

TS04

DATA RELIABILITY
CZTSHA0

AH-E455A-MC

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This microfiche card contains a grid of frames. The first 10 columns of frames contain data, likely performance metrics or test results, organized in a structured layout. The remaining frames on the right side of the card contain diagrams, including what appears to be a block diagram of a system architecture and various flowcharts illustrating processes or data flow. The text and diagrams are printed in a light color on a dark background, typical of microfiche technology.

IDENTIFICATION

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PRODUCT CODE: AC-E454A-MC

PRODUCT NAME: CZTSHA0 TS11/TS04 DATA RELIAB

MAINTAINER: DIAGNOSTIC ENGINEERING

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GLOSSARY

ACT	AUTOMATED COMPUTER TEST
APT	AUTOMATED PRODUCT TEST SYSTEM USED IN MANUFACTURING.
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.
TERMINATION CLASS CODE TCC	THREE BIT CODE IN THE TSSR WHICH INDICATES THE TYPE OF COMMAND TERMINATION.
TSBA	TAPE SYSTEM BUS ADDRESS REGISTER.
TSDB	TAPE SYSTEM DATA BUFFER REGISTER.
TSSR	TAPE SYSTEM STATUS REGISTER.
XST0	EXTENDED STATUS REGISTER 0
XST1	EXTENDED STATUS REGISTER 1
XST2	EXTENDED STATUS REGISTER 2
XST3	EXTENDED STATUS REGISTER 3
XXDP	XXDP IS A 'CATCH-ALL' NAME FOR A GROUP OF PDP-11 DIAGNOSTIC PACKAGES AVAILABLE ON MULTIMEDIA.

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

1.1.1 FUNCTIONAL DESCRIPTION

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

1.1.2 STRUCTURE OF PROGRAM

THIS DIAGNOSTIC OCCUPIES 14.5K WORDS OF MEMORY AND IS COMPATIBLE WITH BOTH XXDP AND ACT. IT CAN BE RUN STANDALONE UNDER XXDP, AND CAN BE CHAINED UNDER XXDP, ACT AND APT IN ACT MODE (SEE 'CREATE CORE IMAGE' COMMAND BELOW FOR DETAILS OF CHAINING PROCEDURE). IT IS A SINGLE PROGRAM FROM THE STANDPOINT OF THE DIAGNOSTIC USER, BUT IT CONTAINS A CONTROL MODULE WHICH WILL BE LATER RELEASED INDEPENDENTLY AS A DIAGNOSTIC SUPERVISOR.

WHEN THIS DIAGNOSTIC IS STARTED AT ADDRESS 200, CONTROL GOES FIRST TO THE SUPERVISOR PORTION, WHICH WILL ASK CERTAIN 'HARD CORE' QUESTIONS ABOUT THE ENVIRONMENT. THEN IT WILL ENTER COMMAND MODE, INDICATED BY A PROMPT CHARACTER (DS B>). AT COMMAND MODE THE OPERATOR MAY ENTER ANY OF SEVERAL COMMANDS AS DESCRIBED BELOW.

THE SUPERVISOR CODING FOLLOWS IMMEDIATELY THE DIAGNOSTIC TEST CODING, BUT THE SUPERVISOR LISTING HAS BEEN SUPPRESSED FOR GENERAL DISTRIBUTION. A LIMITED DISTRIBUTION HAS BEEN MADE TO FIELD SERVICE OF THE SUPERVISOR ASSEMBLY LISTING, AND IT MAY BE CONSULTED IN EVENT OF A SOFTWARE PROBLEM.

1.1.3 MEMORY MAP

0	VECTOR AREA
777	
1000	STACK
1777	
2000	DIAGNOSTIC
20777	
21000	DIAGNOSTIC SUPERVISOR
51777	
52000	FREE FOR READ/WRITE BUFFER ALLOCATION
71777	
72000	XXDP
77777	

1.1.4 DIAGNOSTIC INFORMATION

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

THERE ARE 5 TESTS IN THIS PROGRAM:

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

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

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

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

1.2.2 SOFTWARE REQUIREMENTS

DIAGNOSTIC SUPERVISOR

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP USERS MANUAL MD-11-DZQXA
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

2.0 OPERATING INSTRUCTIONS

2.1 LOADING AND STARTING PROCEDURES

2.1.1 LOADING PROCEDURES

THIS PROGRAM MAY BE LOADED FROM PAPER TAPE USING THE ABSOLUTE LOADER.
IT MAY ALSO BE LOADED FROM ANY XXDP LOAD MEDIA.

2.1.2 STARTING PROCEDURES

THE PROGRAM STARTS AT LOCATION 200. USE STANDARD DEC PROCEDURES
TO START THE PROGRAM.

2.1.3 STEPS FOR QUICK AND SIMPLE EXECUTION

THE DIAGNOSTIC CAN BE EXECUTED STANDALONE WITHOUT READING THE REMAINDER OF THIS
DOCUMENT, AS FOLLOWS:

- A) LOAD THE DIAGNOSTIC
- B) START AT ADDRESS 200
- C) ANSWER THE HARDWARE QUESTIONS
- D) RECEIVE PROMPT (DS B>)
- E) ENTER STA<CR>
- F) ANSWER HARDWARE AND SOFTWARE QUESTIONS
- G) GET END OF PASS MESSAGES OR ERROR MESSAGES
- H) TO END EXECUTION, ENTER CONTROL/C

2.1.4 THE SIX STEPS OF EXECUTION

THIS DIAGNOSTIC SHOULD BE LOADED AND STARTED USING NORMAL XXDP
PROCEDURES. THE START COMMAND SHOULD NOT SPECIFY AN ADDRESS, BECAUSE
THE DIAGNOSTIC HAS THE PROPER TRANSFER ADDRESS CODED INTO IT.

WHEN THIS DIAGNOSTIC IS STARTED, THE FOLLOWING STEPS WILL OCCUR:

* STEP 1 *

A SHORT SERIES OF 'HARDWARE QUESTIONS' WILL BE ASKED:

QUESTION	MEANING
L-CLK (L) N ?	IS THERE AN L-CLOCK?
P-CLK (L) N ?	P-CLOCK?
50HZ (L) N ?	IS THE POWER 50 CYCLES (AS IN EUROPE)?

LSI (L) N ? IS MACHINE AN LSI?
LPT (L) N ? IS THERE A LINE PRINTER?
MEM (K) (D) 16 ? HOW MANY K OF MEMORY ARE THERE?

THE DEFAULTS (SHOWN AFTER EACH QUESTION) CAN BE SELECTED BY HITTING CARRIAGE RETURN. IT IS POSSIBLE THAT NOT ALL OF THE QUESTIONS WILL BE ASKED: FOR EXAMPLE, IF YOU SAY 'YES' TO THE L-CLOCK QUESTION, THE P-CLOCK QUESTION WILL NOT BE ASKED.

* STEP 2 *

WHEN YOU HAVE ANSWERED ALL THE HARDCORE QUESTIONS, THE DIAGNOSTIC WILL ISSUE THE PROMPT 'DS-B>'. FROM THIS POINT UNTIL THE TIME WHEN YOU RESTART XXDP, YOU WILL BE TALKING TO THE DIAGNOSTIC, NOT XXDP. WE WILL REFER TO THE PRESENCE OF THIS PROMPT AS BEING IN DIAGNOSTIC COMMAND MODE, AS OPPOSED TO XXDP COMMAND MODE.

AT THIS POINT YOU WILL ENTER A 'START' COMMAND. THIS IS NOT THE SAME AS THE XXDP 'START' COMMAND, WHICH YOU ALREADY ISSUED IN RESPONSE TO THE XXDP DOT PROMPT. THIS 'START' COMMAND CAN TAKE A NUMBER OF SWITCHES AND FLAGS (ALL OPTIONAL) AND THE DETAILS OF THESE ARE SET FORTH IN '2.3 DETAILS OF COMMANDS AND SYNTAX'. HOWEVER, IN ORDER TO USE THE PROGRAM, ALL YOU NEED TO SAY IS SOMETHING LIKE THIS:

STA/PASS:1/FLAGS:HOE

THINGS TO NOTE HERE:

1. ONLY THE FIRST THREE CHARACTERS OF THIS OR ANY COMMAND AT THE 'DS-B>' LEVEL NEED TO BE TYPED.
2. THE 'PASS' SWITCH SPECIFIES HOW MANY PASSES YOU DESIRE. A PASS CONSISTS OF RUNNING THE FULL DIAGNOSTIC AGAINST ALL UNITS BEING TESTED (THIS WILL BE EXPLAINED SHORTLY). ONE PASS IS SPECIFIED IN THE ABOVE EXAMPLE.
3. THE 'FLAGS' SWITCH MAY SPECIFY ANY OF A NUMBER OF FLAGS, BUT THE MAIN USEFUL ONES ARE:

LOE LOOP ONE ERROR
HOE HALT ON ERROR
IER INHIBIT ERROR PRINTOUT

THE HOE FLAG IS SPECIFIED IN THE ABOVE EXAMPLE (WE'LL SEE WHY SHORTLY).

* STEP 3 *

WHEN YOU HAVE TYPED IN A 'START' COMMAND THE DIAGNOSTIC WILL COME BACK WITH THE QUESTION 'N UNITS?' O WHICH YOU SHOULD RESPOND BY TYPING IN THE NUMBER OF DEVICES YOU WISH TO TEST.

A WORD OF WARNING HERE: THE NUMBER OF UNITS DEPENDS ON THE TARGET DEVICE OF THE DIAGNOSTIC. FOR EXAMPLE, IF THE DIAGNOSTIC IS DIRECTED AT A DISK DRIVE, THEN THE NUMBER OF UNITS WOULD BE THE NUMBER OF DRIVES TO BE TESTED. WHEREAS IF THE DIAGNOSTIC WAS DIRECTED AT THE DISK CONTROLLER, THEN THE NUMBER OF UNITS WOULD BE THE NUMBER OF CONTROLLERS. THE TARGET DEVICE OF A DIAGNOSTIC CAN ALWAYS BE DETERMINED BY INSPECTING THE 'HEADER' STATEMENT NEAR THE BEGINNING OF THE SOURCE CODE. ONE OF THE OPERANDS OF THIS 'HEADER' STATEMENT SHOULD BE THE DEVICE TYPE OF THE DIAGNOSTIC.

* STEP 4 *

WHEN YOU HAVE TYPED IN THE NUMBER OF UNITS TO BE TESTED, THE DIAGNOSTIC WILL ASK YOU THE 'HARDWARE QUESTIONS'. THE ANSWERS TO THESE QUESTIONS ARE USED TO BUILD TABLES IN CORE, CALLED 'HARDWARE P-TABLES'. ONE HARDWARE P-TABLE WILL BE BUILT FOR EACH UNIT TO BE TESTED.

THERE ARE SEVERAL HARDWARE QUESTIONS AND THE ENTIRE SERIES WILL BE POSED N TIMES, WHERE N IS THE NUMBER OF UNITS.

SEE 2.3.13 FOR HARDWARE PARAMETERS

THIS REPRESENTS A NEW PHILOSOPHY IN DIAGNOSTIC ENGINEERING. DIAGNOSTIC WILL IN THE FUTURE NOT BE WRITTEN TO AUTOSIZE OR ASSUME STANDARD ADDRESSES: INSTEAD, THEY WILL ASK THE OPERATOR FOR ALL THE INFORMATION THEY NEED TO TEST THE DEVICE.

* STEP 5 *

AFTER YOU HAVE ANSWERED ALL THE HARDWARE QUESTIONS FOR ALL THE UNITS, YOU WILL BE ASKED 'CHANGE SW?' IF YOU WANT TO BE ASKED THE SOFTWARE QUESTIONS THAT DETERMINE THE BEHAVIOR OF THIS PROGRAM, TYPE 'Y'. IF YOU WANT TO TAKE ALL THE DEFAULTS TO THESE QUESTIONS, TYPE 'N'. IF YOU TYPE 'Y' YOU WILL BE ASKED THE SOFTWARE QUESTIONS, AND THE ANSWERS WILL BE PUT INTO THE SOFTWARE P-TABLE IN THE PROGRAM. THE SERIES OF QUESTIONS WILL BE ASKED JUST ONCE, REGARDLESS OF THE NUMBER OF UNITS TO BE TESTED.

SEE 2.3.14 FOR SOFTWARE PARAMETERS

* STEP 6 *

AFTER YOU HAVE ANSWERED THE SOFTWARE QUESTIONS, THE DIAGNOSTIC WILL BEGIN TO EXECUTE THE HARDWARE TEST CODE. THERE ARE SEVERAL THINGS THAT CAN HAPPEN NEXT, DEPENDING ON WHETHER A HARDWARE ERROR IS ENCOUNTERED AND ALSO ON WHAT SWITCH VALUES YOU SELECTED ON THE START COMMAND. CONSIDER THE POSSIBILITIES:

1. IF NO ERROR IS ENCOUNTERED, THEN THE DIAGNOSTIC WILL SIMPLY EXECUTE THE DESIRED NUMBER OF PASSES AND RETURN TO COMMAND MODE (PROMPT DS-B>).
2. IF AN ERROR IS ENCOUNTERED, THEN ONE OF THREE THINGS HAPPENS, DEPENDING ON THE SETTINGS OF THE HOE AND LOE FLAGS.

HOE SET: THE ERROR WILL BE REPORTED ON THE CONSOLE AND THE DIAGNOSTIC WILL RETURN TO COMMAND MODE.

LOE SET: THE DIAGNOSTIC WILL LOOP ENLESSLY ON THE BLOCK OF CODE THAT DETECTED THE ERROR.

NEITHER HOE NOR LOE SET: THE ERROR WILL BE REPORTED ON THE CONSOLE AND NORMAL EXECUTION WILL RESUME AS IF NO ERROR HAD OCCURED.

2.2 SPECIA ENVIRONMENTS

ACT

APT

2.3 PROGRAM OPTIONS

2.3.1 START COMMAND

STA(RT)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:<FLAG-LIST>/EOP:<INCR>

2.3.1.1 TESTS SWITCH (/TESTS:<TEST-LIST>)

<TEST-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (1:2 ETC.) OR RANGES OF DECIMAL NUMBERS (1-5:8-10 ETC.) THAT SPECIFY THE TESTS TO BE EXECUTED. THE NUMBERS ARE SEPARATED BY COLONS. THE NUMBERS RANGE FROM 1 TO THE LARGEST TEST NUMBER IN THE DIAGNOSTIC. THEY MAY BE SPECIFIED IN ANY ORDER. TESTS WILL BE EXECUTED IN NUMERICAL ORDER REGARDLESS OF THE ORDER OF SPECIFICATION. THE DEFAULT IS TO EXECUTE ALL TESTS. ON THIS AND ALL SWITCHES, THE ANGLE BRACKETS <> ARE PUNCTUATION USED IN THE DEFINITION ONLY, AND ARE NOT TO BE TYPED BY THE OPERATOR. SEE EXAMPLE

AT END OF 2.3.1.

2.3.1.2 PASS SWITCH (/PASS:<PASS-CNT>)

<PASS-CNT> IS A DECIMAL NUMBER INDICATING THE DESIRED NUMBER OF PASSES. A PASS IS DEFINED AS THE EXECUTION OF THE FULL DIAGNOSTIC (ALL SELECTED TESTS) AGAINST ALL UNITS SUBMITTED. THE DEFAULT IS NON-ENDING EXECUTION. IN THIS CASE EXIT FROM THE PROGRAM IS ACCOMPLISHED EITHER BY TYPING A CONTROL/C OR BY OCCURANCE OF AN ERROR WITH THE HALT ON ERROR FLAG BEING SET. THE EXIT IS A RETURN TO COMMAND MODE. SEE EXAMPLE AT END OF 2.3.1.

2.3.1.3 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS A SEQUENCE OF ELEMENTS OF THE FORM <FLAG>, <FLAG=1>, OR <FLAG=0>, SEPARATED BY COLONS, WHERE <FLAG> HAS ONE OF THE FOLLOWING VALUES:

HOE	HALT ON ERROR, CAUSING COMMAND MODE TO BE ENTERED WHEN AN ERROR IS ENCOUNTERED
LOE	LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP CONTINUOUSLY WITHIN THE SMALLEST DEFINED BLOCK OF CODING (SEGMENT, SUBTEST, OR TEST) CONTAINING THE ERROR
IER	INHIBIT ERROR REPORTING
IBE	INHIBIT BASIC ERROR REPORTS
IXE	INHIBIT EXTENDED ERROR REPORTS
PRI	DIRECT ALL MESSAGES TO A LINE PRINTER
PNT	PRINT NUMBER OF TEST BEING EXECUTED
BOE	BELL ON ERROR
UAM	RUN IN UNATTENDED MODE, BYPASSING MANUAL INTERVENTION TESTS
ISR	INHIBIT STATISTICAL REPORTS
IDU	INHIBIT DROPPING OF UNITS BY DIAGNOSTIC

THE FLAGS NAMED OR EQUATED TO 1 ARE SET, THOSE EQUATED TO 0 ARE CLEARED. A FLAG NOT SPECIFIED IS CLEARED. IF THE FLAGS SWITCH IS NOT GIVEN ALL FLAGS ARE CLEARED. SEE EXAMPLE AT END OF 2.3.1.

2.3.1.4 END OF PASS SWITCH (/EOP:<INCR>)

<INCR> IS A DECIMAL NUMBER INDICATING HOW OFTEN (IN TERMS OF PASSES) IT IS DESIRED THAT THE END OF PASS MESSAGE BE PRINTED. THE DEFAULT IS AT THE END OF EVERY PASS. SEE EXAMPLE AT END OF 2.3.1.

2.3.1.5 EFFECT OF COMMAND

THE EFFECT OF THE START COMMAND IS TO INITIATE THE HARDWARE PARAMETER DIALOGUE, THE SOFTWARE PARAMETER DIALOGUE, AND THEN THE DIAGNOSTIC TESTS THEMSELVES.

THE HARDWARE PARAMETER DIALOGUE COMMENCES WITH THE QUESTION '# UNITS?' TO WHICH THE OPERATOR REPLIES WITH A DECIMAL NUMBER N FROM 1 TO 64. THE TERM 'UNIT' REFERS TO THE DEVICE TO WHICH THIS SERIES OF DIAGNOSTICS IS DEDICATED. FOLLOWING THIS ARE THE QUESTIONS WHEREBY THE P-TABLES THEMSELVES WILL BE BUILT. EACH P-TABLE IS A CORE-RESIDENT TABLE CONTAINING ALL THE HARDWARE INFORMATION FOR ONE UNIT. THE OPERATOR MUST SUPPLY

N (NUMBER OF UNITS) VALUES FOR EACH QUESTION. HE MAY DO THIS BY GIVING ONE ANSWER TO EACH QUESTION (IN WHICH CASE THE SERIES OF QUESTIONS WILL BE POSED N TIMES) OR BY GIVING N VALUES, SEPARATED BY COMMAS, TO EACH QUESTION (SERIES WILL BE POSED ONCE). EACH QUESTION IS FOLLOWED BY THE RESPONSE RADIX (D FOR DECIMAL, B FOR BINARY, O FOR OCTAL, L FOR YES/NO) IN PARENTHESES AND THE DEFAULT VALUE AFTER THE PARENTHESES.

FOLLOWING THE HARDWARE QUESTIONS ARE THE SOFTWARE QUESTIONS TO BUILD THE SOFTWARE TABLES, WHICH DEFINE THE MODE (QUICK VERIFY ETC.) THAT THE DIAGNOSTIC WILL EXECUTE IN.

WHEN THE QUESTION '# UNITS?' IS ANSWERED, MEMORY STORAGE IS ALLOCATED FOR THE P-TABLES, AND IF THERE IS NOT ENOUGH TO ACCOMMODATE THEM THE MESSAGE 'TOO MANY UNITS' IS ISSUED. IN THIS CASE THE DIAGNOSTIC MUST BE EXECUTED MORE THAN ONCE TO TEST ALL UNITS.

EXAMPLE:

STA/TESTS:1:2-4:6:8-10/PASS:3/FLAGS:IER:HOE=1:UAM:LOE

THIS COMMAND WILL CAUSE THREE PASSES TO BE MADE, EACH PASS CONSISTING OF TESTS 1,2,3,4,6,8,9, AND 10 EXECUTED AGAINST ALL UNITS. THERE IS NO DIFFERENCE BETWEEN SAYING <FLAG> AND SAYING <FLAG=1>. THE NOTATION <FLAG=0> IS MEANINGFUL ONLY ON A COMMAND OTHER THAN START TO CLEAR A FLAG THAT WAS PREVIOUSLY SET. NOTE THAT ON ALL COMMANDS ONLY THE FIRST THREE LETTERS ARE SCANNED.

2.3.2 RESTART COMMAND

RES(TART)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:<FLAG-LIST>/UNITS:<UNIT-LIST>

2.3.2.1 TESTS, PASS, AND FLAGS SWITCHES

<TEST-LIST>, <PASS-CNT>, AND <FLAG-LIST> ARE AS IN THE START COMMAND.

2.3.2.2 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (1,2 ETC.) OR RANGES OF DECIMAL NUMBERS (1-5, 8-10 ETC.) THAT SPECIFY THE UNITS TO BE TESTED. THE NUMBERS ARE SEPARATED BY COLONS. THE NUMBERS MAY RANGE FROM 1 THRU N (N IS THE NUMBER OF UNITS SPECIFIED IN THE PREVIOUS START COMMAND). THE NUMBER INDICATES THE POSITION OF THE P-TABLE AS THE DATA WAS ENTERED DURING THE HARDWARE DIALOGUE. THE UNITS WHICH ARE SELECTED MUST NOT HAVE BEEN DROPPED BY THE DROP COMMAND. SEE THE DISCUSSION OF ADD AND DROP COMMANDS BELOW. DEFAULT IS TO TEST ALL UNITS WHICH HAVE NOT BEEN DROPPED BY A DROP COMMAND.

2.3.2.3 EFFECT OF COMMAND

THE RESTART COMMAND DIFFERS FROM THE START COMMAND IN THAT THE P-TABLES

FROM THE PREVIOUS START COMMAND (THERE MUST HAVE BEEN ONE) ARE USED, INSTEAD OF NEW ONES BEING BUILT. THE UNITS SWITCH GIVES THE ABILITY TO SELECT A SUBSET OF THESE. THE SOFTWARE DIALOGUE MAY OPTIONALLY BE RE-EXECUTED (OPERATOR WILL BE ASKED). THE COMMAND CAN BE USED AFTER COMMAND MODE HAS BEEN REENTERED IN ANY OF THE THREE NORMAL WAYS: A) THE REQUESTED NUMBER OF PASSES HAVE BEEN MADE B) AN ERROR WAS ENCOUNTERED WITH THE HALT ON ERROR FLAG SET C) A CONTROL/C WAS ENTERED BY THE OPERATOR.

2.3.3 CONTINUE COMMAND

CON(TINUE)/PASS:<PASS-CNT/FLAGS:<FLAG-LIST>

2.3.3.1 PASS SWITCH (/PASS:<PASS-CNT>)

<PASS-CNT> IS SAME AS IN START COMMAND, BUT THE DEFAULT IS THE UNSATISFIED PASS-CNT FROM THE PREVIOUS START OR RESTART. IF NONE REMAINS, THE DEFAULT IS NON-ENDING EXECUTION.

2.3.3.2 FLAG SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS SAME AS IN START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

2.3.3.3 EFFECT OF COMMAND

CONTINUE MUST FOLLOW A START OR RESTART, AND COMMAND MODE MUST HAVE BEEN ENTERED DUE TO A HALT ON ERROR OR A CONTROL/C. THE EFFECT OF THE COMMAND IS TO GO TO THE BEGINNING OF THE TEST THAT WAS BEING EXECUTED WHEN THE HALT OR CONTROL/C TOOK PLACE. SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED. HARDWARE PARAMETERS MAY NOT BE CHANGED.

2.3.4 PROCEED COMMAND

PRO(CEED)/FLAGS:<FLAG-LIST>

2.3.4.1 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS AS IN THE START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

2.3.4.2 EFFECT OF COMMAND

PROCEED MUST FOLLOW A START, RESTART, OR CONTINUE. COMMAND MODE MUST HAVE BEEN ENTERED VIA A HALT ON ERROR. THE EFFECT OF THE COMMAND IS TO BEGIN EXECUTION AT THE LOCATION FOLLOWING THE ERROR CALL. NEITHER HARDWARE NOR SOFTWARE PARAMETERS MAY BE ALTERED.

2.3.5 CREATE CORE IMAGE COMMAND

CCI/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:<FLAG-LIST>

2.3.5.1 TESTS, PASS, AND FLAGS SWITCHES

<TEST-LIST>, <PASS-CNT>, <FLAG-LIST>, AND ARE AS
IN THE START COMMAND, EXCEPT THAT THE UAM (UNATTENDED MODE) FLAG
DEFAULTS TO THE SET POSITION.

2.3.5.2 EFFECT OF COMMAND

THE PURPOSE OF THIS COMMAND IS TO CREATE A BIC FILE SUITABLE FOR
CHAIN MODE EXECUTION. THE XXDP PROCEDURE IS AS FOLLOWS:

INVOKE THE XXDP UTILITY UPD1 OR UPD2
LOAD XXN:FILE.BIN
START 200
<QUESTIONS AND ANSWERS>
RESTART UPD1 USING RESTART ADDRESS
HICORE ADDRESS (IF 'PASSED 14.5K' MESSAGE CAME)
DUMP XXN:FILE.BIC

THE OPERATOR DIALOGUE (HARDWARE AND SOFTWARE) WILL
BE EXECUTED AS IN THE START COMMAND, BUT AT THE END OF THE QUESTIONS
THE HALT STATE WILL BE ENTERED. THE OPERATOR SHOULD THEN
DUMP THE PROGRAM TO THE XXDP LIBRARY USING A BIC EXTENSION
TO INDICATE THAT THIS FILE IS CHAINABLE. HE SHOULD USE THE XXDP UTILITY
UPD1 OR UPD2 TO DO THIS. IF THE P-TABLES EXTEND BEYOND 14.5K, A MESSAGE
WILL BE ISSUED GIVING THE NEW UPPER CORE LIMIT, TO WHICH THE OPERATOR
MUST ADJUST BEFORE DUMPING. HE MAY NOW DELETE THE
NON-CHAINABLE BIN FILE IF DESIRED, SINCE THE BIC FILE HAS ALL THE
CAPABILITIES OF IT.

WHEN THIS BIC FILE IS SUBSEQUENTLY EXECUTED IN CHAIN MODE,
THE OPERATOR DIALOGUES WILL BE BYPASSED. HOWEVER, IF IT IS EXECUTED
STANDALONE, THE DIALOGUE WILL BE REISSUED.

NOTE THAT IF THE MESSAGE 'TOO MANY UNITS' IS ISSUED, TWO OR MORE
CORE IMAGES MUST BE CREATED (WITH DIFFERENT NAMES) TO TEST ALL UNITS.

NOTE THAT ALTHOUGH THE CHAINABLE IMAGE CAN BE EXECUTED ON A
16K MACHINE, THE ORIGINAL CCI CREATION MUST BE DONE ON A
LARGE MACHINE, THE EXACT SIZE BEING DEPENDENT ON WHICH UPDATE
UTILITY IS USED.

2.3.6 ADD COMMAND

ADD/UNITS:<UNIT-LIST>

2.3.6.1 UNITS SWITCH (/UNITS:<UNIT-LIST>

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

2.3.6.2 EFFECT OF COMMAND

THE UNITS SPECIFIED ARE ADDED TO THE TEST SEQUENCE. EACH UNIT MUST HAVE A P-TABLE IN MEMORY DUE TO AN EARLIER HARDWARE DIALOGUE. THIS COMMAND MUST BE FOLLOWED BY A RESTART OR CONTINUE. THE UNITS SWITCH MUST BE SPECIFIED. THE ADD COMMAND IS MEANINGFUL ONLY FOR UNITS THAT WERE PREVIOUSLY DROPPED.

2.3.7 DROP COMMAND

DRO(P)/UNITS:<UNIT-LIST>

2.3.7.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

2.3.7.2 EFFECT OF COMMAND

THE UNITS SPECIFIED WILL BE DROPPED FROM TESTING. THE UNITS WILL BE RESELECTED ONLY BY THE EXECUTION OF AN ADD OR START COMMAND. THE UNITS SWITCH MUST BE ENTERED. THIS COMMAND MUST BE FOLLOWED BY A RESTART OR A CONTINUE COMMAND.

2.3.8 PRINT COMMAND

PRI(NT)

2.3.8.1 EFFECT OF COMMAND

ALL STATISTICS TABLES ACCUMULATED BY THE DIAGNOSTIC ARE PRINTED. THE ISR (INHIBIT STATISTICAL REPORTING) FLAG IS CLEARED.

2.3.9 DISPLAY COMMAND

DIS(PLAY)/UNITS:<UNIT-LIST>

2.3.9.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

2.3.9.2 EFFECT OF COMMAND

THE HARDWARE P-TABLES FOR ALL UNITS UNDER TEST ARE PRINTED OUT IN THE

FORMAT IN WHICH THEY WERE ENTERED. ANY UNITS THAT WERE DROPPED BY THE OPERATOR 'DROP' COMMAND ARE SO DESIGNATED.

2.3.10 FLAGS COMMAND

FLA(GS)

2.3.10.1 EFFECT OF COMMAND

THE CURRENT SETTINGS OF ALL FLAGS ARE PRINTED.

2.3.11 ZFLAGS COMMAND

ZFL(AGS)

2.3.11.1 EFFECT OF COMMAND

ALL FLAGS ARE CLEARED.

2.3.12 CONTROL CHARACTERS

A CONTROL C (^C) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES A RETURN TO COMMAND MODE.

A CONTROL Z (^Z) ENTERED DURING ONE OF THE THREE OPERATOR DIALOGUES (HARD CORE QUESTIONS (SEE 1.1.1), HARDWARE DIALOGUE (SEE 2.3.1.5), OR SOFTWARE DIALOGUE (SEE 2.3.1.5) CAUSES THE DEFAULTS TO BE TAKEN FOR THE REMAINDER OF THAT DIALOGUE.

A CONTROL O (^O) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES ALL TELETYPE OUTPUT TO BE SUPPRESSED FOR THE REMAINDER OF THE DIAGNOSTIC OR UNTIL ANOTHER ^O IS TYPED, WHICH RESTORES NORMAL TELETYPE OUTPUT.

2.3.13 HARDWARE PARAMETERS

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.

TSDB ADDRESS (172520) ?

VECTOR (150) ?

2.3.14 SOFTWARE PARAMETERS

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 ?

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) 5 ?	(1-27) (DECIMAL)
BRF COUNT (D) 4096 ?	(1-4K) (DECIMAL)
# OF OPERATIONS (D) 10 ?	(1-65K) (DECIMAL)
PATTERN (D) 7 ?	(0-8) (DECIMAL)
CMD/3 (D) 5 ?	(1-27) (DECIMAL)
BRF COUNT (D) 4096 ?	(1-4K) (DECIMAL)
# OF OPERATIONS (D) 10 ?	(1-65K) (DECIMAL)
PATTERN (D) 7 ?	(0-8) (DECIMAL)
CMD/4 (D) 5 ?	(1-27) (DECIMAL)
BRF COUNT (D) 4096 ?	(1-4K) (DECIMAL)
# OF OPERATIONS (D) 10 ?	(1-65K) (DECIMAL)
PATTERN (D) 7 ?	(0-8) (DECIMAL)
CMD/5 (D) 5 ?	(1-27) (DECIMAL)
BRF COUNT (D) 4096 ?	(1-4K) (DECIMAL)
# OF OPERATIONS (D) 10 ?	(1-65K) (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 DIFFERENT CHARACTERISTIC IS DESIRED, THE OPERATOR SHOULD ENTER THAT CHARACTERISTIC CODE. A TOTAL OF 4 COMMANDS MAY BE ENTERED IN ADDITION TO THE SET CHARACTERISTICS COMMAND. IF THE OPERATOR WISHES TO USE LESS THAN 4 COMMANDS, AN END COMMAND MUST BE ENTERED AND THEN A CONTROL Z (^Z) CAN BE ENTERED TO TERMINATE P-TABLE DIALOGUE.

2.3.14.1 COMMAND LIST FOR USE IN P-TABLE DIALOGUE.

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' MILLISECDS WHERE N IS DEFINED IN THE # OF OPERATIONS.
27 =	END	END OF COMMAND SEQUENCE.

2.3.14.2 DATA PATTERN LIST FOR USE IN P-TABLE 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.

2.3.15 EXTENDED DISCUSSION OF P-TABLE DIALOGUE

THE FULL CAPABILITY OF THE HARDWARE DIALOGUE IS REVEALED BY THE FOLLOWING DISCUSSION OF WHAT HAPPENS INTERNALLY.

AS SOON AS THE QUESTION '# UNITS?' IS ANSWERED (WITH THE NUMBER N, SAY) SPACE IN CORE IS ALLOCATED FOR N P-TABLES. ALL OF THE P-TABLES ARE OF THE SAME FORMAT, AND THERE IS A ONE-TO ONE CORRESPONDENCE BETWEEN THE HARDWARE PARAMETER QUESTIONS AND THE SLOTS IN THE P-TABLE FORMAT.

ON THE FIRST TRIP THRU THE QUESTIONS, ALL OF THE SLOTS IN ALL OF THE P-TABLES ARE FILLED. IF THE OPERATOR TYPES IN LESS THAN N EXPLICIT VALUES IN RESPONSE TO A PARTICULAR QUESTION, THESE VALUES ARE PLACED IN THE P-TABLES (ONE VALUE GOING INTO THE PROPER SLOT OF EACH P-TABLE BEGINNING WITH THE FIRST P-TABLE) UNTIL THE STRING OF VALUES IS EXHAUSTED. THE LAST VALUE IN THE STRING BECOMES THE NEW DEFAULT AND IS USED TO FILL THAT SLOT IN THE REMAINING P-TABLES.

ON SUBSEQUENT TRIPS THRU THE QUESTIONS, THE SAME PROCESS IS CARRIED OUT, EXCEPT THAT THE EARLIEST P-TABLE NOT TO HAVE RECEIVED AN EXPLICIT VALUE IN ANY OF ITS SLOTS NOW ASSUMES THE ROLE THAT TABLE NUMBER ONE PLAYED IN THE FIRST TRIP.

THE SERIES OF QUESTIONS IS REISSUED UNTIL AT LEAST ONE QUESTION HAS RECEIVED N EXPLICIT VALUES FROM THE OPERATOR.

IN GIVING A STRING OF VALUES, COMMAS WITHOUT INTERVENING VALUES MAY BE USED TO INDICATE A REPETITION OF THE LAST NAMED VALUE.

A STRING OF VALUES MAY BE GIVEN AS A RANGE (6-10 FOR EXAMPLE). IF THE VALUES REPRESENT PURE NUMERICAL DATA, THIS SAMPLE RANGE TRANSLATES TO THE STRING 6,7,8,9,10 (AN INCREMENT OF 1). IF THE VALUES ARE ADDRESSES, THE SAMPLE RANGE TRANSLATES TO THE STRING 6,8,10 (AN INCREMENT OF 2).

NOW LET US SEE HOW WE COULD USE THESE CAPABILITIES TO CONSTRUCT A SET OF P-TABLES. ASSUME THAT WE HAVE 64 UNITS, AND THAT THERE ARE THREE HARDWARE PARAMETERS FOR EACH (THREE SLOTS IN THE P-TABLE, THREE HARDWARE QUESTIONS IN THE DIALOGUE). LET THE DESIRED VALUE FOR THE FIRST PARAMETER BE THE NUMBER 75 FOR ALL 64 TABLES. LET THE DESIRED VALUE FOR THE SECOND PARAMETER BE EQUAL TO THE UNIT NUMBER (1,2,3,...,64) EXCEPT FOR UNIT 50, WHICH SHOULD RECEIVE THE VALUE 49. LET THE DESIRED VALUE FOR THE THIRD PARAMETER BE THE NUMBER 76 FOR THE FIRST 20 UNITS AND THE NUMBER 77 FOR THE LAST 44 UNITS.

THE FOLLOWING DIALOGUE WOULD ACCOMPLISH THIS GOAL:

UNITS (D) ? 64

UNIT 1

<QUESTION 1> ? 75

<QUESTION 2> ? 1-20

<QUESTION 3> ? 76

UNIT 21

<QUESTION 1> ?

<QUESTION 2> ? 21-49,,51-64
<QUESTION 3> ? 77

THE FIRST TIME THE SERIES IS ASKED, SLOT ONE RECEIVES A 75 IN ALL 64 TABLES. SLOT TWO RECEIVES THE VALUES 1,2,3,...,20 IN TABLES 1 THRU 20 AND A CONSTANT 20 IN TABLES 21 THRU 64. SLOT THREE RECEIVES A CONSTANT 76 IN ALL 64 TABLES.

THE SECOND TIME THRU THE SERIES, TABLES 21 THRU THE END ARE GOING TO BE AFFECTED (NOTE THAT THIS PIECE OF INFORMATION IS PRINTED OUT FOR THE THE OPERATOR IN THE FORM 'UNIT XX' AT THE BEGINNING OF EACH SERIES). QUESTION 1 IS RESPONDED TO BY A <CR>, SO SLOT ONE STAYS AT CONSTANT 75 IN TABLES 21 THRU 64, SINCE NO NEW EXPLICIT VALUES ARE TYPED IN. SLOT TWO GETS THE VALUES 21,22,23,...,49 IN TABLES 21 THRU 49, AND GETS A 49 IN SLOT 50, AND GETS THE VALUES 51,52,53,...,64 IN TABLES 51 THRU 64. SLOT THREE GETS THE VALUE 77 IN TABLES 21 THRU 64.

THE DIALOGUE IS TERMINATED WHEN THE SOFTWARE RECOGNIZES THAT 64 EXPLICIT VALUES HAVE BEEN GIVEN FOR AT LEAST ONE QUESTION (NAMELY QUESTION 2).

2.3.16 EXAMPLES OF SOFTWARE P-TABLE DIALOGUE

2.3.16.1 BASIC FUNCTION AND DATA RELIABILITY WITH ALL ERROR REPORTING ENABLED

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

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

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

- A) RECEIVE PROMPT (DS B>)
- 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>
DISABLE INTERRUPTS (L) N ?	N<CR>
INHIBIT RECOVERY (L) N ?	N<CR>
CHANGE CMD SEQUENCE (L) N ?	N<CR>

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

- A) RECEIVE PROMPT (DS B>)
- B) ENTER STA/TES:5/FLA:IEP: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>	
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 (O) 40 ?	40<CR>	
CMD/2 (D) 5 ?	13<CR>	(REWIND) (COULD BE ANY COMMAND)
BRF COUNT (D) 4096 ?	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) 4096 ?	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) 4096 ?	<^Z>	

2.4 EXECUTION TIMES

2.4.1 SYSTEM CONFIGURATION

PDP11/34
MOS MEMORY
A36
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 - 16 MINUTES PER PASS.
TEST 4 - READ COMPATABILITY - 22 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

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

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:

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

A STATUS CONDITION HAS BEEN ENCOUNTERED THAT MAY HAVE SIGNIFICANCE TO THE PROGRAM. BITS OF INTEREST INCLUDE TMK, 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.

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

THE SPECIFIED FUNCTION WAS NOT INITIATED. BITS OF INTEREST ARE RMR, OFI, 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.

31.5.5 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 WILL BE DROPPED FROM THE TEST CYCLE UNLESS THE IDU OPTION IS USED.

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. 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:HOE. THERE ARE NO OTHER HALTS.

4.0 PERFORMANCE REPORT

UNIT X PASS:XXXXX RECORD:XXXXX
BYTES WRITTEN = XXX,XXX,XXX,XXX
BYTES READ REV = XXX,XXX,XXX,XXX
BYTES READ FWD = XXX,XXX,XXX,XXX
RECOVERABLE ERRORS - WRT RDR RDF
UNRECOVERABLE ERRORS - XXXXX XXXXX XXXXX
SPECIAL CONDITION HARD/FATAL DATA COMPARE
XXXXX XXXXX XXXXX

5.0 TEST SUMMARIES

5.1 TEST 1 -

BASIC FUNCTIONS.

EXECUTES AND VERIFIES CORRECT COMPLETION OF ALL TS04 FUNCTIONS.

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

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

SUBTEST 2 - REWIND.

- + REWIND.
- + REWIND AT BOT.

SUBTEST 3 - WRITE/VERIFY.

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

SUBTEST 4 - WRITE TAPE MARK, ERASE.

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

SUBTEST 5 - SPACE FILES.

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

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

SUBTEST 6 - SPACE RECORDS.

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

SUBTEST 7 - WRITE RETRY.

- + REWIND.
- + WRITE DATA.
- + WRITE RETRY.

SUBTEST 8 - READ REV RETRY.

- + READ REVERSE.
- + READ NEXT REVERSE.
- + READ NEXT FORWARD.

SUBTEST 9 - READ FWD RETRY.

- + READ FORWARD.
- + READ PREVIOUS FORWARD.
- + READ PREVIOUS REVERSE.

SUBTEST 10 - CLEAN.

- + CLEAN.
- + REWIND.

SUBTEST 11 - WRITE/VERIFY SWAPPED DATA BYTES.

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

SUBTEST 12 - READ SWAPPED DATA BYTES.

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

5.2 TEST 2 - DATA RELIABILITY.

1. THE TAPE IS INITIATED WITH THE FOLLOWING COMMANDS:
SET CHARACTERISTIC 40
REWIND
WRITE/VERIFY 63 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.

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

5.4 TEST 4 - READ COMPATABILITY/READ UTILITY.

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 WRITE/VERIFY RANDOM DATA IS EXECUTED.

6.0 DEVICE INFORMATION TABLES

6.1 GENERAL

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

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

6.2 UNIBUS INTERFACE SPECIFICATIONS

<u>TS11/ TS04</u>	<u>INT. VECTOR</u>	<u>UNIBUS ADDRESS</u>	<u>REGISTER</u>
FIRST	150	772520 772522	TSBA/TSDB TSSR
SECOND	154	772524 772526	TSBA/TSDB TSSR
THIRD	160	772530 772532	TSBA/TSDB TSSR
FOURTH	164	772534 772536	TSBA/TSDB TSSR

6.3 BIT DEFINITIONS FOR TS11/TS04 REGISTERS

6.3.1 TS11/TS04 REGISTER SUMMARY

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
TSBA	A15	A14	A13	A12	A11	A10	A09	A08	A07	A06	A05	A04	A03	A02	A01	A00
TSDB	P15	P14	P13	P12	P11	P10	P09	P08	P07	P06	P05	P04	P03	P02	P17	P16
TSSR	SC	UPE	SPE	RMR	NXM	NBA	A17	A16	SSR	OFL	FC1	FC0	TC2	TC1	TC0	
XST0	TMK	RLS	LET	RLL	WLE	NEF	ILC	ILA	MOT	ONL	IE	VCK	PED	WLK	BOT	EOT
XST1	DLT		COR	CRS	TIG	DBF	SCK		IPR	SYN	IPO	IED	POS	POL	UNC	MTE
						NZO				DRP	ITM	LCO	NZN	LRC	CRC	VPE
XST2	OPM	SIP	BPE	CAF		WCF		DTP	DT7	DT6	DT5	DT4	DT3	DT2	DT1	DT0
XST3	MICRO DIAGNOSTIC ERROR CODE								LMX	OPI	REV	CRF	DCK	NOI		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 THE VALUES OF BITS 17 AND 16 OF THE TSBA REGISTER.
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 FC0 (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 TC0 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)

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
TMK	RLS	LET	RLL	WLE	NEF	ILC	ILA	MOT	ONL	IE	VCK	PED	WLK	BOT	EOT

BIT	NAME	TCC	DEFINITION
15	TMK	5,2	TAPE MARK DETECTED. SET WHENEVER A TAPE MARK WAS DETECTED DURING A READ, SPACE, OR SKIP COMMAND AND AS A RESULT OF THE WRITE TAPE MARK OR WITE TAPE MARK RETRY COMMANDS.
14	RLS	2	RECORD LENGTH SHORT. THIS BIT INDICATES THAT EITHER THE RECORD'S LENGTH WAS SHORTER THAN THE BYTE COUNT ON READ OPERATIONS, A SPACE RECORD OPERATION ENCOUNTERED A TAPE MARK OR BOT BEFORE THE POSITION COUNT WAS EXHAUSTED, OR A SKIP TAPE MARKS COMMAND WAS TERMINATED BY ENCOUNTERING BOT OR A DOUBLE TAPE MARK (IF THAT OPERATIONAL MODE IS ENABLED, SEE LET) PRIOR TO EXHAUSTING THE POSITION COUNTER.
13	LET	2	LOGICAL END OF TAPE. SET ONLY ON THE SKIP TAPE MARKS COMMAND WHEN EITHER TWO CONTIGUOUS TAPE MARKS ARE DETECTED OR WHEN MOVING OFF OF BOT AND THE FIRST RECORD ENCOUNTERED IS A TAPE MARK. THE SETTING OF THIS BIT WILL NOT OCCUR UNLESS THIS MODE OF TERMINATION IS ENABLED THROUGH USE OF THE SET CHARACTERISTICS COMMAND.
12	RLL	2	RECORD LENGTH LONG. WHEN SET, THIS BIT INDICATES THAT THE RECORD READ WAS LONGER THAN THE BYTE COUNT SPECIFIED.
11	WLE	3,6	WRITE LOCK ERROR. WHEN SET, INDICATES THAT A WRITE OPERATION WAS ISSUED BUT THE MOUNTED TAPE DID NOT CONTAIN A WRITE ENABLE RING OR THE WRT LOCK SWITCH ACTIVATED DURING THE OPERATION.
10	NEF	3	NON-EXECUTABLE FUNCTION. WHEN SET, INDICATES THAT THE COMMAND COULD NOT BE EXECUTED DUE TO ONE OF THE FOLLOWING CONDITIONS: - 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)

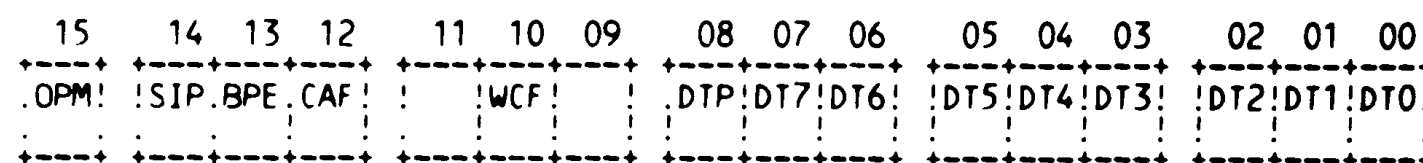
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
DLT		COR	CRS	TIG	DBF	SCK		IPR	SYN	IPO	IED	POS	POL	UNC	MTE
					NZO			DRP		ITM	LCO	NZN	LRC	CRC	VPE

BIT	NAME	TCC	DEFINITION
15	DLT	4	DATA LATE. SET WHEN THE I/O SILO IS FULL ON A READ OR EMPTY ON A WRITE. THESE CONDITIONS OCCUR WHENEVER THE UNIBUS LATENCY EXCEEDS THE DATA TRANSFER RATE OF THE TS04.
14	-	-	NOT USED.
13	COR	S	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	EXCESSIVE SKEW. FOR NRZI, DATA OCCURRED BETWEEN THE 50% MARK AND THE 100% MARK OF THE NRZI DATA WINDOW. FOR PE, IT TOOK MORE THAN FIVE CHARACTERS IN READ-AFTER-WRITE OR TEN CHARACTERS IN READ TO PROPERLY CENTER THE WINDOWS OF THE FORMAT CHANNEL LOGIC.
	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	S,4	INVALID PREAMBLE. SET ON A PE DRIVE IF THE PREAMBLE APPEARS TO BE SHORTER THAN 36 CHARACTERS OR LONGER THAN 44 CHARACTERS. ALSO

SET IF THE PREAMBLE IS INCORRECTLY ENCODED BEYOND THE FIFTEENTH CHARACTER IN READ OR THE TENTH CHARACTER IN READ-AFTER-WRITE.

06	SYN	4	SYNCH FAILURE. SET ON A PE DRIVE IF THE FORMATTER WAS UNABLE TO ACHIEVE SYNCHRONIZATION IN THE PREAMBLE.
	DRP	4	NRZ RECORD DROPPED A CHARACTER (THE NEXT CHARACTER WAS TO BE CONSIDERED CRC).
05	IPO	5,4	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	5,4	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	5,4	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	5,4	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.

6.3.5 EXTENDED STATUS REGISTER 2 (XSTAT2)

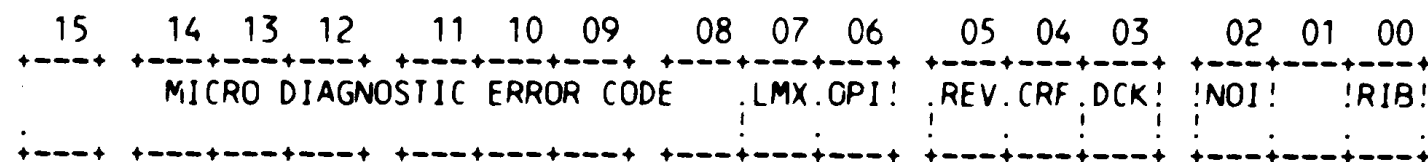


BIT	NAME	TCC	DEFINITION
15	OPM	S	OPERATION IN PROGRESS. (TAPE MOVING)
14	SIP	7	S:LO PARITY ERROR. CAUSES FATAL CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
13	BPE	7	SERIAL BUS PARITY ERROR AT DRIVE. SET BY THE TS04 WHEN A PARITY ERROR IS DETECTED ON DATA 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	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.
09	-	-	NOT USED.
08	DTP	S	DEAD TRACK PARITY. THE BITS DTP THROUGH DT0 INDICATE WHICH TRACK(S) WENT DEAD, IF ANY, DURING THE LAST DATA TRANSFER OPERATION. IF DESKEW BUFFER FAIL (DBF) IS SET, THESE BITS INDICATE WHICH CHANNEL FAILED.
07	DT7	S	DEAD TRACK 7. SEE DTP.
06	DT6	S	DEAD TRACK 6. SEE DTP.
05	DT5	S	DEAD TRACK 5. SEE DTP.
04	DT4	S	DEAD TRACK 4. SEE DTP.
03	DT3	S	DEAD TRACK 3. SEE DTP.

02	DT2	S	DEAD TRACK 2. SEE DTP.
01	DT1	S	DEAD TRACK 1. SEE DTP.
00	DT0	S	DEAD TRACK 0. SEE DTP.

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

6.3.6 EXTENDED STATUS REGISTER 3 (XSTAT3)



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

PE: AT LEAST 24 CHARACTERS IN A ROW THAT DO
 NOT QUALIFY AS A TAPE MARK OR A DATA
 PREAMBLE.

01 - - NOT USED.

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
 TS04 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.	M8965	20
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	24

		M8922.		
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	M8922 M8923 M8924	26

```

2278      .TITLE PROGRAM HEADER AND TABLES
2279      .SBTTL PROGRAM HEADER
2280
2281      .ENABL ABS,AMA
2282      =      2000
2283      .      BGNMOD
2284
2285      ;**
2286      ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
2287      ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
2288      ;--
2289
2290      002000      POINTER ALL
2291
2292
2293      002000      HEADER CZTSH,A,0,5000,5000,2700,,E,DESCM
2294      002000      L$NAME::
2295      002010      L$REV::
2296      002011      L$DEPO::
2297      002012      L$UNIT::
2298      002014      L$TIML::
2299      002016      L$HPCP::
2300      002020      L$SPCP::
2301      002022      L$HPTP::
2302      002024      L$SPTP::
2303      002026      L$LADP::
2304      002030      L$STA::
2305      002032      L$CO::
2306      002034      L$EFLG::
2307      002036      L$APT::
2308      002040      L$DTP::
2309      002042      L$EXP1::
2310      002044      L$EXP2::
2311      002046      L$EXP3::
2312      002050      L$MREV::
2313      002052      L$TIM1::
2314      002054      L$TIMU::
2315      002056      L$EF::
2316      002062      L$SPC::
2317      002064      L$DEVP::
2318      002066      L$REPP::
2319      002070      L$DRCT::
2320      002072      L$DRS::
2321      002074      L$AUT::
2322      002076      L$DUT::
2323      002100      L$STID::
2324      002102      L$DESC::
2325      002104      L$ICP::
2326      002106      L$CCP::
2327

```

PROGRAM HEADER AND TABLES
CZTSHA.P11 28-DEC-78 14:34

MACY11 30A(1052) 29-DEC-78 15:33^{L 4} PAGE 53
DISPATCH TABLE

SEQ 0050

2328
2329
2330
2331
2332
2333
2334
2335
2336
2337

002110
002112

.SBTTL DISPATCH TABLE

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

DISPATCH 5
L\$DISPATCH::

PROGRAM HEADER AND TABLES
CZTSHA.P11 28-DEC-78 14:34

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DEFAULT HARDWARE P-TABLE

SEQ 0051

```
2338      .SBTTL  DEFAULT HARDWARE P-TABLE
2339
2340      :++
2341      : THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
2342      : THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
2343      : IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
2344      :--
2345
2346      002124      BGNHW  DFPTBL
2347      002126      L$HW::
2348      002126      DFPTBL::
2349
2350
2351      002126      172520      ;TSDB ADDRESS.
2352      002130      000150      ;VECTOR ADDRESS.
2353
2354      002132
2355      002132      L10000:      ENDDHW
```

```

2356      .SBTTL  SOFTWARE P-TABLE
2357
2358      :++
2359      : THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
2360      : PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
2361      :--
2362
2363      002132      BGNSW  SFPTBL
2364      002134      L$SW::
2365      002134      SFPTBL::
2366
2367      002134      001      CLRFLG:: .BYTF  1      ;CLEAR COUNTERS FLAG.
2368      002135      000      RRANV:: .BYTE  0      ;RESET RANDOM VARIABLES EACH PASS FLAG.
2369      002136      000      HAE:: .BYTE  0      ;HALT AFTER EACH COMMAND FLAG.
2370      002137      000      .BYTE  0      ;SPARE.
2371      002140      000      .BYTE  0      ;SPARE.
2372      002141      000      .BYTE  0      ;SPARE.
2373      002142      000      DINT:: .BYTE  0      ;DISABLE INTERRUPTS FLAG.
2374      002143      000      IREC:: .BYTE  0      ;INHIBIT ERROR RECOVERY FLAG.
2375      002144      000      CHGFLG:: .BYTE  0      ;CHANGE CMD SEQ TABLE FLAG.
2376      002145      000      .BYTE  0      ;SPARE.
2377      002146      000      PIRE:: .BYTE  0      ;INHIBIT RESIDUAL FRAMECOUNT ERROR REPORT FLAG.
2378      002147      000      .BYTE  0      ;SPARE.
2379      002150      000040      CHAR:: CH.EAI      ;CHARACTERISTICS CODE (DEFAULT = 40).
2380      002152      000005      CMDD:: .WORD  5      ;COMMAND 2 (DEFAULT = WRITE/VERIFY).
2381      002154      010000      .WORD  DATCNT      ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE)
2382      002156      000012      .WORD  12      ;NUMBER OF OPERATIONS (DEFAULT = 10).
2383      002160      000007      .WORD  RANP      ;PATTERN (DEFAULT = RANDOM).
2384      002162      000005      .WORD  5      ;COMMAND 3 (DEFAULT = WRITE/VERIFY).
2385      002164      010000      .WORD  DATCNT      ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2386      002166      000012      .WORD  12      ;NUMBER OF OPERATIONS (DEFAULT = 10).
2387      002170      000007      .WORD  RANP      ;PATTERN (DEFAULT = RANDOM).
2388      002172      000005      .WORD  5      ;COMMAND 4 (DEFAULT = WRITE/VERIFY).
2389      002174      010000      .WORD  DATCNT      ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2390      002176      000012      .WORD  12      ;NUMBER OF OPERATIONS (DEFAULT = 10).
2391      002200      000007      .WORD  RANP      ;PATTERN (DEFAULT = RANDOM).
2392      002202      000005      .WORD  5      ;COMMAND 5 (DEFAULT = WRITE/VERIFY).
2393      002204      010000      .WORD  DATCNT      ;BYTE COUNT (DEFAULT = MAX BUFFER SIZE).
2394      002206      000012      .WORD  12      ;NUMBER OF OPERATIONS (DEFAULT = 10).
2395      002210      000007      .WORD  RANP      ;PATTERN (DEFAULT = RANDOM).
2396      002212      000033      .WORD  33      ;END OF CMD SEQ TABLE CODE.
2397
2398      002214      ENDSW
2399      002214      L10001:
2400
2401      002214      ENDMOD

```

```

2402
2403      .TITLE GLOBAL AREAS
2404      .SBTTL GLOBAL EQUATES SECTION
2405
2406      002214      BGNMOD
2407
2408      :++
2409      : THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
2410      : ARE USED IN MORE THAN ONE TEST.
2411      :--
2412
2413      002214      EQUALS
2414      :
2415      : BIT DIFINITIONS
2416      :
2417      100000      BIT15== 100000
2418      040000      BIT14== 40000
2419      020000      BIT13== 20000
2420      010000      BIT12== 10000
2421      004000      BIT11== 4000
2422      002000      BIT10== 2000
2423      001000      BIT09== 1000
2424      000400      BIT08== 400
2425      000200      BIT07== 200
2426      000100      BIT06== 100
2427      000040      BIT05== 40
2428      000020      BIT04== 20
2429      000010      BIT03== 10
2430      000004      BIT02== 4
2431      000002      BIT01== 2
2432      000001      BIT00== 1
2433      :
2434      001000      BIT9== BIT09
2435      000400      BIT8== BIT08
2436      000200      BIT7== BIT07
2437      000100      BIT6== BIT06
2438      000040      BIT5== BIT05
2439      000020      BIT4== BIT04
2440      000010      BIT3== BIT03
2441      000004      BIT2== BIT02
2442      000002      BIT1== BIT01
2443      000001      BIT0== BIT00
2444      :
2445      : EVENT FLAG DEFINITIONS
2446      : EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
2447      : EF16:EF01 AVAILABLE FOR PROGRAM USE
2448      :
2449      000040      EF.START== 32.      ; START COMMAND WAS ISSUED
2450      000037      EF.RESTART== 31.    ; RESTART COMMAND WAS ISSUED
2451      000036      EF.CONTINUE== 30.   ; CONTINUE COMMAND WAS ISSUED
2452      000035      EF.NEW== 29.        ; A NEW PASS HAS BEEN STARTED
2453      000034      EF.PWR== 28.        ; A POWER-FAIL/POWER-UP OCCURRED
2454      :
2455      000020      EF16== 16.
2456      000017      EF15== 15.
2457      000016      EF14== 14.

```

```
2458      000015      EF13== 13.
2459      000014      EF12== 12.
2460      000013      EF11== 11.
2461      000012      EF10== 10.
2462      000011      EF09== 9.
2463      000010      EF08== 8.
2464      000007      EF07== 7.
2465      000006      EF06== 6.
2466      000005      EF05== 5.
2467      000004      EF04== 4.
2468      000003      EF03== 3.
2469      000002      EF02== 2.
2470      000001      EF01== 1.
2471
2472      ; PRIORITY LEVEL DEFINITIONS
2473      ;
2474      000340      PRI07== 340
2475      000300      PRI06== 300
2476      000240      PRI05== 240
2477      000200      PRI04== 200
2478      000140      PRI03== 140
2479      000100      PRI02== 100
2480      000040      PRI01== 40
2481      000000      PRI00== 0
2482
2483
2484      ; REGISTER USAGE.
2485      ;
2486      ; R0 - PASSES PARAMETERS TO/FROM DIAGNOSTIC SUPERVISOR.
2487      ; R1 - COMMAND SEQUENCE TABLE POINTER.
2488      ; R2 - GENERAL PURPOSE REGISTER.
2489      ; R3 - GENERAL PURPOSE REGISTER.
2490      ; R4 - GENERAL PURPOSE REGISTER.
2491      ; R5 - CURRENT LOGICAL DEVICE NUMBER X 2.
2492      ; R6 - STACK POINTER.
2493      ; R7 - PROGRAM COUNTER.
2494
2495      ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE TSSR REGISTERS.
2496
2497      100000      TS.SC==100000      ;SPECIAL CONDITION BIT.
2498      040000      TS.UPE==40000      ;UNIBUS PARITY ERROR
2499      020000      TS.SPE==20000      ;SERIAL BUS PARITY ERROR.
2500      010000      TS.RMR==10000      ;REGISTER MODIFICATION REFUSED.
2501      004000      TS.NXM==4000      ;NON-EXISTENT MEMORY.
2502      002000      TS.NBA==2000      ;NEED BUFFER ADDRESS.
2503      001000      TS.A17==1000      ;BUS ADDRESS BIT 17.
2504      000400      TS.A16==400      ;BUS ADDRESS BIT 16.
2505      000200      TS.SSR==200      ;UNIT READY BIT.
2506      000100      TS.OFL==100      ;OFF LINE.
2507      177717      TSC.FCC==177717      ;FATAL CLASS CODE MASK.
2508      177761      TSC.TCC==177761      ;TERMINATION CLASS CODE MASK.
```

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2509      ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE COMMAND WORD
2510
2511      100000      ACK.C==100000      ;ACKNOWLEDGE BIT
2512      040000      CVC.C==40000      ;CLEAR VOLUME CHECK.
2513      020000      OPP.C==20000      ;OPPOSITE BIT
2514      010000      SWB.C==10000      ;SWAP BYTE BIT
2515      004000      MOD.C3==4000      ;MODE BIT 3
2516      004000      BRFC==4000      ;BYTE/RECORD/FILE COUNT FLAG BIT. NOT USED
2517      ;BY TS04 BUT USED INTERNALLY BY THIS PROGRAM ONLY.
2518      002000      MOD.C2==2000      ;MODE BIT 2
2519      001000      MOD.C1==1000      ;MODE BIT 1
2520      000400      MOD.C0==400      ;MODE BIT 0
2521      000200      IE.C==200      ;INTERRUPT ENABLE ;
2522      000100      FMT.C1==100      ;FORMAT BIT 1
2523      000100      VFY.C==100      ;WRITE VERIFY FLAG BIT. INTERNAL USE ONLY.
2524      ;NOT USED BY TS04.
2525      000040      FMT.C0==40      ;FORMAT BIT 0.
2526      000040      JMP.C==40      ;JUMP BIT-TO DIRECT THIS PROGRAM TO JUMP TO
2527      ;A CERTAIN LOCATION IN THE COMMAND SEQUENCE
2528      ;TABLE. INTERNAL USE ONLY.
2529      000020      CMD.C4==20      ;COMMAND BIT 4
2530      000020      DLY.C==20      ;INSERT DELAY. INTERNAL USE ONLY.
2531      000010      CMD.C3==10      ;COMMAND BIT 3
2532      000004      CMD.C2==4      ;COMMAND BIT 2
2533      000002      CMD.C1==2      ;COMMAND BIT 1
2534      000001      CMD.C0==1      ;COMMAND BIT 0
2535
2536      ;      BIT DEFINITIONS FOR DEVICE CHARACTERISTICS.
2537
2538      000200      CH.ESS==200      ;ENABLE SKIP TAPE MARKS STOP (STOP AT LOGICAL EOT).
2539      000040      CH.EAI==40      ;ENABLE ATTENTION INTERRUPTS.
2540      000020      CH.ERI==20      ;ENABLE MESSAGE BUFFER RELEASE INTERRUPTS.
2541      000040      DFTSCH==CH.EAI      ;DEFAULT CHARACTERISTICS CODE.
2542
2543      ;THE FOLLOWING INDICATES THE RELATIVE POSITIONS OF THE STATUS WORDS
2544      ;IN THE MESSAGE BUFFER.
2545
2546      000004      MS.RFC==4      ;RESIDUAL FRAME COUNT.
2547      000006      MS.XS0==6      ;EXT STATUS REG 0
2548      000010      MS.XS1==10      ;EXT STATUS REG 1
2549      000012      MS.XS2==12      ;EXT STATUS REG 2
2550      000014      MS.XS3==14      ;EXT STATUS REG 3
2551
2552      ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 0.
2553
2554      100000      X0.TMK==100000      ;TAPE MARK.
2555      040000      X0.RLS==40000      ;RECORD LENGTH SHORT.
2556      020000      X0.LET==20000      ;LOGICAL EOT.
2557      010000      X0.RLL==10000      ;RECORD LENGTH LONG.
2558      000100      X0.ONL==100      ;ON LINE BIT.
2559      000002      X0.BOT==2      ;BOT BIT.
2560      000001      X0.EOT==1      ;EOT BIT.
2561
2562      ;THE FOLLOWING ARE BIT DEFINITIONS FOR EXTENDED STATUS REGISTER 3.
2563
2564      000010      X3.DCK==10      ;DENSITY CHECK.
```

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2565      000337      X3.RNY==337      ;CAPSTAN RUNAWAY UDIAG ERROR CODE.
2566
2567      ;THE FOLLOWING DEFINITIONS SHOW THE RELATIVE POSITIONS OF THE COMMAND
2568      ;PACKET ENTRIES.
2569
2570      000000      CP.CMD==0      ;CMDPKT+0==TS04 COMMAND.
2571      000002      CP.ADL==2      ;CMDPKT+2==BUFFER ADDRESS LOW.
2572      000004      CP.ADH==4      ;CMDPKT+4==BUFFER ADDRESS HIGH.
2573      000006      CP.CNT==6      ;CKDPKT+6==BYTE/FILE/RECORD COUNT
2574
2575      ;      MISCELLANEOUS DEFINITIONS.
2576
2577      000340      INTPRI==PRI07      ;PRIORITY TO BE USED IN INTERRUPT STATE.
2578      002366      TSBA==TSDB      ;DATA BUFFER ADDRESS REGISTER.
2579      000010      SCHCNT==10      ;ARBITRARY BYTE LENGTH FOR CHARACTERISTIC
2580      ;BUFFER LENGTH. (EVEN #)
2581      000016      MSGCNT==16      ;MESSAGE BUFFER LENGTH IN BYTES. (EVEN #)
2582      002750      DIABLK==DATAWT      ;WRITE BUFFER ALSO USED FOR DIAG CMD.
2583      000020      DIACNT==20      ;DIAGNOSTIC COMMAND BUFFER EXTENT.
2584      010000      DATCNT==4096.      ;MAXIMUM RECORD LENGTH IN BYTES.
2585      ;THIS COUNT SHOULD BE A MULTIPLE OF 256 TO INSURE
2586      ;PROPER READ/WRITE BUFFER ALLOCATION BY THE SUPER.
2587      000260      CNTLEN==CNTEND-CNTBGN      ;LENGTH OF STATISTICAL COUNTER AREA.
2588      177700      RNOPSC==177700      ;RANDOM # OF OPERATIONS MASK.
2589      000007      RANP==7      ;CODE TO SELECT RANDOM PATTERN.
2590      000020      RRECL==16.      ;READ RECOVERY ATTEMPT LIMIT.
2591      000020      WRECL==16.      ;WRITE RECOVERY ATTEMPT LIMIT.
2592      153624      RANBC==153624      ;CONSTANT USED TO RESET RANDOM # GENERATOR BASE.
2593      032561      RANSC==32561      ;CONSTANT USED TO RESET RANDOM # SAVE LOCATION.
2594      177774      NINUSE==177774      ;NOT IN USE CODE FOR DEVICE STATE TABLE.
2595      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
2596      ;NOT 'COMMAND' BITS.
2597
2598      ;THE FOLLOWING DEFINES THE COMMAND WORD FOR EACH TS04 COMMAND.
2599
2600      100013      DRI== ACK.C.CMD.C3!CMD.C1!CMD.CO      ;DRIVE INIT.
2601
2602      104001      RDF-- ACK.C.BRF.C!CMD.CO      ;READ FORWARD
2603
2604      104401      RDR-- ACK.C!BRF.C!MOD.CO.CMD.CO      ;READ REVERSE
2605
2606      104005      WRT-- ACK.C!BRF.C!CMD.CO!CMD.C2      ;WRITE COMMAND
2607
2608      104105      WTV-- ACK.C!BRF.C!VFY.C!CMD.CO!CMD.C2      ;WRITE VERIFY
2609
2610      104010      SRF== ACK.C!BRF.C!CMD.C3      ;SPACE RECORD FORWARD
2611
2612      104410      SRR== ACK.C!BRF.C!MOD.CO!CMD.C3      ;SPACE RECORD REVERSE
2613
2614
2615
2616
2617
2618
2619
2620

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2621	105401	RNR==	ACK.C!BRF.C!MOD.C1!MOD.CO!CMD.CO	
2622				;READ REV RETRY1 - REREAD NEXT REVERSE, IE. SPACE FWD, READ REVERSE
2623				
2624	125401	RNF==	ACK.C!BRF.C!OPP.C!MOD.C1!MOD.CO!CMD.CO	
2625				;READ REV RETRY2 - RERFAD NEXT FORWARD, IE.READ FORWARD, SPACE REVERSE
2626				
2627	105001	RPF==	ACK.C!BRF.C!MOD.C1!CMD.CO	
2628				;READ FWD RETRY1 - REREAD PREVIOUS FORWARD, IE. SPACE REVERSE, READ FORW
2629				
2630	125001	RPR==	ACK.C!BRF.C!OPP.C!MOD.C1!CMD.CO	
2631				;READ FWD RETRY2 - REREAD PREVIOUS REVERSE, IE. READ REVERSE, SPACE FORW
2632				
2633	105005	WRR==	ACK.C!MOD.C1!BRF.C!CMD.C2!CMD.CO	
2634				;WRITE RETRY
2635				
2636	102010	RWD==	ACK.C!MOD.C2!CMD.C3	
2637				;REWIND COMMAND
2638				
2639	100012	MBR==	ACK.C!CMD.C3!CMD.C1	
2640				;MESSAGE BUFFER RELEASE
2641				
2642	100011	WTM==	ACK.C!CMD.C3!CMD.CO	
2643				;WRITE TAPE MARK.
2644				
2645	101011	WTR==	ACK.C!MOD.C1!CMD.C3!CMD.CO	
2646				;WRITE TAPE MARK RETRY.
2647				
2648	105010	SFF==	ACK.C!BRF.C!MOD.C1!CMD.C3	
2649				;SPACE FILE FORWARD
2650				
2651	105410	SFR==	ACK.C!BRF.C!MOD.CO!MOD.C1!CMD.C3	
2652				;SPACE FILE REVERSE
2653				
2654	100017	GES==	ACK.C!CMD.CO!CMD.C1!CMD.C2!CMD.C3	
2655				;GET EXTENDED STATUS
2656				
2657	100411	ERS==	ACK.C!MOD.CO!CMD.C3!CMD.CO	
2658				;ERASE 3 INCHES OF TAPE
2659				
2660	100412	UNL==	ACK.C!MOD.CO!CMD.C3!CMD.C1	
2661				;UNLOAD COMMAND
2662				
2663	101012	CLN==	ACK.C!MOD.C1!CMD.C3!CMD.C1	
2664				;ERASE TAPE.
2665				
2666	140004	SCH==	ACK.C!CVC.C!CMD.C2	
2667				;SET DEVICE CHARACTERISTICS.
2668	100006	DIA==	ACK.C!CMD.C2!CMD.C1	
2669				;DIAGNOSTICS.
2670	000040	JMP==	JMP.C	
2671				;JUMP TO 'N'TH COMMAND
2672	000020	DLY==	DLY.C	
2673				;DELAY 'N' MS.
2674	177777	END==	177777	
				;END OF COMMAND SEQUENCES

```

2675      .SBTTL  GLOBAL DATA SECTION
2676
2677      ;++
2678      ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
2679      ; IN MORE THAN ONE TEST.
2680      ;--
2681
2682      ;
2683      ; STORAGE FOR DEVICE REGISTERS
2684      ;
2685      DEVREG  0,0
2686      L$DR::
2687      L$DRST::
2688
2689
2690      ;      COMMAND PACKET.
2691
2692      ;      -      .+3&177774      ;MUST BE ON MOD 4 BOUNDARY.
2693      ;M$PKT:: 0      ;1ST WORD IS TS04 COMMAND.
2694      ;      0      ;2ND WORD IS THE BUFFER LOW ADDRESS.
2695      ;      0      ;3RD WORD IS THE BUFFER HIGH ADDRESS.
2696      ;      0      ;4TH WORD IS THE BYTE/RECORD/FILE COUNT.
2697
2698
2699      ;      GET STATUS COMMAND PACKET.
2700
2701      ;      -      .+3&177774      ;MUST BE ON MOD 4 BOUNDARY.
2702      ;G$CPK:: .WORD  GES
2703
2704
2705      ;      MESSAGE BUFFER RELEASE COMMAND PACKET.
2706
2707      ;      =      .+3&177774      ;MUST BE ON MOD 4 BOUNDARY.
2708      ;B$CPK:: .WORD  MBR
2709
2710
2711      ;      REWIND COMMAND PACKET (USED IN ERROR RECOVERY ONLY)
2712
2713      ;      =      .+3&177774      ;MUST BE ON A MODULE 4 BOUNDARY.
2714      ;R$WCPK:: .WORD  RWD
2715      ;      .WORD  1
2716
2717
2718      ;      WORK AREA FOR ANALYSIS OF MESSAGE PACKET CONTENTS.
2719
2720      MSGPKT:: .BI KW 7
2721      ;1ST WORD:: MESSAGE TYPE.
2722      ;2ND WORD:: DATA FIELD LENGTH.
2723      ;3RD WORD:: RESIDUAL FRAME COUNT.
2724      ;4TH WORD:: XSTAT0
2725      ;5TH WORD:: XSTAT1
2726      ;6TH WORD:: XSTAT2
2727      ;7TH WORD:: XSTAT3

```

```

2728      ;      MESSAGE PACKETS.
2729
2730      MSGPK0:: .BLKW 7      ;MESSAGE PACKET FOR DEVICE #0
2731      MSGPK1:: .BLKW 7      ;MESSAGE PACKET FOR DEVICE #1
2732      MSGPK2:: .BLKW 7      ;MESSAGE PACKET FOR DEVICE #2
2733      MSGPK3:: .BLKW 7      ;MESSAGE PACKET FOR DEVICE #3
2734
2735      ;      SET CHARACTERISTIC BLOCK.
2736
2737      SCHBK:: MSGPK0      ;1ST WORD:: MSGPKT ADDR LO(SET UP BY EXECUTE ROUTINE).
2738      0      ;2ND WORD:: MSGPKT ADDR HI.
2739      MSGCNT      ;3RD WORD:: MSG BUFFER LENGTH (BYTES)
2740      CH.EAI      ;4TH WORD:: CHARACTERISTICS WORD(SET BY SETUP ROUTINE).
2741
2742      ;      TS04 REGISTER ADDRESSES.
2743
2744
2745      TSDB:: .BLKW 4      ;TS04 DATA BUFFER ADDRESSES.
2746      TSSR:: .BLKW 4      ;TS04 STATUS REGISTER ADDRESSES.
2747      TSVLT:: .BLKW 4      ;TS04 VECTOR ADDRESSES.
2748
2749      ;      ADDRESSES OF MESSAGE PACKETS.
2750
2751      MSGPKA:: MSGPK0      ;DEVICE 0.
2752      MSGPK1      ;DEVICE 1.
2753      MSGPK2      ;DEVICE 2.
2754      MSGPK3      ;DEVICE 3.
2755
2756      ;      ADDRESSES OF INTERRUPT HANDLING ROUTINES.
2757
2758      TS4INT:: TS4IN0      ;DEVICE 0.
2759      TS4IN1      ;DEVICE 1.
2760      TS4IN2      ;DEVICE 2.
2761      TS4IN3      ;DEVICE 3.
2762
2763      ;      TS04 CODE LEVELS, WILL BE STORED AFTER SCH CMD IN BASIC FUNCTION TEST
2764
2765      TS4CL:: 0      ;DEVICE 0
2766      0      ;DEVICE 1
2767      0      ;DEVICE 2
2768      0      ;DEVICE 3
2769
2770      ;      UNIT NUMBERS OF ALL DEVICES BEING TESTED(1-4).
2771      ;      WHEN DEVICE IS NOT IN USE, IT'S LOCATION WILL = -3.
2772      ;      R5 WILL ALWAYS CONTAIN THE PRESENT LOGICAL UNIT NUMBER X 2.
2773
2774      DEVTBL:: .WORD NINUSE
2775      .WORD NINUSE
2776      .WORD NINUSE
2777      .WORD NINUSE
2778      .WORD END

```

```

2779      ;      COUNTER AREA.
2780
2781      CNTBGN=.
2782      002460 000020      WRBC:: .BLKW 20      ;BYTES WRITTEN.
2783      002520 000020      RRBC:: .BLKW 20      ;BYTES READ REV.
2784      002560 000020      RFBC:: .BLKW 20      ;BYTES READ FWD.
2785      002620 000004      WRREC:: .BLKW 4      ;RECOVERABLE WRITE ERRORS.
2786      002630 000004      WRUNR:: .BLKW 4      ;UNRECOVERABLE WRITE ERRORS.
2787      002640 000004      RRREC:: .BLKW 4      ;RECOVERABLE READ REV ERRORS.
2788      002650 000004      RRUNR:: .BLKW 4      ;UNRECOVERABLE READ REV ERRORS.
2789      002660 000004      RFREC:: .BLKW 4      ;RECOVERABLE READ FWD ERRORS.
2790      002670 000004      RFUNR:: .BLKW 4      ;UNRECOVERABLE READ FWD ERRORS.
2791      002700 000004      PASCNT:: .BLKW 4      ;PASS COUNT.
2792      002710 000004      SCCNT:: .BLKW 4      ;SPECIAL CONDITION COUNT.
2793      002720 000004      VFYCNT:: .BLKW 4      ;COUNT OF TS04 WRITE VERIFY ERRORS.
2794      002730 000004      HRDCNT:: .BLKW 4      ;COUNT OF # OF TIMES WE SAW HARD ERRORS.
2795      002740 000004      CNTEND=.      ;END OF STATISTICAL COUNTERS.
2796      002740 000004      RECCNT:: .BLKW 4      ;NUMBER OF RECORDS FROM BOT(CLEARED ONLY ON REWIND).
2797
2798
2799      ;      THE FOLLOWING ARE THE DEFINITIONS OF VARIABLES
2800      ;      USED BY THE PROGRAM.
2801
2802      002750 000000      DATAWT:: .WORD 0      ;WRITE BUFFER ADDRESS.
2803      002752 000000      DATARD:: .WORD 0      ;READ BUFFER ADDRESS.
2804      002754 000000      NCNT:: .WORD 0      ;STORAGE FOR VALUE OF N.
2805      002756 000000      NCNT1:: .WORD 0      ;TEMP STORAGE FOR VALUE OF N.
2806      002760 000000      BRCNT:: .WORD 0      ;STORAGE FOR BPCR VALUE.
2807      002762 177777      CMDWRD:: .WORD END      ;CONTAINS COMMAND WORD BEING EXECUTED PRESENTLY.
2808      002764 177777      CMDSAV:: .WORD END      ;SAVE LOCATION FOR CMD WORD DURING ERROR RECOVERY
2809      002766 177777      PCMDWD:: .WORD END      ;CONTAINS PREVIOUS COMMAND WORD.
2810      002770 000000      CMDLG:: .WORD 0      ;CURRENT COMMAND LOGGING CODE.
2811      002772 000000      LENMSK:: .WORD 0      ;RANDOM WRITE LENGTH MASK, TO BE SET UP BY TESTS
2812      002774 153624      RANB:: .WORD 153624      ;RANDOM # GENERATOR BASE.
2813      002776 032561      RANS:: .WORD 32561      ;RANDOM # SAVE LOCATION.
2814      003000 000000      TIME1:: .WORD 0      ;TIME COUNT 1.
2815      003002 000000      TIME2:: .WORD 0      ;TIME COUNT 2.
2816      003004 000000      JLOOP:: .WORD 0      ;JMP COMMAND LOOP COUNT.
2817      003006 000000      JLOC:: .WORD 0      ;JMP COMMAND LOCATION COUNT.
2818      003010 000000      PATERN:: .WORD 0      ;PATTERN SELECT CODE.
2819      003012 000000      CTCC:: .WORD 0      ;CURRENT TERMINATION CLASS CODE.
2820      003014 000000      R5SAVE:: .WORD 0      ;LOCATION FOR SAVING CURRENT DEVICE POINTER.

```

```

2821      ;      ERROR FLAG AREA, THESE FLAGS ARE CLEARED DURING INITIALIZATION AND
2822      ;      AFTER EACH COMMAND IS COMPLETED.
2823
2824      003016      BGNFLG=.
2825      003016      000000C      RETRYC:: .WORD 0      ;# OF RECOVERY ATTEMPTS EXECUTED.
2826      003020      000      RECLOG:: .BYTE 0      ;RECORD COUNT HAS BEEN UPDATED FOR THIS RECORD.
2827      003021      000      ERLOG:: .BYTE 0      ;DATA BYTES AND ERRORS HAVE BEEN LOGGED FOR THIS RECORD.
2828      003022      000      RWERR:: .BYTE 0      ;READ/WRITE ERROR HAS OCCURED.
2829      003023      000      UNREC:: .BYTE 0      ;UNRECOVERABLE ERROR HAS OCCURED.
2830      003024      000      ERRREC:: .BYTE 0      ;ERROR RECOVERY MODE.
2831      003025      000      DROPED:: .BYTE 0      ;CURRENT UNIT HAS BEEN DROPPED
2832      ;
2833      003026      ENDERF=.
2834
2835      ;      ADDITIONAL FLAGS, THESE FLAGS ARE CLEARED DURING INITIALIZATION.
2836
2837      003026      000004      .NTFLG:: .BLKW 4      ;INTERRUPT OCCURRED FLAGS FOR EACH DEVICE.
2838      003036      000      RANDOM:: .BYTE 0      ;RANDOM EVERYTHING FLAG.
2839      003037      000      VFYFLG:: .BYTE 0      ;SET DURING WRITE/VERIFY COMMAND.
2840      003040      000      EOTFLG:: .BYTE 0      ;EOT HAS BEEN REACHED ON THIS PASS
2841      003041      000      RPTFLG:: .BYTE 0      ;PERFORMANCE REPORT HAS BEEN REQUESTED.
2842      003042      000      SWBFLG:: .BYTE 0      ;ENABLES SWAP BYTE FUNCTION WHEN NOT EQUAL TO ZERO.
2843      003043      000      IRE:: .BYTE 0      ;INHIBIT RESIDUAL FRAME COUNT ERROR REPORT.
2844      ;
2845      003044      ENDFLG-.
2846
2847      ;      ADDITIONAL FLAGS, THESE FLAGS ARE CLEARED ONLY AFTER BEING CHECKED.
2848
2849      003044      000      STAFLG:: .BYTE 0      ;START FLAG - SET BY INIT CODE IF STARTING.
2850      003045      000      PWRFLG:: .BYTE 0      ;POWER FAILURE FLAG - SET ONLY DURING INIT.
2851      ;
2851      .EVEN

```

```

2852                                     :THE FOLLOWING IS THE COMMAND SEQUENCE TABLE. THE TABLE
2853                                     :HAS DEFAULT VALUES AT PROGRAM LOAD AS SHOWN. THESE VALUES
2854                                     :CAN BE UPDATED BY A TEST OR BY OPERATOR INPUT.
2855
2856 003046 140004 CMDSEQ:: .WORD SCH ;SET CHARACTERISTICS.
2857 003050 000040 .WORD CH.EAI
2858 003052 000001 .WORD 1
2859 003054 000000 .WORD 0
2860 003056 104105 CMDSE2:: .WORD WTV ;WRITE VERIFY
2861 003060 010000 .WORD DATCNT ;MAX BUFFER LENGTH.
2862 003062 000012 .WORD 00012 ;TEN TIMES.
2863 003064 000007 .WORD RANP ;RANDOM PATTERN.
2864 003066 104105 .WORD WTV ;WRITE VERIFY..
2865 003070 010000 .WORD DATCNT ;MAX BUFFER LENGTH.
2866 003072 000012 .WORD 00012 ;TEN TIMES.
2867 003074 000007 .WORD RANP ;RANDOM PATTERN.
2868 003076 104105 .WORD WTV ;WRITE VERIFY.
2869 003100 010000 .WORD DATCNT ;MAX BUFFER LENGTH.
2870 003102 000012 .WORD 00012 ;TEN TIMES.
2871 003104 000007 .WORD RANP ;RANDOM PATTERN.
2872 003106 104105 .WORD WTV ;WRITE VERIFY.
2873 003110 010000 .WORD DATCNT ;MAX BUFFER LENGTH.
2874 003112 000012 .WORD 00012 ;TEN TIMES.
2875 003114 000007 .WORD RANP ;RANDOM PATTERN.
2876 003116 000004 .BLKW 4 ;EXTENSION TO HOLD 1 MORE CMD.
2877 003126 177777 : SEQEND:: .WORD END ;SOFT END OF SEQUENCE TABLE.
2878 003130 177777 .WORD END
2879 003132 177777 .WORD END
2880 003134 177777 .WORD END
2881 003136 177777 .WORD END ;HARD END OF SEQUENCE TABLE.
  
```

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2882                                     ;THE FOLLOWING IS THE TS04 COMMAND TABLE
2883
2884 003140 100013          CMDTBL:: .WORD DRI          ;DRIVE INIT.
2885 003142 104001          .WORD RDF          ;READ FORWARD.
2886 003144 104401          .WORD RDR          ;READ REVERSE.
2887 003146 104005          .WORD WRT          ;WRITE
2888 003150 104105          .WORD WTV          ;WRITE/VERIFY. (WRITE ALL RECORDS, RDR AND
2889                                     ;CHECK DATA ON ALL RECORDS, RDF AND
2890                                     ;CHECK DATA ON ALL RECORDS.)
2891 003152 104010          .WORD SRF          ;SPACE 'N' RECORDS FORWARD.
2892 003154 104410          .WORD SRR          ;SPACE 'N' RECORDS REVERSE.
2893 003156 105401          .WORD RNR          ;READ NEXT REVERSE. I.E., SPACE FWD, READ REVERSE.
2894 003160 125401          .WORD RNF          ;READ NEXT FORWARD. I.E., READ FORWARD, SPACE REVERSE.
2895 003162 105001          .WORD RPF          ;READ PREVIOUS FORWARD. I.E., SPACE REVERSE, READ FORWAR
2896 003164 125001          .WORD RPR          ;READ PREVIOUS REVERSE. I.E., READ REVERSE, SPACE FORWAR
2897 003166 105005          .WORD WRR          ;WRITE RETRY.
2898 003170 102010          .WORD RWD          ;REWIND.
2899 003172 100012          .WORD MBR          ;MESSAGE BUFFER RELEASE
2900 003174 100011          .WORD WTM          ;WRITE TAPE MARK
2901 003176 101011          .WORD WTR          ;WRITE TAPE MARK RETRY.
2902 003200 105010          .WORD SFF          ;SPACE 'N' FILES FORWARD.
2903 003202 105410          .WORD SFR          ;SPACE 'N' FILES REVERSE.
2904 003204 100017          .WORD GES          ;GET EXTENDED STATUS.
2905 003206 100411          .WORD ERS          ;ERASE 3 INCHES OF TAPE.
2906 003210 100412          .WORD UNL          ;REWIND AND UNLOAD.
2907 003212 101012          .WORD CLN          ;CLEAR TAPE.
2908 003214 140004          .WORD SCH          ;SET CHARACTERISTICS.
2909 003216 100006          .WORD DIA          ;DIAGNOSTIC COMMAND.
2910 003220 000040          .WORD JMP          ;JUMP TO THE NTH COMMAND IN THE SEQUENCE.
2911 003222 000020          .WORD DLY          ;DELAY 'N' MS.
2912 003224 177777          .WORD END          ;END OF COMMAND TABLE
2913

```

```

2914      ;      THE FOLLOWING TABLE CONTAINS THE ASCII FOR EACH COMMAND.
2915
2916 003226 051104 111      CMDASC:: .ASCII /DRI/      ;DRIVE INIT.
2917      003232      .EVEN
2918 003232 042122 106      .ASCII /RDF/      ;READ FORWARD.
2919      003236      .EVEN
2920 003236 042122 122      .ASCII /RDR/      ;READ REVERSE.
2921      003242      .EVEN
2922 003242 051127 124      .ASCII /WRT/      ;WRITE
2923      003246      .EVEN
2924 003246 052127 126      .ASCII /WTV/      ;WRITE/VERIFY. (WRITE ALL RECORDS, RDR AND CHECK DATA
2925      .EVEN      ;ON ALL RECORDS, RDF AND CHECK DATA ON ALL RECORDS.)
2926      003252      .EVEN
2927 003252 051123 106      .ASCII /SRF/      ;SPACE 'N' RECORDS FORWARD.
2928      003256      .EVEN
2929 003256 051123 122      .ASCII /SRR/      ;SPACE 'N' RECORDS REVERSE.
2930      003262      .EVEN
2931 003262 047122 122      .ASCII /RNR/      ;READ NEXT REVERSE. I.E., SPACE FWD READ REVERSE.
2932      003266      .EVEN
2933 003266 047122 106      .ASCII /RNF/      ;READ NEXT FORWARD, I.E., READ FORWARD, SPACE REVERSE.
2934      003272      .EVEN
2935 003272 050122 106      .ASCII /RPF/      ;READ PREVIOUS FORWARD. IE., SPACE REVERSE, READ FORWARD
2936      003276      .EVEN
2937 003276 050122 122      .ASCII /RPR/      ;READ PREVIOUS REVERSE. IE., READ REVERSE, SPACE FORWARD
2938      003302      .EVEN
2939 003302 051127 122      .ASCII /WRR/      ;WRITE RETRY.
2940      003306      .EVEN
2941 003306 053522 104      .ASCII /RWD/      ;REWIND.
2942      003312      .EVEN
2943 003312 041115 122      .ASCII /MBR/      ;MESSAGE BUFFER RELEASE
2944      003316      .EVEN
2945 003316 052127 115      .ASCII /WTM/      ;WRITE TAPE MARK
2946      003322      .EVEN
2947 003322 052127 122      .ASCII /WTR/      ;WRITE TAPE MARK RETRY.
2948      003326      .EVEN
2949 003326 043123 106      .ASCII /SFF/      ;SPACE 'N' FILES FORWARD.
2950      003332      .EVEN
2951 003332 043123 122      .ASCII /SFR/      ;SPACE 'N' FILES REVERSE.
2952      003336      .EVEN
2953 003336 042507 123      .ASCII /GES/      ;GET EXTENDED STATUS.
2954      003342      .EVEN
2955 003342 051105 123      .ASCII /ERS/      ;ERASE 3 INCHES OF TAPE.
2956      003346      .EVEN
2957 003346 047125 114      .ASCII /UNL/      ;REWIND AND UNLOAD.
2958      003352      .EVEN
2959 003352 046103 116      .ASCII /CLN/      ;CLEAN TAPE.
2960      003356      .EVEN
2961 003356 041523 110      .ASCII /SCH/      ;SET CHARACTERISTICS. WHERE BRF=200, 40, 20, 0.
2962      003362      .EVEN      ;SEE TS11/TS04 PROGRAMMING SPECIFICATION FOR DESCRIPTION
2963      003362 044504 101      .ASCII /DIA/      ;DIAGNOSTICS. SEE TS11/TS04 PROGRAMMING SPECIFICATION
2964      003366      .EVEN      ;FOR DESCRIPTION. ODT MUST BE USED TO LOAD DIAGNOSTIC D
2965      003366      .EVEN      ;INTO THE WRITE BUFFER BEFORE THIS CMD IS ISSUED.
2966      003366      .EVEN
2967 003366 046512 120      .ASCII /JMP/      ;JUMP TO THE NTH COMMAND IN THE COMMAND
2968      .EVEN      ;SEQUENCE TABLE, WHERE N IS DEFINED IN
2969

```

2970 ;THE # OF OPERATIONS.
2971 .EVEN
2972 003372 046104 131 .ASCII /DLY/ ;DELAY 'N' MS, WHERE N IS DEFINED IN
2973 ;THE # OF OPERATIONS.
2974
2975 .EVEN
2976 003376 047105 104 .ASCII /END/ ;END OF COMMAND SEQUENCE.
2977 .EVEN
2978
2979
2980

2981 ;*****
2982 ;*****
2983 ; PATCH AREA
2984
2985 003402 000102 .BLKW 66.
2986 ;*****
2987 ;*****

2988
 2989
 2990
 2991
 2992
 2993
 2994
 2995
 2996
 2997
 2998
 2999
 3000
 3001
 3002
 3003
 3004
 3005
 3006
 3007

.SBTTL GLOBAL TEXT SECTION

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

: NAMES OF DEVICES SUPPORTED BY PROGRAM

: DEVTYP <TS04>
 L\$DVTYP::

: FORMAT STATEMENTS USED IN PRINT CALLS

.NLIST BEX

003614	051524	032060	042040	DESCM::	.ASCIZ /TS04 DRT/
003625	045	022516	052501	CODELM::	.ASCIZ /%N%AUNIT %D1%S2%ATS04 CODE LEVEL = P%03%N%N/
	003702				.EVEN
003702	054130	020130	046503	HALTM::	.ASCIZ /XXX CMD - TYPE <CR> TO CONTINUE/
003742	046503	020104	040520	CMDPKM::	.ASCIZ /CMD PACKET ADR NOT ON MODULO 4 BOUNDARY/
	004012				.EVEN
004012	054130	020130	040504	WIVERM::	.ASCIZ /XXX DATA COMPARE ERROR/
004041	116	020117	051524	TOERM::	.ASCIZ /NO TS04 RESPONSE/
004062	047125	042504	044506	SCERM::	.ASCIZ /UNDEFINED SPECIAL CONDITION/
004116	043122	020103	047516	RFCERM::	.ASCIZ /RFC NON ZERO/
004133	124	030123	020064	NSSRM::	.ASCIZ /TS04 NOT READY/
004152	042522	051124	020131	RLEXM::	.ASCIZ /RETRY LIMIT EXCEEDED ON ABOVE ERROR/
004216	052101	042524	052116	ATTNM::	.ASCIZ /ATTENTION CONDITION - UNIT OFF LINE/
004262	052506	041516	044524	FUNRM::	.ASCIZ /FUNCTION REJECT/
004302	040506	040524	020114	FATSM::	.ASCIZ /FATAL SUBSYSTEM ERROR/
004330	047516	044440	052116	NOINTM::	.ASCIZ /NO INTERRUPT/
004345	124	050101	020105	TSAM::	.ASCIZ /TAPE STATUS ALERT/
004367	124	047517	046440	TOOMM::	.ASCIZ /TOO MANY INTERRUPTS/
004413	103	050101	052123	RNYM::	.ASCIZ /CAPSTAN RUNAWAY/
004433	122	041505	053117	RERM::	.ASCIZ /RECOVERABLE ERROR/
004455	125	051116	041505	URERM::	.ASCIZ /UNRECOVERABLE ERROR/
004501	045	022516	052501	DROPDm::	.ASCIZ /%N%AUNIT %D1%A HAS BEEN DROPPED%N/
004543	045	022516	040501	AUDRPM::	.ASCIZ /%N%AALL UNITS DROPPED%N%N/

.LIST BEX
 .EVEN

3008 004576

```
3009      .SBTTL  GLOBAL ERROR REPORT SECTION
3010
3011      :++
3012      : THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
3013      : THAT ARE USED IN MORE THAN ONE TEST.  IT ALSO INCLUDES THE ASCII MESSAGES
3014      : THAT ARE USED BY THE PRINTB AND PRINTX CALLS..
3015      :--
3016
3017
3018      004576      BGNMSG  DTAERM
3019      004576      DTAERM::
3020
3021      004576      PRINTB  #DTAER1,DEVTBL(R5),<B,TIME1>,<B,TIME2>,R2,RECCNT(R5)
3022
3023      004644      EXIT    MSG
3024
3025
3026
3027      004650      040445  047125  052111  DTAER1: .NLIST  BEX
3028      004746      .ASCIIZ  '%AUNIT %D1%A  WAS:%B8%A  S/B:%B8%A  BYTE:%D4%A  RECORD:%D5%N'
3029      .LIST  BEX
3030      .EVEN
3031
3032      ENDMSG
3033
3034      004750      BGNMSG  STAERM
3035      004750      STAERM::
3036      004750      PRINTB  #STAER1,DEVTBL(R5),PASCNT(R5),RECCNT(R5)
3037      005004      PRINTX  #STAER7
3038      005024      PRINTX  #STAER2
3039      005044      PRINTX  #STAER3,CMDPKT,@TSDB(R5),MSGPKT+MS.RFC,@TSSR(R5),CTCC
3040      005110      PRINTX  #STAER4,CMDPKT+2,CMDPKT+4,CMDPKT+6
3041      005144      PRINTX  #STAER0
3042      005164      PRINTX  #STAER6,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3
3043      005224      EXIT    MSG
3044
3045      005230      040445  054130  020130  STAER1: .NLIST  BEX
3046      .ASCIIZ  '/%AXXX CMD FAILED - UNIT %D1%S3%APASS:%D5%S3%ARECORD:%D5%N/'
3047      .EVEN
3048      005322      040445  051120  053105  STAER7: .ASCIIZ  '/%APREVIOUS CMD WAS  XXX %N/'
3049      005355      045  041501  042115  STAER2: .ASCIIZ  '/%ACMDPKT%S2%ATSBA%S4%ARFC%S5%ATSSR%S3%ATCC%N/'
3050      005432      047445  022466  031123  STAER3: .ASCIIZ  '/%06%S2%06%S2%06%S2%06%S2%D1%N/'
3051      005470      047445  022466  116  STAER4: .ASCII  '/%06%N/'
3052      005475      045  033117  047045  .ASCII  '/%06%N/'
3053      005502      047445  022466  000116  .ASCIIZ  '/%06%N/'
3054      005510      040445  051530  030124  STAER0: .ASCIIZ  '/%AXST0%S4%AXST1%S4%AXST2%S4%AXST3%N/'
3055      005554      047445  022466  031123  STAER6: .ASCIIZ  '/%06%S2%06%S2%06%S2%06%N/'
3056      .LIST  BEX
3057      .EVEN
3058
3059      ENDMSG
3060
3061      L10003:
```

GLOBAL AREAS MACY11 30A(1052) 29-DEC-78 15:33 PAGE 71
CZTSHA.P11 28-DEC-78 14:34 GLOBAL ERROR REPORT SECTION

SEQ 0068

3050 005606 BGNMSG NURTYM
3051 005606 NURTYM::
3052 005606 EXIT MSG
3053
3054 005612 040445 042522 047503 NURTY1: .NLIST BEX
 .ASCIZ /%ARECOVERED FROM ABOVE ERROR ON RETRY #%D2%A.%N/
 .LIST BEX
 .EVEN
3055
3056
3057 005672 ENDMSG
3058 005672 L10004:

```
3059      .SBTTL  GLOBAL SUBROUTINES SECTION
3060
3061      ;++
3062      ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
3063      ; THAT ARE USED IN MORE THAN ONE TEST.
3064      ;--
3065
3066      ;      MODULES TO HANDLE TS04 INTERRUPTS.
3067
3068      005674      BGNSRV  TS4IN0      ;DEVICE 0.
3069      005674      TS4IN0::
3070      005674          SETPRI INTPRI      ;SET INTERRUPT PRIORITY.
3071      005702          LET INTFLG := INTFLG + #1      ;SET INTERRUPT OCCURRED FLAG.
3072      005706          ENDSRV
3073      005706      L10005:
3074
3075      005710      BGNSRV  TS4IN1      ;DEVICE 1.
3076      005710      TS4IN1::
3077      005710          SETPRI INTPRI      ;SET INTERRUPT PRIORITY.
3078      005716          LET INTFLG+2 := INTFLG+2 + #1      ;SET INTERRUPT OCCURRED FLAG.
3079      005722          ENDSRV
3080      005722      L10006:
3081
3082      005724      BGNSRV  TS4IN2      ;DEVICE 2.
3083      005724      TS4IN2::
3084      005724          SETPRI INTPRI      ;SET INTERRUPT PRIORITY.
3085      005732          LET INTFLG+4 := INTFLG+4 + #1      ;SET INTERRUPT OCCURRED FLAG.
3086      005736          ENDSRV
3087      005736      L10007:
3088
3089      005740      BGNSRV  TS4IN3      ;DEVICE 3.
3090      005740      TS4IN3::
3091      005740          SETPRI INTPRI      ;SET INTERRUPT PRIORITY.
3092      005746          LET INTFLG+6 := INTFLG+6 + #1      ;SET INTERRUPT OCCURRED FLAG.
3093      005752          ENDSRV
3094      005752      L10010:
```

:

```
3095      :      SUBROUTINE TO STORE A SET CHARACTERISTIC COMMAND AS
3096      :      THE FIRST ENTRY IN THE SEQUENCE TABLE.
3097      :      INPUTS:
3098      :      OUTPUTS:
3099      :      REGISTERS:
3100      :      CALLS:
3101
3102 005754      SETCH:: LET R1 := #CMDSEQ      :INIT COMMAND SEQUENCE TABLE POINTER.
3103 005760      MOV      #SCH,(R1)+      :THIS CODE SETS UP A SET CHARACTERISTIC
3104 005764      MOV      #DFTSCH,(R1)+      :COMMAND AS THE FIRST COMMAND IN THE
3105 005770      MOV      #1,(R1)+      :SEQUENCE TABLE.
3106 005774      TST      (R1)+      :SKIP PATTERN LOCATION.
3107 005776      RTS PC
3108
3109
3110
3111
3112      :      SUBROUTINE TO STORE A REWIND COMMAND IN THE SEQUENCE TABLE
3113      :      INPUTS:
3114      :      OUTPUTS:
3115      :      REGISTERS:
3116      :      CALLS:
3117
3118 006000      SETRW:: LET (R1)+ := #RWIND      :CMD = REWIND.
3119 006004      LET (R1)+ := #1      :BRF.
3120 006010      LET (R1)+ := #1      :# OF OPERATIONS.
3121 006014      TST (R1)+      :SKIP PATTERN.
3122 006016      RTS PC      :RETURN
```

```
3123      :      SUBROUTINE TO EXECUTE ALL COMMANDS IN THE SEQUENCE TABLE ON ALL
3124      :      DEVICES.
3125      :      INPUTS:
3126      :      OUTPUTS:      R2 = TERMINATION INDICATOR (0=END OF TABLE,1=EOT)
3127      :      REGISTERS:
3128      :      CALLS:      CMDAC,SETUP,EXECUTE,GOWAIT,CKHAE,NEXTU,FIRSTU,VFYDAT.
3129
3130      EXALL:: LET R1 := #CMDSEQ      ;INIT SEQUENCE TABLE POINTER.
3131      WHILE (R1) NE #END DO      ;WHILE THERE ARE CMDS IN THE SEQUENCE TABLE.
3132      JSR PC,SETUP      ;GO SETUP THE COMMAND BLOCK.
3133      WHILE NCNT NE #0 DO      ;WHILE THERE ARE RECORDS REMAINING:
3134      JSR PC,CMDAC      ;STORE CMD ASCII IN ERROR MESSAGE.
3135      IFB RANDOM NE #0 THEN      ;IF IN RANDOM MODE:
3136      IF CMDWRD EQ #WRT THEN      ;IF CMD IS A WRITE THEN:
3137      IFB VFYFLG NE #0 THEN      ;IF DATA IS TO BE VERIFIED THEN:
3138      LET BRFCNT := RANS CLR.BY #177740 ;ALLOW BYTE COUNT OF 16-31.
3139      ELSE      ;ELSE IF DATA IS NOT TO BE VERIFIED:
3140      LET RANB := RANB + RANS
3141      LET RANS := RANS + RANB
3142      LET BRFCNT := RANS CLR.BY LENMSK ;SET UP RANDOM LENGTH
3143      ENDIF
3144      IF BRFCNT LT #D16 THEN ;DC NOT ALLOW BYTE COUNT OF LESS THAN 16.
3145      LET BRFCNT := #20 ;CHANGE 0 TO 16 BYTES.
3146      ENDIF
3147      LET CMDPKT+CP.CNT := BRFCNT ;MOVE BRFCNT TO CMD PACKET.
3148      ENDIF
3149      ENDIF
3150      JSR PC,FIRSTU      ;SET UP FOR FIRST UNIT.
3151      IF DEVTBL(R5) EQ #END THEN ;IF ALL DEVICES HAVE BEEN DROPPED:
3152      DOCLN      ;DO CLEAN CODE + TERMINATE PASS.
3153      ENDIF
3154      WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE DEVICES:
3155      JSR PC,EXECUTE      ;GO EXECUTE THE COMMAND.
3156      JSR PC,NEXTU      ;FIND NEXT UNIT IN TEST CYCLE.
3157      ENDDO
3158      IFB RPTFLG NE #0 THEN      ;IF REPORT HAS BEEN REQUESTED THEN:
3159      LET RPTFLG :=B= #0      ;CLR THE FLAG.
3160      DORPT      ;PRINT THE PERFORMANCE REPORT.
3161      ENDIF
3162      JSR PC,FIRSTU      ;SET UP FOR FIRST UNIT.
3163      WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE DEVICES:
3164      JSR PC,GOWAIT      ;GO WAIT FOR INTERRUPT + CHECK FOR ERRORS.
3165      IF #X0.EOT SETIN MSGPKT+MS.XS0 THEN ;IF AT EOT:
3166      LET EOTFLG :=B= #1      ;SET EOT FLAG.
3167      ENDIF
3168      JSR PC,NEXTU      ;FIND NEXT UNIT IN TEST CYCLE.
3169      ENDDO
3170      JSR PC,CKHAE      ;CHECK HALT AFTER EACH CMD FLAG.
3171      IFB EOTFLG NE #0 THEN      ;IF EOT HAS BEEN REACHED THEN:
3172      LET EOTFLG :=B= #0      ;CLR EOT FLAG.
3173      LET R2 := #1      ;SET EOT INDICATORS
3174      BR EXARTN      ;RETURN
3175      ENDIF
3176      LET NCNT := NCNT - #1      ;UPDATE RECORD COUNT.
3177      LET PCMDWD := CMDWRD      ;SAVE PREVIOUS COMMAND WORD.
3178      FNDDO
```

```
3179 006346 004737 011540      JSR    PC,VFYDAT      ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
3180                                ;VERIFY THE LAST N RECORDS OF DATA.
3181 006352                                ENDDO
3182 006354      LET R2 := #0      ;SET NORMAL RETURN INDICATOR.
3183 006356 000207      EXARTN: RTS PC      ;RETURN.
3184
3185
3186
3187      :      THIS SUBROUTINE STORES THE ASCII FOR THE CURRENT COMMAND AND PREVIOUS
3188      :      COMMAND IN THE STANDARD ERROR MESSAGE. ON ENTRY LOCATION CMDWRD
3189      :      CONTAINS CURRENT CMD AND LOCATION DCMWD CONTAINS PREVIOUS CMD.
3190      :      INPUTS:
3191      :      OUTPUTS:
3192      :      REGISTERS:      R3, R4.
3193      :      CALLS:      GCMDB
3194
3195 006360      (MDAC:: LET R4 := CMDWRD      ;R4 = CMD BINARY.
3196 006364 004737 006422      JSR    PC,GCMDB      ;GET CMD ASCII.
3197 006370 012337 005232      MOV     (R3)+,STAER1+2      ;MOVE CMD ASCII
3198 006374 111337 005234      MOVB    (R3),STAER1+4      ;INTO MSG.
3199 006400      LET R4 := PCMDWD      ;R4 = PREVIOUS CMD BINARY.
3200 006404 004737 006422      JSR    PC,GCMDB      ;GET CMD ASCII.
3201 006410      LET STAER7+24 := (R3)+      ;MOVE CMD ASCII
3202 006414      LET STAER7+26 := B= (R3)      ;INTO MSG.
3203 006420 000207      RTS     PC      ;RETURN. GO EXECUTE NEXT FUNCTION.
3204
3205
3206
3207      :      SUBROUTINE TO FIND THE ASCII EQUIVLENT OF THE COMMAND IN R4.
3208      :      ADDRESS OF ASCII 1ST WORD IS RETURNED IN R3.
3209      :      INPUTS:      R4 = PRESENT COMMAND WORD.
3210      :      OUTPUTS:      R3 = ADDRESS OF PRESENT COMMAND ASCII.
3211      :      REGISTERS:
3212      :      CALLS:
3213
3214 006422      GCMDB:: LET R3 := #0      ;INIT CMD TBL POINTER.
3215 006424      WHILE CMTBL(R3) NE R4 DO      ;UNTIL CURRENT CMD IS FOUND:
3216 006432      LET R3 := R3 + #2      ;SEARCH CMD TABLE.
3217 006436      ENDDO
3218 006440      LET R3 := R3 SHIFT +1 + #CMDASC ;POINT TO ASCII FOR THAT COMMAND.
3219 006446 000207      RTS     PC      ;RETURN.
```

```
3220      :      THIS SUBROUTINE LOADS THE TS04 COMMAND PACKET FROM ONE
3221      :      ENTRY IN THE SEQUENCE TABLE.
3222      :      INPUTS:
3223      :      OUTPUTS:
3224      :      REGISTERS:      R2, R3.
3225      :      CALLS:      GENPAT.
3226
3227      006450      SETUP:: LET CMDLG := #0      ;CLR CMD LOGGING CODE(DISABLES LOGGING)
3228      006454      MOV      (R1)+,CMDPKT      ;LOAD THE COMMAND WORD.
3229      006460      011137      002232      MOV      (R1),CMDPKT+CP.CNT      ;LOAD THE BYTE/RECORD/FILE COUNT.
3230      006464      011137      002760      MOV      (R1),BRFCNT      ;SAVE BRFC FOR THIS COMMAND.
3231      006470      013702      002224      MOV      CMDPKT,R2      ;GET CMD.
3232      006474      042702      177740      BIC      #NCMD.C,R2      ;CLR ALL BUT CMD BITS.
3233      006500      010203      MOV      R2,R3      ;SAVE IT TWICE.
3234      006502      162703      000010      SUB      #CMD.C3,R3      ;POSITION COMMAND?
3235      006506      001003      BNE      2$      ;BR IF NOT.
3236      006510      011137      002226      MOV      (R1),CMDPKT+2      ;MOVE BPCR IN 2ND PKT WORD FOR POSITION CMD.
3237      006514      000461      BR      3$
3238      006516      2$:      IF CMDPKT EQ #WTM THEN      ;IF CMD IS A WRITE TAPE MARK THEN:
3239      006526      LET CMDLG := #2      ;WTM LOGGING CODE IS 2.
3240      006534      ENDIF
3241      006534      010203      MOV      R2,R3
3242      006536      162703      000001      SUB      #CMD.CO,R3      ;IS IT A READ?
3243      006542      001017      BNE      1$      ;BR IF NOT.
3244      006544      013737      002752      002226      MOV      DATARD,CMDPKT+CP.ADL      ;IF SO, LOAD THE BUFFER ADDR.
3245      006552      IF #MOD.CO SET IN CMDPKT THEN      ;IF CMD IS A READ REV THEN:
3246      006562      LET CMDLG := #4      ;LOGGING CODE IS 4.
3247      006570      ELSE      ;ELSE - IF CMD IS A READ FWD:
3248      006572      LET CMDLG := #6      ;LOGGING CODE IS 6.
3249      006600      ENDIF
3250      006600      000427      BR      3$      ;CONTINUE.
3251      006602      010203      1$:      MOV      R2,R3      ;IS IT
3252      006604      162703      000004      SUB      #CMD.C2,R3      ;A SET CHARACTERISTICS CMD?
3253      006610      001011      BNE      4$      ;BR IF NOT.
3254      006612      LET CMDPKT+CP.ADL := #SCHBK      ;SET UP ADR LO FOR SET CHAR.
3255      006620      012737      000010      002232      MOV      #SCHCNT,CMDPKT+CP.CNT      ;SET BUFFER EXTENT
3256      006626      LET SCHBK+6 := (R1)      ;STORE CHARACTERISTIC CODE IN SCH BLOCK.
3257      006632      000412      BR      3$      ;CONTINUE.
3258      006634      010203      4$:      MOV      R2,R3      ;IS IT
3259      006636      162703      000006      SUB      #CMD.C1!CMD.C2,R3      ;A DIAGNOSTIC (DIA) CMD?
3260      006642      001006      BNE      3$      ;BR IF NOT.
3261      006644      012737      000020      002232      MOV      #DIACNT,CMDPKT+CP.CNT      ;LOAD BUFFER EXTENT.
3262      006652      012737      002750      002226      MOV      #DIABLK,CMDPKT+CP.ADL      ;LOAD BUFFER ADR LOW.
3263      006660      005721      3$:      TST      (R1)+      ;POINT TO N (NUMBER OF TIMES TO EXECUTE THIS INS
3264      006662      012137      002754      MOV      (R1)+,NCNT      ;SAVE N.
3265      006666      LET NCNT1 := NCNT      ;SAVE N.
3266      006674      012137      003010      MOV      (R1)+,PATERN      ;SAVE PATTERN CODE FOR CURRENT CMD.
3267      006700      010203      MOV      R2,R3      ;IS IT
3268      006702      162703      000005      SUB      #CMD.CO!CMD.C2,R3      ;A WRITE?
3269      006706      001010      BNE      5$      ;BR IF NOT.
3270      006710      013737      002750      002226      MOV      DATAWT,CMDPKT+CP.ADL      ;LOAD WRITE BUFFER LO ORDER.
3271      006716      004737      007030      JSR      PC,GENPAT      ;GO GENERATE THE WRITE PATTERN.
3272      006722      LET CMDLG := #2      ;WRITE LOGGING CODE IS 2.
3273      006730      5$:      IF #VFY.C SET IN CMDPKT THEN      ;IF DATA VERIFICATION IS REQUIRED:
3274      006740      LET VFY LG := #1      ;SET VERIFY FLAG.
3275      006746      042737      000100      002224      BIC      #VFY.C,CMDPKT      ;CLEAR VERIFY BIT(NOT USED BY HARDWARE).
```

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 CZTSHA.P11 28-DEC-78 14:34 GLOBAL SUBROUTINES SECTION

SEQ 0074

3276	006754		ELSE		;IF DATA VERIFICATION IS NOT REQUIRED:
3277	006756		LET VFYFLG :B= #0		;CLR VERIFY FLAG.
3278	006762		ENDIF		
3279	006762		LET PCMDWD := CMDWRD		;SAVE PREVIOUS CMD WORD.
3280	006770		LET CMDWRD := CMDPKT		;SAVE PRESENT CMD WORD.
3281	006776		IFB SWBFLG NE #0 THEN		;IF SWAP BYTES IS ENABLED:
3282	007004		LET CMDPKT := CMDPKT SET.BY #SWB.C		;SET SWAP BIT IN COMMAND.
3283	007012		ENDIF		
3284	007012	042737 004000 002224	BIC #BRF.C,CMDPKT		;CLR BRF BIT (INTERNAL ONLY).
3285	007020		LET CMDSAV := CMDPKT		;SAVE 1ST WORD OF COMMAND PACKET.
3286	007026	000207	RTS PC		;RETURN.

```
3287      :      THIS SUBROUTINE SETS UP AND CALLS THE APPROPRIATE SUBROUTINE TO GENERATE
3288      :      THE DESIRED PATTERN FOR THE WRITE AND WRITE/VERIFY COMMANDS.
3289      :      INPUTS:
3290      :      OUTPUTS:
3291      :      REGISTERS:      R2, R3, R4.
3292      :      CALLS:      PATRO - PATR7
3293
3294      007030 013703 003010      GENPAT:: MOV      PATERN,R3
3295      007034      LET R3 := R3 SHIFT 1      ;SET UP PATTERN ROUTINE POINTER.
3296      007036 013704 002760      MOV      BRFCNT,R4      ;SAVE BYTE COUNT.
3297      007042 005204      INC      R4
3298      007044      LET R4 := R4 CLR.BY #1
3299      007050 013702 002750      MOV      DATAWT,R2      ;SAVE DATA WRITE BUFFER ADDRESS.
3300      007054 004773 007062      JSR      PC,@PAT1BL(R3)      ;GO GENERATE THE APPROPRIATE PATTERN.
3301      007060 000207      RTS      PC      ;RETURN TO SETUP SUBROUTINE.
3302
3303      ;TS04 WRITE PATTERN LOOKUP TABLE. USED TO JSR TO THE
3304      ;CORRECT DATA PATTERN GENERATING ROUTINE.
3305
3306      007062 007104      PAT1BL: PATRO
3307      007064 007142      PATR1
3308      007066 007162      PATR2
3309      007070 007172      PATR3
3310      007072 007216      PATR4
3311      007074 007230      PATR5
3312      007076 007242      PATR6
3313      007100 007262      PATR7
3314      007102 007314      PATR8
3315
3316
3317      ;INCREMENTING PATTERN. 0 - 377.
3318
3319      007104      PATRO:: LET R3 := #400
3320      007110      1$: LET R4 := R4 - #2      ;DECREMENT WORD COUNT.
3321      007114 100411      BMI      2$      ;BR IF DONE.
3322      007116      LET (R2)+ := R3      ;STORE DATA WORD.
3323      007120      LET R3 := R3 + #1002      ;UPDATE PATTERN.
3324      007124      IF R3 EQ #1000 THEN      ;IF PATTERN HAS WRAPPED AROUND THEN:
3325      007132      LET R3 := #400      ;INIT THE PATTERN AGAIN.
3326      007136      ENDIF
3327      007136 000764      BR      1$      ;DO IT AGAIN.
3328      007140 000207      2$: RTS      PC      ;RETURN.
3329
3330      ;ALL ONE'S PATTERN.
3331
3332      007142 012703 177777      PATR1:: MOV      #-1,R3      ;ALL ONES PATTERN;.
3333      007146      ZROPAT: LET R4 := R4 - #2      ;DECREMENT BYTE COUNT.
3334      007152 100402      BMI      1$      ;DONE?,BR IF YES.
3335      007154 010322      MOV      R3,(R2)+      ;IF NOT LOAD NEXT BYTE WITH PATTERN.
3336      007156 000773      BR      ZROPAT      ;DO IT AGAIN.
3337
3338      007160 000207      1$: RTS      PC      ;RETURN.
```

```
3339                ;ALL ZEROES PATTERN.
3340
3341 007162 005003      PATR2:: CLR    R3                ;CLR PATTERN REGISTER.
3342 007164 004737 007146 JSR    PC,ZROPAT          ;GO GENERATE IT.
3343 007170 000207      RTS    PC                ;RETURN.
3344
3345                ;ONE BIT WALKING FROM R TO L IN A FIELD OF ZEROES.
3346
3347 007172 012703 00040' PATR3:: MOV    #401,R3                ;INIT PATTERN REGISTER.
3348 007176          WLKZRO: LET R4 := R4 - #2          ;DECREMENT WORD COUNT.
3349          BMI    1$                                ;BR IF DONE.
3350          MOV    R3,(R2)+                          ;LOAD DATA.
3351          ASL    R3                                ;SHIFT PATTERN.
3352          ADC    R3                                ;ADD CARRY BACK INTO PATTERN.
3353          BR     WLKZRO                            ;DO IT AGAIN.
3354 007214 000207 1$:  RTS    PC                ;RETURN.
3355
3356                ;ZERO BIT WALKING FROM R TO L IN A FIELD OF 1'S.
3357
3358 007216 012703 177376 PATR4:: MOV    #177376,R3        ;INIT PATTERN REGISTER.
3359 007222 004737 007176 JSR    PC,WLKZRO          ;GO GENERATE ;IT.
3360 007226 000207      RTS    PC                ;RETURN.
3361
3362                ;ALTERNATING ONE AND ZERO BITS WITH ALTERNATE BYTES
3363                ;COMPLEMENTED.
3364
3365 007230 012703 125125 PATR5:: MOV    #125125,R3        ;INIT PATTERN REGISTER.
3366 007234 004737 007146 JSR    PC,ZROPAT          ;GO GENERATE IT.
3367 007240 000207      RTS    PC                ;RETURN.
3368
3369                ;ALTERNATING BYTES OF 000 AND 377.
3370
3371 007242 012703 177400 PATR6:: MOV    #177400,R3        ;INIT PATTERN REGISTER.
3372 007246 1$:  LET R4 := R4 - #2          ;DECREMENT WORD COUNT.
3373          BMI    2$                                ;BR IF DONE.
3374          MOV    R3,(R2)+                          ;LOAD DATA.
3375          BR     1$                                ;DO IT AGAIN.
3376 007260 000207 2$:  RTS    PC                ;RETURN.
3377
3378                ;RANDOM PATTERN GENERATOR
3379
3380 007262          PATR7:: LET R4 := R4 - #2          ;DECREMENT WORD COUNT
3381 007266 100411          BMI    GIT                ;BR IF DONE.
3382 007270 063737 002776 002774 ADD    RANS,RANB          ;GET NEW #.
3383 007276 063737 002774 002776 ADD    RANB,RANS          ;SAVE #.
3384 007304 013722 002776          MOV    RANS,(R2)+      ;CONTINUE.
3385 007310 000764          BR     PATR7              ;RETURN
3386 007312 000207 GIT:  RTS    PC
3387
3388                ; NO PATTERN GENERATION.
3389
3390 007314 000207 PATR8:: RTS    PC                ;RETURN.
```

```
3391      :      THIS SUBROUTINE INITIATES TS04 COMMAND EXECUTION
3392      :      AND CHECKS FOR TS04 RESPONSE.
3393      :      INPUTS:
3394      :      OUTPUTS:
3395      :      REGISTERS:      R2, R3, R4.
3396      :      CALLS:      DROPU, MOVMSG, FIRSTU, NEXTU.
3397
3398      007316      EXCUTE:: LET TIME1 := #-1      ;INIT TIMEOUT COUNTER.
3399      007324      REPEAT      ;WAIT -
3400      007324      LET TIME1 := TIME1 - #1      ;UPDATE TIMEOUT COUNTER.
3401      007330      IF TIME1 EQ #0 THEN      ;IF TIMED OUT:
3402      007336      JSR PC,MOVMSG      ;MOVE CURRENT PACKET MSG.
3403      007342      LET R2 := #2      ;ERROR NUMBER.
3404      007346      LET R4 := #NSSRM      ;MESSAGE ADDRESS.
3405      007352      JSR PC,DROPU      ;DROP THE UNIT.
3406      007356      BR EXCRTN      ;RETURN.
3407      007360      ENDIF
3408      007360      UNTIL #TS.SSR SETIN @TSSR(R5)      ;WAIT UNTIL DEVICE IS READY.
3409      007370      IF CMDWRD EQ #SCH THEN      ;IF WE ARE DOING A SET CHAR CMD THEN:
3410      007400      LET R5SAVE := R5      ;SAVE CURRENT DEVICE POINTER.
3411      007404      JSR PC,FIRSTU      ;FIND FIRST UNIT.
3412      007410      WHILE DEVTBL(R5) NE #END DO
3413      007420      JSR PC,WSSR      ;WAIT FOR UNIT READY OR TIME OUT,
3414      007424      JSR PC,NEXTU      ;FIND NEXT UNIT.
3415      007430      ENDDO
3416      007432      LET R5 := R5SAVE      ;RESTORE CURRENT DEVICE POINTER.
3417      007436      LET SCHBK := MSGPKA(R5)      ;SET UP ADR OF MSG PKT IN SCH BLOCK.
3418      007444      ENDIF
3419      007444      LET R3 := MSGPKA(R5)      ;ADR OF THIS UNIT'S MSG PACKET.
3420      007450      LET R2 := #0      ;CLR COUNTER.
3421      007452      WHILE R2 NE #MSGCNT DO      ;WHILE THERE ARE MORE LOCATIONS:
3422      007460      LET (R3)+ := #-1      ;INIT THE MSG PACKET WITH ALL 1'S
3423      007464      LET R2 := R2 + #2      ;UPDATE COUNTER.
3424      007470      ENDDO
3425      007472      TSTB DINT      ;ARE INTERRUPTS DISABLED.
3426      007476      BNE 1$      ;BR IF YES.
3427      007500      IFB INTFLG(R5) GT #1 THEN      ;IF MORE THAN ONE INTERRUPT HAS OCCURED:
3428      007510      LET R2 := #15.      ;ERROR NUMBER,
3429      007514      LET R4 := #TOOMM      ;MESSAGE ADDRESS.
3430      007520      JSR PC,DROPU      ;DROP THE UNIT
3431      007524      BR EXCRTN      ;RETURN - UNIT HAS BEEN DROPPED.
3432      007526      ENDIF
3433      007526      LET INTFLG(R5) := #0      ;CLR INTERRUPT FLAG FOR THIS DEV.
3434      007532      BIS #IE.C,CMDPKT      ;SET INT ENABLE BIT.
3435      007540      MOV #CMDPKT,@TSDB(R5)      ;LOAD TSDB WITH CMDPKT ADDRESS
3436      007546      ;THIS INITIATES COMMAND EXECUTION.
3437      007546      IF #TS.SSR SETIN @TSSR(R5) THEN      ;IF READY DID NOT DROP THEN:
3438      007556      JSR PC,MOVMSG      ;MOVE CURRENT MESSAGE PACKET TO COMMON.
3439      007562      LET R2 := #3      ;ERROR NUMBER.
3440      007566      LET R4 := #TOERM      ;MESSAGE ADDRESS.
3441      007572      JSR PC,DROPU      ;DROP THE UNIT
3442      007576      ENDIF
3443      007576      EXCRTN: RTS PC      ;RETURN.
```

```
3444      :      THIS SUBROUTINE WAITS FOR THE TS04 INERRUPT OR DONE BIT TO SET AND ALLOWS THE
3445      :      OPERATOR TO TRANSFER CONTROL TO THE SUPERVISOR.
3446      :      UPON APPEARANCE OF THE INTERRUPT OR DONE, CHECK TSSR FOR STATUS ERRORS,
3447      :      LOG BYTES AND ERRORS AND PERFORM ERROR RECOVERY IF NESSASARY.
3448      :      INPUTS:
3449      :      OUTPUTS:
3450      :      REGISTERS:      R2, R3.
3451      :      CALLS:      DROPU, MOVMSG, RECUD, CHKERR, LOG, CLRERR.
3452
3453      007600      GOWAIT:: LET TIME1 := #-1      ;INIT TIME OUT COUNTER.
3454      007606      REPEAT      ;REPEAT UNTIL INTERRUPT OCCURES:
3455      007606      BREAK      ;GO TO THE SUPER TO ALLOW TTY INPUT.
3456      007610      IF CMDWRD EQ #RWD THEN      ;IF COMMAND WAS REWIND THEN:
3457      007620      WAITUS 100.      ;WAIT AN EXTRA 10 MSEC EACH LOOP.
3458      007626      ENDIF
3459      007626      IFB DINT EQ #0 THEN      ;IF INTERRUPTS ARE ENABLED.
3460      007634      LET R2 := INTFLG(R5)      ;FETCH INTERRUPT OCCURRED FLAG.
3461      007640      ELSE      ;IF IN BRUTUS MODE:
3462      007642      LET R3 := COMP #TS.SSR      ;SET UP A MASK FOR THE DONE BIT.
3463      007650      LET R2 := @TSSR(R5) CLR.BY R3      ;FETCH DONE BIT.
3464      007656      ENDIF
3465      007656      LET TIME1 := TIME1 - #1      ;UPDATE TIMEOUT COUNTER.
3466      007662      IF TIME1 EQ #0 THEN      ;IF TIME OUT HAS OCCURRED:
3467      007670      004737 010020      JSR PC,MOVMSG      ;MOVE CURRENT MSG PACKET TO COMMON AREA.
3468      007674      LET R2 := #4      ;ERROR NUMBER.
3469      007700      LET R4 := #NOINTM      ;MESSAGE ADDRESS.
3470      007704      004737 012350      JSR PC,DROPU      ;DROP THE UNIT.
3471      007710      000412      BR GOWRTN      ;RETURN.
3472      007712      ENDIF
3473      007712      UNTIL R2 NE #0      ;REPEAT UNTIL INTERRUPT OR READY OCCURES.
3474      007716      004737 010020      JSR PC,MOVMSG      ;MOVE CURRENT MSG. PACKET TO COMMON AREA.
3475      007722      004737 010070      JSR PC,RECUD      ;UPDATE THE RECORD COUNT.
3476      007726      004737 010212      JSR PC,CHKERR      ;CHECK FOR STATUS ERRORS.
3477      007732      004737 011254      JSR PC,LOG      ;LOG BYTES AND ERRORS.
3478      007736      GOWRTN: LET R3 := #ENDERF
3479      007742      004737 007750      JSR PC,CLRERR      ;CLEAR ALL ERROR FLAGS
3480      007746      000207      RTS PC      ;RETURN IF DONE.
```

```

3481      :      SUBROUTINE TO CLEAR FLAGS.
3482      :      INPUTS:      R3 = LWA TO BE CLEARED + 2.
3483      :      OUTPUTS:
3484      :      REGISTERS:      R2
3485      :      CALLS:
3486
3487 007750 CLRERR:: LET R2 := #BGNFLG
3488 007754 REPEAT
3489 007754     LET (R2)+ := #0
3490 007756 UNTIL R2 EQ R3
3491 007762 RTS PC      000207
3492
3493
3494
3495      :      SUBROUTINE TO WAIT UNTIL CURRENT UNIT IS READY OR UNTIL TIME OUT.
3496      :      INPUTS:
3497      :      OUTPUTS:
3498      :      REGISTERS:
3499      :      CALLS:
3500
3501 007764 WSSR:: LET TIME1 := #-1      ;INIT TIMEOUT COUNTER.
3502 007772 REPEAT      ;REPEAT UNTIL DEV READY OR TIMEOUT:
3503 007772     BREAK      ;BREAK TO THE SUPERVISOR.
3504 007774     LET TIME1 := TIME1 - #1      ;UPDATE TIMEOUT COUNTER.
3505 010000 UNTIL #TS.SSR SETIN @TSSR(R5) OR TIME1 EQ #0
3506      ;REPEAT UNTIL DEV READY OR TIMEOUT.
3507 010016 RTS PC      ;RETURN.      000207
3508
3509
3510
3511      :      SUBROUTINE TO MOVE THE CURRENT MESSAGE PACKET TO THE COMMON AREA AND
3512      :      TO UPDATE THE CURRENT TERMINATION CLASS CODE.
3513      :      INPUTS:
3514      :      OUTPUTS:
3515      :      REGISTERS:      R2, R3.
3516      :      CALLS:
3517
3518 010020 MOVMSG:: LET R3 := MSGPKA(R5)      ;ADR OF THIS DEVICE'S MSG.
3519 010024 LET R2 := #0      ;CLR COUNTER.
3520 010026 WHILE R2 NE #MSGCNT DO      ;WHILE THERE ARE MORE LOCATIONS:
3521 010034     LET MSGPKT(R2) := (R3)+      ;MOVE MSG TO COMMON AREA.
3522 010040     LET R2 := R2 + #2      ;UPDATE COUNTER.
3523 010044 ENDDO
3524 010046 LET R2 := @TSSR(R5) CLR.BY #TSC.TCC ;FETCH THE TERMINATION CLASS CODE.
3525 010056 LET CTCC := R2 SHIFT -1      ;SAVE THE TCC.
3526 010066 RTS PC      000207

```

```

3527      :      SUBROUTINE TO UPDATE THE RECORD COUNT.
3528      :      INPUTS:
3529      :      OUTPUTS:
3530      :      REGISTERS:
3531      :      CALLS:
3532
3533 010070  RECUD:: IFB RECLOG EQ #0 THEN      ;IF RECORD HAS NOT BEEN LOGGED:
3534 010076      IF #BIT0 NOTSETIN CTCC THEN    ;IF TCC IS EVEN THEN:
3535 010106      LET RECLOG :=B= RECLOG + #1      ;SET RECORD LOGGED,
3536 010112      IF CMDWRD EQ #RWD THEN          ;IF THIS IS A REWIND CMD:
3537 010122      LET RECCNT(R5) := #0          ;CLEAR RECORD COUNT,
3538 010126      ELSE
3539 010130      IF #BRF.C SETIN CMDWRD THEN      ;IF BRF USED, UPDATE RECORD COUNT.
3540 010140      IF #MOD.CO NOTSETIN CMDWRD THEN ;IF A FORWARD CMD:
3541 010150      IF #MOD.CO NOTSETIN PCMDWD THEN ;IF PREV CMD WAS A FWD ALSO:
3542 010160      LET RECCNT(R5) := RECCNT(R5) + #1 ;INCREMENT RECORD COUNT.
3543 010164      ENDIF
3544 010164      ELSE
3545 010166      IF #MOD.CO SETIN PCMDWD THEN      ;IF REVERSE CMD:
3546 010176      IF RECCNT(R5) NE #0 THEN          ;INSURE A POSITIVE COUNT.
3547 010204      LET RECCNT(R5) := RECCNT(R5) - #1 ;DECREMENT RECORD COUNT.
3548 010210      ENDIF
3549 010210      ENDIF
3550 010210      ENDIF
3551 010210      ENDIF
3552 010210      ENDIF
3553 010210      ENDIF
3554 010210      ENDIF
3555 010210  RTS      PC      ;RETURN.
  
```

000207

```
3556      :      THIS IS THE ERROR CHECK SUBROUTINE.  AFTER INTERRUPT THIS
3557      :      SUBROUTINE IS CALLED TO CHECK THE TS04 STATUS.
3558      :      IF SPECIAL COND IS SET THEN THE TCC HANDLING SUBROUTINE IS ENTERED.
3559      :      IF THE RFC IS NON ZERO FOR A COMMAND REQUIRING A BPCR,
3560      :      THEN AN ERROR RFC IS REPORTED,
3561      :      INPUTS:
3562      :      OUTPUTS:
3563      :      REGISTERS:      R2, R4.
3564      :      CALLS:      TCC0-TCC7.
3565
3566 010212  CHKERR:: IF #TS.SC SETIN @TSSR(R5) THEN ;IF SPECIAL COND STATUS IS SET THEN:
3567 010222      IF CTCC NE #2 THEN ;IF TCC IS NOT 2 THEN:
3568 010232      IFB ERRREC EQ #0 THEN ;IF NOT IN ERROR RECOVERY:
3569 010240 005265 002710      INC SCCNT(R5) ;INC SC COUNTER.
3570 010244      ENDIF
3571 010244      ENDIF
3572 010244      LET R2 := CTCC SHIFT 1 ;CURRENT TCC X 2.
3573 010252 004772 010344      JSR PC,@TCCRA(R2) ;GO TO THE TCC HANDLING SUBROUTINE.
3574 010256      ELSE
3575 010260      IF #BRF.C SETIN CMDWRD THEN ;IF BRF IS USED IN THIS CMD THEN:
3576 010270      IF MSGPKT+MS.RFC NE #0 THEN ;IF THERE IS AN RFC THEN:
3577 010276      IFB RANDOM EQ #0 THEN ;IF NOT IN RANDOM MODE:
3578 010304      IFB IRE EQ #0 THEN ;IF RFC ERROR REPORTS ARE ALLOWED:
3579 010312      LET HRDCNT(R5) := HRDCNT(R5) + #1 ;UPDATE HARD ERROR COUNT
3580 010316      ERRHRD #13,RFCERM,STAERM ;REPORT RFC ERROR
3581 010326      ENDIF
3582 010326      ENDIF
3583 010326      ENDIF
3584 010326      ENDIF
3585 010326      ENDIF
3586 010326      IFB RWERR NE #0 THEN ;IF A READ/WRITE ERROR HAS OCCURRED THEN:
3587 010334      LET CMDPKT := CMDSAV ;RESTORE CMD PACKET AFTER ERROR RECOV.
3588 010342      ENDIF
3589 010342 000207      RTS PC ;RETURN.
3590
3591      :      ADDRESSES OF TCC HANDLING ROUTINES FOR TERMINATION CLASS CODES 0 - 7.
3592
3593 010344 010364  TCCRA: TCC0
3594 010346 010402      TCC1
3595 010350 010420      TCC2
3596 010352 010514      TCC3
3597 010354 010532      TCC4
3598 010356 010656      TCC5
3599 010360 010742      TCC6
3600 010362 011104      TCC7
```

```
3601      :      SUBROUTINE TO HANDLE TERMINATION CLASS CODE 0, UNDEFINED SPECIAL
3602      :      CONDITION ERROR.
3603      :      INPUTS:
3604      :      OUTPUTS:
3605      :      REGISTERS:
3606      :      CALLS:
3607
3608      010364      TCC0:: LET HRDCNT(R5) := HRDCNT(R5) + #1 ;UPDATE HARD ERROR COUNT.
3609      010370      ERRHRD #5,SCERM,STAERM ;REPORT SPECIAL CONDITION ERROR.
3610      010400      000207      RTS PC ;RETURN.
3611
3612
3613
3614
3615
3616      :      SUBROUTINE TO HANDLE TERMINATION CLASS CODE 1, ATTENTION CONDITION.
3617      :      THIS TCC INDICATES THAT THE DRIVE HAS UNDERGONE A STATUS CHANGE
3618      :      SUCH AS GOING OFFLINE OR COMING ONLINE.
3619      :      INPUTS:
3620      :      OUTPUTS:
3621      :      REGISTERS:      R2,R4
3622      :      CALLS:      DROPU
3623
3624      010402      TCC1:: LET R2 := #6 ;ERROR NUMBER.
3625      010406      LET R4 := #ATTNM ;MESSAGE ADDRESS.
3626      010412      004737 012350 JSR PC,DROPU ;DROP THE UNIT.
3627      010416      000207      RTS PC ;RETURN.
```

```
3628      : SUBROUTINE TO HANDLE TERMINATION CLASS CODE 2, TAPE STATUS ALERT.
3629      : A STATUS CONDITION HAS BEEN ENCOUNTERED THAT MAY HAVE SIGNIFICANCE
3630      : TO THE PROGRAM. BITS OF INTEREST INCLUDE TMK, RLS, LET, RLL, EOT.
3631      : INPUTS:
3632      : OUTPUTS:
3633      : REGISTERS:
3634      : CALLS:
3635
3636 010420 TCC2:: IF #X0.TMK!X0.RLS!X0.LET!X0.RLL SETIN MSGPKT+MS.XSO THEN
3637      : IF TAPE MARK, RECORD LENGTH ERROR OR
3638      : LOGICAL EOT THEN:
3639 010430 IF #X0.TMK!X0.LET NOTSETIN MSGPKT+MS.XSO THEN ;IF RECORD LENGTH ERROR:
3640 010440 IFB IRE NE #0 OR RANDOM NE #0 THEN ;IF RFC ERROR REPORTS ARE
3641      : INHIBITED OR IN RANDOM MODE THEN:
3642 010454 000416 BR TC2RTN ;RETURN - TCC2 CAUSED BY EOT.
3643 010456 ENDIF
3644 010456 ENDIF
3645 010456 IFB ERRREC NE #0 THEN ;IF WE ARE IN ERROR RECOVERY THEN:
3646 010464 LET UNREC :B= UNREC + #1 ;SET UNRECOVERABLE FLAG FOR LOG.
3647 010470 ELSE ;ELSE - IF NOT IN ERROR RECOVERY:
3648 010472 LET SCCNT(R5) := SCCNT(R5) + #1 ;INCREMENT THE SPEC COND COUNTER.
3649 010476 ENDIF
3650 010476 LET HRDCNT(R5) := HRDCNT(R5) + #1 ;UPDATE HARD ERROR COUNT.
3651 010502 ERRHRD #7,TSAM,STAERM ;REPORT TAPE STATUS ALERT.
3652 010512 ENDIF
3653 010512 000207 TC2RTN: RTS PC ;RETURN.
3654
3655
3656
3657
3658
3659      : SUBROUTINE TO HANDLE TERMINATION CLASS CODE 3, FUNCTION REJECT.
3660      : THE SPECIFIED FUNCTION WAS NOT INITIATED. BITS OF INTEREST ARE
3661      : RMR, OFL, VCK, BOT, ILC, WLE, ILA, AND NBA.
3662      : INPUTS:
3663      : OUTPUTS:
3664      : REGISTERS: R2,R4
3665      : CALLS: DROPU
3666
3667 010514 TCC3:: LET R2 := #8. ;ERROR NUMBER.
3668 010520 LET R4 := #FUNRM ;MESSAGE ADDRESS.
3669 010524 004737 012350 JSR PC,DROPU ;DROP THE UNIT.
3670 010530 000207 RTS PC ;RETURN.
```

```
3671      : SUBROUTINE TO HANDLE TERMINATION CLASS CODE 4, RECOVERABLE ERROR.
3672      : TAPE POSITION IS ONE RECORD BEYOND WHAT ITS POSITION WAS WHEN
3673      : THE FUNCTION WAS INITIATED. RECOVERY PROCEDURE IS TO LOG THE
3674      : ERROR AND ISSUE THE APPROPRIATE RETRY COMMAND.
3675      : INPUTS:
3676      : OUTPUTS:
3677      : REGISTERS:      R2,R4.
3678      : CALLS:         RTLE, EXCUTE, GOWAIT, DROPU
3679
3680 010532 004737 011122      TCC4:: JSR PC,RTLE      ;CHECK FOR RETRY LIMIT EXCEEDED.
3681 010536                  IF CMDLG GT #2 THEN      ;IF READ CMD THEN:
3682 010546                  LET R2 := #RRECL SHIFT -1 ;R2=READ RETRY COUNT LIMIT / 2
3683 010554                  IF RETRYC GE R2 THEN      ;IF RETRY COUNT IS MORE THAN HALF LIMIT:
3684 010562                  LET CNDPKT := CNDPKT SET.BY #OPP.C ;SET OPPOSITE BIT FOR RETRY2.
3685 010570                  ENDIF
3686 010570                  ENDIF
3687 010570                  IF RETRYC EQ #0 THEN      ;IF THIS IS THE ORIGINAL ERROR THEN:
3688 010576                  ERRSOFT #9,RERM,STAERM    ;REPORT RECOVERABLE ERROR
3689 010606                  ENDIF
3690 010606                  LET RETRYC := RETRYC + #1 ;UPDATE RETRY COUNT.
3691 010612                  LET CNDPKT := CNDPKT SET.BY #MOD.C1 ;SET RETRY BIT IN CMD PACKET.
3692 010620                  IFB IREC EQ #0 THEN      ;IF ERROR RECOVERY ENABLED:
3693 010626                  LET ERRREC :B= ERRREC + #1 ;SET ERROR RECOVERY FLAG.
3694 010632                  POP R2,R2                ;POP 2 RTN ADRS FROM STACK.
3695 010636 004737 007316      JSR PC,EXCUTE          ;GO EXECUTE THE RETRY COMMAND.
3696 010642 000137 007600      JMP GOWAIT           ;GO WAIT FOR INTERRUPT + CHECK STATUS.
3697 010646                  ELSE                    ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
3698 010650                  LET UNREC :B UNREC + #1   ;SET UNRECOVERABLE ERROR FLAG.
3699 010654                  ENDIF
3700 010654 000207      RTS PC                        ;RETURN
```

```
3701      : SUBROUTINE TO HANDLE TERMINATION CLASS CODE 5, RECOVERABLE ERROR.
3702      : TAPE POSITION HAS NOT CHANGED. RECOVERY PROCEDURE IS TO LOG THE
3703      : ERROR AND RE-ISSUE THE ORIGINAL COMMAND.
3704      : INPUTS:
3705      : OUTPUTS:
3706      : REGISTERS: R2,R4.
3707      : CALLS: RTLE, EXCUTE, GOWAIT, DROPJ.
3708
3709 010656 004737 011122 TCC5:: JSR PC,RTLE ;CHECK FOR RETRY LIMIT EXCEEDED
3710 010662 IF RETRYC EQ #0 THEN ;IF THIS IS THE ORIGINAL ERROR THEN:
3711 010670 ERRSOFT #10, RERM, STAERM ;REPORT RECOVERABLE ERROR.
3712 010700 ENDIF
3713 010700 LET RETRYC := RETRYC + #1 ;UPDATE RETRY COUNTER.
3714 010704 IFB IREC EQ #0 THEN ;IF ERROR RECOVERY IS ENABLED:
3715 010712 LET ERRREC :B= ERRREC + #1 ;SET ERROR RECOVERY FLAG.
3716 010716 POP R2,R2 ;POP 2 RTN ADRS FROM STACK.
3717 010722 004737 007316 JSR PC,EXCUTE ;GO RE-ISSUE THE COMMAND.
3718 010726 000137 007600 JMP GOWAIT ;GO WAIT FOR INTERRUPT + CHECK STATUS.
3719 010732 ELSE ;ELSE IF ERROR RECOVERY IS NOT ENABLED:
3720 010734 LET UNREC :B= UNREC + #1 ;SET UNRECOVERABLE ERROR FLAG.
3721 010740 ENDIF
3722 010740 000207 RTS PC ;RETURN.
3723
3724
```

```
3725      : SUBROUTINE TO HANDLE TERMINATION CLASS CODE 6, UNRECOVERABLE ERROR.
3726      : TAPE POSITION HAS BEEN LOST. THE ONLY VALID RECOVERY PROCEDURE
3727      : IS TO REWIND AND START OVER AT BOT UNLESS THE TAPE HAS LABELS OR
3728      : SEQUENCE NUMBERS. THIS DIAGNOSTIC WILL REWIND AND RETRY THE
3729      : COMMAND ONLY IF DENSITY CHECK IS SET, OTHERWISE THE UNIT WILL BE
3730      : DROPPED FROM THE TEST SEQUENCE.
3731      : INPUTS:
3732      : OUTPUTS:
3733      : REGISTERS:      R2, R4
3734      : CALLS:         RTLE, WSSR, EXCUTE, GOWAIT, DROPU
3735
3736 010742      TCC6:: IF X3.DCK NOTSETIN MSGPKT+MS.XS3 THEN
3737
3738 010752          IF CMDLG NE #0 THEN
3739 010760              LET RWERR :B= RWERR + #1
3740 010764              LET UNREC :B= UNREC + #1
3741 010770              ENDIF
3742 010770              LET R2 := #11.
3743 010774              LET R4 := #URERM
3744 011000 004737 012350          JSR PC,DROPU
3745 011004          ELSE
3746 011006 004737 011122          JSR PC,RTLE
3747 011012              IF RETRYC EQ #0 THEN
3748 011020                  ERRSOFT #11,URERM,STAERM
3749 011030                  ENDIF
3750 011030                  LET RETRYC := RETRYC + #1
3751 011034                  IFB IRE EQ #0 THEN
3752 011042                      LET ERRREC :B= ERRREC + #1
3753 011046                      LET @TSDB(R5) := #RWCPK
3754 011054 004737 007764          JSR PC,WSSR
3755 011060                      POP R2,R2
3756 011064 004737 007316          JSR PC,EXCUTE
3757 011070 000137 007600          JMP GOWAIT
3758 011074              ELSE
3759 011076                  LET UNREC :B UNREC + #1
3760 011102                  ENDIF
3761 011102              ENDIF
3762 011102 000207          RTS PC
```

```

;IF THERE IS NO DENSITY CHECK THEN:
;IF CMD IS A READ OR WRITE THEN:
;SET RD/WR ERROR FLAG,
;SET UNRECOVERABLE ERROR FLAG.
;ERROR NUMBER.
;MESSAGE ADDRESS.
;REPORT ERROR + DROP UNIT.
;ELSE-IF THERE IS DENSITY CHECK:
;CHECK FOR RETRY LIMIT EXCEEDED.
;IF THIS IS THE ORIGINAL ERROR THEN:
;REPORT DENSITY CHECK ERROR.
;UPDATE RETRY COUNT.
;IF ERROR RECOVERY IS ENABLED THEN:
;SET ERROR RECOVERY FLAG,
;ISSUE A REWIND COMMAND,
;WAIT FOR SUBSYSTEM READY,
;POP 2 RTN ADR'S FROM STACK,
;REISSUE THE COMMAND,
;WAIT FOR INTERRUPT
;ELSE-IF ERR REC DISABLED:
;SET UNRECOVERABLE ERROR FLAG.
;
;RETURN
```

```
3763      :      SUBROUTINE TO HANDLE TERMINATION CLASS CODE 7, FATAL SUBSYSTEM
3764      :      ERROR. THE SUBSYSTEM IS INCAPABLE OF PROPERLY PERFORMING
3765      :      COMMANDS OR AT LEAST ITS INTEGRITY IS SERIOUSLY QUESTIONABLE.
3766      :      REFER TO THE FATAL CLASS CODE FIELD IN THE TSSR REGISTER FOR
3767      :      ADDITIONAL INFORMATION ON THE TYPE OF FATAL ERROR.
3768      :      INPUTS:
3769      :      OUTPUTS:
3770      :      REGISTERS:      R2, R4
3771      :      CALLS:
3772
3773      011104      TCC7:: LET R2 := #12.      ;ERROR NUMBER.
3774      011110      LET R4 := #FATSM      ;MESSAGE ADDRESS.
3775      011114      004737 012350      JSR PC,DROPU      ;DROP THE UNIT.
3776      011120      000207      RTS PC      ;RETURN.
3777
3778
3779
3780      :      SUBROUTINE TO CHECK FOR RETRY LIMIT EXCEEDED. PRINTS ERROR MESSAGE
3781      :      IF EXCEEDED AND DROP UNIT UNLESS COMMAND IS A READ.
3782      :      INPUTS:
3783      :      OUTPUTS:
3784      :      REGISTERS:      R2, R4.
3785      :      CALLS:      DROPU
3786
3787      011122      RTLE:: IF CMDLG EQ #0 THEN      ;IF CMD IS NOT A READ OR WRITE THEN:
3788      011130      LET R2 := #11.      ;ERROR NUMBER.
3789      011134      LET R4 := #URERM      ;MESSAGE ADDRESS.
3790      011140      004737 012350      JSR PC,DROPU      ;DROP THE UNIT.
3791      011144      POP R2
3792      011146      000441      BR RTLRTN      ;AND RETURN.
3793      011150      ENDIF
3794      011150      LET RWERR :B= RWERR + #1      ;SET READ/WRITE ERROR FLAG.
3795      011154      IF CMDLG EQ #2 THEN      ;IF CMD IS A WRT OR WTM:
3796      011164      IF RETRYC EQ #WRECL THEN      ;IF RETRY COUNT HAS REACHED LIMIT:
3797      011174      LET UNREC :B= UNREC + #1      ;SET UNRECOVERABLE FLAG
3798      011200      LET R2 := #14.      ;ERROR NUMBER.
3799      011204      LET R4 := #RLEXM      ;MESSAGE ADDRESS.
3800      011210      004737 012350      JSR PC,DROPU      ;DROP THE UNIT.
3801      011214      POP R2
3802      011216      000415      BR RTLRTN      ;AND RETURN.
3803      011220      ENDIF
3804      011220      ELSE
3805      011222      IF RETRYC EQ #RRECL THEN      ;ELSE - CMD IS A READ:
3806      011232      LET UNREC :B= UNREC + #1      ;IF RETRY COUNT HAS REACHED LIMIT:
3807      011236      ERRSOFT #14,RLEXM,STAERM      ;SET UNRECOVERABLE FLAG
3808      011246      POP R2      ;REPORT RECOVERABLE ERROR.
3809      011250      000400      BR RTLRTN      ;AND RETURN.
3810      011252      ENDIF
3811      011252      ENDIF
3812      011252      000207      RTLRTN: RTS PC      ;RETURN
```

```

3813      :      SUBROUTINE TO LOG BYTES READ/WITTEN.
3814      :      ALSO UPDATES READ/WRITE ERROR COUNTERS.
3815      :      INPUTS:
3816      :      OUTPUTS:
3817      :      REGISTERS:      R2, R3, R4.
3818      :      CALLS:
3819
3820      LOG::  IFB ERLOG EQ #0 THEN      ;IF DATA AND ERRORS HAVE NOT BEEN LOGGED THEN:
3821      LET ERLOG := B= ERLOG + #1      ;SET LOG DONE FLAG.
3822      LET R4 := CMDLG                  ;GET CURRENT CMD LOGGING CODE.
3823      IF R4 NE #0 THEN                  ;IF THERE IS A CODE THEN:
3824      LET R4 := R4 - #2                  ;ADJUST THE CODE FOR TABLE INDEX.
3825      LET R2 := R5 + BINC(R4) + #CNTBGN ;R2 = ADR OF BYTE COUNT LSW.
3826      LET (R2) := (R2) + BRFCNT          ;ADD BRFCNT TO LSW.
3827      IF MSGPKT+MS.RFC LOS BRFCNT THEN ;IF THE RFC IS LOWER OR THE SAME AS BRFC THEN
3828      LET (R2) := (R2) - MSGPKT+MS.RFC ;SUBTRACT RFC FROM EXPECTED BRFC.
3829      ENDIF
3830      LET R3 := R2 + #10                  ;R3 = ADR OF 2ND WORD.
3831      WHILE (R2) GT #999. DO
3832      LET (R2) := (R2) - #1000.          ;UPDATE BYTE COUNT
3833      LET (R3) := (R3) + #1              ;2ND WORD.
3834      ENDDO
3835      LET R2 := R3 + #10                  ;R2 = ADR OF 3RD WORD.
3836      WHILE (R3) GT #999. DO
3837      LET (R3) := (R3) - #1000.          ;UPDATE BYTE COUNT
3838      LET (R2) := (R2) + #1              ;3RD WORD.
3839      ENDDO
3840      LET R3 := R2 + #10                  ;R3 = ADR OF 4TH WORD.
3841      WHILE (R2) GT #999. DO
3842      LET (R2) := (R2) - #1000.          ;UPDATE BYTE COUNT
3843      LET (R3) := (R3) + #1              ;4TH WORD.
3844      ENDDO
3845      IFB RWERR NE #0 THEN                ;IF R/W ERROR, UPDATE ERROR COUNT.
3846      LET R2 := R5 + EINC(R4) + #WRREC ;R2 = ADR OF COUNTER.
3847      IFB UNREC NE #0 THEN                ;IS THE ERROR UNRECOVERABLE?
3848      LET R2 := R2 + #10                  ;YES, POINT TO NEXT COUNTER.
3849      LET (R2) := (R2) + #1              ;UPDATE THE ERROR COUNTER
3850      ELSE                                ;ELSE - IF ERROR IS RECOVERABLE:
3851      LET (R2) := (R2) + #1              ;UPDATE THE ERROR COUNTER
3852      IFB IREC EQ #0 THEN                ;IF ERROR RECOVERY IS ENABLED:
3853      PRINTB #NURTY1,RETRYC              ;PRINT # OF RETRIES TO RECOVER.
3854      ENDIF
3855      ENDIF
3856      ENDIF
3857      ENDIF
3858      ENDIF
3859      RTS PC
3860      :      INDEXES TO BYTE COUNTERS.
3861      BINC:  0                            ;WRITE.
3862      40      ;READ REV.
3863      100     ;READ FWD.
3864      :      INDEXES TO READ/WRITE ERROR COUNTERS.
3865      F INC:  0                            ;WRITE.
3866      20      ;READ REV.
3867      40      ;READ FWD.

```

```

3868      ;      IF A WRITE/VERIFY COMMAND IS ISSUED, CONTROL IS THEN
3869      ;      TRANSFERRED TO THIS SUBROUTINE TO READ REVERSE, CHECK DATA,
3870      ;      READ FORWARD, CHECK DATA, THEN CONTINUE TO NEXT COMMAND.
3871      ;      INPUTS:
3872      ;      OUTPUTS:
3873      ;      REGISTERS:
3874      ;      CALLS:          VFEXC.
3875
3876 011540  VFYDAT:: IFB VFYFLG NE #0 THEN          ;IF DATA IS TO BE VERIFIED:
3877 011546      LET PCMDWD := CMDWRD              ;SAVE THE PREVIOUS COMMAND WORD.
3878 011554      LET CMDWRD := #RDR                ;COMMAND IS READ REV.
3879 011562      LET CMDLG := #4                   ;SET UP CMD LOGGING INDEX.
3880 011570 004737 011624      JSR PC,VFEXC        ;GO READ ALL THE RECORDS REV.
3881 011574      LET PCMDWD := CMDWRD              ;SAVE THE PREVIOUS COMMAND WORD.
3882 011602      LET CMDWRD := #RDF                ;COMMAND IS READ FWD.
3883 011610      LET CMDLG := #6                   ;SET UP CMD LOGGING INDEX.
3884 011616 004737 011624      JSR PC,VFEXC        ;GO READ ALL RECORDS FWD.
3885 011622
3886 011622 000207      ENDIF
                        RTS      PC      ;RETURN.
  
```

```
3887      :      SUBROUTINE TO EXECUTE THE READ AND VERIFY, FORWARD OR REVERSE.
3888      :      INPUTS:
3889      :      OUTPUTS:
3890      :      REGISTERS:      R2
3891      :      CALLS:      CMDAC, EXCUTE, GOWAIT, CKDATA, CKHAE, NEXTU, FIRSTU.
3892
3893      VFEXC:: LET CMDPKT := CMDWRD CLR.BY #BRF.C ;COMMAND PACKET = READ REV OR FWD.
3894      IFB SWBFLG NE #0 THEN ;IF BYTES ARE TO BE SWAPPED:
3895      LET CMDPKT := CMDPKT SET.BY #SWB.C ;SET SWAB BIT IN CMD PACKET.
3896      ENDIF
3897      LET CMDSAV := CMDPKT ;SAVE COMMAND PACKET 1ST WORD.
3898      LET NCNT := NCNT1 ;SET NUMBER OF RECORDS.
3899      MOV DATARD,CMDPKT+CP.ADL ;SAVE BUFFER START ADDRESS.
3900      WHILE NCNT NE #0 DO ;WHILE THERE ARE RECORDS REMAINING:
3901      JSR PC,CMDAC ;STORE CMD ASCII IN ERROR MSG.
3902      JSR PC,FIRSTU ;SET UP FOR FIRST UNIT.
3903      IF DEVTBL(R5) EQ #END THEN ;IF ALL UNITS HAVE BEEN DROPPED THEN:
3904      DOCLN ;DO CLEAN CODE AND TERMINATE PASS.
3905      ENDIF
3906      WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE DEVICES REMAINING:
3907      LET R2 := DATARD + #8. ;INIT READ BUFFER POINTER.
3908      WHILE R2 NE DATARD DO ;UNTIL 8 BYTES HAVE BEEN SET,
3909      LET -(R2) := #-1 ;INIT READ BUFFER.
3910      ENDDO
3911      JSR PC,EXCUTE ;GO EXECUTE THE COMMAND.
3912      IFB DROPED EQ #0 THEN ;IF UNIT HAS NOT BEEN DROPPED THEN:
3913      JSR PC,GOWAIT ;GO WAIT FOR DONE BIT.
3914      ENDIF
3915      IFB DROPED EQ #0 THEN ;IF UNIT HAS NOT BEEN DROPPED THEN:
3916      JSR PC,CKDATA ;GO VERIFY DATA.
3917      ENDIF
3918      JSR PC,CKHAE ;CHECK FOR HALT AFTER EACH CMD.
3919      JSR PC,NEXTU ;GO FIND THE NEXT UNIT.
3920      ENDDO
3921      LET NCNT := NCNT - #1 ;UPDATE THE RECORD COUNT.
3922      LET PCMDWD := CMDWRD ;SAVE PREVIOUS COMMAND WORD.
3923      ENDDO
3924      RTS PC ;RETURN.
3925
```

011624			
011640			
011646			
011654			
011654			
011662			
011670	013737	002752	002226
011676			
011704	004737	006360	
011710	004737	012300	
011714			
011724			
011726			
011726			
011736			
011746			
011754			
011760			
011762	004737	007316	
011766			
011774	004737	007600	
012000			
012000			
012006	004737	012042	
012012			
012012	004737	012672	
012016	004737	012326	
012022			
012024			
012030			
012036			
012040	000207		

```
3926      :      SUBROUTINE TO COMPARE DATA BETWEEN READ AND WRITE BUFFERS
3927      :      AND PRINT ERROR MESSAGE ON MISCOMPARE.
3928      :      INPUTS:
3929      :      OUTPUTS:
3930      :      REGISTERS:      R2, R3, R4.
3931      :      CALLS:      GCMDB
3932
3933      CKDATA:: IF MSGPKT+MS.RFC LOS BRFCNT THEN ;IF RFC IS LOWER OR THE SAME AS BRFC THEN:
3934      LET R3 := BRFCNT - MSGPKT+MS.RFC ;VERIFY LENGTH = EXP LEN - RFC.
3935      ELSE ;ELSE, IS RFC IS NEGATIVE:
3936      LET R3 := BRFCNT ;VERIFY LENGTH = EXP LEN.
3937      ENDIF
3938      IF R3 NE #0 THEN ;IF THE LENGTH IS NOT ZERO THEN:
3939      LET CKDCNT := R3 - # ;SAVE VERIFICATION LENGTH - 1.
3940      LET R4 := CMDWRD ;R4=CMD BINARY.
3941      JSR PC,GCMDB ;GET CMD ASCII.
3942      LET WTVRM := (R3)+ ;MOVE CMD ASCII.
3943      LET WTVRM+2 :B- (R3) ;INTO MSG.
3944      CLR B CKDFF ;INIT 1ST TIME THRU FLAG.
3945      CLP R2 ;INIT BYTE COUNTER
3946      LET R3 := DATAW ;GET WRITE BUFFER ADDRESS.
3947      LET R4 := DATARD ;GET READ BUFFER ADDRESS.
3948      REPEAT ;REPEAT UNTIL ALL DATA IS COMPARED:
3949      IF R2 EQ CKDCNT THEN ;IF THIS IS THE LAST BYTE THEN:
3950      IFB SWBFLG NE #0 THEN ;IF BYTE SWAPPING IS ENABLED THEN:
3951      IF #BIT00 NOTSETIN CKDCNT THEN ;IF RECORD LENGTH IS ODD THEN:
3952      TSTB (R3)+ ;LAST BYTE WILL BE IN
3953      TSTB (R4)+ ;THE UPPER BYTE.
3954      ENDIF
3955      ENDIF
3956      ENDIF
3957      CMPB (R3),(R4) ;ARE THEY EQUAL.
3958      BEQ 3$ ;BR IF SO.
3959      TSTB CKDFF ;1 ST TIME THRU?
3960      BNE 2$ ;BR IF NOT.
3961      INC VFYCNT(R5) ;INC THE VERIFY ERROR COUNTER.
3962      INC HRDCNT(R5) ;INC THE HARD ERROR COUNT.
3963      LET CKDFF := #1 ;CLR 1ST TIME THRU FLAG.
3964      MOV B (R4),TIME1 ;SAVE WAS DATA FOR TYP0UT.
3965      BIC #177400,TIME1 ;CLEAR GARBAGE.
3966      MOV B (R3),TIME2 ;SAVE SHOULD BE DATA FOR TYP0UT.
3967      BIC #177400,TIME2 ;CLEAR GARBAGE.
3968      ERRHRD #17,WTVRM,DIAERM ;REPORT WRITE/ VERIFY ERROR.
3969      TSTB (R3)+ ;UPDATE WRITE BUFFER ADDRESS.
3970      TSTB (R4)+ ;UPDATE READ BUFFER ADDRESS.
3971      TSTB (R2)+ ;UPDATE BYTE COUNTER.
3972      UNTIL R2 GT CKDCNT ;END OF DATA COMPARE REPEAT LOOP.
3973      ENDIF
3974      RTS PC ;OTHERWISE, RETURN.
3975
3976      CKDCNT: .WORD 0 ;# OF BYTES TO BE VERIFIED -1.
3977      CKDFF: .BYTE 0 ;FIRST TIME THRU DATA ERROR LOOP FLAG.
3978      .EVEN
```

```
3979      :      SUBROUTINE TO FIND THE FIRST DEVICE IN THE TEST SEQUENCE.
3980      :      INPUTS:
3981      :      OUTPUTS:
3982      :      REGISTERS:
3983      :      CALLS:
3984
3985 012300      FIRSTU:: LET DROPE :B= #0      :CLR UNIT DROPPED FLAG
3986 012304      LET R5 := #0      :CLR DEVICE POINTER.
3987 012306      WHILE DEVTBL(R5) EQ #NINUSE DO :WHILE DEVICES ARE NOT IN USE:
3988 012310      LET R5 := R5 + #2      :POINT TO NEXT DEVICE.
3989 012322      ENDDO
3990 012324      RTS      PC      :RETURN WITH 1ST DEVICE IN R5.
3991
3992
3993
3994
3995
3996      :      SUBROUTINE TO FIND THE NEXT UNIT IN THE TEST CYCLE.
3997      :      INPUTS:
3998      :      OUTPUTS:
3999      :      REGISTERS:
4000      :      CALLS:
4001
4002 012326      NEXTU:: LET DROPE :B= #0      :CLR UNIT DROPPED FLAG
4003 012332      REPEAT      :REPEAT UNTIL THE NEXT DEVICE IS FOUND.
4004 012332      LET R5 := R5 + #2      :UPDATE DEVICE TABLE POINTER.
4005 012336      UNTIL DEVTBL(R5) NE #NINUSE
4006 012346      RTS      PC      :RETURN.
4007
4008
4009
```

```
4010      :      SUBROUTINE TO DROP A DEVICE FROM THE TEST SEQUENCE.
4011      :      *****
4012      :      THIS SUBROUTINE DYNAMICALLY MODIFIES A SUPERVISOR CALL. *****
4013      :      *****
4014      :      INPUTS:      R2=ERROR #, R4=BASIC MESSAGE ADDRESS.
4015      :      OUTPUTS:
4016      :      REGISTERS:    R2, R4
4017      :      CALLS:      MOVMSG, PRXST, LOG
4018
4019 012350 DROPU:  LET DRO100+2 := R2      ;STORE ERROR # IN ERROR CALL.
4020 012354      LET DRO100+4 := R4      ;STORE MSG ADR IN ERROR CALL.
4021 012360      LET HRDCNT(R5) := HRDCNT(R5) + #1 ;INCREMENT THE HARD ERROR COUNT.
4022 012364      LET DROPN := DEVTBL(R5) ;SAVE # OF DEVICE TO BE DROPPED.
4023 012372 DRO100: ERRDF R2,R4,STAERM ;PRINT THE ERROR MESSAGE,
4024 012402      LET R4 := MSGPKT+MS.XS3 SHIFT -8. ;GET UDIAG ERROR CODE FROM XSTAT3.
4025 012426      LET @TSDB(R5) := #GSCP ;INITIATE A GET STATUS COMMAND.
4026 012434      WAITUS 10. ;GO TO SUPER-WAIT 1 MSEC.
4027 012442 004737 010020 JSR PC,MOVMSG ;MOVE MSG PACKET TO COMMON AREA.
4028 012446      IFB R4 EQ #X3.RNY THEN ;IF WE HAVE A CAPSTAN RUNAWAY THEN:
4029 012454      ERRDF #16,RNYM,STAERM ;REPORT CAPSTAN RUNAWAY WITH TACH CNT.
4030 012464      ENDIF
4031 012464 004737 012610 JSR PC,PRXST ;PRINT EXTENDED STATUS REGISTERS.
4032 012470      IFB RECLOG NE #0 THEN ;IF THE RECORD HAS BEEN LOGGED THEN:
4033 012476 004737 011254 JSR PC,LOG ;LOG DATA BYTES + RD/WR ERRORS.
4034 012502      ENDIF
4035 012502      DORPT ;PRINT PERFORMANCE REPORT
4036 012504      IF PASCNT(R5) NE #0 THEN
4037 012512      LET PASCNT(R5) := PASCNT(R5) - #1
4038 012516      ENDIF
4039 012516      LET R0 := R5 SHIFT -1 ;R0=LOGICAL DEVICE NUMBER
4040 012522      DODU R0 ;DROP THE UNIT.
4041 012524      BCOMPLETE DRO200 ;BR IF DROPPING OF UNITS IS ENABLED.
4042 012526      IFB IREC EQ #0 THEN ;IF RECOVERY IS ENABLED THEN:
4043 012534      LET @TSSR(R5) := #0 ;ISSUE SUBSYSTEM INIT.
4044 012540      LET STAFLG :B= STAFLG + #1 ;SET START FLAG TO ENABLE REWIND.
4045 012544      DOCLN ;DO CLEAN CODE AND ABORT PASS.
4046 012546      ELSE ;ELSE - RECOVERY IS DISABLED:
4047 012550 000415 BR DRORTN ;RETURN AND CONTINUE TEST SEQUENCE.
4048 012552      ENDIF
4049 012552 DRO200: PRINTF #DROPPDM,DROPN ;PRINT DROP DEVICE MESSAGE
4050 012576      LET DROPED :B= #1 ;SET UNIT DROPPED FLAG.
4051 012604 000207 DRORTN: RTS PC ;RETURN.
4052
4053 012606 000000 DPOPN: .WORD 0 ;# OF UNIT TO BE DROPPED
```

```
4054      :      SUBROUTINE TO PRINT EXTENDED STATUS REGISTERS.
4055      :      INPUTS:
4056      :      OUTPUTS:
4057      :      REGISTERS:
4058      :      CALLS:
4059
4060      012610      PRXST:: PRINTX #STAERO      ;TYPE OUT THE X-ST REGS.
4061      012630      PRINTX #STAER6,MSGPKT+MS.XS0,MSGPKT+MS.XS1,MSGPKT+MS.XS2,MSGPKT+MS.XS3
4062      012670      000207      RTS PC
4063
4064
4065
4066
4067      :      SUBROUTINE TO HALT AFTER EACH COMMAND.
4068      :      INPUTS:
4069      :      OUTPUTS:
4070      :      REGISTERS:      R3, R4
4071      :      CALLS:
4072
4073      012672      CKHAE:: IFB HAE NE #0 THEN      ;IF HALT FLAG IS SET:
4074      012700      MANUAL      ;IS MANUAL INTERVENTION ALLOWED?
4075      012702      BNCOMPLETE CKHRTN      ;BR IF NOT.
4076      012704      LET R4 := CMDWRD      ;COMMAND WORD.
4077      012710      004737 006422      JSR PC,GCMDA      ;FETCH ADR OF CMD ASCII.
4078      012714      LET HALTM := (R3)+      ;MOVE CMD ASCII
4079      012720      LET HALTM+2 :=B= (R3)      ;INTO MESSAGE.
4080      012724      GMANIL HALTM,TIME1,1,YES      ;HALT - WAIT FOR AN OEPRATOR INPUT.
4081      012740      10000$:      ENDIF
4082      012740
4083      012740      000207      CKHRTN: RTS      PC      ;RETURN
4084
4085
4086      012742      .EVEN
4086      012742      ENDMOD
```

```
4087
4088
4089      .TITLE MISCELLANEOUS SECTIONS
4090      .SBTTL  REPORT CODING SECTION
4091 012742      BGNMOD
4092
4093      :++
4094      : THE REPORT CODING SECTION CONTAINS THE
4095      : 'PRINTS' CALLS THAT GENERATE STATISTICAL REPORTS.
4096      :--
4097
4098 012742      BGNRPT
4099 012742      L$RPT::
4100
4101
4102 012742      LET      R$SAVE := R5          :SAVE CURRENT DEVICE POINTER.
4103 012746 004737 012300      JSR      PC,FIRSTU      :FIND THE FIRST UNIT.
4104 012752      WHILE DEVTBL(R5) NE #END DO      :WHILE THERE ARE MORE DEVICES:
4105 012762      PRINTS      #RPT1A,DEVTBL(R5),PASCNT(R5),RECCNT(R5)
4106 013016      PRINTS      #RPT1B,WRBC+30(R5),WRBC+20(R5),WRBC+10(R5),WRBC(R5)
4107 013056      PRINTS      #RPT1C,RRBC+30(R5),RRBC+20(R5),RRBC+10(R5),RRBC(R5)
4108 013116      PRINTS      #RPT1D,RFBC+30(R5),RFBC+20(R5),RFBC+10(R5),RFBC(R5)
4109 013156      PRINTS      #RPT1E
4110 013176      PRINTS      #RPT1F,WRREC(R5),RRREC(R5),RFREC(R5)
4111 013232      PRINTS      #RPT1G,WRUNR(R5),RRUNR(R5),RFUNR(R5)
4112 013266      PRINTS      #RPT1H
4113 013306      PRINTS      #RPT1I,SCCNT(R5),HRDCNT(R5),VFYCNT(R5)
4114 013342 004737 012326      JSR      PC,NEXTU      :FIND THE NEXT UNIT.
4115 013346      ENDDO
4116 013350      LET R5 := R$SAVE          :RESTORE CURRENT DEVICE POINTER.
4117 013354      EXIT      RPT
4118
4119
4120      .NLIST BEX
013360 047045 047045 040445 RPT1A: .ASCIIZ /%N%N%AUNIT %D1%S3%APASS-%D5%S3%ARECORD:%D5%N/
013435      045 041101 052131 RPT1B: .ASCIIZ /%ABYTES WRITTEN = %D3%A,%Z3%A,%Z3%A,%Z3%N/
013510 040445 054502 042524 RPT1C: .ASCIIZ /%ABYTES READ REV = %D3%A,%Z3%A,%Z3%A,%Z3%N/
013563      045 041101 052131 RPT1D: .ASCIIZ /%ABYTES READ FWD = %D3%A,%Z3%A,%Z3%A,%Z3%N/
013636 051445 032462 040445 RPT1E: .ASCIIZ /%S25%AWRT%S4%ARDR%S4%ARDF%N/
013672 040445 042522 047503 RPT1F: .ASCIIZ /%ARECOVERABLE ERRORS - %D5%S2%D5%S2%D5%N/
013745      045 052501 051116 RPT1G: .ASCIIZ /%AUNRECOVERABLE ERRORS - %D5%S2%D5%S2%D5%N%N/
014022 040445 050123 041505 RPT1H: .ASCIIZ '%ASPECIAL CONDITION%S3%AHARD/FATAL%S3%ADATA COMPARE%N''
014110 051445 022465 032504 RPT1I: .ASCIIZ /%S5%D5%S11%D5%S9%D5%N%N/
4121      .LIST BEX
4122      .EVEN
4123 014140      ENDRPT
4124 014140      L10011:
```

```

4125 .SBTTL INITIALIZE SECTION
4126
4127 ;++
4128 ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
4129 ; AT THE BEGINNING OF EACH PASS.
4130 ;--
4131
4132         BGNINIT
4133 LSINIT::
4134
4135 INIT10: IF #BIT0:BIT1 SET IN #CMDPKT THEN ;IF CMD PACKET IS NOT ON MODULO 4 BOUNDARY:
4136         ERRSF #1,CMDPKM ;PRINT ERROR MSG.
4137         WAITMS 100. ;GO TO SUPERVISOR, WAIT 10 SECONDS.
4138         BR INIT10 ;
4139         ENDIF
4140
4141 IFB CLRFLG NE #0 THEN ;IF CLR COUNTERS FLAG SET:
4142         CLRB CLRFLG ;INIT CLR FLAG.
4143         LET R2 := #0
4144         WHILE R2 NE #CNTLEN DO
4145             LET WRBC(R2) := #0 ;CLR ALL STATISTICAL COUNTERS.
4146             LET R2 := R2 + #2
4147         ENDDO
4148         ENDIF
4149
4150 IFB RRANV NE #0 THEN ;IF RESET RANDOM VARIABLE FLAG IS SET THEN:
4151         LET RANB := #RANBC ;RESET RANDOM BASE #.
4152         LET RANS := #RANSC ;RESET RANDOM SAVE LOCATION.
4153         ENDIF
4154
4155 READEF #EF.START ;READ START COMMAND EVENT FLAG.
4156 BNCOMPLETE INIT15 ;BRANCH IF NOT STARTING.
4157 LET STAFLG :B= STAFLG + #1 ;SET START COMMAND FLAG.
4158 LET R5 := #6
4159 REPEAT
4160     LET DEVTBL(R5) := #NINUSE ;INITIATE UNIT NUMBER TABLE
4161     LET R5 := R5 - #2 ;BY STORING NOT IN USE IN EACH LOCATION.
4162 UNTIL R5 EQ #0
4163 LET R5 := LSUNIT SHIFT 1
4164 REPEAT
4165     LET R5 := R5 - #2 ;STORE ALL UNIT
4166     LET DEVTBL(R5) := R5 SHIFT -1 + #1 ;NUMBERS IN DEVTBL.
4167 UNTIL R5 EQ #0
4168
4169 INIT15: READEF #EF.PWR ;HAS THERE BE A POWER FAILURE?
4170 BNCOMPLETE INIT16 ;BRANCH IF NOT.
4171 LET STAFLG :B= STAFLG + #1 ;IF SU - SET THE START FLAG.
4172 LET PWRFLG :B= PWRFLG + #1 ;IF SO - SET THE POWER FAIL FLAG.
4173
4174 INIT16: JSR PC,FIRSTU ;INIT DEVICE POINTER.
4175 LET R2 := #0 ;INIT DEVICE COUNTER.
4176 WHILE DEVTBL(R5) NE #END DO
4177     LET R2 := R2 + #1
4178     LET R0 := R5 SHIFT -1
4179     GPHARD P0,R0 ;GET HARDWARE P TABLE FROM SUPER.
4180     LET TSDB(R5) := (R0) ;SAVE TSDB ADDRESS.

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4181 014410      LET TSSR(R5) := (R0) + #2      ;SAVE TSSR ADDRESS.
4182 014422      LET TSVCT(R5) := (R0)          ;SAVE INTERRUPT VECTOR ADDRESS.
4183 014426      SETVEC TSVCT(R5),TS4INT(R5),#INTPRI ;SET UP INTERRUPT PROCESSING CONDITIONS.
4184 014454      IFB PWRFLG EQ #0 THEN          ;IF POWER FAIL HAS NOT OCCURRED THEN:
4185 014462      LET PASCNT(R5) := PASCNT(R5) + #1 ;UPDATE PASS COUNT.
4186 014466      ENDIF
4187 014466 004737 012326 JSR PC,NEXTU          ;DO IT FOR ALL DEVICES.
4188 014472      ENDDO
4189
4190 014474      IF R2 EQ #0 THEN                ;IF THERE ARE NO UNITS:
4191 014500      PRINTF #AUDRPM                  ;PRINT ALL UNITS DROPPED.
4192 014520      WAITMS 50.                      ;GO TO SUPERVISOR, WAIT 5 SECONDS.
4193 014526      BREAK                          ;GO TO SUPERVISOR, CHECK TTY.
4194 014530      DOCLN                          ;DO CLEAN CODE + ABORT PASS.
4195 014532      ENDIF
4196
4197 014532 004737 012300 JSR PC,FIRSTU          ;SET UP FOR FIRST UNIT.
4198 014536      WHILE DEVTBL(R5) NE #END DO      ;WHILE THERE ARE MORE DEVICES:
4199 014546      LET TIME1 := #-1                ;INIT TIMEOUT COUNTER.
4200 014554      REPEAT                          ;REPEAT UNTIL UNIT IS ON LINE:
4201 014554      BREAK                          ;BREAK TO THE SUPERVISOR,
4202 014556      LET TIME1 := TIME1 - #1          ;UPDATE TIMEOUT COUNTER.
4203 014562      IF TIME1 EQ #0 THEN              ;IF TIMED OUT THEN:
4204 014570 004737 010020 JSR PC,MOVMSG          ;MOVE MSG PACKET TO COMMON AREA,
4205 014574 004737 010402 JSR PC,TCC1          ;PRINT UNIT OFFLINE + DROP UNIT,
4206 014600      ELSE                          ;ELSE - IF NOT TIMED OUT:
4207 014602      LET @TSDB(R5) := #GSCPK        ;ISSUE GET STATUS COMMAND,
4208 014610      WAITUS 100.                    ;WAIT 10 MSEC.
4209 014616      ENDIF
4210 014616      UNTIL #TS.OFL NOTSETIN @TSSR(R5) OR TIME1 EQ #0
4211          ;REPEAT UNTIL ON LINE OR TIMED OUT.
4212 014634 004737 012326 JSR PC,NEXTU          ;SET UP FOR NEXT UNIT.
4213 014640      ENDDO
4214
4215 014642      LET R2 := #DATCNT SHIFT -8.      ;GENERATE PAGE COUNT FROM MAX LENGTH.
4216 014666      BUFFER R2,R3                    ;REQUEST MEMORY FROM SUPER FOR RD/WR BUFFERS.
4217 014674      BCOMPLETE INIT20                ;BRANCH IF ENOUGH MEMORY IS AVAILABLE.
4218 014676      DOCLN                          ;DO CLEAN CODE + TERMINATE PASS.
4219 014700      INIT20: LET DATAWT := R3        ;SAVE WRITE BUFFER ADDRESS.
4220 014704      LET DATARD := #DATCNT + R3      ;SAVE READ BUFFER ADDRESS.
4221
4222 014716      LET CHGFLG :B= #0                ;CLR CHANGE CMD SEQ TBL FLAG.
4223 014722      LET R3 := #ENDFLG
4224 014726 004737 007750 JSR PC,CLRERR          ;CLEAR ALL FLAGS.
4225 014732      LET PWRFLG :B= #0              ;CLEAR THE POWER FAIL FLAG.
4226
4227 014736      EXIT INIT
4228      .EVEN
4229
4230 014742      ENDINIT
4231 014742      L10012:

```

```
4232 .SBTTL CLEANUP CODING SECTION
4233
4234 :++
4235 : THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
4236 : AT THE END OF EACH PASS.
4237 :--
4238
4239         BGNCLN
4240 L$CLEAN::
4241
4242
4243         JSR      PC,FIRSTU           ;FIND FIRST UNIT.
4244         WHILE DEVTL(R5) NE #END DO
4245             JSR PC,WSSR           ;WAIT FOR UNIT READY OR TIMEOUT,
4246             LET @TSDB(R5) := #BRCPK ;ISSUE MSG BUFFER RELEASE CMD.
4247             CLRVEC TSVCT(R5)      ;RELEASE INTERRUPT VECTORS FOR ALL DEV.
4248             JSR PC,NEXTU           ;FIND NEXT UNIT.
4249         ENDDO
4250         UNBUFF DATAWT            ;RELEASE THE READY/WRITE BUFFERS TO SUPER.
4251
4252         EXIT      CLN
4253         .EVEN
4254
4255         ENDCLN
4256 L10013:
```

```
4257 .SBTTL DROP UNIT SECTION
4258
4259 :++
4260 : THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
4261 : TO NO LONGER BE TESTED.
4262 :--
4263
4264 015022 BGNDU
4265 015022 L$DU::
4266
4267 015022 LET R5 := R0 SHIFT 1 ;R5 = LOGICAL DEVICE NUMBER X 2.
4268 015026 004737 007764 JSR PC,WSSR ;WAIT FOR UNIT READY OR TIMEOUT.
4269 015032 LET @TSDB(R5) := #BRCPK ;ISSUE MSG BUFFER RELEASE CMD.
4270 015040 LET DEVTBL(R5) := #NINUSE ;SET NOT IN USE FLAG FOR THE DEVICE.
4271 015046 CLRVEC TSVCT(R5) ;RELEASE THE INTERRUPT VECTOR.
4272
4273 015054 EXIT DU
4274 .EVEN
4275
4276 015060 ENDDU
4277 015060 L1004:
```

```

4278      .SBTTL  ADD UNIT SECTION
4279
4280      :++
4281      : THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
4282      : TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING.  IF
4283      : 'EF.AUNIT' IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
4284      :--
4285
4286 015062      BGNAU
4287 015062      L$AU::
4288
4289
4290 015062      LET R5 := R0 SHIFT 1      ;R5 = LOGICAL DEVICE NUMBER X 2.
4291 015066      LET DEVTBL(R5) := R0 + #1 ;STORE UNIT # IN DEVICE TABLE.
4292 015076      GPBARD R0,R0              ;GET HARDWARE P TABLE FROM SUPER.
4293 015100      LET TSDB(R5) := (R0)      ;SAVE TSDB ADDRESS.
4294 015104      LET TSSR(R5) := (R0) + #2 ;SAVE TSSR ADDRESS.
4295 015116      LET TSVCT(R5) := (R0)     ;SAVE INTERRUPT VECTOR ADDRESS.
4296 015122      SETVEC TSVCT(R5),TS4INT(R5),#INTPRI ;SET UP INTERUPT PROCESSING CONDITIONS.
4297 015150      LET INTFLG(R5) := #0     ;CLEAR INTERRUPT FLAGS.
4298
4299 015154      EXIT  AU
4300
4301      .EVEN
4302
4303 015160      ENDAU
4304 015160      L10015:
4305
4306 015162      ENDMOD
4307

```

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4308
4309 .TITLE HARDWARE TESTS
4310
4311 .SBTTL TEST 1: BASIC FUNCTIONS.
4312
4313 :++
4314 : TEST TO EXECUTE ALL TS04 FUNCTIONS.
4315 :--
4316
4317 015162 BGNMOD
4318
4319 015162 BGNTST
4320 015162 T1::
4321
4322 015162 LET RANDOM :B- #0 ;CLR THE RANDOM OPERATIONS FLAG.
4323
4324 015166 BGNSUB ;SUBTEST 1 - SET CHAR, DRIVE INIT, GET STATUS.
4325 015166 T1.1:
4326
4327 015170 LET R2 := #BFSEQ0 ;ADR OF CMD SEQ.
4328 015174 004737 015754 JSR PC,BFSEQ ;SET UP CMD SEQ.
4329 015200 004737 006020 JSR PC,EXALL ;EXECUTE CMD SEQ ON ALL DEVICES.
4330 015204 004737 012300 JSR PC,FIRSTU ;FIND THE FIRST UNIT.
4331 015210 WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE DEVICES:
4332 015220 LET R2 := MSGPKA(R5) ;GET MSG PACKET ADR,
4333 015224 LET R2 := R2 + #12 ;GET XSTAT2 ADR,
4334 015230 LET TS4CL(R5) := (R2) CLR.BY #177400 ;STORE CODE LEVEL FROM DTR BYTE,
4335 015242 IF PASCNT(R5) EQ #1 THEN ;IF THIS IS PASS 1 THEN:
4336 015252 PRINTF #CODELM,DEVTBL(R5),TS4CL(R5) ;PRINT THE TS04 MICROCODE LEVEL.
4337 015302 ENDF
4338 015302 004737 012326 JSR PC,NEXTU ;FIND NEXT UNIT.
4339 015306 ENDDO
4340 015310 ENDSUB
4341 015310 L10017:
4342
4343 015312 BGNSUB ;SUBTEST 2 - REWIND.
4344 015312 T1.2:
4345
4346 015314 LET R2 := #BFSEQ1 ;ADR OF CMD SEQ.
4347 015320 004737 015754 JSR PC,BFSEQ ;SET UP CMD SEQ.
4348 015324 004737 006020 JSR PC,EXALL ;EXECUTE CMD SEQ ON ALL DEVICES.
4349 015330 ENDSUB
4350 015330 L10020:
4351
4352 015332 BGNSUB ;SUBTEST 3 - WRITE/VERIFY.
4353 015332 T1.3:
4354
4355 015334 LET R2 := #BFSEQ2 ;ADR OF CMD SEQ.
4356 015340 004737 015754 JSR PC,BFSEQ ;SET UP CMD SEQ.
4357 015344 004737 006020 JSR PC,EXALL ;EXECUTE CMD SEQ ON ALL DEVICES.
4358 015350 ENDSUB
4359 015350 L10021:
4360
4361 015352 BGNSUB ;SUBTEST 4 - WRITE TAPE MARK, ERASE.
4362 015352 T1.4:
4363

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4364	015354			LET R2 := #BFSEQ3	:ADR OF CMD SEQ.
4365	015360	004737	015754	JSR PC,BFSEQ	:SET UP CMD SEQ.
4366	015364	004737	006020	JSR PC,EXALL	:EXECUTE CMD SEQ ON ALL DEVICES.
4367	015370			ENDSUB	
4368	015370			L10022:	
4369					
4370	015372			BGNSUB	:SUBTEST 5 - SPACE FILES.
4371	015372			T1.5:	
4372					
4373	015374			LET R2 := #BFSEQ4	:ADR OF CMD SEQ.
4374	015400	004737	015754	JSR PC,BFSEQ	:SET UP CMD SEQ.
4375	015404	004737	006020	JSR PC,EXALL	:EXECUTE CMD SEQ ON ALL DEVICES.
4376	015410			ENDSUB	
4377	015410			L10023:	
4378					
4379	015412			BGNSUB	:SUBTEST 6 - SPACE RECORDS.
4380	015412			T1.6:	
4381					
4382	015414			LET R2 := #BFSEQ5	:ADR OF CMD SEQ.
4383	015420	004737	015754	JSR PC,BFSEQ	:SET UP CMD SEQ.
4384	015424	004737	006020	JSR PC,EXALL	:EXECUTE CMD SEQ ON ALL DEVICES.
4385	015430			ENDSUB	
4386	015430			L10024:	
4387					
4388	015432			BGNSUB	:SUBTEST 7 - WRITE RETRY.
4389	015432			T1.7:	
4390					
4391	015434			LET R2 := #BFSEQ6	:ADR OF CMD SEQ.
4392	015440	004737	015754	JSR PC,BFSEQ	:SET UP CMD SEQ.
4393	015444	004737	006020	JSR PC,EXALL	:EXECUTE CMD SEQ ON ALL DEVICES.
4394	015450			ENDSUB	
4395	015450			L10025:	
4396					
4397	015452			BGNSUB	:SUBTEST 8 - READ REV RETRY.
4398	015452			T1.8:	
4399					
4400	015454			LET R2 := #BFSEQ7	:ADR OF CMD SEQ.
4401	015460	004737	015754	JSR PC,BFSEQ	:SET UP CMD SEQ.
4402	015464	004737	006020	JSR PC,EXALL	:EXECUTE CMD SEQ ON ALL DEVICES.
4403	015470			ENDSUB	
4404	015470			L10026:	
4405					
4406	015472			BGNSUB	:SUBTEST 9 - READ FWD RETRY.
4407	015472			T1.9:	
4408					
4409	015474			LET R2 := #BFSEQ8	:ADR OF CMD SEQ.
4410	015500	004737	015754	JSR PC,BFSEQ	:SET UP CMD SEQ.
4411	015504	004737	006020	JSR PC,EXALL	:EXECUTE CMD SEQ ON ALL DEVICES.
4412	015510			ENDSUB	
4413	015510			L10027:	
4414					
4415	015512			BGNSUB	:SUBTEST 10- CLEAN.
4416	015512			T1.10:	
4417					
4418	015514			LET R2 := #BFSEQ9	:ADR OF CMD SEQ.
4419	015520	004737	015754	JSR PC,BFSEQ	:SET UP CMD SEQ.

4420	015524	004737	006020	JSR PC,EXALL	;EXECUTE CMD SEQ ON ALL DEVICES.
4421	015530			ENDSUB	
4422	015530			L10030:	
4423					
4424	015532			BGNSUB	;SUBTEST 11 - WIV SWAPPED DATA BYTES.
4425	015532			T1.11:	
4426					
4427	015534			LET R2 := #BFSE10	;ADR OF CMD SEQ.
4428	015540	004737	015754	JSR PC,BFSEQ	;SET UP CMD SEQ.
4429	015544	004737	006020	JSR PC,EXALL	;WRITE/VERIFY RECORDS 1 AND 2.
4430	015550			LET SWBFLG :B= #1	;ENABLE BYTE SWAPPING.
4431	015556	004737	006020	JSR PC,EXALL	;WRITE/VERIFY RECORDS 3 AND 4.
4432	015562			LET SWBFLG :B= #0	;DISABLE BYTE SWAPPING.
4433	015566			ENDSUB	
4434	015566			L10031:	
4435					
4436	015570			LET R2 := DATAWT + #8.	;INIT WRITE BUFFER POINTER.
4437	015600			WHILE R2 NE DATAWT DO	;UNTIL 8 BYTES HAVE BEEN SWAPPED.
4438	015606	000342		SWAB -(R2)	;SWAP DATA BYTES IN WRITE BUFFER.
4439	015610			ENDDO	
4440					
4441	015612			BGNSUB	;SUBTEST 12 - READ SWAPPED DATA BYTES.
4442	015612			T1.12:	
4443					
4444	015614			LET CMDWRD := #RDR	;CMD IS READ REV.
4445	015622	004737	011624	JSR PC,VFEXC	;VERIFY ODD LENGTH SWAP (RECORD 4).
4446	015626			LET CMDPKT+CP.CNT := #10	;CHANGE BYTE COUNT TO 8.
4447	015634	004737	011624	JSR PC,VFEXC	;VERIFY EVEN LENGTH SWAP (RECORD 3).
4448	015640			LET SWBFLG :B= #1	;ENABLE BYTE SWAPPING.
4449	015646			LET CMDPKT+CP.CNT := #7	;CHANGE BYTE COUNT TO 7.
4450	015654	004737	011624	JSR PC,VFEXC	;VERIFY ODD LENGTH SWAP (RECORD 2).
4451	015660			LET CMDPKT+CP.CNT := #10	;CHANGE BYTE COUNT TO 8.
4452	015666	004737	011624	JSR PC,VFEXC	;VERIFY EVEN LENGTH SWAP (RECORD 1).
4453	015672			LET CMDWRD := #RDF	;CMD IS READ FWD.
4454	015700	004737	011624	JSR PC,VFEXC	;VERIFY EVEN LENGTH SWAP (RECORD 1).
4455	015704			LET CMDPKT+CP.CNT := #7	;CHANGE BYTE COUNT TO 7.
4456	015712	004737	011624	JSR PC,VFEXC	;VERIFY ODD LENGTH SWAP (RECORD 2).
4457	015716			LET SWBFLG :B= #0	;DISABLE BYTE SWAPPING.
4458	015722			LET CMDPKT+CP.CNT := #10	;CHANGE BYTE COUNT TO 8.
4459	015730	004737	011624	JSR PC,VFEXC	;VERIFY EVEN LENGTH SWAP (RECORD 3).
4460	015734			LET CMDPKT+CP.CNT := #7	;CHANGE BYTE COUNT TO 7.
4461	015742	004737	011624	JSR PC,VFEXC	;VERIFY ODD LENGTH SWAP (RECORD 4).
4462	015746			ENDSUB	
4463	015746			L10032:	
4464					
4465	015750			EXIT	IST

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4466      :      SUBROUTINE TO MOVE A COMMAND SEQUENCE TO THE SEQUENCE TABLE.
4467      :      INPUTS:      R2 = FWA OF COMMAND SEQUENCE.
4468      :      OUTPUTS:
4469      :      REGISTERS:
4470      :      CALLS:
4471
4472 015754  BFSEQ:  LET R1 := #CMDSEQ      ;INIT SEQ TABLE ADDRESS.
4473 015760      WHILE (R2) NE #END DO    ;WHILE THERE ARE MORE COMMANDS:
4474 015766      LET (R1)+ : (R2)+        ;MOVE COMMANDS TO SEQ TABLE.
4475 015770      ENDDO
4476 015772      LET (R1) := #END        ;STORE END OF SEQUENCE CODE.
4477 015776 000207  RTS      PC          ;RETURN.
4478
4479
4480
4481      :      BASIC FUNCTION COMMAND SEQUENCE
4482
4483 016000 140004  BFSEQ0: .WORD  SCH      ;SET CHAR. 200.      (1)
4484 016002 000200      200
4485 016004 000001      1
4486 016006 000000      0
4487 016010 100013      DRI      ;DRIVE INIT.      (2)
4488 016012 000001      1
4489 016014 000001      1
4490 016016 000000      0
4491 016020 140004      SCH      ;SET CHAR. 20      (3)
4492 016022 000020      20
4493 016024 000001      1
4494 016026 000000      0
4495 016030 100017      GES      ;GET STATUS.      (4)
4496 016032 000001      1
4497 016034 000001      1
4498 016036 000000      0
4499 016040 140004      SCH      ;SET CHAR. 40.      (5)
4500 016042 000040      40
4501 016044 000001      1
4502 016046 000000      0
4503 016050 177777      .WORD  END
4504
4505 016052 102010  BFSEQ1:      RWD      ;REWIND TWICE.      (6)
4506 016054 000001      1
4507 016056 000002      2
4508 016060 000000      0
4509 016062 177777      .WORD  END
4510
4511 016064 104105  BFSEQ2:      WTV      ;WRITE/VERIFY PAT 1.      (7)
4512 016066 010000      DATCNT
4513 016070 000001      1
4514 016072 000001      1
4515 016074 104105      WTV      ;WTV PAT 2.      (8)
4516 016076 010000      DATCNT
4517 016100 000001      1
4518 016102 000002      2
4519 016104 104105      WTV      ;WTV PAT 3.      (9)
4520 016106 010000      DATCNT
4521 016110 000001      1

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4522	016112	000003		3		
4523	016114	104105		WTV	;WTV PAT 4.	(10)
4524	016116	010000		DATCNT		
4525	016120	000001		1		
4526	016122	000004		4		
4527	016124	104105		WTV	;WTV PAT 5.	(11)
4528	016126	010000		DATCNT		
4529	016130	000001		1		
4530	016132	000005		5		
4531	016134	104105		WTV	;WTV PAT 6.	(12)
4532	016136	010000		DATCNT		
4533	016140	000001		1		
4534	016142	000006		6		
4535	016144	104105		WTV	;WTV PAT 0.	(13)
4536	016146	010000		DATCNT		
4537	016150	000001		1		
4538	016152	000000		0		
4539	016154	177777	.WORD	END		
4540						
4541	016156	100011	BF SEQ3:	WTM	;WRITE TAPE MARK.	(14)
4542	016160	000001		1		
4543	016162	000001		1		
4544	016164	000000		0		
4545	016166	104005		WRT	;WRITE 10 RECORDS.	(15)
4546	016170	010000		DATCNT		
4547	016172	000010		10		
4548	016174	000001		1		
4549	016176	100411		ERS	;ERASE 10 TIMES.	(16)
4550	016200	000001		1		
4551	016202	000010		10		
4552	016204	000000		0		
4553	016206	100011		WTM	;WRITE TAPE MARK.	(17)
4554	016210	000001		1		
4555	016212	000001		1		
4556	016214	000000		0		
4557	016216	101011		WTR	;WTM RETRY	(18)
4558	016220	000001		1		
4559	016222	000001		1		
4560	016224	000000		0		
4561	016226	177777	.WORD	END		
4562						
4563	016230	105410	BF SEQ4:	SFR	;SPACE 2 FILES REV.	(19)
4564	016232	000002		2		
4565	016234	000001		1		
4566	016236	000000		0		
4567	016240	105010		SFF	;SPACE 2 FILES FWD.	(20)
4568	016242	000002		2		
4569	016244	000001		1		
4570	016246	000000		0		
4571	016250	105410		SFR	;SPACE 2 FILES REV.	(21)
4572	016252	000001		1		
4573	016254	000002		2		
4574	016256	000000		0		
4575	016260	105010		SFF	;SPACE 2 FILES FWD.	(22)
4576	016262	000001		1		
4577	016264	000002		2		

4578	016266	000000	0		
4579	016270	177777	.WORD	END	
4580					
4581	016272	102010	BFSEQ5:	RWD	;REWIND. (23)
4582	016274	000001		1	
4583	016276	000001		1	
4584	016300	000000		0	
4585	016302	104010		SRF	;SPACE 7 RECORDS FWD. (24)
4586	016304	000007		7	
4587	016306	000001		1	
4588	016310	000000		0	
4589	016312	104410		SRR	;SPACE 7 RECORDS REV. (25)
4590	016314	000007		7	
4591	016316	000001		1	
4592	016320	000000		0	
4593	016322	104010		SRF	;SPACE 7 RECORDS FWD. (26)
4594	016324	000001		1	
4595	016326	000007		7	
4596	016330	000000		0	
4597	016332	104410		SRR	;SPACE 7 RECORDS REV. (27)
4598	016334	000001		1	
4599	016336	000007		7	
4600	016340	000000		0	
4601	016342	177777	.WORD	END	
4602					
4603	016344	102010	BFSEQ6:	RWD	;REWIND. (28)
4604	016346	000001		1	
4605	016350	000001		1	
4606	016352	000000		0	
4607	016354	104005		WRT	;WRITE. (29)
4608	016356	010000		DATCNT	
4609	016360	000001		1	
4610	016362	000001		1	
4611	016364	105005		WRR	;WRITE RETRY. (30)
4612	016366	010000		DATCNT	
4613	016370	000001		1	
4614	016372	000001		1	
4615	016374	177777	.WORD	END	
4616					
4617	016376	104401	BFSEQ7:	RDR	;READ REV. (31)
4618	016400	010000		DATCNT	
4619	016402	000001		1	
4620	016404	000001		1	
4621	016406	105401		RNR	;READ NEXT REV. (32)
4622	016410	010000		DATCNT	
4623	016412	000001		1	
4624	016414	000001		1	
4625	016416	125401		RNF	;READ NEXT FWD. (33)
4626	016420	010000		DATCNT	
4627	016422	000001		1	
4628	016424	000001		1	
4629	016426	177777	.WORD	END	
4630					
4631	016430	104001	BFSEQ8:	RDF	;READ FWD. (34)
4632	016432	010000		DATCNT	
4633	016434	000001		1	

4634	016436	000001	1			
4635	016440	105001	RPF		;READ PREVIOUS FWD.	(35)
4636	016442	010000	DATCNT			
4637	016444	000001	1			
4638	016446	000001	1			
4639	016450	125001	RPR		;READ PREVIOUS REV.	(36)
4640	016452	010000	DATCNT			
4641	016454	000001	1			
4642	016456	000001	1			
4643	016460	177777	.WORD	END		
4644						
4645	016462	101012	BFSEQ9: .WORD	CLN	;CLEAN.	(37)
4646	016464	000001	1			
4647	016466	000001	1			
4648	016470	000000	0			
4649	016472	102010	RWD		;REWIND	(38)
4650	016474	000001	1			
4651	016476	000001	1			
4652	016500	000000	0			
4653	016502	177777	.WORD	END	;END OF SEQUENCE.	
4654						
4655	016504	104105	BFSE10:	WTV	;WRITE/VERIFY EVEN LENGTH.	(39)
4656	016506	000010	10			
4657	016510	000001	1			
4658	016512	000000	0			
4659	016514	104105	WTV		;WRITE/VERIFY ODD LENGTH.	(40)
4660	016516	000007	7			
4661	016520	000001	1			
4662	016522	000000	0			
4663	016524	177777	.WORD	END		
4664			.EVEN			
4665						
4666	016526		ENDTST			
4667	016526		L10016:			

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4668 .SBTTL TEST 2: DATA RELIABILITY.
4669
4670 :++
4671 : TEST TO CHECK THE DATA RELIABILITY OF THE TS04.
4672 :--
4673 016530 BGNTST
4674 016530 T2::
4675
4676 016530 LET RANDOM :B= #1 ;SET THE RANDOM OPERATIONS FLAG.
4677 016536 LET R2 := #DATCNT - #1 ;SET UP THE RECORD LENGTH MASK.
4678 016544 LET LENMSK := COMP R2 ;ALLOW MAXIMUM BUFFER.
4679 016554 004737 005754 JSR PC,SETCH ;CMD 1 = SET CHARACTERISTIC.
4680 016560 IFB STAFLG NE #0 THEN ;IF STARTING THEN:
4681 016566 004737 006000 JSR PC,SETRW ;CMD2=REWIND
4682 016572 LET STAFLG :B= #0 ;CLR START FLAG.
4683 016576 ENDIF
4684 016576 LET (R1)+ := #WTV ;CMD3 = WRITE/ VERIFY.
4685 016602 LET (R1)+ := #DATCNT ;SET BRF TO MAX FOR PATTERN GENERATION.
4686 016606 LET R2 := COMP #RNOPSC
4687 016614 LET (R1)+ := R2 ;63 OPERATIONS.
4688 016616 LET (R1)+ := #RANP ;RANDOM PATTERN.
4689 016622 REPEAT ;REPEAT TO EOT:
4690 016622 WHILE R1 LT #SEQEND DO ;FILL SEQ TBL WITH RANDOM CMDS.
4691 016630 LET RANS := RANS + RANB
4692 016636 LET R2 := RANS CLR.BY #177741 ;R2 = RANDOM # (0 - 36).
4693 016646 004772 016762 JSR PC,@RANCMD(R2) ;SET UP A RANDOM CMD + BRF.
4694 016652 ENDDO
4695 016654 LET (R1) := #END ;STORE END OF SEQUENCE CODE IN TABLE.
4696 016660 004737 006020 JSR PC,EXALL ;GO EXECUTE ALL CMDS IN SEQUENCE TABLE.
4697 016664 LET R1 := #CMDSEQ ;INIT CMD SEQ TBL POINTER,
4698 016670 UNTIL R2 NE #0 ;REPEAT UNTIL EOT IS REACHED
4699 016674 004737 017022 JSR PC,RANRD ;SET UP READ REV/FWD CMDS,
4700 016700 LET CMDSEQ+4 := COMP #RNOPSC ;# OF RECORDS FOR READ REV.
4701 016712 LET CMDSEQ+14 := CMDSEQ+4 ;# OF RECORDS FOR READ FORWARD.
4702 016720 LET (R1) := #END ;STORE END OF SEQUENCE CODE IN SEQ TABLE.
4703 016724 004737 006020 JSR PC,EXALL ;GO EXECUTE READ REV/FWD OF LAST N RECORDS.
4704 016730 LET RPTFLG :B= #1 ;REQUEST PERFORMANCE REPORT DURING REWIND.
4705 016736 LET R1 := #CMDSEQ ;INIT SEQ TBL POINTER,
4706 016742 004737 006000 JSR PC,SETRW ;STORE REWIND IN SEQ TBL,
4707 016746 LET (R1) := #END ;STORE END IN SEQ TBL,
4708 016752 004737 006020 JSR PC,EXALL ;EXECUTE REWIND CMD ON ALL UNITS
4709
4710 016756 EXIT TST
4711

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4712      ;      ADDRESSES OF SUBROUTINES USED TO SET UP RANDOM OPERATIONS IN
4713      ;      THE DATA RELIABILITY TEST.
4714
4715      016762 017110      RANCMD: RANWV      ;WRITE/VERIFY.
4716      016764 017076      RANWR      ;WRITE.
4717      016766 017076      RANWR      ;WRITE.
4718      016770 017076      RANWR      ;WRITE.
4719      016772 017076      RANWR      ;WRITE.
4720      016774 017076      RANWR      ;WRITE.
4721      016776 017076      RANWR      ;WRITE.
4722      017000 017076      RANWR      ;WRITE.
4723      017002 017022      RANRD      ;READ.
4724      017004 017022      RANRD      ;READ.
4725      017006 017022      RANRD      ;READ.
4726      017010 017022      RANRD      ;READ.
4727      017012 017022      RANRD      ;READ.
4728      017014 017022      RANRD      ;READ.
4729      017016 017022      RANRD      ;READ.
4730      017020 017022      RANRD      ;READ.
4731
4732
4733
4734
4735
4736      ;      SUBROUTINE TO SET UP READ COMMANDS IN SEQUENCE TABLE.
4737      ;      INPUTS:
4738      ;      OUTPUTS:
4739      ;      REGISTERS:      R2
4740      ;      CALLS:
4741
4742      017022      RANRD: LET (R1)+ := #RDR      ;STORE READ REV CMD.
4743      017026      LET (R1)+ := #DATCNT      ;SET BRJ TO MAX FOR READ RANDOM LENGTHS.
4744      017032      LET RANB := RANB + RANS
4745      017040      LET R2 := RANB CLR.BY #RNOPSC
4746      017050      LET (R1)+ := R2      ;SET RANDOM # OF OPERATIONS.
4747      017052      LET (R1)+ := #RANP      ;RANDOM PATTERN.
4748      017056      LET (R1)+ := #RDF      ;STORE READ FWD CMD.
4749      017062      LET (R1)+ := #DATCNT      ;SET BRJ TO MAX TO READ RANDOM LENGTHS.
4750      017066      LET (R1)+ := R2      ;SET RANDOM # OF OPERATIONS.
4751      017070      LET (R1)+ := #RANP      ;RANDOM PATTERN.
4752      017074 000207      RTS PC
  
```

```

4753      :      SUBROUTINE TO SET UP A WRITE COMMAND IN THE SEQUENCE TABLE.
4754      :      INPUTS:
4755      :      OUTPUTS:
4756      :      REGISTERS:
4757      :      CALLS:
4758
4759 017076      RANWR: LET (R1)+ := #WRT      ;STORE WRITE CMD.
4760 017102 004737 017122      JSR PC,RANW      ;STORE BRf, # OF OPERATIONS, PATTERN.
4761 017106 000207      RTS PC
4762
4763
4764
4765
4766
4767      :      SUBROUTINE TO SET UP A WRITE/VERIFY COMMAND IN THE SEQUENCE TABLE.
4768      :      INPUTS:
4769      :      OUTPUTS:
4770      :      REGISTERS:
4771      :      CALLS:
4772
4773 017110      RANWV: LET (R1)+ := #WTV      ;STORE WRITE/VERIFY CMD.
4774 017114 004737 017122      JSR PC,RANW      ;STORE BRf, # OF OPERATIONS, PATTERN.
4775 017120 000207      RTS      PC
4776
4777
4778
4779
4780
4781      :      SUBROUTINE TO STORE BRf, # OF OPERATIONS, PATTERN IN COMMAND
4782      :      SEQUENCE TABLE FOR WRITE AND WRITE/VERIFY COMMANDS.
4783      :      INPUTS:
4784      :      OUTPUTS:
4785      :      REGISTERS:      R2
4786      :      CALLS:
4787
4788 017122      RANW: LET (R1)+ := #DATCNT      ;SET BRf TO MAX FOR PATTERN GENERATION.
4789      ;RANDOM BRf WILL BE GENERATED FOR EACH RECORD.
4790
4791      LET RANB := RANB + RANS
4792      LET R2 := RANB CLR.BY #RNOPSC
4793      LET (R1)+ := R2      ;SET RANDOM # OF OPERATIONS.
4794 017152 000207      LET (R1)+ := #RANP      ;RANDOM PATTERN.
4795      RTS PC      ;RETURN.
4796
4797      .EVEN
4798 017154      ENDTST
4799 017154      L10033:
4800

```

```

4801 .SBTTL TEST 3: WRITE COMPATABILITY/WRITE UTILITY.
4802
4803 :++
4804 : TEST TO WRITE RECORDS FROM BOT TO EOT.
4805 :--
4806
4807 017156          BGNTST
4808 017156          T3::
4809
4810 017156          LET RANDOM := #1
4811 017164          LET R2 := #DATCNT - #1
4812 017172          LET LENMSK := COMP R2
4813 017202 004737 005754 JSR PC,SETCH
4814 017206 004737 006000 JSR PC,SETRW
4815 017212          REPEAT
4816 017212          WHILE R1 LT #SEQEND DO
4817 017220 004737 017076 JSR PC,RANWR
4818 017224          ENDDO
4819 017226          LET (R1) := #END
4820 017232 004737 006020 JSR PC,EXALL
4821 017236          LET R1 := #CMDSEQ
4822 017242          UNTIL R2 NE #0
4823 017246 004737 006000 JSR PC,SETRW
4824 017252          LET (R1) := #END
4825 017256 004737 006020 JSR PC,EXALL
4826
4827 017262          EXIT TST
4828
4829          .EVEN
4830
4831 017266          ENDTST
4832 017266          L10034:
4833

```

:SET THE RANDOM OPERATIONS FLAG.
:SET UP THE RECORD LENGTH MASK.
:ALLOW MAXIMUM BUFFER.
:CMD 1 = SET CHARACTERISTIC.
:CMD2=REWIND
:REPEAT TO EOT.
:WHILE THERE IS MORE ROOM IN SEQ TABLE:
:STORE A WRITE CMD IN SEQUENCE TABLE.

:STORE END OF SEQUENCE CODE IN TABLE.
:EXECUTE ALL CMDS IN SEQ TBL ON UNITS.
:INIT SEQ TBL POINTER,
:REPEAT UNTIL EOT IS REACHED
:STORE REWIND IN SEQ TBL,
:STORE END IN SEQ TBL,
:EXECUTE REWIND CMD ON ALL UNITS

4834
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4841 017270
4842 017270
4843
4844 017270
4845 017276 004737 005754
4846 017302 004737 006000
4847 017306
4848 017312
4849 017316
4850 017322
4851 017326
4852 017332 004737 006020
4853 017336
4854 017342
4855 017346
4856 017352 004737 012300
4857 017356
4858 017362
4859 017366
4860 017372 004737 006020
4861
4862 017376
4863
4864
4865
4866 017402
4867 017402

.SBTTL TEST 4: READ COMPATABILITY/READ UTILITY.

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

T4:: BGNTST

LET RANDOM :B- #1
JSR PC,SETH
JSR PC,SETRW
LET (R1)+ := #RDF
LET (R1)+ := #DATCNT
LET (R1)+ := #77777
LET (R1)+ := #RANP
LET (R1) := #END
JSR PC,EXALL
LET P1 := #CMDSEQ
LET (R1)+ := #RDR
LET (R1)+ := #DATCNT
JSR PC,FIRSTU
LET (R1)+ := RECNT(R5)
LET (R1)+ := #RANP
LET (R1) := #END
JSR PC,EXALL

:SET THE RANDOM OPERATIONS FLAG.
:CMD 1 = SET CHARACTERISTIC.
:CMD2=REWIND.
:CMD3 = READ FORWARD.
:SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
:SET RECORD COUNT TO MAX FOR WHOLE TAPE.
:PATTERN = RANDOM.
:STORE END OF SEQUENCE CODE IN TABLE.
:EXECUTE ALL CMDS IN SEQ TBL ON ALL UNITS.
:INIT CMD SEQ TBL POINTER.
:CMD1 = READ REVERSE.
:SET LENGTH TO MAX FOR UNKNOWN LENGTHS.
:SET UP R5 TO FIND RECORD COUNT.
:RECORD COUNT = # OF RECORDS ON TAPE.
:PATTERN = RANDOM.
:STORE END OF SEQUENCE CODE IN TABLE.
:GO EXECUTE READ REV. OF ENTIRE TAPE.

EXIT TST

.EVEN

ENDTST

L1003>

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TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

SEQ 0113

```

4868 .SBTTL TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.
4869
4870
4871 :++
4872 : TEST TO EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.
4873 :--
4874
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4909
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4914
4915
4916
4917
4918
4919
4920
4921
4922
4923
017404
017404
017404
017410
017416 004737 005754
017422
017430
017434 004737 020014
017440 004737 020014
017444 004737 020014
017450 004737 020014
017454 004737 020014
017460
017464
017470
017476 022711 000040
017502 001024
017504
017510 012137 003006
017514
017520 022137 003004
017524 001003
017526
017532 000756
017534
017540 005337 003006
017544 001751
017546
017552 000772
017554 022711 000020
017560 001015
017562
017566
017572
017600 005337 003002
017604 001372
017606
017612 000726
017614 004737 006450
017620
017626 004737 006360
017632 004737 012300
017636
017646
017650
017650
017660 004737 007316
017664 004737 012326
017670

          BGNTST
T5::
          LET RANDOM := #0
          LET IRE := PIRE
          JSR PC,SETCH
          LET CMDSEQ+2 := CHAR
          LET R2 := #CMD
          JSR PC,PTCMDS
          JSR PC,PTCMDS
          JSR PC,PTCMDS
          JSR PC,PTCMDS
          JSR PC,PTCMDS
          LET JLOOP := #0
          LET R1 := #CMDSEQ
3$:      WHILE (R1) NE #END DO
          CMP #JMP.C,(R1)
          BNE 6$
          LET R1 := R1 + #2
          MOV (R1)+,JLOC
          LET JLOOP := JLOOP + #1
          CMP (R1)+,JLOOP
          BNE 1$
          LET R1 := R1 + #2
          BR 3$
1$:      LET R1 := #CMDSEQ
2$:      DEC JLOC
          BEQ 3$
          LET R1 := R1 + #10
          BR 2$
6$:      CMP #DLY.C,(R1)
          BNE 4$
          LET R1 := R1 + #4
          LET TIME2 := (R1)
7$:      WAITUS 10.
          DEC TIME2
          BNE 7$
          LET R1 := R1 + #4
          BR 3$
4$:      JSR PC,SETUP
          WHILE NCNT NE #0 DO
          JSR PC,CMDAC
          JSR PC,FIRSTU
          IF DEVTBL(R5) EQ #END THEN
          DOCLN
          ENDIF
          WHILE DEVTBL(R5) NE #END DO
          JSR PC,EXECUTE
          JSR PC,NEXTU
          ENDDO

;CLEAR RANDOM MODE FLAG.
;MOVE INHIBIT RFC ERROR REPORT FLAG.
;CMD 1 = SET CHARACTERISTIC.
;MOVE CHAR CODE FROM P TBL TO SEQ TBL.
;R2 POINTS TO CMD2 IN SOFT P TABLE.
;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 END CMD FROM P TBL TO SEQ TBL.
;CLEAR JMP CMD LOOP COUNT.
;INIT SEQUENCE TABLE POINTER.
;WHILE THERE ARE CMDS LEFT IN SEQUENCE TBL:
;IS THIS A JUMP CMD?
;BR IF NOT.
;POINT TO BRF.
;SAVE BRF (LOCATION).
;UPDATE THE LOOP COUNT.
;HAS LOOP COUNT BE SATISFIED?
;IF NOT, JMP AGAIN.
;IF SO, ADJUST SEQ POINTER
;AND GO TO NEXT COMMAND.
;INIT CMD SEQ TABLE POINTER.
;DECR LOCATION COUNTER.
;IF THIS IS THE RIGHT LOCATION TO JMP TO, GO SET
;IF NOT, UPDATE SEQ POINTER TO NEXT CMD.
;DO IT AGAIN.
;DELAY?
;BR IF NOT.
;R1 = LOCATION OF N COUNT.
;SAVE N COUNT.
;GO TO SUPER-WAIT 1 MSEC.

;POINT TO NEXT CMD.
;GO CHECK NEXT CMD.
;GO SETUP THE COMMAND BLOCK.
;WHILE THERE ARE RECORDS REMAINING:
;STORE CMD ASCII IN ERROR MSG.
;SET UP FOR 1ST UNIT.
;IF ALL DEVICES HAVE BEEN DROPPED:
;DO CLEAN CODE AND ABORT PASS.

;WHILE THERE ARE UNITS REMAINING:
;GO EXECUTE THE COMMAND.
;FIND NEXT UNIT.

```

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TEST 5: EXECUTE OPERATOR SELECTED COMMAND SEQUENCE.

SEQ 0114

```

4924 017672 004737 012300      JSR PC,FIRSTU      ;SET UP FOR 1ST UNIT.
4925 017676                    WHILE DEVTBL(R5) NE #END DO ;WHILE THERE ARE MORE UNITS.
4926 017706 004737 007600      JSR      PC,GOWAIT    ;GO WAIT FOR INTERRUPT + CHECK FOR ERRORS.
4927 017712 023727 002762 100017 CMP      CMDWRD,#GES ;IS THIS A GET STATUS CMD?
4928 017720 001002                    BNE      5$      ;BR IF NOT.
4929 017722 004737 012610      JSR PC,PRXST      ;PRINT EXTENDED STATUS REGISTERS.
4930 017726                    IF #X0.EOT SETIN MSGPKT+MS.XS0 OR #X0.BOT SETIN MSGPKT+MS.XS0 THEN
4931 017746                    LET NCNT := #1      ;FORCE TERMINATION OF COMMAND.
4932 017754                    ENDIF
4933 017754 004737 012672      JSR      PC,CKHAE    ;CHECK HALT AFTER EACH CMD FLAG.
4934 017760 004737 012326      JSR      PC,NEXTU    ;FIND NEXT UNIT IN TEST SEQUENCE.
4935 017764                    ENDDO
4936 017766      LET NCNT := NCNT - #1      ;UPDATE RECORD COUNT.
4937 017772      LET PCMDWD := CMDWRD      ;SAVE PREVIOUS COMMAND WORD.
4938 020000                    ENDDO
4939 020002 004737 011540      JSR      PC,VFYDAT    ;IF LAST CMD WAS A WRITE VERIFY, THEN GO
4940 020006                    ;VERIFY THE LAST N RECORDS OF DATA.
4941 020006                    ENDDO
4942
4943 020010      ENDT5: EXIT      TST
4944
4945
4946
4947
4948
4949
4950      :      SUBROUTINE TO MOVE A COMMAND FROM THE SOFTWARE P TABLE TO
4951      :      THE COMMAND SEQUENCE TABLE.
4952      :      INPUTS:      R2 = POINTER TO SOFT 'P' TABLE
4953      :      OUTPUTS:
4954      :      REGISTERS:      R3.
4955      :      CALLS:
4956
4957 020014      PTCMD5: LET R3 : (R2)+ - #1 SHIFT +1 ;R3 = COMMAND TABLE INDEX.
4958 020022      LET (R1)+ := CMDTBL(R3) ;MOVE COMMAND WORD.
4959 020026      LET (R1)+ := (R2)+ ;MOVE # OF BYTES.
4960 020030      LET (R1)+ := (R2)+ ;MOVE # OF OPERATIONS.
4961 020032      LET (R1)+ := (R2)+ ;MOVE PATTERN CODE.
4962 020034 000207      RTS PC
4963      .EVEN
4964
4965 020036      ENDTST
4966 020036      L10036:
4967
4968 020040      ENDMOD

```

PARAMETER CODING MACY11 30A(1052) 29-DEC-78 15:33 PAGE 118
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SEQ 0115

```
4969 .TITLE PARAMETER CODING
4970
4971 .SBTTL  HARDWARE PARAMETER CODING SECTION
4972
4973 020040      BGNMOD
4974
4975
4976 :++
4977 : THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
4978 : THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
4979 : MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
4980 : INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
4981 : MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
4982 : WITH THE OPERATOR.
4983 :--
4984      BGNHRD
4985 020042      L$HARD::
4986
4987 020042      GPRMA  TS4ADR,0,0,160000,177564,YES
4988 020052      GPRMD  TS4VCT,2,0,777,60,776,YES
4989
4990 020064      EXIT HRD
4991
4992      .NLIST  BEX
4993      020066 051524 041104 040440 TS4ADR: .ASCIZ /TSDB ADDRESS/
4994      020103      126 041505 047524 TS4VCT: .ASCIZ /VECTOR/
4995      .LIST  BEX
4996      .EVEN
4997
4998      ENDHRD
4999      L10037:
```

4997
4998
4999
5000
5001
5002
5003
5004
5005
5006
5007
5008 020112
5009 020114
5010
5011
5012 020114
5013 020122
5014 020130
5015 020136
5016 020144
5017 020152
5018 020160
5019 020162
5020 020170
5021 020202
5022 020214
5023 020226
5024 020240
5025 020252
5026 020264
5027 020276
5028 020310
5029 020322
5030 020334
5031 020346
5032 020360
5033 020372
5034 020404
5035 020416
5036 020430
5037 020442
5038 020442

.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
L\$SOFT::

GPRML CLRM,0,1,YES
GPRML RRVM,0,400,YES
GPRML HAEM,2,1,YES
GPRML DINTM,6,1,YES
GPRML IRECM,6,400,YES
GPRML CHGM,10,1,YES
XFERF ENDSP
GPRML IREM,12,1,YES
GPRMD CHARM,14,0,377,0,200,YES
GPRMD CMD2M,16,D,37,1,33,YES
GPRMD BPCRM,20,D,-1,1,DATCNT,YES
GPRMD NUMBM,22,D,-1,1,-1,YES
GPRMD PATTM,24,D,17,0,10,YES
GPRMD CMD3M,26,D,37,1,33,YES
GPRMD BPCRM,30,D,-1,1,DATCNT,YES
GPRMD NUMBM,32,D,-1,1,-1,YES
GPRMD PATTM,34,D,17,0,10,YES
GPRMD CMD4M,36,D,37,1,33,YES
GPRMD BPCRM,40,D,-1,1,DATCNT,YES
GPRMD NUMBM,42,D,-1,1,-1,YES
GPRMD PATTM,44,D,17,0,10,YES
GPRMD CMD5M,46,D,37,1,33,YES
GPRMD BPCRM,50,D,-1,1,DATCNT,YES
GPRMD NUMBM,52,D,-1,1,-1,YES
GPRMD PATTM,54,D,17,0,10,YES

ENDSP:
EXIT SFT

5039
 5040

020444	046103	040503	020122	CLRM:	.ASCII	/CLEAR COUNTERS/
020463	122	051505	052105	RRVM:	.ASCII	/RESET RANDOM VARIABLES/
020512	040510	052114	040440	HAEM:	.ASCII	/HALT AFTER EACH CMD/
020536	044504	040523	046102	DINTM:	.ASCII	/DISABLE INTERRUPTS/
020561	111	044116	041111	IREFM:	.ASCII	/INHIBIT RECOVERY/
020602	044103	047101	042507	CHGM:	.ASCII	/CHANGE CMD SEQUENCE/
020626	047111	044510	044502	IREFM:	.ASCII	/INHIBIT RFC ERROR REPORT/
020657	103	040510	040522	CHARM:	.ASCII	/CHARACTERISTICS CODE/
020704	046503	027504	000062	CMD2M:	.ASCII	'CMD/2'
020712	051102	020106	047503	BPCRM:	.ASCII	/BRF COUNT/
020724	020043	043117	047440	NUMBM:	.ASCII	/# OF OPERATIONS/
020744	040520	052124	051105	PATM:	.ASCII	/PATTERN/
020754	046503	027504	000063	CMD3M:	.ASCII	'CMD/3'
020762	046503	027504	000064	CMD4M:	.ASCII	'CMD/4'
020770	046503	027504	000065	CMD5M:	.ASCII	'CMD/5'

.LIST BEX
 .EVEN

5041

5042

5043 020776

5044 020776

5045

5046 020776

5047 020776

5048 020776

ENDSF

L10040

LASTAD

LAST:

ENDMOD

```
5049  
5050 051572 000000      .SBTTL  DIAGNOSTIC SUPERVISOR -- LOW CORE SET UP  
      051574 000000      .WORD    0          ;SPACE FOR USER POOL POINTER  
      051576 000000      .WORD    0          ;SIZE  
      051600 000000      .WORD    0          ;CHECKSUM (NOT CURRENTLY USED)  
      051604      .WORD    0          ;SIZE OF H.W. PTAB. ALLOCATION  
      000200      END.SUPV-.+2  
      000200      .END 200
```

ABOFLA	021322	G	5050#	*
ABOPAS	021240	G	5050#	*
ABO.FM	023602		5050#	
ACK.C =	100000	G	2511#	2595
			2633	2600
				2603
				2606
				2609
				2612
				2615
				2618
				2621
				2624
				2627
				2630
AFSI	021030	G	5050#	
ALLOC	041742		5050#	
APT.ER	022732		5050#	
ATTNM	004216	G	3007#	3626
AUDRPM	004543	G	3007#	4192
ASAAV	025600		5050#	
ASAAW	025614		5050#	
ASAAZ	025626		5050#	
ASAAZ	025634		5050#	
ASAAZ	025650		5050#	
ASABA	025660		5050#	
BFSEQ	015754		4328	4347
BFSEQ0	016000		4328	4356
BFSEQ1	016052		4347	4365
BFSEQ2	016064		4356	4374
BFSEQ3	016156		4365	4383
BFSEQ4	016230		4374	4392
BFSEQ5	016272		4383	4401
BFSEQ6	016344		4392	4410
BFSEQ7	016376		4401	4419
BFSEQ8	016430		4410	4428
BFSEQ9	016462		4419	4472#
BFSE10	016504		4428	
BGNFLG=	003016		2824#	
BGN.SU=	020776		5050#	
BINC	011524		3826	
BINMSG	040252		5050#	
BIT0 =	000001	G	2443#	3535
BIT00 =	000001	G	2432#	4136
BIT01 =	000002	G	2431#	3952
BIT02 =	000004	G	2430#	
BIT03 =	000010	G	2429#	
BIT04 =	000020	G	2428#	
BIT05 =	000040	G	2427#	
BIT06 =	000100	G	2426#	
BIT07 =	000200	G	2425#	
BIT08 =	000400	G	2424#	
BIT09 =	001000	G	2423#	
BIT1 =	000002	G	2442#	
BIT10 =	002000	G	2422#	
BIT11 =	004000	G	2421#	
BIT12 =	010000	G	2420#	
BIT13 =	020000	G	2419#	
BIT14 =	040000	G	2418#	
BIT15 =	100000	G	2417#	
BIT2 =	000004	G	2441#	
BIT3 =	000010	G	2440#	
BIT4 =	000020	G	2439#	
BIT5 =	000040	G	2438#	
BIT6 =	000100	G	2437#	
BIT7 =	000200	G	2436#	

[illegible]

CMDLG	002770	G	2810#	3228*	3240*	3247*	3249*	3273*	3682	3739	3788	3796	3823	3880*	3884*
CMDPKM	003742	G	3007#	4137											
CMDPKT	002224	G	2693#	3040	3041	3148*	3228*	3229*	3231	3236*	3239	3244*	3246	3255*	3261*
			3262*	3270*	3274	3275*	3281	3283*	3284*	3286	3434*	3435	3588*	3685*	3692*
			3894*	3896*	3898	3899*	4136	4447*	4450*	4452*	4456*	4459*	4461*		
CMDSAV	002764	G	2808#	3286*	3588	3898*									
CMDSEQ	003046	G	2856#	3103	3131	4473	4698	4701*	4702*	4706	4822	4854	4881*	4889	4900
CMDSE2	003056	G	2860#												
CMDTBL	003140	G	2884#	3216	4959										
CMDWRD	002762	G	2807#	3137	3178	3196	3280	3281*	3410	3457	3537	3540	3541	3576	3878
			3879*	3882	3883*	3894	3923	3941	4077	4445*	4454*	4927	4938		
CMD.CO=	000001	G	2534#	2600	2603	2606	2609	2612	2621	2624	2627	2630	2633	2642	2645
			2654	2657	3242	3268									
CMD.C1=	000002	G	2533#	2600	2639	2654	2660	2663	2668	3259					
CMD.C2=	000004	G	2532#	2609	2612	2633	2654	2666	2668	3252	3259	3268			
CMD.C3=	000010	G	2531#	2600	2615	2618	2636	2639	2642	2645	2648	2651	2654	2657	2660
			2663	3234											
CMD.C4=	000020	G	2529#												
CMD2M	020704		5022	5040#											
CMD3M	020754		5026	5040#											
CMD4M	020762		5030	5040#											
CMD5M	020770		5034	5040#											
CNTBGN=	002460		2587	2781#	3826										
CNTEND=	002740		2587	2795#											
CNTLEN=	000260	G	2587#	4145											
CNVT	044542		5050#												
CODELM	003625	G	3007#	4337											
COMMAN	021046	G	5050#*												
COMMTA	044356		5050#												
CONTCL	050154	G	5050#												
CP.ADH=	000004	G	2572#												
CP.ADL=	000002	G	2571#	3244*	3255*	3262*	3270*	3899*							
CP.CMD=	000000	G	2570#												
CP.CNT=	000006	G	2573#	3148*	3229*	3255*	3261*	4447*	4450*	4452*	4456*	4459*	4461*		
CRLF	040454		5050#												
CTCC	003012	G	2819#	3040	3526*	3535	3568	3573							
CURR.S	021004	G	5050#*												
CURR.T	021006	G	5050#*												
CVC.C =	040000	G	2512#	2595	2666										
C\$AAD	033344		5050#												
C\$AAE	033356		5050#												
C\$AAK	034354		5050#												
C\$AAL	034520		5050#												
C\$ABRT=	000021		2280#												
C\$ADR =	000020		2280#	3581	3610	3652	3689	3712	3749	3808	3969	4024	4030	4137	
C\$AU =	000054		2280#	4305											
C\$BRK =	000022		2280#	3456	3504	4194	4202								
C\$BSEG=	000004		2280#												
C\$BSUB=	000002		2280#	4326	4345	4354	4363	4372	4381	4390	4399	4408	4417	4426	4443
C\$BUFF=	000030		2280#	4217											
C\$CEFG=	000046		2280#												
C\$CLEA=	000012		2280#	4257											
C\$CLP1=	000006		2280#												
C\$CVEC=	000036		2280#	4248	4272										
C\$DCLN=	000044		2280#	3153	3905	4046	4195	4219	4919						
C\$DODU	000053		2280#	4041											

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F\$HARD=	000004	2280#	4985	4991	4996	5019	5039							
F\$HW	= 000013	2280#	2347	2355										
F\$INIT=	000006	2280#	4133	4231										
F\$JMP	= 000050	2280#	3024	3044	3053	4118	4228	4253	4274	4300	4466	4711	4828	4863
		4944	4991	5039										
F\$MOD	= 000000	2280#	2284	2402	2407	4087	4092	4307	4318	4969	4974	5049		
F\$MSG	= 000011	2280#	3019	3031	3034	3049	3051	3058						
F\$PWR	= 000017	2280#												
F\$RPT	= 000012	2280#	4099	4124										
F\$SEG	= 000003	2280#												
F\$SOFT=	000005	2280#	5009	5019	5039	5044								
F\$SRV	= 000010	2280#	3069	3073	3076	3080	3083	3087	3090	3094				
F\$SUB	= 000002	2280#	4326	4341	4345	4350	4354	4359	4363	4368	4372	4377	4381	4386
		4390	4395	4399	4404	4408	4413	4417	4422	4426	4434	4443	4463	
F\$SW	= 000014	2280#	2364	2399										
F\$TEST=	000001	2280#	4321	4667	4675	4799	4809	4832	4843	4867	4876	4966		
GARBAG	041626	5050#												
GCMDB	006422	G 3196	3200	3214#	3941	4077								
GENPAT	007030	G 3271	3294#											
GES	= 100017	G 2654#	2702	2904	4495	4927								
GETCHR	040332	5050#												
GETCMN	043716	5050#												
GETPAR	035410	5050#												
GETSWI	042712	5050#												
GET.TW	042462	5050#												
GIT	007312	3381	3386#											
GOWAIT	007600	G 3164	3453#	3696	3718	3757	3913	4926						
GOWRTN	007736	3471	3478#											
GSCPK	002234	G 2702#	4026	4208										
G\$EXCP=	000400	2280#												
G\$HILI=	000002	2280#												
G\$LOLI=	000001	2280#												
G\$NO	= 000000	2280#												
G\$OFFS-	000400	2280#	4081	4988	4989	5013	5014	5015	5016	5017	5018	5020	5021	5022
		5023	5024	5025	5026	5027	5028	5029	5030	5031	5032	5033	5034	5035
		5036	5037											
G\$OF SI	000376	2280#	4081	4988	4989	5013	5014	5015	5016	5017	5018	5020	5021	5022
		5023	5024	5025	5026	5027	5028	5029	5030	5031	5032	5033	5034	5035
		5036	5037											
G\$PRMA	000001	2280#	4988											
G\$PRMD-	000002	2280#	4989	5021</										

HAEM	020512	5015	5040#											
HALTM	003702 G	3007#	4079*	4080*	4081									
HCORED	025540	5050#												
HCOREQ	025450	5050#												
HCORET	021264 G	5050#*												
HC.ADR	021034 G	5050#												
HC.DEF	021026 G	5050#												
HC.DIA	021024 G	5050#												
HELP =	000000	2278#	2280	2292	2328	2338	2350	2367	2483	2688	3002	3003	3020	3026
		3027	4101	4119	4135	4228	4242	4253	4267	4274	4289	4300	4987	4992
		5011	5040											
HERTZ.	025410	5050#												
HOLDSP=	000020	5050#												
HRDCNT	002730 G	2794#	3580*	3609*	3651*	3962*	4022*	4114						
HW.ADR	021032 G	5050#												
ISAAB	045070	5050#												
IE.C =	000200 G	2521#	2595	3434										
ININIT	021254 G	5050#*												
INITIA	040302	5050#												
INIT.M	026366	5050#												
INIT.R	021070 G	5050#												
INIT10	014142	4135#	4138											
INIT15	014336	4157	4169#											
INIT16	014356	4171	4174#											
INIT20	014700	4218	4219#											
INPUTA	041230	5050#												
INTFLG	003026 G	2837#	3072*	3079*	3086*	3093*	3428	3434*	3461	4298*				
INTFOR	034526	5050#												
INTPRI=	000340 G	2577#	3071	3078	3085	3092	4184	4297						
INVAL.	025334	5050#												
INVINT	034364	5050#												
INV.SW	022366	5050#												
IN.SUF	027336	5050#												
IRE	003043 G	2843#	3579	3641	3752	4879*								
IREC	002143 G	2374#	3693	3715	3853	4043								
IRECM	020561	5017	5040#											
IREM	020626	5020	5040#											
ISAU =	000041	2280#	4287#	4305#										
ISCLN	000041	2280#	4240#	4253	4257#									
ISDU	000041	2280#	4265#	4278#										
ISHRD	000041	4985#	4997#											
ISINIT	000041	2280#	4133#	4228	4232#									
ISMOD	000041	2280#	2284#	2402#	2407#	4087#	4092#	4307#	4318#	4969#	4974#	5049#		
ISMSG	000041	2280#	3019#	3032#	3034#	3050#	3051#	3059#						
ISPWR	000041	2280#												
ISRPT	000041	2280#	4099#	4125#										
ISSEG	000041	2280#	4320	4325	4344	4353	4362	4371	4380	4389	4398	4407	4416	4425
		4442	4674	4808	4842	4875								
ISSFT	000041	5009#	5045#											
ISSRV	000041	2280#	3069#	3074#	3076#	3081#	3083#	3088#	3090#	3095#				
ISSUB	000041	2280#	4320	4325#	4341#	4342#	4344#	4350#	4351#	4353#	4359#	4360#	4362#	4368#
		4369#	4371#	4377#	4378#	4380#	4386#	4387#	4389#	4395#	4396#	4398#	4404#	4405#
		4407#	4413#	4414#	4416#	4422#	4423#	4425#	4434#	4435#	4442#	4463#	4464#	4674
		4808	4842	4875										
ISTST	000041	2280#	4320#	4325	4344	4353	4362	4371	4380	4389	4398	4407	4416	4425
		4442	4466	4667#	4668#	4674#	4711	4799#	4800#	4808#	4828	4832#	4833#	4842#

JLOC	003006	G	4863	4867#	4868#	4875#	4944	4966#	4967#
JLOOP	003004	G	2817#	4893*	4900*				
JMP	= 000040	G	2816#	4886*	4895*				
JMP.C	= 000040	G	2670#	2910					
J\$JMP	= 000167		2526#	2670	4890				
KBPTR	021106	G	2280#	3024	3044	3053	4118	4274	4300
KBUF	021110	G	5050#*						
LENMSK	002772	G	5050#*						
LINE.F	021324	G	2811#	3143	4679*	4813*			
LOAD.F	025764		5050#*						
LOG	011254	G	5050#*						
LOGMSG	040274		3477	3820#	4033				
LPBFR	021104	G	5050#						
LPCNTR	021102	G	5050#*						
LPT.AD	025426		5050#						
LPT.RE	025422		5050#						
LSI.RE	025416		5050#						
LUP	046370		5050#						
LUP.AD	033374		5050#*						
L\$APT	002036	G	2307#						
L\$AU	015062	G	2322	4287#					
L\$AUT	002074	G	2321#						
L\$CCP	002106	G	2326#						
L\$CLEA	014744	G	2327	4240#					
L\$CO	002032	G	2305#						
L\$DEPO	002011	G	2296#						
L\$DESC	002102	G	2324#						
L\$DEVP	002064	G	2317#						
L\$DISP	002112	G	2309	2336#					
L\$DR	002216	G	2320	2686#					
L\$DRCT	002070	G	2319#						
L\$DRS	002072	G	2320#						
L\$DRST	002222	G	2321	2687#					
L\$DTP	002040	G	2308#						
L\$DU	015022	G	2323	4265#					
L\$DUT	002076	G	2322#						
L\$DVTY	003606	G	2318	3000#					
L\$EF	002056	G	2315#						
L\$EFLG	002034	G	2306#						
L\$EXP1	002042	G	2309#						
L\$EXP2	002044	G	2310#						
L\$EXP3	002046	G	2311#						
L\$HARD	020042	G	2300	4985#					
L\$HPCP	002016	G	2299#						
L\$HPTP	002022	G	2301#						
L\$HW	002126	G	2302	2347#					
L\$ICP	002104	G	2325#						
L\$INIT	014142	G	2326	4133#					
L\$LADP	002026	G	2303#						
L\$LAST	020776	G	2304	5047#					
L\$MREV	002050	G	2312#						
L\$NAME	002000	G	2294#						
L\$REPP	002066	G	2318#						
L\$REV	002010	G	2295#						
L\$RPT	012742	G	2319	4099#					

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L 10

SEQ 0128

LSSOFT	020114 G	2301	5009#	
LSSPC	002062 G	2316#		
LSSPCP	002020 G	2300#		
LSSPTP	002024 G	2302#		
LSSTA	002030 G	2304#		
LSSW	002134 G	2303	2364#	
LSTIML	002014 G	2298#		
LSTIMU	002054 G	2314#		
LSTIM1	002052 G	2313#		
LSTSTI	002100 G	2323#		
LSUNIT	002012 G	2297#	4164	
L.CLK.	025374	5050#		
L10000	002132	2347	2355#	
L10001	002214	2364	2399#	
L10002	004746	3024	3031#	
L10003	005604	3044	3049#	
L10004	005672	3053	3058#	
L10005	005706	3073#		
L10006	005722	3080#		
L10007	005736	3087#		
L10010	005752	3094#		
L10011	014140	4118	4124#	
L10012	014742	4228	4231#	
L10013	015020	4253	4256#	
L10014	015060	4274	4277#	
L10015	015160	4300	4304#	
L10016	016526	4466	4667#	
L10017	015310	4341#		
L10020	015330	4350#		
L10021	015350	4359#		
L10022	015370	4368#		
L10023	015410	4377#		
L10024	015430	4386#		
L10025	015450	4395#		
L10026	015470	4404#		
L10027	015510	4413#		
L10030	015530	4422#		
L10031	015566	4434#		
L10032	015746	4463#		
L10033	017154	4711	4799#	
L10034	017266	4828	4832#	
L10035	017402	4863	4867#	
L10036	020036	4944	4966#	
L10037	020112	4985	4991	4996#
L10040	020776	5009	5039	5044#
MAJ.IN	021060 G	5050#*		
MAJ.LO	046470	5050#*		
MAJ.US	021062 G	5050#*		
MAN.TI	001244	5050#		
MAP16	051176 G	5050#		
MASK.B	030100	5050#		
MASK.W	030076	5050#		
MBR =	100012 G	2639#	2708	2899
MEM.SI	025436	5050#		
MIN.IN	021054 G	5050#*		
MIN.US	021056 G	5050#*		

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READ.P	046472	G	5050#										
RECCNT	002740	G	2796#	3022	3037	3538*	3543*	3547	3548*	4106	4858		
RECLOG	003020	G	2826#	3534	3536*	4033							
RECLD	010070	G	3475	3533#									
REGBAC	051162	G	5050#										
REGSAV	051146	G	5050#										
REQN.P	021052	G	5050#*										
REQN.T	025744	G	5050#*										
RERM	004433	G	3007#	3689	3712								
RETRYC	003016	G	2825#	3684	3688	3691*	3711	3714*	3748	3751*	3797	3806	3854
RE.SET	022534	G	5050#										
RFBC	002560	G	2784#	4109									
RFCEM	004116	G	3007#	3581									
RFREC	002660	G	2789#	4111									
RFUNR	002670	G	2790#	4112									
RLEXM	004152	G	3007#	3800	3808								
RNF	= 125401	G	2624#	2894	4625								
RNOPSC	= 177700	G	2588#	4687	4701	4746	4792						
RNR	= 105401	G	2621#	2893	4621								
RNYM	004413	G	3007#	4030									
RPF	= 105001	G	2627#	2895	4635								
RPR	= 125001	G	2630#	2896	4639								
RPTFLG	003041	G	2841#	3159	3160*	4705*							
RPT1A	013360		4106	4120#									
RPT1B	013435		4107	4120#									
RPT1C	013510		4108	4120#									
RPT1D	013563		4109	4120#									
RPT1E	013636		4110	4120#									
RPT1F	013672		4111	4120#									
RPT1G	013745		4112	4120#									
RPT1H	014022		4113	4120#									
RPT1I	014110		4114	4120#									
RFANV	002135	G	2368#	4151									
RRBC	002520	G	2783#	4108									
RRCL	= 000020	G	2590#	3683	3806								
RRREC	002640	G	2787#	4111									
RRUNR	002650	G	2788#	4112									
RRVM	020463		5014	5040#									
RSTACK	050422	G	5050#										
RTLE	011122	G	3680	3709	3746	3787#							
RTLRTN	011252		3792	3802	3809	3812#							
RWCPK	002244	G	2715#	3754									
RWD	= 102010	G	2636#	2715	2898	3119	3457	3537	4505	4581	4603	4649	
RWERR	003022	G	2828#	3587	3740*	3795*	3846						
RSSAVE	003014	G	2820#	3411*	3417	4103*	4117						
SAVEDO	= 022732		5050#										
SCCNT	002710	G	2792#	3569*	3649*	4114							
SCERM	004062	G	3007#	3610									
SCH	= 140004	G	2666#	2856	2908	3103	3410	4483	4491	4499			
SCHBK	002356	G	2737#	3255	3257*	3418*							
SCHCNT	= 000010	G	2579#	3255									
SEARCH	042430		5050#										
SEGSTA	021276	G	5050#*										
SEQEND	003126	G	2877#	4691	4817								
SETCH	005754	G	3102#	4679	4813	4845	4879						
SETRW	006000	G	3118#	4681	4706	4814	4823	4846					

SETUP	006450	G	3132	3227#	4913										
SET.MA	026154		5050#												
SFF =	105010	G	2648#	2902	4567	4575									
SFPTBL	002134	G	2365#												
SFR =	105410	G	2651#	2903	4563	4571									
SHIFT	051260	G	5050#												
SPEC.U	025670		5050#*												
SPV.SE	000400		5050#												
SRF =	104010	G	2615#	2891	4585	4593									
SRR =	104410	G	2618#	2892	4589	4597									
STAERM	004750	G	3034#	3581	3610	3652	3689	3712	3749	3808	4024	4030			
STAERO	005510		3042	3045#	4061										
STAER1	005230		3037	3045#	3197*	3198*									
STAER2	005355		3039	3045#											
STAER3	005432		3040	3045#											
STAER4	005470		3041	3045#											
STAER6	005554		3043	3045#	4062										
STAER7	005322		3038	3045#	3202*	3203*									
STAFLG	003044	G	2849#	4045*	4158*	4172*	4581	4683*							
STARTC	050150	G	5050#												
STRCHR	041162		5050#												
STRT.T	025746		5050#*												
ST.SET	022600		5050#												
SUNIT.	025752		5050#*												
SUPERV	023634		5050#												
SUPFLA	021242	G	5050#*												
SUPV.T	021414	G	5050#*												
SUP.PR	022352		5050#												
SVCCNT-	177777		2280#	2284	2347	2355	2364	2399	2402	2407	3019	3031	3034	3049	3051
			3058	3069	3073	3076	3080	3083	3087	3090	3094	4082	4087	4092	4099
			4124	4133	4231	4240	4256	4265	4277	4287	4304	4307	4318	4320	4321
			4325	4326	4341	4344	4345	4350	4353	4354	4359	4362	4363	4368	4371
			4372	4377	4380	4381	4386	4389	4390	4395	4398	4399	4404	4407	4408
			4413	4416	4417	4422	4425	4426	4434	4442	4443	4463	4667	4674	4675
			4799	4808	4809	4832	4842	4843	4867	4875	4876	4966	4969	4974	4985
			4996	5009	5044	5049									
SVCGBL=	000000		2280#	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305
			2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318
			2319	2320	2321	2322	2323	2324	2325	2326	2327	2336	2337	2347	2348
			2349	2364	2365	2366	2686	2687	2688	3000	3001	3019	3020	3034	3035
			3051	3052	3069	3070	3076	3077	3083	3084	3090	3091	4099	4100	4133
			4134	4240	4241	4265	4266	4287	4288	4985	4986	5009	5010	5047#	5048
SVCHAN	030270		5050#												
SVCINS=	177777		2280#	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306
			2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319
			2320	2321	2322	2323	2324	2325	2326	2327	2336	2337	2347	2364	2686
			2687	2688	3001	3022	3024	3032	3037	3038	3039	3040	3041	3042	3043
			3044	3050	3053	3059	3071	3074	3078	3081	3085	3088	3092	3095	3153
			3161	3456	3458	3504	3581	3610	3652	3689	3712	3749	3808	3854	3905
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			4081	4106	4107	4108	4109	4110	4111	4112	4113	4114	4118	4125	4137
			4138	4156	4157	4170	4171	4180	4184	4192	4193	4194	4195	4202	4209
			4217	4218	4219	4228	4232	4248	4251	4253	4257	4272	4274	4278	4293
			4297	4300	4305	4326	4337	4342	4345	4351	4354	4360	4363	4369	4372
			4378	4381	4387	4390	4396	4399	4405	4408	4414	4417	4423	4426	4435
			4443	4464	4466	4668	4711	4800	4828	4833	4863	4868	4909	4919	4944

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		5019	5020	5021	5022	5023	5024	5025	5026	5027	5028	5029	5030	5031
		5032	5033	5034	5035	5036	5037	5039	5044	5047				
SVCSTK=	177777	2280#	2284	2347	2355	2364	2399	2402	2407	3019	3031	3034	3049	3051
		3058	3069	3073	3076	3080	3083	3087	3090	3094	4087	4092	4099	4124
		4133	4231	4240	4256	4265	4277	4287	4304	4307	4318	4321	4326	4341
		4345	4350	4354	4359	4363	4368	4372	4377	4381	4386	4390	4395	4399
		4404	4408	4413	4417	4422	4426	4434	4443	4463	4667	4675	4799	4809
		4832	4843	4867	4876	4966	4969	4974	4985	4991	4996	5009	5019	5039
		5044	5049											
SVCSUB=	000000	2280#	4325	4326	4344	4345	4353	4354	4362	4363	4371	4372	4380	4381
		4389	4390	4398	4399	4407	4408	4416	4417	4425	4426	4442	4443	
SVCTAG=	000000	2280#	2355	2356	2399	2400	3031	3032	3049	3050	3058	3059	3073	3074
		3080	3081	3087	3088	3094	3095	4081	4082	4124	4125	4231	4232	4256
		4257	4277	4278	4304	4305	4341	4342	4350	4351	4359	4360	4368	4369
		4377	4378	4386	4387	4395	4396	4404	4405	4413	4414	4422	4423	4434
		4435	4463	4464	4667	4668	4799	4800	4832	4833	4867	4868	4966	4967
		4996	4997	5044	5045									
SVCTST=	000000	2280#	4320	4321	4674	4675	4808	4809	4842	4843	4875	4876		
SWBFLG	003042 G	2842#	3282	3895	3951	4431*	4433*	4449*	4458*					
SWB.C =	010000 G	2514#	2595	3283	3896									
SWCHAN	025562	5050#												
SWITCH	044434	5050#												
SW.ADR	021036 G	5050#												
SW.PTA	025546	5050#												
SYS.FT	034314	5050#												
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		4423#	4435#	4464#	4668#	4800#	4833#	4868#	4967#	4997#	5045#			
TCCRA	010344	3573	3593#											
TCC0	010364 G	3593	3608#											

ASSEMBLY ROUTINES
DOCTOR.P11

MACY11 30A(1052)
17-FEB-78 09:08

29-DEC-78 15:33

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CROSS REFERENCE TABLE --

E 11
USER SYMBOLS

SEQ 0134

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TST.AB	030212		5050#												
TST.TO	022414		5050#												
TSVCT	002406	G	2747#	4183*	4184	4248	4272	4296*	4297						
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TS.A17=	001000	G	2503#												
TS.NBA=	002000	G	2502#												
TS.NXM=	004000	G	2501#												
TS.OFL=	000100	G	2506#	4211											
TS.RMR=	010000	G	2500#												
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TS.SPE=	020000	G	2499#												
TS.SSR=	000200	G	2505#	3409	3438	3463	3506								
TS.UPE=	040000	G	2498#												
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TS4CL	002436	G	2765#	4335*	4337										
TS4INT	002426	G	2758#	4184	4297										
TS4IN0	005674	G	2758	3069#											
TS4IN1	005710	G	2759	3076#											
TS4IN2	005724	G	2760	3083#											
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TS4VCT	020103		4989	4992#											
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TYPEPC	034514		5050#												
TYPFLA	044136		5050#												
TYPLIN	040516		5050#												
TYPNUM	040100		5050#												
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TYP.ER	034344		5050#												
TY.UNI	027356		5050#												
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			4106#	4107#	4108#	4109#	4110#	4111#	4112#	4113#	4114#	4192#	4337#		
TS\$CODE-	156004		4081#	4988#	4989#	4991#	5013#	5014#	5015#	5016#	5017#	5018#	5019#	5020#	5021#
			5022#	5023#	5024#	5025#	5026#	5027#	5028#	5029#	5030#	5031#	5032#	5033#	5034#
			5035#	5036#	5037#	5039#									
TS\$ERCO=	000021		3581#	3610#	3652#	3689#	3712#	3749#	3808#	3969#	4024#	4030#	4137#		
TS\$ERRN=	000001		2280#	3581#	3610#	3652#	3689#	3712#	3749#	3808#	3969#	4024#	4030	4137#	
TS\$EXCP-	000000		4988#	4989#	5021#	5022#	5023#	5024#	5025#	5026#	5027#	5028#	5029#	5030#	5031#
			5032#	5033#	5034#	5035#	5036#	5037#							
TS\$FLAG-	000041		3024#	3044#	3053#	4118#	4228#	4253#	4274#	4300#	4466#	4711#	4828#	4863#	4944#
			4991#	5039#											
TS\$HILI=	000010		4988#	4989#	5021#	5022#	5023#	5024#	5025#	5026#	5027#	5028#	5029#	5030#	5031#
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			5032#	5033#	5034#	5035#	5036#	5037#							
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TS\$NEST=	177777		2280#	2284#	2347#	2355#	2364#	2399#	2402#	2407#	3019#	3031#	3034#	3049#	3051#
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[illegible]

[illegible]

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2560#	3166	4931										
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2554#	3637	3640										
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5050#												
5050#												
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3203#	3215#	3217#	3219#	3228#	3240#	3247#	3249#	3255#	3257#	3266#	3273#	3275#
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[illegible]

\$F\$IF - 000110

\$F\$INC 000210
\$F\$LOO= 000200
\$F\$NAM= 000160
\$F\$NO 000403

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4167	4172	4173	4176	4177	4178	4179	4181	4182	4183	4185	4186	4191
4199	4200	4203	4204	4208	4216	4220	4221	4223	4224	4226	4245	4247
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4334	4335	4336	4347	4356	4365	4374	4383	4392	4401	4410	4419	4428
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4918	4921	4926	4931	4932	4937	4938	4958	4959	4960	4961	4962	
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2280#	3072	3079	3086	3093	3103	3119	3120	3121	3131	3132	3134	3137
3139	3141	3142	3143	3145	3146	3148	3152	3155	3160	3164	3166	3167
3173	3174	3177	3178	3183	3196	3200	3202	3203	3215	3216	3217	3219
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\$F\$STRU= 000404
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\$F\$WHI= 000120

\$F\$YES = 000402

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	3715#	3722#	3737#	3739#	3742#	3748#	3750#	3752#	3761#	3762#	3788#	3794#	3796#
	3797#	3804#	3806#	3811#	3812#	3821#	3824#	3828#	3830#	3846#	3848#	3853#	3855#
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	4154#	4185#	4187#	4191#	4196#	4204#	4210#	4336#	4338#	4681#	4684#	4918#	4920#
	4931#	4933#											
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	3737#	3762	3788#	3794	3796#	3812	3821#	3859	3877#	3886	3895#	3897	3904#
	3906	3913#	3915	3916#	3918	3934#	3938	3939#	3974	4029#	4031	4033#	4035
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	4187	4191#	4196	4204#	4210	4336#	4338	4681#	4684	4918#	4920	4931#	4933
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	3686	3739#	3742	3748#	3750	3752#	3761	3797#	3804	3806#	3811	3824#	3858
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SLSTIN= 177777

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4165	4168	4177	4185	4187	4189	4191	4196	4199	4201	4204	4207	4210
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4165	4168	4177	4185	4187	4189	4191	4196	4199	4201	4204	4207	4210
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SLSTI: 177777

SLSTIA: 177777

SSAV2 051324 G
SSAV3 051340 G
SSAV4 051356 G

\$SAVS 051376 G
\$SSKO = 050245

\$TAGLE 177777

\$TAGNU= 050257

\$TEMP 000402

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ASSEMBLY ROUTINES		MACY11 30A(1052)		29-DEC-78 15:33		PAGE 159		K 12		DOCTOR.P11 17-FEB-78 09:08		CROSS REFERENCE TABLE --		MACRO NAMES		SEQ 0153	
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	3715	3720	3737	3739	3746	3748	3752	3759	3788	3796	3797	3805	3806	3821	3824
	3828	3832	3835	3837	3840	3842	3845	3846	3848	3851	3853	3877	3895	3901	3904
	3907	3909	3911	3913	3916	3921	3924	3934	3936	3939	3949	3950	3951	3952	3988
	3990	4004	4029	4033	4037	4043	4047	4074	4105	4116	4136	4142	4145	4148	4151
	4160	4165	4177	4185	4189	4191	4199	4201	4204	4207	4214	4245	4250	4332	4336
	4340	4438	4440	4474	4476	4681	4690	4691	4695	4816	4817	4819	4890	4915	4918
	4921	4924	4926	4931	4936	4939	4942								
\$\$SELE	1#														
\$\$SETS	1#	3132	3134	3136	3137	3138	3140	3145	3152	3155	3158	3159	3164	3166	3170
	3172	3179	3182	3216	3218	3239	3246	3248	3274	3277	3282	3325	3400	3402	3410
	3413	3416	3422	3425	3428	3438	3455	3457	3460	3462	3467	3489	3503	3521	3524
	3534	3535	3537	3539	3540	3541	3542	3545	3546	3547	3567	3568	3569	3575	3576
	3577	3578	3579	3587	3637	3640	3641	3646	3648	3682	3684	3688	3693	3698	3711
	3715	3720	3737	3739	3746	3748	3752	3759	3788	3796	3797	3805	3806	3821	3824
	3828	3832	3835	3837	3840	3842	3845	3846	3848	3851	3853	3877	3895	3901	3904
	3907	3909	3911	3913	3916	3921	3924	3934	3936	3939	3949	3950	3951	3952	3988
	3990	4004	4029	4033	4037	4043	4047	4074	4105	4116	4136	4142	4145	4148	4151
	4160	4165	4177	4185	4189	4191	4199	4201	4204	4207	4214	4245	4250	4332	4336
	4340	4438	4440	4474	4476	4681	4690	4691	4695	4816	4817	4819	4890	4915	4918
	4921	4924	4926	4931	4936	4939	4942								
\$\$SETT	1#														

. ABS. 051602 000

ERRORS DETECTED: 0

CZTSHA,CZTSHA/CRF/SOL=SVC.SML,SPMAC.SML,CZTSHA.DOC,CZTSHA.P11,DOCTOR.P11
 RUN-TIME: 114 118 8 SECONDS
 RUN-TIME RATIO: 351/241=1.4
 CORE USED: 27K (53 PAGES)