-(SP)                ; LUN,*
13041 072076  010446                            MOV     R4,-(SP)                ; WRDCNT,*
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13043                                   ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
13044                                   ;       TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT 23-Oct-1980 14:57:05    PA:<
13045
13046 072100  016646  000052                    MOV     52(SP),-(SP)                    ; PTR,*
13047 072104  016646  000040                    MOV     40(SP),-(SP)                    ; SECTOR,*
13048 072110  004737  043046                    JSR     PC,RETRY
13049 072114  062706  000014                    ADD     #14,SP
13050 072120  020027  000005                    CMP     R0,#5
13051 072124  001051                            BNE     25$
13052 072126  027766  140276  000036            CMP     @ML.REG+44,36(SP)               ; *,OLDSEC                              6700
13053 072134  001034                            BNE     24$
13054 072136  016600  000040                    MOV     40(SP),R0                       ; OLDCHN,*
13055 072142  017703  140260                    MOV     @ML.REG+42,R3
13056 072146  006203                            ASR     R3
13057 072150  006203                            ASR     R3
13058 072152  006203                            ASR     R3
13059 072154  006203                            ASR     R3
13060 072156  006203                            ASR     R3
13061 072160  006203                            ASR     R3
13062 072162  042703  177700                    BIC     #177700,R3
13063 072166  020300                            CMP     R3,R0
13064 072170  001016                            BNE     24$
13065 072172  032737  000001  002260            BIT     #1,ERROUT                       ;                                       6703
13066 072200  001404                            BEQ     23$
13067 072202  104456                            TRAP    56                              ;                                       6705
13068 072204  012441                            .WORD   12441
13069 072206  010624                            .WORD   MSG4
13070 072210  000000                            .WORD   0
13071 072212  010146                    23$:    MOV     R1,-(SP)                        ; LUN,*                                 6706
13072 072214  013746  032360                    MOV     BOARD,-(SP)
13073 072220  004737  035302                    JSR     PC,UP.HARD.COUNT
13074 072224  000426                            BR      27$                             ;                                       6700
13075 072226  032737  000001  002260    24$:    BIT     #1,ERROUT                       ;                                       6710
13076 072234  001415                            BEQ     26$
13077 072236  104457                            TRAP    57                              ;                                       6712
13078 072240  012442                            .WORD   12442
13079 072242  010610                            .WORD   MSG3
13080 072244  000000                            .WORD   0
13081 072246  000410                            BR      26$                             ;                                       6713
13082 072250  032737  000001  002260    25$:    BIT     #1,ERROUT                       ;                                       6717
13083 072256  001404                            BEQ     26$
13084 072260  104457                            TRAP    57                              ;                                       6719
13085 072262  012443                            .WORD   12443
13086 072264  010610                            .WORD   MSG3
13087 072266  000000                            .WORD   0
13088 072270  010146                    26$:    MOV     R1,-(SP)                        ; LUN,*                                 6720
13089 072272  013746  032360                    MOV     BOARD,-(SP)
13090 072276  004737  035430                    JSR     PC,UP.SOFT.COUNT
13091 072302  022626                    27$:    CMP     (SP)+,(SP)+                     ;                                       6691
13092 072304  062737  000002  030706    28$:    ADD     #2,WPTR                         ;                                       6726
13093 072312  062706  000020                    ADD     #20,SP                          ;                                       6578
13094 072316  005266  000010                    INC     10(SP)                          ; KOUNT2                                6577
13095 072322  026627  000010  000012            CMP     10(SP),#12                      ; KOUNT2,*
13096 072330  003002                            BGT     29$
13097 072332  000137  070712                    JMP     3$
```

```
MLX4    MACRO M1113  24-OCT-80 09:59  PAGE 340                                                                    SEQ 0295
RAND4 TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT

  13099                                 ;MLX4                                                  23-Oct-1980 15:01:43    TOPS
  13100                                 ;               TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT 23-Oct-1980 14:57:05    PA:<
  13101
  13102 072336  005266  000012          29$:    INC     12(SP)                          ; KOUNT                                 6569
  13103 072342  026666  000012  000014          CMP     12(SP),14(SP)                   ; KOUNT,*
  13104 072350  003002                          BGT     30$
  13105 072352  000137  070652                  JMP     2$
  13106 072356  005266  000030          30$:    INC     30(SP)                          ; COUNT                                 6566
  13107 072362  026666  000030  000050          CMP     30(SP),50(SP)                   ; COUNT,REPEAT
  13108 072370  003002                          BGT     31$
  13109 072372  000137  070622                  JMP     1$
  13110 072376  062706  000032          31$:    ADD     #32,SP                          ;                                       6510
  13111 072402  000207                          RTS     PC
  13112
  13113                                 ; Routine Size:  457 words
  13114                                 ; Maximum stack depth per invocation:  36 words
  13119
  13120
```

```
13122 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
13123 ;                 DEFINITION OF OPTION 5                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (52)
13124
13125 ;          6733  %SBTTL  'DEFINITION OF OPTION 5'
13126 ;          6734
13127 ;          6735  ROUTINE OPT5: NOVALUE =
13128 ;          6736  BEGIN  !* 1 *
13129 ;          6737
13130 ;          6738  !++
13131 ;          6739  !  ROUTINE:     OPT5
13132 ;          6740  !
13133 ;          6741  !  PURPOSE:     TO EXERCISE THE ML11 SYSTEMS UNDER TEST IN A RANDOM
13134 ;          6742  !               MANNER, SO AS TO SIMULATE THE FLEXIBILITY OF TESTING
13135 ;          6743  !               THAT WOULD BE DONE BY AN OPERATING SYSTEM.
13136 ;          6744  !
13137 ;          6745  !               THERE ARE 4 RANDOM TESTS WHICH ARE CALLED BY 'OPT5'
13138 ;          6746  !               TO ACCOMPLISH ALL TESTING.  IT IS THE RESPONSIBILITY
13139 ;          6747  !               OF THIS ROUTINE TO DECIDE HOW MANY TIMES THOSE 4
13140 ;          6748  !               RANDOM TESTS WILL BE EXECUTED.  REFER TO 'RAND1' TO
13141 ;          6749  !               'RAND4' ABOVE FOR MORE INFORMATION.
13142 ;          6750  !--
13143 ;          6751
13144 ;          6752  LOCAL
13145 ;          6753     REPEAT;
13146 ;          6754
13147 ;          6755  PRINTB(SAY2,WRD34,RTN5);
13148 ;          6756     !'RUNNING OPT5'
13149 ;          6757
13150 ;          6758  REPEAT = 9 - .NUM_DRIVES;        !THE MORE UNITS THERE ARE ON THE SYSTEM, THE
13151 ;          6759                                   !FEWER TIMES EACH RANDOM TEST WILL BE RUN.
13152 ;          6760
13153 ;          6761  INCR LUN FROM 0 TO (.L$UNIT - 1) DO      !SEE IF THERE ARE ANY UNITS
13154 ;          6762     BEGIN  !* 2 *                         !WHICH HAVE 64K CHIPS (ML11-B)
13155 ;          6763     IF .DRIVE_STATUS[.LUN] EQL ACTIVE
13156 ;          6764     THEN
13157 ;          6765        BEGIN  !* 3 *
13158 ;          6766        UNIT = .DRIVE;
13159 ;          6767        IF .MLDT
13160 ;          6768        THEN
13161 ;          6769           BEGIN  !* 4 *
13162 ;          6770           REPEAT = 1;     !THERE IS AT LEAST 1 UNIT WHICH IS AN ML11-B, SO
13163 ;          6771                           !LOWER THE REPEAT TIME FOR ALL TESTABLE UNITS.
13164 ;          6772           EXITLOOP;
13165 ;          6773           END;   !* 4 *
13166 ;          6774        END;   !* 3 *
13167 ;          6775     END;   !* 2 *
13168 ;          6776
13169 ;          6777  !+
13170 ;          6778  ! AT THIS POINT, 'REPEAT' IS BASED ON THE SYSTEM CONFIGURATION.
13171 ;          6779  ! NOW WEIGHT THE LOOP COUNTS OF THE 4 RANDOM TESTS SO THAT RAND1
13172 ;          6780  ! AND RAND2 ARE MUCH QUICKER THAN RAND3 AND RAND4.  RAND3 IS LONGEST.
13173 ;          6781  !-
13174 ;          6782
13175 ;          6783  RAND1(.REPEAT);                 !TEST USING RANDOM DATA
13176 ;          6784  RAND2(.REPEAT);                 !TEST USING RANDOM DATA, WORD COUNTS
```

```
13178 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
13179 ;                DEFINITION OF OPTION 5                  23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (52)
13180
13181 ;         6785   RAND3(.REPEAT);          !TEST USING RANDOM SECTORS, DATA, WORD COUNTS
13182 ;         6786   RAND4((.REPEAT * 16));   !TEST USING RANDOM UNITS, SECTORS, DATA, WORD COUNTS
13183 ;         6787
13184 ;         6788   RETURN;
13185 ;         6789
13186 ;         6790   END;   !* 1 *
13190
13191                                      .SBTTL  OPT5 DEFINITION OF OPTION 5
13195 072404  004137  005202        OPT5: JSR     R1,$SAVE4                       ;                              6735
13196 072410  012746  007300              MOV     #RTN5,-(SP)                     ;                              6755
13197 072414  012746  006766              MOV     #WRD34,-(SP)
13198 072420  012746  006522              MOV     #SAY2,-(SP)
13199 072424  012746  000003              MOV     #3,-(SP)
13200 072430  010600                      MOV     SP,R0                           ; SP,*
13201 072432  104414                      TRAP    14
13202 072434  012703  000011              MOV     #11,R3                          ; *,REPEAT                     6758
13203 072440  163703  032474              SUB     NUM.DRIVES,R3                   ; *,REPEAT
13204 072444  013704  002012              MOV     L$UNIT,R4                       ;                              6761
13205 072450  005001                      CLR     R1                              ; LUN
13206 072452  000450                      BR      3$
13207 072454  010102        1$:           MOV     R1,R2                           ; LUN,*                        6763
13208 072456  006202                      ASR     R2
13209 072460  006202                      ASR     R2
13210 072462  006202                      ASR     R2
13211 072464  062702  032460              ADD     #DRIVE.STATUS,R2
13212 072470  010246                      MOV     R2,-(SP)
13213 072472  010146                      MOV     R1,-(SP)                        ; LUN,*
13214 072474  042716  177770              BIC     #177770,(SP)
13215 072500  012746  000001              MOV     #1,-(SP)
13216 072504  005046                      CLR     -(SP)
13217 072506  004737  004244              JSR     PC,BL$GT2
13218 072512  062706  000010              ADD     #10,SP
13219 072516  005300                      DEC     R0
13220 072520  001024                      BNE     2$
13221 072522  010102                      MOV     R1,R2                           ; LUN,*                        6766
13222 072524  006302                      ASL     R2
13223 072526  016202  032440              MOV     PTABLE.ADDR(R2),R2
13224 072532  016200  000006              MOV     6(R2),R0
13225 072536  042700  177770              BIC     #177770,R0
13226 072542  142777  000007  137624      BICB    #7,@ML.REG+10
13227 072550  150077  137620              BISB    R0,@ML.REG+10
13228 072554  032777  000001  137630      BIT     #1,@ML.REG+26                   ;                              6767
13229 072562  001403                      BEQ     2$
13230 072564  012703  000001              MOV     #1,R3                           ; *,REPEAT                     6770
13231 072570  000403                      BR      4$                              ;                              6772
13232 072572  005201              2$:     INC     R1                              ; LUN                          6761
```

```
                                ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
                                ;               DEFINITION OF OPTION 5                  23-Oct-1980 14:57:05    PA:<
                                3$:     CMP     R1,R4                   ; LUN,*
                                        BLT     1$
                                4$:     MOV     R3,(SP)                 ; REPEAT,*                              6783
                                        JSR     PC,RAND1
                                        MOV     R3,(SP)                 ; REPEAT,*                              6784
                                        JSR     PC,RAND2
                                        MOV     R3,(SP)                 ; REPEAT,*                              6785
                                        JSR     PC,RAND3
                                        MOV     R3,R0                   ; REPEAT,*                              6786
                                        ASL     R0
                                        ASL     R0
                                        ASL     R0
                                        ASL     R0
                                        MOV     R0,(SP)
                                        JSR     PC,RAND4
                                        ADD     #10,SP                  ;                                       6735
                                        RTS     PC

                                ; Routine Size:  82 words
                                ; Maximum stack depth per invocation:  13 words
```

```
13264 ;MLX4
13265 ;                 THE OPTION SCHEDULER                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
13266                                                           23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (53)
13267 ;          6791  %SBTTL  'THE OPTION SCHEDULER'
13268 ;          6792
13269 ;          6793  BGNTST;
13270 ;          6794
13271 ;          6795  !++
13272 ;          6796  !  ROUTINE:     T1
13273 ;          6797  !
13274 ;          6798  !  PURPOSE:     THIS IS THE ONE MAIN TEST OF THE EXERCISER.  IT LOOKS
13275 ;          6799  !               AT THE AVAILABILITY OF TEST OPTIONS AND MAKES CALLS TO
13276 ;          6800  !               THE OPTIONS WHEN APPROPRIATE.
13277 ;          6801  !
13278 ;          6802  !               THE QUICK VERIFY PASS INCLUDES THE FOLLOWING ROUTINES:
13279 ;          6803  !
13280 ;          6804  !               (1)  INTEGRITY
13281 ;          6805  !               (2)  OPT1
13282 ;          6806  !               (3)  OPT2
13283 ;          6807  !               (4)  OPT3
13284 ;          6808  !
13285 ;          6809  !               SUBSEQUENT PASSES INCLUDE:
13286 ;          6810  !
13287 ;          6811  !               (1)  OPT1
13288 ;          6812  !               (2)  OPT2
13289 ;          6813  !               (3)  OPT3
13290 ;          6814  !               (4)  OPT4
13291 ;          6815  !               (5)  OPT5
13292 ;          6816  !--
13293 ;          6817
13294 ;          6818  IF .QUICK NEQ 0
13295 ;          6819  THEN  !THIS IS THE QUICK VERIFY PASS
13296 ;          6820     BEGIN
13297 ;          6821     PRINTB(CRLF);
13298 ;          6822     PRINTB(SAY3,WRD2,PHR2,WRD4);
13299 ;          6823        !'BEGIN QUICK VERIFY PASS'
13300 ;          6824     INTEGRITY();
13301 ;          6825     END;
13302 ;          6826
13303 ;          6827  IF .DROP1 EQL 0
13304 ;          6828  THEN  !OPTION 1 IS AVAILABLE
13305 ;          6829     OPT1();
13306 ;          6830
13307 ;          6831  IF .DROP2 EQL 0
13308 ;          6832  THEN  !OPTION 2 IS AVAILABLE
13309 ;          6833     OPT2();
13310 ;          6834
13311 ;          6835  IF .DROP3 EQL 0
13312 ;          6836  THEN  !OPTION 3 IS AVAILABLE
13313 ;          6837     OPT3();
13314 ;          6838
13315 ;          6839  IF .QUICK EQL 0
13316 ;          6840  THEN
13317 ;          6841     BEGIN
13318 ;          6842     IF .DROP4 EQL 0
```

```
13320 ;MLX4                                          23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
13321 ;                THE OPTION SCHEDULER          23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (53)
13322
13323 ;          6843      THEN  !OPTION 4 IS AVAILABLE
13324 ;          6844          OPT4();
13325 ;          6845
13326 ;          6846      IF .DROP5 EQL 0
13327 ;          6847      THEN  !OPTION 5 IS AVAILABLE
13328 ;          6848          OPT5();
13329 ;          6849      END;
13330 ;          6850
13331 ;          6851  ENDTST;
13335
13336                                      .SBTTL  $T1 THE OPTION SCHEDULER
13340 072650  005737  030712        $T1:  TST     QUICK                       ;                    6818
13341 072654  001426                      BEQ     1$
13342 072656  012746  006510              MOV     #CRLF,-(SP)                 ;                    6821
13343 072662  012746  000001              MOV     #1,-(SP)
13344 072666  010600                      MOV     SP,R0                       ; SP,*
13345 072670  104414                      TRAP    14
13346 072672  012716  006634              MOV     #WRD4,(SP)                  ;                    6822
13347 072676  012746  007352              MOV     #PHR2,-(SP)
13348 072702  012746  006622              MOV     #WRD2,-(SP)
13349 072706  012746  006534              MOV     #SAY3,-(SP)
13350 072712  012746  000004              MOV     #4,-(SP)
13351 072716  010600                      MOV     SP,R0                       ; SP,*
13352 072720  104414                      TRAP    14
13353 072722  004737  044070              JSR     PC,INTEGRITY                ;                    6824
13354 072726  062706  000014              ADD     #14,SP                      ;                    6820
13355 072732  005737  002236        1$:   TST     DROP1                       ;                    6827
13356 072736  001002                      BNE     2$
13357 072740  004737  046316              JSR     PC,OPT1                     ;                    6829
13358 072744  005737  002240        2$:   TST     DROP2                       ;                    6831
13359 072750  001002                      BNE     3$
13360 072752  004737  050232              JSR     PC,OPT2                     ;                    6833
13361 072756  005737  002242        3$:   TST     DROP3                       ;                    6835
13362 072762  001002                      BNE     4$
13363 072764  004737  053560              JSR     PC,OPT3                     ;                    6837
13364 072770  005737  030712        4$:   TST     QUICK                       ;                    6839
13365 072774  001012                      BNE     6$
13366 072776  005737  002244              TST     DROP4                       ;                    6842
13367 073002  001002                      BNE     5$
13368 073004  004737  055472              JSR     PC,OPT4                     ;                    6844
13369 073010  005737  002250        5$:   TST     DROP5                       ;                    6846
13370 073014  001002                      BNE     6$
13371 073016  004737  072404              JSR     PC,OPT5                     ;                    6848
13372 073022  000207                6$:   RTS     PC                          ;                    6790
13373
13374                                ; Routine Size:  54 words
```

```
13376                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
13377                                   ;               THE OPTION SCHEDULER                    23-Oct-1980 14:57:05    PA:<
13378
13379                                   ; Maximum stack depth per invocation:  6 words
13384
13385
13389
13390                                           .SBTTL  T1 THE OPTION SCHEDULER
13394 073024                            T1::
13395 073024  004737  072650            1$:     JSR     PC,$T1                          ;                               6849
13396 073030  104466                            TRAP    66
13397 073032  006000                            ROR     R0
13398 073034  103773                            BLO     1$
13399 073036  000207                            RTS     PC
13400
13401                                   ; Routine Size:  6 words
13402                                   ; Maximum stack depth per invocation:  0 words
13407
13408
```

```
13410 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
13411 ;                 END OF PASS SUMMARY                    23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (54)
13412
13413 ;          6852  %SBTTL  'END OF PASS SUMMARY'
13414 ;          6853
13415 ;          6854  ROUTINE EOP: NOVALUE =
13416 ;          6855  BEGIN  !* 1 *
13417 ;          6856
13418 ;          6857  !++
13419 ;          6858  !  ROUTINE:      EOP
13420 ;          6859  !
13421 ;          6860  !  PURPOSE:      TO PRINT A STATUS REPORT FOR EACH DRIVE.  IF AN
13422 ;          6861  !                ARRAY HAS ANY HARD OR SOFT ERRORS, THEN ITS ERROR
13423 ;          6862  !                COUNT WILL APPEAR, AND IF THE COUNT IS TOO HIGH,
13424 ;          6863  !                THEN A DIAGNOSIS TO RUN THE ML11 PROM MAINTENANCE
13425 ;          6864  !                PROGRAM WILL ALSO APPEAR.
13426 ;          6865  !
13427 ;          6866  !                THE FOLLOWING IS A SAMPLE REPORT FOR 2 DRIVES:
13428 ;          6867  !
13429 ;          6868  !
13430 ;          6869  !  PERFORMANCE SUMMARY
13431 ;          6870  !
13432 ;          6871  !  NUMBER OF MBYTES TRANSFERRED:
13433 ;          6872  !   1028 MBYTES WRITTEN
13434 ;          6873  !    250 MBYTES READ
13435 ;          6874  !   1145 MBYTES WRITE CHECKED
13436 ;          6875  !
13437 ;          6876  !  LOGICAL UNIT: 0    DRIVE: 1    SERIAL #: 1234
13438 ;          6877  !    SOFT ERROR COUNT:     9
13439 ;          6878  !      ARRAY  3:     9
13440 ;          6879  !    HARD ERROR COUNT:    11
13441 ;          6880  !      ARRAY  0:     6
13442 ;          6881  !      ARRAY 10:     2
13443 ;          6882  !      ARRAY 15:     3
13444 ;          6883  !    TRANSFER RETRIES:     0
13445 ;          6884  !
13446 ;          6885  !  LOGICAL UNIT: 1    DRIVE: 1    SERIAL #: 9876
13447 ;          6886  !  DRIVE DROPPED   (CONTROLLER FATAL ERROR)
13448 ;          6887  !    SOFT ERROR COUNT:   100
13449 ;          6888  !      ARRAY  1:     9
13450 ;          6889  !      ARRAY 13:    10  --> RUN ML11 PROM MAINTENANCE PROGRAM
13451 ;          6890  !      ARRAY 14:     1
13452 ;          6891  !      ARRAY 15:    80  --> RUN ML11 PROM MAINTENANCE PROGRAM
13453 ;          6892  !    HARD ERROR COUNT:     2
13454 ;          6893  !      ARRAY 14:     1
13455 ;          6894  !      ARRAY 15:     1
13456 ;          6895  !    TRANSFER RETRIES:     0
13457 ;          6896  !--
13458 ;          6897
13459 ;          6898
13460 ;          6899  LOCAL
13461 ;          6900     SFT_TOT, HRD_TOT, TRY_TOT;
13462 ;          6901
13463 ;          6902  IF .EOPSUM
13464 ;          6903  THEN  !THE OPERATOR HAS ALLOWED THE SUMMARY TO PRINT
```

```
13466 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
13467 ;                END OF PASS SUMMARY                     23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (54)
13468
13469 ;          6904      BEGIN  !* 2 *
13470 ;          6905      PRINTB(CRLF);
13471 ;          6906      PRINTB(SAY1,PHR17);
13472 ;          6907         !'PERFORMANCE SUMMARY'
13473 ;          6908      PRINTB(CRLF);
13474 ;          6909      PRINTB(SAY1,PHR12);
13475 ;          6910         !NUMBER OF MBYTES TRANSFERED:
13476 ;          6911      PRINTB(FMT14,.WR_MILLIONS,PHR19);
13477 ;          6912         !'XXXXX MBYTES WRITTEN'
13478 ;          6913      PRINTB(FMT14,.RD_MILLIONS,PHR20);
13479 ;          6914         !'XXXXX MBYTES READ'
13480 ;          6915      PRINTB(FMT14,.WC_MILLIONS,PHR13);
13481 ;          6916         !'XXXXX MBYTES WRITE CHECKED'
13482 ;          6917      INCR LUN FROM 0 TO (.L$UNIT-1) DO
13483 ;          6918         BEGIN  !* 3 *
13484 ;          6919         UNIT = .DRIVE;
13485 ;          6920         IF .DPR EQL 0
13486 ;          6921         THEN  PRINTB(FMT4A,PHR7,.LUN,WRD11,.DRIVE)
13487 ;          6922                  !'LOGICAL UNIT: X    DRIVE: Y'
13488 ;          6923         ELSE  SAYWHO(.LUN);
13489 ;          6924                  !'LOGICAL UNIT: X    DRIVE: Y    SERIAL #: ZZZZ'
13490 ;          6925         IF .DROPT_DRIVES[.LUN] EQL ACTIVE
13491 ;          6926         THEN
13492 ;          6927            BEGIN  !* 4 *
13493 ;          6928            PRINTB(SAY2,WRD11,WRD21);
13494 ;          6929               !'DRIVE DROPPED'
13495 ;          6930            SELECTONE .WHY_DROPT[.LUN] OF
13496 ;          6931               SET
13497 ;          6932               [CODE_1] :   PRINTB(FMT2,CAUSE1);
13498 ;          6933                               !'   (NOT POWERED UP)'
13499 ;          6934               [CODE_2] :   PRINTB(FMT2,CAUSE2);
13500 ;          6935                               !'   (NOT AN ML11 UNIT)'
13501 ;          6936               [CODE_3] :   PRINTB(FMT2,CAUSE3);
13502 ;          6937                               !'   (OPERATOR SELECTED TEST LIMITS INCORRECTLY)'
13503 ;          6938               [CODE_4] :   PRINTB(FMT2,CAUSE4);
13504 ;          6939                               !'   (ALL RETRIES FAILED FOR A NON-FATAL ERROR)'
13505 ;          6940               [CODE_5] :   PRINTB(FMT2,CAUSE5);
13506 ;          6941                               !'   (CONTROLLER FATAL ERROR)'
13507 ;          6942               [CODE_6] :   PRINTB(FMT2,CAUSE6);
13508 ;          6943                               !'   (DRIVE FATAL ERROR)'
13509 ;          6944               [CODE_7] :   PRINTB(FMT2,CAUSE7);
13510 ;          6945                               !'   (ECC HARD ERROR)'
13511 ;          6946               [CODE_8] :   PRINTB(FMT2,CAUSE8);
13512 ;          6947                               !'   (ECC LOGIC FAILURE)'
13513 ;          6948               TES;
13514 ;          6949            END;   !* 4 *
13515 ;          6950
13516 ;          6951         SFT_TOT = 0;
13517 ;          6952         HRD_TOT = 0;
13518 ;          6953         TRY_TOT = 0;
13519 ;          6954         INCR ARRAY FROM 0 TO 15 DO
13520 ;          6955            BEGIN
```

```
13522 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
13523 ;                END OF PASS SUMMARY                     23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (54)
13524 ;
13525 ;         6956          SFT_TOT = .SFT_TOT + .SOFTS[.LUN,.ARRAY,0,16,0];
13526 ;         6957          HRD_TOT = .HRD_TOT + .HARDS[.LUN,.ARRAY,0,16,0];
13527 ;         6958          TRY_TOT = .TRY_TOT + .TRIES[.LUN,.ARRAY,0,16,0];
13528 ;         6959          END;
13529 ;         6960       PRINTB(FMT7,PHR5,.SFT_TOT);
13530 ;         6961          !'  SOFT ERROR COUNT: DDDDD'
13531 ;         6962       IF .SFT_TOT NEQ 0
13532 ;         6963       THEN
13533 ;         6964          INCR ARRAY FROM 0 TO 15 DO
13534 ;         6965             IF .SOFTS[.LUN,.ARRAY,0,16,0] NEQ 0
13535 ;         6966             THEN
13536 ;         6967                BEGIN
13537 ;         6968                PRINTB(FMT9,.ARRAY,.SOFTS[.LUN,.ARRAY,0,16,0]);
13538 ;         6969                   !'    ARRAY XX: YYYYY'
13539 ;         6970                !+
13540 ;         6971                ! NOW SEE IF THRESHOLDS FOR SOFT ERRORS
13541 ;         6972                ! HAVE BEEN REACHED FOR THIS ARRAY BOARD:
13542 ;         6973                !-
13543 ;         6974                IF ((.ARR_TYP EQL 0) AND
13544 ;         6975                   (.SOFTS[.LUN,.ARRAY,0,16,0] GEQ S16K_LIMIT))
13545 ;         6976                THEN  PRINTB(FMT2,MSG2);
13546 ;         6977                         !'  --> RUN ML11 PROM MAINTENANCE PROGRAM'
13547 ;         6978                IF ((.ARR_TYP EQL 1) AND
13548 ;         6979                   (.SOFTS[.LUN,.ARRAY,0,16,0] GEQ S64K_LIMIT))
13549 ;         6980                THEN  PRINTB(FMT2,MSG2);
13550 ;         6981                         !'  --> RUN ML11 PROM MAINTENANCE PROGRAM'
13551 ;         6982                END;
13552 ;         6983       PRINTB(FMT7,PHR18,.HRD_TOT);
13553 ;         6984          !'  HARD ERROR COUNT: DDDDD'
13554 ;         6985       IF .HRD_TOT NEQ 0
13555 ;         6986       THEN
13556 ;         6987          INCR ARRAY FROM 0 TO 15 DO
13557 ;         6988             IF .HARDS[.LUN,.ARRAY,0,16,0] NEQ 0
13558 ;         6989             THEN
13559 ;         6990                BEGIN
13560 ;         6991                PRINTB(FMT9,.ARRAY,.HARDS[.LUN,.ARRAY,0,16,0]);
13561 ;         6992                   !'    ARRAY XX: YYYYY'
13562 ;         6993                !+
13563 ;         6994                ! NOW SEE IF THRESHOLDS FOR HARD ERRORS
13564 ;         6995                ! HAVE BEEN REACHED FOR THIS ARRAY BOARD:
13565 ;         6996                !-
13566 ;         6997                IF ((.ARR_TYP EQL 0) AND
13567 ;         6998                   (.HARDS[.LUN,.ARRAY,0,16,0] GEQ H16K_LIMIT))
13568 ;         6999                THEN  PRINTB(FMT2,MSG2);
13569 ;         7000                         !'  --> RUN ML11 PROM MAINTENANCE PROGRAM'
13570 ;         7001                IF ((.ARR_TYP EQL 1) AND
13571 ;         7002                   (.HARDS[.LUN,.ARRAY,0,16,0] GEQ H64K_LIMIT))
13572 ;         7003                THEN  PRINTB(FMT2,MSG2);
13573 ;         7004                         !'  --> RUN ML11 PROM MAINTENANCE PROGRAM'
13574 ;         7005                END;
13575 ;         7006       PRINTB(FMT7,PHR6,.TRY_TOT);
13576 ;         7007          !'  TRANSFER RETRIES: DDDDD'
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;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
;               END OF PASS SUMMARY                      23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (54)

;          7008         IF .TRY_TOT NEQ 0
;          7009            THEN
;          7010               INCR ARRAY FROM 0 TO 15 DO
;          7011                  IF .TRIES[.LUN,.ARRAY,0,16,0] NEQ 0
;          7012                  THEN  PRINTB(FMT9,.ARRAY,.TRIES[.LUN,.ARRAY,0,16,0]);
;          7013                                !'     ARRAY XX: YYYYY'
;          7014         END;    !* 3 *
;          7015      PRINTB(CRLF);
;          7016      END;    !* 2 *
;          7017
;          7018   RETURN;
;          7019
;          7020   END;    !* 1 *

                                        .SBTTL  EOP END OF PASS SUMMARY
073040  004137  005222          EOP:    JSR     R1,$SAVE5                       ;                       6854
073044  162706  000006                  SUB     #6,SP
073050  032737  000001  002256          BIT     #1,EOPSUM                       ;                       6902
073056  001002                          BNE     1$
073060  000137  074660                  JMP     31$
073064  012746  006510          1$:     MOV     #CRLF,-(SP)                     ;                       6905
073070  012746  000001                  MOV     #1,-(SP)
073074  010600                          MOV     SP,R0                           ; SP,*
073076  104414                          TRAP    14
073100  012716  007764                  MOV     #PHR17,(SP)                     ;                       6906
073104  012746  006514                  MOV     #SAY1,-(SP)
073110  012746  000002                  MOV     #2,-(SP)
073114  010600                          MOV     SP,R0                           ; SP,*
073116  104414                          TRAP    14
073120  012716  006510                  MOV     #CRLF,(SP)                      ;                       6908
073124  012746  000001                  MOV     #1,-(SP)
073130  010600                          MOV     SP,R0                           ; SP,*
073132  104414                          TRAP    14
073134  012716  007624                  MOV     #PHR12,(SP)                     ;                       6909
073140  012746  006514                  MOV     #SAY1,-(SP)
073144  012746  000002                  MOV     #2,-(SP)
073150  010600                          MOV     SP,R0                           ; SP,*
073152  104414                          TRAP    14
073154  012716  010032                  MOV     #PHR19,(SP)                     ;                       6911
073160  013746  032336                  MOV     WR.MILLIONS,-(SP)
073164  012746  006470                  MOV     #FMT14,-(SP)
073170  012746  000003                  MOV     #3,-(SP)
073174  010600                          MOV     SP,R0                           ; SP,*
073176  104414                          TRAP    14
073200  012716  010052                  MOV     #PHR20,(SP)                     ;                       6913
073204  013746  032344                  MOV     RD.MILLIONS,-(SP)
```

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13634                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
13635                                   ;       END OF PASS SUMMARY                             23-Oct-1980 14:57:05    PA:<
13636
13637 073210  012746  006470                    MOV     #FMT14,-(SP)
13638 073214  012746  000003                    MOV     #3,-(SP)
13639 073220  010600                            MOV     SP,R0                   ; SP,*
13640 073222  104414                            TRAP    14
13641 073224  012716  007662                    MOV     #PHR13,(SP)             ;                                               6915
13642 073230  013746  032352                    MOV     WC.MILLIONS,-(SP)
13643 073234  012746  006470                    MOV     #FMT14,-(SP)
13644 073240  012746  000003                    MOV     #3,-(SP)
13645 073244  010600                            MOV     SP,R0                   ; SP,*
13646 073246  104414                            TRAP    14
13647 073250  013766  002012  000044            MOV     L$UNIT,44(SP)           ;                                               6917
13648 073256  005001                            CLR     R1                      ; LUN
13649 073260  000137  074626                    JMP     29$
13650 073264  010100                  2$:       MOV     R1,R0                   ; LUN,*                                         6919
13651 073266  006300                            ASL     R0
13652 073270  016003  032440                    MOV     PTABLE.ADDR(R0),R3
13653 073274  016304  000006                    MOV     6(R3),R4
13654 073300  042704  177770                    BIC     #177770,R4
13655 073304  142777  000007  137062            BICB    #7,@ML.REG+10
13656 073312  150477  137056                    BISB    R4,@ML.REG+10
13657 073316  032777  000400  137052            BIT     #400,@ML.REG+12         ;                                               6920
13658 073324  001022                            BNE     3$
13659 073326  016003  032440                    MOV     PTABLE.ADDR(R0),R3      ;                                               6921
13660 073332  016346  000006                    MOV     6(R3),-(SP)
13661 073336  012746  006662                    MOV     #WRD11,-(SP)
13662 073342  010146                            MOV     R1,-(SP)                ; LUN,*
13663 073344  012746  007472                    MOV     #PHR7,-(SP)
13664 073350  012746  005640                    MOV     #FMT4A,-(SP)
13665 073354  012746  000005                    MOV     #5,-(SP)
13666 073360  010600                            MOV     SP,R0                   ; SP,*
13667 073362  104414                            TRAP    14
13668 073364  062706  000012                    ADD     #12,SP
13669 073370  000403                            BR      4$                      ;                                               6920
13670 073372  010146                  3$:       MOV     R1,-(SP)                ; LUN,*                                         6923
13671 073374  004737  033436                    JSR     PC,SAYWHO
13672 073400  010100                  4$:       MOV     R1,R0                   ; LUN,*                                         6925
13673 073402  006200                            ASR     R0
13674 073404  006200                            ASR     R0
13675 073406  006200                            ASR     R0
13676 073410  062700  032462                    ADD     #DROPT.DRIVES,R0
13677 073414  010046                            MOV     R0,-(SP)
13678 073416  010146                            MOV     R1,-(SP)                ; LUN,*
13679 073420  042716  177770                    BIC     #177770,(SP)
13680 073424  012746  000001                    MOV     #1,-(SP)
13681 073430  005046                            CLR     -(SP)
13682 073432  004737  004244                    JSR     PC,BL$GT2
13683 073436  062706  000010                    ADD     #10,SP
13684 073442  005300                            DEC     R0
13685 073444  001160                            BNE     14$
13686 073446  012746  006744                    MOV     #WRD21,-(SP)            ;                                               6928
13687 073452  012746  006662                    MOV     #WRD11,-(SP)
13688 073456  012746  006522                    MOV     #SAY2,-(SP)
```

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13690                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
13691                                   ;       END OF PASS SUMMARY                             23-Oct-1980 14:57:05    PA:<
13692
13693 073462  012746  000003                    MOV     #3,-(SP)
13694 073466  010600                            MOV     SP,R0                   ; SP,*
13695 073470  104414                            TRAP    14
13696 073472  005003                            CLR     R3                      ;                                       6930
13697 073474  156103  032464                    BISB    WHY.DROPT(R1),R3        ; *(LUN),*
13698 073500  020327  000001                    CMP     R3,#1
13699 073504  001011                            BNE     5$
13700 073506  012746  010102                    MOV     #CAUSE1,-(SP)           ;                                       6932
13701 073512  012746  005602                    MOV     #FMT2,-(SP)
13702 073516  012746  000002                    MOV     #2,-(SP)
13703 073522  010600                            MOV     SP,R0                   ; SP,*
13704 073524  104414                            TRAP    14
13705 073526  000523                            BR      12$
13706 073530  020327  000002            5$:     CMP     R3,#2                   ;                                       6930
13707 073534  001011                            BNE     6$
13708 073536  012746  010124                    MOV     #CAUSE2,-(SP)           ;                                       6934
13709 073542  012746  005602                    MOV     #FMT2,-(SP)
13710 073546  012746  000002                    MOV     #2,-(SP)
13711 073552  010600                            MOV     SP,R0                   ; SP,*
13712 073554  104414                            TRAP    14
13713 073556  000507                            BR      12$
13714 073560  020327  000003            6$:     CMP     R3,#3                   ;                                       6930
13715 073564  001011                            BNE     7$
13716 073566  012746  010150                    MOV     #CAUSE3,-(SP)           ;                                       6936
13717 073572  012746  005602                    MOV     #FMT2,-(SP)
13718 073576  012746  000002                    MOV     #2,-(SP)
13719 073602  010600                            MOV     SP,R0                   ; SP,*
13720 073604  104414                            TRAP    14
13721 073606  000473                            BR      12$
13722 073610  020327  000004            7$:     CMP     R3,#4                   ;                                       6930
13723 073614  001011                            BNE     8$
13724 073616  012746  010224                    MOV     #CAUSE4,-(SP)           ;                                       6938
13725 073622  012746  005602                    MOV     #FMT2,-(SP)
13726 073626  012746  000002                    MOV     #2,-(SP)
13727 073632  010600                            MOV     SP,R0                   ; SP,*
13728 073634  104414                            TRAP    14
13729 073636  000457                            BR      12$
13730 073640  020327  000005            8$:     CMP     R3,#5                   ;                                       6930
13731 073644  001011                            BNE     9$
13732 073646  012746  010300                    MOV     #CAUSE5,-(SP)           ;                                       6940
13733 073652  012746  005602                    MOV     #FMT2,-(SP)
13734 073656  012746  000002                    MOV     #2,-(SP)
13735 073662  010600                            MOV     SP,R0                   ; SP,*
13736 073664  104414                            TRAP    14
13737 073666  000443                            BR      12$
13738 073670  020327  000006            9$:     CMP     R3,#6                   ;                                       6930
13739 073674  001011                            BNE     10$
13740 073676  012746  010332                    MOV     #CAUSE6,-(SP)           ;                                       6942
13741 073702  012746  005602                    MOV     #FMT2,-(SP)
13742 073706  012746  000002                    MOV     #2,-(SP)
13743 073712  010600                            MOV     SP,R0                   ; SP,*
13744 073714  104414                            TRAP    14
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13746                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
13747                                   ;       END OF PASS SUMMARY                             23-Oct-1980 14:57:05    PA:<
13748
13749 073716  000427                            BR      12$
13750 073720  020327  000007          10$:      CMP     R3,#7                   ;                               6930
13751 073724  001011                            BNE     11$
13752 073726  012746  010356                    MOV     #CAUSE7,-(SP)           ;                               6944
13753 073732  012746  005602                    MOV     #FMT2,-(SP)
13754 073736  012746  000002                    MOV     #2,-(SP)
13755 073742  010600                            MOV     SP,R0                   ; SP,*
13756 073744  104414                            TRAP    14
13757 073746  000413                            BR      12$
13758 073750  020327  000010          11$:      CMP     R3,#10                  ;                               6930
13759 073754  001012                            BNE     13$
13760 073756  012746  010400                    MOV     #CAUSE8,-(SP)           ;                               6946
13761 073762  012746  005602                    MOV     #FMT2,-(SP)
13762 073766  012746  000002                    MOV     #2,-(SP)
13763 073772  010600                            MOV     SP,R0                   ; SP,*
13764 073774  104414                            TRAP    14
13765 073776  062706  000006          12$:      ADD     #6,SP
13766 074002  062706  000010          13$:      ADD     #10,SP                  ;                               6927
13767 074006  005066  000044          14$:      CLR     44(SP)                  ; SFT.TOT                       6951
13768 074012  005066  000042                    CLR     42(SP)                  ; HRD.TOT                       6952
13769 074016  005005                            CLR     R5                      ; TRY.TOT                       6953
13770 074020  010100                            MOV     R1,R0                   ; LUN,*                         6956
13771 074022  006300                            ASL     R0
13772 074024  006300                            ASL     R0
13773 074026  006300                            ASL     R0
13774 074030  006300                            ASL     R0
13775 074032  010004                            MOV     R0,R4
13776 074034  005002                            CLR     R2                      ; ARRAY                         6954
13777 074036  010403          15$:      MOV     R4,R3                   ;                               6956
13778 074040  060203                            ADD     R2,R3                   ; ARRAY,*
13779 074042  006303                            ASL     R3
13780 074044  066366  030732  000044            ADD     SOFTS(R3),44(SP)        ; *,SFT.TOT
13781 074052  066366  031332  000042            ADD     HARDS(R3),42(SP)        ; *,HRD.TOT                     6957
13782 074060  066305  031732                    ADD     TRIES(R3),R5            ; *,TRY.TOT                     6958
13783 074064  005202                            INC     R2                      ; ARRAY                         6954
13784 074066  020227  000017                    CMP     R2,#17                  ; ARRAY,*
13785 074072  003761                            BLE     15$
13786 074074  016616  000044                    MOV     44(SP),(SP)             ; SFT.TOT,*                     6960
13787 074100  012746  007426                    MOV     #PHR5,-(SP)
13788 074104  012746  006070                    MOV     #FMT7,-(SP)
13789 074110  012746  000003                    MOV     #3,-(SP)
13790 074114  010600                            MOV     SP,R0                   ; SP,*
13791 074116  104414                            TRAP    14
13792 074120  005766  000052                    TST     52(SP)                  ; SFT.TOT                       6962
13793 074124  001470                            BEQ     20$
13794 074126  005002                            CLR     R2                      ; ARRAY                         6964
13795 074130  010403          16$:      MOV     R4,R3                   ;                               6965
13796 074132  060203                            ADD     R2,R3                   ; ARRAY,*
13797 074134  006303                            ASL     R3
13798 074136  062703  030732                    ADD     #SOFTS,R3
13799 074142  005713                            TST     (R3)
13800 074144  001454                            BEQ     19$
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13802                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
13803                                   ;       END OF PASS SUMMARY                             23-Oct-1980 14:57:05    PA:<
13804
13805 074146  011346                            MOV     (R3),-(SP)              ;                                       6968
13806 074150  010246                            MOV     R2,-(SP)                ; ARRAY,*
13807 074152  012746  006156                      MOV     #FMT9,-(SP)
13808 074156  012746  000003                      MOV     #3,-(SP)
13809 074162  010600                            MOV     SP,R0                   ; SP,*
13810 074164  104414                            TRAP    14
13811 074166  032777  002000  136214              BIT     #2000,@ML.REG+24        ;                                       6974
13812 074174  001015                            BNE     17$
13813 074176  021327  000012                      CMP     (R3),#12                ;                                       6975
13814 074202  002412                            BLT     17$
13815 074204  012746  010542                      MOV     #MSG2,-(SP)             ;                                       6976
13816 074210  012746  005602                      MOV     #FMT2,-(SP)
13817 074214  012746  000002                      MOV     #2,-(SP)
13818 074220  010600                            MOV     SP,R0                   ; SP,*
13819 074222  104414                            TRAP    14
13820 074224  062706  000006                      ADD     #6,SP
13821 074230  032777  002000  136152  17$:       BIT     #2000,@ML.REG+24        ;                                       6978
13822 074236  001415                            BEQ     18$
13823 074240  021327  000012                      CMP     (R3),#12                ;                                       6979
13824 074244  002412                            BLT     18$
13825 074246  012746  010542                      MOV     #MSG2,-(SP)             ;                                       6980
13826 074252  012746  005602                      MOV     #FMT2,-(SP)
13827 074256  012746  000002                      MOV     #2,-(SP)
13828 074262  010600                            MOV     SP,R0                   ; SP,*
13829 074264  104414                            TRAP    14
13830 074266  062706  000006                      ADD     #6,SP
13831 074272  062706  000010            18$:      ADD     #10,SP                  ;                                       6967
13832 074276  005202                    19$:      INC     R2                      ; ARRAY                                 6964
13833 074300  020227  000017                      CMP     R2,#17                  ; ARRAY,*
13834 074304  003711                            BLE     16$
13835 074306  016616  000050            20$:      MOV     50(SP),(SP)             ; HRD.TOT,*                             6983
13836 074312  012746  010010                      MOV     #PHR18,-(SP)
13837 074316  012746  006070                      MOV     #FMT7,-(SP)
13838 074322  012746  000003                      MOV     #3,-(SP)
13839 074326  010600                            MOV     SP,R0                   ; SP,*
13840 074330  104414                            TRAP    14
13841 074332  005766  000056                      TST     56(SP)                  ; HRD.TOT                               6985
13842 074336  001470                            BEQ     25$
13843 074340  005002                            CLR     R2                      ; ARRAY                                 6987
13844 074342  010403                    21$:      MOV     R4,R3                   ;                                       6988
13845 074344  060203                            ADD     R2,R3                   ; ARRAY,*
13846 074346  006303                            ASL     R3
13847 074350  062703  031332                      ADD     #HARDS,R3
13848 074354  005713                            TST     (R3)
13849 074356  001454                            BEQ     24$
13850 074360  011346                            MOV     (R3),-(SP)              ;                                       6991
13851 074362  010246                            MOV     R2,-(SP)                ; ARRAY,*
13852 074364  012746  006156                      MOV     #FMT9,-(SP)
13853 074370  012746  000003                      MOV     #3,-(SP)
13854 074374  010600                            MOV     SP,R0                   ; SP,*
13855 074376  104414                            TRAP    14
13856 074400  032777  002000  136002              BIT     #2000,@ML.REG+24        ;                                       6997
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13858                                   ;MLX4                                                   23-Oct-1980 15:01:43    TOPS
13859                                   ;       END OF PASS SUMMARY                             23-Oct-1980 14:57:05    PA:<
13860
13861 074406  001015                            BNE     22$
13862 074410  021327  000012                    CMP     (R3),#12                ;                               6998
13863 074414  002412                            BLT     22$
13864 074416  012746  010542                    MOV     #MSG2,-(SP)             ;                               6999
13865 074422  012746  005602                    MOV     #FMT2,-(SP)
13866 074426  012746  000002                    MOV     #2,-(SP)
13867 074432  010600                            MOV     SP,R0                   ; SP,*
13868 074434  104414                            TRAP    14
13869 074436  062706  000006                    ADD     #6,SP
13870 074442  032777  002000  135740  22$:      BIT     #2000,@ML.REG+24        ;                               7001
13871 074450  001415                            BEQ     23$
13872 074452  021327  000012                    CMP     (R3),#12                ;                               7002
13873 074456  002412                            BLT     23$
13874 074460  012746  010542                    MOV     #MSG2,-(SP)             ;                               7003
13875 074464  012746  005602                    MOV     #FMT2,-(SP)
13876 074470  012746  000002                    MOV     #2,-(SP)
13877 074474  010600                            MOV     SP,R0                   ; SP,*
13878 074476  104414                            TRAP    14
13879 074500  062706  000006                    ADD     #6,SP
13880 074504  062706  000010          23$:      ADD     #10,SP                  ;                               6990
13881 074510  005202                  24$:      INC     R2                      ; ARRAY                         6987
13882 074512  020227  000017                    CMP     R2,#17                  ; ARRAY,*
13883 074516  003711                            BLE     21$
13884 074520  010516                  25$:      MOV     R5,(SP)                 ; TRY.TOT,*                     7006
13885 074522  012746  007450                    MOV     #PHR6,-(SP)
13886 074526  012746  006070                    MOV     #FMT7,-(SP)
13887 074532  012746  000003                    MOV     #3,-(SP)
13888 074536  010600                            MOV     SP,R0                   ; SP,*
13889 074540  104414                            TRAP    14
13890 074542  005705                            TST     R5                      ; TRY.TOT                       7008
13891 074544  001425                            BEQ     28$
13892 074546  005002                            CLR     R2                      ; ARRAY                         7010
13893 074550  010403                  26$:      MOV     R4,R3                   ;                               7011
13894 074552  060203                            ADD     R2,R3                   ; ARRAY,*
13895 074554  006303                            ASL     R3
13896 074556  016303  031732                    MOV     TRIES(R3),R3
13897 074562  001412                            BEQ     27$
13898 074564  010346                            MOV     R3,-(SP)                ;                               7012
13899 074566  010246                            MOV     R2,-(SP)                ; ARRAY,*
13900 074570  012746  006156                    MOV     #FMT9,-(SP)
13901 074574  012746  000003                    MOV     #3,-(SP)
13902 074600  010600                            MOV     SP,R0                   ; SP,*
13903 074602  104414                            TRAP    14
13904 074604  062706  000010                    ADD     #10,SP
13905 074610  005202                  27$:      INC     R2                      ; ARRAY                         7010
13906 074612  020227  000017                    CMP     R2,#17                  ; ARRAY,*
13907 074616  003754                            BLE     26$
13908 074620  062706  000024          28$:      ADD     #24,SP                  ;                               6918
13909 074624  005201                            INC     R1                      ; LUN                           6917
13910 074626  020166  000044          29$:      CMP     R1,44(SP)               ; LUN,*
13911 074632  002002                            BGE     30$
13912 074634  000137  073264                    JMP     2$
```

```
 13914                                  ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
 13915                                  ;                  END OF PASS SUMMARY                   23-Oct-1980 14:57:05    PA:<
 13916
 13917 074640  012716  006510          30$:    MOV     #CRLF,(SP)                      ;                                 7015
 13918 074644  012746  000001                  MOV     #1,-(SP)
 13919 074650  010600                          MOV     SP,R0                           ; SP,*
 13920 074652  104414                          TRAP    14
 13921 074654  062706  000042                  ADD     #42,SP                          ;                                 6904
 13922 074660  062706  000006          31$:    ADD     #6,SP                           ;                                 6854
 13923 074664  000207                          RTS     PC
 13924
 13925                                  ; Routine Size:  459 words
 13926                                  ; Maximum stack depth per invocation:  39 words
 13931
 13932
```

```
13934 ;MLX4                                                    23-Oct-1980 15:01:43    TOPS-20 Bliss-16 V2(206)
13935 ;                 CLEANUP CODING SECTION                 23-Oct-1980 14:57:05    PA:<ROSEN>MLX4.BLI.1 (55)
13936
13937 ;          7021   %SBTTL  'CLEANUP CODING SECTION'
13938 ;          7022
13939 ;          7023   BGNCLN;
13940 ;          7024
13941 ;          7025   !+
13942 ;          7026   ! THE CLEANUP CODING SECTION IS EXECUTED AFTER
13943 ;          7027   ! EACH PASS THROUGH THE EXERCISER.
13944 ;          7028   !-
13945 ;          7029
13946 ;          7030
13947 ;          7031   EOP_COUNT = .EOP_COUNT + 1;
13948 ;          7032
13949 ;          7033   IF .EOP_COUNT EQL 1
13950 ;          7034   THEN    PRINTB(SAY3,WRD3,PHR2,WRD4)
13951 ;          7035             !'END QUICK VERIFY PASS'
13952 ;          7036   ELSE    PRINTB(FMT3,WRD3,WRD4,.EOP_COUNT);
13953 ;          7037             !'** END PASS XX **'
13954 ;          7038   EOP();
13955 ;          7039
13956 ;          7040   RETURN;
13957 ;          7041
13958 ;          7042   ENDCLN;
13962
13963                                  .SBTTL  LCLEAN CLEANUP CODING SECTION
13967 074666  005237  030722          LCLEAN: INC     EOP.COUNT                       ;                       7031
13968 074672  023727  030722  000001          CMP     EOP.COUNT,#1                    ;                       7033
13969 074700  001015                          BNE     1$
13970 074702  012746  006634                  MOV     #WRD4,-(SP)                     ;                       7034
13971 074706  012746  007352                  MOV     #PHR2,-(SP)
13972 074712  012746  006630                  MOV     #WRD3,-(SP)
13973 074716  012746  006534                  MOV     #SAY3,-(SP)
13974 074722  012746  000004                  MOV     #4,-(SP)
13975 074726  010600                          MOV     SP,R0                           ; SP,*
13976 074730  104414                          TRAP    14
13977 074732  000414                          BR      2$                              ;                       7033
13978 074734  013746  030722          1$:     MOV     EOP.COUNT,-(SP)                 ;                       7036
13979 074740  012746  006634                  MOV     #WRD4,-(SP)
13980 074744  012746  006630                  MOV     #WRD3,-(SP)
13981 074750  012746  005610                  MOV     #FMT3,-(SP)
13982 074754  012746  000004                  MOV     #4,-(SP)
13983 074760  010600                          MOV     SP,R0                           ; SP,*
13984 074762  104414                          TRAP    14
13985 074764  004737  073040          2$:     JSR     PC,EOP                          ;                       7038
13986 074770  062706  000012                  ADD     #12,SP                          ;                       7020
13987 074774  000207                          RTS     PC
13988
```

```
                                ;MLX4                                                    23-Oct-1980 15:01:43    TOPS
                                ;                CLEANUP CODING SECTION                  23-Oct-1980 14:57:05    PA:<

                                ; Routine Size:  36 words
                                ; Maximum stack depth per invocation:  5 words

                                        .SBTTL  L$CLEAN CLEANUP CODING SECTION
074776                          L$CLEAN::
074776  004737  074666                JSR     PC,LCLEAN                       ;       7040
075002  104412                        TRAP    12
075004  000207                        RTS     PC

                                ; Routine Size:  4 words
                                ; Maximum stack depth per invocation:  0 words

;          7043
;          7044  LASTAD;
;          7045  BGNSETUP (0);
;          7046  ENDSETUP;
075006  075012                  BL$LAS::.WORD   T$FREE
075010  000000                          .WORD   <<T$FREE-<BL$LAS+4>>/2>
075012  000000                  T$FREE::.WORD   0

075012                          L$LAST==            BL$LAS+4
000000                          T$PTHV==            0

                                        .SBTTL  $END.LINK CLEANUP CODING SECTION
075014                          $END.LINK::
075014  000207                        RTS     PC                              ;       7042
```

```
                                ;MLX4                                   23-Oct-1980 15:01:43    TOPS
                                ;               CLEANUP CODING SECTION  23-Oct-1980 14:57:05    PA:<


                                ; Routine Size:  1 word
                                ; Maximum stack depth per invocation:  0 words


;          7047  END
;          7048
;          7049  ELUDOM

                                ; OTS external references
                                        .GLOBL  BL$GT2, $SAVE5, $SAVE4, $SAVE3
                                        .GLOBL  $SAVE2, BL$PU2, BL$SHF, BL$DIV
                                        .GLOBL  BL$MOD, BL$MUL









                                ;          7050
                                ;          7051
                                ; Size:          8779 code + 5384 data words
                                ; Run Time:      01:54.5
                                ; Elapsed Time: 09:06.0
                                ; Memory Used:  150 pages
                                ; Compilation Complete

        000001                          .END
```

SYMBOL TABLE

SEQ 0315

```
ADR   = 000020 G      C$AUTO= 000061      DOUBLE  041226        F$INIT= 000006      I$MSG = 000041
ASSEMB= 000010        C$BRK = 000022      DRIVE.  032460 G      F$JMP = 000050      I$PROT= 000040
BANK    032362        C$BSEG= 000004      DROPNE  002234 G      F$MOD = 000000      I$PTAB= 000041
BASE.A  030724        C$BSUB= 000002      DROPT.  032462 G      F$MSG = 000011      I$PWR = 000041
BIT0  = 000001 G      C$CEFG= 000045      DROP1   002236 G      F$PROT= 000021      I$RPT = 000041
BIT00 = 000001 G      C$CLCK= 000062      DROP2   002240 G      F$PWR = 000017      I$SEG = 000041
BIT01 = 000002 G      C$CLEA= 000012      DROP3   002242 G      F$RPT = 000012      I$SETU= 000041
BIT02 = 000004 G      C$CLOS= 000035      DROP4   002244 G      F$SEG = 000003      I$SFT = 000041
BIT03 = 000010 G      C$CLP1= 000006      DROP5   002250 G      F$SOFT= 000005      I$SRV = 000041
BIT04 = 000020 G      C$CVEC= 000036      ECCDIS  002254 G      F$SRV = 000010      I$SUB = 000041
BIT05 = 000040 G      C$DCLN= 000044      EF.CON= 000036 G      F$SUB = 000002      I$TST = 000041
BIT06 = 000100 G      C$DODU= 000051      EF.NEW= 000035 G      F$SW  = 000014      I.AM.D  032354
BIT07 = 000200 G      C$DRPT= 000024      EF.PWR= 000034 G      F$TEST= 000001      J$JMP = 000167
BIT08 = 000400 G      C$DU  = 000053      EF.RES= 000037 G      GEN1    036014      LAU     005536
BIT09 = 001000 G      C$EDIT= 000003      EF.STA= 000040 G      GEN2    036522      LAUTO   005372
BIT1  = 000002 G      C$ERDF= 000055      END.RB= 030706        GEN3    036556      LCLEAN  074666
BIT10 = 002000 G      C$ERHR= 000056      END.WB= 020706        GEN4    036654      LDU     005404
BIT11 = 004000 G      C$ERRO= 000060      EOP     073040 G      GEN5    036710      LIMIT   002222 G
BIT12 = 010000 G      C$ERSF= 000054      EOPSUM  002256 G      GETCNT  036176      LINIT   035556
BIT13 = 020000 G      C$ERSO= 000057      EOP.CO  030722        GET.WR  044034      LOE   = 040000 G
BIT14 = 040000 G      C$ESCA= 000010      ERRBLK  002200 G      G$CNTO= 000200      LOT   = 000010 G
BIT15 = 100000 G      C$ESEG= 000005      ERRMSG  002176 G      G$DELM= 000372      LOW.SE  032476 G
BIT2  = 000004 G      C$ESUB= 000003      ERRNBR  002174 G      G$DISP= 000003      LRPT    005354
BIT3  = 000010 G      C$ETST= 000001      ERROUT  002260 G      G$EXCP= 000400      LSECT   002226 G
BIT4  = 000020 G      C$EXIT= 000032      ERRTYP  002172 G      G$HILI= 000002      L$ACP   002110 G
BIT5  = 000040 G      C$GETB= 000026      EVL   = 000004 G      G$LOLI= 000001      L$APT   002036 G
BIT6  = 000100 G      C$GETW= 000027      E$END = 002100        G$NO  = 000000      L$AU    005540 G
BIT7  = 000200 G      C$GMAN= 000043      E$LOAD= 000035        G$OFFS= 000400      L$AUT   002070 G
BIT8  = 000400 G      C$GPHR= 000042      FILLER  036356        G$OFSI= 000376      L$AUTO  005374 G
BIT9  = 001000 G      C$GPLO= 000030      FMT1A = 005550        G$PRMA= 000001      L$CCP   002106 G
BL$DIV  005056 G      C$GPRI= 000040      FMT1B = 005564        G$PRMD= 000002      L$CLEA  074776 G
BL$GT1  004122 G      C$INIT= 000011      FMT10A= 006206        G$PRML= 000000      L$CO    002032 G
BL$GT2  004244 G      C$INLP= 000020      FMT10B= 006262        G$RADA= 000140      L$DEPO  002011 G
BL$LAS  075006 G      C$MANI= 000050      FMT11 = 006276        G$RADB= 000000      L$DESC  002130 G
BL$MOD  005070 G      C$MEM = 000031      FMT12A= 006332        G$RADD= 000040      L$DESP  002076 G
BL$MUL  004632 G      C$MSG = 000023      FMT12B= 006400        G$RADL= 000120      L$DEVP  002060 G
BL$PU1  004406 G      C$OPEN= 000034      FMT13 = 006446        G$RADO= 000020      L$DISP  002204 G
BL$PU2  004502 G      C$PNTB= 000014      FMT14 = 006470        G$XFER= 000004      L$DLY   002116 G
BL$SHF  005102 G      C$PNTF= 000017      FMT15 = 006502        G$YES = 000010      L$DTP   002040 G
BOARD   032360        C$PNTS= 000016      FMT2  = 005602        HARDS   031332      L$DTYP  002034 G
BOE   = 000400 G      C$PNTX= 000015      FMT3  = 005610        HELP  = 000000      L$DU    005526 G
BR.LEV  030730        C$QIO = 000377      FMT4A = 005640        HOE   = 100000 G    L$DUT   002072 G
CAUSE1= 010102        C$RDBU= 000007      FMT4B = 005674        IBE   = 010000 G    L$DVTY  002122 G
CAUSE2= 010124        C$REFG= 000047      FMT4C = 005712        IDU   = 000040 G    L$EF    002052 G
CAUSE3= 010150        C$RESE= 000033      FMT5  = 005742        IER   = 020000 G    L$ENVI  002044 G
CAUSE4= 010224        C$REVI= 000003      FMT6  = 006020        INIT.A  033120      L$ERRT  002172 G
CAUSE5= 010300        C$RFLA= 000021      FMT7  = 006070        INTEGR  044070      L$ETP   002102 G
CAUSE6= 010332        C$RPT = 000025      FMT8  = 006110        ISOLAT  035212      L$EXP1  002046 G
CAUSE7= 010356        C$SEFG= 000046      FMT9  = 006156        ISR   = 000100 G    L$EXP4  002064 G
CAUSE8= 010400        C$SPRI= 000041      F$AU  = 000015        IXE   = 004000 G    L$EXP5  002066 G
CHECK   042622        C$SVEC= 000037      F$AUTO= 000020        I$AU  = 000041      L$HARD  002264 G
CHOOSE  043010        C$TPRI= 000013      F$BGN = 000040        I$AUTO= 000041      L$HIME  002120 G
CLKTBL  032572        DATA.C  030716      F$CLEA= 000007        I$CLN = 000041      L$HPCP  002016 G
COMP.C  030720        DECODE  035106      F$DU  = 000016        I$DU  = 000041      L$HPTP  002022 G
CONFIG  033714        DFPTBL  002210 G    F$END = 000041        I$HRD = 000041      L$HW    002210 G
CRLF  = 006510        DIAGMC= 000000      F$HARD= 000004        I$INIT= 000041      L$ICP   002104 G
C$AU  = 000052        DIVMOD  004674      F$HW  = 000013        I$MOD = 000041      L$INIT  036004 G
```

```
L$LADP  002026 G        ONEFIL= 000001          P.AAI   006020          P.ACN   007164          QH4     002417
L$LAST= 075012 G        ONLY    002232 G        P.AAJ   006070          P.ACO   007172          QS1     002646
L$LOAD  002100 G        OPT1    046316          P.AAK   006110          P.ACP   007176          QS10    003513
L$LUN   002074 G        OPT2    050232          P.AAL   006156          P.ACQ   007202          QS11    003532
L$MREV  002050 G        OPT3    053560          P.AAM   006206          P.ACR   007206          QS12    003614
L$NAME  002000 G        OPT4    055472          P.AAN   006262          P.ACS   007212          QS13    003633
L$PRIO  002042 G        OPT5    072404          P.AAO   006276          P.ACT   007216          QS14    003665
L$PROT  004014 G        O$APTS= 000001          P.AAP   006332          P.ACU   007250          QS15    003717
L$PRT   002112 G        O$AU  = 000001          P.AAQ   006400          P.ACV   007256          QS16    003764
L$REPP  002062 G        O$BGNR= 000001          P.AAR   006446          P.ACW   007264          QS2     002713
L$REV   002010 G        O$BGNS= 000001          P.AAS   006470          P.ACX   007272          QS3     003000
L$RPT   005362 G        O$DU  = 000001          P.AAT   006502          P.ACY   007300          QS4     003033
L$SOFT  002440 G        O$ERRT= 000001          P.AAU   006510          P.ACZ   007306          QS5     003065
L$SPC   002056 G        O$GNSW= 000001          P.AAV   006514          P.ADA   007314          QS6     003132
L$SPCP  002020 G        O$POIN= 000001          P.AAW   006522          P.ADB   007322          QS7     003436
L$SPTP  002024 G        O$SETU= 000001          P.AAX   006534          P.ADC   007330          QS8     003455
L$STA   002030 G        PATTBL  032536 G        P.AAY   006552          P.ADD   007336          QS9     003474
L$SW    002222 G        PATTER  030714          P.AAZ   006574          P.ADE   007352          QUICK   030712
L$TEST  002114 G        PHR1  = 007336          P.ABA   006622          P.ADF   007370          RANDOM  005352 G
L$TIML  002014 G        PHR10 = 007542          P.ABB   006630          P.ADG   007412          RAND1   063116
L$UNIT  002012 G        PHR11 = 007562          P.ABC   006634          P.ADH   007426          RAND2   065022
L10000  002220          PHR12 = 007624          P.ABD   006642          P.ADI   007450          RAND3   066670
L10001  002262          PHR13 = 007662          P.ABE   006652          P.ADJ   007472          RAND4   070562
L10002  002330          PHR14 = 007710          P.ABF   006662          P.ADK   007510          RANGE   002224 G
L10003  002646          PHR15 = 007726          P.ABG   006670          P.ADL   007522          RBUFF   020706
MARPAT  002246 G        PHR16 = 007744          P.ABH   006700          P.ADM   007542          RCBUFF= 021706
MLB10 = 007114          PHR17 = 007764          P.ABI   006706          P.ADN   007562          RDBUFF= 020706
MLB11 = 007122          PHR18 = 010010          P.ABJ   006714          P.ADO   007624          RD.COU  032340
MLB12 = 007126          PHR19 = 010032          P.ABK   006722          P.ADP   007662          RD.MIL  032344
MLB13 = 007132          PHR2  = 007352          P.ABL   006734          P.ADQ   007710          RD.THO  032342
MLB14 = 007136          PHR20 = 010052          P.ABM   006744          P.ADR   007726          READ    042434
MLB15 = 007142          PHR3  = 007370          P.ABN   006754          P.ADS   007744          REFRES  002252 G
MLB16 = 007146          PHR4  = 007412          P.ABO   006760          P.ADT   007764          RETRY   043046
MLB17 = 007152          PHR5  = 007426          P.ABP   006766          P.ADU   010010          RETRYI  032356
MLB18 = 007156          PHR6  = 007450          P.ABQ   006776          P.ADV   010032          RE2     005250
MLB19 = 007164          PHR7  = 007472          P.ABR   007012          P.ADW   010052          RE3     005246
MLB2  = 007052          PHR8  = 007510          P.ABS   007022          P.ADX   010066          RE4     005244
MLB20 = 007172          PHR9  = 007522          P.ABT   007034          P.ADY   010070          RN      005256 G
MLB21 = 007176          PNT   = 001000 G        P.ABU   007040          P.ADZ   010072          RNDSEC  062614
MLB22 = 007202          PRI   = 002000 G        P.ABV   007046          P.AEA   010076          RNDU    062714
MLB23 = 007206          PRI00 = 000000 G        P.ABW   007052          P.AEB   010102          RNDWC   062560
MLB24 = 007212          PRI01 = 000040 G        P.ABX   007056          P.AEC   010124          RPTR    030710
MLB3  = 007056          PRI02 = 000100 G        P.ABY   007062          P.AED   010150          RTN0  = 007216
MLB4  = 007062          PRI03 = 000140 G        P.ABZ   007066          P.AEE   010224          RTN1  = 007250
MLB5  = 007066          PRI04 = 000200 G        P.ACA   007072          P.AEF   010300          RTN2  = 007256
MLB6  = 007072          PRI05 = 000240 G        P.ACB   007076          P.AEG   010332          RTN3  = 007264
MLB7  = 007076          PRI06 = 000300 G        P.ACC   007102          P.AEH   010356          RTN4  = 007272
MLB8  = 007102          PRI07 = 000340 G        P.ACD   007106          P.AEI   010400          RTN5  = 007300
MLB9  = 007106          PTABLE  032440 G        P.ACE   007114          P.AEJ   010424          RTN5A = 007306
ML.REG  032364 G        P.AAA   005550          P.ACF   007122          P.AEK   010512          RTN5B = 007314
MSG0  = 010424          P.AAB   005564          P.ACG   007126          P.AEL   010542          RTN5C = 007322
MSG1  = 010512          P.AAC   005602          P.ACH   007132          P.AEM   010610          RTN5D = 007330
MSG2  = 010542          P.AAD   005610          P.ACI   007136          P.AEN   010624          SAYWHO  033436
MSG3  = 010610          P.AAE   005640          P.ACJ   007142          P.AEO   010640          SAY1  = 006514
MSG4  = 010624          P.AAF   005674          P.ACK   007146          QH1     002330          SAY2  = 006522
MSG5  = 010640          P.AAG   005712          P.ACL   007152          QH2     002345          SAY3  = 006534
NUM.DR  032474 G        P.AAH   005742          P.ACM   007156          QH3     002367          SAY4  = 006552
```

```
MLX4    MACRO M1113  24-OCT-80 09:59  PAGE 359-3                                                    SEQ 0317
SYMBOL TABLE

SAY5  = 006574          TRT11 = 010076          T$TEMP= 000000          WC.MIL  032352          WRD38 = 007034
SEED1   005344 G        TSECT   002230 G        T$TEST= 000000          WC.THO  032350          WRD4  = 006634
SEED2   005346 G        T$ARGC= 000002          T$TSTM= 177777          WDBUFF= 010706          WRD40 = 007040
SEED3   005350 G        T$CODE= 017130          T$TSTS= 000000          WHY.DR  032464 G        WRD41 = 007046
SELPAT  036156          T$ERRN= 000000          T$$HAR= 010002          WPTR    030706          WRD6  = 006642
SERVIC  032562 G        T$EXCP= 000000          T$$HW = 010000          WRD11 = 006662          WRD7  = 006652
SET.PT  043770          T$FREE  075012 G        T$$PRO= 010004          WRD15 = 006670          WRITE   042246
SFPTBL  002222 G        T$GMAN= 000000          T$$SOF= 010003          WRD16 = 006700          WR.COU  032332
SOFTS   030732          T$HILI= 000012          T$$SW = 010001          WRD17 = 006706          WR.MIL  032336
START.  041324          T$LAST= 000000          T1      073024 G        WRD18 = 006714          WR.THO  032334
SVCGBL= 000001          T$LOLI= 000001          UAM   = 000200 G        WRD19 = 006722          X$ALWA= 000000
SVCINS= 000001          T$LSYM= 010000          UP.HAR  035302          WRD2  = 006622          X$FALS= 000040
SVCSUB= 000001          T$NEST= 177777          UP.RD.  042062          WRD20 = 006734          X$OFFS= 000400
SVCTAG= 000001          T$NS0 = 000000          UP.SOF  035430          WRD21 = 006744          X$TRUE= 000020
SVCTST= 000001          T$NS1 = 000021          UP.WC.  042154          WRD24 = 006754          $END.L  075014 G
SYSERR  037000          T$PTHV= 000000 G        UP.WR.  041770          WRD25 = 006760          $PATCH  004022 G
S$LSYM= 010000          T$PTNU= 000000          VEC     030726          WRD3  = 006630          $SAVE2  005150 G
TOP.SE  032516 G        T$SAVL= 177777          WAITER  041320          WRD34 = 006766          $SAVE3  005164 G
TRIES   031732          T$SEGL= 177777          WBUFF   010706          WRD35 = 006776          $SAVE4  005202 G
TRT00 = 010066          T$SUBN= 000000          WCBUFF= 011706          WRD36 = 007012          $SAVE5  005222 G
TRT01 = 010070          T$TAGL= 177777          WC.COU  032346          WRD37 = 007022          $T1     072650
TRT10 = 010072          T$TAGN= 010005

. ABS.  075016     000
        000000     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  31277 WORDS  ( 123 PAGES)
DYNAMIC MEMORY:  21558 WORDS  ( 82 PAGES)
ELAPSED TIME:  00:16:12
ML11X.BIN/EN:AMA,CZMLBA/CR/-SP=SVC/ML,ONEFILEX,MLX1,MLX2,OTS,RANDOM,MLX3,MLX4
```

CZMLBA CREATED BY MACRO ON 24-OCT-80 AT 10:07 PAGE 1
SYMBOL CROSS REFERENCE CREF V01 SEQ 0318

SYMBOL	VALUE		REFERENCES								
ADR	= 000020	G	#120-1727								
ASSEMB	= 000010		38-13	38-13							
BANK	032362		#119-1642	*142-2840	*143-2853	144-2904	205-5774	*205-5786			
BASE.A	030724		#118-1607	*129-2176	130-2225	141-2774					
BIT0	= 000001	G	#120-1711								
BIT00	= 000001	G	#120-1701								
BIT01	= 000002	G	#120-1700								
BIT02	= 000004	G	#120-1699								
BIT03	= 000010	G	#120-1698								
BIT04	= 000020	G	#120-1697								
BIT05	= 000040	G	#120-1696								
BIT06	= 000100	G	#120-1695								
BIT07	= 000200	G	#120-1694								
BIT08	= 000400	G	#120-1693								
BIT09	= 001000	G	#120-1692								
BIT1	= 000002	G	#120-1710								
BIT10	= 002000	G	#120-1691								
BIT11	= 004000	G	#120-1690								
BIT12	= 010000	G	#120-1689								
BIT13	= 020000	G	#120-1688								
BIT14	= 040000	G	#120-1687								
BIT15	= 100000	G	#120-1686								
BIT2	= 000004	G	#120-1709								
BIT3	= 000010	G	#120-1708								
BIT4	= 000020	G	#120-1707								
BIT5	= 000040	G	#120-1706								
BIT6	= 000100	G	#120-1705								
BIT7	= 000200	G	#120-1704								
BIT8	= 000400	G	#120-1703								
BIT9	= 001000	G	#120-1702								
BL$DIV	005056	G	#72-1175	233-7240	248-8065	253-8331	264-8926	307-11286	313-11632	324-12229	324-12243
			335-12827	359-14067							
BL$G11	004122	G	#48-170								
BL$GT2	004244	G	#53-386	214-6242	227-6943	243-7783	249-8094	258-8632	276-9577	296-10682	302-10996
			313-11612	324-12215	342-13217	351-13682	359-14066				
BL$LAS	075006	G	#358-14030	358-14031	358-14035						
BL$MOD	005070	G	#73-1206	159-3637	292-10502	294-10583	296-10667	296-10691	359-14068		
BL$MUL	004632	G	#69-1027	138-2648	359-14068						
BL$PU1	004406	G	#58-595								
BL$PU2	004502	G	#64-833	83-198	83-209	85-311	126-2050	126-2057	151-3200	151-3209	159-3633
			359-14067								
BL$SHF	005102	G	48-182	48-185	48-189	48-193	49-218	54-408	54-411	54-415	54-419
			54-440	58-598	58-602	58-608	59-635	64-842	64-846	64-852	65-884
			#74-1241	129-2181	359-14067						
BOARD	032360		#119-1641	*143-2858	144-2905	205-5773	205-5782	*205-5785	219-6478	219-6495	221-6622
			221-6639	232-7210	233-7231	248-8039	248-8056	252-8296	253-8317	263-8896	263-8913
			281-9859	281-9876	286-10138	286-10155	291-10418	291-10435	306-11256	307-11277	318-11886
			318-11903	329-12492	329-12509	339-13072	339-13089				
BOE	= 000400	G	#121-1735								
BR.LEV	030730		#118-1610	*129-2178	129-2179						
CAUSE1	= 010102		#123-1863	137-2594	352-13700						
CAUSE2	= 010124		#123-1864	138-2621	352-13708						

CZMLBA CREATED BY MACRO ON 24-OCT-80 AT 10:07 PAGE 2
SYMBOL CROSS REFERENCE CREF V01 SEQ 0319

SYMBOL	VALUE	REFERENCES
CAUSE3	= 010150	#123-1865 139-2692 140-2723 352-13716
CAUSE4	= 010224	#123-1866 352-13724
CAUSE5	= 010300	#123-1867 352-13732
CAUSE6	= 010332	#123-1868 352-13740
CAUSE7	= 010356	#123-1869 353-13752
CAUSE8	= 010400	#123-1870 353-13760
CHECK	042622	#197-5380 199-5476 203-5664 203-5696 203-5707 219-6502 219-6507 221-6593 229-7040 245-7874 249-8131 260-8726 278-9690 283-9968 288-10248 303-11086 315-11721 326-12327 328-12459 336-12907
CHOOSE	043010	#199-5469 229-7022 244-7852 249-8112 260-8708 277-9664 282-9943 287-10222 303-11068 314-11699 325-12305 336-12889
CLRTBL	032572	#125-1996 150-3168
COMP.C	030720	#118-1603 *156-3521 159-3623
CONFIG	033714	#137-2568 151-3202
CRLF	= 006510	#121-1770 129-2188 130-2217 204-5741 204-5761 345-13342 350-13607 350-13616 356-13917
C$AU	= 000052	#38-13
C$AUTO	= 000061	#38-13
C$BRK	= 000022	#38-13
C$BSEG	= 000004	#38-13
C$BSUB	= 000002	#38-13
C$CEFG	= 000045	#38-13
C$CLCK	= 000062	#38-13
C$CLEA	= 000012	#38-13
C$CLOS	= 000035	#38-13
C$CLP1	= 000006	#38-13
C$CVEC	= 000036	#38-13
C$DCLN	= 000044	#38-13
C$DODU	= 000051	#38-13
C$DRPT	= 000024	#38-13
C$DU	= 000053	#38-13
C$EDIT	= 000003	#38-13 38-65
C$ERDF	= 000055	#38-13
C$ERHR	= 000056	#38-13
C$ERRO	= 000060	#38-13
C$ERSF	= 000054	#38-13
C$ERSO	= 000057	#38-13
C$ESCA	= 000010	#38-13
C$ESEG	= 000005	#38-13
C$ESUB	= 000003	#38-13
C$ETST	= 000001	#38-13
C$EXIT	= 000032	#38-13
C$GETB	= 000026	#38-13
C$GETW	= 000027	#38-13
C$GMAN	= 000043	#38-13
C$GPHR	= 000042	#38-13
C$GPLO	= 000030	#38-13
C$GPRI	= 000040	#38-13
C$INIT	= 000011	#38-13
C$INLP	= 000020	#38-13
C$MANI	= 000050	#38-13
C$MEM	= 000031	#38-13
C$MSG	= 000023	#38-13

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SYMBOL  VALUE              REFERENCES
C$OPEN  = 000034           #38-13
C$PNTB  = 000014           #38-13
C$PNTF  = 000017           #38-13
C$PNTS  = 000016           #38-13
C$PNTX  = 000015           #38-13
C$QIO   = 000377           #38-13
C$RDBU  = 000007           #38-13
C$REFG  = 000047           #38-13
C$RESE  = 000033           #38-13      #38-13
C$REVI  = 000003           #38-13       38-65
C$RFLA  = 000021           #38-13
C$RPT   = 000025           #38-13
C$SEFG  = 000046           #38-13
C$SPRI  = 000041           #38-13
C$SVEC  = 000037           #38-13
C$TPRI  = 000013           #38-13
DATA.C    030716           #118-1601   *156-3520   159-3625
DECODE    035106           #142-2834    144-2901   205-5776
DFPTBL    002210  G        #39-117
DIAGMC  = 000000            38-13       38-13
DIVMOD    004674           #70-1096     72-1176    73-1207
DOUBLE    041226           #180-4629    216-6321   229-7049   245-7882   249-8139   260-8735   278-9699   283-9977   288-10257
                            303-11095   315-11730  326-12336  336-12916
DRIVE.    032460  G         82-176      83-192     #119-1649   126-2045   150-3177   214-6236   227-6937   243-7777   248-8084
                            258-8626    276-9571    296-10676  301-10986  313-11606  323-12205  342-13211
DROPNE    002234  G        #40-160      120-1680    126-2063
DROPT.    032462  G         82-176      83-203     #119-1652   126-2052   351-13676
DROP1     002236  G        #40-161      120-1680   *127-2069   345-13355
DROP2     002240  G        #40-162      120-1680   *127-2070   345-13358
DROP3     002242  G        #40-163      120-1681   *127-2071   345-13361
DROP4     002244  G        #40-164      120-1681   *127-2072   345-13366
DROP5     002250  G        #40-166      120-1681   *127-2073   345-13369
ECCDIS    002254  G        #40-169      120-1682    129-2183   172-4218   172-4250   173-4302   175-4391   184-4865
EF.CON  = 000036  G        #120-1714
EF.NEW  = 000035  G        #120-1715
EF.PWR  = 000034  G        #120-1716
EF.RES  = 000037  G        #120-1713
EF.STA  = 000040  G        #120-1712
END.RB  = 030706           #121-1748
END.WB  = 020706           #121-1747    206-5844
EOP       073040  G         79-32       79-40      #350-13602  357-13985
EOPSUM    002256  G        #40-188      120-1682    350-13604
EOP.CO    030722           #118-1605   *126-2022   *357-13967  357-13968  357-13978
ERRBLK    002200  G        #39-94
ERRMSG    002176  G        #39-94
ERRNBR    002174  G        #39-94
ERROUT    002260  G        #40-190      120-1682    144-2902   173-4265   177-4535   194-5201   196-5302   198-5403   202-5647
                            204-5733    204-5753    217-6414   218-6467   219-6481   219-6488   220-6562   221-6615   221-6625
                            221-6632    231-7150    232-7203   232-7213   232-7220   247-7979   247-8028   248-8042   248-8049
                            251-8236    252-8289    252-8299   252-8306   262-8836   263-8889   263-8899   263-8906   280-9799
                            281-9852    281-9862    281-9869   285-10078  286-10131  286-10141  286-10148  290-10358  291-10411
                            291-10421   291-10428   305-11196  306-11249  306-11259  306-11266  317-11826  318-11879  318-11889
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SYMBOL  VALUE            REFERENCES
                          318-11896  327-12428  328-12481  329-12495  329-12502  338-13012  339-13065  339-13075  339-13082
ERRTYP     002172  G      #39-94
EVL     = 000004  G      #120-1725
E$END   = 002100         #38-13
E$LOAD  = 000035         #38-13     38-65
FILLER     036356        #159-3615  161-3700   164-3839
FMT1A   = 005550         #121-1750  243-7755
FMT1B   = 005564         #121-1751  243-7764
FMT10A  = 006206         #121-1762  144-2909
FMT10B  = 006262         #121-1763  218-6429   220-6573   231-7161   247-7990   251-8247   262-8847   280-9810   285-10089
                          290-10369  305-11207  317-11837  328-12443  338-13023
FMT11   = 006276         #121-1764  139-2701   140-2732
FMT12A  = 006332         #121-1765  216-6334   230-7066   245-7895   250-8156   261-8752   278-9712   283-9990   288-10270
                          304-11112  315-11743  326-12349  336-12929
FMT12B  = 006400         #121-1766  216-6341   230-7073   245-7902   250-8163   261-8759   278-9719   283-9997   288-10277
                          304-11119  315-11750  326-12356  337-12940
FMT13   = 006446         #121-1767  146-2989   148-3069
FMT14   = 006470         #121-1768  350-13627  351-13637  351-13643
FMT15   = 006502         #121-1769  173-4279   173-4287   173-4295   173-4305   174-4319   174-4327   174-4354   174-4362
                          175-4374  175-4384   175-4394   175-4402   175-4410   175-4418   176-4430   176-4440   176-4448
                          176-4456  176-4464   176-4472   176-4480   177-4494   177-4502   177-4510
FMT2    = 005602         #121-1752  137-2595   138-2622   139-2693   140-2724   276-9588   277-9660   282-9939   287-10218
                          352-13701  352-13709  352-13717  352-13725  352-13733  352-13741  353-13753  353-13761  354-13816
                          354-13826  355-13865  355-13875
FMT3    = 005610         #121-1753  357-13981
FMT4A   = 005640         #121-1754  132-2329   137-2584   351-13664
FMT4B   = 005674         #121-1755  132-2343   141-2776
FMT4C   = 005712         #121-1756  132-2353
FMT5    = 005742         #121-1757  140-2744
FMT6    = 006020         #121-1758  185-4907   194-5209   196-5310   198-5411
FMT7    = 006070         #121-1759  353-13788  354-13837  355-13886
FMT8    = 006110         #121-1760  141-2770
FMT9    = 006156         #121-1761  354-13807  354-13852  355-13900
F$AU    = 000015         #38-13
F$AUTO  = 000020         #38-13
F$BGN   = 000040         #38-13     38-39      41-256     42-300     44-376     44-408
F$CLEA  = 000007         #38-13
F$DU    = 000016         #38-13
F$END   = 000041         #38-13     38-13      38-13      38-13      38-13      38-13      38-13      38-13      38-13
                          38-13     38-13      38-13      38-13      38-13      38-13      38-13      38-13      38-39
                          41-274    43-337     44-408
F$HARD  = 000004         #38-13     41-256     41-274     42-312     42-314     42-317     42-320     43-323     43-328
F$HW    = 000013         #38-13     39-117     39-134
F$INIT  = 000006         #38-13
F$JMP   = 000050         #38-13
F$MOD   = 000000         #38-13     38-39      44-408
F$MSG   = 000011         #38-13
F$PROT  = 000021         #38-13     44-376     44-382
F$PWR   = 000017         #38-13
F$RPT   = 000012         #38-13
F$SEG   = 000003         #38-13
F$SOFT  = 000005         #38-13     42-300     42-312     42-314     42-317     42-320     43-323     43-328     43-337
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SYMBOL  VALUE            REFERENCES
F$SRV   = 000010         #38-13
F$SUB   = 000002         #38-13
F$SW    = 000014         #38-13      40-143     40-192
F$TEST  = 000001         #38-13
GEN1      036014         #153-3313   228-6961
GEN2      036522         #161-3695   243-7769
GEN3      036556         #162-3763   214-6228   258-8618
GEN4      036654         #164-3834   275-9551   275-9555
GEN5      036710         #165-3895   301-10978  313-11601  323-12200  334-12800
GETCNT    036176         #156-3486   161-3696   164-3835
GET.WR    044034         #208-5893   215-6258   228-6964   243-7797   249-8108   259-8650   302-11010
G$CNTO  = 000200         #38-13
G$DELM  = 000372         #38-13
G$DISP  = 000003         #38-13
G$EXCP  = 000400         #38-13
G$HILI  = 000002         #38-13
G$LOLI  = 000001         #38-13
G$NO    = 000000         #38-13
G$OFFS  = 000400         #38-13      41-269     41-270     41-271     41-272     42-311     42-313     42-315     42-316
                          42-318     42-319     43-322     43-324     43-325     43-326     43-327     43-329     43-330
                          43-331     43-332     43-333     43-334
G$OFSI  = 000376         #38-13      41-269     41-270     41-271     41-272     42-311     42-313     42-315     42-316
                          42-318     42-319     43-322     43-324     43-325     43-326     43-327     43-329     43-330
                          43-331     43-332     43-333     43-334
G$PRMA  = 000001         #38-13      41-269     41-270
G$PRMD  = 000002         #38-13      41-271     41-272     42-315     42-316     42-318     43-322     43-329
G$PRML  = 000000         #38-13      42-311     42-313     42-319     43-324     43-325     43-326     43-327     43-330
                          43-331     43-332     43-333     43-334
G$RADA  = 000140         #38-13
G$RADB  = 000000         #38-13
G$RADD  = 000040         #38-13      42-318     43-322     43-329
G$RADL  = 000120         #38-13      42-311     42-313     42-319     43-324     43-325     43-326     43-327     43-330
                          43-331     43-332     43-333     43-334
G$RADO  = 000020         #38-13      41-269     41-270     41-271     41-272     42-315     42-316
G$XFER  = 000004         #38-13      42-312     42-314     42-317     42-320     43-323     43-328
G$YES   = 000010         #38-13      41-269     41-270     41-271     41-272     42-311     42-313     42-315     42-316
                          42-318     42-319     43-322     43-324     43-325     43-326     43-327     43-329     43-330
                          43-331     43-332     43-333     43-334
HARDS     031332         #118-1613   *126-2014  145-2971   353-13781  354-13847
HELP    = 000000         #38-4       38-8       38-30      38-48      38-67      39-103     39-119     40-145     #41-197
                          41-258     41-276     42-302     44-339     44-384     44-401     44-413
HOE     = 100000  G      #121-1742
IBE     = 010000  G      #121-1739
IDU     = 000040  G      #120-1728
IER     = 020000  G      #121-1740
INIT.A    033120         #129-2173   150-3188
INTEGR    044070         #214-6217   345-13353
ISOLAT    035212         #144-2900   217-6401   217-6413   220-6550   220-6561   231-7136   231-7149   246-7962   246-7974
                          251-8223   251-8235   262-8822   262-8835   279-9782   280-9798   284-10060  285-10077  289-10340
                          290-10357  305-11182  305-11195  316-11809  317-11825  327-12415  327-12427  338-12999  338-13011
ISR     = 000100  G      #121-1733
IXE     = 004000  G      #121-1738
```

```
SYMBOL  VALUE            REFERENCES
I$AU    = 000041         #38-13
I$AUTO  = 000041         #38-13
I$CLN   = 000041         #38-13
I$DU    = 000041         #38-13
I$HRD   = 000041         #41-256    #41-274
I$INIT  = 000041         #38-13
I$MOD   = 000041         #38-13      38-39     #38-39      44-408    #44-408
I$MSG   = 000041         #38-13
I$PROT  = 000040         #38-13     #44-376
I$PTAB  = 000041         #38-13
I$PWR   = 000041         #38-13
I$RPT   = 000041         #38-13
I$SEG   = 000041         #38-13
I$SETU  = 000041         #38-13
I$SFT   = 000041         #42-300    #43-337
I$SRV   = 000041         #38-13
I$SUB   = 000041         #38-13
I$TST   = 000041         #38-13
I.AM.D    032354         #119-1637  *123-1886  *185-4876   185-4882   185-4888
J$JMP   = 000167         #38-13
LAU       005536         #84-269     84-287
LAUTO     005372         #81-103     81-121
LCLEAN    074666         #357-13967  358-14010
LDU       005404         #82-184     83-232
LIMIT     002222  G      #40-153     120-1679   139-2659
LINIT     035556         #150-3160   151-3234
LOE     = 040000  G      #121-1741
LOT     = 000010  G      #120-1726
LOW.SE    032476  G      #119-1659  *126-2039  *140-2715   140-2742   215-6253   228-6956   243-7792   249-8103   259-8645
                          276-9594   293-10566  302-11005  313-11619  324-12227
LRPT      005354         #79-40      79-59
LSECT     002226  G      #40-157     120-1679  *139-2671  *139-2679   140-2713   140-2715   140-2730
L$ACP     002110  G      #38-65
L$APT     002036  G      #38-65
L$AU      005540  G       38-65     #84-287
L$AUT     002070  G      #38-65
L$AUTO    005374  G       38-65     #81-121
L$CCP     002106  G      #38-65
L$CLEA    074776  G       38-65     #358-14009
L$CO      002032  G      #38-65
L$DEPO    002011  G      #38-65
L$DESC    002130  G       38-65     #39-85
L$DESP    002076  G      #38-65
L$DEVP    002060  G      #38-65
L$DISP    002204  G       38-65     #39-101
L$DLY     002116  G      #38-65
L$DTP     002040  G      #38-65
L$DTYP    002034  G      #38-65
L$DU      005526  G       38-65     #83-232
L$DUT     002072  G      #38-65
L$DVTY    002122  G       38-65     #38-80
L$EF      002052  G      #38-65
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SYMBOL  VALUE              REFERENCES
L$ENVI     002044  G       #38-65
L$ERRT     002172  G        38-65      #39-94
L$ETP      002102  G       #38-65
L$EXP1     002046  G       #38-65
L$EXP4     002064  G       #38-65
L$EXP5     002066  G       #38-65
L$HARD     002264  G        38-65       41-256     #41-256
L$HIME     002120  G       #38-65
L$HPCP     002016  G       #38-65
L$HPTP     002022  G       #38-65
L$HW       002210  G        38-65       39-117     #39-117
L$ICP      002104  G       #38-65
L$INIT     036004  G        38-65      #151-3234
L$LADP     002026  G       #38-65
L$LAST   = 075012  G        38-65      #358-14035
L$LOAD     002100  G       #38-65
L$LUN      002074  G       #38-65       82-176     82-184     83-194     83-199     83-205     120-1679   *126-2036  *150-3172
                           *214-6246   *228-6951  *243-7787  *249-8098  *259-8640  *276-9581  *302-11000 *313-11616 *324-12219
                           *334-12808
L$MREV     002050  G       #38-65
L$NAME     002000  G       #38-65
L$PRIO     002042  G       #38-65
L$PROT     004014  G        38-65      #44-376
L$PRT      002112  G       #38-65
L$REPP     002062  G       #38-65
L$REV      002010  G       #38-65
L$RPT      005362  G        38-65      #79-59
L$SOFT     002440  G        38-65       42-300     #42-300
L$SPC      002056  G       #38-65
L$SPCP     002020  G       #38-65
L$SPTP     002024  G       #38-65
L$STA      002030  G       #38-65
L$SW       002222  G        38-65       40-143     #40-143
L$TEST     002114  G       #38-65
L$TIML     002014  G       #38-65
L$UNIT     002012  G       #38-65       120-1679   125-1997   150-3169   214-6229   227-6930   243-7770   248-8077   258-8619
                            275-9560    296-10659  296-10666  296-10669  296-10690  301-10979  313-11598  323-12197  342-13204
                            351-13647
L10000     002220           39-117      #39-134
L10001     002262           40-143      #40-192
L10002     002330           41-256      #41-274
L10003     002646           42-300      #43-337
MARPAT     002246  G       #40-165       120-1681   275-9549   275-9552
MLB10    = 007114          #122-1810     175-4425
MLB11    = 007122          #122-1811     176-4439
MLB12    = 007126          #122-1812     176-4447
MLB13    = 007132          #122-1813     176-4455
MLB14    = 007136          #122-1814     176-4463
MLB15    = 007142          #122-1815     176-4471
MLB16    = 007146          #122-1816     176-4479
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MLB18    = 007156          #122-1818     177-4501
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MLB2    = 007052       #122-1802   174-4353
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MLB21   = 007176       #122-1821   174-4318
MLB22   = 007202       #122-1822   173-4286
MLB23   = 007206       #122-1823   173-4294
MLB24   = 007212       #122-1824   174-4326
MLB3    = 007056       #122-1803   174-4361
MLB4    = 007062       #122-1804   174-4369
MLB5    = 007066       #122-1805   175-4383
MLB6    = 007072       #122-1806   173-4304   175-4393
MLB7    = 007076       #122-1807   175-4401
MLB8    = 007102       #122-1808   175-4409
MLB9    = 007106       #122-1809   175-4417
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                        137-2577   138-2610   138-2631   138-2641   140-2748   142-2834   144-2900   144-2906   145-2973
                        145-2977   147-3053   147-3057   171-4191   171-4194   171-4196   171-4198   171-4201   172-4207
                        172-4209   172-4211   172-4213   172-4216   172-4221   172-4223   172-4225   172-4227   172-4229
                        172-4231   172-4234   172-4236   172-4238   172-4241   172-4243   172-4245   172-4248   172-4253
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                        232-7190   232-7193   247-7981   247-7995   247-7996   247-8015   247-8018   251-8238   251-8252
                        251-8253   252-8276   252-8279   262-8838   262-8852   262-8853   263-8876   263-8879   280-9801
                        280-9815   280-9816   280-9835   280-9838   285-10080  285-10094  285-10095  285-10114  285-10117
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                        306-11239  317-11828  317-11842  317-11843  317-11862  317-11865  327-12430  328-12448  328-12449
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MSG1    = 010512       #123-1872   215-6281   215-6291   215-6300   216-6348   217-6374   217-6384   217-6393   219-6519
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                        282-9925   283-10005  284-10031  284-10042  284-10051  286-10180  287-10195  287-10204  288-10285
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                        305-11173  314-11673  314-11683  314-11692  315-11757  316-11782  316-11792  316-11801  325-12279
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MSG2    = 010542       #123-1873   146-2987   148-3067   217-6404   220-6553   231-7139   246-7965   251-8226   262-8825
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                        355-13864  355-13874
MSG3    = 010610       #123-1874   219-6485   219-6492   221-6629   221-6636   232-7217   232-7224   248-8046   248-8053
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MSG4    = 010624       #123-1875   218-6471   221-6619   232-7207   248-8036   252-8293   263-8893   281-9856   286-10135
                        291-10415  306-11253  318-11883  328-12485  339-13069
MSG5    = 010640       #123-1876   216-6327   229-7055   245-7888   250-8149   260-8741   278-9705   283-9983   288-10263
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OPT1	046316		#227-6921	345-13357							
OPT2	050232		#242-7728	345-13360							
OPT3	053560		#258-8608	345-13363							
OPT4	055472		#275-9541	345-13368							
OPT5	072404		#342-13195	345-13371							
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O$AU	= 000001		#38-13	#38-46	38-65						
O$BGNR	= 000001		#38-13	#38-46	38-65						
O$BGNS	= 000001		#38-13	#38-46	38-65						
O$DU	= 000001		#38-13	#38-46	38-65						
O$ERRT	= 000001		#38-13	#38-46	38-65						
O$GNSW	= 000001		#38-13	#38-46	38-65						
O$POIN	= 000001		#38-13	#38-46	38-46	38-65					
O$SETU	= 000001		#38-13	#38-46	38-65						
PATTBL	032536	G	#119-1663	156-3520	156-3521						
PATTER	030714		#118-1600	*154-3398	154-3399	*154-3401	161-3695	*242-7736	242-7747	242-7749	243-7760
			243-7768								
PHR1	= 007336		#122-1835	185-4902	198-5409	203-5667					
PHR10	= 007542		#123-1848	173-4269	174-4343						
PHR11	= 007562		#123-1849	178-4543							
PHR12	= 007624		#123-1850	350-13620							
PHR13	= 007662		#123-1851	351-13641							
PHR14	= 007710		#123-1852	139-2700	140-2729						
PHR15	= 007726		#123-1853	140-2731							
PHR16	= 007744		#123-1854	139-2698							
PHR17	= 007764		#123-1855	350-13611							
PHR18	= 010010		#123-1856	354-13836							
PHR19	= 010032		#123-1857	350-13625							
PHR2	= 007352		#122-1836	345-13347	357-13971						
PHR20	= 010052		#123-1858	350-13631							
PHR3	= 007370		#122-1837	130-2211							
PHR4	= 007412		#122-1838	141-2775							
PHR5	= 007426		#122-1839	353-13787							
PHR6	= 007450		#122-1840	355-13885							
PHR7	= 007472		#122-1841	132-2328	137-2583	351-13663					
PHR8	= 007510		#123-1846	132-2342	132-2352						
PHR9	= 007522		#123-1847	242-7750	243-7763						
PNT	= 001000	G	#121-1736								
PRI	= 002000	G	#121-1737								
PRI00	= 000000	G	#120-1724								
PRI01	= 000040	G	#120-1723								
PRI02	= 000100	G	#120-1722								
PRI03	= 000140	G	#120-1721								
PRI04	= 000200	G	#120-1720								
PRI05	= 000240	G	#120-1719								
PRI06	= 000300	G	#120-1718								
PRI07	= 000340	G	#120-1717								
PTABLE	032440	G	#119-1647	132-2324	137-2572	137-2579	*150-3184	184-4842	184-4856	342-13223	351-13652

SYMBOL	VALUE	REFERENCES (351-13659)	
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P.AAC	005602	#107-974	121-1752
P.AAD	005610	#107-976	121-1753
P.AAE	005640	#107-984	121-1754
P.AAF	005674	#107-994	121-1755
P.AAG	005712	#107-999	121-1756
P.AAH	005742	#108-1011	121-1757
P.AAI	006020	#108-1027	121-1758
P.AAJ	006070	#108-1041	121-1759
P.AAK	006110	#108-1047	121-1760
P.AAL	006156	#109-1064	121-1761
P.AAM	006206	#109-1072	121-1762
P.AAN	006262	#109-1087	121-1763
P.AAO	006276	#109-1091	121-1764
P.AAP	006332	#109-1101	121-1765
P.AAQ	006400	#110-1118	121-1766
P.AAR	006446	#110-1131	121-1767
P.AAS	006470	#110-1137	121-1768
P.AAT	006502	#110-1141	121-1769
P.AAU	006510	#110-1143	121-1770
P.AAV	006514	#110-1145	121-1771
P.AAW	006522	#110-1147	121-1772
P.AAX	006534	#110-1151	121-1773
P.AAY	006552	#110-1156	121-1774
P.AAZ	006574	#110-1162	121-1775
P.ABA	006622	#111-1174	121-1776
P.ABB	006630	#111-1176	121-1777
P.ABC	006634	#111-1178	121-1778
P.ABD	006642	#111-1180	121-1779
P.ABE	006652	#111-1183	121-1780
P.ABF	006662	#111-1186	121-1781
P.ABG	006670	#111-1188	121-1782
P.ABH	006700	#111-1191	121-1783
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P.ABK	006722	#111-1197	122-1790
P.ABL	006734	#111-1201	122-1791
P.ABM	006744	#111-1204	122-1792
P.ABN	006754	#111-1207	122-1793
P.ABO	006760	#111-1209	122-1794
P.ABP	006766	#111-1211	122-1795
P.ABQ	006776	#111-1214	122-1796
P.ABR	007012	#111-1218	122-1797
P.ABS	007022	#111-1221	122-1798
P.ABT	007034	#111-1225	122-1799
P.ABU	007040	#112-1231	122-1800
P.ABV	007046	#112-1233	122-1801
P.ABW	007052	#112-1235	122-1802
P.ABX	007056	#112-1237	122-1803
P.ABY	007062	#112-1239	122-1804

SYMBOL	VALUE	REFERENCES	
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P.ACD	007106	#112-1249	122-1809
P.ACE	007114	#112-1251	122-1810
P.ACF	007122	#112-1253	122-1811
P.ACG	007126	#112-1255	122-1812
P.ACH	007132	#112-1257	122-1813
P.ACI	007136	#112-1259	122-1814
P.ACJ	007142	#112-1261	122-1815
P.ACK	007146	#112-1263	122-1816
P.ACL	007152	#112-1265	122-1817
P.ACM	007156	#112-1267	122-1818
P.ACN	007164	#112-1269	122-1819
P.ACO	007172	#112-1271	122-1820
P.ACP	007176	#112-1273	122-1821
P.ACQ	007202	#112-1275	122-1822
P.ACR	007206	#112-1277	122-1823
P.ACS	007212	#112-1279	122-1824
P.ACT	007216	#112-1281	122-1825
P.ACU	007250	#113-1294	122-1826
P.ACV	007256	#113-1296	122-1827
P.ACW	007264	#113-1298	122-1828
P.ACX	007272	#113-1300	122-1829
P.ACY	007300	#113-1302	122-1830
P.ACZ	007306	#113-1304	122-1831
P.ADA	007314	#113-1306	122-1832
P.ADB	007322	#113-1308	122-1833
P.ADC	007330	#113-1310	122-1834
P.ADD	007336	#113-1312	122-1835
P.ADE	007352	#113-1316	122-1836
P.ADF	007370	#113-1321	122-1837
P.ADG	007412	#113-1327	122-1838
P.ADH	007426	#113-1331	122-1839
P.ADI	007450	#113-1337	122-1840
P.ADJ	007472	#114-1347	122-1841
P.ADK	007510	#114-1352	123-1846
P.ADL	007522	#114-1356	123-1847
P.ADM	007542	#114-1362	123-1848
P.ADN	007562	#114-1368	123-1849
P.ADO	007624	#114-1380	123-1850
P.ADP	007662	#114-1390	123-1851
P.ADQ	007710	#115-1402	123-1852
P.ADR	007726	#115-1407	123-1853
P.ADS	007744	#115-1412	123-1854
P.ADT	007764	#115-1418	123-1855
P.ADU	010010	#115-1425	123-1856
P.ADV	010032	#115-1431	123-1857
P.ADW	010052	#115-1437	123-1858
P.ADX	010066	#115-1441	123-1859
P.ADY	010070	#115-1442	123-1860

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P.AEB     010102           #115-1447   123-1863
P.AEC     010124           #116-1457   123-1864
P.AED     010150           #116-1464   123-1865
P.AEE     010224           #116-1479   123-1866
P.AEF     010300           #116-1494   123-1867
P.AEG     010332           #116-1503   123-1868
P.AEH     010356           #117-1514   123-1869
P.AEI     010400           #117-1520   123-1870
P.AEJ     010424           #117-1527   123-1871
P.AEK     010512           #117-1545   123-1872
P.AEL     010542           #117-1553   123-1873
P.AEM     010610           #118-1570   123-1874
P.AEN     010624           #118-1574   123-1875
P.AEO     010640           #118-1578   123-1876
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QH2       002345            41-270    #41-284
QH3       002367            41-271    #41-285
QH4       002417            41-272    #41-286
QS1       002646            42-311    #44-345
QS10      003513            43-327    #44-360
QS11      003532            43-322     43-329    #44-361
QS12      003614            43-330    #44-362
QS13      003633            43-331    #44-363
QS14      003665            43-332    #44-364
QS15      003717            43-333    #44-365
QS16      003764            43-334    #44-366
QS2       002713            42-313    #44-346
QS3       003000            42-315    #44-347
QS4       003033            42-316    #44-348
QS5       003065            42-318    #44-349
QS6       003132            42-319    #44-350
QS7       003436            43-324    #44-357
QS8       003455            43-325    #44-358
QS9       003474            43-326    #44-359
QUICK     030712           #118-1599  *150-3167  *151-3215   242-7737   248-8074   345-13340  345-13364
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RAND1     063116           #301-10969  343-13240
RAND2     065022           #312-11585  343-13242
RAND3     066670           #323-12188  343-13244
RAND4     070562           #334-12791  343-13251
RANGE     002224  G        #40-155     120-1679   139-2661
RBUFF     020706           #118-1596   121-1745   121-1746   121-1748   216-6313   216-6319   216-6360   218-6448   228-6953
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RCBUFF  = 021706           #121-1746   275-9559
RDBUFF  = 020706           #121-1745   275-9558
RD.COU    032340           #119-1625  *126-2028   189-5036  *189-5037  *189-5041
RD.MIL    032344           #119-1629  *126-2030  *189-5045  *189-5047   350-13632
RD.THO    032342           #119-1627  *126-2029  *189-5040   189-5042  *189-5044
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                            337-12961  339-13048
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                            198-5394   198-5405   *202-5641  *205-5788
RE2        005250           76-1355    #76-1385
RE3        005246           76-1363    #76-1384
RE4        005244           76-1372    #76-1383
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RNDWC      062560           #292-10498 313-11626  324-12234  334-12814
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RTN1     = 007250           #122-1826  227-6923
RTN2     = 007256           #122-1827  242-7730
RTN3     = 007264           #122-1828  258-8610
RTN4     = 007272           #122-1829  275-9543
RTN5     = 007300           #122-1830  342-13196
RTN5A    = 007306           #122-1831  301-10971
RTN5B    = 007314           #122-1832  312-11587
RTN5C    = 007322           #122-1833  323-12190
RTN5D    = 007330           #122-1834  334-12793
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SAY1     = 006514           #121-1771  173-4270   174-4344   178-4544   185-4912   216-6328   229-7056   245-7889   250-8150
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SAY2     = 006522           #121-1772  137-2590   138-2617   139-2688   140-2719   204-5737   204-5757   214-6222   227-6925
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SAY3     = 006534           #121-1773  130-2213   203-5659   203-5669   203-5679   345-13349  357-13973
SAY4     = 006552           #121-1774
SAY5     = 006574           #121-1775  130-2201
SEED1      005344  G        *77-15     77-18      #77-33     120-1682   165-3896
SEED2      005346  G        77-13      *77-20     77-27      #77-34     120-1683   165-3897
SEED3      005350  G        77-19      77-23      *77-26     #77-35     120-1683   165-3898
SELPAT     036156           #154-3398  242-7746
SERVIC     032562  G        #123-1885  130-2235
SET.PT     043770           #206-5840  228-6967   243-7800   249-8111   259-8653   302-11013  313-11629  324-12237  334-12817
SFPTBL     002222  G        #40-143
SOFTS      030732           #118-1612  *126-2013  147-3051   353-13780  353-13798
START.     041324           #184-4837  194-5190   196-5291   198-5392
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SVCINS  = 000001           #38-13     #38-19      38-65      38-65      38-65      38-65      38-65      38-65      38-65
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SVCSUB  = 000001           #38-13     #38-21
SVCTAG  = 000001           #38-13     #38-23      39-134     40-192     41-274     43-337
SVCTST  = 000001           #38-13     #38-20
SYSERR    037000           #171-4184   185-4918
S$LSYM  = 010000           #38-13     #39-134    #40-192    #41-274    #43-337
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TRIES     031732           #118-1614  *126-2015  *205-5784   353-13782  355-13896
TRT00   = 010066           #123-1859   140-2752
TRT01   = 010070           #123-1860   140-2756
TRT10   = 010072           #123-1861   140-2760
TRT11   = 010076           #123-1862   140-2764
TSECT     002230  G        #40-158     120-1680  *139-2672  *139-2673  *139-2680  *139-2681   139-2682   139-2684   139-2699
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T$ERRN  = 000000           #38-13
T$EXCP  = 000000           #41-269     41-269    #41-270     41-270    #41-271     41-271     #41-272     41-272    #42-315
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T$FREE    075012  G         358-14030  358-14031 #358-14032
T$GMAN  = 000000           #38-13
T$HILI  = 000012           #41-269     41-269    #41-270     41-270    #41-271     41-271     #41-272     41-272    #42-315
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T$LAST  = 000000           #38-13
T$LOLI  = 000001           #41-269     41-269    #41-270     41-270    #41-271     41-271     #41-272     41-272    #42-315
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T$NS0   = 000000           #38-39    44-408
T$NS1   = 000021           #39-117   39-134    #40-143   40-192    #41-256   41-274    #42-300   42-312    42-314
                           42-317    42-320    43-323    43-328    43-337    #44-376   44-382
T$PTHV  = 000000   G       38-65     #358-14036
T$PTNU  = 000000           #38-13
T$SAVL  = 177777           #38-13
T$SEGL  = 177777           #38-13
T$SUBN  = 000000           #38-13
T$TAGL  = 17777?           #38-13
T$TAGN  = 010005           #38-13    39-117    39-117    #39-117   40-143    40-143    #40-143   41-256    41-256
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T$TEMP  = 000000           #39-101   39-101    39-101    #39-101   #39-134   39-134    #40-192   40-192    #41-269
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T$TEST  = 000000           #38-13
T$TSTM  = 177777           #38-13
T$TSTS  = 000000           #38-13
T$$HAR  = 010002           #41-256   41-256    41-274
T$$HW   = 010000           #39-117   39-117    39-134
T$$PRO  = 010004           #44-376
T$$SOF  = 010003           #42-300   42-300    43-337
T$$SW   = 010001           #40-143   40-143    40-192
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UP.RD.    042062           #189-5033 196-5296
UP.SOF    035430           #147-3043 219-6496  221-6640  233-7232  248-8057  253-8318  263-8914  281-9877  286-10156
                           291-10436 307-11278 318-11904 329-12510 339-13090
UP.WC.    042154           #191-5096 198-5397
UP.WR.    041770           #187-4970 194-5195
VEC       030726           #118-1609 *129-2177 130-2236
WAITER    041320           #181-4688 184-4850  185-4884
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                        324-12220  334-12809
WCBUFF  = 011706       #121-1744   275-9554   275-9557
WC.COU    032346       #119-1631  *126-2031   191-5099  *191-5100  *191-5104
WC.MIL    032352       #119-1635  *126-2033  *191-5108  *191-5110   351-13642
WC.THO    032350       #119-1633  *126-2032  *191-5103   191-5105  *191-5107
WDBUFF  = 010706       #121-1743   275-9550   275-9556
WHY.DR    032464   G   #119-1655  *126-2058  *138-2603  *138-2626  *139-2705  *140-2736  *215-6278  *215-6288  *215-6302
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                       *339-13092
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WRD15   = 006670       #121-1782   144-2907   185-4904   194-5206   196-5307   198-5408
WRD16   = 006700       #121-1783   185-4896   194-5207   203-5657
WRD17   = 006706       #121-1784   185-4899   196-5308   203-5677
WRD18   = 006714       #121-1785   202-5652   203-5666   203-5676   204-5736   204-5756
WRD19   = 006722       #122-1790   204-5735
WRD2    = 006622       #121-1776   203-5658   203-5668   203-5678   345-13348
WRD20   = 006734       #122-1791   144-2908   204-5755
WRD21   = 006744       #122-1792   137-2588   138-2615   139-2686   140-2717   351-13686
WRD24   = 006754       #122-1793   276-9587   277-9659   287-10217
WRD25   = 006760       #122-1794   282-9938
WRD3    = 006630       #121-1777   357-13972  357-13980
WRD34   = 006766       #122-1795   130-2200   214-6221   227-6924   242-7731   258-8611   275-9544   342-13197
WRD35   = 006776       #122-1796   276-9582
WRD36   = 007012       #122-1797   129-2187   130-2207
WRD37   = 007022       #122-1798   129-2185   130-2209
WRD38   = 007034       #122-1799   129-2194
WRD4    = 006634       #121-1778   345-13346  357-13970  357-13979
WRD40   = 007040       #122-1800   129-2195   130-2212
WRD41   = 007046       #122-1801   129-2192
WRD6    = 006642       #121-1779   138-2633
WRD7    = 006652       #121-1780   138-2636
WRITE     042246       #193-5178   202-5650   203-5687   203-5693   203-5702   204-5721   215-6264   215-6269   228-6972
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SYMBOL	VALUE		REFERENCES								
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			286-10162	286-10167	302-11018	302-11023	314-11656	314-11661	324-12258	325-12267	335-12842
			335-12847								
WR.COU	032332		#118-1615	*126-2025	187-4973	*187-4974	*187-4978				
WR.MIL	032336		#119-1623	*126-2027	*187-4982	*187-4984	350-13626				
WR.THO	032334		#118-1617	*126-2026	*187-4977	187-4979	*187-4981				
X$ALWA	= 000000		#38-13	42-317	43-323						
X$FALS	= 000040		#38-13	42-312	42-314						
X$OFFS	= 000400		#38-13	42-312	42-314	42-317	42-320	43-323	43-328		
X$TRUE	= 000020		#38-13	42-320	43-328						
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$PATCH	004022	G	#44-399								
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$SAVE3	005164	G	43-170	49-218	53-386	54-440	64-833	65-884	#76-1357	293-10563	359-14066
$SAVE4	005202	G	#76-1365	125-1996	129-2174	150-3160	153-3313	184-4838	296-10658	342-13195	359-14066
$SAVE5	005222	G	70-1096	74-1274	#76-1374	131-2299	137-2568	159-3615	171-4184	180-4630	202-5640
			214-6218	227-6921	242-7728	258-8608	275-9541	301-10969	312-11585	323-12188	334-12791
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$T1	072650		#345-13340	346-13395							

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BGNPRO            44-376
BGNSFT           #42-300
BGNSW            #40-143
DESCRI           #39-85
DEVTYP           #38-80
DISPAT            39-101
ENDHRD           #41-274
ENDHW             39-134
ENDMOD            44-408
ENDPRO           #44-382
ENDSFT            43-337
ENDSW             40-192
ERRTBL            39-94
GPRMA            #41-269   #41-270
GPRMD             41-271    41-272    42-315    42-316    42-318    43-322    43-329
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                 #43-333   #43-334
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                 #43-334   #43-334
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	#43-334	#43-334								
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SVC	#38-12	38-13								
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XFERF	42-312	42-314								
XFERT	#42-320	#43-328								