

TS11

TS11 DATA RELIAB
CZTSHB0

AH E455B MC

NOV 1979

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FICHE 1 OF 2

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TS11

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FICHE 2 OF 2

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IDENTIFICATION

SEQ 0001

PRODUCT CODE: AC-E454B-MC
PRODUCT NAME: CZISHBO TS11 DATA RELIAB
PRODUCT DATE: 15-AUG-79
MAINTAINER: DIAGNOSTIC ENGINEERING
AUTHOR: BOB WERY

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USER DOCUMENTATION

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ACT	AUTOMATED COMPUTER TEST SYSTEM
APT	AUTOMATED PRODUCT TEST SYSTEM
BYTE/RECORD/FILE COUNT BRF	IS STORED IN THE 4TH WORD OF THE COMMAND PACKET AND IT'S USE BY THE TS04 DEPENDS ON THE TYPE OF COMMAND.
CMD	TS04 COMMAND (SEE 2.3.14.1 FOR LIST OF COMMANDS)
COMMAND PACKET CMDPKT	FOUR WORD PACKET IN THE CPU MEMORY WHICH CONTAINS ALL INFORMATION NEEDED BY THE TS04 TO EXECUTE A COMMAND.
EXTENDED STATUS	FOUR WORDS OF TS04 STATUS WHICH ARE TRANSFERRED AS PART OF THE MESSAGE PACKET AT THE COMPLETION OF A COMMAND.
MESSAGE PACKET	SEVEN WORD PACKET IN THE CPU MEMORY INTO WHICH THE TS04 STORES STATUS AT THE COMPLETION OF A COMMAND.
PC	PROGRAM COUNTER
PSW	PROCESSOR STATUS WORD
RESIDUAL FRAME COUNT RFC	THIS COUNT IS PART OF THE MESSAGE PACKET AND CONTAINS THE NUMBER OF BYTES/RECORDS /FILES REMAINING TO BE PROCESSED AT THE COMPLETION OF A COMMAND.
SPECIAL CONDITION SPEC COND	TSS4 BIT15. WHEN SET, INDICATES THAT THE LAST COMMAND DID NOT COMPLETE WITHOUT INCIDENT.
TERMINATION CLASS CODE TCC	THREE BIT CODE IN THE TSSR WHICH INDICATES THE TYPE OF COMMAND TERMINATION.
TSBA	TAPE SYSTEM BUS ADDRESS REGISTER.
TSDB	TAPE SYSTEM DATA BUFFER REGISTER.
TSSR	TAPE SYSTEM STATUS REGISTER.
XST0	EXTENDED STATUS REGISTER 0
XST1	EXTENDED STATUS REGISTER 1
XST2	EXTENDED STATUS REGISTER 2
XST3	EXTENDED STATUS REGISTER 3
XXDP+	XXDP+ IS A "CATCH-ALL" NAME FOR A GROUP OF PDP-11 DIAGNOSTIC PACKAGES AVAILABLE ON MULTIMEDIA.

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

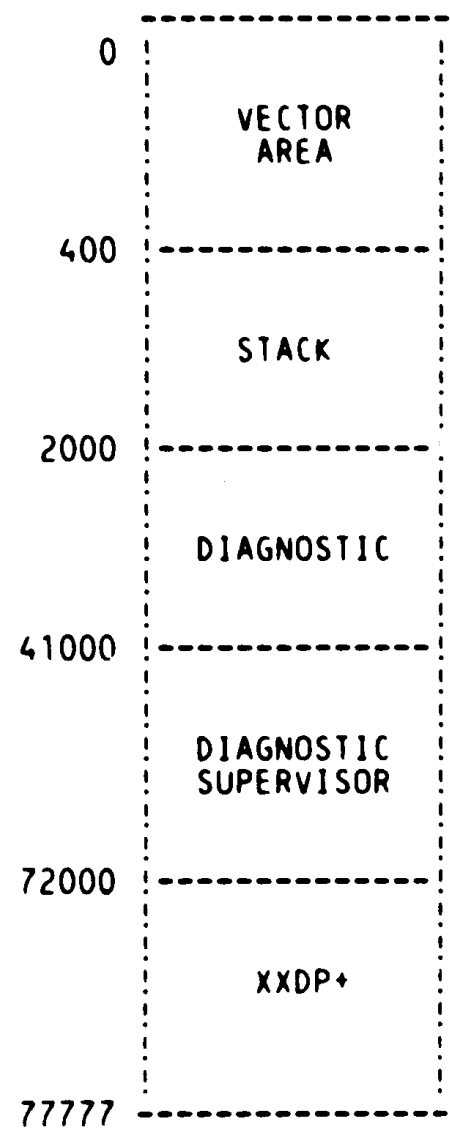
1.1.1 FUNCTIONAL DESCRIPTION

THIS PROGRAM CAN BE USED AS A BASIC FUNCTION TEST, A DATA RELIABILITY TEST, A COMPATABILITY TEST, OR TO EXECUTE A SEQUENCE OF OPERATOR SELECTED COMMANDS.

1.1.2 STRUCTURE OF PROGRAM

THIS DIAGNOSTIC IS A SINGLE PROGRAM FROM THE STANDPOINT OF THE DIAGNOSTIC USER, BUT IT CONTAINS A CONTROL MODULE RELEASED INDEPENDENTLY AS A DIAGNOSTIC SUPERVISOR.

1.1.3 MEMORY MAP



FREE MEMO SPACE FOR WR/RD BFRS OR OTHER PUROSES
IS ALLOCATED BY THE SUPERVISOR ON REQUEST OR CHOOSEN
BY PROGRAMMER TO RESIDE BETWEEN THE DIAG AND THE
SUPERVISOR.

1.1.4 DIAGNOSTIC INFORMATION

THIS DIAGNOSTIC CAN TEST UP TO 4 UNITS SIMULTANEOUSLY. THE 4 UNITS ARE ASSIGNED LOGICAL UNIT NUMBERS 0 - 3 BY THE DIAGNOSTIC.

THERE ARE 5 TESTS IN THIS PROGRAM:

- TEST 1 - BASIC FUNCTIONS.
- TEST 2 - DATA RELIABILITY.
- TEST 3 - WRITE COMPATABILITY/WRITE UTILITY.
- TEST 4 - READ COMPATABILITY/READ UTILITY.
- TEST 5 - OPERATOR SELECTED SEQUENCE.

ERROR RECOVERY IS PERFORMED ON READ, WRITE AND WRITE TAPE MARK ERRORS UNLESS RECOVERY IS INHIBITED BY THE OPERATOR. THE WRITE AND WRITE TAPE MARK RETRY LIMIT IS 16. THE READ FORWARD/READ REVERSE RETRY LIMIT IS 16 (8 IN THE SAME DIRECTION AND 8 IN THE OPPOSITE DIRECTION). FOR MORE INFORMATION ON ERROR RECOVERY PROCEDURES, SEE SECTION 3.0 (ERROR REPORTING).

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

PDP-11 PROCESSOR WITH 16K OR MORE OF MEMORY
CONSOLE DEVICE (LA30,LA36,VT50,ETC.)
PROGRAM LOAD DEVICE

1.2.2 SOFTWARE REQUIREMENTS

DIAGNOSTIC SUPERVISOR - REVISION D

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP+ USERS MANUAL MD-11-CHQUS
DIAGNOSTIC SUPERVISOR PROGRAM LISTING
PDP-11 DIAGNOSTIC SUPERVISOR INTERFACE SPECIFICATION.
PDP-11 DIAGNOSTIC SUPERVISOR PROGRAMMER'S GUIDE.
TS11/TS04 PROGRAMMING SPECIFICATION.
TS11/TS04 ENGINEERING SPECIFICATION.
TS11/TS04 COMMAND PACKET SPECIFICATION.

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

ORDER OF HOST CPU DIAGNOSTIC USAGE:

- 1) CONTROL LOGIC PROGRAM - ALL TESTS.
- 2) DATA RELIABILITY PROGRAM:
 - A) BASIC FUNCTION TEST.
 - B) DATA RELIABILITY TEST.

1.5 ASSUMPTIONS

THE HARDWARE OTHER THAN THE SUBSYSTEM BEING TESTED IS ASSUMED TO WORK PROPERLY. FALSE ERRORS MAY BE REPORTED IF THE PROCESSOR, MEMORY, ETC., DO NOT FUNCTION PROPERLY.

1.6 DIAGNOSTIC HISTORY

- REVISION A - OCT 1978
 - ORIGINAL RELEASE
- REVISION B - FEB 1979
 - CORRECTED END OF TAPE PROBLEMS IN TESTS 3-5.
 - CHANGED DEFAULT VECTOR ADDRESS FROM 150 TO 224.
 - DECREASED MAXIMUM RECORD LENGTH FROM 4096 TO 2048 BYTES.
- REVISION B - AUG 1979
 - DO NOT PRINT RECOVERABLE ERRORS UNLESS REQUESTED BY OPERATOR
 - WARN OPERATOR OF UNIT(S) BEING NOT READY OR OFF-LINE.
DROPPED UNIT(S) LEFT NOT READY OR OFF-LINE FOR 3.5 MINUTES.
 - IMPROVE BEHAVIOR AT EOT
 - IN TEST 2, FREEZE UNITS REACHING EOT UNTIL OTHERS CATCH-UP INSTEAD OF ALLOWING THEM TO SHUTTLE AT EOT
 - WHEN ALL UNITS REACH EOT, WRITE ONE RECORD BEYOND EOT. IN TEST 5, READ REV THAT EXTRA RECORD TO POSITION TAPE SO THAT THE NEXT COMMAND REQUESTED CAN BE EXECUTED. THAT EXTRA RECORD SHALL LEAVE A CLEAN IRG GAP AND A VALID RECORD TO READ WHEN SHORTER READ STOP DISTANCE MIGHT CAUSE UNIT TO FLAG EOT ON THAT EXTRA RECORD INSTEAD OF THE PREVIOUS ONE. THIS SHOULD ELIMINATE MANY READ ERRORS AT EOT AND TAPES RUNNING OFF THE WHEELS.
 - WRITE RECORD COUNT ON TAPE.
PRINT RECORD COUNT READ FROM TAPE IN READ ERROR PRINTS TO INDICATE IF POSITION WAS LOST.

* CAUTION *

INTERPRET THAT "RECORD READ" COUNT WITH CAUTION. IF VERY DIFFERENT FROM RECORD COUNT TRACKED BY THE DIAGNOSTIC, POSITION IS NOT NECESSARILY JUST. ERRORS IN READING THAT RECORD MIGHT HAVE CAUSED RECORD COUNT TO BE ERRONEOUSLY READ FROM TAPE.

IN TEST 2, IF DIAGNOSTIC IS RESTARTED OR CONTINUED, RECORD COUNT IS RESET TO ZERO ALTHOUGH TAPE WAS NOT REWOUND. THIS IS NECESSARY BECAUSE THERE IS NO ACCURATE WAY TO DETERMINE ON WHAT RECORD COUNT OF WHAT UNIT THE DIAGNOSTIC WAS HALTED BEFORE RESTARTING OR CONTINUING.

IT IS SUGGESTED THAT A "PRINT" BE REQUESTED WHEN HALTING DIAG TO GET A PRINT OF THE RECORD COUNT WHEN HALTED.

- VERIFY RECORD OF 4000 BYTES INSTEAD OF 22 BYTES.
- WHEN COMPARING DATA, CHECK AND PRINT IF NO DATA WAS READ OR RECORD WAS LONGER THAN EXPECTED.
- FREEZE TSSR REG WHEN A COMMAND IS COMPLETED TO AVOID DIFFERENCES BETWEEN TSSR AND TCC FETCHED AT DIFFERENT TIMES.
- WHEN DROPPING A UNIT, FLAG SECOND PRINT OF EXTENDED STATUS AS BEING THE RESULT OF A GET STATUS COMMAND.
WAIT FOR SSR UP BEFORE PRINTING THAT STATUS.
- ADJUST "PASS" COUNT OF DIAG TO MATCH "EOP" PASS COUNT OF SUPERVISOR.
- INCREASE NUMBER OF SELECTABLE COMMANDS IN TEST 5 FROM 4 TO 7. DEFAULT COMMAND 6 IS NOW REWIND.
- CONVERT DIAG TO REV C OF SUPERVISOR.
- ADD SEVERAL SECTIONS:
 - PROTECT TABLE
 - AUTO-DROP CODE
 - HARD CODED PARAMETER TABLE

2.0 OPERATING INSTRUCTIONS

L 1

SEQ 0011

FOR OPERATING INSTRUCTIONS, PLEASE SEE CHAPTER 5 OF XXDP+ OPERATOR'S MANUAL.

2.1 HARDWARE PARAMETERS

ON A "N" RESPONSE TO "CHANGE HW?", THE DIAG SHALL RUN ASSUMING ONE UNIT AT TSSR = 177522 WITH A VECTOR = 224.

ON A "Y" RESPONSE TO "CHANGE HW?" QUESTION, THEN THE FOLLOWING QUESTIONS WILL BE ASKED ON A START COMMAND. THE VALUE LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT VALUE THAT WILL BE TAKEN ON A CARRIAGE RETURN RESPONSE.

TSSR ADDRESS (172522) ?,

VECTOR (224) ?

THE VALIDITY OF THESE PARAMETERS CAN BE CHECKED BEFORE RUNNING THE TESTS BY SETTING THE FLAG "ADR" ON A STA, RES OR CON COMMAND. THE SO CALLED AUTO DROP CODE SHALL THEN BE EXECUTED AFTER THE INIT CODE AND BEFORE THE HARDWARE TESTS ARE RUN. THAT CODE FIRST TESTS THE ADDRESS OF THE TSSR(S). IF NO RESPONSE, IT DROPS THE UNIT(S) IMMEDIATELY WITH THE FOLLOWING MESSAGE:

BUS TRAP AT XXXXXX (XXXXXX = TSSR AD)

INTERFACE BAD OR NOT SET TO ABOVE AD.

ON A RESPONSE FROM THE INTERFACE, THE UNITS THAT ARE NOT READY OR NOT ON-LINE ARE DROPPED IMMEDIATELY. THE HARDWARE TESTS SHALL THEN BE RUN ON RESPONDING UNITS.

IF THE "ADR" FLAG IS NOT SET, THE READY AND OFF-LINE STATUS OF THE UNITS ARE CHECKED. A MESSAGE SHALL BE PRINTED EVERY SO OFTEN TO WARN THE OPERATOR OF UNITS BEING NOT READY OR OFF-LINE. THESE UNITS SHALL BE DROPPED AFTER A REASONABLE AMOUNT OF TIME (3 MIN ON A 11/70).

THE FOLLOWING QUESTIONS ARE ASKED IF REQUESTED ON A START, RESTART, OR CONTINUE. THEY ALLOW FLEXIBILITY IN THE WAY THE PROGRAM BEHAVES.

CLEAR COUNTERS (L) Y ?

RESET RANDOM VARIABLES (L) N ?

HALT AFTER EACH CMD (L) N ?

PRINT RECOVERABLE ERRORS (L) N ?

DISABLE INTERRUPTS (L) N ?

INHIBIT RECOVERY (L) N ?

CHANGE CMD SEQUENCE (L) N ?

NOTE: THIS QUESTION SHOULD BE ANSWERED (N) UNLESS AN OPERATOR SELECTED SEQUENCE IS TO BE EXECUTED. IF THIS QUESTION WAS ANSWERED (N), NO MORE QUESTIONS WILL BE ASKED. IF THIS QUESTION WAS ANSWERED Y, THE FOLLOWING QUESTIONS MUST BE ANSWERED OR DEFAULTED WITH A <CR> ONLY:

INHIBIT RFC ERROR REPORTS (L) N ?		
CHARACTERISTICS CODE (O) 40 ?	(0,20,40,200)	(OCTAL)
CMD/2 (D) 13 ?	(1-27)	(DECIMAL)
BRF COUNT (D) 1 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 1 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)
CMD/3 (D) 4 ?	(1-27)	(DECIMAL)
BRF COUNT (D) 2048 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 32000 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)
CMD/4 (D) 3 ?	(1-27)	(DECIMAL)
BRF COUNT (D) 2048 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 32000 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)
CMD/5 (D) 2 ?	(1-27)	(DECIMAL)
BRF COUNT (D) 2048 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 32000 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)
CMD/6 (D) 13 ?	(1-27)	(DECIMAL)
BRF COUNT (D) 1 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 1 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)
CMD/7 (D) 27 ?	(1-27)	(DECIMAL)
BRF COUNT (D) 2048 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 32000 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)
CMD/8 (D) 27 ?	(1-27)	(DECIMAL)
BRF COUNT (D) 2048 ?	(1-2K)	(DECIMAL)
# OF OPERATIONS (D) 32000 ?	(1-32K)	(DECIMAL)
PATTERN (D) 7 ?	(0-8)	(DECIMAL)

NOTE: THE PROGRAM AUTOMATICALLY INSERTS AN CHARACTERISTIC 40 AS THE FIRST COMMAND IN THE SEQUENCE TABLE. IF A

N 1
DIFFERENT CHARACTERISTIC IS DESIRED, THE OPERATOR SHOULD
ENTER THAT CHARACTERISTIC CODE. A TOTAL OF 7 COMMANDS
MAY BE ENTERED IN ADDITION TO THE SET CHARACTERISTICS
COMMAND. IF THE OPERATOR WISHES TO USE LESS THAN 7
COMMANDS, AN END COMMAND MUST BE ENTERED AND THEN A
CONTROL Z (^Z) CAN BE ENTERED TO TERMINATE SOFTWARE DIALOGUE.

SEQ 0013

2.2.1 COMMAND LIST FOR USE IN SOFTWARE DIALOGUE.

B 2

SEQ 0014

CODE	COMMAND	DESCRIPTION
1 =	DRI	DRIVE INITIATE.
2 =	RDF	READ FORWARD.
3 =	RDR	READ REVERSE.
4 =	WRT	WRITE.
5 =	WTV	WRITE/VERIFY. IE. WRITE N RECORDS; READ REVERSE AND CHECK N RECORDS OF DATA; READ FORWARD AND CHECK N RECORDS.
6 =	SRF	SPACE RECORDS FORWARD.
7 =	SRR	SPACE RECORDS REVERSE.
8 =	RNR	READ NEXT REVERSE, IE. SPACE FWD, READ REV.
9 =	RNF	READ NEXT FORWARD, IE. READ FWD, SPACE REV.
10 =	RPF	READ PREVIOUS FWD, IE. SPACE REV, READ FWD.
11 =	RPR	READ PREVIOUS REV, IE. READ REV, SPACE FWD.
12 =	WRR	WRITE RETRY.
13 =	RWD	REWIND.
14 =	MBR	MESSAGE BUFFER RELEASE.
15 =	WTM	WRITE TAPE MARK.
16 =	WTR	WRITE TAPE MARK RETRY.
17 =	SFF	SPACE FILES FORWARD.
18 =	SFR	SPACE FILES REVERSE.
19 =	GES	GET EXTENDED STATUS.
20 =	ERS	ERASE 3 INCHES OF TAPE.
21 =	UNL	UNLOAD.
22 =	CLN	CLEAN TAPE
23 =	SCH	SET DEVICE CHARACTERISTIC. WHERE BRF=200, 40, 20, 0. 200 = ENABLE SKIP TAPE MARKS STOP (STOP AT LOGICAL EOT) 40 = ENABLE ATTENTION INTERRUPTS. 20 = ENABLE MESSAGE BUFFER RELEASE INTERRUPTS. SEE TS11/TS04 PROGRAMMING SPECIFICATION FOR DESCRIPTION.
24 =	DIA	DIAGNOSTICS. SEE TS11/TS04 PROGRAMMING SPECIFICATION FOR DESCRIPTION. ODT MUST BE USED TO LOAD DIAGNOSTIC DATA INTO THE WRITE BUFFER BEFORE THIS CMD IS ISSUED.
25 =	JMP	JUMP TO THE NTH COMMAND IN THE COMMAND SEQUENCE TABLE, WHERE N IS DEFINED IN THE BRF FIELD.
26 =	DLY	DELAY 'N' MILLISECONDS WHERE N IS DEFINED IN THE # OF OPERATIONS.
27 =	END	END OF COMMAND SEQUENCE.

2.2.2 DATA PATTERN LIST FOR USE IN SOFTWARE DIALOGUE.

PATTERN #	DESCRIPTION.
0	INCREMENTING PATTERN. 0 - 377.
1	ALL '1''S PATTERN.
2	ALL '0''S PATTERN.
3	'1' BIT WALKING FROM R TO L IN A FIELD OF '0''S.
4	'0' BIT WALKING FROM R TO L IF A FIELD OF '1''S.
5	ALTERNATING '1' AND '0' BITS WITH ALTERNATE BYTES COMPLIMENTED. (125/252)
6	ALTERNATING BYTES OF 000 AND 377.
7	RANDOM DATA PATTERN.
8	NO PATTERN GENERATION.

2.3 EXAMPLES OF SOFTWARE DIALOGUE

SEQ 0015

2.3.1 BASIC FUNCTION AND DATA RELIABILITY WITH ALL ERROR REPORTING ENABLED

- A) RECEIVE PROMPT (DR>)
- B) ENTER STA/TES:1-2<CR>
- C) ANSWER HARDWARE QUESTIONS.
- D) PROCEED WITH THE FOLLOWING DIALOGUE:

CHANGE SW (L) ?	Y<CR>
CLEAR COUNTERS (L) N ?	Y<CR>
RESET RANDOM VARIABLES (L) N ?	N<CR>
HALT AFTER EACH CMD (L) N ?	N<CR>
PRINT RECOVERABLE ERRORS (L) N ?	Y<CR>
DISABLE INTERRUPTS (L) N ?	N<CR>
INHIBIT RECOVERY (L) N ?	N<CR>
CHANGE CMD SEQUENCE (L) N ?	N<CR>

2.3.2 TO SET UP A SCOPE LOOP FOR A FAILURE IN BASIC FUNCTIONS.

- A) RECEIVE PROMPT (DR>)
- B) ENTER STA/TES:1/FLA:LOE:IER:ISR:IDU<CR>
- C) ANSWER HARDWARE QUESTIONS.
- D) PROCEED WITH THE FOLLOWING DIALOGUE:

```

CHANGE SW (L) ?           Y<CR>
CLEAR COUNTERS (L) N ?   Y<CR>
RESET RANDOM VARIABLES (L) N ? N<CR>
HALT AFTER EACH CMD (L) N ? N<CR>
PRINT RECOVERABLE ERRORS (L) N ? N<CR>
DISABLE INTERRUPTS (L) N ? N<CR>
INHIBIT RECOVERY (L) N ? N<CR>
CHANGE CMD SEQUENCE (L) N ? N<CR>

```

2.3.3 TO SET UP A SCOPE LOOP FOR A FAILURE IN DATA RELIABILITY

- A) RECEIVE PROMPT (DR>)
- B) ENTER STA/TES:5/FLA:IER:ISR:IDU/EOP:1000<CR>
- C) ANSWER HARDWARE QUESTIONS.
- D) PROCEED WITH THE FOLLOWING DIALOGUE:

```

CHANGE SW (L) ?           Y<CR>
CLEAR COUNTERS (L) N ?   Y<CR>
RESET RANDOM VARIABLES (L) N ? N<CR>
HALT AFTER EACH CMD (L) N ? N<CR>
PRINT RECOVERABLE ERRORS (L) N ? N<CR>
DISABLE INTERRUPTS (L) N ? Y<CR>
INHIBIT RECOVERY (L) N ? Y<CR>
CHANGE CMD SEQUENCE (L) N ? Y<CR>
INHIBIT RFC ERROR REPORTS (L) N ? Y<CR>
CHARACTERISTICS CODE (D) 40 ? 40<CR>
CMD/2 (D) 5 ?             13<CR> (REWIND) (COULD BE ANY COMMAND)
BRF COUNT (D) 2048 ?      1<CR>
# OF OPERATIONS (D) 10 ? 1<CR>
PATTERN (D) 7 ?           1<CR>
CMD/3 (D) 5 ?             4<CR> (WRITE) (COULD BE ANY COMMAND)
BRF (D) 2048 ?            1000<CR>
# OF OPERATIONS (D) 10 ? 10000<CR>
PATTERN (D) 7 ?           1<CR>
CMD/4 (D) 5 ?             27<CR> (END) (COULD BE ANY COMMAND)
BRF (D) 2048 ?            <^Z>

```

2.4 EXECUTION TIMES

2.4.1 SYSTEM CONFIGURATION

PDP11/34
MOS MEMORY
LA36
TS11/TS04

2.4.2 TEST EXECUTION TIMES

TEST 1 - BASIC FUNCTIONS - 30 SECONDS PER PASS.
TEST 2 - DATA RELIABILITY - 45 MINUTES PER PASS.
TEST 3 - WRITE COMPATABILITY - 20 MINUTES PER PASS.
TEST 4 - READ COMPATABILITY - 20 MINUTES PER PASS.
TEST 5 - OPERATOR SELECTED SEQUENCE - DEPENDS ON SEQUENCE SELECTED.

NOTE: ALL EXECUTION TIMES ARE SHOWN FOR ONE UNIT OPERATION.
APPROXIMATELY 10% WILL BE ADDED TO ALL EXECUTION TIMES
FOR EACH ADDITIONAL UNIT.

3.0 ERROR INFORMATION

SEQ 0018

3.1 ERROR REPORTING

ALL ERROR REPORTS EXCEPT FOR ERRORS #1 AND #17 INCLUDE A DUMP OF THE FOLLOWING INFORMATION:

ERROR #, TEST #, SUBTEST #, PROGRAM COUNTER, UNIT #, COMMAND, PREVIOUS COMMAND, PASS COUNT, # OF RECORDS FROM BOT, RECORD READ COUNT, THE COMMAND PACKET, TSSR, TCC, TSBA, RFC, AND THE EXTENDED STATUS REGISTERS (SEE 2.3.14.1 FOR LIST OF COMMANDS).

STANDARD ERROR REPORT FORMAT:

```
CZTSH SFT ERR XXXXX TST XXX SUB XXX PC: XXXXXX
(ASCII ERROR MESSAGE)
XXX CMD FAILED - UNIT X PASS: XXXXX RECORD: XXXXX
PREVIOUS CMD WAS XXX * RECORD READ: XXXXX *
CMDPKT TSBA RFC TSSR TCC
XXXXXX XXXXXX XXXXXX XXXXXX X
XXXXXX
XXXXXX
XXXXXX
XST0 XST1 XST2 XST3
XXXXXX XXXXXX XXXXXX XXXXXX
```

* CAUTION *

INTERPRET THAT 'RECORD READ' COUNT WITH CAUTION. IF VERY DIFFERENT FROM RECORD COUNT TRACKED BY THE DIAGNOSTIC, POSITION IS NOT NECESSARELY LOST. ERRORS IN READING THAT RECORD MIGHT HAVE CAUSED RECORD COUNT TO BE ERRONEOUSLY READ FROM TAPE. IN TEST 2, IF DIAGNOSTIC IS RESTARTED OR CONTINUED, RECORD COUNT IS RESET TO ZERO ALTHOUGH TAPE WAS NOT REWOUND. THIS IS NECESSARY BECAUSE THERE IS NO ACCURATE WAY TO DETERMINE ON WHAT RECORD COUNT OF WHAT UNIT THE DIAGNOSTIC WAS HALTED BEFORE RESTARTING OR CONTINUING. IT IS SUGGESTED THAT A 'PRINT' BE REQUESTED WHEN HALTING DIAG TO GET A PRINT OF THE RECORD COUNT WHEN HALTED.

EXAMPLE OF AN ERROR REPORT:

```
CZTSH SFT ERR 00009 TST 002 SUB 000 PC: 010606
RECOVERABLE ERROR
WRT CMD FAILED - UNIT 2 PASS: 2 RECORD: 254
PREVIOUS CMD WAS WRT
CMDPKT TSBA RFC TSSR TCC
100005 002324 000000 100210 4
051766
000000
000371
XST0 XST1 XST2 XST3
000350 000002 100004 000000
```

- 3.1.1 ERROR #1 - COMMAND PACKET ADDRESS NOT ON A MODULO 4 BOUNDARY: ^{6 2}
IF THIS ERROR IS REPORTED, THE PROGRAM DID NOT LOAD PROPERLY. THIS IS A SYSTEM FATAL ERROR AND THE PROGRAM MUST BE RELOADED TO CORRECT IT.
- 3.1.2 ERROR #2 - TS04 NOT READY:
BEFORE ANY COMMAND IS ISSUED TO THE TS04, THE SUBSYSTEM READY BIT IN THE TSS4 IS CHECKED. IF THE SSR IS NOT SET, THE PROGRAM REPORTS THE NOT READY ERROR. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST SEQUENCE UNLESS THE IDU OPTION IS USED.
- 3.1.3 ERROR #3 - NO RESPONSE ERROR:
ONCE THE TSDB IS LOADED, THE TS04 HAS ONE MILLISECOND TO RESPOND OR THE PROGRAM REPORTS A NO RESPONSE ERROR. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST SEQUENCE UNLESS THE IDU OPTION IS USED.
- 3.1.4 ERROR #4 - NO INTERRUPT ERROR:
COMMAND WAS ISSUED AND NO INTERRUPT RECEIVED. THE PROGRAM REPORTS THAT NO INTERRUPT OCCURRED. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.
- 3.1.5 SPECIAL CONDITION ERRORS:
IF, DURING EXECUTION, AN INCIDENT OCCURS FORCING THE TSSR SPECIAL CONDITION BIT TO SET, THE PROGRAM WILL SELECT ONE OF 8 ERROR HANDLING ROUTINES, DEPENDING ON THE TERMINATION CLASS CODE.
THE TERMINATION CLASS CODES IN THE TSSR ARE PROCESSED AS FOLLOWS WHEN SPECIAL CONDITION IS SET:
- 3.1.5.1 ERROR #5 - TERMINATION CLASS CODE 0, UNDEFINED SPECIAL CONDITION
THE ERROR IS REPORTED, A HARD ERROR IS LOGGED AND THE PROGRAM PROCEEDS NORMALLY.
- 3.1.5.2 ERROR #6 - TERMINATION CLASS CODE 1, ATTENTION CONDITION
THIS TCC INDICATES THAT THE DRIVE HAS UNDERGONE A STATUS CHANGE SUCH AS GOING OFFLINE OR COMING ONLINE. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.
- 3.1.5.3 ERROR #7 - TERMINATION CLASS CODE 2, TAPE STATUS ALERT

H 2

A STATUS CONDITION HAS BEEN ENCOUNTERED THAT MAY HAVE SIGNIFICANCE TO THE PROGRAM. BITS OF INTEREST INCLUDE *MK, RLS, LET, RLL, EOT. ACTION TAKEN DEPENDS ON THE TEST BEING EXECUTED. IF THE CONDITION IS UNEXPECTED, THE ERROR IS REPORTED AND A HARD ERROR IS LOGGED. THE PROGRAM PROCEEDS NORMALLY.

SEQ 0020

3.1.5.4 ERROR #8 - TERMINATION CLASS CODE 3, FUNCTION REJECT

THE SPECIFIED FUNCTION WAS NOT INITIATED. BITS OF INTEREST ARE RMR, OFL, VCK, BOT, ILC, WLE, ILA, AND NBA. THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.5.5 ERROR #9 - TERMINATION CLASS CODE 4, RECOVERABLE ERROR

TAPE POSITION IS ONE RECORD BEYOND WHAT ITS POSITION WAS WHEN THE FUNCTION WAS INITIATED. RECOVERY PROCEDURE IS TO LOG THE ERROR AND ISSUE THE APPROPRIATE RETRY COMMAND. IF RETRY LIMIT IS REACHED BEFORE THE ERROR IS RECOVERED, RETRY LIMIT EXCEEDED IS REPORTED AS DESCRIBED IN ERROR #14 BELOW.

3.1.5.6 ERROR #10 - TERMINATION CLASS CODE 5, RECOVERABLE ERROR

TAPE POSITION HAS NOT CHANGED. RECOVERY PROCEDURE IS TO LOG THE ERROR AND RE-ISSUE THE ORIGINAL COMMAND. IF RETRY LIMIT IS REACHED BEFORE THE ERROR IS RECOVERED, RETRY LIMIT EXCEEDED IS REPORTED AS DESCRIBED IN ERROR #14 BELOW.

3.1.5.7 ERROR #11 - TERMINATION CLASS CODE 6, UNRECOVERABLE ERROR

TAPE POSITION HAS BEEN LOST. THE ONLY VALID RECOVERY PROCEDURE IS TO REWIND AND START OVER AT BOT UNLESS THE TAPE HAS LABELS OR SEQUENCE NUMBERS. IF DENSITY CHECK IS SET THIS DIAGNOSTIC WILL REWIND AND RETRY THE COMMAND, OTHERWISE THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.5.8 ERROR #12 - TERMINATION CLASS CODE 7, FATAL SUBSYSTEM ERROR

THE SUBSYSTEM IS INCAPABLE OF PROPERLY PERFORMING COMMANDS OR AT LEAST ITS INTEGRITY IS SERIOUSLY QUESTIONABLE. REFER TO THE FATAL CLASS CODE FIELD IN THE TSSR REGISTER FOR ADDITIONAL INFORMATION ON THE TYPE OF FATAL ERROR. THE DEVICE WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.6 ERROR #13 - RFC NON-ZERO ERROR:

IF, AFTER EXECUTION, THE RESIDUAL FRAME COUNT IS NON-ZERO, THE ERROR IS REPORTED AND A HARD ERROR IS LOGGED. THE PROGRAM THEN PROCEEDS NORMALLY. THE REPORTING AND LOGGING OF THESE ERRORS IS OPTIONAL.

3.1.7 ERROR #14 - RETRY LIMIT EXCEEDED:

ON A WRITE COMMAND THIS IS A FATAL DEVICE ERROR AND THE DEVICE^{1 2}
WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

SEQ 0021

ON A READ COMMAND THIS ERROR IS LOGGED AS A HARD ERROR AND
THE PROGRAM PROCEEDS NORMALLY.

3.1.8 ERROR #15 - TOO MANY INTERRUPTS:

IF MORE THAN ONE INTERRUPT OCCURS PER COMMAND, THIS ERROR IS REPORTED.
THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM
THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.9 ERROR #16 - CAPSTAN RUNAWAY:

CAPSTAN DID NOT STOP WITHIN ACCEPTABLE WINDOW AFTER LAST
COMMAND. THE PROGRAM WILL ISSUE A GET STATUS COMMAND BEFORE REPORTING
THE ERROR SO THAT THE DEAD TRACK FIELD IN EXTENDED STATUS REGISTER 2
WILL CONTAIN THE TACH COUNT WHEN THE TAPE STOPPED.
THIS IS A FATAL DEVICE ERROR AND THE DEVICE WILL BE DROPPED FROM
THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

3.1.10 ERROR #17 - DATA COMPARE ERROR:

IF A DATA VALIDATION ERROR OCCURS DURING A WRITE/VERIFY COMMAND,
THE PROGRAM PRINTS WHAT THE DATA SHOULD HAVE BEEN AND WHAT THE
DATA WAS, AND PRINTS THE BYTE AND RECORD NUMBER THE ERROR OCCURRED
ON. ONLY THE FIRST 10 BYTES IN ERROR PER RECORD ARE PRINTED.
THE TOTAL # OF BYTES IN ERROR PER RECORD IS ALSO PRINTED. A
HARD ERROR IS LOGGED AND THE PROGRAM PROCEEDS NORMALLY.

3.2 ERROR HALTS

ERROR HALTS ARE SUPPORTED PER DESCRIBED IN THE PREVIOUS SECTION
WITH /FLAG:MOE. THERE ARE NO OTHER HALTS.

4.0 PERFORMANCE REPORT

SEQ 0022

```

UNIT X   PASS:XXXXX  RECORD:XXXXX
BYTES WRITTEN  XXX,XXX,XXX,XXX
BYTES READ REV XXX,XXX,XXX,XXX
BYTES READ FWD XXX,XXX,XXX,XXX

RECOVERABLE ERRORS   WRT      RDR      RDF
UNRECOVERABLE ERRORS XXXXX    XXXXX    XXXXX

SPEC COND   HARD   FATAL   COMPARE
  XXXXX    XXXXX   XXXXX   XXXXX

```

5.0 TEST SUMMARIES

5.1 TEST 1 -

BASIC FUNCTIONS.

EXECUTES AND VERIFIES CORRECT COMPLETION OF ALL TS04 FUNCTIONS.

SUBTEST 1 - SET CHAR, DRIVE INIT, GET STATUS.

- + SET CHARACTERISTIC 200.
- + DRIVE INITIATE.
- + SET CHARACTERISTIC 20.
- + GET STATUS
- + SET CHARACTERISTIC 40.
- + PRINT TS04 MICROCODE LEVEL (PASS 1 ONLY)

SUBTEST 2 - REWIND.

- + REWIND.
- + REWIND AT BOT.

SUBTEST 3 - WRITE/VERIFY.

- + WRITE/VERIFY PATTERN 1.
- + WRITE/VERIFY PATTERN 2.
- + WRITE/VERIFY PATTERN 3.
- + WRITE/VERIFY PATTERN 4.
- + WRITE/VERIFY PATTERN 5.
- + WRITE/VERIFY PATTERN 6.
- + WRITE/VERIFY PATTERN 0.

SUBTEST 4 - WRITE TAPE MARK, ERASE.

- + WRITE TAPE MARK.
- + WRITE 10 RECORDS
- + ERASE 10 TIMES
- + WRITE TAPE MARK.
- + WRITE TAPE MARK RETRY.

SUBTEST 5 - SPACE FILES.

- + SPACE 2 FILES REVERSE.
- + SPACE 2 FILES FORWARD.
- + SPACE 2 FILES REVERSE.
- + SPACE 2 FILES FORWARD.

SUBTEST 6 - SPACE RECORDS.

- ‡ REWIND.
- ‡ SPACE 7 RECORDS FORWARD.
- ‡ SPACE 7 RECORDS REVERSE.
- ‡ SPACE 7 RECORDS FORWARD.
- ‡ SPACE 7 RECORDS REVERSE.

SUBTEST 7 - WRITE RETRY.

- ‡ REWIND.
- ‡ WRITE DATA.
- ‡ WRITE RETRY.

SUBTEST 8 - READ REV RETRY.

- ‡ READ REVERSE.
- ‡ READ NEXT REVERSE.
- ‡ READ NEXT FORWARD.

SUBTEST 9 - READ FWD RETRY.

- ‡ READ FORWARD.
- ‡ READ PREVIOUS FORWARD.
- ‡ READ PREVIOUS REVERSE.

SUBTEST 10 - CLEAN.

- ‡ CLEAN.
- ‡ REWIND.

SUBTEST 11 - WRITE/VERIFY SWAPPED DATA BYTES.

- ‡ WRITE/VERIFY EVEN LENGTH (RECORD 1).
- ‡ WRITE/VERIFY ODD LENGTH (RECORD 2).
- ‡ SET DATA BYTE SWAP.
- ‡ WRITE/VERIFY EVEN LENGTH (RECORD 3).
- ‡ WRITE/VERIFY ODD LENGTH (RECORD 4).
- ‡ CLEAR DATA BYTE SWAP.

SUBTEST 12 - READ SWAPPED DATA BYTES.

- ‡ READ REV RECORD 4.
- ‡ READ REV RECORD 3.
- ‡ SET DATA BYTE SWAP.
- ‡ READ REV RECORD 2.
- ‡ READ REV RECORD 1.
- ‡ READ FWD RECORD 1.
- ‡ READ FWD RECORD 2.
- ‡ CLEAR DATA BYTE SWAP.
- ‡ READ FWD RECORD 3.
- ‡ READ FWD RECORD 4.

5.2 TEST 2 -

DATA RELIABILITY.

1. THE TAPE IS INITIATED WITH THE FOLLOWING COMMANDS:
SET CHARACTERISTIC 40
REWIND
WRITE/VERIFY 31 RECORDS OF RANDOM LENGTH AND DATA
2. WRITE AND READ COMMANDS ARE SELECTED AT RANDOM AND ARE EXECUTED A RANDOM NUMBER OF TIMES WITH RANDOM LENGTHS AND RANDOM PATTERN UNTIL END OF TAPE IS REACHED.
3. AT THE END OF EACH PASS, A REWIND COMMAND IS ISSUED AND A PERFORMANCE REPORT IS PRINTED.

NOTE: IF A RESTART COMMAND IS USED TO INITIATE TEST 1, THE INITIAL REWIND COMMAND IS NOT ISSUED.

5.3 TEST 3 -

WRITE COMPATABILITY/WRITE UTILITY.

REWINDS AND WRITES RECORDS OF RANDOM LENGTHS AND RANDOM DATA FROM BOT TO EOT.

5.4 TEST 4 -

READ COMPATABILITY/READ UTILITY.

REWINDS AND READS ENTIRE TAPE, FORWARD AND REVERSE.

5.5 TEST 5 -

EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

THE SEQUENCE OF COMMANDS ENTERED BY THE OPERATOR IS EXECUTED. IF NO COMMANDS WERE ENTERED, A DEFAULT SEQUENCE OF REWIND/WRITE/READ REV/READ FWD/REWIND OF ENTIRE TAPE IS EXECUTED WITH RANDOM PATTERN AND RECORD LENGTH OF 2048 BYTES.

6.1 GENERAL

THE TS04 TAPE SUBSYSTEM CONSISTS OF A TS11 UNIBUS TO SERIAL BUS CONTROLLER CONNECTED TO A TS04 DRIVE. FROM A SOFTWARE VIEWPOINT THIS CONFIGURATION IS UNIQUE (FOR A UNIBUS DEVICE) IN A NUMBER OF WAYS:

- A. ONLY ONE REGISTER MAY BE WRITTEN - TSDB (TAPE SYSTEM DATA BUFFER),
- B. TWO REGISTERS MAY BE READ - TSSR AND TSBA (TAPE SYSTEM STATUS REGISTER AND TAPE SYSTEM BUS ADDRESS REGISTER),
- C. COMMANDS ARE NOT WRITTEN TO THE DRIVE; RATHER, COMMAND POINTERS ARE WRITTEN WHICH POINT TO COMMAND PACKETS SOMEWHERE IN CPU MEMORY. THE COMMAND POINTER IS USED BY THE TS04 SUBSYSTEM TO FETCH THE WORD(S) WITHIN THE COMMAND PACKET. THE WORDS WITHIN THE COMMAND PACKET ARE:
 - 1. COMMAND WORD
 - 2. LOW ORDER BUFFER ADDRESS
 - 3. HIGH ORDER BUFFER ADDRESS
 - 4. BYTE COUNT
- D. THE TSSR CONTAINS ALL THE INFORMATION WHICH WILL BE NECESSARY TO DETERMINE WHETHER:
 - 1. THE DRIVE IS READY TO ACCEPT ANOTHER COMMAND,
 - 2. THE PREVIOUS COMMAND WAS EXECUTED WITHOUT ERROR.IF EITHER OF THE ABOVE CONDITIONS IS UNTRUE AT "JOB DONE" OR "COMMAND INITIATION" TIME, IT MAY BE NECESSARY TO GET THE EXTENDED STATUS REGISTERS TO DETERMINE WHAT ACTION IS TO BE TAKEN AND/OR LOG THE ERROR INFORMATION.
- E. EXTENDED STATUS REGISTERS ARE NOT READ DIRECTLY FROM DRIVE REGISTERS; RATHER, A "GET STATUS" COMMAND IS ISSUED WHICH WILL CAUSE THE TS04 TO TRANSFER EXTENDED STATUS INFORMATION TO THE MEMORY AREA POINTED TO BY THE BUFFER ADDRESS OF THE "GET STATUS" COMMAND. THERE ARE FOUR EXTENDED STATUS REGISTERS. SEE 6.3.
- F. THE TSDB MUST BE WRITTEN WITH A DATO INSTRUCTION TO PROPERLY WRITE THE COMMAND POINTER. A DATOB WILL CAUSE A MAINTENANCE FUNCTION. A DATO TO THE TSSR WILL CAUSE SUBSYSTEM INIT.
- G. COMMAND PACKETS MUST RESIDE ON DIVIDE BY FOUR MEMORY BOUNDARIES (AS OPPOSED TO DIVIDE BY 2 OR WORD BOUNDARIES) .

6.2 UNIBUS INTERFACE SPECIFICATIONS

N 2

SEQ 0026

<u>TS11/ TS04</u>	<u>INT. VECTOR</u>	<u>UNIBUS ADDRESS</u>	<u>REGISTER</u>
FIRST	224	772520 772522	TSBA/TSDB TSSR
SECOND	154	772524 772526	TSBA/TSDB TSSR
THIRD	160	772530 772532	TSBA/TSDB TSSR
FOURTH	164	772534 772536	TSBA/TSDB TSSR

6.3 BIT DEFINITIONS FOR TS11/TS04 REGISTERS

6.3.1 TS11/TS04 REGISTER SUMMARY

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
TSBA	A15	A14	A13	A12	A11	A10	A09	A08	A07	A06	A05	A04	A03	A02	A01	A00	
TSDB	P15	P14	P13	P12	P11	P10	P09	P08	P07	P06	P05	P04	P03	P02	P17	P16	
TSSR	SC	UPE	SPE	RMR	NXM	NBA	A17	A16	SSR	OFL	FC1	FC0	TC2	TC1	TC0		
XST0	TMK	RLS	LET	RLL	WLE	NEF	ILC	ILA	MOT	ONL	IE	VCK	PED	WLK	BOT	EOT	
XST1	DLT		COR	CRS	TIG	DBF	SCK		IPR	SYN	IPO	IED	POS	POL	UNC	MTE	
						NZO				DRP	ITM	LCO	NZN	LRC	CRC	VPE	
XST2	OPM	SIP	BPE	CAF		WCF		DTP	DT7	DT6	DT5	DT4	DT3	DT2	DT1	DT0	
XST3	MICRO DIAGNOSTIC ERROR CODE							LMX	OPI	REV	CRF	DCK	NOI	LXS	RIB		

TERMINATION CLASS CODES (TSSR TC0-TC2):

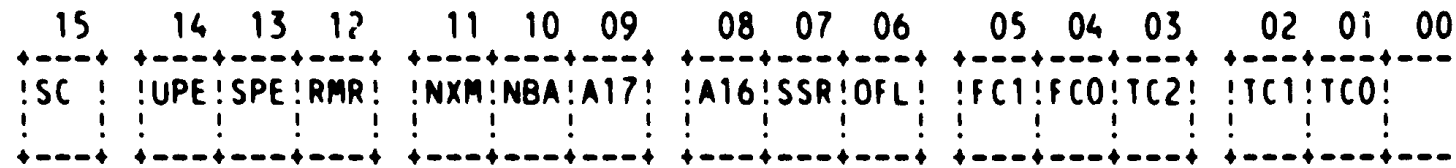
- 0 = NORMAL TERMINATION
- 1 = ATTENTION CONDITION
- 2 = TAPE STATUS ALERT
- 3 = FUNCTION REJECT
- 4 = RECOVERABLE ERROR - TAPE POSITION = ONE RECORD
DOWN TAPE FROM START OF FUNCTION
- 5 = RECOVERABLE ERROR - TAPE NOT MOVED
- 6 = UNRECOVERABLE ERROR - TAPE POSITION LOST
- 7 = FATAL CONTROLLER ERROR

FATAL CLASS CODES (TSSR FC0-FC1):

- 0 = MICRO DIAGNOSTIC FAILURE (DISPLAYED IN TS04 OPERATOR PANEL AND XST3).
- 1 = I/O SEQUENCER CROM PARITY ERROR.
- 2 = MICROPROCESSOR CROM PARITY ERROR.
SILO PARITY ERROR.
SERIAL BUS PARITY ERROR DETECTED AT TS11 (SPE).
SERIAL BUS PARITY ERROR DETECTED AT TS04 (BPE).
FATAL ERROR HALTS 1750-1777 IN TS04 PROGRAM COUNTER DISPLAY.
- 3 = LOSS OF AC POWER HAS BEEN DETECTED.

6.3.2 TS11 STATUS REGISTER (TSSR)

UNIBUS ADDRESS + 2 - READ ONLY



BIT	NAME	TCC	DEFINITION
15	SC	S	SPECIAL CONDITION. WHEN SET, INDICATES THAT THE LAST COMMAND DID NOT COMPLETE WITHOUT INCIDENT. SPECIFICALLY, EITHER AN ERROR WAS DETECTED OR AN EXCEPTION CONDITION OCCURRED. EXCEPTION CONDITIONS CAN BE TAPE MARKS ON READ COMMANDS, REVERSE MOTION AND AT BOT, EOT WHILE WRITING, ETC. MAY ALSO BE SET BY THE ERROR BITS CONTAINED IN THE TSSR REGISTER: UPE, SPE, RMR, AND NXM. THE TERMINATION CLASS BITS ARE SOMETHING OTHER THAN 0 (UNLESS RMR IS THE ONLY ERROR - SEE RMR).
14	UPE	4/5	UNIBUS PARITY ERROR. SET BY THE TS11 WHEN IT DETECTS A PARITY ERROR ON THE UNIBUS DATA WHEN TRANSFERRING TO OR FROM THE CPU'S MEMORY.
13	SPE	7	SERIAL BUS PARITY ERROR. THIS BIT IS SET BY THE TS11 WHEN IT DETECTS A SERIAL BUS PARITY ERROR ON DATA RECEIVED FROM THE TS04.
12	RMR	S	REGISTER MODIFICATION REFUSED. SET BY THE TS11 WHEN A COMMAND POINTER IS LOADED INTO TSDB AND SUB-SYSTEM READY (SSR) IS NOT SET. NOTE THAT THIS BIT CAUSES SPECIAL CONDITION BUT NO TERMINATION CLASS (IN FACT, THE TSC4 NEVER SEES THIS ERROR) BECAUSE ON A SYSTEM WITH NO BUGS, THIS BIT MAY COME UP ON AN ATTENTION MESSAGE. IF ATTNS ARE NOT ENABLED, THIS BIT COMING UP IS AN INDICATION OF EITHER A FATAL CONTROLLER ERROR OR A SOFTWARE BUG.
11	NXM	4/5	NON-EXISTENT MEMORY. SET BY THE TS11 WHEN TRYING TO TRANSFER TO OR FROM A MEMORY LOCATION WHICH DOES NOT EXIST. MAY OCCUR WHEN FETCHING THE COMMAND PACKET, FETCHING OR STORING DATA, OR STORING THE MESSAGE PACKET.
10	NBA	S	NEED BUFFER ADDRESS. WHEN SET, INDICATES THAT THE TS04 NEEDS A MESSAGE BUFFER ADDRESS. THIS BIT IS CLEARED DURING THE SET CHARACTERISTICS COMMAND (IF A GOOD ADDRESS WAS GIVEN).
09	A17	S	BUS ADDRESS BIT 17. A17 AND A16 (BIT 08) TRACK

THE VALUES OF BITS 17 AND 16 OF THE TSBA REGISTER. ^{D 3}

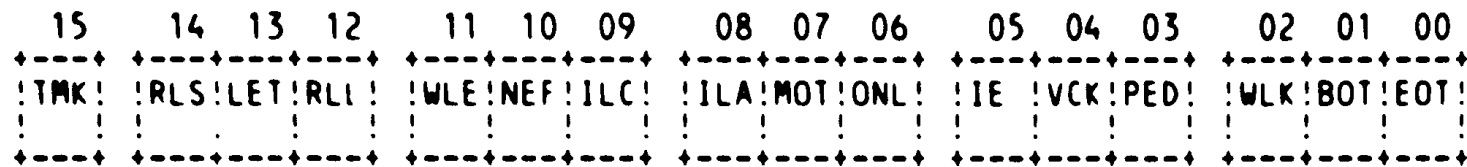
SEQ 0029

08	A16	S	BUS ADDRESS BIT 16. SEE A17 (BIT 09).
07	SSR	S	SUB-SYSTEM READY. WHEN SET, INDICATES THAT THE TS11/TS04 SUBSYSTEM IS NOT BUSY AND IS READY TO ACCEPT A NEW COMMAND POINTER.
06	OFL	S,1,3	OFF-LINE. WHEN SET, INDICATES THAT THE TS04 IS OFF-LINE AND UNAVAILABLE FOR ANY TAPE MOTION COMMANDS. THIS BIT CAN CAUSE A TERMINATION CLASS OF 1 (ON ATTN INTERRUPT) OR 3 (RESULTS IN NEF).
05	FC1	7	FATAL TERMINATION CLASS 01. FC1 AND FCO (BIT 04) ARE USED TO INDICATE THE TYPE OF FATAL ERROR WHICH HAS OCCURRED ON THE TS04. THESE BITS ARE VALID ONLY WHEN SC IS SET AND THE TERMINATION CLASS CODE BITS ARE ALL SET (111).
04	FC0	7	FATAL TERMINATION CLASS 00. SEE FC1 (BIT 05).
03	TC2	S	TERMINATION CLASS BIT 02. THIS BIT, ALONG WITH THE TC1 AND TCO BITS, ACT AS AN OFFSET VALUE WHENEVER AN ERROR OR EXCEPTION CONDITION OCCURS ON A COMMAND. EACH OF THE EIGHT POSSIBLE VALUES OF THIS FIELD REPRESENT A PARTICULAR CLASS OF ERRORS OR EXCEPTIONS. THE CONDITIONS IN EACH CLASS HAVE SIMILAR SIGNIFICANCE AND, AS APPLICABLE, RECOVERY PROCEDURES. THE CODE PROVIDED IN THIS FIELD IS EXPECTED TO BE UTILIZED AS AN OFFSET INTO A DISPATCH TABLE FOR HANDLING OF THE CONDITION.
02	TC1	S	TERMINATION CLASS BIT 01. SEE TC2 (BIT 03).
01	TC0	S	TERMINATION CLASS BIT 00. SEE TC2 (BIT 03).
00	-	-	NOT USED.

UNIBUS ADDRESS + 2 - WRITE ONLY

SUBSYSTEM INITIALIZE

6.3.3 EXTENDED STATUS REGISTER 0 (XSTAT0)



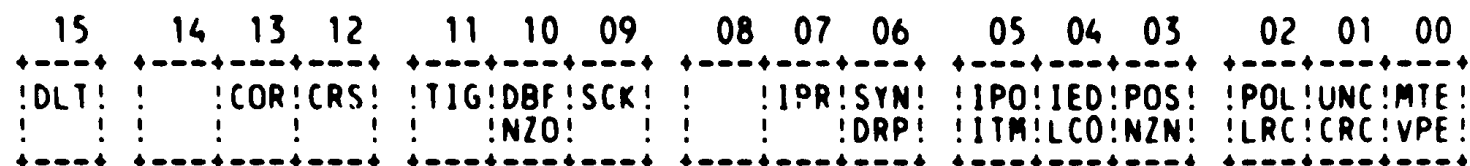
BIT	NAME	TCC	DEFINITION
15	TMK	5,2	TAPE MARK DETECTED. SET WHENEVER A TAPE MARK WAS DETECTED DURING A READ, SPACE, OR SKIP COMMAND AND AS A RESULT OF THE WRITE TAPE MARK OR WITE TAPE MARK RETRY COMMANDS.
14	RLS	2	RECORD LENGTH SHORT. THIS BIT INDICATES THAT EITHER THE RECORD'S LENGTH WAS SHORTER THAN THE BYTE COUNT ON READ OPERATIONS, A SPACE RECORD OPERATION ENCOUNTERED A TAPE MARK OR BOT BEFORE THE POSITION COUNT WAS EXHAUSTED, OR A SKIP TAPE MARKS COMMAND WAS TERMINATED BY ENCOUNTERING BOT OR A DOUBLE TAPE MARK (IF THAT OPERATIONAL MODE IS ENABLED, SEE LET) PRIOR TO EXHAUSTING THE POSITION COUNTER.
13	LET	2	LOGICAL END OF TAPE. SET ONLY ON THE SKIP TAPE MARKS COMMAND WHEN EITHER TWO CONTIGUOUS TAPE MARKS ARE DETECTED OR WHEN MOVING OFF OF BOT AND THE FIRST RECORD ENCOUNTERED IS A TAPE MARK. THE SETTING OF THIS BIT WILL NOT OCCUR UNLESS THIS MODE OF TERMINATION IS ENABLED THROUGH USE OF THE SET CHARACTERISTICS COMMAND.
12	RLL	2	RECORD LENGTH LONG. WHEN SET, THIS BIT INDICATES THAT THE RECORD READ WAS LONGER THAN THE BYTE COUNT SPECIFIED.
11	WLE	3,6	WRITE LOCK ERROR. WHEN SET, INDICATES THAT A WRITE OPERATION WAS ISSUED BUT THE MOUNTED TAPE DID NOT CONTAIN A WRITE ENABLE RING OR THE WRT LOCK SWITCH ACTIVATED DURING THE OPERATION.
10	NEF	3	NON-EXECUTABLE FUNCTION. WHEN SET, INDICATES THAT THE COMMAND COULD NOT BE EXECUTED DUE TO ONE OF THE FOLLOWING CONDITIONS: <ul style="list-style-type: none"> - THE COMMAND SPECIFIED REVERSE TAPE DIRECTION BUT THE TAPE WAS ALREADY POSITIONED AT BOT. - THE ISSUING OF ANY COMMAND, EXCEPT REWIND,

UNLOAD, OR A COMMAND WITH THE CLEAR VOLUME CHECK (CVC) BIT SET, WHEN THE VOLUME CHECK BIT IS SET.

- ANY COMMAND, EXCEPT GET STATUS OR DRIVE INITIALIZE, WHEN THE TS04 IS OFF-LINE.
- ANY WRITE COMMAND WHEN THE TAPE DOES NOT CONTAIN A WRITE ENABLE RING (WRITE LOCK STATUS - WLS).

09	ILC	3	ILLEGAL COMMAND. SET WHEN A COMMAND IS ISSUED AND EITHER ITS COMMAND FIELD OR ITS COMMAND MODE FIELD CONTAINS CODES WHICH ARE NOT SUPPORTED BY THE TS04.
08	ILA	3	ILLEGAL ADDRESS. (MORE THAN 18 BITS OR ODD WHEN AN EVEN ADDRESS IS REQUIRED.)
07	MOT	S	TAPE IS MOVING.
06	ONL	S	ON LINE. WHEN SET, INDICATES THAT THE TS04 IS ON-LINE AND OPERABLE.
05	IE	S	INTERRUPT ENABLE. REFLECTS THE STATE OF THE INTERRUPT ENABLE BIT SUPPLIED ON THE LAST COMMAND.
04	VCK	S	VOLUME CHECK. WHEN SET, INDICATES THAT THE DRIVE HAS BEEN EITHER POWERED DOWN OR TURNED OFF-LINE. CLEARED BY THE CLEAR VOLUME CHECK (CVC) BIT IN THE COMMAND HEADER WORD. THIS BIT CAN CAUSE A TERMINATION CLASS OF 3.
03	PED	S	PHASE ENCODED DRIVE. WHEN SET, INDICATES THAT THE TS04 IS CAPABLE OF READING AND WRITING ONLY 1600 BPI PHASE ENCODED DATA. WHEN RESET, INDICATES THAT THE TS04 HAS ONLY 800 BPI NRZI DATA CAPABILITIES.
02	WLK	S,3	WRITE LOCKED. WHEN SET, INDICATES THAT THE MOUNTED REEL OF TAPE DOES NOT HAVE A WRITE-ENABLE RING INSTALLED. THE TAPE IS, THEREFORE, WRITE PROTECTED.
01	BOT	S,3	BEGINNING OF TAPE. WHEN SET, INDICATES THAT THE TAPE IS POSITIONED AT THE LOAD POINT AS DENOTED BY THE BOT REFLECTIVE STRIP ON THE TAPE.
00	EOT	S,2	END OF TAPE. THIS BIT IS SET WHENEVER THE TAPE IS POSITIONED AT OR BEYOND THE END OF TAPE REFLECTIVE STRIP. DOES NOT RESET UNTIL THE TAPE PASSES OVER THE REFLECTIVE STRIP IN THE REVERSE DIRECTION UNDER PROGRAM CONTROL.

6.3.4 EXTENDED STATUS REGISTER 1 (XSTAT1)



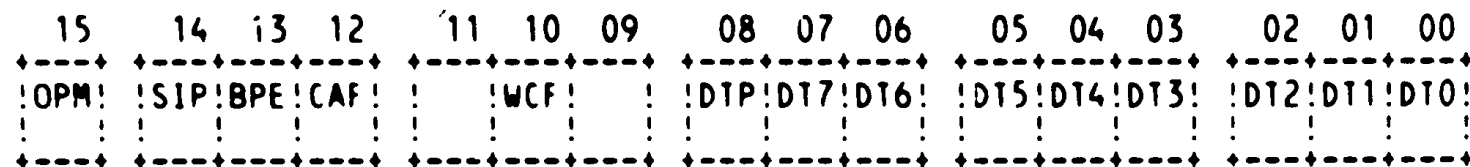
BIT	NAME	TCC	DEFINITION
15	DLT	4	DATA LATE. SET WHEN THE I/O SILO IS FULL ON A READ OR EMPTY ON A WRITE. THESE CONDITIONS OCCUR WHENEVER THE UNIBUS LATENCY EXCEEDS THE DATA TRANSFER RATE OF THE TS04.
14	-	-	NOT USED.
13	COR	5	CORRECTABLE DATA. IN PHASE ENCODED MODE, A CORRECTABLE DATA ERROR HAS BEEN ENCOUNTERED.
12	CRS	4	CREASE DETECTED. FOR NRZI, ALL DATA TRACKS DROPPED OUT FOR MORE THAN THREE CHARACTER TIMES BUT FOR LESS THAN .1 INCHES OF TAPE. FOR PE, EIGHT OUT OF NINE DATA TRACKS WENT DEAD FOR LESS THAN .1 INCHES BEFORE A VALID POSTAMBLE WAS DETECTED.
11	TIG	4	TRASH IN THE GAP. NON-ERASED DATA WAS DETECTED IN A GAP DURING A READ, WRITE, WRITE TAPE MARK, OR ERASE COMMAND.
10	DBF	4	DESKEW BUFFER FAIL. ONE OF THE DESKEW BUFFERS FAILED TO ASSERT "OUTPUT READY" WITHIN 20 MICROSECONDS AFTER BEING ENABLED. THE DEAD TRACK BITS WILL INDICATE ON WHICH TRACKS THIS FAILURE OCCURRED. THIS ERROR IS PROBABLY A RESULT OF A BROKEN FORMATTER.
	NZO	4	NRZ FIFO OVERRUN.
09	SCK	4	SPEED CHECK. TAPE SPEED WAS OFF BY MORE THAN 5% DURING A WRITE DATA OPERATION. NOTE THAT SPEED AVERAGED OVER 8 TICKS AND THE AVERAGE MUST BE OFF 5% TO CAUSE THIS ERROR.
08	-	-	NOT USED.
07	IPR	5,4	INVALID PREAMBLE. SET ON A PE DRIVE IF THE PREAMBLE APPEARS TO BE SHORTER THAN 36 CHARACTERS OR LONGER THAN 44 CHARACTERS. ALSO SET IF THE PREAMBLE IS INCORRECTLY ENCODED BEYOND THE FIFTEENTH CHARACTER IN READ OR THE TENTH CHARACTER IN READ-AFTER-WRITE.

06	SYN	4	SYNCH FAILURE. SET ON A PE DRIVE IF THE FORMATTER WAS UNABLE TO ACHIEVE SYNCHRONIZATION IN THE PREAMBLE.
	DRP	4	NRZ RECORD DROPPED A CHARACTER (THE NEXT CHARACTER WAS TO BE CONSIDERED CRC).
05	IPO	S,4	INVALID POSTAMBLE. SET ON A PE DRIVE DURING READ OR WRITE IF ANY OF THE FIRST 39 CHARACTERS OF THE POSTAMBLE ARE NOT READ CORRECTLY.
	ITM	S,4	ILLEGAL TAPE MARK FOR NRZ.
04	IED	4	INVALID END DATA. FOR PE, EIGHT OUT OF NINE TRACKS WENT DEAD BEFORE THE POSTAMBLE WAS DETECTED.
	LRO	4	FOR NRZI, DATA WAS NOT DETECTED IN EITHER THE LRCC OR CRCC WINDOWS. (LRC WAS ZERO)
03	POS	S,4	POSTAMBLE SHORT. SET ON PE DRIVES DURING A READ OR WRITE WHEN LESS THAN 38 ALL-ZEROES CHARACTERS ARE READ FOLLOWING THE ALL-ONES CHARACTER.
	NZN	S,4	NRZ NOISE RECORD (FEWER THAN 13(10) FRAMES).
02	POL	4	POSTAMBLE LONG. SET ON PE DRIVES DURING READ OR WRITE OPERATIONS WHEN THE POSTAMBLE EXCEEDS 42 CHARACTERS.
	LRC	4	LRC ERROR. SET ON NRZI DRIVES WHEN THE LRCC CHARACTER WAS FOUND IN ERROR.
01	UNC	4	UNCORRECTABLE DATA. SET ON PE DRIVES WHEN A PARITY ERROR OCCURRED WITHOUT A CORRESPONDING DEAD TRACK INDICATION.
	CRC	4	CRC ERROR. SET ON NRZI DRIVES WHEN THE CRC CHARACTER WAS FOUND TO BE IN ERROR.
00	MTE	4	MULTI-TRACK ERROR. SET ON PE DRIVES WHEN MORE THAN ONE DEAD TRACK OCCURRED IN THE PREAMBLE OR IN THE DATA FIELD.
	VPE	4	VERTICAL PARITY ERROR. SET ON NRZI DRIVES WHEN A CHARACTER DID NOT CONTAIN AN ODD NUMBER OF ONE BITS.

SEQ 0033

H 3

6.3.5 EXTENDED STATUS REGISTER 2 (XSTAT2)



BIT	NAME	TCC	DEFINITION
15	OPM	S	OPERATION IN PROGRESS. (TAPE MOVING)
14	SIP	7,F2	SILO PARITY ERROR. CAUSES FATAL CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
13	BPE	7,F2	SERIAL BUS PARITY ERROR AT DRIVE. SET BY THE TS04 WHEN A PARITY ERROR IS DETECTED ON DATA TRANSMITTED FROM THE TS11 TO THE TS04. CAUSES FATAL CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
12	CAF	7	CAPSTAN ACCELERATION FAIL. AFTER ACCELERATING TAPE FOR .2 INCHES, THE TAPE SPEED WAS CHECKED AND FOUND TO BE OUT OF TOLERANCE BY MORE THAN 10%.
11	-	-	NOT USED.
10	WCF	7	THE WRITE BOARD IS NOT EMPTYING THE I/O SILO AT THE PROPER RATE. THIS ERROR CAN BE THE RESULT OF THE WRITE BOARD CLOCK NOT BEING TURNED ON (BROKEN HARDWARE).
09	-	-	NOT USED.
08	DTP	S	DEAD TRACK PARITY. THE BITS DTP THROUGH DT0 INDICATE WHICH TRACK(S) WENT DEAD, IF ANY, DURING THE LAST DATA TRANSFER OPERATION. IF DESKEW BUFFER FAIL (DBF) IS SET, THESE BITS INDICATE WHICH CHANNEL FAILED.
07	DT7	S	DEAD TRACK 7. SEE DTP.
06	DT6	S	DEAD TRACK 6. SEE DTP.
05	DT5	S	DEAD TRACK 5. SEE DTP.
04	DT4	S	DEAD TRACK 4. SEE DTP.
03	DT3	S	DEAD TRACK 3. SEE DTP.
02	DT2	S	DEAD TRACK 2. SEE DTP.
01	DT1	S	DEAD TRACK 1. SEE DTP.

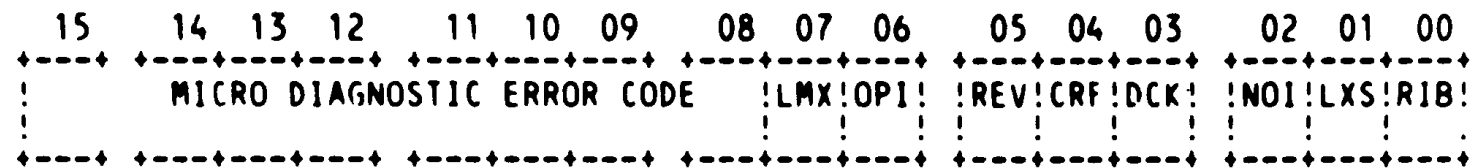
00 DT0 S DEAD TRACK 0. SEE DTP.

J 3

SEQ 0035

NOTE: ON A SET CHARACTERISTICS COMMAND, THE UCODE LEVEL IS RETURNED IN DT7 THRU DT0. ON A GET STATUS COMMAND, THE RESIDUAL CAPSTAN TICK COUNT (INTERNALLY R7) IS RETURNED IN DT7 THRU DT0.

6.3.6 EXTENDED STATUS REGISTER 3 (XSTAT3)



BIT	NAME	TCC	DEFINITION
15 TO 08			MICRO DIAGNOSTIC ERROR CODE. (SEE LIST OF CODES BELOW). ALL ERROR CODES IN THE TABLE WILL BE DISPLAYED ON THE TS04 CONTROL PANEL BUT ONLY CODES HIGHER THAN 110 WILL BE AVAILABLE TO CPU DIAGNOSTICS FOR PRINTOUT IN THE MICRO DIAGNOSTIC ERROR CODE FIELD OF XSTAT3. THIS ERROR CODE FIELD IS VALID ONLY WHEN THE TERMINATION CLASS CODE IN THE TSSR EQUALS 7 AND THE FATAL CLASS CODE IN THE TSSR EQUALS 0, INDICATING AN INTERNAL DIAGNOSTIC FAILURE.
07	NTL	6	LIMIT EXCEEDED. SET WHEN THE TAPE TENSION ARMS HAVE EXCEEDED THEIR ALLOWABLE TRAVEL AND HAVE CAUSED THE ACTIVATION OF THE LIMIT SWITCHES. NO TENSION EXISTS ON THE MOUNTED TAPE.
06	OPI	6	OPERATION INCOMPLETE. SET WHEN A READ, SPACE, OR SKIP OPERATION HAS MOVED 25 FEET OF TAPE WITHOUT DETECTING ANY DATA ON THE TAPE.
05	REV	5	DIRECTION OF CURRENT OPERATION WAS REVERSE (BUT IS 0 IF REWIND OR FORWARD)
04	CRF	7	CAPSTAN RESPONSE FAILURE. A MOTION COMMAND WAS GIVEN TO THE CAPSTAN BUT WE DID NOT GET A TICK BACK WITHIN A REASONABLE AMOUNT OF TIME.
03	DCK	5,6	DENSITY CHECK. SET ON PE DRIVES WHEN A PE IDENTIFICATION BURST WAS NOT DETECTED WHEN MOVING OFF OF BOT. SET ON NRZI DRIVES WHEN A NON-NRZI IDENTIFICATION BURST WAS FOUND WHEN MOVING OFF OF BOT.
02	NOI	6	NOISE RECORD. SET DURING A READ OR SPACE OPERATION WHEN A BURST OF FLUX CHANGES, WHICH DO NOT QUALIFY AS A RECORD (BUT TOO MANY TO IGNORE), ARE DETECTED: NRZI: AT LEAST TWO CHARACTERS IN A ROW BUT LESS THAN TWELVE, FOLLOWED BY A CHARACTER IN EITHER THE CRCC OR LRCC WINDOWS. PE: AT LEAST 24 CHARACTERS IN A ROW THAT DO NOT QUALIFY AS A TAPE MARK OR A DATA PREAMBLE.

01 LXS S LIMIT EXCEEDED STATICALLY. THIS BIT IS SET ANY L 3
 TIME THE LIMIT SWITCHES ARE EXCEEDED. THIS BIT
 CAN ONLY BE CLEARED BY MANUALLY LOADING THE TAPE.

SEQ 0037

00 RIB 2 REVERSE INTO BOT. A READ, SPACE, OR SKIP
 COMMAND ALREADY IN PROGRESS HAS ENCOUNTERED THE
 BOT MARKER WHEN MOVING TAPE IN THE REVERSE
 DIRECTION. TAPE MOTION WILL BE HALTED AT BOT.

MICRO DIAGNOSTIC ERROR CODES

FOLLOWING IS A LIST OF THE ERRORS WHICH ARE DISPLAYED IN THE MICRO
 DIAGNOSTIC ERROR CODE (XSTAT3 BITS 15 - 08) AND ALSO IN THE LIGHTS ON THE
 TSO4 CONTROL PANEL, DUE TO FAILURES ON THE CAPSTAN BOARD, I/O BOARDS,
 WRITE BOARD, READ BOARD, OR FORMATTER BOARD. THE MICRO WILL BE IN A
 TIGHT LOOP IN THE DISPM PROGRAM, WAITING FOR OPERATOR OR CPU
 INTERVENTION WHILE THE ERROR IS BEING DISPLAYED IN THE CONSOLE
 LIGHTS. IT IS APPARENT THAT AN ERROR IS BEING DISPLAYED IF THE 'UOK'
 LIGHT IS NOT LIGHTED, THE PROCESSOR IS NOT STOPPED, AND AN OCTAL
 NUMBER (100-377) IS BEING DISPLAYED IN THE LIGHTS. TO SCOPE LOOP
 THESE TESTS, ENTER MAINTENANCE MODE (ON-LINE SWITCH TO 'OFF'
 POSITION, MAINTENANCE SWITCH UP, PRESS RESET), ENTER THE OFF-LINE
 TEST NUMBER (SEE SCOPE LOOP COLUMN BELOW) IN THE OPERATOR CONSOLE
 LIGHTS (ENTER ONES WITH LEFT-MOST SWITCH, ENTER ZEROES WITH
 RIGHT-MOST SWITCH), AND PRESS ON-LINE BUTTON. TEST WILL LOOP UNTIL
 ON-LINE SWITCH IS RETURNED TO OFF-LINE POSITION, ERRORS WILL BE
 DISPLAYED CONTINUOUSLY.

ERROR (DISPLAY)	PROGRAM	ERROR DESCRIPTION	LIKELY MODULE	SCOPE LOOP
337	OPERATIONAL CODE	CAPSTAN RUNAWAY ERROR (H3.RNY). CAPSTAN DIDN'T STOP WITHIN ACCEPTABLE WINDOW AFTER LAST COMMAND.		
100	IOTSM	BASIC I/O MICRO FAILURE (PARITY ERROR, IOATN, HANDSHAKING, AND DATA WINDOW TEST BETWEEN THE I/O AND MAIN MICROS. NOTE: CAN ALSO BE CAUSED BY THE SERIAL BUS .SHIN (SHIFT IN) STUCK ASSERTED.	M8967	14
101	IOTSM	ERROR IN I/O CONTROL REGISTER TEST	M8966 M8967	15
102	IOTSM	FAILURE OF FRAME COUNTER TEST	M8966	15
103	IOTSM	FAILURE OF I/O SILO NON-PARITY ERROR DATA TEST OR THE WRITE FLAG.	M8966 M8963	16
104	IOTSM	FAILURE OF I/O SILO PARITY ERROR TEST OR DATA LATE TEST.	M8966	17

Line No	Code	Description	Module	Page	Seq
105	IOTSM	FAILURE OF SHIFT LOOP WITH ZEROES.	M8965	20	SEQ 0038
106	IOTSM	FAILURE OF SHIFT LOOP WITH ONES.	M8965	21	
107	IOTSM	FAILURE OF SHIFT LENGTH MUX.	M8965	22	
110	IOTSM	FAILURE TO RECEIVE CORRECT OP-CODE FROM TS11 WHEN WE SENT DATA OVER THE SERIAL BUS.	M8965 TS11 MOTHER BD SBUS CABLE	47	
111	CATSM	FAILURE OF 1 KHZ CLOCK TEST. TSTS TAC SYNC FLOP AND ATTN, TOO.	G159 CBUS CABLE M8963	2	
112	CATSM	LIGHT REGISTER CHANGED WHEN MOTION REGISTER WAS CLEARED.	G159	3,4	
113	CATSM	FWD OR MVG BITS WRONG AFTER 1 TICK OF SIMULATED COMMAND AND TACH PULSES.	G159	3,4	
114	CATSM	FAILURE OF SIMULATED CAPSTAN SPEED TEST. THE CAPSTAN SPEED COUNTER WAS OUT OF RANGE WHEN TAPE MOTION AT SPEED WAS SIMULATED.	G159	3,4	
115	CATSM	FAILURE OF SIMULATED SLOW CAPSTAN TEST. SPEED COUNTER DID NOT LATCH UP WITH MAX COUNT WHEN SLOW TACH TICKS WERE SIMULATED.	G159	3,4	
116	CATSM	FAILURE OF SIMULATED CAPSTAN DECEL TEST. COUNTER NOT ZERO FOR FORWARD OR 377 FOR REVERSE WHILE DECELERATING, OR MVG BIT NOT 1.	G159	3,4	
117	CATSM	FAILURE OF MOVING FLOP TO GO TO ZERO AFTER STOPPING (DIRECTION REVERSAL FOR ONE TACH TICK).	G159	3,4	
120	PETSM	FAILURE OF WRITE BOARD TO TURN ON AND EMPTY THE SILO, OR DATA LATE BIT DOESN'T WORK.	M8929 M8966	23	
121	PETSM	FAILURE OF WRITE BOARD TO EMPTY SILO AT CORRECT SPEED.	M8929	23	
124	PETSM	FORMATTER FLAG DOESN'T WORK ON THE M8922.	M8922	24	
125	PETSM	FORMATTER SILO FILLING AND DATA ERROR	M8922 M8923 M8924	24	
126	PETSM	PEAK SHIFT TEST ERROR	M8922 M8923 M8924	25	

127

PETSM

FORMATTER TABLE LOOKUP ROM CHECKSUM
TEST ERROR

N 3
M8922 26
M8923
M8924

SEQ 0039

3	PROGRAM HEADER
104	DISPATCH TABLE
121	DESCRIPTIVE TEXT
138	DEFAULT HARDWARE P-TABLE
157	SOFTWARE P-TABLE
217	GLOBAL EQUATES SECTION
492	GLOBAL DATA SECTION
780	GLOBAL TEXT SECTION
795	GLOBAL ERROR REPORT SECTION
936	GLOBAL SUBROUTINES SECTION
3007	REPORT CODING SECTION
3112	LOAD DEVICE PROTECTION TABLE
3125	INITIALIZE SECTION
3507	AUTO DROP SECTION
3633	CLEANUP CODING SECTION
3668	DROP UNIT SECTION
3703	ADD UNIT SECTION
3754	TEST 1: BASIC FUNCTIONS.
4207	TEST 2: DATA RELIABILITY.
4408	TEST 3: WRITE COMPATABILITY/WRITE UTILITY.
4474	TEST 4: READ COMPATABILITY/READ UTILITY.
4529	TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.
4759	HARDWARE PARAMETER CODING SECTION
4797	SOFTWARE PARAMETER CODING SECTION
5057	HARD CODED P-TBL

PARAMETER CODING
NLISTF.P11

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C 4

SEQ 0041

1

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2      .TITLE PROGRAM HEADER AND TABLES
3      .SBTTL PROGRAM HEADER
4
5      .ENABL ABS,AMA
6      =      2000
7 002000 BGNMOD
8
9      :++
10     : THE PROGRAM HEADER IS THE INTERFACE BETWEEN
11     : THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
12     :--
13
14 002000 POINTER BGNRPT,BGNSW,BGNSFT,BGNAU,BGNDU,BGNSETUP
15
16
17 002000 HEADER CZTSH,B,0,5000,1,#INTPRI
18 002000 L$NAME:: ;DIAGNOSTIC NAME
19 002000 103 .ASCII /C/
20 002001 132 .ASCII /Z/
21 002002 124 .ASCII /T/
22 002003 123 .ASCII /S/
23 002004 110 .ASCII /H/
24 002005 000 .BYTE 0
25 002006 000 .BYTE 0
26 002007 000 .BYTE 0
27 002010 L$REV:: ;REVISION LEVEL
28 002010 102 .ASCII /B/
29 002011 L$DEPO:: ;0
30 002011 060 .ASCII /O/
31 002012 L$UNIT:: ;NUMBER OF UNITS
32 002012 000001 .WORD T$PTHV
33 002014 L$TIML:: ;LONGEST TEST TIME
34 002014 005000 .WORD 5000
35 002016 L$HPCP:: ;POINTER TO H.W. QUES.
36 002016 022616 .WORD L$HARD
37 002020 L$SPCP:: ;POINTER TO S.W. QUES.
38 002020 022670 .WORD L$SOFT
39 002022 L$HPTP:: ;PTR. TO DEF. H.W. PTABLE
40 002022 002174 .WORD L$HW
41 002024 L$SPTP:: ;PTR. TO S.W. PTABLE
42 002024 002202 .WORD L$SW
43 002026 L$LADP:: ;DIAG. END ADDRESS
44 002026 024236 .WORD L$LAST
45 002030 L$STA:: ;RESERVED FOR APT STATS
46 002030 000000 .WORD 0
47 002032 L$CO::
48 002032 000000 .WORD 0
49 002034 L$DTYP:: ;DIAGNOSTIC TYPE
50 002034 000001 .WORD 1
51 002036 L$APT:: ;APT EXPANSION
52 002036 000000 .WORD 0
53 002040 L$DTP:: ;PTR. TO DISPATCH TABLE
54 002040 002124 .WORD L$DISPATCH
55 002042 L$PRIO:: ;DIAGNOSTIC RUN PRIORITY
56 002042 000340 .WORD #INTPRI
57 002044 L$EXPI:: ;EXPANSION WORDS

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58	002044	000000			.WORD	0
59	002046		L\$EXP2::			
60	002046	000000			.WORD	0
61	002050		L\$MREV::	;SVC REV AND EDIT #		
62	002050	003			.BYTE	C\$REVISION
63	002051	002			.BYTE	C\$EDIT
64	002052		L\$EF::	;DIAG. EVENT FLAGS		
65	002052	000000			.WORD	0
66	002054	000000			.WORD	0
67	002056		L\$SPC::			
68	002056	000000			.WORD	0
69	002060		L\$DEVP::	; POINTER TO DEVICE TYPE LIST		
70	002060	002164			.WORD	L\$DVTYP
71	002062		L\$REPP::	;PTR. TO REPORT CODE		
72	002062	014126			.WORD	L\$RPT
73	002064		L\$EXP4::			
74	002064	000000			.WORD	0
75	002066		L\$EXP5::			
76	002066	000000			.WORD	0
77	002070		L\$AUT::	;PTR. TO ADD UNIT CODE		
78	002070	017314			.WORD	L\$AU
79	002072		L\$DUT::	;PTR. TO DROP UNIT CODE		
80	002072	017242			.WORD	L\$DU
81	002074		L\$LUN::	; LUN FOR EXERCISERS TO FILL		
82	002074	000000			.WORD	0
83	002076		L\$DESP::	; POINTER TO DIAG. DESCRIPTION		
84	002076	002136			.WORD	L\$DESC
85	002100		L\$LOAD::	;GENERATE SPECIAL AUTOLOAD EMT		
86	002100	104035			EMT	E\$LOAD
87	002102		L\$ETP::	;POINTER TO ERR_TBL		
88	002102	000000			.WORD	0
89	002104		L\$IICP::	;PTR. TO INIT CODE		
90	002104	015260			.WORD	L\$IINIT
91	002106		L\$CCP::	;PTR. TO CLEAN-UP CODE		
92	002106	017172			.WORD	L\$CLEAN
93	002110		L\$ACP::	;PTR. TO AUTO CODE		
94	002110	016550			.WORD	L\$AUTU
95	002112		L\$PR::	;PTR. TO PROTECT TABLE		
96	002112	015252			.WORD	L\$PROT
97	002114		L\$TEST::	;TEST NUMBER		
98	002114	000000			.WORD	0
99	002116		L\$DLY::	;DELAY COUNT		
100	002116	000000			.WORD	0
101	002120		L\$HIME::	;PTR. TO HIGH MEM		
102	002120	000000			.WORD	0
103						

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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.
:--

DISPATCH 5

L\$DISPATCH::

.WORD 5
.WORD T1
.WORD T2
.WORD T3
.WORD T4
.WORD T5

.SBTTL DESCRIPTIVE TEXT

:++
: 2 LINES OF TEXT PRINTED TO THE OPERATOR TO IDENTIFY THE DIAGNOSTIC AND THE DEVICE UNDER
:--

DESCRIPT <DATA RELIABILITY TEST>

L\$DESC::

.ASCIZ /DATA RELIABILIT

DEVTYP <TS11>

L\$DVTYP::

.EVEN

.ASCIZ /TS11/
.EVEN

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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 RUN-TIME P-TABLE.
:--

BGNHW DFPTBL

.WORD L10000-LSHW/2

LSHW::
DFPTBL::

172522 :TSSR ADDRESS.
224 :VECTOR ADDRESS.

ENDHW

L10000:

```

157          .SBTTL  SOFTWARE P-TABLE
158
159          :++
160          : THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
161          : PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
162          :--
163
164          002200          BGN$W  SFPTBL          .WORD  L10001-L$SW/2
165          002200          000043
166          002202          L$SW::
167          002202          SFPTBL::
168
169          002202          001          CLRFLG:: .BYTE 1          ;CLEAR COUNTERS FLAG.
170          002203          000          RRANV:: .BYTE 0          ;RESET RANDOM VARIABLES EACH PASS FLAG.
171          002204          000          HAE:: .BYTE 0          ;HALT AFTER EACH COMMAND FLAG.
172          002205          000          ERCVER:: .BYTE 0          ;ENABLE RECOVERABLE ERROR PRINTS FLAG.
173          002206          000          .BYTE 0          ;SPARE.
174          002207          000          .BYTE 0          ;SPARE
175          002210          000          DINT:: .BYTE 0          ;DISABLE INTERRUPTS FLAG.
176          002211          000          IREC:: .BYTE 0          ;INHIBIT ERROR RECOVERY FLAG.
177          002212          000          CHGFLG:: .BYTE 0          ;CHANGE CMD SEQ TABLE FLAG.
178          002213          000          .BYTE 0          ;SPARE.
179          002214          000          PIRE:: .BYTE 0          ;INHIBIT RESIDUAL FRAMECOUNT ERROR REPORT FLAG.
180          002215          000          .BYTE 0          ;SPARE.
181          002216          000040          CHAR:: CH.EAI          ;CHARACTERISTICS CODE (DEFAULT = 40).
182          002220          000015          CMDD:: .WORD 13.          ;COMMAND 2 (DEFAULT = REWIND).
183          002222          000001          .WORD 1          ;BYTE COUNT
184          002224          000001          .WORD 1          ;NUMBER OF OPERATIONS
185          002226          000007          .WORD RANP          ;PATTERN
186          002230          000004          .WORD 4          ;COMMAND 3 (DEFAULT = WRITE)
187          002232          004000          .WORD DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
188          002234          076400          .WORD 3200.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
189          002236          000007          .WORD RANP          ;PATTERN (DEFAULT = RANDOM).
190          002240          000003          .WORD 3          ;COMMAND 4 (DEFAULT = READ REV).
191          002242          004000          .WORD DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
192          002244          076400          .WORD 3200.          ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
193          002246          000007          .WORD RANP          ;PATTERN (DEFAULT = RANDOM).
194          002250          000002          .WORD 2          ;COMMAND 5 (DEFAULT = READ FWD).
195          002252          004000          .WORD DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
196          002254          076400          .WORD 3200.          ;NUMBER OF OPERATIONS (DEFAULT = 32,000).
197          002256          000007          .WORD RANP          ;PATTERN (DEFAULT = RANDOM).
198          002260          000015          .WORD 13.          ;COMMAND 6 (DEFAULT = REWIND).
199          002262          000001          .WORD 1          ;BYTE COUNT
200          002264          000001          .WORD 1          ;NUMBER OF OPERATIONS
201          002266          000007          .WORD RANP          ;PATTERN
202          002270          000033          .WORD 27.          ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 7
203          002272          004000          .WORD DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
204          002274          076400          .WORD 3200.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
205          002276          000007          .WORD RANP          ;PATTERN (DEFAULT = RANDOM).
206          002300          000033          .WORD 27.          ;END OF CMD SEQ TABLE CODE (DEF) OR CMD 8
207          002302          004000          .WORD DATCNT          ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
208          002304          076400          .WORD 3200.          ;NUMBER OF OPERATIONS (DEFAULT = 32000).
209          002306          000007          .WORD RANP          ;PATTERN (DEFAULT = RANDOM).
210
211          002310          ENDSW
212          002310          L10001:

```


PROGRAM HEADER AND TABLES
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SOFTWARE P-TABLE

SEQ 0047

213
214 002310

ENDMOD

```
215  
216 .TITLE GLOBAL AREAS  
217 .SBTTL GLOBAL EQUATES SECTION  
218  
219 002310 BGNMOD  
220  
221 :++  
222 : THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT  
223 : ARE USED IN MORE THAN ONE TEST.  
224 :--  
225  
226 002310 EQUALS  
227 :  
228 : BIT DIFINITIONS  
229 :  
230 100000 BIT15== 100000  
231 040000 BIT14== 40000  
232 020000 BIT13== 20000  
233 010000 BIT12== 10000  
234 004000 BIT11== 4000  
235 002000 BIT10== 2000  
236 001000 BIT09== 1000  
237 000400 BIT08== 400  
238 000200 BIT07== 200  
239 000100 BIT06== 100  
240 000040 BIT05== 40  
241 000020 BIT04== 20  
242 000010 BIT03== 10  
243 000004 BIT02== 4  
244 000002 BIT01== 2  
245 000001 BIT00== 1  
246 :  
247 001000 BIT9== BIT09  
248 000400 BIT8== BIT08  
249 000200 BIT7== BIT07  
250 000100 BIT6== BIT06  
251 000040 BIT5== BIT05  
252 000020 BIT4== BIT04  
253 000010 BIT3== BIT03  
254 000004 BIT2== BIT02  
255 000002 BIT1== BIT01  
256 000001 BIT0== BIT00  
257 :  
258 : EVENT FLAG DEFINITIONS  
259 : EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION  
260 :  
261 000040 EF.START== 32. ; START COMMAND WAS ISSUED  
262 000037 EF.RESTART== 31. ; RESTART COMMAND WAS ISSUED  
263 000036 EF.CONTINUE== 30. ; CONTINUE COMMAND WAS ISSUED  
264 000035 EF.NEW== 29. ; A NEW PASS HAS BEEN STARTED  
265 000034 EF.PWR== 28. ; A POWER-FAIL/POWER-UP OCCURRED  
266 :  
267 :  
268 : PRIORITY LEVEL DEFINITIONS  
269 :  
270 000340 PRI07== 340
```

```

271      000300      PRI06== 300
272      000240      PRI05== 240
273      000200      PRI04== 200
274      000140      PRI03== 140
275      000100      PRI02== 100
276      000040      PRI01== 40
277      000000      PRI00== 0
278      :
279      ;OPERATOR FLAG BITS
280      :
281      000004      EVL==      4
282      000010      LOT==      10
283      000020      ADR==      20
284      000040      IDU==      40
285      000100      ISR==     100
286      000200      UAM==     200
287      000400      BOE==     400
288      001000      PNT==    1000
289      002000      PRI==    2000
290      004000      IXE==    4000
291      010000      IBE==   10000
292      020000      IER==   20000
293      040000      LOE==   40000
294      100000      HOE==  100000
295      :
296      :
297      ; REGISTER USAGE.
298      :
299      :      R0 - PASSES PARAMETERS TO/FROM DIAGNOSTIC SUPERVISOR.
300      :      R1 - COMMAND SEQUENCE TABLE POINTER.
301      :      R2 - GENERAL PURPOSE REGISTER.
302      :      R3 - GENERAL PURPOSE REGISTER.
303      :      R4 - GENERAL PURPOSE REGISTER.
304      :      R5 - CURRENT LOGICAL DEVICE NUMBER X 2.
305      :      R6 - STACK POINTER.
306      :      R7 - PROGRAM COUNTER.
307      :
308      ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE TSSR REGISTERS.
309      :
310      100000      TS.SC==100000      ;SPECIAL CONDITION BIT.
311      040000      TS.UPE==40000      ;UNIBUS PARITY ERROR
312      020000      TS.SPE==20000      ;SERIAL BUS PARITY ERROR.
313      010000      TS.RMR==10000      ;REGISTER MODIFICATION REFUSED.
314      004000      TS.NXM==4000      ;NON-EXISTENT MEMORY.
315      002000      TS.NBA==2000      ;NEED BUFFER ADDRESS.
316      001000      TS.A17==1000      ;BUS ADDRESS BIT 17.
317      000400      TS.A16==400      ;BUS ADDRESS BIT 16.
318      000200      TS.SSR==200      ;UNIT READY BIT.
319      000100      TS.OFL==100      ;OFF LINE.
320      177717      TSC.FCC==177717      ;FATAL CLASS CODE MASK.
321      177761      TSC.TCC==177761      ;TERMINATION CLASS CODE MASK.

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322 ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE COMMAND WORD
323
324 100000 ACK.C==100000 ;ACKNOWLEDGE BIT
325 040000 CVC.C==40000 ;CLEAR VOLUME CHECK.
326 020000 OPP.C==20000 ;OPPOSITE BIT
327 010000 SWB.C==10000 ;SWAP BYTE BIT
328 004000 MOD.C3==4000 ;MODE BIT 3
329 004000 BR.F.C==4000 ;BYTE/RECORD/FILE COUNT FLAG BIT. NOT USED
330 ;BY TS04 BUT USED INTERNALLY BY THIS PROGRAM ONLY.
331 002000 MOD.C2==2000 ;MODE BIT 2
332 001000 MOD.C1==1000 ;MODE BIT 1
333 000400 MOD.C0==400 ;MODE BIT 0
334 000200 IE.C==200 ;INTERRUPT ENABLE
335 000100 FMT.C1==100 ;FORMAT BIT 1
336 000100 VFY.C==100 ;WRITE VERIFY FLAG BIT. INTERNAL USE ONLY.
337 ;NOT USED BY TS04.
338 000040 FMT.C0==40 ;FORMAT BIT 0.
339 000040 JMP.C==40 ;JUMP BIT-TO DIRECT THIS PROGRAM TO JUMP TO
340 ;A CERTAIN LOCATION IN THE COMMAND SEQUENCE
341 ;TABLE. INTERNAL USE ONLY.
342 000020 / CMD.C4==20 ;COMMAND BIT 4
343 000020 DLY.C==20 ;INSERT DELAY. INTERNAL USE ONLY.
344 000010 CMD.C3==10 ;COMMAND BIT 3
345 000004 CMD.C2==4 ;COMMAND BIT 2
346 000002 CMD.C1==2 ;COMMAND BIT 1
347 000001 CMD.C0==1 ;COMMAND BIT 0
348
349 ; BIT DEFINITIONS FOR DEVICE CHARACTERISTICS.
350
351 000200 CH.ESS==200 ;ENABLE SKIP TAPE MARKS STOP (STOP AT LOGICAL EOT).
352 000040 CH.EAI==40 ;ENABLE ATTENTION INTERRUPTS.
353 000020 CH.ERI==20 ;ENABLE MESSAGE BUFFER RELEASE INTERRUPTS.
354 000040 DF.TSCH==CH.EAI ;DEFAULT CHARACTERISTICS CODE.
355
356 ;THE FOLLOWING INDICATES THE RELATIVE POSITIONS OF THE STATUS WORDS
357 ;IN THE MESSAGE BUFFER.
358
359 000004 MS.RFC==4 ;RESIDUAL FRAME COUNT.
360 000006 MS.XS0==6 ;EXT STATUS REG 0
361 000010 MS.XS1==10 ;EXT STATUS REG 1
362 000012 MS.XS2==12 ;EXT STATUS REG 2
363 000014 MS.XS3==14 ;EXT STATUS REG 3
364
365 ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 0.
366
367 100000 X0.TMK==100000 ;TAPE MARK.
368 040000 X0.RLS==40000 ;RECORD LENGTH SHORT.
369 020000 X0.LET==20000 ;LOGICAL EOT.
370 010000 X0.RLL==10000 ;RECORD LENGTH LONG.
371 000100 X0.ONL==100 ;ON LINE BIT.
372 000002 X0.BOT==2 ;BOT BIT.
373 000001 X0.EOT==1 ;EOT BIT.
374
375 ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 2.
376
377 100000 X2.OPM==100000 ;OPERATION IN PROGRESS, TAPE MOVING
```

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378
379 ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 3.
380
381 000010 X3.DCK==10 ;DENSITY CHECK.
382 157400 X3.RNY==157400 ;CAPSTAN RUNAWAY UDIAG ERROR CODE.
383
384 ;THE FOLLOWING DEFINITIONS SHOW THE RELATIVE POSITIONS OF THE COMMAND
385 ;PACKET ENTRIES.
386
387 000000 CP.CMD==0 ;CMDPKT+0==TS04 COMMAND.
388 000002 CP.ADL==2 ;CMDPKT+2==BUFFER ADDRESS LOW.
389 000004 CP.ADH==4 ;CMDPKT+4==BUFFER ADDRESS HIGH.
390 000006 CP.CNT==6 ;CKDPKT+6==BYTE/FILE/RECORD COUNT
391
392 ; MISCELLANEOUS DEFINITIONS.
393
394 000340 INTPRI==PRI07 ;PRIORITY TO BE USED IN INTERRUPT STATE.
395 002452 TSBA==TSDB ;DATA BUFFER ADDRESS REGISTER.
396 000010 SCHCNT==10 ;ARBITRARY BYTE LENGTH FOR CHARACTERISTIC
397 ;BUFFER LENGTH. (EVEN #)
398 000016 MSGCNT==16 ;MESSAGE BUFFER LENGTH IN BYTES. (EVEN #)
399 003044 DIABLK==DATAWT ;WRITE BUFFER ALSO USED FOR DIAG CMD.
400 000020 DIACNT==20 ;DIAGNOSTIC COMMAND BUFFER EXTENT.
401 004000 DATCNT==2048. ;MAXIMUM RECORD LENGTH IN BYTES,
402 ;THIS COUNT SHOULD BE A MULTIPLE OF 256 TO INSURE
403 ;PROPER READ/WRITE BUFFER ALLOCATION BY THE SUPER.
404 000270 CNTLEN==CNTEND-CNTBGN ;LENGTH OF STATISTICAL COUNTER AREA.
405 177740 RNOPSC==177740 ;RANDOM # OF OPERATIONS MASK.
406 000007 RANP==7 ;CODE TO SELECT RANDOM PATTERN.
407 000020 RRECL==16. ;READ RECOVERY ATTEMPT LIMIT.
408 000020 WRECL==16. ;WRITE RECOVERY ATTEMPT LIMIT.
409 153624 RANBC==153624 ;CONSTANT USED TO RESET RANDOM # GENERATOR BASE.
410 032561 RANSC==32561 ;CONSTANT USED TO RESET RANDOM # SAVE LOCATION.
411 177774 NINUSE==177774 ;NOT IN USE CODE FOR DEVICE STATE TABLE.
412 177740 NCMD.C==ACK.C!CVC.C!OPP.C!SWB.C!MOD.C3!MOD.C2!MOD.C1!MOD.CO!IE.C!FMT.C1!FMT.CO
413 ;NOT "COMMAND" BITS.
414
415 ;THE FOLLOWING DEFINES THE COMMAND WORD FOR EACH TS04 COMMAND.
416
417 100013 DRI== ACK.C!CMD.C3!CMD.C1!CMD.CO ;DRIVE INIT.
418
419 104001 RDF== ACK.C!BRF.C!CMD.CO ;READ FORWARD
420
421 104401 RDR== ACK.C!BRF.C!MOD.CO!CMD.CO ;READ REVERSE
422
423 104005 WRT== ACK.C!BRF.C!CMD.CO!CMD.C2 ;WRITE COMMAND
424
425 104105 WTV== ACK.C!BRF.C!VFY.C!CMD.CO!CMD.C2 ;WRITE VERIFY
426
427 104010 SRF== ACK.C!BRF.C!CMD.C3 ;SPACE RECORD FORWARD
428
429
430
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```

434			
435	104410	SRR==	ACK.C!BRF.C!MOD.CO!CMD.C3
436			;SPACE RECORD REVERSE
437			
438	105401	RNR==	ACK.C!BRF.C!MOD.C1!MOD.CO!CMD.CO
439			;READ REV RETRY1 - REREAD NEXT REVERSE, IE. SPACE FWD, READ REVERSE
440			
441	125401	RNF==	ACK.C!BRF.C!OPP.C!MOD.C1!MOD.CO!CMD.CO
442			;READ REV RETRY2 - REREAD NEXT FORWARD, IE.READ FORWARD, SPACE REVERSE
443			
444	105001	RPF==	ACK.C!BRF.C!MOD.C1!CMD.CO
445			;READ FWD RETRY1 - REREAD PREVIOUS FORWARD, IE. SPACE REVERSE, READ FORW
446			
447	125001	RPR==	ACK.C!BRF.C!OPP.C!MOD.C1!CMD.CO
448			;READ FWD RETRY2 - REREAD PREVIOUS REVERSE, IE. READ REVERSE, SPACE FORW
449			
450	105005	WRR==	ACK.C!MOD.C1!BRF.C!CMD.C2!CMD.CO
451			;WRITE RETRY
452			
453	102010	RWD==	ACK.C!MOD.C2!CMD.C3
454			;REWIND COMMAND
455			
456	100012	MBR==	ACK C!CMD.C3!CMD.C1
457			;MESSAGE BUFFER RELEASE
458			
459	100011	WTM==	ACK.C!CMD.C3.CMD.CO
460			;WRITE TAPE MARK.
461			
462	101011	WTR==	ACK.C!MOD.C1!CMD.C3!CMD.CO
463			;WRITE TAPE MARK RETRY.
464			
465	105010	SFF==	ACK.C!BRF.C!MOD.C1!CMD.C3
466			;SPACE FILE FORWARD
467			
468	105410	SFR==	ACK.C!BRF.C!MOD.CO!MOD.C1!CMD.C3
469			;SPACE FILE REVERSE
470			
471	100017	GES==	ACK.C!CMD.CO!CMD.C1!CMD.C2!CMD.C3
472			;GET EXTENDED STATUS
473			
474	100411	ERS==	ACK.C!MOD.CO!CMD.C3!CMD.CO
475			;ERASE 3 INCHES OF TAPE
476			
477	100412	UNL==	ACK.C!MOD.CO!CMD.C3!CMD.C1
478			;UNLOAD COMMAND
479			
480	101012	CLN==	ACK.C!MOD.C1!CMD.C3!CMD.C1
481			;ERASE TAPE.
482			
483	140004	SCH==	ACK.C!CVC.C!CMD.C2
484			;SET DEVICE CHARACTERISTICS.
485	100006	DIA==	ACK.C!CMD.C2!CMD.C1
486			;DIAGNOSTICS.
487	000040	JMP==	JMP.C
488			;JUMP TO 'N'TH COMMAND
489	000020	DLY==	DLY.C
			;DELAY 'N' MS.

GLOBAL AREAS
CZTSHB.P11

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GLOBAL EQUATES SECTION

B 5

SEQ 0053

490
491

177777

END== 177777

;END OF COMMAND SEQUENCES

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.SBTTL GLOBAL DATA SECTION

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

: COMMAND PACKET.

. = .+3&177774 ;MUST BE ON MOD 4 BOUNDRY.
CNDPKT:: 0 ;1ST WORD IS TS04 COMMAND.
0 ;2ND WORD IS THE BUFFER LOW ADDRESS.
0 ;3RD WORD IS THE BUFFER HIGH ADDRESS.
0 ;4TH WORD IS THE BYTE/RECORD/FILE COUNT.

: GET STATUS COMMAND PACKET.

. = .+3&177774 ;MUST BE ON MOD 4 BOUNDRY.
GSCP:: .WORD GES

: MESSAGE BUFFER RELEASE COMMAND PACKET.

. = .+3&177774 ;MUST BE ON MOD 4 BOUNDRY.
BRCPK:: .WORD MBR

: REWIND COMMAND PACKET (USED IN ERROR RECOVERY ONLY)

. = .+3&177774 ;MUST BE ON A MODULE 4 BOUNDARY.
RWCPK:: .WORD RWD
.WORD 1

: WORK AREA FOR ANALYSIS OF MESSAGE PACKET CONTENTS.

MSGPKT:: .BLKW 7 ;1ST WORD:: MESSAGE TYPE.
;2ND WORD:: DATA FIELD LENGTH.
;3RD WORD:: RESIDUAL FRAME COUNT.
;4TH WORD:: XSTAT0
;5TH WORD:: XSTAT1
;6TH WORD:: XSTAT2
;7TH WORD:: XSTAT3


```

539      :      MESSAGE PACKETS.
540
541 002352 000007      MSGPK0:: .BLKW 7      ;MESSAGE PACKET FOR DEVICE #0
542 002370 000007      MSGPK1:: .BLKW 7      ;MESSAGE PACKET FOR DEVICE #1
543 002406 000007      MSGPK2:: .BLKW 7      ;MESSAGE PACKET FOR DEVICE #2
544 002424 000007      MSGPK3:: .BLKW 7      ;MESSAGE PACKET FOR DEVICE #3
545
546      :      SET CHARACTERISTIC BLOCK.
547
548 002442 002352      SCHBK:: MSGPK0      ;1ST WORD:: MSGPKT ADDR LO(SET UP BY EXCUTE ROUTINE).
549 002444 000000      0      ;2ND WORD:: MSGPKT ADDR HI.
550 002446 000016      MSGCNT      ;3RD WORD:: MSG BUFFER LENGTH (BYTES)
551 002450 000040      CH.EAI      ;4TH WORD:: CHARACTERISTICS WORD(SET BY SETUP ROUTINE).
552
553      :      TS04 REGISTER ADDRESSES.
554
555 002452 000004      TSDB:: .BLKW 4      ;TS04 DATA BUFFER ADDRESSES.
556 002462 000004      TSSR:: .BLKW 4      ;TS04 STATUS REGISTER ADDRESSES.
557 002472 000004      TSVCT:: .BLKW 4      ;TS04 VECTOR ADDRESSES.
558
559      :      ADDRESSES OF MESSAGE PACKETS.
560
561 002502 002352      MSGPKA:: MSGPK0      ;DEVICE 0.
562 002504 002370      MSGPK1      ;DEVICE 1.
563 002506 002406      MSGPK2      ;DEVICE 2.
564 002510 002424      MSGPK3      ;DEVICE 3.
565
566      :      ADDRESSES OF INTERRUPT HANDLING ROUTINES.
567
568 002512 006012      TS4INT:: TS4IN0      ;DEVICE 0.
569 002514 006020      TS4IN1      ;DEVICE 1.
570 002516 006026      TS4IN2      ;DEVICE 2.
571 002520 006034      TS4IN3      ;DEVICE 3.
572
573      :      TS04 CODE LEVELS, WILL BE STORED AFTER SCH CMD IN BASIC FUNCTION TEST
574
575 002522 000000      TS4CL:: 0      ;DEVICE 0
576 002524 000000      0      ;DEVICE 1
577 002526 000000      0      ;DEVICE 2
578 002530 000000      0      ;DEVICE 3
579
580      :      UNIT NUMBERS OF ALL DEVICES BEING TESTED(1-4).
581      :      WHEN DEVICE IS NOT IN USE, IT,S LOCATION WILL = -3.
582      :      R5 WILL ALWAYS CONTAIN THE PRESENT LOGICAL UNIT NUMBER X 2.
583
584 002532 177774      DEVTBL:: .WORD NINUSE
585 002534 177774      .WORD NINUSE
586 002536 177774      .WORD NINUSE
587 002540 177774      .WORD NINUSE
588 002542 177777      .WORD END

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```
589          :      COUNTER AREA.
590
591          CNTBGN=.
592 002544 000020  WRBC:: .BLKW 20          ;BYTES WRITTEN.
593 002604 000020  RRBC:: .BLKW 20          ;BYTES READ REV.
594 002644 000020  RFBC:: .BLKW 20          ;BYTES READ FWD.
595 002704 000004  WRREC:: .BLKW 4           ;RECOVERABLE WRITE ERRORS.
596 002714 000004  WRUNR:: .BLKW 4          ;UNRECOVERABLE WRITE ERRORS.
597 002724 000004  RRREC:: .BLKW 4           ;RECOVERABLE READ REV ERRORS.
598 002734 000004  RRUNR:: .BLKW 4          ;UNRECOVERABLE READ REV ERRORS.
599 002744 000004  RFREC:: .BLKW 4           ;RECOVERABLE READ FWD ERRORS.
600 002754 000004  RFUNR:: .BLKW 4          ;UNRECOVERABLE READ FWD ERRORS.
601 002764 000004  PASCNT:: .BLKW 4          ;PASS COUNT.
602 002774 000004  SCCNT:: .BLKW 4           ;SPECIAL CONDITION COUNT.
603 003004 000004  VFYCNT:: .BLKW 4          ;COUNT OF TS04 DATA COMPARE ERRORS.
604 003014 000004  HRDCNT:: .BLKW 4          ;COUNT OF HARD ERRORS.
605 003024 000004  FTLCNT:: .BLKW 4          ;COUNT OF FATAL ERRORS.
606          CNTEND=.
607 003034 000004  RECcnt:: .BLKW 4          ;NUMBER OF RECORDS FROM BOT(CLEARED ONLY ON REWIND).
608
609
610          :      THE FOLLOWING ARE THE DEFINITIONS OF VARIABLES
611          :      USED BY THE PROGRAM.
612
613 003044 000000  DATAWT:: .WORD 0          ;WRITE BUFFER ADDRESS.
614 003046 000000  DATARD:: .WORD 0          ;READ BUFFER ADDRESS.
615 003050 000000  NCNT:: .WORD 0           ;STORAGE FOR VALUE OF N.
616 003052 000000  NCNT1:: .WORD 0          ;TEMP STORAGE FOR VALUE OF N.
617 003054 000000  BRFCNT:: .WORD 0          ;STORAGE FOR BPCR VALUE.
618 003056 177777  CMDWRD:: .WORD END        ;CONTAINS COMMAND WORD BEING EXECUTED PRESENTLY.
619 003060 177777  CMDSAV:: .WORD END        ;SAVE LOCATION FOR CMD WORD DURING ERROR RECOVERY
620 003062 177777  PCMDWD:: .WORD END        ;CONTAINS PREVIOUS COMMAND WORD.
621 003064 000000  CMDLG:: .WORD 0          ;CURRENT COMMAND LOGGING CODE.
622 003066 000000  LENMSK:: .WORD 0          ;RANDOM WRITE LENGTH MASK, TO BE SET UP BY TESTS
623 003070 153624  RANB:: .WORD 153624       ;RANDOM # GENERATOR BASE.
624 003072 032561  RANS:: .WORD 32561        ;RANDOM # SAVE LOCATION.
625 003074 000000  TIME1:: .WORD 0          ;TIME COUNT 1.
626 003076 000000  TIME2:: .WORD 0          ;TIME COUNT 2.
627 003100 000000  JLOOP:: .WORD 0          ;JMP COMMAND LOOP COUNT.
628 003102 000000  JLOC:: .WORD 0           ;JMP COMMAND LOCATION COUNT.
629 003104 000000  PATERN:: .WORD 0         ;PATTERN SELECT CODE.
630 003106 000000  CTCC:: .WORD 0           ;CURRENT TERMINATION CLASS CODE.
631 003110 000000  RSSAVE:: .WORD 0         ;LOCATION FOR SAVING CURRENT DEVICE POINTER.
632 003112 000000  TSSREG:: .WORD 0         ;CURRENT STATUS REGISTER.
```

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633      :      ERROR FLAG AREA, THESE FLAGS ARE CLEARED DURING INITIALIZATION AND
634      :      AFTER EACH COMMAND IS COMPLETED.
635
636      003114      BGNFLG=.
637 003114 000000      RETRYC:: .WORD 0      ;# OF RECOVERY ATTEMPTS EXECUTED.
638 003116      000      RECLOG:: .BYTE 0      ;RECORD COUNT HAS BEEN UPDATED FOR THIS RECORD.
639 003117      000      ERLOG:: .BYTE 0      ;DATA BYTES AND ERRORS HAVE BEEN LOGGED FOR THIS RECORD.
640 003120      000      RWERR:: .BYTE 0      ;READ/WRITE ERROR HAS OCCURED.
641 003121      000      UNREC:: .BYTE 0      ;UNRECOVERABLE ERROR HAS OCCURED.
642 003122      000      ERRREC:: .BYTE 0      ;ERROR RECOVERY MODE.
643      003124      .EVEN
644      003124
645
646      :      ADDITIONAL FLAGS, THESE FLAGS ARE CLEARED DURING INITIALIZATION.
647
648 003124 000004      INTFLG:: .BLKW 4      ;INTERRUPT OCCURRED FLAGS FOR EACH DEVICE.
649 003134 000004      EOTFLG:: .BLKW 4      ;EOT/BOT FLAGS FOR EACH DEVICE (XSTATO).
650 003144      000      EXPBOT:: .BYTE 0      ;BOT IS EXPECTED, DO NOT ABORT ON BOT/FUNC RTI.
651 003145      000      RANDOM:: .BYTE 0      ;RANDOM EVERYTHING FLAG.
652 003146      000      VFYFLG:: .BYTE 0      ;SET DURING WRITE/VERIFY COMMAND.
653 003147      000      RPTFLG:: .BYTE 0      ;PERFORMANCE REPORT HAS BEEN REQUESTED.
654 003150      000      SWBFLG:: .BYTE 0      ;ENABLES SWAP BYTE FUNCTION WHEN NOT EQUAL TO ZERO.
655 003151      000      IRE:: .BYTE 0      ;INHIBIT RESIDUAL FRAME COUNT ERROR REPORT.
656 003152      000      DROPED:: .BYTE 0      ;CURRENT UNIT HAS BEEN DROPPED
657 003153      000      T1SWB:: .BYTE 0      ;TEST1 SWAP BYTES FLAG
658 003154      000      ALLEOT:: .BYTE 0      ;ALL UNITS @ EOT FLAG
659      003156      .EVEN
660      003156
661
662      :      ADDITIONAL FLAGS, THESE FLAGS ARE CLEARED ONLY AFTER BEING CHECKED.
663
664 003156      000      STAFLG:: .BYTE 0      ;START FLAG - SET BY INIT CODE IF STARTING.
665 003157      000      PWRFLG:: .BYTE 0      ;POWER FAILURE FLAG - SET ONLY DURING INIT.
666 003160      000      TRAPD4:: .BYTE 0      ;TRAPED AT 4 FLAG
667 003161      000      SPAFLG:: .BYTE 0      ;SPARE FLAG
668
669      :      OPERATOR FLAG SETTINGS PASSED BY DIAG. SUPERVISOR IN A 16 BIT WORD
670      :      SEE GLOBAL EQUATES SECTION FOR FLAG BIT LIST
671
672 003162 000000      OPFLAG:: .WORD 0      ;READ ONLY OPERATOR FLAG WORD
673      .EVEN

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674                                     ;THE FOLLOWING IS THE COMMAND SEQUENCE TABLE. THE TABLE
675                                     ;HAS DEFAULT VALUES AT PROGRAM LOAD AS SHOWN. THESE VALUES
676                                     ;CAN BE UPDATED BY A TEST OR BY OPERATOR INPUT.
677
678 003164 140004                       CMDSEQ:: .WORD SCH                ;SET CHARACTERISTICS.
679 003166 000040                       .WORD CH.EAI
680 003170 000001                       .WORD 1
681 003172 000000                       .WORD 0
682 003174 102010                       CMDSE2:: .WORD RWD                ;REWIND.
683 003176 000001                       .WORD 1                          ;BYTE COUNT.
684 003200 000001                       .WORD 1                          ;ONCE.
685 003202 000007                       .WORD RANP                       ;PATTERN.
686 003204 104005                       .WORD WRT                         ;WRITE.
687 003206 004000                       .WORD DATCNT                     ;MAX BUFFER LENGTH.
688 003210 076400                       .WORD 32000.                     ;32,000 RECORDS.
689 003212 000007                       .WORD RANP                       ;RANDOM PATTERN.
690 003214 104401                       .WORD RDR                         ;READ REV.
691 003216 004000                       .WORD DATCNT                     ;MAX BUFFER LENGTH.
692 003220 076400                       .WORD 32000.                     ;32,000 RECORDS
693 003222 000007                       .WORD RANP                       ;RANDOM PATTERN.
694 003224 104001                       .WORD RDF                         ;READ FWD.
695 003226 004000                       .WORD DATCNT                     ;MAX BUFFER LENGTH.
696 003230 076400                       .WORD 32000.                     ;32,000 RECORDS.
697 003232 000007                       .WORD RANP                       ;RANDOM PATTERN.
698 003234 102010                       .WORD RWD                         ;REWIND.
699 003236 000001                       .WORD 1                          ;BYTE COUNT.
700 003240 000001                       .WORD 1                          ;ONCE.
701 003242 000007                       .WORD RANP                       ;PATTERN.
702 003244 000004                       .BLKW 4                          ;EXTENSTION TO HOLD 1 MORE CMD.
703 003254 177777                       SEQEND:: .WORD END              ;SOFT END OF SEQUENCE TABLE.
704 003256 177777                       .WORD END
705 003260 177777                       .WORD END
706 003262 177777                       .WORD END
707 003264 177777                       .WORD END                        ;HARD END OF SEQUENCE TABLE.

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708                                     ;THE FOLLOWING IS THE TS04 COMMAND TABLE
709
710 003266 100013          CMDTBL:: .WORD DRI          ;DRIVE INIT.
711 003270 104001          .WORD RDF          ;READ FORWARD.
712 003272 104401          .WORD RDR          ;READ REVERSE.
713 003274 104005          .WORD WRT          ;WRITE
714 003276 104105          .WORD WTV          ;WRITE/VERIFY. (WRITE ALL RECORDS, RDR AND
715                                     ;CHECK DATA ON ALL RECORDS, RDF AND
716                                     ;CHECK DATA ON ALL RECORDS.)
717 003300 104010          .WORD SRF          ;SPACE 'N' RECORDS FORWARD.
718 003302 104410          .WORD SRR          ;SPACE 'N' RECORDS REVERSE.
719 003304 105401          .WORD RNR          ;READ NEXT REVERSE. I.E., SPACE FWD, READ REVERSE.
720 003306 125401          .WORD RNF          ;READ NEXT FORWARD, I.E., READ FORWARD, SPACE REVERSE.
721 003310 105001          .WORD RPF          ;READ PREVIOUS FORWARD. I.E., SPACE REVERSE, READ FORWAR
722 003312 125001          .WORD RPR          ;READ PREVIOUS REVERSE. I.E., READ REVERSE, SPACE FORWAR
723 003314 105005          .WORD WRR          ;WRITE RETRY.
724 003316 102010          .WORD RWD          ;REWIND.
725 003320 100012          .WORD MBR          ;MESSAGE BUFFER RELEASE
726 003322 100011          .WORD WTM          ;WRITE TAPE MARK
727 003324 101011          .WORD WTR          ;WRITE TAPE MARK RETRY.
728 003326 105010          .WORD SFF          ;SPACE 'N' FILES FORWARD.
729 003330 105410          .WORD SFR          ;SPACE 'N' FILES REVERSE.
730 003332 100017          .WORD GES          ;GET EXTENDED STATUS.
731 003334 100411          .WORD ERS          ;ERASE 3 INCHES OF TAPE.
732 003336 100412          .WORD UNL          ;REWIND AND UNLOAD.
733 003340 101012          .WORD CLN          ;CLEAR TAPE.
734 003342 140004          .WORD SCH          ;SET CHARACTERISTICS.
735 003344 100006          .WORD DIA          ;DIAGNOSTIC COMMAND.
736 003346 000040          .WORD JMP          ;JUMP TO THE NTH COMMAND IN THE SEQUENCE.
737 003350 000020          .WORD DLY          ;DELAY 'N' MS.
738 003352 177777          .WORD END          ;END OF COMMAND TABLE
739
```

Line	Code	Address	Value	Command	Description
740					: THE FOLLOWING TABLE CONTAINS THE ASCII FOR EACH COMMAND.
741					
742	003354	051104	111	CMDASC:: .ASCII /DRI/	:DRIVE INIT.
743	003357	122	043104	.ASCII /RDF/	:READ FORWARD.
744	003362	042122	122	.ASCII /RDR/	:READ REVERSE.
745	003365	127	052122	.ASCII /WRT/	:WRITE
746	003370	052127	126	.ASCII /WTV/	:WRITE/VERIFY. (WRITE ALL RECORDS, RDR AND CHECK DATA ON ALL RECORDS, RDF AND CHECK DATA ON ALL RECORDS.)
747					
748	003373	123	043122	.ASCII /SRF/	:SPACE 'N' RECORDS FORWARD.
749	003376	051123	122	.ASCII /SRR/	:SPACE 'N' RECORDS REVERSE.
750	003401	122	051116	.ASCII /RNR/	:READ NEXT REVERSE. I.E., SPACE FWD READ REVERSE.
751	003404	047122	106	.ASCII /RNF/	:READ NEXT FORWARD, I.E., READ FORWARD, SPACE REVERSE.
752	003407	122	043120	.ASCII /RPF/	:READ PREVIOUS FORWARD. IE., SPACE REVERSE, READ FORWARD
753	003412	050122	122	.ASCII /RPR/	:READ PREVIOUS REVERSE. IE., READ REVERSE, SPACE FORWARD
754	003415	127	051122	.ASCII /WRR/	:WRITE RETRY.
755	003420	053522	104	.ASCII /RWD/	:REWIND.
756	003423	115	051102	.ASCII /MBR/	:MESSAGE BUFFER RELEASE
757	003426	052127	115	.ASCII /WTM/	:WRITE TAPE MARK
758	003431	127	051124	.ASCII /WTR/	:WRITE TAPE MARK RETRY.
759	003434	043123	106	.ASCII /SFF/	:SPACE 'N' FILES FORWARD.
760	003437	123	051106	.ASCII /SFR/	:SPACE 'N' FILES REVERSE.
761	003442	042507	123	.ASCII /GES/	:GET EXTENDED STATUS.
762	003445	105	051522	.ASCII /ERS/	:ERASE 3 INCHES OF TAPE.
763	003450	047125	114	.ASCII /UNL/	:REWIND AND UNLOAD.
764	003453	103	047114	.ASCII /CLN/	:CLEAN TAPE.
765	003456	041523	110	.ASCII /SCH/	:SET CHARACTERISTICS. WHERE BRF=200, 40, 20, 0.
766					:SEE TS11/TS04 PROGRAMMING SPECIFICATION FOR DESCRIPTION
767	003461	104	040511	.ASCII /DIA/	:DIAGNOSTICS. SEE TS11/TS04 PROGRAMMING SPECIFICATION
768					:FOR DESCRIPTION. ODT MUST BE USED TO LOAD DIAGNOSTIC D
769					:INTO THE WRITE BUFFER BEFORE THIS CMD IS ISSUED.
770	003464	046512	120	.ASCII /JMP/	:JUMP TO THE NTH COMMAND IN THE COMMAND
771					:SEQUENCE TABLE, WHERE N IS DEFINED IN
772					:THE # OF OPERATIONS.
773	003467	104	054514	.ASCII /DLY/	:DELAY 'N' MS, WHERE N IS DEFINED IN
774					:THE # OF OPERATIONS.
775	003472	047105	104	.ASCII /END/	:END OF COMMAND SEQUENCE.
776		003476		.EVEN	
777					
778					
779					

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

:
: FORMAT STATEMENTS USED IN PRINT CALLS
:

.NLIST BEX

003476	047045	040445	047125	CODELM::	.ASCIZ	/XN%AUNIT %D1%A TS11 CODE LEVEL P%03%N%N/ .EVEN
003546	054130	020130	046503	HALTM::	.ASCIZ	/XXX CMD - TYPE <CR> TO CONTINUE/
003606	046503	020104	040520	CMDPKM::	.ASCIZ	/CMD PACKET ADR NOT ON MODULO 4 BOUNDARY: RELOAD!/ .EVEN
003670	040504	040524	041440	WTVERM::	.ASCIZ	/DATA COMPARE ERROR/
003713	116	020117	051524	TOERM::	.ASCIZ	/NO TS11 RESPONSE/
003734	047125	042504	044506	SCERM::	.ASCIZ	/UNDEFINED SPEC COND/
003760	043122	020103	047516	RFCERM::	.ASCIZ	/RFC NON ZERO/
003775	124	030523	020061	NSSRM::	.ASCIZ	/TS11 NOT READY/
004014	042522	051124	020131	RLEXM::	.ASCIZ	/RETRY LIMIT EXCEEDED/
004041	125	044516	020124	ATTNM::	.ASCIZ	/UNIT OFF LINE/
004057	106	047125	052103	FUNRM::	.ASCIZ	/FUNCTION REJECT/
004077	106	052101	046101	FATSM::	.ASCIZ	/FATAL SUBSYSTEM ERROR/
004125	116	020117	047111	NOINTM::	.ASCIZ	/NO INTERRUPT/
004142	040524	042520	051440	TSAM::	.ASCIZ	/TAPE STATUS ALERT/
004164	047524	020117	040515	TOOMM::	.ASCIZ	/TOO MANY INTERRUPTS/
004210	040503	051520	040524	RNYM::	.ASCIZ	/CAPSTAN RUNAWAY-GET STATUS RESULTS:/
004254	042522	047503	042526	RERM::	.ASCIZ	/RECOVERABLE ERROR/
004276	047125	042522	047503	URERM::	.ASCIZ	/UNRECOVERABLE ERROR/
004322	047045	040445	051104	DROPDM::	.ASCIZ	/XN%ADROPPED UNIT %D1%N/
004351	045	022516	040501	AUDRPM::	.ASCIZ	/XN%AALL UNITS DROPPED%N%N/
004403	045	022516	041101	DTAER2::	.ASCIZ	'%N%ABYTE:%D4%S2%AWAS:%B8%S2%AS/B:%B8%N''
004452	042045	022464	020101	DTAER3::	.ASCIZ	'%D4%A BYTES IN ERROR OUT OF %D4%N''
004514	040445	047516	042040	DTAER4::	.ASCIZ	/XANO DATA READ%N/
004535	045	051101	041505	DTAER5::	.ASCIZ	/XARECORD TOO LONG: >%04%A BYTES%N/
004577	045	051101	041505	NURTY1::	.ASCIZ	/XARECOVERED ON RETRY #%D2%N/
004633	045	052501	044516	OFLINM::	.ASCIZ	/X%UNIT %D1%A OFF LINF%N/
004663	045	043501	052105	GETSTM::	.ASCIZ	/X%GET STATUS CMD RESULTS:%N/

794

004720

.LIST BEX
.EVEN

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795          .SBTTL  GLOBAL ERROR REPORT SECTION
796
797          ;++
798          ; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
799          ; THAT ARE USED IN MORE THAN ONE TEST.  IT ALSO INCLUDES THE ASCII MESSAGES
800          ; THAT ARE USED BY THE PRINTB AND PRINTX CALLS..
801          ;--
802
803
804 004720          BGNMSG  DTAERM
805 004720          DTAERM:
806 004720          PRINTB  #STAER1,DEVTL(R5),PASCNT(R5),RECCNT(R5)
807 004720          016546  003034          MOV      RECCNT(R5),-(SP)
808 004724          016546  002764          MOV      PASCNT(R5),-(SP)
809 004730          016546  002532          MOV      DEVTL(R5),-(SP)
810 004734          012746  005400          MOV      #STAER1,-(SP)
811 004740          012746  000004          MOV      #4,-(SP)
812 004744          010600          MOV      SP,R0
813 004746          104414          TRAP    C$PNTB
814 004750          062706  000012          ADD     #12,SP
815 004754          PRINTB  #STAER7
816 004754          012746  005472          MOV      #STAER7,-(SP)
817 004760          012746  000001          MOV      #1,-(SP)
818 004764          010600          MOV      SP,R0
819 004766          104414          TRAP    C$PNTB
820 004770          062706  000004          ADD     #4,SP
821 004774          LET RECD := R2          ;SAVE R2
822 004774          010237  006006          MOV      R2,RECD
823 005000          LET TIME1 := R3          ;SAVE R3
824 005000          010337  003074          MOV      R3,TIME1
825 005004          LET TIME2 := R4          ;SAVE R4
826 005004          010437  003076          MOV      R4,TIME2
827 005010          004737  006042          JSR PC,RECTAP          ;RETRIEVE RECORD READ
828 005014          LET R2 := RECD          ;RESTORE R2
829 005014          013702  006006          MOV      RECD,R2
830 005020          LET RECD := R3          ;SAVE RECORD READ
831 005020          010337  006006          MOV      R3,RECD
832 005024          LET R3 := TIME1          ;RESTORE R3
833 005024          013703  003074          MOV      TIME1,R3
834 005030          LET R4 := TIME2          ;RESTORE R4
835 005030          013704  003076          MOV      TIME2,R4
836 005034          PRINTB  #STAER6,RECD          ;PRINT RECORD READ
837 005034          013746  006006          MOV      RECD,-(SP)
838 005040          012746  005522          MOV      #STAER6,-(SP)
839 005044          012746  000002          MOV      #2,-(SP)
840 005050          010600          MOV      SP,R0
841 005052          104414          TRAP    C$PNTB
842 005054          062706  000006          ADD     #6,SP
843 005060          EXIT  MSG
844 005060          000167          .WORD  JSJMP
845 005062          000000          .WORD  L10002-2-.
846          .EVEN
847
848 005064          ENDMSG
849 005064          L10002:
850 005064          104423          TRAP    C$MSG

```


851						
852	005066			BGNMSG STAERM		
853	005066			STAERM::		
854	005066			PRINTB #STAER1,DEVTBL(R5),PASCNT(R5),RECCNT(R5)		
855	005066	016546	003034			MOV RECCNT(R5),-(SP)
856	005072	016546	002764			MOV PASCNT(R5),-(SP)
857	005076	016546	002532			MOV DEVTBL(R5),-(SP)
858	005102	012746	005400			MOV #STAER1,-(SP)
859	005106	012746	000004			MOV #4,-(SP)
860	005112	010600				MOV SP,RO
861	005114	104414				TRAP C\$PNTB
862	005116	062706	000012			ADD #12,SP
863	005122			PRINTB #STAER7		
864	005122	012746	005472			MOV #STAER7,-(SP)
865	005126	012746	000001			MOV #1,-(SP)
866	005132	010600				MOV SP,RO
867	005134	104414				TRAP C\$PNTB
868	005136	062706	000004			ADD #4,SP
869	005142			LET R2 := CNDPKT CLR.BY #177740		
870	005142	013702	002310			MOV CNDPKT,R2
871	005146	042702	177740			BIC #177740,R2
872	005152			LET R2 := R2 - #1		
873	005152	005302				DEC R2
874	005154			IF R2 EQ #0 THEN ;IF CMD IS A READ.		
875	005154	005702				TST R2
876	005156	001016				BNE 50000\$
877	005160	004737	006042	JSR PC,RECTAP ;THEN RETRIEVE		
878	005164			LET RECD := R3 ;AND		
879	005164	010337	006006			MOV R3,RECD
880	005170			PRINTB #STAER6,RECD ;TYPE RECORD READ		
881	005170	013746	006006			MOV RECD,-(SP)
882	005174	012746	005522			MOV #STAER6,-(SP)
883	005200	012746	000002			MOV #2,-(SP)
884	005204	010600				MOV SP,RO
885	005206	104414				TRAP C\$PNTB
886	005210	062706	000006			ADD #6,SP
887	005214			ENDIF		
888	005214					50000\$:
889	005214			PRINTX #STAER2		
890	005214	012746	005556			MOV #STAER2,-(SP)
891	005220	012746	000001			MOV #1,-(SP)
892	005224	010600				MOV SP,RO
893	005226	104415				TRAP C\$PNTX
894	005230	062706	000004			ADD #4,SP
895	005234			PRINTX #STAER3,CNDPKT,@TSDB(R5),MSGPKT+MS.RFC,TSSREG,CTCC		
896	005234	013746	003106			MOV CTCC,-(SP)
897	005240	013746	003112			MOV TSSREG,-(SP)
898	005244	013746	002340			MOV MSGPKT+MS.RFC,-(
899	005250	017546	002452			MOV @TSDB(R5),-(SP)
900	005254	013746	002310			MOV CNDPKT,-(SP)
901	005260	012746	005635			MOV #STAER3,-(SP)
902	005264	012746	000006			MOV #6,-(SP)
903	005270	010600				MOV SP,RO
904	005272	104415				TRAP C\$PNTX
905	005274	062706	000016			ADD #16,SP
906	005300			PRINTX #STAER4,CNDPKT+2,CNDPKT+4,CNDPKT+6		

907	005300	013746	002316					MOV	CMDPKT+6,-(SP)
908	005304	013746	002314					MOV	CMDPKT+4,-(SP)
909	005310	013746	002312					MOV	CMDPKT+2,-(SP)
910	005314	012746	005673					MOV	#STAER4,-(SP)
911	005320	012746	000004					MOV	#4,-(SP)
912	005324	010600						MOV	SP,RO
913	005326	104415						TRAP	C\$PNTX
914	005330	062706	000012					ADD	#12,SP
915	005334				PRINTX	#STAER5,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3		MOV	MSGPKT+MS.XS3,-(
916	005334	013746	002350					MOV	MSGPKT+MS.XS2,-(
917	005340	013746	002346					MOV	MSGPKT+MS.XS1,-(
918	005344	013746	002344					MOV	MSGPKT+MS.XS0,-(
919	005350	013746	002342					MOV	#STAER5,-(SP)
920	005354	012746	005713					MOV	#5,-(SP)
921	005360	012746	000005					MOV	SP,RO
922	005364	010600						TRAP	C\$PNTX
923	005366	104415						ADD	#14,SP
924	005370	062706	000014						
925	005374				EXIT	MSG			
926	005374	000167						.WORD	J\$JMP
927	005376	000410						.WORD	L10003-2-
928									
929									
	005400	040445	054130	020130	STAER1:	.NLIST BEX .ASCIZ /%AXXX CMD FAILED - UNIT %D1%S3%APASS:%D5%S3%ARECORD:%D5%N/ .EVEN			
	005472	040445	051120	053105	STAER7:	.ASCIZ /%APREVIOUS CMD WAS XXX/			
	005522	051445	030461	040445	STAER6:	.ASCIZ /%S11%A* RECORD READ:%D5%A */			
	005556	047045	040445	046503	STAER2:	.ASCIZ /%N%ACMDPKT%S2%ATSBA%S4%ARFC%S5%ATSSR%S3%ATCC%N/			
	005635	045	033117	051445	STAER3:	.ASCIZ /%06%S2%06%S2%06%S2%06%S2%D1%N/			
	005673	045	033117	047045	STAER4:	.ASCIZ /%06%N/			
	005700	047445	022466	116		.ASCIZ /%06%N/			
	005705	045	033117	047045		.ASCIZ /%06%N/			
	005713	045	054101	052123	STAER5:	.ASCIZ /%AXST0%S4%AXST1%S4%AXST2%S4%AXST3%N/			
	005756	047445	022466	031123		.ASCIZ /%06%S2%06%S2%06%S2%06%N/			
						.LIST BEX			
						.EVEN			
930									
931	006006	000000			RECRED:	.WORD 0 ;RECORD READ FROM TAPE			
932									
933	006010					ENDMSG			
934	006010				L10003:				
935	006010	104423						TRAP	C\$MSG

```
936          .SBTTL GLOBAL SUBROUTINES SECTION
937
938          ;++
939          ; THE GLOLAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
940          ; THAT ARE USED IN MORE THAN ONE TEST.
941          ;--
942
943          ;     MODULES TO HANDLE TS04 INTERRUPTS.
944
945          BGNSRV TS4IN0          ;DEVICE 0.
946          TS4IN0::
947          LET INTFLG := INTFLG + #1          ;SET INTERRUPT OCCURRED FLAG.
948          005237 003124          INC          INTFLG
949          ENDSRV
950          L10004:
951          006016 000002          RTI
952
953          BGNSRV TS4IN1          ;DEVICE 1.
954          TS4IN1::
955          LET INTFLG+2 := INTFLG+2 + #1      ;SET INTERRUPT OCCURRED FLAG.
956          005237 003126          INC          INTFLG+2
957          ENDSRV
958          L10005:
959          006024 000002          RTI
960
961          BGNSRV TS4IN2          ;DEVICE 2.
962          TS4IN2::
963          LET INTFLG+4 := INTFLG+4 + #1      ;SET INTERRUPT OCCURRED FLAG.
964          005237 003130          INC          INTFLG+4
965          ENDSRV
966          L10006:
967          006032 000002          RTI
968
969          BGNSRV TS4IN3          ;DEVICE 3.
970          TS4IN3::
971          LET INTFLG+6 := INTFLG+6 + #1      ;SET INTERRUPT OCCURRED FLAG.
972          005237 003132          INC          INTFLG+6
973          ENDSRV
974          L10007:
975          006040 000002          RTI
```

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976          :          SUBROUTINE TO RETRIEVE RECORD COUNT READ FROM TAPE FOR ERROR
977          :          PRINTS.
978          :          INPUTS:
979          :          OUTPUTS: R3 = RECORD COUNT READ
980          :          REGISTERS: R2, R3, R4
981          :          CALLS:
982
983 006042    RECTAP::IF #MOD.CO SETIN CMDWRD THEN          ;READ REV FETCH
984 006042    032737 000400 003056                          BIT          #MOD.CO,CMDWRD
985 006050    001430                                      BEQ          50001$
986 006052    LET R2 := MSGPKT+MS.RFC + DATARD ;FIND LAST READ AD.
987 006052    013702 002340                                  MOV          MSGPKT+MS.RFC,R2
988 006056    063702 003046                                  ADD          DATARD,R2
989 006062    IF #BIT00 SETIN R2 THEN                      ;ODD AD., REASSEMBLE
990 006062    032702 000001                                  BIT          #BIT00,R2
991 006066    001417                                      BEQ          50002$
992 006070    LET R2 := R2 + #1                            ;REC COUNT STARTING
993 006070    005202                                      INC          R2
994 006072    LET R3 :B= (R2) CLR.BY #177400 ;WITH UPPER BYTE FETCH
995 006072    111203                                      MOVB         (R2),R3
996 006074    142703 177400                                  BICB         #177400,R3
997 006100    LET R3 := SWAP R3                            ;
998 006100    000303                                      SWAB         R3
999 006102    LET R2 := R2 - #1                            ;LOWER BYTE AD.
1000 006102    005302                                      DEC          R2
1001 006104    IFB SWBFLG NE #0 THEN
1002 006104    105737 003150                                  TSTB         SWBFLG
1003 006110    001401                                      BEQ          50003$
1004 006112    LET R2 := R2 - #1                            ;LOWER BYTE AD. ON SWAP
1005 006112    005302                                      DEC          R2
1006 006114    ENDIF
1007 006114    50003$:
1008 006114    LET R4 :B= (R2) CLR.BY #177400 ;FETCH LOWER BYTE
1009 006114    111204                                      MOVB         (R2),R4
1010 006116    142704 177400                                  BICB         #177400,R4
1011 006122    LET R3 := R3 OR R4                          ;MERGE BYTES
1012 006122    050403                                      BIS          R4,R3
1013 006124    ELSE
1014 006124    000401                                      BR           50004$
1015 006126    50002$:
1016 006126    LET R3 := (R2)                              ;EVEN AD. FETCH
1017 006126    011203                                      MOV          (R2),R3
1018 006130    ENDIF
1019 006130    50004$:
1020 006130    ELSE
1021 006130    000402                                      BR           50005$
1022 006132    50001$:
1023 006132    LET R3 := @DATARD                            ;READ FWD FETCH
1024 006132    017703 174710                                  MOV          @DATARD,R3
1025 006136    ENDIF
1026 006136    50005$:
1027
1028 006136    000207    RTS          PC

```

```

1029      :      SUBROUTINE TO STORE A SET CHARACTERISTIC COMMAND AS
1030      :      THE FIRST ENTRY IN THE SEQUENCE TABLE.
1031      :      INPUTS:
1032      :      OUTPUTS:
1033      :      REGISTERS:
1034      :      CALLS:
1035
1036 006140      SETCH:: LET R1 := #CMDSEQ      ;INIT COMMAND SEQUENCE TABLE POINTER.
1037 006140 012701 003164      MOV      #SCH,(R1)+      ;THIS CODE SETS UP A SET CHARACTERISTIC
1038 006144 012721 140004      MOV      #DFTSCH,(R1)+      ;COMMAND AS THE FIRST COMMAND IN THE
1039 006150 012721 000040      MOV      #1,(R1)+      ;SEQUENCE TABLE.
1040 006154 012721 000001      TST      (R1)+      ;SKIP PATTERN LOCATION.
1041 006160 005721
1042 006162 000207      RTS PC
1043
1044
1045
1046
1047      :      SUBROUTINE TO STORE A REWIND COMMAND IN THE SEQUENCE TABLE
1048      :      INPUTS:
1049      :      OUTPUTS:
1050      :      REGISTERS:
1051      :      CALLS:
1052
1053 006164      SETRW:: LET (R1)+ := #RWD      ;CMD = REWIND.
1054 006164 012721 102010      LET (R1)+ := #1      ;BRF.
1055 006170
1056 006170 012721 000001      LET (R1)+ := #1      ;# OF OPERATIONS.
1057 006174
1058 006174 012721 000001      TST (R1)+      ;SKIP PATTERN.
1059 006200 005721      RTS      PC      ;RETURN
1060 006202 000207

```

GLOBAL AREAS
CZTSHB.P11MACY11 30(1046)
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GLOBAL SUBROUTINES SECTION

SEQ 0068

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1061      :      SUBROUTINE TO EXECUTE ALL COMMANDS IN THE SEQUENCE TABLE ON ALL
1062      :      DEVICES.
1063      :      INPUTS:
1064      :      OUTPUTS:      R2 = TERMINATION INDICATOR (0=END OF TABLE,1=EOT)
1065      :      REGISTERS:
1066      :      CALLS:      CMDAC,SETUP,EXSUB,CKHAE,NEXTU,FIRSTU,VFYDAT.
1067
1068      006204      EXALL:: LET R1 := #CMDSEQ      ;INIT SEQUENCE TABLE POINTER.
1069      006204      012701      003164      MOV      #CMDSEQ,R1
1070      006210      WHILE (R1) NE #END DO      ;WHILE THERE ARE CMDS IN THE SEQUENCE TABLE.
1071      006210      50006$:
1072      006210      021127      177777      CMP      (R1),#END
1073      006214      001527      BEQ      50007$
1074      006216      004737      007114      JSR PC,SETUP      ;GO SETUP THE COMMAND BLOCK.
1075      006222      WHILE NCNT LT NCNT1 DO      ;WHILE THERE ARE RECORDS REMAINING:
1076      006222      50010$:
1077      006222      023737      003050      003052      CMP      NCNT,NCNT1
1078      006230      002116      BGE      50011$
1079      006232      004737      007006      JSR PC,CMDAC      ;STORE CMD ASCII IN ERROR MESSAGE.
1080      006236      IFB RANDOM NE #0 THEN      ;IF IN RANDOM MODE:
1081      006236      105737      003145      TSTB     RANDOM
1082      006242      001435      BEQ      50012$
1083      006244      IF CMDWRD EQ #WRT THEN      ;IF CMD IS A WRITE THEN:
1084      006244      023727      003056      104005      CMP      CMDWRD,#WRT
1085      006252      001031      BNE      50013$
1086      006254      IFB VFYFLG EQ #0 THEN      ;IF DATA IS NOT TO BE VERIFIED THEN:
1087      006254      105737      003146      TSTB     VFYFLG
1088      006260      001026      BNE      50014$
1089      006262      LET RANB := RANB + RANS      ;GENERATE
1090      006262      063737      003072      003070      ADD      RANS,RANB
1091      006270      LET RANS := RANS + RANB      ;RANDOM
1092      006270      063737      003070      003072      ADD      RANB,RANS
1093      006276      LET BRFCNT := RANS      ;LENGTH
1094      006276      013737      003072      003054      MOV      RANS,BRFCNT
1095      006304      LET BRFCNT := BRFCNT CLR.BY LENMSK ;MASK RANDOM LENGTH.
1096      006304      043737      003066      003054      BIC      LENMSK,BRFCNT
1097      006312      IF BRFCNT LT #18. THEN      ;DO NOT ALLOW BYTE COUNT OF LESS THAN 18
1098      006312      023727      003054      000022      CMP      BRFCNT,#18.
1099      006320      002003      BGE      50015$
1100      LET BRFCNT := #18. ;CHANGE COUNT OF 0-17 TO 18.
1101      006322      012737      000022      003054      MOV      #18.,BRFCNT
1102      006330      ENDIF
1103      006330      50015$:
1104      006330      LET CMDPKT+CP.CNT := BRFCNT ;MOVE BRFCNT TO CMD PACKET.
1105      006330      013737      003054      002316      MOV      BRFCNT,CMDPKT+CP
1106      006336      ENDIF
1107      006336      50014$:
1108      006336      ENDIF
1109      006336      50013$:
1110      006336      ENDIF
1111      006336      50012$:
1112      006336      004737      006500      JSR PC,EXSUB      ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATUS.
1113      006342      004737      014052      JSR PC,CKHAE      ;CHECK HALT AFTER EACH CMD FLAG.
1114      006346      LET R2 := #1      ;SET ALL UNITS AT BOT/EOT.
1115      006346      012702      000001      MOV      #1,R2
1116      006352      004737      013462      JSR PC,FIRSTU      ;FIND FIRST UNIT.

```

GLOBAL AREAS
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GLOBAL SUBROUTINES SECTION

SEQ 0069

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1117 006356          WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE UNITS:
1118 006356          50016$:
1119 006356 026527 002532 177777          CMP      DEVTBL(R5),#END
1120 006364 001426          BEQ      50017$
1121 006366          IF #MOD.CO SETIN CMDWRD THEN ;IF CMD IS REVERSE THEN:
1122 006366 032737 000400 003056          BIT      #MOD.CO,CMDWRD
1123 006374 001406          BEQ      50020$
1124 006376          IF #XO.BOT NOTSETIN EOTFLG(R5) THEN ;IF NOT AT BOT THEN:
1125 006376 032765 000002 003134          BIT      #XO.BOT,EOTFLG(R
1126 006404 001001          BNE      50021$
1127 006406          LET R? := #0          ;CLEAR EOT/BOT FLAG.
1128 006406 005002          CLR      R2
1129 006410          ENDIF
1130 006410          ELSE
1131 006410          ;ELSE IF CMD IS NOT REVERSE:
1132 006410 000411          BR      50022$
1133 006412          50020$:
1134 006412          IF #XO.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
1135 006412 032765 000001 003134          BIT      #XO.EOT,EOTFLG(R
1136 006420 001404          BEQ      50023$
1137 006422 032737 000001 003056          BIT      #CMD.CO,CMDWRD
1138 006430 001001          BNE      50024$
1139 006432          50023$:
1140          ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
1141 006432          LET R2 := #0          ;CLEAR EOT/BOT FLAG.
1142 006432 005002          CLR      R2
1143 006434          ENDIF
1144 006434          ENDIF
1145 006434          50024$:
1146 006434          50022$:
1147 006434 004737 013530          JSR PC,NEXTU          ;FIND NEXT UNIT
1148 006440          ENDDO          ;
1149 006440 000746          BR      50016$
1150 006442          50017$:
1151 006442          IF R2 EQ #1 THEN          ;IF ALL UNIT ARE AT EOT/BOT THEN:
1152 006442 020227 000001          CMP      R2,#1
1153 006446 001001          BNE      50025$
1154 006450 000412          BR      EXARTN          ;RETURN WITH R2 = #1.
1155 006452          ENDIF
1156 006452          50025$:
1157 006452          LET NCNT := NCNT + #1          ;UPDATE RECORD COUNT.
1158 006452 005237 003050          INC      NCNT
1159 006456          LET PCMDWD := CMDWRD          ;SAVE PREVIOUS COMMAND WORD.
1160 006456 013737 003056 003062          MOV      CMDWRD,PCMDWD
1161 006464          ENDDO
1162 006464 000656          BR      50010$
1163 006466          50011$:
1164 006466 004737 012450          JSR PC,VFYDAT          ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
1165          ;VERIFY THE LAST N RECORDS OF DATA.
1166 006472          ENDDO
1167 006472 000646          BR      50006$
1168 006474          50007$:
1169 006474          LET R2 := #0          ;SET NORMAL RETURN INDICATOR.
1170 006474 005002          CLR      R2
1171 006476 000207          EXARTN: RTS PC          ;RETURN.
1172

```

```

1173
1174
1175      :      SUBROUTINE TO ISSUE COMMAND TO ALL DEVICES, WAIT FOR
1176      :      ALL INTERRUPTS, AND CHECK ALL STATUS.
1177      :      INPUTS:
1178      :      OUTPUTS:
1179      :      REGISTERS:
1180      :      CALLS:          EXECUTE,GOWAIT,NEXTU,FIRSTU.
1181
1182 006500 004737 013462      EXSUB::      JSR PC,FIRSTU          ;SET UP FOR FIRST UNIT.
1183 006504                                WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE DEVICES:
1184 006504                                50026$:
1185 006504 026527 002532 177777                                CMP      DEVTBL(R5),#END
1186 006512 001450                                BEQ      50027$
1187 006514                                IF #MOD.CO SETIN CMDWRD THEN ;IF CMD IS REVERSE THEN:
1188 006514 032737 000400 003056                                BIT      #MOD.CO,CMDWRD
1189 006522 001421                                BEQ      50030$
1190 006524                                IF #XO.BOT NOTSETIN EOTFLG(R5) THEN ;IF NOT AT BOT
1191 006524 032765 000002 003134                                BIT      #XO.BOT,EOTFLG(R
1192 006532 001014                                BNE      50031$
1193 006534                                IF #XO.EOT SETIN EOTFLG(R5) THEN ;BUT IF AT EOT
1194 006534 032765 000001 003134                                BIT      #XO.EOT,EOTFLG(R
1195 006542 001406                                BEQ      50032$
1196 006544                                IFB ALLEOT NE #0 THEN          ;AND ALL OTHERS AT EOT
1197 006544 105737 003154                                TSTB     ALLEOT
1198 006550 001402                                BEQ      50033$
1199 006552 004737 007770                                JSR PC,EXECUTE                ;THEN EXECUTE REV CMD
1200 006556                                ENDIF                          ;IF NOT ALL AT EOT, FREEZE UNIT(S) AT EO
1201 006556                                50033$:
1202 006556                                ELSE                            ;IF NOT AT BOT AND
1203 006556 000402                                BR        50034$
1204 006560                                50032$:
1205 006560 004737 007770                                JSR PC,EXECUTE                ;NOT AT EOT, EXEC REV CMD
1206 006564                                ENDIF
1207 006564                                50034$:
1208 006564                                ENDIF
1209 006564                                50031$:
1210 006564                                ELSE                            ;ELSE IF CMD IS NOT REVERSE:
1211 006564 000420                                BR        50035$
1212 006566                                50030$:
1213 006566                                IF #XO.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
1214 006566 032765 000001 003134                                BIT      #XO.EOT,EOTFLG(R
1215 006574 001404                                BEQ      50036$
1216 006576 032737 000001 003056                                BIT      #CMD.CO,CMDWRD
1217 006604 001003                                BNE      50037$
1218 006606                                50036$:
1219                                ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
1220 006606 004737 007770                                JSR PC,EXECUTE                ;ISSUE CMD TO TS04
1221 006612                                ELSE
1222 006612 000405                                BR        50040$
1223 006614                                50037$:
1224 006614                                IFB ALLEOT NE #0 THEN
1225 006614 105737 003154                                TSTB     ALLEOT
1226 006620 001402                                BEQ      50041$
1227 006622 004737 007770                                JSR PC,EXECUTE
1228 006626                                ENDIF

```


1229	006626						50041\$:
1230	006626			ENDIF			
1231	006626						50040\$:
1232	006626			ENDIF			
1233	006626						50035\$:
1234	006626	004737	013530	JSR PC,NEXTU		;FIND NEXT UNIT IN TEST CYCLE.	
1235	006632			ENDDC			
1236	006632	000724					BR 50026\$
1237	006634						50027\$:
1238	006634			IFB RPTFLG NE #0 THEN		;IF REPORT HAS BEEN REQUESTED THEN:	
1239	006634	105737	003147				TSTB RPTFLG
1240	006640	001403					BEQ 50042\$
1241	006642			LET RPTFLG :B= #0		;CLR THE FLAG,	
1242	006642	105037	003147				CLRB RPTFLG
1243	006646			DORPT		;PRINT THE PERFORMANCE REPORT.	
1244	006646	104424					TRAP C\$DRPT
1245	006650			ENDIF			
1246	006650						50042\$:
1247	006650	004737	013462	JSR PC,FIRSTU		;SET UP FOR FIRST UNIT.	
1248	006654			WHILE DEVTBL(R5) NE #END DO		;WHILE THERE ARE MORE DEVICES:	
1249	006654						50043\$:
1250	006654	026527	002532				CMP DEVTBL(R5),#END
1251	006662	001450					BEQ 50044\$
1252	006664			IF #MOD.CO SETIN CMDWRD THEN		;IF CMD IS REVERSE THEN:	
1253	006664	032737	000400				BIT #MOD.CO,CMDWRD
1254	006672	001421					BEQ 50045\$
1255	006674			IF #XO.BOT NOTSETIN EOTFLG(R5) THEN		;IF NOT AT BOT	
1256	006674	032765	000002				BIT #XO.BOT,EOTFLG(R
1257	006702	001014					BNE 50046\$
1258	006704			IF #XO.EOT SETIN EOTFLG(R5) THEN		;BUT IF AT EOT	
1259	006704	032765	000001				BIT #XO.EOT,EOTFLG(R
1260	006712	001406					BEQ 50047\$
1261	006714			IFB ALLEOT NE #0 THEN		;AND ALL OTHERS AT EOT	
1262	006714	105737	003154				TSTB ALLEOT
1263	006720	001402					BEQ 50050\$
1264	006722	004737	010300	JSR PC,GOWAIT		;THEN WAIT FOR CMD END	
1265	006726			ENDIF		;IF NOT ALL AT EOT, DO NOT WAIT	
1266	006726						50050\$:
1267	006726			ELSE		;NOT AT BOT, AND NOT AT EOT	
1268	006726	000402					BR 50051\$
1269	006730						50047\$:
1270	006730	004737	010300	JSR PC,GOWAIT		;WAIT FOR INT,CHECK STAT	
1271	006734			ENDIF			
1272	006734						50051\$:
1273	006734			ENDIF			
1274	006734						50046\$:
1275	006734			ELSE		;ELSE IF CMD IS FORWARD:	
1276	006734	000420					BR 50052\$
1277	006736						50045\$:
1278	006736			IF #XO.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN			
1279	006736	032765	000001				BIT #XO.EOT,EOTFLG(R
1280	006744	001404					BEQ 50053\$
1281	006746	032737	000001				BIT #CMD.CO,CMDWRD
1282	006754	001003					BNE 50054\$
1283	006756						50053\$:
1284							;IF NOT AT EOT OR NOT A MOTION CMD THEN:

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1285 006756 004737 010300      JSR PC,GOWAIT      ;WAIT FOR INT,CHECK STATUS.
1286 006762                      ELSE
1287 006762 000405                      50054$: BR      50055$
1288 006764                      IFB ALLEOT NE #0 THEN
1289 006764                      TSTB      ALLEOT
1290 006764 105737 003154                      BEQ      50056$
1291 006770 001402                      JSR PC,GOWAIT
1292 006772 004737 010300                      ENDIF
1293 006776                      50056$:
1294 006776                      ENDIF
1295 006776                      50055$:
1296 006776                      50052$:
1297 006776                      ENDIF
1298 006776                      JSR      PC,NEXTU      ;FIND NEXT UNIT IN TEST CYCLE.
1299 006776 004737 013530                      ENDDO
1300 007002                      50044$: BR      50043$
1301 007002 000724                      RTS PC
1302 007004                      ;RETURN.
1303 007004 000207
```

```

1304 : THIS SUBROUTINE STORES THE ASCII FOR THE CURRENT COMMAND AND PREVIOUS
1305 : COMMAND IN THE STANDARD ERROR MESSAGE. ON ENTRY LOCATION CMDWRD
1306 : CONTAINS CURRENT CMD AND LOCATION PCMDWD CONTAINS PREVIOUS CMD.
1307 : INPUTS:
1308 : OUTPUTS:
1309 : REGISTERS: R3, R4.
1310 : CALLS: GCMDA
1311
1312 007006 CMDAC:: LET R4 := CMDWRD ;R4 = CMD BINARY.
1313 007006 013704 003056 ; MOV CMDWRD,R4
1314 007012 004737 007060 JSR PC,GCMDA ;GET CMD ASCII.
1315 007016 112337 005402 MOVB (R3)+,STAER1+2 ;MOVE CMD ASCII
1316 007022 112337 005403 MOVB (R3)+,STAER1+3 ;
1317 007026 111337 005404 MOVB (R3),STAER1+4 ;INTO MSG.
1318 007032 LET R4 := PCMDWD ;R4 = PREVIOUS CMD BINARY.
1319 007032 013704 003062 ; MOV PCMDWD,R4
1320 007036 004737 007060 JSR PC,GCMDA ;GET CMD ASCII.
1321 007042 LET STAER7+24 :B= (R3)+ ;MOVE CMD ASCII
1322 007042 112337 005516 LET STAER7+25 :B= (R3)+ ; MOVB (R3)+,STAER7+24
1323 007046 LET STAER7+26 :B= (R3) ; MOVB (R3)+,STAER7+25
1324 007046 112337 005517 LET STAER7+26 :B= (R3) ;INTO MSG.
1325 007052 MOVB (R3),STAER7+26
1326 007052 111337 005520 RTS PC ;RETURN. GO EXECUTE NEXT FUNCTION.
1327 007056 000207
1328
1329
1330
1331 : SUBROUTINE TO FIND THE ASCII EQUIVILENT OF THE COMMAND IN R4.
1332 : ADDRESS OF ASCII 1ST WORD IS RETURNED IN R3.
1333 : INPUTS: R4 = PRESENT COMMAND WORD.
1334 : OUTPUTS: R3 = ADDRESS OF PRESENT COMMAND ASCII.
1335 : REGISTERS:
1336 : CALLS:
1337
1338 007060 GCMDA:: LET R3 := #0 ;INIT CMD TBL POINTER.
1339 007060 005003 ; CLR R3
1340 007062 WHILE CMTBL(R3) NE R4 DC ;UNTIL CURRENT CMD IS FOUND:
1341 007062 ; 50057$:
1342 007062 026304 003266 ; CMP CMTBL(R3),R4
1343 007066 001403 ; BEQ 50060$
1344 007070 LET R3 := R3 + #2 ;SEARCH CMD TABLE.
1345 007070 062703 000002 ; ADD #2,R3
1346 007074 ENDDO ; BR 50057$
1347 007074 000772 ; 50060$:
1348 007076 LET R4 := R3 ; MOV R3,R4
1349 007076 LET R3 := R3 SHIFT -1 ;POINT TO ASCII FOR THAT COMMAND
1350 007076 010304 ; ASR R3
1351 007100 NOP
1352 007100 006203 ADD R4,R3
1353 007102 000240 ADD #CMDASC,R3
1354 007104 060403 ;RTS PC
1355 007106 062703 003354
1356 007112 000207

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1357      :      THIS SUBROUTINE LOADS THE TS04 COMMAND PACKET FROM ONE
1358      :      ENTRY IN THE SEQUENCE TABLE.
1359      :      INPUTS:
1360      :      OUTPUTS:
1361      :      REGISTERS:      R2, R3.
1362      :      CALLS:      GENPAT.
1363
1364      7114      SETUP:: LET CMDLG := #0      ;CLR CMD LOGGING CODE(DISABLES LOGGING)
1365      7114      005037 003064      ;          CLR      CMDLG
1366      00120      012137 002310      MOV      (R1)+,CMDPKT      ;LOAD THE COMMAND WORD.
1367      007124      011137 002316      MOV      (R1),CMDPKT+CP.CNT ;LOAD THE BYTE/RECORD/FILE COUNT.
1368      007130      011137 003054      MOV      (R1),BRFCNT      ;SAVE BRFCNT FOR THIS COMMAND.
1369      007134      013702 002310      MOV      CMDPKT,R2      ;GET CMD.
1370      007140      042702 177740      BIC      #NCMD.C,R2      ;CLR ALL BUT CMD BITS.
1371      007144      010203      MOV      R2,R3      ;SAVE IT TWICE.
1372      007146      162703 000010      SUB      #CMD.C3,R3      ;POSITION COMMAND?
1373      007152      001003      BNE      2$      ;BR IF NOT.
1374      007154      011137 002312      MOV      (R1),CMDPKT+2      ;MOVE BPCR IN 2ND PKT WORD FOR POSITION CMD.
1375      007160      000461      BR      3$
1376      007162      2$:      IF CMDPKT EQ #WTM THEN      ;IF CMD IS A WRITE TAPE MARK THEN:
1377      007162      023727 002310 100011      ;          CMP      CMDPKT,#WTM
1378      007170      001003      ;          BNE      50061$
1379      007172      ;          LET CMDLG := #2      ;WTM LOGGING CODE IS 2.
1380      007172      012737 000002 003064      ;          MOV      #2,CMDLG
1381      007200      ;          ENDIF
1382      007200      ;          50061$:
1383      007200      010203      MOV      R2,R3
1384      007202      162703 000001      SUB      #CMD.CO,R3      ;IS IT A READ?
1385      007206      001017      BNE      1$      ;BR IF NOT.
1386      007210      013737 003046 002312      MOV      DATARD,CMDPKT+CP.ADL ;IF SO, LOAD THE BUFFER ADDR.
1387      007216      IF #MOD.CO SET IN CMDPKT THEN ;IF CMD IS A READ REV THEN:
1388      007216      032737 000400 002310      ;          BIT      #MOD.CO,CMDPKT
1389      007224      001404      ;          BEQ      50062$
1390      007226      ;          LET CMDLG := #4      ;LOGGING CODE IS 4.
1391      007226      012737 000004 003064      ;          MOV      #4,CMDLG
1392      007234      ELSE      ;ELSE - IF CMD IS A READ FWD:
1393      007234      000403      ;          BR      50063$
1394      007236      ;          50062$:
1395      007236      ;          LET CMDLG := #6      ;LOGGING CODE IS 6.
1396      007236      012737 000006 003064      ;          MOV      #6,CMDLG
1397      007244      ;          ENDIF
1398      007244      ;          50063$:
1399      007244      000427      BR      3$      ;CONTINUE.
1400      007246      010203      1$:      MOV      R2,R3      ;IS IT
1401      007250      162703 000004      SUB      #CMD.C2,R3      ;A SET CHARACTERISTICS CMD?
1402      007254      001011      BNE      4$      ;BR IF NOT.
1403      007256      LET CMDPKT+CP.ADL := #SCHBK ;SET UP ADR LO FOR SET CHAR.
1404      007256      012737 002442 002312      ;          MOV      #SCHBK,CMDPKT+CP
1405      007264      012737 000010 002316      MOV      #SCHCNT,CMDPKT+CP.CNT ;SET BUFFER EXTENT
1406      007272      LET SCHBK+6 := (R1) ;STORE CHARACTERISTIC CODE IN SCH BLOCK.
1407      007272      011137 002450      ;          MOV      (R1),SCHBK+6
1408      007276      000412      BR      3$      ;CONTINUE.
1409      007300      010203      4$:      MOV      R2,R3      ;IS IT
1410      007302      162703 000006      SUB      #CMD.C1!CMD.C2,R3 ;A DIAGNOSTIC (DIA) CMD?
1411      007306      001006      BNE      3$      ;BR IF NOT.
1412      007310      012737 000020 002316      MOV      #DIACNT,CMDPKT+CP.CNT ;LOAD BUFFER EXTENT.

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1413	007316	012737	003044	002312		MOV	#DIABLK,CMDPKT+CP.ADL	;LOAD BUFFER ADR LOW.
1414	007324	005721			3\$:	TST	(R1)+	;POINT TO N (NUMBER OF TIMES TO EXECUTE THIS INS
1415	007326					LET	NCNT1 := (R1)+	;SAVE NUMBER OF OPERATIONS
1416	007326	012137	003052					MOV (R1)+,NCNT1
1417	007332					LET	NCNT := #0	;CLEAR OPERATION COUNTER.
1418	007332	005037	003050					CLR NCNT
1419	007336	012137	003104			MOV	(R1)+,PATERN	;SAVE PATTERN CODE FOR CURRENT CMD.
1420	007342	010203				MOV	R2,R3	;IS IT
1421	007344	162703	000005			SUB	#CMD.CO!CMD.C2,R3	;A WRITE?
1422	007350	001010				BNE	5\$;BR IF NOT.
1423	007352	013737	003044	002312		MOV	DATAWT,CMDPKT+CP.ADL	;LOAD WRITE BUFFER LO ORDER.
1424	007360	004737	007472			JSR	PC,GENPAT	;GO GENERATE THE WRITE PATTERN.
1425	007364					LET	CMDLG := #2	;WRITE LOGGING CODE IS 2.
1426	007364	012737	000002	003064				MOV #2,CMDLG
1427	007372				5\$:	IF	#VFY.C SETIN CMDPKT THEN	;IF DATA VERIFICATION IS REQUIRED:
1428	007372	032737	000100	002310				BIT #VFY.C,CMDPKT
1429	007400	001407						BEQ 50064\$
1430	007402					LET	VFYFLG :B= #1	;SET VERIFY FLAG.
1431	007402	112737	000001	003146				MOVB #1,VFYFLG
1432	007410	042737	000100	002310		BIC	#VFY.C,CMDPKT	;CLEAR VERIFY BIT(NOT USED BY HARDWARE).
1433	007416					ELSE		;IF DATA VERIFICATION IS NOT REQUIRED:
1434	007416	000402						BR 50065\$
1435	007420							50064\$:
1436	007420					LET	VFYFLG :B= #0	;CLR VERIFY FLAG.
1437	007420	105037	003146					CLRB VFYFLG
1438	007424					ENDIF		
1439	007424							50065\$:
1440	007424					LET	PCMDWD := CMDWRD	;SAVE PREVIOUS CMD WORD.
1441	007424	013737	003056	003062				MOV CMDWRD,PCMDWD
1442	007432					LET	CMDWRD := CMDPKT	;SAVE PRESENT CMD WORD.
1443	007432	013737	002310	003056				MOV CMDPKT,CMDWRD
1444	007440					IFB	SWBFLG NE #0 THEN	;IF SWAP BYTES IS ENABLED:
1445	007440	105737	003150					TSTB SWBFLG
1446	007444	001403						BEQ 50066\$
1447	007446					LET	CMDPKT := CMDPKT SET.BY #SWB.C	;SET SWAP BIT IN COMMAND.
1448	007446	052737	010000	002310				BIS #SWB.C,CMDPKT
1449	007454					ENDIF		
1450	007454							50066\$:
1451	007454	042737	004000	002310		BIC	#BRF.C,CMDPKT	;CLR BRF BIT (INTERNAL ONLY).
1452	007462					LET	CMDSAV := CMDPKT	;SAVE 1ST WORD OF COMMAND PACKET.
1453	007462	013737	002310	003060				MOV CMDPKT,CMDSAV
1454	007470	000207				RTS	PC	;RETURN.

```

1455 : THIS SUBROUTINE SETS UP AND CALLS THE APPROPRIATE SUBROUTINE TO GENERATE
1456 : THE DESIRED PATTERN FOR THE WRITE AND WRITE/VERIFY COMMANDS.
1457 : INPUTS:
1458 : OUTPUTS:
1459 : REGISTERS: R2, R3, R4.
1460 : CALLS: PATRO - PATR7
1461
1462 007472 GENPAT:: LET R3 := PATERN SHIFT 1 ;SETUP PATTERN ROUTINE POINTER
1463 007472 013703 003104 ; MOV PATERN,R3
1464 007476 006303 ; ASL R3
1465 007500 LET R4 := BRFCNT + #1 ;SET LENGTH OF WRITE BFR
1466 007500 013704 003054 ; MOV BRFCNT,R4
1467 007504 005204 ; INC R4
1468 007506 LET R4 := R4 CLR.BY #1 ;ROUNDED UP TO NEXT WORD
1469 007506 042704 000001 ; BIC #1,R4
1470 007512 LET R4 := R4 - #2 ;WITH FIRST WORD RESERVED
1471 007512 162704 000002 ; SUB #2,R4
1472 007516 LET R2 := DATAWT + #2 ;FOR RECORD COUNT
1473 007516 013702 003044 ; MOV DATAWT,R2
1474 007522 062702 000002 ; ADD #2,R2
1475 007526 004773 007534 JSR PC,@PATTBL(R3) ;GO GENERATE THE APPROPRIATE PATTERN.
1476 007532 000207 RTS PC ;RETURN TO SETUP SUBROUTINE.
1477
1478 ;TS04 WRITE PATTERN LOOKUP TABLE. USED TO JSR TO THE
1479 ;CORRECT DATA PATTERN GENERATING ROUTINE.
1480
1481 007534 007556 PATTBL: PATRO
1482 007536 007614 PATR1
1483 007540 007634 PATR2
1484 007542 007644 PATR3
1485 007544 007670 PATR4
1486 007546 007702 PATR5
1487 007550 007714 PATR6
1488 007552 007734 PATR7
1489 007554 007766 PATR8
1490
1491
1492 ;INCREMENTING PATTERN. 0 - 377.
1493
1494 007556 PATRO:: LET R3 := #400
1495 007556 012703 000400 ; MOV #400,R3
1496 007562 1$: LET R4 := R4 - #2 ;DECREMENT WORD COUNT.
1497 007562 162704 000002 ; SUB #2,R4
1498 007566 100411 BMI 2$ ;BR IF DONE.
1499 007570 LET (R2)+ := R3 ;STORE DATA WORD.
1500 007570 010322 ; MOV R3,(R2)+
1501 007572 LET R3 := R3 + #1002 ;UPDATE PATTERN.
1502 007572 062703 001002 ; ADD #1002,R3
1503 007576 IF R3 EQ #1000 THEN ;IF PATTERN HAS WRAPPED AROUND THEN:
1504 007576 020327 001000 ; CMP R3,#1000
1505 007602 001002 ; BNE 50067$
1506 007604 LET R3 := #400 ;INIT THE PATTERN AGAIN.
1507 007604 012703 000400 ; MOV #400,R3
1508 007610 ENDIF
1509 007610 ; DO IT AGAIN. 50067$:
1510 007610 000764 BR 1$

```

```
1511 007612 000207      2$:   RTS    PC           ;RETURN.
1512
1513                    ;ALL ONE'S PATTERN.
1514
1515 007614 012703 177777  PATR1:: MOV    #-1,R3      ;ALL ONES PATTERN;.
1516 007620                    ZROPAT: LET R4 := R4 - #2      ;DECREMENT BYTE COUNT.
1517 007620 162704 000002                    ;DONE?,BR IF YES.          SUB    #2,R4
1518 007624 100402                    MOV    R3,(R2)+          ;IF NOT LOAD NEXT BYTE WITH PATTERN.
1519 007626 010322                    BR     ZROPAT           ;DO IT AGAIN.
1520 007630 000773
1521
1522 007632 000207      1$:   RTS    PC           ;RETURN.
```

```
1523                                     ;ALL ZEROES PATTERN.
1524
1525 007634 005003 PATR2:: CLR R3 ;CLR PATTERN REGISTER.
1526 007636 004737 007620 JSR PC,ZROPAT ;GO GENERATE IT.
1527 007642 000207 RTS PC ;RETURN.
1528
1529                                     ;ONE BIT WALKING FROM R TO L IN A FIELD OF ZEROES.
1530
1531 007644 012703 000401 PATR3:: MOV #401,R3 ;INIT PATTERN REGISTER.
1532 007650 WLKZRO: LET R4 := R4 - #2 ;DECREMENT WORD COUNT.
1533 007650 162704 000002 SUB #2,R4
1534 007654 100404 BMI 1$ ;BR IF DONE.
1535 007656 010322 MOV R3,(R2)+ ;LOAD DATA.
1536 007660 006303 ASL R3 ;SHIFT PATTERN.
1537 007662 005503 ADC R3 ;ADD CARRY BACK INTO PATTERN.
1538 007664 000771 BR WLKZRO ;DO IT AGAIN.
1539 007666 000207 1$: RTS PC ;RETURN.
1540
1541                                     ;ZERO BIT WALKING FROM R TO L IN A FIELD OF 1'S.
1542
1543 007670 012703 177376 PATR4:: MOV #177376,R3 ;INIT PATTERN REGISTER.
1544 007674 004737 007650 JSR PC,WLKZRO ;GO GENERATE ;IT.
1545 007700 000207 RTS PC ;RETURN.
1546
1547                                     ;ALTERNATING ONE AND ZERO BITS WITH ALTERNATE BYTES
1548                                     ;COMPLEMENTED.
1549
1550 007702 012703 125125 PATR5:: MOV #125125,R3 ;INIT PATTERN REGISTER.
1551 007706 004737 007620 JSR PC,ZROPAT ;GO GENERATE IT.
1552 007712 000207 RTS PC ;RETURN.
1553
1554                                     ;ALTERNATING BYTES OF 000 AND 377.
1555
1556 007714 012703 177400 PATR6:: MOV #177400,R3 ;INIT PATTERN REGISTER.
1557 007720 1$: LET R4 := R4 - #2 ;DECREMENT WORD COUNT.
1558 007720 162704 000002 SUB #2,R4
1559 007724 100402 BMI 2$ ;BR IF DONE.
1560 007726 010322 MOV R3,(R2)+ ;LOAD DATA.
1561 007730 000773 BR 1$ ;DO IT AGAIN.
1562 007732 000207 2$: RTS PC ;RETURN.
1563
1564                                     ;RANDOM PATTERN GENERATOR
1565
1566 007734 PATR7:: LET R4 := R4 - #2 ;DECREMENT WORD COUNT
1567 007734 162704 000002 SUB #2,R4
1568 007740 100411 BMI GIT ;BR IF DONE.
1569 007742 063737 003072 003070 ADD RANS,RANB ;GET NEW #.
1570 007750 063737 003070 003072 ADD RANB,RANS ;SAVE #.
1571 007756 013722 003072 MOV RANS,(R2)+ ;CONTINUE.
1572 007762 000764 BR PATR7 ;RETURN
1573 007764 000207 GIT: RTS PC
1574
1575 ; NO PATTERN GENERATION.
1576
1577 007766 000207 PATR8:: RTS PC ;RETURN.
```



```

1578 : THIS SUBROUTINE INITIATES TS04 COMMAND EXECUTION
1579 : AND CHECKS FOR TS04 RESPONSE.
1580 : INPUTS:
1581 : OUTPUTS:
1582 : REGISTERS: R2, R3.
1583 : CALLS: DROPU, MOVMSG, FIRSTU, NEXTU, WSSR.
1584 :
1585 007770 EXCUTE:: LET TIME1 := #-1 ;INIT TIMEOUT COUNTER.
1586 007770 012737 177777 003074 ;WAIT - MOV #-1,TIME1
1587 007776 REPEAT ;WAIT -
1588 007776 ;UPDATE TIMEOUT COUNTER. 50070$:
1589 007776 LET TIME1 := TIME1 - #1 ;UPDATE TIMEOUT COUNTER.
1590 007776 005337 003074 ;IF TIMED OUT: DEC TIME1
1591 010002 IF TIME1 EQ #0 THEN ;IF TIMED OUT:
1592 010002 005737 003074 ;TST TIME1
1593 010006 001011 ;BNE 50071$
1594 010010 004737 010554 JSR PC,MOVMSG ;MOVE CURRENT PACKET MSG.
1595 010014 ;ERRDF #2,NSSRM,STAERM ;REPORT TS04 NOT READY
1596 010014 104455 ;TRAP C$ERDF
1597 010016 000002 ;.WORD 2
1598 010020 003775 ;.WORD NSSRM
1599 010022 005066 ;.WORD STAERM
1600 010024 004737 013560 JSR PC,DROPU ;DROP THE UNIT.
1601 010030 000522 BR EXCRTN ;RETURN.
1602 010032 ENDIF
1603 010032 ;50071$:
1604 010032 UNTIL #TS.SSR SETIN @TSSR(R5) ;WAIT UNTIL DEVICE IS READY.
1605 010032 032775 000200 002462 ;BIT #TS.SSR,@TSSR(R5)
1606 010040 001756 ;BEQ 50070$
1607 010042 IF CMDWRD EQ #SCH THEN ;IF WE ARE DOING A SET CHAR CMD THEN:
1608 010042 023727 003056 140004 ;CMP CMDWRD,#SCH
1609 010050 001022 ;BNE 50072$
1610 010052 LET R5SAVE := R5 ;SAVE CURRENT DEVICE POINTER.
1611 010052 010537 003110 ;MOV R5,R5SAVE
1612 010056 004737 013462 JSR PC,FIRSTU ;FIND FIRST UNIT.
1613 010062 WHILE DEVTBL(R5) NE #END DO
1614 010062 ;50073$:
1615 010062 026527 002532 177777 ;CMP DEVTBL(R5),#END
1616 010070 001405 ;BEQ 50074$
1617 010072 004737 010520 ;JSR PC,WSSR ;WAIT FOR UNIT READY OR TIME OUT,
1618 010076 004737 013530 ;JSR PC,NEXTU ;FIND NEXT UNIT.
1619 010102 ;BR 50073$
1620 010102 000767 ;50074$:
1621 010104 LET R5 := R5SAVE ;RESTORE CURRENT DEVICE POINTER.
1622 010104 ;MOV R5SAVE,R5
1623 010104 013705 003110 ;LET SCHBK := MSGPKA(R5) ;SET UP ADR OF MSG PKT IN SCH BLOCK.
1624 010110 ;MOV MSGPKA(R5),SCHBK
1625 010110 016537 002502 002442 ;ENDIF
1626 010116 ;50072$:
1627 010116 LET R3 := MSGPKA(R5) ;ADR OF THIS UNIT'S MSG PACKET.
1628 010116 ;MOV MSGPKA(R5),R3
1629 010116 016503 002502 ;LET R2 := #0 ;CLR COUNTER.
1630 010122 ;CLR R2
1631 010122 005002 WHILE R2 NE #MSGCNT DO ;WHILE THERE ARE MORE LOCATIONS:
1632 010124 ;50075$:
1633 010124

```

1634	010124	020227	000016						
1635	010130	001405							CMP R2,#MSGCNT
1636	010132								BEQ 50076\$
1637	010132	012723	177777			LET (R3)+ := #-1			;INIT THE MSG PACKET WITH ALL 1'S
1638	010136					LET R2 := R2 + #2			MOV #-1,(R3)+
1639	010136	062702	000002						;UPDATE COUNTER.
1640	010142					ENDDO			ADD #2,R2
1641	010142	000770							BR 50075\$
1642	010144								50076\$:
1643	010144	105737	002210			TSTB DINT			;ARE INTERRUPTS DISABLED.
1644	010150	001023				BNE 1\$;BR IF YES.
1645	010152					IFB INTFLG(R5) GT #1 THEN			;IF MORE THAN ONE INTERRUPT HAS OCCURED:
1646	010152	126527	003124	000001					CMPB INTFLG(R5),#1
1647	010160	003412							BLE 50077\$
1648	010162					LET TSSREG := @TSSR(R5)			;FREEZE THE CURRENT STATUS REG FOR PRINT
1649	010162	017537	002462	003112					MOV @TSSR(R5),TSSREG
1650	010170					ERRDF #15,TOOMM,STAERM			;REPORT TOO MANY INTERRUPTS.
1651	010170	104455							TRAP C\$ERDF
1652	010172	000017							.WORD 15
1653	010174	004164							.WORD TOOMM
1654	010176	005066							.WORD STAERM
1655	010200	004737	013560			JSR PC,DROPU			;DROP THE UNIT
1656	010204	000434				BR EXCRTN			;RETURN - UNIT HAS BEEN DROPPED.
1657	010206					ENDIF			
1658	010206								50077\$:
1659	010206					LET INTFLG(R5) := #0			;CLR INTERRUPT FLAG FOR THIS DEV.
1660	010206	005065	003124						CLR INTFLG(R5)
1661	010212	052737	000200	002310		BIS #IE.C,CMDPKT			;SET INT ENABLE BIT.
1662	010220				1\$:	IFB ERRREC EQ #0 THEN			;IF NOT RETRYING
1663	010220	105737	003122						TSTB ERRREC
1664	010224	001005							BNE 50100\$
1665	010226					LET RECCNT(R5) := RECCNT(R5) + #1			
1666	010226	005265	003034						INC RECCNT(R5)
1667	010232					LET @DATAWT := RECCNT(R5)			;THEN UPDATE REC COUNT TO WRITE IT ON TAPE
1668	010232	016577	003034	172604					MOV RECCNT(R5),@DATA
1669	010240					ENDIF			
1670	010240								50100\$:
1671	010240	012775	002310	002452		MOV #CMDPKT,@TSDB(R5)			;LOAD TSDB WITH CMDPKT ADDRESS
1672	010246								;THIS INITIATES COMMAND EXECUTION.
1673	010246	032775	000200	002462		IF #TS.SSR SETIN @TSSR(R5) THEN			;IF READY DID NOT DROP THEN:
1674	010254	001410							BIT #TS.SSR,@TSSR(R5)
1675	010256	004737	010554						BEQ 50101\$
1676	010262					JSR PC,MOVMSG			;MOVE CURRENT MESSAGE PACKET TO COMMON.
1677	010262	104455				ERRDF #3,TOERM,STAERM			;REPORT NO TS04 RESPONSE.
1678	010264	000003							TRAP C\$ERDF
1679	010266	003713							.WORD 3
1680	010270	005066							.WORD TOERM
1681	010272	004737	013560			JSR PC,DROPU			.WORD STAERM
1682	010276					ENDIF			
1683	010276								
1684	010276								50101\$:
1685	010276	000207				EXCRTN: RTS PC			;RETURN.

```

1686 : THIS SUBROUTINE WAITS FOR THE TS04 INERRUPT OR DONE BIT TO SET AND ALLOWS THE
1687 : OPERATOR TO TRANSFER CONROL TO THE SUPERVISOR.
1688 : UPON APPEARANCE OF THE INTERRUPT OR DONE, CHECK TSSR FOR STATUS ERRORS,
1689 : LOG BYTES AND ERRORS AND PERFORM ERROR RECOVERY IF NESSASARY.
1690 : INPUTS:
1691 : OUTPUTS:
1692 : REGISTERS: R2, R3.
1693 : CALLS: DROPU, MOVMSG, RECUD, CHKERR, LOG, CLRERR.
1694
1695 010300 GOWAIT:: LET TIME1 := #-1 ;INIT TIME OUT COUNTER.
1696 010300 012737 177777 003074 REPEAT ;REPEAT UNTIL INTERRUPT OCCURES:
1697 010306 ;GO TO THE SUPER TO ALLOW TTY INPUT.
1698 010306 BREAK ;GO TO THE SUPER TO ALLOW TTY INPUT.
1699 010306 ;IF COMMAND WAS REWIND THEN:
1700 010306 104422 IF CMDWRD EQ #RWD THEN ;IF COMMAND WAS REWIND THEN:
1701 010310 ;WAIT AN EXTRA MSECS EACH LOOP.
1702 010310 023727 003056 102010 DELAY 10. ;WAIT AN EXTRA MSECS EACH LOOP.
1703 010316 001014 ;IF INTERRUPTS ARE ENABLED.
1704 010320 ;FETCH INTERRUPT OCCURRED FLAG.
1705 010320 012727 000012 IFB DINT EQ #0 THEN ;IF INTERRUPTS ARE ENABLED.
1706 010324 000000 ;FETCH INTERRUPT OCCURRED FLAG.
1707 010326 013727 002116 LET R2 := INTFLG(R5) ;FETCH INTERRUPT OCCURRED FLAG.
1708 010332 000000 ELSE ;IF IN BRUTUS MODE:
1709 010334 005367 177772 LET R3 := COMP #TS.SSR ;SET UP A MASK FGR THE DONE BIT.
1710 010340 001375 ;FETCH DONE BIT.
1711 010342 005367 177756 LET R2 := @TSSR(R5) CLR.BY R3 ;FETCH DONE BIT.
1712 010346 001367 ;UPDATE TIMEOUT COUNTER.
1713 010350 ;IF TIME OUT HAS OCCURRED:
1714 010350 ;RE-ADJUST REC COUNT DOWN
1715 010350 105737 002210 LET TIME1 := TIME1 - #1 ;UPDATE TIMEOUT COUNTER.
1716 010350 001003 IF TIME1 EQ #0 THEN ;IF TIME OUT HAS OCCURRED:
1717 010354 001003 ;MOVE CURRENT MSG PACKET TO COMMON AREA.
1718 010356 016502 003124 LET @DATAWT := RECNT(R5) - #1 ;RE-ADJUST REC COUNT DOWN
1719 010356 016502 003124 JSR PC,MOVMSG ;MOVE CURRENT MSG PACKET TO COMMON AREA.
1720 010362 000406 ERRDF #4,NOINTM,STAERM ;REPORT NO INTERRUPT.
1721 010362 000406 ;
1722 010364 ;
1723 010364 ;
1724 010364 012703 000200 ;
1725 010370 005103 ;
1726 010372 ;
1727 010372 017502 002462 ;
1728 010376 040302 ;
1729 010400 ;
1730 010400 ;
1731 010400 ;
1732 010400 005337 003074 ;
1733 010404 ;
1734 010404 005737 003074 ;
1735 010410 001016 ;
1736 010412 ;
1737 010412 016577 003034 172424 ;
1738 010420 005377 172420 ;
1739 010424 004737 010554 ;
1740 010430 ;
1741 010430 104455 ;

```

1742	010432	000004							.WORD	4
1743	010434	004125							.WORD	NOINTM
1744	010436	005066							.WORD	STAERM
1745	010440	004737	013560		JSR PC,DROPU					
1746	010444	000412			BR GOWRTN					
1747	010446				ENDIF					
1748	010446									
1749	010446				UNTIL R2 NE #0					50106\$:
1750	010446	005702								;REPEAT UNTIL INTERRUPT OR READY OCCURES.
1751	010450	001716								TST R2
1752	010452	004737	010554		JSR PC,MOVMSG					BEQ 50102\$
1753	010456	004737	010640		JSR PC,RECU					;MOVE CURRENT MSG. PACKET TO COMMON AREA.
1754	010462	004737	011004		JSR PC,CHKERR					;UPDATE THE RECORD COUNT.
1755	010466	004737	012150		JSR PC,LOG					;CHECK FOR STATUS ERRORS.
1756	010472				GOWRTN: LET R3 := #ENDERF					;LOG BYTES AND ERRORS.
1757	010472	012703	003124							MOV #ENDERF,R3
1758	010476	004737	010504		JSR PC,CLRERR					;CLEAR ALL ERROR FLAGS
1759	010502	000207			RTS PC					;RETURN IF DONE.

```

1760      :      SUBROUTINE TO CLEAR FLAGS.
1761      :      INPUTS:          R3 = LWA TO BE CLEARED + 2.
1762      :      OUTPUTS:
1763      :      REGISTERS:      R2
1764      :      CALLS:
1765
1766 010504 CLRERR:: LET R2 := #BGNFLG
1767 010504 012702 003114      MOV      #BGNFLG,R2
1768 010510      REPEAT
1769 010510      50107$:
1770 010510      LET (R2)+ := #0
1771 010510 005022      CLR      (R2)+
1772 010512      UNTIL R2 EQ R3
1773 010512 020203      CMP      R2,R3
1774 010514 001375      BNE      50107$
1775 010516 000207      RTS PC
1776
1777
1778
1779      :      SUBROUTINE TO WAIT UNTIL CURRENT UNIT IS READY OR UNTIL TIME OUT.
1780      :      INPUTS:
1781      :      OUTPUTS:
1782      :      REGISTERS:
1783      :      CALLS:
1784
1785 010520 WSSR:: LET TIME1 := #-1      ;INIT TIMEOUT COUNTER.
1786 010520 012737 177777 003074      MOV      #-1,TIME1
1787 010526      REPEAT      ;REPEAT UNTIL DEV READY OR TIMEOUT:
1788 010526      50110$:
1789 010526      BREAK      ;BREAK TO THE SUPERVISOR.
1790 010526 104422      TRAP      C$BRK
1791 010530      LET TIME1 := TIME1 - #1      ;UPDATE TIMEOUT COUNTER.
1792 010530 005337 003074      DEC      TIME1
1793 010534      UNTIL #TS.SSR SETIN @TSSR(R5) OR TIME1 EQ #0
1794 010534 032775 000200 002462      BIT      #TS.SSR,@TSSR(R5)
1795 010542 001003      BNE      50111$
1796 010544 005737 003074      TST      TIME1
1797 010550 001366      BNE      50110$
1798 010552      50111$:
1799      ;REPEAT UNTIL DEV READY OR TIMEOUT.
1800 010552 000207      RTS PC      ;RFTURN.
1801
1802
1803
1804      :      SUBROUTINE TO MOVE THE CURRENT MESSAGE PACKET TO THE COMMON AREA AND
1805      :      TO UPDATE THE CURRENT TERMINATION CLASS CODE.
1806      :      INPUTS:
1807      :      OUTPUTS:
1808      :      REGISTERS:      R2, R3.
1809      :      CALLS:
1810
1811 010554 MOVMSG:: LET TSSREG := @TSSR(R5)      ;FREEZE THE STATUS REG CONTENTS
1812 010554 017537 002462 003112      MOV      @TSSR(R5),TSSREG
1813 010562      LET R2 := TSSREG CLR.BY #TSC.TCC ;EXTRACT THE TERMINATION CLASS CODE,
1814 010562 013702 003112      MOV      TSSREG,R2
1815 010566 042702 177761      BIC      #TSC.TCC,R2

```

```
1816 010572          LET CTCC := R2 SHIFT -1          ;AND SAVE IT
1817 010572 010237 003106          MOV      R2,CTCC
1818 010576 006237 003106          ASR      CTCC
1819 010602          LET R3 := MSGPKA(R5)          ;ADR OF THIS DEVICE'S MSG.
1820 010602 016503 002502          MOV      MSGPKA(R5),R3
1821 010606          LET R2 := #0          ;CLR COUNTER.
1822 010606 005002          CLR      R2
1823 010610          WHILE R2 NE #MSGCNT DO          ;WHILE THERE ARE MORE LOCATIONS:
1824 010610          50112$:
1825 010610 020227 005016          CMP      R2,#MSGCNT
1826 010614 001405          BEQ      50113$
1827 010616          LET MSGPKT(R2) := (R3)+          ;MOVE MSG TO COMMON AREA.
1828 010616 012362 002334          MOV      (R3)+,MSGPKT(R2)
1829 010622          LET R2 := R2 + #2          ;UPDATE COUNTER.
1830 010622 062702 000002          ADD      #2,R2
1831 010626          ENDDO
1832 010626 000770          BR      50112$
1833 010630          50113$:
1834 010630          LET EOTFLG(R5) := MSGPKT+MS.XSO ;MOVE XSTATO TO EOT FLAG.
1835 010630 013765 002342 003134          MOV      MSGPKT+MS.XSO,EOT
1836 010636 000207          RTS      PC
```

```

1837 : SUBROUTINE TO ADJUST THE RECORD COUNT.
1838 : INPUTS:
1839 : OUTPUTS:
1840 : REGISTERS:
1841 : CALLS:
1842 :
1843 010640 RECUD:: IFB RECLOG EQ #0 THEN ;IF RECORD HAS NOT BEEN LOGGED:
1844 010640 105737 003116 TSTB RECLOG
1845 010644 001056 BNE 50114$
1846 010646 LET RECCNT(R5) := RECCNT(R5) - #1
1847 010646 005365 003034 DEC RECCNT(R5)
1848 010652 IF #BIT0 NOTSETIN CTCC AND #X2.OPM SETIN MSGPKT+MS.XS2 THEN ;IF TAPE MOVED T
1849 010652 032737 000001 003106 BIT #BIT0,CTCC
1850 010660 001045 BNE 50115$
1851 010662 032737 100000 002346 BIT #X2.OPM,MSGPKT+M
1852 010670 001441 BEQ 50115$
1853 010672 LET RECLOG :B= RECLOG + #1 ;SET RECORD LOGGED,
1854 010672 105237 003116 INCB RECLOG
1855 010676 IF CMDWRD EQ #RWD THEN ;IF THIS IS A REWIND CMD:
1856 010676 023727 003056 102010 CMP CMDWRD,#RWD
1857 010704 001003 BNE 50116$
1858 010706 LET RECCNT(R5) := #0 ;CLEAR RECORD COUNT,
1859 010706 005065 003034 CLR RECCNT(R5)
1860 010712 ELSE
1861 010712 000430 BR 50117$
1862 010714 50116$:
1863 010714 IF #BRF.C SETIN CMDWRD THEN ;IF BRF USED, UPDATE RECORD COUNT.
1864 010714 032737 004000 003056 BIT #BRF.C,CMDWRD
1865 010722 001424 BEQ 50120$
1866 010724 IF #MOD.CO NOTSETIN CMDWRD THEN ;IF A FORWARD CMD:
1867 010724 032737 000400 003056 BIT #MOD.CO,CMDWRD
1868 010732 001007 BNE 50121$
1869 010734 IF #MOD.CO NOTSETIN PCMDWD THEN ;IF PREV CMD WAS A FWD ALSO:
1870 010734 032737 000400 003062 BIT #MOD.CO,PCMDWD
1871 010742 001002 BNE 50122$
1872 010744 LET RECCNT(R5) := RECCNT(R5) + #1 ;INCREMENT RECORD COUNT.
1873 010744 005265 003034 INC RECCNT(R5)
1874 010750 ENDIF
1875 010750 50122$:
1876 010750 ELSE ;IF REVERSE CMD:
1877 010750 000411 BR 50123$
1878 010752 50121$:
1879 010752 IF #MOD.CO SETIN PCMDWD THEN ;IF PREVIOUS CMD WAS A REV ALSO:
1880 010752 032737 000400 003062 BIT #MOD.CO,PCMDWD
1881 010760 001405 BEQ 50124$
1882 010762 IF RECCNT(R5) NE #0 THEN ;INSURE A POSITIVE COUNT.
1883 010762 005765 003034 TST RECCNT(R5)
1884 010766 001402 BEQ 50125$
1885 010770 LET RECCNT(R5) := RECCNT(R5) - #1 ;DECREMENT RECORD COUNT.
1886 010770 005365 003034 DEC RECCNT(R5)
1887 010774 ENDIF
1888 010774 50125$:
1889 010774 ENDIF
1890 010774 50124$:
1891 010774 ENDIF
1892 010774 50123$:

```

```
1893 010774          ENDIF
1894 010774          ENDIF
1895 010774          ENDIF
1896 010774          ENDIF
1897 010774          ENDIF
1898 010774          LET @DATAWT := RECCNT(R5)
1899 010774          ENDIF
1900 010774 016577 003034 172042          MOV      RECCNT(R5),@DATA
1901 011002          ENDIF
1902 011002          RTS      PC          ;RETURN.
1903 011002 000207
```



```

1904 : THIS IS THE ERROR CHECK SUBROUTINE. AFTER INTERRUPT THIS
1905 : SUBROUTINE IS CALLED TO CHECK THE TSO4 STATUS.
1906 : IF SPECIAL COND IS SET THEN THE TCC HANDLING SUBROUTINE IS ENTERED.
1907 : IF THE RFC IS NON ZERO FOR A COMMAND REQUIRING A BPCR,
1908 : THEN AN ERROR RFC IS REPORTED,
1909 : INPUTS:
1910 : OUTPUTS:
1911 : REGISTERS: R2, R4.
1912 : CALLS: TCC0-TCC7.
1913 :
1914 011004 CHKERR:: IF #TS.SC SETIN TSSREG THEN ;IF SPECIAL COND STATUS IS SET THEN:
1915 011004 032737 100000 003112 BIT #TS.SC,TSSREG
1916 011012 001441 BEQ 50126$
1917 011014 IF CTCC NE #2 THEN ;IF TCC IS NOT 2 THEN:
1918 011014 023727 003106 000002 CMP CTCC,#2
1919 011022 001405 BEQ 50127$
1920 011024 IFB ERRREC EQ #0 THEN ;IF NOT IN ERROR RECOVERY:
1921 011024 105737 003122 TSTB ERRREC
1922 011030 001002 BNE 50130$
1923 011032 005265 002774 INC SCCNT(R5) ;INC SC COUNTER.
1924 011036 ENDIF
1925 011036 50130$:
1926 011036 ENDIF
1927 011036 50127$:
1928 011036 IF #TS.NXM SETIN TSSREG OR #TS.UPE SETIN TSSREG THEN ;WHEN NON-EXISTANT MEMO
1929 011036 032737 004000 003112 BIT #TS.NXM,TSSREG
1930 011044 001004 BNE 50131$
1931 011046 032737 040000 003112 BIT #TS.UPE,TSSREG
1932 011054 001412 BEQ 50132$
1933 011056 50131$:
1934 011056 IF #X2.OPM NOTSETIN MSGPKT+MS.XS2 THEN ;AND TAPE NOT MOVED
1935 011056 032737 100000 002346 BIT #X2.OPM,MSGPKT+M
1936 011064 001003 BNE 50133$
1937 011066 LET R2 := #5 ;SET TCC5 INDEX
1938 011066 012702 000005 MOV #5,R2
1939 011072 ELSE
1940 011072 000402 BR 50134$
1941 011074 50133$:
1942 011074 LET R2 := #4 ;TAPE MOVED, SET TCC4 INDEX
1943 011074 012702 000004 MOV #4,R2
1944 011100 ENDIF
1945 011100 50134$:
1946 011100 ELSE
1947 011100 000402 BR 50135$
1948 011102 50132$:
1949 011102 LET R2 := CTCC ;SET DETECTED TCC INDEX
1950 011102 013702 003106 MOV CTCC,R2
1951 011106 ENDIF
1952 011106 50135$:
1953 011106 LET R2 := R2 SHIFT 1 ;CURRENT TCC X 2.
1954 011106 006302 ASL R2
1955 011110 004772 011210 JSR PC,@TCCRA(R2) ;GO TO THE TCC HANDLING SUBROUTINE.
1956 011114 ELSE
1957 011114 000426 BR 50136$
1958 011116 50126$:
1959 011116 IF #BRF.C SETIN CMDWRD THEN ;IF BRF IS USED IN THIS CMD THEN:

```

```

1960 011116 032737 004000 003056
1961 011124 001422
1962 011126
1963 011126 005737 002340
1964 011132 001417
1965 011134
1966 011134 105737 003145
1967 011140 001403
1968 011142 105737 003146
1969 011146 001411
1970 011150
1971
1972 011150
1973 011150 105737 003151
1974 011154 001006
1975 011156
1976 011156 005265 003014
1977 011162
1978 011162 104456
1979 011164 000015
1980 011166 003760
1981 011170 005066
1982 011172
1983 011172
1984 011172
1985 011172
1986 011172
1987 011172
1988 011172
1989 011172
1990 011172
1991 011172
1992 011172
1993 011172 105737 003120
1994 011176 001403
1995 011200
1996 011200 013737 003060 002310
1997 011206
1998 011206
1999 011206 000207
2000
2001
2002
2003 011210 011230
2004 011212 011246
2005 011214 011264
2006 011216 011374
2007 011220 011412
2008 011222 011544
2009 011224 011642
2010 011226 012004

; IF MSGPKT+MS.RFC NE #0 THEN ;IF THERE IS AN RFC THEN:
;IF NOT IN RANDOM OR IF CMD IS WTV:
;IF RFC ERROR REPORTS ARE ALLOWED:
IFB RANDOM EQ #0 ORB VFYFLG NE #0 THEN
    TSTB RANDOM
    BEQ 50141$
    TSTB VFYFLG
    BEQ 50142$
    50141$:
    TSTB IRE
    BEQ 50143$
    BNE 50143$
    LET HRDCNT(R5) := HRDCNT(R5) + #1 ;UPDATE HARD ERROR COUNT
    INC HRDCNT(R5)
    ERRHRD #13,RFCERM,STAERM ;REPORT RFC ERROR
    TRAP C$ERHRD
    .WORD 13
    .WORD RFCERM
    .WORD STAERM
ENDIF
50143$:
ENDIF
50142$:
ENDIF
50140$:
ENDIF
50137$:
ENDIF
50136$:
IFB RWERR NE #0 THEN ;IF A READ/WRITE ERROR HAS OCCURRED THEN:
    TSTB RWERR
    BEQ 50144$
    LET CMDPKT := CMDSAV ;RESTORE CMD PACKET AFTER ERROR RECCV.
    MOV CMDSAV,CMDPKT
ENDIF
50144$:
RTS PC ;RETURN.

; ADDRESSES OF TCC HANDLING ROUTINES FOR TERMINATION CLASS CODES 0 - 7.
TCCRA: TCC0
TCC1
TCC2
TCC3
TCC4
TCC5
TCC6
TCC7

```

```
2011      :      SUBROUTINE TO HANDLE TERMINATION CLASS CODE 0, UNDEFINED SPECIAL
2012      :      CONDITION ERROR.
2013      :      INPUTS:
2014      :      OUTPUTS:
2015      :      REGISTERS:
2016      :      CALLS:
2017
2018 011230      TCC0:: LET HRDCNT(R5) := HRDCNT(R5) + #1 ;UPDATE HARD ERROR COUNT.
2019 011230 005265 003014      INC      HRDCNT(R5)
2020 011234      ERRHRD #5,SCERM,STAERM      ;REPORT SPECIAL CONDITION ERROR.
2021 011234 104456      TRAP      C$ERHRD
2022 011236 000005      .WORD      5
2023 011240 003734      .WORD      SCERM
2024 011242 005066      .WORD      STAERM
2025 011244 000207      RTS PC      ;RETURN.
2026
2027
2028
2029
2030
2031      :      SUBROUTINE TO HANDLE TERMINATION CLASS CODE 1, ATTENTION CONDITION.
2032      :      THIS TCC INDICATES THAT THE DRIVE HAS UNDERGONE A STATUS CHANGE
2033      :      SUCH AS GOING OFFLINE OR COMING ONLINE.
2034      :      INPUTS:
2035      :      OUTPUTS:
2036      :      REGISTERS:      R2,R4
2037      :      CALLS:      DROPU
2038
2039 011246      TCC1:: ERRDF #6,ATTNM,STAERM      ;REPORT ATTENTION-UNIT OFF LINE.
2040 011246 104455      TRAP      C$ERDF
2041 011250 000006      .WORD      6
2042 011252 004041      .WORD      ATNM
2043 011254 005066      .WORD      STAERM
2044 011256 004737 013560      JSR PC,DROPU      ;DROP THE UNIT.
2045 011262 000207      RTS PC      ;RETURN.
```

```

2046      ;      SUBROUTINE TO HANDLE TERMINATION CLASS CODE 2, TAPE STATUS ALERT.
2047      ;      A STATUS CONDITION HAS BEEN ENCOUNTERED THAT MAY HAVE SIGNIFICANCE
2048      ;      TO THE PROGRAM. BITS OF INTEREST INCLUDE TMK, RLS, LET, RLL, BOT, EOT.
2049      ;      INPUTS:
2050      ;      OUTPUTS:
2051      ;      REGISTERS:
2052      ;      CALLS:
2053
2054 011264      TCC2::      IF #X0.BOT SETIN MSGPKT+MS.XSO ANDB EXPBOT NE #0 THEN
2055 011264 032737 000002 002342      BIT      #X0.BOT,MSGPKT+M
2056 011272 001404      BEQ      50145$
2057 011274 105737 003144      TSTB     EXPBOT
2058 011300 001401      BEQ      50145$
2059      ;IF AT BOT AND BOT IS EXPECTED:
2060 011302 000433      BR      TC2RTN      ;RETURN-TCC2 CAUSED BY EXPECTED BOT.
2061 011304      ENDIF
2062 011304
2063 011304      50145$:
2064 011304 032737 170002 002342      IF #X0.RLS!X0.RLL!X0.TMK!X0.LET!X0.BOT SETIN MSGPKT+MS.XSO THEN
2065 011312 001427      BIT      #X0.RLS!X0.RLL!X
2066      BEQ      50146$
2067 011314      ;IF TCC2 CAUSED BY ANYTHING BUT EOT:
2068 011314 105737 003145      IFB RANDOM EQ #0 ORB VFYFLG NE #0 THEN
2069 011320 001403      TSTB     RANDOM
2070 011322 105737 003146      BEQ      50147$
2071 011326 001421      TSTB     VFYFLG
2072 011330      BEQ      50150$
2073      50147$:
2074 011330      ;IF NOT IN RANDOM OR IF CMD IS WTV:
2075 011330 105737 003151      IFB IRE EQ #0 THEN      ;IF RFC ERROR REPORTS ARE ALLOWED:
2076 011334 001016      TSTB     IRE
2077 011336      BNE      50151$
2078 011336 105737 003122      IFB ERRREC NE #0 THEN      ;IF WE ARE IN ERROR RECOVERY THEN:
2079 011342 001403      TSTB     ERRREC
2080 011344      BEQ      50152$
2081 011344 105237 003121      LET UNREC :B= UNREC + #1      ;SET UNRECOVERABLE FLAG FOR LOG.
2082 011350      ELSE      ;ELSE - IF NOT IN ERROR RECOVERY:
2083 011350 000402      INCB     UNREC
2084 011352      BR      50153$
2085 011352      50152$:
2086 011352 005265 002774      LET SCCNT(R5) := SCCNT(R5) + #1 ;INCREMENT THE SPEC COND COUNTER.
2087 011356      INC      SCCNT(R5)
2088 011356      ENDIF
2089 011356      50153$:
2090 011356 005265 003014      LET HRDCNT(R5) := HRDCNT(R5) + #1 ;UPDATE HARD ERROR COUNT.
2091 011362      ERRHRD #7,TSAM,STAERM      ;REPORT TAPE STATUS ALERT.
2092 011362 104456      INC      HRDCNT(R5)
2093 011364 000007      TRAP     C$ERRHRD
2094 011366 004142      .WORD   7
2095 011370 005066      .WORD   TSAM
2096 011372      .WORD   STAERM
2097 011372      ENDIF      50151$:
2098 011372      ENDIF      50150$:
2099 011372      ENDIF      50146$:
2100 011372
2101 011372

```

```
2102 011372 000207          TC2RTN:  RTS PC                      ;RETURN.
2103
2104
2105
2106
2107
2108          :          SUBROUTINE TO HANDLE TERMINATION CLASS CODE 3, FUNCTION REJECT.
2109          :          THE SPECIFIED FUNCTION WAS NOT INITIATED. BITS OF INTEREST ARE
2110          :          RMR, OFL, VCK, BOT, ILC, WLE, ILA, AND NBA.
2111          :          INPUTS:
2112          :          OUTPUTS:
2113          :          REGISTERS:      R2,R4
2114          :          CALLS:          DROPU
2115
2116 011374          TCC3::  ERRDF #8,FUNRM,STAERM          ;REPORT FUNCTION REJECT.
2117 011374 104455          TRAP          CSERDF
2118 011376 000010          .WORD          8
2119 011400 004057          .WORD          FUNRM
2120 011402 005066          .WORD          STAERM
2121 011404 004737 013560          JSR PC,DROPU          ;DROP THE UNIT.
2122 011410 000207          RTS PC                      ;RETURN.
```

```

2123      :      SUBROUTINE TO HANDLE TERMINATION CLASS CODE 4, RECOVERABLE ERROR.
2124      :      TAPE POSITION IS ONE RECORD BEYOND WHAT ITS POSITION WAS WHEN
2125      :      THE FUNCTION WAS INITIATED. RECOVERY PROCEDURE IS TO LOG THE
2126      :      ERROR AND ISSUE THE APPROPRIATE RETRY COMMAND.
2127      :      INPUTS:
2128      :      OUTPUTS:
2129      :      REGISTERS:      R2,R4.
2130      :      CALLS:      RTLE, EXECUTE, GOWAIT, DROPU
2131
2132 011412 004737 012022      TCC4:: JSR PC,RTLE      ;CHECK FOR RETRY LIMIT EXCEEDED.
2133 011416      IF CMDLG GT #2 THEN      ;IF READ CMD THEN:
2134 011416 023727 003064 000002      CMP      CMDLG,#2
2135 011424 003411      BLE      50154$
2136 011426      LET R2 := #RRECL SHIFT -1      ;R2=READ RETRY COUNT LIMIT / 2
2137 011426 012702 000020      MOV      #RRECL,R2
2138 011432 006202      ASR      R2
2139 011434      IF RETRYC GE R2 THEN      ;IF RETRY COUNT IS MORE THAN HALF LIMIT:
2140 011434 023702 003114      CMP      RETRYC,R2
2141 011440 002403      BLT      50155$
2142 011442      LET CMDPKT := CMDPKT SET.BY #OPP.C ;SET OPPOSITE BIT FOR RETRY2.
2143 011442 052737 020000 002310      BIS      #OPP.C,CMDPKT
2144 011450      ENDIF
2145 011450      50155$:
2146 011450      ENDIF
2147 011450      50154$:
2148 011450      IF RETRYC EQ #0 ANDB ERCVER NE #0 THEN ;IF THIS IS THE ORIGINAL ERROR THEN:
2149 011450 005737 003114      TST      RETRYC
2150 011454 001007      BNE      50156$
2151 011456 105737 002205      TSTB    ERCVER
2152 011462 001404      BEQ      50156$
2153 011464      ERRSOFT #9,RERM,STAERM      ;REPORT RECOVERABLE ERROR
2154 011464 104457      TRAP    C$ERSOFT
2155 011466 000011      .WORD  9
2156 011470 004254      .WORD  RERM
2157 011472 005066      .WORD  STAERM
2158 011474      ENDIF      ;PROVIDED OPERATOR HAS ENABLED THE REPORT
2159 011474      50156$:
2160 011474      LET RETRYC := RETRYC + #1      ;UPDATE RETRY COUNT.
2161 011474 005237 003114      INC      RETRYC
2162 011500      LET CMDPKT := CMDPKT SET.BY #MOD.C1 ;SET RETRY BIT IN CMD PACKET.
2163 011500 052737 001000 002310      BIS      #MOD.C1,CMDPKT
2164 011506      IFB IREC EQ #0 THEN      ;IF ERROR RECOVERY ENABLED:
2165 011506 105737 002211      TSTB    IREC
2166 011512 001011      BNE      50157$
2167 011514      LET ERRREC :B= ERRREC + #1      ;SET ERROR RECOVERY FLAG.
2168 011514 105237 003122      INCB    ERRREC
2169 011520      POP R2,R2      ;POP 2 RTN ADRS FROM STACK.
2170 011520 012602      MOV      (SP)+,R2
2171 011522 012602      MOV      (SP)+,R2
2172 011524 004737 007770      JSR PC,EXECUTE      ;GO EXECUTE THE RETRY COMMAND.
2173 011530 000137 010300      JMP GOWAIT      ;GO WAIT FOR INTERRUPT + CHECK STATUS.
2174 011534      ELSE      ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
2175 011534 000402      BR      50160$
2176 011536      50157$:
2177 011536      LET UNREC :B= UNREC + #1      ;SET UNRECOVERABLE ERROR FLAG.
2178 011536 105237 003121      INCB    UNREC

```

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SEQ 0093

2179 011542
2180 011542
2181 011542 000207

ENDIF

RTS PC

;RETURN

501608:

```

2182      :      SUBROUTINE TO HANDLE TERMINATION CLASS CODE 5, RECOVERABLE ERROR.
2183      :      TAPE POSITION HAS NOT CHANGED. RECOVERY PROCEDURE IS TO LOG THE
2184      :      ERROR AND RE-ISSUE THE ORIGINAL COMMAND.
2185      :      INPUTS:
2186      :      OUTPUTS:
2187      :      REGISTERS:      R2,R4.
2188      :      CALLS:      RTLE, EXCUTE, GOWAIT, DROPU.
2189
2190 011544 004737 012022      TCC5:: JSR PC,RTLE      ;CHECK FOR RETRY LIMIT EXCEEDED
2191 011550      IF RETRYC EQ #0 THEN      ;IF THIS IS THE ORIGINAL ERROR THEN:
2192 011550 005737 003114      TST      RETRYC
2193 011554 001004      BNE      50161$
2194 011556      ERRSOFT #10,RERM,STAERM      ;REPORT RECOVERABLE ERROR.
2195 011556 104457      TRAP      C$ERSOFT
2196 011560 000012      .WORD      10
2197 011562 004254      .WORD      RERM
2198 011564 005066      .WORD      STAERM
2199 011566      ENDIF
2200 011566      50161$:
2201 011566      LET RETRYC := RETRYC + #1      ;UPDATE RETRY COUNTER.
2202 011566 005237 003114      INC      RETRYC
2203 011572      IFB IREC EQ #0 THEN      ;IF ERROR RECOVERY IS ENABLED:
2204 011572 105737 002211      TSTB      IREC
2205 011576 001016      BNE      50162$
2206 011600      LET ERRREC :B= ERRREC + #1      ;SET ERROR RECOVERY FLAG.
2207 011600 105237 003122      INCB      ERRREC
2208 011604      LET RECCNT(R5) := RECCNT(R5) + #1      ;UPDATE REC COUNT
2209 011604 005265 003034      INC      RECCNT(R5)
2210 011610      LET @DATAWT := RECCNT(R5)      ;AND INSERT IT INTO WRT BFR
2211 011610 016577 003034 171226      MOV      RECCNT(R5),@DATA
2212 011616      POP R2,R2      ;POP 2 RTN ADRS FROM STACK.
2213 011616 012602      MOV      (SP)+,R2
2214 011620 012602      MOV      (SP)+,R2
2215 011622 004737 007770      JSR PC,EXCUTE      ;GO RE-ISSUE THE COMMAND.
2216 011626 000137 010300      JMP GOWAIT      ;GO WAIT FOR INTERRUPT + CHECK STATUS.
2217 011632      ELSE      ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
2218 011632 000402      BR      50163$
2219 011634      50162$:
2220 011634      LET UNREC :B= UNREC + #1      ;SET UNRECOVERABLE ERROR FLAG.
2221 011634 105237 003121      INCB      UNREC
2222 011640      ENDIF
2223 011640      50163$:
2224 011640 000207      RTS PC      ;RETURN.
2225
2226

```



```

2227      : SUBROUTINE TO HANDLE TERMINATION CLASS CODE 6, UNRECOVERABLE ERROR.
2228      : TAPE POSITION HAS BEEN LOST. THE ONLY VALID RECOVERY PROCEDURE
2229      : IS TO REWIND AND START OVER AT BOT UNLESS THE TAPE HAS LABELS OR
2230      : SEQUENCE NUMBERS. THIS DIAGNOSTIC WILL REWIND AND RETRY THE
2231      : COMMAND ONLY IF DENSITY CHECK IS SET, OTHERWISE THE UNIT WILL BE
2232      : DROPPED FROM THE TEST SEQUENCE.
2233      : INPUTS:
2234      : OUTPUTS:
2235      : REGISTERS:      R2, R4
2236      : CALLS:         RTLE, WSSR, EXCUTE, GOWAIT, DROPU
2237
2238 011642      TCC6:: IF X3.DCK NOTSETIN MSGPKT+MS.XS3 THEN
2239 011642 033737 000010 002350      BIT      X3.DCK,MSGPKT+MS
2240 011650 001016      BNE      50164$
2241      :IF THERE IS NO DENSITY CHECK THEN:
2242 011652      IF CMDLG NE #0 THEN      ;IF CMD IS A READ OR WRITE THEN:
2243 011652 005737 003064      TST      CMDLG
2244 011656 001404      BEQ      50165$
2245 011660      LET RWERR :B= RWERR + #1      ;SET RD/WR ERROR FLAG,
2246 011660 105237 003120      INCB      RWERR
2247 011664      LET UNREC :B= UNREC + #1      ;SET UNRECOVERABLE ERROR FLAG.
2248 011664 105237 003121      INCB      UNREC
2249 011670      ENDIF      ;
2250 011670      ERRDF #11,URERM,STAERM      ;REPORT UNRECOVERABLE ERROR.
2251 011670      TRAP      C$ERDF
2252 011670 104455      .WORD      11
2253 011672 000013      .WORD      URERM
2254 011674 004276      .WORD      STAERM
2255 011676 005066      ;REPORT ERROR + DROP UNIT.
2256 011700 004737 013560      JSR PC,DROPU      ;ELSE-IF THERE IS DENSITY CHECK:
2257 011704      ELSE      BR      50166$
2258 011704 000436      ;CHECK FOR RETRY LIMIT EXCEEDED.
2259 011706      JSR PC,RTLE      ;IF THIS IS THE ORIGINAL ERROR THEN:
2260 011706 004737 012022      IF RETRYC EQ #0 THEN      TST      RETRYC
2261 011712      ERRSOFT #11,URERM,STAERM      ;REPORT DENSITY CHECK ERROR.
2262 011712 005737 003114      BNE      50167$
2263 011716 001004      TRAP      C$ERSOFT
2264 011720      .WORD      11
2265 011720 104457      .WORD      URERM
2266 011722 000013      .WORD      STAERM
2267 011724 004276      ;UPDATE RETRY COUNT.
2268 011726 005066      ENDIF      ;IF ERROR RECOVERY IS ENABLED THEN:
2269 011730      LET RETRYC := RETRYC + #1      INC      RETRYC
2270 011730      IFB IRE EQ #0 THEN      ;SET ERROR RECOVERY FLAG,
2271 011730      LET ERRREC :B= ERRREC + #1      INCB      ERRREC
2272 011730 005237 003114      LET @TSDB(R5) := #RWCPK      ;ISSUE A REWIND COMMAND,
2273 011734      JSR PC,WSSR      ;WAIT FOR SUBSYSTEM READY,
2274 011734 105737 003151      POP R2,R2      ;POP 2 RTN ADR'S FROM STACK,
2275 011740 001016      MOV      #RWCPK,@TSDB(R5)
2276 011742      ;SET ERROR RECOVERY FLAG,
2277 011742 105237 003122      INCB      ERRREC
2278 011746      ;ISSUE A REWIND COMMAND,
2279 011746 012775 002330 002452      MOV      #RWCPK,@TSDB(R5)
2280 011754 004737 010520      JSR PC,WSSR      ;WAIT FOR SUBSYSTEM READY,
2281 011760      POP R2,R2      ;POP 2 RTN ADR'S FROM STACK,
2282 011760 012602      MOV      (SP)+,R2

```

```
2283 011762 012602  
2284 011764 004737 007770  
2285 011770 000137 010300  
2286 011774  
2287 011774 000402  
2288 011776  
2289 011776  
2290 011776 105237 003121  
2291 012002  
2292 012002  
2293 012002  
2294 012002  
2295 012002 000207
```

```
                JSR PC,EXCUTE  
                JMP GOWAIT  
ELSE  
                LET UNREC :B= UNREC + #1  
ENDIF  
ENDIF  
RTS PC
```

```
                MOV (SP)+,R2  
                ;REISSUE THE COMMAND,  
                ;WAIT FOR INTERRUPT  
                ;ELSE-IF ERR REC DISABLED:  
                BR 50171$  
50170$:  
                ;SET UNRECOVERABLE ERROR FLAG.  
                INCB UNREC  
50171$:  
50166$:  
                ;RETURN
```

```
2296 : SUBROUTINE TO HANDLE TERMINATION CLASS CODE 7, FATAL SUBSYSTEM
2297 : ERROR. THE SUBSYSTEM IS INCAPABLE OF PROPERLY PERFORMING
2298 : COMMANDS OR AT LEAST ITS INTEGRITY IS SERIOUSLY QUESTIONABLE.
2299 : REFER TO THE FATAL CLASS CODE FIELD IN THE TSSR REGISTER FOR
2300 : ADDITIONAL INFORMATION ON THE TYPE OF FATAL ERROR.
2301 : INPUTS:
2302 : OUTPUTS:
2303 : REGISTERS: R2, R4
2304 : CALLS:
2305
2306 012004 TCC7:: ERRDF #12,FATSM,STAERM ;REPORT FATAL SUBSYSTEM ERROR.
2307 012004 104455 TRAP C$ERDF
2308 012006 000014 .WORD 12
2309 012010 004077 .WORD FATSM
2310 012012 005066 .WORD STAERM
2311 012014 004737 013560 JSR PC,DROPU ;DROP THE UNIT.
2312 012020 000207 RTS PC ;RETURN.
2313
2314
2315
2316 : SUBROUTINE TO CHECK FOR RETRY LIMIT EXCEEDED. PRINTS ERROR MESSAGE
2317 : IF EXCEEDED AND DROP UNIT UNLESS COMMAND IS A READ.
2318 : INPUTS:
2319 : OUTPUTS:
2320 : REGISTERS: R2, R4.
2321 : CALLS: DROPU
2322
2323 012022 RTLE:: IF CMDLG EQ #0 THEN ;IF CMD IS NOT A READ OR WRITE THEN:
2324 012022 005737 003064 TST CMDLG
2325 012026 001010 BNE 50172$
2326 012030 ERRDF #11,URERM,STAERM ;REPORT UNRECOVERABLE ERROR.
2327 012030 104455 TRAP C$ERDF
2328 012032 000013 .WORD 11
2329 012034 004276 .WORD URERM
2330 012036 005066 .WORD STAERM
2331 012040 004737 013560 JSR PC,DROFU ;DROP THE UNIT.
2332 012044 POP R2
2333 012044 012602 MOV (SP)+,R2
2334 012046 000437 BR RTLRTN ;AND RETURN.
2335 012050 ENDIF
2336 012050
2337 012050 50172$:
2338 012050 105237 003120 LET RWERR :B= RWERR + #1 ;SET READ/WRITE ERROR FLAG.
2339 012054 INCB RWERR
2340 012054 023727 003064 000002 IF CMDLG EQ #2 THEN ;IF CMD IS A WRT OR WTM:
2341 012062 001016 CMP CMDLG,#2
2342 012064 IF RETRYC EQ #WRECL THEN ;IF RETRY COUNT HAS REACHED LIMIT:
2343 012064 023727 003114 000020 BNE 50173$
2344 012072 001011 CMP RETRYC,#WRECL
2345 012074 BNE 50174$
2346 012074 105237 003121 LET UNREC :B= UNREC + #1 ;SET UNRECOVERABLE FLAG
2347 012100 INCB UNREC
2348 012100 104455 ERRDF #14,RLEXM,STAIRM ;REPORT RETRY LIMIT EXCEEDED.
2349 012102 000016 TRAP C$ERDF
2350 012104 004014 .WORD 14
2351 012106 005066 .WORD RLEXM
. WORD STAERM
```

```

2352 012110 004737 013560          JSR PC,DROPU          ;DROP THE UNIT.
2353 012114          POP R2
2354 012114 012602
2355 012116          * ENDIF
2356 012116
2357 012116          ELSE
2358 012116 000413
2359 012120
2360 012120          IF RETRYC EQ #RRECL THEN          ;IF RETRY COUNT HAS REACHED LIMIT:
2361 012120 023727 003114 000020          ;
2362 012126 001007          ;
2363 012130          LET UNREC :B= UNREC + #1          ;SET UNRECOVERABLE FLAG
2364 012130 105237 003121          ERRHRD #14,RLEXM,STAERM          ;REPORT RECOVERABLE ERROR.
2365 012134
2366 012134 104456          TRAP C$ERHRD
2367 012136 000016          .WORD 14
2368 012140 004014          .WORD RLEXM
2369 012142 005066          .WORD STAERM
2370 012144          POP R2
2371 012144 012602          MOV (SP)+,R2
2372 012146          ENDIF
2373 012146          ;
2374 012146          ;
2375 012146          ;
2376 012146 000207          RTLRTN: RTS PC          ;RETURN

```

50174\$:

MOV (SP)+,R2

;ELSE - CMD IS A READ:

BR 50175\$

50173\$:

;IF RETRY COUNT HAS REACHED LIMIT:

CMP RETRYC,#RRECL
BNE 50176\$

;SET UNRECOVERABLE FLAG

INCB UNREC

;REPORT RECOVERABLE ERROR.

TRAP C\$ERHRD
.WORD 14
.WORD RLEXM
.WORD STAERM

50176\$:

50175\$:

```

2377      :      SUBROUTINE TO LOG BYTES READ/WRITTEN.
2378      :      ALSO UPDATES READ/WRITE ERROR COUNTERS.
2379      :      INPUTS:
2380      :      OUTPUTS:
2381      :      REGISTERS:      R2, R3, R4.
2382      :      CALLS:
2383
2384      LOG::  IFB ERLOG EQ #0 THEN      ;IF DATA AND ERRORS HAVE NOT BEEN LOGGED THEN:
2385      012150 105737 003117      TSTB      ERLOG
2386      012154 001126      BNE      50177$
2387      012156      LET ERLOG :B= ERLOG + #1      ;SET LOG DONE FLAG.
2388      012156 105237 003117      INCB      ERLOG
2389      012162      LET R4 := CMDLG      ;GET CURRENT CMD LOGGING CODE.
2390      012162 013704 003064      MOV      CMDLG,R4
2391      012166      IF R4 NE #0 THEN      ;IF THERE IS A CODE THEN:
2392      012166 005704      TST      R4
2393      012170 001520      BEQ      50200$
2394      012172      LET R4 := R4 - #2      ;ADJUST THE CODE FOR TABLE INDEX.
2395      012172 162704 000002      SUB      #2,R4
2396      012176      LET R2 := R5 + BINC(R4) + #CNTBGN ;R2 = ADR OF BYTE COUNT LSW.
2397      012176 010502      MOV      R5,R2
2398      012200 066402 012434      ADD      BINC(R4),R2
2399      012204 062702 002544      ADD      #CNTBGN,R2
2400      012210      LET (R2) := (R2) + BRFCNT      ;ADD BRFCNT TO LSW.
2401      012210 063712 003054      ADD      BRFCNT,(R2)
2402      012214      IF MSGPKT+MS.RFC LOS BRFCNT THEN ;IF THE RFC IS LOWER OR THE SAME AS BRFC THEN
2403      012214 023737 002340 003054      CMP      MSGPKT+MS.RFC,BR
2404      012222 101002      BHI      50201$
2405      012224      LET (R2) := (R2) - MSGPKT+MS.RFC ;SUBTRACT RFC FROM EXPECTED BRFC.
2406      012224 163712 002340      SUB      MSGPKT+MS.RFC,(R
2407      012230      END-IF
2408      012230      50201$:
2409      012230      LET R3 := R2 + #10      ;R3 = ADR OF 2ND WORD.
2410      012230 010203      MOV      R2,R3
2411      012232 062703 000010      ADD      #10,R3
2412      012236      WHILE (R2) GT #999. DO
2413      012236      50202$:
2414      012236 021227 001747      CMP      (R2),#999.
2415      012242 003404      BLE      50203$
2416      012244      LET (R2) := (R2) - #1000. ;UPDATE BYTE COUNT
2417      012244 162712 001750      SUB      #1000.,(R2)
2418      012250      LET (R3) := (R3) + #1      ;2ND WORD.
2419      012250 005213      INC      (R3)
2420      012252      ENDDO
2421      012252 000771      BR      50202$
2422      012254      50203$:
2423      012254      LET R2 := R3 + #10      ;R2 = ADR OF 3RD WORD.
2424      012254 010302      MOV      R3,R2
2425      012256 062702 000010      ADD      #10,R2
2426      012262      WHILE (R3) GT #999. DO
2427      012262      50204$:
2428      012262 021327 001747      CMP      (R3),#999.
2429      012266 003404      BLE      50205$
2430      012270      LET (R3) := (R3) - #1000. ;UPDATE BYTE COUNT
2431      012270 162713 001750      SUB      #1000.,(R3)
2432      012274      LET (R2) := (R2) + #1      ;3RD WORD.

```

```
2433 012274 005212                                INC      (R2)
2434 012276                                ENDDO
2435 012276 000771                                BR       50204$
2436 012300                                50205$:
2437 012300                                LET R3 := R2 + #10      ;R3 = ADR OF 4TH WORD.
2438 012300 010203                                MOV      R2,R3
2439 012302 062703 000010                        ADD      #10,R3
2440 012306                                WHILE (R2) GT #999. DO
2441 012306                                50206$:
2442 012306 021227 001747                        CMP      (R2),#999.
2443 012312 003404                                BLE      50207$
2444 012314                                LET (R2) := (R2) - #1000. ;UPDATE BYTE COUNT
2445 012314 162712 001750                        LET (R3) := (R3) + #1   ;4TH WORD.
2446 012320                                SUB      #1000.,(R2)
2447 012320 005213                                INC      (R3)
2448 012322                                ENDDO
2449 012322 000771                                BR       50206$
2450 012324                                50207$:
2451 012324                                IFB RWERR NE #0 THEN   ;IF R/W ERROR, UPDATE ERROR COUNT.
2452 012324 105737 003120                        TSTB    RWERR
2453 012330 001440                                BEQ     50210$
2454 012332                                LET R2 := R5 + EINC(R4) + #WRREC ;R2 = ADR OF COUNTER.
2455 012332 010502                                MOV     R5,R2
2456 012334 066402 012442                        ADD     EINC(R4),R2
2457 012340 062702 002704                        ADD     #WRREC,R2
2458 012344                                IFB UNREC NE #0 THEN   ;IS THE ERROR UNRECOVERABLE?
2459 012344 105737 003121                        TSTB    UNREC
2460 012350 001404                                BEQ     50211$
2461 012352                                LET R2 := R2 + #10     ;YES, POINT TO NEXT COUNTER.
2462 012352 062702 000010                        ADD     #10,R2
2463 012356                                LET (R2) := (R2) + #1  ;UPDATE THE ERROR COUNTER
2464 012356 005212                                INC     (R2)
2465 012360                                ELSE                    ;ELSE - IF ERROR IS RECOVERABLE:
2466 012360 000424                                BR      50212$
2467 012362                                50211$:
2468 012362                                LET (R2) := (R2) + #1  ;UPDATE THE ERROR COUNTER
2469 012362 005212                                INC     (R2)
2470 012364                                IFB IREC EQ #0 THEN    ;IF ERROR RECOVERY IS ENABLED:
2471 012364 105737 002211                        TSTB    IREC
2472 012370 001020                                BNE     50213$
2473 012372                                IFB DROPED EQ #0 ANDB ERCVER NE #0 THEN ;IF UNIT HAS NOT BEEN DROPPED:
2474 012372 105737 003152                        TSTB    DROPED
2475 012376 001015                                BNE     50214$
2476 012400 105737 002205                        TSTB    ERCVER
2477 012404 001412                                BEQ     50214$
2478 012406                                PRINTB #NURTY1,RETRYC ;PRINT # OF RETRIES TO RECOVER
2479 012406 013746 003114                        MOV     RETRYC,-(SP)
2480 012412 012746 004577                        MOV     #NURTY1,-(SP)
2481 012416 012746 000002                        MOV     #2,-(SP)
2482 012422 010600                                MOV     SP,R0
2483 012424 104414                                TRAP   C$PNTB
2484 012426 062706 000006                        ADD     #6,SP
2485 012432                                ENDIF                    ;PROVIDED PRINT HAS BEEN ENABLED
2486 012432                                50214$:
2487 012432                                ENDIF
2488 012432                                50213$:
```

```

2489 012432          ENDIF
2490 012432          50212$:
2491 012432          ENDIF
2492 012432          50210$:
2493 012432          ENDIF
2494 012432          50200$:
2495 012432          ENDIF
2496 012432          50177$:
2497 012432 000207   RTS PC
2498                                     INDEXES TO BYTE COUNTERS.
2499 012434 000000   ; BINC: 0 ;WRITE.
2500 012436 000040   40 ;READ REV.
2501 012440 000100   100 ;READ FWD.
2502                                     INDEXES TO READ/WRITE ERROR COUNTERS.
2503 012442 000000   ; EINC: 0 ;WRITE.
2504 012444 000020   20 ;READ REV.
2505 012446 000040   40 ;READ FWD.
2506
2507
2508
2509
2510                                     : IF A WRITE/VERIFY COMMAND IS ISSUED, CONTROL IS THEN
2511                                     : TRANSFERRED TO THIS SUBROUTINE TO READ REVERSE, CHECK DATA,
2512                                     : READ FORWARD, CHECK DATA, THEN CONTINUE TO NEXT COMMAND.
2513                                     : INPUTS:
2514                                     : OUTPUTS:
2515                                     : REGISTERS:
2516                                     : CALLS:          VFEXC.
2517
2518 012450           VFYDAT:: IFB VFYFLG NE #0 THEN           ;IF DATA IS TO BE VERIFIED:
2519 012450 105737 003146           TSTB VFYFLG
2520 012454 001426           BEQ 50215$
2521 012456           LET PCMDWD := CMDWRD           ;SAVE THE PREVIOUS COMMAND WORD.
2522 012456 013737 003056 003062           MOV CMDWRD,PCMDWD
2523 012464           LET CMDWRD := #RDR           ;COMMAND IS READ REV.
2524 012464 012737 104401 003056           MOV #RDR,CMDWRD
2525 012472           LET CMDLG := #4           ;SET UP CMD LOGGING INDEX.
2526 012472 012737 000004 003064           MOV #4,CMDLG
2527 012500 004737 012534           JSR PC,VFEXC           ;GO READ ALL THE RECORDS REV.
2528 012504           LET PCMDWD := CMDWRD           ;SAVE THE PREVIOUS COMMAND WORD.
2529 012504 013737 003056 003062           MOV CMDWRD,PCMDWD
2530 012512           LET CMDWRD := #RDF           ;COMMAND IS READ FWD.
2531 012512 012737 104001 003056           MOV #RDF,CMDWRD
2532 012520           LET CMDLG := #6           ;SET UP CMD LOGGING INDEX.
2533 012520 012737 000006 003064           MOV #6,CMDLG
2534 012526 004737 012534           JSR PC,VFEXC           ;GO READ ALL RECORDS FWD.
2535 012532           ENDIF
2536 012532           50215$:
2537 012532 000207   RTS PC ;RETURN.

```

```

2538      :      SUBROUTINE TO EXECUTE THE READ AND VERIFY, FORWARD OR REVERSE.
2539      :      INPUTS:
2540      :      OUTPUTS:
2541      :      REGISTERS:      R2
2542      :      CALLS:      CMDAC, FIRSTU, VFISU, NEXTU, CKHAE.
2543
2544 012534 VFEXC:: LET CMDPKT := CMDWRD CLR.BY #BRF.C ;COMMAND PACKET = READ REV OR FWD.
2545 012534 013737 003056 002310      MOV      CMDWRD,CMDPKT
2546 012542 042737 004000 002310      BIC      #BRF.C,CMDPKT
2547 012550      IFB SWBFLG NE #0 THEN      ;IF BYTES ARE TO BE SWAPPED:
2548 012550 105737 003150      TSTB     SWBFLG
2549 012554 001403      BEQ      50216$
2550 012556      LET CMDPKT := CMDPKT SET.BY #SWB.C ;SET SWAB BIT IN CMD PACKET.
2551 012556 052737 010000 002310      BIS      #SWB.C,CMDPKT
2552 012564      ENDIF
2553 012564
2554 012564      LET CMDSAV := CMDPKT      ;SAVE COMMAND PACKET 1ST WORD.
2555 012564 013737 002310 003060      MOV      CMDPKT,CMDSAV
2556 012572 013737 003046 002312      MOV      DATARD,CMDPKT+CP.ADL ;SAVE BUFFER START ADDRESS.
2557 012600      LET NCNT := #0      ;CLEAR NUMBER OF OPERATIONS.
2558 012600 005037 003050      CLR      NCNT
2559 012604      WHILE NCNT L' NCNT1 DO      ;WHILE THERE ARE RECORDS REMAINING:
2560 012604      ;50217$:
2561 012604 023737 003050 003052      CMP      NCNT,NCNT1
2562 012612 002062      BGE      50220$
2563 012614 004737 007006      JSR PC,CMDAC      ;STORE CMD ASCII IN ERROR MSG.
2564 012620 004737 013462      JSR PC,FIRSTU    ;SET UP FOR FIRST UNIT.
2565 012624      WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE DEVICES REMAINING:
2566 012624      ;50221$:
2567 012624 026527 002532 177777      CMP      DEVTBL(R5),#END
2568 012632 001442      BEQ      50222$
2569 012634      IF #MOD.CO SETIN CMDWRD THEN ;IF CMD IS REVERSE THEN:
2570 012634 032737 000400 003056      BIT      #MOD.CO,CMDWRD
2571 012642 001421      BEQ      50223$
2572 012644      IF #X0.BOT NOTSETIN EOTFLG(R5) THEN ;IF NOT AT BOT
2573 012644 032765 000002 003134      BIT      #X0.BOT,EOTFLG(R
2574 012652 001014      BNE      50224$
2575 012654      IF #X0.EOT SETIN EOTFLG(R5) THEN ;BUT IF AT EOT
2576 012654 032765 000001 003134      BIT      #X0.EOT,EOTFLG(R
2577 012662 001406      BEQ      50225$
2578 012664      IFB ALLEOT NE #0 THEN      ;AND ALL OTHERS AT EOT
2579 012664 105737 003154      TSTB     ALLEOT
2580 012670 001402      BEQ      50226$
2581 012672 004737 012762      JSR PC,VFISU    ;THEN READ VERIFY
2582 012676      ENDIF      ;IF NOT ALL AT EOT, FREEZE UNIT(S)
2583 012676      ;50226$:
2584 012676      ELSE      ;IF NOT AT BOT AND
2585 012676 000402      BR      50227$
2586 012700      ;50225$:
2587 012700 004737 012762      JSR PC,VFISU    ;NOT AT EOT, READ VFY
2588 012704      ENDIF
2589 012704      ;50227$:
2590 012704      ENDIF
2591 012704      ;50224$:
2592 012704      ELSE      ;ELSE IF CMD IS NOT REVERSE:
2593 012704 000412      BR      50230$

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2594	012706								50223\$:
2595	012706								IF #X0.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
2596	012706	032765	000001	003134					BIT #X0.EOT,EOTFLG(R
2597	012714	001404							BEQ 50231\$
2598	012716	032737	000001	003056					BIT #CMD.CO,CMDWRD
2599	012724	001002							BNE 50232\$
2600	012726								50231\$:
2601									;IF NOT AT EOT OR NOT A MOTION CMD THEN:
2602	012726	004737	012762						;ISSUE CMD, CHECK STATUS AND DATA.
2603	012732								50232\$:
2604	012732								50230\$:
2605	012732								;GO FIND THE NEXT UNIT.
2606	012732								
2607	012732	004737	013530						
2608	012736								
2609	012736	000732							BR 50221\$
2610	012740								50222\$:
2611	012740	004737	014052						;CHECK FOR HALT AFTER EACH CMD.
2612	012744								;UPDATE THE RECORD COUNT.
2613	012744	005237	003050						INC NCNT
2614	012750								;SAVE PREVIOUS COMMAND WORD.
2615	012750	013737	003056	003062					MOV CMDWRD,PCMDWD
2616	012756								
2617	012756	000712							BR 50217\$
2618	012760								50220\$:
2619	012760	000207							;RETURN.

```

2620      :      SUBROUTINE TO ISSUE COMMAND, AWAIT INTERRUPT,
2621      :      CHECK STATUS, CHECK DATA.
2622      :      INPUTS:
2623      :      OUTPUTS:
2624      :      REGISTERS:      R2
2625      :      CALLS:      EXECUTE, GOWAIT, CKDATA.
2626
2627      012762      VFISU::      LET R2 := DATARD + #8.      ;INIT READ BUFFER POINTER.
2628      012762      013702      003046      MOV      DATARD,R2
2629      012766      062702      000010      ADD      #8.,R2
2630      012772      WMILE R2 NE DATARD DO      ;UNTIL 8 BYTES HAVE BEEN SET,
2631      012772      50233$:
2632      012772      020237      003046      CMP      R2,DATARD
2633      012776      001403      BEQ      50234$
2634      013000      LET -(R2) := #-1      ;INIT READ BUFFER.
2635      013000      012742      177777      MOV      #-1,-(R2)
2636      013004      ENDDO
2637      013004      000772      BR      50233$
2638      013006      50234$:
2639      013006      004737      007770      JSR PC,EXECUTE      ;GO EXECUTE THE COMMAND.
2640      013012      IFB DROPED EQ #0 THEN      ;IF UNIT HAS NOT BEEN DROPPED THEN:
2641      013012      105737      003152      TSTB      DROPED
2642      013016      001002      BNE      50235$
2643      013020      004737      010300      JSR      PC,GOWAIT      ;GO WAIT FOR DONE BIT.
2644      013024      ENDIF
2645      013024      50235$:
2646      013024      IFB DROPED EQ #0 THEN      ;IF UNIT HAS NOT BEEN DROPPED THEN:
2647      013024      105737      003152      TSTB      DROPED
2648      013030      001005      BNE      50236$
2649      013032      IF RECCNT(R5) NE #0 THEN      ;IF RECORD COUNT IS NOT 0 THEN:
2650      013032      005765      003034      TST      RECCNT(R5)
2651      013036      001402      BEQ      50237$
2652      013040      004737      013046      JSR      PC,CKDATA      ;GO VERIFY DATA.
2653      013044      ENDIF
2654      013044      50237$:
2655      013044      ENDIF
2656      013044      50236$:
2657      013044      000207      RTS PC
2658

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2659 : SUBROUTINE TO COMPARE DATA BETWEEN READ AND WRITE BUFFERS
2660 : AND PRINT ERROR MESSAGE ON MISCOMPARE.
2661 : INPUTS:
2662 : OUTPUTS:
2663 : REGISTERS: R2, R3, R4.
2664 : CALLS: GCMDB
2665
2666 013046 CKDATA:: LET R3 := BRFCNT - MSGPKT+MS.RFC ; COMPUTE REC LENGTH READ
2667 013046 013703 003054 MOV BRFCNT,R3
2668 013052 163703 002340 SUB MSGPKT+MS.RFC,R3
2669 013056 IF R3 EQ #0 THEN ; WHEN NO DATA RECEIVED
2670 013056 005703 TST R3
2671 013060 001015 BNE 50240$
2672 013062 ERRHRD 17,WTVERM,DTAERM ; PRINT ERROR AND EXIT
2673 013062 104456 TRAP C$ERHRD
2674 013064 000021 .WORD 17
2675 013066 003670 .WORD WTVERM
2676 013070 004720 .WORD DTAERM
2677 013072 PRINTB #DTAER4 ; COMPARE ROUTINE
2678 013072 012746 004514 MOV #DTAER4,-(SP)
2679 013076 012746 000001 MOV #1,-(SP)
2680 013102 010600 MOV SP,R0
2681 013104 104414 TRAP C$PNTB
2682 013106 062706 000004 ADD #4,SP
2683 013112 ELSE
2684 013112 000560 BR 50241$
2685 013114 50240$:
2686 013114 IF R3 HI BRFCNT THEN ; WHEN REC READ IS LONGER
2687 013114 020337 003054 CMP R3,BRFCNT
2688 013120 101417 BLOS 50242$
2689 013122 ERRHRD 17,WTVERM,DTAERM ; THAN EXPECTED, PRINT
2690 013122 104456 TRAP C$ERHRD
2691 013124 000021 .WORD 17
2692 013126 003670 .WORD WTVERM
2693 013130 004720 .WORD DTAERM
2694 013132 PRINTB #DTAERS,CMDPKT+CP.CNT ; AN ERROR MESSAGE
2695 013132 013746 002316 MOV CMDPKT+CP.CNT,-(
2696 013136 012746 004535 MOV #DTAERS,-(SP)
2697 013142 012746 000002 MOV #2,-(SP)
2698 013146 010600 MOV SP,R0
2699 013150 104414 TRAP C$PNTB
2700 013152 062706 000006 ADD #6,SP
2701 013156 ELSE ; AND EXIT ROUTINE
2702 013156 000536 BR 50243$
2703 013160 50242$:
2704 013160 LET CKDCNT := R3 - #1 ; SAVE VERIFICATION LENGTH - 1.
2705 013160 010337 013456 MOV R3,CKDCNT
2706 013164 005337 013456 DEC CKDCNT
2707 013170 005037 013460 CLR CKDFF ; CLEAR # OF BYTES IN ERROR COUNTER.
2708 013174 005002 CLR R2 ; INIT BYTE COUNTER
2709 013176 LET R3 := DATAWT ; GET WRITE BUFFER ADDRESS.
2710 013176 013703 003044 MOV DATAWT,R3
2711 013202 LET R4 := DATARD ; GET READ BUFFER ADDRESS.
2712 013202 013704 003046 MOV DATARD,R4
2713 013206 IFB T1SWB NE #0 THEN ; WHEN RUNNING TEST1-SUB
2714 013206 105737 003153 TSTB T1SWB

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2715 013212 001401
2716 013214 000313
2717 013216
2718 013216
2719 013216
2720 013216
2721 013216
2722 013216 020237 013456
2723 013222 001011
2724 013224
2725 013224 105737 003150
2726 013230 001406
2727 013232
2728 013232 032737 000001 013456
2729 013240 001002
2730 013242 105723
2731 013244 105724
2732 013246
2733 013246
2734 013246
2735 013246
2736 013246
2737 013246
2738 013246 121314
2739 013250 001452
2740 013252 005737 013460
2741 013256 001010
2742 013260 005265 003004
2743 013264 005265 003014
2744 013270
2745 013270 104456
2746 013272 000021
2747 013274 003670
2748 013276 004720
2749 013300
2750 013300 005237 013460
2751 013304 111437 003074
2752 013310 042737 177400 003074
2753 013316 111337 003076
2754 013322 042737 177400 003076
2755 013330
2756 013330 023727 013460 000013
2757 013336 002017
2758 013340
2759 013340 005046
2760 013342 153716 003076
2761 013346 005046
2762 013350 153716 003074
2763 013354 010246
2764 013356 012746 004403
2765 013362 012746 000004
2766 013366 010600
2767 013370 104415
2768 013372 062706 000012
2769 013376
2770 013376

```

```

SWAB (R3) ;SWAP FIRST WORD OF WRT BFR
ENDIF ;WHICH CONTAINS THE RECORD COUNT
REPEAT ;REPEAT UNTIL ALL DATA IS COMPARED:
IF R2 EQ CKDCNT THEN ;IF THIS IS THE LAST BYTE THEN:
    CMP R2,CKDCNT
    BNE 50246$
    IFB SWBFLG NE #0 THEN ;IF BYTE SWAPPING IS ENABLED THEN:
        TSTB SWBFLG
        BEQ 50247$
        IF #BIT00 NOTSETIN CKDCNT THEN ;IF RECORD LENGTH IS ODD THEN:
            BIT #BIT00,CKDCNT
            BNE 50250$
            TSTB (R3)+ ;LAST BYTE WILL BE IN
            TSTB (R4)+ ;THE UPPER BYTE.
        ENDIF
    ENDIF
ENDIF
ENDIF
ENDIF
CMPB (R3),(R4) ;ARE THEY EQUAL.
BEQ 3$ ;BR IF SO.
TST CKDFF ;1 ST TIME THRU?
BNE 2$ ;BR IF NOT.
INC VFYCNT(R5) ;INC THE VERIFY ERROR COUNTER.
INC HRDCNT(R5) ;INC THE HARD ERROR COUNT.
ERRHRD #17,WTVERM,DTAERM ;REPORT WRITE/VERIFY ERROR.
TRAP CSERHRD
.WORD 17
.WORD WTVERM
.WORD DTAERM
2$: LET CKDFF := CKDFF + #1 ;INCREMENT # OF BYTES IN ERROR.
INC CKDFF
MOV B (R4),TIME1 ;SAVE WAS DATA FOR TYP0UT.
BIC #177400,TIME1 ;CLEAR GARBAGE.
MOV B (R3),TIME2 ;SAVE SHOULD BE DATA FOR TYP0UT.
BIC #177400,TIME2 ;CLEAR GARBAGE.
IF CKDFF LT #11. THEN ;IF ERROR BYTE COUNT IS LESS THAN 11:
    CMP CKDFF,#11.
    BGE 50251$
    PRINTX #DTAER2,R2,<B,TIME1>,<B,TIME2> ;PRINT EXP + ACT DATA.
    CLR -(SP)
    BISB TIME2,(SP)
    CLR -(SP)
    BISB TIME1,(SP)
    MOV R2,-(SP)
    MOV #DTAER2,-(SP)
    MOV #4,-(SP)
    MOV SP,R0
    TRAP CSPNTX
    ADD #12,SP
ENDIF
50251$:

```

```

2771 013376 105723          3$:          TSTB (R3)+          ;UPDATE WRITE BUFFER ADDRESS.
2772 013400 105724          TSTB (R4)+          ;UPDATE READ BUFFER ADDRESS.
2773 013402 105722          TSTB (R2)+          ;UPDATE BYTE COUNTER.
2774 013404                UNTIL R2 GT CKDCNT  ;END OF DATA COMPARE REPEAT LOOP.
2775 013404 020237 013456                CMP          R2,CKDCNT
2776 013410 003702                BLE          50245$
2777 013412                LET CKDCNT := CKDCNT + #1 ;CKDCNT EQUALS RECORD LENGTH.
2778 013412 005237 013456                INC          CKDCNT
2779 013416                IF CKDFF NE #0 THEN ;IF COMPARE ERROR HAS OCCURED THEN:
2780 013416 005737 013460                TST          CKDFF
2781 013422 001414                BEQ          50252$
2782 013424                PRINTB #DTAER3,CKDFF,CKDCNT ;PRINT # OF BYTES IN ERROR.
2783 013424 013746 013456                MOV          CKDCNT,-(SP)
2784 013430 013746 013460                MOV          CKDFF,-(SP)
2785 013434 012746 004452                MOV          #DTAER3,-(SP)
2786 013440 012746 000003                MOV          #3,-(SP)
2787 013444 010600                MOV          SP,R0
2788 013446 104414                TRAP         C$PNTB
2789 013450 062706 000010                ADD          #10,SP
2790 013454                ENDIF
2791 013454                ENDIF          50252$:
2792 013454                ENDIF          50243$:
2793 013454                ENDIF          50241$:
2794 013454                RTS          PC ;OTHERWISE, RETURN.
2795 013454
2796 013454 000207
2797
2798 013456 000000          CKDCNT: .WORD 0 ;# OF BYTES TO BE VERIFIED -1.
2799 013460 000000          CKDFF:  .WORD 0 ;# OF BYTES IN ERROR COUNTER.

```

```
2800      :      SUBROUTINE TO FIND THE FIRST DEVICE IN THE TEST SEQUENCE.
2801      :      INPUTS:
2802      :      OUTPUTS:
2803      :      REGISTERS:
2804      :      CALLS:
2805
2806 013462      FIRSTU:: LET DROPE :B= #0      ;CLR UNIT DROPPED FLAG
2807 013462 105037 003152      ;CLRB      DROPE
2808 013466      LET R5 := #0      ;CLR DEVICE POINTER.
2809 013466 005005      ;CLR      R5
2810 013470      WHILE DEVTBL(R5) EQ #NINUSE DO ;WHILE DEVICES ARE NOT IN USE:
2811 013470      50253$:
2812 013470 026527 002532 177774      CMP      DEVTBL(R5),#NINU
2813 013476 001003      BNE      50254$
2814 013500      LET R5 := R5 + #2      ;POINT TO NEXT DEVICE.
2815 013500 062705 000002      ADD      #2,R5
2816 013504      ENDDO
2817 013504 000771      BR      50253$
2818 013506      50254$:
2819 013506      IF DEVTBL(R5) EQ #END THEN ;IF ALL UNITS HAVE BEEN DROPPED THEN:
2820 013506 026527 002532 177777      CMP      DEVTBL(R5),#END
2821 013514 001001      BNE      50255$
2822 013516      DOCLN      ;DO CLEAN CODE AND TERMINATE PASS.
2823 013516 104444      TRAP      C$DCLN
2824 013520      ENDIF
2825 013520      50255$:
2826 013520      LET L$LUN := DEVTBL(R5) ;SET UNIT # IN 'HEADER' FOR ERROR REPORT
2827 013520 016537 002532 002074      MOV      DEVTBL(R5),L$LUN
2828 013526 000207      RTS      PC      ;RETURN WITH 1ST DEVICE IN R5.
```

```
2834      :      SUBROUTINE TO FIND THE NEXT UNIT IN THE TEST CYCLE.
2835      :      INPUTS:
2836      :      OUTPUTS:
2837      :      REGISTERS:
2838      :      CALLS:
2839
2840 013530      NEXTU:: LET DROPE :B= #0      ;CLR UNIT DROPPED FLAG
2841 013530 105037 003152      ;CLRB      DROPE
2842 013534      REPEAT      ;REPEAT UNTIL THE NEXT DEVICE IS FOUND.
2843 013534      50256$:
2844 013534      LET R5 := R5 + #2      ;UPDATE DEVICE TABLE POINTER.
2845 013534 062705 000002      ADD      #2,R5
2846 013540      UNTIL DEVTBL(R5) NE #NINUSE
2847 013540 026527 002532 177774      CMP      DEVTBL(R5),#NINU
2848 013546 001772      BEQ      50256$
2849 013550      LET L$LUN := DEVTBL(R5) ;SET UNIT # IN 'HEADER' FOR ERROR REPORT
2850 013550 016537 002532 002074      MOV      DEVTBL(R5),L$LUN
2851 013556 000207      RTS      PC      ;RETURN.
```

2852
2853
2854

```

2855 : SUBROUTINE TO DROP A DEVICE FROM THE TEST SEQUENCE.
2856 : INPUTS:
2857 : OUTPUTS:
2858 : REGISTERS:
2859 : CALLS:          MOVMSG, PRXST, LOG
2860
2861 013560 DROPU:: LET FTLCNT(R5) := FTLCNT(R5) + #1 ;INCREMENT THE FATAL ERROR COUNT.
2862 013560 005265 003024          INC      FTLCNT(R5)
2863 013564          LET R4 := MSGPKT+MS.XS3 CLR.BY #377 ;GET UDIAG ERROR CODE FROM XSTAT3.
2864 013564 013704 002350          MOV      MSGPKT+MS.XS3,R4
2865 013570 042704 000377          BIC      #377,R4
2866 013574          LET R3 := MSGPKA(R5)          ;ADR OF THIS UNIT'S MSG PACKET.
2867 013574 016503 002502          MOV      MSGPKA(R5),R3
2868 013600          LET R2 := #0          ;CLR COUNTER.
2869 013600 005002          WHILE R2 NE #MSGCNT DO          ;WHILE THERE ARE MORE LOCATIONS:
2870 013602          ;                               50257$:
2871 013602          ;                               CMP      R2,#MSGCNT
2872 013602 020227 000016          ;                               BEQ      50260$
2873 013606 001405          ;                               LET (R3)+ := #-1          ;INIT THE MSG PACKET WITH ALL 1'S
2874 013610          ;                               MOV      #-1,(R3)+
2875 013610 012723 177777          ;                               LET R2 := R2 + #2          ;UPDATE COUNTER.
2876 013614          ;                               ADD      #2,R2
2877 013614 062702 000002          ;                               ENDDO
2878 013620          ;                               BR      50257$
2879 013620 000770          ;                               50260$:
2880 013622          ;                               LET @TSDB(R5) := #GSCP
2881 013622          ;                               ;INITIATE A GET STATUS COMMAND.
2882 013622 012775 002320 002452          ;                               MOV      #GSCP,@TSDB(R5)
2883 013630 004737 010520          ;                               JSR PC,WSSR          ;WAIT A WHILE FOR SSR=1
2884 013634 004737 010554          ;                               JSR PC,MOVMSG        ;MOVE MSG PACKET TO COMMON AREA.
2885 013640          ;                               IF R4 EQ #X3.RNY THEN          ;IF WE HAVE A CAPSTAN RUNAWAY THEN:
2886 013640 020427 157400          ;                               CMP      R4,#X3.RNY
2887 013644 001005          ;                               BNE      50261$
2888 013646          ;                               ERRDF #16,RNYM,STAERM          ;REPORT CAPSTAN RUNAWAY WITH TACH CNT.
2889 013646 104455          ;                               TRAP    C$ERDF
2890 013650 000020          ;                               .WORD  16
2891 013652 004210          ;                               .WORD  RNYM
2892 013654 005066          ;                               .WORD  STAERM
2893 013656          ELSE          ;ELSE-IF NOT A RUNAWAY:
2894 013656 000402          ;                               BR      50262$
2895 013660          ;                               50261$:
2896 013660 004737 013770          ;                               JSR PC,PRXST          ;PRINT EXTENDED STATUS REGISTERS.
2897 013664          ;                               ENDF
2898 013664          ;                               50262$:
2899 013664          ;                               IFB RECLOG NE #0 THEN          ;IF THE RECORD HAS BEEN LOGGED THEN:
2900 013664 105737 003116          ;                               TSTB   RECLOG
2901 013670 001404          ;                               BEQ    50263$
2902 013672          ;                               LET DROPED :B= DROPED + #1          ;SET UNIT DROPPED FLAG.
2903 013672 105237 003152          ;                               INCB   DROPED
2904 013676 004737 012150          ;                               JSR PC,LOG          ;LOG DATA BYTES + RD/WR ERRORS.
2905 013702          ;                               ENDF
2906 013702          ;                               50263$:
2907 013702          ;                               DURPT          ;PRINT PERFORMANCE REPORT
2908 013702 104424          ;                               TRAP   C$DRPT
2909 013704          DROPUA: IF PASCNT(R5) NE #0 THEN          ;
2910 013704 005765 002764          ;                               TST    PASCNT(R5)

```

```

2911 013710 001402
2912 013712
2913 013712 005365 002764
2914 013716
2915 013716
2916 013716
2917 013716 016537 002532 013766
2918 013724
2919 013724 010500
2920 013726 006200
2921 013730
2922 013730 104451
2923 013732
2924 013732 026527 002532 177774
2925 013740 001407
2926 013742
2927 013742 105737 002211
2928 013746 001004
2929 013750
2930 013750 005075 002462
2931 013754
2932 013754 105237 003156
2933 013760
2934 013760
2935 013760
2936 013760
2937 013760
2938 013760 105237 003152
2939 013764 000207
2940
2941 013766 000000

```

```

                    LET PASCNT(R5) := PASCNT(R5) - #1
                    ENDIF
                    LET DROPN := DEVTBL(R5)
                    LET RO := R5 SHIFT -1
                    DODU RO
                    IF DEVTBL(R5) NE #NINUSE THEN
                        IFB IREC EQ #0 THEN
                            LET @TSSR(R5) := #0
                            LET STAFLG :B= STAFLG + #1
                        ENDIF
                    ENDIF
                    DRORTN: LET DROPED :B= DROPED + #1
                    RTS PC
                    DROPN: .WORD 0

```

```

                    ;SAVE # OF UNIT TO BE DROPPED.
                    ;RO=LOGICAL DEVICE NUMBER
                    ;DROP THE UNIT: EXEC BGNDDU-ENDDU CODE IF IDU = 0
                    ;IF UNIT NOT DROPPED
                    ;IF RECOVERY IS ENABLED THEN:
                    ;ISSUE SUBSYSTEM INIT
                    ;SET START FLAG TO ENABLE REWIND,
                    ;# OF UNIT TO BE DROPPED

```

```

50264$:
MOV DEVTBL(R5),DROPN
MOV R5,RO
ASR RO
TRAP C%DODU
CMP DEVTBL(R5),#NINU
BEQ 50265$
TSTB IREC
BNE 50266$
CLR @TSSR(R5)
INCB STAFLG
50266$:
50265$:
INCB DROPED

```



```

2942      :      SUBROUTINE TO PRINT EXTENDED STATUS REGISTERS.
2943      :      INPUTS:
2944      :      OUTPUTS:
2945      :      REGISTERS:
2946      :      CALLS:
2947
2948      PRXST:: PRINTX #GETSTM
2949      013770      012746      004663      MOV      #GETSTM,-(SP)
2950      013774      012746      000001      MOV      #1,-(SP)
2951      014000      010600      MOV      SP,R0
2952      014002      104415      TRAP    C$PNTX
2953      014004      062706      000004      ADD     #4,SP
2954      014010      PRINTX #STAERS,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3
2955      014010      013746      002350      MOV     MSGPKT+MS.XS3,-(
2956      014014      013746      002346      MOV     MSGPKT+MS.XS2,-(
2957      014020      013746      002344      MOV     MSGPKT+MS.XS1,-(
2958      014024      013746      002342      MOV     MSGPKT+MS.XS0,-(
2959      014030      012746      005713      MOV     #STAERS,-(SP)
2960      014034      012746      000005      MOV     #5,-(SP)
2961      014040      010600      MOV     SP,R0
2962      014042      104415      TRAP    C$PNTX
2963      014044      062706      000014      ADD     #14,SP
2964      014050      000207      RTS    PC
2965
2966
2967
2968
2969      :      SUBROUTINE TO HALT AFTER EACH COMMAND.
2970      :      INPUTS:
2971      :      OUTPUTS:
2972      :      REGISTERS:      R3, R4
2973      :      CALLS:
2974
2975      CKHAE:: IFB HAE NE #0 THEN      ;IF HALT FLAG IS SET:
2976      014052      105737      002204      TSTB   HAE
2977      014056      001422      BEQ    50267$
2978      014060      MANUAL      ;IS MANUAL INTERVENTION ALLOWED?
2979      014060      104450      TRAP   C$MANI
2980      014062      BNCOMPLETE CKHRTN      ;BR IF NOT.
2981      014062      103020      BCC    CKHRTN
2982      014064      LET R4 := CMDWRD      ;COMMAND WORD.
2983      014064      013704      003056      MOV    CMDWRD,R4
2984      014070      004737      007060      JSR   PC,GCMDA      ;FETCH ADR OF CMD ASCII.
2985      014074      LET HALTM :B= (R3)+      ;MOVE CMD ASCII
2986      014074      112337      003546      MOVB  (R3)+,HALTM
2987      014100      LET HALTM+1 :B= (R3)+
2988      014100      112337      003547      MOVB  (R3)+,HALTM+1
2989      014104      LET HALTM+2 :B= (R3)      ;INTO MESSAGE.
2990      014104      111337      003550      MOVB  (R3),HALTM+2
2991      014110      GMANIL HALTM,TIME1,1,YES ;HALT - WAIT FOR AN OEPRAOR INPUT.
2992      014110      104443      TRAP   C$GMAN
2993      014112      000404      BR     10000$
2994      014114      003074      .WORD TIME1
2995      014116      000130      .WORD T$CODE
2996      014120      003546      .WORD HALTM
2997      014122      000001      .WORD 1

```

GLOBAL AREAS
CZTSHB.P11

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GLOBAL SUBROUTINES SECTION

SEQ 0112

2998 014124
2999 014124
3000 014124
3001 014124 000207
3002
3003
3004 014126

10000\$:
ENDIF
CKHRTN: RTS PC
.EVEN
ENDMOD

;RETURN 50267\$:

```

3005
3006          .TITLE MISCELLANEOUS SECTIONS
3007          .SBTTL  REPORT CODING SECTION
3008
3009 014126          BGNMOD
3010
3011          :++
3012          : THE REPORT CODING SECTION CONTAINS THE
3013          : 'PRINTS' CALLS THAT GENERATE STATISTICAL REPORTS.
3014          :--
3015
3016 014126          BGNRPT
3017 014126          L$RPT::
3018
3019
3020 014126          LET      R$SAVE := R5          ;SAVE CURRENT DEVICE POINTER.
3021 014126 010537 003110          MOV      R5,R$SAVE
3022 014132 004737 013462          JSR      PC,FIRSTU          ;FIND THE FIRST UNIT.
3023 014136          WHILE DEVTBL(R5) NE #END DO    ;WHILE THERE ARE MORE DEVICES:
3024 014136          50270$:
3025 014136 026527 002532 177777          CMP      DEVTBL(R5),#END
3026 014144 001555          BEQ      50271$
3027 014146          PRINTS      #RPT1A,DEVTBL(R5),PASCNT(R5),RECCNT(R5)
3028 014146 016546 003034          MOV      RECCNT(R5),-(SP)
3029 014152 016546 002764          MOV      PASCNT(R5),-(SP)
3030 014156 016546 002532          MOV      DEVTBL(R5),-(SP)
3031 014162 012746 014510          MOV      #RPT1A,-(SP)
3032 014166 012746 000004          MOV      #4,-(SP)
3033 014172 010600          MOV      SP,R0
3034 014174 104416          TRAP    C$PNTS
3035 014176 062706 000012          ADD      #12,SP
3036 014202          PRINTS      #RPT1B,WRBC+30(R5),WRBC+20(R5),WRBC+10(R5),WRBC(R5)
3037 014202 016546 002544          MOV      WRBC(R5),-(SP)
3038 014206 016546 002554          MOV      WRBC+10(R5),-(SP)
3039 014212 016546 002564          MOV      WRBC+20(R5),-(SP)
3040 014216 016546 002574          MOV      WRBC+30(R5),-(SP)
3041 014222 012746 014565          MOV      #RPT1B,-(SP)
3042 014226 012746 000005          MOV      #5,-(SP)
3043 014232 010600          MOV      SP,R0
3044 014234 104416          TRAP    C$PNTS
3045 014236 062706 000014          ADD      #14,SP
3046 014242          PRINTS      #RPT1C,RRBC+30(R5),RRBC+20(R5),RRBC+10(R5),RRBC(R5)
3047 014242 016546 002604          MOV      RRBC(R5),-(SP)
3048 014246 016546 002614          MOV      RRBC+10(R5),-(SP)
3049 014252 016546 002624          MOV      RRBC+20(R5),-(SP)
3050 014256 016546 002634          MOV      RRBC+30(R5),-(SP)
3051 014262 012746 014636          MOV      #RPT1C,-(SP)
3052 014266 012746 000005          MOV      #5,-(SP)
3053 014272 010600          MOV      SP,R0
3054 014274 104416          TRAP    C$PNTS
3055 014276 062706 000014          ADD      #14,SP
3056 014302          PRINTS      #RPT1D,RFBC+30(R5),RFBC+20(R5),RFBC+10(R5),RFBC(R5)
3057 014302 016546 002644          MOV      RFBC(R5),-(SP)
3058 014306 016546 002654          MOV      RFBC+10(R5),-(SP)
3059 014312 016546 002664          MOV      RFBC+20(R5),-(SP)
3060 014316 016546 002674          MOV      RFBC+30(R5),-(SP)

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3061	014322	012746	014707						MOV	#RPT1D,-(SP)
3062	014326	012746	000005						MOV	#5,-(SP)
3063	014332	010600							MOV	SP,R0
3064	014334	104416							TRAP	C&PNTS
3065	014336	062706	000014						ADD	#14,SP
3066	014342			PRINTS		#RPT1F,WRREC(R5),RRREC(R5),RFREC(R5)				
3067	014342	016546	002744						MOV	RFREC(R5),-(SP)
3068	014346	016546	002724						MOV	RRREC(R5),-(SP)
3069	014352	016546	002704						MOV	WRREC(R5),-(SP)
3070	014356	012746	015013						MOV	#RPT1F,-(SP)
3071	014362	012746	000004						MOV	#4,-(SP)
3072	014366	010600							MOV	SP,R0
3073	014370	104416							TRAP	C&PNTS
3074	014372	062706	000012						ADD	#12,SP
3075	014376			PRINTS		#RPT1G,WRUNR(R5),RRUNR(R5),RFUNR(R5)				
3076	014376	016546	002754						MOV	RFUNR(R5),-(SP)
3077	014402	016546	002734						MOV	RRUNR(R5),-(SP)
3078	014406	016546	002714						MOV	WRUNR(R5),-(SP)
3079	014412	012746	015064						MOV	#RPT1G,-(SP)
3080	014416	012746	000004						MOV	#4,-(SP)
3081	014422	010600							MOV	SP,R0
3082	014424	104416							TRAP	C&PNTS
3083	014426	062706	000012						ADD	#12,SP
3084	014432			PRINTS		#RPT1I,SCCNT(R5),HRDCNT(R5),FTLCNT(R5),VFYCNT(R5)				
3085	014432	016546	003004						MOV	VFYCNT(R5),-(SP)
3086	014436	016546	003024						MOV	FTLCNT(R5),-(SP)
3087	014442	016546	003014						MOV	HRDCNT(R5),-(SP)
3088	014446	016546	002774						MOV	SCCNT(R5),-(SP)
3089	014452	012746	015213						MOV	#RPT1I,-(SP)
3090	014456	012746	000005						MOV	#5,-(SP)
3091	014462	010600							MOV	SP,R0
3092	014464	104416							TRAP	C&PNTS
3093	014466	062706	000014						ADD	#14,SP
3094	014472	004737	013530	JSR	PC,NEXTU					:FIND THE NEXT UNIT.
3095	014476			ENDDO						
3096	014476	000617							BR	50270\$
3097	014500									50271\$:
3098	014500			LET R5 := R5SAVE						:RESTORE CURRENT DEVICE
3099	014500	013705	003110						MOV	POINTER, R5SAVE,R5
3100	014504			EXIT	RPT					
3101	014504	000167							.WORD	J\$JMP
3102	014506	000540							.WORD	L10010-2-
3103										
3104										
3105										
014510	047045	047045	040445	RPT1A:	.ASCIZ	/N%N%AUNIT %D1%\$3%APASS:%D5%\$3%ARECORD:%D5%N/				
014565	045	041101	052131	RPT1B:	.ASCIZ	/%BYTES WRITTEN %D3%A,%Z3%A,%Z3%A,%Z3%N/				
014636	040445	054502	042524	RPT1C:	.ASCIZ	/%BYTES READ REV %D3%A,%Z3%A,%Z3%A,%Z3%N/				
014707	045	041101	052131	RPT1D:	.ASCIZ	/%BYTES READ FWD %D3%A,%Z3%A,%Z3%A,%Z3%N/				
014757	045	031123	022463		.ASCIZ	/%S23%AWRT%\$4%ARDR%\$4%ARDF%N/				
015013	045	051101	041505	RPT1F:	.ASCIZ	/%ARECOVERABLE ERRORS %D5%\$2%D5%\$2%D5%N/				
015064	040445	047125	042522	RPT1G:	.ASCIZ	/%AUNRECOVERABLE ERRORS %D5%\$2%D5%\$2%D5%N%N/				
015136	040445	050123	041505		.ASCIZ	''%ASPEC COND%\$3%AHARD%\$3%AFATAL%\$3%ACOMPARE%N''				
015213	045	031523	042045	RPT1I:	.ASCIZ	/%\$3%D5%\$3%D5%\$3%D5%\$3%D5%N%N/				
				.LIST	BEX					
				.EVEN						

```
3107
3108 015250
3109 015250
3110 015250 104425
3111
3112 .SBTTL LOAD DEVICE PROTECTION TABLE
3113
3114 :++
3115 :TABLE FOR SUPERVISOR TO IDENTIFY THE P-TBL FOR THE LOAD DEV
3116 :THE SUPERVISOR USES THE TBL TO WARN THE OPERATOR WHEN HE TRIES TO TEST THE LOAD DEV
3117 :--
3118
3119 015252
3120 015252
3121 015252 000000
3122 015254 177777
3123 015256 177777
3124 015260

                                ENDRPT
L10010:
                                TRAP   CSRPT

                                BGNPROT
L$PROT::
                                .WORD 0
                                .WORD -1
                                .WORD -1
                                ENDPROT

                                :P-TBL OFFSET OF TSSR, THE TS11 CSR
                                :P-TBL OFFSET OF MASS BUS UNIT #: -1 = NOT A MASS BUS DE
                                :P-TBL OFFSET OF DRIVE #: -1 - NONE, ONE DRIVE PER UNIBU
```

```

3125 .SBTTL INITIALIZE SECTION
3126
3127
3128 ;++
3129 ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
3130 ; AT THE BEGINNING OF EACH PASS.
3131 ;--
3132 015260 BGNINIT
3133 015260 L$INIT::
3134
3135 015260 INIT10: IF #BIT0!BIT1 SETIN #CMDPKT THEN ;IF CMD PACKET IS NOT ON MODULO 4 BOUNDRY:
3136 015260 032727 000003 002310 BIT #BIT0!BIT1,#CMDP
3137 015266 001421 BEQ 50272$
3138 015270 ERRSF #1,CMDPKM ;PRINT ERROR MSG, TRAP C$ERSF
3139 015270 104454 .WORD 1
3140 015272 000001 .WORD CMDPKM
3141 015274 003606 .WORD 0
3142 015276 000000 DELAY 2000. ;GO TO SUPERVISOR, WAIT 2 SECONDS.
3143 015300 MOV #2000.,(PC)+
3144 015300 012727 003720 .WORD 0
3145 015304 000000 MOV L$DLY,(PC)+
3146 015306 013727 002116 .WORD 0
3147 015312 000000 DEC -6(PC)
3148 015314 005367 177772 BNE -.4
3149 015320 001375 DEC -22(PC)
3150 015322 005367 177756 BNE .-20
3151 015326 001367
3152 015330 000753 BR INIT10
3153 015332 ENDIF ;
3154 015332 50272$:
3155
3156 015332 IFB CLRFLG NE #0 THEN ;IF CLR COUNTERS FLAG SET:
3157 015332 105737 002202 TSTB CLRFLG
3158 015336 001413 BEQ 50273$
3159 015340 105037 002202 CLR CLRFLG
3160 015344 CLR R2
3161 015344 005002
3162 015346 WHILE R2 NE #CNTLEN DO
3163 015346 50274$:
3164 015346 020227 000270 CMP R2,#CNTLEN
3165 015352 001405 BEQ 50275$
3166 015354 LET WRBC(R2) := #0 ;CLR ALL STATISTICAL COUNTERS.
3167 015354 005062 002544 CLR WRBC(R2)
3168 015360 LET R2 := R2 + #2
3169 015360 062702 000002 ADD #2,R2
3170 015364 ENDDO
3171 015364 000770 BR 50274$
3172 015366 50275$:
3173 015366 ENDIF
3174 015366 50273$:
3175
3176 015366 IFB RRVN NE #0 THEN ;IF RESET RANDOM VARIABLE FLAG IS SET THEN:
3177 015366 105737 002203 TSTB RRVN
3178 015372 001406 BEQ 50276$
3179 015374 LET RANB := #RANBC ;RESET RANDOM BASE #.
3180 015374 012737 153624 003070 MOV #RANBC,RANB

```

3181	015402			LET RANS := #RANSC	;RESET RANDOM SAVE LOCATION.
3182	015402	012737	032561		MOV #RANSC,RANS
3183	015410			ENDIF	
3184	015410				50276\$:
3185	015410			READEF #EF.START	;READ START COMMAND EVENT FLAG.
3186	015410	012700	000040		MOV #EF.START,RO
3187	015414	104447			TRAP CS\$REFG
3188	015416			BNCOMPLETE INIT15	;BRANCH IF NOT STARTING.
3189	015416	103026			BCC INIT15
3190	015420			LET STAF LG :B= STAF LG + #1	;SET START COMMAND FLAG.
3191	015420	105237	003156		INCB STAF LG
3192	015424			LET R5 := #6	
3193	015424	012705	000006	REPEAT	MOV #6,R5
3194	015430				;INITIATE UNIT NUMBER TABLE
3195	015430				50277\$:
3196	015430			LET DEVTBL(R5) := #NINUSE	;BY STORING NOT IN USE IN EACH LOCATION.
3197	015430	012765	177774		MOV #NINUSE,DEVTBL(R
3198	015436			LET R5 := R5 - #2	
3199	015436	162705	000002		SUB #2,R5
3200	015442			UNTIL R5 EQ #0	
3201	015442	005705			TST R5
3202	015444	001371			BNE 50277
3203	015446			LET R5 := L\$UNIT SHIFT 1	
3204	015446	013705	002012		MOV L\$UNIT,R5
3205	015452	006305			ASL R5
3206	015454			REPEAT	;STORE ALL UNIT
3207	015454				50300\$:
3208	015454			LET R5 := R5 - #2	;NUMBERS IN DEVTBL.
3209	015454	162705	000002		SUB #2,R5
3210	015460			LET DEVTBL(R5) := R5 SHIFT -1	
3211	015460	010565	002532		MOV R5,DEVTBL(R5)
3212	015464	006265	002532		ASR DEVTBL(R5)
3213	015470			UNTIL R5 EQ #0	
3214	015470	005705			IST R5
3215	015472	001370			BNE 50300\$
3216					
3217	015474			INIT15: READEF #EF.PWR	;HAS THERE BE A POWER FAILURE?
3218	015474	012700	000034		MOV #EF.PWR,RO
3219	015500	104447			TRAP CS\$REFG
3220	015502			BNCOMPLETE INIT16	;BRANCH IF NOT.
3221	015502	103004			BCC INIT16
3222	015504			LET STAF LG :B= STAF LG + #1	;IF SO - SET THE START FLAG.
3223	015504	105237	003156		INCB STAF LG
3224	015510			LET PWRFLG :B= PWRFLG + #1	;IF SO - SET THE POWER FAIL FLAG.
3225	015510	105237	003157		INCB PWRFLG
3226					
3227	015514			INIT16: RFLAGS OPFLAG	;READ AND STORE FLAGS SET BY OPERATOR
3228	015514	104421			TRAP CS\$RFLA
3229	015516	010037	003162		MOV RO,OPFLAG
3230	015522			LET R3 := #0	;CLEAR EVENT FLAG
3231	015522	005003			CLR R3
3232	015524			IFB PWRFLG EQ #0 THEN	;IF POWER FAIL HAS NOT OCCURRED THEN:
3233	015524	105737	003157		TSTB PWRFLG
3234	015530	001020			BNE 50301\$
3235	015532			READEF #EF.NEW	;UPDATE PASS COUNT WHEN
3236	015532	012700	000035		MOV #EF.NEW,RO

3237	015536	104447					TRAP	C\$REFG
3238	015540			IFCOND CS THEN			;SUPERVISOR IS IN NEW PASS	
3239	015540	103014					BCC	50302\$
3240	015542			IFB STAFLG EQ #0 THEN			;AND DIAG WAS NEITHER STARTED	
3241	015542	105737	003156				TSTB	STAFLG
3242	015546	001010					BNE	50303\$
3243	015550			READEF #EF.RES			;NOR	
3244	015550	012700	000037				MOV	#EF.RES,RO
3245	015554	104447					TRAP	C\$REFG
3246	015556			IFCOND CC THEN			;RESTARTED	
3247	015556	103402					BCS	50304\$
3248	015560			LET R3 := COMP R3			;DO IT	
3249	015560	005103					COM	R3
3250	015562			ELSE				
3251	015562	000401					BR	50305\$
3252	015564						50304\$:	
3253	015564			LET R3 := R3 + #1			;SET 1ST PASS IF NEW PASS AND	
3254	015564	005203					INC	R3
3255	015566			ENDIF			;RESTARTING	
3256	015566						50305\$:	
3257	015566			ELSE				
3258	015566	000401					BR	50306\$
3259	015570						50303\$:	
3260	015570			LET R3 := R3 + #1			;SET 1ST PASS IF NEW PASS AND	
3261	015570	005203					INC	R3
3262	015572			ENDIF			;STARTING	
3263	015572						50306\$:	
3264	015572			ENDIF			;DO NOT UPDATE IT ON CONTINUE	
3265	015572						50302\$:	
3266	015572			ENDIF			;OR ON POWER FAIL	
3267	015572						50301\$:	
3268	015572	004737	013462	JSR PC,FIRSTU			;INIT DEVICE POINTER.	
3269	015576			LET R2 := #0			;INIT DEVICE COUNTER.	
3270	015576	005002					CLR	R2
3271	015600			WHILE DEVTBL(R5) NE #END DO				
3272	015600						50307\$:	
3273	015600	026527	002532				CMP	DEVTBL(R5),#END
3274	015606	001450					BEQ	50310\$
3275	015610			LET R2 := R2 + #1				
3276	015610	005202					INC	R2
3277	015612			LET RO := R5 SHIFT -1				
3278	015612	010500					MOV	R5,RO
3279	015614	006200					ASR	RO
3280	015616			GPHARD RO,RO			;GET HARDWARE P TABLE FROM SUPER.	
3281	015616	104442					TRAP	C\$GPHRD
3282	015620			IFCOND CS THEN				
3283	015620	103036					BCC	50311\$
3284	015622			LET TSSR(R5) := (RO)			;SAVE TSSR ADDRESS.	
3285	015622	011065	002462				MOV	(RO),TSSR(R5)
3286	015626			LET TSDB(R5) := (RO)+ - #2			;SAVE TSDB ADDRESS.	
3287	015626	012065	002452				MOV	(RO)+,TSDB(R5)
3288	015632	162765	000002		002452		SUB	#2,TSDB(R5)
3289	015640			LET TSVCT(R5) := (RO)			;SAVE INTERRUPT VECTOR ADDRESS.	
3290	015640	011065	002472				MOV	(RO),TSVCT(R5)
3291	015644			SETVEC TSVCT(R5),TS4INT(R5),#INTPRI			;SET UP INTERUPT PROCESSING CONDITIONS.	
3292	015644	012746	000340				MOV	#INTPRI,-(SP)

3293	015650	016546	002512			MOV	TS4INT(R5),-(SP)
3294	015654	016546	002472			MOV	TSVCT(R5),-(SP)
3295	015660	012746	000003			MOV	#3,-(SP)
3296	015664	104437				TRAP	C\$SVEC
3297	015666	062706	000010			ADD	#10,SP
3298	015672			IF R3 NE #0 THEN			
3299	015672	005703					
3300	015674	001410				TST	R3
3301	015676			IF R3 LT #0 THEN		BEQ	50312\$
3302	015676	005703				TST	R3
3303	015700	002003				BGE	50313\$
3304	015702			LET PASCNT(R5) := PASCNT(R5) + #1			
3305	015702	005265	002764			INC	PASCNT(R5)
3306	015706			ELSE			
3307	015706	000403				BR	50314\$
3308	015710						50313\$:
3309	015710			LET PASCNT(R5) := #1			
3310	015710	012765	000001	002764		MOV	#1,PASCNT(R5)
3311	015716			ENDIF			
3312	015716						50314\$:
3313	015716			ENDIF			
3314	015716						50312\$:
3315	015716			ENDIF			
3316	015716						50311\$:
3317	015716			LET RECCNT(R5) := #0			
3318	015716	005065	003034				
3319	015722	004737	013530	JSR PC,NEXTU			
3320	015726			ENDDO			
3321	015726	000724				BR	50307\$
3322	015730						50310\$:
3323							
3324	015730			IF R2 EQ #0 THEN			
3325	015730	005702					
3326	015732	001026				TST	R2
3327	015734					BNE	50315\$
3328	015734	012746	004351	PRINTF #AUDRPM			
3329	015740	012746	000001				
3330	015744	010600				MOV	#AUDRPM, -(SP)
3331	015746	104417				MOV	#1, -(SP)
3332	015750	062706	000004			MOV	SP, R0
3333	015754			DELAY 2000.		TRAP	C\$PNTF
3334	015754	012727	003720			ADD	#4, SP
3335	015760	000000					
3336	015762	013727	002116				
3337	015766	000000				MOV	#2000., (PC)+
3338	015770	005367	177772			.WORD	0
3339	015774	001375				MOV	L\$DLY, (PC)+
3340	015776	005367	177756			.WORD	0
3341	016002	001367				DEC	-6(PC)
3342	016004			BREAK		BNE	-.4
3343	016004	104422				DEC	-22(PC)
3344	016006			DOCLN		BNE	.-20
3345	016006	104444					
3346	016010			ENDIF			
3347	016010						
3348							

50315\$:

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3349 016010                SETPRI #PRI00                ;LOWER CPU PRIORITY TO 0
3350 016010 012700 000000                MOV #PRI00,R0
3351 016014 104441                TRAP C$SPRI
3352 016016                IFB IREC EQ #0 AND #ADR NOTSETIN OPFLAG THEN ;IF ERROR RECOVERY IS ENABLED
3353 016016 105737 002211                TSTB IREC
3354 016022 001145                BNE 50316$
3355 016024 032737 000020 003162        BIT #ADR,OPFLAG
3356 016032 001141                BNE 50316$
3357 016034 004737 013462                JSR PC,FIRSTU                ;AND AUTO-DROP NOT CALLED, THEN SET UP FOR FIRST
3358 016040                WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE DEVICES:
3359 016040                50317$:
3360 016040 026527 002532 177777        CMP DEVTBL(R5),#END
3361 016046 001533                BEQ 50320$
3362 016050                BEGIN COUNTER                ;START 3.5 MINUTE COUNTER
3363 016050                INCR TIME1 FROM #1 TO #25 BY #1
3364 016050 012737 000001 003074        MOV #1,TIME1
3365 016056 000402                BR 50322$
3366 016060                50323$:
3367 016060 005237 003074                INC TIME1
3368 016064                50322$:
3369 016064 023727 003074 000025        CMP TIME1,#25
3370 016072 003106                BGT 50324$
3371 016074                LET @TSDB(R5) := #GSCP K ;AND GET UNITS STATUS
3372 016074 012775 002320 002452        MOV #GSCP K,@TSDB(R5)
3373 016102                DELAY 1000.                ;WAIT 1 SECOND
3374 016102 012727 001750                MOV #1000.,(PC)+
3375 016106 000000                .WORD 0
3376 016110 013727 002116                MOV LSDLY,(PC)+
3377 016114 000000                .WORD 0
3378 016116 005367 177772                DEC -6(PC)
3379 016122 001375                BNE -.4
3380 016124 005367 177756                DEC -22(PC)
3381 016130 001367                BNE .-20
3382 016132                IF #TS.SSR SETIN @TSSR(R5) THEN
3383 016132 032775 000200 002462        BIT #TS.SSR,@TSSR(R5)
3384 016140 001420                BEQ 50325$
3385 016142                IF #TS.OFL NOTSETIN @TSSR(R5) THEN
3386 016142 032775 000100 002462        BIT #TS.OFL,@TSSR(R5)
3387 016150 001001                BNE 50326$
3388 016152                LEAVE COUNTER                ;EXIT COUNTER WHEN UNIT ON LINE
3389 016152 000456                BR 50321$
3390 016154                ELSE
3391 016154                50326$:
3392 016154                PRINTF #OFLINM,DEVTBL(R5) ;PRINT UNIT OFF LINE EVERY 10 SEC
3393 016154 016546 002532                MOV DEVTBL(R5),-(SP)
3394 016160 012746 004633                MOV #OFLINM,-(SP)
3395 016164 012746 000002                MOV #2,-(SP)
3396 016170 010600                MOV SP,R0
3397 016172 104417                TRAP C$PNTF
3398 016174 062706 000006                ADD #6,SP
3399 016200                ENDIF
3400 016200                50327$:
3401 016200                ELSE
3402 016200 000412                BR 50330$
3403 016202                50325$:
3404 016202                PRINTF #NRDYM,DEVTBL(R5)

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3405 016202 016546 002532          MOV      DEVTBL(R5),-(SP)
3406 016206 012746 017134          MOV      #NRDYM,-(SP)
3407 016212 012746 000002          MOV      #2,-(SP)
3408 016216 010600                   MOV      SP,R0
3409 016220 104417                   TRAP     C$PNTF
3410 016222 062706 000006          ADD      #6,SP
3411 016226                   ENDIF
3412 016226                   INCR TIME2 FROM #1 TO #13 BY #1
3413 016226                   50330$:
3414 016226 012737 000001 003076          MOV      #1,TIME2
3415 016234 000402                   BR       50331$
3416 016236                   50332$:
3417 016236 005237 003076          INC      TIME2
3418 016242                   50331$:
3419 016242 023727 003076 000013          CMP      TIME2,#13
3420 016250 003016                   BGT     50333$
3421 016252                   DELAY 1000.           ;WAIT FOR UNIT TO BE SET ON-LINE
3422 016252 012727 001750                   MOV      #1000.,(PC)+
3423 016256 000000                   .WORD   0
3424 016260 013727 002116                   MOV      LSDLY,(PC)+
3425 016264 000000                   .WORD   0
3426 016266 005367 177772                   DEC      -6(PC)
3427 016272 001375                   BNE     -4
3428 016274 005367 177756                   DEC      -22(PC)
3429 016300 001367                   BNE     -20
3430 016302                   BREAK           ;ALLOW TERMINAL INTERRUPT
3431 016302 104422                   TRAP     C$BRK
3432 016304                   ENDINC
3433 016304 000754                   BR       50332$
3434 016306                   50333$:
3435 016306                   ENDINC
3436 016306 000664                   BR       50323$
3437 016310                   50324$:
3438 016310                   END COUNTER
3439 016310                   50321$:
3440 016310                   IF TIME1 GT #25 THEN ;IF OFF LINE FOR 3.5 MINUTES
3441 016310 023727 003074 000025          CMP      TIME1,#25
3442 016316 003404                   BLE     50334$
3443 016320 004737 010554                   JSR PC,MOVMSG           ;GET MESSAGE PACKET
3444 016324 004737 011246                   JSR PC,TCC1           ;PRINT ERROR AND DROP OFF LINE UNIT
3445 016330                   ENDIF
3446 016330                   50334$:
3447 016330                   ;REPEAT UNTIL ON LINE OR TIMED OUT.
3448 016330 004737 013530                   JSR PC,NEXTU           ;SET UP FOR NEXT UNIT.
3449 016334                   ENDDO
3450 016334 000641                   BR       50317$
3451 016336                   50320$:
3452 016336                   ENDIF
3453 016336                   50316$:
3454 016336                   IFB PWRFLG EQ #0 THEN
3455 016336 105737 003157                   TSTB    PWRFLG
3456 016342 001026                   BNE     50335$
3457 016344                   MEMORY DATAWT       ;REQUEST MEMORY FROM SUPER FOR RD/WR BUFFERS.
3458 016344 104431                   TRAP     C$MEM
3459 016346 010037 003044                   MOV      R0,DATAWT
3460 016352                   LET DATARD := DATAWT + #DATCNT           ;SET RD BFR AD

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MISCELLANEOUS SECTIONS MACY11 30(1046) 24-AUG-79 09:10 PAGE 86 F 10
CZTSHB.P11 24-AUG-79 09:08 INITIALIZE SECTION SEQ 0122

3461 016352 013737 003044 003046
3462 016360 062737 004000 003046
3463 016366
3464 016366 027727 164452 004000
3465 016374 002011
3466 016376
3467 016376 012746 016444
3468 016402 012746 000001
3469 016406 010600
3470 016410 104417
3471 016412 062706 000004
3472 016416
3473 016416 104444
3474 016420
3475 016420
3476 016420
3477 016420
3478
3479 016420
3480 016420 105037 002212
3481 016424
3482 016424 012703 003156
3483 016430 004737 010504
3484 016434
3485 016434 105037 003157
3486
3487 016440
3488 016440 104432
3489 016442 000104
3490 016444 040445 051106 042505 MEMOM: .ASCII /%AFREE MEMO TOO SMALL FOR RD-WR BFRS%/
3491 016452 046440 046505 020117
3492 016460 047524 020117 046523
3493 016466 046101 020114 047506
3494 016474 020122 042122 053455
3495 016502 020122 043102 051522
3496 016510 047045
3497 016512 040445 042522 046055
3498 016520 040517 020104 047111
3499 016526 046040 051101 042507
3500 016534 020122 042515 047515
3501 016542 047045 000
3502
3503
3504 016546
3505 016546
3506 016546 104411

IF @DATAWT LT #DATCNT THEN ;WHEN NOT ENOUGH FREE MEMO AVAILABLE
PRINTF #MEMOM ;WARN OPERATOR
DOCLN ;AND ABORT PASS
ENDIF ;DIAG MUST BE RE-LOADED IN A CPU WITH LARGER MEMO
50336$:
ENDIF
50335$:
LET CHGFLG :B= #0 ;CLR CHANGE CMD SEQ TBL FLAG.
LET R3 := #ENDFLG
JSR PC,CLRERR ;CLEAR ALL FLAGS.
LET PWRFLG :B= #0 ;CLEAR THE POWER FAIL FLAG.
EXIT INIT
TRAP C$EXIT
.L10012-.
TRAP C$INIT

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3507 .SBTTL AUTO DROP SECTION
3508
3509 :++
3510 :SECTION EXECUTED AFTER THE INIT CODE WHEN 'ADR' FLAG IS SET BY OPERATOR
3511 :SECTION CHEKS FOR A VALID INTERFACE LOCATION. DROPS UNIT IF NO RESPONSE
3512 :FROM INTERFACE
3513 :--
3514
3515 016550 BGNAUTO
3516 016550 L$AUTO::
3517
3518 016550 004737 013462 JSR PC,FIRSTU ;FIND FIRST UNIT
3519 016554 WHILE DEVTBL(R5) NE #END DO ;
3520 016554 ;
3521 016554 026527 002532 177777 50337$: CMP DEVTBL(R5),#END
3522 016562 001525 BEQ 50340$
3523 016564 LET TRAPD4 :B= #0 ;
3524 016564 105037 003160 CLRB TRAPD4
3525 016570 SETVEC #4,#TRAP4,#PRI07 ;SET VECTOR 4
3526 016570 012746 000340 MOV #PRI07,-(SP)
3527 016574 012746 017164 MOV #TRAP4,-(SP)
3528 016600 012746 000004 MOV #4,-(SP)
3529 016604 012746 000003 MOV #3,-(SP)
3530 016610 104437 TRAP C$SVEC
3531 016612 062706 000010 ADD #10,SP
3532 016616 LET R2 := @TSSR(R5) ;ADDRESS TS11 INTERFACE
3533 016616 017502 002462 MOV @TSSR(R5),R2
3534 016622 CLRVEC #4 ;CLEAR VECTOR AT 4
3535 016622 012700 000004 MOV #4,R0
3536 016626 104436 TRAP C$CVEC
3537 016630 IFB TRAPD4 NE #0 THEN
3538 016630 105737 003160 TSTB TRAPD4
3539 016634 001423 BEQ 50341$
3540 016636 LET FTLCNT(R5) := FTLCNT(R5) + #1
3541 016636 005265 003024 INC FTLCNT(R5)
3542 016642 PRINTF #AUTODM,TSSR(R5) ;PRINT ERROR
3543 016642 016546 002462 MOV TSSR(R5),-(SP)
3544 016646 012746 017040 MOV #AUTODM,-(SP)
3545 016652 012746 000002 MOV #2,-(SP)
3546 016656 010600 MOV SP,R0
3547 016660 104417 TRAP C$PNTF
3548 016662 062706 000006 ADD #6,SP
3549 016666 LET DROPN := DEVTBL(R5) ;SAVE # OF UNIT TO BE DROPPED.
3550 016666 016537 002532 013766 MOV DEVTBL(R5),DROPN
3551 016674 LET R0 := R5 SHIFT -1 ;R0=LOGICAL DEVICE NUMBER
3552 016674 010500 MOV R5,R0
3553 016676 006200 ASR R0
3554 016700 DODU R0 ;DROP THE UNIT: EXEC BGNDU-ENDDU CODE IF IDU - 0
3555 016700 104451 TRAP C$DODU
3556 016702 ELSE
3557 016702 000452 BR 50342$
3558 016704 ;
3559 016704 50341$: LET @TSDB(R5) := #GSCPK ;SEND GET STATUS COMMAND
3560 016704 012775 002320 002452 MOV #GSCPK,@TSDB(R5)
3561 016712 004737 010520 JSR PC,WSSR ;WAIT
3562 016716 IF #TS.SSR SETIN @TSSR(R5) THEN

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MISCELLANEOUS SECTIONS		MACY11	30(1046)	24-AUG-79	09:10	PAGE 88	H 10	SEQ 0124
CZTSHB.P11		24-AUG-79	09:08	AUTO DROP SECTION				
3563	016716	032775	000200	002462				BIT #TS.SSR,@TSSR(R5)
3564	016724	001423						BEQ 50343\$
3565	016726				IF #TS.OFL SETIN @TSSR(R5) THEN			
3566	016726	032775	000100	002462				BIT #TS.OFL,@TSSR(R5)
3567	016734	001416						BEQ 50344\$
3568	016736				LET FTLCNT(R5) := FTLCNT(R5) + #1			
3569	016736	005265	003024					INC FTLCNT(R5)
3570	016742				PRINTF #OFLINM,DEVTBL(R5)			
3571	016742	016546	002532					MOV DEVTBL(R5),-(SP)
3572	016746	012746	004633					MOV #OFLINM,-(SP)
3573	016752	012746	000002					MOV #2,-(SP)
3574	016756	010600						MOV SP,R0
3575	016760	104417						TRAP C\$PNTF
3576	016762	062706	000006					ADD #6,SP
3577	016766	004737	013704		JSR PC,DROPUA			
3578	016772				ENDIF			
3579	016772							50344\$:
3580	016772				ELSE			
3581	016772	000416						BR 50345\$
3582	016774							50343\$:
3583	016774				LET FTLCNT(R5) := FTLCNT(R5) + #1			
3584	016774	005265	003024					INC FTLCNT(R5)
3585	017000				PRINTF #NRDYM,DEVTBL(R5)			
3586	017000	016546	002532					MOV DEVTBL(R5),-(SP)
3587	017004	012746	017134					MOV #NRDYM,-(SP)
3588	017010	012746	000002					MOV #2,-(SP)
3589	017014	010600						MOV SP,R0
3590	017016	104417						TRAP C\$PNTF
3591	017020	062706	000006					ADD #6,SP
3592	017024	004737	013704		JSR PC,DROPUA			
3593	017030				ENDIF			
3594	017030							50345\$:
3595	017030				ENDIF			
3596	017030							50342\$:
3597	017030	004737	013530		JSR PC,NEXTU			
3598	017034				ENDDO			
3599	017034	000647						BR 50337\$
3600	017036							50340\$:
3601								
3602	017036				ENDAUTO			
3603	017036				L10013:			
3604	017036	104461						TRAP C\$AUTO
3605								
3606	017040	040445	052502	020123	AUTODM: .ASCII /%ABUS TRAP AT %06%N/			
3607	017046	051124	050101	040440				
3608	017054	020124	047445	022466				
3609	017062	116						
3610	017063	045	044501	052116	.ASCIZ /%AINTERFACE BAD OR NOT SET TO ABOVE AD%N/			
3611	017070	051105	040506	042503				
3612	017076	041040	042101	047440				
3613	017104	020122	047516	020124				
3614	017112	042523	020124	047524				
3615	017120	040440	047502	042526				
3616	017126	040440	022504	000116				
3617	017134	040445	047125	052111	NRDYM: .ASCIZ /%AUNIT %D1%A NOT RDY%N/			
3618	017142	022440	030504	040445				

3619 017150 047040 052117 051040
3620 017156 054504 047045 000
3621 017164
3622
3623
3624
3625
3626
3627 017164
3628 017164 105237 003160
3629 017170 000002
3630
3631
3632

.EVEN
:
: DEVICE BUS TRAP HANDLER
: OUTPUT: TRAPD4 BYTE 1: TRAPED AT 4
: 0: NO TRAP
:
TRAP4:: LET TRAPD4 :B= TRAPD4 + #1
RTI

INCB TRAPD4

```

3633 .SBTTL CLEANUP CODING SECTION
3634
3635 ;++
3636 ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
3637 ; AT THE END OF EACH PASS.
3638 ;--
3639
3640 017172 BGNCLN
3641 017172 L$CLEAN::
3642
3643
3644 017172 004737 013462 JSR PC,FIRSTU ;FIND FIRST UNIT.
3645 017176 WHILE DEVTBL(R5) NE #END DO
3646 017176 50346$:
3647 017176 026527 002532 177777 CMP DEVTBL(R5),#END
3648 017204 001413 BEQ 50347$
3649 017206 004737 010520 JSR PC,WSSR ;WAIT FOR UNIT READY OR TIMEOUT,
3650 017212 LET @TSDB(R5) := #BRCPK ;ISSUE MSG BUFFER RELEASE CMD.
3651 017212 012775 002324 002452 MOV #BRCPK,@TSDB(R5)
3652 017220 CLRVEC TSVCT(R5) ;RELEASE INTERRUPT VECTORS FOR ALL DEV.
3653 017220 016500 002472 MOV TSVCT(R5),RO
3654 017224 104436 TRAP C$CVEC
3655 017226 004737 013530 JSR PC,NEXTU ;FIND NEXT UNIT.
3656 017232 ENDDO
3657 017232 000761
3658 017234 50347$: BR 50346$
3659
3660 017234 EXIT CLN
3661 017234 104432 TRAP C$EXIT
3662 017236 000002 .WORD L10014-.
3663 .EVEN
3664
3665 017240 ENDCLN
3666 017240 L10014:
3667 017240 104412 TRAP C$CLEAN
  
```



```

3668 .SBTTL DROP UNIT SECTION
3669
3670
3671 :++
3672 : THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
3673 : TO NO LONGER BE TESTED. THAT CODE SHALL BE EXECUTED WHEN DODU
3674 : MACRO IS CALLED WHILE IDU FLAG IS NOT SET BY OPERATOR
3675 :--
3676 017242 BGNDU
3677 017242 L$DU::
3678
3679 017242 LET R5 := R0 SHIFT 1 ;R5 = LOGICAL DEVICE NUMBER X 2.
3680 017242 010005 MOV R0,R5
3681 017244 006305 ASL R5
3682 017246 LET DEVTBL(R5) := #NINUSE ;SET NOT IN USE FLAG FOR THE DEVICE.
3683 017246 012765 177774 002532 MOV #NINUSE,DEVTBL(R
3684 017254 CLRVEC TSVCT(R5) ;RELEASE THE INTERRUPT VECTOR.
3685 017254 016500 002472 MOV TSVCT(R5),R0
3686 017260 104436 TRAP C$CVEC
3687 017262 PRINTF #DROPDM,DROPN ;PRINT DROP DEVICE MESSAGE
3688 017262 013746 013766 MOV DROPN,-(SP)
3689 017266 012746 004322 MOV #DROPDM,-(SP)
3690 017272 012746 000002 MOV #2,-(SP)
3691 017276 010600 MOV SP,R0
3692 017300 104417 TRAP C$PRINTF
3693 017302 062706 000006 ADD #6,SP
3694
3695 017306 EXIT DU
3696 017306 000167 .WORD JSJMP
3697 017310 000000 .WORD L10015-2-.
3698 .EVEN
3699
3700 017312 ENDDU
3701 017312 L10015:
3702 017312 104453 TRAP C$DU
  
```

```
3703 .SBTTL ADD UNIT SECTION
3704
3705
3706 :++
3707 : THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
3708 : TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING. IF
3709 : 'EF.AUNIT' IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
3710 :--
3711 017314          BGNAU
3712 017314          L$AU::
3713
3714
3715 017314          LET R5 := R0 SHIFT 1          ;R5 = LOGICAL DEVICE NUMBER X 2.
3716 017314 010005          MOV          R0,R5
3717 017316 006305          ASL          R5
3718 017320          LET DEVTBL(R5) := R0          ;STORE UNIT # IN DEVICE TABLE.
3719 017320 010065 002532          MOV          R0,DEVTBL(R5)
3720 017324          GPHARD R0,R0          ;GET HARDWARE P TABLE FROM SUPER.
3721 017324 104442          TRAP          C$GPHRD
3722 017326          LET TSSR(R5) := (R0)          ;SAVE TSSR ADDRESS.
3723 017326 011065 002462          MOV          (R0),TSSR(R5)
3724 017332          LET TSDB(R5) := (R0)+ - #2          ;SAVE TSDB ADDRESS.
3725 017332 012065 002452          MOV          (R0)+,TSDB(R5)
3726 017336 162765 000002 002452          SUB          #2,TSDB(R5)
3727 017344          LET TSVCT(R5) := (R0)          ;SAVE INTERRUPT VECTOR ADDRESS.
3728 017344 011065 002472          MOV          (R0),TSVCT(R5)
3729 017350          SETVEC TSVCT(R5),TS4INT(R5),#INTPRI          ;SET UP INTERUPT PROCESSING CONDITIONS.
3730 017350 012746 000340          MOV          #INTPRI,-(SP)
3731 017354 016546 002512          MOV          TS4INT(R5),-(SP)
3732 017360 016546 002472          MOV          TSVCT(R5),-(SP)
3733 017364 012746 000003          MOV          #3,-(SP)
3734 017370 104437          TRAP          C$SVEC
3735 017372 062706 000010          ADD          #10,SP
3736 017376          LET INTFLG(R5) := #0          ;CLEAR INTERRUPT FLAGS.
3737 017376 005065 003124          CLR          INTFLG(R5)
3738
3739 017402          EXIT          AU
3740 017402 000167          .WORD          JSJMP
3741 017404 000000          .WORD          L10016-2-.
3742
3743          .EVEN
3744
3745 017406          ENDAU
3746 017406          L10016:
3747 017406 104452          TRAP          C$AU
3748
3749 017410          ENDMOD
3750
```

```

3751
3752 .TITLE HARDWARE TESTS
3753
3754 .SBTTL TEST 1: BASIC FUNCTIONS.
3755
3756 :++
3757 : TEST TO EXECUTE ALL TS04 FUNCTIONS.
3758 :--
3759
3760 017410 BGNMOD
3761
3762 017410 BGNTST
3763 017410 T1::
3764
3765 017410 LET RANDOM :B= #0 ;CLR THE RANDOM OPERATIONS FLAG.
3766 017410 105037 003145 CLRB RANDOM
3767 017414 LET EXPBOT :B= #0 ;CLR EXPECT BOT FLAG.
3768 017414 105037 003144 CLRB EXPBOT
3769
3770 017420 BGNSUB ;SUBTEST 1 - SET CHAR, DRIVE INIT, GET STATUS.
3771 017420 T1.1:
3772 017420 104402 TRAP C$BSUB
3773
3774 017422 LET R2 := #BFSEQO ;ADR OF CMD SEQ.
3775 017422 012702 020246 MOV #BFSEQO,R2
3776 017426 004737 020222 JSR PC,BFSEQ ;SET UP CMD SEQ.
3777 017432 004737 006204 JSR PC,EXALL ;EXECUTE CMD SEQ ON ALL DEVICES.
3778 017436 004737 013462 JSR PC,FIRSTU ;FIND THE FIRST UNIT.
3779 017442 WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE DEVICES:
3780 017442 50350$:
3781 017442 026527 002532 177777 CMP DEVTBL(R5),#END
3782 017450 001434 BEQ 50351$
3783 017452 LET R2 := MSGPKA(R5) ;GET MSG PACKET ADR,
3784 017452 016502 002502 MOV MSGPKA(R5),R2
3785 017456 LET R2 := R2 + #12 ;GET XSTAT2 ADR,
3786 017456 062702 000012 ADD #12,R2
3787 017462 LET TS4CL(R5) := (R2) CLR.BY #177400 ;STORE CODE LEVEL FROM DTR BYTE,
3788 017462 011265 002522 MOV (R2),TS4CL(R5)
3789 017466 042765 177400 002522 BIC #177400,TS4CL(R5)
3790 017474 IF PASCNT(R5) EQ #1 THEN ;IF THIS IS PASS 1 THEN:
3791 017474 026527 002764 000001 CMP PASCNT(R5),#1
3792 017502 001014 BNE 50352$
3793 017504 PRINTF #CODELM,DEVTBL(R5),TS4CL(R5) ;PRINT THE TS04 MICROCODE LEVEL.
3794 017504 016546 002522 MOV TS4CL(R5),-(SP)
3795 017510 016546 002532 MOV DEVTBL(R5),-(SP)
3796 017514 012746 003476 MOV #CODELM,-(SP)
3797 017520 012746 000003 MOV #3,-(SP)
3798 017524 010600 MOV SP,R0
3799 017526 104417 TRAP C$PNTF
3800 017530 062706 000010 ADD #10,SP
3801 017534 ENDIF
3802 017534 50352$:
3803 017534 004737 013530 JSR PC,NEXTU ;FIND NEXT UNIT.
3804 017540 ENDDO
3805 017540 000740 BR 50350$
3806 017542 50351$:

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3807 017542          ENDSUB
3808 017542          L10020:
3809 017542 104403          TRAP      C$ESUB
3810
3811 017544          BGNSUB          ;SUBTEST 2 - REWIND.
3812 017544          T1.2:
3813 017544 104402          TRAP      C$BSUB
3814
3815 017546          LET R2 := #BFSEQ1          ;ADR OF CMD SEQ.
3816 017546 012702 020320          MOV      #BFSEQ1,R2
3817 017552 004737 020222          JSR      PC,BFSEQ          ;SET UP CMD SEQ.
3818 017556 004737 006204          JSR      PC,EXALL          ;EXECUTE CMD SEQ ON ALL DEVICES.
3819 017562          LET STAFLG :B= #0          ;CLEAR START FLAG
3820 017562 105037 003156          CLR     STAFLG
3821 017566          ENDSUB
3822 017566          L10021:
3823 017566 104403          TRAP      C$ESUB
3824
3825 017570          BGNSUB          ;SUBTEST 3 - WRITE/VERIFY.
3826 017570          T1.3:
3827 017570 104402          TRAP      C$BSUB
3828
3829 017572          LET R2 := #BFSEQ2          ;ADR OF CMD SEQ.
3830 017572 012702 020332          MOV      #BFSEQ2,R2
3831 017576 004737 020222          JSR      PC,BFSEQ          ;SET UP CMD SEQ.
3832 017602 004737 006204          JSR      PC,EXALL          ;EXECUTE CMD SEQ ON ALL DEVICES.
3833 017606          ENDSUB
3834 017606          L10022:
3835 017606 104403          TRAP      C$ESUB
3836
3837 017610          BGNSUB          ;SUBTEST 4 - WRITE TAPE MARK, ERASE.
3838 017610          T1.4:
3839 017610 104402          TRAP      C$BSUB
3840
3841 017612          LET R2 := #BFSEQ3          ;ADR OF CMD SEQ.
3842 017612 012702 020424          MOV      #BFSEQ3,R2
3843 017616 004737 020222          JSR      PC,BFSEQ          ;SET UP CMD SEQ.
3844 017622 004737 006204          JSR      PC,EXALL          ;EXECUTE CMD SEQ ON ALL DEVICES.
3845 017626          ENDSUB
3846 017626          L10023:
3847 017626 104403          TRAP      C$ESUB
3848
3849 017630          BGNSUB          ;SUBTEST 5 - SPACE FILES.
3850 017630          T1.5:
3851 017630 104402          TRAP      C$BSUB
3852
3853 017632          LET R2 := #BFSEQ4          ;ADR OF CMD SEQ.
3854 017632 012702 020476          MOV      #BFSEQ4,R2
3855 017636 004737 020222          JSR      PC,BFSEQ          ;SET UP CMD SEQ.
3856 017642 004737 006204          JSR      PC,EXALL          ;EXECUTE CMD SEQ ON ALL DEVICES.
3857 017646          ENDSUB
3858 017646          L10024:
3859 017646 104403          TRAP      C$ESUB
3860
3861 017650          BGNSUB          ;SUBTEST 6 - SPACE RECORDS.
3862 017650          T1.6:
  
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3863	017650	104402				TRAP	C\$BSUB
3864							
3865	017652			LET R2 := #BFSEQ5	;ADR OF CMD SEQ.		
3866	017652	012702	020540			MOV	#BFSEQ5,R2
3867	017656	004737	020222	JSR PC,BFSEQ	;SET UP CMD SEQ.		
3868	017662	004737	006204	JSR PC,EXALL	;EXECUTE CMD SEQ ON ALL DEVICES.		
3869	017666			ENDSUB			
3870	017666			L10025:			
3871	017666	104403				TRAP	C\$ESUB
3872							
3873	017670			BGNSUB	;SUBTEST 7 - WRITE RETRY.		
3874	017670			T1.7:			
3875	017670	104402				TRAP	C\$BSUB
3876							
3877	017672			LET R2 := #BFSEQ6	;ADR OF CMD SEQ.		
3878	017672	012702	020612			MOV	#BFSEQ6,R2
3879	017676	004737	020222	JSR PC,BFSEQ	;SET UP CMD SEQ.		
3880	017702	004737	006204	JSR PC,EXALL	;EXECUTE CMD SEQ ON ALL DEVICES.		
3881	017706			ENDSUB			
3882	017706			L10026:			
3883	017706	104403				TRAP	C\$ESUB
3884							
3885	017710			BGNSUB	;SUBTEST 8 - READ REV RETRY.		
3886	017710			T1.8:			
3887	017710	104402				TRAP	C\$BSUB
3888							
3889	017712			LET R2 := #BFSEQ7	;ADR OF CMD SEQ.		
3890	017712	012702	020644			MOV	#BFSEQ7,R2
3891	017716	004737	020222	JSR PC,BFSEQ	;SET UP CMD SEQ.		
3892	017722	004737	006204	JSR PC,EXALL	;EXECUTE CMD SEQ ON ALL DEVICES.		
3893	017726			ENDSUB			
3894	017726			L10027:			
3895	017726	104403				TRAP	C\$ESUB
3896							
3897	017730			BGNSUB	;SUBTEST 9 - READ FWD RETRY.		
3898	017730			T1.9:			
3899	017730	104402				TRAP	C\$BSUB
3900							
3901	017732			LET R2 := #BFSEQ8	;ADR OF CMD SEQ.		
3902	017732	012702	020676			MOV	#BFSEQ8,R2
3903	017736	004737	020222	JSR PC,BFSEQ	;SET UP CMD SEQ.		
3904	017742	004737	006204	JSR PC,EXALL	;EXECUTE CMD SEQ ON ALL DEVICES.		
3905	017746			ENDSUB			
3906	017746			L10030:			
3907	017746	104403				TRAP	C\$ESUB
3908							
3909	017750			BGNSUB	;SUBTEST 10- CLEAN.		
3910	017750			T1.10:			
3911	017750	104402				TRAP	C\$BSUB
3912							
3913	017752			LET R2 := #BFSEQ9	;ADR OF CMD SEQ.		
3914	017752	012702	020730			MOV	#BFSEQ9,R2
3915	017756	004737	020222	JSR PC,BFSEQ	;SET UP CMD SEQ.		
3916	017762	004737	006204	JSR PC,EXALL	;EXECUTE CMD SEQ ON ALL DEVICES.		
3917	017766			ENDSUB			
3918	017766			L10031:			

3975	020154	004737	012534		JSR PC,VFEXC		;VERIFY ODD LENGTH SWAP (RECORD 2).
3976	020160				LET SWBFLG :B= #0		;DISABLE BYTE SWAPPING.
3977	020160	105037	003150			CLRB SWBFLG	
3978	020164				LET CMDPKT+CP.CNT := #12		;CHANGE BYTE COUNT TO 10.
3979	020164	012737	000012	002316		MOV #12,CMDPKT+CP.CN	
3980	020172	004737	012534		JSR PC,VFEXC		;VERIFY EVEN LENGTH SWAP (RECORD 3).
3981	020176				LET CMDPKT+CP.CNT := #11		;CHANGE BYTE COUNT TO 9.
3982	020176	012737	000011	002316		MOV #11,CMDPKT+CP.CN	
3983	020204	004737	012534		JSR PC,VFEXC		;VERIFY ODD LENGTH SWAP (RECORD 4).
3984							
3985	020210				ENDSUB		
3986	020210			L10033:			
3987	020210	104403				TRAP C\$ESUB	
3988							
3989	020212				LET T1SWB :B= #0		;CLEAR T1 SWAP BYTES FLAG
3990	020212	105037	003153			CLRB T1SWB	
3991							
3992							
3993	020216				EXIT TST		
3994	020216	104432				TRAP C\$EXIT	
3995	020220	000554				.WORD L10017-	

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3996      :      SUBROUTINE TO MOVE A COMMAND SEQUENCE TO THE SEQUENCE TABLE.
3997      :      INPUTS:          R2 = FWA OF COMMAND SEQUENCE.
3998      :      OUTPUTS:
3999      :      REGISTERS:
4000      :      CALLS:
4001
4002 020222      BFSEQ: LET R1 := #CMDSEQ          ;INIT SEQ TABLE ADDRESS.
4003 020222 012701 003164      WHILE (R2) NE #END DO      ;WHILE THERE ARE MORE COMMANDS:
4004 020226      ;                               50355$:
4005 020226      ;                               CMP      (R2),#END
4006 020226 021227 177777      ;                               BEQ      50356$
4007 020232 001402      ;                               LET (R1)+ := (R2)+
4008 020234      ;                               ;MOVE COMMANDS TO SEQ TABLE.
4009 020234 012221      ;                               MOV      (R2)+,(R1)+
4010 020236      ENDDO
4011 020236 000773      ;                               BR      50355$
4012 020240      ;                               50356$:
4013 020240      LET (R1) := #END          ;STORE END OF SEQUENCE CODE.
4014 020240 012711 177777      ;                               MOV      #END,(R1)
4015 020244 000207      RTS      PC          ;RETURN.

```

4018 ; BASIC FUNCTION COMMAND SEQUENCE

```

4019
4020
4021 020246 140004      BFSEQ0: .WORD      SCH          ;SET CHAR. 200.      (1)
4022 020250 000200      ;                               200
4023 020252 000001      ;                               1
4024 020254 000000      ;                               0
4025 020256 100013      ;                               DRI          ;DRIVE INIT.      (2)
4026 020260 000001      ;                               1
4027 020262 000001      ;                               1
4028 020264 000000      ;                               0
4029 020266 140004      ;                               SCH          ;SET CHAR. 20      (3)
4030 020270 000020      ;                               20
4031 020272 000001      ;                               1
4032 020274 000000      ;                               0
4033 020276 100017      ;                               GES          ;GET STATUS.      (4)
4034 020300 000001      ;                               1
4035 020302 000001      ;                               1
4036 020304 000000      ;                               0
4037 020306 140004      ;                               SCH          ;SET CHAR. 40.      (5)
4038 020310 000040      ;                               40
4039 020312 000001      ;                               1
4040 020314 000000      ;                               0
4041 020316 177777      ;                               .WORD      END
4042
4043 020320 102010      BFSEQ1:          RWD          ;REWIND TWICE.      (6)
4044 020322 000001      ;                               1
4045 020324 000002      ;                               2
4046 020326 000000      ;                               0
4047 020330 177777      ;                               .WORD      END
4048
4049 020332 104105      BFSEQ2:          WTV          ;WRITE/VERIFY PAT 1.      (7)
4050 020334 004000      ;                               DATCNT
4051 020336 000001      ;                               1

```


4052	020340	000001		1			
4053	020342	104105		WTV		:WTV PAT 2.	(8)
4054	020344	004000		DATCNT			
4055	020346	000001		1			
4056	020350	000002		2			
4057	020352	104105		WTV		:WTV PAT 3.	(9)
4058	020354	004000		DATCNT			
4059	020356	000001		1			
4060	020360	000003		3			
4061	020362	104105		WTV		:WTV PAT 4.	(10)
4062	020364	004000		DATCNT			
4063	020366	000001		1			
4064	020370	000004		4			
4065	020372	104105		WTV		:WTV PAT 5.	(11)
4066	020374	004000		DATCNT			
4067	020376	000001		1			
4068	020400	000005		5			
4069	020402	104105		WTV		:WTV PAT 6.	(12)
4070	020404	004000		DATCNT			
4071	020406	000001		1			
4072	020410	000006		6			
4073	020412	104105		WTV		:WTV PAT 0.	(13)
4074	020414	004000		DATCNT			
4075	020416	000001		1			
4076	020420	000000		0			
4077	020422	177777	.WORD	END			
4078							
4079	020424	100011	BFSEQ3:	WTM		:WRITE TAPE MARK.	(14)
4080	020426	000001		1			
4081	020430	000001		1			
4082	020432	000000		0			
4083	020434	104005		WRT		:WRITE 10 RECORDS.	(15)
4084	020436	004000		DATCNT			
4085	020440	000010		10			
4086	020442	000001		1			
4087	020444	100411		ERS		:ERASE 10 TIMES.	(16)
4088	020446	000001		1			
4089	020450	000010		10			
4090	020452	000000		0			
4091	020454	100011		WTM		:WRITE TAPE MARK.	(17)
4092	020456	000001		1			
4093	020460	000001		1			
4094	020462	000000		0			
4095	020464	101011		WTR		:WTM RETRY	(18)
4096	020466	000001		1			
4097	020470	000001		1			
4098	020472	000000		0			
4099	020474	177777	.WORD	END			
4100							
4101	020476	105410	BFSEQ4:	SFR		:SPACE 2 FILES REV.	(19)
4102	020500	000002		2			
4103	020502	000001		1			
4104	020504	000000		0			
4105	020506	105010		SFF		:SPACE 2 FILES FWD.	(20)
4106	020510	000002		2			
4107	020512	000001		1			

4108	020514	000000		0		
4109	020516	105410		SFR	;SPACE 2 FILES REV.	(21)
4110	020520	000001		1		
4111	020522	000002		2		
4112	020524	000000		0		
4113	020526	105010		SFF	;SPACE 2 FILES FWD.	(22)
4114	020530	000001		1		
4115	020532	000002		2		
4116	020534	000000		0		
4117	020536	177777	.WORD	END		
4118						
4119	020540	102010	BFSEQ5:	RWD	;REWIND.	(23)
4120	020542	000001		1		
4121	020544	000001		1		
4122	020546	000000		0		
4123	020550	104010		SRF	;SPACE 7 RECORDS FWD.	(24)
4124	020552	000007		7		
4125	020554	000001		1		
4126	020556	000000		0		
4127	020560	104410		SRR	;SPACE 7 RECORDS REV.	(25)
4128	020562	000007		7		
4129	020564	000001		1		
4130	020566	000000		0		
4131	020570	104010		SRF	;SPACE 7 RECORDS FWD.	(26)
4132	020572	000001		1		
4133	020574	000007		7		
4134	020576	000000		0		
4135	020600	104410		SRR	;SPACE 7 RECORDS REV.	(27)
4136	020602	000001		1		
4137	020604	000007		7		
4138	020606	000000		0		
4139	020610	177777	.WORD	END		
4140						
4141	020612	102010	BFSEQ6:	RWD	;REWIND.	(28)
4142	020614	000001		1		
4143	020616	000001		1		
4144	020620	000000		0		
4145	020622	104005		WRT	;WRITE.	(29)
4146	020624	004000		DATCNT		
4147	020626	000001		1		
4148	020630	000001		1		
4149	020632	105005		WRR	;WRITE RETRY.	(30)
4150	020634	004000		DATCNT		
4151	020636	000001		1		
4152	020640	000001		1		
4153	020642	177777	.WORD	END		
4154						
4155	020644	104401	BFSEQ7:	RDR	;READ REV.	(31)
4156	020646	004000		DATCNT		
4157	020650	000001		1		
4158	020652	000001		1		
4159	020654	105401		RNR	;READ NEXT REV.	(32)
4160	020656	004000		DATCNT		
4161	020660	000001		1		
4162	020662	000001		1		
4163	020664	125401		RNF	;READ NEXT FWD.	(33)

```

4164 020666 004000          DATCNT
4165 020670 000001          1
4166 020672 000001          1
4167 020674 177777          .WORD  END
4168
4169 020676 104001          BFSEQ8:  RDF          ;READ FWD.          (34)
4170 020700 004000          DATCNT
4171 020702 000001          1
4172 020704 000001          1
4173 020706 105001          RPF          ;READ PREVIOUS FWD. (35)
4174 020710 004000          DATCNT
4175 020712 000001          1
4176 020714 000001          1
4177 020716 125001          RPR          ;READ PREVIOUS REV. (36)
4178 020720 004000          DATCNT
4179 020722 000001          1
4180 020724 000001          1
4181 020726 177777          .WORD  END
4182
4183 020730 101012          BFSEQ9: .WORD  CLN          ;C EAN.          (37)
4184 020732 000001          1
4185 020734 000001          1
4186 020736 000000          0
4187 020740 102010          RWD          ;REWIND          (38)
4188 020742 000001          1
4189 020744 000001          1
4190 020746 000000          0
4191 020750 177777          .WORD  END          ;END OF SEQUENCE.
4192
4193 020752 104105          BFSE10: WTV          ;WRITE/VERIFY EVEN LENGTH. (39)
4194 020754 000012          12
4195 020756 000001          1
4196 020760 000000          0
4197 020762 104105          WTV          ;WRITE/VERIFY ODD LENGTH. (40)
4198 020764 000011          11
4199 020766 000001          1
4200 020770 000000          0
4201 020772 177777          .WORD  END
4202          .EVEN
4203
4204 020774          L10017:  ENDTST
4205 020774
4206 020774 104401          TRAP  CSETST

```

```

4207 .SBTTL TEST 2: DATA RELIABILITY.
4208
4209
4210 :++
4211 : TEST TO CHECK THE DATA RELIABILITY OF THE TS04.
4212 :--
4213 T2::
4214
4215 020776 LET RANDOM :B= #1 ;SET THE RANDOM OPERATIONS FLAG.
4216 020776 112737 000001 003145 MOVB #1,RANDOM
4217 021004 LET EXPBOT :B= #0 ;CLEAR EXPECT BOT FLAG.
4218 021004 105037 003144 CLRB EXPBOT
4219 021010 LET R2 := #DATCNT - #1 ;SET UP THE RECORD LENGTH MASK,
4220 021010 012702 004000 MOV #DATCNT,R2
4221 021014 005302 DEC R2
4222 021016 LET LENMSK := COMP R2 ;ALLOW MAXIMUM BUFFER.
4223 021016 010237 003066 MOV R2,LENMSK
4224 021022 005137 003066 COM LENMSK
4225 021026 004737 006140 JSR PC,SETCH ;CMD 1 = SET CHARACTERISTIC.
4226 021032 IFB STAFLG NE #0 THEN ;IF STARTING THEN:
4227 021032 105737 003156 TSTB STAFLG
4228 021036 001404 BEQ 50357$
4229 021040 004737 006164 JSR PC,SETRW ;CMD2=REWIND
4230 021044 LET STAFLG :B= #0 ;CLR START FLAG.
4231 021044 105037 003156 CLRB STAFLG
4232 021050
4233 021050 ENDIF
4234 021050 LET (R1)+ := #WTV ;CMD3 = WRITE/ VERIFY.
4235 021050 012721 104105 MOV #WTV,(R1)+
4236 021054 LET (R1)+ := #DATCNT ;SET BRG TO MAX FOR PATTERN GENERATION.
4237 021054 012721 004000 MOV #DATCNT,(R1)+
4238 021060 LET R2 := COMP #RNOPSC
4239 021060 012702 177740 MOV #RNOPSC,R2
4240 021064 005102 COM R2
4241 021066 LET (R1)+ := R2 ;31 OPERATIONS.
4242 021066 010221 MOV R2,(R1)+
4243 021070 LET (R1)+ := #RANP ;RANDOM PATTERN.
4244 021070 012721 000007 MOV #RANP,(R1)+
4245 021074 REPEAT ;REPEAT TO EOT:
4246 021074 WHILE R1 LT #SEQEND DO ;FILL SEQ TBL WITH RANDOM CMDS.
4247 021074 50360$:
4248 021074 50361$:
4249 021074 020127 003254 CMP R1,#SEQEND
4250 021100 002012 BGE 50362$
4251 021102 LET RANS := RANS + RANB
4252 021102 063737 003070 003072 ADD RANB,RANS
4253 021110 LET R2 := RANS CLR.BY #177741 ;R2 = RANDOM # (0 - 36).
4254 021110 013702 003072 MOV RANS,R2
4255 021114 042702 177741 BIC #177741,R2
4256 021120 004772 021260 JSR PC,@RANCMD(R2) ;SET UP A RANDOM CMD + BRG.
4257 021124 ENDDO
4258 021124 000763 BR 50361$
4259 021126 50362$:
4260 021126 LET (R1) := #END ;STORE END OF SEQUENCE CODE IN TABLE.
4261 021126 012711 177777 MOV #END,(R1)
4262 021132 004737 006204 JSR PC,EXALL ;GO EXECUTE ALL CMDS IN SEQUENCE TABLE.

```

4263	021136			LET R1 := #CMDSEQ	;INIT CMD SEQ TBL POINTER,		
4264	021136	012701	003164			MOV	#CMDSEQ,R1
4265	021142			UNTIL R2 NE #0	;REPEAT UNTIL EOT IS REACHED		
4266	021142	005702				TST	R2
4267	021144	001753				BEQ	503608
4268	021146			LET ALLEOT :B= ALLEOT + #1	;FLAG ALL UNITS @ EOT		
4269	021146	105237	003154			INCB	ALLEOT
4270	021152	000240		NOP			
4271	021154	000240		NOP			
4272	021156	004737	006500	JSR PC,EXSUB	;WRITE ONE RECORD BEYOND EOT ON ALL UNITS		
4273	021162	004737	014052	JSR PC,CKHAE	;SO THAT SHORTER READ STOP DISTANCE		
4274					;SHALL POSITION HEAD IN CLEAN IRG GAP		
4275	021166	004737	021320	JSR PC,RANRD	;SET UP READ REV/FWD CMDS,		
4276	021172			LET CMDSEQ+4 := COMP #RNOPSC	;# OF RECORDS FOR READ REV.		
4277	021172	012737	177740			MOV	#RNOPSC,CMDSEQ+4
4278	021200	005137	003170			COM	CMDSEQ+4
4279	021204			LET CMDSEQ+14 := CMDSEQ+4	;# OF RECORDS FOR READ FORWARD.		
4280	021204	013737	003170			MOV	CMDSEQ+4,CMDSEQ+
4281	021212			LET (R1) := #END	;STORE END OF SEQUENCE CODE IN SEQ TABLE.		
4282	021212	012711	177777			MOV	#END,(R1)
4283	021216	004737	006204	JSR PC,EXALL	;GO EXECUTE READ REV/FWD OF LAST N RECORDS.		
4284	021222			LET ALLEOT :B= #0	;CLEAR ALL UNITS @ EOT FLAG		
4285	021222	105037	003154			CLRB	ALLEOT
4286	021226			LET RPTFLG :B= #1	;REQUEST PERFORMANCE REPORT DURING REWIND.		
4287	021226	112737	000001			MOVB	#1,RPTFLG
4288	021234			LET R1 := #CMDSEQ	;INIT SEQ TBL POINTER,		
4289	021234	012701	003164			MOV	#CMDSEQ,R1
4290	021240	004737	006164	JSR PC,SETRW	;STORE REWIND IN SEQ TBL,		
4291	021244			LET (R1) := #END	;STORE END IN SEQ TBL,		
4292	021244	012711	177777			MOV	#END,(R1)
4293	021250	004737	006204	JSR PC,EXALL	;EXECUTE REWIND CMD ON ALL UNITS		
4294							
4295	021254			EXIT TST			
4296	021254	104432				TRAP	CSEXIT
4297	021256	000174				.WORD	L10034-
4298							

```

4299      :      ADDRESSES OF SUBROUTINES USED TO SET UP RANDOM OPERATIONS IN
4300      :      THE DATA RELIABILITY TEST.
4301
4302 021260 021406      RANCMD: RANWV      ;WRITE/VERIFY.
4303 021262 021374      RANWR      ;WRITE.
4304 021264 021374      RANWR      ;WRITE.
4305 021266 021374      RANWR      ;WRITE.
4306 021270 021374      RANWR      ;WRITE.
4307 021272 021374      RANWR      ;WRITE.
4308 021274 021374      RANWR      ;WRITE.
4309 021276 021374      RANWR      ;WRITE.
4310 021300 021320      RANRD      ;READ.
4311 021302 021320      RANRD      ;READ.
4312 021304 021320      RANRD      ;READ.
4313 021306 021320      RANRD      ;READ.
4314 021310 021320      RANRD      ;READ.
4315 021312 021320      RANRD      ;READ.
4316 021314 021320      RANRD      ;READ.
4317 021316 021320      RANRD      ;READ.
4318
4319
4320
4321
4322
4323      :      SUBROUTINE TO SET UP READ COMMANDS IN SEQUENCE TABLE.
4324      :      INPUTS:
4325      :      OUTPUTS:
4326      :      REGISTERS:      R2
4327      :      CALLS:
4328
4329 021320      RANRD: LET (R1)+ := #RDR      ;STORE READ REV CMD.
4330 021320 012721 104401      MOV      #RDR,(R1)+
4331 021324      LET (R1)+ := #DATCNT      ;SET BRF TO MAX FOR READ RANDOM LENGTHS.
4332 021324 012721 004000      MOV      #DATCNT,(R1)+
4333 021330      LET RANB := RANB + RANS
4334 021330 063737 003072 003070      ADD      RANS,RANB
4335 021336      LET R2 := RANB CLR.BY #RNOPSC
4336 021336 013702 003070      MOV      RANB,R2
4337 021342 042702 177740      BIC      #RNOPSC,R2
4338 021346      LET (R1)+ := R2      ;SET RANDOM # OF OPERATIONS.
4339 021346 010221      MOV      R2,(R1)+
4340 021350      LET (R1)+ := #RANP      ;RANDOM PATTERN.
4341 021350 012721 000007      MOV      #RANP,(R1)+
4342 021354      LET (R1)+ := #RDF      ;STORE READ FWD CMD.
4343 021354 012721 104001      MOV      #RDF,(R1)+
4344 021360      LET (R1)+ := #DATCNT      ;SET BRF TO MAX TO READ RANDOM LENGTHS.
4345 021360 012721 004000      MOV      #DATCNT,(R1)+
4346 021364      LET (R1)+ := R2      ;SET RANDOM # OF OPERATIONS.
4347 021364 010221      MOV      R2,(R1)+
4348 021366      LET (R1)+ := #RANP      ;RANDOM PATTERN.
4349 021366 012721 000007      MOV      #RANP,(R1)+
4350 021372 000207      RTS PC
  
```

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4351      :      SUBROUTINE TO SET UP A WRITE COMMAND IN THE SEQUENCE TABLE.
4352      :      INPUTS:
4353      :      OUTPUTS:
4354      :      REGISTERS:
4355      :      CALLS:
4356
4357 021374 RANWR: LET (R1)+ := #WRT      ;STORE WRITE CMD.
4358 021374 012721 104005      ;STORE BRF, # OF OPERATIONS, PATTERN.
4359 021400 004737 021420      ;STORE BRF, # OF OPERATIONS, PATTERN.
4360 021404 000207      ;STORE BRF, # OF OPERATIONS, PATTERN.
4361
4362
4363
4364
4365
4366      :      SUBROUTINE TO SET UP A WRITE/VERIFY COMMAND IN THE SEQUENCE TABLE.
4367      :      INPUTS:
4368      :      OUTPUTS:
4369      :      REGISTERS:
4370      :      CALLS:
4371
4372 021406 RANWV: LET (R1)+ := #WTV      ;STORE WRITE/VERIFY CMD.
4373 021406 012721 104105      ;STORE BRF, # OF OPERATIONS, PATTERN.
4374 021412 004737 021420      ;STORE BRF, # OF OPERATIONS, PATTERN.
4375 021416 000207      ;STORE BRF, # OF OPERATIONS, PATTERN.
4376
4377
4378
4379
4380
4381      :      SUBROUTINE TO STORE BRF, # OF OPERATIONS, PATTERN IN COMMAND
4382      :      SEQUENCE TABLE FOR WRITE AND WRITE/VERIFY COMMANDS.
4383      :      INPUTS:
4384      :      OUTPUTS:
4385      :      REGISTERS:      R2
4386      :      CALLS:
4387
4388 021420 RANW: LET (R1)+ := #DATCNT      ;SET BRF TO MAX FOR PATTERN GENERATION.
4389 021420 012721 004000      ;RANDOM BRF WILL BE GENERATED FOR EACH RECORD.
4390
4391      LET RANB := RANB + RANS
4392 021424 063737 003072 003070      ADD      RANS,RANB
4393 021432      LET R2 := RANB CLR.BY #RNOPSC
4394 021432 013702 003070      MOV      RANB,R2
4395 021436 042702 177740      BIC      #RNOPSC,R2
4396 021442      LET (R1)+ := R2      ;SET RANDOM # OF OPERATIONS.
4397 021442 010221      MOV      R2,(R1)+
4398 021444      LET (R1)+ := #RANP      ;RANDOM PATTERN.
4399 021444 012721 000007      MOV      #RANP,(R1)+
4400 021450 000207      RTS PC      ;RETURN.
4401
4402      .EVEN
4403
4404 021452      L10034:      ENDTST
4405 021452
4406 021452 104401      TRAP      C$ETST

```

4407


```

4408 .SBTTL TEST 3: WRITE COMPATABILITY/WRITE UTILITY.
4409
4410 :++
4411 : TEST TO WRITE RECORDS FROM BOT TO EOT.
4412 :--
4413
4414 021454          BGNTST
4415 021454          T3::
4416
4417 021454          LET RANDOM :B= #1          ;SET THE RANDOM OPERATIONS FLAG.
4418 021454 112737 000001 003145          ;CLEAR EXPECT BOT FLAG.          MOVB #1,RANDOM
4419 021462          LET EXPBOT :B= #0          ;CLEAR EXPECT BOT FLAG.          CLRB EXPBOT
4420 021462 105037 003144          ;SET UP THE RECORD LENGTH MASK.
4421 021466          LET R2 := #DATCNT - #1          ;SET UP THE RECORD LENGTH MASK.
4422 021466 012702 004000          ;SET UP THE RECORD LENGTH MASK.          MOV #DATCNT,R2
4423 021472 005302          ;SET UP THE RECORD LENGTH MASK.          DEC R2
4424 021474          LET LENMSK := COMP R2          ;ALLOW MAXIMUM BUFFER.
4425 021474 010237 003066          ;ALLOW MAXIMUM BUFFER.          MOV R2,LENMSK
4426 021500 005137 003066          ;ALLOW MAXIMUM BUFFER.          COM LENMSK
4427 021504 004737 006140          JSR PC,SETCH          ;CMD 1 = SET CHARACTERISTIC.
4428 021510 004737 006164          JSR PC,SETRW          ;CMD2=REWIND
4429 021514          LET STAFLG :B= #0          ;CLEAR START FLAG
4430 021514 105037 003156          ;CLEAR START FLAG          CLRB STAFLG
4431 021520          REPEAT          ;REPEAT TO EOT.
4432 021520          ;REPEAT TO EOT.
4433 021520          WHILE R1 LT #SEQEND DO          ;WHILE THERE IS MORE ROOM IN SEQ TABLE:
4434 021520          ;WHILE THERE IS MORE ROOM IN SEQ TABLE:
4435 021520 020127 003254          ;WHILE THERE IS MORE ROOM IN SEQ TABLE:          CMP R1,#SEQEND
4436 021524 002003          ;WHILE THERE IS MORE ROOM IN SEQ TABLE:          BGE 50365$
4437 021526 004737 021374          ;STORE A WRITE CMD IN SEQUENCE TABLE.
4438 021532          JSR PC,RANWR          ;STORE A WRITE CMD IN SEQUENCE TABLE.
4439 021532 000772          ENDDO
4440 021534          ;STORE A WRITE CMD IN SEQUENCE TABLE.          BR 50364$
4441 021534          LET (R1) := #END          ;STORE END OF SEQUENCE CODE IN TABLE.
4442 021534 012711 177777          ;STORE END OF SEQUENCE CODE IN TABLE.          MOV #END,(R1)
4443 021540 004737 006204          ;EXECUTE ALL CMDs IN SEQ TBL ON UNITS.
4444 021544          LET R1 := #CMDSEQ          ;INIT SEQ TBL POINTER,
4445 021544 012701 003164          ;INIT SEQ TBL POINTER,          MOV #CMDSEQ,R1
4446 021550          UNTIL R2 NE #0          ;REPEAT UNTIL EOT IS REACHED
4447 021550 005702          ;REPEAT UNTIL EOT IS REACHED          TST R2
4448 021552 001762          ;REPEAT UNTIL EOT IS REACHED          BEQ 50363$
4449 021554          LET ALLEOT :B= ALLEOT + #1          ;SET ALL UNITS @ EOT FLAG
4450 021554 105237 003154          ;SET ALL UNITS @ EOT FLAG          INCB ALLEOT
4451 021560          NOP
4452 021562          NOP
4453 021564 004737 006500          ;WRITE ONE RECORD BEYOND EOT ON ALL UNITS
4454 021570 004737 014052          ;SO THAT SHORTER READ STOP DISTANCE
4455          ;SHALL POSITION HEAD IN CLEAN IRG GAP
4456 021574          LET ALLEOT :B= #0          ;CLEAR ALL UNITS @ EOT FLAG
4457 021574 105037 003154          ;CLEAR ALL UNITS @ EOT FLAG          CLRB ALLEOT
4458 021600 004737 006164          ;STORE REWIND IN SEQ TBL,
4459 021604          LET (R1) := #END          ;STORE END IN SEQ TBL,
4460 021604 012711 177777          ;STORE END IN SEQ TBL,          MOV #END,(R1)
4461 021610 004737 006204          ;EXECUTE REWIND CMD ON ALL UNITS
4462          JSR PC,EXALL          ;EXECUTE REWIND CMD ON ALL UNITS
4463 021614          EXIT TST

```

4464 021614 104432
4465 021616 000002
4466
4467
4468
4469 021620
4470 021620
4471 021620 104401
4472

.
.EVEN
ENDTST
L10035:

TRAP CSEXIT
.WORD L10035-

TRAP CSETST

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4518
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021622
021622 112737 000001 003145
021630 112737 000001 003144
021642 004737 006140
021646 105037 003156
021652 012721 104001
021656 012721 004000
021662 012721 077777
021666 012721 000007
021672 012711 177777
021676 004737 006204
021702 105237 003154
021706 012701 003164
021712 012721 104401
021716 012721 004000
021722 012721 077777
021726 012721 000007
021732 012711 177777
021736 004737 006204
021742 105037 003154
021746 104432
021750 000002
021752 104401

.SBTTL TEST 4: READ COMPATABILITY/READ UTILITY.

:++
: TEST TO READ ENTIRE TAPE FORWARD AND REVERSE.
:--

T4:: BGNTST

```
LET RANDOM :B= #1 ;SET THE RANDOM OPERATIONS FLAG.
MOV #1,RANDOM
LET EXPBOT :B= #1 ;SET EXPECT BOT FLAG.
MOV #1,EXPBOT
JSR PC,SETCH ;CMD 1 = SET CHARACTERISTIC.
JSR PC,SETRW ;CMD2=REWIND.
LET STAF LG :B= #0 ;CLEAR START FLAG
CLRB STAF LG
LET (R1)+ := #RDF ;CMD3 = READ FORWARD.
MOV #RDF,(R1)+
LET (R1)+ := #DATCNT ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
MOV #DATCNT,(R1)+
LET (R1)+ := #77777 ;SET RECORD COUNT TO MAX FOR WHOLE TAPE.
MOV #77777,(R1)+
LET (R1)+ := #RANP ;PATTERN = RANDOM.
MOV #RANP,(R1)+
LET (R1) := #END ;STORE END OF SEQUENCE CODE IN TABLE.
MOV #END,(R1)
JSR PC,EXALL ;EXECUTE ALL CMDS IN SEQ TBL ON ALL UNITS.
LET ALLEOT :B= ALLEOT + #1 ;FLAG TO ALLOW ALL UNITS AT EOT TO READ REV
INCB ALLEOT
LET R1 := #CMDSEQ ;INIT CMD SEQ TBL POINTER.
MOV #CMDSEQ,R1
LET (R1)+ := #RDR ;CMD1 = READ REVERSE.
MOV #RDR,(R1)+
LET (R1)+ := #DATCNT ;SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
MOV #DATCNT,(R1)+
LET (R1)+ := #77777 ;RECORD COUNT = MAX FOR WHOLE TAPE.
MOV #77777,(R1)+
LET (R1)+ := #RANP ;PATTERN = RANDOM.
MOV #RANP,(R1)+
LET (R1) := #END ;STORE END OF SEQUENCE CODE IN TABLE.
MOV #END,(R1)
JSR PC,EXALL ;GO EXECUTE READ REV. OF ENTIRE TAPE.
LET ALLEOT :B= #0 ;CLEAR ALL UNITS @ EOT FLAG
CLRB ALLEOT
EXIT TST
TRAP C$EXIT
.WORD L10036-.
.EVEN
ENDTST
L10036:
TRAP C$ETST
```

.SBTTL TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

:++
 : TEST TO EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.
 :--

4529					BGNTST	
4530					T5::	
4531						
4532						
4533						
4534						
4535	021754					
4536	021754					
4537						
4538	021754				LET RANDOM :B= #0	;CLEAR RAMDOM MODE FLAG.
4539	021754	105037	003145			CLR RB RANDOM
4540	021760				LET EXPBOT :B= #1	;SET EXPECT BOT FLAG.
4541	021760	112737	000001	003144		MOV B #1,EXPBOT
4542	021766				LET IRE :B= PIRE	;MOVE INHIBIT RFC ERROR REPORT FLAG.
4543	021766	113737	002214	003151		MOV B PIRE,IRE
4544	021774	004737	006140		JSR PC,SETCH	;CMD 1 = SET CHARACTERISTIC.
4545	022000				LET CMDSEQ+2 := CHAR	;MOVE CHAR CODE FROM P TBL TO SEQ TBL.
4546	022000	013737	002216	003166		MOV CHAR,CMDSEQ+2
4547	022006				LET R2 := #CMDD	;R2 POINTS TO CMD2 IN SOFT P TABLE.
4548	022006	012702	002220			MOV #CMDD,R2
4549	022012	004737	022464		JSR PC,PTCMDS	;MOVE CMD 2 FROM P TBL TO SEQ TBL.
4550	022016	004737	022464		JSR PC,PTCMDS	;MOVE CMD 3 FROM P TBL TO SEQ TBL.
4551	022022	004737	022464		JSR PC,PTCMDS	;MOVE CMD 4 FROM P TBL TO SEQ TBL.
4552	022026	004737	022464		JSR PC,PTCMDS	;MOVE CMD 5 FROM P TBL TO SEQ TBL.
4553	022032	004737	022464		JSR PC,PTCMDS	;MOVE CMD 6 FROM P TBL TO SEQ TBL.
4554	022036	004737	022464		JSR PC,PTCMDS	;MOVE CMD 7 FROM P TBL TO SEQ TBL.
4555	022042	004737	022464		JSR PC,PTCMDS	;MOVE END CMD FROM P TBL TO SEQ TBL.
4556	022046				LET JLOOP := #0	;CLEAR JMP CMD LOOP COUNT.
4557	022046	005037	003100			CLR JLOOP
4558	022052				LET STAFLG := #0	;CLEAR START FLAG
4559	022052	005037	003156			CLR STAFLG
4560	022056				LET R1 := #CMDSEQ	;INIT SEQUENCE TABLE POINTER.
4561	022056	012701	003164			MOV #CMDSEQ,R1
4562	022062				3\$: WHILE (R1) NE #END DO	;WHILE THERE ARE CMDS LEFT IN SEQUENCE TBLE:
4563	022062					50366\$:
4564	022062	021127	177777			CMP (R1),#END
4565	022066	001574				BEQ 50367\$
4566	022070	022711	000040		CMP #JMP.C,(R1)	;IS THIS A JUMP CMD?
4567	022074	001024			BNE 6\$;BR IF NOT.
4568	022076				LET R1 := R1 + #2	;POINT TO BRF.
4569	022076	062701	000002			ADD #2,R1
4570	022102	012137	003102		MOV (R1)+,JLOC	;SAVE BRF (LOCATION).
4571	022106	022137	003100		CMP (R1)+,JLOOP	;HAS LOOP COUNT BE SATISFIED?
4572	022112	001003			BNE 1\$;IF NOT, JMP AGAIN.
4573	022114				LET R1 := R1 + #2	;IF SO, ADJUST SEQ POUNTER
4574	022114	062701	000002			ADD #2,R1
4575	022120	000760			BR 3\$;AND GO TO NEXT COMMAND.
4576	022122				1\$: LET JLOOP := JLOOP + #1	;UPDATE THE LOOP COUNT.
4577	022122	005237	003100			INC JLOOP
4578	022126				LET R1 := #CMDSEQ	;INIT CMD SEQ TABLE POINTER.
4579	022126	012701	003164			MOV #CMDSEQ,R1
4580	022132	005337	003102		2\$: DEC JLOC	;DECR LOCATION COUNTER.
4581	022136	001751			BEQ 3\$;IF THIS IS THE RIGHT LOCATION TO JMP TO, GO SET
4582	022140				LET R1 := R1 + #10	;IF NOT, UPDATE SEQ POUNTER TO NEXT CMD.
4583	022140	062701	000010			ADD #10,R1
4584	022144	000772			BR 2\$;DO IT AGAIN.

```

4585 022146 022711 000020      6$:      CMP  #DLY.C,(R1)          ;DELAY?
4586 022152 001026              BNE  4$                  ;BR IF NOT.
4587 022154                      LET R1 := R1 + #4        ;R1 = LOCATION OF N COUNT.
4588 022154 062701 000004              ADD  #4,R1
4589 022160                      LET TIME2 := (R1)       ;SAVE N COUNT.
4590 022160 011137 003076              MOV  (R1),TIME2
4591 022164                      7$:      DELAY 10.                ;GO TO SUPER-WAIT 1 MSEC.
4592 022164 012727 000012              MOV  #10.,(PC)+
4593 022170 000000              .WORD 0
4594 022172 013727 002116              MOV  L$DLY,(PC)+
4595 022176 000000              .WORD 0
4596 022200 005367 177772              DEC  -6(PC)
4597 022204 001375              BNE  .-4
4598 022206 005367 177756              DEC  -22(PC)
4599 022212 001367              BNE  .-20
4600 022214 005337 003076              DEC  TIME2
4601 022220 001361              BNE  7$
4602 022222                      LET R1 := R1 + #4        ;POINT TO NEXT CMD.
4603 022222 062701 000004              ADD  #4,R1
4604 022226 000715              4$:      BR  3$                  ;GO CHECK NEXT CMD.
4605 022230 004737 007114              JSR  PC,SETUP           ;GO SETUP THE COMMAND BLOCK.
4606 022234                      WHILE NCNT LT NCNT1 DO ;WHILE THERE ARE RECORDS REMAINING:
4607 022234                      50370$:
4608 022234 023737 003050 003052              CMP  NCNT,NCNT1
4609 022242 002103              BGE  50371$
4610 022244 004737 007006              JSR  PC,CMDAC           ;STORE CMD ASCII IN ERROR MSG.
4611 022250 004737 006500              JSR  PC,EXSUB          ;ISSUE CMD TO ALL,AWAIT INTS,CHECK STATUS.
4612 022254                      IF CMDWRD EQ #GES THEN ;IF CMD IS GET STATUS THEN:
4613 022254 023727 003056 100017              CMP  CMDWRD,#GES
4614 022262 001002              BNE  50372$
4615 022264 004737 013770              JSR  PC,PRXST          ;PRINT EXTENDED STATUS REGISTERS.
4616 022270                      ENDIF
4617 022270                      50372$:
4618 022270 004737 014052              JSR  PC,CKHAE          ;CHECK HALT AFTER EACH CMD FLAG.
4619 022274                      LET R2 := #1           ;SET ALL UNITS AT BOT/EOT.
4620 022274 012702 000001              MOV  #1,R2
4621 022300 004737 013462              JSR  PC,FIRSTU         ;FIND FIRST UNIT.
4622 022304                      WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE UNITS:
4623 022304                      50373$:
4624 022304 026527 002532 177777              CMP  DEVTBL(R5),#END
4625 022312 001426              BEQ  50374$
4626 022314                      IF #MOD.CO SETIN CMDWRD THEN ;IF CMD IS REVERSE THEN:
4627 022314 032737 000400 003056              BIT  #MOD.CO,CMDWRD
4628 022322 001406              BEQ  50375$
4629 022324                      IF #XO.BOT NOTSETIN EOTFLG(R5) THEN ;IF NOT AT BOT THEN:
4630 022324 032765 000002 003134              BIT  #XO.BOT,EOTFLG(R)
4631 022332 001001              BNE  50376$
4632 022334                      LET R2 := #0           ;CLEAR EOT/BOT FLAG.
4633 022334 005002              CLR  R2
4634 022336                      ENDIF
4635 022336                      50376$:
4636 022336                      ELSE                  ;ELSE IF CMD IS NOT REVERSE:
4637 022336 000411              BR  50377$
4638 022340                      50375$:
4639 022340                      IF #XO.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
4640 022340 032765 000001 003134              BIT  #XO.EOT,EOTFLG(R)

```

Address	OpCode	Operand 1	Operand 2	Operand 3	Comment
4641	022346	001404			BEQ 50400\$
4642	022350	032737	000001	003056	BIT #CMD.CO,CMDWRD
4643	022356	001001			BNE 50401\$
4644	022360				50400\$:
4645					;IF NOT AT EOT OR NOT A MOTION CMD THEN:
4646	022360				;CLEAR EOT/BOT FLAG.
4647	022360	005002			LET R2 := #0
4648	022362				ENDIF
4649	022362				50401\$:
4650	022362				ENDIF
4651	022362				50377\$:
4652	022362	004737	013530		JSR PC,NEXTU ;FIND NEXT UNIT
4653	022366				ENDDO ;
4654	022366	000746			BR 50373\$
4655	022370				50374\$:
4656	022370				IF R2 EQ #1 THEN ;IF ALL UNIT ARE AT EOT/BOT THEN:
4657	022370	020227	000001		CMP R2,#1
4658	022374	001016			BNE 50402\$
4659	022376				LET NCNT1 := NCNT + #1 ;FORCE TERMINATION OF COMMAND.
4660	022376	013737	003050	003052	MOV NCNT,NCNT1
4661	022404	005237	003052		INC NCNT1
4662	022410				LET ALLEOT :B= ALLEOT + #1 ;FLAG ALL UNITS AT EOT/BOT TO ALLOW VERIFY OF D
4663	022410	105237	003154		INCB ALLEOT
4664	022414				IF CMDLG EQ #2 THEN ;WHEN WRITING IS CURRENT COMMAND
4665	022414	023727	003064	000002	CMP CMDLG,#2
4666	022422	001002			BNE 50403\$
4667	022424	004737	022506		JSR PC,T\$WEOT ;GO WRITE/READ REV ONE RECORD BEYOND EOT
4668	022430				ENDIF
4669	022430				50403\$:
4670	022430				ELSE
4671	022430	000402			BR 50404\$
4672	022432				50402\$:
4673	022432				LET ALLEOT :B- #0 ;WHEN NOT ALL @EOT, CLEAR FLAG
4674	022432	105037	003154		CLRB ALLEOT
4675	022436				ENDIF
4676	022436				50404\$:
4677	022436				LET NCNT := NCNT + #1 ;UPDATE RECORD COUNT.
4678	022436	005237	003050		INC NCNT
4679	022442				LET PCMDWD := CMDWRD ;SAVE PREVIOUS COMMAND WORD.
4680	022442	013737	003056	003062	MOV CMDWRD,PCMDWD
4681	022450				ENDDO
4682	022450	000671			BR 50370\$
4683	022452				50371\$:
4684	022452	004737	012450		JSR PC,VFYDAT ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
4685					;VERIFY THE LAST N RECORDS OF DATA.
4686	022456				ENDDO
4687	022456	000601			BR 50366\$
4688	022460				50367\$:
4689					
4690	022460				EXIT TST
4691	022460	104432			TRAP C\$EXIT
4692	022462	000130			.WORD L10037-
4693					
4694					
4695					
4696					

```

4697
4698
4699
4700
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4702
4703
4704
4705
4706 022464
4707 022464 012203
4708 022466 005303
4709 022470 006303
4710 022472
4711 022472 016321 003266
4712 022476
4713 022476 012221
4714 022500
4715 022500 012221
4716 022502
4717 022502 012221
4718 022504 000207
4719
4720
4721
4722
4723
4724
4725
4726 022506 000240
4727 022510 000240
4728 022512 004737 006500
4729 022516 004737 014052
4730
4731 022522
4732 022522 013737 003056 003062
4733 022530
4734 022530 012737 104401 003056
4735 022536
4736 022536 012737 000004 003064
4737 022544
4738 022544 013737 003056 002310
4739 022552 042737 004000 002310
4740 022560
4741 022560 013737 002310 003060
4742 022566
4743 022566 013737 003046 002312
4744 022574 004737 007006
4745 022600 004737 006500
4746 022604 004737 014052
4747 022610 000207
4748
4749
4750
4751
4752 022612

: SUBROUTINE TO MOVE A COMMAND FROM THE SOFTWARE P TABLE TO
: THE COMMAND SEQUENCE TABLE.
: INPUTS: R2 = POINTER TO SOFT 'P' TABLE
: OUTPUTS:
: REGISTERS: R3.
: CALLS:
PTCMDS: LET R3 := (R2)+ - #1 SHIFT +1 ;R3 = COMMAND TABLE INDEX.
MOV (R2)+,R3
DEC R3
ASL R3
LET (R1)+ := CMDTBL(R3) ;MOVE COMMAND WORD. MOV CMDTBL(R3),(R1)+
LET (R1)+ := (R2)+ ;MOVE # OF BYTES. MOV (R2)+,(R1)+
LET (R1)+ := (R2)+ ;MOVE # OF OPERATIONS. MOV (R2)+,(R1)+
LET (R1)+ := (R2)+ ;MOVE PATTERN CODE. MOV (R2)+,(R1)+
RTS PC

: SUBROUTINE TO WRITE THEN READ REVERSE ONE RECORD BEYOND EOT
: INPUTS:
: OUTPUTS:
: REGISTERS:
: CALLS: CMDAC,EXSUB,CKHAE
TSWEOT: NOP
NOP
JSR PC,EXSUB ;WRITE ONE RECORD BEYOND EOT
JSR PC,CKHAE ;SO THAT READ SHORTER STOP DISTANCE
;SHALL POSITION HEAD IN CLEAN IRG GAP
LET PCMDWD := CMDWRD ;REPOSITION TAPE MOV CMDWRD,PCMDWD
LET CMDWRD := #RDR ;BEFORE EXTRA RECORD MOV #RDR,CMDWRD
LET CMDLG := #4 ;BY READING REVERSE MOV #4,CMDLG
LET CMDPKT := CMDWRD CLR.BY #BRF.C MOV CMDWRD,CMDPKT
BIC #BRF.C,CMDPKT
LET CMDSAV := CMDPKT ;THAT RECORD TO ALLOW MOV CMDPKT,CMDSAV
LET CMDPKT+CP.ADL := DATARD ;NEXT COMMAND IN THE MOV DATARD,CMDPKT+CP
JSR PC,CMDAC ;TABLE TO BE EXECUTED
JSR PC,EXSUB
JSR PC,CKHAE
RTS PC

.EVEN
ENDTST

```

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TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

SEQ 0150

4753 022612
4754 022612 10440i
4755
4756 022614

L10037:

TRAP CSETST

ENDMOD

PARAMETER CODING
CZTSHB.P11

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TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

SEQ 0151

```

4757
4758
4759
4760
4761 022614
4762
4763
4764
4765
4766
4767
4768
4769
4770
4771
4772 022614
4773 022614 000024
4774 022616
4775
4776 022616
4777 022616 000031
4778 022620 0226 2
4779 022622 160002
4780 022624 177564
4781 022626
4782 022626 001032
4783 022630 022657
4784 022632 000777
4785 022634 000060
4786 022636 000776
4787
4788 022640
4789 022640 013004
4790
4791
      022642 051524 051123 040440 TS4ADR: .NLIST BEX
      022657 126 041505 047524 TS4VCT: .ASCIZ /TSSR ADDRESS/
                                     .ASCIZ /VECTOR/
                                     .LIST BEX
                                     .EVEN
4792
4793
4794 022666
4795
4796 022666

```

.TITLE PARAMETER CODING

.SBTTL HARDWARE PARAMETER CODING SECTION

BGNMOD

;++

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

BGNHRD

LSHARD::

GPRMA TS4ADR,0,0,160002,177564,YES

GPRMD TS4VCT,2,0,777,60,776,YES

EXIT HRD

ENDHRD

L10040:

.WORD L10040-LSHARD/2

.WORD TSCODE

.WORD TS4ADR

.WORD TSLOLIM

.WORD TSHILIM

.WORD TSCODE

.WORD TS4VCT

.WORD 777

.WORD TSLOLIM

.WORD TSHILIM

.WORD TSCODE

.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
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; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
; WITH THE OPERATOR.
;--

4797					
4798					
4799					
4800					
4801					
4802					
4803					
4804					
4805					
4806					
4807					
4808	022666		BGNSFT		
4809	022666	000461			.WORD L10041-L\$SOFT/2
4810	022670		L\$SOFT::		
4811					
4812					
4813	022670		GPRML	CLRM,0,1,YES	
4814	022670	000130			.WORD T\$CODE
4815	022672	023422			.WORD CLRM
4816	022674	000001			.WORD 1
4817	022676		GPRML	RRVM,0,400,YES	
4818	022676	000130			.WORD T\$CODE
4819	022700	023441			.WORD RRVM
4820	022702	000400			.WORD 400
4821	022704		GPRML	HAEM,2,1,YES	
4822	022704	001130			.WORD T\$CODE
4823	022706	023470			.WORD HAEM
4824	022710	000001			.WORD 1
4825	022712		GPRML	RCVERM,2,400,YES	
4826	022712	001130			.WORD T\$CODE
4827	022714	023514			.WORD RCVERM
4828	022716	000400			.WORD 400
4829	022720		GPRML	DINTM,6,1,YES	
4830	022720	003130			.WORD T\$CODE
4831	022722	023545			.WORD DINTM
4832	022724	000001			.WORD 1
4833	022726		GPRML	IREFM,6,400,YES	
4834	022726	003130			.WORD T\$CODE
4835	022730	023570			.WORD IREFM
4836	022732	000400			.WORD 400
4837	022734		GPRML	CHGM,10,1,YES	
4838	022734	004130			.WORD T\$CODE
4839	022736	023611			.WORD CHGM
4840	022740	000001			.WORD 1
4841	022742		XFERF	ENDSP1	
4842	022742	132044			.WORD T\$CODE
4843	022744		GPRML	IREFM,12,1,YES	
4844	022744	005130			.WORD T\$CODE
4845	022746	023635			.WORD IREFM
4846	022750	000001			.WORD 1
4847	022752		GPRMD	CHARM,14,0,377,0,200,YES	
4848	022752	006032			.WORD T\$CODE
4849	022754	023666			.WORD CHARM
4850	022756	000377			.WORD 377
4851	022760	000000			.WORD T\$LOLIM
4852	022762	000200			.WORD T\$HILIM

4853	022764		GPRMD	CMD2M,16,D,37,1,33,YES		
4854	022764	007052			.WORD	T\$CODE
4855	022766	023713			.WORD	CMD2M
4856	022770	000037			.WORD	37
4857	022772	000001			.WORD	T\$LOLIM
4858	022774	000033			.WORD	T\$HILIM
4859	022776		GPRMD	BPCRM,20,D,-1,1,DATCNT,YES		
4860	022776	010052			.WORD	T\$CODE
4861	023000	023721			.WORD	BPCRM
4862	023002	177777			.WORD	-1
4863	023004	000001			.WORD	T\$LOLIM
4864	023006	004000			.WORD	T\$HILIM
4865	023010		GPRMD	NUMBM,22,D,-1,1,77777,YES		
4866	023010	011052			.WORD	T\$CODE
4867	023012	023733			.WORD	NUMBM
4868	023014	177777			.WORD	-1
4869	023016	000001			.WORD	T\$LOLIM
4870	023020	077777			.WORD	T\$HILIM
4871	023022		GPRMD	PATM,24,D,17,0,10,YES		
4872	023022	012052			.WORD	T\$CODE
4873	023024	023753			.WORD	PATM
4874	023026	000017			.WORD	17
4875	023030	000000			.WORD	T\$LOLIM
4876	023032	000010			.WORD	T\$HILIM
4877	023034		GPRMD	CMD3M,26,D,37,1,33,YES		
4878	023034	013052			.WORD	T\$CODE
4879	023036	023766			.WORD	CMD3M
4880	023040	000037			.WORD	37
4881	023042	000001			.WORD	T\$LOLIM
4882	023044	000033			.WORD	T\$HILIM
4883	023046		GPRMD	BPCRM,30,D,-1,1,DATCNT,YES		
4884	023046	014052			.WORD	T\$CODE
4885	023050	023721			.WORD	BPCRM
4886	023052	177777			.WORD	-1
4887	023054	000001			.WORD	T\$LOLIM
4888	023056	004000			.WORD	T\$HILIM
4889	023060		GPRMD	NUMBM,32,D,-1,1,77777,YES		
4890	023060	015052			.WORD	T\$CODE
4891	023062	023733			.WORD	NUMBM
4892	023064	177777			.WORD	-1
4893	023066	000001			.WORD	T\$LOLIM
4894	023070	077777			.WORD	T\$HILIM
4895	023072		GPRMD	PATM,34,D,17,0,10,YES		
4896	023072	016052			.WORD	T\$CODE
4897	023074	023753			.WORD	PATM
4898	023076	000017			.WORD	17
4899	023100	000000			.WORD	T\$LOLIM
4900	023102	000010			.WORD	T\$HILIM
4901	023104		GPRMD	CMD4M,36,D,37,1,33,YES		
4902	023104	017052			.WORD	T\$CODE
4903	023106	023774			.WORD	CMD4M
4904	023110	000037			.WORD	37
4905	023112	000001			.WORD	T\$LOLIM
4906	023114	000033			.WORD	T\$HILIM
4907	023116		GPRMD	BPCRM,40,D,-1,1,DATCNT,YES		
4908	023116	020052			.WORD	T\$CODE

4909	023120	023721			.WORD	BPCRM
4910	023122	177777			.WORD	-1
4911	023124	000001			.WORD	T\$LOLIM
4912	023126	004000			.WORD	T\$HILIM
4913	023130		GPRMD	NUMBM,42,D,-1,1,77777,YES		
4914	023130	021052			.WORD	T\$CODE
4915	023132	023733			.WORD	NUMBM
4916	023134	177777			.WORD	-1
4917	023136	000001			.WORD	T\$LOLIM
4918	023140	077777			.WORD	T\$HILIM
4919	023142		GPRMD	PATM,44,D,17,0,10,YES		
4920	023142	022052			.WORD	T\$CODE
4921	023144	023753			.WORD	PATM
4922	023146	000017			.WORD	17
4923	023150	000000			.WORD	T\$LOLIM
4924	023152	000010			.WORD	T\$HILIM
4925	023154		GPRMD	CMD5M,46,D,37,1,33,YES		
4926	023154	023052			.WORD	T\$CODE
4927	023156	024002			.WORD	CMD5M
4928	023160	000037			.WORD	37
4929	023162	000001			.WORD	T\$LOLIM
4930	023164	000033			.WORD	T\$HILIM
4931	023166		GPRMD	BPCRM,50,D,-1,1,DATCNT,YES		
4932	023166	024052			.WORD	T\$CODE
4933	023170	023721			.WORD	BPCRM
4934	023172	177777			.WORD	-1
4935	023174	000001			.WORD	T\$LOLIM
4936	023176	004000			.WORD	T\$HILIM
4937	023200		GPRMD	NUMBM,52,D,-1,1,77777,YES		
4938	023200	025052			.WORD	T\$CODE
4939	023202	023733			.WORD	NUMBM
4940	023204	177777			.WORD	-1
4941	023206	000001			.WORD	T\$LOLIM
4942	023210	077777			.WORD	T\$HILIM
4943	023212		GPRMD	PATM,54,D,17,0,10,YES		
4944	023212	026052			.WORD	T\$CODE
4945	023214	023753			.WORD	PATM
4946	023216	000017			.WORD	17
4947	023220	000000			.WORD	T\$LOLIM
4948	023222	000010			.WORD	T\$HILIM
4949	023224		XFER	ENDSP2		
4950	023224	002004			.WORD	T\$CODE
4951	023226		ENDSP1: XFER	ENDSP		
4952	023226	075004			.WORD	T\$CODE
4953	023230		ENDSP2: GPRMD	CMD6M,56,D,37,1,33,YES		
4954	023230	027052			.WORD	T\$CODE
4955	023232	024010			.WORD	CMD6M
4956	023234	000037			.WORD	37
4957	023236	000001			.WORD	T\$LOLIM
4958	023240	000033			.WORD	T\$HILIM
4959	023242		GPRMD	BPCRM,60,D,-1,1,DATCNT,YES		
4960	023242	030052			.WORD	T\$CODE
4961	023244	023721			.WORD	BPCRM
4962	023246	177777			.WORD	-1
4963	023250	000001			.WORD	T\$LOLIM
4964	023252	004000			.WORD	T\$HILIM

4965	023254		GPRMD	NUMBM,62,D,-1,1,77777,YES		
4966	023254	031052			.WORD	TSCODE
4967	023256	023733			.WORD	NUMBM
4968	023260	177777			.WORD	-1
4969	023262	000001			.WORD	TSLOLIM
4970	023264	077777			.WORD	TSHILIM
4971	023266		GPRMD	PATM,64,D,17,0,10,YES		
4972	023266	032052			.WORD	TSCODE
4973	023270	023753			.WORD	PATM
4974	023272	000017			.WORD	17
4975	023274	000000			.WORD	TSLOLIM
4976	023276	000010			.WORD	TSHILIM
4977	023300		GPRMD	CMD7M,66,D,37,1,33,YES		
4978	023300	033052			.WORD	TSCODE
4979	023302	024016			.WORD	CMD7M
4980	023304	000037			.WORD	37
4981	023306	000001			.WORD	TSLOLIM
4982	023310	000033			.WORD	TSHILIM
4983	023312		GPRMD	BPCRM,70,D,-1,1,DATCNT,YES		
4984	023312	034052			.WORD	TSCODE
4985	023314	023721			.WORD	BPCRM
4986	023316	177777			.WORD	-1
4987	023320	000001			.WORD	TSLOLIM
4988	023322	004000			.WORD	TSHILIM
4989	023324		GPRMD	NUMBM,72,D,-1,1,77777,YES		
4990	023324	035052			.WORD	TSCODE
4991	023326	023733			.WORD	NUMBM
4992	023330	177777			.WORD	-1
4993	023332	000001			.WORD	TSLOLIM
4994	023334	077777			.WORD	TSHILIM
4995	023336		GPRMD	PATM,74,D,17,0,10,YES		
4996	023336	036052			.WORD	TSCODE
4997	023340	023753			.WORD	PATM
4998	023342	000017			.WORD	17
4999	023344	000000			.WORD	TSLOLIM
5000	023346	000010			.WORD	TSHILIM
5001	023350		GPRMD	CMD8M,76,D,37,1,33,YES		
5002	023350	037052			.WORD	TSCODE
5003	023352	024024			.WORD	CMD8M
5004	023354	000037			.WORD	37
5005	023356	000001			.WORD	TSLOLIM
5006	023360	000033			.WORD	TSHILIM
5007	023362		GPRMD	BPCRM,100,D,-1,1,DATCNT,YES		
5008	023362	040052			.WORD	TSCODE
5009	023364	023721			.WORD	BPCRM
5010	023366	177777			.WORD	-1
5011	023370	000001			.WORD	TSLOLIM
5012	023372	004000			.WORD	TSHILIM
5013	023374		GPRMD	NUMBM,102,D,-1,1,77777,YES		
5014	023374	041052			.WORD	TSCODE
5015	023376	023733			.WORD	NUMBM
5016	023400	177777			.WORD	-1
5017	023402	000001			.WORD	TSLOLIM
5018	023404	077777			.WORD	TSHILIM
5019	023406		GPRMD	PATM,104,D,17,0,10,YES		
5020	023406	042052			.WORD	TSCODE

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SOFTWARE PARAMETER CODING SECTION

SEQ 0156

5021	023410	023753
5022	023412	000017
5023	023414	000000
5024	023416	000010
5025	023420	
5026	023420	
5027	023420	162004

ENDSP:

XFER JMPMSG

.WORD	PATM
.WORD	17
.WORD	T\$LOLIM
.WORD	T\$HILIM

.WORD T\$CODE

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023422	046103	040505	020122	CLRM:	.ASCIZ	/CLEAR COUNTERS/
023441	122	051505	052105	RRVM:	.ASCIZ	/RESET RANDOM VARIABLES/
023470	040510	052114	040440	HAEM:	.ASCIZ	/HALT AFTER EACH CMD/
023514	051120	047111	020124	RCVERM:	.ASCIZ	/PRINT RECOVERABLE ERRORS/
023545	104	051511	041101	DINTM:	.ASCIZ	/DISABLE INTERRUPTS/
023570	047111	044510	044502	IREFM:	.ASCIZ	/INHIBIT RECOVERY/
023611	103	040510	043516	CHGM:	.ASCIZ	/CHANGE CMD SEQUENCE/
023635	111	044116	041111	IREFM:	.ASCIZ	/INHIBIT RFC ERROR REPORT/
023666	044103	051101	041501	CHARM:	.ASCIZ	/CHARACTERISTICS CODE/
023713	103	042115	031057	CMD2M:	.ASCIZ	"CMD/2"
023721	102	043122	041440	BPCRM:	.ASCIZ	/BRF COUNT/
023733	043	047440	020106	NUMBM:	.ASCIZ	/# OF OPERATIONS/
023753	120	052101	042524	PATM:	.ASCIZ	/PATTERN/

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023764				.LIST	BEX	
				.EVEN		
023764				JMPMSG:		
023764				EXIT SFT		
023764	023004					.WORD T\$CODE

023766	046503	027504	000063	CMD3M:	.ASCIZ	"CMD/3"
023774	046503	027504	000064	CMD4M:	.ASCIZ	"CMD/4"
024002	046503	027504	000065	CMD5M:	.ASCIZ	"CMD/5"
024010	046503	027504	000066	CMD6M:	.ASCIZ	"CMD/6"
024016	046503	027504	000067	CMD7M:	.ASCIZ	"CMD/7"
024024	046503	027504	000070	CMD8M:	.ASCIZ	"CMD/8"

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				.LIST	BEX	
				.EVEN		
024032				ENDSFT		
024032				L10041:		.EVEN
				:*****		
				:*****		
				: PATCH AREA		
				:		
024032	000100			PATCH::	.BLKW	64.
				:*****		
				:*****		
024232				LASTAD		
						.EVEN
024232	024254					.WORD T\$FREE
024234	000007					.WORD T\$SIZE
024236				L\$LAST::		
024236				ENDMOD		

```
5057 .SBTTL HARD CODED P-TBL
5058
5059 :++
5060 :DIAG IS PRE-PARAMETERIZED PER TBL
5061 :--
5062
5063 024236 BGNSETUP 1
5064 024236 BGNPTAB
5065 024236 000000 .WORD 0
5066 024240 000000 .WORD 0
5067 024242 000000 .WORD 0
5068 024244 000000 .WORD 0
5069 024246 000002 .WORD L10044-./2-1
5070 024250
5071 024250 172522 L10042: 172522
5072 024252 000224 224
5073 024254 ENDPTAB
5074 024254 L10044:
5075 024254 ENDSETUP
5076
5077 000001 .END
```


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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0162

DATARD	003046	G	614#	988	1024	1386	2556	2628	2632	2712	3461*	3462*	4743		
DATAWT	003044	G	399	613#	1423	1473	1668*	1737*	1738*	1900*	2211*	2710	3459*	3461	3464
			3939	3943											
DATCNT=	004000	G	187	191	195	203	207	401#	687	691	695	3462	3464	4050	4054
			4058	4062	4066	4070	4074	4084	4146	4150	4156	4160	4164	4170	4174
			4178	4220	4237	4332	4345	4389	4422	4494	4509	4860	4884	4908	4932
			4960	4984	5008										
DEVTBL	002532	G	584#	809	857	1119	1185	1250	1615	2567	2812	2820	2827	2847	2850
			2917	2924	3025	3030	3197*	3211*	3212*	3273	3360	3393	3405	3521	3550
			3571	3586	3647	3683*	3719*	3781	3795	4624					
DFPTBL	002174	G	149#												
DFTSCH=	000040	G	354#	1039											
DIA =	100006	G	485#	735											
DIABLK=	003044	G	399#	1413											
DIACNT=	000020	G	400#	1412											
DIAGMC=	000000		4												
DINT	002210	G	175#	1643	1716										
DINTM	023545		4831	5029#											
DLY =	000020	G	489#	737											
DLY.C =	000020	G	343#	489	4585										
DRI =	100013	G	417#	710	4025										
DROPDM	004322	G	793#	3689											
DROPED	003152	G	656#	2474	2641	2647	2807*	2841*	2903*	2938*					
DROPN	013766		2917*	2941#	3550*	3688									
DROPU	013560	G	1600	1655	1682	1745	2044	2121	2256	2311	2331	2352	2861#		
DROPUA	013704		2909#	3577	3592										
DRORTN	013760		2937#												
DTAERM	004720	G	805#	2676	2693	2748									
DTAER2	004403	G	793#	2764											
DTAER3	004452	G	793#	2785											
DTAER4	004514	G	793#	2678											
DTAER5	004535	G	793#	2696											
EF.CON=	000036	G	263#												
EF.NEW=	000035	G	264#	3236											
EF.PWR=	000034	G	265#	3218											
EF.RES=	000037	G	262#	3244											
EF.STA=	000040	G	261#	3186											
EINC	012442		2456	2503#											
END =	177777	G	491#	588	618	619	620	703	704	705	706	707	738	1072	1119
			1185	1250	1615	2567	2820	3025	3273	3360	3521	3647	3781	4006	4014
			4041	4047	4077	4099	4117	4139	4153	4167	4181	4191	4201	4261	4282
			4292	4442	4460	4500	4515	4564	4624						
ENDERF=	003124		644#	1757											
ENDFLG=	003156		660#	3482											
ENDSP	023420		4952	5025#											
ENDSP1	023226		4842	4951#											
ENDSP2	023230		4950	4953#											
EOTFLG	003134	G	649#	1125	1135	1191	1194	1214	1256	1259	1279	1835*	2573	2576	2596
			4630	4640											
ERCVER	002205	G	172#	2151	2476										
ERLOG	003117	G	639#	2385	2388*										
ERRREC	003122	G	642#	1663	1921	2078	2168*	2207*	2277*						
ERS =	100411	G	474#	731	4087										
EVL =	000004	G	281#												
EXALL	006204	G	1068#	3777	3818	3832	3844	3856	3868	3880	3892	3904	3916	3928	3931
			4262	4283	4293	4443	4461	4501	4516						

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SEQ 0166

LSHARD	022616	G	36	4773	4774#
LSHIME	002120	G	101#		
LSHPCP	002016	G	35#		
LSHPTP	002022	G	39#		
LSHW	002174	G	40	147	148#
LSICP	002104	G	89#		
LSINIT	015260	G	90	3133#	
LSLADP	002026	G	43#		
LSLAST	024236	G	44	5055#	5076
LSLOAD	002100	G	85#		
LSLUN	002074	G	81#	2827*	2850*
LSMREV	002050	G	61#		
LSNAME	002000	G	18#		
LSPRIO	002042	G	55#		
LSPROT	015252	G	96	3120#	
LSPRT	002112	G	95#		
LSREPP	002062	G	71#		
LSREV	002010	G	27#		
LSRPT	014126	G	72	3017#	
LSSOFT	022670	G	38	4809	4810#
LSSPC	002056	G	67#		
LSSPCP	002020	G	37#		
LSSPTP	002024	G	41#		
LSSTA	002030	G	45#		
LSSW	002202	G	42	165	166#
LSTEST	002114	G	97#		
LSTIML	002014	G	33#		
LSUNIT	002012	G	31#	3204	
L10000	002200		147	156#	
L10001	002310		165	212#	
L10002	005064		845	849#	
L10003	006010		927	934#	
L10004	006016		950#		
L10005	006024		958#		
L10006	006032		966#		
L10007	006040		974#		
L10010	015250		3102	3109#	
L10012	016546		3489	3505#	
L10013	017036		3603#		
L10014	017240		3662	3666#	
L10015	017312		3697	3701#	
L10016	017406		3741	3746#	
L10017	020774		3995	4205#	
L10020	017542		3808#		
L10021	017566		3822#		
L10022	017606		3834#		
L10023	017626		3846#		
L10024	017646		3858#		
L10025	017666		3870#		
L10026	017706		3882#		
L10027	017726		3894#		
L10030	017746		3906#		
L10031	017766		3918#		
L10032	020024		3935#		
L10033	020210		3986#		
L10034	021452		4297	4405#	

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SEQ 0169

RPF = 105001 G	444#	721	4173																
RPR = 125001 G	447#	722	4177																
RPTFLG 003147 G	653#	1239	1242*	4287*															
RPT1A 014510	3031	3105#																	
RPT1B 014565	3041	3105#																	
RPT1C 014636	3051	3105#																	
RPT1D 014707	3061	3105#																	
RPT1F 015013	3070	3105#																	
RPT1G 015064	3079	3105#																	
RPT1I 015213	3089	3105#																	
RRANV 002203 G	170#	3177																	
RRBC 002604 G	593#	3047	3048	3049	3050														
RRCL = 000020 G	407#	2137	2361																
RRREC 002724 G	597#	3068																	
RRUNR 002734 G	598#	3077																	
RRVM 023441	4819	5029#																	
RTLE 012022 G	2132	2190	2260	2323#															
RTLRTN 012146	2334	2376#																	
RWCPK 002330 G	526#	2279																	
RWD = 102010 G	453#	526	682	698	724	1054	1702	1856	4043	4119	4141	4187							
RWERR 003120 G	640#	1993	2246*	2338*	2452														
RSSAVE 003110 G	631#	1611*	1623	3021*	3099														
SCCNT 002774 G	602#	1923*	2086*	3088															
SCERM 003734 G	793#	2023																	
SCH = 140004 G	483#	678	734	1038	1608	4021	4029	4037											
SCHBK 002442 G	548#	1404	1407*	1625*															
SCHCNT= 000010 G	396#	1405																	
SEQEND 003254 G	703#	4249	4435																
SETCH 006140 G	1036#	4225	4427	4487	4544														
SETRW 006164 G	1053#	4229	4290	4428	4458	4488													
SETUP 007114 G	1074	1364#	4605																
SFF = 105010 G	465#	728	4105	4113															
SFPTBL 002202 G	167#																		
SFR = 105410 G	468#	729	4101	4109															
SPAFLG 003161 G	667#																		
SRF = 104010 G	432#	717	4123	4131															
SRR = 104410 G	435#	718	4127	4135															
STAERM 005066 G	853#	1599	1654	1681	1744	1981	2024	2043	2095	2120	2157	2198	2255						
	2268	2310	2330	2351	2369	2892													
STAER1 005400	810	858	929#	1315*	1316*	1317*													
STAER2 005556	890	929#																	
STAER3 005635	901	929#																	
STAER4 005673	910	929#																	
STAERS 005713	920	929#	2959																
STAER6 005522	838	882	929#																
STAER7 005472	816	864	929#	1322*	1324*	1326*													
STAFLG 003156 G	664#	2932*	3191*	3223*	3241	3820*	4227	4231*	4430*	4490*	4559*								
SVCGBL= 000000	4#	18	19	27	28	29	30	31	32	33	34	35	36						
	37	38	39	40	41	42	43	44	45	46	47	48	49						
	50	51	52	53	54	55	56	57	58	59	60	61	62						
	64	65	67	68	69	70	71	72	73	74	75	76	77						
	78	79	80	81	82	83	84	85	86	87	88	89	90						
	91	92	93	94	95	96	97	98	99	100	101	102	113						
	114	128	129	135	136	148	149	150	166	167	168	805	806						
	853	854	946	947	954	955	962	963	970	971	3017	3018	3120						
	3121	3133	3134	3516	3517	3641	3642	3677	3678	3712	3713	4774	4775						

SVCINS= 000001

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36	38	40	42	68	70	72	74	76	78	80	82	84
62	63	65	66	94	96	98	100	102	112	114	115	116
86	88	90	92	136	137	147	165	807	808	809	810	811
117	118	129	133	817	818	819	820	837	838	839	840	841
812	813	814	816	855	856	857	858	859	860	861	862	864
842	844	845	850	881	882	883	884	885	886	890	891	892
865	866	867	868	898	899	900	901	902	903	904	905	907
893	894	896	897	911	912	913	914	916	917	918	919	921
908	909	910	911	912	913	914	916	917	918	919	920	921
922	923	924	926	927	935	951	959	967	975	1244	1596	1597
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1707	1708	1709	1710	1711	1712	1741	1742	1743	1744	1790	1978	1979
1980	1981	2021	2022	2023	2024	2040	2041	2042	2043	2092	2093	2094
2095	2117	2118	2119	2120	2154	2155	2156	2157	2195	2196	2197	2198
2252	2253	2254	2255	2265	2266	2267	2268	2307	2308	2309	2310	2327
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2481	2482	2483	2484	2673	2674	2675	2676	2678	2679	2680	2681	2682
2690	2691	2692	2693	2695	2696	2697	2698	2699	2700	2745	2746	2747
2748	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2783	2784
2785	2786	2787	2788	2789	2823	2889	2890	2891	2892	2908	2922	2949
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2979	2981	2992	2993	2994	2995	2996	2997	3028	3029	3030	3031	3032
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3091	3092	3093	3101	3102	3110	3139	3140	3141	3142	3144	3145	3146
3147	3148	3149	3150	3151	3186	3187	3189	3218	3219	3221	3228	3229
3236	3237	3244	3245	3281	3292	3293	3294	3295	3296	3297	3328	3329
3330	3331	3332	3334	3335	3336	3337	3338	3339	3340	3341	3343	3345
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3396	3397	3398	3405	3406	3407	3408	3409	3410	3422	3423	3424	3425
3426	3427	3428	3429	3431	3458	3459	3467	3468	3469	3470	3471	3473
3488	3489	3506	3526	3527	3528	3529	3530	3531	3535	3536	3543	3544
3545	3546	3547	3548	3555	3571	3572	3573	3574	3575	3576	3586	3587
3588	3589	3590	3591	3604	3653	3654	3661	3662	3667	3685	3686	3688
3689	3690	3691	3692	3693	3696	3697	3702	3721	3730	3731	3732	3733
3734	3735	3740	3741	3747	3772	3794	3795	3796	3797	3798	3799	3800
3809	3813	3823	3827	3835	3839	3847	3851	3859	3863	3871	3875	3883
3887	3895	3899	3907	3911	3919	3923	3936	3954	3987	3994	3995	4206
4296	4297	4406	4464	4465	4471	4521	4522	4528	4592	4593	4594	4595
4596	4597	4598	4599	4691	4692	4754	4773	4777	4778	4779	4780	4782
4783	4784	4785	4786	4789	4795	4809	4814	4815	4816	4818	4819	4820
4822	4823	4824	4826	4827	4828	4830	4831	4832	4834	4835	4836	4838
4839	4840	4842	4844	4845	4846	4848	4849	4850	4851	4852	4854	4855
4856	4857	4858	4860	4861	4862	4863	4864	4866	4867	4868	4869	4870
4872	4873	4874	4875	4876	4878	4879	4880	4881	4882	4884	4885	4886
4887	4888	4890	4891	4892	4893	4894	4896	4897	4898	4899	4900	4902
4903	4904	4905	4906	4908	4909	4910	4911	4912	4914	4915	4916	4917
4918	4920	4921	4922	4923	4924	4926	4927	4928	4929	4930	4932	4933
4934	4935	4936	4938	4939	4940	4941	4942	4944	4945	4946	4947	4948
4950	4952	4954	4955	4956	4957	4958	4960	4961	4962	4963	4964	4966
4967	4968	4969	4970	4972	4973	4974	4975	4976	4978	4979	4980	4981
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T1.1	017420	3771#																		
T1.10	017750	3910#																		
T1.11	017770	3922#																		
T1.12	020054	3953#																		
T1.2	017544	3812#																		
T1.3	017570	3826#																		
T1.4	017610	3838#																		
T1.5	017630	3850#																		
T1.6	017650	3862#																		
T1.7	017670	3874#																		
T1.8	017710	3886#																		
T1.9	017730	3898#																		
T2	020776 G	115	4213#																	
T3	021454 G	116	4415#																	
T4	021622 G	117	4481#																	
T5	021754 G	118	4536#																	
TSWEOT	022506	4667	4726#																	
UAM =	000200 G	286#																		
UNL =	100412 G	477#	732																	
UNREC	003121 G	641#	2081*	2178*	2221*	2248*	2290*	2346*	2364*	2459										
URERM	004276 G	793#	2254	2267	2329															
VFEXC	012534 G	2527	2534	2544#	3958	3961	3966	3969	3972	3975	3980	3983								
VFISU	012762 G	2581	2587	2602	2627#															
VFYCNT	003004 G	603#	2742*	3085																
VFYDAT	012450 G	1164	2518#	4684																
VFYFLG	003146 G	652#	1087	1431*	1437*	1968	2070	2519												
VFY.C =	000100 G	336#	429	1428	1432															
WLKZRO	007650	1532#	1538	1544																
WRBC	002544 G	592#	3037	3038	3039	3040	3167*													
WRECL =	000020 G	408#	2343																	
WRR =	105005 G	450#	723	4149																
WRREC	002704 G	595#	2457	3069																
WRT =	104005 G	426#	686	713	1084	4083	4145	4358												
WRUNR	002714 G	596#	3078																	
WSSR	010520 G	1617	1785#	2280	2883	3561	3649													
WTM =	100011 G	459#	726	1377	4079	4091														
WTR =	101011 G	462#	727	4095																
WTV =	104105 G	429#	714	4049	4053	4057	4061	4065	4069	4073	4193	4197	4235	4373						
WTVERM	003670 G	793#	2675	2692	2747															
XSALWA=	000000	4#	4789	4950	4952	5027	5034													
XSALS=	000040	4#	4842																	
XSOFFS=	000400	4#	4789	4842	4950	4952	5027	5034												
XSTRUE=	000020	4#																		
XO.BOT=	000002 G	372#	1125	1191	1256	2055	2064	2573	4630											
XO.EOT=	000001 G	373#	1135	1194	1214	1259	1279	2576	2596	4640										
XO.LET=	020000 G	369#	2064																	
XO.ONL=	000100 G	371#																		
XO.RLL=	010000 G	370#	2064																	
XO.RLS=	040000 G	368#	2064																	
XO.TMK=	100000 G	367#	2064																	
X2.OPM=	100000 G	377#	1851	1935																
X3.DCK=	000010 G	381#	2239																	
X3.RNY=	157400 G	382#	2886																	
ZROPAT	007620	1516#	1520	1526	1551															
SBGNLE=	177777	4#																		
SERFLG=	000400	4#	822#	823	824#	825	826#	827	829#	830	831#	832	833#	834						

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964#	965	972#	973	987#	988#	989	993#	994	995#	996#	997	998#
999	1000#	1001	1005#	1006	1009#	1010#	1011	1012#	1013	1017#	1018	1024#
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1092#	1093	1094#	1095	1096#	1097	1101#	1102	1105#	1106	1115#	1116	1128#
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1319#	1320	1322#	1323	1324#	1325	1326#	1327	1339#	1340	1345#	1346	1350#
1351	1352#	1353	1365#	1366	1380#	1381	1391#	1392	1396#	1397	1404#	1405
1407#	1408	1416#	1417	1418#	1419	1426#	1427	1431#	1432	1437#	1438	1441#
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1469#	1470	1471#	1472	1473#	1474#	1475	1495#	1496	1497#	1498	1500#	1501
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1815#	1816	1817#	1818#	1819	1820#	1821	1822#	1823	1828#	1829	1830#	1831
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1901	1938#	1939	1943#	1944	1950#	1951	1954#	1955	1976#	1977	1996#	1997
2019#	2020	2081#	2082	2086#	2087	2090#	2091	2137#	2138#	2139	2143#	2144
2161#	2162	2163#	2164	2168#	2169	2178#	2179	2202#	2203	2207#	2208	2209#
2210	2211#	2212	2221#	2222	2246#	2247	2248#	2249	2272#	2273	2277#	2278
2279#	2280	2290#	2291	2338#	2339	2346#	2347	2364#	2365	2388#	2389	2390#
2391	2395#	2396	2397#	2398#	2399#	2400	2401#	2402	2406#	2407	2410#	2411#
2412	2417#	2418	2419#	2420	2424#	2425#	2426	2431#	2432	2433#	2434	2438#
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2465	2469#	2470	2522#	2523	2524#	2525	2526#	2527	2529#	2530	2531#	2532
2533#	2534	2545#	2546#	2547	2551#	2552	2555#	2556	2558#	2559	2613#	2614
2615#	2616	2628#	2629#	2630	2635#	2636	2667#	2668#	2669	2705#	2706#	2707
2710#	2711	2712#	2713	2750#	2751	2778#	2779	2807#	2808	2809#	2810	2815#
2816	2827#	2828	2841#	2842	2845#	2846	2850#	2851	2862#	2863	2864#	2865#
2866	2867#	2868	2869#	2870	2875#	2876	2877#	2878	2882#	2883	2903#	2904
2913#	2914	2917#	2918	2919#	2920#	2921	2930#	2931	2932#	2933	2938#	2939
2983#	2984	2986#	2987	2988#	2989	2990#	2991	3021#	3022	3099#	3100	3161#
3162	3167#	3168	3169#	3170	3180#	3181	3182#	3183	3191#	3192	3193#	3194
3197#	3198	3199#	3200	3204#	3205#	3206	3209#	3210	3211#	3212#	3213	3223#
3224	3225#	3226	3231#	3232	3249#	3250	3254#	3255	3261#	3262	3270#	3271
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3306	3310#	3311	3318#	3319	3364#	3365	3367#	3368	3371	3372#	3373	3414#
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3569#	3570	3584#	3585	3628#	3629	3651#	3652	3680#	3681#	3682	3683#	3684
3716#	3717#	3718	3719#	3720	3723#	3724	3725#	3726#	3727	3728#	3729	3737#
3738	3766#	3767	3768#	3769	3775#	3776	3784#	3785	3786#	3787	3788#	3789#
3790	3816#	3817	3820#	3821	3830#	3831	3842#	3843	3854#	3855	3866#	3867
3878#	3879	3890#	3891	3902#	3903	3914#	3915	3926#	3927	3930#	3931	3933#
3934	3939#	3940#	3941	3950#	3951	3957#	3958	3960#	3961	3963#	3964	3965#
3966	3968#	3969	3971#	3972	3974#	3975	3977#	3978	3979#	3980	3982#	3983
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4221#	4222	4223#	4225	4231#	4232	4235#	4236	4237#	4238	4239#	4241	4242#
4243	4244#	4245	4252#	4253	4254#	4255#	4256	4261#	4262	4264#	4265	4269#
4270	4277#	4279	4280#	4281	4282#	4283	4285#	4286	4287#	4288	4289#	4290
4292#	4293	4330#	4331	4332#	4333	4334#	4335	4336#	4337#	4338	4339#	4340
4341#	4342	4343#	4344	4345#	4346	4347#	4348	4349#	4350	4358#	4359	4373#
4374	4389#	4390	4392#	4393	4394#	4395#	4396	4397#	4398	4399#	4400	4418#
4419	4420#	4421	4422#	4423#	4424	4425#	4427	4430#	4431	4442#	4443	4445#

4446	4450#	4451	4457#	4458	4460#	4461	4484#	4485	4486#	4487	4490#	4491
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4506	4507#	4508	4509#	4510	4511#	4512	4513#	4514	4515#	4516	4518#	4519
4539#	4540	4541#	4542	4543#	4544	4546#	4547	4548#	4549	4557#	4558	4559#
4560	4561#	4562	4569#	4570	4574#	4575	4577#	4578	4579#	4580	4583#	4584
4588#	4589	4590#	4591	4603#	4604	4620#	4621	4633#	4634	4647#	4648	4660#
4661#	4662	4663#	4664	4674#	4675	4678#	4679	4680#	4681	4707#	4708#	4709#
4710	4711#	4712	4713#	4714	4715#	4716	4717#	4718	4732#	4733	4734#	4735
4736#	4737	4738#	4739#	4740	4741#	4742	4743#	4744				
SF\$AND= 000310												
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1127	1137	1154	1187	1190	1193	1196	1199	1216	1227	1241	1252	1255
1258	1261	1264	1281	1292	1344	1379	1390	1430	1447	1506	1594	1610
1617	1636	1648	1665	1676	1704	1718	1736	1827	1846	1851	1858	1866
1869	1872	1882	1885	1917	1920	1923	1931	1937	1962	1965	1968	1975
1995	2057	2066	2070	2077	2080	2136	2142	2151	2167	2194	2206	2241
2245	2264	2276	2326	2342	2345	2363	2387	2394	2405	2416	2430	2444
2454	2461	2473	2476	2521	2550	2563	2569	2572	2575	2578	2581	2598
2634	2643	2649	2652	2672	2689	2716	2724	2727	2730	2758	2782	2814
2822	2874	2888	2902	2912	2926	2929	2978	3027	3138	3159	3166	3179
3235	3243	3275	3301	3304	3327	3355	3362	3385	3388	3443	3457	3466
3523	3540	3565	3568	3649	3783	3793	3945	4008	4229	4251	4437	4566
4610	4615	4626	4629	4632	4642	4659	4667					
SF\$BAD= 000401												
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956	964	972	986	987	992	993	995	998	1000	1004	1005	1009
1012	1017	1024	1037	1054	1056	1058	1069	1074	1079	1083	1086	1089
1090	1092	1094	1096	1100	1101	1105	1115	1121	1124	1127	1128	1140
1142	1154	1158	1160	1170	1187	1190	1193	1196	1199	1219	1227	1241
1242	1252	1255	1258	1261	1264	1284	1292	1313	1319	1322	1324	1326
1339	1344	1345	1350	1352	1365	1379	1380	1390	1391	1396	1404	1407
1416	1418	1426	1430	1431	1437	1441	1443	1447	1448	1453	1463	1466
1469	1471	1473	1495	1497	1500	1502	1506	1507	1517	1533	1558	1567
1586	1590	1594	1610	1611	1617	1623	1625	1629	1631	1636	1637	1639
1648	1649	1660	1665	1666	1668	1676	1696	1704	1718	1719	1724	1727
1732	1736	1737	1757	1767	1771	1786	1792	1812	1814	1817	1820	1822
1827	1828	1830	1835	1846	1847	1853	1854	1858	1859	1866	1869	1872
1873	1882	1885	1886	1900	1917	1920	1923	1934	1937	1938	1943	1950
1954	1962	1965	1971	1975	1976	1995	1996	2019	2059	2066	2073	2077
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SEQ 0179

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SFSRTN= 000300

SFSSEL= 000140

SFSHE= 000330

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N 14

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CROSS REFERENCE TABLE -- USER SYMBOLS

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4657#	4665#	4669#	4671	4676#	4682#	4687#						
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\$NSKO = 000120

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SEQ 0188

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	2192#	2200	2204#	2218	2223	2239#	2258	2294	2324#	2336	2340#	2358	2375
	2385#	2496	2519#	2536	2548#	2553	2560#	2617	2631#	2637	2641#	2645	2647#
	2656	2670#	2684	2795	2811#	2817	2820#	2825	2843#	2847	2871#	2879	2886#
	2894	2898	2900#	2906	2910#	2915	2924#	2936	2976#	3000	3024#	3096	3136#
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	1929#	1947	1952	1960#	1989	2068#	2099	2140#	2145	2243#	2250	2262#	2270
	2274#	2287	2292	2343#	2356	2361#	2373	2392#	2494	2566#	2609	2650#	2654
	2687#	2702	2793	2927#	2934	3163#	3171	3239#	3265	3283#	3316	3359#	3450
	3464#	3475	3538#	3557	3596	3791#	3802	4248#	4258	4434#	4439	4607#	4682
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	1256#	1274	1279#	1287	1296	1856#	1861	1896	1921#	1925	1935#	1940	1945
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	2492	2570#	2593	2606	2714#	2718	2720#	2775	2780#	2791	3241#	3258	3263
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	3391	3400											
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	4687#	4688#											
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	4688												
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SEQ 0189

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\$TSK1 = 050367

PARAMETER CODING
CZTSHB.P11

MACY11 30(1046)
24-AUG-79 09:08

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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0192

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	3275#	3321	3360#	3450	3466#	3475	3523#	3599	3649#	3657	3783#	3805	3945#
	3947	4008#	4011	4249#	4258	4435#	4439	4566#	4687				
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	2572#	2594	2595#	2606	2727#	2735	3304#	3308	3309#	3312	3371#	3436	3568#
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1870#	1872#	1875#	1880#	1882#	1883#	1885#	1888#	1890#	1892#	1894#	1896#	1898#
1902#	1915#	1917#	1918#	1920#	1921#	1923#	1925#	1927#	1929#	1931#	1934#	1935#
1937#	1945#	1952#	1960#	1962#	1963#	1965#	1966#	1968#	1971#	1973#	1975#	1983#
1985#	1987#	1989#	1991#	1993#	1995#	1998#	2055#	2057#	2059#	2062#	2064#	2066#
2068#	2070#	2073#	2075#	2077#	2078#	2080#	2088#	2097#	2099#	2101#	2134#	2136#
2140#	2142#	2145#	2147#	2149#	2151#	2153#	2159#	2165#	2167#	2180#	2192#	2194#
2200#	2204#	2206#	2223#	2239#	2241#	2243#	2245#	2250#	2262#	2264#	2270#	2274#
2276#	2292#	2294#	2324#	2326#	2336#	2340#	2342#	2343#	2345#	2356#	2361#	2363#
2373#	2375#	2385#	2387#	2392#	2394#	2403#	2405#	2408#	2413#	2414#	2416#	2427#
2428#	2430#	2441#	2442#	2444#	2452#	2454#	2459#	2461#	2471#	2473#	2474#	2476#
2478#	2486#	2488#	2490#	2492#	2494#	2496#	2519#	2521#	2536#	2548#	2550#	2553#
2560#	2561#	2563#	2566#	2567#	2569#	2570#	2572#	2573#	2575#	2576#	2578#	2579#
2581#	2583#	2589#	2591#	2596#	2598#	2601#	2604#	2606#	2631#	2632#	2634#	2641#
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2770#	2780#	2782#	2791#	2793#	2795#	2811#	2812#	2814#	2820#	2822#	2825#	2871#
2872#	2874#	2886#	2888#	2898#	2900#	2902#	2906#	2910#	2912#	2915#	2924#	2926#
2927#	2929#	2934#	2936#	2976#	2978#	3000#	3024#	3025#	3027#	3136#	3138#	3154#
3157#	3159#	3163#	3164#	3166#	3174#	3177#	3179#	3184#	3233#	3235#	3239#	3241#
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3383#	3385#	3386#	3388#	3400#	3412#	3441#	3443#	3446#	3453#	3455#	3457#	3464#
3466#	3475#	3477#	3520#	3521#	3523#	3538#	3540#	3563#	3565#	3566#	3568#	3579#
3594#	3596#	3646#	3647#	3649#	3780#	3781#	3783#	3791#	3793#	3802#	3942#	3943#
3945#	4005#	4006#	4008#	4227#	4229#	4233#	4248#	4249#	4251#	4434#	4435#	4437#
4563#	4564#	4566#	4607#	4608#	4610#	4613#	4615#	4617#	4623#	4624#	4626#	4627#
4629#	4630#	4632#	4635#	4640#	4642#	4645#	4649#	4651#	4657#	4659#	4665#	4667#
4669#	4676#											
4#												
4#	876#	877	985#	986	991#	992	1003#	1004	1073#	1074	1078#	1079
1082#	1083	1085#	1086	1088#	1089	1099#	1100	1120#	1121	1123#	1124	1126#
1127	1138#	1139	1153#	1154	1186#	1187	1189#	1190	1192#	1193	1195#	1196

SSERFL= 000000
SSFLAG= 000001

SSFROM= 000000
SSLOC = 022422

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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0194

1198#	1199	1217#	1218	1226#	1227	1240#	1241	1251#	1252	1254#	1255	1257#
1258	1260#	1261	1263#	1264	1282#	1283	1291#	1292	1343#	1344	1378#	1379
1389#	1390	1429#	1430	1446#	1447	1505#	1506	1593#	1594	1606#	1607	1609#
1610	1616#	1617	1635#	1636	1647#	1648	1664#	1665	1675#	1676	1703#	1704
1717#	1718	1735#	1736	1751#	1752	1774#	1775	1797#	1798	1826#	1827	1845#
1846	1850#	1851	1852#	1853	1857#	1858	1865#	1866	1868#	1869	1871#	1872
1881#	1882	1884#	1885	1916#	1917	1919#	1920	1922#	1923	1932#	1933	1936#
1937	1961#	1962	1964#	1965	1969#	1970	1974#	1975	1994#	1995	2056#	2057
2058#	2059	2065#	2066	2071#	2072	2076#	2077	2079#	2080	2135#	2136	2141#
2142	2150#	2151	2152#	2153	2166#	2167	2193#	2194	2205#	2206	2240#	2241
2244#	2245	2263#	2264	2275#	2276	2325#	2326	2341#	2342	2344#	2345	2362#
2363	2386#	2387	2393#	2394	2404#	2405	2415#	2416	2429#	2430	2443#	2444
2453#	2454	2460#	2461	2472#	2473	2475#	2476	2477#	2478	2520#	2521	2549#
2550	2562#	2563	2568#	2569	2571#	2572	2574#	2575	2577#	2578	2580#	2581
2599#	2600	2633#	2634	2642#	2643	2648#	2649	2651#	2652	2671#	2672	2688#
2689	2715#	2716	2723#	2724	2726#	2727	2729#	2730	2757#	2758	2776#	2777
2781#	2782	2813#	2814	2821#	2822	2848#	2849	2873#	2874	2887#	2888	2901#
2902	2911#	2912	2925#	2926	2928#	2929	2977#	2978	3026#	3027	3137#	3138
3158#	3159	3165#	3166	3178#	3179	3202#	3203	3215#	3216	3234#	3235	3239#
3240	3242#	3243	3247#	3248	3274#	3275	3283#	3284	3300#	3301	3303#	3304
3326#	3327	3354#	3355	3356#	3357	3361#	3362	3384#	3385	3387#	3388	3442#
3443	3456#	3457	3465#	3466	3522#	3523	3539#	3540	3564#	3565	3567#	3568
3648#	3649	3782#	3783	3792#	3793	3944#	3945	4007#	4008	4228#	4229	4250#
4251	4267#	4268	4436#	4437	4448#	4449	4565#	4566	4609#	4610	4614#	4615
4625#	4626	4628#	4629	4631#	4632	4643#	4644	4658#	4659	4666#	4667	

\$\$LOCN= 000000
 \$\$REG = 177777
 \$\$RETU= 000000
 \$\$RTN1= 000000
 \$\$RTN2= 000000
 \$\$\$SRC = 000000
 \$\$TGSV= 000000
 \$\$TGS1= 000000
 \$\$TGS2= 000000
 \$\$TO = 000000
 \$\$\$TAG= 050000
 = 024254

6#	137#	503#	512#	518#	525#	532#	541#	542#	543#	544#	555#	556#
557#	591	592#	593#	594#	595#	596#	597#	598#	599#	600#	601#	602#
603#	604#	605#	606	607#	636	643#	644	648#	649#	659#	660	702#
776#	793#	794#	845	876	877	927	985	986	991	992	1003	1004
1073	1074	1078	1079	1082	1083	1085	1086	1088	1089	1099	1100	1120
1121	1123	1124	1126	1127	1138	1139	1153	1154	1186	1187	1189	1190
1192	1193	1195	1196	1198	1199	1217	1218	1226	1227	1240	1241	1251
1252	1254	1255	1257	1258	1260	1261	1263	1264	1282	1283	1291	1292
1343	1344	1378	1379	1389	1390	1429	1430	1446	1447	1505	1506	1593
1594	1606	1607	1609	1610	1616	1617	1635	1636	1647	1648	1664	1665
1675	1676	1703	1704	1710	1712	1717	1718	1735	1736	1751	1752	1774
1775	1797	1798	1826	1827	1845	1846	1850	1851	1852	1853	1857	1858
1865	1866	1868	1869	1871	1872	1881	1882	1884	1885	1916	1917	1919
1920	1922	1923	1932	1933	1936	1937	1961	1962	1964	1965	1969	1970
1974	1975	1994	1995	2056	2057	2058	2059	2065	2066	2071	2072	2076
2077	2079	2080	2135	2136	2141	2142	2150	2151	2152	2153	2166	2167
2193	2194	2205	2206	2240	2241	2244	2245	2263	2264	2275	2276	2325
2326	2341	2342	2344	2345	2362	2363	2386	2387	2393	2394	2404	2405
2415	2416	2429	2430	2443	2444	2453	2454	2460	2461	2472	2473	2475
2476	2477	2478	2520	2521	2549	2550	2562	2563	2568	2569	2571	2572

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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0195

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2649	2651	2652	2671	2672	2688	2689	2715	2716	2723	2724	2726	2727
2729	2730	2757	2758	2776	2777	2781	2782	2813	2814	2821	2822	2848
2849	2873	2874	2887	2888	2901	2902	2911	2912	2925	2926	2928	2929
2977	2978	3026	3027	3102	3137	3138	3149	3151	3158	3159	3165	3166
3178	3179	3202	3203	3215	3216	3234	3235	3239	3240	3242	3243	3247
3248	3274	3275	3283	3284	3300	3301	3303	3304	3326	3327	3339	3341
3354	3355	3356	3357	3361	3362	3379	3381	3384	3385	3387	3388	3427
3429	3442	3443	3456	3457	3465	3466	3489	3502#	3522	3523	3539	3540
3564	3565	3567	3568	3621#	3648	3649	3662	3697	3741	3782	3783	3792
3793	3944	3945	3995	4007	4008	4228	4229	4250	4251	4267	4268	4297
4436	4437	4448	4449	4465	4522	4565	4566	4597	4599	4609	4610	4614
4615	4625	4626	4628	4629	4631	4632	4643	4644	4658	4659	4666	4667
4692	4789	4842	4950	4952	5027	5030#	5034	5047#	5069	5076		

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CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0197

ENDDO	2#	1148	1161	1166	1235	1300	1346	1619	1640	1831	2420	2434	2448	2608	2616
	2636	2816	2878	3095	3170	3320	3449	3598	3656	3804	3946	4010	4257	4438	4653
	4681	4686													
ENDDU	2#	4#	3700												
ENDHRD	2#	4#	4794												
ENDHW	2#	4#	155												
ENDIF	2#	887	1006	1018	1025	1102	1106	1108	1110	1129	1143	1145	1155	1200	1206
	1208	1228	1230	1232	1245	1265	1271	1273	1293	1295	1297	1381	1397	1438	1449
	1508	1602	1626	1657	1669	1683	1713	1729	1747	1874	1887	1889	1891	1893	1895
	1897	1901	1924	1926	1944	1951	1982	1984	1986	1988	1990	1997	2061	2087	2096
	2098	2100	2144	2146	2158	2179	2199	2222	2249	2269	2291	2293	2335	2355	2372
	2374	2407	2485	2487	2489	2491	2493	2495	2535	2552	2582	2588	2590	2603	2605
	2644	2653	2655	2717	2732	2734	2736	2769	2790	2792	2794	2824	2897	2905	2914
	2933	2935	2999	3153	3173	3183	3255	3262	3264	3266	3311	3313	3315	3346	3399
	3411	3445	3452	3474	3476	3578	3593	3595	3801	4232	4616	4634	4648	4650	4668
	4675														
ENDINC	2#	3432	3435												
ENDINI	2#	4#	3504												
ENDLOO	2#														
ENDMOD	2#	4#	214	3004	3749	4756	5056								
ENDMSG	2#	4#	848	933											
ENDPRO	2#	4#	3124												
ENDPTA	2#	4#	5073												
ENRPT	2#	4#	3108												
ENDRTN	2#														
ENDSEG	2#	4#													
ENDSEL	2#														
ENDSET	2#	4#	5075												
ENDSFT	2#	4#	5039												
ENDSRV	2#	4#	949	957	965	973									
ENDSUB	2#	4#	3807	3821	3833	3845	3857	3869	3881	3893	3905	3917	3934	3985	
ENDSW	2#	4#	211												
ENDTST	2#	4#	4204	4404	4469	4526	4752								
EQUALS	2#	4#	226												
ERRDF	2#	4#	1595	1650	1677	1740	2039	2116	2251	2306	2326	2347	2888		
ERRHRD	2#	4#	1977	2020	2091	2365	2672	2689	2744						
ERROR	2#	4#													
ERRSF	2#	4#	3138												
ERRSOF	2#	4#	2153	2194	2264										
ERRTBL	2#	4#													
ESCAPE	2#	4#													
EXIF	2#														
EXIFB	2#														
EXIT	2#	4#	843	925	3100	3487	3660	3695	3739	3993	4295	4463	4520	4690	4788
	5033														
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GETBYT	2#	4#													
GETPRI	2#	4#													
GETWOR	2#	4#													
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GMANIL	2#	4#	2991												
GPHARD	2#	4#	3280	3720											
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	4919	4925	4931	4937	4943	4953	4959	4965	4971	4977	4983	4989	4995	5001	5007

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CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0199

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MSCNTO	5034#														
	2#	4#	2995#	4777#	4782#	4814#	4818#	4822#	4826#	4830#	4834#	4838#	4844#	4848#	4854#
	4860#	4866#	4872#	4878#	4884#	4890#	4896#	4902#	4908#	4914#	4920#	4926#	4932#	4938#	4944#
	4954#	4960#	4966#	4972#	4978#	4984#	4990#	4996#	5002#	5008#	5014#	5020#			
MSCOUN	2#	4#	807#	816#	837#	855#	864#	881#	890#	896#	907#	916#	2479#	2678#	2695#
	2759#	2783#	2949#	2955#	3028#	3037#	3047#	3057#	3067#	3076#	3085#	3328#	3393#	3405#	3467#
	3543#	3571#	3586#	3688#	3794#										
MSDATA	2#	4#	18#	27	29	31	33	35	37	39	41	43	45	47	49
	51	53	55	57#	59	61	64	67	69	71	73	75	77	79	81
	83	85	87	89	91	93	95	97	99	101	128#	135#			
MSDECR	2#	4#	156#	212#	215#	849#	934#	950#	958#	966#	974#	3005#	3109#	3125#	3505#
	3603#	3666#	3701#	3746#	3750#	3808#	3822#	3834#	3846#	3858#	3870#	3882#	3894#	3906#	3918#
	3935#	3986#	4205#	4405#	4470#	4527#	4753#	4757#	4795#	5040#	5057#	5065#			
MSDEFA	2#	4#	2995#	4777#	4782#	4814#	4818#	4822#	4826#	4830#	4834#	4838#	4844#	4848#	4854#
	4860#	4866#	4872#	4878#	4884#	4890#	4896#	4902#	4908#	4914#	4920#	4926#	4932#	4938#	4944#
	4954#	4960#	4966#	4972#	4978#	4984#	4990#	4996#	5002#	5008#	5014#	5020#			
MSENDE	2#	4#	156#	212#	215#	849#	934#	950#	958#	966#	974#	3005#	3109#	3505#	3603#
	3666#	3701#	3746#	3750#	3808#	3822#	3834#	3846#	3858#	3870#	3882#	3894#	3906#	3918#	3935#
	3986#	4205#	4405#	4470#	4527#	4753#	4757#	4795#	5040#	5057#					
MSERRI	2#	4#	1596#	1651#	1678#	1741#	1978#	2021#	2040#	2092#	2117#	2154#	2195#	2252#	2265#
	2307#	2327#	2348#	2366#	2673#	2690#	2745#	2889#	3139#						
MSESCA	2#	4#													
MSESCS	2#	4#													
MSEXCP	2#	4#	4777#	4782#	4848#	4854#	4860#	4866#	4872#	4878#	4884#	4890#	4896#	4902#	4908#
	4914#	4920#	4926#	4932#	4938#	4944#	4954#	4960#	4966#	4972#	4978#	4984#	4990#	4996#	5002#
	5008#	5014#	5020#												
MSEXIT	2#	4#	844#	926#	3101#	3488#	3489	3661#	3662	3696#	3740#	3994#	3995	4296#	4297
	4464#	4465	4521#	4522	4691#	4692	4789#	5034#							
MSEXSE	2#	4#	844#	926#	3101#	3488#	3661#	3696#	3740#	3994#	4296#	4464#	4521#	4691#	4789#
	5034#														
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	4296#	4464#	4521#	4691#	4789#	5034#									
MSGEN	2#	4#	18#	27#	29#	31#	33#	35#	37#	39#	41#	43#	45#	47#	49#
	51#	53#	55#	57#	59#	61#	64#	67#	69#	71#	73#	75#	77#	79#	81#
	83#	85#	87#	89#	91#	93#	95#	97#	99#	101#	113#	128#	135#	148#	149#
	156#	166#	167#	212#	805#	849#	853#	934#	946#	950#	954#	958#	962#	966#	970#
	974#	2998#	3017#	3109#	3120#	3133#	3505#	3516#	3603#	3641#	3666#	3677#	3701#	3712#	3746#
	3763#	3771#	3808#	3812#	3822#	3826#	3834#	3838#	3846#	3850#	3858#	3862#	3870#	3874#	3882#
	3886#	3894#	3898#	3906#	3910#	3918#	3922#	3935#	3953#	3986#	4205#	4213#	4405#	4415#	4470#
	4481#	4527#	4536#	4753#	4774#	4796#	4810#	5041#	5055#	5070#	5074#				
MSGENB	2#	4#	2992#	2993											
MSGETS	2#	4#	156#	212#	215#	849#	934#	950#	958#	966#	974#	3005#	3109#	3125#	3505#
	3603#	3666#	3701#	3746#	3750#	3808#	3822#	3834#	3846#	3858#	3870#	3882#	3894#	3906#	3918#
	3935#	3986#	4205#	4405#	4470#	4527#	4753#	4757#	4789#	4795#	4842#	4950#	4952#	5027#	5034#
	5040#	5057#													
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	4842#	4950#	4952#	5027#	5034#										
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SEQ 0200

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SEQ 0201

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	2192	2194	2204	2206	2220	2239	2241	2243	2245	2260	2262	2264	2274	2276	2289
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	2413	2414	2416	2421	2427	2428	2430	2435	2441	2442	2444	2449	2452	2454	2459
	2461	2468	2471	2473	2474	2478	2519	2521	2548	2550	2560	2561	2563	2566	2567
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	3371	3383	3385	3386	3388	3392	3404	3414	3416	3417	3421	3441	3443	3450	3455
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	4630	4632	4639	4640	4645	4654	4657	4659	4665	4667	4673	4682	4687		
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