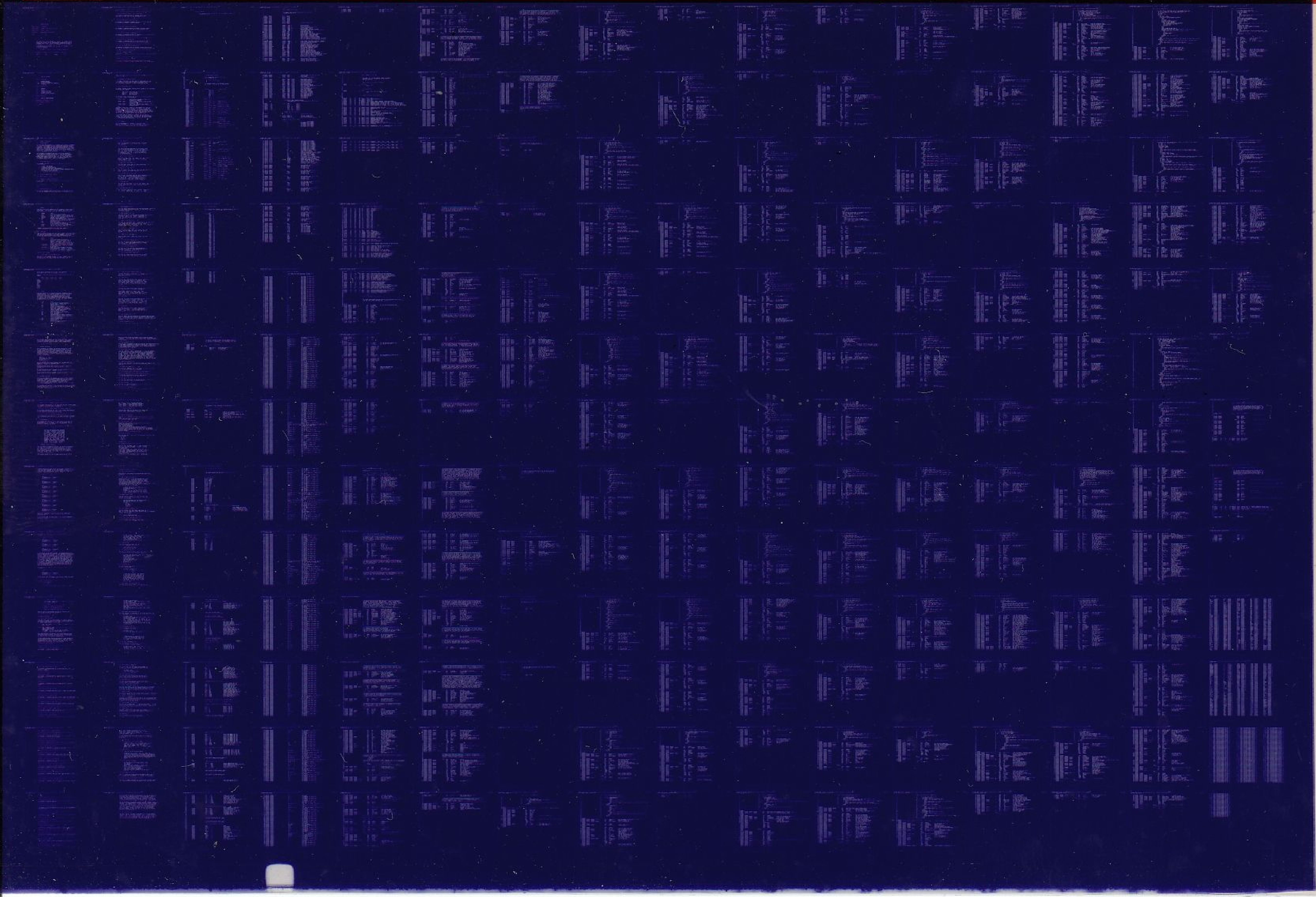
RP07

FE/HOST ISOLATOR
CZRJMAO

AH-F961A-MC
FICHE 1 OF 2

MAY 1983



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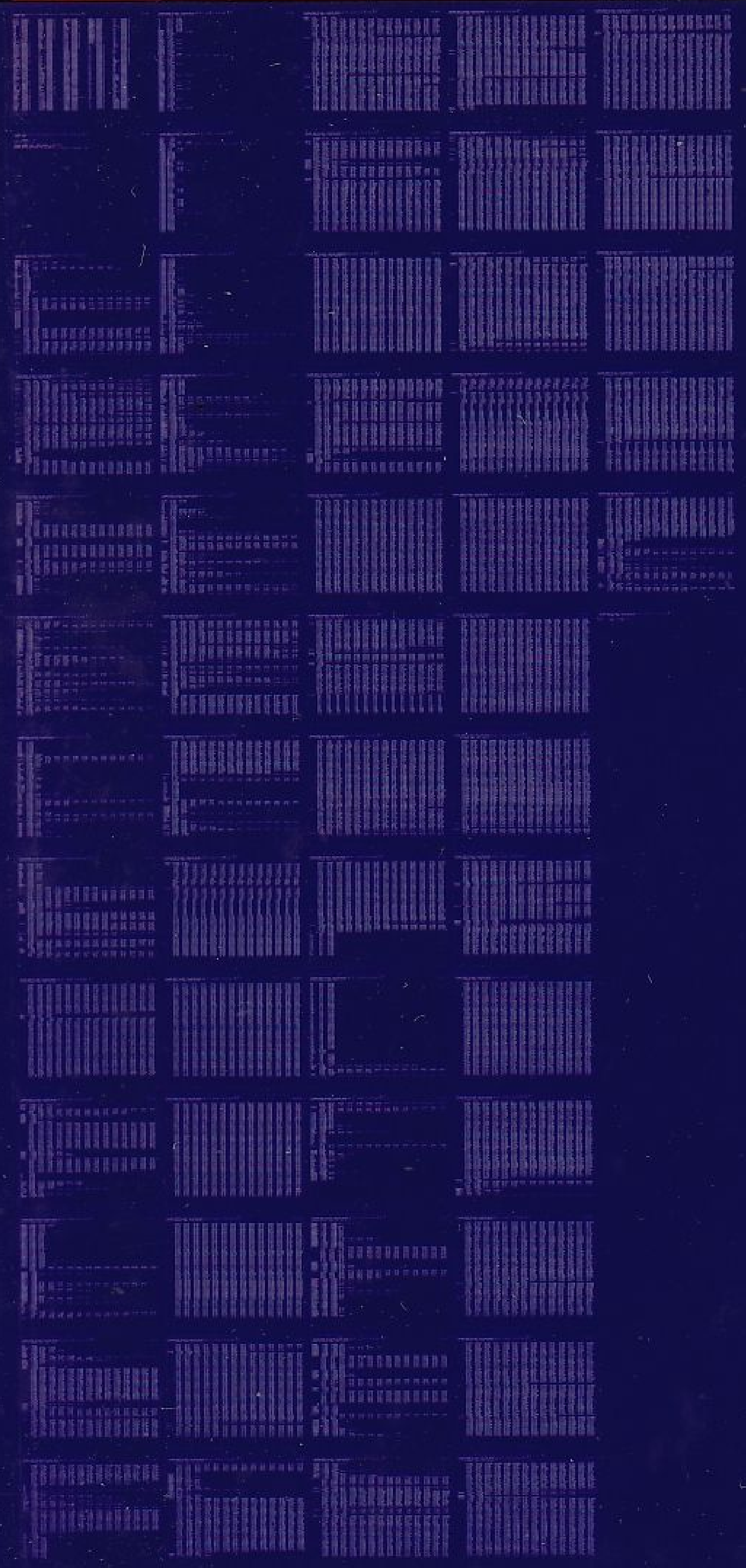

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                        IDENTIFICATION
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        PRODUCT CODE:   AC-F960A-MC

        PRODUCT NAME:   CZRJMAO  RP07 FE/HOST ISOLATOR

        PRODUCT DATE:   JANUARY 1, 1983

        MAINTAINER:     CX DIAGNOSTIC ENGINEERING

        AUTHOR:         MIKE LEAVITT




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                DEC             DECUS           DECTAPE
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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THE RP07 FRONT END DIAGNOSTIC IS A PROGRAM WHICH PARTIALLY AUTOMATES THE PATHFINDER DOCUMENT TO ALLOW COMPUTERIZED SEQUENTIAL DIAGNOSIS OF AN RP07. THE PROGRAM INITIALLY DEMONSTRATES HARDWARE INTEGRITY BETWEEN THE RHXX CONTROLLER, ASSOCIATED CABLING AND THE DISK CONTROL LOGIC (DCL). SATISFACTORY COMPLETION OF THIS PHASE OF TESTING THEN PERMITS "HOST" INVOCATION OF THE RP07 RESIDENT MICRODIAGNOSTICS, THOSE SPECIFICALLY ALLOWING REMOTE EXECUTION, TO ASCERTAIN A REASONABLE LEVEL OF CONFIDENCE IN THE DISK DRIVE.

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 SERVICCS IN SECTION 2 OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

THIS PROGRAM, IN ORDER TO EXECUTE, WILL REQUIRE THE FOLLOWING SYSTEM HARDWARE:

1. AN XXDP+ LOAD MEDIUM,
2. A CONSOLE KEYBOARD/PRINTER,
3. A MINIMUM OF 28K WORD OF MAIN MEMORY,
4. A PDP11 PROCESSOR AND APPROPRIATE MASSBUS CONTROLLER WHICH CONFORMS TO (DEC STD 159) AND WHICH HAS A THROUGHPUT CAPACITY OF 2.2 MBYTES /SEC OR GREATER.
5. AT LEAST ONE RP07 WITH RHXX CONTROLLER

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP+ USER'S MANUAL - CHQUS

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

ALL CPU, MEMORY, AND TERMINAL DIAGNOSTICS MUST RUN SUCCESSFULLY TO COMPLETION.

1.5 ASSUMPTIONS

NONE

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES. FOR DETAILED INFORMATION, REFER TO THE XXDP+ USER'S MANUAL (CHQUS).

2.1 COMMANDS

THERE ARE ELEVEN LEGAL COMMANDS FOR THE DIAGNOSTIC RUNTIME SERVICES (SUPERVISOR). THIS SECTION LISTS THE COMMANDS AND GIVES A VERY BRIEF DESCRIPTION OF THEM. THE XXDP+ USER'S MANUAL HAS MORE DETAILS.

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 XXDP+ MONITOR (XXDP+ OPERATION ONLY!)
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION (IF IMPLEMENTED BY THE DIAGNOSTIC - SECTION 4.0)
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)

A COMMAND CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. SO YOU MAY, FOR EXAMPLE, TYPE "STA" INSTEAD OF "START".

2.2 SWITCHES

THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION. THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS. ALL OF THE LEGAL SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH. IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY "DDDDD".

SWITCH	EFFECT
/TESTS:LIST	EXECUTE ONLY THOSE TESTS SPECIFIED IN THE LIST. LIST IS A STRING OF TEST NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10. THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO BE RUN. ALL OTHER TESTS WILL NOT BE RUN.
/PASS:DDDDD	EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS. FLAGS ARE DESCRIBED IN 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:0:5:10-12 USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-63)

EXAMPLE OF SWITCH USAGE:

```
        START/TESTS:1-5/PASS:1000/EOP:100
```

THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES AND 3) THE END OF PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY. A

SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. YOU MAY, FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".

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

	TESTS	PASS	FLAGS	EOP	UNITS
START	X	X	X	X	X
RESTART	X	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 OPERATIONAL 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 OR CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO RUNTIME SERVICES 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
PNT	PRINT TEST NUMBER AS TEST EXECUTES
BOE	"BELL" ON ERROR
UAM	UNATTENDED MODE (NO MANUAL INTERVENTION)
ISR	INHIBIT STATISTICAL REPORTS (DOES NOT APPLY TO DIAGNOSTICS WHICH DO NOT SUPPORT STATISTICAL REPORTING)
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE
LOT	LOOP ON TEST
EVL	EXECUTE EVALUATION (ON DIAGNOSTICS WHICH HAVE EVALUATION SUPPORT)

* ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1

SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS. YOU MAY SPECIFY MORE THAN ONE FLAG WITH THE FLAG 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 RUNTIME SERVICES WILL PROMPT 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 CHAPTER 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.

```
    UNIT 0
    RPCS1 ADRS (O)  176700 ?
    VECTOR ADRS (O)  254 ?
    BR LEVEL (O)  5 ?
    DRIVE # (O)  0 ?
```

THE 1ST QUESTION "RPCS1 ADRS" REQUIRES THAT THE USER INPUT THE ADDRESS OF RPCS1 OF THE CONTROLLER WHICH IS CONNECTED TO THE DRIVE UNDER TEST. DEFAULT IS 176700 (OCTAL).

THE 2ND QUESTION "VECTOR ADRS" REQUIRES THE USER TO INPUT THE INTERRUPT VECTOR ADDRESS OF THE RHXX CONTROLLER. DEFAULT IS 254 (OCTAL).

THE 3RD QUESTION "BR LEVEL" REQUIRES THE USER TO INPUT THE CONTROLLER INTERRUPT PRIORITY LEVEL. DEFAULT IS LEVEL 5.

THE 4TH QUESTION "DRIVE #" REQUIRES THE USER TO SPECIFY THE DRIVE NUMBER OF THE DRIVE TO BE TESTED. DEFAULT IS 0 (OCTAL).

2.5 SOFTWARE QUESTIONS

AFTER YOU HAVE ANSWERED THE HARDWARE QUESTIONS OR AFTER A RESTART 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).

THE FOLLOWING QUESTION ASKS IF THE USER WANTS TO EXECUTE THE MASSBUS INTERFACE SWITCH TEST. THIS IS USEFUL IF THE USER IS RUNNING MULTIPLE PASSES AND DOES NOT WISH TO SLOW DOWN TESTING IN ORDER TO 'SWITCH' THE MASSBUS INTERFACE SWITCH.

"EXECUTE TEST 25., MASSBUS INTERFACE SWITCH TEST (L) Y ?"

THE FOLLOWING QUESTION ASKS IF THE USER WANTS THE RP07 INTERNAL ERROR LOG CONTENTS. THE ERROR LOG IN THE RP07 MAY BE USEFUL AS A TROUBLESHOOTING TOOL, AND AS SUCH MAY BE OUTPUT UPON REQUEST.

"EXECUTE TEST 52., PRINT CONTENTS OF INTERNAL ERROR LOG (L) Y ?"

THE FOLLOWING QUESTION ASKS THE USER IF THE INTERNAL RP07 READ/WRITE ROUTINE SHOULD BE LIMITED ONLY TO ONE TRACK. THIS MAY BE USEFUL TO HELP ISOLATE A SELECTED HEAD/CHIP FAILURE.

"SELECT A TRACK FOR THE RP07 INTERNAL RD-WRT TESTS (L) N ?"

THE FOLLOWING QUESTION ASKED ONLY IF THE ABOVE QUESTION IS ANSWERED "YES", ALLOWS A USER TO SELECT ONE HEAD FOR THE INTERNAL READ/WRITE TESTS.

"TRACK ADDRESS (D) 0 ?"

THE FOLLOWING QUESTION ASKS IF THE USER DESIRES TO RUN ONLY ONE MICRODIAGNOSTIC. IF THE ANSWER IS YES, AND THE MANUAL MODE OF OPERATION IS ENABLED, THE USER WILL BE INTERROGATED AS TO WHICH ROUTINE TO SELECT FOR EXECUTION.

"EXECUTE TEST 60., SELECT A MICRO-DIAGNOSTIC FOR EXECUTION (L) N ?"

NOTE

ONCE THIS QUESTION HAS BEEN ANSWERED 'YES' AND THE ROUTINE HAS BEEN RUN AT LEAST ONCE, PROVIDING THAT THE USER HAS CORRECTLY INPUT A ROUTINE NUMBER WHICH IS VALID, THE SELECTED ROUTINE WILL ALWAYS RUN WHEN THE TEST IS SELECTED FOR EXECUTION. THE ONLY WAY THE USER MAY CHANGE THE ROUTINE SELECTED FOR EXECUTION IS TO HALT THE PROGRAM VIA THE CONTROL C (^C) MECHANISM AND ISSUE A NEW 'START' COMMAND. ANY OTHER METHOD OF RESUMING PROGRAM OPERATION WILL CONTINUE TO EXECUTE THE ROUTINE PREVIOUSLY ACCEPTED AS INPUT FROM THE USER.

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, THIS BECOMES TEDIOUS SINCE MOST OF THE ANSWERS ARE REPETITIOUS.

TO ILLUSTRATE A MORE EFFICIENT METHOD, SUPPOSE YOU ARE TESTING A FICTIONAL DEVICE, THE XY11. SUPPOSE THIS DEVICE CONSISTS OF

A CONTROL MODULE WITH EIGHT UNITS (SUB-DEVICES) ATTACHED TO IT. THESE UNITS ARE DESCRIBED BY THE OCTAL NUMBERS 0 THROUGH 7. THERE IS ONE HARDWARE PARAMETER THAT CAN VARY AMONG UNITS CALLED THE Q-FACTOR. THIS Q-FACTOR MAY BE 0 OR 1. BELOW IS A SIMPLE WAY TO BUILD A TABLE FOR ONE XY11 WITH EIGHT UNITS.

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

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

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

UNIT 3
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  2<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 4
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  3<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 5
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  4<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 6
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  5<CR>
Q-FACTOR (O) 0 ?  <CR>

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

UNIT 8
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 FROM THE ABOVE EXAMPLE, THE HARDWARE PARAMETERS DO NOT VARY SIGNIFICANTLY FROM UNIT TO UNIT. THE PROCEDURE SHOWN IS NOT VERY EFFICIENT.

THE RUNTIME SERVICES CAN TAKE MULTIPLE UNIT SPECIFICATIONS HOWEVER.

LET'S BUILD THE SAME TABLE USING THE MULTIPLE SPECIFICATION FEATURE.

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

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

        UNIT 3
        CSR ADDRESS (O) ?  160000<CR>
        SUB-DEVICE # (O) ?  2-5<CR>
        Q-FACTOR (O) 0 ?  0<CR>

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

AS YOU CAN SEE IN THE ABOVE DIALOGUE, THE RUNTIME SERVICES WILL BUILD AS MANY ENTRIES AS IT CAN WITH THE INFORMATION GIVEN IN ANY ONE PASS THROUGH THE QUESTIONS. IN THE FIRST PASS, TWO ENTRIES ARE BUILT SINCE TWO SUB-DEVICES AND Q-FACTORS WERE SPECIFIED. THE SERVICES ASSUME THAT THE CSR ADDRESS IS 160000 FOR BOTH SINCE IT WAS SPECIFIED ONLY ONCE. IN THE SECOND PASS, FOUR ENTRIES WERE BUILT. THIS IS BECAUSE FOUR SUB-DEVICES WERE SPECIFIED. THE ''-'' CONSTRUCT TELLS THE RUNTIME SERVICES TO INCREMENT THE DATA FROM THE FIRST NUMBER TO THE SECOND. IN THIS CASE, SUB-DEVICES 2, 3, 4 AND 5 WERE SPECIFIED. (IF THE SUB-DEVICE WERE SPECIFIED BY ADDRESSES, THE INCREMENT WOULD BE BY 2 SINCE ADDRESSES MUST BE ON AN EVEN BOUNDARY.) THE CSR ADDRESSES AND Q-FACTORS FOR THE FOUR ENTRIES ARE ASSUMED TO BE 160000 AND 0 RESPECTIVELY SINCE THEY WERE ONLY SPECIFIED ONCE. THE LAST TWO UNITS ARE SPECIFIED IN THE THIRD PASS.

THE WHOLE PROCESS COULD HAVE BEEN ACCOMPLISHED IN ONE PASS AS SHOWN BELOW.

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

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

AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSING A NULL FIELD) TELL THE RUNTIME SERVICES TO REPEAT THE LAST REPLY.

2.7 QUICK START-UP PROCEDURE (XXDP+)

TO START-UP THIS PROGRAM:

1. BOOT XXDP+

2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ (IF THERE

IS A CLOCK) QUESTIONS

3. TYPE ''R NAME'', WHERE NAME IS THE NAME 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. THESE DEFAULTS ARE DESCRIBED IN SECTIONS 2.3 AND 2.5.

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 ANY ASSOCIATED BASIC ERROR MESSAGES.

3.2 SPECIFIC ERROR MESSAGES

****

- COMPOSITE ERROR SET WHEN NOT EXPECTED -

THIS MESSAGE IS GENERATED WHEN COMPOSITE ERROR IS FOUND TO BE SET WHEN IT SHOULD HAVE BEEN RESET.

****

- DRIVE HUNG, DRY NOT SET IN TIME -

THIS MESSAGE IS GENERATED WHEN GO IS FOUND TO BE SET. THE FUNCTION IS TIMED, AND WHEN THE TIMING FUNCTION EXPIRES, THE ABOVE MESSAGE IS PRODUCED.

****

- DRIVE WRITE LOCKED -

THIS MESSAGE IS PRODUCED WHEN THE PROGRAM PREPARES TO EXECUTE A WRITE FUNCTION AND THE WRITE LOCK BIT (RPDS:WRL) IS FOUND TO BE ASSERTED.

****

- DRIVE OFFLINE -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM PREPARES TO EXECUTE A COMMAND AND THE MEDIUM ON LINE BIT (RPDS:MOL) IS FOUND TO BE RESET.

****

- RPCS2: OR FAILED TO SET IN TIME -

THIS MESSAGE IS GENERATED WHEN WHILE USING A TIMER, THE OUTPUT READY BIT (RPCS2:OR) IS FOUND TO BE RESET UNTIL THE TIMER FUNCTION EXPIRES.

****

- RPCS2:OR FAILED TO CLEAR IN TIME -

THIS MESSAGE IS GENERATED WHEN WHILE USING A TIMER, THE OUTPUT READY BIT (RPCS2:OR) IS FOUND TO BE SET UNTIL THE TIMER FUNCTION EXPIRES.

****

- RH CONTROLLER DIDN'T RESPOND (NO SSYNC). -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM ATTEMPTS TO ACCESS THE CONTROLLER AT THE USER SPECIFIED ADDRESS, AND IT DOESN'T RESPOND.

****

- BIT(S) UNDER TEST DIDN'T CHANGE STATE -

THIS MESSAGE IS GENERATED WHEN THE REGISTER RESULTS ARE NOT THE COMPLIMENT OF THE REGISTER STATE AT THE START OF THE TEST.

****

- RPCS2:CLR DIDN'T FUNCTION PROPERLY -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM FINDS THAT THE CONTROLLER

```
CLEAR FUNCTION DID NOT FUNCTION PROPERLY.

*****************************************************************

- REG CONTENTS DON'T MATCH EXPECTED DATA -

THIS MESSAGE IS PRODUCED WHEN EXTRA BITS SET OR CLEAR WHEN THEY ARE
NOT EXPECTED TO FUNCTION IN THIS MANNER.

*****************************************************************

- REG DIDN'T CLEAR WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN A REGISTER DOESN'T RESET WHEN EXPECTED.

*****************************************************************

- SC OR TRE SET WHEN NOT EXPECTED -

THIS MESSAGE IS GENERATED AS A RESULT OF DETECTING A TRANSFER ERROR
(RPCS1:TRE) OR DETECTING AN UNEXPECTED ATA (RPCS1:SC)

*****************************************************************

- RPCS2:IR FAILED TO SET IN TIME -

THIS MESSAGE IS GENERATED WHEN USING A TIMER, INPUT READY (RPCS2:IR)
IS FOUND TO BE RESET AFTER THE TIMING FUNCTION HAS EXPIRED.

*****************************************************************

- RPCS1, MCPE DIDN'T SET WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM FAILS TO DETECT A MASSBUS
CONTROL PARITY ERROR (RPCS1, MCPE).

*****************************************************************

- RPCS1, SC OR TRE DIDN'T SET WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM FORCES AN ERROR OR ATTENTION,
AND THE RESULTING TRE OR SC IN RPCS1 DOES NOT SET.

*****************************************************************

- BIT(S) UNDER TEST DIDN'T SET WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN THE STIMULUS AND THE RESULT DO NOT
MATCH, AND THE RESULT WAS EXPECTED TO FORCE REGISTER BIT(S) TO TOGGLE FROM
0 TO 1.

*****************************************************************

- BIT(S) UNDER TEST DIDN'T CLEAR WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN THE STIMULUS AND THE RESULT DO NOT MATCH,
AND THE RESULT WAS EXPECTED TO FORCE REGISTER BITS TO TOGGLE FROM
```

1 TO 0.

****

- RH INTERRUPTED AT WRONG PRIORITY -

THIS MESSAGE IS PRODUCED WHEN THE RH CONTROLLER INTERRUPTS AT A PRIORITY HIGHER THAN THE EXPECTED PRIORITY.

****

- RH GENERATED FALSE INTERRUPT -

THIS MESSAGE IS PRODUCED WHEN THE RH IS TESTED TO HAVE NO PREREQUISITE CONDITIONS WHICH COULD GENERATE AN INTERRUPT, YET DOES GENERATE AN INTERRUPT ANYWAY.

****

- RH DIDN'T INTERRUPT WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM EXPECTS AN INTERRUPT BUT DOESN'T GET ONE.

****

- DRIVE NOT PRESENT, TEST INVALID -

THIS MESSAGE IS GENERATED WHEN THE UNIT UNDER TEST IS FOUND TO BE NOT PRESENT.

****

- COMMAND EXECUTION INCORRECT -

THIS MESSAGE IS GENERATED WHEN A COMMAND IS EXECUTED AND THE DRIVE DOESN'T RETURN THE CORRECT STATUS FOR THE COMPLETED OPERATION.

****

- DATA LINES STUCK LOW -

THIS MESSAGE IS GENERATED WHEN, DURING A ''READ ALL TRACK DESCRIPTOR'' OPERATION, THE DATA RECEIVED DOESN'T FORCE ALL 16 DATA LINES FROM A 0 TO 1.

****

- FAILED TO SEEK PROPERLY -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM FAILS TO RECEIVE THE CORRECT STATUS FROM THE DRIVE UPON THE COMPLETION OF A SEEK OPERATION.

****

- DETECTED ERROR DURING WRITE DATA OPERATION -

THIS MESSAGE IS PRODUCED TO ENABLE THE USER TO DISCERN BETWEEN READ

```
AND WRITE ERRORS.

*****************************************************************

- FAILED TO CORRECTLY DETECT A WRITE CHECK ERROR -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM FORCES A WRITE CHECK
ERROR, BUT THE DRIVE FAILS TO POST THE CORRECT STATUS.

*****************************************************************

- DETECTED ERROR DURING FORMAT OPERATION -

THIS MESSAGE IS GENERATED TO ENABLE THE USER TO ISOLATE PROBLEMS
WHICH OCCUR ONLY DURING A FORMAT OPERATION.

*****************************************************************

- DETECTED ERROR DURING DATA TRANSFER -

THIS MESSAGE IS GENERATED ANYTIME AN ERROR IS DETECTED DURING A
DATA TRANSFER OPERATION OTHER THAN THE ONES MENTIONED ABOVE.

*****************************************************************

- FAILED AN RP07 INTERNAL MICRODIAGNOSTIC TEST -

THIS MESSAGE IS GENERATED ANYTIME THE PROGRAM DETECTS AN ERROR DURING
THE MICRODIAGNOSTIC EXECUTION IN THE DRIVE.

*****************************************************************

- RHXX REGISTER SELECTION FAILURE -

THIS MESSAGE IS GENERATED WHEN THE RH REGISTER SELECT TESTS FAIL.
IT IS INDICATIVE OF A MULTIPLEXOR OR SELECT LOGIC FAILURE.

*****************************************************************

- DATA RECEIVED DOESN'T MATCH EXPECTED DATA -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM COMPARES EXPECTED WITH
RECEIVED DATA AND FINDS THAT THEY DON'T MATCH, INDICATING A READ ERROR.

*****************************************************************

- DETECTED A PERMANENT ERROR -

THIS MESSAGE IS GENERATED WHEN RPDS,  ERR=1 AND RPER1, RPER2 AND RPER3 ARE
ALL 0.

*****************************************************************

- INTERNAL RP07 DIAGNOSTIC TIME-OUT -

***************************************************************
THIS MESSAGE IS GENERATED WHEN THE PROGRAM FINDS, USING A MAINTENANCE
```

TIMER, THAT THE DIAGNOSTIC EXECUTION DID NOT COMPLETE WHEN THE TIMER FUNCTION EXPIRED.

4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH THE TOTAL NUMBER OF ERRORS REPORTED SINCE THE DIAGNOSTIC WAS STARTED. THE "EOP" SWITCH CAN BE USED TO CONTROL HOW OFTEN THE END OF PASS MESSAGE IS PRINTED. SECTION 2.2 DESCRIBES SWITCHES.

5.0 DEVICE INFORMATION TABLES

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.

```
        .WORD 176700 ;RPCS1 BASE REGISTER ADDRESS
        .WORD 254    ;VECTOR ADDRESS
        .WORD 240    ;BR LEVEL 5 DEVICE
        .WORD 0      ;DRIVE NUMBER
```

THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM PARAMETERS THAN CAN BE CHANGED BY THE OPERATOR.

```
    SWTTST: .WORD 1     ;USED TO SELECT MASSBUS INTERFACE TEST;
                        ;DISABLED= 0, ENABLED= 1
    ERRDMP: .WORD 1     ;USED TO ENABLE THE RP07 ERROR LOG DUMP
    SELTRK: .WORD 0     ;USED TO SELECT A TRACK ADDRESS IN THE MICRO-
                        ;DIAGNOSTIC TEST
    TRAKAD: .WORD 0     ;USED TO GET THE USER TRACK ADDRESS
    SELRUN: .WORD 0     ;USED TO DETERMINE IF USER SELECTED A MICRO-
                        ;DIAGNOSTIC TEST
```

IN THE BASIC DRIVE TEST, THERE IS A USER PROMPT WHICH ASKS THE OPERATOR TO DISABLE SWITCH A12-501 IN THE DRIVE. IF THE USER RESPONDS "NO", THE TEST IS BYPASSED. IF THE USER RESPONDS "YES", THE PROGRAM EXPECTS THE SWITCH TO BE DISABLED WHEN THE USER RESPONDS. THE PROGRAM, UPON COMPLETION OF THE TEST, ASKS THE USER TO RE-ENABLE THE SWITCH. IF THE USER RESPONDS "NO" THE PROGRAM LOOPS UNTIL THE SWITCH HAS BEEN RE-ENABLED AND THE USER RESPONDS "YES".

IF THE MANUAL MODE OF OPERATION IS ENABLED AND THE USER HAS, THROUGH THE SOFTWARE QUESTIONS, INDICATED THAT ONE MICRO-DIAGNOSTIC IS TO BE SELECTED FOR EXECTUION, THE USER WILL BE ASKED TO INPUT A 2 CHARACTER HEX ENTRY WHICH WILL ALLOW SELECTION AND EXECUTION OF THAT PARTICULAR MICRO-DIAGNOSTIC.

6.0 TEST SUMMARIES

THE FOLLOWING REPRESENT A GENERAL LIST OF TESTS WHICH WILL BE PERFORMED TO THE RH70 CONTROLLER. THOSE TESTS MARKED WITH AN ASTERISK (*) WILL NOT BE EXECUTED WHEN AN RH11 CONTROLLER IS DETERMINED TO BE THE RP07 INTERFACE.

```
TEST 1: UNIT UNDER TEST

        SELECTS A USER SPECIFIED CONTROLLER AND  ASCERTAINS
        THAT  THE CONTROLLER   DOES  INDEED EXIST, IE VALID
        SSYN RESPONSE

TEST 2: RP CLEAR TEST

        THIS TEST ASCERTAINS CORRECTNESS OF THE DEVICE CLEAR
        FUNCTION BY WRITTING RPBA TO ALL ONES, SETTING RP CLR
        (BIT 5) IN RPCS2 AND PROVING THAT AT LEAST SOME OF THE
        BITS  DID  CLEAR  IN RPBA.  IT IS NOT THE INTENT OF
        THE PROGRAM, AT THIS TIME, TO PROVE THE CORRECTNESS
        OF  THE RPBA REGISTER, IT IS JUST TO PROVE THAT THE
        RPCLR FUNCTION DOES WORK.

TEST 3: RPCS2 STATIC FUNCTIONAL TEST

        THIS WALKS A ONE,  ZERO,  ALL  ZEROS,  ALL  ONES  THROUGH
        RPCS2.   THE  RANGE  WILL  BE  FROM BIT 0 TO BIT 2.
        EXECUTE A DEVICE  CLEAR  (RPCS2:  CLR)  AND  ENSURE
        THAT REGISTER DID RESET.

TEST 4: RPWC STATIC FUNCTIONAL TEST

        THIS TEST WALKS A ONE, ZERO, ALL ONES THROUGH RPWC.  WRITE RE-
        GISTER TO ZERO, AND ENSURE THAT REGISTER DID RESET.
        BITS TO TEST = BIT 0 - BIT 15.

TEST 5: RPBA STATIC FUNCTIONAL TEST

        THIS TEST WALKS A ONE, ZERO, ALL ZER/A, ALL ONES THROUGH RPBA.
        ALLOW  A  DEVICE  CLEAR AND CHECK THAT REGISTER DID
        RESET.  BITS TO TEST = BIT 1 - BIT 15.

TEST 6: SC AND TRE TEST #1 (RH11 ONLY)

        THIS TEST WILL TEST RPCS2, MXF (BIT 09) TO PROPERLY SET AND
        CLEAR.   ONCE  PROVEN FUNCTIONALLY CORRECT, SET THE
        BIT (RPCS2, MXF) = 1 AGAIN AND OBSERVE  RPCS1, SC
        AND  RPCS1, TRE.   BOTH  BITS SHOULD BE SET DUE TO
        MISSED TRANSFER (RPCS2, MXF -  BIT09)  BEING  SET.
        SET RPCS2, CLR = 1 AND ENSURE THAT BITS CLEARED.

TEST 7: IR AND OR TEST

        THIS TEST WILL TEST RPCS2, IR TO SET  AND  ENSURE  THAT  IT  DOES
        WITHIN A FIXED TIME LIMIT.  WHEN IT SETS, WRITE RPDB ONCE
        AND THEN TEST FOR RPCS2, OR TO SET WITHIN A  FIXED
        TIME LIMIT.

TEST 8: RPDB READ/WRITE TEST #1

        THIS TEST WRITES RPDB WITH 3 DATA  PATTERNS  INTERLOCKED  WITH
        THE    CORRECT   TRANSITION   OF  RPCS2, IR.   WHEN
        RPCS2, OR SET, READ RPDB AND CHECK DATA  FOR  CORRECTNESS.
```

TEST 9: RPDB READ/WRITE TEST #2

THIS TEST WRITES RPDB TWICE WITH THE SAME DATA PATTERN, INTERLOCKED WITH THE CORRECT TRANSITION OF RPCS2, IR. READ RPDB TWICE, INTERLOCKED WITH THE CORRECT TRANSITION OF RPCS2, OR, AND ENSURE THAT DATA IS CORRECT.

TEST 10: RPDB READ/WRITE TEST #3

THIS TEST WRITES DATA TO RPDB USING 8 DIFFERENT DATA PATTERNS, INTERLOCKED WITH THE CORRECT TRANSITIONS OF RPCS2, IR. READ RPDB AND VERIFY CORRECTNESS OF DATA, INTERLOCKED WITH THE CORRECT TRANSITIONS OF RPCS2, OR.

TEST 11: *MDPE, SC AND TRE TEST #2

THIS TEST WILL SET RPCS2, PAT=1. ENSURE THAT SC AND TRE IN RPCS1 = 0. ENSURE THAT RPCS2, MDPE DID NOT SET. WRITE RPDB ONCE AND VERIFY THAT RPCS1 SC AND TRE=1, DUE TO THE INVERTED (WRONG) PARITY. CHECK RPCS2, MDPE = 1. SET RPCS2, CLR AND ENSURE THAT BITS DID CLEAR.

TEST 12: *RPCS3 STATIC FUNCTIONAL TEST

THIS TEST WALKS A ONE, ZERO, ALL ZEROS, ALL ONES THROUGH RPCS3, FOR THE RANGE OF BITS 0-3 AND BIT 6. EXECUTE A DEVICE CLEAR AND ENSURE THAT REGISTER DID RESET.

TEST 13: *RPBAE STATIC FUNCTIONAL TEST

THIS TEST WALKS A ONE, ZERO, ALL ZEROS, ALL ONES THROUGH RPBAE. ISSUE DEVICE CLEAR AND ENSURE THAT REGISTER DID RESET.

TEST 14: *TEST DUPLICATED ADDRESS BIT 16

THIS TEST WILL RESET DEVICE AND SET RPCS1 A16 = 1, TEST THAT A16 ONLY SET. ENSURE THAT CORRESPONDING BIT IN RPBAE (BIT 0) ALSO = 1. ISSUE DEVICE CLEAR AND ENSURE THAT CORRESPONDING BITS DID CLEAR.

TEST 15: *TEST DUPLICATED ADDRESS BIT 17

THIS TEST WILL RESET THE DEVICE AND SET RPCS1 A17 = 1, TEST THAT A17 ONLY SET. ENSURE THAT CORRESPONDING BIT IN RPBAE (BIT 1) ALSO = 1. ISSUE DEVICE CLEAR AND ENSURE THAT CORRESPONDING BITS DID CLEAR.

TEST 16: TEST RPCS1 INTERRUPT ENABLE BIT

THIS TEST WILL RESET DEVICE AND SET RPCS1 IE (BIT 6) = 1. ENSURE THAT THE BIT UNDER TEST DID SET. ISSUE DEVICE CLEAR AND ENSURE THAT CORRESPONDING BITS DID CLEAR.

TEST 17: *TEST DUPLICATED INTERRUPT ENABLE BIT

THIS TEST SETS RPCS1, IE (BIT 06) = 1. ENSURE THAT RPCS3:IE ALSO SETS. ISSUE DEVICE CLEAR AND ENSURE THAT APPROPRIATE BITS CLEAR.

TEST 18: *IPCKO TEST

THIS TEST WILL ISSUE DEVICE CLEAR, THEN SET IPCKO (RPCS3 BIT 0)=1. CHECK THAT (RPCS2 IR (BIT 6) = 1) WITHIN A TIME PERIOD. WHEN IT DOES, WRITE 0'S (ONCE) INTO RPDB. THIS SHOULD FORCE (RPCS1 TRE AND SC = 1). READ RPDB WITH (RPCS2 OR = 1) AND (RPCS2 MDPE SHOULD = 1). DO SECOND INITIALIZATION AND DEVICE SHOULD CLEAR OUT.

TEST 19: *IPCK1 TEST

THIS TEST WILL ISSUE DEVICE CLEAR, THEN SET IPCK1 (RPCS3 BIT 1)=1. CHECK THAT (RPCS2 IR = 1) WITHIN A TIME PERIOD.

WHEN IT DOES, WRITE 0'S (ONCE) INTO RPDB. THIS SHOULD FORCE (RPCS1 TRE AND SC = 1). READ RPDB WITH (RPCS2 OR = 1) AND (RPCS2 MDPE (BIT 7) SHOULD = 1). DO SECOND INITIALIZATION AND DEVICE SHOULD CLEAR OUT.

TEST 20: *IPCK2 TEST

THIS TEST WILL ISSUE DEVICE CLEAR THEN SET IPCK2 (RPCS3 BIT 2)=1. CHECK THAT (RPCS2 IR = 1) WITHIN A TIME LIMIT. WHEN IT DOES, WRITE 0'S (TWICE) INTO RPDB. THIS SHOULD FORCE (RPCS1 TRE AND SC = 1). READ RPDB WITH (RPCS2 OR = 1) AND (RPCS2 MDPE SHOULD = 1). DO SECOND INITIALIZATION AND DEVICE SHOULD CLEAR OUT.

TEST 21: *IPCK3 TEST

THIS TEST WILL ISSUE DEVICE CLEAR, THEN SET IPCK3 (RPCS3 BIT 3)=1. CHECK THAT (RPCS2 IR = 1). WHEN IT DOES, WRITE RPBD WITH 0'S (TWICE). CHECK FOR SAME ERRORS AS 14 ABOVE. ISSUE DEVICE CLEAR AND ENSURE THAT DEVICE DID CLEAR OUT.

TEST 22: RHXX INTERRUPT TEST # 1

THIS TEST FORCES THE RHXX CONTROLLER TO INTERRUPT FROM THE HIGHEST PRIORITY LEVEL DOWN TO AND INCLUDING THE USER SPECIFIED PRIORITY LEVEL. IF THE DEVICE DOES ACTUALLY GENERATE AN INTERRUPT WHICH DOES GET RECOGNIZED BY THE PROGRAM, THE CONTROLLER PRIORITY CIRCUITRY IS SUSPECT.

TEST 23: RHXX INTERRRUPT TEST #2

THIS TEST ASSUMES THAT SC=0 AND RPDS, ATA ALSO=0. IT THEN

ARMS THE CONTROLLER FOR AN INTERRUPT WHICH IT DOES NOT EXPECT TO RECEIVE. IF IT DOES, AND THERE IS NO APPARENT REASON FOR HAVING RECEIVED IT, IE SC=0 AND RDY DID NOT TOGGLE, THEN A HARDWARE MALFUNCTION MAY BE ASSUMED.

TEST 24: RHXX INTERRUPT TEST #3

THIS TEST SETS THE PRIORITY TO ONE LESS THAN THE USER SPECIFIED PRIORITY. IT THEN ARMS AN INTERRUPT AND FORCES THE CONTROLLER TO TOGGLE RDY. THESE ACTIONS SHOULD GENERATE AND NTERRUPT TO THE CORRECT VECTOR ADDRESS. IF THE INTERRUPT DOESN'T OCCUR, OR OCCURS AT THE WRONG ADDRESS, A HARDWARE MALFUNCTION IS ASSUMED.

TEST 25: BASIC DRIVE SELECT TEST

THIS TEST REQUIRES MANUAL INTERVENTION. IT WILL BE SKIPPED IF THE DIAGNOSTIC IS RUN IN UNATTENDED MODE, OR THE USER RESPONDS "N" TO THE QUESTION: "FOR DRIVE) N, WILL YOU PLACE THE MASSBUS DISABLE SWITCH J12-S01 IN THE 'DISABLED' (DOWN) POSITION?" TO RUN THIS TEST, USE THE DISABLE SWITCH (J12-S01) TO DISCONNECT THE "DRIVE UNDER TEST" FROM THE MASSBUS. NOW READ REG 06 (RPDT) AND VERIFY THAT NO DRIVE RESPONDS TO THIS DRIVE'S ADDRESS (REGISTER SHOULD = 0). WHEN THE TEST IS COMPLETE, THE USER WILL BE REQUIRED TO RE-ENABLE THE MASSBUS DISABLE SWITCH IN ORDER TO RUN ALL OTHER TESTS.

TEST 26: DEMAND AND TRANSFER TEST

THIS TEST WILL READ DRIVE TYPE REGISTER (SHOULD NOT EQUAL 0), BUT IGNORE DATA AND ERRORS. THE DRIVE TYPE REGISTER SHOULD NOT =0, ELSE THE TEST WILL FAIL.

TEST 27: UNIQUE UNIT UNDER TEST

THIS TEST WILL GUARANTEE THAT A UNIT UNDER TEST DOES NOT RESPOND TO ANY OTHER DRIVE ADDRESS ON THE MASSBUS.

WRITE DATA PATTERN 46(8) TO REGISTER 0 OF DRIVE UNDER TEST

WRITE 0'S TO REGISTER 0 OF ALL OTHER DRIVES ON THE BUS.

AFTER WRITING EACH DRIVE ON THE BUSS, READ AND VERIFY THAT REGISTER 0 IN THE DRIVE UNDER TEST HAS NOT BEEN MODIFIED.

TEST 28: READ DRIVE TYPE TEST

THIS TEST WILL READ DRIVE TYPE REGISTER AND ACCEPT 20042, 24042. ANY OTHER VALUE WILL PRODUCE AN ERROR MESSAGE.

TEST 29: RPDA CONSTANT'S TEST

THIS TEST WILL WRITE-READ-VERIFY 1'S AND 0'S IN RPDA, AND AND FLOAT 1'S AND 0'S THROUGH RPDA.

TEST 30: PARITY BIT TRANSITION TEST

THIS TEST WILL VERIFY THAT PARITY BIT SENT FROM DRIVE TO RHXX IS

```
                NOT STUCK AT 1 OR 0.  (USE RPDA REGISTER),
                WRITE   000000  => P=1  READ/CHECK FOR PARITY
                (SHOULD NOT GET A CONTROLLER PARITY ERROR),
                WRITE   000001  => P=0  READ/CHECK FOR PARITY
                (SHOULD NOT GET A CONTROLLER PARITY ERROR)

        TEST 31: FLOATING DATA PARITY TEST

                THIS TEST WILL WRITE ALL 1'S AND ALL 0'S, THEN FLOAT 1'S  AND  0'S
                THROUGH  RPDA,  READING RPER1 AFTER EACH WRITE, AND
                VERIFY THAT NO PARITY ERROR SET IN RPER1.

        TEST 32: REGISTER SELECT TEST 1

                THIS TEST WILL WRITE EACH WRITEABLE REGISTER WITH THE  PATTERN
                70(8)
                READ IT BACK AND VERIFY FOR CORRECTNESS.  REGISTERS USED IN THE
                TEST ARE; RPCS1, RPDA, RPDC, RPOF.

        TEST 33: REGISTER SELECT TEST 2

                ENSURE THAT EACH WRITEABLE REGISTER HAS A UNIQUE ADDRESS.
                WRITEABLE REGISTERS 0, 5, 11, 12
                DATA = 70(8) REF REGISTERS,
                DATA = 0 OTHER REGISTERS
                WRITE 70(8) INTO SOME MASSBUS WRITEABLE REGISTER
                WRITE 0'S TO EVERY OTHER ADDRESSABLE REGISTER ON THE MASSBUS.
                AFTER EACH WRITE (STOP-2), READ AND VERIFY THAT THE REFERENCE
                REGISTER HAS NOT BEEN MODIFIED (IF SO, IDENTIFY CONTROL LINE PAIR BY
                REGISTER NUMBERS)
                REPEAT 1 - 3 FOR ALL WRITEABLE REGISTERS.

        TEST 34: DATA TEST RPMR1

                THIS TEST WILL WRITE, READ/VERIFY THE MAINTENANCE REGISTER (RPMR1)
                USING PATTERNS:
                        ALL 0'S
                        ALL 1'S
                        FLOAT 0'S
                        FLOAT 1'S

                POSSIBLE FAULT:  J8

        TEST 35: MASSBUS INITIALIZE DRIVE CLEAR TEST

                THIS TEST WILL SET RPMR1:  DMD = 1, THEN ISSUE RPCS2, CLR.  CHECK
                DMD = 0.  IF 0, MARK THE EVENT.  SET DMD = 1 AGAIN,
                THEN ISSUE DRIVE CLEAR COMMAND.   VERIFY  THAT  DMD
                DID AGAIN CLEAR.
                IF DMD DIDN'T CLEAR  WITH  EITHER  RPCS2, CLR  OR
                DRIVE  CLEAR  COMMAND, POSSIBLE FAULTS ARE:  J12 OR J8.
                IF DMD DIDN'T CLEAR WITH RPCS2, CLR, BUT DID CLEAR
                WITH  DRIVE CLEAR COMMAND, POSSIBLE FAULTS ARE J12,
                CABLE, OR THE RHXX.
                IF DMD DIDN'T CLEAR WHEN DRIVE  CLEAR  COMMAND  WAS
                EXECUTED,  BUT  DID  CLEAR WHEN RPCS2, CLR WAS ASSERTED,
        POSSIBLE FAULTS ARE J11, OR J12.

TEST 36: PARITY INITIALIZE TEST

        THIS TEST WILL CHECK PARITY FOLLOWING MASSBUS INITIALIZE.
        PROGRAM WILL THEN READ RPER1 AND VERIFY THAT RPER1, PAR AND ILF
        ARE CLEAR.

TEST 37: PARITY ERROR DETECTION TEST

        IMPLIED IN THIS TEST IS THAT THE PREVIOUS TEST  DID
        SUCCESSFULLY  PASS.   THIS  TEST  CREATES A ''DOUBLE
        FAULT'', WHICH IS USED TO DETERMINE THAT THE  PARITY
        DETECTION CIRCUITS WORK PROPERLY, AND THAT ANY COMMAND IS
        REJECTED WHEN A PARITY ERROR IS DETECTED.
        THE PROGRAM WILL SET RPCS2, PAT AND ISSUE A KNOWN ILLEGAL  COMMAND,
        CHECK RPCS1 AND VERIFY  THAT  GO  (BIT  0)  DID RESET
        READ RPER1 AND CHECK FOR FOLLOWING:

                1.  IF RPER1, PAR IS THE ONLY ERROR  BIT  SET,
                    THERE WAS NO ERROR,
                2.  IF RPER1, ILF IS THE ONLY ERROR BIT FOUND,
                    REPLACE J12,
                3.  IF RPER1, ILF AND PAR ARE BOTH SET OR BOTH
                    CLEAR,  REPLACE  EITHER  J9,  J10,  OR J12.
                    (THERE IS A GOOD CHANCE THAT THE 2901 IS BROKEN.)

TEST 38: CORRECT PARITY TEST

        THIS TEST CHECKS A VARIETY  OF  DATA  PATTERNS  AND
        VERIFIES THAT NO PARITY ERRORS OCCURRED.  THE OPERATING
        SEQUENCE IS AS FOLLOWS:

                1.  LOAD DATA PATTERNS INTO THE RPDA REGISTER,
                2.  READ THE RPDA REGISTER  AND  ENSURE  THAT  RHXX
                    DOES NOT DETECT ANY PARITY ERRORS.
                    PATTERNS:
                        ALL ONES
                        ALL ZEROS
                        FLOAT 1'S
                        FLOAT 0'S

TEST 39: CLEAR COMPOSITE ERROR BIT TEST

        THIS TEST ENSURES THAT RPDS, ERR IS NOT STUCK  AT  A
        ONE.  IF IT IS (I) AND RPER1, RPER2 AND RPER3 ARE 0, A PERMANENT
        ERROR IS REPORTED, ELSE A COMPOSITE ERROR IS REPORTED.  OPERATING
        SEQUENCE IS AS FOLLOWS:

                1.  ISSUE A CONTROLLER CLEAR.
                2.  READ RPDS AND ENSURE THAT ERR (BIT 14) IS CLEAR.

TEST 40: SET AND CLEAR COMPOSITE ERROR TEST

        THIS TEST ENSURES THAT COMPOSITE ERROR  RPDS,    BIT
        14 WILL SET AND CLEAR.  SEQUENCE IS AS FOLLOWS:
                1.  SET PAT IN RPCS2,  THEN  WRITE  DATA  TO  RPDA.
                    THIS SHOULD CAUSE A PARITY ERROR,
                2.  READ RPDS  AND  CHECK  THAT  RPDS, ERR=1.   ALSO
                    CHECK THAT RPER1, PAR IS ALSO SET,
                3.  ISSUE A CONTROLLER CLEAR,
                4.  READ RPDS AND ENSURE THAT ERR (BIT 14)=0.  READ
                    RPER1 AND ENSURE THAT PAR (BIT 3)=0.

        TEST 41: CLEAR ATA TEST

            THIS TEST ENSURES THAT RPDS, ATA  (BIT  15)  IS  NOT
            STUCK AT 1.  SEQUENCE IS AS FOLLOWS:

                1.  ISSUE CONTROLLER CLEAR.
                2.  READ RPDS, ATA AND VERIFY THAT IT IS CLEAR.

        TEST 42: SET AND CLEAR ATA TEST

            THIS TEST, BY FORCING AN ERROR, TESTS  THE  CORRECT
            FUNCTIONALITY OF RPDS, ATA.  SEQUENCE FOLLOWS:

                1.  SET RPCS2, PAT (BIT 04)=1, THEN  WRITE  DATA  TO
                    RPDA, FORCING A PARITY ERROR,
                2.  READ RPDS AND CHECK ATA (BIT 15) AND  ERR  (BIT 14)
                    TO BOTH BE SET,
                3.  ISSUE A DRIVE CLEAR,
                4.  READ RPDS AND VERIFY THAT ATA (BIT 15) AND  ERR
                    (BIT 14) DID BOTH CLEAR,
                5.  REPEAT STEP 1,
                6.  SET RPCS2, CLR (BIT 5),
                7.  REPEAT STEP 4.

        TEST 43: CLEAR RPAS TEST

            THIS TEST ENSURES THAT NO BITS ARE SET IN RPAS.
            SEQUENCE IS AS FOLLOWS:

                1.  SET RPCS2, CLR (BIT 5)=1,
                2.  READ RPAS AND ENSURE THAT IT IS CLEAR.

                                   NOTE

                      IF THIS TEST IS FAILED,  THE CONTENTS
                      OF THE PSEUDO REGISTER (RPAS) WILL BE
                      PRINTED OUT,  AND THE CONTENTS OF THE
                      STATUS REGISTER FOR EVERY OTHER DRIVE
                      ON THE MASSBUS.  IF THE  CAUSE OF THE
                      FAILURE IS ANOTHER DRIVE ON THE  BUS,
                      EACH  DRIVE  MAY NEED  TO BE  POWERED
                      DOWN  ONE AT  A TIME,  UNTIL  THE BAD
                      DRIVE IS FOUND.

        TEST 44: RPAS CORRECT POSITION DECODE TEST

            THIS TEST CHECKS FOR THE CORRECT  POSITION  OF  THE
            BIT DECODED IN THE PSEUDO REGISTER.  SEQUENCE OF TEST FOLLOWS:
```

1. SET RPCS2, CLR (BIT 05)=1,
2. SET PAT IN RPCS2, THEN WRITE DATA TO RPDA, FORCING A PARITY ERROR,
3. READ RPAS AND VERIFY THAT BIT POSITION IS CORRECT FOR THE DRIVE UNDER TEST. ALSO VERIFY THAT RPDS, ATA AND ERR IS ALSO SET,
4. WRITE RPAS WITH THE CORRECT BIT FOR THE DRIVE UNDER TEST.
5. READ RPAS AND VERIFY THAT IT DID CLEAR. READ RPDS AND ENSURE THAT ATA CLEARED, BUT ERR DID NOT CLEAR.

TEST 45: RPAS UNIQUE POSITION DECODE TEST

THIS TEST VERIFIES THE UNIQUENESS OF THE PSEUDO REGISTER'S BIT WHICH CORRESPONDS TO THE UNIT-UNDER-TEST. SEQUENCE IS AS FOLLOWS:

1. SET RPCS2, CLR=1,
2. SET RPCS2, PAT=1, AND WRITE DATA TO RPDA, FORCING YET ANOTHER PARITY ERROR,
3. READ RPAS AND ENSURE THAT THE PROPER BIT IS SET. ENSURE THAT RPDS, ATA AND ERR ARE ALSO SET.
4. WRITE THE PSEUDO REGISTER WITH THE COMPLIMENT OF THE EXPECTED DATA IN ITEM 3,
5. READ RPAS AND ENSURE THAT THE BIT FOUND IN ITEM 3 DID NOT CLEAR. VERIFY THAT RPDS, ATA AND ERR DID NOT CLEAR.

TEST 46: CLEAR MASSBUS ATTN TEST

THIS TEST VERIFIES THAT MASSBUS ATTN IS NOT STUCK AT A 1. SEQUENCE IS AS FOLLOWS:

1. SET RPCS2, CLR=1,
2. READ RPCS1 AND VERIFY THAT SC (BIT 15) DID NOT SET (FOR RH20, ENSURE THAT ATTN=0).

NOTE

IF ANOTHER DRIVE IS SUSPECTED TO BE CAUSING THE MALFUNCTION, EACH DRIVE ON THE BUS MUST BE POWERED DOWN, ONE AT A TIME, UNTIL THE OFFENDING UNIT IS LOCATED.

TEST 47: SET AND CLEAR MASSBUS ATTN

THIS TEST VERIFIES THAT THE MASSBUS LINE ''ATTN'' CAN BE SET AND CLEARED. SEQUENCE FOLLOWS:

1. SET RPCS2, PAT=1, AND WRITE RPDA WITH DATA, FORCING A PARITY ERROR,
2. READ RPCS1, SC (BIT 15) AND VERIFY THAT IT SET. (USE ''ATTN'' IN RH20.),
3. SET RPCS2, CLR = 1, AND ENSURE THAT RPCS1, SC DID CLEAR.

TEST 48: READ-IN-PRESET COMMAND TEST

THIS IS THE FIRST TEST TO ISSUE A VALID COMMAND TO THE RP07. IT ENSURES THAT COMPOSITE ERROR DOES NOT SET AS A RESULT OF THE COMMAND EXECUTION. SEQUENCE FOLLOWS:

1. SET RPCS2, CLR=1,
2. ISSUE READ-IN-PRESET COMMAND,
3. VERIFY THAT RPDS, ERR=0.

TEST 49: RHXX UNIQUE REGISTER TEST

THIS TEST LOADS EACH WRITABLE RHXX REGISTER WITH A UNIQUE DATA PATTERN, AND EXPECTS THAT THE PATTERN WILL NOT CHANGE AS FURTHER REGISTERS ARE WRITTEN.

TEST 50: RPLA STATIC TEST

THIS TEST CHECKS RPLA FOR EVERY VALID SECTOR ADDRESS. IF, WHILE USING A MAINTENANCE TIMER, A SECTOR ADDRESS IS NOT FOUND IN TIME, AN ERROR IS REPORTED.

TEST 51: RPMR1 - RPER2 WRAP AROUND TEST

THIS TEST WRITE RPMR1 - LOW BYTE AND, AFTER WAITING A REASONABLE AMOUNT OF TIME FOR HARDWARE AND FIRMWARE LATENCY, EXPECTS RPER2, LOW BYTE, TO CONTAIN THE SAME DATA AS JUST WRITTEN INTO RPMR1. IF THE DATA IS NOT THE SAME, A HARDWARE MALFUNCTION MAY BE ASSUMED.

TEST 52: ERROR LOG DUMP

THIS ROUTINE UNLOADS THE RP07 INTERNAL ERROR LOG WHEN IT WAS REQUESTED BY THE USER. CONTENTS ARE NOT CHECKED, JUST REPORTED TO THE USER.

TEST 53: COMPOSITE MICROCODE TEST

THIS TEST IS A COMPOSITE TEST WHICH RUNS ALL OF THE AVAILABLE RP07 MICRODIAGNOSTICS. THE ROUTINE EMULATES THE RP07 POWER UP SEQUENCE. ERROR CODES ARE REPORTED IN HEX AS ARE THE ROUTINE NUMBERS WHICH WERE RUNNING AT THE TIME OF THE FAILURE.

TEST 54: READ-IN-PRESET FUNCTIONAL TEST

THIS TEST SETS UP RPDC, RPDA = -1, AND SETS RPOF:FMT16=1. IT THEN ISSUES A RIP AND EXPECTS RPDC AND RPDA TO BE ZERO. IT ALSO EXPECTS RPDC AND RPDA TO BE ZERO. IT ALSO EXPECTS RPOF:FMT TO BE RESET.

TEST 55: COMMAND REJECT TEST

THIS TEST, INVERTS PARITY AND ISSUES A RIP COMMAND. IF THE COMMAND EXECUTED WITH A PARITY ERROR PRESENT, IE RPDC OR RPDA=0 OR FMT16=0, THEN A HARDWARE MALFUNCTION MAY BE ASSUMED.

TEST 56: DATA TEST # 1

THIS TEST EXECUTES IN THE FOLLOWING MANNER;
READ TRACK DESCRIPTORS FROM ANYWHERE ON THE

```
        PACK.   THE  PURPOSE IS TO ENSURE THAT THE DATA
        LINES TOGGLE.  REPEAT PROCESS UNTIL  ALL  TESTABLE
        LINES  HAVE  TOGGLED (BITS 0 THROUGH 15).
        IGNORE ALL ERRORS;  THEY MAY BE CAUSED BY  CORRUPTED
        TRACK DESCRIPTOR RECORDS.

        IF AFTER READING EVERY TRACK AND CYLINDER ON THE DRIVE, ALL
        DATA LINES STILL HAVE NOT TOGGLED FROM 0 TO 1, AN ERROR WILL
        BE REPORTED.

TEST 57: DATA TEST #2

        THIS TEST EXECUTES IN THE FOLLOWING MANNER:

                1.  ATTEMPT TO ACCESS A C.E.  CYLINDER WITHOUT SETTING
                    RPMR1:DMD  (BIT 15).  EXPECT RPER1, IAE TO SET.
                2.  ISSUE A RECAL COMMAND, THEN CHECK RPCC = 0.
                3.  ATTEMPT  TO  ACCESS  A  C.E.    CYLINDER   WITH
                    RPMR1:  DMD=1, VERIFY CORRECT POSITION BY COMPARING
                    RPDC WITH RPCC.

TEST 58: DATA TEST #3

        THIS TEST EXECUTES IN THE FOLLOWING MANNER:

                1.  ATTEMPT TO FIND A  DEFECT  FREE  C.E. TRACK  BY
                    DETERMINING  PRESENCE OF A TD WITH NULL SET INFORMATION.
                    IF ONE IS NOT FOUND  DISPATCH  MESSAGE STATING THAT C.E.
                    TRACK #0 WILL BE FORMATTED PRIOR TO PERFORMING OPERATION.
                2.  FORMAT TRACK AND VERIFY SAME (USING NULLSET INFORMATION).
                3.  PERFORM SIMPLE DATA TESTING  ON  THE  FORMATTED
                    TRACK.

        SIMPLE DATA TESTING TO INCLUDE:

                1.  WRITING DATA PATTERNS WITHOUT ERROR.   RPWC
                    WILL  BE TESTED TO = 0, RPBA WILL BE TESTED
                    TO INCREMENT.
                2.  WRITE CHECK  DATA  FORCING  A  WRITE  CHECK
                    ERROR.   BUFFER  POSITION OF THE ERROR WILL
                    BE VERIFIED USING THE RPBA REGISTER.
                3.  WRITE CHECK DATA WITHOUT ERROR.
                4.  ISSUE A RIP COMMAND, FOLLOWED BY A
                    READ HEADER AND DATA COMMAND ON CYL 630 TRACK JUST
                    FORMATTED.  VERIFY THAT RPER1, FER DID SET.

TEST 59: RPER1 NEGATIVE BIT TEST

        THIS TEST ISSUES AN ILLEGAL FUNCTION AND EXPECTS RPER1, ILF TO
        SET.  IT THEN ISSUES A COMMAND WITH THE WRONG SECTOR, WRONG
        TRACK ADDRESS AND EXPECTS RPER1, IAE TO SET AFTER EACH COMMAND.

TEST 60: USER SELECTED MICRODIAGNOSTIC ROUTINE

        THIS TEST, IF MANUAL INTERVENTION IS ALLOWED AND THE USER, THROUGH
        USE OF THE SOFTWARE QUESTIONS, DID ANSWER 'YES' TO THE QUESTION
        'DO YOU WANT TO SELECT ONE MICRODIAGNOSTIC FOR EXECUTION?', WILL
```

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                ALLOW THE USER TO SPECIFY A MICRODIAGNOSTIC ROUTINE FOR EXECUTION.
                ONLY LEGAL 'HEX' CHARACTERS WILL BE ACCEPTED AS INPUT.  ANY PAIR
                OF HEX CHARACTERS WILL BE ACCEPTED.  IT IS UP TO THE USER TO
                INSURE THAT A VALID ROUTINE IS SELECTED, OTHERWISE THE DRIVE WILL
                PRODUCE AN ERROR FOR AN INVALID ROUTINE SELECTION.  THIS ROUTINE
                IS INTENDED PRIMARILY FOR DEBUG OF A PROBLEM, NOT SYSTEM ACCEPTANCE.

                ONE APPLICATION OF THIS ROUTINE COULD BE TO LOOP 'FOREVER' ON A
                USER SELECTED MICRO DIAGNOSTIC ROUTINE, POSSIBLY TO DETECT INTERMITTENT
                PROBLEMS.  THE COMMAND STRING TO PERFORM THIS WOULD BE AS FOLLOWS:
                'STA/TES:60/FLA:<OPTION LIST>'.  THE OPTION IN THIS CASE WOULD BE 'LOT'
                (LOOP ON TEST).  TO CHANGE THE ROUTINE, THE USER WOULD AGAIN USE
                THE 'START' COMMAND:  'STA/TES:60/FLA:LOT'.  THIS ACTION WOULD
                PERMIT THE USER TO CHANGE THE ROUTINE SELECTED FOR EXECUTION.
                ANY OTHER COMMAND, IE 'RES' OR 'CON', ETC, WILL USE THE ROUTINE
                PREVIOUSLY SELECTED BY THE USER, AND WILL NOT PERMIT THE USER TO
                CHANGE THE SELECTED ROUTINE.

        TEST 61: NOP FUNCTIONAL TEST

                THIS TEST VERIFIES THE CORRECT FUNCTIONALITY OF THE NOP COMMAND.
                INITIALLY, THE TEST VERIFIES THAT RPDS,  DRY = 1, THEN ISSUES THE
                COMMAND.  RPDS,  DRY IS AGAIN CHECKED TO BE SET WITHIN A FIXED TIME
                LIMIT.  IF THE LIMIT EXPIRES AND RPDS,  DRY IS NOT SET, A 'DRIVE
                HUNG' MESSAGE WILL BE GENERATED.  COMPOSITE ERROR AND TRANSFER
                ERROR ARE ALSO CHECKED AND VERIFIED TO NOT BE ASSERTED.

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                .REM @

                        VERSION (CZRJM-A-0)

                            1.  THIS VERSION IS THE STARTING POINT FOR CX DIAGNOSTIC SUPPORT OF
                                THE RP07 DISK DRIVE.

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     1                                  ;*LAST REVISION 01-JAN-83
     2
   365                                  .TITLE CZRJMA0 RP07 FE/HOST ISOLATOR
   367                                  .SBTTL  PROGRAM HEADER
   393
   395 000000                                   .ENABL  AMA,ABS
   396          002000                          .       =       2000
   398
   400                                  ;++
   401                                  ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
   402                                  ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
   403                                  ;--
   404
   406
   423
   427 002000                           L$NAME::                        ;DIAGNOSTIC NAME
       002000      103                          .ASCII /C/
       002001      132                          .ASCII /Z/
       002002      122                          .ASCII /R/
       002003      112                          .ASCII /J/
       002004      115                          .ASCII /M/
       002005      000                          .BYTE   0
       002006      000                          .BYTE   0
       002007      000                          .BYTE   0
       002010                           L$REV::                         ;REVISION LEVEL
       002010      101                          .ASCII  /A/
       002011                           L$DEPO::                        ;0
       002011      060                          .ASCII  /0/
       002012                           L$UNIT::                        ;NUMBER OF UNITS
       002012 000001                            .WORD   T$PTHV
       002014                           L$TIML::                        ;LONGEST TEST TIME
       002014 000200                            .WORD   200
       002016                           L$HPCP::                        ;POINTER TO H.W. QUES.
       002016 044762                            .WORD   L$HARD
       002020                           L$SPCP::                        ;POINTER TO S.W. QUES.
       002020 045100                            .WORD   L$SOFT
       002022                           L$HPTP::                        ;PTR. TO DEF. H.W. PTABLE
       002022 002320                            .WORD   L$HW
       002024                           L$SPTP::                        ;PTR. TO S.W. PTABLE
       002024 002332                            .WORD   L$SW
       002026                           L$LADP::                        ;DIAG. END ADDRESS
       002026 045656                            .WORD   L$LAST
       002030                           L$STA::                         ;RESERVED FOR APT STATS
       002030 000000                            .WORD   0
       002032                           L$CO::
       002032 000000                            .WORD   0
       002034                           L$DTYP::                        ;DIAGNOSTIC TYPE
       002034 000000                            .WORD   0
       002036                           L$APT::                         ;APT EXPANSION
       002036 000000                            .WORD   0
       002040                           L$DTP::                         ;PTR. TO DISPATCH TABLE
       002040 002124                            .WORD   L$DISPATCH
       002042                           L$PRIO::                        ;DIAGNOSTIC RUN PRIORITY
       002042 000000                            .WORD   0
       002044                           L$ENVI::                        ;FLAGS DESCRIBE HOW IT WAS SETUP
       002044 000000                            .WORD   0
       002046                           L$EXP1::                        ;EXPANSION WORD
     002046  000000                       .WORD   0
     002050                      L$MREV::                 ;SVC REV AND EDIT #
     002050     003                       .BYTE   C$REVISION
     002051     003                       .BYTE   C$EDIT
     002052                      L$EF::                   ;DIAG. EVENT FLAGS
     002052  000000                       .WORD   0
     002054  000000                       .WORD   0
     002056                      L$SPC::
     002056  000000                       .WORD   0
     002060                      L$DEVP::                 ; POINTER TO DEVICE TYPE LIST
     002060  006354                       .WORD   L$DVTYP
     002062                      L$REPP::                 ;PTR. TO REPORT CODE
     002062  000000                       .WORD   0
     002064                      L$EXP4::
     002064  000000                       .WORD   0
     002066                      L$EXP5::
     002066  000000                       .WORD   0
     002070                      L$AUT::                  ;PTR. TO ADD UNIT CODE
     002070  000000                       .WORD   0
     002072                      L$DUT::                  ;PTR. TO DROP UNIT CODE
     002072  000000                       .WORD   0
     002074                      L$LUN::                  ;LUN FOR EXERCISERS TO FILL
     002074  000000                       .WORD   0
     002076                      L$DESP::                 ;POINTER TO DIAG. DESCRIPTION
     002076  006362                       .WORD   L$DESC
     002100                      L$LOAD::                 ;GENERATE SPECIAL AUTOLOAD EMT
     002100  104035                       EMT     E$LOAD
     002102                      L$ETP::                  ;POINTER TO ERRTBL
     002102  000000                       .WORD   0
     002104                      L$ICP::                  ;PTR. TO INIT CODE
     002104  020652                       .WORD   L$INIT
     002106                      L$CCP::                  ;PTR. TO CLEAN-UP CODE
     002106  021350                       .WORD   L$CLEAN
     002110                      L$ACP::                  ;PTR. TO AUTO CODE
     002110  021346                       .WORD   L$AUTO
     002112                      L$PRT::                  ;PTR. TO PROTECT TABLE
     002112  020644                       .WORD   L$PROT
     002114                      L$TEST::                 ;TEST NUMBER
     002114  000000                       .WORD   0
     002116                      L$DLY::                  ;DELAY COUNT
     002116  000000                       .WORD   0
     002120                      L$HIME::                 ;PTR. TO HIGH MEM
     002120  000000                       .WORD   0
429
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```
                                 .SBTTL  DISPATCH TABLE

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

  002122  000075                           .WORD   61
  002124                         L$DISPATCH::
  002124  021514                           .WORD   T1
  002126  021612                           .WORD   T2
  002130  022000                           .WORD   T3
  002132  022142                           .WORD   T4
  002134  022302                           .WORD   T5
  002136  022444                           .WORD   T6
  002140  022774                           .WORD   T7
  002142  023270                           .WORD   T8
  002144  023442                           .WORD   T9
  002146  023602                           .WORD   T10
  002150  023772                           .WORD   T11
  002152  024152                           .WORD   T12
  002154  024334                           .WORD   T13
  002156  024510                           .WORD   T14
  002160  025034                           .WORD   T15
  002162  025360                           .WORD   T16
  002164  025540                           .WORD   T17
  002166  025732                           .WORD   T18
  002170  026230                           .WORD   T19
  002172  026526                           .WORD   T20
  002174  027044                           .WORD   T21
  002176  027362                           .WORD   T22
  002200  027634                           .WORD   T23
  002202  030102                           .WORD   T24
  002204  030322                           .WORD   T25
  002206  030514                           .WORD   T26
  002210  030624                           .WORD   T27
  002212  031016                           .WORD   T28
  002214  031154                           .WORD   T29
  002216  031322                           .WORD   T30
  002220  031446                           .WORD   T31
  002222  031600                           .WORD   T32
  002224  031736                           .WORD   T33
  002226  032136                           .WORD   T34
  002230  032302                           .WORD   T35
  002232  032562                           .WORD   T36
  002234  032720                           .WORD   T37
  002236  033142                           .WORD   T38
  002240  033324                           .WORD   T39
  002242  033454                           .WORD   T40
  002244  033732                           .WORD   T41
  002246  034032                           .WORD   T42
  002250  034320                           .WORD   T43
  002252  034424                           .WORD   T44
  002254  034636                           .WORD   T45
  002256  035110                           .WORD   T46
  002260  035206                           .WORD   T47
  002262  035324                           .WORD   T48
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      002264  035502                            .WORD   T49
      002266  035760                            .WORD   T50
      002270  036232                            .WORD   T51
      002272  036732                            .WORD   T52
      002274  037702                            .WORD   T53
      002276  040130                            .WORD   T54
      002300  040364                            .WORD   T55
      002302  040624                            .WORD   T56
      002304  041156                            .WORD   T57
      002306  041676                            .WORD   T58
      002310  044004                            .WORD   T59
      002312  044322                            .WORD   T60
      002314  044614                            .WORD   T61
    9
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```
                                 .SBTTL  DEFAULT HARDWARE P-TABLE

                                 ;++
                                 ; 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.
                                 ;--

002316  000004                           .WORD   L10000-L$HW/2
002320                           L$HW::
002320                           DFPTBL::
002320  176700                           .WORD 176700    ;RPCS1 BASE REGISTER ADDRESS
002322  000254                           .WORD 254       ;VECTOR ADDRESS
002324  000240                           .WORD 240       ;BR LEVEL 5 DEVICE
002326  000000                           .WORD 0         ;DRIVE NUMBER


002330                           L10000:
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                                .SBTTL  SOFTWARE P-TABLE

                                ;++
                                ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
                                ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
                                ;--

  002330  000005                        .WORD   L10001-L$SW/2
  002332                        L$SW::
  002332                        SFPTBL::
  002332  000001                SWTTST: .WORD   1               ;USED TO SELECT MASSBUS INTERFACE TEST;
                                                                ;DISABLED= 0, ENABLED= 1
  002334  000001                ERRDMP: .WORD   1               ;USED TO ENABLE THE RP07 ERROR LOG DUMP
  002336  000000                SELTRK: .WORD   0               ;USED TO SELECT A TRACK ADDRESS IN THE MICRO-
                                                                ;DIAGNOSTIC TEST
  002340  000000                TRAKAD: .WORD   0               ;USED TO GET THE USER TRACK ADDRESS
  002342  000000                SELRUN: .WORD   0               ;USED TO DETERMINE IF USER SELECTED A MICRO-
                                                                ;DIAGNOSTIC TEST

  002344                        L10001:
    12                                  .SBTTL  GLOBAL EQUATES SECTION
    40
    50
    52                                  ;++
    53                                  ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
    54                                  ; ARE USED IN MORE THAN ONE TEST.
    55                                  ;--
    56
    57                                  ;
                                        ; BIT DIFINITIONS
                                        ;
              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==  BIT09
              000400                    BIT8==  BIT08
              000200                    BIT7==  BIT07
              000100                    BIT6==  BIT06
              000040                    BIT5==  BIT05
              000020                    BIT4==  BIT04
              000010                    BIT3==  BIT03
              000004                    BIT2==  BIT02
              000002                    BIT1==  BIT01
              000001                    BIT0==  BIT00
                                        ;
                                        ; EVENT FLAG DEFINITIONS
                                        ;    EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                        ;
              000040                    EF.START==        32.                      ; START COMMAND WAS ISSUED
              000037                    EF.RESTART==      31.                      ; RESTART COMMAND WAS ISSUED
              000036                    EF.CONTINUE==     30.                      ; CONTINUE COMMAND WAS ISSUED
              000035                    EF.NEW==          29.                      ; A NEW PASS HAS BEEN STARTED
              000034                    EF.PWR==          28.                      ; A POWER-FAIL/POWER-UP OCCURRED
                                        ;
                                        ;
                                        ; PRIORITY LEVEL DEFINITIONS
                                        ;
              000340                    PRI07== 340
              000300                    PRI06== 300
              000240                    PRI05== 240
              000200                    PRI04== 200
              000140                    PRI03== 140
              000100                    PRI02== 100
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        000040                  PRI01== 40
        000000                  PRI00== 0
                                ;
                                ;OPERATOR FLAG BITS
                                ;
        000004                  EVL==        4
        000010                  LOT==       10
        000020                  ADR==       20
        000040                  IDU==       40
        000100                  ISR==      100
        000200                  UAM==      200
        000400                  BOE==      400
        001000                  PNT==     1000
        002000                  PRI==     2000
        004000                  IXE==     4000
        010000                  IBE==    10000
        020000                  IER==    20000
        040000                  LOE==    40000
        100000                  HOE==   100000
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                        .SBTTL  RHXX REGISTERS

                        ;CONTROL AND STATUS REGISTER 1 (RPCS1)

        000100          IE    = 100               ;INTERRUPT ENABLE (BIT #6)
        000200          RDY   = 200               ;READY (BIT #7)
        000400          A16   = 400               ;HIGH ORDER BUS ADDRESS BIT (BIT #8)
        001000          A17   =1000               ;HIGH ORDER BUS ADDRESS BIT (BIT #9)
        002000          PSEL  =2000               ;PORT SELECT (BIT #10)
        020000          MCPE  =20000              ;MASSBUS PARITY ERROR (BIT #13)
        040000          TRE   =40000              ;TRANSFER ERROR (BIT #14)
        100000          SC    =100000             ;SPECIAL CONDITION (BIT #15)


                        ;WORD COUNT REGISTER (RPWC)
                        ;EACH BIT IS CALLED BY BIT NUMBER


                        ;BUS ADDRESS REGISTER (RPBA)
                        ;EACH BIT IS CALLED BY BIT NUMBER


                        ;CONTROL AND STATUS REGISTER 2 (RPCS2)

        000001          US1  =  1                 ;UNIT SELECT (BIT #0)
        000002          US2  =  2                 ;UNIT SELECT (BIT #1)
        000004          US4  =  4                 ;UNIT SELECT (BIT #2)
        000010          BAI  =  10                ;BUS ADDRESS INCREMENT INHIBIT (BIT #3)
        000020          PAT  =  20                ;MASSBUS PARITY INHIBIT (BIT #4)
        000040          CLR  =  40                ;CLEAR (BIT #5)
        000100          IR   =  100               ;INPUT READY (BIT #6)
        000200          OR   =  200               ;OUTPUT READY (BIT #7)
        000400          MDPE =  400               ;MASSBUS PARITY ERROR (BIT #8)
        001000          MXF  =  1000              ;MISSED TRANSFER ERROR (BIT #9)
        002000          PGE  =  2000              ;PROGRAM ERROR (BIT #10)
        004000          NEM  =  4000              ;NON EXISTENT MEMORY (BIT #11)
        010000          NED  =  10000             ;NON EXISTENT DRIVE (BIT #12)
        020000          UPE  =  20000             ;UNIBUS PARITY ERROR
        040000          WCE  =  40000             ;WRITE CHECK ERROR (BIT #14)
        100000          DLT  =  100000            ;DATA LATE (BIT #15)


                        ;DATA BUFFER REGISTER (RPDB)
                        ;EACH BIT IS DEFINED BY BIT NUMBER

                        .SBTTL  RP07 REGISTERS

                        ;CONTROL AND STATUS 1 (#00)

        000001          GO  =  1                  ;GO BIT (BIT #0)
        000002          F1  =  2                  ;FUNCTION CODE BIT #1
        000004          F2  =  4                  ;FUNCTION CODE BIT #2
        000010          F3  =  10                 ;FUNCTION CODE BIT #3
        000020          F4  =  20                 ;FUNCTION CODE BIT #4
        000040          F5  =  40                 ;FUNCTION CODE BIT #5
        004000          DVA =  4000               ;DEVICE AVAILABLE (BIT #11)

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                        ;DRIVE STATUS REGISTER (RPDS <#01>)

        000001          OM  =   1                       ;OFFSET MODE (BIT #0)
        000002          EWN =   2                       ;EARLY WARNING (BIT #1)
        000004          ILEV=   4                       ;INTERLEAVING AVAILABLE (BIT #2)
        000100          VV  =   100                     ;VOLUME VALID (BIT #6)
        000200          DRY =   200                     ;DATA READY (BIT #7)
        000400          DPR =   400                     ;DRIVE PRESENT (BIT #8)
        001000          PGM =   1000                    ;PROGRAMABLE (BIT #9)
        002000          LBT =   2000                    ;LAST BLOCK TRANSFERRED (BIT #10)
        004000          WRL =   4000                    ;WRITE LOCKED (BIT #11)
        010000          MOL =   10000                   ;MEDIUM ON LINE (BIT #12)
        020000          PIP =   20000                   ;POSITIONER IN PROGRESS (BIT #13)
        040000          ERR =   40000                   ;COMPOSITE ERROR (BIT #14)
        100000          ATA =   100000                  ;ATTENTION ACTIVE (BIT #15)


                        ;ERROR REGISTER #1 (RPER1 <#02>)

        000001          ILF =   1                       ;ILLEGAL FUNCTION (BIT #0)
        000002          ILR =   2                       ;ILLEGAL REGISTER (BIT #1)
        000004          RMR =   4                       ;REGISTER MODIFICATION REFUSED (BIT #2)
        000010          PAR =   10                      ;PARITY ERROR (BIT #3)
        000020          FER =   20                      ;FORMAT ERROR (BIT #4)
        000040          WCF =   40                      ;WRITE CLOCK FAIL (BIT #5)
        000100          ECH =   100                     ;ECC HARD ERROR (BIT #6)
        000200          HCE =   200                     ;HEADER COMPARE ERROR (BIT #7)
        000400          HCRC=   400                     ;HEADER CRC ERROR (BIT #8)
        001000          AOE =   1000                    ;ADDRESS OVERFLOW ERROR (BIT #9)
        002000          IAE =   2000                    ;INVALID ADDRESS ERROR (BIT #10)
        004000          WLE =   4000                    ;WRITE LOCK ERROR (BIT #11)
        010000          DTE =   10000                   ;DRIVE TIMING ERROR (BIT #12)
        020000          OPI =   20000                   ;OPERATION INCOMPLETE (BIT #13)
        040000          UNS =   40000                   ;DRIVE UNSAFE (BIT #14)
        100000          DCK =   100000                  ;DATA CHECK ERROR (BIT #15)


                        ;DIAGNOSTIC MAINTAINABLILTY REGISTER (RPMR1 <#03>)

        100000          DMD =   100000                  ;DIAGNOSTIC MODE (BIT #15)


                        ;ATTENTION SUMMARY PSEUDO REGISTER (RPAS <#04>)

        000001          AT0 =   1                       ;DEVICE 0 (BIT #0)
        000002          AT1 =   2                       ;DEVICE 1 (BIT #1)
        000004          AT2 =   4                       ;DEVICE 2 (BIT #2)
        000010          AT3 =   10                      ;DEVICE 3 (BIT #3)
        000020          AT4 =   20                      ;DEVICE 4 (BIT #4)
        000040          AT5 =   40                      ;DEVICE 5 (BIT #5)
        000100          AT6 =   100                     ;DEVICE 6 (BIT #6)
        000200          AT7 =   200                     ;DEVICE 7 (BIT #7)


                        ;DESIRED SECTOR/TRACK ADDRESS REGISTER (RPDA <#05>)
                        ;EACH BIT IS CALLED BY BIT NUMBER


                        ;DRIVE TYPE REGISTER (RPDT <#06>)

        000001          DRT0 =  1                       ;DRIVE TYPE NUMBER (BIT #0)
        000002          DRT1 =  2                       ;DRIVE TYPE NUMBER (BIT #1)
        000004          DRT2 =  4                       ;DRIVE TYPE NUMBER (BIT #2)
        000010          DRT3 =  10                      ;DRIVE TYPE NUMBER (BIT #3)
        000020          DRT4 =  20                      ;DRIVE TYPE NUMBER (BIT #4)
        000040          DRT5 =  40                      ;DRIVE TYPE NUMBER (BIT #5)
        000100          DRT6 =  100                     ;DRIVE TYPE NUMBER (BIT #6)
        000200          DRT7 =  200                     ;DRIVE TYPE NUMBER (BIT #7)
        000400          DRT8 =  400                     ;DRIVE TYPE NUMBER (BIT #8)
        004000          DRQ =  4000                     ;DRIVE REQUEST REQUIRED (BIT #11)
        020000          MOH =  20000                    ;MOVING HEAD TYPE DRIVE (BIT #13)
        040000          TAP =  40000                    ;TAPE DRIVE (BIT #14)
        100000          NBA =  100000                   ;NOT BLOCK ADDRESSED (BIT #15)


                        ;LOOK AHEAD REGISTER (RPLA <#07>)

        000100          SC1  =  100                     ;SECTOR COUNT FIELD 1 (BIT #6)
        000200          SC2  =  200                     ;SECTOR COUNT FIELD 2 (BIT #7)
        000400          SC4  =  400                     ;SECTOR COUNT FIELD 4 (BIT #8)
        001000          SC8  =  1000                    ;SECTOR COUNT FIELD 8 (BIT #9)
        002000          SC16 =  2000                    ;SECTOR COUNT FIELD 16 (BIT #10)
        004000          SC32 =  4000                    ;SECTOR COUNT FIELD 32 (BIT #11)
        010000          SC64 =  10000                   ;SECTOR COUNT FIELD 64 (BIT #12)


                        ;RP07 SERIAL NUMBER REGISTER (RPSN <#10>)
                        ;EACH BIT IS CALLED BY BIT NUMBER


                        ;RP07 OFFSET REGISTER (RPOF <#11>)

        000200          OFFDIR  = 200                   ;OFFSET DIRECTION (BIT #7)
        002000          HCI     = 2000                  ;HEADER COMPARE CODE INHIBIT (BIT #10)
        004000          ECI     = 4000                  ;ERROR CORRECTION CODE INHIBIT (BIT #11)
        010000          FMT     = 10000                 ;16 BIT FORMAT (BIT #12)
        040000          MTD     = 40000                 ;MOVE TRACK DESCRIPTOR (BIT #14)
        100000          CMOD    = 100000                ;COMMAND MODIFIER (BIT #15)


                        ;RP07 DESIRED CYLINDER ADDRESS (RPDC <#12>)
                        ;EACH BIT IS CALLED BY BIT NUMBER


                        ;RP07 CURRENT CYLINDER ADDRESS (RPCC <#13>)
                        ;EACH BIT IS CALLED BY BIT NUMBER


                        ;RP07 ERROR REGISTER 3 (RPER3 <#15>)

        000002          SCF     = 2                     ;SYNC CLOCK FAILURE (BIT #1)
        000004          SBE     = 4                     ;SYNC BYTE ERROR (BIT #2)
        000010          DPE     = 10                    ;DATA PARITY ERROR (BIT #3)
        000020          SDF     = 20                    ;SERDES DATA FAILURE (BIT #4)
        000040          DCU     = 40                    ;DC UNSAFE (BIT #5)
        000100          IXU     = 100                   ;INDEX UNSAFE (BIT #6)
        000200          DVC     = 200                   ;DEVICE CHECK (BIT #7)
        000400          PHF     = 400                   ;8080 PROCESSOR HANDSHAKE FAILURE (BIT #8)
        001000          LCE     = 1000                  ;LOSS OF CYLINDER ERROR (BIT #9)
        002000          LBC     = 2000                  ;LOSS OF BIT CLOCK (BIT #10)
        020000          DSE     = 20000                 ;DEFECT SKIP ERROR (BIT #13)
        040000          SKI     = 40000                 ;SEEK INCOMPLETE (BIT #14)
        100000          BSE     = 100000                ;BAD SECTOR ERROR (BIT #15)


                        ;RP07 ERROR REGISTER #2 (RPER2 <#14>)
                                                        ;BITS 0 THROUGH 7 = READ ONLY BITS
        000400          WRU  =  400                     ;WRITE READY UNSAFE (BIT #8)
        001000          WOR  =  1000                    ;WRITE OVERRUN (BIT #9)
        002000          RWU1 =  2000                    ;READ/WRITE UNSAFE #1 (BIT #10)
        004000          RWU2 =  4000                    ;READ/WRITE UNSAFE #2 (BIT #11)
        010000          RWU3 =  10000                   ;READ/WRITE UNSAFE #3 (BIT #12)
        020000          CPU  =  20000                   ;CPU UNSAFE (BIT #13)
        040000          CPE  =  40000                   ;CROM PARITY ERROR (BIT #14)
        100000          PGE  =  100000                  ;PROGRAMMING ERROR


                        ;ECC POSITION REGISTER (RPEC1 <#16>)
                        ;EACH BIT IS DEFINED BY BIT NUMBER


                        ;ECC PATTERN REGISTER (RPEC2 <#17>)
                        ;EACH BIT IS DEFINED BY BIT NUMBER

                        .SBTTL  RP07 COMMAND DEFINITIONS

        000005          SEEK     =  5                   ;SEEK
        000007          RECAL    =  7                   ;RECALIBRATE
        000011          DRCLR    =  11                  ;DRIVE CLEAR
        000013          RELEASE  =  13                  ;DRIVE RELEASE
        000015          NOP      =  15                  ;NO OPERATION
        000021          RIP      =  21                  ;READ IN PRESET (NO OPERATION)
        000031          SEARCH   =  31                  ;SEARCH
        000035          DIAG     =  35                  ;DIAGNOSTIC MODE
        000051          WCKD     =  51                  ;WRITE CHECK DATA
        000053          WCKHD    =  53                  ;WRITE CHECK HEADER AND DATE
        000061          WRDTA    =  61                  ;WRITE DATA
        000063          FORTRK   =  63                  ;FORMAT HEADER AND SD FOR ENTIRE TRACK
        000065          WRTD     =  65                  ;WRITE TRACK DESCRIPTOR
        000071          RDDTA    =  71                  ;READ DATA
        000073          RDHDTA   =  73                  ;READ HEADER AND DATA
        000075          RTD      =  75                  ;READ TRACK DESCRIPTOR

```

```
                                  .SBTTL  GLOBAL DATA SECTION

                                  ;++
                                  ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                  ; IN MORE THAN ONE TEST.
                                  ;--

 002344   000001                  PATT1:: 000001
 002346   177776                  PATT2:: 177776
 002350   177777                  PATT3:: 177777
 002352   000000                  PATT4:: 000000
 002354   125252                  PATT5:: 125252
 002356   052525                  PATT6:: 052525
 002360   000070                  PATT7:: 000070
 002362   030221                  PATT8:: 030221                      ;PATTERN 8 (WORST CASE)
 002364   000002                  PATT9:: 000002

 002366   000000                  TABADD:: .WORD  0                   ;BUFFER POINTER
 002370   000037                  ENDTRK:: .WORD  31.                 ;LAST TRACK (RP07+)
 002372   000000                  LASTRK:: .WORD  0                   ;PROGRAM CONTROLLED LAST TRACK
 002374   001165                  ENDCYL:: .WORD  629.                ;LAST CYLINDER, (RP07+)
 002376   000000                  LASCYL:: .WORD  0                   ;PROGRAM CONTROLLED LAST CYLINDER
 002400   000000                  BITPOS:: .WORD  0                   ;USED TO MASK THE CORRECT RPAS BIT POSITION
 002402   000012                  ITCOUN:: .WORD  10.                 ;ITERATION COUNTER
 002404   000000                  ERRWD1::.WORD   0                   ;ERROR MESSAGE INDEX #1
 002406   000000                  ERRWD2::.WORD   0                   ;ERROR MESSAGE INDEX #2
 002410   000000                  BYTCNT::.WORD   0                   ;USED TO INDICATE #OF WORDS TRANSFERRED
 002412   000000                  NEGWRD:: .WORD  0                   ;NEGATED WORD   COUNT FOR DRIVER
 002414   000000                  DESTRK::.WORD   0                   ;USED TO SELECT A DESIRED TRACK
 002416   000000                  DESCYL::.WORD   0                   ;USED TO SELECT A DESIRED CYLINDER
 002420   000000                  FUNCTN::.WORD   0                   ;USED TO SPECIFY A SELECTED FUNCTON
 002422   000000                  ROUTDO::.WORD   0                   ;USE THIS PARAMETER ('USER SELECTED' INDICATOR)
 002424   000000                  SELNUM::.WORD   0                   ;USED TO STORE THE USER MICRODIAGNOSTIC INPUT

 002426   000000                  CLKSTA:: .WORD  0                   ;CLOCK STATUS (NO CLOCK= 0,KW11-P= 1 OR KW11-L= -1
 002430   000000                  FASTAT:: .WORD  0                   ;FAILED STATUS (USED INTERNALLY BY PROGRAM)
 002432   000000                  CSTORE:: .WORD  0                   ;SAVE CARRY FROM PREVIOUS XFER
 002434   000000                  PATCNT:: .WORD  0                   ;# OF PATTERNS TO USE
 002436   000000                  TEMP::   .WORD  0                   ;TEMPORARY STORAGE FOR SCOPE LOOPS
 002440   000000                  SNK::    .WORD  0                   ;ADDRESS OF REGISTER UNDER TEST
 002442   000000                  SRC::    .WORD  0                   ;ADDRESS OF TESTING DATA PATTERN
 002444   000000                  SRCTMP::.WORD   0                   ;DATA PATTERN TEMPORARY STORAGE
 002446   000000                  MASK::   .WORD  0                   ;CONTAINS # OF BITS TO TEST
 002450   000000                  MSK::    .WORD  0                   ;CONTAINS BIT UNDER TEST
 002452   000000                  RCVED::  .WORD  0                   ;CONTAINS RECEIVED BAD DATA
 002454   000000                  EXPTED:: .WORD  0                   ;CONTAINS EXPECTED GOOD DATA
 002456   000000                  TESTRG::.WORD   0                   ;CONTAINS ADDRESS OF REGISTER UNDER TEST
 002460   000000                  ILOCK::  .WORD  0                   ;USED TO INDICATE RPDB IR/OR POLLING
 002462   000000                  INTFLG::.WORD   0                   ;USED TO INDICATE THAT AN INTERRUPT HAS OCCURRED
 002464   000000                  UNABLE::.WORD   0                   ;USED TO CHECK FOR MANUAL INTERVENTION
 002466   000000                  ERSTAT::.WORD   0                   ;REPORTS PASS/FAIL STATUS TO CALLING MODULE
 002470   000000                  FATOF::  .WORD  0                   ;FUNCTION AT TIME OF FAILURE

 002472   000000                  UNIT::   .WORD  0                   ;USED TO SELECT A UNIT FOR TEST
 002474   176700                  RPADR::  .WORD  176700              ;CONTAINS RPCS1 BASE ADDRESS
 002476   000254   000240         RPVEC::  .WORD  254,5*32.           ;CONTAINS VECTOR ADDRESS & BR LEVEL
 002502   000050                  RHEXT::  .WORD  50                  ;CONTAINS RH70 OFFSET TO RPBAE
```

```
002504  000000          RHTYPE::.WORD   0               ;CONTAINS RHXX TYPE; RH11= 0, RH70= 1
002506  000000          DRVNO:: .WORD   0               ;DRIVE NUMBER
002510  000000          DRVSN:: .WORD   0               ;STORAGE FOR EACH S/N DIGIT

002512  176700          RPCS1:: .WORD   176700          ;BASE ADDRESS USED FOR THE DRIVE
002514  176702          RPWC::  .WORD   176702          ;WORD COUNT REGISTER
002516  176704          RPBA::  .WORD   176704          ;BYTE ADDRESS REGISTER
002520  176706          RPDA::  .WORD   176706          ;DESIRED SECTOR/TRACK ADDRESS
002522  176710          RPCS2:: .WORD   176710          ;RP07 STATUS REGISTER
002524  176712          RPDS::  .WORD   176712          ;RP07 DRIVE STATUS
002526  176714          RPER1:: .WORD   176714          ;RP07 ERROR REGISTER #1
002530  176716          RPAS::  .WORD   176716          ;RP07 ATTENTION SUMMARY PSEUDO REGISTER
002532  176720          RPLA::  .WORD   176720          ;RP07 LOOK AHEAD REGISTER
002534  176722          RPDB::  .WORD   176722          ;RP07 DATA BUFFER
002536  176724          RPMR1:: .WORD   176724          ;RP07 MAINTENANCE REGISTER #1
002540  176726          RPDT::  .WORD   176726          ;DRIVE TYPE REGISTER
002542  176730          RPSN::  .WORD   176730          ;RP07 SERIAL NUMBER
002544  176732          RPOF::  .WORD   176732          ;RP07 OFFSET REGISTER
002546  176734          RPDC::  .WORD   176734          ;RP07 DESIRED CYLINDER
002550  176736          RPCC::  .WORD   176736          ;RP07 CURRENT CYLINDER
002552  176740          RPER2:: .WORD   176740          ;RP07 ERROR REGISTER #2
002554  176742          RPER3:: .WORD   176742          ;RP07 ERROR REGISTER #3
002556  176744          RPEC1:: .WORD   176744          ;RP07 ERROR POSITION
002560  176746          RPEC2:: .WORD   176746          ;RP07 ERROR PATTERN
002562  176750          RPBAE:: .WORD   176750          ;RH70 REGISTER
002564  176752          RPCS3:: .WORD   176752          ;RH70 REGISTER

                        ;ATTENTION BITS TABLE (ATABIT=8 BYTES)
                                ;THIS TABLE CONTAINS THE CORRESPONDING BIT TO EACH DRIVES
                                ;ATTENTION BIT

002566     001          ATABIT::.BYTE   1       ;DRIVE 0
002567     002                  .BYTE   2       ;DRIVE 1
002570     004                  .BYTE   4       ;DRIVE 2
002571     010                  .BYTE   10      ;DRIVE 3
002572     020                  .BYTE   20      ;DRIVE 4
002573     040                  .BYTE   40      ;DRIVE 5
002574     100                  .BYTE   100     ;DRIVE 6
002575     200                  .BYTE   200     ;DRIVE 7

                        ; STORAGE FOR DEVICE REGISTERS
                        ;
002576                  REG::   .BLKW 22.               ;SAVE REGISTERS HERE

002652                  PSTACK::.BLKW 10.               ;SOFTWARE PSEUDO STACK
002676                  MCUTXT::.BLKW 13.               ;ASCII TEXT POINTER FILE
002730                  IOBUFF::.BLKW <50.*6>           ;BUFFER USED FOR DATA TRANSFERS

                        ; MODULE CALLOUT DISPATCH TABLE
                        ;
004060  011161          MCUTAB::J1                      ;            (BIT0 ERRWD1)
004062  011166                  J2                      ;A02 MODULE (BIT1 ERRWD1)
004064  011173                  J3                      ;A03 MODULE (BIT2 ERRWD1)
004066  011200                  J4                      ;A04 MODULE (BIT3 ERRWD1)
004070  011205                  J5                      ;A05 MODULE (BIT4 ERRWD1)
004072  011212                  J6                      ;A06 MODULE (BIT5 ERRWD1)
004074  011217                  J7                      ;A07 MODULE (BIT6 ERRWD1)
```

```
115 004076  011224                          J8                  ;A08 MODULE (BIT7 ERRWD1)
116 004100  011231                          J9                  ;A09 MODULE (BIT 8 ERRWD1)
117 004102  011236                          J10                 ;A10 MODULE (BIT 9 ERRWD1)
118 004104  011243                          J11                 ;A11 MODULE (BIT 10 ERRWD1)
119 004106  011250                          J12                 ;A12 MODULE (BIT 11 ERRWD1)
120 004110  011255                          J13                 ;A13 MODULE (BIT 12 ERRWD1)
121 004112  011262                          J14                 ;A14 MODULE (BIT 13 ERRWD1)
122 004114  011267                          J15                 ;A15 MODULE (BIT 14 ERRWD1)
123 004116  011274                          J16                 ;A16 MODULE (BIT 15 ERRWD1)
124 004120  011301                          J17                 ;A17 MODULE (BIT 0 ERRWD2)
125 004122  011132                          RH                  ;RH CONTROLLER (BIT 1 ERRWD2)
126 004124  011151                          CA                  ;CABLE (BIT 2 ERRWD2)
127 004126  011121                          DS                  ;MASSBUS DISABLE SWITCH (BIT 3 ERRWD2)
128 004130  011074                          AD                  ;DUAL DRIVE RESPONSE (BIT 4 ERRWD2)
129 004132  011306                          J20                 ;A20 MODULE (BIT 5 ERRWD2)
130 004134  011313                          J21                 ;A21 MODULE (BIT 6 ERRWD2)
131 004136  011320                          HDA                 ;HDA CALLOUT (BIT 7 ERRWD2)
132 004140  011325                          TERM                ;TERMINATOR CALLOUT (BIT 8 ERRWD2)
133 004142  011341                          SENSOR              ;PHASE DETECTOR SENSOR (BIT 9 ERRWD2)
134 004144  011361                          BLOWER              ;BLOWER ASSY, (BIT 10 ERRWD2)
135 004146  011376                          PTRANS              ;POWER TRANSFORMER (BIT11 ERRWD2)
136 004150  011421                          MTRBRK              ;MOTOR / BRAKE ASSY'S (BIT 12 ERRWD2)
137 004152  011443                          K1RELA              ;RELAY K1 (BIT 13 ERRWD2)
138 004154  011455                          OPRPNL              ;OPERATOR'S PANEL (BIT 14 ERRWD2)
139 004156  011477                          DRVBLT              ;DRIVE BELT (BIT 15 ERRWD2)
140
141 004160  000002                  TST03:: 2                   ;# OF PATTERNS USED IN THIS TEST
142 004162  002522                          RPCS2               ;REGISTER TO TEST
143 004164  000037                          000037              ;BIT MASK, BITS TO TEST = 1
144 004166  002344                          PATT1               ;PATTERN TO USE
145 004170  002346                          PATT2               ;PATTERN TO USE
146
147 004172  000002                  TST04:: 2                   ;# OF PATTERNS USED IN THIS TEST
148 004174  002514                          RPWC                ;REGISTER TO TEST
149 004176  177777                          177777              ;BIT MASK, BITS TO TEST = 1
150 004200  002344                          PATT1               ;PATTERN TO USE
151 004202  002346                          PATT2               ;PATTERN TU USE
152
153 004204  000002                  TST05:: 2                   ;# OF PATTERNS USED IN THIS TEST
154 004206  002516                          RPBA                ;REGISTER TO TEST
155 004210  177776                          177776              ;BIT MASK, BITS TO TEST = 1
156 004212  002364                          PATT9               ;PATTERN TO USE
157 004214  002346                          PATT2               ;PATTERN TO USE
158
159 004216  000003                  TST08:: 3                   ;# OF PATTERNS IN USE IN THIS TEST
160 004220  002534                          RPDB                ;REGISTER UNDER TEST
161 004222  177777                          177777              ;BIT MASK, BITS TO TEST = 1
162 004224  002344                          PATT1               ;PATTERN TO USE
163 004226  002346                          PATT2               ;PATTERN TO USE
164 004230  002354                          PATT5               ;PATTERN TO USE
165
166 004232  000002                  TST11:: 2                   ;# OF PATTERNS TO USE IN THIS TEST
167 004234  002564                          RPCS3               ;REGISTER TO TEST
168 004236  000117                          000117              ;BIT MASK, BITS TO TEST = 1
169 004240  002344                          PATT1               ;PATTERN TO USE
170 004242  002346                          PATT2               ;PATTERN TO USE
171
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    172 004244  000002                  TST12:: 2                           ;# OF PATTERNS TO USE IN THIS TEST
    173 004246  002562                          RPBAE                       ;REGISTER TO TEST
    174 004250  000077                          000077                      ;BIT MASK, BITS TO TEST = 1
    175 004252  002344                          PATT1                       ;PATTERN TO USE
    176 004254  002346                          PATT2                       ;PATTERN TO USE
    177
    178 004256  000003                  TST28:: 3                           ;# OF PATTERNS TO USE
    179 004260  002520                          RPDA                        ;REGISTER TO TEST
    180 004262  177777                          177777                      ;BIT MASK, BITS TO TEST = 1
    181 004264  002344                          PATT1                       ;PATTERN TO USE
    182 004266  002346                          PATT2                       ;PATTERN TO USE
    183 004270  002350                          PATT3                       ;PATTERN TO USE
    184
    185 004272  002512                  TST33:: RPCS1                       ;FILE OF REGISTERS
    186 004274  002520                          RPDA                        ;TO BE USED IN
    187 004276  002544                          RPOF                        ;THIS TEST
    188 004300  002546                          RPDC                        ;LAST REGISTER USED - THIS TEST
    189
    190 004302  000010                  TST34:: 8.                          ;# OF PATTERNS TO USE
    191 004304  002536                          RPMR1                       ;REGISTER TO TEST
    192 004306  177777                          177777                      ;BITS TO TEST
    193 004310  002344                          PATT1                       ;USE THIS PATTERN
    194 004312  002346                          PATT2                       ;USE THIS PATTERN
    195 004314  002350                          PATT3                       ;USE THIS PATTERN
    196 004316  002354                          PATT5                       ;USE THIS PATTERN
    197 004320  002356                          PATT6                       ;USE THIS PATTERN
    198 004322  002360                          PATT7                       ;USE THIS PATTERN
    199 004324  002362                          PATT8                       ;USE THIS PATTERN
    200 004326  002364                          PATT9                       ;USE THIS PATTERN
    201
    202 004330  002512                  TST49:: RPCS1                       ;FILE OF WRITABLE REGISTERS TO TEST
    203 004332  002514                          RPWC
    204 004334  002516                          RPBA
    205 004336  002520                          RPDA
    206 004340  002522                          RPCS2
    207 004342  002536                          RPMR1
    208 004344  002544                          RPOF
    209 004346  002546                          RPDC
    210 004350  002562                          RPBAE
    211 004352  002564                          RPCS3
```

```
     1                                        .SBTTL  MODULE CALLOUT TABLE
     2
     3                                                ;LAST ERROR CODE GUIDE REVISION: 3/15/81 (REV A)
     4                                                ;LAST CHANGE TO THIS SOURCE CODE: 4/22/81
     5
     6 004354   000000                        EC.00:  0                       ;NOT USED (00 ERROR CODE)
     7 004356   000000                                0                       ;NOT USED
     8 004360   000000                                0                       ;NOT USED (01 ERROR CODE)
     9 004362   000000                                0                       ;NOT USED
    10 004364   000000                                0                       ;NOT USED (02 ERROR CODE)
    11 004366   000000                                0                       ;NOT USED
    12 004370   000000                                0                       ;NOT USED (03 ERROR CODE)
    13 004372   000000                                0                       ;NOT USED
    14 004374   000000                                0                       ;NOT USED (04 ERROR CODE)
    15 004376   000000                                0                       ;NOT USED
    16 004400   000000                                0                       ;NOT USED (05 ERROR CODE)
    17 004402   000000                                0                       ;NOT USED
    18 004404   000000                                0                       ;NOT USED (06 ERROR CODE)
    19 004406   000000                                0                       ;NOT USED
    20 004410   000000                                0                       ;NOT USED (07 ERROR CODE)
    21 004412   000000                                0                       ;NOT USED
    22 004414   000000                                0                       ;NOT USED (08 ERROR CODE)
    23 004416   000000                                0                       ;NOT USED
    24 004420   000000                                0                       ;NOT USED (09 ERROR CODE)
    25 004422   000000                                0                       ;NOT USED
    26 004424   000000                                0                       ;NOT USED (0A ERROR CODE)
    27 004426   000000                                0                       ;NOT USED
    28 004430   000000                                0                       ;NOT USED (0B ERROR CODE)
    29 004432   000000                                0                       ;NOT USED
    30 004434   000000                                0                       ;NOT USED (0C ERROR CODE)
    31 004436   000000                                0                       ;NOT USED
    32 004440   000000                                0                       ;NOT USED (0D ERROR CODE)
    33 004442   000000                                0                       ;NOT USED
    34 004444   000000                                0                       ;NOT USED (0E ERROR CODE)
    35 004446   000000                                0                       ;NOT USED
    36 004450   000000                                0                       ;NOT USED (0F ERROR CODE)
    37 004452   000000                                0                       ;NOT USED
    38 004454   000100                                BIT6                    ;A7 MODULE (10 ERROR CODE)
    39 004456   000000                                0                       ;NO CALLOUT
    40 004460   000100                                BIT6                    ;A7 MODULE (11 ERROR CODE)
    41 004462   000000                                0                       ;NO CALLOUT
    42 004464   000100                                BIT6                    ;A7 MODULE (12 ERROR CODE)
    43 004466   000000                                0                       ;NO CALLOUT
    44 004470   000100                                BIT6                    ;A7 MODULE (13 ERROR CODE)
    45 004472   000000                                0                       ;NO CALLOUT
    46 004474   000100                                BIT6                    ;A7 MODULE (14 ERROR CODE)
    47 004476   000000                                0                       ;NO CALLOUT
    48 004500   000100                                BIT6                    ;A7 MODULE (15 ERROR CODE)
    49 004502   000000                                0                       ;NO CALLOUT
    50 004504   000100                                BIT6                    ;A7 MODULE (16 ERROR CODE)
    51 004506   000000                                0                       ;NOT USED
    52 004510   000100                                BIT6                    ;A7 MODULE (17 ERROR CODE)
    53 004512   000000                                0                       ;NO CALLOUT
    54 004514   000100                                BIT6                    ;A7 MODULE (18 ERROR CODE)
    55 004516   000000                                0                       ;NO CALLOUT
    56 004520   000100                                BIT6                    ;A7 MODULE (19 ERROR CODE)
    57 004522   000000                                0                       ;NO CALLOUT
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  58 004524   000100                        BIT6                      ;A7 MODULE (1A ERROR CODE)
  59 004526   000000                        0                         ;NO CALLOUT
  60 004530   000070                        BIT3!BIT4!BIT5            ;A4,A5,A6 MODULES (1B ERROR CODE)
  61 004532   000200                        BIT7                      ;HDA
  62 004534   000070                        BIT3!BIT4!BIT5            ;A4, A5, A6 MODULES (1C ERROR CODE)
  63 004536   000200                        BIT7                      ;HDA
  64 004540   000070                        BIT3!BIT4!BIT5            ;A4, A5, A6 MODULES (1D ERROR CODE)
  65 004542   000200                        BIT7                      ;HDA
  66 004544   000070                        BIT3!BIT4!BIT5            ;A4, A5, A6 MODULES (1E ERROR CODE)
  67 004546   000200                        BIT7                      ;HDA
  68 004550   177776                        ^CBIT0!BIT1!BIT2          ;A4 - A16 MODULES (1F ERROR CODE)
  69 004552   000040                        BIT5                      ;A20 MODULE
  70 004554   000100                        BIT6                      ;A7 MODULE (20 ERROR CODE)
  71 004556   000000                        0                         ;NO CALLOUT
  72 004560   000100                        BIT6                      ;A7 MODULE (21 ERROR CODE)
  73 004562   000000                        0                         ;NO CALLOUT
  74 004564   000100                        BIT6                      ;A7 MODULE (22 ERROR CODE)
  75 004566   000000                        0                         ;NO CALLOUT
  76 004570   000100                        BIT6                      ;A7 MODULE (23 ERROR CODE)
  77 004572   000000                        0                         ;NO CALLOUT
  78 004574   000100                        BIT6                      ;A7 MODULE (24 ERROR CODE)
  79 004576   000000                        0                         ;NO CALLOUT
  80 004600   000100                        BIT6                      ;A7 MODULE (25 ERROR CODE)
  81 004602   000000                        0                         ;NO CALLOUT
  82 004604   000100                        BIT6                      ;A7 MODULE (26 ERROR CODE)
  83 004606   000000                        0                         ;NO CALLOUT
  84 004610   000522                        BIT1!BIT4!BIT6!BIT8       ;A2, A5, A7, A9 MODULES (28 ERROR CODE)
  85 004612   000000                        0                         ;NO CALLOUT
  86 004614   000050                        BIT3!BIT5                 ;A4, A6 MODULE (28 ERROR CODE)
  87 004616   000000                        0                         ;NO CALLOUT
  88 004620   000030                        BIT3!BIT4                 ;A4, A5 MODULE (29 ERROR CODE)
  89 004622   000000                        0                         ;NO CALLOUT
  90 004624   000050                        BIT3!BIT5                 ;A4, A6 MODULES (2A ERROR CODE)
  91 004626   000000                        0                         ;NO CALLOUT
  92 004630   000030                        BIT3!BIT4                 ;A4, A5 MODULE (2B ERROR CODE)
  93 004632   000000                        0                         ;NO CALLOUT
  94 004634   000050                        BIT3!BIT5                 ;A4, A6 MODULE (2C ERROR CODE)
  95 004636   000000                        0                         ;NO CALLOUT
  96 004640   000050                        BIT3!BIT5                 ;A4, A6 MODULE (2D ERROR CODE)
  97 004642   000000                        0                         ;NO CALLOUT
  98 004644   000030                        BIT3!BIT4                 ;A4, A5 MODULE (2E ERROR CODE)
  99 004646   000000                        0                         ;NO CALLOUT
 100 004650   000030                        BIT3!BIT4                 ;A4, A5 MODULE (2F ERROR CODE)
 101 004652   000000                        0                         ;NO CALLOUT
 102 004654   001400                        BIT8!BIT9                 ;A9, A10 MODULES (30 ERROR CODE)
 103 004656   000000                        0                         ;NO CALLOUT
 104 004660   001000                        BIT9                      ;A10 MODULE (31 ERROR CODE)
 105 004662   000000                        0                         ;NO CALLOUT
 106 004664   001000                        BIT9                      ;A10 MODULE (32 ERROR CODE)
 107 004666   000000                        0                         ;NO CALLOUT
 108 004670   001400                        BIT8!BIT9                 ;A9,A10 MODULE (33 ERROR CODE)
 109 004672   000000                        0                         ;NO CALLOUT
 110 004674   001000                        BIT9                      ;A10 MODULE (34 ERROR CODE)
 111 004676   000000                        0                         ;NO CALLOUT
 112 004700   001000                        BIT9                      ;A10 ERROR CODE (35 ERROR CODE)
 113 004702   000000                        0                         ;NO CALLOUT
 114 004704   001000                        BIT9                      ;A10 MODULE (36 ERROR CODE)
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    115 004706   000000                    0                            ;NO CALLOUT
    116 004710   001000                    BIT9                         ;A10 MODULE (37 ERROR CODE)
    117 004712   000000                    0                            ;NO CALLOUT
    118 004714   001000                    BIT9                         ;A10 MODULE (38 ERROR CODE)
    119 004716   000000                    0                            ;NO CALLOUT
    120 004720   001000                    BIT9                         ;A10 MODULE (39 ERROR CODE)
    121 004722   000000                    0                            ;NO CALLOUT
    122 004724   001000                    BIT9                         ;A10 MODULE (3A ERROR CODE)
    123 004726   000000                    0                            ;NOT USED
    124 004730   001000                    BIT9                         ;A10 MODULE (3B ERROR CODE)
    125 004732   000000                    0                            ;NOT USED
    126 004734   000100                    BIT6                         ;A7 MODULE (3C ERROR CODE)
    127 004736   000000                    0                            ;NOT USED
    128 004740   000100                    BIT6                         ;A7 MODULE (3D ERROR CODE)
    129 004742   000000                    0                            ;NOT USED
    130 004744   000100                    BIT6                         ;A7 MODULE (3E ERROR CODE)
    131 004746   000000                    0                            ;NOT USED
    132 004750   001102                    BIT1!BIT6!BIT9               ;A2, A7, A10 MODULES (3F ERROR CODE)
    133 004752   000000                    0                            ;NOT USED
    134 004754   000000                    0                            ;NO CALLOUT (40 ERROR CODE)
    135 004756   000000                    0                            ;NO CALLOUT
    136 004760   000102                    BIT1!BIT6                    ;A2, A7 MODULES (41 ERROR CODE)
    137 004762   002000                    BIT10                        ;BLOWER ASSY
    138 004764   000343                    BIT0!BIT1!BIT5!BIT6!BIT7;A1, A2, A6, A7, A8 MODULES (42 ERROR CODE)
    139 004766   135200                    BIT7!BIT9!BIT11!BIT12!BIT13!BIT15;HDA, PHASE DETECTOR, TRANSFORMER, MOTOR, K1, BELT
    140 004770   000040                    BIT5                         ;A6 MODULE (43 ERROR CODE)
    141 004772   000200                    BIT7                         ;HDA CALLOUT
    142 004774   000070                    BIT3!BIT4!BIT5               ;A4, A5, A6 MODULES (44 ERROR CODE)
    143 004776   000200                    BIT7                         ;HDA CALLOUT
    144 005000   000070                    BIT3!BIT4!BIT5               ;A4, A5, A6 (45 ERROR CODE)
    145 005002   000200                    BIT7                         ;HDA CALLOUT
    146 005004   000070                    BIT3!BIT4!BIT5               ;A4, A5, A6 MODULES (46 ERROR CODE)
    147 005006   000200                    BIT7                         ;HDA
    148 005010   000070                    BIT3!BIT4!BIT5               ;A4, A5, A6 MODULES (47 ERROR CODE)
    149 005012   000200                    BIT7                         ;HDA
    150 005014   000030                    BIT3!BIT4                    ;A4, A5 MODULES (48 ERROR CODE)
    151 005016   000000                    0                            ;NO CALLOUT
    152 005020   000030                    BIT3!BIT4                    ;A4, A5 MODULES (49 ERROR CODE)
    153 005022   000000                    0                            ;NO CALLOUT
    154 005024   000070                    BIT3!BIT4!BIT5               ;A4, A5, A6 MODULES (4A ERROR CODE)
    155 005026   000200                    BIT7                         ;HDA
    156 005030   000032                    BIT1!BIT3!BIT4               ;A2, A4, A5 MODULES (4B ERROR CODE)
    157 005032   000000                    0                            ;NO CALLOUT
    158 005034   000020                    BIT4                         ;A5 MODULE (4C ERROR CODE)
    159 005036   000000                    0                            ;NO CALLOUT
    160 005040   000020                    BIT4                         ;A5 MODULE (4D ERROR CODE)
    161 005042   000000                    0                            ;NO CALLOUT
    162 005044   000053                    BIT0!BIT1!BIT3!BIT5          ;A1, A2, A4, A6 MODULES (4E ERROR CODE)
    163 005046   000000                    0                            ;NO CALLOUT
    164 005050   000012                    BIT1!BIT3                    ;A2, A4 MODULES (4F ERROR CODE)
    165 005052   000000                    0                            ;NOT USED
    166 005054   000070                    BIT3!BIT4!BIT5               ;A4, A5, A6 MODULES (50 ERROR CODE)
    167 005056   000200                    BIT7                         ;HDA
    168 005060   000070                    BIT3!BIT4!BIT5               ;A4, A5, A6 MODULES (51 ERROR CODE)
    169 005062   000200                    BIT7                         ;HDA
    170 005064   000070                    BIT3!BIT4!BIT5               ;A4, A5, A6 MODULES (52 ERROR CODE)
    171 005066   000200                    BIT7                         ;HDA
```

```
005070  000050          BIT3!BIT5               ;A4, A6 MODULES (53 ERROR CODE)
005072  000000          0                       ;NO CALLOUT
005074  000012          BIT1!BIT3               ;A2, A4 MODULES (54 ERROR CODE)
005076  000000          0                       ;NOT USED
005100  000070          BIT3!BIT4!BIT5          ;A4, A5, A6 MODULES (55 ERROR CODE)
005102  000200          BIT7                    ;HDA
005104  000012          BIT1!BIT3               ;A2, A4 MODULES (56 ERROR CODE)
005106  000000          0                       ;NOT USED
005110  000030          BIT3!BIT4               ;A4, A5 MODULES (57 ERROR CODE)
005112  000000          0                       ;NO CALLOUT
005114  000030          BIT3!BIT4               ;A4, A5 MODULES (58 ERROR CODE)
005116  000000          0                       ;NO CALLOUT
005120  000030          BIT3!BIT4               ;A4, A5 MODULES (59 ERROR CODE)
005122  000000          0                       ;NO CALLOUT
005124  000030          BIT3!BIT4               ;A4, A5 MODULES (5A ERROR CODE)
005126  000000          0                       ;NO CALLOUT
005130  000030          BIT3!BIT4               ;A4, A5 MODULES (5B ERROR CODE)
005132  000000          0                       ;NO CALLOUT
005134  000030          BIT3!BIT4               ;A4, A5 MODULES (5C ERROR CODE)
005136  000000          0                       ;NO CALLOUT
005140  000030          BIT3!BIT4               ;A4, A5 MODULES (5D ERROR CODE)
005142  000000          0                       ;NO CALLOUT
005144  000030          BIT3!BIT4               ;A4, A5 MODULES (5E ERROR CODE)
005146  000000          0                       ;NO CALLOUT
005150  000030          BIT3!BIT4               ;A4, A5 MODULES (5F ERROR CODE)
005152  000000          0                       ;NO CALLOUT
005154  000330          BIT3!BIT4!BIT6!BIT7     ;A4, A5, A7, A8  MODULES (60 ERROR CODE)
005156  040000          BIT14                   ;OPERATOR'S PANEL
005160  000070          BIT3!BIT4!BIT5          ;A4, A5, A6 MODULES (61 ERROR CODE)
005162  000200          BIT7                    ;HDA
005164  000050          BIT3!BIT5               ;A4, A6 MODULES (62 ERROR CODE)
005166  000000          0                       ;NO CALLOUT
005170  000020          BIT4                    ;A5 MODULE (63 ERROR CODE)
005172  000000          0                       ;NOT USED
005174  004570          BIT3!BIT4!BIT5!BIT6!BIT8!BIT11;A4, A5, A6, A7, A9, A12 MODULES  (64 ERROR CODE)
005176  000200          BIT7                    ;HDA
005200  004550          BIT3!BIT5!BIT6!BIT8!BIT11;A4, A6, A7, A9, A12 MODULES (65 ERROR CODE)
005202  000000          0                       ;NO CALLOUT
005204  000070          BIT3!BIT4!BIT5          ;A4, A5, A6 MODULES (66 ERROR CODE)
005206  000000          0                       ;NO CALLOUT
005210  000040          BIT5                    ;A6 MODULES (67 ERROR CODE)
005212  000000          0                       ;NO CALLOUT
005214  000050          BIT3!BIT5               ;A4, A6 MODULES (68 ERROR CODE)
005216  000000          0                       ;NO CALLOUT
005220  000200          BIT7                    ;A8 MODULE (69 ERROR CODE)
005222  000000          0                       ;NOT USED
005224  004200          BIT7!BIT11              ;A8, A12 MODULES (6A ERROR CODE)
005226  000004          BIT2                    ;MASSBUS CABLE
005230  000000          0                       ;NOT USED (6B ERROR CODE)
005232  000000          0                       ;NOT USED
005234  000160          BIT4!BIT5!BIT6          ;A5, A6, A7 MODULES (6C ERROR CODE)
005236  000000          0                       ;NO CALLOUT
005240  000160          BIT4!BIT5!BIT6          ;A5, A6, A7 MODULE (6D ERROR CODE)
005242  000000          0                       ;NO CALLOUT
005244  000060          BIT4!BIT5               ;A5, A6 MODULE (6E ERROR CODE)
005246  000000          0                       ;NO CALLOUT
005250  000060          BIT4!BIT5               ;A5, A6 MODULE (6F ERROR CODE)
```

```
229 005252  000000          0                         ;NO CALLOUT
230 005254  000130          BIT3!BIT4!BIT6            ;A4, A5, A7 MODULES (70 ERROR CODE)
231 005256  000000          0                         ;NO CALLOUT
232 005260  000010          BIT3                      ;A4 MODULE (71 ERROR CODE)
233 005262  000000          0                         ;NO CALLOUT
234 005264  000012          BIT1!BIT3                 ;A2,A4 MODULE (72 ERROR CODE)
235 005266  000000          0                         ;NO CALLOUT
236 005270  000012          BIT1!BIT3                 ;A2,A4 MODULE (73 ERROR CODE)
237 005272  000000          0                         ;NO CALLOUT
238 005274  000020          BIT4                      ;A5 MODULE (74 ERROR CODE)
239 005276  000000          0                         ;NO CALLOUT
240 005300  000020          BIT4                      ;A5 MODULE (75 ERROR CODE)
241 005302  000000          0                         ;NO CALLOUT
242 005304  000020          BIT4                      ;A5 MODULE (76 ERROR CODE)
243 005306  000000          0                         ;NO CALLOUT
244 005310  000020          BIT4                      ;A5 MODULE (77 ERROR CODE)
245 005312  000000          0                         ;NO CALLOUT
246 005314  000020          BIT4                      ;A5 MODULE (78 ERROR CODE)
247 005316  000000          0                         ;NO CALLOUT
248 005320  000020          BIT4                      ;A5 MODULE (79 ERROR CODE)
249 005322  000000          0                         ;NO CALLOUT
250 005324  000020          BIT4                      ;A5 MODULE (7A ERROR CODE)
251 005326  000000          0                         ;NO CALLOUT
252 005330  000020          BIT4                      ;A5 MODULE (7B ERROR CODE)
253 005332  000000          0                         ;NO CALLOUT
254 005334  000020          BIT4                      ;A5 MODULE (7C ERROR CODE)
255 005336  000000          0                         ;NO CALLOUT
256 005340  000020          BIT4                      ;A5 MODULE (7D ERROR CODE)
257 005342  000000          0                         ;NO CALLOUT
258 005344  165700          BIT6!BIT7!BIT8!BIT9!BIT11!BIT13!BIT14!BIT15;A7, A8, A9, A10, A12, A14, A15, A16 (7E
259 005346  000201          BIT0!BIT7                 ;A17,HDA CALLOUT (7E ERROR CODE)
260 005350  016200          BIT7!BIT10!BIT11!BIT12    ;A8, A11, A12, A13 (7F ERROR CODE)
261 005352  000000          0                         ;NO CALLOUT
262 005354  000100          BIT6                      ;A7 MODULE (80 ERROR CODE)
263 005356  001000          BIT9                      ;PHASE DETECTOR
264 005360  001600          BIT7!BIT8!BIT9            ;A8, A9, A10 MODULE (81 ERROR CODE)
265 005362  000000          0                         ;NO CALLOUT
266 005364  001400          BIT8!BIT9                 ;A9, A10 MODULES (82 ERROR CODE)
267 005366  000000          0                         ;NO CALLOUT
268 005370  001700          BIT6!BIT7!BIT8!BIT9       ;A7, A8, A9, A10 MODULES (83 ERROR CODE)
269 005372  000000          0                         ;NO CALLOUT
270 005374  025600          BIT7!BIT8!BIT9!BIT11!BIT13;A8, A9, A10, A12, A14 MODULES (84 ERROR CODE)
271 005376  000000          0                         ;NO CALLOUT
272 005400  001400          BIT8!BIT9                 ;A9, A10 MODULES (85 ERROR CODE)
273 005402  000000          0                         ;NO CALLOUT
274 005404  001400          BIT8!BIT9                 ;A9, A10 MODULES (86 ERROR CODE)
275 005406  000000          0                         ;NO CALLOUT
276 005410  000600          BIT7!BIT8                 ;A8, A9 MODULES (87 ERROR CODE)
277 005412  000000          0                         ;NO CALLOUT
278 005414  000000          0                         ;NO CALLOUT (88 ERROR CODE)
279 005416  000000          0                         ;NO CALLOUT
280 005420  000200          BIT7                      ;A8 MODULE (89 ERROR CODE)
281 005422  000000          0                         ;NOT USED
282 005424  000240          BIT5!BIT7                 ;A6, A8 MODULE (8A ERROR CODE)
283 005426  000000          0                         ;NO CALLOUT
284 005430  000020          BIT4                      ;A5 MODULE (8B ERROR CODE)
285 005432  000000          0                         ;NO CALLOUT
```

```
    286 005434  000020              BIT4                            ;A5 MODULE (8C ERROR CODE)
    287 005436  000000              0                               ;NO CALLOUT
    288 005440  000020              BIT4                            ;A5 MODULE (8D ERROR CODE)
    289 005442  000000              0                               ;NO CALLOUT
    290 005444  165200              BIT7!BIT9!BIT11!BIT13!BIT14!BIT15;A8, A10, A12, A14, A15, A16 MODULE (8E ERROR CODE)
    291 005446  000200              BIT7                            ;HDA
    292 005450  001400              BIT8!BIT9                       ;A9, A10 MODULES (8F ERROR CODE)
    293 005452  000000              0                               ;NO CALLOUT
    294 005454  004000              BIT11                           ;A12 MODULE (90 ERROR CODE)
    295 005456  000000              0                               ;NO CALLOUT
    296 005460  004200              BIT7!BIT11                      ;A8, A12 MODULES (91 ERROR CODE)
    297 005462  000000              0                               ;NO CALLOUT
    298 005464  004000              BIT11                           ;A12 MODULE (92 ERROR CODE)
    299 005466  000000              0                               ;NO CALLOUT
    300 005470  004200              BIT7!BIT11                      ;A8, A12 MODULES (93 ERROR CODE)
    301 005472  000000              0                               ;NO CALLOUT
    302 005474  004000              BIT11                           ;A12 MODULE (94 ERROR CODE)
    303 005476  000000              0                               ;NO CALLOUT
    304 005500  004300              BIT6!BIT7!BIT11                 ;A7, A8, A12 MODULES (95 ERROR CODE)
    305 005502  000000              0                               ;NO CALLOUT
    306 005504  004000              BIT11                           ;A12 MODULE (96 ERROR CODE)
    307 005506  000000              0                               ;NO CALLOUT
    308 005510  004000              BIT11                           ;A12 MODULE (97 ERROR CODE)
    309 005512  000000              0                               ;NO CALLOUT
    310 005514  004200              BIT7!BIT11                      ;A8, A12 MODULES (98 ERROR CODE)
    311 005516  000000              0                               ;NO CALLOUT
    312 005520  004200              BIT7!BIT11                      ;A8, A12 MODULES (99 ERROR CODE)
    313 005522  000000              0                               ;NO CALLOUT
    314 005524  004200              BIT7!BIT11                      ;A8, A12 MODULES (9A ERROR CODE)
    315 005526  000000              0                               ;NO CALLOUT
    316 005530  004200              BIT7!BIT11                      ;A8, A12 MODULES (9B ERROR CODE)
    317 005532  000000              0                               ;NO CALLOUT
    318 005534  004200              BIT7!BIT11                      ;A8, A12 MODULES (9C ERROR CODE)
    319 005536  000000              0                               ;NO CALLOUT
    320 005540  004000              BIT11                           ;A12 MODULE (9D ERROR CODE)
    321 005542  000000              0                               ;NO CALLOUT
    322 005544  004000              BIT11                           ;A12 MODULE (9E ERROR CODE)
    323 005546  000000              0                               ;NO CALLOUT
    324 005550  004000              BIT11                           ;A12 MODULE (9F ERROR CODE)
    325 005552  000000              0                               ;NO CALLOUT
    326 005554  004000              BIT11                           ;A12 MODULE (A0 ERROR CODE)
    327 005556  000000              0                               ;NO CALLOUT
    328 005560  004000              BIT11                           ;A12 MODULE (A1 ERROR CODE)
    329 005562  000000              0                               ;NO CALLOUT
    330 005564  004000              BIT11                           ;A12 MODULE (A2 ERROR CODE)
    331 005566  000000              0                               ;NO CALLOUT
    332 005570  004000              BIT11                           ;A12 MODULE (A3 ERROR CODE)
    333 005572  000000              0                               ;NO CALLOUT
    334 005574  004000              BIT11                           ;A12 MODULE (A4 ERROR CODE)
    335 005576  000000              0                               ;NO CALLOUT
    336 005600  004200              BIT7!BIT11                      ;A8, A12 MODULES (A5 ERROR CODE)
    337 005602  000000              0                               ;NO CALLOUT
    338 005604  004200              BIT7!BIT11                      ;A8, A12 MODULES (A6 ERROR CODE)
    339 005606  000000              0                               ;NO CALLOUT
    340 005610  004000              BIT11                           ;A12 MODULE (A7 ERROR CODE)
    341 005612  000000              0                               ;NO CALLOUT
    342 005614  004000              BIT11                           ;A12 MODULE (A8 ERROR CODE)
```

```
005616  000000          0                       ;NO CALLOUT
005620  004000          BIT11                   ;A12 MODULE (A9 ERROR CODE)
005622  000000          0                       ;NO CALLOUT
005624  004000          BIT11                   ;A12 MODULE (AA ERROR CODE)
005626  000000          0                       ;NO CALLOUT
005630  004000          BIT11                   ;A12 MODULE (AB ERROR CODE)
005632  000000          0                       ;NO CALLOUT
005634  004000          BIT11                   ;A12 MODULE (AC ERROR CODE)
005636  000000          0                       ;NO CALLOUT
005640  004000          BIT11                   ;A12 MODULE (AD ERROR CODE)
005642  000000          0                       ;NO CALLOUT
005644  004000          BIT11                   ;A12 MODULE (AE ERROR CODE)
005646  000000          0                       ;NO CALLOUT
005650  004000          BIT11                   ;A12 MODULE (AF ERROR CODE)
005652  000000          0                       ;NO CALLOUT
005654  004000          BIT11                   ;A12 MODULE (B0 ERROR CODE)
005656  000000          0                       ;NO CALLOUT
005660  004000          BIT11                   ;A12 MODULE (B1 ERROR CODE)
005662  000000          0                       ;NO CALLOUT
005664  004000          BIT11                   ;A12 MODULE (B2 ERROR CODE)
005666  000000          0                       ;NO CALLOUT
005670  004000          BIT11                   ;A12 MODULE (B3 ERROR CODE)
005672  000000          0                       ;NO CALLOUT
005674  004000          BIT11                   ;A12 MODULE (B4 ERROR CODE)
005676  000000          0                       ;NO CALLOUT
005700  004000          BIT11                   ;A12 MODULE (B5 ERROR CODE)
005702  000000          0                       ;NO CALLOUT
005704  004000          BIT11                   ;A12 MODULE (B6 ERROR CODE)
005706  000000          0                       ;NO CALLOUT
005710  004000          BIT11                   ;A12 MODULE (B7 ERROR CODE)
005712  000000          0                       ;NO CALLOUT
005714  004000          BIT11                   ;A12 MODULE (B8 ERROR CODE)
005716  000000          0                       ;NO CALLOUT
005720  004300          BIT6!BIT7!BIT11         ;A7, A8, A12 MODULE (B9 ERROR CODE)
005722  000000          0                       ;NO CALLOUT
005724  004200          BIT7!BIT11              ;A8, A12 MODULES (BA ERROR CODE)
005726  000000          0                       ;NO CALLOUT
005730  000000          0                       ;NO CALLOUT (BB ERROR CODE)
005732  000000          0                       ;NO CALLOUT
005734  000000          0                       ;NO CALLOUT (BC ERROR CODE)
005736  000000          0                       ;NO CALLOUT
005740  000000          0                       ;NO CALLOUT (BD ERROR CODE)
005742  000000          0                       ;NO CALLOUT
005744  004000          BIT11                   ;A12 MODULE (BE ERROR CODE)
005746  000000          0                       ;NO CALLOUT
005750  004000          BIT11                   ;A12 MODULE (BF ERROR CODE)
005752  000000          0                       ;NO CALLOUT
005754  000020          BIT4                    ;A5 MODULE (C0 ERROR CODE)
005756  000000          0                       ;NO CALLOUT
005760  000020          BIT4                    ;A5 MODULE (C1 ERROR CODE)
005762  000000          0                       ;NO CALLOUT
005764  000030          BIT3!BIT4               ;A4, A5 MODULES (C2 ERROR CODE)
005766  000000          0                       ;NO CALLOUT
005770  000020          BIT4                    ;A5 MODULE (C3 ERROR CODE)
005772  000000          0                       ;NO CALLOUT
005774  000020          BIT4                    ;A5 MODULE (C4 ERROR CODE)
005776  000000          0                       ;NO CALLOUT
```

```
    400 006000  000060                 BIT4!BIT5               ;A5, A6 MODULES (C5 ERROR CODE)
    401 006002  000000                 0                       ;NO CALLOUT
    402 006004  000020                 BIT4                    ;A5 MODULE (C6 ERROR CODE)
    403 006006  000000                 0                       ;NO CALLOUT
    404 006010  000000                 0                       ;NOT USED (C7 ERROR CODE)
    405 006012  000000                 0                       ;NOT USED
    406 006014  000000                 0                       ;NOT USED (C8 ERROR CODE)
    407 006016  000000                 0                       ;NOT USED
    408 006020  000000                 0                       ;NOT USED (C9 ERROR CODE)
    409 006022  000000                 0                       ;NOT USED
    410 006024  000000                 0                       ;NOT USED (CA ERROR CODE)
    411 006026  000000                 0                       ;NOT USED
    412 006030  000000                 0                       ;NOT USED (CB ERROR CODE)
    413 006032  000000                 0                       ;NOT USED
    414 006034  000000                 0                       ;NOT USED (CC ERROR CODE)
    415 006036  000000                 0                       ;NOT USED
    416 006040  000000                 0                       ;NOT USED (CD ERROR CODE)
    417 006042  000000                 0                       ;NOT USED
    418 006044  000000                 0                       ;NOT USED (CE ERROR CODE)
    419 006046  000000                 0                       ;NOT USED
    420 006050  000000                 0                       ;NOT USED (CF ERROR CODE)
    421 006052  000000                 0                       ;NOT USED
    422 006054  001400                 BIT8!BIT9               ;A9, A10 MODULE (D0 ERROR CODE)
    423 006056  000000                 0                       ;NO CALLOUT
    424 006060  021400                 BIT8!BIT9!BIT13         ;A9, A10, A14 MODULES (D1 ERROR CODE)
    425 006062  000000                 0                       ;NO CALLOUT
    426 006064  001000                 BIT9                    ;A10 MODULE (D2 ERROR CODE)
    427 006066  000000                 0                       ;NO CALLOUT
    428 006070  005400                 BIT8!BIT9!BIT11         ;A9, A10, A12 MODULES (D3 ERROR CODE)
    429 006072  000000                 0                       ;NO CALLOUT
    430 006074  021000                 BIT9!BIT13              ;A10, A14 MODULES (D4 ERROR CODE)
    431 006076  000000                 0                       ;NO CALLOUT
    432 006100  025400                 BIT8!BIT9!BIT11!BIT13   ;A9, A10, A12, A14 MODULES (D5 ERROR CODE)
    433 006102  000000                 0                       ;NO CALLOUT
    434 006104  061000                 BIT9!BIT13!BIT14        ;A10, A14, A15 MODULES (D6 ERROR CODE)
    435 006106  000001                 BIT0                    ;A17 MODULE
    436 006110  000000                 0                       ;NOT USED (D7 ERROR CODE)
    437 006112  000000                 0                       ;NOT USED
    438 006114  001000                 BIT9                    ;A10 MODULE (D8 ERROR CODE)
    439 006116  000000                 0                       ;NO CALLOUT
    440 006120  000000                 0                       ;NOT USED (D9 ERROR CODE)
    441 006122  000000                 0                       ;NOT USED
    442 006124  004400                 BIT8!BIT11              ;A9, A12 MODULE (DA ERROR CODE)
    443 006126  000000                 0                       ;NO CALLOUT
    444 006130  000000                 0                       ;NOT USED (DB ERROR CODE)
    445 006132  000000                 0                       ;NOT USED
    446 006134  060000                 BIT13!BIT14             ;A14, A15 MODULES (DC ERROR CODE)
    447 006136  000000                 0                       ;NO CALLOUT
    448 006140  061000                 BIT9!BIT13!BIT14        ;A10, A14, A15 MODULES (DD ERROR CODE)
    449 006142  000000                 0                       ;NO CALLOUT
    450 006144  020000                 BIT13                   ;A14 MODULE (DE ERROR CODE)
    451 006146  000000                 0                       ;NO CALLOUT
    452 006150  020000                 BIT13                   ;A14 MODULE (DF ERROR CODE)
    453 006152  000000                 0                       ;NO CALLOUT
    454 006154  020000                 BIT13                   ;A14 MODULE (E0 ERROR CODE)
    455 006156  000000                 0                       ;NO CALLOUT
    456 006160  020000                 BIT13                   ;A14 MODULE (E1 ERROR CODE)
```

MODULE CALLOUT TABLE

```
    457 006162  000000                  0                       ;NOT USED
    458 006164  020000                  BIT13                   ;A14 MODULE (E2 ERROR CODE)
    459 006166  000000                  0                       ;NO CALLOUT
    460 006170  020000                  BIT13                   ;A14 MODULE (E3 ERROR CODE)
    461 006172  000000                  0                       ;NO CALLOUT
    462 006174  020000                  BIT13                   ;A14 MODULE (E4 ERROR CODE)
    463 006176  000000                  0                       ;NO CALLOUT
    464 006200  000000                  0                       ;NOT USED (E5 ERROR CODE)
    465 006202  000000                  0                       ;NOT USED
    466 006204  160000                  BIT13!BIT14!BIT15       ;A14, A15, A16 MODULE (E6 ERROR CODE)
    467 006206  000000                  0                       ;OPEN
    468 006210  040000                  BIT14                   ;A15 MODULE (E7 ERROR CODE)
    469 006212  000000                  0                       ;OPEN
    470 006214  141000                  BIT9!BIT14!BIT15        ;A10, A14, A15 MODULES (E8 ERROR CODE)
    471 006216  000000                  0                       ;NO CALLOUT
    472 006220  001000                  BIT9                    ;A10 MODULE (E9 ERROR CODE)
    473 006222  000000                  0                       ;NO CALLOUT
    474 006224  000600                  BIT7!BIT8               ;A8, A9 MODULES (EA ERROR CODE)
    475 006226  000000                  0                       ;NO CALLOUT
    476 006230  000000                  0                       ;NO CALLOUT (EB ERROR CODE)
    477 006232  000000                  0                       ;NO CALLOUT
    478 006234  000000                  0                       ;NO CALLOUT (EC ERROR CODE)
    479 006236  000000                  0                       ;NO CALLOUT
    480 006240  000100                  BIT6                    ;A7 MODULE (ED ERROR CODE)
    481 006242  000000                  0                       ;NO CALLOUT
    482 006244  000000                  0                       ;NO CALLOUT (EE ERROR CODE)
    483 006246  000000                  0                       ;NO CALLOUT
    484 006250  000000                  0                       ;NO CALLOUT (EF ERROR CODE)
    485 006252  000000                  0                       ;NO CALLOUT
    486 006254  100000                  BIT15                   ;A16 MODULE (F0 ERROR CODE)
    487 006256  000000                  0                       ;NO CALLOUT
    488 006260  100200                  BIT7!BIT15              ;A8, A16 MODULE (F1 ERROR CODE)
    489 006262  000201                  BIT0!BIT7               ;A17, HDA CALLOUT
    490 006264  100000                  BIT15                   ;A16 MODULE (F2 ERROR CODE)
    491 006266  000200                  BIT7                    ;HDA CALLOUT
    492 006270  100000                  BIT15                   ;A16 MODULE (F3 ERROR CODE)
    493 006272  000200                  BIT7                    ;HDA CALLOUT
    494 006274  100000                  BIT15                   ;A16 MODULE (F4 ERROR CODE)
    495 006276  000200                  BIT7                    ;HDA CALLOUT
    496 006300  100000                  BIT15                   ;A16 MODULE (F5 ERROR CODE)
    497 006302  000000                  0                       ;NOT USED
    498 006304  141000                  BIT9!BIT14!BIT15        ;A10, A15, A16 MODULE (F6 ERROR CODE)
    499 006306  000201                  BIT0!BIT7               ;A17, HDA CALLOUT
    500 006310  100000                  BIT15                   ;A16 MODULE (F7 ERROR CODE)
    501 006312  000201                  BIT0!BIT7               ;A17, HDA CALLOUT
    502 006314  100000                  BIT15                   ;A16 MODULE (F8 ERROR CODE)
    503 006316  000000                  0                       ;NO CALLOUT
    504 006320  100000                  BIT15                   ;A16 MODULE (F9 ERROR CODE)
    505 006322  000000                  0                       ;NO CALLOUT
    506 006324  000000                  0                       ;NOT USED (FA ERROR CODE)
    507 006326  000000                  0                       ;NOT USED
    508 006330  000000                  0                       ;NOT USED (FB ERROR CODE)
    509 006332  000000                  0                       ;NOT USED
    510 006334  000000                  0                       ;NOT USED (FC ERROR CODE)
    511 006336  000000                  0                       ;NOT USED
    512 006340  000000                  0                       ;NOT USED (FD ERROR CODE)
    513 006342  000000                  0                       ;NOT USED
```

```
   514 006344  000000                         0                              ;NOT USED (FE ERROR CODE)
   515 006346  000000                         0                              ;NOT USED
   516 006350  000000                         0                              ;NOT USED (FF ERROR CODE)
   517 006352  000000                         0                              ;NOT USED
   518
```

```
                                           .SBTTL  GLOBAL TEXT SECTION

                                           ;++
                                           ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                           ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                           ; MORE THAN ONE TEST.
                                           ;--

                                           ; NAMES OF DEVICES SUPPORTED BY PROGRAM
                                           ;
   006354                                  L$DVTYP::
   006354     122      120      060                .ASCIZ  /RP07/
                                                   .EVEN


                                           ; TEST DESCRIPTION
                                           ;
   006362                                  L$DESC::
   006362     122      120      060                .ASCIZ  /RP07 FRONT END-HOST ISOLATOR/
                                                   .EVEN


                                           ; FORMAT STATEMENTS USED IN PRINT CALLS
                                           ;

   006420     045      116      000        CRLF::  .ASCIZ  /%N/
   006423     045      116      045        DSNMSG:: .ASCIZ /%N%ADRIVE %O1%A, PG/
   006447     045      124      000        SNDIGT:: .ASCIZ /%T/
   006452     045      101      124        MSGMOL:: .ASCIZ /%ATEST %D2%A. BYPASSED, DRIVE OFFLINE%N/
   006522     045      101      124        MSGWLO:: .ASCIZ /%ATEST %D2%A. BYPASSED, DRIVE WRITE LOCKED%N/
   006577     045      116      045        MESG10:::.ASCIZ  /%N%ADRIVE %O1%A, WAITING FOR 'MOL' TO SET (DRIVE OFFLINE)/
   006671     045      116      045        MESG11:::.ASCIZ  /%N%ADRIVE %O1%A, WAITING FOR 'DRY' TO SET (DRV NOT READY)/
   006763     045      116      045        MESG12:::.ASCIZ  /%N%ATO REFORMAT FE CYLINDER, TRACK #0 UPON PROGRAM COMPLETION./
   007062     045      116      045        MESG15:::.ASCIZ  /%N%AREFORMATTING FE CYLINDER, TRACK #0. USE THE FORMAT PROGRAM/

   007161     045      101      122        FRMT00:::.ASCIZ  /%AREGISTER UNDER TEST: %O6/
   007214     045      116      045        FRMT01:::.ASCIZ  /%N%AEXPECTED DATA: %O6%A    RECEIVED DATA: %O6/
   007273     045      101      106        FLST00:::.ASCIZ  /%AFAULT LIST: /
   007312     045      124      000        FLST01:::.ASCIZ  /%T/
   007315     045      101      052        FRMT02:::.ASCIZ  /%A** THERE IS ALSO A POSSIBILITY OF A HDA FAILURE **%N/
   007404     045      116      045        FRMT03:::.ASCIZ  /%N%ADRIVE %O1%A, /
   007426     045      101      115        FRMT04:::.ASCIZ  /%AMICRO-CODE TEST #: %T%T%T%T%A (HEX)/
   007474     045      101      040        FRMT05:::.ASCIZ  /%A         ERROR CODE: %T%T%T%T%A (HEX)%N/
   007545     045      101      106        FRMT06:::.ASCIZ  /%AFAILING FUNCTION: %T/
   007574     045      116      045        FRMT07:::.ASCIZ  /%N%ASEEKS TOO LONG: %D3/

   007624     045      116      045        FRMT10:::.ASCIZ  /%N%ASEEK OVERSHOOTS: %D3/
   007655     045      116      045        FRMT11:::.ASCIZ  /%N%ASOFT SEEK OVERSHOOTS: %D3/
   007713     045      116      045        FRMT12:::.ASCIZ  /%N%AGUARD-BAND DETECTED SKI'S  %D3/
   007756     045      116      045        FRMT13:::.ASCIZ  /%N%AINDEX ERRORS: %D3/
   010004     045      116      045        FRMT14:::.ASCIZ  /%N%APLO UNSAFES: %D3/
   010031     045      116      045        FRMT15:::.ASCIZ  /%N%AFAILED RECAL ATTEMPTS: %D3/
   010070     045      116      045        FRMT16:::.ASCIZ  /%N%A(HEX) ERROR LOG ENTRIES, IF PRESENT, ARE AS FOLLOWS:/
   010161     045      124      045        FRMT17:::.ASCIZ  /%T%T%T%T%A        /

   010202     045      116      045        FRMT20:::.ASCIZ  /%N%A8080 REV. LEVEL IS: %D3%N%A2901 REV. LEVEL IS: %D3/
   010271     045      116      045        FRMT23:::.ASCIZ  /%N%AROUTINE NO. (2 CHAR "HEX" INPUT) /
```

```
    74
    75 010337     045     116     045  FRMT40::.ASCIZ  /%N%ADRIVE   RPCS1   RPWC     RPBA     RPDA     RPCS2    RPDS/
    76 010430     045     116     045  FRMT41::.ASCIZ  /%N%06%A  %06%A  %06%A  %06%A  %06%A  %06%A  %06/
    77
    78 010510     045     116     045  FRMT50::.ASCIZ  /%N%ARPER1   RPAS    RPLA     RPDB     RPMR1    RPDT     RPSN/
    79 010601     045     116     045  FRMT51::.ASCIZ  /%N%06%A  %06%A  %06%A  %06%A  %06%A  %06%A  %06/
    80
    81 010661     045     116     045  FRMT60::.ASCIZ  /%N%ARPOF    RPDC    RPCC     RPER2    RPER3    RPEC1    RPEC2/
    82 010753     045     116     045  FRMT61::.ASCIZ  /%N%06%A  %06%A  %06%A  %06%A  %06%A  %06%A  %06%N/
    83
    84 011035     045     101     122  FRMT70::.ASCIZ  /%ARPBAE   RPCS3/
    85 011055     045     116     045  FRMT71::.ASCIZ  /%N%06%A  %06%N/
    86
    97
```

```
                                        .SBTTL  GLOBAL ASCII MESSAGE SECTION

011074   104    125    101  AD::     .ASCIZ  /DUAL DRIVE RESPONSE /
011121   101    061    062  DS::     .ASCIZ  /A12-S01 /              ;MASSBUS DISABLE SWITCH
011132   122    110    040  RH::     .ASCIZ  /RH CONTROLLER /
011151   103    101    102  CA::     .ASCIZ  /CABLES /
011161   101    060    061  J1::     .ASCIZ  /A01 /
011166   101    060    062  J2::     .ASCIZ  /A02 /
011173   101    060    063  J3::     .ASCIZ  /A03 /
011200   101    060    064  J4::     .ASCIZ  /A04 /
011205   101    060    065  J5::     .ASCIZ  /A05 /
011212   101    060    066  J6::     .ASCIZ  /A06 /
011217   101    060    067  J7::     .ASCIZ  /A07 /
011224   101    060    070  J8::     .ASCIZ  /A08 /
011231   101    060    071  J9::     .ASCIZ  /A09 /
011236   101    061    060  J10::    .ASCIZ  /A10 /
011243   101    061    061  J11::    .ASCIZ  /A11 /
011250   101    061    062  J12::    .ASCIZ  /A12 /
011255   101    061    063  J13::    .ASCIZ  /A13 /
011262   101    061    064  J14::    .ASCIZ  /A14 /
011267   101    061    065  J15::    .ASCIZ  /A15 /
011274   101    061    066  J16::    .ASCIZ  /A16 /
011301   101    061    067  J17::    .ASCIZ  /A17 /
011306   101    062    060  J20::    .ASCIZ  /A20 /
011313   101    062    061  J21::    .ASCIZ  /A21 /

011320   110    104    101  HDA::    .ASCIZ  /HDA /
011325   124    105    122  TERM::   .ASCIZ  /TERMINATOR /
011341   063    040    120  SENSOR:: .ASCIZ /3 PHASE SENSOR /
011361   102    114    117  BLOWER:: .ASCIZ /BLOWER ASSY /
011376   120    117    127  PTRANS:: .ASCIZ /POWER TRANSFORMER /
011421   115    117    124  MTRBRK:: .ASCIZ /MOTOR-BRAKE ASSY /
011443   122    105    114  K1RELA:: .ASCIZ /RELAY-K1 /
011455   117    120    105  OPRPNL:: .ASCIZ /OPERATOR'S PANEL /
011477   115    117    124  DRVBLT:: .ASCIZ /MOTOR BELT, MOTOR SPRING /

011531   122    105    101  READTD:: .ASCIZ /READ TD'S/
011543   127    122    124  WTCKHD:: .ASCIZ /WRT CHK HDR & DATA/
011566   127    122    111  WTCKD:: .ASCIZ  /WRITE CHECK DATA/

011607   120    114    101  MESG13::.ASCIZ  /PLACE INTERFACE SWITCH A12-S01 IN DOWN POSITION/
011667   120    114    101  MESG14::.ASCIZ  /PLACE INTERFACE SWITCH A12-S01 IN  UP  POSITION/

011747   103    117    115  EM1::    .ASCIZ  /COMPOSITE ERROR SET WHEN NOT EXPECTED/
012015   104    122    111  EM2::    .ASCIZ  /DRIVE HUNG, DRY NOT SET IN TIME/
012055   104    122    111  EM3::    .ASCIZ  /DRIVE WRITE LOCKED/
012100   104    122    111  EM4::    .ASCIZ  /DRIVE OFFLINE/
012116   122    120    103  EM5::    .ASCIZ  /RPCS2:OR FAILED TO SET IN TIME/
012155   122    120    103  EM6::    .ASCIZ  /RPCS2:OR FAILED  TO CLEAR IN TIME/
012217   104    122    111  EM7::    .ASCIZ  /DRIVE SHOULD BE WRITE ENABLED AND ON LINE!/

012272   122    110    040  EM11::   .ASCIZ  /RH CONTROLLER DIDN'T RESPOND (NO SSYNC)/
012342   102    111    124  EM12::   .ASCIZ  /BIT(S) UNDER TEST DIDN'T CHANGE STATE/
012410   122    120    103  EM13::   .ASCIZ  /RPCS2: CLR DIDN'T FUNCTION PROPERLY/
012454   122    105    107  EM14::   .ASCIZ  /REG CONTENTS DON'T MATCH EXPECTED DATA/
012523   122    105    107  EM15::   .ASCIZ  /REG DIDN'T CLEAR WHEN EXPECTED/
012562   123    103    040  EM16::   .ASCIZ  /SC OR TRE SET WHEN NOT EXPECTED/
```

```
   012622      122     120     103  EM17::  .ASCIZ  /RPCS2:IR FAILED TO SET IN TIME/

   012661      122     120     103  EM20::  .ASCIZ  /RPCS1:MCPE DIDN'T SET WHEN EXPECTED/
   012725      122     120     103  EM21::  .ASCIZ  /RPCS1:SC OR TRE DIDN'T SET WHEN EXPECTED/
   012776      102     111     124  EM22::  .ASCIZ  /BIT(S) UNDER TEST DIDN'T SET WHEN EXPECTED/
   013051      102     111     124  EM23::  .ASCIZ  /BIT(S) UNDER TEST DIDN'T CLEAR WHEN EXPECTED/
   013126      122     110     040  EM24::  .ASCIZ  /RH INTERRUPTED AT WRONG PRIORITY/
   013167      122     110     040  EM25::  .ASCIZ  /RH GENERATED FALSE INTERRUPT/
   013224      122     110     040  EM26::  .ASCIZ  /RH DIDN'T INTERRUPT WHEN EXPECTED/
   013266      104     122     111  EM27::  .ASCIZ  /DRIVE NOT PRESENT, TEST INVALID/

   013326      103     117     115  EM30::  .ASCIZ  /COMMAND EXECUTION INCORRECT/
   013362      104     101     124  EM31::  .ASCIZ  /DATA LINE(S) STUCK LOW/
   013411      106     101     111  EM32::  .ASCIZ  /FAILED TO SEEK PROPERLY/
   013441      104     105     124  EM33::  .ASCIZ  /DETECTED ERROR DURING DATA TRANSFER/
   013505      106     101     111  EM34::  .ASCIZ  /FAILED TO CORRECTLY DETECT A WRITE CHECK ERROR/
   013564      106     101     111  EM35::  .ASCIZ  /FAILED AN RP07 INTERNAL MICRODIAGNOSTIC TEST/
   013641      122     110     130  EM36::  .ASCIZ  /RHXX REGISTER SELECTION FAILURE/
   013701      104     101     124  EM37::  .ASCIZ  /DATA RECEIVED DOESN'T MATCH EXPECTED DATA/

   013753      104     105     124  EM40::  .ASCIZ  /DETECTED ERROR DURING WRITE DATA OPERATION/
   014026      104     105     124  EM41::  .ASCIZ  /DETECTED ERROR DURING FORMAT OPERATION/
   014075      104     105     124  EM42::  .ASCIZ  /DETECTED A PERMANENT ERROR/
   014130      111     116     124  EM43::  .ASCIZ  /INTERNAL RP07 DIAGNOSTIC TIME-OUT/

                                            .EVEN

                                    .SBTTL  GLOBAL ERROR REPORT SECTION

                                    ;++
                                    ; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
                                    ; THAT ARE USED IN MORE THAN ONE TEST.  IT ALSO INCLUDES THE ASCII MESSAGES
                                    ; THAT ARE USED BY THE PRINTB AND PRINTX CALLS..
                                    ;--

   014172                           ERR0::
   014172      004737  017326               JSR     PC,SAVRPR               ;GET THE REGISTER SNAPSHOT NOW
   014176      004737  020532               JSR     PC,DECODE               ;DECODE THE BIT MASK FOR THE ERROR!
   014202      013746  002456               MOV     TESTRG,-(SP)
   014206      012746  007161               MOV     #FRMT00,-(SP)
   014212      012746  000002               MOV     #2,-(SP)
   014216      010600                       MOV     SP,R0
   014220      104414                       TRAP    C$PNTB
   014222      062706  000006               ADD     #6,SP
   014226      013746  002452               MOV     RCVED,-(SP)
   014232      013746  002454               MOV     EXPTED,-(SP)
   014236      012746  007214               MOV     #FRMT01,-(SP)
   014242      012746  000003               MOV     #3,-(SP)
   014246      010600                       MOV     SP,R0
   014250      104414                       TRAP    C$PNTB
   014252      062706  000010               ADD     #10,SP
   014256      004737  016212               JSR     PC,DMPREG               ;DO THE REGISTER DUMP NOW
   014262      004737  016556               JSR     PC,FAULTS               ;REPORT THE FAULT LIST
                                                                            ;CR-LF
   014266      012746  006420               MOV     #CRLF,-(SP)
   014272      012746  000001               MOV     #1,-(SP)
   014276      010600                       MOV     SP,R0
```

```
     014300  104414                    TRAP    C$PNTB
     014302  062706  000004            ADD     #4,SP
 105 014306                    L10002:
     014306  104423                    TRAP    C$MSG
 106
 107 014310                    ERR1::
 108 014310  004737  017326            JSR     PC,SAVRPR          ;GET THE REGISTER SNAPSHOT NOW
 109 014314  010446                    MOV     R4,-(SP)           ;PUT THE ROUTINE NUMBER ON THE STACK
 110 014316  004737  015416            JSR     PC,OCTHEX          ;AND CONVERT TO HEX
 111
 112 014322  012746  002660            MOV     #PSTACK+6,-(SP)
     014326  012746  002656            MOV     #PSTACK+4,-(SP)
     014332  012746  002654            MOV     #PSTACK+2,-(SP)
     014336  012746  002652            MOV     #PSTACK,-(SP)
     014342  012746  007426            MOV     #FRMT04,-(SP)
     014346  012746  000005            MOV     #5,-(SP)
     014352  010600                    MOV     SP,R0
     014354  104414                    TRAP    C$PNTB
     014356  062706  000014            ADD     #14,SP
 113 014362  017746  166164            MOV     @RPER2,-(SP)       ;GET THE CONTENTS OF RPER2 ON THE STACK
 114 014366  042716  177400            BIC     #177400,(SP)       ;AND ELIMINATE THE HIGH ORDER BITS
 115 014372  004737  015416            JSR     PC,OCTHEX          ;NOW CONVERT TO HEX
 116
 117 014376  012746  002660            MOV     #PSTACK+6,-(SP)
     014402  012746  002656            MOV     #PSTACK+4,-(SP)
     014406  012746  002654            MOV     #PSTACK+2,-(SP)
     014412  012746  002652            MOV     #PSTACK,-(SP)
     014416  012746  007474            MOV     #FRMT05,-(SP)
     014422  012746  000005            MOV     #5,-(SP)
     014426  010600                    MOV     SP,R0
     014430  104414                    TRAP    C$PNTB
     014432  062706  000014            ADD     #14,SP
 118 014436  004737  016212            JSR     PC,DMPREG          ;DUMP THE REGISTERS NOW
 119 014442  004737  016132            JSR     PC,CALMOD          ;REPORT THE MODULE LIST
 120 014446  004737  020532            JSR     PC,DECODE          ;DECODE THE MASK BITS FOR A MODULE CALLOUT
 121 014452  004737  016556            JSR     PC,FAULTS          ;AND REPORT THE FIND
 122                                                              ;CR-LF
 123 014456  012746  006420            MOV     #CRLF,-(SP)
     014462  012746  000001            MOV     #1,-(SP)
     014466  010600                    MOV     SP,R0
     014470  104414                    TRAP    C$PNTB
     014472  062706  000004            ADD     #4,SP
 124 014476                    L10003:
     014476  104423                    TRAP    C$MSG
 125
 126 014500                    ERR2::
 127 014500  004737  020532            JSR     PC,DECODE                    ;DECODE THE MESSAGE
 128 014504  013746  002506            MOV     DRVNO,-(SP)
     014510  012746  007404            MOV     #FRMT03,-(SP)
     014514  012746  000002            MOV     #2,-(SP)
     014520  010600                    MOV     SP,R0
     014522  104414                    TRAP    C$PNTB
     014524  062706  000006            ADD     #6,SP
 129 014530  013746  002470            MOV     FATOF,-(SP)
     014534  012746  007545            MOV     #FRMT06,-(SP)
     014540  012746  000002            MOV     #2,-(SP)
     014544  010600                    MOV     SP,R0
```

```
    014546  104414                          TRAP    C$PNTB
    014550  062706  000006                  ADD     #6,SP
130 014554  013746  002452                  MOV     RCVED,-(SP)
    014560  013746  002454                  MOV     EXPTED,-(SP)
    014564  012746  007214                  MOV     #FRMT01,-(SP)
    014570  012746  000003                  MOV     #3,-(SP)
    014574  010600                          MOV     SP,R0
    014576  104414                          TRAP    C$PNTB
    014600  062706  000010                  ADD     #10,SP
131                                                                 ;CR-LF
132 014604  012746  006420                  MOV     #CRLF,-(SP)
    014610  012746  000001                  MOV     #1,-(SP)
    014614  010600                          MOV     SP,R0
    014616  104414                          TRAP    C$PNTB
    014620  062706  000004                  ADD     #4,SP
133 014624  004737  016556                  JSR     PC,FAULTS       ;REPORT THE FAULT LIST
134                                                                 ;CR-LF
135 014630  012746  006420                  MOV     #CRLF,-(SP)
    014634  012746  000001                  MOV     #1,-(SP)
    014640  010600                          MOV     SP,R0
    014642  104414                          TRAP    C$PNTB
    014644  062706  000004                  ADD     #4,SP
136 014650                          L10004:
    014650  104423                          TRAP    C$MSG
137
138 014652                          ERR3::
139 014652  004737  016212                  JSR     PC,DMPREG       ;JUST DUMP THE REGISTERS
140                                                                 ;CR-LF
141 014656  012746  006420                  MOV     #CRLF,-(SP)
    014662  012746  000001                  MOV     #1,-(SP)
    014666  010600                          MOV     SP,R0
    014670  104414                          TRAP    C$PNTB
    014672  062706  000004                  ADD     #4,SP
142 014676                          L10005:
    014676  104423                          TRAP    C$MSG
143
```

```
                                      .SBTTL  GLOBAL SUBROUTINES SECTION

                                      ;AUTO SIZE FOR RH70 CONTROLLER AND DETERMINE IF IT IS JUMPERED FOR 22 OR
                                      ;32 REGISTERS
                                      ;CALL
                                      ;        JSR     PC,SIZE70        ;CALL ROUTINE
                                      ;
                                      ;R5 MUST CONTAIN POINTER TO NEW RPCS1 BASE ADDRESS

014700  005037  002502                SIZE70: CLR     RHEXT            ;CLEAR RPBAE OFFSET
014704  005037  002504                        CLR     RHTYPE           ;CLEAR RHXX TYPE REGISTER (RH11)
014710  013746  000004                        MOV     ERRVEC,-(SP)     ;SAVE CONTENTS OF ERROR VECTOR
014714  012737  014764  000004                MOV     #2$,ERRVEC       ;SETUP 'TRAP' RETURN ADDRESS
014722  011500                                MOV     (R5),R0          ;GET RPCS1 ADDRESS
014724  062700  000050                        ADD     #50,R0           ;GET REGISTER OFFSET FOR RH70
014730  012702  000012                        MOV     #10.,R2          ;GET NUMBER OF REGISTERS TO CHECK
014734  005720                                TST     (R0)+            ;TRAP IF NOT A VALID RPBAE
014736  005720                                TST     (R0)+            ;TRAP IF NOT A VALID RPCS3
014740  012737  000050  002502                MOV     #50,RHEXT        ;LOAD OFFSET FOR RPBAE (22 REGISTER RH)
014746  005720                        1$:     TST     (R0)+            ;TRAP IF NOT A VALID REGISTER
014750  005302                                DEC     R2               ;DONE WITH ALL 32 REGISTERS ?
014752  001375                                BNE     1$               ;BR IF NO
014754  012737  000074  002502                MOV     #74,RHEXT        ;LOAD OFFSET FOR RPBAE (32 REGISTER RH)
014762  000403                                BR      3$
014764  012716  014772                2$:     MOV     #3$,(SP)         ;SETUP RETURN ADDRESS
014770  000002                                RTI

014772  011500                        3$:     MOV     (R5),R0          ;GET RPCS1 REGISTER
014774  013702  002502                        MOV     RHEXT,R2         ;GET RPBAE REGISTER OFFSET
015000  001415                                BEQ     4$               ;BR IF NONE
015002  060002                                ADD     R0,R2            ;GET RPBAE REGISTER
015004  052710  001400                        BIS     #A17!A16,(R0)    ;SET EXTENDED ADDRESS BITS IN RPCS1
015010  022712  000003                        CMP     #3,(R2)          ;ARE THE EXTENDED BITS SET IN RPBAE ?
015014  001007                                BNE     4$               ;BR IF NO
015016  005012                                CLR     (R2)             ;CLEAR EXTENDED ADDRESS BITS IN RPBAE
015020  011046                                MOV     (R0),-(SP)       ;SAVE RPCS1 REG CONTENTS
015022  042726  176377                        BIC     #^C<A17!A16>,(SP)+       ;ARE THE EXTEND BITS CLEAR IN RPCS1 ?
015026  001002                                BNE     4$               ;BR IF NO
015030  005237  002504                        INC     RHTYPE           ;SET RHXX TYPE REGISTER (RH70)
015034  012637  000004                4$:     MOV     (SP)+,ERRVEC     ;RESTORE CONTENTS OF ERROR VECTOR
015040  000207                                RTS     PC
```

```
                                        .SBTTL  DISK DRIVER AND SUPPORT ROUTINES

                                        ;;*****************************************************************************
                                        ;THIS MODULE IS USED ANYTIME A DIAGNOSTIC COMMAND HAS JUST BEEN ISSUED BY
                                        ;THE MODULE ''DRIVER''.  IT POLLS THE CORRECT ATTENTION BIT IN THE PSEUDO
                                        ;REGISTER AND USES A 'WATCHDOG TIMER' TO VERIFY THAT THE BIT DOES EVENTUALLY
                                        ;SET.  IF IT DOES NOT, AN ERROR MESSAGE IS PRODUCED REPORTING A MICRO-
                                        ;DIAGNOSTIC TIMEOUT.
                                        ;;*****************************************************************************

   015042  010146                       RPARDY: MOV     R1,-(SP)        ;SAVE R1
   015044  010446                               MOV     R4,-(SP)        ;SAVE R4
   015046  012701  000062                       MOV     #50.,R1         ;GET AN OVERALL ITERATION COUNT
   015052  033777  002400  165450       1$:     BIT     BITPOS,@RPAS    ;DONE??
   015060  001012                               BNE     2$              ;IF SET, YES
   015062  004737  017000                       JSR     PC,WAIT         ;USE THE WATCHDOG TIMER
   015066  005301                               DEC     R1              ;ONE LESS CYCLE TO-GO
   015070  003370                               BGT     1$              ;IF NOT ZERO, KEEP WATCHING
   015072  017704  165440                       MOV     @RPMR1,R4       ;GET CONTENTS OF RPMR1
   015076  104456                               TRAP    C$ERHRD
   015100  000621                               .WORD   401
   015102  014130                               .WORD   EM43
   015104  014310                               .WORD   ERR1
   015106  013777  002400  165414       2$:     MOV     BITPOS,@RPAS    ;RESET THE ATTENTION BIT TO 0
   015114  012604                               MOV     (SP)+,R4        ;RESTORE R4
   015116  012601                               MOV     (SP)+,R1        ;RESTORE R1
   015120  000207                               RTS     PC              ;TAKE THE RETURN

                                        ;;*****************************************************************************
                                        ;THIS MODULE IS CALLED BY THE DRIVER WHEN EVER A NON-DATA COMMAND HAS
                                        ;JUST BEEN ISSUED.  (EXCEPT A DIAGNOSTIC COMMAND.)  IT POLLS FOR RPDS:
                                        ;DRY.  THE FUNCTION IS NOT TIMED USING A WATCHDOG TIMER, BUT SUPERVISOR
                                        ;'BREAKS' ARE SUPPORTED.
                                        ;;*****************************************************************************

   015122                               READY:
   015122  104422                               TRAP    C$BRK
   015124  105777  165374                       TSTB    @RPDS           ;READY TRUE?
   015130  100374                               BPL     READY           ;NO, SO WAIT SOME MORE
   015132  000207                               RTS     PC              ;TAKE THE RETURN

                                        ;;*****************************************************************************
                                        ;THIS MODULE IS CALLED BY THE DRIVER ANYTIME A DATA COMMAND HAS JUST BEEN
                                        ;ISSUED.  IT POLLS FOR CONTROLLER READY.  THE FUNCTION IS NOT TIMED USING
                                        ;A WATCHDOG TIMER, BUT SUPERVISOR 'BREAKS' ARE SUPPORTED.
                                        ;;*****************************************************************************

   015134                               CREADY:
   015134  104422                               TRAP    C$BRK
   015136  105777  165350                       TSTB    @RPCS1          ;CONTROLLER READY?
   015142  100374                               BPL     CREADY          ;IF 0, NO...WAIT SOME MORE
   015144  000207                               RTS     PC              ;IT'S 1, RETURN
```

```

                                         ;;******************************************************************
                                         ;THIS MODULE DOES THE ACTUAL DISK 'DRIVING'.  INPUTS TO THE MODULE
                                         ;INCLUDE THE FOLLOWING TAGS:  NEGWRD, DESCYL, DESTRK, TABADD, FUNCTN.
                                         ;NEGWRD = THE BYTE COUNT TO BE NEGATED, DESCYL =  THE DESIRED CYLINDER
                                         ;ADDRESS, DESTRK = THE DESIRED TRACK / SECTOR ADDRESS, TABADD = THE STARTING
                                         ;ADDRESS OF THE TRANSFER BUFFER, FUNCTN = THE COMMAND TO BE EXECUTED.
                                         ;CALL TO THE MODULE IS: JSR PC,DRIVER.
                                         ;BUFFERS ARE LOADED/UNLOADED VIA LINKAGE PROVIDED BY TABADD.
                                         ;;******************************************************************

015146  005437  002412                   DRIVER: NEG     NEGWRD          ;NEGATE THE WORD COUNT ONLY ONCE!
015152  004737  015122                           JSR     PC,READY        ;POLL FOR DRIVE READY!
015156  022737  000035  002420                   CMP     #DIAG,FUNCTN    ;DIAGNOSTIC COMMAND??
015164  001414                                   BEQ     1$              ;IF EQUAL, SKIP NEXT CODE
015166  013777  002412  165320                   MOV     NEGWRD,@RPWC    ;WORD COUNT ---> RP REGISTER
015174  013777  002416  165344                   MOV     DESCYL,@RPDC    ;GET THE CYLINDER ADDRESS TO THE DEVICE REGISTER
015202  013777  002414  165310                   MOV     DESTRK,@RPDA    ;TRACK/SEC ---> RP REGISTER
015210  013777  002366  165300                   MOV     TABADD,@RPBA    ;LOAD THE TRANSFER ADDRESS
015216  013777  002420  165266   1$:             MOV     FUNCTN,@RPCS1   ;GET THE COMMAND TO EXECUTE
015224  023727  002420  000035                   CMP     FUNCTN,#DIAG    ;IS THIS A DATA COMMAND?
015232  101004                                   BHI     2$              ;IF > THAN A DIAGNOSTIC COMMAND, YES
015234  001406                                   BEQ     3$              ;IF =, IT GETS HANDLED UNIQUELY
015236  004737  015122                           JSR     PC,READY        ;POLL FOR DRIVE READY
015242  000405                                   BR      4$              ;AND SKIP NEXT POLL OPERATION
015244  004737  015134           2$:             JSR     PC,CREADY       ;POLL FOR CONTROLLER READY
015250  000402                                   BR      4$              ;NOW RETURN
015252  004737  015042           3$:             JSR     PC,RPARDY       ;LOOK FOR ATTENTION NOW
015256  000207                   4$:             RTS     PC              ;NOW RETURN

                                         ;;******************************************************************
                                         ;THIS MODULE IS USED TO INITIATE THE DIAGNOSTIC MONITOR IN THE RP-07.
                                         ;IT IS DEPENDENT UPON 'DRIVER' FOR COMPLETION.
                                         ;SIDE AFFECTS INCLUDE THHE FACT THAT THE DRIVE WILL BE IN 'DIAGNOSTIC
                                         ;MODE' WHEN THIS MODULE COMPLETES.  THE DRIVE WILL BE UNABLE TO ACCEPT
                                         ;COMMANDS OTHER THAN DRIVE CLEAR, AND DIAGNOSTIC COMMANDS.
                                         ;;******************************************************************

015260  004737  016662                   DIAGST::JSR     PC,SEIZE        ;GET THE DRIVE'S ATTENTION!
015264  012777  177000  165244                   MOV     #177000,@RPMR1  ;SET UP THE ''HANDSHAKE''
015272  012737  000035  002420                   MOV     #DIAG,FUNCTN    ;CREATE THE DIAGNOSTIC COMMAND
015300  004737  015146                           JSR     PC,DRIVER       ;ISSUE THE COMMAND
015304  004737  016662                           JSR     PC,SEIZE        ;RESET COMPOSITE ERROR (SETS WHEN FE IS WRITTEN INTO RMPR1)
015310  000207                                   RTS     PC              ;AND RETURN TO MAIN
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                                                ;;*********************************************************************
                                                ;THIS MODULE IS USED TO TURN OFF THE RP-07 DIAGNOSTIC MONITOR.  IT IS
                                                ;DEPENDENT UPON 'DRIVER' FOR ITS COMPLETION. IT WILL CLEAR ANY ERRORS
                                                ;WHICH SET AS A RESULT OF A DIAGNOSTIC ROUTINE EXECUTION.  THERE ARE
                                                ;NO OTHER SIDE-EFFECTS.
                                                ;;*********************************************************************

 015312  012737  040011  002420     DIAGEN: MOV     #TRE!DRCLR,FUNCTN;SET UP FOR A CONTROLLER-DRIVE CLEAR COMMAND
 015320  004737  015146                     JSR     PC,DRIVER       ;ISSUE THE COMMAND
 015324  012777  177400  165204             MOV     #177400,@RPMR1  ;TERMINATE THE SESSION
 015332  012737  000035  002420             MOV     #DIAG,FUNCTN    ;AND SET UP THE COMMAND
 015340  004737  015146                     JSR     PC,DRIVER       ;ISSUE THE COMMAND NOW!!
 015344  005077  165166                     CLR     @RPMR1          ;RESET THE DIAGNOSTIC MODE BIT
 015350  000207                             RTS     PC              ;RETURN TO MAIN

                                                ;;*********************************************************************
                                                ;THIS MODULE RECEIVES INPUT FROM R4.  OUTPUT GOES TO RPMR1.  IT IS
                                                ;DEPENDENT UPON 'DRIVER' FOR COMPLETION.  THIS ROUTINE SHOULD NOT
                                                ;BE EXECUTED UNTIL THE DIAGNOSTIC MONITOR HAS BEEN TURNED ON THROUGH
                                                ;THE EXECUTION OF 'DIAGST'.
                                                ;;*********************************************************************

 015352  010477  165160             DIAGLD: MOV     R4,@RPMR1       ;NOW SET THE DIAGNOSTIC NUMBER
 015356  052777  100000  165152             BIS     #BIT15,@RPMR1   ;AND SET DMD = 1
 015364  012737  000035  002420             MOV     #DIAG,FUNCTN    ;AND SET UP FOR A DIAGNOSTIC COMMAND
 015372  004737  015146                     JSR     PC,DRIVER       ;ISSUE THE COMMAND NOW!
 015376  000207                             RTS     PC              ;RETURN TO CALLER!

                                    .SBTTL  PROGRAM UTILITIES

                                                ;;*********************************************************************
                                                ;THIS MODULE CLEARS THE DRIVE ERROR STATUS THROUGH A CONTROLLER CLEAR.
                                                ;IT SAVES THE STATUS OF THE MAINTENANCE REGISTER (RPMR1), AND RESTORES
                                                ;IT WHEN THE RESET PROCESS IS COMPLETE.
                                                ;;*********************************************************************

 015400  017746  165132             DRVCLR: MOV     @RPMR1,-(SP)    ;SAVE CONTENTS OF RPMR1
 015404  004737  016662                     JSR     PC,SEIZE        ;NOW RESET THE DRIVE
 015410  012677  165122                     MOV     (SP)+,@RPMR1    ;RESTORE THE MAINTENANCE REGISTER
 015414  000207                             RTS     PC              ;AND RETURN TO CALLER

                                                ;;*********************************************************************
                                                ;THIS MODULE IS PART OF THE I/O SUPPORT.  IT CONVERTS OCTAL TO ASCII
                                                ;HEX.  IT RECEIVES ITS INPUT FROM THE TOP OF THE STACK.  IT'S OUTPUT
                                                ;IS PLACED IN PSTACK - PSTACK + 6.
                                                ;;*********************************************************************

 015416  010146                     OCTHEX: MOV     R1,-(SP)        ;SAVE R1
 015420  010246                             MOV     R2,-(SP)        ;SAVE R2
 015422  012700  002652                     MOV     #PSTACK,R0      ;SET UP THE BUFFER ADDRESS
 015426  012702  000004                     MOV     #4,R2           ;GET THE ITERATION VALUES
 015432  012701  000004             1$:     MOV     #4,R1           ;AND DUPLICATE FOR TWO LOOPS
 015436  005010                             CLR     (R0)            ;INITIALIZE THE BUFFER
 015440  006310                     2$:     ASL     (R0)            ;MOVE THE PREVIOUS BIT(S) OVER
 015442  000241                             CLC                     ;CARRY = 0
 015444  006366  000006                     ASL     6(SP)           ;ROTATE A BIT FROM THE TEST VALUE
```

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015450  103002                           BCC     3$              ;IF ZERO, SKIP NEXT INSTRUCTION
015452  052710  000001                   BIS     #BIT0,(R0)      ;MARK THE BIT AS BEING SET
015456  005301                   3$:     DEC     R1              ;ONE LESS ITERATION TO GO
015460  003367                           BGT     2$              ;BUT NOT DONE UNTIL = 0!
015462  005720                           TST     (R0)+           ;NEXT BUFFER LOCATION
015464  005302                           DEC     R2              ;ONE LESS ITERATION TO-GO
015466  003361                           BGT     1$              ;IF NOT ZERO, KEEP GOING!
015470  012702  000004                   MOV     #4,R2           ;GET THE NEW ITERATION COUNT
015474  012700  002652                   MOV     #PSTACK,R0      ;AND GET THE BUFFER ADDRESS AGAIN
015500  005710                   4$:     TST     (R0)            ;CONTENTS ZERO?
015502  003004                           BGT     5$              ;IF NOT, SKIP NEXT
015504  005020                           CLR     (R0)+           ;SET THIS CHARACTER = NULL
015506  005302                           DEC     R2              ;ONE LESS CHARACTER TO GO
015510  003373                           BGT     4$              ;IF NOT ZERO, KEEP GOING
015512  000412                           BR      8$              ;DONE, RETURN!
015514  021027  000011           5$:     CMP     (R0),#11        ;ALPHA OR NUMERIC CHARACTER?
015520  101003                           BHI     6$              ;IF > 11, ALPHA!
015522  062720  000060                   ADD     #60,(R0)+       ;MAKE NUMERIC ASCII
015526  000402                           BR      7$              ;AND GO-ON
015530  062720  000067           6$:     ADD     #55.,(R0)+      ;MAKE HEX ASCII
015534  005302                   7$:     DEC     R2              ;ONE LESS ITERATION TO-GO
015536  003366                           BGT     5$              ;ONE LESS ITERATION, IF NOT ZERO
015540  012602                   8$:     MOV     (SP)+,R2        ;RESTORE R2
015542  012601                           MOV     (SP)+,R1        ;AND R1
015544  012616                           MOV     (SP)+,(SP)      ;MOVE STACK OVER INPUT VALUE
015546  000207                           RTS     PC              ;AND RETURN

                                 ;;**********************************************************************
                                 ;DETERMINE IF THERE IS A CLOCK ON SYSTEM. START THE CLOCK. ''CLKSTA'' WILL
                                 ;INDICATE THE CLOCK TYPE.
                                 ;        0= NO CLOCK
                                 ;       +1= KW11-P
                                 ;       -1= KW11-L
                                 ;THIS ROUTINE WILL ALSO SETUP ''TICKMS'' (TIME PER CLOCK TICK IN MILLISECONDS)
                                 ;AND ''TICKUS'' (TIME PER CLOCK TICK IN MICROSECONDS) AS PER LINE FREQUENCY.
                                 ;CALL
                                 ;       JSR     PC,ST.CLK       ;START THE CLOCK
                                 ;       RETURN
                                 ;;**********************************************************************

015550  005037  002426           ST.CLK: CLR     CLKSTA          ;ASSUME ''NO CLOCK''
015554  005037  015750                   CLR     HERTZ           ;ASSUME ''UNKNOWN'' HERTZ
                                                                 ;IS THERE A P-CLOCK PRESENT ?
015560  012700  000120                   MOV     #'P,R0
015564  104462                           TRAP    C$CLCK
015566  010005                           MOV     R0,R5
                                                                 ;GO TO 1$ IF NO
015570  103031                           BCC     1$

                                         ;SET P-CLOCK P-TABLE & START P-CLOCK

015572  010537  015724                   MOV     R5,PCLKTB       ;SAVE P-CLOCK TABLE ADDRESS
015576  011537  015726                   MOV     (R5),PKCS       ;GET 'CSR' ADDRESS
015602  011537  015730                   MOV     (R5),PKB        ;MAKE PKB ADDRESS BY
015606  062737  000002  015730           ADD     #2,PKB          ;ADDING 2
015614  012537  015732                   MOV     (R5)+,PKC       ;MAKE PKC ADDRESS BY
015620  062737  000004  015732           ADD     #4,PKC          ;ADDING 4
```

```
    113 015626  005725                               TST     (R5)+             ;SKIP OVER 'BR LEVEL'
    114 015630  012537  015734                       MOV     (R5)+,PKV         ;GET 'VECTOR' ADDRESS
    115 015634  012537  015750                       MOV     (R5)+,HERTZ       ;GET 'HERTZ' LINE FREQUENCY
    116 015640  012737  000001  002426               MOV     #1,CLKSTA         ;SET P-CLOCK FLAG
    117 015646  004737  015752                       JSR     PC,ST.PCLK        ;START P-CLOCK AS A WATCH DOG TIMER
    118 015652  000207                               RTS     PC
    119 015654                               1$:                               ;IS THERE A L-CLOCK PRESENT ?
    120 015654  012700  000114                       MOV     #'L,R0
        015660  104462                               TRAP    C$CLCK
        015662  010005                               MOV     R0,R5
    121                                                                        ;GO TO 2$ IF NO
    122 015664  103016                               BCC     2$
    123
    124                                              ;SET L-CLOCK P-TABLE, START L-CLOCK
    125
    126 015666  010537  015740                       MOV     R5,LCLKTB         ;SAVE L-CLOCK TABLE ADDRESS
    127 015672  012537  015742                       MOV     (R5)+,LKS         ;GET 'CSR' ADDRESS
    128 015676  005725                               TST     (R5)+             ;SKIP OVER 'BR LEVEL'
    129 015700  012537  015744                       MOV     (R5)+,LKV         ;GET 'VECTOR' ADDRESS
    130 015704  012537  015750                       MOV     (R5)+,HERTZ       ;GET 'HERTZ' LINE FREQUENCY
    131 015710  012737  177777  002426               MOV     #-1,CLKSTA        ;L-CLOCK FLAG
    132 015716  004737  016016                       JSR     PC,ST.LCLK        ;START L-CLOCK AS A WATCH DOG TIMER
    133 015722  000207                       2$:     RTS     PC
    134
    135                                      ;KW11-P CLOCK TABLE, CSR REG, PKB REG, PKC REG & VEC ADR
    136
    137 015724  000000                       PCLKTB: .WORD   0                 ;P-CLK TBL ADR
    138
    139 015726  172540                       PKCS:   .WORD   172540            ;CONTROL & STATUS
    140 015730  172542                       PKB:    .WORD   172542            ;COUNT SET BFR
    141 015732  172544                       PKC:    .WORD   172544            ;COUNTER
    142 015734  000104  000106               PKV:    .WORD   104,106           ;VECTOR
    143
    144                                      ;KW11-L CLOCK TABLE, CSR REG & VEC ADR
    145
    146 015740  000000                       LCLKTB: .WORD   0                 ;L-CLK TBL ADR
    147
    148 015742  177546                       LKS:    .WORD   177546            ;CONTROL & STATUS
    149 015744  000100  000102               LKV:    .WORD   100,102           ;VECTOR
    150
    151 015750  000000                       HERTZ:  .WORD   0                 ;60 HZ. OR 50 HZ. LINE FREQUENCY
    152
    153 015752                               ST.PCLK:                          ;SETUP VECTOR FOR P-CLOCK
    154 015752  012746  000300                       MOV     #PRI06,-(SP)
        015756  012746  016104                       MOV     #KWSRV,-(SP)
        015762  013746  015734                       MOV     PKV,-(SP)
        015766  012746  000003                       MOV     #3,-(SP)
        015772  104437                               TRAP    C$SVEC
        015774  062706  000010                       ADD     #10,SP
    155 016000  012777  000001  177722               MOV     #1,@PKB           ;COUNT ONE TICK
    156 016006  012777  000115  177712               MOV     #115,@PKCS        ;''INT.EN.'',COUNT DOWN'', ''MODE 1 (REPEAT)'',
    157                                                                        ;''LINE FREQ'', AND ''RUN''
    158 016014  000207                       1$:     RTS     PC                ;RETURN
    159
    160 016016                               ST.LCLK:                          ;SETUP VECTOR FOR L-CLOCK
    161 016016  012746  000300                       MOV     #PRI06,-(SP)
        016022  012746  016104                       MOV     #KWSRV,-(SP)
```

```
016026  013746  015744                    MOV     LKV,-(SP)
016032  012746  000003                    MOV     #3,-(SP)
016036  104437                            TRAP    C$SVEC
016040  062706  000010                    ADD     #10,SP
016044  012777  000100  177670            MOV     #100,@LKS         ;START THE KW11-L
016052  000207                    1$:     RTS     PC                ;RETURN

                                  ;THIS ROUTINE IS USED TO STOP THE SYSTEM CLOCK
                                  ;CALL
                                  ;       JSR     PC,STOPCK         ;CALL ROUTINE

016054  005737  002426            STOPCK: TST     CLKSTA            ;IS THERE A CLOCK AVAILABLE ?
016060  001410                            BEQ     2$                ;BR IF NO
016062  100404                            BMI     1$                ;BR IF L-CLOCK
016064  042777  000101  177634            BIC     #101,@PKCS        ;STOP THE P-CLOCK
016072  000403                            BR      2$
016074  042777  000100  177640    1$:     BIC     #100,@LKS         ;STOP THE L-CLOCK
016102  000207                    2$:     RTS     PC

                                  ;KW11 CLOCK INTERRUPT SERVICE ROUTINE

016104  012746  000024            KWSRV:  MOV     #20.,-(SP)        ;ASSUME 20.0 MSEC
016110  023727  015750  000062            CMP     HERTZ,#50.        ;IS IT 50 HERTZ LINE FREQUENCY ?
016116  001402                            BEQ     1$                ;BR IF YES
016120  012716  000020                    MOV     #16.,(SP)         ;MUST BE 60HZ, 16.667 MSEC
016124  162637  016776            1$:     SUB     (SP)+,WATIME      ;SUBTRACT TIME PER TICK IN MILLISECONDS
016130                            L10006:
016130  000002                            RTI

                                  ;;*******************************************************************************
                                  ;THIS MODULE IS USED TO DECODE THE CONTENTS OF RPER2 AND PRODUCE A MODULE
                                  ;FAULT LIST BASED ON THE CONTENTS OF RPER2.  INPUT IS FROM RPER2 (LOW BYTE)
                                  ;OUTPUT IS TO ERRWD1 AND ERRWD2.  TABLE LOOKUP IS DONE STARTING AT EC.00.
                                  ;;*******************************************************************************

016132  010146                    CALMOD: MOV     R1,-(SP)          ;SAVE R1
016134  010246                            MOV     R2,-(SP)          ;SAVE R2
016136  017702  164410                    MOV     @RPER2,R2         ;GET THE CONTENTS OF RPER2
016142  012701  004354                    MOV     #EC.00,R1         ;GET THE TOP OF THE CALLOUT LIST
016146  042702  177400                    BIC     #177400,R2        ;STRIP THE HIGH BYTE INFORMATION
016152  001005                            BNE     1$                ;IF NOT ZERO, IT'S VALID
016154  005037  002404                    CLR     ERRWD1            ;SET THE CALLOUT LIST TO 0
016160  005037  002406                    CLR     ERRWD2            ;FOR BOTH (THIS ERROR CODE IS BAD)
016164  000407                            BR      2$                ;NOW TAKE THE RETURN
016166  022121                    1$:     CMP     (R1)+,(R1)+       ;MOVE THROUGH THE LIST
016170  005302                            DEC     R2                ;ONE LESS ENTRY TO GO
016172  003375                            BGT     1$                ;DO UNTIL R2 = 0
016174  012137  002404                    MOV     (R1)+,ERRWD1      ;LOAD THE MODULE CALLOUT FOR THIS CODE
016200  011137  002406                    MOV     (R1),ERRWD2       ;FOR BOTH MASKS
016204  012602                    2$:     MOV     (SP)+,R2          ;RESTORE R2
016206  012601                            MOV     (SP)+,R1          ;RESTORE R1
016210  000207                            RTS     PC                ;AND RETURN TO CALLER

                                  ;;*******************************************************************************
                                  ;THIS MODULE 'S PART OF THE I/O SUPPORT.  IT IS USED TO DUMP THE RP-07
                                  ;REGISTERS AS PART OF AN ERROR MESSAGE.  INPUT TO THIS MODULE IS FROM
                                  ;REG - REG+52.  OUTPUT IS TO THE USED SPECIFIED PRINTING DEVICE.
```

```
                                        ;;*************************************************************************

    016212                              DMPREG:                                 ;PRINT 'DRIVE  RPCS1  RPWC   RPBA   RPDA   RPCS2  RPDS'
    016212  012746  010337                      MOV     #FRMT40,-(SP)
    016216  012746  000001                      MOV     #1,-(SP)
    016222  010600                              MOV     SP,R0
    016224  104415                              TRAP    C$PNTX
    016226  062706  000004                      ADD     #4,SP
    016232  013746  002610                      MOV     REG+12,-(SP)
    016236  013746  002606                      MOV     REG+10,-(SP)
    016242  013746  002604                      MOV     REG+6,-(SP)
    016246  013746  002602                      MOV     REG+4,-(SP)
    016252  013746  002600                      MOV     REG+2,-(SP)
    016256  013746  002576                      MOV     REG,-(SP)
    016262  013746  002506                      MOV     DRVNO,-(SP)
    016266  012746  010430                      MOV     #FRMT41,-(SP)
    016272  012746  000010                      MOV     #10,-(SP)
    016276  010600                              MOV     SP,R0
    016300  104415                              TRAP    C$PNTX
    016302  062706  000022                      ADD     #22,SP
                                                                        ;PRINT 'RPER1  RPAS   RPLA   RPDB   RPMR1  RPDT   RPSN'
    016306  012746  010510                      MOV     #FRMT50,-(SP)
    016312  012746  000001                      MOV     #1,-(SP)
    016316  010600                              MOV     SP,R0
    016320  104415                              TRAP    C$PNTX
    016322  062706  000004                      ADD     #4,SP
    016326  013746  002626                      MOV     REG+30,-(SP)
    016332  013746  002624                      MOV     REG+26,-(SP)
    016336  013746  002622                      MOV     REG+24,-(SP)
    016342  013746  002620                      MOV     REG+22,-(SP)
    016346  013746  002616                      MOV     REG+20,-(SP)
    016352  013746  002614                      MOV     REG+16,-(SP)
    016356  013746  002612                      MOV     REG+14,-(SP)
    016362  012746  010601                      MOV     #FRMT51,-(SP)
    016366  012746  000010                      MOV     #10,-(SP)
    016372  010600                              MOV     SP,R0
    016374  104415                              TRAP    C$PNTX
    016376  062706  000022                      ADD     #22,SP
                                                                        ;PRINT 'RPOF   RPDC   RPCC   RPER2  RPER3  RPEC1  RPEC2'
    016402  012746  010661                      MOV     #FRMT60,-(SP)
    016406  012746  000001                      MOV     #1,-(SP)
    016412  010600                              MOV     SP,R0
    016414  104415                              TRAP    C$PNTX
    016416  062706  000004                      ADD     #4,SP
    016422  013746  002644                      MOV     REG+46,-(SP)
    016426  013746  002642                      MOV     REG+44,-(SP)
    016432  013746  002640                      MOV     REG+42,-(SP)
    016436  013746  002636                      MOV     REG+40,-(SP)
    016442  013746  002634                      MOV     REG+36,-(SP)
    016446  013746  002632                      MOV     REG+34,-(SP)
    016452  013746  002630                      MOV     REG+32,-(SP)
    016456  012746  010753                      MOV     #FRMT61,-(SP)
    016462  012746  000010                      MOV     #10,-(SP)
    016466  010600                              MOV     SP,R0
    016470  104415                              TRAP    C$PNTX
    016472  062706  000022                      ADD     #22,SP
    016476  005737  002504                      TST     RHTYPE          ;IS IT RH70 CONTROLLER ?
```

```
227 016502  001424                   BEQ     1$                      ;BR IF NO
228                                                                  ;PRINT 'RPBAE  RPCS3'
229 016504  012746  011035           MOV     #FRMT70,-(SP)
    016510  012746  000001           MOV     #1,-(SP)
    016514  010600                   MOV     SP,R0
    016516  104415                   TRAP    C$PNTX
    016520  062706  000004           ADD     #4,SP
230 016524  013746  002650           MOV     REG+52,-(SP)
    016530  013746  002646           MOV     REG+50,-(SP)
    016534  012746  011055           MOV     #FRMT71,-(SP)
    016540  012746  000003           MOV     #3,-(SP)
    016544  010600                   MOV     SP,R0
    016546  104415                   TRAP    C$PNTX
    016550  062706  000010           ADD     #10,SP
231 016554  000207           1$:     RTS     PC
```

```


                                   ;;*******************************************************************************
                                   ;THIS MODULE IS USED TO PRINT THE MODULE FAULT LIST TO THE USER.  IT
                                   ;IS PART OF THE I/O SUPPORT USED WHEN AN ERROR MESSAGE IS PRODUCED.
                                   ;INPUT IS SET UP BY 'DECODE' SO THAT R2 IS THE LIST POINTER.  OUTPUT IS
                                   ;TO THE USER SPECIFIED PRINTING DEVICE.
                                   ;;*******************************************************************************

016556                             FAULTS:
016556  012746  007273                     MOV     #FLST00,-(SP)
016562  012746  000001                     MOV     #1,-(SP)
016566  010600                             MOV     SP,R0
016570  104414                             TRAP    C$PNTB
016572  062706  000004                     ADD     #4,SP
016576  010146                             MOV     R1,-(SP)            ;;PUSH R1 ON STACK
016600  012701  000015                     MOV     #13.,R1             ;GET THE ITERATION COUNT
016604                             1$:
016604  012246                             MOV     (R2)+,-(SP)
016606  012746  007312                     MOV     #FLST01,-(SP)
016612  012746  000002                     MOV     #2,-(SP)
016616  010600                             MOV     SP,R0
016620  104414                             TRAP    C$PNTB
016622  062706  000006                     ADD     #6,SP
016626  005712                             TST     (R2)                ;MORE DATA?
016630  001402                             BEQ     2$                  ;IF ZERO, NO!
016632  005301                             DEC     R1                  ;ONE LESS ITERATION TO-GO
016634  003363                             BGT     1$                  ;DO UNTIL = 0, OR (R2) = 0
016636                             2$:                                 ;CR-LF
016636  012746  006420                     MOV     #CRLF,-(SP)
016642  012746  000001                     MOV     #1,-(SP)
016646  010600                             MOV     SP,R0
016650  104414                             TRAP    C$PNTB
016652  062706  000004                     ADD     #4,SP
016656  012601                             MOV     (SP)+,R1            ;;POP STACK INTO R1
016660  000207                             RTS     PC                  ;AND RETURN TO CALLER
```

```

                                            ;;*******************************************************************
                                            ;THIS MODULE DOES THE SEIZE OPERATION IN THE EVENT THAT
                                            ;A GIVEN DRIVE IS DUAL PORTED.
                                            ;CALL IS JSR FC, SEIZE
                                            ;THERE ARE NO SIDE EFFECTS
                                            ;;*******************************************************************

016662  052777  000040  163632  SEIZE:  BIS     #CLR,@RPCS2         ;START OUT WITH A CLEARED CONTROLLER
016670  013777  002506  163624          MOV     DRVNO,@RPCS2        ;RELOAD THE DRIVE NUMBER
016676  105777  163622                  TSTB    @RPDS               ;IS THIS DRIVE SEIZED BY ANOTHER PORT?
016702  100424                          BMI     3$                  ;NO, JUST TAKE RETURN
016704  005077  163614                  CLR     @RPDS               ;ISSUE A DRIVE REQUEST
016710  010246                          MOV     R2,-(SP)            ;SAVE R2
016712  012702  000012                  MOV     #10.,R2             ;LOAD R2 WITH AN OVERALL ITERATION COUNT
016716  105777  163602          1$:     TSTB    @RPDS               ;NOW WAIT FOR THE OTHER PORT TO RELEASE
016722  100410                          BMI     2$                  ;NOT YET IF RPDS:DRY = 0
016724  004737  017000                  JSR     PC,WAIT
016730  005302                          DEC     R2                  ;AND REDUCE THE ITERATION COUNT
016732  001371                          BNE     1$                  ;LOOK AGAIN FOR DRIVE PRESENT
016734  104455                          TRAP    C$ERDF
016736  000001                          .WORD   1
016740  013266                          .WORD   EM27
016742  000000                          .WORD   0
016744  112777  000377  163556  2$:     MOVB    #377,@RPAS          ;CLEAR ANY UNWANTED ATTENTION BITS
016752  012602                          MOV     (SP)+,R2            ;RESTORE R2
016754  000207                  3$:     RTS     PC                  ;AND TAKE RETURN

                                            ;;*******************************************************************
                                            ;THIS MODULE IS USED TO WAIT FOR THE SPECIFIED TIME IN MILLISECONDS
                                            ;CALL
                                            ;       MOV     #NUMBER,-(SP)   ;NUMBER IN MILLISECONDS TO WAIT
                                            ;       JSR     PC,WAITMS       ;CALL WAIT ROUTINE
                                            ;
                                            ;NOTE: THE SHORTEST WAIT CANNOT BE LESS THAN 16.66MS
                                            ;
                                            ;;*******************************************************************

016756  016637  000002  016776  WAITMS: MOV     2(SP),WATIME        ;GET WAIT TIME IN MILLISECONDS
016764  005737  016776          1$:     TST     WATIME              ;DONE WITH WAIT YET ?
016770  003375                          BGT     1$                  ;BR IF NO
016772  012616                          MOV     (SP)+,(SP)          ;ADJUST RETURN ADDRESS ON STACK
016774  000207                          RTS     PC                  ;NOW RETURN TO MAIN

016776  000000                  WATIME: .WORD   0                   ;WAIT TIME GOES HERE

                                            ;;*******************************************************************
                                            ;THIS MODULE IS USED TO STALL IN LOOPS WHICH MUST WAIT FOR THE
                                            ;RP07 MICROPROCESSORS.  THE WAIT IS A FIXED TIME PERIOD, AND
                                            ;CANNOT BE CHANGED DYNAMICALLY.  THERE ARE NO SIDE EFFECTS.
                                            ;;*******************************************************************

017000                          WAIT:
017000  012727  000372                  MOV     #250.,(PC)+
017004  000000                          .WORD   0
017006  013727  002116                  MOV     L$DLY,(PC)+
017012  000000                          .WORD   0
```

```
017014  005367  177772                  DEC     -6(PC)
017020  001375                          BNE     .-4
017022  005367  177756                  DEC     -22(PC)
017026  001367                          BNE     .-20
017030  000207                          RTS     PC                      ;NOW RETURN TO MAIN

                                        ;;*****************************************************************************
                                        ;THIS MODULE DOES SOME OF THE ERROR CHECKING WHICH MUST OCCUR AS A
                                        ;RESULT OF ANY DATA TRANSFER.  THE MODULE CHECKS SC, TRE, AND MCPE IN
                                        ;RPCS1, AND CHECKS ERR IN RPDS.  IF ERRORS ARE DETECTED, ''ERSTAT'' IS
                                        ;SET TO -1, OTHERWISE ''ERSTAT'' = 0.  THERE ARE NO OTHER SIDE EFFECTS.
                                        ;;*****************************************************************************

017032  005037  002466          ERRCK:  CLR     ERSTAT                  ;START OUT WITHOUT ERRORS!
017036  032777  040000  163460          BIT     #ERR,@RPDS              ;COMPOSITE ERROR?
017044  001415                          BEQ     1$                      ;NOT IF 0!
017046  013737  002524  002456          MOV     RPDS,TESTRG             ;GET THE FAILING REGISTER
017054  017737  163444  002452          MOV     @RPDS,RCVED             ;AND THE FAILING DATA
017062  013737  002452  002454          MOV     RCVED,EXPTED            ;NOW FORM THE EXPECTED DATA
017070  042737  040000  002454          BIC     #ERR,EXPTED             ;BY CLEARING THE CORRECT BIT
017076  000420                          BR      2$                      ;NOW, GO-ON
017100  032777  160000  163404  1$:     BIT     #SC!TRE!MCPE,@RPCS1;DID WE GET ANY ERRORS?
017106  001417                          BEQ     3$                      ;IF ZERO, NO!
017110  013737  002512  002456          MOV     RPCS1,TESTRG            ;GET THE FAILING REGISTER
017116  017737  163370  002452          MOV     @RPCS1,RCVED            ;AND THE FAILING DATA
017124  013737  002452  002454          MOV     RCVED,EXPTED            ;NOW FORM THE EXPECTED DATA
017132  042737  160000  002454          BIC     #SC!TRE!MCPE,EXPTED;BY CLEARING THE CORRECT BITS!
017140  012737  177777  002466  2$:     MOV     #-1,ERSTAT              ;SHOW THE ERROR STATUS
017146  000207                  3$:     RTS     PC                      ;RETURN TO MAIN

                                        ;;*****************************************************************************
                                        ;THIS MODULE DOES THE DATA LOGGING IN THE EVENT OF A DATA BUFFER
                                        ;MISCOMPARE.  THE ADDRESS ''RPDB'' IS LOADED INTO ''TESTRG'', THE
                                        ;CORRECTED CONTENTS OF ''RPBA'' ARE USED TO POINT TO THE EXPECTED DATA IN ''EXPTED'',
                                        ;AND THE CONTENTS OF ''RPDB'' ARE LOADED INTO THE RECEIVED DATA ''RCVED''.
                                        ;THERE ARE NO OTHER SIDE EFFECTS.
                                        ;;*****************************************************************************

017150  010246                  LOCATE: MOV     R2,-(SP)                ;SAVE R2
017152  017702  163340                  MOV     @RPBA,R2                ;GET THE ADDRESS OF THE EXPECTED DATA
017156  162702  000002                  SUB     #2,R2                   ;AND CORRECT IT
017162  005737  002504                  TST     RHTYPE                  ;WHICH CONTROLLER??
017166  001422                          BEQ     3$                      ;IT'S AN RH11 IF 0!
017170  032777  004000  163366          BIT     #BIT11,@RPCS3           ;IS IT AN EVEN WORD TRANSFER?
017176  001402                          BEQ     1$                      ;NO, IT IS NOT, IF 0!
017200  162702  000004                  SUB     #4,R2                   ;CORRECT IT!
017204  032777  002000  163352  1$:     BIT     #BIT10,@RPCS3           ;IS IT A DOUBLE WORD TRANSFER?
017212  001402                          BEQ     2$                      ;IF ZERO, NO!!
017214  162702  000002                  SUB     #2,R2                   ;CORRECT FOR A DOUBLE WORD TRANSFER
017220  032777  010000  163336  2$:     BIT     #BIT12,@RPCS3           ;IS IT AN ODD WORD TRANSFER?
017226  001402                          BEQ     3$                      ;IF ZERO, NO!
017230  162702  000002                  SUB     #2,R2                   ;CORRECT FOR ODD WORD
017234  011237  002454          3$:     MOV     (R2),EXPTED             ;GET THE ACTUAL DATA
017240  017737  163270  002452          MOV     @RPDB,RCVED             ;AND FAILING DATA
017246  012602                          MOV     (SP)+,R2                ;NOW RESTORE R2
017250  000207                          RTS     PC                      ;AND RETURN TO MAIN

```

```
                                        ;;*************************************************************************
                                        ;THIS MODULE IS USED FOR AN ERROR LOG DUMP.  IT IS FED BY R1, WHICH
                                        ;INITIALLY IS N - 1 FOR THE ROUTINE TO BE SELECTED.  R4 IS USED FOR
                                        ;THE DUMP ROUTINE, AND R1, AFTER BEING INCREMENTED IS USED AS THE
                                        ;LOW BYTE ARGUMENT IN R4.  THIS MODULE IS CALLED BY THE TEST WHICH
                                        ;DUMPS THE RP07 ERROR LOG.
                                        ;;*************************************************************************

    017252  040104                      NEXLOC: BIC     R1,R4           ;TAKE THE PREVIOUS ARGUMENT FROM R4
    017254  005201                              INC     R1              ;GET THE NEXT RAM ADDRESS
    017256  050104                              BIS     R1,R4           ;NOW LOAD THE ARGUMENT INTO R4
    017260  004737  015352                      JSR     PC,DIAGLD       ;R4 IS USED TO LOAD THE DIAGNOSTIC ROUTINE
    017264  000207                              RTS     PC              ;NOW TAKE THE RETURN
```

```
                                                ;;*******************************************************************
                                                ;THIS MODULE CONTROLS SPIRAL READS OR WRITES.  ;IT INCREMENTS THE DESIRED
                                                ;TRACK ADDRESS UNTIL IT IS READY TO OVERFLOW INTO AN ILLEGAL ADDRESS.
                                                ;WHEN THIS IS READY TO HAPPEN, THE DESIRED TRACK IS SET TO ZERO, AND THE
                                                ;DESIRED CYLINDER ADDRESS IS INCREMENTED.  THE TERMINAL STATE IS REACHED
                                                ;WHEN THE DESIRED CYLINDER IS ABOUT TO OVERFLOW, AND THE DESIRED TRACK IS
                                                ;ALSO ABOUT TO OVERFLOW.  WHEN THIS HAPPENS, THE DESIRED TRACK ADDRESS
                                                ;IS RESET TO 0.  THE CALLING MODULE MUST DETECT WHEN THIS CONDITION
                                                ;OCCURS.  VARIABLES: DESCYL, AND DESTRK ARE AFFECTED BY THIS MODULE.
                                                ;THIS MODULE IS AFFECTED BY THE VALUE IN "LASTRK", WHICH REPRESENTS
                                                ;THE LAST USER TRACK, AND BY LASCYL, WHICH REPRESENTS THE LAST USER
                                                ;CYLINDER ADDRESS ON THE DRIVE.  LASCYL DOES NOT INCLUDE ANY DIAGNOSTIC
                                                ;FE CYLINDER ADDRESSING.
                                                ;;*******************************************************************

017266  123737  002415  002372  SPIRAL: CMPB    DESTRK+1,LASTRK ;TRACK COUNT AT MAX?
017274  103003                          BHIS    1$              ;IF HIGHER OR SAME, YES!
017276  105237  002415                  INCB    DESTRK+1        ;NEXT TRACK PLEASE...
017302  000410                          BR      3$              ;AND RETURN
017304  023737  002416  002376  1$:     CMP     DESCYL,LASCYL   ;LAST CYLINDER ADDRESS?
017312  101002                          BHI     2$              ;YES, WE ARE ABOUT TO OVERFLOW!!
017314  005237  002416                  INC     DESCYL          ;NEXT CYLINDER ADDRESS PLEASE....
017320  105037  002415          2$:     CLRB    DESTRK+1        ;RESET THE TRACK ADDRESS TO 0
017324  000207                  3$:     RTS     PC              ;NAD TAKE THE RETURN

                                                ;;*******************************************************************
                                                ;THIS MODULE CREATES AN IMAGE OF THE RP REGISTERS.
                                                ;IT IS USED TO SAVE THE REGISTERS FOR AN ERROR DUMP AFTER
                                                ;AN ERROR IS DETECTED.  CALL IS JSR PC,SAVRPR
                                                ;THE OUTPUT OF THIS MODULE LOADS A BUFFER CALLED "REG"
                                                ;;*******************************************************************

017326  010046                  SAVRPR: MOV     R0,-(SP)
017330  010146                          MOV     R1,-(SP)
017332  012700  002512                  MOV     #RPCS1,R0       ;AND THE TRANSFER ADDRESSES
017336  012701  002576                  MOV     #REG,R1         ;OF THE SOURCE AND REG BUFFERS
017342  013021                  1$:     MOV     @(R0)+,(R1)+    ;NOW LOG THE DATA
017344  022700  002562                  CMP     #RPBAE,R0       ;ARE WE AT THE LIMIT?
017350  101374                          BHI     1$              ;DO UNTIL ALL RHXX REGISTERS ARE LOGGED
017352  005737  002504                  TST     RHTYPE
017356  001402                          BEQ     2$
017360  013021                          MOV     @(R0)+,(R1)+    ;GET THE CONTENTS OF RPBAE
017362  013021                          MOV     @(R0)+,(R1)+    ;GET THE CONTENTS OF RPCS3
017364  012601                  2$:     MOV     (SP)+,R1
017366  012600                          MOV     (SP)+,R0
017370  000207                          RTS     PC              ;RETURN TO MAIN FOR ERROR REPORT

                                                ;;*******************************************************************
                                                ;THE FOLLOWING THREE MODULES ARE USED TO FORM UP EXPECTED VS RECEIVED DATA
                                                ;FOR TWO TYPES OF CASES.  THE FIRST IS WHEN THE PROGRAM TRIES TO SET A BIT
                                                ;AND THE BIT FAILS TO SET, AND THE SECOND IS WHEN THE BIT FAILS TO CLEAR.
                                                ;THE FORMER CASE IS HANDLED BY "BISEXP" AND THE LATTER BY "BICEXP".
                                                ;BOTH "BISEXP" AND "BICEXP" CALL "REGSET" TO PERFORM SOME PRELIMINARY
                                                ;DATA SETUP.  BOTH MODULES "BISEXP" AND "BICEXP" AFFECT THE FOLLOWING:
                                                ;"TESTRG", "EXPTED", "RCVED".
                                                ;;*******************************************************************
```

```
017372  017602  000000          BISEXP::MOV     @(SP),R2                ;GET THE POINTER TO THE FAILING REG.
017376  004737  017452                  JSR     PC,REGSET               ;GO LOAD RESULTS
017402  062716  000002                  ADD     #2,(SP)                 ;MOVE THE POINTER TO GET THE BIT MASK
017406  057637  000000  002454          BIS     @(SP),EXPTED            ;SET EXPECTED BIT WHICH FAILED
017414  062716  000002                  ADD     #2,(SP)                 ;MOVE THE POINTER FOR A RETURN
017420  000207                          RTS     PC                      ;RETURN

017422  017602  000000          BICEXP::MOV     @(SP),R2                ;GET THE POINTER TO THE FAILING REG.
017426  004737  017452                  JSR     PC,REGSET               ;GO LOAD RESULTS
017432  062716  000002                  ADD     #2,(SP)                 ;MOVE THE POINTER TO GET THE MASK
017436  047637  000000  002454          BIC     @(SP),EXPTED            ;CLEAR EXPECTED BIT WHICH FAILED
017444  062716  000002                  ADD     #2,(SP)                 ;MOVE THE POINTER TO TAKE A RETURN
017450  000207                          RTS     PC                      ;NOW TAKE THE RETURN

017452  011237  002456          REGSET: MOV     (R2),TESTRG             ;GET THE FAILING REGISTER
017456  011202                          MOV     (R2),R2                 ;GET THE FAILING REGISTER
017460  011237  002452                  MOV     (R2),RCVED              ;NOW GET ITS CONTENTS
017464  013737  002452  002454          MOV     RCVED,EXPTED            ;AND FORM EXPECTED DATA
017472  000207                          RTS     PC                      ;RETURN


                                ;;*******************************************************************************
                                ;THIS MODULE ISSUES A CONTROLLER CLEAR AND CHECKS THE REGISTER POINTED
                                ;TO BY THE STACK WHEN THE MODULE WAS ORIGINALLY CALLED.  THE REGISTER
                                ;IS CHECKED AGAINST LOCATION "MSK".  THE BITS IN MSK = 0 FOR THOSE BITS
                                ;WHICH SHOULD HAVE CLEARED AFTER A CONTROLLER CLEAR.  IF THE BITS UNDER TEST
                                ;DID NOT CLEAR, AN ERROR MESSAGE IS DISPATCHED BY THIS MODULE, REPORTING
                                ;THE FAILING REGISTER, FAILING DATA, AND EXPECTED DATA.  THE RETURN
                                ;ADDRESS IS MOVED OVER THE REGISTER UNDER TEST, AND CONTROLL IS AGAIN
                                ;PASSED TO THE CALLING MODULE.  THIS MODULE AFFECTS: "TESTRG", "EXPTED",
                                ;"RCVED".
                                ;;*******************************************************************************

017474  005137  002450          RESET:  COM     MSK                     ;INVERT THE BIT MASK, BITS TO TEST=1
017500  010246                          MOV     R2,-(SP)                ;SAVE R2
017502  017602  000002                  MOV     @2(SP),R2               ;FORM ADDRESS OF REGISTER UNDER TEST
017506  011202                          MOV     (R2),R2                 ;GOT IT NOW!
017510  052777  000040  163004          BIS     #CLR,@RPCS2             ;SET RPCS2:CLR=1
017516  033712  002450                  BIT     MSK,(R2)                ;LOOK FOR BIT(S) UNTER TEST TO CLEAR
017522  001415                          BEQ     1$                      ;IF OK, SKIP ERROR DISPATCH
017524  010237  002456                  MOV     R2,TESTRG               ;LOAD THE FAILING ADDRESS
017530  011237  002454                  MOV     (R2),EXPTED             ;AND GET THE FAILING DATA
017534  011237  002452                  MOV     (R2),RCVED              ;AND SAVE IT
017540  043737  002450  002454          BIC     MSK,EXPTED              ;NOW FORM THE EXPECTED DATA
017546  104456                          TRAP    C$ERHRD
017550  000005                          .WORD   5
017552  012523                          .WORD   EM15
017554  014172                          .WORD   ERRO
017556  005137  002450          1$:     COM     MSK                     ;BITS TO TEST=0
017562  012602                          MOV     (SP)+,R2                ;RESTORE R2
017564  062716  000002                  ADD     #2,(SP)                 ;MOVE RETURN ADDRESS OVER DATA FIELD
017570  000207                          RTS     PC                      ;RETURN
```

```

                                        ;;*******************************************************************
                                        ;THIS MODULE, WITH EXTERNALLY SET-UP LINKAGE, WRITES THE REGISTER-UNDER
                                        ;TEST TO A ZERO.  IF THE BITS UNDER TEST DO NOT CLEAR AS EXPECTED, AN
                                        ;ERROR MESSAGE IS DISPATCHED IN THIS MODULE.  CONTROL IS DETERMINED BY:
                                        ;"ILOCK"; WHICH DETERMINES IF THE DEVICE MUST BE POLLED, IE "IR" OR "OR"
                                        ;= 1 AND "MSK" WHICH CONTAINS THE BITS-UNDER-TEST = 0.  WHEN THE
                                        ;MODULE IS CALLED, "SNK" SHOULD EQUAL THE ADDRESS OF THE REGISTER UNDER TEST.
                                        ;THE OUTPUT OF THIS MODULE IS IN THREE VARIABLES: "TESTRG", "EXPTED", AND
                                        ;"RCVED".
                                        ;;*******************************************************************

017572  005737  002460                  LDZERO: TST     ILOCK           ;POLLED MODE?
017576  001402                                  BEQ     1$              ;NOT IF ZERO
017600  004737  017672                          JSR     PC,IRLOCK       ;POLL AND WAIT FOR IR TO SET
017604  005077  162630                  1$:     CLR     @SNK            ;WRITE 0'S TO THE REGISTER UNDER TEST
017610  005737  002460                          TST     ILOCK           ;POLLED MODE?
017614  001402                                  BEQ     2$              ;NOT IF ZERO
017616  004737  017706                          JSR     PC,ORLOCK       ;OK, POLL FOR OR TO SET
017622  017737  162612  002452          2$:     MOV     @SNK,RCVED      ;GET THE TEST RESULTS
017630  043737  002450  002452                  BIC     MSK,RCVED       ;STRIP OUT THE UNWANTED BITS
017636  013737  002450  002454                  MOV     MSK,EXPTED      ;GET THE BIT MASK
017644  005137  002454                          COM     EXPTED          ;BITS-TO-TEST = 1
017650  033737  002454  002452                  BIT     EXPTED,RCVED    ;NOW DO THE DATA COMPARISON
017656  001404                                  BEQ     4$              ;BITS TO TEST = 0, OK!
017660  104456                                  TRAP    C$ERHRD
017662  000006                                  .WORD   6
017664  012523                                  .WORD   EM15
017666  014172                                  .WORD   ERRO
017670  000207                          4$:     RTS     PC              ;RETURN TO MAIN


                                        ;;*******************************************************************
                                        ;THIS MODULE POLLS "IR" TO EQUAL A ONE AT SOME TIME.  THE ACTUAL TESTING
                                        ;OF "IR" AGAINST A WATCHDOG TIMER IS NOT DONE HERE, BUT A SUPERVISOR CALL
                                        ;IS ISSUED IN CASE "IR" NEVER SETS, AND THE DIAGNOSTIC HANGS.  THE DIAGNOSTIC
                                        ;WILL RESPOND TO A CONTROL C WHILE IN THIS MODULE.
                                        ;;*******************************************************************

017672                                  IRLOCK:
017672  104422                                  TRAP    C$BRK
017674  032777  000100  162620                  BIT     #IR,@RPCS2      ;POLL IR IN RPCS2
017702  001773                                  BEQ     IRLOCK          ;AND WAIT FOR IT!
017704  000207                                  RTS     PC              ;NOW RETURN TO CALLING SUBROUTINE

                                        ;;*******************************************************************
                                        ;THIS MODULE POLLS "OR" AND WAITS FOR IT TO SET.  THE ACTUAL TESTING
                                        ;OF "OR" AGAINST A WATCHDOG TIMER IS NOT DONE HERE, BUT A SUPERVISOR CALL
                                        ;IS ISSUED IN CASE "OR NEVER SETS, AND THE DIAGNOSTIC HANGS.  THE DIAGNOSTIC
                                        ;WILL RESPOND TO A CONTROL C WHILE IN THIS MODULE.
                                        ;;*******************************************************************

017706                                  ORLOCK:
017706  104422                                  TRAP    C$BRK
017710  032777  000200  162604                  BIT     #OR,@RPCS2      ;POLL OR IN RPCS2
017716  001773                                  BEQ     ORLOCK          ;AND WAIT FOR IT!
017720  000207                                  RTS     PC              ;NOW RETURN TO CALLING SUBROUTINE
```

```

                                        ;;*************************************************************************
                                        ;THIS MODULE, ONCE THE DRIVE HAS BEEN SEIZED, DOES A PRELOAD OF THE DRIVE.
                                        ;A PRELOAD IS AN OPERATION WHEREIN THE DRIVE IS SET UP THROUGH USE OF A READ
                                        ;IN PRESET COMMAND, AND SETTING FORMAT 16 = 1.  THERE ARE NO SIDE EFFECTS.
                                        ;;*************************************************************************

017722  004737  016662                  PRELOD: JSR     PC,SEIZE        ;GET THE DRIVE'S ATTENTION
017726  012777  000021  162556                  MOV     #RIP,@RPCS1     ;ISSUE A READ IN PRESET COMMAND
017734  052777  010000  162602                  BIS     #FMT,@RPOF      ;16 BITS/WORD
017742  000207                                  RTS     PC              ;RETURN

                                        ;;*************************************************************************
                                        ;THIS MODULE DOES THE PARAMETER SETUP FOR ''FLOAT'', ''LDZERO'' AND ''CONSET''.
                                        ;IT GETS ITS INPUT FROM A TABLE POINTED TO BY THE STACK WHEN THE
                                        ;MODULE IS INITIALLY CALLED.  THIS TABLE CONTAINS THE DATA STRUCTURE
                                        ;USED BY SOME TESTS.  CONTAINED WITHIN THE DATA STRUCTURES ARE
                                        ;THE FOLLOWING:  1) THE REGISTER UNDER TEST, 2) THE BITS UNDER TEST, 3)
                                        ;THE DATA PATTERNS TO USE, 4) THE NUMBER OF PATTERNS TO USE.
                                        ;THE OUTPUT OF THIS MODULE IS IN: ''MSK''; WHICH CONTAINS THE COMPLIMENTED
                                        ;FORM OF THE BITS UNDER TEST, ''PATCNT'' WHICH CONTAINS THE NUMBER OF PATTERNS
                                        ;TO USE, ''MASK'' WHICH CONTAINS THE NUMBER OF BITS TO TEST, ''SRC''; WHICH
                                        ;CONTAINS THE ADDRESS OF THE DATA PATTERN TO USE, ''SNK''; WHICH CONTAINS
                                        ;THE ADDRESS OF THE REGISTER TO TEST, ''SCRTMP'': WHICH IS LOADED FOR A
                                        ;POSSIBLE ERROR CONDITION, ''CSTORE'' WHICH CONTAINS THE CARRY BIT FROM THE
                                        ;LAST OPERATION (INITIALLY SET TO 0, INDICATING THE FIRST OPERATION).
                                        ;;*************************************************************************

017744  010246                          SETUP:  MOV     R2,-(SP)        ;SAVE R2
017746  005037  002432                          CLR     CSTORE          ;CLEAN CARRY STORE
017752  017602  000002                          MOV     @2(SP),R2       ;GET TABLE ADDRESS
017756  012237  002434                          MOV     (R2)+,PATCNT    ;GET THE # OF PATTERNS TO RUN
017762  013237  002440                          MOV     @(R2)+,SNK      ;ADDRESS:REGISTER TO TEST
017766  013737  002440  002456                  MOV     SNK,TESTRG      ;ADDRESS = REGISTER UNDER TEST
017774  012237  002446                          MOV     (R2)+,MASK      ;BITS TO TEST
020000  011237  002442                          MOV     (R2),SRC        ;TEST PATTERN
020004  017737  162432  002444                  MOV     @SRC,SRCTMP     ;BUFFER TO DIDDLE THE BITS
020012  013737  002446  002450                  MOV     MASK,MSK        ;GET THE BITS TO STRIP OUT
020020  005137  002450                          COM     MSK             ;DON'T CARE BITS = 1
020024  012602                                  MOV     (SP)+,R2        ;RESTORE R2
020026  062716  000002                          ADD     #2,(SP)         ;MODIFY RETURN OVER DATA FIELD
020032  000207                                  RTS     PC              ;RETURN

                                        ;;*************************************************************************
                                        ;THIS MODULE GENERATES A BIT WHICH IS FLOATED THROUGH A SELECTED REGISTER
                                        ;UNDER TEST.  IT IS SETUP THROUGH THE MODULE ''SETUP''.  IF ERRORS ARE DETECTED,
                                        ;IT WILL DISPATCH AN APPROPRIATE ERROR MESSAGE.  THIS MODULE EFFECTS THE
                                        ;FOLLOWING VARIABLES:  ''MASK'', ''CSTORE'', ''SRCTMP'', ''RCVED'', ''EXPTED''.
                                        ;;*************************************************************************

020034  013746  002444                  FLOAT:  MOV     SRCTMP,-(SP)    ;PUT PATTERN ON STACK
020040  063716  002432                          ADD     CSTORE,(SP)     ;ADD CARRY FROM LAST ROTATE
020044  043716  002450                          BIC     MSK,(SP)        ;CLEAR OUT UNWANTED BITS
020050  011637  002454                          MOV     (SP),EXPTED     ;GET THE EXPECTED DATA
020054  005737  002460                          TST     ILOCK           ;SHOULD WE POLL IR/OR??
020060  001402                                  BEQ     1$              ;NO, JUST DO THE LOAD FUNCTION
020062  004737  017672                          JSR     PC,IRLOCK       ;GO-AHEAD AND POLL FOR IR = 1
```

```
020066  011677  162346          1$:     MOV     (SP),@SNK       ;WRITE DATA TO REG UNDER TEST
020072  005737  002460                  TST     ILOCK           ;SHOULD WE POLL FOR OR = 1?
020076  001402                          BEQ     2$              ;NO, JUST GET RESULTS
020100  004737  017706                  JSR     PC,ORLOCK       ;OK, POLL FOR OR = 1
020104  017746  162330          2$:     MOV     @SNK,-(SP)      ;GET THE RESULTS
020110  043716  002450                  BIC     MSK,(SP)        ;STRIP UNWANTED DATA
020114  011637  002452                  MOV     (SP),RCVED      ;AND SAVE FOR POSSIBLE ERROR REPORT
020120  022626                          CMP     (SP)+,(SP)+     ;LOOK FOR MATCH
020122  001411                          BEQ     5$              ;IF MATCH, SKIP ERROR DISPATCH
020124  062716  000002                  ADD     #2,(SP)         ;ERROR, MODIFY RETURN FOR ERROR LOOP
020130  005037  002446                  CLR     MASK            ;MASK = 0 FOR PREMATURE EXIT
020134  104456                          TRAP    C$ERHRD
020136  000007                          .WORD   7
020140  012454                          .WORD   EM14
020142  014172                          .WORD   ERRO
020144  000207                  4$:     RTS     PC              ;RETURN
020146  000241                  5$:     CLC                     ;CARRY = 0
020150  006137  002446                  ROL     MASK            ;REDUCE THE ITERATION COUNT BY ONE
020154  000241                          CLC                     ;CARRY = 0
020156  006137  002444                  ROL     SRCTMP          ;ROTATE PATTERN
020162  103403                          BCS     6$              ;OBSERVE & SAVE CARRY
020164  005037  002432                  CLR     CSTORE          ;CARRY=0
020170  000765                          BR      4$              ;RETURN
020172  012737  000001  002432  6$:     MOV     #1,CSTORE       ;CARRY = 1
020200  000761                          BR      4$              ;RETURN

                                ;;*******************************************************************************
                                ;THIS MODULE DOES SOME DATA COMPARISON.  IF THE DATA DOES NOT MATCH,
                                ;AN ERROR MESSAGE AND APPROPRIATE DATA ARE REPORTED.  VARIABLES AFFECTED ARE:
                                ;''PSTACK'', ''TESTRG'', ''RCVED'', ''EXPTED''.
                                ;;*******************************************************************************

020202  010246                  COMPAR: MOV     R2,-(SP)        ;SAVE R2
020204  012702  002652                  MOV     #PSTACK,R2      ;GET THE SOFTWARE PSTACK ADDRESS
020210  017612  000002                  MOV     @2(SP),(R2)     ;GET THE ADDRESS OF THE DATA PATTERN TO RUN
020214  013242                          MOV     @(R2)+,-(R2)    ;NOW GET THE DATA PATTERN TO USE
020216  043712  002450                  BIC     MSK,(R2)        ;THROW OUT UNUSED DATA
020222  011237  002454                  MOV     (R2),EXPTED     ;AND SAVE EXPECTED RESULTS FOR POSSIBLE ERROR
020226  005737  002460                  TST     ILOCK           ;POLL IR/OR MODE?
020232  001402                          BEQ     1$              ;NO, JUST GO-ON
020234  004737  017672                  JSR     PC,IRLOCK       ;WAIT FOR IR TO SET, IT REALLY WILL!
020240  012277  162174          1$:     MOV     (R2)+,@SNK      ;WRITE DATA TO THE REGISTER
020244  005737  002460                  TST     ILOCK           ;POLL IR/OR MODE?
020250  001402                          BEQ     2$              ;NOT IF ZERO
020252  004737  017706                  JSR     PC,ORLOCK       ;WAIT FOR OR TO SET, IT REALLY WILL!
020256  017712  162156          2$:     MOV     @SNK,(R2)       ;GET THE RESULTS
020262  043712  002450                  BIC     MSK,(R2)        ;IGNORE UNUSED DATA
020266  013737  002440  002456          MOV     SNK,TESTRG      ;SAVE REGISTER UNDER TEST
020274  011237  002452                  MOV     (R2),RCVED      ;AND THE REGISTER DATA
020300  021242                          CMP     (R2),-(R2)      ;CHECK RESULTS
020302  001406                          BEQ     4$              ;OK, SKIP ERROR REPORT
020304  104456                          TRAP    C$ERHRD
020306  000004                          .WORD   4
020310  012454                          .WORD   EM14
020312  014172                          .WORD   ERRO
020314  005037  002402                  CLR     ITCOUN          ;SET ITERATIONS TO 0
020320  012602                  4$:     MOV     (SP)+,R2        ;RESTORE R2
```

```
020322  062716  000002                    ADD    #2,(SP)         ;MOVE RETURN OVER DATA INPUT
020326  000207                            RTS    PC              ;NOW RETURN TO MAIN

                                  ;;*************************************************************************
                                  ;THIS MODULE iS USED TO CONTINUE A SETUP PROCEDURE BETWEEN SUBTESTS
                                  ;WITHIN A DIAGNOSTIC TEST.  IT AFFECTS THE FOLLOWING VARIABLES:  ''PATCNT'',
                                  ;''CSTORE'', ''MASK'', ''SRCTMP'', ''SRC''.
                                  ;;*************************************************************************

020330  005337  002434            CONSET: DEC    PATCNT          ;ONE LESS PATTERN TO GO
020334  100415                            BMI    1$              ;UNDERFLOW, WE'RE FINISHED!
020336  005037  002432                    CLR    CSTORE          ;CLEAR CARRY STORE
020342  062737  000002  002442            ADD    #2,SRC          ;GET NEXT PATTERN
020350  013737  002450  002446            MOV    MSK,MASK        ;RELOAD # OF BITS TO TEST
020356  005137  002446                    COM    MASK            ;CORRECT THE INVERSION (BITS TESTED=1)
020362  017737  162054  002444            MOV    @SRC,SRCTMP     ;LOAD THE BUFFER FOR BIT MANIPULATION
020370  000207                    1$:     RTS    PC              ;RETURN
```

```

                                          ;;*****************************************************************************
                                          ;THIS MODULE IS USED IN THE EVENT OF A POWER FAIL.  IT WAITS FOR DRIVE
                                          ;READY TO SET BEFORE RETURNING TO THE MAIN CODE.  IT MAINTAINS A TIMER
                                          ;WHICH PERIODICALLY INFORMS THE USER THAT DRIVE READY HAS NOT YET SET, AND
                                          ;THE PROGRAM IS WAITING FOR IT TO SET BEFORE CONTINUING THE TESTS.
                                          ;;*****************************************************************************

020372  010146                            WATDRY: MOV     R1,-(SP)          ;SAVE R1
020374  012701  000062                    1$:     MOV     #50.,R1           ;GET AN ITERATION COUNT
020400  013777  002506  162114                    MOV     DRVNO,@RPCS2      ;LOAD THE UNIT UNDER TEST
020406  032777  010000  162110            2$:     BIT     #MOL,@RPDS        ;MEDIUM ON LINE?
020414  001017                                    BNE     3$                ;IF = 1, YES
020416  004737  017000                            JSR     PC,WAIT           ;STALL FOR A WHILE
020422  005301                                    DEC     R1                ;ONE LESS ITERATION TO-GO
020424  003370                                    BGT     2$                ;DO UNTIL R1 = 0
020426  013746  002506                            MOV     DRVNO,-(SP)
020432  012746  006577                            MOV     #MESG10,-(SP)
020436  012746  000002                            MOV     #2,-(SP)
020442  010600                                    MOV     SP,R0
020444  104417                                    TRAP    C$PNTF
020446  062706  000006                            ADD     #6,SP
020452  000750                                    BR      1$                ;AND LOOP

020454  012701  000062                    3$:     MOV     #50.,R1           ;GET AN ITERATION COUNT
020460  032777  000200  162036            4$:     BIT     #DRY,@RPDS        ;IS DRIVE READY SET?
020466  001017                                    BNE     5$                ;YES, GO-ON
020470  004737  017000                            JSR     PC,WAIT           ;STALL FOR A WHILE
020474  005301                                    DEC     R1                ;ONE LESS ITERATION TO-GO
020476  003370                                    BGT     4$                ;DO UNTIL R1 = 0
020500  013746  002506                            MOV     DRVNO,-(SP)
020504  012746  006671                            MOV     #MESG11,-(SP)
020510  012746  000002                            MOV     #2,-(SP)
020514  010600                                    MOV     SP,R0
020516  104417                                    TRAP    C$PNTF
020520  062706  000006                            ADD     #6,SP
020524  000753                                    BR      3$                ;AND LOOP

020526  012601                            5$:     MOV     (SP)+,R1          ;RESTORE R1
020530  000207                                    RTS     PC                ;EXIT
```

```

                               ;;****************************************************************************
                               ;THIS MODULE DECODES TWO VARIABLES: ''ERRWD1'' AND ''ERRWD2''.  CONTAINED
                               ;WITHIN THESE TWO VARIABLES ARE BITS WHICH REPRESENT THE VARIOUS MODULES
                               ;WHICH ARE TO BE CALLED OUT FOR DIAGNOSTIC TEST FAILURES.  AFTER THE
                               ;DECODING IS DONE, THE MODULE CREATED AN ASCII DISPATCH TABLE WHICH
                               ;POINTS TO THE VARIOUS ASCII MESSAGES REPRESENTING THE ACTUAL MODULE CALLOUT.
                               ;;****************************************************************************

020532  012700  002404         DECODE: MOV    #ERRWD1,R0        ;GET THE FIRST ERROR WORD STATUS
020536  012702  004060                 MOV    #MCUTAB,R2        ;GET THE MODULE CALL OUT INDEX FILE
020542  012703  002676                 MOV    #MCUTXT,R3        ;NOW GET THE OUTPUT POINTER FILE
020546  012705  000002                 MOV    #2,R5             ;WE'RE DOING 2 ERROR WORD MASKS!
020552  012704  000015                 MOV    #13.,R4           ;AND WE'RE CREATING 13. MESSAGE FILES!
020556  012701  000001         1$:     MOV    #BIT0,R1          ;FORM THE INITIAL BIT MASK
020562  030110                 2$:     BIT    R1,(R0)           ;IS THIS BIT ''ON''??
020564  001402                         BEQ    3$                ;NO, DON'T DO ANYTHING NOW!
020566  011223                         MOV    (R2),(R3)+        ;GET THIS MESSAGE!
020570  005304                         DEC    R4                ;ONE LESS MESSAGE TO GET!
020572  005722                 3$:     TST    (R2)+             ;NEXT INPUT MESSAGE PLEASE...
020574  006301                         ASL    R1                ;MOV MASK OVER FOR NEXT FIND...
020576  001371                         BNE    2$                ;KEEP GOING IF NOT ZERO
020600  005305                         DEC    R5                ;NEXT ERROR WORD STATUS ?
020602  001402                         BEQ    4$                ;IF ZERO, DONE WITH SEARCH
020604  005720                         TST    (R0)+             ;NEXT ERROR WORD PLEASE..
020606  000763                         BR     1$                ;NOW SCAN THIS WORD!
020610  005704                 4$:     TST    R4                ;DID WE LOAD 7 MESSAGES?
020612  001403                         BEQ    6$                ;YES, JUST LOAD POINTER AND RETURN
020614  005023                 5$:     CLR    (R3)+             ;CREATE THE NULL MESSAGE FILE
020616  005304                         DEC    R4                ;DONE?
020620  003375                         BGT    5$                ;NOT IF > 0!
020622  012702  002676         6$:     MOV    #MCUTXT,R2        ;LOAD THE OUTPUT POINTER NOW, WE'RE DONE!
020626  000207                         RTS    PC                ;TAKE THE RETURN

                               ;;****************************************************************************
                               ;THIS IS A SIMPLE INTERRUPT ROUTINE WHICH TALLYS THE NUMBER OF INTERRUPTS
                               ;RECEIVED FOR ANY SELECTED OPERATION.
                               ;;****************************************************************************
020630                         INTSRV::
020630  005237  002462                 INC    INTFLG            ;COUNT THIS INTERRUPT
020634                         L10007:
020634  000002                         RTI

```

```
                                   .SBTTL  REPORT CODING SECTION

                                   ;++
                                   ; THE REPORT CODING SECTION CONTAINS THE
                                   ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
                                   ;--

   020636                          L$RPT::


   020636  000167                          .WORD   J$JMP
   020640  000000                          .WORD   L10010-2-.

                                           .EVEN

   020642                          L10010:
   020642  104425                          TRAP    C$RPT
```

```
                                           .SBTTL  PROTECTION TABLE

                                           ;++
                                           ; THIS TABLE IS USED BY THE RUNTIME SERVICES
                                           ; TO PROTECT iHE LOAD MEDIA.
                                           ;--

   020644                                  L$PROT::
   020644   000000                                 0               ;P-TABLE OFFSET OF CSR
   020646   177777                                 -1              ;NOT A MASSBUS DEVICE
   020650   000006                                 6               ;P-TABLE OFFSET DRIVE #
```

```
                                        .SBTTL  INITIALIZE SECTION

                                        ;++
                                        ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AT THE BEGINNING OF EACH PASS.
                                        ;--

 020652                                 L$INIT::
                                                                        ;RESET THE WORLD
 020652  104433                                 TRAP    C$RESET
                                                                        ;POWER UP SEQUENCE ?
 020654  012700  000034                         MOV     #EF.PWR,R0
 020660  104447                                 TRAP    C$REFG
                                                                        ;GO TO 5$ IF YES
 020662  103504                                 BCS     5$
                                                                        ;CONTINUE COMMAND ?
 020664  012700  000036                         MOV     #EF.CON,R0
 020670  104447                                 TRAP    C$REFG
                                                                        ;GO TO 1$ IF NO, ELSE
 020672  103002                                 BCC     1$
                                                                        ;EXIT INIT
 020674  104432                                 TRAP    C$EXIT
 020676  000446                                 .WORD   L10012-.
 020700                                 1$:                             ;'STA', 'RES' OR 'NEW PASS' ?
 020700  012700  000035                         MOV     #EF.NEW,R0
 020704  104447                                 TRAP    C$REFG
                                                                        ;GO TO 2$ IF NO, MUST BE NEW 'SUB-PASS'
 020706  103015                                 BCC     2$
 020710  005037  002422                         CLR     ROUTDO          ;ALLOW A NEW USER SELECTED MICRO DIAGNOSTIC SELECTION
                                                                        ;CR-LF
 020714  012746  006420                         MOV     #CRLF,-(SP)
 020720  012746  000001                         MOV     #1,-(SP)
 020724  010600                                 MOV     SP,R0
 020726  104417                                 TRAP    C$PNTF
 020730  062706  000004                         ADD     #4,SP
 020734  012737  177777  002472                 MOV     #-1,UNIT        ;RESET UNIT COUNT
 020742  005237  002472                 2$:     INC     UNIT            ;GET NEXT UNIT NUMBER FOR TESTING
 020746  012702  000024                         MOV     #20.,R2         ;RH/RP REGISTER COUNT
 020752  012703  002512                         MOV     #RPCS1,R3       ;DATA SINK
                                                                        ;GET UNIT FROM HARDWARE P-TABLE
 020756  013700  002472                         MOV     UNIT,R0
 020762  104442                                 TRAP    C$GPHRD
 020764  010005                                 MOV     R0,R5
 020766  103365                                 BCC     2$
 020770  011346                                 MOV     (R3),-(SP)      ;SAVE R3
 020772  011546                                 MOV     (R5),-(SP)      ;AND THE BASE ADDRESS
 020774  166616  000002                         SUB     2(SP),(SP)      ;DERIVE NEW ADDRESS
 021000  061623                         3$:     ADD     (SP),(R3)+      ;LOG IT IN NEW TABLE
 021002  005302                                 DEC     R2              ;COUNT LOGGING
 021004  001375                                 BNE     3$              ;R2 NOT ZERO, CONTINUE LOGGING
 021006  004737  014700                         JSR     PC,SIZE70       ;SEE IF RH70 IS PRESENT
 021012  005737  002504                         TST     RHTYPE          ;IS IT AN RH70 ?
 021016  001406                                 BEQ     4$              ;BR IF NO
 021020  013702  002502                         MOV     RHEXT,R2        ;GET RPBAE OFFSET
 021024  061502                                 ADD     (R5),R2         ;ADD BASE ADDRESS TO OFFSET
 021026  010223                                 MOV     R2,(R3)+        ;SAVE NEW RPBAE
 021030  005722                                 TST     (R2)+           ;ADD 2
```

```
021032  010213                              MOV     R2,(R3)           ;SAVE NEW RPCS3

021034  022626                      4$:     CMP     (SP)+,(SP)+       ;RESTORE STACK
021036  012537  002474                      MOV     (R5)+,RPADR       ;SAVE RPCS1 BASE ADDRESS
021042  012537  002476                      MOV     (R5)+,RPVEC       ;SAVE INTERUPT VECTOR ADDRESS
021046  012537  002500                      MOV     (R5)+,RPVEC+2     ;SAVE INTERUPT PRIORITY
021052  011537  002506                      MOV     (R5),DRVNO        ;SETUP DRIVE NUMBER FOR UNIT N
021056  013737  002370  002372              MOV     ENDTRK,LASTRK     ;SET UP THE LAST USABLE TRACK
021064  013737  002374  002376              MOV     ENDCYL,LASCYL     ;AND THE LAST USABLE CYLINDER
021072  000402                              BR      6$

021074  004737  020372              5$:     JSR     PC,WATDRY         ;PWR FAIL, WAIT FOR THE DRIVE TO GO READY
021100  005037  002404              6$:     CLR     ERRWD1            ;NO ERROR STATUS BITS
021104  005037  002406                      CLR     ERRWD2            ;FOR BOTH MASKS
021110  005037  002460                      CLR     ILOCK             ;START WITHOUT IR/OR INTERLOCK
021114  005037  002462                      CLR     INTFLG            ;RESET THE INTERRUPT COUNTER
021120  005037  002464                      CLR     UNABLE            ;INSURE THAT UNIT IS ENABLED
021124  005037  002466                      CLR     ERSTAT            ;NO FAIL STATUS
021130  005037  002420                      CLR     FUNCTN            ;START UP WITH NO FUNCTION CODE
021134  012777  000040  161360              MOV     #CLR,@RPCS2       ;MASSBUS INIT TO CLEAR IMPENDING INTERRUPTS
021142  013701  002506                      MOV     DRVNO,R1          ;GET THE DRIVE NUMBER
021146  010177  161350                      MOV     R1,@RPCS2         ;SELECT DRIVE
021152  005037  002400                      CLR     BITPOS            ;CLEAR ATTENTION BIT POSITION WORD
021156  116137  002566  002400              MOVB    ATABIT(R1),BITPOS       ;GET ATA BIT POSITION FOR THIS DRIVE
021164  004737  015550                      JSR     PC,ST.CLK         ;START THE CLOCK
021170  012746  003720                      MOV     #2000.,-(SP)      ;WAIT 2000. MS
021174  004737  016756                      JSR     PC,WAITMS

                                    ;PRINT DRIVE SERIAL NUMBER

021200  012701  000004                      MOV     #4,R1             ;4 DIGITS
021204  013746  002506                      MOV     DRVNO,-(SP)
021210  012746  006423                      MOV     #DSNMSG,-(SP)
021214  012746  000002                      MOV     #2,-(SP)
021220  010600                              MOV     SP,R0
021222  104417                              TRAP    C$PNTF
021224  062706  000006                      ADD     #6,SP
021230  017746  161306                      MOV     @RPSN,-(SP)       ;FETCH S/N
021234  005002                      7$:     CLR     R2                ;ZERO OUTPUT
021236  006116                              ROL     (SP)              ;PUT NEXT DIGIT INTO R2
021240  006102                              ROL     R2
021242  006116                              ROL     (SP)
021244  006102                              ROL     R2
021246  006116                              ROL     (SP)
021250  006102                              ROL     R2
021252  006116                              ROL     (SP)
021254  006102                              ROL     R2
021256  062702  000060                      ADD     #'0,R2            ;MAKE RESULT ASCII
021262  010237  002510                      MOV     R2,DRVSN          ;SAVE R2 FOR PRINT
021266  012746  002510                      MOV     #DRVSN,-(SP)
021272  012746  006447                      MOV     #SNDIGT,-(SP)
021276  012746  000002                      MOV     #2,-(SP)
021302  010600                              MOV     SP,R0
021304  104417                              TRAP    C$PNTF
021306  062706  000006                      ADD     #6,SP
021312  005301                              DEC     R1                ;COUNT DOWN DIGIT
021314  003347                              BGT     7$                ;NEXT DIGIT
```

```
    98 021316  005726                          TST     (SP)+           ;RESTORE STACK
    99                                                                 ;CR-LF
   100 021320  012746  006420                  MOV     #CRLF,-(SP)
       021324  012746  000001                  MOV     #1,-(SP)
       021330  010600                          MOV     SP,R0
       021332  104417                          TRAP    C$PNTF
       021334  062706  000004                  ADD     #4,SP
   101
   125
   126 021340  104432                          TRAP    C$EXIT
       021342  000002                          .WORD   L10012-.
   127
   139                                         .EVEN
   140
   141 021344                          L10012:
       021344  104411                          TRAP    C$INIT
```

```
                               .SBTTL  AUTODROP SECTION

                               ;++
                               ; THIS CODE IS EXECUTED IMMEDIATELY AFTER THE INITIALIZE CODE IF
                               ; THE ''ADR'' FLAG WAS SET.  THE UNIT(S) UNDER TEST ARE CHECKED TO
                               ; SEE IF THEY WILL RESPOND.  THOSE THAT DON'T ARE IMMEDIATELY
                               ; DROPPED FROM TESTING.
                               ;--

021346                         L$AUTO::

021346                         L10013:
021346  104461                         TRAP    C$AUTO
```

```
                                        .SBTTL  CLEANUP CODING SECTION

                                        ;++
                                        ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AFTER THE HARDWARE TESTS HAVE BEEN PERFORMED.
                                        ;--

021350                                  L$CLEAN::
021350  005037  002404                          CLR     ERRWD1          ;AND ANY LEFT-OVER ERROR STATUS
021354  005037  002406                          CLR     ERRWD2          ;FOR BOTH MASKS!
021360  005037  002466                          CLR     ERSTAT          ;SET FOR PASS STATUS
021364  005037  002430                          CLR     FASTAT          ;ENSURE THAT 'INTERNAL' FAILED STATUS = 0
021370  005037  002464                          CLR     UNABLE          ;INSURE THAT UNIT IS ENABLED
021374  022737  000035  002420                  CMP     #DIAG,FUNCTN    ;WAS LAST COMMAND A DIAGNOSTIC COMMAND?
021402  001002                                  BNE     1$              ;IF SO, TAKE THE BRANCH
021404  004737  015312                          JSR     PC,DIAGEN       ;AND ENSURE THAT THE UNIT ISN'T IN DIAGNOSTIC MODE
021410                                  1$:                             ;SET PRIORITY TO 7
021410  012700  000340                          MOV     #PRI07,R0
021414  104441                                  TRAP    C$SPRI
021416  004737  016054                          JSR     PC,STOPCK       ;STOP CLOCK
021422  012777  000040  161072                  MOV     #CLR,@RPCS2     ;MASSBUS INIT TO CLEAR IMPENDING INTERRUPTS
021430  013777  002506  161064                  MOV     DRVNO,@RPCS2    ;GET DRIVE NUMBER
021436  005737  002426                          TST     CLKSTA          ;RELEASE APPROPRIATE CLOCK VECTOR
021442  001410                                  BEQ     3$              ;NO CLOCK, SKIP
021444  100404                                  BMI     2$              ;L-CLK
                                                                        ;P-CLK VECTOR RELEASE
021446  013700  015734                          MOV     PKV,R0
021452  104436                                  TRAP    C$CVEC
021454  000403                                  BR      3$
                                                                        ;L-CLK VECTOR RELEASE
021456                                  2$:
021456  013700  015744                          MOV     LKV,R0
021462  104436                                  TRAP    C$CVEC
021464                                  3$:                             ;RP07 VECTOR RELEASE
021464  013700  002476                          MOV     RPVEC,R0
021470  104436                                  TRAP    C$CVEC


021472  104432                                  TRAP    C$EXIT
021474  000002                                  .WORD   L10014-.

                                                .EVEN

021476                                  L10014:
021476  104412                                  TRAP    C$CLEAN
```

```
                                 .SBTTL  DROP UNIT SECTION

                                 ;++
                                 ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                 ; TO NO LONGER BE TESTED.
                                 ;--

 021500                          L$DU::


 021500  000167                          .WORD   J$JMP
 021502  000000                          .WORD   L10015-2-.

                                         .EVEN


 021504                          L10015:
 021504  104453                          TRAP    C$DU
```

```
                                        .SBTTL  ADD UNIT SECTION

                                        ;++
                                        ; THE ADD-UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES
                                        ;   TO BE EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK
                                        ;   TO THE TEST CYCLE.
                                        ;--

   021506                               L$AU::


   021506  000167                               .WORD   J$JMP
   021510  000000                               .WORD   L10016-2-.

                                                .EVEN

   021512                               L10016:
   021512  104452                               TRAP    C$AU
```

```
      2                                        .SBTTL  HARDWARE TESTS
```

```
                                            .SBTTL  TEST 1  UNIT UNDER TEST




                                            ;%      TEST 01  UNIT UNDER TEST
                                            ;%      :  GET CSR ADDRESS AND ACCESS THE CONTROLLER
                                            ;%      :  IF DEVICE DOESN'T RESPOND
                                            ;%      :  :  THEN
                                            ;%      :  :  OUTPUT ERROR MESSAGE (NO SSYNC, DEVICE NOT PRESENT)
                                            ;%      :  ENDIF
                                            ;%      END TEST 01


 021514                                     T1::
 021514     012737  000012  002402                  MOV     #10.,ITCOUN         ;LOAD THE OVERALL ITERATION COUNTER
 021522                                     1$:
 021522     012746  000240                          MOV     #240,-(SP)
 021526     012746  021564                          MOV     #2$,-(SP)
 021532     012746  000004                          MOV     #4,-(SP)
 021536     012746  000003                          MOV     #3,-(SP)
 021542     104437                                  TRAP    C$SVEC
 021544     062706  000010                          ADD     #10,SP
 021550     005777  160736                          TST     @RPCS1              ;ACCESS THE CONTROLLER
 021554     012700  000004                          MOV     #4,R0
 021560     104436                                  TRAP    C$CVEC
 021562     000407                                  BR      3$
 021564     022626                          2$:     CMP     (SP)+,(SP)+         ;RESTORE THE STACK, DEVICE DIDN'T RESPOND
 021566     104456                                  TRAP    C$ERHRD
 021570     000001                                  .WORD   1
 021572     012272                                  .WORD   EM11
 021574     000000                                  .WORD   0
 021576     005037  002402                          CLR     ITCOUN              ;SET ITERATIONS TO 0
 021602     005337  002402                  3$:     DEC     ITCOUN              ;ONE LESS ITERATION TO GO
 021606     003345                                  BGT     1$                  ;KEEP GOING UNTIL = 0!
 021610                                     L10017:
 021610     104401                                  TRAP    C$ETST
```

```
                                      .SBTTL  TEST 2  RP CLEAR TEST

                                      ;%      TEST 02  RPCLEAR TEST
                                      ;%      :  WRITE RPBA = #-2
                                      ;%      :  GET CONTENTS OF RPBA AND STORE THEM
                                      ;%      :  IF RPBA = 0
                                      ;%      :  :  THEN
                                      ;%      :  :  OUTPUT ERROR MESSAGE (RPBA DIDN'T SET)
                                      ;%      :  :  ELSE
                                      ;%      :  :  SET RPCS2:  CLR (BIT 05) = 1
                                      ;%      :  ENDIF
                                      ;%      :  COMPARE RPBA WITH STORED VALUE
                                      ;%      :  IF RPBA DID NOT CHANGE
                                      ;%      :  :  THEN
                                      ;%      :  :  OUTPUT ERROR MESSAGE (DEVICE CLEAR DID NOT FUNCTION)
                                      ;%      :  ENDIF
                                      ;%      END TEST 02

021612                                T2::
021612  012737  000012  002402                MOV     #10.,ITCOUN        ;LOAD THE OVERALL ITERATION COUNT
021620                                1$:
021620  104404                                TRAP    C$BSEG
021622  013777  002346  160666                MOV     PATT2,@RPBA        ;LOAD UP RPBA WITH ALL ONES
021630  005777  160662                        TST     @RPBA              ;SEE IF ANY BIT SET
021634  001024                                BNE     2$                 ;IF ANY BITS SET, TAKE BRANCH
021636  013737  002516  002456                MOV     RPBA,TESTRG        ;SAVE THE ADDRESS OF THE REGISTER UNDER TEST
021644  017737  160646  002452                MOV     @RPBA,RCVED        ;AND ITS CONTENTS
021652  013737  002346  002454                MOV     PATT2,EXPTED       ;NOW GET THE EXPECTED RESULTS
021660  005037  002404                        CLR     ERRWD1             ;NO RP07 MODULE CALLOUT
021664  012737  000002  002406                MOV     #BIT1,ERRWD2       ;JUST CALLOUT THE CONTROLLER
021672  104456                                TRAP    C$ERHRD
021674  000002                                .WORD   2
021676  012776                                .WORD   EM22
021700  014172                                .WORD   ERRO
021702  005037  002402                        CLR     ITCOUN             ;ITERATIONS = 0
021706                                2$:
021706                                10000$:
021706  104405                                TRAP    C$ESEG
021710  104404                                TRAP    C$BSEG
021712  017746  160600                        MOV     @RPBA,-(SP)        ;SAVE RPBA FOR COMPARISON
021716  052777  000040  160576                BIS     #CLR,@RPCS2        ;ISSUE DEVICE CLEAR
021724  027726  160566                        CMP     @RPBA,(SP)+        ;COMPARE PRESENT RPBA STATE WITH RPBA LAST STATE
021730  001016                                BNE     3$                 ;TAKE BRANCH IF A CHANGE OCCURRED
021732  005037  002454                        CLR     EXPTED             ;FORM THE EXPECTED DATA
021736  013737  002516  002456                MOV     RPBA,TESTRG        ;GET ADDRESS OF FAILING REGISTER
021744  017737  160546  002452                MOV     @RPBA,RCVED        ;AND THE CONTENTS OF RPBA
021752  104456                                TRAP    C$ERHRD
021754  000003                                .WORD   3
021756  012410                                .WORD   EM13
021760  014172                                .WORD   ERRO
021762  005037  002402                        CLR     ITCOUN             ;ITERATIONS = 0
021766                                3$:
021766                                10001$:
021766  104405                                TRAP    C$ESEG
021770  005337  002402                        DEC     ITCOUN             ;ONE LESS ITERATION TO-GO
021774  003311                                BGT     1$                 ;IF NOT 0, KEEP GOING!
021776                                L10020:
       021776  104401                          TRAP    C$ETST
```

```
                                .SBTTL  TEST 3  RPCS2 READ WRITE TEST

                                ;%      TEST 03  RPCS2 READ-WRITE TEST
                                ;%      :  WRITE RPCS2 WITH DATA PATTERNS 1-4, ONE AT A TIME
                                ;%      :  BITS TO TEST = 0..2
                                ;%      :  IF RPCS2 DOES NOT MATCH PATTERN
                                ;%      :  :  THEN
                                ;%      :  :  OUTPUT ERROR MESSAGE (BIT UNDER TEST DID-NOT SET)
                                ;%      :  :  ELSE
                                ;%      :  :  SET RPCS2:  CLR = 1
                                ;%      :  ENDIF
                                ;%      :  IF RPCS2 BIT UNDER TEST DID NOT CLEAR
                                ;%      :  :  THEN OUTPUT ERROR MESSAGE (BIT DIDN'T CLEAR WITH DEVICE CLEAR)
                                ;%      :  ENDIF
                                ;%      END TEST 03

022000                          T3::
022000  012737  000002  002406          MOV     #BIT1,ERRWD2    ;SET UP THE MODULE CALLOUT (JUST-IN-CASE)
022006  005037  002404                  CLR     ERRWD1          ;NO MODULE CALLOUT FOR THE DRIVE
022012  012737  000012  002402          MOV     #10.,ITCOUN     ;LOAD THE OVERALL ITERATION COUNT
022020                          1$:
022020  004737  017744                  JSR     PC,SETUP        ;LOAD I/O POINTERS
022024  004160                          TST03                   ;FROM THIS TABLE
022026  013737  002444  002436  64$:    MOV     SRCTMP,TEMP     ;SET UP FOR POSSIBLE LOOP
022034  104404                          TRAP    C$BSEG
022036  004737  020034                  JSR     PC,FLOAT        ;FLOAT THE PATTERN
022042  000403                          BR      65$             ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
022044  013737  002436  002444          MOV     TEMP,SRCTMP     ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
022052                          65$:
022052                          10000$:
022052  104405                          TRAP    C$ESEG
022054  005737  002446                  TST     MASK            ;IF MASK = 0, WE'RE DONE
022060  001362                          BNE     64$
022062  004737  020330                  JSR     PC,CONSET       ;GET NEXT PATTERN
022066  005737  002434                  TST     PATCNT          ;IF PATTERN COUNT UNDERFLOWED, DONE!
022072  002355                          BGE     64$             ;NOT DONE YET, GO-ON
022074  104404                          TRAP    C$BSEG
022076  004737  020202                  JSR     PC,COMPAR       ;WRITE THE NEXT PATTERN
022102  002352                          PATT4                   ;WHICH IS PATTERN #4
022104                          10001$:
022104  104405                          TRAP    C$ESEG
022106  104404                          TRAP    C$BSEG
022110  104404                          TRAP    C$BSEG
022112  004737  020202                  JSR     PC,COMPAR       ;DO ANOTHER DATA COMPARISON
022116  002350                          PATT3                   ;USING PATTERN #3
022120                          10003$:
022120  104405                          TRAP    C$ESEG
022122  004737  017474                  JSR     PC,RESET        ;RESET THE DEVICE
022126  002522                          RPCS2                   ;CLEAR RPCS2 BY SETTING MASSBUS CLEAR
022130                          10002$:
022130  104405                          TRAP    C$ESEG
022132  005337  002402                  DEC     ITCOUNT         ;ONE LESS ITERATION TO-GO
022136  003330                          BGT     1$              ;KEEP GOING IF NOT ZERO
022140                          L10021:
022140  104401                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 4  RPWC READ WRITE TEST

                                        ;%      TEST 04  RPWC READ-WRITE TEST
                                        ;%      :  WRITE RPWC WITH DATA PATTERNS 1..4
                                        ;%      :  BITS TO TEST = 1..15
                                        ;%      :  IF RPWC BIT UNDER TEST DOESN'T MATCH EXPECTED
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT UNDER TEST DID NOT SET)
                                        ;%      :  :  ELSE
                                        ;%      :  :  WRITE RPWC = 0
                                        ;%      :  ENDIF
                                        ;%      :  IF RPWC BIT(S) UNDER TEST DID NOT CLEAR
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT(S) DIDN'T CLEAR WHEN EXPECTED)
                                        ;%      :  ENDIF
                                        ;%      END TEST 04

022142                                  T4::
022142  005037  002404                          CLR     ERRWD1          ;MODULE CALLOUT
022146  012737  000002  002406                  MOV     #BIT1,ERRWD2    ;FOR THIS TEST
022154  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE OVERALL ITERATION COUNT
022162                                  1$:
022162  004737  017744                          JSR     PC,SETUP        ;LOAD I/O POINTERS
022166  004172                                  TST04                   ;FROM THIS TABLE
022170  013737  002444  002436          64$:    MOV     SRCTMP,TEMP     ;SET UP FOR POSSIBLE LOOP
022176  104404                                  TRAP    C$BSEG
022200  004737  020034                          JSR     PC,FLOAT        ;FLOAT THE PATTERN
022204  000403                                  BR      65$             ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
022206  013737  002436  002444                  MOV     TEMP,SRCTMP     ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
022214                                  65$:
022214                                  10000$:
022214  104405                                  TRAP    C$ESEG
022216  005737  002446                          TST     MASK            ;IF MASK = 0, WE'RE DONE
022222  001362                                  BNE     64$
022224  004737  020330                          JSR     PC,CONSET       ;GET NEXT PATTERN
022230  005737  002434                          TST     PATCNT          ;IF PATTERN COUNT UNDERFLOWED, DONE!
022234  002355                                  BGE     64$             ;NOT DONE YET, GO-ON
022236  104404                                  TRAP    C$BSEG
022240  004737  020202                          JSR     PC,COMPAR       ;WRITE THE NEXT PATTERN
022244  002352                                  PATT4                   ;WHICH IS PATTERN #4
022246                                  10001$:
022246  104405                                  TRAP    C$ESEG
022250  104404                                  TRAP    C$BSEG
022252  104404                                  TRAP    C$BSEG
022254  004737  020202                          JSR     PC,COMPAR       ;DO ANOTHER DATA COMPARISON
022260  002350                                  PATT3                   ;USING PATTERN #3
022262                                  10003$:
022262  104405                                  TRAP    C$ESEG
022264  004737  017572                          JSR     PC,LDZERO       ;WRITE RPWC TO 0 TO CLEAR IT!
022270                                  10002$:
022270  104405                                  TRAP    C$ESEG
022272  005337  002402                          DEC     ITCOUN          ;ONE LESS ITERATION TO-GO
022276  003331                                  BGT     1$              ;IF NOT ZERO, KEEP GOING
022300                                  L10022:
022300  104401                                  TRAP    C$ETST
```

```
                                        .SBTTL  TEST 5  RPBA READ WRITE TEST

                                        ;%      TEST 05  RPBA READ-WRITE TEST
                                        ;%      :  WRITE RPBA WITH DATA PATTERNS 1..4, ONE AT A TIME
                                        ;%      :  BITS TO TEST = 0..15
                                        ;%      :  IF RPBA BIT(S) UNDER TEST DON'T MATCH EXPECTED DATA
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST DON'T MATCH TEST DATA)
                                        ;%      :  :  ELSE
                                        ;%      :  :  WRITE RPCS2:  CLR = 1
                                        ;%      :  ENDIF
                                        ;%      :  IF RPBA BIT(S) UNDER TEST DIDN'T CLEAR
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST DIDN'T CLEAR)
                                        ;%      :  ENDIF
                                        ;%      END TEST 05
022302                                  T5::
022302  005037  002404                          CLR     ERRWD1          ;MODULE CALLOUT
022306  012737  000002  002406                  MOV     #BIT1,ERRWD2    ;FOR THIS TEST
022314  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNTER
022322                                  1$:
022322  004737  017744                          JSR     PC,SETUP        ;LOAD I/O POINTERS
022326  004204                                  TST05                   ;FROM THIS TABLE
022330  013737  002444  002436  64$:            MOV     SRCTMP,TEMP     ;SET UP FOR POSSIBLE LOOP
022336  104404                                  TRAP    C$BSEG
022340  004737  020034                          JSR     PC,FLOAT        ;FLOAT THE PATTERN
022344  000403                                  BR      65$             ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
022346  013737  002436  002444                  MOV     TEMP,SRCTMP     ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
022354                                  65$:
022354                                  10000$:
022354  104405                                  TRAP    C$ESEG
022356  005737  002446                          TST     MASK            ;IF MASK = 0, WE'RE DONE
022362  001362                                  BNE     64$
022364  004737  020330                          JSR     PC,CONSET       ;GET NEXT PATTERN
022370  005737  002434                          TST     PATCNT          ;IF PATTERN COUNT UNDERFLOWED, DONE!
022374  002355                                  BGE     64$             ;NOT DONE YET, GO-ON
022376  104404                                  TRAP    C$BSEG
022400  004737  020202                          JSR     PC,COMPAR       ;WRITE THE NEXT PATTERN
022404  002352                                  PATT4                   ;WHICH IS PATTERN #4
022406                                  10001$:
022406  104405                                  TRAP    C$ESEG
022410  104404                                  TRAP    C$BSEG
022412  104404                                  TRAP    C$BSEG
022414  004737  020202                          JSR     PC,COMPAR       ;DO ANOTHER DATA COMPARISON
022420  002350                                  PATT3                   ;USING PATTERN #3
022422                                  10003$:
022422  104405                                  TRAP    C$ESEG
022424  004737  017474                          JSR     PC,RESET        ;RESET THE DEVICE
022430  002516                                  RPBA                    ;CLEAR RPBA BY SETTING MASSBUS CLEAR
022432                                  10002$:
022432  104405                                  TRAP    C$ESEG
022434  005337  002402                          DEC     ITCOUN          ;ONE LESS TO GO
022440  003330                                  BGT     1$              ;IF => 0, KEEP GOING!
022442                                  L10023:
022442  104401                                  TRAP    C$ETST
```

```
                                        .SBTTL  TEST 6  SC & TRE TEST 1 (RH11)

                                        ;%      TEST 06  SPECIAL CONDITION AND TRANSFER ERROR TEST (RH11 TEST ONLY!)
                                        ;%      :  SET RPCS2:  CLR = 1
                                        ;%      :  IF RPCS1:  SC OR RPCS1:  TRE = 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT STUCK AT 1, AND SHOULDN'T BE)
                                        ;%      :  :  ELSE
                                        ;%      :  :  SET RPCS2:  MXF (BIT 09) = 1
                                        ;%      :  :  IF RPCS2:  MXF <> 1
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  OUTPUT ERROR MESSAGE (BIT FAILED TO SET WHEN EXPECTED)
                                        ;%      :  :  :  ELSE
                                        ;%      :  :  :  IF RPCS1: TRE <> 1
                                        ;%      :  :  :  :  THEN
                                        ;%      :  :  :  :  OUTPUT ERROR MESSAGE (BIT FAILED TO SET WHEN EXPECTED)
                                        ;%      :  :  :  ENDIF
                                        ;%      :  :  :  IF RPCS1:  SC <> 1
                                        ;%      :  :  :  :  THEN
                                        ;%      :  :  :  :  OUTPUT ERROR MESSAGE (BIT FAILED TO SET WHEN EXPECTED)
                                        ;%      :  :  :  ENDIF
                                        ;%      :  :  :  SET RPCS2:  CLR = 1
                                        ;%      :  :  :  IF RPCS1:  TRE OR SC = 1
                                        ;%      :  :  :  :  THEN
                                        ;%      :  :  :  :  OUTPUT ERROR MESSAGE (BITS FAILED TO CLEAR)
                                        ;%      :  :  :  ENDIF
                                        ;%      :  :  ENDIF
                                        ;%      :  ENDIF
                                        ;%      END TEST 06

022444                                  T6::
022444  005737  002504                          TST     RHTYPE          ;WHICH CONTROLLER??
022450  001402                                  BEQ     1$              ;IF 0, IT'S AN RH11
022452  104432                                  TRAP    C$EXIT
022454  000316                                  .WORD   L10024-.
022456  005037  002404                  1$:     CLR     ERRWD1          ;MODULE CALLOUT FOR THIS TEST
022462  012737  000002  002406                  MOV     #BIT1,ERRWD2    ;ONLY THE CONTROLLER
022470  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNTER
022476                                  2$:
022476  104404                                  TRAP    C$BSEG
022500  104404                                  TRAP    C$BSEG
022502  052777  000040  160012                  BIS     #CLR, @RPCS2    ;INITIALIZE THE DEVICE
022510  013777  002506  160004                  MOV     DRVNO,@RPCS2    ;AND LOAD THE DRIVE NUMBER
022516  032777  140000  157766                  BIT     #SC!TRE,@RPCS1  ;SPECIAL CONDITION OR TRANSFER ERROR?
022524  001412                                  BEQ     3$
022526  004737  017422                          JSR     PC,BICEXP       ;LOAD FAILING DATA
022532  002512                                  RPCS1                   ;FAILING REGISTER
022534  140000                                  SC!TRE                  ;BIT UNDER TEST
022536  104456                                  TRAP    C$ERHRD
022540  000010                                  .WORD   8
022542  012562                                  .WORD   EM16
022544  014172                                  .WORD   ERRO
022546  005037  002402                          CLR     ITCOUN          ;ITERATIONS = 0
022552                                  3$:
022552                                  10001$:
022552  104405                                  TRAP    C$ESEG
022554  104404                                  TRAP    C$BSEG
```

```
022556 052777 001000 157736          BIS     #MXF,@RPCS2       ;SET MISSED TRANSFER = 1
022564 032777 001000 157730          BIT     #MXF,@RPCS2       ;DID IT SET?
022572 001012                        BNE     4$                ;YES IT DID, SKIP ERROR DISPATCH
022574 004737 017372                 JSR     PC,BISEXP         ;LOAD FAILING DATA
022600 002522                        RPCS2                     ;FAILING REGISTER
022602 001000                        MXF                       ;BIT UNDER TEST
022604 104456                        TRAP    C$ERHRD
022606 000011                        .WORD   9
022610 012776                        .WORD   EM22
022612 014172                        .WORD   ERRO
022614 005037 002402                 CLR     ITCOUN            ;ITERATIONS = 0
022620                        4$:
022620                        10002$:
022620 104405                        TRAP    C$ESEG
022622 032777 040000 157662          BIT     #TRE,@RPCS1       ;DID WE DETECT A TRANSFER ERROR??
022630 001012                        BNE     5$                ;YES, GO-ON
022632 004737 017372                 JSR     PC,BISEXP         ;LOAD FAILING DATA
022636 002512                        RPCS1                     ;FAILING REGISTER
022640 040000                        TRE                       ;BIT UNDER TEST
022642 104456                        TRAP    C$ERHRD
022644 000012                        .WORD   10
022646 012776                        .WORD   EM22
022650 014172                        .WORD   ERRO
022652 005037 002402                 CLR     ITCOUN            ;ITERATIONS = 0
022656 032777 100000 157626   5$:    BIT     #SC,@RPCS1        ;DID WE GET SPECIAL CONDITION?
022664 001012                        BNE     6$                ;YES, SKIP ERROR DISPATCH
022666 004737 017372                 JSR     PC,BISEXP         ;LOAD FAILING DATA
022672 002512                        RPCS1                     ;FAILING REGISTER
022674 100000                        SC                        ;BIT UNDER TEST
022676 104456                        TRAP    C$ERHRD
022700 000013                        .WORD   11
022702 012776                        .WORD   EM22
022704 014172                        .WORD   ERRO
022706 005037 002402                 CLR     ITCOUN            ;ITERATIONS = 0
022712 052777 000040 157602   6$:    BIS     #CLR,@RPCS2       ;CLEAR OUT THE CONTROLLER
022720 013777 002506 157574          MOV     DRVNO,@RPCS2      ;RELOAD THE DRIVE NUMBER
022726 032777 140000 157556          BIT     #SC!TRE,@RPCS1    ;DID SC AND TRE CLEAR OUT?
022734 001412                        BEQ     7$                ;YES, TEST OK!
022736 004737 017422                 JSR     PC,BICEXP         ;LOAD FAILING DATA
022742 002512                        RPCS1                     ;FAILING REGISTER
022744 140000                        SC!TRE                    ;BIT UNDER TEST
022746 104456                        TRAP    C$ERHRD
022750 000014                        .WORD   12
022752 013051                        .WORD   EM23
022754 014172                        .WORD   ERRO
022756 005037 002402                 CLR     ITCOUN            ;ITERATIONS = 0
022762                        7$:
022762                        10000$:
022762 104405                        TRAP    C$ESEG
022764 005337 002402                 DEC      ITCOUN           ;ONE LESS ITERATION TO GO
022770 003242                        BGT     2$                ;KEEP GOING IF => 0!
022772                        L10024:
022772 104401                        TRAP    C$ETST
```

```
                                              .SBTTL  TEST 7  IR AND OR TEST

                                              ;%      TEST 07  IR AND OR TEST #1
                                              ;%      :  TEST RPCS2:  IR = 1
                                              ;%      :  IF RPCS2:  IR <> 1
                                              ;%      :  :  THEN
                                              ;%      :  :  WAIT USING A TIMING LOOP
                                              ;%      :  :  IF TIMING LOOP HAS EXPIRED AND IR <> 1
                                              ;%      :  :  :  THEN
                                              ;%      :  :  :  OUTPUT ERROR MESSAGE (BIT FAILED TO SET WHEN EXPECTED)
                                              ;%      :  :  :  ELSE
                                              ;%      :  :  :  WRITE RPDB = 0, ONCE
                                              ;%      :  :  ENDIF
                                              ;%      :  :  IF RPCS2:  OR <> 1
                                              ;%      :  :  :  THEN
                                              ;%      :  :  :  WAIT, USING A TIMING LOOP
                                              ;%      :  :  :  IF TIMING LOOP HAS EXPIRED AND RPCS2:  OR <> 1
                                              ;%      :  :  :  :  THEN
                                              ;%      :  :  :  :  OUTPUT ERROR MESSAGE (RPCS2:  OR DIDN'T SET IN TIME)
                                              ;%      :  :  :  ENDIF
                                              ;%      :  :  :  ELSE
                                              ;%      :  :  :  READ RPDB ONCE
                                              ;%      :  :  ENDIF
                                              ;%      :  :  IF RPCS2:  OR <> 0
                                              ;%      :  :  :  THEN
                                              ;%      :  :  :  OUTPUT ERROR MESSAGE (BIT FAILED TO CLEAR WHEN EXPECTED)
                                              ;%      :  :  ENDIF
                                              ;%      :  ENDIF
                                              ;%      END TEST 07

022774                                        T7::
022774  005037  002404                                CLR     ERRWD1          ;MODULE CALLOUT FOR THIS TEST
023000  012737  000002  002406                        MOV     #BIT1,ERRWD2    ;ONLY THE CONTROLLER COULD FAIL!
023006  012737  000012  002402                        MOV     #10.,ITCOUNT    ;LOAD THE ITERATION COUNT
023014                                        1$:
023014  104404                                        TRAP    C$BSEG
023016  104404                                        TRAP    C$BSEG
023020  032777  000100  157474                        BIT     #IR,@RPCS2      ;LOOK FOR IR TO SET IN RPCS2
023026  001032                                        BNE     2$              ;SET, GO-ON
023030  012727  000002                                MOV     #2,(PC)+
023034  000000                                        .WORD   0
023036  013727  002116                                MOV     L$DLY,(PC)+
023042  000000                                        .WORD   0
023044  005367  177772                                DEC     -6(PC)
023050  001375                                        BNE     .-4
023052  005367  177756                                DEC     -22(PC)
023056  001367                                        BNE     .-20
023060  032777  000100  157434                        BIT     #IR,@RPCS2      ;LOOK FOR IR TO BE SET NOW!
023066  001012                                        BNE     2$              ;IT SET IN TIME
023070  004737  017372                                JSR     PC,BISEXP       ;LOAD FAILING DATA
023074  002522                                        RPCS2                   ;FAILING REGISTER
023076  000100                                        IR                      ;BIT UNDER TEST
023100  104456                                        TRAP    C$ERHRD
023102  000015                                        .WORD   13
023104  012622                                        .WORD   EM17
023106  014172                                        .WORD   ERRO
023110  005037  002402                                CLR     ITCOUN          ;ITERATIONS = 0
```

```
   023114                             2$:
   023114                             10001$:
   023114  104405                             TRAP    C$ESEG
   023116  005077  157412                     CLR     @RPDB           ;WRITE RPDB ONCE WITH DATA
   023122  032777  000200  157372             BIT     #OR,@RPCS2      ;NOW LOOK FOR OUTPUT READY
   023130  001032                             BNE     3$              ;GOT IT, GO ON
   023132  012727  000020                     MOV     #20,(PC)+
   023136  000000                             .WORD   0
   023140  013727  002116                     MOV     L$DLY,(PC)+
   023144  000000                             .WORD   0
   023146  005367  177772                     DEC     -6(PC)
   023152  001375                             BNE     .-4
   023154  005367  177756                     DEC     -22(PC)
   023160  001367                             BNE     .-20
   023162  032777  000200  157332             BIT     #OR,@RPCS2      ;LOOK FOR OR TO BE SET NOW
   023170  001012                             BNE     3$              ;IT SET IN TIME
   023172  004737  017372                     JSR     PC,BISEXP       ;LOAD FAILING DATA
   023176  002522                             RPCS2                   ;FAILING REGISTER
   023200  000200                             OR                      ;BIT UNDER TEST
   023202  104456                             TRAP    C$ERHRD
   023204  000016                             .WORD   14
   023206  012116                             .WORD   EM5
   023210  014172                             .WORD   ERRO
   023212  005037  002402                     CLR     ITCOUN          ;ITERATTIONS = 0
   023216  005777  157312             3$:     TST     @RPDB           ;READ THE BUFFER NOW
   023222  032777  000200  157272             BIT     #OR,@RPCS2      ;OR SHOULD NOW = 0
   023230  001412                             BEQ     4$              ;IT CLEARED, TEST OK
   023232  004737  017422                     JSR     PC,BICEXP       ;LOAD FAILING DATA
   023236  002522                             RPCS2                   ;FAILING REGISTER
   023240  000200                             OR                      ;BIT UNDER TEST
   023242  104456                             TRAP    C$ERHRD
   023244  000017                             .WORD   15
   023246  012155                             .WORD   EM6
   023250  014172                             .WORD   ERRO
   023252  005037  002402                     CLR     ITCOUN          ;ITERATIONS = 0
   023256                             4$:
   023256                             10000$:
   023256  104405                             TRAP    C$ESEG
   023260  005337  002402                     DEC     ITCOUN          ;ONE LESS ITERATION TO-GO
   023264  003253                             BGT     1$              ;KEEP GOING UNTIL <= 0
   023266                             L10025:
   023266  104401                             TRAP    C$ETST
```

```
                                .SBTTL  TEST 8  RPDB READ WRITE TEST #1

                                ;%      TEST 08 RPDB READ WRITE TEST #1
                                ;%      :  WRITE RPDB WITH DATA PATTERNS 1,2,5, ONE AT A TIME
                                ;%      :  BITS TO TEST=0..15
                                ;%      :  IF RPCS2:  IR<>1
                                ;%      :  :  THEN
                                ;%      :  :  POLL BIT UNTIL IT SETS
                                ;%      :  :  ELSE
                                ;%      :  :  WRITE DATA TO RPDB
                                ;%      :  ENDIF
                                ;%      :  IF RPCS2:  OR<>1
                                ;%      :  :  THEN
                                ;%      :  :  POLL BIT UNTIL IT SETS
                                ;%      :  :  ELSE
                                ;%      :  :  READ RPDB
                                ;%      :  ENDIF
                                ;%      :  IF RPDB RECEIVED DATA DOESN'T MATCH EXPECTED DATA
                                ;%      :  :  THEN
                                ;%      :  :  OUTPUT ERROR MESSAGE (BITS RECEIVED DON'T MATCH EXPECTED DATA)
                                ;%      :  ENDIF
                                ;%      :  IF RPCS2:  IR<>1
                                ;%      :  :  THEN
                                ;%      :  :  POLL RPCS2:  IR UNTIL IT SETS
                                ;%      :  ENDIF
                                ;%      :  WRITE RPDB WITH 0'S
                                ;%      :  IF RPCS2:  OR<>1
                                ;%      :  :  THEN
                                ;%      :  :  POLL RPCS2:  OR UNTIL IT SETS
                                ;%      :  ENDIF
                                ;%      :  IF RPDB<>0
                                ;%      :  :  THEN
                                ;%      :  :  OUTPUT ERROR MESSAGE (BITS FAILED TO CLEAR)
                                ;%      :  ENDIF
                                ;%      END TEST 08

023270                          T8::
023270  012737  177777  002460          MOV     #-1,ILOCK         ;MARK THE RPDB POLL MODE
023276  005037  002404                  CLR     ERRWD1            ;CREATE THE MODULE CALLOUT
023302  012737  000002  002406          MOV     #BIT1,ERRWD2      ;FOR THIS TEST
023310  012737  000012  002402          MOV     #10.,ITCOUN       ;LOAD THE ITERATION COUNTER
023316                          1$:
023316  004737  017744                  JSR     PC,SETUP          ;LOAD I/O POINTERS
023322  004216                          TST08                     ;FROM THIS TABLE
023324  013737  002444  002436  64$:    MOV     SRCTMP,TEMP       ;SET UP FOR POSSIBLE LOOP
023332  104404                          TRAP    C$BSEG
023334  004737  020034                  JSR     PC,FLOAT          ;FLOAT THE PATTERN
023340  000403                          BR      65$               ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
023342  013737  002436  002444          MOV     TEMP,SRCTMP       ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
023350                          65$:
023350                          10000$:
023350  104405                          TRAP    C$ESEG
023352  005737  002446                  TST     MASK              ;IF MASK = 0, WE'RE DONE
023356  001362                          BNE     64$
023360  004737  020330                  JSR     PC,CONSET         ;GET NEXT PATTERN
023364  005737  002434                  TST     PATCNT            ;IF PATTERN COUNT UNDERFLOWED, DONE!
023370  002355                          BGE     64$               ;NOT DONE YET, GO-ON
```

```
        023372  104404                              TRAP    C$BSEG
        023374  004737  020202                      JSR     PC,COMPAR       ;WRITE THE NEXT PATTERN
        023400  002352                              PATT4                   ;WHICH IS PATTERN #4
        023402                              10001$:
        023402  104405                              TRAP    C$ESEG
        023404  104404                              TRAP    C$BSEG
        023406  104404                              TRAP    C$BSEG
        023410  004737  020202                      JSR     PC,COMPAR       ;DO ANOTHER DATA COMPARISON
        023414  002350                              PATT3                   ;USING PATTERN #3
        023416                              10003$:
        023416  104405                              TRAP    C$ESEG
        023420  004737  017572                      JSR     PC,LDZERO       ;WRITE RPDB TO 0 TO CLEAR IT!
        023424                              10002$:
        023424  104405                              TRAP    C$ESEG
        023426  005337  002402                      DEC     ITCOUN          ;ONE LESS ITERATION TO-GO
        023432  003331                              BGT     1$              ;KEEP GOING UNTIL <= 0!
        023434  005037  002460                      CLR     ILOCK           ;CLEAR THE FOLLED MODE OF OPERATION
        023440                              L10026:
        023440  104401                              TRAP    C$ETST
```

```
                                        .SBTTL  TEST 09 RPDB READ WRITE TEST #2

                                        ;%      TEST 09  RPDB READ WRITE TEST #2
                                        ;%      :  FOR 2 ITERATIONS DO
                                        ;%      :  :  IF RPCS2:  IR <> 1
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  POLL BIT UNTIL IT SETS
                                        ;%      :  :  :  ELSE
                                        ;%      :  :  :  WRITE RPDB WITH PATTERN #5
                                        ;%      :  :  ENDIF
                                        ;%      :  END DO
                                        ;%      :  FOR 2 ITERATIONS DO
                                        ;%      :  :  IF RPCS2:  OR <> 1
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  POLL BIT UNTIL IT SETS
                                        ;%      :  :  :  ELSE
                                        ;%      :  :  :  READ RPDB
                                        ;%      :  :  ENDIF
                                        ;%      :  :  IF RPDB <> PATTERN #5
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  OUTPUT ERROR MESSAGE (BITS RECEIVED DON'T MATCH EXPECTED DATA)
                                        ;%      :  :  ENDIF
                                        ;%      :  END DO
                                        ;%      END TEST 09

023442                                  T9::
023442  012737  002554  002454                  MOV     #PATT5,EXPTED           ;GET THE TESTING DATA PATTERN
023450  005037  002404                          CLR     ERRWD1                  ;CREATE THE MODULE CALLOUT
023454  012737  000002  002406                  MOV     #BIT1,ERRWD2            ;FOR THIS TEST
023462  012737  000012  002402                  MOV     #10.,ITCOUN             ;LOAD THE ITERATION COUNT
023470                                  1$:
023470  104404                                  TRAP    C$BSEG
023472  012703  000001                          MOV     #1,R3                   ;SET UP TO DO TWO WRITE OPERATIONS
023476  004737  017672                  2$:     JSR     PC,IRLOCK               ;WAIT FOR IR TO SET!
023502  013777  002454  157024                  MOV     EXPTED,@RPDB            ;NOW LOAD RPDB ONCE
023510  005303                                  DEC     R3                      ;ONE LESS ITERATION TO GO
023512  002371                                  BGE     2$                      ;IF NOT MINUS, LOAD RPDB AGAIN!
023514  012703  000001                          MOV     #1,R3                   ;NOW SET-UP TO DO TWO READ OPERATIONS
023520  004737  017706                  3$:     JSR     PC,ORLOCK               ;WAIT FOR OR TO SET
023524  023777  002454  157002                  CMP     EXPTED,@RPDB            ;DOES THE DATA MATCH?
023532  001414                                  BEQ     4$                      ;IF EQUAL, YES IT'S OK
023534  013737  002534  002456                  MOV     RPDB,TESTRG             ;GET THE FAILING REGISTER
023542  017737  156766  002452                  MOV     @RPDB,RCVED             ;NOW GET THE FAILING DATA
023550  104456                                  TRAP    C$ERHRD
023552  000020                                  .WORD   16
023554  012454                                  .WORD   EM14
023556  014172                                  .WORD   ERR0
023560  005037  002402                          CLR     ITCOUN                  ;RESET FURTHER ITERATONS
023564  005303                          4$:     DEC     R3                      ;ONE LESS ITERATION TO-DO
023566  002354                                  BGE     3$                      ;IF NOT MINUS, DO-AGAIN
023570                                  10000$:
023570  104405                                  TRAP    C$ESEG
023572  005337  002402                          DEC     ITCOUN                  ;ONE LESS ITERATION TO GO
023576  003334                                  BGT     1$                      ;KEEP GOING UNTIL <= 0
023600                                  L10027:
023600  104401                                  TRAP    C$ETST
```

```
                                        .SBTTL  TEST 10 RPDB READ WRITE TEST #3

                                        ;%      TEST 10  RPDB READ WRITE TEST #3
                                        ;%      :  FOR 8 ITERATIONS DO
                                        ;%      :  :  IF RRPCS2:  IR <> 1
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  POLL BIT UNTIL IT SETS
                                        ;%      :  :  :  ELSE
                                        ;%      :  :  :  WRITE RPDB WITH A DATA PATTERN (SEQUENTIALLY USING PATTERNS 1 THRU 8)
                                        ;%      :  :  ENDIF
                                        ;%      :  END DO
                                        ;%      :  FOR 8 ITERATIONS DO
                                        ;%      :  :  IF RPCS2:  OR <> 1
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  POLL BIT UNTIL IT SETS
                                        ;%      :  :  :  ELSE
                                        ;%      :  :  :  READ RPDB
                                        ;%      :  :  ENDIF
                                        ;%      :  :  IF RPDB DOESN'T MATCH EXPECTED DATA
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  OUTPUT ERROR MESSAGE (BITS RECEIVED DON'T MATCH EXPECTED DATA)
                                        ;%      :  :  ENDIF
                                        ;%      :  END DO
                                        ;%      END TEST 10

023602                                  T10::
023602  013737  002534  002456                  MOV     RPDB,TESTRG             ;GET THE ADDRESS OF THE REGISTER UNDER TEST
023610  005037  002404                          CLR     ERRWD1                  ;MODULE CALLOUT, THIS TEST
023614  012737  000002  002406                  MOV     #BIT1,ERRWD2            ;ONLY THE CONTROLLER
023622  012737  000012  002402                  MOV     #10.,ITCOUN             ;LOAD THE ITERATION COUNT
023630                                  1$:
023630  104404                                  TRAP    C$BSEG
023632  012704  000001                          MOV     #1,R4                   ;OVERALL LOOP COUNTER
023636  012702  002344                          MOV     #PATT1,R2               ;INPUT POINTER
023642                                  2$:
023642  104404                                  TRAP    C$BSEG
023644  010246                                  MOV     R2,-(SP)                ;SAVE THE INPUT START ADDRESS
023646  012703  000010                          MOV     #8.,R3                  ;SET UP TO WRITE 8 TIMES
023652  004737  017672                  3$:     JSR     PC,IRLOCK               ;POLL IR AND WAIT FOR IT
023656  012277  156652                          MOV     (R2)+,@RPDB             ;LOAD THE BUFFER
023662  005303                                  DEC     R3                      ;REDUCE THE # OF ITERATIONS
023664  001372                                  BNE     3$                      ;AND CONTINUE
023666  012602                                  MOV     (SP)+,R2                ;RESTORE THE ORIGINAL POINTER
023670  012703  000010                          MOV     #8.,R3                  ;AND THE ITERATION COUNTERS
023674  004737  017706                  4$:     JSR     PC,ORLOCK               ;POLL OR AND WAIT FOR IT
023700  022277  156630                          CMP     (R2)+,@RPDB             ;DOES THE DATA MATCH
023704  001414                                  BEQ     5$                      ;IF IT DOES, SKIP ERROR DISPATCH
023706  017737  156622  002452                  MOV     @RPDB,RCVED             ;GET THE BAD DATA
023714  016237  177776  002454                  MOV     -2(R2),EXPTED           ;AND THE EXPECTED DATA
023722  104456                                  TRAP    C$ERHRD
023724  000021                                  .WORD   17
023726  012454                                  .WORD   EM14
023730  014172                                  .WORD   ERRO
023732  005037  002402                          CLR     ITCOUN                  ;RESET FURTHER ITERATIONS
023736  005303                          5$:     DEC     R3                      ;ONE LESS ITERATION TO GO
023740  001355                                  BNE     4$                      ;NOT FINISHED, CHECK NEXT PATTERN
023742                                  10001$:
       023742  104405                                TRAP    C$ESEG
       023744  005704                                TST     R4              ;DONE?
       023746  001404                                BEQ     6$              ;IF 0, YES
       023750  012702  002346                        MOV     #PATT2,R2       ;GET NEXT PATTERN
       023754  005004                                CLR     R4              ;AND INDICATE 2ND HALF OF TEST
       023756  000731                                BR      2$              ;NOW DO IT!
       023760                                6$:
       023760                                10000$:
       023760  104405                                TRAP    C$ESEG
       023762  005337  002402                        DEC     ITCOUN          ;ONE LESS ITERATION TO GO
       023766  003320                                BGT     1$              ;KEEP GOING UNTIL <= 0
       023770                                L10030:
       023770  104401                                TRAP    C$ETST
```

```
                                        .SBTTL  TEST 11 MDPE, SC & TRE TEST (RH70 TEST)

                                        ;%      TEST 11 MDPE, SC & TRE TEST (RH70 TEST)
                                        ;%      SET RPCS2:  CLR = 1
                                        ;%      LOAD THE UNIT-UNDER-TEST # INTO RPCS2
                                        ;%      SET RPCS2:  PAT = 1
                                        ;%      IF RPCS2:  IR <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  WAIT UNTIL RPCS2:  :  IR = 1
                                        ;%      :  :  ELSE
                                        ;%      :  :  WRITE RPDB ONCE, WITH PATTERN #3
                                        ;%      :  ENDIF
                                        ;%      :  IF RPCS2:  MDPE <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (MDPE DIDN'T SET WHEN EXPECTED)
                                        ;%      :  :  ELSE
                                        ;%      :  :  IF (RPCS1:  SC & RPCS1:  TRE <> 1)
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  OUTPUT ERROR MESSAGE (FAILED TO DETECT RPCS1:  SC OR TRE)
                                        ;%      :  :  ENDIF
                                        ;%      :  ENDIF
                                        ;%      END TEST 11

023772                                  T11::
023772  005737  002504                          TST     RHTYPE          ;WHICH CONTROLLER TYPE?
023776  003002                                  BGT     1$              ;IF > 0, RH70...
024000  104432                                  TRAP    C$EXIT
024002  000146                                  .WORD   L10031-.
024004  005037  002404                  1$:     CLR     ERRWD1          ;CREATE THE MODULE CALLOUT
024010  012737  000002  002406                  MOV     #BIT1,ERRWD2    ;FOR THIS TEST
024016  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
024024                                  2$:
024024  104404                                  TRAP    C$BSEG
024026  052777  000040  156466                  BIS     #CLR,@RPCS2     ;START OUT WITHOUT ERRORS!
024034  013777  002506  156460                  MOV     DRVNO,@RPCS2    ;LOAD THE DRIVE NUMBER
024042  052777  000020  156452                  BIS     #PAT,@RPCS2     ;NOW INVERT PARITY
024050  004737  017672                          JSR     PC,IRLOCK       ;WAIT FOR IR TO SET!
024054  013777  002350  156452                  MOV     PATT3,@RPDB     ;WRITE THIS DATA
024062  032777  000400  156432                  BIT     #MDPE,@RPCS2    ;DID WE FORCE A MASSBUS PARITY ERROR?
024070  001005                                  BNE     3$              ;IF SET, YES!!
024072  004737  017372                          JSR     PC,BISEXP       ;FORM THE REPORT DATA
024076  002522                                  RPCS2                   ;THIS REGISTER
024100  000400                                  MDPE                    ;THIS BIT FAILED TO SET
024102  000410                                  BR      4$              ;NOW TAKE THE CALL!
024104  032777  140000  156400          3$:     BIT     #SC!TRE,@RPCS1  ;DID WE GET TRANSFER ERROR AND SPECIAL CONDITION?
024112  001012                                  BNE     5$              ;YES, TEST PASSES!
024114  004737  017372                          JSR     PC,BISEXP       ;GET THE FAILING DATA
024120  002512                                  RPCS1                   ;THIS REGISTER
024122  140000                                  SC!TRE                  ;THESE BITS FAILED TO SET!
024124                                  4$:
024124  104456                                  TRAP    C$ERHRD
024126  000022                                  .WORD   18
024130  013441                                  .WORD   EM33
024132  014172                                  .WORD   ERR0
024134  005037  002402                          CLR     ITCOUN          ;NO FURTHER ITERATIONS
024140                                  5$:
024140                                  10000$:
   024140  104405                           TRAP    C$ESEG
   024142  005337  002402                   DEC     ITCOUN          ;ONE LESS ITERATION TO GO
   024146  003326                           BGT     2$              ;KEEP GOING IF NOT <= 0!
   024150                           L10031:
   024150  104401                           TRAP    C$ETST
```

```
                                         .SBTTL  TEST 12 RPCS3 READ/WRITE TEST

                                         ;%      TEST 09 (RH70 TEST ONLY)  RPCS3 READ-WRITE TEST
                                         ;%      :  WRITE RPCS3 WITH DATA PATTERNS 1..4, ONE AT A TIME
                                         ;%      :  BITS TO TEST = 0..3, 6
                                         ;%      :  IF RPCS3 BIT(S) UNDER TEST DIDN'T SET
                                         ;%      :  :  THEN
                                         ;%      :  :  OUTPUT ERROR MESSAGE (BIT(S) DIDN'T SET)
                                         ;%      :  :  ELSE
                                         ;%      :  :  SET RPCS2:  CLR = 1
                                         ;%      :  ENDIF
                                         ;%      :  IF RPCS3 BIT(S) UNDER TEST DIDN'T CLEAR
                                         ;%      :  :  THEN
                                         ;%      :  :  OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST DIDN'T CLEAR)
                                         ;%      :  ENDIF
                                         ;%      END TEST 12

  024152                                 T12::
  024152  005737  002504                         TST     RHTYPE          ;IF RHTYPE=+1 CONTROLLER IS AN RH70
  024156  003002                                 BGT     1$
  024160  104432                                 TRAP    C$EXIT
  024162  000150                                 .WORD   L10032-.
  024164  005037  002404                 1$:     CLR     ERRWD1          ;MODULE CALLOUT
  024170  012737  000002  002406                 MOV     #BIT1,ERRWD2    ;FOR THIS TEST
  024176  012737  000012  002402                 MOV     #10.,ITCOUN     ;SET UP THE ITERATION COUNTER
  024204                                 2$:                             ;SET PRIORITY TO 7
  024204  012700  000340                         MOV     #PRI07,R0
  024210  104441                                 TRAP    C$SPRI
  024212  004737  017744                         JSR     PC,SETUP        ;LOAD I/O POINTERS
  024216  004232                                 TST11                   ;FROM THIS TABLE
  024220  013737  002444  002436         64$:    MOV     SRCTMP,TEMP     ;SET UP FOR POSSIBLE LOOP
  024226  104404                                 TRAP    C$BSEG
  024230  004737  020034                         JSR     PC,FLOAT        ;FLOAT THE PATTERN
  024234  000403                                 BR      65$             ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
  024236  013737  002436  002444                 MOV     TEMP,SRCTMP     ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
  024244                                 65$:
  024244                                 10000$:
  024244  104405                                 TRAP    C$ESEG
  024246  005737  002446                         TST     MASK            ;IF MASK = 0, WE'RE DONE
  024252  001362                                 BNE     64$
  024254  004737  020330                         JSR     PC,CONSET       ;GET NEXT PATTERN
  024260  005737  002434                         TST     PATCNT          ;IF PATTERN COUNT UNDERFLOWED, DONE!
  024264  002355                                 BGE     64$             ;NOT DONE YET, GO-ON
  024266  104404                                 TRAP    C$BSEG
  024270  004737  020202                         JSR     PC,COMPAR       ;WRITE THE NEXT PATTERN
  024274  002352                                 PATT4                   ;WHICH IS PATTERN #4
  024276                                 10001$:
  024276  104405                                 TRAP    C$ESEG
  024300  104404                                 TRAP    C$BSEG
  024302  104404                                 TRAP    C$BSEG
  024304  004737  020202                         JSR     PC,COMPAR       ;DO ANOTHER DATA COMPARISON
  024310  002350                                 PATT3                   ;USING PATTERN #3
  024312                                 10003$:
  024312  104405                                 TRAP    C$ESEG
  024314  004737  017474                         JSR     PC,RESET        ;RESET THE DEVICE
  024320  002564                                 RPCS3                   ;CLEAR RPCS3 BY SETTING MASSBUS CLEAR
  024322                                 10002$:
    024322  104405                                  TRAP    C$ESEG
 28 024324  005337  002402                          DEC     ITCOUN          ;ONE LESS ITERATION TO GO
 29 024330  003325                                  BGT     2$              ;KEEP GOING IF NOT <= 0!
 30 024332                          L10032:
    024332  104401                                  TRAP    C$ETST
```

```
                                        .SBTTL  TEST 13 RPBAE READ/WRITE TEST

                                        ;%      TEST 13 (RH70 TEST ONLY)  RPBAE READ-WRITE TEST
                                        ;%      :  WRITE RPBAE WITH DATA PATTERNS 1..4, ONE AT A TIME
                                        ;%      :  BITS TO TEST = 0..5
                                        ;%      :  IF RPBAE BIT(S) UNDER TEST DIDN'T MATCH EXPECTED DATA
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT(S) DIDN'T SET)
                                        ;%      :  :  ELSE
                                        ;%      :  :  SET RPCS2:  CLR = 1
                                        ;%      :  ENDIF
                                        ;%      :  IF RPBAE BIT(S) UNDER TEST DIDN'T CLEAR
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST DIDN'T CLEAR)
                                        ;%      :  ENDIF
                                        ;%      END TEST 13

 024334                                 T13::
 024334  005737  002504                         TST     RHTYPE          ;TEST CONTROLLER TYPE
 024340  003002                                 BGT 1$                  ;IF > 0, IT IS AN RH70
 024342  104432                                 TRAP    C$EXIT
 024344  000142                                 .WORD   L10033-.
 024346  005037  002404                 1$:     CLR     ERRWD1          ;MODULE CALLOUT
 024352  012737  000002  002406                 MOV     #BIT1,ERRWD2    ;FOR THIS TEST
 024360  012737  000012  002402                 MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNTER
 024366                                 2$:
 024366  004737  017744                         JSR     PC,SETUP        ;LOAD I/O POINTERS
 024372  004244                                 TST12                   ;FROM THIS TABLE
 024374  013737  002444  002436         64$:    MOV     SRCTMP,TEMP     ;SET UP FOR POSSIBLE LOOP
 024402  104404                                 TRAP    C$BSEG
 024404  004737  020034                         JSR     PC,FLOAT        ;FLOAT THE PATTERN
 024410  000403                                 BR      65$             ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
 024412  013737  002436  002444                 MOV     TEMP,SRCTMP     ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
 024420                                 65$:
 024420                                 10000$:
 024420  104405                                 TRAP    C$ESEG
 024422  005737  002446                         TST     MASK            ;IF MASK = 0, WE'RE DONE
 024426  001362                                 BNE     64$
 024430  004737  020330                         JSR     PC,CONSET       ;GET NEXT PATTERN
 024434  005737  002434                         TST     PATCNT          ;IF PATTERN COUNT UNDERFLOWED, DONE!
 024440  002355                                 BGE     64$             ;NOT DONE YET, GO-ON
 024442  104404                                 TRAP    C$BSEG
 024444  004737  020202                         JSR     PC,COMPAR       ;WRITE THE NEXT PATTERN
 024450  002352                                 PATT4                   ;WHICH IS PATTERN #4
 024452                                 10001$:
 024452  104405                                 TRAP    C$ESEG
 024454  104404                                 TRAP    C$BSEG
 024456  104404                                 TRAP    C$BSEG
 024460  004737  020202                         JSR     PC,COMPAR       ;DO ANOTHER DATA COMPARISON
 024464  002350                                 PATT3                   ;USING PATTERN #3
 024466                                 10003$:
 024466  104405                                 TRAP    C$ESEG
 024470  004737  017474                         JSR     PC,RESET        ;RESET THE DEVICE
 024474  002562                                 RPBAE                   ;CLEAR RPBAE BY SETTING MASSBUS CLEAR
 024476                                 10002$:
 024476  104405                                 TRAP    C$ESEG
 024500  005337  002402                         DEC     ITCOUN          ;ONE LESS ITERATION
```

```
     27 024504  003330                    BGT     2$              ;IF NOT <= 0, KEEP GOING
     28 024506                    L10033:
        024506  104401                    TRAP    C$ETST
```

```
                                            .SBTTL  TEST 14 RPBAE DUPLICATED A16 TEST

                                            ;%      TEST 14 (RH70 TEST ONLY)  RPBAE DUPLICATED A16 TEST
                                            ;%      :  WRITE RPCS1:  A16 (BIT 08) = 1
                                            ;%      :  IF RPCS1:  A16 <> 1
                                            ;%      :  :  THEN
                                            ;%      :  :  OUTPUT ERROR MESSAGE (BIT DIDN'T SET AS EXPECTED)
                                            ;%      :  :  ELSE
                                            ;%      :  :  IF RPCS1:  A17 = 1
                                            ;%      :  :  :  THEN
                                            ;%      :  :  :  OUTPUT ERROR MESSAGE (BIT SET WHEN NOT EXPECTED)
                                            ;%      :  :  ENDIF
                                            ;%      :  :  IF RPBAE:  BIT 0 <> 1
                                            ;%      :  :  :  THEN OUTPUT ERROR MESSAGE (BIT STUCK AT 0)
                                            ;%      :  :  :  ELSE
                                            ;%      :  :  :  SET RPCS2:  CLR = 1
                                            ;%      :  :  ENDIF
                                            ;%      :  ENDIF
                                            ;%      :  IF ((RPCS1:  A16) AND (RPBAE:  BIT 0)) <> 0
                                            ;%      :  :  THEN OUTPUT ERROR MESSAGE (BIT(S) STUCK AT 1)
                                            ;%      :  ENDIF
                                            ;%      END TEST 14

024510                                      T14::
024510  012737  000002  002406                      MOV     #BIT1,ERRWD2    ;MODULE CALLOUT, THIS TEST
024516  005037  002404                              CLR     ERRWD1          ;NO RP07 BOARDS
024522  012737  000012  002402                      MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNTER
024530                                      1$:
024530  104404                                      TRAP    C$BSEG
024532  012777  000400  155752                      MOV     #A16,@RPCS1     ;SET RPCS1:A16=1
024540  032777  000400  155744                      BIT     #A16,@RPCS1     ;TEST RPCS1:A16
024546  001012                                      BNE     2$              ;IF =2, GO ON
024550  004737  017372                              JSR     PC,BISEXP       ;LOAD FAILING DATA
024554  002512                                      RPCS1                   ;FAILING REGISTER
024556  000400                                      A16                     ;BIT UNDER TEST
024560  104456                                      TRAP    C$ERHRD
024562  000022                                      .WORD   18
024564  012776                                      .WORD   EM22
024566  014172                                      .WORD   ERRO
024570  005037  002402                              CLR     ITCOUN          ;NO FURTHER ITERATIONS
024574  032777  001000  155710      2$:             BIT #A17,@RPCS1         ;DID A17 ALSO SET?
024602  001412                                      BEQ     3$              ;IF ZERO, IT'S OK!
024604  004737  017422                              JSR     PC,BICEXP       ;LOAD THE OFFENDING BIT
024610  002512                                      RPCS1                   ;FOR THIS REGISTER
024612  001000                                      A17                     ;THIS BIT!
024614  104456                                      TRAP    C$ERHRD
024616  000023                                      .WORD   19
024620  012454                                      .WORD   EM14
024622  014172                                      .WORD   ERRO
024624  005037  002402                              CLR     ITCOUN          ;ITERATIONS = 0
024630                                      3$:
024630                                      10000$:
024630  104405                                      TRAP    C$ESEG
024632  104404                                      TRAP    C$BSEG
024634  005737  002504                              TST     RHTYPE          ;TEST CONTROLLER TYPE
024640  003002                                      BGT     4$              ;IF > 0, IT IS AN RH70
024642  104432                                      TRAP    C$EXIT
```

```
024644  000036                          .WORD   10001$-.
024646  032777  000001  155706  4$:     BIT     #BITO,@RPBAE    ;TEST RPBA4:BITO.(PARALLELS RPCS1=A16)
024654  001012                          BNE     5$              ;IF SET, GO ON
024656  004737  017372                  JSR     PC,BISEXP       ;LOAD FAILING DATA
024662  002562                          RPBAE                   ;FAILING REGISTER
024664  000001                          BITO                    ;BIT UNDER TEST
024666  104456                          TRAP    C$ERHRD
024670  000024                          .WORD   20
024672  012776                          .WORD   EM22
024674  014172                          .WORD   ERRO
024676  005037  002402                  CLR     ITCOUN          ;ITERATION COUNT = 0
024702                          5$:
024702                          10001$:
024702  104405                          TRAP    C$ESEG
024704  104404                          TRAP    C$BSEG
024706  052777  000040  155606          BIS     #CLR,@RPCS2     ;CLEAR OUT THE DEVICE
024714  032777  000400  155570          BIT     #A16,@RPCS1     ;TEST RPCS1:A16
024722  001412                          BEQ     6$              ;IF ZERO, GO ON
024724  004737  017422                  JSR     PC,BICEXP       ;LOAD FAILING DATA
024730  002512                          RPCS1                   ;FAILING REGISTER
024732  000400                          A16                     ;BIT UNDER TEST
024734  104456                          TRAP    C$ERHRD
024736  000025                          .WORD   21
024740  013051                          .WORD   EM23
024742  014172                          .WORD   ERRO
024744  005037  002402                  CLR     ITCOUN          ;NO FURTHER ITERATIONS
024750                          6$:
024750                          10002$:
024750  104405                          TRAP    C$ESEG
024752  104404                          TRAP    C$BSEG
024754  005737  002504                  TST     RHTYPE          ;TEST CONTROLLER TYPE
024760  003002                          BGT     7$              ;IF > 0, IT IS AN RH70
024762  104432                          TRAP    C$EXIT
024764  000036                          .WORD   10003$-.
024766  032777  000001  155566  7$:     BIT     #BITO,@RPBAE    ;TEST RPBAE:BITO
024774  001412                          BEQ     8$              ;IF 0, GO ON
024776  004737  017422                  JSR     PC,BICEXP       ;LOAD FAILING DATA
025002  002562                          RPBAE                   ;FAILING REGISTER
025004  000001                          BITO                    ;BIT UNDER TEST
025006  104456                          TRAP    C$ERHRD
025010  000026                          .WORD   22
025012  013051                          .WORD   EM23
025014  014172                          .WORD   ERRO
025016  005037  002402                  CLR     ITCOUN          ;RESET THE ITERATION COUNTER
025022                          8$:
025022                          10003$:
025022  104405                          TRAP    C$ESEG
025024  005337  002402                  DEC     ITCOUN          ;ONE LESS ITERATION TO GO
025030  003237                          BGT     1$              ;DO UNTIL <= 0
025032                          L10034:
025032  104401                          TRAP    C$ETST
```

```
                                  .SBTTL  TEST 15 RPBAE DUPLICATED A17 TEST

                                  ;%      TEST 15 (RH70 TEST ONLY)  RPBAE DUPLICATED A17 TEST
                                  ;%      :  WRITE RPCS1:  A17 (BIT 09) = 1
                                  ;%      :  IF RPCS1:  A17 <> 1
                                  ;%      :  :  THEN
                                  ;%      :  :  OUTPUT ERROR MESSAGE (BIT FAILED TO SET)
                                  ;%      :  :  ELSE
                                  ;%      :  :  IF RPCS1:  A16 = 1
                                  ;%      :  :  :  THEN
                                  ;%      :  :  :  OUTPUT ERROR MESSAGE (BIT SET WHEN NOT EXPECTED)
                                  ;%      :  :  ENDIF
                                  ;%      :  :  IF RPBAE:  BIT01 DIDN'T SET
                                  ;%      :  :  :  THEN
                                  ;%      :  :  :  OUTPUT ERROR MESSAGE (BIT FAILED TO SET)
                                  ;%      :  :  :  ELSE
                                  ;%      :  :  :  SET RPCS2:  CLR = 1
                                  ;%      :  :  ENDIF
                                  ;%      :  :  IF ((RPCS1:  A17) AND (RPBAE:  BIT01)) <> 0
                                  ;%      :  :  :  THEN
                                  ;%      :  :  :  OUTPUT ERROR MESSAGE (BIT(S) DIDN'T CLEAR)
                                  ;%      :  :  ENDIF
                                  ;%      :  ENDIF
                                  ;%      END TEST 15

025034                            T15::
025034  005037  002404                    CLR     ERRWD1          ;MODULE CALLOUT FOR THIS TEST
025040  012737  000002  002406            MOV     #BIT1,ERRWD2    ;CONTROLLER ONLY
025046  012737  000012  002402            MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
025054                            1$:
025054  104404                            TRAP    C$BSEG
025056  012777  001000  155426            MOV     #A17,@RPCS1     ;SET RPCS1:A17=1
025064  032777  001000  155420            BIT     #A17,@RPCS1     ;TEST RPCS1:A17
025072  001012                            BNE     2$              ;IF =2, OK
025074  004737  017372                    JSR     PC,BISEXP       ;LOAD FAILING DATA
025100  002512                            RPCS1                   ;FAILING REGISTER
025102  001000                            A17                     ;BIT UNDER TEST
025104  104456                            TRAP    C$ERHRD
025106  000027                            .WORD   23
025110  012776                            .WORD   EM22
025112  014172                            .WORD   ERR0
025114  005037  002402                    CLR     ITCOUN          ;NO ITERATIONS
025120  032777  000400  155364    2$:     BIT     #A16,@RPCS1     ;DID A16 ALSO SET?
025126  001412                            BEQ     3$              ;IF ZERO, NO-IT'S OK!
025130  004737  017422                    JSR     PC,BICEXP       ;LOAD THE FAILING DATA
025134  002512                            RPCS1                   ;THIS REGISTER
025136  000400                            A16                     ;THIS BIT FAILED TO REMAIN CLEAR!
025140  104456                            TRAP    C$ERHRD
025142  000030                            .WORD   24
025144  012454                            .WORD   EM14
025146  014172                            .WORD   ERR0
025150  005037  002402                    CLR     ITCOUN          ;ITERATIONS = 0
025154                            3$:
025154                            10000$:
025154  104405                            TRAP    C$ESEG
025156  104404                            TRAP    C$BSEG
025160  005737  002504                    TST     RHTYPE          ;TEST CONTROLLER TYPE
```

```
 50 025164  003002                          BGT     4$               ;IF > 0, = RH70
 51 025166  104432                          TRAP    C$EXIT
    025170  000036                          .WORD   10001$-.
 52 025172  032777  000002  155362  4$:     BIT     #BIT1,@RPBAE     ;TEST RPBAE:BIT1
 53 025200  001012                          BNE     5$               ;IF =1, OK
 54 025202  004737  017372                  JSR     PC,BISEXP        ;LOAD FAILING DATA
 55 025206  002562                          RPBAE                    ;FAILING REGISTER
 56 025210  000002                          BIT1                     ;BIT UNDER TEST
 57 025212  104456                          TRAP    C$ERHRD
    025214  000031                          .WORD   25
    025216  012776                          .WORD   EM22
    025220  014172                          .WORD   ERRO
 58 025222  005037  002402                  CLR     ITCOUN           ;ITERATIONS = 0
 59 025226                          5$:
 60 025226                          10001$:
    025226  104405                          TRAP    C$ESEG
 61 025230  104404                          TRAP    C$BSEG
 62 025232  052777  000040  155262          BIS     #CLR,@RPCS2      ;SET RPCS2:CLR=1
 63 025240  032777  001000  155244          BIT     #A17,@RPCS1      ;TEST RPCS1:A17
 64 025246  001412                          BEQ     6$               ;IF 0, OK
 65 025250  004737  017422                  JSR     PC,BICEXP        ;LOAD FAILING DATA
 66 025254  002512                          RPCS1                    ;FAILING REGISTER
 67 025256  001000                          A17                      ;BIT UNDER TEST
 68 025260  104456                          TRAP    C$ERHRD
    025262  000032                          .WORD   26
    025264  013051                          .WORD   EM23
    025266  014172                          .WORD   ERRO
 69 025270  005037  002402                  CLR     ITCOUN           ;ITERATIONS = 0
 70 025274                          6$:
 71 025274                          10002$:
    025274  104405                          TRAP    C$ESEG
 72 025276  104404                          TRAP    C$BSEG
 73 025300  005737  002504                  TST     RHTYPE           ;TEST CONTROLLER TYPE
 74 025304  003002                          BGT     7$               ;IF =+1, IS RH70
 75 025306  104432                          TRAP    C$EXIT
    025310  000036                          .WORD   10003$-.
 76 025312  032777  000002  155242  7$:     BIT     #BIT1,@RPBAE     ;TEST RPBAE:BIT1
 77 025320  001412                          BEQ     8$               ;IF =0, OK
 78 025322  004737  017422                  JSR     PC,BICEXP        ;LOAD FAILING DATA
 79 025326  002562                          RPBAE                    ;FAILING REGISTER
 80 025330  001000                          A17                      ;BIT UNDER TEST
 81 025332  104456                          TRAP    C$ERHRD
    025334  000033                          .WORD   27
    025336  013051                          .WORD   EM23
    025340  014172                          .WORD   ERRO
 82 025342  005037  002402                  CLR     ITCOUN           ;ITERATIONS = 0
 83 025346                          8$:
 84 025346                          10003$:
    025346  104405                          TRAP    C$ESEG
 85 025350  005337  002402                  DEC      ITCOUN          ;ONE LESS ITERATION
 86 025354  003237                          BGT     1$               ;IF NOT <= 0, KEEP GOING
 87 025356                          L10035:
    025356  104401                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 16 INTERRUPT ENABLE - BIT TEST

                                        ;%      TEST 16  INTERRUPT ENABLE BIT SET-CLEAR TEST
                                        ;%      :  SET PROCESSOR PRIORITY = 7 (LOCK OUT ALL INTERRUPTS)
                                        ;%      :  SET RPCS1:  IE (BIT 06) = 1
                                        ;%      :  IF RPCS1:  IE <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT DIDN'T SET)
                                        ;%      :  :  ELSE
                                        ;%      :  :  SET RPCS2:  CLR = 1
                                        ;%      :  ENDIF
                                        ;%      :  IF RPCS1:  IE <> 0
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT DIDN'T CLEAR)
                                        ;%      :  ENDIF
                                        ;%      END TEST 16

025360                                  T16::
025360  005037  002404                          CLR     ERRWD1          ;MODULE CALLOUT
025364  012737  000002  002406                  MOV     #BIT1,ERRWD2    ;FOR THIS TEST
025372  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
025400                                  1$:                             ;SET PRIORITY TO 7
025400  012700  000340                          MOV     #PRI07,R0
025404  104441                                  TRAP    C$SPRI
025406  104404                                  TRAP    C$BSEG
025410  052777  000100  155074                  BIS     #IE,@RPCS1      ;WRITE RPCS1:INTERRUPT ENABLE=1
025416  032777  000100  155066                  BIT     #IE,@RPCS1      ;TEST RPCS1:IE
025424  001012                                  BNE     2$              ;IF 2, GO ON
025426  004737  017372                          JSR     PC,BISEXP       ;LOAD FAILING DATA
025432  002512                                  RPCS1                   ;FAILING REGISTER
025434  000100                                  IE                      ;BIT UNDER TEST
025436  104456                                  TRAP    C$ERHRD
025440  000034                                  .WORD   28
025442  012776                                  .WORD   EM22
025444  014172                                  .WORD   ERR0
025446  005037  002402                          CLR     ITCOUN          ;ITERATIONS = 0
025452                                  2$:
025452                                  10000$:
025452  104405                                  TRAP    C$ESEG
025454  104404                                  TRAP    C$BSEG
025456  052777  000040  155036                  BIS     #CLR,@RPCS2     ;SET RPCS2:CLR=1
025464  032777  000100  155020                  BIT     #IE,@RPCS1      ;TEST RPCS1:IE
025472  001412                                  BEQ     3$              ;IF 0, TEST PASSES
025474  004737  017422                          JSR     PC,BICEXP       ;LOAD FAILING DATA
025500  002512                                  RPCS1                   ;FAILING REGISTER
025502  000100                                  IE                      ;BIT UNDER TEST
025504  104456                                  TRAP    C$ERHRD
025506  000035                                  .WORD   29
025510  013051                                  .WORD   EM23
025512  014172                                  .WORD   ERR0
025514  005037  002402                          CLR     ITCOUN          ;RESET FURTHER ITERATIONS
025520                                  3$:
025520                                  10001$:
025520  104405                                  TRAP    C$ESEG
025522  005337  002402                          DEC     ITCOUN          ;ONE LESS ITERATION TO-GO
025526  003324                                  BGT     1$              ;IF NOT <= 0, WE'RE NOT DONE
025530  012700  000000                          MOV     #0,R0
```

```
     025534  104441                  TRAP    C$SPRI
  49 025536                 L10036:
     025536  104401                  TRAP    C$ETST
```

```
                                        .SBTTL  TEST 17 RH70 DUPLICATE INTERRUPT ENABLE TEST

                                        ;%      TEST 17 (RH70 TEST ONLY) RPCS3 DUPLICATE INTERRUPT ENABLE TEST
                                        ;%      :  SET PROCESSOR PRIORITY = 7
                                        ;%      :  SET RPCS1:  IE (BIT 06) = 1
                                        ;%      :  IF RPCS3:  IE (BIT 06) <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE
                                        ;%      :  :  ELSE SET RPCS2:  CLR = 1
                                        ;%      :  ENDIF
                                        ;%      :  IF ((RPCS1:  IE) AND (RPCS3:  IE)) <> 0
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT(S) DIDN'T CLEAR)
                                        ;%      :  ENDIF
                                        ;%      END TEST 17

 025540                                 T17::
 025540  005737  002504                         TST     RHTYPE          ;CAN WE DO THIS TEST
 025544  003002                                 BGT     1$              ;IF RH TYPE =+1, CONTROLLER IS RH70
 025546  104432                                 TRAP    C$EXIT
 025550  000160                                 .WORD   L10037-.
 025552  005037  002404                 1$:     CLR     ERRWD1          ;MODULE CALLOUT
 025556  012737  000002  002406                 MOV     #BIT1,ERRWD2    ;FOR THIS TEST
 025564  012737  000012  002402                 MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
 025572                                 2$:
 025572  104404                                 TRAP    C$BSEG
                                                                        ;SET PRIORITY TO 7
 025574  012700  000340                         MOV     #PRI07,R0
 025600  104441                                 TRAP    C$SPRI
 025602  012777  000100  154702                 MOV     #IE,@RPCS1      ;SET RPCS1:IE=1
 025610  032777  000100  154746                 BIT     #IE,@RPCS3      ;TEST RPCS3:IE
 025616  001012                                 BNE     3$              ;IF SET, GO ON
 025620  004737  017372                         JSR     PC,BISEXP       ;LOAD FAILING DATA
 025624  002564                                 RPCS3                   ;FAILING REGISTER
 025626  000100                                 IE                      ;BIT UNDER TEST
 025630  104456                                 TRAP    C$ERHRD
 025632  000036                                 .WORD   30
 025634  012776                                 .WORD   EM22
 025636  014172                                 .WORD   ERRO
 025640  005037  002402                         CLR     ITCOUN          ;NO ITERATIONS NECESSARY
 025644                                 3$:
 025644                                 10000$:
 025644  104405                                 TRAP    C$ESEG
 025646  104404                                 TRAP    C$BSEG
 025650  052777  000040  154644                 BIS     #CLR,@RPCS2     ;CLEAR OUT THE DEVICE
 025656  032777  000100  154700                 BIT     #IE,@RPCS3      ;TEST RPCS3:IE
 025664  001412                                 BEQ     4$              ;IF CLEAR, TEST PASSES
 025666  004737  017422                         JSR     PC,BICEXP       ;LOAD FAILING DATA
 025672  002564                                 RPCS3                   ;FAILING REGISTER
 025674  000100                                 IE                      ;BIT UNDER TEST
 025676  104456                                 TRAP    C$ERHRD
 025700  000037                                 .WORD   31
 025702  013051                                 .WORD   EM23
 025704  014172                                 .WORD   ERRO
 025706  005037  002402                         CLR     ITCOUN          ;NO ITERATIONS
 025712                                 4$:
 025712                                 10001$:
   025712  104405                         TRAP    C$ESEG
   025714  005337  002402                 DEC     ITCOUN          ;ONE LESS ITERATION TO-GO
   025720  003324                         BGT     2$              ;>0 ?? DO AGAIN!!
   025722  012700  000000                 MOV     #0,R0
   025726  104441                         TRAP    C$SPRI
   025730                         L10037:
   025730  104401                         TRAP    C$ETST
```

```
                                        .SBTTL  TEST 18 IPCKO TEST

                                        ;%      TEST 18 (RH70 TEST ONLY)  MDPE TEST 1
                                        ;%      :  SET RPCS3:  IPCKO (BIT 0) = 1
                                        ;%      :  IF RPCS3:  IPCKO <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT DIDN'T SET)
                                        ;%      :  :  ELSE
                                        ;%      :  :  IF RPCS2:  IR <> 1
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  WAIT
                                        ;%      :  :  ENDIF
                                        ;%      :  :  WRITE DATA TO RPDB
                                        ;%      :  ENDIF
                                        ;%      :  IF ((RPCS1:  TRE) AND (RPCS1:  SC) AND (RPCS2:  MCPE)) <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (SHOULD HAVE DETECTED A PARITY ERROR)
                                        ;%      :  :  ELSE
                                        ;%      :  :  SET RPCS2:  CLR = 1
                                        ;%      :  :  IF ((RPCS2:  MCPE) OR (RPCS1:  SC) OR (RPCS1:  TRE)) = 1
                                        ;%      :  :  :  :  THEN
                                        ;%      :  :  :  OUTPUT ERROR MESSAGE (ERROR STATUS DIDN'T CLEAR)
                                        ;%      :  :  ENDIF
                                        ;%      :  ENDIF
                                        ;%      :  ENDIF
                                        ;%      END TEST 18

   025732                               T18::
   025732  005737  002504                       TST     RHTYPE                  ;IS THE CONTROLLER AN RH70?
   025736  003002                               BGT     64$                     ;IF > 0, YES,
   025740  104432                               TRAP    C$EXIT
   025742  000264                               .WORD   L10040-.
   025744  005037  002404               64$:    CLR     ERRWD1                  ;SET THE MODULE CALLOUT
   025750  012737  000002  002406               MOV     #BIT1,ERRWD2            ;FOR THIS TEST
   025756  012737  000012  002402               MOV     #10.,ITCOUN             ;LOAD THE ITERATION COUNT
   025764                               66$:
   025764  104404                               TRAP    C$BSEG
   025766  052777  000001  154570               BIS     #BITO,@RPCS3            ;SET THE BITO-UNDER-TEST
   025774  032777  000001  154562               BIT     #BITO,@RPCS3            ;DID BITO SET IN RPCS3?
   026002  001012                               BNE     65$                     ;YES, SKIP ERROR DISPATCH
   026004  004737  017372                       JSR     PC,BISEXP               ;LOAD FAILING DATA
   026010  002564                               RPCS3                           ;FAILING REGISTER
   026012  000001                               BITO                            ;BIT UNDER TEST
   026014  104456                               TRAP    C$ERHRD
   026016  000040                               .WORD   32
   026020  012776                               .WORD   EM22
   026022  014172                               .WORD   ERRO
   026024  005037  002402                       CLR     ITCOUN                  ;RESET FURTHER ITERATIONS
   026030                               65$:
   026030                               10000$:
   026030  104405                               TRAP    C$ESEG
   026032  104404                               TRAP    C$BSEG
   026034  004737  017672                       JSR     PC,IRLOCK               ;POLL INPUT READY IN RPCS2
   026040  005077  154470                       CLR     @RPDB                   ;WRITE RPDB WITH 0'S
   026044  004737  017706                       JSR     PC,ORLOCK               ;NOW WAIT FOR OUTPUT READY IN RPCS2
   026050  005777  154460                       TST     @RPDB                   ;NOW DO A ONE WORD READ OF RPDB
   026054  004737  017000                       JSR     PC,WAIT                 ;WAIT FOR THE RP07 MICROPROCESSOR
```

```
      026060  032777  140000  154424            BIT     #SC!TRE,@RPCS1   ;LOOK FOR SC AND TRE
      026066  001012                            BNE     67$              ;THEY BOTH SET, GO-ON
      026070  004737  017372                    JSR     PC,BISEXP        ;LOAD FAILING DATA
      026074  002512                            RPCS1                    ;FAILING REGISTER
      026076  140000                            SC!TRE                   ;BIT UNDER TEST
      026100  104456                            TRAP    C$ERHRD
      026102  000041                            .WORD   33
      026104  012776                            .WORD   EM22
      026106  014172                            .WORD   ERRO
      026110  005037  002402                    CLR     ITCOUN           ;RESET FURTHER ITERATIONS
      026114  032777  000400  154400  67$:      BIT     #MDPE,@RPCS2     ;DID WE DETECT PARITY ERROR?
      026122  001012                            BNE     68$              ;YES, GO-ON
      026124  004737  017372                    JSR     PC,BISEXP        ;LOAD FAILING DATA
      026130  002522                            RPCS2                    ;FAILING REGISTER
      026132  000400                            MDPE                     ;BIT UNDER TEST
      026134  104456                            TRAP    C$ERHRD
      026136  000042                            .WORD   34
      026140  012776                            .WORD   EM22
      026142  014172                            .WORD   ERRO
      026144  005037  002402                    CLR     ITCOUN           ;RESET FURTHER ITERATIONS
      026150  052777  000040  154344  68$:      BIS     #CLR,@RPCS2      ;CLEAR OUT THE DEVICE!
      026156                          10001$:
      026156  104405                            TRAP    C$ESEG
      026160  104404                            TRAP    C$BSEG
      026162  032777  000001  154374            BIT     #BIT0,@RPCS3     ;NOW CHECK TO SEE THAT #BIT0 DID CLEAR
      026170  001412                            BEQ     69$              ;= 0, TEST OK!!
      026172  004737  017422                    JSR     PC,BICEXP        ;LOAD FAILING DATA
      026176  002564                            RPCS3                    ;FAILING REGISTER
      026200  000001                            BIT0                     ;BIT UNDER TEST
      026202  104456                            TRAP    C$ERHRD
      026204  000043                            .WORD   35
      026206  013051                            .WORD   EM23
      026210  000000                            .WORD   0
      026212  005037  002402                    CLR     ITCOUN           ;RESET FURTHER ITERATIONS
      026216                          69$:
      026216                          10002$:
      026216  104405                            TRAP    C$ESEG
      026220  005337  002402                    DEC     ITCOUN           ;ONE LESS ITERATION TO-GO
      026224  003257                            BGT     66$              ;TAKE BRANCH IF NOT DONE
   30 026226                          L10040:
      026226  104401                            TRAP    C$ETST
```

```
                                        .SBTTL  TEST 19 IPCK1 TEST

                                        ;%      TEST 19 (RH70 TEST ONLY) MDPE TEST 2
                                        ;%      :  SET RPCS3:  BIT 01 (IPCK1) = 1
                                        ;%      :  IF RPCS3:  IPCK1 <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT DIDN'T SET)
                                        ;%      :  :  ELSE
                                        ;%      :  :  IF RPCS2:  IR <> 1
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  WAIT FOR RPCS2:  IR TO SET
                                        ;%      :  :  ENDIF
                                        ;%      :  :  WRITE RPDB ONCE
                                        ;%      :  ENDIF
                                        ;%      :  IF ((RPCS1:  TRE) AND (RPCS1:  SC) AND (RPCS2:  MDPE)) <> 1
                                        ;%      :  :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE  (UNDETECTED PARITY ERROR)
                                        ;%      :  :  ELSE
                                        ;%      :  :  SET RPCS2:  CLR = 1
                                        ;%      :  :  IF ((RPCS1:  TRE) OR (RPCS1:  SC) OR (RPCS2:  MDPE)) = 1
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  OUTPUT ERROR MESSAGE (ERROR STATUS FAILED TO CLEAR)
                                        ;%      :  :  ENDIF
                                        ;%      :  ENDIF
                                        ;%      END TEST 19

 026230                                 T19::
 026230  005737  002504                         TST     RHTYPE          ;IS THE CONTROLLER AN RH70?
 026234  003002                                 BGT     64$             ;IF > 0, YES,
 026236  104432                                 TRAP    C$EXIT
 026240  000264                                 .WORD   L10041-.
 026242  005037  002404                 64$:    CLR     ERRWD1          ;SET THE MODULE CALLOUT
 026246  012737  000002  002406                 MOV     #BIT1,ERRWD2    ;FOR THIS TEST
 026254  012737  000012  002402                 MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
 026262                                 66$:
 026262  104404                                 TRAP    C$BSEG
 026264  052777  000002  154272                 BIS     #BIT1,@RPCS3    ;SET THE BIT1-UNDER-TEST
 026272  032777  000002  154264                 BIT     #BIT1,@RPCS3    ;DID BIT1 SET IN RPCS3?
 026300  001012                                 BNE     65$             ;YES, SKIP ERROR DISPATCH
 026302  004737  017372                         JSR     PC,BISEXP       ;LOAD FAILING DATA
 026306  002564                                 RPCS3                   ;FAILING REGISTER
 026310  000001                                 BIT0                    ;BIT UNDER TEST
 026312  104456                                 TRAP    C$ERHRD
 026314  000044                                 .WORD   36
 026316  012776                                 .WORD   EM22
 026320  014172                                 .WORD   ERR0
 026322  005037  002402                         CLR     ITCOUN          ;RESET FURTHER ITERATIONS
 026326                                 65$:
 026326                                 10000$:
 026326  104405                                 TRAP    C$ESEG
 026330  104404                                 TRAP    C$BSEG
 026332  004737  017672                         JSR     PC,IRLOCK       ;POLL INPUT READY IN RPCS2
 026336  005077  154172                         CLR     @RPDB           ;WRITE RPDB WITH 0'S
 026342  004737  017706                         JSR     PC,ORLOCK       ;NOW WAIT FOR OUTPUT READY IN RPCS2
 026346  005777  154162                         TST     @RPDB           ;NOW DO A ONE WORD READ OF RPDB
 026352  004737  017000                         JSR     PC,WAIT         ;WAIT FOR THE RP07 MICROPROCESSOR
 026356  032777  140000  154126                 BIT     #SC!TRE,@RPCS1  ;LOOK FOR SC AND TRE
```

```
      026364  001012                               BNE     67$                 ;THEY BOTH SET, GO-ON
      026366  004737  017372                       JSR     PC,BISEXP           ;LOAD FAILING DATA
      026372  002512                               RPCS1                       ;FAILING REGISTER
      026374  140000                               SC!TRE                      ;BIT UNDER TEST
      026376  104456                               TRAP    C$ERHRD
      026400  000045                               .WORD   37
      026402  012776                               .WORD   EM22
      026404  014172                               .WORD   ERRO
      026406  005037  002402                       CLR     ITCOUN              ;RESET FURTHER ITERATIONS
      026412  032777  000400  154102  67$:         BIT     #MDPE,@RPCS2        ;DID WE DETECT PARITY ERROR?
      026420  001012                               BNE     68$                 ;YES, GO-ON
      026422  004737  017372                       JSR     PC,BISEXP           ;LOAD FAILING DATA
      026426  002522                               RPCS2                       ;FAILING REGISTER
      026430  000400                               MDPE                        ;BIT UNDER TEST
      026432  104456                               TRAP    C$ERHRD
      026434  000046                               .WORD   38
      026436  012776                               .WORD   EM22
      026440  014172                               .WORD   ERRO
      026442  005037  002402                       CLR     ITCOUN              ;RESET FURTHER ITERATIONS
      026446  052777  000040  154046  68$:         BIS     #CLR,@RPCS2         ;CLEAR OUT THE DEVICE!
      026454                          10001$:
      026454  104405                               TRAP    C$ESEG
      026456  104404                               TRAP    C$BSEG
      026460  032777  000002  154076               BIT     #BIT1,@RPCS3        ;NOW CHECK TO SEE THAT #BIT1 DID CLEAR
      026466  001412                               BEQ     69$                 ;= 0, TEST OK!!
      026470  004737  017422                       JSR     PC,BICEXP           ;LOAD FAILING DATA
      026474  002564                               RPCS3                       ;FAILING REGISTER
      026476  000001                               BITO                        ;BIT UNDER TEST
      026500  104456                               TRAP    C$ERHRD
      026502  000047                               .WORD   39
      026504  013051                               .WORD   EM23
      026506  000000                               .WORD   0
      026510  005037  002402                       CLR     ITCOUN              ;RESET FURTHER ITERATIONS
      026514                          69$:
      026514                          10002$:
      026514  104405                               TRAP    C$ESEG
      026516  005337  002402                       DEC     ITCOUN              ;ONE LESS ITERATION TO-GO
      026522  003257                               BGT     66$                 ;TAKE BRANCH IF NOT DONE
   29 026524                          L10041:
      026524  104401                               TRAP    C$ETST
```

```
                                    .SBTTL  TEST 20 IPCK2 TEST

                                    ;%      TEST 20 (RH70 TEST ONLY) MDPE TEST 3
                                    ;%      :  SET RPCS3:  IPCK2 (BIT2) = 1
                                    ;%      :  IF RPCS3:  IPCK2 <> 1
                                    ;%      :  :  THEN
                                    ;%      :  :  OUTPUT ERROR MESSAGE (BIT DIDN'T SET)
                                    ;%      :  :  ELSE
                                    ;%      :  :  IF RPCS2:  IR <> 1
                                    ;%      :  :  :  THEN
                                    ;%      :  :  :  WAIT FOR RPCS2:  IR TO SET
                                    ;%      :  :  ENDIF
                                    ;%      :  WRITE DATA TO RPDB
                                    ;%      :  ENDIF
                                    ;%      :  IF ((RPCS1:  TRE) AND RPCS1:  SC) AND (RPCS2:  MCPE)) <> 1
                                    ;%      :  :  THEN
                                    ;%      :  :  OUTPUT ERROR MESSAGE (UNDETECTED PARITY ERROR)
                                    ;%      :  :  ELSE
                                    ;%      :  :  SET RPCS2:  CLR = 1
                                    ;%      :  :  IF ((RPCS1:  SC) OR (RPCS1:  TRE) OR (RPCS2:  MCPE)) = 1
                                    ;%      :  :  :  THEN
                                    ;%      :  :  :  OUTPUT ERROR MESSAGE (ERROR STATUS FAILED TO CLEAR)
                                    ;%      :  :  ENDIF
                                    ;%      :  ENDIF
                                    ;%      END TEST 20

 026526                             T20::
 026526  005737  002504                     TST     RHTYPE          ;IS THE CONTROLLER AN RH70?
 026532  003002                             BGT     64$             ;IF > 0, YES.
 026534  104432                             TRAP    C$EXIT
 026536  000304                             .WORD   L10042-.
 026540  005037  002404             64$:    CLR     ERRWD1          ;SET THE MODULE CALLOUT
 026544  012737  000002  002406             MOV     #BIT1,ERRWD2    ;FOR THIS TEST
 026552  012737  000012  002402             MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
 026560                             66$:
 026560  104404                             TRAP    C$BSEG
 026562  052777  000004  153774             BIS     #BIT2,@RPCS3    ;SET THE BIT2-UNDER-TEST
 026570  032777  000004  153766             BIT     #BIT2,@RPCS3    ;DID BIT2 SET IN RPCS3?
 026576  001012                             BNE     65$             ;YES, SKIP ERROR DISPATCH
 026600  004737  017372                     JSR     PC,BISEXP       ;LOAD FAILING DATA
 026604  002564                             RPCS3                   ;FAILING REGISTER
 026606  000001                             BIT0                    ;BIT UNDER TEST
 026610  104456                             TRAP    C$ERHRD
 026612  000050                             .WORD   40
 026614  012776                             .WORD   EM22
 026616  014172                             .WORD   ERR0
 026620  005037  002402                     CLR     ITCOUN          ;RESET FURTHER ITERATIONS
 026624                             65$:
 026624                             10000$:
 026624  104405                             TRAP    C$ESEG
 026626  104404                             TRAP    C$BSEG
 026630  004737  017672                     JSR     PC,IRLOCK       ;POLL INPUT READY IN RPCS2
 026634  005077  153674                     CLR     @RPDB           ;WRITE RPDB WITH 0'S
 026640  004737  017672                     JSR     PC,IRLOCK       ;WAIT FOR IR TO SET AGAIN
 026644  005077  153664                     CLR     @RPDB           ;WRITE RPDB = 0, AGAIN
 026650  004737  017706                     JSR     PC,ORLOCK       ;NOW WAIT FOR OUTPUT READY IN RPCS2
 026654  005777  153654                     TST     @RPDB           ;NOW DO A ONE WORD READ OF RPDB
```

```
     026660  004737  017706                   JSR     PC,ORLOCK          ;WAIT FOR OUTPUT READY TO SET IN RPCS2 AGAIN!
     026664  005777  153644                   TST     @RPDB              ;DO A SECOND READ OF RPDB
     026670  004737  017000                   JSR     PC,WAIT            ;WAIT FOR THE RP07 MICROPROCESSOR
     026674  032777  140000  153610           BIT     #SC!TRE,@RPCS1     ;LOOK FOR SC AND TRE
     026702  001012                           BNE     67$                ;THEY BOTH SET, GO-ON
     026704  004737  017372                   JSR     PC,BISEXP          ;LOAD FAILING DATA
     026710  002512                           RPCS1                      ;FAILING REGISTER
     026712  140000                           SC!TRE                     ;BIT UNDER TEST
     026714  104456                           TRAP    C$ERHRD
     026716  000051                           .WORD   41
     026720  012776                           .WORD   EM22
     026722  014172                           .WORD   ERRO
     026724  005037  002402                   CLR     ITCOUN             ;RESET FURTHER ITERATIONS
     026730  032777  000400  153564  67$:     BIT     #MDPE,@RPCS2       ;DID WE DETECT PARITY ERROR?
     026736  001012                           BNE     68$                ;YES, GO-ON
     026740  004737  017372                   JSR     PC,BISEXP          ;LOAD FAILING DATA
     026744  002522                           RPCS2                      ;FAILING REGISTER
     026746  000400                           MDPE                       ;BIT UNDER TEST
     026750  104456                           TRAP    C$ERHRD
     026752  000052                           .WORD   42
     026754  012776                           .WORD   EM22
     026756  014172                           .WORD   ERRO
     026760  005037  002402                   CLR     ITCOUN             ;RESET FURTHER ITERATIONS
     026764  052777  000040  153530  68$:     BIS     #CLR,@RPCS2        ;CLEAR OUT THE DEVICE!
     026772                          10001$:
     026772  104405                           TRAP    C$ESEG
     026774  104404                           TRAP    C$BSEG
     026776  032777  000004  153560           BIT     #BIT2,@RPCS3       ;NOW CHECK TO SEE THAT #BIT2 DID CLEAR
     027004  001412                           BEQ     69$                ;= 0, TEST OK!!
     027006  004737  017422                   JSR     PC,BICEXP          ;LOAD FAILING DATA
     027012  002564                           RPCS3                      ;FAILING REGISTER
     027014  000001                           BITO                       ;BIT UNDER TEST
     027016  104456                           TRAP    C$ERHRD
     027020  000053                           .WORD   43
     027022  013051                           .WORD   EM23
     027024  000000                           .WORD   0
     027026  005037  002402                   CLR     ITCOUN             ;RESET FURTHER ITERATIONS
     027032                          69$:
     027032                          10002$:
     027032  104405                           TRAP    C$ESEG
     027034  005337  002402                   DEC     ITCOUN             ;ONE LESS ITERATION TO-GO
     027040  003247                           BGT     66$                ;TAKE BRANCH IF NOT DONE
  29 027042                          L10042:
     027042  104401                           TRAP    C$ETST
```

```
                                        .SBTTL  TEST 21 IPCK3 TEST

                                        ;%      TEST 21 (RH70 TEST ONLY) MDPE TEST 4
                                        ;%      :  SET RPCS3:  IPCK3 (BIT 03) = 1
                                        ;%      :  IF RPCS3:  IPCK3 <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (BIT FAILED TO SET)
                                        ;%      :  :  ELSE
                                        ;%      :  :  IF RPCS2:  IR <> 1
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  WAIT FOR RPCS2:  IR TO SET
                                        ;%      :  :  ENDIF
                                        ;%      :  :  ELSE
                                        ;%      :  :  WRITE DATA TO RPDB
                                        ;%      :  :  WAIT FOR RPCS2:  IR TO SET AGAIN (USING A TIMER)
                                        ;%      :  :  WRITE RPDB WITH DATA AGAIN
                                        ;%      :  ENDIF
                                        ;%      :  IF ((RPCS1:  SC) AND (RPCS1:  TRE) AND (RPCS2:  MCPE)) <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (UNDETECTED PARITY ERROR)
                                        ;%      :  :  ELSE
                                        ;%      :  :  SET RPCS2:  CLR = 1
                                        ;%      :  ENDIF
                                        ;%      :  IF ((RPCS1:  SC) OR (RPCS1:  TRE) OR (RPCS2:  MCPE)) = 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (ERROR STATUS FAILED TO CLEAR)
                                        ;%      :  ENDIF
                                        ;%      END TEST 21

  027044                                T21::
  027044  005737  002504                        TST     RHTYPE          ;IS THE CONTROLLER AN RH70?
  027050  003002                                BGT     64$             ;IF > 0, YES,
  027052  104432                                TRAP    C$EXIT
  027054  000304                                .WORD   L10043-.
  027056  005037  002404                64$:    CLR     ERRWD1          ;SET THE MODULE CALLOUT
  027062  012737  000002  002406                MOV     #BIT1,ERRWD2    ;FOR THIS TEST
  027070  012737  000012  002402                MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
  027076                                66$:
  027076  104404                                TRAP    C$BSEG
  027100  052777  000010  153456                BIS     #BIT3,@RPCS3    ;SET THE BIT3-UNDER-TEST
  027106  032777  000010  153450                BIT     #BIT3,@RPCS3    ;DID BIT3 SET IN RPCS3?
  027114  001012                                BNE     65$             ;YES, SKIP ERROR DISPATCH
  027116  004737  017372                        JSR     PC,BISEXP       ;LOAD FAILING DATA
  027122  002564                                RPCS3                   ;FAILING REGISTER
  027124  000001                                BIT0                    ;BIT UNDER TEST
  027126  104456                                TRAP    C$ERHRD
  027130  000054                                .WORD   44
  027132  012776                                .WORD   EM22
  027134  014172                                .WORD   ERR0
  027136  005037  002402                        CLR     ITCOUN          ;RESET FURTHER ITERATIONS
  027142                                65$:
  027142                                10000$:
  027142  104405                                TRAP    C$ESEG
  027144  104404                                TRAP    C$BSEG
  027146  004737  017672                        JSR     PC,IRLOCK       ;POLL INPUT READY IN RPCS2
  027152  005077  153356                        CLR     @RPDB           ;WRITE RPDB WITH 0'S
  027156  004737  017672                        JSR     PC,IRLOCK       ;WAIT FOR IR TO SET AGAIN
```

```
   027162 005077 153346                 CLR     @RPDB            ;WRITE RPDB = 0, AGAIN
   027166 004737 017706                 JSR     PC,ORLOCK        ;NOW WAIT FOR OUTPUT READY IN RPCS2
   027172 005777 153336                 TST     @RPDB            ;NOW DO A ONE WORD READ OF RPDB
   027176 004737 017706                 JSR     PC,ORLOCK        ;WAIT FOR OUTPUT READY TO SET IN RPCS2 AGAIN!
   027202 005777 153326                 TST     @RPDB            ;DO A SECOND READ OF RPDB
   027206 004737 017000                 JSR     PC,WAIT          ;WAIT FOR THE RP07 MICROPROCESSOR
   027212 032777 140000 153272          BIT     #SC!TRE,@RPCS1   ;LOOK FOR SC AND TRE
   027220 001012                        BNE     67$              ;THEY BOTH SET, GO-ON
   027222 004737 017372                 JSR     PC,BISEXP        ;LOAD FAILING DATA
   027226 002512                        RPCS1                    ;FAILING REGISTER
   027230 140000                        SC!TRE                   ;BIT UNDER TEST
   027232 104456                        TRAP    C$ERHRD
   027234 000055                        .WORD   45
   027236 012776                        .WORD   EM22
   027240 014172                        .WORD   ERRO
   027242 005037 002402                 CLR     ITCOUN           ;RESET FURTHER ITERATIONS
   027246 032777 000400 153246 67$:     BIT     #MDPE,@RPCS2     ;DID WE DETECT PARITY ERROR?
   027254 001012                        BNE     68$              ;YES, GO-ON
   027256 004737 017372                 JSR     PC,BISEXP        ;LOAD FAILING DATA
   027262 002522                        RPCS2                    ;FAILING REGISTER
   027264 000400                        MDPE                     ;BIT UNDER TEST
   027266 104456                        TRAP    C$ERHRD
   027270 000056                        .WORD   46
   027272 012776                        .WORD   EM22
   027274 014172                        .WORD   ERRO
   027276 005037 002402                 CLR     ITCOUN           ;RESET FURTHER ITERATIONS
   027302 052777 000040 153212 68$:     BIS     #CLR,@RPCS2      ;CLEAR OUT THE DEVICE!
   027310                       10001$:
   027310 104405                        TRAP    C$ESEG
   027312 104404                        TRAP    C$BSEG
   027314 032777 000010 153242          BIT     #BIT3,@RPCS3     ;NOW CHECK TO SEE THAT #BIT3 DID CLEAR
   027322 001412                        BEQ     69$              ;= 0, TEST OK!!
   027324 004737 017422                 JSR     PC,BICEXP        ;LOAD FAILING DATA
   027330 002564                        RPCS3                    ;FAILING REGISTER
   027332 000001                        BIT0                     ;BIT UNDER TEST
   027334 104456                        TRAP    C$ERHRD
   027336 000057                        .WORD   47
   027340 013051                        .WORD   EM23
   027342 000000                        .WORD   0
   027344 005037 002402                 CLR     ITCOUN           ;RESET FURTHER ITERATIONS
   027350                       69$:
   027350                       10002$:
   027350 104405                        TRAP    C$ESEG
   027352 005337 002402                 DEC     ITCOUN           ;ONE LESS ITERATION TO-GO
   027356 003247                        BGT     66$              ;TAKE BRANCH IF NOT DONE
32 027360                       L10043:
   027360 104401                        TRAP    C$ETST
```

```
                                    .SBTTL  TEST 22 INTERRUPT TEST #1

                                    ;%      TEST 22 INTERRUPT TEST 1
                                    ;%      :  WRITE RPCS1:  RDY (BIT 07) = 1
                                    ;%      :  IF RPCS1:  RDY <> 1
                                    ;%      :  :  THEN
                                    ;%      :  :  OUTPUT ERROR MESSAGE (RPCS1:  RDY STUCK AT 0)
                                    ;%      :  ENDIF
                                    ;%      :  SET PROCESSOR PRIORITY = 7 DOWNTO THE DEVICE PRIORITY, ONE LEVEL AT A TIME
                                    ;%      :  SET RPCS1:  RDY AND RPCS1:  IE = 1
                                    ;%      :  IF INTERRUPT IS RECEIVED
                                    ;%      :  :  THEN
                                    ;%      :  :  OUTPUT ERROR MESSAGE (RHXX INTERRUPTED TO WRONG PRIORITY)
                                    ;%      :  ENDIF
                                    ;%      END TEST 22

027362                              T22::
027362  005037  002404                      CLR     ERRWD1          ;CREATE THE MODULE CALLOUT
027366  012737  000002  002406              MOV     #BIT1,ERRWD2    ;FOR THIS TEST
027374  012737  000012  002402              MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
027402                              1$:
027402  104404                              TRAP    C$BSEG
027404  005037  002462                      CLR     INTFLG          ;RESET THE INTERRUPT STATUS FLAG
027410  052777  000200  153074              BIS     #RDY,@RPCS1     ;SET RDY = 1 IN RPCS1
027416  032777  000200  153066              BIT     #RDY,@RPCS1     ;IS IT = 1 ?
027424  001012                              BNE     2$              ;YES, SKIP ERROR DISPATCH
027426  004737  017372                      JSR     PC,BISEXP       ;LOAD UP THE ERROR POINTERS
027432  002512                              RPCS1                   ;THIS REGISTER
027434  000200                              RDY                     ;THIS BIT
027436  104456                              TRAP    C$ERHRD
027440  000060                              .WORD   48
027442  012776                              .WORD   EM22
027444  014172                              .WORD   ERRO
027446  005037  002402                      CLR     ITCOUN          ;RESET THE ITERATION COUNTER
027452                              2$:
027452                              10000$:
027452  104405                              TRAP    C$ESEG
027454  012746  000340                      MOV     #PRI07,-(SP)
027460  012746  020630                      MOV     #INTSRV,-(SP)
027464  013746  002476                      MOV     RPVEC,-(SP)
027470  012746  000003                      MOV     #3,-(SP)
027474  104437                              TRAP    C$SVEC
027476  062706  000010                      ADD     #10,SP
027502  012702  000340                      MOV     #PRI07,R2       ;SET THE PRIORITY TO 7
027506                              3$:
027506  104404                              TRAP    C$BSEG
027510  010200                              MOV     R2,R0
027512  104441                              TRAP    C$SPRI
027514  052777  000300  152770              BIS     #RDY!IE,@RPCS1  ;FORCE AN INTERRUPT, BUT DON'T HONOR IT!
027522  012727  000020                      MOV     #20,(PC)+
027526  000000                              .WORD   0
027530  013727  002116                      MOV     L$DLY,(PC)+
027534  000000                              .WORD   0
027536  005367  177772                      DEC     -6(PC)
027542  001375                              BNE     .-4
027544  005367  177756                      DEC     -22(PC)
027550  001367                              BNE     .-20
```

```
   027552  005737  002462                    TST     INTFLG          ;IF INTFLG > 0, WRONG PRIORITY!!
   027556  001406                            BEQ     4$              ;IT'S OK IF ZERO!
   027560  104456                            TRAP    C$ERHRD
   027562  000061                            .WORD   49
   027564  013126                            .WORD   EM24
   027566  000000                            .WORD   0
   027570  005037  002402                    CLR     ITCOUN          ;NO ITERATIONS NECESSARY
   027574                           4$:
   027574                           10001$:
   027574  104405                            TRAP    C$ESEG
   027576  162702  000040                    SUB     #40,R2          ;REDUCE THE PRIORITY LEVEL
   027602  020237  002500                    CMP     R2,RPVEC+2      ;AT THE DEVICE PRIORITY YET?
   027606  103337                            BHIS    3$              ;NOT IF HIGHER OR SAME...
   027610  052777  000040  152704            BIS     #CLR,@RPCS2     ;NOW DISARM INTERRUPTS
   027616  005337  002402                    DEC     ITCOUN          ;ONE LESS
   027622  003267                            BGT     1$              ;DO UNTIL <= 0
   027624  013700  002476                    MOV     RPVEC,R0
   027630  104436                            TRAP    C$CVEC
   027632                           L10044:
   027632  104401                            TRAP    C$ETST
```

```
                                              .SBTTL  TEST 23 INTERRUPT TEST #2

                                              ;%      TEST 23 INTERRUPT TEST 2
                                              ;%      :  WRITE RPCS2:  CLR = 1
                                              ;%      :  SET PROCESSOR PRIORITY = 0
                                              ;%      :  IF ((RPCS1:  SC) OR (RPDS:  ATA)) = 1
                                              ;%      :  :  THEN
                                              ;%      :  :  OUTPUT ERROR MESSAGE (PERSISTENT ATA OR SC-CANNOT PERFORM INTERRUPT TEST)
                                              ;%      :  :  EXIT TEST 19
                                              ;%      :  ENDIF
                                              ;%      :  WRITE RPCS1:  IE = 1
                                              ;%      :  IF RHXX INTERRUPTS
                                              ;%      :  :  THEN
                                              ;%      :  :  OUTPUT ERROR MESSAGE (RECEIVED FALSE INTERRUPT)
                                              ;%      :  ENDIF
                                              ;%      END TEST 23

 027634                                       T23::
 027634  012737  016000  002404                       MOV     #BIT10!BIT11!BIT12,ERRWD1;J11-J13 CALLOUT
 027642  012737  000406  002406                       MOV     #BIT1!BIT2!BIT8,ERRWD2;CONTROLLER, CABLE, TERMINATOR
 027650  012737  000012  002402                       MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
 027656                                       1$:
 027656  104404                                       TRAP    C$BSEG
 027660  005037  002462                               CLR     INTFLG          ;RESET THE INTERRUPTS RECEIVED FLAG
 027664  052777  000040  152630                       BIS     #CLR,@RPCS2     ;CLEAR OUT THE CONTROLLER
 027672  013777  002506  152622                       MOV     DRVNO,@RPCS2    ;LOAD THE DRIVE NUMBER
 027700  032777  160000  152604                       BIT     #SC!TRE!MCPE,@RPCS1;DO WE HAVE A SPECIAL CONDITION, MCPE, OR TRANSFER ERROR?
 027706  001412                                       BEQ     2$              ;IF ZERO, NO!!
 027710  004737  017422                               JSR     PC,BICEXP       ;LOAD THE ERROR POINTERS
 027714  002512                                       RPCS1                   ;THIS REGISTER FAILED,
 027716  160000                                       SC!TRE!MCPE             ;THIS DATA SHOULD BE CLEAR
 027720  104456                                       TRAP    C$ERHRD
 027722  000062                                       .WORD   50
 027724  012562                                       .WORD   EM16
 027726  014172                                       .WORD   ERRO
 027730  104432                                       TRAP    C$EXIT
 027732  000146                                       .WORD   L10045-.
 027734                                       2$:
 027734                                       10000$:
 027734  104405                                       TRAP    C$ESEG
 027736  012746  000340                               MOV     #PRI07,-(SP)
 027742  012746  020630                               MOV     #INTSRV,-(SP)
 027746  013746  002476                               MOV     RPVEC,-(SP)
 027752  012746  000003                               MOV     #3,-(SP)
 027756  104437                                       TRAP    C$SVEC
 027760  062706  000010                               ADD     #10,SP
 027764  104404                                       TRAP    C$BSEG
 027766  012700  000000                               MOV     #0,R0
 027772  104441                                       TRAP    C$SPRI
 027774  012777  000100  152510                       MOV     #IE,@RPCS1      ;ARM THE DEVICE, BUT DON'T EXPECT AN INTERRUPT
 030002  012727  000020                               MOV     #20,(PC)+
 030006  000000                                       .WORD   0
 030010  013727  002116                               MOV     L$DLY,(PC)+
 030014  000000                                       .WORD   0
 030016  005367  177772                               DEC     -6(PC)
 030022  001375                                       BNE     .-4
 030024  005367  177756                               DEC     -22(PC)
```

```
     030030  001367                                BNE     .-20
  39 030032  005737  002462                        TST     INTFLG          ;THIS SHOULD = 0, FOR NO INTERRUPTS
  40 030036  001406                                BEQ     3$              ;IS ZERO, TEST OK!
  41 030040  104456                                TRAP    C$ERHRD
     030042  000063                                .WORD   51
     030044  013167                                .WORD   EM25
     030046  014172                                .WORD   ERRO
  42 030050  005037  002402                        CLR     ITCOUN          ;RESET FURTHER ITERATIONS
  43 030054                               3$:
     030054                               10001$:
     030054  104405                                TRAP    C$ESEG
  44 030056  052777  000040  152436                BIS     #CLR,@RPCS2     ;DISARM INTERRUPTS
  45 030064  005337  002402                        DEC     ITCOUN          ;ONE LESS ITERATION
  46 030070  003272                                BGT     1$              ;IF > 0, DO AGAIN
  47 030072  013700  002476                        MOV     RPVEC,R0
     030076  104436                                TRAP    C$CVEC
  48 030100                               L10045:
     030100  104401                                TRAP    C$ETST
```

```
                                        .SBTTL  TEST 24 INTERRUPT TEST #3

                                        ;%      TEST 24 INTERRUPT TEST 3
                                        ;%      :  SET RPCS2:  CLR = 1
                                        ;%      :  SET ((RPCS1:  IE) AND (RPCS1:  RDY)) = 1
                                        ;%      :  CLEAR PROCESSOR STATUS
                                        ;%      :  IF INTERRUPT DOESN'T OCCUR
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (DEVICE FAILED TO INTERRUPT)
                                        ;%      :  ENDIF
                                        ;%      END TEST 24

030102                                  T24::
030102  012737  000012  002402                  MOV     #10.,ITCOUN      ;LOAD THE ITERATION COUNTER
030110  012746  000340                          MOV     #PRI07,-(SP)
030114  012746  020630                          MOV     #INTSRV,-(SP)
030120  013746  002476                          MOV     RPVEC,-(SP)
030124  012746  000003                          MOV     #3,-(SP)
030130  104437                                  TRAP    C$SVEC
030132  062706  000010                          ADD     #10,SP
030136                                  1$:
030136  104404                                  TRAP    C$BSEG
030140  005037  002462                          CLR     INTFLG           ;RESET THE INTERRUPTS RECEIVED MARKER
030144  052777  000040  152350                  BIS     #CLR,@RPCS2      ;FLUSH OUT THE CONTROLLER
030152  013777  002506  152342                  MOV     DRVNO,@RPCS2     ;LOAD THE DRIVE NUMBER TO AVOID A TRANSFER ERROR!
030160  005737  002500                          TST     RPVEC+2          ;GET THE DEVICE PRIORITY
030164  001002                                  BNE     2$               ;IT'S > ZERO, SET UP TO LOWER THE PROCESSOR STATUS
030166  005046                                  CLR     -(SP)            ;IT'S AT PRIORITY 0!
030170  000404                                  BR      3$               ;GO NOW!
030172  013746  002500                  2$:     MOV     RPVEC+2,-(SP)    ;GET THE PRIORITY
030176  162716  000040                          SUB     #40,(SP)         ;AND LOWER IT
030202                                  3$:
030202  012600                                  MOV     (SP)+,R0
030204  104441                                  TRAP    C$SPRI
030206  052777  000300  152276                  BIS     #RDY!IE,@RPCS1   ;FORCE AN INTERRUPT!!
030214  012727  000020                          MOV     #20,(PC)+
030220  000000                                  .WORD   0
030222  013727  002116                          MOV     L$DLY,(PC)+
030226  000000                                  .WORD   0
030230  005367  177772                          DEC     -6(PC)
030234  001375                                  BNE     .-4
030236  005367  177756                          DEC     -22(PC)
030242  001367                                  BNE     .-20
030244  005737  002462                          TST     INTFLG           ;IF WE RECEIVED AN INTERRUPT. THIS > 0
030250  003006                                  BGT     4$               ;GOT IT, TEST OK!
030252  104456                                  TRAP    C$ERHRD
030254  000064                                  .WORD   52
030256  013224                                  .WORD   EM26
030260  000000                                  .WORD   0
030262  005037  002402                          CLR     ITCOUN           ;NO ITERATIONS NECESSARY
030266                                  4$:
030266                                  10000$:
030266  104405                                  TRAP    C$ESEG
030270  052777  000040  152224                  BIS     #CLR,@RPCS2      ;NOW REMOVE ALL INTERRUPT STATUS
030276  005337  002402                          DEC     ITCOUN           ;ONE LESS ITERATION TO GO
030302  003315                                  BGT     1$               ;IF > 0, DO AGAIN
030304  013700  002476                          MOV     RPVEC,R0
```

```
     030310  104436                        TRAP    C$CVEC
  38                                                          ;SET PRIORITY TO 7
  39 030312  012700  000340                MOV     #PRI07,R0
     030316  104441                        TRAP    C$SPRI
  40 030320                      L10046:
     030320  104401                        TRAP    C$ETST
```

```
                                        .SBTTL  TEST 25 BASIC DRIVE TEST

                                        ;%      TEST 25 (RP07 REMOTE REGISTER TESTS)-BASIC DRIVE SELECT TEST
                                        ;%      :  CHECK MASSBUS INTERFACE SWITCH TEST LOCATION 'SWTTST'
                                        ;%      :  IF 'SWTTST' = 0
                                        ;%      :  :  THEN EXIT TEST
                                        ;%      :  ENDIF
                                        ;%      :  PRINT MESSAGE ASKING USER TO DISCONNECT THE DRIVE-UNDER-TEST
                                        ;%      :  FROM THE MASSBUS BY USING THE DISABLE SWITCH
                                        ;%      :  THIS TEST CANNOT BE RUN REMOTELY.
                                        ;%      :  SET RPCS2:  CLR = 1
                                        ;%      :  LOAD THE DRIVE-UNDER-TEST DEVICE NUMBER INTO RPCS2
                                        ;%      :  IF REGISTER 06 (RPDT) <> 0
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (DUAL RESPONSE FOUND)
                                        ;%      :  :  OUTPUT FAULT LIST = ANOTHER DRIVE RESPONDING,
                                        ;%      :  :  RHXX, CABLES, DRIVE SELECT, XMITTERS-RECEIVERS FOR DRIVE,
                                        ;%      :  :  J11 / J13, TERMINATOR
                                        ;%      :  ENDIF
                                        ;%      END TEST 25

 030322                                 T25::
 030322  005737  002332                         TST     SWTTST          ;SHOULD WE DO MASSBUS INTERFACE SWITCH TEST ?
 030326  001002                                 BNE     1$              ;BR IF = 1, YES
 030330  104432                                 TRAP    C$EXIT
 030332  000160                                 .WORD   L10047-.
 030334                                 1$:
 030334  104450                                 TRAP    C$MANI
 030336  103402                                 BCS     2$
 030340  104432                                 TRAP    C$EXIT
 030342  000150                                 .WORD   L10047-.
 030344                                 2$:                             ;TYPE 'PLACE INTERFACE SWITCH A12-S01 IN DOWN POSITION (L)
 030344  104443                                 TRAP    C$GMAN
 030346  000404                                 BR      10000$
 030350  002464                                 .WORD   UNABLE
 030352  000120                                 .WORD   T$CODE
 030354  011607                                 .WORD   MESG13
 030356  000001                                 .WORD   1
 030360                                 10000$:
 030360  005737  002464                         TST     UNABLE          ;DID OPERATOR RESPOND YES?
 030364  003002                                 BGT     3$              ;IF > 0, YES
 030366  104432                                 TRAP    C$EXIT
 030370  000122                                 .WORD   L10047-.
 030372                                 3$:
 030372  104404                                 TRAP    C$BSEG
 030374  013777  002506  152120                 MOV     DRVNO,@RPCS2    ;LOAD THE DRIVE NUMBER
 030402  005777  152132                         TST     @RPDT           ;LOOK AT THE DRIVE TYPE REGISTER
 030406  001422                                 BEQ     4$              ;SHOULD BE ALL 0'S
 030410  013737  002540  002456                 MOV     RPDT,TESTRG     ;FAILING REGISTER
 030416  017737  152116  002452                 MOV     @RPDT,RCVED     ;FAILING DATA
 030424  005037  002454                         CLR     EXPTED          ;EXPECTED DATA
 030430  012737  016000  002404                 MOV     #BIT10!BIT11!BIT12,ERRWD1       ;MARK J11, J12 & J13 FOR CALLOUT
 030436  012737  030424  002406                 MOV     #BIT!BIT2!BIT4!BIT8,ERRWD2      ;MARK RH, CABLE, TERMINATOR,  ANOTHER DRIVE
 030444  104456                                 TRAP    C$ERHRD
 030446  000065                                 .WORD   53
 030450  012523                                 .WORD   EM15
 030452  014172                                 .WORD   ERRO
```

```
    47 030454                       4$:
       030454                       10001$:
       030454  104405                        TRAP    C$ESEG
    48 030456                       5$:                             ;TYPE 'PLACE INTERFACE SWITCH A12-S01 IN  UP  POSITION (L)
    49 030456  104443                        TRAP    C$GMAN
       030460  000404                        BR      10002$
       030462  002464                        .WORD   UNABLE
       030464  000120                        .WORD   T$CODE
       030466  011667                        .WORD   MESG14
       030470  100000                        .WORD   100000
       030472                       10002$:
    50 030472  005737  002464                TST     UNABLE          ;DID OPERATOR RESPOND YES ?
    51 030476  002403                        BLT     6$              ;IF < 0, YES
    52 030500  004737  017000                JSR     PC,WAIT         ;SPIN FOR A STALL LOOP
    53 030504  000764                        BR      5$              ;NOW ASK THE QUESTION AGAIN!
    54
    55 030506  005037  002464       6$:      CLR     UNABLE          ;INITIALIZE THIS
    56 030512                       L10047:
       030512  104401                        TRAP    C$ETST
```

```
                                        .SBTTL TEST 26  DEMAND AND TRANSFER TEST

                                        ;%      TEST 26   DEMAND AND TRANSFER TEST
                                        ;%      :  LOAD THE DRIVE-UNDER-TEST'S NUMBER INTO RPCS2
                                        ;%      :  READ RPDT REGISTER
                                        ;%      :  IGNORE DATA AND ERRORS
                                        ;%      :  IF REGISTER DOESN'T RESPOND
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (DEMAND AND TRANSFER LOGIC NOT WORKING)
                                        ;%      :  :  OUTPUT FAULT LIST:  RHXX, CABLES, J11 / J13, REMOTE POSSIBILITY OF
                                        ;%      :  :  J08, CTOD, REGISTER SELECT LINES, DISABLE SWITCH, TERMINATOR.
                                        ;%      :  ENDIF
                                        ;%      END TEST 26

 030514                                 T26::
 030514  012737  000012  002402                 MOV     #10.,ITCOUN             ;LOAD THE ITERATION COUNT
 030522                                 1$:
 030522  104404                                 TRAP    C$BSEG
 030524  013777  002506  151770                 MOV     DRVNO,@RPCS2            ;LOAD THE DRIVE NUMBER
 030532  017737  152002  002452                 MOV     @RPDT, RCVED            ;LOOK AT RPDT
 030540  005737  002452                         TST     RCVED                   ;IF IT IS > 0, DRIVE IS THERE
 030544  001022                                 BNE     2$                      ;> 0, OK
 030546  012737  020042  002454                 MOV     #20042,EXPTED           ;CREATE THE CORRECT DRIVE TYPE CONTENTS
 030554  013737  002540  002456                 MOV     RPDT, TESTRG            ;GET THE FAILING REGISTER
 030562  012737  012200  002404                 MOV #BIT7!BIT10!BIT12,ERRWD1;SET MODULE CALLOUT MASK
 030570  012737  000416  002406                 MOV #BIT1!BIT2!BIT3!BIT8,ERRWD2;FOR BOTH WORDS
 030576  104456                                 TRAP    C$ERHRD
 030600  000066                                 .WORD   54
 030602  012776                                 .WORD   EM22
 030604  014172                                 .WORD   ERRO
 030606  005037  002402                         CLR     ITCOUN                  ;RESET THE ITERATION COUNT
 030612                                 2$:
 030612                                 10000$:
 030612  104405                                 TRAP    C$ESEG
 030614  005337  002402                         DEC     ITCOUN                  ;ONE LESS ITERATION
 030620  003340                                 BGT     1$                      ;IF >0, DO AGAIN
 030622                                 L10050:
 030622  104401                                 TRAP    C$ETST
```

```
                                          .SBTTL  TEST 27 UNIQUE UNIT UNDER TEST

                                          ;%      TEST 27 UNIQUE UNIT UNDER TEST
                                          ;%      :  WRITE  #46 TO RPCS1 FOR THE DRIVE UNDER TEST
                                          ;%      :  WRITE DATA PATTERN #4 TO RPCS1 FOR ALL OTHER DRIVES ON THE BUS
                                          ;%      :  IF RPCS1 FOR THE DRIVE UNDER TEST <> #46
                                          ;%      :  :  THEN
                                          ;%      :  :  OUTPUT ERROR MESSAGE (DRIVE SELECT LOGIC FAILURE)
                                          ;%      :  :  OUTPUT FAULT LIST:  RHXX, CABLE, J11/J13, TERMINATOR
                                          ;%      :  ENDIF
                                          ;%      END TEST 27

030624                                    T27::
030624  012737  000012  002402                    MOV     #10.,ITCOUN       ;LOAD THE ITERATION COUNT
030632                                    1$:
030632  104404                                    TRAP    C$BSEG
030634  013777  002506  151660                    MOV     DRVNO,@RPCS2      ;LOAD THE DRIVE UNDER TEST
030642  012777  000046  151642                    MOV     #46,@RPCS1        ;SET SOME COMMAND FUNCTION BITS
030650  005002                                    CLR     R2                ;SET UP TO DO ALL DRIVES
030652  020237  002506                    2$:     CMP     R2,DRVNO          ;DRIVE UNDER TEST?
030656  001405                                    BEQ     3$                ;IF SO, WE ALREADY WROTE IT.
030660  010277  151636                            MOV     R2,@RPCS2         ;LOAD THIS DRIVE #
030664  013777  002352  151620                    MOV     PATT4,@RPCS1      ;AND WRITE A PATTERN
030672  005202                            3$:     INC     R2                ;NEXT DRIVE
030674  020227  000010                            CMP     R2,#10            ;DONE
030700  103764                                    BLO     2$                ;IF <10, NO
030702  013777  002506  151612                    MOV     DRVNO,@RPCS2      ;RELOAD ORIGINAL DRIVE UNDER TEST
030710  012737  000046  002454                    MOV     #46,EXPTED        ;CREATE DATA FILE
030716  017737  151570  002452                    MOV     @RPCS1,RCVED      ;GET RESULTS
030724  012702  000046                            MOV     #46,R2            ;AND STRIP UNUSED DATA
030730  005102                                    COM     R2                ;FOR A POSSIBLE ERROR REPORT
030732  040237  002452                            BIC     R2,RCVED          ;DATA SHOULD MATCH NOW
030736  023737  002454  002452                    CMP     EXPTED,RCVED      ;DO THE COMPARISON
030744  001417                                    BEQ     4$                ;IF EQUAL, IT'S OK
030746  013737  002512  002456                    MOV     RPCS1,TESTRG      ;LOG FAILING REGISTER
030754  012737  012000  002404                    MOV     #BIT10!BIT12,ERRWD1 ;FORM MODULE CALL-OUT
030762  012737  000406  002406                    MOV     #BIT1!BIT2!BIT8, ERRWD2 ;BOTH WORDS
030770  104456                                    TRAP    C$ERHRD
030772  000076                                    .WORD   62
030774  012454                                    .WORD   EM14
030776  014172                                    .WORD   ERRO
031000  005037  002402                            CLR     ITCOUN            ;ITERATIONS = 0
031004                                    4$:
031004                                    10000$:
031004  104405                                    TRAP    C$ESEG
031006  005337  002402                            DEC     ITCOUN            ;ONE LESS ITERATION
031012  003307                                    BGT     1$                ;DO UNTIL <= 0
031014                                    L10051:
031014  104401                                    TRAP    C$ETST
```

```
                                        .SBTTL TEST 28  RPDT REGISTER TEST

                                        ;%      TEST 28 TEST DRIVE TYPE REGISTER
                                        ;%      :  SET RPCS2:  CLR = 1
                                        ;%      :  LOAD DRIVE-UNDER-TEST'S NUMBER INTO RPCS2
                                        ;%      :  READ RPDT
                                        ;%      :  IF RPDT DOESN'T = ONE OF THE FOLLOWING:  20042, 24042
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (RP07 NOT FOUND, RPDT = (RPDT CONTENTS))
                                        ;%      :  :  OUTPUT FAULT LIST:  RHXX, CABLES, J11/J13, J12, CTOD, RS, MASSBUS,
                                        ;%      :  :  J08, TERMINATOR.
                                        ;%      :  ENDIF
                                        ;%      END TEST 28

031016                                  T28::
031016  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
031024                                  1$:
031024  104404                                  TRAP    C$BSEG
031026  052777  000040  151466                  BIS     #CLR,@RPCS2     ;START OUT WITH AN INITIALIZED CONTROLLER
031034  053777  002506  151460                  BIS     DRVNO,@RPCS2    ;LOAD THE DRIVE #
031042  017737  151472  002452                  MOV     @RPDT,RCVED     ;GET RPDT AND STORE IT
031050  012737  020042  002454                  MOV     #20042,EXPTED   ;CREATE EXPECTED DATA
031056  032737  004000  002452                  BIT     #DRQ, RCVED     ;DUAL PORTED?
031064  001403                                  BEQ     2$              ;NO, IF NOT SET!
031066  052737  004000  002454                  BIS     #DRQ, EXPTED    ;SET DUAL-PORT
031074  023737  002452  002454          2$:     CMP     RCVED, EXPTED   ;DOES DATA MATCH?
031102  001417                                  BEQ     3$              ;YES, TEST OK!
031104  013737  002540  002456                  MOV     RPDT, TESTRG    ;AND LOAD FAILING REGISTER
031112  012737  016200  002404                  MOV #BIT7!BIT10!BIT11!BIT12, ERRWD1;CREATE MODULE CALLOUT LIST
031120  012737  000406  002406                  MOV #BIT1!BIT2!BIT8, ERRWD2;FOR BOTH MASK WORDS
031126  104456                                  TRAP    C$ERHRD
031130  000067                                  .WORD   55
031132  012454                                  .WORD   EM14
031134  014172                                  .WORD   ERRO
031136  005037  002402                          CLR     ITCOUN          ;RESET FURTHER ITERATIONS
031142                                  3$:
031142                                  10000$:
031142  104405                                  TRAP    C$ESEG
031144  005337  002402                          DEC     ITCOUN          ;ONE LESS ITERATION
031150  003325                                  BGT     1$              ;IF >0, DO AGAIN
031152                                  L10052:
031152  104401                                  TRAP    C$ETST
```

```
                                        .SBTTL TEST 29  RPDA READ WRITE TEST

                                        ;%      TEST 29 RPDA READ WRITE TEST
                                        ;%      :  WRITE RPDA WITH DATA PATTERNS 1-4, ONE AT A TIME
                                        ;%      :  IF RPDA DATA DOESN'T MATCH EXPECTED
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (RPDA BIT(S) UNDER TEST DON'T MATCH EXPECTED)
                                        ;%      :  :  OUTPUT FAULT LIST:  RHXX, CABLES, STUCK DATA BITS, J11/J13,
                                        ;%      :  :  CTOD STUCK AT 0, J12, J8, TERMINATOR
                                        ;%      :  ENDIF
                                        ;%      :  WRITE RPDA WITH DATA PATTERN #4
                                        ;%      :  IF RPDA DOESN'T = 0
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (RPDA BITS STUCK AT 1)
                                        ;%      :  :  OUTPUT FAULT LIST:  RHXX, CABLES, STUCK DATA BITS, J11/J13,
                                        ;%      :  :  J12, REMOTE POSSIBILITY OF J8, TERMINATOR
                                        ;%      :  ENDIF
                                        ;%      END TEST 29

031154                                  T29::
031154  012737  000012  002402                  MOV     #10.,ITCOUN      ;LOAD THE ITERATION COUNT
031162  012737  016200  002404                  MOV     #BIT7!BIT10!BIT11!BIT12,ERRWD1;CREATE THE MODULE CALLOUT
031170  012737  000406  002406                  MOV     #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MODULES
031176  004737  016662                  1$:     JSR     PC,SEIZE         ;LOAD THE DRIVE UNDER TEST
031202  004737  017744                          JSR     PC,SETUP         ;LOAD I/O POINTERS
031206  004256                                  TST28                    ;FROM THIS TABLE
031210  013737  002444  002436          64$:    MOV     SRCTMP,TEMP      ;SET UP FOR POSSIBLE LOOP
031216  104404                                  TRAP    C$BSEG
031220  004737  020034                          JSR     PC,FLOAT         ;FLOAT THE PATTERN
031224  000403                                  BR      65$              ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
031226  013737  002436  002444                  MOV     TEMP,SRCTMP      ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
031234                                  65$:
031234                                  10000$:
031234  104405                                  TRAP    C$ESEG
031236  005737  002446                          TST     MASK             ;IF MASK = 0, WE'RE DONE
031242  001362                                  BNE     64$
031244  004737  020330                          JSR     PC,CONSET        ;GET NEXT PATTERN
031250  005737  002434                          TST     PATCNT           ;IF PATTERN COUNT UNDERFLOWED, DONE!
031254  002355                                  BGE     64$              ;NOT DONE YET, GO-ON
031256  104404                                  TRAP    C$BSEG
031260  004737  020202                          JSR     PC,COMPAR        ;WRITE THE NEXT PATTERN
031264  002352                                  PATT4                    ;WHICH IS PATTERN #4
031266                                  10001$:
031266  104405                                  TRAP    C$ESEG
031270  104404                                  TRAP    C$BSEG
031272  104404                                  TRAP    C$BSEG
031274  004737  020202                          JSR     PC,COMPAR        ;DO ANOTHER DATA COMPARISON
031300  002350                                  PATT3                    ;USING PATTERN #3
031302                                  10003$:
031302  104405                                  TRAP    C$ESEG
031304  004737  017572                          JSR     PC,LDZERO        ;WRITE RPDA TO 0 TO CLEAR IT!
031310                                  10002$:
031310  104405                                  TRAP    C$ESEG
031312  005337  002402                          DEC     ITCOUN           ;ONE LESS ITERATON
031316  003327                                  BGT     1$               ;DO UNTIL <= 0!
031320                                  L10053:
031320  104401                                  TRAP    C$ETST
```

```
                                .SBTTL TEST 30  PARITY BIT TRANSITION TEST

                                ;%      TEST 30 PARITY BIT TRANSITION TEST
                                ;%      :  WRITE RPDA USING DATA PATTERN 4
                                ;%      :  IF ((TRE) OR (MCPE)) = 1
                                ;%      :  :  THEN
                                ;%      :  :  OUTPUT ERROR MESSAGE (DETECTED FALSE PARITY ERROR)
                                ;%      :  :  OUTPUT FAULT LIST:   RHXX, CABLES, J11/J13, J12, J08, TERMINATOR
                                ;%      :  ENDIF
                                ;%      :  WRITE RPDA USING DATA PATTERN #1, ONCE.
                                ;%      :  IF ((TRE) OR (MCPE)) = 1
                                ;%      :  :  THEN
                                ;%      :  :  OUTPUT ERROR MESSAGE (DETECTED FALSE PARITY ERROR)
                                ;%      :  :  OUTPUT FAULT LIST:   RHXX, CABLES, J11/J13, J12, J08, TERMINATOR
                                ;%      :  ENDIF
                                ;%      END TEST 30

031322                          T30::
031322  012737  000012  002402          MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
031330                          1$:
031330  104404                          TRAP    C$BSEG
031332  012703  002352                  MOV     #PATT4,R3       ;GET THE ZEROS PATTERN
031336  012702  000002                  MOV     #2,R2           ;DO THE OPERATION TWICE
031342  004737  016662                  JSR     PC,SEIZE        ;FLUSH ERRORS AND GET THE DRIVE
031346  014377  151146          2$:     MOV     -(R3), @RPDA    ;LOAD THE PATTERN
031352  004737  017000                  JSR     PC,WAIT         ;WAIT FOR ANY ERRORS TO SET
031356  032777  060000  151126          BIT     #TRE!MCPE,@RPCS1;ERRORS?
031364  001420                          BEQ     3$              ;NOT IF =0, TEST OK!
031366  004737  017422                  JSR     PC,BICEXP       ;FORM DATA REPORT
031372  002512                          RPCS1                   ;FORM DATA REPORT
031374  060000                          TRE!MCPE                ;THESE BITS FAILED TO BE CLEAR
031376  012737  016200  002404          MOV     #BIT7!BIT10!BIT11!BIT12,ERRWD1;FORM MODULE CALLOUT MASK
031404  012737  000406  002406          MOV     #BIT1!BIT2!BIT8,ERRWD2;BOTH WORDS
031412  104456                          TRAP    C$ERHRD
031414  000070                          .WORD   56
031416  013051                          .WORD   EM23
031420  014172                          .WORD   ERR0
031422  005037  002402                  CLR     ITCOUN          ;RESET THE ITERATON COUNT
031426  005743                  3$:     TST     -(R3)           ;MOVE POINTER BACK
031430  005302                          DEC     R2              ;DO SECOND TIME
031432  003345                          BGT     2$              ;IF R2=0, DONE
031434                          10000$:
031434  104405                          TRAP    C$ESEG
031436  005337  002402                  DEC      ITCOUN         ;ONE LESS ITERATION
031442  003332                          BGT     1$              ;IF <= 0, DONE!!
031444                          L10054:
031444  104401                          TRAP    C$ETST
```

```
                                        .SBTTL TEST 31  FLOATING DATA PARITY TEST

                                        ;%      TEST 31 FLOATING ONES AND ZEROS PARITY TEST
                                        ;%      :  WRITE RPDA USING DATA PATTERNS 1 TO 9, ONE AT A TIME
                                        ;%      :  IF RPER1:  PAR = 1 AFTER ANY WRITE OR ANY READ TO RPDA
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (DETECTED FALSE PARITY ERROR)
                                        ;%      :  :  OUTPUT FAULT LIST:  RHXX (PARITY NETWORK), DRIVE (PARITY NETWORK), J12, J08.
                                        ;%      :  ENDIF
                                        ;%      END TEST 31

031446                                  T31::
031446  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
031454                                  1$:
031454  104404                                  TRAP    C$BSEG
031456  012702  000011                          MOV     #9.,R2          ;DO FOR 9 PATTERNS
031462  012703  002344                          MOV     #PATT1,R3       ;GET FIRST PATTERN
031466  004737  016662                          JSR     PC,SEIZE        ;FLUSH ERRORS AND GET THE DRIVE
031472  012377  151022                  2$:     MOV     (R3)+,@RPDA     ;WRITE PATTERN TO RPDA
031476  032777  000010  151022                  BIT     #PAR,@RPER1     ;PARITY ERROR?
031504  001006                                  BNE     3$              ;IF =1, YES - IT'S NOT OK
031506  005777  151006                          TST     @RPDA           ;READ THE REGISTER JUST WRITTEN
031512  032777  000010  151006                  BIT     #PAR,@RPER1     ;DID READ CAUSE ERRORS?
031520  001420                                  BEQ     4$              ;IF PAR = 0, NO!
031522  004737  017422                  3$:     JSR     PC,BICEXP       ;FORM DATA REPORT
031526  002526                                  RPER1                   ;FAILING REGISTER
031530  000010                                  PAR                     ;THIS BIT FAILED TO CLEAR
031532  012737  004200  002404                  MOV     #BIT7!BIT11,ERRWD1;FORM MODULE CALL OUT MASK
031540  012737  000002  002406                  MOV     #BIT1,ERRWD2    ;BOTH WORDS
031546  104456                                  TRAP    C$ERHRD
031550  000071                                  .WORD   57
031552  013051                                  .WORD   EM23
031554  014172                                  .WORD   ERRO
031556  005037  002402                          CLR     ITCOUN          ;RESET FURTHER ITERATIONS
031562  005302                          4$:     DEC     R2              ;REDUCE ITERATIONS
031564  003342                                  BGT     2$              ;>0, DO AGAIN...
031566                                  10000$:
031566  104405                                  TRAP    C$ESEG
031570  005337  002402                          DEC     ITCOUN          ;ONE LESS ITERATION
031574  003327                                  BGT     1$              ;IF <= 0, DONE
031576                                  L10055:
031576  104401                                  TRAP    C$ETST
```

```
                                    .SBTTL  TEST 32 REGISTER SELECT TEST #1

                                    ;%      TEST 32 REGISTER SELECT TEST 1
                                    ;%      :  USE DATA PATTERN #7
                                    ;%      :  WRiTE REGISTERS:  RPCS1, RPDA, RPDC, RPOF, ONE AT A TIME.
                                    ;%      :  READ EACH REGISTER AFTER WRITING IT
                                    ;%      :  IF REGISTER UNDER TEST DOESN'T MATCH TEST DATA
                                    ;%      :  :  THEN
                                    ;%      :  :  OUTPUT ERROR MESSAGE (BIT(S) FAILED TO SET)
                                    ;%      :  :  OUTPUT FAULT LIST:  RHXX, CABLES, J11/J13, J12, J08, TERMINATOR
                                    ;%      :  ENDIF
                                    ;%      END TEST 32

031600                              T32::
031600  013737  002360  002450              MOV     PATT7,MSK               ;CREAT BIT MASK
031606  005137  002450                      COM     MSK                     ;UNUSED BITS = 1
031612  012737  016200  002404              MOV     #BIT7!BIT10!BIT11!BIT12,ERRWD1;CREATE THE MODULE CALLOUT
031620  012737  000406  002406              MOV     #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
031626  004737  016662                      JSR     PC,SEIZE                ;FLUSH ERRORS AND GET THE DRIVE
031632  012737  000012  002402              MOV     #10.,ITCOUN             ;LOAD THE ITERATION COUNT
031640                              1$:
031640  104404                              TRAP    C$BSEG
031642  013701  002512                      MOV     RPCS1,R1                ;GET THE FIRST ADDRESS
031646  010137  002440              2$:     MOV     R1,SNK                  ;LOAD TEST REGISTER POINTER
031652  004737  020202                      JSR     PC,COMPAR               ;DO THE COMPARISON
031656  002360                              PATT7                           ;USING THIS DATA
031660  020137  002520                      CMP     R1,RPDA                 ;SEE CURRENT REGISTER
031664  103003                              BHIS    3$                      ;WE ALREADY DID RPCS1 & RPDA!
031666  062701  000006                      ADD     #6,R1                   ;DO RPDA NEXT
031672  000765                              BR      2$                      ;GO!
031674  020137  002544              3$:     CMP     R1,RPOF                 ;DID WE DO RPOF?
031700  103003                              BHIS    4$                      ;YES, SKIP NEXT
031702  062701  000024                      ADD     #24,R1                  ;DO # RPOF NOW
031706  000757                              BR      2$                      ;GO!
031710  020137  002546              4$:     CMP     R1,RPDC                 ;DONE?
031714  001403                              BEQ     5$                      ;IF EQUAL, YES
031716  062701  000002                      ADD     #2, R1                  ;DO RPDC NOW!
031722  000751                              BR      2$                      ;GO
031724                              5$:
031724                              10000$:
031724  104405                              TRAP    C$ESEG
031726  005337  002402                      DEC     ITCOUN                  ;ONE LESS ITERATION
031732  003342                              BGT     1$                      ;IF <= 0, DONE!!
031734                              L10056:
031734  104401                              TRAP    C$ETST
```

```
                                            .SBTTL  TEST 33 REGISTER SELECT TEST #2

                                            ;%      TEST 33 REGISTER SELECT TEST 2
                                            ;%      :  USE DATA PATTERN #7
                                            ;%      :  WRITE REGISTERS:  RPCS1, RPDA, RPDC, RPOF, ONE AT A TIME.
                                            ;%      :  WRITE ALL OTHER REGISTERS WITH 0'S
                                            ;%      :  IF WRITING ALL OTHER REGISTERS WITH 0'S CHANGED THE REGISTER UNDER TEST
                                            ;%      :  :  THEN
                                            ;%      :  :  OUTPUT ERROR MESSAGE (REGISTER SELECT LINES CROSSED)
                                            ;%      :  :  OUTPUT FAULT LIST:  RH11, CABLE, J11/J13, J12, J08,TERMINATOR
                                            ;%      :  ENDIF
                                            ;%      END TEST 33

   031736                                   T33::
   031736  012737  016200  002404                   MOV     #BIT7!BIT'0!BIT11!BIT12,ERRWD1;CREATE THE MODULE CALLOUT
   031744  012737  000406  002406                   MOV     #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
   031752  013702  002360                           MOV     PATT7,R2           ;GET THE TEST PATTERN
   031756  004737  016662                           JSR     PC,SEIZE           ;GET THE DRIVE, FIRST FLUSH ERRORS!
   031762  012737  000012  002402                   MOV     #10.,ITCOUN        ;LOAD THE ITERATION COUNT
   031770                                   1$:
   031770  104404                                   TRAP    C$BSEG
   031772  012701  004272                           MOV     #TST33,R1          ;GET FILE OF REGISTERS
   031776  013137  002440                   2$:     MOV     @(R1)+,SNK         ;GET THE TEST REGISTER
   032002  010277  150432                           MOV     R2,@SNK            ;WRITE THE TEST PATTERN TO THE REGISTER
   032006  023737  002440  002546                   CMP     SNK,RPDC           ;DONE WRITING REGISTERS YET?
   032014  103770                                   BLO     2$                 ;NOT DONE YET, DO MORE
   032016  012703  000024                           MOV     #20.,R3            ;GET THE ITERATION COUNT
   032022  012701  004272                           MOV     #TST33,R1          ;GET FILE OF REGISTERS AGAIN
   032026  013704  002512                           MOV     RPCS1,R4           ;GET START OF REGISTER FILE
   032032  020471  000000                   3$:     CMP     R4,@(R1)           ;SHOULD WE CLEAR THIS REGISTER?
   032036  001411                                   BEQ     5$                 ;IF THEY MATCH, NO
   032040  005024                                   CLR     (R4)+              ;WRITE THIS REGISTER TO A 0
   032042  020437  002524                           CMP     R4,RPDS            ;DID WE JUST WRITE RPCS2?
   032046  001002                                   BNE     4$                 ;IF <> , NO..
   032050  004737  016662                           JSR     PC,SEIZE           ;GET THE DRIVE AGAIN!
   032054  005303                           4$:     DEC     R3                 ;REDUCE THE ITERATION COUNT
   032056  003365                                   BGT     3$                 ;DO UNTIL EQUAL TO 0
   032060  000402                                   BR      6$                 ;TAKE THIS BRANCH WHEN DONE..
   032062  022421                           5$:     CMP     (R4)+,(R1)+        ;POP THE POINTERS
   032064  000773                                   BR      4$                 ;GO ON
   032066  012701  004272                   6$:     MOV     #TST33,R1          ;GET FILE REGISTERS AGAIN
   032072  010237  002450                           MOV     R2,MSK             ;GET THE TESTING PATTERN
   032076  005137  002450                           COM     MSK                ;DON'T CARE BITS EQUAL 1
   032102  013137  002440                   7$:     MOV     @(R1)+,SNK         ;GET THE RESULTS
   032106  004737  020202                           JSR     PC,COMPAR          ;CHECK THE DATA FOR CORRECTNESS
   032112  002360                                   PATT7                      ;USING THIS DATA PATTERN
   032114  023737  002440  002546           8$:     CMP     SNK,RPDC           ;DONE YET??
   032122  103767                                   BLO     7$                 ;NOT YET, IF LOWER
   032124                                   10000$:
   032124  104405                                   TRAP    C$ESEG
   032126  005337  002402                           DEC     ITCOUN             ;ONE LESS ITERATION
   032132  003316                                   BGT     1$                 ;IF <= 0, DONE!!
   032134                                   L10057:
   032134  104401                                   TRAP    C$ETST
```

```
                                         .SBTTL  TEST 34 RPMR1 DATA TEST

                                         ;%      TEST 34 RPMR1 DATA TEST
                                         ;%      :  USE DATA PATTERNS 1 TO 9, ONE AT A TIME
                                         ;%      :  BITS TO TEST = 0 TO 15
                                         ;%      :  IF RPMR1 DOESN'T MATCH TEST DATA
                                         ;%      :  :  THEN
                                         ;%      :  :  OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST FAILED TO SET)
                                         ;%      :  :  OUTPUT FAULT LIST:  J08
                                         ;%      :  :  ELSE
                                         ;%      :  :  WRITE RPMR1 = 0
                                         ;%      :  :  IF RPMR1 <> 0
                                         ;%      :  :  :  THEN
                                         ;%      :  :  :  OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST FAILED TO CLEAR)
                                         ;%      :  :  :  OUTPUT FAULT LIST:  J08
                                         ;%      :  :  ENDIF
                                         ;%      :  ENDIF
                                         ;%      END TEST 34

032136                                   T34::
032136  012737  000200  002404                   MOV     #BIT7,ERRWD1      ;CREATE THE MODULE CALLOUT
032144  005037  002406                           CLR     ERRWD2            ;FOR BOTH MASKS
032150  004737  016662                           JSR     PC,SEIZE          ;FLUSH ERRORS AND GET THE DRIVE
032154  012737  000012  002402                   MOV     #10.,ITCOUN       ;LOAD THE ITERATION COUNT
032162                                   1$:
032162  004737  017744                           JSR     PC,SETUP          ;LOAD I/O POINTERS
032166  004302                                   TST34                     ;FROM THIS TABLE
032170  013737  002444  002436           64$:    MOV     SRCTMP,TEMP       ;SET UP FOR POSSIBLE LOOP
032176  104404                                   TRAP    C$BSEG
032200  004737  020034                           JSR     PC,FLOAT          ;FLOAT THE PATTERN
032204  000403                                   BR      65$               ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
032206  013737  002436  002444                   MOV     TEMP,SRCTMP       ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
032214                                   65$:
032214                                   10000$:
032214  104405                                   TRAP    C$ESEG
032216  005737  002446                           TST     MASK              ;IF MASK = 0, WE'RE DONE
032222  001362                                   BNE     64$
032224  004737  020330                           JSR     PC,CONSET         ;GET NEXT PATTERN
032230  005737  002434                           TST     PATCNT            ;IF PATTERN COUNT UNDERFLOWED, DONE!
032234  002355                                   BGE     64$               ;NOT DONE YET, GO-ON
032236  104404                                   TRAP    C$BSEG
032240  004737  020202                           JSR     PC,COMPAR         ;WRITE THE NEXT PATTERN
032244  002352                                   PATT4                     ;WHICH IS PATTERN #4
032246                                   10001$:
032246  104405                                   TRAP    C$ESEG
032250  104404                                   TRAP    C$BSEG
032252  104404                                   TRAP    C$BSEG
032254  004737  020202                           JSR     PC,COMPAR         ;DO ANOTHER DATA COMPARISON
032260  002350                                   PATT3                     ;USING PATTERN #3
032262                                   10003$:
032262  104405                                   TRAP    C$ESEG
032264  004737  017572                           JSR     PC,LDZERO         ;WRITE RPMR1 TO 0 TO CLEAR IT!
032270                                   10002$:
032270  104405                                   TRAP    C$ESEG
032272  005337  002402                           DEC     ITCOUN            ;ONE LESS ITERATION
032276  003331                                   BGT     1$                ;IF <= 0, DONE
032300                                   L10060:
      032300  104401                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 35 MASSBUS INTIALIZE DRIVE CLEAR TEST

                                        ;%      TEST 35 MASSBUS INITIALIZE/DRIVE CLEAR RPMR1:  DMD BIT TEST
                                        ;%      :  SET RPMR1:  DMD = 1
                                        ;%      :  SET RPCS2:  CLR = 1
                                        ;%      :  IF RPMR1:  DMD = 0
                                        ;%      :  :  THEN
                                        ;%      :  :  MARK THE EVENT
                                        ;%      :  ENDIF
                                        ;%      :  SET RPMR1:  DMD = 1 AGAIN
                                        ;%      :  ISSUE DRIVE CLEAR COMMAND
                                        ;%      :  IF RPMR1:  DMD = 0
                                        ;%      :  :  THEN
                                        ;%      :  :  MARK THIS EVENT
                                        ;%      :  ENDIF
                                        ;%      :  IF RPMR1:  DMD DIDN'T CLEAR WITH EITHER EVENT
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (RPMR1:  DMD NOT CLEARED BY RPCS2:  CLR OR DRIVE CLEAR)
                                        ;%      :  :  OUTPUT FAULT LIST:  J12, J08.
                                        ;%      :  ENDIF
                                        ;%      :  IF RPMR1:  DMD IS CLEARED BY DRIVE CLEAR COMMAND, BUT NOT RPCS2:  CLR
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (RPMR1:   CLEARED BY DRIVE CLEAR BUT NOT RPCS2:  CLR)
                                        ;%      :  :  OUTPUT FAULT LIST:  J12, CABLE, RHXX.
                                        ;%      :  ENDIF
                                        ;%      :  IF RPMR1:  DMD CLEARED BY RPCS2:  CLR BUT NOT DRIVE CLEAR COMMAND
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (RPMR1:  CLEARED BY RPCS2:  CLR BUT NOT DRIVE CLEAR COMMA
                                        ;%      :  :  OUTPUT FAULT LIST:  J11, J12.
                                        ;%      :  ENDIF
                                        ;%      END TEST 35

   032302                               T35::
   032302  005037  002466                       CLR     ERSTAT          ;ERROR STATUS=0 FOR START-UP
   032306  012737  000012  002402               MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
   032314                               1$:
   032314  104404                               TRAP    C$BSEG
   032316  013777  002506  150176               MOV     DRVNO,@RPCS2    ;LOAD THE DRIVE-UNDER-TEST
   032324  052777  100000  150204               BIS     #DMD,@RPMR1     ;SET RPMR1-DMD=1
   032332  052777  000040  150162               BIS     #CLR,@RPCS2     ;TRY TO CLEAR IT USING A CONTROLLER CLR
   032340  013777  002506  150154               MOV     DRVNO,@RPCS2    ;RELOAD THE DRIVE NUMBER
   032346  032777  100000  150162               BIT     #DMD,@RPMR1     ;DID IT CLEAR?
   032354  001403                               BEQ     2$              ;YES, SKIP NEXT
   032356  152737  000377  002466               BISB    #377,ERSTAT     ;MARK THIS FAILED STATE
   032364  013777  002506  150130       2$:     MOV     DRVNO,@RPCS2    ;LOAD THE DRIVE #
   032372  052777  100000  150136               BIS     #DMD,@RPMR1     ;SET RPMR1-DMD=1
   032400  012777  000011  150104               MOV     #DRCLR,@RPCS1   ;ISSURE A DRIVE CLEAR COMMAND
   032406  032777  100000  150122               BIT     #DMD,@RPMR1     ;DID DMD CLEAR?
   032414  001403                               BEQ     3$              ;IF 0, YES
   032416  152737  000377  002467               BISB    #377,ERSTAT+1   ;MARK THE FAILED STATE
   032424  005737  002466               3$:     TST     ERSTAT          ;TEST PASS?
   032430  001445                               BEQ     7$              ;IF 0 YES
   032432  012737  004000  002404               MOV     #BIT11,ERRWD1   ;LOAD PART OF THE MODULE CALL OUT
   032440  022737  000377  002466               CMP     #377,ERSTAT     ;NOW DETERMINE WHAT FAILED
   032446  001415                               BEQ     5$              ;DRIVE CLEAR COMMAND WORKED, RH CLR FAILED
   032450  005037  002406                       CLR     ERRWD2          ;FORM FURTHER MODULE CALL-OUT
   032454  105737  002466                       TSTB    ERSTAT          ;FURTHER CHECK RESULTS
   032460  001404                           BEQ     4$                 ;RHCLR WORKED, DRIVE CLEAR FAILED
   032462  052737  000200  002404           BIS     #BIT7,ERRWD1       ;NOTHING WORKED, DRIVE CLEAR OR RHCLR
   032470  000407                           BR      6$                 ;REPORT THE ERROR
   032472  052737  012000  002404  4$:      BIS     #BIT10!BIT12,ERRWD1 ;CREATE MODULE CALL-OUT
   032500  000403                           BR      6$                 ;REPORT IT
   032502  012737  000006  002406  5$:      MOV     #BIT1!BIT2,ERRWD2 ;CREATE MODULE CALL-OUT
   032510  013737  002536  002456  6$:      MOV     RPMR1,TESTRG       ;FORM REPORT DATA
   032516  005037  002454                   CLR     EXPTED             ;EXPECTED DATA
   032522  012737  100000  002452           MOV     #DMD,RCVED         ;RECEIVED DATA
   032530  104456                           TRAP    C$ERHRD
   032532  000075                           .WORD   61
   032534  013051                           .WORD   EM23
   032536  014172                           .WORD   ERRO
   032540  005037  002402                   CLR     ITCOUN             ;NO ITERATIONS
   032544                          7$:
   032544                          10000$:
   032544  104405                           TRAP    C$ESEG
   032546  005037  002466                   CLR     ERSTAT             ;ERSTAT=0
   032552  005337  002402                   DEC     ITCOUN             ;ONE LESS ITERATION
   032556  003256                           BGT     1$                 ;IF <= 0, DONE!
   032560                          L10061:
   032560  104401                           TRAP    C$ETST
```

```
                                                .SBTTL  TEST 36 PARITY INITIALIZE TEST

                                                ;%      TEST 36 PARITY INITIALIZE TEST
                                                ;%      :  SET RPCS2:  CLR = 1
                                                ;%      :  IF (RPER1:  PAR) = 1
                                                ;%      :  :  THEN
                                                ;%      :  :  OUTPUT ERROR MESSAGE (DETECTED FALSE PARITY ERROR)
                                                ;%      :  :  OUTPUT FAULT LIST:  J12, J09, J10.  (CURRENT STATE OF 2901 = ?? )
                                                ;%      :  ENDIF
                                                ;%      :  IF (RPER1:  ILF) = 1
                                                ;%      :  :  THEN
                                                ;%      :  :  OUTPUT ERROR MESSAGE (DETECTED FALSE ILLEGAL FUNCTION ERROR)
                                                ;%      :  :  OUTPUT FAULT LIST:  J12, J09, J10, (2901 ??)
                                                ;%      :  ENDIF
                                                ;%      END TEST 36

032562                                          T36::
032562  012737  000012  002402                          MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
032570                                          1$:
032570  104404                                          TRAP    C$BSEG
032572  004737  016662                                  JSR     PC,SEIZE        ;GET CONTROL OF THE DRIVE
032576  013737  002526  002456                          MOV     RPER1,TESTRG    ;FORM REPORT DATA
032604  005037  002454                                  CLR     EXPTED          ;EXPTECTED=0
032610  005037  002452                                  CLR     RCVED           ;RECEIVED=?
032614  032777  000010  147704                          BIT     #PAR,@RPER1     ;IS PARITY ERROR=1?
032622  001403                                          BEQ     2$              ;IF 0, NO
032624  052737  000010  002452                          BIS     #PAR,RCVED      ;MARK THE ERROR
032632  032777  000001  147712                  2$:     BIT     #ILF,@RPER2     ;IS ILLEGAL FUNCTION SET?
032640  001403                                          BEQ     3$              ;IF 0, NO
032642  052737  000001  002452                          BIS     #ILF,RCVED      ;MARK IT!
032650  005737  002452                          3$:     TST     RCVED           ;ERRORS??
032654  001414                                          BEQ     4$              ;IF 0, TEST PASSES
032656  012737  012000  002404                          MOV     #BIT10!BIT12,ERRWD1 ;FORM MODULE CALLOUT LIST
032664  012737  000006  002406                          MOV     #BIT1!BIT2,ERRWD2 ;BOTH WORDS
032672  104456                                          TRAP    C$ERHRD
032674  000077                                          .WORD   63
032676  013051                                          .WORD   EM23
032700  014172                                          .WORD   ERRO
032702  005037  002402                                  CLR     ITCOUN          ;NO ITERATIONS
032706                                          4$:
032706                                          10000$:
032706  104405                                          TRAP    C$ESEG
032710  005337  002402                                  DEC     ITCOUN          ;ONE LESS ITERATION
032714  003325                                          BGT     1$              ;IF <= 0, DONE
032716                                          L10062:
032716  104401                                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 37 PARITY ERROR DETECTION TEST

                                        ;%      TEST 37 PARITY ERROR DETECTION TEST
                                        ;%      :  SET RPCS2:  PAT = 1
                                        ;%      :  ISSUE A KNOWN ILLEGAL FUNCTION
                                        ;%      :  IF (RPER1:  ILF = 1 AND RPER1:  PAR = 0)
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (PARITY ERROR NOT DETECTED)
                                        ;%      :  :  OUTPUT FAULT LIST:  J12.
                                        ;%      :  ENDIF
                                        ;%      :  IF ((RPER1:  ILF AND RPER1:  PAR) = 1 OR = 0)
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (UNKNOWN FUNCTIONAL SEQUENCE)
                                        ;%      :  :  OUTPUT FAULT LIST:  J09, J10, J12, (2901 GONE ??)
                                        ;%      :  ENDIF
                                        ;%      END TEST 37

032720                                  T37::
032720  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
032726                                  1$:
032726  104404                                  TRAP    C$BSEG
032730  004737  016662                          JSR     PC,SEIZE        ;GET THE DRIVE UNDER TEST
032734  052777  000020  147560                  BIS     #PAT,@RPCS2     ;INVERT PARITY, FORCE ERRORS!!
032742  012777  000046  147542                  MOV     #46,@RPCS1      ;LOAD AN ILLEGAL FUNCTION CODE (WITHOUT SETTING GO)
032750  012737  000010  002452                  MOV     #PAR,RCVED      ;FORM EXPECTED DATA
032756  013737  002452  002454                  MOV     RCVED,EXPTED    ;IN CASE OF AN ERROR
032764  005037  002466                          CLR     ERSTAT          ;RESET STATUS MARK
032770  004737  017000                          JSR     PC,WAIT         ;STALL FOR SOME SETTLE TIME
032774  032777  000001  147524                  BIT     #ILF,@RPER1     ;DID ILLEGAL FUNCTION SET?
033002  001406                                  BEQ     2$              ;IF NOT, GO ON
033004  052737  000001  002452                  BIS     #ILF,RCVED      ;LOG THIS ERROR IN THE RECEIVED BUFFER
033012  112737  000377  002466                  MOVB    #377,ERSTAT     ;MARK THIS FAILURE
033020  032777  000010  147500          2$:     BIT     #PAR,@RPER1     ;DID PARITY ERROR SET?
033026  001006                                  BNE     3$              ;IF SO, GO ON
033030  042737  000010  002452                  BIC     #PAR,RCVED      ;LOG FAILING RESULT
033036  112737  000377  002466                  MOVB    #377,ERSTAT     ;MARK THIS FAILURE
033044  005737  002466                  3$:     TST     ERSTAT          ;ERRORS?
033050  001425                                  BEQ     5$              ;IF 0, NO
033052  013737  002526  002456                  MOV     RPER1,TESTRG    ;GET FAILING REGISTER
033060  012737  004000  002404                  MOV     #BIT11,ERRWD1   ;AND FORM MODULE CALL-OUT
033066  005037  002406                          CLR     ERRWD2          ;BOTH WORDS
033072  023727  002466  000377                  CMP     ERSTAT,#377     ;ILLEGAL FUNCTION ONLY SET?
033100  001403                                  BEQ     4$              ;IF MATCH, THAT WAS ONLY ERROR
033102  052737  001400  002404                  BIS     #BIT8!BIT9,ERRWD1 ;FORM REST OF CALL OUT
033110                                  4$:
033110  104456                                  TRAP    C$ERHRD
033112  000100                                  .WORD   64
033114  012454                                  .WORD   EM14
033116  014172                                  .WORD   ERR0
033120  005037  002402                          CLR     ITCOUN          ;NO ITERATIONS NECESSARY
033124                                  5$:
033124                                  10000$:
033124  104405                                  TRAP    C$ESEG
033126  005037  002466                          CLR     ERSTAT          ;ERSTAT=0
033132  005337  002402                          DEC     ITCOUN          ;ONE LESS ITERATION
033136  003273                                  BGT     1$              ;IF <= 0, WE'RE DONE!!
033140                                  L10063:
        033140  104401                          TRAP    C$ETST
```

```
                                          .SBTTL  TEST 38 CORRECT PARITY TEST

                                          ;%      TEST 38 CORRECT PARITY TEST
                                          ;%      :  LOAD DATA PATTERNS 1 TO 4 INTO RPDA, ONE AT A TIME
                                          ;%      :  READ RPDA AFTER EACH WRITE FUNCTION
                                          ;%      :  IF ((RPCS1:  MCPE) OR (RPCS1:  TRE) OR (RPER1:  PAR)) = 1
                                          ;%      :  :  THEN
                                          ;%      :  :  OUTPUT ERROR MESSAGE (PARITY LOGIC MALFUNCTION)
                                          ;%      :  :  OUTPUT FAULT LIST:  J11, J12, J13, RHXX, CABLE, TERMINATOR
                                          ;%      :  ENDIF
                                          ;%      END TEST 38

033142                                    T38::
033142  012737  000012  002402                    MOV     #10.,ITCOUN        ;LOAD THE ITERATION COUNT
033150                                    1$:
033150  104404                                    TRAP    C$BSEG
033152  004737  016662                            JSR     PC,SEIZE           ;GET THE DRIVE UNDER TEST
033156  012702  002344                            MOV     #PATT1,R2          ;GET THE PATTERN ADDRESS
033162  012701  000004                            MOV     #4,R1              ;AND THE OVERALL ITERATION COUNT
033166  012277  147326                    2$:     MOV     (R2)+,@RPDA        ;WRITE THE DATA
033172  005777  147322                            TST     @RPDA              ;READ THE REGISTER
033176  032777  060000  147306                    BIT     #MCPE!TRE,@RPCS1   ;ERROR?
033204  001011                                    BNE     3$                 ;IF <>0, YES!
033206  004737  017000                            JSR     PC,WAIT            ;STALL FOR SOME SETTLE TIME
033212  032777  000010  147306                    BIT     #PAR,@RPER1        ;PARITY ERROR?
033220  001010                                    BNE     4$                 ;IF <>0, YES
033222  005301                                    DEC     R1                 ;ONE LESS ITERATION
033224  003360                                    BGT     2$                 ;IF >0, NOT FINISHED
033226  000431                                    BR      6$                 ;GET OUT NOW!
033230  004737  017422                    3$:     JSR     PC,BICEXP          ;FORM UP THE FAILING DATA
033234  002512                                    RPCS1                      ;THIS REGISTER
033236  060000                                    MCPE!TRE                   ;THESE BITS FAILED TO CLEAR
033240  000410                                    BR      5$                 ;REPORT THE ERROR
033242  013737  002526  002456            4$:     MOV     RPER1,TESTRG       ;GET ADDRESS OF FAILING DATA
033250  017737  147252  002452                    MOV     @RPER1,RCVED       ;GOT FAILED RESULTS
033256  005037  002454                            CLR     EXPTED             ;FORM EXPECTED DATA
033262  012737  016000  002404            5$:     MOV     #BIT10!BIT11!BIT12,ERRWD1 ;FORM MODULE CALL-OUT
033270  012737  000406  002406                    MOV     #BIT1!BIT2!BIT8,ERRWD2    ;BOTH WORDS
033276  104456                                    TRAP    C$ERHRD
033300  000101                                    .WORD   65
033302  013051                                    .WORD   EM23
033304  014172                                    .WORD   ERRO
033306  005037  002402                            CLR     ITCOUN             ;NO FURTHER ITERATIONS
033312                                    6$:
033312                                    10000$:
033312  104405                                    TRAP    C$ESEG
033314  005337  002402                            DEC     ITCOUN             ;ONE LESS ITERATION
033320  003313                                    BGT     1$                 ;IF <= 0, DONE!!
033322                                    L10064:
033322  104401                                    TRAP    C$ETST
```

```
                                          .SBTTL  TEST 39 CLEAR COMPOSITE ERROR TEST

                                          ;%      TEST 39 CLEAR COMPOSITE ERROR TEST
                                          ;%      :  SET RPCS2:  CLR = 1
                                          ;%      :  IF RPDS:  ERR = 1
                                          ;%      :  :  THEN
                                          ;%      :  :  IF ((RPER1 = 0) AND (RPER2 = 0) AND (RPER3 = 0))
                                          ;%      :  :  :  THEN
                                          ;%      :  :  :  OUTPUT ERROR MESSAGE (DETECTED A PERMANENT ERROR)
                                          ;%      :  :  :  ELSE
                                          ;%      :  :  :  OUTPUT ERROR MESSAGE (DETECTED COMPOSITE ERROR)
                                          ;%      :  :  ENDIF
                                          ;%      :  :  OUTPUT FAULT LIST:  J12
                                          ;%      :  ENDIF
                                          ;%      END TEST 39

033324                                    T39::
033324  012737  000012  002402                    MOV     #10.,ITCOUN       ;LOAD THE ITERATION COUNT
033332                                    1$:
033332  104404                                    TRAP    C$BSEG
033334  004737  016662                            JSR     PC,SEIZE          ;GET THE DRIVE UNDER TEST
033340  032777  040000  147156                    BIT     #ERR,@RPDS        ;DID WE RECEIVE A COMPOSITE ERROR?
033346  001435                                    BEQ     4$                ;IF 0, TEST OK
033350  004737  017422                            JSR     PC,BICEXP         ;FORM UP ERROR REPORT
033354  002524                                    RPDS                      ;THIS REGISTER
033356  040000                                    ERR                       ;THIS BIT FAILED TO CLEAR
033360  005037  002406                            CLR     ERRWD2            ;CREATE MODULE CALL OUT
033364  012737  004000  002404                    MOV     #BIT11,ERRWD1     ;BOTH WORDS
033372  005777  147130                            TST     @RPER1            ;DID WE HAVE A DETECTABLE HARDWARE BUG?
033376  001013                                    BNE     2$                ;IF NOT 0, YES
033400  005777  147146                            TST     @RPER2            ;DID WE HAVE A DETECTABLE HARDWARE BUG??
033404  001010                                    BNE     2$                ;IF NOT 0, YES
033406  005777  147142                            TST     @RPER3            ;DID WE HAVE A DETECTABLE HARDWARE BUG?
033412  001005                                    BNE     2$                ;IF NOT 0, YES
033414  104456                                    TRAP    C$ERHRD
033416  000102                                    .WORD   66
033420  014075                                    .WORD   EM42
033422  014172                                    .WORD   ERRO
033424  000404                                    BR      3$                ;SKIP NEXT MESSAGE
033426                                    2$:
033426  104456                                    TRAP    C$ERHRD
033430  000103                                    .WORD   67
033432  011747                                    .WORD   EM1
033434  014172                                    .WORD   ERRO
033436  005037  002402                    3$:     CLR     ITCOUN            ;NO FURTHER ITERATIONS NECESSARY
033442                                    4$:
033442                                    10000$:
033442  104405                                    TRAP    C$ESEG
033444  005337  002402                            DEC     ITCOUN            ;ONE LESS ITERATION TO-GO
033450  003330                                    BGT     1$                ;IF >0, DO AGAIN
033452                                    L10065:
033452  104401                                    TRAP    C$ETST
```

```
                                        .SBTTL  TEST 40 COMPOSITE ERROR SET - RESET TEST

                                        ;%      TEST 40 FORCE A COMPOSITE ERROR, THEN CLEAR IT
                                        ;%      :  SET RPCS2:  PAT = 1
                                        ;%      :  WRITE DATA PATTERN #1 TO RPDA
                                        ;%      :  READ RPDA AFTER PERFORMING THE WRITE OPERATION
                                        ;%      :  IF ((RPDS:  ERR) OR (RPER1:  PAR)) = 0
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (COMPOSITE ERROR DIDN'T SET WHEN EXPECTED)
                                        ;%      :  :  OUTPUT FAULT LIST:  J09, J10, J12
                                        ;%      :  :  ELSE
                                        ;%      :  :  SET RPCS2:  CLR = 1
                                        ;%      :  :  IF ((RPDS:  ERR) OR (RPER1:  PAR) = 1
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  OUTPUT ERROR MESSAGE (ERROR STATUS FAILED TO CLEAR)
                                        ;%      :  :  :  OUTPUT FAULT LIST:  J12
                                        ;%      :  :  ENDIF
                                        ;%      :  ENDIF
                                        ;%      END TEST 40

033454                                  T40::
033454  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
033462                                  1$:
033462  104404                                  TRAP    C$BSEG
033464  004737  016662                          JSR     PC,SEIZE        ;GET THE DRIVE UNDER TEST
033470  052777  000020  147024                  BIS     #PAT,@RPCS2     ;INVERT PARITY - FORCE  ERRORS!
033476  013777  002344  147014                  MOV     PATT1,@RPDA     ;WRITE A PATTERN
033504  005777  147010                          TST     @RPDA           ;READ THE REGISTER JUST WRITTEN
033510  004737  017000                          JSR     PC,WAIT         ;STALL FOR THE RP07 MICROPROCESSOR
033514  032777  000010  147004                  BIT     #PAR,@RPER1     ;DID WE DETECT A PARITY ERROR?
033522  001005                                  BNE     2$              ;IF = 1, YES
033524  004737  017372                          JSR     PC,BISEXP       ;FORM THE FAILING DATA
033530  002526                                  RPER1                   ;THIS REGISTER FAILED
033532  000010                                  PAR                     ;THIS BIT FAILED TO SET
033534  000410                                  BR      3$              ;AND REPORT IT
033536  032777  040000  146760  2$:            BIT     #ERR,@RPDS      ;DID WE GET COMPOSITE ERROR?
033544  001017                                  BNE     4$              ;IF = 1, YES
033546  004737  017372                          JSR     PC,BISEXP       ;FORM THE ERROR DATA
033552  002524                                  RPDS                    ;FORM THE ERROR REPORT
033554  040000                                  ERR                     ;FORM THE EXPECTED DATA

033556  012737  005400  002404  3$:             MOV     #BIT8!BIT9!BIT11,ERRWD1 ;FORM MODULE CALL-OUT LIST
033564  005037  002406                          CLR     ERRWD2          ;BOTH WORDS
033570  104456                                  TRAP    C$ERHRD
033572  000104                                  .WORD   68
033574  012776                                  .WORD   EM22
033576  014172                                  .WORD   ERR0
033600  005037  002402                          CLR     ITCOUN          ;NO FURTHER ITERATONS NECESSARY
033604  052777  000040  146710  4$:             BIS     #CLR,@RPCS2     ;RESET THE DEVICE
033612  013777  002506  146702                  MOV     DRVNO,@RPCS2    ;RELOAD THE DRIVE - UNDER - TEST
033620  032777  000010  146700                  BIT     #PAR,@RPER1     ;ERROR STATUS GONE?
033626  001411                                  BEQ     5$              ;IF = 0, YES
033630  013737  002526  002456                  MOV     RPER1,TESTRG    ;FORM THE ERROR REPORT DATA
033636  017737  146664  002452                  MOV     @RPER1,RCVED    ;PAR SET AND SHOULD HAVE CLEARED
033644  005037  002454                          CLR     EXPTED          ;SHOW 0 BITS EXPECTED DATA
033650  000410                                  BR      6$              ;AND REPORT THE ERROR
033652  032777  040000  146644  5$:             BIT     #ERR,@RPDS      ;DID COMPOSITE ERROR CLEAR?
```

```
   033660  001417                              BEQ     7$                  ;IF 0, YES
   033662  004737  017422                      JSR     PC,BICEXP           ;CREATE THIS INFORMATION
   033666  002524                              RPDS                        ;AND MAKE IT AVAILABLE FOR
   033670  040000                              ERR                         ;AN ERROR MESSAGE

   033672  012737  004000  002404  6$:         MOV     #BIT11,ERRWD1       ;CREATE MODULE CALL OUT
   033700  005037  002406                      CLR     ERRWD2              ;FOR BOTH WORDS
   033704  104456                              TRAP    C$ERHRD
   033706  000105                              .WORD   69
   033710  011747                              .WORD   EM1
   033712  014172                              .WORD   ERRO
   033714  005037  002402                      CLR     ITCOUN              ;RESET THE ITERATION COUNTER
   033720                          7$:
   033720                          10000$:
   033720  104405                              TRAP    C$ESEG
   033722  005337  002402                      DEC     ITCOUN              ;ONE LESS ITERATION TO GO
   033726  003255                              BGT     1$                  ;DO UNTIL <= 0
   033730                          L10066:
   033730  104401                              TRAP    C$ETST
```

```
                                          .SBTTL  TEST 41 ATA CLEAR TEST

                                          ;%      TEST 41 CLEAR ATA TEST
                                          ;%      :  SET RPCS2:  CLR = 1
                                          ;%      :  IF RPDS:  ATA = 1
                                          ;%      :  :  THE
                                          ;%      :  :  OUTPUT ERROR MESSAGE (DETECTED FALSE ATA)
                                          ;%      :  :  OUTPUT FAULT LIST:  J12
                                          ;%      :  ENDIF
                                          ;%      END TEST 41

   033732                                 T41::
   033732  012737  000012  002402                 MOV     #10.,ITCOUN        ;LOAD THE ITERATION COUNT
   033740                                 1$:
   033740  104404                                 TRAP    C$BSEG
   033742  004737  016662                         JSR     PC,SEIZE           ;GET THE DRIVE UNDER TEST
   033746  004737  017000                         JSR     PC,WAIT            ;WAIT FOR THE RP07 MICROPROCESSOR
   033752  032777  100000  146544                 BIT     #ATA,@RPDS         ;DOES THE ATTENTION SUMMARY BIT = 1
   033760  001417                                 BEQ     2$                 ;IF IT DOES, IT'S WRONG.
   033762  004737  017422                         JSR     PC,BICEXP          ;FORM THE FAILING DATA
   033766  002524                                 RPDS                       ;THIS REGISTER FAILED
   033770  140000                                 ATA!ERR                    ;THESE BITS FAILED TO CLEAR
   033772  012737  004000  002404                 MOV     #BIT11,ERRWD1      ;FORM MODULE CALL - OUT
   034000  005037  002406                         CLR     ERRWD2             ;BOTH WORDS
   034004  104456                                 TRAP    C$ERHRD
   034006  000106                                 .WORD   70
   034010  012454                                 .WORD   EM14
   034012  014172                                 .WORD   ERRO
   034014  005037  002402                         CLR     ITCOUN             ;RESET THE ITERATON COUNTER
   034020                                 2$:
   034020                                 10000$:
   034020  104405                                 TRAP    C$ESEG
   034022  005337  002402                         DEC     ITCOUN             ;ONE LESS ITERATION
   034026  003344                                 BGT     1$                 ;DO UNTIL <= 0
   034030                                 L10067:
   034030  104401                                 TRAP    C$ETST
```

```
                                        .SBTTL  TEST 42 ATA SET - RESET TEST

                                        ;%      TEST 42 SET AND CLEAR ATA BIT
                                        ;%      :  SET RPCS2:  PAT = 1
                                        ;%      :  WRITE RPDA WITH DATA PATTERN #1, ONCE
                                        ;%      :  IF ((RPDS:  ATA) AND (RPDS:  ERR)) <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (ATA DIDN'T SET WHEN EXPECTED)
                                        ;%      :  :  OUTPUT FAULT LIST:  J09, J10
                                        ;%      :  :  ELSE
                                        ;%      :  :  ISSUE DRIVE CLEAR COMMAND
                                        ;%      :  ENDIF
                                        ;%      :  IF ((RPDS:  ATA) AND (RPDS:  ERR)) <> 0
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (ATA DIDN'T CLEAR WHEN EXPECTED)
                                        ;%      :  :  OUTPUT FAULT LIST:  J12
                                        ;%      :  ENDIF
                                        ;%      :  SET RPCS2:  PAT = 1
                                        ;%      :  WRITE RPDA WITH DATA PATTERN #1, ONCE
                                        ;%      :  SET RPCS2:  CLR = 1
                                        ;%      :  IF  ((RPDS:  ATA) OR (RPDS:  ERR) <> 0)
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (RPCS2:  CLR DIDN'T CLEAR ATA AS EXPECTED)
                                        ;%      :  :  OUTPUT FAULT LIST:  J12
                                        ;%      :  ENDIF
                                        ;%      END TEST 42

034032                                  T42::
034032  012737  000012  002402                  MOV     #10.,ITCOUN        ;LOAD THE ITERATION COUNTER
034040                                  1$:
034040  104404                                  TRAP    C$BSEG
034042  004737  016662                          JSR     PC,SEIZE           ;GET THE DRIVE UNDER TEST
034046  052777  000020  146446                  BIS     #PAT,@RPCS2        ;INVERT PARITY
034054  013777  002344  146436                  MOV     PATT1,@RPDA        ;MOVE DATA TO RPDA
034062  005037  002406                          CLR     ERRWD2             ;FORM SOME MODULE CALL - OUT
034066  004737  017000                          JSR     PC,WAIT            ;WAIT FOR THE RP07 MICROPROCESSOR TO FINISH
034072  032777  140000  146424                  BIT     #ATA!ERR,@RPDS     ;DID WE DETECT ATTENTION AND ERROR?
034100  001035                                  BNE     2$                 ;IF = 1, YES
034102  012737  001400  002404                  MOV     #BIT8!BIT9,ERRWD1          ;FORM BALANCE OF MODULE CALL OUT
034110  004737  017372                          JSR     PC,BISEXP          ;SHOW DATA TO ERROR - REPORT
034114  002524                                  RPDS                       ;THIS REGISTER
034116  140000                                  ATA!ERR                    ;THESE BITS FAILED TO SET
034120  012737  001400  002404                  MOV     #BIT8!BIT9,ERRWD1;LOG THE MODULE CALLOUT
034126  000452                                  BR      4$                 ;REPORT IT!
034130  032777  010000  146366                  BIT     #MOL,@RPDS         ;IS THE DRIVE ON-LINE
034136  001016                                  BNE     2$                 ;YES, IT IS ONLINE!
034140  004737  017326                          JSR     PC,SAVRPR          ;GET THE REGISTER SNAPSHOT
034144  013746  002114                          MOV     L$TEST,-(SP)
034150  012746  006452                          MOV     #MSGMOL,-(SP)
034154  012746  000002                          MOV     #2,-(SP)
034160  010600                                  MOV     SP,R0
034162  104417                                  TRAP    C$PNTF
034164  062706  000006                          ADD     #6,SP
034170  104432                                  TRAP    C$EXIT
034172  000124                                  .WORD   L10070-.
034174  013777  002506  146320          2$:     MOV     DRVNO,@RPCS2       ;LOAD THE DRIVE #, CLEAR OUT PARITY INVERT
034202  012777  000011  146302                  MOV     #DRCLR,@RPCS1      ;ISSUE A DRIVE CLEAR COMMAND
```

```
034210  032777  140000  146306            BIT     #ATA!ERR,@RPDS   ;CHECK ATTENTION AND ERROR
034216  001016                            BNE     4$               ;THEY'RE SET, ERROR!
034220  052777  000020  146274    3$:     BIS     #PAT,@RPCS2      ;INVERT PARITY
034226  013777  002344  146264            MOV     PATT1,@RPDA      ;WRITE DATA AGAIN
034234  004737  017000                    JSR     PC,WAIT          ;WAIT FOR THE MICRO PROCESSORS
034240  004737  016662                    JSR     PC,SEIZE         ;GET THE DRIVE NOW!
034244  032777  140000  146252            BIT     #ATA!ERR,@RPDS   ;CHECK ATTENTION AND ERROR
034252  001415                            BEQ     5$               ;IF 0, TEST PASSES
034254  004737  017422            4$:     JSR     PC,BICEXP        ;FORM EXPECTED DATA
034260  002524                            RPDS                     ;THIS REGISTER
034262  140000                            ATA!ERR                  ;THESE BITS FAILED TO CLEAR
034264  012737  004000  002404            MOV     #BIT11,ERRWD1    ;LOAD THIS MODULE CALLOUT
034272  104456                            TRAP    C$ERHRD
034274  000107                            .WORD   71
034276  012454                            .WORD   EM14
034300  014172                            .WORD   ERRO
034302  005037  002402                    CLR     ITCOUN           ;NO FURTHER ITERATIONS
034306                            5$:
034306                            10000$:
034306  104405                            TRAP    C$ESEG
034310  005337  002402                    DEC      ITCOUN          ;ONE LESS TO-GO
034314  003251                            BGT     1$               ;IF <= 0, WE'RE DONE!
034316                            L10070:
034316  104401                            TRAP    C$ETST
```

```
                                   .SBTTL  TEST 43 RPAS CLEAR TEST

                                   ;%      TEST 43 CLEAR RPAS REGISTER TEST
                                   ;%      :  SET RPCS2:   CLR = 1
                                   ;%      :  IF RPAS <> 0
                                   ;%      :  :  THEN
                                   ;%      :  :  OUTPUT ERROR MESSAGE (RPAS DIDN'T CLEAR WHEN EXPECTED)
                                   ;%      :  :  OUTPUT CONTENTS OF RPAS
                                   ;%      :  :  OUTPUT FAULT LIST:  J11 / J13, J12, ANOTHER DRIVE
                                   ;%      :  ENDIF
                                   ;%      END TEST 43

034320                             T43::
034320  012737  000012  002402             MOV     #10.,ITCOUN      ;LOAD THE ITERATION COUNTER
034326                             1$:
034326  104404                             TRAP    C$BSEG
034330  004737  016662                     JSR     PC,SEIZE         ;GET THE DRIVE UNDER TEST
034334  005777  146170                     TST     @RPAS            ;RPAS = 0?
034340  001424                             BEQ     2$               ;IF 0, TEST OK!
034342  005037  002454                     CLR     EXPTED           ;FORM ERROR DATA
034346  013737  002530  002456             MOV     RPAS,TESTRG      ;FOR AN ERROR DISPATCH
034354  017737  146150  002452             MOV     @RPAS,RCVED      ;GET RECEIVED DATA
034362  012737  016000  002404             MOV     #BIT10!BIT11!BIT12,ERRWD1        ;FORM MODULE CALL OUT
034370  012737  000020  002406             MOV     #BIT4,ERRWD2     ;BOTH WORDS
034376  104456                             TRAP    C$ERHRD
034400  000110                             .WORD   72
034402  012523                             .WORD   EM15
034404  014172                             .WORD   ERRO
034406  005037  002402                     CLR     ITCOUN           ;RESET THE ITERATION COUNTER
034412                             2$:
034412                             10000$:
034412  104405                             TRAP    C$ESEG
034414  005337  002402                     DEC ITCOUN               ;ONE LESS TO-GO
034420  003342                             BGT     1$               ;IF >0, WE'RE NOT DONE
034422                             L10071:
034422  104401                             TRAP    C$ETST
```

```
                                    .SBTTL  TEST 44 RPAS CORRECT POSITION TEST

                                    ;%      TEST 44 RPAS CORRECT POSITION DECODE TEST
                                    ;%      :  SET RPCS2:  CLR = 1
                                    ;%      :  SET RPCS2:  PAT = 1
                                    ;%      :  WRITE RPDA WITH DATA PATTERN #1, ONCE
                                    ;%      :  IF RPAS:  ATA BIT IS NOT CORRECT POSITION FOR DRIVE UNDER TEST
                                    ;%      :  :  THEN
                                    ;%      :  :  OUTPUT ERROR MESSAGE (RPAS DECODE LOGIC FAILURE)
                                    ;%      :  :  OUTPUT FAULT LIST:  J11 / J13
                                    ;%      :  :  ELSE
                                    ;%      :  :  WRITE RPAS WITH EXPECTED RESULTS
                                    ;%      :  ENDIF
                                    ;%      :  SET RPCS2:  PAT = 0
                                    ;%      :  IF RPAS:  ATA BIT UNDER TEST <> 0
                                    ;%      :  :  THEN
                                    ;%      :  :  OUTPUT ERROR MESSAGE (RPAS DECODE LOGIC FAILURE)
                                    ;%      :  :  OUTPUT FAULT LIST:  J11 / J13, J12
                                    ;%      :  ENDIF
                                    ;%      END TEST 44

034424                              T44::
034424  012737  000012  002402              MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
034432                              1$:
034432  104404                              TRAP    C$BSEG
034434  004737  016662                      JSR     PC,SEIZE        ;GET THE DRIVE UNDER TEST
034440  052777  000020  146054              BIS     #PAT,@RPCS2     ;INVERT PARITY (FORCE ERRORS)
034446  013777  002344  146044              MOV     PATT1,@RPDA     ;WRITE A PATTERN TO RPDA
034454  004737  017000                      JSR     PC,WAIT         ;WAIT FOR THE RP07 MICROPROCESSOR TO FINISH
034460  013737  002400  002454              MOV     BITPOS,EXPTED   ;GET THE EXPECTED DATA
034466  023777  002454  146034              CMP     EXPTED,@RPAS    ;DID CORRECT ATN BIT SET?
034474  001417                              BEQ     2$              ;IF EQUAL OK!
034476  013737  002530  002456              MOV     RPAS,TESTRG     ;FORM REGISTER DATA
034504  017737  146020  002452              MOV     @RPAS,RCVED     ;AND RECEIVED ERROR DATA
034512  012737  012000  002404              MOV     #BIT10!BIT12,ERRWD1     ;NOW GET MODULE CALL - OUT
034520  005037  002406                      CLR     ERRWD2          ;BOTH WORDS
034524  104456                              TRAP    C$ERHRD
034526  000111                              .WORD   73
034530  012454                              .WORD   EM14
034532  014172                              .WORD   ERRO
034534  042777  000020  145760      2$:     BIC     #PAT,@RPCS2     ;INVERT PARITY AGAIN
034542  013777  002454  145760              MOV     EXPTED,@RPAS    ;TRY TO CLEAR RPAS
034550  005037  002454                      CLR     EXPTED          ;SHOW EXPECTED RESULTS
034554  005777  145750                      TST     @RPAS           ;DID RPAS CLEAR?
034560  001421                              BEQ     3$              ;IF SO, SKIP ERROR DISPATCH
034562  013737  002530  002456              MOV     RPAS,TESTRG     ;FORM REGISTER DATA
034570  017737  145734  002452              MOV     @RPAS,RCVED     ;FORM RECEIVED DATA
034576  012737  016000  002404              MOV     #BIT10!BIT11!BIT12,ERRWD1       ;CREATE MODULE LIST
034604  005037  002406                      CLR     ERRWD2          ;BOTH WORDS
034610  104456                              TRAP    C$ERHRD
034612  000112                              .WORD   74
034614  013051                              .WORD   EM23
034616  014172                              .WORD   ERRO
034620  005037  002402                      CLR     ITCOUN          ;NO LOOPS NECESSARY
034624                              3$:
034624                              10000$:
034624  104405                              TRAP    C$ESEG
```

```
     49 034626  005337  002402                  DEC     ITCOUN          ;ONE LESS TO-GO
     50 034632  003277                          BGT     1$              ;IF >0, WE'RE NOT DONE
     51 034634                          L10072:
        034634  104401                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 45 UNIQUE POSITION DECODE TEST

                                        ;%      TEST 45 RPAS UNIQUE POSITION DECODE TEST
                                        ;%      :  SET RPCS2:  CLR = 1
                                        ;%      :  SET RPCS2:  PAT = 1
                                        ;%      :  WRITE RPDA WITH DATA PATTERN #1, ONCE
                                        ;%      :  IF RPAS:  ATA FOR THE DRIVE UNDER TEST <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (RPAS DECODE LOGIC FAILURE)
                                        ;%      :  :  OUTPUT FAULT LIST:  J11/J13
                                        ;%      :  ENDIF
                                        ;%      :  IF RPDS:  ATA <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (RPDS:  ATA DIDN'T SET)
                                        ;%      :  ENDIF
                                        ;%      :  WRITE RPAS WITH THE COMPLIMENT OF THE EXPECTED DATA
                                        ;%      :  IF RPAS:  ATA FOR THE DRIVE UNDER TEST = 0
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (RPAS DECODE LOGIC FAILURE)
                                        ;%      :  :  OUTPUT FAULT LIST:  J11 / J13
                                        ;%      :  ENDIF
                                        ;%      END TEST 45

034636                                  T45::
034636  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
034644                                  1$:
034644  104404                                  TRAP    C$BSEG
034646  004737  016662                          JSR     PC,SEIZE        ;GET THE DRIVE UNDER TEST
034652  052777  000020  145642                  BIS     #PAT,@RPCS2     ;INVERT PARITY (FORCE ERRORS)
034660  013777  002344  145632                  MOV     PATT1,@RPDA     ;WORIT RPDA WITH PATTERN1
034666  013737  002400  002454                  MOV     BITPOS,EXPTED   ;GET THE CORRECT ATTENTION BIT POSITION
034674  004737  017000                          JSR     PC,WAIT         ;WAIT FOR THE RP07 MICROPROCESSOR
034700  023777  002454  145622                  CMP     EXPTED,@RPAS    ;MATCH?
034706  001421                                  BEQ     2$              ;IF EQUAL, OK!
034710  013737  002530  002456                  MOV     RPAS,TESTRG     ;FORM FAILURE DATA
034716  017737  145606  002452                  MOV     @RPAS,RCVED     ;AND LOG IT
034724  012737  012000  002404                  MOV     #BIT10!BIT12,ERRWD1     ;CREATE MODULE CALL - OUT
034732  005037  002406                          CLR     ERRWD2          ;BOTH WORDS
034736  104456                                  TRAP    C$ERHRD
034740  000113                                  .WORD   75
034742  012454                                  .WORD   EM14
034744  014172                                  .WORD   ERRO
034746  005037  002402                          CLR     ITCOUN          ;NO LOOPS NECESSARY
034752  032777  100000  145544  2$.             BIT     #ATA,@RPDS      ;DID ATA SET?
034760  001012                                  BNE     3$              ;IF NOT ZERO, YES!
034762  004737  017372                          JSR     PC,BISEXP       ;LOAD THE FAILING INFORMATION
034766  002524                                  RPDS                    ;THIS REGISTER FAILED
034770  100000                                  ATA                     ;THIS BIT FAILED TO SET
034772  104456                                  TRAP    C$ERHRD
034774  000114                                  .WORD   76
034776  012776                                  .WORD   EM22
035000  014172                                  .WORD   ERRO
035002  005037  002402                          CLR     ITCOUN          ;NO LOOP NECESSARY
035006  005137  002454          3$:             COM     EXPTED          ;COMPLIMENT THE EXPECTED DATA
035012  013777  002454  145510                  MOV     EXPTED,@RPAS    ;AND WRITE TO RPDA (SHOULD DO NOTHING)
035020  005137  002454                          COM     EXPTED          ;RE-INVERT EXPECTED DATA
035024  023777  002454  145476                  CMP     EXPTED,@RPAS    ;AND SEE IF ATN CLEARD
```

```
   035032  001421                          BEQ     4$              ;IF MATCH, IT DID NOT TEST OK!
   035034  013737  002530  002456          MOV     RPAS,TESTRG     ;FORM FAILING REGISTER
   035042  017737  145462  002452          MOV     @RPAS,RCVED     ;AND FAILING DATA
   035050  012737  012000  002404          MOV     #BIT10!BIT12,ERRWD1     ;CREATE MODULE CALLOUT
   035056  005037  002406                  CLR     ERRWD2          ;BOTH WORDS
   035062  104456                          TRAP    C$ERHRD
   035064  000115                          .WORD   77
   035066  012454                          .WORD   EM14
   035070  014172                          .WORD   ERRO
   035072  005037  002402                  CLR     ITCOUN          ;RESET THE ITERATION COUNTER
   035076                          4$:
   035076                          10000$:
   035076  104405                          TRAP    C$ESEG
   035100  005337  002402                  DEC     ITCOUN          ;ONE LESS ITERATION
   035104  003257                          BGT     1$              ;IF > 0, DO AGAIN!!
   035106                          L10073:
   035106  104401                          TRAP    C$ETST
```

```
                                   .SBTTL  TEST 46 MASSBUS ATTENTION CLEAR TEST

                                   ;%      TEST 46 CLEAR MASSBUS ATTENTION TEST
                                   ;%      :  SET RPCS2:  CLR = 1
                                   ;%      :  IF ((RPCS1:  SC) OR (ON RH20-''ATTN'') = 1
                                   ;%      :  :  THEN
                                   ;%      :  :  OUTPUT ERROR MESSAGE (DETECTED FALSE SPECIAL CONDITION)
                                   ;%      :  :  OUTPUT FAULT LIST:  CABLE, RHXX, J11/J13, ANOTHER DRIVE, TERMINATOR
                                   ;%      :  ENDIF
                                   ;%      END TEST 46

035110                             T46::
035110  012737  000012  002402             MOV     #10.,ITCOUN         ;LOAD THE ITERATION COUNT
035116                             1$:
035116  104404                             TRAP    C$BSEG
035120  004737  016662                     JSR     PC,SEIZE            ;GET THE DRIVE AFTER PURGING ERRORS!
035124  032777  100000  145360             BIT     #SC,@RPCS1          ;TEST RPCS1 = SPECIAL CONDITION
035132  001420                             BEQ     2$                  ;IF 0, TEST OK!
035134  004737  017422                     JSR     PC,BICEXP           ;FORM UP FAILING DATA
035140  002512                             RPCS1                       ;THIS REGISTER
035142  100000                             SC                          ;THIS BIT FAILED TO CLEAR
035144  012737  012000  002404             MOV     #BIT10!BIT12,ERRWD1      ;FORM UP MODULE CALLOUT
035152  012737  000426  002406             MOV     #BIT1!BIT2!BIT4!BIT8,ERRWD2;BOTH WORDS
035160  104456                             TRAP    C$ERHRD
035162  000116                             .WORD   78
035164  012562                             .WORD   EM16
035166  014172                             .WORD   ERRO
035170  005037  002402                     CLR     ITCOUN              ;NO ITERATIONS NECESSARY
035174                             2$:
035174                             10000$:
035174  104405                             TRAP    C$ESEG
035176  005337  002402                     DEC     ITCOUN              ;ONE LESS ITERATION TO GO
035202  003345                             BGT     1$                  ;IF <= 0, DONE!!
035204                             L10074:
035204  104401                             TRAP    C$ETST
```

```
                                        .SBTTL  TEST 47 MASSBUS ATTENTION SET/CLEAR TEST

                                        ;%      TEST 47 MASSBUS ATTN SET & CLEAR TEST
                                        ;%      :  SET RPCS2:  CLR = 1
                                        ;%      :  SET RPCS2:  PAT = 1
                                        ;%      :  WRITE RPDA WITH DATA PATTERN #1, ONCE
                                        ;%      :  IF ((RPCS1:  SC) OR (IN RH20-"ATTN")) <> 1
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (FAILED TO DETECT SPECIAL CONDITION WHEN EXPECTED)
                                        ;%      :  :  OUTPUT FAULT LIST:  RHXX, CABLES, J11 / J13, TERMINATOR
                                        ;%      :  ENDIF
                                        ;%      END TEST 47

035206                                  T47::
035206  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
035214                                  1$:
035214  104404                                  TRAP    C$BSEG
035216  004737  016662                          JSR     PC,SEIZE        ;FLUSH ERRORS THEN GET THE DRIVE
035222  052777  000020  145272                  BIS     #PAT,@RPCS2     ;INVERT PARITY (FORCE ERRORS)
035230  013777  002344  145262                  MOV     PATT1,@RPDA     ;WRITE RPDA, ONCE
035236  004737  017000                          JSR     PC,WAIT         ;WAIT FOR THE RP07 MICROPROCESSOR
035242  032777  100000  145242                  BIT     #SC,@RPCS1      ;DID SPECIAL CONDITION SET?
035250  001020                                  BNE     2$              ;IF = 2, YES
035252  004737  017372                          JSR     PC,BISEXP       ;FORM ERROR DATA
035256  002512                                  RPCS1                   ;FOR AN ERROR DISPATCH
035260  100000                                  SC                      ;THIS BIT FAILED TO SET
035262  012737  012000  002404                  MOV     #BIT10!BIT12,ERRWD1     ;FORM MODULE LIST
035270  012737  000406  002406                  MOV     #BIT1!BIT2!BIT8,ERRWD2  ;BOTH WORDS
035276  104456                                  TRAP    C$ERHRD
035300  000117                                  .WORD   79
035302  012725                                  .WORD   EM21
035304  014172                                  .WORD   ERRO
035306  005037  002402                          CLR     ITCOUN          ;RESET THE ITERATION COUNTER
035312                                  2$:
035312                                  10000$:
035312  104405                                  TRAP    C$ESEG
035314  005337  002402                          DEC     ITCOUN          ;ONEW LESS ITERATION
035320  003335                                  BGT     1$              ;IF <= 0, DONE
035322                                  L10075:
035322  104401                                  TRAP    C$ETST
```

```
                                              .SBTTL  TEST 48 READ-IN-PRESET COMMAND TEST

                                              ;%      TEST 48 READ-IN-PRESET BASIC COMMAND TEST
                                              ;%      :  SET RPCS2:  CLR = 1
                                              ;%      :  ISSUE READ-IN-PRESET COMMAND
                                              ;%      :  IF RPDS:  ERR = 1
                                              ;%      :  :  THEN
                                              ;%      :  :  OUTPUT ERROR MESSAGE (DETECTED FALSE COMPOSITE ERROR)
                                              ;%      :  :  OUTPUT FAULT LIST:  J12
                                              ;%      :  ENDIF
                                              ;%      END TEST 48

035324                                        T48::
035324  012737  000012  002402                        MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
035332  032777  010000  145164                        BIT     #MOL,@RPDS      ;DRIVE ON LINE?
035340  001016                                        BNE     1$              ;IF 1, YES
035342  004737  017326                                JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
035346  013746  002114                                MOV     L$TEST,-(SP)
035352  012746  006452                                MOV     #MSGMOL,-(SP)
035356  012746  000002                                MOV     #2,-(SP)
035362  010600                                        MOV     SP,R0
035364  104417                                        TRAP    C$PNTF
035366  062706  000006                                ADD     #6,SP
035372  104432                                        TRAP    C$EXIT
035374  000104                                        .WORD   L10076-.
035376                                        1$:
035376  104404                                        TRAP    C$BSEG
035400  004737  016662                                JSR     PC,SEIZE        ;GET THE DRIVE UNDER TEST
035404  012777  000021  145100                        MOV     #RIP,@RPCS1     ;ISSUE THE READ-IN-PRESET
035412  004737  017000                                JSR     PC,WAIT         ;WAIT FOR THE RP07 MICROPROCESSOR
035416  032777  040000  145100                        BIT     #ERR,@RPDS      ;DID IT CAUSE AN ERROR?
035424  001417                                        BEQ     2$              ;IF 0, NO!
035426  004737  017422                                JSR     PC,BICEXP       ;LOAD FAILURE DATA
035432  002524                                        RPDS                    ;THIS REGISTER
035434  040000                                        ERR                     ;THIS BIT FAILED TO STAY CLEAR
035436  012737  004000  002404                        MOV     #BIT11,ERRWD1   ;FORM MODULE CALLOUT
035444  005037  002406                                CLR     ERRWD2          ;FOR BOTH WORDS
035450  104456                                        TRAP    C$ERHRD
035452  000120                                        .WORD   80
035454  013051                                        .WORD   EM23
035456  014172                                        .WORD   ERR0
035460  005037  002402                                CLR     ITCOUN          ;NO ITERATIONS NECESSARY
035464                                        2$:
035464                                        10000$:
035464  104405                                        TRAP    C$ESEG
035466  005337  002402                                DEC     ITCOUN          ;ONE LESS TO-GO
035472  003341                                        BGT     1$              ;UNTIL <= 0!!
035474  004737  017722                                JSR     PC,PRELOD       ;RESET THE DRIVE TO 16 BIT MODE
035500                                        L10076:
035500  104401                                        TRAP    C$ETST
```

```
                                        .SBTTL  TEST 49 RHXX UNIQUE REGISTER TEST

                                        ;%      :   SET RPCS2:  CLR = 1
                                        ;%      :   LOAD DRIVE NUMBER INTO RPCS2
                                        ;%      :   REPEAT
                                        ;%      :   :  WRITE A UNIQUE PATTERN INTO A SELECTED REGISTER
                                        ;%      :   :  REGISTERS TO TEST = RPCS1, RPWC, RPBA, RPDA, RPMR1, RPOF, RPDC
                                        ;%      :   :  OPTIONAL REGISTERS FOR AN RH70 = RPBAE, RPCS3
                                        ;%      :   :  UNTIL ALL REGISTERS HAVE BEEN WRITTEN
                                        ;%      :   ENDREPEAT
                                        ;%      :   IF REGISTER UNDER TEST DOESN'T MATCH EXPECTED DATA
                                        ;%      :   :  THEN
                                        ;%      :   :  OUTPUT ERROR MESSAGE (REGISTER SELECTION FAILURE)
                                        ;%      :   :  OUTPUT FAULT LIST:  RHXX, CABLES, J11, J12, J13, TERMINATOR
                                        ;%      :   ENDIF
                                        ;%      END TEST 49

035502                                  T49::
035502  012737  000012  002402                  MOV     #10.,ITCOUN             ;LOAD THE ITERATION COUNT
035510  004737  016662                          JSR     PC,SEIZE                ;LOAD THE DRIVE UNDER TEST
035514  012737  000002  002436          1$:     MOV     #2,TEMP                 ;LOAD THE FIRST DATA PATTERN
035522  012702  002652                          MOV     #PSTACK,R2              ;CREATE THE CHECK BUFFER ADDRESS
035526  012701  004330                          MOV     #TST49,R1               ;GET THE FILE OF REGISTERS
035532  012703  000004                          MOV     #4,R3                   ;GET THE FIRST SEGMENT COUNT
035536  013146                          2$:     MOV     @(R1)+,-(SP)            ;GET THE INITIAL STATE OF THE REGISTER
035540  017612  000000                          MOV     @(SP),(R2)              ;SAVE IT IN THE IMAGE FILE
035544  053736  002436                          BIS     TEMP,@(SP)+             ;WRITE THE UNIQUE TEST BIT
035550  053722  002436                          BIS     TEMP,(R2)+              ;AND SET THE CORRECT MASK IN THE IMAGE FILE
035554  005237  002436                          INC     TEMP                    ;NEXT UNIQUE PATTERN
035560  005303                                  DEC     R3                      ;REDUCE THE ITERATION COUNT
035562  003365                                  BGT     2$                      ;IF > 0, KEEP GOING!
035564  012737  000010  002436                  MOV     #10,TEMP                ;NEXT PATTERN
035572  012703  000004                          MOV     #4,R3                   ;AND THE NEXT SEGMENT COUNT
035576  005737  002504                          TST     RHTYPE                  ;WHICH CONTROLLER?
035602  001402                                  BEQ     4$                      ;IF 0, RH11
035604  062703  000002                          ADD     #2,R3                   ;ADD 2 TO THE SEGMENT COUNT TO INCLUDE RPBAE & RPCS3
035610  013146                          4$:     MOV     @(R1)+,-(SP)            ;SAVE THE INITIAL STATE OF THE REGISTER
035612  017612  000000                          MOV     @(SP),(R2)              ;NOW GET THE INITIAL CONTENTS OF THE REGSISTER
035616  053736  002436                          BIS     TEMP,@(SP)+             ;NOW WRITE THE TEST PATTERN
035622  053722  002436                          BIS     TEMP,(R2)+              ;AND UPDATE THE IMAGE FILE
035626  005237  002436                          INC     TEMP                    ;NEXT PATTERN
035632  005303                                  DEC     R3                      ;ONE LESS ITERATION TO GO
035634  003365                                  BGT     4$                      ;IF > 0, NOT DONE YET!!
035636  012701  004330                          MOV     #TST49,R1               ;GET THE REGISTER FILE AGAIN
035642  012702  002652                          MOV     #PSTACK,R2              ;AND THE OUTPUT FILE AGAIN
035646  012703  000010                          MOV     #8.,R3                  ;GET THE OVERALL ITERATION COUNT
035652  005737  002504                          TST     RHTYPE                  ;WHICH CONTROLLER??
035656  001402                                  BEQ     5$                      ;IF 0, IT'S AN RH11!!
035660  062703  000002                          ADD     #2,R3                   ;INCLUDE THE TWO EXTRA REGISTERS: RPBAE & RPCS3
035664  013146                          5$:     MOV     @(R1)+,-(SP)            ;GET THE ADDRESS OF THE REGISTER UNDER TEST
035666  023622                                  CMP     @(SP)+,(R2)+            ;DOES THE DATA MATCH?
035670  001425                                  BEQ     6$                      ;YES, GO-ON!
035672  017637  177776  002452                  MOV     @-2(SP),RCVED           ;GET THE FAILING DATA
035700  016637  177776  002456                  MOV     -2(SP),TESTRG           ;AND THE FAILING REGISTER ADDRESS
035706  016237  177776  002454                  MOV     -2(R2),EXPTED           ;NOW GET THE EXPECTED DATA
035714  012737  016000  002404                  MOV     #BIT10!BIT11!BIT12,ERRWD1
035722  012737  000406  002406                  MOV     #BIT1!BIT2!BIT8,ERRWD2;CREATE THE MODULE CALLOUT
```

```
     58 035730   104456                       TRAP     C$ERHRD
        035732   000121                       .WORD    81
        035734   013641                       .WORD    EM36
        035736   014172                       .WORD    ERRO
     59 035740   005037   002402              CLR      ITCOUN          ;RESET THE ITERATION COUNTER
     60 035744   005303             6$:       DEC      R3              ;ONE LESS REGISTER TO TEST
     61 035746   003346                       BGT      5$              ;IF > 0, KEEP GOING!
     62 035750   005337   002402              DEC      ITCOUN          ;ONE LESS ITERATION
     63 035754   003257                       BGT      1$              ;IF <= 0, DONE!!
     64 035756                      L10077:
        035756   104401                       TRAP     C$ETST
```

```
                                             .SBTTL  TEST 50 RPLA STATIC TEST

                                             ;%      TEST 50 RPLA STATIC TEST
                                             ;%      :  SET UP FOR A SECTOR MATCH IN RPLA
                                             ;%      :  SET UP A WATCHDOG TIMER
                                             ;%      :  REPEAT
                                             ;%      :  :  IF DESIRED SECTOR DOESN'T MATCH CONTENTS OF RPLA
                                             ;%      :  :  :  THEN
                                             ;%      :  :  :  DECREMENT THE WATCHDOG TIMER
                                             ;%      :  :  :  IF WATCHDOG TIMER = 0
                                             ;%      :  :  :  :  THEN
                                             ;%      :  :  :  :  OUTPUT ERROR MESSAGE (CAN'T FIND DESIRED SECTOR IN TIME)
                                             ;%      :  :  :  :  OUTPUT FAULT LIST:  J8, J11, J12, J13, RHXX, CONTROLLER, CABLES, TERMINA
                                             ;%      :  :  :  :  ELSE
                                             ;%      :  :  :  :  RE-READ RPLA LOOKING FOR A SECTOR MATCH
                                             ;%      :  :  :  ENDIF
                                             ;%      :  :  :  ELSE
                                             ;%      :  :  :  GET NEXT LEGAL SECTOR ADDRESS
                                             ;%      :  :  :  REFRESH THE WATCHDOG TIMER
                                             ;%      :  :  ENDIF
                                             ;%      :  :  UNTIL ALL LEGAL SECTOR ADDRESSES HAVE BEEN USED
                                             ;%      :  ENDREPEAT
                                             ;%      END TEST 50

 035760                                      T50::
 035760  012737  000012  002402                      MOV     #10.,ITCOUN      ;LOAD THE OVERALL ITERATION COUNTER
 035766  005001                              1$:     CLR     R1               ;R1 IS USED FOR THE SECTOR ADDRESS
 035770  012703  000003                              MOV     #3,R3            ;OVERALL ITERATION COUNTER
 035774  013737  002532  002456                      MOV     RPLA,TESTRG      ;THIS REGISTER MIGHT FAIL
 036002  012737  016200  002404                      MOV     #BIT7!BIT10!BIT11!BIT12,ERRWD1
 036010  012737  000406  002406                      MOV     #BIT1!BIT2!BIT8,ERRWD2
 036016  004737  016662                              JSR     PC,SEIZE         ;GET THE DRIVE NOW!
 036022  012737  177777  002436      2$:     MOV     #-1,TEMP         ;USED FOR A WATCHDOG TIMER
 036030  027701  144476              3$:     CMP     @RPLA,R1         ;NOW LOOK FOR SECTOR 0
 036034  001421                                      BEQ     6$               ;MATCH, GO-ON
 036036  005337  002436                              DEC     TEMP             ;1.2 LESS MICROSECONDS TO GO
 036042  001372                                      BNE     3$               ;KEEP GOING IF NOT ZERO
 036044  005303                                      DEC     R3               ;ONE LESS ITERATION TO GO
 036046  003365                                      BGT     2$               ;IF NOT ZERO, KEEP GOING
 036050  017737  144456  002452      4$:     MOV     @RPLA,RCVED      ;GET THE RECEIVED DATA
 036056  010137  002454              5$:     MOV     R1,EXPTED        ;GET THE EXPECTED DATA
 036062  104456                                      TRAP    C$ERHRD
 036064  000122                                      .WORD   82
 036066  012454                                      .WORD   EM14
 036070  014172                                      .WORD   ERRO
 036072  005037  002402                              CLR     ITCOUN           ;RESET THE ITERATION COUNTER
 036076  000454                                      BR      14$              ;TAKE EARLY RETURN
 036100  012703  002652              6$:     MOV     #FSTACK,R3       ;GET THE 2 OUT OF 3 BUFFER
 036104  062701  000100                              ADD     #100,R1          ;SET UP FOR THE NEXT SECTOR ADDRESS
 036110  020127  006200                              CMP     R1,#6200         ;DONE? (SECTOR 50)
 036114  001442                                      BEQ     13$              ;IF MATCH, YES
 036116  012702  000002                              MOV     #2,R2            ;WE MUST HAVE TWO MATCHES
 036122  012704  000003                              MOV     #3,R4            ;USE THIS FOR AN OVERALL ITERATION COUNT
 036126  012737  177777  002436      7$:     MOV     #-1,TEMP         ;USE THIS AS A WATCHDOG TIMER
 036134  005337  002436              8$:     DEC     TEMP             ;1.2 MICRO SECONDS LESS WINDOW
 036140  001404                                      BEQ     9$               ;IF ZERO, FIND OUT WHICH ITERATION
 036142  027701  144364                              CMP     @RPLA,R1         ;MATCH?
```

```
036146  001372                        BNE     8$               ;IF NOT, KEEP TRYING
036150  001403                        BEQ     10$              ;IF SO, TRY AGAIN
036152  005304              9$:       DEC     R4               ;ONE LESS ITERATION TO GO
036154  003364                        BGT     7$               ;IF NOT ZERO, KEEP TRYING
036156  001734                        BEQ     4$               ;IF ZERO, WE HAVE AN ERROR
036160  017723  144346      10$:      MOV     @RPLA,(R3)+      ;GET THE FIRST OF THREE READINGS
036164  017723  144342                MOV     @RPLA,(R3)+      ;GET THE SECOND OF THREE READINGS
036170  017723  144336                MOV     @RPLA,(R3)+      ;GET THE FINAL READING
036174  024301              11$:      CMP     -(R3),R1         ;DO WE MATCH?
036176  001003                        BNE     12$              ;IF NOT, CHECK IT FOR ERRORS
036200  005302                        DEC     R2               ;OK ONCE, TRY AGAIN
036202  003374                        BGT     11$              ;TAKE BRANCH IF NOT 0
036204  000406                        BR      13$              ;TEST OK, SO-FAR
036206  020327  002650      12$:      CMP     R3,#PSTACK-2     ;DID WE RUN OUT OF BUFFER?
036212  101370                        BHI     11$              ;NOT YET
036214  011337  002454                MOV     (R3),EXPTED      ;GET THE EXPECTED DATA FOR THE REPORT
036220  000716                        BR      5$               ;NOW REPORT THE ERROR
036222  005337  002402      13$:      DEC     ITCOUN           ;ONE LESS ITERATION......
036226  003257                        BGT     1$               ;IF <= 0, DONE!!
036230                      14$:
036230                      L10100:
036230  104401                        TRAP    C$ETST
```

```
                                        .SBTTL  TEST 51 RPMR1 - RPER2 WRAP AROUND TEST

                                        ;%      TEST 51 RPMR1 - RPER2 WRAP AROUND TEST
                                        ;%      :  USING PATTERNS 1-4, ONE AT A TIME,
                                        ;%      :  WRITE RPMR1, LOW BYTE WITH TEST PATTERN
                                        ;%      :  WRITE RPMR1, HIGH BYTE WITH 'FE'(HEX)
                                        ;%      :  ISSUE A DIAGNOSTIC COMMAND
                                        ;%      :  WAIT FOR THE COMMAND COMPLETION
                                        ;%      :  IF RPER2, LOW BYTE ONLY, DOESN'T MATCH THE TEST PATTERN
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (REGISTER CONTENTS DON'T MATCH EXPECT DATA)
                                        ;%      :  :  OUTPUT FAULT LIST:  J7, J8
                                        ;%      :  ENDIF
                                        ;%      END TEST 51

  036232                                T51::
  036232  012737  000002  002402                MOV     #2.,ITCOUN              ;LOAD THE ITERATION COUNT
  036240  012737  000035  002420                MOV     #DIAG,FUNCTN            ;LOAD THE DIAGNOSTIC COMMAND FUNCTION
  036246  012737  000300  002404                MOV     #BIT6!BIT7,ERRWD1;LOAD THE CALLOUT LIST
  036254  005037  002406                        CLR     ERRWD2                  ;NO MODULE FOR THIS MASK
  036260  004737  016662                        JSR     PC,SEIZE                ;LOAD THE DRIVE NUMBER
  036264  013737  002552  002456                MOV     RPER2,TESTRG            ;THIS REGISTER MAY FAIL
  036272  012701  177000                1$:     MOV     #177000,R1              ;SET UP FOR A 0'S WRITE WRAP TO RPER2
  036276  104404                                TRAP    C$BSEG
  036300  010177  144232                        MOV     R1,@RPMR1               ;LOAD THE MAINTENANCE REGISTER NOW
  036304  004737  015146                        JSR     PC,DRIVER               ;ISSUE THE DIAGNOSTIC COMMAND
  036310  017746  144236                        MOV     @RPER2,-(SP)            ;GET THE RESULTS
  036314  042716  177400                        BIC     #177400,(SP)            ;AND REMOVE THE UNWANTED BITS
  036320  120126                                CMPB    R1,(SP)+                ;MATCH?
  036322  001415                                BEQ     2$                      ;TAKE BRANCH IF SO...
  036324  005037  002454                        CLR     EXPTED                  ;RESET THE EXPECTED DATA
  036330  110137  002454                        MOVB    R1,EXPTED               ;LOAD THE EXPECTED STATUS
  036334  016637  177776  002452                MOV     -2(SP),RCVED            ;AND THE FAILING STATUS
  036342  104456                                TRAP    C$ERHRD
  036344  000123                                .WORD   83
  036346  012454                                .WORD   EM14
  036350  014172                                .WORD   ERR0
  036352  005037  002402                        CLR     ITCOUN                  ;NO ITERATIONS NECESSARY
  036356  004737  015400                2$:     JSR     PC,DRVCLR               ;PURGE ERRORS
  036362                                10000$:
  036362  104405                                TRAP    C$ESEG
  036364  104404                                TRAP    C$BSEG
  036366  012701  177377                        MOV     #177377,R1              ;WRITE AN ALL ONES PATTERN TO RPER2
  036372  010177  144140                        MOV     R1,@RPMR1               ;WRITE THE MAINTENANCE REGISTER NOW
  036376  004737  015146                        JSR     PC,DRIVER               ;ISSUE THE DIAGNOSTIC COMMAND
  036402  017746  144144                        MOV     @RPER2,-(SP)            ;GET THE RESULTS
  036406  042716  177400                        BIC     #177400,(SP)            ;STRIP THE HIGH BITS OUT
  036412  120126                                CMPB    R1,(SP)+                ;MATCH?
  036414  001415                                BEQ     3$                      ;IF SO, TAKE BRANCH
  036416  005037  002454                        CLR     EXPTED                  ;SET UP FOR AN ERROR MESSAGE
  036422  110137  002454                        MOVB    R1,EXPTED               ;SET THE EXPECTED DATA
  036426  016637  177776  002452                MOV     -2(SP),RCVED            ;SET THE RECEIVED DATA
  036434  104456                                TRAP    C$ERHRD
  036436  000124                                .WORD   84
  036440  012454                                .WORD   EM14
  036442  014172                                .WORD   ERR0
  036444  005037  002402                        CLR     ITCOUN                  ;NO FURTHER ITERATIONS NECESSARY
```

```
036450  004737  015400          3$:     JSR     PC,DRVCLR       ;NO LEFT-OVER ERRORS
036454                          10001$:
036454  104405                          TRAP    C$ESEG
036456  012701  000001                  MOV     #BIT0,R1        ;LOAD THE NEXT PATTERN NOW
036462  052701  177000          4$:     BIS     #177000,R1      ;AND SET THE DIAGNOSTIC START MASK
036466  104404                          TRAP    C$BSEG
036470  010177  144042                  MOV     R1,@RPMR1       ;LOAD THE WRAP TEST NOW
036474  004737  015146                  JSR     PC,DRIVER       ;ISSUE THE COMMAND NOW!
036500  017746  144046                  MOV     @RPER2,-(SP)    ;GET THE RESULTS
036504  042716  177400                  BIC     #177400,(SP)    ;STRIP UNWANTED DATA
036510  120126                          CMPB    R1,(SP)+        ;MATCH??
036512  001415                          BEQ     5$              ;IF SO, SKIP ERROR MESSAGE
036514  005037  002454                  CLR     EXPTED          ;RESET THE EXPECTED DATA
036520  110137  002454                  MOVB    R1,EXPTED       ;GET THE EXPECTED DATA
036524  016637  177776  002452          MOV     -2(SP),RCVED    ;AND THE FAILED RESULTS
036532  104456                          TRAP    C$ERHRD
036534  000125                          .WORD   85
036536  012454                          .WORD   EM14
036540  014172                          .WORD   ERR0
036542  005037  002402                  CLR     ITCOUN          ;NO ITERATIONS NECESSARY
036546  004737  015400          5$:     JSR     PC,DRVCLR       ;NO ERRORS!
036552                          10002$:
036552  104405                          TRAP    C$ESEG
036554  042701  177200                  BIC     #177200,R1      ;DONE?
036560  001402                          BEQ     6$              ;IF ZERO, YES!!!
036562  006301                          ASL     R1              ;NEXT BIT POSTIION, NOW!
036564  000736                          BR      4$              ;KEEP GOING!
036566  012701  000376          6$:     MOV     #376,R1         ;LAST PATTERN
036572  052701  177000          7$:     BIS     #177000,R1      ;LOAD THE DIAGNOSTIC START AGAIN
036576  104404                          TRAP    C$BSEG
036600  010177  143732                  MOV     R1,@RPMR1       ;LOAD THE WRAP DATA NOW
036604  004737  015146                  JSR     PC,DRIVER       ;EXECUTE THE DIAGNOSTIC COMMAND NOW
036610  017746  143736                  MOV     @RPER2,-(SP)    ;GET THE RESULTS
036614  042716  177400                  BIC     #177400,(SP)    ;STRIP UNWANTED DATA
036620  120126                          CMPB    R1,(SP)+        ;MATCH??
036622  001415                          BEQ     8$              ;IF SO, SKIP ERROR REPORT
036624  005037  002454                  CLR     EXPTED          ;RESET THE EXPECTED DATA
036630  110137  002454                  MOVB    R1,EXPTED       ;LOG THE GOOD DATA
036634  016637  177776  002452          MOV     -2(SP),RCVED    ;LOG THE BAD DATA
036642  104456                          TRAP    C$ERHRD
036644  000126                          .WORD   86
036646  012454                          .WORD   EM14
036650  014172                          .WORD   ERR0
036652  005037  002402                  CLR     ITCOUN          ;RESET THE ITERATIONS COUNTER
036656  004737  015400          8$:     JSR     PC,DRVCLR       ;RESET ANY ERRORS
036662                          10003$:
036662  104405                          TRAP    C$ESEG
036664  042701  177400                  BIC     #177400,R1      ;REMOVE THE MASK
036670  000261                          SEC                     ;CARRY = 1
036672  006101                          ROL     R1              ;SHIFT LEFT (ONE TIME!!)
036674  042701  177400                  BIC     #177400,R1      ;CLEAR THE UNUSED BITS FOR THE FINAL TEST
036700  022701  000377                  CMP     #377,R1         ;DONE??
036704  001332                          BNE     7$              ;IF NOT, KEEP GOING
036706  005337  002402                  DEC     ITCOUN          ;ONE LESS ITERATION TO-GO
036712  003402                          BLE     9$              ;IF <= 0, DONE
036714  000137  036272                  JMP     1$              ;DO UNTIL = 0
036720  004737  015400          9$:     JSR     PC,DRVCLR       ;ELIMINATE ANY ERRORS!!
```

```
    99 036724  004737  015312              JSR     PC,DIAGEN         ;SHUT THE DIAGNOSTIC MONITOR OFF.
   100 036730                     L10101:
       036730  104401                      TRAP    C$ETST
```

```
                                        .SBTTL  TEST 52 ERROR LOG DUMP

                                        ;%      TEST 52 ERROR LOG DUMP
                                        ;%      :  THIS TEST DOES NO DATA CHECKING
                                        ;%      :  LOAD #17(HEX) INTO RPMR1, HIGH BYTE
                                        ;%      :  LOAD LOW BYTE OF RPMR1 WITH RAM LOCATION TO BE DUMPED:
                                        ;%      :  71-72(HEX) FOR REVISION LEVEL
                                        ;%      :  32-37(HEX) FOR THE ERROR LOG
                                        ;%      :  88(HEX) FOR FAILED RECAL ATTEMPTS
                                        ;%      :  38-4A(HEX) FOR LAST 20. UNIQUE ERROR LOG ENTRIES
                                        ;%      :  REPEAT
                                        ;%      :  :  LOAD A DIAGNOSTIC COMMAND
                                        ;%      :  :  WHEN COMMAND EXECUTION COMPLETES GET CONTENTS OF RPER2
                                        ;%      :  :  CONVERT TO HEX OR DECIMAL (AS REQUIRED)
                                        ;%      :  :  PRINT OUTPUT TO USER
                                        ;%      :  :  UNTIL ALL CONTENTS HAVE BEEN DUMPED
                                        ;%      :  ENDREPEAT
                                        ;%      END TEST 52

036732                                  T52::
036732  005737  002334                          TST     ERRDMP                  ;DUMP THE ERROR LOG?
036736  003002                                  BGT     1$                      ;IF >0, YES
036740  104432                                  TRAP    C$EXIT
036742  000736                                  .WORD   L10102-.
036744  004737  016662                  1$:     JSR     PC,SEIZE                ;LOAD THE DRIVE NUMBER
036750  012702  002652                          MOV     #PSTACK,R2              ;GET THE OUTPUT BUFFER
036754  012737  000035  002420                  MOV     #DIAG,FUNCTN            ;SET UP FOR A DIAGNOSTIC COMMAND
036762  012701  000161                          MOV     #161,R1                 ;THIS IS THE FIRST LOW BYTE PARAMETER (71 HEX)
036766  012704  000027                          MOV     #27,R4                  ;THIS IS THE DUMP ROUTINE NUMBER (17 HEX)
036772  000304                                  SWAB    R4                      ;PUT THIS AS THE COMMAND NUMBER
036774  004737  015260                          JSR     PC,DIAGST               ;START THE DIAGNOSTIC MONITOR
037000  050104                          2$:     BIS     R1,R4                   ;LOAD THE RAM ADDRESS
037002  004737  015400                          JSR     PC,DRVCLR               ;NO ERRORS INITIALLY
037006  004737  015352                          JSR     PC,DIAGLD               ;ISSUE THE COMMAND
037012  017712  143534                          MOV     @RPER2,(R2)             ;GET THE RESULTS (8080/2901 REV'S)
037016  042722  177400                          BIC     #177400,(R2)+           ;STRIP OUT UNWANTED DATA
037022  040104                                  BIC     R1,R4                   ;REMOVE THE LOW BYTE ARGUMENT
037024  020127  000162                          CMP     R1,#162                 ;DONE BOTH LOCATIONS? (72 HEX)
037030  001402                                  BEQ     3$                      ;IF MATCH, YES
037032  005201                                  INC     R1                      ;SET THE 2901 REV LEVEL REQUEST
037034  000761                                  BR      2$                      ;AND GO TO THE RAM AND GET IT
037036                                  3$:                                     ;PRINT 8080 AND 2901 REVISION LEVELS
037036  013746  002654                          MOV     PSTACK+2,-(SP)
037042  013746  002652                          MOV     PSTACK,-(SP)
037046  012746  010202                          MOV     #FRMT20,-(SP)
037052  012746  000003                          MOV     #3,-(SP)
037056  010600                                  MOV     SP,R0
037060  104417                                  TRAP    C$PNTF
037062  062706  000010                          ADD     #10,SP
037066  012701  000061                          MOV     #61,R1                  ;SET UP FOR THE NEXT RAM DUMP (31 HEX)
037072  004737  015400                          JSR     PC,DRVCLR               ;NO ERRORS NOW!
037076  004737  017252                          JSR     PC,NEXLOC               ;NOW GET THE DATA
037102  017746  143444                          MOV     @RPER2,-(SP)            ;GET THE RAM OUTPUT
037106  042726  177400                          BIC     #177400,(SP)+           ;STRIP UNUSED DATA
                                                                                ;PRINT NUMBER OF SEEKS TOO LONG
037112  016646  177776                          MOV     -2(SP),-(SP)
037116  012746  007574                          MOV     #FRMT07,-(SP)
```

```
       037122  012746  000002                  MOV     #2,-(SP)
       037126  010600                          MOV     SP,R0
       037130  104417                          TRAP    C$PNTF
       037132  062706  000006                  ADD     #6,SP
    53 037136  004737  015400                  JSR     PC,DRVCLR          ;NO RESIDUAL ERRORS
    54 037142  004737  017252                  JSR     PC,NEXLOC          ;GET THE NEXT RAM CONTENTS
    55 037146  017746  143400                  MOV     @RPER2,-(SP)       ;GET THE RESULTS
    56 037152  042726  177400                  BIC     #177400,(SP)+      ;STRIP UNWANTED DATA
    57                                                                    ;PRINT NUMBER OF SEEK OVERSHOOTS
    58 037156  016646  177776                  MOV     -2(SP),-(SP)
       037162  012746  007624                  MOV     #FRMT10,-(SP)
       037166  012746  000002                  MOV     #2,-(SP)
       037172  010600                          MOV     SP,R0
       037174  104417                          TRAP    C$PNTF
       037176  062706  000006                  ADD     #6,SP
    59 037202  004737  015400                  JSR     PC,DRVCLR          ;NO ERRORS
    60 037206  004737  017252                  JSR     PC,NEXLOC          ;NEXT CONTENTS, PLEASE..
    61 037212  017746  143334                  MOV     @RPER2,-(SP)       ;GET THE RESULTS
    62 037216  042726  177400                  BIC     #177400,(SP)+      ;STRIP UNUSED DATA
    63                                                                    ;PRINT NUMBER OF SOFT SEEK OVERSHOOTS
    64 037222  016646  177776                  MOV     -2(SP),-(SP)
       037226  012746  007655                  MOV     #FRMT11,-(SP)
       037232  012746  000002                  MOV     #2,-(SP)
       037236  010600                          MOV     SP,R0
       037240  104417                          TRAP    C$PNTF
       037242  062706  000006                  ADD     #6,SP
    65 037246  004737  015400                  JSR     PC,DRVCLR          ;NO FURTHER ERRORS
    66 037252  004737  017252                  JSR     PC,NEXLOC          ;GET THE NEXT CONTENTS PLEASE..
    67 037256  017746  143270                  MOV     @RPER2,-(SP)       ;GET THE RESULTS
    68 037262  042726  177400                  BIC     #177400,(SP)+      ;STRIP THE UNUSED DATA
    69                                                                    ;PRINT GUARD-BAND DETECTED SKI'S
    70 037266  016646  177776                  MOV     -2(SP),-(SP)
       037272  012746  007713                  MOV     #FRMT12,-(SP)
       037276  012746  000002                  MOV     #2,-(SP)
       037302  010600                          MOV     SP,R0
       037304  104417                          TRAP    C$PNTF
       037306  062706  000006                  ADD     #6,SP
    71 037312  004737  015400                  JSR     PC,DRVCLR          ;NO FURTHER ERRORS
    72 037316  004737  017252                  JSR     PC,NEXLOC          ;NEXT RAM LOCATION...
    73 037322  017746  143224                  MOV     @RPER2,-(SP)       ;GET THE RESULTS
    74 037326  042726  177400                  BIC     #177400,(SP)+      ;STRIP THE UNUSED DATA
    75                                                                    ;PRINT NUMBER OF INDEX ERRORS
    76 037332  016646  177776                  MOV     -2(SP),-(SP)
       037336  012746  007756                  MOV     #FRMT13,-(SP)
       037342  012746  000002                  MOV     #2,-(SP)
       037346  010600                          MOV     SP,R0
       037350  104417                          TRAP    C$PNTF
       037352  062706  000006                  ADD     #6,SP
    77 037356  004737  015400                  JSR     PC,DRVCLR          ;NO FURTHER ERRORS
    78 037362  004737  017252                  JSR     PC,NEXLOC          ;NEXT RAM LOCATION
    79 037366  017746  143160                  MOV     @RPER2,-(SP)       ;GET THE RESULTS
    80 037372  042726  177400                  BIC     #177400,(SP)+      ;STRIP THE ''WHO CARES'' BITS
    81                                                                    ;PRINT NUMBER OF PLO UNSAFES
    82 037376  016646  177776                  MOV     -2(SP),-(SP)
       037402  012746  010004                  MOV     #FRMT14,-(SP)
       037406  012746  000002                  MOV     #2,-(SP)
       037412  010600                          MOV     SP,R0
```

```
037414  104417                  TRAP    C$PNTF
037416  062706  000006          ADD     #6,SP
037422  012701  000210          MOV     #210,R1                 ;GET THE SET-UP FOR THE #OF RECAL ATTEMPTS(88 HEX)
037426  004737  015400          JSR     PC,DRVCLR               ;NO FURTHER ERRORS
037432  004737  017252          JSR     PC,NEXLOC               ;GET THE DATA NOW
037436  017746  143110          MOV     @RPER2,-(SP)            ;GET THE RESULTS
037442  042726  177400          BIC     #177400,(SP)+           ;STRIP THE UNWANTED DATA
                                                                ;PRINT THE NUMBER OF RECAL ATTEMPTS
037446  016646  177776          MOV     -2(SP),-(SP)
037452  012746  010031          MOV     #FRMT15,-(SP)
037456  012746  000002          MOV     #2,-(SP)
037462  010600                  MOV     SP,R0
037464  104417                  TRAP    C$PNTF
037466  062706  000006          ADD     #6,SP
                                                                ;PRINT ERROR LOG ENTRIES, IF ANY
037472  012746  010070          MOV     #FRMT16,-(SP)
037476  012746  000001          MOV     #1,-(SP)
037502  010600                  MOV     SP,R0
037504  104417                  TRAP    C$PNTF
037506  062706  000004          ADD     #4,SP
037512  012702  000004          MOV     #4,R2                   ;GET A 4 ITERATION COUNT
037516  012701  000067          MOV     #67,R1                  ;GET THE FIRST RAM LOCATION-1 FOR THE LAST 20 ERRORS
037522  012703  000005  4$:     MOV     #5,R3                   ;5 ENTRIES / ROW
                                                                ;CR-LF
037526  012746  006420          MOV     #CRLF,-(SP)
037532  012746  000001          MOV     #1,-(SP)
037536  010600                  MOV     SP,R0
037540  104417                  TRAP    C$PNTF
037542  062706  000004          ADD     #4,SP
037546  004737  015400  5$:     JSR     PC,DRVCLR               ;NO FURTHER ERRORS
037552  004737  017252          JSR     PC,NEXLOC               ;GET THE RAM DATA
037556  017746  142770          MOV     @RPER2,-(SP)            ;GET THE RESULTS
037562  042716  177400          BIC     #177400,(SP)            ;STRIP THE UNUSED RESULTS
037566  005726                  TST     (SP)+                   ;LOOK FOR NULL DATA
037570  001427                  BEQ     6$                      ;TAKE BRANCH IF 0
037572  005746                  TST     -(SP)                   ;RESTORE THE STACK FOR OCTHEX
037574  004737  015416          JSR     PC,OCTHEX               ;CONVERT TO HEX
                                                                ;DUMP THE RAM CONTENTS
037600  012746  002660          MOV     #PSTACK+6,-(SP)
037604  012746  002656          MOV     #PSTACK+4,-(SP)
037610  012746  002654          MOV     #PSTACK+2,-(SP)
037614  012746  002652          MOV     #PSTACK,-(SP)
037620  012746  010161          MOV     #FRMT17,-(SP)
037624  012746  000005          MOV     #5,-(SP)
037630  010600                  MOV     SP,R0
037632  104417                  TRAP    C$PNTF
037634  062706  000014          ADD     #14,SP
037640  005303                  DEC     R3                      ;ONE LESS ROW TO GO
037642  003341                  BGT     5$                      ;KEEP GOING
037644  005302                  DEC     R2                      ;ONE LESS COLUMN TO GO
037646  003325                  BGT     4$                      ;KEEP GOING
037650                  6$:                                     ;CR-LF
037650  012746  006420          MOV     #CRLF,-(SP)
037654  012746  000001          MOV     #1,-(SP)
037660  010600                  MOV     SP,R0
037662  104417                  TRAP    C$PNTF
037664  062706  000004          ADD     #4,SP
```

```
    037670  004737  015400                  JSR     PC,DRVCLR       ;RESET RPER2 TO 0
    037674  004737  015312                  JSR     PC,DIAGEN       ;SHUT OFF THE DIAGNOSTIC MONITOR
    037700                          L10102:
    037700  104401                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 53 COMPOSITE MICROCODE TEST

                                        ;%      TEST 53 COMPOSITE MICROCODE TEST
                                        ;%      :  THIS TEST RUNS TWO SEQUENCES OF MICRODIAGNOSTICS THROUGH THE
                                        ;%      :  RP07.  THE FIRST SEQUENCE IS COMPRISED OF ROUTINES 24 - 3B
                                        ;%      :  THE SECOND SEQUENCE IS COMPRISED OF ROUTINES 18 - 23.  IF THE
                                        ;%      :  LOOP ON ERROR OPTION IS SELECTED, THE ROUTINE WHICH WAS RUNNING
                                        ;%      :  AT THE TIME OF THE ERROR WILL BE 'FROZEN' SO THAT THE ERROR MAY
                                        ;%      :  BE ANALYZED FURTHER TO IDENTIFY THE FAILURE MECHANISM.
                                        ;%      :  TEST ALGORITHM IS AS FOLLOWS:
                                        ;%      :  TURN ON THE DIAGNOSTIC MONITOR
                                        ;%      :  LOAD RPMR1 WITH A DIAGNOSTIC NUMBER (AND HEAD NUMBER IF NECESSARY)
                                        ;%      :  REPEAT
                                        ;%      :  :  ISSUE A DIAGNOSTIC COMMAND
                                        ;%      :  :  IF RPER2 (LOW BYTE) <> 0
                                        ;%      :  :  :  THEN
                                        ;%      :  :  :  REPORT THE ERROR (IN HEX), AND THE MODULE CALLOUT
                                        ;%      :  :  ENDIF
                                        ;%      :  :  UNTIL ALL ROUTINES HAVE BEEN RUN
                                        ;%      :  ENDREPEAT
                                        ;%      :  TURN OFF THE DIAGNOSTIC MONITOR
                                        ;%      END TEST 53

037702                                  T53::
037702  012704  000044                          MOV     #44,R4          ;SET UP THE FIRST ROUTINE NUMBER
037706  004737  016662                          JSR     PC,SEIZE        ;LOAD THE DRIVE NUMBER
037712  004737  015260                          JSR     PC,DIAGST       ;AND THEN THE ''HANDSHAKE''
037716  005002                                  CLR     R2              ;R2 USED FOR THE TRACK ADDRESS
037720  000304                          1$:     SWAB    R4              ;R4 HIGH BYTE USED FOR THE ROUTINE #
037722                                  2$:
037722  104404                                  TRAP    C$BSEG
037724  004737  015352                          JSR     PC,DIAGLD       ;NOW EXECUTE THE ROUTINE NUMBER
037730  017746  142616                          MOV     @RPER2,-(SP)    ;GET THE RESULTS OF THE TEST
037734  042726  177400                          BIC     #177400,(SP)+   ;STRIP JUNK
037740  001414                                  BEQ     3$              ;IF 0, YES!!
037742  104456                                  TRAP    C$ERHRD
037744  000620                                  .WORD   400
037746  013564                                  .WORD   EM35
037750  014310                                  .WORD   ERR1
037752  012737  040011  002420                  MOV     #TRE!DRCLR,FUNCTN       ;LOAD THE DRIVE CLEAR AND CONTROLLER CLEAR COMMAND
037760  004737  015146                          JSR     PC,DRIVER       ;NOW EXECUTE THE DRIVE CLEAR COMMAND
037764  052777  100000  142544                  BIS     #DMD,@RPMR1     ;SET THE DIAGNOSTIC MODE BIT AGAIN
037772                                  3$:
037772                                  10000$:
037772  104405                                  TRAP    C$ESEG
037774  000304                                  SWAB    R4              ;RESTORE R4
037776  005204                                  INC     R4              ;GET NEXT ROUTINE #
040000  120427  000037                          CMPB    R4,#37          ;IS THIS A READ/WRITE ROUTINE?
040004  103745                                  BLO     1$              ;VALID ROUTINE, KEEP GOING
040006  120427  000043                          CMPB    R4,#43          ;READ-WRITE ROUTINE?
040012  101035                                  BHI     5$              ;IF HIGHER, NO
040014  000304                                  SWAB    R4              ;ROUTINE # IN HIGH BYTE
040016  005737  002336                          TST     SELTRK          ;USER SPECIFIED TRACK ADDRESS??
040022  001411                                  BEQ     4$              ;IF ZERO, NO-DO THEM ALL!!
040024  010446                                  MOV     R4,-(SP)        ;GET R4 ON THE STACK FOR SOME CHECKING
040026  042716  000377                          BIC     #377,(SP)       ;STRIP THE TRACK ADDRESS
040032  022627  021400                          CMP     (SP)+,#21400    ;WAS THIS THE LAST ROUTINE?
```

```
040036  001431                          BEQ     6$              ;IF =, YES IT WAS!!
040040  053704  002340                  BIS     TRAKAD,R4       ;SET THE USER SPECIFIED TRACK ADDRESS
040044  000726                          BR      2$              ;AND GO-ON
040046  162704  000400          4$:     SUB     #400,R4         ;GET THE LAST ROUTINE # (WE MAY NOT BE DONE)
040052  040204                          BIC     R2,R4           ;RESET THE TRACK ADDRESS
040054  005202                          INC     R2              ;NEXT TRACK ADDRESS, PLEASE
040056  050204                          BIS     R2,R4           ;LOAD THE NEW TRACK ADDRESS
040060  020227  000037                  CMP     R2,#31.         ;WAS IT LEGAL?
040064  101716                          BLOS    2$              ;YES IT WAS, GO-ON
040066  105004                          CLRB    R4              ;RESET TO TRACK 0
040070  005002                          CLR     R2              ;AND RESET THE TRACK TO 0
040072  062704  000400                  ADD     #400,R4         ;GET NEXT ROUTINE #
040076  020427  021400                  CMP     R4,#21400       ;IS THIS ROUTINE #43 (HIGH BYTE INFO)?
040102  103707                          BLO     2$              ;IF LESS, NO
040104  000406                          BR      6$              ;DONE, TURN OFF THE MONITOR
040106  120427  000073          5$:     CMPB    R4,#73          ;END ROUTINE?
040112  101702                          BLOS    1$              ;NOT YET, IF LOWER
040114  012704  000030                  MOV     #30,R4          ;LOAD THE NEXT SEQUENCE OF ROUTINES
040120  000677                          BR      1$              ;AND KEEP GOING
040122  004737  015312          6$:     JSR     PC,DIAGEN       ;ALL DONE, SHUT-OFF THE DIAGNOSTIC MONITOR
040126                          L10103:
040126  104401                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 54 READ-IN-PRESET FUNCTIONAL TEST

                                ;%      TEST 54 READ-IN-PRESET FUNCTIONAL TEST
                                ;%      :  WRITE RPDA WITH DATA PATTERN #3
                                ;%      :  WRITE RPDC WITH DATA PATTERN #3
                                ;%      :  SET RPOF:  FMT = 1
                                ;%      :  ISSUE A READ-IN-PRESET COMMAND
                                ;%      :  :  IF ((RPDA) OR (RPDC) OR (RPOF:  FMT) <> 0
                                ;%      :  :  THEN
                                ;%      :  :  OUTPUT ERROR MESSAGE (RIP COMMAND FAILED TO EXECUTE PROPERLY)
                                ;%      :  :  OUTPUT FAULT LIST:  J12
                                ;%      :  ENDIF
                                ;%      END TEST 54

040130                          T54::
040130  012737  000012  002402          MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
040136  032777  010000  142360          BIT     #MOL,@RPDS      ;DRIVE ON-LINE?
040144  001016                          BNE     1$              ;IF = 1, YES
040146  004737  017326                  JSR     PC,SAVRPR       ;GET THE REGISTER IMAGE
040152  013746  002114                  MOV     L$TEST,-(SP)
040156  012746  006452                  MOV     #MSGMOL,-(SP)
040162  012746  000002                  MOV     #2,-(SP)
040166  010600                          MOV     SP,R0
040170  104417                          TRAP    C$PNTF
040172  062706  000006                  ADD     #6,SP
040176  104432                          TRAP    C$EXIT
040200  000162                          .WORD   L10104-.
040202                          1$:
040202  104404                          TRAP    C$BSEG
040204  004737  016662                  JSR     PC,SEIZE        ;GET THE DRIVE UNDER TEST
040210  013777  002350  142302          MOV     PATT3,@RPDA     ;WRITE PRDA = -1
040216  013777  002350  142322          MOV     PATT3,@RPDC     ;WRITE RPDC = -1
040224  052777  010000  142312          BIS     #FMT,@RPOF      ;FMT 16 = 1
040232  012777  000021  142252          MOV     #RIP,@RPCS1     ;ISSUE THE READ-IN-PRESET COMMAND
040240  005777  142254                  TST     @RPDA           ;DID RPDA CLEAR?
040244  001405                          BEQ     2$              ;IF 0, YES!
040246  004737  017422                  JSR     PC,BICEXP       ;FORM THE FAILING DATA
040252  002520                          RPDA                    ;THIS REGISTER
040254  177777                          177777                  ;THESE BITS FAILED TO CLEAR
040256  000420                          BR      4$              ;GO-ON
040260  005777  142262          2$:     TST     @RPDC           ;DID RPDC CLEAR?
040264  001405                          BEQ     3$              ;IF = 0, YES!
040266  004737  017422                  JSR     PC,BICEXP       ;FORM THE FAILING DATA
040272  002546                          RPDC                    ;THIS REGISTER
040274  177777                          177777                  ;THESE BITS FAILED TO CLEAR
040276  000410                          BR      4$              ;NOW REPORT THE ERROR
040300  032777  010000  142236  3$:     BIT     #FMT,@RPOF      ;DID FMT16 CLEAR
040306  001417                          BEQ     5$              ;IF 0, YES
040310  004737  017422                  JSR     PC,BICEXP       ;FORM THE FAILING DATA FOR THIS FAILURE
040314  002544                          RPOF                    ;THIS REGISTER
040316  010000                          FMT                     ;THIS BIT FAILEDS TO CLEAR
040320  012737  004000  002404  4$:     MOV     #BIT11,ERRWD1   ;FORM MODULE CALL-OUT
040326  005037  002406                  CLR     ERRWD2          ;BOTH WORDS
040332  104456                          TRAP    C$ERHRD
040334  000127                          .WORD   87
040336  013326                          .WORD   EM30
040340  014172                          .WORD   ERRO
```

```
040342  005037  002402                  CLR     ITCOUN          ;NO ITERATIONS NOW!!
040346                          5$:
040346                          10000$:
040346  104405                          TRAP    C$ESEG
040350  005337  002402                  DEC     ITCOUN          ;ONE LESS ITERATION
040354  003312                          BGT     1$              ;IF <= 0, DONE!!
040356  004737  017722                  JSR     PC,PRELOD       ;PUT DRIVE BACK IN 16 BIT MODE
040362                          L10104:
040362  104401                          TRAP    C$ETST
```

```
                                        .SBTTL  TEST 55 COMMAND REJECT TEST

                                        ;%      TEST 55 COMMAND REJECT TEST
                                        ;%      :  SET RPCS2:  PAT = 1
                                        ;%      :  WRITE RPDA WITH DATA PATTERN #3, ONCE
                                        ;%      :  WRITE RPAS WITH DATA PATTERN #3, ONCE
                                        ;%      :  ISSUE A READ-IN-PRESET COMMAND
                                        ;%      :  IF ((RPDS:  ATA <> 1) OR (RPDA <> DATA PATTERN #3))
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (COMMAND EXECUTED WITH ERRORS PRESENT)
                                        ;%      :  :  OUTPUT FAULT LIST:  J12
                                        ;%      :  ENDIF
                                        ;%      END TEST 55

040364                                  T55::
040364  012737  000012  002402                  MOV     #10.,ITCOUN     ;LOAD THE ITERATION COUNT
040372  032777  010000  142124                  BIT     #MOL,@RPDS      ;DRIVE ON-LINE?
040400  001016                                  BNE     1$              ;IF = 1, YES
040402  004737  017326                          JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
040406  013746  002114                          MOV     L$TEST,-(SP)
040412  012746  006452                          MOV     #MSGMOL,-(SP)
040416  012746  000002                          MOV     #2,-(SP)
040422  010600                                  MOV     SP,R0
040424  104417                                  TRAP    C$PNTF
040426  062706  000006                          ADD     #6,SP
040432  104432                                  TRAP    C$EXIT
040434  000166                                  .WORD   L10105-.
040436                                  1$:
040436  104404                                  TRAP    C$BSEG
040440  004737  016662                          JSR     PC,SEIZE        ;GET THE DRIVE UNDER TEST
040444  052777  000020  142050                  BIS     #PAT,@RPCS2     ;INVERT PARITY (FORCE ERRORS)
040452  013777  002350  142040                  MOV     PATT3,@RPDA     ;WRITE RPDA = - 1
040460  013777  002350  142042                  MOV     PATT3,@RPAS     ;WRITE RPAS = - 1
040466  004737  017000                          JSR     PC,WAIT         ;NOW WAIT FOR THE 8080 TO DETECT THE PARITY ERROR
040472  012777  000021  142012                  MOV     #RIP,@RPCS1     ;ISSUE A READ-IN-PRESET
040500  023777  002350  142012                  CMP     PATT3,@RPDA     ;MATCH??
040506  001412                                  BEQ     2$              ;IF OK, (MATCH) GO-ON
040510  013737  002350  002454                  MOV     PATT3,EXPTED    ;FORM THE EXPECTED DATA
040516  013737  002520  002456                  MOV     RPDA,TESTRG     ;GET THE FAILING REGISTER
040524  017737  141770  002452                  MOV     @RPDA,RCVED     ;NOW THE FAILING RESULTS
040532  000412                                  BR      3$              ;NOW REPORT IT!
040534  004737  017000                  2$:     JSR     PC,WAIT         ;STALL FOR RP07 MICROPROCESSOR DELAY
040540  032777  100000  141756                  BIT     #ATA,@RPDS      ;DID ATA CLEAR
040546  001017                                  BNE     4$              ;IF SET, NO - IT'S OK
040550  004737  017372                          JSR     PC,BISEXP       ;FORM ERROR DATA
040554  002524                                  RPDS                    ;THIS REGISTER
040556  100000                                  ATA                     ;THIS BIT FAILED TO SET
040560  012737  004000  002404          3$:     MOV     #BIT11,ERRWD1   ;FORM MODULE CALL-OUT
040566  005037  002406                          CLR     ERRWD2          ;BOTH WORDS
040572  104456                                  TRAP    C$ERHRD
040574  000130                                  .WORD   88
040576  013326                                  .WORD   EM30
040600  014172                                  .WORD   ERRO
040602  005037  002402                          CLR     ITCOUN          ;NO ITERATIONS NEEDED
040606                                  4$:
040606                                  10000$:
040606  104405                                  TRAP    C$ESEG
```

```
    49 040610  005337  002402                  DEC     ITCOUN          ;ONE LESS ITERATION TO-GO
    50 040614  003310                          BGT     1$              ;IF <= 0, DONE
    51 040616  004737  017722                  JSR     PC,PRELOD       ;16/BIT MODE
    52 040622                          L10105:
       040622  104401                          TRAP    C$ETST
```

```
                                         .SBTTL  TEST 56: DATA TEST #1

                                         ;%      TEST  DATA TEST #1 FIRST DATA TEST OF THE MASSBUS DATA LINES
                                         ;%      :  SET UP A (TOGGLE) BIT MAP FOR ALL EXPECTED BITS (BITS 0 TO 15)
                                         ;%      :  SET UP FOR A RETRY OF 20128 ITERATIONS (629 * 32)
                                         ;%      :  SET RPDC = 0
                                         ;%      :  SET RPDA = 255(.)
                                         ;%      :  REPEAT
                                         ;%      :  :  SET RPOF:  CMOD = 1
                                         ;%      :  :  ISSUE A READ TRACK DESCRIPTOR COMMAND
                                         ;%      :  :  IF (RPCS1:  TRE) OR (RPDS:  ERR) = 1
                                         ;%      :  :  :  THEN
                                         ;%      :  :  :  SET RPCS2:  CLR = 1
                                         ;%      :  :  :  INCREMENT THE RETRY COUNTER
                                         ;%      :  :  :  RELOAD THE DRIVE NUMBER
                                         ;%      :  :  :  IF RPDA < LAST TRACK ADDRESS (32-RP07)
                                         ;%      :  :  :  :  THEN INCREMENT RPDA (HIGH BYTE ONLY)
                                         ;%      :  :  :  :  ELSE CLEAR RPDA (HIGH BYTE)
                                         ;%      :  :  :  :  INCREMENT RPDC
                                         ;%      :  :  :  ENDIF
                                         ;%      :  :  :  ELSE
                                         ;%      :  :  :  STORE TD WORD #1 AND WORD #2
                                         ;%      :  :  :  MARK OFF BITS WHICH JUST TOGGLED FROM OFF TO ON, IN BIT MAP
                                         ;%      :  :  :  INCREMENT RPDA (HIGH BYTE ONLY)
                                         ;%      :  :  :  IF RPDA (HIGH BYTE) > LAST TRACK ADDRESS (32-RP07)
                                         ;%      :  :  :  :  THEN
                                         ;%      :  :  :  :  SET RPDA (HIGH BYTE) = 0
                                         ;%      :  :  :  :  INCREMENT RPDC
                                         ;%      :  :  :  :  ELSE
                                         ;%      :  :  :  INCREMENT RPDA (HIGH BYTE ONLY)
                                         ;%      :  :  :  ENDIF
                                         ;%      :  :  ENDIF
                                         ;%      :  :  UNTIL (BIT MAP-ALL BITS UNDER TEST HAVE TOGGLED) OR (RETRY MAX EXCEEDED)
                                         ;%      :  ENDREPEAT
                                         ;%      :  IF BIT MAP DIDN'T COMPLETELY TOGGLE, AND RETRY COUNT > MAXIMUM (20128)
                                         ;%      :  :  THEN
                                         ;%      :  :  OUTPUT ERROR MESSAGE (DATA LINES STUCK OR OPEN)
                                         ;%      :  :  OUTPUT FAULT LIST:  J11 / J13, CABLES, RHXX, J10, TERMINATOR
                                         ;%      :  ENDIF
                                         ;%      END TEST

 040624                                  T56::
 040624  004737  016662                          JSR     PC,SEIZE          ;GET THE DRIVE UNDER TEST
 040630  032777  010000  141666                  BIT     #MOL,@RPDS        ;IS THE DRIVE REALLY ON-LINE?
 040636  001016                                  BNE     1$                ;IF SET, IT IS ON-LINE
 040640  004737  017326                          JSR     PC,SAVRPR         ;GET THE REGISTER SNAPSHOT
 040644  013746  002114                          MOV     L$TEST,-(SP)
 040650  012746  006452                          MOV     #MSGMOL,-(SP)
 040654  012746  000002                          MOV     #2,-(SP)
 040660  010600                                  MOV     SP,R0
 040662  104417                                  TRAP    C$PNTF
 040664  062706  000006                          ADD     #6,SP
 040670  104432                                  TRAP    C$EXIT
 040672  000262                                  .WORD   L10106-.
 040674  012737  000012  002402          1$:     MOV     #10.,ITCOUN       ;LOAD THE ITERATION COUNT
 040702  012737  177777  002454                  MOV     #-1,EXPTED        ;SET UP FOR THE EXPECTED RESULTS
 040710                                  2$:
```

TEST 56: DATA TEST #1

```
040710  104404                                  TRAP    C$BSEG
040712  005037  002432                          CLR     CSTORE          ;CLEAR THE BITS RECEIVED COUNTER
040716  005037  002452                          CLR     RCVED           ;CLEAR THE RECEIVER OF THE DATA
040722  005037  002416                          CLR     DESCYL          ;START AT CYLINDER 0
040726  012737  000377  002414                  MOV     #377,DESTRK     ;AND TRACK 0
040734  012701  000006                          MOV     #6,R1           ;GET AN ITERATION COUNT
040740  012702  002652                          MOV     #PSTACK,R2      ;GET THE BUFFER ADDRESS
040744  005022                          3$:     CLR     (R2)+           ;INITIALIZE THE BUFFER
040746  005301                                  DEC     R1              ;ONE LESS ITERATION TO-GO
040750  003375                                  BGT     3$              ;IF NOT ZERO, KEEP GOING
040752  052777  100000  141564          4$:     BIS     #CMOD,@RPOF     ;SET COMMAND MODIFIER
040760  012737  000075  002420                  MOV     #RTD,FUNCTN     ;SET COMMAND = READ TRACK DESCRIPTOR
040766  012737  002652  002366                  MOV     #PSTACK,TABADD  ;LOAD BUFFER LINK
040774  012737  000006  002412                  MOV     #6,NEGWRD       ;SET WORD COUNT
041002  004737  015146                          JSR     PC,DRIVER       ;DO THE OPERATION NOW!
041006  005237  002432                          INC     CSTORE          ;SHOW THIS ITERATION IN THE COUNTER
041012  032777  040000  141504                  BIT     #ERR,@RPDS      ;DID WE GET AN ERROR?
041020  001004                                  BNE     5$              ;IF SET, YES
041022  032777  040000  141462                  BIT     #TRE,@RPCS1     ;DID WE GET A TRANSFER ERROR?
041030  001403                                  BEQ     6$              ;NO, THE TRANSFER WAS OK!
041032  004737  016662                  5$:     JSR     PC,SEIZE        ;GET RID OF ERRORS NOW
041036  000414                                  BR      8$
041040  012701  000006                  6$:     MOV     #6,R1           ;GET THE ITERATION COUNT
041044  012702  002652                          MOV     #PSTACK,R2      ;AND THE BUFFER ADDRESS
041050  052237  002452                  7$:     BIS     (R2)+,RCVED     ;LOG THE BIT(S) TRANSITION(S)
041054  005301                                  DEC     R1              ;REDUCE THE ITERATION COUNT
041056  003374                                  BGT     7$              ;IF > 0, KEEP GOING!
041060  023737  002452  002454                  CMP     RCVED,EXPTED    ;ALL BITS TOGGLE?
041066  001426                                  BEQ     10$             ;IF SAME, YES
041070  023727  002432  047200          8$:     CMP     CSTORE,#<628.*32.> ;DONE ALL CYLINDERS?
041076  103003                                  BHIS    9$              ;YES, THERE IS AN ERROR
041100  004737  017266                          JSR     PC,SPIRAL       ;UPDATE THE DRIVER
041104  000722                                  BR      4$              ;AND GO-ON!
041106  013737  002534  002456          9$:     MOV     RPDB,TESTRG     ;LOAD FAILING "REGISTER"
041114  012737  013000  002404                  MOV     #BIT9!BIT10!BIT12,ERRWD1 ;CREATE MODULE CALL-OUT
041122  012737  000406  002406                  MOV     #BIT1!BIT2!BIT8,ERRWD2 ;BOTH WORDS
041130  104456                                  TRAP    C$ERHRD
041132  001440                                  .WORD   800
041134  013362                                  .WORD   EM31
041136  014172                                  .WORD   ERR0
041140  005037  002402                          CLR     ITCOUN          ;NO FURTHER ITERATIONS NECESSARY
041144                                  10$:
041144                                  10000$:
041144  104405                                  TRAP    C$ESEG
041146  005337  002402                          DEC     ITCOUN          ;ONE LESS ITERATION TO GO
041152  003256                                  BGT     2$              ;DO UNTIL = 0
041154                                  L10106:
041154  104401                                  TRAP    C$ETST
```

```
                                          .SBTTL  TEST 57: DATA TEST #2

                                          ;%      TEST DATA TEST #2 TEST INVALID ADDRESS ERROR, RECALIBRATE & SEEK COMMANDS
                                          ;%      :  SET RPDC = FE CYLINDER ADDRESS
                                          ;%      :  SET RPDA = 0
                                          ;%      :  SET RPOF:  CMD
                                          ;%      :  CLEAR RMPM1:  DMD
                                          ;%      :  ISSUE SEEK COMMAND
                                          ;%      :  IF RPER1:  IAE <> 1
                                          ;%      :  :  THEN
                                          ;%      :  :  OUTPUT ERROR MESSAGE (FAILED TO DETECT AN INVALID ADDRESS ERROR)
                                          ;%      :  :  OUTPUT FAULT LIST:  J09, J10, J08, J07, J12, RHXX, CABLES, TERMINATOR
                                          ;%      :  :  ELSE
                                          ;%      :  :  SET RPCS2:  CLR = 1
                                          ;%      :  :  ISSUE RECALIBRATE COMMAND
                                          ;%      :  :  IF ((RPCS1:  TRE) OR (RPDS:  ERR)) = 1
                                          ;%      :  :  :  THEN
                                          ;%      :  :  :  OUTPUT ERROR MESSAGE (DETECTED ERRORS AFTER ISSUING A RECALIBRATE COMMAND)
                                          ;%      :  :  :  OUTPUT FAULT LIST:  J09, J10, J12, CABLES, RHXX, TERMINATOR
                                          ;%      :  :  ENDIF
                                          ;%      :  :  SET RPOF:  CMD = 1
                                          ;%      :  :  SET RPMR1:  DMD = 1
                                          ;%      :  :  SET RPDC = FE CYLINDER
                                          ;%      :  :  ISSUE A SEEK COMMAND
                                          ;%      :  :  IF RPDC <> RPCC AND ((RPDS:  ERR <> 1) OR (RPCS1:  TRE <> 1))
                                          ;%      :  :  :  THEN
                                          ;%      :  :  :  OUTPUT ERROR MESSAGE (DIDN'T ACCESS FE CYLINDER PROPERLY, DIDN'T DETECT AN
                                          ;%      :  :  :  OUTPUT FAULT LIST:  J09, J10, RHXX, CABLES, J12, TERMINATOR
                                          ;%      :  :  :  ELSE
                                          ;%      :  :  :  IF RPDC <> RPCC AND ((RPDS:  ERR = 1) OR (RPCS1:  TRE = 1))
                                          ;%      :  :  :  :  THEN
                                          ;%      :  :  :  :  OUTPUT ERROR MESSAGE (DIDN'T ACCESS FE CYLINDER PROPERLY, DID DETECT ERR
                                          ;%      :  :  :  :  OUTPUT FAULT LIST:  J09, J10, J08, J07, RHXX, CABLES, J12
                                          ;%      :  :  :  ENDIF
                                          ;%      :  :  ENDIF
                                          ;%      :  ENDIF
                                          ;%      END TEST

 041156                                   T57::
 041156  013737  002376  002416                   MOV     LASCYL,DESCYL     ;FORM THE CE CYLINDER ADDRESS
 041164  005237  002416                           INC     DESCYL            ;IT IS ONE MORE THAN THE END CYLINDER
 041170  005037  002414                           CLR     DESTRK            ;START AT TRACK #0
 041174  004737  016662                           JSR     PC,SEIZE          ;GET THE DRIVE UNDER TEST
 041200  032777  010000  141316                   BIT     #MOL,@RPDS        ;IS THE DRIVE ON LINE??
 041206  001016                                   BNE     1$                ;IF 1, IT IS
 041210  004737  017326                           JSR     PC,SAVRPR         ;GET THE REGISTER SNAPSHOT
 041214  013746  002114                           MOV     L$TEST,-(SP)
 041220  012746  006452                           MOV     #MSGMOL,-(SP)
 041224  012746  000002                           MOV     #2,-(SP)
 041230  010600                                   MOV     SP,R0
 041232  104417                                   TRAP    C$PNTF
 041234  062706  000006                           ADD     #6,SP
 041240  104432                                   TRAP    C$EXIT
 041242  000432                                   .WORD   L10107-.
 041244                                   1$:
 041244  104404                                   TRAP    C$BSEG
 041246  052777  100000  141270                   BIS     #CMOD,@RPOF       ;SET COMMAND MODIFIER
 54 041254  042777  100000  141254           BIC     #DMD,@RPMR1       ;AND FAIL TO SET DIAGNOSTIC MODE (FORCE ERRORS!!)
 55 041262  012737  002652  002366           MOV     #PSTACK,TABADD    ;DO THE LINK TRANSFER ADDRESS
 56 041270  012737  000006  002412           MOV     #6,NEGWRD         ;AND SET UP A WORD COUNT
 57 041276  012737  000005  002420           MOV     #SEEK,FUNCTN      ;LOAD A SEEK COMMAND
 58 041304  004737  015146                   JSR     PC,DRIVER         ;NOW ISSUE THE COMMAND
 59 041310  004737  017000                   JSR     PC,WAIT           ;WAIT FOR THINGS TO SETTLE DOWN
 60 041314  022777  002000  141204           CMP     #IAE,@RPER1       ;DID WE GET AN INVALID ADDRESS ERROR? (ONLY??)
 61 041322  001423                           BEQ     2$                ;IF = YES WE DID!
 62 041324  012737  002000  002454           MOV     #IAE,EXPTED       ;FORM THE EXPECTED DATA
 63 041332  017737  141170  002452           MOV     @RPER1,RCVED      ;FORM THE RECEIVED DATA
 64 041340  013737  002526  002456           MOV     RPER1,TESTRG      ;THIS REGISTER FAILED THE TEST
 65 041346  012737  005700  002404           MOV     #BIT6!BIT7!BIT8!BIT9!BIT11,ERRWD1;LIST THE MODULE CALLOUT
 66 041354  012737  000406  002406           MOV     #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
 67 041362  104456                           TRAP    C$ERHRD
    041364  001441                           .WORD   801
    041366  012454                           .WORD   EM14
    041370  014172                           .WORD   ERR0
 68 041372                           2$:
    041372                           10000$:
    041372  104405                           TRAP    C$ESEG
 69 041374  104404                           TRAP    C$BSEG
 70 041376  004737  016662                   JSR     PC,SEIZE          ;PURGE ERRORS, AND RELOAD THE DRIVE NUMBER
 71 041402  012737  000007  002420           MOV     #RECAL,FUNCTN     ;NOW SET A RECALIBRATE COMMAND IN THE QUEUE
 72 041410  004737  015146                   JSR     PC,DRIVER         ;EXECUTE THE COMMAND NOW!
 73 041414  004737  017000                   JSR     PC,WAIT           ;WAIT FOR SOME SETTLE TIME
 74 041420  032777  040000  141064           BIT     #TRE,@RPCS1       ;TRANSFER ERROR??
 75 041426  001405                           BEQ     3$                ;NOPE, NOT IF ZERO
 76 041430  004737  017422                   JSR     PC,BICEXP         ;LOAD THIS FAILURE STATUS
 77 041434  002512                           RPCS1                     ;THIS REGISTER
 78 041436  040000                           TRE                       ;THIS BIT SET AND SHOULDN'T HAVE
 79 041440  000410                           BR      4$                ;NOW REPORT THE FIND
 80 041442  032777  040000  141054   3$:     BIT     #ERR,@RPDS        ;DID WE GET AN ERROR SUMMATION BIT??
 81 041450  001420                           BEQ     5$                ;NOT IF ZERO
 82 041452  004737  017422                   JSR     PC,BICEXP         ;FORM THIS ERROR!!
 83 041456  002524                           RPDS                      ;THIS REGISTER FAILED
 84 041460  040000                           ERR                       ;THIS BIT SET AND SHOULDN'T HAVE
 85 041462  012737  005400  002404   4$:     MOV     #BIT8!BIT9!BIT11,ERRWD1;FORM THE MODULE CALLOUT
 86 041470  012737  000406  002406           MOV     #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
 87 041476  104456                           TRAP    C$ERHRD
    041500  001442                           .WORD   802
    041502  013051                           .WORD   EM23
    041504  014172                           .WORD   ERR0
 88 041506  004737  016662                   JSR     PC,SEIZE          ;RESET THE ERROR CONDITION
 89 041512                           5$:
    041512                           10001$:
    041512  104405                           TRAP    C$ESEG
 90 041514  104404                           TRAP    C$BSEG
 91 041516  052777  100000  141012           BIS     #DMD,@RPMR1       ;AND NOW SET DIAGNOSTIC MODE
 92 041524  012737  000005  002420           MOV     #SEEK,FUNCTN      ;LOAD A SEEK COMMAND
 93 041532  004737  015146                   JSR     PC,DRIVER         ;DO THE SEEK NOW!
 94 041536  004737  017000                   JSR     PC,WAIT           ;SETTLE TIME.......
 95 041542  027777  141000  141000           CMP     @RPDC,@RPCC       ;DID WE GET ON-CYLINDER??
 96 041550  001446                           BEQ     7$                ;YES, TEST PASSES
 97 041552  017737  140770  002454           MOV     @RPDC,EXPTED      ;LOAD THE ERROR STATUS
 98 041560  017737  140764  002452           MOV     @RPCC,RCVED       ;EXPECTED VS RECEIVED
 99 041566  013737  002550  002456           MOV     RPCC,TESTRG       ;AND THE "FAILED" REGISTER
100 041574  032777  040000  140722           BIT     #ERR,@RPDS        ;LOOK FOR ERROR BITS
```

```
    101 041602  001017                          BNE     6$              ;WE DIDN'T GET ON-CYLINDER, BUT WE DETECTED AN ERROR
    102 041604  032777  040000  140700          BIT     #TRE,@RPCS1     ;DID WE DETECT A TRANSFER ERROR?
    103 041612  001013                          BNE     6$              ;IF = 1, YES
    104 041614  012737  005400  002404          MOV     #BIT8!BIT9!BIT11,ERRWD1;LOAD THE MODULE CALLOUT
    105 041622  012737  000406  002406          MOV     #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
    106 041630  104456                          TRAP    C$ERHRD
        041632  001443                          .WORD   803
        041634  012725                          .WORD   EM21
        041636  014172                          .WORD   ERRO
    107 041640  000412                          BR      7$              ;NOW CHECK FOR LOOP...
    108 041642  012737  005700  002404  6$:     MOV     #BIT6!BIT7!BIT8!BIT9!BIT11,ERRWD1;LOAD ALL THESE BITS FOR MODULE CALLOUT
    109 041650  012737  000006  002406          MOV     #BIT1!BIT2,ERRWD2;THESE BITS ALSO!!
    110 041656  104456                          TRAP    C$ERHRD
        041660  001444                          .WORD   804
        041662  012454                          .WORD   EM14
        041664  014172                          .WORD   ERRO
    111 041666  004737  016662          7$:     JSR     PC,SEIZE        ;END WITHOUT ERRORS
    112 041672                          10002$:
        041672  104405                          TRAP    C$ESEG
    113 041674                          L10107:
        041674  104401                          TRAP    C$ETST
```

```
.SBTTL  TEST 58: DATA TEST #3

;%      TEST DATA TEST #3 READ TD'S, FORMAT, FORMAT VERIFY A SELECTED TRACK ON FE CYLINDER
;%      THEN PERFORM DATA TESTING ON THAT TRACK
;%      :  VAR    DO-REPEAT:  BOOLEAN
;%      :  VAR    RETRY-COUNTER:  INTEGER
;%      :  SET RPDC = FE CYLINDER ADDRESS
;%      :  SET DO-REPEAT = TRUE
;%      :  SET RPDA = 255(.)
;%      :  ISSUE A SEEK COMMAND
;%      :  IF ((RPER2:  ERR) OR (RPCS1:  TRE)) = 1
;%      :  :  THEN
;%      :  :  OUTPUT ERROR MESSAGE (DIDN'T EXECUTE SEEK PROPERLY)
;%      :  :  OUTPUT FAULT LIST:  J09, J10, J08, J07, CABLES, RHXX, TERMINATOR
;%      :  ENDIF
;%      :  REPEAT
;%      :  :  SET RPOF:  :  CMD = 1
;%      :  :  ISSUE A READ TRACK DESCRIPTOR COMMAND
;%      :  :  IF TD WORD #3 <> 1 100 000 000 000 000 OR (RPCS2:  ERR OR RPCS1:  TRE = 1)
;%      :  :  :  THEN
;%      :  :  :  IF RPDA (HIGH BYTE) < LAST TRACK ADDRESS
;%      :  :  :  :  THEN
;%      :  :  :  :  INCREMENT RPDA (HIGH BYTE ONLY)
;%      :  :  :  :  SET RPCS2:  CLR = 1
;%      :  :  :  :  RELOAD THE DRIVE NUMBER FOR THE DRIVE-UNDER-TEST
;%      :  :  :  :  ELSE
;%      :  :  :  :  OUTPUT MESSAGE (INCORRECTLY FORMATTING TRACK #0, REFORMAT USING
;%      :  :  :  :  FORMATTER UPON COMPLETION OF THIS DIAGNOSTIC)
;%      :  :  :  :  SET DO-REPEAT = FALSE
;%      :  :  :  ENDIF
;%      :  :  :  ELSE
;%      :  :  :  SAVE TRACK NUMBER FOR FOUND NULLSET TD
;%      :  :  :  FORMAT TRACK FOUND WITH NULLSET TD INFORMATION
;%      :  :  :  IF ((RPDS:  :  ERR) OR (RPCS1:  :  TRE) = 1)
;%      :  :  :  :  THEN
;%      :  :  :  :  OUTPUT ERROR MESSAGE (FAILED DURING A FORMAT TRACK OPERATION)
;%      :  :  :  :  OUTPUT FAULT LIST:  J09, J10, J11 / J13, J14, RHXX, CABLES, TERMINATOR
;%      :  :  :  ENDIF
;%      :  :  :  SET DO-REPEAT = FALSE
;%      :  :  ENDIF
;%      :  :  UNTIL NOT DO-REPEAT
;%      :  ENDREPEAT
;%      :  ISSUE A WRITE-CHECK HEADER COMMAND (WITH RPOF:  CMD = 1)
;%      :  IF ((RPDS:  ERR) OR (RPCS1:  TRE) = 1
;%      :  :  THEN
;%      :  :  OUTPUT ERROR MESSAGE (FAILED OPERATION:  WRITE-CHECK HEADERS, RPOF:  CMD = 1)
;%      :  :  OUTPUT FAULT LIST:  J09, J10, J11 / J13, J14, RHXX, CABLES, TERMINATOR
;%      :  ENDIF
;%      :  A:
;%      :  WRITE A SECTOR USING DATA PATTERNS 1 TO 8, ONE AT A TIME
;%      :  IF ((RPDS:  ERR) OR (RPCS1:  TRE) = 1)
;%      :  :  THEN
;%      :  :  INCREMENT RETRY-COUNTER
;%      :  :  IF RETRY COUNTER < 3
;%      :  :  :  THEN
;%      :  :  :  GOTO A
;%      :  :  :  ELSE
```

```
                                    ;%       :  :  :  OUTPUT ERROR MESSAGE (FAILED TO WRITE A SIMPLE DATA TRANSFER)
                                    ;%       :  :  :  OUTPUT FAULT LIST:  J11 / J13, J09, J10, J14, CABLES, RHXX, TERMINATOR
                                    ;%       :  :  ENDIF
                                    ;%       :  ENDIF
                                    ;%       :  CLEAR RETRY-COUNTER
                                    ;%       :  B:
                                    ;%       :  READ A SECTOR USING DATA PATTERNS 1 TO 8, ONE AT A TIME
                                    ;%       :  IF ((RPDS:  ERR) OR (RPCS1:  TRE) = 1)
                                    ;%       :  :  THEN
                                    ;%       :  :  INCREMENT RETRY-COUNTER
                                    ;%       :  :  IF RETRY-COUNTER < 3
                                    ;%       :  :  :  THEN GOTO B
                                    ;%       :  :  :  ELSE
                                    ;%       :  :  :  OUTPU. ERROR MESSAGE (FAILED A SIMPLE READ TEST)
                                    ;%       :  :  :  OUTPUT FAULT LIST:  J11 / J13, J09, J10, J14, CABLES, RHXX, TERMINATOR
                                    ;%       :  :  ENDIF
                                    ;%       :  ENDIF
                                    ;%       :  ISSUE A RIP COMMAND
                                    ;%       :  SET UP A 6 WORD TRANSFER
                                    ;%       :  SET RPOF:  CMOD = 1
                                    ;%       :  ISSUE A READ HEADER AND DATA COMMAND
                                    ;%       :  IF RPER1:  FER = 0
                                    ;%       :  :  THEN
                                    ;%       :  :  OUTPUT ERROR MESSAGE (FAILED TO DETECT RPER1:  FER)
                                    ;%       :  ENDIF
                                    ;%       :  SET RPOF:  FMT16 = 1
                                    ;%       :  RESET ALL DRIVE ERRORS
                                    ;%       END TEST

 041676                             T58::
 041676  004737  017722                      JSR     PC,PRELOD           ;GET THE DRIVE NOW
 041702  032777  010000  140614              BIT     #MOL,@RPDS          ;IS THE DRIVE ON LINE??
 041710  001016                              BNE     1$                  ;IF 1, IT IS
 041712  004737  017326                      JSR     PC,SAVRPR           ;GET THE REGISTER SNAPSHOT
 041716  013746  002114                      MOV     L$TEST,-(SP)
 041722  012746  006452                      MOV     #MSGMOL,-(SP)
 041726  012746  000002                      MOV     #2,-(SP)
 041732  010600                              MOV     SP,R0
 041734  104417                              TRAP    C$PNTF
 041736  062706  000006                      ADD     #6,SP
 041742  104432                              TRAP    C$EXIT
 041744  002036                              .WORD   L10110-.
 041746  032777  004000  140550     1$:      BIT     #WRL,@RPDS          ;IS THE DRIVE WRITE LOCKED?
 041754  001416                              BEQ     2$                  ;IF=0, NO
 041756  004737  017326                      JSR     PC,SAVRPR           ;GET THE REGISTER SNAPSHOT
 041762  013746  002114                      MOV     L$TEST,-(SP)
 041766  012746  006522                      MOV     #MSGWLO,-(SP)
 041772  012746  000002                      MOV     #2,-(SP)
 041776  010600                              MOV     SP,R0
 042000  104417                              TRAP    C$PNTF
 042002  062706  000006                      ADD     #6,SP
 042006  104432                              TRAP    C$EXIT
 042010  001772                              .WORD   L10110-.
 042012  005037  002414             2$:      CLR     DESTRK              ;TRACK ADDRESS (DESIRED)=0
 042016  013737  002376  002416              MOV     LASCYL,DESCYL       ;GO TO LAST USER CYLINDER (DESIRED)
 042024  005237  002416                      INC     DESCYL              ;GO TO FE CYLINDER (DESIRED)
 042030                             T58.1:
    042030  104402                            TRAP    C$BSUB
    042032  104404                            TRAP    C$BSEG
    042034  012737  000005  002420            MOV     #SEEK,FUNCTN      ;LOAD UP A SEEK COMMAND
    042042  012777  100000  140466            MOV     #DMD,@RPMR1       ;SET FOR DIAGNOSTIC MODE
    042050  004737  015146                    JSR     PC,DRIVER         ;ISSUE THE COMMAND
    042054  004737  017000                    JSR     PC,WAIT           ;STALL FOR SOME SETTLE TIME
    042060  012777  000377  140442            MOV     #377,@RPAS        ;CLEAR OUT THE RESULTING ATTENTION BIT
    042066  004737  017032                    JSR     PC,ERRCK          ;LOOK FOR ERRORS
    042072  005737  002466                    TST     ERSTAT            ;IF ERRORS, THIS = -1
    042076  001414                            BEQ     3$                ;IF 0, NO
    042100  012737  001700  002404            MOV     #BIT6!BIT7!BIT8!BIT9,ERRWD1  ;FORM THE MODULE CALLOUT
    042106  012737  000406  002406            MOV     #BIT1!BIT2!BIT8,ERRWD2  ;FOR BOTH WORDS
    042114  104456                            TRAP    C$ERHRD
    042116  001445                            .WORD   805
    042120  013411                            .WORD   EM32
    042122  014172                            .WORD   ERRO
    042124  004737  015400                    JSR     PC,DRVCLR         ;RESET ERRORS
    042130                            3$:
    042130                            10000$:
    042130  104405                            TRAP    C$ESEG
    042132  104404                            TRAP    C$BSEG
    042134  012702  002652            4$:     MOV     #PSTACK,R2        ;INITIALIZE A BUFFER
    042140  012701  000006                    MOV     #6,R1             ;GET THE BUFFER SIZE
    042144  005022                    5$:     CLR     (R2)+             ;BUFFER=0
    042146  005301                            DEC     R1                ;ONE LESS WORD TO GO
    042150  003375                            BGT     5$                ;DO UNTIL = 0
    042152  012737  000075  002420            MOV     #RTD,FUNCTN       ;SET UP FOR A READ TRACK DESCRIPTOR OP
    042160  052737  000377  002414            BIS     #377,DESTRK       ;SECTOR ADDRESS=-1
    042166  052777  100000  140350            BIS     #CMOD,@RPOF       ;SET THE COMMAND MODIFIER FOR A READ TD OPERATION
    042174  012737  000006  002412            MOV     #6,NEGWRD         ;SET UP FOR A 6 WORD TRANSFER
    042202  012737  002652  002366            MOV     #PSTACK,TABADD    ;LOAD THE LINK ADDRESS
    042210  004737  015146                    JSR     PC,DRIVER         ;ISSUE THE COMMAND
    042214  023727  002656  140000            CMP     PSTACK+4,#140000  ;IS TRACK DESCRIPTOR NULL?
    042222  001431                            BEQ     6$                ;IF EQUAL, YES!
    042224  004737  015400                    JSR     PC,DRVCLR         ;RESET ANY ERROR!
    042230  004737  017266                    JSR     PC,SPIRAL         ;GO TO NEXT TRACK
    042234  105737  002415                    TSTB    DESTRK+1          ;DID WE TRY ALL TRACKS?
    042240  001335                            BNE     4$                ;IF NOT 0, NO TRY AGAIN
    042242  012746  007062                    MOV     #MESG15,-(SP)
    042246  012746  000001                    MOV     #1,-(SP)
    042252  010600                            MOV     SP,R0
    042254  104417                            TRAP    C$PNTF
    042256  062706  000004                    ADD     #4,SP
    042262  012746  006763                    MOV     #MESG12,-(SP)
    042266  012746  000001                    MOV     #1,-(SP)
    042272  010600                            MOV     SP,R0
    042274  104417                            TRAP    C$PNTF
    042276  062706  000004                    ADD     #4,SP
    042302  004737  015400                    JSR     PC,DRVCLR         ;CLEAR OUT ANY ERRORS NOW!!
    042306  013746  002416            6$:     MOV     DESCYL,-(SP)      ;GET THE DESIRED CYLINDER ADDRESS
    042312  052716  030000                    BIS     #BIT13!BIT12,(SP)         ;AND MASK IT TO REPRESENT A TD
    042316  032737  040000  002652            BIT     #BIT14,PSTACK     ;WAS THE TD MOVED?
    042324  001402                            BEQ     7$                ;IF ZERO, NO
    042326  052716  040000                    BIS     #BIT14,(SP)       ;SET THE CORRECT BIT
    042332  005737  002652            7$:     TST     PSTACK            ;BIT 15 SET?  (HEADER 0 MOVED)
    042336  100002                            BPL     8$                ;IF ZERO, NO
    042340  052716  100000                    BIS     #BIT15,(SP)       ;SET THE SAME BIT IN THE MASK
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042344  022637  002652            8$:       CMP     (SP)+,PSTACK        ;MATCH?
042350  001423                              BEQ     9$                  ;IF EQUAL, YES
042352  012737  033400  002404              MOV     #BIT8!BIT9!BIT10!BIT12!BIT13,ERRWD1;SET UP THE MODULE CALLOUT
042360  012737  000406  002406              MOV     #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
042366  013737  002652  002452              MOV     PSTACK,RCVED        ;FORM THE DATA FOR THE ERROR REPORT
042374  016637  177776  002454              MOV     -2(SP),EXPTED       ;AND THE EXPECTED DATA
042402  012737  011531  002470              MOV     #READTD,FATOF       ;LOAD THE FAILING FUNCTON
042410  104456                              TRAP    C$ERHRD
042412  001446                              .WORD   806
042414  013701                              .WORD   EM37
042416  014500                              .WORD   ERR2
042420  012701  002730            9$:       MOV     #IOBUFF,R1          ;GET THE OUTPUT BUFFER ADDRESS
042424  042737  000377  002414              BIC     #377,DESTRK         ;SECTOR ADDRESS = 0!
042432  013702  002414                      MOV     DESTRK,R2           ;LOAD THE BUFFER TRACK ADDRESS
042436  105002                              CLRB    R2                  ;FOR AN INTERLEAVED FORMAT
042440  010203                              MOV     R2,R3               ;THIS IS THE HIGH OR ''ODD'' SECTOR
042442  152703  000031                      BISB    #25.,R3             ;IT STARTS AT SECTOR ADDRESS 25
042446  005004                              CLR     R4                  ;INITIALIZE THIS, IT'S A TOGGLE REGISTER
042450  012705  000062                      MOV     #50.,R5             ;# OF SECTORS/TRACK
042454  013711  002416            10$:      MOV     DESCYL,(R1)         ;CYLINDER ADDRESS
042460  052721  150000                      BIS     #150000,(R1)+       ;MARK SECTOR GOOD, IN 16 BIT MODE
042464  005704                              TST     R4                  ;DO THIS TO GET NEXT SECTOR
042466  100410                              BMI     11$                 ;IT'S -1, LOAD HIGH OR ''ODD'' SECTOR
042470  010221                              MOV     R2,(R1)+            ;LOAD LOW SECTOR
042472  005202                              INC     R2                  ;UPDATE THE SECTOR COUNT
042474  032777  000004  140022              BIT     #ILEV,@RPDS         ;DRIVE INTERLEAVED ENABLED?
042502  001405                              BEQ     12$                 ;IF ZERO, NO!
042504  005104                              COM     R4                  ;AND TOGGLE
042506  000403                              BR      12$                 ;MOVE ON...
042510  010321                    11$:      MOV     R3,(R1)+            ;LOAD HIGH SECTOR
042512  005203                              INC     R3                  ;UPDATE SECTOR COUNT
042514  005004                              CLR     R4                  ;TOGGLE
042516  012721  140000            12$:      MOV     #140000,(R1)+       ;LOAD THE NULL-CASE
042522  012721  140000                      MOV     #140000,(R1)+       ;FOR ALL FOUR WORDS
042526  012721  140000                      MOV     #140000,(R1)+       ;THIRD WORD
042532  012721  140000                      MOV     #140000,(R1)+       ;FOURTH WORD
042536  005305                              DEC     R5                  ;ONE LESS SECTOR TO DO
042540  003345                              BGT     10$                 ;BUT GO ON UNTIL 0
042542  012737  002730  002366              MOV     #IOBUFF,TABADD      ;RELOAD THE LINK ADDRESS
042550  012737  000063  002420              MOV     #FORTRK,FUNCTN      ;LOAD UP FOR A FORMAT TRACK OPERATION
042556  012737  000454  002412              MOV     #<50.*6>,NEGWRD     ;AND THE WORD COUNT (314<8> EFF1)
042564  052777  100000  137752              BIS     #CMOD,@RPOF         ;COMMAND MODIFIER=1
042572  004737  015146                      JSR     PC,DRIVER           ;NOW DO THE TRANSFER
042576  004737  017032                      JSR     PC,ERRCK            ;LOOK FOR ERRORS
042602  005737  002466                      TST     ERSTAT              ;IF ERRORS, THIS = -1
042606  001414                              BEQ     13$                 ;LOOKS OK IF 0!!
042610  012737  033400  002404              MOV     #BIT8!BIT9!BIT10!BIT12!BIT13,ERRWD1 ;LOAD THE MODULE CALLOUT LIST
042616  012737  000406  002406              MOV     #BIT1!BIT2!BIT8,ERRWD2 ;FOR BOTH MASK WORDS
042624  104456                              TRAP    C$ERHRD
042626  001447                              .WORD   807
042630  014026                              .WORD   EM41
042632  014172                              .WORD   ERR0
042634  004737  015400                      JSR     PC,DRVCLR           ;RELOAD AND RESET ERRORS!
042640                            13$:
042640                            10001$:
042640  104405                              TRAP    C$ESEG
042642  104404                              TRAP    C$BSEG
```

```
    198 042644  012737  000053  002420            MOV     #WCKHD,FUNCTN     ;LOAD UP A WRITE-CHECK HEADERS COMMAND
    199 042652  012702  002732                    MOV     #IOBUFF+2,R2      ;SET-UP TO REARRANGE THE BUFFER
    200 042656  012703  000062                    MOV     #50.,R3           ;THIS IS THE ITERATION COUNT
    201 042662  005004                            CLR     R4                ;THIS IS THE SECTOR ADDRESS
    202 042664  110412                    14$:    MOVB    R4,(R2)           ;RELOAD THE SECTOR ADDRESS
    203 042666  005204                            INC     R4                ;NEXT SECTOR ADDRESS
    204 042670  062702  000014                    ADD     #14,R2            ;SKIP DATA IN CURRENT SECTOR MAP
    205 042674  005303                            DEC     R3                ;ONE LESS ITERATION TO GO
    206 042676  003372                            BGT     14$               ;IF > 0, GO-ON
    207 042700  052777  100000  137636            BIS     #CMOD,@RPOF       ;COMMAND MODIFIER=1
    208 042706  012737  002730  002366            MOV     #IOBUFF,TABADD    ;LOAD THE LINK ADDRESS
    209 042714  012737  000454  002412            MOV     #<50.*6>,NEGWRD   ;AND THE WORD COUNT (314<8> EFF1)
    210 042722  004737  015146                    JSR     PC,DRIVER         ;NOW DO THE TRANSFER
    211 042726  012737  011543  002470            MOV     #WTCKHD,FATOF     ;LOAD THE FAILING FUNCTION
    212 042734  012737  033400  002404            MOV     #BIT8!BIT9!BIT10!BIT12!BIT13,ERRWD1 ;CREATE MODULE CALLOUT
    213 042742  012737  000406  002406            MOV     #BIT1!BIT2!BIT8,ERRWD2 ;LIST FOR BOTH MASKS
    214 042750  032777  040000  137534            BIT     #TRE,@RPCS1       ;DID WE GET A TRANSFER ERROR?
    215 042756  001407                            BEQ     15$               ;IF ZERO, NO!
    216 042760  004737  017150                    JSR     PC,LOCATE         ;FIND THE DATA FOR THE REPORT
    217 042764  104456                            TRAP    C$ERHRD
        042766  001450                            .WORD   808
        042770  013441                            .WORD   EM33
        042772  014500                            .WORD   ERR2
    218 042774  000411                            BR      16$               ;SKIP THE NEXT DISPATCH
    219 042776  004737  017032            15$:    JSR     PC,ERRCK          ;ANY ERRORS?
    220 043002  005737  002466                    TST     ERSTAT            ;IF ZERO, NO
    221 043006  001406                            BEQ     17$               ;TAKE BRANCH IF NO ERRORS
    222 043010  104456                            TRAP    C$ERHRD
        043012  001451                            .WORD   809
        043014  012454                            .WORD   EM14
        043016  014172                            .WORD   ERR0
    223 043020  004737  015400            16$:    JSR     PC,DRVCLR         ;RESET ALL ERRORS
    224 043024                            17$:
    225 043024                            10002$:
        043024  104405                            TRAP    C$ESEG
    226 043026                            L10111:
        043026  104403                            TRAP    C$ESUB
    227 043030                            T58.2:
        043030  104402                            TRAP    C$BSUB
    228 043032  105037  002414                    CLRB    DESTRK            ;SECTOR ADDRESS=0
    229 043036  012737  033400  002404            MOV     #BIT8!BIT9!BIT10!BIT12!BIT13,ERRWD1;SET UP THE MODULE CALLOUT
    230 043044  012737  000406  002406            MOV     #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
    231 043052  012737  000004  002436            MOV     #4,TEMP           ;ALLOW FOR FOUR DATA ERRORS BEFORE REPORTING THE ERROR!
    232 043060  012703  002344                    MOV     #PATT1,R3         ;GET THE TEST PATTERN
    233 043064  012701  002730            1$:     MOV     #IOBUFF,R1        ;CREATE THE OUTPUT BUFFER
    234 043070  012702  000400                    MOV     #256.,R2          ;GET THE BUFFER SIZE
    235 043074  011321                    2$:     MOV     (R3),(R1)+        ;START LOADING THE BUFFER
    236 043076  005302                            DEC     R2                ;ONE LESS WORD TO LOAD
    237 043100  003375                            BGT     2$                ;IF > 0, GO-ON
    238 043102  104404                            TRAP    C$BSEG
    239 043104  012737  002730  002366    3$:     MOV     #IOBUFF,TABADD    ;LOAD THE LINK AGAIN
    240 043112  012737  000061  002420            MOV     #WRDTA,FUNCTN     ;SETUP FOR A WRITE DATA COMMAND
    241 043120  012737  000400  002412            MOV     #256.,NEGWRD      ;WRITE ONE SECTOR
    242 043126  004737  015146                    JSR     PC,DRIVER         ;NOW DO IT!
    243 043132  004737  017032                    JSR     PC,ERRCK          ;LOOK FOR ERRORS
    244 043136  005737  002466                    TST     ERSTAT            ;IF ERRORS, THIS = -1
    245 043142  001424                            BEQ     4$                ;SKIP ERROR DISPATCH IF 0
```

```
043144  005737  002436                    TST     TEMP              ;DID WE DO FOUR ITERATIONS?
043150  003021                            BGT     4$                ;IF NOT 0, NO!!
043152  104456                            TRAP    C$ERHRD
043154  001452                            .WORD   810
043156  013753                            .WORD   EM40
043160  014172                            .WORD   ERR0
043162  012746  007315                    MOV     #FRMT02,-(SP)
043166  012746  000001                    MOV     #1,-(SP)
043172  010600                            MOV     SP,R0
043174  104414                            TRAP    C$PNTB
043176  062706  000004                    ADD     #4,SP
043202  012737  177777  002430            MOV     #-1,FASTAT        ;MARK THIS SECTOR AS FAILED
043210  004737  015400                    JSR     PC,DRVCLR         ;GET RID OF ANY ERRORS
043214  012702  003030          4$:       MOV     #IOBUFF+64.,R2    ;GET ONE BUFFER LOCATION
043220  005112                            COM     (R2)              ;AND LOUSE IT UP!
043222  012737  000051  002420            MOV     #WCKD,FUNCTN      ;LOAD THE WRITE CHECK FUNCTION
043230  012737  002730  002366            MOV     #IOBUFF,TABADD    ;LOAD THE LINK ADDRESS
043236  012737  000400  002412            MOV     #256.,NEGWRD      ;AND THE WORD COUNT
043244  004737  015146                    JSR     PC,DRIVER         ;NOW DO THE COMMAND EXECUTION
043250  004737  017000                    JSR     PC,WAIT           ;WAIT FOR A SETTLE TIME
043254  032777  040000  137240            BIT     #WCE,@RPCS2       ;DID WE GET A WRITE CHECK ERROR?
043262  001014                            BNE     5$                ;IF = 1, YES!
043264  004737  017372                    JSR     PC,BISEXP         ;FORM THE FAILING DATA
043270  002522                            RPCS2                     ;THIS REGISTER FAILED
043272  040000                            WCE                       ;THIS BIT FAILED TO SET
043274  104456                            TRAP    C$ERHRD
043276  001453                            .WORD   811
043300  012776                            .WORD   EM22
043302  014172                            .WORD   ERR0
043304  012737  177777  002430            MOV     #-1,FASTAT        ;MARK THIS FAILURE
043312  000424                            BR      7$                ;NOW GO-ON
043314  017746  137214          5$:       MOV     @RPDB,-(SP)       ;GET THE ACTUAL DATA
043320  005112                            COM     (R2)              ;INVERT THE EXPECTED DATA
043322  022612                            CMP     (SP)+,(R2)        ;MATCH?
043324  001417                            BEQ     7$                ;LOOKS OK, GO-ON
043326  016637  177776  002452            MOV     -2(SP),RCVED      ;AND LOG THE RESULTS FOR ERROR REPORTING
043334  011237  002454                    MOV     (R2),EXPTED       ;NOW GET THE EXPECTED DATA
043340  005737  002436          6$:       TST     TEMP              ;WHICH ITERATION?
043344  003007                            BGT     7$                ;IF > 0, NOT THE LAST
043346  012737  011566  002470            MOV     #WTCKD,FATOF      ;LOAD THE FUNCTION AT TIME OF FAILURE
043354  104456                            TRAP    C$ERHRD
043356  001454                            .WORD   812
043360  013505                            .WORD   EM34
043362  014500                            .WORD   ERR2
043364  017746  137122          7$:       MOV     @RPCS1,-(SP)      ;SAVE RPCS1 ON STACK
043370  042716  037777                    BIC     #^C<SC!TRE>,(SP)          ;GET RID OF THE UNNECESSARY BITS
043374  022726  140000                    CMP     #SC!TRE,(SP)+     ;DID SC AND TRE SET?

043400  001410                            BEQ     8$                ;IF SET, SKIP ERROR REPORT
043402  004737  017372                    JSR     PC,BISEXP         ;LOAD THE FAILING DATA
043406  002512                            RPCS1                     ;THIS REGISTER
043410  140000                            SC!TRE                    ;THESE BITS DIDN'T SET
043412  104456                            TRAP    C$ERHRD
043414  001455                            .WORD   813
043416  012776                            .WORD   EM22
043420  014172                            .WORD   ERR0
043422  004737  015400          8$:       JSR     PC,DRVCLR         ;RELOAD AND RESET
```

```
043426  012737  002730  002366           MOV     #IOBUFF,TABADD   ;NOW VERIFY DATA FOR CORRECTNESS
043434  012737  000400  002412           MOV     #256.,NEGWRD     ;DO 256 WORD (1 SECTOR) TRANSFER
043442  012737  000051  002420           MOV     #WCKD,FUNCTN     ;SET UP FOR A WRITE CHECK
043450  004737  015146                   JSR     PC,DRIVER        ;DO THE COMMAND NOW!
043454  004737  017032                   JSR     PC,ERRCK         ;ERRORS?
043460  005737  002466                   TST     ERSTAT           ;IF ERRORS, THIS = - 1
043464  001452                           BEQ     13$              ;SKIP ERROR DISPATCH IF 0
043466  005337  002436           9$:     DEC     TEMP             ;ALLOW ONE LESS ERROR!
043472  002404                           BLT     10$              ;IF < 0, REPORT THE ERROR NOW!!
043474  105237  002414                   INCB    DESTRK           ;GO TO THE NEXT SECTOR
043500  000137  043104                   JMP     @#3$             ;AND FOR NOW, SKIP THE ERROR DISPATCH!
043504  012737  011566  002470   10$:    MOV     #WTCKD,FATOF     ;LOAD THE FAILING FUNCTION
043512  005037  002436                   CLR     TEMP             ;TEMP = 0, FOR A POSSIBLE LOOP
043516  032777  040000  136766           BIT     #TRE,@RPCS1      ;DID WE GET A TRANSFER ERROR?
043524  001417                           BEQ     11$              ;IF 0, NO
043526  004737  017150                   JSR     PC,LOCATE        ;FIND THE ERROR
043532  104456                           TRAP    C$ERHRD
043534  001456                           .WORD   814
043536  013441                           .WORD   EM33
043540  014500                           .WORD   ERR2
043542  012746  007315                   MOV     #FRMT02,-(SP)
043546  012746  000001                   MOV     #1,-(SP)
043552  010600                           MOV     SP,R0
043554  104414                           TRAP    C$PNTB
043556  062706  000004                   ADD     #4,SP
043562  000411                           BR      12$              ;SKIP NEXT REPORT
043564  004737  017032           11$:    JSR     PC,ERRCK         ;LOOK FOR ANY ERROR
043570  005737  002466                   TST     ERSTAT           ;IF ONE FOUND, THIS = - 1
043574  001406                           BEQ     13$              ;NO ERRORS, GO-ON
043576  104456                           TRAP    C$ERHRD
043600  001457                           .WORD   815
043602  012454                           .WORD   EM14
043604  014172                           .WORD   ERR0
043606  004737  015400           12$:    JSR     PC,DRVCLR        ;RESET AND RELOAD
043612  005737  002430           13$:    TST     FASTAT           ;ANY ERROR?
043616  001403                           BEQ     14$              ;IF ZERO, NO
043620  005037  002430                   CLR     FASTAT           ;RESET THE FAILED MARKER
043624  000720                           BR      9$               ;AND GO TO NEXT SECTOR
043626                           14$:
043626                           10000$:
043626  104405                           TRAP    C$ESEG
043630  005723                           TST     (R3)+            ;POP R3 TO THE NEXT DATA TABLE ENTRY
043632  020327  002362                   CMP     R3,#PATT8        ;DONE YET
043636  101002                           BHI     15$              ;IF R3 > # PATT8, YES
043640  000137  043064                   JMP     @#1$             ;DO MORE!!
043644                           15$:
043644                           L10112:
043644  104403                           TRAP    C$ESUB
043646  104404                           TRAP    C$BSEG
043650  012737  000021  002420           MOV     #RIP,FUNCTN      ;SET UP FOR ANOTHER READ IN PRESET
043656  004737  015146                   JSR     PC,DRIVER        ;ISSUE THE COMMAND
043662  012737  000073  002420           MOV     #RDHDTA,FUNCTN   ;NOW PREPARE TO READ A HEADER .
043670  052777  100000  136646           BIS     #CMOD,@RPOF      ;ONLY SIX WORDS / TRANSFER
043676  012737  000006  002412           MOV     #6,NEGWRD        ;LIKE I SAID, SIX WORDS ONLY!
043704  012737  002652  002366           MOV     #PSTACK,TABADD   ;TRANSFER TO START AT THIS BUFFER ADDRESS
043712  004737  015146                   JSR     PC,DRIVER        ;THIS SHOULD CAUSE A FORMAT ERROR
043716  022777  000020  136602           CMP     #FER,@RPER1      ;DID IT??
```

```
    330 043724  001423                              BEQ     1$                      ;IF MATCH, IT DID!
    331 043726  012737  000020  002454              MOV     #FER,EXPTED             ;FORM THE EXPECTED DATA
    332 043734  017737  136566  002452              MOV     @RPER1,RCVED            ;FORM THE RECEIVED DATA
    333 043742  013737  002526  002456              MOV     RPER1,TESTRG            ;THIS REGISTER FAILED THE TEST
    334 043750  012737  004400  002404              MOV     #BIT8!BIT11,ERRWD1;LOAD THE MODULE CALLOUT
    335 043756  012737  000406  002406              MOV     #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
    336 043764  104456                              TRAP    C$ERHRD
        043766  001460                              .WORD   816
        043770  012454                              .WORD   EM14
        043772  014172                              .WORD   ERRO
    337 043774  004737  017722          1$:         JSR     PC,PRELOD               ;RESET FOR 16 BIT MODE
    338 044000                          10000$:
        044000  104405                              TRAP    C$ESEG
    339 044002                          L10110:
        044002  104401                              TRAP    C$ETST
```

```
                                        .SBTTL  TEST 59 RPER1 NEGATIVE BIT TESTS

                                        ;%      TEST 59 RPER1 NEGATIVE BIT TESTS
                                        ;%      :  SET UP AN ILLEGAL COMMAND (#43 - OCTAL)
                                        ;%      :  ISSUE THE COMMAND
                                        ;%      :  IF RPER1:  ILF = 0
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (FAILED TO DETECT RPER1:  ILF)
                                        ;%      :  :  OUTPUT FAULT LIST:  J12
                                        ;%      :  ENDIF
                                        ;%      :  ISSUE A DRIVE CLEAR COMMAND
                                        ;%      :  SET UP FOR SECTOR ADDRESS 50(DECIMAL)
                                        ;%      :  SET UP FOR TRACK ADDRESS 31(DECIMAL)
                                        ;%      :  ISSUE SEEK COMMAND
                                        ;%      :  IF RPER1:  IAE = 0
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (FAILED TO DETECT RPER1:  IAE)
                                        ;%      :  ENDIF
                                        ;%      :  ISSUE A DRIVE CLEAR
                                        ;%      :  DECREMENT THE SECTOR ADDRESS (49 DECIMAL)
                                        ;%      :  INCREMENT THE TRACK ADDRESS (32 DECIMAL)
                                        ;%      :  ISSUE SEEK COMMAND
                                        ;%      :  IF RPER1:  IAE = 0
                                        ;%      :  :  THEN
                                        ;%      :  :  OUTPUT ERROR MESSAGE (FAILED TO DETECT RPER1:  IAE)
                                        ;%      :  :  OUTPUT FAULT LIST:  J7, J8, RHXX, CABLES, TERMINATOR
                                        ;%      :  ENDIF
                                        ;%      :  ISSUE DRIVE CLEAR COMMAND
                                        ;%      END TEST 59

044004                                  T59::
044004  104404                                  TRAP    C$BSEG
044006  004737  015400                          JSR     PC,DRVCLR               ;START UP WITHOUT ERRORS
044012  032777  010000  136504                  BIT     #MOL,@RPDS              ;DRIVE ONLINE?
044020  001016                                  BNE     1$                      ;IF = 1, YES
044022  004737  017326                          JSR     PC,SAVRPR               ;GET THE REGISTER SNAPSHOT
044026  013746  002114                          MOV     L$TEST,-(SP)
044032  012746  006452                          MOV     #MSGMOL,-(SP)
044036  012746  000002                          MOV     #2,-(SP)
044042  010600                                  MOV     SP,R0
044044  104417                                  TRAP    C$PNTF
044046  062706  000006                          ADD     #6,SP
044052  104432                                  TRAP    C$EXIT
044054  000244                                  .WORD   L10113-.
044056  012737  000043  002420  1$:             MOV     #43,FUNCTN              ;LOAD UP AN ILLEGAL FUNCION
044064  013737  002526  002456                  MOV     RPER1,TESTRG            ;FORM UP PART OF THE ERROR MESSAGE
044072  004737  015146                          JSR     PC,DRIVER               ;ISSUE THAT ILLEGAL COMMAND
044076  022777  000001  136422                  CMP     #ILF,@RPER1             ;DID ILLEGAL FUNCTION ONLY SET?
044104  001417                                  BEQ     2$                      ;IF MATCH, YES
044106  012737  004000  002404                  MOV     #BIT11,ERRWD1           ;LOAD THE MASK
044114  005037  002406                          CLR     ERRWD2                  ;FOR BOTH MASKS
044120  012737  000001  002454                  MOV     #ILF,EXPTED             ;SET UP THE EXPECTED DATA
044126  017737  136374  002452                  MOV     @RPER1,RCVED            ;REPORT THE RECEIVED DATA
044134  104456                                  TRAP    C$ERHRD
044136  001461                                  .WORD   817
044140  012454                                  .WORD   EM14
044142  014172                                  .WORD   ERR0
```

```
044144                                   2$:
044144                                   10000$:
044144  104405                                   TRAP    C$ESEG
044146  104404                                   TRAP    C$BSEG
044150  004737  015400                           JSR     PC,DRVCLR        ;PURGE ANY ERRORS
044154  012737  005700  002404                   MOV     #BIT6!BIT7!BIT8!BIT9!BIT11,ERRWD1;LOAD THE MODULE CALLOUT
044162  012737  000406  002406                   MOV     #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
044170  012737  001165  002416                   MOV     #629.,DESCYL     ;LAST USER CYLINDER, PLEASE
044176  112737  000037  002415                   MOVB    #31.,DESTRK+1    ;LAST USER TRACK, PLEASE
044204  112737  000062  002414                   MOVB    #50.,DESTRK      ;ILLEGAL SECTOR ADDRESS, PLEASE
044212  012737  000005  002420                   MOV     #SEEK,FUNCTN     ;LOAD UP A SEEK COMMAND
044220  004737  015146                           JSR     PC,DRIVER        ;ISSUE THE COMMAND, BUT EXPECT IT TO FAIL
044224  022777  002000  136274                   CMP     #IAE,@RPER1      ;DID WE GET THE EXPECTED RESULTS?
044232  001413                                   BEQ     4$               ;IF MATCH, YES
044234  012737  002000  002454   3$:             MOV     #IAE,EXPTED      ;FORM THE EXPECTED DATA
044242  017737  136260  002452                   MOV     @RPER1,RCVED     ;GET THE ACTUAL DATA
044250  104456                                   TRAP    C$ERHRD
044252  001462                                   .WORD   818
044254  012454                                   .WORD   EM14
044256  014172                                   .WORD   ERRO
044260  000414                                   BR      5$               ;AND GET-OUT!
044262  105337  002414           4$:             DECB    DESTRK           ;LAST LEGAL SECTOR ADDRESS, PLEASE
044266  105237  002415                           INCB    DESTRK+1         ;ILLEGAL TRACK ADDRESS, PLEASE
044272  004737  015400                           JSR     PC,DRVCLR        ;NO ERRORS, YET!!
044276  004737  015146                           JSR     PC,DRIVER        ;NOW ISSUE THE BOGUS SEEK COMMAND
044302  022777  002000  136216                   CMP     #IAE,@RPER1      ;DID WE GET IAE ONLY??
044310  001351                                   BNE     3$               ;TAKE BRANCH IF NOT
044312  004737  017722           5$:             JSR     PC,PRELOD        ;RESET FURTHER ERRORS
044316                                   10001$:
044316  104405                                   TRAP    C$ESEG
044320                                   L10113:
044320  104401                                   TRAP    C$ETST
```

```
                                  .SBTTL  TEST 60 USER SELECTED MICRODIAGNOSTIC ROUTINE

                                  ;%      TEST 60 USER SELECTED MICRODIAGNOSTIC ROUTINE
                                  ;%      :  IF MANUAL TESTING IS NOT ALLOWED
                                  ;%      :  THEN
                                  ;%      :  :  EXIT TEST
                                  ;%      :  ELSE
                                  ;%      :  IF USER SELECTED INPUT ALLOWS A HEX DATA SELECTION
                                  ;%      :  :  THEN
                                  ;%      :  :  A:
                                  ;%      :  :  GET A 2 CHARACTER USER INPUT
                                  ;%      :  :  IF THE USER INPUT IS NOT A VALID HEX CHARACTER
                                  ;%      :  :  :  THEN
                                  ;%      :  :  :  REJECT THE INPUT AND GOTO A
                                  ;%      :  :  ENDIF
                                  ;%      :  :  LEFT JUSTIFY THE INPUT DATA AND MAKE IT BYTE ORIENTED
                                  ;%      :  :  BY PUTTING TWO HEX CHARACTERS IN ONE BYTE
                                  ;%      :  :  MOVE THE USER DATA INTO R4
                                  ;%      :  :  TURN ON THE DIAGNOSTIC MONITOR IN THE DRIVE
                                  ;%      :  :  LOAD THE ROUTINE NUMBER INTO THE DRIVE
                                  ;%      :  :  WAIT FOR THE COMMAND TO FINISH EXECUTION
                                  ;%      :  :  IF RPER2 <> 0
                                  ;%      :  :  :  THEN
                                  ;%      :  :  :  REPORT THE ERROR (DRIVE FAILED A MICRODIAGNOSTIC ROUTINE)
                                  ;%      :  :  :  RESET ALL DRIVE AND CONTROLLER ERRORS
                                  ;%      :  :  ENDIF
                                  ;%      :  ENDIF
                                  ;%      END TEST 60

044322                            T60::
044322  005737  002342                    TST     SELRUN          ;ALLOW A USER INPUT?
044326  003002                            BGT     1$              ;IF >0, YES
044330  104432                            TRAP    C$EXIT
044332  000260                            .WORD   L10114-.
044334  005737  002422            1$:     TST     ROUTDO          ;USER PREVIOUSLY SELECTED INPUT??
044340  100470                            BMI     6$              ;SKIP NEXT DIALOGUE
044342  104450                            TRAP    C$MANI
044344  103402                            BCS     2$
044346  104432                            TRAP    C$EXIT
044350  000242                            .WORD   L10114-.
044352                            2$:                             ;PRINT 'ROUTINE NO. (2 CHAR ''HEX'' INPUT)'
044352  012746  010271                    MOV     #FRMT23,-(SP)
044356  012746  000001                    MOV     #1,-(SP)
044362  010600                            MOV     SP,R0
044364  104417                            TRAP    C$PNTF
044366  062706  000004                    ADD     #4,SP
044372  104443                            TRAP    C$GMAN
044374  000406                            BR      10000$
044376  002652                            .WORD   PSTACK
044400  000142                            .WORD   T$CODE
044402  000000                            .WORD
044404  000001                            .WORD   1
044406  000002                            .WORD   T$LOLIM
044410  000002                            .WORD   T$HILIM
044412                            10000$:
044412  012704  002652                    MOV     #PSTACK,R4      ;GET THE START OF THE STRING
044416  012702  000002                    MOV     #2,R2           ;SET AN ITERATION COUNT
```

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044422  112401                   3$:     MOVB    (R4)+,R1            ;GET THE DATA CHAHRACTER
044424  020127  000071                   CMP     R1,#71              ;AND BEGIN TO SCALE IT
044430  101004                           BHI     4$                  ;TAKE BRANCH IF ALPHA, NOT NUMERIC
044432  162701  000060                   SUB     #60,R1              ;STRIP THE ASCII
044436  100745                           BMI     2$                  ;IF MINUS, THE USER GOOFED!! DO AGAIN!
044440  000406                           BR      5$                  ;OK SO-FAR, KEEP GOING
044442  162701  000067           4$:     SUB     #67,R1              ;STRIP THE ASCII
044446  100741                           BMI     2$                  ;IF MINUS, THE USER GOOFED!  DO AGAIN!
044450  020127  000017                   CMP     R1,#17              ;LEGAL CHARACTER (IN HEX)??
044454  003336                           BGT     2$                  ;IF >, IT'S TOO LARGE
044456  110164  177777           5$:     MOVB    R1,-1(R4)           ;MOVE THE HEX BACK INTO THE BUFFER (SANS ASCII)
044462  005302                           DEC     R2                  ;ONE LESS CHARACTER TO GO
044464  003356                           BGT     3$                  ;DO UNTIL R2 = 0
044466  124444                           CMPB    -(R4),-(R4)         ;BACK THE POINTER UP BY TWO BYTES
044470  106314                           ASLB    (R4)                ;TO LEFT JUSTIFY THE LOW BYTE
044472  106314                           ASLB    (R4)                ;SECOND SHIFT
044474  106314                           ASLB    (R4)                ;THIRD SHIFT
044476  106324                           ASLB    (R4)+               ;FOURTH SHIFT (POP POINTER)
044500  151437  002652                   BISB    (R4),PSTACK         ;FORM THE ENTIRE 2 CHAR HEX FIELD
044504  105037  002653                   CLRB    PSTACK+1            ;THROW THE HIGH BYTE OUT NOW!
044510  005137  002422                   COM     ROUTDO              ;MARK THE USER SELECTED INPUT
044514  013737  002652  002424           MOV     PSTACK,SELNUM       ;SAVE THE USER ROUTINE NUMBER
044522  013704  002424           6$:     MOV     SELNUM,R4           ;LOAD THE ROUTINE NUMBER
044526  004737  015260                   JSR     PC,DIAGST           ;TURN ON THE MONITOR
044532  000304                           SWAB    R4                  ;HIGH BYTE = ROUTINE NUMBER
044534  104404                           TRAP    C$BSEG
044536  004737  015352                   JSR     PC,DIAGLD           ;LOAD THE ROUTINE NUMBER
044542  017746  136004                   MOV     @RPER2,-(SP)        ;GET THE RESULTS OF THE TEST
044546  042726  177400                   BIC     #177400,(SP)+       ;STRIP JUNK
044552  001414                           BEQ     7$                  ;IF ZERO, NO!!
044554  104456                           TRAP    C$ERHRD
044556  000621                           .WORD   401
044560  013564                           .WORD   EM35
044562  014310                           .WORD   ERR1
044564  012737  040011  002420           MOV     #TRE!DRCLR,FUNCTN;PREPARE TO RESET THE ERRORS
044572  004737  015146                   JSR     PC,DRIVER           ;PURGE ERRORS NOW!
044576  052777  100000  135732           BIS     #DMD,@RPMR1         ;TURN ON THE DMD BIT AGAIN
044604                           7$:
044604                           10001$:
044604  104405                           TRAP    C$ESEG
044606  004737  015312                   JSR     PC,DIAGEN           ;TURN OFF THE MONITOR
044612                           L10114:
044612  104401                           TRAP    C$ETST
```

```
                                         .SBTTL  TEST 61 NOP FUNCTIONAL TEST

                                         ;%      TEST 61 NOP FUNCTIONAL TEST
                                         ;%      :  LOAD UNIT UNDER TEST INTO RPCS2
                                         ;%      :  IF RPDS:  DRY <> 1
                                         ;%      :  :  THEN
                                         ;%      :  :  OUTPUT ERROR MESSAGE (RPDS:  DRY NOT SET WHEN EXPECTED)
                                         ;%      :  ENDIF
                                         ;%      :  WRITE NOP COMMAND TO RPCS1
                                         ;%      :  TIME RPDS:  DRY
                                         ;%      :  IF TIME EXPIRES AND RPDS:  DRY <> 1
                                         ;%      :  :  THEN
                                         ;%      :  :  OUTPUT ERROR MESSAGE (RPDS:  DRY NOT SET IN TIME)
                                         ;%      :  ENDIF
                                         ;%      :  IF RPDS:  ERR = 1
                                         ;%      :  :  THEN
                                         ;%      :  :  OUTPUT ERROR MESSAGE (COMPOSITE ERROR SET WHEN NOT EXPECTED)
                                         ;%      :  ENDIF
                                         ;%      :  IF RPCS1:  TRE = 1
                                         ;%      :  :  THEN
                                         ;%      :  :  OUTPUT ERROR MESSAGE (RPCS1:  TRE SET WHEN NOT EXPECTED)
                                         ;%      :  ENDIF
                                         ;%      END TEST 61

044614                                   T61::
044614  012737  004000  002404                   MOV     #BIT11,ERRWD1   ;LOAD THE ERROR MASK
044622  005037  002406                           CLR     ERRWD2          ;FOR BOTH MASKS
044626  004737  016662                           JSR     PC,SEIZE        ;GET THE DRIVE NOW!
044632  012701  000036                           MOV     #30.,R1         ;GET AN OVERALL WATCHDOG TIMER
044636  012777  000015  135646                   MOV     #NOP,@RPCS1     ;WRITE A NOP COMMAND
044644  105777  135654                   1$:     TSTB    @RPDS           ;DO WE HAVE DRIVE READY?
044650  100413                                   BMI     2$              ;IF MINUS, YES!!
044652  004737  017000                           JSR     PC,WAIT         ;STALL, AND WASTE SOME TIME
044656  005301                                   DEC     R1              ;ONE LESS ITERATION TO-GO
044660  003371                                   BGT     1$              ;IF R1 <> 0, DO AGAIN
044662  004737  017326                           JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
044666  104456                                   TRAP    C$ERHRD
044670  000622                                   .WORD   402
044672  012015                                   .WORD   EM2
044674  014652                                   .WORD   ERR3
044676  000425                                   BR      4$              ;AND SKIP NEXT PART OF TEST
044700  032777  040000  135616           2$:     BIT     #ERR,@RPDS      ;COMPOSITE ERROR SET?
044706  001407                                   BEQ     3$              ;TAKE BRANCH IF NOT
044710  004737  017326                           JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
044714  104456                                   TRAP    C$ERHRD
044716  000623                                   .WORD   403
044720  011747                                   .WORD   EM1
044722  014652                                   .WORD   ERR3
044724  000412                                   BR      4$              ;AND TAKE EARLY EXIT
044726  032777  040000  135556           3$:     BIT     #TRE,@RPCS1     ;TRANSFER ERROR SET?
044734  001410                                   BEQ     5$              ;IF ZERO, WE'RE OK
044736  004737  017326                           JSR     PC,SAVRPR       ;GET THE REGISTER SNAPSHOT
044742  104456                                   TRAP    C$ERHRD
044744  000624                                   .WORD   404
044746  012562                                   .WORD   EM16
044750  014652                                   .WORD   ERR3
044752  004737  016662                   4$:     JSR     PC,SEIZE        ;PURGE REMAINING ERRORS
```

```
    49 044756                       5$:
       044756                       L10115:
       044756  104401                         TRAP    C$ETST
    50
```

```

                                                .SBTTL  HARDWARE PARAMETER CODING SECTION

                                                ;++
                                                ; 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.
                                                ;--

044760  000022                                          .WORD L10116-L$HARD/2
044762                                          L$HARD::
                                                                                        ;PRINT 'RPCS1 ADRS?'
044762  000031                                          .WORD   T$CODE
044764  045026                                          .WORD   MESG1
044766  160000                                          .WORD   T$LOLIM
044770  177777                                          .WORD   T$HILIM
                                                                                        ;PRINT 'VECTOR ADRS?'
044772  001031                                          .WORD   T$CODE
044774  045041                                          .WORD   MESG4
044776  000000                                          .WORD   T$LOLIM
045000  000377                                          .WORD   T$HILIM
                                                                                        ;PRINT 'BR LEVEL?'
045002  002032                                          .WORD   T$CODE
045004  045055                                          .WORD   MESG5
045006  000340                                          .WORD   340
045010  000000                                          .WORD   T$LOLIM
045012  000007                                          .WORD   T$HILIM
                                                                                        ;PRINT 'DRIVE #?'
045014  003032                                          .WORD   T$CODE
045016  045066                                          .WORD   MESG6
045020  000007                                          .WORD   7
045022  000000                                          .WORD   T$LOLIM
045024  000007                                          .WORD   T$HILIM
                                                        .EVEN
045026                                          L10116:

045026     122      120      103                MESG1:  .ASCIZ  /RPCS1 ADRS/
045041     126      105      103                MESG4:  .ASCIZ  /VECTOR ADRS/
045055     102      122      040                MESG5:  .ASCIZ  /BR LEVEL/
045066     104      122      111                MESG6:  .ASCIZ  /DRIVE #/

                                                        .EVEN
```

```
                                          .SBTTL  SOFTWARE PARAMETER CODING SECTION

                                          ;++
                                          ; 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.
                                          ;--

 045076  000022                                     .WORD L10117-L$SOFT/2
 045100                                   L$SOFT::
                                                                              ;PRINT 'EXECUTE TEST 25.,  MASSBUS INTERFACE SWITCH TEST  (L
 045100  000130                                     .WORD    T$CODE
 045102  045144                                     .WORD    MESG17
 045104  000001                                     .WORD    1
                                                                              ;PRINT 'EXECUTE TEST 52., PRINT CONTENTS OF INTERNAL ERROR L
 045106  001130                                     .WORD    T$CODE
 045110  045224                                     .WORD    MESG18
 045112  000001                                     .WORD    1
                                                                              ;PRINT 'SELECT A TRACK FOR THE RP07 INTERNAL RD-WRT TESTS (L
 045114  002130                                     .WORD    T$CODE
 045116  045313                                     .WORD    MESG20
 045120  000001                                     .WORD    1
                                                                              ;GO TO 1$ IF NO
 045122  006044                                     .WORD    T$CODE
                                                                              ;PRINT 'TRACK ADDRESS (D)  0 ?'
 045124  003052                                     .WORD    T$CODE
 045126  045375                                     .WORD    MESG21
 045130  000037                                     .WORD    37
 045132  000000                                     .WORD    T$LOLIM
 045134  000037                                     .WORD    T$HILIM
 045136                                   1$:                                 ;PRINT 'EXECUTE TEST 60., SELECT A MICRO-DIAGNOSTIC FOR EXEC
 045136  004130                                     .WORD    T$CODE
 045140  045413                                     .WORD    MESG22
 045142  000001                                     .WORD    1



                                                    .EVEN
 045144                                   L10117:

 045144      105       130       105      MESG17::.ASCIZ  /EXECUTE TEST 25., MASSBUS INTERFACE SWITCH TEST/
 045224      105       130       105      MESG18::.ASCIZ  /EXECUTE TEST 52., PRINT CONTENTS OF INTERNAL ERROR LOG/
 045313      123       105       114      MESG20::.ASCIZ  /SELECT A TRACK FOR THE RP07 INTERNAL RD-WRT TESTS/
 045375      124       122       101      MESG21::.ASCIZ  /TRACK ADDRESS/
 045413      105       130       105      MESG22::.ASCIZ  /EXECUTE TEST 60., SELECT A MICRO-DIAGNOSTIC FOR EXECUTION/


                                                    .EVEN

 045506                                   $PATCH::.BLKW   50.                 ;PROGRAM PATCH AREA (50. WORDS)


                                                    .EVEN
 045652  045672                                     .WORD T$FREE
 045654  000006                                     .WORD T$SIZE
 045656                                   L$LAST::
     1
    14
    16 045656  000000                   .WORD   0
       045660  000004                   .WORD   L10122-./2-1
       045662                   L10120:
    17 045662  176700                   .WORD   176700
    18 045664  000254                   .WORD   254
    19 045666  000240                   .WORD   240
    20 045670  000000                   .WORD   0
    21 045672                   L10122:
    23         000001           .END
```

```
SYMBOL TABLE

AD      011074 G     CONSET  020330       C$SPRI= 000041       EM17    012622 G     FRMT03  007404 G
ADR   = 000020 G     CPE   = 040000       C$SVEC= 000037       EM2     012015 G     FRMT04  007426 G
AOE   = 001000       CPU   = 020000       C$TPRI= 000013       EM20    012661 G     FRMT05  007474 G
ASSEMB= 000010       CR    = 000015 G     DCK   = 100000       EM21    012725 G     FRMT06  007545 G
ATA   = 100000       CREADY  015134       DCU   = 000040       EM22    012776 G     FRMT07  007574 G
ATABIT  002566 G     CRLF    006420 G     DECODE  020532       EM23    013051 G     FRMT10  007624 G
AT0   = 000001       CSTORE  002432 G     DESCYL  002416 G     EM24    013126 G     FRMT11  007655 G
AT1   = 000002       C$AU  = 000052       DESTRK  002414 G     EM25    013167 G     FRMT12  007713 G
AT2   = 000004       C$AUTO= 000061       DFPTBL  002320 G     EM26    013224 G     FRMT13  007756 G
AT3   = 000010       C$BRK = 000022       DIAG  = 000035       EM27    013266 G     FRMT14  010004 G
AT4   = 000020       C$BSEG= 000004       DIAGEN  015312       EM3     012055 G     FRMT15  010031 G
AT5   = 000040       C$BSUB= 000002       DIAGLD  015352       EM30    013326 G     FRMT16  010070 G
AT6   = 000100       C$CEFG= 000045       DIAGMC= 000000       EM31    013362 G     FRMT17  010161 G
AT7   = 000200       C$CLCK= 000062       DIAGST  015260 G     EM32    013411 G     FRMT20  010202 G
A16   = 000400       C$CLEA= 000012       DLT   = 100000       EM33    013441 G     FRMT23  010271 G
A17   = 001000       C$CLOS= 000035       DMD   = 100000       EM34    013505 G     FRMT40  010337 G
BAI   = 000010       C$CLP1= 000006       DMPREG  016212       EM35    013564 G     FRMT41  010430 G
BELL  = 000007 G     C$CVEC= 000036       DPE   = 000010       EM36    013641 G     FRMT50  010510 G
BICEXP  017422 G     C$DCLN= 000044       DPR   = 000400       EM37    013701 G     FRMT51  010601 G
BISEXP  017372 G     C$DODU= 000051       DRCLR = 000011       EM4     012100 G     FPMT60  010661 G
BITPOS  002400 G     C$DRPT= 000024       DRIVER  015146       EM40    013753 G     FRMT61  010753 G
BIT0  = 000001 G     C$DU  = 000053       DRQ   = 004000       EM41    014026 G     FRMT70  011035 G
BIT00 = 000001 G     C$EDIT= 000003       DRT0  = 000001       EM42    014075 G     FRMT71  011055 G
BIT01 = 000002 G     C$ERDF= 000055       DRT1  = 000002       EM43    014130 G     FUNCTN  002420 G
BIT02 = 000004 G     C$ERHR= 000056       DRT2  = 000004       EM5     012116 G     F$AU  = 000015
BIT03 = 000010 G     C$ERRO= 000060       DRT3  = 000010       EM6     012155 G     F$AUTO= 000020
BIT04 = 000020 G     C$ERSF= 000054       DRT4  = 000020       EM7     012217 G     F$BGN = 000040
BIT05 = 000040 G     C$ERSO= 000057       DRT5  = 000040       ENDCYL  002374 G     F$CLEA= 000007
BIT06 = 000100 G     C$ESCA= 000010       DRT6  = 000100       ENDTRK  002370 G     F$DU  = 000016
BIT07 = 000200 G     C$ESEG= 000005       DRT7  = 000200       ERR   = 040000       F$END = 000041
BIT08 = 000400 G     C$ESUB= 000003       DRT8  = 000400       ERRCK   017032       F$HARD= 000004
BIT09 = 001000 G     C$ETST= 000001       DRVBLT  011477 G     ERRDMP  002334       F$HW  = 000013
BIT1  = 000002 G     C$EXIT= 000032       DRVCLR  015400       ERRVEC= 000004       F$INIT= 000006
BIT10 = 002000 G     C$GETB= 000026       DRVNO   002506 G     ERRWD1  002404 G     F$JMP = 000050
BIT11 = 004000 G     C$GETW= 000027       DRVSN   002510 G     ERRWD2  002406 G     F$MOD = 000000
BIT12 = 010000 G     C$GMAN= 000043       DRY   = 000200       ERR0    014172 G     F$MSG = 000011
BIT13 = 020000 G     C$GPHR= 000042       DS      011121 G     ERR1    014310 G     F$PROT= 000021
BIT14 = 040000 G     C$GPLO= 000030       DSE   = 020000       ERR2    014500 G     F$PWR = 000017
BIT15 = 100000 G     C$GPRI= 000040       DSNMSG  006423 G     ERR3    014652 G     F$RPT = 000012
BIT2  = 000004 G     C$INIT= 000011       DTE   = 010000       ERSTAT  002466 G     F$SEG = 000003
BIT3  = 000010 G     C$INLP= 000020       DVA   = 004000       EVL   = 000004 G     F$SOFT= 000005
BIT4  = 000020 G     C$MANI= 000050       DVC   = 000200       EWN   = 000002       F$SRV = 000010
BIT5  = 000040 G     C$MEM = 000031       ECH   = 000100       EXPTED  002454 G     F$SUB = 000002
BIT6  = 000100 G     C$MSG = 000023       ECI   = 004000       E$END = 002100       F$SW  = 000014
BIT7  = 000200 G     C$OPEN= 000034       EC.00   004354       E$LOAD= 000035       F$TEST= 000001
BIT8  = 000400 G     C$PNTB= 000014       EF.CON= 000036 G     FASTAT  002430 G     F1    = 000002
BIT9  = 001000 G     C$PNTF= 000017       EF.NEW= 000035 G     FATOF   002470 G     F2    = 000004
BLOWER  011361 G     C$PNTS= 000016       EF.PWR= 000034 G     FAULTS  016556       F3    = 000010
BOE   = 000400 G     C$PNTX= 000015       EF.RES= 000037 G     FER   = 000020       F4    = 000020
BSE   = 100000       C$QIO = 000377       EF.STA= 000040 G     FLOAT   020034       F5    = 000040
BYTCNT  002410 G     C$RDBU= 000007       EM1     011747 G     FLST00  007273 G     GO    = 000001
CA      011151 G     C$REFG= 000047       EM11    012272 G     FLST01  007312 G     G$CNTO= 000200
CALMOD  016132       C$RESE= 000033       EM12    012342 G     FMT   = 010000       G$DELM= 000372
CLKSTA  002426 G     C$REVI= 000003       EM13    012410 G     FORTRK= 000063       G$DISP= 000003
CLR   = 000040       C$RFLA= 000021       EM14    012454 G     FRMT00  007161 G     G$EXCP= 000400
CMOD  = 100000       C$RPT = 000025       EM15    012523 G     FRMT01  007214 G     G$HILI= 000002
COMPAR  020202       C$SEFG= 000046       EM16    012562 G     FRMT02  007315 G     G$LOLI= 000001
```

```
SYMBOL TABLE

G$NO  = 000000      J1      011161 G    L$EXP4  002064 G    L10034  025032          MCUTXT  002676 G
G$OFFS= 000400      J10     011236 G    L$EXP5  002066 G    L10035  025356          MDPE  = 000400
G$OFSI= 000376      J11     011243 G    L$HARD  044762 G    L10036  025536          MESG1   045026
G$PRMA= 000001      J12     011250 G    L$HIME  002120 G    L10037  025730          MESG10  006577 G
G$PRMD= 000002      J13     011255 G    L$HPCP  002016 G    L10040  026226          MESG11  006671 G
G$PRML= 000000      J14     011262 G    L$HPTP  002022 G    L10041  026524          MESG12  006763 G
G$RADA= 000140      J15     011267 G    L$HW    002320 G    L10042  027042          MESG13  011607 G
G$RADB= 000000      J16     011274 G    L$ICP   002104 G    L10043  027360          MESG14  011667 G
G$RADD= 000040      J17     011301 G    L$INIT  020652 G    L10044  027632          MESG15  007062 G
G$RADL= 000120      J2      011166 G    L$LADP  002026 G    L10045  030100          MESG17  045144 G
G$RADO= 000020      J20     011306 G    L$LAST  045656 G    L10046  030320          MESG18  045224 G
G$XFER= 000004      J21     011313 G    L$LOAD  002100 G    L10047  030512          MESG20  045313 G
G$YES = 000010      J3      011173 G    L$LUN   002074 G    L10050  030622          MESG21  045375 G
HCE   = 000200      J4      011200 G    L$MREV  002050 G    L10051  031014          MESG22  045413 G
HCI   = 002000      J5      011205 G    L$NAME  002000 G    L10052  031152          MESG4   045041
HCRC  = 000400      J6      011212 G    L$PRIO  002042 G    L10053  031320          MESG5   045055
HDA     011320 G    J7      011217 G    L$PROT  020644 G    L10054  031444          MESG6   045066
HELP  = 000000      J8      011224 G    L$PRT   002112 G    L10055  031576          MOH   = 020000
HERTZ   015750      J9      011231 G    L$REPP  002062 G    L10056  031734          MOL   = 010000
HOE   = 100000 G    KWSRV   016104      L$REV   002010 G    L10057  032134          MSGMOL  006452 G
IAE   = 002000      K1RELA  011443 G    L$RPT   020636 G    L10060  032300          MSGWLO  006522 G
IBE   = 010000 G    LASCYL  002376 G    L$SOFT  045100 G    L10061  032560          MSK     002450 G
IDU   = 000040 G    LASTRK  002372 G    L$SPC   002056 G    L10062  032716          MTD   = 040000
IE    = 000100      LBC   = 002000      L$SPCP  002020 G    L10063  033140          MTRBRK  011421 G
IER   = 020000 G    LBT   = 002000      L$SPTP  002024 G    L10064  033322          MXF   = 001000
ILEV  = 000004      LCE   = 001000      L$STA   002030 G    L10065  033452          NBA   = 100000
ILF   = 000001      LCLKTB  015740      L$SW    002332 G    L10066  033730          NED   = 010000
ILOCK   002460 G    LDZERO  017572      L$TEST  002114 G    L10067  034030          NEGWRD  002412 G
ILR   = 000002      LF    = 000012 G    L$TIML  002014 G    L10070  034316          NEM   = 004000
INTFLG  002462 G    LKS     015742      L$UNIT  002012 G    L10071  034422          NEXLOC  017252
INTSRV  020630 G    LKV     015744      L10000  002330      L10072  034634          NOP   = 000015
IOBUFF  002730 G    LOCATE  017150      L10001  002344      L10073  035106          OCTHEX  015416
IR    = 000100      LOE   = 040000 G    L10002  014306      L10074  035204          OFFDIR= 000200
IRLOCK  017672      LOT   = 000010 G    L10003  014476      L10075  035322          OM    = 000001
ISR   = 000100 G    L$ACP   002110 G    L10004  014650      L10076  035500          ONEFIL= 000001
ITCOUN  002402 G    L$APT   002036 G    L10005  014676      L10077  035756          OPI   = 020000
IXE   = 004000 G    L$AU    021506 G    L10006  016130      L10100  036230          OPRPNL  011455 G
IXU   = 000100      L$AUT   002070 G    L10007  020634      L10101  036730          OR    = 000200
I$AU  = 000041      L$AUTO  021346 G    L10010  020642      L10102  037700          ORLOCK  017706
I$AUTO= 000041      L$CCP   002106 G    L10012  021344      L10103  040126          O$APTS= 000000
I$CLN = 000041      L$CLEA  021350 G    L10013  021346      L10104  040362          O$AU  = 000000
I$DU  = 000041      L$CO    002032 G    L10014  021476      L10105  040622          O$BGNR= 000000
I$HRD = 000041      L$DEPO  002011 G    L10015  021504      L10106  041154          O$BGNS= 000001
I$INIT= 000041      L$DESC  006362 G    L10016  021512      L10107  041674          O$DU  = 000000
I$MOD = 000041      L$DESP  002076 G    L10017  021610      L10110  044002          O$ERRT= 000000
I$MSG = 000041      L$DEVP  002060 G    L10020  021776      L10111  043026          O$GNSW= 000001
I$PROT= 000040      L$DISP  002124 G    L10021  022140      L10112  043644          O$POIN= 000001
I$PTAB= 000041      L$DLY   002116 G    L10022  022300      L10113  044320          O$SETU= 000001
I$PWR = 000041      L$DTP   002040 G    L10023  022442      L10114  044612          PAR   = 000010
I$RPT = 000041      L$DTYP  002034 G    L10024  022772      L10115  044756          PAT   = 000020
I$SEG = 000041      L$DU    021500 G    L10025  023266      L10116  045026          PATCNT  002434 G
I$SETU= 000041      L$DUT   002072 G    L10026  023440      L10117  045144          PATT1   002344 G
I$SFT = 000041      L$DVTY  006354 G    L10027  023600      L10120  045662          PATT2   002346 G
I$SRV = 000041      L$EF    002052 G    L10030  023770      L10122  045672          PATT3   002350 G
I$SUB = 000041      L$ENVI  002044 G    L10031  024150      MASK    002446 G        PATT4   002352 G
I$TST = 000041      L$ETP   002102 G    L10032  024332      MCPE  = 020000          PATT5   002354 G
J$JMP = 000167      L$EXP1  002046 G    L10033  024506      MCUTAB  004060 G        PATT6   002356 G
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PATT7   002360 G     RPDS    002524 G     S$LSYM= 010000       T$$DU = 010015       T45     034636 G
PATT8   002362 G     RPDT    002540 G     TABADD  002366 G     T$$HAR= 010116       T46     035110 G
PATT9   002364 G     RPEC1   002556 G     TAP   = 040000       T$$HW = 010000       T47     035206 G
PCLKTB  015724       RPEC2   002560 G     TEMP    002436 G     T$$INI= 010012       T48     035324 G
PGE   = 100000       RPER1   002526 G     TERM    011325 G     T$$MSG= 010005       T49     035502 G
PGM   = 001000       RPER2   002552 G     TESTRG  002456 G     T$$PC = 000001       T5      022302 G
PHF   = 000400       RPER3   002554 G     TRAKAD  002340       T$$PRO= 010011       T50     035760 G
PIP   = 020000       RPLA    002532 G     TRE   = 040000       T$$PTA= 010121       T51     036232 G
PKB     015730       RPMR1   002536 G     TST03   004160 G     T$$RPT= 010010       T52     036732 G
PKC     015732       RPOF    002544 G     TST04   004172 G     T$$SEG= 010001       T53     037702 G
PKCS    015726       RPSN    002542 G     TST05   004204 G     T$$SOF= 010117       T54     040130 G
PKV     015734       RPVEC   002476 G     TST08   004216 G     T$$SRV= 010007       T55     040364 G
PNT   = 001000 G     RPWC    002514 G     TST11   004232 G     T$$SUB= 010112       T56     040624 G
PRELOD  017722       RTD   = 000075       TST12   004244 G     T$$SW = 010001       T57     041156 G
PRI   = 002000 G     RWU1  = 002000       TST28   004256 G     T$$TES= 010115       T58     041676 G
PRI00 = 000000 G     RWU2  = 004000       TST33   004272 G     T1      021514 G     T58.1   042030
PRI01 = 000040 G     RWU3  = 010000       TS134   004302 G     T10     023602 G     T58.2   043030
PRI02 = 000100 G     SAVRPR  017326       TST49   004330 G     T11     023772 G     T59     044004 G
PRI03 = 000140 G     SBE   = 000004       T$ARGC= 000001       T12     024152 G     T6      022444 G
PRI04 = 000200 G     SC    = 100000       T$CODE= 004130       T13     024334 G     T60     044322 G
PRI05 = 000240 G     SCF   = 000002       T$ERRN= 000624       T14     024510 G     T61     044614 G
PRI06 = 000300 G     SC1   = 000100       T$EXCP= 000000       T15     025034 G     T7      022774 G
PRI07 = 000340 G     SC16  = 002000       T$FLAG= 000040       T16     025360 G     T8      023270 G
PSEL  = 002000       SC2   = 000200       T$FREE= 045672       T17     025540 G     T9      023442 G
PSTACK  002652 G     SC32  = 004000       T$GMAN= 000000       T18     025732 G     UAM   = 000200 G
PTRANS  011376 G     SC4   = 000400       T$HILI= 000037       T19     026230 G     UNABLE  002464 G
RCVED   002452 G     SC64  = 010000       T$LAST= 000001       T2      021612 G     UNIT    002472 G
RDDTA = 000071       SC8   = 001000       T$LOLI= 000000       T20     026526 G     UNS   = 040000
RDHDTA= 000073       SDF   = 000020       T$LSYM= 010000       T21     027044 G     UPE   = 020000
RDY   = 000200       SEARCH= 000031       T$LTNO= 000075       T22     027362 G     US1   = 000001
READTD  011531 G     SEEK  = 000005       T$NEST= 177777       T23     027634 G     US2   = 000002
READY   015122       SEIZE   016662       T$NS0 = 000000       T24     030102 G     US4   = 000004
RECAL = 000007       SELNUM  002424 G     T$NS1 = 000005       T25     030322 G     VV    = 000100
REG     002576 G     SELRUN  002342       T$NS2 = 000003       T26     030514 G     WAIT    017000
REGSET  017452       SELTRK  002336       T$NS3 = 000003       T27     030624 G     WAITMS  016756
RELEAS= 000013       SENSOR  011341 G     T$PCNT= 000000       T28     031016 G     WATDRY  020372
RESET   017474       SETUP   017744       T$PTAB= 010121       T29     031154 G     WATIME  016776
RH      011132 G     SFPTBL  002332 G     T$PTHV= 000001       T3      022000 G     WCE   = 040000
RHEXT   002502 G     SIZE70  014700       T$PTNU= 000001       T30     031322 G     WCF   = 000040
RHTYPE  002504 G     SKI   = 040000       T$SAVL= 177777       T31     031446 G     WCKD  = 000051
RIP   = 000021       SNDIGT  006447 G     T$SEGL= 177777       T32     031600 G     WCKHD = 000053
RMR   = 000004       SNK     002440 G     T$SEK0= 010001       T33     031736 G     WLE   = 004000
ROUTDO  002422 G     SPIRAL  017266       T$SEK1= 010003       T34     032136 G     WOR   = 001000
RPADR   002474 G     SRC     002442 G     T$SIZE= 000006       T35     032302 G     WRDTA = 000061
RPARDY  015042       SRCTMP  002444 G     T$SUBN= 000000       T36     032562 G     WRL   = 004000
RPAS    002530 G     STOPCK  016054       T$TAGL= 177777       T37     032720 G     WRTD  = 000065
RPBA    002516 G     ST.CLK  015550       T$TAGN= 010123       T38     033142 G     WRU   = 000400
RPBAE   002562 G     ST.LCL  016016       T$TEMP= 000000       T39     033324 G     WTCKD   011566 G
RPCC    002550 G     ST.PCL  015752       T$TEST= 000075       T4      022142 G     WTCKHD  011543 G
RPCS1   002512 G     SVCGBL= 000000       T$TSTM= 177777       T40     033454 G     X$ALWA= 000000
RPCS2   002522 G     SVCINS= 000000       T$TSTS= 000001       T41     033732 G     X$FALS= 000040
RPCS3   002564 G     SVCSUB= 000000       T$$AU = 010016       T42     034032 G     X$OFFS= 000400
RPDA    002520 G     SVCTAG= 000000       T$$AUT= 010013       T43     034320 G     X$TRUE= 000020
RPDB    002534 G     SVCTST= 000000       T$$CLE= 010014       T44     034424 G     $PATCH  045506 G
RPDC    002546 G     SWTTST  002332       T$$DAT= 010122

. ABS.  045672     000
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        000000     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  32256 WORDS  ( 126 PAGES)
DYNAMIC MEMORY AVAILABLE FOR  70 PAGES
CZRJMA.BIC,CZRJMA/C=[20,0]SVC34R.MLB,[20,12]CZRJMA.DOC,CZRJMA.HIS,CZRJMA
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$$$MFG    2-17      2-30      6-3       7-362     7-424
$$$NOT   15-42     60-25     87-23     95-33
$PATCH   98-55#
A16      12-7#     17-33     17-38     49-29     49-30     49-34     49-61     49-65     50-39     50-43
A17      12-8#     17-33     17-38     49-37     49-41     50-31     50-32     50-36     50-63     50-67     50-80
AD       13-128    16-3#
ADR      11-57#
AOE      12-87#
ASSEMB    7-373     7-373
AT0      12-103#
AT1      12-104#
AT2      12-105#
AT3      12-106#
AT4      12-107#
AT5      12-108#
AT6      12-109#
AT7      12-110#
ATA      12-73#    76-17     76-21     77-36     77-41     77-55     77-61     77-65     80-40     80-44     90-39     90-43
ATABIT   13-89#    30-75
BAI      12-28#
BELL     15-14
BICEXP   23-65#    41-44     41-78     42-62     49-39     49-63     49-76     50-41     50-65     50-78     51-39     52-41     53-29     54-28
         55-28     56-31     58-28     65-28     66-24     73-29     74-23     75-55     76-19     77-63     81-18     83-29     89-33     89-39
         89-45     92-76     92-82
BISEXP   23-58#    41-54     41-62     41-69     42-42     42-54     46-39     46-45     49-32     49-52     50-34     50-54     51-28     52-30
         53-29     53-29     53-29     54-28     54-28     54-28     55-28     55-28     55-28     56-31     56-31     56-31     57-26     75-31
         75-37     77-39     80-42     82-23     90-41     93-261    93-282
BIT0     11-57#    14-68     14-138    14-162    14-259    14-435    14-489    14-499    14-501    20-59     27-15     49-50     49-54     49-74
         49-78     53-29     53-29     53-29     53-29     53-29     54-28     54-28     55-28     55-28     56-31     56-31     86-53
BIT00    11-57     11-57#
BIT01    11-57     11-57#
BIT02    11-57     11-57#
BIT03    11-57     11-57#
BIT04    11-57     11-57#
BIT05    11-57     11-57#
BIT06    11-57     11-57#
BIT07    11-57     11-57#
BIT08    11-57     11-57#
BIT09    11-57     11-57#
BIT1     11-57#    14-68     14-84     14-132    14-136    14-138    14-156    14-162    14-164    14-174    14-178    14-234    14-236    37-29
         38-18     39-20     40-19     41-36     42-33     43-40     44-29     45-29     46-29     47-23     48-23     49-25     50-28     50-52
         50-56     50-76     51-20     52-22     53-29     54-28     54-28     54-28     54-28     55-28     56-31     57-19     58-20     61-25
         62-36     63-29     64-23     65-32     66-28     67-18     68-16     70-62     71-33     73-37     81-22     82-27     84-57     85-31
         91-89     92-66     92-86     92-105    92-109    93-116    93-152    93-193    93-213    93-230    93-335    94-56
BIT10    11-57#    14-137    14-260    22-93     58-19     60-44     61-24     62-35     63-28     64-22     65-31     67-17     68-15     70-60
         71-32     73-36     78-22     79-34     79-44     80-36     80-54     81-21     82-26     84-56     85-30     91-88     93-151    93-192
         93-212    93-229
BIT11    11-57#    14-139    14-206    14-208    14-218    14-258    14-260    14-270    14-290    14-294    14-296    14-298    14-300    14-302
         14-304    14-306    14-308    14-310    14-312    14-314    14-316    14-318    14-320    14-322    14-324    14-326    14-328    14-330
         14-332    14-334    14-336    14-338    14-340    14-342    14-344    14-346    14-348    14-350    14-352    14-354    14-356    14-358
         14-360    14-362    14-364    14-366    14-368    14-370    14-372    14-374    14-376    14-378    14-386    14-388    14-428    14-432
         14-442    22-90     58-19     60-44     63-28     64-22     65-31     66-27     67-17     68-15     70-52     72-39     73-36     74-27
         75-41     75-59     76-22     77-66     78-22     79-44     83-32     84-56     85-30     89-48     90-44     92-65     92-85     92-104
         92-108    93-334    94-47     94-55     96-26
BIT12    11-57#    14-139    14-260    22-96     58-19     60-44     61-24     62-35     63-28     64-22     65-31     67-17     68-15     70-60
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        71-32    73-36    78-22    79-34    79-44    80-36    80-54    81-21    82-26    84-56    85-30    91-88    93-142   93-151
        93-192   93-212   93-229
BIT13   11-57#   14-139   14-258   14-270   14-290   14-424   14-430   14-432   14-434   14-446   14-448   14-450   14-452   14-454
        14-456   14-458   14-460   14-462   14-466   93-142   93-151   93-192   93-212   93-229
BIT14   11-57#   14-199   14-258   14-290   14-434   14-446   14-448   14-466   14-468   14-470   14-498   93-143   93-145
BIT15   11-57#   14-139   14-258   14-290   14-466   14-470   14-486   14-488   14-490   14-492   14-494   14-496   14-498   14-500
        14-502   14-504   20-25    93-148
BIT2    11-57#   14-68    14-219   55-28    55-28    55-28    58-20    60-45    61-25    62-36    63-29    64-23    65-32    67-18
        68-16    70-62    71-33    73-37    81-22    82-27    84-57    85-31    91-89    92-66    92-86    92-105   92-109   93-116
        93-152   93-193   93-213   93-230   93-335   94-56
BIT3    11-57#   14-60    14-62    14-64    14-66    14-86    14-88    14-90    14-92    14-94    14-96    14-98    14-100   14-142
        14-144   14-146   14-148   14-150   14-152   14-154   14-156   14-162   14-164   14-166   14-168   14-170   14-172   14-174
        14-176   14-178   14-180   14-182   14-184   14-186   14-188   14-190   14-192   14-194   14-196   14-198   14-200   14-202
        14-206   14-208   14-210   14-214   14-230   14-232   14-234   14-236   14-394   56-31    56-31    56-31    61-25
BIT4    11-57#   14-60    14-62    14-64    14-66    14-84    14-88    14-92    14-98    14-100   14-142   14-144   14-146   14-148
        14-150   14-152   14-154   14-156   14-158   14-160   14-166   14-168   14-170   14-176   14-180   14-182   14-184   14-186
        14-188   14-190   14-192   14-194   14-196   14-198   14-200   14-204   14-206   14-210   14-222   14-224   14-226   14-228
        14-230   14-238   14-240   14-242   14-244   14-246   14-248   14-250   14-252   14-254   14-256   14-284   14-286   14-288
        14-390   14-392   14-394   14-396   14-398   14-400   14-402   60-45    78-23    81-22
BIT5    11-57#   14-60    14-62    14-64    14-66    14-69    14-86    14-90    14-94    14-96    14-138   14-140   14-142   14-144
        14-146   14-148   14-154   14-162   14-166   14-168   14-170   14-172   14-176   14-200   14-202   14-206   14-208   14-210
        14-212   14-214   14-222   14-224   14-226   14-228   14-282   14-400
BIT6    11-57#   14-38    14-40    14-42    14-44    14-46    14-48    14-50    14-52    14-54    14-56    14-58    14-70    14-72
        14-74    14-76    14-78    14-80    14-82    14-84    14-126   14-128   14-130   14-132   14-136   14-138   14-198   14-206
        14-208   14-222   14-224   14-230   14-258   14-262   14-268   14-304   14-376   14-480   86-19    92-65    92-108   93-115
        94-55
BIT7    11-57#   14-61    14-63    14-65    14-67    14-138   14-139   14-141   14-143   14-145   14-147   14-149   14-155   14-167
        14-169   14-171   14-177   14-198   14-201   14-207   14-216   14-218   14-258   14-259   14-260   14-264   14-268   14-270
        14-276   14-280   14-282   14-290   14-291   14-296   14-300   14-304   14-310   14-312   14-314   14-316   14-318   14-336
        14-338   14-376   14-378   14-474   14-488   14-489   14-491   14-493   14-495   14-499   14-501   61-24    63-28    64-22
        65-31    66-27    67-17    68-15    69-21    70-58    85-30    86-19    92-65    92-108   93-115   94-55
BIT8    11-57#   14-84    14-102   14-108   14-206   14-208   14-258   14-264   14-266   14-268   14-270   14-272   14-274   14-276
        14-292   14-422   14-424   14-428   14-432   14-442   14-474   58-20    60-45    61-25    62-36    63-29    64-23    65-32
        67-18    68-15    72-43    73-37    75-41    77-38    77-42    81-22    82-27    84-57    85-31    91-89    92-65    92-66
        92-85    92-86    92-104   92-105   92-108   93-115   93-116   93-151   93-152   93-192   93-193   93-212   93-213   93-229
        93-230   93-334   93-335   94-55    94-56
BIT9    11-57#   14-102   14-104   14-106   14-108   14-110   14-112   14-114   14-116   14-118   14-120   14-122   14-124   14-132
        14-139   14-258   14-263   14-264   14-266   14-268   14-270   14-272   14-274   14-290   14-292   14-422   14-424   14-426
        14-428   14-430   14-432   14-434   14-438   14-448   14-470   14-472   14-498   72-43    75-41    77-38    77-42    91-88
        92-65    92-85    92-104   92-108   93-115   93-151   93-192   93-212   93-229   94-55
BITPOS  13-23#   18-14    18-21    30-74*   30-75*   79-29    80-30
BLOWER  13-134   16-30#
BOE     11-57#
BSE     12-181#
BYTCNT  13-27#
C$AU     7-373#  34-35
C$AUTO   7-373#  31-18
C$BRK    7-373#  18-33    18-44    24-36    24-48
C$BSEG   7-373#  37-21    37-33    38-21    38-21    38-21    38-21    39-22    39-22    39-22    39-22    40-21    40-21    40-21
        40-21    41-38    41-39    41-50    42-35    42-36    43-42    43-42    43-42    43-42    44-31    45-31    45-34    46-31
        47-27    47-27    47-27    47-27    48-25    48-25    48-25    48-25    49-28    49-46    49-59    49-70    50-30    50-48
        50-61    50-72    51-24    51-35    52-24    52-37    53-29    53-29    53-29    54-28    54-28    54-28    55-28    55-28
        55-28    56-31    56-31    56-31    57-21    57-34    58-22    58-35    59-16    60-37    61-17    62-15    63-17    64-25
        64-25    64-25    64-25    65-20    66-14    67-21    68-20    69-25    69-25    69-25    69-25    70-36    71-19    72-20
        73-15    74-19    75-23    76-14    77-30    78-15    79-24    80-26    81-14    82-16    83-23    86-24    86-38    86-55
        86-75    88-30    89-25    90-25    91-54    92-52    92-69    92-90    93-106   93-120   93-197   93-238   93-321   94-32
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          94-53     95-72
C$BSUB     7-373#   93-105    93-227
C$CEFG     7-373#
C$CLCK     7-373#   20-101    20-120
C$CLEA     7-373#   32-57
C$CLOS     7-373#
C$CLP1     7-373#
C$CVEC     7-373#   32-26     32-29     32-31     36-64     57-49     58-47     59-37
C$DCLN     7-373#
C$DODU     7-373#
C$DRPT     7-373#
C$DU       7-373#   33-34
C$EDIT     7-373#    7-427
C$ERDF     7-373#   22-21
C$ERHR     7-373#   18-20     23-101    24-26     25-69     25-106    36-67     37-30     37-41     41-47     41-57     41-65     41-72     41-81
          42-45     42-57     42-65     44-43     45-48     46-48     49-35     49-42     49-55     49-66     49-79     50-37     50-44     50-57
          50-68     50-81     51-31     51-42     52-33     52-44     53-29     53-29     53-29     53-29     54-28     54-28     54-28     54-28
          55-28     55-28     55-28     55-28     56-31     56-31     56-31     56-31     57-29     57-40     58-31     58-41     59-31     60-46
          61-26     62-37     63-30     65-33     66-29     70-66     71-34     72-44     73-38     74-34     74-36     75-43     75-61     76-24
          77-67     78-24     79-36     79-46     80-38     80-45     80-56     81-23     82-28     83-34     84-58     85-42     86-34     86-49
          86-65     86-85     88-35     89-50     90-46     91-90     92-67     92-87     92-106    92-110    93-117    93-156    93-194    93-217
          93-222    93-248    93-264    93-276    93-285    93-303    93-309    93-336    94-51     94-66     95-77     96-37     96-42     96-47
C$ERRO     7-373#
C$ERSF     7-373#
C$ERSO     7-373#
C$ESCA     7-373#
C$ESEG     7-373#   37-32     37-43     38-21     38-21     38-21     38-21     39-22     39-22     39-22     39-22     40-21     40-21     40-21
          40-21     41-49     41-59     41-83     42-47     42-67     43-42     43-42     43-42     43-42     44-47     45-52     45-58     46-50
          47-27     47-27     47-27     47-27     48-25     48-25     48-25     48-25     49-45     49-58     49-69     49-82     50-47     50-60
          50-71     50-84     51-34     51-45     52-36     52-47     53-29     53-29     53-29     54-28     54-28     54-28     55-28     55-28
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          64-25     64-25     64-25     65-38     66-33     67-38     68-48     69-25     69-25     69-25     69-25     70-68     71-36     72-46
          73-40     74-38     75-63     76-26     77-69     78-26     79-48     80-58     81-25     82-30     83-36     86-37     86-52     86-68
          86-88     88-39     89-52     90-48     91-92     92-68     92-89     92-112    93-119    93-196    93-225    93-315    93-338    94-52
          94-75     95-81
C$ESUB     7-373#   93-226    93-320
C$ETST     7-373#   36-71     37-46     38-24     39-25     40-24     41-86     42-70     43-46     44-50     45-61     46-53     47-30     48-28
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          63-35     64-28     65-41     66-36     67-41     68-51     69-28     70-72     71-39     72-50     73-43     74-41     75-66     76-29
          77-72     78-29     79-51     80-61     81-28     82-33     83-40     84-64     85-74     86-100    87-115    88-72     89-56     90-52
          91-95     92-113    93-339    94-76     95-83     96-49
C$EXIT     7-373#   30-20     30-126    32-42     41-34     46-27     47-21     48-21     49-49     49-73     50-51     50-75     52-20     53-29
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          93-93     93-101    94-41     95-36     95-41
C$GETB     7-373#
C$GETW     7-373#
C$GMAN     7-373#   60-33     60-49     95-44
C$GPHR     7-373#   30-37
C$GPLO     7-373#
C$GPRI     7-373#
C$INIT     7-373#   30-141
C$INLP     7-373#
C$MANI     7-373#   60-29     95-39
C$MEM      7-373#
C$MSG      7-373#   16-105    16-124    16-136    16-142
C$OPEN     7-373#
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C$PNTF    7-373#  26-17     26-26     30-27     30-82     30-95     30-100    77-47     83-18     87-45     87-52     87-58     87-64     87-70
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         93-139   94-37     95-43
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C$PNTX    7-373#  20-218    20-219    20-221    20-222    20-224    20-225    20-229    20-230
C$QIO     7-373#
C$RDBU    7-373#
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C$REVI    7-373#   7-427
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C$RPT     7-373#  28-75
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C$SPRI    7-373#  32-18     47-26     51-23     51-48     52-26     52-50     57-35     58-36     59-26     59-39
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C$TPRI    7-373#
CA       13-126   16-6#
CALMOD   16-119   20-193#
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CLR      12-30#   22-9      23-94     30-71     32-20     37-35     41-40     41-74     46-32     49-60     50-62     51-36     52-38     53-29
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COMPAR   25-87#   38-21     38-21     39-22     39-22     40-21     40-21     43-42     43-42     47-27     47-27     48-25     48-25     64-25
         64-25    67-24     68-44     69-25     69-25
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CPE      12-192#
CPU      12-191#
CR       15-12
CREADY   18-44#   18-46     19-26
CRLF     15-39#   16-104    16-123    16-132    16-135    16-141    21-18     30-27     30-100    87-96     87-112
CSTORE   13-37#   25-30*    25-52     25-76*    25-78*    25-120*   91-55*    91-69*    91-83
DCK      12-93#
DCU      12-173#
DECODE   16-98    16-120    16-127    27-10#
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DESTRK   13-29#   19-18     23-16     23-18*    23-23*    91-58*    92-42*    93-102*   93-127*   93-136    93-158*   93-159    93-228*   93-296*
         94-58*   94-59*    94-68*    94-69*
DFPTBL    9-9#
DIAG     12-212#  19-14     19-21     19-41     20-12     20-26     32-14     86-18     87-29
DIAGEN   20-9#    32-16     86-99     87-114    88-71     95-82
DIAGLD   20-24#   22-115    87-36     88-31     95-73
DIAGMC    7-373    7-373
DIAGST   19-39#   87-33     88-27     95-70
DLT      12-40#
DMD      12-98#   70-38     70-41     70-45     70-47     70-65     88-38     92-54     92-91     93-108    95-80
DMPREG   16-101   16-118    16-139    20-217#
DPE      12-171#
DPR      12-66#
DRCLR    12-207#  20-9      70-46     77-54     88-36     95-78
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         93-109   93-131    93-188    93-210    93-242    93-257    93-290    93-323    93-328    94-44     94-61     94-71     95-79
DRQ      12-128#  63-22     63-24
DRTO     12-119#
DRT1     12-120#
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DRT3     12-122#
DRT4     12-123#
DRT5     12-124#
DRT6     12-125#
DRT7     12-126#
DRT8     12-127#
DRVBLT   13-139   16-35#
DRVCLR   20-38#   86-36    86-51    86-67    86-87    86-98    87-35    87-47    87-53    87-59    87-65    87-71    87-77    87-84
         87-97    87-113   93-118   93-134   93-140   93-195   93-223   93-251   93-286   93-310   94-33    94-54    94-70
DRVNO    13-59#   16-128   20-219   22-10    26-11    26-17    26-26    30-58*   30-72    30-82    32-21    41-41    41-75    46-33
         58-25    59-19    60-38    61-18    62-16    62-19    62-26    63-19    70-37    70-40    70-44    75-46    77-53
DRVSN    13-60#   30-94*   30-95
DRY      12-65#   26-21
DS       13-127   16-4#
DSE      12-179#
DSNMSG   15-40#   30-82
DTE      12-90#
DVA      12-56#
DVC      12-175#
E$END     7-373#
E$LOAD    7-373#   7-427
EC.00    14-6#    20-196
ECH      12-84#
ECI      12-153#
EF.CON   11-57#   30-16
EF.NEW   11-57#   30-22
EF.PWR   11-57#   30-12
EF.RES   11-57#
EF.STA   11-57#
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EM11     16-52#   36-67
EM12     16-53#
EM13     16-54#   37-41
EM14     16-55#   25-69    25-106   44-43    45-48    49-42    50-44    62-37    63-30    72-44    76-24    77-67    79-36    80-38
         80-56    85-42    86-34    86-49    86-65    86-85    92-67    92-110   93-222   93-309   93-336   94-51    94-66
EM15     16-56#   23-101   24-26    60-46    78-24
EM16     16-57#   41-47    58-31    81-23    96-47
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EM2      16-45#   96-37
EM20     16-60#
EM21     16-61#   82-28    92-106
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         93-285
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EM27     16-67#   22-21
EM3      16-46#
EM30     16-69#   89-50    90-46
EM31     16-70#   91-90
EM32     16-71#   93-117
EM33     16-72#   46-48    93-217   93-303
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EM37     16-76#    93-156
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EM40     16-78#    93-248
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EM42     16-80#    74-34
EM43     16-81#    18-20
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EM6      16-49#    42-65
EM7      16-50#
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ENDTRK   13-19#    30-59
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ERRC     16-96#    23-101    24-26     25-69     25-106    37-30     37-41     41-47     41-57     41-65     41-72     41-81     42-45     42-57
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ERR2     16-126#   93-156    93-217    93-276    93-303
ERR3     16-138#   96-37     96-42     96-47
ERRCK    22-60#    93-112    93-189    93-219    93-243    93-291    93-306
ERRDMP   10-11#    87-21
ERRVEC   17-10     17-13     17-14*    17-41*
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         93-115*   93-151*   93-192*   93-212*   93-229*   93-334*   94-47*    94-55*    96-26*
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         93-335*   94-48*    94-56*    96-27*
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EVL      11-57#
EWN      12-62#
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          59-13     59-13     59-13     59-33     59-40     59-40     60-22     60-22     60-22     60-28     60-31     60-36     60-47     60-56
          60-56     61-15     61-15     61-15     61-28     61-31     61-31     62-13     62-13     62-13     62-39     62-42     62-42     63-15
          63-15     63-15     63-32     63-35     63-35     64-20     64-20     64-20     64-25     64-25     64-25     64-28     64-28     65-18
          65-18     65-18     65-38     65-41     65-41     66-12     66-12     66-12     66-33     66-36     66-36     67-14     67-14     67-14
          67-38     67-41     67-41     68-14     68-14     68-14     68-48     68-51     68-51     69-20     69-20     69-20     69-25     69-25
          69-25     69-28     69-28     70-33     70-33     70-33     70-68     70-72     70-72     71-17     71-17     71-17     71-36     71-39
          71-39     72-18     72-18     72-18     72-46     72-50     72-50     73-13     73-13     73-13     73-40     73-43     73-43     74-17
          74-17     74-17     74-38     74-41     74-41     75-21     75-21     75-21     75-63     75-66     75-66     76-12     76-12     76-12
          76-26     76-29     76-29     77-28     77-28     77-28     77-52     77-69     77-72     77-72     78-13     78-13     78-13     78-26
          78-29     78-29     79-22     79-22     79-22     79-48     79-51     79-51     80-24     80-24     80-24     80-58     80-61     80-61
          81-12     81-12     81-12     81-25     81-28     81-28     82-14     82-14     82-14     82-30     82-33     82-33     83-13     83-13
          83-13     83-22     83-36     83-40     83-40     84-18     84-18     84-18     84-64     84-64     85-25     85-25     85-25     85-74
          85-74     86-16     86-16     86-16     86-37     86-52     86-68     86-88     86-100    86-100    87-20     87-20     87-20     87-26
          87-115    87-115    88-24     88-24     88-24     88-39     88-72     88-72     89-15     89-15     89-15     89-24     89-52     89-56
          89-56     90-15     90-15     90-15     90-24     90-48     90-52     90-52     91-42     91-42     91-42     91-51     91-92     91-95
          91-95     92-39     92-39     92-39     92-51     92-68     92-89     92-112    92-113    92-113    93-87     93-87     93-87     93-93
          93-101    93-105    93-105    93-119    93-196    93-225    93-226    93-226    93-227    93-227    93-315    93-320    93-320    93-338
          93-339    93-339    94-31     94-31     94-31     94-41     94-52     94-75     94-76     94-76     95-30     95-30     95-30     95-36
          95-41     95-81     95-83     95-83     96-25     96-25     96-25     96-49     96-49     96-51     97-42     97-61     98-33     98-64
          99-15     99-16     99-21     99-22
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         83-22     87-26     89-24     90-24     91-51     92-51     93-93     93-101    94-41     95-36     95-41
F$MOD     7-373#    7-399    10-26     11-51     27-43     28-40     34-36     36-38     96-51     97-42     98-64
F$MSG     7-373#   16-96     16-105    16-107    16-124    16-126    16-136    16-138    16-142
F$PROT    7-373#   29-8      29-12
F$PWR     7-373#
F$RPT     7-373#   28-46     28-75
F$SEG     7-373#   37-21     37-32     37-33     37-43     38-21     38-21     38-21     38-21     38-21     38-21     38-21     38-21     39-22
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         43-42     43-42     43-42     43-42     43-42     44-31     44-47     45-31     45-34     45-52     45-58     46-31     46-50     47-27
         47-27     47-27     47-27     47-27     47-27     47-27     47-27     48-25     48-25     48-25     48-25     48-25     48-25     48-25
         48-25     49-28     49-45     49-46     49-58     49-59     49-69     49-70     49-82     50-30     50-47     50-48     50-60     50-61
         50-71     50-72     50-84     51-24     51-34     51-35     51-45     52-24     52-36     52-37     52-47     53-29     53-29     53-29
         53-29     53-29     53-29     54-28     54-28     54-28     54-28     54-28     54-28     55-28     55-28     55-28     55-28     55-28
         55-28     56-31     56-31     56-31     56-31     56-31     56-31     57-21     57-31     57-34     57-42     58-22     58-33     58-35
         58-43     59-16     59-33     60-37     60-47     61-17     61-28     62-15     62-39     63-17     63-32     64-25     64-25     64-25
         64-25     64-25     64-25     64-25     64-25     65-20     65-38     66-14     66-33     67-21     67-38     68-20     68-48     69-25
         69-25     69-25     69-25     69-25     69-25     69-25     69-25     70-36     70-68     71-19     71-36     72-20     72-46     73-15
         73-40     74-19     74-38     75-23     75-63     76-14     76-26     77-30     77-69     78-15     78-26     79-24     79-48     80-26
         80-58     81-14     81-25     82-16     82-30     83-23     83-36     86-24     86-37     86-38     86-52     86-55     86-68     86-75
         86-88     88-30     88-39     89-25     89-52     90-25     90-48     91-54     91-92     92-52     92-68     92-69     92-89     92-90
         92-112    93-106    93-119    93-120    93-196    93-197    93-225    93-238    93-315    93-321    93-338    94-32     94-52     94-53
         94-75     95-72     95-81
F$SOFT    7-373#   98-12     98-20     98-33
F$SRV     7-373#   20-179    20-185    27-39     27-41
F$SUB     7-373#   93-105    93-226    93-227    93-320
F$SW      7-373#   10-8      10-25
F$TEST    7-373#   36-60     36-71     37-19     37-46     38-17     38-24     39-18     39-25     40-17     40-24     41-31     41-86     42-31
         42-70     43-37     43-46     44-26     44-50     45-26     45-61     46-24     46-53     47-18     47-30     48-18     48-28     49-24
         49-85     50-26     50-87     51-18     51-49     52-17     52-51     53-28     53-30     54-27     54-29     55-27     55-29     56-30
         56-32     57-17     57-50     58-18     58-48     59-13     59-40     60-22     60-56     61-15     61-31     62-13     62-42     63-15
         63-35     64-20     64-28     65-18     65-41     66-12     66-36     67-14     67-41     68-14     68-51     69-20     69-28     70-33
         70-72     71-17     71-39     72-18     72-50     73-13     73-43     74-17     74-41     75-21     75-66     76-12     76-29     77-28
         77-72     78-13     78-29     79-22     79-51     80-24     80-61     81-12     81-28     82-14     82-33     83-13     83-40     84-18
         84-64     85-25     85-74     86-16     86-100    87-20     87-115    88-24     88-72     89-15     89-56     90-15     90-52     91-42
         91-95     92-39     92-113    93-87     93-339    94-31     94-76     95-30     95-83     96-25     96-49
F1       12-51#
F2       12-52#
F3       12-53#
F4       12-54#
F5       12-55#
FASTAT   13-36#    32-12*    93-250*   93-265*   93-311    93-313*
FATOF    13-52#    16-129    93-155*   93-211*   93-275*   93-298*
FAULTS   16-102    16-121    16-133    21-9#
FER      12-82#    93-329    93-331
FLOAT    25-51#    38-21     39-22     40-21     43-42     47-27     48-25     64-25     69-25
FLST00   15-54#    21-9
FLST01   15-55#    21-12
FMT      12-154#   25-10     89-29     89-43     89-47
FORTRK   12-216#   93-185
FRMT00   15-52#    16-99
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CROSS REFERENCE TABLE (CREF V04.00 )

FRMT01  15-53#    16-100    16-130
FRMT02  15-56#    93-249    93-304
FRMT03  15-57#    16-128
FRMT04  15-58#    16-112
FRMT05  15-59#    16-117
FRMT06  15-60#    16-129
FRMT07  15-61#    87-52
FRMT10  15-63#    87-58
FRMT11  15-64#    87-64
FRMT12  15-65#    87-70
FRMT13  15-66#    87-76
FRMT14  15-67#    87-82
FRMT15  15-68#    87-89
FRMT16  15-69#    87-91
FRMT17  15-70#    87-106
FRMT20  15-72#    87-45
FRMT23  15-73#    95-43
FRMT40  15-75#    20-218
FRMT41  15-76#    20-219
FRMT50  15-78#    20-221
FRMT51  15-79#    20-222
FRMT60  15-81#    20-224
FRMT61  15-82#    20-225
FRMT70  15-84#    20-229
FRMT71  15-85#    20-230
FUNCTN  13-31#    19-14     19-20     19-21     19-41*    20-9*     20-12*    20-26*    30-70*    32-14     86-18*    87-29*    88-36*    91-65*
        92-57*    92-71*    92-92*    93-107*   93-126*   93-185*   93-198*   93-240*   93-254*   93-289*   93-322*   93-324*   94-42*    94-60*
        95-78*
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G$DELM   7-373#   22-50     42-39     42-51     57-37     58-38     59-28
G$DISP   7-373#
G$EXCP   7-373#
G$HILI   7-373#
G$LOLI   7-373#
G$NO     7-373#   60-33     60-49     95-44
G$OFFS   7-373#   60-33     60-49     95-44     97-54     97-56     97-58     97-60     98-14     98-16     98-18     98-22     98-24
G$OFSI   7-373#   60-33     60-49     95-44     97-54     97-56     97-58     97-60     98-14     98-16     98-18     98-22     98-24
G$PRMA   7-373#   97-54     97-56
G$PRMD   7-373#   95-44     97-58     97-60     98-22
G$PRML   7-373#   60-33     60-49     98-14     98-16     98-18     98-24
G$RADA   7-373#   95-44
G$RADB   7-373#
G$RADD   7-373#   98-22
G$RADL   7-373#   60-33     60-49     98-14     98-16     98-18     98-24
G$RADO   7-373#   97-54     97-56     97-58     97-60
G$XFER   7-373#   98-20
G$YES    7-373#   97-54     97-56     97-58     97-60     98-14     98-16     98-18     98-22     98-24
GO      12-50#
HCE     12-85#
HCI     12-152#
HCRC    12-86#
HDA     13-131    16-27#
HELP     7-354#    7-368     7-390     7-407     7-430     8-10      9-15     10-17     11-4#     11-41     12-222    14-519    15-19     15-29
        15-87     15-98     16-144    28-3#     28-48     28-62     29-14     30-102    30-128    31-12     32-33     32-44     33-10     33-21
        34-11     34-22     35-5#     36-48     36-55     97-4#     97-75     98-26     98-48     98-57     99-2
HERTZ   20-99*    20-115*   20-130*   20-151#   20-181
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I$CLN     7-373#   32-8#     32-42     32-57#
I$DU      7-373#   33-8#     33-34#
I$HRD    97-52#    97-61#
I$INIT    7-373#   30-8#     30-20     30-126    30-141#
I$MOD     7-373#    7-399     7-399#   10-26     10-26#    11-51     11-51#    27-43     27-43#    28-40     28-40#    34-36     34-36#    36-38
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I$PROT    7-373#   29-8#
I$PTAB    7-373#   99-16     99-16#    99-21     99-21#
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I$RPT     7-373#   28-46#    28-75#
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         46-31#    46-50#    47-18     47-27#    47-27#    47-27#    47-27#    47-27#    47-27#    47-27#    48-18     48-25#    48-25#    48-25#
         48-25#    48-25#    48-25#    48-25#    49-24     49-28#    49-45#    49-46#    49-49     49-58#    49-59#    49-69#    49-70#    49-73
         49-82#    50-26     50-30#    50-47#    50-48#    50-51     50-60#    50-61#    50-71#    50-72#    50-75     50-84#    51-18     51-24#
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         53-29#    54-27     54-28#    54-28#    54-28#    54-28#    54-28#    54-28#    55-27     55-28#    55-28#    55-28#    55-28#    55-28#
         55-28#    56-30     56-31#    56-31#    56-31#    56-31#    56-31#    56-31#    57-17     57-21#    57-31#    57-34#    57-42#    58-18
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         62-15#    62-39#    63-15     63-17#    63-32#    64-20     64-25#    64-25#    64-25#    64-25#    64-25#    64-25#    64-25#    65-18
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         82-16#    82-30#    83-13     83-23#    83-36#    84-18     85-25     86-16     86-24#    86-37#    86-38#    86-52#    86-55#    86-68#
         86-75#    86-88#    87-20     88-24     88-30#    88-39#    89-15     89-25#    89-52#    90-15     90-25#    90-48#    91-42     91-54#
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         93-197#   93-225#   93-227    93-238#   93-315#   93-321#   93-338#   94-31     94-32#    94-52#    94-53#    94-75#    95-30     95-72#
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         63-15     64-20     65-18     66-12     67-14     68-14     69-20     70-33     71-17     72-18     73-13     74-17     75-21     76-12
         77-28     78-13     79-22     80-24     81-12     82-14     83-13     84-18     85-25     86-16     87-20     88-24     89-15     90-15
         91-42     92-39     93-87     93-105    93-105#   93-226    93-226#   93-226#   93-227    93-227#   93-320    93-320#   93-320#   94-31
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I$TST     7-373#   36-60     36-60#    36-71     36-71#    36-71#    37-19     37-19#    37-46     37-46#    37-46#    38-17     38-17#    38-24
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         41-34     41-86     41-86#    41-86#    42-31     42-31#    42-70     42-70#    42-70#    43-37     43-37#    43-46     43-46#    43-46#
         44-26     44-26#    44-50     44-50#    44-50#    45-26     45-26#    45-61     45-61#    45-61#    46-24     46-24#    46-27     46-53
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         88-72#     88-72#     89-15      89-15#     89-24      89-56      89-56#     89-56#     90-15      90-15#     90-24      90-52      90-52#     90-52#
         91-42      91-42#     91-51      91-95      91-95#     91-95#     92-39      92-39#     92-51      92-113     92-113#    92-113#    93-87      93-87#
         93-93      93-101     93-105     93-227     93-339     93-339#    93-339#    94-31      94-31#     94-41      94-76      94-76#     94-76#     95-30
         95-30#     95-36      95-41      95-83      95-83#     95-83#     96-25      96-25#     96-49      96-49#     96-49#
IAE      12-88#     92-60      92-62      94-62      94-64      94-72
IBE      11-57#
IDU      11-57#
IE       12-5#      51-25      51-26      51-30      51-37      51-41      52-27      52-28      52-32      52-39      52-43      57-36      58-37      59-27
IER      11-57#
ILEV     12-63#     93-171
ILF      12-78#     71-27      71-29      72-28      72-30      94-45      94-49
ILOCK    13-48#     24-13      24-17      25-55      25-59      25-93      25-97      30-66*     43-38*     43-45*
ILR      12-79#
INTFLG   13-49#     27-40*     30-67*     57-22*     57-38      58-23*     58-39      59-17*     59-29
INTSRV   27-39#     57-32      58-34      59-15
IOBUFF   13-104#    93-157     93-184     93-199     93-208     93-233     93-239     93-252     93-255     93-287
IR       12-31#     24-37      42-37      42-40      42-44
IRLOCK   24-15      24-36#     24-38      25-57      25-95      44-33      45-37      46-35      53-29      54-28      55-28      55-28      56-31      56-31
ISR      11-57#
ITCOUN   13-24#     25-107*    36-61*     36-68*     36-69*     37-20*     37-31*     37-42*     37-44*     38-20*     38-22*     39-21*     39-23*     40-20*
         40-22*     41-37*     41-48*     41-58*     41-66*     41-73*     41-82*     41-84*     42-34*     42-46*     42-58*     42-66*     42-68*     43-41*
         43-43*     44-30*     44-44*     44-48*     45-30*     45-49*     45-59*     46-30*     46-49*     46-51*     47-24*     47-28*     48-24*     48-26*
         49-27*     49-36*     49-43*     49-56*     49-67*     49-80*     49-83*     50-29*     50-38*     50-45*     50-58*     50-69*     50-82*     50-85*
         51-21*     51-32*     51-43*     51-46*     52-23*     52-34*     52-45*     52-48*     53-29*     53-29*     53-29*     53-29*     53-29*     53-29*
         54-28*     54-28*     54-28*     54-28*     54-28*     54-28*     55-28*     55-28*     55-28*     55-28*     55-28*     55-28*     56-31*     56-31*
         56-31*     56-31*     56-31*     56-31*     57-20*     57-30*     57-41*     57-47*     58-21*     58-42*     58-45*     59-14*     59-32*     59-35*
         61-16*     61-27*     61-29*     62-14*     62-38*     62-40*     63-16*     63-31*     63-33*     64-21*     64-26*     65-19*     65-34*     65-39*
         66-13*     66-30*     66-34*     67-20*     67-39*     68-19*     68-49*     69-24*     69-26*     70-35*     70-67*     70-70*     71-18*     71-35*
         71-37*     72-19*     72-45*     72-48*     73-14*     73-39*     73-41*     74-18*     74-37*     74-39*     75-22*     75-44*     75-62*     75-64*
         76-13*     76-25*     76-27*     77-29*     77-68*     77-70*     78-14*     78-25*     78-27*     79-23*     79-47*     79-49*     80-25*     80-39*
         80-46*     80-57*     80-59*     81-13*     81-24*     81-26*     82-15*     82-29*     82-31*     83-14*     83-35*     83-37*     84-19*     84-59*
         84-62*     85-26*     85-43*     85-72*     86-17*     86-35*     86-50*     86-66*     86-86*     86-95*     89-16*     89-51*     89-53*     90-16*
         90-47*     90-49*     91-52*     91-91*     91-93*
IXE      11-57#
IXU      12-174#
J$JMP     7-373#    28-60      33-19      34-20
J1       13-108     16-7#
J10      13-117     16-16#
J11      13-118     16-17#
J12      13-119     16-18#
J13      13-120     16-19#
J14      13-121     16-20#
J15      13-122     16-21#
J16      13-123     16-22#
J17      13-124     16-23#
J2       13-109     16-8#
J20      13-129     16-24#
J21      13-130     16-25#
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J3       13-110   16-9#
J4       13-111   16-10#
J5       13-112   16-11#
J6       13-113   16-12#
J7       13-114   16-13#
J8       13-115   16-14#
J9       13-116   16-15#
K1RELA   13-137   16-33#
KWSRV    20-154   20-161    20-180#
L$ACP      7-427#
L$APT      7-427#
L$AU     34-9#
L$AUT      7-427#
L$AUTO     7-427   31-10#
L$CCP      7-427#
L$CLEA     7-427   32-8#
L$CO       7-427#
L$DEPO     7-427#
L$DESC     7-427   15-27#
L$DESP     7-427#
L$DEVP     7-427#
L$DISP     7-427    8-8#
L$DLY      7-427#  22-50    42-39    42-51    57-37    58-38    59-28
L$DTP      7-427#
L$DTYP     7-427#
L$DU     33-8#
L$DUT      7-427#
L$DVTY     7-427   15-17#
L$EF       7-427#
L$ENVI     7-427#
L$ETP      7-427#
L$EXP1     7-427#
L$EXP4     7-427#
L$EXP5     7-427#
L$HARD     7-427   97-52    97-52#
L$HIME     7-427#
L$HPCP     7-427#
L$HPTP     7-427#
L$HW       7-427    9-9      9-9#
L$ICP      7-427#
L$INIT     7-427   30-8#
L$LADP     7-427#
L$LAST     7-427   98-63#   99-22
L$LOAD     7-427#
L$LUN      7-427#
L$MREV     7-427#
L$NAME     7-427#
L$PRIO     7-427#
L$PROT     7-427   29-8#
L$PRT      7-427#
L$REPP     7-427#
L$REV      7-427#
L$RPT    28-46#
L$SOFT     7-427   98-12    98-12#
L$SPC      7-427#
L$SPCP     7-427#
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L$STA     7-427#
L$SW      7-427   10-8     10-8#
L$TEST    7-427#  77-47    83-18    89-20    90-20    91-47    92-47    93-92    93-97    94-37
L$TIML    7-427#
L$UNIT    7-427#
L10000    9-9      9-25#
L10001   10-8     10-25#
L10002   16-105#
L10003   16-124#
L10004   16-136#
L10005   16-142#
L10006   20-185#
L10007   27-41#
L10010   28-60    28-75#
L10012   30-20    30-126   30-141#
L10013   31-18#
L10014   32-42    32-57#
L10015   33-19    33-34#
L10016   34-20    34-35#
L10017   36-71#
L10020   37-46#
L10021   38-24#
L10022   39-25#
L10023   40-24#
L10024   41-34    41-86#
L10025   42-70#
L10026   43-46#
L10027   44-50#
L10030   45-61#
L10031   46-27    46-53#
L10032   47-21    47-30#
L10033   48-21    48-28#
L10034   49-85#
L10035   50-87#
L10036   51-49#
L10037   52-20    52-51#
L10040   53-29    53-30#
L10041   54-28    54-29#
L10042   55-28    55-29#
L10043   56-31    56-32#
L10044   57-50#
L10045   58-32    58-48#
L10046   59-40#
L10047   60-28    60-31    60-36    60-56#
L10050   61-31#
L10051   62-42#
L10052   63-35#
L10053   64-28#
L10054   65-41#
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L10056   67-41#
L10057   68-51#
L10060   69-28#
L10061   70-72#
L10062   71-39#
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L10063   72-50#
L10064   73-43#
L10065   74-41#
L10066   75-66#
L10067   76-29#
L10070   77-52    77-72#
L10071   78-29#
L10072   79-51#
L10073   80-61#
L10074   81-28#
L10075   82-33#
L10076   83-22    83-40#
L10077   84-64#
L10100   85-74#
L10101   86-100#
L10102   87-26    87-115#
L10103   88-72#
L10104   89-24    89-56#
L10105   90-24    90-52#
L10106   91-51    91-95#
L10107   92-51    92-113#
L10110   93-93    93-101   93-339#
L10111   93-226#
L10112   93-320#
L10113   94-41    94-76#
L10114   95-36    95-41    95-83#
L10115   96-49#
L10116   97-52    97-61#
L10117   98-12    98-33#
L10120   99-16#
L10122   99-16    99-21#
LASCYL   13-22#   23-20    30-60*   92-40    93-103
LASTRK   13-20#   23-16    30-59*
LBC      12-178#
LBT      12-68#
LCE      12-177#
LCLKTB   20-126*  20-146#
LDZERO   24-13#   39-22    43-42    64-25    69-25
LF       15-13
LKS      20-127*  20-148#  20-162*  20-174*
LKV      20-129*  20-149#  20-161   32-29
LOCATE   22-85#   93-216   93-302
LOE      11-57#
LOT      11-57#
MASK     13-43#   25-35*   25-38    25-68*   25-72*   25-122*  25-123*  38-21    39-22    40-21    43-42    47-27    48-25    64-25
         69-25
MCPE     12-10#   22-68    22-73    58-26    58-30    65-26    65-30    73-21    73-31
MCUTAB   13-108#  27-11
MCUTXT   13-103#  27-12    27-32
MDPE     12-33#   46-37    46-41    53-29    53-29    54-28    54-28    55-28    55-28    56-31    56-31
MESG1    97-54    97-66#
MESG10   15-47#   26-17
MESG11   15-48#   26-26
MESG12   15-49#   93-139
MESG13   16-41#   60-33
MESG14   16-42#   60-49
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MESG17   98-14     98-38#
MESG18   98-16     98-39#
MESG20   98-18     98-40#
MESG21   98-22     98-41#
MESG22   98-24     98-42#
MESG4    97-56     97-67#
MESG5    97-58     97-68#
MESG6    97-60     97-69#
MOH      12-129#
MOL      12-70#    26-12     77-44     83-15     89-17     90-17     91-44     92-44     93-89     94-34
MSGMOL   15-45#    77-47     83-18     89-20     90-20     91-47     92-47     93-92     94-37
MSGWLO   15-46#    93-97
MSK      13-44#    23-90*    23-95     23-100    23-102*   24-21     24-22     25-38*    25-39*    25-53     25-63     25-91     25-101    25-122
         67-15*    67-16*    68-41*    68-42*
MTD      12-155#
MTRBRK   13-136    16-32#
MXF      12-34#    41-51     41-52     41-56
NBA      12-131#
NED      12-37#
NEGWRD   13-28#    19-12*    19-16     91-67*    92-56*    93-129*   93-186*   93-209*   93-241*   93-256*   93-288*   93-326*
NEM      12-36#
NEXLOC   22-112#   87-48     87-54     87-60     87-66     87-72     87-78     87-85     87-98
NOP      12-209#   96-30
O$APTS    7-373#    7-427
O$AU      7-373#    7-427
O$BGNR    7-373#    7-427
O$BGNS    7-373#    7-405#    7-427
O$DU      7-373#    7-427
O$ERRT    7-373#    7-427
O$GNSW    7-373#    7-405#    7-427
O$POIN    7-373#    7-405     7-405#    7-405#    7-405#    7-427
O$SETU    7-373#    7-405#    7-427    98-63
OCTHEX   16-110    16-115    20-49#    87-104
OFFDIR   12-151#
OM       12-61#
ONEFIL    2-4#      2-8       4-=43     5-1       7-358#    7-394    10-27     11-1      11-8#     11-13     28-7#     28-12     34-37     35-1
         35-9#     36-3      96-52     97-1      97-8#     97-14
OPI      12-91#
OPRPNL   13-138    16-34#
OR       12-32#    24-49     42-49     42-52     42-56     42-60     42-64
ORLOCK   24-19     24-48#    24-50     25-61     25-99     44-38     45-43     53-29     54-28     55-28     55-28     56-31     56-31
PAR      12-81#    66-19     66-22     66-26     71-24     71-26     72-24     72-32     72-34     73-24     75-29     75-33     75-47
PAT      12-29#    46-34     72-22     75-25     77-32     77-57     79-26     79-37     80-28     82-18     90-27
PATCNT   13-38#    25-32*    25-118*   38-21     39-22     40-21     43-42     47-27     48-25     64-25     69-25
PATT1    13-8#     13-144    13-150    13-162    13-169    13-175    13-181    13-193    45-33     66-16     73-17     75-26     77-33     77-58
         79-27     80-29     82-19     93-232
PATT2    13-9#     13-145    13-151    13-157    13-163    13-170    13-176    13-182    13-194    37-22     37-27     45-55
PATT3    13-10#    13-183    13-195    38-21     39-22     40-21     43-42     46-36     47-27     48-25     64-25     69-25     89-27     89-28
         90-28     90-29     90-32     90-34
PATT4    13-11#    38-21     39-22     40-21     43-42     47-27     48-25     62-22     64-25     65-21     69-25
PATT5    13-12#    13-164    13-196    44-27
PATT6    13-13#    13-197
PATT7    13-14#    13-198    67-15     67-25     68-17     68-45
PATT8    13-15#    13-199    93-317
PATT9    13-16#    13-156    13-200
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PCLKTB  20-107*  20-137#
PGE     12-35#   12-193#
PGM     12-67#
PHF     12-176#
PIP     12-71#
PKB     20-109*  20-110*  20-140#  20-155*
PKC     20-111*  20-112*  20-141#
PKCS    20-108*  20-139#  20-156*  20-172*
PKV     20-114*  20-142#  20-154   32-26
PNT     11-57#
PRELOD  25-8#    83-39    89-55    90-51    93-88    93-337   94-74
PRI     11-57#
PRI00   11-57#
PRI01   11-57#
PRI02   11-57#
PRI03   11-57#
PRI04   11-57#
PRI05   11-57#
PRI06   11-57#   20-154   20-161
PRI07   11-57#   32-18    47-26    51-23    52-26    57-32    57-33    58-34    59-15    59-39
PSEL    12-9#
PSTACK  13-102#  16-112   16-112   16-112   16-112   16-117   16-117   16-117   16-117   20-51    20-66    25-88    84-22    84-45
        85-45    85-68    87-28    87-45    87-45    87-106   87-106   87-106   87-106   91-60    91-66    91-77    92-55    93-121
        93-130   93-132   93-143   93-146   93-149   93-153   93-327   95-44    95-45    95-65*   95-66*   95-68
PTRANS  13-135   16-31#
RCVED   13-45#   16-100   16-130   22-64*   22-65    22-71*   22-72    22-100*  23-74*   23-75    23-99*   24-20*   24-21*   24-24
        25-64*   25-103*  37-26*   37-40*   44-42*   45-46*   60-42*   61-19*   61-20    62-28*   62-31*   62-32    63-20*   63-22
        63-25    70-65*   71-23*   71-26*   71-29*   71-30    72-24*   72-25    72-30*   72-34*   73-34*   75-50*   78-21*   79-33*
        79-43*   80-35*   80-53*   84-53*   85-40*   86-33*   86-48*   86-64*   86-84*   90-36*   91-56*   91-79*   91-81    92-63*
        92-98*   93-153*  93-271*  93-332*  94-50*   94-65*
RDDTA   12-218#
RDHDTA  12-219#  93-324
RDY     12-6#    57-23    57-24    57-28    57-36    59-27
READTD  16-37#   93-155
READY   18-33#   18-35    19-13    19-24
RECAL   12-206#  92-71
REG     13-100#  20-219   20-219   20-219   20-219   20-219   20-219   20-222   20-222   20-222   20-222   20-222   20-222   20-222
        20-225   20-225   20-225   20-225   20-225   20-225   20-225   20-230   20-230   23-36
REGSET  23-59    23-66    23-72#
RELEAS  12-208#
RESET   23-90#   38-21    40-21    47-27    48-25
RH      13-125   16-5#
RHEXT   13-57#   17-11*   17-20*   17-24*   17-30    30-48
RHTYPE  13-58#   17-12*   17-40*   20-226   22-88    23-40    30-46    41-32    46-25    47-19    48-19    49-47    49-71    50-49
        50-73    52-18    53-29    54-28    55-28    56-31    84-34    84-47
RIP     12-210#  25-9     83-25    89-30    90-31    93-322
RMR     12-80#
ROUTDO  13-32#   30-25*   95-37    95-67*
RPADR   13-55#   30-55*
RPARDY  18-11#   19-28
RPAS    13-69#   18-14    18-21*   22-22*   78-17    78-20    78-21    79-30    79-32    79-33    79-38*   79-40    79-42    79-43
        80-32    80-34    80-35    80-48*   80-50    80-52    80-53    90-29*   93-111*
RPBA    13-64#   13-154   13-204   19-19*   22-86    37-22*   37-23    37-25    37-26    37-34    37-36    37-39    37-40    40-21
RPBAE   13-82#   13-173   13-210   23-38    48-25    49-50    49-53    49-74    49-77    50-52    50-55    50-76    50-79
RPCC    13-77#   92-95    92-98    92-99
RPCS1   13-62#   13-185   13-202   18-45    19-20*   22-68    22-70    22-71    23-35    25-9*    30-35    36-63    41-42    41-45
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         41-60     41-63     41-67     41-70     41-76     41-79     46-43     46-46     49-29*    49-30     49-33     49-37     49-40     49-61
         49-64     50-31*    50-32     50-35     50-39     50-42     50-63     50-66     51-25*    51-26     51-29     51-37     51-40     52-27*
         53-29     53-29     54-28     54-28     55-28     55-28     56-31     56-31     57-23*    57-24     57-27     57-36*    58-26     58-29
         58-37*    59-27*    62-17*    62-22*    62-28     62-34     65-26     65-29     67-22     68-28     70-46*    72-23*    73-21     73-30
         77-54*    81-16     81-19     82-21     82-24     63-25*    89-30*    90-31*    91-72     92-74     92-77     92-102    93-214    93-277
         93-283    93-300    96-30*    96-44
RPCS2    13-66#    13-142    13-206    22-9*     22-10*    23-94*    24-37     24-49     26-11*    30-71*    30-73*    32-20*    32-21*    37-35*
         38-21     41-40*    41-41*    41-51*    41-52     41-55     41-74*    41-75*    42-37     42-40     42-43     42-49     42-52     42-55
         42-60     42-63     46-32*    46-33*    46-34*    46-37     46-40     49-60*    50-62*    51-36*    52-38*    53-29     53-29     53-29*
         54-28     54-28     54-28*    55-28     55-28     55-28*    56-31     56-31     56-31*    57-46*    58-24*    58-25*    58-44*    59-18*
         59-19*    59-34*    60-38*    61-18*    62-16*    62-21*    62-26*    63-18*    63-19*    70-37*    70-39*    70-40*    70-44*    72-22*
         75-25*    75-45*    75-46*    77-32*    77-53*    77-57*    79-26*    79-37*    80-28*    82-18*    90-27*    93-259    93-262
RPCS3    13-83#    13-167    13-211    22-90     22-93     22-96     47-27     52-28     52-31     52-39     52-42     53-29     53-29     53-29
         53-29     53-29*    54-28     54-28     54-28     54-28     54-28*    55-28     55-28     55-28     55-28     55-28*    56-31     56-31
         56-31     56-31     56-31*
RPDA     13-65#    13-179    13-186    13-205    19-18*    65-24*    66-18*    66-21     67-26     73-19*    73-20     75-26*    75-27     77-33*
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RPDT     13-73#    60-39     60-41     60-42     61-19     61-23     63-20     63-27
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SENSOR   13-133    16-29#
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SFPTBL   10-8#
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SPIRAL   23-16#    91-85     93-135
SRC      13-41#    25-36*    25-37     25-121*   25-124
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          95-77     95-77     95-77     95-77     95-81     95-81     95-83     95-83     96-37     96-37     96-37     94-37     96-37     96-37
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         96-25     96-25     96-25
SWTTST   10-9#     60-23
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T$$AUT   31-10#    31-18
T$$CLE   32-8#     32-42     32-57
T$$DAT   99-16     99-16#    99-21
T$$DU    33-8#     33-19     33-34
T$$HAR   97-52     97-52#    97-61
T$$HW     9-9       9-9#      9-25
T$$INI   30-8#     30-20     30-126    30-141
T$$MSG   16-96#    16-105    16-107#   16-124    16-126#   16-136    16-138#   16-142
T$$PC    99-15#    99-22
T$$PRO   29-8#
T$$PTA   99-15#    99-16     99-16#
T$$RPT   28-46#    28-60     28-75
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         69-25#    69-25#    70-36     70-36#    70-68     70-68#    71-19     71-19#    71-36     71-36#    72-20     72-20#    72-46     72-46#
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         93-225    93-225#   93-238    93-238#   93-315    93-315#   93-321    93-321#   93-338    93-338#   94-32     94-32#    94-52     94-52#
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T$$SUB   93-105#   93-226    93-227#   93-320
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CROSS REFERENCE TABLE (CREF V04.00 )

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         94-76    95-30#   95-36    95-41    95-83    96-25#   96-49
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         16-130   16-130#  16-130#  16-130#  16-132   16-132   16-132#  16-135   16-135   16-135#  16-141   16-141   16-141#  20-218
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CZRJMAO RP07 FE/HOST ISOLATOR MACRO V04.00 1-JAN-83 13:37:00 PAGE S-30                                    SEQ 0238
CROSS REFERENCE TABLE (CREF V04.00 )

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          77-30#    77-69     78-15#    78-26     79-24#    79-48     80-26#    80-58     81-14#    81-25     82-16#    82-30     83-23#    83-36
          86-24#    86-37     86-38#    86-52     86-55#    86-68     86-75#    86-88     88-30#    88-39     89-25#    89-52     90-25#    90-48
          91-54#    91-92     92-52#    92-68     92-69#    92-89     92-90#    92-112    93-106#   93-119    93-120#   93-196    93-197#   93-225
          93-238#   93-315    93-321#   93-338    94-32#    94-52     94-53#    94-75     95-72#    95-81
T$SEK1    38-21     38-21#    39-22     39-22#    40-21     40-21#    41-39#    41-49     41-50#    41-59     42-36#    42-47     43-42     43-42#
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T$SUBN     7-373#   36-60#    37-19#    38-17#    39-18#    40-17#    41-31#    42-31#    43-37#    44-26#    45-26#    46-24#    47-18#    48-18#
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          63-15#    64-20#    65-18#    66-12#    67-14#    68-14#    69-20#    70-33#    71-17#    72-18#    73-13#    74-17#    75-21#    76-12#
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          91-42#    92-39#    93-87#    93-105    93-105    93-105#   93-227    93-227    93-227#   94-31#    95-30#    96-25#
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T$TAGN     7-373#    9-9       9-9       9-9#     10-8      10-8      10-8#     16-96     16-96     16-96#    16-107    16-107    16-107#   16-126
          16-126    16-126#   16-138    16-138    16-138#   20-179    20-179    20-179#   27-39     27-39     27-39#    28-46     28-46     28-46#
          29-8      29-8      29-8#     30-8      30-8      30-8#     31-10     31-10     31-10#    32-8      32-8      32-8#     33-8      33-8
          33-8#     34-9      34-9      34-9#     36-60     36-60     36-60#    37-19     37-19     37-19#    38-17     38-17     38-17#    39-18
          39-18     39-18#    40-17     40-17     40-17#    41-31     41-31     41-31#    42-31     42-31     42-31#    43-37     43-37     43-37#
          44-26     44-26     44-26#    45-26     45-26     45-26#    46-24     46-24     46-24#    47-18     47-18     47-18#    48-18     48-18
          48-18#    49-24     49-24     49-24#    50-26     50-26     50-26#    51-18     51-18     51-18#    52-17     52-17     52-17#    53-28
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          62-13#    63-15     63-15     63-15#    64-20     64-20     64-20#    65-18     65-18     65-18#    66-12     66-12     66-12#    67-14
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          76-12#    77-28     77-28     77-28#    78-13     78-13     78-13#    79-22     79-22     79-22#    80-24     80-24     80-24#    81-12
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          90-15#    91-42     91-42     91-42#    92-39     92-39     92-39#    93-87     93-87     93-87#    93-105    93-105    93-105#   93-227
          93-227    93-227#   94-31     94-31     94-31#    95-30     95-30     95-30#    96-25     96-25     96-25#    97-52     97-52     97-52#
          98-12     98-12     98-12#    99-15     99-15     99-15#    99-16     99-16     99-16     99-16     99-16#    99-16#
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           50-84     50-84#    50-87     50-87#    51-34     51-34#    51-45     51-45#    51-49     51-49#    52-20     52-20#    52-36     52-36#
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           72-46     72-46#    72-50     72-50#    73-40     73-40#    73-43     73-43#    74-38     74-38#    74-41     74-41#    75-63     75-63#
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           92-112    92-112#   92-113    92-113#   93-93     93-93#    93-101    93-101#   93-119    93-119#   93-196    93-196#   93-225    93-225#
           93-226    93-226#   93-315    93-315#   93-320    93-320#   93-338    93-338#   93-339    93-339#   94-41     94-41#    94-52     94-52#
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           97-60     97-60#    97-60#    97-60#    97-61     97-61#    98-14     98-14     98-14     98-14#    98-14#    98-14#    98-16     98-16
           98-16     98-16#    98-16#    98-16#    98-18     98-18     98-18     98-18#    98-18#    98-18#    98-22     98-22     98-22     98-22#
           98-22#    98-22#    98-24     98-24     98-24     98-24#    98-24#    98-24#    98-33     98-33#    98-64     98-64#
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           49-24#    50-26     50-26     50-26#    51-18     51-18     51-18#    52-17     52-17     52-17#    53-28     53-28     53-28#    54-27
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           77-28#    78-13     78-13     78-13#    79-22     79-22     79-22#    80-24     80-24     80-24#    81-12     81-12     81-12#    82-14
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           91-42#    92-39     92-39     92-39#    93-87     93-87     93-87#    93-105    93-227    94-31     94-31     94-31#    95-30     95-30
           95-30#    96-25     96-25     96-25#    98-63
T$TSTM      7-373#   16-99     16-102    16-104    16-105    16-112    16-117    16-123    16-124    16-128    16-129    16-130    16-132    16-135
           16-136    16-141    16-142    18-20     18-33     18-44     20-101    20-120    20-154    20-161    20-218    20-219    20-221    20-222
           20-224    20-225    20-229    20-230    21-9      21-12     21-18     22-21     23-101    24-26     24-36     24-48     25-69     25-106
           26-17     26-26     28-75     30-10     30-12     30-16     30-20     30-22     30-27     30-37     30-82     30-95     30-100    30-126
           30-141    31-18     32-18     32-26     32-29     32-31     32-42     32-57     33-34     34-35     36-62     36-64     36-67     36-71
           37-21     37-30     37-32     37-33     37-41     37-43     37-46     38-21     38-21     38-21     38-21     38-21     38-21     38-21
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           41-65     41-72     41-81     41-83     41-86     42-35     42-36     42-45     42-47     42-57     42-65     42-67     42-70     43-42
           43-42     43-42     43-42     43-42     43-42     43-42     43-42     43-46     44-31     44-43     44-47     44-50     45-31     45-34
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           48-25     48-28     49-28     49-35     49-42     49-45     49-46     49-49     49-55     49-58     49-59     49-66     49-69     49-70
           49-73     49-79     49-82     49-85     50-30     50-37     50-44     50-47     50-48     50-51     50-57     50-60     50-61     50-68
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           51-49     52-20     52-24     52-26     52-33     52-36     52-37     52-44     52-47     52-50     52-51     53-29     53-29     53-29
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           58-31     58-32     58-33     58-34     58-35     58-36     58-41     58-43     58-47     58-48     59-15     59-16     59-26     59-31
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           61-17     61-26     61-28     61-31     62-15     62-37     62-39     62-42     63-17     63-30     63-32     63-35     64-25     64-25
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           73-15     73-38     73-40     73-43     74-19     74-34     74-36     74-38     74-41     75-23     75-43     75-61     75-63     75-66
           76-14     76-24     76-26     76-29     77-30     77-47     77-52     77-67     77-69     77-72     78-15     78-24     78-26     78-29
           79-24     79-36     79-46     79-48     79-51     80-26     80-38     80-45     80-56     80-58     80-61     81-14     81-23     81-25
           81-28     82-16     82-28     82-30     82-33     83-18     83-22     83-23     83-34     83-36     83-40     84-58     84-64     85-42
           85-74     86-24     86-34     86-37     86-38     86-49     86-52     86-55     86-65     86-68     86-75     86-85     86-88     86-100
           87-26     87-45     87-52     87-58     87-64     87-70     87-76     87-82     87-89     87-91     87-96     87-106    87-112    87-115
           88-30     88-35     88-39     88-72     89-20     89-24     89-25     89-50     89-52     89-56     90-20     90-24     90-25     90-46
           90-48     90-52     91-47     91-51     91-54     91-90     91-92     91-95     92-47     92-51     92-52     92-67     92-68     92-69
           92-87     92-89     92-90     92-106    92-110    92-112    92-113    93-92     93-93     93-97     93-101    93-105    93-106    93-117
           93-119    93-120    93-138    93-139    93-156    93-194    93-196    93-197    93-217    93-222    93-225    93-226    93-227    93-238
           93-248    93-249    93-264    93-276    93-285    93-303    93-304    93-309    93-315    93-320    93-321    93-336    93-338    93-339
           94-32     94-37     94-41     94-51     94-52     94-53     94-66     94-75     94-76     95-36     95-39     95-41     95-43     95-44
           95-72     95-77     95-81     95-83     96-37     96-42     96-47     96-49
T$TSTS      7-373#   36-60#    37-19#    38-17#    39-18#    40-17#    41-31#    42-31#    43-37#    44-26#    45-26#    46-24#    47-18#    48-18#
           49-24#    50-26#    51-18#    52-17#    53-28#    54-27#    55-27#    56-30#    57-17#    58-18#    59-13#    60-22#    61-15#    62-13#
           63-15#    64-20#    65-18#    66-12#    67-14#    68-14#    69-20#    70-33#    71-17#    72-18#    73-13#    74-17#    75-21#    76-12#
           77-28#    78-13#    79-22#    80-24#    81-12#    82-14#    83-13#    84-18#    85-25#    86-16#    87-20#    88-24#    89-15#    90-15#
           91-42#    92-39#    93-87#    94-31#    95-30#    96-25#
T1           8-8     36-60#
T10          8-8     45-26#
T11          8-8     46-24#
T12          8-8     47-18#
T13          8-8     48-18#
T14          8-8     49-24#
T15          8-8     50-26#
T16          8-8     51-18#
T17          8-8     52-17#
T18          8-8     53-28#
T19          8-8     54-27#
T2           8-8     37-19#
T20          8-8     55-27#
T21          8-8     56-30#
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T22     8-8       57-17#
T23     8-8       58-18#
T24     8-8       59-13#
T25     8-8       60-22#
T26     8-8       61-15#
T27     8-8       62-13#
T28     8-8       63-15#
T29     8-8       64-20#
T3      8-8       38-17#
T30     8-8       65-18#
T31     8-8       66-12#
T32     8-8       67-14#
T33     8-8       68-14#
T34     8-8       69-20#
T35     8-8       70-33#
T36     8-8       71-17#
T37     8-8       72-18#
T38     8-8       73-13#
T39     8-8       74-17#
T4      8-8       39-18#
T40     8-8       75-21#
T41     8-8       76-12#
T42     8-8       77-28#
T43     8-8       78-13#
T44     8-8       79-22#
T45     8-8       80-24#
T46     8-8       81-12#
T47     8-8       82-14#
T48     8-8       83-13#
T49     8-8       84-18#
T5      8-8       40-17#
T50     8-8       85-25#
T51     8-8       86-16#
T52     8-8       87-20#
T53     8-8       88-24#
T54     8-8       89-15#
T55     8-8       90-15#
T56     8-8       91-42#
T57     8-8       92-39#
T58     8-8       93-87#
T58.1   93-105#
T58.2   93-227#
T59     8-8       94-31#
T6      8-8       41-31#
T60     8-8       95-30#
T61     8-8       96-25#
T7      8-8       42-31#
T8      8-8       43-37#
T9      8-8       44-26#
TABADD  13-18#    19-19     91-66*    92-55*    93-130*   93-184*   93-208*   93-239*   93-255*   93-287*   93-327*
TAP     12-130#
TEMP    13-39#    38-21     38-21*    39-22     39-22*    40-21     40-21*    43-42     43-42*    47-27     47-27*    48-25     48-25*    64-25
        64-25*    69-25     69-25*    84-21*    84-27     84-28     84-29*    84-32*    84-39     84-40     84-41*    85-33*    85-36*    85-51*
        85-52*    93-231*   93-246    93-273    93-294*   93-299*
TERM    13-132    16-28#
TESTRG  13-47#    16-99     22-63*    22-70*    23-72*    23-97*    25-34*    25-102*   37-25*    37-39*    44-41*    45-27*    60-41*    61-23*
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CROSS REFERENCE TABLE (CREF V04.00 )

         62-34*    63-27*    70-63*    71-21*    72-38*    73-33*    75-49*    78-20*    79-32*    79-42*    80-34*    80-52*    84-54*    85-29*
         86-22*    90-35*    91-87*    92-64*    92-99*    93-333*   94-43*
TRAKAD   10-14#    88-53
TRE      12-11#    20-9      22-68     22-73     41-42     41-46     41-60     41-64     41-76     41-80     46-43     46-47     53-29     53-29
         54-28     54-28     55-28     55-28     56-31     56-31     58-26     58-30     65-26     65-30     73-21     73-31     88-36     91-72
         92-74     92-78     92-102    93-214    93-278    93-279    93-284    93-300    95-78     96-44
TST03    13-141#   38-21
TST04    13-147#   39-22
TST05    13-153#   40-21
TST08    13-159#   43-42
TST11    13-166#   47-27
TST12    13-172#   48-25
TST28    13-178#   64-25
TST33    13-185#   68-21     68-27     68-40
TST34    13-190#   69-25
TST49    13-202#   84-23     84-44
UAM      11-57#
UNABLE   13-50#    30-68*    32-13*    60-33     60-34     60-49     60-50     60-55*
UNIT     13-54#    30-28*    30-29*    30-37
UNS      12-92#
UPE      12-38#
US1      12-25#
US2      12-26#
US4      12-27#
VV       12-64#
WAIT     18-16     22-18     22-50#    26-14     26-23     53-29     54-28     55-28     56-31     60-52     65-25     72-27     73-23     75-28
         76-16     77-35     77-59     79-28     80-31     82-20     83-26     90-30     90-38     92-59     92-73     92-94     93-110    93-258
         96-33
WAITMS   22-36#    30-77
WATDRY   26-9#     30-63
WATIME   20-184*   22-36*    22-37     22-42#
WCE      12-39#    93-259    93-263
WCF      12-83#
WCKD     12-213#   93-254    93-289
WCKHD    12-214#   93-198
WLE      12-89#
WOR      12-187#
WRDTA    12-215#   93-240
WRL      12-69#    93-94
WRTD     12-217#
WRU      12-186#
WTCKD    16-39#    93-275    93-298
WTCKHD   16-38#    93-211
X$ALWA    7-373#
X$FALS    7-373#   98-20
X$OFFS    7-373#   98-20
X$TRUE    7-373#
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BCOMPL   1-15#    7-373#  30-14   60-30   95-40
BERROR   1-19#    7-373#
BGNAU    1-23#    7-373#  34-9
BGNAUT   1-31#    7-373#  31-10
BGNCLN   1-39#    7-373#  32-8
BGNDU    1-47#    7-373#  33-8
BGNHRD   1-55#    7-373#  97-52
BGNHW    1-66#    7-373#   9-9
BGNINI   1-77#    7-373#  30-8
BGNMOD   1-85#    7-373#   7-399  11-51   28-40   36-38   97-42
BGNMSG   1-98#    7-373#  16-96   16-107  16-126  16-138
BGNPRO   1-106#   7-373#  29-8
BGNPTA   1-114#   7-373#  99-16
BGNRPT   1-144#   7-373#  28-46
BGNSEG   1-152#   7-373#  37-21   37-33   38-21   38-21   38-21   38-21   39-22   39-22   39-22   39-22   40-21   40-21
        40-21    40-21    41-38   41-39   41-50   42-35   42-36   43-42   43-42   43-42   43-42   44-31   45-31   45-34
        46-31    47-27    47-27   47-27   47-27   48-25   48-25   48-25   48-25   49-28   49-46   49-59   49-70   50-30
        50-48    50-61    50-72   51-24   51-35   52-24   52-37   53-29   53-29   53-29   54-28   54-28   54-28   55-28
        55-28    55-28    56-31   56-31   56-31   57-21   57-34   58-22   58-35   59-16   60-37   61-17   62-15   63-17
        64-25    64-25    64-25   64-25   65-20   66-14   67-21   68-20   69-25   69-25   69-25   69-25   70-36   71-19
        72-20    73-15    74-19   75-23   76-14   77-30   78-15   79-24   80-26   81-14   82-16   83-23   86-24   86-38
        86-55    86-75    88-30   89-25   90-25   91-54   92-52   92-69   92-90   93-106  93-120  93-197  93-238  93-321
        94-32    94-53    95-72
BGNSET   1-161#   7-373#  99-15
BGNSFT   1-182#   7-373#  98-12
BGNSRV   1-193#   7-373#  20-179  27-39
BGNSUB   1-201#   7-373#  93-105  93-227
BGNSW    1-225#   7-373#  10-8
BGNTST   1-236#   7-373#  36-60   37-19   38-17   39-18   40-17   41-31   42-31   43-37   44-26   45-26   46-24   47-18
        48-18    49-24    50-26   51-18   52-17   53-28   54-27   55-27   56-30   57-17   58-18   59-13   60-22   61-15
        62-13    63-15    64-20   65-18   66-12   67-14   68-14   69-20   70-33   71-17   72-18   73-13   74-17   75-21
        76-12    77-28    78-13   79-22   80-24   81-12   82-14   83-13   84-18   85-25   86-16   87-20   88-24   89-15
        90-15    91-42    92-39   93-87   94-31   95-30   96-25
BNCOMP   1-266#   7-373#  20-103  20-122  30-18   30-24   30-38
BNERRO   1-270#   7-373#
BREAK    1-274#   7-373#  18-33   18-44   24-36   24-48
BRESET   1-278#   7-373#  30-10
CKLOOP   1-282#   7-373#
CLOCK    1-286#   7-373#  20-101  20-120
CLOSE    1-292#   7-373#
CLRVEC   1-296#   7-373#  32-26   32-29   32-31   36-64   57-49   58-47   59-37
COMMEN   1-301#   7-373#
DELAY    1-322#   7-373#  22-50   42-39   42-51   57-37   58-38   59-28
DESCRI   1-317#   7-373#  15-27
DEVTYP   1-341#   7-373#  15-17
DISPAT   1-346#   7-373#   8-8
DISPLA   1-360#   7-373#
DOCLN    1-376#   7-373#
DODU     1-380#   7-373#
DORPT    1-385#   7-373#
ENDAU    1-389#   7-373#  34-35
ENDAUT   1-401#   7-373#  31-18
ENDCLN   1-413#   7-373#  32-57
ENDCOM   1-425#   7-373#
ENDDU    1-441#   7-373#  33-34
ENDHRD   1-453#   7-373#  97-61
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ENDHW    1-465#    7-373#    9-25
ENDINI   1-475#    7-373#    30-141
ENDMOD   1-487#    7-373#    10-26     27-43     34-36     96-51     98-64
ENDMSG   1-500#    7-373#    16-105    16-124    16-136    16-142
ENDPRO   1-512#    7-373#    29-12
ENDPTA   1-520#    7-373#    99-21
ENDRPT   1-529#    7-373#    28-75
ENDSEG   1-541#    7-373#    37-32     37-43     38-21     38-21     38-21     38-21     39-22     39-22     39-22     39-22     40-21     40-21
         40-21     40-21     41-49     41-59     41-83     42-47     42-67     43-42     43-42     43-42     43-42     44-47     45-52     45-58
         46-50     47-27     47-27     47-27     47-27     48-25     48-25     48-25     48-25     49-45     49-58     49-69     49-82     50-47
         50-60     50-71     50-84     51-34     51-45     52-36     52-47     53-29     53-29     53-29     54-28     54-28     54-28     55-28
         55-28     55-28     56-31     56-31     56-31     57-31     57-42     58-33     58-43     59-33     60-47     61-28     62-39     63-32
         64-25     64-25     64-25     64-25     65-38     66-33     67-38     68-48     69-25     69-25     69-25     69-25     70-68     71-36
         72-46     73-40     74-38     75-63     76-26     77-69     78-26     79-48     80-58     81-25     82-30     83-36     86-37     86-52
         86-68     86-88     88-39     89-52     90-48     91-92     92-68     92-89     92-112    93-119    93-196    93-225    93-315    93-338
         94-52     94-75     95-81
ENDSET   1-555#    7-373#    99-22
ENDSFT   1-568#    7-373#    98-33
ENDSRV   1-580#    7-373#    20-185    27-41
ENDSUB   1-596#    7-373#    93-226    93-320
ENDSW    1-614#    7-373#    10-25
ENDTST   1-624#    7-373#    36-71     37-46     38-24     39-25     40-24     41-86     42-70     43-46     44-50     45-61     46-53     47-30
         48-28     49-85     50-87     51-49     52-51     53-30     54-29     55-29     56-32     57-50     58-48     59-40     60-56     61-31
         62-42     63-35     64-28     65-41     66-36     67-41     68-51     69-28     70-72     71-39     72-50     73-43     74-41     75-66
         76-29     77-72     78-29     79-51     80-61     81-28     82-33     83-40     84-64     85-74     86-100    87-115    88-72     89-56
         90-52     91-95     92-113    93-339    94-76     95-83     96-49
EQUALS   1-642#    7-373#    11-57
ERRDF    1-714#    7-373#    22-21
ERRHRD   1-718#    7-373#    18-20     23-101    24-26     25-69     25-106    36-67     37-30     37-41     41-47     41-57     41-65     41-72
         41-81     42-45     42-57     42-65     44-43     45-48     46-48     49-35     49-42     49-55     49-66     49-79     50-37     50-44
         50-57     50-68     50-81     51-31     51-42     52-33     52-44     53-29     53-29     53-29     53-29     54-28     54-28     54-28
         54-28     55-28     55-28     55-28     55-28     56-31     56-31     56-31     56-31     57-29     57-40     58-31     58-41     59-31
         60-46     61-26     62-37     63-30     65-33     66-29     70-66     71-34     72-44     73-38     74-34     74-36     75-43     75-61
         76-24     77-67     78-24     79-36     79-46     80-38     80-45     80-56     81-23     82-28     83-34     84-58     85-42     86-34
         86-49     86-65     86-85     88-35     89-50     90-46     91-90     92-67     92-87     92-106    92-110    93-117    93-156    93-194
         93-217    93-222    93-248    93-264    93-276    93-285    93-303    93-309    93-336    94-51     94-66     95-77     96-37     96-42
         96-47
ERROR    1-722#    7-373#
ERRSF    1-726#    7-373#
ERRSOF   1-730#    7-373#
ERRTBL   1-734#    7-373#
ESCAPE   1-744#    7-373#
EXIT     1-771#    7-373#    28-60     30-20     30-126    32-42     33-19     34-20     41-34     46-27     47-21     48-21     49-49     49-73
         50-51     50-75     52-20     53-29     54-28     55-28     56-31     58-32     60-28     60-31     60-36     77-52     83-22     87-26
         89-24     90-24     91-51     92-51     93-93     93-101    94-41     95-36     95-41
FEQUAL   1-810#    7-373#
GETBYT   1-824#    7-373#
GETPRI   1-834#    7-373#
GETWOR   1-829#    7-373#
GMANIA   1-839#    7-373#
GMANID   1-848#    7-373#    95-44
GMANIL   1-859#    7-373#    60-33     60-49
GPHARD   1-868#    7-373#    30-37
GPRMA    1-874#    7-373#    97-54     97-56
GPRMD    1-903#    7-373#    95-44     95-44#    97-58     97-60     98-22
GPRML    1-934#    7-373#    60-33     60-33#    60-49     60-49#    98-14     98-16     98-18     98-24
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HEADER    1-954#    7-373#    7-427
INLOOP    1-962#    7-373#
IOSETU    1-966#    7-373#
IOSTAR    1-974#    7-373#
IPCKTS    7-127#   53-29     54-28     55-28     56-31
KT11      1-982#    7-373#
LASTAD    1-;47#    7-373#   98-63
M$BYTE    1-D00#    7-373#    7-427     7-427     7-427     7-427#
M$CHEC    1-E18#    7-373#   28-60     28-60#    30-20     30-20#    30-126    30-126#   32-42     32-42#    33-19     33-19#    34-20     34-20#
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         50-75     50-75#    52-20     52-20#    53-29     53-29#    54-28     54-28#    55-28     55-28#    56-31     56-31#    58-32     58-32#
         60-28     60-28#    60-31     60-31#    60-36     60-36#    77-52     77-52#    83-22     83-22#    87-26     87-26#    89-24     89-24#
         90-24     90-24#    91-51     91-51#    92-51     92-51#    93-93     93-93#    93-101    93-101#   94-41     94-41#    95-36     95-36#
         95-41     95-41#
M$CNTO    1-E82#    7-373#   60-33     60-33#    60-49     60-49#    95-44     95-44#    97-54     97-54#    97-56     97-56#    97-58     97-58#
         97-60     97-60#    98-14     98-14#    98-16     98-16#    98-18     98-18#    98-22     98-22#    98-24     98-24#
M$COUN    1-D66#    7-373#   16-99     16-99#    16-100    16-100    16-100#   16-104    16-104#   16-112    16-112    16-112    16-112    16-112#
         16-117    16-117    16-117    16-117    16-117#   16-123    16-123#   16-128    16-128#   16-129    16-129#   16-130    16-130    16-130#
         16-132    16-132#   16-135    16-135#   16-141    16-141#   20-218    20-218#   20-219    20-219    20-219    20-219    20-219    20-219
         20-219    20-219#   20-221    20-221#   20-222    20-222    20-222    20-222    20-222    20-222    20-222    20-222#   20-224    20-224#
         20-225    20-225    20-225    20-225    20-225    20-225    20-225    20-225#   20-229    20-229#   20-230    20-230    20-230#   21-9
         21-9#     21-12     21-12#    21-18     21-18#    26-17     26-17#    26-26     26-26#    30-27     30-27#    30-82     30-82#    30-95
         30-95#    30-100    30-100#   77-47     77-47#    83-18     83-18#    87-45     87-45     87-45#    87-52     87-52#    87-58     87-58#
         87-64     87-64#    87-70     87-70#    87-76     87-76#    87-82     87-82#    87-89     87-89#    87-91     87-91#    87-96     87-96#
         87-106    87-106    87-106    87-106    87-106#   87-112    87-112#   89-20     89-20#    90-20     90-20#    91-47     91-47#    92-47
         92-47#    93-92     93-92#    93-97     93-97#    93-138    93-138#   93-139    93-139#   93-249    93-249#   93-304    93-304#   94-37
         94-37#    95-43     95-43#
M$DATA    1-B67#    7-373#    7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427
          7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427     7-427
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         15-17#    15-27     15-27#
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M$ESCS     1-D10#    7-373#
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CROSS REFERENCE TABLE (CREF V04.00 )

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CROSS REFERENCE TABLE (CREF V04.00 )

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         96-42#    96-47     96-47     96-47     96-47#    97-54     97-54#    97-56     97-56#    97-58     97-58#    97-60     97-60#    98-14
         98-14#    98-16     98-16#    98-18     98-18#    98-20     98-20#    98-22     98-22#    98-24     98-24#    99-16     99-16#
M$XFER    1-@82#    7-373#   98-20     98-20#
MANUAL    1-;62#    7-373#   60-29     95-39
MEMORY    1-;66#    7-373#
OPEN      1-;71#    7-373#
POINTE    1-;76#    7-373#    7-405
POP      7-341#    21-19
PRINTB    1-<39#    7-373#   16-99     16-100    16-104    16-112    16-117    16-123    16-128    16-129    16-130    16-132    16-135    16-141
         21-9      21-12     21-18     93-249    93-304
PRINTF    1-<79#    7-373#   26-17     26-26     30-27     30-82     30-95     30-100    77-47     83-18     87-45     87-52     87-58     87-64
         87-70     87-76     87-82     87-89     87-91     87-96     87-106    87-112    89-20     90-20     91-47     92-47     93-92     93-97
         93-138    93-139    94-37     95-43
PRINTS    1-=19#    7-373#
PRINTX    1-=59#    7-373#   20-218    20-219    20-221    20-222    20-224    20-225    20-229    20-230
PUSH     7-330#    21-10
READBU    1-=99#    7-373#
READEF    1->03#    7-373#   30-12     30-16     30-22
RFLAGS    1->08#    7-373#
SETPRI    1->13#    7-373#   32-18     47-26     51-23     51-48     52-26     52-50     57-35     58-36     59-26     59-39
SETVEC    1->18#    7-373#   20-154    20-161    36-62     57-32     58-34     59-15
SLASH     1->24#    7-373#
STARS     1->38#    7-263#    7-373#   18-3      18-9      18-26     18-31     18-38     18-42     19-2      19-10     19-31     19-37     20-2
         20-7      20-17     20-22     20-32     20-36     20-43     20-47     20-85     20-96     20-187    20-191    20-211    20-215    21-2
         21-7      22-2      22-7      22-26     22-34     22-44     22-48     22-53     22-58     22-77     22-83     22-104    22-110    23-1
         23-14     23-26     23-31     23-48     23-56     23-78     23-88     24-2      24-11     24-29     24-34     24-41     24-46     25-2
         25-6      25-13     25-27     25-44     25-49     25-81     25-85     25-112    25-116    26-2      26-7      27-2      27-8      27-35
         27-38
SVC       1->52#    7-372#    7-373
TSTFL    7-53#     38-21     39-22     40-21     43-42     47-27     48-25     64-25     69-25
WAIT.M   7-24#     30-77
XFER      1-@12#    7-373#   28-60#    30-20#    30-126#   32-42#    33-19#    34-20#    41-34#    46-27#    47-21#    48-21#    49-49#    49-73#
         50-51#    50-75#    52-20#    53-29#    54-28#    55-28#    56-31#    58-32#    60-28#    60-31#    60-36#    77-52#    83-22#    87-26#
         89-24#    90-24#    91-51#    92-51#    93-93#    93-101#   94-41#    95-36#    95-41#
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XFERF     1-@16#    7-373#  98-20
XFERT     1-@20#    7-373#
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