

RM80

FCTNL TEST PT 1
CZRND AO

AH-T111A-MC
FICHE 1 OF 2

JUL 1982
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The main body of the document is a large grid of approximately 15 columns and 25 rows of data. Each cell in the grid contains a small, dense table of information. The data is organized into several distinct sections across the rows, including:

- Header Information:** Identifiers such as 'FCTNL TEST PT 1' and 'CZRND AO' are repeated in the first few columns of each row.
- Test Parameters:** Columns containing numerical values, possibly representing test results or parameters.
- Logistical Data:** Information related to the test's execution, such as dates and times.
- Identification Codes:** Unique alphanumeric codes for each test instance.

The text is small and difficult to read, but the overall structure is a highly organized data matrix.

RM80

FCTNL TEST PT 1
CZRNDAO

AH-T111A-MC
FICHE 2 OF 2

JUL 1982
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A large grid of data tables, likely representing test results or performance metrics. The data is organized into multiple columns and rows, with some cells containing numerical values and others containing text or symbols. The overall appearance is that of a dense data matrix.



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IDENTIFICATION

PRODUCT CODE: AC-T110A-MC
PRODUCT NAME: CZRND AO RM80 FCTNL TEST PT 1
PRODUCT DATE: APRIL 1, 1982
MAINTAINER: CX DIAGNOSTIC GROUP
AUTHOR: MIKE LEAVITT

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1.0 INTRODUCTION

1.1 ABSTRACT

THE RM80 SUBSYSTEM FUNCTIONAL TEST IS A STAND ALONE PROGRAM WHICH USES FUNCTIONAL MEANS TO VERIFY THE OPERABILITY OF THE RM80 DISK SUBSYSTEM. IN PARTICULAR, THE PROGRAM SERVES THE FOLLOWING PURPOSES:

TO EXPLICITLY ESTABLISH CONFIDENCE IN THE BASIC OPERATIONS OF THE DISK DRIVE, INCLUDING MECHANICAL POSITIONING AND DATA TRANSFER OPERATIONS;

TO IMPLICITLY ESTABLISH CONFIDENCE IN THE DRIVE/ADAPTER ELECTRICAL INTERFACE;

TO VERIFY THE FUNCTIONALITY OF THE RM80 SUBSYSTEM, INCLUDING THE MASSBUS CONTROLLER, MASSBUS ADAPTER AND THE DISK DRIVE.

THE TEST IS COMPRISED OF 4 PARTS, WHICH WOULD NORMALLY BE RUN IN SEQUENCE, STARTING WITH PART 1. BRIEFLY, PART 1 TESTS HOUSEKEEPING AND MECHANICAL POSITIONING OPERATIONS; PART 2 TESTS WRITE, READ AND WRITE CHECK OPERATIONS USING HEADER AND DATA; PART 3 TESTS WRITE, READ AND WRITE CHECK OPERATIONS USING DATA; PART 4 TESTS MECHANICAL POSITIONING OPERATIONS AND VARIOUS TIMING PARAMETERS OF THE RM80 DISK DRIVE.

1.2 UNIT UNDER TEST

THE UNIT UNDER TEST (UUT) IS THE RM80 DISK SUBSYSTEM WHICH CONSISTS OF THE RH70 MASSBUS CONTROLLER, THE RM80 MASSBUS ADAPTER, AND THE STORAGE MODULE DISK DRIVE. NOTE THAT A DISK PACK IS REQUIRED FOR TESTING AND IS CONSIDERED AN INTEGRAL OF THE STORAGE MODULE DISK DRIVE.

2.0 OPERATING REQUIREMENTS

2.1 HARDWARE REQUIREMENTS

THE FOLLOWING MINIMUM HARDWARE CONFIGURATION, ASSUMED TO BE OPERATIONAL, IS REQUIRED TO LOAD AND EXECUTE THE RM80 SUBSYSTEM FUNCTIONAL TEST:

PDP-11 PROCESSOR
20K MEMORY
KW11-L OR KW11-P CLOCK
PROGRAM LOADING DEVICE
TERMINAL
RH70 CONTROLLER
1 TO 8 RM80 DISK DRIVES

2.2 MEDIA REQUIREMENTS

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EACH UNIT BEING TESTED MUST BE LOADED WITH A DISK BEFORE TESTING BEGINS ON THAT UNIT. THE DISK MAY BE FORMATTED OR UNFORMATTED.

2.3 PREREQUISITE DIAGNOSTIC PROGRAMS

RM80 DISKLESS TEST, PART 1 & 2

3.0 OPERATING PROCEDURE

3.1 LOADING

THE PROGRAM MAY BE LOADED BY EITHER OF THE FOLLOWING MEDIA:

.PAPER TAPE, USING THE STANDARD PAPER TAPE LOADING PROCEDURE.
.XXDP MEDIA, USING THE APPROPRIATE LOADING DEVICE.

3.2 SWITCH OPTIONS

THE FOLLOWING SWITCH OPTIONS ARE PROVIDED TO ENHANCE THE UTILITY OF THE PROGRAM.

SW15 HALT ON ERROR
SW14 LOOP ON TEST (CURRENTLY BEING EXECUTED)
SW13 INHIBIT ERROR TYPEOUTS
SW12 UNUSED
SW11 INHIBIT TEST ITERATIONS
SW10 BELL ON ERROR
SW09 LOOP ON ERROR
SW08 LOOP ON TEST IN SW07-00

THE LOW ORDER 8 SWITCHES (SW07-SW00), ARE USED IN CONJUNCTION WITH SW08 TO SPECIFY THE OCTAL NUMBER OF THE TEST WHICH THE PROGRAM WILL LOOP ON.

3.3 STARTING

THE PROGRAM MAY BE STARTED AT LOCATION 200 OR 204. STARTING AT 200 WILL BE THE NORMAL STARTING ADDRESS. STARTING AT 204 WILL ENABLE THE RH/RM BASE ADDRESS TO BE CHANGED. IF RUNNING IN A STAND-ALONE ENVIRONMENT, THE PROGRAM USES CONSOLE DIALOGUE TO ALLOW THE OPERATOR TO CONTROL TEST CONDITIONS.

3.4 HALTING

THE PROGRAM CAN BE HALTED BY TYPING CONTROL C FROM THE CONSOLE OR BY PRESSING THE HALT SWITCH ON THE PROCESSOR FRONT PANEL.

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3.5 RESTARTING

THE PROGRAM CAN BE RESTARTED AT ADDRESS 200 OR 204. (SEE SECTION 3.3)

4.0 OPERATOR INTERFACE

4.1 PROGRAM ID

THE PROGRAM TYPES ITS TITLE AND MAINDEC NUMBER THE FIRST TIME IT IS STARTED AFTER BEING LOADED. PROGRAM IDENTIFICATION DOES NOT OCCUR IF THE PROGRAM IS RESTARTED.

4.2 CONSOLE DIALOGUE

WHEN THE PROGRAM IS RUNNING IN STAND ALONE MODE, IT ENTERS A CONSOLE DIALOGUE SEQUENCE AFTER TYPING THE PROGRAM I.D..

THE FIRST QUESTION TYPED OUT IS: 'TYPE HELP TEXT (L) N ?'. IF THE OPERATOR RESPONDS WITH A 'Y', THE PROGRAM WILL TYPE A BRIEF HELP MESSAGE WHICH WILL LIST SWITCH OPTIONS, ETC. ANY OTHER RESPONSE TO THE QUESTION IS CONSIDERED A 'N' AND NO HELP TEXT IS TYPED. THIS QUESTION IS ONLY ASKED ON THE INITIAL PROGRAM START AND NOT ON SUBSEQUENT START-UP'S.

ON THE PROGRAM INITIAL START AND WHEN RESTARTING AT LOCATION 204, THE OPERATOR MAY CHANGE THE RH/RM BASE ADDRESSES WITH THE FOLLOWING DIALOGUE.

EXAMPLE 1

```
RMCS1=176700 <CR>      ;NO CHANGE IN ADDRESS  
RMVEC=000254 <CR>      ;NO CHANGE IN ADDRESS
```

EXAMPLE 2

```
RMCS1=176700 177200<CR> ;CHANGE BASE ADDRESS TO 177200  
RMVEC=000254 260<CR>   ;CHANGE VECTOR ADDRESS TO 260
```

THE NEXT QUESTION ASKED IS 'DO YOU WANT MANUAL INTERVENTION TESTS (L) N ?'. IF THE OPERATOR ANSWERED WITH A 'Y' RESPONSE, UPON ENTERING A MANUAL INTERVENTION TEST, THE PROGRAM WILL ASK THE OPERATOR TO PERFORM CERTAIN FUNCTIONS TO THE DRIVE. THERE IS ONLY ONE MANUAL INTERVENTION TEST IN THIS PROGRAM. (SEE SECTION 6.0, TEST #2) ANY OTHER RESPONSE TO THE QUESTION IS CONSIDERED TO BE 'N' AND THERE WILL BE NO MANUAL INTERVENTION IN THE PROGRAM OPERATION. TERMINATE RESPONSE WITH A CARRIAGE RETURN.

ON THE INITIAL START, THE NEXT QUESTION TYPED IS, 'TYPE 'A' TO TEST ALL DRIVES, OR TYPE DRIVE NUMBER(S) AND TERMINATE INPUT WITH A CARRIAGE RETURN'. THEN, 'DRIVE(S):' IS TYPED AND WAITS FOR THE

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OPERATOR TO TYPE AN 'A' TO TEST ALL POSSIBLE DRIVES OR TYPE ANY STRING OF DRIVE NUMBER(S) TO BE TESTED AND TERMINATE THE INPUT WITH A 'CARRIAGE RETURN'. NO COMMAS OR ANY OTHER SEPARATORS ARE NEEDED WHEN ENTERING THE DRIVE NUMBERS AS A STRING. THE PROGRAM ENTERS THE COMMA SEPARATOR AUTOMATICALLY AFTER TYPING EACH NUMBER. ON ALL SUBSEQUENT STARTS, ONLY THE 'DRIVE(S):' PROMPT IS TYPED.

THE DIAGNOSTIC THEN INITIALIZES AND REPORTS THE STATUS OF THE DRIVES WHICH WERE PREVIOUSLY SPECIFIED FOR TESTING. THE FOLLOWING IS AN EXAMPLE PRINTOUT:

```
'UNIT STATUS:
 0 ONLINE RM80
 1 LOAD DEVICE
 2 OFFLINE RM80
 3 NOT PRESENT
 4 NOT PRESENT
 5 NOT AN RM80
 6 NOT PRESENT
 7 NOT PRESENT'
```

THE ABOVE UNIT STATUS SHOWS THAT DRIVE 0 WILL BE TESTED, WHILE DRIVES 1 - 7 WILL NOT BE TESTED.

THE DIAGNOSTIC THEN TYPES THE FOLLOWING MESSAGE, BASED ON THE STATUS OF THE DRIVE:

```
'DRIVE(S) TO BE TESTED, 0'
```

IF NO DRIVES ARE AVAILABLE FOR TESTING THE FOLLOWING MESSAGE WILL BE TYPED TO THE OPERATOR:

```
'DRIVE(S) TO BE TESTED, NONE'
```

THE PROGRAM WILL THEN, EITHER START TESTING THE DRIVES AVAILABLE FOR TESTING OR RETURN TO THE BEGINNING OF THE PROGRAM AND WAIT.

ONCE THE DRIVES START TESTING, THE FOLLOWING MESSAGE WILL OCCUR AS EACH DRIVE BEGINS TO BE TESTED:

```
'DRIVE 0'
```

AFTER ALL THE DRIVES ARE COMPLETELY TESTED, THE END OF PASS MESSAGE WILL BE TYPED (SEE SECTION 4.3) AND THE PROGRAM WILL START TESTING ALL THE DRIVES AGAIN. THIS WILL CONTINUE UNTIL THE PROGRAM IS HALTED BY THE OPERATOR.

NOTE: THE LETTER LOCATED WITHIN THE BRACKETS () INDICATES THE TYPE OF RESPONSE REQUIRED BY THE USER, D=DECIMAL, O=OCTAL AND L=LETTER.

4.3 PROGRESS REPORTS

AN END OF PASS REPORT OCCURS EACH TIME THE PROGRAM IS EXECUTED FOR ALL DEVICES IN THE TEST QUEUE. THE END OF PASS REPORT IS AS FOLLOWS.

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'END OF PASS 1'

THE FOLLOWING MESSAGE WILL ALSO OCCUR IF THERE WERE ERRORS SINCE THE LAST END OF PASS REPORT.

'TOTAL ERRORS SINCE LAST REPORT 0'

4.4 PERFORMANCE REPORT

NO PERFORMANCE REPORTS ARE GIVEN DURING THE EXECUTION OF THE PROGRAM.

4.5 PROGRAM HALTS

THERE ARE NO SCHEDULED HALTS DURING THE EXECUTION OF THE PROGRAM. PROCESSOR HALTS ARE DUE TO THE TRAP CATCHER.

4.6 ERROR REPORTS

THE FIRST LINE OF THE ERROR REPORT CONTAINS THE NUMBER OF THE UNIT (DRIVE) BEING TESTED, THE DRIVE TYPE, THE TEST NUMBER, THE ERROR NUMBER AND THE VALUE OF THE PROGRAM COUNTER WHERE THE ERROR WAS CALLED. THIS LINE IS FOLLOWED BY THE ERROR MESSAGE: ONE OR MORE LINES OF TEXT WHICH GIVE A BRIEF, YET COMPREHENSIVE DESCRIPTION OF THE ERROR. THE ERROR MESSAGE IS NORMALLY FOLLOWED BY ONE OR MORE PAIRS OF LINES CONTAINING DATA HEADERS AND DATA PERTINENT TO THE ERROR, INCLUDING EXPECTED AND ACTUAL TEST RESULTS.

THE FOLLOWING PRINTOUT SHOWS A TYPICAL ERROR MESSAGE FOR THIS PROGRAM:

```

DRV# 0 - RM80, TEST# 14, ERR# 326, PC=016654
MASSBUS DATA BUS PARITY ERROR 'MDPE' (RMCS2, BIT 8) DETECTED
DURING WRITE COMMAND
EXPECTED  RECEVD
040300    040700
RMCS1     RMCS2   RMDS   RMER1   RMER2   RMAS
144252    040700  010700  000000  000000  000000
RMWC      RMBA     RMDA   RMOF   RMDC   RMEC1  RMEC2
177403    104604  000002  010000  000000  004066  000000
RMR1      RMR2     RMDT   RMSN
000010    011777  024026  177777

```

4.7 EXECUTION TIME

PASS 1 OF THE PROGRAM TAKES ABOUT 20 SECONDS. PASS 2 AND SUBSEQUENT PASSES TAKE 2.3 MINUTES.

5.0 ENVIRONMENTAL SUPPORT

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5.1 PROCESSOR COMPATIBILITY

THE RM80 SUBSYSTEM FUNCTIONAL TEST IS EXECUTABLE ON A PDP-11/70 PROCESSOR, PROVIDING PREVIOUSLY MENTIONED HARDWARE REQUIREMENTS ARE MET, AND PROVIDING THAT DATA THROUGHPUT ON THE SYSTEM IS SUFFICIENT TO SUSTAIN DATA TRANSFER OPERATIONS.

5.2 DUAL PORT CONFIGURATIONS

THE RM80 SUBSYSTEM FUNCTIONAL TEST DOES NOT SPECIFICALLY TEST DUAL PORT LOGIC IN THE RM80 ADAPTER BUT IS EXECUTABLE ON RM80 SUBSYSTEMS HAVING THE DUAL PORT OPTION PROVIDING THE DUAL PORT SWITCH IS SET TO THE APPROPRIATE PORT (A OR B).

5.3 MEMORY PARITY HARDWARE

MEMORY PARITY HARDWARE IS NOT USED DURING THE EXECUTION OF THE RM80 SUBSYSTEM FUNCTIONAL TEST.

5.4 MEMORY MANAGEMENT HARDWARE

MEMORY MANAGEMENT HARDWARE IS NOT USED DURING THE RM80 SUBSYSTEM FUNCTIONAL TEST.

5.5 ACT11, APT11 COMPATIBILITY

THE RM80 SUBSYSTEM FUNCTIONAL TEST IS COMPATIBLE WITH ACT11 AND APT11 IN BOTH DUMP AND AUTOMATIC MODES. FURTHER, THE PROGRAM WILL EXECUTE A QUICK PASS DURING THE FIRST PASS IN SUPPORT OF QUICK VERIFY MODE.

5.6 XXDP COMPATIBILITY

THE RM80 SUBSYSTEM FUNCTIONAL TEST IS COMPATIBLE WITH XXDP IN DUMP AND CHAIN MODES, AND PROVIDES MEDIA PROTECTION IN THE CASE WHERE THE RM80 IS THE XXDP LOADING DEVICE.

5.7 OPERATING SYSTEM COMPATIBILITY

THE PROGRAM IS NOT COMPATIBLE WITH ANY SOFTWARE OPERATING SYSTEM.

6.0 TEST DESCRIPTION

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TEST 1 CONTROLLER ACCESS TEST

PURPOSE:

TO VERIFY THAT THE UNIBUS ADDRESS OF THE RM80 SUBSYSTEM IS CORRECT, AS DEFINED AT LOCATION \$BASE.

PROCEDURE:

THE TEST TRIES TO ACCESS ALL MASSBUS CONTROLLER REGISTERS USING THE \$BASE ADDRESS. REGISTER CONTENTS ARE IGNORED DURING THE TEST, AND THE TEST FAILS IF A BUS TIMEOUT OCCURS FOR ANY REGISTER TRANSFER.

IF THE TEST FAILS AND THE PROGRAM IS RUNNING IN A STAND ALONE ENVIRONMENT, I.E., LOCATION 42 IS 0, THE PROGRAM WILL JUMP TO LOCATION 204 WHICH ALLOWS THE OPERATOR TO CHANGE THE \$BASE ADDRESS VIA CONSOLE DIALOGUE. OTHERWISE, THE PROGRAM ESCAPES TO THE END OF PASS HANDLER.

TEST 2 LOGICAL ADDRESS PLUG TEST (OPTIONAL, SEE SECTION 4.2)

PURPOSE:

TO VERIFY THAT ALL LOGICAL ADDRESS PLUGS(0-7) FUNCTION IN EACH DEVICE UNDER TEST.

PROCEDURE:

THIS TEST SELECTS EACH UNIT BY INSERTING ADDRESS PLUGS 0-7 INTO EACH DEVICE BEING TESTED AND READS RMER2 TO VERIFY THAT 'OPE' IS SET. A MASSBUS CLEAR IS ISSUED AND RMER2 IS READ TO VERIFY THAT 'OPE' IS CLEAR. THE CONTROL STATUS REGISTERS 1 AND 2 ARE READ TO VERIFY THAT THE CORRECT UNIT WAS SELECTED AND IS AVAILABLE FOR TESTING, 'DVA' IS SET IN RMCS1 AND 'NED' IS CLEAR IN RMCS2.

TEST 3 UNIBUS INITIALIZE TEST

PURPOSE:

TO VERIFY THAT ALL APPLICABLE SUBSYSTEM REGISTERS ARE INITIALIZED BY THE RESET INSTRUCTION.

PROCEDURE:

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NONZERO VALUES ARE WRITTEN IN EACH APPLICABLE REGISTER. A RESET INSTRUCTION IS EXECUTED, AND THE REGISTERS ARE TESTED TO INSURE THEY WERE INITIALIZED. THIS TEST IS DONE ONCE BECAUSE OF APT COMPATIBILITY REQUIREMENTS.

THE FOLLOWING REGISTERS ARE PRESET BEFORE THE INITIALIZE OCCURS:

RMCS1 - 003577

RMBA - 777776

RMCS2 - 021037

RMER1 - 777777

RMER2 - 777777

RMMR - 040001

IN ADDITION, THE DATA BUFFER IS USED TO FORCE DLT, TRE, SC AND OR TO A ONE AND TO FORCE IR TO A ZERO.

TEST 4 CONTROLLER CLEAR TEST

PURPOSE:

TO VERIFY THAT APPLICABLE SUBSYSTEM REGISTERS ARE INITIALIZED BY A "CONTROLLER CLEAR" OPERATION.

PROCEDURE:

LIKE THE UNIBUS INITIALIZE TEST, THIS TEST WRITES NONZERO VALUES IN THOSE REGISTERS WHICH ARE INITIALIZED BY CONTROLLER CLEAR. THE SUBSYSTEM IS THEN CLEARED USING A CONTROLLER CLEAR, I.E., BIT 5 OF CONTROL STATUS REGISTER 2 (RMCS2), AND EACH REGISTER IS READ TO INSURE IT WAS CLEARED.

TEST 5 ERROR CLEAR TEST

PURPOSE:

TO VERIFY THAT ALL APPLICABLE RH70 MASSBUS CONTROLLER STATUS AND ERROR CONDITIONS ARE INITIALIZED BY AN ERROR CLEAR OPERATION.

PROCEDURE:

AN "RH70 ERROR CLEAR" OPERATION, I.E., WRITING A ONE IN TRE, BIT 14 OF RMCS1 WILL CLEAR THE FOLLOWING STATUS BITS:

457
458 .TRE, BIT 14 OF RMCS1
459
460 .MCPE, BIT 13 OF RMCS1 - READ ONLY
461
462 .DLT, BIT 15 OF RMCS2 - READ ONLY
463
464 .WCE, BIT 14 OF RMCS2 - READ ONLY
465
466 .UPE, BIT 13 OF RMCS2
467
468 .NED, BIT 12 OF RMCS2 - READ ONLY
469
470 .PGE, BIT 10 OF RMCS2 - READ ONLY
471
472 .MXF, BIT 09 OF RMCS2
473
474 .MDPE, BIT 08 OF RMCS2 - READ ONLY
475
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477 THE TEST SETS UPE AND MXF STATUS BITS, THEN SETS TRE (ERROR
478 CLEAR) AND VERIFIES THAT ALL THE ABOVE STATUS BITS ARE CLEARED.
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484 TEST 6 DRIVE STATUS TEST
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486 PURPOSE:

487 TO VERIFY THAT THE STORAGE MODULE DISK DRIVE IS IN A STATE
488 THAT PERMITS FURTHER TESTING.
489

490 PROCEDURE:

491 THIS TEST INITIALIZES THE MASSBUS AND EXAMINES STATUS OF THE
492 SELECTED DEVICE FOR THE FOLLOWING CONDITIONS:
493

494 .MOL, BIT 12 OF RMDS =1, INDICATING THAT UNIT READY IS
495 ASSERTED BY THE DRIVE;
496

497 .WRL, BIT 11 OF RMDS =0, INDICATING THAT THE DRIVE IS NOT IN
498 A WRITE PROTECT STATE;
499

500 .DVC, BIT 07 OF RMER2 =0, INDICATING DRIVE FAULT IS
501 UNASSERTED BY THE DRIVE;
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503 .UNS, BIT 14 OF RMER1 SHOULD EQUAL DVC, OTHERWISE AC POWER
504 IS LOW OR A FAILURE HAS OCCURRED WITH UNSAFE STATUS.
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511 TEST 7 PRIMARY/SECONDARY ERROR TEST
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PURPOSE:

TO VERIFY THAT THE RM80 CAN EXECUTE A COMMAND WITHOUT INCURRING UNEXPECTED ERRORS.

PROCEDURE:

THE TEST EXECUTES A PACK ACKNOWLEDGE COMMAND AND MAKES SURE THAT GC RESETS AND THAT THERE ARE NO PARITY ERRORS, ETC. VOLUME VALID STATUS IS IGNORED.

TEST 10 DIAGNOSTIC MODE TEST

PURPOSE:

TO VERIFY THAT MAINTENANCE HARDWARE IS OPERATIONAL.

PROCEDURE:

THE TEST THAT DIAGNOSTIC MODE CAN BE SET AND RESET, THEN VERIFIES THAT 'MOL, PIP, WRL, SKI, AND DVC' CAN BE CONTROLLED USING MAINTENANCE REGISTER 1.

TEST 11 PACK ACKNOWLEDGE TEST

PURPOSE:

TO VERIFY THAT VOLUME VALID CAN BE SET BY A PACK ACKNOWLEDGE COMMAND, LENDING CREDENCE TO THE EXECUTION OF THE COMMAND AND TO THE STABILITY OF THE UNIT READY SIGNAL FROM THE DRIVE.

PROCEDURE:

A PACK ACKNOWLEDGE COMMAND IS ISSUED TO THE SELECTED DEVICE AND VOLUME VALID STATUS, BIT 10 OF RMD5, IS CHECKED FOR ONE.

TEST 12 RECALIBRATE TEST

PURPOSE:

THE PRIMARY PURPOSE IS TO ASCERTAIN THAT THE DRIVE WILL EXECUTE A RECALIBRATE OPERATION TO THE EXTENT THAT 'PIP' AND 'SKI' STATUS BECOME UNASSERTED AT THE COMPLETION OF THE RECALIBRATE. THE SECONDARY PURPOSE IS TO PUT THE DRIVE IN A KNOWN STATE SO THAT FURTHER TESTS CAN CHECK FOR UNEXPECTED STATE

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CHANGES IN THE DRIVE.

PROCEDURE:

THE RECALIBRATE TEST PRESETS THE DISK ADDRESS REGISTER, RMDA, AND THE DESIRED CYLINDER REGISTER, RMDC, TO ZERO, THEN EXECUTES A RECALIBRATE COMMAND. THE TEST VERIFIES THE FOLLOWING CONDITIONS:

.SKI=0, 'SEEK ERROR' IS INACTIVE;

.PIP=0, 'ON CYLINDER' IS ACTIVE, AS INDICATED BY 'POSITIONING IN PROGRESS' BEING INACTIVE;

.IAE=0, NO 'INVALID ADDRESS ERROR' DURING RECALIBRATE;

.OPI=0, NO 'OPERATION INCOMPLETE ERROR', INDICATING THAT THAT THE DRIVE WAS READY AT THE START OF THE COMMAND AND THAT ON CYLINDER STATUS WENT INACTIVE WHEN THE DRIVE RECEIVED THE COMMAND;

.ATA=1, ATTENTION IS SET BY RECALIBRATE.

TEST 13 ABORT RECALIBRATE TEST

PURPOSE:

TO VERIFY THAT THE RM80 INHIBITS A RECALIBRATE WHEN AN ABORT CONDITION EXISTS AT THE START OF THE COMMAND.

PROCEDURE:

THE TEST SETS AN ERROR IN THE ERROR REGISTER AND ISSUES A RECALIBRATE COMMAND, VERIFYING THAT 'PIP' REMAINS INACTIVE.

TEST 14 IVC RECALIBRATE TEST

PURPOSE:

TO VERIFY THAT INVALID COMMAND STATUS, BIT 12 OF RMR2, SETS WHEN VOLUME VALID IS INACTIVE DURING A RECALIBRATE COMMAND.

PROCEDURE:

THE PROGRAM SETS AND RESETS DIAGNOSTIC MODE WHICH CAUSES VOLUME VALID, BIT 6 OF RMD5 TO RESET. THE PROGRAM THEN EXECUTES A RECALIBRATE COMMAND AND VERIFIES THAT 'IVC' STATUS SETS AND THAT 'PIP' REMAINS INACTIVE.

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TEST 15 IAE RECALIBRATE TEST**PURPOSE:**

TO VERIFY THAT INVALID ADDRESS ERROR DOES NOT SET DURING A RECALIBRATE COMMAND .

PROCEDURE:

THE TEST PRESETS THE DISK ADDRESS (RMDA) AND THE DESIRED CYLINDER ADDRESS (RMDC) TO ILLEGAL VALUES AND ISSUES A RECALIBRATE COMMAND, VERIFYING THAT "IAE" DOES NOT SET DURING THE COMMAND.

TEST 16 RECALIBRATE AT OFFSET**PURPOSE:**

TO VERIFY THAT OFFSET MODE DOES NOT AFFECT RECALIBRATE.

PROCEDURE:

THE TEST EXECUTES AN OFFSET COMMAND, THEN EXECUTES A RECALIBRATE COMMAND AND VERIFIES THAT THERE ARE NO ERRORS DURING RECALIBRATE.

TEST 17 DRIVE CLEAR TEST**PURPOSE:**

TO VERIFY THAT ALL APPLICABLE RM80 MASSBUS ADAPTER ERROR AND STATUS CONDITIONS ARE INITIALIZED BY A "DRIVE CLEAR" COMMAND.

PROCEDURE:

THIS TEST WRITES ONES IN THOSE MASSBUS ADAPTER BITS WHICH ARE INITIALIZED BY DRIVE CLEAR , THEN ISSUES THE DRIVE CLEAR COMMAND AND VERIFIES THAT EACH BIT IS CLEARED. ADDITIONALLY, REGISTERS WHICH ARE NOT AFFECTED BY "DRIVE CLEAR" ARE ALSO PRESET AND VERIFIED.

THE FOLLOWING ITEMS ARE PRESET:

.RMER1, ERROR REGISTER 1 IS SET TO ALL ONES;

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.DMD, DIAGNOSTIC MODE IS SET;

.RMER2, ERROR REGISTER 3, IS SET TO ALL ONES.

FOLLOWING THE DRIVE CLEAR COMMAND, THE FOLLOWING ITEMS ARE CHECKED:

.RMCS1, IS CHECKED FOR DVA=1, F0-F4 AND GO=0, ALL OTHER BITS ARE DONT CARES;

.RMDS, IS CHECKED FOR 0, EXCEPT FOR MOL,DPR,DRY, AND VV WHICH SHOULD BE ONE, AND PGM WHICH IS A DONT CARE.

.RMER1, IS CHECKED FOR 0;

.RMAS, IS CHECKED TO INSURE THE APPROPRIATE ATA BIT IS 0;

.RMMR, IS CHECKED FOR 0, EXCEPT FOR WORD CLOCK, LAST SECTOR, AND LAST SECTOR AND TRACK WHICH ARE DONT CARES;

.RMMR2 IS CHECKED FOR 0, EXCEPT FOR THE TEST BIT WHICH IS ONE, AND REQA, REQB WHICH ARE DONT CARES;

.RMEC2 IS CHECKED FOR 0;

.RMER2 IS CHECKED FOR 0;

TEST 20 NOP TEST

PURPOSE:

TO VERIFY THE EXECUTION OF 'NOP' COMMAND.

PROCEDURE:

A NOP COMMAND IS EXECUTED ON THE SELECTED DEVICE AND STATUS IS CHECKED TO VERIFY THAT THERE WERE NO ERRORS OR UNEXPECTED CHANGES IN STATUS.

TEST 21 OFFSET TEST

PURPOSE:

TO VERIFY THE EXECUTION OF 'OFFSET' COMMAND.

PROCEDURE:

THE OFFSET COMMAND IS EXECUTED AND THE PROGRAM CHECKS THAT OFFSET STATUS, BIT 0 OF RMDS IS SET AND THAT ATTENTION, BIT 15 OF

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RMDS IS ALSO SET. ADDITIONALLY, CONTROLLER, ADAPTER, AND DRIVE STATUS IS CHECKED FOR UNEXPECTED CHANGES.

TEST 22 GO/ATA TEST

PURPOSE:

TO VERIFY THAT 'ATA' WILL RESET WITH 'GO' PROVIDING COMPOSITE ERROR IS INACTIVE.

PROCEDURE:

ATTENTION, BIT 15 OF RMDS, IS SET USING AN OFFSET COMMAND AND RESET USING A NOP COMMAND.

TEST 23 WRITE ATA TEST

PURPOSE:

TO VERIFY THAT ATTENTION CAN BE RESET BY WRITING THE ATTENTION SUMMARY REGISTER, RMAS.

PROCEDURE:

ATTENTION IS SET USING AN OFFSET COMMAND AFTER WHICH THE PROGRAM WRITES A 0 IN THE ATTENTION SUMMARY REGISTER, VERIFYING THAT ATTENTION REMAINS SET. FOLLOWING THAT, THE PROGRAM WRITES A 1 IN RMAS AND VERIFIES THAT ATTENTION RESETS.

TEST 24 ERROR/ATA TEST

PURPOSE:

TO VERIFY THAT 'GO' DOES NOT RESET 'ATA' WHEN THERE IS A COMPOSITE ERROR.

PROCEDURE:

'ATA' IS SET WITH AN OFFSET COMMAND AFTER WHICH ONE OF THE ERROR BITS IS SET. THE PROGRAM THEN ISSUES A NOP COMMAND AND VERIFIES THAT THE ATTENTION BIT REMAINS SET.

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TEST 25 PROGRAM INTERRUPT TEST

PURPOSE:

TO VERIFY THAT THE RM80 SUBSYSTEM WILL GENERATE A PROGRAM INTERRUPT WHEN PROCESSOR PRIORITY IS LESS THAN CONTROLLER PRIORITY AND INTERRUPT IS ENABLED.

PROCEDURE:

ATTENTION IS SET USING AN OFFSET COMMAND. WITH INTERRUPT ENABLED AND PROCESSOR PRIORITY SET BELOW CONTROLLER PRIORITY, THE PROGRAM VERIFIES THAT A PROGRAM INTERRUPT OCCURS.

TEST 26 INHIBIT INTERRUPT TEST

PURPOSE:

TO VERIFY THAT A PROGRAM INTERRUPT DOES NOT OCCUR WHEN (1) PROCESSOR AND CONTROLLER PRIORITY ARE THE SAME AND INTERRUPT IS ENABLED OR (2) WHEN PROCESSOR PRIORITY IS LESS THAN CONTROLLER AND INTERRUPTS ARE NOT ENABLED.

PROCEDURE:

ATTENTION IS SET USING AN OFFSET COMMAND WITH THE PRIORITY OF THE PROCESSOR SET EQUAL TO THE PRIORITY OF THE CONTROLLER. INTERRUPT IS ENABLED AND THE TEST VERIFIES THAT A PROGRAM INTERRUPT DOES NOT OCCUR. INTERRUPTS ARE DISABLED AND PROCESSOR PRIORITY IS LOWERED AND THE TEST VERIFIES THAT A PROGRAM INTERRUPT DOES NOT OCCUR.

TEST 27 RETURN TO CENTERLINE TEST

PURPOSE:

TO VERIFY THE EXECUTION OF 'RETURN TO CENTERLINE' COMMAND.

PROCEDURE:

THIS TEST ISSUES AN RTC COMMAND AND VERIFIES THAT OFFSET STATUS, BIT 0 OF RMD5 IS RESET AND THAT ATTENTION, BIT 15 OF RMD5 IS SET. UNEXPECTED STATUS OR ERROR CONDITIONS ARE ALSO VERIFIED.

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TEST 30 READ IN PRESET TEST

PURPOSE:

TO VERIFY THE EXECUTION OF 'READ IN PRESET' COMMAND.

PROCEDURE:

THIS TEST LOADS NON ZERO VALUES IN THOSE ADAPTER REGISTERS WHICH ARE INITIALIZED BY THE READ IN PRESET COMMAND, THEN EXECUTES THE COMMAND AND VERIFIES THE CONTENTS OF EACH REGISTER. THE FOLLOWING REGISTERS ARE CHECKED:

.RMDA, THE DISK ADDRESS REGISTER, IS LOADED WITH ALL ONES AND VERIFIED TO BE ZERO AFTER THE RIP COMMAND;

.RMDC, THE DESIRED CYLINDER REGISTER, IS LOADED WITH ALL ONES (001777) AND VERIFIED TO BE ZERO AFTER THE RIP COMMAND;

.RMOF, THE OFFSET REGISTER, IS PRESET (TO 017200) AND VERIFIED TO BE ZERO AFTER THE TEST;

TEST 31 RMDC CLEAR OFFSET TEST

PURPOSE:

TO VERIFY THAT WRITING THE DESIRED CYLINDER REGISTER (RMDC) WILL CLEAR OFFSET MODE.

PROCEDURE:

OFFSET MODE IS SET USING THE OFFSET COMMAND, THEN RESET BY WRITING RMDC.

TEST 32 ILLEGAL FUNCTION TEST

PURPOSE:

TO VERIFY THAT THE RM80 SUBSYSTEM DETECTS ALL ILLEGAL FUNCTIONS.

PROCEDURE:

EACH ILLEGAL FUNCTION CODE IS EXECUTED WITH THE PROGRAM VERIFYING THAT "ILLEGAL FUNCTION" STATUS, BIT 0 OF RMER1 IS SET FOR EACH CODE. THE SUBSYSTEM IS INITIALIZED PRIOR TO EACH ILLEGAL FUNCTION TEST.

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TEST 33 INVALID COMMAND TEST**PURPOSE:**

TO VERIFY IVC ERROR DETECTION.

PROCEDURE:

THE TEST RESETS VOLUME VALID USING MAINTENANCE UNIT READY, THEN EXECUTES A NOP COMMAND AND VERIFIES THAT IVC IS SET. THE PROCESS IS REPEATED FOR EACH FUNCTION CODE, WITH IVC BEING CHECKED ACCORDING TO THE FUNCTION.

TEST 34 INVALID ADDRESS ERROR TEST**PURPOSE:**

TO VERIFY IAE ERROR DETECTION.

PROCEDURE:

THE TEST EXECUTES EACH FUNCTION CODE WITH RMDA, AND RMDC SET TO ILLEGAL ADDRESSES, AND VERIFIES IAE ACCORDING TO THE FUNCTION.

TEST 35 WRITE LOCK ERROR TEST**PURPOSE:**

TO VERIFY WLE ERROR DETECTION.

PROCEDURE:

THE TEST SIMULATES WRITE PROTECT USING MAINTENANCE WRITE PROTECT AND VERIFIES WLE ACCORDING TO THE FUNCTION BEING EXECUTED. EACH FUNCTION CODE IS TESTED.

TEST 36 ERROR ABORT TESTS**PURPOSE:**

TO TEST COMMAND EXECUTION DURING AN ABORT CONDITION.

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PROCEDURE:

EACH FUNCTION CODE IS EXECUTED UNDER A SIMULATED UNSAFE CONDITION AND THE TEST VERIFIES THAT GO IS RESET.

TEST 37 RMR TEST

PURPOSE:

TO VERIFY THAT RMR ERROR IS DETECTED.

PROCEDURE:

THE TEST EXECUTES A NOP COMMAND WITH DEBUG CLOCK ENABLED. WITH GO SET, THE TEST WRITES RMCSI, VERIFYING THAT RMR ERROR SETS.

TEST 40 PARITY ERROR TEST

PURPOSE:

TO VERIFY THAT PARITY ERRORS ARE DETECTED.

PROCEDURE:

WITH PAT SET TO CAUSE BAD PARITY ON THE CONTROL BUS, THE TEST WRITES A SHIFTING ONE BIT PATTERN TO RMDA AND VERIFIES THAT AN ERROR IS DETECTED BY THE RM80 FOR EACH PATTERN.

TEST 41 ILLEGAL REGISTER TEST

PURPOSE:

TO VERIFY THE DETECTION OF ILLEGAL REGISTER ADDRESSES BY THE RM80 SUSBSYSTEM.

PROCEDURE:

EACH REGISTER ADDRESS IS ACCESSED AND ILLEGAL REGISTER STATUS, BIT 1 OF RMR1 IS CHECKED ACCORDING TO THE ADDRESS USED. NOTE THAT THE EXECUTION OF THIS TEST IS DEPENDENT ON THE REGISTER ADDRESS JUMPER IN THE RH70 CONTROLLER BECAUSE THE RANGE OF ADDRESSES WHICH THE CONTROLLER WILL RESPOND TO IS LIMITED BY THE WAY THE JUMPER IS CUT.

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SEEK TESTS (42 - 52)

PURPOSE:

THE PURPOSE OF EACH OF THE FOLLOWING SEEK TESTS IS TO VERIFY THE EXECUTION OF SEEK OPERATIONS BY THE RM80 SUBSYSTEM USING A SET OF ADDRESSES THAT TEST THE ADAPTER/DEVICE INTERFACE AND ELECTROMECHANICAL HEAD POSITIONING HARDWARE.

PROCEDURE:

EACH TEST WILL RECALIBRATE THE DRIVE IF 'PIP' OR 'SKI' IS ACTIVE. FOLLOWING THAT, THE TEST EXECUTES A SEEK TO A CYLINDER ADDRESS OR SERIES OF ADDRESSES. AT THE COMPLETION OF EACH SEEK OPERATION, SUBSYSTEM STATUS IS STORED AND THE TEST CHECKS FOR PRIMARY ERRORS WHICH PRECLUDE FURTHER ERROR CHECKING. IF THERE ARE NO PRIMARY ERRORS THE TEST CHECKS FOR OPERATIONAL ERRORS AND THEN SECONDARY ERRORS.

TEST 42 SEEK TO FIRST CYLINDER TEST

THIS TEST SEEKS TO THE FIRST CYLINDER.

TEST 43 SEEK TO LAST CYLINDER TEST

THIS TEST SEEKS TO THE LAST CYLINDER.

TEST 44 SEEK PRIME CYLINDERS TEST

THIS TEST SEEKS FORWARD TO EACH PRIME CYLINDER ADDRESS, I.E., CYLINDERS 1, 2, 4, 8, 16, 32, 64, 128, 256 AND 512.

TEST 45 SEEK ZERO DIFFERENCE TEST

THIS TEST EXECUTES SUCCESSIVE SEEKS TO CYLINDER 0.

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TEST 46 SEEK MAXIMUM DIFFERENCE FORWARD

THIS TEST DOES A RECALIBRATE COMMAND, REGARDLESS OF THE CONDITION OF 'PIP' OR 'SKI', AND THEN EXECUTES A SEEK TO THE LAST CYLINDER.

TEST 47 SEEK ADJACENT FORWARD TEST

THIS TEST SEEKS TO CYLINDER 0, FOLLOWED BY A SEEK TO THE ADJACENT FORWARD CYLINDER, I.E., CYLINDER 1.

TEST 50 SEEK ADJACENT REVERSE TEST

THIS TEST SEEKS TO CYLINDER 1, FOLLOWED BY A SEEK TO THE ADJACENT REVERSE CYLINDER, I.E., CYLINDER 0.

TEST 51 SEEK TO INVALID SECTOR TEST

WITH THE OFFSET REGISTER SET FOR 18 BIT FORMAT, THE PROGRAM SEEKS TO CYLINDER 0, TRACK 0, FOR EACH INVALID SECTOR ADDRESS AND VERIFIES THAT INVALID ADDRESS ERROR SETS FOR EACH SECTOR. THE TEST IS REPEATED FOR 16 BIT FORMAT.

TEST 52 SEEK TO INVALID TRACK TEST

THE TEST SEEKS TO EACH INVALID TRACK ADDRESS WITH CYLINDER AND SECTOR ADDRESS SET TO 0 AND VERIFIES THAT INVALID ADDRESS ERROR SETS FOR EACH TRACK ADDRESS.

TEST 53 SEEK TO INVALID CYLINDER TEST

THE PROGRAM SEEKS TO EACH INVALID CYLINDER ADDRESS WITH THE SECTOR AND TRACK ADDRESS SET TO 0 AND VERIFIES THAT INVALID ADDRESS ERROR SETS FOR EACH CYLINDER ADDRESS.

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TEST 54 IVC SEEK TEST

PURPOSE:

TO VERIFY THAT INVALID COMMAND STATUS, BIT 12 OF RMER2 SETS WHEN VOLUME VALID IS INACTIVE DURING A SEEK COMMAND.

PROCEDURE:

THE TEST RESETS VOLUME VALID BY SETTING AND RESETTING DIAGNOSTIC MODE, THEN EXECUTES A SEEK COMMAND AND VERIFIES THAT "IVC" STATUS IS SET.

TEST 55 ABORT SEEK TEST

PURPOSE:

TO VERIFY THAT THE RM80 INHIBITS A SEEK WHEN AN ABORT CONDITION EXISTS AT THE START OF THE COMMAND.

PROCEDURE:

THE TEST SETS AN ERROR IN THE ERROR REGISTER AND ISSUES A SEEK COMMAND, VERIFYING THAT "PIP" REMAINS INACTIVE.

TEST 56 SEEK AT OFFSET

PURPOSE:

TO VERIFY THAT OFFSET MODE DOES NOT CAUSE ERRORS DURING SEEK.

PROCEDURE:

THE TEST EXECUTES AN OFFSET COMMAND THEN EXECUTES A SEEK COMMAND, VERIFYING THE RESULTS OF THE SEEK.

TEST 57 LOOK AHEAD TEST

PURPOSE:

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TO INSURE THAT THE SECTOR COUNT WHICH ORIGINATES AT THE DRIVE AND IS VISIBLE THROUGH THE LOOK AHEAD REGISTER (RMLA) IS OPERATIONAL.

PROCEDURE:

WITH THE OFFSET REGISTER SET FOR 18 BIT FORMAT, THE PROGRAM SAMPLES THE LOOK AHEAD REGISTER AND COLLECTS EACH DIFFERENT SAMPLE UNTIL THE VALUE OF THE FIRST SAMPLE IS DETECTED OR UNTIL 31. SAMPLES ARE TAKEN. THE COLLECTION IS THEN TESTED TO DETERMINE THAT THE SECTOR COUNT INCREMENTS CORRECTLY THROUGH THE ENTIRE RANGE OF VALID SECTORS. THE SAME PROCEDURE IS REPEATED FOR 16 BIT FORMAT, WHERE THE LIMIT ON THE NUMBER OF SAMPLES IS 32. ALSO, 16 BIT FORMAT WITH SSEI SET, WHERE THE LIMIT ON THE NUMBER OF SAMPLES IS 33.

TEST 60 SEARCH ON CYLINDER

PURPOSE:

TO VERIFY THE EXECUTION OF SEARCH OPERATIONS WITH NO HEAD MOTION USING THE SECTOR PULSE FOR SECTOR COMPARE.

PROCEDURE:

THE TEST INTIALIZES AND RECALIBRATES THE DRIVE IF 'PIP' OR 'SKI' IS ACTIVE THEN SEEKS TO CYLINDER 0. THE TEST THEN DOES A SEARCH TO EACH SECTOR AND VERIFIES THAT THE SEARCH COMPLETES WITHOUT ERROR. THIS TEST IS DONE IN 16 BIT FORMAT WITH SSEI SET.

TEST 61 SEARCH OFF CYLINDER

PURPOSE:

TO VERIFY THE EXECUTION OF A SEARCH COMMAND WITH IMPLIED HEAD MOTION.

PROCEDURE:

THE DRIVE IS RECALIBRATED AND INITIALIZED IF THE DRIVE IS OFF CYLINDER OR HAS A SEEK ERROR. THE PROGRAM THEN EXECUTES AN EXPLICIT SEEK TO CYLINDER 279., FOLLOWED BY A SEARCH TO CYLINDER 280., TRACK 0, SECTOR 0. THE NEXT SECTOR IS SEARCHED FOR BY AN EXPLICIT SEEK TO CYLINDER 278., FOLLOWED BY A SEARCH TO CYLINDER 281., TRACK 0, SECTOR 1, ETC., UNTIL ALL SECTORS HAVE BEEN SEARCHED. THE TEST IS DONE FOR 16 BIT FORMAT WITH SSEI SET, WHERE THE LAST SECTOR SEARCHED IS 31.

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TEST 62 SEARCH INVALID SECTOR**PURPOSE:**

TO VERIFY THE DETECTION OF AN INVALID SECTOR ADDRESS DURING A SEARCH OPERATION.

PROCEDURE:

THE DRIVE IS RECALIBRATED AND INITIALIZED IF IT IS OFF CYLINDER OR HAS A SEEK ERROR. WITH THE OFFSET REGISTER SET FOR 18 BIT FORMAT, THE PROGRAM EXECUTES A SEARCH TO EACH INVALID SECTOR, I.E., SECTORS 30. AND 31. AND VERIFIES THAT INVALID ADDRESS ERROR SETS FOR EACH SECTOR. THIS TEST IS EXECUTED IN 16 BIT FORMAT, WHERE SECTOR 31. IS THE INVALID SECTOR

TEST 63 SEARCH INVALID TRACK**PURPOSE:**

TO VERIFY THE DETECTION OF AN INVALID TRACK ADDRESS DURING A SEARCH OPERATION.

PROCEDURE:

THE DRIVE IS RECALIBRATED AND INITIALIZED IF IT IS OFF CYLINDER OR HAS A SEEK ERROR. THE PROGRAM EXECUTES A SEARCH TO EACH INVALID TRACK ADDRESS WITH THE CYLINDER ADDRESS 0, AND SECTOR ADDRESS 0 AND VERIFIES THAT INVALID ADDRESS ERROR SETS FOR EACH TRACK.

TEST 64 SEARCH INVALID CYLINDER**PURPOSE:**

TO VERIFY THE DETECTION OF AN INVALID CYLINDER ADDRESS DURING A SEARCH OPERATION.

PROCEDURE:

THE DRIVE IS RECALIBRATED AND INITIALIZED IF IT IS OFF CYLINDER OR HAS A SEEK ERROR. THE PROGRAM THEN EXECUTES A SEARCH TO EACH INVALID CYLINDER ADDRESS AND VERIFIES THAT INVALID ADDRESS ERROR SETS FOR EACH CYLINDER.

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TEST 65 IVC SEARCH TEST

PURPOSE:

TO VERIFY THAT INVALID COMMAND STATUS SETS WHEN VOLUME VALID IS INACTIVE DURING A SEARCH COMMAND.

PROCEDURE:

VOLUME VALID IS RESET BY SETTING AND RESETTING DIAGNOSTIC MODE, AFTER WHICH THE TEST EXECUTES A SEARCH COMMAND, VERIFYING THAT "IVC" STATUS SETS.

TEST 66 ABORT SEARCH TEST

PURPOSE:

TO VERIFY THAT THE RM80 INHIBITS A SEARCH WHEN AN ABORT CONDITION EXISTS AT THE START OF THE COMMAND.

PROCEDURE:

THE TEST SETS AN ERROR IN THE ERROR REGISTER AND ISSUES A SEARCH COMMAND, VERIFYING THAT "PIP" REMAINS INACTIVE.

TEST 67 SEARCH AT OFFSET TEST

PURPOSE:

TO VERIFY THAT OFFSET MODE DOES NOT CAUSE SEARCH ERRORS.

PROCEDURE:

THE TEST EXECUTES AN OFFSET COMMAND, THEN EXECUTES A SEARCH COMMAND, VERIFYING THAT THERE ARE NO ERRORS DURING THE SEARCH.

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:*LAST REVISION 19-OCT-81
.TITLE CZRND AO RM80 FCTNL PT1
:*COPYRIGHT (C) 1982
:*DIGITAL EQUIPMENT CORPORATION
:*COLORADO SPGS., CO. 80919
:*
:*PROGRAM BY MIKE LEAVITT
:*
:*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
:*PACKAGE (MAINDEC-11-DZQAC-C5), 18-MAR-81

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.SBTTL OPERATIONAL SWITCH SETTINGS
:*
:*      SWITCH      USE
:*      -----
:*      15          HALT ON ERROR
:*      14          LOOP ON TEST
:*      13          INHIBIT ERROR TYPEOUTS
:*      12          UNUSED
:*      11          INHIBIT ITERATIONS
:*      10          BELL ON ERROR
:*      9           LOOP ON ERROR
:*      8           LOOP ON TEST IN SWR<7:0>
:*      7          TN128
:*      6          TN64
:*      5          TN32
:*      4          TN16
:*      3          TN8
:*      2          TN4
:*      1          TN2
:*      0          TN1

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478
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.SBTTL BASIC DEFINITIONS

```

:*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100  STACK = 1100
104000  ERROR = EMT          ;;BASIC DEFINITION OF ERROR CALL
000004  SCOPE = IOT         ;;BASIC DEFINITION OF SCOPE CALL

:*MISCELLANEOUS DEFINITIONS
000011  HT = 11           ;;CODE FOR HORIZONTAL TAB
000012  LF = 12           ;;CODE FOR LINE FEED
000015  CR = 15           ;;CODE FOR CARRIAGE RETURN
000200  CRLF = 200        ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776  PS = 177776      ;;PROCESSOR STATUS WORD
177776  PSW=PS
177774  STKLMT = 177774   ;;STACK LIMIT REGISTER
177772  PIRQ = 177772    ;;PROGRAM INTERRUPT REQUEST REGISTER
177570  DSWP = 177570    ;;HARDWARE SWITCH REGISTER
177570  DDISP = 177570   ;;HARDWARE DISPLAY REGISTER

:*GENERAL PURPOSE REGISTER DEFINITIONS
000000  R0 = %0          ;;GENERAL REGISTER
000001  R1 = %1          ;;GENERAL REGISTER
000002  R2 = %2          ;;GENERAL REGISTER
000003  R3 = %3          ;;GENERAL REGISTER

```

000004	R4	=	%4	::GENERAL REGISTER
000005	R5	=	%5	::GENERAL REGISTER
000006	R6	=	%6	::GENERAL REGISTER
000007	R7	=	%7	::GENERAL REGISTER
000006	SP	=	%6	::STACK POINTER
000007	PC	=	%7	::PROGRAM COUNTER

;*PRIORITY LEVEL DEFINITIONS

000000	PR0	=	0	::PRIORITY LEVEL 0
000040	PR1	=	40	::PRIORITY LEVEL 1
000100	PR2	=	100	::PRIORITY LEVEL 2
000140	PR3	=	140	::PRIORITY LEVEL 3
000200	PR4	=	200	::PRIORITY LEVEL 4
000240	PR5	=	240	::PRIORITY LEVEL 5
000300	PR6	=	300	::PRIORITY LEVEL 6
000340	PR7	=	340	::PRIORITY LEVEL 7

;'SWITCH REGISTER' SWITCH DEFINITIONS

100000	SW15	=	100000
040000	SW14	=	40000
020000	SW13	=	20000
010000	SW12	=	10000
004000	SW11	=	4000
002000	SW10	=	2000
001000	SW09	=	1000
000400	SW08	=	400
000200	SW07	=	200
000100	SW06	=	100
000040	SW05	=	40
000020	SW04	=	20
000010	SW03	=	10
000004	SW02	=	4
000002	SW01	=	2
000001	SW00	=	1
001000	SW9=SW09		
000400	SW8=SW08		
000200	SW7=SW07		
000100	SW6=SW06		
000040	SW5=SW05		
000020	SW4=SW04		
000010	SW3=SW03		
000004	SW2=SW02		
000002	SW1=SW01		
000001	SW0=SW00		

;*DATA BIT DEFINITIONS (BIT00 TO BIT15)

100000	BIT15	=	100000
040000	BIT14	=	40000
020000	BIT13	=	20000
010000	BIT12	=	10000
004000	BIT11	=	4000
002000	BIT10	=	2000
001000	BIT09	=	1000
000400	BIT08	=	400
000200	BIT07	=	200
000100	BIT06	=	100
000040	BIT05	=	40

```

000020 BIT04 = 20
000010 BIT03 = 10
000004 BIT02 = 4
000002 BIT01 = 2
000001 BIT00 = 1
001000 BIT9=BIT09
000400 BIT8=BIT08
000200 BIT7=BIT07
000100 BIT6=BIT06
000040 BIT5=BIT05
000020 BIT4=BIT04
000010 BIT3=BIT03
000004 BIT2=BIT02
000002 BIT1=BIT01
000001 BIT0=BIT00
    
```

```

;*BASIC "CPU" TRAP VECTOR ADDRESSES
000004 ERRVEC = 4 ;:TIME OUT AND OTHER ERRORS
000010 RESVEC = 10 ;:RESERVED AND ILLEGAL INSTRUCTIONS
000014 TBITVEC = 14 ;:'T' BIT
000014 TRTVEC = 14 ;:TRACE TRAP
000014 BPTVEC = 14 ;:BREAKPOINT TRAP (BPT)
000020 IOTVEC = 20 ;:INPUT/OUTPUT TRAP (IOT) **SCOPE**
000024 PWRVEC = 24 ;:POWER FAIL
000030 EMTVEC = 30 ;:EMULATOR TRAP (EMT) **ERROR**
000034 TRAPVEC = 34 ;:'TRAP' TRAP
000060 TKVEC = 60 ;:TTY KEYBOARD VECTOR
000064 TPVEC = 64 ;:TTY PRINTER VECTOR
000240 PIRQVEC = 240 ;:PROGRAM INTERRUPT REQUEST VECTOR
    
```

.SBTTL RM80 REGISTER BIT DEFINITIONS

;*RMCS1 CONTROL STATUS REGISTER

```

480
481
482
483
484
485 004000 DVA = BIT11 ;:DEVICE AVAILABLE-READ ONLY
486 000040 F4 = BIT05 ;:FUNCTION CODE
487 000020 F3 = BIT04 ;:FUNCTION CODE
488 000010 F2 = BIT03 ;:FUNCTION CODE
489 000004 F1 = BIT02 ;:FUNCTION CODE
490 000002 F0 = BIT01 ;:FUNCTION CODE
491 000001 GO = BIT00 ;:GO BIT
492 000077 FNCMSK = 000077 ;:FUNCTION CODE MASK
493
494
    
```

;*FUNCTION CODES (BITS 01-05 OF RMCS1)

```

495 000000 NOP = 000000 ;:NOP COMMAND
496 000002 ILF02 = 000002 ;:ILLEGAL COMMAND
497 000004 SEEK = 000004 ;:SEEK COMMAND
498 000006 RECAL = 000006 ;:RECALIBRATE COMMAND
499 000010 DRVCLR = 000010 ;:DRIVE CLEAR COMMAND
500 000012 RELEASE = 000012 ;:RELEASE COMMAND
501 000014 OFFSET = 000014 ;:OFFSET COMMAND
502 000016 RTC = 000016 ;:RETURN TO CENTERLINE COMMAND
503 000020 RIP = 000020 ;:READ IN PRESET COMMAND
504 000022 PAKACK = 000022 ;:PACK ACKNOWLEDGE COMMAND
505 000022 PACACK = PAKACK
506 000024 ILF24 = 000024 ;:ILLEGAL COMMAND
507 000026 ILF26 = 000026 ;:ILLEGAL COMMAND
    
```

508	000030	SEARCH = 000030	:SEARCH COMMAND
511	000030	ILF30 = 000030	:ILLEGAL COMMAND
	000032	ILF32 = 000032	:ILLEGAL COMMAND
	000034	ILF34 = 000034	:ILLEGAL COMMAND
	000036	ILF36 = 000036	:ILLEGAL COMMAND
	000040	ILF40 = 000040	:ILLEGAL COMMAND
	000042	ILF42 = 000042	:ILLEGAL COMMAND
	000044	ILF44 = 000044	:ILLEGAL COMMAND
	000046	ILF46 = 000046	:ILLEGAL COMMAND
512	000050	WCD = 000050	:WRITE CHECK DATA COMMAND
513	000052	WCH = 000052	:WRITE CHECK HEADER AND DATA
514	000054	ILF54 = 000054	:ILLEGAL COMMAND
515	000056	ILF56 = 000056	:ILLEGAL COMMAND
516	000060	WD = 000060	:WRITE DATA COMMAND
517	000062	WH = 000062	:WRITE HEADER AND DATA COMMAND
518	000064	ILF64 = 000064	:ILLEGAL COMMAND
519	000066	ILF66 = 000066	:ILLEGAL COMMAND
520	000070	RD = 000070	:READ DATA COMMAND
521	000072	RH = 000072	:READ HEADER AND DATA COMMAND
522	000074	ILF74 = 000074	:ILLEGAL COMMAND
523	000076	ILF76 = 000076	:ILLEGAL COMMAND
524			
525		:*RMDA DISK ADDRESS REGISTER	
526			
527		:TRACK ADDRESS DEFINITIONS	
528	004000	TA8 = BIT11	:TRACK ADDRESS 8.
529	002000	TA4 = BIT10	:TRACK ADDRESS 4
530	001000	TA2 = BIT09	:TRACK ADDRESS 2
531	000400	TA1 = BIT08	:TRACK ADDRESS 1
532			
533		:SECTOR ADDRESS DEFINITIONS	
534	000020	SA16 = BIT04	:SECTOR ADDRESS 16.
535	000010	SA8 = BIT03	:SECTOR ADDRESS 8.
536	000004	SA4 = BIT02	:SECTOR ADDRESS 4
537	000002	SA2 = BIT01	:SECTOR ADDRESS 2
538	000001	SA1 = BIT00	:SECTOR ADDRESS 1
539			
540		:TRACK & SECTOR MASKS	
541	177400	TADMSK = 177400	:TRACK ADDRESS MASK
542	000377	SADMSK = 000377	:SECTOR ADDRESS MASK
543			
544		:*RMDS DRIVE STATUS REGISTER	
545			
546	100000	ATA = BIT15	:ATTENTION ACTIVE
547	040000	ERR = BIT14	:COMPOSITE ERROR
548	020000	PIP = BIT13	:POSITIONING IN PROGRESS
549	010000	MOL = BIT12	:MEDIUM ON LINE
550	004000	WRL = BIT11	:WRITE LOCK
551	002000	LBT = BIT10	:LAST BLOCK TRANSFERRED
552	001000	PGM = BIT09	:PROGRAMMABLE
553	000400	DPR = BIT08	:DRIVE PRESENT
554	000200	DRY = BIT07	:DRIVE READY
555	000100	VV = BIT06	:VOLUME VALID
556	000001	OM = BIT00	:OFFSET MODE ACTIVE
557			
558		:*RMER1 ERROR REGISTER #1	
559			

560	100000	DCK	= BIT15	:DATA CHECK ERROR
561	040000	UNS	= BIT14	:DRIVE UNSAFE
562	020000	OPI	= BIT13	:OPERATION INCOMPLETE
563	010000	DTE	= BIT12	:DRIVE TIMING ERROR
564	004000	WLE	= BIT11	:WRITE LOCK ERROR
565	002000	IAE	= BIT10	:INVALID ADDRESS ERROR
566	001000	AOE	= BIT09	:ADDRESS OVERFLOW ERROR
567	000400	HCRC	= BIT08	:HEADER CRC ERROR
568	000200	HCE	= BIT07	:HEADER COMPARE ERROR
569	000100	ECH	= BIT06	:ECC 'HARD' ERROR
570	000040	WCF	= BIT05	:WRITE CLOCK FAILURE
571	000020	FER	= BIT04	:FORMAT ERROR
572	000010	PAR	= BIT03	:PARITY ERROR
573	000004	RMR	= BIT02	:REGISTER MODIFICATION REFUSED
574	000002	ILR	= BIT01	:ILLEGAL REGISTER
575	000001	ILF	= BIT00	:ILLEGAL FUNCTION
576				
577	115760	NDTMSK	= DCK!DTE!WLE!AOE!HCRC!HCE!ECH!WCF!FER	
578			: 'NDTMSK' IS USED TO MASK ERROR REGISTER 1 DURING NON - DATA	
579			: COMMANDS, I.E., HOUSEKEEPING AND POSITIONING COMMANDS	
580				
581			: *RMAS ATTENTION SUMMARY REGISTER	
582				
583	000377	ATMSK	= 377	: MASK FOR ATTENTION BITS
584				
585			: *RMLA LOOK AHEAD REGISTER	
586				
587	002000	SC4	= BIT10	: SECTOR COUNT = 16
588	001000	SC3	= BIT09	: SECTOR COUNT = 8
589	000400	SC2	= BIT08	: SECTOR COUNT = 4
590	000200	SC1	= BIT07	: SECTOR COUNT = 2
591	000100	SC0	= BIT06	: SECTOR COUNT = 1
592				
593	003700	SCTMSK	= 003700	: SECTOR COUNT MASK
594				
595			: *RMR1 MAINTENANCE REGISTER #1	
596				
597			: WRITE ONLY BITS	
598	100000	DBCK	= BIT15	: DEBUG CLOCK
599	040000	DBEN	= BIT14	: DEBUG CLOCK ENABLE
600	020000	DEBL	= BIT13	: DIAGNOSTIC END OF BLOCK
601	010000	DTO	= BIT12	: DIAGNOSTIC TIMEOUT
602	004000	MCLK	= BIT11	: MAINTENANCE CLOCK
603	002000	MRD	= BIT10	: READ DATA
604	001000	MUR	= BIT09	: UNIT READY
605	000400	MOC	= BIT08	: ON CYLINDER
606	000200	MSER	= BIT07	: SEEK ERROR
607	000100	MDF	= BIT06	: DRIVE FAULT
608	000040	MS	= BIT05	: SECTOR PULSE
609	000010	MWP	= BIT03	: WRITE PROTECT
610	000004	MI	= BIT02	: INDEX PULSE
611	000002	MSC	= BIT01	: SECTOR COMPARE
612	000001	DMD	= BIT00	: DIAGNOSTIC MODE
613				
614			: READ ONLY BITS	
615	100000	OCC	= BIT15	: OCCUPIED
616	040000	RG	= BIT14	: RUN AND GO

617	020000	EBL	= BIT13	:END OF BLOCK
618	010000	REX	= BIT12	:EXCEPTION
619	004000	ESRC	= BIT11	:ENABLE SEARCH
620	002000	PLFS	= BIT10	:LOOKING FOR SYNC
621	001000	ECRC	= BIT09	:ENABLE CRC OUT
622	000400	PDA	= BIT08	:DATA AREA
623	000200	PHA	= BIT07	:HEADER AREA
624	000100	CONT	= BIT06	:CONTINUE
625	000040	WC	= BIT05	:WORD CLOCK
626	000020	EECC	= BIT04	:ENABLE ECC OUT
627	000010	MWD	= BIT03	:WRITE DATA BIT
628	000004	LS	= BIT02	:LAST SECTOR
629	000002	LST	= BIT01	:LAST SECTOR AND TRACK
630	000001	DMD	= BIT00	:DIAGNOSTIC MODE
631				
632		:*RMDT DRIVE TYPE REGISTER		
633				
634	100000	NSA	= BIT15	:NOT SECTOR ADDRESSED = 0
635	040000	TAP	= BIT14	:TAPE DRIVE = 0
636	020000	MOH	= BIT13	:MOVING HEAD = 1
637	004000	DRQ	= BIT11	:DRIVE REQUEST REQUIRED
638				
639		:*RMOF OFFSET REGISTER		
640				
641	010000	FMT16	= BIT12	:16 BIT WORD FORMAT
642	004000	ECI	= BIT11	:ECC INHIBIT
643	002000	HCI	= BIT10	:HEADER COMPARE INHIBIT
644	001000	SSEI	= BIT09	:SKIP SECTOR ERROR INHIBIT
645	000200	OFD	= BIT07	:OFFSET FORWARD
646				
647		:*RMDC DESIRED CYLINDER ADDRESS REGISTER		
648				
649	001777	CYLMASK	= 001777	:MASK FOR CYLINDER ADDRESS
650				
651		:*RMR2 MAINTENANCE REGISTER #2		
652				
653		:READ ONLY BITS		
654	100000	RQA	= BIT15	:PORT A REQUEST
655	040000	ROB	= BIT14	:PORT B REQUEST
656	020000	TAG	= BIT13	:TAG CONTROL
657	010000	TST	= BIT12	:COMMAND SEQUENCE TEST BIT
658	004000	CC	= BIT11	:CONTROL OR CYLINDER TAG
659	002000	CH	= BIT10	:CONTROL OR HEAD TAG
660	001000	BB09	= BIT09	:TAG BUS
661	000400	BB08	= BIT08	:TAG BUS
662	000200	BB07	= BIT07	:TAG BUS
	000100	BB06	= BIT06	:TAG BUS
	000040	BB05	= BIT05	:TAG BUS
	000020	BB04	= BIT04	:TAG BUS
	000010	BB03	= BIT03	:TAG BUS
	000004	BB02	= BIT02	:TAG BUS
	000002	BB01	= BIT01	:TAG BUS
	000001	BB00	= BIT00	:TAG BUS
663				
664		:*RMR2 ERROR REGISTER 2		
665				
666	100000	BSE	= BIT15	:BAD SECTOR ERROR

667	040000	SKI	= BIT14	:SEEK INCOMPLETE
668	020000	OPE	= BIT13	:OPERATOR PLUG ERROR
669	010000	IVC	= BIT12	:INVALID COMMAND ERROR
670	004000	LSC	= BIT11	:LOSS OF SYSTEM CLOCK
671	002000	LBC	= BIT10	:LOSS OF BIT CLOCK
672	000200	DVC	= BIT07	:DEVICE CHECK
673	000040	SSE	= BIT05	:SKIP SECTOR ERROR
674	000010	DPE	= BIT03	:DATA PARITY ERROR
675				
676		.SBTTL	PROGRAM MNEMONICS	
677				
678	100000	MSE	= BIT15	:MANUFACTURING DETECTED SECTOR ERROR
679	040000	USE	= BIT14	:USER DETECTED SECTOR ERROR
680	020000	SSF	= BIT13	:SKIP SECTOR FAILURE
681				
682		.SBTTL	RM80 REGISTER INDEX VALUES	
683				
684	000000	RMCS1	= 00	:CONTROL STATUS REGISTER #1
685	000006	RMDA	= 06	:DISK ADDRESS REGISTER
686	000012	RMDS	= 12	:DRIVE STATUS REGISTER
687	000014	RMER1	= 14	:ERROR REGISTER #1
688	000016	RMAS	= 16	:ATTENTION SUMMARY REGISTER
689	000020	RMLA	= 20	:LOOK AHEAD REGISTER
690	000024	RMMR1	= 24	:MAINTENANCE REGISTER
691	000026	RMDT	= 26	:DRIVE TYPE REGISTER
692	000030	RMSN	= 30	:SERIAL NUMBER REGISTER
693	000032	RMOF	= 32	:OFFSET REGISTER
694	000034	RMDC	= 34	:DESIRED CYLINDER REGISTER
695	000036	RMHR	= 36	:HOLDING REGISTER
696	000040	RMMR2	= 40	:MAINTENANCE REGISTER #2
697	000042	RMER2	= 42	:ERROR REGISTER #2
698	000044	RMEC1	= 44	:ECC POSITION REGISTER
699	000046	RMEC2	= 46	:ECC PATTERN REGISTER
700	000050	ILRG50	= 50	:ILLEGAL REGISTER 50
701	000052	ILRG52	= 52	:ILLEGAL REGISTER 52
702	000054	ILRG54	= 54	:ILLEGAL REGISTER 54
	000056	ILRG56	= 56	:ILLEGAL REGISTER 56
	000060	ILRG60	= 60	:ILLEGAL REGISTER 60
	000062	ILRG62	= 62	:ILLEGAL REGISTER 62
	000064	ILRG64	= 64	:ILLEGAL REGISTER 64
	000066	ILRG66	= 66	:ILLEGAL REGISTER 66
	000070	ILRG70	= 70	:ILLEGAL REGISTER 70
	000072	ILRG72	= 72	:ILLEGAL REGISTER 72
	000074	ILRG74	= 74	:ILLEGAL REGISTER 74
	000076	ILRG76	= 76	:ILLEGAL REGISTER 76
703				
704	000077	IDXMSK	= 77	:MASK FOR REGISTER INDEX NUMBER
705				
706		.SBTTL	RH CONTROLLER REGISTER BIT DEFINITIONS	
707				
708		:*RMCS1	CONTROL STATUS REGISTER #1	
709				
710	100000	SC	= BIT15	:SPECIAL CONDITION-READ ONLY
711	040000	TRE	= BIT14	:TRANSFER ERROR
712	020000	MCPE	= BIT13	:MASSBUS CONTROL BUS PARITY ERROR-READ ONLY
713	002000	PSEL	= BIT10	:PORT B SELECT
714	001000	A17	= BIT09	:ADDRESS EXTENSION

715	000400	A16	= BIT08	:ADDRESS EXTENSION
716	000200	RDY	= BIT07	:READY-READ ONLY
717	000100	IE	= BIT06	:INTERRUPT ENABLE
718				
719		:*RMCS2 RH CONTROL STATUS REGISTER #2		
720				
721	100000	DLT	= BIT15	:DATA LATE-READ ONLY
722	040000	WCE	= BIT14	:WRITE CHECK ERROR-READ ONLY
723	020000	UPE	= BIT13	:UNIBUS PARITY ERROR
724	010000	NED	= BIT12	:NONEXISTANT DRIVE-READ ONLY
725	004000	NEM	= BIT11	:NONEXISTANT MEMORY-READ ONLY
726	002000	PGE	= BIT10	:PROGRAM ERROR-READ ONLY
727	001000	MXF	= BIT09	:MISSED TRANSFER
728	000400	MDPE	= BIT08	:MASSBUS DATA BUS PARITY ERROR-READ ONLY
729	000200	OR	= BIT07	:OUTPUT READY-READ ONLY
730	000100	IR	= BIT06	:INPUT READY-READ ONLY
731	000040	CLR	= BIT05	:CONTROLLER CLEAR
732	000020	PAT	= BIT04	:PARITY TEST
733	000010	BAI	= BIT03	:UNIBUS ADDRESS INCREMENT INHIBIT
736	000004	U2	= BIT02	:UNIT SELECT
	000002	U1	= BIT01	:UNIT SELECT
	000001	U0	= BIT00	:UNIT SELECT
737				
738		:UNIT SELECT MASK		
739				
740	000007	UNTMSK	= 7	:UNIT SELECT MASK
741				
742		:*RMCS3 RH70 CONTROL STATUS REGISTER #3		
743				
744	100000	APE	= BIT15	:ADDRESS PARITY ERROR
745	040000	DPEHI	= BIT14	:DATA PARITY ERROR HIGH WORD
746	020000	DPELO	= BIT13	:DATA PARITY ERROR LOW WORD
747	010000	WCEHI	= BIT12	:WRITE CHECK ERROR HIGH WORD
748	004000	WCELO	= BIT11	:WRITE CHECK ERROR LOW WORD
749	002000	DBL	= BIT10	:DOUBLE WORD TRANSFER
750	000100	IE	= BIT06	:INTERRUPT ENABLE
751	000010	IPCK3	= BIT03	:INVERT PARITY CHECK
752	000004	IPCK2	= BIT02	:INVERT PARITY CHECK
753	000002	IPCK1	= BIT01	:INVERT PARITY CHECK
754	000001	IPCK0	= BIT00	:INVERT PARITY CHECK
755				
756		.SBTTL RH CONTROLLER REGISTER INDEX VALUES		
757				
758	000000	RMCS1	= 00	:CONTROL, STATUS REGISTER #1
759	000002	RMWC	= 02	:WORD COUNT REGISTER
760	000004	RMBA	= 04	:BUS ADDRESS REGISTER
761	000010	RMCS2	= 10	:CONTROL, STATUS REGISTER #2
762	000022	RMDB	= 22	:DATA BUFFER
763	000050	RMBAE	= 50	:BUS ADDRESS EXTENSION
764	000052	RMCS3	= 52	:CONTROL, STATUS REGISTER #3
765				
766	176700	ABASE	= 176700	:UNIBUS ADDRESS
767	120254	AVECT1	= 120254	:UNIBUS VECTOR ADDRESS AND PRIORITY
768				

```

1          .SBTTL TRAP CATCHER
          .=0
          : *ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
          : *SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
          : *LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
          000000
          000174
000174 000000
000176 000000
          .=174
DISPREG: .WORD 0          ;;SOFTWARE DISPLAY REGISTER
SWREG:   .WORD 0          ;;SOFTWARE SWITCH REGISTER

          .SBTTL STARTING ADDRESS(ES)
000200 000137 005426      JMP      @#START          ;;JUMP TO STARTING ADDRESS OF PROGRAM
2
3 000204 000137 005416      JMP      @#START1         ;CHANGE RH/RM BUS ADDRESS
4
5          .SBTTL ACT11 HOOKS
          : *****
          : HOOKS REQUIRED BY ACT11
          000210          $SVPC=.          ;SAVE PC
          000046          .=46
          041512          $ENDAD          ;;1)SET LOC.46 TO ADDRESS OF SENDAD IN .SEOP
          000052          .=52
          000000          .WORD 0          ;;2)SET LOC.52 TO ZERO
          000210          .=$SVPC          ;; RESTORE PC
6
7          .=1100
8          .SBTTL APT PARAMETER BLOCK
          : *****
          : SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
          : *****
          001100          .SX=.          ;;SAVE CURRENT LOCATION
          000024          .=24          ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024 000200          200          ;;FOR APT START UP
          000044          .=44          ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044 001100          $APTHDR          ;;POINT TO APT HEADER BLOCK
          001100          .=$X          ;;RESET LOCATION COUNTER
          : *****
          : SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
          : INTERFACE SPEC.
          001100          $APTHD:
          001100 000000          $HIBTS: .WORD 0          ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
          001102 001222          $MBADR: .WORD $MAIL          ;;ADDRESS OF APT MAILBOX (BITS 0-15)
          001104 000024          $STMT: .WORD 20.          ;;RUN TIM OF LONGEST TEST
          001106 000024          $PASTM: .WORD 20.          ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
          001110 000024          $UNITM: .WORD 20.          ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDED UNIT
          001112 000042          .WORD $ETEND-$MAIL/2          ;;LENGTH MAILBOX-ETABLE(WORDS)
9          TAGADR=.
  
```

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.SBTTL COMMON TAGS

*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
*USED IN THE PROGRAM.

001114	001114			SCMTAG: .TAGADR	::START OF COMMON TAGS
001114	000000			.WORD 0	
001116	000			\$TSTNM: .BYTE 0	::CONTAINS THE TEST NUMBER
001117	000			\$ERFLG: .BYTE 0	::CONTAINS ERROR FLAG
001120	000000			\$ICNT: .WORD 0	::CONTAINS SUBTEST ITERATION COUNT
001122	000000			\$LPADR: .WORD 0	::CONTAINS SCOPE LOOP ADDRESS
001124	000000			\$LPERR: .WORD 0	::CONTAINS SCOPE RETURN FOR ERRORS
001126	000000			\$ERTTL: .WORD 0	::CONTAINS TOTAL ERRORS DETECTED
001130	000			\$ITEMB: .BYTE 0	::CONTAINS ITEM CONTROL BYTE
001131	001			\$ERMAX: .BYTE 1	::CONTAINS MAX. ERRORS PER TEST
001132	000000			\$ERRPC: .WORD 0	::CONTAINS PC OF LAST ERROR INSTRUCTION
001134	000000			\$GDADR: .WORD 0	::CONTAINS ADDRESS OF 'GOOD' DATA
001136	000000			\$BDADR: .WORD 0	::CONTAINS ADDRESS OF 'BAD' DATA
001140	000000			\$GDDAT: .WORD 0	::CONTAINS 'GOOD' DATA
001142	000000			\$BDDAT: .WORD 0	::CONTAINS 'BAD' DATA
001144	000000			.WORD 0	::RESERVED--NOT TO BE USED
001146	000000			.WORD 0	
001150	000			\$AUTOB: .BYTE 0	::AUTOMATIC MODE INDICATOR
001151	000			\$INTAG: .BYTE 0	::INTERRUPT MODE INDICATOR
001152	000000			.WORD 0	
001154	177570			\$SWR: .WORD DSWR	::ADDRESS OF SWITCH REGISTER
001156	177570			\$DISPLAY: .WORD DDISP	::ADDRESS OF DISPLAY REGISTER
001160	177560			\$TKS: 177560	::TTY KBD STATUS
001162	177562			\$TKB: 177562	::TTY KBD BUFFER
001164	177564			\$TPS: 177564	::TTY PRINTER STATUS REG. ADDRESS
001166	177566			\$TPB: 177566	::TTY PRINTER BUFFER REG. ADDRESS
001170	000			\$NULL: .BYTE 0	::CONTAINS NULL CHARACTER FOR FILLS
001171	002			\$FILLS: .BYTE 2	::CONTAINS # OF FILLER CHARACTERS REQUIRED
001172	012			\$FILLC: .BYTE 12	::INSERT FILL CHARS. AFTER A 'LINE FEED'
001173	000			\$TPFLG: .BYTE 0	::'TERMINAL AVAILABLE' FLAG (BIT<07>=0=YES)
001174	000000			\$TMP0: .WORD 0	::USER DEFINED
001176	000000			\$TMP1: .WORD 0	::USER DEFINED
001200	000000			\$TMP2: .WORD 0	::USER DEFINED
001202	000000			\$TMP3: .WORD 0	::USER DEFINED
001204	000000			\$TMP4: .WORD 0	::USER DEFINED
001206	000000			\$TIMES: 0	::MAX. NUMBER OF ITERATIONS
001210	000000			\$ESCAPE: 0	::ESCAPE ON ERROR ADDRESS
001212	207	377	377	\$BELL: .ASCIZ <207><377><377>	::CODE FOR BELL
001216	077			\$QUES: .ASCII /?/	::QUESTION MARK
001217	015			\$CRLF: .ASCII <15>	::CARRIAGE RETURN
001220	012	000		\$LF: .ASCIZ <12>	::LINE FEED

.SBTTL APT MAILBOX-ETABLE

001222				\$.EVEN	
001222	000000			\$MAIL: .WORD	::APT MAILBOX
001224	000000			\$MSGTY: .WORD	AMSGTY ::MESSAGE TYPE CODE
001226	000000			\$FATAL: .WORD	AFATAL ::FATAL ERROR NUMBER
				\$TESTN: .WORD	ATESTN ::TEST NUMBER

001230	000000	\$PASS:	.WORD	APASS	::PASS COUNT
001232	000000	\$DEVCT:	.WORD	ADEVCT	:::DEVICE COUNT
001234	000000	\$UNIT:	.WORD	AUNIT	:::I/O UNIT NUMBER
001236	000000	\$MSGAD:	.WORD	AMSGAD	:::MESSAGE ADDRESS
001240	000000	\$MSGLG:	.WORD	AMSLG	:::MESSAGE LENGTH
001242		SETABLE:			:::APT ENVIRONMENT TABLE
001242	000	\$ENV:	.BYTE	AENV	:::ENVIRONMENT BYTE
001243	000	\$ENVM:	.BYTE	AENVM	:::ENVIRONMENT MODE BITS
001244	000000	\$SWREG:	.WORD	ASWREG	:::APT SWITCH REGISTER
001246	000000	\$USWR:	.WORD	AUSWR	:::USER SWITCHES
001250	000000	\$CPUOP:	.WORD	ACPUOP	:::CPU TYPE,OPTIONS
		*			BITS 15-11=CPU TYPE
		*			11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
		*			11/70=06,PDQ=07,Q=10
		*			BIT 10=REAL TIME CLOCK
		*			BIT 9=FLOATING POINT PROCESSOR
		*			BIT 8=MEMORY MANAGEMENT
001252	000	\$MAMS1:	.BYTE	AMAMS1	:::HIGH ADDRESS,M.S. BYTE
001253	000	\$MTYP1:	.BYTE	AMTYP1	:::MEM. TYPE,BLK#1
		*			MEM.TYPE BYTE -- (HIGH BYTE)
		*			900 NSEC CORE=001
		*			300 NSEC BIPOLAR=002
		*			500 NSEC MOS=003
001254	000000	\$MADR1:	.WORD	AMADR1	:::HIGH ADDRESS,BLK#1
		*			MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF 'TYPE' ABOVE
001256	000	\$MAMS2:	.BYTE	AMAMS2	:::HIGH ADDRESS,M.S. BYTE
001257	000	\$MTYP2:	.BYTE	AMTYP2	:::MEM. TYPE,BLK#2
001260	000000	\$MADR2:	.WORD	AMADR2	:::MEM.LAST ADDRESS,BLK#2
001262	000	\$MAMS3:	.BYTE	AMAMS3	:::HIGH ADDRESS,M.S.BYTE
001263	000	\$MTYP3:	.BYTE	AMTYP3	:::MEM. TYPE,BLK#3
001264	000000	\$MADR3:	.WORD	AMADR3	:::MEM.LAST ADDRESS,BLK#3
001266	000	\$MAMS4:	.BYTE	AMAMS4	:::HIGH ADDRESS,M.S.BYTE
001267	000	\$MTYP4:	.BYTE	AMTYP4	:::MEM. TYPE,BLK#4
001270	000000	\$MADR4:	.WORD	AMADR4	:::MEM.LAST ADDRESS,BLK#4
001272	120254	\$VECT1:	.WORD	AVECT1	:::INTERRUPT VECTOR#1,BUS PRIORITY#1
001274	000000	\$VECT2:	.WORD	AVECT2	:::INTERRUPT VECTOR#2BUS PRIORITY#2
001276	176700	\$BASE:	.WORD	ABASE	:::BASE ADDRESS OF EQUIPMENT UNDER TEST
001300	000000	\$DEVN:	.WORD	ADEVN	:::DEVICE MAP
001302	000000	\$CDW1:	.WORD	ACDW1	:::CONTROLLER DESCRIPTION WORD#1
001304	000000	\$CDW2:	.WORD	ACDW2	:::CONTROLLER DESCRIPTION WORD#2
001306	000000	\$DDW0:	.WORD	ADDW0	:::DEVICE DESCRIPTOR WORD#0
001310	000000	\$DDW1:	.WORD	ADDW1	:::DEVICE DESCRIPTOR WORD#1
001312	000000	\$DDW2:	.WORD	ADDW2	:::DEVICE DESCRIPTOR WORD#2
001314	000000	\$DDW3:	.WORD	ADDW3	:::DEVICE DESCRIPTOR WORD#3
001316	000000	\$DDW4:	.WORD	ADDW4	:::DEVICE DESCRIPTOR WORD#4
001320	000000	\$DDW5:	.WORD	ADDW5	:::DEVICE DESCRIPTOR WORD#5
001322	000000	\$DDW6:	.WORD	ADDW6	:::DEVICE DESCRIPTOR WORD#6
001324	000000	\$DDW7:	.WORD	ADDW7	:::DEVICE DESCRIPTOR WORD#7
001326		SETEND:			
		.MEXIT			

.SBTTL USER DEFINED TAGS

001326	000000	CHGADR: .WORD	0	:CHANGE RH/RM BUS ADDRESS = -1, NO CHANGE = 0
001330	000000	MANUAL: .WORD	0	:ENABLE MANUAL INTERVENTION TEST(S) = 1
001332	000000	XXDP: .WORD	0	:THE LOW BYTE CONTAINS THE DRIVE NUMBER FROM WHICH :THE PROGRAM WAS LOADED. THE HIGH BYTE CONTAINS THE :'XXDP' DEVICE CODE FOR THE RM80.
001334	000	LSTRK: .BYTE	0	:LO BYTE = 0
001335	000	.BYTE	0	:HI BYTE, CONTAINS LAST TRACK ADDRESS OF UNIT :UNDER TEST. RM80 = 13.

:THE REGISTER INPUT BUFFER IS USED FOR
 :STORING DRIVE STATUS

001336

GETBUF:

		:REGISTER INPUT BUFFER		
001336	000000	RMCS1I: .WORD	0	:CONTROL, STATUS REGISTER #1
001340	000000	RMWCI: .WORD	0	:WORD COUNT REGISTER
001342	000000	RMBAI: .WORD	0	:BUS ADDRESS REGISTER
001344	000000	RMDAI: .WORD	0	:DISK ADDRESS REGISTER
001346	000000	RMCS2I: .WORD	0	:CONTROL, STATUS REGISTER #2
001350	000000	RMDSI: .WORD	0	:DRIVE STATUS REGISTER
001352	000000	RMER1I: .WORD	0	:ERROR REGISTER #1
001354	000000	RMASI: .WORD	0	:ATTENTION SUMMARY REGISTER
001356	000000	RMLAI: .WORD	0	:LOOK AHEAD REGISTER
001360	000000	RMDBI: .WORD	0	:DATA BUFFER
001362	000000	RMMR1I: .WORD	0	:MAINTENANCE REGISTER #1
001364	000000	RMDTI: .WORD	0	:DRIVE TYPE REGISTER
001366	000000	RMSNI: .WORD	0	:SERIAL NUMBER REGISTER
001370	000000	RMOFI: .WORD	0	:OFFSET REGISTER
001372	000000	RMDCI: .WORD	0	:DESIRED CYLINDER REGISTER
001374	000000	RMHRI: .WORD	0	:HOLDING REGISTER
001376	000000	RMMR2I: .WORD	0	:MAINTENANCE REGISTER #2
001400	000000	RMER2I: .WORD	0	:ERROR REGISTER #2
001402	000000	RMEC1I: .WORD	0	:ECC POSITION REGISTER
001404	000000	RMEC2I: .WORD	0	:ECC PATTERN REGISTER
001406	000000	RMBAEI: .WORD	0	:BUS ADDRESS EXTENSION REGISTER
001410	000000	RMCS3I: .WORD	0	:CONTROL, STATUS REGISTER #3

:THE REGISTER OUTPUT BUFFER IS USED FOR
 :ASSEMBLING DATA GOING TO REGISTER

001412

PUTBUF:

		:REGISTER OUTPUT BUFFER		
001412	000000	RMCS1O: .WORD	0	:CONTROL, STATUS REGISTER #1
001414	000000	RMWCO: .WORD	0	:WORD COUNT REGISTER
001416	000000	RMBAO: .WORD	0	:BUS ADDRESS REGISTER
001420	000000	RMDAO: .WORD	0	:DISK ADDRESS REGISTER
001422	000000	RMCS2O: .WORD	0	:CONTROL, STATUS REGISTER #2
001424	000000	RMDSO: .WORD	0	:DRIVE STATUS REGISTER
001426	000000	RMER1O: .WORD	0	:ERROR REGISTER #1
001430	000000	RMASO: .WORD	0	:ATTENTION SUMMARY REGISTER
001432	000000	RMLAO: .WORD	0	:LOOK AHEAD REGISTER
001434	000000	RMDBO: .WORD	0	:DATA BUFFER
001436	000000	RMMR1O: .WORD	0	:MAINTENANCE REGISTER #1

001440	000000	RMDTO: .WORD	0	:DRIVE TYPE REGISTER
001442	000000	RMSNO: .WORD	0	:SERIAL NUMBER REGISTER
001444	000000	RMOFO: .WORD	0	:OFFSET REGISTER
001446	000000	RMDCO: .WORD	0	:DESIRED CYLINDER REGISTER
001450	000000	RMHRO: .WORD	0	:HOLDING REGISTER
001452	000000	RMMR20: .WORD	0	:MAINTENANCE REGISTER #2
001454	000000	RMER20: .WORD	0	:ERROR REGISTER #2
001456	000000	RMEC10: .WORD	0	:ECC POSITION REGISTER
001460	000000	RMEC20: .WORD	0	:ECC PATTERN REGISTER
001462	000000	RMBAEO: .WORD	0	:BUS ADDRESS EXTENSION REGISTER
001464	000000	RMCS30: .WORD	0	:CONTROL, STATUS REGISTER #3

:EACH WORD OF THE TEST QUE CONTAINS THE DEVICE NUMBER IN
 :THE LOW BYTE AND THE ATTENTION BIT IN THE HIGH BYTE. THE
 :FIRST WORD CONTAINS THE ADDRESS OF THE DEVICE UNDER TEST
 :IN THE TABLE. A ZERO WORD IS A BLANK AND REPRESENTS THE
 :END OF THE QUE.

001466	000000	TSTQUE: .WORD	0	:CONTAINS DEVICE POINTER
001470		.BLKW	8.	:TEST QUE FOR DEVICES UNDER TEST
001510	000000	.WORD	0	:TABLE TERMINATOR GOES HERE WHEN :ALL 8. DEVICES ARE UNDER TEST.

001512	000000	CLKADR: .WORD	0	:UNIBUS ADDRESS OF KW11 CLOCK
001514	000000	CLKVCT: .WORD	0	:VECTOR ADDRESS OF KW11 CLOCK

001516		GETINX: .BLKB	23.	:THE GET INDEX TABLE CONTAINS A BYTE LIST OF REGISTERS WHICH :ARE READ BY THE GET SUBROUTINE. THE LIST IS TERMINATED BY :A NEGATIVE BYTE. :GET INDEX TABLE
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001545		PUTINX: .BLKB	23.	:THE PUT INDEX TABLE ICONTAINS A BYTE LIST OF REGISTERS WHICH :ARE WRITTEN BY THE PUT SUBROUTINE. THE LIST IS TERMINATED BY :A NEGATIVE BYTE. :PUT INDEX TABLE
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:PUT TAGS HERE

.SBTTL ERROR POINTER TABLE

;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
 ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
 ;*LOCATION \$ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
 ;*NOTE1: IF \$ITEMB IS 0 THE ONLY PERTINENT DATA IS (\$ERRPC).
 ;*NOTE2: EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

;* EM ;:POINTS TO THE ERROR MESSAGE
 ;* DH ;:POINTS TO THE DATA HEADER
 ;* DT ;:POINTS TO THE DATA
 ;* DF ;:POINTS TO THE DATA FORMAT

001574

1
2
3

001574 070112
 001576 074256
 001600 074406
 001602 074476

\$ERRTB:

;ERROR 1 WRONG UNIT SELECTED

EMT1
 EHT1
 EDT1
 EFT1

4
5
6

001604 070116
 001606 074256
 001610 074406
 001612 074476

;ERROR 2 DEVICE WENT UNAVAILABLE

EMT2
 EHT1
 EDT1
 EFT1

7
8
9

001614 070124
 001616 074256
 001620 074406
 001622 074476

;ERROR 3 DEVICE WENT NON-EXISTENT

EMT3
 EHT1
 EDT1
 EFT1

10
11
12

001624 070132
 001626 074256
 001630 074406
 001632 074476

;ERROR 4 CONTROLLER NOT READY

EMT4
 EHT1
 EDT1
 EFT1

13
14
15

001634 070140
 001636 074256
 001640 074406
 001642 074476

;ERROR 5 DRIVE NOT READY AND GO NOT RESET

EMT5
 EHT1
 EDT1
 EFT1

16
17

;ERROR 6 UNEXPECTED VALUE FOR 'ATA' STATUS

18	001644	070146	EMT6	
	001646	074256	EHT1	
	001650	074406	EDT1	
	001652	074476	EFT1	
19				
20			:ERROR 7	BUS TIMEOUT TRYING TO READ OR WRITE REGISTER
21	001654	070154	EMT7	
	001656	000000	0	
	001660	000000	0	
	001662	000000	0	
22				
23			:ERROR 10	DRIVE NOT READY BUT GO IS RESET
24	001664	070162	EMT10	
	001666	074256	EHT1	
	001670	074406	EDT1	
	001672	074476	EFT1	
25				
26			:ERROR 11	GO NOT RESET BUT DRIVE IS READY
27	001674	070166	EMT11	
	001676	074256	EHT1	
	001700	074406	EDT1	
	001702	074476	EFT1	
28				
29			:ERROR 12	INCORRECT FUNCTION CODE
30	001704	070172	EMT12	
	001706	074256	EHT1	
	001710	074406	EDT1	
	001712	074476	EFT1	
31				
32			:ERROR 13	PARITY ERROR READING REMOTE REGISTERS
33	001714	070200	EMT13	
	001716	074256	EHT1	
	001720	074406	EDT1	
	001722	074476	EFT1	
34				
35			:ERROR 14	TRANSFER ERROR IS INCORRECT
36	001724	070212	EMT14	
	001726	074256	EHT1	
	001730	074406	EDT1	
	001732	074476	EFT1	
37				
38			:ERROR 15	INCORRECT WORD COUNT
39				

	001734	070220		EMT15
	001736	074256		EHT1
	001740	074406		EDT1
	001742	074476		EFT1
40				
41			;ERROR 16	INCORRECT BUS ADDRESS
42				
	001744	070226		EMT16
	001746	074256		EHT1
	001750	074406		EDT1
	001752	074476		EFT1
43				
44			;ERROR 17	INCORRECT LBT STATUS
45				
	001754	070236		EMT17
	001756	074256		EHT1
	001760	074406		EDT1
	001762	074476		EFT1
46				
47			;ERROR 20	INCORRECT AOE
48				
	001764	070246		EMT20
	001766	074256		EHT1
	001770	074406		EDT1
	001772	074476		EFT1
49				
50			;ERROR 21	INCORRECT DISK ADDRESS
51				
	001774	070256		EMT21
	001776	074256		EHT1
	002000	074406		EDT1
	002002	074476		EFT1
52				
53			;ERROR 22	INCORRECT CYLINDER ADDRESS
54				
	002004	070266		EMT22
	002006	074256		EHT1
	002010	074406		EDT1
	002012	074476		EFT1
55				
56			;ERROR 23	INCORRECT WLE STATUS
57				
	002014	070276		EMT23
	002016	074256		EHT1
	002020	074406		EDT1
	002022	074476		EFT1
58				
59			;ERROR 24	INCORRECT UPE STATUS
60				
	002024	070306		EMT24

	002026	074256		EMT1	
	002030	074406		EDT1	
	002032	074476		EFT1	
61					
62			:ERROR	25	INCORRECT WCF STATUS
63					
	002034	070316		EMT25	
	002036	074256		EHT1	
	002040	074406		EDT1	
	002042	074476		EFT1	
64					
65			:ERROR	26	INCORRECT WCE STATUS
66					
	002044	070326		EMT26	
	002046	074256		EHT1	
	002050	074406		EDT1	
	002052	074476		EFT1	
67					
68			:ERROR	27	INCORRECT MDPE STATUS
69					
	002054	070336		EMT27	
	002056	074256		EHT1	
	002060	074406		EDT1	
	002062	074476		EFT1	
70					
71			:ERROR	30	INCORRECT DCK STATUS
72					
	002064	070346		EMT30	
	002066	074256		EHT1	
	002070	074406		EDT1	
	002072	074476		EFT1	
73					
74			:ERROR	31	INCORRECT ECH STATUS
75					
	002074	070356		EMT31	
	002076	074256		EHT1	
	002100	074406		EDT1	
	002102	074476		EFT1	
76					
77			:ERROR	32	DLT SHOULD NOT BE SET
78					
	002104	070366		EMT32	
	002106	074256		EHT1	
	002110	074406		EDT1	
	002112	074476		EFT1	
79					
80			:ERROR	33	MXF SHOULD NOT BE SET
81					
	002114	070376		EMT33	
	002116	074256		EHT1	

	002120	074406	EDT1	
	002122	074476	EFT1	
82				
83				:ERROR 34 DTE SHOULD NOT BE SET
84				
	002124	070406	EMT34	
	002126	074256	EHT1	
	002130	074406	EDT1	
	002132	074476	EFT1	
85				
86				:ERROR 35 INCORRECT HCRC STATUS
87				
	002134	070416	EMT35	
	002136	074256	EHT1	
	002140	074406	EDT1	
	002142	074476	EFT1	
88				
89				:ERROR 36 INCORRECT HCE STATUS
90				
	002144	070426	EMT36	
	002146	074256	EHT1	
	002150	074406	EDT1	
	002152	074476	EFT1	
91				
92				:ERROR 37 INCORRECT FER STATUS
93				
	002154	070436	EMT37	
	002156	074256	EHT1	
	002160	074406	EDT1	
	002162	074476	EFT1	
94				
95				:ERROR 40 DPE SHOULD NOT BE SET (NOT A DATA COMMAND)
96				
	002164	070446	EMT40	
	002166	074256	EHT1	
	002170	074406	EDT1	
	002172	074476	EFT1	
97				
98				:ERROR 41 LOST 'MOL' DURING PACK ACKNOWLEDGE
99				
	002174	070454	EMT41	
	002176	074256	EHT1	
	002200	074406	EDT1	
	002202	074476	EFT1	
100				
101				:ERROR 42 UNSAFE ERROR DURING PACK ACKNOWLEDGE
102				
	002204	070464	EMT42	
	002206	074256	EHT1	
	002210	074406	EDT1	

	002212	074476	EFT1	
103				
104			:ERROR 43	'OPI' ERROR DURING PACK ACKNOWLEDGE
105				
	002214	070476	EMT43	
	002216	074256	EHT1	
	002220	074406	EDT1	
	002222	074476	EFT1	
106				
107			:ERROR 44	'RMR' ERROR DURING PACK ACKNOWLEDGE
108				
	002224	070506	EMT44	
	002226	074256	EHT1	
	002230	074406	EDT1	
	002232	074476	EFT1	
109				
110			:ERROR 45	'ILR' ERROR DURING PACK ACKNOWLEDGE
111				
	002234	070516	EMT45	
	002236	074256	EHT1	
	002240	074406	EDT1	
	002242	074476	EFT1	
112				
113			:ERROR 46	'ILF' ERROR DURING PACK ACKNOWLEDGE
114				
	002244	070526	EMT46	
	002246	074256	EHT1	
	002250	074406	EDT1	
	002252	074476	EFT1	
115				
116			:ERROR 47	COMPOSITE ERROR STATUS IS INCORRECT
117				
	002254	070536	EMT47	
	002256	074256	EHT1	
	002260	074406	EDT1	
	002262	074476	EFT1	
118				
119			:ERROR 50	PARITY ERROR WRITING REMOTE REGISTERS
120				
	002264	070544	EMT50	
	002266	074256	EHT1	
	002270	074406	EDT1	
	002272	074476	EFT1	
121				
122			:ERROR 51	INCORRECT IAE STATUS DURING SEEK COMMAND
123				
	002274	070554	EMT51	
	002276	074256	EHT1	
	002300	074406	EDT1	
	002302	074476	EFT1	

124				
125			:ERROR 52	OPI ERROR DURING SEEK - MEDIUM IS NOT ON LINE
126				
	002304	070566	EMT52	
	002306	074256	EHT1	
	002310	074406	EDT1	
	002312	074476	EFT1	
127				
128			:ERROR 53	OPI ERROR DURING SEEK - MEDIUM IS ON LINE, ASSUME
129			:	ON CYLINDER LATCH DIDN'T RESET
130				
	002314	070604	EMT53	
	002316	074256	EHT1	
	002320	074406	EDT1	
	002322	074476	EFT1	
131				
132			:ERROR 54	SEEK INCOMPLETE ERROR DURING SEEK COMMAND
133				
	002324	070622	EMT54	
	002326	074256	EHT1	
	002330	074406	EDT1	
	002332	074476	EFT1	
134				
135			:ERROR 55	DEVICE CHECK DURING SEEK COMMAND
136				
	002334	070632	EMT55	
	002336	074256	EHT1	
	002340	074406	EDT1	
	002342	074476	EFT1	
137				
138			:ERROR 56	PIP IS STILL SET AFTER SEEK - SKI IS RESET
139				
	002344	070644	EMT56	
	002346	074256	EHT1	
	002350	074406	EDT1	
	002352	074476	EFT1	
140				
141			:ERROR 57	ATA DID NOT SET DURING SEEK COMMAND
142				
	002354	070662	EMT57	
	002356	074256	EHT1	
	002360	074406	EDT1	
	002362	074476	EFT1	
143				
144			:ERROR 60	IVC ERROR DURING SEEK COMMAND - LOST
145			:	VOLUME VALID
146				
	002364	070672	EMT60	
	002366	074256	EHT1	
	002370	074406	EDT1	

	002372	074476	EFT1	
147				
148			:ERROR 61	ERRONEOUS IVC ERROR DURING SEEK COMMAND -
149			:	VOLUME VALID IS STILL SET
150				
	002374	070710	EMT61	
	002376	074256	EHT1	
	002400	074406	EDT1	
	002402	074476	EFT1	
151				
152			:ERROR 62	MOL IS ZERO, BUT OPI WAS NOT
153			:	REPORTED DURING SEEK COMMAND
154				
	002404	070730	EMT62	
	002406	074256	EHT1	
	002410	074406	EDT1	
	002412	074476	EFT1	
155				
156			:ERROR 63	SSE SHOULD NOT BE SET
157				
	002414	070744	EMT63	
	002416	074256	EHT1	
	002420	074406	EDT1	
	002422	074476	EFT1	
158				
159			:ERROR 64	DRIVE DID NOT DETECT "IVC" ERROR DURING SEEK
160				
	002424	070754	EMT64	
	002426	074256	EHT1	
	002430	074406	EDT1	
	002432	074476	EFT1	
161				
162			:ERROR 65	DRIVE EXECUTED A SEEK WITH ERROR SET
163				
	002434	070774	EMT65	
	002436	074256	EHT1	
	002440	074406	EDT1	
	002442	074476	EFT1	
164				
165			:ERROR 66	UNEXPECTED ERROR SET IN RMER1
166				
	002444	071014	EMT66	
	002446	074256	EHT1	
	002450	074406	EDT1	
	002452	074476	EFT1	
167				
168			:ERROR 67	UNEXPECTED ERROR SET IN RMER2
169				
	002454	071026	EMT67	
	002456	074256	EHT1	

	002460	074406	EDT1	
	002462	074476	EFT1	
170				
171				:ERROR 70 ERRONEOUS "IAE" ERROR DURING RECALIBRATE
172				
	002464	071040	EMT70	
	002466	074256	EHT1	
	002470	074406	EDT1	
	002472	074476	EFT1	
173				
174				:ERROR 71 "ILF" ERROR DURING RECALIBRATE
175				
	002474	071050	EMT71	
	002476	074256	EHT1	
	002500	074406	EDT1	
	002502	074476	EFT1	
176				
177				:ERROR 72 "OPI" ERROR DURING RECALIBRATE DUE TO "MOL" = 0
178				
	002504	071060	EMT72	
	002506	074256	EHT1	
	002510	074406	EDT1	
	002512	074476	EFT1	
179				
180				:ERROR 73 "OPI" ERROR DURING RECALIBRATE BECAUSE ON
181				: CYLINDER DIDNT DROP
182				
	002514	071076	EMT73	
	002516	074256	EHT1	
	002520	074406	EDT1	
	002522	074476	EFT1	
183				
184				:ERROR 74 "IVC" ERROR DURING RECALIBRATE - "VV" = 0
185				
	002524	071114	EMT74	
	002526	074256	EHT1	
	002530	074406	EDT1	
	002532	074476	EFT1	
186				
187				:ERROR 75 ERRONEOUS "IVC" ERROR DURING RECALIBRATE - "VV" = 1
188				
	002534	071124	EMT75	
	002536	074256	EHT1	
	002540	074406	EDT1	
	002542	074476	EFT1	
189				
190				:ERROR 76 "SKI" ERROR DURING RECALIBRATE
191				
	002544	071144	EMT76	
	002546	074256	EHT1	

	002550	074406	EDT1	
	002552	074476	EFT1	
192				
193				:ERROR 77 'DVC' OCCURRED DURING RECALIBRATE
194				
	002554	071154	EMT77	
	002556	074256	EHT1	
	002560	074406	EDT1	
	002562	074476	EFT1	
195				
196				:ERROR 100 LOST 'MOL' DURING RECALIBRATE - 'DPI' = 0
197				
	002564	071166	EMT100	
	002566	074256	EHT1	
	002570	074406	EDT1	
	002572	074476	EFT1	
198				
199				:ERROR 101 LOST 'VV' DURING RECALIBRATE - 'IVC' = 0
200				
	002574	071204	EMT101	
	002576	074256	EHT1	
	002600	074406	EDT1	
	002602	074476	EFT1	
201				
202				:ERROR 102 'ATA' DID NOT SET DURING RECALIBRATE
203				
	002604	071222	EMT102	
	002606	074256	EHT1	
	002610	074406	EDT1	
	002612	074476	EFT1	
204				
205				:ERROR 103 'DM' DID NOT RESET DURING RECALIBRATE
206				
	002614	071232	EMT103	
	002616	074256	EHT1	
	002620	074406	EDT1	
	002622	074476	EFT1	
207				
208				:ERROR 104 'PIP' IS STIL SET AFTER RECALIBRATE
209				
	002624	071244	EMT104	
	002626	074256	EHT1	
	002630	074406	EDT1	
	002632	074476	EFT1	
210				
211				:ERROR 105 UNEXPECTED 'ILR' ERROR DURING RECALIBRATE
212				
	002634	071262	EMT105	
	002636	074256	EHT1	
	002640	074406	EDT1	

	002642	074476	EFT1	
213				
214			:ERROR	106 UNEXPECTED 'RMR' ERROR DURING RECALIBRATE
215				
	002644	071272	EMT106	
	002646	074256	EHT1	
	002650	074106	EDT1	
	002652	074476	EFT1	
216				
217			:ERROR	107 'UNS' ERROR DURING RECALIBRATE - AC POWER IS LOW
218				
	002654	071302	EMT107	
	002656	074256	EHT1	
	002660	074406	EDT1	
	002662	074476	EFT1	
219				
220			:ERROR	110 CANNOT ACCESS MASSBUS CONTROLLER VIA UNIBUS
221				
	002664	071322	EMT110	
	002666	074300	EHT110	
	002670	074424	EDT110	
	002672	074514	EFT110	
222				
223			:ERROR	111 NONEXISTENT DEVICE
224				
	002674	071334	EMT111	
	002676	074304	EHT111	
	002700	074426	EDT111	
	002702	074516	EFT111	
225				
226			:ERROR	112 DEVICE NOT AVAILABLE
227				
	002704	071342	EMT112	
	002706	074304	EHT111	
	002710	074426	EDT111	
	002712	074516	EFT111	
228				
229			:ERROR	113 BUS TIMEOUT-NED STATUS FAILURE
230				
	002714	071350	EMT113	
	002716	000000	0	
	002720	000000	0	
	002722	000000	0	
231				
232			:ERROR	114 UNUSED
233				
	002724	000000	0	
	002726	000000	0	
	002730	000000	0	
	002732	000000	0	

234			
235		;ERROR 115	RMCS1 NOT INITIALIZED BY UNIBUS
236			
	002734	071364	EMT115
	002736	074256	EHT1
	002740	074406	EDT1
	002742	074476	EFT1
237			
238		;ERROR 116	RMBA NOT INITIALIZED BY UNIBUS
239			
	002744	071374	EMT116
	002746	074256	EHT1
	002750	074406	EDT1
	002752	074476	EFT1
240			
241		;ERROR 117	RMCS2 NOT INITIALIZED BY UNIBUS
242			
	002754	071404	EMT117
	002756	074256	EHT1
	002760	074406	EDT1
	002762	074476	EFT1
243			
244		;ERROR 120	RMER1 NOT INITIALIZED BY UNIBUS
245			
	002764	071414	EMT120
	002766	074256	EHT1
	002770	074406	EDT1
	002772	074476	EFT1
246			
247		;ERROR 121	RMAS NOT INITIALIZED BY UNIBUS
248			
	002774	071424	EMT121
	002776	074256	EHT1
	003000	074406	EDT1
	003002	074476	EFT1
249			
250		;ERROR 122	RMMR1 NOT INITIALIZED BY UNIBUS
251			
	003004	071434	EMT122
	003006	074256	EHT1
	003010	074406	EDT1
	003012	074476	EFT1
252			
253		;ERROR 123	RMDS NOT INITIALIZED BY UNIBUS
254			
	003014	071444	EMT123
	003016	074256	EHT1
	003020	074406	EDT1
	003022	074476	EFT1

255			
256		:ERROR 124	RMEC2 NOT INITIALIZED BY UNIBUS
257	003024 071454	EMT124	
	003026 074256	EHT1	
	003030 074406	EDT1	
	003032 074476	EFT1	
258			
259		:ERROR 125	RMMR2 NOT INITIALIZED BY UNIBUS
260	003034 071464	EMT125	
	003036 074256	EHT1	
	003040 074406	EDT1	
	003042 074476	EFT1	
261			
262		:ERROR 126	RMCS1 NOT CLEARED BY CONTROLLER CLEAR
263	003044 071474	EMT126	
	003046 074256	EHT1	
	003050 074406	EDT1	
	003052 074476	EFT1	
264			
265		:ERROR 127	RMBA NOT CLEARED BY CONTROLLER CLEAR
266	003054 071506	EMT127	
	003056 074256	EHT1	
	003060 074406	EDT1	
	003062 074476	EFT1	
267			
268		:ERROR 130	RMCS2 NOT CLEARED BY CONTROLLER CLEAR
269	003064 071520	EMT130	
	003066 074256	EHT1	
	003070 074406	EDT1	
	003072 074476	EFT1	
270			
271		:ERROR 131	RMER1 NOT CLEARED BY CONTROLLER CLEAR
272	003074 071532	EMT131	
	003076 074256	EHT1	
	003100 074406	EDT1	
	003102 074476	EFT1	
273			
274		:ERROR 132	RMAS NOT CLEARED BY CONTROLLER CLEAR
275	003104 071544	EMT132	
	003106 074256	EHT1	
	003110 074406	EDT1	
	003112 074476	EFT1	
276			

277			:ERROR 133	RMMR1 NOT CLEARED BY CONTROLLER CLEAR
278	003114	071556		EMT133
	003116	074256		EHT1
	003120	074406		EDT1
	003122	074476		EFT1
279			:ERROR 134	RMDS NOT CLEARED BY CONTROLLER CLEAR
280				EMT134
281	003124	071570		EHT1
	003126	074256		EDT1
	003130	074406		EFT1
	003132	074476		
282			:ERROR 135	RMEC2 NOT CLEARED BY CONTROLLER CLEAR
283				EMT135
284	003134	071602		EHT1
	003136	074256		EDT1
	003140	074406		EFT1
	003142	074476		
285			:ERROR 136	RMMR2 NOT CLEARED BY CONTROLLER CLEAR
286				EMT136
287	003144	071614		EHT1
	003146	074256		EDT1
	003150	074406		EFT1
	003152	074476		
288			:ERROR 137	RMCS1 NOT CLEARED BY ERROR CLEAR
289				EMT137
290	003154	071626		EHT1
	003156	074256		EDT1
	003160	074406		EFT1
	003162	074476		
291			:ERROR 140	RMCS2 NOT CLEARED BY ERROR CLEAR
292				EMT140
293	003164	071636		EHT1
	003166	074256		EDT1
	003170	074406		EFT1
	003172	074476		
294			:ERROR 141	RMCS1 NOT CLEARED BY DRIVE CLEAR
295				EMT141
296	003174	071646		EHT1
	003176	074256		EDT1
	003200	074406		EFT1
	003202	074476		
297			:ERROR 142	RMDS NOT CLEARED BY DRIVE CLEAR
298				

299	003204 071656	EMT142	
	003206 074256	EHT1	
	003210 074406	EDT1	
	003212 074476	EFT1	
300			
301		;ERROR 143	RMER1 NOT CLEARED BY DRIVE CLEAR
302	003214 071666	EMT143	
	003216 074256	EHT1	
	003220 074406	EDT1	
	003222 074476	EFT1	
303			
304		;ERROR 144	RMA5 NOT CLEARED BY DRIVE CLEAR
305	003224 071676	EMT144	
	003226 074256	EHT1	
	003230 074406	EDT1	
	003232 074476	EFT1	
306			
307		;ERROR 145	RMMR1 NOT CLEARED BY DRIVE CLEAR
308	003234 071706	EMT145	
	003236 074256	EHT1	
	003240 074406	EDT1	
	003242 074476	EFT1	
309			
310		;ERROR 146	RMMR2 NOT CLEARED BY DRIVE CLEAR
311	003244 071716	EMT146	
	003246 074256	EHT1	
	003250 074406	EDT1	
	003252 074476	EFT1	
312			
313		;ERROR 147	RMER2 NOT CLEARED BY DRIVE CLEAR
314	003254 071726	EMT147	
	003256 074256	EHT1	
	003260 074406	EDT1	
	003262 074476	EFT1	
315			
316		;ERROR 150	RMEC2 NOT CLEARED BY DRIVE CLEAR
317	003264 071736	EMT150	
	003266 074256	EHT1	
	003270 074406	EDT1	
	003272 074476	EFT1	
318			
319		;ERROR 151	MEDIUM NOT ON LINE
320			

ERROR POINTER TABLE

	003274	071746		EMT151
	003276	074256		EHT1
	CJ3300	074406		EDT1
	003302	074476		EFT1
321				
322			;ERROR 152	DRIVE FAULT
323				
	003304	071760		EMT152
	003306	074256		EHT1
	003310	074406		EDT1
	003312	074476		EFT1
324				
325			;ERROR 153	UNSAFE SHOULD BE SET BECAUSE DVC IS SET
326				
	003314	071772		EMT153
	003316	074256		EHT1
	003320	074406		EDT1
	003322	074476		EFT1
327				
328			;ERROR 154	UNSAFE SHOULD NOT BE SET, AC IS LOW
329				
	003324	072010		EMT154
	003326	074256		EHT1
	003330	074406		EDT1
	003332	074476		EFT1
330				
331			;ERROR 155	VOLUME VALID NOT SET BY PACK ACK
332				
	003334	072026		EMT155
	003336	074256		EHT1
	003340	074406		EDT1
	003342	074476		EFT1
333				
334			;ERROR 156	OFFSET MODE NOT SET BY 1/2 FSET COMMAND
335				
	003344	072040		EMT156
	003346	074256		EHT1
	003350	074406		EDT1
	003352	074476		EFT1
336				
337			;ERROR 157	OFFSET MODE NOT RESET BY RTC COMMAND
338				
	003354	072052		EMT157
	003356	074256		EHT1
	003360	074406		EDT1
	003362	074476		EFT1
339				
340			;ERROR 160	RMOF NOT RESET BY RIP COMMAND
341				
	003364	072064		EMT160

	003366	074256		EHT1
	003370	074406		EDT1
	003372	074476		EFT1
342				
343			:ERROR 161	RMDA NOT RESET BY RIP COMMAND
344				
	003374	072074		EMT161
	003376	074256		EHT1
	003400	074406		EDT1
	003402	074476		EFT1
345				
346			:ERROR 162	RMDC NOT RESET BY RIP COMMAND
347				
	003404	072106		EMT162
	003406	074256		EHT1
	003410	074406		EDT1
	003412	074476		EFT1
348				
349			:ERROR 163	DATA WAS ECC CORRECTED BUT DOES NOT COMPARE WITH
350			:	WRITE BUFFER
351				
	003414	074052		EMT336
	003416	074344		EHT336
	003420	074442		EDT336
	003422	074532		EFT336
352				
353			:ERROR 164	OPI SHOULD NOT BE SET
354				
	003424	072130		EMT164
	003426	074256		EHT1
	003430	074406		EDT1
	003432	074476		EFT1
355				
356			:ERROR 165	IVC SHOULD NOT BE SET
357				
	003434	072136		EMT165
	003436	074256		EHT1
	003440	074406		EDT1
	003442	074476		EFT1
358				
359			:ERROR 166	IAE SHOULD NOT BE SET
360				
	003444	072144		EMT166
	003446	074256		EHT1
	003450	074406		EDT1
	003452	074476		EFT1
361				
362			:ERROR 167	NEM SHOULD NOT BE SET
363				
	003454	072152		EMT167

	003456	074256		EMT1
	003460	074406		EDT1
	003462	074476		EFT1
364				
365			:ERROR	170 INCORRECT 'MOL' STATUS DURING DIAGNOSTIC MODE
366				
	003464	072160		EMT170
	003466	074256		EHT1
	003470	074406		EDT1
	003472	074476		EFT1
367				
368			:ERROR	171 'ATA' NOT SET DURING RETURN TO CENTERLINE
369				
	003474	072172		EMT171
	003476	074256		EHT1
	003500	074406		EDT1
	003502	074476		EFT1
370				
371			:ERROR	172 'ATA' NOT SET BY OFFSET COMMAND
372				
	003504	072202		EMT172
	003506	074256		EHT1
	003510	074406		EDT1
	003512	074476		EFT1
373				
374			:ERROR	173 RMER2 NOT INITIALIZED BY UNIBUS INIT
375				
	003514	072212		EMT173
	003516	074256		EHT1
	003520	074406		EDT1
	003522	074476		EFT1
376				
377			:ERROR	174 RMER2 NOT INITIALIZED BY CONTROLLER CLEAR
378				
	003524	072222		EMT174
	003526	074256		EHT1
	003530	074406		EDT1
	003532	074476		EFT1
379				
380			:ERROR	175 SELECTED DEVICE IS IN WRITE PROTECT
381				
	003534	072234		EMT175
	003536	074256		EHT1
	003540	074406		EDT1
	003542	074476		EFT1
382				
383			:ERROR	176 CANNOT SET DIAGNOSTIC MODE
384				
	003544	072242		EMT176
	003546	074256		EHT1

	003550	074406	EDT1	
	003552	074476	EFT1	
385				
386				:ERROR 177 --RESERVED FOR POWER MONITOR BIT FAILURE--
387				
	003554	000000	0	
	003556	000000	0	
	003560	000000	0	
	003562	000000	0	
388				
389				:ERROR 200 INCORRECT 'PIP' STATUS DURING DIAGNOSTIC MODE
390				
	003564	072252	EMT200	
	003566	074256	EHT1	
	003570	074406	EDT1	
	003572	074476	EFT1	
391				
392				:ERROR 201 INCORRECT 'WRL' STATUS DURING DIAGNOSTIC MODE
393				
	003574	072264	EMT201	
	003576	074256	EHT1	
	003600	074406	EDT1	
	003602	074476	EFT1	
394				
395				:ERROR 202 INCORRECT 'SKI' STATUS DURING DIAGNOSTIC MODE
396				
	003604	072276	EMT202	
	003606	074256	EHT1	
	003610	074406	EDT1	
	003612	074476	EFT1	
397				
398				:ERROR 203 INCORRECT 'DVC' STATUS DURING DIAGNOSTIC MODE
399				
	003614	072310	EMT203	
	003616	074256	EHT1	
	003620	074406	EDT1	
	003622	074476	EFT1	
400				
401				:ERROR 204 'VV' WAS NOT RESET BY MAINTENANCE UNIT READY
402				
	003624	072322	EMT204	
	003626	074256	EHT1	
	003630	074406	EDT1	
	003632	074476	EFT1	
403				
404				:ERROR 205 SELECTED DEVICE HAS A PERSISTENT 'SKI' ERROR
405				
	003634	072340	EMT205	
	003636	074256	EHT1	
	003640	074406	EDT1	

	003642	074476	EFT1	
406				
407			:ERROR	206 'LBC' DID NOT SET DURING DIAGNOSTIC MODE
408				
	003644	072350	EMT206	
	003646	074256	EHT1	
	003650	074406	EDT1	
	003652	074476	EFT1	
409				
410			:ERROR	207 UNEXPECTED LOSS OF 'MOL' - MEDIUM IS OFF LINE
411				
	003654	072360	EMT207	
	003656	074256	EHT1	
	003660	074406	EDT1	
	003662	074476	EFT1	
412				
413			:ERROR	210 UNEXPECTED LOSS OF VOLUME VALID - 'VV' = 0
414				
	003664	072372	EMT210	
	003666	074256	EHT1	
	003670	074406	EDT1	
	003672	074476	EFT1	
415				
416			:ERROR	211 UNEXPECTED MECHANICAL MOTION - 'PIP' = 1
417				
	003674	072400	EMT211	
	003676	074256	EHT1	
	003700	074406	EDT1	
	003702	074476	EFT1	
418				
419			:ERROR	212 UNEXPECTED DEVICE FAULT - 'DVC' = 1
420				
	003704	072414	EMT212	
	003706	074256	EHT1	
	003710	074406	EDT1	
	003712	074476	EFT1	
421				
422			:ERROR	213 UNEXPECTED SEEK INCOMPLETE ERROR - 'SKI' = 1
423				
	003714	072430	EMT213	
	003716	074256	EHT1	
	003720	074406	EDT1	
	003722	074476	EFT1	
424				
425			:ERROR	214 DRIVE EXECUTED A RECALIBRATE WITH ERROR SET
426				
	003724	072440	EMT214	
	003726	074270	EHT2	
	003730	074416	EDT2	
	003732	074506	EFT2	

427				
428			:ERROR 215	DRIVE DID NOT DETECT "IVC" ERROR DURING RECALIBRATE
429	003734	072460		EMT215
	003736	074270		EHT2
	003740	074416		EDT2
	003742	074506		EFT2
430				
431			:ERROR 216	INCORRECT "IVC" STATUS
432	003744	072472		EMT216
	003746	074256		EHT1
	003750	074406		EDT1
	003752	074476		EFT1
433				
434			:ERROR 217	INCORRECT "IAE" STATUS
435	003754	072502		EMT217
	003756	074256		EHT1
	003760	074406		EDT1
	003762	074476		EFT1
436				
437			:ERROR 220	INCORRECT "WLE" STATUS
438	003764	072512		EMT220
	003766	074256		EHT1
	003770	074406		EDT1
	003772	074476		EFT1
439				
440			:ERROR 221	INCORRECT "DPI" STATUS
441	003774	072522		EMT221
	003776	074256		EHT1
	004000	074406		EDT1
	004002	074476		EFT1
442				
443			:ERROR 222	RM80 DID NOT DETECT RMR ERROR
444	004004	072532		EMT222
	004006	074256		EHT1
	004010	074406		EDT1
	004012	074476		EFT1
445				
446			:ERROR 223	RM80 DID NOT DETECT PARITY ERROR ON MASSBUS CONTROL BUS
447	004014	072542		EMT223
	004016	074320		EHT223
	004020	074432		EDT223
	004022	074522		EFT223

448			
449			
450			:ERROR 224 SSE NOT DETECTED DURING DATA TRANSFER
	004024	072552	EMT224
	004026	074256	EHT1
	004030	074406	EDT1
	004032	074476	EFT1
451			
452			
453			:ERROR 225 'SSEI' NOT RESET BY END OF TRACK DURING DATA TRANSFER
	004034	072566	EMT225
	004036	074256	EHT1
	004040	074406	EDT1
	004042	074476	EFT1
454			
455			
456			:ERROR 226 'SSEI' SHOULD BE SET AFTER DATA TRANSFER
	004044	072606	EMT226
	004046	074256	EHT1
	004050	074406	EDT1
	004052	074476	EFT1
457			
458			
459			:ERROR 227 SSE WAS DETECTED W/ SSEI SET
	004054	072616	EMT227
	004056	074256	EHT1
	004060	074406	EDT1
	004062	074476	EFT1
460			
461			
462			:ERROR 230 WRONG UNIT SELECTED
	004064	072632	EMT230
	004066	074310	EHT112
	004070	074426	EDT111
	004072	074516	EFT111
463			
464			
465			:ERROR 231 INCORRECT 'OPE' STATUS
	004074	072636	EMT231
	004076	074310	EHT112
	004100	074426	EDT111
	004102	074516	EFT111
466			
467			
468			:ERROR 232 UNUSED
	004104	072646	EMT232
	004106	000000	0
	004110	000000	0
	004112	000000	0

469

470			;ERROR	233	UNUSED
471	004114	072650		EMT233	
	004116	000000		0	
	004120	000000		0	
	004122	000000		0	
472					
473			;ERROR	234	UNUSED
474	004124	000000		0	
	004126	000000		0	
	004130	000000		0	
	004132	000000		0	
475					
476			;ERROR	235	UNUSED
477	004134	000000		0	
	004136	000000		0	
	004140	000000		0	
	004142	000000		0	
478					
479			;ERROR	236	UNUSED
480	004144	000000		0	
	004146	000000		0	
	004150	000000		0	
	004152	000000		0	
481					
482			;ERROR	237	UNUSED
483	004154	000000		0	
	004156	000000		0	
	004160	000000		0	
	004162	000000		0	
484					
485			;ERROR	240	UNUSED
486	004164	000000		0	
	004166	000000		0	
	004170	000000		0	
	004172	000000		0	
487					
488			;ERROR	241	UNUSED
489	004174	000000		0	
	004176	000000		0	
	004200	000000		0	
	004202	000000		0	
490					
491			;ERROR	242	UNUSED

492	004204	000000	0	
	004206	000000	0	
	004210	000000	0	
	004212	000000	0	
493				
494			:ERROR 243	UNUSED
495	004214	000000	0	
	004216	000000	0	
	004220	000000	0	
	004222	000000	0	
496				
497			:ERROR 244	UNUSED
498	004224	000000	0	
	004226	000000	0	
	004230	000000	0	
	004232	000000	0	
499				
500			:ERROR 245	UNUSED
501	004234	000000	0	
	004236	000000	0	
	004240	000000	0	
	004242	000000	0	
502				
503			:ERROR 246	'ATA' NOT RESET BY GO WHEN 'ERR' = 0
504	004244	072676	EMT246	
	004246	074256	EHT1	
	004250	074406	EDT1	
	004252	074476	EFT1	
505				
506			:ERROR 247	'ATA' NOT RESET BY WRITING RMAS
507	004254	072706	EMT247	
	004256	074256	EHT1	
	004260	074406	EDT1	
	004262	074476	EFT1	
508				
509			:ERROR 250	'ATA' WAS RESET BY GO WHEN 'ERR' = 1
510	004264	072720	EMT250	
	004266	074256	EHT1	
	004270	074406	EDT1	
	004272	074476	EFT1	
511				
512			:ERROR 251	PROGRAM INTERRUPT WAS NOT GENERATED
513				

004274	072734	EMT251	
004276	074270	EHT2	
004300	074416	EDT2	
004302	074506	EFT2	
514			
515		:ERROR	252 PROGRAM INTERRUPT SHOULD NOT HAVE BEEN GENERATED
516			
004304	072742	EMT252	
004306	074270	EHT2	
004310	074416	EDT2	
004312	074506	EFT2	
517			
518		:ERROR	253 OFFSET MODE WAS NOT RESET BY WRITING RMDC
519			
004314	072750	EMT253	
004316	074256	EHT1	
004320	074406	EDT1	
004322	074476	EFT1	
520			
521		:ERROR	254 INCORRECT "ILF" STATUS
522			
004324	072766	EMT254	
004326	074256	EHT1	
004330	074406	EDT1	
004332	074476	EFT1	
523			
524		:ERROR	255 INCORRECT "ATA" STATUS
525			
004334	072776	EMT255	
004336	074256	EHT1	
004340	074406	EDT1	
004342	074476	EFT1	
526			
527		:ERROR	256 INCORRECT "ILR" STATUS
528			
004344	073006	EMT256	
004346	074332	EHT256	
004350	074432	EDT223	
004352	074522	EFT223	
529			
530		:ERROR	257 INVALID IAE STATUS DURING SEARCH COMMAND
531			
004354	073016	EMT257	
004356	074256	EHT1	
004360	074406	EDT1	
004362	074476	EFT1	
532			
533		:ERROR	260 "IVC" WAS NOT DETECTED DURING SEARCH COMMAND
534			
004364	073030	EMT260	

004366	074256	EHT1	
004370	074406	EDT1	
004372	074476	EFT1	
535			
536		;ERROR	261 DRIVE EXECUTED SEARCH WITH ERROR SET
537			
004374	073042	EMT261	
004376	074256	EHT1	
004400	074406	EDT1	
004402	074476	EFT1	
538			
539		;ERROR	262 'LBC' ERROR NOT SET DURING DIAGNOSTIC MODE
540			
004404	073062	EMT262	
004406	074256	EHT1	
004410	074406	EDT1	
004412	074476	EFT1	
541			
542		;ERROR	263 'SKI' ERROR DURING SEARCH COMMAND
543			
004414	073072	EMT263	
004416	074256	EHT1	
004420	074406	EDT1	
004422	074476	EFT1	
544			
545		;ERROR	264 'IVC' ERROR DURING SEARCH - LOST VOLUME VALID
546			
004424	073102	EMT264	
004426	074256	EHT1	
004430	074406	EDT1	
004432	074476	EFT1	
547			
548		;ERROR	265 ERRONEOUS IVC ERROR DURING SEARCH - VOLUME IS VALID
549			
004434	073122	EMT265	
004436	074256	EHT1	
004440	074406	EDT1	
004442	074476	EFT1	
550			
551		;ERROR	266 DEVICE FAULT (DVC) DURING SEARCH
552			
004444	073142	EMT266	
004446	074256	EHT1	
004450	074406	EDT1	
004452	074476	EFT1	
553			
554		;ERROR	267 SKI SHOULD HAVE BEEN SET BECAUSE CYLINDER
555		:	, ADDRESS IS TOO LARGE
556			
004454	073154	EMT267	

ERROR POINTER TABLE

004456	074256	EHT1	
004460	074406	EDT1	
004462	074476	EFT1	
557			
558		:ERROR	270 OPI ERROR DURING SEARCH BECAUSE MOL = 0
559			
004464	073172	EMT270	
004466	074256	EHT1	
004470	074406	EDT1	
004472	074476	EFT1	
560			
561		:ERROR	271 OPI ERROR DURING SEARCH BECAUSE ON CYLINDER
562		:	DIDN'T DROP
563			
004474	073206	EMT271	
004476	074256	EHT1	
004500	074406	EDT1	
004502	074476	EFT1	
564			
565		:ERROR	272 LOST MOL DURING SEARCH, OPI IS NOT SET
566			
004504	073224	EMT272	
004506	074256	EHT1	
004510	074406	EDT1	
004512	074476	EFT1	
567			
568		:ERROR	273 PIP STIL SET AFTER SEARCH
569			
004514	073242	EMT273	
004516	074256	EHT1	
004520	074406	EDT1	
004522	074476	EFT1	
570			
571		:ERROR	274 PARITY ERROR OCCURRED WHILE WRITING REMOTE
572		:	REGISTERS BUT MXF DID NOT SET
573			
004524	073260	EMT274	
004526	074256	EHT1	
004530	074406	EDT1	
004532	074476	EFT1	
574			
575		:ERROR	275 MXF ERROR - COMPOSITE ERROR OCCURRED BEFORE DATA
576		:	COMMAND STARTED
577			
004534	073276	EMT275	
004536	074256	EHT1	
004540	074406	EDT1	
004542	074476	EFT1	
578			
579		:ERROR	276 'OPI' ERROR DURING DATA TRANSFER BECAUSE 'MOL' WAS

580			:	ZERO
581				
	004544	073310		EMT276
	004546	074256		EHT1
	004550	074406		EDT1
	004552	074476		EFT1
582			:	
583			:ERROR	277 'DPI' ERROR DURING DATA TRANSFER BECAUSE 1) ON
584			:	CYLINDER DIDN'T DROP OR 2) SEARCH TIMED OUT OR
585			:	3) RUN TIMED OUT
586				
	004554	073324		EMT277
	004556	074256		EHT1
	004560	074406		EDT1
	004562	074476		EFT1
587			:	
588			:ERROR	300 'IVC' ERROR DURING DATA TRANSFER BECAUSE VOLUME
589			:	WAS NOT VALID
590				
	004564	073342		EMT300
	004566	074256		EHT1
	004570	074406		EDT1
	004572	074476		EFT1
591			:	
592			:ERROR	301 ERRONEOUS 'IVC' ERROR DURING DATA TRANSFER - VOLUME
593			:	IS VALID
594				
	004574	073362		EMT301
	004576	074256		EHT1
	004600	074406		EDT1
	004602	074476		EFT1
595			:	
596			:ERROR	302 'ILR' ERROR DURING DATA TRANSFER
597				
	004604	073404		EMT302
	004606	074256		EHT1
	004610	074406		EDT1
	004612	074476		EFT1
598			:	
599			:ERROR	303 'ILF' ERROR DURING DATA TRANSFER
600				
	004614	073416		EMT303
	004616	074256		EHT1
	004620	074406		EDT1
	004622	074476		EFT1
601			:	
602			:ERROR	304 'RMR' ERROR DURING DATA TRANSFER
603				
	004624	073430		EMT304
	004626	074256		EHT1
	004630	074406		EDT1

	004632	074476	EFT1	
604				
605			:ERROR 305	INCORRECT 'IAE' STATUS DURING DATA TRANSFER
606				
	004634	073442	EMT305	
	004636	074256	EHT1	
	004640	074406	EDT1	
	004642	074476	EFT1	
607				
608			:ERROR 306	'SKI' ERROR DURING DATA TRANSFER
609				
	004644	073454	EMT306	
	004646	074256	EHT1	
	004650	074406	EDT1	
	004652	074476	EFT1	
610				
611			:ERROR 307	DRIVE DID NOT DETECT SKI ERROR DUE TO CYLINDER
612				
	004654	073464	EMT307	
	004656	074256	EHT1	
	004660	074406	EDT1	
	004662	074476	EFT1	
613				
614			:ERROR 310	DEVICE FAULT DURING DATA TRANSFER
615				
	004664	073504	EMT310	
	004666	074256	EHT1	
	004670	074406	EDT1	
	004672	074476	EFT1	
616				
617			:ERROR 311	LOSS OF BIT CLOCK DURING DATA TRANSFER
618				
	004674	073516	EMT311	
	004676	074256	EHT1	
	004700	074406	EDT1	
	004702	074476	EFT1	
619				
620			:ERROR 312	LOSS OF SYSTEM CLOCK DURING DATA TRANSFER
621				
	004704	073530	EMT312	
	004706	074256	EHT1	
	004710	074406	EDT1	
	004712	074476	EFT1	
622				
623			:ERROR 313	UNSAFE ERROR DURING DATA TRANSFER (DVC = 0)
624				
	004714	073542	EMT313	
	004716	074256	EHT1	
	004720	074406	EDT1	
	004722	074476	EFT1	

625				
626			:ERROR 314	DRIVE TIMING ERROR DURING DATA TRANSFER
627	004724	073562		EMT314
	004726	074256		EHT1
	004730	074406		EDT1
	004732	074476		EFT1
628				
629			:ERROR 315	WRITE LOCK ERROR
630	004734	073574		EMT315
	004736	074256		EHT1
	004740	074406		EDT1
	004742	074476		EFT1
631				
632			:ERROR 316	ERRONEOUS WRITE LOCK ERROR
633	004744	073606		EMT316
	004746	074256		EHT1
	004750	074406		EDT1
	004752	074476		EFT1
634				
635			:ERROR 317	HEADER CRC ERROR DURING DATA TRANSFER
636	004754	073620		EMT317
	004756	074256		EHT1
	004760	074406		EDT1
	004762	074476		EFT1
637				
638			:ERROR 320	FORMAT ERROR DURING DATA TRANSFER
639	004764	073630		EMT320
	004766	074256		EHT1
	004770	074406		EDT1
	004772	074476		EFT1
640				
641			:ERROR 321	HEADER COMPARE ERROR DURING DATA TRANSFER
642	004774	073640		EMT321
	004776	074256		EHT1
	005000	074406		EDT1
	005002	074476		EFT1
643				
644			:ERROR 322	HEADER ERRORS SHOULD NOT BE SET
645	005004	073650		EMT322
	005006	074256		EHT1
	005010	074406		EDT1
	005012	074476		EFT1

646				
647			:ERROR 323	DATA CHECK ERROR DURING DATA TRANSFER
648				
	005014	073656		EMT323
	005016	074256		EHT1
	005020	074406		EDT1
	005022	074476		EFT1
649				
650			:ERROR 324	CORRECTABLE DATA CHECK ERROR DURING DATA TRANSFER
651				
	005024	073666		EMT324
	005026	074256		EHT1
	005030	074406		EDT1
	005032	074476		EFT1
652				
653			:ERROR 325	UNCORRECTABLE DATA CHECK ERROR DURING DATA TRANSFER
654				
	005034	073700		EMT325
	005036	074256		EHT1
	005040	074406		EDT1
	005042	074476		EFT1
655				
656			:ERROR 326	DATA PARITY ERROR DURING READ COMMAND
657				
	005044	073712		EMT326
	005046	074256		EHT1
	005050	074406		EDT1
	005052	074476		EFT1
658				
659			:ERROR 327	OFFSET MODE NOT RESET BY WRITE COMMAND
660				
	005054	073730		EMT327
	005056	074256		EHT1
	005060	074406		EDT1
	005062	074476		EFT1
661				
662			:ERROR 330	DATA PARITY ERROR DURING WRITE COMMAND
663				
	005064	073742		EMT330
	005066	074256		EHT1
	005070	074406		EDT1
	005072	074476		EFT1
664				
665			:ERROR 331	WRITE CLOCK FAILURE DURING WRITE COMMAND
666				
	005074	073752		EMT331
	005076	074256		EHT1
	005100	074406		EDT1
	005102	074476		EFT1
667				

668		:ERROR 332	DATA LATE ERROR DURING DATA TRANSFER
669			
	005104 073764		EMT332
	005106 074256		EHT1
	005110 074406		EDT1
	005112 074476		EFT1
670		:ERROR 333	PIP STIL SET AFTER DATA TRANSFER - SKI = 0
671			
672			
	005114 073776		EMT333
	005116 074256		EHT1
	005120 074406		EDT1
	005122 074476		EFT1
673		:ERROR 334	LOST MOL DURING DATA TRANSFER - OPI = 0
674			
675			
	005124 074014		EMT334
	005126 074256		EHT1
	005130 074406		EDT1
	005132 074476		EFT1
676		:ERROR 335	LOST VOLUME VALID DURING DATA TRANSFER - IVC = 0
677			
678			
	005134 074032		EMT335
	005136 074256		EHT1
	005140 074406		EDT1
	005142 074476		EFT1
679		:ERROR 336	DATA READ DOES NOT COMPARE WITH DATA WRITTEN
680			
681			
	005144 074052		EMT336
	005146 074344		EHT336
	005150 074442		EDT336
	005152 074532		EFT336
682		:ERROR 337	WRITE CHECK ERROR NOT DETECTED
683			
684			
	005154 074062		EMT337
	005156 074356		EHT337
	005160 074452		EDT337
	005162 074542		EFT337
685		:ERROR 340	WRITE CHECK ERROR AT UNEXPECTED ADDRESS
686			
687			
	005164 074072		EMT340
	005166 074344		EHT336
	005170 074442		EDT336
	005172 074532		EFT336
688		:ERROR 341	INCORRECT DATA DURING WRITE CHECK ERROR
689			

690	005174 074104	EMT341	
	005176 074344	EHT336	
	005200 074442	EDT336	
	005202 074532	EFT336	
691			
692		:ERROR 342	'IVC' ERROR NOT DETECTED DURING DATA TRANSFER
693	005204 074112	EMT342	
	005206 074256	EHT1	
	005210 074406	EDT1	
	005212 074476	EFT1	
694			
695		:ERROR 343	'FER' NOT DETECTED DURING DATA TRANSFER
696	005214 074124	EMT343	
	005216 074256	EHT1	
	005220 074406	EDT1	
	005222 074476	EFT1	
697			
698		:ERROR 344	'HCE' NOT DETECTED DURING DATA TRANSFER
699	005224 074136	EMT344	
	005226 074370	EHT344	
	005230 074462	EDT344	
	005232 074552	EFT344	
700			
701		:ERROR 345	'BSE' NOT DETECTED DURING DATA TRANSFER
702	005234 074150	EMT345	
	005236 074256	EHT1	
	005240 074406	EDT1	
	005242 074476	EFT1	
703			
704		:ERROR 346	HEADER ERROR WAS DETECTED W/ HCI SET
705	005244 074160	EMT346	
	005246 074256	EHT1	
	005250 074406	EDT1	
	005252 074476	EFT1	
706			
707		:ERROR 347	DATA TRANSFER NOT ABORTED W/ COMP ERROR SET
708	005254 074174	EMT347	
	005256 074256	EHT1	
	005260 074406	EDT1	
	005262 074476	EFT1	
709			
710		:ERROR 350	LOST VOLUME VALID DURING SEARCH - 'IVC' = 0
711			

005264	074206	EMT350
005266	074256	EHT1
005270	074406	EDT1
005272	074476	EFT1

712
713
714 :ERROR 351 'ATA' DID NOT SET DURING SEARCH

005274	074224	EMT351
005276	074256	EHT1
005300	074406	EDT1
005302	074476	EFT1

715
716
717 :ERROR 352 PROGRAM TIMEOUT WHILE TESTING RMLA

005304	074234	EMT352
005306	000000	0
005310	000000	0
005312	000000	0

718
719
720 :ERROR 353 LOOK AHEAD TEST FAILS

005314	074240	EMT353
005316	074402	EHT353
005320	074474	EDT353
005322	074562	EFT353

721
722
723 :ERROR 354 BSE SHOULD NOT BE SET

005324	074250	EMT354
005326	074256	EHT1
005330	074406	EDT1
005332	074476	EFT1

724
725 :PUT ERROR TABLE HERE

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.SBTTL ERROR TABLE USAGE

:THE ERROR TABLE ABOVE CONSISTS OF FOUR WORD ENTRIES FOR EACH ERROR
:NUMBER, I.E.,

: EMT - ERROR MESSAGE TABLE ADDRESS
: EHT - ERROR HEADER TABLE ADDRESS
: EDT - ERROR DATA TABLE ADDRESS
: EFT - ERROR FORMAT TABLE ADDRESS

:THE EMT ENTRY IS THE ADDRESS OF THE TABLE OF ERROR MESSAGE STRINGS
:FOR THE PARTICULAR ERROR. EACH ERROR MESSAGE TABLE LISTS THE ADDRESS
:OF ONE OR MORE ERROR MESSAGE STRINGS WHICH ARE TO BE FORMATTED AND
:TYPED BY THE ERROR TYPE SUBROUTINE. IF THE EMT ENTRY IS ZERO, THERE IS
:NO MESSAGE TO BE TYPED FOR THE ERROR.

:SIMILARLY, THE EHT, EDT, AND EFT ENTRIES ARE ADDRESSES OF TABLES
:OF HEADER, DATA AND FORMAT INFORMATION FOR A GIVEN ERROR. EACH ENTRY
:IN THE ERROR HEADER TABLE MAY OR MAY NOT HAVE AN ASSOCIATED LINE OF
:DATA, HOWEVER, EACH DATA LINE MUST HAVE AN ASSOCIATED FORMAT AND
:HEADER. THAT IS, A HEADER LINE MAY BE PRINTED WITHOUT ANY DATA,
:BUT A DATA LINE IS NOT PRINTED WITHOUT A HEADER, AND EACH DATA LINE
:MUST ALSO HAVE A FORMAT.

:IN SUMMARY,

: EACH NONZERO ENTRY IS THE ADDRESS OF A TABLE,
: EACH TABLE IS A LIST OF ADDRESSES WHICH DEFINES THE LOCATIONS
: OF MESSAGE STRINGS, HEADERS, DATA OR FORMAT.

```

1      ;THIS ROUTINE HANDLES UNEXPECTED TIMEOUTS
2
3 005334 011600      BADTMO: MOV      (SP),R0      ;SAVE PC WHERE THE TIME OUT OCCURED
4 005336 005740      TST      -(R0)      ;ADJUST PC -2
5 005340 022626      CMP      (SP)+,(SP)+      ;RESTORE STACK POINTER
6 005342 104401  C05350  TYPE      ,65$      ;:TYPE ASCIZ STRING
   005346 000417      BR       64$      ;:GET OVER THE ASCIZ
   ;:65$: .ASCIZ <CRLF>/UNEXPECTED BUS TIMEOUT, PC=/
   64$:
7 005406 010046      MOV      R0,-(SP)      ;SETUP FOR TYPING OUT PC
8 005410 104402      TYPOC
9 005412 000240      NOP
   ;PUT 'HALT(0)' INSTRUCTION HERE IF YOU WISH
   ;TO STOP ON UNEXPECTED TIMEOUT.
10
11 005414 000404      BR       START      ;BRANCH TO START
12
13      .SBTTL  START OF PROGRAM
14
15 005416 012737 177777 001326  START1: MOV      #-1,CHGADR      ;CHANGE RH/RM BUS ADDRESS
16 005424 000402      BR       START2
17
18 005426 005037 001326  START:  CLR      CHGADR      ;NO CHANGE IN ADDRESS
19 005432 000240  START2:  NOP
20 005434 005227 000000      INC      #0      ;TTY LOOP, WAIT FOR INCREMENT
21 005440 001375      BNE     #-4      ;OF WORD
22 005442 000005      RESET     ;RESET THE WORLD
23
24      .SBTTL  INITIALIZE THE COMMON TAGS
   ;:CLEAR THE COMMON TAGS ($CMTAG) AREA
   MOV      #SCMTAG,R6      ;:FIRST LOCATION TO BE CLEARED
   CLR      (R6)+          ;:CLEAR MEMORY LOCATION
   CMP      #SWR,R6        ;:DONE?
   BNE     -6             ;:LOOP BACK IF NO
   MOV      #STACK,SP      ;:SETUP THE STACK POINTER
   ;:INITIALIZE A FEW VECTORS
   MOV      #SCOPE,@IOTVEC ;:IOT VECTOR FOR SCOPE ROUTINE
   MOV      #340,@IOTVEC+2 ;:LEVEL 7
   MOV      #ERROR,@EMTVEC ;:EMT VECTOR FOR ERROR ROUTINE
   MOV      #340,@EMTVEC+2 ;:LEVEL 7
   MOV      #TRAP,@TRAPVEC ;:TRAP VECTOR FOR TRAP CALLS
   MOV      #340,@TRAPVEC+2 ;:LEVEL 7
   MOV      #SPWRDN,@PWRVEC ;:POWER FAILURE VECTOR
   MOV      #340,@PWRVEC+2 ;:LEVEL 7
   MOV      $ENDCT,$EOPCT  ;:SETUP END-OF-PROGRAM COUNTER
   CLR      $TIMES         ;:INITIALIZE NUMBER OF ITERATIONS
   CLR      $ESCAPE       ;:CLEAR THE ESCAPE ON ERROR ADDRESS
   MOV     #1,$SERMAX      ;:ALLOW ONE ERROR PER TEST
   MOV     #,$SLPADR      ;:INITIALIZE THE LOOP ADDRESS FOR SCOPE
   MOV     #,$SLPERR      ;:SETUP THE ERROR LOOP ADDRESS
   ;:SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
   ;:EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
   MOV     @ERRVEC,-(SP)   ;:SAVE ERROR VECTOR
   MOV     #64$,@ERRVEC   ;:SET UP ERROR VECTOR
   MOV     #DSWR,SWR      ;:SETUP FOR A HARDWARE SWICH REGISTER
   MOV     #DDISP,DISPLAY ;:AND A HARDWARE DISPLAY REGISTER
   CMP     #-1,@SWR       ;:TRY TO REFERENCE HARDWARE SWR
   BNE     66$           ;:BRANCH IF NO TIMEOUT TRAP OCCURRED
   ;:AND THE HARDWARE SWR IS NOT = -1

```

```

005642 000403          BR      65$          ;;BRANCH IF NO TIMEOUT
005644 012716 005652 64$:  MOV     #65$, (SP)      ;;SET UP FOR TRAP RETURN
005650 000002          RTI
005652 012737 000176 001154 65$:  MOV     #SWREG, SWR      ;;POINT TO SOFTWARE SWR
005660 012737 000174 001156 65$:  MOV     #DISPREG, DISPLAY  ;;POINT TO SOFTWARE SWR
005666 012637 000004 66$:  MOV     (SP)+, @#ERRVEC  ;;RESTORE ERROR VECTOR

005672 005037 001230          CLR     $PASS          ;;CLEAR PASS COUNT
005676 132737 000200 001243 67$:  BITB   #APTSIZE, $ENVM  ;;TEST USER SIZE UNDER APT
005704 001403          BEQ    67$            ;;YES, USE NON-APT SWITCH
005706 012737 001244 001154 67$:  MOV     #SSWREG, SWR    ;;NO, USE APT SWITCH REGISTER
005714

25 ;SETUP "TIMEOUT" TRAP VECTOR FOR UNEXPECTED BUS TIMEOUTS
26 005714 012737 005334 000004 67$:  MOV     #BADTMO, ERRVEC  ;;SETUP FOR UNEXPECTED TIMEOUT
27 005722 012737 000300 000006 67$:  MOV     #PR6, ERRVEC+2  ;;LEVEL 6
28
29 .SBTTL  TYPE PROGRAM NAME
   ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
005730 005227 177777          INC     #-1            ;;FIRST TIME?
005734 001033          BNE    68$            ;;BRANCH IF NO
005736 022737 041512 000042 68$:  CMP     #SENDAD, @#42  ;;ACT-11?
005744 001427          BEQ    68$            ;;BRANCH IF YES
005746 104401 005754          TYPE   ,69$          ;;TYPE ASCIZ STRING
005752 000424          BR     68$            ;;GET OVER THE ASCIZ
   ;;69$: .ASCIZ <CRLF>@CZRND AO - RM80 FUNCTIONAL TEST, PT 1@<CRLF>
   ;;68$:
   .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
006024 005737 000042          TST    @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
006030 001012          BNE    70$            ;;BRANCH IF YES
006032 123727 001242 000001 70$:  CMPB   $ENV, #1        ;;ARE WE RUNNING UNDER APT?
006040 001406          BEQ    70$            ;;BRANCH IF YES
006042 023727 001154 000176 70$:  CMP     SWR, #SWREG     ;;SOFTWARE SWITCH REG SELECTED?
006050 001005          BNE    71$            ;;BRANCH IF NO
006052 104401          GTSWR  ;;GET SOFT-SWR SETTINGS
006054 000403          BR     71$
006056 112737 000001 001150 70$:  MOVB   #1, $AUTOB     ;;SET AUTO-MODE INDICATOR
006064 71$:

30
31 ;THE FOLLOWING FINDS OUT THE PROGRAM CONTROL MODE:
32 ;PAPER TAPE (MANUAL), ACT11, XXDP CHAIN OR DUMP
33
34 006064 005037 001332          CLR     XXDP           ;;CLEAR 'XXDP' LOAD DEVICE STORAGE
35 006070 122737 000016 000041 35$:  CMPB   #16, @#41      ;;LOADED FROM AN RM80 ?
36 006076 001121          BNE    35$            ;;BR IF NOT
37 006100 013737 000040 001332 35$:  MOV     @#40, XXDP     ;;GET DEVICE INDICATOR AND NUMBER
38 006106 122737 000007 001332 35$:  CMPB   #7, XXDP       ;;IS IT A VALID NUMBER ?
39 006114 103002          BHS    1$             ;;YES
40 006116 105037 001332          CLRB   XXDP           ;;NO, DEFAULT TO DRIVE 0
41 006122 005737 000042 1$:  TST    @#42            ;;CHAIN MODE OR ACT11 AUTO ACCEPT ?
42 006126 001425          BEQ    2$             ;;BR IF NEITHER
43 006130 104401 006136          TYPE   ,73$          ;;TYPE ASCIZ STRING
   006134 000412          BR     72$            ;;GET OVER THE ASCIZ
   ;;73$: .ASCIZ <CRLF>/NOT TESTING DRIVE /
   ;;72$:
44 006162 005046          CLR     -(SP)         ;;CLEAR WORD ON STACK
45 006164 113716 001332 45$:  MOVB   XXDP, (SP)     ;;GET DRIVE ADDRESS
46 006170 104403          TYPOS  ;;TYPE THE ADDRESS
    
```

```

47 006172      001      .BYTE      1      :ONLY 1 CHARACTER
48 006173      000      .BYTE      0      :SUPRESS LEADING ZEROS
49 006174 104401 001217  TYPE      $CRLF   :CR-LF
50 006200 000460      BR        3$      :GET NUMBER OF DRIVES
51
52 006202 005227 177777 2$: INC      #-1     :FIRST TIME THRU HERE ?
53 006206 001055      BNE      3$      :NO
54 006210 104401 006216  TYPE      75$     :TYPE ASCIZ STRING
   006214 000410      BR        74$     :GET OVER THE ASCIZ
   :75$: .ASCIZ <CRLF>/TO TEST DRIVE /
   74$:
55 006236 005046      CLR      -(SP)    :CLEAR WORD ON STACK
56 006240 113716 001332  MOVB     XXDP,(SP):GET DRIVE ADDRESS
57 006244 104403      TYPOS
58 006246      001      .BYTE      1      :ONLY 1 CHARACTER
59 006247      000      .BYTE      0      :SUPRESS LEADING ZEROS
60 006250 104401 006256  TYPE      76$     :TYPE ASCIZ STRING
   006254 000432      BR        3$      :GET OVER THE ASCIZ
   :76$: .ASCIZ /, HALT PROGRAM, CLEAR LOC. 40 AND RESTART PROGRAM./<CRLF>
   3$:
64 :CHECK FOR AUTO MODE OR STANDALONE MODE
65 006342 005737 000042  TST      @#42    :RUNNING IN AUTO MODE ?
66 006346 001537      BEQ      STANDALONE :BR IF NO
67 006350 012737 000377 001300  MOV      #377,$DEV :SET DEVICE MAP FOR ALL DRIVES
68
69 :PROGRAM IS RUNNING IN AUTO MODE - SEE IF SIZING IS ALLOWED
70 006356      XSIZ:
71 006356 132737 000200 001243  BITB     #BIT7,$ENVM :SIZING ALLOWED ?
72 006364 001124      BNE     12$      :NO
73
74 006366 005001      CLR      R1      :START FROM DRIVE 0
75 006370 013700 001276  MOV      $BASE,R0 :LOAD THE BASE ADDRESS
76 006374 104401 067112  TYPE     ,SYSTAT  :TYPE 'UNIT STATUS:'
77
78 006400 136137 070102 001300 1$: BITB     ATNTBL(R1),$DEV :IS DEVICE PRESENT IN MAP ?
79 006406 001507      BEQ     11$      :BR IF NO
80 006410 104401 001217  TYPE     $CRLF   :CR-LF
81 006414 010146      MOV     R1,-(SP)  :SAVE R1 FOR TYPEOJT
   006416 104403      TYPOS
   006420      002      .BYTE     2      :GO TYPE--OCTAL ASCII
   006421      000      .BYTE     0      :TYPE 2 DIGIT(S)
82 006422 104401 067775  TYPE     ,BLNKS4  :SUPPRESS LEADING ZEROS
   :TYPE 4 BLANKS
83
84 006426 012760 000040 000010  MOV      #CLR,RMCS2(R0) :CLEAR MASS BUS
85 006434 010160 000010  MOV      R1,RMCS2(R0) :LOAD THE DRIVE ADDRESS
86 006440 005760 000012  TST      RMDS(R0)   :ACCESS DRIVE REGISTER
87 006444 032760 010000 000010  BIT      #NED,RMCS2(R0) :IS DRIVE PRESENT ?
88 006452 001027      BNE     3$      :BR IF NO
89 006454 032760 004000 000000  BIT      #DVA,RMCS1(R0) :IS DRIVE AVAILABLE ?
90 006462 001426      BEQ     4$      :BR IF NO
91 006464 012737 067130 006624  MOV      #SRM80,10$  :ASSUME RM80 DEVICE
92 006472 022760 020026 000026  CMP      #20026,RMDT(R0) :SINGLE PORT RM80 ?
93 006500 001407      BEQ     2$      :BR IF YES
94 006502 022760 024026 000026  CMP      #24026,RMDT(R0) :DUAL PORT RM80 ?
95 006510 001403      BEQ     2$      :BR IF YES
96 006512 104401 067135  TYPE     ,NOTRM   :DRIVE NOT AN RM80
97 006516 000412      BR      5$      :CHECK NEXT DRIVE

```

98	006520	032760	010000	000012	2\$:	BIT	#MOL,RMDS(R0)	:IS MEDIUM ON LINE ?
99	006526	001412				BEQ	6\$:BR IF NO
100	006530	000417				BR	7\$	
101								
102	006532	104401	067167		3\$:	TYPE	,NOTPRS	:DRIVE NOT PRESENT
103	006536	000402				BR	5\$:CHECK NEXT DRIVE
104								
105	006540	104401	067204		4\$:	TYPE	,NOTAVL	:DRIVE NOT AVAILABLE
106	006544	146137	070102	001300	5\$:	BICB	ATNTBL(R1),SDEVM	:CLEAR DEVICE FROM BIT MAP
107	006552	000425				BR	11\$:CHECK NEXT DRIVE
108								
109	006554	104401	067223		6\$:	TYPE	,UNTOFF	:DRIVE OFFLINE
110	006560	146137	070102	001300		BICB	ATNTBL(R1),SDEVM	:CLEAR DEVICE FROM BIT MAP
111	006566	000413				BR	9\$:PRINT DRIVE TYPE
112								
113	006570	005737	001332		7\$:	TST	XXDP	:LOADED FROM RM80 ?
114	006574	001406				BEQ	8\$:NO
115	006576	123701	001332			CMPB	XXDP,R1	:IS THIS THE DRIVE ?
116	006602	001003				BNE	8\$:BR IF NO
117	006604	104401	067152			TYPE	,LODEV	:DRIVE IS LOAD DEVICE
118	006610	000755				BR	5\$	
119								
120	006612	104401	067234		8\$:	TYPE	,UNTON	:DRIVE ONLINE
121	006616	104401	067777		9\$:	TYPE	,BLNKS2	:TYPE 2 BLANKS
122	006622	104401				TYPE		:PRINT DRIVE TYPE
123	006624	000000			10\$:	.WORD	0	:MESSAGE ADDRESS HERE
124								
125	006626	005201			11\$:	INC	R1	:INCREMENT THE DRIVE ADDRESS
126	006630	020127	000007			CMP	R1,#7	:ALL DRIVES ARE CHECKED ?
127	006634	003661				BLE	1\$:BRANCH IF NOT
128								
129	006636	104401	001217		12\$:	TYPE	,SCRLF	:CR-LF
130	006642	000137	007402			JMP	CMNSTART	:JUMP TO COMMON START


```

1          .SBTTL  STANDALONE INPUT ROUTINES
2
3          STANDALONE:
4 006646   004737   064402   JSR      PC,$TKINT      ;INITIALIZE CONSOLE
5
6 006652   005227   177777   INC      #-1            ;FIRST TIME THRU HERE ?
7 006656   001023   BNE      2$            ;BR IF NO
8
9          ;SEE IF OPERATOR WANTS HELP TEXT
10
11 006660   104401   066536   TYPE    ,MSHELP        ;WANT HELP ?
12 006664   104411   RDCHR                    ;GET RESPONSE
13 006666   012637   001176   MOV     (SP)+,$TMP1     ;SAVE AND ECHO RESPONSE
14 006672   123727   001176   000131  CMPB    $TMP1,#'Y       ;WAS IT A YES RESPONSE ?
15 006700   001005   BNE      1$            ;NO
16 006702   104401   001176   TYPE    , $TMP1        ;TYPE 'Y'
17 006706   104401   104372   TYPE    ,HELP          ;YES - TYPE HELP TEXT
18 006712   000414   BR       3$
19 006714   104401   067771   1$:    TYPE    ,N         ;TYPE 'N'
20 006720   104401   001217   TYPE    , $CRLF        ;CR-LF
21 006724   000407   BR       3$
22
23          ;SEE IF USER WANTS TO CHANGE UNIBUS ADDRESS
24 006726   2$:
25 006726   005737   001326   TST     CHGADR          ;CHANGE RH/RM BUS ADDRESS ?
26 006732   001457   BEQ     7$            ;BR IF NO
27 006734   005037   001326   CLR     CHGADR          ;NO CHANGE NEXT TIME
28 006740   104401   001217   TYPE    , $CRLF        ;CR-LF
29
30          ;DIALOGUE TO CHANGE THE UNIBUS ADDRESS, VECTOR ADDRESS AND INTERRUPT PRIORITY
31 006744   3$:
32 006744   104401   066567   TYPE    ,CNSLO1        ;TYPE CURRENT BUS ADDRESS
33 006750   013746   001276   MOV     $BASE,-(SP)    ;SAVE $BASE FOR TYPEOUT
34 006754   104402   TYPOC                    ;GO TYPE--OCTAL ASCII(ALL DIGITS)
35 006756   104401   067777   TYPE    ,BLNKS2        ;TYPE 2 BLANKS
36 006762   104413   RDOCT                    ;GET NEW BUS ADDRESS
37 006764   012637   001176   MOV     (SP)+,$TMP1     ;CARRIAGE RETURN ?
38 006770   001412   BEQ     5$            ;YES-SKIP TO NEXT ENTRY
39 006772   022737   160000   001176  CMP     #160000,$TMP1   ;BASE ADDRESS IN I/O PAGE ?
40 007000   101403   BLOS    4$            ;YES
41 007002   104401   066577   TYPE    ,CNSLO2        ;TYPE WARNING MESSAGE
42 007006   000756   BR       3$          ;TRY AGAIN
43 007010   013737   001176   001276  4$:    MOV     $TMP1,$BASE    ;STORE NEW BUS ADDRESS
44 007016   104401   066641   5$:    TYPE    ,CNSLO3
45 007022   005046   CLR     -(SP)
46 007024   113716   001272   MOVB    $VECT1,(SP)   ;GET CURRENT VECTOR ADDRESS
47 007030   104402   TYPOC
48 007032   104401   067777   TYPE    ,BLNKS2        ;TYPE 2 BLANKS
49 007036   104413   RDOCT                    ;GET NEW VECTOR ADDRESS
50 007040   012637   001176   MOV     (SP)+,$TMP1     ;CARRIAGE RETURN?
51 007044   001412   BEQ     7$            ;YES-SKIP TO NEXT ENTRY
52 007046   022737   001000   001176  CMP     #1000,$TMP1    ;VECTOR ADDRESS < 1000 ?
53 007054   101003   BHI     6$            ;YES!!
54 007056   104401   066650   TYPE    ,CNSLO4        ;TYPE WARNING MESSAGE
55 007062   000755   BR       5$          ;RETRY
56 007064   113737   001176   001272  6$:    MOVB    $TMP1,$VECT1  ;STORE NEW VECTOR ADDRESS
    
```

```

57
58          :FIND OUT IF USER WANTS TO DO LOGICAL ADDRESS PLUG TEST
59 007072 005037 001330 7$: CLR MANUAL ;NO MANUAL INTERVENTION
60 007076 104401 067300   TYPE ,MSMNUL ;TYPE 'PLUG TEST ?'
61 007102 104412   RDLIN ;READ THE ENTRY
62 007104 012600   MOV (SP)+,RO ;SAVE ADDRESS OF RESPONSE
63 007106 105710   TSTB (RO) ;WAS RESPONSE A CARRIAGE RETURN ?
64 007110 001417   BEQ 9$ ;BR IF YES
65 007112 105760 000001 TSTB 1(RO) ;WAS IT TERMINATED WITH CARRIAGE RETURN ?
66 007116 001011   BNE 8$ ;BR IF NO
67 007120 122710 000116 CMPB #'N',(RO) ;WAS IT A 'N' RESPONSE ?
68 007124 001411   BEQ 9$ ;BR IF YES
69 007126 012737 000001 001330 MOV #1,MANUAL ;SET MANUAL INTERVENTION FLAG
70 007134 122710 000131 CMPB #'Y',(RO) ;WAS IT A 'Y' RESPONSE ?
71 007140 001403   BEQ 9$ ;BR IF YES
72 007142 104401 067047 8$: TYPE ,CNSL09 ;TYPE '' ?ILLEGAL INPUT''
73 007146 000751   BR 7$ ;RETRY
74
75          :DIALOGUE TO INPUT DEVICE NUMBERS
76 007150 005227 177777 9$: INC #-1 ;FIRST TIME THRU ?
77 007154 001002   BNE 10$ ;BR IF NO
78 007156 104401 066704   TYPE ,CNSL07 ;TYPE INPUT INSTRUCTIONS
79 007162 104401 001217 10$: TYPE ,$CRLF ;CR-LF
80 007166 005037 001300 11$: CLR $DEV ;CLEAR DEVICE MAP
81 007172 104401 067070   TYPE ,MSDRVS ;TYPE 'DRIVE(S): '
82 007176 104411   RDCHR
83 007200 012637 001176   MOV (SP)+,$TMP1 ;GET RESPONSE
84 007204 023727 001176 000101 CMP $TMP1,#'A ;IS INPUT 'A' ?
85 007212 001007   BNE 12$ ;NO
86 007214 104401 066522   TYPE ,ALL ;YES, TYPE 'ALL' AND GO
87 007220 012737 000377 001300 MOV #377,$DEV ;SET DEVICE MAP FOR ALL DRIVES
88 007226 000137 006356   JMP XSIZ ;AUTO SIZE.
89
90 007232 023727 001176 000015 12$: CMP $TMP1,#CR ;CARRIAGE RETURN ?
91 007240 001436   BEQ 14$ ;YES
92 007242 104401 001176   TYPE , $TMP1 ;ECHO RESPONSE
93 007246 023727 001176 000060 CMP $TMP1,#'0 ;NUMBER < 0 ?
94 007254 002430   BLT 14$ ;YES
95 007256 023727 001176 000067 CMP $TMP1,#'7 ;NUMBER > 7 ?
96 007264 003427   BLE 15$ ;NO
97 007266 000423   BR 14$ ;ILLEGAL INPUT
98
99 007270 104411 13$: RDCHR
100 007272 012637 001176   MOV (SP)+,$TMP1 ;GET RESPONSE
101 007276 023727 001176 000015 CMP $TMP1,#CR ;CARRIAGE RETURN ?
102 007304 001432   BEQ 16$ ;YES
103 007306 104401 066533   TYPE ,COMMA ;TYPE ','
104 007312 104401 001176   TYPE , $TMP1 ;ECHO RESPONSE
105 007316 023727 001176 000060 CMP $TMP1,#'0 ;NUMBER < 0 ?
106 007324 002404   BLT 14$ ;YES
107 007326 023727 001176 000067 CMP $TMP1,#'7 ;NUMBER > 7 ?
108 007334 003403   BLE 15$ ;NO
109 007336 104401 067046 14$: TYPE ,CNSL08 ;TYPE CR-LF '' ?ILLEGAL INPUT''
110 007342 000711   BR 11$ ;RETRY
111
112 007344 013701 001176 15$: MOV $TMP1,R1 ;R1 = DRIVE NUMBER
113 007350 042701 177770   BIC #^C7,R1
    
```

114	007354	156137	070102	001300	BISB	ATNTBL(R1), \$DEVM		:SET DEVICE IN MAP
115	007362	122737	000377	001300	CMPB	#377, \$DEVM		:DONE ?
116	007370	101337			BHI	13\$:NO
117	007372	104401	001217		16\$: TYPE	, \$CRLF		:CR-LF
118	007376	000137	006356		JMP	XSIZ		:GO SIZE DEVICES

```

1
2 007402
3 007402 104401 067244
4 007406 013700 001300
5 007412 001004
6 007414 104401 066533
7 007420 104401 067273
8 007424 012701 001470
9 007430 010137 001466
10 007434 012702 000001
11 007440 005003
12 007442 030200
13 007444 001413
14 007446 104401 066533
15 007452 010311
16 007454 010346
    007456 104403
    007460 001
    007461 000
17 007462 116361 070102 000001
18 007470 062701 000002
19 007474 006302
20 007476 105702
21 007500 001402
22 007502 005203
23 007504 000756
24 007506 005011
25 007510 104401 001217
26
27
28 007514 004737 043246
29 007520 000425
30 007522 104401 007530
    007526 000413
    007556
31 007556 005737 000042
32 007562 001002
33 007564 000137 005426
34 007570 000137 041502
35 007574
36
37 007574 000240
38 007576 105737 001300
39 007602 001007
40 007604 005737 000042
41 007610 001002
42 007612 000137 005426
43 007616 000137 041502
44
45 007622 105037 001116
46 007626 005037 001206
47 007632 004737 064402
48 007636 012746 000240
    007642 012746 007650
    007646 000002
    007650

:ASSEMBLE TEST QUE FROM DEVICE MAP
CMNSTART:
    TYPE      DRIVES      ;TYPE 'DRIVE(S) TO BE TESTED'
    MOV      $DEVN,R0      ;R0 = DEVICE MAP
    BNE      1$            ;BR IF DRIVES TO TEST
    TYPE      ,COMMA      ;TYPE ' '
    TYPE      ,NONE       ;TYPE 'NONE'
1$:  MOV      #TSTQUE+2,R1 ;R1 = ADDRESS OF FIRST ENTRY IN QUE
    MOV      R1,TSTQUE    ;INITIALIZE ENTRY POINTER
    MOV      #1,R2        ;R2 = DEVICE POINTER
    CLR      R3           ;R3 = DEVICE NUMBER
2$:  BIT      R2,R0        ;IS THIS DEVICE IN MAP ?
    BEQ      3$          ;NO !!
    TYPE      ,COMMA      ;TYPE ' '
    MOV      R3,(R1)      ;YES - ENTER DEVICE NUMBER IN QUE
    MOV      R3,-(SP)     ;SAVE R3 FOR TYPEOUT
    TYPOS    1           ;GO TYPE--OCTAL ASCII
    .BYTE    1           ;TYPE 1 DIGIT(S)
    .BYTE    0           ;SUPPRESS LEADING ZEROS
    MOVB     ATNTBL(R3),1(R1);ENTER ATTENTION BIT IN QUE
    ADD      #2,R1        ;ADVANCE ENTRY POINTER
3$:  ASL      R2           ;ADVANCE DEVICE POINTER
    TSTB     R2           ;DONE ALL DEVICES ?
    BEQ      4$          ;YES
    INC      R3           ;ADVANCE DEVICE NUMBER
    BR       2$          ;ENTER NEXT DEVICE
4$:  CLR      (R1)        ;TERMINATE TEST QUE
    TYPE     .$CRLF      ;TYPE CR-LF

:SIZE FOR CLOCK
    JSR     PC,SIZCLK    ;SEE IF CLOCK PRESENT
    BR     6$           ;YES - CLOCK IS PRESENT
    TYPE    ,65$        ;TYPE ASCII STRING
    BR     64$         ;GET OVER THE ASCII
::65$: .ASCIZ <CRLF>/NO 'L' OR 'P' CLOCK/
64$:
    TST     2#42       ;ANY MONITOR PRESENT ?
    BNE     5$         ;BR IF YES
    JMP     START      ;JUMP TO START
5$:  JMP     $GET42    ;RETURN CONTROL TO MONITOR
6$:
READY: NOP
    TSTB    $DEVN      ;READY TO START TEST
    BNE     2$         ;ANY DRIVES IN MAP ?
    TST     2#42       ;ANY MONITOR PRESENT ?
    BNE     1$         ;BR IF YES
1$:  JMP     START      ;JUMP TO START
    JMP     $GET42    ;RETURN CONTROL TO MONITOR
2$:  CLRB    $STNM      ;RESET TEST NUMBER
    CLR     $TIMES     ;INITIALIZE NUMBER OF ITERATIONS
    JSR     PC,$TKINT  ;INITIALIZE TTY
    MOV     #PR5,-(SP) ;PUT NEW PS ON STACK
    MOV     #64$,-(SP);PUT NEW PC ON STACK
    RTI                    ;POP NEW PC AND PS
64$:
    
```

```

49 007650 117737 171612 001234      MOV      @TSTQUE,$UNIT      ;LOAD DRIVE NUMBER
50
51                                     ;CLEAR MASSBUS CONTROLLER, SELECT DRIVE AND SET LAST TRACK ADDRESS
52 007656 013700 001276                MOV      $BASE,R0          ;R0 = UNIBUS ADDRESS
53 007662 012760 000040 000010        MOV      #CLR,RMCS2(R0)    ;CLEAR MASSBUS
54 007670 113760 001234 000010        MOV      $UNIT,RMCS2(R0)  ;SELECT DEVICE UNDER TEST
55 007676 012737 006400 001334        MOV      #TAB!TA4!TA1,LSTRK ;SET LAST TRACK = 13.
56
57                                     ;TYPE DRIVE NUMBER TO BE TESTED($UNIT)
58 007704 104401 001217                TYPE     ,SCRLF           ;CR-LF
59 007710 104401 067104                TYPE     ,MSGDRV         ;TYPE 'DRIVE'
60 007714 013746 001234                MOV      $UNIT,-(SP)     ;;SAVE $UNIT FOR TYPEOUT
                                ;;TYPE DRIVE NUMBER
                                ;;GO TYPE--OCTAL ASCII
                                ;;TYPE 2 DIGIT(S)
                                ;;SUPPRESS LEADING ZEROS
                                ;;THESE TWO LOOPS ARE ADDED TO
                                ;;WAIT FOR TTY
        007720 104403                TYPOS
        007722      002                .BYTE 2
        007723      000                .BYTE 0
61 007724 005004                CLR      R4
62 007726 005304                DEC      R4
63 007730 001376                BNE     .-2
64 007732 005304                DEC      R4
65 007734 001376                BNE     .-2
    
```

1
2

 : *TEST 1 CONTROLLER ACCESS TEST

 TST1:

007736	000004			SCOPE	:SCOPE CALL
007736	000240			NOP	:START OF TEST
007740	012706	001100		MOV #STACK,SP	:INITIALIZE STACK POINTER
007742	013700	001276		MOV \$BASE,R0	:R0 = UNIBUS ADDRESS
007746	013701	001466		MOV TSTQUE,R1	:(R1) = DEVICE BEING TESTED
007752	012737	000001	001226	MOV #1,\$TESTN	::SET TEST NUMBER IN APT MAIL BOX
3					
4	007764	005001		CLR R1	
5	007766	013746	000004	MOV ERRVEC,-(SP)	::PUSH ERRVEC ON STACK
	007772	013746	000006	MOV ERRVEC+2,-(SP)	::PUSH ERRVEC+2 ON STACK
6	007776	012737	010100	MOV #1\$,ERRVEC	
7	010004	012737	000300	MOV #PR6,ERRVEC+2	
8					
9	010012	110160	000001	MOVB R1,RMCS1+1(R0)	:MOVE HI BYTE TO RMCS1
10	010016	010160	000002	MOV R1,RMWC(R0)	:MOVE WORD COUNT REGISTER
11	010022	016002	000002	MOV RMWC(R0),R2	
12	010026	010160	000004	MOV R1,RMBA(R0)	:MOVE BUS ADDRESS REGISTER
13	010032	016002	000004	MOV RMBA(R0),R2	
14	010036	016046	000010	MOV RMCS2(R0),-(SP)	::PUSH RMCS2(R0) ON STACK
15	010042	010160	000010	MOV R1,RMCS2(R0)	:MOVE CONTROL STATUS REGISTER
16	010046	016002	000010	MOV RMCS2(R0),R2	
17	010052	012660	000010	MOV (SP)+,RMCS2(R0)	::POP STACK INTO RMCS2(R0)
18	010056	010160	000022	MOV R1,RMDB(R0)	:MOVE DATA BUFFER
19	010062	016002	000022	MOV RMDB(R0),R2	
20	010066	012637	000006	MOV (SP)+,ERRVEC+2	::POP STACK INTO ERRVEC+2
	010072	012637	000004	MOV (SP)+,ERRVEC	::POP STACK INTO ERRVEC
21	010076	000417		BR 3\$:NO BUS TIMEOUT OCCURRED
22					
23	010100	022626		1\$: CMP (SP)+,(SP)+	:ADJUST STACK
24	010102	012637	000006	MOV (SP)+,ERRVEC+2	::POP STACK INTO ERRVEC+2
	010106	012637	000004	MOV (SP)+,ERRVEC	::POP STACK INTO ERRVEC
25	010112	104110		EMT 110	
26	010114	005737	000042	TST @M42	:IS MONITOR PRESENT ?
27	010120	001002		BNE 2\$:BR IF YES
28	010122	000137	005416	JMP START1	:YES-GO GET \$BASE
29	010126	005037	001300	2\$: CLR \$DEVN	:FUDGE NO DRIVES IN MAP
30	010132	000137	041502	JMP \$GET42	:RETURN CONTROL TO MONITOR
31	010136			3\$:	
32					
33					

 : *TEST 2 LOGICAL ADDRESS PLUGS TEST

 TST2:

010136	000004			SCOPE	:SCOPE CALL
010136	000240			NOP	:START OF TEST
010140	012706	001100		MOV #STACK,SP	:INITIALIZE STACK POINTER
010142	013700	001276		MOV \$BASE,R0	:R0 = UNIBUS ADDRESS
010146	013701	001466		MOV TSTQUE,R1	:(R1) = DEVICE BEING TESTED
010152	012737	000001	001206	MOV #1,\$TIMES	::DO 1 ITERATION
010156	012737	000002	001226	MOV #2,\$TESTN	::SET TEST NUMBER IN APT MAIL BOX
34					
35	010172	005737	001330	TST MANUAL	:DO WANT MANUAL INTERVENTION TEST ?


```

85 010444 032737 004000 001176 5$: BIT #DVA,$TMP1 ;WAS DEVICE AVAILABLE ?
86 010452 001001 BNE 6$ ;BR IF YES
87 010454 104112 EMT 112
88
89 010456 005202 6$: INC R2 ;ADDRESS NEXT UNIT
90 010460 020227 000007 CMP R2,#UNMSK ;ALL PLUGS ADDRESSED ?
91 010464 101670 BLOS 1$ ;BR IF NO
92 010466 104401 067750 TYPE ,DONE ;TYPE DONE MESSAGE
93 010472 104401 067617 TYPE ,INSERT ;TYPE 'INSERT LOGICAL ADRS PLUG #'
94 010476 013746 001234 MOV $UNIT,-(SP) ;SAVE $UNIT FOR TYPEOUT
;GET ORIGINAL DRIVE ADDRESSED
;GO TYPE--OCTAL ASCII
;TYPE 1 DIGIT(S)
;SUPPRESS LEADING ZEROS
;TYPE RETURN WHEN READY
;WAIT FOR <RET> TO CONTINUE
;CR-LF
;THESE TWO LOOPS ARE ADDED TO
;WAIT FOR TTY
010502 104403 TYPOS
010504 001 .BYTE 1
010505 000 .BYTE 0
95 010506 104401 067720 TYPE ,RET
96 010512 104412 RDLIN
97 010514 104401 001217 TYPE ,$CRLF
98 010520 005004 CLR R4
99 010522 005304 DEC R4
100 010524 001376 BNE -2
101 010526 005304 DEC R4
102 010530 001376 BNE -2
103 010532 7$:
104
105
*****
;*TEST 3 UNIBUS INITIALIZE TEST
*****
TST3:
010532 000004 SCOPE ;SCOPE CALL
010532 000004 NOP ;START OF TEST
010534 000240 MOV #STACK,SP ;INITIALIZE STACK POINTER
010536 012706 001100 MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
010542 013700 001276 MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
010546 013701 001466 MOV #1,$TIMES ;DO 1 ITERATION
010552 012737 000001 001206 MOV #3,$TESTN ;SET TEST NUMBER IN APT MAIL BOX
010560 012737 000003 001226
106
107 010566 004737 052466 JSR PC,CNTCLR ;GO ISSUE CONTROLLER CLEAR
010572 000404 BR 1$ ;GO TO 1$ IF NO ERROR
010574 000240 NOP ;RETURN HERE IF ERROR
010576 104000 EMT ;ERROR NUMBER DEFINED BY SUBROUTINE
010600 000137 011402 JMP 15$ ;GO TO 15$ IF ERROR
108 010604 1$:
109 010604 012702 000101 MOV #65.,R2 ;SET OR AND RESET IR
110 010610 012737 000000 001434 MOV #0,RMDB0 ;WRITE ZEROS IN DATA SILO
111 010616 112737 000022 001545 MOVB #RMDB,PUTINX ;SETUP REGISTER INDEX
112 010624 112737 000200 001546 MOVB #200,PUTINX+1
113 010632 2$:
114 010632 004737 043016 JSR PC,PUT ;GO WRITE REGISTER(S) WITH PUT SUBROUTINE
010636 000404 BR 3$ ;GO TO 3$ IF NO ERROR
010640 000240 NOP ;RETURN HERE IF ERROR
010642 104000 EMT ;ERROR # DEFINED BY PUT SUBROUTINE
010644 070137 011402 JMP 15$ ;GO TO 15$ IF ERROR
115 010650 005302 3$: DEC R2 ;DECREMENT COUNT
116 010652 001367 BNE 2$ ;WRITE SILO AGAIN
117 010654 012737 177777 001416 MOV #-1,RMBA0 ;RMBA = ALL 1'S
118 010662 012737 177777 001426 MOV #-1,RMER10 ;RMER1 = ALL 1'S
119 010670 012737 177777 001454 MOV #-1,RMER20 ;RMER2 = ALL 1'S
  
```



```

13 UNIBUS INITIALIZE TEST
120 010676 012737 040001 001436      MOV      #DMD!DBEN,RMMR10      ;SET DIAGNOSTIC MODE
121 010704 012737 003577 001412      MOV      #003577,RMCS10
122 010712 012737 021037 001422      MOV      #021037,RMCS20
123
124 010720 012702 001545      MOV      #PUTINX,R2          ;R2 = ADDRESS OF INDEX TABLE
125 010724 112722 000004      MOVB    #RMB A,(R2)+
126 010730 112722 000014      MOVB    #RMER1,(R2)+
127 010734 112722 000042      MOVB    #RMER2,(R2)+
128 010740 112722 000024      MOVB    #RMMR1,(R2)+
129 010744 112722 000000      MOVB    #RMCS1,(R2)+
130 010750 112722 000010      MOVB    #RMCS2,(R2)+
131 010754 112722 000200      MOVB    #200,(R2)+
132 010760 004737 043016      JSR     PC,PUT              ;GO WRITE REGISTER(S) WITH PUT SUBROUTINE
      010764 000404      BR      4$                ;GO TO 4$ IF NO ERROR
      010766 000240      NOP                    ;RETURN HERE IF ERROR
      010770 104000      EMT                    ;ERROR # DEFINED BY PUT SUBROUTINE
      010772 000137 011402      JMP     15$              ;GO TO 15$ IF ERROR
133 010776 000005      4$:  RESET                ;UNIBUS INITIALIZE
134 011000 004737 064402      JSR     PC,$TKINT         ;INITIALIZE CONSOLE
135 011004 111160 000010      MOVB   (R1),RMCS2(R0)    ;SELECT DEVICE
136 011010 004737 042462      JSR     PC,$GETSTS       ;GO SET UP FOR STATUS FETCH
137
138 011014 004737 042546      JSR     PC,$GET          ;GO READ REGISTER(S) WITH GET SUBROUTINE
      011020 000403      BR      5$                ;GO TO 5$ IF NO ERROR
      011022 000240      NOP                    ;RETURN HERE IF ERROR
      011024 104000      EMT                    ;ERROR # DEFINED BY GET SUBROUTINE
139 011026 000565      BR      15$              ;SKIP REMAINDER OF TEST
140
141 011030 013737 001336 001142 5$:  MOV     RMCS1I,$BDDAT     ;VERIFY RMCS1
142 011036 042737 100000 001142      BIC    #SC,$BDDAT        ;IGNORE SPECIAL CONDITION
143 011044 012737 004200 001140      MOV     #DVA!RDY,$GDDAT  ;EXPECT DVA & RDY
144 011052 023737 001140 001142      CMP    $GDDAT,$BDDAT    ;COMPARE EXPECTED, RECEIVED
145 011060 001401      BEQ    6$                ;BRANCH IF EQUAL
146 011062 104115      EMT     115
147
148 011064 005037 001140      6$:  CLR     $GDDAT          ;VERIFY RMB A IS ZERO
149 011070 013737 001342 001142      MOV     RMB A I,$BDDAT
150 011076 001401      BEQ    7$                ;BRANCH IF ZERO
151 011100 104116      EMT     116
152
153 011102 013737 001346 001142 7$:  MOV     RMCS2I,$BDDAT    ;VERIFY RMCS2
154 011110 005046      CLR    -(SP)             ;EXPECT IR & UNIT NUMBER
155 011112 111116      MOVB   (R1),(SP)
156 011114 052716 000100      BIS    #IR,(SP)
157 011120 012637 001140      MOV    (SP)+,$GDDAT
158 011124 023737 001140 001142      CMP    $GDDAT,$BDDAT    ;COMPARE EXPECTED & RECEIVED
159 011132 001401      BEQ    8$                ;BRANCH IF EQUAL
160 011134 104117      EMT     117
161
162 011136 005037 001140      8$:  CLR     $GDDAT          ;VERIFY RMER1
163 011142 013737 001352 001142      MOV     RMER1I,$BDDAT
164 011150 042737 040000 001142      BIC    #UNS,$BDDAT      ;IGNORE UNSAFE
165 011156 001401      BEQ    9$                ;BRANCH IF ZERO
166 011160 104120      EMT     120
167
168 011162 013737 001354 001142 9$:  MOV     RMA SI,$BDDAT    ;VERIFY RMA S
169 011170 005002      CLR    R2                ;CLEAR ALL BUT THIS

```

```

170 011172 116102 000001      MOVB      1(R1),R2      ;DRIVES ATTENTION BIT
171 011176 000302      SWAB     R2
172 011200 005102      COM      R2
173 011202 000240      NOP
174 011204 040237 001142      BIC      R2,$BDDAT
175 011210 001401      BEQ     10$           ;BRANCH IF ITS 0
176 011212 104121      EMT     121
177
178 011214 013737 001362 001142 10$:  MOV     RMMR1I,$BDDAT ;VERIFY RMMR
179 011222 042737 000046 001142      BIC     #WC!LS!LST,$BDDAT ;IGNORE WORD CLOCK, SCT, TRK
180 011230 012737 000010 001140      MOV     #MWD,$GDDAT ;EXPECT WRITE DATA BIT
181 011236 023737 001140 001142      CMP     $GDDAT,$BDDAT ;COMPARE EXPECTED AND RECEIVED
182 011244 001401      BEQ     11$           ;BRANCH IF 0
183 011246 104122      EMT     122
184
185 011250 005037 001140 11$:  CLR     $GDDAT ;EXPECT ZEROS
186 011254 013737 001404 001142      MOV     RMEC2I,$BDDAT ;VERIFY RMEC2 = 0
187 011262 001401      BEQ     12$
188 011264 104124      EMT     124
189
190 011266 013737 001376 001142 12$:  MOV     RMMR2I,$BDDAT ;VERIFY RMMR2
191 011274 042737 140000 001142      BIC     #RQA!RQB,$BDDAT
192 011302 012737 011777 001140      MOV     #TST!1777,$GDDAT ;EXPECT TEST.TAG BIT ON
193 011310 023737 001140 001142      CMP     $GDDAT,$BDDAT
194 011316 001401      BEQ     13$
195 011320 104125      EMT     125
196
197 011322 005037 001140 13$:  CLR     $GDDAT ;EXPECT ALL ZEROS
198 011326 013737 001400 001142      MOV     RMER2I,$BDDAT ;VERIFY RMER2
199 011334 042737 040200 001142      BIC     #SKI!DVC,$BDDAT ;IGNORE DEVICE ERRORS
200 011342 001401      BEQ     14$           ;BRANCH IF OTHER BITS 0
201 011344 104173      EMT     173
202 011346 013737 001350 001142 14$:  MOV     RMDSI,$BDDAT ;CHECK DRIVE STATUS REGISTER
203 011354 042737 177177 001142      BIC     #^C<DPR!DRY>,$BDDAT
204 011362 012737 000600 001140      MOV     #DPR!DRY,$GDDAT ;EXPECTED STATUS
205 011370 023737 001142 001140      CMP     $BDDAT,$GDDAT ;COMPARE EXPECTED & RECEIVED STATUS
206 011376 001401      BEQ     15$           ;DRIVE STATUS IS OK
207 011400 104123      EMT     123
208 011402 15$:
209
210

```

```

:*****
:*TEST 4 CONTROLLER CLEAR TEST
:*****
TST4:

```

```

011402
011402 000004      SCOPE ;SCOPE CALL
011404 000240      NOP   ;START OF TEST
011406 012706 001100      MOV   #STACK,SP ;INITIALIZE STACK POINTER
011412 013700 001276      MOV   $BASE,R0 ;R0 = UNIBUS ADDRESS
011416 013701 001466      MOV   TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
011422 012737 000004 001226      MOV   #4,$TESTN ;SET TEST NUMBER IN APT MAIL BOX
211
212 011430 004737 052466      JSR   PC,CNTCLR ;GO ISSUE CONTROLLER CLEAR
011434 000404      BR    1$ ;GO TO 1$ IF NO ERROR
011436 000240      NOP   ;RETURN HERE IF ERROR
011440 104000      EMT   ;ERROR NUMBER DEFINED BY SUBROUTINE
011442 000137 011740      JMP   8$ ;GO TO 8$ IF ERROR
213 011446 1$:

```

214	011446	012702	000101		MOV	#65.,R2	
215	011452	012737	000000	001434	MOV	#0,RMDBO	:WRITE ZEROS IN DATA SILO
216	011460	112737	000022	001545	MOVB	#RMDB,PUTINX	:SETUP REGISTER INDEX TABLE
217	011466	112737	000200	001546	MOVB	#200,PUTINX+1	
218	011474						
219	011474	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	011500	000404			BR	3\$:GO TO 3\$ IF NO ERROR
	011502	000240			NOP		:RETURN HERE IF ERROR
	011504	104000			EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	011506	000137	011740		JMP	8\$:GO TO 8\$ IF ERROR
220	011512	005302			DEC	R2	:DECREMENT COUNT
221	011514	001367			BNE	2\$:AND WRITE SILO AGAIN IF NOT DONE
222	011516	012737	177777	001416	MOV	#-1,RMBA0	
223	011524	012737	177777	001426	MOV	#-1,RMER10	
224	011532	012737	177777	001454	MOV	#-1,RMER20	
225	011540	012737	040001	001436	MOV	#DMD!DBEN,RMMR10	
226	011546	012737	003577	001412	MOV	#003577,RMCS10	
227	011554	012737	021037	001422	MOV	#021037,RMCS20	
228	011562	012702	001545		MOV	#PUTINX,R2	:R2 = ADDRESS OF INDEX TABLE
229	011566	112722	000004		MOVB	#RMB0,(R2)+	
230	011572	112722	000014		MOVB	#RMER1,(R2)+	
231	011576	112722	000042		MOVB	#RMER2,(R2)+	
232	011602	112722	000024		MOVB	#RMMR1,(R2)+	
233	011606	112722	000000		MOVB	#RMCS1,(R2)+	
234	011612	112722	000010		MOVB	#RMCS2,(R2)+	
235	011616	112722	000200		MOVB	#200,(R2)+	
236	011622	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	011626	000403			BR	4\$:GO TO 4\$ IF NO ERROR
	011630	000240			NOP		:RETURN HERE IF ERROR
	011632	104000			EMT		:ERROR # DEFINED BY PUT SUBROUTINE
237	011634	000430			BR	7\$	
238							
239	011636						
240	011636	004737	052466		JSR	PC,CNTCLR	:GO ISSUE CONTROLLER CLEAR
	011642	000404			BR	5\$:GO TO 5\$ IF NO ERROR
	011644	000240			NOP		:RETURN HERE IF ERROR
	011646	104000			EMT		:ERROR NUMBER DEFINED BY SUBROUTINE
	011650	000137	011740		JMP	8\$:GO TO 8\$ IF ERROR
241	011654	004737	042462		JSR	PC,GETSTS	:SETUP TO READ ALL REGISTERS
242							
243	011660	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	011664	000404			BR	6\$:GO TO 6\$ IF NO ERROR
	011666	000240			NOP		:RETURN HERE IF ERROR
	011670	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	011672	000137	011740		JMP	8\$:GO TO 8\$ IF ERROR
244	011676						
245	011676	004737	052604		JSR	PC,CLRSTS	:GO VERIFY CONTROLLER CLEAR OPERATION
	011702	000405			BR	7\$:GO TO 7\$ IF NO ERROR
	011704	000240			NOP		:RETURN HERE IF ERROR
	011706	104000			EMT		:ERROR # DEFINED BY CLRSTS SUBROUTINE
	011710	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	011712	000137	011740		JMP	8\$:GO TO 8\$ IF ERROR
246	011716						
247	011716	012737	000000	001412	MOV	#NOP,RMCS10	:CHANGE FUNCTION CODE FOR ERROR CHECK
248							
249	011724	004737	044416		JSR	PC,SECERR	:GO CHECK FOR SECONDARY ERRORS
	011730	000403			BR	8\$:GO TO 8\$ IF NO ERROR

T4 CONTROLLER CLEAR TEST

```

011732 000240      NOP      :RETURN HERE IF ERROR
011734 104000      EMT      :ERROR # DEFINED BY SECERR SUBROUTINE
011736 004736      JSR      PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
250 011740      8$:
251
252
:*****
:*TEST 5      ERROR CLEAR TEST
:*****
TST5:
011740
011740 000004      SCOPE    :SCOPE CALL
011742 000240      NOP      :START OF TEST
011744 012706 001100  MOV      #STACK,SP :INITIALIZE STACK POINTER
011750 013700 001276  MOV      $BASE,R0  :R0 = UNIBUS ADDRESS
011754 013701 001466  MOV      TSTQUE,R1 : (R1) = DEVICE BEING TESTED
011760 012737 000005 001226  MOV      #5,$TESTN :SET TEST NUMBER IN APT MAIL BOX
253
254 011766 004737 052466  JSR      PC,CNTCLR :GO ISSUE CONTROLLER CLEAR
011772 000404      BR      1$      :GO TO 1$ IF NO ERROR
011774 000240      NOP      :RETURN HERE IF ERROR
011776 104000      EMT      :ERROR NUMBER DEFINED BY SUBROUTINE
012000 000137 012146  JMP      5$      :GO TO 5$ IF ERROR
255
256 012004 112737 000000 001545 1$:  MOVB    #RMCS1,PUTINX :SETUP PUT INDEX TABLE
012012 112737 000200 001546  MOVB    #200,PUTINX+1 :SET TERMINATOR BYTE
012020 012737 040000 001412  MOV     #TRE,RMCS10  :SET RMCS1 OUTPUT BUFFER = TRE
012026 004737 043016  JSR     PC,PUT      :GO WRITE RMCS1 VIA PUT SUBROUTINE
012032 000404      BR      2$      :GO TO 2$ IF NO ERROR
012034 000240      NOP      :RETURN HERE IF ERROR
012036 104000      EMT      :ERROR DEFINED BY PUT SUBROUTINE
012040 000137 012146  JMP      5$      :GO TO 5$ IF ERROR
257
258 012044 112737 000000 001516 2$:  MOVB    #RMCS1,GETINX
259 012052 112737 000010 001517  MOVB    #RMCS2,GETINX+1
260 012060 112737 000200 001520  MOVB    #200,GETINX+2
261
262 012066 004737 042546  JSR     PC,GET      :GO READ REGISTER(S) WITH GET SUBROUTINE
012072 000403      BR      3$      :GO TO 3$ IF NO ERROR
012074 000240      NOP      :RETURN HERE IF ERROR
012076 104000      EMT      :ERROR # DEFINED BY GET SUBROUTINE
263 012100 000422      BR      5$      :SKIP REST OF TEST
264 012102 013737 001336 001142 3$:  MOV     RMCS1I,$BDDAT :CHECK TRE & MCPE
265 012110 005037 001140      CLR     $GDDAT      :EXPECT 0'S
266 012114 042737 117777 001142  BIC     #^C<TRE!MCPE>,$BDDAT
267 012122 001401      BEQ    4$      :BRANCH IF TRE & MCPE = 0
268 012124 104137      EMT     137
269
270 012126 013737 001346 001142 4$:  MOV     RMCS2I,$BDDAT :CHECK RMCS2
271 012134 042737 104377 001142  BIC     #^C<WCE!UPE!NED!PGE!MXF!MDPE>,$BDDAT
272 012142 001401      BEQ    5$
273 012144 104140      EMT     140
274
275 012146      5$:
276
277
:*****
:*TEST 6      DRIVE STATUS TEST
:*****
TST6:
012146

```

	012146	000004				SCOPE		:SCOPE CALL
	012150	000240				NOP		:START OF TEST
	012152	012706	001100			MOV	#STACK,SP	:INITIALIZE STACK POINTER
	012156	013700	001276			MOV	\$BASE,R0	:R0 = UNIBUS ADDRESS
	012162	013701	001466			MOV	TSTQIJE,R1	:(R1) = DEVICE BEING TESTED
	012166	012737	000006	001226		MOV	#6,\$TESTN	::SE1 TEST NUMBER IN APT MAIL BOX
278								
279	012174	004737	052466			JSR	PC,CNTCLR	:GO ISSUE CONTROLLER CLEAR
	012200	000404				BR	1\$:GO TO 1\$ IF NO ERROR
	012202	000240				NOP		:RETURN HERE IF ERROR
	012204	104000				EMT		:ERROR NUMBER DEFINED BY SUBROUTINE
	012206	000137	012462			JMP	8\$:GO TO 8\$ IF ERROR
280	012212				1\$:			
281	012212	004737	042462			JSR	PC,GETSTS	
282								
283	012216	004737	042546			JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	012222	000403				BR	2\$:GO TO 2\$ IF NO ERROR
	012224	000240				NOP		:RETURN HERE IF ERROR
	012226	104000				EMT		:ERROR # DEFINED BY GET SUBROUTINE
284	012230	000514				BR	8\$:SKIP REST OF TEST
285	012232	032737	010000	001350	2\$:	BIT	#MOL,RMDSI	:MEDIUM ON LINE??
286	012240	001016				BNE	3\$:YES!!
287	012242	013737	001350	001140		MOV	RMDSI,\$GDDAT	:EXPECTED STATUS
288	012250	042737	162000	001140		BIC	#ATA!ERR!PIP!LBT,\$GDDAT	
289	012256	052737	010000	001140		BIS	#MOL,\$GDDAT	
290	012264	013737	001350	001142		MOV	RMDSI,\$BDDAT	:RECEIVED STATUS
291	012272	104151				EMT	151	:MOL STATUS INCORRECT
292	012274	000440				BR	5\$	
293								
294	012276	032737	000200	001400	3\$:	BIT	#DVC,RMER2I	:IS THERE A DEVICE CHECK??
295	012304	001422				BEQ	4\$:BR IF NO
296	012306	013737	001400	001142		MOV	RMER2I,\$BDDAT	:RECEIVED STATUS
297	012314	005037	001140			CLR	\$GDDAT	:EXPECTED STATUS
298	012320	104152				EMT	152	:DRIVE FAULT
299								
300	012322	032737	040000	001352		BIT	#UNS,RMER1I	:IS UNS SET??
301	012330	001022				BNE	5\$:YES!!
302	012332	013737	001352	001142		MOV	RMER1I,\$BDDAT	:RECEIVED STATUS
303	012340	012737	040000	001140		MOV	#UNS,\$GDDAT	:EXPECTED STATUS
304	012346	104153				EMT	153	: "DVC" IS SET BUT "UNS" IS NOT
305	012350	000412				BR	5\$	
306								
307	012352	032737	040000	001352	4\$:	BIT	#UNS,RMER1I	:IS UNS SET??
308	012360	001410				BEQ	6\$:NO!!
309	012362	013737	001352	001142		MOV	RMER1I,\$BDDAT	:RECEIVED STATUS
310	012370	005037	001140			CLR	\$GDDAT	:EXPECTED STATUS
311	012374	104154				EMT	154	: "DVC" IS NOT SET, BUT "UNS" IS
312	012376	000137	041256		5\$:	JMP	\$EOSP	:SKIP REST OF TEST
313								
314	012402	032737	004000	001350	6\$:	BIT	#WRL,RMDSI	:IS WRITE PROTECT ON??
315	012410	001412				BEQ	7\$:NO!!
316	012412	032737	001350	001140		MOV	RMDSI,\$GDDAT	:EXPECTED STATUS
317	012420	042737	166076	001140		BIC	#^C<MOL!PGM!DPR!DRY!VV!OM>,\$GDDAT	
318	012426	013737	001350	001142		MOV	RMDSI,\$BDDAT	:RECEIVED STATUS
319	012434	104175				EMT	175	:SELECTED DEVICE IN WRITE PROTECT
320								
321	012436	032737	040000	001400	7\$:	BIT	#SKI,RMER2I	:IS SKI SET??

```
322 012444 001406 BEQ 8$ :NO!!
323 012446 013737 001400 001142 MOV RMER2I,$BDDAT :RECEIVED STATUS
324 012454 005037 001140 CLR $GDDAT :EXPECTED STATUS
325 012460 104205 EMT 205 :PERSISTENT SEEK INCOMPLETE ERROR
326 012462 8$:
327
328
```

```
::*****
:*TEST 7 PRIMARY/SECONDARY ERROR TEST
:*****
```

TST7:

```
012462 000004 SCOPE :SCOPE CALL
012462 000240 NOP :START OF TEST
012466 012706 001100 MOV #STACK,SP :INITIALIZE STACK POINTER
012472 013700 001276 MOV $BASE,R0 :R0 = UNIBUS ADDRESS
012476 013701 001466 MOV TSTQUE,R1 : (R1) = DEVICE BEING TESTED
012502 012737 000007 001226 MOV #7,$TESTN :SET TEST NUMBER IN APT MAIL BOX
329
330 012510 004737 052466 JSR PC,CNTCLR :GO ISSUE CONTROLLER CLEAR
012514 000404 BR 1$ :GO TO 1$ IF NO ERROR
012516 000240 NOP :RETURN HERE IF ERROR
012520 104000 EMT :ERROR NUMBER DEFINED BY SUBROUTINE
012522 000137 012642 JMP 5$ :GO TO 5$ IF ERROR
331 012526 1$:
332 012526 112737 000000 001545 MOVB #RMCS1,PUTINX :SETUP PUT INDEX TABLE
012534 112737 000200 001546 MOVB #200,PUTINX+1 :SET TERMINATOR BYTE
012542 012737 000023 001412 MOV #PAKACK!GO,RMCS10 :SET RMCS1 OUTPUT BUFFER = PAKACK!GO
012550 004737 043016 JSR PC,PUT :GO WRITE RMCS1 VIA PUT SUBROUTINE
012554 000403 BR 2$ :GO TO 2$ IF NO ERROR
012556 000240 NOP :RETURN HERE IF ERROR
012560 104000 EMT :ERROR DEFINED BY PUT SUBROUTINE
333 012562 000427 BR 5$ :SKIP REST OF TEST IF ERROR
334 012564 004737 042462 2$: JSR PC,GETSTS :SETUP FOR STATUS FETCH
335 012570 004737 043370 JSR PC,TIMOUT :WAIT FOR COMPLETION OF NOP
336
337 012574 004737 042546 JSR PC,GET :GO READ REGISTER(S) WITH GET SUBROUTINE
012600 000403 BR 3$ :GO TO 3$ IF NO ERROR
012602 000240 NOP :RETURN HERE IF ERROR
012604 104000 EMT :ERROR # DEFINED BY GET SUBROUTINE
338 012606 000415 BR 5$ :SKIP REST OF TEST IF ERROR
339 012610 3$:
340 012610 004737 043564 JSR PC,PRIERR :GO CHECK FOR PRIMARY ERRORS
012614 000404 BR 4$ :GO TO 4$ IF NO ERROR
012616 000240 NOP :RETURN HERE IF ERROR
012620 104000 EMT :ERROR # DEFINED BY PRIERR SUBROUTINE
012622 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
341 012624 000406 BR 5$ :SKIP REST OF TEST IF ERROR
342 012626 4$:
343 012626 004737 044416 JSR PC,SECERR :GO CHECK FOR SECONDARY ERRORS
012632 000403 BR 5$ :GO TO 5$ IF NO ERROR
012634 000240 NOP :RETURN HERE IF ERROR
012636 104000 EMT :ERROR # DEFINED BY SECERR SUBROUTINE
012640 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
344 012642 5$:
345
346
```

```
::*****
:*TEST 10 DIAGNOSTIC MODE TEST
:*****
```

					TST10:			
	012642				SCOPE		:SCOPE CALL	
	012642	000004			NOP		:START OF TEST	
	012644	000240			MOV	#STACK,SP	:INITIALIZE STACK POINTER	
	012646	012706	001100		MOV	\$BASE,R0	:R0 = UNIBUS ADDRESS	
	012652	013700	001276		MOV	TSTQUE,R1	:(R1) = DEVICE BEING TESTED	
	012656	013701	001466		MOV	#10,\$TESTN	:SET TEST NUMBER IN APT MAIL BOX	
	012662	012737	000010	001226				
347								
348	012670	004737	052466		JSR	PC,CNTCLR	:GO ISSUE CONTROLLER CLEAR	
	012674	000404			BR	1\$:GO TO 1\$ IF NO ERROR	
	012676	000240			NOP		:RETURN HERE IF ERROR	
	012700	104000			EMT		:ERROR NUMBER DEFINED BY SUBROUTINE	
	012702	000137	013714		JMP	21\$:GO TO 21\$ IF ERROR	
349								
350	012706	112737	000024	001545	1\$:	MOV	#RMMR1,PUTINX	:SETUP PUT INDEX TABLE
	012714	112737	000200	001546		MOV	#200,PUTINX+1	:SET TERMINATOR BYTE
	012722	012737	000001	001436		MOV	#DMD,RMMR1O	:SET RMMR1 OUTPUT BUFFER = DMD
	012730	004737	043016		JSR	PC,PUT	:GO WRITE RMMR1 VIA PUT SUBROUTINE	
	012734	000404			BR	2\$:GO TO 2\$ IF NO ERROR	
	012736	000240			NOP		:RETURN HERE IF ERROR	
	012740	104000			EMT		:ERROR DEFINED BY PUT SUBROUTINE	
	012742	000137	013714		JMP	21\$:GO TO 21\$ IF ERROR	
351	012746	004737	042462		2\$:	JSR	PC,GETSTS	:SETUP FOR STATUS FETCH
352								
353	012752	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE	
	012756	000404			BR	3\$:GO TO 3\$ IF NO ERROR	
	012760	000240			NOP		:RETURN HERE IF ERROR	
	012762	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE	
	012764	000137	013714		JMP	21\$:GO TO 21\$ IF ERROR	
354	012770	032737	000001	001362	3\$:	BIT	#DMD,RMMR1I	:IS DIAGNOSTIC MODE SET??
355	012776	001011			BNE	4\$:YES!!	
356	013000	012737	000001	001140	MOV	#DMD,\$GDDAT	:EXPECTED STATUS	
357	013006	013737	001362	001142	MOV	RMMR1I,\$BDDAT	:RECEIVED STATUS	
358	013014	104176			EMT	176		
359	013016	000137	013714		JMP	21\$:SKIP REST OF TEST IF DMD = 0	
360	013022	032737	010000	001350	4\$:	BIT	#MOL,RMDSI	:IS 'MOL' = 0 ??
361	013030	001411			BEQ	5\$:YES!!	
362	013032	013737	001350	001142	MOV	RMDSI,\$BDDAT	:SETUP BAD DATA FOR TYPEOUT	
363	013040	042737	167777	001142	BIC	#^CMOL,\$BDDAT		
364	013046	005037	001140		CLR	\$GDDAT	:SETUP GOOD DATA FOR TYPEOUT	
365	013052	104170			EMT	170		
366	013054	032737	020000	001350	5\$:	BIT	#PIP,RMDSI	:IS PIP SET??
367	013062	001012			BNE	6\$:YES!!	
368	013064	013737	001350	001142	MOV	RMDSI,\$BDDAT	:SETUP BAD DATA FOR TYPEOUT	
369	013072	042737	157777	001142	BIC	#^CPIP,\$BDDAT		
370	013100	012737	020000	001140	MOV	#PIP,\$GDDAT	:EXPECTED PIP SET	
371	013106	104200			EMT	200		
372	013110	032737	004000	001350	6\$:	BIT	#WRL,RMDSI	:IS WRITE LOCK OFF??
373	013116	001411			BEQ	7\$:YES!!	
374	013120	013737	001350	001142	MOV	RMDSI,\$BDDAT	:SETUP BAD DATA FOR TYPEOUT	
375	013126	042737	173777	001142	BIC	#^CWRL,\$BDDAT		
376	013134	005037	001140		CLR	\$GDDAT	:EXPECTED WRL = 0	
377	013140	104201			EMT	201		
378	013142	032737	040000	001400	7\$:	BIT	#SKI,RMER2I	:IS SKI = 0
379	013150	001411			BEQ	8\$:YES!!	
380	013152	013737	001400	001142	MOV	RMER2I,\$BDDAT	:SETUP BAD DATA FOR TYPEOUT	
381	013160	042737	137777	001142	BIC	#^CSKI,\$BDDAT		

```

382 013166 005037 001140 CLR SGDDAT ;SKI SHOULD BE 0
383 013172 104202 EMT 202
384 013174 032737 000200 001400 8$: BIT #DVC,RMER2I ;IS DEVICE CHECK = 0??
385 013202 001411 BEQ 9$ ;YES!!
386 013204 013737 001400 001142 MOV RMER2I,$BDDAT ;SETUP BAD DATA FOR TYPEOUT
387 013212 042737 177577 001142 BIC #^CDVC,$BDDAT
388 013220 005037 001140 CLR SGDDAT ;DVC SHOULD BE 0
389 013224 104203 EMT 203
390 013226 9$:
391 013226 112737 000024 001545 MOVB #RMMR1,PUTINX ;SETUP PUT INDEX TABLE
013234 112737 000200 001546 MOVB #200,PUTINX+1 ;SET TERMINATOR BYTE
013242 012737 001711 001436 MOV #DMD!MUR!MOC!MSER!MDF!MUP,RMMR10 ;SET RMMR1 OUTPUT BUFFER = DMD!MUR!M
013250 004737 043016 JSR PC,PUT ;GO WRITE RMMR1 VIA PUT SUBROUTINE
013254 000404 BR 10$ ;GO TO 10$ IF NO ERROR
013256 000240 NOP ;RETURN HERE IF ERROR
013260 104000 EMT ;ERROR DEFINED BY PUT SUBROUTINE
013262 000137 013714 JMP 21$ ;GO TO 21$ IF ERROR
392 013266 10$:
393 013266 004737 042546 JSR PC,GET ;GO READ REGISTER(S) WITH GET SUBROUTINE
013272 000404 BR 11$ ;GO TO 11$ IF NO ERROR
013274 000240 NOP ;RETURN HERE IF ERROR
013276 104000 EMT ;ERROR # DEFINED BY GET SUBROUTINE
013300 000137 013714 JMP 21$ ;GO TO 21$ IF ERROR
394 013304 032737 000001 001362 11$: BIT #DMD,RMMR1 ;IS DIAGNOSTIC MODE SET??
395 013312 001011 BNE 12$ ;YES!!
396 013314 012737 000001 001140 MOV #DMD,$GDDAT ;EXPECTED STATUS
397 013322 013737 001362 001142 MOV RMMR1I,$BDDAT ;RECEIVED STATUS
398 013330 104176 EMT 176
399 013332 000137 013714 JMP 21$ ;SKIP REST OF TEST IF DMD = 0
400 013336 032737 010000 001350 12$: BIT #MOL,RMDSI ;IS MOL = 1??
401 013344 001012 BNE 13$ ;YES!!
402 013346 013737 001350 001142 MOV RMDSI,$BDDAT ;SETUP BAD DATA FOR TYPEOUT
403 013354 042737 167777 001142 BIC #^CMOL,$BDDAT
404 013362 012737 010000 001140 MOV #MOL,$GDDAT ;EXPECTED MOL = 1
405 013370 104170 EMT 170
406 013372 032737 020000 001350 13$: BIT #PIP,RMDSI ;IS PIP = 0 ?
407 013400 001411 BEQ 14$ ;YES!!
408 013402 013737 001350 001142 MOV RMDSI,$BDDAT ;SETUP BAD DATA FOR TYPEOUT
409 013410 042737 157777 001142 BIC #^CPIP,$BDDAT
410 013416 005037 001140 CLR $GDDAT ;EXPECTED PIP STATUS
411 013422 104200 EMT 200
412 013424 032737 004000 001350 14$: BIT #WRL,RMDSI ;IS WRL SET??
413 013432 001012 BNE 15$ ;YES!!
414 013434 013737 001350 001142 MOV RMDSI,$BDDAT ;SETUP BAD DATA FOR TYPEOUT
415 013442 042737 173777 001142 BIC #^CWRL,$BDDAT
416 013450 012737 004000 001140 MOV #WRL,$GDDAT ;EXPECTED GOOD STATUS
417 013456 104201 EMT 201
418 013460 032737 040000 001400 15$: BIT #SKI,RMER2I ;IS SKI SET??
419 013466 001012 BNE 16$ ;YES!!
420 013470 013737 001400 001142 MOV RMER2I,$BDDAT ;BAD DATA FOR TYPEOUT
421 013476 042737 137777 001142 BIC #^CSKI,$BDDAT
422 013504 012737 040000 001140 MOV #SKI,$GDDAT ;EXPECTED SKI ON
423 013512 104202 EMT 202
424 013514 032737 000200 001400 16$: BIT #DVC,RMER2I ;IS DVC SET ??
425 013522 001012 BNE 17$ ;YES!!
426 013524 013737 001400 001142 MOV RMER2I,$BDDAT ;BAD DATA FOR TYPEOUT
427 013532 042737 177577 001142 BIC #^CDVC,$BDDAT
  
```



```

428 013540 012737 000200 001140      MOV    #DVC,$GDDAT      ;EXPECTED DVC ON
429 013546 104203                      EMT    203
430 013550 032737 000100 001350 17$:  BIT    #VV,RMDSI      ;MUR SHOULD HAVE RESET VOLUME VALID
431 013556 001411                      BEQ    18$            ;BRANCH IF IT DID
432 013560 013737 001350 001142      MOV    RMDSI,$BDDAT    ;BAD DATA FOR TYPEOUT
433 013566 042737 177677 001142      BIC    #^CVV,$BDDAT
434 013574 005037 001140      CLR    $GDDAT        ;GOOD DATA FOR TYPEOUT
435 013600 104204                      EMT    204
436 013602                      18$:
437 013602 112737 000000 001545      MOVB   #RMCS1,PUTINX   ;SETUP PUT INDEX TABLE
      013610 112737 000200 001546      MOVB   #200,PUTINX+1   ;SET TERMINATOR BYTE
      013616 012737 000011 001412      MOV    #DRVCLR!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = DRVCLR!GO
      013624 004737 043016      JSR    PC,PUT         ;GO WRITE RMCS1 VIA PUT SUBROUTINE
      013630 000404                      BR     19$            ;GO TO 19$ IF NO ERROR
      013632 000240                      NOP
      013634 104000                      EMT
      013636 000137 013714      JMP    21$            ;ERROR DEFINED BY PUT SUBROUTINE
      ;GO TO 21$ IF ERROR
438 013642                      19$:
439 013642 004737 042546      JSR    PC,GET         ;GO READ REGISTER(S) WITH GET SUBROUTINE
      013646 000404                      BR     20$            ;GO TO 20$ IF NO ERROR
      013650 000240                      NOP
      013652 104000                      EMT
      013654 000137 013714      JMP    21$            ;RETURN HERE IF ERROR
      ;ERROR # DEFINED BY GET SUBROUTINE
      ;GO TO 21$ IF ERROR
440 013660 032737 002000 001400 20$:  BIT    #LBC,RMER2I    ;IS LBC SET ??
441 013666 001012                      BNE   21$            ;YES!!
442 013670 013737 001400 001142      MOV    RMER2I,$BDDAT  ;BAD DATA FOR TYPEOUT
443 013676 012737 002000 001140      MOV    #LBC,$GDDAT    ;GOOD DATA FOR TYPEOUT
444 013704 042737 002000 001142      BIC    #LBC,$BDDAT
445 013712 104262                      EMT    262
446 013714                      21$:
447
448

```

```

*****
*TEST 11      PACK ACKNOWLEDGE TEST
*****
TST11:

```

```

013714 000004      SCOPE      ;SCOPE CALL
013714 000240      NOP        ;START OF TEST
013720 012706 001100  MOV    #STACK,SP    ;INITIALIZE STACK POINTER
013724 013700 001276  MOV    $BASE,R0     ;R0 = UNIBUS ADDRESS
013730 013701 001466  MOV    TSTQUE,R1    ;(R1) = DEVICE BEING TESTED
013734 012737 000011 001226  MOV    #11,$TESTN   ;SET TEST NUMBER IN APT MAIL BOX
449
450 013742 004737 052466  JSR    PC,CNTCLR    ;GO ISSUE CONTROLLER CLEAR
      013746 000404                      BR     1$            ;GO TO 1$ IF NO ERROR
      013750 000240                      NOP
      013752 104000                      EMT
      013754 000137 014214      JMP    8$            ;RETURN HERE IF ERROR
      ;ERROR NUMBER DEFINED BY SUBROUTINE
      ;GO TO 8$ IF ERROR
451 013760                      1$:
452 013760 112737 000024 001545      MOVB   #RMMR1,PUTINX  ;SETUP PUT INDEX TABLE
      013766 112737 000200 001546      MOVB   #200,PUTINX+1  ;SET TERMINATOR BYTE
      013774 012737 000001 001436      MOV    #DMD,RMMR10   ;SET RMMR1 OUTPUT BUFFER = DMD
      014002 004737 043016      JSR    PC,PUT         ;GO WRITE RMMR1 VIA PUT SUBROUTINE
      014006 000404                      BR     2$            ;GO TO 2$ IF NO ERROR
      014010 000240                      NOP
      014012 104000                      EMT
      014014 000137 014214      JMP    8$            ;RETURN HERE IF ERROR
      ;ERROR DEFINED BY PUT SUBROUTINE
      ;GO TO 8$ IF ERROR
453 014020                      2$:

```

T11 PACK ACKNOWLEDGE TEST

```

454 014020 112737 000024 001545      MOVB  #RMMR1,PUTINX      ;SETUP PUT INDEX TABLE
      014026 112737 000200 001546      MOVB  #200,PUTINX+1     ;SET TERMINATOR BYTE
      014034 012737 000000 001436      MOV   #0,RMMR10        ;SET RMMR1 OUTPUT BUFFER = 0
      014042 004737 043016                JSR   PC,PUT            ;GO WRITE RMMR1 VIA PUT SUBROUTINE
      014046 000404                BR    3$               ;GO TO 3$ IF NO ERROR
      014050 000240                NOP                    ;RETURN HEPE IF ERROR
      014052 104000                EMT                    ;ERROR DEFINED BY PUT SUBROUTINE
      014054 000137 014214                JMP   8$               ;GO TO 8$ IF ERROR
455 014060 3$:
456 014060 112737 000000 001545      MOVB  #RMCS1,PUTINX     ;SETUP PUT INDEX TABLE
      014066 112737 000200 001546      MOVB  #200,PUTINX+1     ;SET TERMINATOR BYTE
      014074 012737 000023 001412      MOV   #PAKACK!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = PAKACK!GO
      014102 004737 043016                JSR   PC,PUT            ;GO WRITE RMCS1 VIA PUT SUBROUTINE
      014106 000404                BR    4$               ;GO TO 4$ IF NO ERROR
      014110 000240                NOP                    ;RETURN HERE IF ERROR
      014112 104000                EMT                    ;ERROR DEFINED BY PUT SUBROUTINE
      014114 000137 014214                JMP   8$               ;GO TO 8$ IF ERROR
457 014120 004737 042462                JSR   PC,GETSTS        ;
458 014124 004737 043370                JSR   PC,TIMOUT        ;WAIT FOR COMPLETION
459
460 014130 004737 042546                JSR   PC,GET           ;GO READ REGISTER(S) WITH GET SUBROUTINE
      014134 000403                BR    5$               ;GO TO 5$ IF NO ERROR
      014136 000240                NOP                    ;RETURN HEPE IF ERROR
      014140 104000                EMT                    ;ERROR # DEFINED BY GET SUBROUTINE
      014142 000424                BR    8$               ;SKIP REMAINDER OF TEST
461 014144 5$:
462 014144
463 014144 004737 043564                JSR   PC,PRIERR        ;GO CHECK FOR PRIMARY ERRORS
      014150 000404                BR    6$               ;GO TO 6$ IF NO ERROR
      014152 000240                NOP                    ;RETURN HERE IF ERROR
      014154 104000                EMT                    ;ERROR # DEFINED BY PRIERR SUBROUTINE
      014156 004736                JSR   PC,@(SP)+        ;GO BACK FOR MORE ERROR CHECKS
      014160 000415                BR    8$               ;SKIP TO NEXT TEST
464 014160
465 014162 6$:
466 014162 004737 053464                JSR   PC,ACKSTS        ;GO VERIFY PACK ACKNOWLEDGE
      014166 000404                BR    7$               ;GO TO 7$ IF NO ERROR
      014170 000240                NOP                    ;RETURN HERE IF ERROR
      014172 104000                EMT                    ;ERROR # DEFINED BY ACKSTS SUBROUTINE
      014174 004736                JSR   PC,@(SP)+        ;GO BACK FOR MORE ERROR CHECKS
      014176 000406                BR    8$               ;SKIP TO NEXT TEST
467 014176
468
469 014200 7$:
470 014200 004737 044416                JSR   PC,SECERR        ;GO CHECK FOR SECONDARY ERRORS
      014204 000403                BR    8$               ;GO TO 8$ IF NO ERROR
      014206 000240                NOP                    ;RETURN HERE IF ERROR
      014210 104000                EMT                    ;ERROR # DEFINED BY SECERR SUBROUTINE
      014212 004736                JSR   PC,@(SP)+        ;GO BACK FOR MORE ERROR CHECKS
471 014214 8$:
472
473

```

```

*****
;*TEST 12      RECALIBRATE TEST
*****

```

```

TST12:
014214
014214 000004      SCOPE      ;SCOPE CALL
014216 000240      NOP        ;START OF TEST
014220 012706 0G1100  MOV   #STACK,SP ;INITIALIZE STACK POINTER
014224 013700 001276  MOV   $BASE,R0  ;R0 = UNIBUS ADDRESS
014230 013701 001466  MOV   TSTQUE,R1 ;(R1) = DEVICE BEING TESTED

```

```
474 014234 012737 000012 001226      MOV      #12,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
475 014242 004737 041532      JSR      PC,TSTPRP      ;PREPARE DEVICE FOR TEST
    014246 050020      .WORD    050020        ;TASK DESCRIPTOR AS FOLLOWS:
                                ;CLEAR CONTROLLER & SELECT DEVICE
                                ;PACK ACKNOWLEDGE IF VOLUME NOT VALID
                                ;VERIFY PACK ACKNOWLEDGE
                                ;GO TO 1$ IF NO ERROR
                                ;RETURN HERE IF ERROR
                                ;ERROR # DEFINED BY TSTPRP SUBROUTINE
                                ;GO TO 6$ IF ERROR
    014250 000404      BR       1$
    014252 000240      NOP
    014254 104000      EMT
    014256 000137 014424      JMP      6$
476 014262      1$:
477 014262 112737 000000 001545      MOV      #RMCS1,PUTINX   ;SETUP PUT INDEX TABLE
    014270 112737 000200 001546      MOV      #200,PUTINX+1  ;SET TERMINATOR BYTE
    014276 012737 000007 001412      MOV      #RECAL!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = RECAL!GO
    014304 004737 043016      JSR      PC,PUT         ;GO WRITE RMCS1 VIA PUT SUBROUTINE
    014310 000404      BR       2$
    014312 000240      NOP
    014314 104000      EMT
    014316 000137 014424      JMP      6$
478 014322 004737 042462      2$:
479 014326 004737 043370      JSR      PC,GETSTS      ;GO SETUP FOR STATUS FETCH
    480      JSR      PC,TIMOUT   ;WAIT FOR COMPLETION
481 014332 004737 042546      JSR      PC,GET         ;GO READ REGISTER(S) WITH GET SUBROUTINE
    014336 000404      BR       3$
    014340 000240      NOP
    014342 104000      EMT
    014344 000137 014424      JMP      6$
482 014350      3$:
483 014350 004737 043564      JSR      PC,PRIERR      ;GO CHECK FOR PRIMARY ERRORS
    014354 000405      BR       4$
    014356 000240      NOP
    014360 104000      EMT
    014362 004736      JSR      PC,@(SP)+     ;GO BACK FOR MORE ERROR CHECKS
    014364 000137 014424      JMP      6$
484 014370      4$:
485 014370 004737 054260      JSR      PC,RCLSTS      ;GO VERIFY RECALIBRATE OPERATION
    014374 000405      BR       5$
    014376 000240      NOP
    014400 104000      EMT
    014402 004736      JSR      PC,@(SP)+     ;GO BACK FOR MORE ERROR CHECKS
    014404 000137 014424      JMP      6$
486 014410      5$:
487 014410 004737 044416      JSR      PC,SECERR      ;GO CHECK FOR SECONDARY ERRORS
    014414 000403      BR       6$
    014416 000240      NOP
    014420 104000      EMT
    014422 004736      JSR      PC,@(SP)+     ;GO BACK FOR MORE ERROR CHECKS
488 014424      6$:
489
490
```

```
*****
;*TEST 13      ABORT RECALIBRATE TEST
*****
TST13:
    SCOPE      ;SCOPE CALL
    NOP
    MOV      #STACK,SP  ;START OF TEST
                        ;INITIALIZE STACK POINTER
```

	014434	013700	001276		MOV	\$BASE,R0	:RO = UNIBUS ADDRESS
	014440	013701	001466		MOV	TSTQUE,R1	:(R1) = DEVICE BEING TESTED
	014444	012737	000001	001206	MOV	#1,\$TIMES	::DO 1 ITERATION
	014452	012737	000013	001226	MOV	#13,\$TESTN	::SET TEST NUMBER IN APT MAIL BOX
491							
492	014460	004737	041532		JSR	PC,TSTPRP	:PREPARE DEVICE FOR TEST
	014464	054130			.WORD	054130	:TASK DESCRIPTOR AS FOLLOWS:
							:CLEAR CONTROLLER & SELECT DEVICE
							:VERIFY CONTROLLER CLEAR OPERATION
							:PACK ACKNOWLEDGE IF VOLUME NOT VALID
							:VERIFY PACK ACKNOWLEDGE
							:RECALIBRATE IF 'SKI' OR 'PIP' IS SET
							:VERIFY RECALIBRATION
							:GO TO 1\$ IF NO ERROR
							:RETURN HERE IF ERROR
							:ERROR # DEFINED BY TSTPRP SUBROUTINE
							:GO TO 9\$ IF ERROR
	014466	000404			BR	1\$	
	014470	000240			NOP		
	014472	104000			EMT		
	014474	000137	014732		JMP	9\$	
493	014500						1\$:
494	014500	112737	000014	001545	MOVB	#RMER1,PUTINX	:SETUP PUT INDEX TABLE
	014506	112737	000200	001546	MOVB	#200,PUTINX+1	:SET TERMINATOR BYTE
	014514	012737	040000	001426	MOV	#UNS,RMER10	:SET RMER1 OUTPUT BUFFER = UNS
	014522	004737	043016		JSR	PC,PUT	:GO WRITE RMER1 VIA PUT SUBROUTINE
	014526	000404			BR	2\$:GO TO 2\$ IF NO ERROR
	014530	000240			NOP		:RETURN HERE IF ERROR
	014532	104000			EMT		:ERROR DEFINED BY PUT SUBROUTINE
	014534	000137	014732		JMP	9\$:GO TO 9\$ IF ERROR
495	014540						2\$:
496	014540	112737	000000	001545	MOVB	#RMCS1,PUTINX	:SETUP PUT INDEX TABLE
	014546	112737	000200	001546	MOVB	#200,PUTINX+1	:SET TERMINATOR BYTE
	014554	012737	000007	001412	MOV	#RECAL!GO,RMCS10	:SET RMCS1 OUTPUT BUFFER = RECAL!GO
	014562	004737	043016		JSR	PC,PUT	:GO WRITE RMCS1 VIA PUT SUBROUTINE
	014566	000404			BR	3\$:GO TO 3\$ IF NO ERROR
	014570	000240			NOP		:RETURN HERE IF ERROR
	014572	104000			EMT		:ERROR DEFINED BY PUT SUBROUTINE
	014574	000137	014732		JMP	9\$:GO TO 9\$ IF ERROR
497	014600	004737	042462		JSR	PC,GETSTS	:SETUP FOR STATUS FETCH
498							
499	014604	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	014610	000404			BR	4\$:GO TO 4\$ IF NO ERROR
	014612	000240			NOP		:RETURN HERE IF ERROR
	014614	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	014616	000137	014732		JMP	9\$:GO TO 9\$ IF ERROR
500	014622	032737	020000	001350	BIT	#PIP,RMDSI	:DID THE DRIVE RECALIBRATE??
501	014630	001401			BEQ	5\$:NO!!
502	014632	104214			EMT	214	
503	014634	004737	043370		JSR	PC,TIMOUT	:WAIT FOR COMPLETION
504							
505	014640	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	014644	000404			BR	6\$:GO TO 6\$ IF NO ERROR
	014646	000240			NOP		:RETURN HERE IF ERROR
	014650	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	014652	000137	014732		JMP	9\$:GO TO 9\$ IF ERROR
506	014656						6\$:
507	014656	004737	043564		JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	014662	000405			BR	7\$:GO TO 7\$ IF NO ERROR
	014664	000240			NOP		:RETURN HERE IF ERROR
	014666	104000			EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE

T13 ABORT RECALIBRATE TEST

```

014670 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
014672 000137 014732 JMP 9$ ;GO TO 9$ IF ERROR
508 014676 7$:
509 014676 004737 060210 JSR PC,STCDRVSTS ;GO CHECK FOR CHANGES IN DRIVE STATUS
014702 000405 BR 8$ ;GO TO 8$ IF NO ERROR
014704 000240 NOP ;RETURN HERE IF ERROR
014706 104000 EMT ;ERROR # DEFINED BY STCDRVSTS SUBROUTINE
014710 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
014712 000137 014732 JMP 9$ ;GO TO 9$ IF ERROR
510 014716 8$:
511 014716 004737 044416 JSR PC,SECERR ;GO CHECK FOR SECONDARY ERRORS
014722 000403 BR 9$ ;GO TO 9$ IF NO ERROR
014724 000240 NOP ;RETURN HERE IF ERROR
014726 104000 EMT ;ERROR # DEFINED BY SECERR SUBROUTINE
014730 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
512 014732 9$:
513
514

```

```

:*****
:*TEST 14 IVC RECALIBRATE TEST
:*****
TST14:

```

```

014732 000004 SCOPE ;SCOPE CALL
014734 000240 NOP ;START OF TEST
014736 012706 001100 MOV #STACK,SP ;INITIALIZE STACK POINTER
014742 013700 001276 MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
014746 013701 001466 MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
014752 012737 000001 001206 MOV #1,$TIMES ;DO 1 ITERATION
014760 012737 000014 001226 MOV #14,$TESTN ;SET TEST NUMBER IN APT MAIL BOX
515
516 014766 004737 041532 JSR PC,TSTPRP ;PREPARE DEVICE FOR TEST
014772 054130 .WORD 054130 ;TASK DESCRIPTOR AS FOLLOWS:
;CLEAR CONTROLLER & SELECT DEVICE
;VERIFY CONTROLLER CLEAR OPERATION
;PACK ACKNOWLEDGE IF VOLUME NOT VALID
;VERIFY PACK ACKNOWLEDGE
;RECALIBRATE IF 'SKI' OR 'PIP' IS SET
;VERIFY RECALIBRATION
014774 000404 BR 1$ ;GO TO 1$ IF NO ERROR
014776 000240 NOP ;RETURN HERE IF ERROR
015000 104000 EMT ;ERROR # DEFINED BY TSTPRP SUBROUTINE
015002 000137 015242 JMP 8$ ;GO TO 8$ IF ERROR
517 015006 1$:
518 015006 112737 000024 001545 MOVB #RMMR1,PUTINX ;SETUP PUT INDEX TABLE
015014 112737 000200 001546 MOVB #200,PUTINX+1 ;SET TERMINATOR BYTE
015022 012737 000001 001436 MOV #DMD,RMMR10 ;SET RMMR1 OUTPUT BUFFER = DMD
015030 004737 043016 JSR PC,PUT ;GO WRITE RMMR1 VIA PUT SUBROUTINE
015034 000404 BR 2$ ;GO TO 2$ IF NO ERROR
015036 000240 NOP ;RETURN HERE IF ERROR
015040 104000 EMT ;ERROR DEFINED BY PUT SUBROUTINE
015042 000137 015242 JMP 8$ ;GO TO 8$ IF ERROR
519 015046 2$:
520 015046 112737 000024 001545 MOVB #RMMR1,PUTINX ;SETUP PUT INDEX TABLE
015054 112737 000200 001546 MOVB #200,PUTINX+1 ;SET TERMINATOR BYTE
015062 012737 000000 001436 MOV #0,RMMR10 ;SET RMMR1 OUTPUT BUFFER = 0
015070 004737 043016 JSR PC,PUT ;GO WRITE RMMR1 VIA PUT SUBROUTINE
015074 000404 BR 3$ ;GO TO 3$ IF NO ERROR
015076 000240 NOP ;RETURN HERE IF ERROR

```

```

015100 104000          EMT          :ERROR DEFINED BY PUT SUBROUTINE
015102 000137 015242  JMP          8$          :GO TO 8$ IF ERROR
521 015106          3$:
522 015106 112737 000000 001545  MOV#      #RMCS1,PUTINX  :SETUP PUT INDEX TABLE
015114 112737 000200 001546  MOV#      #200,PUTINX+1  :SET TERMINATOR BYTE
015122 012737 000007 001412  MOV#      #RECAL!GO,RMCS10 :SET RMCS1 OUTPUT BUFFER = RECAL!GO
015130 004737 043016  JSR      PC,PUT          :GO WRITE RMCS1 VIA PUT SUBROUTINE
015134 000404          BR          4$          :GO TO 4$ IF NO ERROR
015136 000240          NOP          :RETURN HERE IF ERROR
015140 104000          EMT          :ERROR DEFINED BY PUT SUBROUTINE
015142 000137 015242  JMP          8$          :GO TO 8$ IF ERROR
523 015146 004737 042462  JSR      PC,GETSTS      :SETUP FOR STATUS FETCH
524 015152 004737 043370  JSR      PC,TIMOUT     :WAIT FOR RECAL TO COMPLETE
525
526 015156 004737 042546  JSR      PC,GET        :GO READ REGISTER(S) WITH GET SUBROUTINE
015162 000404          BR          5$          :GO TO 5$ IF NO ERROR
015164 000240          NOP          :RETURN HERE IF ERROR
015166 104000          EMT          :ERROR # DEFINED BY GET SUBROUTINE
015170 000137 015242  JMP          8$          :GO TO 8$ IF ERROR
527 015174          5$:
528 015174 004737 043564  JSR      PC,PRIERR     :GO CHECK FOR PRIMARY ERRORS
015200 000405          BR          6$          :GO TO 6$ IF NO ERROR
015202 000240          NOP          :RETURN HERE IF ERROR
015204 104000          EMT          :ERROR # DEFINED BY PRIERR SUBROUTINE
015206 004736          JSR      PC,@(SP)+    :GO BACK FOR MORE ERROR CHECKS
015210 000137 015242  JMP          8$          :GO TO 8$ IF ERROR
529 015214 032737 010000 001400 6$:  BIT      #IVC,RMER2I   :IVC SHOULD BE SET
530 015222 001001          BNE      7$          :IT IS - GO CHECK SECONDARY ERRORS
531 015224 104215          EMT          215
532 015226          7$:
533 015226 004737 044416  JSR      PC,SECERR     :GO CHECK FOR SECONDARY ERRORS
015232 000403          BR          8$          :GO TO 8$ IF NO ERROR
015234 000240          NOP          :RETURN HERE IF ERROR
015236 104000          EMT          :ERROR # DEFINED BY SECERR SUBROUTINE
015240 004736          JSR      PC,@(SP)+    :GO BACK FOR MORE ERROR CHECKS
534 015242          8$:
535
536

```

```

:*****
:*TEST 15      IAE RECALIBRATE TEST
:*****
TST15:

```

```

015242 000004          SCOPE          :SCOPE CALL
015244 000240          NOP          :START OF TEST
015246 012706 001100  MOV#      #STACK,SP    :INITIALIZE STACK POINTER
015252 013700 001276  MOV#      $BASE,R0     :R0 = UNIBUS ADDRESS
015256 013701 001466  MOV#      TSTQUE,R1   :(R1) = DEVICE BEING TESTED
015262 012737 000001 001206  MOV#      #1,$TIMES   :DO 1 ITERATION
015270 012737 000015 001226  MOV#      #15,$TESTN  :SET TEST NUMBER IN APT MAIL BOX
537
538 015276 004737 041532  JSR      PC,TSTPRP    :PREPARE DEVICE FOR TEST
015302 054130          .WORD     054130  :TASK DESCRIPTOR AS FOLLOWS:
:CLEAR CONTROLLER & SELECT DEVICE
:VERIFY CONTROLLER CLEAR OPERATION
:PACK ACKNOWLEDGE IF VOLUME NOT VALID
:VERIFY PACK ACKNOWLEDGE
:RECALIBRATE IF 'SKI' OR 'PIP' IS SET
:VERIFY RECALIBRATION

```

```
015304 000404 BR 1$ :GO TO 1$ IF NO ERROR
015306 000240 NOP :RETURN HERE IF ERROR
015310 104000 EMT :ERROR # DEFINED BY TSTPRP SUBROUTINE
015312 000337 015504 JMP 6$ :GO TO 6$ IF ERROR
539 015316 1$:
540 015316 012737 177777 001446 MOV #-1,RMDCO :RMDC WILL BE ALL ONES
541 015324 012737 177777 001420 MOV #-1,RMDAO :RMDA WILL BE ALL ONES
542 015332 012737 000007 001412 MOV #RECAL!GO,RMCS10
543 015340 012702 001545 MOV #PUTINX,R2 :R2 POINTS TO PUT INDEX TABLE
544 015344 112722 000034 MOVB #RMDC,(R2)+ :SETUP PUT INDEX TABLE
545 015350 112722 000006 MOVB #RMDA,(R2)+
546 015354 112722 000000 MOVB #RMCS1,(R2)+
547 015360 112722 000200 MOVB #200,(R2)+
548 015364 004737 043016 JSR PC,PUT :GO WRITE REGISTER(S) WITH PUT SUBROUTINE
015370 000404 BR 2$ :GO TO 2$ IF NO ERROR
015372 000240 NOP :RETURN HERE IF ERROR
015374 104000 EMT :ERROR # DEFINED BY PUT SUBROUTINE
015376 000137 015504 JMP 6$ :GO TO 6$ IF ERROR
549 015402 004737 042462 2$: JSR PC,GETSTS :SETUP FOR STATUS FETCH
550 015406 004737 043370 JSR PC,TIMOUT :WAIT FOR GO TO RESET
551
552 015412 004737 042546 JSR PC,GET :GO READ REGISTER(S) WITH GET SUBROUTINE
015416 000404 BR 3$ :GO TO 3$ IF NO ERROR
015420 000240 NOP :RETURN HERE IF ERROR
015422 104000 EMT :ERROR # DEFINED BY GET SUBROUTINE
015424 000137 015504 JMP 6$ :GO TO 6$ IF ERROR
553 015430 3$:
554 015430 004737 043564 JSR PC,PRIERR :GO CHECK FOR PRIMARY ERRORS
015434 000405 BR 4$ :GO TO 4$ IF NO ERROR
015436 000240 NOP :RETURN HERE IF ERROR
015440 104000 EMT :ERROR # DEFINED BY PRIERR SUBROUTINE
015442 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
015444 000137 015504 JMP 6$ :GO TO 6$ IF ERROR
555 015450 4$:
556 015450 004737 054260 JSR PC,RCLSTS :GO VERIFY RECALIBRATE OPERATION
015454 000405 BR 5$ :GO TO 5$ IF NO ERROR
015456 000240 NOP :RETURN HERE IF ERROR
015460 104000 EMT :ERROR # DEFINED BY RCLSTS SUBROUTINE
015462 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
015464 000137 015504 JMP 6$ :GO TO 6$ IF ERROR
557 015470 5$:
558 015470 004737 044416 JSR PC,SECERR :GO CHECK FOR SECONDARY ERRORS
015474 000403 BR 6$ :GO TO 6$ IF NO ERROR
015476 000240 NOP :RETURN HERE IF ERROR
015500 104000 EMT :ERROR # DEFINED BY SECERR SUBROUTINE
015502 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
559 015504 6$:
560
561
```

```
::*****
:*TEST 16 RECALIBRATE AT OFFSET
:*****
```

```
TST16:
015504 SCOPE :SCOPE CALL
015504 000004 NOP :START OF TEST
015506 000240 MOV #STACK,SP :INITIALIZE STACK POINTER
015510 012706 001100 MOV $BASE,R0 :R0 = UNIBUS ADDRESS
015514 013700 001276 MOV TSTQUE,R1 :(R1) = DEVICE BEING TESTED
015520 013701 001466
```

```

015524 012737 000001 001206      MOV      #1,$TIMES      ;;DO 1 ITERATION
015532 012737 000016 001226      MOV      #16,$TESTN    ;;SET TEST NUMBER IN APT MAIL BOX

562
563 015540 004737 041532      JSR      PC,TSTPRP     ;PREPARE DEVICE FOR TEST
015544 050020                .WORD    050020        ;TASK DESCRIPTOR AS FOLLOWS:
                                ;CLEAR CONTROLLER & SELECT DEVICE
                                ;PACK ACKNOWLEDGE IF VOLUME NOT VALID
                                ;VERIFY PACK ACKNOWLEDGE
                                ;GO TO 1$ IF NO ERROR
                                ;RETURN HERE IF ERROR
                                ;ERROR # DEFINED BY TSTPRP SUBROUTINE
                                ;GO TO 7$ IF ERROR

015546 000404                BR       1$
015550 000240                NOP
015552 104000                EMT
015554 000137 015762      JMP      7$

564 015560                1$:
565 015560 112737 000000 001545      MOVB     #RMCS1,PUTINX ;SETUP PUT INDEX TABLE
015566 112737 000200 001546      MOVB     #200,PUTINX+1 ;SET TERMINATOR BYTE
015574 012737 000015 001412      MOV      #OFFSET!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = OFFSET!GO
015602 004737 043016      JSR      PC,PUT        ;GO WRITE RMCS1 VIA PUT SUBROUTINE
015606 000404                BR       2$
015610 000240                NOP
015612 104000                EMT
015614 000137 015762      JMP      7$

566 015620                2$:
567 015620 112737 000000 001545      MOVB     #RMCS1,PUTINX ;SETUP PUT INDEX TABLE
015626 112737 000200 001546      MOVB     #200,PUTINX+1 ;SET TERMINATOR BYTE
015634 012737 000007 001412      MOV      #RECAL!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = RECAL!GO
015642 004737 043016      JSR      PC,PUT        ;GO WRITE RMCS1 VIA PUT SUBROUTINE
015646 000404                BR       3$
015650 000240                NOP
015652 104000                EMT
015654 000137 015762      JMP      7$

568 015660                3$:
569
570                ;SETUP GET INDEX TABLE TO READ ALL REGISTERS
015660 004737 042462      JSR      PC,GETSTS     ;GO TO GETSTS SUBROUTINE

571
572                ;WAIT FOR COMMAND TO COMPLETE
015664 004737 043370      JSR      PC,TIMOUT     ;GO TO TIMEOUT SUBROUTINE

573
574 015670 004737 042546      JSR      PC,GET        ;GO READ REGISTER(S) WITH GET SUBROUTINE
015674 000404                BR       4$
015676 000240                NOP
015700 104000                EMT
015702 000137 015762      JMP      7$

575 015706                4$:
576 015706 004737 043564      JSR      PC,PRIERR     ;GO CHECK FOR PRIMARY ERRORS
015712 000405                BR       5$
015714 000240                NOP
015716 104000                EMT
015720 004736                JSR      PC,@(SP)+     ;GO BACK FOR MORE ERROR CHECKS
015722 000137 015762      JMP      7$

577 015726                5$:
578 015726 004737 054260      JSR      PC,RCLSTS     ;GO VERIFY RECALIBRATE OPERATION
015732 000405                BR       6$
015734 000240                NOP
015736 104000                EMT
015740 004736                JSR      PC,@(SP)+     ;GO BACK FOR MORE ERROR CHECKS
015742 000137 015762      JMP      7$

```



```

579 015746
580 015746 004737 044416
    015752 000403
    015754 000240
    015756 104000
    015760 004736
581 015762
582
583
    015762
    015762 000004
    015764 000240
    015766 012706 001100
    015772 013700 001276
    015776 013701 001466
    016002 012737 000017 001226
584
585 016010 004737 041532
    016014 054130
    016016 000404
    016020 000240
    016022 104000
    016024 000137 016232
586 016030
587 016030 012737 000000 001420
588 016036 012737 000011 001412
589 016044 012737 177777 001426
590 016052 012737 177777 001454
591 016060 042737 004000 001454
592 016066 012702 001545
593 016072 112722 000006
594 016076 112722 000042
595 016102 112722 000014
596 016106 112722 000000
597 016112 112722 000200
598 016116 004737 043016
    016122 000403
    016124 000240
    016126 104000
599 016130 000440
600 016132 004737 042462
601 016136 004737 043370
602
603 016142 004737 042546
    016146 000403
    016150 000240
    016152 104000
604 016154 000426
605 016156

6$: JSR PC,SECERR ;GO CHECK FOR SECONDARY ERRORS
    BR 7$ ;GO TO 7$ IF NO ERROR
    NOP ;RETURN HERE IF ERROR
    EMT ;ERROR # DEFINED BY SECERR SUBROUTINE
    JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS

7$:

:*****
:*TEST 17 DRIVE CLEAR TEST
:*****
TST17:
    SCOPE ;SCOPE CALL
    NOP ;START OF TEST
    MOV #STACK,SP ;INITIALIZE STACK POINTER
    MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
    MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
    MOV #17,$TESTN ;;SET TEST NUMBER IN APT MAIL BOX

584
585 JSR PC,TSTPRP ;PREPARE DEVICE FOR TEST
    .WORD 054130 ;TASK DESCRIPTOR AS FOLLOWS:
    ;CLEAR CONTROLLER & SELECT DEVICE
    ;VERIFY CONTROLLER CLEAR OPERATION
    ;PACK ACKNOWLEDGE IF VOLUME NOT VALID
    ;VERIFY PACK ACKNOWLEDGE
    ;RECALIBRATE IF 'SKI' OR 'PIP' IS SET
    ;VERIFY RECALIBRATION
    BR 1$ ;GO TO 1$ IF NO ERROR
    NOP ;RETURN HERE IF ERROR
    EMT ;ERROR # DEFINED BY TSTPRP SUBROUTINE
    JMP 6$ ;GO TO 6$ IF ERROR

1$: MOV #0,RMDAO
    MOV #DRVCLR!GO,RMCS10
    MOV #-1,RMER10
    MOV #-1,RMER20
    BIC #LSC,RMER20 ;DELETE FOR PASS 2 ETCH
    MOV #PUTINX,R2 ;R2 POINTS TO INDEX TABLE
    MOVB #RMDA,(R2)+ ;RMDA CLEARS LBT
    MOVB #RMER2,(R2)+
    MOVB #RMER1,(R2)+
    MOVB #RMCS1,(R2)+
    MOVB #200,(R2)+
    JSR PC,PUT ;GO WRITE REGISTER(S) WITH PUT SUBROUTINE
    BR 2$ ;GO TO 2$ IF NO ERROR
    NOP ;RETURN HERE IF ERROR
    EMT ;ERROR # DEFINED BY PUT SUBROUTINE
    BR 6$ ;ESCAPE IF ERROR

2$: JSR PC,GETSTS ;SETUP FOR STATUS FETCH
    JSR PC,TIMOUT ;WAIT FOR DRIVE CLEAR TO COMPLETE

3$: JSR PC,GET ;GO READ REGISTER(S) WITH GET SUBROUTINE
    BR 3$ ;GO TO 3$ IF NO ERROR
    NOP ;RETURN HERE IF ERROR
    EMT ;ERROR # DEFINED BY GET SUBROUTINE
    BR 6$ ;SKIP REMAINDER OF TEST
  
```

```

606 016156 004737 043564      JSR    PC,PRIERR      ;GO CHECK FOR PRIMARY ERRORS
      016162 000405          BR     4$             ;GO TO 4$ IF NO ERROR
      016164 000240          NOP                    ;RETURN HERE IF ERROR
      016166 104000          EMT                    ;ERROR # DEFINED BY PRIERR SUBROUTINE
      016170 004736          JSR    PC,@(SP)+      ;GO BACK FOR MORE ERROR CHECKS
      016172 000137 016232    JMP     6$             ;GO TO 6$ IF ERROR

607 016176                    4$:
608 016176 004737 056022      JSR    PC,DRVSTS      ;GO VERIFY DRIVE CLEAR
      016202 000405          BR     5$             ;GO TO 5$ IF NO ERROR
      016204 000240          NOP                    ;RETURN HERE IF ERROR
      016206 104000          EMT                    ;ERROR # DEFINED BY DRVSTS SUBROUTINE
      016210 004736          JSR    PC,@(SP)+      ;GO BACK FOR MORE ERROR CHECKS
      016212 000137 016232    JMP     6$             ;GO TO 6$ IF ERROR

609 016216                    5$:
610 016216 004737 044416      JSR    PC,SECERR      ;GO CHECK FOR SECONDARY ERRORS
      016222 000403          BR     6$             ;GO TO 6$ IF NO ERROR
      016224 000240          NOP                    ;RETURN HERE IF ERROR
      016226 104000          EMT                    ;ERROR # DEFINED BY SECERR SUBROUTINE
      016230 004736          JSR    PC,@(SP)+      ;GO BACK FOR MORE ERROR CHECKS

611 016232                    6$:
612
613
      ;*****
      ;*TEST 20      NOP TEST
      ;*****
      TST20:
      016232 000004          SCOPE                   ;SCOPE CALL
      016234 000240          NOP                    ;START OF TEST
      016236 012706 001100    MOV     #STACK,SP      ;INITIALIZE STACK POINTER
      016242 013700 001276    MOV     $BASE,R0       ;R0 = UNIBUS ADDRESS
      016246 013701 001466    MOV     TSTQUE,R1      ;(R1) = DEVICE BEING TESTED
      016252 012737 000020 001226  MOV     #20,$TESTN     ;;SET TEST NUMBER IN APT FAIL BOX

614
615 016260 004737 041532      JSR    PC,TSTPRP      ;PREPARE DEVICE FOR TEST
      016264 054130          .WORD 054130         ;TASK DESCRIPTOR AS FOLLOWS:
      ;CLEAR CONTROLLER & SELECT DEVICE
      ;VERIFY CONTROLLER CLEAR OPERATION
      ;PACK ACKNOWLEDGE IF VOLUME NOT VALID
      ;VERIFY PACK ACKNOWLEDGE
      ;RECALIBRATE IF "SKI" OR "PIP" IS SET
      ;VERIFY RECALIBRATION
      016266 000404          BR     1$             ;GO TO 1$ IF NO ERROR
      016270 000240          NOP                    ;RETURN HERE IF ERROR
      016272 104000          EMT                    ;ERROR # DEFINED BY TSTPRP SUBROUTINE
      016274 000137 016462    JMP     7$             ;GO TO 7$ IF ERROR

616 016300                    1$:
617 016300 112737 000000 001545  MOVB   #RMCS1,PUTINX   ;SETUP PUT INDEX TABLE
      016306 112737 000200 001546  MOVE   #200,PUTINX+1  ;SET TERMINATOR BYTE
      016314 012737 000001 001412  MOV    #NOP!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = NOP!GO
      016322 004737 043016          JSR    PC,PUT          ;GO WRITE RMCS1 VIA PUT SUBROUTINE
      016326 000404          BR     2$             ;GO TO 2$ IF NO ERROR
      016330 000240          NOP                    ;RETURN HERE IF ERROR
      016332 104000          EMT                    ;ERROR DEFINED BY PUT SUBROUTINE
      016334 000137 016462    JMP     7$             ;GO TO 7$ IF ERROR

618 016340 004737 042462      JSR    PC,GETSTS      ;SETUP FOR STATUS FETCH
619
620 016344 004737 042546      JSR    PC,GET          ;GO READ REGISTER(S) WITH GET SUBROUTINE
      016350 000404          BR     3$             ;GO TO 3$ IF NO ERROR
  
```

T20 NOP TEST

```

016352 000240      NOP      :RETURN HERE IF ERROR
016354 104000      EMT      :ERROR # DEFINED BY GET SUBROUTINE
016356 000137 016462  JMP      7$      :GO TO 7$ IF ERROR
621 016362      3$:
622 016362 004737 043564  JSR      PC,PRIERR :GO CHECK FOR PRIMARY ERRORS
016366 000405      BR      4$      :GO TO 4$ IF NO ERROR
016370 000240      NOP      :RETURN HERE IF ERROR
016372 104000      EMT      :ERROR # DEFINED BY PRIERR SUBROUTINE
016374 004736      JSR      PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
016376 000137 016462  JMP      7$      :GO TO 7$ IF ERROR
623 016402      4$:
624 016402 004737 050562  JSR      PC,CMPESTS :CHECK ANY ERRORS NOT MASKED
016406 115760      .WORD   NDTMSK    :MASK FOR RMER1
016410 000010      .WORD   DPE      :MASK FOR RMER2
016412 000405      BR      5$      :GO TO 5$ IF NO ERROR
016414 000240      NOP      :RETURN HERE IF ERROR
016416 104000      EMT      :ERROR # DEFINED BY CMPESTS SUBROUTINE
016420 004736      JSR      PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
016422 000137 016462  JMP      7$      :GO TO 7$ IF ERROR
625 016426      5$:
626 016426 004737 060210  JSR      PC,STCDRVSTS :GO CHECK FOR CHANGES IN DRIVE STATUS
016432 000405      BR      6$      :GO TO 6$ IF NO ERROR
016434 000240      NOP      :RETURN HERE IF ERROR
016436 104000      EMT      :ERROR # DEFINED BY STCDRVSTS SUBROUTINE
016440 004736      JSR      PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
016442 000137 016462  JMP      7$      :GO TO 7$ IF ERROR
627 016446      6$:
628 016446 004737 044416  JSR      PC,SECERR  :GO CHECK FOR SECONDARY ERRORS
016452 000403      BR      7$      :GO TO 7$ IF NO ERROR
016454 000240      NOP      :RETURN HERE IF ERROR
016456 104000      EMT      :ERROR # DEFINED BY SECERR SUBROUTINE
016460 004736      JSR      PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
629 016462      7$:
630
631

```

```

:*****
:*TEST 21      OFFSET TEST
:*****
TST21:

```

```

016462 000004      SCOPE     :SCOPE CALL
016464 000240      NOP      :START OF TEST
016466 012706 001100  MOV      #STACK,SP :INITIALIZE STACK POINTER
016472 013700 001276  MOV      $BASE,R0   :R0 = UNIBUS ADDRESS
016476 013701 001466  MOV      TSTQUE,R1  :(R1) = DEVICE BEING TESTED
016502 012737 000021 001226  MOV      #21,$TESTN :SET TEST NUMBER IN APT MAIL BOX
632
633 016510 004737 041532  JSR      PC,TSTPRP  :PREPARE DEVICE FOR TEST
016514 054130      .WORD   054130    :TASK DESCRIPTOR AS FOLLOWS:
                                :CLEAR CONTROLLER & SELECT DEVICE
                                :VERIFY CONTROLLER CLEAR OPERATION
                                :PACK ACKNOWLEDGE IF VOLUME NOT VALID
                                :VERIFY PACK ACKNOWLEDGE
                                :RECALIBRATE IF 'SKI' OR 'PIP' IS SET
                                :VERIFY RECALIBRATION
016516 000404      BR      1$      :GO TO 1$ IF NO ERROR
016520 000240      NOP      :RETURN HERE IF ERROR
016522 104000      EMT      :ERROR # DEFINED BY TSTPRP SUBROUTINE
016524 000137 017006  JMP      9$      :GO TO 9$ IF ERROR

```

```

634 016530
635 016530 112737 000000 001545 1$: MOVB #RMCS1,PUTINX ;SETUP PUT INDEX TABLE
    016536 112737 000200 001546 MOVB #200,PUTINX+1 ;SET TERMINATOR BYTE
    016544 012737 000015 001412 MCV #OFFSET!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = OFFSET!GO
    016552 004737 043016 JSR PC,PUT ;GO WRITE RMCS1 VIA PUT SUBROUTINE
    016556 000404 BR 2$ ;GO TO 2$ IF NO ERROR
    016560 000240 NOP ;RETURN HERE IF ERROR
    016562 104000 EMT ;ERROR # DEFINED BY PUT SUBROUTINE
    016564 000137 017006 JMP 9$ ;GO TO 9$ IF ERROR
636 016570 004737 042462 2$: JSR PC,GETSTS ;SETUP FOR STATUS FETCH
637 016574 004737 043370 JSR PC,TIMOUT ;WAIT FOR GO TO RESET
638
639 016600 004737 042546 JSR PC,GET ;GO READ REGISTER(S) WITH GET SUBROUTINE
    016604 000404 BR 3$ ;GO TO 3$ IF NO ERROR
    016606 000240 NOP ;RETURN HERE IF ERROR
    016610 104000 EMT ;ERROR # DEFINED BY GET SUBROUTINE
    016612 000137 017006 JMP 9$ ;GO TO 9$ IF ERROR
640 016616 3$:
641 016616 004737 043564 JSR PC,PRIERR ;GO CHECK FOR PRIMARY ERRORS
    016622 000405 BR 4$ ;GO TO 4$ IF NO ERROR
    016624 000240 NOP ;RETURN HERE IF ERROR
    016626 104000 EMT ;ERROR # DEFINED BY PRIERR SUBROUTINE
    016630 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
    016632 000137 017006 JMP 9$ ;GO TO 9$ IF ERROR
642 016636 032737 000001 001350 4$: BIT #OM,RMDSI ;OFFSET MODE ON??
643 016644 001012 BNE 5$ ;YES!!
644 016646 013737 001350 001142 MOV RMDSI,$BDDAT ;BAD DATA FOR TYPEOUT
645 016654 042737 177776 001142 BIC #^COM,$BDDAT
646 016662 012737 000001 001140 MOV #OM,$GDDAT ;GOOD DATA FOR TYPEOUT
647 016670 104156 EMT 156
648 016672 032737 100000 001350 5$: BIT #ATA,RMDSI ;WAS ATTENTION SET ??
649 016700 001012 BNE 6$ ;YES!!
650 016702 013737 001350 001142 MOV RMDSI,$BDDAT ;BAD DATA FOR TYPEOUT
651 016710 042737 077777 001142 BIC #^CATA,$BDDAT
652 016716 012737 100000 001140 MOV #ATA,$GDDAT ;GOOD DATA FOR TYPEOUT
653 016724 104172 EMT 172
654 016726 6$:
655 016726 004737 050562 JSR PC,CMPEERRSTS ;CHECK ANY ERRORS NOT MASKED
    016732 115760 .WORD NDTMSK ;MASK FOR RMER1
    016734 000010 .WORD DPE ;MASK FOR RMER2
    016736 000405 BR 7$ ;GO TO 7$ IF NO ERROR
    016740 000240 NOP ;RETURN HERE IF ERROR
    016742 104000 EMT ;ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
    016744 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
    016746 000137 017006 JMP 9$ ;GO TO 9$ IF ERROR
656 016752 7$:
657 016752 004737 060210 JSR PC,STCDRVSTS ;GO CHECK FOR CHANGES IN DRIVE STATUS
    016756 000405 BR 8$ ;GO TO 8$ IF NO ERROR
    016760 000240 NOP ;RETURN HERE IF ERROR
    016762 104000 EMT ;ERROR # DEFINED BY STCDRVSTS SUBROUTINE
    016764 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
    016766 000137 017006 JMP 9$ ;GO TO 9$ IF ERROR
658 016772 8$:
659 016772 004737 044416 JSR PC,SECERR ;GO CHECK FOR SECONDARY ERRORS
    016776 000403 BR 9$ ;GO TO 9$ IF NO ERROR
    017000 000240 NOP ;RETURN HERE IF ERROR
    017002 104000 EMT ;ERROR # DEFINED BY SECERR SUBROUTINE
    
```

```

T21 017004 004736          JSR      PC,@(SP)+      :GO BACK FOR MORE ERROR CHECKS
660 017006          9$:
661
662          :*****
          :*TEST 22      GO/ATA TEST
          :*****
          TST22:
          SCOPE          :SCOPE CALL
          NOP            :START OF TEST
          MOV      #STACK,SP  :INITIALIZE STACK POINTER
          MOV      $BASE,R0   :R0 = UNIBUS ADDRESS
          MOV      TSTQUE,R1  : (R1) = DEVICE BEING TESTED
          MOV      #22,$TESTN :SET TEST NUMBER IN APT MAIL BOX
663
664 017034 004737 041532 JSR      PC,TSTPRP      :PREPARE DEVICE FOR TEST
          017040 054130 .WORD 054130 :TASK DESCRIPTOR AS FOLLOWS:
          :CLEAR CONTROLLER & SELECT DEVICE
          :VERIFY CONTROLLER CLEAR OPERATION
          :PACK ACKNOWLEDGE IF VOLUME NOT VALID
          :VERIFY PACK ACKNOWLEDGE
          :RECALIBRATE IF "SKI" OR "PIP" IS SET
          :VERIFY RECALIBRATION
          :GO TO 1$ IF NO ERROR
          :RETURN HERE IF ERROR
          :ERROR # DEFINED BY TSTPRP SUBROUTINE
          :GO TO 12$ IF ERROR
          BR      1$
          NOP
          EMT
          JMP      12$
665 017054          1$:
666 017054 112737 000000 001545 MOV      #RMCS1,PUTINX :SETUP PUT INDEX TABLE
          017062 112737 000200 001546 MOV      #200,PUTINX+1 :SET TERMINATOR BYTE
          017070 012737 000015 001412 MOV      #OFFSET!GO,RMCS10 :SET RMCS1 OUTPUT BUFFER = OFFSET!GO
          017076 004737 043016 JSR      PC,PUT        :GO WRITE RMCS1 VIA PUT SUBROUTINE
          017102 000404 BR      2$            :GO TO 2$ IF NO ERROR
          017104 000240 NOP            :RETURN HERE IF ERROR
          017106 104000 EMT          :ERROR DEFINED BY PUT SUBROUTINE
          017110 000137 017426 JMP      12$          :GO TO 12$ IF ERROR
667 017114 004737 042462 2$: JSR      PC,GETSTS     :SETUP TO READ ALL REGISTERS
668
669 017120 004737 042546 JSR      PC,GET        :GO READ REGISTER(S) WITH GET SUBROUTINE
          017124 000404 BR      3$            :GO TO 3$ IF NO ERROR
          017126 000240 NOP            :RETURN HERE IF ERROR
          017130 104000 EMT          :ERROR # DEFINED BY GET SUBROUTINE
          017132 000137 017426 JMP      12$          :GO TO 12$ IF ERROR
670 017136 032737 100000 001350 3$: BIT      #ATA,RMDSI   :IS ATTENTION SET??
          017144 001012 BNE      4$            :YES!!
          017146 012737 100000 001140 MOV      #ATA,$GDDAT  :GOOD DATA FOR TYPEOUT
          017154 013737 001350 001142 MOV      RMDSI,$BDDAT :BAD DATA FOR TYPEOUT
          017162 042737 077777 001142 BIC      #^CATA,$BDDAT
          017170 104172 EMT      172
676 017172          4$:
677 017172 004737 050562 JSR      PC,CMPEERRSTS :CHECK ANY ERRORS NOT MASKED
          017176 000000 .WORD 0 :MASK FOR RMER1
          017200 000000 .WORD 0 :MASK FOR RMER2
          017202 000405 BR      5$            :GO TO 5$ IF NO ERROR
          017204 000240 NOP            :RETURN HERE IF ERROR
          017206 104000 EMT          :ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
          017210 004736 JSR      PC,@(SP)+      :GO BACK FOR MORE ERROR CHECKS
          017212 000137 017426 JMP      12$          :GO TO 12$ IF ERROR

```

```

678 017216          5$:
679 017216 112737 000000 001545   MOVB   #RMCS1,PUTINX   ;SETUP PUT INDEX TABLE
    017224 112737 000200 001546   MOVB   #200,PUTINX+1 ;SET TERMINATOR BYTE
    017232 012757 000001 001412   MOV    #NOP!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = NOP!GO
    017240 004737 043016          JSR    PC,PUT         ;GO WRITE RMCS1 VIA PUT SUBROUTINE
    017244 000404          BR     6$            ;GO TO 6$ IF NO ERROR
    017246 000240          NOP                    ;RETURN HERE IF ERROR
    017250 104000          EMT                    ;ERROR DEFINED BY PUT SUBROUTINE
    017252 000137 017426          JMP    12$           ;GO TO 12$ IF ERROR

680 017256          6$:
681 017256 004737 042546          JSR    PC,GET        ;GO READ REGISTER(S) WITH GET SUBROUTINE
    017262 000404          BR     7$            ;GO TO 7$ IF NO ERROR
    017264 000240          NOP                    ;RETURN HERE IF ERROR
    017266 104000          EMT                    ;ERROR # DEFINED BY GET SUBROUTINE
    017270 000137 017426          JMP    12$           ;GO TO 12$ IF ERROR

682 017274          7$:
683 017274 004737 043564          JSR    PC,PRIERR    ;GO CHECK FOR PRIMARY ERRORS
    017300 000405          BR     8$            ;GO TO 8$ IF NO ERROR
    017302 000240          NOP                    ;RETURN HERE IF ERROR
    017304 104000          EMT                    ;ERROR # DEFINED BY PRIERR SUBROUTINE
    017306 004736          JSR    PC,@(SP)+    ;GO BACK FOR MORE ERROR CHECKS
    017310 000137 017426          JMP    12$           ;GO TO 12$ IF ERROR

684 017314 032737 100000 001350 8$:
685 017322 001411          BEQ    #ATA,RMDSI   ;IS ATTENTION RESET??
686 017324 013737 001350 001142   MOV    RMDSI,$BDDAT ;YES
687 017332 042737 077777 001142   BIC    #^CATA,$BDDAT ;BAD DATA FOR TYPEOUT
688 017340 005037 001140          CLR    $GDDAT      ;GOOD DATA FOR TYPEOUT
689 017344 104246          EMT    246

690 017346          9$:
691 017346 004737 050562          JSR    PC,CMPEERRSTS ;CHECK ANY ERRORS NOT MASKED
    .WORD .WORD          NDMSK      ;MASK FOR RMER1
    .WORD .WORD          DPE        ;MASK FOR RMER2
    017352 115760          BR     10$           ;GO TO 10$ IF NO ERROR
    017354 000010          BR     10$           ;RETURN HERE IF ERROR
    017356 000405          NOP                    ;ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
    017360 000240          EMT                    ;GO BACK FOR MORE ERROR CHECKS
    017362 104000          JSR    PC,@(SP)+    ;GO TO 12$ IF ERROR
    017364 004736          JMP    12$           ;GO TO 12$ IF ERROR

692 017372          10$:
693 017372 004737 060210          JSR    PC,STCDRVSTS ;GO CHECK FOR CHANGES IN DRIVE STATUS
    017376 000405          BR     11$           ;GO TO 11$ IF NO ERROR
    017400 000240          NOP                    ;RETURN HERE IF ERROR
    017402 104000          EMT                    ;ERROR # DEFINED BY STCDRVSTS SUBROUTINE
    017404 004736          JSR    PC,@(SP)+    ;GO BACK FOR MORE ERROR CHECKS
    017406 000137 017426          JMP    12$           ;GO TO 12$ IF ERROR

694 017412          11$:
695 017412 004737 044416          JSR    PC,SECERR    ;GO CHECK FOR SECONDARY ERRORS
    017416 000403          BR     12$           ;GO TO 12$ IF NO ERROR
    017420 000240          NOP                    ;RETURN HERE IF ERROR
    017422 104000          EMT                    ;ERROR # DEFINED BY SECERR SUBROUTINE
    017424 004736          JSR    PC,@(SP)+    ;GO BACK FOR MORE ERROR CHECKS

696 017426          12$:
697
698
    
```

```

*****
;*TEST 23      WRITE ATA TEST
*****
TST23:      SCOPE      ;SCOPE CALL
    
```

```

017426
017426 000004
    
```

	017430	000240			NOP		:START OF TEST
	017432	012706	001100		MOV	#STACK,SP	:INITIALIZE STACK PCINTER
	017436	013700	001276		MOV	\$BASE,R0	:R0 = UNIBUS ADDRESS
	017442	013701	001466		MOV	TSTQUE,R1	:(R1) = DEVICE BEING TESTED
	017446	012737	000023	001226	MOV	#23,\$TESTN	:SET TEST NUMBER IN APT MAIL BOX
699	017454	004737	041532		JSR	PC,TSTPRP	:PREPARE DEVICE FOR TEST
700	017460	054130			.WORD	054130	:TASK DESCRIPTOR AS FOLLOWS:
							:CLEAR CONTROLLER & SELECT DEVICE
							:VERIFY CONTROLLER CLEAR OPERATION
							:PACK ACKNOWLEDGE IF VOLUME NOT VALID
							:VERIFY PACK ACKNOWLEDGE
							:RECALIBRATE IF 'SKI' OR 'PIP' IS SET
							:VERIFY RECALIBRATION
							:GO TO 1\$ IF NO ERROR
							:RETURN HERE IF ERROR
							:ERROR # DEFINED BY TSTPRP SUBROUTINE
							:GO TO 9\$ IF ERROR
	017462	000404			BR	1\$	
	017464	000240			NOP		
	017466	104000			EMT		
	017470	000137	017772		JMP	9\$	
701	017474						
702	017474	112737	000000	001545	MOVB	#RMCS1,PUTINX	:SETUP PUT INDEX TABLE
	017502	112737	000200	001546	MOVB	#200,PUTINX+1	:SET TERMINATOR BYTE
	017510	012737	000015	001412	MOV	#OFFSET!GO,RMCS10	:SET RMCS1 OUTPUT BUFFER = OFFSET!GO
	017516	004737	043016		JSR	PC,PUT	:GO WRITE RMCS1 VIA PUT SUBROUTINE
	017522	000404			BR	2\$:GO TO 2\$ IF NO ERROR
	017524	000240			NOP		:RETURN HERE IF ERROR
	017526	104000			EMT		:ERROR DEFINED BY PUT SUBROUTINE
	017530	000137	017772		JMP	9\$:GO TO 9\$ IF ERROR
703	017534	004737	042462		JSR	PC,GETSTS	:SETUP TO READ ALL REGISTERS
704							
705	017540	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	017544	000404			BR	3\$:GO TO 3\$ IF NO ERROR
	017546	000240			NOP		:RETURN HERE IF ERROR
	017550	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	017552	000137	017772		JMP	9\$:GO TO 9\$ IF ERROR
706	017556	032737	100000	001350	BIT	#ATA,RMDSI	:IS ATTENTION SET??
707	017564	001012			BNE	4\$:YES!!
708	017566	013737	001350	001142	MOV	RMDSI,\$BDDAT	:BAD DATA FOR TYPEOUT
709	017574	042737	077777	001142	BIC	#^CATA,\$BDDAT	
710	017602	012737	100000	001140	MOV	#ATA,\$GDDAT	:GOOD DATA FOR TYPEOUT
711	017610	104172			EMT	172	
712	017612	116102	000001		MOVB	1(R1),R2	:R2 = ATTENTION BIT
713	017616	042702	177400		BIC	#^CATNMSK,R2	:CLEAR SIGN EXTENSION
714	017622	000240			NOP		
715	017624	010237	001430		MOV	R2,RMAS0	:PUT RMAS BIT IN OUTPUT BUF
716	017630	112737	000016	001545	MOVB	#RMAS,PUTINX	:WRITE REGISTER INDEX IN TABLE
717	017636	112737	000200	001546	MOVB	#200,PUTINX+1	:WRITE TERMINATOR
718	017644	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	017650	000404			BR	5\$:GO TO 5\$ IF NO ERROR
	017652	000240			NOP		:RETURN HERE IF ERROR
	017654	104000			EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	017656	000137	017772		JMP	9\$:GO TO 9\$ IF ERROR
719	017662						
720	017662	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	017566	000404			BR	6\$:GO TO 6\$ IF NO ERROR
	017670	000240			NOP		:RETURN HERE IF ERROR
	017672	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	017674	000137	017772		JMP	9\$:GO TO 9\$ IF ERROR

T23 WRITE ATA TEST

```

721 017700          6$:
722 017700 004737 043564      JSR    PC,PRIERR      ;GO CHECK FOR PRIMARY ERRORS
    017704 000405          BR     7$             ;GO TO 7$ IF NO ERROR
    017706 000240          NOP                    ;RETURN HERE IF ERROR
    017710 104000          EMT                    ;ERROR # DEFINED BY PRIERR SUBROUTINE
    017712 004736          JSR    PC,@(SP)+          ;GO BACK FOR MORE ERROR CHECKS
    017714 000137 017772      JMP    9$             ;GO TO 9$ IF ERROR
723 017720 032737 100000 001350 7$:
724 017726 001411          BIT     #ATA,RMDSI      ;IS ATTENTION RESET??
725 017730 013737 001350 001142  BEQ    8$             ;YES!!
726 017736 042737 077777 001142  MOV    RMDSI,$BDDAT    ;BAD DATA FOR TYPEOUT
727 017744 005037 001140          BIC    #^CATA,$BDDAT
728 017750 104247          CLR    $GDDAT        ;GOOD DATA FOR TYPEOUT
729 017752          EMT     247
730 017752 004737 050562      8$:
    017756 000000          JSR    PC,CMPEERRSTS   ;CHECK ANY ERRORS NOT MASKED
    017760 000000          .WORD  0                ;MASK FOR RMER1
    017762 000403          .WORD  0                ;MASK FOR RMER2
    017764 000240          BR     9$             ;GO TO 9$ IF NO ERROR
    017766 104000          NOP                    ;RETURN HERE IF ERROR
    017770 004736          EMT                    ;ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
731 017772          JSR    PC,@(SP)+          ;GO BACK FOR MORE ERROR CHECKS
732
733
    ;*****
    ;*TEST 24      ERROR/ATA TEST
    ;*****
    TST24:
    017772          SCOPE          ;SCOPE CALL
    017774 000004          NOP                    ;START OF TEST
    017776 012706 001100      MOV    #STACK,SP      ;INITIALIZE STACK POINTER
    020002 013700 001276      MOV    $BASE,R0       ;R0 = UNIBUS ADDRESS
    020006 013701 001466      MOV    TSTQUE,R1      ;(R1) = DEVICE BEING TESTED
    020012 012737 000024 001226  MOV    #24,$TESTN    ;SET TEST NUMBER IN APT MAIL BOX
734
735 020020 004737 041532      JSR    PC,TSTPRP      ;PREPARE DEVICE FOR TEST
    020024 054130          .WORD  054130        ;TASK DESCRIPTOR AS FOLLOWS:
    ;CLEAR CONTROLLER & SELECT DEVICE
    ;VERIFY CONTROLLER CLEAR OPERATION
    ;PACK ACKNOWLEDGE IF VOLUME NOT VALID
    ;VERIFY PACK ACKNOWLEDGE
    ;RECALIBRATE IF "SKI" OR "PIP" IS SET
    ;VERIFY RECALIBRATION
    020026 000404          BR     1$             ;GO TO 1$ IF NO ERROR
    020030 000240          NOP                    ;RETURN HERE IF ERROR
    020032 104000          EMT                    ;ERROR # DEFINED BY TSTPRP SUBROUTINE
    020034 000137 020364      JMP    10$           ;GO TO 10$ IF ERROR
736 020040          1$:
737 020040 112737 000000 001545  MOVB   #RMCS1,PUTINX   ;SETUP PUT INDEX TABLE
    020046 112737 000200 001546  MOVB   #200,PUTINX+1   ;SET TERMINATOR BYTE
    020054 012737 000015 001412  MOV    #OFFSET!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = OFFSET!GO
    020062 004737 043016          JSR    PC,PUT         ;GO WRITE RMCS1 VIA PUT SUBROUTINE
    020066 000404          BR     2$             ;GO TO 2$ IF NO ERROR
    020070 000240          NOP                    ;RETURN HERE IF ERROR
    020072 104000          EMT                    ;ERROR DEFINED BY PUT SUBROUTINE
    020074 000137 020364      JMP    10$           ;GO TO 10$ IF ERROR
738 020100 004737 042462      2$:
739          JSR    PC,GETSTS ;SETUP TO READ ALL REGISTERS

```



```

740 020104 004737 042546 JSR PC,GET ;GO READ REGISTER(S) WITH GET SUBROUTINE
    020110 000404 BR 3$ ;GO TO 3$ IF NO ERROR
    020112 000240 NOP ;RETURN HERE IF ERROR
    020114 104000 EMT ;ERROR # DEFINED BY GET SUBROUTINE
    020116 000137 020364 JMP 10$ ;GO TO 10$ IF ERROR
741 020122 032737 100000 001350 3$: BIT #ATA,RMDSI ;IS ATA SET??
742 020130 001012 BNE 4$ ;YES!!
743 020132 013737 001350 001142 MOV RMDSI,$BDDAT ;BAD DATA FOR TYPEOUT
744 020140 032737 077777 001142 BIC #^CATA,$BDDAT
745 020146 012737 100000 001140 MOV #ATA,$GDDAT ;GOOD DATA FOR TYPEOUT
746 020154 104172 EMT 172
747 020156 4$:
748 020156 112737 000014 001545 MOVB #RMER1,PUTINX ;SETUP PUT INDEX TABLE
    020164 112737 000200 001546 MOVB #200,PUTINX+1 ;SET TERMINATOR BYTE
    020172 012737 040000 001426 MOV #UNS,RMER10 ;SET RMER1 OUTPUT BUFFER = UNS
    020200 004737 043016 JSR PC,PUT ;GO WRITE RMER1 VIA PUT SUBROUTINE
    020204 000404 BR 5$ ;GO TO 5$ IF NO ERROR
    020206 000240 NOP ;RETURN HERE IF ERROR
    020210 104000 EMT ;ERROR DEFINED BY PUT SUBROUTINE
    020212 000137 020364 JMP 10$ ;GO TO 10$ IF ERROR
749 020216 5$:
750 020216 112737 000000 001545 MOVB #RMCS1,PUTINX ;SETUP PUT INDEX TABLE
    020224 112737 000200 001546 MOVB #200,PUTINX+1 ;SET TERMINATOR BYTE
    020232 012737 000001 001412 MOV #NOP!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = NOP!GO
    020240 004737 043016 JSR PC,PUT ;GO WRITE RMCS1 VIA PUT SUBROUTINE
    020244 000404 BR 6$ ;GO TO 6$ IF NO ERROR
    020246 000240 NOP ;RETURN HERE IF ERROR
    020250 104000 EMT ;ERROR DEFINED BY PUT SUBROUTINE
    020252 000137 020364 JMP 10$ ;GO TO 10$ IF ERROR
751 020256 6$:
752 020256 004737 042546 JSR PC,GET ;GO READ REGISTER(S) WITH GET SUBROUTINE
    020262 000404 BR 7$ ;GO TO 7$ IF NO ERROR
    020264 000240 NOP ;RETURN HERE IF ERROR
    020266 104000 EMT ;ERROR # DEFINED BY GET SUBROUTINE
    020270 000137 020364 JMP 10$ ;GO TO 10$ IF ERROR
753 020274 032737 100000 001350 7$: BIT #ATA,RMDSI ;IS ATA STILL SET??
754 020302 001012 BNE 8$ ;YES!!
755 020304 012737 100000 001140 MOV #ATA,$GDDAT ;GOOD DATA FOR TYPEOUT
756 020312 013737 001350 001142 MOV RMDSI,$BDDAT ;BAD DATA FOR TYPEOUT
757 020320 042737 077777 001142 BIC #^CATA,$BDDAT
758 020326 104250 EMT 250
759 020330 8$:
760 020330 004737 060210 JSR PC,STCDRVSTS ;GO CHECK FOR CHANGES IN DRIVE STATUS
    020334 000405 BR 9$ ;GO TO 9$ IF NO ERROR
    020336 000240 NOP ;RETURN HERE IF ERROR
    020340 104000 EMT ;ERROR # DEFINED BY STCDRVSTS SUBROUTINE
    020342 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
    020344 000137 020364 JMP 10$ ;GO TO 10$ IF ERROR
761 020350 9$:
762 020350 004737 044416 JSR PC,SECERR ;GO CHECK FOR SECONDARY ERRORS
    020354 000403 BR 10$ ;GO TO 10$ IF NO ERROR
    020356 000240 NOP ;RETURN HERE IF ERROR
    020360 104000 EMT ;ERROR # DEFINED BY SECERR SUBROUTINE
    020362 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
763 020364 10$:
764
765 ;:*****
    
```

;*TEST 25 PROGRAM INTERRUPT TEST
 :*****
 TST25:

020364	000004			SCOPE		:SCOPE CALL
020364	000240			NOP		:START OF TEST
020370	012706	001100		MOV	#STACK,SP	:INITIALIZE STACK POINTER
020374	013700	001276		MOV	\$BASE,R0	:R0 = UNIBUS ADDRESS
020400	013701	001466		MOV	TSTQUE,R1	:(R1) = DEVICE BEING TESTED
020404	012737	000025	001226	MOV	#25,\$TESTN	::SET TEST NUMBER IN APT MAIL BOX
766						
767	020412	004737	041532	JSR	PC,TSTPRP	:PREPARE DEVICE FOR TEST
	020416	054130		.WORD	054130	:TASK DESCRIPTOR AS FOLLOWS:
						:CLEAR CONTROLLER & SELECT DEVICE
						:VERIFY CONTROLLER CLEAR OPERATION
						:PACK ACKNOWLEDGE IF VOLUME NOT VALID
						:VERIFY PACK ACKNOWLEDGE
						:RECALIBRATE IF 'SKI' OR 'PIP' IS SET
						:VERIFY RECALIBRATION
						:GO TO 1\$ IF NO ERROR
						:RETURN HERE IF ERROR
						:ERROR # DEFINED BY TSTPRP SUBROUTINE
						:GO TO 16\$ IF ERROR
	020420	000404		BR	1\$	
	020422	000240		NOP		
	020424	104000		EMT		
	020426	000137	021054	JMP	16\$	
768	020432					1\$:
769	020432	113702	001272	MOVB	\$VECT1,R2	:R2 = INTERRUPT ADDRESS
770	020436	042702	177400	BIC	#^C<377>,R2	:CLEAR SIGN EXTENSION
771	020442	011204		MOV	(R2),R4	:SAVE HANDLER ADDRESS
772	020444	016205	000002	MOV	2(R2),R5	:SAVE HANDLER PRIORITY
773	020450	012712	020714	MOV	#9\$, (R2)	:WRITE HANDLER ADDRESS AND
774	020454	012762	000300	MOV	#PR6,2(R2)	:PRIORITY FOR THIS TEST
775	020462	113703	001273	MOVB	\$VECT1+1,R3	:R3 = INTERRUPT LEVEL
776	020466	042703	177400	BIC	#^C<377>,R3	:CLEAR SIGN EXTENSION
777	020472	000303		SWAB	R3	
778	020474	005303		DEC	R3	:DECREMENT INTERRUPT LEVEL
779	020476	100001		BPL	2\$	
780	020500	005003		CLR	R3	
781	020502	042703	177437	BIC	#^CPR7,R3	
782	020506	000240		NOP		
783	020510	012746	000300	MOV	#PR6,-(SP)	::PUSH #PR6 ON STACK
784	020514	012746	020652	MOV	#6,-(SP)	::PUSH #6\$ ON STACK
785	020520	010346		MOV	R3,-(SP)	::PUSH R3 ON STACK
786	020522	012746	020644	MOV	#5,-(SP)	::PUSH #5\$ ON STACK
787	020526	012737	177777	MOV	#-1,RMAS0	:WRITE ONES IN RMAS TO
788	020534	112737	000016	MOVB	#RMAS,PUTINX	:CLEAR ALL ATTENTIONS
789	020542	112737	000200	MOVB	#200,PUTINX	
790						
791	020550	004737	043016	JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	020554	000404		BR	3\$:GO TO 3\$ IF NO ERROR
	020556	000240		NOP		:RETURN HERE IF ERROR
	020560	104000		EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	020562	000137	021054	JMP	16\$:GO TO 16\$ IF ERROR
792	020566					3\$:
793	020566	112737	000000	MOVB	#RMCS1,PUTINX	:SETUP PUT INDEX TABLE
	020574	112737	000200	MOVB	#200,PUTINX+1	:SET TERMINATOR BYTE
	020602	012737	000115	MOV	#OFFSET!GO!IE,RMCS10	:SET RMCS1 OUTPUT BUFFER = OFFSET!GO!IE
	020610	004737	043016	JSR	PC,PUT	:GO WRITE RMCS1 VIA PUT SUBROUTINE
	020614	000404		BR	4\$:GO TO 4\$ IF NO ERROR
	020616	000240		NOP		:RETURN HERE IF ERROR

020620	104000		EMT		:ERROR DEFINED BY PUT SUBROUTINE
020622	000137	021054	JMP	16\$:GO TO 16\$ IF ERROR
794 020626			4\$: JSR	PC,TIMOUT	:WAIT FOR COMPLETION
795 020626	004737	043370	JSR	PC,GETSTS	:SETUP TO READ ALL REGISTERS
796 020632	004737	042462	MOV	#205,R3	:R3 = GROSS TIMEOUT
797 020636	012703	000205	RTI		:DROP CP PRIORITY
798 020642	000002		5\$: DEC	R3	:TIMEOUT THE INTERRUPT
799 020644	005303		BPL	5\$	
800 020646	100376				
801					
802					:TIMEOUT BEFORE INTERRUPT
803					
804 020650	000002		RTI		:RAISE CP PRIORITY
805 020652			6\$: JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
806 020652	004737	042546	BR	7\$:GO TO 7\$ IF NO ERROR
	000404		NOP		:RETURN HERE IF ERROR
	000240		EMT		:ERROR # DEFINED BY GET SUBROUTINE
	104000		JMP	16\$:GO TO 16\$ IF ERROR
807 020664	000137	021054	7\$: JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
808 020670	004737	043564	BR	8\$:GO TO 8\$ IF NO ERROR
	000405		NOP		:RETURN HERE IF ERROR
	000240		EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	104000		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	004736		JMP	16\$:GO TO 16\$ IF ERROR
809 020704	000137	021054	8\$: EMT	251	
020710	104251		BR	12\$	
810 020712	000423				
811					
812 020714	022626		9\$: CMP	(SP)+,(SP)+	:ADJUST STACK
813 020716	012716	020724	MOV	#10\$,(SP)	:CHANGE RETURN ADDRESS
814 020722	000002		RTI		:RAISE CP PRIORITY
815 020724			10\$: JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
816 020724	004737	042546	BR	11\$:GO TO 11\$ IF NO ERROR
	000404		NOP		:RETURN HERE IF ERROR
	000240		EMT		:ERROR # DEFINED BY GET SUBROUTINE
	104000		JMP	16\$:GO TO 16\$ IF ERROR
817 020736	000137	021054	11\$: JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
818 020742	004737	043564	BR	12\$:GO TO 12\$ IF NO ERROR
	000405		NOP		:RETURN HERE IF ERROR
	000240		EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	104000		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	004736		JMP	16\$:GO TO 16\$ IF ERROR
819 020754	000137	021054	12\$: JSR	PC,CMPEPERRSTS	:CHECK ANY ERRORS NOT MASKED
820 020762	004737	050562	.WORD	NDTMSK	:MASK FOR RMER1
	115760		.WORD	DPE	:MASK FOR RMER2
	000010		BR	13\$:GO TO 13\$ IF NO ERROR
	000405		NOP		:RETURN HERE IF ERROR
	000240		EMT		:ERROR # DEFINED BY CMPEPERRSTS SUBROUTINE
	104000		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	004736		JMP	16\$:GO TO 16\$ IF ERROR
821 021002	000137	021054	13\$: JSR	PC,STCDRVSTS	:GO CHECK FOR CHANGES IN DRIVE STATUS
822 021006	004737	060210			

```
021012 000405 BR 14$ :GO TO 14$ IF NO ERROR
021014 000240 NOP :RETURN HERE IF ERROR
021016 104000 EMT :ERROR # DEFINED BY STCDRVSTS SUBROUTINE
021020 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
021022 000137 JMP 16$ :GO TO 16$ IF ERROR
823 021026 14$:
824 021026 004737 044416 JSR PC,SECERR :GO CHECK FOR SECONDARY ERRORS
021032 000405 BR 15$ :GO TO 15$ IF NO ERROR
021034 000240 NOP :RETURN HERE IF ERROR
021036 104000 EMT :ERROR # DEFINED BY SECERR SUBROUTINE
021040 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
021042 000137 JMP 16$ :GO TO 16$ IF ERROR
825 021046 15$:
826 021046 010412 MOV R4,(R2)
827 021050 010562 000002 MOV R5,2(R2)
828 021054 16$:
829
830
```

::*****
:*TEST 26 INHIBIT INTERRUPT TEST
:*****
TST26:

```
021054 000004 SCOPE :SCOPE CALL
021056 000240 NOP :START OF TEST
021060 012706 001100 MOV #STACK,SP :INITIALIZE STACK POINTER
021064 013700 001276 MOV $BASE,R0 :R0 = UNIBUS ADDRESS
021070 013701 001466 MOV TSTQUE,R1 : (R1) = DEVICE BEING TESTED
021074 012737 000026 001226 MOV #26,$TESTN ;;SET TEST NUMBER IN APT MAIL BOX
831
832 021102 004737 041532 JSR PC,TSTPRP :PREPARE DEVICE FOR TEST
021106 054130 .WORD 054130 :TASK DESCRIPTOR AS FOLLOWS:
: CLEAR CONTROLLER & SELECT DEVICE
: VERIFY CONTROLLER CLEAR OPERATION
: PACK ACKNOWLEDGE IF VOLUME NOT VALID
: VERIFY PACK ACKNOWLEDGE
: RECALIBRATE IF 'SKI' OR 'PIP' IS SET
: VERIFY RECALIBRATION
: GO TO 1$ IF NO ERROR
: RETURN HERE IF ERROR
: ERROR # DEFINED BY TSTPRP SUBROUTINE
: GO TO 13$ IF ERROR
021110 000404 BR 1$
021112 000240 NOP
021114 104000 EMT
021116 000137 JMP 13$
833 021122 1$:
834 021122 113702 001272 MOVB $VECT1,R2 :R2 = INTERRUPT ADDRESS
835 021126 042702 177400 BIC #C<377>,R2 :CLEAR SIGN EXTENSION
836 021132 011204 MOV (R2),R4 :SAVE HANDLER ADDRESS
837 021134 016205 000002 MOV 2(R2),R5 :SAVE HANDLER PRIORITY
838 021140 012712 021362 MOV #8$,R2 :WRITE HANDLER ADDRESS AND
839 021144 012762 000300 000002 MOV #PR6,2(R2) :PRIORITY FOR THIS TEST
840 021152 113703 001273 MOVB $VECT1+1,R3 :R3 = INTERRUPT LEVEL
841 021156 042703 177400 BIC #C<377>,R3 :CLEAR SIGN EXTENSION
842 021162 012746 000300 MOV #PR6,-(SP) ;;PUSH #PR6 ON STACK
843 021166 012746 021414 MOV #12$,-(SP) ;;PUSH #12$ ON STACK
844 021172 010346 MOV R3,-(SP) ;;PUSH R3 ON STACK
845 021174 005316 DEC (SP)
846 021176 100001 BPL 2$
847 021200 005016 CLR (SP)
848 021202 042716 177437 2$: BIC #CPR7,(SP)
849 021206 012746 021350 MOV #6$,-(SP) ;;PUSH #6$ ON STACK
```

```

850 021212 010346      MOV      R3,-(SP)      ;:PUSH R3 ON STACK
851 021214 012746 021276  MOV      #4$,-(SP)    ;:PUSH #4$ ON STACK
852 021220 004737 042462  JSR      PC,GETSTS    ;:SETUP TO READ ALL REGISTERS
853
854 021224 112737 000000 001545  MOVB    #RMCS1,PUTINX ;:SETUP PUT INDEX TABLE
      021232 112737 000200 001546  MOVB    #200,PUTINX+1 ;:SET TERMINATOR BYTE
      021240 012737 000115 001412  MOV     #OFFSET!GO!IE,RMCS10 ;:SET RMCS1 OUTPUT BUFFER = OFFSET!GO!IE
      021246 004737 043016      JSR      PC,PUT        ;:GO WRITE RMCS1 VIA PUT SUBROUTINE
      021252 000404      BR       3$           ;:GO TO 3$ IF NO ERROR
      021254 000240      NOP                    ;:RETURN HERE IF ERROR
      021256 104000      EMT                    ;:ERROR DEFINED BY PUT SUBROUTINE
      021260 000137 021422      JMP      13$          ;:GO TO 13$ IF ERROR
855 021264      3$:
856 021264 004737 043370      JSR      PC,TIMOUT    ;:WAIT FOR GO = 0
857 021270 012703 000205  MOV     #205,R3       ;:R3 = GROSS TIMER
858 021274 000002      RTI
859
860 021276 005303      4$:      DEC     R3            ;:DELAY
861 021300 100376      BPL     4$
862
863 021302 112737 000000 001545  MOVB    #RMCS1,PUTINX ;:SETUP PUT INDEX TABLE
      021310 112737 000200 001546  MOVB    #200,PUTINX+1 ;:SET TERMINATOR BYTE
      021316 012737 000000 001412  MOV     #NOP,RMCS10   ;:SET RMCS1 OUTPUT BUFFER = NOP
      021324 004737 043016      JSR      PC,PUT        ;:GO WRITE RMCS1 VIA PUT SUBROUTINE
      021330 000404      BR       5$           ;:GO TO 5$ IF NO ERROR
      021332 000240      NOP                    ;:RETURN HERE IF ERROR
      021334 104000      EMT                    ;:ERROR DEFINED BY PUT SUBROUTINE
      021336 000137 021422      JMP      13$          ;:GO TO 13$ IF ERROR
864 021342 012703 000205      5$:      MOV     #205,R3
865 021346 000002      RTI
866
867 021350 012712 021364      6$:      MOV     #9$,(R2)
868 021354 005303      7$:      DEC     R3
869 021356 100376      BPL     7$
870 021360 000002      RTI                    ;:NO ERROR
871
872 021362 022626      8$:      CMP     (SP)+,(SP)+   ;:ADJUST STACK
873 021364 022626      9$:      CMP     (SP)+,(SP)+   ;:ADJUST STACK
874 021366 012716 021374      MOV     #10$,(SP)
875 021372 000002      RTI
876 021374      10$:
877 021374 004737 042546      JSR      PC,GET        ;:GO READ REGISTER(S) WITH GET SUBROUTINE
      021400 000404      BR       11$          ;:GO TO 11$ IF NO ERROR
      021402 000240      NOP                    ;:RETURN HERE IF ERROR
      021404 104000      EMT                    ;:ERROR # DEFINED BY GET SUBROUTINE
      021406 000137 021422      JMP      13$          ;:GO TO 13$ IF ERROR
878 021412      11$:      EMT     252
      021412 104252
879
880 021414 010412      12$:      MOV     R4,(R2)
881 021416 010562 000002      MOV     R5,2(R2)
882 021422      13$:
883
884

```

021422

```

:*****
:*TEST 27      RETURN TO CENTERLINE TEST
:*****
TST27:

```

	021422	000004			SCOPE		:SCOPE CALL
	021424	000240			NOP		:START OF TEST
	021426	012706	001100		MOV	#STACK,SP	:INITIALIZE STACK POINTER
	021432	013700	001276		MOV	\$BASE,R0	:R0 = UNIBUS ADDRESS
	021436	013701	001466		MOV	TSTQUE,R1	:(R1) = DEVICE BEING TESTED
	021442	012737	000027	001226	MOV	#27,\$TESTN	::SET TEST NUMBER IN APT MAIL BOX
885							
886	021450	004737	041532		JSR	PC,TSTPRP	:PREPARE DEVICE FOR TEST
	021454	054130			.WORD	054130	:TASK DESCRIPTOR AS FOLLOWS:
							:CLEAR CONTROLLER & SELECT DEVICE
							:VERIFY CONTROLLER CLEAR OPERATION
							:PACK ACKNOWLEDGE IF VOLUME NOT VALID
							:VERIFY PACK ACKNOWLEDGE
							:RECALIBRATE IF 'SKI' OR 'PIP' IS SET
							:VERIFY RECALIBRATION
							:GO TO 1\$ IF NO ERROR
							:RETURN HERE IF ERROR
							:ERROR # DEFINED BY TSTPRP SUBROUTINE
							:GO TO 9\$ IF ERROR
	021456	000404			BR	1\$	
	021460	000240			NOP		
	021462	104000			EMT		
	021464	000137	021744		JMP	9\$	
887	021470			1\$:			
888	021470	112737	000000	001545	MOVB	#RMCS1,PUTINX	:SETUP PUT INDEX TABLE
	021476	112737	000200	001546	MOVB	#200,PUTINX+1	:SET TERMINATOR BYTE
	021504	012737	000017	001412	MOV	#RTC!GO,RMCS10	:SET RMCS1 OUTPUT BUFFER = RTC!GO
	021512	004737	043016		JSR	PC,PUT	:GO WRITE RMCS1 VIA PUT SUBROUTINE
	021516	000404			BR	2\$:GO TO 2\$ IF NO ERROR
	021520	000240			NOP		:RETURN HERE IF ERROR
	021522	104000			EMT		:ERROR DEFINED BY PUT SUBROUTINE
	021524	000137	021744		JMP	9\$:GO TO 9\$ IF ERROR
889	021530	004737	042462	2\$:	JSR	PC,GETSTS	:SETUP FOR STATUS FETCH
890	021534	004737	043370		JSR	PC,TIMOUT	:WAIT FOR RECAL TO COMPLETE
891							
892	021540	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	021544	000404			BR	3\$:GO TO 3\$ IF NO ERROR
	021546	000240			NOP		:RETURN HERE IF ERROR
	021550	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	021552	000137	021744		JMP	9\$:GO TO 9\$ IF ERROR
893	021556			3\$:			
894	021556	004737	043564		JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	021562	000405			BR	4\$:GO TO 4\$ IF NO ERROR
	021564	000240			NOP		:RETURN HERE IF ERROR
	021566	104000			EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	021570	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	021572	000137	021744		JMP	9\$:GO TO 9\$ IF ERROR
895	021576	032737	000001	001350	4\$:	BIT	#OM,RMDSI
896	021604	001411			BEQ	5\$:OFFSET MODE OFF??
897	021606	005037	001140		CLR	\$GDDAT	:GOOD DATA FOR TYPEOUT
898	021612	013737	001350	001142	MOV	RMDSI,\$BDDAT	:BAD DATA FOR TYPEOUT
899	021620	042737	177776	001142	BIC	#^COM,\$BDDAT	
900	021626	104157			EMT	157	
901	021630	032737	100000	001350	5\$:	BIT	#ATA,RMDSI
902	021636	001012			BNE	6\$:WAS ATTENTION SET ??
903	021640	013737	001350	001142	MOV	RMDSI,\$BDDAT	:BAD DATA FOR TYPEOUT
904	021646	042737	077777	001142	BIC	#^CATA,\$BDDAT	
905	021654	012737	100000	001140	MOV	#ATA,\$GDDAT	:GOOD DATA FOR TYPEOUT
906	021662	104171			EMT	171	
907	021664			6\$:			
908	021664	004737	050562		JSR	PC,CMPEERRSTS	:CHECK ANY ERRORS NOT MASKED

```

021670 115760 .WORD NDTMSK ;MASK FOR RMER1
021672 000010 .WORD DPE ;MASK FOR RMER2
021674 000405 BR 7$ ;GO TO 7$ IF NO ERROR
021676 000240 NOP ;RETURN HERE IF ERROR
021700 104000 EMT ;ERROR # DEFINED BY CMPERRSTS SUBROUTINE
021702 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
021704 000137 021744 JMP 9$ ;GO TO 9$ IF ERROR
909 021710 7$:
910 021710 004737 060210 JSR PC,STCDRVSTS ;GO CHECK FOR CHANGES IN DRIVE STATUS
021714 000405 BR 8$ ;GO TO 8$ IF NO ERROR
021716 000240 NOP ;RETURN HERE IF ERROR
021720 104000 EMT ;ERROR # DEFINED BY STCDRVSTS SUBROUTINE
021722 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
021724 000137 021744 JMP 9$ ;GO TO 9$ IF ERROR
911 021730 8$:
912 021730 004737 044416 JSP PC,SECERR ;GO CHECK FOR SECONDARY ERRORS
021734 000403 BR 9$ ;GO TO 9$ IF NO ERROR
021736 000240 NOP ;RETURN HERE IF ERROR
021740 104000 EMT ;ERROR # DEFINED BY SECERR SUBROUTINE
021742 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
913 021744 9$:
914
915

```

```

:*****
:*TEST 30 READ IN PRESET TEST
:*****
TST30:

```

```

021744 000004 SCOPE ;SCOPE CALL
021746 000240 NOP ;START OF TEST
021750 012706 001100 MOV #STACK,SP ;INITIALIZE STACK POINTER
021754 013700 001276 MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
021760 013701 001466 MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
021764 012737 000030 001226 MOV #30,$TESTN ;;SET TEST NUMBER IN APT MAIL BOX
916
917 021772 004737 041532 JSR PC,TSTPRP ;PREPARE DEVICE FOR TEST
021776 054130 .WORD 054130 ;TASK DESCRIPTOR AS FOLLOWS:
;CLEAR CONTROLLER & SELECT DEVICE
;VERIFY CONTROLLER CLEAR OPERATION
;PACK ACKNOWLEDGE IF VOLUME NOT VALID
;VERIFY PACK ACKNOWLEDGE
;RECALIBRATE IF 'SKI' OR 'PIP' IS SET
;VERIFY RECALIBRATION
022000 000404 BR 1$ ;GO TO 1$ IF NO ERROR
022002 000240 NOP ;RETURN HERE IF ERROR
022004 104000 EMT ;ERROR # DEFINED BY TSTPRP SUBROUTINE
022006 000137 022326 JMP 10$ ;GO TO 10$ IF ERROR
918 022012 1$:
919 022012 012702 001545 MOV #PUTINX,R2 ;R2 POINTS TO INDEX TABLE
920 022016 112722 000006 MOVB #RMDA,(R2)+
921 022022 112722 000034 MOVB #RMDC,(R2)+
922 022026 112722 000032 MOVB #RMOF,(R2)+
923 022032 112722 000000 MOVB #RMCS1,(R2)+
924 022036 112722 000200 MOVB #200,(R2)+
925 022042 012737 177777 001420 MOV #-1,RMDAO
926 022050 012737 177777 001446 MOV #-1,RMDCO
927 022056 012737 017200 001444 MOV #FMT16!ECI!HCI!SSEI!OFD,RMOFO
928 022064 012737 000021 001412 MOV #RIP!GO,RMCS10
929 022072 004737 043016 JSR PC,PUT ;GO WRITE REGISTER(S) WITH PUT SUBROUTINE

```

	022076	000404		BR	2\$:GO TO 2\$ IF NO ERROR
	022100	000240		NOP					:RETURN HERE IF ERROR
	022102	104000		EMT					:ERROR # DEFINED BY PUT SUBROUTINE
	022104	000137	022326	JMP	10\$:GO TO 10\$ IF ERROR
930	022110	004737	042462	JSR	PC,GETSTS	2\$:			:SETUP FOR STATUS FETCH
931	022114	004737	043370	JSR	PC,TIMOUT				:WAIT FOR RIP TO COMPLETE
932									
933	022120	004737	042546	JSR	PC,GET				:GO READ REGISTER(S) WITH GET SUBROUTINE
	022124	000404		BR	3\$:GO TO 3\$ IF NO ERROR
	022126	000240		NOP					:RETURN HERE IF ERROR
	022130	104000		EMT					:ERROR # DEFINED BY GET SUBROUTINE
	022132	000137	022326	JMP	10\$:GO TO 10\$ IF ERROR
934	022136					3\$:			
935	022136	004737	043564	JSR	PC,PRIERR				:GO CHECK FOR PRIMARY ERRORS
	022142	000405		BR	4\$:GO TO 4\$ IF NO ERROR
	022144	000240		NOP					:RETURN HERE IF ERROR
	022146	104000		EMT					:ERROR # DEFINED BY PRIERR SUBROUTINE
	022150	004736		JSR	PC,@(SP)+				:GO BACK FOR MORE ERROR CHECKS
	022152	000137	022326	JMP	10\$:GO TO 10\$ IF ERROR
936	022156	013737	001370	MOV	RMOFI,\$BDDAT	4\$:	001142		:IS RMOF RESET??
937	022164	042737	160577	BIC	#^C<FMT16!ECI!HCI!SSEI!OFD>,\$BDDAT		001142		
938	022172	001403		BEQ	5\$:YES!!
939	022174	005037	001140	CLR	\$GDDAT				:GOOD DATA FOR TYPEOUT
940	022200	104160		EMT	160				
941	022202	005737	001344	TST	RMDAI	5\$:			:IS RMDA RESET??
942	022206	001406		BEQ	6\$:YES!!
943	022210	013737	001344	MOV	RMDAI,\$BDDAT		001142		:BAD DATA FOR TYPEOUT
944	022216	005037	001140	CLR	\$GDDAT				:GOOD DATA FOR TYPEOUT
945	022222	104161		EMT	161				
946	022224	005737	001372	TST	RMDCI	6\$:			:IS RMDC RESET??
947	022230	001406		BEQ	7\$:YES!!
948	022232	013737	001372	MOV	RMDCI,\$BDDAT		001142		:BAD DATA FOR TYPEOUT
949	022240	005037	001140	CLR	\$GDDAT				:GOOD DATA FOR TYPEOUT
950	022244	104162		EMT	162				
951	022246					7\$:			
952	022246	004737	050562	JSR	PC,CMPERRSTS				:CHECK ANY ERRORS NOT MASKED
	022252	115760		.WORD	NDTMSK				:MASK FOR RMER1
	022254	000010		.WORD	DPE				:MASK FOR RMER2
	022256	000405		BR	8\$:GO TO 8\$ IF NO ERROR
	022260	000240		NOP					:RETURN HERE IF ERROR
	022262	104000		EMT					:ERROR # DEFINED BY CMPERRSTS SUBROUTINE
	022264	004736		JSR	PC,@(SP)+				:GO BACK FOR MORE ERROR CHECKS
	022266	000137	022326	JMP	10\$:GO TO 10\$ IF ERROR
953	022272					8\$:			
954	022272	004737	060210	JSR	PC,STCDRVSTS				:GO CHECK FOR CHANGES IN DRIVE STATUS
	022276	000405		BR	9\$:GO TO 9\$ IF NO ERROR
	022300	000240		NOP					:RETURN HERE IF ERROR
	022302	104000		EMT					:ERROR # DEFINED BY STCDRVSTS SUBROUTINE
	022304	004736		JSR	PC,@(SP)+				:GO BACK FOR MORE ERROR CHECKS
	022306	000137	022326	JMP	10\$:GO TO 10\$ IF ERROR
955	022312					9\$:			
956	022312	004737	044416	JSR	PC,SECERR				:GO CHECK FOR SECONDARY ERRORS
	022316	000403		BR	10\$:GO TO 10\$ IF NO ERROR
	022320	000240		NOP					:RETURN HERE IF ERROR
	022322	104000		EMT					:ERROR # DEFINED BY SECERR SUBROUTINE
	022324	004736		JSR	PC,@(SP)+				:GO BACK FOR MORE ERROR CHECKS
957	022326					10\$:			

958
959

```

:*****
:*TEST 31          RMDC CLEAR OFFSET TEST
:*****
TST31:
    
```

022326	000004				SCOPE		:SCOPE CALL
022326	000240				NOP		:START OF TEST
022330	012706	001100			MOV	#STACK,SP	:INITIALIZE STACK POINTER
022332	013700	001276			MOV	\$BASE,R0	:R0 = UNIBUS ADDRESS
022336	013701	001466			MOV	TSTQUE,R1	:(R1) = DEVICE BEING TESTED
022342	012737	000031	001226		MOV	#31,\$TESTN	::SET TEST NUMBER IN APT MAIL BOX
960							
961	022354	004737	041532		JSR	PC,TSTPRP	:PREPARE DEVICE FOR TEST
	022360	054130			.WORD	054130	:TASK DESCRIPTOR AS FOLLOWS:
							:CLEAR CONTROLLER & SELECT DEVICE
							:VERIFY CONTROLLER CLEAR OPERATION
							:PACK ACKNOWLEDGE IF VOLUME NOT VALID
							:VERIFY PACK ACKNOWLEDGE
							:RECALIBRATE IF "SKI" OR "PIP" IS SET
							:VERIFY RECALIBRATION
							:GO TO 1\$ IF NO ERROR
							:RETURN HERE IF ERROR
							:ERROR # DEFINED BY TSTPRP SUBROUTINE
							:GO TO 8\$ IF ERROR
022362	000404				BR	1\$	
022364	000240				NOP		
022366	104000				EMT		
022370	000137	022644			JMP	8\$	
962	022374			1\$:			
963	022374	112737	000000	001545	MOVB	#RMCS1,PUTINX	:SETUP PUT INDEX TABLE
	022402	112737	000200	001546	MOVB	#200,PUTINX+1	:SET TERMINATOR BYTE
	022410	012737	000015	001412	MOV	#OFFSET!GO,RMCS10	:SET RMCS1 OUTPUT BUFFER = OFFSET!GO
	022416	004737	043016		JSR	PC,PUT	:GO WRITE RMCS1 VIA PUT SUBROUTINE
	022422	000404			BR	2\$:GO TO 2\$ IF NO ERROR
	022424	000240			NOP		:RETURN HERE IF ERROR
	022426	104000			EMT		:ERROR DEFINED BY PUT SUBROUTINE
	022430	000137	022644		JMP	8\$:GO TO 8\$ IF ERROR
964	022434	004737	042462		JSR	PC,GETSTS	:SETUP FOR STATUS
965							
966	022440	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	022444	000404			BR	3\$:GO TO 3\$ IF NO ERROR
	022446	000240			NOP		:RETURN HERE IF ERROR
	022450	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	022452	000137	022644		JMP	8\$:GO TO 8\$ IF ERROR
967	022456			3\$:			
968	022456	004737	043564		JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	022462	000405			BR	4\$:GO TO 4\$ IF NO ERROR
	022464	000240			NOP		:RETURN HERE IF ERROR
	022466	104000			EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	022470	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	022472	000137	022644		JMP	8\$:GO TO 8\$ IF ERROR
969	022476	032737	000001	001350	4\$:	BIT	#OM,RMDSI
970	022504	001013			BNE	5\$:OFFSET ON??
971	022506	013737	001350	001142	MOV	RMDSI,\$BDDAT	:YES
972	022514	042737	177776	001142	BIC	#^COM,\$BDDAT	:BAD DATA FOR TYPEOUT
973	022522	012737	000001	001140	MOV	#OM,\$GDDAT	:GOOD DATA FOR TYPEOUT
974	022530	104156			EMT	156	
975	022532	000444			BR	8\$:SKIP REST OF TEST
976	022534			5\$:			
977	022534	112737	000034	001545	MOVB	#RMDC,PUTINX	:SETUP PUT INDEX TABLE
	022542	112737	000200	001546	MOVB	#200,PUTINX+1	:SET TERMINATOR BYTE

```

022550 012737 000000 001446      MOV      #0,RMDCO      ;SET RMDC OUTPUT BUFFER = 0
022556 004737 043016              JSR      PC,PUT       ;GO WRITE RMDC VIA PUT SUBROUTINE
022562 000404                    BR       6$          ;GO TO 6$ IF NO ERROR
022564 000240                    NOP      ;RETURN HERE IF ERROR
022566 104000                    EMT     ;ERROR DEFINED BY PUT SUBROUTINE
022570 000137 022644              JMP      8$          ;GO TO 8$ IF ERROR
978 022574                    6$:
979 022574 004737 042546          JSR      PC,GET       ;GO READ REGISTER(S) WITH GET SUBROUTINE
022600 000404                    BR       7$          ;GO TO 7$ IF NO ERROR
022602 000240                    NOP      ;RETURN HERE IF ERROR
022604 104000                    EMT     ;ERROR # DEFINED BY GET SUBROUTINE
022606 000137 022644              JMP      8$          ;GO TO 8$ IF ERROR
980 022612 032737 000001 001350 7$: BIT      #0M,RMDSI    ;DID OFFSET MODE RESET??
981 022620 001411                    BEQ     8$
982 022622 013737 001350 001142    MOV      RMDSI,$BDDAT ;BAD DATA FOR TYPEOUT
983 022630 042737 177776 001142    BIC     #^COM,$BDDAT
984 022636 005037 001140          CLR     $GDDAT      ;GOOD DATA FOR TYPEOUT
985 022642 104253                    EMT     253
986 022644                    8$:
987
988

```

```

:*****
:*TEST 32      ILLEGAL FUNCTION TEST
:*****
TST32:

```

```

022644 000004                    SCOPE      ;SCOPE CALL
022646 000240                    NOP      ;START OF TEST
022650 012706 001100          MOV      #STACK,SP   ;INITIALIZE STACK POINTER
022654 013700 001276          MOV      $BASE,R0    ;R0 = UNIBUS ADDRESS
022660 013701 001466          MOV      TSTQUE,R1   ;(R1) = DEVICE BEING TESTED
022664 012737 000032 001226    MOV      #32,$TESTN  ;:SET TEST NUMBER IN APT MAIL BOX
989
990 022672 004737 041532          JSR      PC,TSTPRP   ;PREPARE DEVICE FOR TEST
022676 040000          .WORD 040000      ;TASK DESCRIPTOR AS FOLLOWS:
                                ;CLEAR CONTROLLER & SELECT DEVICE
022700 000404                    BR       1$          ;GO TO 1$ IF NO ERROR
022702 000240                    NOP      ;RETURN HERE IF ERROR
022704 104000                    EMT     ;ERROR # DEFINED BY TSTPRP SUBROUTINE
022706 000137 023430          JMP      13$        ;GO TO 13$ IF ERROR
991 022712                    1$:
992 022712 004737 042462          JSR      PC,GETSTS   ;SETUP FOR STATUS
993 022716 012702 000000          MOV      #NOP,R2
994 022722                    2$:
995 022722 004737 052466          JSR      PC,CNTCLR   ;GO ISSUE CONTROLLER CLEAR
022726 000404                    BR       3$          ;GO TO 3$ IF NO ERROR
022730 000240                    NOP      ;RETURN HERE IF ERROR
022732 104000                    EMT     ;ERROR NUMBER DEFINED BY SUBROUTINE
022734 000137 023430          JMP      13$        ;GO TO 13$ IF ERROR
996 022740                    3$:
997
998 ;SET DIAGNOSTIC MODE AND DIAGNOSTIC UNIT READY, DIAGNOSTIC ON
999 ;CYLINDER
1000 022740 112737 000024 001545    MOV      #RMR1,PUTINX ;SETUP PUT INDEX TABLE
022746 112737 000200 001546    MOV      #200,PUTINX+1 ;SET TERMINATOR BYTE
022754 112737 000001 001436    MOV      #DMD,RMR10  ;SET RMR1 OUTPUT BUFFER = DMD
022762 004737 043016          JSR      PC,PUT      ;GO WRITE RMR1 VIA PUT SUBROUTINE
022766 000404                    BR       4$          ;GO TO 4$ IF NO ERROR
022770 000240                    NOP      ;RETURN HERE IF ERROR

```

T32 ILLEGAL FUNCTION TEST

```

022772 104000          EMT          :ERROR DEFINED BY PUT SUBROUTINE
022774 000137 023430  JMP          13$          :GO TO 13$ IF ERROR
1001 023000          4$:
1002 023000 112737 000024 001545  MOVB        #RMMR1,PUTINX  :SETUP PUT INDEX TABLE
023006 112737 000200 001546  MOVB        #200,PUTINX+1 :SET TERMINATOR BYTE
023014 012737 001401 001436  MOV        #DMD!MUR!MOC,RMMR10 :SET RMMR1 OUTPUT BUFFER = DMD!MUR!MOC
023022 004737 043016  JSR        PC,PUT          :GO WRITE RMMR1 VIA PUT SUBROUTINE
023026 000404          BR          5$          :GO TO 5$ IF NO ERROR
023030 000240          NOP          :RETURN HERE IF ERROR
023032 104000          EMT          :ERROR DEFINED BY PUT SUBROUTINE
023034 000137 023430  JMP          13$          :GO TO 13$ IF ERROR
1003 023040          5$:
1004
1005
1006 023040 112737 000000 001545  MOVB        #RMCS1,PUTINX  :SETUP PUT INDEX TABLE
023046 112737 000200 001546  MOVB        #200,PUTINX+1 :SET TERMINATOR BYTE
023054 012737 000023 001412  MOV        #PAKACK!GO,RMCS10 :SET RMCS1 OUTPUT BUFFER = PAKACK!GO
023062 004737 043016  JSR        PC,PUT          :GO WRITE RMCS1 VIA PUT SUBROUTINE
023066 000404          BR          6$          :GO TO 6$ IF NO ERROR
023070 000240          NOP          :RETURN HERE IF ERROR
023072 104000          EMT          :ERROR DEFINED BY PUT SUBROUTINE
023074 000137 023430  JMP          13$          :GO TO 13$ IF ERROR
1007 023100          6$:
1008 023100 012737 000001 001412  MOV        #GO,RMCS10
1009 023106 050237 001412  BIS        R2,RMCS10      :WRITE FUNCTION CODE IN BUFFER
1010 023112 012737 104372 001416  MOV        #BUFONE,RMBAO   :DUMMY BUS ADDRESS
1011 023120 012737 177777 001414  MOV        #-1,RMWCO      :DUMMY WORD COUNT
1012 023126 005037 001420  CLR        RMDAO          :CLEAR DISK ADDRESS
1013 023132 005037 001446  CLR        RMDCO          :CLEAR CYLINDER ADDRESS
1014 023136 012737 010000 001444  MOV        #FMT16,RMOFO   :16 BIT FORMAT
1015 023144 012703 001545  MOV        #PUTINX,R3      :WRITE REGISTER INDEX TABLE
1016 023150 112723 000004  MOVB       #RMB A,(R3)+
1017 023154 112723 000002  MOVB       #RMB C,(R3)+
1018 023160 112723 000032  MOVB       #RMB F,(R3)+
1019 023164 112723 000006  MOVB       #RMB D A,(R3)+
1020 023170 112723 000034  MOVB       #RMB D C,(R3)+
1021 023174 112723 000000  MOVB       #RMB S 1,(R3)+
1022 023200 112713 000200  MOVB       #200,(R3)
1023 023204 004737 043016  JSR        PC,PUT          :GO WRITE REGISTER(S) WITH PUT SUBROUTINE
023210 000404          BR          7$          :GO TO 7$ IF NO ERROR
023212 000240          NOP          :RETURN HERE IF ERROR
023214 104000          EMT          :ERROR # DEFINED BY PUT SUBROUTINE
023216 000137 023430  JMP          13$          :GO TO 13$ IF ERROR
1024 023222 004737 043370  7$: JSR        PC,TIMOUT     :WAIT FOR GO TO RESET
1025
1026 023226 004737 042546  JSR        PC,GET          :GO READ REGISTER(S) WITH GET SUBROUTINE
023232 000404          BR          8$          :GO TO 8$ IF NO ERROR
023234 000240          NOP          :RETURN HERE IF ERROR
023236 104000          EMT          :ERROR # DEFINED BY GET SUBROUTINE
023240 000137 023430  JMP          13$          :GO TO 13$ IF ERROR
1027 023244          8$:
1028 023244 004737 043564  JSR        PC,PRIERR       :GO CHECK FOR PRIMARY ERRORS
023250 000405          BR          9$          :GO TO 9$ IF NO ERROR
023252 000240          NOP          :RETURN HERE IF ERROR
023254 104000          EMT          :ERROR # DEFINED BY PRIERR SUBROUTINE
023256 004736  JSR        PC,@(SP)+      :GO BACK FOR MORE ERROR CHECKS
023260 000137 023430  JMP          13$          :GO TO 13$ IF ERROR

```

```
1029 023264 016237 070002 001140 9$: MOV FNCDTB(R2),SGDDAT ;GET ENTRY FROM FUNCTION CODE TABLF
1030 023272 042737 177776 001140 BIC #^CILF,SGDDAT
1031 023300 013737 001352 001142 MOV RMER1I,$BDDAT ;BAD DATA FOR TYPEOUT
1032 023306 042737 177776 001142 BIC #^CILF,$BDDAT
1033 023314 023737 001140 001142 CMP $GDDAT,$BDDAT ;IS ILF STATUS CORRECT?
1034 023322 001402 BEQ 10$ ;YES!!
1035 023324 104254 EMT 254
1036 023326 000440 BR 13$
1037 023330 016237 070002 001140 10$: MOV FNCDTB(R2),SGDDAT
1038 023336 032737 040000 001350 BIT #EPR,RMDSI ;WAS AN ERROR DETECTED??
1039 023344 001403 BEQ 11$ ;NO!!
1040 023346 052737 100000 001140 BIS #ATA,SGDDAT ;YES - ATA SHOULD BE ON
1041 023354 042737 077777 001140 11$: BIC #^CATA,SGDDAT
1042 023362 013737 001350 001142 MOV RMDSI,$BDDAT ;GET DRIVE'S ATTENTION
1043 023370 042737 077777 001142 BIC #^CATA,$BDDAT
1044 023376 023737 001140 001142 CMP $GDDAT,$BDDAT ;IS ATA STATUS OK??
1045 023404 001402 BEQ 12$ ;YES!!
1046 023406 104255 EMT 255
1047 023410 000407 BR 13$
1048 023412 062702 000002 12$: ADD #2,R2 ;GO TO NEXT FUNCTION CODE
1049 023416 022702 000076 CMP #ILF76,R2 ;DONE??
1050 023422 103402 BLO 13$ ;YES !!
1051 023424 000137 022722 JMP 2$ ;TEST NEXT FUNCTION
1052 023430 13$:
1053
1054
```

```
::*****
:*TEST 33 INVALID COMMAND TEST
:*****
TST33:
```

```
023430
023430 000004 SCOPE ;SCOPE CALL
023432 000240 NOP ;START OF TEST
023434 012706 001100 MOV #STACK,SP ;INITIALIZE STACK POINTER
023440 013700 001276 MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
023444 013701 001466 MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
023450 012737 000033 001226 MOV #33,$TESTN ;SET TEST NUMBER IN APT MAIL BOX
1055
1056 023456 004737 041532 JSR PC,TSTPRP ;PREPARE DEVICE FOR TEST
023462 040000 .WORD 040000 ;TASK DESCRIPTOR AS FOLLOWS:
;CLEAR CONTROLLER & SELECT DEVICE
023464 000404 BR 1$ ;GO TO 1$ IF NO ERROR
023466 000240 NOP ;RETURN HERE IF ERROR
023470 104000 EMT ;ERROR # DEFINED BY TSTPRP SUBROUTINE
023472 000137 024154 JMP 13$ ;GO TO 13$ IF ERROR
1057 023476 1$:
1058 023476 004737 042462 JSR PC,GETSTS ;SETUP FOR STATUS
1059 023502 012702 000000 MOV #NOP,R2
1060 023506 2$:
1061 023506 004737 052466 JSR PC,CNTCLR ;GO ISSUE CONTROLLER CLEAR
023512 000404 BR 3$ ;GO TO 3$ IF NO ERROR
023514 000240 NOP ;RETURN HERE IF ERROR
023516 104000 EMT ;ERROR NUMBER DEFINED BY SUBROUTINE
023520 000137 024154 JMP 13$ ;GO TO 13$ IF ERROR
1062 023524 3$:
1063
1064 ;SET DIAGNOSTIC MODE AND DIAGNOSTIC UNIT READY, DIAGNOSTIC ON
1065 ;CYLINDER
1666 023524 112737 000024 001545 MOV #RMMR1,PUTINX ;SETUP PUT INDEX TABLE
```

T33

INVALID COMMAND TEST

```

023532 112737 000200 001546      MOVB  #200,PUTINX+1      ;SET TERMINATOR BYTE
023540 012737 000001 001436      MOV   #DMD,RMMR10      ;SET RMMR1 OUTPUT BUFFER = DMD
023546 004737 043016              JSR   PC,PUT           ;GO WRITE RMMR1 VIA PUT SUBROUTINE
023552 000404                    BR    4$              ;GO TO 4$ IF NO ERROR
023554 000240                    NOP                      ;RETURN HERE IF ERROR
023556 104000                    EMT                      ;ERROR DEFINED BY PUT SUBROUTINE
023560 000137 024154              JMP   13$             ;GO TO 13$ IF ERROR
1067 023564                      4$:
1068 023564 112737 000024 001545      MOVB  #RMMR1,PUTINX     ;SETUP PUT INDEX TABLE
023572 112737 000200 001546      MOVB  #200,PUTINX+1    ;SET TERMINATOR BYTE
023600 012737 001401 001436      MOV   #DMD!MUR!MOC,RMMR10 ;SET RMMR1 OUTPUT BUFFER = DMD!MUR!MOC
023606 004737 043016              JSR   PC,PUT           ;GO WRITE RMMR1 VIA PUT SUBROUTINE
023612 000404                    BR    5$              ;GO TO 5$ IF NO ERROR
023614 000240                    NOP                      ;RETURN HERE IF ERROR
023616 104000                    EMT                      ;ERROR DEFINED BY PUT SUBROUTINE
023620 000137 024154              JMP   13$             ;GO TO 13$ IF ERROR
1069 023624                      5$:
1070
1071
1072                               ;VOLUME VALID IS LEFT RESET FOR THE TEST
1073
1074 023624                      6$:
1075 023624 012737 000001 001412      MOV   #GO,RMCS10
1076 023632 050237 001412          BIS   R2,RMCS10       ;WRITE FUNCTION CODE IN BUFFER
1077 023636 012737 104372 001416      MOV   #BUFONE,RMBA0   ;DUMMY BUS ADDRESS
1078 023644 012737 177777 001414      MOV   #-1,RMWCO       ;DUMMY WORD COUNT
1079 023652 005037 001420          CLR   RMDAO           ;CLEAR DISK ADDRESS
1080 023656 005037 001446          CLR   RMDCO           ;CLEAR CYLINDER ADDRESS
1081 023662 012737 010000 001444      MOV   #FMT16,RMOFO    ;16 BIT FORMAT
1082 023670 012703 001545          MOV   #PUTINX,R3     ;WRITE REGISTER INDEX TABLE
1083 023674 112723 000004          MOVB  #RMA,(R3)+
1084 023700 112723 000002          MOVB  #RMC,(R3)+
1085 023704 112723 000032          MOVB  #RMOF,(R3)+
1086 023710 112723 000006          MOVB  #RMDA,(R3)+
1087 023714 112723 000034          MOVB  #RMDC,(R3)+
1088 023720 112723 000000          MOVB  #RMCS1,(R3)+
1089 023724 112713 000200          MOVB  #200,(R3)
1090 023730 004737 043016          JSR   PC,PUT           ;GO WRITE REGISTER(S) WITH PUT SUBROUTINE
023734 000404                    BR    7$              ;GO TO 7$ IF NO ERROR
023736 000240                    NOP                      ;RETURN HERE IF ERROR
023740 104000                    EMT                      ;ERROR # DEFINED BY PUT SUBROUTINE
023742 000137 024154          JMP   13$             ;GO TO 13$ IF ERROR
1091 023746 004737 043370          JSR   PC,TIMOUT       ;WAIT FOR GO TO RESET
1092
1093 023752 004737 042546          JSR   PC,GET           ;GO READ REGISTER(S) WITH GET SUBROUTINE
023756 000404                    BR    8$              ;GO TO 8$ IF NO ERROR
023760 000240                    NOP                      ;RETURN HERE IF ERROR
023762 104000                    EMT                      ;ERROR # DEFINED BY GET SUBROUTINE
023764 000137 024154          JMP   13$             ;GO TO 13$ IF ERROR
1094 023770                      8$:
1095 023770 004737 043564          JSR   PC,PRIERR       ;GO CHECK FOR PRIMARY ERRORS
023774 000405                    BR    9$              ;GO TO 9$ IF NO ERROR
023776 000240                    NOP                      ;RETURN HERE IF ERROR
024000 104000                    EMT                      ;ERROR # DEFINED BY PRIERR SUBROUTINE
024002 004736                    JSR   PC,@(SP)+       ;GO BACK FOR MORE ERROR CHECKS
024004 000137 024154          JMP   13$             ;GO TO 13$ IF ERROR
1096 024010 016237 070002 001140 9$:      MOV   FNCDTB(R2),$GDDAT ;GET ENTRY FROM FUNCTION CODE TABLE

```

T33 INVALID COMMAND TEST

```

1097 024016 042737 167777 001140 BIC #*CIVC,$GDDAT
1098 024024 013737 001400 001142 MOV RMER2I,$BDDAT ;BAD DATA FOR TYPEOUT
1099 024032 042737 167777 001142 BIC #*CIVC,$BDDAT
1100 024040 023737 001140 001142 CMP $GDDAT,$BDDAT ;IS IVC STATUS CORRECT?
1101 024046 001402 BEQ 10$ ;YES!!
1102 024050 104216 EMT 216
1103 024052 000440 BR 13$
1104 024054 016237 070002 001140 10$: MOV FNCDTB(R2),$GDDAT
1105 024062 032737 040000 001350 BIT #EKR,RMSI ;WAS AN ERROR DETECTED??
1106 024070 001403 BEQ 11$ ;NO!!
1107 024072 052737 100000 001140 BIS #ATA,$GDDAT ;YES - ATA SHOULD BE ON
1108 024100 042737 077777 001140 11$: BIC #*CATA,$GDDAT
1109 024106 013737 001350 001142 MOV RMSI,$BDDAT ;GET DRIVE'S ATTENTION
1110 024114 042737 077777 001142 BIC #*CATA,$BDDAT
1111 024122 023737 001140 001142 CMP $GDDAT,$BDDAT ;IS ATA STATUS OK??
1112 024130 001402 BEQ 12$ ;YES!!
1113 024132 104255 EMT 255
1114 024134 000407 BR 13$
1115 024136 062702 000002 12$: ADD #2,R2 ;GO TO NEXT FUNCTION CODE
1116 024142 022702 000076 CMP #ILF76,R2 ;DONE??
1117 024146 103402 BLO 13$ ;YES !!
1118 024150 000137 023506 JMP 2$ ;TEST NEXT FUNCTION
1119 024154 13$:
1120
1121

```

```

:*****
:*TEST 34 INVALID ADDRESS ERROR TEST
:*****
TST34:

```

```

024154 000004 SCOPE ;SCOPE CALL
024154 000240 NOP ;START OF TEST
024160 012706 001100 MOV #STACK,SP ;INITIALIZE STACK POINTER
024164 013700 001276 MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
024170 013701 001466 MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
024174 012737 000034 001226 MOV #34,$TESTN ;:SET TEST NUMBER IN APT MAIL BOX
1122
1123 024202 004737 041532 JSR PC,TSTPRP ;PREPARE DEVICE FOR TEST
024206 040000 .WORD 040000 ;TASK DESCRIPTOR AS FOLLOWS:
;CLEAR CONTROLLER & SELECT DEVICE
024210 000404 BR 1$ ;GO TO 1$ IF NO ERROR
024212 000240 NOP ;RETURN HERE IF ERROR
024214 104000 EMT ;ERROR # DEFINED BY TSTPRP SUBROUTINE
024216 000137 024744 JMP 13$ ;GO TO 13$ IF ERROR
1124 024222 1$: JSR PC,GETSTS ;SETUP FOR STATUS
1125 024222 004737 042462 MOV #NOP,R2
1126 024226 012702 000000 2$: JSR PC,CNTCLR ;GO ISSUE CONTROLLER CLEAR
024232 004737 052466 BR 3$ ;GO TO 3$ IF NO ERROR
024236 000404 NOP ;RETURN HERE IF ERROR
024240 000240 EMT ;ERROR NUMBER DEFINED BY SUBROUTINE
024242 104000 JMP 13$ ;GO TO 13$ IF ERROR
024244 000137 024744 3$:
1129 024250 ;SET DIAGNOSTIC MODE AND DIAGNOSTIC UNIT READY, DIAGNOSTIC ON
1130 ;CYLINDER
1131
1132
1133 024250 112737 000024 001545 MOV #RMR1,PUTINX ;SETUP PUT INDEX TABLE
024256 112737 000200 001546 MOV #200,PUTINX+1 ;SET TERMINATOR BYTE

```

```

024264 012737 000001 001436      MOV      #DMD,RMMR10      ;SET RMMR1 OUTPUT BUFFER = DMD
024272 004737 043016              JSR      PC,PUT          ;GO WRITE RMMR1 VIA PUT SUBROUTINE
024276 000404                      BR       4$              ;GO TO 4$ IF NO ERROR
024300 000240                      NOP                          ;RETURN HERE IF ERROR
024302 104000                      EMT                          ;ERROR DEFINED BY PUT SUBROUTINE
024304 000137 024744              JMP      13$             ;GO TO 13$ IF ERROR
1134 024310
1135 024310 112737 000024 001545      4$:      MOVB     #RMMR1,PUTINX    ;SETUP PUT INDEX TABLE
024316 112737 000200 001546      MOVB     #200,PUTINX+1    ;SET TERMINATOR BYTE
024324 012737 001401 001436      MOV      #DMD!MUR!MOC,RMMR10 ;SET RMMR1 OUTPUT BUFFER = DMD!MUR!MOC
024332 004737 043016              JSR      PC,PUT          ;GO WRITE RMMR1 VIA PUT SUBROUTINE
024336 000404                      BR       5$              ;GO TO 5$ IF NO ERROR
024340 000240                      NOP                          ;RETURN HERE IF ERROR
024342 104000                      EMT                          ;ERROR DEFINED BY PUT SUBROUTINE
024344 000137 024744              JMP      13$             ;GO TO 13$ IF ERROR
1136 024350
1137
1138
1139 024350 112737 000000 001545      ;SET VOLUME VALID BEFORE ISSUING FUNCTION CODE BEING TESTED
024356 112737 000200 001546      MOVB     #RMCS1,PUTINX    ;SETUP PUT INDEX TABLE
024364 012737 000023 001412      MOVB     #200,PUTINX+1    ;SET TERMINATOR BYTE
024372 004737 043016      MOV      #PAKACK!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = PAKACK!GO
024376 000404                      JSR      PC,PUT          ;GO WRITE RMCS1 VIA PUT SUBROUTINE
024400 000240                      BR       6$              ;GO TO 6$ IF NO ERROR
024402 104000                      NOP                          ;RETURN HERE IF ERROR
024404 000137 024744              EMT                          ;ERROR DEFINED BY PUT SUBROUTINE
1140 024410              JMP      13$             ;GO TO 13$ IF ERROR
1141 024410 012737 000001 001412      6$:      MOV      #GO,RMCS10
1142 024416 050237 001412      BIS      R2,RMCS10        ;WRITE FUNCTION CODE IN BUFFER
1143 024422 012737 104372 001416      MOV      #BUFONE,RMBAO    ;DUMMY BUS ADDRESS
1144 024430 012737 177777 001414      MOV      #-1,RMWC         ;DUMMY WORD COUNT
1145 024436 012737 177777 001420      MOV      #-1,RMDAO        ;USE INVALID DISK ADDRESS
1146 024444 012737 177777 001446      MOV      #-1,RMDC         ;USE INVALID CYLINDER ADDRESS
1147 024452 012737 010000 001444      MOV      #FMT16,RMFO      ;16 BIT FORMAT
1148 024460 012703 001545      MOV      #PUTINX,R3       ;WRITE REGISTER INDEX TABLE
1149 024464 112723 000004      MOVB     #RMA,(R3)+
1150 024470 112723 000002      MOVB     #RMC,(R3)+
1151 024474 112723 000032      MOVB     #RMOF,(R3)+
1152 024500 112723 000006      MOVB     #RMDA,(R3)+
1153 024504 112723 000034      MOVB     #RMDC,(R3)+
1154 024510 112723 000000      MOVB     #RMCS1,(R3)+
1155 024514 112713 000200      MOVB     #200,(R3)
1156 024520 004737 043016      JSR      PC,PUT          ;GO WRITE REGISTER(S) WITH PUT SUBROUTINE
024524 000404                      BR       7$              ;GO TO 7$ IF NO ERROR
024526 000240                      NOP                          ;RETURN HERE IF ERROR
024530 104000                      EMT                          ;ERROR # DEFINED BY PUT SUBROUTINE
024532 000137 024744              JMP      13$             ;GO TO 13$ IF ERROR
1157 024536 004737 043370      7$:      JSR      PC,TIMOUT       ;WAIT FOR GO TO RESET
1158
1159 024542 004737 042546      JSR      PC,GET           ;GO READ REGISTER(S) WITH GET SUBROUTINE
024546 000404                      BR       8$              ;GO TO 8$ IF NO ERROR
024550 000240                      NOP                          ;RETURN HERE IF ERROR
024552 104000                      EMT                          ;ERROR # DEFINED BY GET SUBROUTINE
024554 000137 024744              JMP      13$             ;GO TO 13$ IF ERROR
1160 024560
1161 024560 004737 043564      8$:      JSR      PC,PRIERR       ;GO CHECK FOR PRIMARY ERRORS
024564 000405                      BR       9$              ;GO TO 9$ IF NO ERROR
  
```

```

024566 000240      NOP      ;RETURN HERE IF ERROR
024570 104000      EMT      ;ERROR # DEFINED BY PRIERR SUBROUTINE
024572 004736      JSR      PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
024574 000137 024744 JMP      13$      ;GO TO 13$ IF ERROR
1162 024600 016237 070002 001140 9$:      MOV      FNCDTB(R2),SGDDAT ;GET ENTRY FROM FUNCTION CODE TABLE
1163 024606 042737 175777 001140      BIC      #^CIAE,SGDDAT
1164 024614 013737 001352 001142      MOV      RMER1I,$BDDAT ;BAD DATA FOR TYPEOUT
1165 024622 042737 175777 001142      BIC      #^CIAE,$BDDAT
1166 024630 023737 001140 001142      CMP      $GDDAT,$BDDAT ;IS IAE STATUS CORRECT?
1167 024636 001402      BEQ      10$      ;YES!!
1168 024640 104217      EMT      217
1169 024642 000440      BR      13$
1170 024644 016237 070002 001140 10$:     MOV      FNCDTB(R2),SGDDAT
1171 024652 032737 040000 001350      BIT      #ERR,RMDSI ;WAS AN ERROR DETECTED??
1172 024660 001403      BEQ      11$      ;NO!!
1173 024662 052737 100000 001140      BIS      #ATA,SGDDAT ;YES - ATA SHOULD BE ON
1174 024670 042737 077777 001140 11$:     BIC      #^CATA,SGDDAT
1175 024676 013737 001350 001142      MOV      RMDSI,$BDDAT ;GET DRIVE'S ATTENTION
1176 024704 042737 077777 001142      BIC      #^CATA,$BDDAT
1177 024712 023737 001140 001142      CMP      $GDDAT,$BDDAT ;IS ATA STATUS OK??
1178 024720 001402      BEQ      12$      ;YES!!
1179 024722 104255      EMT      255
1180 024724 000407      BR      13$
1181 024726 062702 000002 000002 12$:     ADD      #2,R2 ;GO TO NEXT FUNCTION CODE
1182 024732 022702 000076      CMP      #ILF76,R2 ;DONE??
1183 024736 103402      BLO      13$      ;YES !!
1184 024740 000137 024232      JMP      2$      ;TEST NEXT FUNCTION
1185 024744      13$:
1186
1187

```

```

:*****
:*TEST 35      WRITE LOCK ERROR TEST
:*****
TST35:

```

```

024744 000004      SCOPE    ;SCOPE CALL
024746 000240      NOP      ;START OF TEST
024750 012706 001100      MOV      #STACK,SP ;INITIALIZE STACK POINTER
024754 013700 001276      MOV      $BASE,R0  ;R0 = UNIBUS ADDRESS
024760 013701 001466      MOV      TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
024764 012737 000035 001226      MOV      #35,$TESTN ;SET TEST NUMBER IN APT MAIL BOX
1188
1189 024772 004737 041532      JSR      PC,TSTPRP ;PREPARE DEVICE FOR TEST
024776 040000      .WORD   040000 ;TASK DESCRIPTOR AS FOLLOWS:
;CLEAR CONTROLLER & SELECT DEVICE
025000 000404      BR      1$      ;GO TO 1$ IF NO ERROR
025002 000240      NOP      ;RETURN HERE IF ERROR
025004 104000      EMT      ;ERROR # DEFINED BY TSTPRP SUBROUTINE
025006 000137 025530      JMP      13$    ;GO TO 13$ IF ERROR
1190 025012      1$:
1191 025012 004737 042462      JSR      PC,GETSTS ;SETUP FOR STATUS
1192 025016 012702 000000      MOV      #NOP,R2
1193 025022      2$:
1194 025022 004737 052466      JSR      PC,CNTCLR ;GO ISSUE CONTROLLER CLEAR
025026 000404      BR      3$      ;GO TO 3$ IF NO ERROR
025030 000240      NOP      ;RETURN HERE IF ERROR
025032 104000      EMT      ;ERROR NUMBER DEFINED BY SUBROUTINE
025034 000137 025530      JMP      13$    ;GO TO 13$ IF ERROR
1195 025040      3$:

```



```

1196
1197           :SET DIAGNOSTIC MODE AND DIAGNOSTIC UNIT READY, DIAGNOSTIC ON
1198           :CYLINDER, AND DIAGNOSTIC WRITE LOCK
1199 025040 112737 000024 001545      MOVB  #RMR1,PUTINX      :SETUP PUT INDEX TABLE
025046 112737 000200 001546      MOVB  #200,PUTINX+1    :SET TERMINATOR BYTE
025054 012737 000001 001436      MOV   #DMD,RMR10      :SET RMR1 OUTPUT BUFFER = DMD
025062 004737 043016      JSR   PC,PUT          :GO WRITE RMR1 VIA PUT SUBROUTINE
025066 000404      BR    4$             :GO TO 4$ IF NO ERROR
025070 000240      NOP                    :RETURN HERE IF ERROR
025072 104000      EMT                    :ERROR DEFINED BY PUT SUBROUTINE
025074 000137 025530      JMP   13$            :GO TO 13$ IF ERROR

1200 025100      4$:
1201 025100 112737 000024 001545      MOVB  #RMR1,PUTINX      :SETUP PUT INDEX TABLE
025106 112737 000200 001546      MOVB  #200,PUTINX+1    :SET TERMINATOR BYTE
025114 012737 001411 001436      MOV   #DMD!MUR!MOC!MWP,RMR10 :SET RMR1 OUTPUT BUFFER = DMD!MUR!MOC!MWP
025122 004737 043016      JSR   PC,PUT          :GO WRITE RMR1 VIA PUT SUBROUTINE
025126 000404      BR    5$             :GO TO 5$ IF NO ERROR
025130 000240      NOP                    :RETURN HERE IF ERROR
025132 104000      EMT                    :ERROR DEFINED BY PUT SUBROUTINE
025134 000137 025530      JMP   13$            :GO TO 13$ IF ERROR

1202 025140      5$:
1203
1204           :SET VOLUME VALID BEFORE ISSUING FUNCTION CODE BEING TESTED
1205 025140 112737 000000 001545      MOVB  #RMCS1,PUTINX    :SETUP PUT INDEX TABLE
025146 112737 000200 001546      MOVB  #200,PUTINX+1    :SET TERMINATOR BYTE
025154 012737 000023 001412      MOV   #PAKACK!GO,RMCS10 :SET RMCS1 OUTPUT BUFFER = PAKACK!GO
025162 004737 043016      JSR   PC,PUT          :GO WRITE RMCS1 VIA PUT SUBROUTINE
025166 000404      BR    6$             :GO TO 6$ IF NO ERROR
025170 000240      NOP                    :RETURN HERE IF ERROR
025172 104000      EMT                    :ERROR DEFINED BY PUT SUBROUTINE
025174 000137 025530      JMP   13$            :GO TO 13$ IF ERROR

1206 025200      6$:
1207 025200 012737 000001 001412      MOV   #GO,RMCS10
1208 025206 050237 001412      BIS   R2,RMCS10      :WRITE FUNCTION CODE IN BUFFER
1209 025212 012737 104372 001416      MOV   #BUFONE,RMBAO   :DUMMY BUS ADDRESS
1210 025220 012737 177777 001414      MOV   #-1,RMWCO      :DUMMY WORD COUNT
1211 025226 005037 001420      CLR   RMDAO          :CLEAR DISK ADDRESS
1212 025232 005037 001446      CLR   RMDCO          :CLEAR CYLINDER ADDRESS
1213 025236 012737 010000 001444      MOV   #FMT16,RMOFO    :16 BIT FORMAT
1214 025244 012703 001545      MOV   #PUTINX,R3     :WRITE REGISTER INDEX TABLE
1215 025250 112723 000004      MOVB  #RMA,(R3)+
1216 025254 112723 000002      MOVB  #RMC,(R3)+
1217 025260 112723 000032      MOVB  #RMOF,(R3)+
1218 025264 112723 000006      MOVB  #RMDA,(R3)+
1219 025270 112723 000034      MOVB  #RMDC,(R3)+
1220 025274 112723 000000      MOVB  #RMCS1,(R3)+
1221 025300 112713 000200      MOVB  #200,(R3)
1222 025304 004737 043016      JSR   PC,PUT          :GO WRITE REGISTER(S) WITH PUT SUBROUTINE
025310 000404      BR    7$             :GO TO 7$ IF NO ERROR
025312 000240      NOP                    :RETURN HERE IF ERROR
025314 104000      EMT                    :ERROR # DEFINED BY PUT SUBROUTINE
025316 000137 025530      JMP   13$            :GO TO 13$ IF ERROR
1223 025322 004737 043370      7$: JSR   PC,TIMOUT      :WAIT FOR GO TO RESET
1224
1225 025326 004737 042546      JSR   PC,GET          :GO READ REGISTER(S) WITH GET SUBROUTINE
025332 000404      BR    8$             :GO TO 8$ IF NO ERROR
025334 000240      NOP                    :RETURN HERE IF ERROR
    
```

```
1226 025336 104000 EMT ;ERROR # DEFINED BY GET SUBROUTINE
      025340 000137 025530 JMP 13$ ;GO TO 13$ IF ERROR
1227 025344 004737 043564 8$: JSR PC,PRIERR ;GO CHECK FOR PRIMARY ERRORS
      025350 000405 BR 9$ ;GO TO 9$ IF NO ERROR
      025352 000240 NOP ;RETURN HERE IF ERROR
      025354 104000 EMT ;ERROR # DEFINED BY PRIERR SUBROUTINE
      025356 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
      025360 000137 025530 JMP 13$ ;GO TO 13$ IF ERROR
1228 025364 016237 070002 001140 9$: MOV FNCDTB(R2),SGDDAT ;GET ENTRY FROM FUNCTION CODE TABLE
1229 025372 042737 173777 001140 BIC #^CWLE,SGDDAT
1230 025400 013737 001352 001142 MOV RMER1I,$BDDAT ;BAD DATA FOR TYPEOUT
1231 025406 042737 173777 001142 BIC #^CWLE,$BDDAT
1232 025414 023737 001140 001142 CMP $GDDAT,$BDDAT ;IS WLE STATUS CORRECT?
1233 025422 001402 BEQ 10$ ;YES!!
1234 025424 104220 EMT 220
1235 025426 000440 BR 13$
1236 025430 016237 070002 001140 10$: MOV FNCDTB(R2),SGDDAT
1237 025436 032737 040000 001350 BIT #ERR,RMSI ;WAS AN ERROR DETECTED??
1238 025444 001403 BEQ 11$ ;NO!!
1239 025446 052737 100000 001140 BIS #ATA,SGDDAT ;YES - ATA SHOULD BE ON
1240 025454 042737 077777 001140 11$: BIC #^CATA,SGDDAT
1241 025462 013737 001350 001142 MOV RMSI,$BDDAT ;GET DRIVE'S ATTENTION
1242 025470 042737 077777 001142 BIC #^CATA,$BDDAT
1243 025476 023737 001140 001142 CMP $GDDAT,$BDDAT ;IS ATA STATUS OK??
1244 025504 001402 BEQ 12$ ;YES!!
1245 025506 104255 EMT 255
1246 025510 000407 BR 13$
1247 025512 062702 000002 12$: ADD #2,R2 ;GO TO NEXT FUNCTION CODE
1248 025516 022702 000076 CMP #ILF76,R2 ;DONE??
1249 025522 103402 BLO 13$ ;YES !!
1250 025524 000137 025022 JMP 2$ ;TEST NEXT FUNCTION
1251 025530 13$:
1252
1253
```

```
::*****
:*TEST 36 ERROR ABORT TESTS
:*****
TST36:
```

```
025530 SCOPE ;SCOPE CALL
025530 000004 NOP ;START OF TEST
025532 000240 MOV #STACK,SP ;INITIALIZE STACK POINTER
025534 012706 001100 MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
025540 013700 001276 MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
025544 013701 001466 MOV #36,$TESTN ;SET TEST NUMBER IN APT MAIL BOX
025550 012737 000036 001226
1254 JSR PC,TSTPRP ;PREPARE DEVICE FOR TEST
1255 .WORD 054130 ;TASK DESCRIPTOR AS FOLLOWS:
;CLEAR CONTROLLER & SELECT DEVICE
;VERIFY CONTROLLER CLEAR OPERATION
;PACK ACKNOWLEDGE IF VOLUME NOT VALID
;VERIFY PACK ACKNOWLEDGE
;RECALIBRATE IF "SKI" OR "PIP" IS SET
;VERIFY RECALIBRATION
025564 000404 BR 1$ ;GO TO 1$ IF NO ERROR
025566 000240 NOP ;RETURN HERE IF ERROR
025570 104000 EMT ;ERROR # DEFINED BY TSTPRP SUBROUTINE
025572 000137 026062 JMP 9$ ;GO TO 9$ IF ERROR
```

1256	025576			1\$:		
1257						
1258					:SETUP GET INDEX TABLE TO READ ALL REGISTERS	
1259	025576	004737	042462		JSR PC,GETSTS	:GO TO GETSTS SUBROUTINE
1260	025602	012702	000000		MOV #NOP,R2	:R2 = FUNCTION CODE
1261	025606			2\$:		
1261	025606	004737	052466		JSR PC,CNTCLR	:GO ISSUE CONTROLLER CLEAR
	025612	000404			BR 3\$:GO TO 3\$ IF NO ERROR
	025614	000240			NOP	:RETURN HERE IF ERROR
	025616	104000			EMT	:ERROR # DEFINED BY CNTCLR SUBROUTINE
	025620	000137	026062		JMP 9\$:GO TO 9\$ IF ERROR
1262	025624			3\$:		
1263	025624	112737	000014		MOVB #RMER1,PUTINX	:SETUP PUT INDEX TABLE
	025632	112737	000200	001545	MOVB #200,PUTINX+1	:SET TERMINATOR BYTE
	025640	012737	040000	001546	MOV #UNS,RMER10	:SET RMER1 OUTPUT BUFFER = UNS
	025646	004737	043016	001426	JSR PC,PUT	:GO WRITE RMER1 VIA PUT SUBROUTINE
	025652	000404			BR 4\$:GO TO 4\$ IF NO ERROR
	025654	000240			NOP	:RETURN HERE IF ERROR
	025656	104000			EMT	:ERROR DEFINED BY PUT SUBROUTINE
	025660	000137	026062		JMP 9\$:GO TO 9\$ IF ERROR
1264	025664			4\$:		
1265	025664	012737	000001	001412	MOV #GO,RMCS10	
1266	025672	050237	001412		BIS R2,RMCS10	:WRITE FUNCTION CODE IN BUFFER
1267	025676	012737	104372	001416	MOV #BUFONE,RMBA0	:DUMMY BUS ADDRESS
1268	025704	012737	177777	001414	MOV #-1,RMWCO	:DUMMY WORD COUNT
1269	025712	012737	000000	001420	MOV #0,RMDAO	:CLEAR DISK ADDRESS
1270	025720	012737	000000	001446	MOV #0,RMDCO	:CLEAR CYLINDER ADDRESS
1271	025726	012737	010000	001444	MOV #FMT16,RMOFO	:16 BIT FORMAT
1272	025734	012703	001545		MOV #PUTINX,R3	:WRITE REGISTER INDEX TABLE
1273	025740	112723	000004		MOVB #RMBA,(R3)+	
1274	025744	112723	000002		MOVB #RMWC,(R3)+	
1275	025750	112723	000032		MOVB #RMOF,(R3)+	
1276	025754	112723	000006		MOVB #RMDA,(R3)+	
1277	025760	112723	000034		MOVB #RMDC,(R3)+	
1278	025764	112723	000000		MOVB #RMCS1,(R3)+	
1279	025770	112713	000200		MOVB #200,(R3)	
1280	025774	004737	043016		JSR PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	026000	000402			BR 5\$:GO TO 5\$ IF NO ERROR
	026002	000240			NOP	:RETURN HERE IF ERROR
	026004	104000			EMT	:ERROR # DEFINED BY PUT SUBROUTINE
1281	026006			5\$:		
1282						
1283					:WAIT FOR COMMAND TO COMPLETE	
1284	026006	004737	043370		JSR PC,TIMOUT	:GO TO TIMEOUT SUBROUTINE
1285	026012	004737	042546			
	026016	000404			JSR PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	026020	000240			BR 6\$:GO TO 6\$ IF NO ERROR
	026022	104000			NOP	:RETURN HERE IF ERROR
	026024	000137	026062		EMT	:ERROR # DEFINED BY GET SUBROUTINE
	026024	000137	026062		JMP 9\$:GO TO 9\$ IF ERROR
1286	026030			6\$:		
1287	026030	004737	043564		JSR PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	026034	000405			BR 7\$:GO TO 7\$ IF NO ERROR
	026036	000240			NOP	:RETURN HERE IF ERROR
	026040	104000			EMT	:ERROR # DEFINED BY PRIERR SUBROUTINE
	026042	004736			JSR PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	026044	000137	026062		JMP 9\$:GO TO 9\$ IF ERPOR

```

1288 026050          7$:
1289 026050          8$:
1290 026050 062702 000002      ADD      #2,R2      ;ADVANCE FUNCTION CODE
1291 026054 022702 000076      CMP      #ILF76,R2 ;DONE ALL COMMANDS
1292 026060 103252              BHIS     2$          ;NO !!
1293 026062          9$:
1294
1295
::*****
:*TEST 37      RMR TEST
:*****
TST37:
026062          SCOPE      ;SCOPE CALL
026062 000004      NOP      ;START OF TEST
026064 000240      MOV      #STACK,SP ;INITIALIZE STACK POINTER
026066 012706 001100      MOV      $BASE,R0   ;R0 = UNIBUS ADDRESS
026072 013700 001276      MOV      TSTQUE,R1  ;(R1) = DEVICE BEING TESTED
026076 013701 001466      MOV      #37,$TESTN ;:SET TEST NUMBER IN APT MAIL BOX
026102 012737 000037 001226      JSR      PC,TSTPRP ;PREPARE DEVICE FOR TEST
1296
1297 026110 004737 041532      .WORD   040000    ;TASK DESCRIPTOR AS FOLLOWS:
026114 040000              ;CLEAR CONTROLLER & SELECT DEVICE
026116 000404      BR       1$      ;GO TO 1$ IF NO ERROR
026120 000240      NOP      ;RETURN HERE IF ERROR
026122 104000      EMT     ;ERROR # DEFINED BY TSTPRP SUBROUTINE
026124 000137 026522      JMP      11$     ;GO TO 11$ IF ERROR
1298 026130          1$:
1299
1300      ;SETUP GET INDEX TABLE TO READ ALL REGISTERS
026130 004737 042462      JSR      PC,GETSTS ;GO TO GETSTS SUBROUTINE
1301 026134          2$:
1302 026134 112737 000024 001545      MOV      #RMMR1,PUTINX ;SETUP PUT INDEX TABLE
026142 112737 000200 001546      MOV      #200,PUTINX+1 ;SET TERMINATOR BYTE
026150 012737 000001 001436      MOV      #DMD,RMMR10  ;SET RMMR1 OUTPUT BUFFER = DMD
026156 004737 043016      JSR      PC,PUT     ;GO WRITE RMMR1 VIA PUT SUBROUTINE
026162 000404      BR       3$      ;GO TO 3$ IF NO ERROR
026164 000240      NOP      ;RETURN HERE IF ERROR
026166 104000      EMT     ;ERROR DEFINED BY PUT SUBROUTINE
026170 000137 026522      JMP      11$     ;GO TO 11$ IF ERROR
1303 026174          3$:
1304 026174 112737 000024 001545      MOV      #RMMR1,PUTINX ;SETUP PUT INDEX TABLE
026202 112737 000200 001546      MOV      #200,PUTINX+1 ;SET TERMINATOR BYTE
026210 012737 001401 001436      MOV      #DMD!MUR!MOC,RMMR10 ;SET RMMR1 OUTPUT BUFFER = DMD!MUR!MOC
026216 004737 043016      JSR      PC,PUT     ;GO WRITE RMMR1 VIA PUT SUBROUTINE
026222 000404      BR       4$      ;GO TO 4$ IF NO ERROR
026224 000240      NOP      ;RETURN HERE IF ERROR
026226 104000      EMT     ;ERROR DEFINED BY PUT SUBROUTINE
026230 000137 026522      JMP      11$     ;GO TO 11$ IF ERROR
1305 026234          4$:
1306 026234 112737 000000 001545      MOV      #RMCS1,PUTINX ;SETUP PUT INDEX TABLE
026242 112737 000200 001546      MOV      #200,PUTINX+1 ;SET TERMINATOR BYTE
026250 012737 000023 001412      MOV      #PAKACK!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = PAKACK!GO
026256 004737 043016      JSR      PC,PUT     ;GO WRITE RMCS1 VIA PUT SUBROUTINE
026262 000404      BR       5$      ;GO TO 5$ IF NO ERROR
026264 000240      NOP      ;RETURN HERE IF ERROR
026266 104000      EMT     ;ERROR DEFINED BY PUT SUBROUTINE
026270 000137 026522      JMP      11$     ;GO TO 11$ IF ERROR
1307 026274          5$:
    
```

```

1308 026274 004737 042546 JSR PC,GET ;GO READ REGISTER(S) WITH GET SUBROUTINE
      026300 000404 BR 6$ ;GO TO 6$ IF NO ERROR
      026302 000240 NOP ;RETURN HERE IF ERROR
      026304 104000 EMT ;ERROR # DEFINED BY GET SUBROUTINE
      026306 000137 026522 JMP 11$ ;GO TO 11$ IF ERROR
1309 026312 6$:
1310 026312 000240 NOP
1311 026314 112737 000024 001545 MOVB #RMMR1,PUTINX ;SETUP PUT INDEX TABLE
      026322 112737 000200 001546 MOVB #200,PUTINX+1 ;SET TERMINATOR BYTE
      026330 012737 041401 001436 MOV #DMD!MUR!MOC!DBEN,RMMR10 ;SET RMMR1 OUTPUT BUFFER = DMD!MUR!MOC!DBEN
      026336 004737 043016 JSR PC,PUT ;GO WRITE RMMR1 VIA PUT SUBROUTINE
      026342 000404 BR 7$ ;GO TO 7$ IF NO ERROR
      026344 000240 NOP ;RETURN HERE IF ERROR
      026346 104000 EMT ;ERROR DEFINED BY PUT SUBROUTINE
      026350 000137 026522 JMP 11$ ;GO TO 11$ IF ERROR
1312 026354 7$:
1313 026354 112737 000000 001545 MOVB #RMCS1,PUTINX ;SETUP PUT INDEX TABLE
      026362 112737 000200 001546 MOVB #200,PUTINX+1 ;SET TERMINATOR BYTE
      026370 012737 000001 001412 MOV #NOP!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = NOP!GO
      026376 004737 043016 JSR PC,PUT ;GO WRITE RMCS1 VIA PUT SUBROUTINE
      026402 000404 BR 8$ ;GO TO 8$ IF NO ERROR
      026404 000240 NOP ;RETURN HERE IF ERROR
      026406 104000 EMT ;ERROR DEFINED BY PUT SUBROUTINE
      026410 000137 026522 JMP 11$ ;GO TO 11$ IF ERROR
1314 026414 8$:
1315 026414 112737 000000 001545 MOVB #RMCS1,PUTINX ;SETUP PUT INDEX TABLE
      026422 112737 000200 001546 MOVB #200,PUTINX+1 ;SET TERMINATOR BYTE
      026430 012737 000015 001412 MOV #OFFSET!GO,RMCS10 ;SET RMCS1 OUTPUT BUFFER = OFFSET!GO
      026436 004737 043016 JSR PC,PUT ;GO WRITE RMCS1 VIA PUT SUBROUTINE
      026442 000404 BR 9$ ;GO TO 9$ IF NO ERROR
      026444 000240 NOP ;RETURN HERE IF ERROR
      026446 104000 EMT ;ERROR DEFINED BY PUT SUBROUTINE
      026450 000137 026522 JMP 11$ ;GO TO 11$ IF ERROR
1316 026454 9$:
1317 026454 004737 042546 JSR PC,GET ;GO READ REGISTER(S) WITH GET SUBROUTINE
      026460 000404 BR 10$ ;GO TO 10$ IF NO ERROR
      026462 000240 NOP ;RETURN HERE IF ERROR
      026464 104000 EMT ;ERROR # DEFINED BY GET SUBROUTINE
      026466 000137 026522 JMP 11$ ;GO TO 11$ IF ERROR
1318 026472 10$:
1319 026472 000240 NOP
1320 026474 032737 000004 001352 BIT #RMR,RMER1 ;IS RMR SET ??
      026502 001007 BNE 11$ ;YES !!
      026504 012737 000004 001140 MOV #RMR,$GDDAT ;EXPECTED STATUS
      026512 013737 001352 001142 MOV RMER1,$BDDAT ;RECEIVED STATUS
      026520 104222 EMT 222
1325 026522 11$:
1326
1327

```

```

*****
*TEST 40 PARITY ERROR TEST
*****
TST40:

```

```

026522 000004 SCOPE ;SCOPE CALL
026524 000240 NOP ;START OF TEST
026526 012706 001100 MOV #STACK,SP ;INITIALIZE STACK POINTER
026532 013700 001276 MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
026536 013701 001466 MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED

```



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T41 ILLEGAL REGISTER TEST

026752 013700 001276 MOV $RASE,R0 ;R0 = UNIBUS ADDRESS
026756 013701 001466 MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
026762 012737 000041 001226 MOV #41,$TESTN ;;SET TEST NUMBER IN APT MAIL BOX

1361
1362 026770 004737 041532 JSR PC,TSTPRP ;PREPARE DEVICE FOR TEST
026774 040000 .WORD 040000 ;TASK DESCRIPTOR AS FOLLOWS:
;CLEAR CONTROLLER & SELECT DEVICE
026776 000404 BR 1$ ;GO TO 1$ IF NO ERROR
027000 000240 NOP ;RETURN HERE IF ERROR
027002 104000 EMT ;ERROR # DEFINED BY TSTPRP SUBROUTINE
027004 000137 027270 JMP 10$ ;GO TO 10$ IF ERROR

1363 027010 1$:
1364 027010 005005 CLR R5 ;R5 = EXPECTED STATUS
1365 027012 004737 042462 JSR PC,GETSTS ;SETUP FOR STATUS
1366 027016 013746 000004 MOV ERRVEC,-(SP) ;;PUSH ERRVEC ON STACK
1367 027022 013746 000006 MOV ERRVEC+2,-(SP) ;;PUSH ERRVEC+2 ON STACK
1368 027026 012737 027266 000004 MOV #9$,ERRVEC ;SETUP FOR BUS TIMEOUT
1369 027034 012737 000300 000006 MOV #PR6,ERRVEC+2
1370 027042 005002 CLR R2 ;R2 = REGISTER INDEX
1371 027044 2$:
1372 027044 004737 052466 JSR PC,CNTCLR ;GO ISSUE CONTROLLER CLEAR
027050 000404 BR 3$ ;GO TO 3$ IF NO ERROR
027052 000240 NOP ;RETURN HERE IF ERROR
027054 104000 EMT ;ERROR NUMBER DEFINED BY SUBROUTINE
027056 000137 027202 JMP 7$ ;GO TO 7$ IF ERROR

1373 027062 010003 3$:
1374 027064 060203 MOV R0,R3 ;R3 = REGISTER ADDRESS
1375 027066 005013 ADD R2,R3
1376 027070 004737 050774 CLR (R3) ;CLEAR THE REGISTER
027074 000404 JSR PC,DEVSEL ;GO SELECT DEVICE
027076 000240 BR 4$ ;GO TO 4$ IF NO ERROR
027100 104000 NOP ;RETURN HERE IF ERROR
027102 000137 027270 EMT ;ERROR # DEFINED BY DEVSEL SUBROUTINE
JMP 10$ ;GO TO 10$ IF ERROR

1377 027106 4$:
1378 027106 004737 042546 JSR PC,GET ;GO READ REGISTER(S) WITH GET SUBROUTINE
027112 000404 BR 5$ ;GO TO 5$ IF NO ERROR
027114 000240 NOP ;RETURN HERE IF ERROR
027116 104000 EMT ;ERROR # DEFINED BY GET SUBROUTINE
027120 000137 027202 JMP 7$ ;GO TO 7$ IF ERROR

1379 027124 5$:
1380 027124 004737 043564 JSR PC,PRIERR ;GO CHECK FOR PRIMARY ERRORS
027130 000405 BR 6$ ;GO TO 6$ IF NO ERROR
027132 000240 NOP ;RETURN HERE IF ERROR
027134 104000 EMT ;ERROR # DEFINED BY PRIERR SUBROUTINE
027136 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
027140 000137 027202 JMP 7$ ;GO TO 7$ IF ERROR

1381 027144 010537 001140 6$:
1382 027150 013737 001352 001142 MOV R5,$GDDAT ;GET DRIVE'S ILR STATUS
1383 027156 042737 177775 001142 MOV RMERR1,$BDDAT
1384 027164 023737 001140 001142 BIC #^CILR,$BDDAT
1385 027172 001403 CMP $GDDAT,$BDDAT ;IS ILR STATUS OK??
1386 027174 010237 001174 BEQ 7$ ;YES!!
1387 027200 104256 MOV R2,$TMPD ;SAVE R2 FOR ERROR DATA
EMT 256

1388
1389 ;THE FOLLOWING CODING FOR HANDLE RH70
1390 ;RH 70 REGISTER NUMBERS IS EITHER 22 OR 32
1391 027202 062702 000002 7$: ADD #2,R2 ;INCREMENT THE REGISTER ADDRESS

```

T41 ILLEGAL REGISTER TEST

```

1392 027206 022702 000050      CMP      #50,R2      :TIME TO CHECK THE EXTEND ADDRESS REG ?
1393 027212 101314      BHI      2$          :BRANCH IF NOT
1394 027214 103420      BLO      8$          :BRANCH IF ALREADY SET UP
1395 027216 012705 000002      MOV      #ILR,R5     :EXCEPT ILR HAPPEND
1396 027222 012760 001400 000000      MOV      #A16!A17,RMCS1(R0) :SET EXTENDED ADDRESS BITS
1397 027230 012702 000054      MOV      #54,R2      :SET ADDRESS TO 54,IF 22 REGISTERS
1398 027234 016003 000050      MOV      50(R0),R3   :IS THIS 22 REG RH70 ?
1399 027240 042703 177774      BIC      #177774,R3  :LEFT ONLY BIT 0 AND BIT 1
1400 027244 022703 000003      CMP      #BIT0!BIT1,R3 :BIT 0 AND BIT 1 SET AT THE SAME TIME ?
1401 027250 001402      BEQ      8$          :BRANCH IF SO
1402 027252 012702 000050      MOV      #50,R2      :OTHERWISE,SET ADDRESS TO 50
1403 027256 022702 000074      CMP      #74,R2      :ALL REGISTERS CHECKED ?
1404 027262 101402      BLOS     10$         :BRANCH IF SO
1405 027264 000667      BR       2$          :NEXT REGISTER
1406
1407 027266 022626      9$:      CMP      (SP)+,(SP)+
1408 027270      10$:     MOV      (SP)+,ERRVEC+2  ;;POP STACK INTO ERRVEC+2
      027270 012637 000006      MOV      (SP)+,ERRVEC  ;;POP STACK INTO ERRVEC
1409 027274 012637 000004
1410
1411
::*****
:*TEST 42      SEEK FIRST CYLINDER
::*****
TST42:
      SCOPE      :SCOPE CALL
      NOP        :START OF TEST
      MOV      #STACK,SP :INITIALIZE STACK POINTER
      MOV      $BASE,R0  :R0 = UNIBUS ADDRESS
      MOV      TSTQUE,R1 : (R1) = DEVICE BEING TESTED
      MOV      #1,$TIMES  :DO 1 ITERATION
      MOV      #42,$TESTN :SET TEST NUMBER IN APT MAIL BOX
1412
1413 027334      1$:      JSR      PC,TSTPRP    :PREPARE DEVICE FOR TEST
1414 027334 004737 041532      .WORD   054130      :TASK DESCRIPTOR AS FOLLOWS:
      027340 054130      :CLEAR CONTROLLER & SELECT DEVICE
      :VERIFY CONTROLLER CLEAR OPERATION
      :PACK ACKNOWLEDGE IF VOLUME NOT VALID
      :VERIFY PACK ACKNOWLEDGE
      :RECALIBRATE IF "SKI" OR "PIP" IS SET
      :VERIFY RECALIBRATION
      BR       2$          :GO TO 2$ IF NO ERROR
      NOP        :RETURN HERE IF ERROR
      EMT        :ERROR # DEFINED BY TSTPRP SUBROUTINE
      JMP      10$         :GO TO 10$ IF ERROR
1415 027342 000404      2$:      BR       2$
      027344 000240      NOP
      027346 104000      EMT
      027350 000137 027572      JMP      10$
1416 027354 012737 000000 001446      2$:      MOV      #0,RMDCO    :CYLINDER = 0
1417 027362 012737 000000 001420      3$:      MOV      #0,RMDAO    :TRACK = 0, SECTOR = 0
1418 027370 012737 000005 001412      MOV      #SEEK!GO,RMCS10 :LOAD SEEK COMMAND IN BUFFER
1419 027376 012702 001545      MOV      #PUTINX,R2   :R2 POINTS TO REGISTER TABLE
1420 027402 112722 000034      MOVB     #RMDC,(R2)+  :WRITE REGISTER INDEX TABLE
1421 027406 112722 000006      MOVB     #RMDA,(R2)+
1422 027412 112722 000000      MOVB     #RMCS1,(R2)+
1423 027416 112722 000200      MOVB     #200,(R2)+  :WRITE TERMINATOR
1424 027422 004737 043016      JSR      PC,PUT      :GO WRITE REGISTER(S) WITH PUT SUBROUTINE
      027426 000404      BR       4$          :GO TO 4$ IF NO ERROR
      027430 000240      NOP        :RETURN HERE IF ERROR

```



```

027432 104000 EMT ;ERROR # DEFINED BY PUT SUBROUTINE
027434 000137 027572 JMP 10$ ;GO TO 10$ IF ERROR
1425 027440 004737 042462 4$: JSR PC,GETSTS ;SETUP FGR STATUS FETCH
1426 027444 004737 043370 JSR PC,TIMOUT ;WAIT FOR SEEK TO COMPLETE
1427
1428 027450 004737 042546 JSR PC,GET ;GO READ REGISTER(S) WITH GET SUBROUTINE
027454 000404 BR 5$ ;GO TO 5$ IF NO ERROR
027456 000240 NOP ;RETURN HERE IF ERROR
027460 104000 EMT ;ERROR # DEFINED BY GET SUBROUTINE
027462 000137 027572 JMP 10$ ;GO TO 10$ IF ERROR
1429 027466
1430 027466 004737 043564 5$: JSR PC,PRIERR ;GO CHECK FOR PRIMARY ERRORS
027472 000405 BR 6$ ;GO TO 6$ IF NO ERROR
027474 000240 NOP ;RETURN HERE IF ERROR
027476 104000 EMT ;ERROR # DEFINED BY PRIERR SUBROUTINE
027500 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
027502 000137 027572 JMP 10$ ;GO TO 10$ IF ERROR
1431 027506
1432 027506 004737 051206 6$: JSR PC,SEKSTS ;GO VERIFY RESULTS OF SEEK OPERATION
027512 000405 BR 7$ ;GO TO 7$ IF NO ERROR
027514 000240 NOP ;RETURN HERE IF ERROR
027516 104000 EMT ;ERROR # DEFINED BY SEKSTS SUBROUTINE
027520 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
027522 000137 027572 JMP 10$ ;GO TO 10$ IF ERROR
1433 027526
1434 027526 004737 050562 7$: JSR PC,CMPERRSTS ;CHECK ANY ERRORS NOT MASKED
027532 115760 .WORD NDTMSK ;MASK FOR RMER1
027534 000010 .WORD DPE ;MASK FOR RMER2
027536 000405 BR 8$ ;GO TO 8$ IF NO ERROR
027540 000240 NOP ;RETURN HERE IF ERROR
027542 104000 EMT ;ERROR # DEFINED BY CMPERRSTS SUBROUTINE
027544 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
027546 000137 027572 JMP 10$ ;GO TO 10$ IF ERROR
1435 027552
1436 027552 004737 044416 8$: JSR PC,SECERR ;GO CHECK FOR SECONDARY ERRORS
027556 000405 BR 9$ ;GO TO 9$ IF NO ERROR
027560 000240 NOP ;RETURN HERE IF ERROR
027562 104000 EMT ;ERROR # DEFINED BY SECERR SUBROUTINE
027564 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
027566 000137 027572 JMP 10$ ;GO TO 10$ IF ERROR
1437 027572
1438
1439 027572
1440
1441

```

```

*****
:*TEST 43 SEEK LAST CYLINDER
*****
TST43:

```

```

027572
027572 000004
027574 000240
027576 012706 001100
027602 013700 001276
027606 013701 001466
027612 012737 000001 001206
027620 012737 000043 001226
1442
1443 027626 1$:

```

```

SCOPE ;SCOPE CALL
NOP ;START OF TEST
MOV #STACK,SP ;INITIALIZE STACK POINTER
MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
MOV #1,$TIMES ;DO 1 ITERATION
MOV #43,$TESTN ;SET TEST NUMBER IN APT MAIL BOX

```

1444	027626	004737	041532		JSR	PC,TSTPRP	:PREPARE DEVICE FOR TEST
	027632	054130			.WORD	054130	:TASK DESCRIPTOR AS FOLLOWS:
							:CLEAR CONTROLLER & SELECT DEVICE
							:VERIFY CONTROLLER CLEAR OPERATION
							:PACK ACKNOWLEDGE IF VOLUME NOT VALID
							:VERIFY PACK ACKNOWLEDGE
							:RECALIBRATE IF 'SKI' OR 'PIP' IS SET
							:VERIFY RECALIBRATION
	027634	000404			BR	2\$:GO TO 2\$ IF NO ERROR
	027636	000240			NOP		:RETURN HERE IF ERROR
	027640	104000			EMT		:ERROR # DEFINED BY TSTPRP SUBROUTINE
	027642	000137	030064		JMP	10\$:GO TO 10\$ IF ERROR
1445	027646			2\$:			
1446	027646	012737	001060	001446	MOV	#560,RMDC0	:CYLINDER = 560.
1447	027654	012737	000030	001420	MOV	#0,RMDAO	:TRACK = 0, SECTOR = 0
1448	027662	012737	000005	001412	MOV	#SEEK!GO,RMCS10	:LOAD SEEK COMMAND IN BUFFER
1449	027670	012702	001545		MOV	#PUTINX,R2	:R2 POINTS TO REGISTER TABLE
1450	027674	112722	000034		MOVB	#RMDC,(R2)+	:WRITE REGISTER INDEX TABLE
1451	027700	112722	000006		MOVB	#RMDA,(R2)+	
1452	027704	112722	000000		MOVB	#RMCS1,(R2)+	
1453	027710	112722	000200		MOVB	#200,(R2)+	:WRITE TERMINATOR
1454	027714	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	027720	000404			BR	4\$:GO TO 4\$ IF NO ERROR
	027722	000240			NOP		:RETURN HERE IF ERROR
	027724	104000			EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	027726	000137	030064		JMP	10\$:GO TO 10\$ IF ERROR
1455	027732	004737	042462	4\$:	JSR	PC,GETSTS	:SETUP FOR STATUS FETCH
1456	027736	004737	043370		JSR	PC,TIMOUT	:WAIT FOR SEEK TO COMPLETE
1457							
1458	027742	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	027746	000404			BR	5\$:GO TO 5\$ IF NO ERROR
	027750	000240			NOP		:RETURN HERE IF ERROR
	027752	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	027754	000137	030064		JMP	10\$:GO TO 10\$ IF ERROR
1459	027760			5\$:			
1460	027760	004737	043564		JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	027764	000405			BR	6\$:GO TO 6\$ IF NO ERROR
	027766	000240			NOP		:RETURN HERE IF ERROR
	027770	104000			EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	027772	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	027774	000137	030064		JMP	10\$:GO TO 10\$ IF ERROR
1461	030000			6\$:			
1462	030000	004737	051206		JSR	PC,SEKSTS	:GO VERIFY RESULTS OF SEEK OPERATION
	030004	000405			BR	7\$:GO TO 7\$ IF NO ERROR
	030006	000240			NOP		:RETURN HERE IF ERROR
	030010	104000			EMT		:ERROR # DEFINED BY SEKSTS SUBROUTINE
	030012	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	030014	000137	030064		JMP	10\$:GO TO 10\$ IF ERROR
1463	030020			7\$:			
1464	030020	004737	050562		JSR	PC,CMPERRSTS	:CHECK ANY ERRORS NOT MASKED
	030024	115760			.WORD	NDTMSK	:MASK FOR RMER1
	030026	000010			.WORD	DPE	:MASK FOR RMER2
	030030	000405			BR	8\$:GO TO 8\$ IF NO ERROR
	030032	000240			NOP		:RETURN HERE IF ERROR
	030034	104000			EMT		:ERROR # DEFINED BY CMPERRSTS SUBROUTINE
	030036	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	030040	000137	030064		JMP	10\$:GO TO 10\$ IF ERROR

```

1465 030044
1466 030044 004737 044416
      030050 000405
      030052 000240
      030054 104000
      030056 004736
      030060 000137 030064
1467 030064
1468
1469 030064
1470
1471

      030064
      030064 000004
      030066 000240
      030070 012706 001100
      030074 013700 001276
      030100 013701 001466
      030104 012737 000002 001206
      030112 012737 000044 001226
1472
1473 030120 012737 000001 001446
1474 030126
1475 030126 004737 041532
      030132 054130

      030134 000404
      030136 000240
      030140 104000
      030142 000137 030376
1476 030146
1477 030146 012737 000000 001420
1478 030154 012737 000005 001412
1479 030162 012702 001545
1480 030166 112722 000034
1481 030172 112722 000000
1482 030176 112722 000000
1483 030202 112722 000200
1484 030206 004737 043016
      030212 000404
      030214 000240
      030216 104000
      030220 000137 030376
1485 030224
1486 030224 004737 042462
1487 030230 004737 043370
1488
1489 030234 004737 042546
      030240 000404
      030242 000240

8$: JSR PC,SECERR ;GO CHECK FOR SECONDARY ERRORS
    BR 9$ ;GO TO 9$ IF NO ERROR
    NOP ;RETURN HERE IF ERROR
    EMT ;ERROR # DEFINED BY SECERR SUBROUTINE
    JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
    JMP 10$ ;GO TO 10$ IF ERROR

9$:
10$:

:*****
:*TEST 44 SEEK PRIME CYLINDERS
:*****
TST44:
    SCOPE ;SCOPE CALL
    NOP ;START OF TEST
    MOV #STACK,SP ;INITIALIZE STACK POINTER
    MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
    MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
    MOV #2,$TIMES ;DO 2 ITERATIONS
    MOV #44,$TESTN ;SET TEST NUMBER IN APT MAIL BOX

1$: MOV #1,RMDCO ;FIRST CYLINDER = 1
    JSR PC,TSTPRP ;PREPARE DEVICE FOR TEST
    .WORD 054130 ;TASK DESCRIPTOR AS FOLLOWS:
    ;CLEAR CONTROLLER & SELECT DEVICE
    ;VERIFY CONTROLLER CLEAR OPERATION
    ;PACK ACKNOWLEDGE IF VOLUME NOT VALID
    ;VERIFY PACK ACKNOWLEDGE
    ;RECALIBRATE IF 'SKI' OR 'PIP' IS SET
    ;VERIFY RECALIBRATION
    BR 2$ ;GO TO 2$ IF NO ERROR
    NOP ;RETURN HERE IF ERROR
    EMT ;ERROR # DEFINED BY TSTPRP SUBROUTINE
    JMP 9$ ;GO TO 9$ IF ERROR

2$: MOV #0,RMDAO ;TRACK = 0, SECTOR = 0
    MOV #SEEK!GO,RMCS10 ;LOAD SEEK COMMAND IN BUFFER
    MOV #PUTINX,R2 ;R2 POINTS TO REGISTER TABLE
    MOVB #RMDC,(R2)+ ;WRITE REGISTER INDEX TABLE
    MOVB #RMDA,(R2)+
    MOVB #RMCS1,(R2)+
    MOVB #200,(R2)+
    JSR PC,PUT ;WRITE TERMINATOR
    BR 3$ ;GO WRITE REGISTER(S) WITH PUT SUBROUTINE
    NOP ;GO TO 3$ IF NO ERROR
    EMT ;RETURN HERE IF ERROR
    JMP 9$ ;ERROR # DEFINED BY PUT SUBROUTINE
    ;GO TO 9$ IF ERROR

3$: JSR PC,GETSTS ;SETUP FOR STATUS FETCH
    JSR PC,TIMOUT ;WAIT FOR SEEK TO COMPLETE

    JSR PC,GET ;GO READ REGISTER(S) WITH GET SUBROUTINE
    BR 4$ ;GO TO 4$ IF NO ERROR
    NOP ;RETURN HERE IF ERROR
    
```

```

1490 030244 104000 030376 EMT ;ERROR # DEFINED BY GET SUBROUTINE
      030246 000137 030376 JMP 9$ ;GO TO 9$ IF ERROR
1491 030252 4$: JSR PC,PRIERR ;GO CHECK FOR PRIMARY ERRORS
      030252 004737 043564 BR 5$ ;GO TO 5$ IF NO ERROR
      030256 000405 NOP ;RETURN HERE IF ERROR
      030260 000240 EMT ;ERROR # DEFINED BY PRIERR SUBROUTINE
      030262 104000 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
      030264 004736 JMP 9$ ;GO TO 9$ IF ERROR
1492 030266 000137 030376
1493 030272 5$: JSR PC,SEKSTS ;GO VERIFY RESULTS OF SEEK OPERATION
      030272 004737 051206 BR 6$ ;GO TO 6$ IF NO ERROR
      030276 000405 NOP ;RETURN HERE IF ERROR
      030300 000240 EMT ;ERROR # DEFINED BY SEKSTS SUBROUTINE
      030302 104000 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
      030304 004736 JMP 9$ ;GO TO 9$ IF ERROR
1494 030306 000137 030376
1495 030312 6$: JSR PC,CMPERRSTS ;CHECK ANY ERRORS NOT MASKED
      030312 004737 050562 .WORD ND1MSK ;MASK FOR RMER1
      030316 115760 .WORD DPE ;MASK FOR RMER2
      030320 000010 BR 7$ ;GO TO 7$ IF NO ERROR
      030322 000405 NOP ;RETURN HERE IF ERROR
      030324 000240 EMT ;ERROR # DEFINED BY CMPERRSTS SUBROUTINE
      030326 104000 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
      030330 004736 JMP 9$ ;GO TO 9$ IF ERROR
1496 030332 000137 030376
1497 030336 7$: JSR PC,SECERR ;GO CHECK FOR SECONDARY ERRORS
      030336 004737 044416 BR 8$ ;GO TO 8$ IF NO ERROR
      030342 000405 NOP ;RETURN HERE IF ERROR
      030344 000240 EMT ;ERROR # DEFINED BY SECERR SUBROUTINE
      030346 104000 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
      030350 004736 JMP 9$ ;GO TO 9$ IF ERROR
1498 030352 000137 030376
1499 030356 8$: ASL RMDCO ;SHIFT TO NEXT PRIME CYLINDER
1500 030356 006337 001446 CMP #512.,RMDCO ;IS THE TEST DONE??
1501 030362 022737 001000 001446 BLO 9$ ;YES!!
1502 030370 103402 JSR PC,SECERR ;GO CHECK FOR SECONDARY ERRORS
1503 030372 000137 030126 BR 8$ ;GO TO 8$ IF NO ERROR
1504 030376
1505

```

 :*TEST 45 SEEK ZERO DIFFERENCE

```

TST45:
030376 SCOPE ;SCOPE CALL
030376 000004 NOP ;START OF TEST
030400 000240 MOV #STACK,SP ;INITIALIZE STACK POINTER
030402 012706 001100 MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
030406 013700 001276 MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
030412 013701 001466 MOV #25,$TIMES ;DO 25. ITERATIONS
030416 012737 000031 001206 MOV #45,$TESTN ;SET TEST NUMBER IN APT MAIL BOX
030424 012737 000045 001226
1506
1507 030432 1$: JSR PC,TSTPRP ;PREPARE DEVICE FOR TEST
1508 030432 004737 041532 .WORD 054130 ;TASK DESCRIPTOR AS FOLLOWS:
      030436 054130 ;CLEAR CONTROLLER & SELECT DEVICE
      ;VERIFY CONTROLLER CLEAR OPERATION
      ;PACK ACKNOWLEDGE IF VOLUME NOT VALID

```

	030440	000404		BR	2\$:VERIFY PACK ACKNOWLEDGE
	030442	000240		NOP			:RECALIBRATE IF 'SKI' OR 'PIP' IS SET
	030444	104000		EMT			:VERIFY RECALIBRATION
	030446	000137	030704	JMP	10\$:GO TO 2\$ IF NO ERROR
1509	030452						:RETURN HERE IF ERROR
1510	030452	012703	000003		2\$:		:ERROR # DEFINED BY TSTPRP SUBROUTINE
1511	030456	012737	000000	MOV	#3,R3		:GO TO 10\$ IF ERROR
1512	030464	012737	000000	MOV	#0,RMDCO		:R3 = NUMBER OF SEEKS
1513	030472	012737	000005	MOV	#0,RMDAO	001446	:CYLINDER = 0
1514	030500	012702	001545	MOV	#SEEK!GO,RMCS10	001420	:TRACK = 0, SECTOR = 0
1515	030504	112722	000006	MOV	#PUTIX,R2	001412	:FUNCTION CODE FOR SEEK
1516	030510	112722	000034	MOV	#RMDA,(R2)+		:R2 POINTS TO REGISTER INDEX
1517	030514	112722	000000	MOV	#RMDC,(R2)+		:WRITE REGISTER INDEX TABLE
1518	030520	112722	000200	MOV	#RMCS1,(R2)+		
1519	030524						:TERMINATE TABLE
1520	030524	004737	043016	JSR	PC,PUT		:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	030530	000404		BR	4\$:GO TO 4\$ IF NO ERROR
	030532	000240		NOP			:RETURN HERE IF ERROR
	030534	104000		EMT			:ERROR # DEFINED BY PUT SUBROUTINE
	030536	000137	030704	JMP	10\$:GO TO 10\$ IF ERROR
1521	030542	004737	042462	JSR	PC,GETSTS		:SETUP FOR READING STATUS
1522	030546	004737	043370	JSR	PC,TIMOUT		:WAIT FOR COMPLETION
1523							
1524	030552	004737	042546	JSR	PC,GET		:GO READ REGISTER(S) WITH GET SUBROUTINE
	030556	000404		BR	5\$:GO TO 5\$ IF NO ERROR
	030560	000240		NOP			:RETURN HERE IF ERROR
	030562	104000		EMT			:ERROR # DEFINED BY GET SUBROUTINE
	030564	000137	030704	JMP	10\$:GO TO 10\$ IF ERROR
1525	030570						
1526	030570	004737	043564	JSR	PC,PRIERR		:GO CHECK FOR PRIMARY ERRORS
	030574	000405		BR	6\$:GO TO 6\$ IF NO ERROR
	030576	000240		NOP			:RETURN HERE IF ERROR
	030600	104000		EMT			:ERROR # DEFINED BY PRIERR SUBROUTINE
	030602	004736		JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
	030604	000137	030704	JMP	10\$:GO TO 10\$ IF ERROR
1527	030610						
1528	030610	004737	051206	JSR	PC,SEKSTS		:GO VERIFY RESULTS OF SEEK OPERATION
	030614	000405		BR	7\$:GO TO 7\$ IF NO ERROR
	030616	000240		NOP			:RETURN HERE IF ERROR
	030620	104000		EMT			:ERROR # DEFINED BY SEKSTS SUBROUTINE
	030622	004736		JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
	030624	000137	030704	JMP	10\$:GO TO 10\$ IF ERROR
1529	030630						
1530	030630	004737	050562	JSR	PC,CMPERRSTS		:CHECK ANY ERRORS NOT MASKED
	030634	115760		.WORD	NDTMSK		:MASK FOR RMER1
	030636	000010		.WORD	DPE		:MASK FOR RMER2
	030640	000405		BR	8\$:GO TO 8\$ IF NO ERROR
	030642	000240		NOP			:RETURN HERE IF ERROR
	030644	104000		EMT			:ERROR # DEFINED BY CMPERRSTS SUBROUTINE
	030646	004736		JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
	030650	000137	030704	JMP	10\$:GO TO 10\$ IF ERROR
1531	030654						
1532	030654	004737	044416	JSR	PC,SECERR		:GO CHECK FOR SECONDARY ERRORS
	030660	000405		BR	9\$:GO TO 9\$ IF NO ERROR

```

030662 000240      NOP      :RETURN HERE IF ERROR
030664 104000      EMT      :ERROR # DEFINED BY SECERR SUBROUTINE
030666 004736      JSR      PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
030670 000137 030704 JMP      10$      :GO TO 10$ IF ERROR
1533 030674      9$:
1534 030674 005303      DEC      R3      :DONE ALL SEEKS??
1535 030676 001402      BEQ     10$      :YES!!
1536 030700 000137 030524 JMP      3$      :NO - GO DO NEXT SEEK
1537 030704      10$:
1538
1539
:*****
:*TEST 46      SEEK MAXIMUM DIFFERENCE FORWARD
:*****
TST46:
030704      SCOPE   :SCOPE (ALL
030704 000004      NOP   :START CF TEST
030706 000240      MOV   #STACK,SP :INITIALIZE STACK POINTER
030710 012706 001100 MOV   $BASE,R0   :R0 = UPIBUS ADDRESS
030714 013700 001276 MOV   TSTQUE,R1  :(R1) = DEVICE BEING TESTED
030720 C13701 001466 MOV   #25,$TIMES :DO 25. ITERATIONS
030724 012737 000031 001206 MOV   #46,$TESTN :SET T-ST NUMBER IN APT MAIL BOX
030732 012737 000046 001226
1540
1541 030740      1$:
1542 030740 004737 041532 JSR   PC,TSTPRP :PREPARE DEVICE FOR TEST
030744 052130      .WORD 052130 :TASK DESCRIPTOR AS FOLLOWS:
:CLEAR CONTROLLER & SELECT DEVICE
:VERIFY CONTROLLER CLEAR OPERATION
:PACK ACKNOWLEDGE IF VOLUME NOT VALID
:VERIFY PACK ACKNOWLEDGE
:RECALIBRATE DRIVE
:VERIFY RECALIBRATION
:GO TO 2$ IF NO ERROR
030746 000404      BR     2$      :RETURN HERE IF ERROR
030750 000240      NOP
030752 104000      EMT
030754 000137 031172 JMP   8$      :ERROR # DEFINED BY TSTPRP SUBROUTINE
:GO TO 8$ IF ERROR
1543 030760      2$:
1544 030760 012737 001060 001446 MOV   #560.,RMDCO :LAST CYLINDER
1545 030766 012737 000000 001420 MOV   #0,RMDAO   :TRACK = 0, SECTOR = 0
1546 030774 012737 000005 001412 MOV   #SEEK!GO,RMCS10 :LOAD SEEK COMMAND IN BUFFER
1547 031002 012702 001545      MOV   #PUTINX,R2 :R2 POINTS TO REGISTER TABLE
1548 031006 112722 000034      MOVB  #RMDC,(R2)+ :WRITE REGISTER INDEX TABLE
1549 031012 112722 000006      MOVB  #RMDA,(R2)+
1550 031016 112722 000000      MOVB  #RMCS1,(R2)+
1551 031022 112722 000200      MOVB  #200,(R2)+
1552 031026 004737 043016 JSR   PC,PUT    :WRITE TERMINATOR
031032 000404      BR     3$      :GO WRITE REGISTER(S) WITH PUT SUBROUTINE
031034 000240      NOP   :GO TO 3$ IF NO ERROR
031036 104000      EMT   :RETURN HERE IF ERROR
031040 000137 031172 JMP   8$      :ERROR # DEFINED BY PUT SUBROUTINE
:GO TO 8$ IF ERROR
1553 031044 004737 042462 JSR   PC,GETSTS :SETUP FOR STATUS FETCH
1554 C31050 004737 043370 JSR   PC,TIMOUT :WAIT FOR SEEK TO COMPLETE
1555
1556 031054 004737 042546 JSR   PC,GET    :GO READ REGISTER(S) WITH GET SUBROUTINE
031060 000404      BR     4$      :GO TO 4$ IF NO ERROR
031062 000240      NOP   :RETURN HERE IF ERROR
031064 104000      EMT   :ERROR # DEFINED BY GET SUBROUTINE
031066 000137 031172 JMP   8$      :GO TO 8$ IF ERROR

```

```

1557 031072          4$:
1558 031072 004737 043564      JSR    PC,PRIERR      :GO CHECK FOR PRIMARY ERRORS
      031076 000405          BR      5$           :GO TO 5$ IF NO ERROR
      031100 000240          NOP           :RETURN HERE IF ERROR
      031102 104000          EMT           :ERROR # DEFINED BY PRIERR SUBROUTINE
      031104 004736          JSR    PC,@(SP)+     :GO BACK FOR MORE ERROR CHECKS
      031106 000137 031172      JMP      8$           :GO TO 8$ IF ERROR

1559 031112          5$:
1560 031112 004737 051206      JSR    PC,SEKSTS     :GO VERIFY RESULTS OF SEEK OPERATION
      031116 000405          BR      6$           :GO TO 6$ IF NO ERROR
      031120 000240          NOP           :RETURN HERE IF ERROR
      031122 104000          EMT           :ERROR # DEFINED BY SEKSTS SUBROUTINE
      031124 004736          JSR    PC,@(SP)+     :GO BACK FOR MORE ERROR CHECKS
      031126 000137 031172      JMP      8$           :GO TO 8$ IF ERROR

1561 031132          6$:
1562 031132 004737 050562      JSR    PC,CMPERRSTS :CHECK ANY ERRORS NOT MASKED
      031136 115760          .WORD  NDTMSK       :MASK FOR RMER1
      031140 000010          .WORD  DPE          :MASK FOR RMER2
      031142 000405          BR      7$           :GO TO 7$ IF NO ERROR
      031144 000240          NOP           :RETURN HERE IF ERROR
      031146 104000          EMT           :ERROR # DEFINED BY CMPERRSTS SUBROUTINE
      031150 004736          JSR    PC,@(SP)+     :GO BACK FOR MORE ERROR CHECKS
      031152 000137 031172      JMP      8$           :GO TO 8$ IF ERROR

1563 031156          7$:
1564 031156 004737 044416      JSR    PC,SECERR     :GO CHECK FOR SECONDARY ERRORS
      031162 000403          BR      8$           :GO TO 8$ IF NO ERROR
      031164 000240          NOP           :RETURN HERE IF ERROR
      031166 104000          EMT           :ERROR # DEFINED BY SECERR SUBROUTINE
      031170 004736          JSR    PC,@(SP)+     :GO BACK FOR MORE ERROR CHECKS

1565 031172          8$:
1566
1567

```

```

:*****
:*TEST 47      SEEK ADJACENT FORWARD
:*****
TST47:

```

```

      031172          SCOPE          :SCOPE CALL
      031172 000004          NOP           :START OF TEST
      031174 000240          MOV      #STACK,SP  :INITIALIZE STACK POINTER
      031176 012706 001100      MOV      $BASE,R0    :R0 = UNIBUS ADDRESS
      031202 013700 001276      MOV      TSTQUE,R1   :(R1) = DEVICE BEING TESTED
      031206 013701 001466      MOV      #47,$TESTN  ;;SET TEST NUMBER IN APT MAIL BOX
      031212 012737 000047 001226

1568
1569 031220          1$:
1570 031220 004737 041532      JSR    PC,TSTPRP    :PREPARE DEVICE FOR TEST
      031224 054130          .WORD  054130      :TASK DESCRIPTOR AS FOLLOWS:
      :CLEAR CONTROLLER & SELECT DEVICE 1
      :VERIFY CONTROLLER CLEAR OPERATION
      :PACK ACKNOWLEDGE IF VOLUME NOT VALID
      :VERIFY PACK ACKNOWLEDGE
      :RECALIBRATE IF 'SKI' OR 'PIP' IS SET
      :VERIFY RECALIBRATION
      031226 000404          BR      2$           :GO TO 2$ IF NO ERROR
      031230 000240          NOP           :RETURN HERE IF ERROR
      031232 104000          EMT           :ERROR # DEFINED BY TSTPRP SUBROUTINE
      031234 000137 031474      JMP      10$         :GO TO 10$ IF ERROR

1571 031240          2$:
1572 031240 012737 000000 001446      MOV      #0,RMDCO   :CYLINDER = 0

```

```

T47      SEEK ADJACENT FORWARD

1573 031246 012737 000000 001420      MOV      #0,RMDAO      ;TRACK = 0, SECTOR = 0
1574 031254 012737 000005 001412      MOV      #SEEK!GO,RMCS10 ;FUNCTION CODE FOR SEEK
1575 031262 012702 001545              MOV      #PUTINX,R2    ;R2 POINTS TO REGISTER INDEX
1576 031266 112722 000034              MOV      #RMDC,(R2)+  ;WRITE REGISTER INDEX TABLE
1577 031272 112722 000006              MOV      #RMDA,(R2)+
1578 031276 112722 000000              MOV      #RMCS1,(R2)+
1579 031302 112722 000200              MOV      #200,(R2)+  ;TERMINATE REGISTER TABLE
1580 031306
1581 031306 004737 043016      3$:      JSR      PC,PUT      ;GO WRITE REGISTER(S) WITH PUT SUBROUTINE
          031312 000404      BR      4$          ;GO TO 4$ IF NO ERROR
          031314 000240      NOP
          031316 104000      EMT          ;RETURN HERE IF ERROR
          031320 000137 031474      JMP      10$       ;ERROR # DEFINED BY PUT SUBROUTINE
1582 031324 004737 042462      4$:      JSR      PC,GETSTS  ;GO TO 10$ IF ERROR
1583 031330 004737 043370      JSR      PC,TIMOUT ;SETUP FOR STATUS FETCH
          ;WAIT FOR COMPLETION
1584
1585 031334 004737 042546      JSR      PC,GET      ;GO READ REGISTER(S) WITH GET SUBROUTINE
          031340 000404      BR      5$          ;GO TO 5$ IF NO ERROR
          031342 000240      NOP
          031344 104000      EMT          ;RETURN HERE IF ERROR
          031346 000137 031474      JMP      10$       ;ERROR # DEFINED BY GET SUBROUTINE
1586 031352
1587 031352 004737 043564      5$:      JSR      PC,PRIERR  ;GO CHECK FOR PRIMARY ERRORS
          031356 000405      BR      6$          ;GO TO 6$ IF NO ERROR
          031360 000240      NOP
          031362 104000      EMT          ;RETURN HERE IF ERROR
          031364 004736      JSR      PC,@(SP)+  ;ERROR # DEFINED BY PRIERR SUBROUTINE
          031366 000137 031474      JMP      10$       ;GO BACK FOR MORE ERROR CHECKS
1588 031372
1589 031372 004737 051206      6$:      JSR      PC,SEKSTS  ;GO VERIFY RESULTS OF SEEK OPERATION
          031376 000405      BR      7$          ;GO TO 7$ IF NO ERROR
          031400 000240      NOP
          031402 104000      EMT          ;RETURN HERE IF ERROR
          031404 004736      JSR      PC,@(SP)+  ;ERROR # DEFINED BY SEKSTS SUBROUTINE
          031406 000137 031474      JMP      10$       ;GO BACK FOR MORE ERROR CHECKS
1590 031412
1591 031412 004737 050562      7$:      JSR      PC,CMPESTS ;CHECK ANY ERRORS NOT MASKED
          031416 115760      .WORD   NDTMSK      ;MASK FOR RMER1
          031420 000010      .WORD   DPE         ;MASK FOR RMER2
          031422 000405      BR      8$          ;GO TO 8$ IF NO ERROR
          031424 000240      NOP
          031426 104000      EMT          ;RETURN HERE IF ERROR
          031430 004736      JSR      PC,@(SP)+  ;ERROR # DEFINED BY CMPESTS SUBROUTINE
          031432 000137 031474      JMP      10$       ;GO BACK FOR MORE ERROR CHECKS
1592 031436
1593 031436 004737 044416      8$:      JSR      PC,SECERR  ;GO CHECK FOR SECONDARY ERRORS
          031442 000405      BR      9$          ;GO TO 9$ IF NO ERROR
          031444 000240      NOP
          031446 104000      EMT          ;RETURN HERE IF ERROR
          031450 004736      JSR      PC,@(SP)+  ;ERROR # DEFINED BY SECERR SUBROUTINE
          031452 000137 031474      JMP      10$       ;GO BACK FOR MORE ERROR CHECKS
1594 031456
1595 031456 005737 001446      9$:      TST      RMDCO      ;FIRST TIME THROUGH??
1596 031462 001004      BNE     10$        ;NO!!
1597 031464 005237 001446      INC     RMDCO      ;YES - SEEK TO ADJACENT CYLINDER FORWARD
1598 031470 000137 031306      JMP     3$
1599 031474      10$:

```


1600
1601

 : *TEST 50 SEEK ADJACENT REVERSE
 : *****
 TST50:

031474
 031474 000004
 031476 000240
 031500 012706 001100
 031504 013700 001276
 031510 013701 001466
 031514 012737 000050 001226

SCOPE
 NOP
 MOV #STACK,SP
 MOV \$BASE,R0
 MOV TSTQUE,R1
 MOV #50,\$TESTN

:SCOPE CALL
 :START OF TEST
 :INITIALIZE STACK POINTER
 :R0 = UNIBUS ADDRESS
 :(R1) = DEVICE BEING TESTED
 :SET TEST NUMBER IN APT MAIL BOX

1602
1603
1604

031522
 031522 004737 041532
 031526 054130

1\$:
 JSR PC,TSTPRP
 .WORD 054130

:PREPARE DEVICE FOR TEST
 :TASK DESCRIPTOR AS FOLLOWS:
 :CLEAR CONTROLLER & SELECT DEVICE
 :VERIFY CONTROLLER CLEAR OPERATION
 :PACK ACKNOWLEDGE IF VOLUME NOT VALID
 :VERIFY PACK ACKNOWLEDGE
 :RECALIBRATE IF 'SKI' OR 'PIP' IS SET
 :VERIFY RECALIBRATION
 :GO TO 2\$ IF NO ERROR
 :RETURN HERE IF ERROR
 :ERROR # DEFINED BY TSTPRP SUBROUTINE
 :GO TO 10\$ IF ERROR

031530 000404
 031532 000240
 031534 104000
 031536 000137 032000

BR 2\$
 NOP
 EMT
 JMP 10\$

:CYLINDER = 1
 :TRACK = 0, SECTOR = 0
 :FUNCTION CODE FOR SEEK
 :R2 POINTS TO REGISTER INDEX
 :WRITE REGISTER INDEX TABLE

1605

031542
 031542 012737 000001 001446
 031550 012737 000000 001420
 031556 012737 000005 001412
 031564 012702 001545
 031570 112722 000006
 031574 112722 000034
 031600 112722 000000
 031604 112722 000200

2\$:
 MOV #1,RMDC0
 MOV #0,RMDAO
 MOV #SEEK!GO,RMCS10
 MOV #PUTINX,R2
 MOVB #RMDA,(R2)+
 MOVB #RMDC,(R2)+
 MOVB #RMCS1,(R2)+
 MOVB #200,(R2)+

:TERMINATE TABLE

1614

031610
 031610 004737 043016
 031614 000404
 031616 000240
 031620 104000
 031622 000137 032000

3\$:
 JSR PC,PUT
 BR 4\$
 NOP
 EMT
 JMP 10\$

:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
 :GO TO 4\$ IF NO ERROR
 :RETURN HERE IF ERROR
 :ERROR # DEFINED BY PUT SUBROUTINE
 :GO TO 10\$ IF ERROR

1616

031626 004737 042462
 031632 004737 043370

4\$:
 JSR PC,GETSTS
 JSR PC,TIMOUT

:SETUP TO READ ALL REGISTERS
 :WAIT FOR SEEK TO COMPLETE

1618

031636 004737 042546
 031642 000404
 031644 000240
 031646 104000
 031650 000137 032000

5\$:
 JSR PC,GET
 BR 5\$
 NOP
 EMT
 JMP 10\$

:GO READ REGISTER(S) WITH GET SUBROUTINE
 :GO TO 5\$ IF NO ERROR
 :RETURN HERE IF ERROR
 :ERROR # DEFINED BY GET SUBROUTINE
 :GO TO 10\$ IF ERROR

1620

031654
 031654 004737 043564
 031660 000405
 031662 000240
 031664 104000
 031666 004736
 031670 000137 032000

6\$:
 JSR PC,PRIERR
 BR 6\$
 NOP
 EMT
 JSR PC,@(SP)+
 JMP 10\$

:GO CHECK FOR PRIMARY ERRORS
 :GO TO 6\$ IF NO ERROR
 :RETURN HERE IF ERROR
 :ERROR # DEFINED BY PRIERR SUBROUTINE
 :GO BACK FOR MORE ERROR CHECKS
 :GO TO 10\$ IF ERROR

1622

031674
 031674 004737 051206

6\$:
 JSR PC,SEKSTS

:GO VERIFY RESULTS OF SEEK OPERATION

```

031700 000405 BR 7$ :GO TO 7$ IF NO ERROR
031702 000240 NOP :RETURN HERE IF ERROR
031704 104000 EMT :ERROR # DEFINED BY SEKSTS SUBROUTINE
031706 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
031710 000137 032000 JMP 10$ :GO TO 10$ IF ERROR
1624 031714 7$:
1625 031714 004737 050562 JSR PC,CMPERRSTS :CHECK ANY ERRORS NOT MASKED
031720 115760 .WORD NDIMSK :MASK FOR RMER1
031722 000010 .WORD DPE :MASK FOR RMER2
031724 000405 BR 8$ :GO TO 8$ IF NO ERROR
031726 000240 NOP :RETURN HERE IF ERROR
031730 104000 EMT :ERROR # DEFINED BY CMPERRSTS SUBROUTINE
031732 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
031734 000137 032000 JMP 10$ :GO TO 10$ IF ERROR
1626 031740 8$:
1627 031740 004737 044416 JSR PC,SECERR :GO CHECK FOR SECONDARY ERRORS
031744 000405 BR 9$ :GO TO 9$ IF NO ERROR
031746 000240 NOP :RETURN HERE IF ERROR
031750 104000 EMT :ERROR # DEFINED BY SECERR SUBROUTINE
031752 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
031754 000137 032000 JMP 10$ :GO TO 10$ IF ERROR
1628 031760 9$:
1629 031760 022737 000001 001446 CMP #1,RMDCO :IS THIS THE FIRST SEEK??
1630 031766 001004 BNE 10$ :NO!!
1631 031770 005337 001446 DEC RMDCO :YES - SEEK TO ADJACENT CYLINDER
1632 031774 000137 031610 JMP 3$ :GO SEEK
1633 032000 10$:
1634
1635

```

```

:*****
:*TEST 51 SEEK INVALID SECTOR
:*****
TST51:

```

```

032000 000004 SCOPE :SCOPE CALL
032002 000240 NOP :START OF TEST
032004 012706 001100 MOV #STACK,SP :INITIALIZE STACK POINTER
032010 013700 001276 MOV $BASE,R0 :R0 = UNIBUS ADDRESS
032014 013701 001466 MOV TSTQUE,R1 :(R1) = DEVICE BEING TESTED
032020 012737 000051 001226 MOV #51,$TESTN ;;SET TEST NUMBER IN APT MAIL BOX
1636
1637 032026 1$:
1638 032026 004737 041532 JSR PC,TSTPRP :PREPARE DEVICE FOR TEST
032032 054130 .WORD 054130 :TASK DESCRIPTOR AS FOLLOWS:
: CLEAR CONTROLLER & SELECT DEVICE
: VERIFY CONTROLLER CLEAR OPERATION
: PACK ACKNOWLEDGE IF VOLUME NOT VALID
: VERIFY PACK ACKNOWLEDGE
: RECALIBRATE IF 'SKI' OR 'PIP' IS SET
: VERIFY RECALIBRATION
032034 000404 BR 2$ :GO TO 2$ IF NO ERROR
032036 000240 NOP :RETURN HERE IF ERROR
032040 104000 EMT :ERROR # DEFINED BY TSTPRP SUBROUTINE
032042 000137 032416 JMP 14$ :GO TO 14$ IF ERROR
1639 032046 2$:
1640 032046 012737 000005 001412 MOV #SEEK!GO,RMCS10 :SEEK COMMAND
1641 032054 012737 000000 001444 MOV #0,RMFO :FORMAT 18 BIT
1642 032062 012737 000000 001446 MOV #0,RMDCO :CYLINDER = 0
1643 032070 012737 000036 001420 MOV #30.,RMDAO :INVALID SECTOR = 30., TRACK = 0

```

T51

SEEK INVALID SECTOR

1644	032076	012702	001545	MOV	#PUTINX,R2	:R2 POINTS TO REGISTER TABLE
1645	032102	112722	000032	MOV	#RMOF,(R2)+	:WRITE REGISTER INDEX TABLE
1646	032106	112722	000006	MOV	#RMDA,(R2)+	
1647	032112	112722	000034	MOV	#RMDC,(R2)+	
1648	032116	112722	000000	MOV	#RMCS1,(R2)+	
1649	032122	112722	000209	MOV	#200,(R2)+	:TERMINATE TABLE
1650	032126	004737	042462	JSR	PC,GETSTS	:SETUP INPUT REGISTER INDEX
1651	032132					
1652	032132	004737	052466	JSR	PC,CNTCLR	:GO ISSUE CONTROLLER CLEAR
	032136	000404		BR	4\$:GO TO 4\$ IF NO ERROR
	032140	000240		NOP		:RETURN HERE IF ERROR
	032142	104000		EMT		:ERROR NUMBER DEFINED BY SUBROUTINE
	032144	000137	032416	JMP	14\$:GO TO 14\$ IF ERKOR
1653	032150					
1654	032150	004737	042546	JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	032154	000404		BR	5\$:GO TO 5\$ IF NO ERROR
	032156	000240		NOP		:RETURN HERE IF ERROR
	032160	104000		EMT		:ERROR # DEFINED BY GET SUBROUTINE
	032162	000137	032416	JMP	14\$:GO TO 14\$ IF ERROR
1655	032166					
1656	032166	004737	052604	JSR	PC,CLRSTS	:GO VERIFY CONTROLLER CLEAR OPERATION
	032172	000405		BR	6\$:GO TO 6\$ IF NO ERROR
	032174	000240		NOP		:RETURN HERE IF ERROR
	032176	104000		EMT		:ERROR # DEFINED BY CLRSTS SUBROUTINE
	032200	004736		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	032202	000137	032416	JMP	14\$:GO TO 14\$ IF ERROR
1657	032206					
1658	032206	004737	043016	JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	032212	000404		BR	7\$:GO TO 7\$ IF NO ERROR
	032214	000240		NOP		:RETURN HERE IF ERROR
	032216	104000		EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	032220	000137	032416	JMP	14\$:GO TO 14\$ IF ERROR
1659	032224					
1660	032224	004737	043370	JSR	PC,TIMOUT	:WAIT FOR GO TO RESET
1661						
1662	032230	004737	042546	JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	032234	000404		BR	8\$:GO TO 8\$ IF NO ERROR
	032236	000240		NOP		:RETURN HERE IF ERROR
	032240	104000		EMT		:ERROR # DEFINED BY GET SUBROUTINE
	032242	000137	032416	JMP	14\$:GO TO 14\$ IF ERROR
1663	032246					
1664	032246	004737	043564	JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	032252	000405		BR	9\$:GO TO 9\$ IF NO ERROR
	032254	000240		NOP		:RETURN HERE IF ERROR
	032256	104000		EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	032260	004736		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	032262	000137	032416	JMP	14\$:GO TO 14\$ IF ERROR
1665	032266					
1666	032266	004737	051206	JSR	PC,SEKSTS	:GO VERIFY RESULTS OF SEEK OPERATION
	032272	000405		BR	10\$:GO TO 10\$ IF NO ERROR
	032274	000240		NOP		:RETURN HERE IF ERROR
	032276	104000		EMT		:ERROR # DEFINED BY SEKSTS SUBROUTINE
	032300	004736		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	032302	000137	032416	JMP	14\$:GO TO 14\$ IF ERROR
1667	032306					
1668	032306					
1669	032306	004737	050562	JSR	PC,COMPERRSTS	:CHECK ANY ERRORS NOT MASKED

```

032312 117760 .WORD IAE!NDTMSK .MASK FOR RMER1
032314 000010 .WORD DPE ;MASK FOR RMER2
032316 000405 BR 12$ ;GO TO 12$ IF NO ERROR
032320 000240 NOP ;RETURN HERE IF ERROR
032322 104000 EMT ;ERROR # DEFINED BY CMPERRSTS SUBROUTINE
032324 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
032326 000137 032416 JMP 14$ ;GO TO 14$ IF ERROR
1670 032332 12$: JSR PC,SECERR ;GO CHECK FOR SECONDARY ERRORS
1671 032332 004737 044416 BR 13$ ;GO TO 13$ IF NO ERROR
032336 000405 NOP ;RETURN HERE IF ERROR
032340 000240 EMT ;ERROR # DEFINED BY SECERR SUBROUTINE
032342 104000 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
032344 004736 032416 JMP 1$ ;GO TO 14$ IF ERROR
1672 032352 13$: INC RMDAO ;INCREMENT SECTOR ADDRESS
1673 032352 005237 001420 CMP RMDAO,#64. ;DONE YET ?
1674 032356 023727 001420 000100 BLOS 3$ ;NO - TEST NEXT SECTOR
1676 032366 032737 010000 001444 BIT #FMT16,RMOFO ;WAS TEST DONE FOR 16 BIT MODE YET ?
1678 032374 001010 BNE 14$ ;BR IF YES
1679 032376 012737 010000 001444 MOV #FMT16,RMOFO ;SET 16 BIT FORMAT MODE
1680 032404 012737 000037 001420 MOV #31.,RMDAO ;SET INVALID SECTOR 31.
1681 032412 000137 032132 JMP 3$ ;NO - TEST NEXT SECTOR
1682 032416 14$:
1683
1684
*****
;*TEST 52 SEEK INVALID TRACK
*****
TST52:
032416 000004 SCOPE ;SCOPE CALL
032420 000240 NOP ;START OF TEST
032422 012706 001100 MOV #STACK,SP ;INITIALIZE STACK POINTER
032426 013700 001276 MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
032432 013701 001466 MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
032436 012737 000052 001226 MOV #52,$TESTN ;:SET TEST NUMBER IN APT MAIL BOX
1685
1686 032444 004737 041532 JSR PC,TSTPRP ;PREPARE DEVICE FOR TEST
032450 054130 .WORD 054130 ;TASK DESCRIPTOR AS FOLLOWS:
;CLEAR CONTROLLER & SELECT DEVICE
;VERIFY CONTROLLER CLEAR OPERATION
;PACK ACKNOWLEDGE IF VOLUME NOT VALID
;VERIFY PACK ACKNOWLEDGE
;RECALIBRATE IF 'SKI' OR 'PIP' IS SET
;VERIFY RECALIBRATION
032452 000404 BR 1$ ;GO TO 1$ IF NO ERROR
032454 000240 NOP ;RETURN HERE IF ERROR
032456 104000 EMT ;ERROR # DEFINED BY TSTPRP SUBROUTINE
032460 000137 033014 JMP 13$ ;GO TO 13$ IF ERROR
1687 032464 1$: MOV #SEEK!GO,RMCS10 ;SEEK COMMAND
1688 032464 012737 000005 001412 MOV #0,RMDCO ;CYLINDER = 0
1689 032472 012737 000000 001446 MOV LSTRK,RMDAO ;LAST TRACK, SECTOR = 0
1690 032500 013737 001334 001420 MOV RMDAO+1 ;SETUP FIRST INVALID TRACK
1691 032506 105237 001421 INCB RMDAO+1 ;SET 16 BIT FORMAT
1692 032512 012737 010000 001444 MOV #FMT16,RMOFO ;R2 POINTS TO REGISTER TABLE
1693 032520 012702 001545 MOV #PUTINX,R2 ;WRITE REGISTER INDEX
1694 032524 112722 000032 MOVB #RMOF,(R2)+
    
```

1695	032530	112722	000034	MOVW	#RMDC,(R2)+	:TABLE FOR OUTPUT
1696	032534	112722	000006	MOVW	#RMDA,(R2)+	
1697	032540	112722	000000	MOVW	#RMCST,(R2)+	
1698	032544	112722	000200	MOVW	#200,(R2)+	:TERMINATE TABLE
1699	032550	004737	042462	JSR	PC,GETSTS	:SETUP INPUT TABLE FOR STATUS
1700	032554					
1701	032554	004737	052466	JSR	PC,CNTCLR	:GO ISSUE CONTROLLER CLEAR
	032560	000404		BR	3\$:GO TO 3\$ IF NO ERROR
	032562	000240		NOP		:RETURN HERE IF ERROR
	032564	104000		EMT		:ERROR NUMBER DEFINED BY SUBROUTINE
	032566	000137	033014	JMP	13\$:GO TO 13\$ IF ERROR
1702	032572					
1703	032572	004737	042546	JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	032576	000404		BR	4\$:GO TO 4\$ IF NO ERROR
	032600	000240		NOP		:RETURN HERE IF ERROR
	032602	104000		EMT		:ERROR # DEFINED BY GET SUBROUTINE
	032604	000137	033014	JMP	13\$:GO TO 13\$ IF ERROR
1704	032610					
1705	032610	004737	052604	JSR	PC,CLRSTS	:GO VERIFY CONTROLLER CLEAR OPERATION
	032614	000405		BR	5\$:GO TO 5\$ IF NO ERROR
	032616	000240		NOP		:RETURN HERE IF ERROR
	032620	104000		EMT		:ERROR # DEFINED BY CLRSTS SUBROUTINE
	032622	004736		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	032624	000137	033014	JMP	13\$:GO TO 13\$ IF ERROR
1706	032630					
1707	032630	004737	043016	JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	032634	000404		BR	6\$:GO TO 6\$ IF NO ERROR
	032636	000240		NOP		:RETURN HERE IF ERROR
	032640	104000		EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	032642	000137	033014	JMP	13\$:GO TO 13\$ IF ERROR
1708	032646					
1709	032646	004737	043370	JSR	PC,TIMOUT	:WAIT FOR GO TO RESET
1710						
1711	032652	004737	042546	JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	032656	000404		BR	7\$:GO TO 7\$ IF NO ERROR
	032660	000240		NOP		:RETURN HERE IF ERROR
	032662	104000		EMT		:ERROR # DEFINED BY GET SUBROUTINE
	032664	000137	033014	JMP	13\$:GO TO 13\$ IF ERROR
1712	032670					
1713	032670	004737	043564	JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	032674	000405		BR	8\$:GO TO 8\$ IF NO ERROR
	032676	000240		NOP		:RETURN HERE IF ERROR
	032700	104000		EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	032702	004736		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	032704	000137	033014	JMP	13\$:GO TO 13\$ IF ERROR
1714	032710					
1715	032710	004737	051206	JSR	PC,SEKSTS	:GO VERIFY RESULTS OF SEEK OPERATION
	032714	000405		BR	9\$:GO TO 9\$ IF NO ERROR
	032716	000240		NOP		:RETURN HERE IF ERROR
	032720	104000		EMT		:ERROR # DEFINED BY SEKSTS SUBROUTINE
	032722	004736		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	032724	000137	033014	JMP	13\$:GO TO 13\$ IF ERROR
1716	032730					
1717	032730					
1718	032730	004737	050562	JSR	PC,COMPERRSTS	:CHECK ANY ERRORS NOT MASKED
	032734	117760		.WORD	IAE!NDTMSK	:MASK FOR RMER1
	032736	000010		.WORD	DPE	:MASK FOR RMER2

```

032740 000405 BR 11$ :GO TO 11$ IF NO ERROR
032742 000240 NOP :RETURN HERE IF ERROR
032744 104000 EMT :ERROR # DEFINED BY CMPERRSTS SUBROUTINE
032746 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
032750 000137 033014 JMP 13$ :GO TO 13$ IF ERROR
1719 032754 11$:
1720 032754 004737 044416 JSR PC,SECERR :GO CHECK FOR SECONDARY ERRORS
032760 000405 BR 12$ :GO TO 12$ IF NO ERROR
032762 000240 NOP :RETURN HERE IF ERROR
032764 104000 EMT :ERROR # DEFINED BY SECERR SUBROUTINE
032766 004736 JSR PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
032770 000137 033014 JMP 13$ :GO TO 13$ IF ERROR
1721 032774 12$:
1722 032774 105237 001421 INCB RMDAO+1 :INCREMENT TRACK ADDRESS
1723 033000 123727 001421 000200 CMPB RMDAO+1,#128. :DONE??
1724 033006 101002 BHI 13$ :BR IF YES
1725 033010 000137 032554 JMP 2$ :TEST NEXT INVALID TRACK
1726 033014 13$:
1727
1728

```

```

:*****
:*TEST 53 SEEK INVALID CYLINDER
:*****
TST53:

```

```

033014 033014 000004 SCOPE :SCOPE CALL
033016 000240 NOP :START OF TEST
033020 012706 001100 MOV #STACK,SP :INITIALIZE STACK POINTER
033024 013700 001276 MOV $BASE,R0 :R0 = UNIBUS ADDRESS
033030 013701 001466 MOV TSTQUE,R1 : (R1) = DEVICE BEING TESTED
033034 012737 000053 001226 MOV #53,$TESTN ;;SET TEST NUMBER IN APT MAIL BOX
1729 033042 004737 041532 JSR PC,TSTPRP :PREPARE DEVICE FOR TEST
033046 054130 .WORD 054130 :TASK DESCRIPTOR AS FOLLOWS:
: CLEAR CONTROLLER & SELECT DEVICE
: VERIFY CONTROLLER CLEAR OPERATION
: PACK ACKNOWLEDGE IF VOLUME NOT VALID
: VERIFY PACK ACKNOWLEDGE
: RECALIBRATE IF 'SKI' OR 'PIP' IS SET
: VERIFY RECALIBRATION
033050 000404 BR 1$ :GO TO 1$ IF NO ERROR
033052 000240 NOP :RETURN HERE IF ERROR
033054 104000 EMT :ERROR # DEFINED BY TSTPRP SUBROUTINE
033056 000137 033406 JMP 12$ :GO TO 12$ IF ERROR
1731 033062 1$:
1732 033062 012737 000005 001412 MOV #SEEK!GO,RMCS10 :SEEK FUNCTION CODE
1733 033070 012737 001061 001446 MOV #561.,RMDCO :START AT FIRST INVALID CYLINDER
1734 033076 012737 000000 001420 MOV #0,RMDAO :TRACK = 0, SECTOR = 0
1735 033104 012737 010000 001444 MOV #FMT16,RMOFO :SET 16 BIT FORMAT
1736 033112 012702 001545 MOV #PUTINX,R2 :R2 POINTS TO INDEX TABLE
1737 033116 112722 000006 MOVB #RMDA,(R2)+ :WRITE REGISTER TABLE
1738 033122 112722 000034 MOVB #RMDC,(R2)+
1739 033126 112722 000032 MOVB #RMOF,(R2)+
1740 033132 112722 000000 MOVB #RMCS1,(R2)+
1741 033136 112722 000200 MOVB #200,(R2)+ :TERMINATE TABLE
1742 033142 004737 042462 JSR PC,GETSTS :SETUP FOR STATUS
1743 033146 2$:
1744 033146 004737 052466 JSR PC,CNTCLR :GO ISSUE CONTROLLER CLEAR
033152 000404 BR 3$ :GO TO 3$ IF NO ERROR

```

	033154	000240		NOP			:RETURN HERE IF ERROR
	033156	104000		EMT			:ERROR NUMBER DEFINED BY SUBROUTINE
	033160	000137	033406	JMP	12\$:GO TO 12\$ IF ERROR
1745	033164					3\$:	
1746	033164	004737	042546	JSR	PC,GET		:GO READ REGISTER(S) WITH GET SUBROUTINE
	033170	000404		BR	4\$:GO TO 4\$ IF NO ERROR
	033172	000240		NOP			:RETURN HERE IF ERROR
	033174	104000		EMT			:ERROR # DEFINED BY GET SUBROUTINE
	033176	000137	033406	JMP	12\$:GO TO 12\$ IF ERROR
1747	033202					4\$:	
1748	033202	004737	052604	JSR	PC,CLRSTS		:GO VERIFY CONTROLLER CLEAR OPERATION
	033206	000405		BR	5\$:GO TO 5\$ IF NO ERROR
	033210	000240		NOP			:RETURN HERE IF ERROR
	033212	104000		EMT			:ERROR # DEFINED BY CLRSTS SUBROUTINE
	033214	004736		JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
	033216	000137	033406	JMP	12\$:GO TO 12\$ IF ERROR
1749	033222					5\$:	
1750	033222	004737	043016	JSR	PC,PUT		:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	033226	000404		BR	6\$:GO TO 6\$ IF NO ERROR
	033230	000240		NOP			:RETURN HERE IF ERROR
	033232	104000		EMT			:ERROR # DEFINED BY PUT SUBROUTINE
	033234	000137	033406	JMP	12\$:GO TO 12\$ IF ERROR
1751	033240					6\$:	
1752	033240	004737	043370	JSR	PC,TIMOUT		:WAIT FOR GO TO RESET
1753							
1754	033244	004737	042546	JSR	PC,GET		:GO READ REGISTER(S) WITH GET SUBROUTINE
	033250	000404		BR	7\$:GO TO 7\$ IF NO ERROR
	033252	000240		NOP			:RETURN HERE IF ERROR
	033254	104000		EMT			:ERROR # DEFINED BY GET SUBROUTINE
	033256	000137	033406	JMP	12\$:GO TO 12\$ IF ERROR
1755	033262					7\$:	
1756	033262	004737	043564	JSR	PC,PRIERR		:GO CHECK FOR PRIMARY ERRORS
	033266	000405		BR	8\$:GO TO 8\$ IF NO ERROR
	033270	000240		NOP			:RETURN HERE IF ERROR
	033272	104000		EMT			:ERROR # DEFINED BY PRIERR SUBROUTINE
	033274	004736		JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
	033276	000137	033406	JMP	12\$:GO TO 12\$ IF ERROR
1757	033302					8\$:	
1758	033302	004737	051206	JSR	PC,SEKSTS		:GO VERIFY RESULTS OF SEEK OPERATION
	033306	000405		BR	9\$:GO TO 9\$ IF NO ERROR
	033310	000240		NOP			:RETURN HERE IF ERROR
	033312	104000		EMT			:ERROR # DEFINED BY SEKSTS SUBROUTINE
	033314	004736		JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
	033316	000137	033406	JMP	12\$:GO TO 12\$ IF ERROR
1759	033322					9\$:	
1760	033322	004737	050562	JSR	PC,CMPEERRSTS		:CHECK ANY ERRORS NOT MASKED
	033326	117760		.WORD	IAE!NDTMSK		:MASK FOR RMER1
	033330	000010		.WORD	DPE		:MASK FOR RMER2
	033332	000405		BR	10\$:GO TO 10\$ IF NO ERROR
	033334	000240		NOP			:RETURN HERE IF ERROR
	033336	104000		EMT			:ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
	033340	004736		JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
	033342	000137	033406	JMP	12\$:GO TO 12\$ IF ERROR
1761	033346					10\$:	
1762	033346	004737	044416	JSR	PC,SECERR		:GO CHECK FOR SECONDARY ERRORS
	033352	000405		BR	11\$:GO TO 11\$ IF NO ERROR
	033354	000240		NOP			:RETURN HERE IF ERROR

T53 SEEK INVALID CYLINDER

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033356 104000          EMT          ;ERROR # DEFINED BY SECERR SUBROUTINE
033360 004736          JSR          PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
033362 000137 033406    JMP          12$      ;GO TO 12$ IF ERROR
1763 033366          11$:
1764 033366 005237 001446    INC          RMDCO      ;INCREMENT CYLINDER ADDRESS
1765 033372 023727 001446 002000    CMP          RMDCO,#1024. ;DONE ALL CYLINDERS ?
1766 033400 103002          BHS          12$      ;BR IF YES
1767 033402 000137 033146    JMP          2$      ;TEST NEXT INVALID CYLINDER
1768 033406          12$:
1769
1770
:*****
:*TEST 54          IVC SEEK TEST
:*****
TST54:
033406          SCOPE          ;SCOPE CALL
033406 000004          NOP          ;START OF TEST
033410 000240          MOV          #STACK,SP ;INITIALIZE STACK POINTER
033412 012706 001100    MOV          $BASE,R0   ;R0 = UNIBUS ADDRESS
033416 013700 001276    MOV          TSTQUE,R1  ;(R1) = DEVICE BEING TESTED
033422 013701 001466    MOV          #54,$TESTN ;:SET TEST NUMBER IN APT MAIL BOX
033426 012737 000054 001226    MOV          JSR          PC,CNTCLR ;GO ISSUE CONTROLLER CLEAR
1771 033434 004737 052466    BR          1$        ;GO TO 1$ IF NO ERROR
1772 033440 000404          NOP          ;RETURN HERE IF ERROR
033442 000240          EMT          ;ERROR NUMBER DEFINED BY SUBROUTINE
033444 104000          JMP          8$        ;GO TO 8$ IF ERROR
1773 033452          1$:
1774 033452 112737 000024 001545    MOVB         #RMR1,PUTINX ;SETUP PUT INDEX TABLE
033460 112737 000200 001546    MOVB         #200,PUTINX+1 ;SET TERMINATOR BYTE
033466 012737 000001 001436    MOV          #DMD,RMR10 ;SET RMR1 OUTPUT BUFFER = DMD
033474 004737 043016    JSR          PC,PUT     ;GO WRITE RMR1 VIA PUT SUBROUTINE
033500 000404          BR          2$        ;GO TO 2$ IF NO ERROR
033502 000240          NOP          ;RETURN HERE IF ERROR?
033504 104000          EMT          ;ERROR DEFINED BY PUT SUBROUTINE
033506 000137 033746    JMP          8$        ;GO TO 8$ IF ERROR
1775 033512          2$:
1776 033512 012737 000005 001412    MOV          #SEEK!GO,RMCS10
1777 033520 012737 000000 001436    MOV          #0,RMR10
1778 033526 012737 000000 001446    MOV          #0,RMDCO   ;CYLINDER = 0
1779 033534 012737 000000 001420    MOV          #0,RMDAO   ;TRACK = 0, SECTOR = 0
1780 033542 012702 001545    MOV          #PUTINX,R2 ;WRITE REGISTER INDEX
1781 033546 112722 000024    MOVB         #RMR1,(R2)+ ;TABLE
1782 033552 112722 000006    MOVB         #RMDA,(R2)+
1783 033556 112722 000034    MOVB         #RMDC,(R2)+
1784 033562 112722 000000    MOVB         #RMCS1,(R2)+
1785 033566 112722 000200    MOVB         #200,(R2)+
1786 033572 004737 042462    JSR          PC,GETSTS  ;SETUP FOR STATUS
1787 033576 004737 043016    JSR          PC,PUT     ;GO WRITE REGISTER(S) WITH PUT SUBROUTINE
033602 000404          BR          3$        ;GO TO 3$ IF NO ERROR
033604 000240          NOP          ;RETURN HERE IF ERROR
033606 104000          EMT          ;ERROR # DEFINED BY PUT SUBROUTINE
033610 000137 033746    JMP          8$        ;GO TO 8$ IF ERROR
1788 033614          3$:
1789 033614 004737 042546    JSR          PC,GET     ;GO READ REGISTER(S) WITH GET SUBROUTINE
033620 000404          BR          4$        ;GO TO 4$ IF NO ERROR
033622 000240          NOP          ;RETURN HERE IF ERROR
033624 104000          EMT          ;ERROR # DEFINED BY GET SUBROUTINE

```



```

1790 033626 000137 033746      JMP      8$      :GO TO 8$ IF ERROR
1791 033632 004737 043564      JSR      PC,PRIERR :GO CHECK FOR PRIMARY ERRORS
033636 000405      BR       5$      :GO TO 5$ IF NO ERROR
033640 000240      NOP      :RETURN HERE IF ERROR
033642 104000      EMT     :ERROR # DEFINED BY PRIERR SUBROUTINE
033644 004736      JSR     PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
1792 033646 000137 033746      JMP      8$      :GO TO 8$ IF ERROR
1793 033652 032737 010000 001400 5$: BIT     #IVC,RMER2I :DID INVALID COMMAND SET??
1794 033660 001012      BNE     6$      :YES!!
1795 033662 012737 010000 001140      MOV     #IVC,$GDDAT :GOOD DATA FOR TYPEOUT
1796 033670 013737 001400 001142      MOV     RMER2I,$BDDAT :BAD DATA FOR TYPEOUT
1797 033676 042737 167777 001142      BIC     #*CIVC,$BDDAT
1798 033706      EMT     64
1799 033706 004737 050562      JSR     PC,CMPEERRSTS :CHECK ANY ERRORS NOT MASKED
033712 115760      .WORD  NDTMSK     :MASK FOR RMER1
033714 010010      .WORD  IVC!DPE   :MASK FOR RMER2
033716 000405      BR       7$      :GO TO 7$ IF NO ERROR
033720 000240      NOP      :RETURN HERE IF ERROR
033722 104000      EMT     :ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
033724 004736      JSR     PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
1800 033726 000137 033746      JMP      8$      :GO TO 8$ IF ERROR
1801 033732 004737 044416      JSR     PC,SECERR  :GO CHECK FOR SECONDARY ERRORS
033736 000403      BR       8$      :GO TO 8$ IF NO ERROR
033740 000240      NOP      :RETURN HERE IF ERROR
033742 104000      EMT     :ERROR # DEFINED BY SECERR SUBROUTINE
033744 004736      JSR     PC,@(SP)+ :GO BACK FOR MORE ERROR CHECKS
1802 033746      JSR
1803
1804

```

 :*TEST 55 ABORT SEEK TEST

```

033746 000004      TST55: SCOPE      :SCOPE CALL
033750 000240      NOP      :START OF TEST
033752 012706 001100      MOV     #STACK,SP :INITIALIZE STACK POINTER
033756 013700 001276      MOV     $BASE,R0   :R0 = UNIBUS ADDRESS
033762 013701 001466      MOV     TSTQUE,R1  :(R1) = DEVICE BEING TESTED
033766 012737 000055 001226      MOV     #55,$TESTN :SET TEST NUMBER IN APT MAIL BOX
1805
1806 033774 004737 041532      JSR     PC,TSTPRP  :PREPARE DEVICE FOR TEST
034000 054130      .WORD  054130     :TASK DESCRIPTOR AS FOLLOWS:
                                :CLEAR CONTROLLER & SELECT DEVICE
                                :VERIFY CONTROLLER CLEAR OPERATION
                                :PACK ACKNOWLEDGE IF VOLUME NOT VALID
                                :VERIFY PACK ACKNOWLEDGE
                                :RECALIBRATE IF 'SKI' OR 'PIP' IS SET
                                :VERIFY RECALIBRATION
034002 000404      BR       1$      :GO TO 1$ IF NO ERROR
034004 000240      NOP      :RETURN HERE IF ERROR
034006 104000      EMT     :ERROR # DEFINED BY TSTPRP SUBROUTINE
034010 000137 034310      JMP      9$      :GO TO 9$ IF ERROR
1807 034014 012737 040000 001426 1$: MOV     #UNS,RMER10 :SET UNSAFE ERROR
1808 034014 012737 000000 001446      MOV     #0,RMDCO  :CYLINDER = 0
1809

```

1810	034030	012737	000000	001420	MOV	#0,RMDAO	:TRACK = 0, SECTOR = 0
1811	034036	012737	000005	001412	MOV	#SEEK!GO,RMCS10	:SEEK COMMAND
1812	034044	012702	001545		MOV	#PUTINX,R2	:SETUP REGISTER INDEX TABLE
1813	034050	112722	000006		MOVB	#RMDA,(R2)+	:AND OUTPUT BUFFER
1814	034054	112722	000034		MOVB	#RMDC,(R2)+	
1815	034060	112722	000014		MOVB	#RMER1,(R2)+	
1816	034064	112722	000000		MOVB	#RMCS1,(R2)+	
1817	034070	112722	000200		MOVB	#200,(R2)+	
1818	034074	004737	042462		JSR	PC,GETSTS	:SETUP FOR STATUS FETCH
1819	034100	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	034104	000404			BR	2\$:GO TO 2\$ IF NO ERROR
	034106	000240			NOP		:RETURN HERE IF ERROR
	034110	104000			EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	034112	000137	034310		JMP	9\$:GO TO 9\$ IF ERROR
1820	034116						
1821	034116	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	034122	000404			BR	3\$:GO TO 3\$ IF NO ERROR
	034124	000240			NOP		:RETURN HERE IF ERROR
	034126	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	034130	000137	034310		JMP	9\$:GO TO 9\$ IF ERROR
1822	034134	032737	020000	001350	BIT	#PIP,RMDSI	:DID DRIVE START SEEK??
1823	034142	001411			BEQ	4\$:NO!!
1824	034144	013737	001350	001142	MOV	RMDSI,\$BDDAT	:BAD DATA FOR TYPEOUT
1825	034152	042737	157777	001142	BIC	#*CPIP,\$BDDAT	
1826	034160	005037	001140		CLR	\$GDDAT	:GOOD DATA FOR TYPEOUT
1827	034164	104065			EMT	6\$	
1828	034166	004737	043370		JSR	PC,TIMOUT	:WAIT FOR GO TO RESET
1829							
1830	034172	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	034176	000404			BR	5\$:GO TO 5\$ IF NO ERROR
	034200	000240			NOP		:RETURN HERE IF ERROR
	034202	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	034204	000137	034310		JMP	9\$:GO TO 9\$ IF ERROR
1831	034210						
1832	034210	004737	043564		JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	034214	000405			BR	6\$:GO TO 6\$ IF NO ERROR
	034216	000240			NOP		:RETURN HERE IF ERROR
	034220	104000			EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	034222	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	034224	000137	034310		JMP	9\$:GO TO 9\$ IF ERROR
1833	034230						
1834	034230	004737	060210		JSR	PC,STCDRVSTS	:GO CHECK FOR CHANGES IN DRIVE STATUS
	034234	000405			BR	7\$:GO TO 7\$ IF NO ERROR
	034236	000240			NOP		:RETURN HERE IF ERROR
	034240	104000			EMT		:ERROR # DEFINED BY STCDRVSTS SUBROUTINE
	034242	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	034244	000137	034310		JMP	9\$:GO TO 9\$ IF ERROR
1835	034250						
1836	034250	004737	050562		JSR	PC,CMPEERRSTS	:CHECK ANY ERRORS NOT MASKED
	034254	155760			.WORD	NDTMSK!UNS	:MASK FOR RMER1
	034256	000010			.WORD	DPE	:MASK FOR RMER2
	034260	000405			BR	8\$:GO TO 8\$ IF NO ERROR
	034262	000240			NOP		:RETURN HERE IF ERROR
	034264	104000			EMT		:ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
	034266	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	034270	000137	034310		JMP	9\$:GO TO 9\$ IF ERROR
1837	034274						

T55 ABORT SEEK TEST

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1838 034274 004737 044416      JSR    PC,SECERR      :GO CHECK FOR SECONDARY ERRORS
      034300 000403          BR     9$             :GO TO 9$ IF NO ERROR
      034302 000240          NOP                    :RETURN HERE IF ERROR
      034304 104000          EMT                    :ERROR # DEFINED BY SECERR SUBROUTINE
      034306 004736          JSR    PC,@(SP)+      :GO BACK FOR MORE ERROR CHECKS
1839 034310          9$:
1840
1841
      :*****
      :*TEST 56      SEEK AT OFFSET
      :*****
      TST56:
      034310          SCOPE          :SCOPE CALL
      034310 000004          NOP          :START OF TEST
      034312 000240          MOV     #STACK,SP  :INITIALIZE STACK POINTER
      034314 012706 001100   MOV     $BASE,R0    :R0 = UNIBUS ADDRESS
      034320 013700 001276   MOV     TSTQUE,R1   :(R1) = DEVICE BEING TESTED
      034324 013701 001466   MOV     #56,$TESTN :;SET TEST NUMBER IN APT MAIL BOX
      034330 012737 000056 001226
1842
1843 034336          1$:
1844 034336 004737 041532      JSR    PC,TSTPRP     :PREPARE DEVICE FOR TEST
      034342 054130          .WORD   054130      :TASK DESCRIPTOR AS FOLLOWS:
      :CLEAR CONTROLLER & SELECT DEVICE
      :VERIFY CONTROLLER CLEAR OPERATION
      :PACK ACKNOWLEDGE IF VOLUME NOT VALID
      :VERIFY PACK ACKNOWLEDGE
      :RECALIBRATE IF 'SKI' OR 'PIP' IS SET
      :VERIFY RECALIBRATION
      :GO TO 2$ IF NO ERROR
      :RETURN HERE IF ERROR
      :ERROR # DEFINED BY TSTPRP SUBROUTINE
      :GO TO 10$ IF ERROR
      034344 000404          BR     2$
      034346 000240          NOP
      034350 104000          EMT
      034352 000137 034634   JMP    10$
1845 034356          2$:
1846 034356 012737 000000 001446   MOV     #0,RMDCO    :CYLINDER = 0
1847 034364 012737 000000 001420   MOV     #0,RMDAO    :TRACK = 0, SECTOR = 0
1848 034372 012737 000015 001412   MOV     #OFFSET!GO,RMCS10 :LOAD OFFSET COMMAND IN BUFFER
1849 034400 012702 001545          MOV     #PUTINX,R2  :R2 POINTS TO REGISTER TABLE
1850 034404 112722 000034          MOV     #RMDC,(R2)+ :WRITE REGISTER INDEX TABLE
1851 034410 112722 000006          MOV     #RMDA,(R2)+
1852 034414 112722 000000          MOV     #RMCS1,(R2)+
1853 034420 112722 000200          MOV     #200,(R2)+
1854 034424 004737 043016          JSR    PC,PUT       :WRITE TERMINATOR
      034430 000404          BR     3$          :GO WRITE REGISTER(S) WITH PUT SUBROUTINE
      034432 000240          NOP          :GO TO 3$ IF NO ERROR
      034434 104000          EMT          :RETURN HERE IF ERROR
      034436 000137 034634   JMP    10$         :ERROR # DEFINED BY PUT SUBROUTINE
1855 034442 004737 042462          JSR    PC,GETSTS    :GO TO 10$ IF ERROR
1856 034446 004737 043370          JSR    PC,TIMOUT    :SETUP FOR STATUS FETCH
1857 034452          4$:
1858 034452 012737 000005 001412   MOV     #SEEK!GO,RMCS10 :LOAD SEEK COMMAND
1859 034460 112737 000000 001545   MOV     #RMCS1,PUTINX :LOAD REGISTER INDEX TABLE
1860 034466 112737 000200 001546   MOV     #200,PUTINX+1
1861 034474 004737 043016          JSR    PC,PUT       :GO WRITE REGISTER(S) WITH PUT SUBROUTINE
      034500 000404          BR     5$          :GO TO 5$ IF NO ERROR
      034502 000240          NOP          :RETURN HERE IF ERROR
      034504 104000          EMT          :ERROR # DEFINED BY PUT SUBROUTINE
      034506 000137 034634   JMP    10$         :GO TO 10$ IF ERROR
1862 034512          5$:

```

T56

```

1863
1864      034512 004737 043370      :WAIT FOR COMMAND TO COMPLETE
      JSR      PC,TIMOUT      ;GO TO TIMEOUT SUBROUTINE
1865
1866      034516 004737 042546      JSR      PC,GET      ;GO READ REGISTER(S) WITH GET SUBROUTINE
      034522 000404      BR      6$      ;GO TO 6$ IF NO ERROR
      034524 000240      NOP      ;RETURN HERE IF ERROR
      034526 104000      EMT      ;ERROR # DEFINED BY GET SUBROUTINE
      034530 000137 034634      JMP      10$      ;GO TO 10$ IF ERROR
1867
1868      034534 004737 043564      6$:      JSR      PC,PRIERR      ;GO CHECK FOR PRIMARY ERRORS
      034540 000405      BR      7$      ;GO TO 7$ IF NO ERROR
      034542 000240      NOP      ;RETURN HERE IF ERROR
      034544 104000      EMT      ;ERROR # DEFINED BY PRIERR SUBROUTINE
      034546 004736      JSR      PC,@(SP)+      ;GO BACK FOR MORE ERROR CHECKS
      034550 000137 034634      JMP      10$      ;GO TO 10$ IF ERROR
1869
1870      034554 004737 051206      7$:      JSR      PC,SEKSTS      ;GO VERIFY RESULTS OF SEEK OPERATION
      034560 000405      BR      8$      ;GO TO 8$ IF NO ERROR
      034562 000240      NOP      ;RETURN HERE IF ERROR
      034564 104000      EMT      ;ERROR # DEFINED BY SEKSTS SUBROUTINE
      034566 004736      JSR      PC,@(SP):      ;GO BACK FOR MORE ERROR CHECKS
      034570 000137 034634      JMP      10$      ;GO TO 10$ IF ERROR
1871
1872      034574 004737 050562      8$:      JSR      PC,CMPERRSTS      ;CHECK ANY ERRORS NOT MASKED
      034600 115760      .WORD   NDTMSK      ;MASK FOR RMER1
      034602 000010      .WORD   DPE      ;MASK FOR RMER2
      034604 000405      BR      9$      ;GO TO 9$ IF NO ERROR
      034606 000240      NOP      ;RETURN HERE IF ERROR
      034610 104000      EMT      ;ERROR # DEFINED BY CMPERRSTS SUBROUTINE
      034612 004736      JSR      PC,@(SP)+      ;GO BACK FOR MORE ERROR CHECKS
      034614 000137 034634      JMP      10$      ;GO TO 10$ IF ERROR
1873
1874      034620 004737 044416      9$:      JSR      PC,SECERR      ;GO CHECK FOR SECONDARY ERRORS
      034624 000403      BR      10$      ;GO TO 10$ IF NO ERROR
      034626 000240      NOP      ;RETURN HERE IF ERROR
      034630 104000      EMT      ;ERROR # DEFINED BY SECERR SUBROUTINE
      034632 004736      JSR      PC,@(SP)+      ;GO BACK FOR MORE ERROR CHECKS
1875
1876      034634      10$:
1877
      ;*****
      ;*TEST 57      LOOK AHEAD TEST
      ;*****
      TST57:
      034634      000004      SCOPE      ;SCOPE CALL
      034636      000240      NOP      ;START OF TEST
      034640      012706 001100      MOV      #STACK,SP      ;INITIALIZE STACK POINTER
      034644      013700 001276      MOV      $BASE,R0      ;R0 = UNIBUS ADDRESS
      034650      013701 001466      MOV      TSTQUE,R1      ;(R1) = DEVICE BEING TESTED
      034654      012737 060057 001226      MOV      #57,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1878
1879      034662 004737 052466      JSR      PC,CNTCLR      ;GO ISSUE CONTROLLER CLEAR
      034666 000404      BR      1$      ;GO TO 1$ IF NO ERROR
      034670 000240      NOP      ;RETURN HERE IF ERROR
      034672 104000      EMT      ;ERROR NUMBER DEFINED BY SUBROUTINE
      034674 000137 035354      JMP      20$      ;GO TO 20$ IF ERROR
1880      034700 012703 000037      1$:      MOV      #31.,R3      ;R3 = SAMPLE COUNT FOR 18 BIT MODE
    
```

1881	034704	012737	000000	001444		MOV	#0,RMOFO	:START WITH 18 BIT MODE
1882	034712	012737	000000	001446		MOV	#0,RMDCO	:CYLINDER = 0
1883	034720	012737	000000	001420		MOV	#0,RMDAO	:SEARCH TRACK = 0, SECTOR = 0
1884	034726	012737	000030	001412	2\$:	MOV	#SEARCH,RMCS10	:SEARCH COMMAND
1885	034734	012702	001545			MOV	#PUTINX,R2	
1886	034740	112722	000005			MOVB	#RMDA,(R2)+	
1887	034744	112722	000034			MOVB	#RMDC,(R2)+	
1888	034750	112722	000032			MOVB	#RMOF,(R2)+	
1889	034754	112722	000000			MOVB	#RMCS1,(R2)+	
1890	034760	112722	000200			MOVB	#200,(R2)+	
1891	034764	004737	042462			JSR	PC,GETSTS	
1892								
1893	034770	004737	043016			JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	034774	000404				BR	3\$:GO TO 3\$ IF NO ERROR
	034776	000240				NOP		:RETURN HERE IF ERROR
	035000	104000				EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	035002	000137	035344			JMP	19\$:GO TO 19\$ IF ERROR
1894	035006				3\$:			
1895	035006	012702	000002			MOV	#2,R2	:DO 2 CLOCK CYCLES
1896	035012	004737	043532		4\$:	JSR	PC,STIMER	:START CLOCK TIMER
1897	035016	032777	000200	144466	5\$:	BIT	#BIT7,@CLKADR	:TIMER DONE??
1898	035024	001774				BEQ	5\$:NO!!
1899	035026	005302				DEC	R2	:DEC NUMBER OF CYCLES
1900	035030	001370				BNE	4\$:CONTINUE IF NOT DONE
1901								
1902	035032	012737	000031	001412		MOV	#SEARCH!GO,RMCS10	:EXECUTE SEARCH COMMAND
1903								
1904	035040	004737	043016			JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	035044	000404				BR	6\$:GO TO 6\$ IF NO ERROR
	035046	000240				NOP		:RETURN HERE IF ERROR
	035050	104000				EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	035052	000137	035344			JMP	19\$:GO TO 19\$ IF ERROR
1905	035056				6\$:			
1906	035056	004737	043370			JSR	PC,TIMOUT	:WAIT FOR COMPLETION
1907								
1908	035062	004737	042546			JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	035066	000404				BR	7\$:GO TO 7\$ IF NO ERROR
	035070	000240				NOP		:RETURN HERE IF ERROR
	035072	104000				EMT		:ERROR # DEFINED BY GET SUBROUTINE
	035074	000137	035344			JMP	19\$:GO TO 19\$ IF ERROR
1909	035100				7\$:			
1910	035100	004737	043564			JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	035104	000405				BR	8\$:GO TO 8\$ IF NO ERROR
	035106	000240				NOP		:RETURN HERE IF ERROR
	035110	104000				EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	035112	004736				JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	035114	000137	035344			JMP	19\$:GO TO 19\$ IF ERROR
1911	035120				8\$:			
1912	035120	012704	104372			MOV	#BUFFER,R4	:R4 = STORAGE ADDRESS
1913	035124	012705	177777			MOV	#-1,R5	:R5 = GROSS TIMER
1914	035130	016014	000020		9\$:	MOV	RMLA(R0),(R4)	:STORE RMLA SAMPLE
1915	035134	016002	000020			MOV	RMLA(R0),R2	:GET ANOTHER LOOK
1916	035140	020214				CMP	R2,(R4)	:ARE SAMPLES SAME??
1917	035142	001403				BEQ	10\$:YES!!
1918	035144	005305				DEC	R5	:TIMEOUT??
1919	035146	001370				BNE	9\$:NO - TRY AGAIN
1920	035150	000411				BR	12\$:PROGRAM TIMEOUT

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1921 035152 062704 000002      10$:  ADD      #2,R4      ;ADVANCE STORAGE ADDRESS
1922 035156 005303              DEC      R3          ;ALL SAMPLES TAKEN??
1923 035160 001410              BEQ      13$         ;YES!!
1924 035162 026002 000020      11$:  CMP      RMLA(R0),R2 ;WAIT FOR CHANGE
1925 035166 001360              BNE     9$          ;YES!!
1926 035170 005305              DEC      R5          ;TIMEOUT??
1927 035172 001373              BNE     11$         ;NO
1928 035174              12$:  EMT      352
      035174 104352              JMP      20$
1929 035176 000137 035354      13$:  MOV      #3500,R2    ;R2 = MAXIMUM SAMPLE
      035202 012702 003500      MOV      #30.,R3     ;R3 = NUMBER OF COMPARES
      035206 012703 000036      MOV      #BUFFER,R4  ;R4 = BUFFER ADDRESS
      035212 012704 104372      BIT      #FMT16,RMOFO ;IS SAMPLE FOR 18 BIT MODE ?
      035216 032737 010000 001444 BEQ      14$         ;BR IF YES
      035224 001404
1930
1931      ;SET 18 BIT SAMPLE PARAMETERS
1932 035202 012702 003500      14$:  MOV      #3700,R2    ;R2 = MAXIMUM SAMPLE
      035206 012703 000040      MOV      #32.,R3     ;R3 = NUMBER OF COMPARES
      035212 012704 104372      MOV      (R4)+,R5    ;GET A SAMPLE AND INCREMENT
      035216 032737 010000 001444 ADD      #100,R5     ;FOR EXPECTED VALUE OF NEXT
      035224 001404              CMP      R2,R5      ;SHOULD NEXT BE 0 ?
1937      15$:  BHIS    15$         ;NO!!
1938      16$:  CLR      R5          ;YES - CHANGE EXPECTED
      035226 012702 003700      CMP      R5,(R4)    ;IS NEXT SAMPLE CORRECT??
      035232 012703 000040      BEQ      16$         ;YES!!
      035236 012405              MOV      R5,$GDDAT  ;EXPECTED VALUE
      035240 062705 000100      MOV      (R4),$BDDAT ;RECEIVED VALUE
      035244 020205              EMT      353
      035246 103001              BR       19$
      035250 005005              17$:  DEC      R3          ;ALL SAMPLES CHECKED??
      035252 020514              BNE     14$         ;NO - TEST NEXT SAMPLE
      035254 001406              BIT      #FMT16,RMOFO ;TEST DONE FOR 16 BIT MODE ?
      035256 010537 001140      BNE     17$         ;BR IF YES
      035262 011437 001142      MOV      #FMT16,RMOFO ;SET 16 BIT MODE AND
      035266 104353              BR       18$         ;DO AGAIN FOR 16 BIT MODE
      035270 000425              18$:  BIT      #SSEI,RMOFO ;TEST FOR 16 BIT MODE W/ SSEI SET ?
      035272 005303              BNE     19$         ;BR IF YES
      035274 001360              BIS      #SSEI,RMOFO ;SETUP FOR 16 BIT MODE W/ SSEI AND
      035276 032737 010000 001444 19$:  MOV      #33.,R3     ;SET SAMPLE COUNT.
      035304 001004              JMP      2$          ;DO AGAIN FOR 16 BIT MODE W/ SSEI
      035306 012737 010000 001444 20$:  MOV      (SP)+,ERRVEC+2 ;POP STACK INTO ERRVEC+2
      035314 000407              MOV      (SP)+,ERRVEC ;POP STACK INTO ERRVEC
      035316 032737 001000 001444 17$:  BIT      #SSEI,RMOFO ;TEST FOR 16 BIT MODE W/ SSEI SET ?
      035324 001007              BNE     19$         ;BR IF YES
      035326 052737 001000 001444 18$:  BIS      #SSEI,RMOFO ;SETUP FOR 16 BIT MODE W/ SSEI AND
      035334 012703 000041              MOV      #33.,R3     ;SET SAMPLE COUNT.
      035334 000137 034726              JMP      2$          ;DO AGAIN FOR 16 BIT MODE W/ SSEI
      035344              19$:  MOV      (SP)+,ERRVEC+2 ;POP STACK INTO ERRVEC+2
      035344 012637 000006              MOV      (SP)+,ERRVEC ;POP STACK INTO ERRVEC
      035350 012637 000004              20$:  MOV      (SP)+,ERRVEC+2 ;POP STACK INTO ERRVEC+2
      035354              MOV      (SP)+,ERRVEC ;POP STACK INTO ERRVEC
1967
1968
1969
1970
      ;*****
      ;*TEST 60 SEARCH ON CYLINDER
      ;*****
      ;T60:
      SCOPE
      NOP
      ;SCOPE CALL
      ;START OF TEST
  
```

T60

SEARCH ON CYLINDER

	035360	012706	001100		MOV	#STACK,SP	:INITIALIZE STACK POINTER
	035364	013700	001276		MOV	\$BASE,R0	:R0 = UNIBUS ADDRESS
	035370	013701	001466		MOV	TSTQUE,R1	:(R1) = DEVICE BEING TESTED
	035374	012737	000060	001226	MOV	#60,\$TESTN	::SET TEST NUMBER IN APT MAIL BOX
1971							
1972	035402	004737	041532		JSR	PC,TSTPRP	:PREPARE DEVICE FOR TEST
	035406	054130			.WORD	054130	:TASK DESCRIPTOR AS FOLLOWS:
							:CLEAR CONTROLLER & SELECT DEVICE
							:VERIFY CONTROLLER CLEAR OPERATION
							:PACK ACKNOWLEDGE IF VOLUME NOT VALID
							:VERIFY PACK ACKNOWLEDGE
							:RECALIBRATE IF 'SKI' OR 'PIP' IS SET
							:VERIFY RECALIBRATION
							:GO TO 1\$ IF NO ERROR
							:RETURN HERE IF ERROR
							:ERROR # DEFINED BY TSTPRP SUBROUTINE
							:GO TO 12\$ IF ERROR
	035410	000404			BR	1\$	
	035412	000240			NOP		
	035414	104000			EMT		
	035416	000137	035776		JMP	12\$	
1973	035422			1\$:			
1974	035422	012703	000037		MOV	#31.,R3	:R3 = MAXIMUM SECTOR ADDRESS
1975	035426	012737	000000	001446	MOV	#0,RMDCO	:CYLINDER = 0
1976	035434	012737	000000	001420	MOV	#0,RMDAO	:TRACK = 0, SECTOR = 0
1977	035442	012737	011000	001444	MOV	#FMT16!SSEI,RMOF0	:SET 16 BIT MODE W/ SSEI
1978	035450	012737	000005	001412	MOV	#SEEK!GO,RMCS10	:SEEK COMMAND
1979	035456	012702	001545		MOV	#PUTINX,R2	:SETUP REGISTER INDEX TABLE
1980	035462	112722	000006		MOVB	#RMDA,(R2)+	:FOR SEEK TO CYLINDER 0
1981	035466	112722	000034		MOVB	#RMDC,(R2)+	
1982	035472	112722	000032		MOVB	#RMOF,(R2)+	
1983	035476	112722	000000		MOVB	#RMCS1,(R2)+	
1984	035502	112722	000200		MOVB	#200,(R2)+	
1985	035506	004737	042462		JSR	PC,GETSTS	:SETUP FOR STATUS FETCH
1986	035512	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	035516	000404			BR	2\$:GO TO 2\$ IF NO ERROR
	035520	000240			NOP		:RETURN HERE IF ERROR
	035522	104000			EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	035524	000137	035776		JMP	12\$:GO TO 12\$ IF ERROR
1987	035530	004737	043370	2\$:	JSR	PC,TIMOUT	
1988							
1989	035534	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	035540	000404			BR	3\$:GO TO 3\$ IF NO ERROR
	035542	000240			NOP		:RETURN HERE IF ERROR
	035544	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	035546	000137	035776		JMP	12\$:GO TO 12\$ IF ERROR
1990	035552			3\$:			
1991	035552	004737	043564		JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	035556	000405			BR	4\$:GO TO 4\$ IF NO ERROR
	035560	000240			NOP		:RETURN HERE IF ERROR
	035562	104000			EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	035564	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	035566	000137	035776		JMP	12\$:GO TO 12\$ IF ERROR
1992	035572			4\$:			
1993	035572	004737	051206		JSR	PC,SEKSTS	:GO VERIFY RESULTS OF SEEK OPERATION
	035576	000405			BR	5\$:GO TO 5\$ IF NO ERROR
	035600	000240			NOP		:RETURN HERE IF ERROR
	035602	104000			EMT		:ERROR # DEFINED BY SEKSTS SUBROUTINE
	035604	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	035606	000137	035776		JMP	12\$:GO TO 12\$ IF ERROR
1994	035612	012737	000031	001412	5\$:	MOV	#SEARCH!GO,RMCS10
							:STORE SEARCH COMMAND

1995	035620	004737	043016	JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	035624	000404		BR	6\$:GO TO 6\$ IF NO ERROR
	035626	000240		NOP		:RETURN HERE IF ERROR
	035630	104000		EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	035632	000137	035776	JMP	12\$:GO TO 12\$ IF ERROR
1996	035636				6\$:	
1997	035636	004737	043370	JSR	PC,TIMOUT	:WAIT FOR SEARCH TO COMPLETE
1998						
1999	035642	004737	042546	JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	035646	000404		BR	7\$:GO TO 7\$ IF NO ERROR
	035650	000240		NOP		:RETURN HERE IF ERROR
	035652	104000		EMT		:ERRGR # DEFINED BY GET SUBROUTINE
	035654	000137	035776	JMP	12\$:GO TO 12\$ IF ERROR
2000	035660				7\$:	
2001	035660	004737	043564	JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	035664	000405		BR	8\$:GO TO 8\$ IF NO ERROR
	035666	000240		NOP		:RETURN HERE IF ERROR
	035670	104000		EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	035672	004736		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	035674	000137	035776	JMP	12\$:GO TO 12\$ IF ERROR
2002	035700				8\$:	
2003	035700	004737	056624	JSR	PC,SCHSTS	:GO VERIFY SEARCH OPERATION
	035704	000405		BR	9\$:GO TO 9\$ IF NO ERROR
	035706	000240		NOP		:RETURN HERE IF ERROR
	035710	104000		EMT		:ERROR # DEFINED BY SCHSTS SUBROUTINE
	035712	004736		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	035714	000137	035776	JMP	12\$:GO TO 12\$ IF ERROR
2004	035720				9\$:	
2005	035720	004737	050562	JSR	PC,CMPEERRSTS	:CHECK ANY ERRORS NOT MASKED
	035724	115760		.WORD	NDTMSK	:MASK FOR RMER1
	035726	000010		.WORD	DPE	:MASK FOR RMER2
	035730	000405		BR	10\$:GO TO 10\$ IF NO ERROR
	035732	000240		NOP		:RETURN HERE IF ERROR
	035734	104000		EMT		:ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
	035736	004736		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	035740	000137	035776	JMP	12\$:GO TO 12\$ IF ERROR
2006	035744				10\$:	
2007	035744	004737	044416	JSR	PC,SECERR	:GO CHECK FOR SECONDARY ERRORS
	035750	000405		BR	11\$:GO TO 11\$ IF NO ERROR
	035752	000240		NOP		:RETURN HERE IF ERROR
	035754	104000		EMT		:ERROR # DEFINED BY SECERR SUBROUTINE
	035756	004736		JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	035760	000137	035776	JMP	12\$:GO TO 12\$ IF ERROR
2008	035764				11\$:	
2009	035764	005237	001420	INC	RMDAO	:INCREMENT SECTOR ADDRESS
2010	035770	020337	001420	CMP	R3,RMDAO	:DONE ALL SECTORS??
2011	035774	103306		BHIS	5\$:NO!!
2012	035776				12\$:	
2013						
2014						

```

:*****
:*TEST 61      SEARCH OFF CYLINDER
:*****
TSTG1:

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035776				SCOPE		:SCOPE CALL
035776	000004			NOP		:START OF TEST
036000	000240			MOV	#STACK,SP	:INITIALIZE STACK POINTER
036002	012706	001100		MOV	\$BASE,R0	:R0 = UNIBUS ADDRESS
036006	017700	001276				

2015	036012	013701	001466		MOV	TSTQUE,R1	:(R1) = DEVICE BEING TESTED
	036016	012737	000061	001226	MOV	#61,\$TESTN	::SET TEST NUMBER IN APT MAIL BOX
2016	036024	004737	041532		JSR	PC,TSTPRP	:PREPARE DEVICE FOR TEST
	036030	054130			.WORD	054130	:TASK DESCRIPTOR AS FOLLOWS:
							:CLEAR CONTROLLER & SELECT DEVICE
							:VERIFY CONTROLLER CLEAR OPERATION
							:PACK ACKNOWLEDGE IF VOLUME NOT VALID
							:VERIFY PACK ACKNOWLEDGE
							:RECALIBRATE IF 'SKI' OR 'PIP' IS SET
							:VERIFY RECALIBRATION
	036032	000404			BR	1\$:GO TO 1\$ IF NO ERROR
	036034	000240			NOP		:RETURN HERE IF ERROR
	036036	104000			EMT		:ERROR # DEFINED BY TSTPRP SUBROUTINE
	036040	000137	036440		JMP	13\$:GO TO 13\$ IF ERROR
2017	036044			1\$:			
2018	036044	012737	000000	001420	MOV	#0,RMDAO	:START AT TRACK = 0, SECTOR = 0
2019	036052	012737	011000	001444	MOV	#FMT16!SSEI,RMOFO	:SET 16 BIT MODE W/ SSEI
2020	036060	012703	000427		MOV	#279.,R3	:R3 = SEARCH CYLINDER
2021	036064	012705	000430		MOV	#280.,R5	:R5 = SEEK CYLINDER
2022	036070	012737	000005	001412	2\$:	MOV #SEEK!GO,RMCS10	:LOAD SEEK COMMAND
2023	036076	010537	001446		MOV	R5,RMDCO	:LOAD CYLINDER ADDRESS
2024	036102	012702	001545		MOV	#PUTINX,R2	:R2 POINTS TO REGISTER TABLE
2025	036106	112722	000032		MOVB	#RMOF,(R2)+	:SETUP REGISTER INDEX TABLE
2026	036112	112722	000034		MOVB	#RMDC,(R2)+	:FOR SEEK COMMAND
2027	036116	112722	000006		MOVB	#RMDA,(R2)+	
2028	036122	112722	000000		MOVB	#RMCS1,(R2)+	
2029	036126	112722	000200		MOVB	#200,(R2)+	:TERMINATE TABLE
2030	036132	004737	042462		JSR	PC,GETSTS	:SETUP FOR STATUS
2031	036136	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	036142	000404			BR	3\$:GO TO 3\$ IF NO ERROR
	036144	000240			NOP		:RETURN HERE IF ERROR
	036146	104000			EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	036150	000137	036440		JMP	13\$:GO TO 13\$ IF ERROR
2032	036154			3\$:			
2033	036154	004737	043370		JSR	PC,TIMOUT	:WAIT FOR SEEK TO COMPLETE
2034							
2035	036160	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	036164	000404			BR	4\$:GO TO 4\$ IF NO ERROR
	036166	000240			NOP		:RETURN HERE IF ERROR
	036170	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	036172	000137	036440		JMP	13\$:GO TO 13\$ IF ERROR
2036	036176			4\$:			
2037	036176	004737	043564		JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	036202	000405			BR	5\$:GO TO 5\$ IF NO ERROR
	036204	000240			NOP		:RETURN HERE IF ERROR
	036206	104000			EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	036210	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	036212	000137	036440		JMP	13\$:GO TO 13\$ IF ERROR
2038	036216			5\$:			
2039	036216	004737	051206		JSR	PC,SEKSTS	:GO VERIFY RESULTS OF SEEK OPERATION
	036222	000405			BR	6\$:GO TO 6\$ IF NO ERROR
	036224	000240			NOP		:RETURN HERE IF ERROR
	036226	104000			EMT		:ERROR # DEFINED BY SEKSTS SUBROUTINE
	036230	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	036232	000137	036440		JMP	13\$:GO TO 13\$ IF ERROR
2040	036236			6\$:			

2041	036236	010337	001446		MOV	R3,RMDCO	:LOAD CYLINDER ADDRESS
2042	036242	012737	000031	001412	MOV	#SEARCH!GO,RMCS10	:LOAD SEARCH COMMAND
2043	036250	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	036254	000404			BR	7\$:GO TO 7\$ IF NO ERROR
	036256	000240			NOP		:RETURN HERE IF ERROR
	036260	104000			EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	036262	000137	036440		JMP	13\$:GO TO 13\$ IF ERROR
2044	036266			7\$:			
2045	036266	004737	043370		JSR	PC,TIMOUT	:WAIT FOR SEARCH TO COMPLETE
2046							
2047	036272	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	036276	000404			BR	8\$:GO TO 8\$ IF NO ERROR
	036300	000240			NOP		:RETURN HERE IF ERROR
	036302	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	036304	000137	036440		JMP	13\$:GO TO 13\$ IF ERROR
2048	036310			8\$:			
2049	036310	004737	043564		JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	036314	000405			BR	9\$:GO TO 9\$ IF NO ERROR
	036316	000240			NOP		:RETURN HERE IF ERROR
	036320	104000			EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	036322	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	036324	000137	036440		JMP	13\$:GO TO 13\$ IF ERROR
2050	036330			9\$:			
2051	036330	004737	056624		JSR	PC,SCHSTS	:GO VERIFY SEARCH OPERATION
	036334	000405			BR	10\$:GO TO 10\$ IF NO ERROR
	036336	000240			NOP		:RETURN HERE IF ERROR
	036340	104000			EMT		:ERROR # DEFINED BY SCHSTS SUBROUTINE
	036342	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	036344	000137	036440		JMP	13\$:GO TO 13\$ IF ERROR
2052	036350			10\$:			
2053	036350	004737	050562		JSR	PC,CMPEERRSTS	:CHECK ANY ERRORS NOT MASKED
	036354	115760			.WORD	NDTMSK	:MASK FOR RMER1
	036356	000010			.WORD	DPE	:MASK FOR RMER2
	036360	000405			BR	11\$:GO TO 11\$ IF NO ERROR
	036362	000240			NOP		:RETURN HERE IF ERROR
	036364	104000			EMT		:ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
	036366	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	036370	000137	036440		JMP	13\$:GO TO 13\$ IF ERROR
2054	036374			11\$:			
2055	036374	004737	044416		JSR	PC,SECERR	:GO CHECK FOR SECONDARY ERRORS
	036400	000405			BR	12\$:GO TO 12\$ IF NO ERROR
	036402	000240			NOP		:RETURN HERE IF ERROR
	036404	104000			EMT		:ERROR # DEFINED BY SECERR SUBROUTINE
	036406	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	036410	000137	036440		JMP	13\$:GO TO 13\$ IF ERROR
2056	036414			12\$:			
2057	036414	005303			DEC	R3	:DECREMENT SEARCH CYLINDER
2058	036416	005205			INC	R5	:INCREMENT SEEK CYLINDER
2059	036420	005237	001420		INC	RMDAO	:INCREMENT SECTOR ADDRESS
2060	036424	023727	001420	000037	CMP	RMDAO,#31.	:DONE ALL SECTORS??
2061	036432	101002			BHI	13\$:BR IF YES
2062	036434	000137	036070		JMP	2\$:DO NEXT SECTOR
2063	036440			13\$:			
2064							
2065							

:*TEST 62 SEARCH INVALID SECTOR

	036440				TST62:				
	036440	000004			SCOPE			:SCOPE CALL	
	036442	000240			NOP			:START OF TEST	
	036444	012706	001100		MOV	#STACK,SP		:INITIALIZE STACK POINTER	
	036450	013700	001276		MOV	\$BASE,R0		:R0 = UNIBUS ADDRESS	
	036454	013701	001466		MOV	TSTQUE,R1		:(R1) = DEVICE BEING TESTED	
	036460	012737	000062	001226	MOV	#G2,\$TESTN		::SET TEST NUMBER IN APT MAIL BOX	
2066									
2067	036466	004737	041532		JSR	PC,TSTPRP		:PREPARE DEVICE FOR TEST	
	036472	054130			.WORD	054130		:TASK DESCRIPTOR AS FOLLOWS:	
								:CLEAR CONTROLLER & SELECT DEVICE	
								:VERIFY CONTROLLER CLEAR OPERATION	
								:PACK ACKNOWLEDGE IF VOLUME NOT VALID	
								:VERIFY PACK ACKNOWLEDGE	
								:RECALIBRATE IF 'SKI' OR 'PIP' IS SET	
								:VERIFY RECALIBRATION	
	036474	000404			BR	1\$:GO TO 1\$ IF NO ERROR	
	036476	000240			NOP			:RETURN HERE IF ERROR	
	036500	104000			EMT			:ERROR # DEFINED BY TSTPRP SUBROUTINE	
	036502	000137	037040		JMP	12\$:GO TO 12\$ IF ERROR	
2068	036506								
2069	036506	012737	000000	001444	1\$:	MOV	#0,RMOFO	:SET 18 BIT FORMAT	
2070	036514	012737	000000	001446	MOV	#0,RMDCO		:CYLINDER = 0	
2071	036522	012737	000036	001420	MOV	#30,,RMDAO		:FIRST INVALID SECTOR = 30.	
2072	036530	012737	000031	001412	MOV	#SEARCH!GO,RMCS10		:SEARCH COMMAND	
2073	036536	012702	001545		MOV	#PUTINX,R2		:WRITE REGISTER TABLE FOR	
2074	036542	112722	000034		MOVB	#RMDC,(R2)+		:COMMAND	
2075	036546	112722	000032		MOVB	#RMDF,(R2)+			
2076	036552	112722	000006		MOVB	#RMDA,(R2)+			
2077	036556	112722	000000		MOVB	#RMCS1,(R2)+			
2078	036562	112722	000200		MOVB	#200,(R2)+		:TERMINATE TABLE	
2079	036566	004737	042462		JSR	PC,GETSTS		:SETUP STATUS FETCH	
2080	036572								
2081	036572	004737	052466		2\$:	JSR	PC,CNTCLR	:GO ISSUE CONTROLLER CLEAR	
	036576	000404			BR	3\$:GO TO 3\$ IF NO ERROR	
	036600	000240			NOP			:RETURN HERE IF ERROR	
	036602	104000			EMT			:ERROR NUMBER DEFINED BY SUBROUTINE	
	036604	000137	037040		JMP	12\$:GO TO 12\$ IF ERROR	
2082	036610								
2083	036610	004737	043016		3\$:	JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE	
	036614	000404			BR	4\$:GO TO 4\$ IF NO ERROR	
	036616	000240			NOP			:RETURN HERE IF ERROR	
	036620	104000			EMT			:ERROR # DEFINED BY PUT SUBROUTINE	
	036622	000137	037040		JMP	12\$:GO TO 12\$ IF ERROR	
2084	036626								
2085	036626	004737	043370		4\$:	JSR	PC,TIMOUT	:WAIT FOR GO TO RESET	
2086									
2087	036632	004737	042546		5\$:	JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE	
	036636	000404			BR	5\$:GO TO 5\$ IF NO ERROR	
	036640	000240			NOP			:RETURN HERE IF ERROR	
	036642	104000			EMT			:ERROR # DEFINED BY GET SUBROUTINE	
	036644	000137	037040		JMP	12\$:GO TO 12\$ IF ERROR	
2088	036650								
2089	036650	004737	043564		5\$:	JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS	
	036654	000405			BR	6\$:GO TO 6\$ IF NO ERROR	
	036656	000240			NOP			:RETURN HERE IF ERROR	
	036660	104000			EMT			:ERROR # DEFINED BY PRIERR SUBROUTINE	

2090	036662	004736				JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
	036664	000137	037040			JMP	12\$:GO TO 12\$ IF ERROR
2091	036670	004737	056624		6\$:	JSR	PC,SCHSTS		:GO VERIFY SEARCH OPERATION
	036674	000405				BR	7\$:GO TO 7\$ IF NO ERROR
	036676	000240				NOP			:RETURN HERE IF ERROR
	036700	104000				EMT			:ERROR # DEFINED BY SCHSTS SUBROUTINE
	036702	004736				JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
2092	036704	000137	037040			JMP	12\$:GO TO 12\$ IF ERROR
2093	036710	004737	060210		7\$:	JSR	PC,STCDRVSTS		:GO CHECK FOR CHANGES IN DRIVE STATUS
	036714	000405				BR	8\$:GO TO 8\$ IF NO ERROR
	036716	000240				NOP			:RETURN HERE IF ERROR
	036720	104000				EMT			:ERROR # DEFINED BY STCDRVSTS SUBROUTINE
	036722	004736				JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
2094	036724	000137	037040			JMP	12\$:GO TO 12\$ IF ERROR
2095	036730	004737	050562		8\$:	JSR	PC,CMPEERRSTS		:CHECK ANY ERRORS NOT MASKED
	036734	117760				.WORD	IAE!NDTMSK		:MASK FOR RMER1
	036736	000010				.WORD	DPE		:MASK FOR RMER2
	036740	000405				BR	9\$:GO TO 9\$ IF NO ERROR
	036742	000240				NOP			:RETURN HERE IF ERROR
	036744	104000				EMT			:ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
	036746	004736				JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
2096	036750	000137	037040			JMP	12\$:GO TO 12\$ IF ERROR
2097	036754	004737	044416		9\$:	JSR	PC,SECERR		:GO CHECK FOR SECONDARY ERRORS
	036760	000405				BR	10\$:GO TO 10\$ IF NO ERROR
	036762	000240				NOP			:RETURN HERE IF ERROR
	036764	104000				EMT			:ERROR # DEFINED BY SECERR SUBROUTINE
	036766	004736				JSR	PC,@(SP)+		:GO BACK FOR MORE ERROR CHECKS
2098	036770	000137	037040			JMP	12\$:GO TO 12\$ IF ERROR
2099	036774	005237	001420		10\$:	INC	RMDAO		:INCREMENT SECTOR ADDRESS
2100	037000	023727	001420	000100		CMP	RMDAO,#64.		:DONE YET ?
2101	037006	101412				BLOS	11\$:NO - TEST NEXT SECTOR
2102									
2103	037010	032737	010000	001444		BIT	#FMT16,RMOFO		:TEST FOR 16 BIT MODE YET ?
2104	037016	001010				BNE	12\$:BR IF YES
2105	037020	012737	010000	001444		MOV	#FMT16,RMOFO		:SET 16 BIT MODE
2106	037026	012737	000037	001420		MOV	#31.,RMDAO		:SET INVALID SECTOR = 31.
2107	037034	000137	036572		11\$:	JMP	2\$:TEST NEXT SECTOR
2108	037040				12\$:				
2109									
2110									

 :*TEST 63 SEARCH INVALID TRACK

 TST63:

037040						SCOPE			:SCOPE CALL
037040	000004					NOP			:START OF TEST
037042	000240					NOP			:INITIALIZE STACK POINTER
037044	012706	001100				MOV	#STACK,SP		:RO = UNIBUS ADDRESS
037050	013700	001276				MOV	\$BASE,R0		:(R1) = DEVICE BEING TESTED
037054	013701	001466				MOV	TSTQUE,R1		::SET TEST NUMBER IN APT MAIL BOX
037060	012737	000063	001226			MOV	#63,\$TESTN		
2111									
2112	037066	004737	041532			JSR	PC,TSTPRP		:PREPARE DEVICE FOR TEST
	037072	054130				.WORD	054130		:TASK DESCRIPTOR AS FOLLOWS:

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;CLEAR CONTROLLER & SELECT DEVICE
;VERIFY CONTROLLER CLEAR OPERATION
;PACK ACKNOWLEDGE IF VOLUME NOT VALID
;VERIFY PACK ACKNOWLEDGE
;RECALIBRATE IF 'SKI' OR 'PIP' IS SET
;VERIFY RECALIBRATION
;GO TO 1$ IF NO ERROR
;RETURN HERE IF ERROR
;ERROR # DEFINED BY TSTPRP SUBROUTINE
;GO TO 11$ IF ERROR

037074 000404 BR 1$
037076 000240 NOP
037100 104000 EMT
037102 000137 037420 JMP 11$

2113 037106 1$:
2114 037106 012737 000031 001412 MOV #SEARCH!GO,RMCS10 ;SEARCH COMMAND
2115 037114 012737 000000 001446 MOV #0,RMDCO ;CYLINDER = 0
2116 037122 013737 001334 001420 MOV LSTRK,RMDAO ;LAST TRACK, SECTOR = 0
2117 037130 105237 001421 INCB RMDAO+1 ;SETUP FIRST INVALID TRACK
2118 037134 012737 010000 001444 MOV #FMT16,RMOFO ;SET 16 BIT FORMAT
2119 037142 012702 001545 MOV #PUTINX,R2 ;WRITE REGISTER INDEX TABLE
2120 037146 112722 000006 MOVB #RMDA,(R2)+
2121 037152 112722 000034 MOVB #RMDC,(R2)+
2122 037156 112722 000032 MOVB #RMOF,(R2)+
2123 037162 112722 000000 MOVB #RMCS1,(R2)+
2124 037166 112722 000200 MOVB #200,(R2)+ ;TERMINATE TABLE
2125 037172 004737 042462 JSR PC,GETSTS
2126 037176 2$:
2127 037176 004737 052466 JSR PC,CNTCLR ;GO ISSUE CONTROLLER CLEAR
037202 000404 BR 3$ ;GO TO 3$ IF NO ERROR
037204 000240 NOP ;RETURN HERE IF ERROR
037206 104000 EMT ;ERROR NUMBER DEFINED BY SUBROUTINE
037210 000137 037420 JMP 11$ ;GO TO 11$ IF ERROR

2128 037214 3$:
2129 037214 004737 043016 JSR PC,PUT ;GO WRITE REGISTER(S) WITH PUT SUBROUTINE
037220 000404 BR 4$ ;GO TO 4$ IF NO ERROR
037222 000240 NOP ;RETURN HERE IF ERROR
037224 104000 EMT ;ERROR # DEFINED BY PUT SUBROUTINE
037226 000137 037420 JMP 11$ ;GO TO 11$ IF ERROR

2130 037232 4$:
2131 037232 004737 043370 JSR PC,TIMOUT ;WAIT FOR GO TO RESET
2132
2133 037236 004737 042546 JSR PC,GET ;GO READ REGISTER(S) WITH GET SUBROUTINE
037242 000404 BR 5$ ;GO TO 5$ IF NO ERROR
037244 000240 NOP ;RETURN HERE IF ERROR
037246 104000 EMT ;ERROR # DEFINED BY GET SUBROUTINE
037250 000137 037420 JMP 11$ ;GO TO 11$ IF ERROR

2134 037254 5$:
2135 037254 004737 043564 JSR PC,PRIERR ;GO CHECK FOR PRIMARY ERRORS
037260 000405 BR 6$ ;GO TO 6$ IF NO ERROR
037262 000240 NOP ;RETURN HERE IF ERROR
037264 104000 EMT ;ERROR # DEFINED BY PRIERR SUBROUTINE
037266 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
037270 000137 037420 JMP 11$ ;GO TO 11$ IF ERROR

2136 037274 6$:
2137 037274 004737 056624 JSR PC,SCHSTS ;GO VERIFY SEARCH OPERATION
037300 000405 BR 7$ ;GO TO 7$ IF NO ERROR
037302 000240 NOP ;RETURN HERE IF ERROR
037304 104000 EMT ;ERROR # DEFINED BY SCHSTS SUBROUTINE
037306 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
037310 000137 037420 JMP 11$ ;GO TO 11$ IF ERROR
    
```

```

2138 037314          7$:
2139 037314 004737 060210      JSR    PC,STCDRVSTS      ;GO CHECK FOR CHANGES IN DRIVE STATUS
      037320 000405          BR     8$                ;GO TO 8$ IF NO ERROR
      037322 000240          NOP                    ;RETURN HERE IF ERROR
      037324 104000          EMT                    ;ERROR # DEFINED BY STCDRVSTS SUBROUTINE
      037326 004736          JSR    PC,@(SP)+          ;GO BACK FOR MORE ERROR CHECKS
      037330 000137 037420      JMP    11$              ;GO TO 11$ IF ERROR

2140 037334          8$:
2141 037334 004737 050562      JSR    PC,CMPERRSTS      ;CHECK ANY ERRORS NOT MASKED
      037340 117760          .WORD   NDTMSK!IAE          ;MASK FOR RMER1
      037342 000010          .WORD   DPE                ;MASK FOR RMER2
      037344 000405          BR     9$                ;GO TO 9$ IF NO ERROR
      037346 000240          NOP                    ;RETURN HERE IF ERROR
      037350 104000          EMT                    ;ERROR # DEFINED BY CMPERRSTS SUBROUTINE
      037352 004736          JSR    PC,@(SP)+          ;GO BACK FOR MORE ERROR CHECKS
      037354 000137 037420      JMP    11$              ;GO TO 11$ IF ERROR

2142 037360          9$:
2143 037360 004737 044416      JSR    PC,SECERR        ;GO CHECK FOR SECONDARY ERRORS
      037364 000405          BR     10$               ;GO TO 10$ IF NO ERROR
      037366 000240          NOP                    ;RETURN HERE IF ERROR
      037370 104000          EMT                    ;ERROR # DEFINED BY SECERR SUBROUTINE
      037372 004736          JSR    PC,@(SP)+          ;GO BACK FOR MORE ERROR CHECKS
      037374 000137 037420      JMP    11$              ;GO TO 11$ IF ERROR

2144 037400          10$:
2145 037400 105237 001421      INCB   RMDAO+1          ;INCREMENT TRACK ADDRESS
2146 037404 123727 001421 000200 CMPB   RMDAO+1,#128.    ;DONE ALL TRACKS ?
2147 037412 101002          BHI   11$                ;BR IF YES
2148 037414 000137 037176      JMP    2$                ;TEST NEXT TRACK
2149 037420
2150
2151
    
```

```

:*****
:*TEST 64      SEARCH INVALID CYLINDER
:*****
    
```

```

      037420
      037420 000004          TST64:  SCOPE          ;SCOPE CALL
      037422 000240          NOP          ;START OF TEST
      037424 012706 001100      MOV    #STACK,SP      ;INITIALIZE STACK POINTER
      037430 013700 001276      MOV    $BASE,R0       ;R0 = UNIBUS ADDRESS
      037434 013701 001466      MOV    TSTQUE,R1      ;(R1) = DEVICE BEING TESTED
      037440 012737 000064 001226 MOV    #64,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX

2152 037446 004737 041532      JSR    PC,TSTPRP      ;PREPARE DEVICE FOR TEST
2153 037452 054130          .WORD   054130        ;TASK DESCRIPTOR AS FOLLOWS:
      ;CLEAR CONTROLLER & SELECT DEVICE
      ;VERIFY CONTROLLER CLEAR OPERATION
      ;PACK ACKNOWLEDGE IF VOLUME NOT VALID
      ;VERIFY PACK ACKNOWLEDGE
      ;RECALIBRATE IF 'SKI' OR 'PIP' IS SET
      ;VERIFY RECALIBRATION
      037454 000404          BR     1$                ;GO TO 1$ IF NO ERROR
      037456 000240          NOP                    ;RETURN HERE IF ERROR
      037460 104000          EMT                    ;ERROR # DEFINED BY TSTPRP SUBROUTINE
      037462 000137 037774      JMP    11$              ;GO TO 11$ IF ERROR

2154 037466          1$:
2155 037466 012737 000031 001412 MOV    #SEARCH!GO,RMC$10 ;SEARCH COMMAND
2156 037474 012737 001061 001446 MOV    #561.,RMDCO      ;START AT FIRST INVALID CYLINDER
2157 037502 012737 000000 001420 MOV    #0,RMDAO        ;TRACK = 0, SECTOR = 0
    
```

2158	037510	012737	010000	001444	MOV	#FMT16,RMOFO	:SET 16 BIT FORMAT
2159	037516	012702	001545		MOV	#PUTINX,R2	:WRITE REGISTER INDEX TABLE
2160	037522	112722	000632		MOVB	#RMOF,(R2)+	
2161	037526	112722	000034		MOVB	#RMDC,(R2)+	
2162	037532	112722	000006		MOVB	#RMDA,(R2)+	
2163	037536	112722	000000		MOVB	#RMCS1,(R2)+	
2164	037542	112722	000200		MOVB	#200,(R2)+	
2165	037546	004737	042462		JSR	PC,GETSTS	:SETUP STATUS FETCH
2166	037552						
2167	037552	004737	052466		JSR	PC,CNTCLR	:GO ISSUE CONTROLLER CLEAR
	037556	000404			BR	3\$:GO TO 3\$ IF NO ERROR
	037560	000240			NOP		:RETURN HERE IF ERROR
	037562	104000			EMT		:ERROR NUMBER DEFINED BY SUBROUTINE
	037564	000137	037774		JMP	11\$:GO TO 11\$ IF ERROR
2168	037570						
2169	037570	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	037574	000404			BR	4\$:GO TO 4\$ IF NO ERROR
	037576	000240			NOP		:RETURN HERE IF ERROR
	037600	104000			EMT		:ERRCR # DEFINED BY PUT SUBROUTINE
	037602	000137	037774		JMP	11\$:GO TO 11\$ IF ERROR
2170	037606						
2171	037606	004737	043370		JSR	PC,TIMOUT	
2172							
2173	037612	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	037616	000404			BR	5\$:GO TO 5\$ IF NO ERROR
	037620	000240			NOP		:RETURN HERE IF ERROR
	037622	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	037624	000137	037774		JMP	11\$:GO TO 11\$ IF ERROR
2174	037630						
2175	037630	004737	043564		JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	037634	000405			BR	6\$:GO TO 6\$ IF NO ERROR
	037636	000240			NOP		:RETURN HERE IF ERROR
	037640	104000			EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	037642	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	037644	000137	037774		JMP	11\$:GO TO 11\$ IF ERROR
2176	037650						
2177	037650	004737	056624		JSR	PC,SCHSTS	:GO VERIFY SEARCH OPERATION
	037654	000405			BR	7\$:GO TO 7\$ IF NO ERROR
	037656	000240			NOP		:RETURN HERE IF ERROR
	037660	104000			EMT		:ERROR # DEFINED BY SCHSTS SUBROUTINE
	037662	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	037664	000137	037774		JMP	11\$:GO TO 11\$ IF ERROR
2178	037670						
2179	037670	004737	060210		JSR	PC,STCDRVSTS	:GO CHECK FOR CHANGES IN DRIVE STATUS
	037674	000405			BR	8\$:GO TO 8\$ IF NO ERROR
	037676	000240			NOP		:RETURN HERE IF ERROR
	037700	104000			EMT		:ERROR # DEFINED BY STCDRVSTS SUBROUTINE
	037702	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	037704	000137	037774		JMP	11\$:GO TO 11\$ IF ERROR
2180	037710						
2181	037710	004737	050562		JSR	PC,CMPERRSTS	:CHECK ANY ERRORS NOT MASKED
	037714	117760			.WORD	IAE!NDTMSK	:MASK FOR RMER1
	037716	000010			.WORD	DPE	:MASK FOR RMER2
	037720	000405			BR	9\$:GO TO 9\$ IF NO ERROR
	037722	000240			NOP		:RETURN HERE IF ERROR
	037724	104000			EMT		:ERROR # DEFINED BY CMPERRSTS SUBROUTINE
	037726	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS

```

2182 037730 000137 037774          JMP      11$          :GO TO 11$ IF ERROR
2183 037734 004737 044416          JSR      PC,SECERR   :GO CHECK FOR SECONDARY ERRORS
      037740 000405          BR       10$        :GO TO 10$ IF NO ERROR
      037742 000240          NOP      :RETURN HERE IF ERROR
      037744 104000          EMT     :ERROR # DEFINED BY SECERR SUBROUTINE
      037746 004736          JSR     PC,@(SP)+   :GO BACK FOR MORE ERROR CHECKS
      037750 000137 037774          JMP     11$        :GO TO 11$ IF ERROR
2184 037754          :
2185 037754 005237 001446          INC     RMDCO       :INCREMENT CYLINDER ADDRESS
2186 037760 023727 001446 002000    CMP     RMDCO,#1024. :DONE ALL CYLINDERS ?
2187 037766 103002          BHIS    11$        :BR IF YES
2188 037770 000137 037552          JMP     2$         :TEST NEXT INVALID CYLINDER
2189 037774          :
2190          :
2191          :
    
```

 :*TEST 65 IVC SEARCH TEST
 :*****
 :TST65:

```

      037774          :
      037774 000004          SCOPE      :SCOPE CALL
      037776 000240          NOP      :START OF TEST
      040000 012706 001160    MOV     #STACK,SP   :INITIALIZE STACK POINTER
      040004 013700 001276    MOV     $BASE,R0    :R0 = UNIBUS ADDRESS
      040010 013701 001466    MOV     TSTQUE,R1   : (R1) = DEVICE BEING TESTED
      040014 012737 000065 001226    MOV     #65,$TSTN   :SET TEST NUMBER IN APT MAIL BOX
2192          :
2193 040022 004737 041532          JSR     PC,TSTPRP   :PREPARE DEVICE FOR TEST
      040026 054130          .WORD   054130    :TASK DESCRIPTOR AS FOLLOWS:
      :CLEAR CONTROLLER & SELECT DEVICE
      :VERIFY CONTROLLER CLEAR OPERATION
      :PACK ACKNOWLEDGE IF VOLUME NOT VALID
      :VERIFY PACK ACKNOWLEDGE
      :RECALIBRATE IF 'SKI' OR 'PIP' IS SET
      :VERIFY RECALIBRATION
      040030 000404          BR       1$        :GO TO 1$ IF NO ERROR
      040032 000240          NOP      :RETURN HERE IF ERROR
      040034 104000          EMT     :ERROR # DEFINED BY TSTPRP SUBROUTINE
      040036 000137 040354          JMP     8$        :GO TO 8$ IF ERROR
2194 040042          :
2195 040042 112737 000024 001545    MOVB   #RMR1,PUTIX  :SETUP PUT INDEX TABLE
      040050 112737 000200 001546    MOVB   #200,PUTIX+1 :SET TERMINATOR BYTE
      040056 012737 000001 001436    MOV     #DMD,RMR10  :SET RMR1 OUTPUT BUFFER = DMD
      040064 004737 040016          JSR     PC,PUT      :GO WRITE RMR1 VIA PUT SUBROUTINE
      040070 000404          BR       2$        :GO TO 2$ IF NO ERROR
      040072 000240          NOP      :RETURN HERE IF ERROR
      040074 104000          EMT     :ERROR DEFINED BY PUT SUBROUTINE
      040076 000137 040354          JMP     8$        :GO TO 8$ IF ERROR
2196 040102          :
2197 040102 012737 000000 001436    MOV     #0,RMR10    :RESET DIAGNOSTIC MODE
2198 040110 012737 000000 001446    MOV     #0,RMDCO    :CYLINDER 0
2199 040116 012737 000000 001420    MOV     #0,RMDAO    :TRACK = 0, SECTOR = 0
2200 040124 012737 000000 001444    MOV     #0,RMOFO    :18 BIT FORMAT
2201 040132 012737 000031 001412    MOV     #SEARCH!GO,RMCS10 :SEARCH COMMAND
2202 040140 012702 001545          MOV     #PUTIX,R2   :LOAD INDEX TABLE
2203 040144 112722 000024          MOVB   #RMR1,(R2)+
2204 040150 112722 000034          MOVB   #RMDC,(R2)+
2205 040154 112722 000006          MOVB   #RMDA,(R2)+
    
```



```

2206 040160 112722 000032      MOVB  #RMOF,(R2)+
2207 040164 112722 000000      MOVB  #RMCS1,(R2)+
2208 040170 112722 000200      MOVB  #200,(R2)+
2209 040174 004737 042462      JSR   PC,GETSTS
2210 040200 004737 043016      JSR   PC,PUT          ;GO WRITE REGISTER(S) WITH PUT SUBROUTINE
      040204 000404          BR    3$             ;GO TO 3$ IF NO ERROR
      040206 000240          NOP                    ;RETURN HERE IF ERROR
      040210 104000          EMT                    ;ERROR # DEFINED BY PUT SUBROUTINE
      040212 000137 040354      JMP   8$             ;GO TO 8$ IF ERROR
2211 040216          3$:
2212 040216 004737 043370      JSR   PC,TIMOUT      ;WAIT FOR GO TO RESET
2213
2214 040222 004737 042546      JSR   PC,GET          ;GO READ REGISTER(S) WITH GET SUBROUTINE
      040226 000404          BR    4$             ;GO TO 4$ IF NO ERROR
      040230 000240          NOP                    ;RETURN HERE IF ERROR
      040232 104000          EMT                    ;ERROR # DEFINED BY GET SUBROUTINE
      040234 000137 040354      JMP   8$             ;GO TO 8$ IF ERROR
2215 040240          4$:
2216 040240 004737 043564      JSR   PC,PRIERR      ;GO CHECK FOR PRIMARY ERRORS
      040244 000405          BR    5$             ;GO TO 5$ IF NO ERROR
      040246 000240          NOP                    ;RETURN HERE IF ERROR
      040250 104000          EMT                    ;ERROR # DEFINED BY PRIERR SUBROUTINE
      040252 004736          JSR   PC,@(SP)+      ;GO BACK FOR MORE ERROR CHECKS
      040254 000137 040354      JMP   8$             ;GO TO 8$ IF ERROR
2217 040260          5$:
2218 040260 032737 010000 001400  BIT   #IVC,RMER2I    ;DID IVC SET??
2219 040266 001012          BNE   6$             ;YES!!
2220 040270 012737 010000 001140  MOV   #IVC,$GDDAT    ;EXPECTED STATUS
2221 040276 013737 001400 001142  MOV   RMER2I,$BDDAT  ;RECEIVED STATUS
2222 040304 042737 167777 001142  BIC   #^CIVC,$BDDAT
2223 040312 104260          EMT   260
2224 040314          6$:
2225 040314 004737 050562      JSR   PC,CMPEERRSTS  ;CHECK ANY ERRORS NOT MASKED
      040320 115760          .WORD NDTMSK        ;MASK FOR RMER1
      040322 010010          .WORD IVC!DPE       ;MASK FOR RMER2
      040324 000405          BR    7$             ;GO TO 7$ IF NO ERROR
      040326 000240          NOP                    ;RETURN HERE IF ERROR
      040330 104000          EMT                    ;ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
      040332 004736          JSR   PC,@(SP)+      ;GO BACK FOR MORE ERROR CHECKS
      040334 000137 040354      JMP   8$             ;GO TO 8$ IF ERROR
2226 040340          7$:
2227 040340 004737 044416      JSR   PC,SECERR      ;GO CHECK FOR SECONDARY ERRORS
      040344 000403          BR    8$             ;GO TO 8$ IF NO ERROR
      040346 000240          NOP                    ;RETURN HERE IF ERROR
      040350 104000          EMT                    ;ERROR # DEFINED BY SECERR SUBROUTINE
      040352 004736          JSR   PC,@(SP)+      ;GO BACK FOR MORE ERROR CHECKS
2228 040354          8$:
2229
2230

```

```

:*****
:*TEST 66      ABORT SEARCH TEST
:*****

```

```

TST66:
040354          SCOPE          ;SCOPE CALL
040354 000004          NOP                    ;START OF TEST
040356 000240          MOV   #STACK,SP     ;INITIALIZE STACK POINTER
040360 012706 001100          MOV   $BASE,R0       ;R0 = UNIBUS ADDRESS
040364 013700 001276          MOV   TSTQUE,R1     ;(R1) = DEVICE BEING TESTED
040370 013701 001466

```

2231	040374	012737	000066	001226	MOV	#66,\$TESTN	::SET TEST NUMBER IN APT MAIL BOX
2232	040402	004737	041532		JSR	PC,TSTPRP	:PREPARE DEVICE FOR TEST
	040406	054130			.WORD	054130	:TASK DESCRIPTOR AS FOLLOWS:
							:CLEAR CONTROLLER & SELECT DEVICE
							:VERIFY CONTROLLER CLEAR OPERATION
							:PACK ACKNOWLEDGE IF VOLUME NOT VALID
							:VERIFY PACK ACKNOWLEDGE
							:RECALIBRATE IF "SKI" OR "PIP" IS SET
							:VERIFY RECALIBRATION
	040410	000404			BR	1\$:GO TO 1\$ IF NO ERROR
	040412	000240			NOP		:RETURN HERE IF ERROR
	040414	104000			EMT		:ERROR # DEFINED BY TSTPRP SUBROUTINE
	040416	000137	040720		JMP	9\$:GO TO 9\$ IF ERROR
2233	040422					1\$:	
2234	040422	012737	040000	001426	MOV	#UNS,RMER10	:SET UNSAFE ERROR
2235	040430	012737	000031	001412	MOV	#SEARCH!GO,RMCS10	:SEARCH COMMAND
2236	040436	012737	000000	001446	MOV	#0,RMDCO	:CYLINDER 0
2237	040444	012737	000000	001420	MOV	#0,RMDAO	:SECTOR = 0, TRACK = 0
2238	040452	012702	001545		MOV	#PUTINX,R2	:WRITE REGISTER INDEX TABLE
2239	040456	112722	000034		MOVB	#RMDC,(R2)+	
2240	040462	112722	000006		MOVB	#RMDA,(R2)+	
2241	040466	112722	000014		MOVB	#RMER1,(R2)+	
2242	040472	112722	000000		MOVB	#RMCS1,(R2)+	
2243	040476	112722	000200		MOVB	#200,(R2)+	:TERMINATE TABLE
2244	040502	004737	042462		JSR	PC,GETSTS	:SETUP FOR STATUS
2245	040506	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	040512	000404			BR	2\$:GO TO 2\$ IF NO ERROR
	040514	000240			NOP		:RETURN HERE IF ERROR
	040516	104000			EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	040520	000137	040720		JMP	9\$:GO TO 9\$ IF ERROR
2246	040524					2\$:	
2247	040524	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	040530	000404			BR	3\$:GO TO 3\$ IF NO ERROR
	040532	000240			NOP		:RETURN HERE IF ERROR
	040534	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	040536	000137	040720		JMP	9\$:GO TO 9\$ IF ERROR
2248	040542					3\$:	
2249	040542	032737	020000	001350	BIT	#PIP,RMSI	:IS PIP SET??
2250	040550	001412			BEQ	4\$:NO!!
2251	040552	012737	000000	001140	MOV	#0,\$GDDAT	:EXPECTED STATUS
2252	040560	013737	001350	001142	MOV	RMDSI,\$BDDAT	:RECEIVED STATUS
2253	040566	042737	157777	001142	BIC	#^CPIP,\$BDDAT	
2254	040574	104261			EMT	261	
2255	040576					4\$:	
2256	040576	004737	043370		JSR	PC,TIMOUT	:WAIT FOR GO TO RESET
2257							
2258	040602	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	040606	000404			BR	5\$:GO TO 5\$ IF NO ERROR
	040610	000240			NOP		:RETURN HERE IF ERROR
	040612	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	040614	000137	040720		JMP	9\$:GO TO 9\$ IF ERROR
2259	040620					5\$:	
2260	040620	004737	043564		JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	040624	000405			BR	6\$:GO TO 6\$ IF NO ERROR
	040626	000240			NOP		:RETURN HERE IF ERROR
	040630	104000			EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE

```

040632 004736 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
040634 000137 040720 JMP 9$ ;GO TO 9$ IF ERROR
2261 040640 6$: JSR PC,STCDRVSTS ;GO CHECK FOR CHANGES IN DRIVE STATUS
2262 040640 004737 060210 BR 7$ ;GO TO 7$ IF NO ERROR
040644 000405 NOP ;RETURN HERE IF ERROR
040646 000240 EMT ;ERROR # DEFINED BY STCDRVSTS SUBROUTINE
040650 104000 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
040652 004736 JMP 9$ ;GO TO 9$ IF ERROR
2263 040654 000137 040720 7$: JSR PC,CMPEERRSTS ;CHECK ANY ERRORS NOT MASKED
2264 040660 004737 050562 .WORD NDTMSK!UNS ;MASK FOR RMER1
040664 155760 .WORD DPE ;MASK FOR RMER2
040666 000010 BR 8$ ;GO TO 8$ IF NO ERROR
040670 000405 NOP ;RETURN HERE IF ERROR
040672 000240 EMT ;ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
040674 104000 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
040676 004736 JMP 9$ ;GO TO 9$ IF ERROR
2265 040700 000137 040720 8$: JSR PC,SECERR ;GO CHECK FOR SECONDARY ERRORS
2266 040704 004737 044416 BR 9$ ;GO TO 9$ IF NO ERROR
040710 000403 NOP ;RETURN HERE IF ERROR
040712 000240 EMT ;ERROR # DEFINED BY SECERR SUBROUTINE
040714 104000 JSR PC,@(SP)+ ;GO BACK FOR MORE ERROR CHECKS
040716 004736 9$:
2267 040720
2268
2269
  
```

```

*****
:*TEST 67 SEARCH AT OFFSET
*****
TST67:
  
```

```

040720 000004 SCOPE ;SCOPE CALL
040720 000240 NOP ;START OF TEST
040722 000240 MOV #STACK,SP ;INITIALIZE STACK POINTER
040724 012706 001100 MOV $BASE,R0 ;R0 = UNIBUS ADDRESS
040730 013700 001276 MOV TSTQUE,R1 ;(R1) = DEVICE BEING TESTED
040734 013701 001466 MOV #67,$TESTN ;SET TEST NUMBER IN APT MAIL BOX
040740 012737 000067 001226
2270 040746 004737 041532 JSR PC,TSTPRP ;PREPARE DEVICE FOR TEST
2271 040752 054130 .WORD 054130 ;TASK DESCRIPTOR AS FOLLOWS:
;CLEAR CONTROLLER & SELECT DEVICE
;VERIFY CONTROLLER CLEAR OPERATION
;PACK ACKNOWLEDGE IF VOLUME NOT VALID
;VERIFY PACK ACKNOWLEDGE
;RECALIBRATE IF "SKI" OR "PIP" IS SET
;VERIFY RECALIBRATION
040754 000404 BR 1$ ;GO TO 1$ IF NO ERROR
040756 000240 NOP ;RETURN HERE IF ERROR
040760 104000 EMT ;ERROR # DEFINED BY TSTPRP SUBROUTINE
040762 000137 041256 JMP 9$ ;GO TO 9$ IF ERROR
2272 040766 1$: MOV #0,RMDCO ;CYLINDER = 0
2273 040766 012737 000000 001446 MOV #0,RMDAO ;TRACK = 0, SECTOR = 0
2274 040774 012737 000000 001420 MOV #FMT16,RMFOF ;16 BIT FORMAT
2275 041002 012737 010000 001444 MOV #OFFSET!GO,RMCS10 ;OFFSET COMMAND
2276 041010 012737 000015 001412 MOV #PUTINX,R2 ;SETUP REGISTER INDEX TABLE
2277 041016 012702 001545 MOV #RMDA,(R2)+ ;FOR SEEK TO CYLINDER 0
2278 041022 112722 000006 MOV #RMDC,(R2)+
2279 041026 112722 000034
  
```

2280	041032	112722	000032		MOVB	#RMOF,(R2)+	
2281	041036	112722	000000		MOVB	#RMCS1,(R2)+	
2282	041042	112722	000200		MOVB	#200,(R2)+	
2283	041046	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	041052	000404			BR	2\$:GO TO 2\$ IF NO ERROR
	041054	000240			NOP		:RETURN HERE IF ERROR
	041056	104000			EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	041060	000137	041256		JMP	9\$:GO TO 9\$ IF ERROR
2284	041064			2\$:			
2285	041064	004737	042462		JSR	PC,GETSTS	:SETUP FOR STATUS FETCH
2286	041070	004737	043370		JSR	PC,TIMOUT	
2287	041074			3\$:			
2288	041074	112737	000000	001545	MOVB	#RMCS1,PUTINX	:LOAD REGISTER INDEX TABLE
2289	041102	112737	000200	001546	MOVB	#200,PUTINX+1	
2290	041110	012737	000031	001412	MOV	#SEARCH!GO,RMCS10	:STORE SEARCH COMMAND
2291	041116	004737	043016		JSR	PC,PUT	:GO WRITE REGISTER(S) WITH PUT SUBROUTINE
	041122	000404			BR	4\$:GO TO 4\$ IF NO ERROR
	041124	000240			NOP		:RETURN HERE IF ERROR
	041126	104000			EMT		:ERROR # DEFINED BY PUT SUBROUTINE
	041130	000137	041256		JMP	9\$:GO TO 9\$ IF ERROR
2292	041134			4\$:			
2293	041134	004737	043370		JSR	PC,TIMOUT	:WAIT FOR SEARCH TO COMPLETE
2294							
2295	041140	004737	042546		JSR	PC,GET	:GO READ REGISTER(S) WITH GET SUBROUTINE
	041144	000404			BR	5\$:GO TO 5\$ IF NO ERROR
	041146	000240			NOP		:RETURN HERE IF ERROR
	041150	104000			EMT		:ERROR # DEFINED BY GET SUBROUTINE
	041152	000137	041256		JMP	9\$:GO TO 9\$ IF ERROR
2296	041156			5\$:			
2297	041156	004737	043564		JSR	PC,PRIERR	:GO CHECK FOR PRIMARY ERRORS
	041162	000405			BR	6\$:GO TO 6\$ IF NO ERROR
	041164	000240			NOP		:RETURN HERE IF ERROR
	041166	104000			EMT		:ERROR # DEFINED BY PRIERR SUBROUTINE
	041170	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	041172	000137	041256		JMP	9\$:GO TO 9\$ IF ERROR
2298	041176			6\$:			
2299	041176	004737	056624		JSR	PC,SCHSTS	:GO VERIFY SEARCH OPERATION
	041202	000405			BR	7\$:GO TO 7\$ IF NO ERROR
	041204	000240			NOP		:RETURN HERE IF ERROR
	041206	104000			EMT		:ERROR # DEFINED BY SCHSTS SUBROUTINE
	041210	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	041212	000137	041256		JMP	9\$:GO TO 9\$ IF ERROR
2300	041216			7\$:			
2301	041216	004737	050562		JSR	PC,CMPEERRSTS	:CHECK ANY ERRORS NOT MASKED
	041222	115760			.WORD	NDTMSK	:MASK FOR RMER1
	041224	000010			.WORD	DPE	:MASK FOR RMER2
	041226	000405			BR	8\$:GO TO 8\$ IF NO ERROR
	041230	000240			NOP		:RETURN HERE IF ERROR
	041232	104000			EMT		:ERROR # DEFINED BY CMPEERRSTS SUBROUTINE
	041234	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS
	041236	000137	041256		JMP	9\$:GO TO 9\$ IF ERROR
2302	041242			8\$:			
2303	041242	004737	044416		JSR	PC,SECERR	:GO CHECK FOR SECONDARY ERRORS
	041246	000403			BR	9\$:GO TO 9\$ IF NO ERROR
	041250	000240			NOP		:RETURN HERE IF ERROR
	041252	104000			EMT		:ERROR # DEFINED BY SECERR SUBROUTINE
	041254	004736			JSR	PC,@(SP)+	:GO BACK FOR MORE ERROR CHECKS

T67 SEARCH AT OFFSET

2304 041256

98:

```
1 .SBTTL END OF SUB-PASS ROUTINE
2
3 ;THIS IS THE END OF SUB-PASS ROUTINE. THIS ROUTINE IS USED TO
4 ;TERMINATE THE OPERATION OF THE CURRENT DEVICE UNDER TEST AND
5 ;SELECT THE NEXT DEVICE FOR TEST. IF THERE ARE NO MORE DEVICES
6 ;TO TEST, EXIT IS MADE TO '$EOP' ROUTINE. OTHERWISE, RETURN
7 ;IS MADE TO 'READY' ROUTINE.
8
9 041256 000004 $EOSP: SCJPE
10 041260 000240 NOP
11 041262 013700 001466 MOV TSTQUE,RO ;GET POINTER TO TSTQUE
12 041266 062700 000002 ADD #2,RO ;ADJUST POINTER TO NEXT DEVICE
13 041272 010037 001466 MOV RO,TSTQUE ;SAVE POINTER TO TSTQUE
14 041276 005710 TST (RO) ;ANY MORE DEVICES FOR TEST ?
15 041300 001402 BEQ 1$ ;BR IF NO
16 041302 000137 007574 JMP READY ;YES, JUMP TO 'READY' ROUTINE
17 041306 012737 001470 001466 1$: MOV #TSTQUE+2,TSTQUE ;INITIALIZE POINTER TO FIRST DEVICE IN
18 ;TEST QUE TABLE
19
20 .SBTTL END OF PASS ROUTINE
```

```
::*****
:*INCREMENT THE PASS NUMBER ($PASS)
:*TYPE 'END PASS #XXXXX TOTAL NUMBER OF ERRORS SINCE LAST REPORT YYYYY'
:*WHERE XXXXX AND YYYYY ARE DECIMAL NUMBERS
:*IF THERES A MONITOR GO TO IT
:*IF THERE ISN'T JUMP TO READY
```

```
041314 $EOP:
041314 000240 NOP
041316 005037 001116 CLR $TSTNM ;:ZERO THE TEST NUMBER
041322 005037 001206 CLR $TIMES ;:ZERO THE NUMBER OF ITERATIONS
041326 005237 001230 INC $PASS ;:INCREMENT THE PASS NUMBER
041332 042737 100000 001230 BIC #100000,$PASS ;:DON'T ALLOW A NEG. NUMBER
041340 005327 DEC (PC)+ ;:LOOP?
041342 000001 $EOPCT: .WORD 1
041344 003066 BGT $DOAGN ;:YES
041346 012737 MOV (PC)+,a(PC)+ ;:RESTORE COUNTER
041350 000001 $ENDCT: .WORD 1
041352 041342 $EOPCT
041354 104401 041362 TYPE ,65$ ;:TYPE ASCIZ STRING
041360 000407 BR 64$ ;:GET OVER THE ASCIZ
65$: .ASCIZ <12><15>/END PASS #/
64$:
041400 MOV $PASS,-(SP) ;:SAVE $PASS FOR TYPEOUT
041400 013746 001230 ;:TYPE PASS NUMBER
041404 104405 TYPDS ;:GO TYPE--DECIMAL ASCII WITH SIGN
041406 005737 001126 TST $ERTTL ;:SEE IF ANY ERRORS THIS PASS
041412 001431 BEQ $GT42P ;:BR IF NO ERRORS TO REPORT
041414 104401 041422 TYPE ,67$ ;:TYPE ASCIZ STRING
041420 000421 BR 66$ ;:GET OVER THE ASCIZ
67$: .ASCIZ / TOTAL ERRORS SINCE LAST REPORT /
66$:
041464 MOV $ERTTL,-(SP) ;:SAVE $ERTTL FOR TYPEOUT
041464 013746 001126 ;:TOTAL NUMBER OF ERRORS
041470 104405 TYPDS ;:GO TYPE--DECIMAL ASCII WITH SIGN
041472 005037 001126 CLR $ERTTL ;:CLEAR ERROR TOTAL
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.SBTTL TEST PREPARATION MODULE

: THIS MODULE PREPARES THE SUBSYSTEM FOR THE EXECUTION OF A TEST,
 : REPORTING AN ERROR TO THE USER IF AN ERROR IS DETECTED. THE USER
 : SPECIFIES TASKS TO BE PERFORMED, WHICH THE MODULE EXECUTES
 : USING SUBROUTINES.

:CALL:

```

JSR    PC,TSTPRP          TASK/VERIFY DESCRIPTOR
.WORD  NNNNN              RETURN HERE IF NO ERROR
BR     ??                 RETURN HERE IF ERROR
NOP
ERROR  ERROR DEFINED BY MODULE
    
```

:TASK/VERIFY DESCRIPTOR

```

BIT 15 = 1  SELECT DEVICE AND VERIFY DEVICE IS AVAILABLE
-----
BIT 14 = 1  CLEAR CONTROLLER AND SELECT DEVICE
BIT 13      (RESERVED FOR DRIVE CLEAR)
BIT 12 = 1  PACK ACKNOWLEDGE IF VOLUME NOT VALID
-----
BIT 11 = 1  RECALIBRATE IF POSITIONING IN PROGRESS OR SKI ERROR
BIT 10 = 1  RECALIBRATE DRIVE
BIT 9
-----
BIT 8
BIT 7
BIT 6 = 1  VERIFY CONTROLLER CLEAR OPERATION
-----
BIT 5      (RESERVED FOR DRIVE CLEAR)
BIT 4 = 1  VERIFY PACK ACKNOWLEDGE
BIT 3 = 1  VERIFY RECALIBRATION
-----
BIT 2
BIT 1
BIT 0
    
```

TSTPRP:

:STORE TASK DESCRIPTOR AND CLEAR USER'S ERROR CALL

```

MOV    @($P),39$          :STORE DESCRIPTOR
ADD    #6,($P)            :MOVE SP TO USERS ERROR CALL
CLRB   @($P)              :CLEAR ERROR CALL
SUB    #4,($P)            :MOVE SP TO NO ERROR RETURN

JSR    PC,GETSTS          :SETUP TO READ ALL REGISTERS
JSR    PC,GET             :GET RMER2
BR     2$                 :BR IF NO ERROR DETECTED
BR     1$                 :GET OVER ERROR NUMBER
.WORD  0                  :ERROR DEFINED BY GET SUBROUTINE
1$:   ADD    #4,($P)       :XFER ERROR TO USER AND
      MOVB   1$-2,@($P)   :GET ERROR NUMBER.
      JMP    37$

2$:   MOV    RMER2I,40$   :GET RMER2 AND SAVE FOR LATER
    
```

:*****


```

58 ;SELECT DEVICE AND VERIFY DEVICE AVAILABLE IF BIT 15 SET IN TASK
59 041616 005737 042456 TST 39$ ;SELECT DEVICE??
60 041622 100014 BPL 4$ ;NO!!
61
62 041624 004737 050774 JSR PC,DEVSEL ;GO SELECT DEVICE
63 041630 000411 BR 4$ ;NO ERROR - CONTINUE
64 041632 000401 BR 3$
65 041634 000000 .WORD 0 ;ERROR NUMBER FROM DEVSEL
66 041636 062716 000004 3$: ADD #4,(SP) ;TRANSFER ERROR TO USER
67 041642 113776 041634 000000 MOVB 3$,2,@(SP)
68 041650 000137 042446 JMP 37$
69
70 ;*****
71 ;CLEAR CONTROLLER IF BIT 14 IS SET IN TASK
72 041654 032737 040000 042456 4$: BIT #BIT14,39$ ;CLEAR CONTROLLER??
73 041654 001451 BEQ 13$ ;NO!!
74
75 JSR PC,CNTCLR ;GO CLEAR CONTROLLER
76 041664 004737 052466 BR 7$ ;CONTINUE - NO ERROR
77 041670 000411 BR 6$
78 041672 000401 BR 6$
79 041674 000000 .WORD 0 ;ERROR NUMBER FROM CNTCLR
80 041676 062716 000004 5$: ADD #4,(SP) ;TRANSFER ERROR TO USER
81 041702 113776 041674 000000 6$: MOVB 5$,@ (SP)
82 041710 000137 042446 JMP 37$
83
84 ;*****
85 ;VERIFY CONTROLLER CLEAR IF BIT6 SET IN TASK
86 041714 032737 000100 042456 7$: BIT #BIT6,39$ ;VERIFY??
87 041714 001431 BEQ 13$ ;NO!!
88
89 JSR PC,GET ;GO GET STATUS
90 041724 004737 042546 BR 10$ ;NO ERROR GETTING STATUS
91 041730 000411 BR 9$
92 041732 000401 BR 9$
93 041734 000000 .WORD 0 ;ERROR FROM GETTING STATUS
94 041736 062716 000004 8$: ADD #4,(SP) ;TRANSFER ERROR TO USER
95 041742 113776 041734 000000 9$: MOVB 8$,@ (SP)
96 041750 000137 042446 JMP 37$
97
98 041754 004737 052604 10$: JSR PC,CLRSTS ;GO VERIFY STATUS CLEAR
99 041760 000412 BR 13$ ;NO ERROR IN CLEAR
100 041762 000401 BR 12$
101 041764 000000 .WORD 0 ;ERROR IN STATUS CLEAR
102 041766 005726 11$: TST (SP)+ ;STRIP RETURN ADDRESS TO
103 041770 062716 000004 12$: ADD #4,(SP) ;SUBROUTINE AND TRANSFER
104 041774 113776 041764 000000 MOVB 11$,@ (SP) ;ERROR TO USER
105 042002 000137 042446 JMP 37$
106
107 ;*****
108 ;EXECUTE PACK ACKNOWLEDGE IF BIT12 SET IN TASK AND VOLUME IS
109 ;NOT VALID
110 042006 032737 010000 042456 13$: BIT #BIT12,39$ ;PACK ACKNOWLEDGE??
111 042006 001501 BEQ 25$ ;NO!!
112 042014 004737 042546 JSR PC,GET
113
114
    
```

```
115 042022 000411 BR 16$ :NO ERROR GETTING RMDS
116 042024 000401 BR 15$
117 042026 000000 14$: .WORD 0
118 042030 062716 000004 15$: ADD #4,(SP) :TRANSFER ERROR TO USER
119 042034 113776 042026 000000 MOVB 14$,a(SP)
120 042042 000137 042446 JMP 37$
121
122 042046 032737 000100 001350 16$: BIT #VV,RMDSI :IS VOLUME VALID??
123 042054 001061 BNE 25$ :YES!!
124
125 042056 012737 000023 001412 MOV #PAKACK!GO,RMCS10 :LOAD PACK ACK COMMAND
126 042064 112737 000000 001545 MOVB #RMCS1,PUTINX :SETUP REGISTER INDEX TABLE
127 042072 112737 000200 001546 MOVB #200,PUTINX+1
128 042100 004737 043016 JSR PC,PUT :GO WRITE COMMAND
129 042104 000410 BR 19$ :NO ERROR LOADING REGISTER
130 042106 000401 BR 18$
131 042110 000000 17$: .WORD 0 :ERROR FROM PUT SUB
132 042112 062716 000004 18$: ADD #4,(SP) :TRANSFER ERROR TO USER
133 042116 113776 042110 000000 MOVE 17$,a(SP)
134 042124 000550 BR 37$
135
136 042126 004737 043370 19$: JSR PC,TIMOUT :WAIT FOR COMMAND TO COMPLETE
137
138 :*****
139 :VERIFY PACK ACKNOWLEDGE IF #BIT4 SET IN TASK
140 042132 032737 000020 042456 BIT #BIT4,39$ :VERIFY PACK ACKNOWLEDGE??
141 042140 001427 BEQ 25$ :NO!!
142
143 042142 004737 042546 JSR PC,GET :GO GET STATUS
144 042146 000410 BR 22$ :NO ERROR GETTING STATUS
145 042150 000401 BR 21$
146 042152 000000 20$: .WORD 0 :ERROR FROM GET SUB
147 042154 062716 000004 21$: ADD #4,(SP) :TRANSFER ERROR TO USER
148 042160 113776 042152 000000 MOVB 20$,a(SP)
149 042166 000527 BR 37$
150
151 042170 004737 053464 22$: JSR PC,ACKSTS :GO CHECK ACKNOWLEDGE
152 042174 000411 BR 25$ :NO ERROR
153 042176 000401 BR 24$
154 042200 000000 23$: .WORD 0 :PACK ACKNOWLEDGE ERROR
155 042202 005726 24$: TST (SP)+ :STRIP RETURN TO SUB AND
156 042204 062716 000004 ADD #4,(SP) :TRANSFER ERROR TO USER
157 042210 113776 042200 000000 MOVB 23$,a(SP)
158 042216 000513 BR 37$
159
160 :*****
161 :RECALIBRATE DRIVE IF BIT 11 IS SET IN TASK AND 'SKI' IS SET
162 :OR 'PJP' IS ACTIVE.
163 :RECALIBRATE DRIVE IF BIT 10 IS SET
164 042220 25$:
165 042220 032737 002000 042456 BIT #BIT10,39$ :RECALIBRATE DRIVE ?
166 042226 001027 BNE 29$ :YES!!
167 042230 032737 004000 042456 BIT #BIT11,39$ :RECALIBRATE??
168 042236 001505 BEQ 38$ :NO!!
169
170 042240 004737 042546 JSR PC,GET :GO GET RMDS
171 042244 000410 BR 28$ :NO ERROR GETTING RMDS
```

```

172 042246 000401          BR      27$
173 042250 000000          .WORD  0          ;ERROR FROM GET SUB
174 042252 062716 000004 26$:      ADD      #4,(SP)  ;TRANSFER ERROR TO USER
175 042256 113776 042250 000000 27$:      MOVB     26$,a(SP)
176 042264 000470          BR      37$
177
178 042266 032737 040000 042460 28$:      BIT      #SKI,40$  ;WAS SKI SET ?
179 042274 001004          BNE     29$        ;YES, GO RECALIBRATE
180 042276 032737 020000 001350          BIT      #PIP,RMDSI ;IS PIP ACTIVE??
181 042304 001462          BEQ     38$        ;NO!!
182
183 042306 012737 000007 001412 29$:      MOV      #RECAL!GO,RMCS10 ;LOAD RECALIBRATE COMMAND
184 042314 112737 000000 001545          MOVB     #RMCS1,PUTINX ;AND REGISTER INDEX
185 042322 112737 000200 001546          MOVB     #200,PUTINX+1 ;SET TERMINATOR
186 042330 004737 043016          JSR      PC,PUT     ;GO ISSUE RECALIBRATE
187 042334 000410          BR      31$        ;NO ERROR
188 042336 000401          BR      30$
189 042340 000000          .WORD  0          ;ERROR IN REGISTER TRANSFER
190 042342 062716 000004 30$:      ADD      #4,(SP)  ;TRANSFER ERROR TO USER
191 042346 113776 042340 000000          MOVB     30$-2,a(SP)
192 042354 000434          BR      37$
193
194 042356 004737 043370          31$:      JSR      PC,TIMOUT ;WAIT FOR COMPLETION
195
196
197
198 042362 032737 000010 042456          .:*****
199 042370 001430          .:VERIFY RECALIBRATE IF BIT 3 SET IN TASK
200
201 042372 004737 042546          BIT      #BIT3,39$  ;VERIFY RECALIBRATE??
202 042376 000410          BEQ     38$        ;NO!!
203 042400 000401          JSR      PC,GET     ;GO GET STATUS
204 042402 000000          BR      34$        ;NO ERROR GETTING STATUS
205 042404 062716 000004 32$:      .WORD  0          ;ERROR FROM GET
206 042410 113776 042402 000000 33$:      ADD      #4,(SP)  ;TRANSFER ERROR TO USER
207 042416 000413          MOVB     32$,a(SP)
208
209 042420 004737 054260          34$:      JSR      PC,RCLSTS ;GO CHECK RECALIBRATE
210 042424 000412          BR      38$        ;NO ERROR DURING RECALIBRATE
211 042426 000401          BR      36$
212 042430 000000          35$:      .WORD  0          ;ERROR DURING RECALIBRATE
213 042432 005726          36$:      TST      (SP)+   ;STRIP RETURN TO SUB AND
214 042434 062716 000004          ADD      #4,(SP)  ;TRANSFER ERROR TO USER
215 042440 113776 042430 000000          MOVB     35$,a(SP)
216 042446 162716 000002          37$:      SUB      #2,(SP)  ;MOVE SP BACK BEFORE ERROR
217 042452 000240          38$:      NOP
218 042454 000207          RTS      PC        ;RETURN TO USER
219
220 042456 000000          39$:      .WORD  0          ;TASK/VERIFY DESCRIPTUR
221 042460 000000          40$:      .WORD  0          ;CONTAINS RMER2
    
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.SBTTL GET STATUS SUBROUTINE

;THIS SUBROUTINE SETS UP THE 'GET INDEX TABLE' AND THE 'GET
;BUFFER' FOR READING ALL SUBSYSTEM REGISTERS VIA THE GET SUBROUTINE
;AND THEN RETURNS TO THE USER.

;CALL: JSR PC,GETSTS
;      ???
;      RETURN HERE

GETSTS:
MOV R0,-(SP) ;:PUSH R0 ON STACK
MOV R1,-(SP) ;:PUSH R1 ON STACK
MOV R2,-(SP) ;:PUSH R2 ON STACK
MOV #GETINX,R0 ;:R0 = ADDRESS OF INDEX TABLE
MOV #RMEC2I+2,R1 ;:R1 = ADDRESS OF GET BUFFER
MOV #RMEC2,R2 ;:R2 = REGISTER INDE
2$: MOVB R2,(R0)+ ;:WRITE REGISTER INDEX IN TABLE
CLR -(R1) ;:CLEAR CORRESPONDING LOCATION
3$: SUB #2,R2 ;:DECREMENT TO NEXT INDEX
BMI 4$ ;:BRANCH OUT IF DONE
CMP #RMD8,R2 ;:DONT WRITE RMD8 INDEX
BNE 2$
CLR -(R1)
BR 3$
4$: MOVB #200,(R0)+ ;:WRITE TERMINATOR
MOV (SP)+,R2 ;:POP STACK INTO R2
MOV (SP)+,R1 ;:POP STACK INTO R1
MOV (SP)+,R0 ;:POP STACK INTO R0
NOP
RTS PC
    
```

042462 010046
 042464 010146
 042466 010246
 042470 012700 001516
 042474 012701 001406
 042500 012702 000046
 042504 110220
 042506 005041
 042510 162702 000002
 042514 100405
 042516 022702 000022
 042522 001370
 042524 005041
 042526 000770
 042530 112720 000200
 042534 012602
 042536 012601
 042540 012600
 042542 000240
 042544 000207

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.SBTTL GET SUBROUTINE

:THIS SUBROUTINE READS THE REGISTERS WHICH ARE LISTED IN THE
: "GET INDEX TABLE" AND STORES THEIR VALUES IN THE CORRESPONDING
: LOCATION IN THE "GET REGISTER BUFFER". FOR EXAMPLE, AN
: ENTRY OF 04 IN THE TABLE WILL CAUSE THE SUBROUTINE TO
: READ "R04" AND STORE ITS CONTENTS AT THE LOCATION IN
: THE BUFFER ASSIGNED TO THAT REGISTER. THE NUMBER OF
: REGISTERS TO BE READ IS VARIABLE FROM 1 TO 22; THE INDEX
: TABLE MUST BE TERMINATED WITH A CONTROL BYTE (200)
: WHICH SHOULD FOLLOW THE LAST ENTRY.

:SUBROUTINE CALL:

- :(1) "GET INDEX TABLE" HAS BEEN LOADED WITH REGISTER INDEX
VALUES AND TERMINATED WITH A CONTROL BYTE
- :(2) "GET INPUT BUFFER" IS AVAILABLE FOR USE. (NOTE THAT
UNUSED LOCATIONS, I.E., ENTRIES IN BUFFER CORRESPONDING
TO REGISTERS NOT READ, ARE NOT CHANGED.)
- :(3) JSR PC,GET
BR ??? RETURN HERE IF NO ERROR FOUND
NOP RETURN HERE IF ANY ERROR FOUND
ERROR SUB DEFINES ERROR NUMBER
???

:R0 = REGISTER BASE ADDRESS
:R1 = REGISTER ADDRESS
:R2 = BUFFER BASE ADDRESS
:R3 = BUFFER ADDRESS
:R4 = POINTER TO REGISTER INDEX

```

GET:  NOP
      ADD    #4,(SP)           ;CLEAR ERROR NUMBER IN USER'S
      CLR    @ (SP)           ;ERROR CALL
      SUB    #4,(SP)
      MOV    R0,-(SP)         ;;PUSH R0 ON STACK
      MOV    R1,-(SP)         ;;PUSH R1 ON STACK
      MOV    R2,-(SP)         ;;PUSH R2 ON STACK
      MOV    R3,-(SP)         ;;PUSH R3 ON STACK
      MOV    R4,-(SP)         ;;PUSH R4 ON STACK
      MOV    ERRVEC,-(SP)     ;;PUSH ERRVEC ON STACK
      MOV    ERRVEC+2,-(SP)   ;;PUSH ERRVEC+2 ON STACK
      MOV    $BASE,R0
      MOV    #GETBUF,R2
      MOV    #GETINX,R4
      MOV    #5$,ERRVEC      ;SETUP FOR TIMEOUT
      MOV    #PR6,ERRVEC+2
1$:   MOV    RMCS2(R0),STMP0   ;GET 'NED' STATUS
      MOV    RMCS1(R0),STMP1  ;GET 'DVA' STATUS
      BIT    #DVA,STMP1      ;DEVICE AVAILABLE??
      BNE    3$              ;YES!!
      ADD    #4,16(SP)        ;WRITE ERROR NUMBER IN USER'S
      MOV    #112,@16(SP)    ;ERROR CALL
      BR     7$
3$:   TST    (R4)             ;DONE??
      BMI    9$              ;YES!!
      MOV    (R4),R1         ;R1 = REGISTER ADDRESS
      BIC    #^CIDXMSK,R1    ;CLEAR ANY SIGN EXTENSION
    
```

```

042546 000240
042550 062716 000004
042554 105076 000000
042560 162716 000004
042564 010046
042566 010146
042570 010246
042572 010346
042574 010446
042576 013746 000004
042602 013746 000006
36 042606 013700 001276
37 042612 012702 001336
38 042616 012704 001516
39 042622 012737 042730 000004
40 042630 012737 000300 000006
41 042636 016037 000010 001174 1$:
42 042644 016037 000000 001176
43 042652 032737 004000 001176
44 042660 001007
45 042662 062766 000004 000016
46 042670 112776 000112 000016
47 042676 000423
48 042700 105714 3$:
49 042702 100433
50 042704 111401
51 042706 042701 177700
    
```

```

52 042712 060001          ADD      R0,R1
53 042714 112403          MOV      (R4)+,R3          ;R3 = STORAGE ADDRESS FOR REGISTER
54 042716 042703 177700   BIC      #^CIDXMSK,R3    ;CLEAR ANY SIGN EXTENSION
55 042722 060203          ADD      R2,R3
56 042724 011113          MOV      (R1),(R3)       ;READ REGISTER
57 042726 000764          BR       3$
58
59 042730 022626          5$:     CMP      (SP)+,(SP)+    ;RESTORE STACK
60 042732 062766 000004 000016   ADD      #4,16(SP)       ;WRITE ERROR NUMBER IN
61 042740 112776 000007 000016   MOV      #7,216(SP)     ;USER'S ERROR CALL
62 042746 162766 000002 000016   7$:     SUB      #2,16(SP)
63 042754 105714          8$:     TST      (R4)         ;DONE CLEARING??
64 042756 100405          BMI      9$             ;YES!!
65 042760 005003          CLR      R3            ;CLEAR REMAINING STORAGE
66 042762 112403          MOV      (R4)+,R3       ;LOCATIONS
67 042764 060203          ADD      R2,R3
68 042766 005013          CLR      (R3)
69 042770 000771          BR       8$
70 042772          9$:
    042772 012637 000006   MOV      (SP)+,ERRVEC+2  ;:POP STACK INTO ERRVEC+2
    042776 012637 000004   MOV      (SP)+,ERRVEC   ;:POP STACK INTO ERRVEC
    043002 012604          MOV      (SP)+,R4       ;:POP STACK INTO R4
    043004 012603          MOV      (SP)+,R3       ;:POP STACK INTO R3
    043006 012602          MOV      (SP)+,R2       ;:POP STACK INTO R2
    043010 012601          MOV      (SP)+,R1       ;:POP STACK INTO R1
    043012 012600          MOV      (SP)+,R0       ;:POP STACK INTO R0
71 043014 000207          RTS      PC             ;RETURN
    
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.SBTTL PUT SUBROUTINE

:THIS SUBROUTINE WRITES THE REGISTERS WHICH ARE LISTED IN THE
 : 'PUT INDEX TABLE' WITH THE CONTENTS OF THE CORRESPONDING
 : LOCATION IN THE 'PUT REGISTER BUFFER'. THE NUMBER OF
 : REGISTERS WRITTEN IS VARIABLE; THE INDEX TABLE MUST
 : BE TERMINATED WITH A CONTROL BYTE (200) WHICH SHOULD
 : FOLLOW THE LAST ENTRY.

:SUBROUTINE CALL:

- : (1) 'PUT INDEX TABLE' HAS BEEN LOADED WITH INDEX VALUES
 OF REGISTERS TO BE WRITTEN.
- : (2) 'PUT REGISTER BUFFER' CONTAINS CONTENTS OF EACH
 REGISTER TO BE WRITTEN.
- : (3) JSR PC,PUT
 BR ??? RETURN HERE IF NO ERROR FOUND
 NOP RETURN HERE IF ANY ERROR FOUND
 ERROR SUB DEFINES ERROR NUMBER
 ???

:R0 = REGISTER BASE ADDRESS
 :R1 = REGISTER ADDRESS
 :R2 = BUFFER BASE ADDRESS
 :R3 = BUFFER ADDRESS
 :R4 = POINTER TO REGISTER INDEX

```

PUT:  NOP
      MOV R0,-(SP)      ;;PUSH R0 ON STACK
      MOV R1,-(SP)      ;;PUSH R1 ON STACK
      MOV R2,-(SP)      ;;PUSH R2 ON STACK
      MOV R3,-(SP)      ;;PUSH R3 ON STACK
      MOV R4,-(SP)      ;;PUSH R4 ON STACK
      MOV ERRVEC,-(SP)  ;;PUSH ERRVEC ON STACK
      MOV ERRVEC+2,-(SP) ;;PUSH ERRVEC+2 ON STACK
      MOV $BASE,R0
      MOV #PUTBUF,R2
      MOV #PUTINX,R4
      MOV #5$,ERRVEC    ;SETUP FOR TIMEOUT
      MOV #PR6,ERRVEC+2
1$:   MOV RMCS2(R0),STMP0 ;GET 'NED' STATUS
      MOV RMCS1(R0),STMP1 ;GET 'DVA' STATUS
      BIT #DVA,STMP1     ;DEVICE AVAILABLE??
      BNE 3$            ;YES!!
      ADD #4,16(SP)     ;WRITE ERROR NUMBER IN
      MOVB #112,16(SP) ;USER'S ERROR CALL
      BR 7$
3$:   TSTB (R4)         ;DONE??
      BMI 9$            ;YES!!
      MOVB (R4),R1      ;R1 = REGISTER ADDRESS
      BIC #^CIDXMSK,R1 ;CLEAR ANY SIGN EXTENSION
      ADD R0,R1
      MOVB (R4),R3      ;R3 = STORAGE ADDRESS
      BIC #^CIDXMSK,R3 ;CLEAR ANY SIGN EXTENSION
      ADD R2,R3
      MOV (R3),(R1)     ;WRITE REGISTER
      CMPB #RMOF,(R4)  ;WAS RMOF JUST LOADED ?
  
```

043016 000240
 043020 010046
 043022 010146
 043024 010246
 043026 010346
 043030 010446
 043032 013746 000004
 043036 013746 000006
 043042 013700 001276
 043046 012702 001412
 043052 012704 001545
 043056 012737 043176 000004
 043064 012737 000300 000006
 043072 016037 000010 001174
 043100 016037 000000 001176
 043106 032737 004000 001176
 043114 001007
 043116 062766 000004 000016
 043124 112776 000112 000016
 043132 000430
 043134 105714
 043136 100431
 043140 111401
 043142 042701 177700
 043146 060001
 043150 111403
 043152 042703 177700
 043156 060203
 043160 011311
 043162 122714 000032

```
52 043166 001001          BNE      4$          :BR IF NO
53 043170 011311          MOV      (R3), (R1)  :WRITE RMOF AGAIN, TO ENSURE 16 BIT FORMAT
54                                     :IS SET BEFORE "SSEI" BIT IS SET.
55 043172 105724          4$:      TSTB     (R4)+  :ADJUST REGISTER POINTER
56 043174 000757          BR       3$
57
58 043176 022626          5$:      CMP      (SP)+, (SP)+ :ADJUST STACK
59 043200 062766 000004 000016  ADD      #4, 16(SP)  :WRITE ERROR NUMBER IN
60 043206 112776 000007 000016  MOVB     #7, @16(SP) :USER'S ERROR CALL
61 043214 162766 000002 000016  7$:      SUB      #2, 16(SP)
62
63 043222          9$:      MOV      (SP)+, ERRVEC+2  ::POP STACK INTO ERRVEC+2
64 043222 012637 000006          MOV      (SP)+, ERRVEC  ::POP STACK INTO ERRVEC
65 043226 012637 000004          MOV      (SP)+, R4      ::POP STACK INTO R4
66 043232 012604          MOV      (SP)+, R3      ::POP STACK INTO R3
67 043234 012603          MOV      (SP)+, R2      ::POP STACK INTO R2
68 043236 012602          MOV      (SP)+, R1      ::POP STACK INTO R1
69 043240 012601          MOV      (SP)+, R0      ::POP STACK INTO R0
70 043242 012600          MOV      (SP)+, R0
71 043244 000207          RTS      PC          :RETURN
```



```

1          .SBTTL  SIZE CLOCK SUBROUTINE
2
3 043246   013746   000004   .SIZCLK:  MOV    ERRVEC,-(SP)      ;;PUSH ERRVEC ON STACK
043246   013746   000006      MOV    ERRVEC+2,-(SP)    ;;PUSH ERRVEC+2 ON STACK
043252   013746   000006      MOV    #1$,ERRVEC      ;;SET UP FOR BUS TIMEOUT
4 043256   012737   043314   000004      MOV    #PR6,ERRVEC+2
5 043264   012737   000300   000006      MOV    #177546,CLKADR  ;;LOAD ADDRESSES FOR KW11-L
6 043272   012737   177546   001512      MOV    #100,CLKVCT
7 043300   012737   000100   001514      MOV    @CLKADR
8 043306   005777   136200      TST    @CLKADR          ;;TEST FOR KW11-L PRESENT
9 043312   000421      BR     3$              ;;YES - KW11-L IS PRESENT
10 043314   022626      1$:  CMP    (SP)+,(SP)+    ;;RESTORE SP
11 043316   012737   043346   000004      MOV    #2$,ERRVEC      ;;SET UP FOR BUS TIMEOUT
12 043324   012737   172540   001512      MOV    #172540,CLKADR  ;;LOAD ADDRESSES FOR KW11-P CLOCK
13 043332   012737   000104   001514      MOV    #104,CLKVCT
14 043340   005777   136146      TST    @CLKADR          ;;TEST FOR KW11-P PRESENT
15 043344   000404      BR     3$              ;;YES - KW11-P IS PRESENT
16 043346   022626      2$:  CMP    (SP)+,(SP)+    ;;RESTORE SP
17 043350   062766   000002   000004      ADD    #2,4(SP)        ;;MOVE RETURN TO ERROR
18 043356      012637   000006      3$:  MOV    (SP)+,ERRVEC+2  ;;POP STACK INTO ERRVEC+2
043356   012637   000004      MOV    (SP)+,ERRVEC    ;;POP STACK INTO ERRVEC
19 043366   000207      RTS    PC              ;;RETURN TO USER
    
```

TIMEOUT SUBROUTINE

```

1      .SBTTL  TIMEOUT SUBROUTINE
2
3      ;THIS SUBROUTINE WAITS FOR RDY = 1 AND GO = 0 OR FOR A TIMEOUT
4      ;GREATER THAN APPROX. 500 MSEC AND THEN RETURNS.
5
6      ;CALL:  JSR      PC, TIMEOUT
7      ;      ???
8      ;      RETURN HERE
9
10     TIMEOUT:
11     MOV      R0, -(SP)      ;;PUSH R0 ON STACK
12     MOV      R2, -(SP)      ;;PUSH R2 ON STACK
13     MOV      ERRVEC, -(SP)  ;;PUSH ERRVEC ON STACK
14     MOV      ERRVEC+2, -(SP) ;;PUSH ERRVEC+2 ON STACK
15     MOV      #3$, ERRVEC    ;;SETUP FOR BUS TIMEOUT - 04 TRAP
16     MOV      #PR6, ERRVEC+2
17     MOV      $BASE, R0      ;;R0=BASE ADDRESS
18     MOV      #30, R2        ;;R2=NUMBER OF CLOCK CYCLES
19     JSR      PC, $TIMER     ;;START CLOCK TIMER
20
21     1$:
22     MOV      RMCS1(R0), -(SP) ;;GET STATUS
23     BIC      #^C<RDY!GO>, (SP)
24     CMP      #RDY, (SP)+    ;;RDY=1, GO=0??
25     BEQ      4$            ;;YES!!
26     BIT      #BIT7, @CLKADR ;;TIMER DONE??
27     BEQ      2$            ;;NO!!
28     DEC      R2            ;;DEC NUMBER OF CYCLES
29     BNE      1$            ;;CONTINUE IF NOT DONE
30     BR       4$            ;;'RDY' DID NOT SET OR 'GO' DID NOT RESEI
31     ;WITHIN 500 MSEC AFTER THE COMMAND WAS ISSUED.
32
33     3$:  CMP      (SP)+, (SP)+ ;;ADJUST STACK
34     ADD      #4, 12(SP)      ;;MOVE SP TO USER'S CALL
35     MOV      #7, @12(SP)    ;;WRITE ERROR NUMBER
36     SUB      #2, 12(SP)
37
38     4$:  MOV      (SP)+, ERRVEC+2 ;;POP STACK INTO ERRVEC+2
39     MOV      (SP)+, ERRVEC    ;;POP STACK INTO ERRVEC
40     MOV      (SP)+, R2        ;;POP STACK INTO R2
41     MOV      (SP)+, R0        ;;POP STACK INTO R0
42     RTS      PC              ;;RETURN TO USER
43
44     ;THIS ROUTINE IS USED START THE KW11-L OR THE KW11-P CLOCK. THE CLOCK
45     ;IS STARTED TO RUN IN FLAG MODE. A CLOCK WILL BE 16.667MS FOR A 60 HZ CPU
46     ;AND 20MS FOR A 50 HZ CPU.
47
48     $TIMER:
49     MOV      R1, -(SP)      ;;PUSH R1 ON STACK
50     MOV      CLKADR, R1     ;;R1=CLOCK ADDRESS
51     CMP      R1, #172540    ;;KW11-P CLOCK??
52     BNE      1$            ;;NO!!
53     MOV      #1, 2(R1)      ;;SET COUNTER
54     MOV      #BIT2!BIT0, (R1) ;;START COUNTER
55     MOV      (SP)+, R1      ;;POP STACK INTO R1
56     RTS      PC              ;;RETURN
57
58     1$:  MOV      R1, -(SP)      ;;PUSH R1 ON STACK
59     MOV      CLKADR, R1     ;;R1=CLOCK ADDRESS
60     CMP      R1, #172540    ;;KW11-P CLOCK??
61     BNE      1$            ;;NO!!
62     MOV      #1, 2(R1)      ;;SET COUNTER
63     MOV      #BIT2!BIT0, (R1) ;;START COUNTER
64     MOV      (SP)+, R1      ;;POP STACK INTO R1
65     RTS      PC              ;;RETURN

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.SBTTL PRIMARY ERROR CHECK SUBROUTINE

:THE PURPOSE OF THIS SUBROUTINE IS TO VERIFY THAT STATUS IS VALID AND
 :THAT FURTHER ERROR AND STATUS CHECKING SHOULD BE PERFORMED. THE
 :FOLLOWING CHECKS ARE MADE:

:CORRECT UNIT IS SELECTED, I.E., THE UNIT SELECT BITS OF RMCS2
 :(BITS 0-2) EQUAL THE UNIT BEING TESTED:

:SELECTED UNIT IS AVAILABLE, I.E., DVA (BIT 11 OF RMCS1) IS SET
 :AND NED (BIT 12 OF RMCS2) IS RESET:

:LAST COMMAND WAS COMPLETED, I.E., THE MASSBUS CONTROLLER IS
 :READY (BIT 7 OF RMCS1) AND THE GO BIT IS RESET (BIT 0 OF RMCS1) OR THE
 :DRIVE READY BIT (BIT 7 OF RMDS) IS SET.

:NO PARITY ERROR OCCURRED WHEN READING REMOTE REGISTERS,
 :I.E., MCPE = 0.

:NO PARITY ERROR OCCURRED WHEN WRITING REMOTE REGISTERS,
 :I.E., PAR = 0, OR, PAR = DPE = 1

:THE SUBROUTINE ASSUMES THAT:

:STATUS HAS BEEN STORED IN THE REGISTER INPUT BUFFER,
 :IN PARTICULAR, RMCS1, RMCS2 AND RMDS HAVE BEEN STORED IN THEIR
 :CORRESPONDING LOCATIONS OF THE 'GET' BUFFER.

:(SUNIT) CONTAINS THE DRIVE NUMBER

:THE SUBROUTINE IS CALLED AS FOLLOWS:

```
(1) JSR PC,PRIERR
      BR   ???           RETURN HERE IF NO ERROR
      NOP           RETURN HERE TO REPORT AN ERROR
      ERROR          ERROR NUMBER DEFINED BY SUB
      JSR PC,@(SP)+   GO BACK TO SUB FOR MORE ERROR CHECKS
      ???           RETURN HERE IF NO MORE ERRORS
```

PRIERR:

:CLEAR USER'S ERROR CALL

```
ADD #4,(SP)           :MOVE (SP) TO ERROR CALL
CLRB @ (SP)           :CLEAR ERROR NUMBER
SUB #4,(SP)           :MOVE (SP) TO NO ERROR RETURN
```

:REPORT AN ERROR IF THE WRONG UNIT IS SELECTED

```
MOV RMCS2I,$BDDAT    :CORRECT UNIT SELECTED??
BIC #^CUNTMSK,$BDDAT
MOV $UNIT,$GDDAT     :GOOD DATA FOR TYPEOUT
BIC #^CUNTMSK,$GDDAT
CMPB $GDDAT,$BDDAT   :COMPARE EXPECTED AND RECEIVED
                        :DRIVE NUMBERS
```

```
BEO 1$               :YES!!
ADD #4,(SP)
MOVB #1,@(SP)        :ERROR 1
SUB #2,(SP)           :MOVE SP TO RETURN FOR ERROR
JSR PC,@(SP)+        :REPORT WRONG UNIT SELECTED
```

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043564
043564 062716 000004
043570 105076 000000
043574 162716 000004
043600 013737 001346 001142
043606 042737 177770 001142
043614 013737 001234 001140
043622 042737 177770 001140
043630 123737 001140 001142
043636 001415
043640 062716 000004
043644 112776 000001 000000
043652 162716 000002
043656 004736
```

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58 043660 162716 000010          SUB      #10,(SP)          ;RESTORE (SP)
59 043664 000240          NOP
60 043666 000137 044406          JMP      10$             ;SKIP OTHER CHECKS
61 043672
62
63                               ;REPORT AN ERROR IF THE DEVICE IS NOT AVAILABLE OR IF
64                               ;THE DEVICE IS NONEXISTANT
65 043672 032737 004000 001336      BIT      #DVA,RMCS1I      ;DEVICE AVAILABLE??
66 043700 001045          BNE      5$              ;YES!!
67 043702 013737 001336 001140      MOV      RMCS1I,$GDDAT    ;EXPECTED STATUS
68 043710 052737 004000 001140      BIS      #DVA,$GDDAT
69 043716 013737 001336 001142      MOV      RMCS1I,$BDDAT    ;RECEIVED STATUS
70 043724 062716 000004          ADD      #4,(SP)
71 043730 112776 000002 000000      MOVB     #2,@(SP)         ;ERROR #2
72 043736 032737 010000 001346      BIT      #NED,RMCS2I      ;WAS NED SET??
73 043744 001414          BEQ      2$              ;NO!!
74 043746 013737 001346 001140      MOV      RMCS2I,$GDDAT    ;EXPECTED STATUS
75 043754 013737 001346 001142      MOV      RMCS2I,$BDDAT    ;RECEIVED STATUS
76 043762 042737 010000 001140      BIC      #NED,$GDDAT
77 043770 112776 000003 000000      MOVB     #3,@(SP)         ;YES - CHANGE ERROR NUMBER
78 043776 162716 000002          JSR      #2,(SP)         ;MOVE SP TO RETURN FOR ERROR
79 044002 004736          JSR      PC,@(SP)+        ;REPORT DEVICE NOT AVAILABLE
80 044004 162716 000010          SUB      #10,(SP)         ;RESTORE (SP)
81 044010 000240          NOP
82 044012 000575          BR       10$             ;SKIP OTHER CHECKS
83 044014
84
85                               ;REPORT AN ERROR IF MASSBUS CONTROLLER IS NOT READY
86 044014 032737 000200 001336      BIT      #RDY,RMCS1I      ;CONTROLLER READY??
87 044022 001030          BNE      7$              ;YES!!
88 044024 013737 001336 001140      MOV      RMCS1I,$GDDAT    ;EXPECTED STATUS
89 044032 052737 000200 001140      BIS      #RDY,$GDDAT
90 044040 042737 160001 001140      BIC      #SC!TRÉ!MCPE!GO,$GDDAT
91 044046 013737 001336 001142      MOV      RMCS1I,$BDDAT    ;RECEIVED STATUS
92 044054 062716 000004          ADD      #4,(SP)
93 044060 112776 000004 000000      MOVB     #4,@(SP)         ;ERROR #4
94 044066 162716 000002          SUB      #2,(SP)         ;MOVE SP TO RETURN FOR ERROR
95 044072 004736          JSR      PC,@(SP)+        ;REPORT CONTROLLER NOT READY
96 044074 162716 000010          SUB      #10,(SP)         ;RESTORE (SP)
97 044100 000240          NOP
98 044102 000541          BR       10$             ;SKIP OTHER CHECKS
99 044104
100
101                               ;REPORT AN ERROR IF GO IS NOT ZERO AND DRY IS NOT ONE
102 044104 032737 000001 001336      BIT      #GO,RMCS1I       ;GO RESET??
103 044112 001431          BEQ      8$              ;YES!!
104 044114 032737 000200 001350      BIT      #DRY,RMDSI       ;DRIVE READY??
105 044122 001025          BNE      8$              ;YES!!
106 044124 013737 001336 001140      MOV      RMCS1I,$GDDAT    ;EXPECTED STATUS
107 044132 042737 160001 001140      BIC      #SC!TRÉ!MCPE!GO,$GDDAT
108 044140 013737 001336 001142      MOV      RMCS1I,$BDDAT    ;RECEIVED STATUS
109 044146 062716 000004          ADD      #4,(SP)
110 044152 112776 000005 000000      MOVB     #5,@(SP)         ;ERROR #5
111 044160 162716 000002          SUB      #2,(SP)         ;MOVE SP TO RETURN FOR ERROR
112 044164 004736          JSR      PC,@(SP)+        ;REPORT DRIVE NOT READY
113 044166 162716 000010          SUB      #10,(SP)         ;RESTORE (SP)
114 044172 000240          NOP
    
```

```

115 044174 000504          BR      10$
116 044176          8$:
117
118          ;REPORT AN ERROR IF THE RM CONTROLLER DETECTED BAD
119          ;PARITY ON THE MASSBUS CONTROL BUS
120 044176 032737 020000 001336      BIT      #MCPE,RMCS1I ;PARITY ERROR ??
121 044204 001425          BEQ      9$          ;NO!!
122 044206 013737 001336 001140      MOV      RMCS1I,$GDDAT ;EXPECTED STATUS
123 044214 042737 160001 001140      BIC      #SC!TRÉ!MCPE!GO,$GDDAT
124 044222 013737 001336 001142      MOV      RMCS1I,$BDDAT ;RECEIVED STATUS
125 044230 062716 000004          ADD      #4,(SP) ;MOVE STACK TO USER'S ERROR
126 044234 112776 000013 000000      MOV      #13,@(SP) ;ERROR #47
127 04424 162716 000002          SUB      #2,(SP) ;MOVE SP TO RETURN FOR ERROR
128 044246 004736          JSR      PC,@(SP)+ ;REPORT ERROR VIA USER
129 044250 162716 000010          SUB      #10,(SP) ;RESTORE STACK
130 044254 000240          NOP
131 044256 000453          BR      10$
132 044260          9$:
133
134          ;REPORT AN ERROR IF THE RM80 DETECTED A CONTROL BUS PARITY ERROR
135 044260 032737 000010 001352      BIT      #PAR,RMER1I ;WAS THERE A PARITY ERROR??
136 044266 001451          BEQ      11$         ;NO!!
137 044270 032737 000010 001400      BIT      #DPE,RMER2I ;WAS IT THE CONTROL BUS??
138 044276 001045          BNE      11$         ;NOT SURE!!
139 044300 032737 000010 001426      BIT      #PAR,RMER10 ;DID TEST SET PAR ??
140 044306 001413          BEQ      93$        ;NO!!
141 044310 010046          MOV      R0,-(SP) ;PUSH R0 ON STACK
142 044312 012700 001545          MOV      #PUTINX,R0 ;R0 POINTS TO INDEX TABLE
143 044316 122710 000014          91$: CMPB    #RMER1,(R0) ;SEARCH TABLE FOR RMER1
144 044322 001002          BNE      92$
145 044324 012600          MOV      (SP)+,R0 ;POP STACK INTO R0
146 044326 000431          BR      11$        ;PAR WAS SET BY TEST
147 044330 105720          92$: TSTB   (R0)+ ;END OF TABLE??
148 044332 100371          BPL      91$        ;NO!!
149 044334 012600          MOV      (SP)+,R0 ;POP STACK INTO R0
150 044336 013737 001352 001140      93$: MOV      RMER1I,$GDDAT ;EXPECTED STATUS
151 044344 042737 000010 001140      BIC      #PAR,$GDDAT
152 044352 013737 001352 001142      MOV      RMER1I,$BDDAT ;RECEIVED STATUS
153 044360 062716 000004          ADD      #4,(SP) ;MOVE SP TO USER'S ERROR CALL
154 044364 112776 000050 000000      MOV      #50,@(SP) ;WRITE THE ERROR NUMBER
155 044372 162716 000002          SUB      #2,(SP) ;MOVE SP TO RETURN FOR ERROR
156 044376 004736          JSR      PC,@(SP)+ ;REPORT THE ERROR
157 044400 162716 000010          SUB      #10,(SP) ;MOVE SP TO NO ERROR RETURN
158 044404 000240          NOP
159 044406 062716 000010          10$: ADD     #10,(SP) ;RETURN TO ERROR
160 044412 000240          11$: NOP ;RETURN TO NO ERROR
161 044414 000207          RTS     PC
    
```

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1      .SBTTL SECONDARY ERROR CHECK SUBROUTINE
2
3      :THE ERROR CHECK SUBROUTINE PROVIDES DETECTION OF SECONDARY ERRORS
4      :SUCH AS UNEXPECTED ERRORS AND UNEXPECTED REGISTER CONTENTS. THESE
5      :ERRORS ARE DEEMED SECONDARY IN THAT THEY ARE NOT NECESSARILY
6      :ASSOCIATED WITH THE OPERATION BEING PERFORMED.
7      :WHEN THE SUBROUTINE IDENTIFIES SUCH AN ERROR, IT MOVES THE ERROR
8      :NUMBER TO THE ERROR CALL IN THE TEST ROUTINE AND THEN RETURNS
9      :TO THE TEST ROUTINE WHICH MAKES THE ERROR CALL. AFTER THE TEST ROUTINE
10     :MAKES THE ERROR CALL, IT RETURNS TO THE SUBROUTINE WHICH THEN LOOKS FOR
11     :OTHER ERRORS. WHEN ALL ERRORS HAVE BEEN REPORTED, THE SUBROUTINE
12     :RETURNS TO THE ADDRESS FOLLOWING THE SUBROUTINE CALL.
13
14     :CALL: JSR      PC,SECERR
15           BR       ???          RETURN HERE IF NO ERROR
16           NOP      RETURN HERE TO REPORT AN ERROR
17           ERROR   ERROR NUMBER DEFINED BY SUB
18           JSR     PC,@(SP)+    GO BACK TO SUB FOR MORE ERROR CHECKS
19           ???     RETURN HERE IF NO MORE ERRORS
20
21     :NOTE: THE SUBROUTINE ASSUMES THAT REGISTERS HAVE BEEN STORED AT THE
22     :INPUT REGISTER BUFFER.
23
24     044416 SECERR:
25
26     :*****
27     :STORE FUNCTION CODE AND CLEAR USER'S ERROR NUMBER
28     044416 013737 001412 050556 MOV RMCS10,515$ :STORE FUNCTION CODE
29     044424 042737 177701 050556 BIC #^C<F0!F1!F2!F3!F4>,515$
30     044432 062716 000004 ADD #4,(SP) :MOVE (SP) TO ERROR CALL
31     044436 105076 000000 CLRB @(SP) :CLEAR ERROR NUMBER
32     044442 162716 000004 SUB #4,(SP) :MOVE (SP) TO NO ERROR RETURN
33
34     :*****
35     :CHECK SECONDARY ERRORS COMMON TO ALL COMMANDS
36
37     :REPORT ERROR IF DRIVE IS NOT READY, I.E., IF DRY = 0
38     044446 032737 000200 001350 BIT #DRY,RMDSI :DRIVE READY??
39     044454 001024 BNE 5$ :YES!!
40     044456 013737 001350 001142 MOV RMDSI,$BDDAT :BAD DATA FOR TYPEOUT
41     044464 042737 177577 001142 BIC #^CDRY,$BDDAT
42     044472 012737 000200 001140 MOV #DRY,$GDDAT :GOOD DATA FOR TYPEOUT
43     044500 062716 000004 ADD #4,(SP)
44     044504 112776 000010 000000 MOVB #10,@(SP) :ERROR NUMBER
45     044512 162716 000002 SUB #2,(SP) :MOVE SP TO RETURN FOR ERROR
46     044516 004736 JSR PC,@(SP)+ :REPORT NOT READY
47     044524 162716 000010 SUB #10,(SP) :RESTORE (SP) TO ERROR N
48     044524 000240 NOP
49
50     :REPORT ERROR IF GO BIT IS NOT RESET
51     044526 032737 000001 001336 5$: BIT #GO,RMCS1I :GO BIT RESET??
52     044534 001423 BEQ 10$ :YES!!
53     044536 013737 001336 001142 MOV RMCS1I,$BDDAT :BAD DATA FOR TYPEOUT
54     044544 042737 177776 001142 BIC #^CGO,$BDDAT
55     044552 005037 001140 CLR $GDDAT :GOOD DATA FOR TYPEOUT
56     044556 062716 000004 ADD #4,(SP)
57     044562 112776 000011 000000 MOVB #11,@(SP) :ERROR NUMBER
    
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58 044570 162716 000002      SUB      #2,(SP)      ;MOVE SP TO RETURN FOR ERROR
59 044574 004736             JSR      PC,@(SP)+   ;REPORT DEVICE NOT AVAILABLE
60 044576 162716 000010      SUB      #10,(SP)    ;RESTORE (SP)
61 044602 000240             NOP
62
63                               ;REPORT ERROR IF FUNCTION CODE READ FROM DEVICE IS NOT CORRECT
64 044604 013737 001336 001142 10$:      MOV      RMCS1I,$BDDAT ;IS FUNCTION CODE CORRECT??
65 044612 042737 177701 001142      BIC      #^C76,$BDDAT
66 044620 013737 050556 001140      MOV      515$,$GDDAT ;EXPELTED FUNCTION CODE
67 044626 023737 001142 001140      CMP      $BDDAT,$GDDAT
68 044634 001-13             BEQ      15$         ;YES!!
69 044636 062716 000004             ADD      #4,(SP)
70 044642 112776 000012 000000      MOVB    #12,@(SP)   ;ERROR NUMBER
71 044650 162716 000002             SUB      #2,(SP)    ;MOVE SP TO RETURN FOR ERROR
72 044654 004736             JSR      PC,@(SP)+   ;REPORT WRONG FUNCTION CODE
73 044656 162716 000010      SUB      #10,(SP)   ;RESTORE (SP)
74 044662 000240             NOP
75 044664
76                               15$:
77                               ;REPORT AN ERROR IF COMPOSITE ERROR IS SET AND NO OTHER
78                               ;ERRORS ARE SET, OR IF COMPOSITE ERROR IS NOT SET AND
79                               ;OTHER ERRORS ARE SET
79 044664 005037 001140             CLR      $GDDAT      ;EXPECT 'ERR' = 0
80 044670 005737 001352             TST      RMER1I      ;IS RMER1 = 0??
81 044674 001003             BNE      20$         ;NO!!
82 044676 005737 001400             TST      RMER2I      ;IS RMERZ = 0??
83 044702 001403             BEQ      25$         ;YES!!
84 044704 052737 040000 001140 20$:      BIS      #ERR,$GDDAT ;'ERR' SOULD BE SET
85 044712 013737 001350 001142 25$:      MOV      RMDSI,$BDDAT
86 044720 042737 137777 001142      BIC      #^CERR,$BDDAT
87 044726 023737 001140 001142      CMP      $GDDAT,$BDDAT ;IS 'ERR' OK??
88 044734 001412             BEQ      30$         ;YES!!
89 044736 062716 000004             ADD      #4,(SP)    ;MOVE SP TO USER'S ERROR
90 044742 112776 000047 000000      MOVB    #47,@(SP)  ;WRITE ERROR NUMBER
91 044750 162716 000002             SUB      #2,(SP)    ;MOVE SP TO ERROR RETURN
92 044754 004736             JSR      PC,@(SP)+   ;REPORT INVALID COMP ERROR
93 044756 162716 000010      SUB      #10,(SP)
94
95                               ;REPORT AN ERROR IF 'TRE' IS SET AND NONE OF THE BITS WHICH SET
96                               ;TRE IS SET, OR IF TRE IS NOT SET AND ONE OR MORE BITS WHICH
97                               ;SET TRE IS SET
98 044762 005037 001140 30$:      CLR      $GDDAT      ;EXPECT 'TRE' = 0
99 044766 013746 001346             MOV      RMCS2I,-(SP) ;WAS DLT, WCE, UPE, NED, NEM
100 044772 042726 000377             BIC      #377,(SP)+ ;PGE, MXF OR MDPE SET
101 044776 001010             BNE      35$         ;YES!!
102 045000 032737 040000 001350      BIT      #ERR,RMDSI ;WAS EXCEPTION RECEIVED??
103 045006 001407             BEQ      40$         ;NO!!
104 045010 022737 000030 050556      CMP      #SEARCH,515$ ;WAS DATA TRANSFERRED??
105 045016 103003             BHIS    40$         ;NO!!
106 045020 052737 040000 001140 35$:      BIS      #TRE,$GDDAT ;'TRE' SHOULD BE SET
107 045026 013737 001336 001142 40$:      MOV      RMCS1I,$BDDAT ;BAD DATA FOR TYPEOUT
108 045034 042737 137777 001142      BIC      #^CTRE,$BDDAT
109 045042 023737 001140 001142      CMP      $GDDAT,$BDDAT ;IS 'TRE' OK??
110 045050 001413             BEQ      45$         ;YES!!
111 045052 062716 000004             ADD      #4,(SP)    ;MOVE SP TO USER'S ERROR CALL
112 045056 112776 000014 000000      MOVB    #14,@(SP)  ;WRITE ERROR NUMBER
113 045064 162716 000002             SUB      #2,(SP)    ;MOVE SP TO RETURN FOR ERROR
114 045070 004736             JSR      PC,@(SP)+   ;REPORT TRE ERROR
    
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115 045072 162716 000010          SUB      #10,(SP)      ;RESTORE (SP)
116 045076 000240          NOP
117 045100          45$:
118
119          ;*****
120          ;USING THE FUNCTION CODE TABLE, CHECK FOR THE FOLLOWING ERRORS:
121          ;.STATUS BITS NOT SET THAT SHOULD BE SET, E.G., ATA AND ILF
122          ;.STATUS BITS SET THAT SHOULD NOT BE SET, E.G., WCE AND ECH
123          ;NOTE THAT SOME ERROR BITS ARE CONDITIONAL ON THE COMMAND AND OTHER
124          ;STATUS CONDITIONS, E.G., WRITE LOCK ERROR SHOULD ONLY BE SET IF
125          ;WRITE LOCK IS ON AND THE COMMAND IS A WRITE.
126
127          ;GET AND STORE THE ENTRY FROM THE FUNCTION CODE TABLE
128 045100 010046          MOV      R0,-(SP)      ;:PUSH R0 ON STACK
129 045102 013700 050556      MOV      515$,R0      ;:GET FUNCTION CODE
130 045106 016037 070002 050550  MOV      FNCDTB(R0),500$ ;:STORE ENTRY
131 045114 012600          MOV      (SP)+,R0     ;:POP STACK INTO R0
132
133          ;REPORT AN ERROR IF AN UNEXPECTED ATTENTION OCCURRED OR IF
134          ;ATA IS NOT SET AND SHOULD BE SET.
135 045116 013737 050550 001140  MOV      500$,SGDDAT  ;:GET EXPECTED ATA STATUS
136 045124 032737 040000 001350  BIT      #ERR,RMSI    ;:IS COMPOSITE ERROR SET ??
137 045132 001403          BEQ     50$          ;:NO !!
138 045134 052737 100000 001140  BIS      #ATA,SGDDAT  ;:EXPECT AN ATTENTION
139 045142 042737 077777 001140  BIC      #^CATA,SGDDAT ;:STRIP DONT CARES
140 045150 013737 001350 001142  MOV      RMSI,$BDDAT  ;:GET RECEIVED ATA
141 045156 042737 077777 001142  BIC      #^CATA,$BDDAT ;:STRIP DONT CARES
142 045164 023737 001140 001142  CMP      SGDDAT,$BDDAT ;:IS ATA OK ??
143 045172 001413          BEQ     55$          ;:YES !!
144 045174 062716 000004          ADD     #4,(SP)      ;:MOVE SP TO USERS ERROR CALL
145 045200 112776 000006 000000  MOVB    #6,@(SP)     ;:LOAD ERROR # IN CALL
146 045206 162716 000002          SUB     #2,(SP)     ;:MOVE SP TO ERROR RETURN
147 045212 004736          JSR     PC,@(SP)+   ;:REPORT ERROR
148 045214 162716 000010          SUB     #10,(SP)    ;:RESTORE SP
149 045220 000240          NOP
150 045222          55$:
151
152          ;REPORT ERROR IF ILF IS INCORRECT, I.E., IF ILF DOES NOT COMPARE
153          ;WITH FUNCTION CODE TABLE
154 045222 013737 050550 001140  MOV      500$,SGDDAT  ;:GET EXPECTED ILF
155 045230 042737 177776 001140  BIC      #^CILF,SGDDAT ;:CLEAR ALL OTHER BITS
156 045236 013737 001352 001142  MOV      RMER1I,$BDDAT ;:GET RECEIVED ILF
157 045244 042737 177776 001142  BIC      #^CILF,$BDDAT ;:CLEAR ALL OTHER BITS
158 045252 023737 001140 001142  LMP     SGDDAT,$BDDAT ;:IS ILF OK ??
159 045260 001412          BEQ     60$          ;:YES !!
160 045262 062716 000004          ADD     #4,(SP)     ;:MOVE SP TO USERS ERROR CALL
161 045266 112776 000254 000000  MOVB    #254,@(SP)   ;:WRITE ERROR NUMBER IN CALL
162 045274 162716 000002          SUB     #2,(SP)     ;:MOVE SP TO ERROR RETURN
163 045300 004736          JSR     PC,@(SP)+   ;:REPORT ERROR AND RETURN
164 045302 162716 000010          SUB     #10,(SP)    ;:MOVE SP TO NO ERROR
165 045306 005037 001140 60$:  CLR     SGDDAT      ;:CLEAR EXPECTED STATUS
166
167          ;REPORT AN ERROR IF WCE IS SET AND SHOULD NOT BE SET
168 045312 013746 050550          MOV      500$,-(SP) ;:GET WCE STATUS ENABLE
169 045316 052716 137777          BIS      #^WCE,(SP) ;:SET ALL OTHER BITS
170 045322 013737 001346 001142  MOV      RMCS2I,$BDDAT ;:RECEIVED STATUS
171 045330 042637 001142          BIC      (SP)+,$BDDAT ;:CLEAR WCE IF ENABLED
    
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172 045334 001412          BEQ      90$          ;BRANCH IF WCE OK
173 045336 062716 000004    ADD      #4,(SP)      ;MOVE SP TO USER'S ERROR CALL
174 045342 112776 000026 000000    MOVB    #26,@(SP)    ;WRITE ERROR NUMBER
175 045350 162716 000002          SUB      #2,(SP)      ;MOVE SP TO ERROR RETURN
176 045354 004736          JSR      PC,@(SP)+    ;REPORT ERROR
177 045356 162716 000010          SUB      #10,(SP)     ;RESTORE ERROR
178 045362          90$:
179
180          ;REPORT ERROR IF OPI STATUS IS SET AND SHOULD NOT BE SET
181 045362 013746 050550    MOV      500$,-(SP)   ;GET OPI STATUS ENABLE
182 045366 052716 157777    BIS      #*COPI,(SP)  ;SET ALL OTHER BITS
183 045372 013737 001352 001142    MOV      RMER1I,$BDDAT ;GET RECEIVED STATUS
184 045400 042637 001142    BIC      (SP)+,$BDDAT ;CLEAR OPI IF ENABLED
185 045404 001412          BEQ      100$         ;BRANCH IF OPI OK
186 045406 062716 000004    ADD      #4,(SP)      ;MOVE SP TO USER'S ERROR CALL
187 045412 112776 000164 000000    MOVB    #164,@(SP)   ;WRITE ERROR NUMBER IN CALL
188 045420 162716 000002          SUB      #2,(SP)      ;MOVE SP TO ERROR RETURN
189 045424 004736          JSR      PC,@(SP)+    ;REPORT ERROR
190 045426 162716 000010          SUB      #10,(SP)     ;RESTORE SP
191 045432          100$:
192
193          ;REPORT ERROR IF IVC IS SET AND IS NOT ENABLED OR IF IVC IS
194          ;SET AND VV IS NOT RESET
195 045432 013746 050550    MOV      500$,-(SP)   ;GET IVC STATUS ENABLE
196 045436 032737 000100 001350    BIT      #VV,RMDSI    ;IS VV SET
197 045444 001402          BEQ      105$         ;NO !!
198 045446 042716 010000    BIC      #IVC,(SP)    ;YES - IVC SHOULD BE 0
199 045452 052716 167777    BIS      #*CIVC,(SP)  ;SET ALL OTHER BITS
200 045456 013737 001400 001142    MOV      RMER2I,$BDDAT ;GET RECEIVED STATUS
201 045464 042637 001142    BIC      (SP)+,$BDDAT ;CLEAR IVC IF ENABLED
202 045470 001412          BEQ      110$         ;BRANCH IF IVC OK
203 045472 062716 000004    ADD      #4,(SP)      ;MOVE SP TO USERS ERROR CALL
204 045476 112776 000165 000000    MOVB    #165,@(SP)   ;WRITE ERROR NUMBER IN CALL
205 045504 162716 000002          SUB      #2,(SP)      ;MOVE SP TO ERROR RETURN
206 045510 004736          JSR      PC,@(SP)+    ;REPORT ERROR
207 045512 162716 000010          SUB      #10,(SP)     ;RESTORE SP TO NO ERROR
208 045516          110$:
209
210          ;BIT 11 (WLE) OF THE FUNCTION CODE TABLE IS THE ENABLING BIT FOR
211          ; ALL WRITE ERRORS, I.E.,
212          ;     RMER1 - WLE, WCF
213          ;     RMER2 - DPE
214          ;     RMCS2 - LPE.
215          ;EACH OF THESE ERRORS IS CHECKED TO SEE IF AN ERROR IS SET WHEN THE
216          ;WRITE ERROR ENABLE BIT IS RESET.
217
218          ;REPORT AN ERROR IF WLE IS SET AND WRITE ERRORS ARE NOT ENABLED, OR IF
219          ;THE DRIVE IS NOT WRITE PROTECTED
220 045516 012746 177777    MOV      #-1,-(SP)    ;ASSUME WRITE ERRORS ENABLED
221 045522 032737 004000 050550    BIT      #WLE,500$    ;ARE WRITE ERRORS ENABLED ??
222 045530 001404          BEQ      115$         ;NO !!
223 045532 032737 004000 001350    BIT      #WRL,RMDSI    ;IS THE DRIVE WRITE PROTECTED ??
224 045540 001002          BNE      120$         ;YES !!
225 045542 042716 004000 115$:    BIC      #WLE,(SP)    ;RESET WLE ENABLE
226 045546 013737 001352 001142 120$:    MOV      RMER1I,$BDDAT ;GET RECEIVED STATUS
227 045554 042637 001142    BIC      (SP)+,$BDDAT ;CLEAR WLE IF ENABLED
228 045560 001412          BEQ      125$         ;BRANCH IF WLE OK
    
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229 045562 062716 000004          ADD    #4,(SP)          ;MOVE SP TO USERS ERROR CALL
230 045566 112776 000023 000000    MOVB   #23,@(SP)       ;WRITE ERROR NUMBER IN CALL
231 045574 162716 000002          SUB    #2,(SP)         ;MOVE SP TO ERROR RETURN
232 045600 004736          JSR    PC,@(SP)+       ;REPORT ERROR AND RETURN
233 045602 162716 000010          SUB    #10,(SP)        ;RESTORE SP TO NO ERROR
234 045606          125$:
235
236          ;REPORT ERROR IF WCF IS SET AND WRITE ERRORS ARE NOT ENABLED
237 045606 012746 177777          MOV    #-1,-(SP)       ;ASSUME WRITE ERRORS ENABLED
238 045612 032737 004000 050550    BIT    #WLE,500$       ;ARE WRITE ERRORS ENABLED ??
239 045620 001002          BNE    130$           ;YES !!
240 045622 042716 000040          BIC    #WCF,(SP)       ;DISABLE WCF FRROR
241 045626 013737 001352 001142 130$:  MOV    RMER11,$BDDAT    ;GET RECEIVED STATUS
242 045634 042637 001142          BIC    (SP)+,$BDDAT    ;RESET WCF IF ENABLED
243 045640 001412          BEQ    135$           ;BRANCH IF WCF OK
244 045642 062716 000004          ADD    #4,(SP)         ;MOVE SP TO USERS ERROR CALL
245 045646 112776 000025 000000    MOVB   #25,@(SP)       ;WRITE ERROR NUMBER IN CALL
246 045654 162716 000002          SUB    #2,(SP)         ;MOVE SP TO ERROR RETURN
247 045660 004736          JSR    PC,@(SP)+       ;REPORT ERROR
248 045662 162716 000010          SUB    #10,(SP)        ;RESTORE SP TO NO ERROR
249 045666          135$:
250
251          ;REPORT ERROR IF DPE IS SET AND WRITE ERRORS ARE NOT ENABLED
252 045666 012746 177777          MOV    #-1,-(SP)       ;ASSUME WRITE ERRORS ARE ENABLED
253 045672 032737 004000 050550    BIT    #WLE,500$       ;ARE WRITE ERRORS ENABLED ??
254 045700 001002          BNE    140$           ;YES !!
255 045702 042716 000010          BIC    #DPE,(SP)       ;RESET DPE ENABLE
256 045706 013737 001400 001142 140$:  MOV    RMER21,$BDDAT    ;GET RECEIVED STATUS
257 045714 042637 001142          BIC    (SP)+,$BDDAT    ;RESET DPE IF ENABLED
258 045720 001412          BEQ    145$           ;BRANCH IF DPE OK
259 045722 062716 000004          ADD    #4,(SP)         ;MOVE SP TO USERS ERROR CALL
260 045726 112776 000040 000000    MOVB   #40,@(SP)       ;WRITE ERROR NUMBER IN CALL
261 045734 162716 000002          SUB    #2,(SP)         ;MOVE SP TO ERROR RETURN
262 045740 004736          JSR    PC,@(SP)+       ;REPORT ERROR
263 045742 162716 000010          SUB    #10,(SP)        ;RESTORE SP TO NO ERROR
264 045746          145$:
265
266          ;REPORT AN ERROR IF UPE IS SET AND WRITE ERRORS ARE NOT ENABLED
267 045746 012746 177777          MOV    #-1,-(SP)       ;ASSUME WRITE ERRORS ARE ENABLED
268 045752 032737 004000 050550    BIT    #WLE,500$       ;ARE WRITE ERRORS ENABLED ??
269 045760 001002          BNE    150$           ;YES !!
270 045762 042716 020000          BIC    #UPE,(SP)       ;DISABLE UPE ERROR
271 045766 013737 001346 001142 150$:  MOV    RMCS21,$BDDAT    ;GET RECEIVED STATUS
272 045774 042637 001142          BIC    (SP)+,$BDDAT    ;RESET UPE IF ENABLED
273 046000 001412          BEQ    155$           ;BRANCH IF UPE OK
274 046002 062716 000004          ADD    #4,(SP)         ;MOVE SP TO USERS ERROR CALL
275 046006 112776 000024 000000    MOVB   #24,@(SP)       ;WRITE ERROR NUMBER IN CALL
276 046014 162716 000002          SUB    #2,(SP)         ;MOVE SP TO ERROR RETURN
277 046020 004736          JSR    PC,@(SP)+       ;REPORT ERROR AND RETURN
278 046022 162716 000010          SUB    #10,(SP)        ;MOVE SP TO NO ERROR
279 046026          155$:
280
281          ;REPORT AN ERROR IF IAE IS SET AND IS NOT ENABLED
282 046026 013746 050550          MOV    500$,-(SP)      ;GET IAE ENABLE
283 046032 052716 175777          BIS    #^CIAE,(SP)     ;SET ALL OTHER BITS
284 046036 013737 001352 001142    MOV    RMER11,$BDDAT    ;GET RECEIVED STATUS
285 046044 042637 001142          BIC    (SP)+,$BDDAT    ;CLEAR IAE IF ENABLED
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286 046050 001412          BEQ      160$          ;BRANCH IF IAE IS OK
287 046052 062716 000004  ADD      #4,(SP)        ;MOVE SP TO USERS ERROR CALL
288 046056 112776 000166 000000  MOVVB   #166,@(SP)     ;WRITE ERROR NUMBER
289 046064 162716 000002          SUB      #2,(SP)        ;MOVE SP TO ERROR RETURN
290 046070 004736          JSR      PC,@(SP)+     ;REPORT ERROR AND RETURN
291 046072 162716 000010  SUB      #10,(SP)      ;MOVE SP TO NO ERROR
292 046076          160$:
293
294          ;BIT 09 (AOE) OF THE FUNCTION CODE TABLE IS THE ENABLING BIT FOR
295          ; ALL READ/WRITE ERRORS, I.E.,
296          ;
297          ; RMCS1 - TRE
298          ; RMCS2 - DLT,NEM,MXF
299          ; RMDS - LBT
300          ; RMER1 - AOE
301          ;NOTE:
302          ; LBT IS NOT CHECKED BECAUSE IT ONLY RESETS WHEN THE DESIRED
303          ; CYLINDER REGISTER IS WRITTEN
304          ;NOTE:
305          ; AOE CANNOT BE SET IF LBT IS NOT ALSO SET
306          ;NOTE:
307          ; TRE IS CHECKED AS A FUNCTION OF OTHER ERROR CONDITONS ABOVE
308
309          ;REPORT AN ERROR IF DLT IS SET AND READ/WRITE ERRORS ARE NOT ENABLED
310 046076 012746 177777          MOV      #-1,-(SP)     ;ASSUME ERRORS ARE ENABLED
311 046102 032737 001000 050550  BIT      #AOE,500$     ;ARE ERRORS ENABLED ??
312 046110 001002          BNE      165$          ;YES !!
313 046112 042716 100000          BIC      #DLT,(SP)     ;RESET DLT ENABLE
314 046116 013737 001346 001142 165$:  MOV      RMCS2I,$BDDAT ;GET RECEIVED STATUS
315 046124 042637 001142          BIC      (SP)+,$BDDAT ;CLEAR DLT IF ENABLED
316 046130 001412          BEQ      170$          ;BRANCH IF DLT IS OK
317 046132 062716 000004  ADD      #4,(SP)        ;MOVE SP TO USERS ERROR CALL
318 046136 112776 000032 000000  MOVVB   #32,@(SP)     ;WRITE ERROR NUMBER IN CALL
319 046144 162716 000002          SUB      #2,(SP)        ;MOVE SP TO ERROR RETURN
320 046150 004736          JSR      PC,@(SP)+     ;REPORT ERROR AND RETURN
321 046152 162716 000010  SUB      #10,(SP)      ;MOVE SP TO NO ERROR
322 046156          170$:
323
324          ;REPORT ERROR IF NEM IS SET AND READ/WRITE ERRORS ARE NOT ENABLED
325 046156 012746 177777          MOV      #-1,-(SP)     ;ASSUME ERRORS ARE ENABLED
326 046162 032737 001000 050550  BIT      #AOE,500$     ;ARE ERRORS ENABLED ??
327 046170 001002          BNE      175$          ;YES !!
328 046172 042716 004000          BIC      #NEM,(SP)     ;DISABLE NEM
329 046176 013737 001346 001142 175$:  MOV      RMCS2I,$BDDAT ;GET RECEIVED STATUS
330 046204 042637 001142          BIC      (SP)+,$BDDAT ;CLEAR NEM IF ENABLED
331 046210 001412          BEQ      180$          ;BRANCH IF NEM IS OK
332 046212 062716 000004  ADD      #4,(SP)        ;MOVE SP TO USERS ERROR CALL
333 046216 112776 000167 000000  MOVVB   #167,@(SP)     ;WRITE ERROR NUMBER IN CALL
334 046224 162716 000002          SUB      #2,(SP)        ;MOVE SP TO ERROR RETURN
335 046230 004736          JSR      PC,@(SP)+     ;REPORT ERROR AND RETURN
336 046232 162716 000010  SUB      #10,(SP)      ;MOVE SP TO NO ERROR
337 046236          180$:
338
339          ;REPORT ERROR IF MXF IS SET AND READ/WRITE ERRORS ARE NOT ENABLED
340 046236 012746 177777          MOV      #-1,-(SP)     ;ASSUME ERRORS ARE ENABLED
341 046242 032737 001000 050550  BIT      #AOE,500$     ;ARE DATA ERRORS ENABLED ??
342 046250 001002          BNE      185$          ;YES !!
    
```

```

343 046252 042716 001000      BIC      #MXF,(SP)      ;DISABLE MXF ERROR
344 046256 013737 001346 001142 185$:  MOV      RMCS2I,$BDDAT ;GET RECEIVED STATUS
345 046264 042637 001142      BIC      (SP)+,$BDDAT ;CLEAR MXF IF ENABLED
346 046270 001412      BEQ      190$          ;BRANCH IF MXF IS OK
347 046272 062716 000004      ADD      #4,(SP)       ;MOVE SP TO USERS ERROR CALL
348 046276 112776 000033 000000  MOVB     #33,@(SP)     ;WRITE ERROR NUMBER IN CALL
349 046304 162716 000002      SUB      #2,(SP)       ;MOVE SP TO ERROR RETURN
350 046310 004736      JSR      PC,@(SP)+     ;REPORT ERROR AND RETURN
351 046312 162716 000010      SUB      #10,(SP)      ;MOVE SP TO NO ERROR
352 046316      190$:
353
354      ;REPORT ERROR IF AOE IS SET AND DATA ERRORS ARE NOT ENABLED
355 046316 012746 177777      MOV      #-1,-(SP)     ;ASSUME DATA ERRORS ARE ENABLED
356 046322 032737 001000 050550  BIT      #AOE,500$     ;ARE DATA ERRORS EANBLED ??
357 046330 001404      BEQ      191$          ;NO !!
358 046332 032737 002000 001350  BIT      #LBT,RMDSI    ;IS LBT ALSO SET ??
359 046340 001002      BNE      195$          ;YES !!
360 046342 042716 001000 191$:  BIC      #AOE,(SP)     ;DISABLE AOE
361 046346 013737 001352 001142 195$:  MOV      RMER1I,$BDDAT ;GET RECEIVED STATUS
362 046354 042637 001142      BIC      (SP)+,$BDDAT ;CLEAR AOE IF ENABLED
363 046360 001412      BEQ      200$          ;BRANCH IF AOE IS OK
364 046362 062716 000004      ADD      #4,(SP)       ;MOVE SP TO USERS ERROR CALL
365 046366 112776 000020 000000  MOVB     #20,@(SP)     ;WRITE ERROR NUMBER
366 046374 162716 000002      SUB      #2,(SP)       ;MOVE SP TO ERROR RETURN
367 046400 004736      JSR      PC,@(SP)+     ;REPORT ERROR AND RETURN
368 046402 162716 000010      SUB      #10,(SP)      ;MOVE SP TO NO ERROR
369 046406      200$:
370
371      ;BIT 07 (HCE) OF THE FUNCTION CODE TABLE IS THE ENABLING BIT FOR
372      ;HEADER ERRORS, I.E.,
373      ;
374      ;
375      ;
376      ;RESET THE ENABLING BIT (HCE) IF HEADER COMPARE INHIBIT IS SET
377 046406 032737 002000 001370  BIT      #HCI,RMOFI    ;IS HCI SET ??
378 046414 001403      BEQ      201$          ;NO !!
379 046416 042737 000200 050550  BIC      #HCE,500$     ;YES - DISABLE ALL HEADER ERRORS
380 046424      201$:
381
382      ;REPORT AN ERROR IF HCRC IS SET AND HEADER ERRORS ARE NOT ENABLED
383 046424 012746 177777      MOV      #-1,-(SP)     ;ASSUME ERRORS ENABLED
384 046430 032737 000200 050550  BIT      #HCE,500$     ;ARE HEADER ERRORS ENABLED ??
385 046436 001002      BNE      205$          ;YES !!
386 046440 042716 000400      BIC      #HCRC,(SP)    ;DISABLE HCRC
387 046444 013737 001352 001142 205$:  MOV      RMER1I,$BDDAT ;GET RECEIVED STATUS
388 046452 042637 001142      BIC      (SP)+,$BDDAT ;RESET HCRC IF ENABLED
389 046456 001412      BEQ      210$          ;BRANCH IF HCRC IS OK
390 046460 062716 000004      ADD      #4,(SP)       ;MOVE SP TO USERS ERROR CALL
391 046464 112776 000035 000000  MOVB     #35,@(SP)     ;WRITE ERROR NUMBER IN CALL
392 046472 162716 000002      SUB      #2,(SP)       ;MOVE SP TO ERROR RETURN
393 046476 004736      JSR      PC,@(SP)+     ;REPORT ERROR AND RETURN
394 046500 162716 000010      SUB      #10,(SP)      ;MOVE SP TO NO ERROR
395 046504      210$:
396
397      ;REPORT ERROR IF HCE IS SET AND HEADER ERRORS ARE NOT ENABLED
398 046504 012746 177777      MOV      #-1,-(SP)     ;ASSUME ERRORS ENABLED
399 046510 032737 000200 050550  BIT      #HCE,500$     ;ARE ERRORS ENABLED ??
    
```

```

400 046516 001002          BNE      215$          ;YES !!
401 046520 042716 000200  BIC      #HCE,(SP)    ;DISABLE HCE
402 046524 013737 001352 001142 215$:  MOV      RMER1I,$BDDAT ;GET RECEIVED STATUS
403 046532 042637 001142          BIC      (SP)+,$BDDAT ;CLEAR HCE IF ENABLED
404 046536 001412          BEQ      220$          ;BRANCH IF HCE IS OK
405 046540 062716 000004          ADD      #4,(SP)      ;MOVE SP TO USERS ERROR CALL
406 046544 112776 000036 000000  MOVB     #36,@(SP)    ;WRITE ERROR NUMBER IN CALL
407 046552 162716 000002          SUB      #2,(SP)      ;MOVE SP TO ERROR RETURN
408 046556 004736          JSR      PC,@(SP)+    ;REPORT ERROR AND RETURN
409 046560 162716 000010          SUB      #10,(SP)     ;MOVE SP TO NO ERROR
410 046564          220$:
411
412          ;REPORT ERROR IF FER IS SET AND HEADER ERRORS ARE NOT ENABLED
413 046564 012746 177777          MOV      #-1,-(SP)    ;ASSUME FER IS ENABLED
414 046570 032737 000200 050550  BIT      #HCE,500$    ;ARE HEADER ERRORS ENABLED ??
415 046576 001002          BNE      225$          ;YES !!
416 046600 042716 000020          BIC      #FER,(SP)    ;DISABLE FER
417 046604 013737 001352 001142 225$:  MOV      RMER1I,$BDDAT ;GET RECEIVED STATUS
418 046612 042637 001142          BIC      (SP)+,$BDDAT ;RESET FER IF ENABLED
419 046616 001412          BEQ      230$          ;BRANCH IF FER OK
420 046620 062716 000004          ADD      #4,(SP)      ;MOVE SP TO USERS ERROR CALL
421 046624 112776 000037 000000  MOVB     #37,@(SP)    ;WRITE ERROR NUMBER IN CALL
422 046632 162716 000002          SUB      #2,(SP)      ;MOVE SP TO ERROR RETURN
423 046636 004736          JSR      PC,@(SP)+    ;REPORT ERROR AND RETURN
424 046640 162716 000010          SUB      #10,(SP)     ;MOVE SP TO NO ERROR
425 046644          230$:
426
427          ;REPORT ERROR IF BSE IS SET AND HEADER ERRORS ARE NOT ENABLED
428 046644 012746 177777          MOV      #-1,-(SP)    ;ASSUME ERRORS ENABLED
429 046650 032737 000200 050550  BIT      #HCE,500$    ;ARE THEY ENABLED ??
430 046656 001002          BNE      235$          ;YES !!
431 046660 042716 100000          BIC      #BSE,(SP)    ;DISABLE BSE
432 046664 013737 001400 001142 235$:  MOV      RMER2I,$BDDAT ;GET RECEIVED STATUS
433 046672 042637 001142          BIC      (SP)+,$BDDAT ;CLEAR BSE IF ENABLED
434 046676 001412          BEQ      240$          ;BRANCH IF BSE OK
435 046700 062716 000004          ADD      #4,(SP)      ;MOVE SP TO USERS ERROR CALL
436 046704 112776 000354 000000  MOVB     #354,@(SP)   ;WRITE ERROR NUMBER
437 046712 162716 000002          SUB      #2,(SP)      ;MOVE SP TO ERROR RETURN
438 046716 004736          JSR      PC,@(SP)+    ;REPORT ERROR AND RETURN
439 046720 162716 000010          SUB      #10,(SP)     ;MOVE SP TO NO ERROR
440 046724          240$:
441
442          ;RESET THE ENABLING BIT (HCE), IF SKIP SECTOR ERROR INHIBIT (SSEI)
443          ;SET OR FORMAT 16 (FMT) IS CLEAR.
444 046724 010046          MOV      R0,-(SP)     ;;PUSH R0 ON STACK
445 046726 013700 050556          MOV      515$,R0      ;GET FUNCTION CODE
446 046732 016037 070002 050550  MOV      FNCDTB(R0),500$ ;STORE FUNCTION TABLE ENTRY
447 046740 012600          MOV      (SP)+,R0     ;;POP STACK INTO R0
448 046742 032737 010000 001370  BIT      #FMT16,RMOFI  ;18 BIT FORMAT MODE ?
449 046750 001404          BEQ      241$          ;BR IF YES
450 046752 032737 001000 001370  BIT      #SSEI,RMOFI  ;IS SSEI SET ?
451 046760 001403          BEQ      242$          ;BR IF NO
452 046762 042737 000200 050550 241$:  BIC      #HCE,500$    ;DISABLE HEADER ERROR
453 046770          242$:
454
455          ;REPORT ERROR IF SSE IS SET AND HEADER ERRORS ARE NOT ENABLED
456 046770 012746 177777          MOV      #-1,-(SP)    ;ASSUME ERRORS ENABLED
    
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457 046774 032737 000200 050550      BIT      #HCE,500$      :ARE HCE'S VALID FOR THIS FUNCTION ?
458 047002 001002                BNE      243$         :YES !!
459 047004 042716 000040                BIC      #SSE,(SP)    :DISABLE SSE
460 047010 013737 001400 001142 243$:  MOV      RMER2I,$BDDAT :GET RECEIVED STATUS
461 047016 042637 001142                BIC      (SP)+,$BDDAT :CLEAR SSE IF NOT VALID FOR FUNCTION
462 047022 001412                BEQ      244$         :BRANCH IF SSE OK
463 047024 062716 000004                ADD      #4,(SP)      :MOVE SP TO USERS ERROR CALL
464 047030 112776 000063 000000        MOV      #63,@(SP)    :WRITE ERROR NUMBER
465 047036 162716 000002                SUB      #2,(SP)      :MOVE SP TO ERROR RETURN
466 047042 004736                JSR      PC,@(SP)+    :REPORT ERROR AND RETURN
467 047044 162716 000010                SUB      #10,(SP)     :MOVE SP TO NO ERROR
468 047050                244$:
469
470                :BIT 06 OF THE FUNCTION CODE TABLE IS THE ENABLING BIT FOR DATA
471                :FIELD ERRORS, I.E.,
472                :      RMCS2 - MDPE
473                :      RMER1 - DCK,ECH
474                :NOTE:
475                :      ECH CANNOT SET UNLESS IT IS ENABLED AND ECI IS RESET AND
476                :      DCK IS SET.
477
478                :REPORT ERROR IF MDPE IS SET AND IS NOT ENABLED
479 047050 012746 177777                MOV      #-1,-(SP)    :ASSUME ENABLED
480 047054 032737 000100 050550        BIT      #ECH,500$    :ARE DATA FIELD ERRORS ENABLED ??
481 047062 001002                BNE      245$         :YES !!
482 047064 042716 000400                BIC      #MDPE,(SP)   :DISABLE MDPE
483 047070 013737 001346 001142 245$:  MOV      RMCS2I,$BDDAT :GET RECEIVED STATUS
484 047076 042637 001142                BIC      (SP)+,$BDDAT :CLEAR MDPE IF ENABLED
485 047102 001412                BEQ      250$         :BRANCH IF MDPE OK
486 047104 062716 000004                ADD      #4,(SP)      :MOVE SP TO USERS ERROR CALL
487 047110 112776 000027 000000        MOV      #27,@(SP)    :WRITE ERROR NUMBER IN CALL
488 047116 162716 000002                SUB      #2,(SP)      :MOVE SP TO ERROR RETURN
489 047122 004736                JSR      PC,@(SP)+    :REPORT ERROR AND RETURN
490 047124 162716 000010                SUB      #10,(SP)     :MOVE SP TO NO ERROR
491 047130                250$:
492
493                :REPORT ERROR IF DCK IS SET AND DATA FIELD ERRORS ARE NOT ENABLED
494 047130 012746 177777                MOV      #-1,-(SP)    :ASSUME ENABLED
495 047134 032737 000100 050550        BIT      #ECH,500$    :ARE THEY ENABLED ??
496 047142 001002                BNE      255$         :YES !!
497 047144 042716 100000                BIC      #DCK,(SP)    :DISABLE DCK
498 047150 013737 001352 001142 255$:  MOV      RMER1I,$BDDAT :GET RECEIVED STATUS
499 047156 042637 001142                BIC      (SP)+,$BDDAT :CLEAR DCK IF ENABLED
500 047162 001412                BEQ      260$         :BRANCH IF DCK IS OK
501 047164 062716 000004                ADD      #4,(SP)      :MOVE SP TO USERS ERROR CALL
502 047170 112776 000030 000000        MOV      #30,@(SP)    :WRITE ERROR NUMBER IN CALL
503 047176 162716 000002                SUB      #2,(SP)      :MOVE SP TO ERROR RETURN
504 047202 004736                JSR      PC,@(SP)+    :REPORT ERROR AND RETURN
505 047204 162716 000010                SUB      #10,(SP)     :MOVE SP TO NO ERROR
506 047210                260$:
507
508                :REPORT ERROR IF ECH IS SET AND,
509                :      DATA FIELD ERRORS ARE NOT ENABLED, OR
510                :      ECI IS SET, OR
511                :      DCK IS NOT SET.
512 047210 012746 177777                MOV      #-1,-(SP)    :ASSUME ENABLED
513 047214 032737 000100 050550        BIT      #ECH,500$    :ARE ERRORS ENABLED ??
    
```

514	047222	001410			BEQ	265\$:NO !!
515	047224	032737	004000	001370	BIT	#ECI,RMOFI	:IS ECI SET ??
516	047232	001004			BNE	265\$:YES !!
517	047234	032737	100000	001352	BIT	#DCK,RMER1I	:IS DCK ALSO SET ??
518	047242	001002			BNE	270\$:YES !!
519	047244	042716	000100		BIC	#ECH,(SP)	:DISABLE ECH
520	047250	013737	001352	001142	MOV	RMER1I,\$BDDAT	:GET RECEIVED STATUS
521	047256	042637	001142		BIC	(SP)+,\$BDDAT	:CLEAR ECH IF ENABLED
522	047262	001412			BEQ	275\$:BRANCH IF ECH IS OK
523	047264	062716	000004		ADD	#4,(SP)	:MOVE SP TO USERS ERROR CALL
524	047270	112776	000031	000000	MOVB	#31,@(SP)	:WRITE ERROR NUMBER IN CALL
525	047276	162716	000002		SUB	#2,(SP)	:MOVE SP TO ERROR RETURN
526	047302	004736			JSR	PC,@(SP)+	:REPORT ERROR AND RETURN
527	047304	162716	000010		SUB	#10,(SP)	:MOVE SP TO NO ERROR
528	047310						

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1
2
3
4
5 047310 022737 000030 050556      CMP      #SEARCH,515$      ;WAS DATA TRANSFERRED ?
6 047316 103402                    BLO      220$              ;BR IF YES
7 047320 000137 050522                    JMP      355$              ;NO - EXIT
8
9
10 047324 013737 001340 001142      ;REPORT ERROR IF RMWC NOT ZERO AND TRE IS ZERO
11 047332 001421                    280$:  MOV      RMWCI,$BDDAT      ;WORD COUNT ZERO??
12 047334 032737 040000 001336      BEQ      285$              ;YES
13 047342 001015                    BIT      #TRE,RMCS1I      ;TRANSFER ERROR DETECTED??
14 047344 062716 000004                    BNE      285$              ;YES!!
15 047350 112776 000015 000000      ADD      #4,(SP)
16 047356 005037 001140                    MOV      #15,@(SP)        ;ERROR NUMBER
17 047362 162716 000002                    CLR      $GDDAT           ;GOOD DATA FOR TYPEOUT
18 047366 004736                    SUB      #2,(SP)          ;MOVE SP TO RETURN FOR ERROR
19 047370 162716 000010                    JSR      PC,@(SP)+        ;REPORT WORD COUNT NOT ZERO
20 047374 000240                    SUB      #10,(SP)        ;RESTORE (SP)
21
22
23 047376 013737 001340 001140      ;REPORT ERROR IF RMBA IS NOT CORRECT
24 047404 163737 001414 001140      285$:  MOV      RMWCI,$GDDAT      ;GET WORD COUNT AT END OF TRANSFER AND
25 047412 006337 001140                    SUB      RMWCO,$GDDAT      ;SUBTRACT STARTING WORD COUNT.
26 047416 063737 001416 001140      ASL      $GDDAT           ;* 2
27
28 047424 032737 000010 001346      ADD      RMBAO,$GDDAT      ;ADD STARTING BUS ADDRESS
29 047432 001403                    BIT      #BAI,RMCS2I      ;WAS BUS ADDRESS INHIBIT (BAI) SET ??
30 047434 013737 001416 001140      BEQ      290$              ;NO !!
31
32 047442 023737 001140 001342      MOV      RMBAO,$GDDAT      ;ADDRESS SHOULD NOT HAVE CHANGED
33 047450 001416                    290$:  CMP      $GDDAT,RMBAI      ;BUS ADDRESS OK??
34 047452 013737 001342 001142      BEQ      295$              ;YES!!
35 047460 062716 000004                    MOV      RMBAI,$BDDAT      ;BAD DATA FOR TYPEOUT
36 047464 112776 000016 000000      ADD      #4,(SP)
37 047472 162716 000002                    MOV      #16,@(SP)        ;ERROR NUMBER
38 047476 004736                    SUB      #2,(SP)          ;MOVE SP TO RETURN FOR ERROR
39 047500 162716 000010                    JSR      PC,@(SP)+        ;REPORT UNEXPECTED ADDRESS
40 047504 000240                    SUB      #10,(SP)        ;RESTORE (SP)
41
42
43 047506 005046                    ;COMPUTE NUMBER OF SECTORS TRANSFERRED FROM WORD COUNT
44 047510 013746 001340                    295$:  CLR      -(SP)            ;NUMBER OF SECTORS TRANSFERRED
45 047514 163716 001414                    MOV      RMWCI,-(SP)      ;GET WORD COUNT AT END OF TRANSFER AND
46
47 047520 012746 000400                    SUB      RMWCO,(SP)      ;SUBTRACT STARTING WORD COUNT.
48 047524 032737 000002 001412      MOV      #256,-(SP)      ;ASSUME 256. WORDS PER SECTOR
49 047532 001402                    BIT      #BIT1,RMCS10     ;HEADER & DATA COMMAND ??
50 047534 062716 000002                    BEQ      300$              ;NO !!
51
52 047540 005266 000004                    ADD      #2,(SP)          ;CHANGE TO 258. WORDS PER SECTOR
53 047544 161666 000002                    300$:  INC      4(SP)            ;INCREMENT SECTOR COUNT
54 047550 003373                    SUB      (SP),2(SP)      ;SUBTRACT ONE SECTOR'S WORTH
55 047552 022626                    BGT      300$              ;CONTINUE IF NOT DONE
56
57
;COMPUTE EXPECTED SECTOR, TRACK AND CYLINDER ADDRESS FROM
    
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58                                     :NUMBER OF SECTORS
59 047554 013737 001446 050550      MOV      RMDCO,500$      ;STORE ORIGINAL CYLINDER
60 047562 013737 001420 050552      MOV      RMDAO,505$     ;STORE ORIGINAL TRACK
61 047570 013737 001420 050554      MOV      RMDAO,510$     ;STORE ORIGINAL SECTOR
62 047576 013737 001334 050560      MOV      LSTRK,520$     ;STORE LAST TRACK
63 047604 000337 050560              SWAB     520$           ;GET TRACK ADDRESS TO LO BYTE AND
64 047610 005237 050560              INC      520$           ;INCREMENT TO GET TOTL # OF TRACKS.
65
66 047614 042737 000377 050552      BIC     #^C<TADMSK>,505$ ;SAVE TRACK ADDRESS BITS AND
67 047622 000337 050552              SWAB     505$           ;SWAP TRACK ADDRESS TO LOW BYTE.
68 047626 042737 177400 050554      BIC     #^C<SADMSK>,510$ ;SAVE SECTOR ADDRESS BITS
69 047634 062637 050554              ADD      (SP)+,510$
70
71 047640 032737 001000 001444      BIT     #SSEI,RMOFO     ;WAS SSEI SET ?
72 047646 001411                    BEQ     310$            ;NO !!
73
74 047650 023727 050554 000040      CMP     510$,#32.       ;SECTOR OVEFLOWED??
75 047656 103417                    BLO     315$            ;NO!!
76 047660 005237 050552              INC     505$           ;INCREMENT TRACK
77 047664 162737 000040 050554      SUB     #32.,510$       ;ADJUST SECTOR
78
79 047672 023727 050554 000037 310$:  CMP     510$,#31.       ;SECTOR OVERFLOWED ?
80 047700 103406                    BLO     315$            ;NO !!
81 047702 005237 050552 314$:  INC     505$           ;INCREMENT TRACK
82 047706 162737 000037 050554      SUB     #31.,510$       ;ADJUST SECTOR
83 047714 000766                    BR      310$            ;TRY AGAIN
84
85 047716 023737 050552 050560 315$:  CMP     505$,520$       ;TRACK OVERFLOWED??
86 047724 103407                    BLO     320$            ;NO!!
87 047726 005237 050550              INC     500$           ;INCREMENT CYLINDER
88 047732 163737 050560 050552      SUB     520$,505$       ;ADJUST TRACK
89 047740 000766                    BR      315$            ;TRY AGAIN
90 047742 000240                    NOP
91
92                                     ;REPORT ERROR IF "SSEI" IS SET AFTER TRACK SWITCHING OCCURED
93                                     ;THRU DATA TRANSFER
94 047744 005037 001140 320$:  CLR     $GDDAT          ;SETUP EXPECTED SSEI = 0
95 047750 013737 001370 001142      MOV     RMOFI,$BDDAT    ;GET RECIEVED DATA AND
96 047756 042737 176777 001142      BIC     #^CSSEI,$BDDAT ;SAVE SSEI BIT FOR COMPARE.
97
98 047764 032737 001000 001444      BIT     #SSEI,RMOFO     ;WAS SSEI SET BEFORE DATA TRANSFER ?
99 047772 001420                    BEQ     322$            ;NO
100 047774 123737 001421 001345     CMPB   RMDAO+1,RMDAI+1 ;DID TRACK SWITCH OCCUR ?
101 050002 001411                    BEQ     321$            ;NO
102 050004 005737 001142              TST     $BDDAT          ;IS SSEI STILL SET ?
103 050010 001430                    BEQ     324$            ;NO
104 050012 062716 000004              ADD     #4,(SP)         ;POINT TO ERROR
105 050016 112776 000225 000000      MOVB   #225,@(SP)      ;DEFINE ERROR NUMBER
106 050024 000414                    BR      323$
107
108                                     ;REPORT ERROR IF "SSEI" IS INCORRECT
109 050026 012737 001000 001140 321$:  MOV     #SSEI,$GDDAT    ;SETUP EXPECTED SSEI = 1
110 050034 023737 001140 001142 322$:  CMP     $GDDAT,$BDDAT   ;IS SSEI CORRECT ?
111 050042 001413                    BEQ     324$            ;YES
112 050044 062716 000004              ADD     #4,(SP)         ;POINT TO ERROR
113 050050 112776 000226 000000      MOVB   #226,@(SP)      ;DEFINE ERROR NUMBER
114 050056 162716 000002 323$:  SUB     #2,(SP)         ;ADJUST RETURN TO ERROR
    
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115 050062 004736          JSR    PC,@(SP)+      :REPORT ERROR
116 050064 162716 000010  SUB    #10,(SP)       :RESTORE (SP)
117 050070 000240          NOP
118
119          :REPORT ERROR IF 'LBT' IS NOT CORRECT
120 050072 005037 001140 324$: CLR    $GDDAT        :SET GOOD DATA FOR LBT = 0
121 050076 023727 050550 001060  CMP    500$,#560.    :SHOULD LBT BE SET??
122 050104 101407          BLOS   325$         :NO!!
123 050106 032737 002000 001352  BIT    #IAE,RMER1I   :WAS IAE SET ??
124 050114 001003          BNE    325$         :YES - LBT SHOULD NOT BE SET
125 050116 012737 002000 001140  MOV    #LBT,$GDDAT   :SET GOOD DATA FOR LBT = 1
126 050124 013737 001350 001142 325$: MOV    RMDSI,$BDDAT :BAD DATA FOR TYPEOUT
127 050132 042737 175777 001142  BIC    #^CLBT,$BDDAT
128 050140 023737 001140 001142  CMP    $GDDAT,$BDDAT :IS LBT CORRECT??
129 050146 001413          BEQ    330$         :YES!!
130 050150 062716 000004          ADD    #4,(SP)
131 050154 112776 000017 000000  MOVB   #17,@(SP)    :ERROR NUMBER
132 050162 162716 000002          SUB    #2,(SP)      :MOVE SP TO RETURN FOR ERROR
133 050166 004736          JSR    PC,@(SP)+    :REPORT LBT IS WRONG
134 050170 162716 000010  SUB    #10,(SP)     :RESTORE (SP)
135 050174 000240          NOP
136
137          :REPORT ERROR IF 'AOE' IS INCORRECT
138 050176 005037 001140 330$: CLR    $GDDAT        :SET FOR AOE = 0
139 050202 032737 002000 001352  BIT    #IAE,RMER1I   :WAS 'IAE' DETECTED??
140 050210 001031          BNE    340$         :YES-'AOE' SHOULD BE ZERO
141 050212 023727 050550 001060  CMP    500$,#560.    :SHOULD AOE BE SET??
142 050220 101425          BLOS   340$         :NO!!
143 050222 005737 050552          TST    505$         :MAYBE
144 050226 001012          BNE    335$         :YES
145 050230 005737 050554          TST    510$
146 050234 001007          BNE    335$         :YES !!
147 050236 032737 000010 050556  BIT    #F2,515$      :WAS THIS READ OR WRITE CHECK ??
148 050244 001413          BEQ    340$         :NO !!
149 050246 005737 001340          TST    RMWCI
150 050252 001410          BEQ    340$         :WAS ALL DATA TRANSFERRED ??
151 050254 012737 001000 001140 335$: MOV    #AOE,$GDDAT   :SET FOR AOE = 1
152 050262 005037 050552          CLR    505$         :CLEAR EXPECTED TRACK
153 050266 012737 000001 050554  MOV    #1,510$       :EXPECT SECTOR = 1
154 050274 013737 001352 001142 340$: MOV    RMER1I,$BDDAT :BAD DATA FOR TYPEOUT
155 050302 042737 176777 001142  BIC    #^CAOE,$BDDAT
156 050310 023737 001140 001142  CMP    $GDDAT,$BDDAT :IS AOE CORRECTY??
157 050316 001413          BEQ    345$         :YES!!
158 050320 062716 000004          ADD    #4,(SP)
159 050324 112776 000020 000000  MOVB   #20,@(SP)    :ERROR NUMBER
160 050332 162716 000002          SUB    #2,(SP)      :MOVE SP TO RETURN FOR ERROR
161 050336 004736          JSR    PC,@(SP)+    :REPORT AOE IS WRONG
162 050340 162716 000010  SUB    #10,(SP)     :RESTORE (SP)
163 050344 000240          NOP
164
165          :REPORT ERROR IF RMDA IS NOT CORRECT
166 050346 032737 002000 001352 345$: BIT    #IAE,RMER1I   :WAS THERE AN IAE ERROR ??
167 050354 001062          BNE    355$         :YES - DONT CHECK RMDA,RMDC
168 050356 013737 050552 001140  MCV    505,$GDDAT   :SETUP EXPECTED DISK ADDRESS
169 050364 000337 001140          SWAB   $GDDAT
170 050370 113737 050554 001140  MOVB   510,$GDDAT
171 050376 013737 001344 001142  MOV    RMDA!, $BDDAT :SETUP RECEIVED DISK ADDRESS
    
```

```

172 050404 023737 001140 001142      CMP      $GDDAT,$BDDAT      :COMPARE EXPECTED & RECEIVED
173 050412 001413                    BEQ      350$              :BRANCH IF EQUAL
174 050414 062716 000004                    AND      #4,(SP)
175 050420 112776 000021 000000      MOVB     #21,@(SP)         :ERROR NUMBER
176 050426 162716 000002                    SUB      #2,(SP)          :MOVE SP TO RETURN FOR ERROR
177 050432 004736                    JSR      PC,@(SP)+        :REPORT BAD DISK ADDRESS
178 050434 162716 000010                    SUB      #10,(SP)         :RESTORE (SP)
179 050440 000240                    NOP
180
181                                     :REPORT ERROR IF RMDC IS INCORRECT
182 050442 013737 050550 001140      350$:   MOV      500$,$GDDAT   :SETUP EXPECTED CYLINDER
183 050450 042737 176000 001140      BIC      #^C1777,$GDDAT
184 050456 013737 001372 001142      MOV      RMDCI,$BDDAT     :SETUP RECEIVED CYLINDER
185 050464 023737 001140 001142      CMP      $GDDAT,$BDDAT   :COMPARE CYLINDERS
186 050472 001413                    BEQ      355$              :BRANCH IF EQUAL
187 050474 062716 000004                    ADD      #4,(SP)
188 050500 112776 000022 000000      MOVB     #22,@(SP)         :ERROR NUMBER
189 050506 162716 000002                    SUB      #2,(SP)          :MOVE SP TO RETURN FOR ERROR
190 050512 004736                    JSR      PC,@(SP)+        :REPORT BAD CYLINDER
191 050514 162716 000010                    SUB      #10,(SP)         :RESTORE (SP)
192 050520 000240                    NOP
193
194 050522 062716 000004                    355$:   ADD      #4,(SP)     :MOVE (SP) TO ERROR CALL
195 050526 105776 000000                    TSTB     @(SP)            :WAS ERROR FOUND??
196 050532 001403                    BEQ      360$
197 050534 062716 000004                    ADD      #4,(SP)         :MOVE (SP) TO ERROR RETURN
198 050540 000402                    BR       365$
199 050542 162716 000004                    360$:   SUB      #4,(SP)     :MOVE (SP) TO NO ERROR RETURN
200 050546 000207                    365$:   RTS      PC
201
202 050550 000000                    500$:   .WORD    0         :CYLINDER
203 050552 000000                    505$:   .WORD    0         :TRACK
204 050554 000000                    510$:   .WORD    0         :SECTOR
205 050556 000000                    515$:   .WORD    0         :FUNCTION CODE
206 050560 000000                    520$:   .WORD    0         :TOTAL # OF TRACKS = LAST TRACK +1
    
```

```

1      .SBTTL  COMPOSITE ERROR CHECK SUBROUTINE
2
3      ;THIS SUBROUTINE CHECKS THE STORED CONTENTS OF RMER1 AND
4      ;RMER2 AFTER MASKING EACH REGISTER WORD WITH THE USER'S STATUS
5      ;MASKS AND REPORTS AN ERROR IF ANY BITS ARE LEFT ON AFTER
6      ;THE MASKS ARE APPLIED.
7
8      ;CALL:
9      ;(1)   JSR      PC,CMPERRSTS
10     ;      .WORD   MASK FOR ERROR REGISTER 1
11     ;      .WORD   MASK FOR ERROR REGISTER 2
12     ;      BR      ???   RETURN HERE IF NO ERROR
13     ;      NOP     RETURN HERE TO REPORT AN ERROR
14     ;      ERROR   ERROR NUMBER DEFINED BY SUB
15     ;      JSR     PC,@(SP)+ GO BACK TO SUB FOR MORE ERROR CHECKS
16     ;      ???    RETURN HERE IF NO MORE ERRORS
17
18     ;NOTE:  BITS TO BE MASKED SHOULD BE ONE; BITS TO BE TESTED SHOULD
19     ;BE ZERO
20
21     050562  CMPERRSTS:
22
23     ;MASK AND STORE THE CONTENTS OF RMER1 AND RMER2
24     050562  013737  001352  001176  MOV      RMER1I,$TMP1  ;STORE RMER1 AT TEMP STORAGE
25     050570  047637  000000  001176  BIC      @(SP),$TMP1  ;MASK RMER1
26     050576  062716  000002             ADD      #2,(SP)      ;MOVE SP TO NEXT MASK
27     050602  013737  001400  001200  MOV      RMER2I,$TMP2  ;STORE RMER2 AT TEMP STORAGE
28     050610  047637  000000  001200  BIC      @(SP),$TMP2  ;MASK RMER2
29
30
31     ;CLEAR USER'S ERROR CALL
32     050616  062716  000006             ADD      #6,(SP)      ;MOVE SP TO USER'S ERROR CALL
33     050622  105076  000000             CLRB    @(SP)        ;CLEAR ERROR NUMBER
34     050626  162716  000004             SUB     #4,(SP)      ;LEAVE SP AT NO ERROR RETURN
35
36     ;SEE IF THERE WERE ANY ERRORS IN RMER1, I.E., $TMP1
37     050632  005737  001176             TST     $TMP1        ;ANY ERRORS TO REPORT??
38     050636  001420             BEQ     5$          ;NO !!
39     050640  013737  001176  001142  MOV     $TMP1,$BDDAT ;RECEIVED STATUS FOR TYPEOUT
40     050646  005037  001140             CLR     $GDDAT      ;EXPECTED STATUS FOR TYPEOUT
41     050652  062716  000004             ADD     #4,(SP)      ;MOVE SP TO USER'S ERROR CALL
42     050656  112776  000066  000000  MOVB   #66,@(SP)    ;CORRECTABLE DATA CHECK ERROR #
43     050664  162716  000002             SUB     #2,(SP)      ;MOVE SP TO RETURN FOR ERROR
44     050670  004736             JSR     PC,@(SP)+   ;REPORT ERROR VIA USER
45     050672  162716  000010             SUB     #10,(SP)    ;MOVE SP BACK TO BRANCH
46     050676  000240             NOP
47     050700  5$:
48
49
50     ;SEE IF THERE ARE ANY ERRORS TO REPORT IN RMER2 ($TMP2)
51     050700  005737  001200             TST     $TMP2        ;ANY ERRORS IN RMER2?
52     050704  001420             BEQ     10$         ;NO!!
53
54     050706  013737  001200  001142  MOV     $TMP2,$BDDAT ;RECEIVED STATUS FOR TYPEOUT
55     050714  005037  001140             CLR     $GDDAT      ;EXPECTED STATUS FOR TYPEOUT
56     050720  062716  000004             ADD     #4,(SP)      ;MOVE SP TO USER'S ERROR CALL
57     050724  112776  000067  000000  MOVB   #67,@(SP)    ;WRITE ERROR NUMBER IN USER'S CALL
    
```

58	0507	162716	000002	SUB	#2.(SP)	:MOVE SP TO RETURN FOR ERROR
59	050756	004736		JSR	PC,@(SP)+	:REPORT ERROR VIA USER
60	050740	162716	000010	SUB	#10.(SP)	:MOVE SP TO NO ERROR RETURN
61	050744	000240		NOP		
62	050746					
63						
64						
65	050746	062716	000004	ADD	#4.(SP)	:MOVE SP TO USER'S ERROR CALL
66	050752	105776	000000	TSTB	@(SP)	:WAS THERE AN ERROR CALLED??
67	050756	001403		BEQ	20\$:NO!!
68	050760	062716	000004	ADD	#4.(SP)	:YES - MOVE SP TO ERROR RETURN
69	050764	000402		BR	30\$	
70	050766	162716	000004	SUB	#4.(SP)	:MOVE SP TO NO ERROR RETURN
71	050772	000207		RTS	PC	:RETURN TO USER

```

1      .SBTTL  DEVICE SELECT SUBROUTINE
2
3      : THIS SUBROUTINE SELECTS THE DEVICE, GETTING THE DEVICE NUMBER FROM THE
4      : TEST QUEUE.
5
6      :CALL:
7      : (1)   JSR      PC,DEVSEL
8      : (2)   BR       ??          RETURN IF NO ERROR
9      : (3)   NOP
10     : (4)   ERROR          ERROR DEFINED BY SUBROUTINE
11
12     050774  DEVSEL:
13
14     :CLEAR USER'S ERROR CALL
15     050774  062716  000004      ADD     #4,(SP)          :MOVE SP TO USER'S ERROR
16     051000  105076  000000      CLRB   @ (SP)          :CLEAR LOW ORDER BYTE OF CALL
17     051004  162716  000004      SUB     #4,(SP)          :MOVE SP BACK
18
19     :SAVE USER'S INFORMATION AND SETUP REGISTERS
20     051010  013746  000004      MOV     ERRVEC,-(SP)    ;;PUSH ERRVEC ON STACK
21     051014  013746  000006      MOV     ERRVEC+2,-(SP) ;;PUSH ERRVEC+2 ON STACK
22     051020  010046          MOV     R0,-(SP)      ;;PUSH R0 ON STACK
23     051022  010146          MOV     R1,-(SP)      ;;PUSH R1 ON STACK
24     051024  012737  051144  000004      MOV     #20$,ERRVEC    :SETUP FOR BUS TIMEOUT
25     051032  012737  000300  000006      MOV     #PR6,ERRVEC+2
26     051040  013700  001276          MOV     $BASE,R0      :R0 = UNIBUS ADDRESS
27     051044  013701  001466          MOV     TSTQUE,R1     :R1 POINTS TO DEVICE NUMBER
28
29     :SELECT DEVICE AND VERIFY THAT DEVICE IS AVAILABLE
30     051050  111160  000010          MOV     (R1),RMCS2(R0) :WRITE UNIT SELECT BITS
31     051054  016037  000000  001176      MOV     RMCS1(R0),$TMP1 :GET 'DVA' STATUS
32     051062  016037  000010  001174      MOV     RMCS2(R0),$TMP0 :GET 'NED' STATUS
33
34     051070  032737  010000  001174      BIT     #NED,$TMP0     :IS DEVICE NONEXISTENT ?
35     051076  001407          BEQ     10$           :NO!!
36     051100  062766  000004  000010      ADD     #4,10(SP)      :MOVE SP TO USERS ERROR CALL
37     051106  112776  000111  000010      MOV     #111,@10(SP)  :WRITE ERROR NUMBER
38     051114  000422          BR      30$
39
40     051116  032737  004000  001176  10$:  BIT     #DVA,$TMP1     :IS DEVICE AVAILABLE ?
41     051124  001021          BNE     35$           :YES!!
42     051126  062766  000004  000010      ADD     #4,10(SP)      :MOVE SP TO USERS ERROR CALL
43     051134  112776  000112  000010      MOV     #112,@10(SP)  :WRITE ERROR NUMBER
44     051142  000407          BR      30$
45
46     :HANDLE BUS TIMEOUT
47     051144  022626  20$:  CMP     (SP)+,(SP)+    :ADJUST SP
48     051146  062766  000004  000010      ADD     #4,10(SP)      :MOVE SP TO USERS ERROR CALL
49     051154  112776  000113  000010      MOV     #113,@10(SP)  :WRITE BUS TIMEOUT ERROR NUMBER
50     051162  162766  000002  000010  30$:  SUB     #2,10(SP)      :ADJUST RETURN TO 'NOP' PRECEDING
51                                     :THE ERROR CALL
52
53     :RESTORE USERS DATA AND RETURN TO ADDRESS ON STACK
54     051170  012601  35$:  MOV     (SP)+,R1      ;;POP STACK INTO R1
55     051172  012600          MOV     (SP)+,R0      ;;POP STACK INTO R0
56     051174  012637  000006          MOV     (SP)+,ERRVEC+2 ;;POP STACK INTO ERRVEC+2
    
```

051200 012637 000004
52 051204 000207

MOV (SP)+.ERRVEC
RTS PC
::POP STACK INTO ERRVEC
:EXIT

```

1      .SBTTL  SEEK STATUS CHECK SUBROUTINE
2
3      ;THIS SUBROUTINE VERIFIES THE RESULTS OF SEEK TESTS USING STATUS
4      ;STORED IN THE GET BUFFER AND TEST PARAMETERS STORED IN THE PUT BUFFER.
5
6      ;
7      ;THE SUBROUTINE RETURNS TO THE CALLING ROUTINE IF AN ERROR IS DETECTED
8      ;AFTER HAVING LOADED THE APPROPRIATE ERROR NUMBER IN THE 'ERROR' TRAP
9      ;OF THE CALLING ROUTINE.  SEEK STATUS IS CHECKED AS FOLLOWS:
10
11     ;CALL:
12     ;(1)   JSR      PC,SEKSTS
13           BR       ???           RETURN HERE IF NO ERROR
14           NOP      ???           RETURN HERE TO REPORT AN ERROR
15           ERROR   ???           ERROR NUMBER DEFINED BY SUB
16           JSR    PC,@(SP)+      GO BACK TO SUB FOR MORE ERROR CHECKS
17           ???
18
19     051206  SEKSTS:
20
21     ;CLEAR USERS' ERROR CALL
22     051206  000240  NOP
23     051210  062716  000004  ADD     #4,(SP)           ;MOVE (SP) TO ERROR CALL
24     051214  105076  000000  CLRB   @ (SP)           ;CLEAR ERROR NUMBER
25     051220  162716  000004  SUB    #4,(SP)           ;MOVE (SP) TO NO ERROR RETURN
26     051224  005037  052464  CLR    300$             ;CLEAR ERROR FLAGS
27
28     ;TEST FOR MASSBUS CONTROL BUS PARITY ERROR WHEN WRITING
29     ;LOCAL REGISTERS, I.E., 'PAR' = 1 AND 'DPE' = 0
30     051230  032737  000010  001352  BIT    #PAR,RMER1I      ;WAS PARITY ERROR DETECTED??
31     051236  001424  BEQ    1$              ;NO!!
32     051240  032737  000010  001400  BIT    #DPE,RMER2I     ;WAS IT DUE TO CONTROL BUS??
33     051246  001020  BNE    1$              ;NOT SURE!!
34
35     ;REPORT REGISTER PARITY ERROR VIA USER'S ERROR CALL
36     051250  005037  001140  CLR    $GDDAT           ;EXPECTED STATUS
37     051254  013737  001352  001142  MOV    RMER1I,$BDDAT    ;RECEIVED STATUS
38     051262  062716  000004  ADD    #4,(SP)         ;MOVE STACK TO USER'S ERROR
39     051266  112776  000050  000000  MOVB  #50,@(SP)        ;ERROR #50
40     051274  162716  000002  SUB    #2,(SP)         ;MOVE SP TO RETURN FOR ERROR
41     051300  004736  JSR    PC,@(SP)+
42     051302  162716  000010  SUB    #10,(SP)        ;RESTORE STACK
43     051306  000447  BR     3$              ;IAE SHOULD BE ZERO
44
45     ;DETERMINE THE VALUE OF "IAE" STATUS BASED ON TRACK, SECTOR, CYLINDER
46     ;AND THE STATUS OF "SSEI" BIT DURING A SEEK OPERATION. ALSO, SET "SKI"
47     ;IF CYLINDER ADDRESS IS TOO LARGE.
48     051310  012737  002000  001140  1$:  MOV    #IAE,$GDDAT    ;SETUP FOR IAE = 1
49     051316  052737  040000  052464  BIS    #SKI,300$       ;SETUP FOR SKI = 1
50     051324  023727  001446  001060  CMP    RMDCO,#560.     ;GREATER THAN LAST CYLINDER ?
51     051332  101035  BHI    3$              ;YES - CYLINDER IS INVALID
52     051334  042737  040000  052464  BIC    #SKI,300$       ;CLEAR SKI ERROR FLAG
53
54     051342  123737  001421  001335  CMPB  RMDAO+1,LSTRK+1  ;GREATER THAN LAST TRACK ?
55     051350  101026  BHI    3$              ;YES - TRACK IS INVALID
56
57     051352  123727  001420  000035  CMPB  RMDAO,#29.       ;SECTOR > 29. ?
    
```



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58 051360 101420          BLOS 2$          :BR IF NO
59 051362 032737 010000 001444 BIT #FMT16,RMOFO :18 BIT FORMAT ?
60 051370 001416          BEQ 3$          :YES - SECTOR IS INVALID FOR 18 BIT MODE
61 051372 123727 001420 000036 CMPB RMDAO,#30.  :SECTOR > 30. ?
62 051400 101410          BLOS 2$          :BR IF NO
63 051402 032737 001000 001444 BIT #SSEI,RMOFO  :IS SSEI CLEAR ?
64 051410 001406          BEQ 3$          :YES - SECTOR IS INVALID FOR 16 BIT MODE
65 051412 123727 001420 000037 CMPB RMDAO,#31.  :SECTOR > 31. ?
66 051420 101002          BHI 3$          :YES - SECTOR IS INVALID
67
68 051422 005037 001140 2$: CLR $GDDAT      :''IAE'' SHOULD = 0
69
70 :COMPARE EXPECTED AND RECIEVED ''IAE'' STATUS
71 051426 013737 001352 001142 3$: MOV RMER1I,$BDDAT :IS IAE OK??
72 051434 042737 175777 001142 BIC #^CIAE,$BDDAT :SAVE IAE BIT FOR COMPARE
73 051442 023737 001140 001142 CMP $GDDAT,$BDDAT :CORRECT ''IAE'' STATUS ?
74 051450 001004          BNE 35$         :BR IF NO
75 051452 042737 040000 052464 BIC #SKI,300$   :CLEAR SKI FLAG
76 051460 000413          BR 5$           :GO CHECK NEXT ERROR
77 051462
78 35$:
79 :REPORT INCORRECT ''IAE'' STATUS VIA USER'S ERROR CALL
80 051466 112776 000051 000000 ADD #4,(SP)
81 051474 162716 000002          MOVB #51,@(SP)   :ERROR 51
82 051500 004736          JSR PC,@(SP)+  :MOVE SP TO RETURN FOR ERROR
83 051502 162716 000010          SUB #10,(SP)   :REPORT INCORRECT IAE
84 051506 000240          NOP           :RESTORE (SP)
85 051510
86
87 5$:
88 :REPORT ANY IVC ERROR AS
89 : IVC ERROR WITH VOLUME VALID ZERO
90 051510 032737 010000 001400 : ERRONEOUS IVC ERROR, VOLUME VALID IS SET
91 051516 001427          BIT #IVC,RMER2I  :IVC ERROR??
92 051520 005037 001140          BEQ 52$         :NO!!
93 051524 013737 001400 001142 CLR $GDDAT      :EXPECTED STATUS
94 051532 062716 000004          MOV RMER2I,$BDDAT :RECEIVED STATUS
95 051536 112776 000060 000000 ADD #4,(SP)     :MOVE SP TO USER'S ERROR
96 051544 032737 000100 001350 MOVB #60,@(SP)  :ERROR 60 IF VV = 0
97 051552 001403          BIT #VV,RMDSI
98 051554 112776 000061 000000 BEQ 51$         :ERROR 61 IF VV = 1
99 051562 162716 000002          MOVB #61,@(SP)  :MOVE SP TO RETURN FOR ERROR
100 051566 004736          JSR PC,@(SP)+  :REPORT ERROR VIA USER
101 051570 162716 000010          SUB #10,(SP)   :RESTORE SP
102 051574 000240          NOP
103
104 051576 013737 001400 001142 52$: MOV RMER2I,$BDDAT :RECEIVED STATUS
105 051604 042737 137777 001142 BIC #^CSKI,$BDDAT :CLEAR DONT CARES
106 051612 013737 052464 001140 MOV 300$,$GDDAT  :GET EXPECTED SKI STATUS
107 051620 042737 137777 001140 BIC #^CSKI,$GDDAT :CLEAR DONT CARES
108 051626 001417          BEQ 53$         :BRANCH IF 0 EXPECTED
109
110 :REPORT ERROR IF SKI IS NOT SET (IAE WAS NOT DETECTED)
111 051630 032737 040000 001142 BIT #SKI,$BDDAT  :WAS SKI DETECTED ??
112 051636 001032          BNE 54$         :YES !!
113 051640 062716 000004          ADD #4,(SP)    :MOVE SP TO USERS ERROR CALL
114 051644 112776 000267 000000 MOVB #267,@(SP)  :WRITE ERROR NUMBER
    
```

```

115 051652 162716 000002          SUB      #2,(SP)          :MOVE SP TO ERROR RETURN
116 051656 004736                JSR      PC,@(SP)+       :REPORT ERROR AND RETURN
117 051660 162716 000010          SUB      #10,(SP)       :MOVE SP TO NO ERROR
118 051664 000443                BR       6$              :GO TO NEXT ERROR CHECK
119 051666                53$:
120
121                                :REPORT ERROR IF SKI IS SET
122 051666 032737 040000 001142    BIT      #SKI,$BDDAT     :IS SKI SET ??
123 051674 001413                BEQ      54$              :NO - SKI IS OK
124 051676 062716 000004          ADD      #4,(SP)         :MOVE (SP) TO ERROR
125 051702 112776 000054 000000    MOVB     #54,@(SP)       :LOAD ERROR NUMBER
126 051710 162716 000002          SUB      #2,(SP)         :MOVE SP TO RETURN FOR ERROR
127 051714 004736                JSR      PC,@(SP)+       :REPORT SEEK ERROR
128 051716 162716 000010          SUB      #10,(SP)       :RESTORE (SP)
129 051722 000240                NOP
130
131                                :REPORT ANY DEVICE CHECK
132 051724 032737 000200 001400    54$: BIT      #DVC,RMER2I   :WAS THERE DVC DURING SEEK??
133 051732 001420                BEQ      6$              :NO!!
134 051734 005037 001140          CLR      $GDDAT         :EXPECTED STATUS
135 051740 013737 001400 001142    MOV      RMER2I,$BDDAT   :RECEIVED STATUS
136 051746 062716 000004          ADD      #4,(SP)
137 051752 112776 000055 000000    MOVB     #55,@(SP)       :ERROR #55
138 051760 162716 000002          SUB      #2,(SP)         :MOVE SP TO RETURN FOR ERROR
139 051764 004736                JSR      PC,@(SP)+       :REPORT ER:OP VIA USER
140 051766 162716 000010          SUB      #10,(SP)       :RESTORE SP
141 051772 000240                NOP
142
143                                :REPORT ANY 'OPI' ERROR AS OPI WITH MOL = 0, OR OPI
144                                :BECAUSE ON CYLINDER LATCH DIDN'T RESET
145 051774 032737 020000 001352    6$: BIT      #OPI,RMER1I   :'OPI' ERROR??
146 052002 001427                BEQ      8$              :NO!!
147 052004 005037 001140          CLR      $GDDAT         :EXPECTED STATUS
148 052010 013737 001352 001142    MOV      RMER1I,$BDDAT   :RECEIVED STATUS
149 052016 062716 000004          ADD      #4,(SP)         :MOVE (SP) TO ERROR
150 052022 112776 000052 000000    MOVB     #52,@(SP)       :LOAD ERROR NUMBER
151 052030 032737 010000 001350    BIT      #MOL,RMDSI     :WAS MEDIUM ON LINE??
152 052036 001403                BEQ      7$              :NO!!
153 052040 112776 000053 000000    MOVB     #53,@(SP)       :YES - CHANGE ERROR NUMBER
154 052046 162716 000002          SUB      #2,(SP)         :MOVE SP TO RETURN FOR ERROR
155 052052 004736                JSR      PC,@(SP)+       :REPORT 'OPI' ERROR
156 052054 162716 000010          SUB      #10,(SP)       :RESTORE (SP)
157 052060 000240                NOP
158
159                                :SEE IF 'PIP' = 0, AND 'ATA', 'MOL' AND 'VV' = 1
160 052062 013746 001350          8$: MOV      RMDSI,-(SP)
161 052066 042716 047677          BIC      #^C<ATA!PIP!MOL!VV>,(SP)
162 052072 022726 110100          CMP      #ATA!MOL!VV,(SP)+
163 052076 001002          BNE     9$              :ERROR IN RMDS
164 052100 000137 052434          JMP      14$             :RMDS IS OK
165
166                                :REPORT ERROR IF MOL = 0 AND OPI = 0
167 052104 032737 010000 001350    9$: BIT      #MOL,RMDSI   :IS MOL RESET??
168 052112 001030                BNE     10$              :NO - MOL IS SET
169 052114 032737 020000 001352    BIT      #OPI,RMER1I     :WAS OPI SET
170 052122 001024                BNE     10$              :YES - DONT REPORT ERROR
171 052124 013737 001350 001140    MOV      RMDSI,$GDDAT   :EXPECTED STATUS
    
```

```

172 052132 052737 010000 001140      BIS      #MOL,$GDDAT
173 052140 013737 001350 001142      MOV      RMDSI,$BDDAT      ;RECEIVED STATUS
174 052146 062716 000004      ADD      #4,(SP)
175 052152 112776 000062 000000      MOVVB   #62,@(SP)
176 052160 162716 000002      SUB      #2,(SP)      ;MOVE SP TO RETURN FOR ERROR
177 052164 004736      JSR      PC,@(SP)+      ;REPORT ERROR VIA USER
178 052166 162716 000010      SUB      #10,(SP)
179 052172 000240      NOP
180
181      ;REPORT AN ERROR IF 'PIP' IS STIL SET AND SKI NOT SET
182 052174 032737 020000 001350 10$: BIT      #PIP,RMDSI      ;IS 'PIP' STILL SET??
183 052202 001430      BEQ      11$      ;NO!!
184 052204 032737 040000 001400      BIT      #SKI,RMER2I      ;WAS 'SKI' SET??
185 052212 001024      BNE      11$      ;YES-DONT REPORT PIP
186 052214 013737 001350 001140      MOV      RMDSI,$GDDAT      ;EXPECTED STATUS
187 052222 042737 020000 001142      BIC      #PIP,$BDDAT
188 052230 013737 001350 001142      MOV      RMDSI,$BDDAT      ;RECEIVED STATUS
189 052236 062716 000004      ADD      #4,(SP)      ;MOVE (SP) TO ERROR
190 052242 112776 000056 000000      MOVVB   #56,@(SP)      ;LOAD ERROR NUMBER
191 052250 162716 000002      SUB      #2,(SP)      ;MOVE SP TO RETURN FOR ERROR
192 052254 004736      JSR      PC,@(SP)+      ;REPORT 'PIP' SET AFTER SEEK
193 052256 162716 000010      SUB      #10,(SP)      ;RESTORE (SP)
194 052262 000240      NOP
195
196      ;REPORT AN ERROR IF 'ATA' IS NOT SET
197 052264 032737 100000 001350 11$: BIT      #ATA,RMDSI      ;WAS 'ATA' SET ??
198 052272 001024      BNE      13$      ;YES!!
199 052274 013737 001350 001140      MOV      RMDSI,$GDDAT      ;EXPECTED STATUS
200 052302 052737 110600 001140      BIS      #ATA!MOL!DPR!DRY,$GDDAT
201 052310 013737 001350 001142      MOV      RMDSI,$BDDAT      ;RECEIVED STATUS
202 052316 062716 000004      ADD      #4,(SP)      ;MOVE (SP) TO ERROR
203 052322 112776 000057 000000      MOVVB   #57,@(SP)      ;LOAD ERROR NUMBER
204 052330 162716 000002      SUB      #2,(SP)      ;MOVE SP TO RETURN FOR ERROR
205 052334 004736      JSR      PC,@(SP)+      ;REPORT ATTENTION NOT SET DURING
206      ;SEEK TEST
207 052336 162716 000010      SUB      #10,(SP)      ;RESTORE (SP)
208 052342 000240      NOP
209
210      ;REPORT ERROR IF VOLUME VALID IS RESET AND IVC IS ZERO
211 052344 032737 000100 001350 13$: BIT      #VV,RMDSI      ;IS VV = 0 ??
212 052352 001030      BNE      14$      ;NO!!
213 052354 032737 010000 001400      BIT      #IVC,RMER2I      ;IS IVC ALSO 0 ??
214 052362 001024      BNE      14$      ;NO - IVC IS SET
215 052364 013737 001350 001140      MOV      RMDSI,$GDDAT      ;EXPECTED STATUS
216 052372 052737 000100 001140      BIS      #VV,$GDDAT
217 052400 013737 001350 001142      MOV      RMDSI,$BDDAT      ;RECEIVED STATUS
218 052406 062716 000004      ADD      #4,(SP)
219 052412 112776 000064 000000      MOVVB   #64,@(SP)      ;ERROR #64
220 052420 162716 000002      SUB      #2,(SP)      ;MOVE SP TO RETURN FOR ERROR
221 052424 004736      JSR      PC,@(SP)+
222 052426 162716 000010      SUB      #10,(SP)
223 052432 000240      NOP
224 052434      14$:
225
226      ;MODIFY THE RETURN ADDRESS IF AN ERROR WAS DETECTED
227 052434 000240      NOP
228 052436 062716 000004      ADD      #4,(SP)      ;MOVE (SP) TO ERROR CALL
    
```

229	052442	105776	000000		TSTB	@(SP)		:WAS ERROR CALLED??
230	052446	001403			BEQ	15\$:NO!!
231	052450	062716	000004		ADD	#4,(SP)		:MOVE TO ERROR RETURN
232	052454	000402			BR	16\$		
233								
234	052456	162716	000004	15\$:	SUB	#4,(SP)		:MOVE (SP) TO NO ERROR RETURN
235	052462	000207		16\$:	RTS	PC		:RETURN
236								
237	052464	000000		300\$:	.WORD	0		:ERROR FLAGS

```

1      .SBTTL  CONTROLLER CLEAR SUBROUTINE
2
3      :THIS SUBROUTINE CLEARS THE MASSBUS CONTROLLER, MASSBUS ADAPTERS,
4      :AND DRIVES, THEN SELECTS THE DRIVE.
5
6      :CALL:  JSR      PC,CNTCLR
7              BR      ???          RETURN HERE IF NO ERROR FOUND
8              NOP
9              ERROR          RETURN HERE IF ANY ERROR FOUND
10             ???          SUB DEFINES ERROR NUMBER
11
12      CNTCLR:
13      052466 010046      MOV      R0,-(SP)          ;;PUSH R0 ON STACK
14      052470 010146      MOV      R1,-(SP)          ;;PUSH R1 ON STACK
15      052472 013746 000004  MOV      ERRVEC,-(SP)      ;;PUSH ERRVEC ON STACK
16      052476 013746 C00006  MOV      ERRVEC+2,-(SP)    ;;PUSH ERRVEC+2 ON STACK
17      13 052502 012737 052542 000004  MOV      #10$,ERRVEC      ;SETUP FOR BUS TIMEOUT
18      14 052510 012737 000300 000006  MOV      #PR6,ERRVEC+2
19      15 052516 013700 001276      MOV      $BASE,R0          ;R0 = UNIBUS ADDRESS
20      16 052522 012760 000040 000010  MOV      #CLR,RMCS2(R0)   ;CLEAR MASSBUS
21      17 052530 013701 001466      MOV      TSTQUE,R1        ;GET DEVICE UNDER TEST
22      18 052534 111160 000010      MOV      (R1),RMCS2(R0)  ;SELECT DEVICE
23      19 052540 000412
24
25      21 052542 022626      10$:  CMP      (SP)+,(SP)+    ;ADJUST STACK
26      22 052544 062766 000004 000010  ADD      #4,10(SP)        ;MOVE SP TO USER'S ERROR CALL
27      23 052552 112776 000007 000010  MOV      #7,210(SP)      ;WRITE THE ERROR NUMBER
28      24 052560 162766 000002 000010  SUB      #2,10(SP)        ;ADJUST SP TO RETURN TO ERROR
29      25 052566
30      052566 012637 000006      20$:  MOV      (SP)+,ERRVEC+2    ;;POP STACK INTO ERRVEC+2
31      052572 012637 000004      MOV      (SP)+,ERRVEC    ;;POP STACK INTO ERRVEC
32      052576 012601      MOV      (SP)+,R1        ;;POP STACK INTO R1
33      052600 012600      MOV      (SP)+,R0        ;;POP STACK INTO R0
34      26 052602 000207      RTS      PC

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.SBTTL CONTROLLER CLEAR STATUS CHECK SUBROUTINE

;THIS SUBROUTINE VERIFIES THAT THE SUBSYSTEM IS INITIALIZED BASED ON
;STATUS STORED IN THE GET BUFFER. THIS SUBROUTINE SHOULD ONLY BE
;USED FOLLOWING A CONTROLLER CLEAR OPERATION, I.E., WRITING A 1 IN BIT
;5 OF RMCS2, BECAUSE THE ERROR MESSAGES ARE BASED ON THAT CONDITION.

;STATUS PERTINENT TO THE DEVICE IS NOT CHECKED. IN PARTICULAR, THE
;FOLLOWING STATUS BITS ARE NOT CHECKED:
:
:       ATA,ERR,PIP,MOL,WRL,LBT,PGM,VV,OM,UNS,SKI,DVC
:
:CALL:
:(1)   JSR      PC,CLRSTS
:       BR      ???
:       NOP
:       ERROR
:       JSR      PC,@(SP)+
:       ???
:
:RETURN HERE IF NO ERROR
:RETURN HERE TO REPORT AN ERROR
:ERROR NUMBER DEFINED BY SUB
:GO BACK TO SUB FOR MORE ERROR CHECKS
:RETURN HERE IF NO MORE ERRORS

CLRSTS:

;CLEAR USER'S ERROR CALL
ADD     #4,(SP)      ;MOVE SP TO ERROR
CLRB    @(SP)        ;CLEAR ERROR NUMBER
SUB     #4,(SP)      ;MOVE SP BACK TO NO ERROR

;REPORT ERROR IF RMCS1 NOT INITIALIZED
4$:     MOV     RMCS1I,$BDDAT ;VERIFY RMCS1
        BIC     #SC,$BDDAT   ;IGNORE SPECIAL CONDITION
        MOV     #DVA!RDY,$GDDAT ;EXPECT DVA & RDY
        CMP     $GDDAT,$BDDAT ;COMPARE EXPECTED, RECEIVED
        BEQ     5$          ;BRANCH IF EQUAL
        ADD     #4,(SP)      ;MOVE SP TO USER'S ERROR CALL
        MOVB    #126,@(SP)   ;WRITE ERROR NUMBER IN CALL
        SUB     #2,(SP)      ;MOVE SP TO RETURN FOR ERROR
        JSR     PC,@(SP)+    ;REPORT ERROR VIA USER
        SUB     #10,(SP)     ;MOVE SP BACK TO NO ERROR
        NOP

;REPORT ERROR IF RMBA NOT RESET
5$:     CLR     $GDDAT        ;VERIFY RMBA IS ZERO
        MOV     RBAI,$BDDAT
        BEQ     7$          ;BRANCH IF ZERO
        ADD     #4,(SP)      ;MOVE SP TO USER'S ERROR CALL
        MOVB    #127,@(SP)   ;WRITE ERROR NUMBER IN CALL
        SUB     #2,(SP)      ;MOVE SP TO RETURN FOR ERROR
        JSR     PC,@(SP)+    ;REPORT ERROR VIA USER
        SUB     #10,(SP)     ;MOVE SP BACK TO NO ERROR
        NOP

;REPORT ERROR IF RMCS2 NOT INITIALIZED
7$:     MOV     RMCS2I,$BDDAT ;VERIFY RMCS2
        MOV     R1,-(SP)     ;PUSH R1 ON STACK
        CLR     -(SP)        ;EXPECT IR & UNIT NUMBER
        MOV     TSTQUE,R1   ;R1 = ADDRESS OF TEST QUE
        MOVB    (R1),(SP)
        BIS     #IR,(SP)
        MOV     (SP)+,$GDDAT
    
```

052604				
052604	062716	000004		
052610	105076	000000		
052614	162716	000004		
052620	013737	001336	001142	
052626	042737	100000	001142	
052634	012737	004200	001140	
052642	023737	001140	001142	
052650	001413			
052652	062716	000004		
052656	112776	000126	000000	
052664	162716	000002		
052670	004736			
052672	162716	000010		
052676	000240			
052700	005037	001140		
052704	013737	001342	001142	
052712	001413			
052714	062716	000004		
052720	112776	000127	000000	
052726	162716	000002		
052732	004736			
052734	162716	000010		
052740	000240			
052742	013737	001346	001142	
052750	010146			
052752	005046			
052754	013701	001466		
052760	111116			
052762	052716	000100		
052766	012637	001140		

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58 052772 012601          MOV      (SP)+,R1          ;;POP STACK INTO R1
59 052774 023737 001140 001142  CMP      $GDDAT,$BDDAT    ;;COMPARE EXPECTED & RECEIVED
60 053002 001413          BEQ      9$              ;;BRANCH IF EQUAL
61 053004 062716 000004          ADD      #4,(SP)          ;;MOVE SP TO USER'S ERROR CALL
62 053010 112776 000130 000000  MOVB    #130,@(SP)        ;;WITE ERROR NUMBER IN CALL
63 053016 162716 000002          SUB      #2,(SP)          ;;MOVE SP TO RETURN FOR ERROR
64 053022 004736          JSR     PC,@(SP)+         ;;REPORT ERROR VIA USER
65 053024 162716 000010          SUB      #10,(SP)        ;;MOVE SP BACK TO NO ERROR
66 053030 000240          NOP
67                                ;REPORT ERROR IF RMER1 NOT RESET-IGNORE UNS
68 053032 005037 001140 9$: CLR      $GDDAT          ;;VERIFY RMER1
69 053036 013737 001352 001142  MOV     RMER1I,$BDDAT
70 053044 042737 040000 001142  BIC     #UNS,$BDDAT      ;;IGNORE UNSAFE
71 053052 001413          BEQ     13$             ;;BRANCH IF ZERO
72 053054 062716 000004          ADD     #4,(SP)          ;;MOVE SP TO USER'S ERROR CALL
73 053060 112776 000131 000000  MOVB   #131,@(SP)        ;;WITE ERROR NUMBER IN CALL
74 053066 162716 000002          SUB     #2,(SP)          ;;MOVE SP TO RETURN FOR ERROR
75 053072 004736          JSR    PC,@(SP)+         ;;REPORT ERROR VIA USER
76 053074 162716 000010          SUB     #10,(SP)        ;;MOVE SP BACK TO NO ERROR
77 053100 000240          NOP
78                                ;REPORT ERROR IF RMMR1 NOT INITIALIZED-IGNORE WC,LS,LST
79 053102 013737 001362 001142 13$: MOV     RMMR1I,$BDDAT    ;;VERIFY RMMR
80 053110 042737 000046 001142  BIC     #WC!LS!LST,$BDDAT ;;IGNORE WORD CLOCK, SCT, TRK
81 053116 012737 000010 001140  MOV     #MWD,$GDDAT      ;;EXPECT WRITE DATA BIT
82 053124 023737 001140 001142  CMP     $GDDAT,$BDDAT    ;;COMPARE EXPECTED AND RECEIVED
83 053132 001413          BEQ     17$             ;;BRANCH IF 0
84 053134 062716 000004          ADD     #4,(SP)          ;;MOVE SP TO USER'S ERROR CALL
85 053140 112776 000133 000000  MOVB   #133,@(SP)        ;;WITE ERROR NUMBER IN CALL
86 053146 162716 000002          SUB     #2,(SP)          ;;MOVE SP TO RETURN FOR ERROR
87 053152 004736          JSR    PC,@(SP)+         ;;REPORT ERROR VIA USER
88 053154 162716 000010          SUB     #10,(SP)        ;;MOVE SP BACK TO NO ERROR
89 053160 000240          NOP
90                                ;REPORT AN ERROR IF RMEC2 IS NOT RESET
91 053162 005037 001140 17$: CLR     $GDDAT          ;;EXPECT ZEROS
92 053166 013737 001404 001142  MOV     RMEC2I,$BDDAT    ;;VERIFY RMEC2 = 0
93 053174 001413          BEQ     19$
94 053176 062716 000004          ADD     #4,(SP)          ;;MOVE SP TO USER'S ERROR CALL
95 053202 112776 000135 000000  MOVB   #135,@(SP)        ;;WITE ERROR NUMBER IN CALL
96 053210 162716 000002          SUB     #2,(SP)          ;;MOVE SP TO RETURN FOR ERROR
97 053214 004736          JSR    PC,@(SP)+         ;;REPORT ERROR VIA USER
98 053216 162716 000010          SUB     #10,(SP)        ;;MOVE SP BACK TO NO ERROR
99 053222 000240          NOP
100                                ;REPORT ERROR IF RMMR2 NOT INITIALIZED-IGNORE RQA,RQB
101 053224 013737 001376 001142 19$: MOV     RMMR2I,$BDDAT    ;;VERIFY RMMR2
102 053232 042737 140000 001142  BIC     #RQA!RQB,$BDDAT
103 053240 012737 011777 001140  MOV     #TST!1777,$GDDAT ;;EXPECT TEST BIT ON
104 053246 023737 001140 001142  CMP     $GDDAT,$BDDAT
105 053254 001413          BEQ     21$
106 053256 062716 000004          ADD     #4,(SP)          ;;MOVE SP TO USER'S ERROR CALL
107 053262 112776 000136 000000  MOVB   #136,@(SP)        ;;WITE ERROR NUMBER IN CALL
108 053270 162716 000002          SUB     #2,(SP)          ;;MOVE SP TO RETURN FOR ERROR
109 053274 004736          JSR    PC,@(SP)+         ;;REPORT ERROR VIA USER
110 053276 162716 000010          SUB     #10,(SP)        ;;MOVE SP BACK TO NO ERROR
111 053302 000240          NOP
112                                ;REPORT ERROR IF RMER2 NOT RESET-IGNORE SKI,DVC
113 053304 005037 001140 21$: CLR     $GDDAT          ;;EXPECT ALL ZEROS
114 053310 013737 001400 001142  MOV     RMER2I,$BDDAT    ;;VERIFY RMER2
    
```

115	053316	042737	040200	001142	BIC	#SKI!DVC,\$BDDAT	:IGNORE DEVICE ERRORS
116	053324	001413			BEQ	215\$:BRANCH IF OTHER BITS 0
117	053326	062716	000004		ADD	#4,(SP)	:MOVE SP TO USER'S ERROR CALL
118	053332	112776	000174	000000	MOVB	#174,@(SP)	:WRITE ERROR NUMBER IN CALL
119	053340	162716	000002		SUB	#2,(SP)	:MOVE SP TO RETURN FOR ERROR
120	053344	004736			JSR	PC,@(SP)+	:REPORT ERROR VIA USER
121	053346	162716	000010		SUB	#10,(SP)	:MOVE SP BACK TO NO ERROR
122	053352	000240			NOP		
123							:REPORT ERROR IF RMD5 NOT INITIALIZED
124	053354	013737	001350	001142	215\$: MOV	RMDSI,\$BDDAT	:TEST DRIVE STATUS REGISTER
125	053362	042737	177177	001142	BIC	#^C<DRY!DPR>,\$BDDAT	
126	053370	012737	000600	001140	MOV	#DPR!DRY,\$GDDAT	:EXPECTED DRIVE STATUS
127	053376	023737	001140	001142	CMP	\$GDDAT,\$BDDAT	:COMPARE EXPECTED & RECEIVED
128	053404	001413			BEQ	22\$:BRANCH IF EQUAL
129	053406	062716	000004		ADD	#4,(SP)	:MOVE SP TO USER'S ERROR CALL
130	053412	112776	000134	000000	MOVB	#134,@(SP)	:WRITE ERROR NUMBER
131	053420	162716	000002		SUB	#2,(SP)	:MOVE SP TO RETURN FOR ERROR
132	053424	004736			JSR	PC,@(SP)+	:REPORT ERROR TO USER
133	053426	162716	000010		SUB	#10,(SP)	:MOVE SP BACK TO NO ERROR
134	053432	000240			NOP		
135	053434	062716	000004		22\$: ADD	#4,(SP)	:MOVE SP TO ERROR CALL
136	053440	105776	000000		TSTB	@(SP)	:WAS AN ERROE DETECTED??
137	053444	001403			BEQ	23\$:NO!!
138	053446	062716	000004		ADD	#4,(SP)	:YES - MOVE TO ERROR RETURN
139	053452	000402			BR	24\$	
140	053454	162716	000004		23\$: SUB	#4,(SP)	:MOVE SP TO NO ERROR RETURN
141	053460	000240			24\$: NOP		
142	053462	000207			RTS	PC	

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053464
053464 062716 000004
053470 105076 000000
053474 162716 000004
053500 032737 000100 001350
053506 001024
053510 013737 001350 001140
053516 032737 000100 001140
053524 013737 001350 001142
053532 062716 000004
053536 112776 000155 000000
053544 162716 000002
053550 004736
053552 162716 000010
053556 000240
053560
053560 032737 010000 001350
053566 001024
053570 013737 001350 001140
053576 052737 010000 001140
053604 013737 001350 001142
053612 062716 000004
053616 112776 000041 000000
053624 162716 000002
053630 004736
053632 162716 000010
053636 000240
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053640 032737 060007 001352
053646 001570
053650 032737 040000 001352
053656 001424
053660 013737 001352 001142
    
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.SBTTL PACK ACKNOWLEDGE STATUS CHECK

;THIS SUBROUTINE CHECKS THE RESULTS OF A PACK ACKNOWLEDGE
;COMMAND USING THE STATUS STORED IN THE GET BUFFER. ERRORS ARE
;REPORTED TO THE USER VIA THE USER'S ERROR CALL.

;CALL:
;(1) JSR PC,ACKSTS
      BR ??? RETURN HERE IF NO ERROR
      NOP RETURN HERE TO REPORT AN ERROR
      ERROR ERROR NUMBER DEFINED BY SUB
      JSR PC,@(SP)+ GO BACK TO SUB FOR MORE ERROR CHECKS
      ??? RETURN HERE IF NO MORE ERRORS

ACKSTS:

;CLEAR USER'S ERROR CALL
ADD #4,(SP) ;MOVE SP TO ERROR CALL
CLRB @(SP) ;CLEAR LOW ORDER BYTE
SUB #4,(SP) ;MOVE SP BACK

;REPORT AN ERROR IF 'VV' IS 0
BIT #VV,RMSI ;IS VOLUME VALID SET??
BNE 1$ ;YES!!
MOV RMSI,$GDDAT ;EXPECTED STATUS
BIS #VV,$GDDAT
MOV RMSI,$BDDAT ;RECEIVED STATUS
ADD #4,(SP) ;MOVE SP TO ERROR CALL
MOVB #155,@(SP) ;WRITE NUMBER IN ERROR CALL
SUB #2,(SP) ;MOVE SP TO RETURN FOR ERROR
JSR PC,@(SP)+ ;REPORT THE ERROR
SUB #10,(SP) ;MOVE SP BACK TO BRANCH
NOP

1$:
;REPORT AN ERROR IF 'MOL' IS 0
BIT #MOL,RMSI ;IS MOL SET??
BNE 2$ ;YES!!
MOV RMSI,$GDDAT ;EXPECTED STATUS
BIS #MOL,$GDDAT
MOV RMSI,$BDDAT ;RECEIVED STATUS
ADD #4,(SP) ;MOVE SP TO ERROR CALL
MOVB #41,@(SP) ;WRITE NUMBER OF ERROR IN CALL
SUB #2,(SP) ;MOVE SP TO RETURN FOR ERROR
JSR PC,@(SP)+ ;REPORT TH ERROR
SUB #10,(SP) ;MOVE SP TO BRANCH
NOP

2$:
;SEE IF 'UNS','OPI','RMR','ILR' OR 'ILF' IS SET
BIT #UNS!OPI!RMR!ILR!ILF,RMER1I
BEQ 7$

;REPORT AN ERROR IF 'UNS' IS SET
BIT #UNS,RMER1I ;WAS UNS SET??
BEQ 3$ ;NO!!
MOV RMER1I,$BDDAT ;RECEIVED STATUS
    
```

58	053666	013737	001352	001140	MOV	RMER1I,\$GDDAT	:EXPECTED STATUS
59	053674	042737	040000	001140	BIC	#UNS,\$GDDAT	
60	053702	062716	000004		ADD	#4,(SP)	:MOVE SP TO ERROR CALL
61	053706	112776	000042	000000	MOVB	#42,@(SP)	:WRITE NUMBER OF ERROR IN CALL
62	053714	162716	000002		SUB	#2,(SP)	:MOVE SP TO RETURN FOR ERROR
63	053720	004736			JSR	PC,@(SP)+	:REPORT THE ERROR VIA USER
64	053722	162716	000010		SUB	#10,(SP)	:MOVE SP TO NO ERROR RETURN
65	053726	000240			NOP		
66	053730					3\$:	
67							
68						:REPORT ANY OPI ERROR	
69	053730	032737	020000	001352	BIT	#OPI,RMER1I	:WAS OPI SET ??
70	053736	001424			BEQ	4\$:NO!!
71	053740	013737	001352	001142	MOV	RMER1I,\$BDDAT	:RECEIVED STATUS
72	053746	013737	001352	001140	MOV	RMER1I,\$GDDAT	:EXPECTED STATUS
73	053754	042737	020000	001140	BIC	#OPI,\$GDDAT	
74	053762	062716	000004		ADD	#4,(SP)	:MOVE SP TO ERROR CALL
75	053766	112776	000043	000000	MOVB	#43,@(SP)	:WRITE NUMBER OF ERROR IN CALL
76	053774	162716	000002		SUB	#2,(SP)	:MOVE SP TO RETURN FOR ERROR
77	054000	004736			JSR	PC,@(SP)+	:REPORT THE ERROR VIA USER
78	054002	162716	000010		SUB	#10,(SP)	:MOVE SP TO NO ERROR RETURN
79	054006	000240			NOP		
80	054010					4\$:	
81							
82						:REPORT ANY RMR ERROR	
83	054010	032737	000004	001352	BIT	#RMR,RMER1I	:WAS RMR SET??
84	054016	001424			BEQ	5\$:NO!!
85	054020	013737	001352	001142	MOV	RMER1I,\$BDDAT	:RECEIVED STATUS
86	054026	013737	001352	001140	MOV	RMER1I,\$GDDAT	:EXPECTED STATUS
87	054034	042737	000004	001140	BIC	#RMR,\$GDDAT	
88	054042	062716	000004		ADD	#4,(SP)	:MOVE SP TO ERROR CALL
89	054046	112776	000044	000000	MOVB	#44,@(SP)	:WRITE NUMBER OF ERROR IN CALL
90	054054	162716	000002		SUB	#2,(SP)	:MOVE SP TO RETURN FOR ERROR
91	054060	004736			JSR	PC,@(SP)+	:REPORT THE ERROR VIA USER
92	054062	162716	000010		SUB	#10,(SP)	:MOVE SP TO NO ERROR RETURN
93	054066	000240			NOP		
94	054070					5\$:	
95							
96						:REPORT ANY	
97	054070	032737	000002	001352	BIT	#ILR,RMER1I	:WAS ILR SET??
98	054076	001424			BEQ	6\$:NO!!
99	054100	013737	001352	001142	MOV	RMER1I,\$BDDAT	:RECEIVED STATUS
100	054106	013737	001352	001140	MOV	RMER1I,\$GDDAT	:EXPECTED STATUS
101	054114	042737	000002	001140	BIC	#ILR,\$GDDAT	
102	054122	062716	000004		ADD	#4,(SP)	:MOVE SP TO ERROR CALL
103	054126	112776	000045	000000	MOVB	#45,@(SP)	:WRITE NUMBER OF ERROR IN CALL
104	054134	162716	000002		SUB	#2,(SP)	:MOVE SP TO RETURN FOR ERROR
105	054140	004736			JSR	PC,@(SP)+	:REPORT THE ERROR VIA USER
106	054142	162716	000010		SUB	#10,(SP)	:MOVE SP TO NO ERROR RETURN
107	054146	000240			NOP		
108	054150					6\$:	
109							
110						:REPORT ANY	
111	054150	032737	000001	001352	BIT	#ILF,RMER1I	:WAS ILF SET??
112	054156	001424			BEQ	7\$:NO!!
113	054160	013737	001352	001142	MOV	RMER1I,\$BDDAT	:RECEIVED STATUS
114	054166	013737	001352	001140	MOV	RMER1I,\$GDDAT	:EXPECTED STATUS

115	054174	042737	000001	001140	BIC	#1LF,\$GDDAT	
116	054202	062716	000004		ADD	#4,(SP)	:MOVE SP TO ERROR CALL
117	054206	112776	000046	000000	MOVB	#46,@(SP)	:WRITE NUMBER OF ERROR IN CALL
118	054214	162716	000002		SUB	#2,(SP)	:MOVE SP TO RETURN FOR ERROR
119	054220	004736			JSR	PC,@(SP)+	:REPORT THE ERROR VIA USER
120	054222	162716	000010		SUB	#10,(SP)	:MOVE SP TO NO ERROR RETURN
121	054226	000240			NOP		
122	054230						
123							
124							
125	054230	062716	000004		ADD	#4,(SP)	:MOVE SP TO ERROR CALL
126	054234	105776	000000		TSTB	@(SP)	:WAS ERROR FOUND??
127	054240	001403			BEQ	8\$:NO!!
128	054242	062716	000004		ADD	#4,(SP)	:YES - MOVE TO ERROR RETURN
129	054246	000402			BR	9\$	
130	054250	162716	000004		SUB	#4,(SP)	:MOVE SP TO NO ERROR RETURN
131	054254	000240			NOP		
132	054256	000207			RTS	PC	

7\$:

:AUGMENT RETURN ADDRESS IF ERROR WAS FOUND

8\$:

9\$:

```

1          .SBTTL RECALIBRATE STATUS CHECK SUBROUTINE
2
3          ;THIS SUBROUTINE CHECKS THE RESULTS OF A RECALIBRATE OPERATION
4          ;USING THE STATUS STORED IN THE GET BUFFER.
5
6          ;CALL:
7
8          ;(1) JSR PC,RCLSTS ;CALL SUBROUTINE
9              BR   ???      RETURN HERE IF NO ERROR
10             NOP          RETURN HERE TO REPORT AN ERROR
11             ERROR       ERROR NUMBER DEFINED BY SUB
12             JSR PC,@(SP)+ GO BACK TO SUB FOR MORE ERROR CHECKS
13             ???        RETURN HERE IF NO MORE ERRORS
14
15 054260   RCLSTS:
16
17          ;CLEAR USER'S ERROR NUMBER
18 054260   062716 000004   ADD #4,(SP)
19 054264   105076 000000   CLR  @ (SP) ;CLEAR USER'S ERROR CALL
20 054270   162716 000004   SUB #4,(SP) ;MOVE SP BACK TO BRANCH
21
22
23          ;SEE IF 'PAR' OR 'ILF' OR 'DPE' OR 'IAE' IS SET
24 054274   032737 022011 001352 BIT #OPI!PAR!ILF!IAE,RMER1I
25 054302   001553          BEQ 4$ ;NONE ARE SET - GO TO NEXT CHECK
26
27          ;REPORT ANY MASSBUS CONTROL BUS PARITY ERROR, I.E.,
28          ;'PAR' = 1 AND 'DPE' = 0
29 054304   032737 000010 001352 BIT #PAR,RMER1I ;WAS 'PAR' SET??
30 054312   001430          BEQ 1$ ;NO!!
31 054314   032737 000010 001400 BIT #DPE,RMER2I ;WAS 'DPE' SET??
32 054322   001024          BNE 1$ ;YES - NOT A REGISTER ERROR
33 054324   013737 001352 001140 MOV RMER1I,$GDDAT ;EXPECTED STATUS
34 054332   042737 000010 001140 BIC #PAR,$GDDAT
35 054340   013737 001352 001142 MOV RMER1I,$BDDAT ;RECEIVED STATUS
36 054346   062716 000004          ADD #4,(SP) ;MOVE SP TO USER'S ERROR CALL
37 054352   112776 000050 000000 MOVB #50,@(SP) ;WRITE ERROR NUMBER IN CALL
38 054360   162716 000002          SUB #2,(SP) ;MOVE SP TO RETURN FOR ERROR
39 054364   004736          JSR PC,@(SP)+ ;GO REPORT ERROR
40 054366   162716 000010          SUB #10,(SP) ;MOVE SP BACK TO BRANCH
41 054372   000240          NOP
42 054374   1$:
43
44          ;REPORT ANY 'ILF' ERROR
45 054374   032737 000001 001352 BIT #ILF,RMER1I ;WAS 'ILF' SET??
46 054402   001424          BEQ 2$ ;NO!!
47 054404   013737 001352 001140 MOV RMER1I,$GDDAT ;EXPECTED STATUS
48 054412   042737 000001 001140 BIC #ILF,$GDDAT
49 054420   013737 001352 001142 MOV RMER1I,$BDDAT ;RECEIVED STATUS
50 054426   062716 000004          ADD #4,(SP) ;MOVE SP TO USER'S ERROR CALL
51 054432   112776 000071 000000 MOVB #71,@(SP) ;WRITE ERROR NUMBER IN CALL
52 054440   162716 000002          SUB #2,(SP) ;MOVE SP TO RETURN FOR ERROR
53 054444   004736          JSR PC,@(SP)+ ;REPORT ERROR VIA USER
54 054446   162716 000010          SUB #10,(SP) ;MOVE SP BACK TO BRANCH
55 054452   000240          NOP
56 054454   2$:
57

```

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58      ;REPORT ANY 'DPI' ERROR AS
59      . OPI DUE TO 'MOL' = 0
60      . OPI BECAUSE ON CYLINDER LATCH DIDN'T RESET
61 054454 032737 020000 001352      BIT      #OPI,RMER1I      :WAS OPI SET??
62 054462 001433                    BEQ      31$              :NO!!
63 054464 013737 001352 001140      MOV      RMER1I,$GDDAT   :EXPECTED STATUS
64 054472 042737 020000 001140      BIC      #OPI,$GDDAT
65 054500 013737 001352 001142      MOV      RMER1I,$BDDAT   :RECEIVED STATUS
66 054506 062716 000004              ADD      #4,(SP)         :MOVE SP TO USER'S ERROR CALL
67 054512 112776 000072 000000      MOV      #72,@(SP)      :WRITE ERROR NUMBER IN USER'S CALL
68 054520 032737 010000 001350      BIT      #MOL,RMDSI     :WAS 'MOL' = 0??
69 054526 001403                    BEQ      3$              :YES!!
70 054530 112776 000073 000000      MOV      #73,@(SP)      :NO - CHANGE ERROR NUMBER
71 054536 162716 000002      3$:    SUB      #2,(SP)      :MOVE SP TO RETURN FOR ERROR
72 054542 004736                    JSR      PC,@(SP)+       :REPORT ERROR VIA USER
73 054544 162716 000010      SUB      #10,(SP)       :MOVE SP BACK TO BRANCH
74 054550 000240                    NOP
75 054552                    31$:
76
77      ;REPORT AN ERROR IF 'IAE' IS SET
78 054552 032737 002000 001352      BIT      #IAE,RMER1I     :IS 'IAE' SET??
79 054560 001424                    BEQ      4$              :NO!!
80 054562 013737 001352 001140      MOV      RMER1I,$GDDAT   :EXPECTED STATUS
81 054570 042737 002000 001140      BIC      #IAE,$GDDAT
82 054576 013737 001352 001142      MOV      RMER1I,$BDDAT   :RECEIVED STATUS
83 054604 062716 000004              ADD      #4,(SP)         :MOVE SP TO ERROR CALL
84 054610 112776 000070 000000      MOV      #70,@(SP)      :WRITE ERROR NUMBER IN USER'S CALL
85 054616 162716 000002      SUB      #2,(SP)         :MOVE SP TO RETURN FOR ERROR
86 054622 004736                    JSR      PC,@(SP)+       :REPORT ERROR
87 054624 162716 000010      SUB      #10,(SP)       :MOVE SP BACK TO NO ERROR RETURN
88 054630 000240                    NOP
89 054632                    4$:
90
91      ;SEE IF 'SKI' OR 'IVC' OR 'DVC' IS SET
92 054632 032737 050200 001400      BIT      #SKI!IVC!DVC,RMER2I
93 054640 001517                    BEQ      8$              :NONE OF THE BITS ARE SET
94
95
96      ;REPORT ANY 'IVC' ERROR AS
97      . IVC WITH VV = 0
98      . ERRONEOUS IVC ERROR
99 054642 032737 010000 001400      BIT      #IVC,RMER2I     :WAS IVC SET??
100 054650 001433                    BEQ      6$              :NO!!
101 054652 013737 001400 001140      MOV      RMER2I,$GDDAT   :EXPECTED STATUS
102 054660 042737 010000 001140      BIC      #IVC,$GDDAT
103 054666 013737 001400 001142      MOV      RMER2I,$BDDAT   :RECEIVED STATUS
104 054674 062716 000004              ADD      #4,(SP)         :MOVE SP TO USER'S ERROR CALL
105 054700 112776 000074 000000      MOV      #74,@(SP)      :WRITE ERROR NUMBER IN CALL
106 054706 032737 000100 001350      BIT      #VV,RMDSI      :WAS VV = 0??
107 054714 001403                    BEQ      5$              :YES!!
108 054716 112776 000075 000000      MOV      #75,@(SP)      :NO - CHANGE ERROR NUMBER
109 054724 162716 000002      5$:    SUB      #2,(SP)      :MOVE SP TO RETURN FOR ERROR
110 054730 004736                    JSR      PC,@(SP)+       :REPORT ERROR VIA USER
111 054732 162716 000010      SUB      #10,(SP)       :MOVE SP BACK TO BRANCH
112 054736 000240                    NOP
113 054740                    6$:
114

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115 ;REPORT ANY 'SKI' ERROR
116 054740 032737 040000 001400 BIT #SKI,RMER2I ;WAS SKI SET??
117 054746 001424 BEQ 7$ ;NO!!
118 054750 013737 001400 001140 MOV RMER2I,$GDDAT ;EXPECTED STATUS
119 054756 042737 040000 001140 BIC #SKI,$GDDAT
120 054764 013737 001400 001142 MOV RMER2I,$BDDAT ;RECEIVED STATUS
121 054772 062716 000004 ADD #4,(SP) ;MOVE SP TO USER'S ERROR CALL
122 054776 112776 000076 000000 MOVB #76,@(SP) ;WRITE ERROR NUMBER
123 055004 162716 000002 SUB #2,(SP) ;MOVE SP TO RETURN FOR ERROR
124 055010 004736 JSR PC,@(SP)+ ;REPORT ERROR VIA USER
125 055012 162716 000010 SUB #10,(SP) ;MOVE SP TO BRANCH
126 055016 000240 NOP
127 055020 7$:
128
129 ;REPORT ANY 'DVC' ERROR
130 055020 032737 000200 001400 BIT #DVC,RMER2I ;WAS 'DVC' SET??
131 055026 001424 BEQ 8$ ;NO!!
132 055030 013737 001400 001140 MOV RMER2I,$GDDAT ;EXPECTED STATUS
133 055036 042737 000200 001140 BIC #DVC,$GDDAT
134 055044 013737 001400 001142 MOV RMER2I,$BDDAT ;RECEIVED STATUS
135 055052 062716 000004 ADD #4,(SP) ;MOVE SP TO USER'S ERROR CALL
136 055056 112776 000077 000000 MOVB #77,@(SP) ;WRITE ERROR NUMBER
137 055064 162716 000002 SUB #2,(SP) ;MOVE SP TO RETURN FOR ERROR
138 055070 004736 JSR PC,@(SP)+ ;REPORT ERROR VIA USER
139 055072 162716 000010 SUB #10,(SP) ;MOVE SP TO USER'S BRANCH
140 055076 000240 NOP
141 055100 8$:
142
143 ;SEE IF 'PIP' AND 'OM' ARE 0, AND 'ATA','MOL' AND 'VV' ARE 1
144 055100 013746 001350 MOV RMDSI,-(SP) ;PUT RMD5 ON STACK
145 055104 042716 047676 BIC #^C<PIP!MOL!VV!OM!ATA>,(SP)
146 055110 022726 110100 CMP #ATA!MOL!VV,(SP)+
147 055114 001002 BNE 85$
148 055116 000137 055532 JMP 13$
149 055122 85$:
150
151 ;REPORT AN ERROR IF MOL = 0 AND OPI = 0, I.E., MEDIUM WENT OFF
152 ;LINE AFTER RECALIBRATE WAS INITIATED
153 055122 032737 010000 001350 BIT #MOL,RMDSI ;DID MOL DROP??
154 055130 001030 BNE 9$ ;NO!!
155 055132 032737 020000 001352 BIT #OPI,RMER1I ;WAS OPI ERROR REPORTED??
156 055140 001024 BNE 9$ ;YES - DON'T REPORT MOL = 0
157 055142 013737 001350 001140 MOV RMDSI,$GDDAT ;EXPECTED STATUS
158 055150 032737 010000 001140 BIS #MOL,$GDDAT
159 055156 013737 001350 001142 MOV RMDSI,$BDDAT ;RECEIVED STATUS
160 055164 062716 000004 ADD #4,(SP) ;MOVE SP TO USER'S ERROR CALL
161 055170 112776 000100 000000 MOVB #100,@(SP) ;WRITE ERROR NUMBER
162 055176 162716 000002 SUB #2,(SP) ;MOVE SP TO RETURN FOR ERROR
163 055202 004736 JSR PC,@(SP)+ ;REPORT ERROR VIA USER
164 055204 162716 000010 SUB #10,(SP) ;MOVE SP BACK TO USER'S BRANCH
165 055210 000240 NOP
166 055212 9$:
167
168 ;REPORT AN ERROR IF 'VV' = 0 AND 'IVC' = 0
169 055212 032737 000100 001350 BIT #VV,RMDSI ;DID 'VV' DROP??
170 055220 001030 BNE 10$ ;NO!!
171 055222 032737 010000 001400 BIT #IVC,RMER2I ;WAS THERE A IVC ERROR??
    
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172 055230 001024          BNE      10$          ;YES - DONT REPORT VV = 0
173 055232 013737 001350 001140  MOV     RMDSI,$GDDAT ;EXPECTED STATUS
174 055240 013737 001350 001142  MOV     RMDSI,$BDDAT ;RECEIVED STATUS
175 055246 052737 000100 001140  BIS     #VV,$GDDAT
176 055254 062716 000004          ADD     #4,(SP)      ;MOVE SP TO USER'S ERROR CALL
177 055260 112776 000101 000000  MOVB   #101,a(SP)   ;WRITE ERROR NUMBER IN CALL
178 055266 162716 000002          SUB     #2,(SP)     ;MOVE SP TO RETURN FOR ERROR
179 055272 C04736          JSR     PC,a(SP)+
180 055274 162716 000010          SUB     #10,(SP)   ;MOVE SP BACK TO USER'S BRANCH
181 055300 000240          NOP
182 055302          10$:
183
184          ;REPORT AN ERROR IF ATA IS NOT SET
185 055302 032737 100000 001350  BIT     #ATA,RMDSI  ;WAS ATA SET DURING RECALIBRATE??
186 055310 001024          BNE     11$          ;YES!!
187 055312 013737 001350 001140  MOV     RMDSI,$GDDAT ;EXPECTED STATUS
188 055320 052737 100000 001140  BIS     #ATA,$GDDAT
189 055326 013737 001350 001142  MOV     RMDSI,$BDDAT ;RECEIVED STATUS
190 055334 062716 000004          ADD     #4,(SP)      ;MOVE SP TO USER'S ERROR CALL
191 055340 112776 000102 000000  MOVB   #102,a(SP)   ;WRITE ERROR NUMBER IN CALL
192 055346 162716 000002          SUB     #2,(SP)
193 055352 004736          JSR     PC,a(SP)+
194 055354 162716 000010          SUB     #10,(SP)   ;MOVE SP TO USER'S BRANCH
195 055360 000240          NOP
196
197 055362          11$:
198
199          ;REPORT AN ERROR IF 'OM' IS NOT ZERO BECAUSE RECALIBRATE SHOULD
200          ;ALWAYS CLEAR OFFSET MODE
201 055362 032737 000001 001350  BIT     #OM,RMDSI   ;WAS 'OM' RESET??
202 055370 001424          BEQ     12$          ;YES!!
203 055372 013737 001350 001140  MOV     RMDSI,$GDDAT ;EXPECTED STATUS
204 055400 042737 000001 001140  BIC     #OM,$GDDAT
205 055406 013737 001350 001142  MOV     RMDSI,$BDDAT ;RECEIVED STATUS
206 055414 062716 000004          ADD     #4,(SP)      ;MOVE SP TO USER'S ERROR CALL
207 055420 112776 000103 000000  MOVB   #103,a(SP)   ;WRITE ERROR NUMBER
208 055426 162716 000002          SUB     #2,(SP)     ;MOVE SP TO RETURN FOR ERROR
209 055432 004736          JSR     PC,a(SP)+  ;REPORT ERROR VIA USER
210 055434 162716 000010          SUB     #10,(SP)   ;MOVE SP TO USER'S BRANCH
211 055440 000240          NOP
212 055442          12$:
213
214          ;REPORT AN ERROR IF 'PIP' IS STIL ON, I.E., DRIVE NOT ON
215          ;CYLINDER
216 055442 032737 020000 001350  BIT     #PIP,RMDSI  ;IS DRIVE OFF CYLINDER??
217 055450 001430          BEQ     13$          ;NO!!
218 055452 032737 040000 001400  BIT     #SKI,RMER2I ;WAS 'SKI' DETECTED??
219 055460 001024          BNE     13$          ;YES-DONT REPORT 'PIP'
220 055462 013737 001350 001140  MOV     RMDSI,$GDDAT ;EXPECTED STATUS
221 055470 042737 020000 001140  BIC     #PIP,$GDDAT
222 055476 013737 001350 001142  MOV     RMDSI,$BDDAT ;RECEIVED STATUS
223 055504 062716 000004          ADD     #4,(SP)     ;MOVE SP TO USER'S ERROR CALL
224 055510 112776 000104 000000  MOVB   #104,a(SP)   ;WRITE ERROR NUMBER
225 055516 162716 000002          SUB     #2,(SP)     ;MOVE SP TO RETURN FOR ERROR
226 055522 004736          JSR     PC,a(SP)+
227 055524 162716 000010          SUB     #10,(SP)   ;MOVE SP BACK TO USER'S BRANCH
228 055530 000240          NOP
    
```

```

229 055532          13$:
230
231                ;SEE IF 'ILR' OR 'RMR' OR 'UNS' IS SET
232 055532 032737 040006 001352      BIT    #ILR!RMR!UNS,RMER1I
233 055540 001514                BEQ    16$
234
235                ;REPORT AN ERROR IF 'ILR' IS SET
236 055542 032737 000002 001352      BIT    #ILR,RMER1I      ;WAS ILR SET DURING RECALIBRATE??
237 055550 001424                BEQ    14$              ;NO!!
238 055552 013737 001352 001140      MOV    RMER1I,$GDDAT    ;EXPECTED STATUS
239 055560 042737 000002 001140      BIC    #ILR,$GDDAT
240 055566 013737 001352 001142      MOV    RMER1I,$BDDAT    ;RECEIVED STATUS
241 055574 062716 000004                ADD    #4,(SP)          ;MOVE SP TO USER'S ERROR CALL
242 055600 112776 000105 000000      MOV    #105,@(SP)      ;WRITE ERROR NUMBER IN CALL
243 055606 162716 000002                SUB    #2,(SP)          ;MOVE SP TO RETURN FOR ERROR
244 055612 004736                JSR    PC,@(SP)+
245 055614 162716 000010                SUB    #10,(SP)         ;MOVE SP TO USER'S BRANCH
246 055620 000240                NOP
247 055622
248
249                14$:
250                ;REPORT AN ERROR IF 'RMR' IS SET
251 055622 032737 000004 001352      BIT    #RMR,RMER1I      ;WAS RMR SET??
252 055630 001424                BEQ    15$              ;NO!!
253 055632 013737 001352 001140      MOV    RMER1I,$GDDAT    ;EXPECTED STATUS
254 055640 042737 000004 001140      BIC    #RMR,$GDDAT
255 055646 013737 001352 001142      MOV    RMER1I,$BDDAT    ;RECEIVED STATUS
256 055654 062716 000004                ADD    #4,(SP)          ;MOVE SP TO USER'S ERROR CALL
257 055660 112776 000106 000000      MOV    #106,@(SP)      ;WRITE ERROR NUMBER IN USER'S CALL
258 055666 162716 000002                SUB    #2,(SP)          ;MOVE SP TO RETURN FOR ERROR
259 055672 004736                JSR    PC,@(SP)+
260 055674 162716 000010                SUB    #10,(SP)         ;REPORT ERROR VIA USER
261 055700 000240                NOP                      ;MOVE SP TO USER'S BRANCH
262
263                15$:
264                ;REPORT AN ERROR IF 'UNS' IS SET AND 'DVC' IS 0
265 055702 032737 040000 001352      BIT    #UNS,RMER1I      ;WAS UNSAFE ON??
266 055710 001430                BEQ    16$              ;NO!!
267 055712 032737 000200 001400      BIT    #DVC,RMER2I      ;WAS THERE A DEVICE CHECK??
268 055720 001024                BNE    16$              ;YES - DON'T REPORT UNSAFE
269 055722 013737 001352 001140      MOV    RMER1I,$GDDAT    ;EXPECTED STATUS
270 055730 042737 040000 001140      BIC    #UNS,$GDDAT
271 055736 013737 001352 001142      MOV    RMER1I,$BDDAT    ;RECEIVED STATUS
272 055744 062716 000004                ADD    #4,(SP)          ;MOVE SP TO USER'S ERROR CALL
273 055750 112776 000107 000000      MOV    #107,@(SP)      ;WRITE ERROR NUMBER
274 055756 162716 000002                SUB    #2,(SP)          ;MOVE SP TO RETURN FOR ERROR
275 055762 004736                JSR    PC,@(SP)+
276 055764 162716 000010                SUB    #10,(SP)         ;REPORT ERROR VIA USER
277 055770 000240                NOP                      ;MOVE SP BACK TO USER'S BRANCH
278
279                16$:
280                ;AUGMENT THE RETURN ADDRESS IF ANY ERROR WAS DETECTED
281 055772 062716 000004                ADD    #4,(SP)          ;MOVE SP TO USER'S ERROR CALL
282 055776 105776 000000      TSTB    @(SP)           ;WAS AN ERROR REPORTED??
283 056002 001403                BEQ    17$              ;NO!!
284 056004 062716 000004                ADD    #4,(SP)          ;YES - AUGMENT SP RETURN
285 056010 000402                BR     18$
286 056012 162716 000004                SUB    #4,(SP)          ;NO ERROR - RETURN SP TO BRANCH
    
```


RECALIBRATE STATUS CHECK SUBROUTINE

286 056016 000240
287 056020 000207

18\$: NOP
RTS PC

;STATUS CECK IS COMPLETE

```

1      .SBTTL  DRIVE CLEAR STATUS CHECK SUBROUTINE
2
3
4      :      BR      ???      RETURN HERE IF NO ERROR
5      :      NOP      RETURN HERE TO REPORT AN ERROR
6      :      ERROR   ERROR NUMBER DEFINED BY SUB
7      :      JSR     PC,@(SP)+ GO BACK TO SUB FOR MORE ERROR CHECKS
8      :      ???      RETURN HERE IF NO MORE ERRORS
9 056022  DRVSTS:
10
11      :CLEAR USER'S ERROR CALL
12 056022 062716 000004      ADD     #4,(SP)      :MOVE SP TO ERROR CALL
13 056026 105076 000000      CLR    @(SP)      :CLEAR ERROR CALL
14 056032 162716 000004      SUB     #4,(SP)      :MOVE SP TO USER'S BRANCH
15
16 056036 013737 001336 001142 4$: :REPORT ERROR IF RMCS1 NOT INITIALIZED
17 056044 042737 173700 001142      MOV     RMCS1I,$BDDAT :CHECK RMCS1
18 056052 012737 004010 001140      BIC     #^C<DVA!FNCMSK>,$BDDAT :CLEAR DONT CARES
19 056060 023737 001140 001142      MOV     #DVA!DRVCLR,$GDDAT :EXPECT DVA
20 056066 001443      CMP     $GDDAT,$BDDAT :COMPARE EXPECTED & RECEIVED
21 056070 062716 000004      BEQ     6$          :BRANCH IF EQUAL
22 056074 112776 000141 000000      ADD     #4,(SP)      :MOVE SP TO ERROR CALL
23 056102 162716 000002      MOVB   #141,@(SP)   :WRITE NUMBER OF ERROR IN CALL
24 056106 004736      SUB     #2,(SP)      :MOVE SP TO RETURN FOR ERROR
25 056110 162716 000010      JSR     PC,@(SP)+   :REPORT THE ERROR VIA USER
26 056114 000240      SUB     #10,(SP)    :MOVE SP TO NO ERROR RETURN
27      NOP
28 056116 013737 001350 001142 5$: :REPORT ERROR IF RMDS NOT INITIALIZED
29 056124 042737 021101 001142      MOV     RMDSI,$BDDAT :CHECK RMDS
30 056132 012737 010600 001140      BIC     #PGM!OM!VV!PIP,$BDDAT :CLEAR DONT CARES
31 056140 023737 001140 001142      MOV     #MOL!DPR!DRY,$GDDAT :EXPECT DRY & DPR
32 056146 001413      CMP     $GDDAT,$BDDAT :COMPARE EXPECTED & RECEIVED
33 056150 062716 000004      BEQ     6$          :BRANCH IF EQUAL
34 056154 112776 000142 000000      ADD     #4,(SP)      :MOVE SP TO ERROR CALL
35 056162 162716 000002      MOVB   #142,@(SP)   :WRITE NUMBER OF ERROR IN CALL
36 056166 004736      SUB     #2,(SP)      :MOVE SP TO RETURN FOR ERROR
37 056170 162716 000010      JSR     PC,@(SP)+   :REPORT THE ERROR VIA USER
38 056174 000240      SUB     #10,(SP)    :MOVE SP TO NO ERROR RETURN
39      NOP
40 056176 005037 001140 6$: :REPORT ERROR IF RMER1 NOT INITIALIZED
41 056202 013737 001352 001142      CLR     $GDDAT      :EXPECT 0'S
42 056210 001413      MOV     RMER1I,$BDDAT :CHECK RMER1
43 056212 062716 000004      BEQ     8$          :BRANCH IF EQUAL
44 056216 112776 000143 000000      ADD     #4,(SP)      :MOVE SP TO ERROR CALL
45 056224 162716 000002      MOVB   #143,@(SP)   :WRITE NUMBER OF ERROR IN CALL
46 056230 004736      SUB     #2,(SP)      :MOVE SP TO RETURN FOR ERROR
47 056232 162716 000010      JSR     PC,@(SP)+   :REPORT THE ERROR VIA USER
48 056236 000240      SUB     #10,(SP)    :MOVE SP TO NO ERROR RETURN
49      NOP
50 056240 013737 001354 001142 8$: :REPORT ERROR IF ATA NOT INITIALIZED
51 056246 010146      MOV     RMASI,$BDDAT :CHECK ATTENTION BIT
52 056250 010246      MOV     R1,-(SP)    :PUSH R1 ON STACK
53 056252 013701 001466      MOV     R2,-(SP)    :PUSH R2 ON STACK
54 056256 116102 000001      MOV     TSTQUE,R1
55 056262 042702 177400      MOVB   1(R1),R2
56 056266 005102      BIC     #^CATNMSK,R2
57 056270 040237 001142      COM    R2
      BIC     R2,$BDDAT
    
```

58	056274	012602			MOV	(SP)+,R2	::POP STACK INTO R2
59	056276	012601			MOV	(SP)+,R1	::POP STACK INTO R1
60	056300	005737	001142		TST	\$BDDAT	::IS ATTENTION CLEARED??
61	056304	001413			BEQ	9\$::BRANCH IF ATTENTION CLEARED
62	056306	062716	000004		ADD	#4,(SP)	::MOVE SP TO ERROR CALL
63	056312	112776	000144	000000	MOVB	#144,@(SP)	::WRITE NUMBER OF ERROR IN CALL
64	056320	162716	000002		SUB	#2,(SP)	::MOVE SP TO RETURN FOR ERROR
65	056324	004736			JSR	PC,@(SP)+	::REPORT THE ERROR VIA USER
66	056326	162716	000010		SUB	#10,(SP)	::MOVE SP TO NO ERROR RETURN
67	056332	000240			NOP		
68							:REPORT ERROR IF RMMR1 NOT INITIALIZED
69	056334	013737	001362	001142	9\$: MOV	RMMR1I,\$BDDAT	:CHECK RMMR
70	056342	042737	000046	001142	BIC	#WC!LS!LST,\$BDDAT	:CLEAR DONT CARES
71	056350	012737	000010	001140	MOV	#MWD,\$GDDAT	:EXPECT WRITE DATA ON
72	056356	023737	001140	001142	CMP	\$GDDAT,\$BDDAT	:COMPARE EXPECTED AND RECEIVED
73	056364	001413			BEQ	11\$:BRANCH IF ZERO
74	056366	062716	000004		ADD	#4,(SP)	::MOVE SP TO ERROR CALL
75	056372	112776	000145	000000	MOVB	#145,@(SP)	::WRITE NUMBER OF ERROR IN CALL
76	056400	162716	000002		SUB	#2,(SP)	::MOVE SP TO RETURN FOR ERROR
77	056404	004736			JSR	PC,@(SP)+	::REPORT THE ERROR VIA USER
78	056406	162716	000010		SUB	#10,(SP)	::MOVE SP TO NO ERROR RETURN
79	056412	000240			NOP		
80							:REPORT ERROR IF RMMR2 NOT INITIALIZED
81	056414	013737	001376	001142	11\$: MOV	RMMR2I,\$BDDAT	:CHECK RMMR2
82	056422	042737	140000	001142	BIC	#RQA!RQB,\$BDDAT	:CLEAR REQA, REQB
83	056430	012737	011777	001140	MOV	#TST!1777,\$GDDAT	:EXPECT TEST BIT ON
84	056436	023737	001140	001142	CMP	\$GDDAT,\$BDDAT	:COMPARE EXPECTED & RECEIVED
85	056444	001413			BEQ	15\$:BRANCH IF EQUAL
86	056446	062716	000004		ADD	#4,(SP)	::MOVE SP TO ERROR CALL
87	056452	112776	000146	000000	MOVB	#146,@(SP)	::WRITE NUMBER OF ERROR IN CALL
88	056460	162716	000002		SUB	#2,(SP)	::MOVE SP TO RETURN FOR ERROR
89	056464	004736			JSR	PC,@(SP)+	::REPORT THE ERROR VIA USER
90	056466	162716	000010		SUB	#10,(SP)	::MOVE SP TO NO ERROR RETURN
91	056472	000240			NOP		
92	056474	005037	001140		15\$: CLR	\$GDDAT	:EXPECT ZEROS
93							:REPORT ERROR IF RMEC2 NOT RESET
94	056500	013737	001404	001142	MOV	RMEC2I,\$BDDAT	:CHECK RMEC2
95	056506	001413			BEQ	17\$:BRANCH IF 0
96	056510	062716	000004		ADD	#4,(SP)	::MOVE SP TO ERROR CALL
97	056514	112776	000150	000000	MOVB	#150,@(SP)	::WRITE NUMBER OF ERROR IN CALL
98	056522	162716	000002		SUB	#2,(SP)	::MOVE SP TO RETURN FOR ERROR
99	056526	004736			JSR	PC,@(SP)+	::REPORT THE ERROR VIA USER
100	056530	162716	000010		SUB	#10,(SP)	::MOVE SP TO NO ERROR RETURN
101	056534	000240			NOP		
102							:REPORT ERROR IF RMEP2 NOT RESET
103	056536	013737	001400	001142	17\$: MOV	RMEP2I,\$BDDAT	:CHECK RMEP2
104	056544	001413			BEQ	18\$:BRANCH IF NO ERRGR
105	056546	062716	000004		ADD	#4,(SP)	::MOVE SP TO ERROR CALL
106	056552	112776	000147	000000	MOVB	#147,@(SP)	::WRITE NUMBER OF ERROR IN CALL
107	056560	162716	000002		SUB	#2,(SP)	::MOVE SP TO RETURN FOR ERROR
108	056564	004736			JSR	PC,@(SP)+	::REPORT THE ERROR VIA USER
109	056566	162716	000010		SUB	#10,(SP)	::MOVE SP TO NO ERROR RETURN
110	056572	000240			NOP		
111	056574				18\$:		
112							
113	056574				19\$:		
114							

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.SBTTL SEARCH STATUS CHECK SUBROUTINE

:THIS SUBROUTINE VERIFIES THE RESULTS OF SEARCH OPERATIONS USING
:STATUS STORED IN THE GET BUFFER AND TEST CONDITIONS STORED IN THE
:PUT BUFFER.

:THE SUBROUTINE RETURNS TO THE CALLING ROUTINE IF AN ERROR IS
:DETECTED AFTER HAVING LOADED THE APPROPRIATE ERROR NUMBER IN
:THE USER'S 'ERROR' TRAP.

:THE FOLLOWING CONDITIONS ARE CHECKED:

    .ANY ERROR WHICH OCCURRED WHILE READING OR WRITING REMOTE
:REGISTERS IS REPORTED, I.E., 'MCPE' = 1 OR 'PAR' = 1

    .''IAE'' STATUS IS CHECKED IN ACCORDANCE WITH THE VALUE DETERMINED
:BY THE PROGRAM, WHICH IS BASED ON FORMAT AND ADDRESS.

    .''DPI'', IF SET, IS REPORTED AS 1) 'DPI' DUE TO MOL = 0, OR 2)
:'DPI' DUE TO ON CYLINDER LATCH.

    .''IVC'', IF SET, IS REPORTED AS 1) ''IVC'' ERROR WITH VOLUME
:VALID ZERO, OR 2) ERRONEOUS ''IVC'' ERROR WITH VOLUME VALID SET.

    .''SKI'' IS REPORTED IF SET

    .''DVC'' IS REPORTED IF SET

    .AN ERROR IS REPORTED IF 'MOL' = 0, OR 'PIP' = 1, OR 'ATA' = 0,
:OR 'VV' = 0.

:CALL:
:(1) JSR PC,SCHSTS
:(2) BR ??
:(3) NOP
:(4) ERROR
:(5) JSR PC,@(SP)+
:(6) ??

SCHSTS:

:CLEAR USER'S ERROR CALL
ADD #4,(SP) ;MOVE SP TO USER'S ERROR CALL
CLRB @(SP) ;CLEAR ERROR NUMBER
SUB #4,(SP) ;MOVE SP BACK TO NO ERROR BR
CLR 200$ ;CLEAR STATUS FLAGS

:TEST FOR MASSBUS CONTROL BUS PARITY ERROR WHEN WRITING REMOTE
:REGISTERS, I.E., 'PAR' = 1 AND 'DPE' = 0.
BIT #PAR,RMER1I ;WAS PARITY ERROR DETECTED??
BEQ 10$ ;NO!!
BIT #DPE,RMER2I ;WAS IT CONTROL BUS ERROR??
BNE 10$ ;PROBABLY NOT!!

:REPORT CONTROL BUS PARITY ERROR VIA USER'S ERROR CALL
MOV RMER1I,$GDDAT ;EXPECTED STATUS
BIC #PAR,$GDDAT
```

```
056624
056624 062716 000004
056630 105076 000000
056634 162716 000004
056640 005037 060206
056644 032737 000010 001352
056652 001431
056654 032737 000010 001400
056662 001025
056664 013737 001352 001140
056672 042737 000010 001140
```

```
RETURN HERE IF NO ERROR
RETURN HERE TO REPORT ERROR
SUBROUTINE WILL LOAD ERROR #
GO BACK FOR MORE CHECKS
RETURN AFTER ALL ERRORS REPORTED
```

```

58 056700 013737 001352 001142      MOV      RMER11,$BDDAT      ;RECEIVED STATUS
59 056706 062716 000004                ADD      #4,(SP)           ;MOVE SP TO USER'S ERROR CALL
60 056712 112776 000050 000000      MOVVB   #50,@(SP)         ;WRITE ERROR NUMBER IN CALL
61 056720 162716 000002                SUB      #2,(SP)           ;MOVE SP TO RETURN IF ERROR
62 056724 004736                JSR      PC,@(SP)+         ;REPORT ERROR
63 056726 162716 000010      SUB      #10,(SP)         ;RESTORE SP TO NO ERROR
64 056732 000240                NOP
65 056734 000430                BR       15$              ;SKIP FURTHER ERROR CHECKS
66 056736                10$:
67
68                ;TEST FOR MASSBUS CONTROL BUS PARITY ERROR WHEN READING REMOTE
69                ;REGISTERS, I.E., 'MCPE' = 1.
70 056736 032737 020000 001336      BIT      #MCPE,RMCS11     ;WAS PARITY ERROR DETECTED??
71 056744 001426                BEQ      20$              ;NO!!
72
73                ;REPORT CONTROL BUS PARITY ERROR VIA USER'S ERROR CALL.
74 056746 013737 001336 001140      MOV      RMCS11,$GDDAT    ;EXPECTED STATUS
75 056754 042737 020000 001140      BIC      #MCPE,$GDDAT
76 056762 013737 001336 001142      MOV      RMCS11,$BDDAT    ;RECEIVED STATUS
77 056770 062716 000004                ADD      #4,(SP)           ;MOVE SP TO USER'S ERROR CALL
78 056774 112776 000013 000000      MOVVB   #13,@(SP)         ;WRITE ERROR NUMBER
79 057002 162716 000002                SUB      #2,(SP)           ;MOVE SP TO RETURN IF ERROR
80 057006 004736                JSR      PC,@(SP)+         ;REPORT ERROR AND RETURN
81 057010 162716 000010      SUB      #10,(SP)         ;RESTORE SP TO NO ERROR
82 057014 000240                NOP
83 057016 000137 060160      15$:      JMP      150$             ;OMIT STATUS CHECKING
84 057022      20$:
85
86                ;DETERMINE THE VALUE OF "IAE" STATUS BASED ON TRACK, SECTOR, CYLINDER
87                ;AND THE STATUS OF "SSEI" DURING A SEARCH. ALSO SET "SKI" FLAG IF
88                ;CYLINDER ADDRESS IS TOO LARGE.
89 057022 012737 002000 001140      MOV      #IAE,$GDDAT      ;SETUP FOR IAE = 1
90 057030 052737 040000 060206      BIS      #SKI,200$        ;SETUP FOR SKI = 1
91 057036 023727 001446 001060      CMP      RMDCO,#560.      ;GREATER THAN LAST CYLINDER ?
92 057044 101035                BHI      30$              ;YES - CYLINDER IS INVALID
93 057046 042737 040000 060206      BIC      #SKI,200$        ;"SKI" SHOULD BE ZERO
94
95 057054 123737 001421 001335      CMPB    RMDAO+1,LSTRK+1   ;GREATER THAN LAST TRACK ?
96 057062 101026                BHI      30$              ;YES - TRACK IS INVALID
97
98 057064 123727 001420 000035      CMPB    RMDAO,#29.        ;SECTOR > 29. ?
99 057072 101420                BLOS    25$              ;NO!!
100 057074 032737 010000 001444      BIT      #FMT16,RMOFO     ;18 BIT FORMAT ?
101 057102 001416                BEQ      30$              ;YES - SECTOR IS INVALID FOR 18 BIT MODE
102 057104 123727 001420 000036      CMPB    RMDAO,#30.        ;SECTOR > 30. ?
103 057112 101410                BLOS    25$              ;BR IF NO
104 057114 032737 001000 001444      BIT      #SSEI,RMOFO     ;IS SSEI CLEAR ?
105 057122 001406                BEQ      30$              ;YES - SECTOR IS INVALID FOR 16 BIT MODE
106 057124 123727 001420 000037      CMPB    RMDAO,#31.        ;SECTOR > 31. ?
107 057132 101002                BHI      30$              ;YES - SECTOR IS INVALID
108
109 057134 005037 001140      25$:      CLR      $GDDAT           ;"IAE" SHOULD = 0
110
111                ;COMPARE EXPECTED AND RECIVED "IAE" STATUS
112 057140 013737 001352 001142      30$:      MOV      RMER11,$BDDAT    ;GET RECEIVED IAE
113 057146 042737 175777 001142      BIC      #^CIAE,$BDDAT
114 057154 023737 001140 001142      CMP      $GDDAT,$BDDAT    ;IS IAE CORRECT??
    
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115 057162 001004          BNE      40$          :NO!!
116 057164 042737 040000 060206      BIC      #SKI,200$      :SKI SHOULD BE ZERO
117 057172 000413          BR       50$
118 057174          40$:
119
120          ;REPORT INCORRECT IAE STATUS VIA USER'S ERROR CALL
121 057174 062716 000004      ADD      #4,(SP)        :MOVE SP TO USER'S ERROR CALL
122 057200 112776 000257 000000      MOVB    #257,@(SP)     :WRITE ERROR NUMBER IN CALL
123 057206 162716 000002      SUB     #2,(SP)        :MOVE SP TO RETURN IF ERROR
124 057212 004736          JSR     PC,@(SP)+      :REPORT ERROR AND RETURN
125 057214 162716 000010      SUB     #10,(SP)      :RETURN SP TO NO ERROR
126 057220 000240          NOP
127 057222          50$:
128
129          ;SEE IF "SKI" OR "DVC" OR "IVC" IS SET
130 057222 032737 050200 001400      BIT     #SKI!DVC!IVC,RMER2I :ARE ANY BITS SET??
131 057230 001531          BEQ     90$          :NO!!
132
133          ;REPORT ERROR IF "SKI" IS SET AND "SKI" FLAG IS NOT SET
134 057232 013737 001400 001142      MOV     RMER2I,$BDDAT  :RECEIVED "SKI" STATUS
135 057240 042737 137777 001142      BIC     #^CSKI,$BDDAT
136 057246 013737 060206 001140      MOV     200$,$GDDAT  :EXPECTED "SKI" STATUS
137 057254 042737 137777 001140      BIC     #^CSK!,$GDDAT
138 057262 023737 001140 001142      CMP     $GDDAT,$BDDAT :IS "SKI" OK??
139 057270 001422          DEQ     60$          :YES-CHANGE ERROR NUMBER
140 057272 062716 000004      ADD     #4,(SP)        :MOVE SP TO USER'S ERROR CALL
141 057276 112776 000263 000000      MOVB    #263,@(SP)     :WRITE ERROR NUMBER
142 057304 032737 040000 001140      BIT     #SKI,$GDDAT   :SHOULD "SKI" BE SET??
143 057312 001403          BEQ     55$          :NO!!
144 057314 112776 000267 000000      MOVB    #267,@(SP)     :YES-CHANGE ERROR NUMBER
145 057322 162716 000002      SUB     #2,(SP)        :MOVE SP TO RETURN IF ERROR
146 057326 004736          JSR     PC,@(SP)+      :REPORT ERROR AND RETURN
147 057330 162716 000010      SUB     #10,(SP)      :RESTORE SP TO NO ERROR
148 057334 000240          NOP
149 057336          60$:
150
151          ;REPORT "IVC" ERROR AS
152          :
153          :
154 057336 032737 010000 001400      BIT     #IVC,RMER2I   :IS IVC SET??
155 057344 001433          BEQ     80$          :NO!!
156 057346 013737 001400 001140      MOV     RMER2I,$GDDAT :EXPECTED STATUS
157 057354 042737 010000 001140      BIC     #IVC,$GDDAT
158 057362 013737 001400 001142      MOV     RMER2I,$BDDAT :RECEIVED STATUS
159 057370 062716 000004      ADD     #4,(SP)        :MOVE SP TO USER'S ERROR CALL
160 057374 112776 000264 000000      MOVB    #264,@(SP)     :WRITE ERROR NUMBER IN CALL
161 057402 032737 000100 001350      BIT     #VV,RMDSI     :WAS VOLUME VALID??
162 057410 001403          BEQ     70$          :NO!!
163 057412 112776 000265 000000      MOVB    #265,@(SP)     :YES - CHANGE ERROR NUMBER
164 057420 162716 000002      SUB     #2,(SP)        :MOVE SP TO RETURN IF ERROR
165 057424 004736          JSR     PC,@(SP)+      :REPORT ERROR AND RETURN
166 057426 162716 000010      SUB     #10,(SP)      :RESTORE SP TO NO ERROR
167 057432 000240          NOP
168 057434          70$:
169
170          ;REPORT ANY DEVICE FAULT, I.E., "DVC" = 1
171 057434 032737 000200 001400      BIT     #DVC,RMER2I   :WAS THERE A DEVICE FAULT??
    
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172 057442 001424          BEQ      90$          :NO!!
173 057444 013737 001400 001140  MOV     RMER2I,$GDDAT :EXPECTED STATUS
174 057452 042737 000200 001140  BIC     #DVC,$GDDAT
175 057460 013737 001400 001142  MOV     RMER2I,$BDDAT :RECEIVED STATUS
176 057466 062716 000004          ADD     #4,(SP)       :MOVE SP TO USER'S ERROR CALL
177 057472 112776 000266 000000  MOVB   #266,@(SP)    :WRITE ERROR NUMBER IN CALL
178 057500 162716 000002          SUB     #2,(SP)      :MOVE SP TO RETURN IF ERROR
179 057504 004736          JSR    PC,@(SP)+    :REPORT ERROR AND RETURN
180 057506 162716 000010          SUB     #10,(SP)    :RESTORE SP TO NO ERROR
181 057512 000240          NOP
182 057514          90$:
183
184          :REPORT ANY 'OPI' ERROR AS
185          : 'OPI' BECAUSE MEDIUM IS NOT ONLINE
186          : 'OPI' BECAUSE 'ON CYLINDER' DIDN'T DROP
187 057514 032737 020000 001352  BIT     #OPI,RMER1I  :WAS OPI SET??
188 057522 001433          BEQ     110$        :NO!!
189 057524 013737 001352 001140  MOV     RMER1I,$GDDAT :EXPECTED STATUS
190 057532 042737 020000 001140  BIC     #OPI,$GDDAT
191 057540 013737 001352 001142  MOV     RMER1I,$BDDAT :RECEIVED STATUS
192 057546 062716 000004          ADD     #4,(SP)       :MOVE SP TO USER'S ERROR CALL
193 057552 112776 000270 000000  MOVB   #270,@(SP)    :SETUP ERROR FOR MOL = 0
194 057560 032737 010000 001350  BIT     #MOL,RMDSI   :WAS MOL 0??
195 057566 001403          BEQ     105$        :YES!!
196 057570 112776 000271 000000  MOVB   #271,@(SP)    :MOL WAS 1 - CHANGE ERROR
197 057576 162716 000002          SUB     #2,(SP)      :MOVE SP TO RETURN IF ERROR
198 057602 004736          JSR    PC,@(SP)+    :REPORT ERROR AND RETURN
199 057604 162716 000010          SUB     #10,(SP)    :RESTORE SP TO NO ERROR
200 057610 000240          NOP
201 057612          110$:
202
203          :SEE IF 'ATA' = 'MOL' = 'VV' = 1 AND 'PIP' = 0
204 057612 013746 001350  MOV     RMDSI,-(SP)   :GET DRIVE STATUS
205 057616 042716 047677  BIC     #^C<ATA!PIP!MOL!VV>,(SP)
206 057622 022726 110100  CMP     #ATA!MOL!VV,(SP)+ :IS DRIVE STATUS CORRECT??
207 057626 001554          BEQ     150$        :YES!!
208
209          :REPORT AN ERROR IF MOL = 0 AND OPI ERROR WAS NOT REPORTED, I.E., OPI = 0
210 057630 032737 010000 001350  BIT     #MOL,RMDSI   :WAS MEDIUM OFF LINE??
211 057636 001030          BNE     120$        :NO!!
212 057640 013737 001350 001140  MOV     RMDSI,$GDDAT :EXPECTED STATUS
213 057646 052737 010000 001140  BIS     #MOL,$GDDAT
214 057654 013737 001350 001142  MOV     RMDSI,$BDDAT :RECEIVED STATUS
215 057662 032737 020000 001352  BIT     #OPI,RMER1I  :WAS OPI REPORTED BEFORE??
216 057670 001013          BNE     120$        :YES - DON'T REPORT MOL = 0
217 057672 062716 000004          ADD     #4,(SP)       :MOVE SP TO USER'S ERROR CALL
218 057676 112776 000272 000000  MOVB   #272,@(SP)    :WRITE ERROR NUMBER IN CALL
219 057704 162716 000002          SUB     #2,(SP)      :MOVE SP TO RETURN IF ERROR
220 057710 004736          JSR    PC,@(SP)+    :REPORT ERROR AND RETURN
221 057712 162716 000010          SUB     #10,(SP)    :RESTORE SP TO NO ERROR
222 057716 000240          NOP
223 057720          120$:
224
225          :REPORT AN ERROR IF PIP IS STIL SET AND SKI IS RESET
226 057720 032737 020000 001350  BIT     #PIP,RMDSI   :IS POSITIONING IN PROGRESS??
227 057726 001430          BEQ     130$        :NO!!
228 057730 032737 040000 001400  BIT     #SKI,RMER2I  :WAS 'SKI' DETECTED??
    
```


229	057736	001024			BNE	130\$:YES-DONT REPORT PIP
230	057740	013737	001350	001140	MOV	RMDSI,\$GDDAT	:EXPECTED STATUS
231	057746	042737	020000	001140	BIC	#PIP,\$GDDAT	
232	057754	013737	001350	001142	MOV	RMDSI,\$BDDAT	:RECEIVED STATUS
233	057762	062716	000004		ADD	#4,(SP)	:MOVE SP TO USER'S ERROR CALL
234	057766	112776	000273	000000	MOVB	#273,@(SP)	:WRITE ERROR NUMBER IN CALL
235	057774	162716	000002		SUB	#2,(SP)	:MOVE SP TO RETURN IF ERROR
236	060000	004736			JSR	PC,@(SP)+	:REPORT ERROR AND RETURN
237	060002	162716	000010		SUB	#10,(SP)	:RESTORE SP TO NO ERROR
238	060006	000240			NOP		
239	060010					130\$:	
240							
241							:REPORT AN ERROR IF VOLUME IS NOT VALID AND IVC = 0
242	060010	032737	000100	001350	BIT	#VV,RMDSI	:IS VOLUME VALID??
243	060016	001030			BNE	140\$:YES!!
244	060020	032737	010000	001400	BIT	#IVC,RMER2I	:WAS IVC DETECTED??
245	060026	001024			BNE	140\$:YES - DON'T REPORT VV = 0
246	060030	013737	001350	001140	MOV	RMDSI,\$GDDAT	:EXPECTED STATUS
247	060036	052737	000100	001140	BIS	#VV,\$GDDAT	
248	060044	013737	001350	001142	MOV	RMDSI,\$BDDAT	:RECEIVED STATUS
249	060052	062716	000004		ADD	#4,(SP)	:MOVE SP TO USERS ERROR CALL
250	060056	112776	000350	000000	MOVB	#350,@(SP)	:WRITE ERROR NUMBER IN CALL
251	060064	162716	000002		SUB	#2,(SP)	:MOVE SP TO RETURN IF ERROR
252	060070	004736			JSR	PC,@(SP)+	:REPORT ERROR AND RETURN
253	060072	162716	000010		SUB	#10,(SP)	:RESTORE SP TO NO ERROR
254	060076	000240			NOP		
255	060100					140\$:	
256							
257							:REPORT AN ERROR IF ATTENTION IS NOT SET
258	060100	032737	100000	001350	BIT	#ATA,RMDSI	:IS ATA ON??
259	060106	001024			BNE	150\$:YES!!
260	060110	013737	001350	001140	MOV	RMDSI,\$GDDAT	:EXPECTED STATUS
261	060116	052737	100000	001140	BIS	#ATA,\$GDDAT	
262	060124	013737	001350	001142	MOV	RMDSI,\$BDDAT	:RECEIVED STATUS
263	060132	062716	000004		ADD	#4,(SP)	:MOVE SP TO USER'S ERROR CALL
264	060136	112776	000351	000000	MOVB	#351,@(SP)	:WRITE ERROR NUMBER IN CALL
265	060144	162716	000002		SUB	#2,(SP)	:MOVE SP TO RETURN IF ERROR
266	060150	004736			JSR	PC,@(SP)+	:REPORT ERROR AND RETURN
267	060152	162716	000010		SUB	#10,(SP)	:RESTORE SP TO NO ERROR
268	060156	000240			NOP		
269	060160					150\$:	
270							
271							:ARGUMENT THE RETURN ADDRESS IF AN ERROR WAS DETECTED
272	060160	062716	000004		ADD	#4,(SP)	:MOVE SP TO USER'S ERROR CALL
273	060164	105776	000000		TSTB	@(SP)	:WAS ERROR FOUND??
274	060170	001403			BEQ	160\$:NO!!
275	060172	062716	000004		ADD	#4,(SP)	:YES - CHANGE RETURN
276	060176	000402			BR	170\$	
277	060200	162716	000004		SUB	#4,(SP)	:NO ERROR FOUND
278	060204	000207			RTS	PC	:RETURN TO USER
279							
280	060206	000000				200\$:	:STORAGE FOR FLAGS

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.SBTTL STATIC DRIVE STATUS CHECK SUBROUTINE

:THIS SUBROUTINE LOOKS FOR UNEXPECTED CHANGES IN DRIVE
 :STATUS, SUCH AS THE DRIVE LOSING VOLUME VALID. THE SUBROUTINE
 :CAN BE USED BY HOUSEKEEPING AND OTHER COMMANDS DURING WHICH THERE
 :SHOULD NOT BE ANY DRIVE ERRORS OR CHANGES IN STATE.

:THE FOLLOWING CONDITIONS ARE TESTED AND REPORTED AS ERRORS
 :IF TRUE:

: .MOL = 0, INDICATES DRIVE WENT OFFLINE, NOTE
 : THAT MOL IS ASSUMED TO HAVE BEEN SET
 : .VV = 0, INDICATES THE DRIVE LOST VOLUME VALID
 : .PIP = 1, INDICATES THAT THE DRIVE IS OFF CYLINDER
 : .SKI = 1, INDICATES THE DRIVE HAS AN UNEXPECTED SKI ERROR
 : .DVC = 1, INDICATES AN UNEXPECTED DEVICE FAULT

:THE SUBROUTINE IS CALLED AFTER STORING STATUS IN THE GET BUFFER.

```

:(1) JSR PC,STCDRVSTS
      BR   ???          RETURN HERE IF NO ERROR
      NOP          RETURN HERE TO REPORT AN ERROR
      ERROR          ERROR NUMBER DEFINED BY SUB
      JSR PC,@(SP)+   GO BACK TO SUB FOR MORE ERROR CHECKS
      ???          RETURN HERE IF NO MORE ERRORS
    
```

STCDRVSTS:

```

: CLEAR USER'S ERROR CALL
      ADD #4,(SP) ;MOVE SP TO USER'S ERROR CALL
      CLRB @ (SP) ;CLEAR ERROR NUMBER
      SUB #4,(SP) ;MOVE SP BACK TO NO ERROR RETURN
: SEE IF 'MOL' = 'VV' = 1, AND 'PIP' = 0
      MOV RMDSI,-(SP) ;PUT DRIVE STATUS ON STACK
      BIC #^C<PIP!MOL!VV>,(SP)
      CMP #MOL!VV,(SP)+ ;ARE MOL,VV AND PIP O.K.??
      BEQ 30$ ;YES!!
    
```

```

: REPORT AN ERROR IF MOL = 0 AND 'OPI' = 0
      BIT #MOL,RMDSI ;IS MOL ON ??
      BNE 10$ ;YES!!
      BIT #OPI,RMER1I ;WAS 'OPI' SET??
      BNE 10$ ;YES-DONT REPORT 'MOL' = 0
      MOV RMDSI,$GDDAT ;EXPECTED STATUS
      BIS #MOL,$GDDAT
      MOV RMDSI,$BDDAT ;RECEIVED STATUS
      ADD #4,(SP) ;MOVE SP TO USER'S ERROR CALL
      MOVB #207,@(SP) ;WRITE ERROR NUMBER IN CALL
      SUB #2,(SP) ;MOVE SP TO RETURN FOR ERROR
      JSR PC,@(SP)+ ;REPORT ERROR VIA USER
      SUB #10,(SP) ;MOVE SP BACK TO NO ERROR RETURN
      NOP
    
```

10\$:

```

: REPORT AN ERROR IF VOLUME VALID IS NOW ZERO AND 'IVC' = 0
      BIT #VV,RMDSI ;IS 'VV' = 0??
      BNE 20$ ;NO!!
    
```

```

27 060210
30 060210 062716 000004
31 060214 105076 000000
32 060220 162716 000004
34 060224 013746 001350
35 060230 042716 147677
36 060234 022726 010100
37 060240 001524
40 060242 032737 010000 001350
41 060250 001030
42 060252 032737 020000 001352
43 060260 001024
44 060262 013737 001350 001140
45 060270 052737 010000 001140
46 060276 013737 001350 001142
47 060304 062716 000004
48 060310 112776 000207 000000
49 060316 162716 000002
50 060322 004736
51 060324 162716 000010
52 060330 000240
53 060332
56 060332 032737 000100 001350
57 060340 001030
    
```

```

58 060342 032737 010000 001400 BIT #IVC,RMER2I ;WAS "IVC" SET??
59 060350 001024 BNE 20$ ;YES-DONT REPORT "VV" = 0
60 060352 013737 001350 001140 MOV RMDSI,$GDDAT ;EXPECTED STATUS
61 060360 052737 000100 001350 BIS #VV,RMDSI
62 060366 013737 001350 001142 MOV RMDSI,$BDDAT ;RECEIVED STATUS
63 060374 062716 000004 ADD #4,(SP) ;MOVE SP TO USER'S ERROR CALL
64 060400 112776 000210 000000 MOVB #210,@(SP) ;WRITE ERROR NUMBER IN CALL
65 060406 162716 000002 SUB #2,(SP) ;MOVE SP TO RETURN FOR ERROR
66 060412 004736 JSR PC,@(SP)+ ;REPORT ERROR VIA USER
67 060414 162716 000010 SUB #10,(SP) ;MOVE SP BACK TO NO ERROR
68 060420 000240 NOP
69 060422
70
71 ;REPORT AN ERROR IF DRIVE IS OFF CYLINDER AND "SKI" = 0
72 060422 032737 020000 001350 BIT #PIP,RMDSI ;IS DRIVE OFF CYLINDER??
73 060430 001430 BEQ 30$ ;NO!!
74 060432 032737 040000 001400 BIT #SKI,RMER2I ;WAS "SKI" SET??
75 060440 001024 BNE 30$ ;YES-DONT REPORT "PIP" = 1
76 060442 013737 001350 001140 MOV RMDSI,$GDDAT ;EXPECTED STATUS
77 060450 042737 020000 001140 BIC #PIP,$GDDAT
78 060456 013737 001350 001142 MOV RMDSI,$BDDAT ;RECEIVED STATUS
79 060464 062716 000004 ADD #4,(SP) ;MOVE SP TO USER'S ERROR CALL
80 060470 112776 000211 000000 MOVB #211,@(SP) ;WRITE ERROR NUMBER IN USER'S CALL
81 060476 162716 000002 SUB #2,(SP) ;MOVE SP TO RETURN FOR ERROR
82 060502 004736 JSR PC,@(SP)+ ;REPORT ERROR VIA USER
83 060504 162716 000010 SUB #10,(SP) ;MOVE SP TO NO ERROR RETURN
84 060510 000240 NOP
85 060512
86
87 ;SEE IF "SKI" = "DVC" = 0
88 060512 013746 001400 MOV RMER2I,-(SP) ;PUT ERROR REG 2 ON STACK
89 060516 042726 137577 BIC #^C<SKI!DVC>,(SP)+
90 060522 001460 BEQ 60$ ;BRANCH IF NO ERROR
91 060524
92
93 ;REPORT AN ERROR IF THERE IS A DEVICE FAULT
94 060524 032737 000200 001400 BIT #DVC,RMER2I ;ANY DEVICE FAULT??
95 060532 001424 BEQ 50$ ;NO!!
96 060534 013737 001400 001140 MOV RMER2I,$GDDAT ;EXPECTED STATUS
97 060542 042737 000200 001140 BIC #DVC,$GDDAT
98 060550 013737 001400 001142 MOV RMER2I,$BDDAT ;RECEIVED STATUS
99 060556 062716 000004 ADD #4,(SP) ;MOVE SP TO USER'S CALL
100 060562 112776 000212 000000 MOVB #212,@(SP) ;WRITE NUMBER OF ERROR IN CALL
101 060570 162716 000002 SUB #2,(SP) ;MOVE SP TO RETURN FOR ERROR
102 060574 004736 JSR PC,@(SP)+ ;REPORT ERROR VIA USER
103 060576 162716 000010 SUB #10,(SP) ;MOVE SP BACK TO NO ERROR
104 060602 000240 NOP
105 060604
106
107 ;REPORT AN ERROR IF "SKI" = 1
108 060604 032737 040000 001400 BIT #SKI,RMER2I ;IS THERE A SEEK INCOMPLETE ERROR
109 060612 001424 BEQ 60$ ;NO!!
110 060614 013737 001400 001140 MOV RMER2I,$GDDAT ;EXPECTED STATUS
111 060622 042737 040000 001140 BIC #SKI,$GDDAT
112 060630 013737 001400 001142 MOV RMER2I,$BDDAT ;RECEIVED STATUS
113 060636 062716 000004 ADD #4,(SP) ;MOVE SP TO USER'S ERROR CALL
114 060642 112776 000213 000000 MOVB #213,@(SP) ;WRITE ERROR NUMBER IN USER'S ERROR CALL
    
```

115	060650	162716	000002	SUB	#2,(SP)	:MOVE SP TO RETURN FOR ERROR
116	060654	004736		JSR	PC,@(SP)+	:REPORT ERROR VIA USER
117	060656	162716	000010	SUB	#10,(SP)	:MOVE SP BACK TO NO ERROR
118	060662	000240		NCP		
119	060664					
120						
121						
122	060664	062716	000004	ADD	#4,(SP)	:MOVE SP TO USER'S ERROR CALL
123	060670	105776	000000	TSTB	@(SP)	:WAS AN ERROR DETECTED??
124	060674	001403		BEQ	70\$:NO!!
125	060676	062716	000004	ADD	#4,(SP)	:YES - MOVE SP TO USER'S ERROR RETURN
126	060702	000402		BR	80\$	
127	060704	162716	000004	SUB	#4,(SP)	:NO - MOVE SP TO NO ERROR RETURN
128	060710	000240		NOP		
129	060712	000207		RTS	PC	:RETURN TO USER

1

.SBTTL SAVE AND RESTORE R0-R5 ROUTINES

```

:*****
:*SAVE R0-R5
:*CALL:
:* SAVREG
:*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
:*
:*TOP---(+16)
:* +2---(+18)
:* +4---R5
:* +6---R4
:* +8---R3
:*+10---R2
:*+12---R1
:*+14---R0
    
```

```

060714
060714 010046
060716 010146
060720 010246
060722 010346
060724 010446
060726 010546
060730 016646 000022
060734 016646 000022
060740 016646 000022
060744 016646 000022
060750 000002
    
```

```

$SAVREG:
MOV R0,-(SP)      ::PUSH R0 ON STACK
MOV R1,-(SP)      ::PUSH R1 ON STACK
MOV R2,-(SP)      ::PUSH R2 ON STACK
MOV R3,-(SP)      ::PUSH R3 ON STACK
MOV R4,-(SP)      ::PUSH R4 ON STACK
MOV R5,-(SP)      ::PUSH R5 ON STACK
MOV 22(SP),-(SP)  ::SAVE PS OF MAIN FLOW
MOV 22(SP),-(SP)  ::SAVE PC OF MAIN FLOW
MOV 22(SP),-(SP)  ::SAVE PS OF CALL
MOV 22(SP),-(SP)  ::SAVE PC OF CALL
RTI
    
```

*RESTORE R0-R5

```

:*CALL:
:* RESREG

```

```

060752
060752 012666 000022
060756 012666 000022
060762 012666 000022
060766 012666 000022
060772 012605
060774 012604
060776 012603
061000 012602
061002 012601
061004 012600
061006 000002
    
```

```

$RESREG:
MOV (SP)+,22(SP)  ::RESTORE PC OF CALL
MOV (SP)+,22(SP)  ::RESTORE PS OF CALL
MOV (SP)+,22(SP)  ::RESTORE PC OF MAIN FLOW
MOV (SP)+,22(SP)  ::RESTORE PS OF MAIN FLOW
MOV (SP)+,R5      ::POP STACK INTO R5
MOV (SP)+,R4      ::POP STACK INTO R4
MOV (SP)+,R3      ::POP STACK INTO R3
MOV (SP)+,R2      ::POP STACK INTO R2
MOV (SP)+,R1      ::POP STACK INTO R1
MOV (SP)+,R0      ::POP STACK INTO R0
RTI
    
```

.SBTTL BINARY TO ASCII AND TYPE ROUTINE

 *THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 16-BIT
 *BINARY-ASCII NUMBER AND TYPE IT.

*CALL:

* MOV NUMBER,-(SP) ::NUMBER TO BE TYPED
 * TYPBN ::TYPE IT

061010	010146			\$TYPBN:	MOV	R1,-(SP)	::SAVE R1 ON THE STACK
061012	016601	000006			MOV	6(SP),R1	::GET THE INPUT NUMBER
061016	000261				SEC		::SET 'C' SO CAN KEEP TRACK OF THE NUMBER OF BITS
061020	112737	000060	061062	1\$:	MOVB	#'0,\$BIN	::SET CHARACTER TO AN ASCII '0'.
061026	006101				ROL	R1	::GET THIS BIT
061030	001406				BEQ	2\$::DONE?
061032	105537	061062			ADCB	\$BIN	::NO--SET THE CHARACTER EQUAL TO THIS BIT
061036	104401	061062			TYPE	,\$BIN	::GO TYPE THIS BIT
061042	000241				CLC		::CLEAR 'C' SO CAN KEEP TRACK OF BITS
061044	000765				BR	1\$::GO DO THE NEXT BIT
061046	012601			2\$:	MOV	(SP)+,R1	::POP THE STACK INTO R1
061050	016666	000002	000004		MOV	2(SP),4(SP)	::ADJUST THE STACK
061056	012616				MOV	(SP)+,(SP)	
061060	000002				RTI		::RETURN TO USER
061062	000	000		\$BIN:	.BYTE	0,0	::STORAGE FOR ASCII CHAR. AND TERMINATOR

.SBTTL CONVERT BINARY TO DECIMAL AND TYPE ROUTINE

```

*****
*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
*REPLACED WITH SPACES.

```

```

*CALL:
*      MOV      NUM,-(SP)      ;;PUT THE BINARY NUMBER ON THE STACK
*      TYPDS                    ;;GO TO THE ROUTINE

```

```

061064
061064 010046
061066 010146
061070 010246
061072 010346
061074 010546
061076 012746 020200
061102 016605 000020
061106 100004
061110 005405
061112 112766 000055 000001
061120 005000 1$:
061122 012703 061300
061126 112723 000040
061132 005002 2$:
061134 016001 061270
061140 160105 3$:
061142 002402
061144 005202
061146 000774
061150 060105 4$:
061152 005702
061154 001002
061156 105716
061160 100407
061162 106316 5$:
061164 103003
061166 116663 000001 177777
061174 052702 000060 6$:
061200 052702 000040 7$:
061204 110223
061206 005720
061210 020027 000010
061214 002746
061216 003002
061220 010502
061222 000764
061224 105726 8$:
061226 100003
061230 116663 177777 177776 9$:
061236 105013
061240 012605
061242 012603
061244 012602
061246 012601

STYPDS:
MOV      R0,-(SP)      ;;PUSH R0 ON STACK
MOV      R1,-(SP)      ;;PUSH R1 ON STACK
MOV      R2,-(SP)      ;;PUSH R2 ON STACK
MOV      R3,-(SP)      ;;PUSH R3 ON STACK
MOV      R5,-(SP)      ;;PUSH R5 ON STACK
MOV      #20200,-(SP)  ;;SET BLANK SWITCH AND SIGN
MOV      20(SP),R5     ;;GET THE INPUT NUMBER
BPL      1$            ;;BR IF INPUT IS POS.
NEG      R5            ;;MAKE THE BINARY NUMBER POS.
MOVB     #'-,1(SP)     ;;MAKE THE ASCII NUMBER NEG.
CLR      R0            ;;ZERO THE CONSTANTS INDEX
MOV      #SDBLK,R3     ;;SETUP THE OUTPUT POINTER
MOVB     #' ,(R3)+     ;;SET THE FIRST CHARACTER TO A BLANK
CLR      R2            ;;CLEAR THE BCD NUMBER
MOV      $DTBL(R0),R1  ;;GET THE CONSTANT
SUB      R1,R5         ;;FORM THIS BCD DIGIT
BLT      4$            ;;BR IF DONE
INC      R2            ;;INCREASE THE BCD DIGIT BY 1
BR       3$
4$:      ADD      R1,R5      ;;ADD BACK THE CONSTANT
TST      R2            ;;CHECK IF BCD DIGIT=0
BNE      5$            ;;FALL THROUGH IF 0
TSTB     (SP)          ;;STILL DOING LEADING 0'S?
BMI      7$            ;;BR IF YES
ASLB     (SP)          ;;MSD?
BCC      6$            ;;BR IF NO
MOVB     1(SP),-1(R3)  ;;YES--SET THE SIGN
BIS      #'0,R2        ;;MAKE THE BCD DIGIT ASCII
BIS      #' ,R2        ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
MOVB     R2,(R3)+     ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
TST      (R0)+        ;;JUST INCREMENTING
CMP      R0,#10       ;;CHECK THE TABLE INDEX
BLT      2$            ;;GO DO THE NEXT DIGIT
BGT      8$            ;;GO TO EXIT
MOV      R5,R2        ;;GET THE LSD
BR       6$            ;;GO CHANGE TO ASCII
8$:      TSTB     (SP)+    ;;WAS THE LSD THE FIRST NON-ZERO?
BPL      9$            ;;BR IF NO
MOVB     -1(SP),-2(R3) ;;YES--SET THE SIGN FOR TYPING
CLRB     (R3)          ;;SET THE TERMINATOR
MOV      (SP)+,R5     ;;POP STACK INTO R5
MOV      (SP)+,R3     ;;POP STACK INTO R3
MOV      (SP)+,R2     ;;POP STACK INTO R2
MOV      (SP)+,R1     ;;POP STACK INTO R1

```

061250	012600			MOV	(SP)+,R0	::POP STACK INTO R0
061252	104401	061300		TYPE	,SDBLK	::NOW TYPE THE NUMBER
061256	016666	000002	000004	MOV	2(SP),4(SP)	::ADJUST THE STACK
061264	012616			MOV	(SP)+,(SP)	
061266	000002			RTI		::RETURN TO USER
061270	023420					
061272	001750		\$DTBL:	10000.		
061274	000144			1000.		
061276	000012			100.		
061300				10.		
			\$DBLK:	.BLKW	4	

.SBTTL BINARY TO OCTAL (ASCII) AND TYPE

```

*****
*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
*OCTAL (ASCII) NUMBER AND TYPE IT.
*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
*CALL:
*   MOV     NUM,-(SP)      ;;NUMBER TO BE TYPED
*   TYPOS   N              ;;CALL FOR TYPEOUT
*   .BYTE  N              ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
*   .BYTE  M              ;;M=1 OR 0
*                               ;;1=TYPE LEADING ZEROS
*                               ;;0=SUPPRESS LEADING ZEROS

```

```

*$TYPON---ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
*$TYPOS OR $TYPOC

```

```

*CALL:
*   MOV     NUM,-(SP)      ;;NUMBER TO BE TYPED
*   TYPON   N              ;;CALL FOR TYPEOUT

```

```

*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER

```

```

*CALL:
*   MOV     NUM,-(SP)      ;;NUMBER TO BE TYPED
*   TYPOC   N              ;;CALL FOR TYPEOUT

```

061310	017646	000000		\$TYPOS:	MOV	@(SP),-(SP)	;;PICKUP THE MODE
061314	116637	000001	061532		MOVB	1(SP),\$OFILL	;;LOAD ZERO FILL SWITCH
061322	112637	061535			MOVB	(SP)+,\$OMODE+1	;;NUMBER OF DIGITS TO TYPE
061326	062716	000002			ADD	#2,(SP)	;;ADJUST RETURN ADDRESS
061332	000406				BR	\$TYPON	
061334	112737	000001	061533	\$TYPOC:	MOVB	#1,\$OFILL	;;SET THE ZERO FILL SWITCH
061342	112737	000006	061535		MOVB	#6,\$OMODE+1	;;SET FOR SIX(6) DIGITS
061350	112737	000005	061532	\$TYPON:	MOVB	#5,\$OCNT	;;SET THE ITERATION COUNT
061356	010346				MOV	R3,-(SP)	;;SAVE R3
061360	010446				MOV	R4,-(SP)	;;SAVE R4
061362	010546				MOV	R5,-(SP)	;;SAVE R5
061364	113704	061535			MOVB	\$OMODE+1,R4	;;GET THE NUMBER OF DIGITS TO TYPE
061370	005404				NEG	R4	
061372	062704	000006			ADD	#6,R4	;;SUBTRACT IT FOR MAX. ALLOWED
061376	110437	061534			MOVB	R4,\$OMODE	;;SAVE IT FOR USE
061402	113704	061533			MOVB	\$OFILL,R4	;;GET THE ZERO FILL SWITCH
061406	016605	000012			MOV	12(SP),R5	;;PICKUP THE INPUT NUMBER
061412	005003				CLR	R3	;;CLEAR THE OUTPUT WORD
061414	006105			1\$:	ROL	R5	;;ROTATE MSB INTO 'C'
061416	000404				BR	3\$;;GO DO MSB
061420	006105			2\$:	ROL	R5	;;FORM THIS DIGIT
061422	006105				ROL	R5	
061424	006105				ROL	R5	
061426	010503				MOV	R5,R3	
061430	006103			3\$:	ROL	R3	;;GET LSB OF THIS DIGIT
061432	105337	061534			DECB	\$OMODE	;;TYPE THIS DIGIT?
061436	100016				BPL	7\$;;BR IF NO
061440	042703	177770			BIC	#177770,R3	;;GET RID OF JUNK
061444	001002				BNE	4\$;;TEST FOR 0
061446	005704				TST	R4	;;SUPPRESS THIS 0?
061450	001403				BEQ	5\$;;BR IF YES
061452	005204			4\$:	INC	R4	;;DON'T SUPPRESS ANYMORE 0'S

061454	052703	000060		BIS	#'0,R3	::MAKE THIS DIGIT ASCII
061460	052703	000040	5\$:	BIS	#' ,R3	::MAKE ASCII IF NOT ALREADY
061464	110337	061530		MOVB	R3,8\$::SAVE FOR TYPING
061470	104401	061530		TYPE	8\$::GO TYPE THIS DIGIT
061474	105337	061532	7\$:	DECB	\$OCNT	::COUNT BY 1
061500	003347			BGT	2\$::BR IF MORE TO DO
061502	002402			BLT	6\$::BR IF DONE
061504	005204			INC	R4	::INSURE LAST DIGIT ISN'T A BLANK
061506	000744			BR	2\$::GO DO THE LAST DIGIT
061510	012605		6\$:	MOV	(SP)+,R5	::RESTORE R5
061512	012604			MOV	(SP)+,R4	::RESTORE R4
061514	012603			MOV	(SP)+,R3	::RESTORE R3
061516	016666	000002 000004		MOV	2(SP),4(SP)	::SET THE STACK FOR RETURNING
061524	012616			MOV	(SP)+,(SP)	
061526	000002			RTI		::RETURN
061530	000		8\$:	.BYTE	0	::STORAGE FOR ASCII DIGIT
061531	000			.BYTE	0	::TERMINATOR FOR TYPE ROUTINE
061532	000		\$OCNT:	.BYTE	0	::OCTAL DIGIT COUNTER
061533	000		\$OFILL:	.BYTE	0	::ZERO FILL SWITCH
061534	000000		\$OMODE:	.WORD	0	::NUMBER OF DIGITS TO TYPE

:HORIZONTAL TAB PROCESSOR

061724	112716	000040		8\$:	MOVB	#' (SP)	::REPLACE TAB WITH SPACE
061730	004737	061750		9\$:	JSR	PC,\$TYPEC	::TYPE A SPACE
061734	132737	000007	062066		BITB	#7,\$CHARCNT	::BRANCH IF NOT AT
061742	001372				BNE	9\$::TAB STOP
061744	005726				TST	(SP)+	::POP SPACE OFF STACK
061746	000724				BR	2\$::GET NEXT CHARACTER
061750				\$TYPEC:			
061750	105777	117204			TSTB	@\$TKS	::CHAR IN KYBD BUFFER?
061754	100022				BPL	10\$::BR IF NOT
061756	017746	117200			MOV	@\$TKB,-(SP)	::GET CHAR
061762	042716	177600			BIC	#177600,(SP)	::STRIP EXTRANEIOUS BITS
061766	122716	000023			CMPB	#\$XOFF,(SP)	::WAS CHAR XOFF
061772	001012				BNE	102\$::BR IF NOT
061774				101\$:			
061774	105777	117160			TSTB	@\$TKS	::WAIT FOR CHAR
062000	100375				BPL	101\$	
062002	117716	117154			MOVB	@\$TKB,(SP)	::GET CHAR
062006	042716	177600			BIC	#177600,(SP)	::STRIP IT
062012	122716	000021			CMPB	#\$XON,(SP)	::WAS IT XON?
062016	001366				BNE	101\$::BR IF NOT
062020				102\$:			
062020	005726				TST	(SP)+	::FIX STACK
062022				10\$:			
062022	105777	117136			TSTB	@\$TPS	::WAIT UNTIL PRINTER IS READY
062026	100375				BPL	10\$	
062030	116677	000002	117130		MOVB	2(SP),@\$TPB	::LOAD CHAR TO BE TYPED INTO DATA REG.
062036	122766	000015	000002		CMPB	#CR,2(SP)	::IS CHARACTER A CARRIAGE RETURN?
062044	001003				BNE	1\$::BRANCH IF NO
062046	105037	062066			CLRB	\$CHARCNT	::YES--CLEAR CHARACTER COUNT
062052	000406				BR	\$TYPEX	::EXIT
062054	122766	000012	000002	1\$:	CMPB	#LF,2(SP)	::IS CHARACTER A LINE FEED?
062062	001402				BEQ	\$TYPEX	::BRANCH IF YES
062064	105227				INCB	(PC)+	::COUNT THE CHARACTER
062066	000000			\$CHARCNT:	WORD	0	::CHARACTER COUNT STORAGE
062070	000207			\$TYPEX:	RTS	PC	

.SBTTL SCOPE HANDLER ROUTINE

```

:*****
:*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
:*AND LOAD THE TEST NUMBER($STNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
:*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
:*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
:*SW14=1      LOOP ON TEST
:*SW11=1      INHIBIT ITERATIONS
:*SW09=1      LOOP ON ERROR
:*SW08=1      LOOP ON TEST IN SWR<7:0>
:*CALL
:*          SCOPE          ;;SCOPE=10T
    
```

```

062072          $SCOPE:
062072 104410          CKSWR          ;;TEST FOR CHANGE IN SOFT-SWR
062074 004737 062734  JSR          PC,STOP
062100 032777 040000 117046 1$:    BIT          #BIT14,@SWR          ;;LOOP ON PRESENT TEST?
062106 001402          BEQ          9$          ;;NO IF SW14=0
062110 000137 062540          JMP          $OVER          ;;JUMP OVER SCOPE ROUTINE
062114          9$:
062114 000416          :####START OF CODE FOR THE XOR TESTER####
          SXTSTR: BR          6$
062116 013746 000004          MOV          @ERRVEC,-(SP)          ;;IF RUNNING ON THE 'XOR' TESTER CHANGE
062122 012737 062142 000004          MOV          #5$,@ERRVEC          ;;THIS INSTRUCTION TO A 'NOP' (NOP=240)
062130 005737 177060          TST          @177060          ;;SAVE THE CONTENTS OF THE ERROR VECTOR
062134 012637 000004          MOV          (SP)+,@ERRVEC          ;;SET FOR TIMEOUT
062140 000561          BR          $SVLAD          ;;TIME OUT ON XOR?
062142 022626          5$:    CMP          (SP)+,(SP)+          ;;RESTORE THE ERROR VECTOR
062144 012637 000004          MOV          (SP)+,@ERRVEC          ;;GO TO THE NEXT TEST
062150 000521          BR          7$          ;;CLEAR THE STACK AFTER A TIME OUT
062152          6$:;####END OF CODE FOR THE XOR TESTER####          ;;RESTORE THE ERROR VECTOR
062152 032777 000400 116774          BIT          #BIT08,@SWR          ;;LOOP ON SPEC. TEST?
062160 001421          BEQ          2$          ;;BR IF NO
062162 005046          CLR          -(SP)          ;;CLEAR A TEMP. LOCATION
062164 117716 116764          MOVB         @SWR,(SP)          ;;PICKUP THE DESIRED TEST NUMBER
062170 001414          BEQ          8$          ;;BRANCH IF BAD TEST NUMBER IN SWR
062172 022716 000067          CMP          #67,(SP)          ;;CHECK THE NUMBER IN THE SWR
062176 002411          BLT          8$          ;;BRANCH IF TEST NUMBER IS OUT OF RANGE
062200 011637 001116          MOV          (SP),$STNM          ;;UPDATE THE TEST NUMBER
062204 005316          DEC          (SP)          ;;BACKUP BY ONE
062206 006316          ASL          (SP)          ;;SCALE THE TEST NUMBER AS AN INDEX
062210 062716 062556          ADD          #$$SW08TBL,(SP)          ;;FORM THE ADDRESS OF TEST POINTER
062214 013637 001122          MOV          @(SP)+,$LPADR          ;;SET LOOP ADDRESS TO DESIRED TEST
062220 000547          BR          $OVER          ;;GO LOOP ON THE TEST
062222 005726          8$:    TST          (SP)+          ;;CLEAN THE BAD TEST NUMBER OFF OF THE STACK
062224 105737 001117          2$:    TSTB         $ERFLG          ;;HAS AN ERROR OCCURRED?
062230 001502          BEQ          3$          ;;BR IF NO
062232 022737 177777 063352          CMP          #-1,CPSAVE          ;;SEE IF TIMEOUT WAS PREVIOUSLY RECORDED
062240 001455          BEQ          2003$          ;;KICK AROUND ROUTINE IF SO
062242 013746 000004          MOV          ERRVEC,-(SP)          ;;SAVE CONTENTS OF ERROR VECTOR
062246 012737 062264 000004          MOV          #2000$,ERRVEC          ;;SETUP 'TRAP' RETURN ADDRESS
062254 013737 177766 063352          MOV          177766,CPSAVE          ;;MOVE CPU ERROR REGISTER TO CPSAVE FOR TEST
062262 000406          BR          2001$
062264 012737 177777 063352 2000$: MOV          #-1,CPSAVE          ;;SET CPU ERROR REGISTER TIMEOUT INDICATOR
062272 012716 062300          MOV          #2001$,(SP)          ;;SETUP RETURN ADDRESS
    
```

SCOPE HANDLER ROUTINE

```

062276 000002          RTI
062300 012637 000004    2001$: MOV      (SP)+,ERRVEC      ;;RESTORE CONTENTS OF ERROR VECTOR

062304 022737 177777 063352 2002$: CMP      #-1,CPSAVE      ;;SEE IF CPSAVE HAS CPU ERR REG TIMEOUT INDICATION
062312 001430          BEQ      2003$          ;;BRANCH IF SO
062314 032737 000001 063352    BIT      #BIT00,CPSAVE      ;;SEE IF THE POWER MONITOR BIT IS ON
062322 001424          BEQ      2003$          ;;BRANCH TO CONTINUE ROUTINE IF CLEAR
062324 042737 000001 177766    BIC      #BIT00,177766     ;;CLEAR THE BIT FOUND TO BE SET
062332 013746 001154          MOV      SWR,-(SP)         ;;SAVE SWR ADDRESS
062336 017646 000000          MOV      @ (SP),-(SP)      ;;SAVE SWR VALUE
062342 012737 000176 001154    MOV      #176,SWR         ;;GET SOFTWARE SWR ADDRESS
062350 011677 116600          MOV      (SP),@SWR        ;;GET CURRENT SWR VALUE
062354 042777 001000 116572    BIC      #BIT09,@SWR      ;;DON'T ALLOW LOOP ON ERROR ON THIS ERROR
062362 104177          EMT      177             ;;CALL SPECIAL POWER FAIL BIT ERROR CALL
062364 012676 000000          MOV      (SP)+,@(SP)     ;;RESTORE SWR TO ORIGINAL VALUE
062370 012637 001154          MOV      (SP)+,SWR       ;;RESTORE SWR ADDRESS

062374          2003$:
062374 123737 001131 001117    CMPB    $ERMAX,$ERFLG    ;;MAX. ERRORS FOR THIS TEST OCCURRED?
062402 101015          BHI     3$              ;;BR IF NO
062404 032777 001000 116542    BIT     #BIT09,@SWR      ;;LOOP ON ERROR?
062412 001404          BEQ     4$              ;;BR IF NO
062414 013737 001124 001122    7$: MOV     $LPERR,$LPADR  ;;SET LOOP ADDRESS TO LAST SCOPE
062422 000446          BR      $OVER
062424 105037 001117          4$: CLRB   $ERFLG         ;;ZERO THE ERROR FLAG
062430 005037 001206          CLR    $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
062434 000415          BR     1$              ;;ESCAPE TO THE NEXT TEST
062436 032777 004000 116510    3$: BIT     #BIT11,@SWR    ;;INHIBIT ITERATIONS?
062444 001011          BNE    1$              ;;BR IF YES
062446 005737 001230          TST    $PASS           ;;IF FIRST PASS OF PROGRAM
062452 001406          BEQ    1$              ;;      INHIBIT ITERATIONS
062454 005237 001120          INC    $ICNT           ;;INCREMENT ITERATION COUNT
062460 023737 001206 001120    CMP    $TIMES,$ICNT     ;;CHECK THE NUMBER OF ITERATIONS MADE
062466 002024          BGE    $OVER           ;;BR IF MORE ITERATION REQUIRED
062470 012737 000001 001120    1$: MOV    #1,$ICNT      ;;REINITIALIZE THE ITERATION COUNTER
062476 013737 062554 001206    MOV    $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
062504 105237 001116          $SVLAD: INCB  $STNM      ;;COUNT TEST NUMBERS
062510 113737 001116 001226    MOVB  $STNM,$STESTN    ;;SET TEST NUMBER IN APT MAILBOX
062516 011637 001122          MOV    (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
062522 011637 001124          MOV    (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
062526 005037 001210          CLR    $ESCAPE        ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
062532 112737 000001 001131    MOVB  #1,$ERMAX        ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
062540 013777 001116 116410    $OVER: MOV    $STNM,@DISPLAY ;;DISPLAY TEST NUMBER
062546 013716 001122          MOV    $LPADR,(SP)    ;;FUDGE RETURN ADDRESS
062552 000002          RTI
062554 000005          $MXCNT: 5.           ;;FIXES PS
062556          $SW08TBL:      ;;MAX. NUMBER OF ITERATIONS
          .REPT $TN-1
062556 007740          .WORD  TST1+2        ;;STARTING ADDRESS OF TEST 1
062560 010140          .WORD  TST2+2        ;;STARTING ADDRESS OF TEST 2
062562 010534          .WORD  TST3+2        ;;STARTING ADDRESS OF TEST 3
062564 011404          .WORD  TST4+2        ;;STARTING ADDRESS OF TEST 4
062566 011742          .WORD  TST5+2        ;;STARTING ADDRESS OF TEST 5
062570 012150          .WORD  TST6+2        ;;STARTING ADDRESS OF TEST 6
062572 012464          .WORD  TST7+2        ;;STARTING ADDRESS OF TEST 7
062574 012644          .WORD  TST10+2       ;;STARTING ADDRESS OF TEST 10
062576 013716          .WORD  TST11+2       ;;STARTING ADDRESS OF TEST 11
062600 014216          .WORD  TST12+2       ;;STARTING ADDRESS OF TEST 12

```

062602	014426	.WORD	TST13+2	::STARTING ADDRESS OF TEST 13
062604	014734	.WORD	TST14+2	::STARTING ADDRESS OF TEST 14
062606	015244	.WORD	TST15+2	::STARTING ADDRESS OF TEST 15
062610	015506	.WORD	TST16+2	::STARTING ADDRESS OF TEST 16
062612	015764	.WORD	TST17+2	::STARTING ADDRESS OF TEST 17
062614	016234	.WORD	TST20+2	::STARTING ADDRESS OF TEST 20
062616	016464	.WORD	TST21+2	::STARTING ADDRESS OF TEST 21
062620	017010	.WORD	TST22+2	::STARTING ADDRESS OF TEST 22
062622	017430	.WORD	TST23+2	::STARTING ADDRESS OF TEST 23
062624	017774	.WORD	TST24+2	::STARTING ADDRESS OF TEST 24
062626	020366	.WORD	TST25+2	::STARTING ADDRESS OF TEST 25
062630	021056	.WORD	TST26+2	::STARTING ADDRESS OF TEST 26
062632	021424	.WORD	TST27+2	::STARTING ADDRESS OF TEST 27
062634	021746	.WORD	TST30+2	::STARTING ADDRESS OF TEST 30
062636	022330	.WORD	TST31+2	::STARTING ADDRESS OF TEST 31
062640	022646	.WORD	TST32+2	::STARTING ADDRESS OF TEST 32
062642	023432	.WORD	TST33+2	::STARTING ADDRESS OF TEST 33
062644	024156	.WORD	TST34+2	::STARTING ADDRESS OF TEST 34
062646	024746	.WORD	TST35+2	::STARTING ADDRESS OF TEST 35
062650	025532	.WORD	TST36+2	::STARTING ADDRESS OF TEST 36
062652	026064	.WORD	TST37+2	::STARTING ADDRESS OF TEST 37
062654	026524	.WORD	TST40+2	::STARTING ADDRESS OF TEST 40
062656	026744	.WORD	TST41+2	::STARTING ADDRESS OF TEST 41
062660	027302	.WORD	TST42+2	::STARTING ADDRESS OF TEST 42
062662	027574	.WORD	TST43+2	::STARTING ADDRESS OF TEST 43
062664	030066	.WORD	TST44+2	::STARTING ADDRESS OF TEST 44
062666	030400	.WORD	TST45+2	::STARTING ADDRESS OF TEST 45
062670	030706	.WORD	TST46+2	::STARTING ADDRESS OF TEST 46
062672	031174	.WORD	TST47+2	::STARTING ADDRESS OF TEST 47
062674	031476	.WORD	TST50+2	::STARTING ADDRESS OF TEST 50
062676	032002	.WORD	TST51+2	::STARTING ADDRESS OF TEST 51
062700	032420	.WORD	TST52+2	::STARTING ADDRESS OF TEST 52
062702	033016	.WORD	TST53+2	::STARTING ADDRESS OF TEST 53
062704	033410	.WORD	TST54+2	::STARTING ADDRESS OF TEST 54
062706	033750	.WORD	TST55+2	::STARTING ADDRESS OF TEST 55
062710	034312	.WORD	TST56+2	::STARTING ADDRESS OF TEST 56
062712	034636	.WORD	TST57+2	::STARTING ADDRESS OF TEST 57
062714	035356	.WORD	TST60+2	::STARTING ADDRESS OF TEST 60
062716	036000	.WORD	TST61+2	::STARTING ADDRESS OF TEST 61
062720	036442	.WORD	TST62+2	::STARTING ADDRESS OF TEST 62
062722	037042	.WORD	TST63+2	::STARTING ADDRESS OF TEST 63
062724	037422	.WORD	TST64+2	::STARTING ADDRESS OF TEST 64
062726	037776	.WORD	TST65+2	::STARTING ADDRESS OF TEST 65
062730	040356	.WORD	TST66+2	::STARTING ADDRESS OF TEST 66
062732	040722	.WORD	TST67+2	::STARTING ADDRESS OF TEST 67

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5	062734			
	062734	012746	000140	
	062740	012746	062746	
	062744	000002		
	062746			
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7				
8				
9	062746	012746	000240	


```

;DROP PRIORITY TO ALLOW CONSOLE INTERRUPT
STOP:
    MOV    #PR3,-(SP)    ;;PUT NEW PS ON STACK
    MOV    #64$,-(SP)   ;;PUT NEW PC ON STACK
    RTI                          ;;POP NEW PC AND PS
64$:
;RAISE PRIORITY TO INHIBIT CONSOLE INTERRUPT
    MOV    #PR5,-(SP)    ;;PUT NEW PS ON STACK
    
```

```
062752 012746 062760      MOV    #65$,-(SP)    ;;PUT NEW PC ON STACK  
062756 000002              RTI                      ;;POP NEW PC AND PS  
062760                      65$: RTS    PC                ;RETURN  
10 062760 000207
```


1

.SBTTL ERROR HANDLER ROUTINE

```

*****
*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
*AND GO TO ERRTP ON ERROR
*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
*SW15=1      HALT ON ERRCR
*SW13=1      INHIBIT ERROR TYPEOUTS
*SW10=1      BELL ON ERROR
*SW09=1      LOOP ON ERROR
*CALL
*          ERROR      N          ;;ERROR=EMT AND N=ERROR ITEM NUMBER
    
```

```

062762 105037 063354 $ERRGR: CLRB      IBSAVE      ;;CLEAR THE ITEM BYTE SAVE LOCATION
062766 104410          CKSWR          ;;TEST FOR CHANGE IN SOFT-SWR
062770 105237 001117 7$:      INCB      $ERFLG      ;;SET THE ERROR FLAG
062774 001775          BEQ      7$          ;;DON'T LET THE FLAG GO TO ZERO
062776 013777 001116 116152 MOV      $STNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
063004 032777 002009 116142 BIT      #BIT10,@SWR    ;;BELL ON ERROR?
063012 001402          BEQ      1$          ;;NO - SKIP
063014 104401 001212          TYPE      $BELL      ;;RING BELL
063020 005237 001126 1$:      INC      $ERTTL      ;;COUNT THE NUMBER OF ERRORS
063024 011637 001132          MOV      (SP), $ERRPC  ;;GET ADDRESS OF ERROR INSTRUCTION
063030 162737 000002 001132 SUB      #2, $ERRPC
063036 117737 116070 001130 MOVVB   @ $ERRPC, $ITEMB ;;STRIP AND SAVE THE ERROR ITEM CODE
063044 032777 001000 116102 BIT      #BIT09,@SWR    ;;SEE IF LOOP ON ERROR IS SET
063052 001060          BNE      1004$      ;;BRANCH AROUND ROUTINE IF SO
063054 122737 000177 001130 CMPB    #177, $ITEMB    ;;SEE IF THIS IS THE POWER FAIL CALL
063062 001454          BEQ      1004$      ;;BRANCH AROUND ROUTINE IF IT IS
063064 105737 063354          TSTB      IBSAVE      ;;SEE IF THIS IS THE 2ND ERROR CALL IN THIS ROUTINE
063070 001047          BNE      1003$      ;;BRANCH IF SO
063072 022737 177777 063352 CMP      #-1, CPSAVE    ;;SEE IF CPSAVE HAS CPU ERR REG TIMEOUT INDICATION
063100 001445          BEQ      1004$      ;;BRANCH IF SO
063102 013746 000004          MOV      ERRVEC, -(SP)  ;;SAVE CONTENTS OF ERROR VECTOR
063106 012737 063124 000004 MOV      #1000$, ERRVEC ;;SETUP 'TRAP' RETURN ADDRESS
063114 013737 177766 063352 MOV      177766, CPSAVE ;;MOVE CPU ERROR REGISTER TO CPSAVE FOR TEST
063122 000406          BR      1001$
063124 012737 177777 063352 1000$: MOV      #-1, CPSAVE    ;;SET CPU ERROR REGISTER TIMEOUT INDICATOR
063132 012716 063140          MOV      #1001$, (SP)  ;;SETUP RETURN ADDRESS
063136 000002          RTI
063140 012637 000004          1001$: MOV      (SP)+, ERRVEC  ;;RESTORE CONTENTS OF ERROR VECTOR

063144 022737 177777 063352 1002$: CMP      #-1, CPSAVE    ;;SEE IF CPSAVE HAS CPU ERR REG TIMEOUT INDICATION
063152 001420          BEQ      1004$      ;;BRANCH IF SO
063154 032737 000001 063352 BIT      #BIT00, CPSAVE  ;;SEE IF POWER MONITOR BIT IS SET IN CPU ERR REG
063162 001414          BEQ      1004$      ;;BRANCH IF OK
063164 042737 000001 177766 BIC      #BIT00, 177766 ;;CLEAR THE BIT FOUND SET
063172 113737 001130 063354 MOVVB   $ITEMB, IBSAVE  ;;MAKE IBSAVE NON-ZERO FOR DUAL ERROR CALL
063200 112737 000177 001130 MOVVB   #177, $ITEMB    ;;SET $ITEMB TO SPECIAL POWER FAIL POINTER
063206 000402          BR      1004$      ;;BRANCH OVER IBSAVE CLEARING

063210 105037 063354          1003$: CLRB      IBSAVE      ;;CLEAR IBSAVE SO 2ND TIME THROUGH EXITS
063214          1004$:
063214 032777 020000 115732 BIT      #BIT13,@SWR    ;;SKIP TYPEOUT IF SET
063222 001004          BNE      20$          ;;SKIP TYPEOUTS
063224 004757 063356          JSR      PC, ERRTP    ;;GO TO USER ERROR ROUTINE
    
```

063230	104401	001217		TYPE	,\$CRLF	
063234			20\$:			
063234	122737	000001	001242	CMPF,	#APTENV,\$ENV	::RUNNING IN APT MODE
063242	001007			BNE	2\$::NO SKIP APT ERROR REPORT
063244	113737	001130	063256	MOVB	\$ITEMB,21\$::SET ITEM NUMBER AS ERROR NUMBER
063252	004737	066270		JSR	PC,\$ATY4	::REPORT FATAL ERROR TO APT
063256	000		21\$:	.BYTE	0	
063257	000			.BYTE	0	
063260	000777		22\$:	BR	22\$::APT ERROR LOOP
063262	105737	063354	2\$:	TSTB	IBSAVE	::SEE IF IBSAVE IS LOADED
063266	001005			BNE	3\$::BRANCH IF NOT - NO HALT ON PWR MON BIT ERROR
063270	005777	115660		TST	@SWR	::HALT ON ERROR
063274	100002			BPL	3\$::SKIP IF CONTINUE
063276	000000			HALT		::HALT ON ERROR!
063300	104410			CKSWR		::TEST FOR CHANGE IN SOFT-SWR
063302			3\$:			
063302	032777	001000	115644	BIT	#BIT09,@SWR	::LOOP ON ERROR SWITCH SET?
063310	001402			BEQ	4\$::BR IF NO
063312	013716	001124		MOV	\$LPERR,(SP)	::FUDGE RETURN FOR LOOPING
063316	005737	001210	4\$:	TST	\$ESCAPE	::CHECK FOR AN ESCAPE ADDRESS
063322	001402			BEQ	5\$::BR IF NONE
063324	013716	001210		MOV	\$ESCAPE,(SP)	::FUDGE RETURN ADDRESS FOR ESCAPE
063330			5\$:			
063330	022737	041512	000042	CMP	#\$ENDAD,@#42	::ACT-11 AUTO-ACCEPT?
063336	001001			BNE	6\$::BRANCH IF NO
063340	000000			HALT		::YES
063342			6\$:			
063342	105737	063354		TSTB	IBSAVE	::SEE IF ITEM BYTE SAVE LOCATION HAS AN ERROR CALL
063346	001210			BNE	7\$::BRANCH BACK TO CALL ORIGINAL ERROR
063350	000002			RTI		::RETURN
063352	000000			CPSAVE: .WORD	0	::LOCATION TO SAVE CPU ERROR REG CONTENTS
063354	000000			IBSAVE: .WORD	0	::LOCATION TO SAVE ITEM BYTE

.SBTTL ERROR TYPEOUT ROUTINE

```

: *THE ERROR TYPEOUT ROUTINE ASSEMBLES AND PRINTS INFORMATION
: *REGARDING THE DETECTION OF AN ERROR AS FOLLOWS:
: *
: *   .UNIT NUMBER, DRIVE TYPE, TEST NUMBER, ERROR NUMBER AND
: *PROGRAM COUNTER ARE PRINTED ON THE FIRST LINE;
: *   .ERROR MESSAGE IS ASSEMBLED, FORMATTED AND PRINTED ON
: *ONE OR MORE SUCCEEDING LINES;
: *   .PAIRED LINES OF ERROR HEADERS AND ERROR DATA ARE PRINTED
: *AFTER THE ERROR MESSAGE.
    
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063356 104414
063360 032777 020000 115566
063366 001402
063370 000137 064166

063410 104403
063412 003
063413 000

063414 013700 001276
063420 016000 000026
063424 042700 177740
063430 012737 067130 063452
063436 022700 000026
063442 001004
063444 104401 064237
063450 104401
063452 000000

063476 104403
063500 003
063501 000
063502 005037 064174
063506 113737 001130 064174
063514 001406
063516 104401 064217
063522 013746 064174

063526 104403
063530 003
063531 000
063532 104401 064226
    
```

```

ERRRYP: SAVREG
        BIT    #SW13,@SWR    ;INHIBIT TYPEOUTS??
        BEQ    1$           ;NO!!
        JMP    27$          ;YES!!

1$:     TYPE    ,SCLF
        TYPE    ,ERTY00     ;TYPE 'DRV#'
        MOV    $UNIT,-(SP)  ;SAVE $UNIT FOR TYPEOUT
                                ;TYPE DRIVE NUMBER
                                ;GO TYPE--OCTAL ASCII
                                ;TYPE 3 DIGIT(S)
                                ;SUPPRESS LEADING ZEROS

2$:     TYPE    ,ERTY05     ;TYPE " - "
                                ;TYPE DRIVE TYPE
                                ;DRIVE TYPE MESSAGE IS STORED HERE

3$:     .WORD   0

4$:     CLR    TSTNMB       ;LOAD TEST NUMBER FOR
        MOV    $TESTN,TSTNMB
        TYPE    ,ERTY01     ;TYPE 'TST#'
        MOV    TSTNMB,-(SP) ;SAVE TSTNMB FOR TYPEOUT
                                ;TYPE TEST NUMBER
                                ;GO TYPE--OCTAL ASCII
                                ;TYPE 3 DIGIT(S)
                                ;SUPPRESS LEADING ZEROS
                                ;LOAD ERROR NUMBER FOR
                                ;TYPEOUT
                                ;SKIP IF NO ERROR CALLED
                                ;TYPE 'ERR#'
                                ;SAVE ERRNMB FOR TYPEOUT
                                ;TYPE ERROR NUMBER
                                ;GO TYPE--OCTAL ASCII
                                ;TYPE 3 DIGIT(S)
                                ;SUPPRESS LEADING ZEROS

5$:     CLR    ERRNMB
        MOV    $ITEMB,ERRNMB ;TYPEOUT
        BEQ    5$           ;SKIP IF NO ERROR CALLED
        TYPE    ,ERTY02     ;TYPE 'ERR#'
        MOV    ERRNMB,-(SP) ;SAVE ERRNMB FOR TYPEOUT
                                ;TYPE ERROR NUMBER
                                ;GO TYPE--OCTAL ASCII
                                ;TYPE 3 DIGIT(S)
                                ;SUPPRESS LEADING ZEROS

        TYPOS
        .BYTE  3
        .BYTE  0
        CLR    ERRNMB
        MOV    $ITEMB,ERRNMB
        BEQ    5$
        TYPE    ,ERTY02
        MOV    ERRNMB,-(SP)
        TYPOS
        .BYTE  3
        .BYTE  0
        TYPE    ,ERTY03
    
```

ERROR TYPEOUT ROUTINE

```

46 063536 013746 001132      MOV      $ERRPC,-(SP)      ;;SAVE $ERRPC FOR TYPEOUT
                                ;;TYPE PROGRAM COUNTER
                                ;;GO TYPE--OCTAL ASCII
063542 104403      TYPOS
063544      006      .BYTE      6      ;;TYPE 6 DIGIT(S)
063545      001      .BYTE      1      ;;TYPE LEADING ZEROS
47
48      ;GENERATE POINTER TO ERROR TABLE UNLESS ERROR NUMBER IS 0
49 063546 005737 064174      6$:      TST      ERRNMB      ;WAS AN ERROR CALLED?
50 063552 001002      BNE      7$      ;BR IF YES
51 063554 000137 064166      JMP      27$      ;NO--EXIT
52
53 063560 104401 001217      7$:      TYPE      ,SCRLF      ;YES-TYPE CRLF
54 063564 105037 064200      CLRB     BOTFLG      ;CLEAR BOT FLAG
55 063570 105037 064201      CLRB     CHRCNT      ;CLEAR CHARACTER COUNTER
56 063574 013700 064174      MOV      ERRNMB,R0    ;R0 POINTS TO FIRST OF
57 063600 122700 000177      CMPB    #177,R0      ;SEE IF THIS ERROR CALL IS SPECIAL POWER FAIL CALL
58 063604 001003      BNE      8$      ;BRANCH IF NOT
59 063606 012700 064244      MOV      #PFECH,R0    ;MOVE POWER FAIL ERROR CALL TABLE TO R0
60 063612 000405      BR      9$
61 063614 006300      8$:      ASL      R0      ;FOUR ENTRIES IN ERROR
62 063616 006300      ASL      R0      ;TABLE
63 063620 006300      ASL      R0
64 063622 062700 001564      ADD      #$ERRTB-8.,R0
65 063626 011001      9$:      MOV      (R0),R1      ;R1 POINTS TO ERROR MESSAGE
66      ;TABLE
67 063630 001507      BEQ      19$      ;BRANCH IF NO ERROR MESSAGE
68
69      ;TYPE THE ERROR MESSAGE
70 063632 012102      10$:     MOV      (R1)+,R2      ;R2=ADDRESS OF MESSAGE STRING
71 063634 001505      BEQ      19$      ;BRANCH IF END OF MESSAGE
72 063636 010237 064004      MOV      R2,18$      ;LOAD ADDRESS OF STRING
73 063642 005037 064176      CLR      BOTADR      ;CLEAR BOT ADDRESS
74 063646 112203      11$:     MOVB     (R2)+,R3      ;END OF STRING??
75 063650 001454      BEQ      17$      ;YES!!
76 063652 122703 000015      CMPB    #CR,R3      ;CARRIAGE RETURN??
77 063656 001003      BNE      12$      ;NO!!
78 063660 105037 064201      CLRB     CHRCNT      ;YES-CLEAR CHAR COUNT
79 063664 000770      BR      11$      ;GET NEXT CHARACTER
80 063666 122703 000012      12$:     CMPB    #LF,R3      ;LINE FEED??
81 063672 001765      BEQ      11$      ;YES-GET NEXT CHARACTER
82 063674 122703 000011      CMPB    #HT,R3      ;HORIZONTAL TAB??
83 063700 001007      BNE      14$      ;NO!!
84 063702 105237 064201      13$:     INCB     CHRCNT      ;ADJUST CHARACTER COUNT
85 063706 132737 000007 064201      BITB    #7,CHRCNT
86 063714 001372      BNE      13$
87 063716 000407      BR      15$
88 063720 105237 064201      14$:     INCB     CHRCNT      ;INCREMENT CHARACTER COUNT
89 063724 122703 000040      CMPB    #' ,R3      ;SPACE??
90 063730 001002      BNE      15$      ;NO!!
91 063732 010237 064176      MOV      R2,BOTADR    ;SAVE ADDRESS OF SPACE
92 063736 122737 000100 064201      15$:     CMPB    #64.,CHRCNT ;END OF LINE??
93 063744 103340      BHIS    11$      ;NO!!
94 063746 013704 064176      MOV      BOTADR,R4    ;GET ADDRESS OF LAST SPACE
95 063752 001007      BNE      16$      ;BRANCH IF SPACE DETECTED
96 063754 104401 001217      TYPE      ,SCRLF      ;TYPE CRLF
97 063760 105037 064201      CLRB     CHRCNT      ;CLEAR CHARACTER COUNT
98 063764 013702 064004      MOV      18$,R2      ;SET UP R2 FOR TESTING

```

```

99 063770 000726
100 063772 105044
101 063774 112737 177777 064200
102 064002 104401
103 064004 000000
104 064006 105737 064200
105 064012 001707
106 064014 104401 001217
107 064020 105037 064200
108 064024 105037 064201
109 064030 013702 064176
110 064034 010237 064004
111 064040 112742 000040
112 064044 105722
113 064046 000677
114
115
116 064050 016001 000002
117 064054 001444
118 064056 104401 001217
119 064062 016002 000004
120 064066 016003 000006
121 064072 012137 064102
122 064076 001433
123
124 064100 104401
125 064102 000000
126 064104 104401 001217
127 064110 005702
128 064112 001767
129 064114 012204
130 064116 012305
131 064120 105725
132 064122 100407
133 064124 001403
134 064126 013446
135 064130 104405
136 064132 000405
137 064134 013446
138 064136 104402
139 064140 000402
140 064142 013446
141 064144 104406
142 064146 005714
143 064150 001403
144 064152 104401 064234
145 064156 000760
146 064160 104401 001217
147 064164 000742
148 064166 104415
149 064170 000207
150
151 064172 000000
152 064174 000000
153 064176 000000
154 064200 000
155 064201 000

BR 11$
CLR8 -(R4)
MOVE #1,BOTFLG
TYPE
.WORD
TSTB BOTFLG
BEQ 10$
TYPE ,$CRLF
CLR8 BOTFLG
CLR8 CHRCNT
MOV BOTADR,R2
MOV R2,18$
MOVB #'-(R2)
TSTB (R2)+
BR 11$

:REPLACE SPACE
:SET BOT FLAG
:TYPE ERROR MESSAGE STRING
:STRING ADDRESS GOES HERE
:WAS STRING TRUNCATED??
:NO!!
:YES-TYPE CRLF
:CLEAR BOT FLAG
:CLEAR CHARACTER COUNT
:SETUP R2 FOR TESTING
:SETUP 18$ FOR TYPING
:RESTORE SPACE
:RESTORE R2
:TYPE REST OF STRING

:TYPE ERROR HEADER AND ERROR DATA
19$: MOV 2(R0),R1 :R1 POINTS TO ERROR HEADER TABLE
BEQ 27$ :BRANCH IF NO HEADER
TYPE , $CRLF : (ASSUME NO DATA)
MOV 4(R0),R2 :R2 POINTS TO DATA ADDRESS TABLE
MOV 6(R0),R3 :R3 POINTS TO FORMAT TABLE
20$: MOV (R1)+,21$ :PUT HEADER ADDRESS FOR TYPE
BEQ 27$ :BRANCH IF END OF HEADERS
:(ASSUME END OF DATA)

21$: TYPE
.WORD 0 :HEADER ADDRESS GOES HERE
TYPE , $CRLF
TST R2 :DATA WITH HEADER??
BEQ 20$ :NO!!
MOV (R2)+,R4 :R4 POINTS TO DATA ADDRESS
MOV (R3)+,R5 :R5 POINTS TO FORMAT
22$: TSTB (R5)+ :WHAT KIND OF DATA??
BMI 24$ :BINARY
BEQ 23$ :OCTAL
MOV @ (R4)+,-(SP) :DECIMAL
TYPDS
BR 25$
23$: MOV @ (R4)+,-(SP)
TYPOC
BR 25$
24$: MOV @ (R4)+,-(SP)
TYPBN
25$: TST (R4) :MORE DATA??
BEQ 26$ :NO!!
TYPE ,ERTY04 :YES-TYPE 2 SPACES
BR 22$ :AND CONTINUE
26$: TYPE , $CRLF :TYPE ONE BLANK LINE
BR 20$ :BEFORE NEXT HEADER
27$: RESREG
RTS PC

TSTNMB: .WORD 0 :TEST NUMBER
ERRNMB: .WORD 0 :ERROR NUMBER
BOTADR: .WORD 0 :BEGINNING OF TEXT ADDRESS
BOTFLG: .BYTE 0 :BOT FLAG
CHRCNT: .BYTE 0 :CHARACTER COUNT
    
```

156									
157	064202	104	122	126	ERTY00:	.ASCIZ	@DRV#@		
158	064207	054	040	124	ERTY01:	.ASCIZ	@, TEST#@		
159	064217	054	040	105	ERTY02:	.ASCIZ	@, ERR#@		
160	064226	054	040	120	ERTY03:	.ASCIZ	@, PC=@		
161	064234	040	040	000	ERTY04:	.ASCIZ	@ @		
162	064237	040	055	040	ERTY05:	.ASCIZ	@ - @		
163					.EVEN				
164	064244	064254	064342	064360	PFECH:	PFECH1,PFECH2,PFECH3,PFECH4	;WORDS DEFINING TABLES BELOW		
165	064254	064260	000000		PFECH1:	+.4,0			
166	064260	120	117	127		.ASCIZ	?POWER MONITOR BIT IN CPU ERROR REGISTER FOUND SET?		
167					.EVEN				
168	064342	064346	000000		PFECH2:	+.4,0			
169	064346	103	120	125		.ASCIZ	?CPUERREG?		
170					.EVEN				
171	064360	064362			PFECH3:	+.2			
172	064362	063352	000000			.WORD	CPSAVE,0		
173	064366	064370			PFECH4:	+.2			
174	064370	000	000			.BYTE	0,0		

1

.SBTTL TTY INPUT ROUTINE

064372 000000
 064374 000000
 064376 000000
 06440C 064401

```

*****
.ENABL LSB
$TKCNT: .WORD 0      ;;NUMBER OF ITEMS IN QUEUE
$TKQIN: .WORD 0      ;;INPUT POINTER
$TKQOUT: .WORD 0     ;;OUTPUT POINTER
$TKQSRV: .BLKB 1     ;;TTY KEYBOARD QUEUE
$TKGEND=.
.EVEN
  
```

```

;*TK INITIALIZE ROUTINE
;*THIS ROUTINE WILL INITIALIZE THE TTY KEYBOARD INPUT QUEUE
;*SETUP THE INTERRUPT VECTOR AND TURN ON THE KEYBOARD INTERRUPT
  
```

064402 005037 064372
 064406 012737 064400 064374
 064414 013737 064374 064376
 064422 012737 064452 000060
 064430 012737 000200 000062
 064436 005777 114520
 064442 012777 000100 114510
 064450 000207

```

;*CALL:
* JSR PC,$TKINT
* RETURN
$TKINT: CLR $TKCNT      ;;CLEAR COUNT OF ITEMS IN QUEUE
        MOV # $TKQSRV,$TKQIN ;;MOVE THE STARTING ADDRESS OF THE
        MOV $TKQIN,$TKQOUT ;;QUEUE INTO THE INPUT & OUTPUT POINTERS.
        MOV # $TKSRV,$TKVEC ;;INITIALIZE THE KEYBOARD VECTOR
        MOV #200,$TKVEC+2 ;;'BR' LEVEL 4
        TST @ $TKB        ;;CLEAR DONE FLAG
        MOV #100,$TKS     ;;ENABLE TTY KEYBOARD INTERRUPT
        RTS PC           ;;RETURN TO CALLER
  
```

```

;*TK SERVICE ROUTINE
;*THIS ROUTINE WILL SERVICE THE TTY KEYBOARD INTERRUPT
;*BY READING THE CHARACTER FROM THE INPUT BUFFER AND PUTTING
;*IT IN THE QUEUE.
;*IF THE CHARACTER IS A 'CONTROL-C' (^C) $TKINT IS CALLED AND
;*UPON RETURN EXIT IS MADE TO THE 'CONTROL-C' RESTART ADDRESS (SHUT)
  
```

064452 117746 114504
 064456 042716 177600
 064462 021627 000021
 064466 001002
 064470 005726
 064472 000002
 064474
 064474 021627 000003
 064500 001007
 064502 104401 065600
 064506 004737 064402
 064512 005726
 064514 000137 065642
 064520 021627 000007
 064524 001004
 064526 022737 000176 001154
 064534 001500

 064536
 064536 022737 000001 064372
 064544 001004
 064546 104401 001212

```

$TKSRV: MOVB @ $TKB, -(SP) ;;PICKUP THE CHARACTER
        BIC #^C177,(SP) ;;STRIP THE JUNK
        CMP (SP),#$XON ;;IS IT A RANDOM XON?
        BNE 30$ ;;BRANCH IF NO
        TST (SP)+ ;;CLEAN RANDOM XON OFF STACK
        RTI ;;RETURN
30$:
        CMP (SP),#3 ;;IS IT A CONTROL C?
        BNE 1$ ;;BRANCH IF NO
        TYPE ,SCNTLC ;;TYPE A CONTROL-C (^C)
        JSR PC,$TKINT ;;INIT THE KEYBOARD
        TST (SP)+ ;;CLEAN UP STACK
        JMP SHUT ;;CONTROL C RESTART
1$:
        CMP (SP),#7 ;;IS IT A CONTROL G?
        BNE 2$ ;;BRANCH IF NO
        CMP #SWREG,SWR ;;IS SOFT-SWR SELECTED?
        BEQ 6$ ;;GO TO SWR CHANGE
2$:
        CMP #1,$TKCNT ;;IS THE QUEUE FULL?
        BNE 3$ ;;BRANCH IF NO
        TYPE ,SBELL ;;RING THE TTY BELL
  
```

```

064552 005726          TST      (SP)+      ;; CLEAN CHARACTER OFF OF STACK
064554 000451          BR        5$          ;; EXIT
064556 021627 000023 3$:      CMP      (SP),#23    ;; IS IT A CONTROL-S?
064562 001021          BNE      32$          ;; BRANCH IF NO
064564 005077 114370          CLR      @S1KS        ;; DISABLE TTY KEYBOARD INTERRUPTS
064570 005726          TST      (SP)+      ;; CLEAN CHAR OFF STACK
064572 105777 114362 31$:      TSTB     @S1KS        ;; WAIT FOR A CHAR
064576 100375          BPL      31$          ;; LOOP UNTIL ITS THERE
064600 117746 114356          MOVB     @STKB,-(SP)  ;; GET THE CHARACTER
064604 042716 177600          BIC      #'C177,(SP) ;; MAKE IT 7-BIT ASCII
064610 022627 000021          CMP      (SP)+,#21   ;; IS IT A CONTROL-Q?
064614 001366          BNE      31$          ;; BRANCH IF NO
064616 012777 000100 114334      MOV      #100,@S1KS  ;; REENABLE TTY KEYBOARD INTERRUPTS
064624 000002          RTI                      ;; RETURN
064626 005237 064372 32$:      INC      $TKCNT       ;; COUNT THIS CHARACTER
064632 021627 000140          CMP      (SP),#140   ;; IS IT UPPER CASE?
064636 002405          BLT      4$          ;; BRANCH IF YES
064640 021627 000175          CMP      (SP),#175   ;; IS IT A SPECIAL CHAR?
064644 003002          BGT      4$          ;; BRANCH IF YES
064646 042716 000040          BIC      #40,(SP)    ;; MAKE IT UPPER CASE
064652 112677 177516 4$:      MOVB     (SP)+,@STKQIN ;; AND PUT IT IN QUEUE
064656 005237 064374          INC      $TKQIN       ;; UPDATE THE POINTER
064662 023727 064374 064401      CMP      $TKQIN,$STKQEND ;; GO OFF THE END?
064670 001003          BNE      5$          ;; BRANCH IF NO
064672 012737 064400 064374      MOV      #STKQSRRT,$TKQIN ;; RESET THE POINTER
064700 000002 5$:      RTI                      ;; RETURN
  
```

```

*****
*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP
*CALL WHEN OPERATING IN TTY INTERRUPT MODE.
  
```

```

064702 022737 000176 001154 $CKSWR: CMP      #SWREG,SWR    ;; IS THE SOFT-SWR SELECTED
064710 001124          BNE      15$          ;; EXIT IF NOT
064712 105777 114242          TSTB     @S1KS        ;; IS A CHAR WAITING?
064716 100121          BPL      15$          ;; IF NOT, EXIT
064720 117746 114236          MOVB     @STKB,-(SP)  ;; YES
064724 042716 177600          BIC      #'C177,(SP) ;; MAKE IT 7-BIT ASCII
064730 021627 000007          CMP      (SP),#7     ;; IS IT A CONTROL-G?
064734 001300          BNE      2$          ;; IF NOT, PUT IT IN THE TTY QUEUE
                          ;; AND EXIT
  
```

```

*****
*CONTROL IS PASSED TO THIS POINT FROM EITHER THE TTY INTERRUPT SERVICE
*ROUTINE OR FROM THE SOFTWARE SWITCH REGISTER TRAP CALL, AS A RESULT OF A
*CONTROL-G BEING TYPED, AND THE SOFTWARE SWITCH REGISTER BEING SELECTED.
  
```

```

064736 123727 001150 000001 6$:      CMPB     $AUTOB,#1    ;; ARE WE RUNNING IN AUTO-MODE?
064744 001674          BEQ      2$          ;; BRANCH IF YES
064746 005726          TST      (SP)+      ;; CLEAR CONTROL-G OFF STACK
064750 004737 064402          JSR      PC,$TKINT   ;; FLUSH THE TTY INPUT QUEUE
064754 005077 114200          CLR      @S1KS        ;; DISABLE TTY KEYBOARD INTERRUPTS
064760 112737 000001 001151      MOVB     #1,$INTAG    ;; SET INTERRUPT MODE INDICATOR

064766 104401 065612          TYPE     ,SCNTLG     ;; ECHO THE CONTROL-G (^G)
064772 104401 065617          TYPE     ,SMSWR     ;; TYPE CURRENT CONTENTS
064776 013746 000176          MOV      $WREG,-(SP) ;; SAVE SWREG FOR TYPEOUT
065002 104402          TYPOC                    ;; GO TYPE--OCTAL ASCII(ALL DIGITS)
  
```



```

065004 104401 065630          TYPE      ,SMNEW          ::PROMPT FOR NEW SWR
065010 005046          CLR        -(SP)          ::CLEAR COUNTER
065012 005046          CLR        -(SP)          ::THE NEW SWR
065014 105777 114140      7$:      TSTB      @STKS          ::CHAR THERE?
065020 100375          BPL        7$          ::IF NOT TRY AGAIN

065022 117746 114134      MOVB      @STKB, -(SP)      ::PICK UP CHAR
065026 042716 177600      BIC        #^C177, (SP)  ::MAKE IT 7-BIT ASCII

065032 021627 000003      CMP        (SP), #3          ::IS IT A CONTROL-C?
065036 001015          BNE        9$          ::BRANCH IF NOT
065040 104401 065600      TYPE      ,SCNTLC          ::YES, ECHO CONTROL-C (^C)
065044 062706 000006      ADD        #6, SP          ::CLEAN UP STACK
065050 123727 001151 000001  CMPB      $INTAG, #1        ::REENABLE TTY KEYBOARD INTERRUPTS?
065056 001003          BNE        8$          ::BRANCH IF NO
065060 012777 000100 114072  MOV        #100, @STKS      ::ALLOW TTY KEYBOARD INTERRUPTS
065066 000137 065642      8$:      JMP        SHUT          ::CONTROL-C RESTART

065072 021627 000025      9$:      CMP        (SP), #25        ::IS IT A CONTRGL-U?
065076 001005          BNE        10$         ::BRANCH IF NOT
065100 104401 065605      TYPE      ,SCNTLU          ::YES, ECHO CONTROL-U (^U)
065104 062706 000006      20$:     ADD        #6, SP          ::IGNORE PREVIOUS INPUT
065110 000737          BR         19$          ::LET'S TRY IT AGAIN

065112 021627 000015      10$:     CMP        (SP), #15        ::IS IT A <CR>?
065116 001022          BNE        16$         ::BRANCH IF NO
065120 005766 000004      TST        4(SP)          ::YES, IS IT THE FIRST CHAR?
065124 001403          BEQ        11$         ::BRANCH IF YES
065126 016677 000002 114020  MOV        2(SP), @SWR      ::SAVE NEW SWR
065134 062706 000006      11$:     ADD        #6, SP          ::CLEAN UP STACK
065140 104401 001217      14$:     TYPE      ,SCLRF          ::ECHO <CR> AND <LF>
065144 123727 001151 000001  CMPB      $INTAG, #1        ::RE-ENABLE TTY KBD INTERRUPTS?
065152 001003          BNE        15$         ::BRANCH IF NOT
065154 012777 000100 113776  MOV        #100, @STKS      ::RE-ENABLE TTY KBD INTERRUPTS
065162 000002          15$:     RTI                    ::RETURN
065164 004737 061750      16$:     JSR        PC, $TYPEPC      ::ECHO CHAR
065170 021627 000060      CMP        (SP), #60        ::CHAR < 0?
065174 002420          BLT        18$         ::BRANCH IF YES
065176 021627 000067      CMP        (SP), #67        ::CHAR > 7?
065202 003015          BGT        18$         ::BRANCH IF YES
065204 042726 000060      BIC        #60, (SP)+       ::STRIP-OFF ASCII
065210 005766 000002      TST        2(SP)          ::IS THIS THE FIRST CHAR
065214 001403          BEQ        17$         ::BRANCH IF YES
065216 006316          ASL        (SP)          ::NO, SHIFT PRESENT
065220 006316          ASL        (SP)          ::CHAR OVER TO MAKE
065222 006316          ASL        (SP)          ::ROOM FOR NEW ONE.
065224 005266 000002      17$:     INC        2(SP)          ::KEEP COUNT OF CHAR
065230 056616 177776      BIS        -2(SP), (SP)     ::SET IN NEW CHAR
065234 000667          BR         7$          ::GET THE NEXT ONE
065236 104401 001216      18$:     TYPE      ,SQUES          ::TYPE ?<CR><LF>
065242 000720          BR         20$          ::SIMULATE CONTROL-U
.DSABL  LSB

```

::*****

```

: *THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
: *CALL:
: *      RDCHR          :: GET A CHARACTER FROM THE QUEUE
: *      RETURN HERE   :: CHARACTER IS ON THE STACK
: *                   :: WITH PARITY BIT STRIPPED OFF
:
065244 011646          SRDCHR: MOV      (SP), -(SP)      :: PUSH DOWN THE PC AND
065246 016666 000004 000002  MOV      4(SP), 2(SP)    :: THE PS
065254 005066 000004          CLR      4(SP)          :: GET READY FOR A CHARACTER
065260 005046          CLR      -(SP)         :: PUT NEW PS ON STACK
065262 012746 065270          MOV      #64$, -(SP)    :: PUT NEW PC ON STACK
065266 000002          RTI                   :: POP NEW PC AND PS
065270
065270 005737 064372 64$:   TST      $STKCNT      :: WAIT ON A CHARACTER
065274 001775          BEQ      1$
065276 005337 064372          DEC      $STKCNT      :: DECREMENT THE COUNTER
065302 117766 177070 000004  MOVB    @STKQOUT, 4(SP)  :: GET ONE CHARACTER
065310 005237 064376          INC      $STKQOUT     :: UPDATE THE POINTER
065314 023727 064376 064401  CMP     $STKQOUT, #STKQEND :: DID IT GO OFF OF THE END?
065322 001003          BNE     2$           :: BRANCH IF NO
065324 012737 064400 064376  MOV     #STKQSR, $STKQOUT :: RESET THE POINTER
065332 000002          RTI                   :: RETURN
: *****
: *THIS ROUTINE WILL INPUT A STRING FROM THE TTY
: *CALL:
: *      RDLIN          :: INPUT A STRING FROM THE TTY
: *      RETURN HERE   :: ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
: *                   :: TERMINATOR WILL BE A BYTE OF ALL 0'S
:
065334 010346          SRDLIN: MOV     R3, -(SP)      :: SAVE R3
065336 005046          CLR     -(SP)         :: CLEAR THE RUBOUT KEY
065340 012703 065570 1$:   MOV     #STTYIN, R3    :: GET ADDRESS
065344 022703 065600 2$:   CMP     #STTYIN+8., R3  :: BUFFER FULL?
065350 101456          BLOS   4$             :: BR IF YES
065352 104411          RDCHR          :: GO READ ONE CHARACTER FROM THE TTY
065354 112613          MOVB   (SP)+, (R3)    :: GET CHARACTER
065356 122713 000177 10$:  CMPB   #177., (R3)    :: IS IT A RUBOUT
065362 001022          BNE   5$             :: BR IF NO
065364 005716          TST   (SP)           :: IS THIS THE FIRST RUBOUT?
065366 001007          BNE   6$             :: BR IF NO
065370 112737 000134 065566  MOVB   #' \, 9$      :: TYPE A BACK SLASH
065376 104401 065566          TYPE  , 9$
065402 012716 177777          MOV   #-1., (SP)    :: SET THE RUBOUT KEY
065406 005303 6$:   DEC   R3             :: BACKUP BY ONE
065410 020327 065570          CMP   R3, #STTYIN   :: STACK EMPTY?
065414 103434          BLO   4$             :: BR IF YES
065416 111337 065566          MOVB  (R3), 9$      :: SETUP TO TYPEOUT THE DELETED CHAR.
065422 104401 065566          TYPE  , 9$
065426 000746          BR    2$             :: GO TYPE
065430 005716          TST  (SP)           :: GO READ ANOTHER CHAR.
065432 001406          BEQ  7$             :: RUBOUT KEY SET?
065434 112737 000134 065566  MOVB  #' \, 9$      :: BR IF NO
065442 104401 065566          TYPE  , 9$
065446 005016          CLR  (SP)           :: TYPE A BACK SLASH
065450 122713 000025 7$:   CMPB  #25., (R3)    :: CLEAR THE RUBOUT KEY
065454 001003          BNE  8$             :: IS CHARACTER A CTRL U?
: *                   :: BR IF NO

```

065456	104401	065605		TYPE	,\$CNTLU	::TYPE A CONTROL 'U'
065462	000726			BR	1\$::GO START OVER
065464	122713	000022	8\$:	CMPB	#22,(R3)	::IS CHARACTER A '^R'?
065470	001011			BNE	3\$::BRANCH IF NO
065472	105013			CLRB	(R3)	::CLEAR THE CHARACTER
065474	104401	001217		TYPE	,\$CRLF	::TYPE A 'CR' & 'LF'
065500	104401	065570		TYPE	,\$TTYIN	::TYPE THE INPUT STRING
065504	000717			BR	2\$::GO PICKUP ANOTHER CHACTER
065506	104401	001216	4\$:	TYPE	,\$QUES	::TYPE A '?'
065512	000712			BR	1\$::CLEAR THE BUFFER AND LOOP
065514	111337	065566	3\$:	MOVB	(R3),9\$::ECHO THE CHARACTER
065520	104401	065566		TYPE	,\$9\$	
065524	122723	000015		CMPB	#15,(R3)+	::CHECK FOR RETURN
065530	001305			BNE	2\$::LOOP IF NOT RETURN
065532	105063	177777		CLRB	-1(R3)	::CLEAR RETURN (THE 15)
065536	104401	001220		TYPE	,\$LF	::TYPE A LINE FEED
065542	005726			TST	(SP)+	::CLEAN RUBOUT KEY FROM THE STACK
065544	012603			MOV	(SP)+,R3	::RESTORE R3
065546	011646			MOV	(SP),-(SP)	::ADJUST THE STACK AND PUT ADDRESS OF THE
065550	016666	000004	000002	MOV	4(SP),2(SP)	::FIRST ASCII CHARACTER ON IT
065556	012766	065570	000004	MOV	#\$TTYIN,4(SP)	
065564	000002			RTI		::RETURN
065566	000		9\$:	.BYTE	0	::STORAGE FOR ASCII CHAR. TO TYPE
065567	000			.BYTE	0	::TERMINATOR
065570				,\$TTYIN:	,\$BLKB	8.
065600	136	103	015	,\$CNTLC:	,\$ASCIZ	/'^C/<15><12>
065605	136	125	015	,\$CNTLU:	,\$ASCIZ	/'^U/<15><12>
065612	136	107	015	,\$CNTLG:	,\$ASCIZ	/'^G/<15><12>
065617	015	012	123	,\$MSWR:	,\$ASCIZ	<15><12>/SWR = /
065630	040	040	116	,\$MNEW:	,\$ASCIZ	/ NEW = /
				,\$EVEN		
2						
3	065642	005737	000042	SHUT:	TST	,\$42
4	065646	001002			BNE	1\$
5	065650	000137	005426		JMP	START
6	065654	005037	001300	1\$:	CLR	,\$DEVM
7	065660	000137	041314		JMP	,\$EOP
						::ANY MONITOR PRESENT ?
						::BR IF YES
						::GO TO START
						::FUDGE NO DRIVES IN MAP
						::RETURN TO \$EOP

1

.SBTTL READ AN OCTAL NUMBER FROM THE TTY

 *THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
 *CHANGE IT TO BINARY.
 *CALL:

* RDOCT :::READ AN OCTAL NUMBER
 * RETURN HERE :::LOW ORDER BITS ARE ON TOP OF THE STACK
 * :::HIGH ORDER BITS ARE IN \$HIOCT

065664	011646		\$RDOCT: MOV	(SP),-(SP)	:::PROVIDE SPACE FOR THE
065666	016666	000004	MOV	4(SP),2(SP)	:::INPUT NUMBER
065674	010046		MOV	R0,-(SP)	:::PUSH R0 ON STACK
065676	010146		MOV	R1,-(SP)	:::PUSH R1 ON STACK
065700	010246		MOV	R2,-(SP)	:::PUSH R2 ON STACK
065702	104412		1\$: RDLIN		:::READ AN ASCII LINE
065704	012600		MOV	(SP)+,R0	:::GET ADDRESS OF 1ST CHARACTER
065706	005001		CLR	R1	:::CLEAR DATA WORD
065710	005002		CLR	R2	
065712	112046		2\$: MOVB	(R0)+,-(SP)	:::PICKUP THIS CHARACTER
065714	001412		BEQ	3\$:::IF ZERO GET OUT
065716	006301		ASL	R1	:::*2
065720	006102		ROL	R2	
065722	006301		ASL	R1	:::*4
065724	006102		ROL	R2	
065726	006301		ASL	R1	:::*8
065730	006102		ROL	R2	
065732	042716	177770	BIC	#^C7,(SP)	:::STRIP THE ASCII JUNK
065736	062601		ADD	(SP)+,R1	:::ADD IN THIS DIGIT
065740	000764		BR	2\$:::LOOP
065742	005726		3\$: TST	(SP)+	:::CLEAN TERMINATOR FROM STACK
065744	010166	000012	MOV	R1,12(SP)	:::SAVE THE RESULT
065750	010237	065764	MOV	R2,\$HIOCT	
065754	012602		MOV	(SP)+,R2	:::POP STACK INTO R2
065756	012601		MOV	(SP)+,R1	:::POP STACK INTO R1
065760	012600		MOV	(SP)+,R0	:::POP STACK INTO R0
065762	000002		RTI		:::RETURN
065764	000000		\$HIOCT: .WORD	0	:::HIGH ORDER BITS GO HERE

.SBTTL TRAP DECODER

 *THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE 'TRAP' INSTRUCTION
 *AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
 *OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
 *GO TO THAT ROUTINE.

065766	016646	000002	\$TRAP:	MOV	2(SP),-(SP)	::ASSUME THE STATUS OF
065772	042716	000020		BIC	#20,(SP)	:: THE CALLER--DO NOT ALLOW
065776	012746	066004		MOV	#1\$,-(SP)	:: T-BIT TRAPS
066002	000002			RTI		::SET THE NEW STATUS
066004	010046		1\$:	MOV	R0,-(SP)	::SAVE R0
066006	016600	000002		MOV	2(SP),R0	::GET TRAP ADDRESS
066012	005740			TST	-(R0)	::PACKUP BY 2
066014	111000			MOVB	(R0),R0	::GET RIGHT BYTE OF TRAP
066016	006300			ASL	R0	::POSITION FOR INDEXING
066020	016000	066040		MOV	\$TRPAD(R0),R0	::INDEX TO TABLE
066024	000200			RTS	R0	::GO TO ROUTINE

::THIS IS USE TO HANDLE THE 'GETPRI' MACRO

066026	011646		\$TRAP2:	MOV	(SP),-(SP)	::MOVE THE PC DOWN
066030	016666	000004		MOV	4(SP),2(SP)	::MOVE THE PSW DOWN
066036	000C02	000002		RTI		::RESTORE THE PSW

.SBTTL TRAP TABLE

*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
 *BY THE 'TRAP' INSTRUCTION.

			:	ROUTINE		
			:	-----		
066040	066026		\$TRPAD:	.WORD	\$TRAP2	
066042	061536			\$TYPE	::CALL=TYPE	TRAP+1(104401) TTY TYPEOUT ROUTINE
066044	061334			\$TYPOC	::CALL=TYPOC	TRAP+2(104402) TYPE OCTAL NUMBER (WITH LEADING ZEROS)
066046	061310			\$TYPOS	::CALL=TYPOS	TRAP+3(104403) TYPE OCTAL NUMBER (NO LEADING ZEROS)
066050	061350			\$TYPON	::CALL=TYPON	TRAP+4(104404) TYPE OCTAL NUMBER (AS PER LAST CALL)
066052	061064			\$TYPDS	::CALL=TYPDS	TRAP+5(104405) TYPE DECIMAL NUMBER (WITH SIGN)
066054	061010			\$TYPBN	::CALL=TYPBN	TRAP+6(104406) TYPE BINARY (ASCII) NUMBER
066056	064772			\$GTSWR	::CALL=GTSWR	TRAP+7(104407) GET SOFT-SWR SETTING
066060	064702			\$CKSWR	::CALL=CKSWR	TRAP+10(104410) TEST FOR CHANGE IN SOFT-SWR
066062	065244			\$RDCHR	::CALL=RDCHR	TRAP+11(104411) TTY TYPEIN CHARACTER ROUTINE
066064	065334			\$RDLIN	::CALL=RDLIN	TRAP+12(104412) TTY TYPEIN STRING ROUTINE
066066	065664			\$RDOCT	::CALL=RDOCT	TRAP+13(104413) READ AN OCTAL NUMBER FROM TTY
066070	060714			\$SAVREG	::CALL=SAVREG	TRAP+14(104414) SAVE R0-R5 ROUTINE
066072	060752			\$RESREG	::CALL=RESREG	TRAP+15(104415) RESTORE R0-R5 ROUTINE

.SBTTL POWER DOWN AND UP ROUTINES

```

*****
:POWER DOWN ROUTINE
066074 012737 066234 000024 $PWRDN: MOV    #SILLUP,@#PWRVEC  ;;SET FOR FAST UP
066102 012737 000340 000026      MOV    #340,@#PWRVEC+2  ;;PRIO:7
066110 010046      MOV    R0,-(SP)      ;;PUSH R0 ON STACK
066112 010146      MOV    R1,-(SP)      ;;PUSH R1 ON STACK
066114 010246      MOV    R2,-(SP)      ;;PUSH R2 ON STACK
066116 010346      MOV    R3,-(SP)      ;;PUSH R3 ON STACK
066120 010446      MOV    R4,-(SP)      ;;PUSH R4 ON STACK
066122 010546      MOV    R5,-(SP)      ;;PUSH R5 ON STACK
066124 017746 113024      MOV    @SWR,-(SP)    ;;PUSH @SWR ON STACK
066130 010637 066240      MOV    SP,$SAVR6    ;;SAVE SP
066134 012737 066146 000024      MOV    #SPWRUP,@#PWRVEC ;;SET UP VECTOR
066142 000000      HALT
066144 000776      BR     -2           ;;HANG UP

*****
:POWER UP ROUTINE
066146 012737 066234 000024 $PWRUP: MOV    #SILLUP,@#PWRVEC  ;;SET FOR FAST DOWN
066154 013706 066240      MOV    $SAVR6,SP    ;;GET SP
066160 005037 066240      CLR    $SAVR6       ;;WAIT LOOP FOR THE TTY
066164 005237 066240 1$:   INC    $SAVR6       ;;WAIT FOR THE INC
066170 001375      BNE    1$          ;;OF WORD
066172 012677 112756      MOV    (SP)+,@SWR   ;;POP STACK INTO @SWR
066176 012605      MOV    (SP)+,R5    ;;POP STACK INTO R5
066200 012604      MOV    (SP)+,R4    ;;POP STACK INTO R4
066202 012603      MOV    (SP)+,R3    ;;POP STACK INTO R3
066204 012602      MOV    (SP)+,R2    ;;POP STACK INTO R2
066206 012601      MOV    (SP)+,R1    ;;POP STACK INTO R1
066210 012600      MOV    (SP)+,R0    ;;POP STACK INTO R0
066212 012737 066074 000024      MOV    #SPWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
066220 012737 000340 000026      MOV    #340,@#PWRVEC+2 ;;PRIO:7
066226 104401      TYPE    $POWER      ;;REPORT THE POWER FAILURE
066230 066242      $PWRMG: .WORD    $POWER ;;POWER FAIL MESSAGE POINTER
066232 000002      $SILLUP: HALT      ;;THE POWER UP SEQUENCE WAS STARTED
066234 000000      BR     -2           ;; BEFORE THE POWER DOWN WAS COMPLETE
066236 000776      $SAVR6: 0           ;;PUT THE SP HERE
066240 000000      $POWER: .ASCIZ  <15><12>'POWER'
066242 015 012 120      .EVEN
    
```

.SBTTL APT COMMUNICATIONS ROUTINE

```

*****
066252 112737 000001 066516 $ATY1: MOVB #1,$FFLG ;;TO REPORT FATAL ERROR
066260 112737 000001 066514 $ATY3: MOVB #1,$MFLG ;;TO TYPE A MESSAGE
066266 000403 BR SATYC
066270 112737 000001 066516 $ATY4: MOVB #1,$FFLG ;;TO ONLY REPORT FATAL ERROR
066276 SATYC:
066276 010046 MOV R0,-(SP) ;;PUSH R0 ON STACK
066300 010146 MOV R1,-(SP) ;;PUSH R1 ON STACK
066302 105737 066514 TSTB $MFLG ;;SHOULD TYPE A MESSAGE?
066306 001450 BEQ 5$ ;;IF NOT: BR
066310 122737 000001 001242 CMPB #APTENV,$ENV ;;OPERATING UNDER APT?
066316 001031 BNE 3$ ;;IF NOT: BR
066320 132737 000100 001243 BITB #APTPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
066326 001425 BEQ 3$ ;;IF NOT: BR
066330 017600 000004 MOV @4(SP),R0 ;;GET MESSAGE ADDR.
066334 062766 000002 000004 ADD #2,4(SP) ;;BUMP RETURN ADDR.
066342 005737 001222 1$: TST $MSGTYPE ;;SEE IF DONE W/ LAST XMISSION?
066346 001375 BNE 1$ ;;IF NOT: WAIT
066350 010037 001236 MOV R0,$MSGAD ;;PUT ADDR IN MAILBOX
066354 105720 2$: TSTB (R0)+ ;;FIND END OF MESSAGE
066356 001376 BNE 2$
066360 163700 001236 SUB $MSGAD,R0 ;;SUB START OF MESSAGE
066364 006200 ASR R0 ;;GET MESSAGE LNGTH IN WORDS
066366 010037 001240 MOV R0,$MSGGLT ;;PUT LENGTH IN MAILBOX
066372 012737 000004 001222 MOV #4,$MSGTYPE ;;TELL APT TO TAKE MSG.
066400 000413 BR 5$
066402 017637 000004 066426 3$: MOV @4(SP),4$ ;;PUT MSG ADDR IN JSR LINKAGE
066410 062766 000002 000004 ADD #2,4(SP) ;;BUMP RETURN ADDRESS
066416 013746 177776 MOV 177776,-(SP) ;;PUSH 177776 ON STACK
066422 004737 061536 JSR PC,$TYPE ;;CALL TYPE MACRO
066426 000000 4$: .WORD 0
066430 5$:
066430 105737 066516 10$: TSTB $FFLG ;;SHOULD REPORT FATAL ERROR.
066434 001416 BEQ 12$ ;;IF NOT: BR
066436 005737 001242 TST $ENV ;;RUNNING UNDER APT?
066442 001413 BEQ 12$ ;;IF NOT: BR
066444 005737 001222 11$: TST $MSGTYPE ;;FINISHED LAST MESSAGE?
066450 001375 BNE 11$ ;;IF NOT: WAIT
066452 017637 000004 001224 MOV @4(SP),$FATAL ;;GET ERROR #
066460 062766 000002 000004 ADD #2,4(SP) ;;BUMP RETURN ADDR.
066466 005237 001222 INC $MSGTYPE ;;TELL APT TO TAKE ERROR
066472 105037 066516 12$: CLRB $FFLG ;;CLEAR FATAL FLAG
066476 105037 066515 CLRB $LFLG ;;CLEAR LOG FLAG
066502 105037 066514 CLRB $MFLG ;;CLEAR MESSAGE FLAG
066506 012601 MOV (SP)+,R1 ;;POP STACK INTO R1
066510 012600 MOV (SP)+,R0 ;;POP STACK INTO R0
066512 000207 RTS PC ;;RETURN
066514 000 $MFLG: .BYTE 0 ;;MESSG. FLAG
066515 000 $LFLG: .BYTE 0 ;;LOG FLAG
066516 000 $FFLG: .BYTE 0 ;;FATAL FLAG
.EVEN
000200 APTSIZE = 200
000001 APTENV = 001
000100 APTPOOL = 100
000040 APTCSUP = 040
  
```

			.SBTTL CONSOLE MESSAGES	
2				
3	066520	075	000	EQUALS: .ASCIZ @=@
4	066522	101	114	ALL: .ASCIZ @ALL@<CRLF>
5	066527	040	077	040 QUES: .ASCIZ @ ? @
6	066533	054	040	009 COMMA: .ASCIZ @, @
7	066536	200	124	131 MSHELP: .ASCIZ <CRLF>@TYPE HELP TEXT (L) N ? @
8	066567	200	122	115 CNSLO1: .ASCIZ <CRLF>@RMCS1=@
9	066577	040	114	111 CNSLO2: .ASCIZ @ LIMITS - LO= 160000, HI= 17XXXX@<CRLF>
10	066641	122	115	126 CNSLO3: .ASCIZ @RMVEC=@
11	066650	040	114	111 CNSLO4: .ASCIZ @ LIMITS - LO= 0, HI= 1000@<CRLF><LF>
12	066704	200	124	131 CNSLO7: .ASCII <CRLF>@TYPE 'A' TO TEST ALL DRIVES, OR TYPE DRIVE NUMBER(S)@
13	066771	200	101	116 .ASCIZ <CRLF>@AND TERMINATE INPUT WITH A CARRIAGE RETURN.@
14	067046	200		CNSLO8: .ASCII <CRLF>
15	067047	040	077	111 CNSLO9: .ASCIZ @ ?ILLEGAL INPUT@<CRLF>
16	067070	200	104	122 MSDRVS: .ASCIZ <CRLF>/DRIVE(S): /
17	067104	104	122	111 MSGDRV: .ASCIZ /DRIVE/
18	067112	200	125	116 SYSTAT: .ASCIZ <CRLF>/UNIT STATUS:/
19	067130	122	115	070 \$RM80: .ASCIZ /RM80/
20	067135	040	116	117 NOTRM: .ASCIZ / NOT AN RM80/
21	067152	040	114	117 LODEV: .ASCIZ / LOAD DEVICE/
22	067167	040	116	117 NOTPRS: .ASCIZ / NOT PRESENT/
23	067204	040	116	117 NOTAVL: .ASCIZ / NOT AVAILABLE/
24	067223	040	117	106 UNTOFF: .ASCIZ / OFFLINE/
25	067234	040	117	116 UNTON: .ASCIZ / ONLINE/
26	067244	200	104	122 DRIVES: .ASCIZ <CRLF>/DRIVE(S) TO BE TESTED/
27	067273	116	117	116 NONE: .ASCIZ /NONE/
28	067300	200	104	117 MSMNUL: .ASCIZ <CRLF>/DO YOU WANT MANUAL INTERVENTION TESTS (L) N ? /
29	067360	200	120	105 MSUNIT: .ASCIZ <CRLF>/PERFORMING 'LOGICAL ADDRESS PLUG TEST' ON DRIVE #/
30	067443	200	012	102 MINSTR: .ASCII <CRLF><LF>/BEFORE PROCEEDING WITH THE TEST, POWER DOWN OR PULL/
31	067527	200	124	110 .ASCIZ <CRLF>/THE ADDRESS PLUGS FROM ALL DEVICES NOT BEING TESTED./<CRLF><LF>
32	067617	111	116	123 INSERT: .ASCIZ /INSERT LOGICAL ADDRESS PLUG #/
33	067655	120	125	114 PULL: .ASCIZ /PULL LOGICAL ADDRESS PLUG #0, THEN/
34	067720	200	124	131 RET: .ASCIZ <CRLF>/TYPE <RET> WHEN READY./
35	067750	120	114	125 DONE: .ASCIZ /PLUG TEST DONE!/<CRLF>
36	067771	116	000	N: .ASCIZ /N/
37	067773	131	000	Y: .ASCIZ /Y/
38	067775	040		BLNKS4: .ASCII / /
39	067776	040		BLNKS3: .ASCII / /
40	067777	040		BLNKS2: .ASCII / /
41	070000	040	000	BLNKS1: .ASCIZ / /
42				.EVEN

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070002
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.SBTTL FUNCTION CODE TABLE

;THE FUNCTION CODE TABLE IS USED TO DEFINE STATUS CONDITIONS FOR
;EACH FUNCTION CODE. BIT USAGE IS AS FOLLOWS:

; ATA - BIT 15 IS SET IN THE ENTRY FOR A GIVEN FUNCTION CODE
;IF ATA SHOULD BE SET WHEN THE FUNCTION CODE IS EXECUTED, OTHERWISE,
;BIT 15 IS ZERO, INDICATING THAT ATA SHOULD NOT NORMALLY BE SET.
;NOTE THAT ATA MAY BE SET WHEN A COMMAND IS EXECUTED EVEN THOUGH
;IT IS NOT EXPECTED AS A RESULT OF THE COMMAND.

; WCE - BIT 14 IS SET IN THE ENTRY FOR A GIVEN FUNCTION CODE
;IF WRITE CHECK ERRORS ARE ENABLED AS A FUNCTION OF THE COMMAND.

; OPI - BIT 13 IS SET IN THE ENTRY FOR A GIVEN FUNCTION CODE
;IF OPI ERRORS ARE ENABLED DURING THE EXECUTION OF THAT COMMAND.

; IVC - BIT 12 IS SET IN THE ENTRY FOR A GIVEN FUNCTION CODE
;IF IVC ERRORS ARE ENABLED DURING THE EXECUTION OF THAT COMMAND.

; WLE - BIT 11 IS SET IN THE ENTRY FOR A GIVEN FUNCTION CODE
;IF WRITE ERRORS ARE ENABLED DURING THE EXECUTION OF THAT COMMAND.
;THE WRITE ERRORS WHICH ARE ENABLED ARE 'WLE', 'WCF', 'DPE', 'UPE'.

; IAE - BIT 10 IS SET IN THE ENTRY FOR A GIVEN FUNCTION CODE
;IF INVALID ADDRESS ERROR IS ENABLED FOR THAT COMMAND.

; AOE - BIT 09 IS SET IN THE ENTRY FOR A GIVEN FUNCTION CODE
;IF READ AND WRITE ERRORS ARE ENABLED DURING THE EXECUTION OF THE
;COMMAND. THE ERRORS ENABLED BY THIS BIT ARE 'TRE', 'DLT', 'NEM',
;'MXF', 'LBT', AND 'AOE'.

; BIT 08 IS NOT USED.

; HCE - BIT 07 IS SET IN THE ENTRY FOR A GIVEN FUNCTION CODE
;IF HEADER ERRORS ARE ENABLED DURING THE EXECUTION OF THAT COMMAND.
;HEADER ERRORS INCLUDE 'HCRC', 'HCE', 'FER', 'BSE' AND 'SSE'.

; ECH - BIT 06 IS SET IN THE ENTRY FOR A GIVEN FUNCTION CODE
;IF DATA FIELD ERRORS ARE ENABLED DURING THE EXECUTION OF THAT
;COMMAND. THESE ERRORS INCLUDE 'MDPE', 'DCK', AND 'ECH'.

; BIT 05 IS NOT USED.

; BIT 04 IS NOT USED.

; BIT 03 IS NOT USED.

; BIT 02 IS NOT USED.

; BIT 01 IS NOT USED.

; ILF - BIT 00 IS SET IF THE FUNCTION CODE IS ILLEGAL.

FNCDTB: ;FUNCTION CODE TABLE

.WORD OPI ;NOP
```

58	070004	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (2)
59	070006	132000	.WORD	ATA!OPI!IVC!IAE	:SEEK
60	070010	130000	.WORD	ATA!CPI!IVC	:RECALIBRATE
61	070012	020000	.WORD	OPI	:DRIVE CLEAR
62	070014	030000	.WORD	OPI!IVC	:RELEASE
63	070016	130000	.WORD	OPI!ATA!IVC	:OFFSET
64	070020	130000	.WORD	OPI!ATA!IVC	:RETURN TO CENTERLINE
65	070022	020000	.WORD	OPI	:READ IN PRESET
66	070024	020000	.WORD	CPI	:PACK ACKNOWLEDGE
67	070026	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (24)
68	070030	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (26)
69	070032	132000	.WORD	ATA!OPI!IVC!IAE	:SEARCH
70	070034	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (32)
71	070036	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (34)
72	070040	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (36)
73	070042	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (40)
74	070044	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (42)
75	070046	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (44)
76	070050	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (46)
77	070052	073300	.WORD	WCE!OPI!IVC!IAE!AOE!HCE!ECH	:WRITE CHECK DATA
78	070054	073300	.WORD	WCE!OPI!IVC!IAE!AOE!HCE!ECH	:WRITE CHECK HEADER AND DATA
79	070056	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (54)
80	070060	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (56)
81	070062	037200	.WORD	OPI!IVC!WLE!IAE!AOE!HCE	:WRITE DATA
82	070064	037000	.WORD	OPI!IVC!WLE!IAE!AOE	:WRITE HEADER AND DATA
83	070066	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (64)
84	070070	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (66)
85	070072	033300	.WORD	OPI!IVC!IAE!AOE!HCE!ECH	:READ DATA
86	070074	033300	.WORD	OPI!IVC!IAE!AOE!HCE!ECH	:READ HEADER AND DATA
87	070076	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (74)
88	070100	130001	.WORD	OPI!ATA!ILF!IVC	:ILLEGAL FUNCTION (76)

1		
2		
3	070102	001
4	070103	002
5	070104	004
6	070105	010
7	070106	020
8	070107	040
9	070110	100
10	070111	200

.SBTTL ATTENTION (ATA) TABLE

ATNTBL:	.BYTE	1.
	.BYTE	2.
	.BYTE	4.
	.BYTE	8.
	.BYTE	16.
	.BYTE	32.
	.BYTE	64.
	.BYTE	128.

				.SBTTL	ERROR MESSAGE TABLE	
1						
2						
3	070112	074564	000000	EMT1:	.WORD	EMS1,0
4	070116	074633	074650 000000	EMT2:	.WORD	EMS2,EMS3,0
5	070124	074633	074713 000000	EMT3:	.WORD	EMS2,EMS4,0
6	070132	074756	075006 000000	EMT4:	.WORD	EMS5,EMS6,0
7	070140	074756	075120 000000	EMT5:	.WORD	EMS5,EMS10,0
8	070146	101552	077001 000000	EMT6:	.WORD	EMS167,EMS64,0
9	070154	077547	101577 000000	EMT7:	.WORD	EMS110,EMS170,0
10	070162	075053	000000	EMT10:	.WORD	EMS7,0
11	070166	075120	000000	EMT11:	.WORD	EMS10,0
12	070172	075162	075173 000000	EMT12:	.WORD	EMS11,EMS12,0
13	070200	075234	075245 075256	EMT13:	.WORD	EMS13,EMS14,EMS15,EMS16,0
14	070212	075330	077001 000000	EMT14:	.WORD	EMS17,EMS64,0
15	070220	075162	075413 000000	EMT15:	.WORD	EMS11,EMS21,0
16	070226	075162	075436 075565	EMT16:	.WORD	EMS11,EMS22,EMS27,0
17	070236	075162	075452 075576	EMT17:	.WORD	EMS11,EMS23,EMS30,0
18	070246	075162	075500 075576	EMT20:	.WORD	EMS11,EMS24,EMS30,0
19	070256	075162	075527 075565	EMT21:	.WORD	EMS11,EMS25,EMS27,0
20	070266	075162	075544 075565	EMT22:	.WORD	EMS11,EMS26,EMS27,0
21	070276	075162	075606 075576	EMT23:	.WORD	EMS11,EMS31,EMS30,0
22	070306	075162	075635 075576	EMT24:	.WORD	EMS11,EMS32,EMS30,0
23	070316	075162	075664 075576	EMT25:	.WORD	EMS11,EMS33,EMS30,0
24	070326	075162	075712 075576	EMT26:	.WORD	EMS11,EMS34,EMS30,0
25	070336	075162	075763 075576	EMT27:	.WORD	EMS11,EMS35,EMS30,0
26	070346	075162	076012 075576	EMT30:	.WORD	EMS11,EMS36,EMS30,0
27	070356	075162	076041 075576	EMT31:	.WORD	EMS11,EMS37,EMS30,0
28	070366	075162	076067 075576	EMT32:	.WORD	EMS11,EMS40,EMS30,0
29	070376	075162	076116 075576	EMT33:	.WORD	EMS11,EMS41,EMS30,0
30	070406	075162	076144 075576	EMT34:	.WORD	EMS11,EMS42,EMS30,0
31	070416	075162	076173 075576	EMT35:	.WORD	EMS11,EMS43,EMS30,0
32	070426	075162	076222 075576	EMT36:	.WORD	EMS11,EMS44,EMS30,0
33	070436	075162	076275 075576	EMT37:	.WORD	EMS11,EMS45,EMS30,0
34	070446	077065	075370 000000	EMT40:	.WORD	EMS66,EMS20,0
35	070454	077253	100753 077261	EMT41:	.WORD	EMS75,EMS141,EMS76,0
36	070464	101044	101054 077207	EMT42:	.WORD	EMS144,EMS145,EMS72,EMS76,0
37	070476	076367	076505 077261	EMT43:	.WORD	EMS47,EMS53,EMS76,0
38	070506	077312	076505 077261	EMT44:	.WORD	EMS77,EMS53,EMS76,0
39	070516	077340	076505 077261	EMT45:	.WORD	EMS100,EMS53,EMS76,0
40	070526	077366	076505 077261	EMT46:	.WORD	EMS101,EMS53,EMS76,0
41	070536	077017	077, J1 000000	EMT47:	.WORD	EMS65,EMS64,0
42	070544	075234	075256 076753	EMT50:	.WORD	EMS13,EMS15,EMS63,0
43	070554	075162	076340 075576	EMT51:	.WORD	EMS11,EMS46,EMS30,EMS67,0
44	070566	076367	076505 077135	EMT52:	.WORD	EMS47,EMS53,EMS67,EMS115,EMS140,EMS141,0
45	070604	076367	076505 077135	EMT53:	.WORD	EMS47,EMS53,EMS67,EMS115,EMS141,EMS164,0
46	070622	076416	076505 077135	EMT54:	.WORD	EMS50,EMS53,EMS67,0
47	070632	101001	101016 076505	EMT55:	.WORD	EMS142,EMS143,EMS53,EMS67,0
48	070644	076445	077207 077135	EMT56:	.WORD	EMS51,EMS72,EMS67,EMS115,EMS50,EMS70,0
49	070662	101552	077217 077135	EMT57:	.WORD	EMS167,EMS73,EMS67,0
50	070672	076570	077135 077747	EMT60:	.WORD	EMS56,EMS67,EMS115,EMS150,EMS152,EMS70,0
51	070710	077174	076570 077135	EMT61:	.WORD	EMS71,EMS56,EMS67,EMS115,EMS150,EMS152,EMS72,0
52	070730	100732	077135 077747	EMT62:	.WORD	EMS140,EMS67,EMS115,EMS47,EMS70,0
53	070744	102752	102775 075370	EMT63:	.WORD	EMS225,EMS226,EMS20,0
54	070754	101137	101202 077162	EMT64:	.WORD	EMS150,EMS152,EMS70,EMS115,EMS56,EMS73,EMS67,0
55	070774	076473	102177 102360	EMT65:	.WORD	EMS52,EMS205,EMS214,EMS206,EMS115,EMS51,EMS72,0
56	071014	101511	077443 077207	EMT66:	.WORD	EMS165,EMS103,EMS72,EMS124,0
57	071026	101511	077443 077207	EMT67:	.WORD	EMS165,EMS103,EMS72,EMS171,0

ERROR MESSAGE TABLE

58	071040	076340	075370	101404	EMT70:	.WORD	EMS46,EMS20,EMS163,0
59	071050	077174	077366	101404	EMT71:	.WORD	EMS71,EMS101,EMS163,0
60	071060	076367	077207	101404	EMT72:	.WORD	EMS47,EMS72,EMS163,EMS115,EMS140,EMS141,0
61	071076	076367	077207	101404	EMT73:	.WORD	EMS47,EMS72,EMS163,EMS115,EMS141,EMS72,0
62	071114	076570	076505	101404	EMT74:	.WORD	EMS56,EMS53,EMS163,0
63	071124	077174	076570	101404	EMT75:	.WORD	EMS71,EMS56,EMS163,EMS115,EMS150,EMS152,EMS72,0
64	071144	076416	076505	101404	EMT76:	.WORD	EMS50,EMS53,EMS163,0
65	071154	101001	101016	076505	EMT77:	.WORD	EMS142,EMS143,EMS53,EMS163,0
66	071166	077253	100753	101404	EMT100:	.WORD	EMS75,EMS141,EMS163,EMS115,EMS47,EMS70,0
67	071204	077253	101137	101404	EMT101:	.WORD	EMS75,EMS150,EMS163,EMS115,EMS56,EMS73,0
68	071222	101552	077217	101404	EMT102:	.WORD	EMS167,EMS73,EMS163,0
69	071232	101122	101156	077234	EMT103:	.WORD	EMS147,EMS151,EMS74,EMS163,0
70	071244	076445	077234	101404	EMT104:	.WORD	EMS51,EMS74,EMS163,EMS115,EMS50,EMS70,0
71	071262	101511	077340	101404	EMT105:	.WORD	EMS165,EMS100,EMS163,0
72	071272	101511	077312	101404	EMT106:	.WORD	EMS165,EMS77,EMS163,0
73	071302	101044	101054	076505	EMT107:	.WORD	EMS144,EMS145,EMS53,EMS163,EMS115,EMS143,EMS70,0
74	071322	077547	077607	077752	EMT110:	.WORD	EMS110,EMS112,EMS116,EMS111,0
75	071334	077673	074713	000000	EMT111:	.WORD	EMS113,EMS4,0
76	071342	077673	074650	000000	EMT112:	.WORD	EMS113,EMS3,0
77	071350	077547	077747	077752	EMT113:	.WORD	EMS110,EMS115,EMS116,EMS117,EMS114,0
78	071354				EMT114:		:NOT USED
79	071364	100024	100464	100510	EMT115:	.WORD	EMS121,EMS132,EMS133,0
80	071374	100067	100464	100510	EMT116:	.WORD	EMS122,EMS132,EMS133,0
81	071404	100124	100464	100510	EMT117:	.WORD	EMS123,EMS132,EMS133,0
82	071414	100167	100464	100510	EMT120:	.WORD	EMS124,EMS132,EMS133,0
83	071424	100221	100464	100510	EMT121:	.WORD	EMS125,EMS132,EMS133,0
84	071434	100264	100464	100510	EMT122:	.WORD	EMS126,EMS132,EMS133,0
85	071444	100675	100464	100510	EMT123:	.WORD	EMS137,EMS132,EMS133,0
86	071454	100366	100464	100510	EMT124:	.WORD	EMS130,EMS132,EMS133,0
87	071464	100424	100464	100510	EMT125:	.WORD	EMS131,EMS132,EMS133,0
88	071474	100024	100464	100533	EMT126:	.WORD	EMS121,EMS132,EMS134,EMS123,0
89	071506	100067	100464	100533	EMT127:	.WORD	EMS122,EMS132,EMS134,EMS123,0
90	071520	100124	100464	100533	EMT130:	.WORD	EMS123,EMS132,EMS134,EMS123,0
91	071532	100167	100464	100533	EMT131:	.WORD	EMS124,EMS132,EMS134,EMS123,0
92	071544	100221	100464	100533	EMT132:	.WORD	EMS125,EMS132,EMS134,EMS123,0
93	071556	100264	100464	100533	EMT133:	.WORD	EMS126,EMS132,EMS134,EMS123,0
94	071570	100675	100464	100533	EMT134:	.WORD	EMS137,EMS132,EMS134,EMS123,0
95	071602	100366	100464	100533	EMT135:	.WORD	EMS130,EMS132,EMS134,EMS123,0
96	071614	100424	100464	100533	EMT136:	.WORD	EMS131,EMS132,EMS134,EMS123,0
97	071626	100024	100464	100575	EMT137:	.WORD	EMS121,EMS132,EMS135,0
98	071636	100124	100464	100575	EMT140:	.WORD	EMS123,EMS132,EMS135,0
99	071646	100024	100464	100650	EMT141:	.WORD	EMS121,EMS132,EMS136,0
100	071656	100675	100464	100650	EMT142:	.WORD	EMS137,EMS132,EMS136,0
101	071666	100167	100464	100650	EMT143:	.WORD	EMS124,EMS132,EMS136,0
102	071676	100221	100464	100650	EMT144:	.WORD	EMS125,EMS132,EMS136,0
103	071706	100264	100464	100650	EMT145:	.WORD	EMS126,EMS132,EMS136,0
104	071716	100424	100464	100650	EMT146:	.WORD	EMS131,EMS132,EMS136,0
105	071726	101626	100464	100650	EMT147:	.WORD	EMS171,EMS132,EMS136,0
106	071736	100366	100464	100650	EMT150:	.WORD	EMS130,EMS132,EMS136,0
107	071746	100732	077747	100753	EMT151:	.WORD	EMS140,EMS115,EMS141,EMS70,0
108	071760	101001	077747	101016	EMT152:	.WORD	EMS142,EMS115,EMS143,EMS72,0
109	071772	101044	101054	101103	EMT153:	.WORD	EMS144,EMS145,EMS146,EMS115,EMS143,EMS72,0
110	072010	101044	101054	075370	EMT154:	.WORD	EMS144,EMS145,EMS20,EMS115,EMS143,EMS70,0
111	072026	101137	101202	101250	EMT155:	.WORD	EMS150,EMS152,EMS154,EMS153,0
112	072040	101122	101156	101250	EMT156:	.WORD	EMS147,EMS151,EMS154,EMS155,0
113	072052	101122	101156	101304	EMT157:	.WORD	EMS147,EMS151,EMS156,EMS157,0
114	072064	101354	101304	101337	EMT160:	.WORD	EMS161,EMS156,EMS160,0

ERROR MESSAGE TABLE

115	072074	075527	075565	101304	EMT161:	.WORD	EMS25,EMS27,EMS156,EMS160,0
116	072106	075544	075565	101304	EMT162:	.WORD	EMS26,EMS27,EMS156,EMS160,0
117	072120	076367	101404	100732	EMT163:	.WORD	EMS47,EMS163,EMS140,0
118	072130	076367	075370	000000	EMT164:	.WORD	EMS47,EMS20,0
119	072136	076570	075370	000000	EMT165:	.WORD	EMS56,EMS20,0
120	072144	076340	075370	000000	EMT166:	.WORD	EMS46,EMS20,0
121	072152	102700	075370	000000	EMT167:	.WORD	EMS224,EMS20,0
122	072160	102136	100753	075576	EMT170:	.WORD	EMS203,EMS141,EMS30,EMS202,0
123	072172	101552	101250	101322	EMT171:	.WORD	EMS167,EMS154,EMS157,0
124	072202	101552	101250	101264	EMT172:	.WORD	EMS167,EMS154,EMS155,0
125	072212	101626	100464	100510	EMT173:	.WORD	EMS171,EMS132,EMS133,0
126	072222	101626	100464	100533	EMT174:	.WORD	EMS171,EMS132,EMS134,EMS123,0
127	072234	077673	102001	000000	EMT175:	.WORD	EMS113,EMS177,0
128	072242	102023	102040	000000	EMT176:	.WORD	EMS200,EMS201,0
129	072250	000000			EMT177:	.WORD	
130	072252	102136	076445	075576	EMT200:	.WORD	EMS203,EMS51,EMS30,EMS202,0
131	072264	102136	102151	075576	EMT201:	.WORD	EMS203,EMS204,EMS30,EMS202,0
132	072276	102136	076416	075576	EMT202:	.WORD	EMS203,EMS50,EMS30,EMS202,0
133	072310	102136	101016	075576	EMT203:	.WORD	EMS203,EMS143,EMS30,EMS202,0
134	072322	101137	077234	102106	EMT204:	.WORD	EMS150,EMS74,EMS202,EMS115,EMS152,EMS72,0
135	072340	076416	077443	077207	EMT205:	.WORD	EMS50,EMS103,EMS72,0
136	072350	077452	077217	102106	EMT206:	.WORD	EMS104,EMS73,EMS202,0
137	072360	077253	100753	077747	EMT207:	.WORD	EMS75,EMS141,EMS115,EMS140,0
138	072372	077253	101137	000000	EMT210:	.WORD	EMS75,EMS150,0
139	072400	076445	077207	077747	EMT211:	.WORD	EMS51,EMS72,EMS115,EMS50,EMS70,0
140	072414	101001	076505	077747	EMT212:	.WORD	EMS142,EMS53,EMS115,EMS143,EMS72,0
141	072430	076416	077443	076505	EMT213:	.WORD	EMS50,EMS103,EMS53,0
142	072440	076473	102177	101525	EMT214:	.WORD	EMS52,EMS205,EMS166,EMS206,EMS115,EMS51,EMS72,0
143	072460	076473	100002	076570	EMT215:	.WORD	EMS52,EMS117,EMS56,EMS163,0
144	072472	076570	075576	077001	EMT216:	.WORD	EMS56,EMS30,EMS64,0
145	072502	076340	075576	077001	EMT217:	.WORD	EMS46,EMS30,EMS64,0
146	072512	075606	075576	077001	EMT220:	.WORD	EMS31,EMS30,EMS64,0
147	072522	076367	075576	077001	EMT221:	.WORD	EMS47,EMS30,EMS64,0
148	072532	076473	100002	077312	EMT222:	.WORD	EMS52,EMS117,EMS77,0
149	072542	076473	100002	076753	EMT223:	.WORD	EMS52,EMS117,EMS63,0
150	072552	076473	100002	102752	EMT224:	.WORD	EMS52,EMS117,EMS225,EMS115,EMS226,0
151	072566	102752	103024	103035	EMT225:	.WORD	EMS225,EMS227,EMS230,EMS115,EMS156,EMS231,EMS57,0
152	072606	075162	103035	075576	EMT226:	.WORD	EMS11,EMS230,EMS30,0
153	072616	102752	102775	077747	EMT227:	.WORD	EMS225,EMS226,EMS115,EMS230,EMS72,0
154	072632	074564	000000		EMT230:	.WORD	EMS1,0
155	072636	102136	101752	075576	EMT231:	.WORD	EMS203,EMS176,EMS30,0
156	072646	000000			EMT232:	.WORD	
157	072650	000000			EMT233:	.WORD	
158	072652	000000			EMT234:	.WORD	
159	072654	000000			EMT235:	.WORD	
160	072656	000000			EMT236:	.WORD	
161	072660	000000			EMT237:	.WORD	
162	072662	000000			EMT240:	.WORD	
163	072664	000000			EMT241:	.WORD	
164	072666	000000			EMT242:	.WORD	
165	072670	000000			EMT243:	.WORD	
166	072672	000000			EMT244:	.WORD	
167	072674	000000			EMT245:	.WORD	
168	072676	101552	100464	102236	EMT246:	.WORD	EMS167,EMS132,EMS207,0
169	072706	101552	100464	102263	EMT247:	.WORD	EMS167,EMS132,EMS210,EMS125,0
170	072720	101552	102274	102263	EMT250:	.WORD	EMS167,EMS211,EMS210,EMS207,EMS206,0
171	072734	102312	102335	000000	EMT251:	.WORD	EMS212,EMS213,0

ERROR MESSAGE TABLE

172	072742	101511	102312	000000	EMT252:	.WORD	EMS165,EMS212,0
173	072750	101122	101156	101304	EMT253:	.WORD	EMS147,EMS151,EMS156,EMS210,EMS26,EMS27,0
174	072766	102136	077366	075576	EMT254:	.WORD	EMS203,EMS101,EMS30,0
175	072776	102136	101552	075576	EMT255:	.WORD	EMS203,EMS167,EMS30,0
176	073006	102136	077340	075576	EMT256:	.WORD	EMS203,EMS100,EMS30,0
177	073016	075162	076340	075576	EMT257:	.WORD	EMS11,EMS46,EMS30,EMS102,0
178	073030	076473	100002	076570	EMT260:	.WORD	EMS52,EMS117,EMS56,EMS102,0
179	073042	076473	102177	102502	EMT261:	.WORD	EMS52,EMS205,EMS220,EMS206,EMS115,EMS51,EMS72,0
180	073062	077452	077217	102106	EMT262:	.WORD	EMS104,EMS73,EMS202,0
181	073072	076416	076505	077414	EMT263:	.WORD	EMS50,EMS53,EMS102,0
182	073102	076570	076505	077414	EMT264:	.WORD	EMS56,EMS53,EMS102,EMS115,EMS150,EMS152,EMS70,0
183	073122	077174	076570	077414	EMT265:	.WORD	EMS71,EMS56,EMS102,EMS115,EMS150,EMS152,EMS72,0
184	073142	101001	101016	076505	EMT266:	.WORD	EMS142,EMS143,EMS53,EMS102,0
185	073154	076416	101103	077747	EMT267:	.WORD	EMS50,EMS146,EMS115,EMS52,EMS117,EMS46,0
186	073172	076367	076505	077414	EMT270:	.WORD	EMS47,EMS53,EMS102,EMS115,EMS140,0
187	073206	076367	076505	077414	EMT271:	.WORD	EMS47,EMS53,EMS102,EMS115,EMS141,EMS72,0
188	073224	077253	100753	077414	EMT272:	.WORD	EMS75,EMS141,EMS102,EMS115,EMS47,EMS73,0
189	073242	076445	077234	077414	EMT273:	.WORD	EMS51,EMS74,EMS102,EMS115,EMS50,EMS70,0
190	073260	076753	076505	076645	EMT274:	.WORD	EMS63,EMS53,EMS57,EMS115,EMS41,EMS146,0
191	073276	077752	076505	076116	EMT275:	.WORD	EMS116,EMS53,EMS41,EMS57,0
192	073310	076367	076505	076645	EMT276:	.WORD	EMS47,EMS53,EMS57,EMS115,EMS140,0
193	073324	076367	076505	076645	EMT277:	.WORD	EMS47,EMS53,EMS57,EMS115,EMS141,EMS72,0
194	073342	076570	076505	076645	EMT300:	.WORD	EMS56,EMS53,EMS57,EMS115,EMS150,EMS152,EMS70,0
195	073362	077174	076570	076505	EMT301:	.WORD	EMS71,EMS56,EMS53,EMS57,EMS115,EMS150,EMS152,EMS72,0
196	073404	101511	077340	077443	EMT302:	.WORD	EMS165,EMS100,EMS103,EMS57,0
197	073416	101511	077366	077443	EMT303:	.WORD	EMS165,EMS101,EMS103,EMS57,0
198	073430	101511	077312	077443	EMT304:	.WORD	EMS165,EMS77,EMS103,EMS57,0
199	073442	076340	075576	077001	EMT305:	.WORD	EMS46,EMS30,EMS64,EMS57,0
200	073454	076416	076505	076645	EMT306:	.WORD	EMS50,EMS53,EMS57,0
201	073464	076416	101103	077747	EMT307:	.WORD	EMS50,EMS146,EMS115,EMS52,EMS117,EMS46,EMS57,0
202	073504	101001	101016	076505	EMT310:	.WORD	EMS142,EMS143,EMS53,EMS57,0
203	073516	077452	077443	076505	EMT311:	.WORD	EMS104,EMS103,EMS53,EMS57,0
204	073530	077501	077443	076505	EMT312:	.WORD	EMS105,EMS103,EMS53,EMS57,0
205	073542	101044	101054	077443	EMT313:	.WORD	EMS144,EMS145,EMS103,EMS57,EMS115,EMS143,EMS70,0
206	073562	076144	077443	076505	EMT314:	.WORD	EMS42,EMS103,EMS53,EMS57,0
207	073574	075606	077443	076505	EMT315:	.WORD	EMS31,EMS103,EMS53,EMS57,0
208	073606	077174	075606	077443	EMT316:	.WORD	EMS71,EMS31,EMS103,EMS57,0
209	073620	076173	077443	076645	EMT317:	.WORD	EMS43,EMS103,EMS57,0
210	073630	076275	077443	076645	EMT320:	.WORD	EMS45,EMS103,EMS57,0
211	073640	076222	077443	076645	EMT321:	.WORD	EMS44,EMS103,EMS57,0
212	073650	077530	075370	000000	EMT322:	.WORD	EMS106,EMS20,0
213	073656	076012	077443	076645	EMT323:	.WORD	EMS36,EMS103,EMS57,0
214	073666	101701	076012	077443	EMT324:	.WORD	EMS173,EMS36,EMS103,EMS57,0
215	073700	101661	076012	077443	EMT325:	.WORD	EMS172,EMS36,EMS103,EMS57,0
216	073712	075234	101716	075256	EMT326:	.WORD	EMS13,EMS174,EMS15,EMS35,EMS53,EMS175,0
217	073730	101122	101156	077234	EMT327:	.WORD	EMS147,EMS151,EMS74,EMS175,0
218	073742	077065	076505	101724	EMT330:	.WORD	EMS66,EMS53,EMS175,0
219	073752	075664	077443	076505	EMT331:	.WORD	EMS33,EMS103,EMS53,EMS175,0
220	073764	076067	077443	076505	EMT332:	.WORD	EMS40,EMS103,EMS53,EMS57,0
221	073776	076445	077234	076645	EMT333:	.WORD	EMS51,EMS74,EMS57,EMS115,EMS50,EMS70,0
222	074014	077253	100753	076645	EMT334:	.WORD	EMS75,EMS141,EMS57,EMS115,EMS47,EMS73,0
223	074032	077253	101137	101202	EMT335:	.WORD	EMS75,EMS150,EMS152,EMS57,EMS115,EMS56,EMS73,0
224	074052	076673	076706	076735	EMT336:	.WORD	EMS60,EMS61,EMS62,0
225	074062	077752	100002	075712	EMT337:	.WORD	EMS116,EMS117,EMS34,0
226	074072	075712	076505	076517	EMT340:	.WORD	EMS34,EMS53,EMS54,EMS111,0
227	074104	076541	075712	000000	EMT341:	.WORD	EMS55,EMS34,0
228	074112	076473	100002	076570	EMT342:	.WORD	EMS52,EMS117,EMS56,EMS57,0

229	074124	076473	100002	076275	EMT343: .WORD	EMS52,EMS117,EMS45,EMS57,0
230	074136	076473	100002	076222	EMT344: .WORD	EMS52,EMS117,EMS44,EMS57,0
231	074150	076473	100002	102522	EMT345: .WORD	EMS52,EMS117,EMS221,0
232	074160	077530	075370	077747	EMT346: .WORD	EMS106,EMS20,EMS115,EMS223 EMS72,0
233	074174	076473	102177	102572	EMT347: .WORD	EMS52,EMS205,EMS222,EMS206,0
234	074206	077253	101137	077414	EMT350: .WORD	EMS75,EMS150,EMS102,EMS115,EMS56,EMS73,0
235	074224	101552	077217	077414	EMT351: .WORD	EMS167,EMS73,EMS102,0
236	074234	102375	000000		EMT352: .WORD	EMS215,0
237	074240	102447	102136	102417	EMT353: .WORD	EMS217,EMS203,EMS216,0
238	074250	102522	075370	000000	EMT354: .WORD	EMS221,EMS20,0

1	074256	103127	103725	104002	EHT1:	.WORD	EH1,STSH1,STSH2,STSH4,0
2	074270	103725	104002	104127	EHT2:	.WORD	STSH1,STSH2,STSH4,0
3							
4	074300	103146	000000		EHT110:	.WORD	EH110,0
5	074304	103155	000000		EHT111:	.WORD	EH111,0
6	074310	103127	000000		EHT112:	.WORD	EH1,0
7	074314	103174	000000		EHT114:	.WORD	EH114,0
8	074320	103223	103725	104002	EHT223:	.WORD	EH223,STSH1,STSH2,STSH4,0
9	074332	103251	103725	104002	EHT256:	.WORD	EH256,STSH1,STSH2,STSH4,0
10							
11	074344	103325	103725	104002	EHT336:	.WORD	EH336,STSH1,STSH2,STSH4,0
12	074356	103364	103725	104002	EHT337:	.WORD	EH337,STSH1,STSH2,STSH4,0
13	074370	103521	103725	104002	EHT344:	.WORD	EH344,STSH1,STSH2,STSH4,0
14							
15	074402	103657	000000		EHT353:	.WORD	EH353,0

1	074406	104166	104262	104300	EDT1:	.WORD	ED1,STSD1,STSD2,STSD4
2	074416	104262	104300	104332	EDT2:	.WORD	STSD1,STSD2,STSD4
3							
4	074424	104174			EDT110:	.WORD	ED110
5	074426	104200			EDT111:	.WORD	ED111
6							
7	074430	104206			EDT114:	.WORD	ED114
8	074432	104216	104262	104300	EDT223:	.WORD	ED223,STSD1,STSD2,STSD4
9							
10	074442	104226	104262	104300	EDT336:	.WORD	ED336,STSD1,STSD2,STSD4
11	074452	104240	104262	104300	EDT337:	.WORD	ED337,STSD1,STSD2,STSD4
12	074462	104240	104262	104300	EDT344:	.WORD	ED337,STSD1,STSD2,STSD4.0
13							
14	074474	104252			EDT353:	.WORD	ED353

1	074476	104345	104363	104363	EFT1:	.WORD	EF111,STSF,STSF,STSF
2	074506	104363	104363	104363	EFT2:	.WORD	STSF,STSF,STSF
3							
4	074514	104344			EFT110:	.WORD	EF110
5	074516	104345			EFT111:	.WORD	EF111
6							
7	074520	104347			EFT114:	.WORD	EF114
8	074522	104347	104363	104363	EFT223:	.WORD	EF114,STSF,STSF,STSF
9							
10	074532	104352	104363	104363	EFT336:	.WORD	EF336,STSF,STSF,STSF
11	074542	104352	104363	104363	EFT337:	.WORD	EF336,STSF,STSF,STSF
12	074552	104352	104363	104363	EFT344:	.WORD	EF336,STSF,STSF,STSF
13							
14	074562	104347			EFT353:	.WORD	EF114

Line	Hex	Hex	Hex	Label	Text
1				.SBTTL	ERROR MESSAGE STRINGS
2					
3	074564	127	122	117	EMS1: .ASCIZ @WRONG UNIT SELECTED (RMCS2, BITS 0-2) @
4	074633	104	105	126	EMS2: .ASCIZ @DEVICE WENT @
5	074650	125	116	101	EMS3: .ASCIZ @UNAVAILABLE 'DVA' (RMCS1, BIT 11) @
6	074713	116	117	116	EMS4: .ASCIZ @NONEXISTENT 'NED' (RMCS2, BIT 12) @
7	074756	103	117	115	EMS5: .ASCIZ @COMMAND NOT COMPLETED, @
8	075006	103	117	116	EMS6: .ASCIZ @CONTROLLER NOT READY (RMCS1, BIT 7) @
9	075053	104	122	111	EMS7: .ASCIZ @DRIVE NOT READY 'DRY' (RMDS, BIT 7) @
10	075120	107	117	040	EMS10: .ASCIZ @GO NOT RESET 'GO' (RMCS1, BIT 0) @
11	075162	111	116	126	EMS11: .ASCIZ @INVALID @
12	075173	106	125	116	EMS12: .ASCIZ @FUNCTION CODE (RMCS1, BITS 1-5) @
13	075234	115	101	123	EMS13: .ASCIZ @MASSBUS @
14	075245	103	117	116	EMS14: .ASCIZ @CONTROL @
15	075256	102	125	123	EMS15: .ASCIZ @BUS PARITY ERROR @
16	075300	042	115	103	EMS16: .ASCIZ @'M(PE' (RMCS1, BIT 13) @
17	075330	124	122	101	EMS17: .ASCIZ @TRANSFER ERROR (RMCS1, BIT 14) @
18	075370	123	110	117	EMS20: .ASCIZ @SHOULD NOT BE SET @
19	075413	127	117	122	EMS21: .ASCIZ @WORD COUNT (RMWC) @
20	075436	102	125	123	EMS22: .ASCIZ @BUS (RMBA) @
21	075452	042	114	102	EMS23: .ASCIZ @'LBT' (RMDS, BIT 10) @
22	075500	042	101	117	EMS24: .ASCIZ @'AOE' (RMER1, BIT 09) @
23	075527	104	111	123	EMS25: .ASCIZ @DISK (RMDA) @
24	075544	103	131	114	EMS26: .ASCIZ @CYLINDER (RMDC) @
25	075565	101	104	104	EMS27: .ASCIZ @ADDRESS @
26	075576	123	124	101	EMS30: .ASCIZ @STATUS @
27	075606	042	127	114	EMS31: .ASCIZ @'WLE' (RMER1, BIT 11) @
28	075635	042	125	120	EMS32: .ASCIZ @'UPE' (RMCS2, BIT 13) @
29	075664	042	127	103	FMS33: .ASCIZ @'WCF' (RMER1, BIT 5) @
30	075712	127	122	111	EMS34: .ASCIZ @WRITE CHECK ERROR-'WCE' (RMCS2, BIT 14) @
31	075763	042	115	104	EMS35: .ASCIZ @'MDPE' (RMCS2, BIT 8) @
32	076012	042	104	103	EMS36: .ASCIZ @'DCK' (RMER1, BIT 15) @
33	076041	042	105	103	EMS37: .ASCIZ @'ECH' (RMER1, BIT 6) @
34	076067	042	104	114	EMS40: .ASCIZ @'DLT' (RMCS2, BIT 15) @
35	076116	042	115	130	EMS41: .ASCIZ @'MXF' (RMCS2, BIT 9) @
36	076144	042	104	124	EMS42: .ASCIZ @'DTE' (RMER1, BIT 12) @
37	076173	042	110	103	EMS43: .ASCIZ @'HCRC' (RMER1, BIT 8) @
38	076222	110	105	101	EMS44: .ASCIZ @HEADER COMPARE ERROR 'HCE' (RMER1, BIT 7) @
39	076275	106	117	122	EMS45: .ASCIZ @FORMAT ERROR 'FER' (RMER1, BIT 4) @
40	076340	042	111	101	FMS46: .ASCIZ @'IAE' (RMER1, BIT 10) @
41	076367	042	117	120	EMS47: .ASCIZ @'OPI' (RMER1, BIT 13) @
42	076416	042	123	113	EMS50: .ASCIZ @'SKI' (RMER2, BIT 14) @
43	076445	042	120	111	EMS51: .ASCIZ @'PIP' (RMDS, BIT 13) @
44	076473	124	110	105	EMS52: .ASCIZ @THE RM80 @
45	076505	104	105	124	EMS53: .ASCIZ @DETECTED @
46	076517	101	124	040	EMS54: .ASCIZ @AT AN UNEXPECTED @
47	076541	111	116	103	EMS55: .ASCIZ @INCORRECT DATA DURING @
48	076570	111	116	126	EMS56: .ASCIZ @INVALID COMMAND ERROR 'IVC' (RMER2, BIT 12) @
49	076645	104	125	122	EMS57: .ASCIZ @DURING DATA TRANSFER @
50	076673	104	101	124	EMS60: .ASCIZ @DATA READ @
51	076706	104	117	105	EMS61: .ASCIZ @DOES NOT COMPARE WITH @
52	076735	104	101	124	EMS62: .ASCIZ @DATA WRITTEN @
53	076753	042	120	101	EMS63: .ASCIZ @'PAR' (RMER1, BIT 3) @
54	077001	111	123	040	EMS64: .ASCIZ @IS INCORRECT @
55	077017	103	117	115	EMS65: .ASCIZ @COMPOSITE ERROR 'ERR' (RMDS, BIT 14) @
56	077065	104	101	124	EMS66: .ASCIZ @DATA PARITY ERROR 'DPE' (RMER2, BIT 3) @
57	077135	104	125	122	EMS67: .ASCIZ @DURING SEEK COMMAND @

ERROR MESSAGE STRINGS

58	077162	111	123	040	EMS70:	.ASCIZ	@IS RESET @
59	077174	105	122	122	EMS71:	.ASCIZ	@ERRONEOUS @
60	077207	111	123	040	EMS72:	.ASCIZ	@IS SET @
61	077217	104	111	104	EMS73:	.ASCIZ	@DID NOT SET @
62	077234	104	111	104	EMS74:	.ASCIZ	@DID NOT RESET @
63	077253	114	117	123	EMS75:	.ASCIZ	@LOST @
64	077261	104	125	122	EMS76:	.ASCIZ	@DURING PACK ACK COMMAND @
65	077312	042	122	115	EMS77:	.ASCIZ	@'RMR' (RMER1, BIT 2) @
66	077340	042	111	114	EMS100:	.ASCIZ	@'ILR' (RMER1, BIT 1) @
67	077366	042	111	114	EMS101:	.ASCIZ	@'ILF' (RMER1, BIT 0) @
68	077414	104	125	122	EMS102:	.ASCIZ	@DURING SEARCH COMMAND @
69	077443	105	122	122	EMS103:	.ASCIZ	@ERROR @
70	077452	042	114	102	EMS104:	.ASCIZ	@'LBC' (RMER2, BIT 10) @
71	077501	042	114	123	EMS105:	.ASCIZ	@'LSC' (RMER2, BIT 11) @
72	077530	110	105	101	EMS106:	.ASCIZ	@HEADER ERRORS @
73	077547	102	125	123	EMS110:	.ASCIZ	@BUS TIMEOUT (04 TRAP) @
74	077576	101	104	104	EMS111:	.ASCIZ	@ADDRESS @
75	077607	127	110	105	EMS112:	.ASCIZ	@WHEN READING/WRITING RH REGISTERS @
76	077651	101	124	040		.ASCIZ	@AT THE FOLLOWING @
77	077673	124	110	105	EMS113:	.ASCIZ	@THE SELECTED DEVICE IS @
78	077723	116	117	116	EMS114:	.ASCIZ	@NONEXISTENT DEVICE @
79	077747	015	012	000	EMS115:	.ASCIZ	<CR><LF>
80	077752	124	110	105	EMS116:	.ASCIZ	@THE MASSBUS CONTROLLER @
81	100002	106	101	111	EMS117:	.ASCIZ	@FAILED TO DETECT @
82	100024				EMS120:		:NOT USED
83	100024	.03	117	116	EMS121:	.ASCIZ	@CONTROL STATUS REGISTER 1, RMCS1, @
84	100067	102	125	123	EMS122:	.ASCIZ	@BUS ADDRESS REGISTER, RMBA, @
85	100124	103	117	116	EMS123:	.ASCIZ	@CONTROL STATUS REGISTER 2, RMCS2, @
86	100167	105	122	122	EMS124:	.ASCIZ	@ERROR REGISTER 1, RMER1, @
87	100221	101	124	124	EMS125:	.ASCIZ	@ATTENTION SUMMARY REGISTER, RMAS, @
88	100264	115	101	111	EMS126:	.ASCIZ	@MAINTENANCE REGISTER #1, RMMR #1, @
89	100327	105	103	103	EMS127:	.ASCIZ	@ECC POSITION REGISTER, RMEC1, @
90	100366	105	103	103	EMS130:	.ASCIZ	@ECC PATTERN REGISTER, RMEC2, @
91	100424	115	101	111	EMS131:	.ASCIZ	@MAINTENANCE REGISTER 2, RMMR2, @
92	100464	116	117	124	EMS132:	.ASCIZ	@NOT INITIALIZED BY @
93	100510	125	116	111	EMS133:	.ASCIZ	@UNIBUS INITIALIZE @
94	100533	103	117	116	EMS134:	.ASCIZ	@CONTROLLER CLEAR, I.E. BIT 5 OF @
95	100575	122	110	040	EMS135:	.ASCIZ	@RH CONTROLLER ERROR CLEAR (RMCS1, BIT 14) @
96	100650	104	122	111	EMS136:	.ASCIZ	@DRIVE CLEAR COMMAND @
97	100675	104	122	111	EMS137:	.ASCIZ	@DRIVE STATUS REGISTER, RMDS @
98	100732	115	105	104	EMS140:	.ASCIZ	@MEDIUM OFF LINE @
99	100753	042	115	117	EMS141:	.ASCIZ	@'MOL' (RMDS, BIT 12) @
100	101001	104	122	111	EMS142:	.ASCIZ	@DRIVE FAULT @
101	101016	042	104	126	EMS143:	.ASCIZ	@'DVC' (RMER2, BIT 7) @
102	101044	125	116	123	EMS144:	.ASCIZ	@UNSAFE @
103	101054	042	125	116	EMS145:	.ASCIZ	@'UNS' (RMER1, BIT 14) @
104	101103	123	110	117	EMS146:	.ASCIZ	@SHOULD BE SET @
105	101122	117	106	106	EMS147:	.ASCIZ	@OFFSET MODE @
106	101137	040	126	117	EMS150:	.ASCIZ	@ VOLUME VALID @
107	101156	042	117	115	EMS151:	.ASCIZ	@'OM' (RMDS, BIT 0) @
108	101202	042	126	126	EMS152:	.ASCIZ	@'VV' (RMDS, BIT 6) @
109	101226	120	101	103	EMS153:	.ASCIZ	@PACK ACK COMMAND @
110	101250	116	117	124	EMS154:	.ASCIZ	@NOT SET BY @
111	101264	117	106	106	EMS155:	.ASCIZ	@OFFSET COMMAND @
112	101304	116	117	124	EMS156:	.ASCIZ	@NOT RESET BY @
113	101322	122	124	103	EMS157:	.ASCIZ	@RTC COMMAND @
114	101337	122	111	120	EMS160:	.ASCIZ	@RIP COMMAND @

ERROR MESSAGE STRINGS

115	101354	117	106	106	EMS161: .ASCIZ	@OFFSET REGISTER (RMOF) @
116	101404				EMS162:	:<UNUSED>
117	101404	104	125	122	EMS163: .ASCIZ	@DURING RECALIBRATE @
118	101430	111	123	040	EMS164: .ASCII	@IS INTERMITTENT OR DRIVE DIDNT DROP ON @
119	101477	103	131	114	.ASCIZ	@CYLINDER @
120	101511	125	116	105	EMS165: .ASCIZ	@UNEXPECTED @
121	101525	122	105	103	EMS166: .ASCIZ	@RECALIBRATE COMMAND @
122	101552	042	101	124	EMS167: .ASCIZ	@'ATA' (RMD5, BIT15) @
123	101577	127	110	105	EMS170: .ASCIZ	@WHEN READING REGISTER @
124	101626	105	122	122	EMS171: .ASCIZ	@ERROR REGISTER #2, RMER2, @
125	101661	116	117	116	EMS172: .ASCIZ	@NONRECOVERABLE @
126	101701	122	105	103	EMS173: .ASCIZ	@RECOVERABLE @
127	101716	104	101	124	EMS174: .ASCIZ	@DATA @
128	101724	104	125	122	EMS175: .ASCIZ	@DURING WRITE COMMAND @
129	101757	042	117	120	EMS176: .ASCIZ	@'DPE' (RMER2, BIT '3) @
130	102001	111	116	040	EMS177: .ASCIZ	@IN WRITE PROTECT @
131	102023	103	101	116	EMS200: .ASCIZ	@CAN NOT SET @
132	102040	104	111	101	EMS201: .ASCIZ	@DIAGNOSTIC MODE 'DMD' (RMMR1, BIT 0) @
133	102106	104	125	122	EMS202: .ASCIZ	@DURING DIAGNOSTIC MODE @
134	102136	111	116	103	EMS203: .ASCIZ	@INCORRECT @
135	102151	042	127	122	EMS204: .ASCIZ	@'WRL' (RMD5, BIT 11) @
136	102177	105	130	105	EMS205: .ASCIZ	@EXECUTED @
137	102211	127	111	124	EMS206: .ASCIZ	@WITH COMP ERROR SET @
138	102236	042	107	117	EMS207: .ASCIZ	@'GO' (RMCS1, BIT 0) @
139	102263	127	122	111	EMS210: .ASCIZ	@WRITING @
140	102274	127	101	123	EMS211: .ASCIZ	@WAS RESET BY @
141	102312	120	122	117	EMS212: .ASCIZ	@PROGRAM INTERRUPT @
142	102335	127	101	125	EMS213: .ASCIZ	@WAS NOT GENERATED @
143	102360	123	105	105	EMS214: .ASCIZ	@SEEK COMMAND @
144	102376	120	122	117	EMS215: .ASCIZ	@PROGRAM TIMEOUT @
145	102417	104	125	122	EMS216: .ASCIZ	@DURING LOOK AHEAD TEST @
146	102447	114	117	117	EMS217: .ASCIZ	@LOOK AHEAD REGISTER,RPLA, @
147	102502	123	105	101	EMS220: .ASCIZ	@SEARCH COMMAND @
148	102522	102	101	104	EMS221: .ASCIZ	@BAD SECTOR ERROR 'BSE' (RMER2, BIT 15) @
149	102572	101	040	104	EMS222: .ASCIZ	@A DATA TRANSFER COMMAND @
150	102623	110	105	101	EMS223: .ASCIZ	@HEADER COMPARE INHIBIT 'HCI' (RMOF, BIT 10) @
151	102700	116	117	116	EMS224: .ASCIZ	@NONEXISTENT MEMORY 'NEM' (RMCS2, BIT 11) @
152	102752	123	113	111	EMS225: .ASCIZ	@SKIP SECTOR ERROR @
153	102775	042	123	123	EMS226: .ASCIZ	@'SSE' (RMER2, BIT 05) @
154	103024	111	116	110	EMS227: .ASCIZ	@INHIBIT @
155	103035	042	123	123	EMS230: .ASCIZ	@'SSEI' (RMOF, BIT 09) @
156	103064	105	116	104	EMS231: .ASCIZ	@END OF TRACK @
157	103102	101	106	124	EMS232: .ASCIZ	@AFTER DATA TRANSFER @

ERROR MESSAGE STRINGS

1	103127	105	130	120	EH1:	.ASCIZ	@EXPCTD	RECEVD@			
2	103146	102	125	123	EH110:	.ASCIZ	@BUSADR@				
3	103155	040	122	115	EH111:	.ASCIZ	@ RMCS2	RMCS1@			
4											
5	103174	122	105	103	EH114:	.ASCIZ	@RECEVD	SNGPRT	DULPRT@		
6	103223	105	130	120	EH223:	.ASCIZ	@EXPCTD	RECEVD	DATA@		
7	103251	105	130	120	EH256:	.ASCII	@EXPCTD	RECEVD	RGSTR@<CRLF>		
8	103277	123	124	101		.ASCIZ	@STATUS	STATUS	INDEX@		
9											
10	103325	107	104	101	EH336:	.ASCIZ	@GDADRS	GDDATA	BDADRS	BDDATA@	
11	103364	122	115	103	EH337:	.ASCII	@RMCS2	STATUS	FAILING	DATA@<CRLF>	
12	103423	137	137	137		.ASCII	@			@<CRLF>	
13	103462	105	130	120		.ASCIZ	@EXPCTD	RECEVD	--BIT--	ADRESS@	
14											
15	103521	122	115	105	EH344:	.ASCII	@RMER1	STATUS	HEADER	FAILING@<CRLF>	
16	103561	137	137	137		.ASCII	@		WORD	BIT@<CRLF>	
17	103617	105	130	120		.ASCIZ	@EXPCTD	RECEVD	NUMBER	POSITON@	
18	103657	105	130	120	EH353:	.ASCII	@EXPCTD	RECEVD@<CRLF>			
19	103676	040	122	115		.ASCIZ	@ RMLA	RMLA	RMOF @		
20											
21	103725	040	122	115	STSH1:	.ASCII	@ RMCS1	RMCS2	RMDS	RMER1	RMER2@
22	103772	040	040	040		.ASCIZ	@	RMA@			
23	104002	040	122	115	STSH2:	.ASCII	@ RMWC	RMBA	RMDA	RMOF	RMDC@
24	104047	040	040	040		.ASCIZ	@	RMEC1	RMEC2@		
25	104071	040	122	115	STSH3:	.ASCIZ	@ RMDA	RMDC	RMOF	RMLA@	
26	104127	040	122	115	STSH4:	.ASCIZ	@ RMMR1	RMMR2	RMDT	RMSN@	
27						.EVEN					

1	104166	001140	001142	000000	ED1:	.WORD	\$GDDAT,\$BDDAT,0
2	104174	001276	000000		ED110:	.WORD	\$BASE,0
3	104200	001174	001176	000000	ED111:	.WORD	\$TMP0,\$TMP1,0
4							
5	104206	001364	001176	001200	ED114:	.WORD	RMDTI,\$TMP1,\$TMP2,0
6	104216	001140	001142	001174	ED223:	.WORD	\$GDDAT,\$BDDAT,\$TMP0,0
7							
8	104226	001134	001140	001136	ED336:	.WORD	\$GDADR,\$GDDAT,\$BDADR,\$BDDAT,0
9							
10	104240	001140	001142	001174	ED337:	.WORD	\$GDDAT,\$BDDAT,\$TMP0,\$TMP1,0
11	104252	001140	001142	001444	ED353:	.WORD	\$GDDAT,\$BDDAT,RMOFO,0
12							
13	104262	001336	001346	001350	STSD1:	.WORD	RMCS1I,RMCS2I,RMDSI,RMER1I,RMER2I,RMASI,0
14	104300	001340	001342	001344	STSD2:	.WORD	RMWCI,RMBAI,RMDAI,RMOFI,RMDCI,RMECI
15	104314	001404	000000			.WORD	RMEC2I,0
16	104320	001344	001372	001370	STSD3:	.WORD	RMDAI,RMDCI,RMOFI,RMLAI,0
17	104332	001362	001376	001364	STSD4:	.WORD	RMMR1I,RMMR2I,RMDTI,RMSNI,0

1	104344	000			EF110:	.BYTE	0
2	104345	000	000		EF111:	.BYTE	0,0
3	104347	000	000	000	EF114:	.BYTE	0,0,0
4	104352	000	000	000	EF336:	.BYTE	0,0,0,0
5	104356	000	000	000	EF337:	.BYTE	0,0,0,0,0
6							
7	104363	000	000	000	STSF:	.BYTE	0,0,0,0,0,0,0

ERROR MESSAGE STRINGS

1	104372								BUFFER:
2	104372								BUFONE: .BLKW 258.
3	105376								BUFTWO: .BLKW 258.
4									
5		104372							.=BUFFER
6									
7	104372								HELP:
8	104372	200							.ASCII <CRLF>
9	104373	200							.ASCII <CRLF>
10	104374	114	111	123					.ASCII @LIST OF TESTS@<CRLF>
11	104412	055	055	055					.ASCII @-----@<CRLF>
12	104430	124	061	011					.ASCII @T1 CONTROLLER ACCESS TEST@<CRLF>
13	104462	124	062	011					.ASCII @T2 LOGICAL ADDRESS PLUGS TEST@<CRLF>
14	104520	124	063	011					.ASCII @T3 UNIBUS INITIALIZE TEST@<CRLF>
15	104552	124	064	011					.ASCII @T4 CONTROLLER CLEAR TEST@<CRLF>
16	104603	124	065	011					.ASCII @T5 ERROR CLEAR TEST@<CRLF>
17	104627	124	066	011					.ASCII @T6 DRIVE STATUS TEST@<CRLF>
18	104654	124	067	011					.ASCII @T7 PRIMARY/SECONDARY ERROR TEST@<CRLF>
19	104714	124	061	060					.ASCII @T10 DIAGNOSTIC MODE TEST@<CRLF>
20	104745	124	061	061					.ASCII @T11 PACK ACKNOWLEDGE TEST@<CRLF>
21	104777	124	061	062					.ASCII @T12 RECALIBRATE TEST@<CRLF>
22	105024	124	061	063					.ASCII @T13 ABORT RECALIBRATE TEST@<CRLF>
23	105057	124	061	064					.ASCII @T14 IVC RECALIBRATE TEST@<CRLF>
24	105110	124	061	065					.ASCII @T15 IAE RECALIBRATE TEST@<CRLF>
25	105141	124	061	066					.ASCII @T16 RECALIBRATE AT OFFSET@<CRLF>
26	105173	124	061	067					.ASCII @T17 DRIVE CLEAR TEST@<CRLF>
27	105220	124	062	060					.ASCII @T20 NOP TEST@<CRLF>
28	105235	124	062	061					.ASCII @T21 OFFSET TEST@<CRLF>
29	105255	124	062	062					.ASCII @T22 GO/ATA TEST@<CRLF>
30	105275	124	062	063					.ASCII @T23 WRITE ATA TEST@<CRLF>
31	105320	124	062	064					.ASCII @T24 ERROR/ATA TEST@<CRLF>
32	105343	124	062	065					.ASCII @T25 PROGRAM INTERRUPT TEST@<CRLF>
33	105376	124	062	066					.ASCII @T26 INHIBIT INTERRUPT TEST@<CRLF>
34	105431	124	062	067					.ASCII @T27 RETURN TO CENTERLINE TEST@<CRLF>
35	105467	124	063	060					.ASCII @T30 READ IN PRESET TEST@<CRLF>
36	105517	124	063	061					.ASCII @T31 RMDC CLEAR OFFSET TEST@<CRLF>
37	105552	124	063	062					.ASCII @T32 ILLEGAL FUNCTION TEST@<CRLF>
38	105604	124	063	063					.ASCII @T33 INVALID COMMAND TEST@<CRLF>
39	105635	124	063	064					.ASCII @T34 INVALID ADDRESS ERROR TEST@<CRLF>
40	105674	124	063	065					.ASCII @T35 WRITE LOCK ERROR TEST@<CRLF>
41	105726	124	063	066					.ASCII @T36 ERROR ABORT TESTS@<CRLF>
42	105754	124	063	067					.ASCII @T37 RMR TEST@<CRLF>
43	105771	124	064	060					.ASCII @T40 PARITY ERROR TEST@<CRLF>
44	106017	124	064	061					.ASCII @T41 ILLEGAL REGISTER TEST@<CRLF>
45	106051	124	064	062					.ASCII @T42 SEEK FIRST CYLINDER@<CRLF>
46	106101	124	064	063					.ASCII @T43 SEEK LAST CYLINDER@<CRLF>
47	106130	124	064	064					.ASCII @T44 SEEK PRIME CYLINDERS@<CRLF>
48	106161	124	064	065					.ASCII @T45 SEEK ZERO DIFFERENCE@<CRLF>
49	106212	124	064	066					.ASCII @T46 SEEK MAXIMUM DIFFERENCE FORWARD@<CRLF>
50	106256	124	064	067					.ASCII @T47 SEEK ADJACENT FORWARD@<CRLF>
51	106310	124	065	060					.ASCII @T50 SEEK ADJACENT REVERSE@<CRLF>
52	106342	124	065	061					.ASCII @T51 SEEK INVALID SECTOR@<CRLF>
53	106372	124	065	062					.ASCII @T52 SEEK INVALID TRACK@<CRLF>
54	106421	124	065	063					.ASCII @T53 SEEK INVALID CYLINDER@<CRLF>
55	106453	124	065	064					.ASCII @T54 IVC SEEK TEST@<CRLF>
56	106475	124	065	065					.ASCII @T55 ABORT SEEK TEST@<CRLF>
57	106521	124	065	066					.ASCII @T56 SEEK AT OFFSET@<CRLF>

ERROR MESSAGE STRINGS

58	106544	124	065	067	.ASCII	@T57	LOOK AHEAD TEST@<CRLF>
59	106570	124	066	060	.ASCII	@T60	SEARCH ON CYLINDER@<CRLF>
60	106617	124	066	061	.ASCII	@T61	SEARCH OFF CYLINDER@<CRLF>
61	106647	124	066	062	.ASCII	@T62	SEARCH INVALID SECTOR@<CRLF>
62	106701	124	066	063	.ASCII	@T63	SEARCH INVALID TRACK@<CRLF>
63	106732	124	066	064	.ASCII	@T64	SEARCH INVALID CYLINDER@<CRLF>
64	106766	124	066	065	.ASCII	@T65	IVC SEARCH TEST@<CRLF>
65	107012	124	066	066	.ASCII	@T66	ABORT SEARCH TEST@<CRLF>
66	107040	124	066	067	.ASCII	@T67	SEARCH AT OFFSET@<CRLF>
67	107065	200			.ASCII	<CRLF>	
68	107066	117	120	105	.ASCII	@OPERATIONAL SWITCH SETTINGS@<CRLF>	
69	107122	055	055	055	.ASCII	@-----@<CRLF>	
70	107156	123	127	111	.ASCII	@SWITCH	USE@<CRLF>
71	107173	055	055	055	.ASCII	@-----@<CRLF>	
72	107230	040	040	061	.ASCII	@ 15	HALT ON ERROR@<CRLF>
73	107254	040	040	061	.ASCII	@ 14	LOOP ON TEST@<CRLF>
74	107277	040	040	061	.ASCII	@ 13	INHIBIT ERROR TYPEOUTS@<CRLF>
75	107334	040	040	061	.ASCII	@ 12	@<CRLF>
76	107343	040	040	061	.ASCII	@ 11	INHIBIT ITERATIONS@<CRLF>
77	107374	040	040	061	.ASCII	@ 10	BELL ON ERROR@<CRLF>
78	107420	040	040	040	.ASCII	@ 9	LOOP ON ERROR@<CRLF>
79	107444	040	040	040	.ASCII	@ 8	LOOP ON TEST IN SWR<7:0>@<CRLF>
80	107503	040	040	040	.ASCII	@ 7	TN128@<CRLF>
81	107517	040	040	040	.ASCII	@ 6	TN64@<CRLF>
82	107532	040	040	040	.ASCII	@ 5	TN32@<CRLF>
83	107545	040	040	040	.ASCII	@ 4	TN16@<CRLF>
84	107560	040	040	040	.ASCII	@ 3	TN8@<CRLF>
85	107572	040	040	040	.ASCII	@ 2	TN4@<CRLF>
86	107604	040	040	040	.ASCII	@ 1	TN2@<CRLF>
87	107616	040	040	040	.ASCIIZ	@ 0	TN1@<CRLF>
88							
89		000200			.END	200	

SYMBOL TABLE

ABASE = 176700	AUNIT = 000000	CH = 002000	EDT114 074430	EMS102 077414
ACDW1 = 000000	AUSWR = 000000	CHGADR 001326	EDT2 074416	EMS103 077443
ACDW2 = 000000	AVECT1= 120254	CHRCNT 064201	EDT223 074432	EMS104 077452
ACKSTS 053464	AVECT2= 000000	CKSWR = 104410	EDT336 074442	EMS105 077501
ACPUOP= 000000	A16 = 000400	CLKADR 001512	EDT337 074452	EMS106 077530
ADDW0 = 000000	A17 = 001000	CLKVCT 001514	EDT344 074462	EMS11 075162
ADDW1 = 000000	BACK = 000001	CLR = 000040	EDT353 074474	EMS110 077547
ADDW10= 000000	BADTMO 005334	CLRSTS 052604	ED1 104166	EMS111 077576
ADDW11= 000000	BAI = 000010	CMNSTA 007402	ED110 104174	EMS112 077607
ADDW12= 000000	BB00 = 000001	CMPEER 050562	ED111 104200	EMS113 077673
ADDW13= 000000	BB01 = 000002	CNSL01 066567	ED114 104206	EMS114 077723
ADDW14= 000000	BB02 = 000004	CNSL02 066577	ED223 104216	EMS115 077747
ADDW15= 000000	BB03 = 000010	CNSL03 066641	ED336 104226	EMS116 077752
ADDW2 = 000000	BB04 = 000020	CNSL04 066650	ED337 104240	EMS117 100002
ADDW3 = 000000	BB05 = 000040	CNSL07 066704	ED353 104252	EMS12 075173
ADDW4 = 000000	BB06 = 000100	CNSL08 067046	EECC = 000020	EMS120 100024
ADDW5 = 000000	BB07 = 000200	CNSL09 067047	EFT1 074476	EMS121 100024
ADDW6 = 000000	BB08 = 000400	CNTCLR 052466	EFT110 074514	EMS122 100067
ADDW7 = 000000	BB09 = 001000	COMMA 066533	EFT111 074516	EMS123 100124
ADDW8 = 000000	BIT0 = 000001	CONT = 000100	EFT114 074520	EMS124 100167
ADDW9 = 000000	BIT00 = 000001	CPSAVE 063352	EFT2 074506	EMS125 100221
ADEVCT= 000000	BIT01 = 000002	CR = 000015	EFT223 074522	EMS126 100264
ADEVM = 000000	BIT02 = 000004	CRLF = 000200	EFT336 074532	EMS127 100327
ADR = 000001	BIT03 = 000010	CYLSK= 001777	EFT337 074542	EMS13 075234
AENV = 000000	BIT04 = 000020	DBCK = 100000	EFT344 074552	EMS130 100366
AENVM = 000000	BIT05 = 000040	DBEN = 040000	EFT353 074562	EMS131 100424
AFATAL= 000000	BIT06 = 000100	DBL = 002000	EF110 104344	EMS132 100464
ALL 066522	BIT07 = 000200	DCK = 100000	EF111 104345	EMS133 100510
AMADR1= 000000	BIT08 = 000400	DDISP = 177570	EF114 104347	EMS134 100533
AMADR2= 000000	BIT09 = 001000	DEBL = 020000	EF336 104352	EMS135 100575
AMADR3= 000000	BIT1 = 000002	DEVSEL 050774	EF337 104356	EMS136 100650
AMADR4= 000000	BIT10 = 002000	DISPLA 001156	EHT1 074256	EMS137 100675
AMAMS1= 000000	BIT11 = 004000	DISPRE 000174	EHT110 074300	EMS14 075245
AMAMS2= 000000	BIT12 = 010000	DLT = 100000	EHT111 074304	EMS140 100732
AMAMS3= 000000	BIT13 = 020000	DMD = 000001	EHT112 074310	EMS141 100753
AMAMS4= 000000	BIT14 = 040000	DONE 067750	EHT114 074314	EMS142 101001
AMSGAD= 000000	BIT15 = 100000	DPE = 000010	EHT2 074270	EMS143 101016
AMSGLG= 000000	BIT2 = 000004	DPEHI = 040000	EHT223 074320	EMS144 101044
AMSGTY= 000000	BIT3 = 000010	DPELO = 020000	EHT256 074332	EMS145 101054
AMTYP1= 000000	BIT4 = 000020	DPR = 000400	EHT336 074344	EMS146 101103
AMTYP2= 000000	BIT5 = 000040	DRIVES 067244	EHT337 074356	EMS147 101122
AMTYP3= 000000	BIT6 = 000100	DRQ = 004000	EHT344 074370	EMS15 075256
AMTYP4= 000000	BIT7 = 000200	DRVCLR= 000010	EHT353 074402	EMS150 101137
AOE = 001000	BIT8 = 000400	DRVSTS 056022	EH1 103127	EMS151 101156
APASS = 000000	BIT9 = 001000	DRY = 000200	EH110 103146	EMS152 101202
APE = 100000	BLNKS1 070000	DSWR = 177570	EH111 103155	EMS153 101226
APRIOR= 000000	BLNKS2 067777	DTE = 010000	EH114 103174	EMS154 101250
APTCSU= 000040	BLNKS3 067776	DTO = 010000	EH223 103223	EMS155 101264
APTENV= 000001	BLNKS4 067775	DVA = 004000	EH256 103251	EMS156 101304
APTSIZ= 000200	BOTADR 064176	DVC = 000200	EH336 103325	EMS157 101322
APTSPO= 000100	BOTFLG 064200	EBL = 020000	EH337 103364	EMS16 075300
ARGS = 000002	BPTVEC= 000014	ECH = 000100	EH344 103521	EMS160 101337
ASIREG= 000000	BSE = 100000	ECI = 004000	EH353 103657	EMS161 101354
ATA = 100000	BUFFER 104372	ECRC = 001000	EMS1 074564	EMS162 101404
ATESTN= 000000	BUFONE 104372	EDT1 074406	EMS10 075170	EMS163 101404
ATMSK= 000377	BUFTWO 105376	EDT110 074424	EMS100 077340	EMS164 101430
ATNTBL 070102	CC = 004000	EDT111 074426	EMS101 077366	EMS165 101511

SYMBOL TABLE

EMS166	101525	EMS40	076067	EMT121	071424	EMT203	072310	EMT266	073142
EMS167	101552	EMS41	076116	EMT122	071434	EMT204	072322	EMT267	073154
EMS17	075330	EMS42	076144	EMT123	071444	EMT205	072340	EMT27	070336
EMS170	101577	EMS43	076173	EMT124	071454	EMT206	072350	EMT270	073172
EMS171	101626	EMS44	076222	EMT125	071464	EMT207	072360	EMT271	073206
EMS172	101661	EMS45	076275	EMT126	071474	EMT21	070256	EMT272	073224
EMS173	101701	EMS46	076340	EMT127	071506	EMT210	072372	EMT273	073242
EMS174	101716	EMS47	076367	EMT13	070200	EMT211	072400	EMT274	073260
EMS175	101724	EMS5	074756	EMT130	071520	EMT212	072414	EMT275	073276
EMS176	101752	EMS50	076416	EMT131	071532	EMT213	072430	EMT276	073310
EMS177	102001	EMS51	076445	EMT132	071544	EMT214	072440	EMT277	073324
EMS2	074633	EMS52	076473	EMT133	071556	EMT215	072460	EMT3	070124
EMS20	075370	EMS53	076505	EMT134	071570	EMT216	072472	EMT30	070346
EMS200	102023	EMS54	076517	EMT135	071602	EMT217	072502	EMT300	073342
EMS201	102040	EMS55	076541	EMT136	071614	EMT22	070266	EMT301	073362
EMS202	102106	EMS56	076570	EMT137	071626	EMT220	072512	EMT302	073404
EMS203	102136	EMS57	076645	EMT14	070212	EMT221	072522	EMT303	073416
EMS204	102151	EMS6	075006	EMT140	071636	EMT222	072532	EMT304	073430
EMS205	102177	EMS60	076673	EMT141	071646	EMT223	072542	EMT305	073442
EMS206	102211	EMS61	076706	EMT142	071656	EMT224	072552	EMT306	073454
EMS207	102236	EMS62	076735	EMT143	071666	EMT225	072566	EMT307	073464
EMS21	075413	EMS63	076753	EMT144	071676	EMT226	072606	EMT31	070356
EMS210	102263	EMS64	077001	EMT145	071706	EMT227	072616	EMT310	073504
EMS211	102274	EMS65	077017	EMT146	071716	EMT23	070276	EMT311	073516
EMS212	102312	EMS66	077065	EMT147	071726	EMT230	072632	EMT312	073530
EMS213	102335	EMS67	077135	EMT15	070220	EMT231	072636	EMT313	073542
EMS214	102360	EMS7	075053	EMT150	071736	EMT232	072646	EMT314	073562
EMS215	102376	EMS70	077162	EMT151	071746	EMT233	072650	EMT315	073574
EMS216	102417	EMS71	077174	EMT152	071760	EMT234	072652	EMT316	073606
EMS217	102447	EMS72	077207	EMT153	071772	EMT235	072654	EMT317	073620
EMS22	075436	EMS73	077217	EMT154	072010	EMT236	072656	EMT32	070366
EMS220	102502	EMS74	077234	EMT155	072026	EMT237	072660	EMT320	073630
EMS221	102522	EMS75	077253	EMT156	072040	EMT24	070306	EMT321	073640
EMS222	102572	EMS76	077261	EMT157	072052	EMT240	072662	EMT322	073650
EMS223	102623	EMS77	077312	EMT16	070226	EMT241	072664	EMT323	073656
EMS224	102700	EMTVEC=	000030	EMT160	072064	EMT242	072666	EMT324	073666
EMS225	102752	EMT1	070112	EMT161	072074	EMT243	072670	EMT325	073700
EMS226	102775	EMT10	070162	EMT162	072106	EMT244	072672	EMT326	073712
EMS227	103024	EMT100	071166	EMT163	072120	EMT245	072674	EMT327	073730
EMS23	075452	EMT101	071204	EMT164	072130	EMT246	072676	EMT33	070376
EMS230	103035	EMT102	071222	EMT165	072136	EMT247	072706	EMT330	073742
EMS231	103064	EMT103	071232	EMT166	072144	EMT25	070316	EMT331	073752
EMS232	103102	EMT104	071244	EMT167	072152	EMT250	072720	EMT332	073764
EMS24	075500	EMT105	071262	EMT17	070236	EMT251	072734	EMT333	073776
EMS25	075527	EMT106	071272	EMT170	072160	EMT252	072742	EMT334	074014
EMS26	075544	EMT107	071302	EMT171	072172	EMT253	072750	EMT335	074032
EMS27	075565	EMT11	070166	EMT172	072202	EMT254	072766	EMT336	074052
EMS3	074650	EMT110	071322	EMT173	072212	EMT255	072776	EMT337	074062
EMS30	075576	EMT111	071334	EMT174	072222	EMT256	073006	EMT34	070406
EMS31	075606	EMT112	071342	EMT175	072234	EMT257	073016	EMT340	074072
EMS32	075635	EMT113	071350	EMT176	072242	EMT26	070326	EMT341	074104
EMS33	075664	EMT114	071364	EMT177	072250	EMT260	073030	EMT342	074112
EMS34	075712	EMT115	071364	EMT2	070116	EMT261	073042	EMT343	074124
EMS35	075763	EMT116	071374	EMT20	070246	EMT262	073062	EMT344	074136
EMS36	076012	EMT117	071404	EMT200	072252	EMT263	073072	EMT345	074150
EMS37	076041	EMT12	070172	EMT201	072264	EMT264	073102	EMT346	074160
EMS4	074713	EMT120	071414	EMT202	072276	EMT265	073122	EMT347	074174

SYMBOL TABLE

EMT35	070416	FER	=	000020	IOTVEC=	000020	PAKACK=	000022	RMBAI	001342
EMT350	074206	FIND	=	000001	IPCK0	=	000001	PAR	=	000010
EMT351	074224	FMT16	=	010000	IPCK1	=	000002	PAT	=	000020
EMT352	074234	FNLDTB	=	070002	IPCK2	=	000004	PDA	=	000400
EMT353	074240	FNCMSK	=	000077	IPCK3	=	000010	PFECH	=	064244
EMT354	074250	F0	=	000002	IR	=	000100	PFECH1	=	064254
EMT36	070426	F1	=	000004	IVC	=	010000	PFECH2	=	064342
EMT37	070436	F2	=	000010	LBC	=	002000	PFECH3	=	064360
EMT4	070132	F3	=	000020	LBT	=	002000	PFECH4	=	064366
EMT40	070446	F4	=	000040	LF	=	000012	PGE	=	002000
EMT41	070454	GET	=	042546	LODEV	=	067152	PGM	=	001000
EMT42	070464	GETBUF	=	001336	LS	=	000004	PHA	=	000200
EMT43	070476	GETINX	=	001516	LSC	=	004000	PIP	=	020000
EMT44	070506	GETSTS	=	042462	LST	=	000002	PIRQ	=	177772
EMT45	070516	GO	=	000001	LSTRK	=	001334	PIRQVE	=	000240
EMT46	070526	GTSWR	=	104407	MANUAL	=	001330	PLFS	=	002000
EMT47	070536	HCE	=	000200	MCLK	=	004000	PRIERR	=	043564
EMT5	070140	HCI	=	002000	MCPE	=	020000	PRO	=	000000
EMT50	070544	HCRC	=	000400	MDF	=	000100	PR1	=	000040
EMT51	070554	HELP	=	104372	MDPE	=	000400	PR2	=	000100
EMT52	070566	HT	=	000011	MI	=	000004	PR3	=	000140
EMT53	070604	IAE	=	002000	MINSTR	=	067443	PR4	=	000200
EMT54	070622	IBSAVE	=	063354	MOC	=	000400	PR5	=	000240
EMT55	070632	IDXMSK	=	000077	MOH	=	020000	PR6	=	000300
EMT56	070644	IE	=	000100	MOL	=	010000	PR7	=	000340
EMT57	070662	ILF	=	000001	MRD	=	002000	PS	=	177776
EMT6	070146	ILF02	=	000002	MS	=	000040	PSEL	=	002000
EMT60	070672	ILF24	=	000024	MSC	=	000002	PSW	=	177776
EMT61	070710	ILF26	=	000026	MSDRVS	=	067070	PULL	=	067655
EMT62	070730	ILF30	=	000030	MSE	=	100000	PUT	=	043016
EMT63	070744	ILF32	=	000032	MSER	=	000200	PUTBUF	=	001412
EMT64	070754	ILF34	=	000034	MSGDRV	=	067104	PUTINX	=	001545
EMT65	070774	ILF36	=	000036	MSHELP	=	066536	PWRVEC	=	000024
EMT66	071014	ILF40	=	000040	MSMNL	=	067300	QUES	=	066527
EMT67	071026	ILF42	=	000042	MSUNIT	=	067360	RCLSTS	=	054260
EMT7	070154	ILF44	=	000044	MUR	=	001000	RD	=	000070
EMT70	071040	ILF46	=	000046	MWD	=	000010	RDCHR	=	104411
EMT71	071050	ILF54	=	000054	MWP	=	000010	RDLIN	=	104412
EMT72	071060	ILF56	=	000056	MXF	=	001000	RDOCT	=	104413
EMT73	071076	ILF64	=	000064	N	=	067771	RDY	=	000200
EMT74	071114	ILF66	=	000066	NDTMSK	=	115760	READY	=	007574
EMT75	071124	ILF74	=	000074	NED	=	010000	RECAL	=	000006
EMT76	071144	ILF76	=	000076	NEM	=	004000	RESREG	=	104415
EMT77	071154	ILR	=	000002	NONE	=	067273	RESVEC	=	000010
EQUALS	066520	ILRG50	=	000050	NOP	=	000000	RET	=	067720
ERR	=	ILRG52	=	000052	NOTAVL	=	067204	REX	=	010000
ERRMB	064174	ILRG54	=	000054	NOTPRS	=	067167	RG	=	040000
ERROR	=	ILRG56	=	000056	NOTRM	=	067135	RH	=	000072
ERRTYP	063356	ILRG60	=	000060	NSA	=	100000	RIP	=	000020
ERRVEC	=	ILRG62	=	000062	OCC	=	100000	RELEASE	=	000012
ERTY00	064202	ILRG64	=	000064	OFD	=	000200	RMAS	=	000016
ERTY01	064207	ILRG66	=	000066	OFFSET	=	000014	RMASI	=	001354
ERTY02	064217	ILRG70	=	000070	ON	=	000001	RMASO	=	001430
ERTY03	064226	ILRG72	=	000072	OPE	=	020000	RMB	=	000004
ERTY04	064234	ILRG74	=	000074	OPI	=	020000	RMBAE	=	000050
ERTY05	064237	ILRG76	=	000076	OR	=	000200	RMBAEI	=	001406
ESRC	=	INSERT	=	067617	PACACK	=	000022	RMBAE0	=	001462

RMBAO	001416
RMCS1	= 000000
RMCS1I	001336
RMCS10	001412
RMCS2	= 000010
RMCS2I	001346
RMCS20	001422
RMCS3	= 000052
RMCS3I	001410
RMCS30	001464
RMDA	= 000006
RMDAI	001344
RMDAO	001420
RMDB	= 000022
RMDBI	001360
RMDBO	001434
RMDC	= 000034
RMDCI	001372
RMDCO	001446
RMDS	= 000012
RMDSI	001350
RMDSO	001424
RMDT	= 000026
RMDTI	001364
RMDTO	001440
RMEC1	= 000044
RMEC1I	001402
RMEC10	001456
RMEC2	= 000046
RMEC2I	001404
RMEC20	001460
RMER1	= 000014
RMER1I	001352
RMER10	001426
RMEK2	= 000042
RMER2I	001400
RMER20	001454
RMHR	= 000036
RMHRI	001374
RMHRO	001450
RMLA	= 000020
RMLAI	001356
RMLAO	001432
RMPR1	= 000024
RMPR1I	001362
RMPR10	001436
RMPR2	= 000040
RMPR2I	001376
RMPR20	001452
RMOF	= 000032
RMOFI	001370
RMOFO	001444
RMR	= 000004
RMSN	= 000030
RMSNI	001366
RMSNO	001442

SYMBOL TABLE

RMWC	=	000002	SW02	=	000004	TST24	017772	WC	=	000040	SEOSP	041256	
RMWCI	001340	SW03	=	000010	TST25	020364	WCD	=	000050	SERFLG	001117		
RMWCO	001414	SW04	=	000020	TST26	021054	WCE	=	040000	SERMAX	001131		
RQA	=	100000	SW05	=	000040	TST27	021422	WCEHI	=	010000	SERROR	062762	
RQB	=	040000	SW06	=	000100	TST3	010532	WCELO	=	004000	SERRPC	001132	
RTC	=	000016	SW07	=	000200	TST30	021744	WCF	=	000040	SERRTB	001574	
R6	=	X000006	SW08	=	000400	TST31	022326	WCH	=	000052	SERTTL	001126	
R7	=	X000007	SW09	=	001000	TST32	022644	WD	=	000060	SESCAP	001210	
SADMSK	=	000377	SW1	=	000002	TST33	023430	WH	=	000062	SETABL	001242	
SAVREG	=	104414	SW10	=	002000	TST34	024154	WLE	=	004000	SETEND	001326	
SA1	=	000001	SW11	=	004000	TST35	024744	WRL	=	004000	\$FATAL	001224	
SA16	=	000020	SW12	=	010000	TST36	025530	XSIZ	006356	\$FFLG	066516		
SA2	=	000002	SW13	=	020000	TST37	026062	XXDP	001332	\$FILLC	001172		
SA4	=	000004	SW14	=	040000	TST4	011402	Y	067773	\$FILLS	001171		
SA8	=	000010	SW15	=	100000	TST40	026522	\$APTHD	001100	\$GDADR	001134		
SC	=	100000	SW2	=	000004	TST41	026742	\$ATYC	066276	\$GDDAT	001140		
SCHSTS	055624	SW3	=	000010	TST42	027300	\$ATY1	066252	\$GET42	041502			
SCOPE	=	000004	SW4	=	000020	TST43	027572	\$ATY3	066260	\$GTSWR	064772		
SCTMSK	=	003700	SW5	=	000040	TST44	030064	\$ATY4	066270	\$GT42P	041476		
SCO	=	000100	SW6	=	000100	TST45	030376	\$AUTOB	001150	\$HD	=	000000	
SC1	=	000200	SW7	=	000200	TST46	030704	\$BASE	001276	\$HIBTS	001100		
SC2	=	000400	SW8	=	000400	TST47	031172	\$BDADR	001136	\$HIOCT	065764		
SC3	=	001000	SW9	=	001000	TST5	011740	\$BDDAT	001142	\$ICNT	001120		
SC4	=	002000	SYSTAT	067112	TST50	031474	\$BELL	001212	\$ILLUP	066234			
SEARCH	=	000030	TADMSK	=	177400	TST51	032000	\$BIN	061062	\$INTAG	001151		
SECERR	044416	TAG	=	020000	TST52	032416	\$CDW1	001302	\$ITEMB	001130			
SEEK	=	000004	TAGADR	=	001114	TST53	033014	\$CDW2	001304	\$LF	001220		
SEKSTS	051206	TAP	=	040000	TST54	033406	\$CHARC	062066	\$LFLG	066515			
SHUT	065642	TA1	=	000400	TST55	033746	\$CKSWR	064702	\$LPADR	001122			
SIZCLK	043246	TA2	=	001000	TST56	034310	\$CMTAG	001114	\$LPERR	001124			
SKI	=	040000	TA4	=	002000	TST57	034634	\$CM3	=	000000	\$MADR1	001254	
SSE	=	000040	TA8	=	004000	TST6	012146	\$CM4	=	000005	\$MADR2	001260	
SSEI	=	001000	TBITVE	=	000014	TST60	035354	\$CNTLC	065600	\$MADR3	001264		
SSF	=	020000	TIMOUT	043370	TST61	035776	\$CNTLG	065612	\$MADR4	001270			
STACK	=	001100	TKVEC	=	000060	TST62	036440	\$CNTLU	065605	\$MAIL	001222		
STANDA	006646	TPVEC	=	000064	TST63	037040	\$CPUOP	001250	\$MAMS1	001252			
STAR	005426	TRAPVE	=	000034	TST64	037420	\$CRLF	001217	\$MAMS2	001256			
START1	005416	TRE	=	040000	TST65	037774	\$DBLK	001300	\$MAMS3	001262			
START2	005432	TRTVEC	=	000014	TST66	040354	\$DDW0	001306	\$MAMS4	001266			
STCDRV	060210	TST	=	010000	TST67	040720	\$DDW1	001310	\$MBADR	001102			
STIMER	043532	TSTNMB	064172	TST7	012462	TST68	040720	\$DDW2	001312	\$MFLG	066514		
STKLMT	=	177774	TSTPRP	041532	TYPBN	=	104406	\$DDW3	001314	\$MNEW	065630		
STOP	062734	TSTQUE	001466	TST1	007736	TYPDS	=	104405	\$DDW4	001316	\$MSGAD	001236	
STSD1	104262	TST10	012642	TST11	013714	TYPE	=	104401	\$DDW5	001320	\$MSGLG	001240	
STSD2	104300	TST11	013714	TST12	014214	TYPOC	=	104402	\$DDW6	001322	\$MSGTY	001222	
STSD3	104320	TST12	014214	TST13	014424	TYPON	=	104404	\$DDW7	001324	\$MSWR	065617	
STSD4	104332	TST13	014424	TST14	014732	TYPOS	=	104403	\$DEVCT	001232	\$MTYP1	001253	
STSF	104363	TST14	014732	TST15	015242	UNS	=	040000	\$DEVN	001300	\$MTYP2	001257	
STSH1	103725	TST15	015242	TST16	015504	UNTMSK	=	000007	\$DOAGN	041522	\$MTYP3	001263	
STSH2	104002	TST16	015504	TST17	015762	UNTOFF	067223	\$DTBL	061270	\$MTYP4	001267		
STSH3	104071	TST17	015762	TST2	010136	UNTON	067234	\$ENDAD	041512	\$MXCNT	062554		
STSH4	104127	TST20	016232	TST21	016462	UPE	=	020000	\$ENDCT	041350	\$NULL	001170	
SWR	001154	TST22	017006	TST23	017426	USE	=	040000	\$ENV	001242	\$NWTST	=	000001
SWREG	000176	U0	=	000001	U1	=	000002	\$ENVN	001243	\$OCNT	061532		
SW0	=	000001	U2	=	000004	VV	=	000100	\$EOP	041314	\$OMODE	061534	
SW00	=	000001						\$EOPCT	041342	\$OVER	062540		
SW01	=	000002								\$PASS	001230		

SYMBOL TABLE

\$PASTM	001106	\$SCOPE	062072	\$TKQEN=	064401	\$TPS	001164	\$TYPDN	061350
\$POWER	066242	\$SETUP=	000137	\$TKQIN	064374	\$TRAP	065766	\$TYPOS	051310
\$PWRDN	066074	\$STUP =	177777	\$TKQOU	064376	\$TRAP2	066026	\$UNIT	001234
\$PWRMG	066230	\$SVLAD	062504	\$TKQSR	064400	\$TRP =	000016	\$UNITM	001110
\$PWRUP	066146	\$SVPC =	000210	\$TKS	001160	\$TRPAD	066040	\$USWR	001246
\$QUES	001216	\$SWR =	167400	\$TKSRV	064452	\$TSTM	001104	\$VECT1	001272
\$RDCHR	065244	\$SWREG	001244	\$TMP0	001174	\$TSTMN	001116	\$VECT2	001274
\$RDLIN	065334	\$SWRMK=	000000	\$TMP1	001176	\$TTYIN	065570	\$XOFF =	000023
\$RDOCT	065664	\$SW08T	062556	\$TMP2	001200	\$TYPBN	061010	\$XON =	000021
\$RDSZ =	000010	\$TESTN	001226	\$TMP3	001202	\$TYPDS	061064	\$XTSTR	062114
\$RESRE	060752	\$TIMES	001206	\$TMP4	001204	\$TYPE	061536	\$GET4=	000000
\$RM80	067130	\$TKB	001162	\$STN =	000070	\$TYPEC	061750	\$SSW08=	000070
\$RTNAD	041524	\$TKCNT	064372	\$STPB	001166	\$TYPEX	062070	\$OFILL	061533
\$SAVRE	060714	\$TKINT	064402	\$STPFLG	001173	\$TYPOC	061334	.SX =	001100
\$SAVR6	066240								

. ABS. 107631 000
0C0000 001

ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 61952 WORDS (242 PAGES)

DYNAMIC MEMORY AVAILABLE FOR 70 PAGES

CZRNDABIC,CZRNDAC=CZRNDADOC,CZRNDAL20.0]SYSMAC/M

SCKSWR	42-1#	44-1	44-1											
SCM3	6-0	6-0#												
SCM4	6-0	6-0	6-0	6-0	6-0	6-0	6-0	6-0	6-0	6-0	6-0#	6-0#	6-0#	6-0#
	6-0#	6-0#												
SCMTAG	6-0#	10-24	10-24	10-24	10-24	10-24	10-24	10-24						
SCNTLC	42-1	42-1	42-1	42-1	42-1#									
SCNTLG	42-1	42-1#												
SCNTLU	42-1	42-1	42-1#											
SCPUOP	6-0#													
SCRLF	6-0#	10-49	10-80	10-129	11-20	11-28	11-79	11-117	12-25	12-58	13-46	13-52	13-97	14-20
	38-1	38-1	38-1	40-1	40-1	40-1	41-20	41-53	41-96	41-106	41-118	41-126	41-146	42-1
	42-1	42-1	42-1											
SDBLK	36-1	36-1	36-1#											
SDDW0	6-0#													
SDDW1	6-0#													
SDDW2	6-0#													
SDDW3	6-0#													
SDDW4	6-0#													
SDDW5	6-0#													
SDDW6	6-0#													
SDDW7	6-0#													
SDEVCT	6-0#													
SDEVN	6-0#	10-67*	10-78	10-106*	10-110*	11-80*	11-87*	11-114*	11-115	12-4	12-38	13-29*	42-6*	
SDOAGN	14-20	14-20	14-20#											
SDTBL	36-1	36-1#												
SENDAD	5-5	10-29	14-20#	40-1										
SENDCT	10-24	14-20#												
SENULL	14-20#													
SENV	6-0#	10-29	38-1	40-1	46-1	46-1								
SEVM	6-0#	10-24	10-71	38-1	38-1	46-1								
SEOP	14-20#	42-7												
SEOPCT	10-24*	14-20	14-20#											
SEOSP	13-312	14-9#												
SERFLG	6-0#	39-1	39-1	39-1	39-1	39-1	39-1*	40-1	40-1	40-1*				
SERMAX	6-0#	10-24*	39-1	39-1	39-1	39-1*								
SERROR	10-24	40-1#												
SERRPC	6-0#	40-1	40-1	40-1	40-1*	40-1*	41-46							
SERRTB	8-0#	41-64												
SERTTL	6-0#	14-20	14-20	14-20*	40-1	40-1	40-1*							
SESCAP	6-0#	10-24*	39-1*	40-1	40-1	40-1	40-1							
SETABL	6-0#													
SETEND	5-8	6-0#												
SFATAL	6-0#	46-1*												
SFFLG	46-1	46-1#	46-1*	46-1*	46-1*									
SFILLC	6-0#	38-1	38-1	38-1										
SFILLS	6-0#	38-1	38-1											
SGDADR	6-0#	56-8												
SGDDAT	6-0#	13-143*	13-144	13-148*	13-157*	13-158	13-162*	13-180*	13-181	13-185*	13-192*	13-193	13-197*	13-204*
	13-205	13-265*	13-287*	13-288*	13-289*	13-297*	13-303*	13-310*	13-316*	13-317*	13-324*	13-356*	13-364*	13-370*
	13-376*	13-382*	13-388*	13-396*	13-404*	13-410*	13-416*	13-422*	13-428*	13-434*	13-443*	13-646*	13-652*	13-672*
	13-688*	13-710*	13-727*	13-745*	13-755*	13-897*	13-905*	13-939*	13-944*	13-949*	13-973*	13-984*	13-:29*	13-:30*
	13-:33	13-:37*	13-:40*	13-:41*	13-:44	13-:96*	13-:97*	13-:00	13-:04*	13-:07*	1- -:08*	13-:11	13-:62*	13-:63*
	13-:66	13-:70*	13-:73*	13-:74*	13-:77	13-<28*	13-<29*	13-<32	13-<36*	13-<39*	13-<40*	13-<43	13-:22*	13-:51*
	13-:81*	13-:84	13-A94*	13-B26*	13-C48*	13-F20*	13-F51*	21-49*	21-50*	21-51	21-67*	21-68*	21-74*	21-76*
	21-88*	21-89*	21-90*	21-106*	21-107*	21-122*	21-123*	21-150*	21-151*	22-42*	22-55*	22-66*	22-67	22-79*
	22-84*	22-87	22-98*	22-106*	22-109	22-135*	22-138*	22-139*	22-142	22-154*	22-155*	22-158	22-165*	23-16*

	23-23*	23-24*	23-25*	23-26*	23-30*	23-32	23-94*	23-109*	23-110	23-120*	23-125*	23-129	23-138*	23-151*
	23-156	23-168*	23-169*	23-170*	23-172	23-182*	23-183*	23-185	24-40*	24-55*	26-36*	26-48*	26-68*	26-73
	26-92*	26-106*	26-107*	26-134*	26-147*	26-171*	26-172*	26-186*	26-199*	26-200*	26-215*	26-216*	28-31*	28-32
	28-41*	28-57*	28-59	28-68*	28-81*	28-82	28-91*	28-103*	28-104	28-113*	28-126*	28-127	29-25*	29-26*
	29-39*	29-40*	29-58*	29-59*	29-72*	29-73*	29-86*	29-87*	29-100*	29-101*	29-114*	29-115*	30-33*	30-34*
	30-47*	30-48*	30-63*	30-64*	30-80*	30-81*	30-101*	30-102*	30-118*	30-119*	30-132*	30-133*	30-157*	30-158*
	30-173*	30-175*	30-187*	30-188*	30-203*	30-204*	30-220*	30-221*	30-238*	30-239*	30-252*	30-253*	30-268*	30-269*
	31-18*	31-19	31-30*	31-31	31-40*	31-71*	31-72	31-83*	31-84	31-92*	32-56*	32-57*	32-74*	32-75*
	32-89*	32-109*	32-114	32-136*	32-137*	32-138	32-142	32-156*	32-157*	32-173*	32-174*	32-189*	32-190*	32-212*
	32-213*	32-230*	32-231*	32-246*	32-247*	32-260*	32-261*	33-44*	33-45*	33-60*	33-76*	33-77*	33-96*	33-97*
	33-110*	33-111*	56-1	56-6	56-8	56-10	56-11							
\$GET42	12-34	12-43	13-30	14-20#										
\$GT42P	14-20	14-20#												
\$GTSWR	42-1#	44-1	44-1											
\$HD	4-475	4-475	4-475											
\$HIBTS	5-8#													
\$HIOCT	43-1#	43-1*												
\$ICNT	6-0#	39-1	39-1	39-1	39-1*	39-1*								
\$ILLUP	45-1	45-1	45-1#											
\$INTAG	6-0#	42-1	42-1	42-1	42-1	42-1*								
\$ITEMB	6-0#	40-1	40-1	40-1	40-1	40-1	40-1*	40-1*	41-41					
\$LF	6-0#	38-1	38-1	40-1	40-1	42-1	42-1	42-1						
\$LFLG	46-1#	46-1*												
\$LPADR	6-0#	10-24*	39-1	39-1	39-1	39-1*	39-1*	39-1*						
\$LPERR	6-0#	10-24*	13-38*	39-1	39-1	39-1	39-1*	40-1						
\$MADR1	6-0#													
\$MADR2	6-0#													
\$MADR3	6-0#													
\$MADR4	6-0#													
\$MAIL	5-8	5-8	6-0#	10-24	10-29	13-2	13-33	13-105	13-210	13-252	13-277	13-328	13-346	13-448
	13-473	13-490	13-514	13-536	13-561	13-583	13-613	13-631	13-662	13-698	13-733	13-765	13-830	13-884
	13-915	13-959	13-988	13-:54	13-:21	13-:87	13-:53	13-<95	13-=27	13-=60	13->11	13->41	13->71	13-?05
	13-?39	13-?67	13-@01	13-@35	13-@84	13-A28	13-A70	13-804	13-B41	13-B77	13-C70	13-D14	13-D65	13-E10
	13-E51	13-E91	13-F30	13-F69	38-1	39-1	40-1							
\$MAMS1	6-0#													
\$MAMS2	6-0#													
\$MAMS3	6-0#													
\$MAMS4	6-0#													
\$MBADR	5-8#													
\$MFLG	46-1	46-1#	46-1*	46-1*										
\$MNEW	42-1	42-1#												
\$MSGAD	6-0#	46-1	46-1*											
\$MSGLG	6-0#	46-1*												
\$MSGTY	6-0#	46-1	46-1	46-1*	46-1*									
\$MSWR	42-1	42-1#												
\$MTYP1	6-0#													
\$MTYP2	6-0#													
\$MTYP3	6-0#													
\$MTYP4	6-0#													
\$MXCNT	39-1	39-1	39-1	39-1#										
\$NULL	6-0#	38-1	38-1	38-1										
\$NWTST	13-2	13-2#	13-2#	13-33	13-33#	13-33#	13-105	13-105#	13-105#	13-210	13-210#	13-210#	13-252	13-252#
	13-252#	13-277	13-277#	13-277#	13-328	13-328#	13-328#	13-346	13-346#	13-346#	13-448	13-448#	13-448#	13-473
	13-473#	13-473#	13-490	13-490#	13-490#	13-514	13-514#	13-514#	13-536	13-536#	13-536#	13-561	13-561#	13-561#
	13-583	13-583#	13-583#	13-613	13-613#	13-613#	13-631	13-631#	13-631#	13-662	13-662#	13-662#	13-698	13-698#
	13-698#	13-733	13-733#	13-733#	13-765	13-765#	13-765#	13-830	13-830#	13-830#	13-884	13-884#	13-884#	13-915

CROSS REFERENCE TABLE (CREF V04.00)

	13-915#	13-915#	13-959	13-959#	13-959#	13-988	13-988#	13-988#	13-:54	13-:54#	13-:54#	13-:21	13-:21#	13-:21#
	13-:87	13-:87#	13-:87#	13-<53	13-<53#	13-<53#	13-<95	13-<95#	13-<95#	13-=27	13-=27#	13-=27#	13-=60	13-=60#
	13-=60#	13->11	13->11#	13->11#	13->41	13->41#	13->41#	13->71	13->71#	13->71#	13->71#	13-?05	13-?05#	13-?05#
	13-?39#	13-?39#	13-?67	13-?67#	13-?67#	13-@01	13-@01#	13-@01#	13-@35	13-@35#	13-@35#	13-@84	13-@84#	13-@84#
	13-A28	13-A28#	13-A28#	13-A70	13-A70#	13-A70#	13-B04	13-B04#	13-B04#	13-B41	13-B41#	13-B41#	13-B77	13-B77#
	13-B77#	13-C70	13-C70#	13-C70#	13-D14	13-D14#	13-D14#	13-D65	13-D65#	13-D65#	13-E10	13-E10#	13-E10#	13-E51
	13-E51#	13-E51#	13-E91	13-E91#	13-E91#	13-F30	13-F30#	13-F30#	13-F69	13-F69#	13-F69#			
SUCNT	37-1#	37-1*	37-1*											
SOMODE	37-1	37-1#	37-1*	37-1*	37-1*	37-1*								
SOVER	39-1	39-1	39-1	39-1	39-1#									
SPASS	6-0#	10-24*	14-20	14-20	14-20	14-20*	14-20*	39-1	39-1	39-1				
SPASTM	5-8#													
SPOWER	45-1	45-1#												
SPWRDN	10-24	45-1	45-1#											
SPWRMG	45-1#													
SPWRUP	45-1	45-1#												
SQUES	6-0#	38-1	38-1	40-1	40-1	42-1	42-1	42-1	42-1					
SR2A	44-1													
SRDCHR	42-1#	44-1	44-1											
SRDDEC	44-1													
SRDLIN	42-1#	44-1	44-1											
SRDOCT	43-1#	44-1	44-1											
SRDSZ	42-1	42-1#												
SRESRE	34-1#	44-1												
SRMB0	10-91	41-28	47-19#											
SRTNAD	14-20#													
SSAVR6	45-1	45-1#	45-1*	45-1*	45-1*									
SSAVRE	34-1#	44-1	44-1											
SSCOPE	10-24	39-1#												
SSETUP	4-769	4-769	4-769	4-769	4-769	4-769	4-769#	4-769#	4-769#	4-769#	4-769#	4-769#	4-769#	10-24
	10-24	10-24	10-24	10-24	10-24	10-24	10-24	10-24	10-24	10-24	10-24	10-29	10-29	10-29
	14-20	14-20	39-1	40-1	40-1	40-1	40-1	42-1	42-1	42-1	42-1	42-1	42-1	42-1
SSTUP	4-769	4-769	4-769	4-769	4-769	4-769	4-769#	4-769#	4-769#	4-769#	4-769#	4-769#	4-769#	4-769#
	4-769#	4-769#	4-769#	4-769#	4-769#									
SSVLAD	39-1	39-1#												
SSVPC	5-5	5-5#												
SSWOBT	39-1	39-1#												
SSWR	4-464#	4-475	4-476	4-476	4-476	4-476	4-476	4-476	4-476	4-476	6-0	6-0	6-0	10-24
	10-24	10-24	10-24	10-24	13-2	13-33	13-105	13-210	13-252	13-277	13-328	13-346	13-448	13-473
	13-490	13-514	13-536	13-561	13-583	13-613	13-631	13-662	13-698	13-733	13-765	13-830	13-884	13-915
	13-959	13-988	13-:54	13-:21	13-:87	13-<53	13-<95	13-=27	13-=60	13->11	13->41	13->71	13-?05	13-?39
	13-?67	13-@01	13-@35	13-@84	13-A28	13-A70	13-B04	13-B41	13-B77	13-C70	13-D14	13-D65	13-E10	13-E51
	13-E91	13-F30	13-F69	14-20	14-20	14-20	14-20	14-20	14-20	39-1	39-1	39-1	39-1	39-1
	39-1	39-1	39-1	39-1	39-1	39-1	39-1	39-1	39-1	39-1	39-1	39-1	39-1	39-1
	40-1	40-1	40-1	40-1	40-1	40-1	40-1	40-1	40-1	40-1	40-1	45-1		
SSWREG	6-0#	10-24												
SSWRPK	4-476	4-476	4-476	4-476	4-476	4-476	4-476	4-476	4-476	39-1	39-1	39-1	39-1	39-1
	39-1	39-1	39-1	39-1	39-1									
STESTN	6-0#	13-2*	13-33*	13-105*	13-210*	13-252*	13-277*	13-328*	13-346*	13-448*	13-473*	13-490*	13-514*	13-536*
	13-561*	13-583*	13-613*	13-631*	13-662*	13-698*	13-733*	13-765*	13-830*	13-884*	13-915*	13-959*	13-988*	13-:54*
	13-:21*	13-:87*	13-<53*	13-<95*	13-=27*	13-=60*	13->11*	13->41*	13->71*	13-?05*	13-?39*	13-?67*	13-@01*	13-@35*
	13-@84*	13-A28*	13-A70*	13-B04*	13-B41*	13-B77*	13-C70*	13-D14*	13-D65*	13-E10*	13-E51*	13-E91*	13-F30*	13-F69*
	39-1*	41-37												
STIMES	6-0#	10-24*	12-46*	13-33*	13-105*	13-490*	13-514*	13-536*	13-561*	13->11*	13->41*	13->71*	13-?05*	13-?39*
	14-20*	39-1	39-1	39-1	39-1*	39-1*								
STKB	6-0#	38-1	38-1	42-1	42-1	42-1	42-1	42-1	42-1	42-1				

STKCN1	42-1	42-1	42-1#	42-1*	42-1*	42-1*								
STKINT	11-4	12-47	13-134	42-1	42-1	42-1#								
STKQEN	42-1	42-1	42-1#											
STKQIN	42-1	42-1	42-1#	42-1*	42-1*	42-1*	42-1*							
STKQOU	42-1	42-1	42-1#	42-1*	42-1*	42-1*								
STKQSR	42-1	42-1	42-1	42-1#										
STKS	6-0#	38-1	38-1	42-1	42-1	42-1	42-1	42-1	42-1*	42-1*	42-1*	42-1*	42-1*	42-1*
STKSRV	42-1	42-1#												
STMP0	6-0#	13-55*	13-64*	13-72*	13-78*	13-80	13-53*	13-86*	17-41*	18-35*	25-29*	25-31	56-3	56-6
STMP1	6-0#	11-13*	11-14	11-16	11-36*	11-38	11-42	11-50*	11-52	11-56	11-83*	11-84	11-90	11-92
	11-93	11-95	11-100*	11-101	11-104	11-105	11-107	11-112	13-56*	13-57*	13-65*	13-66*	13-70*	13-71*
	13-73	13-79*	13-85	17-42*	17-43	18-36*	18-37	24-24*	24-25*	24-37	24-39	25-28*	25-37	56-5
	56-5	56-10												
STMP2	6-0#	24-27*	24-28*	24-51	24-54	56-5								
STMP3	6-0#													
STMP4	6-0#													
STN	4-465#	4-475	13-2	13-2	13-2	13-2#	13-33	13-33	13-33	13-33#	13-105	13-105	13-105	13-105#
	13-210	13-210	13-210	13-210#	13-252	13-252	13-252	13-252#	13-277	13-277	13-277	13-277#	13-328	13-328
	13-328	13-328#	13-346	13-346	13-346	13-346#	13-448	13-448	13-448	13-448#	13-473	13-473	13-473	13-473#
	13-490	13-490	13-490	13-490#	13-514	13-514	13-514	13-514#	13-536	13-536	13-536	13-536#	13-561	13-561
	13-561	13-561#	13-583	13-583	13-583	13-583#	13-613	13-613	13-613	13-613#	13-631	13-631	13-631	13-631#
	13-662	13-662	13-662	13-662#	13-698	13-698	13-698	13-698#	13-733	13-733	13-733	13-733#	13-765	13-765
	13-765	13-765#	13-830	13-830	13-830	13-830#	13-884	13-884	13-884	13-884#	13-915	13-915	13-915	13-915#
	13-959	13-959	13-959	13-959#	13-988	13-988	13-988	13-988#	13-54	13-54	13-54	13-54#	13-21	13-21
	13-21	13-21#	13-87	13-87	13-87	13-87#	13-53	13-53	13-53	13-53#	13-95	13-95	13-95	13-95#
	13-27	13-27	13-27	13-27#	13-60	13-60	13-60	13-60#	13-11	13-11	13-11	13-11#	13-41	13-41
	13-41	13-41#	13-71	13-71	13-71	13-71#	13-05	13-05	13-05	13-05#	13-39	13-39	13-39	13-39#
	13-67	13-67	13-67	13-67#	13-201	13-201	13-201	13-201#	13-235	13-235	13-235	13-235#	13-284	13-284
	13-284	13-284#	13-A28	13-A28	13-A28	13-A28#	13-A70	13-A70	13-A70	13-A70#	13-804	13-804	13-804	13-804#
	13-841	13-841	13-841	13-841#	13-877	13-877	13-877	13-877#	13-C70	13-C70	13-C70	13-C70#	13-D14	13-D14
	13-D14	13-D14#	13-D65	13-D65	13-D65	13-D65#	13-E10	13-E10	13-E10	13-E10#	13-E51	13-E51	13-E51	13-E51#
	13-E91	13-E91	13-E91	13-E91#	13-F30	13-F30	13-F30	13-F30#	13-F69	13-F69	13-F69	13-F69#	39-1	39-1
STPB	6-0#	38-1	38-1	38-1*										
STPFLG	6-0#	38-1	38-1	38-1										
STPS	6-0#	38-1	38-1	38-1										
STRAP	10-24	44-1#												
STRAP2	44-1	44-1#												
STRP	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1
	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1
	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1
	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1
	44-1#	44-1#	44-1#	44-1#	44-1#	44-1#	44-1#	44-1#	44-1#	44-1#	44-1#	44-1#	44-1#	44-1#
STRPAD	44-1	44-1#												
STSTM	5-8#													
STSTM#	6-0#	12-45*	14-20*	39-1	39-1	39-1	39-1	39-1	39-1*	39-1*	40-1	40-1	40-1	
STYIN	42-1	42-1	42-1	42-1	42-1	42-1#								
STYPBN	35-1#	44-1	44-1											
STYPDS	36-1#	44-1	44-1											
STYPE	38-1#	44-1	44-1	46-1										
STYPEC	38-1	38-1	38-1	38-1#	42-1									
STYPEX	38-1	38-1	38-1#											
STYPOC	37-1#	44-1	44-1											
STYPO#	37-1	37-1#	44-1											
STYPOS	37-1#	44-1												
SUNIT	6-0#	12-49*	12-54	12-60	13-40	13-43	13-94	21-49	41-22					

AMAMS3	6-0	6-0												
AMAMS4	6-0	6-0												
AMSGAD	6-0	6-0												
AMSLG	6-0	6-0												
AMSGTY	6-0	6-0												
AMTYP1	6-0	6-0												
AMTYP2	6-0	6-0												
AMTYP3	6-0	6-0												
AMTYP4	6-0	6-0												
AOE	4-566#	4-577	22-311	22-326	22-341	22-356	22-360	23-151	23-155	48-77	48-78	48-81	48-82	48-85
	48-86													
APASS	6-0	6-0												
APE	4-744#													
APRIOR	6-0													
APTCSU	38-1	46-1#												
APTENV	38-1	40-1	46-1	46-1#										
APTSIZ	10-24	46-1#												
APTSPO	38-1	46-1	46-1#											
ARGS	13-114#	13-132#	13-138#	13-219#	13-236#	13-243#	13-245#	13-249#	13-262#	13-283#	13-337#	13-340#	13-343#	13-353#
	13-393#	13-439#	13-460#	13-463#	13-466#	13-470#	13-475	13-475#	13-481#	13-483#	13-485#	13-487#	13-492	13-492#
	13-499#	13-505#	13-507#	13-509#	13-511#	13-516	13-516#	13-526#	13-528#	13-533#	13-538	13-538#	13-548#	13-552#
	13-554#	13-556#	13-558#	13-563	13-563#	13-570#	13-572#	13-574#	13-576#	13-578#	13-580#	13-585	13-585#	13-598#
	13-603#	13-606#	13-608#	13-610#	13-615	13-615#	13-620#	13-622#	13-624	13-624#	13-626#	13-628#	13-633	13-633#
	13-639#	13-641#	13-655	13-655#	13-657#	13-659#	13-664	13-664#	13-669#	13-677	13-677#	13-681#	13-683#	13-691
	13-691#	13-693#	13-695#	13-700	13-700#	13-705#	13-718#	13-720#	13-722#	13-730	13-730#	13-735	13-735#	13-740#
	13-752#	13-760#	13-762#	13-767	13-767#	13-791#	13-806#	13-808#	13-816#	13-818#	13-820	13-820#	13-822#	13-824#
	13-832	13-832#	13-877#	13-886	13-886#	13-892#	13-894#	13-908	13-908#	13-910#	13-912#	13-917	13-917#	13-929#
	13-933#	13-935#	13-952	13-952#	13-954#	13-956#	13-961	13-961#	13-966#	13-968#	13-979#	13-990	13-990#	13-:23#
	13-:26#	13-:28#	13-:56	13-:56#	13-:90#	13-:93#	13-:95#	13-:23	13-:23#	13-:56#	13-:59#	13-:61#	13-:89	13-:89#
	13-<22#	13-<25#	13-<27#	13-<55	13-<55#	13-<58#	13-<61#	13-<80#	13-<83#	13-<85#	13-<87#	13-<97	13-<97#	13-:00#
	13-=08#	13-=17#	13-=29	13-=29#	13-=33#	13-=45#	13-=47#	13-=62	13-=62#	13-=76#	13-=78#	13-=80#	13->14	13->14#
	13->24#	13->28#	13->30#	13->32#	13->34	13->34#	13->36#	13->44	13->44#	13->54#	13->58#	13->60#	13->62#	13->64
	13->64#	13->66#	13->75	13->75#	13->84#	13->89#	13->91#	13->93#	13->95	13->95#	13->97#	13-?08	13-?08#	13-?20#
	13-?24#	13-?26#	13-?28#	13-?30	13-?30#	13-?32#	13-?42	13-?42#	13-?52#	13-?56#	13-?58#	13-?60#	13-?62	13-?62#
	13-?64#	13-?70	13-?70#	13-?81#	13-?85#	13-?87#	13-?89#	13-?91	13-?91#	13-?93#	13-204	13-204#	13-215#	13-219#
	13-221#	13-223#	13-225	13-225#	13-227#	13-238	13-238#	13-254#	13-256#	13-258#	13-262#	13-264#	13-266#	13-269
	13-269#	13-271#	13-286	13-286#	13-A03#	13-A05#	13-A07#	13-A11#	13-A13#	13-A15#	13-A18	13-A18#	13-A20#	13-A30
	13-A30#	13-A46#	13-A48#	13-A50#	13-A54#	13-A56#	13-A58#	13-A60	13-A60#	13-A62#	13-A87#	13-A89#	13-A91#	13-A99
	13-A99#	13-B01#	13-B06	13-B06#	13-B19#	13-B21#	13-B30#	13-B32#	13-B34#	13-B36	13-B36#	13-B38#	13-B44	13-B44#
	13-B54#	13-B61#	13-B64#	13-B66#	13-B68#	13-B70#	13-B72	13-B72#	13-B74#	13-B93#	13-C04#	13-C08#	13-C10#	13-C72
	13-C72#	13-C86#	13-C89#	13-C91#	13-C93#	13-C95#	13-C99#	13-D01#	13-D03#	13-D05	13-D05#	13-D07#	13-D16	13-D16#
	13-D31#	13-D35#	13-D37#	13-D39#	13-D43#	13-D47#	13-D49#	13-D51#	13-D53	13-D53#	13-D55#	13-D67	13-D67#	13-D83#
	13-D87#	13-D89#	13-D91#	13-D93#	13-D95	13-D95#	13-D97#	13-E12	13-E12#	13-E29#	13-E33#	13-E35#	13-E37#	13-E39#
	13-E41	13-E41#	13-E43#	13-E53	13-E53#	13-E69#	13-E73#	13-E75#	13-E77#	13-F79#	13-E81	13-E81#	13-E83#	13-E93
	13-E93#	13-F10#	13-F14#	13-F16#	13-F25	13-F25#	13-F27#	13-F32	13-F32#	13-F45#	13-F47#	13-F58#	13-F60#	13-F62#
	13-F64	13-F64#	13-F66#	13-F71	13-F71#	13-F83#	13-F91#	13-F95#	13-F97#	13-F99#	13-G01	13-G01#	13-G03#	
ASWREG	6-0	6-0												
ATA	4-546#	13-288	13-648	13-651	13-652	13-670	13-672	13-674	13-684	13-687	13-706	13-709	13-710	13-723
	13-726	13-741	13-744	13-745	13-753	13-755	13-757	13-901	13-904	13-905	13-:40	13-:41	13-:43	13-:07
	13-:08	13-:10	13-:73	13-:74	13-:76	13-<39	13-<40	13-<42	22-138	22-139	22-141	26-161	26-162	26-197
	26-200	30-145	30-146	30-185	30-188	32-205	32-206	32-258	32-261	48-58	48-59	48-60	48-63	48-64
	48-67	48-66	48-69	48-70	48-71	48-72	48-73	48-74	48-75	48-76	48-79	48-80	48-83	48-84
	48-87	48-88												
ATESTN	6-0	6-0												
ATMISK	4-583#	13-713	31-55											
ATNTBL	10-78	10-106	10-110	11-114	12-17	49-3#								

	13-E83#	13-E93	13-E93#	13-F10	13-F10#	13-F14	13-F14#	13-F16	13-F16#	13-F16#	13-F25	13-F25#	13-F25#	13-F27
	13-F27#	13-F27#	13-F32	13-F32#	13-F45	13-F45#	13-F47	13-F47#	13-F58	13-F58#	13-F60	13-F60#	13-F60#	13-F62
	13-F62#	13-F62#	13-F64	13-F64#	13-F64#	13-F66	13-F66#	13-F66#	13-F71	13-F71#	13-F83	13-F83#	13-F91	13-F91#
	13-F95	13-F95#	13-F97	13-F97#	13-F97#	13-F99	13-F99#	13-F99#	13-G01	13-G01#	13-G01#	13-G03	13-G03#	13-G03#
BADTMO	10-3#	10-26												
BAI	4-733#	23-28												
BB00	4-662#													
BB01	4-662#													
BB02	4-662#													
BB03	4-662#													
BB04	4-662#													
BB05	4-662#													
BB06	4-662#													
BB07	4-662#													
BB08	4-662#													
BB09	4-662#													
BIT0	4-479#	13->00	20-43											
BIT00	4-479	4-479#	4-491	4-538	4-556	4-575	4-612	4-630	4-662	4-736	4-754	39-1	39-1	40-1
	40-1													
BIT01	4-479	4-479#	4-490	4-537	4-574	4-611	4-629	4-662	4-736	4-753				
BIT02	4-479	4-479#	4-489	4-536	4-573	4-610	4-628	4-662	4-736	4-752				
BIT03	4-479	4-479#	4-488	4-535	4-572	4-609	4-627	4-662	4-674	4-733	4-751			
BIT04	4-479	4-479#	4-487	4-534	4-571	4-626	4-662	4-732						
BIT05	4-479	4-479#	4-486	4-570	4-608	4-625	4-662	4-673	4-731					
BIT06	4-479	4-479#	4-555	4-569	4-591	4-607	4-624	4-662	4-717	4-730	4-750			
BIT07	4-479	4-479#	4-554	4-568	4-590	4-606	4-623	4-645	4-662	4-672	4-716	4-729		
BIT08	4-479	4-479#	4-531	4-553	4-567	4-589	4-605	4-622	4-662	4-715	4-728	39-1		
BIT09	4-479	4-479#	4-530	4-552	4-566	4-588	4-604	4-621	4-644	4-662	4-714	4-727	39-1	39-1
	40-1	40-1												
BIT1	4-479#	13->00	23-48											
BIT10	4-479#	4-529	4-551	4-565	4-587	4-603	4-620	4-643	4-659	4-671	4-713	4-726	4-749	15-165
	40-1													
BIT11	4-479#	4-485	4-528	4-550	4-564	4-602	4-619	4-637	4-642	4-658	4-670	4-725	4-748	15-167
	39-1													
BIT12	4-479#	4-549	4-563	4-601	4-618	4-641	4-657	4-669	4-724	4-747	15-111			
BIT13	4-479#	4-548	4-562	4-600	4-617	4-636	4-656	4-668	4-680	4-712	4-723	4-746	40-1	
BIT14	4-479#	4-547	4-561	4-599	4-616	4-635	4-655	4-667	4-679	4-711	4-722	4-745	15-73	39-1
BIT15	4-479#	4-546	4-560	4-598	4-615	4-634	4-654	4-666	4-678	4-710	4-721	4-744		
BIT2	4-479#	20-43												
BIT3	4-479#	15-198												
BIT4	4-479#	15-140												
BIT5	4-479#													
BIT6	4-479#	15-87												
BIT7	4-479#	10-71	13-897	20-20										
BIT8	4-479#													
BIT9	4-479#													
BLNKS1	47-41#													
BLNKS2	10-121	11-34	11-48	47-40#										
BLNKS3	47-39#													
BLNKS4	10-82	47-38#												
BOTADR	41-73*	41-91*	41-94	41-109	41-153#									
BOTFLG	41-54*	41-101*	41-104	41-107*	41-154#									
BPTVEC	4-479#													
BSE	4-666#	22-431												
BUFFER	13-C12	13-C34	58-1#	58-5										
BUFONE	13-:10	13-:77	13-:43	13-<09	13-<67	58-2#								

BUFTWO	58-3#													
CC	4-658#													
CH	4-659#													
CHGADR	7-0#	10-15*	10-18*	11-25	11-27*									
CHRCNT	41-55*	41-78*	41-84*	41-85	41-88*	41-92	41-97*	41-108*	41-155#					
CKSWR	39-1	40-1	40-1	44-1#										
CLKADR	7-0#	13-897	19-6*	19-8	19-12*	19-14	20-20	20-39						
CLKVCT	7-0#	19-7*	19-13*											
CLR	4-731#	10-84	12-53	13-61	27-16									
CLRSTS	13-245	13-256	13-A05	13-A48	15-98	28-22#								
CMNSTA	10-130	12-2#												
CMPERR	13-524	13-655	13-677	13-691	13-730	13-820	13-908	13-952	13->34	13->64	13->95	13-?30	13-?62	13-?91
	13-225	13-269	13-A18	13-A60	13-A99	13-B36	13-B72	13-D05	13-D53	13-D95	13-E41	13-E81	13-F25	13-F64
	13-G01	24-21#												
CNSL01	11-32	47-8#												
CNSL02	11-40	47-9#												
CNSL03	11-44	47-10#												
CNSL04	11-54	47-11#												
CNSL07	11-78	47-12#												
CNSL08	11-109	47-14#												
CNSL09	11-72	47-15#												
CNTCLR	13-107	13-212	13-240	13-254	13-279	13-330	13-348	13-450	13-995	13-:61	13-:28	13-:94	13-<61	13-=33
	13-=72	13-252	13-A01	13-A44	13-A72	13-B79	13-D81	13-E27	13-E67	15-76	27-12#			
COMPA	11-103	12-6	12-14	47-6#										
CONT	4-624#													
CPSAVE	39-1	39-1	39-1	39-1*	39-1*	40-1	40-1	40-1	40-1	40-1	40-1#	40-1*	40-1*	41-172
CR	4-479#	11-90	11-101	38-1	38-1	41-76	54-79							
CR.F	4-479#	10-6	10-29	10-29	10-43	10-54	10-60	12-30	38-1	38-1	47-4	47-7	47-8	47-9
	47-11	47-12	47-13	47-14	47-15	47-16	47-18	47-26	47-28	47-29	47-30	47-31	47-31	47-34
	47-35	55-7	55-11	55-12	55-15	55-16	55-18	58-8	58-9	58-10	58-11	58-12	58-13	58-14
	58-15	58-16	58-17	58-18	58-19	58-20	58-21	58-22	58-23	58-24	58-25	58-26	58-27	58-28
	58-29	58-30	58-31	58-32	58-33	58-34	58-35	58-36	58-37	58-38	58-39	58-40	58-41	58-42
	58-43	58-44	58-45	58-46	58-47	58-48	58-49	58-50	58-51	58-52	58-53	58-54	58-55	58-56
	58-57	58-58	58-59	58-60	58-61	58-62	58-63	58-64	58-65	58-66	58-67	58-68	58-69	58-70
	58-71	58-72	58-73	58-74	58-75	58-76	58-77	58-78	58-79	58-80	58-81	58-82	58-83	58-84
	58-85	58-86	58-87											
CYLSK	4-649#													
DBCK	4-598#													
DBEN	4-599#	13-120	13-225	13-=11										
DBL	4-749#													
DCK	4-560#	4-577	22-497	22-517										
DDISP	4-479#	6-0	10-24											
DEBL	4-600#													
DEVSEL	13-=76	15-62	25-12#											
DISPLA	6-0#	10-24*	10-24*	39-1*	40-1*									
DISPRE	5-1#	10-24												
DLT	4-721#	22-313												
DMD	4-612#	4-630#	13-120	13-225	13-350	13-354	13-356	13-391	13-394	13-396	13-452	13-518	13-:00	13-:02
	13-:66	13-:68	13-:33	13-:35	13-:99	13-<01	13-=02	13-=04	13-=11	13-A74	13-E95			
DONE	13-92	47-35#												
DPE	4-674#	13-624	13-655	13-691	13-820	13-908	13-952	13->34	13->64	13->95	13-?30	13-?62	13-?91	13-225
	13-269	13-A18	13-A60	13-A99	13-B36	13-B72	13-D05	13-D53	13-D95	13-E41	13-E81	13-F25	13-F64	13-G01
	21-137	22-255	26-32	30-31	32-52									
DPEHI	4-745#													
DPELO	4-746#													
DPR	4-553#	13-203	13-204	13-317	26-200	28-125	28-126	31-30						

DRIVES	12-3	47-26#													
DRQ	4-637#														
DRVCLR	4-499#	13-437	13-588	31-18											
DRVSTS	13-608	31-9#													
DRY	4-554#	13-203	13-204	13-317	21-104	22-38	22-41	22-42	26-200	28-125	28-126	31-30			
DSWR	4-479#	6-0	10-24												
DTE	4-563#	4-577													
DTO	4-601#														
DVA	4-485#	10-89	13-85	13-143	17-43	18-37	21-65	21-68	25-37	28-31	31-17	31-18			
DVC	4-672#	13-199	13-294	13-384	13-387	13-424	13-427	13-428	26-132	28-115	30-92	30-130	30-133	30-266	
	32-130	32-171	32-174	33-89	33-94	33-97									
EBL	4-617#														
ECH	4-569#	4-577	22-480	22-495	22-513	22-519	48-77	48-78	48-85	48-86					
ECI	4-642#	13-927	13-937	22-515											
ECRC	4-621#														
ED1	52-1	56-1#													
ED110	52-4	56-2#													
ED111	52-5	56-3#													
ED114	52-7	56-5#													
ED223	52-8	56-6#													
ED336	52-10	56-8#													
ED337	52-11	52-12	56-10#												
ED353	52-14	56-11#													
EDT1	8-3	8-6	8-9	8-12	8-15	8-18	8-24	8-27	8-30	8-33	8-36	8-39	8-42	8-45	
	8-48	8-51	8-54	8-57	8-60	8-63	8-66	8-69	8-72	8-75	8-78	8-81	8-84	8-87	
	8-90	8-93	8-96	8-99	8-102	8-105	8-108	8-111	8-114	8-117	8-120	8-123	8-126	8-130	
	8-133	8-136	8-139	8-142	8-146	8-150	8-154	8-157	8-160	8-163	8-166	8-169	8-172	8-175	
	8-178	8-182	8-185	8-188	8-191	8-194	8-197	8-200	8-203	8-206	8-209	8-212	8-215	8-218	
	8-236	8-239	8-242	8-245	8-248	8-251	8-254	8-257	8-260	8-263	8-266	8-269	8-272	8-275	
	8-278	8-281	8-284	8-287	8-290	8-293	8-296	8-299	8-302	8-305	8-308	8-311	8-314	8-317	
	8-320	8-323	8-326	8-329	8-332	8-335	8-338	8-341	8-344	8-347	8-350	8-353	8-356	8-359	
	8-366	8-369	8-372	8-375	8-378	8-381	8-384	8-387	8-390	8-393	8-396	8-399	8-402	8-405	
	8-411	8-414	8-417	8-420	8-423	8-426	8-429	8-432	8-435	8-438	8-441	8-444	8-447	8-450	
	8-504	8-507	8-510	8-513	8-516	8-519	8-522	8-525	8-528	8-531	8-534	8-537	8-540	8-543	
	8-556	8-559	8-562	8-565	8-568	8-571	8-574	8-577	8-580	8-583	8-586	8-589	8-592	8-595	
	8-606	8-609	8-612	8-615	8-618	8-621	8-624	8-627	8-630	8-633	8-636	8-639	8-642	8-645	
	8-648	8-651	8-654	8-657	8-660	8-663	8-666	8-669	8-672	8-675	8-678	8-681	8-684	8-687	
	8-705	8-708	8-711	8-714	8-717	8-720	8-723	52-1#							
EDT110	8-221	52-4#													
EDT111	8-224	8-227	8-462	8-465	52-5#										
EDT114	52-7#														
EDT2	8-426	8-429	8-513	8-516	52-2#										
EDT223	8-447	8-528	52-8#												
EDT336	8-351	8-681	8-687	8-690	52-10#										
FDT337	8-684	52-11#													
EDT344	8-699	52-12#													
EDT353	8-720	52-14#													
EECC	4-626#														
EF110	53-4	57-1#													
EF111	53-1	53-5	57-2#												
EF114	53-7	53-8	53-14	57-3#											
EF336	53-10	53-11	53-12	57-4#											
EF337	57-5#														
EFT1	8-3	8-6	8-9	8-12	8-15	8-18	8-24	8-27	8-30	8-33	8-36	8-39	8-42	8-45	
	8-48	8-51	8-54	8-57	8-60	8-63	8-66	8-69	8-72	8-75	8-78	8-81	8-84	8-87	
	8-90	8-93	8-96	8-99	8-102	8-105	8-108	8-111	8-114	8-117	8-120	8-123	8-126	8-130	

EMS231	50-151	54-156#												
EMS232	54-157#													
EMS24	50-18	54-22#												
EMS25	50-19	50-115	54-23#											
EMS26	50-20	50-116	50-173	54-24#										
EMS27	50-16	50-19	50-20	50-115	50-116	50-173	54-25#							
EMS3	50-4	50-76	54-5#											
EMS30	50-17	50-18	50-21	50-22	50-23	50-24	50-25	50-26	50-27	50-28	50-29	50-30	50-31	50-32
	50-33	50-43	50-122	50-130	50-131	50-132	50-133	50-144	50-145	50-146	50-147	50-152	50-155	50-174
	50-175	50-176	50-177	50-199	54-26#									
EMS31	50-21	50-146	50-207	50-208	54-27#									
EMS32	50-22	54-28#												
EMS33	50-23	50-219	54-29#											
EMS34	50-24	50-225	50-226	50-227	54-30#									
EMS35	50-25	50-216	54-31#											
EMS36	50-26	50-213	50-214	50-215	54-32#									
EMS37	50-27	54-33#												
EMS4	50-5	50-75	54-6#											
EMS40	50-28	50-220	54-34#											
EMS41	50-29	50-190	50-191	54-35#										
EMS42	50-30	50-206	54-36#											
EMS43	50-31	50-209	54-37#											
EMS44	50-32	50-211	50-230	54-38#										
EMS45	50-33	50-210	50-229	54-39#										
EMS46	50-43	50-58	50-120	50-145	50-177	50-185	50-199	50-201	54-40#					
EMS47	50-37	50-44	50-45	50-52	50-60	50-61	50-66	50-117	50-118	50-147	50-186	50-187	50-188	50-192
	50-193	50-222	54-41#											
EMS5	50-6	50-7	54-7#											
EMS50	50-46	50-48	50-64	50-70	50-132	50-135	50-139	50-141	50-181	50-185	50-189	50-200	50-201	50-221
	54-42#													
EMS51	50-48	50-55	50-70	50-130	50-139	50-142	50-179	50-189	50-221	54-43#				
EMS52	50-55	50-142	50-143	50-148	50-149	50-150	50-178	50-179	50-185	50-201	50-228	50-229	50-230	50-231
	50-233	54-44#												
EMS53	50-37	50-38	50-39	50-40	50-44	50-45	50-46	50-47	50-62	50-64	50-65	50-73	50-140	50-141
	50-181	50-182	50-184	50-186	50-187	50-190	50-191	50-192	50-193	50-194	50-195	50-200	50-202	50-203
	50-204	50-206	50-207	50-216	50-218	50-219	50-220	50-226	54-45#					
EMS54	50-226	54-46#												
EMS55	50-227	54-47#												
EMS56	50-50	50-51	50-54	50-62	50-63	50-67	50-119	50-143	50-144	50-178	50-182	50-183	50-194	50-195
	50-223	50-228	50-234	54-48#										
EMS57	50-151	50-190	50-191	50-192	50-193	50-194	50-195	50-196	50-197	50-198	50-199	50-200	50-201	50-202
	50-203	50-204	50-205	50-206	50-207	50-208	50-209	50-210	50-211	50-213	50-214	50-215	50-220	50-221
	50-222	50-223	50-228	50-229	50-230	54-49#								
EMS6	50-6	54-8#												
EMS60	50-224	54-50#												
EMS61	50-224	54-51#												
EMS62	50-224	54-52#												
EMS63	50-42	50-149	50-190	54-53#										
EMS64	50-8	50-14	50-41	50-144	50-145	50-146	50-147	50-199	54-54#					
EMS65	50-41	54-55#												
EMS66	50-34	50-218	54-56#											
EMS67	50-43	50-44	50-45	50-46	50-47	50-48	50-49	50-50	50-51	50-52	50-54	54-57#		
EMS7	50-10	54-9#												
EMS70	50-48	50-50	50-52	50-54	50-66	50-70	50-73	50-107	50-110	50-139	50-182	50-189	50-194	50-205
	50-221	54-58#												
EMS71	50-51	50-59	50-63	50-183	50-195	50-208	54-59#							

EMT152	8-323	50-108#
EMT153	8-326	50-109#
EMT154	8-329	50-110#
EMT155	8-332	50-111#
EMT156	8-335	50-112#
EMT157	8-338	50-113#
EMT16	8-42	50-16#
EMT160	8-341	50-114#
EMT161	8-344	50-115#
EMT162	8-347	50-116#
EMT163	50-117#	
EMT164	8-354	50-118#
EMT165	8-357	50-119#
EMT166	8-360	50-120#
EMT167	8-363	50-121#
EMT17	8-45	50-17#
EMT170	8-366	50-122#
EMT171	8-369	50-123#
EMT172	8-372	50-124#
EMT173	8-375	50-125#
EMT174	8-378	50-126#
EMT175	8-381	50-127#
EMT176	8-384	50-128#
EMT177	50-129#	
EMT2	8-6	50-4#
EMT20	8-48	50-18#
EMT200	8-390	50-130#
EMT201	8-393	50-131#
EMT202	8-396	50-132#
EMT203	8-399	50-133#
EMT204	8-402	50-134#
EMT205	8-405	50-135#
EMT206	8-408	50-136#
EMT207	8-411	50-137#
EMT21	8-51	50-19#
EMT210	8-414	50-138#
EMT211	8-417	50-139#
EMT212	8-420	50-140#
EMT213	8-423	50-141#
EMT214	8-426	50-142#
EMT215	8-429	50-143#
EMT216	8-432	50-144#
EMT217	8-435	50-145#
EMT22	8-54	50-20#
EMT220	8-438	50-146#
EMT221	8-441	50-147#
EMT222	8-444	50-148#
EMT223	8-447	50-149#
EMT224	8-450	50-150#
EMT225	8-453	50-151#
EMT226	8-456	50-152#
EMT227	8-459	50-153#
EMT23	8-57	50-21#
EMT230	8-462	50-154#
EMT231	8-465	50-155#
EMT232	8-468	50-156#

EMT233	8-471	50-157#
EMT234	50-158#	
EMT235	50-159#	
EMT236	50-160#	
EMT237	50-161#	
EMT24	8-60	50-22#
EMT240	50-162#	
EMT241	50-163#	
EMT242	50-164#	
EMT243	50-165#	
EMT244	50-166#	
EMT245	50-167#	
EMT246	8-504	50-168#
EMT247	8-507	50-169#
EMT25	8-63	50-23#
EMT250	8-510	50-170#
EMT251	8-513	50-171#
EMT252	8-516	50-172#
EMT253	8-519	50-173#
EMT254	8-522	50-174#
EMT255	8-525	50-175#
EMT256	8-528	50-176#
EMT257	8-531	50-177#
EMT26	8-66	50-24#
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EMT262	8-540	50-180#
EMT263	8-543	50-181#
EMT264	8-546	50-182#
EMT265	8-549	50-183#
EMT266	8-552	50-184#
EMT267	8-556	50-185#
EMT27	8-69	50-25#
EMT270	8-559	50-186#
EMT271	8-563	50-187#
EMT272	8-566	50-188#
EMT273	8-569	50-189#
EMT274	8-573	50-190#
EMT275	8-577	50-191#
EMT276	8-581	50-192#
EMT277	8-586	50-193#
EMT3	8-9	50-5#
EMT30	8-72	50-26#
EMT300	8-590	50-194#
EMT301	8-594	50-195#
EMT302	8-597	50-196#
EMT303	8-600	50-197#
EMT304	8-603	50-198#
EMT305	8-606	50-199#
EMT306	8-609	50-200#
EMT307	8-612	50-201#
EMT31	8-75	50-27#
EMT310	8-615	50-202#
EMT311	8-618	50-203#
EMT312	8-621	50-204#
EMT313	8-624	50-205#

EMT314	8-627	50-206#
EMT315	8-630	50-207#
EMT316	8-633	50-208#
EMT317	8-636	50-209#
EMT32	8-78	50-28#
EMT320	8-639	50-210#
EMT321	8-642	50-211#
EMT322	8-645	50-212#
EMT323	8-648	50-213#
EMT324	8-651	50-214#
EMT325	8-654	50-215#
EMT326	8-657	50-216#
EMT327	8-660	50-217#
EMT33	8-81	50-29#
EMT330	8-663	50-218#
EMT331	8-666	50-219#
EMT332	8-669	50-220#
EMT333	8-672	50-221#
EMT334	8-675	50-222#
EMT335	8-678	50-223#
EMT336	8-351	8-681
EMT337	8-684	50-225#
EMT34	8-84	50-30#
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EMT341	8-690	50-227#
EMT342	8-693	50-228#
EMT343	8-696	50-229#
EMT344	8-699	50-230#
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EMT346	8-705	50-232#
EMT347	8-708	50-233#
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EMT350	8-711	50-234#
EMT351	8-714	50-235#
EMT352	8-717	50-236#
EMT353	8-720	50-237#
EMT354	8-723	50-238#
EMT36	8-90	50-32#
EMT37	8-93	50-33#
EMT4	8-12	50-6#
EMT40	8-96	50-34#
EMT41	8-99	50-35#
EMT42	8-102	50-36#
EMT43	8-105	50-37#
EMT44	8-108	50-38#
EMT45	8-111	50-39#
EMT46	8-114	50-40#
EMT47	8-117	50-41#
EMT5	8-15	50-7#
EMT50	8-120	50-42#
EMT51	8-123	50-43#
EMT52	8-126	50-44#
EMT53	8-130	50-45#
EMT54	8-133	50-46#
EMT55	8-136	50-47#
EMT56	8-139	50-48#

50-224#

EMT57	8-142	50-49#												
EMT6	8-18	50-8#												
EMT60	8-146	50-50#												
EMT61	8-150	50-51#												
EMT62	8-154	50-52#												
EMT63	8-157	50-53#												
EMT64	8-160	50-54#												
EMT65	8-163	50-55#												
EMT66	8-166	50-56#												
EMT67	8-169	50-57#												
EMT7	8-21	50-9#												
EMT70	8-172	50-58#												
EMT71	8-175	50-59#												
EMT72	8-178	50-60#												
EMT73	8-182	50-61#												
EMT74	8-185	50-62#												
EMT75	8-188	50-63#												
EMT76	8-191	50-64#												
EMT77	8-194	50-65#												
EMTVEC	4-479#	10-24*	10-24*											
EQUALS	47-3#													
ERR	4-547#	13-288	13-:38	13-:05	13-:71	13-<37	22-84	22-86	22-102	22-136				
ERRNMB	41-40*	41-41*	41-44	41-49	41-56	41-152#								
ERROR	4-479#													
ERRTYP	40-1	41-13#												
ERRVEC	4-479#	10-24	10-24*	10-24*	10-26*	10-27*	13-5	13-5	13-6*	13-7*	13-20*	13-20*	13-24*	13-24*
	13-=:66	13-=:67	13-=:68*	13-=:69*	13-:08*	13-:09*	13-C66*	13-C67*	17-35	17-35	17-39*	17-40*	17-70*	17-70*
	18-29	18-29	18-33*	18-34*	18-63*	18-63*	19-3	19-3	19-4*	19-5*	19-11*	19-18*	19-18*	20-9
	20-9	20-10*	20-11*	20-31*	20-31*	25-20	25-20	25-21*	25-22*	25-51*	25-51*	27-12	27-12	27-13*
	27-14*	27-25*	27-25*	39-1	39-1	39-1*	39-1*	39-1*	39-1*	39-1*	40-1	40-1*	40-1*	40-1*
ERTY00	41-21	41-157#												
ERTY01	41-38	41-158#												
ERTY02	41-43	41-159#												
ERTY03	41-45	41-160#												
ERTY04	41-144	41-161#												
ERTY05	41-31	41-162#												
ESRC	4-619#													
F0	4-490#	22-29												
F1	4-489#	22-29												
F2	4-488#	22-29	23-147											
F3	4-487#	22-29												
F4	4-486#	22-29												
FER	4-571#	4-577	22-416											
FIND	13-114	13-114#	13-114#	13-132	13-132#	13-132#	13-138	13-138#	13-138#	13-219	13-219#	13-219#	13-236	13-236#
	13-236#	13-243	13-243#	13-243#	13-245	13-245#	13-245#	13-249	13-249#	13-249#	13-262	13-262#	13-262#	13-283
	13-283#	13-283#	13-337	13-337#	13-337#	13-340	13-340#	13-340#	13-343	13-343#	13-343#	13-353	13-353#	13-353#
	13-393	13-393#	13-393#	13-439	13-439#	13-439#	13-460	13-460#	13-460#	13-463	13-463#	13-463#	13-466	13-466#
	13-466#	13-470	13-470#	13-470#	13-475	13-475#	13-475#	13-481	13-481#	13-481#	13-483	13-483#	13-483#	13-485
	13-485#	13-485#	13-487	13-487#	13-487#	13-492	13-492#	13-492#	13-499	13-499#	13-499#	13-505	13-505#	13-505#
	13-507	13-507#	13-507#	13-509	13-509#	13-509#	13-511	13-511#	13-511#	13-516	13-516#	13-516#	13-526	13-526#
	13-526#	13-528	13-528#	13-528#	13-533	13-533#	13-533#	13-538	13-538#	13-538#	13-548	13-548#	13-548#	13-552
	13-552#	13-552#	13-554	13-554#	13-554#	13-556	13-556#	13-556#	13-558	13-558#	13-558#	13-563	13-563#	13-563#
	13-570	13-570#	13-572	13-572#	13-574	13-574#	13-574#	13-576	13-576#	13-576#	13-578	13-578#	13-578#	13-580
	13-580#	13-580#	13-585	13-585#	13-585#	13-598	13-598#	13-598#	13-603	13-603#	13-603#	13-606	13-606#	13-606#
	13-608	13-608#	13-608#	13-610	13-610#	13-610#	13-615	13-615#	13-615#	13-620	13-620#	13-620#	13-622	13-622#
	13-622#	13-624	13-624#	13-624#	13-626	13-626#	13-626#	13-628	13-628#	13-628#	13-633	13-633#	13-633#	13-639

PUT	13-114	13-132	13-219	13-236	13-256	13-332	13-350	13-391	13-437	13-452	13-454	13-456	13-477	13-494
	13-496	13-518	13-520	13-522	13-548	13-565	13-567	13-598	13-617	13-635	13-666	13-679	13-702	13-718
	13-737	13-748	13-750	13-791	13-793	13-854	13-863	13-888	13-929	13-963	13-977	13-:00	13-:02	13-:06
	13-:23	13-:66	13-:68	13-:90	13-:33	13-:35	13-:39	13-:56	13-:99	13-<01	13-<05	13-<22	13-<63	13-<80
	13-=02	13-=04	13-=06	13-=11	13-=13	13-=15	13-=45	13->24	13->54	13->84	13-?20	13-?52	13-?81	13-@15
	13-@58	13-A07	13-A50	13-A74	13-A87	13-A19	13-B54	13-B61	13-B93	13-C04	13-C86	13-C95	13-D31	13-D43
	13-D83	13-E29	13-E69	13-E95	13-F10	13-F45	13-F83	13-F91	15-128	15-186	18-28#			
PUTBUF	7-0#	18-31												
PUTINX	7-0#	13-111*	13-112*	13-124	13-216*	13-217*	13-228	13-256*	13-256*	13-332*	13-332*	13-350*	13-350*	13-391*
	13-391*	13-437*	13-437*	13-452*	13-452*	13-454*	13-454*	13-456*	13-456*	13-477*	13-477*	13-494*	13-494*	13-496*
	13-496*	13-518*	13-518*	13-520*	13-520*	13-522*	13-522*	13-543	13-565*	13-565*	13-567*	13-567*	13-592	13-617*
	13-617*	13-635*	13-635*	13-666*	13-666*	13-679*	13-679*	13-702*	13-702*	13-716*	13-717*	13-737*	13-737*	13-748*
	13-748*	13-750*	13-750*	13-788*	13-789*	13-793*	13-793*	13-854*	13-854*	13-863*	13-863*	13-888*	13-888*	13-919
	13-963*	13-963*	13-977*	13-977*	13-:00*	13-:00*	13-:02*	13-:02*	13-:06*	13-:06*	13-:15	13-:66*	13-:66*	13-:68*
	13-:68*	13-:82	13-:33*	13-:33*	13-:35*	13-:35*	13-:39*	13-:39*	13-:48	13-:99*	13-:99*	13-<01*	13-<01*	13-<05*
	13-<05*	13-<14	13-<63*	13-<63*	13-<72	13-=02*	13-=02*	13-=04*	13-=04*	13-=06*	13-=06*	13-=11*	13-=11*	13-=13*
	13-=13*	13-=15*	13-=15*	13-=40	13->19	13->49	13->79	13-?14	13-?47	13-?75	13-@09	13-@44	13-@93	13-A36
	13-A74*	13-A74*	13-A80	13-B12	13-B49	13-B59*	13-B60*	13-B85	13-C79	13-D24	13-D73	13-E19	13-E59	13-E95*
	13-E95*	13-F02	13-F38	13-F77	13-F88*	13-F89*	15-126*	15-127*	15-184*	15-185*	18-32	21-142		
PWRVEC	4-479#	10-24*	10-24*	45-1*	45-1*	45-1*	45-1*	45-1*	45-1*					
QUES	47-5#													
R6	4-479#	10-24	10-24*	10-24*										
R7	4-479#													
RCLSTS	13-485	13-556	13-578	15-209	30-15#									
RD	4-520#													
RDCHR	11-12	11-82	11-99	42-1	44-1#									
RDLIN	11-61	13-51	13-96	43-1	44-1#									
RDOCT	11-35	11-49	44-1#											
RDY	4-716#	13-143	20-17	20-18	21-86	21-89	28-31							
READY	12-37#	14-16	14-20											
RECAL	4-498#	13-477	13-496	13-522	13-542	13-567	15-183							
RESREG	41-148	44-1#												
RESVEC	4-479#													
RET	13-50	13-95	47-34#											
REX	4-618#													
RG	4-616#													
RH	4-521#													
RIP	4-503#	13-928												
RELEASE	4-500#													
RMAS	4-688#	13-716	13-788											
RMASI	7-0#	13-168	31-50	56-13										
RMASO	7-0#	13-715*	13-787*											
RMB	4-760#	13-12*	13-13	13-125	13-229	13-:16	13-:83	13-:49	13-<15	13-<73				
RMBAE	4-763#													
RMBAEI	7-0#													
RMBAE0	7-0#													
RMBAI	7-0#	13-149	23-32	23-34	28-42	56-14								
RMBAO	7-0#	13-117*	13-222*	13-:10*	13-:77*	13-:43*	13-<09*	13-<67*	23-26	23-30				
RMCS1	4-684#	4-758#	10-89	13-9*	13-79	13-129	13-233	13-256	13-258	13-332	13-437	13-456	13-477	13-496
	13-522	13-546	13-565	13-567	13-596	13-617	13-635	13-666	13-679	13-702	13-737	13-750	13-793	13-854
	13-863	13-888	13-923	13-963	13-:06	13-:21	13-:88	13-:39	13-:54	13-<05	13-<20	13-<78	13-=06	13-=13
	13-=15	13-=96*	13->22	13->52	13->82	13-?17	13-?50	13-?78	13-@12	13-@48	13-@97	13-A40	13-A84	13-B16
	13-B52	13-B59	13-B89	13-C83	13-D28	13-D77	13-E23	13-E63	13-F07	13-F42	13-F81	13-F88	15-126	15-184
	17-42	18-36	20-16	25-28										
RMCS1I	7-0#	13-141	13-264	21-65	21-67	21-69	21-86	21-88	21-91	21-102	21-106	21-108	21-120	21-122
	21-124	22-51	22-53	22-64	22-107	23-12	28-29	31-16	32-70	32-74	32-76	56-13		

RMCS10	7-0#	13-121*	13-226*	13-247*	13-256*	13-332*	13-437*	13-456*	13-477*	13-496*	13-522*	13-542*	13-565*	13-567*
	13-588*	13-617*	13-635*	13-666*	13-679*	13-702*	13-737*	13-750*	13-793*	13-854*	13-863*	13-888*	13-928*	13-963*
	13-:06*	13-:08*	13-:09*	13-:75*	13-:76*	13-:39*	13-:41*	13-:42*	13-<05*	13-<07*	13-<08*	13-<65*	13-<66*	13-:06*
	13--13*	13-=15*	13->18*	13->48*	13->78*	13-?13*	13-?46*	13-?74*	13-@08*	13-@40*	13-@88*	13-A32*	13-A76*	13-B11*
	13-B48*	13-B58*	13-B84*	13-C02*	13-C78*	13-C94*	13-D22*	13-D42*	13-D72*	13-E14*	13-E55*	13-F01*	13-F35*	13-F76*
	13-F90*	15-125*	15-183*	22-28	23-48									
RMCS2	4-761#	10-84*	10-85*	10-87	12-53*	12-54*	13-14	13-15*	13-16	13-17*	13-54*	13-61*	13-62*	13-70
	13-78	13-130	13-135*	13-234	13-259	13-=11	17-41	18-35	25-27*	25-29	27-16*	27-18*		
RMCS2I	7-0#	13-153	13-270	21-47	21-72	21-7,	21-75	22-99	22-170	22-271	22-314	22-329	22-344	22-483
	23-28	28-51	56-13											
RMCS20	7-0#	13-122*	13-227*	13-=38*										
RMCS3	4-764#													
RMCS3I	7-0#													
RMCS30	7-0#													
RMDA	4-685#	13-545	13-593	13-920	13-:19	13-:86	13-:52	13-<18	13-<76	13-=42	13->21	13->51	13->81	13-?15
	13-?49	13-?77	13-@10	13-@46	13-@96	13-A37	13-A82	13-B13	13-B51	13-B86	13-C80	13-D27	13-D76	13-E20
	13-E62	13-F05	13-F40	13-F78										
RMDAI	7-0#	13-941	13-943	23-100	23-171	56-14	56-16							
RMDAO	7-0#	13-541*	13-587*	13-925*	13-:12*	13-:79*	13-:45*	13-<11*	13-<69*	13-=39*	13->17*	13->47*	13->77*	13-?12*
	13-?45*	13-?73*	13-@07*	13-@43*	13-@73*	13-@74	13-@80*	13-@90*	13-@91*	13-A22*	13-A23	13-A34*	13-A79*	13-B10*
	13-B47*	13-B83*	13-C76*	13-D09*	13-D10	13-D18*	13-D59*	13-D60	13-D71*	13-D99*	13-E00	13-E06*	13-E16*	13-E17*
	13-E45*	13-E46	13-E57*	13-E99*	13-F37*	13-F74*	23-60	23-61	23-100	26-54	26-57	26-61	26-65	32-95
	32-98	32-102	32-106											
RMDB	4-762#	13-18*	13-19	13-111	13-216	16-20								
RMDBI	7-0#													
RMDBO	7-0#	13-110*	13-215*											
RMDC	4-694#	13-544	13-921	13-977	13-:20	13-:87	13-:53	13-<19	13-<77	13->20	13->50	13->80	13-?16	13-?48
	13-?76	13-@11	13-@47	13-@95	13-A38	13-A83	13-B14	13-B50	13-B87	13-C81	13-D26	13-D74	13-E21	13-E61
	13-F04	13-F39	13-F79											
RMDCI	7-0#	13-946	13-948	23-184	56-14	56-16								
RMDCO	7-0#	13-540*	13-926*	13-977*	13-:13*	13-:80*	13-:46*	13-<12*	13-<70*	13->16*	13->46*	13->73*	13->99*	13-?00
	13-?11*	13-?44*	13-?72*	13-?95	13-?97*	13-@06*	13-@29	13-@31*	13-@42*	13-@89*	13-A33*	13-A64*	13-A65	13-A78*
	13-B09*	13-B46*	13-B82*	13-C75*	13-D23*	13-D41*	13-D70*	13-E15*	13-E56*	13-E85*	13-E86	13-E98*	13-F36*	13-F73*
	23-59	26-50	32-91											
RMDS	4-686#	10-86	10-98											
RMDSI	7-0#	13-202	13-285	13-287	13-290	13-314	13-316	13-318	13-360	13-362	13-366	13-368	13-372	13-374
	13-400	13-402	13-406	13-408	13-412	13-414	13-430	13-432	13-500	13-642	13-644	13-648	13-650	13-670
	13-673	13-684	13-686	13-706	13-708	13-723	13-725	13-741	13-743	13-753	13-756	13-895	13-898	13-901
	13-903	13-969	13-971	13-980	13-982	13-:38	13-:42	13-:05	13-:09	13-:71	13-:75	13-<37	13-<41	13-B22
	13-B24	13-F49	13-F52	15-122	15-180	21-104	22-38	22-40	22-85	22-102	22-136	22-140	22-196	22-223
	22-358	23-126	26-96	26-151	26-160	26-167	26-171	26-173	26-182	26-186	26-188	26-197	26-199	26-201
	26-211	26-215	26-217	28-124	29-23	29-25	29-27	29-37	29-39	29-41	30-68	30-106	30-144	30-153
	30-157	30-159	30-169	30-173	30-174	30-185	30-187	30-189	30-201	30-203	30-205	30-216	30-220	30-222
	31-23	32-161	32-194	32-204	32-210	32-212	32-214	32-226	32-230	32-232	32-242	32-246	32-248	32-258
	32-260	32-262	33-34	33-40	33-44	33-46	33-56	33-60	33-61*	33-62	33-72	33-76	33-78	56-13
RMDSO	7-0#													
RMDT	4-691#	10-92	10-94	41-26										
RMDTI	7-0#	56-5	56-17											
RMDTO	7-0#													
RMEC1	4-698#													
RMEC1I	7-0#	56-14												
RMEC10	7-0#													
RMEC2	4-699#	16-15												
RMEC2I	7-0#	13-186	16-14	28-92	31-94	56-15								
RMEC20	7-0#													
RMER1	4-687#	13-126	13-230	13-494	13-595	13-748	13-<63	13-B15	13-F41	21-143				

TST25	13-765#	39-1												
TST26	13-330#	39-1												
TST27	13-884#	39-1												
TST3	13-105#	39-1												
TST30	13-915#	39-1												
TST31	13-959#	39-1												
TST32	13-988#	39-1												
TST33	13-:54#	39-1												
TST34	13-:21#	39-1												
TST35	13-:87#	39-1												
TST36	13-<53#	39-1												
TST37	13-<95#	39-1												
TST4	13-210#	39-1												
TST40	13-=27#	39-1												
TST41	13-=60#	39-1												
TST42	13->11#	39-1												
TST43	13->41#	39-1												
TST44	13->71#	39-1												
TST45	13-?05#	39-1												
TST46	13-?39#	39-1												
TST47	13-?67#	39-1												
TST5	13-252#	39-1												
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TST51	13-235#	39-1												
TST52	13-284#	39-1												
TST53	13-A28#	39-1												
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TST55	13-B04#	39-1												
TST56	13-B41#	39-1												
TST57	13-B77#	39-1												
TST6	13-277#	39-1												
TST60	13-C70#	39-1												
TST61	13-D14#	39-1												
TST62	13-D65#	39-1												
TST63	13-E10#	39-1												
TST64	13-E51#	39-1												
TST65	13-E91#	39-1												
TST66	13-F30#	39-1												
TST67	13-F69#	39-1												
TST7	13-328#	39-1												
TSTNMB	41-36*	41-37*	41-39	41-151#										
TSTPRP	13-475	13-492	13-516	13-538	13-563	13-585	13-615	13-633	13-664	13-700	13-735	13-767	13-832	13-886
	13-917	13-961	13-990	13-:56	13-:23	13-:89	13-<55	13-<97	13-=29	13-=62	13->14	13->44	13->75	13-?08
	13-?42	13-?70	13-204	13-238	13-286	13-A30	13-B06	13-B44	13-C72	13-D16	13-D67	13-E12	13-E53	13-E93
	13-F32	13-F71	15-38#											
TSTQUE	7-0#	12-8	12-9*	12-49	13-2	13-33	13-105	13-210	13-252	13-277	13-328	13-346	13-448	13-473
	13-490	13-514	13-536	13-561	13-583	13-613	13-631	13-662	13-698	13-733	13-765	13-830	13-884	13-915
	13-959	13-988	13-:54	13-:21	13-:87	13-<53	13-<95	13-=27	13-=60	13->11	13->41	13->71	13-?05	13-?39
	13-?67	13-201	13-235	13-284	13-A28	13-A70	13-B04	13-B41	13-B77	13-C70	13-D14	13-D65	13-E10	13-E51
	13-E91	13-F30	13-F69	14-11	14-13*	14-17	14-17*	25-24	27-17	28-54	31-53			
TYPBN	41-141	44-1#												
TYPDS	14-20	14-20	41-135	44-1#										
TYPE	10-6	10-29	10-43	10-49	10-54	10-60	10-76	10-80	10-82	10-96	10-102	10-105	10-109	10-117
	10-120	10-121	10-122	10-129	11-11	11-16	11-17	11-19	11-20	11-28	11-32	11-34	11-40	11-44
	11-48	11-54	11-60	11-72	11-78	11-79	11-81	11-86	11-92	11-103	11-104	11-109	11-117	12-3
	12-6	12-7	12-14	12-25	12-30	12-58	12-59	13-39	13-41	13-45	13-46	13-48	13-50	13-52

SSCMRE	5-10#													
SSCMTM	5-10#	6-0	6-0	6-0	6-0	6-0								
SSESCA	4-479#													
SSNEWT	4-479#	13-2	13-33	13-105	13-210	13-252	13-277	13-328	13-346	13-448	13-473	13-490	13-514	13-536
	13-561	13-583	13-613	13-631	13-662	13-698	13-733	13-765	13-830	13-884	13-915	13-959	13-988	13-:54
	13-:21	13-:87	13-<53	13-<95	13-=27	13-=60	13->11	13->41	13->71	13-?05	13-?39	13-?67	13-@01	13-@35
	13-@84	13-A28	13-A70	13-B04	13-B41	13-B77	13-C70	13-D14	13-D65	13-E10	13-E51	13-E91	13-F30	13-F69
SSSET	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1#
SSSETM	10-24	10-24#												
SSSKIP	4-479#													
.SACT1	4-471#	5-5												
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.SAPTH	4-471#	5-8												
.SAPTY	4-471#	46-1												
.SCATC	4-467#	5-1												
.SCMTA	4-468#	5-10												
.SEOP	4-468#	14-20												
.SERRO	4-468#	40-1												
.SPOWE	4-470#	45-1												
.SRDDE	4-469#													
.SRDOC	4-469#	43-1												
.SREAD	4-469#	42-1												
.SSAVE	4-470#	34-1												
.SSCOP	4-468#	39-1												
.SSIZE	4-470#													
.STRAP	4-470#	44-1												
.STYPB	4-469#	35-1												
.STYPD	4-469#	36-1												
.STYPE	4-468#	38-1												
.STYPO	4-469#	37-1												
.EQUIAT	4-467#	4-479												
.HEADE	4-467#	4-475												
.SETUP	4-467#	4-769												
.SWRHI	4-467#	4-476												
.SWRLO	4-467#	4-476#	4-477											
CALCLR	4-179#	13-107	13-212	13-240	13-254	13-279	13-330	13-348	13-450	13-995	13-:61	13-:28	13-:94	13-=:72
	13-@52	13-A01	13-A44	13-A72	13-B79	13-D81	13-E27	13-E67						
CALSUB	4-193#	13-114	13-132	13-138	13-219	13-236	13-243	13-245	13-249	13-262	13-283	13-337	13-340	13-343
	13-353	13-393	13-439	13-460	13-463	13-466	13-470	13-475	13-481	13-483	13-485	13-487	13-492	13-499
	13-505	13-507	13-509	13-511	13-516	13-526	13-528	13-533	13-538	13-548	13-552	13-554	13-556	13-558
	13-563	13-570	13-572	13-574	13-576	13-578	13-580	13-585	13-598	13-603	13-606	13-608	13-610	13-615
	13-620	13-622	13-624	13-626	13-628	13-633	13-639	13-641	13-655	13-657	13-659	13-664	13-669	13-677
	13-681	13-683	13-691	13-693	13-695	13-700	13-705	13-718	13-720	13-722	13-730	13-735	13-740	13-752
	13-760	13-762	13-767	13-791	13-806	13-808	13-816	13-818	13-820	13-822	13-824	13-832	13-877	13-886
	13-892	13-894	13-908	13-910	13-912	13-917	13-929	13-933	13-935	13-952	13-954	13-956	13-961	13-966
	13-968	13-979	13-990	13-:23	13-:26	13-:28	13-:56	13-:90	13-:93	13-:95	13-:23	13-:56	13-:59	13-:61
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	13->95	13->97	13-?08	13-?20	13-?24	13-?26	13-?28	13-?30	13-?32	13-?42	13-?52	13-?56	13-?58	13-?60
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	13-@25	13-@27	13-@38	13-@54	13-@56	13-@58	13-@62	13-@64	13-@66	13-@69	13-@71	13-@86	13-A03	13-A05
	13-A07	13-A11	13-A13	13-A15	13-A18	13-A20	13-A30	13-A46	13-A48	13-A50	13-A54	13-A56	13-A58	13-A60
	13-A62	13-A87	13-A89	13-A91	13-A99	13-B01	13-B06	13-B19	13-B21	13-B30	13-B32	13-B34	13-B36	13-B38
	13-B44	13-B54	13-B61	13-B64	13-B66	13-B68	13-B70	13-B72	13-B74	13-B93	13-C04	13-C08	13-C10	13-C72
	13-C86	13-C89	13-C91	13-C93	13-C95	13-C99	13-D01	13-D03	13-D05	13-D07	13-D16	13-D31	13-D35	13-D37

PUSH	4-479#	13-5	13-14	13-783	13-784	13-785	13-786	13-842	13-843	13-844	13-849	13-850	13-851	13-866
	13-67	16-10	16-11	16-12	17-35	18-29	19-3	20-9	20-38	21-141	22-128	22-444	25-20	27-12
	28-52	31-51	31-52	34-1	36-1	43-1	45-1	45-1	46-1	46-1	46-1			
PUTREG	4-437#	13-256	13-332	13-350	13-391	13-437	13-452	13-454	13-456	13-477	13-494	13-496	13-518	13-520
	13-522	13-565	13-567	13-617	13-635	13-666	13-679	13-702	13-737	13-748	13-750	13-793	13-854	13-863
	13-888	13-963	13-977	13-:00	13-:02	13-:06	13-:66	13-:68	13-:33	13-:35	13-:39	13-:99	13-<01	13-<05
	13-<63	13-#02	13-#04	13-#06	13-#11	13-#13	13-#15	13-A74	13-E95					
REPORT	4-479#													
RGBFMC	4-69#	7-0	7-0											
SETPRI	4-479#	12-48	39-5	39-9	42-1									
SETTRA	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1	44-1#
SETUP	4-479#	10-24												
SKIP	4-479#													
SLASH	4-479#													
STARS	4-479#	5-5	5-8	5-8	5-8	6-0	6-0	6-0	13-2	13-2	13-33	13-33	13-105	13-105
	13-210	13-210	13-252	13-252	13-277	13-277	13-328	13-328	13-346	13-346	13-448	13-448	13-473	13-473
	13-490	13-490	13-514	13-514	13-536	13-536	13-561	13-561	13-583	13-583	13-613	13-613	13-631	13-631
	13-662	13-662	13-698	13-698	13-733	13-733	13-765	13-765	13-830	13-830	13-884	13-884	13-915	13-915
	13-959	13-959	13-988	13-988	13-:54	13-:54	13-:21	13-:21	13-:87	13-:87	13-<53	13-<53	13-<95	13-<95
	13-#27	13-#27	13-#60	13-#60	13->11	13->11	13->41	13->41	13->71	13->71	13-?05	13-?05	13-?39	13-?39
	13-?67	13-?67	13-@01	13-@01	13-@35	13-@35	13-@84	13-@84	13-A28	13-A28	13-A70	13-A70	13-B04	13-B04
	13-841	13-841	13-877	13-877	13-C70	13-C70	13-D14	13-D14	13-D65	13-D65	13-E10	13-E10	13-E51	13-E51
	13-E91	13-E91	13-F30	13-F30	13-F69	13-F69	14-20	15-57	15-70	15-84	15-107	15-138	15-160	15-196
	22-26	22-34	22-119	23-1	23-3	34-1	35-1	36-1	37-1	38-1	39-1	40-1	42-1	42-1
	42-1	42-1	42-1	43-1	44-1	45-1	45-1	46-1						
SWRSU	4-479#	10-24	10-24#											
TAGS	4-103#	6-0												
TRMTRP	44-1#													
TYPBIN	4-479#													
TYPDEC	4-479#	14-20	14-20											
TYPNAM	4-467#	4-479#	10-29											
TYPNUM	4-479#													
TYPOCS	4-479#	10-81	12-16	12-60	13-40	13-49	13-94	41-22	41-39	41-44	41-46			
TYPOCT	4-479#	11-33	42-1											
TYPTXT	4-479#	10-6	10-43	10-54	10-60	12-30	14-20	14-20						
XPER	4-12#	8-3	8-6	8-9	8-12	8-15	8-18	8-21	8-24	8-27	8-30	8-33	8-36	8-39
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	8-84	8-87	8-90	8-93	8-96	8-99	8-102	8-105	8-108	8-111	8-114	8-117	8-120	8-123
	8-126	8-130	8-133	8-136	8-139	8-142	8-146	8-150	8-154	8-157	8-160	8-163	8-166	8-169
	8-172	8-175	8-178	8-182	8-185	8-188	8-191	8-194	8-197	8-200	8-203	8-206	8-209	8-212
	8-215	8-218	8-221	8-224	8-227	8-230	8-233	8-236	8-239	8-242	8-245	8-248	8-251	8-254
	8-257	8-260	8-263	8-266	8-269	8-272	8-275	8-278	8-281	8-284	8-287	8-290	8-293	8-296
	8-299	8-302	8-305	8-308	8-311	8-314	8-317	8-320	8-323	8-326	8-329	8-332	8-335	8-338
	8-341	8-344	8-347	8-351	8-354	8-357	8-360	8-363	8-366	8-369	8-372	8-375	8-378	8-381
	8-384	8-387	8-390	8-393	8-396	8-399	8-402	8-405	8-408	8-411	8-414	8-417	8-420	8-423
	8-426	8-429	8-432	8-435	8-438	8-441	8-444	8-447	8-450	8-453	8-456	8-459	8-462	8-465
	8-468	8-471	8-474	8-477	8-480	8-483	8-486	8-489	8-492	8-495	8-498	8-501	8-504	8-507
	8-510	8-513	8-516	8-519	8-522	8-525	8-528	8-531	8-534	8-537	8-540	8-543	8-546	8-549
	8-552	8-556	8-559	8-563	8-566	8-569	8-573	8-577	8-581	8-586	8-590	8-594	8-597	8-600
	8-603	8-606	8-609	8-612	8-615	8-618	8-621	8-624	8-627	8-630	8-633	8-636	8-639	8-642
	8-645	8-648	8-651	8-654	8-657	8-660	8-663	8-666	8-669	8-672	8-675	8-678	8-681	8-684
	8-687	8-690	8-693	8-696	8-699	8-702	8-705	8-708	8-711	8-714	8-717	8-720	8-723	