

TS11

TS11 DATA RELIAB
CZTSHB0

AH E455B MC

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FICHE 1 OF 2

NOV 1979

digited

MADE IN USA

This image shows a microfiche card, which is a type of microfilm used for storing digital data. The card is dark blue or black and features a grid of small, square frames. Each frame contains a small, light-colored image, likely a scan of a document page. The frames are arranged in a regular grid pattern across the entire surface of the card. The top of the card has a red header area with white text, including the title 'TS11', the identifier 'CZTSHB0', and other technical information such as 'AH E455B MC', 'COPYRIGHT 78 79', 'FICHE 1 OF 2', 'NOV 1979', 'digited', and 'MADE IN USA'. The microfiche card is a common format for storing large amounts of data in a compact, portable form.

TS11

TS11 DATA RELIAB
CZTSHB0

AH E455B MC

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FICHE 2 OF 2

NOV 1979

digital

MADE IN USA

IDENTIFICATION

B 1

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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E 1

SEQ 0004

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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 WITH- OUT INCIDENT.
TERMINATION CLASS CODE TCC	THREE BIT CODE IN THE TSSR WHICH INDI- CATES 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.

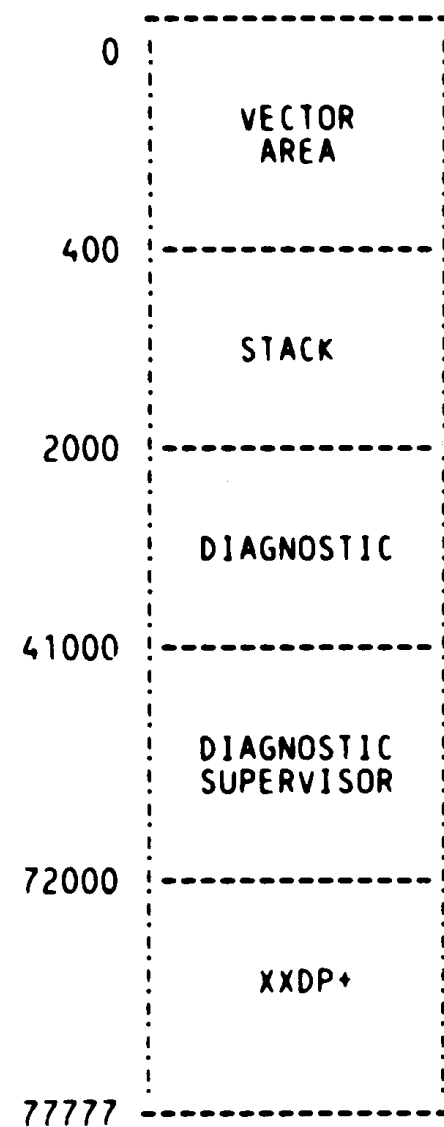
1.1.2 STRUCTURE OF PROGRAM

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

H 1

SEQ 0007



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

1.1.4 DIAGNOSTIC INFORMATION

SEQ 0008

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

J 1

SEQ 0009

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

K 1

SEQ 0010

- 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 FLEXABILITY 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/TESTS: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.

SEQ 0016

- 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

F 2

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}

SEQ 0019

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

J 2

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

	WRT	RDR	RDF
RECOVERABLE ERRORS	XXXXX	XXXXX	XXXXX
UNRECOVERABLE ERRORS	XXXXX	XXXXX	XXXXX

SPEC COND	HARD	FATAL	COMPARE
XXXXXX	XXXXXX	XXXXXX	XXXXXX

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.

L 2

SEQ 0024

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) .

<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

B 3

SEQ 0027

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

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
SC	UPE	SPE	RMR	NXM	NBA	A17	A16	SSR	OFL	FC1	FC0	TC2	TC1	TC0	

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 TS04 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

D 3

THE VALUES OF BITS 17 AND 16 OF THE TSBA REGISTER.

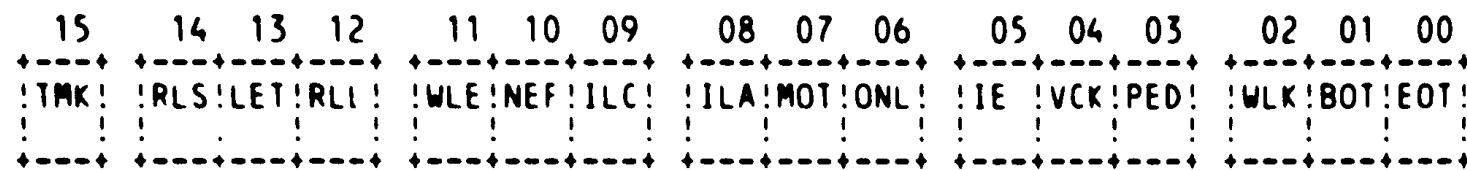
SEQ 0029

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)



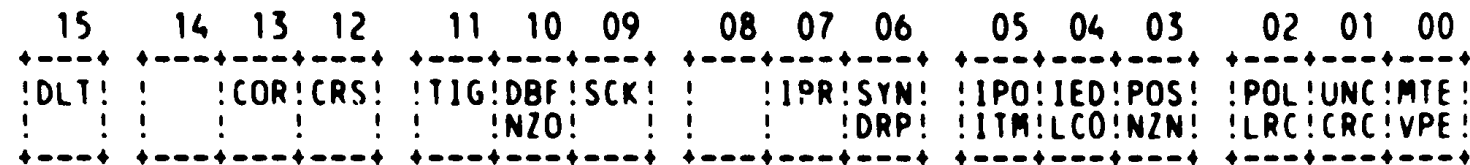
BIT	NAME	TCC	DEFINITION
15	TMK	S,2	TAPE MARK DETECTED. SET WHENEVER A TAPE MARK WAS DETECTED DURING A READ, SPACE, OR SKIP COMMAND AND AS A RESULT OF THE WRITE TAPE MARK OR WITE TAPE MARK RETRY COMMANDS.
14	RLS	2	RECORD LENGTH SHORT. THIS BIT INDICATES THAT EITHER THE RECORD'S LENGTH WAS SHORTER THAN 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: - 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)



B1T	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.

H 3

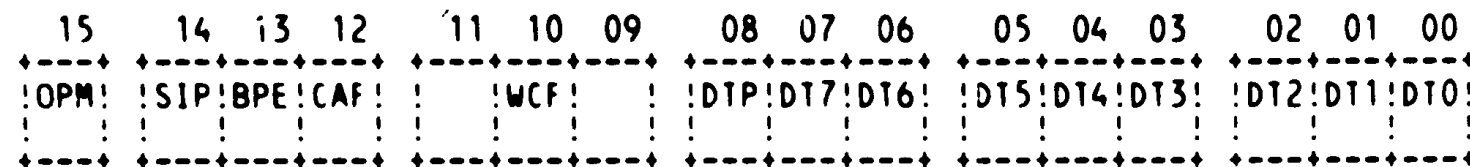
06	SYN	4	SYNCH FAILURE. SET ON A PE DRIVE IF THE FORMATTER WAS UNABLE TO ACHIEVE SYNCHRONIZATION IN THE PREAMBLE.
	DRP	4	NRZ RECORD DROPPED A CHARACTER (THE NEXT CHARACTER WAS TO BE CONSIDERED CRC).
05	IPO	S,4	INVALID POSTAMBLE. SET ON A PE DRIVE DURING READ OR WRITE IF ANY OF THE FIRST 39 CHARACTERS 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

6.3.5 EXTENDED STATUS REGISTER 2 (XSTAT2)

1 3

SEQ 0034



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.

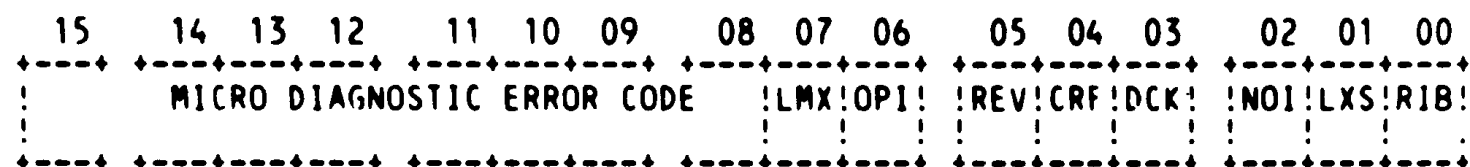
00 D10 S DEAD TRACK 0. SEE D1P.

J 3

SEQ 0035

NOTE: ON A SET CHARACTERISTICS COMMAND, THE UCODE LEVEL IS RETURNED
IN D17 THRU D10. ON A GET STATUS COMMAND, THE RESIDUAL CAPSTAN
TICK COUNT (INTERNALLY R7) IS RETURNED IN D17 THRU D10.

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	OP1	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

105	IOTSM	FAILURE OF SHIFT LOOP WITH ZEROES.	M 3 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 MACY11 30(1046) 24-AUG-79 09:10 PAGE 1 C 4
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SEQ 0041

1

```
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$NAME:: ;DIAGNOSTIC NAME
19 002000      103
20 002001      132
21 002002      124
22 002003      123
23 002004      110
24 002005      000
25 002006      000
26 002007      000
27 002010      L$REV:: ;REVISION LEVEL
28 002010      102
29 002011      L$DEPO:: ;0
30 002011      060
31 002012      L$UNIT:: ;NUMBER OF UNITS
32 002012      000001
33 002014      L$TIML:: ;LONGEST TEST TIME
34 002014      005000
35 002016      L$HPCP:: ;POINTER TO H.W. QUES.
36 002016      022616
37 002020      L$SPCP:: ;POINTER TO S.W. QUES.
38 002020      022670
39 002022      L$HPTP:: ;PTR. TO DEF. H.W. PTABLE
40 002022      002174
41 002024      L$SPTP:: ;PTR. TO S.W. PTABLE
42 002024      002202
43 002026      L$LADP:: ;DIAG. END ADDRESS
44 002026      024236
45 002030      L$STA:: ;RESERVED FOR APT STATS
46 002030      000000
47 002032      L$CO::
48 002032      000000
49 002034      L$DTYP:: ;DIAGNOSTIC TYPE
50 002034      000001
51 002036      L$APT:: ;APT EXPANSION
52 002036      000000
53 002040      L$DTP:: ;PTR. TO DISPATCH TABLE
54 002040      002124
55 002042      L$PRIO:: ;DIAGNOSTIC RUN PRIORITY
56 002042      000340
57 002044      L$EXP1:: ;EXPANSION WORDS
```

.ASCII	/C/
.ASCII	/Z/
.ASCII	/T/
.ASCII	/S/
.ASCII	/H/
.BYTE	0
.BYTE	0
.BYTE	0
.ASCII	/B/
.ASCII	/O/
.WORD	T\$PTHV
.WORD	5000
.WORD	L\$HARD
.WORD	L\$SOFT
.WORD	L\$HW
.WORD	L\$SW
.WORD	L\$LAST
.WORD	0
.WORD	0
.WORD	1
.WORD	0
.WORD	L\$DISPATCH
.WORD	#INTPRI

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 ERRIBL	
88	002102	000000		.WORD	0
89	002104		L\$ICP::	;PTR. TO INIT CODE	
90	002104	015260		.WORD	L\$INIT
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\$AUTO
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					

```

104 .SBTTL DISPATCH TABLE
105
106 :++
107 : THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
108 : IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
109 :--
110
111 DISPATCH 5
112 002122 000005 .WORD 5
113 002124 L$DISPATCH::
114 002124 017410 .WORD T1
115 002126 020776 .WORD T2
116 002130 021454 .WORD T3
117 002132 021622 .WORD T4
118 002134 021754 .WORD T5
119
120
121 .SBTTL DESCRIPTIVE TEXT
122
123 :++
124 : 2 LINES OF TEXT PRINTED TO THE OPERATOR TO IDENTIFY THE DIAGNOSTIC AND THE DEVICE UNDER
125 :--
126
127 002136 DESCRIPT <DATA RELIABILITY TEST>
128 002136 L$DESC::
129 002136 040504 040524 051040 .ASCIIZ /DATA RELIABILIT
130 002144 046105 040511 044502
131 002152 044514 054524 052040
132 002160 051505 000124
133 .EVEN
134 002164 DEVTYP <TS11>
135 002164 L$DVTYP:: - -
136 002164 051524 030481 -000- .ASCIIZ /TS11/
137 002172 .EVEN

```

PROGRAM HEADER AND TABLES
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DEFAULT HARDWARE P-TABLE

SEQ 0045

```
138      .SBTTL  DEFAULT HARDWARE P-TABLE
139
140      ;++
141      ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
142      ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
143      ; IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
144      ;--
145
146      002172      BGNHW  DFPTBL
147      002172      000002
148      002174
149      002174
150
151
152      002174      172522      ;TSSR ADDRESS.
153      002176      000224      ;VECTOR ADDRESS.
154
155      002200
156      002200      L10000:  ENDHW
```

```

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$W  SFPTBL
165      002200      000043      .WORD  L10001-L$SW/2
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 32000.      ;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 32000.      ;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 32000.      ;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 32000.      ;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 32000.      ;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 DEFINITIONS
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.
```

```
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      BRF.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      DFTSCH==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
422      104401      RDR==  ACK.C!BRF.C!MOD.CO!CMD.CO        ;READ REVERSE
423
424
425      104005      WRT==  ACK.C!BRF.C!CMD.CO!CMD.C2        ;WRITE COMMAND
426
427
428      104105      WTV==  ACK.C!BRF.C!VFY.C!CMD.CO!CMD.C2  ;WRITE VERIFY
429
430
431      104010      SRF==  ACK.C!BRF.C!CMD.C3              ;SPACE RECORD FORWARD
432
433
```

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 BOUNDARY.
CMDPKT:: 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 BOUNDARY.
GSCP:: .WORD GES

: MESSAGE BUFFER RELEASE COMMAND PACKET.

: = .+3&177774 ;MUST BE ON MOD 4 BOUNDARY.
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          003034 003034  CNTEND=.      ;END OF STATISTICAL COUNTERS.
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      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 ;EXTENSION 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.

```

;THE FOLLOWING IS THE TS04 COMMAND TABLE

708				
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				

: THE FOLLOWING TABLE CONTAINS THE ASCII FOR EACH COMMAND.

740						
741						
742	003354	051104	111			
743	003357	122	043104			
744	003362	042122	122			
745	003365	127	052122			
746	003370	052127	126			
747						
748	003373	123	043122			
749	003376	051123	122			
750	003401	122	051116			
751	003404	047122	106			
752	003407	122	043120			
753	003412	050122	122			
754	003415	127	051122			
755	003420	053522	104			
756	003423	115	051102			
757	003426	052127	115			
758	003431	127	051124			
759	003434	043123	106			
760	003437	123	051106			
761	003442	042507	123			
762	003445	105	051522			
763	003450	047125	114			
764	003453	103	047114			
765	003456	041523	110			
766						
767	003461	104	040511			
768						
769						
770	003464	046512	120			
771						
772						
773	003467	104	054514			
774						
775	003472	047105	104			
776		003476				
777						
778						
779						

CMDASC::	.ASCII	/DRI/	;DRIVE INIT.
	.ASCII	/RDF/	;READ FORWARD.
	.ASCII	/RDR/	;READ REVERSE.
	.ASCII	/WRT/	;WRITE
	.ASCII	/WTV/	;WRITE/VERIFY. (WRITE ALL RECORDS, RDR AND CHECK DATA
			;ON ALL RECORDS, RDF AND CHECK DATA ON ALL RECORDS.)
	.ASCII	/SRF/	;SPACE 'N' RECORDS FORWARD.
	.ASCII	/SRR/	;SPACE 'N' RECORDS REVERSE.
	.ASCII	/RNR/	;READ NEXT REVERSE. I.E., SPACE FWD READ REVERSE.
	.ASCII	/RNF/	;READ NEXT FORWARD, I.E., READ FORWARD, SPACE REVERSE.
	.ASCII	/RPF/	;READ PREVIOUS FORWARD. IE., SPACE REVERSE, READ FORWARD
	.ASCII	/RPR/	;READ PREVIOUS REVERSE. IE., READ REVERSE, SPACE FORWARD
	.ASCII	/WRR/	;WRITE RETRY.
	.ASCII	/RWD/	;REWIND.
	.ASCII	/MBR/	;MESSAGE BUFFER RELEASE
	.ASCII	/WTM/	;WRITE TAPE MARK
	.ASCII	/WTR/	;WRITE TAPE MARK RETRY.
	.ASCII	/SFF/	;SPACE 'N' FILES FORWARD.
	.ASCII	/SFR/	;SPACE 'N' FILES REVERSE.
	.ASCII	/GES/	;GET EXTENDED STATUS.
	.ASCII	/ERS/	;ERASE 3 INCHES OF TAPE.
	.ASCII	/UNL/	;REWIND AND UNLOAD.
	.ASCII	/CLN/	;CLEAN TAPE.
	.ASCII	/SCH/	;SET CHARACTERISTICS. WHERE BRF=200, 40, 20, 0.
			;SEE TS11/TS04 PROGRAMMING SPECIFICATION FOR DESCRIPTION
			;DIAGNOSTICS. SEE TS11/TS04 PROGRAMMING SPECIFICATION
			;FOR DESCRIPTION. ODT MUST BE USED TO LOAD DIAGNOSTIC D
			;INTO THE WRITE BUFFER BEFORE THIS CMD IS ISSUED.
	.ASCII	/JMP/	;JUMP TO THE NTH COMMAND IN THE COMMAND
			;SEQUENCE TABLE, WHERE N IS DEFINED IN
			;THE # OF OPERATIONS.
	.ASCII	/DLY/	;DELAY 'N' MS, WHERE N IS DEFINED IN
			;THE # OF OPERATIONS.
	.ASCII	/END/	;END OF COMMAND SEQUENCE.
	.EVEN		

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

.LIST BEX
.EVEN

794

004720

```
795      .SBTTL  GLOBAL ERROR REPORT SECTION
796
797
798      ;++
799      ; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
800      ; THAT ARE USED IN MORE THAN ONE TEST.  IT ALSO INCLUDES THE ASCII MESSAGES
801      ; THAT ARE USED BY THE PRINTB AND PRINTX CALLS..
802      ;--
803
804      BGNMSG  DTAERM
805      DTAERM:
806      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$PNTB
842      005054 062706 000006      ADD      #6,SP
843      005060              EXIT      MSG
844      005060 000167              .WORD    JSJMP
845      005062 000000              .WORD    L10002-2-.
846
847      .EVEN
848      005064              ENDMSG
849      005064      L10002:
850      005064 104423              TRAP     C$MSG
```

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

```
MOV  RECCNT(R5),-(SP)
MOV  PASCNT(R5),-(SP)
MOV  DEVTBL(R5),-(SP)
MOV  #STAER1,-(SP)
MOV  #4,-(SP)
MOV  SP,R0
TRAP C$PNTB
ADD  #12,SP

MOV  #STAER7,-(SP)
MOV  #1,-(SP)
MOV  SP,R0
TRAP C$PNTB
ADD  #4,SP

MOV  CNDPKT,R2
BIC  #177740,R2

DEC  R2

TST  R2
BNE  50000$

MOV  R3,RECD

MOV  RECD,-(SP)
MOV  #STAER6,-(SP)
MOV  #2,-(SP)
MOV  SP,R0
TRAP C$PNTB
ADD  #6,SP

MOV  #STAER2,-(SP)
MOV  #1,-(SP)
MOV  SP,R0
TRAP C$PNTX
ADD  #4,SP

MOV  CTCC,-(SP)
MOV  TSSREG,-(SP)
MOV  MSGPKT+MS.RFC,-(
MOV  @TSDB(R5),-(SP)
MOV  CNDPKT,-(SP)
MOV  #STAER3,-(SP)
MOV  #6,-(SP)
MOV  SP,R0
TRAP C$PNTX
ADD  #16,SP
```

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		
916	005334	013746	002350			MOV	MSGPKT+MS.XS3,-(
917	005340	013746	002346			MOV	MSGPKT+MS.XS2,-(
918	005344	013746	002344			MOV	MSGPKT+MS.XS1,-(
919	005350	013746	002342			MOV	MSGPKT+MS.XS0,-(
920	005354	012746	005713			MOV	#STAER5,-(SP)
921	005360	012746	000005			MOV	#5,-(SP)
922	005364	010600				MOV	SP,RO
923	005366	104415				TRAP	C\$PNTX
924	005370	062706	000014			ADD	#14,SP
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%ATSBAXS4%ARFC%S5%ATSSRXS3%ATCC%N/
	005635	045	033117	051445	STAER3:	.ASCIZ	/O6%S2%O6%S2%O6%S2%O6%S2%D1%N/
	005673	045	033117	047045	STAER4:	.ASCIZ	/O6%N/
	005700	047445	022466	116		.ASCIZ	/O6%N/
	005705	045	033117	047045		.ASCIZ	/O6%N/
	005713	045	054101	052123	STAER5:	.ASCIZ	/AXST0%S4%AXST1%S4%AXST2%S4%AXST3%N/
	005756	047445	022466	031123		.ASCIZ	/O6%S2%O6%S2%O6%S2%O6%N/
						.LIST	BEX
						.EVEN	
930							
931	006006	000000			RECRED:	.WORD	0 ;RECORD READ FROM TAPE
932							
933	006010						
934	006010				L10003:	ENDMSG	
935	006010	104423					TRAP C\$MSG

```
936      .SBTTL  GLOBAL SUBROUTINES SECTION
937
938      ;++
939      ; THE GLOAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
940      ; THAT ARE USED IN MORE THAN ONE TEST.
941      ;--
942
943      ;      MODULES TO HANDLE TS04 INTERRUPTS.
944
945      006012      BGNSRV  TS4IN0      ;DEVICE 0.
946      006012      TS4IN0::          ;
947      006012      LET INTFLG := INTFLG + #1      ;SET INTERRUPT OCCURRED FLAG.
948      006012      005237 003124      INC      INTFLG
949      006016      ENDSRV
950      006016      L10004:
951      006016      000002      RTI
952
953      006020      BGNSRV  TS4IN1      ;DEVICE 1.
954      006020      TS4IN1::          ;
955      006020      LET INTFLG+2 := INTFLG+2 + #1  ;SET INTERRUPT OCCURRED FLAG.
956      006020      005237 003126      INC      INTFLG+2
957      006024      ENDSRV
958      006024      L10005:
959      006024      000002      RTI
960
961      006026      BGNSRV  TS4IN2      ;DEVICE 2.
962      006026      TS4IN2::          ;
963      006026      LET INTFLG+4 := INTFLG+4 + #1  ;SET INTERRUPT OCCURRED FLAG.
964      006026      005237 003130      INC      INTFLG+4
965      006032      ENDSRV
966      006032      L10006:
967      006032      000002      RTI
968
969      006034      BGNSRV  TS4IN3      ;DEVICE 3.
970      006034      TS4IN3::          ;
971      006034      LET INTFLG+6 := INTFLG+6 + #1  ;SET INTERRUPT OCCURRED FLAG.
972      006034      005237 003132      INC      INTFLG+6
973      006040      ENDSRV
974      006040      L10007:
975      006040      000002      RTI
```

```
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      MOV      (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$:
1008 006114      LET R4 :B= (R2) CLR.BY #177400 ;FETCH LOWER BYTE
1009 006114 111204      MOV      (R2),R4
1010 006116 142704 177400      BICB      #177400,R4
1011 006122      LET R3 := R3 OR R4      ;MERGE BYTES
1012 006122 050403      BIS      R4,R3
1013 006124      ELSE
1014 006124 000401      BR      50004$
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      #CMDSEQ,R1
1038 006144 012721 140004      MOV      #SCH,(R1)+      ;THIS CODE SETS UP A SET CHARACTERISTIC
1039 006150 012721 000040      MOV      #DFTSCH,(R1)+      ;COMMAND AS THE FIRST COMMAND IN THE
1040 006154 012721 000001      MOV      #1,(R1)+      ;SEQUENCE TABLE.
1041 006160 005721      TST      (R1)+      ;SKIP PATTERN LOCATION.
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      MOV      #RWD,(R1)+
1055 006170      LET (R1)+ := #1      ;BRF.
1056 006170 012721 000001      MOV      #1,(R1)+
1057 006174      LET (R1)+ := #1      ;# OF OPERATIONS.
1058 006174 012721 000001      MOV      #1,(R1)+
1059 006200 005721      TST (R1)+      ;SKIP PATTERN.
1060 006202 000207      RTS      PC      ;RETURN
```

```
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      006322      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.
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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
1131 006410      ELSE      ;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$:
1140      ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
1141 006432      LET R2 := #0      ;CLEAR EOT/BOT FLAG.
1142 006432 005002      CLR      R2
1143 006434      ENDIF
1144 006434
1145 006434      ENDIF
1146 006434      50024$:
1147 006434 004737 013530      50022$:
1148 006440      JSR PC,NEXTU      ;FIND NEXT UNIT
1149 006440 000746      ENDDO      ;
1150 006442      BR      50016$
1151 006442      IF R2 EQ #1 THEN      50017$:
1152 006442 020227 000001      ;IF ALL UNIT ARE AT EOT/BOT THEN:
1153 006446 001001      CMP      R2,#1
1154 006450 000412      BNE      50025$
1155 006452      BR      EXARTN      ;RETURN WITH R2 = #1.
1156 006452      ENDIF
1157 006452      LET NCNT := NCNT + #1      50025$:
1158 006452 005237 003050      ;UPDATE RECORD COUNT.
1159 006456      LET PCMDWD := CMDWRD      INC      NCNT
1160 006464 013737 003056 003062      ;SAVE PREVIOUS COMMAND WORD.
1161 006464      ENDDO      MOV      CMDWRD,PCMDWD
1162 006464 000656      BR      50010$
1163 006466      50011$:
1164 006466 004737 012450      JSR PC,VFYDAT      ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
1165      ENDDO      ;VERIFY THE LAST N RECORDS OF DATA.
1166 006472      BR      50006$
1167 006472 000646      50007$:
1168 006474      ;SET NORMAL RETURN INDICATOR.
1169 006474      LET R2 := #0      CLR      R2
1170 006474 005002      ;RETURN.
1171 006476 000207      EXARTN: RTS PC
1172

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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:      EXCUTE,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 #X0.BOT NOTSETIN EOTFLG(R5) THEN ;IF NOT AT BOT
1191 006524 032765 000002 003134      BIT      #X0.BOT,EOTFLG(R
1192 006532 001014      BNE      50031$
1193 006534      IF #X0.EOT SETIN EOTFLG(R5) THEN ;BUT IF AT EOT
1194 006534 032765 000001 003134      BIT      #X0.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,EXCUTE      ;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$:
1205 006560 004737 007770      JSR PC,EXCUTE      ;NOT AT EOT, EXEC REV CMD
1206 006564      ENDIF
1207 006564      50034$:
1208 006564      ENDIF
1209 006564      50031$:
1210 006564      ELSE      ;ELSE IF CMD IS NOT REVERSE:
1211 006564 000420      BR      50035$
1212 006566      50030$:
1213 006566      IF #X0.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
1214 006566 032765 000001 003134      BIT      #X0.EOT,EOTFLG(R
1215 006574 001404      BEQ      50036$
1216 006576 032737 000001 003056      BIT      #CMD.CO,CMDWRD
1217 006604 001003      BNE      50037$
1218 006606      50036$:
1219      ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
1220 006606 004737 007770      JSR PC,EXCUTE      ;ISSUE CMD TO TS04
1221 006612      ELSE
1222 006612 000405      BR      50040$
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,EXCUTE
1228 006626      ENDIF
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1229 006626                                50041$:
1230 006626                                50040$:
1231 006626                                50035$:
1232 006626                                50027$:
1233 006626                                50026$:
1234 006626 004737 013530                JSR PC,NEXTU ;FIND NEXT UNIT IN TEST CYCLE.
1235 006632                                ENDDC
1236 006632 000724                                BR 50026$
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                                DORPT ;PRINT THE PERFORMANCE REPORT.
1243 006646                                CLRB RPTFLG
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$:
1250 006654 026527 002532 177777                CMP DEVTBL(R5),#END
1251 006662 001450                                BEQ 50044$
1252 006664                                IF #MOD.CO SETIN CMDWRD THEN ;IF CMD IS REVERSE THEN:
1253 006664 032737 000400 003056                BIT #MOD.CO,CMDWRD
1254 006672 001421                                BEQ 50045$
1255 006674                                IF #X0.BOT NOTSETIN EOTFLG(R5) THEN ;IF NOT AT BOT
1256 006674 032765 000002 003134                BIT #X0.BOT,EOTFLG(R
1257 006702 001014                                BNE 50046$
1258 006704                                IF #X0.EOT SETIN EOTFLG(R5) THEN ;BUT IF AT EOT
1259 006704 032765 000001 003134                BIT #X0.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                                50046$:
1274 006734                                ELSE ;ELSE IF CMD IS FORWARD:
1275 006734                                BR 50052$
1276 006734 000420                                50045$:
1277 006736                                IF #X0.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
1278 006736                                BIT #X0.EOT,EOTFLG(R
1279 006736 032765 000001 003134                BEQ 50053$
1280 006744 001404                                BIT #CMD.CO,CMDWRD
1281 006746 032737 000001 003056                BNE 50054$
1282 006754 001003                                50053$:
1283 006756                                ;IF NOT AT EOT OR NOT A MOTION CMD THEN:
1284
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1285	006756	004737	010300	JSR PC,GOWAIT	;WAIT FOR INT,CHECK STATUS.		
1286	006762			ELSE			
1287	006762	000405				BR	50055\$
1288	006764					50054\$:	
1289	006764			IFB ALLEOT NE #0 THEN			
1290	006764	105737	003154			TSTB	ALLEOT
1291	006770	001402				BEQ	50056\$
1292	006772	004737	010300	JSR PC,GOWAIT			
1293	006776			ENDIF			
1294	006776					50056\$:	
1295	006776			ENDIF			
1296	006776					50055\$:	
1297	006776			ENDIF			
1298	006776					50052\$:	
1299	006776	004737	013530	JSR PC,NEXTU	;FIND NEXT UNIT IN TEST CYCLE.		
1300	007002			ENDDO			
1301	007002	000724				BR	50043\$
1302	007004					50044\$:	
1303	007004	000207		RTS PC	;RETURN.		

```

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      MOV      (R3)+,STAER1+2      ;MOVE CMD ASCII
1316      007022      112337      005403      MOV      (R3)+,STAER1+3      ;
1317      007026      111337      005404      MOV      (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      MOV      (R3)+,STAER7+24
1323      007046      LET STAER7+25 :B= (R3)+      ;
1324      007046      112337      005517      MOV      (R3)+,STAER7+25
1325      007052      LET STAER7+26 :B= (R3)      ;INTO MSG.
1326      007052      111337      005520      MOV      (R3),STAER7+26
1327      007056      000207      RTS      PC      ;RETURN. GO EXECUTE NEXT FUNCTION.
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 CMDTBL(R3) NE R4 DO      ;UNTIL CURRENT CMD IS FOUND:
1341      007062      026304      003266      50057$:      CMP      CMDTBL(R3),R4
1342      007066      001403      BEQ      50060$
1343      007070      LET R3 := R3 + #2      ;SEARCH CMD TABLE.
1344      007070      062703      000002      ADD      #2,R3
1345      007074      ENDDO
1346      007074      000772      BR      50060$
1347      007076      LET R4 := R3
1348      007076      010304      MOV      R3,R4
1349      007100      LET R3 := R3 SHIFT -1      ;POINT TO ASCII FOR THAT COMMAND
1350      007100      006203      ASR      R3
1351      007102      000240      NOP
1352      007104      060403      ADD      R4,R3
1353      007106      062703      003354      ADD      #CMDASC,R3
1354      007112      000207      RTS      PC      ;RETURN.

```

```
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.
```

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      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
1510      007610      000764      BR      1$      ;DO IT AGAIN.
1511
```

```
1511 007612 000207      2$:   RTS      PC           ;RETURN.
1512
1513                      ;ALL ONE'S PATTERN.
1514
1515 007614 012703 177777  PATR1:: MOV      #-1,R3       ;ALL ONES PATTERN;.
1516 007620                      ZROPAT: LET R4 := R4 - #2   ;DECREMENT BYTE COUNT.
1517 007620 162704 000002                      ;
1518 007624 100402                      BMI      1$         ;DONE?,BR IF YES.
1519 007626 010322                      MOV      R3,(R2)+    ;IF NOT LOAD NEXT BYTE WITH PATTERN.
1520 007630 000773                      BR        ZROPAT      ;DO IT AGAIN.
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      MOV      #-1,TIME1
1587 007776      REPEAT      ;WAIT -
1588 007776      ;UPDATE TIMEOUT COUNTER.      50070$:
1589 007776      LET TIME1 := TIME1 - #1      ;UPDATE TIMEOUT COUNTER.
1590 007776 005337 003074      DEC      TIME1
1591 010002      IF TIME1 EQ #0 THEN      ;IF TIMED OUT:
1592 010002 005737 003074      TST      TIME1
1593 010006 001011      BNE      50071$
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 R$SAVE := R5      ;SAVE CURRENT DEVICE POINTER.
1611 010052 010537 003110      MOV      R5,R$SAVE
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      ENDDO
1620 010102 000767      BR      50073$
1621 010104      50074$:
1622 010104      LET R5 := R$SAVE      ;RESTORE CURRENT DEVICE POINTER.
1623 010104 013705 003110      MOV      R$SAVE,R5
1624 010110      LET SCHBK := MSGPKA(R5)      ;SET UP ADR OF MSG PKT IN SCH BLOCK.
1625 010110 016537 002502 002442      MOV      MSGPKA(R5),SCHBK
1626 010116      ENDIF
1627 010116      50072$:
1628 010116      LET R3 := MSGPKA(R5)      ;ADR OF THIS UNIT'S MSG PACKET.
1629 010116 016503 002502      MOV      MSGPKA(R5),R3
1630 010122      LET R2 := #0      ;CLR COUNTER.
1631 010122 005002      CLR      R2
1632 010124      WHILE R2 NE #MSGCNT DO      ;WHILE THERE ARE MORE LOCATIONS:
1633 010124      50075$:
```

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SEQ 0080

Line	Address	Hex	Label	Operation	Comment	Register/Value
1634	010124	020227	000016			
1635	010130	001405				
1636	010132			LET (R3)+ := #-1	;INIT THE MSG PACKET WITH ALL 1'S	
1637	010132	012723	177777			
1638	010136			LET R2 := R2 + #2	;UPDATE COUNTER.	
1639	010136	062702	000002			
1640	010142			ENDDO		
1641	010142	000770				
1642	010144					
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			
1647	010160	003412	000001			
1648	010162			LET TSSREG := @TSSR(R5)	;FREEZE THE CURRENT STATUS REG FOR PRINT	
1649	010162	017537	002462			
1650	010170			ERRDF #15,TOOMM,STAERM	;REPORT TOO MANY INTERRUPTS.	
1651	010170	104455				
1652	010172	000017				
1653	010174	004164				
1654	010176	005066				
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					
1659	010206			LET INTFLG(R5) := #0	;CLR INTERRUPT FLAG FOR THIS DEV.	
1660	010206	005065	003124			
1661	010212	052737	000200	BIS #1E.C,CMDPKT	;SET INT ENABLE BIT.	
1662	010220		002310	IFB ERRREC EQ #0 THEN	;IF NOT RETRYING	
1663	010220	105737	003122			
1664	010224	001005				
1665	010226			LET RECCNT(R5) := RECCNT(R5) + #1		
1666	010226	005265	003034			
1667	010232			LET @DATAWT := RECCNT(R5)	;THEN UPDATE REC COUNT TO WRITE IT ON TAPE	
1668	010232	016577	003034			
1669	010240		172604	ENDIF		
1670	010240					
1671	010240	012775	002310	MOV #CMDPKT,@TSDB(R5)	;LOAD TSDB WITH CMDPKT ADDRESS	
1672			002452		;THIS INITIATES COMMAND EXECUTION.	
1673	010246			IF #TS.SSR SETIN @TSSR(R5) THEN	;IF READY DID NOT DROP THEN:	
1674	010246	032775	000200			
1675	010254	001410	002462			
1676	010256	004737	010554	JSR PC,MOVMSG	;MOVE CURRENT MESSAGE PACKET TO COMMON.	
1677	010262			ERRDF #3,TOERM,STAERM	;REPORT NO TS04 RESPONSE.	
1678	010262	104455				
1679	010264	000003				
1680	010266	003713				
1681	010270	005066				
1682	010272	004737	013560	JSR PC,DROPU	;DROP THE UNIT	
1683	010276			ENDIF		
1684	010276					
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:      DROP, 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      ;IF COMMAND WAS REWIND THEN:
1699      010306      104422      IF CMDWRD EQ #RWD THEN      ;WAIT AN EXTRA MSECS EACH LOOP.
1700      010306      023727 003056 102010      DELAY 10.
1701      010310      001014      ;IF COMMAND WAS REWIND THEN:
1702      010310      ;IF COMMAND WAS REWIND THEN:
1703      010316      ;IF COMMAND WAS REWIND THEN:
1704      010320      ;IF COMMAND WAS REWIND THEN:
1705      010320      012727 000012      ;IF COMMAND WAS REWIND THEN:
1706      010324      000000      ;IF COMMAND WAS REWIND THEN:
1707      010326      013727 002116      ;IF COMMAND WAS REWIND THEN:
1708      010332      000000      ;IF COMMAND WAS REWIND THEN:
1709      010334      005367 177772      ;IF COMMAND WAS REWIND THEN:
1710      010340      001375      ;IF COMMAND WAS REWIND THEN:
1711      010342      005367 177756      ;IF COMMAND WAS REWIND THEN:
1712      010346      001367      ;IF COMMAND WAS REWIND THEN:
1713      010350      ;IF COMMAND WAS REWIND THEN:
1714      010350      ;IF COMMAND WAS REWIND THEN:
1715      010350      105737 002210      ;IF COMMAND WAS REWIND THEN:
1716      010350      001003      ;IF COMMAND WAS REWIND THEN:
1717      010354      ;IF COMMAND WAS REWIND THEN:
1718      010356      LET R2 := INTFLG(R5)      ;IF COMMAND WAS REWIND THEN:
1719      010356      016502 003124      ;IF COMMAND WAS REWIND THEN:
1720      010362      ELSE      ;IF COMMAND WAS REWIND THEN:
1721      010362      000406      ;IF COMMAND WAS REWIND THEN:
1722      010364      ;IF COMMAND WAS REWIND THEN:
1723      010364      LET R3 := COMP #TS.SSR      ;IF COMMAND WAS REWIND THEN:
1724      010364      012703 000200      ;IF COMMAND WAS REWIND THEN:
1725      010370      005103      ;IF COMMAND WAS REWIND THEN:
1726      010372      LET R2 := @TSSR(R5) CLR.BY R3 ;IF COMMAND WAS REWIND THEN:
1727      010372      017502 002462      ;IF COMMAND WAS REWIND THEN:
1728      010376      040302      ;IF COMMAND WAS REWIND THEN:
1729      010400      ;IF COMMAND WAS REWIND THEN:
1730      010400      ;IF COMMAND WAS REWIND THEN:
1731      010400      LET TIME1 := TIME1 - #1      ;IF COMMAND WAS REWIND THEN:
1732      010400      005337 003074      ;IF COMMAND WAS REWIND THEN:
1733      010404      IF TIME1 EQ #0 THEN      ;IF COMMAND WAS REWIND THEN:
1734      010404      005737 003074      ;IF COMMAND WAS REWIND THEN:
1735      010410      001016      ;IF COMMAND WAS REWIND THEN:
1736      010412      LET @DATAWT := RECCNT(R5) - #1 ;RE-ADJUST REC COUNT DOWN
1737      010412      016577 003034 172424      ;RE-ADJUST REC COUNT DOWN
1738      010420      005377 172420      ;RE-ADJUST REC COUNT DOWN
1739      010424      004737 010554      ;RE-ADJUST REC COUNT DOWN
1740      010430      ;RE-ADJUST REC COUNT DOWN
1741      010430      104455      ;RE-ADJUST REC COUNT DOWN
```

1742 010432 000004
 1743 010434 004125
 1744 010436 005066
 1745 010440 004737 013560
 1746 010444 000412
 1747 010446
 1748 010446
 1749 010446
 1750 010446 005702
 1751 010450 001716
 1752 010452 004737 010554
 1753 010456 004737 010640
 1754 010462 004737 011004
 1755 010466 004737 012150
 1756 010472
 1757 010472 012703 003124
 1758 010476 004737 010504
 1759 010502 000207

JSR PC,DROPU
 BR GOWRTN
 ENDIF
 UNTIL R2 NE #0
 JSR PC,MOVMSG
 JSR PC,RECUD
 JSR PC,CHKERR
 JSR PC,LOG
 GOWRTN: LET R3 := #ENDERF
 JSR PC,CLRERR
 RTS PC

.WORD 4
 .WORD NOINTM
 .WORD STAERM
 ;DROP THE UNIT.
 ;RETURN.
 50106\$:
 ;REPEAT UNTIL INTERRUPT OR READY OCCURES.
 TST R2
 BEQ 50102\$
 ;MOVE CURRENT MSG. PACKET TO COMMON AREA.
 ;UPDATE THE RECORD COUNT.
 ;CHECK FOR STATUS ERRORS.
 ;LOG BYTES AND ERRORS.
 MOV #ENDERF,R3
 ;CLEAR ALL ERROR FLAGS
 ;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      ;RFTURN.
1801      RTS PC
1802
1803
1804      :
1805      :      SUBROUTINE TO MOVE THE CURRENT MESSAGE PACKET TO THE COMMON AREA AND
1806      :      TO UPDATE THE CURRENT TERMINATION CLASS CODE.
1807      :      INPUTS:
1808      :      OUTPUTS:
1809      :      REGISTERS:      R2, R3.
1810      :      CALLS:
1811
1812      010554      MOVMSG:: LET TSSREG := @TSSR(R5)      ;FREEZE THE STATUS REG CONTENTS
1813      010554      017537      002462      003112      MOV      @TSSR(R5),TSSREG
1814      010562      LET R2 := TSSREG CLR.BY #TSC.TCC ;EXTRACT THE TERMINATION CLASS CODE,
1815      010566      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	000016			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	000700				BR	50112\$
1833	010630						50113\$:
1834	010630			LET EOTFLAG(R5) := MSGPKT+MS.XSO	;MOVE XSTATO TO EOT FLAG.		
1835	010630	013765	002342 003134			MOV	MSGPKT+MS.XSO,E0
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$:
1889      010774      ENDIF      50124$:
1890      010774      50123$:
1891      010774      ENDIF
1892      010774

```

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

50120$:
50117$:
50115$:
      MOV      RECCNT(R5),@DATA
50114$:
```

```
1904      :      THIS IS THE ERROR CHECK SUBROUTINE.  AFTER INTERRUPT THIS
1905      :      SUBROUTINE IS CALLED TO CHECK THE TS04 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:
    IFB RANDOM EQ #0 ORB VFYFLG NE #0 THEN
        50141$:
        ;IF NOT IN RANDOM OR IF CMD IS WTV:
        ;IF RFC ERROR REPORTS ARE ALLOWED:
        TSTB IRE
        BEQ 50141$
        TSTB VFYFLG
        BEQ 50142$
        50141$:
        ;IF NOT IN RANDOM OR IF CMD IS WTV:
        ;IF RFC ERROR REPORTS ARE ALLOWED:
        TSTB IRE
        BNE 50143$
        INC COUNT
        HRDCNT(R5)
        LET HRDCNT(R5) := HRDCNT(R5) + #1 ;UPDATE HARD ERROR COUNT
        ERRHRD #13,RFCERM,STAERM ;REPORT RFC ERROR
        TRAP C$ERHRD
        .WORD 13
        .WORD RFCERM
        .WORD STAERM
    ENDIF
ENDIF
50143$:
50142$:
50140$:
50137$:
50136$:
;IF A READ/WRITE ERROR HAS OCCURRED THEN:
TSTB RWERR
BEQ 50144$
MOV CMDSAV,CMDPKT
;RESTORE CMD PACKET AFTER ERROR RECOV.
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      ATTNM
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.XS0 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$:
2064 011304 032737 170002 002342 IF #X0.RLS!X0.RLL!X0.TMK!X0.LET!X0.BOT SETIN MSGPKT+MS.XS0 THEN
2065 011312 001427 BIT #X0.RLS!X0.RLL!X
2066      BEQ 50146$
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 LET UNREC :B= UNREC + #1 ;SET UNRECOVERABLE FLAG FOR LOG.
2081 011344 105237 003121 BEQ 50152$
2082 011350 ELSE ;ELSE - IF NOT IN ERROR RECOVERY:
2083 011350 000402 INC 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 INC HRDCNT(R5)
2092 011362 104456 ;REPORT TAPE STATUS ALERT.
2093 011364 000007 TRAP C$ERRHRD
2094 011366 004142 .WORD 7
2095 011370 005066 .WORD TSAM
2096 011372 .WORD STAERM
2097 011372 50151$:
2098 011372 ENDIF
2099 011372 50150$:
2100 011372 ENDIF
2101 011372 50146$:
```

```
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 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$ERSOFT
2196 011560 000012                                .WORD    10
2197 011562 004254                                .WORD    RERM
2198 011564 005066                                .WORD    STAERM
2199 011566
2200 011566                                50161$:
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
2220 011634      LET UNREC :B= UNREC + #1            ;SET UNRECOVERABLE ERROR FLAG.
2221 011634 105237 003121                                INCB     UNREC
2222 011640      ENDIF
2223 011640
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
2240 011650 001016
2241
2242 011652 IF CMDLG NE #0 THEN
2243 011652 005737 003064
2244 011656 001404
2245 011660
2246 011660 105237 003120
2247 011664
2248 011664 105237 003121
2249 011670
2250 011670
2251 011670
2252 011670 104455
2253 011672 000013
2254 011674 004276
2255 011676 005066
2256 011700 004737 013560
2257 011704
2258 011704 000436
2259 011706
2260 011706 004737 012022
2261 011712
2262 011712 005737 003114
2263 011716 001004
2264 011720
2265 011720 104457
2266 011722 000013
2267 011724 004276
2268 011726 005066
2269 011730
2270 011730
2271 011730
2272 011730 005237 003114
2273 011734
2274 011734 105737 003151
2275 011740 001016
2276 011742
2277 011742 105237 003122
2278 011746
2279 011746 012775 002330 002452
2280 011754 004737 010520
2281 011760
2282 011760 012602

      : IF THERE IS NO DENSITY CHECK THEN:
      : IF CMD IS A READ OR WRITE THEN:
      TST CMDLG
      BEQ 501658
      INCB RWERR
      INCB UNREC
      : SET RD/WR ERROR FLAG,
      : SET UNRECOVERABLE ERROR FLAG.
      :
      501658:
      : REPORT UNRECOVERABLE ERROR.
      TRAP C$ERDF
      .WORD 11
      .WORD URERM
      .WORD STAERM
      : REPORT ERROR + DROP UNIT.
      : ELSE-IF THERE IS DENSITY CHECK:
      BR 501668
      501648:
      : CHECK FOR RETRY LIMIT EXCEEDED.
      : IF THIS IS THE ORIGINAL ERROR THEN:
      TST RETRYC
      BNE 501678
      TRAP C$ERSOFT
      .WORD 11
      .WORD URERM
      .WORD STAERM
      : REPORT DENSITY CHECK ERROR.
      :
      501678:
      : UPDATE RETRY COUNT.
      INC RETRYC
      : IF ERROR RECOVERY IS ENABLED THEN:
      TSTB IRE
      BNE 501708
      INCB ERRREC
      : SET ERROR RECOVERY FLAG,
      : ISSUE A REWIND COMMAND,
      MOV #RWCPK,@TSDB(R5)
      : WAIT FOR SUBSYSTEM READY,
      : POP 2 RTN ADR'S FROM STACK,
      MOV (SP)+,R2
```

```

MOV          (SP)+,R2
;REISSUE THE COMMAND,
;WAIT FOR INTERRUPT
;ELSE-IF ERR REC DISABLED:
BR           50171$
50170$:
;SET UNRECOVERABLE ERROR FLAG.
INC B       UNREC
;
50171$:
;
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      1CC7:: 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      BNE      50173$
2343      012064      023727      003114      000020      IF RETRYC EQ #WRECL THEN      ;IF RETRY COUNT HAS REACHED LIMIT:
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
2351      012106      005066      .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          ;IF RETRY COUNT HAS REACHED LIMIT:
2362 012126 001007          CMP RETRYC,#RRECL
2363 012130          LET UNREC :B= UNREC + #1          ;SET UNRECOVERABLE FLAG
2364 012130 105237 003121          ;REPORT RECOVERABLE ERROR.
2365 012134          ERRHRD #14,RLEXM,STAERM          INCB UNREC
2366 012134 104456          TRAP C$ERHRD
2367 012136 000016          .WORD 14
2368 012140 004014          .WORD RLEXM
2369 012142 005066          .WORD STAERM
2370 012144          POP R2
2371 012144 012602          MOV (SP)+,R2
2372 012146          ENDIF
2373 012146          50176$:
2374 012146          ENDIF          50175$:
2375 012146
2376 012146 000207          RTLRTN: RTS PC          ;RETURN
```

```

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 BRFCNT 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
2491 012432          ENDIF
2492 012432
2493 012432          ENDIF
2494 012432
2495 012432          ENDIF
2496 012432
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
2537 012532 000207    RTS PC    ;RETURN.

```

50212\$:

50210\$:

50200\$:

50177\$:

50215\$:

```

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      50216$:
2554 012564      LET CMDSAV := CMDPKT      ;SAVE COMMAND PACKET 1ST WORD.
2555 012564 013737 002310 003060      MOV CMDPKT,CMDSAV
2556 012572 013737 003046 002312      MOV DATARD,CMDPKT+CP.ADL ;SAVE BUFFER START ADDRESS.
2557 012600      LET NCNT := #0      ;CLEAR NUMBER OF OPERATIONS.
2558 012600 005037 003050      CLR NCNT
2559 012604      WHILE NCNT L' NCNT1 DO ;WHILE THERE ARE RECORDS REMAINING:
2560 012604      50217$:
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$:
2592 012704      ELSE ;ELSE IF CMD IS NOT REVERSE:
2593 012704 000412      BR 50230$

```

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				JSR PC,VFISU		
2604	012732				ENDIF		
2605	012732				ENDIF	50232\$:	
2606	012732					50230\$:	
2607	012732	004737	013530		JSR PC,NEXTU	;GO FIND THE NEXT UNIT.	
2608	012736				ENDDO		
2609	012736	000732				BR 50221\$	
2610	012740					50222\$:	
2611	012740	004737	014052		JSR PC,CKHAF	;CHECK FOR HALT AFTER EACH CMD.	
2612	012744				LET NCNT := NCNT + #1	;UPDATE THE RECORD COUNT.	
2613	012744	005237	003050			INC NCNT	
2614	012750				LET PCMDWD := CMDWRD	;SAVE PREVIOUS COMMAND WORD.	
2615	012750	013737	003056	003062		MOV CMDWRD,PCMDWD	
2616	012756				ENDDO		
2617	012756	000712				BR 50217\$	
2618	012760					50220\$:	
2619	012760	000207			RTS PC	;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
```

```
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:      GCMDA
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
```

```
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
CMPB (R3),(R4) ;ARE THEY EQUAL.
BEQ 3$ ;BR IF SO.
TST CKDFF ;1 ST TIME THRU?
BNE 2$ ;BR IF NOT.
INC VFYCNTR(R5) ;INC THE VERIFY ERROR COUNTER.
INC HRDCNTR(R5) ;INC THE HARD ERROR COUNT.
ERRHRD #17,WTVERM,DTAERM ;REPORT WRITE/VERIFY ERROR.
    TRAP C$ERRHRD
    .WORD 17
    .WORD WTVERM
    .WORD DTAERM
    INC CKDFF
LET CKDFF := CKDFF + #1 ;INCREMENT # OF BYTES IN ERROR.
MOVB (R4),TIME1 ;SAVE WAS DATA FOR TYP0UT.
BIC #177400,TIME1 ;CLEAR GARBAGE.
MOVB (R3),TIME2 ;SAVE SHOULD BE DATA FOR TYP0UT.
BIC #177400,TIME2 ;CLEAR GARBAGE.
IF CKDFF LT #11. THEN ;IF ERROR BYTE COUNT IS LESS THAN 11:
    CMP CKDFF,#11.
    BGE 50251$
    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 C$PNTX
    ADD #12,SP
ENDIF
50251$:
```

```
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$PNTB
2789 013450 062706 000010      ADD      #10,SP
2790 013454              ENDIF
2791 013454              50252$:
2792 013454              ENDIF
2793 013454              50243$:
2794 013454              ENDIF
2795 013454              50241$:
2796 013454 000207      RTS      PC      ;OTHERWISE, RETURN.
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.
2829
2830
2831
2832
2833      : SUBROUTINE TO FIND THE NEXT UNIT IN THE TEST CYCLE.
2834      : INPUTS:
2835      : OUTPUTS:
2836      : REGISTERS:
2837      : CALLS:
2838
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      CLR      R2
2870      013602      WHILE R2 NE #MSGCNT DO ;WHILE THERE ARE MORE LOCATIONS:
2871      013602      50257$:
2872      013602      020227      000016      CMP      R2,#MSGCNT
2873      013606      001405      BEQ      50260$
2874      013610      LET (R3)+ := #-1 ;INIT THE MSG PACKET WITH ALL 1'S
2875      013610      012723      177777      MOV      #-1,(R3)+
2876      013614      LET R2 := R2 + #2 ;UPDATE COUNTER.
2877      013614      062702      000002      ADD      #2,R2
2878      013620      ENDDO
2879      013620      000770      BR      50257$
2880      013622      50260$:
2881      013622      LET @TSDB(R5) := #GSCPK ;INITIATE A GET STATUS COMMAND.
2882      013622      012775      002320      002452      MOV      #GSCPK,@TSDB(R5)
2883      013630      004737      010520      JSR PC,WSSR ;WAIT A WHILE FOR SSR=1
2884      013634      004737      010554      JSR PC,MOVMSG ;MOVE MSG PACKET TO COMMON AREA.
2885      013640      IF R4 EQ #X3.RNY THEN ;IF WE HAVE A CAPSTAN RUNAWAY THEN:
2886      013640      020427      157400      CMP      R4,#X3.RNY
2887      013644      001005      BNE      50261$
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$:
2896      013660      004737      013770      JSR PC,PRXST ;PRINT EXTENDED STATUS REGISTERS.
2897      013664      ENDIF
2898      013664      50262$:
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      ENDIF
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)      ;SAVE # OF UNIT TO BE DROPPED.
      LET RO := R5 SHIFT -1      ;RO=LOGICAL DEVICE NUMBER
      DODU RO      ;DROP THE UNIT: EXEC BGNDU-ENDDU CODE IF IDU = 0
      IF DEVTBL(R5) NE #NINUSE THEN ;IF UNIT NOT DROPPED
      IFB IREC EQ #0 THEN      ;IF RECOVERY IS ENABLED THEN:
      LET @TSSR(R5) := #0      ;ISSUE SUBSYSTEM INIT
      LET STAFLG :B= STAFLG + #1 ;SET START FLAG TO ENABLE REWIND,
      ENDIF
      ENDIF
      DRORTN: LET DROPED :B= DROPED + #1 ;SET UNIT DROPPED FLAG.
      RTS      PC      ;RETURN.
      DROPN: .WORD 0      ;# OF UNIT TO BE DROPPED

50264$:
      DEC      PASCNT(R5)
      MOV      DEVTBL(R5),DROPN
      MOV      R5,RO
      ASR      RO
      TRAP     C$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
2976      014052      105737      002204      ;IF HALT FLAG IS SET:
2977      014056      001422      TSTB      HAE
2978      014060      MANUAL      BEQ      50267$
2979      014060      104450      ;IS MANUAL INTERVENTION ALLOWED?
2980      014062      BNCOMPLETE CKHRTN      TRAP     C$MANI
2981      014062      103020      ;BR IF NOT.
2982      014064      LET R4 := CMDWRD      BCC      CKHRTN
2983      014064      013704      003056      ;COMMAND WORD.
2984      014070      004737      007060      MOV      CMDWRD,R4
2985      014074      JSR      PC,GCMDA      ;FETCH ADR OF CMD ASCII.
2986      014074      112337      003546      ;MOVE CMD ASCII
2987      014100      LET HALTM+1 :B= (R3)+      MOVB      (R3)+,HALTM
2988      014100      112337      003547      MOVB      (R3)+,HALTM+1
2989      014104      LET HALTM+2 :B= (R3)      ;INTO MESSAGE.
2990      014104      111337      003550      MOVB      (R3),HALTM+2
2991      014110      GMANIL HALTM,TIME1,1,YES      ;HALT - WAIT FOR AN OEPRAOTR INPUT.
2992      014110      104443      TRAP     C$GMAN
2993      014112      000404      BR      10000$
2994      014114      003074      .WORD    TIME1
2995      014116      000130      .WORD    TSCODE
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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MISCELLANEOUS SECTIONS MACY11 30(1046) 24-AUG-79 09:10 PAGE 78 K 9
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3061 014322 012746 014707
3062 014326 012746 000005
3063 014332 010600
3064 014334 104416
3065 014336 062706 000014
3066 014342 PRINTS #RPT1F,WRREC(R5),RRREC(R5),RFREC(R5)
3067 014342 016546 002744
3068 014346 016546 002724
3069 014352 016546 002704
3070 014356 012746 015013
3071 014362 012746 000004
3072 014366 010600
3073 014370 104416
3074 014372 062706 000012
3075 014376 PRINTS #RPT1G,WRUNR(R5),RRUNR(R5),RFUNR(R5)
3076 014376 016546 002754
3077 014402 016546 002734
3078 014406 016546 002714
3079 014412 012746 015064
3080 014416 012746 000004
3081 014422 010600
3082 014424 104416
3083 014426 062706 000012
3084 014432 PRINTS #RPT1I,SCCNT(R5),HRDCNT(R5),FTLCNT(R5),VFYCNTR(R5)
3085 014432 016546 003004
3086 014436 016546 003024
3087 014442 016546 003014
3088 014446 016546 002774
3089 014452 012746 015213
3090 014456 012746 000005
3091 014462 010600
3092 014464 104416
3093 014466 062706 000014
3094 014472 004737 013530
3095 014476
3096 014476 000617
3097 014500
3098 014500
3099 014500 013705 003110
3100 014504
3101 014504 000167
3102 014506 000540
3103
3104
3105

014510 047045 047045 040445 RPT1A: .NLIST BEX
014565 045 041101 052131 RPT1B: .ASCIZ /%N%N%AUNIT %D1%S3%APASS:%D5%S3%ARECORD:%D5%N/
014636 040445 054502 042524 RPT1C: .ASCIZ /%BYTES WRITTEN %D3%A,%Z3%A,%Z3%A,%Z3%A/
014707 045 041101 052131 RPT1D: .ASCIZ /%BYTES READ REV %D3%A,%Z3%A,%Z3%A,%Z3%A/
014757 045 031123 022463 RPT1E: .ASCIZ /%S23%AWRT%S4%ARDR%S4%ARDF%N/
015013 045 051101 041505 RPT1F: .ASCIZ /%RECOVERABLE ERRORS %D5%S2%D5%S2%D5%N/
015064 040445 047125 042522 RPT1G: .ASCIZ /%UNRECOVERABLE ERRORS %D5%S2%D5%S2%D5%N%N/
015136 040445 050123 041505 RPT1H: .ASCIZ /%ASPEC COND%S3%AHARD%S3%AFATAL%S3%ACOMPARE%N/
015213 045 031523 042045 RPT1I: .ASCIZ /%S3%D5%S3%D5%S3%D5%S3%D5%N%N/
.LIST BEX
.EVEN

JSR PC,NEXTU ;FIND THE NEXT UNIT.
ENDDO

LET R5 := R5SAVE ;RESTORE CURRENT DEVICE
EXIT RPT

BR 50270$
50271$:
POINTER.
MOV R5SAVE,R5
.WORD JSJMP
.WORD L10010-2-.

```

```
3107
3108 015250
3109 015250
3110 015250 104425
3111
3112 .SBITL 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$INIT::
3134
3135 015260 INIT10: IF #BIT0!BIT1 SET IN #CMDPKT THEN ;IF CMD PACKET IS NOT ON MODULO 4 BOUNDARY:
3136 015260 032727 000003 002310 BIT #BIT0!BIT1,#CMDP
3137 015266 001421 BEQ 50272$
3138 015270 ERRSF #1,CMDPKM ;PRINT ERROR MSG,
3139 015270 104454 TRAP C$ERSF
3140 015272 000001 .WORD 1
3141 015274 003606 .WORD CMDPKM
3142 015276 000000 .WORD 0
3143 015300 DELAY 2000. ;GO TO SUPERVISOR, WAIT 2 SECONDS.
3144 015300 012727 003720 MOV #2000.,(PC)+
3145 015304 000000 .WORD 0
3146 015306 013727 002116 MOV L$DLY,(PC)+
3147 015312 000000 .WORD 0
3148 015314 005367 177772 DEC -6(PC)
3149 015320 001375 BNE -4
3150 015322 005367 177756 DEC -22(PC)
3151 015326 001367 BNE -20
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 LET R2 := #0 ;INIT CLR FLAG.
3161 015344 005002 CLR R2
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 RRANV NE #0 THEN ;IF RESET RANDOM VARIABLE FLAG IS SET THEN:
3177 015366 105737 002203 TSTB RRANV
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,R0
3187	015414	104447			TRAP C\$REFG
3188	015416			BNCOMPLETE INIT15	;BRANCH IF NOT STARTING.
3189	015416	103026			BCC INIT15
3190	015420			LET STAFLG :B= STAFLG + #1	;SET START COMMAND FLAG.
3191	015420	105237	003156		INCB STAFLG
3192	015424			LET R5 := #6	
3193	015424	012705	000006		MOV #6,R5
3194	015430			REPEAT	;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	002532	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,R0
3219	015500	104447			TRAP C\$REFG
3220	015502			BNCOMPLETE INIT16	;BRANCH IF NOT.
3221	015502	103004			BCC INIT16
3222	015504			LET STAFLG :B= STAFLG + #1	;IF SO - SET THE START FLAG.
3223	015504	105237	003156		INCB STAFLG
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 C\$RFLA
3229	015516	010037	003162		MOV R0,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,R0

3237	015536	104447				TRAP	C\$REFG
3238	015540			IFCOND CS THEN	;SUPERVISOR IS IN NEW PASS	BCC	50302\$
3239	015540	103014					
3240	015542			IFB STAFLG EQ #0 THEN	;AND DIAG WAS NEITHER STARTED	TSTB	STAFLG
3241	015542	105737	003156			BNE	50303\$
3242	015546	001010					
3243	015550			READEF #EF.RES	;NOR	MOV	#EF.RES,R0
3244	015550	012700	000037			TRAP	C\$REFG
3245	015554	104447					
3246	015556			IFCOND CC THEN	;RESTARTED	BCS	50304\$
3247	015556	103402		LET R3 := COMP R3	;DO IT	COM	R3
3248	015560						
3249	015560	005103		ELSE		BR	50305\$
3250	015562	000401					
3251	015562						
3252	015564			LET R3 := R3 + #1	;SET 1ST PASS IF NEW PASS AND	INC	R3
3253	015564						
3254	015564	005203		ENDIF	;RESTARTING		
3255	015566						
3256	015566			ELSE			
3257	015566						
3258	015566	000401				BR	50306\$
3259	015570						
3260	015570			LET R3 := R3 + #1	;SET 1ST PASS IF NEW PASS AND	INC	R3
3261	015570	005203					
3262	015572			ENDIF	;STARTING		
3263	015572						
3264	015572			ENDIF	;DO NOT UPDATE IT ON CONTINUE		
3265	015572						
3266	015572			ENDIF	;OR ON POWER FAIL		
3267	015572						
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						
3273	015600	026527	002532 177777				
3274	015606	001450					
3275	015610			LET R2 := R2 + #1			
3276	015610	005202				INC	R2
3277	015612			LET R0 := R5 SHIFT -1			
3278	015612	010500				MOV	R5,R0
3279	015614	006200				ASR	R0
3280	015616			GPHARD R0,R0	;GET HARDWARE P TABLE FROM SUPER.	TRAP	C\$GPHRD
3281	015616	104442					
3282	015620			IFCOND CS THEN			
3283	015620	103036				BCC	50311\$
3284	015622			LET TSSR(R5) := (R0)	;SAVE TSSR ADDRESS.		
3285	015622	011065	002462			MOV	(R0),TSSR(R5)
3286	015626			LET TSDB(R5) := (R0)+ - #2	;SAVE TSDB ADDRESS.		
3287	015626	012065	002452			MOV	(R0)+,TSDB(R5)
3288	015632	162765	000002 002452			SUB	#2,TSDB(R5)
3289	015640			LET TSVCT(R5) := (R0)	;SAVE INTERRUPT VECTOR ADDRESS.		
3290	015640	011065	002472			MOV	(R0),TSVCT(R5)
3291	015644			SETVEC TSVCT(R5),TS4INT(R5),#INTPRI	;SET UP INTERRUPT 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	;ACTUAL PASSCOUNT UPDATE PER R3	TST	R3
3299	015672	005703				BEQ	50312\$
3300	015674	001410					
3301	015676			IF R3 LT #0 THEN		TST	R3
3302	015676	005703				BGE	50313\$
3303	015700	002003					
3304	015702			LET PASCNT(R5) := PASCNT(R5) + #1		INC	PASCNT(R5)
3305	015702	005265	002764				
3306	015706			ELSE		BR	50314\$
3307	015706	000403			50313\$:		
3308	015710			LET PASCNT(R5) := #1		MOV	#1, PASCNT(R5)
3309	015710						
3310	015710	012765	000001 002764	ENDIF			
3311	015716				50314\$:		
3312	015716			ENDIF			
3313	015716				50312\$:		
3314	015716			ENDIF			
3315	015716				50311\$:		
3316	015716			LET RECCNT(R5) := #0	;CLEAR RECORD COUNT	CLR	RECCNT(R5)
3317	015716						
3318	015716	005065	003034	JSR PC,NEXTU	;DO IT FOR ALL DEVICES.		
3319	015722	004737	013530	ENDDO		BR	50307\$
3320	015726				50310\$:		
3321	015726	000724					
3322	015730						
3323							
3324	015730			IF R2 EQ #0 THEN	;IF THERE ARE NO UNITS:	TST	R2
3325	015730	005702				BNE	50315\$
3326	015732	001026					
3327	015734			PRINTF #AUDRPM	;PRINT ALL UNITS DROPPED,	MOV	#AUDRPM, -(SP)
3328	015734	012746	004351			MOV	#1, -(SP)
3329	015740	012746	000001			MOV	SP, R0
3330	015744	010600				TRAP	C\$PNTF
3331	015746	104417				ADD	#4, SP
3332	015750	062706	000004				
3333	015754			DELAY 2000.	;GO TO SUPERVISOR, WAIT 2 SECONDS.	MOV	#2000., (PC)+
3334	015754	012727	003720			.WORD	0
3335	015760	000000				MOV	L\$DLY, (PC)+
3336	015762	013727	002116			.WORD	0
3337	015766	000000				DEC	-6(PC)
3338	015770	005367	177772			BNE	.-4
3339	015774	001375				DEC	-22(PC)
3340	015776	005367	177756			BNE	.-20
3341	016002	001367					
3342	016004			BREAK	;GO TO SUPERVISOR, CHECK TTY.	TRAP	C\$BRK
3343	016004	104422		DOCLN	;DO CLEAN CODE + ABORT PASS.	TRAP	C\$DCLN
3344	016006						
3345	016006	104444					
3346	016010			ENDIF			
3347	016010				50315\$:		
3348							

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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      50323$
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) := #GSCPK ;AND GET UNITS STATUS
3372 016074 012775 002320 002452  MOV      #GSCPK,@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      L$DLY,(PC)+
3377 016114 000000          .WORD      0
3378 016116 005367 177772          DEC      -6(PC)
3379 016122 001375          BNE      -4
3380 016124 005367 177756          DEC      -22(PC)
3381 016130 001367          BNE      -20
3382 016132          IF #TS.SSR SETIN @TSSR(R5) THEN
3383 016132 032775 000200 002462  BIT      #TS.SSR,@TSSR(R5)
3384 016140 001420          BEQ      50325$
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					50330\$:	
3413	016226				INCR TIME2 FROM #1 TO #13 BY #1		
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							;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	
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3461	016352	013737	003044	003046			MOV	DATAWT, DATARD
3462	016360	062737	004000	003046			ADD	#DATCNT, DATARD
3463	016366				IF @DATAWT LT #DATCNT THEN			; WHEN NOT ENOUGH FREE MEMO AVAILABLE
3464	016366	027727	164452	004000			CMP	@DATAWT, #DATCNT
3465	016374	002011					BGE	50336\$
3466	016376				PRINTF #MEMOM			; WARN OPERATOR
3467	016376	012746	016444				MOV	#MEMOM, -(SP)
3468	016402	012746	000001				MOV	#1, -(SP)
3469	016406	010600					MOV	SP, R0
3470	016410	104417					TRAP	C\$PNTF
3471	016412	062706	000004				ADD	#4, SP
3472	016416				DOCLN			; AND ABORT PASS
3473	016416	104444					TRAP	C\$DOCLN
3474	016420				ENDIF			; DIAG MUST BE RE-LOADED IN A CPU WITH LARGER MEMO
3475	016420							50336\$:
3476	016420				ENDIF			50335\$:
3477	016420							
3478								
3479	016420				LET CHGFLG :B= #0			; CLR CHANGE CMD SEQ TBL FLAG.
3480	016420	105037	002212				CLRB	CHGFLG
3481	016424				LET R3 := #ENDFLG			
3482	016424	012703	003156				MOV	#ENDFLG, R3
3483	016430	004737	010504		JSR PC, CLRERR			; CLEAR ALL FLAGS.
3484	016434				LET PWRFLG :B= #0			; CLEAR THE POWER FAIL FLAG.
3485	016434	105037	003157				CLRB	PWRFLG
3486								
3487	016440				EXIT INIT			
3488	016440	104432					TRAP	C\$EXIT
3489	016442	000104					.WORD	L10012-
3490	016444	040445	051106	042505	MEMOM: .ASCII	/ %AFREE MEMO TOO SMALL FOR RD-WR BFRS%N/		
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	.ASCIZ	/ %ARE-LOAD IN LARGER MEMO%N/		
3498	016520	040517	020104	047111				
3499	016526	046040	051101	042507				
3500	016534	020122	042515	047515				
3501	016542	047045	000					
3502		016546			.EVEN			
3503								
3504	016546				ENDINIT			
3505	016546				L10012:			
3506	016546	104411					TRAP	C\$INIT

```

3507 .SBTTL AUTO DROP SECTION
3508
3509
3510 ;++
3511 ;SECTION EXECUTED AFTER THE INIT CODE WHEN 'ADR' FLAG IS SET BY OPERATOR
3512 ;SECTION CHECKS FOR A VALID INTERFACE LOCATION. DROPS UNIT IF NO RESPONSE
3513 ;FROM INTERFACE
3514 ;--
3515 016550 BGNAUTO
3516 016550 L$AUTO::
3517
3518 016550 004737 013462 JSR PC,FIRSTU ;FIND FIRST UNIT
3519 016554 WHILE DEVTBL(R5) NE #END DO ;
3520 016554 50337$:
3521 016554 026527 002532 177777 CMP DEVTBL(R5),#END
3522 016562 001525 BEQ 50340$
3523 016564 LET TRAPD4 :B= #0 ;
3524 016564 105037 003160 CLR B 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 50341$:
3559 016704 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			
3564	016724	001423					
3565	016726				IF #TS.OFL SETIN @TSSR(R5) THEN		
3566	016726	032775	000100	002462			
3567	016734	001416					
3568	016736				LET FTLCNT(R5) := FTLCNT(R5) + #1		
3569	016736	005265	003024				
3570	016742				PRINTF #OFLINM,DEVTBL(R5)		
3571	016742	016546	002532				
3572	016746	012746	004633				
3573	016752	012746	000002				
3574	016756	010600					
3575	016760	104417					
3576	016762	062706	000006				
3577	016766	004737	013704				
3578	016772				JSR PC,DROPUA		
3579	016772				ENDIF		
3580	016772				ELSE		
3581	016772	000416					
3582	016774						
3583	016774				LET FTLCNT(R5) := FTLCNT(R5) + #1		
3584	016774	005265	003024				
3585	017000				PRINTF #NRDYM,DEVTBL(R5)		
3586	017000	016546	002532				
3587	017004	012746	017134				
3588	017010	012746	000002				
3589	017014	010600					
3590	017016	104417					
3591	017020	062706	000006				
3592	017024	004737	013704				
3593	017030				JSR PC,DROPUA		
3594	017030				ENDIF		
3595	017030				ENDIF		
3596	017030						
3597	017030	004737	013530		JSR PC,NEXTU		
3598	017034				ENDDO		
3599	017034	000647					
3600	017036						
3601							
3602	017036				ENDAUTO		
3603	017036				L10013:		
3604	017036	104461					
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	.ASCIIZ /%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: .ASCIIZ /%AUNIT %D1%A NOT RDY%N/		
3618	017142	022440	030504	040445			

3619 017150 047040 052117 051040
3620 017156 054504 047045 000
3621 017164

.EVEN

3622
3623 : DEVICE BUS TRAP HANDLER
3624 : OUTPUT: TRAPD4 BYTE 1: TRAPED AT 4
3625 : 0: NO TRAP
3626

3627 017164
3628 017164 105237 003160
3629 017170 000002

TRAP4:: LET TRAPD4 :B= TRAPD4 + #1

INCB TRAPD4

RTI

3630
3631
3632

```

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$CLEAN::
3642
3643
3644 017172 004737 013462 JSR PC,FIRSTU ;FIND FIRST UNIT.
3645 017176 WHILE DEVTBL(R5) NE #END DO
3646 017176
3647 017176 026527 002532 177777 50346$:
3648 017204 001413 CMP DEVTBL(R5),#END
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),R0
3654 017224 104436 TRAP C$CVEC
3655 017226 004737 013530 JSR PC,NEXTU ;FIND NEXT UNIT.
3656 017232 ENDDO
3657 017232 000761
3658 017234
3659
3660 017234 EXIT CLN
3661 017234 104432
3662 017236 000002 TRAP C$EXIT
3663 .EVEN L10014-.
3664
3665 017240 ENDCLN
3666 017240 L10014:
3667 017240 104412 TRAP C$CLEAN
  
```

```

3668 .SBTTL DROP UNIT SECTION
3669
3670 ;++
3671 ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
3672 ; TO NO LONGER BE TESTED. THAT CODE SHALL BE EXECUTED WHEN DODU
3673 ; MACRO IS CALLED WHILE IDU FLAG IS NOT SET BY OPERATOR
3674 ;--
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      ; THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
3707      ; TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING.  IF
3708      ; 'EF.AUNIT' IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
3709      ;--
3710
3711      BGNAU
3712      L$AU::
3713
3714
3715      LET R5 := R0 SHIFT 1          ;R5 = LOGICAL DEVICE NUMBER X 2.
3716      017314 010005                MOV    R0,R5
3717      017316 006305                ASL    R5
3718      017320                LET DEVTBL(R5) := R0      ;STORE UNIT # IN DEVICE TABLE.
3719      017320 010065 002532          MOV    R0,DEVTBL(R5)
3720      017324                GPHARD R0,R0              ;GET HARDWARE P TABLE FROM SUPER.
3721      017324 104442                TRAP    C$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$SVEC
3735      017372 062706 000010          ADD    #10,SP
3736      017376                LET INTFLG(R5) := #0      ;CLEAR INTERRUPT FLAGS.
3737      017376 005065 003124          CLR    INTFLG(R5)
3738
3739      EXIT    AU
3740      017402 000167                .WORD    JSJMP
3741      017404 000000                .WORD    L10016-2-.
3742
3743      .EVEN
3744
3745      017406                ENDAU
3746      017406                L10016:
3747      017406 104452                TRAP    C$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: TRAP C$BSUB
3772 017420 104402
3773
3774 017422 LET R2 := #BFSEQO ;ADR OF CMD SEQ.
3775 017422 012702 020246 MOV #BFSEQO,R2
3776 017426 004737 020222 JSR PC,BFSEQ ;SET UP CMD SEQ.
3777 017432 004737 006204 JSR PC,EXALL ;EXECUTE CMD SEQ ON ALL DEVICES.
3778 017436 004737 013462 JSR PC,FIRSTU ;FIND THE FIRST UNIT.
3779 017442 WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE DEVICES:
3780 017442 50350$:
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			CLRB	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:			

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:		

3919	017766	104403				TRAP	C\$ESUB
3920							
3921	017770						
3922	017770						
3923	017770	104402				TRAP	C\$BSUB
3924							
3925	017772						
3926	017772	012702	020752			MOV	#BFSE10,R2
3927	017776	004737	020222				
3928	020002	004737	006204				
3929	020006						
3930	020006	112737	000001	003150		MOVB	#1,SWBFLG
3931	020014	004737	006204				
3932	020020						
3933	020020	105037	003150			CLRB	SWBFLG
3934	020024						
3935	020024						
3936	020024	104403				TRAP	C\$ESUB
3937							
3938	020026						
3939	020026	013702	003044			MOV	DATAWT,R2
3940	020032	062702	000012			ADD	#10.,R2
3941	020036						
3942	020036						
3943	020036	020237	003044			CMP	R2,DATAWT
3944	020042	001402				BEQ	50354\$
3945	020044	000342					
3946	020046						
3947	020046	000773				BR	50353\$
3948	020050						
3949	020050						
3950	020050	105237	003153			INCB	T1SWB
3951							
3952	020054						
3953	020054						
3954	020054	104402				TRAP	C\$BSUB
3955							
3956	020056						
3957	020056	012737	104401	003056		MOV	#RDR,CMDWRD
3958	020064	004737	012534				
3959	020070						
3960	020070	012737	000012	002316		MOV	#12,CMDPKT+CP.CN
3961	020076	004737	012534				
3962	020102						
3963	020102	112737	000001	003150		MOVB	#1,SWBFLG
3964	020110						
3965	020110	012737	000011	002316		MOV	#11,CMDPKT+CP.CN
3966	020116	004737	012534				
3967	020122						
3968	020122	012737	000012	002316		MOV	#12,CMDPKT+CP.CN
3969	020130	004737	012534				
3970	020134						
3971	020134	012737	104001	003056		MOV	#RDF,CMDWRD
3972	020142	004737	012534				
3973	020146						
3974	020146	012737	000011	002316		MOV	#11,CMDPKT+CP.CN

```
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                CLR      SWBFLG
3978 020164                LET CNDPKT+CP.CNT := #12    ;CHANGE BYTE COUNT TO 10.
3979 020164 012737 000012 002316      JSR      PC,VFEXC      MOV      #12,CNDPKT+CP.CN
3980 020172 004737 012534                LET CNDPKT+CP.CNT := #11    ;VERIFY EVEN LENGTH SWAP (RECORD 3).
3981 020176                JSR      PC,VFEXC      ;CHANGE BYTE COUNT TO 9.
3982 020176 012737 000011 002316      JSR      PC,VFEXC      MOV      #11,CNDPKT+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$ESUB
3988
3989 020212                LET T1SWB :B= #0      ;CLEAR T1 SWAP BYTES FLAG
3990 020212 105037 003153                CLR      T1SWB
3991
3992
3993 020216                EXIT      TST
3994 020216 104432                TRAP      C$EXIT
3995 020220 000554                .WORD      L10017-.
```

```

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)+      ;MOVE COMMANDS TO SEQ TABLE.
4008 020234      ;      MOV      (R2)+,(R1)+
4009 020234 012221      ;      ENDDO
4010 020236      ;      BR      50355$
4011 020236 000773      ;      50356$:
4012 020240      ;      LET (R1) := #END      ;STORE END OF SEQUENCE CODE.
4013 020240      ;      MOV      #END,(R1)
4014 020240 012711 177777      ;      RTS      PC      ;RETURN.
4015 020244 000207
4016
4017
4018
4019      :      BASIC FUNCTION COMMAND SEQUENCE
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	SFR	;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	SFR	;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		ENDTST			
4205	020774		L10017:			
4206	020774	104401			'RAP CSETST	

.SBTTL TEST 2: DATA RELIABILITY.

;++
: TEST TO CHECK THE DATA RELIABILITY OF THE TS04.
:--

BGNTST
T2::

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

4263 021136
4264 021136 012701 003164
4265 021142
4266 021142 005702
4267 021144 001753
4268 021146
4269 021146 105237 003154
4270 021152 000240
4271 021154 000240
4272 021156 004737 006500
4273 021162 004737 014052
4274
4275 021166 004737 021320
4276 021172
4277 021172 012737 177740 003170
4278 021200 005137 003170
4279 021204
4280 021204 013737 003170 003200
4281 021212
4282 021212 012711 177777
4283 021216 004737 006204
4284 021222
4285 021222 105037 003154
4286 021226
4287 021226 112737 000001 003147
4288 021234
4289 021234 012701 003164
4290 021240 004737 006164
4291 021244
4292 021244 012711 177777
4293 021250 004737 006204
4294
4295 021254
4296 021254 104432
4297 021256 000174
4298

LET R1 := #CMDSEQ
UNTIL R2 NE #0

LET ALLEOT :B= ALLEOT + #1

NOP
NOP
JSR PC,EXSUB
JSR PC,CKHAE

JSR PC,RANRD
LET CMDSEQ+4 := COMP #RNOPSC

LET CMDSEQ+14 := CMDSEQ+4

LET (R1) := #END

JSR PC,EXALL
LET ALLEOT :B= #0

LET RPTFLG :B= #1

LET R1 := #CMDSEQ

JSR PC,SETRW
LET (R1) := #END

JSR PC,EXALL

EXIT TST

;INIT CMD SEQ TBL POINTER,
MOV #CMDSEQ,R1
;REPEAT UNTIL EOT IS REACHED
TST R2
BEQ 503608
;FLAG ALL UNITS @ EOT
INCB ALLEOT

;WRITE ONE RECORD BEYOND EOT ON ALL UNITS
;SO THAT SHORTER READ STOP DISTANCE
;SHALL POSITION HEAD IN CLEAN IRG GAP
;SET UP READ REV/FWD CMDS,
;# OF RECORDS FOR READ REV.
MOV #RNOPSC,CMDSEQ+4
COM CMDSEQ+4
;# OF RECORDS FOR READ FORWARD.
MOV CMDSEQ+4,CMDSEQ+
;STORE END OF SEQUENCE CODE IN SEQ TABLE.
MOV #END,(R1)
;GO EXECUTE READ REV/FWD OF LAST N RECORDS.
;CLEAR ALL UNITS @ EOT FLAG
CLRB ALLEOT
;REQUEST PERFORMANCE REPORT DURING REWIND.
MOVB #1,RPTFLG
;INIT SEQ TBL POINTER,
MOV #CMDSEQ,R1
;STORE REWIND IN SEQ TBL,
;STORE END IN SEQ TBL,
MOV #END,(R1)
;EXECUTE REWIND CMD ON ALL UNITS

TRAP C\$EXIT
.WORD L10034-.

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	

```

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      MOV      #WRT,(R1)+
4359 021400 004737 021420      JSR PC,RANW      ;STORE BRF, # OF OPERATIONS, PATTERN.
4360 021404 000207      RTS PC
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      MOV      #WTV,(R1)+
4374 021412 004737 021420      JSR PC,RANW      ;STORE BRF, # OF OPERATIONS, PATTERN.
4375 021416 000207      RTS      PC
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      MOV      #DATCNT,(R1)+
4390      ;RANDOM BRF WILL BE GENERATED FOR EACH RECORD.
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

```

HARDWARE TESTS MACY11 30(1046) 24-AUG-79 09:10 PAGE 106
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M 11

SEQ 0142

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 MOV #1,RANDOM
4419 021462 LET EXPBOT :B= #0 ;CLEAR EXPECT BOT FLAG.
4420 021462 105037 003144 CLRB EXPBOT
4421 021466 LET R2 := #DATCNT - #1 ;SET UP THE RECORD LENGTH MASK.
4422 021466 012702 004000 MOV #DATCNT,R2
4423 021472 005302 DEC R2
4424 021474 LET LENMSK := COMP R2 ;ALLOW MAXIMUM BUFFER.
4425 021474 010237 003066 MOV R2,LENMSK
4426 021500 005137 003066 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 CLRB STAFLG
4431 021520 REPEAT ;REPEAT TO EOT.
4432 021520
4433 021520 WHILE R1 LT #SEQEND DO ;WHILE THERE IS MORE ROOM IN SEQ TABLE:
4434 021520
4435 021520 020127 003254
4436 021524 002003
4437 021526 004737 021374 JSR PC,RANWR ;STORE A WRITE CMD IN SEQUENCE TABLE.
4438 021532 ENDDO
4439 021532 000772 BR 50364$
4440 021534
4441 021534 LET (R1) := #END ;STORE END OF SEQUENCE CODE IN TABLE.
4442 021534 012711 177777 MOV #END,(R1)
4443 021540 004737 006204 JSR PC,EXALL ;EXECUTE ALL CMDs IN SEQ TBL ON UNITS.
4444 021544 LET R1 := #CMDSEQ ;INIT SEQ TBL POINTER,
4445 021544 012701 003164 MOV #CMDSEQ,R1
4446 021550 UNTIL R2 NE #0 ;REPEAT UNTIL EOT IS REACHED
4447 021550 005702 TST R2
4448 021552 001762 BEQ 50363$
4449 021554 LET ALLEOT :B= ALLEOT + #1 ;SET ALL UNITS @ EOT FLAG
4450 021554 105237 003154 INCB ALLEOT
4451 021560 NOP
4452 021562 000240
4453 021564 004737 006500 JSR PC,EXSUB ;WRITE ONE RECORD BEYOND EOT ON ALL UNITS
4454 021570 004737 014052 JSR PC,CKHAE ;SO THAT SHORTER READ STOP DISTANCE
4455
4456 021574 LET ALLEOT :B= #0 ;SHALL POSITION HEAD IN CLEAN IRG GAP
4457 021574 105037 003154 CLRB ALLEOT
4458 021600 004737 006164 JSR PC,SETRW ;STORE REWIND IN SEQ TBL,
4459 021604 LET (R1) := #END ;STORE END IN SEQ TBL,
4460 021604 012711 177777 MOV #END,(R1)
4461 021610 004737 006204 JSR PC,EXALL ;EXECUTE REWIND CMD ON ALL UNITS
4462
4463 021614 EXIT TST

```

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TEST 3: WRITE COMPATABILITY/WRITE UTILITY.

SEQ 0144

4464 021614 104432

4465 021616 000002

4466

4467

4468

4469 021620

4470 021620

4471 021620 104401

4472

.EVEN

ENDTST

L10035:

TRAP (SEXIT
.WORD L10035-.

TRAP (SETST

.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.

MOVB #1,RANDOM

LET EXPBOT :B= #1

;SET EXPECT BOT FLAG.

MOVB #1,EXPBOT

JSR PC,SETCH

;CMD 1 = SET CHARACTERISTIC.

JSR PC,SETRW

;CMD2=REWIND.

LET STAFLG :B= #0

;CLEAR START FLAG

CLRB STAFLG

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

4473
4474
4475
4476
4477
4478
4479
4480 021622
4481 021622
4482
4483 021622
4484 021622 112737 000001 003145
4485 021630
4486 021630 112737 000001 003144
4487 021636 004737 006140
4488 021642 004737 006164
4489 021646
4490 021646 105037 003156
4491 021652
4492 021652 012721 104001
4493 021656
4494 021656 012721 004000
4495 021662
4496 021662 012721 077777
4497 021666
4498 021666 012721 000007
4499 021672
4500 021672 012711 177777
4501 021676 004737 006204
4502 021702
4503 021702 105237 003154
4504 021706
4505 021706 012701 003164
4506 021712
4507 021712 012721 104401
4508 021716
4509 021716 012721 004000
4510 021722
4511 021722 012721 077777
4512 021726
4513 021726 012721 000007
4514 021732
4515 021732 012711 177777
4516 021736 004737 006204
4517 021742
4518 021742 105037 003154
4519
4520 021746
4521 021746 104432
4522 021750 000002
4523
4524
4525
4526 021752
4527 021752
4528 021752 104401

.SBTTL TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

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

T5:: BGNTST

LET RANDOM :B= #0
LET EXPBOT :B= #1
LET IRE :B= PIRE
JSR PC,SETECH
LET CMDSEQ+2 := CHAR
LET R2 := #CMDD
JSR PC,PTCMDS
JSR PC,PTCMDS
JSR PC,PTCMDS
JSR PC,PTCMDS
JSR PC,PTCMDS
JSR PC,PTCMDS
JSR PC,PTCMDS
LET JLOOP := #0

LET STAFLG := #0
LET R1 := #CMDSEQ
3\$: WHILE (R1) NE #END DO

CMR #JMP.C,(R1)
BNE 6\$
LET R1 := R1 + #2
MOV (R1)+,JLOC
CMP (R1)+,JLOOP
BNE 1\$
LET R1 := R1 + #2
BR 3\$
1\$: LET JLOOP := JLOOP + #1
LET R1 := #CMDSEQ
2\$: DEC JLOC
BEQ 3\$
LET R1 := R1 + #10
BR 2\$

;CLEAR RANDOM MODE FLAG.
CLR RANDOM
;SET EXPECT BOT FLAG.
MOVB #1,EXPBOT
;MOVE INHIBIT RFC ERROR REPORT FLAG.
MOVB PIRE,IRE
;CMD 1 = SET CHARACTERISTIC.
;MOVE CHAR CODE FROM P TBL TO SEQ TBL.
MOV CHAR,CMDSEQ+2
;R2 POINTS TO CMD2 IN SOFT P TABLE.
MOV #CMDD,R2
;MOVE CMD 2 FROM P TBL TO SEQ TBL.
;MOVE CMD 3 FROM P TBL TO SEQ TBL.
;MOVE CMD 4 FROM P TBL TO SEQ TBL.
;MOVE CMD 5 FROM P TBL TO SEQ TBL.
;MOVE CMD 6 FROM P TBL TO SEQ TBL.
;MOVE CMD 7 FROM P TBL TO SEQ TBL.
;MOVE END CMD FROM P TBL TO SEQ TBL.
;CLEAR JMP CMD LOOP COUNT.
CLR JLOOP
;CLEAR START FLAG
CLR STAFLG
;INIT SEQUENCE TABLE POINTER.
MOV #CMDSEQ,R1
;WHILE THERE ARE CMDS LEFT IN SEQUENCE TBL:
50366\$: CMP (R1),#END
BEQ 50367\$
;IS THIS A JUMP CMD?
;BR IF NOT.
;POINT TO BRF.
ADD #2,R1
;SAVE BRF (LOCATION).
;HAS LOOP COUNT BE SATISFIED?
;IF NOT, JMP AGAIN.
;IF SO, ADJUST SEQ POUNTER
ADD #2,R1
;AND GO TO NEXT COMMAND.
;UPDATE THE LOOP COUNT.
INC JLOOP
;INIT CMD SEQ TABLE POINTER.
MOV #CMDSEQ,R1
;DECR LOCATION COUNTER.
;IF THIS IS THE RIGHT LOCATION TO JMP TO, GO SET
;IF NOT, UPDATE SEQ POINTER TO NEXT CMD.
ADD #10,R1
;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              BR      3$              ;GO CHECK NEXT CMD.
4605 022230 004737 007114      4$:      JSR     PC,SETUP      ;GO SETUP THE COMMAND BLOCK.
4606 022234              WHILE NCNT LT NCNT1 DO      ;WHILE THERE ARE RECORDS REMAINING:
4607 022234              50370$:
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 #X0.BOT NOTSETIN EOTFLG(R5) THEN ;IF NOT AT BOT THEN:
4630 022324 032765 000002 003134              BIT     #X0.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 #X0.EOT NOTSETIN EOTFLG(R5) OR #CMD.CO NOTSETIN CMDWRD THEN
4640 022340 032765 000001 003134              BIT     #X0.EOT,EOTFLG(R
```

Address	Instruction	Label	Comment	Register	Value
4641	022346	001404			
4642	022350	032737	000001	003056	
4643	022356	001001			
4644	022360				
4645					
4646	022360		LET R2 := #0		
4647	022360	005002			
4648	022362		ENDIF		
4649	022362				
4650	022362		ENDIF		
4651	022362				
4652	022362	004737	013530		
4653	022366		JSR PC,NEXTU		
4654	022366	000746	ENDDO		
4655	022370				
4656	022370		IF R2 EQ #1 THEN		
4657	022370	020227	000001		
4658	022374	001016			
4659	022376		LET NCNT1 := NCNT + #1		
4660	022376	013737	003050	003052	
4661	022404	005237	003052		
4662	022410		LET ALLEOT :B= ALLEOT + #1		
4663	022410	105237	003154		
4664	022414		IF CMDLG EQ #2 THEN		
4665	022414	023727	003064	000002	
4666	022422	001002			
4667	022424	004737	022506		
4668	022430		JSR PC,T5WEOT		
4669	022430		ENDIF		
4670	022430		ELSE		
4671	022430	000402			
4672	022432		LET ALLEOT :B- #0		
4673	022432		WHEN NOT ALL @EOT, CLEAR FLAG		
4674	022432	105037	003154		
4675	022436		ENDIF		
4676	022436				
4677	022436		LET NCNT := NCNT + #1		
4678	022436	005237	003050		
4679	022442		LET PCMDWD := CMDWRD		
4680	022442	013737	003056	003062	
4681	022450		ENDDO		
4682	022450	000671			
4683	022452				
4684	022452	004737	012450		
4685			JSR PC,VFYDAT		
4686	022456		ENDDO		
4687	022456	000601			
4688	022460				
4689					
4690	022460		EXIT	TST	
4691	022460	104432			
4692	022462	000130			
4693					
4694					
4695					
4696					

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TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

SEQ 0149

```

4697
4698
4699
4700
4701
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

L10037:

4754 022612 10440i

TRAP CSETST

4755

4756 022614

ENDMOD

PARAMETER CODING
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TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

SEQ 0151

```

4757      .TITLE PARAMETER CODING
4758
4759      .SBTTL  HARDWARE PARAMETER CODING SECTION
4760
4761 022614      BGNMOD
4762
4763      ;++
4764      ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
4765      ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
4766      ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
4767      ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
4768      ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
4769      ; WITH THE OPERATOR.
4770      ;--
4771
4772      BGNHRD
4773 022614 000024      LSHARD::      .WORD L10040-LSHARD/2
4774 022616
4775
4776 022616      GPRMA  TS4ADR,0,0,160002,177564,YES
4777 022616 000031      .WORD  TSCODE
4778 022620 0226 2      .WORD  TS4ADR
4779 022622 160002      .WORD  TSLOLIM
4780 022624 177564      .WORD  TSHILIM
4781 022626
4782 022626 001032      GPRMD  TS4VCT,2,0,777,60,776,YES
4783 022630 022657      .WORD  TSCODE
4784 022632 000777      .WORD  TS4VCT
4785 022634 000060      .WORD  777
4786 022636 000776      .WORD  TSLOLIM
4787      .WORD  TSHILIM
4788 022640      EXIT HRD
4789 022640 013004      .WORD  TSCODE
4790
4791      .NLIST  BEX
4792      022642 051524 051123 040440 TS4ADR: .ASCIZ /TSSR ADDRESS/
4793      022657 126 041505 047524 TS4VCT: .ASCIZ /VECTOR/
4794      .LIST  BEX
4795      .EVEN
4796 022666      ; ENDHRD
4797      L10040:      .EVEN

```

.SBTTL SOFTWARE PARAMETER CODING SECTION

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

BGNSFT

.WORD L10041-L\$SOFT/2

L\$SOFT::

GPRML CLRM,0,1,YES

.WORD T\$CODE
.WORD CLRM
.WORD 1

GPRML RRVM,0,400,YES

.WORD T\$CODE
.WORD RRVM
.WORD 400

GPRML HAEM,2,1,YES

.WORD T\$CODE
.WORD HAEM
.WORD 1

GPRML RCVERM,2,400,YES

.WORD T\$CODE
.WORD RCVERM
.WORD 400

GPRML DINTM,6,1,YES

.WORD T\$CODE
.WORD DINTM
.WORD 1

GPRML IRECM,6,400,YES

.WORD T\$CODE
.WORD IRECM
.WORD 400

GPRML CHGM,10,1,YES

.WORD T\$CODE
.WORD CHGM
.WORD 1

XFERF ENDSP1

.WORD T\$CODE

GPRML IREM,12,1,YES

.WORD T\$CODE
.WORD IREM
.WORD 1

GPRMD CHARM,14,0,377,0,200,YES

.WORD T\$CODE
.WORD CHARM
.WORD 377
.WORD T\$LOLIM
.WORD T\$HILIM

4797
4798
4799
4800
4801
4802
4803
4804
4805
4806
4807
4808 022666
4809 022666 000461
4810 022670
4811
4812
4813 022670
4814 022670 000130
4815 022672 023422
4816 022674 000001
4817 022676
4818 022676 000130
4819 022700 023441
4820 022702 000400
4821 022704
4822 022704 001130
4823 022706 023470
4824 022710 000001
4825 022712
4826 022712 001130
4827 022714 023514
4828 022716 000400
4829 022720
4830 022720 003130
4831 022722 023545
4832 022724 000001
4833 022726
4834 022726 003130
4835 022730 023570
4836 022732 000400
4837 022734
4838 022734 004130
4839 022736 023611
4840 022740 000001
4841 022742
4842 022742 132044
4843 022744
4844 022744 005130
4845 022746 023635
4846 022750 000001
4847 022752
4848 022752 006032
4849 022754 023666
4850 022756 000377
4851 022760 000000
4852 022762 000200

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SEQ 0153

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

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

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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	PATIM,64,D,17,0,10,YES		
4972	023266	032052			.WORD	TSCODE
4973	023270	023753			.WORD	PATIM
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	PATIM,74,D,17,0,10,YES		
4996	023336	036052			.WORD	TSCODE
4997	023340	023753			.WORD	PATIM
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	PATIM,104,D,17,0,10,YES		
5020	023406	042052			.WORD	TSCODE

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

ENDSP:

XFER JMPMSG

.WORD PATTM
.WORD 17
.WORD TSLOLIM
.WORD TSHILIM

.WORD TSCODE

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SEQ 0157

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5028
5029      023422 046103 040505 020122 CLRM: .ASCIZ /CLEAR COUNTERS/
      023441      122 051505 052105 RRVN: .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 IRECM: .ASCIZ /INHIBIT RECOVERY/
      023611      103 040510 043516 CHGM: .ASCIZ /CHANGE CMD SEQUENCE/
      023635      111 044116 041111 IREM: .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 BPCR: .ASCIZ /BRF COUNT/
      023733      043 047440 020106 NUMBM: .ASCIZ /# OF OPERATIONS/
      023753      120 052101 042524 PATTM: .ASCIZ /PATTERN/
      .LIST BEX
5030      023764      .EVEN
5031
5032      023764      JMPMSG:
5033      023764      EXIT SFT
5034      023764 023004      .WORD T$CODE
5035
5036      023766 046503 027504 000063 CMD3M: .ASCIZ "CMD/3"
      023774 046503 027504 000064 CMD4M: .ASCIZ "CMD/4"
      024002 046503 027504 000065 CMD5M: .ASCIZ "CMD/5"
      024010 046503 027504 000066 CMD6M: .ASCIZ "CMD/6"
      024016 046503 027504 000067 CMD7M: .ASCIZ "CMD/7"
      024024 046503 027504 000070 CMD8M: .ASCIZ "CMD/8"
      .LIST BEX
5037      .EVEN
5038
5039      024032      ENDSFT
5040      .EVEN
5041      024032      L10041:
5042      ;*****
5043      ;*****
5044      ;*****
5045      ;*****
5046      ;*****
5047      024032 000100      PATCH: .BLKW 64.
5048      ;*****
5049      ;*****
5050
5051      024232      LASTAD
5052      .EVEN
5053      024232 024254      .WORD T$FREE
5054      024234 000007      .WORD T$SIZE
5055
5056      024236      L$LAST:
      .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
```


CHARM	023666		4849	5029#																
CHGFLG	002212	G	177#	3480*																
CHGM	023611		4839	5029#																
CHKERR	011004	G	1754	1914#																
CH.EAI=	000040	G	181	352#	354	551	679													
CH.ERI=	000020	G	353#																	
CH.ESS=	000200	G	351#																	
CKDATA	013046	G	2652	2666#																
CKDCNT	013456		2705*	2706*	2722	2728	2775	2778*	2783	2798#										
CKDFF	013460		2707*	2740	2750*	2756	2780	2784	2799#											
CKHAE	014052	G	1113	2611	2975#	4273	4454	4618	4729	4746										
CKHRTN	014124		2981	3001#																
CLN =	101012	G	480#	733	4183															
CLRERR	010504	G	1758	1766#	3483															
CLRFLG	002202	G	169#	3157	3159*															
CLRM	023422		4815	5029#																
CMDAC	007006	G	1079	1312#	2563	4610	4744													
CMDASC	003354	G	742#	1355																
CMDD	002220	G	182#	4548																
CMDLG	003064	G	621#	1365*	1380*	1391*	1396*	1426*	2134	2243	2324	2340	2390	2526*	2533*					
			4665	4736*																
CMDPKM	003606	G	793#	3141																
CMDPKT	002310	G	504#	870	900	907	908	909	1105*	1366*	1367*	1369	1374*	1377	1386*					
			1388	1404*	1405*	1412*	1413*	1423*	1428	1432*	1443	1448*	1451*	1453	1661*					
			1671	1996*	2143*	2163*	2545*	2546*	2551*	2555	2556*	2695	3136	3960*	3965*					
			3968*	3974*	3979*	3982*	4738*	4739*	4741	4743*										
CMDSAV	003060	G	619#	1453*	1996	2555*	4741*													
CMDSEQ	003164	G	678#	1037	1069	4003	4264	4277*	4278*	4280*	4289	4445	4505	4546*	4561					
			4579																	
CMDSE2	003174	G	682#																	
CMDTBL	003266	G	710#	1342	4711															
CMDWRD	003056	G	618#	984	1084	1122	1137	1160	1188	1216	1253	1281	1313	1441	1443*					
			1608	1702	1856	1864	1867	1960	2522	2524*	2529	2531*	2545	2570	2598					
			2615	2983	3957*	3971*	4613	4627	4642	4680	4732	4734*	4738							
CMD.CO=	000001	G	347#	417	420	423	426	429	438	441	444	447	450	459	462					
			471	474	1137	1216	1281	1384	1421	2598	4642									
CMD.C1=	000002	G	346#	417	456	471	477	480	485	1410										
CMD.C2=	000004	G	345#	426	429	450	471	483	485	1401	1410	1421								
CMD.C3=	000010	G	344#	417	432	435	453	456	459	462	465	468	471	474	477					
			480	1372																
CMD.C4=	000020	G	342#																	
CMD2M	023713		4855	5029#																
CMD3M	023766		4879	5036#																
CMD4M	023774		4903	5036#																
CMD5M	024002		4927	5036#																
CMD6M	024010		4955	5036#																
CMD7M	024016		4979	5036#																
CMD8M	024024		5003	5036#																
CNTBGN=	002544		404	591#	2399															
CNTEND=	003034		404	606#																
CNTLEN=	000270	G	404#	3164																
CODELM	003476	G	793#	3796																
COUNTE=	050321		3363#	3389	3439															
CP.ADH=	000004	G	389#																	
CP.ADL=	000002	G	388#	1386*	1404*	1413*	1423*	2556*	4743*											
CP.CMD=	000000	G	387#																	

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SEQ 0161

CP.CNT=	000006	G	390#	1105*	1367*	1405*	1412*	2695	3960*	3965*	3968*	3974*	3979*	3982*
CTCC	003106	G	630#	896	1817*	1818*	1849	1918	1950					
CVC.C =	040000	G	325#	412	483									
C\$AU =	000052		4#	3747										
C\$AUTO=	000061		4#	3604										
C\$BRK =	000022		4#	1700	1790	3343	3431							
C\$BSEG=	000004		4#											
C\$BSUB=	000002		4#	3772	3813	3827	3839	3851	3863	3875	3887	3899	3911	3923
C\$CEFG=	000045		4#											3954
C\$CLCK=	000062		4#											
C\$CLEA=	000012		4#	3667										
C\$CLOS=	000035		4#											
C\$CLP1=	000006		4#											
C\$CVEC=	000036		4#	3536	3654	3686								
C\$DCLN=	000044		4#	2823	3345	3473								
C\$DODU=	000051		4#	2922	3555									
C\$DRPT=	000024		4#	1244	2908									
C\$DU =	000053		4#	3702										
C\$EDIT=	000002		4#	63										
C\$ERDF=	000055		4#	1596	1651	1678	1741	2040	2117	2252	2307	2327	2348	2889
C\$ERHR=	000056		4#	1978	2021	2092	2366	2673	2690	2745				
C\$ERRO=	000060		4#											
C\$ERSF=	000054		4#	3139										
C\$ERSO=	000057		4#	2154	2195	2265								
C\$ESCA=	000010		4#											
C\$ESEG=	000005		4#											
C\$ESUB=	000003		4#	3809	3823	3835	3847	3859	3871	3883	3895	3907	3919	3936
C\$ETST=	000001		4#	4206	4406	4471	4528	4754						3987
C\$EXIT=	000032		4#	3488	3661	3994	4296	4464	4521	4691				
C\$GETB=	000026		4#											
C\$GETW=	000027		4#											
C\$GMAN=	000043		4#	2992										
C\$GPHR=	000042		4#	3281	3721									
C\$GPLO=	000030		4#											
C\$GPRI=	000040		4#											
C\$INIT=	000011		4#	3506										
C\$INLP=	000020		4#											
C\$MANI=	000050		4#	2979										
C\$MEM =	000031		4#	3458										
C\$MESSG =	000023		4#	850	935									
C\$OPEN=	000034		4#											
C\$PNTB=	000014		4#	813	819	841	861	867	885	2483	2681	2699	2788	
C\$PNTF=	000017		4#	3331	3397	3409	3470	3547	3575	3590	3692	3799		
C\$PNTS=	000016		4#	3034										

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										
DR1 =	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#		
DROUPA	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											
DTAERS	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	426	

SEQ 0163

[illegible]

[illegible]

[illegible]

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K 13

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#	
LSOFT	022670 G	38	4809	4810#
LSSPC	002056 G	67#		
LSSPCP	002020 G	37#		
LSSTP	002024 G	41#		
LSSTA	002030 G	45#		
LSW	002202 G	42	165	166#
LSTEST	002114 G	97#		
LSIML	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#	

[illegible]

PATR2	007634	G	1483	1525#																
PATR3	007644	G	1484	1531#																
PATR4	007670	G	1485	1543#																
PATR5	007702	G	1486	1550#																
PATR6	007714	G	1487	1556#																
PATR7	007734	G	1488	1566#	1572															
PATR8	007766	G	1489	1577#																
PATIBL	007534		1475	1481#																
PATIM	023753		4873	4897	4921	4945	4973	4997	5021	5029#										
PCMDWD	003062	G	620#	1160*	1319	1441*	1870	1880	2522*	2529*	2615*	4680*	4732*							
PIRE	002214	G	179#	4543																
PNT	= 001000	G	288#																	
PR1	= 002000	G	289#																	
PR100	= 000000	G	277#	3350																
PR101	= 000040	G	276#																	
PR102	= 000100	G	275#																	
PR103	= 000140	G	274#																	
PR104	= 000200	G	273#																	
PR105	= 000240	G	272#																	
PR106	= 000300	G	271#																	
PR107	= 000340	G	270#	394	352o															
PRXST	013770	G	2896	2948#	4615															
PTCMDS	022464		4549	4550	4551	4552	4553	4554	4555	4706#										
PWRFLG	003157	G	665#	3225*	3233	3455	3485*													
RANB	003070	G	623#	1090*	1092	1569*	1570	3180*	4252	4334*	4336	4392*	4394							
RANBC	= 153624	G	409#	3180																
RANCMD	021260		4256	4302#																
RANDOM	003145	G	651#	1081	1966	2068	3766*	4216*	4418*	4484*	4539*									
RANP	= 000007	G	185	189	193	197	201	205	209	406#	685	689	693	697	701					
			4244	4341	4349	4399	4498	4513												
RANRD	021320		4275	4310	4311	4312	4313	4314	4315	4316	4317	4329#								
RANS	003072	G	624#	1090	1092*	1094	1569	1570*	1571	3182*	4252*	4254	4334	4392						
RANSC	= 032561	G	410#	3182																
RANW	021420		4359	4374	4388#															
RANWR	021374		4303	4304	4305	4306	4307	4308	4309	4357#	4437									
RANWV	021406		4302	4372#																
RCVERM	023514		4827	5029#																
RDF	= 104001	G	420#	694	711	2531	3971	4169	4343	4492										
RDR	= 104401	G	423#	690	712	2524	3957	4155	4330	4507	4734									
RECCNT	003034	G	607#	807	855	1666*	1668	1737	1847*	1859*	1873*	1883	1886*	1900	2209*					
			2211	2650	3028	3318*														
RECLOG	003116	G	638#	1844	1854*	2900														
RECRED	006006		822*	829	831*	837	879*	881	931#											
RECTAP	006042	G	827	877	983#															
RECUD	010640	G	1753	1843#																
RERM	004254	G	793#	2156	2197															
RETRYC	003114	G	637#	2140	2149	2161*	2192	2202*	2262	2272*	2343	2361	2479							
RFBC	002644	G	594#	3057	3058	3059	3060													
RFCERM	003760	G	793#	1980																
RFREC	002744	G	599#	3067																
RFUNR	002754	G	600#	3076																
RLEXM	004014	G	793#	2350	2368															
RNF	= 125401	G	441#	720	4163															
RNOPSC	= 177740	G	405#	4239	4277	4337	4395													
RNR	= 105401	G	438#	719	4159															
RNYM	004210	G	793#	2891																

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SEQ 0169

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SEQ 0170

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62	63	65	66	68	70	72	74	76	78	80	82	84
86	88	90	92	94	96	98	100	102	112	114	115	116
117	118	129	133	136	137	147	165	807	808	809	810	811
812	813	814	816	817	818	819	820	837	838	839	840	841
842	844	845	850	855	856	857	858	859	860	861	862	864
865	866	867	868	881	882	883	884	885	886	890	891	892
893	894	896	897	898	899	900	901	902	903	904	905	907
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
1598	1599	1651	1652	1653	1654	1678	1679	1680	1681	1700	1705	1706
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
2328	2329	2330	2348	2349	2350	2351	2366	2367	2368	2369	2479	2480
2481	2482	2483	2484	2673	2674	2675	2676	2678	2679	2680	2681	2682
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2785	2786	2787	2788	2789	2823	2889	2890	2891	2892	2908	2922	2949
2950	2951	2952	2953	2955	2956	2957	2958	2959	2960	2961	2962	2963
2979	2981	2992	2993	2994	2995	2996	2997	3028	3029	3030	3031	3032
3033	3034	3035	3037	3038	3039	3040	3041	3042	3043	3044	3045	3047
3048	3049	3050	3051	3052	3053	3054	3055	3057	3058	3059	3060	3061
3062	3063	3064	3065	3067	3068	3069	3070	3071	3072	3073	3074	3076
3077	3078	3079	3080	3081	3082	3083	3085	3086	3087	3088	3089	3090
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
3350	3351	3374	3375	3376	3377	3378	3379	3380	3381	3393	3394	3395
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
4982	4984	4985	4986	4987	4988	4990	4991	4992	4993	4994	4996	4997

CROSS REFERENCE TABLE -- USER SYMBOLS

		4998	4999	5000	5002	5003	5004	5005	5006	5008	5009	5010	5011	5012
		5014	5015	5016	5017	5018	5020	5021	5022	5023	5024	5027	5034	5040
		5052	5053	5054	5065	5066	5067	5068	5069					
SVCSUB=	000000	4#	3771	3772	3812	3813	3826	3827	3838	3839	3850	3851	3862	3863
SVCTAG=	000000	4#	3874	3875	3886	3887	3898	3899	3910	3911	3922	3923	3953	3954
		4#	156	157	212	213	849	850	934	935	950	951	958	959
			966	967	974	975	2998	2999	3109	3110	3505	3506	3603	3604
			3667	3701	3702	3746	3747	3808	3809	3822	3823	3834	3835	3846
			3858	3859	3870	3871	3882	3883	3894	3895	3906	3907	3918	3919
			3936	3986	3987	4205	4206	4405	4406	4470	4471	4527	4528	4753
			4796	4797	5041	5042	5070	5071	5074	5075				4754
SVCTST=	000000	4#	3763	3764	4213	4214	4415	4416	4481	4482	4536	4537		
SWBFLG	003150 G	654#	1002	1445	2548	2725	3930*	3933*	3963*	3977*				
SWB.C =	010000 G	327#	412	1448	2551									
S&LSYM=	010000	4#	157#	213#	850#	935#	951#	959#	967#	975#	2993	2998	2999#	3110#
			3506#	3604#	3667#	3702#	3747#	3809#	3823#	3835#	3847#	3859#	3871#	3883#
			3907#	3919#	3936#	3987#	4206#	4406#	4471#	4528#	4754#	4797#	5042#	
TCCRA	011210	1955	2003#											
TCCO	011230 G	2003	2018#											
TCC1	011246 G	2004	2039#	3444										
TCC2	011264 G	2005	2054#											
TCC3	011374 G	2006	2116#											
TCC4	011412 G	2007	2132#											
TCC5	011544 G	2008	2190#											
TCC6	011642 G	2009	2238#											
TCC7	012004 G	2010	2306#											
TC2RTN	011372	2060	2102#											
TIME1	003074 G	625#	824*	833	1586*	1590*	1592	1696*	1732*	1734	1786*	1792*	1796	2751*
		2752*	2762	2994	3364*	3367*	3369	3441						
TIME2	003076 G	626#	826*	835	2753*	2754*	2760	3414*	3417*	3419	4590*	4600*		
TOERM	003713 G	793#	1680											
TOOMM	004164 G	793#	1653											
TRAPD4	003160 G	666#	3524*	3538	3628*									
TRAP4	017164 G	3527	3627#											
TSAM	004142 G	793#	2094											
TSBA =	002452 G	395#												
TSC.FC=	177717 G	320#												
TSC.TC=	177761 G	321#	1815											
TSDB	002452 G	395	555#	899	1671*	2279*	2882*	3287*	3288*	3372*	3560*	3651*	3725*	3726*
TSSR	002462 G	556#	1605	1649	1674	1727	1794	1812	2930*	3285*	3383	3386	3533	3543
		3563	3566	3723*										
TSSREG	003112 G	632#	897	1649*	1812*	1814	1915	1929	1931					
TSVCT	002472 G	557#	3290*	3294	3653	3685	3728*	3732						
TS.A16=	000400 G	317#												
TS.A17=	001000 G	316#												
TS.NBA=	002000 G	315#												
TS.NXM=	004000 G	314#	1929											
TS.OFL=	000100 G	319#	3386	3566										
TS.RMR=	010000 G	313#												
TS.SC =	100000 G	310#	1915											
TS.SPE=	020000 G	312#												
TS.SSR=	000200 G	318#	1605	1674	1724	1794	3383	3563						
TS.UPE=	040000 G	311#	1931											
TS4ADR	022642	4778	4791#											
TS4CL	002522 G	575#	3788*	3789*	3794									
TS4INT	002512 G	568#	3293	3731										

568	946#											
569	954#											
570	962#											
571	970#											
4783	4791#											
19#	20#	21#	22#	23#	24#	807#	814	816#	820	837#	842	855#
862	864#	868	881#	886	890#	894	896#	905	907#	914	916#	924
2479#	2484	2678#	2682	2695#	2700	2759#	2768	2783#	2789	2949#	2953	2955#
2963	3028#	3035	3037#	3045	3047#	3055	3057#	3065	3067#	3074	3076#	3083
3085#	3093	3328#	3332	3393#	3398	3405#	3410	3467#	3471	3543#	3548	3571#
3576	3586#	3591	3688#	3693	3794#	3800						
2995#	4777#	4782#	4789#	4814#	4818#	4822#	4826#	4830#	4834#	4838#	4842#	4844#
4848#	4854#	4860#	4866#	4872#	4878#	4884#	4890#	4896#	4902#	4908#	4914#	4920#
4926#	4932#	4938#	4944#	4950#	4952#	4954#	4960#	4966#	4972#	4978#	4984#	4990#
4996#	5002#	5008#	5014#	5020#	5027#	5034#						
4#	1597#	1652#	1679#	1742#	1979#	2022#	2041#	2093#	2118#	2155#	2196#	2253#
2266#	2308#	2328#	2349#	2367#	2674#	2691#	2746#	2890#	3140#			
4777#	4781	4782#	4787	4848#	4853	4854#	4859	4860#	4865	4866#	4871	4872#
4877	4878#	4883	4884#	4889	4890#	4895	4896#	4901	4902#	4907	4908#	4913
4914#	4919	4920#	4925	4926#	4931	4932#	4937	4938#	4943	4944#	4949	4954#
4959	4960#	4965	4966#	4971	4972#	4977	4978#	4983	4984#	4989	4990#	4995
4996#	5001	5002#	5007	5008#	5013	5014#	5019	5020#	5025			
844#	846	926#	928	3101#	3103	3488#	3661#	3696#	3698	3740#	3742	3994#
4296#	4464#	4521#	4691#	4789#	5034#							
5053	5076#											
4#												
4777#	4780	4782#	4786	4848#	4852	4854#	4858	4860#	4864	4866#	4870	4872#
4876	4878#	4882	4884#	4888	4890#	4894	4896#	4900	4902#	4906	4908#	4912
4914#	4918	4920#	4924	4926#	4930	4932#	4936	4938#	4942	4944#	4948	4954#
4958	4960#	4964	4966#	4970	4972#	4976	4978#	4982	4984#	4988	4990#	4994
4996#	5000	5002#	5006	5008#	5012	5014#	5018	5020#	5024			
4#	5053#	5064										
4777#	4779	4782#	4785	4848#	4851	4854#	4857	4860#	4863	4866#	4869	4872#
4875	4878#	4881	4884#	4887	4890#	4893	4896#	4899	4902#	4905	4908#	4911
4914#	4917	4920#	4923	4926#	4929	4932#	4935	4938#	4941	4944#	4947	4954#
4957	4960#	4963	4966#	4969	4972#	4975	4978#	4981	4984#	4987	4990#	4993
4996#	4999	5002#	5005	5008#	5011	5014#	5017	5020#	5023			
4#	157	213	850	935								

TSP TAB= 010043	5065#	5071											
TSP THV= 000001	32	5076#											
TSP TNU= 000001	4#	5071#	5076										
TSS AVL= 177777	4#												
TSS E GL= 177777	4#												
TSS IZE= 000007	5054	5076#											
TSSUBN= 000000	4#	3763#	3771#	3812#	3826#	3838#	3850#	3862#	3874#	3886#	3898#	3910#	3922#
	3953#	4213#	4415#	4481#	4536#								
TSTAGL= 177777	4#												
TSTAGN= 010045	4#	147#	165#	805#	853#	946#	954#	962#	970#	3017#	3120#	3133#	3516#
	3641#	3677#	3712#	3764#	3772#	3813#	3827#	3839#	3851#	3863#	3875#	3887#	3899#
	3911#	3923#	3954#	4214#	4416#	4482#	4537#	4773#	4809#	5064#	5065#	5069#	
TSTEMP= 000000	114#	115#	116#	117#	118#	119#	156#	212#	215#	844#	845	849#	926#
	927	934#	950#	958#	966#	974#	2995#	3005#	3101#	3102	3109#	3125#	3488#
	3489	3505#	3603#	3661#	3662	3666#	3696#	3697	3701#	3740#	3741	3746#	3750#
	3808#	3822#	3834#	3846#	3858#	3870#	3882#	3894#	3906#	3918#	3935#	3986#	3994#
	3995	4205#	4296#	4297	4405#	4464#	4465	4470#	4521#	4522	4527#	4691#	4692
	4753#	4757#	4777#	4782#	4789#	4795#	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#	5034#	5040#	5057#						
TSTEST= 000005	4#	3763#	3771	3812	3826	3838	3850	3862	3874	3886	3898	3910	3922
	3953	4213#	4415#	4481#	4536#	5056							
TSTSTM= 177777	4#	813	819	841	850	861	867	885	893	904	913	923	935
	1244	1596	1651	1678	1700	1741	1790	1978	2021	2040	2092	2117	2154
	2195	2252	2265	2307	2327	2348	2366	2483	2673	2681	2690	2699	2745
	2767	2788	2823	2889	2908	2922	2952	2962	2979	2992	3034	3044	3054
	3064	3073	3082	3092	3110	3139	3187	3219	3228	3237	3245	3281	3296
	3331	3343	3345	3351	3397	3409	3431	3458	3470	3473	3488	3506	3530
	3536	3547	3555	3575	3590	3604	3654	3661	3667	3686	3692	3702	3721
	3734	3747	3772	3799	3809	3813	3823	3827	3835	3839	3847	3851	3859
	3863	3871	3875	3883	3887	3895	3899	3907	3911	3919	3923	3936	3954
	3987	3994	4206	4296	4406	4464	4471	4521	4528	4691	4754		
TSTSTS= 000001	4#	3764#	4214#	4416#	4482#	4537#							
TSSAU = 010016	3712#	3740	3746										
TSSAUT= 010013	3516#	3603											

T1.1	017420	3771#																		
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T1.6	017650	3862#																		
T1.7	017670	3874#																		
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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						
WTVRM	003670 G	793#	2675	2692	2747															
X\$ALWA=	000000	4#	4789	4950	4952	5027	5034													
X\$FALS=	000040	4#	4842																	
X\$OFFS=	000400	4#	4789	4842	4950	4952	5027	5034												
X\$TRUE=	000020	4#																		
X0.BOT=	000002 G	372#	1125	1191	1256	2055	2064	2573	4630											
X0.EOT=	000001 G	373#	1135	1194	1214	1259	1279	2576	2596	4640										
X0.LET=	020000 G	369#	2064																	
X0.ONL=	000100 G	371#																		
X0.RLL=	010000 G	370#	2064																	
X0.RLS=	040000 G	368#	2064																	
X0.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															
\$BGNLE=	177777	4#																		
\$ERFLG=	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#
1129	1142#	1143	1158#	1159	1160#	1161	1170#	1171	1242#	1243	1313#	1314
1319#	1320	1322#	1323	1324#	1325	1326#	1327	1339#	1340	1345#	1346	1350#
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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
1502#	1503	1507#	1508	1517#	1518	1533#	1534	1558#	1559	1567#	1568	1586#
1587	1590#	1591	1611#	1612	1623#	1624	1625#	1626	1629#	1630	1631#	1632
1637#	1638	1639#	1640	1649#	1650	1660#	1661	1666#	1667	1668#	1669	1696#
1697	1719#	1720	1724#	1726	1727#	1728#	1729	1732#	1733	1737#	1738#	1739
1757#	1758	1767#	1768	1771#	1772	1786#	1787	1792#	1793	1812#	1813	1814#
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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#
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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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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
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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
3276#	3277	3278#	3279#	3280	3285#	3286	3287#	3288#	3289	3290#	3291	3305#
3306	3310#	3311	3318#	3319	3364#	3365	3367#	3368	3371	3372#	3373	3414#
3415	3417#	3418	3421	3461#	3462#	3463	3480#	3481	3482#	3483	3485#	3486
3524#	3525	3533#	3534	3541#	3542	3550#	3551	3552#	3553#	3554	3560#	3561
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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
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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
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4374	4389#	4390	4392#	4393	4394#	4395#	4396	4397#	4398	4399#	4400	4418#
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H 14

SEQ 0176

SF\$AND= 000310

SF\$BAD= 000401

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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				
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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
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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					
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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
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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
2080	2081	2086	2090	2136	2137	2142	2143	2153	2161	2163	2167	2168
2178	2194	2202	2206	2207	2209	2211	2221	2241	2245	2246	2248	2264
2272	2276	2277	2279	2290	2326	2338	2342	2345	2346	2363	2364	2387
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2424	2430	2431	2433	2438	2444	2445	2447	2454	2455	2457	2461	2462
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2551	2555	2558	2563	2569	2572	2575	2578	2581	2601	2613	2615	2628
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2727	2730	2750	2758	2778	2782	2807	2809	2814	2815	2822	2827	2841
2845	2850	2862	2864	2867	2869	2874	2875	2877	2882	2888	2902	2903
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2990	3021	3027	3099	3138	3159	3161	3166	3167	3169	3179	3180	3182
3191	3193	3197	3199	3204	3209	3211	3223	3225	3231	3235	3243	3249
3254	3261	3270	3275	3276	3278	3285	3287	3290	3301	3304	3305	3310
3318	3327	3357	3362	3364	3367	3372	3385	3388	3414	3417	3443	3457
3461	3466	3480	3482	3485	3523	3524	3533	3540	3541	3550	3552	3560
3565	3568	3569	3584	3628	3649	3651	3680	3683	3716	3719	3723	3725
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1 14

SEQ 0177

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\$F\$CAS= 000150
\$F\$DEC= 000220
\$F\$DO = 000340

\$F\$FAL= 000405
\$F\$GOO= 000400

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CROSS REFERENCE TABLE -- USER SYMBOLS

J 14

SEQ 0178

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K 14

SEQ 0179

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L 14

SEQ 0180

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2167	2194	2206	2241	2245	2264	2276	2326	2342	2345	2363	2387	2394
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SF\$RTN= 000300

SF\$SEL= 000140

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\$F\$TRU= 000404
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	4248	4249	4258	4434	4435	4439	4563	4564	4607	4608	4623	4624
	4654	4682	4687									4642
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1346	1351	1353	1366	1377	1381	1382	1388	1392	1393	1397	1398	1405
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N 14

PARAMETER CODING
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CROSS REFERENCE TABLE -- USER SYMBOLS

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PARAMETER CODING
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CROSS REFERENCE TABLE -- USER SYMBOLS

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4635	4637	4638	4641	4643	4644	4649	4651	4654	4655	4658	4666	4669
4671	4672	4676	4682	4683	4687	4688						
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\$LSTCN= 177777

PARAMETER CODING
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C 15

SEQ 0184

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1832	1833	1844	1846	1849	1853	1856	1858	1862	1863	1864	1866	1867
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PARAMETER CODING
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CROSS REFERENCE TABLE -- USER SYMBOLS

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SEQ 0185

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CROSS REFERENCE TABLE -- USER SYMBOLS

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SEQ 0186

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875#	888	984#	1021	1026	1071#	1167	1184#	1236	1239#	1246	1249#	1301

\$NSKO = 000120

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	1509	1588#	1605	1608#	1627	1633#	1641	1646#	1658	1663#	1670	1674#	1684
	1698#	1750	1769#	1773	1788#	1794	1824#	1832	1844#	1902	1915#	1957	1991
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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#
	3154	3157#	3174	3177#	3184	3195#	3201	3207#	3214	3233#	3267	3272#	3321
	3325#	3347	3353#	3453	3455#	3477	3520#	3599	3646#	3657	3780#	3805	3942#
	3947	4005#	4011	4227#	4233	4246#	4266	4432#	4447	4563#	4687		
\$NSK1 = 000120	990#	1014	1019	1076#	1162	1188#	1211	1233	1253#	1276	1298	1592#	1603
	1614#	1620	1702#	1714	1716#	1721	1730	1734#	1748	1849#	1898	1918#	1927
	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
\$NSK2 = 000110	1002#	1007	1081#	1111	1118#	1149	1152#	1156	1191#	1209	1214#	1222	1231
	1256#	1274	1279#	1287	1296	1856#	1861	1896	1921#	1925	1935#	1940	1945
	1963#	1987	2075#	2097	2403#	2408	2413#	2421	2427#	2435	2441#	2449	2452#
	2492	2570#	2593	2606	2714#	2718	2720#	2775	2780#	2791	3241#	3258	3263
	3299#	3314	3363#	3439	3441#	3446	3563#	3581	3594	4613#	4617	4623#	4654
	4657#	4671	4676										
\$NSK3 = 000110	1084#	1109	1122#	1132	1146	1194#	1203	1207	1225#	1229	1259#	1268	1272
	1290#	1294	1864#	1894	1966#	1985	2078#	2083	2088	2459#	2466	2490	2573#
	2591	2596#	2604	2722#	2737	2756#	2770	3247#	3251	3256	3302#	3307	3312
	3364#	3436	3566#	3579	4627#	4637	4651	4665#	4669				
\$NSK4 = 000110	1087#	1107	1125#	1130	1135#	1144	1197#	1201	1262#	1266	1867#	1877	1892
	1973#	1983	2471#	2488	2576#	2585	2589	2725#	2735	3383#	3402	3412	3414#
	3433	4630#	4635	4640#	4649								
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	3391	3400											
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	3806#	3947#	3948#	4011#	4012#	4258#	4259#	4439#	4440#	4654#	4655#	4682#	4683#
	4687#	4688#											
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	1621	1641#	1642	1832#	1833	2421#	2422	2435#	2436	2449#	2450	2609#	2610#
	2617#	2618	2637#	2638	2817#	2818	2879#	2880	3096#	3097	3171#	3172	3321#
	3322	3367#	3371	3417#	3421	3450#	3451	3599#	3600	3657#	3658	3805#	3806
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	4688												
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	1121#	1124#	1127#	1130#	1133#	1134#	1140#	1144#	1146#	1149#	1154#	1156#	1162#
	1167#	1185#	1187#	1190#	1193#	1196#	1199#	1201#	1204#	1205#	1207#	1209#	1212#
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	1289#	1292#	1294#	1296#	1298#	1301#	1342#	1344#	1347#	1379#	1382#	1390#	1394#
	1395#	1398#	1430#	1435#	1436#	1439#	1447#	1450#	1506#	1509#	1589#	1594#	1603#
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SEQ 0189

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2220#	2223#	2241#	2245#	2250#	2259#	2260#	2264#	2270#	2276#	2288#	2289#	2292#
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\$TAGNU= 050405

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SEQ 0190

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3781#	3782	3783#	3792	3793#	3942	3943#	3944	3945#	4005	4006#	4007	4008#
4228	4229#	4246	4247#	4248	4249#	4250	4251#	4432	4433#	4434	4435#	4436
4437#	4563	4564#	4565	4566#	4607	4608#	4609	4610#	4614	4615#	4623	4624#
4625	4626#	4628	4629#	4631	4632#	4637	4639#	4641	4643	4644	4645#	4658
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PARAMETER CODING
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J 15

SEQ 0191

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1917#	1958	1959#	1991	1995#	1998	2059#	2062	2066#	2101	2136#	2147	2153#
2159	2167#	2176	2177#	2180	2194#	2200	2206#	2219	2220#	2223	2241#	2259
2260#	2294	2326#	2336	2342#	2359	2360#	2375	2387#	2496	2521#	2536	2550#
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3179#	3184	3196#	3201	3208#	3214	3235#	3267	3273#	3321	3327#	3347	3357#
3453	3457#	3477	3521#	3599	3647#	3657	3781#	3805	3943#	3947	4006#	4011
4229#	4233	4247#	4266	4433#	4447	4564#	4687					
992#	1015	1016#	1019	1074#	1167	1187#	1236	1252#	1301	1344#	1347	1594#
1603	1615#	1620	1636#	1641	1704#	1714	1718#	1722	1723#	1730	1736#	1748
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\$SELOC= 000402

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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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2077#	2097	2405#	2408	2414#	2421	2428#	2435	2442#	2449	2454#	2492	2567#
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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0193

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1071#	1072#	1074#	1076#	1077#	1079#	1081#	1083#	1084#	1086#	1087#	1089#	1098#
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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

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SSLOC = 022422

PARAMETER CODING
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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0194

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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	

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 \$\$RTN2= 000000
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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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N 15

SEQ 0195

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	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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SEQ 0197

ENDDO	2#	1148	1161	1166	1235	1300	1346	1619	1640	1831	2420	2434	2448	2608	2616
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	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														
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ENDLOO	2#														
ENDMOD	2#	4#	214	3004	3749	4756	5056								
ENDMSG	2#	4#	848	933											
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ENDPTA	2#	4#	5073												
ENDRPT	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#													
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EXIFB	2#														
EXIT	2#	4#	843	925	3100	3487	3660	3695	3739	3993	4295	4463	4520	4690	4788
	5033														
FEQUAL	2#	4#													
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CROSS REFERENCE TABLE -- MACRO NAMES

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HEADER	2#	4#	17												
IF	2#	874	983	989	1083	1097	1121	1124	1134	1151	1187	1190	1193	1213	1252
	1255	1258	1278	1376	1387	1427	1503	1591	1607	1673	1701	1733	1848	1855	1863
	1866	1869	1879	1882	1914	1917	1928	1934	1959	1962	2054	2063	2133	2139	2148
	2191	2238	2242	2261	2323	2339	2342	2360	2391	2402	2569	2572	2575	2595	2649
	2669	2686	2721	2727	2755	2779	2819	2885	2909	2923	3135	3298	3301	3324	3382
	3385	3440	3463	3562	3565	3790	4612	4626	4629	4639	4656	4664			
IFB	2#	1001	1080	1086	1196	1224	1238	1261	1289	1444	1645	1662	1715	1843	1920
	1965	1972	1992	2067	2074	2077	2164	2203	2273	2384	2451	2458	2470	2473	2518
	2547	2578	2640	2646	2713	2724	2899	2926	2975	3156	3176	3232	3240	3352	3454
	3537	4226													
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IF .ERR	2#														
IF .NO.	2#														
INCR	2#	3363	3413												
INCRU	2#														
INLINE	2#														
INLOOP	2#	4#													
IOSETU	2#	4#													
IOSTAR	2#	4#													
KT11	2#	4#													
LASTAD	2#	4#	5051												
LEAVE	2#	3388													
LET	2#	821	823	825	828	830	832	834	869	872	878	947	955	963	971
	986	992	994	997	999	1004	1008	1011	1016	1023	1036	1053	1055	1057	1068
	1089	1091	1093	1095	1100	1104	1114	1127	1141	1157	1159	1169	1241	1312	1318
	1321	1323	1325	1338	1344	1349	1351	1364	1379	1390	1395	1403	1406	1415	1417
	1425	1430	1436	1440	1442	1447	1452	1462	1465	1468	1470	1472	1494	1496	1499
	1501	1506	1516	1532	1557	1566	1585	1589	1610	1622	1624	1628	1630	1636	1638
	1648	1659	1665	1667	1695	1718	1723	1726	1731	1736	1756	1766	1770	1785	1791
	1811	1813	1816	1819	1821	1827	1829	1834	1846	1853	1858	1872	1885	1899	1937
	1942	1949	1953	1975	1995	2018	2080	2085	2089	2136	2142	2160	2162	2167	2177
	2201	2206	2208	2210	2220	2245	2247	2271	2276	2278	2289	2337	2345	2363	2387
	2389	2394	2396	2399	2400	2405	2409	2416	2418	2423	2430	2432	2437	2444	2446
	2454	2457	2461	2463	2468	2521	2523	2525	2528	2530	2532	2544	2550	2554	2557
	2612	2614	2627	2634	2666	2704	2709	2711	2749	2777	2806	2808	2814	2826	2840
	2844	2849	2861	2863	2866	2868	2874	2876	2881	2902	2912	2916	2918	2929	2931
	2937	2982	2985	2987	2989	3020	3098	3160	3166	3168	3179	3181	3190	3192	3196
	3198	3203	3208	3210	3222	3224	3230	3248	3253	3260	3269	3275	3277	3284	3286
	3289	3304	3309	3317	3371	3460	3479	3481	3484	3523	3532	3540	3549	3551	3559
	3568	3583	3627	3650	3679	3682	3715	3718	3722	3724	3727	3736	3765	3767	3774
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	3932	3938	3949	3956	3959	3962	3964	3967	3970	3973	3976	3978	3981	3989	4002
	4008	4013	4215	4217	4219	4222	4230	4234	4236	4238	4241	4243	4251	4253	4260
	4263	4268	4276	4279	4281	4284	4286	4288	4291	4329	4331	4333	4335	4338	4340
	4342	4344	4346	4348	4357	4372	4388	4391	4393	4396	4398	4417	4419	4421	4424
	4429	4441	4444	4449	4456	4459	4483	4485	4489	4491	4493	4495	4497	4499	4502
	4504	4506	4508	4510	4512	4514	4517	4538	4540	4542	4545	4547	4556	4558	4560
	4568	4573	4576	4578	4582	4587	4589	4602	4619	4632	4646	4659	4662	4673	4677
	4679	4706	4709	4710	4712	4714	4716	4731	4733	4735	4737	4740	4742		
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LOOP	2#														
MANUAL	2#	4#	2978												
MEMORY	2#	4#	3457												

PARAMETER CODING		MACY11 30(1046)		24-AUG-79 09:10		PAGE 165		E 16									
CZTSHB.P11		24-AUG-79 09:08		CROSS REFERENCE TABLE -- MACRO NAMES												SEQ 0199	
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	5034#																
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	4860#	4866#	4872#	4878#	4884#	4890#	4896#	4902#	4908#	4914#	4920#	4926#	4932#	4938#	4944#		
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	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#		
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	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#		
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MSERRI	2#	4#	1596#	1651#	1678#	1741#	1978#	2021#	2040#	2092#	2117#	2154#	2195#	2252#	2265#		
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MSESCA	2#	4#															
MSESCS	2#	4#															
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CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0200

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RETURN	2#														

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SECRET 20

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PARAMETER CODING MACY11 30(1046) 24-AUG-79 09:10 PAGE 177
 CZTSHB.P11 24-AUG-79 09:08 CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0211

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	1983	1985	1987	1989	1991	1998	2062	2084	2088	2097	2099	2101	2145	2147	2159
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	4008	4011	4227	4229	4246	4247	4248	4249	4251	4258	4432	4433	4434	4435	4437
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SEQ 0212

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1885	1915	1917	1918	1920	1921	1923	1929	1934	1935	1937	1942	1949	1959	1960
1962	1963	1965	1966	1971	1973	1975	1993	1995	2055	2059	2064	2066	2068	2073
2075	2077	2078	2080	2085	2134	2136	2140	2142	2149	2153	2165	2167	2177	2192
2194	2204	2206	2220	2239	2241	2243	2245	2260	2262	2264	2274	2276	2289	2324
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\$\$\$SETT 2#

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ERRORS DETECTED: 0

CZTSHB,CZTSHB/CRF/SOL/EQ:ONEFILE=NLSTF.P11,SVC.SML,SPMAC.SML,LSTF.P11,CZTSHB.P11

RUN-TIME: 126 138 11 SECONDS

RUN-TIME RATIO: 311/277=1.1

CORE USED: 32K (64 PAGES)