2064

Program Number 06-173R06

COMMON 2.5 AND 10 MEGABYTE DISK TEST PROGRAM

Consists of:

Program Description	06-173M95R06A15
Test Program Listing	06-173M96R06A13

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COMMON 2.5 AND 10 MEGABYTE DISK TEST PROGRAM DESCRIPTION

1. GENERAL

The Common 2.5 and 10 Megabyte Disk Test provides a comprehensive test cf the features of all components of Perkin-Elmer 2.5 and 10 Megabyte Disk Systems. Format Mode testing, Seek Interruput queuing from multiple files, and multiple file data transfers may be tested.

NOTE

This test program presumes that the Disk Pack used has been formatted. To format a Fixed or Removable Cartridge Disk Pack, refer to the Common Disk Formatter Program Description, Publication Number 06-251M95A15. The Common Disk Test can destroy the format of the Disk Pack used.

Prior to performing this test, the user should be familiar with the contents of the 2.5 and 10 Megabyte Removable Cartridge Disk Programming Manual, Publication Number 29-454.

2. REQUIREMENTS

The following is a list of the minimum hardware requirements for this test:

- Processor: 16-bit or 32-bit with standard multiplexor bus
- Minimum Memory: 16K Bytes
- Selector Channel (SELCH)
- 2.5 or 10 Megabyte Disk Controller, Drive, and Pack
- Ccnsole Input and List Device (refer to Appendix A)

The following test programs or their equivalents are to be run prior to loading this test:

- Memory Test
- Processor Test
- SELCH Test

The following list indicates the requirements of the machine under test:

- This program assumes that the tests listed above have been run without the detection of an error.

- Device Addresses

  The Disk System Controller should be strapped for device address X'B6'. If the address is different, the DISCON option must be entered. Refer to Appendices B and C.

  To select the desired Drive, the TFILE or XFILE option must be entered. Refer to Appendices B and C.

  The Selector Channel is assumed to be strapped for device address X'F0'. If the address is different, the SELCH option must be entered. Refer to Appendices B and C.

3. TEST SEQUENCE

Test 00

The status of the Selector Channel, Disk Controller, and Disk Drive is checked. An uncorrectable error causes an error message to be printed, and the test is aborted. Test 00 is executed whenever the RUN command is entered, and cannot be bypassed.

Test 01

A simple test of the Seek and Restore operations is performed. A Seek is made to the maximum valid cylinder address, followed by a Restore to Cylinder 0. The sequence is performed for each valid cylinder address bit between LOCYL and HICYL. The Illegal Address status bit is then tested.

Test 02

Oscillating Seek Test. Performs an exhaustive check of the head-positioning servo for cylinders between LOCYL and HICYL.

Test 03

Random Seek Test. Designed to Detect head-positioning problems not found by the preceding tests.

Test 04

Interrupt Seek Test. Performs a simple check of Seek Interrupt logic, by seeking to a distant cylinder, the current cylinder, and an invalid cylinder. Also tests Restore interrupt.

Test 05

Format Mode Test. The following errors are synthesized and tested:

A. Header Comparison failure
B. Defective Sector (Track) status
C. Longitudinal Redundancy Check error
D. Controller Overrun status

Test 06

Multi-Sector Test. Checks multi-sector data transfer, head switching, and Cylinder Overflow logic.

Test 07

Interrupt Data Test. Checks Data Transfer Interrupt logic, and Selector Channel/Disk Controller Interrupt sequencing.

Test 08

Spiral Data Test. Checks Read and Write logic with all possible data patterns. The number of consecutive sectors in each transfer is variable.

Test 09

Worst-Case Data Test. Checks Read and Write logic with a selectable worst-case data pattern. The number of consecutive sectors in each transfer is variable.

Test 0A

Random Data Test. Checks Read and Write logic with a random data pattern. The number of consecutive sectors in each transfer is variable.

Test 0B

Manual Intervention Test (requires operator response). Performs testing which requires manual intervention.

Test 0C

Multi-Disk Test (requires two Disk Drives of the same type on the same controller). Performs the following checks:

A. Overlapping Seek operations.
B. Seek Interrupt queuing.
C. Multiple-Sector data transfer between Drives.

Test 0D

Scope Loop Test. Reads and writes a selectable data pattern in Normal Mode. The number of consecutive sectors transferred is variable from 1 to 2.

Test 0E

Scope Loop Test. Reads and writes a selectable data pattern in Format Mode. The number of consecutive sectors transferred is variable from 1 to 2.

Test 0F

Scope Loop Test. Reads and writes a selectable sector with the Defective Sector (Defective Track) bit set in the Sector header.

Test 10

Scope Loop Test. Reads and writes a selectable sector with an incorrect Normal Mode Longitudinal Redundancy Check Word.

Test 11

Scope Loop Test. Reads and writes a selectable sector with an incorrect Cylinder Address in the sector header.

Test 12

Scope Loop Test. Reads and writes a selectable sector with an incorrect head address in the sector header.

Test 13

Scope Loop Test. Performs a Read Check operation on a selectable sector.

Test 14

Scope Loop Test. Seeks to a selectable cylinder, or between selectable cylinders.

Test 15

Read-Only Test. Reads a selectable area of the disk and performs error checking, in Normal Mode.

Test 16

Reformat Test. Restores proper format on a selectable track. Sectors with errors are flagged as defective; the flag is tested. This test is not a substitute for the Common Disk Formatter program.

4. LOADING PROCEDURES

4.1 Object Format

The 06-173M17 Tape is an absolute, non-zoned memory image tape with front-end boot loader. The test occupies approximately 16KB of memory.

4.2 Multimedia Diagnostic Loading Procedure

To load the program from the Perkin-Elmer multimedia diagnostic system, refer to Publication Number 06-176M95A15. To load this program from the Perkin-Elmer Floppy Disk diagnostic system, refer to Publication Number 06-225M95A15.

4.3 Object Loading Procedure

1. Manually enter the X'50' Sequence shown below into memory:

LOCATION	CONTENTS	
X'30'	X'0000'	
X'32'	X'0000'	
X'34'	X'0000'	
X'36'	X'0050'	
X'50'	X'D500'	
X'52'	X'00CF'	
X'54'	X'4300'	
X'56'	X'0080'	
X'78'	X'0294'	For TTY or Carousel 35
X'78'	X'0399'	For HSPTR
X'78'	X'1399'	For HSPTR/P
X'78'	X'85A1'	For 800 BPI Mag Tape
X'78'	X'C186'	For Floppy Disk

2. Place the Test Program Tape in the Reader.

3. Execute at address X'30'.

4. When the processor halts, observe the CHKSUM byte displayed on the console display register D1, if equipped (else, look at general register 6). If it is zero, loading is now complete; if not, repeat the loading procedure.

5. PROGRAM EXECUTION

1. Refer to Appendix A and set up the addresses for the console input device and the list output device.

2. Address memory location X'0A00' (on all machines)

3. Start program execution. Observe that the following is output to the list device:

   COMMON DISK TEST 06-173R06

6. OPERATING PROCEDURES

6.1 Ncrmal Testing

After the Test Program is loaded, the correct values for the PACTYP, DRIVE, LOCYL, HICYL, and XFILE options must be entered. If the default value for any other option is not the desired value, the correct value must be entered. (Refer to Appendices B and C).

When the RUN command is entered, the Option Table is tested for validity. If an invalid option value is detected, (e.g., invalid HICYL option for the type of drive under test), an error advisory is printed (see Appendix E), and control is returned to the Command Processor. For example:

```
*RUN
INVALID HICYL OPTION
*
```

The user should refer to Appendix C for the valid option entry, correct the error and again enter the RUN command. If all option entries are correct, Test 0 is selected and run. When Test 0 terminates, all other selected tests are run, and control is returned to the Command Processor.

The default testing sequence includes Tests 0, 1, 2, 3, 4, 6, 7, 8, 9, and A. When these tests have been executed successfully, select and run Test 5, then refer to Additional Testing, below. Ensure that the format switch on the controller is in the ENABLE position (FMT) before running Test 5 or any other test using the format mode.

If the message

SELECT NEW SECTOR OR LOCYL OPTION

is displayed, enter a different LOCYL or SECTOR option (see Appendix C), then select and run the indicated test again with the newly-selected track.

6.2 Additional Testing

The tests listed in this section do not lend themselves to the default mode of testing, but must be run successfully (where applicable) before testing is complete.

6.2.1 Manual Intervention Test. (Test B). Select Test B and enter the RUN Command. Follow the directions displayed on the Console Device as testing proceeds. For example, when the message

SET DRIVE OFF-LINE

is displayed, depress the START switch on the Drive's Switch Panel, to turn off the lamp. Refer to Appendix E for messages displayed.

6.2.2 Multi-Disk Test (Test C). If two or more Disk Drives of the same type are attached to the Controller, select the desired Secondary file by entering the XFILE option. DRIVE and XFILE must not specify the fixed and removable disks within the same drive. Enter the appropriate LOCYL and SECTOR options to avoid destruction of data on the packs mounted on the Drives specified by the DRIVE and XFILE Options, and enter the RUN command. The Multi-Disk Test simulates an actual operating environment, testing interrupt sequencing and data transfers. When used in conjunction with the LOOP option, this test provides an extensive Multi-Disk exerciser.

6.2.3 Scope Loop Tests. Select and run tests D, E, F, 10, 11, 12, 13, and 14 for repetitive testing of:

A. Data Transfers in Normal and Format Modes
B. Sector Match and Redundancy Check Logic
C. Seek/Restore Logic

Refer to Appendix F for the options applicable to each test.

6.2.4 Read-Only Test (Test 15). Select and run Test 15 for quick check of Normal-Mode Disk operation. Each sector between the limits specified by the LOCYL and HICYL options (inclusively) is read, with error checking. Data on the Disk is not destroyed. When used in conjunction with Test 4 (Interrupt Seek) and Test 7 (Interrupt Data), a brief non-destructive confidence test of the drive is performed.

6.2.5 Re-Format Test (Test 16). Any test writing to the disk in format mode causes an automatic reformat of the track, on completion of the test. In the event that the re-format is aborted, or if it is desired to establish format on a track, Test 16 must be run. For example, if the automatic re-format is aborted after running Test E:

```
* TEST E
* RUN
TEST 0E
ATTEMPTING RE-FORMAT
ERROR 0E5021
RE-FORMAT ABORTED
*
```

The track specified by the LOCYL and SECTOR options may then be re-formatted by the following command sequence:

```
* TEST 16
* RUN
```

6.3 Modification of Options

The Option Table (see Appendix C) provides a means for the user to tailor the test sequence as necessary. The option values may be set in different combinations, to test additional functions or to place emphasis on a particular test sequence. The following modifications are recommended as part of the test sequence for the 2.5 or 10 Megabyte Disk System.

DRIVE. If more than one Drive (fixed or removable) is attached to the Controller, repeat all test sequences for each valid DRIVE option, to verify the operation of each Drive in the Disk System.

LOCYL. This option determines the lower Cylinder Address limit for most of the test sequences. Those data transfer tests, transferring 24 sectors of data or less, use the cylinder specified by the LOCYL option. Since the recording density varies as the cylinder address increases, the LOCYL option should be varied through several steps from zero through maximum, and the tests repeated for each LOCYL option entered.

HICYL. This option determines the upper Cylinder Address limit for most of the test sequences. Modify this option in conjunction with the LOCYL option, to further test data transfer operations and seek logic sequencing.

RETRY. This option determines the maximum number of errors allowed before the current test is aborted. Increase this value to prevent aborting the test.

SECNUM. This option specifies how many sectors are transferred at a time, in the Data Tests. Modify this option to isolate a fault in multi-sector data transfers.

XFILE. This option specifies the secondary file used in the Multi-Disk Test. Vary this option in conjunction with the DRIVE option to test valid combinations of primary and secondary files.

DATA. This option specifies the worst-case data halfword used for data transfers. Modify this option if a Data Recovery or Bus problem is suspected.

INBUF, OUTBUF. These options determine the addresses of the buffers to be used for data transfers. The options should be modified to test extended memory data transfers (32-bit machines). Often, faults may be isolated with the buffers located at 16KB or 64KB boundaries.

SECTOR. This option, in conjunction with the LOCYL option, determines where single-sector data transfers will be made, on the cylinder. Because the timing is different for data transfers for each sector in any given track, the SECTOR option should be varied in conjunction with the LOCYL and DATA options to verify proper operation over the valid range.

OTHER OPTIONS. The LOOP, CONTIN, SCOPE, BUFSIZ, and SEEK options allow the user to run the selected tests a specified number of times, or continuously; and to tailor the Scope Loop Tests as needed. For a description of option usage in the Scope Loop Tests, refer to the program listing.

7. ERROR PRCCEDURES

7.1 Recoverable Errors

If an error is detected which is considered recoverable, an error message is displayed on the List Device. For example:

```
ERROR 013040
```

The program then attempts to recover from the error. If the error is not corrected, another error message is displayed. This sequence continues until the error is corrected, or the RETRY count is exhausted. In the latter case, the following message is displayed:

```
SOLID ERROR:
TEST nn ABORTED
```

where nn is the test number. The next specified test is then executed.

7.2 Irrecoverable Errors

If a Machine Malfunction Interrupt is taken, the following message is displayed:

```
ERROR TTF3
PSW PPPP LOC LLLL
STATUS = SSSSSSSS
```

Where:

TT	is the number of the test in which the error was detected
F3	is the code for Machine Malfunction
PPPP	is the old PSW status when the error was detected
LLLL	is the old PSW location counter when the error was detected
SSSSSSSS	is the new PSW status (Machine Malfunction Status Word for 3200 family processors), reported at the time of the error

Control is then returned to the Command Processor, and the program waits for console input.

In the case of irrecoverable errors other than Machine Malfunction Interrupt, the following message is immediately printed, and control is then returned to the Command Processor:

```
ERROR TTFN
PSW PPPP LOC LLLL
```

where FN is the code for the Irrecoverable Error detected, and other printout is as described above (see Appendix E).

8. OVERNIGHT TESTING

To run the selected tests for an extended period of time, enter 'RUN' and take the Console Device Off-Line. Testing continues until the Console Device is put back On-Line, when the number of times the test sequence was executed, and the number of errors detected, are printed:

```
TOTAL  TOTERR
XXXX   YYYY
```

The Manual Intervention Test (Test B) should not be run in this mode. Those tests which destroy format may be selected and run in this mode, as part of a string including tests which expect proper format. However, in the event that the automatic re-format is aborted, testing is terminated.

If the option NOMSG F is entered, followed by the RUN command, the software behaves as though the Console and List devices are off-line; the specified subtests are selected and run in a continuous mode. For an error tally, put the Console device back on-line and restart the program at its start address. The TOTAL and TCTERR tallies are then output as described above, followed by the test program title.

APPENDIX A
USER DEVICE DEFINITION

ASCII INPUT/OUTPUT DEVICE SUPPORT

The R05 Executive (ETPE R05) of the program uses the concept of Console I/O device and List device. The console I/O device is an interactive device which is capable of logging messages and accepting commands and other user input. When the executive is accepting input from the user, or sending messages to the user, the console device is used. When the test program is running, the List device is used for logging messages.

IO HALFWORD CONTROL OF I/O DEVICE SELECTION

The List device and Console device are specified to the Executive by the contents of the halfword IO at ORIGIN1+X'10' (normally X'0A10'). The interpretation of this data is detailed in Table 1. The Executive allows only the identifiers shown and changes illegal identifiers to X'01'.

TABLE 1 INPUT/OUTPUT IDENTIFIERS

IO	0 — 7: Console Device Identifier	8 — 15: List Device Identifier
	X'01' - CRT on PASLA/PALM or COMM MUX interface	X'01' - CRT on PASLA/PALM or COMM MUX interface
	X'02' - Device on Current Loop interface	X'02' - Device on Current Loop interface
	X'03' - Reserved. Changed to X'01'.	X'03' - Line Printer on Line Printer interface
	X'04' - Carousel on PASLA/PALM or COMM MUX interface	X'04' - Carousel on PASLA/PALM or COMM MUX interface
	X'05' - CRT on Micro-I/O Bus interface	X'05' - CRT on Micro-I/O Bus interface

I/O DEVICE ADDRESSES AND CHARACTERISTICS

The device types implied by the values contained in the IO halfword are described in the following paragraphs. For each of the devices, including device type X'03', termination of an output line results in a carriage return, line feed, and null character being output by the executive (X'0D', X'0A', X'00').

Devices identified by X'01' are assumed to be on a full-duplex asynchronous RS-232-type interface with addresses X'010' and X'011' for read and write sides, respectively. Examples of such interfaces are PASLA, PALM, and COMM MUX. The Executive programs these devices for highest clock rate, seven data bits, two stop bits, and even parity. If the terminal is set up differently, location CRT2ND must be modified accordingly. Line break status is assumed to be indicated by framing-error status, with BUSY not active, and a zero character in the receive buffer. Off-line status is assumed to be X'0C' (BUSY+EXAMINE STATUS).

Devices identified by X'02' are assumed to be on a Teletype-compatible current loop interface with address X'002'. The Executive programs these devices for unblocked mode (Echoplex). Line break status is assumed to be indicated by framing-error status. Off-Line status is assumed to be X'01' (Device Unavailable). If this bit is set, other status bits are don't cares.

The list device identified by X'03' is assumed to be a line printer on a line printer interface with address X'062'. Off-Line status is assumed to be X'01' (Device Unavailable). If this bit is set, other status bits are don't cares.

Devices indicated by X'04' are assumed to be attached as described for device type X'01', having the capability of transmitting DC4 and DC2 transmission pause and resume requests. An example of such a device is the Perkin-Elmer Carousel 300 terminal.

Devices indicated by X'05' are assumed to be on a Micro-I/O bus interface with address X'0C0'. These devices are programmed for Blocked mode (Full Duplex). Line break is assumed to be indicated by framing-error status which is not testable if a character is in the interface read buffer. Off-Line status is assumed to be X'01' (Device unavailable). If this bit is set, other status bits are don't cares.

SELECTING DEVICES BEFORE STARTING EXECUTION

The IO halfword, described above, controls which device identifiers are used when the program is started. The default data in this halfword is X'0101'. If this value does not indicate the desired type of I/O device, of the types supported, the data in the IO halfword may be modified before starting program execution.

If the default device addresses are not the addresses of the devices configured in the system, the table of device addresses found in the source program adjacent to the IO halfword may be modified. There are two halfword entries used for each type device. The first is the read-side address, and the second is the write-side address. Both these halfwords must be modified for any change required. If the device type has only one address (for example, a line printer), the device address must be placed in each of the two appropriate halfwords. The R05 Executive always uses the read side address to test Off-Line status.

APPENDIX B
OPTION/COMMAND INPUT

An asterisk (*) operator prompt is output to the console device to indicate that the program is waiting for user input. Any option name may be typed in from the console, followed by a carriage return (CR) if there are no arguments or if the default arguments are to be used. If arguments are required, the option name must be followed by a space, and then the desired argument or arguments separated by commas.

An invalid command/option name or option value causes a question mark (?) to be output, followed by a carriage return, line feed, and an asterisk prompt. If, during command/option input, a mistake is made, the hash mark (#) can be typed to delete the entire command line. The ASCII CANCEL (control-x) is treated the same as a hash mark. A carriage return, line feed, and new prompt are output. The left arrow (←) can be typed to delete the previcusly typed character, or a string of characters can be deleted by typing a left arrow for each character to be deleted. The backspace character and delete character are treated the same as a left arrow.

APPENDIX C
OPTION TABLE

Examine each option in the following list, and read each description. If a default value is specified, and is the value desired, no action is necessary. If a default value is not specified, or is not the desired value, then the option must be entered. See Appendix B for Command Input structure.

NOTE

Test 0 is run prior to any test sequence. Test 0 is run once only, regardless of the LOCP option. If CONTIN 1 is specified, however, Test 0 is run once each time the selected string of tests is executed.

OPTION	MANDATORY (x)	DEFAULT VALUE	DESCRIPTION
BUFSIZ		0	Selects the number of sectors transferred at one time, in Tests D and E. 0 = 1 sector transfer size 1 = 2 sector transfer size
BYCKAD		0	Determines whether an address check (Read Check) is to be performed following a Seek or Restore operation. 1 = Bypass Address Check 0 = Perform Address Check (Requires Formatted Disk Pack)
CONTIN		0	Enables the user to run all selected tests continuously, until the BREAK key returns the program to Command mode. 0 = Normal Execution 1 = Continuous Execution

OPTION	MANDATORY (x)	DEFAULT VALUE	DESCRIPTION
DATA		X'BDBD'	Defines the worst-case data pattern read and written.
DISCON		X'00B6'	Defines Disk Controller Address.
DRIVE	x	X'FFFF'	A one-digit number that defines which Drive attached to the Controller is to be used for testing. For a controller with address X'B6', the following are valid entries, specifying the removable platters on the corresponding Drives. DRIVE 0 - address X'C6' DR0 DRIVE 1 - address X'D6' DR1 DRIVE 2 - address X'E6' DR2 DRIVE 3 - address X'F6' DR3 If PACTYP CE01 or 0001 is specified, then for a controller with address X'B6', the following are also valid entries, specifying the fixed platters on the corresponding Drives. DRIVE 4 - address X'C7' DF0 DRIVE 5 - address X'D7' DF1 DRIVE 6 - address X'E7' DF2 DRIVE 7 - address X'F7' DF3
FMTSEC		1	Specifies whether formatting is to be done on a sector or track basis. 0 = Flags all sectors as defective on the track containing the faulty sector 1 = Flags only the faulty sector as defective

OPTION	MANDATORY (x)	DEFAULT VALUE	DESCRIPTION
HEADS		NONE	Determines which heads are not to be used during execution of the tests. When HEADS 1 is entered, the following message is printed: ENTER DELETED HEAD > Enter the address of the desired head, followed by a carriage return (CR). Example - to delete head address 0: *HEADS 1 (CR) ENTER DELETED HEAD > 0 (CR) No head address may be greater than the maximum address implied by the PACTYP option. If HEADS 0 is entered, no head is deleted. The HEADS option must not conflict with the SECTOR option.
HICYL	x	X'FFFF'	Establishes the high cylinder address during the test procedure. HICYL must not be less than the LOCYL option, and must not be greater than the number of cylinders implied by the PACTYP option.
INBUF		See Listing	Specifies the Read Buffer absolute start-location in memory. Only the last four digits entered are retained for a 16-bit processor. If the default value is not used, the buffer address must not lie within the test program. (See OUTBUF, SECNUM).

OPTION	MANDATORY (x)	DEFAULT VALUE	DESCRIPTION
INTLEV		0	Defines the interrupt level of the SELCH, Controller, and Disk Drive. INTLEV = 0→X'F'
LOCYL	x	X'FFFF'	Establishes the low cylinder address during the test procedure. LOCYL must be less than or equal to the HICYL option, and not greater than the number of cylinders implied by the PACTYP option.
LOOP		0	Determines the number of times a test is executed before advancing to the next selected test. LOOP≤X'FFFF'
NOAUTC		0	Inhibits track evaluation before execution of Format-mode tests, and inhibits automatic re-format of the track following execution of such tests. 0 = Normal Operation 1 = Inhibit Automatic Functions
NOMSG		0	Determines whether commentary messages are to be printed. 0 = All messages printed 1 = Error messages only 2 = Suppress Level 1 Supplementary information (See Appendix E). 3 = Suppress Levels 1 & 2 Supplementary information (See Appendix E). F = No printing at all. Restart program for a summary of TOTAL and TOTERR. Only the RUN command may be entered once NOMSG F is specified. When program is restarted, NOMSG is forced back to 0.

OPTION	MANDATORY (x)	DEFAULT VALUE	DESCRIPTION
OPTICN		N/A	Causes all options, with their current values, to be displayed on the Console device. OPTION n (CR) causes the options to be displayed on the specified list device (See Appendix A). Printing stops after about 15 lines. Depress (CR) to enter the next command, or depress (LF) (CR) to print the remainder of the options.
OUTBUF		See Listing	Specifies the Write Buffer starting location in memory. The write buffer must not overlap the read buffer. (See INBUF.) For Test 15, OUTBUF may specify the last halfword of configured memory. Only the last four digits entered are retained, for a 16-bit processor.
PACTYP		X'CE01'	Identifies the type of Pack, and Drive. For example, type CEXX designates a Customer Engineer pack. Only Tests 0 and 15 are allowed to run in this case. The PACTYP suffix digits are defined as follows: SUFFIX — MEANING 00 — 2.5 Mb Drive Max Head Address = X'01' Max Sector Address = X'17' Max Cyl Address = X'CA' Drives 0,1,2,3 supported 01 — 10 Mb Drive Max Head Address = X'01' Max Sector Address = X'17' Max Cyl Address = X'197' Drives 0,1,2,3,4,5,6, 7 supported Type 00XX designates a User Pack.

OPTION	MANDATORY (x)	DEFAULT VALUE	DESCRIPTION
RETRY		2	Specifies the number of retries allowed following an error before the test is aborted. RETRY = 0⟶X'7FFF'
RUN	x	N/A	Causes the selected tests to be run, according to the options specified.
SCOPE		0	Used in SCOPE LOOP TESTS D,E, F,10,11,and 12. 0 = Write - Read 1 = Read Only 2 = Write Only 3 = Write-Read-Check Data
SECNUM		3	Specifies (the number of sectors -1) per transfer in Tests 8,9,A,C, and 15. For Tests 8,9,A, and C SECNUM = 0,1,2,3,5,7,X'0B', or X'17' For Test 15, SECNUM may also have the value X'2F'. Memory required for each I/O buffer is (SECNUM + 1) times X'110'. For Test 15, OUTBUF may extend into non-existent memory. (See INBUF, OUTBUF.)
SECTOR		0	Selects the Head and Sector addresses used in tests transferring no more than 24 sectors of data. SECTOR = hhkk, where hh = the head address kk = the address of the first sector

OPTION	MANDATORY (x)	DEFAULT VALUE	DESCRIPTION
			The addresses used must not be greater than the maximum addresses implied by the PACTYP option, although any value for kk is accepted (through X'FF') for the scope loop tests. The head address must not be the same as a head deleted by the HEADS option.
SEEK		0	Used in SEEK SCOPE LOOP TEST (Test E). 0 = Seek LOCYL, Restore 1 = Seek LOCYL, seek HICYL
SELCH		X'00F0'	Defines Selector Channel Address
TEST		0,1,2,3, 4,6,7,8, 9,A	Selects the test(s) to be executed when the RUN command is entered. Test 0 is always selected. TEST (CR) causes the default tests to be selected.
XFILE	x	X'FFFF'	A one-digit number that defines which Drive attached to the controller is to be used as the secondary file, for Disk-to-Disk data transfers in Test 0C. This option is entered in the same manner as the DRIVE option. (See DRIVE.) XFILE and DRIVE must not specify the fixed and removable disks within the same Drive, and may not equal one another.

APPENDIX D
EXPECTED PRINTOUT

```
COMMON DISK TEST 06-173R06
* OPTION
HEADS
INBUF       KKKKKK
OUTBUF      KKKKKK
TEST 0,1,2,3,4,6,7,8,9,A (Default Tests)
LOCYL       FFFF
HICYL       FFFF
SECTOR      0000
PACTYP      CE01
BYCKAD      0000
SELCH       00F0
DISCON      00B6
DRIVE       FFFF
XFILE       FFFF
RETRY       0002
DATA        BDBD
SCOPE       0000
BUFSIZ      0000
SECNUM      0003
SEEK        0000
FMTSEC      0001
LOOP        0000
CONTIN      0000
NOMSG       0000
INTLEV      0000
NOAUTO      0000
* DRIVE     0
* LOCYL     0
* HICYL     7
* PACTYP    1 (See Appendix C)
* RUN
```

NOTE

If more than one Drive is attached to the Controller, repeat the test for each DRIVE Option.

```
TEST 00             (Status Test)
TEST 01             (Seek Restore Test)
TEST 02             (Oscillating Seek Test)
```

```
TEST 03                 (Random Seek Test)
TEST 04                 (Interrupt Seek Test)
TEST 06                 (Multi-Sector Test)
TEST 07                 (Interrupt Data Test)
TEST 08                 (Spiral Data Test)
TEST 09                 (Worst-Case Data Test)
TEST 0A                 (Random Data Test)
END OF TEST
NO ERROR
* TEST 5                (Requires Format Mode be enabled)
* RUN

TEST 00
TEST 05                 (Format-Mode Test)
ATTEMPTING RE-FORMAT
END OF TEST
NO ERROR
* TEST B
* RUN

TEST 00
TEST 0B                 (Manual Intervention Test)
SET DRIVE OFF-LINE
SET DRIVE ON-LINE
SET WRITE-PROTECT ON
SET WRITE-PROTECT OFF
END OF TEST
NO ERROR

* XFILE 1               (If two or more Drives on Controller.
* TEST C                Repeat with all valid combinations of
RUN                     DRIVE and XFILE).
TEST 00
TEST 0C                 (Multi-Disk Test)
END OF TEST
NO ERROR

* INBUF 10000           (or Top-of-Memory, less X'500'.)
* TEST 6,7,8,9,A
* RUN

TEST 00
    .
    .
    .
TEST 0A
END OF TEST
NO ERROR
*
```

```
* TEST 4,7,15
* CONTIN 1
* RUN

TEST 00
TEST 04                 (Interrupt Seek Test)
TEST 07                 (Interrupt Data Test)
TEST 15                 (Read-Only Test)
    .
    .
    .
TEST 15
BREAK TERMINATION       (User Depresses BREAK Key)
* CONTIN 0
```

The sequence above represents basic testing of the Disk System. For further testing, run the above tests, changing the LOOP, CONTIN, LOCYL, HICYL, PACTYP, DRIVE, XFILE, INBUF, OUTBUF, DATA, and HEADS options, as applicable.

In addition, Tests D,E,F,10,11,12,13,14, and 16 should be run, varying the above options, as applicable. Further options related to these tests include BUFSIZ, SECTOR, SEEK, and SCOPE. For this series of tests, the LOCYL, HICYL, and SECTOR options should encompass an error-free area on the Disk.

APPENDIX E
ERROR MESSAGES

The following tables are designed to explain all error printouts, as well as the options used by each test. In the following tables, the term "Global" in the "Options Used" column is used to indicate the following options which are applicable to all of the tests:

LOOP, CONTIN	INBUF
TEST	OUTBUF
DRIVE	
SELCH	
DISCON	
RETRY	
FACTYP	

NOTES

1. On Multi-sector transfers the head (HH) and sector (KK) fields indicate the exact sector in error.

2. All numbers displayed in error printouts are hexadecimal.

3. If any test is run which writes to the disk in Format Mode, the track selected by the LOCYL and SECTOR options should be reformatted. The test program attempts to perform this function automatically. If the re-format is aborted for some reason, a manual re-format must be performed. This is accomplished by Selecting Test 16, and entering 'RUN'. The message 'RE-FORMAT LOCYL' is displayed whenever manual intervention is required.

4. If an abnormal status is indicated by the disk controller following a data transfer, the SELCH final address register is read. The value returned is used as the expected final address, for testing purposes.

Error Message Format Table

Error Message Format

Irreccverable Errors

```
ERROR TTFN
DEV DDD STA SS
PSW PPPP LOC LLLL
```

OR

```
ERROR TTFN
PSW PPPP LOC LLLL
```

OR

```
ERROR TTFN
PSW PPPP LOC LLLL
STATUS SSSSSSSS
```

Interpretation

TT	= Test Number
TTF1	= Arithmetic Fault Interrupt
TTF2	= Illegal Instruction Interrupt
TTF3	= Machine Malfunction Interrupt
TTF4	= Unexpected Device Interrupt
TTF5	= 32 Bit Relocation/Protect Interrupt 16 Bit Floating Point Div. Interrupt
TTF6	= External Interrupt into the wrong interrupt level. (See INTLEV option in Appendix C.)
TTF7	= Data Format Fault
TTF8	= System Queue Service
TTF9	= Supervisor Call
DDD	= Device Address returned when the interrupt occurred
SS	= Status of the interrupting device
PPPP	= PSW Status when interrupt occurred
LLLL	= PSW Location Counter when interrupt occurred

SSSSSSSS = Machine Malfunction Status. For the 3200 family of processors, this is the contents of the Machine Malfunction Status Word at X'0040'. For all other processors, this is the new PSW Status when the Machine Malfunction interrupt occurred. Refer to the appropriate Processor User's Manual for further details.

Recoverable Errors - Type 1 (Status Error)

```
ERROR TTCCNN
LOC LLLL
DEV DDD STA SS
SHOULD BE SX
STATUS S1 S2 S3 S4 S5 S6 S7 S8 S9 S10
CYL CCC HEAD HH SECT KK
```

Interpretation

TT	= Subtest Number
CC	= Operation Attempted
NN	= Error Detected
LLLL	= Location when Error Detected
DDD	= Device Producing the Error
SS	= Status of Device Producing Error
SX	= Expected Status
S1	= Selector Channel Status
S2	= Disk Controller Status
S3	= Drive 0 Status
S4	= Drive 1 Status
S5	= Drive 2 Status
S6	= Drive 3 Status
S7	= Fixed 0 Status
S8	= Fixed 1 Status
S9	= Fixed 2 Status
S10	= Fixed 3 Status
CCC	= Current Cylinder Address
HH	= Starting Head Address
KK	= Starting Sector Address

Recoverable Errors - Type 2 (Timeout Error)

```
ERROR TTCCNN
LOC LLLL
DEV DDD STA SS
STATUS S1 S2 S3 S4 S5 S6 S7 S8 S9 S10
CYL CCC HEAD HH SECT KK
```

Interpretation

TT	= Subtest Number
CC	= Operation Attempted
NN	= Error Detected
LLLL	= Location when Error Detected
DDD	= Device Producing the Error
SS	= Status of Device Producing the Error
S1	= Selector Channel Status
S2	= Disk Controller Status
S3	= Drive 0 Status
S4	= Drive 1 Status
S5	= Drive 2 Status
S6	= Drive 3 Status
S7	= Fixed 0 Status
S8	= Fixed 1 Status
S9	= Fixed 2 Status
S10	= Fixed 3 Status
CCC	= Current Cylinder Address
HH	= Starting Head Address
KK	= Starting Sector Address

Recoverable Errors - Type 3 (SELCH Final Address Error)

```
ERROR TTCCNN
LOC LLLL
DEV DDD STA SS
SHOULD BE SX
STATUS S1 S2 S3 S4 S5 S6 S7 S8 S9 S10
CYL CCC HEAD HH SECT KK
SELCH FA AAAA
SHOULD BE BBBB
```

Interpretation

TT	= Subtest Number
CC	= Cperation Attempted
NN	= Error Detected
LLLL	= Location when Error Detected
DDD	= Selector Channel Address
SS	= Selector Channel Status
SX	= Expected Selector Channel Status
S1	= Selector Channel Status
S2	= Disk Controller Status
S3	= Drive 0 Status
S4	= Drive 1 Status
S5	= Drive 2 Status
S6	= Drive 3 Status
S7	= Fixed 0 Status
S8	= Fixed 1 Status
S9	= Fixed 2 Status
S10	= Fixed 3 Status
CCC	= Current Cylinder Address
HH	= Head Address when Error Detected
KK	= Sector Address when Error Detected
AAAA	= Selector Channel Final Address Read
BBBB	= Selector Channel Final Address Expected

Recoverable Errors - Type 4 (Data Compare Error)

```
ERROR TTCCNN
LOC LILL
DEV DDD STA SS
STATUS S1 S2 S3 S4 S5 S6 S7 S8 S9 S10
CYL CCC HEAD HH SECT KK
BYTES NNNN READ AAAA
SHOULD BE BBBB
```

Interpretation

TT	= Subtest Number
CC	= Operation Attempted
NN	= Error Detected
LLLL	= Location when Error Detected
DDD	= Associated Disk Drive Address
SS	= Associated Disk Drive Status
S1	= Selector Channel Status
S2	= Disk Controller Status
S3	= Drive 0 Status
S4	= Drive 1 Status
S5	= Drive 2 Status
S6	= Drive 3 Status
S7	= Fixed 0 Status
S8	= Fixed 1 Status
S9	= Fixed 2 Status
S10	= Fixed 3 Status
CCC	= Current Cylinder Address
HH	= Head Address when Error Detected
KK	= Sector Address when Error Detected
NNNN	= Byte Count when Error Detected
AAAA	= Data Bytes Read
BBBB	= Data Expected to be Read

Recoverable Errors - Type 5 (Background Testing Failure)

ERROR TTCCNN
LOC LLLL
BACKGROUND FAILURE

Interpretation

TT	= Subtest Number
CC	= Operation Attempted
NN	= Error Detected
LLLL	= Location when Error Detected

ERROR CODE CC	OPERATION ATTEMPTED
00	Testing Initial Status
20	SEEK (Valid Cylinder Address)
21	SEEK (Invalid Cylinder Address)
30	RESTORE
31	RESTORE FOLLOWING SEEK INCOMPLETE
50	READ - CHECK or TRACK EVALUATION
60	(ANY) WRITE
61	WRITE FORMAT
70	(ANY) READ
71	READ FORMAT
80	DATA TEST
90	TESTING REQUIRED ERROR STATUS FROM CONTROLLER
91	WRITE - PROTECT VIOLATION
92	HEADER FAIL
93	DEFECTIVE SECTOR (TRACK)
94	CYLINDER OVERFLOW
95	DATA TRANSFER ERROR
A0	TESTING REQUIRED ERROR STATUS FROM DRIVE
A1	WRITE - PROTECT
A3	DRIVE UNSAFE
A4	DRIVE NOT READY
A5	SEEK INCOMPLETE
A6	DRIVE OFF-LINE

ERROR CODE NN	ERROR DETECTED
01	Status Error from Interrupting Device
02	Expected Error Status not produced by Interrupting Device
11	Selector Channel Status Error
12	Expected Error Status not produced by Selector Channel
21	Disk Controller Status Error
22	Expected Error Status not produced by Disk Controller
31	Status Error from Currently-Selected Drive
32	Expected Error Status not produced by Current Drive
40	Time-out
50	Not used
60	Selector Channel Final Address Error
70	Data Compare Error
91	Background Testing Failure

Fault Isolation Table

Fault Identification	Recommended Trouble-shooting Procedure	Related Options
Initial Status of Controller and/or SELCH or disk drive in error	Ensure that SELCH and controller addresses are correct and all interfaces are properly seated. Repeat Test 0.	DISCON SELCH DRIVE XFILE
Disk Seek Operation failure	Refer to Test 14 which provides Seek/Restore Scope Loop capability. Run with SEEK option = 1 which results in alternate Seek operations to LOCYL and HICYL	LOCYL HICYL SEEK LOOP BYCKAD
Disk Restore Operation failure	Refer to Test 14 which provides Seek/Restore Scope Loop capability. Run with SEEK option = 0 which results in alternate Seek and Restore operations to LOCYL.	LOCYL SEEK LOOP BYCKAD
Disk Controller Read-Check Operation failure	Refer to Test 13 which provides Read Check Scope loop capability. Select the desired Head and Sector using the SECTOR option.	BYCKAD SECTOR LOCYL
Disk Controller Read and Write	For isolating non-formatting read and write errors, use the normal mode scope loop, Test D. Select the desired head and sector using the SECTOR option and desired data using the DATA option. The SCOPE option controls Read/Write/ data compare, read only, or write only features. Similarly, for formatting operation failures, use the format mode scope loop (TEST E) as above.	SECTOR DATA LOCYL SCOPE

00 08 00 08 09 09 00 09 09 09

Fault Isolation Table

Fault Identification	Recommended Trouble-shooting Procedure	Related Options
Data Compare Failure on Read/Write operations	Run Tests 8, 9 or A which use spiral, worst case, and random data respectively. Attempt to establish some pattern of data failure. As a further means of isolation, use the Normal Mode Scope loop with various data patterns as selected by the DATA option. Test A provides a pseudo-random data pattern to be used in disk transfers which represent worst-case data for the controller data separation network. In addition, the SECNUM option provides a means of executing data transfers of one or more sectors.	SECNUM DATA LOCYL HICYL SCOPE LOOP SECTOR BUFSIZ
Write-Protect Logic failure	Use Normal Mode Scope Loop and the Loop option to isolate the failure (TEST D).	SCOPE LOOP SECTOR DATA BUFSIZ
Contrcller Sector Header Logic failure	Test 5 (Format Mode Testing) exercises Defective Sector logic and identifies failures in this area. For further hardware fault isolation use the Defective Sector (Track) Scope Loop (TEST F).	SCOPE LOOP SECTOR DATA

OTHER MESSAGES

Messages other than the error messages already discussed may be displayed. These are either error or advisory messages, and are shown below.

1. INVALID XXXXXX OPTION

   This message is printed after the 'RUN' command is entered, if the XXXXXX option has not been entered, or is incorrect.

2. SOLID ERROR:

   TEST XX ABORTED

   This message is printed if more errors occur in Test XX than the maximum specified by the RETRY option.

3. WRITE PROTECT ON

   This message is printed if Test XX attempts to write to the Disk and sees Drive Write Protect Status.

4. DEF SEC FLAGGED TTT HH KK

   FLAG REJECTED < - - - X

   This message is printed if a Defective Sector is detected and flagged, during the execution of the Re-Format Test (Test 16). Cylinder, head and sector information is displayed as TTT HH KK. If reading the sector just flagged does not give Defective Sector status, FLAG REJECTED is printed.

5. TEST XX

   This message indicates the test in progress.

6. NO ERROR

   This message indicates that the specified test sequence was completed without the detection of an error.

7. SET DRIVE OFF-LINE

   SET DRIVE ON-LINE

   SET WRITE-PROTECT ON

   SET WRITE-PROTECT OFF

These messages are displayed during execution of the Manual Intervention Test (Test B), and are instructions to the user to place the Drive under test in the stated condition. Depress the BREAK key to exit the test, if the Drive Write-Protect feature is not equipped.

8. ILLEGAL CYLADRS-CE PACK

This message is displayed when a test other than Test 0 or Test 15 is specified for a Customer Engineer Pack (PACTYP=CEXX).

9. SELECT NEW SECTOR OR LOCYL OPTION

If the required number of consecutive sectors of the track specified by the LOCYL and SECTOR options are not defect-free, this message is displayed. The user should select a different track and rerun the test until an error-free condition is encountered.

10. ENTER DELETED HEAD

This message is displayed as the result of the user's entering a HEADS 1 option. See Appendix C.

11. RE-FORMAT LOCYL

This message is displayed after the selected test sequence terminates, if any test in the sequence wrote to the Disk in Format Mode, and the automatic re-format was not completed. When this message is displayed, the Re-Format Test (Test 16) should be selected and Run.

12. BREAK TERMINATION

This message is displayed when testing is aborted by depression of the BREAK key on the Console Device.

13. DRIVE OFF-LINE

This message indicates that an attempt to communicate with the indicated Drive returned Drive Status X'09'.

14. SOFT READ ERROR

This message indicates that a Read or Read-Check operation failed on the first attempt, but was successful the second time.

15. HARD READ ERROR

This message indicates that a Read or Read-Check operation failed two consecutive attempts.

16. MEMORY LIMIT EXCEEDED

This message indicates that insufficient memory is available for the attempted Read or Write operation. In this case, the SECNUM, INBUF, and/or OUTBUF options must be modified, before attempting to run the test. See Appendix C.

17. REFORMAT ABORTED

This message indicates that format on the track specified by the LOCYL and SECTOR options could not be restored. Test 16 should be selected and run successfully before removing the Disk Pack from the Drive.

18. COMMAND IGNORED

This message is displayed when the LOCYL or SECTOR option is entered, if it is determined that the test sequence wrote to the disk in format mode, and a re-format sequence was not completed. The command entered by the user is ignored.

19. DEF SEC FOUND

This message is displayed when a normal-mode READ, WRITE, or READ-CHECK causes the controller to return an unexpected DEF SEC (DEF TRK) status. Sectors identified by this message are not used in accumulating an error tally.

A READ or WRITE operation is terminated when the defective sector is found. If a value other than zero is specified for the SECNUM option, sectors following the defective sector within the current transfer block may not be accessed by the test program.

20. DRIVE WRITE PROTECT ON
XFILE WRITE PROTECT ON

These messages indicate that the Drive(s) specified by the DRIVE or XFILE option return hardware write-protected status. The current selected test is aborted, and the next specified test (if any) is selected.

21. DEV XXX FALSE SYNC

This message indicates that device XXX returned status X'04' when interrogated before beginning the test sequence. Ensure that the PACTYP, SELCH, DISCON, DRIVE, and XFILE options have the correct values, and that the interfaces are correctly seated.

APPENDIX F
CROSS REFERENCE

TEST	OPTIONS USED	INTERRUPTS USED	REQUIRE FORMATTED DISK	DESTROY DATA	DESTROY FORMAT	NOTES
0	Global	NO	NO	NO	NO	'Global' refers to the following options: TEST,LOOP, CONTIN,SELCH, DISCON,DRIVE RETRY,PACTYP, INBUF,OUTBUF.
1	Global, BYCKAD	NO	YES*	NO	NO	
2	Global, BYCKAD LOCYL, HICYL, SECTOR	NO	YES*	NO	NO	
3	Global, BYCKAD HICYL, LOCYL SECTOR	NO	YES*	NO	NO	
4	Global	YES	YES	NO	NO	
5	Global, LOCYL, HICYL	NO	YES	YES	YES	Restores Format as part of normal test sequence
6	Global, LOCYL	NO	YES	YES	NO	Requires HEADS = 0
7	Global, LOCYL SECTOR	YES	YES	NO	NO	
8	Global, LOCYL, HICYL, SECNUM	NO	YES	YES	NO	

* Formatted Disk not required if BYCKAD = 1.

TEST	OPTIONS USED	INTERRUPTS USED	REQUIRE FORMATTED DISK	DESTROY DATA	DESTROY FORMAT	NOTES
9	Global, LOCYL, HICYL, SECNUM	NO	YES	YES	NO	
A	Global, LOCYL, HICYL, SECNUM	NO	YES	YES	NO	
B	Global, LOCYL	NO	NO	NO	NO	
C	Global, XFILE, LOCYL, BUFSIZ, SECTOR, SECNUM	YES	YES	NO	NO	Requires 2 Drives of the same type.
D	Global, LOCYL, SECTOR, DATA, BUFSIZ, SCOPE	NO	YES	YES	YES	Restores Format as part of normal test sequence.
E	Global, LOCYL, SECTOR, SCOPE, BUFSIZ	NO	YES	YES	YES	See Above.
F	Global, LOCYL, SECTOR, SCOPE	NO	YES	YES	YES	See Above.
10	Global, LOCYL, SECTOR, SCOPE	NO	YES	YES	YES	See Above.

TEST	OPTIONS USED	INTERRUPTS USED	REQUIRE FORMATTED DISK	DESTROY DATA	DESTROY FORMAT	NOTES
11	Global, LOCYL, SECTOR, SCOPE	NO	YES	YES	YES	See Above.
12	Global, LOCYL, SECTOR, SCOPE	NO	YES	YES	YES	See Above.
13	Global, LOCYL, SECTOR	NO	YES	NO	NO	
14	Global, LOCYL, HICYL, SEEK, BYCKAD	NO	YES*	NO	NO	
15	Global, LOCYL, HICYL, SECNUM	NO	YES	NO	NO	
16	Global, LOCYL, SECTOR	NO	NO	YES	YES	Restores Format

*Formatted Disk not required if BYCKAD = 1.

APPENDIX G
COMMAND, STATUS, AND DATA BYTES

DRIVE COMMAND, STATUS, AND DATA BYTES

BIT	0	1	2	3	4	5	6	7	FUNCTION
CMD	DIS	EN	X	X	X	X	SEEK	RESTORE	
WD								256	CYLINDER ADDRESS*
WD	128	64	32	16	8	4	2	1	BYTE
SS	WRT PROT	WRT CHK	ILL ADDR	DISK ADDR INTLK	$\overline{\text{RSRW}}$	EX	SEEK INC	$\overline{\text{DISK READY}}$	

* The greater track density of the 10 Megabyte Drive requires that 2 Write Data instructions or 1 Write Halfword instruction be used to transfer cylinder address information to the drive. In the case of a 2.5 Megabyte Drive one Write Data is sufficient.

CONTROLLER COMMAND, STATUS, AND DATA BYTES

BIT	0	1	2	3	4	5	6	7	FUNCTION
CMD	X	X	X	X	0	0	0	1	READ
	X	X	X	X	0	0	1	0	WRITE
	X	X	X	X	0	0	1	1	READ CHECK
	X	X	X	X	0	1	0	1	READ FORMAT
	X	X	X	X	0	1	1	0	WRITE FORMAT
	X	X	0	0	1	0	0	0	RESET
WD	X	X	HEAD 0/1	SECT 16	SECT 8	SECT 4	SECT 2	SECT 1	
RD (CONTROLLER IDLE)	0	0	0	SECT 16	SECT 8	SECT 4	SECT 2	SECT 1	
SS	OVER-RUN	ADDR COMP FAIL	DEF TRK	CYL OV	BSY	EX	CONT IDLE	DATA TRANSFER ERROR	

X = Don't care

APPENDIX H
RELATED DOCUMENTS

Test Program Listing	06-173M96R06A13
2.5 and 10 Megabyte Removable Cartridge Disk Programming Manual	29-454

PROG= DISCTEST ASSEMBLED BY CAL 03-066R07-00 (32-BIT)

```
 1          SCRAT                                                    CDT00000
 2          CROSS                                                    CDT00010
 3  DISCTEST PROG  COMMON DISK TEST 06-173R06                        CDT00020
 4          TARGT 16                  CODE EXPECTS TARGT 16          CDT00030
 5          NORX3                                                    CDT00040
 6          SQUEZ 2                                                  CDT00050
 7          ERSQZ                                                    CDT00060


 9  * COMMON DISK TEST 06-173R06                                     CDT00080
10  * COPYRIGHT PERKIN-ELMER, INC., APRIL 1979                        CDT00090
11  * EDITED 041680                                                  CDT00100
12  *                                                                CDT00110
13  * PROGRAM USES THE COMMON INSTRUCTION SET                        CDT00120
14  *                                                                CDT00130
15  * THIS PROGRAM PROVIDES A COMPREHENSIVE TEST OF THE P-E          CDT00140
16  * 2.5 AND 10 MB DISK SYSTEMS. FORMAT AND NORMAL                  CDT00150
17  * MODE TESTING, INTERRUPT QUEUING, MULTIPLE-FILE DATA            CDT00160
18  * TRANSFERS, AND ERROR HANDLING ARE SUPPORTED.                   CDT00170
19  *                                                                CDT00180
20  * THERE ARE NUMEROUS OPTIONS AVAILABLE TO THE USER, AND          CDT00190
21  * DETAILED ERROR MESSAGES TO AID IN THE ISOLATION OF A FAULT     CDT00200
22  * AT THE HARDWARE LEVEL.                                         CDT00210
23  *                                                                CDT00220
24  * THE PROGRAM CAN BE RUN ON ANY STANDARD PERKIN-ELMER            CDT00230
25  * 16 OR 32 BIT COMPUTER WITH STANDARD MULTIPLEXOR BUS.           CDT00240
26  * OPTIONS AND RUN COMMAND ARE TO BE ENTERED VIA A CONSOLE        CDT00250
27  * TERMINAL. A SINGLE DISK CONTROLLER AND ITS ATTACHED DRIVES     CDT00260
28  * MAY BE TESTED AT ONE TIME.                                     CDT00270
29  *                                                                CDT00280
```

```
                         31          NLSTC                                                    CDT00300
                         32  *                                                                CDT00310
                         33  $STRUC1  STRUC                  OPTION TABLE STRUCTURE           CDT00320
0000                     34  $OPTNAME DS    6                ASCII OPTION NAME                CDT00330
0006                     35  $CKROUT  DS    2                Z(CHECK ROUTINE)                 CDT00340
0008                     36  $VALU1   DS    2                16-BIT VALUE                     CDT00350
000A                     37  $VALU2   DS    2                SPARE                            CDT00360
000C                     38          ENDS                                                     CDT00370
                         39  *                                                                CDT00380
      0000 0050          40  $BUFLEN  EQU   80               I/O BUFFER LENGTH                CDT00390
                         41  *                                                                CDT00400
                         42  *                                                                CDT00410
                         43  *       CONDITIONAL ASSEMBLY PARAMETERS TO FOLLOW                 CDT00420
                         44  *                                                                CDT00430
                         45  *            IN ALL CASES, 0 EQUALS DELETE                       CDT00440
                         46  *                          1 EQUALS INCLUDE                      CDT00450
                         47  *                                                                CDT00460
                         48  *                               FOR SCLOCK, FOLLOWING TIMERS INCLUDED CDT00470
                         49  *                              1 EQUALS INCLUDE SOFTWARE         CDT00480
                         50  *                              2 EQUALS INCLUDE HARDWARE         CDT00490
                         51  *                              3 EQUALS INCLUDE BOTH             CDT00500
                         52  *            TIMER LABEL IS "TIMER" FOR SOFTWARE AND             CDT00510
                         53  *            HARDWARE, EXCEPT WHEN BOTH ARE INCLUDED.            CDT00520
                         54  *            THEN LABELS ARE "STIMER" AND "HTIMER"               CDT00530
                         55  *            RESPECTIVELY.                                       CDT00540
                         56  *                                                                CDT00550
      0000 0000          57  $R5BIN   EQU   0                                                 CDT00560
      0000 0000          58  $DECTAB  EQU   0                                                 CDT00570
      0000 0000          59  $DECHEX  EQU   0                                                 CDT00580
      0000 0000          60  $DECASC  EQU   0                                                 CDT00590
      0000 0000          61  $KBINT   EQU   0                                                 CDT00600
      0000 0001          62  $CLOCK   EQU   1                                                 CDT00610
      0000 0001          63  $DISPLAY EQU   1                                                 CDT00620
      0000 0000          64  $BUFIO   EQU   0                                                 CDT00630
                         65  *                                                                CDT00640
      0000 0000          66  R0       EQU   0                                                 CDT00650
      0000 0001          67  R1       EQU   1                                                 CDT00660
      0000 0002          68  R2       EQU   2                                                 CDT00670
      0000 0003          69  R3       EQU   3                                                 CDT00680
      0000 0004          70  R4       EQU   4                                                 CDT00690
      0000 0005          71  R5       EQU   5                                                 CDT00700
      0000 0006          72  R6       EQU   6                                                 CDT00710
      0000 0007          73  R7       EQU   7                                                 CDT00720
      0000 0008          74  R8       EQU   8                                                 CDT00730
      0000 0009          75  R9       EQU   9                                                 CDT00740
      0000 000A          76  R10      EQU   10                                                CDT00750
      0000 000B          77  R11      EQU   11                                                CDT00760
      0000 000C          78  R12      EQU   12                                                CDT00770
      0000 000D          79  R13      EQU   13                                                CDT00780
      0000 000E          80  R14      EQU   14                                                CDT00790
      0000 000F          81  R15      EQU   15                                                CDT00800
                         82  *                                                                CDT00810
                         83  *  BOOTLOADER WITH CHKSUM                                        CDT00820
```

```
                                84  *                                                                    CDT00830
0000R                           85          ORG   X'80'                                                 CDT00840
0080   2421                     86          LIS   R2,1                                                   CDT00850
0082   2303                     87          BS    BOOT                                                   CDT00860
0084   3600                     88          DC    Z(PSWSAVE+X'FF'&X'FF00') S32/3200 PPF PSW SAVE PTR     CDT00870
0086   36C8                     89          DC    Z(PSWSAVE+X'FF'&X'FF00'+8) S32/3200 PPF REGSAVE PTR    CDT00880
0088   C810 0A00                90  BOOT    LDAI  R1,ORIGIN1          R1 = ADR( FIRST BYTE OF TEST PROG  CDT00890
008C   C830 35DC                91          LDAI  R3,LNZB+1           R3 = ADR( LAST NON-ZERO BYTE )     CDT00900
0090   4030 0022                92          STH   R3,X'22'            S16 REGISTER SAVE POINTER          CDT00910
0094   2731                     93          SIS   R3,1                                                   CDT00920
0096   C860 00FF                94  MN      LHI   R6,X'00FF'          R6 = CHKSUM BYTE = X'MN'           CDT00930
009A   D340 0078                95          LB    R4,X'78'            INPUT DEV ADR                      CDT00940
009E   DE40 0079                96          OC    R4,X'79'                                               CDT00950
00A2   9D45                     97  LEADER  SSR   R4,R5                                                  CDT00960
00A4   2091                     98          BTBS  9,1                 DU,BSY                             CDT00970
00A6   9B45                     99          RDR   R4,R5                                                  CDT00980
00A8   0855                    100          LDAR  R5,R5                                                  CDT00990
00AA   2234                    101          BZS   LEADER              IGNORE LEADER                      CDT01000
00AC   D251 0000               102  LOAD    STB   R5,0(R1)            STORE 1ST NON-ZERO & SUBSEQUENT BY CDT01010
00B0   D351 0000               103          LB    R5,0(R1)            RELOAD DATA BYTE TO                CDT01020
00B4   0765                    104          XAR   R6,R5               GENERATE CHKSUM                    CDT01030
00B6   9481                    105          EXBR  R8,R1                                                  CDT01040
00B8   9828                    106          WHR   R2,R8               DISPLAY MEMORY ADDRESS             CDT01050
00BA   9D45                    107          SSR   R4,R5                                                  CDT01060
00BC   2091                    108          BTBS  9,1                 DU,BSY                             CDT01070
00BE   9B45                    109          RDR   R4,R5                                                  CDT01080
00C0   C110 00AC               110          BXLE  R1,LOAD             LOAD TILL LAST BYTE                CDT01090
00C4   9486                    111          EXBR  R8,R6                                                  CDT01100
00C6   9828                    112          WHR   R2,R8               FINAL CHKSUM                       CDT01110
00C8   2478                    113  LDWT    LIS   R7,8                                                   CDT01120
00CA   917C                    114          SLLS  R7,12               R7 = X'8000'                       CDT01130
00CC   9557                    115          EPSR  R5,R7               HALT PROCESSOR.                    CDT01140
00CE   2203                    116          BS    LDWT                                                   CDT01150
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EXEC - ETPE R05P2

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00D0                          118          ORG   X'A00'                                                    CDT01170
0A00   4300 0A5E              119  ORIGIN1 B     START              START HERE FOR 32-BIT PROCESSOR        CDT01180
0A04                          120          IFZ   ADC-2                                                     CDT01190
0A04   4300 0A5E              121  ORIGIN2 B     START              START HERE FOR 16-BIT PROCESSOR        CDT01200
0A08   4300 0A72              122  ORIGIN3 B     START3             SPECIAL 32-BIT PROCESSOR START         CDT01210
0A0C   4300 0A74              123  CRIGIN4 B     START4             SPECIAL 16-BIT PROCESSOR START         CDT01220
                              124          ELSE                                                            CDT01230
                              128          ENDC                                                            CDT01270
                              129  *                                                                       CDT01280
                              130  *----------------------------                                           CDT01290
                              131  *   TEST CONSTANTS                          *                           CDT01300
                              132  *                                                                       CDT01310
       0000 0006              133  $MAXIO  EQU   6                  > MAX VALID IDENTIFIER                 CDT01320
0A10   0101                   134  IO      DC    X'0101'            I/O DEVICE(S) IDENTIFIER               CDT01330
                              135  *                                                                       CDT01340
0A12   0010                   136  PASLADR DC    X'0010'            PALSA/PALM READ ADDRESS                CDT01350
0A14   0011                   137          DC    X'0011'            PASLA/PALM WRITE ADDRESS               CDT01360
0A16   0002                   138  CLIFADR DC    X'0002'            CURRENT LOOP INTERFACE READ ADDRES     CDT01370
0A18   0002                   139          DC    X'0002'            CURRENT LOOP INTERFACE WRITE ADDRE     CDT01380
0A1A   0062                   140  LPADR   DC    X'0062'            DUMMY FOR LINE PRINTER                 CDT01390
0A1C   0062                   141          DC    X'0062'            WRITE ADDRESS                          CDT01400
0A1E   0010                   142  C300ADR DC    X'0010'            CAROUSEL/PASLA READ ADDRESS            CDT01410
0A20   0011                   143          DC    X'0011'            CAROUSEL/PASLA WRITE ADDRESS           CDT01420
0A22   00C0                   144  MICROBUS DC   X'00C0'            MICROBUS READ ADDRESS                  CDT01430
0A24   00C0                   145          DC    X'00C0'            MICROBUS WRITE ADDRESS                 CDT01440
0A26   0000                   146          DCX   0                  PROVISION FOR SPECIAL DEVICE (READ     CDT01450
0A28   0000                   147          DCX   0                  WRITE ADDRESS                          CDT01460
                              148  *                                                                       CDT01470
                              149  * IO =   0101  FOR CRT ON PASLA                                         CDT01480
                              150  *        0202  FOR TELETYPE, CAROUSEL 15/30                             CDT01490
                              151  *        XX03  FOR LINE PRINTER                                         CDT01500
                              152  *        0404  FOR CAROUSEL 300                                         CDT01510
                              153  *        0505  FOR MICROBUS                                             CDT01520
                              154  *                                                                       CDT01530
                              155  *-------------------------------------------------------------          CDT01540
                              156  *  ETPE IO COMMANDS                                                     CDT01550
                              157  *                                                                       CDT01560
0A2A   0000                   158  CONRADR DCX   0                  CONSOLE DEVICE READ ADDRESS            CDT01570
0A2C   0000                   159  CONWADR DCX   0                  CONSOLE DEVICE WRITE ADDRESS           CDT01580
                              160  *                                                                       CDT01590
0A2E   0000                   161  CONRD   DCX   0                  CONSOLE READ/WRITE COMMANDS            CDT01600
       0000 0A2F              162  CONWRT  EQU   CONRD+1                                                   CDT01610
0A30   0000                   163  CON2ND  DCX   0                                                         CDT01620
       0000 0A31              164  CONENRD EQU   CON2ND+1                                                  CDT01630
0A32   0000                   165  CONCMD  DCX   0                  DUMMY HW AS POINTER                    CDT01640
0A34   A1A3                   166  CRTRD   DCX   A1A3               FOR CRT                                CDT01650
0A36   EE61                   167  CRT2ND  DCX   EE61                                                      CDT01660
0A38   E4E8                   168  CLIFRD  DCX   E4E8               *   CURRENT LOOP INTERFACE   P3 3/80   CDT01670
0A3A   0064                   169  CLIF2ND DCX   0064               .                            P3 3/80   CDT01680
0A3C   0080                   170  LPWRT   DCX   0080               *   LINE PRINTER                       CDT01690
0A3E   0000                   171          DCX   0                  DUMMY FOR LP                           CDT01700
0A40   A1A3                   172  CARRD   DCX   A1A3               *   CAROUSEL 300                       CDT01710
0A42   F061                   173  CAR2ND  DCX   F061                                                      CDT01720
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0A44  8202            174 MREADC  DCX  8202          *   MICROBUS                          CDT01730
0A46  0082            175         DCX  0082          .                          P2 1/80    CDT01740
                      176 *                                                                 CDT01750
                      177 *-------------------------------------------------------------    CDT01760
0A48  00              178 CONRQ2S DB   0             CONSOLE REQUEST TO SEND CMD           CDT01770
0A49  23              179 CRTRQ2S DB   X'23'         FOR CRT                               CDT01780
0A4A  00              180         DB   0             DUMMY BYTE FOR CLI                    CDT01790
0A4B  00              181         DB   0             *   DUMMY BYTE FOR LP                 CDT01800
0A4C  23              182 CARRQ2S DB   X'23'         *   CAROUSEL 300                      CDT01810
0A4D  00              183         DB   0             *   DUMMY BYTE FOR MICROBUS           CDT01820
0A4E                  184         DB   *             (ALIGN ON HW BOUNDRY)                 CDT01830
0A4E  0000            185         DCX  0             RESERVED                              CDT01840
0A50  30F0            186 PSW     DCX  30F0          PSW USED IN PROGRAM                   CDT01850
0A52  30F0            187 PSW2    DCX  30F0          PSW USED IN EXEC                      CDT01860
0A54  70F0            188 PSW3    DCX  70F0          PSW USED IN INTERRUPT TESTS           CDT01870
0A56  0000            189         DCX  0             RESERVED                              CDT01880
0A58  0000            190         DCX  0             RESERVED                              CDT01890
0A5A  0F00            191 STIMVAL DCX  0F00          TIMEOUT CONSTANT           06-173     CDT01900
0A5C  8800            192 $CON    DCX  8800          BREAKPOINT INSTRUCTION                CDT01910
                      193 *-----------------------------                                    CDT01920
                      194 *                                                                 CDT01930
0A5E  48E0 0A52       195 START   LH   R14,PSW2      NEW PSW FOR ILLEGAL INTERRUPT         CDT01940
0A62  C8F0 0A76       196         LDAI R15,STARTA     AND NEW LOC                           CDT01950
0A66  D0E0 0034       197         STM  R14,X'34'      FOR SERIES 16                         CDT01960
0A6A  D0E0 0030       198         STM  R14,X'30'      FOR SERIES 32                         CDT01970
0A6E  0000            199         DCX  0              TAKE AN ILLEGAL INSTRUCTION INT       CDT01980
0A70  2200            200         BS   *              HALT IF II NOT TAKEN                  CDT01990
                      201 *                                                                 CDT02000
* 0A72  2302          202 START3  B    STARTA         INSERT SPECIAL ROUTINE HERE           CDT02010
  0A74                203         IFZ  ADC-2                                               CDT02020
* 0A74  2301          204 START4  B    STARTA         INSERT SPECIAL ROUTINE HERE           CDT02030
                      205         ENDC                                                     CDT02040
0A76  C800 8000       206 STARTA  LHI  R0,X'8000'                                          CDT02050
0A7A  4000 1624       207         STH  R0,ISITERR     FORCE TITLE PRINT                     CDT02060
0A7E  EC00 0010       208         SRL  R0,16          REGISTER PAIR SHIFTED, SERIES 16      CDT02070
0A82  4000 1610       209         STH  R0,MOD32       SIGN EXTENSION, SERIES 32.            CDT02080
                      210 *                                                                 CDT02090
0A86  41E0 11CA       211         BAL  R14,STCON      SET UP CONSOLE                        CDT02100
0A8A  41F0 137C       212         BAL  R15,LCORE      SET UP LOW CORE                       CDT02110
0A8E  2400            213         LIS  R0,0                                                CDT02120
0A90  4000 1904       214         STH  R0,RFMTFLG     RESET 'REFORMAT REQUIRED' FLAG        CDT02130
0A94  4000 17F8       215         STH  R0,NOMSG+$VALU1 FORCE 'NOMSG 0' AT START             CDT02140
0A98  4000 1620       216         STH  R0,$BRKFLG     NO BREAK KEY YET                      CDT02150
0A9C  41F0 103C       217         BAL  R15,CRLF                                            CDT02160
0AA0  41F0 1048       218         BAL  R15,$PRINT     PRINT TEST PROGRAM TITLE              CDT02170
0AA4  199A            219         DAC  TITLE                                               CDT02180
0AA6  48F0 162E       220         LH   R15,$WASDU     WAS DEVICE SEEN DU ?                  CDT02190
0AAA  4230 0D6E       221         BNZ  HALT9          PRINT TOTAL, TOTERR                   CDT02200
                      222 *                                                                 CDT02210
                      223 *                                                                 CDT02220
                      224 *  KEYBOARD INPUT ROUTINE                                         CDT02230
                      225 *                                                                 CDT02240
      0000 0AAE       226 OPTIN   EQU  *                                                   CDT02250
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0AAE  41F0 1334          227           BAL   R15,SETKB          ESTABLISH CONSOLE                          CDT02260
0AB2  41F0 103C          228           BAL   R15,CRLF                                                        CDT02270
0AB6  4820 0A52          229  OPTIN1   LH    R2,PSW2            SPEC'D AS X'30F0'                          CDT02280
0ABA  4020 1624          230           STH   R2,ISITERR         FORCE EXEC MESSAGE PRINT                   CDT02290
0ABE  9512               231           EPSR  R1,R2              NO INT. REG SET 15                         CDT02300
0AC0  2400               232           LIS   R0,0               NO BRK TERM QUEUE, NOMSG>0   P1 10/79    CDT02310
0AC2  4000 1620          233           STH   R0,$BRKFLG         P1 10/79                                   CDT02320
0AC6  41F0 1334          234           BAL   R15,SETKB          ESTABLISH CONSOLE                          CDT02330
0ACA  D340 16E8          235           LB    R4,AMSG            OUTPUT AN * TO INDICATE                    CDT02340
0ACE  41F0 10D8          236           BAL   R15,OUTCHR         COMMAND MODE ESTABLISHED                   CDT02350
0AD2  2541               237           LCS   R4,1               X'FF'                                      CDT02360
0AD4  41F0 10D8          238           BAL   R15,OUTCHR                                                    CDT02370
0AD8  41F0 114C          239           BAL   R15,$READ          GET INPUT RECORD                           CDT02380
                         240  *                                                                             CDT02390
                         241  * ------------------------------------                                       CDT02400
                         242  *                                                                             CDT02410
                         243  * COMMAND DECODE                                                              CDT02420
                         244  *                                                                             CDT02430
0ADC  C8C0 124E          245  $LOOK    LDAI  R12,QUESTN         GLOBAL ERROR ROUTINE                       CDT02440
0AE0  C810 1700          246           LDAI  R1,OPT-$STRUC1     TO START AT OPTION TABLE                   CDT02450
* 0AE4  261C              247  $LOOK.0  AHI   R1,$STRUC1        ADVANCE TO NEXT TABLE ENTRY                CDT02460
0AE6  2430               248  $LOOK.1  LIS   R3,0               CLEAR BUFFER INDEX                         CDT02470
0AE8  4851 0000          249           LH    R5,0(R1)           END OF TABLE ?                             CDT02480
0AEC  021C               250           BMR   R12                IF MINUS, THEN NO MATCH => ERROR.          CDT02490
0AEE  0861               251           LDAR  R6,R1              START OF OPTION ENTRY                      CDT02500
0AF0  D343 3644          252  $LOOK.2  LB    R4,$INBUF(R3)      GET INPUT BYTE                             CDT02510
0AF4  D356 0000          253           LB    R5,0(R6)           GET OPTION NAME BYTE                       CDT02520
0AF8  2631               254           AIS   R3,1               ADVANCE TO NEXT BYTE                       CDT02530
0AFA  C550 0020          255           CLHI  R5,C' '            OPTION NAME SPACE IN TABLE ?               CDT02540
0AFE  233A               256           BES   $LOOK.3            BRANCH: YES.                               CDT02550
0B00  0545               257           CLAR  R4,R5              INPUT, OPTION BYTES MATCH ?                CDT02560
0B02  203F               258           BNES  $LOOK.0            BRANCH: NO.                                CDT02570
0B04  2661               259           AIS   R6,1               INDEX OPTION POINTER                       CDT02580
0B06  C530 0006          260           CLHI  R3,$CKROUT         WHOLE OPTION NAME MATCHED ?                CDT02590
0B0A  208D               261           BLS   $LOOK.2            BRANCH: NOT YET.                           CDT02600
0B0C  D343 3644          262           LB    R4,$INBUF(R3)      GET BYTE FOLLOWING OPTION                  CDT02610
0B10  2631               263           AIS   R3,1               INCREMENT BUFFER POINTER                   CDT02620
0B12  C540 0020          264  $LOOK.3  CLHI  R4,C' '            OPTION FOLLOWED BY SPACE ?                 CDT02630
0B16  2336               265           BES   $LOOK.4            BRANCH: YES.                               CDT02640
0B18  C540 000D          266           CLHI  R4,X'0D'           CARRIAGE RETURN ?                          CDT02650
0B1C  4230 0AE4          267           BNE   $LOOK.0            BRANCH: NO MATCH                           CDT02660
0B20  2731               268           SIS   R3,1               POINT TO CARRIAGE RETURN                   CDT02670
0B22  C510 1838          269  $LOOK.4  CLAI  R1,OPTION          'OPTION' CMD ?                             CDT02680
0B26  4330 0BCA          270           BE    $OPTPRT            BRANCH: YES.                               CDT02690
0B2A  C510 1844          271           CLAI  R1,RUN             'RUN' CMD ?                                CDT02700
0B2E  4330 0C72          272           BE    $RUNIT             BRANCH: YES.                               CDT02710
0B32  C510 1850          273           CLAI  R1,CON             'CON' CMD ?                                CDT02720
0B36  4330 0A5C          274           BE    $CON               BRANCH: YES.                               CDT02730
0B3A  C510 170C          275           CLAI  R1,TEST            'TEST' CMD ?                               CDT02740
0B3E  4330 0B60          276           BE    $TESTOP            BRANCH: YES.                               CDT02750
                         277  *                                                                             CDT02760
                         278  * TO PROCESS COMMANDS WHICH MUST HAVE HEXADECIMAL INPUT VALUE                 CDT02770
                         279  *                                                                             CDT02780
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0B42  C540 0020          280 $LOOK.5  CLHI  R4,C' '          OPTION FOLLOWED BY SPACE ?      CDT02790
0B46  023C               281          BNER  R12              IF NO, ERROR.                   CDT02800
0B48  41E0 0F44          282          BAL   R14,OPTVAL       GET OPTION VALUE IN R6          CDT02810
0B4C  274D               283          SIS   R4,X'0D'         TERMINATED BY CR ?              CDT02820
0B4E  023C               284          BNZR  R12              IF NO, ERROR.                   CDT02830
0B50  48E1 0006          285          LH    R14,$CKROUT(R1)  GET A(OPTION CHECK ROUTINE)     CDT02840
0B54  2332               286          BZS   $LOOK.6          BRANCH: NO SPECIAL ROUTINE.     CDT02850
0B56  01FE               287          BALR  R15,R14          LINK OPTION CHECK ROUTINE       CDT02860
0B58  4061 0008          288 $LOOK.6  STH   R6,$VALU1(R1)    STORE OPTION VALUE              CDT02870
0B5C  4300 0AB6          289          B     OPTIN1           TO ACCEPT NEXT COMMAND          CDT02880
                         290 *                                                               CDT02890
                         291 *                                                               CDT02900
0B60  4890 1894          292 $TESTOP  LH    R9,DEFTESTS      ASSUME DEFAULT REQUIRED         CDT02910
0B64  4880 1896          293          LH    R8,DEFTESTS+2                                    CDT02920
0B68  D340 3648          294          LB    R4,$INBUF+4      GET NEXT BYTE                   CDT02930
0B6C  274D               295          SIS   R4,X'0D'         CARRIAGE RETURN ?               CDT02940
0B6E  4330 0BA6          296          BZ    $TSTOP.5         BRANCH: YES.                    CDT02950
0B72  CB40 0013          297          SHI   R4,C' '-X'0D'    WAS SPACE ?                     CDT02960
0B76  023C               298          BNZR  R12              BRANCH: INPUT ERROR.            CDT02970
0B78  2490               299          LIS   R9,0             CLEAR ACCUMULATORS              CDT02980
0B7A  2480               300          LIS   R8,0                                             CDT02990
                         301 *                                                               CDT03000
0B7C  41E0 0F44          302 $TSTOP.1 BAL   R14,OPTVAL       GET OPTION VALUE IN R6          CDT03010
0B80  4960 18C6          303          CH    R6,MAXTST        VALID TEST NUMBER ?             CDT03020
0B84  022C               304          BPR   R12              ERROR: INVALID TEST NUMBER      CDT03030
0B86  24E8               305          LIS   R14,8                                            CDT03040
0B88  91EC               306          SLLS  R14,12           (R14) = '8000'                  CDT03050
0B8A  CCE6 0000          307          SRHL  R14,0(R6)        UNARY OPERAND                   CDT03060
0B8E  276F               308          SIS   R6,15            TEST 16:31 ?                    CDT03070
0B90  2123               309          BPS   $TSTOP.3         BRANCH: YES.                    CDT03080
0B92  069E               310          OAR   R9,R14           SET CURRENT BIT                 CDT03090
0B94  2302               311          BS    $TSTOP.4                                         CDT03100
0B96  068E               312 $TSTOP.3 OAR   R8,R14           SET CURRENT BIT                 CDT03110
0B98  274D               313 $TSTOP.4 SIS   R4,X'0D'         CMD TERMINATED BY CR ?          CDT03120
0B9A  2336               314          BZS   $TSTOP.5         BRANCH: YES.                    CDT03130
0B9C  CB40 001F          315          SHI   R4,C','-X'0D'    WAS COMMA ?                     CDT03140
0BA0  4330 0B7C          316          BZ    $TSTOP.1         BRANCH: YES. TRY AGAIN.         CDT03150
0BA4  030C               317          BR    R12              INPUT ERROR.                    CDT03160
0BA6  4090 1714          318 $TSTOP.5 STH   R9,TEST+$VALU1   STORE VALID SELECTED TESTS      CDT03170
0BAA  4080 1716          319          STH   R8,TEST+$VALU2   .                               CDT03180
0BAE  4300 0AB6          320          B     OPTIN1           TO ACCEPT NEXT COMMAND          CDT03190
                         321 *                                                               CDT03200
                         322 * ------------------------------------                        CDT03210
                         323 * OPTION CHECK ROUTINES                                       CDT03220
                         324 *                                                               CDT03230
0BB2  C360 FFFE          325 ZERONE   THI   R6,X'FFFE'       IGNORE LSB                      CDT03240
0BB6  033F               326          BZR   R15              OKAY                            CDT03250
0BB8  030C               327          BR    R12              ERROR RETURN                    CDT03260
                         328 *                                                               CDT03270
0BBA  C360 FC00          329 ADR      THI   R6,X'FC00'       (R6) = 10 BIT DEVICE ADDRESS    CDT03280
0BBE  033F               330          BZR   R15              RETURN TO LOOK5                 CDT03290
0BC0  030C               331          BR    R12                                              CDT03300
                         332 *                                                               CDT03310
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0BC2  C360 FFF0      333  LEVEL    THI   R6,X'FFF0'          (R6) = INTERRUPT LEVEL HEX DIGIT      CDT03320
0BC6  033F           334           BZR   R15                 RETURN TO LOOK5                       CDT03330
0BC8  030C           335           BR    R12                                                       CDT03340
                     363  *----------------------------                                            CDT03620
                     364  *  TO PROCESS INPUT COMMAND 'OPTION'                                      CDT03630
                     365  *                                                                         CDT03640
0BCA  C540 000D      366  $OPTPRT  CLHI  R4,X'0D'            OPTION (CR) ?                         CDT03650
0BCE  233A           367           BES   $OPT.0              BRANCH: YES.                          CDT03660
0BD0  41E0 0F44      368           BAL   R14,OPTVAL          NO, GET OPTION DEV. PRINTOUT NUM.     CDT03670
0BD4  C560 0006      369           CLHI  R6,$MAXIO           DEVICE NUMBER VALID ?                 CDT03680
0BD8  038C           370           BNLR  R12                 BRANCH: NO.                           CDT03690
0BDA  0866           371           LDAR  R6,R6               OPTION ZERO ?                         CDT03700
0BDC  033C           372           BZR   R12                 BRANCH: YES. INVALID INPUT.           CDT03710
0BDE  D260 1623      373           STB   R6,IOSAVE+1         CHANGE THE LIST DEVICE                CDT03720
0BE2  4820 183E      374  $OPT.0   LH    R2,OPTION+$CKROUT   SPECIAL PRINTOUT ROUTINE ?            CDT03730
0BE6  2332           375           BZS   OPTRTN              BRANCH: NO.                           CDT03740
0BE8  01F2           376           BALR  R15,R2              LINK USER ROUTINE                     CDT03750
0BEA  C830 170C      377  CPTRTN   LDAI  R3,OPT              START OF OPTION TABLE                 CDT03760
0BEE  244F           378  $OPT.A   LIS   R4,15                                                      CDT03770
0BF0  4040 1842      379           STH   R4,$LINCNT          LINES PER PRINTOUT PAGE ABOUT 15      CDT03780
0BF4  2410           380  $OPT.B   LIS   R1,0                                                       CDT03790
0BF6  0823           381           LDAR  R2,R3               START OF OPTION ENTRY                 CDT03800
0BF8  D302 0000      382  $OPT.2   LB    R0,0(R2)           GET OPTION NAME BYTE                  CDT03810
0BFC  D201 35F4      383           STB   R0,$OUTBUF(R1)      MOVE TO OUTPUT BUFFER                 CDT03820
0C00  2611           384           AIS   R1,1                                                      CDT03830
0C02  2621           385           AIS   R2,1                                                      CDT03840
0C04  C510 0006      386           CLHI  R1,$CKROUT          WHOLE NAME MOVED ?                    CDT03850
0C08  2088           387           BLS   $OPT.2              BRANCH: NO.                           CDT03860
0C0A  C840 2020      388           LHI   R4,C' '             SPACES                                CDT03870
0C0E  4040 35FA      389           STH   R4,$OUTBUF+$CKROUT                                        CDT03880
0C12  C530 170C      390           CLAI  R3,TEST             PROCESSING 'TEST' OPTION ?            CDT03890
0C16  2136           391           BNES  $OPT.3              BRANCH: NO.                           CDT03900
0C18  C850 1714      392           LDAI  R5,TEST+$VALU1      A(OPTION BITS)                        CDT03910
0C1C  41F0 0FCA      393           BAL   R15,$LSTBIT         OUTPUT BIT NUMBERS (E.G.,1,2...)      CDT03920
0C20  230D           394           RS    $OPT.5              ADVANCE TO NEXT OPTION                CDT03930
                     395  *                                                                         CDT03940
                     396  * PROCESSING OPTIONS WITH 4-DIGIT HEX VALUES.                            CDT03950
                     397  * OPTION NAME ALREADY IN OUTPUT BUFFER.                                  CDT03960
                     398  *                                                                         CDT03970
0C22  4813 0008      399  $OPT.3   LH    R1,$VALU1(R3)      OPTION VALUE HALFWORD                 CDT03980
0C26  2404           400           LIS   R0,4                                                      CDT03990
0C28  C820 35FB      401           LDAI  R2,$OUTBUF+$CKROUT+1 BUFFER OFFSET                        CDT04000
0C2C  41F0 0FA4      402           BAL   R15,HEXASC          WRITE OPTION VALUE IN HEX (4 DIGITS   CDT04010
0C30  240D           403           LIS   R0,X'0D'            CARRIAGE RETURN                       CDT04020
0C32  D200 35FF      404           STB   R0,$OUTBUF+$CKROUT+5 INSERT TO BUFFER                     CDT04030
0C36  41F0 1056      405           BAL   R15,@PRINT          OUTPUT PRINT BUFFER                   CDT04040
* 0C3A  263C         406  $OPT.5   AHI   R3,$STRUC1          LENGTH OF TABLE ENTRY                 CDT04050
0C3C  C530 1814      407           CLAI  R3,OPTEND2          DONE ALL PRINTING OPTIONS ?           CDT04060
0C40  4380 0AB6      408           BNL   OPTIN1              BRANCH: YES.                          CDT04070
0C44  D300 1623      409           LB    R0,IOSAVE+1         CURRENT LIST ID                       CDT04080
0C48  D400 0A10      410           CLB   R0,IO               SAME AS CONSOLE ?                     CDT04090
0C4C  4230 0BEE      411           BNE   $OPT.A              BRANCH: YES. NO LINE CNT TEST.        CDT04100
0C50  2501           412           LCS   R0,1                                                      CDT04110
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EXEC - ETPE R05P2

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0C52  6100 1842          413           AHM   R0,$LINCNT          DECREMENT COUNTER                    CDT04120
0C56  4230 0BF4          414           BNZ   $OPT.B              BRANCH: SCREEN NOT FULL              CDT04130
0C5A  41F0 114C          415           BAL   R15,$READ           GET (CR) OR (LF) TO CONTINUE         CDT04140
0C5E  D340 3644          416           LB    R4,$INBUF           FIRST CHARACTER                      CDT04150
0C62  274D               417           SIS   R4,X'0D'            CARRIAGE RETURN ?                    CDT04160
0C64  4330 0AB6          418           BZ    OPTIN1              BRANCH: YES. DONE.                   CDT04170
0C68  2643               419           AIS   R4,X'03'            LINE FEED (X'0A') ?                  CDT04180
0C6A  4230 0ADC          420           BNZ   $LOOK               BRANCH: NO. ATTEMPT DECODE.          CDT04190
0C6E  4300 0BEE          421 $OPT.6    B     $OPT.A              BRANCH: CONTINUE.                    CDT04200
                         422 *----------------------------                                          CDT04210
                         423 * 'RUN' COMMAND HAS BEEN ENTERED                                        CDT04220
                         424 *                                                                       CDT04230
0C72  274D               425 $RUNIT    SIS   R4,X'0D'            CARRIAGE RETURN ENTERED ?            CDT04240
0C74  023C               426           BNZR  R12                 BRANCH: INPUT ERROR.                 CDT04250
                         427 * FIND HIGHEST SELECTED TEST NUMBER                                     CDT04260
0C76  C8F0 001F          428           LHI   R15,31              INITIAL OFFSET FROM 0                CDT04270
0C7A  4800 1716          429           LH    R0,TEST+$VALU2      BITS FOR TESTS 16:31                 CDT04280
0C7E  2135               430           BNZS  $KEEP.1             BRANCH: BIT(S) SET.                  CDT04290
0C80  24FF               431           LIS   R15,15              OFFSET FROM 0                        CDT04300
0C82  4800 1714          432           LH    R0,TEST+$VALU1      BITS FOR TESTS 0:15                  CDT04310
0C86  033C               433           BZR   R12                 BRANCH: NO TESTS SELECTED.           CDT04320
0C88  9001               434 $KEEP.1   SRLS  R0,1                SHIFT UNTIL BIT SEEN                 CDT04330
0C8A  2183               435           BCS   $KEEP.2             BRANCH: GOT IT.                      CDT04340
0C8C  27F1               436           SIS   R15,1               DECREMENT INDEX                      CDT04350
0C8E  2203               437           BS    $KEEP.1             AND LOOP.                            CDT04360
0C90  40F0 1628          438 $KEEP.2   STH   R15,SELTST          HIGHEST SELECTED TEST NUMBER.        CDT04370
0C94  41F0 137C          439           BAL   R15,LCORE           SET UP LOW CORE                      CDT04380
                         440 *                                                                       CDT04390
0C98  41F0 103C          441           BAL   R15,CRLF            LINE FEED TO LIST DEVICE             CDT04400
0C9C  41F0 1DBE          442           BAL   R15,INIT            LINK USER INITIALIZATION ROUTINE     CDT04410
0CA0  41F0 133E          443 INITRET   BAL   R15,SETLST          SELECT LIST DEVICE                   CDT04420
0CA4  2400               444           LIS   R0,0                                                     CDT04430
0CA6  4000 1630          445           STH   R0,TOTAL            RESET TOTAL                          CDT04440
0CAA  4000 1632          446           STH   R0,TOTERR           RESET TOTERR                         CDT04450
                         447 *-------------------------------------------------                      CDT04460
                         448 * TO PROCEED TO NEXT SEQUENTIAL TEST (STARTS WITH TEST 0)               CDT04470
                         449 *                                                                       CDT04480
0CAE  2501               450 $KEEP1    LCS   R0,1                                                     CDT04490
0CB0  4000 1634          451           STH   R0,BTESTNO          RESET BINARY TEST NUMBER             CDT04500
0CB4  4810 1634          452 $KEEP2    LH    R1,BTESTNO          BINARY TEST NUMBER                   CDT04510
0CB8  2611               453           AIS   R1,1                                                     CDT04520
0CBA  4910 1628          454           CH    R1,SELTST           STILL VALID ?                        CDT04530
0CBE  4220 0D3A          455           BP    $KEEP5              BRANCH: NO.                          CDT04540
0CC2  4010 1634          456           STH   R1,BTESTNO          INCREMENTED TO CURRENT TEST          CDT04550
0CC6  2480               457           LIS   R8,0                OFFSET TO LOW-ORDER HALFWORD         CDT04560
0CC8  4080 1636          458           STH   R8,COUNT            ZERO LOOP COUNT                      CDT04570
0CCC  4080 1624          459           STH   R8,ISITERR          RESET ERROR FLAG                     CDT04580
0CD0  C510 0010          460           CLHI  R1,16               TEST 0 TO 15 ?                       CDT04590
0CD4  2182               461           BLS   $KEEP2.1            BRANCH: NO.                          CDT04600
0CD6  2482               462           LIS   R8,2                OFFSET TO HIGH-ORDER HALFWORD        CDT04610
0CD8  0861               463 $KEEP2.1  LDAR  R6,R1                                                    CDT04620
0CDA  41E0 0F78          464           BAL   R14,UNARY           CONVERT (R6) TO BIT IN R3            CDT04630
0CDE  4438 1714          465           NH    R3,TEST+$VALU1(R8)  TEST SELECTED ?                      CDT04640
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0CE2  4330 0CB4     466           BZ    $KEEP2            BRANCH: NO. FIND ONE THAT IS.          CDT04650
0CE6  2402          467           LIS   R0,2              SET DIGITS TO PRINT = 2                CDT04660
0CE8  C820 1658     468           LDAI  R2,MTESTNO        R2 = A(MTESTNO)                        CDT04670
0CEC  41F0 0FA4     469           BAL   R15,HEXASC        STORE TEST # IN ASCII @ MTESTNO        CDT04680
0CF0  41F0 1048     470           BAL   R15,$PRINT                                               CDT04690
0CF4  1652          471           DAC   TSTMSG            'TEST NN'                              CDT04700
                    472 *                                                                        CDT04710
                    473 * ------------------------------                                       CDT04720
                    474 *  TO RUN CURRENT SELECTED TEST                                          CDT04730
                    475 *                                                                        CDT04740
0CF6  41F0 125C     476 $KEEP3    BAL   R15,TSTBRK        CHECK BREAK KEY                        CDT04750
0CFA  2400          477           LIS   R0,0                                                     CDT04760
0CFC  4000 1624     478           STH   R0,ISITERR        RESET ERROR FLAG                       CDT04770
0D00  48E0 0A50     479           LH    R14,PSW           SPEC'D AS X'70F0'                      CDT04780
0D04  48F0 1634     480           LH    R15,BTESTNO       BINARY TEST NUMBER                     CDT04790
0D08  91F1          481           SLLS  R15,LADC          CONVERT TO OFFSET                      CDT04800
0D0A  48FF 1898     482           LDA   R15,TESTS(R15)    POINTER TO TEST MODULE                 CDT04810
0D0E  D0E0 1600     483           STM   R14,NEWPSW                                               CDT04820
0D12  C200 1600     484           LPSW  NEWPSW            GO TO TEST, WITH INTERRUPTS ENABLED    CDT04830
                    485 *----------------------------                                          CDT04840
                    486 *  THE SUBTEST HAS BEEN RUN                                              CDT04850
                    487 *                                                                        CDT04860
0D16  4810 0A52     488 TSTEND    LH    R1,PSW2           SPEC'D AS X'30F0'                      CDT04870
0D1A  9501          489           EPSR  R0,R1             DISABLE INTERRUPTS                     CDT04880
0D1C  4820 1636     490           LH    R2,COUNT          NUMBER OF TIMES MODULE RAN             CDT04890
0D20  2621          491           AIS   R2,1                                                     CDT04900
0D22  4020 1636     492           STH   R2,COUNT                                                 CDT04910
0D26                493           IFZ   $DISPLAY-1        IF DISPLAY INCLUDED:                   CDT04920
0D26  41F0 0DC2     494           BAL   R15,DISPLAY       DISPLAY:                               CDT04930
0D2A  1630          495           DC    Z(TOTAL),Z(TOTERR)                                       CDT04940
0D2C  1632
                    496           ENDC                                                           CDT04950
0D2E  4520 17E0     497           CLH   R2,LOOP+$VALU1    REACHED LIMIT ?                        CDT04960
0D32  4280 0CF6     498           BL    $KEEP3            BRANCH: NO. RUN AGAIN.                 CDT04970
0D36  4300 0CB4     499           B     $KEEP2            SELECT NEXT TEST.                      CDT04980
                    500 * ------------------------------------                                 CDT04990
                    501 *  ENTIRE TEST SEQUENCE HAS RUN                                          CDT05000
                    502 *                                                                        CDT05010
      0000 0D3A     503 ABORT     EQU   *                 BRANCH HERE TO HALT TESTING            CDT05020
      0000 0D3A     504 $KEEP5    EQU   *                                                        CDT05030
0D3A  2401          505           LIS   R0,1                                                     CDT05040
0D3C  6100 1630     506           AHM   R0,TOTAL          GET TOTAL+1 (MODULO 2**16)             CDT05050
0D40  41F0 12EC     507           BAL   R15,TSTDU         R1 <> 0 IF LIST OFFLINE                CDT05060
0D44  4610 17EC     508           OH    R1,CONTIN+$VALU1  R1 <> 0 IF CONTIN = 1                  CDT05070
0D48  4230 0CAE     509           BNZ   $KEEP1            BRANCH: START NEW SERIES.              CDT05080
0D4C  48E0 163A     510           LDA   R14,$SHUTDWN      ANY USER-SPEC'D POST-TEST ROUTINE ?    CDT05090
0D50  2332          511           BZS   $KEEP5.1          BRANCH: NO.                            CDT05100
0D52  01FE          512           BALR  R15,R14           GO TO SPECIFIED ROUTINE.               CDT05110
0D54  41F0 1048     513 $KEEP5.1  BAL   R15,$PRINT                                               CDT05120
0D58  16D8          514           DAC   EOTMSG            'END OF TEST'                          CDT05130
0D5A  4800 1632     515           LH    R0,TOTERR         ANY ERRORS LOGGED ?                    CDT05140
0D5E  2134          516           BNZS  $KEEP5.2          BRANCH: YES.                           CDT05150
0D60  41F0 1048     517           BAL   R15,$PRINT        ELSE, PRINT                            CDT05160
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0D64   1678            518           DAC   NOERMSG           'NO ERROR'                                CDT05170
0D66   4800 162E       519  $KEEP5.2 LH    R0,$WASDU         WAS LIST DEVICE OFFLINE ?                 CDT05180
0D6A   4330 0AB6       520           BZ    OPTIN1            BRANCH: NO. GET NEXT COMMAND              CDT05190
                       521  *                                                                           CDT05200
       0000 0D6E       522  HALT9    EQU   *                 STOP MACHINE FOR ERROR PRINT              CDT05210
0D6E   41F0 12EC       523           BAL   R15,TSTDU         CHECK IF LIST DEVICE OFF-LINE             CDT05220
0D72   2336            524           BZS   $KEEP7           BRANCH: ON-LINE NOW.                      CDT05230
0D74   C810 080F       525           LHI   R1,X'080F'                                                  CDT05240
0D78   9114            526           SLHLS R1,4              R1 = X'80F0'                              CDT05250
0D7A   9501            527           EPSR  R0,R1             STOP PROCESSOR. WHEN 'EXE/RUN' DEP        CDT05260
0D7C   2207            528           BS    HALT9             CHECK IF LIST DEVICE ON-LINE.             CDT05270
                       529  *                                                                           CDT05280
                       530  * LIST DEVICE WAS OFF-LINE. PRINT TOTAL, TOTERR                            CDT05290
                       531  *                                                                           CDT05300
       0000 0D7E       532  $KEEP7   EQU   *                                                           CDT05310
0D7E   2400            533           LIS   R0,0                                                        CDT05320
0D80   4000 162E       534           STH   R0,$WASDU         RESET DU FLAG                             CDT05330
0D84   41F0 1048       535           BAL   R15,$PRINT                                                  CDT05340
0D88   1704            536           DAC   NULLMSG           OUTPUT NULL STRING, CRLF                  CDT05350
0D8A   41F0 1048       537           BAL   R15,$PRINT                                                  CDT05360
0D8E   1669            538           DAC   TOTMSG            'TOTAL   TOTERR'                        CDT05370
0D90   C840 2020       539           LHI   R4,C' '           SPACES                                    CDT05380
0D94   4040 35F8       540           STH   R4,$OUTBUF+4                                                CDT05390
0D98   4040 35FA       541           STH   R4,$OUTBUF+6                                                CDT05400
0D9C   2404            542           LIS   R0,4                                                        CDT05410
0D9E   C820 35F4       543           LDAI  R2,$OUTBUF        DESTINATION                               CDT05420
0DA2   4810 1630       544           LH    R1,TOTAL                                                    CDT05430
0DA6   41F0 0FA4       545           BAL   R15,HEXASC        CONVERT TOTAL                             CDT05440
0DAA   4810 1632       546           LH    R1,TOTERR                                                   CDT05450
0DAE   2628            547           AIS   R2,8             DESTINATION                               CDT05460
0DB0   41F0 0FA4       548           BAL   R15,HEXASC        CONVERT TOTERR                            CDT05470
0DB4   240D            549           LIS   R0,X'0D'          CARRIAGE RETURN                           CDT05480
0DB6   D202 0004       550           STB   R0,4(R2)          TO TERMINATE MESSAGE.                     CDT05490
0DBA   41F0 1056       551           BAL   R15,@PRINT        PRINT CONTENTS OF BUFFER:                 CDT05500
                       552  *                               TOTAL    TOTERR                           CDT05510
                       553  *                               XXXX     YYYY                             CDT05520
0DBE   4300 0A76       554           B     STARTA            PRINT TITLE, ACCEPT COMMAND.              CDT05530
                       555  * ************************************                                      CDT05540
0DC2                   556           IFZ   $DISPLAY-1                                                  CDT05550
                       557  *                                                                           CDT05560
0DC2   2401            558  DISPLAY  LIS   R0,1             DISPLAY PANEL ADDRESS                     CDT05570
0DC4   DE00 1616       559           OC    R0,INCR           INCREMENTAL MODE                          CDT05580
0DC8   481F 0002       560           LH    R1,2(R15)         GET 2ND PARAMETER ADDRESS                 CDT05590
0DCC   4811 0000       561           LH    R1,0(R1)          GET DATA                                  CDT05600
0DD0   9411            562           EXBR  R1,R1                                                       CDT05610
0DD2   9801            563           WHR   R0,R1             WRITE DATA                                CDT05620
0DD4   481F 0000       564           LH    R1,0(R15)         GET 1ST PARAMETER ADDRESS                 CDT05630
0DD8   4811 0000       565           LH    R1,0(R1)          GET DATA                                  CDT05640
0DDC   9411            566           EXBR  R1,R1                                                       CDT05650
0DDE   9801            567           WHR   R0,R1             WRITE DATA TO D1,D2                       CDT05660
0DE0   DE00 1615       568           OC    R0,NORM           NORMAL MODE                               CDT05670
0DE4   430F 0004       569           B     4(R15)            RETURN                                    CDT05680
                       570  *                                                                           CDT05690
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                                571  * ************************************                CDT05700
                                572           ENDC                                       CDT05710
                                573  *                                                   CDT05720
                                574  * ERROR ROUTINES                  (OVERRIDE NOMSG OPTION)  CDT05730
                                575  * RETURN LINK R15; NO REGISTERS MODIFIED.           CDT05740
                                576  *                                                   CDT05750
0DE8   D0F0 35E8                577  ERR      STM   R15,$R15SAV        SAVE LINK         CDT05760
0DEC   41F0 0E36                578           BAL   R15,ERRCOM         'ERROR TTNN'      CDT05770
0DF0   0E62                     579           DAC   ERRCOM1            EXIT              CDT05780
                                580  *                                                   CDT05790
0DF2   D0F0 35E8                581  ERRD     STM   R15,$R15SAV        SAVE LINK         CDT05800
0DF6   41F0 0E36                582           BAL   R15,ERRCOM         'ERROR TTNN'      CDT05810
0DFA   0E96                     583           DAC   ERRD1              'DEV DDD'         CDT05820
0DFC   0E62                     584           DAC   ERRCOM1            EXIT              CDT05830
                                585  *                                                   CDT05840
0DFE   D0F0 35E8                586  ERRS     STM   R15,$R15SAV        SAVE LINK         CDT05850
0E02   41F0 0E36                587           BAL   R15,ERRCOM         'ERROR TTNN'      CDT05860
0E06   0EA8                     588           DAC   ERRS1              'STA SS'          CDT05870
0E08   0E62                     589           DAC   ERRCOM1            EXIT              CDT05880
                                590  *                                                   CDT05890
0E0A   D0F0 35E8                591  ERRDS    STM   R15,$R15SAV        SAVE LINK         CDT05900
0E0E   41F0 0E36                592           BAL   R15,ERRCOM         'ERROR TTNN'      CDT05910
0E12   0E96                     593           DAC   ERRD1              'DEV DDD'         CDT05920
0E14   0EA8                     594           DAC   ERRS1              'STA SS'          CDT05930
0E16   0E62                     595           DAC   ERRCOM1            EXIT              CDT05940
                                596  *                                                   CDT05950
0E18   D0F0 35E8                597  ERRL     STM   R15,$R15SAV        SAVE LINK         CDT05960
0E1C   D0E0 15F8                598           STM   R14,OLDPSW         STORE CALLER'S PSW, LOC  CDT05970
0E20   41F0 0E36                599           BAL   R15,ERRCOM         'ERROR TTNN'      CDT05980
0E24   0EFC                     600           DAC   ERRL1              'LOC LLLL'        CDT05990
0E26   0E62                     601           DAC   ERRCOM1            EXIT              CDT06000
                                602  *                                                   CDT06010
0E28   D0F0 35E8                603  ERRALL   STM   R15,$R15SAV        SAVE LINK         CDT06020
0E2C   41F0 0E36                604           BAL   R15,ERRCOM         'ERROR TTNN'      CDT06030
0E30   0EBA                     605           DAC   ERRDS1             'DEV DDD STA SS'  CDT06040
0E32   0EDA                     606           DAC   ERRPL1             'PSW PPPP  LOC LLLL'  CDT06050
0E34   0E62                     607           DAC   ERRCOM1            EXIT              CDT06060
                                608  *                                                   CDT06070
                                609  *  COMMON ERROR ROUTINE                             CDT06080
                                610  *                                                   CDT06090
0E36   D000 3714                611  ERRCOM   STM   R0,ERRSAVE         STORE USER REGISTER SET  CDT05100
0E3A   4810 0A52                612           LH    R1,PSW2            SPEC'D AS X'30F0'  CDT06110
0E3E   9501                     613           EPSR  R0,R1              DISABLE INT. @ PROCESSOR LEVEL  CDT06120
0E40   4800 1658                614           LH    R0,MTESTNO         MASTER TEST NUMBER  CDT06130
0E44   4000 1662                615           STH   R0,ETESTNO         MOVE TO MESSAGE   CDT06140
0E48   4000 1624                616           STH   R0,ISITERR         TO FORCE ERROR PRINT  CDT06150
0E4C   26F1                     617           AIS   R15,ADC-1                            CDT06160
0E4E   C4F0 FFFE                618           NHI   R15,0-ADC                            CDT06170
0E52   48CF 0000                619           LDA   R12,0(R15)         FIRST PARAMETER   CDT06180
0E56   48DF 0002                620           LDA   R13,ADC(R15)       SECOND PARAMETER  CDT06190
0E5A   41E0 0E8C                621           BAL   R14,ERR1           'ERROR TTNN'      CDT06200
0E5E   01EC                     622           BALR  R14,R12            GO TO FIRST ROUTINE,  CDT06210
0E60   01ED                     623           BALR  R14,R13            SECOND ROUTINE.   CDT06220
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                        624  *                                                                    CDT06230
0E62   2400             625  ERRCOM1  LIS   R0,0                                                 CDT06240
0E64   4000 1624        626           STH   R0,ISITERR          RESET ERROR PRINT FLAG           CDT06250
0E68   2411             627           LIS   R1,1                                                 CDT06260
0E6A   4010 1626        628           STH   R1,NOERR            SUPPRESS THAT PRINT              CDT06270
0E6E   6110 1632        629           AHM   R1,TOTERR           INCREMENT TOTERR                 CDT06280
0E72   2138             630           BNZS  ERRCOM2             BRANCH: STILL COUNTING.          CDT06290
0E74   2511             631           LCS   R1,1                65,535 ERRORS REPORTED           CDT06300
0E76   4010 1632        632           STH   R1,TOTERR                                            CDT06310
0E7A   41F0 12EC        633           BAL   R15,TSTDU           LIST DEVICE OFF-LINE ?           CDT06320
0E7E   4230 0D6E        634           BNZ   HALT9               BRANCH: YES.                     CDT06330
0E82   D100 3714        635  ERRCOM2  LM    R0,ERRSAVE         RESTORE REGISTERS                CDT06340
0E86   D1F0 35E8        636           LM    R15,$R15SAV        RESTORE LINK                     CDT06350
0E8A   030F             637           BR    R15                RETURN TO CALLER.                CDT06360
                        638  *--------------------------                                          CDT06370
                        639  * MESSAGE PRINT ROUTINES          (DO NOT OVERRIDE NOMSG OPTION)     CDT06380
                        640  * RETURN LINK R14; REGISTERS MODIFIED R0,R1,R2,R5.                   CDT06390
                        641  *                                                                    CDT06400
                        642  *  TO PRINT 'ERROR TTNN'                                           CDT06410
                        643  *                                                                    CDT06420
0E8C                    644           CNOP  ADC                 ALIGN PARAMETER                  CDT06430
0E8C   D0E0 35EC        645  ERR1     STM   R14,$R14SAV         SAVE LINK                        CDT06440
0E90   41E0 0F36        646           BAL   R14,$MSGPRT1        PRINT MESSAGE                    CDT06450
0E94   165C             647           DAC   ERRMSG              'ERROR TTNN'                     CDT06460
                        648  *                                  TT FROM MTESTNO, NN FROM ERRNO   CDT06470
                        649  *                                                                    CDT06480
                        650  *  TO PRINT 'DEV DDD'                                              CDT06490
                        651  *                                                                    CDT06500
0E96   D0E0 35EC        652  ERRD1    STM   R14,$R14SAV         SAVE LINK                        CDT06510
0E9A   2403             653           LIS   R0,3                SET UP DIGITS = 3                CDT06520
0E9C   4810 1612        654           LH    R1,ERRDEV           R1 = ERROR DEV # IN BINARY       CDT06530
0EA0   41E0 0F26        655           BAL   R14,$MSGPRT         PRINT 'DEV DDD'                  CDT06540
0EA4   1694             656           DAC   ASCIDEV2            HEXASC DESTINATION               CDT06550
0EA6   1690             657           DAC   DEVMSG2             A(MESSAGE)                       CDT06560
                        658  *                                                                    CDT06570
                        659  *  TO PRINT 'STA SS'                                               CDT06580
                        660  *                                                                    CDT06590
0EA8   D0E0 35EC        661  ERRS1    STM   R14,$R14SAV         SAVE LINK                        CDT06600
0EAC   2402             662           LIS   R0,2                SET UP DIGITS = 2                CDT06610
0EAE   D310 1614        663           LB    R1,ERRSTA           R1 = ERROR STATUS                CDT06620
0EB2   41E0 0F26        664           BAL   R14,$MSGPRT         PRINT 'STA SS'                   CDT06630
0EB6   168D             665           DAC   ASCISTA             HEXASC DESTINATION               CDT06640
0EB8   1689             666           DAC   STAMSG              A(MESSAGE)                       CDT06650
                        667  *                                                                    CDT06660
                        668  *  TO PRINT 'DEV DDD STA SS'                                       CDT06670
                        669  *                                                                    CDT06680
0EBA   D0E0 35EC        670  ERRDS1   STM   R14,$R14SAV         SAVE LINK                        CDT06690
0EBE   2403             671           LIS   R0,3                SET UP DIGITS = 3                CDT06700
0EC0   4810 1612        672           LH    R1,ERRDEV           R1 = ERROR DEV #                 CDT06710
0EC4   C820 1685        673           LDAI  R2,ASCIDEV          HEXASC DESTINATION               CDT06720
0EC8   41F0 0FA4        674           BAL   R15,HEXASC          CONVERT IT TO ASCII              CDT06730
0ECC   2402             675           LIS   R0,2                SET UP DIGITS = 2                CDT06740
0ECE   D310 1614        676           LB    R1,ERRSTA           R1 = ERROR STATUS                CDT06750
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0ED2  41E0 0F26      677          BAL   R14,$MSGPRT        PRINT 'DEV DDD STA SS'      CDT06760
0ED6  168D           678          DAC   ASCISTA           HEXASC DESTINATION          CDT06770
0ED8  1681           679          DAC   DEVMSG            A(MESSAGE)                  CDT06780
                     680  *                                                           CDT06790
                     681  *  TO PRINT 'PSW PPPP  LOC LLLL'                           CDT06800
                     682  *                                                           CDT06810
0EDA  D0E0 35EC      683  ERRPL1  STM   R14,$R14SAV        SAVE REGISTERS              CDT06820
0EDE  D1E0 15F8      684          LM    R14,OLDPSW         R14 = PSW, R15 = LOC        CDT06830
0EE2  081E           685          LDAR  R1,R14             PSW TO PRINT REGISTER       CDT06840
0EE4                 686          IFZ   ADC-2                                          CDT06850
0EE4  2404           687          LIS   R0,4               ASSUME SERIES 16            CDT06860
0EE6  4850 1610      688          LH    R5,MOD32                                       CDT06870
0EEA  2332           689          BZS   ERRPL1A                                        CDT06880
                     690          ENDC                                                 CDT06890
0EEC  2406           691          LIS   R0,6               SERIES 32                   CDT06900
0EEE  C820 16AE      692  ERRPL1A LDAI  R2,ASCIPSW         DESTINATION                 CDT06910
0EF2  C850 16AA      693          LDAI  R5,PSWMSG                                      CDT06920
0EF6  41F0 0FA4      694          BAL   R15,HEXASC         CONVERT PSW                 CDT06930
0EFA  2305           695          BS    ERRPL1B            GO CONVERT LOC              CDT06940
                     696  *                                                           CDT06950
                     697  *  TO PRINT 'LOC LLLL'                                     CDT06960
                     698  *                                                           CDT06970
0EFC  D0E0 35EC      699  ERRL1   STM   R14,$R14SAV        SAVE REGISTERS              CDT06980
0F00  C850 16B6      700          LDAI  R5,LOCMSG          A(MESSAGE)                  CDT06990
0F04  D1E0 15F8      701  ERRPL1B LM    R14,OLDPSW         R15 = OLD LOC TO PRINT      CDT07000
0F08  081F           702          LDAR  R1,R15             DATA TO PRINT REGISTER      CDT07010
0F0A                 703          IFZ   ADC-2                                          CDT07020
0F0A  2404           704          LIS   R0,4               ASSUME SERIES 16            CDT07030
0F0C  48F0 1610      705          LH    R15,MOD32                                      CDT07040
0F10  2332           706          BZS   ERRL1A                                         CDT07050
                     707          ENDC                                                 CDT07060
0F12  2406           708          LIS   R0,6               SERIES 32                   CDT07070
0F14  C820 16BA      709  ERRL1A  LDAI  R2,ASCILOC         DESTINATION                 CDT07080
0F18  41F0 0FA4      710          BAL   R15,HEXASC         CONVERT                     CDT07090
0F1C  41F0 1060      711          BAL   R15,PRINT          PRINT                       CDT07100
0F20  D1E0 35EC      712          LM    R14,$R14SAV        RESTORE LINK                CDT07110
0F24  030E           713          BR    R14                RETURN                      CDT07120
                     714  *                                                           CDT07130
                     715  * ROUTINE IS CALLED BY MESSAGE PRINT ROUTINES               CDT07140
                     716  *                                                           CDT07150
0F26  26E1           717  $MSGPRT  AIS   R14,ADC-1                                    CDT07160
0F28  C4E0 FFFE      718          NHI   R14,0-ADC                                     CDT07170
0F2C  482E 0000      719          LDA   R2,0(R14)          HEXASC DESTINATION          CDT07180
0F30  41F0 0FA4      720          BAL   R15,HEXASC         CONVERT DATA TO HEXADECIMAL CDT07190
0F34  26E2           721          AIS   R14,ADC                                       CDT07200
0F36  485E 0000      722  $MSGPRT1 LDA   R5,0(R14)          A(MESSAGE TO PRINT)         CDT07210
0F3A  41F0 1060      723          BAL   R15,PRINT          PRINT SPECIFIED MESSAGE     CDT07220
0F3E  D1E0 35EC      724          LM    R14,$R14SAV                                   CDT07230
0F42  030E           725          BR    R14                RETURN TO ORIGINAL CALLER   CDT07240
                     726  * ----------------------------                              CDT07250
                     727  *                                                           CDT07260
                     728  * TO OBTAIN OPTION VALUE IN R6    (R7:R6, TARGT 16)         CDT07270
                     729  * RETURNS WHEN SPECIAL CHARACTER FOUND. IGNORES SPACES.     CDT07280
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                          730  *                                                                    CDT07290
0F44   2460               731  CPTVAL   LIS   R6,0              INITIALIZE ACCUMULATOR          CDT07300
0F46                      732           IFZ   ADC-2                                               CDT07310
0F46   2470               733           LIS   R7,0              HIGH-ORDER BITS, TARGT 16       CDT07320
                          734           ENDC                                                      CDT07330
0F48   D343 3644          735  $OPTV.0  LB    R4,$INBUF(R3)     GET NEXT INPUT CHARACTER        CDT07340
0F4C   C530 0050          736           CLHI  R3,$BUFLEN        AT END OF INPUT BUFFER ?        CDT07350
0F50   038E               737           BNLR  R14               RETURN IF YES.                  CDT07360
0F52   2631               738           AIS   R3,1              ADVANCE BUFFER POINTER          CDT07370
0F54   C540 0020          739           CLHI  R4,C' '           SPACE ?                         CDT07380
0F58   2238               740           BES   $OPTV.0           BRANCH: YES. IGNORE.            CDT07390
0F5A   C540 0030          741           CLHI  R4,C'0'           LESS THAN ZERO ?                CDT07400
0F5E   028E               742           BLR   R14               RETURN IF SPECIAL CHARACTER     CDT07410
0F60   24FF               743           LIS   R15,15                                              CDT07420
0F62   D44F 1642          744  $OPTV.2  CLB   R4,HEXTAB(R15)    SCAN TABLE                      CDT07430
0F66   2334               745           BES   $OPTV.3           MATCH                           CDT07440
0F68   27F1               746           SIS   R15,1                                             CDT07450
0F6A   2214               747           BNMS  $OPTV.2                                           CDT07460
0F6C   030C               748           BR    R12               ERROR; VALUE NOT IN TABLE.      CDT07470
0F6E   EB60 0004          749  $OPTV.3  RLL   R6,4               (R6:R7), SERIES 16              CDT07480
0F72   066F               750           OAR   R6,R15            OR IN CURRENT DIGIT             CDT07490
0F74   4300 0F48          751           B     $OPTV.0                                           CDT07500
                          752  *---------------------------------                                CDT07510
                          753  * TO CONVERT (R6) FROM BINARY TO UNARY PATTERN, IN R3              CDT07520
                          754  *                                                                  CDT07530
0F78   2438               755  UNARY    LIS   R3,8               BIT TO SHIFT                    CDT07540
0F7A   913C               756           SLHLS R3,12              R3 = '8000'                     CDT07550
0F7C   CC36 0000          757           SRHL  R3,0(R6)           SHIFT TO DESIRED POSITION       CDT07560
0F80   030E               758           BR    R14               AND RETURN.                     CDT07570
                          759  *                                                                  CDT07580
                          760  *-----------------------------                                   CDT07590
                          761  *                                                                  CDT07600
0F82                      762           IFNZ  $CLOCK            0 = INCLUDE NO TIMERS           CDT07610
       0000 0F82          763  $TIMER   EQU   *                                                   CDT07620
0F82                      764           IFZ   $CLOCK-3          3 = INCLUDE BOTH                CDT07630
                          766           ELSE
       0000 0F82          767  TIMER    EQU   *                                                   CDT07660
                          768           ENDC                                                      CDT07670
                          769  *  TO PROVIDE # OF MILLISECONDS DELAY SPECIFIED BY R0              CDT07680
                          770  *                                                                  CDT07690
0F82   D000 3694          771           STM   R0,RSAVE           SAVE REGISTERS                  CDT07700
0F86   2410               772  $STIM1   LIS   R1,0                                               CDT07710
0F88   2421               773           LIS   R2,1                                              CDT07720
0F8A   4830 0A5A          774           LH    R3,$TIMVAL         (R3) = CONSTANT FOR 1 MSEC DELAY CDT07730
0F8E   C110 0F8E          775           BXLE  R1,*                                              CDT07740
0F92   2701               776           SIS   R0,1                                              CDT07750
0F94   2037               777           BNZS  $STIM1             LOOP TILL SPECIFIED DELAY      CDT07760
*  0F96   2301            778           B     $TIMRET            RELOAD REGISTERS, RETURN (R15) CDT07770
                          779  *                                                                  CDT07780
                          780  *-----------------------------                                   CDT07790
                          781  *                                                                  CDT07800
0F98   D100 3694          803  $TIMRET  LM    R0,RSAVE           RESTORE USER'S REGISTERS       CDT08020
0F9C   030F               804  $TIMXT   BR    R15                AND RETURN.                    CDT08030
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                        806  * ----------------------------                                          CDT08050
                        807  * ROUTINE RESTORES REGISTERS SAVED ON ENTRY TO CALLING ROUTINE          CDT08060
                        808  * AND RETURNS BY R15                                                    CDT08070
                        809  *                                                                       CDT08080
0F9E   D100 3694        810  $RSAVRET LM    R0,RSAVE                                                CDT08090
0FA2   03CF             811           BR    R15                 RETURN TO ORIGINAL CALLER           CDT08100
                        812  ******* THIS IS WHERE TO IMPLEMENT STACK                                CDT08110
                        813  *                                                                       CDT08120
                        835  *----------------------------                                          CDT08340
                        836  *  TO CONVERT HEXADECIMAL DATA IN R1 TO ASCII CHAR & STORE @ 0(R2)      CDT08350
                        837  * OUTPUTS UP TO 4 DIGITS (8 DIGITS, SERIES 32)                          CDT08360
                        838  *                                                                       CDT08370
0FA4   D000 3694        839  HEXASC   STM   R0,RSAVE            STORE REGISTERS                     CDT08380
0FA8   0830             840           LDAR  R3,R0               R3 = DIGITS                         CDT08390
0FAA   9132             841           SLLS  R3,2                                                    CDT08400
0FAC   2734             842           SIS   R3,4                R3 = 4(DIGITS)-4                    CDT08410
0FAE   0841             843  $HEXA.1  LDAR  R4,R1               R4 = HEX DATA                       CDT08420
0FB0   EC43 0000        844           SRL   R4,0(R3)                                                CDT08430
0FB4   C440 000F        845           NHI   R4,15               R4 = HEX DIGIT TO BE CONVERTED      CDT08440
0FB8   D344 1642        846           LB    R4,HEXTAB(R4)                                           CDT08450
0FBC   D242 0000        847           STB   R4,0(R2)            STORE ASCII CHAR                    CDT08460
0FC0   2621             848           AIS   R2,1                                                    CDT08470
0FC2   2734             849           SIS   R3,4                                                    CDT08480
0FC4   221B             850           BNMS  $HEXA.1             LOOP TILL ALL DIGITS                CDT08490
0FC6   4300 0F9E        851           B     $RSAVRET            RESTORE REGISTERS, RETURN (R15)     CDT08500
                        878  * --------------------------------                                      CDT08770
                        879  * TO OUTPUT LIST OF BITS IN ASCENDING NUMERIC ORDER,                    CDT08780
                        880  * STARTING FROM HIGH-ORDER BIT AS BIT 0                                 CDT08790
                        881  * DOES NOT OVERLAY OPTION NAME IN $OUTBUF.                              CDT08800
                        882  *                                                                       CDT08810
0000 0FCA               883  $LSTBIT  EQU   *                                                       CDT08820
0FCA   D000 3714        884           STM   R0,ERRSAVE          SAVE REGISTERS                      CDT08830
0FCE   2401             885           LIS   R0,1                DIGITS TO OUTPUT                    CDT08840
0FD0   2410             886           LIS   R1,0                STARTING WITH NUMBER 0              CDT08850
0FD2   2470             887           LIS   R7,0                PRINT FLAG                          CDT08860
0FD4   4835 0000        888           LH    R3,0(R5)            LOW-NUMBERED PARAMETER BITS         CDT08870
0FD8   2136             889           BNZS  $LSTB.B             BRANCH: ONE SET                     CDT08880
0FDA   4835 0002        890  $LSTB.A  LH    R3,2(R5)            HIGH-NUMBERED PARAMETER BITS        CDT08890
0FDE   2402             891           LIS   R0,2                2 DIGITS NEEDED FOR HEXASC          CDT08900
0FE0   C810 0010        892           LHI   R1,X'10'            BIT NUMBER BASE                     CDT08910
0FE4   2428             893  $LSTB.B  LIS   R2,$CKROUT+2       NO OVERLAY OF OPTION NAME           CDT08920
0FE6   9131             894  $LSTB.0  SLHLS R3,1                TEST LEFTMOST HALFWORD BIT          CDT08930
0FE8   4380 100A        895           BNC   $LSTB.2A            BRANCH: ZERO.                       CDT08940
0FEC   C520 0008        896           CLHI  R2,$CKROUT+2        ANY OUTPUT YET ?                    CDT08950
0FF0   2336             897           BES   $LSTB.1             BRANCH: NO                          CDT08960
0FF2   C840 002C        898           LHI   R4,C','             COMMA                               CDT08970
0FF6   D242 35F4        899           STB   R4,$OUTBUF(R2)      INSERT IN BUFFER                    CDT08980
0FFA   2621             900           AIS   R2,1                                                    CDT08990
0FFC   08D2             901  $LSTB.1  LDAR  R13,R2             SAVE BUFFER OFFSET                  CDT09000
0FFE   CA20 35F4        902           AHI   R2,$OUTBUF          HEXASC DESTINATION                  CDT09010
1002   41F0 0FA4        903           BAL   R15,HEXASC          CONVERT BIT NUMBER                  CDT09020
1006   082D             904           LDAR  R2,R13              GET OFFSET                          CDT09030
1008   0A20             905  $LSTB.2  AAR   R2,R0               INCREMENT BUFFER POINTER            CDT09040
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100A  2611           906  $LSTB.2A AIS   R1,1              INCREMENT BIT NUMBER                CDT09050
100C  C310 000F      907           THI   R1,15             HALFWORD COMPLETED ?                CDT09060
1010  4230 0FE6      908           BNZ   $LSTB.0           BRANCH: NO.                         CDT09070
1014  244D           909           LIS   R4,X'0D'          CARRIAGE RETURN                     CDT09080
1016  D242 35F4      910           STB   R4,$OUTBUF(R2)    INSERT IN BUFFER                    CDT09090
101A  0672           911           OAR   R7,R2             ACCUMULATE HIGHEST BYTE COUNT       CDT09100
101C  C520 0008      912           CLHI  R2,$CKROUT+2      ANY OUTPUT THIS TIME ?              CDT09110
1020  2333           913           BES   $LSTB.2B          BRANCH: NO.                         CDT09120
1022  41F0 1056      914           BAL   R15,@PRINT        PRINT THE BUFFER.                   CDT09130
1026  C510 0020      915  $LSTB.2B CLHI  R1,32             FULLWORD COMPLETED ?                CDT09140
102A  4280 0FDA      916           BL    $LSTB.A           BRANCH: NO.                         CDT09150
102E  2778           917           SIS   R7,$CKROUT+2      ANY OUTPUT DONE ?                   CDT09160
1030  2133           918           BNZS  $LSTB.2C          BRANCH: YES.                        CDT09170
1032  41F0 1056      919           BAL   R15,@PRINT        PRINT OPTION NAME IN BUFFER.        CDT09180
1036  D100 3714      920  $LSTB.2C LM    R0,ERRSAVE                                           CDT09190
103A  030F           921           BR    R15               RETURN                              CDT09200
                     922  * ----------------------------                                      CDT09210
                     938  *  TO OUTPUT CR,LF TO LIST DEVICE                                   CDT09370
                     939  *                                                                    CDT09380
103C  D000 3694      940  CRLF     STM   R0,RSAVE          SAVE REGISTERS                      CDT09390
1040  C850 1708      941           LDAI  R5,CRLFMSG        CR, LF                              CDT09400
1044  4300 1064      942           B     $P1               GO PRINT LINE.                      CDT09410
                     943  *                                                                    CDT09420
1048  26F1           944  $PRINT   AIS   R15,ADC-1                                           CDT09430
104A  C4F0 FFFE      945           NHI   R15,0-ADC                                            CDT09440
104E  485F 0000      946           LDA   R5,0(R15)         A(MESSAGE TO PRINT)                 CDT09450
1052  26F2           947           AIS   R15,ADC                                              CDT09460
1054  2306           948           BS    $P0                                                  CDT09470
                     949  *                                                                    CDT09480
1056  D000 3694      950  @PRINT   STM   R0,RSAVE          SAVE REGISTERS                      CDT09490
105A  C850 35F4      951           LDAI  R5,$OUTBUF        TO PRINT OUTPUT BUFFER              CDT09500
105E  2303           952           BS    $P1                                                  CDT09510
                     953  *                                                                    CDT09520
      0000 1060      954  PRINT    EQU   *                 TO PRINT THE ASCII MESSAGE          CDT09530
1060  D000 3694      955  $P0      STM   R0,RSAVE          STORE REGISTERS                     CDT09540
1064  2400           956  $P1      LIS   R0,0                                                 CDT09550
1066  4000 162A      957           STH   R0,$LINEPOS       RESET BUFFER                        CDT09560
106A  41F0 12EC      958           BAL   R15,TSTDU         IS DEVICE UNAVAILABLE ?             CDT09570
106E  4230 0F9E      959           BNZ   $RSAVRET          IF YES, RELOAD REGISTERS, RETURN.   CDT09580
                     960  *                                                                    CDT09590
1072  4810 162E      961           LH    R1,SWASDU         WAS DEVICE EVER SEEN DU ?           CDT09600
1076  4230 0D6E      962           BNZ   HALT9             OUTPUT TOTAL, TOTERR.               CDT09610
                     963  *                                                                    CDT09620
107A  4800 1624      964           LH    R0,ISITERR        AN ERROR MESSAGE ?                  CDT09630
107E  4500 17F8      965           CLH   R0,NOMSG+$VALU1   IF SO, CAN BE SUPPRESSED ?          CDT09640
1082  4280 0F9E      966           BL    $RSAVRET          BRANCH: MESSAGE IS SUPPRESSED.      CDT09650
                     967  *                                                                    CDT09660
1086  D345 0000      968  $PRT.2   LB    R4,0(R5)          GET A MESSAGE BYTE                  CDT09670
108A  41F0 10D8      969           BAL   R15,OUTCHR        OUTPUT IT                           CDT09680
108E  274D           970           SIS   R4,X'0D'          CR ?                                CDT09690
1090  233A           971           BZS   $PRT.3            MSG OVER                            CDT09700
1092  2651           972           AIS   R5,1                                                 CDT09710
1094  C350 0002      973           THI   R5,2              TIME TO CHECK BREAK ?               CDT09720
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1098  2239           974          BZS   $PRT.2            BRANCH: NO.                          CDT09730
109A  4050 162C      975          STH   R5,$PRTFLG        TO DEFER BREAK ACKNOWLEDGE           CDT09740
109E  41F0 125C      976          BAL   R15,TSTBRK                                            CDT09750
10A2  220E           977          BS    $PRT.2            LOOP FOR NEXT CHAR                   CDT09760
                     978  *                                                                    CDT09770
10A4  244A           979  $PRT.3  LIS   R4,X'0A'          LF                                   CDT09780
10A6  41F0 10D8      980          BAL   R15,OUTCHR        LF                                   CDT09790
10AA  2440           981          LIS   R4,0              ASCII 'NUL'                          CDT09800
10AC  41F0 10D8      982          BAL   R15,OUTCHR        TERMINAL CHARACTER                   CDT09810
10B0  41F0 125C      983          BAL   R15,TSTBRK                                            CDT09820
10B4  4040 162C      984          STH   R4,$PRTFLG        RE-ENABLE BREAK ACKNOWLEDGE          CDT09830
10B8  48F0 1620      985          LH    R15,$BRKFLG                                           CDT09840
10BC  4040 1620      986          STH   R4,$BRKFLG        BREAK BEING ACKNOWLEDGED             CDT09850
10C0  4330 0F9E      987          BZ    $RSAVRET          RESTORE REGISTERS, RETURN (R15)      CDT09860
10C4  40F0 1624      988          STH   R15,ISITERR       FORCE MESSAGE PRINT                  CDT09870
10C8  C550 1703      989          CLAI  R5,$BRKEND        PRINTING 'BRK TERM' MESSAGE ?        CDT09880
10CC  2334           990          BES   $PRT.4            BRANCH: YES.                         CDT09890
10CE  41F0 1048      991  $PRT.3A BAL   R15,$PRINT        'RECURSIVE' CALL          P2 1/80    CDT09900
10D2  16EA           992          DAC   BRKMSG            'BREAK TERMINATION'                  CDT09910
10D4  4300 0AB6      993  $PRT.4  B     OPTIN1            TO CMD PROCESSOR                     CDT09920
                     994  *--------------------------------                                    CDT09930
                     995  *  TO OUTPUT A CHARACTER TO THE LIST DEVICE                          CDT09940
                     996  *                                                                    CDT09950
10D8  40F0 163C      997  OUTCHR  STA   R15,OUT.SAV       SAVE RETURN ADDRESS                  CDT09960
10DC  D310 1623      998          LB    R1,IOSAVE+1                                           CDT09970
10E0  2714           999          SIS   R1,4                                                  CDT09980
10E2  4230 1112     1000          BNZ   $OTC.4            BRANCH IF NOT CAROUSEL               CDT09990
10E6  4010 1638     1001  $OTC.0  STH   R1,$PAUSE         ZERO $PAUSE FLAG                     CDT10000
10EA  41F0 12EC     1002  $OTC.1  BAL   R15,TSTDU         ON LINE ?                            CDT10010
10EE  4230 1146     1003          BNZ   $OTC.7            BRANCH: OFFLINE. EXIT.               CDT10020
10F2  9D21          1004          SSR   R2,R1             GET CAROUSEL STATUS                  CDT10030
10F4  2385          1005          BFFS  8,$OTC.3          BRANCH IF CHAR. IS TO BE READ        CDT10040
10F6  4810 1638     1006  $OTC.2  LH    R1,$PAUSE         PAUSED NOW ?                         CDT10050
10FA  2038          1007          BNZS  $OTC.1            YES, LOOP                            CDT10060
10FC  230B          1008          BS    $OTC.4            NO, GO OUTPUT CHARACTER              CDT10070
10FE  9B21          1009  $OTC.3  RDR   R2,R1             GET CAROUSEL CHARACTER               CDT10080
1100  C410 007F     1010          NHI   R1,X'7F'                                              CDT10090
1104  C510 0014     1011          CLHI  R1,X'14'          DC4 ?                                CDT10100
1108  4330 10E6     1012          BE    $OTC.0            DC4. SET $PAUSE FLAG.                CDT10110
110C  CB10 0012     1013          SHI   R1,X'12'          DC2 ?                                CDT10120
1110  203D          1014          BNZS  $OTC.2            BRANCH: NO. CHECK IF PAUSED NOW.     CDT10130
                    1015  *                                                                    CDT10140
1112  4010 1638     1016  $OTC.4  STH   R1,$PAUSE         RESET FLAG                           CDT10150
1116  4110 1364     1017          BAL   R1,$SETUP           SET UP FOR OUTPUT                  CDT10160
111A  9D01          1018  $OTC.5  SSR   R0,R1             WAIT FOR NOT BUSY                    CDT10170
111C  4230 1146     1019          BTC   3,$OTC.7          BRANCH IF OFF-LINE                   CDT10180
1120  C510 0048     1020          CLHI  R1,X'48'          (NOT) CL2S OR PF ?        P4 4/80    CDT10190
1124  4330 1146     1021          BE    $OTC.7            BRANCH: ASSUME OFF-LINE   P4 4/80    CDT10200
1128  C410 00FC     1022          NHI   R1,X'FC'                                              CDT10210
112C  C510 000C     1023          CLHI  R1,X'0C'          HDX PASLA OFF-LINE ?                 CDT10220
*1130  233B         1024          BE    $OTC.7            BRANCH: YES.              P4 4/80    CDT10230
1132  9014          1025          SRHLS R1,4              BUSY ?                    P4 4/80    CDT10240
1134  208D          1026          BCS   $OTC.5            WAIT FOR NOT BUSY.        P4 4/80    CDT10250
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EXEC - ETPE R05P2

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1136  9A04           1027            WDR   R0,R4             OUTPUT DATA BYTE                          CDT10260
1138  9D01           1028  $OTC.6    SSR   R0,R1             WAIT FOR NOT BUSY                         CDT10270
113A  2176           1029            BTFS  7,$OTC.7          BRANCH IF OFF-LINE (PASLA HANGS)          CDT10280
113C  C510 0048      1030            CLHI  R1,X'48'          (NOT) CL2S OR PF ?            P4 4/80     CDT10290
1140  2333           1031            BES   $OTC.7            BRANCH: ASSUME OFF-LINE       P4 4/80     CDT10300
1142  9014           1032            SRHLS R1,4              BUSY ?                        P4 4/80     CDT10310
1144  2086           1033            BCS   $OTC.6            BRANCH: YES                   P4 4/80     CDT10320
1146  48F0 163C      1034  $OTC.7    LDA   R15,OUT.SAV                                                  CDT10330
114A  030F           1035            BR    R15               RETURN                                    CDT10340
                     1036  * ---------------------------------                                         CDT10350
                     1054  * ROUTINE GETS INPUT RECORD                                                 CDT10530
                     1055  *                                                                           CDT10540
114C  D000 3694      1056  $READ     STM   R0,RSAVE          SAVE REGISTERS                            CDT10550
1150  25D1           1057  $RD.1     LCS   R13,1             INITIALIZE                                CDT10560
1152  26D1           1058  $RD.2     AIS   R13,1             INCREMENT BUFFER POINTER                  CDT10570
1154  40D0 162A      1059            STH   R13,$LINEPOS      ADDRESS OF CURRENT BYTE                   CDT10580
1158  4140 1348      1060  $RD.3     BAL   R4,KBREAD         PUT DEVICE IN READ MODE                   CDT10590
115C  9D04           1061            SSR   R0,R4                                                       CDT10600
115E  2081           1062            BTBS  8,1               IF BUSY, LOOP (POSSIBLE HANG)             CDT10610
1160  9B04           1063            RDR   R0,R4             READ A CHAR IN R4                         CDT10620
1162  D390 0A10      1064            LB    R9,IO             WHAT TYPE DEVICE ?            P1 10/79    CDT10630
1166  2792           1065            SIS   R9,2              TYPE 2 ?                      P1 10/79    CDT10640
1168  2338           1066            BZS   $RD.3A            BRANCH: YES. E-PLEX ON.       P1 10/79    CDT10650
116A  4890 0A2C      1067            LH    R9,CONWADR        GET WRITE ADDRESS                         CDT10660
116E  DE90 0A2F      1068            OC    R9,CONWRT         TURN DEVICE AROUND                        CDT10670
1172  9D93           1069            SSR   R9,R3                                                       CDT10680
1174  2081           1070            BTBS  8,1               WAIT FOR BUSY NOT                         CDT10690
1176  9A94           1071            WDR   R9,R4             ECHO RECEIVED BYTE                        CDT10700
      0000 1178      1072  $RD.3A    EQU   *                 P1 10/79                                  CDT10710
1178  C440 007F      1073            NHI   R4,X'7F'          REMOVE PARITY BIT                         CDT10720
117C  C540 0060      1074            CLHI  R4,X'60'          UPPER-CASE CHARACTER ?                    CDT10730
1180  2183           1075            BLS   $RD.4             BRANCH: NO.                               CDT10740
1182  CB40 0020      1076            SHI   R4,X'20'          CONVERT TO LOWER-CASE                     CDT10750
1186  C540 0023      1077  $RD.4     CLHI  R4,X'23'          HASH-MARK ?                               CDT10760
118A  4330 0AAE      1078            BE    OPTIN             BRANCH: YES. GO TO CMD PROC.              CDT10770
118E  C540 0018      1079            CLHI  R4,X'18'          ASCII 'CANCEL' CHARACTER ?                CDT10780
1192  4330 0AAE      1080            BE    OPTIN             BRANCH: YES.                              CDT10790
1196  C540 005F      1081            CLHI  R4,X'5F'          BACKARROW, UNDERLINE, DELETE ?            CDT10800
119A  2334           1082            BES   $RD.5             BRANCH: DELETE LAST CHARACTER             CDT10810
119C  C540 0008      1083            CLHI  R4,X'08'          BACKSPACE ?                               CDT10820
11A0  2136           1084            BNES  $RD.6             BRANCH: NO.                               CDT10830
11A2  27D2           1085  $RD.5     SIS   R13,2             TO DELETE LAST CHARACTER                  CDT10840
11A4  4210 1150      1086            BM    $RD.1             BRANCH: NO UNDERFLOW ALLOWED.             CDT10850
11A8  4300 1152      1087            B     $RD.2             GET ANOTHER CHARACTER                     CDT10860
11AC  D24D 3644      1088  $RD.6     STB   R4,$INBUF(R13)    STORE CURRENT INPUT BYTE                  CDT10870
11B0  C540 000D      1089            CLHI  R4,X'0D'          CARRIAGE RETURN ?                         CDT10880
11B4  2135           1090            BNES  $RD.7             BRANCH: NOT YET.                          CDT10890
11B6  C850 1708      1091            LDAI  R5,CRLFMSG                                                  CDT10900
11BA  4300 1064      1092            B     $P1               OUTPUT (CR),(LF) TO CONSOLE, RETURN.      CDT10910
11BE  C5D0 004F      1093  $RD.7     CLHI  R13,$BUFLEN-1     BUFFER AT MAX ?                           CDT10920
11C2  4280 1152      1094            BL    $RD.2             BRANCH: NOT YET.                          CDT10930
11C6  4300 1158      1095            B     $RD.3             BRANCH: FORCE OVERLAY OF LAST CHARACT     CDT10940
                     1096  *                                                                           CDT10950
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                        1097  * -------------------------------                                  CDT10960
                        1098  * SET UP FOR CONSOLE, LIST I/O DEVICES                             CDT10970
                        1099  *                                                                   CDT10980
11CA   D310 0A10        1100  STCON    LB     R1,IO              GET I/O IDENTIFIERS            CDT10990
11CE   D320 0A11        1101           LB     R2,IO+1                                           CDT11000
11D2   2436             1102           LIS    R3,$MAXIO          IDENTIFIER CAN BE 1,2,3,4,5    CDT11010
11D4   0513             1103           CLAR   R1,R3                                             CDT11020
11D6   2182             1104           BLS    $STC.1             BRANCH IF KB IDENTIFIER OK     CDT11030
11D8   2411             1105           LIS    R1,1               ELSE FORCE CRT                 CDT11040
11DA   0523             1106  $STC.1   CLAR   R2,R3                                            CDT11050
11DC   2182             1107           BLS    $STC.2             SAME TEST FOR LIST DEVICE      CDT11060
11DE   2421             1108           LIS    R2,1                                              CDT11070
11E0   D210 0A10        1109  $STC.2   STB    R1,IO              REESTABLISH VALUES             CDT11080
11E4   D220 0A11        1110           STB    R2,IO+1                                           CDT11090
11E8   D362 0A48        1111           LB     R6,CONRQ2S(R2)                                    CDT11100
11EC   4060 161C        1112           STH    R6,$LSTPAS         SET PASLA FLAG (LIST DEVICE)   CDT11110
11F0   0866             1113           LDAR   R6,R6                                             CDT11120
11F2   2336             1114           BZS    $STC.3             SKIP IF NOT PASLA              CDT11130
11F4   9122             1115           SLHLS  R2,2                                              CDT11140
11F6   4802 0A10        1116           LH     R0,IO(R2)                                         CDT11150
11FA   DE02 0A32        1117           OC     R0,CONCMD(R2)      ISSUE 2ND COMMAND (TO LIST DEVICE***  CDT11160
                        1118  *                                                                   CDT11170
11FE   41F0 1334        1119  $STC.3   BAL    R15,SETKB          ESTABLISH KEYBOARD DEVICE (& IOSAVE)  CDT11180
1202   9310             1120           LBR    R1,R0              (R1) = 1,2,4,5 ; (R0 = KBIDENT)  CDT11190
1204   9112             1121           SLHLS  R1,2               (R1)=4,8,16,20                 CDT11200
1206   2712             1122           SIS    R1,2                                              CDT11210
1208   4831 0A10        1123           LH     R3,IO(R1)                                         CDT11220
120C   4030 0A2A        1124           STH    R3,CONRADR         SET UP CONSOLE DEVICE READ ADDRESS  CDT11230
1210   4831 0A12        1125           LH     R3,IO+2(R1)                                       CDT11240
1214   4030 0A2C        1126           STH    R3,CONWADR         SET UP CONSOLE WRITE ADDRESS   CDT11250
1218   4821 0A32        1127           LH     R2,CONCMD(R1)                                     CDT11260
121C   4020 0A2E        1128           STH    R2,CONRD           SET UP R/W COMMANDS            CDT11270
1220   4821 0A34        1129           LH     R2,CONCMD+2(R1)                                   CDT11280
1224   4020 0A30        1130           STH    R2,CON2ND          2ND CMD; ENABLE READ CMD       CDT11290
1228   9310             1131           LBR    R1,R0                                             CDT11300
122A   D341 0A48        1132           LB     R4,CONRQ2S(R1)                                    CDT11310
122E   D240 0A48        1133           STB    R4,CONRQ2S         CONSOLE REQUEST TO SEND        CDT11320
1232   4040 161A        1134           STH    R4,$CONPAS         SET PASLA FLAG (CONSOLE)       CDT11330
1236   0844             1135           LDAR   R4,R4                                             CDT11340
1238   2333             1136           BZS    $STC.4             SKIP 2ND OC IF NOT PASLA DEVICE  CDT11350
123A   9422             1137           EXBR   R2,R2                                             CDT11360
123C   9E32             1138           OCR    R3,R2              ISSUE 2ND COMMAND (TO CONSOLE)  CDT11370
123E   DE30 0A2E        1139  $STC.4   OC     R3,CONRD           PUT CONSOLE IN READ MODE       CDT11380
1242   9B32             1140           RDR    R3,R2              READ A DUMMY CHARACTER (SET BUSY)  CDT11390
1244   0844             1141           LDAR   R4,R4              CONSOLE PASLA DEVICE ?         CDT11400
1246   2333             1142           BZS    $STC.5             BRANCH: NO.                    CDT11410
1248   DE30 0A48        1143           OC     R3,CONRQ2S         REQUEST TO SEND (KEEP ON-LINE)  CDT11420
       0000 124C        1144  $STC.5   EQU    *                                                 CDT11430
124C   030E             1145           BR     R14                RETURN                         CDT11440
                        1146  *-----------------------------                                    CDT11450
                        1147  *  TO OUTPUT '?' TO CONSOLE                                       CDT11460
                        1148  *                                                                   CDT11470
124E   41F0 1334        1149  QUESTN   BAL    R15,SETKB          SELECT KEYBOARD DEVICE         CDT11480
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1252  41F0 1048          1150           BAL   R15,$PRINT                                          CDT11490
1256  16E4               1151           DAC   QMSG              QUESTION MARK, CRLF           CDT11500
1258  4300 0AB6          1152           B     OPTIN1            ACCEPT NEXT COMMAND           CDT11510
                         1153  *-----------------------------                                   CDT11520
                         1154  * IF BREAK KEY DEPRESSED, GO TO 'OPTIN' OR (BRKVECT); ELSE RETURN. CDT11530
                         1155  *                                                               CDT11540
      0000 125C          1156  TSTBRK EQU   *                                                  CDT11550
125C  D0E0 35E0          1157           STM   R14,$TBRKSV       SAVE REGISTERS                CDT11560
1260  48F0 17F8          1158           LH    R15,NOMSG+$VALU1  (R15) = 15 IF IGNORING I/O    CDT11570
1264  46F0 1620          1159           OH    R15,$BRKFLG       (R15) = 15 IF BRK ALREADY SEEN CDT11580
1268  27FF               1160           SIS   R15,15            LOOK FOR BREAK ?              CDT11590
126A  2137               1161           BNZS  $TSTB.2           BRANCH: YES.                  CDT11600
                         1162  *                                                               CDT11610
126C  24F0               1163  $TSTB.1  LIS   R15,0                                           CDT11620
126E  40F0 161E          1164           STH   R15,BRKVECT       CANCEL BREAK VECTOR           CDT11630
1272  D1E0 35E0          1165  $TSTB.1A LM    R14,$TBRKSV       RELOAD REGISTERS,             CDT11640
1276  030F               1166           BR    R15               RETURN TO CALLER.             CDT11650
                         1167  *                                                               CDT11660
1278  48E0 0A2A          1168  $TSTB.2  LH    R14,CONRADR       READ SIDE ADDRESS FOR TERMINAL CDT11670
127C  D3F0 0A10          1169           LB    R15,IO            CONSOLE ID CODE               CDT11680
1280  C5F0 0002          1170           CLHI  R15,2                                           CDT11690
1284  2333               1171           BES   $TSTB.3           BRANCH: TTY                   CDT11700
1286  C5F0 0005          1172           CLHI  R15,5                                           CDT11710
128A  4330 12C8          1173  $TSTB.3  BE    $TSTB.5           BRANCH: MICRO-I/O BUS         CDT11720
128E  9DEF               1174           SSR   R14,R15                                         CDT11730
1290  4280 126C          1175           BTC   8,$TSTB.1         BRANCH: BSY = NO BRK          CDT11740
1294  C3F0 0020          1176           THI   R15,X'20'                                       CDT11750
1298  4330 126C          1177           BZ    $TSTB.1           BRANCH: NO FRERR = NO BRK     CDT11760
129C  9BEF               1178           RDR   R14,R15                                         CDT11770
129E  08FF               1179           LDAR  R15,R15                                         CDT11780
12A0  4230 126C          1180           BNZ   $TSTB.1           BRANCH: NONZERO CHAR = NO BRK CDT11790
                         1181  *                                                               CDT11800
      0000 12A4          1182  $TSTB.4  EQU   *                 IT IS BREAK                   CDT11810
12A4  24FF               1183           LIS   R15,15                                          CDT11820
12A6  40F0 1620          1184           STH   R15,$BRKFLG       SET FLAG                      CDT11830
12AA  48F0 162C          1185           LH    R15,$PRTFLG       PRINTING NOW ?                CDT11840
12AE  4230 1272          1186           BNZ   $TSTB.1A          BRANCH: YES.                  CDT11850
12B2  24E0               1187           LIS   R14,0                                           CDT11860
12B4  48F0 161E          1188           LH    R15,BRKVECT       SPECIFIED VECTOR              CDT11870
12B8  40E0 161E          1189           STH   R14,BRKVECT       CANCEL VECTOR                 CDT11880
12BC  023F               1190           BNZR  R15               BUT TAKE IMMEDIATELY IF NON-ZERO. CDT11890
12BE  25F1               1191           LCS   R15,1             FORCE MESSAGE PRINT      P2 1/80 CDT11900
12C0  40F0 1624          1192           STH   R15,ISITERR       .                        P2 1/80 CDT11910
12C4  4300 10CE          1193           B     $PRT.3A           'BREAK TERMINATION'      P2 1/80 CDT11920
                         1194  *                                                               CDT11930
12C8  9DEF               1195  $TSTB.5  SSR   R14,R15                                         CDT11940
12CA  C3F0 0020          1196           THI   R15,X'20'                                       CDT11950
12CE  2134               1197           BNZS  $TSTB.6           BRANCH: BRK.                  CDT11960
12D0  9BEF               1198           RDR   R14,R15           IF BRK QUEUED, SEE IT NEXT TIME. CDT11970
12D2  4300 126C          1199           B     $TSTB.1           BRANCH: NO FRERR = NO BRK     CDT11980
12D6  9BEF               1200  $TSTB.6  RDR   R14,R15           READ BREAK CHAR               CDT11990
12D8  C8F0 8000          1201           LHI   R15,X'8000'                                     CDT12000
12DC  26F1               1202  $TSTB.7  AIS   R15,1                                           CDT12010
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12DE  2031          1203           BNZS  $TSTB.7                                          CDT12020
12E0  9DEF          1204           SSR   R14,R15                                         CDT12030
12E2  C3F0 0020     1205           THI   R15,X'20'          BRK KEY STILL DOWN ?         CDT12040
12E6  2038          1206           BNZS  $TSTB.6            BRANCH: YES.                 CDT12050
12E8  4300 12A4     1207           B     $TSTB.4            GO SERVICE BREAK             CDT12060
                    1208  *-----------------------------                                  CDT12070
                    1209  * SEE IF CURRENT LIST DEVICE IS OFF-LINE (R1 & CC NON-ZERO IF OFF)  CDT12080
                    1210  *                                                               CDT12090
12EC  241F          1211  TSTDU    LIS   R1,15                                          CDT12100
12EE  4510 17F8     1212           CLH   R1,NOMSG+$VALU1    IGNORING I/O ?               CDT12110
12F2  4330 1324     1213           BE    $IS.DU             BRANCH: CONSIDER AS DU.      CDT12120
12F6  4800 161A     1214           LH    R0,$CONPAS                                     CDT12130
12FA  D310 1623     1215           LB    R1,IOSAVE+1        LIST DEVICE ID               CDT12140
12FE  D410 0A10     1216           CLB   R1,IO              SAME AS CONSOLE DEVICE ?     CDT12150
1302  2333          1217           BES   $TSTDU.1           BRANCH: YES.                 CDT12160
1304  4800 161C     1218           LH    R0,$LSTPAS         NON-ZERO IF LIST DEVICE ON PASLA.  CDT12170
1308  9112          1219  $TSTDU.1 SLLS  R1,2                                           CDT12180
130A  4821 0A0E     1220           LH    R2,PASLADR-4(R1)   'READ SIDE' ADDRESS          CDT12190
130E  9D21          1221           SSR   R2,R1              GET DEVICE STATUS            CDT12200
1310  211A          1222           BTFS  1,$IS.DU                                       CDT12210
1312  0800          1223           LDAR  R0,R0              DEVICE ON PASLA ?            CDT12220
1314  2336          1224           BZS   $NOT.DU                                        CDT12230
1316  C410 00FC     1225           NHI   R1,X'FC'                                       CDT12240
131A  C510 000C     1226           CLHI  R1,X'0C'           PASLA DU IF BSY+EX SET HERE  CDT12250
131E  2333          1227           BES   $IS.DU             BRANCH: DU.                  CDT12260
1320  2410          1228  $NOT.DU  LIS   R1,0                                           CDT12270
1322  2302          1229           BS    $DU.X                                          CDT12280
1324  2511          1230  $IS.DU   LCS   R1,1                                          CDT12290
1326  4800 162E     1231  $DU.X    LH    R0,$WASDU          GET OLD FLAG                 CDT12300
132A  0601          1232           OAR   R0,R1                                          CDT12310
132C  4000 162E     1233           STH   R0,$WASDU          ACCUMULATE                   CDT12320
1330  0811          1234           LDAR  R1,R1              SET CC <> 0 IF DU            CDT12330
                    1235  *                                OR CC = 0 IF NOT DU          CDT12340
1332  030F          1236           BR    R15                RETURN                       CDT12350
                    1237  * --------------------------------                             CDT12360
                    1238  * TO DIRECT INPUT AND OUTPUT TO CONSOLE DEVICE                  CDT12370
                    1239  *                                                               CDT12380
1334  D300 0A10     1240  SETKB    LB    R0,IO              GET KEYBOARD DEVICE          CDT12390
1338  D200 1623     1241           STB   R0,IOSAVE+1        SET LIST TO KEYBOARD         CDT12400
133C  030F          1242           BR    R15                RETURN                       CDT12410
                    1243  * -----------------------------                                CDT12420
                    1244  * TO RESELECT USER'S I/O CHOICE                                 CDT12430
                    1245  *                                                               CDT12440
133E  4800 0A10     1246  SETLST   LH    R0,IO                                          CDT12450
1342  4000 1622     1247           STH   R0,IOSAVE                                      CDT12460
1346  030F          1248           BR    R15                RETURN                       CDT12470
                    1249  *-----------------------------                                CDT12480
                    1250  *  TO PUT KEYBOARD DEVICE IN READ MODE                         CDT12490
                    1251  *                                                               CDT12500
1348  4800 0A2A     1252  KBREAD   LH    R0,CONRADR                                     CDT12510
134C  DE00 0A2E     1253           OC    R0,CONRD           OC CONSOLE - READ COMMAND    CDT12520
1350  DB00 1618     1254           RD    R0,SINK            READ A DUMMY CHARACTER (SET BUSY)  CDT12530
1354  4890 161A     1255           LH    R9,$CONPAS         PASLA ?                      CDT12540
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1358  4200 1358  1256           NOP   *                FOR SPECIAL KB DEVICE                CDT12550
135C  2333       1257           BZS   $KBR.1           NO, BRANCH TO EXIT                   CDT12560
135E  DE00 0A48  1258           OC    R0,CONRQ2S       YES, OC (REQUEST TO SEND)            CDT12570
1362  0304       1259  $KBR.1   BR    R4               RETURN                               CDT12580
                 1272  *----------------------------                                        CDT12710
                 1273  *  LIST DEVICE SET UP ROUTINE                                        CDT12720
                 1274  *                                                                    CDT12730
1364  4010 1640  1275  $SETUP   STA   R1,SET.RTN                                           CDT12740
1368  D310 1623  1276           LB    R1,IOSAVE+1      GET LIST DEVICE IDENTIFIER           CDT12750
136C  9112       1277           SLHLS R1,2             HW INDEX                             CDT12760
136E  4801 0A10  1278           LH    R0,IO(R1)        GET LIST DEVICE WRITE ADDRESS        CDT12770
1372  DE01 0A31  1279           OC    R0,CONCMD-1(R1)                                       CDT12780
1376  4810 1640  1280           LDA   R1,SET.RTN                                           CDT12790
137A  0301       1281           BR    R1               RETURN                               CDT12800
                 1282  * ****************************                                      CDT12810
                 1283  *  LOW CORE SET UP ROUTINE                                          CDT12820
                 1284  *                                                                    CDT12830
137C  D0E0 35EC  1285  LCORE    STM   R14,$R14SAV      SAVE REGISTERS                       CDT12840
1380  2400       1286           LIS   R0,0                                                 CDT12850
1382  C810 004E  1287           LHI   R1,X'4E'                                             CDT12860
1386  4001 0000  1288  $LCOR1   STH   R0,0(R1)         ZERO MEMORY FROM X'0000'-X'004F'     CDT12870
138A  4001 0080  1289           STH   R0,X'80'(R1)     ZERO MEMORY FROM X'0080'-X'00CF'     CDT12880
138E  2712       1290           SIS   R1,2                                                 CDT12890
1390  2215       1291           BNMS  $LCOR1                                               CDT12900
                 1292  *                                                                    CDT12910
1392              1293           IFZ   ADC-2                                                CDT12920
1392  4800 1610  1294           LH    R0,MOD32         SERIES 32 ?                          CDT12930
1396  2333       1295           BZS   $LCOR2           BRANCH: NO.                          CDT12940
                 1296           ENDC                                                       CDT12950
1398  C800 144C  1297           LHI   R0,$XI32         32-BIT I/O HANDLER                   CDT12960
139C  C810 07FE  1298  $LCOR2   LHI   R1,1023*2         FOR MAX I/O SERVICE TABLE            CDT12970
13A0  4001 00D0  1299  $LCOR3   STH   R0,X'D0'(R1)      VECTORS TO MEMORY X'00D0'-X'08CE'    CDT12980
13A4  2712       1300           SIS   R1,2             ARE ZERO FOR SERIES 16               CDT12990
13A6  2213       1301           BNMS  $LCOR3                                               CDT13000
                 1302  *                                                                    CDT13010
13A8  C8E0 3000  1303           LHI   R14,X'3000'      ARITH FAULT, MALFUNCTION, ONLY.      CDT13020
13AC  C8F0 1574  1304           LDAI  R15,$ERRF2       ILLEGAL INSTRUCTION HANDLER          CDT13030
13B0              1305           IFZ   ADC-2                                                CDT13040
13B0  D0E0 0034  1306           STM   R14,X'34'        FOR SERIES 16                        CDT13050
                 1307           ENDC                                                       CDT13060
13B4  D0E0 0030  1308           STM   R14,X'30'        FOR SERIES 32                        CDT13070
                 1309  *                                                                    CDT13080
13B8  24E0       1310           LIS   R14,0            TO ZERO MMF BIT IN NEW PSW           CDT13090
13BA  C8F0 1506  1311           LDAI  R15,$ERRF3       MACHINE MALFUNCTION NEW LOC          CDT13100
13BE              1312           IFZ   ADC-2                                                CDT13110
13BE  D0E0 003C  1313           STM   R14,X'3C'        FOR SERIES 16                        CDT13120
                 1314           ENDC                                                       CDT13130
13C2  D0E0 0038  1315           STM   R14,X'38'        FOR SERIES 32                        CDT13140
                 1316  *                                                                    CDT13150
13C6  C8E0 3000  1317           LHI   R14,X'3000'      ARITH FAULT, MALFUNCTION, ONLY.      CDT13160
13CA  C8F0 1584  1318           LDAI  R15,$ERRF1                                           CDT13170
13CE              1319           IFZ   ADC-2                                                CDT13180
13CE  4800 1610  1320           LH    R0,MOD32                                             CDT13190
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13D2  2133          1321          BNZS  $LCOR3A            BRANCH: PROTECT X'50' SEQUENCE       CDT13200
13D4  D0E0 004C     1322          STM   R14,X'4C'           FIXED-POINT DIV FAULT HDLR, S16      CDT13210
      0000 13D8     1323  $LCOR3A EQU   *                                                        CDT13220
                    1324          ENDC                                                         CDT13230
13D8  D0E0 0048     1325          STM   R14,X'48'           ARITHMETIC FAULT HDLR, S32           CDT13240
                    1326  *                                                                    CDT13250
13DC  40E0 009A     1327          STH   R14,X'9A'           SVC NEW PSW                          CDT13260
13E0  241E          1328          LIS   R1,14                                                    CDT13270
13E2  C800 156C     1329          LHI   R0,$ERRF9           SVC INTERRUPT HDLR                   CDT13280
13E6  4001 009C     1330  $LCOR4  STH   R0,X'9C'(R1)        SVC INTPT NEW LOC'S                  CDT13290
13EA  2712          1331          SIS   R1,2                                                     CDT13300
13EC  2213          1332          BNMS  $LCOR4              DO ALL 16                            CDT13310
                    1333  *                                                                    CDT13320
13EE  C840 3608     1334          LHI   R4,PSWSAVE+X'FF'&X'FF00'+8 PPF REG SAVE AREA           CDT13330
13F2                1335          IFZ   ADC-2                                                  CDT13340
13F2  4810 1610     1336          LH    R1,MOD32                                               CDT13350
13F6  213D          1337          BNZS  $LCOR5                                                 CDT13360
                    1338  *                                                                    CDT13370
                    1339  * SET UP ADDITIONAL LOW CORE FOR 16-BIT MACHINE ONLY                  CDT13380
                    1340  *                                                                    CDT13390
13F8  4040 0022     1341          STH   R4,X'22'            REG SAVE POINTER                     CDT13400
13FC  C8F0 157C     1342          LHI   R15,$ERRF5A                                            CDT13410
1400  D0E0 002C     1343          STM   R14,X'2C'           S16 FLOAT-POINT INTPT NEW PSW        CDT13420
                    1344  *                                                                    CDT13430
1404  C8F0 143E     1345          LHI   R15,$XI16           S16 I/O HANDLER                      CDT13440
1408  D0E0 0044     1346          STM   R14,X'44'           S16 EXTERNAL INTPT NEW PSW           CDT13450
140C  4300 1438     1347          B     $LCORXIT            RESTORE R14:R15, RETURN (R15)        CDT13460
                    1348  *                                                                    CDT13470
                    1349  * SET UP ADDITIONAL LOW CORE FOR 32-BIT MACHINE ONLY                  CDT13480
                    1350  *                                                                    CDT13490
                    1351          ENDC                                                         CDT13500
1410  24F0          1352  $LCOR5  LIS   R15,0                                                  CDT13510
1412  D0F0 0040     1353          STM   R15,X'40'           ZERO MALFUNCTION STATUS WORD, S320   CDT13520
                    1354  *                                                                    CDT13530
1416  4040 0086     1355          STH   R4,X'86'            S32 PPF REG SAVE POINTER             CDT13540
141A  2748          1356          SIS   R4,8                                                   CDT13550
141C  4040 0084     1357          STH   R4,X'84'            S32 PPF PSW SAVE POINTER             CDT13560
                    1358  *                               FOR S3200, IS ONE 24-BIT ADDRESS.    CDT13570
                    1359  *                                                                    CDT13580
1420  C8F0 1568     1360          LDAI  R15,$ERRF8                                             CDT13590
1424  D0E0 0088     1361          STM   R14,X'88'           SYSTEM QUEUE INTPT NEW PSW           CDT13600
                    1362  *                                                                    CDT13610
1428  C8F0 1580     1363          LDAI  R15,$ERRF5                                             CDT13620
142C  D0E0 0090     1364          STM   R14,X'90'           RELOC/PROTECT INTPT NEW PSW          CDT13630
                    1365  *                                                                    CDT13640
1430  C8F0 1564     1366          LDAI  R15,$ERRF7                                             CDT13650
1434  D0E0 00C8     1367          STM   R14,X'C8'           DATA FORMAT FAULT NEW PSW            CDT13660
                    1368  *                                                                    CDT13670
1438  D1E0 35EC     1369  $LCORXIT LM   R14,$R14SAV        RESTORE REGISTERS                    CDT13680
143C  030F          1370          BR    R15                 AND RETURN.                          CDT13690
                    1371  *                                                                    CDT13700
                    1397  *                                                                    CDT13960
                    1398  * ********************************************                       CDT13970
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                         1399  *  EXTERNAL INTERRUPT HANDLER                                    CDT13980
143E                     1400           IFZ   ADC-2                                            CDT13990
143E  D000 36D4          1401  $XI16    STM   R0,INTSAV          FOR 16-BIT PROCESSOR          CDT14000
1442  9F23               1402           ACKR  R2,R3              ACKNOWLEDGE THE INTERRUPT     CDT14010
1444  D1E0 0040          1403           LM    R14,X'40'          OLD PSW, EXTERNAL INTERRUPT   CDT14020
1448  24A0               1404           LIS   R10,0              AVOID $ERRF6 ON SERIES 16     CDT14030
144A  2306               1405           BS    $XI16A                                          CDT14040
                         1406  *                                                              CDT14050
                         1407  *                               FOR 32-BIT PROCESSOR          CDT14060
144C  95AA               1408  $XI32    EPSR  R10,R10            PSW AFTER INTERRUPT           CDT14070
144E  50A0               1409           DC    X'50A0',Z(INTPSW)  * ST R10,INTPSW               CDT14080
1450  1608
1452  08E0               1410           LDAR  R14,R0             OLD PSW                       CDT14090
1454  08F1               1411           LDAR  R15,R1             OLD LOC                       CDT14100
      0000 1456          1412  $XI16A   EQU   *                                               CDT14110
                         1413           ELSE                                                   CDT14120
                         1418           ENDC                                                   CDT14170
1456  4020 1612          1419           STH   R2,INTDEV          INTERRUPTING DEVICE ADDRESS   CDT14180
145A  D230 1614          1420           STB   R3,INTSTA          INTERRUPTING DEVICE STATUS    CDT14190
145E  D0E0 15F8          1421           STM   R14,OLDPSW                                       CDT14200
1462  4520 0A2A          1422           CLH   R2,CONRADR         CONSOLE READ-SIDE INTERRUPT ? CDT14210
1462                     1423           IFZ   $KBINT-1                                         CDT14220
                         1425           ELSE
1466  4330 14C0          1426           BE    RETOPSW            IGNORE (FOR 1610,20,30)       CDT14250
                         1427           ENDC                                                   CDT14260
                         1428  *                                                              CDT14270
146A  2450               1429           LIS   R5,0                                             CDT14280
146C  4865 185E          1430  $XI1     LH    R6,DEVSADR(R5)     GET DEV ADRS FROM TABLE       CDT14290
1470  4210 14CE          1431           BM    $ERRF4             TABLE OVERFLOW.               CDT14300
1474  0562               1432           CLAR  R6,R2              COMPARE INTERRUPTING DEVICE ADDRES CDT14310
1476  2333               1433           BES   $XI2                                             CDT14320
1478  2652               1434           AIS   R5,2                                             CDT14330
147A  2207               1435           BS    $XI1                                             CDT14340
147C  4865 1874          1436  $XI2     LH    R6,DEVINT(R5)      GET INTERRUPT HANDLER ADDRESS CDT14350
1480  4330 14CE          1437           BZ    $ERRF4             INTERRUPT NOT EXPECTED        CDT14360
1484  9051               1438           SRLS  R5,1               IF SERIES 32,                 CDT14370
1486  90A4               1439           SRLS  R10,4              INTERRUPT LEVEL MUST BE CORRECT CDT14380
1488  C4A0 000F          1440           NHI   R10,15                                           CDT14390
148C  D4A5 188A          1441           CLB   R10,INTLVL(R5)     CHECK PROPER INTERRUPT LEVEL  CDT14400
1490  4230 14D2          1442           BNE   $ERRF6             SERIES 16 ZERO ALWAYS MATCHES. CDT14410
                         1443  *                                                              CDT14420
1494  081F               1444           LDAR  R1,R15             OLD LOC AT INTERRUPT          CDT14430
1496  48E0 0A52          1445           LH    R14,PSW2           SPEC'D AS X'30F0'             CDT14440
149A  08F6               1446           LDAR  R15,R6             INTERRUPT VECTOR              CDT14450
149C                     1447           IFZ   ADC-2                                            CDT14460
149C  D0E0 1600          1448           STM   R14,NEWPSW         PSW TO ENTER SERVICE ROUTINE  CDT14470
14A0  4800 1610          1449           LH    R0,MOD32           SERIES 32 ?                   CDT14480
14A4  213C               1450           BNZS  $XI4               BRANCH: YES.                  CDT14490
14A6  C510 0F82          1451           CLAI  R1,$TIMER          WAS IN TIMER ROUTINE ?        CDT14500
14AA  2187               1452           BLS   $XI3               BRANCH: NO.                   CDT14510
14AC  C510 0F9C          1453           CLAI  R1,$TIMXT          FINAL CHECK:                  CDT14520
14B0  2384               1454           BNLS  $XI3               BRANCH: NOT IN TIMER ROUTINE. CDT14530
14B2  D100 3694          1455           LM    R0,RSAVE           RELOAD REGISTERS SAVED BY TIMER CDT14540
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14B6  2303           1456           BS    $XI4                                                  CDT14550
14B8  D100 36D4      1457  $XI3     LM    R0,INTSAV          RELOAD REGISTERS SAVED BY $XI16    CDT14560
14BC  C200 1600      1458  $XI4     LPSW  NEWPSW             AND GO TO SERVICE ROUTINE.         CDT14570
                     1459           ELSE  .                                                     CDT14580
                     1461           ENDC                                                        CDT14600
                     1462  *                                                                    CDT14610
                     1463  * ------------------------------------------                        CDT14620
                     1464  * TO RETURN ON OLD PSW FOLLOWING I/O INTERRUPT                       CDT14630
                     1465  *                                                                    CDT14640
      0000 14C0      1466  RETOPSW  EQU   *                                                    CDT14650
14C0                 1467           IFZ   ADC-2                                                 CDT14660
14C0  4800 1610      1468           LH    R0,MOD32           SERIES 32 ?                        CDT14670
14C4  2133           1469           BNZS  RETOPSW1           BRANCH: NO.                        CDT14680
14C6  D100 36D4      1470           LM    R0,INTSAV          RESTORE USER REGISTER, SERIES 16   CDT14690
                     1471           ENDC                                                        CDT14700
      0000 14CA      1472  RETOPSW1 EQU   *                                                    CDT14710
14CA  C200 15F8      1473           LPSW  OLDPSW                                              CDT14720
                     1474  * ---------------------------------                                CDT14730
                     1475  *  EXTERNAL INTERRUPT ERROR ROUTINE                                CDT14740
                     1476  *                                                                    CDT14750
14CE  2464           1477  $ERRF4   LIS   R6,4               ERROR TTF4                        CDT14760
14D0  2302           1478           BS    XIERR1                                              CDT14770
                     1479  *---------------------------------                                CDT14780
                     1480  * DEVICE INTERRUPTED IN WRONG INTERRUPT LEVEL                       CDT14790
                     1481  *                                                                    CDT14800
14D2  2466           1482  $ERRF6   LIS   R6,6               ERROR TTF6                        CDT14810
14D4  C660 4630      1483  XIERR1   OHI   R6,C'F0'           CONVERT TO ASCII                  CDT14820
14D8  4060 1664      1484           STH   R6,ERRNO                                             CDT14830
14DC  D3AA 1642      1485           LB    R10,HEXTAB(R10)    CONVERT LEVEL TO ASCII       P3 3/80  CDT14840
14E0  D2A0 16D6      1486           STB   R10,ERRLVL         AND STORE IN MESSAGE         P3 3/80  CDT14850
14E4  4810 0A52      1487           LH    R1,PSW2            SPEC'D AS X'30F0'                 CDT14860
14E8  9501           1488           EPSR  R0,R1              ENSURE USER REGISTER SET          CDT14870
14EA  41F0 0E28      1489           BAL   R15,ERRALL         'ERROR TTFN', 'DEV DDD STA SS'    CDT14880
                     1490  *                                 'PSW PPPP  LOC LLLL'              CDT14890
14EE  4860 1664      1491           LH    R6,ERRNO                                            CDT14900
14F2  C560 4636      1492           CLHI  R6,C'F6'           WRONG INTERRUPT LEVEL ?           CDT14910
14F6  2136           1493           BNES  XIERR2             BRANCH: NO.                       CDT14920
14F8  4060 1624      1494           STH   R6,ISITERR         FORCE PRINT                       CDT14930
14FC  41F0 1048      1495           BAL   R15,$PRINT                                           CDT14940
1500  16C1           1496           DAC   INTLVLM            'INTERRUPTED IN LEVEL N'          CDT14950
1502  4300 0AB6      1497  XIERR2   B     OPTIN1             ENTER COMMAND MODE.               CDT14960
                     1498  *----------------------------                                     CDT14970
                     1499  *  SPURIOUS INTERRUPT HANDLERS                                     CDT14980
                     1500  *                                                                  CDT14990
                     1501  *  MACHINE MALFUNCTION INTERRUPT TRAP                              CDT15000
                     1502  *                                                                  CDT15010
1506  95DD           1503  $ERRF3   EPSR  R13,R13           PSW AT ENTRY TO HANDLER & SAME CC  CDT15020
1508  D1E0 0020      1504           LM    R14,X'20'          S32 MALFUNCTION OLD PSW           CDT15030
150C                 1505           IFZ   ADC-2                                               CDT15040
150C  4800 1610      1506           LH    R0,MOD32           SERIES 32 ?                       CDT15050
1510  233D           1507           BZS   $MM16.1            BRANCH: NO..                      CDT15060
1512  50D0           1508           DC    X'50D0',Z(MMSW)    * ST R13,MMSW                     CDT15070
1514  160C
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1516  5800           1509          DC    X'5800',X'0040'     * L R0,X'40'                      CDT15080
1518  0040
151A  4330 1538      1510          BZ    $MM.1               BRANCH: NOT S3200                 CDT15090
151E  5000           1511          DC    X'5000',Z(MMSW)     * ST R0,MMSW                      CDT15100
1520  160C
1522  4210 153E      1512          BM    $MM.2               BRANCH: S3200 POWER FAIL          CDT15110
1526  4300 154E      1513          B     $MM.3               BRANCH: OTHER S3200 MALFUNCTION   CDT15120
                     1514  *                                                                   CDT15130
152A  D1E0 0038      1515  $MM16.1 LM    R14,X'38'           S16 MALFUNCTION OLD PSW           CDT15140
152E  40D0 160E      1516          STH   R13,MMSW+2          PSW STATUS AT INTERRUPT           CDT15150
1532  2400           1517          LIS   R0,0                                                  CDT15160
1534  4000 160C      1518          STH   R0,MMSW             LEADING ZEROS                     CDT15170
1538  C3D0 0001      1519  $MM.1   THI   R13,X'0001'         POWER FAIL ?                      CDT15180
153C  2339           1520          BZS   $MM.3               BRANCH: NO.                       CDT15190
153E  C800 154E      1521  $MM.2   LHI   R0,$MM.3                                              CDT15200
1542  4000 003E      1522          STH   R0,X'3E'            CHANGE INTERRUPT NEW LOC          CDT15210
                     1523          ELSE                                                        CDT15220
                     1536          ENDC                                                        CDT15350
1546  4810 0A52      1537          LH    R1,PSW2             SPEC'D AS X'30F0'                 CDT15360
154A  9501           1538          EPSR  R0,R1               RE-ENABLE MALFUNCTION             CDT15370
154C  2200           1539          BS    *                   AND WAIT FOR POWER RESTORE.       CDT15380
                     1540  *                                                                   CDT15390
                     1541  * AT THIS POINT, WE KNOW IT IS NOT A POWER FAIL.                     CDT15400
                     1542  * POWER RESTORE REPORTS 'POWER FAIL' AS REASON FOR INTERRUPT.        CDT15410
                     1543  *                                                                   CDT15420
154E  C810 1506      1544  $MM.3   LDAI  R1,$ERRF3           RESTORE INTERRUPT VECTOR          CDT15430
1552                 1545          IFZ   ADC-2                                                 CDT15440
1552  4010 003E      1546          STH   R1,X'3E'                                              CDT15450
1556  4800 1610      1547          LH    R0,MOD32                                              CDT15460
155A  2333           1548          BZS   $MM.3A                                                CDT15470
155C  5010           1549          DC    X'5010',X'003C'     * ST R1,X'3C'                     CDT15480
155E  003C
      0000 1560      1550  $MM.3A  EQU   *                                                     CDT15490
                     1551          ELSE                                                        CDT15500
                     1553          ENDC                                                        CDT15520
                     1554  *                                                                   CDT15530
1560  2463           1555          LIS   R6,3                ERROR TTF3                        CDT15540
1562  2308           1556          BS    $BS.COMM                                              CDT15550
                     1557  * -------------------------                                         CDT15560
                     1558  * DATA FORMAT FAULT INTERRUPT                                       CDT15570
                     1559  *                                                                   CDT15580
1564  2467           1560  $ERRF7  LIS   R6,7                ERROR TTF7                        CDT15590
1566  2306           1561          BS    $BS.COMM                                              CDT15600
                     1562  * -------------------------                                         CDT15610
                     1563  * SYSTEM QUEUE SERVICE INTERRUPT                                     CDT15620
                     1564  *                                                                   CDT15630
1568  2468           1565  $ERRF8  LIS   R6,8                ERROR TTF8                        CDT15640
156A  2304           1566          BS    $BS.COMM            .                    P2 1/80      CDT15650
                     1567  * -------------------------                                         CDT15660
                     1568  * SUPERVISOR CALL INTERRUPT                                         CDT15670
                     1569  *                                                                   CDT15680
156C  2469           1570  $ERRF9  LIS   R6,9                ERROR TTF9                        CDT15690
156E  C820 0096      1571          LHI   R2,X'96'            WHERE TO FIND OLD PSW, S16  P2 1/80  CDT15700
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1572  230C                1572  $BS.COMM BS    COMM                .                          P2 1/80   CDT15710
                          1573  * -------------------------                                             CDT15720
                          1574  *  ILLEGAL INSTRUCTION INTERRUPT TRAP                                   CDT15730
                          1575  *                                                                       CDT15740
1574  2462                1576  $ERRF2   LIS   R6,2                ERROR TTF2                          CDT15750
1576                      1577           IFZ   ADC-2                                                    CDT15760
1576  C820 0030           1578           LHI   R2,X'30'             WHERE TO FIND OLD PSW, SERIES 16    CDT15770
                          1579           ENDC                                                           CDT15780
157A  2308                1580           BS    COMM                                                     CDT15790
                          1581  * -------------------------                                             CDT15800
157C                      1582           IFZ   ADC-2                                                    CDT15810
                          1583  *  FLOATING-PT ARITH FAULT INT TRAP  (16 BIT PROCESSOR)                 CDT15820
                          1584  *                                                                       CDT15830
157C  C820 0028           1585  $ERRF5A  LHI   R2,X'28'             WHERE TO FIND OLD PSW, SERIES 16    CDT15840
                          1586  * -------------------------                                             CDT15850
                          1587           ENDC                                                           CDT15860
                          1588  *  RELOCATION/PROTECTION INT TRAP                                       CDT15870
                          1589  *                                                                       CDT15880
1580  2465                1590  $ERRF5   LIS   R6,5                ERROR TTF5                          CDT15890
1582  2304                1591           BS    COMM                                                     CDT15900
                          1592  * -------------------------                                             CDT15910
                          1593  *  ARITHMETIC FAULT INT (32-BIT PROCESSOR) TRAP                         CDT15920
1584                      1594           IFZ   ADC-2                                                    CDT15930
                          1595  *  FIXED-PT DIVIDE FAULT INT (16-BIT PROCESSOR) TRAP                    CDT15940
                          1596           ENDC                                                           CDT15950
                          1597  *                                                                       CDT15960
1584  2461                1598  $ERRF1   LIS   R6,1                ERROR TTF1                          CDT15970
1586                      1599           IFZ   ADC-2                                                    CDT15980
1586  C820 0048           1600           LHI   R2,X'48'             WHERE TO FIND OLD PSW, SERIES 16    CDT15990
                          1601           ENDC                                                           CDT16000
                          1602  *                                                                       CDT16010
                          1603  * ERROR TTFN PRINTOUT ROUTINE. EXPECTS USER REGISTER SET SELECTED.      CDT16020
                          1604  *                                                                       CDT16030
      0000 158A           1605  COMM     EQU   *                                                       CDT16040
158A                      1606           IFZ   ADC-2                                                    CDT16050
158A  4800 1610           1607           LH    R0,MOD32             SERIES 16 ?                         CDT16060
158E  2136                1608           BNZS  $COMM1               BRANCH: NO.                         CDT16070
1590  C560 0003           1609           CLHI  R6,3                 FROM $ERRF3 ?                       CDT16080
1594  2333                1610           BES   $COMM1               BRANCH: YES.                        CDT16090
1596  D1E2 0000           1611           LM    R14,0(R2)            GET INTERRUPT OLD PSW               CDT16100
                          1612           ENDC                                                           CDT16110
159A  D0E0 15F8           1613  $COMM1   STM   R14,OLDPSW           OLD PSW, OLD LOC                    CDT16120
159E  C660 4630           1614           OHI   R6,C'F0'             CONVERT ERROR NUMBER TO ASCII       CDT16130
15A2  4060 1664           1615           STH   R6,ERRNO             ERROR NUMBER                        CDT16140
15A6  4060 1624           1616           STH   R6,ISITERR           FORCE ERROR MESSAGE PRINT           CDT16150
15AA  4810 0A52           1617           LH    R1,PSW2              SPEC'D AS X'30F0'                   CDT16160
15AE  9501                1618           EPSR  R0,R1                ENSURE USER REGISTER SET            CDT16170
15B0  41E0 11CA           1619  $COMM2   BAL   R14,STCON            SET UP & SELECT KEYBOARD DEVICE     CDT16180
15B4  41F0 12EC           1620           BAL   R15,TSTDU            TEST IF KEYBOARD OFF-LINE           CDT16190
15B8  2034                1621           BNZS  $COMM2               WAIT FOR ON-LINE.                   CDT16200
15BA  41F0 103C           1622           BAL   R15,CRLF             SEND LINE FEED                      CDT16210
15BE  41F0 0DE8           1623           BAL   R15,ERR              PRINT 'ERROR XXFN'                  CDT16220
15C2  4860 1664           1624           LH    R6,ERRNO             GET ERROR NUMBER                    CDT16230
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15C6  4060 1624          1625           STH   R6,ISITERR        FORCE PRINT                          CDT16240
15CA  41E0 0EDA          1626           BAL   R14,ERRPL1         PRINT 'PSW PPPP  LOC LLLL'          CDT16250
15CE  C560 4633          1627           CLHI  R6,C'F3'           MACHINE MALFUNCTION ?                CDT16260
15D2  4230 0AB6          1628           BNE   OPTIN1             BRANCH: NO.                          CDT16270
                         1629  *                                                                      CDT16280
15D6                     1630           IFZ   ADC-2                                                   CDT16290
15D6  4810 160E          1631           LH    R1,MMSW+2          ASSUME SERIES 16                     CDT16300
15DA  4800 1610          1632           LH    R0,MOD32           SERIES 32 ?                          CDT16310
15DE  2333               1633           BZS   $COMM3             BRANCH: NO.                          CDT16320
15E0  5810               1634           DC    X'5810',Z(MMSW)    * L R1,MMSW                          CDT16330
15E2  160C
      0000 15E4          1635  $COMM3   EQU   *                                                       CDT16340
                         1636           ELSE                                                          CDT16350
                         1638           ENDC                                                          CDT16370
15E4  2408               1639           LIS   R0,8               DIGIT COUNT                          CDT16380
15E6  C820 16A1          1640           LDAI  R2,ASCIMSW         DESTINATION                          CDT16390
15EA  41F0 0FA4          1641           BAL   R15,HEXASC         CONVERT 3200 MMSW FOR PRINT          CDT16400
15EE  41F0 1048          1642           BAL   R15,$PRINT                                              CDT16410
15F2  1698               1643           DAC   MMSWMSG            'STATUS = XXXXXXXX'                  CDT16420
15F4  4300 0AAE          1644           B     OPTIN              GET COMMAND INPUT                    CDT16430
                         1645  * ************************                                              CDT16440
                         1646  *  ETPE CONSTANTS & TABLES                                            CDT16450
15F8                     1647           ALIGN 8                                                       CDT16460
                         1648  *------------------------                                             CDT16470
15F8  0000               1649  CLDPSW   DCX   0000,0000,0000,0000                                     CDT16480
15FA  0000
15FC  0000
15FE  0000
1600  0000               1650  NEWPSW   DCX   0000,0000,0000,0000                                     CDT16490
1602  0000
1604  0000
1606  0000
1608  0000 0000          1651  INTPSW   DCY   0                  (SERIES 32 ONLY)                     CDT16500
160C  0000               1652  MMSW     DCX   0000,0000          MACHINE MALFUNCTION STATUS           CDT16510
160E  0000
                         1653  *------------------------                                             CDT16520
1610  0000               1654  MOD32    DCX   0                  NON-ZERO, SERIES 32                  CDT16530
1612  0000               1655  INTDEV   DCX   0                  INTERRUPTING DEV ADR                 CDT16540
      0000 1612          1656  ERRDEV   EQU   INTDEV             ERROR DEVICE #                       CDT16550
1614  00                 1657  INTSTA   DB    0                  INTERRUPTING DEV STATUS              CDT16560
      0000 1614          1658  ERRSTA   EQU   INTSTA             ERRONEOUS STATUS                     CDT16570
1615  80                 1659  NORM     DB    X'80'              CONSOLE NORMAL MODE                  CDT16580
1616  40                 1660  INCR     DB    X'40'              CONSOLE INCREMENTAL MODE             CDT16590
1617  E0                 1661  $CLKSTRT DB    X'E0'              PIC CMD DISARM+START                 CDT16600
1618                     1662           DB    *                  (ALIGN ON HW BOUNDARY)               CDT16610
1618  0000               1663  SINK     DC    0                  BIT BUCKET                           CDT16620
161A  0000               1664  $CONPAS  DCX   0                  SET WHEN CONSOLE ON PASLA/PALM       CDT16630
161C  0000               1665  $LSTPAS  DCX   0                  SET WHEN LIST DEVICE ON PASLA        CDT16640
                         1666  * --------------------                                               CDT16650
161E  0000               1670  BRKVECT  DC    Z(0)               BREAK KEY VECTOR                     CDT16690
1620  0000               1671  $BRKFLG  DCX   0                  SET IF BREAK KEY DETECTED            CDT16700
1622  0000               1672  IOSAVE   DCX   0                  CURRENT I/O IDENTIFIERS              CDT16710
1624  0000               1673  ISITERR  DCX   0                  MESSAGE LEVEL                        CDT16720
```

```
1626   0000                1674  NOERR     DCX   0                  ZERO = 'NO ERROR'                          CDT16730
1628   0000                1675  SELTST    DCX   0                  HIGHEST SELECTED TEST #                    CDT16740
162A   0000                1676  $LINEPOS  DCX   0                  CURRENT SOUTBUF POSITION                   CDT16750
162C   0000                1677  $PRTFLG   DCX   0                  FLAG USED FOR DEFERRING BRK ACKNOWLED      CDT16760
162E   0000                1678  $WASDU    DCX   0                  ZERO IF I/O DEVICE ON-LINE                 CDT16770
1630   0000                1679  TOTAL     DCX   0                  TIMES WHOLE TEST RAN                       CDT16780
1632   0000                1680  TOTERR    DCX   0                  TOTAL ERRORS DETECTED                      CDT16790
1634   0000                1681  BTESTNO   DCX   0                  CURRENT TEST # IN BINARY                   CDT16800
1636   0000                1682  COUNT     DCX   0                  TIMES CURRENT TEST RAN                     CDT16810
1638   0000                1683  $PAUSE    DCX   0                  SET DURING TRANSMISSICN PAUSE              CDT16820
163A   0000                1684  $SHUTDWN  DAC   0                  A(USER-DEFINED SHUTDOWN ROUTINE)           CDT16830
163C   0000                1685  OUT.SAV   DAC   0                  OUTCHR RETURN ADDRESS SAVE                 CDT16840
163E   0000                1686  BRK.SAV   DAC   0                  TSTBRK RETURN ADDRESS SAVE                 CDT16850
1640   0000                1687  SET.RTN   DAC   0                  $SETUP RETURN ADDRESS SAVE                 CDT16860
                           1688  *                                                                             CDT16870
1642   3031 3233 3435 3637 1692  HEXTAB    DB    C'0123456789ABCDEF' HEXADECIMAL DIGITS                         CDT16910
164A   3839 4142 4344 4546
                           1693  *--------------------------------                                            CDT16920
                           1694  *  ETPE MESSAGES                                                             CDT16930
                           1695  *                                                                             CDT16940
1652   5445 5354 2020 2A2A 1696  TSTMSG    DB    C'TEST  **',X'0D'                                            CDT16950
165A   0D
       0000 1658           1697  MTESTNO   EQU   TSTMSG+6           MASTER TEST NUMBER (ASCII)                 CDT16960
165C                       1698              ALIGN 2                                                         CDT16970
165C   4552 524F 5220 2A2A 1699  ERRMSG    DB    C'ERROR ****  ',X'0D'                                       CDT16980
1664   2A2A 2020 0D
       0000 1662           1700  ETESTNO   EQU   ERRMSG+6           STORED BY ETPE                             CDT16990
       0000 1664           1701  ERRNO     EQU   ERRMSG+8           STORE ERRNO AS CHAR CONSTANT               CDT17000
1669   544F 5441 4C20 2020 1702  TOTMSG    DB    C'TOTAL   TOTERR',X'0D'                                      CDT17010
1671   544F 5445 5252 0D
1678   4E4F 2045 5252 4F52 1703  NOERMSG   DB    C'NO ERROR',X'0D'                                            CDT17020
1680   0D
1681   4445 5620 2A2A 2A20 1704  DEVMSG    DB    C'DEV *** STA **',X'0D'                                      CDT17030
1689   5354 4120 2A2A 0D
       0000 1685           1705  ASCIDEV   EQU   DEVMSG+4                                                    CDT17040
       0000 1689           1706  STAMSG    EQU   DEVMSG+8                                                    CDT17050
       0000 168D           1707  ASCISTA   EQU   DEVMSG+12                                                   CDT17060
1690   4445 5620 2A2A 2A0D 1708  DEVMSG2   DB    C'DEV ***',X'0D'                                             CDT17070
       0000 1694           1709  ASCIDEV2  EQU   DEVMSG2+4                                                   CDT17080
1698   5354 4154 5553 203D 1710  MMSWMSG   DB    C'STATUS =         ',X'0D'                                   CDT17090
16A0   2020 2020 2020 2020
16A8   200D
       0000 16A1           1711  ASCIMSW   EQU   MMSWMSG+9                                                   CDT17100
16AA   5053 5720 2020 2020 1712  PSWMSG    DB    C'PSW         LOC       ',X'0D'                             CDT17110
16B2   2020 2020 4C4F 4320
16BA   2020 2020 2020 0D
       0000 16AE           1713  ASCIPSW   EQU   PSWMSG+4                                                    CDT17120
       0000 16B6           1714  LOCMSG    EQU   PSWMSG+12                                                   CDT17130
       0000 16BA           1715  ASCILOC   EQU   PSWMSG+16                                                   CDT17140
16C1   494E 5445 5252 5550 1716  INTLVLM   DB    C'INTERRUPTED IN LEVEL *',X'0D'                              CDT17150
16C9   5445 4420 494E 204C
16D1   4556 454C 202A 0D
       0000 16D6           1717  ERRLVL    EQU   INTLVLM+21                                                   CDT17160
```

```
16D8   454E 4420 4F46 2054  1718  EOTMSG   DB    C'END OF TEST',X'0D'                                  CDT17170
16E0   4553 540D
16E4                        1719          ALIGN 4                                                     CDT17180
16E4   8D0A 3F0D            1720  QMSG    DB    X'8D',X'0A',C'?',X'0D' CR,LF,?,CR                     CDT17190
16E8   2A0D                 1721  AMSG    DB    C'*',X'0D'           *,CR                             CDT17200
16EA   FFFF FFFF FFFF FFFF  1722  BRKMSG  DB    -1,-1,-1,-1,-1,-1,-1,-1                               CDT17210
16F2   4252 4541 4B20 5445  1723          DB    C'BREAK TERMINATION',X'0D'                            CDT17220
16FA   524D 494E 4154 494F
1702   4E0D
       0000 1703            1724  $BRKEND EQU   *-1                                                   CDT17230
1704   FFFF FFFF 0D         1725  NULLMSG DB    -1,-1,-1,-1,X'0D'                                     CDT17240
       0000 1708            1726  CRLFMSG EQU   NULLMSG+4                                             CDT17250
1709   00                   1727          DB    *                    HALFWORD ALIGN                   CDT17260
```

DATA CONSTANTS & CHECK ROUTINES

```
                                1729  *-----------------------------                                    CDT17280
                                1730  *  OPTION/COMMAND TABLE                                          CDT17290
                                1731  *  STRUCTURE DEFINED BY '$STRUC1' AT TOP OF LISTING              CDT17300
170C                            1732          ALIGN 4                                                  CDT17310
                                1733  * ** COPY ETPE FILE ONLY TO HERE                                  CDT17320
      0000 170C                 1734  OPT     EQU   *                                                  CDT17330
170C  5445 5354 2020            1735  TEST    DC    C'TEST  ',X'0000',X'FBE0',X'0000'                  CDT17340
1712  0000
1714  FBE0
1716  0000
1718  4C4F 4359 4C20            1736  LOCYL   DC    C'LOCYL ',Z(RFMTCK),X'FFFF',X'FFFF'                CDT17350
171E  1CEA
1720  FFFF
1722  FFFF
1724  4849 4359 4C20            1737  HICYL   DC    C'HICYL ',X'0000',X'FFFF',X'FFFF'                  CDT17360
172A  0000
172C  FFFF
172E  FFFF
1730  5345 4354 4F52            1738  SECTOR  DC    C'SECTOR',Z(RFMTCK),X'0000',X'0000'                CDT17370
1736  1CEA
1738  0000
173A  0000
173C  5041 4354 5950            1739  PACTYP  DC    C'PACTYP',X'0000',X'CE01',X'0000'                  CDT17380
1742  0000
1744  CE01
1746  0000
1748  4259 434B 4144            1740  BYCKAD  DC    C'BYCKAD',Z(ZERONE),X'0000',X'0000'                CDT17390
174E  0BB2
1750  0000
1752  0000
1754  5345 4C43 4820            1741  SELCH   DC    C'SELCH ',Z(ADR),X'00F0',X'0000'                   CDT17400
175A  0BBA
175C  00F0
175E  0000
1760  4449 5343 4F4E            1742  DISCON  DC    C'DISCON',Z(ADR),X'00B6',X'0000'                   CDT17410
1766  0BBA
1768  00B6
176A  0000
176C  4452 4956 4520            1743  DRIVE   DC    C'DRIVE ',X'0000',X'FFFF',X'FFFF'                  CDT17420
1772  0000
1774  FFFF
1776  FFFF
1778  5846 494C 4520            1744  XFILE   DC    C'XFILE ',X'0000',X'FFFF',X'FFFF'                  CDT17430
177E  0000
1780  FFFF
1782  FFFF
1784  5245 5452 5920            1745  RETRY   DC    C'RETRY ',X'0000',X'0002',X'0000'                  CDT17440
178A  0000
178C  0002
178E  0000
      0000 178E                 1746  RRCTR   EQU   RETRY+$VALU2                                       CDT17450
1790  4441 5441 2020            1747  DATA    DC    C'DATA  ',X'0000',X'BDBD',X'0000'                  CDT17460
1796  0000
```

DATA CONSTANTS & CHECK ROUTINES

```
1798 BDBD
179A 0000
179C 5343 4F50 4520       1748  SCOPE    DC    C'SCOPE ',X'0000',X'0000',X'0000'                CDT17470
17A2 0000
17A4 0000
17A6 0000
17A8 4255 4653 495A       1749  BUFSIZ   DC    C'BUFSIZ',Z(ZERONE),X'0000',X'0000'              CDT17480
17AE 0BB2
17B0 0000
17B2 0000
17B4 5345 434E 554D       1750  SECNUM   DC    C'SECNUM',X'0000',X'0003',X'0000'                CDT17490
17BA 0000
17BC 0003
17BE 0000
17C0 5345 454B 2020       1751  SEEK     DC    C'SEEK  ',Z(ZERONE),X'0000',X'0000'             CDT17500
17C6 0BB2
17C8 0000
17CA 0000
17CC 464D 5453 4543       1752  FMTSEC   DC    C'FMTSEC',Z(ZERONE),X'0001',X'0000'              CDT17510
17D2 0BB2
17D4 0001
17D6 0000
17D8 4C4F 4F50 2020       1753  LOOP     DC    C'LOOP  ',X'0000',X'0000',X'0000'               CDT17520
17DE 0000
17E0 0000
17E2 0000
17E4 434F 4E54 494E       1754  CONTIN   DC    C'CONTIN',Z(ZERONE),X'0000',X'0000'              CDT17530
17EA 0BB2
17EC 0000
17EE 0000
17F0 4E4F 4D53 4720       1755  NOMSG    DC    C'NOMSG ',Z(LEVEL),X'0000',X'0000'               CDT17540
17F6 0BC2
17F8 0000
17FA 0000
17FC 494E 544C 4556       1756  INTLEV   DC    C'INTLEV',Z(LEVEL),X'0000',X'0000'               CDT17550
1802 0BC2
1804 0000
1806 0000
1808 4E4F 4155 544F       1757  NOAUTO   DC    C'NOAUTO',Z(ZERONE),X'0000',X'0000'              CDT17560
180E 0BB2
1810 0000
1812 0000
     0000 1814            1758  OPTEND2  EQU   *                    END OF PRINTING OPTIONS     CDT17570
1814 4845 4144 5320       1759  HEADS    DC    C'HEADS ',Z(NOHEADR),X'0000',X'0000'             CDT17580
181A 1C42
181C 0000
181E 0000
     0000 181C            1760  HEADSA   EQU   HEADS+$VALU1                                    CDT17590
1820 494E 4255 4620       1761  INBUF    DC    C'INBUF ',Z(RBUFIN),X'0000',Z(RDF)               CDT17600
1826 1C1C
1828 0000
182A 3B94
     0000 1828            1762  RDFADR   EQU   INBUF+$VALU1                                    CDT17610
```

DATA CONSTANTS & CHECK ROUTINES

```
182C  4F55 5442 5546        1763  OUTBUF    DC    C'OUTBUF',Z(WBUFIN),X'0000',Z(WTF)                          CDT17620
1832  1C22
1834  0000
1836  3754
      0000 1834             1764  WTFADR    EQU   OUTBUF+$VALU1                                               CDT17630
      0000 1838             1765  OPTEND    EQU   *                    END OF OPTIONS WITH VALUES               CDT17640
1838  4F50 5449 4F4E        1766  OPTION    DC    C'OPTION',Z(OPTIONAD),X'0000',X'0000'                       CDT17650
183E  1C88
1840  0000
1842  0000
      0000 1842             1767  $LINCNT   EQU   OPTION+$VALU2      PRINTOUT LINE COUNTER                    CDT17660
1844  5255 4E20 2020        1768  RUN       DC    C'RUN    ',X'0000',X'0000',X'0000'                          CDT17670
184A  0000
184C  0000
184E  0000
1850  434F 4E20 2020        1769  CON       DC    C'CON    ',X'0000',X'0000',X'0000'                          CDT17680
1856  0000
1858  0000
185A  0000
185C  FFFF                  1770            DCX   FFFF                                                        CDT17690
      0000 185E             1771  DEVSADR   EQU   *                    INTERRUPTING DEVICE TABLE                CDT17700
185E  0000-SLCH-FF          1772            DCX   0                    SELCH                                    CDT17710
1860  0000-CNT-FF           1773            DCX   0                    CONTROLLER                               CDT17720
1862  0000-0-10B            1774            DCX   0,0,0,0             DRIVE 0,1,2,3 REM                        CDT17730
1864  0000-1-11B
1866  0000-2-12B
1868  0000-3-13B
186A  0000-4-FFFF           1775            DCX   0,0,0,0             DRIVE 4,5,6,7 FXD                        CDT17740
186C  0000-5-FFFF
186E  0000-6-FFFF
1870  0000-7-FFFF
1872  FFFF  FFFF            1776            DCX   FFFF                                                        CDT17750

1874  0000 -                1778  DEVINT    DCX   0                    SELCH                                    CDT17770
1876  0000 -                1779            DCX   0                    CTRLR                                    CDT17780
1878  0000 -                1780            DCX   0,0,0,0             DRIVE 0,1,2,3 REM                        CDT17790
187A  0000 -
187C  0000 -
187E  0000 -
1880  0000 -                1781            DCX   0,0,0,0             DRIVE 4,5,6,7 FXD                        CDT17800
1882  0000 -
1884  0000 -
1886  0000 -
1888  FFFF - F F F F        1782            DCX   FFFF                                                        CDT17810

      0000 188A             1784  INTLVL    EQU   *                                                          CDT17830
188A  0000 '  00 00         1785            DB    0,0                  SELCH, CTRLR                             CDT17840
188C  0000 0000             1786            DB    0,0,0,0              DRIVE 0,1,2,3 REM                        CDT17850
1890  0000 0000             1787            DB    0,0,0,0              DRIVE 4,5,6,7 FXD                        CDT17860

1894  FBE0                  1789  DEFTESTS  DCX   FBE0,0000             DEFAULT TESTS                            CDT17880
1896  0000
1898  20F4                  1790  TESTS     DC    TEST0,TEST1,TEST2,TEST3,TEST4,TEST5,TEST6,TEST7,TEST8       CDT17890
```

DATA CONSTANTS & CHECK ROUTINES

```
189A   2122
189C   219E
189E   21D2
18A0   2200
18A2   225C
18A4   237A
18A6   2406
18A8   24C4
18AA   24CA                1791          DC    TEST9,TESTA,TESTB,TESTC,TESTD,TESTE,TESTF,TEST10          CDT17900
18AC   24D0
18AE   254C
18B0   25EE
18B2   26E2
18B4   2744
18B6   27A6
18B8   2826
18BA   2852                1792          DC    TEST11,TEST12,TEST13,TEST14,TEST15,TEST16                 CDT17910
18BC   2874
18BE   28A0
18C0   28C0
18C2   2904
18C4   29A8
18C6   0016                1793  MAXTST  DCX   0016                                                      CDT17920
                           1794  *                                                                       CDT17930
       0000 0002           1795  TABSIZ  EQU   2                 NUMBER OF TABLE ENTRIES                 CDT17940
       0000 18C8           1796  HEADTAB EQU   *                 HEADS/CYL                               CDT17950
18C8   0002                1797          DCX   2                 2.5 MB                                  CDT17960
18CA   0002                1798          DCX   2                 10 MB                                   CDT17970

       0000 18CC           1800  SECTAB  EQU   *                 SECTORS/TRK                             CDT17990
18CC   0018                1801          DCX   18                2.5 MB                                  CDT18000
18CE   0018                1802          DCX   18                10 MB                                   CDT18010

       0000 18D0           1804  CYLTAB  EQU   *                 TRKS/HEAD                               CDT18030
18D0   00CB                1805          DCX   00CB              2.5 MB                                  CDT18040
18D2   0198                1806          DCX   0198              10 MB                                   CDT18050

       0000 18D4           1808  BITTAB  EQU   *                 MAX VALID CYLINDER ADDRESS BIT          CDT18070
18D4   0080                1809          DCX   0080              2.5 MB                                  CDT18080
18D6   0100                1810          DCX   0100              10 MB                                   CDT18090

       0000 18D8           1812  PRECLTAB EQU  *                 PHYSICAL SECTOR LENGTH                  CDT18110
18D8   010E                1813          DCX   010E              2.5 MB                                  CDT18120
18DA   010E                1814          DCX   010E              10 MB                                   CDT18130

       0000 18DC           1816  NUMTAB  EQU   *                 VALID SECNUM VALUES                     CDT18150
18DC   0001 0203 0507 0B17  1817          DB    0,1,2,3,5,7,11,23,47 FOR 2 TRACKS.                      CDT18160
18E4   2F

                           1819  * COMMAND BYTES                                                         CDT18180
18E6                       1820          ALIGN 2                                                         CDT18190
18E6   00                  1821  WCMD    DB    0                 CURRENT WRITE COMMAND                   CDT18200
18E7   00                  1822  RCMD    DB    0                 CURRENT READ COMMAND                    CDT18210
```

DATA CONSTANTS & CHECK ROUTINES

```
18E8  03              1823  RCHECK    DB    X'03'          READ CHECK                              CDT18220
18E9  C8              1824  RESET     DB    X'C8'          CONTROLLER RESET, INT                   CDT18230
18EA  C2              1825  SEEKC     DB    X'C2'          SEEK                                    CDT18240
18EB  C1              1826  RESTOC    DB    X'C1'          RESTORE                                 CDT18250
18EC  42              1827  ISKCMD    DB    X'42'          INTERRUPT SEEK                          CDT18260
18ED  41              1828  IRESTOC   DB    X'41'          INTERRUPT RESTORE                       CDT18270
18EE  08              1829  STOP      DB    X'08'          SELCH STOP                              CDT18280
18EF  48              1830  ESTOP     DB    X'48'          SELCH STOP, EXTENDED MODE               CDT18290
18F0  00              1831  STOPCMD   DB    0              STOP COMMAND USED                       CDT18300
18F1  00              1832  GAP1      DB    0              FIRST PREAMBLE                          CDT18310
18F2  03              1833  SYNC      DB    X'03'          HEADER SYNC BYTE                        CDT18320
18F3  00              1834  SLCHCMD   DB    0              SELCH COMMAND USED                      CDT18330
18F4  00              1835  SVC2STAT  DB    0              SVC2 CONTROLLER STATUS                  CDT18340
18F5  00              1836            DB    *                                                      CDT18350
18F6  4130            1837  IDDC      DCX   4130           USED IN TEST 7                          CDT18360

                      1839  * STATUS BYTE EQUATES                                                 CDT18380
                      1840  *                                                                     CDT18390
                      1841  * CONTROLLER                                                          CDT18400
                      1842  *                                                                     CDT18410
      0000 0080       1843  OVERRUN   EQU   X'80'          CONTROLLER OVERRUN                      CDT18420
      0000 0040       1844  HDFAIL    EQU   X'40'          SECTOR HEADER MATCH FAILURE             CDT18430
      0000 0020       1845  DEFSEC    EQU   X'20'          SECTOR HEADER MATCH FAILURE             CDT18440
      0000 0010       1846  CYLOV     EQU   X'10'          CYLINDER OVERVLOW OCCURRED              CDT18450
      0000 0008       1847  BSY       EQU   X'08'          BUSY                                    CDT18460
      0000 0004       1848  EX        EQU   X'04'          EXAMINE                                 CDT18470
      0000 0002       1849  IDLE      EQU   X'02'          CONTROLLER IDLE                         CDT18480
      0000 0001       1850  DATERR    EQU   X'01'          DATA TRANSFER ERROR                     CDT18490
                      1851  *                                                                     CDT18500
                      1852  * DRIVE ADDITIONAL                                                   CDT18510
                      1853  *                                                                     CDT18520
      0000 0080       1854  WRTPRT    EQU   X'80'          DRIVE WRITE-PROTECT                     CDT18530
      0000 0020       1855  ILGADR    EQU   X'20'          ILLEGAL CYLINDER ADDRESS                CDT18540
      0000 0010       1856  INTLK     EQU   X'10'          DISK ADDRESS INTERLOCK                  CDT18550
      0000 0008       1857  NOTRDY    EQU   X'08'          DRIVE NOT READY                         CDT18560
      0000 0002       1858  SEEKINC   EQU   X'02'          SEEK INCOMPLETE                         CDT18570
      0000 0001       1859  OFFLINE   EQU   X'01'          DRIVE OFF-LINE                          CDT18580

18F8  0000            1861  MAXSEC    DCX   0              SECTORS PER TRACK                       CDT18600
18FA  0000            1862  PRECL     DCX   0              PHYSICAL RECORD LENGTH                  CDT18610
      0000 0100       1863  LRECL     EQU   256            LOGICAL RECORD LENGTH                   CDT18620

18FC  0000            1865  MAXCYL    DCX   0              MAX CYL ADRS + 1                        CDT18640
18FE  0000            1866  MAXHEAD   DCX   0              MAX HEAD ADRS + 1                       CDT18650
1900  0000            1867  MAXBIT    DCX   0              MAX VALID CYLADRS BIT                   CDT18660
1902  0000            1868  RDER      DCX   0              READ ERROR FLAG                         CDT18670
1904  0000            1869  RFMTFLG   DCX   0              SET IF LOCYL FORMAT POT. DESTROYED      CDT18680
1906  0000            1870  ERRFLG1   DCX   0              SET WHEN ERROR DETECTED BY SVC          CDT18690
1908  0000            1871  STOPFLAG  DCX   0              CONTROLS STOP ON OPTION ERRORS          CDT18700
190A  0000            1872  LRCC      DCX   0              CKSUM USED IN SCOPE LOOPS               CDT18710
190C  0000            1873  RND1      DCX   0              RANDOM NUMBER                           CDT18720
190E  0000            1874  RND2      DCX   0              RANDOM NUMBER                           CDT18730
```

DATA CONSTANTS & CHECK ROUTINES

```
1910    0000                1875  STATE    DCX   0              CURRENT DRIVE ADDRESS                    CDT18740
1912    0000                1876  RWOCMD   DCX   0              USED BY 'READ', 'WRIT'                   CDT18750
1914    0000                1877  OPCODE   DCX   0              CURRENT OPERATION'S 'CODE' (CC)          CDT18760
1916    0000                1878  EDATA    DCX   0              EXPECTED DATA ON READ                    CDT18770
1918    0000                1879  RDATA    DCX   0              ACTUAL DATA READ                         CDT18780
191A    0000                1880  FLAGS    DCX   0              MODULE FLAGS                             CDT18790
191C    0000                1881  SVCNUM   DCX   0              SVC NUMBER FROM CALLER                   CDT18800
191E    0000                1882  SEQPTR   DCX   0              ERROR PRINT CONTROL (INTERNAL)           CDT18810
1920    0000                1883  CURSECT  DCX   0              CURRENT SECTOR (LOGICAL)                 CDT18820
1922    0000                1884  HEAD     DCX   0              CURRENT HEAD NUMBER                      CDT18830
1924    0000                1885  CURCYL   DCX   0              CURRENT CYLINDER NUMBER                  CDT18840
1926    0000                1886  COUNTER  DCX   0              INTERNAL LOOPS COUNTER                   CDT18850
1928    0000                1887  FUTADRS  DCX   0              ADRS OF PRIMARY DRIVE                    CDT18860
192A    0000                1888  SECFILAD DCX   0              ADRS OF SECONDARY DRIVE                  CDT18870
192C    0000                1889  SIZE     DCX   0              XFER SIZE                                CDT18880
192E    00FF                1890  IDSIZE   DCX   00FF           XFER SIZE USED IN TEST 7                 CDT18890
1930                        1891           ALIGN 4                                                       CDT18900
1930    0000 0000           1892  BLKADRS  DCY   0              SVC PARAM BLK ADRS                       CDT18910
1934    0000 0000           1893  SVCPSW   DCY   0,0            RETURN PSW FOR SVC.DRV (32-BIT)          CDT18920
1938    0000 0000
193C    0000 0000           1894  MEMTOP   DCY   0              DETECTED TOP-OF-MEMORY                   CDT18930
1940    0000 0000           1895  EXSELAD  DCY   0              SELCH END ADRS READ                      CDT18940
        0000 1940           1896  BCOUNT   EQU   EXSELAD        BYTE COUNT AT ERROR                      CDT18950
1944    0000 0000           1897  SA       DCY   0              TRANSFER START                           CDT18960
1948    0000 0000           1898  FA       DCY   0              TRANSFER END                             CDT18970
194C    0000 0000           1899  SW1SAV   DCY   0              USED IN TESTS 8,9,A                      CDT18980
1950    0000 0000           1900  RSRET    DCY   0              SAVE                                     CDT18990
1954    0000 0000           1901  RWSAVE   DCY   0              SAVE                                     CDT19000
1958    0000 0000           1902  FLGRTN   DCY   0              SAVE                                     CDT19010
195C    0000 0000           1903  SKRTN    DCY   0              SAVE                                     CDT19020
1960    0000 0000           1904  INTSKR   DCY   0              SAVE                                     CDT19030
1964    0000 0000           1905  RERN     DCY   0              RERUN ADRS                               CDT19040
1968    0000 0000           1906  RXERFL   DCY   0              ADRS OF TEST SVC IN LOOP TESTS           CDT19050
196C    0000 0000           1907  ERRFLG   DCY   0              SAVE                                     CDT19060
1970    0000 0000           1908  TEMPA    DCY   0              SAVE                                     CDT19070
1974    0000 0000           1909  TEMPB    DCY   0              SAVE                                     CDT19080
1978    0000 0000           1910  TEMPC    DCY   0              SAVE                                     CDT19090
                            1911  *                                                                     CDT19100
        0000 197C           1912  STATTAB  EQU   *              DEVICE STATUSES ON GIVEN ERROR           CDT19110
197C    00                  1913           DB    0              SELECTOR CHANNEL                         CDT19120
197D    00                  1914           DB    0              DISK SYSTEM CONTROLLER                   CDT19130
197E    00                  1915           DB    0              DRIVE 0                                  CDT19140
197F    00                  1916           DB    0              DRIVE 1                                  CDT19150
1980    00                  1917           DB    0              DRIVE 2                                  CDT19160
1981    00                  1918           DB    0              DRIVE 3                                  CDT19170
1982    00                  1919           DB    0              FIXD 0                                   CDT19180
1983    00                  1920           DB    0              FIXD 1                                   CDT19190
1984    00                  1921           DB    0              FIXD 2                                   CDT19200
1985    00                  1922           DB    0              FIXD 3                                   CDT19210

        0000 1986           1924  SVCVECTS EQU   *              SVC NEW PSW LOCATIONS                    CDT19230
1986    30D4                1925           DC    Z(SVC0.OP)                                            CDT19240
1988    30E0                1926           DC    Z(SVC1.OP)                                            CDT19250
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DATA CONSTANTS & CHECK ROUTINES

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198A  30EA                1927          DC    Z(SVC2.OP)                                  CDT19260
198C  30F8                1928          DC    Z(SVC3.OP)                                  CDT19270
198E  3102                1929          DC    Z(SVC4.OP)                                  CDT19280
1990  310C                1930          DC    Z(SVC5.OP)                                  CDT19290
1992  3110                1931          DC    Z(SVC6.OP)                                  CDT19300
1994  311A                1932          DC    Z(SVC7.OP)                                  CDT19310
1996  156C                1933          DC    Z(SERRF9)           SVC 8 RESERVED          CDT19320
1998  3124                1934          DC    Z(SVC9.OP)                                  CDT19330


      0000 0003           1936  DCAD    EQU   3                                         CDT19350
      0000 0004           1937  SLAD    EQU   4                                         CDT19360
      0000 0005           1938  FUT     EQU   5                                         CDT19370
      0000 0006           1939  WK0     EQU   6                                         CDT19380
      0000 0007           1940  WK1     EQU   7                                         CDT19390
      0000 0008           1941  WK2     EQU   8                                         CDT19400
      0000 0009           1942  WK3     EQU   9                                         CDT19410
      0000 000A           1943  STAT    EQU   10                                        CDT19420
      0000 000B           1944  TRACK   EQU   11                                        CDT19430
      0000 000C           1945  OPKEY   EQU   12                                        CDT19440
      0000 000D           1946  SECT    EQU   13                                        CDT19450

                          1948  *       MESSAGES                                        CDT19470
199A  434F 4D4D 4F4E 2044 1949  TITLE   DB    C'COMMON DISK TEST 06-173R06  '         CDT19480
19A2  4953 4B20 5445 5354
19AA  2030 362D 3137 3352
19B2  3036 2020
19B6  0D                  1950          DB    X'0D'                                       CDT19490
19B7  454E 5445 5220 4445 1951  MSG01   DB    C'ENTER DELETED HEAD',X'0D'                 CDT19500
19BF  4C45 5445 4420 4845
19C7  4144 0D
19CA  494E 5641 4C49 4420 1952  MSG02   DB    C'INVALID           OPTION',X'0D'           CDT19510
19D2  2020 2020 2020 2020
19DA  204F 5054 494F 4E0D
19E2  494C 4C45 4741 4C20 1953  MSG03   DB    C'ILLEGAL CYLADRS-CE PACK',X'0D'            CDT19520
19EA  4359 4C41 4452 532D
19F2  4345 2050 4143 4B0D
19FA  434F 4D4D 414E 4420 1954  MSG35   DB    C'COMMAND IGNORED: ',X'8D'                  CDT19530
1A02  4947 4E4F 5245 443A
1A0A  208D
1A0C  0A52 452D 464F 524D 1955  MSG04   DB    X'0A',C'RE-FORMAT LOCYL',X'0D'              CDT19540
1A14  4154 204C 4F43 594C
1A1C  0D
1A1D  4445 4620 5345 4320 1956  MSG05   DB    C'DEF SEC FLAGGED *** ** **',X'0D'          CDT19550
1A25  464C 4147 4745 4420
1A2D  2A2A 2A20 2A2A 202A
1A35  2A0D
1A37  464C 4147 2052 454A 1957  MSG06   DB    C'FLAG REJECTED <-----X',X'0D'              CDT19560
1A3F  4543 5445 4420 3C2D
1A47  2D2D 2D2D 580D
1A4D  5345 5420 4452 4956 1958  MSG07   DB    C'SET DRIVE OFF-LINE',X'0D'                 CDT19570
1A55  4520 4F46 462D 4C49
1A5D  4E45 0D
```

DATA CONSTANTS & CHECK ROUTINES

```
                0000 1A50              1959  MSG08   EQU   MSG07+3                                                    CDT19580
1A60  5345 5420 4452 4956              1960  MSG09   DB    C'SET DRIVE ON-LINE',X'0D'                                 CDT19590
1A68  4520 4F4E 2D4C 494E
1A70  450D
1A72  5345 5420 5752 4954              1961  MSG10   DB    C'SET WRITE-PROTECT OFF',X'0D'                             CDT19600
1A7A  452D 5052 4F54 4543
1A82  5420 4F46 460D
                0000 1A75              1962  MSG11   EQU   MSG10+3                                                    CDT19610
1A88  5345 5420 5752 4954              1963  MSG12   DB    C'SET WRITE-PROTECT ON',X'0D'                              CDT19620
1A90  452D 5052 4F54 4543
1A98  5420 4F4E 0D
                0000 1A8B              1964  MSG13   EQU   MSG12+3                                                    CDT19630
1A9D  534F 4C49 4420 4552              1965  MSG14   DB    C'SOLID ERROR:',X'0D'                                      CDT19640
1AA5  524F 523A 0D
1AAA  4259 5445 5320 2020              1966  MSG15   DB    C'BYTES        READ ****',X'0D'                            CDT19650
1AB2  2020 2020 2052 4541
1ABA  4420 2A2A 2A2A 0D
1AC1  5345 4C43 4820 4641              1967  MSG16   DB    C'SELCH FA       ',X'0D'                                   CDT19660
1AC9  2020 2020 2020 200D
1AD2                                   1968          ALIGN 2                                                          CDT19670
1AD2  5348 4F55 4C44 2042              1969  MSG17   DB    C'SHOULD BE       ',X'0D'                                  CDT19680
1ADA  4520 2020 2020 2020
1AE2  0D
1AE3  0A44 4546 2053 4543              1970  MSG30   DB    X'0A',C'DEF SEC FOUND',X'0D'                               CDT19690
1AEB  2046 4F55 4E44 0D
1AF2  4359 4C20 2A2A 2A20              1971  MSG18   DB    C'CYL *** HEAD ** SECT **',X'0D'                           CDT19700
1AFA  4845 4144 202A 2A20
1B02  5345 4354 202A 2A0D
1B0A  4445 5620 2A2A 2A20              1972  MSG19   DB    C'DEV *** FALSE SYNC',X'0D'                                CDT19710
1B12  4641 4C53 4520 5359
1B1A  4E43 0D
1B1D  4452 4956 450D                   1973  MSG20   DB    C'DRIVE',X'0D'                                             CDT19720
1B23  5846 494C 450D                   1974  MSG21   DB    C'XFILE',X'0D'                                             CDT19730
1B29  4841 5244 2052 4541              1975  MSG22   DB    C'HARD READ ERROR',X'0D'                                   CDT19740
1B31  4420 4552 524F 520D
1B39  534F 4654 2052 4541              1976  MSG23   DB    C'SOFT READ ERROR',X'0D'                                   CDT19750
1B41  4420 4552 524F 520D
1B4A                                   1977          ALIGN 2                                                          CDT19760
1B4A  5445 5354 2020 2A2A              1978  MSG24   DB    C'TEST  **  ABORTED',X'0D'                                 CDT19770
1B52  2020 4142 4F52 5445
1B5A  440D
1B5C  4D45 4D4F 5259 204C              1979  MSG25   DB    C'MEMORY LIMIT EXCEEDED',X'0D'                             CDT19780
1B64  494D 4954 2045 5843
1B6C  4545 4445 440D
1B72  5345 4C45 4354 204E              1980  MSG26   DB    C'SELECT NEW SECTOR OR LOCYL OPTION',X'0D'                 CDT19790
1B7A  4557 2053 4543 544F
1B82  5220 4F52 204C 4F43
1B8A  594C 204F 5054 494F
1B92  4E0D
1B94  5354 4154 5553                   1981  MSG27   DB    C'STATUS'                                                  CDT19800
1B9A                                   1982          DO    5                10 DEVICES                                CDT19810
1B9A  202A 2A20 2A2A                   1983          DB    C' ** **'                                                  CDT19820
1BA0  202A 2A20 2A2A                   1983          DB    C' ** **'
```

DATA CONSTANTS & CHECK ROUTINES

```
1BA6  202A 2A20 2A2A        1983            DB    C' ** **'
1BAC  202A 2A20 2A2A        1983            DB    C' ** **'
1BB2  202A 2A20 2A2A        1983            DB    C' ** **'
1BB8  0D                    1984            DB    X'0D'                                  CDT19830
1BB9  494E 4255 4620 2020   1985  MSG28     DB    C'INBUF        ',X'0D'                 CDT19840
1BC1  2020 2020 200D
1BC7  4F55 5442 5546 2020   1986  MSG29     DB    C'OUTBUF       ',X'0D'                 CDT19850
1BCF  2020 2020 200D
1BD6                        1987            ALIGN 2                                      CDT19860
1BD6  4552 524F 5220 5454   1988  MSG31     DB    C'ERROR TTCCNN',X'0D'                   CDT19870
1BDE  4343 4E4E 0D
1BE3  4154 5445 4D50 5449   1989  MSG32     DB    C'ATTEMPTING RE-FORMAT',X'0D'           CDT19880
1BEB  4E47 2052 452D 464F
1BF3  524D 4154 0D
1BF8  4241 434B 4752 4F55   1990  MSG33     DB    C'BACKGROUND FAILURE',X'0D'             CDT19890
1C00  4E44 2046 4149 4C55
1C08  5245 0D
1C0B  5245 464F 524D 4154   1991  MSG34     DB    C'REFORMAT ABORTED',X'0D'               CDT19900
1C13  2041 424F 5254 4544
1C1B  0D
1C1C                        1992            DB    *                                      CDT19910
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                        1994  * OPTION ENTRY HANDLERS                                                  CDT19930

1C1C   C810 1828        1996  RBUFIN   LDAI  R1,RDFADR          READ BUFFER POINTER                   CDT19950
1C20   2303             1997           BS    BUFIN.1                                                   CDT19960
1C22   C810 1834        1998  WBUFIN   LDAI  R1,WTFADR          WRITE BUFFER POINTER                  CDT19970
1C26   C460 FFFE        1999  BUFIN.1  NHI   R6,X'FFFE'         FORCE ALIGN 2                         CDT19980
1C2A   C560 3754        2000           CLHI  R6,WTF              ABOVE PROGRAM ?                       CDT19990
1C2E   028C              2001           BLR   R12                 BRANCH: INPUT ERROR                   CDT20000
1C30   4061 0002        2002           STH   R6,2(R1)            ASSUME 16-BIT                         CDT20010
1C34   48C0 1610        2003           LH    R12,MOD32           32-BIT ?                              CDT20020
1C38   2333             2004           BZS   BUFIN.2             BRANCH: NO.                           CDT20030
1C3A   5061              2005           DC    X'5061',X'0000'     *ST R6,0(R1)                          CDT20040
1C3C   0000
1C3E   4300 0AB6        2006  BUFIN.2  B     OPTIN1                                                    CDT20050
                        2007  *                                                                         CDT20060
1C42   0836             2008  NOHEADR  LDAR  R3,R6               HEADS 0 ?                             CDT20070
1C44   4330 1C80        2009           BZ    NOH.2               BRANCH: DELETE NONE.                  CDT20080
1C48   41F0 1CEA        2010           BAL   R15,RFMTCK           CHECK IF RE-FORMAT REQ'D              CDT20090
1C4C   41F0 0BB2        2011           BAL   R15,ZERONE           MUST BE 0 OR 1                        CDT20100
1C50   40F0 1624        2012           STH   R15,ISITERR                                                 CDT20110
1C54   41F0 1048        2013           BAL   R15,$PRINT                                                  CDT20120
1C58   19B7             2014           DAC   MSG01               'ENTER DELETED HEADS'                 CDT20130
1C5A   C840 003E        2015           LHI   R4,C'>'                                                     CDT20140
1C5E   41F0 10D8        2016           BAL   R15,OUTCHR          '>' FOR PROMPT                        CDT20150
1C62   2440             2017           LIS   R4,0                                                        CDT20160
1C64   41F0 10D8        2018           BAL   R15,OUTCHR          FOLLOWED BY ASCII 'NUL' FOR PASLA     CDT20170
1C68   41F0 114C        2019           BAL   R15,$READ           GET USER INPUT                        CDT20180
1C6C   2430             2020           LIS   R3,0                POINT TO BUFFER START, THEN           CDT20190
1C6E   41E0 0F44        2021  NOH.1    BAL   R14,OPTVAL          CONVERT INPUT VALUE                   CDT20200
1C72   4560 18FE        2022           CLH   R6,MAXHEAD          VALID HEAD NUMBER ?                   CDT20210
1C76   038C             2023           BNLR  R12                 BRANCH: INVALID 'HEADS' OPTION        CDT20220
1C78   41E0 0F78        2024           BAL   R14,UNARY                                                   CDT20230
1C7C   274D             2025           SIS   R4,X'0D'            CARRIAGE RETURN ?                     CDT20240
1C7E   023C             2026           BNZR  R12                 BRANCH: NO. INPUT ERROR.              CDT20250
1C80   4030 181C        2027  NOH.2    STH   R3,HEADSA           STORE BIT FOR DELETED HEAD            CDT20260
1C84   4300 0AB6        2028           B     OPTIN1                                                    CDT20270

1C88   41F0 103C        2030  OPTIONAD BAL   R15,CRLF                                                  CDT20290
1C8C   2425             2031           LIS   R2,$CKROUT-1                                              CDT20300
1C8E   D302 1814        2032  OPTNAD.3 LB    R0,HEADS(R2)                                              CDT20310
1C92   D202 35F4        2033           STB   R0,$OUTBUF(R2)                                            CDT20320
1C96   2721             2034           SIS   R2,1                                                      CDT20330
1C98   2215             2035           BNMS  OPTNAD.3                                                  CDT20340
1C9A   C800 2020        2036           LHI   R0,C'  '            SPACES                                CDT20350
1C9E   4000 35FA        2037           STH   R0,$OUTBUF+$CKROUT                                        CDT20360
1CA2   2428             2038           LIS   R2,$CKROUT+2                                              CDT20370
1CA4   C850 181C        2039           LDAI  R5,HEADS+$VALU1     OPTION FULLWORD                       CDT20380
1CA8   41F0 0FCA        2040           BAL   R15,$LSTBIT         'HEADS 0,..... '                      CDT20390
1CAC   4810 182A        2041           LH    R1,RDFADR+2         .                                     CDT20400
1CB0   4820 1610        2042           LH    R2,MOD32            32-BIT ?                              CDT20410
1CB4   2333             2043           BZS   OPTNAD.1            BRANCH: NO                            CDT20420
1CB6   5810             2044           DC    X'5810',Z(RDFADR)   * L R1,RDFADR                         CDT20430
1CB8   1828
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DATA CONSTANTS & CHECK ROUTINES

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1CBA  C820 1BC0          2045  OPTNAD.1 LDAI  R2,MSG28+7                                    CDT20440
1CBE  2406               2046           LIS   R0,6              SIX DIGITS                 CDT20450
1CC0  41F0 0FA4          2047           BAL   R15,HEXASC                                   CDT20460
1CC4  41F0 1048          2048           BAL   R15,$PRINT                                   CDT20470
1CC8  1BB9               2049           DAC   MSG28             'INBUF ...'                CDT20480
1CCA  4810 1836          2050           LH    R1,WTFADR+2       .                          CDT20490
1CCE  4820 1610          2051           LH    R2,MOD32                                     CDT20500
1CD2  2333               2052           BZS   OPTNAD.2                                     CDT20510
1CD4  5810               2053           DC    X'5810',Z(WTFADR) * L R1,WTFADR              CDT20520
1CD6  1834
1CD8  C820 1BCE          2054  OPTNAD.2 LDAI  R2,MSG29+7                                   CDT20530
1CDC  41F0 0FA4          2055           BAL   R15,HEXASC                                   CDT20540
1CE0  41F0 1048          2056           BAL   R15,$PRINT                                   CDT20550
1CE4  1BC7               2057           DAC   MSG29             'OUTBUF ...'               CDT20560
1CE6  4300 0BEA          2058           B     OPTRTN                                       CDT20570
                         2059  *                                                          CDT20580
      0000 1CEA          2060  RFMTCK   EQU   *                 TESTS IF REFORMAT REQUIRED. CDT20590
1CEA  48A0 1904          2061           LH    R10,RFMTFLG       REFORMAT REQUIRED ?        CDT20600
1CEE  033F               2062           BZR   R15               BRANCH: NO.                CDT20610
1CF0  48A0 1810          2063           LH    R10,NOAUTO+$VALU1 AUTOMATIC FUNCTION SUPPRESSED ? CDT20620
1CF4  023F               2064           BNZR  R15               BRANCH: YES.               CDT20630
1CF6  41F0 1048          2065           BAL   R15,$PRINT                                   CDT20640
1CFA  19FA               2066           DAC   MSG35             'CMD IGNORED: REFORMAT LOCYL' CDT20650
1CFC  4300 0AB6          2067           B     OPTIN1                                       CDT20660


                         2069  * OPTION INPUT ERROR ROUTINES USED AFTER 'RUN' COMMAND     CDT20680
                         2070  *                                                          CDT20690
1D00  41F0 1D66          2071  ERROR1   BAL   R15,SETMSG        INVALID SECNUM OPTION      CDT20700
1D04  17B4               2072           DC    Z(SECNUM)                                    CDT20710
1D06  41F0 1D66          2073  ERROR2   BAL   R15,SETMSG        INVALID DRIVE OPTION       CDT20720
1D0A  176C               2074           DC    Z(DRIVE)                                     CDT20730
1D0C  41F0 1D66          2075  ERROR3   BAL   R15,SETMSG        INVALID LOCYL OPTION       CDT20740
1D10  1718               2076           DC    Z(LOCYL)                                     CDT20750
1D12  41F0 1D66          2077  ERROR4   BAL   R15,SETMSG        INVALID HICYL OPTION       CDT20760
1D16  1724               2078           DC    Z(HICYL)                                     CDT20770
1D18  41F0 1D66          2079  ERROR5   BAL   R15,SETMSG        INVALID SECTOR OPTION      CDT20780
1D1C  1730               2080           DC    Z(SECTOR)                                    CDT20790
1D1E  C820 1B0E          2081  ERROR6   LDAI  R2,MSG19+4        DEVICE FALSE SYNC          CDT20800
1D22  2403               2082           LIS   R0,3                                         CDT20810
1D24  41F0 0FA4          2083           BAL   R15,HEXASC        CONVERT TO ASCII           CDT20820
1D28  C850 1B0A          2084           LDAI  R5,MSG19                                     CDT20830
1D2C  230F               2085           BS    BS.PRINT                                     CDT20840
1D2E  41F0 1D66          2086  ERROR7   BAL   R15,SETMSG        INVALID PACTYP OPTION      CDT20850
1D32  173C               2087           DC    Z(PACTYP)                                    CDT20860
1D34  C850 1A8B          2088  ERROR8   LDAI  R5,MSG13          WRITE-PROTECT ON           CDT20870
1D38  2309               2089           BS    BS.PRINT                                     CDT20880
1D3A  41F0 1D66          2090  ERROR9   BAL   R15,SETMSG        INVALID SCOPE OPTION       CDT20890
1D3E  179C               2091           DC    Z(SCOPE)                                     CDT20900
1D40  C850 19E2          2092  ERROR11  LDAI  R5,MSG03          INVALID CYLADRS - CE PACK  CDT20910
1D44  2303               2093           BS    BS.PRINT                                     CDT20920
1D46  C850 1B5C          2094  ERROR12  LDAI  R5,MSG25          AVAILABLE MEMORY EXCEEDED  CDT20930
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DATA CONSTANTS & CHECK ROUTINES

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1D4A   4300 1D7E          2095  BS.PRINT B     PRINTIT                                          CDT20940
1D4E   41F0 1D66          2096  ERROR13  BAL   R15,SETMSG          INVALID XFILE OPTION       CDT20950
1D52   1778               2097           DC    Z(XFILE)                                         CDT20960
1D54   41F0 1D66          2098  ERROR14  BAL   R15,SETMSG          INVALID INBUF OPTION       CDT20970
1D58   1820               2099           DC    Z(INBUF)                                         CDT20980
1D5A   41F0 1D66          2100  ERROR15  BAL   R15,SETMSG          INVALID OUTBUF OPTION      CDT20990
1D5E   182C               2101           DC    Z(OUTBUF)                                        CDT21000
1D60   41F0 1D66          2102  ERROR16  BAL   R15,SETMSG          INVALID HEADS OPTION       CDT21010
1D64   1814               2103           DC    Z(HEADS)                                         CDT21020
                          2104  *                                                              CDT21030
1D66   485F 0000          2105  SETMSG   LH    R5,0(R15)           GET ARGUMENT POINTER       CDT21040
1D6A   2486               2106           LIS   WK2,6                                            CDT21050
1D6C   D375 0005          2107  SETMSG1  LB    WK1,5(R5)                                        CDT21060
1D70   D278 19D3          2108           STB   WK1,MSG02+9(WK2)                                 CDT21070
1D74   2751               2109           SIS   R5,1                                             CDT21080
1D76   2781               2110           SIS   WK2,1                                            CDT21090
1D78   2026               2111           BPS   SETMSG1                                          CDT21100
1D7A   C850 19CA          2112           LDAI  R5,MSG02                                         CDT21110
1D7E   25F1               2113  PRINTIT  LCS   R15,1                                           CDT21120
1D80   40F0 1624          2114           STH   R15,ISITERR         FORCE PRINT                CDT21130
1D84   41F0 1060          2115           BAL   R15,PRINT                                        CDT21140
1D88   4800 1908          2116           LH    R0,STOPFLAG         TEST RUNNING ?             CDT21150
1D8C   213D               2117           BNZS  .ABT0               BRANCH: NO.                CDT21160
1D8E   4800 1658          2118  .ABORT   LH    R0,MTESTNO          ASCII TEST NUMBER          CDT21170
1D92   4000 1B50          2119           STH   R0,MSG24+6                                       CDT21180
1D96   4000 1624          2120           STH   R0,ISITERR          FORCE PRINT                CDT21190
1D9A   4800 191A          2121           LH    R0,FLAGS            TEST RUNNING; LOOK AT MODULE FLAGS  CDT21200
1D9E   2316               2122           BNMS  .ABT1               BRANCH: NOT REFORMAT TEST  CDT21210
1DA0   41F0 1048          2123           BAL   R15,$PRINT                                       CDT21220
1DA4   1C0B               2124           DAC   MSG34               'REFORMAT ABORTED'         CDT21230
1DA6   4300 0AB6          2125  .ABT0    B     OPTIN1              HALT TESTING.              CDT21240
                          2126  *                                                              CDT21250
1DAA   41F0 1048          2127  .ABT1    BAL   R15,$PRINT                                       CDT21260
1DAE   1B4A               2128           DAC   MSG24               'SUBTEST NN ABORTED'       CDT21270
1DB0   40F0 1626          2129           STH   R15,NOERR           SUPPRESS THAT PRINT        CDT21280
1DB4   2400               2130           LIS   R0,0                                             CDT21290
1DB6   4000 1624          2131           STH   R0,ISITERR                                       CDT21300
1DBA   4300 2988          2132           B     REFORMAT            TEST IF REFORMAT REQ'D.    CDT21310


                          2134  * INITIALIZATION                                               CDT21330
1DBE   C860 8000          2135  INIT     LHI   R6,X'8000'                                       CDT21340
1DC2   4660 1714          2136           OH    R6,TEST+$VALU1                                   CDT21350
1DC6   4060 1714          2137           STH   R6,TEST+$VALU1      SET TEST0 BIT              CDT21360
1DCA   4060 1908          2138           STH   R6,STOPFLAG         TO CAUSE STOP ON OPTION ERRORS  CDT21370
                          2139  *                                                              CDT21380
1DCE   D370 1745          2140           LB    R7,PACTYP+$VALU1+1                               CDT21390
1DD2   C570 0002          2141           CLHI  R7,TABSIZ           VALID ENTRY ?              CDT21400
1DD6   4380 1D2E          2142           BNL   ERROR7                                           CDT21410
1DDA   9171               2143           SLLS  R7,1                                             CDT21420
1DDC   4887 18D0          2144           LH    R8,CYLTAB(R7)                                    CDT21430
1DE0   4080 18FC          2145           STH   R8,MAXCYL           VALID FOR SELECTED DRIVE TYPE  CDT21440
```

DATA CONSTANTS & CHECK ROUTINES

```
1DE4  4887 18C8          2146          LH    R8,HEADTAB(R7)                                  CDT21450
1DE8  4080 18FE          2147          STH   R8,MAXHEAD                                      CDT21460
1DEC  4887 18CC          2148          LH    R8,SECTAB(R7)                                   CDT21470
1DF0  4080 18F8          2149          STH   R8,MAXSEC                                       CDT21480
1DF4  4887 18D8          2150          LH    R8,PRECLTAB(R7)                                 CDT21490
1DF8  4080 18FA          2151          STH   R8,PRECL            PHYSICAL RECORD LENGTH      CDT21500
1DFC  4887 18D4          2152          LH    R8,BITTAB(R7)                                   CDT21510
1E00  4080 1900          2153          STH   R8,MAXBIT           MAX VALID CYLADRS BIT       CDT21520
                         2154  *                                                             CDT21530
1E04  2418               2155          LIS   R1,8                                            CDT21540
1E06  D301 18DC          2156  INIT.A  LB    R0,NUMTAB(R1)       GET VALID SECNUM VALUE      CDT21550
1E0A  4500 17BC          2157          CLH   R0,SECNUM+$VALU1    SECNUM VALID ?              CDT21560
1E0E  2335               2158          BES   INIT.B              BRANCH: YES.                CDT21570
1E10  2711               2159          SIS   R1,1                                            CDT21580
1E12  2216               2160          BNMS  INIT.A                                          CDT21590
1E14  4300 1D00          2161          B     ERROR1              BRANCH: INVALID SECNUM OPTION. CDT21600
                         2162  *                                                             CDT21610
1E18  48B0 172C          2163  INIT.B  LH    TRACK,HICYL+$VALU1                              CDT21620
1E1C  45B0 18FC          2164          CLH   TRACK,MAXCYL                                    CDT21630
1E20  4380 1D12          2165          BNL   ERROR4              INVALID HICYL OPTION        CDT21640
1E24  45B0 1720          2166          CLH   TRACK,LOCYL+$VALU1                              CDT21650
1E28  4280 1D0C          2167          BL    ERROR3              INVALID LOCYL OPTION        CDT21660
                         2168  *                                                             CDT21670
1E2C  D360 1738          2169          LB    R6,SECTOR+$VALU1    HEAD PORTION                CDT21680
1E30  4560 18FE          2170          CLH   R6,MAXHEAD                                      CDT21690
1E34  4380 1D18          2171          BNL   ERROR5              INVALID SECTOR OPTION       CDT21700
1E38  41E0 0F78          2172          BAL   R14,UNARY            SET MASK POSITION           CDT21710
1E3C  4430 181C          2173          NH    R3,HEADSA           SECTOR, HEADS OPTION MUST AGREE: CDT21720
1E40  4230 1D18          2174          BNZ   ERROR5              BRANCH: INVALID SECTOR OPTION CDT21730
                         2175  *                                 SECTOR ADRS CHECKED BY MODINIT. CDT21740
                         2176  *                                                             CDT21750
1E44  4860 17A4          2177          LH    R6,SCOPE+$VALU1                                 CDT21760
1E48  9062               2178          SRLS  R6,2                                            CDT21770
1E4A  4230 1D3A          2179          BNZ   ERROR9              0:3 VALID IN SOME CASES     CDT21780
                         2180  *                                                             CDT21790
1E4E  4860 175C          2181          LH    R6,SELCH+$VALU1     ← R6 = F8                   CDT21800
1E52  4060 185E          2182          STH   R6,DEVSADR                                      CDT21810
1E56  4860 1768          2183          LH    R6,DISCON+$VALU1    ← R6 = B6                   CDT21820
1E5A  4060 1860          2184          STH   R6,DEVSADR+2                                    CDT21830
1E5E  2516               2185          LCS   R1,6                                            CDT21840
1E60  D320 1745          2186          LB    R2,PACTYP+$VALU1+1  DRIVE TYPE IDENTIFIER       CDT21850
→1E64  CA60 0010 0001 sim"FC"  2187  INIT.2  AHI   R6,X'10'      ; R6=B6+10 = C6, Calculate physical DRV num CDT21860
1E68  C876 0001          2188          LHI   R7,1(R6)                                        CDT21870
1E6C  4061 1868          2189          STH   R6,DEVSADR+10(R1)   REMOVABLE                   CDT21880
1E70  0822               2190          LDAR  R2,R2               2.5 MB ?                    CDT21890
1E72  2132               2191          BNZS  INIT.3              BRANCH: NO.                 CDT21900
1E74  2571               2192          LCS   R7,1                2.5 MB - NO FIXD.           CDT21910
1E76  4071 1870          2193  INIT.3  STH   R7,DEVSADR+18(R1)  FIXED                       CDT21920
1E7A  2612               2194          AIS   R1,2                                            CDT21930
1E7C  222C               2195          BNPS  INIT.2                                          CDT21940
                         2196  *                                                             CDT21950
1E7E  C8E0 1D06          2197          LDAI  R14,ERROR2          'INVALID DRIVE OPTION' MESSAGE CDT21960
1E82  D370 1745          2198          LB    R7,PACTYP+$VALU1+1                              CDT21970
```

DATA CONSTANTS & CHECK ROUTINES

```
1E86   9173           2199           SLLS  R7,3                BECOMES 0 OR 8                          CDT21980
1E88   4820 1774      2200           LH    R2,DRIVE+$VALU1                                              CDT21990
1E8C   C520 0004      2201           CLHI  R2,4                 DRIVE 0:3 ?                             CDT22000
1E90   2183           2202           BLS   INIT.3A              BRANCH: YES.                            CDT22010
1E92   0527           2203           CLAR  R2,R7                DRIVE 0:7 ?                             CDT22020
1E94   038E           2204           BNLR  R14                  BRANCH: INVALID DRIVE OPTION            CDT22030
1E96   9121           2205  INIT.3A  SLLS  R2,1                 FORM INDEX                              CDT22040
1E98   4802 1862      2206           LH    R0,DEVSADR+4(R2)     GET DRIVE ADDRESS                       CDT22050
1E9C   4000 1928      2207           STH   R0,FUTADRS                                                    CDT22060
1EA0   C8E0 1D4E      2208           LDAI  R14,ERROR13          'INVALID XFILE OPTION' MESSAGE          CDT22070
1EA4   4810 1780      2209           LH    R1,XFILE+$VALU1                                              CDT22080
1EA8   2408           2210           LIS   R0,8                                                         CDT22090
1EAA   4400 1714      2211           NH    R0,TEST+$VALU1       WILL TEST 0C BE RUN ?                   CDT22100
1EAE   4330 1ED0      2212           BZ    INIT.3C              BRANCH: NO.                             CDT22110
1EB2   C510 0004      2213           CLHI  R1,4                 DRIVE 0:3 ?                             CDT22120
1EB6   2183           2214           BLS   INIT.3B              BRANCH: YES.                            CDT22130
1EB8   0517           2215           CLAR  R1,R7                DRIVE 0:7 ?                             CDT22140
1EBA   038E           2216           BNLR  R14                  BRANCH: INVALID XFILE OPTION            CDT22150
1EBC   0512           2217  INIT.3B  CLAR  R1,R2                DRIVE, XFILE OPTIONS SAME ?             CDT22160
1EBE   033E           2218           BER   R14                  BRANCH: INV XFILE OPTION                CDT22170
1EC0   0721           2219           XAR   R2,R1                DRIVE, XFILE ON SAME SPINDLE ?          CDT22180
1EC2   2724           2220           SIS   R2,4                 .                                       CDT22190
1EC4   033E           2221           BZR   R14                  BRANCH: YES. INV XFILE OPTION.          CDT22200
1EC6   9111           2222           SLLS  R1,1                 FORM INDEX                              CDT22210
1EC8   4801 1862      2223           LH    R0,DEVSADR+4(R1)     GET XFILE ADDRESS                       CDT22220
1ECC   4000 192A      2224           STH   R0,SECFILAD                                                   CDT22230
       0000 1ED0      2225  INIT.3C  EQU   *                                                            CDT22240
                      2226  *                                                                           CDT22250
1ED0   241A           2227           LIS   R1,10                                                        CDT22260
1ED2   D360 1889      2228           LB    R6,INTLVL+$VALU1+1                                           CDT22270
1ED6   D261 1889      2229  INIT.4   STB   R6,INTLVL-1(R1)     SET INTERRUPT LEVELS                    CDT22280
1EDA   2711           2230           SIS   R1,1                                                         CDT22290
1EDC   2023           2231           BPS   INIT.4                                                       CDT22300
                      2232  *                                                                           CDT22310
1EDE   4010 0098      2233           STH   R1,X'98'             SET SVC NEW PSW VECTORS                 CDT22320
1EE2   C800 3000      2234           LHI   R0,X'3000'                                                   CDT22330
1EE6   4000 009A      2235           STH   R0,X'9A'                                                     CDT22340
1EEA   C810 0012      2236           LHI   R1,18                                                        CDT22350
1EEE   4801 1986      2237  INIT.5   LH    R0,SVCVECTS(R1)                                              CDT22360
1EF2   4001 009C      2238           STH   R0,X'9C'(R1)                                                 CDT22370
1EF6   2712           2239           SIS   R1,2                                                         CDT22380
1EF8   2215           2240           BNMS  INIT.5                                                       CDT22390
                      2241  *                                                                           CDT22400
1EFA   2411           2242           LIS   R1,1                                                         CDT22410
1EFC   4010 190C      2243           STH   R1,RND1              INIT FIBONACCI SEQUENCE                 CDT22420
1F00   0A11           2244           AAR   R1,R1                                                        CDT22430
1F02   4010 190E      2245           STH   R1,RND2                                                      CDT22440
                      2246  *                                                                           CDT22450
                      2247  * FOLLOWING ROUTINE TESTS FOR 64KB OR 1MB MAX MEM, BY TARGET MACHINE       CDT22460
1F06   C810 1F3E      2248  GETMTOP  LHI   R1,FOUNDTOP         SET MM INT VECTOR                       CDT22470
1F0A   4010 003E      2249           STH   R1,X'3E'                                                     CDT22480
1F0E   2410           2250           LIS   R1,0                                                         CDT22490
1F10   4000 0000      2251           STH   R0,0                 PRESET DATA AT 0                        CDT22500
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DATA CONSTANTS & CHECK ROUTINES

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1F14  4010 193C        2252            STH   R1,MEMTOP          INIT HIGH HALF                          CDT22510
1F18  25F5             2253            LCS   R15,5               TEST PATTERN = F----FB                  CDT22520
1F1A  48B1 0000        2254  TOP2      LH    R11,0(R1)           SAVE CURRENT CONTENTS                   CDT22530
1F1E  40F1 0000        2255            STH   R15,0(R1)           INSERT TEST PATTERN                     CDT22540
1F22  40B0 0002        2256            STH   R11,X'2'            TO CLEAR LATCHES                        CDT22550
1F26  45F1 0000        2257            CLH   R15,0(R1)           MEMORY THERE ?                          CDT22560
1F2A  213A             2258            BNES  FOUNDTOP            BRANCH: NOPE.                           CDT22570
1F2C  45F0 0000        2259            CLH   R15,0               WRAP ?                                  CDT22580
1F30  2337             2260            BES   FOUNDTOP           BRANCH: YUP.                            CDT22590
1F32  40B1 0000        2261            STH   R11,0(R1)           RESTORE PREVIOUS CELL CONTENTS          CDT22600
1F36  CA10 2000        2262            AHI   R1,X'2000'          ADVANCE 8KB                             CDT22610
1F3A  4300 1F1A        2263            B     TOP2                CONTINUE.                               CDT22620
1F3E  4830 0A52        2264  FOUNDTOP  LH    R3,PSW2                                                     CDT22630
1F42  9523             2265            EPSR  R2,R3               RE-ENABLE MM INT                        CDT22640
1F44  C800 1506        2266            LHI   R0,$ERRF3                                                   CDT22650
1F48  4000 003E        2267            STH   R0,X'3E'            RESTORE MALFUNCTION INTPT VECTOR        CDT22660
1F4C  2711             2268            SIS   R1,1                POINT TO HIGHEST BYTE                   CDT22670
1F4E  4010 193E        2269            STH   R1,MEMTOP+2         ASSUME 16-BIT                           CDT22680
1F52  D3F0 18EE        2270            LB    R15,STOP            16-BIT SELCH STOP CMD                   CDT22690
1F56  4800 1610        2271            LH    R0,MOD32                                                    CDT22700
1F5A  2335             2272            BZS   INIT.6              BRANCH: IT IS 16-BIT                    CDT22710
1F5C  5010             2273            DC    X'5010',Z(MEMTOP)   * ST R1,MEMTOP                          CDT22720
1F5E  193C
1F60  D3F0 18EF        2274            LB    R15,ESTOP           32-BIT SELCH STOP CMD                   CDT22730
1F64  D2F0 18F0        2275  INIT.6    STB   R15,STOPCMD         SELCH STOP CMD USED.                    CDT22740
                       2276  *                                                                           CDT22750
1F68  41F0 2DFE        2277            BAL   R15,XFERSIZP        GET LARGEST TRANSFER SIZE (IN R0)       CDT22760
1F6C  4810 1836        2278            LH    R1,WTFADR+2         ASSUME 16-BIT                           CDT22770
1F70  4820 182A        2279            LH    R2,RDFADR+2         .                                       CDT22780
1F74  4830 193E        2280            LH    R3,MEMTOP+2         TOP-OF-MEMORY                           CDT22790
1F78  48F0 1610        2281            LH    R15,MOD32           32-BIT ?                                CDT22800
1F7C  2337             2282            BZS   INIT.7              BRANCH: NO                              CDT22810
1F7E  5810             2283            DC    X'5810',Z(WTFADR)   *L R1,WTFADR                            CDT22820
1F80  1834
1F82  5820             2284            DC    X'5820',Z(RDFADR)   *L R2,RDFADR                            CDT22830
1F84  1828
1F86  5830             2285            DC    X'5830',Z(MEMTOP)   *L R3,MEMTOP                            CDT22840
1F88  193C
1F8A  0512             2286  INIT.7    CLAR  R1,R2               IS WTF BELOW RDF ?                      CDT22850
1F8C  2386             2287            BNLS  INIT.8                                                      CDT22860
1F8E  0A10             2288            AAR   R1,R0               WTF END ADDRESS;                        CDT22870
1F90  0512             2289            CLAR  R1,R2               BUFFER OVERLAP ?                        CDT22880
1F92  4380 1D5A        2290            BNL   ERROR15             BRANCH: INV OUTBUF OPTION               CDT22890
1F96  230A             2291            BS    INIT.9                                                      CDT22900
1F98  0A20             2292  INIT.8    AAR   R2,R0               RDF END ADDRESS                         CDT22910
1F9A  4280 1D54        2293            BC    ERROR14             BRANCH: INV INBUF OPTION                CDT22920
1F9E  0532             2294            CLAR  R3,R2               COMPARE TO TOP-OF-MEMORY                CDT22930
1FA0  4280 1D46        2295            BL    ERROR12             BRANCH: MEMORY SIZE EXCEEDED            CDT22940
1FA4  0521             2296            CLAR  R2,R1               BUFFER OVERLAP ?                        CDT22950
1FA6  4380 1D54        2297            BNL   ERROR14             BRANCH: INV INBUF OPTION                CDT22960
1FAA  4300 0CA0        2298  INIT.9    B     INITRET             RETURN TO EXEC                          CDT22970
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                        2300  * ************************************************************      CDT22990
                        2301  *                                                                  CDT23000
                        2302  * TO INITIALIZE DEDICATED DEVICE ADDRESS REGISTERS.                CDT23010
                        2303  * TO PUT DEVICES IN INITIAL STATES, TEST MODULE OPTIONS.           CDT23020
                        2304  * CALLING SEQUENCE: BAL R15,MODINIT                               CDT23030
                        2305  *                   DCX MODULEFLAGS                               CDT23040
                        2306  *                                                                  CDT23050
                        2307  * MODULE FLAGS HAVE THE FOLLOWING MEANINGS:                       CDT23060
                        2308  * 0001:  BIT15 - REQUIRES TRACK EVALUATION                        CDT23070
                        2309  * 0002:  BIT14 - NO ABORT (SCOPE LOOPS)                           CDT23080
                        2310  * 0004:  BIT13 - NOT USED                                        CDT23090
                        2311  * 0008:  BIT12 - SECONDARY DRIVE TO BE USED                       CDT23100
                        2312  * 0010:  BIT11 - READ-ONLY/TEST DATA SCOPE OPTIONS DISALLOWED     CDT23110
                        2313  * 0020:  BIT10 - NO HEADS MAY BE DELETED                         CDT23120
                        2314  * 0040:  BIT09 - > 1 TRACK TRANSFER ALLOWED                      CDT23130
                        2315  * 0080:  BIT08 - REQUIRES 'TSECT' INITIALIZATION                 CDT23140
                        2316  * 0100:  BIT07 - DOES NOT WRITE TO DISK                          CDT23150
                        2317  * 0200:  BIT06 - ANY SECTOR ADRS ALLOWED                         CDT23160
                        2318  * 8000:  BIT00 - REFORMAT IN PROGRESS                           CDT23170

      0000 1FAE         2320  MODINIT EQU   *                                                  CDT23190
1FAE  4120 307C         2321          BAL   R2,SETCODE          TESTING INITIAL STATUS       CDT23200
1FB2  0000              2322          DCX   0000                OPKEY = OPCODE = 0           CDT23210
1FB4  40C0 1624         2323          STH   OPKEY,ISITERR       LEVEL 0 PRINT SUPPRESSION    CDT23220
1FB8  40C0 1908         2324          STH   OPKEY,STOPFLAG      ALLOW CONTINUE ON OPTION ERRORS CDT23230
1FBC  480F 0000         2325          LH    R0,0(R15)           LOAD MODULE FLAGS            CDT23240
1FC0  4000 191A         2326          STH   R0,FLAGS            SAVE FLAGS FOR TEST          CDT23250
1FC4  26F2              2327          AIS   R15,2               ADVANCE PAST PARAMETER       CDT23260
1FC6  40F0 1976         2328          STA   R15,TEMPB+4-ADC     WILL GO TO 'RERN'            CDT23270
                        2329  *                                                                CDT23280
1FCA  4810 1634         2330          LH    R1,BTESTNO                                       CDT23290
1FCE  4330 204E         2331          BZ    MOD.3               BRANCH: TEST 0 NEEDN'T TEST FLAGS CDT23300
1FD2  0800              2332          LDAR  R0,R0               REFORMAT IN PROGRESS ?       CDT23310
1FD4  211A              2333          BMS   MOD.00              BRANCH: YES.                 CDT23320
1FD6  4810 1810         2334          LH    R1,NOAUTO+$VALU1    AUTOMATIC FUNCTION SUPPRESSED ? CDT23330
1FDA  2137              2335          BNZS  MOD.00              BRANCH: YES.                 CDT23340
1FDC  C850 1A0C         2336          LDAI  R5,MSG04            MESSAGE :                    CDT23350
1FE0  4810 1904         2337          LH    R1,RFMTFLG          REFORMAT REQUIRED ?          CDT23360
1FE4  4230 1D7E         2338          BNZ   PRINTIT             'REFORMAT LOCYL'             CDT23370
1FE8  C300 0100         2339  MOD.00  THI   R0,X'0100'          DOES IT WRITE TO DISK ?      CDT23380
1FEC  4230 2018         2340          BNZ   MOD.0C              BRANCH: NO.                  CDT23390
1FF0  4820 1928         2341          LH    R2,FUTADRS          DRIVE                        CDT23400
1FF4  9D22              2342          SSR   R2,R2                                            CDT23410
1FF6  9027              2343          SRLS  R2,7                                             CDT23420
1FF8  2334              2344          BZS   MOD.0A              BRANCH: NOT WRT-PROT.        CDT23430
1FFA  E150 1B1D         2345          SVC   5,MSG20             'DRIVE'                      CDT23440
1FFE  230B              2346          BS    MOD.0B              'WRITE-PROTECT ON'           CDT23450
2000  C300 0008         2347  MOD.0A  THI   R0,X'0008'          TEST USES SECONDARY DRIVE ?  CDT23460
2004  233A              2348          BZS   MOD.0C              BRANCH: NO.                  CDT23470
2006  4820 192A         2349          LH    R2,SECFILAD         XFILE                        CDT23480
200A  9D22              2350          SSR   R2,R2                                            CDT23490
200C  9027              2351          SRLS  R2,7                XFILE WRITE-PROTECTED ?      CDT23500
200E  2335              2352          BZS   MOD.0C              BRANCH: NO.                  CDT23510
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1860 CTRLR -58
1862 DRIVE -10B

INITIALIZATION

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2010  E150 1B23          2353           SVC   5,MSG21            'XFILE'                          CDT23520
2014  4300 1D34          2354  MOD.0B   B     ERROR8             'WRITE-PROTECT ON'               CDT23530
                         2355  *                                                                   CDT23540
2018  C300 0010          2356  MOD.0C   THI   R0,X'0010'         SCOPE 1&3 ILLEGAL ?              CDT23550
201C  2336               2357           BZS   MOD.1              BRANCH: ACCEPTABLE.              CDT23560
201E  2411               2358           LIS   R1,1                                                CDT23570
2020  4410 17A4          2359           NH    R1,SCOPE+$VALU1                                    CDT23580
2024  4230 1D3A          2360           BNZ   ERROR9             INVALID SCOPE OPTION             CDT23590
                         2361  *                                                                   CDT23600
2028  4810 17BC          2362  MOD.1    LH    R1,SECNUM+$VALU1   SECNUM VALUE                     CDT23610
202C  4510 18F8          2363           CLH   R1,MAXSEC          > 1 TRACK SPEC'D ?               CDT23620
2030  2188               2364           BLS   MOD.2              BRANCH: NO.                      CDT23630
2032  C300 0040          2365           THI   R0,X'0040'         > 1 TRACK WRITE ALLOWED ?        CDT23640
2036  4330 1D00          2366           BZ    ERROR1             BRANCH: INVALID SECNUM OPTION    CDT23650
203A  4810 181C          2367           LH    R1,HEADSA          ARE ANY HEADS DELETED ?          CDT23660
203E  2136               2368           BNZS  MOD.2A             BRANCH: INVALID 'HEADS' OPTION   CDT23670
2040  C300 0020          2369  MOD.2    THI   R0,X'0020'         ANY HEADS ALLOWED TO BE DELETED ?CDT23680
2044  2335               2370           BZS   MOD.3              BRANCH: SO IT SAYS.              CDT23690
2046  4810 181C          2371           LH    R1,HEADSA          ARE ANY HEADS DELETED ?          CDT23700
204A  4230 1D60          2372  MOD.2A   BNZ   ERROR16            BRANCH: INVALID 'HEADS' OPTION   CDT23710
                         2373  *                                                                   CDT23720
204E  4800 178C          2374  MOD.3    LH    R0,RETRY+$VALU1                                    CDT23730
2052  4000 178E          2375           STH   R0,RRCTR           INITIALIZE TO MAX RETRIES        CDT23740
                         2376  *                                                                   CDT23750
2056  4840 175C          2377           LH    SLAD,SELCH+$VALU1  SELCH ADDRESS                    CDT23760
205A  DE40 18F0          2378           OC    SLAD,STOPCMD       SELCH STOP                       CDT23770
205E  9D40               2379           SSR   SLAD,R0            ENSURE PRIVATE BUS CONNECT       CDT23780
2060  C820 FFEE          2380           LHI   R2,-18                                               CDT23790
2064  40C2 1886          2381  MOD.4    STH   OPKEY,DEVINT+18(R2) REMOVE INTERRUPT VECTORS         CDT23800
2068  4812 1870          2382           LH    R1,DEVSADR+18(R2)  CORRESPONDING DEVICE ADDRESS     CDT23810
206C  2117               2383           BMS   MOD.4X             BRANCH:DOESN'T EXIST             CDT23820
206E  9D10               2384           SSR   R1,R0              SENSE STATUS                     CDT23830
2070  4000 1908          2385           STH   R0,STOPFLAG        FSYNC CAUSES STOP                CDT23840
2074  2704               2386           SIS   R0,4               FALSE SYNC ?                     CDT23850
2076  4330 1D1E          2387           BZ    ERROR6             'DEV DDD FALSE SYNC'             CDT23860
2078  4020 1908          2388  MOD.4X   STH   R2,STOPFLAG        @ EXIT, STOPFLAG = 0             CDT23870
207A  2622               2389           AIS   R2,2                                                CDT23880
207C  222E               2390           BNPS  MOD.4                                              CDT23890
                         2391  *                                                                   CDT23900
207E  C8F0 207E          2392  MOD.4A   LDAI  R15,MOD.4A                                         CDT23910
2082  40F0 1966          2393           STA   R15,RERN+4-ADC     FOR MODINIT ERRORS -             CDT23920
2086  4830 1768          2394           LH    DCAD,DISCON+$VALU1                                 CDT23930
208A  4850 1928          2395           LH    FUT,FUTADRS                                        CDT23940
208E  4050 1910          2396           STH   FUT,STATE                                          CDT23950
2092  DE30 18E9          2397           OC    DCAD,RESET         CONTROLLER 'RESET'               CDT23960
2096  41E0 2D5E          2398           BAL   R14,CWAIT          WAIT FOR CTRLR IDLE              CDT23970
209A  000F               2399           DCX   000F                                               CDT23980
209C  24D0               2400           LIS   SECT,0                                             CDT23990
209E  40D0 1920          2401           STH   SECT,CURSECT                                       CDT24000
20A2  24B0               2402           LIS   TRACK,0                                            CDT24010
20A4  40B0 1924          2403           STH   TRACK,CURCYL                                       CDT24020
20A8  40B0 1922          2404           STH   TRACK,HEAD         HEAD 0                          CDT24030
20AC  9D5A               2405           SSR   FUT,STAT                                          CDT24040
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INITIALIZATION

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20B2  2323           2406          BFFS  SEEKINC,MOD.5                                  CDT24050
20B4  41F0 2AC4      2407          BAL   R15,RESTORE                                    CDT24060
20B8  4800 191A      2408  MOD.5   LH    R0,FLAGS          RELOAD MODULE FLAGS:         CDT24070
20BC  C300 0081      2409          THI   R0,X'0081'        TEST TSECT, EVALUATE BITS    CDT24080
20C0  2333           2410          BZS   MOD.6             BRANCH: NO SEEK REQ'D        CDT24090
20C2  4190 2AF4      2411          BAL   WK3,TSECT         GET CYLINDER, HEAD, SECTOR   CDT24100
20C6  4800 191A      2412  MOD.6   LH    R0,FLAGS                                       CDT24110
20CA  C300 0200      2413          THI   R0,X'0200'        CHECK FOR VALID SECTOR ADRS ?CDT24120
20CE  2135           2414          BNZS  MOD.6A            BRANCH: NO.                  CDT24130
20D0  45D0 18F8      2415          CLH   SECT,MAXSEC       VALID SECTOR ADRS ?          CDT24140
20D4  4380 1D18      2416          BNL   ERROR5            BRANCH: INVALID SECTOR OPTION.CDT24150
20D8  9001           2417  MOD.6A  SRLS  R0,1              TEST EVALUATION BIT          CDT24160
20DA  2388           2418          BNCS  MOD.7                                          CDT24170
20DC  4800 1810      2419  TESTAUTO LH   R0,NOAUTO+$VALU1  PRE-EVAL & POST-FMT INHIBITED ?CDT24180
20E0  2135           2420          BNZS  MOD.7             BRANCH: YES.                 CDT24190
20E2  41F0 2BF0      2421          BAL   R15,TENSECT       EVALUATE TRACK               CDT24200
20E6  D3D0 1739      2422          LB    SECT,SECTOR+$VALU1+1                           CDT24210
                     2423  *                                                            CDT24220
20EA  48F0 1976      2424  MOD.7   LDA   R15,TEMPB+4-ADC                                CDT24230
20EE  40F0 1966      2425          STA   R15,RERN+4-ADC    RERUN ADDRESS                CDT24240
20F2  030F           2426          BR    R15               RETURN TO CALLER.            CDT24250
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SYSTEM TEST SEQUENCES - TEST 00

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                        2428  * ********************************************************************  CDT24270
                        2429  *                                                                     CDT24280
                        2430  *                    T E S T   0                                      CDT24290
                        2431  *                                                                     CDT24300
                        2432  * PURPOSE OF TEST:                                                    CDT24310
                        2433  * TEST 0 CHECKS THE STATUS OF THE SELECTOR CHANNEL, CONTROLLER, AND    CDT24320
                        2434  * DISK DRIVE(S) TO BE USED. TEST 0 IS RUN BEFORE ALL OTHER TESTS,     CDT24330
                        2435  * AND CANNOT BE BYPASSED.                                            CDT24340
                        2436  *                                                                     CDT24350
                        2437  * ASSUMPTIONS:                                                       CDT24360
                        2438  * THE DISK DRIVE MUST BE ON-LINE.                                    CDT24370
                        2439  * IT IS ASSUMED THAT THE PROCESSOR, SELCH, MEMORY, AND CONSOLE I/O   CDT24380
                        2440  * TESTS HAVE BEEN RUN SUCCESSFULLY PRIOR TO SELECTING THIS TEST.     CDT24390
                        2441  *                                                                     CDT24400
                        2442  * DESIGN SPECIFICATIONS:                                             CDT24410
                        2443  * TO RUN TEST 0 WITH NO ERRORS:                                      CDT24420
                        2444  *        1) THE SELCH MUST NOT BE BUSY FOLLOWING A 'STOP' COMMAND     CDT24430
                        2445  *        2) CONTROLLER 'BUSY' AND 'IDLE' BITS, ONLY, MUST BE SET.    CDT24440
                        2446  *        3) ALL DISK DRIVE STATUS BITS MUST BE RESET.                 CDT24450
                        2447  *                                                                     CDT24460
                        2448  * HOW TO RUN THE TEST:                                               CDT24470
                        2449  * ENTER APPROPRIATE VALUES FOR THE SELCH, DISCON, AND DRIVE OPTIONS. CDT24480
                        2450  * SELECT THE TEST, AND ENTER 'RUN'. NO MANUAL INTERVENTION IS REQUIRED. CDT24490
                        2451  *                                                                     CDT24500
                        2452  * OPTIONS:                                                           CDT24510
                        2453  * LOOP, CONTIN, SELCH, DISCON, DRIVE                                 CDT24520
                        2454  *                                                                     CDT24530
                        2455  * ERRORS:                                                            CDT24540
                        2456  * 000000 - 00FFFF                                                    CDT24550


20F4  41F0 1FAE         2458  TEST0    BAL   R15,MODINIT                                          CDT24570
20F8  0140              2459           DCX   0140              DOES NOT WRITE TO DISK             CDT24580
                        2460  *                               ANY VALID SECNUM                   CDT24590
20FA  E110 3572         2461           SVC   1,PBLK01          TEST SELCH NOT BUSY                CDT24600
20FE  E120 3576         2462           SVC   2,PBLK02          TEST CTRLR STATUS = X'0A' OR X'0B' CDT24610
2102  E130 357E         2463           SVC   3,PBLK04          TEST DRIVE STATUS = X'00'          CDT24620
2106  2408              2464           LIS   R0,X'0008'                                           CDT24630
2108  4400 1714         2465           NH    R0,TEST+SVALU1    WILL TEST 0C BE RUN ?              CDT24640
210C  2339              2466           BZS   TST0.1            BRANCH: NO.                        CDT24650
210E  4850 192A         2467           LH    FUT,SECFILAD                                         CDT24660
2112  4050 1910         2468           STH   FUT,STATE                                            CDT24670
2116  E120 3576         2469           SVC   2,PBLK02          TEST CTRLR STATUS = X'0A' OR X'0B' CDT24680
211A  E130 357E         2470           SVC   3,PBLK04          TEST XFILE STATUS = X'00'          CDT24690
211E  4300 0CB4         2471  TST0.1   B     SKEEP2            RUN ONCE ONLY                      CDT24700
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SYSTEM TEST SEQUENCES - TEST 01

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                                2473  * ************************************************************      CDT24720
                                2474  *                                                                  CDT24730
                                2475  *              T E S T   1                                         CDT24740
                                2476  *                                                                  CDT24750
                                2477  * PURPOSE OF TEST:                                                CDT24760
                                2478  * TEST 1 PERFORMS A SIMPLE CHECK OF THE SEEK AND RESTORE FUNCTIONS.CDT24770
                                2479  *                                                                  CDT24780
                                2480  * ASSUMPTIONS:                                                    CDT24790
                                2481  * THE DISK DRIVE MUST BE ON-LINE. THE DISK PACK MUST BE FORMATTED IFCDT24800
                                2482  * BYCKAD = 0.                                                     CDT24810
                                2483  *                                                                  CDT24820
                                2484  * DESIGN SPECIFICATIONS:                                          CDT24830
                                2485  *        1) THE HEADS ARE RESTORED TO CYLINDER 0                   CDT24840
                                2486  *        2) THE MOST SIGNIFICANT VALID CYLINDER ADDRESS BIT        CDT24850
                                2487  *           IS SET, AND A SEEK IS MADE TO THAT CYLINDER.           CDT24860
                                2488  *           THE CYLINDER ADDRESS IS THEN DIVIDED BY TWO (SETTING   CDT24870
                                2489  *           THE NEXT LEAST-SIGNIFICANT BIT), AND THE PROCESS IS    CDT24880
                                2490  *           REPEATED, UNTIL CYLINDER 1 IS REACHED.                 CDT24890
                                2491  *           (A RESTORE IS PERFORMED BEFORE EACH SEEK.)              CDT24900
                                2492  *        3) THE HEADS ARE THEN RESTORED TO CYLINDER 0, AND         CDT24910
                                2493  *           A SEEK IS MADE TO THE MAXIMUM VALID CYLINDER ADDRESS.   CDT24920
                                2494  *        4) THE HEADS ARE RESTORED TO CYLINDER 0, AND              CDT24930
                                2495  *           A SEEK IS MADE TO THAT CYLINDER.                       CDT24940
                                2496  *        5) A SEEK IS MADE TO AN INVALID CYLINDER ADDRESS,         CDT24950
                                2497  *           EXPECTING 'ILLEGAL ADDRESS' STATUS.                    CDT24960
                                2498  *                                                                  CDT24970
                                2499  *        CYLINDER ADDRESSES < LOCYL OR > HICYL OPTIONS ARE NOT SEEKED,CDT24980
                                2500  *        WITH THE EXCEPTION OF (MAX) AND (MAX+1).                  CDT24990
                                2501  *                                                                  CDT25000
                                2502  *        A READ-CHECK IS PERFORMED FOLLOWING EACH SEEK OR          CDT25010
                                2503  *        RESTORE, IN STEPS 1 THROUGH 4, UNLESS 'BYCKAD' = 1.       CDT25020
                                2504  *        THE SECTOR SPECIFIED BY THE 'SECTOR' OPTION IS USED.      CDT25030
                                2505  *                                                                  CDT25040
                                2506  * HOW TO RUN THE TEST:                                            CDT25050
                                2507  * ENTER APPROPRIATE VALUES FOR THE SELCH, DISCON, AND DRIVE OPTIONS,CDT25060
                                2508  * SELECT THE TEST, AND ENTER 'RUN'. NO MANUAL INTEVENTION IS REQUIRED.CDT25070
                                2509  *                                                                  CDT25080
                                2510  * OPTIONS:                                                        CDT25090
                                2511  * LOOP, CONTIN, DISCON, DRIVE, BYCKAD, PACTYP, SECTOR             CDT25100
                                2512  *                                                                  CDT25110
                                2513  * ERRORS:                                                         CDT25120
                                2514  * 010000 - 01FFFF                                                 CDT25130

2122  41F0 1FAE                 2516  TEST1    BAL   R15,MODINIT                                        CDT25150
2126  01C0                      2517           DCX   01C0              TSECT; DOESN'T WRITE DISK        CDT25160
                                2518  *                               ANY VALID SECNUM.                CDT25170
2128  48B0 1900                 2519           LH    TRACK,MAXBIT      MAX VALID CYLADRS BIT            CDT25180
212C  40B0 1972                 2520  TST1.1   STA   TRACK,TEMPA+4-ADC                                  CDT25190
2130  41F0 30A2                 2521           BAL   R15,ILLADD        CHECK FOR INVALID CYLINDERS      CDT25200
2134  214A                      2522           DAC   TST1.2            BYPASS DESTINATION               CDT25210
2136  41F0 2AC4                 2523           BAL   R15,RESTORE       RESTORE TO CYLINDER 0            CDT25220
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SYSTEM TEST SEQUENCES - TEST 01

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213A  41F0 2B32          2524          BAL   R15,CKADSR          READ CHECK                          CDT25230
213E  48B0 1972          2525          LDA   TRACK,TEMPA+4-ADC                                       CDT25240
2142  41F0 2AA4          2526          BAL   R15,SKSR            SEEK SELECTED CYLINDER              CDT25250
2146  41F0 2B32          2527          BAL   R15,CKADSR          READ CHECK                          CDT25260
214A  90B1               2528  TST1.2  SRLS  TRACK,1            NEXT BINARY SUBMULTIPLE             CDT25270
214C  4230 212C          2529          BNZ   TST1.1              CONTINUE                            CDT25280
                         2530  *                                                                     CDT25290
2150  41F0 2AC4          2531          BAL   R15,RESTORE         RESTORE                             CDT25300
2154  41F0 2B32          2532          BAL   R15,CKADSR                                              CDT25310
2158  48B0 18FC          2533          LH    TRACK,MAXCYL        TO SEEK HIGHEST CYLINDER            CDT25320
215C  27B1               2534          SIS   TRACK,1                                               CDT25330
215E  41F0 2AA4          2535          BAL   R15,SKSR                                              CDT25340
2162  41F0 2B32          2536          BAL   R15,CKADSR                                            CDT25350
2166  41F0 2AC4          2537          BAL   R15,RESTORE                                           CDT25360
216A  41F0 2AA4          2538          BAL   R15,SKSR            SEEK CYLINDER 0                     CDT25370
216E  41F0 2B32          2539          BAL   R15,CKADSR          READ CHECK                          CDT25380
                         2540  *                                                                     CDT25390
2172  48B0 18FC          2541          LH    TRACK,MAXCYL                                          CDT25400
2176  41F0 2A98          2542          BAL   R15,SETCYL                                            CDT25410
217A  DE50 18EA          2543          OC    FUT,SEEKC           SEEK COMMAND                        CDT25420
217E  4120 307C          2544          BAL   R2,SETCODE                                            CDT25430
2182  0021               2545          DCX   0021                =SEEKING ILLEGAL CYLADRS            CDT25440
2184  2401               2546          LIS   R0,1                                                  CDT25450
2186  41F0 0F82          2547          BAL   R15,TIMER           WAIT > 100 USEC FOR ERROR STATUS    CDT25460
218A  E130 3582          2548          SVC   3,PBLK05            TEST ILLADD SET BY INVALID CYLADRS  CDT25470
218E  41F0 2AC4          2549          BAL   R15,RESTORE                                           CDT25480
2192  E130 3586          2550          SVC   3,PBLK06            TEST ILLADD RESET BY RESTORE        CDT25490
2196  41F0 2B32          2551          BAL   R15,CKADSR          AND READ-CHECK.                     CDT25500
219A  4300 0D16          2552          B     TSTEND              EXIT.                               CDT25510
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                        2554  * ************************************************************      CDT25530
                        2555  *                                                                  CDT25540
                        2556  *       T E S T   0 2                                              CDT25550
                        2557  *                                                                  CDT25560
                        2558  * PURPOSE OF TEST:                                                 CDT25570
                        2559  * TEST 2 PERFORMS AN EXHAUSTIVE CHECK OF THE HEAD-POSITICNING SERVO.  CDT25580
                        2560  *                                                                  CDT25590
                        2561  * ASSUMPTIONS:                                                    CDT25600
                        2562  * THE DISK DRIVE MUST BE ON-LINE. THE DISK PACK MUST BE FORMATTED IF  CDT25610
                        2563  * BYCKAD = 0.                                                      CDT25620
                        2564  *                                                                  CDT25630
                        2565  * DESIGN SPECIFICATIONS:                                          CDT25640
                        2566  * FOLLOWING A RESTORE TO CYLINDER 0, A SENSE-STATUS SEEK IS MADE   CDT25650
                        2567  * TO THE MAXIMUM VALID CYLINDER ADDRESS. SEEKS ARE THEN MADE TO    CDT25660
                        2568  * CYLINDERS 1 AND (MAX-1). THE PROCESS REPEATES UNTIL ALL SEEKS ARE  CDT25670
                        2569  * NEAR THE CENTER OF THE RANGE, THEN CONTINUES AS THE RANGE EXPANDS.  CDT25680
                        2570  * THE TEST TERMINATES WHEN THE MAXIMUM RANGE IS REACHED.          CDT25690
                        2571  *                                                                  CDT25700
                        2572  * CYLINDER ADDRESSES < LOCYL OR > HICYL ARE NOT SEEKED.           CDT25710
                        2573  *                                                                  CDT25720
                        2574  * A READ-CHECK IS PERFORMED ON THE HEAD AND SECTOR SPECIFIED BY    CDT25730
                        2575  * THE 'SECTOR' OPTION, FOR ALL CYLINDERS, IF 'BYCKAD' = 0.        CDT25740
                        2576  *                                                                  CDT25750
                        2577  * HOW TO RUN THE TEST:                                            CDT25760
                        2578  * ENTER APPROPRIATE VALUES FOR THE SELCH, DISCON, AND DRIVE OPTIONS.  CDT25770
                        2579  * SELECT THE TEST, AND ENTER 'RUN'. NO MANUAL INTERVENTION IS REQUIRED.  CDT25780
                        2580  *                                                                  CDT25790
                        2581  * OPTIONS:                                                        CDT25800
                        2582  * LOOP, CONTIN, DISCON, DRIVE, BYCKAD, PACTYP, SECTOR             CDT25810
                        2583  *                                                                  CDT25820
                        2584  * ERRORS:                                                         CDT25830
                        2585  * 020000 - 02FFFF                                                 CDT25840

219E  41F0 1FAE         2587  TEST2   BAL   R15,MODINIT                                        CDT25860
21A2  01C0              2588          DCX   01C0              TSECT; DOESN'T WRITE DISK        CDT25870
                        2589  *                               ANY VALID SECNUM.                CDT25880
21A4  41F0 2AC4         2590          BAL   R15,RESTORE       RESTORE TO CYLINDER 0            CDT25890
21A8  2460              2591          LIS   WK0,0             IF 0: SEEK (WK2); ELSE SEEK (WK1)  CDT25900
21AA  2571              2592          LCS   WK1,1             ASCENDING CYLINDERS              CDT25910
21AC  4880 18FC         2593          LH    WK2,MAXCYL        DESCENDING CYLINDERS             CDT25920
21B0  2781              2594  OSCT1   SIS   WK2,1                                             CDT25930
21B2  4210 0D16         2595          BM    TSTEND                                           CDT25940
21B6  08B8              2596          LDAR  TRACK,WK2                                        CDT25950
21B8  41F0 30A2         2597  OSCT2   BAL   R15,ILLADD        CHECK CE PACK INVALID ADRS       CDT25960
21BC  21C6              2598          DAC   OSCT3             BYPASS DESTINATION               CDT25970
21BE  41F0 2AA4         2599          BAL   R15,SKSR          SEEK CYLINDER, IF NOT VOID.      CDT25980
21C2  41F0 2B32         2600          BAL   R15,CKADSR        READ CHECK                       CDT25990
21C6  C760 FFFF         2601  OSCT3   XHI   WK0,-1            CHANGE SENSE OF SEEK             CDT26000
21CA  221D              2602          BNMS  OSCT1             BRANCH: SEEK DESCENDING          CDT26010
21CC  2671              2603          AIS   WK1,1                                             CDT26020
21CE  08B7              2604          LDAR  TRACK,WK1                                        CDT26030
21D0  220C              2605          BS    OSCT2             SEEK ASCENDING.                  CDT26040
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                        2607  * ***************************************************************      CDT26060
                        2608  *                                                                      CDT26070
                        2609  *       T E S T   3                                                    CDT26080
                        2610  *                                                                      CDT26090
                        2611  * PURPOSE OF TEST:                                                     CDT26100
                        2612  * TEST 3 PERFORMS SEEKS TO RANDOM CYLINDERS BETWEEN LOCY AND HICYL.    CDT26110
                        2613  * DESIGNED TO DISCOVER ERRORS NOT DETECTED BY TESTS 1 AND 2.           CDT26120
                        2614  *                                                                      CDT26130
                        2615  * ASSUMPTIONS:                                                         CDT26140
                        2616  * THE DISK DRIVE MUST BE ON-LINE. THE DISK PACK MUST BE FORMATTED      CDT26150
                        2617  * IF BYCKAD = 0.                                                       CDT26160
                        2618  *                                                                      CDT26170
                        2619  * DESIGN SPECIFICATIONS:                                               CDT26180
                        2620  * ONE THOUSAND SEEKS ARE MADE TO RANDOM CYLINDER ADDRESSES SUPPLIED    CDT26190
                        2621  * BY A FIBONACCI GENERATOR.                                            CDT26200
                        2622  * SEEK ADDRESSES NOT ALLOWED TO EXCEED THE HICYL OPTION SPECIFIED,     CDT26210
                        2623  * NOR TO BE LESS THAN THE LOCYL OPTION SPECIFIED.                      CDT26220
                        2624  * A READ-CHECK IS PERFORMED ON ON HEAD AND SECTOR SPECIFIED BY         CDT26230
                        2625  * THE 'SECTOR' OPTION AFTER EACH SEEK, UNLESS THE 'BYCKAD'            CDT26240
                        2626  * OPTION = 1.                                                          CDT26250
                        2627  *                                                                      CDT26260
                        2628  * HOW TO RUN THE TEST:                                                 CDT26270
                        2629  * ENTER APPROPRIATE VALUES FOR THE SELCH, DISCON, AND DRIVE OPTIONS,   CDT26280
                        2630  * AND ENTER 'RUN'. NO MANUAL INTERVENTION IS REQUIRED.                 CDT26290
                        2631  *                                                                      CDT26300
                        2632  * OPTIONS:                                                             CDT26310
                        2633  * LOOP, CONTIN, DISCON, DRIVE, BYCKAD, PACTYP, LOCYL, HICYL, SECTOR    CDT26320
                        2634  *                                                                      CDT26330
                        2635  * ERRORS:                                                              CDT26340
                        2636  * 030000 - 03FFFF                                                      CDT26350

21D2  41F0 1FAE         2638  TEST3    BAL   R15,MODINIT                                           CDT26370
21D6  01C0              2639           DCX   01C0              TSECT; DOESN'T WRITE DISK           CDT26380
                        2640  *                                ANY VALID SECNUM.                   CDT26390
21D8  C800 03E8         2641           LHI   R0,1000           SET COUNTER FOR 1000                CDT26400
21DC  4000 1926         2642           STH   R0,COUNTER                                            CDT26410
21E0  41F0 308E         2643  TST3.1   BAL   R15,RAND          RANDOM SEEKS                        CDT26420
21E4  C460 0FFF         2644           NHI   WK0,X'0FFF'                                           CDT26430
21E8  9063              2645           SRLS  WK0,3                                                 CDT26440
21EA  08B6              2646           LDAR  TRACK,WK0                                             CDT26450
21EC  41F0 30A2         2647           BAL   R15,ILLADD        VOID AREA CHECK                     CDT26460
21F0  21E0              2648           DAC   TST3.1            BYPASS DESTINATION                  CDT26470
21F2  41F0 2AA4         2649           BAL   R15,SKSR         SEEK                                CDT26480
21F6  41F0 2B32         2650           BAL   R15,CKADSR       READ-CHECK                          CDT26490
21FA  41F0 2BDA         2651           BAL   R15,CNTDOWN       CONTINUE, OR EXIT                   CDT26500
21FE  21E0              2652           DAC   TST3.1            CONTINUATION VECTOR                 CDT26510
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                        2654  * ************************************************************        CDT26530
                        2655  *                                                                    CDT26540
                        2656  *       T E S T   4                                                  CDT26550
                        2657  *                                                                    CDT26560
                        2658  * PURPOSE OF TEST:                                                   CDT26570
                        2659  * TEST 4 PERFORMS A SIMPLE CHECK OF THE SEEK AND RESTORE             CDT26580
                        2660  * INTERRUPTS. ILLEGAL ADDRESS IS TESTED FOR SEEKING AN              CDT26590
                        2661  * ILLEGAL CYLINDER ADDRESS.                                         CDT26600
                        2662  *                                                                    CDT26610
                        2663  * ASSUMPTIONS:                                                      CDT26620
                        2664  * THE DISK DRIVE MUST BE ON-LINE.                                   CDT26630
                        2665  *                                                                    CDT26640
                        2666  * DESIGN SPECIFICATIONS:                                            CDT26650
                        2667  * THE HEADS ARE RESTORED TO CYLINDER 0. AN INTERRUPT VECTOR IS      CDT26660
                        2668  * SET UP, AND AN INTERRUPT SEEK IS MADE TO CYLINDER 0. AN INTERRUPT CDT26670
                        2669  * SEEK TO THE MAXIMUM VALID CYLINDER ADDRESS IS THEN PERFORMED.      CDT26680
                        2670  * NEXT, A SEEK IS ATTEMPTED TO AN INVALID CYLINDER ADDRESS, EXPECTING CDT26690
                        2671  * AN INTERRUPT WITH 'ILLEGAL ADDRESS' STATUS.                       CDT26700
                        2672  * THE RESTORE INTERRUPT IS THEN TESTED, AND THE TEST TERMINATES.    CDT26710
                        2673  * NOTE - NO READ CHECKS ARE PERFORMED ON ANY CYLINDER.              CDT26720
                        2674  *                                                                    CDT26730
                        2675  * HOW TO RUN THE TEST:                                              CDT26740
                        2676  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, AND DRIVE OPTIONS, CDT26750
                        2677  * AND ENTER 'RUN'. NO MANUAL INTERVENTION IS REQUIRED.              CDT26760
                        2678  *                                                                    CDT26770
                        2679  * OPTIONS:                                                          CDT26780
                        2680  * LOOP, CONTIN, DISCON, DRIVE, PACTYP                               CDT26790
                        2681  *                                                                    CDT26800
                        2682  * ERRORS:                                                           CDT26810
                        2683  * 040000 - 04FFFF                                                   CDT26820


2200  41F0 1FAE         2685  TEST4    BAL   R15,MODINIT                                         CDT26840
2204  01C0              2686           DCX   01C0              ANY VALID SECNUM, TSECT.          CDT26850
                        2687  *                                DOESN'T WRITE DISC.               CDT26860
2206  41F0 2AC4         2688           BAL   R15,RESTORE                                         CDT26870
220A  41E0 2CB6         2689           BAL   R14,INSERT        ESTABLISH DRIVE INTERRUPT VECTOR: CDT26880
220E  1928              2690           DC    Z(FUTADRS),Z(SKINTA)                                CDT26890
2210  2A66
2212  41E0 2A40         2691           BAL   R14,INTSK         SEEK CYLINDER 0                   CDT26900
2216  48B0 18FC         2692           LH    TRACK,MAXCYL      SEEK MAX CYLINDER:                CDT26910
221A  27B1              2693           SIS   TRACK,1                                             CDT26920
221C  41E0 2A40         2694           BAL   R14,INTSK                                           CDT26930
2220  41E0 2A40         2695           BAL   R14,INTSK         SEEK MAX AGAIN                    CDT26940
                        2696  *                                                                  CDT26950
2224  48B0 18FC         2697           LH    TRACK,MAXCYL                                        CDT26960
2228  41E0 2A40         2698           BAL   R14,INTSK         SEEK INVALID                      CDT26970
222C  4120 307C         2699  TST4.1   BAL   R2,SETCODE                                         CDT26980
2230  0021              2700           DCX   0021              =SEEKING ILLEGAL CYLADRS          CDT26990
2232  E100 3582         2701           SVC   0,PBLK05          ILLADD SET BY INVALID ADDRESS ?   CDT27000
2236  E130 3582         2702           SVC   3,PBLK05          TEST CURRENT STATUS, ALSO.        CDT27010
223A  DE50 18ED         2703           OC    FUT,IRESTOC       INTERRUPT RESTORE                 CDT27020
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SYSTEM TEST SEQUENCES - TEST 04

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223E   4120 307C        2704      BAL   R2,SETCODE                                    CDT27030
2242   0031             2705      DCX   0031          =RESTORE FOLLOWING ILLEGAL ADDRESS  CDT27040
2244   41E0 2A58        2706      BAL   R14,INTSK3     WAIT FOR RESTORE INTERRUPT      CDT27050
2248   06D6             2707      DCX   06D6          TIMEOUT VALUE                   CDT27060
224A   24B0             2708      LIS   TRACK,0                                       CDT27070
224C   40B0 1924        2709      STH   TRACK,CURCYL                                  CDT27080
2250   E100 357E        2710      SVC   0,PBLK04      TEST ILLADD+BSY RESET (INTPT)   CDT27090
2254   E130 357E        2711      SVC   3,PBLK04      TEST AGAIN (SSR)                CDT27100
2258   4300 0D16        2712      B     TSTEND        EXIT.                           CDT27110
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2714  * ************************************************************      CDT27130
2715  *                                                                   CDT27140
2716  *       T E S T   5                                                 CDT27150
2717  *                                                                   CDT27160
2718  * PURPOSE OF TEST:                                                  CDT27170
2719  * TEST 5 PERFORMS A SIMPLE CHECK OF FORMAT-MODE READ/WRITE FUNCTION,  CDT27180
2720  * AND SYNTHESIZES NORMAL-MODE READ/WRITE ERRORS.                     CDT27190
2721  *                                                                   CDT27200
2722  * ASSUMPTIONS:                                                      CDT27210
2723  * THE DISK DRIVE MUST BE ON-LINE AND NOT WRITE-PROTECTED. THE DISK   CDT27220
2724  * PACK MUST BE PROPERLY FORMATTED ON THE TRACK SPECIFIED BY THE      CDT27230
2725  * LOCYL AND SECTOR OPTIONS. THE DISK CONTROLLER MUST BE IN THE       CDT27240
2726  * FORMAT MODE. AN ATTEMPT IS MADE TO RESTORE PROPER FORMAT WHEN      CDT27250
2727  * TEST 5 TERMINATES.                                                CDT27260
2728  *                                                                   CDT27270
2729  * DESIGN SPECIFICATIONS:                                            CDT27280
2730  * A SEEK IS MADE TO 'LOCYL', AND ALL SECTORS OF THE TRACK SPECIFIED  CDT27290
2731  * BY THE HEAD BYTE OF THE 'SECTOR' OPTION ARE EVALUATED FOR         CDT27300
2732  * DEFECTIVE SECTOR (TRACK) FLAGS. THE TEST THEN PROCEEDS AS FOLLOWS:  CDT27310
2733  *                                                                   CDT27320
2734  *  A. SECTOR 0 IS FORMATTED WITH DEF SEC (TRK) SET.                 CDT27330
2735  *  B. SECTOR 2 IS FORMATTED WITH INCORRECT NORMAL MODE LRC FIELD.   CDT27340
2736  *  C. SECTOR 4 IS FORMATTED WITH INCORRECT SECTOR ADDRESS FIELD.    CDT27350
2737  *  D. SECTOR 6 IS FORMATTED PROPERLY.                               CDT27360
2738  *  E. SECTOR 7 IS FORMATTED WITH INCORRECT HEAD ADDRESS FIELD.      CDT27370
2739  *                                                                   CDT27380
2740  * EACH OF STEPS A - E READS THE FORMATTED SECTOR AND TESTS DATA.     CDT27390
2741  * THE FOLLOWING NORMAL-MODE READS OR WRITES ARE THEN PERFORMED:      CDT27400
2742  *                                                                   CDT27410
2743  *  A. SECTOR 0 IS READ, EXPECTING DEF SEC (TRK) STATUS.             CDT27420
2744  *  B. SECTOR 2 IS READ, DATA TRANSFER ERROR (LRCC) EXPECTED.        CDT27430
2745  *  C. SECTOR 4 IS READ, HEADER COMPARE FAIL STATUS EXPECTED.        CDT27440
2746  *  D. SECTORS 6 & 7 ARE READ IN ONE TRANSFER,                       CDT27450
2747  *     HEADER COMPARE FAIL STATUS EXPECTED.                          CDT27460
2748  *  E. SECTORS 6 & 7 ARE WRITTEN IN ONE TRANSFER,                    CDT27470
2749  *     HEADER COMPARE FAIL STATUS EXPECTED.                          CDT27480
2750  *  F. SECTOR 24 IS READ AND WRITTEN. BECAUSE THIS IS AN ILLEGAL     CDT27490
2751  *     SECTOR ADDRESS, CONTROLLER OVERRUN IS EXPECTED.               CDT27500
2752  *                                                                   CDT27510
2753  * PROPER FORMAT IS RESTORED ON SUCCESSFUL COMPLETION OF THE TEST.    CDT27520
2754  *                                                                   CDT27530
2755  * HOW TO RUN THE TEST:                                              CDT27540
2756  * PLACE THE CONTROLLER MODE SWITCH IN THE FORMAT ("FMT") POSITION.  CDT27550
2757  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE,        CDT27560
2758  * LOCYL, AND SECTOR OPTIONS, AND ENTER 'RUN'. NO MANUAL             CDT27570
2759  * INTERVENTION IS REQUIRED.                                         CDT27580
2760  *                                                                   CDT27590
2761  * OPTIONS:                                                          CDT27600
2762  * SELCH, DISCON, DRIVE, BYCKAD, PACTYP, LOCYL, SECTOR (HEAD PORTION),  CDT27610
2763  * INBUF, OUTBUF                                                     CDT27620
2764  *                                                                   CDT27630
2765  * ERRORS:                                                           CDT27640
2766  * 050000 - 05FFFF                                                   CDT27650
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225C  41F0 1FAE          2768  TEST5   BAL   R15,MODINIT                                  CDT27670
2260  00C1               2769          DCX   00C1              EVALUATE, TSECT          CDT27680
                         2770  *                               ANY VALID SECNUM.        CDT27690
2262  4800 18FA          2771          LH    R0,PRECL                                     CDT27700
2266  2701               2772          SIS   R0,1                                         CDT27710
2268  4000 192C          2773          STH   R0,SIZE           FOR FORMAT MODE TRANSFERS  CDT27720
226C  C8D0 0040          2774          LHI   SECT,0+X'40'      DEFECTIVE SECTOR FLAG      CDT27730
2270  41F0 29FC          2775          BAL   R15,FMSUDF        SET UP DATA FIELD          CDT27740
2274  41F0 2DC6          2776          BAL   R15,HEADER        CREATE SECTOR HEADER       CDT27750
2278  24D0               2777          LIS   SECT,0            SECTOR 0                   CDT27760
227A  C800 0605          2778          LHI   R0,X'0605'        FORMAT WRITE/READ          CDT27770
227E  4000 18E6          2779          STH   R0,WCMD           CONTROLLER COMMANDS        CDT27780
2282  41F0 2FDE          2780          BAL   R15,WRIT          SECTOR 0 - DEF SEC (TRK)   CDT27790
2286  41F0 2FBE          2781          BAL   R15,READ                                     CDT27800
228A  41F0 2F44          2782          BAL   R15,TDATA                                    CDT27810
                         2783  *                                                          CDT27820
228E  24D2               2784          LIS   SECT,2                                       CDT27830
2290  41F0 2DC6          2785          BAL   R15,HEADER                                   CDT27840
2294  C800 F0F0          2786          LHI   R0,X'F0F0'                                   CDT27850
2298  4700 190A          2787          XH    R0,LRCC                                      CDT27860
229C  2712               2788          SIS   R1,2                                         CDT27870
229E  4A10 18FA          2789          AH    R1,PRECL                                     CDT27880
22A2  4001 0000          2790          STH   R0,0(R1)          SECTOR 2, BAD LRCC         CDT27890
22A6  41F0 2FDE          2791          BAL   R15,WRIT                                     CDT27900
22AA  41F0 2FBE          2792          BAL   R15,READ                                     CDT27910
22AE  41F0 2F44          2793          BAL   R15,TDATA                                    CDT27920
                         2794  *                                                          CDT27930
22B2  41F0 2DC6          2795          BAL   R15,HEADER                                   CDT27940
22B6  24D4               2796          LIS   SECT,4                                       CDT27950
22B8  41F0 2FDE          2797          BAL   R15,WRIT          SECTOR 4 - BAD SECTOR ADRS IN HEADER  CDT27960
22BC  41F0 2FBE          2798          BAL   R15,READ                                     CDT27970
22C0  41F0 2F44          2799          BAL   R15,TDATA                                    CDT27980
                         2800  *                                                          CDT27990
22C4  24D6               2801          LIS   SECT,6            SECTOR 6 - CORRECT FORMAT  CDT28000
22C6  41F0 2DC6          2802          BAL   R15,HEADER                                   CDT28010
22CA  41F0 2FDE          2803          BAL   R15,WRIT                                     CDT28020
22CE  41F0 2FBE          2804          BAL   R15,READ                                     CDT28030
22D2  41F0 2F44          2805          BAL   R15,TDATA                                    CDT28040
                         2806  *                                                          CDT28050
22D6  24D7               2807          LIS   SECT,7            SECTOR 7 - BAD HEAD ADDRESS  CDT28060
22D8  D300 1738          2808          LB    R0,SECTOR+$VALU1  HEAD PORTION OF OPTION     CDT28070
22DC  C700 0001          2809          XHI   R0,1              REVERSE STATE OF HEAD BIT  CDT28080
22E0  4000 1922          2810          STH   R0,HEAD                                      CDT28090
22E4  41F0 2DC6          2811          BAL   R15,HEADER                                   CDT28100
22E8  D300 1738          2812          LB    R0,SECTOR+$VALU1                             CDT28110
22EC  4000 1922          2813          STH   R0,HEAD           RESTORE CORRECT HEAD VALUE CDT28120
22F0  41F0 2FDE          2814          BAL   R15,WRIT                                     CDT28130
22F4  41F0 2FBE          2815          BAL   R15,READ                                     CDT28140
22F8  41F0 2F44          2816          BAL   R15,TDATA                                    CDT28150

                         2818  * NOW TEST, USING WHAT WAS WRITTEN                         CDT28170
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SYSTEM TEST SEQUENCES - TEST 5

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22FC  C800 0201          2819          LHI   R0,X'0201'          NORMAL MODE READ/WRITE CMDS          CDT28180
2300  4000 18E6          2820          STH   R0,WCMD                                                  CDT28190
2304  C800 00FF          2821          LHI   R0,LRECL-1                                               CDT28200
2308  4000 192C          2822          STH   R0,SIZE             FOR NORMAL-MODE SECTOR XFER          CDT28210
230C  4120 307C          2823          BAL   R2,SETCODE                                               CDT28220
2310  0093               2824          DCX   0093                =EXPECTING DEF SEC (TRK) STATUS      CDT28230
2312  24D0               2825          LIS   SECT,0                                                   CDT28240
2314  C800 358A          2826          LDAI  R0,PBLK08           EXPECTING DEF SEC                    CDT28250
2318  4000 196E          2827          STA   R0,ERRFLG+4-ADC                                          CDT28260
231C  41F0 2FCC          2828          BAL   R15,READX                                                CDT28270
2320  41F0 2FEC          2829          BAL   R15,WRITX                                                CDT28280
                         2830  *                                                                      CDT28290
2324  24D2               2831          LIS   SECT,2                                                   CDT28300
2326  C800 358E          2832          LDAI  R0,PBLK09                                                CDT28310
232A  4000 196E          2833          STA   R0,ERRFLG+4-ADC                                          CDT28320
232E  4120 307C          2834          BAL   R2,SETCODE                                               CDT28330
2332  0095               2835          DCX   0095                =EXPECTING PARITY-ERROR (DTE)        CDT28340
2334  41F0 2FCC          2836          BAL   R15,READX                                                CDT28350
                         2837  *                                                                      CDT28360
2338  24D4               2838          LIS   SECT,4                                                   CDT28370
233A  C800 3592          2839          LDAI  R0,PBLK0A                                                CDT28380
233E  4000 196E          2840          STA   R0,ERRFLG+4-ADC                                          CDT28390
2342  4120 307C          2841          BAL   R2,SETCODE                                               CDT28400
2346  0092               2842          DCX   0092                =EXPECTING HEADER COMPARE FAIL       CDT28410
2348  41F0 2FCC          2843          BAL   R15,READX                                                CDT28420
234C  41F0 2FEC          2844          BAL   R15,WRITX                                                CDT28430
                         2845  *                                                                      CDT28440
2350  C800 01FF          2846          LHI   R0,2*LRECL-1        FOR 2 SECTORS                        CDT28450
2354  4000 192C          2847          STH   R0,SIZE                                                  CDT28460
2358  24D6               2848          LIS   SECT,6                                                   CDT28470
235A  41F0 2FCC          2849          BAL   R15,READX                                                CDT28480
235E  41F0 2FEC          2850          BAL   R15,WRITX           EXPECT ERROR ON WRITE, ALSO          CDT28490
                         2851  *                                                                      CDT28500
2362  C8D0 0018          2852          LHI   SECT,24             ILLEGAL SECTOR ADRS                  CDT28510
2366  C800 3596          2853          LDAI  R0,PBLK0B           TO TEST CTRLR STATUS = X'86'         CDT28520
236A  4000 196E          2854          STA   R0,ERRFLG+4-ADC                                          CDT28530
236E  41F0 2FEC          2855          BAL   R15,WRITX           WRITE, EXPECT ERROR                  CDT28540
2372  41F0 2FCC          2856          BAL   R15,READX           READ, EXPECT ERROR                   CDT28550
                         2857  *                                                                      CDT28560
2376  4300 2988          2858          B     REFORMAT                                                 CDT28570
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SYSTEM TEST SEQUENCES - TEST 6

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                        2860  * ****************************************************************      CDT28590
                        2861  *                                                                       CDT28600
                        2862  *       T E S T   6                                                     CDT28610
                        2863  *                                                                       CDT28620
                        2864  * PURPOSE OF TEST:                                                      CDT28630
                        2865  * TEST 6 IS THE ONLY TEST WHICH SPECIFICALLY TESTS MULTIPLE-SECTOR      CDT28640
                        2866  * HEAD ADVANCE/CYLINDER OVERFLOW LOGIC.                                 CDT28650
                        2867  *                                                                       CDT28660
                        2868  * ASSUMPTIONS:                                                         CDT28670
                        2869  * THE SELECTED DISK DRIVE MUST BE ON-LINE, AND NOT WRITE-PROTECTED.     CDT28680
                        2870  * THE CYLINDER SPECIFIED BY THE 'LOCYL' OPTION MUST BE CORRECTLY        CDT28690
                        2871  * FORMATTED. THE 'HEADS' OPTION *MUST* BE ZERO (0).                     CDT28700
                        2872  *                                                                       CDT28710
                        2873  * DESIGN SPECIFICATIONS:                                               CDT28720
                        2874  * A DATA TRANSFER OF (ONE SECTOR + 6 BYTES) IS MADE TO THE HIGHEST     CDT28730
                        2875  * SECTOR ADDRESS OF HEAD 0, OF THE CYLINDER SPECIFIED BY LOCYL.        CDT28740
                        2876  * THE DATA IS READ BACK FROM HEADS 0 AND 1, AND TESTED. THE OPERATION   CDT28750
                        2877  * IS REPEATED WITH HEAD 1, WITH CYLINDER OVERFLOW STATUS EXPECTED.      CDT28760
                        2878  * THE DATA READ BACK IS TESTED.                                        CDT28770
                        2879  *                                                                       CDT28780
                        2880  * HOW TO RUN THE TEST:                                                 CDT28790
                        2881  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, AND DRIVE O      CDT28800
                        2882  * OPTIONS, AND ENTER 'RUN'. NO MANUAL INTERVENTION IS NECESSARY.       CDT28810
                        2883  *                                                                       CDT28820
                        2884  * OPTIONS:                                                             CDT28830
                        2885  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, RETRY, HEADS,            CDT28840
                        2886  * INBUF, OUTBUF                                                        CDT28850
                        2887  *                                                                       CDT28860
                        2888  * ERRORS:                                                              CDT28870
                        2889  * 060000 - 06FFFF                                                      CDT28880

237A  41F0 1FAE         2891  TEST6    BAL   R15,MODINIT                                            CDT28900
237E  00E0              2892           DCX   0CE0              NO DELETED HEADS, TSECT,              CDT28910
                        2893  *                                ANY VALID SECNUM.                     CDT28920
2380  2400              2894           LIS   R0,0                                                    CDT28930
2382  4000 1922         2895           STH   R0,HEAD           START WITH HEAD 0                     CDT28940
2386  C800 0201         2896           LHI   R0,X'0201'        NORMAL READ/WRITE                     CDT28950
238A  4000 18E6         2897           STH   R0,WCMD           SAVE COMMANDS                         CDT28960
238E  48D0 18F8         2898           LH    SECT,MAXSEC                                             CDT28970
2392  27D1              2899           SIS   SECT,1                                                  CDT28980
2394  C800 0105         2900           LHI   R0,LRECL+5        SET SIZE = 262                        CDT28990
2398  4000 192C         2901           STH   R0,SIZE                                                 CDT29000
239C  41F0 2EB6         2902           BAL   R15,SPIFILL       FILL BUFFER WITH SPIRAL DATA          CDT29010
23A0  41F0 2FDE         2903           BAL   R15,WRIT          WRITE BUFFER TO DISK                  CDT29020
23A4  41F0 2FBE         2904           BAL   R15,READ          AND READ BACK.                        CDT29030
23A8  41F0 2F44         2905           BAL   R15,TDATA         TEST DATA READ                        CDT29040
23AC  41F0 2BAA         2906           BAL   R15,NEWHEAD       GET NEXT HEAD                         CDT29050
23B0  23B2              2907           DAC   TST6.1            CONTINUATION VECTOR                   CDT29060
23B2  24D0              2908  TST6.1   LIS   SECT,0                                                  CDT29070
23B4  2405              2909           LIS   R0,5                                                    CDT29080
23B6  4000 192C         2910           STH   R0,SIZE           FOR 6 BYTES                           CDT29090
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SYSTEM TEST SEQUENCES - TEST 6

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23BA   41F0 2FBE          2911          BAL   R15,READ                                    CDT29100
23BE   41F0 2F36          2912          BAL   R15,TDATAX          TEST DATA READ ON HEAD 1  CDT29110
23C2   0100               2913          DC    Z(LRECL)            BYTE OFFSET               CDT29120
                          2914  *                                                           CDT29130
23C4   C800 0105          2915          LHI   R0,LRECL+5          SET SIZE BACK             CDT29140
23C8   4000 192C          2916          STH   R0,SIZE             FOR 262 BYTES             CDT29150
23CC   48D0 18F8          2917          LH    SECT,MAXSEC                                   CDT29160
23D0   27D1               2918          SIS   SECT,1              LAST SECTOR IN CYLINDER   CDT29170
23D2   2501               2919          LCS   R0,1                                          CDT29180
23D4   4000 196E          2920          STA   R0,ERRFLG+4-ADC     UNCONDITIONAL RETURN      CDT29190
23D8   2401               2921          LIS   R0,1                                          CDT29200
23DA   4000 1922          2922          STH   R0,HEAD             HEAD 1                    CDT29210
23DE   4120 307C          2923          BAL   R2,SETCODE                                    CDT29220
23E2   0094               2924          DCX   0094                =TESTING CTRLR ERROR STATUS (CYLOV)  CDT29230
23E4   41F0 2FEC          2925          BAL   R15,WRITX           WRITE, EXPECT ERROR       CDT29240
23E8   E120 359A          2926          SVC   2,PBLK0C            TEST CTRLR STATUS = X'1E' CDT29250
23EC   41F0 2FCC          2927          BAL   R15,READX           READ, EXPECT ERROR        CDT29260
23F0   E120 359A          2928          SVC   2,PBLK0C            ON READ, ALSO.            CDT29270
23F4   E160 359E          2929          SVC   6,PBLK0D            CHECK SELCH LIMITS        CDT29280
23F8   2506               2930          LCS   R0,6                                          CDT29290
23FA   6100 192C          2931          AHM   R0,SIZE             SET SIZE BACK TO LRECL-1  CDT29300
23FE   41F0 2F44          2932          BAL   R15,TDATA           TEST DATA.                CDT29310
2402   4300 0D16          2933          B     TSTEND              EXIT.                     CDT29320
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                        2935  * ****************************************************************      CDT29340
                        2936  *                                                                       CDT29350
                        2937  *       T E S T   7                                                     CDT29360
                        2938  *                                                                       CDT29370
                        2939  * PURPOSE OF TEST:                                                      CDT29380
                        2940  * TEST 7 CHECKS DATA TRANSFER INTERRUPT LOGIC, AND SELECTOR CHANNEL/    CDT29390
                        2941  * DISK CONTROLLER INTERRUPT SEQUENCING.                                 CDT29400
                        2942  * THIS TEST MAY BE USED TO TEST LARGE TRANSFERS (UP TO A FULL CYLINDER) CDT29410
                        2943  * IF ADEQUATE MEMORY IS AVAILABLE. THIS IS DONE BY MANUALLY CHANGING    CDT29420
                        2944  * LOCATION 'IDSIZE' TO THE REQUIRED TRANSFER LENGTH. IF A WRITE TO THE  CDT29430
                        2945  * DISK IS DESIRED, THE COMMANDS AT LOCATION 'IDDC' MUST BE CHANGED TO   CDT29440
                        2946  * X'4210', AND DRIVE MUST NOT BE WRITE-PROTECTED.                       CDT29450
                        2947  * TESTS 7 AND 15 ARE THE ONLY TESTS ALLOWING GREATER THAN ONE           CDT29460
                        2948  * TRACK IN A SINGLE TRANSFER.                                          CDT29470
                        2949  *                                                                       CDT29480
                        2950  * ASSUMPTIONS:                                                         CDT29490
                        2951  * THE SELECTED DISK DRIVE MUST BE ON-LINE. THE DISK PACK USED MUST BE   CDT29500
                        2952  * PROPERLY FORMATTED.                                                   CDT29510
                        2953  *                                                                       CDT29520
                        2954  * DESIGN SPECIFICATIONS:                                               CDT29530
                        2955  * THE SELECTED DRIVE IS INTERRUPT-SEEKED TO LOCYL. 256 DATA BYTES ARE   CDT29540
                        2956  * READ UNDER INTERRUPT CONTROL, FROM THE HEAD AND SECTOR SPECIFIED       CDT29550
                        2957  * BY THE 'SECTOR' OPTION. THE SELCH IS EXPECTED TO INTERRUPT FIRST,     CDT29560
                        2958  * FOLLOWED BY THE CONTROLLER.                                           CDT29570
                        2959  *                                                                       CDT29580
                        2960  * HOW TC RUN THE TEST:                                                 CDT29590
                        2961  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, AND DRIVE         CDT29600
                        2962  * OPTIONS, AND ENTER 'RUN'. NO MANUAL INTERVENTION IS NECESSARY.        CDT29610
                        2963  *                                                                       CDT29620
                        2964  * OPTIONS:                                                             CDT29630
                        2965  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, SECTOR, RETRY, INBUF      CDT29640
                        2966  *                                                                       CDT29650
                        2967  * ERRORS:                                                              CDT29660
                        2968  * 070000 - 07FFFF                                                      CDT29670

2406  41F0 1FAE         2970  TEST7    BAL   R15,MODINIT                                            CDT29690
240A  01E0              2971           DCX   01E0              DOES NOT WRITE DISK (DEFAULT TEST)    CDT29700
                        2972  *                                ANY VALID SECNUM, TSECT.              CDT29710
240C  41E0 2CB6         2973           BAL   R14,INSERT        INSERT DRIVE INTPT VECTOR:            CDT29720
2410  1928              2974           DC    Z(FUTADRS),Z(SKINTA)                                    CDT29730
2412  2A66
2414  48B0 1720         2975           LH    TRACK,LOCYL+$VALU1                                      CDT29740
2418  41E0 2A40         2976           BAL   R14,INTSK         SEEK                                  CDT29750
                        2977  *                                                                       CDT29760
241C  41E0 2CB6         2978           BAL   R14,INSERT        DELETE DRIVE                          CDT29770
2420  1928              2979           DC    Z(FUTADRS),Z(0)                                         CDT29780
2422  0000
2424  4190 2B02         2980           BAL   WK3,TSECTA        GET STARTING HEAD, SECTOR             CDT29790
2428  2401              2981           LIS   R0,1                                                    CDT29800
242A  4600 192E         2982           OH    R0,IDSIZE         TRANSFER SIZE, FORCED ODD             CDT29810
242E  4000 192C         2983           STH   R0,SIZE                                                 CDT29820
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2432  C800 35A2          2984           LDAI  R0,PBLK0E                                    CDT29830
2436  4000 196E          2985           STA   R0,ERRFLG+4-ADC     FOR ERROR ROUTINE        CDT29840
243A  4120 307C          2986           BAL   R2,SETCODE                                   CDT29850
243E  0070               2987           DCX   0070                =READ OPERATION          CDT29860
2440  D300 18F7          2988           LB    R0,IDDC+1           SELCH COMMAND            CDT29870
2444  C300 0020          2989           THI   R0,X'20'            SELCH TO READ ?          CDT29880
2448  2134               2990           BNZS  TST7.2              BRANCH: YES.             CDT29890
244A  4120 307C          2991           BAL   R2,SETCODE                                   CDT29900
244E  0060               2992           DCX   0060                =WRITE OPERATON          CDT29910
2450  D200 18F3          2993  TST7.2   STB   R0,SLCHCMD                                   CDT29920
2454  41F0 2C42          2994           BAL   R15,SLCH            WRITE ADDRESSES TO SELCH CDT29930
2458  985B               2995           WHR   FUT,TRACK           CYL ADRS FOR CTRLR HEADER MATCH CDT29940
245A  41E0 2D5E          2996           BAL   R14,CWAIT           WAIT FOR CTRLR IDLE      CDT29950
245E  000F               2997           DCX   000F                                         CDT29960
2460  41F0 2DEE          2998           BAL   R15,CHEDR           WRITE HEADER TO CONTROLLER CDT29970
2464  D300 18F6          2999           LB    R0,IDDC             CTRLR CMD X'41'          CDT29980
2468  C500 0006          3000           CLHI  R0,X'06'            FORMAT WRITE TO DISK ?   CDT29990
246C  2133               3001           BNES  TST7.3              BRANCH: NO.              CDT30000
246E  4000 1904          3002           STH   R0,RFMTFLG          SET FLAG.                CDT30010
2472  D200 1912          3003  TST7.3   STB   R0,RWOCMD           FOR ERROR HANDLER        CDT30020
2476  9E30               3004           OCR   DCAD,R0             COMMAND TO CONTROLLER    CDT30030
2478  DE40 18F7          3005           OC    SLAD,IDDC+1         SELCH CMD X'30'          CDT30040
247C  41E0 2CB6          3006           BAL   R14,INSERT          INSERT SELCH INTPT VECTOR: CDT30050
2480  175C               3007           DC    Z(SELCH+$VALU1),Z(IDTSW)                     CDT30060
2482  2490
2484  C8F0 2488          3008           LDAI  R15,INDT            (LOAD R15 FOR ERROR MSG) CDT30070
2488  C800 0100          3009  INDT     LHI   R0,256              TIMEOUT CONSTANT         CDT30080
248C  41E0 2A7E          3010           BAL   R14,ITMLP           WAIT FOR INTERRUPT       CDT30090

                         3012  * INTERRUPT HANDLERS                                        CDT30110

2490  E100 359E          3014  IDTSW    SVC   0,PBLK0D            TEST SELCH NOT BSY (INTPT) CDT30130
2494  D3A0 1614          3015           LB    STAT,INTSTA         SELCH STATUS AT INTERRUPT CDT30140
2498  D2A0 18F4          3016           STB   STAT,SVC2STAT       SVC6 ADJUSTS SELCH FA IF ERROR. CDT30150
249C  E110 359E          3017           SVC   1,PBLK0D            TEST SELCH STATUS AGAIN  CDT30160
24A0  41E0 2CB6          3018           BAL   R14,INSERT          DELETE SELCH             CDT30170
24A4  175C               3019           DC    Z(SELCH+$VALU1),Z(0)                         CDT30180
24A6  0000
24A8  E160 359E          3020           SVC   6,PBLK0D            TEST SELCH ADDRESS RETURNED CDT30190
24AC  41E0 2CB6          3021           BAL   R14,INSERT          INSERT CTRLR INTPT VECTOR: CDT30200
24B0  1768               3022           DC    Z(DISCON+$VALU1),Z(IDTSW2)                   CDT30210
24B2  24B8
24B4  41F0 2488          3023           BAL   R15,INDT            GO ENABLE INTPTS         CDT30220

24B8  E100 35A2          3025  IDTSW2   SVC   0,PBLK0E            TEST CTRLR STATUS = X'02' (INTPT) CDT30240
24BC  E120 35A2          3026           SVC   2,PBLK0E            (SENSE STATUS)           CDT30250
24C0  4300 2988          3027           B     REFORMAT            CHECK IF REFORMAT REQUIRED. CDT30260
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                        3029  * ********************************************************************      CDT30280
                        3030  *                                                                          CDT30290
                        3031  *       T E S T   8                                                        CDT30300
                        3032  *                                                                          CDT30310
                        3033  * PURPOSE OF TEST:                                                        CDT30320
                        3034  * TEST 8 CHECKS NORMAL-MODE READ/WRITE OPERATIONS WITH ALL POSSIBLE       CDT30330
                        3035  * BIT PATTERNS (SPIRAL DATA).                                            CDT30340
                        3036  *                                                                          CDT30350
                        3037  * ASSUMPTIONS:                                                           CDT30360
                        3038  * THE SELECTED DRIVE MUST BE ON-LINE AND NOT WRITE-PROTECTED.            CDT30370
                        3039  * THE DISK PACK USED MUST BE PROPERLY FORMATTED.                         CDT30380
                        3040  *                                                                          CDT30390
                        3041  * DESIGN SPECIFICATIONS:                                                 CDT30400
                        3042  * THE BUFFER IS FILLED WITH SPIRAL DATA. THE DATA IS WRITTEN TO          CDT30410
                        3043  * THE LOWEST VALID HEAD ADDRESS NOT DELETED BY THE 'HEADS' OPTION,       CDT30420
                        3044  * OF THE CYLINDER SPECIFIED BY 'LOCYL'. THE DATA IS THEN READ BACK      CDT30430
                        3045  * AND TESTED. THE PROCESS IS REPEATED FOR ALL HEADS NOT DELETED,         CDT30440
                        3046  * FORALL CYLINDERS THROUGH 'HICYL'.                                      CDT30450
                        3047  *                                                                          CDT30460
                        3048  * HOW TO RUN THE TEST:                                                   CDT30470
                        3049  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, HEADS,      CDT30480
                        3050  * LOCYL, AND HICYL OPTIONS, AND ENTER 'RUN'. NO MANUAL INTERVENTION      CDT30490
                        3051  * IS NECESSARY.                                                          CDT30500
                        3052  *                                                                          CDT30510
                        3053  * OPTIONS:                                                               CDT30520
                        3054  * LOOP, CONTIN, SELCH, DISCON, DRIVE, HEADS, LOCYL, HICYL, PACTYP,       CDT30530
                        3055  * RETRY, SECNUM, OUTBUF, INBUF                                          CDT30540
                        3056  *                                                                          CDT30550
                        3057  * ERRORS:                                                                CDT30560
                        3058  * 080000 - 08FFFF                                                        CDT30570

24C4   C800 2512        3060  TEST8    LDAI  R0,SPIRAL                                                CDT30590
24C8   2306              3061           BS    SWRTST                                                   CDT30600
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SYSTEM TEST SEQUENCES - TEST 9

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                        3063  * ********************************************************************   CDT30620
                        3064  *                                                                        CDT30630
                        3065  *       T E S T   9                                                      CDT30640
                        3066  *                                                                        CDT30650
                        3067  * PURPOSE OF TEST:                                                       CDT30660
                        3068  * TEST 9 CHECKS NORMAL-MODE READ/WRITE OPERATIONS WITH A USER-SPECIFIED  CDT30670
                        3069  * WORST-CASE DATA PATTERN.                                               CDT30680
                        3070  *                                                                        CDT30690
                        3071  * ASSUMPTIONS:                                                           CDT30700
                        3072  * THE SELECTED DISK DRIVE MUST BE ON-LINE AND NOT WRITE-PROTECTED.       CDT30710
                        3073  * THE DISK PACK USED MUST BE PROPERLY FORMATTED.                         CDT30720
                        3074  *                                                                        CDT30730
                        3075  * DESIGN SPECIFICATIONS:                                                 CDT30740
                        3076  * THE DATA BUFFER IS FILLED WITH WORST-CASE DATA, SPECIFIED BY THE       CDT30750
                        3077  * 'DATA' OPTION. THIS DATA IS WRITTEN TO THE LOWEST VALID HEAD ADDRESS   CDT30760
                        3078  * NOT DELETED BY THE 'HEADS' OPTION, OF THE CYLINDER SPECIFIED BY       CDT30770
                        3079  * 'LOCYL'. THE DATA IS THEN READ BACK AND TESTED. THE PROCESS IS         CDT30780
                        3080  * REPEATED FOR ALL HEADS NOT DELETED, FOR ALL CYLINDERS THROUGH 'HICYL'. CDT30790
                        3081  *                                                                        CDT30800
                        3082  * HOW TO RUN THE TEST:                                                   CDT30810
                        3083  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, HEADS,      CDT30820
                        3084  * LOCYL, HICYL AND DATA OPTIONS, AND ENTER 'RUN'. NO MANUAL INTERVENTION CDT30830
                        3085  * IS NECESSARY.                                                          CDT30840
                        3086  *                                                                        CDT30850
                        3087  * OPTIONS:                                                               CDT30860
                        3088  * LOOP, CONTIN, SELCH, DISCON, DRIVE, HEADS, LOCYL, HICYL, DATA,         CDT30870
                        3089  * PACTYP, RETRY, SECNUM, OUTBUF, INBUF                                   CDT30880
                        3090  *                                                                        CDT30890
                        3091  * ERRORS:                                                                CDT30900
                        3092  * 090000 - 09FFFF                                                        CDT30910


24CA  C800 2518         3094  TEST9   LDAI  R0,WORCAS                                                CDT30930
24CE  2303              3095          BS    SWRTST                                                     CDT30940
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SYSTEM TEST SEQUENCES - TEST A

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                        3097  * ********************************************************************      CDT30960
                        3098  *                                                                          CDT30970
                        3099  *        T E S T   A                                                       CDT30980
                        3100  *                                                                          CDT30990
                        3101  * PURPOSE OF TEST:                                                        CDT31000
                        3102  * TEST A CHECKS NORMAL-MODE READ/WRITE OPERATIONS WITH A PSEUDO-          CDT31010
                        3103  * RANDOM DATA PATTERN.                                                    CDT31020
                        3104  *                                                                          CDT31030
                        3105  * ASSUMPTIONS:                                                           CDT31040
                        3106  * THE SELECTED DRIVE MUST BE ON-LINE AND NOT WRITE-PROTECTED.            CDT31050
                        3107  * THE DISK PACK USED MUST BE PROPERLY FORMATTED.                         CDT31060
                        3108  *                                                                          CDT31070
                        3109  * DESIGN SPECIFICATIONS:                                                 CDT31080
                        3110  * THE DATA BUFFER IS FILLED WITH PSEUDO-RANDOM DATA, GENERATED BY        CDT31090
                        3111  * A FIBONACCI SEQUENCE. THIS DATA IS WRITTEN TO THE LOWEST VALID         CDT31100
                        3112  * HEAD ADDRESS NOT DELETED BY THE 'HEADS' OPTION, OF THE CYLINDER        CDT31110
                        3113  * SPECIFIED BY THE 'LOCYL' OPTION. THE DATA IS READ BACK AND TESTED.     CDT31120
                        3114  * THE PROCESS IS REPEATED FOR ALL HEADS NOT DELETED, FOR ALL             CDT31130
                        3115  * CYLINDERS THROUGH 'HICYL'.                                            CDT31140
                        3116  *                                                                          CDT31150
                        3117  * HOW TO RUN THE TEST:                                                   CDT31160
                        3118  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, HEADS,      CDT31170
                        3119  * LOCYL, AND HICYL OPTIONS, AND ENTER 'RUN'. NO MANUAL INTERVENTION      CDT31180
                        3120  * IS NECESSARY.                                                          CDT31190
                        3121  *                                                                          CDT31200
                        3122  * OPTIONS:                                                               CDT31210
                        3123  * LOOP, CONTIN, SELCH, DISCON, DRIVE, HEADS, LOCYL, HICYL, PACTYP,       CDT31220
                        3124  * RETRY, SECNUM, OUTBUF, INBUF                                          CDT31230
                        3125  *                                                                          CDT31240
                        3126  * ERRORS:                                                                CDT31250
                        3127  * 0A0000 - 0AFFFF                                                        CDT31260


24D0  C800 251E         3129  TESTA    LDAI  R0,RANDA1                                                CDT31280
                        3130  *---------------------------------COMMON PROCESS STARTS HERE             CDT31290
24D4  4000 194E         3131  SWRTST   STA   R0,SW1SAV+4-ADC     SET 'SWITCH'                        CDT31300
24D8  41F0 1FAE         3132           BAL   R15,MODINIT                                              CDT31310
24DC  0002              3133           DCX   0002               WILL NOT ABORT ON ERRORS            CDT31320
24DE  41F0 2E04         3134           BAL   R15,XFERSIZL       SET UP 'SIZE'                       CDT31330
24E2  C800 0201         3135           LHI   R0,X'0201'         NORMAL READ/WRITE CMDS              CDT31340
24E6  4000 18E6         3136           STH   R0,WCMD                                                  CDT31350
24EA  48B0 1720         3137           LH    TRACK,LOCYL+$VALU1 GET LOW TRACK                       CDT31360
24EE  C800 2542         3138  SWRSEK   LDAI  R0,RCLDON                                               CDT31370
24F2  4000 1966         3139           STA   R0,RERN+4-ADC      RERUN ADRS FOR SEEK ERRORS          CDT31380
24F6  41F0 30A2         3140           BAL   R15,ILLADD         CHECK FOR INVALID CYLINDERS         CDT31390
24FA  2542              3141           DAC   RCLDON             BYPASS DESTINATION                  CDT31400
24FC  41F0 2AA4         3142           BAL   R15,SKSR            SEEK CYLINDER                       CDT31410
2500  41F0 2BBA         3143           BAL   R15,FIRSTHD        GET 1ST NON-DELETED HEAD            CDT31420
2504  250A              3144           DAC   HADV1              CONTINUATION VECTOR                 CDT31430
2506  4300 1D60         3145           B     ERROR16            INVALID 'HEADS' OPTION              CDT31440
250A  24D0              3146  HADV1    LIS   SECT,0                                                 CDT31450
250C  4800 194E         3147  SWRSW1   LDA   R0,SW1SAV+4-ADC     LOAD TRANSFER ADDRESS;              CDT31460
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2510  0300            3148          BR    R0                TRANSFER.                          CDT31470


2512  41F0 2EB6       3150  SPIRAL  BAL   R15,SPIFILL       FILL BUFFER WITH SPIRAL DATA       CDT31490
2516  2306            3151          BS    RANDA3                                               CDT31500

2518  41F0 2ECA       3153  WORCAS  BAL   R15,WCASFILL      FILL BUFFER WITH WORST-CASE DATA   CDT31520
251C  2303            3154          BS    RANDA3                                               CDT31530

251E  41F0 2EDE       3156  RANDA1  BAL   R15,RANDFILL      FILL BUFFER WITH RANDOM DATA       CDT31550

2522  C800 2536       3158  RANDA3  LDAI  R0,RANDA4                                           CDT31570
2526  4000 1966       3159          STA   R0,RERN+4-ADC     RERUN ADRS FOR READ/WRITE ERRORS   CDT31580
252A  41F0 2FDE       3160          BAL   R15,WRIT          WRITE                              CDT31590
252E  41F0 2FBE       3161          BAL   R15,READ          READ BACK                          CDT31600
2532  41F0 2F44       3162          BAL   R15,TDATA         TEST DATA READ                     CDT31610
2536  41F0 2B94       3163  RANDA4  BAL   R15,NEWSEC        GET NEXT SECTOR NUMBER             CDT31620
253A  250C            3164          DAC   SWRSW1           CONTINUATION BRANCH                CDT31630
253C  41F0 2BAA       3165          BAL   R15,NEWHEAD       GET NEXT HEAD NUMBER               CDT31640
2540  250A            3166          DAC   HADV1            CONTINUATION                       CDT31650
2542  41F0 2BCE       3167  RCLDON  BAL   R15,NEWCYL        GET NEXT CYLINDER                  CDT31660
2546  24EE            3168          DAC   SWRSEK           CONTINUATION                       CDT31670
2548  4300 0D16       3169          B     TSTEND           EXIT.                              CDT31680
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                        3171  * ************************************************************      CDT31700
                        3172  *                                                                  CDT31710
                        3173  *       T E S T   B                                                CDT31720
                        3174  *                                                                  CDT31730
                        3175  * PURPOSE OF TEST:                                                 CDT31740
                        3176  * TEST B CHECKS THOSE STATUS BITS WHICH CANNOT BE TESTED WITHOUT    CDT31750
                        3177  * MANUAL INTERVENTION                                              CDT31760
                        3178  *                                                                  CDT31770
                        3179  * ASSUMPTIONS:                                                     CDT31780
                        3180  * THE SELECTED DISK DRIVE MUST BE ON-LINE.                         CDT31790
                        3181  *                                                                  CDT31800
                        3182  * DESIGN SPECIFICATIONS:                                           CDT31810
                        3183  * THIS TEST CHECKS DRIVE AND CONTROLLER STATUS FOLLOWING OPERATOR   CDT31820
                        3184  * RESPONSE TO PRINTED MESSAGES. IF THE PROPER STATUS IS NOT RETURNED CDT31830
                        3185  * BEFORE TIME-OUT, AB ERROR IS LOGGED, AND THE TEST ADVANCES TO    CDT31840
                        3186  * THE NEXT SEQUENCE.                                               CDT31850
                        3187  *                                                                  CDT31860
                        3188  * HOW TO RUN THE TEST:                                             CDT31870
                        3189  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, AND DRIVE    CDT31880
                        3190  * OPTIONS, AND ENTER 'RUN'. FOLLOW DIRECTIONS DISPLAYED ON         CDT31890
                        3191  * THE CONSOLE DEVICE. IF THE DISK DRIVE IS NOT EQUIPPED WITH A     CDT31900
                        3192  * 'PROTECT' SWITCH, DEPRESS BREAK TO EXIT THE TEST.                CDT31910
                        3193  *                                                                  CDT31920
                        3194  * OPTIONS:                                                         CDT31930
                        3195  * LOOP, CONTIN, DISCON, DRIVE, RETRY                               CDT31940
                        3196  *                                                                  CDT31950
                        3197  * ERRORS:                                                          CDT31960
                        3198  * 0B0000 - 0BFFFF                                                  CDT31970

254C  41F0 1FAE         3200  TESTB    BAL   R15,MODINIT                                        CDT31990
2550  0140               3201           DCX   0140              DOES NOT WRITE TO DISK           CDT32000
                        3202  *                                ANY VALID SECNUM.                CDT32010
2552  4050 1612          3203           STH   FUT,ERRDEV        FOR ERROR PRINTOUT               CDT32020
2556  4120 25A4          3204           BAL   R2,STATWAIT       LOG MSG, WAIT FOR EVENT          CDT32030
255A  1A4D               3205           DC    Z(MSG07)          'SET DRIVE OFF-LINE'             CDT32040
255C  00A6               3206           DCX   00A6              OPKEY                            CDT32050
255E  8001               3207           DCX   8001              OFFLINE, TRUE                    CDT32060
2560  E130 35A6          3208           SVC   3,PBLK0F          TEST DRIVE STATUS = X'09'        CDT32070
                        3209  *                                                                  CDT32080
2564  4120 25A4          3210           BAL   R2,STATWAIT       LOG MSG, WAIT FOR EVENT          CDT32090
2568  1A60               3211           DC    Z(MSG09)          'SET DRIVE ON-LINE'              CDT32100
256A  0000               3212           DCX   0000              OPKEY                            CDT32110
256C  0001               3213           DCX   0001              OFFLINE, FALSE                   CDT32120
256E  E130 357E          3214           SVC   3,PBLK04          TEST DRIVE STATUS = X'00'        CDT32130
                        3215  *                                                                  CDT32140
2572  4120 25A4          3216           BAL   R2,STATWAIT       LOG MSG, WAIT FOR EVENT          CDT32150
2576  1A88               3217           DC    Z(MSG12)          'SET WRITE-PROTECT ON'           CDT32160
2578  00A1               3218           DCX   00A1              OPKEY                            CDT32170
257A  8080               3219           DCX   8080              WRTPRT, TRUE                     CDT32180
257C  E130 35BA          3220           SVC   3,PBLK18          TEST DRIVE STATUS = X'80'        CDT32190
                        3221  *                                                                  CDT32200
2580  4120 25A4          3222           BAL   R2,STATWAIT       LOG MSG, WAIT FOR EVENT          CDT32210
2584  1A72               3223           DC    Z(MSG10)          'SET WRITE-PROTECT OFF'          CDT32220
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SYSTEM TEST SEQUENCES - TEST B

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2586  0000           3224          DCX   0000              OPKEY                                    CDT32230
2588  0080           3225          DCX   0080              WRTPRT, FALSE                            CDT32240
258A  E130 357A      3226          SVC   3,PBLK03          TEST DRIVE NOT WRITE-PROTECTED           CDT32250
                     3227  *                                                                        CDT32260
258E  9D5A           3228          SSR   FUT,STAT                                                   CDT32270
2590  2318           3229          BFFS  1,TSTB.0          BRANCH: DRIVE ON-LINE AGAIN.             CDT32280
2592  4120 25A4      3230          BAL   R2,STATWAIT       LOG MSG, WAIT FOR EVENT                  CDT32290
2596  1A60           3231          DC    Z(MSG09)          'SET DRIVE ON-LINE'                      CDT32300
2598  0000           3232          DCX   0000              OPKEY                                    CDT32310
259A  0001           3233          DCX   0001              OFFLINE, FALSE                           CDT32320
259C  E130 357E      3234          SVC   3,PBLK04          TEST DRIVE STATUS = X'00' OR X'80'       CDT32330
25A0  4300 0D16      3235  TSTB.0  B     TSTEND            TO EXEC                                  CDT32340


25A4  41F0 1334      3237  STATWAIT BAL  R15,SETKB         SELECT CONSOLE FOR OUTPUT                CDT32360
25A8  4812 0000      3238          LH    R1,0(R2)          MESSAGE ADDRESS                          CDT32370
25AC  E151 0000      3239          SVC   5,0(R1)           LOG MESSAGE                              CDT32380
25B0  41F0 133E      3240          BAL   R15,SETLST        RESTORE USER-SELECTED I/O                CDT32390
25B4  48C2 0002      3241          LH    OPKEY,2(R2)       SPECIFIED OPKEY                          CDT32400
25B8  40C0 1914      3242          STH   OPKEY,OPCODE      FOR ERROR MESSAGE                        CDT32410
25BC  C870 7FFF      3243          LHI   WK1,X'7FFF'       DELAY COUNT                              CDT32420
25C0  41E0 2D9C      3244  STATW1  BAL   R14,MILSEC                                                 CDT32430
25C4  41F0 125C      3245          BAL   R15,TSTBRK                                                 CDT32440
25C8  DE30 18E9      3246          OC    DCAD,RESET                                                 CDT32450
25CC  9D5A           3247          SSR   FUT,STAT          GET DRIVE STATUS                         CDT32460
25CE  44A2 0004      3248          NH    STAT,4(R2)        'AND' WITH MASK                          CDT32470
25D2  2339           3249          BZS   STATW3            BRANCH: BIT(S) NOT SET                   CDT32480
                     3250  *                                                                        CDT32490
25D4  4802 0004      3251          LH    R0,4(R2)          TRUE OR FALSE EXPECTED ?                 CDT32500
25D8  2119           3252          BMS   STATW4            BRANCH: GOT DESIRED FALSE                CDT32510
25DA  2671           3253          AIS   WK1,1             DOUBLE TIMEOUT                           CDT32520
25DC  41E0 2D9C      3254          BAL   R14,MILSEC        DELAY AGAIN...                           CDT32530
25E0  4300 25C0      3255  STATW2  B     STATW1            AND WAIT FOR FALSE STATUS.               CDT32540
                     3256  *                                                                        CDT32550
25E4  4802 0004      3257  STATW3  LH    R0,4(R2)          TRUE OR FALSE EXPECTED ?                 CDT32560
25E8  2014           3258          BMS   STATW2            BRANCH: WAIT FOR TRUE                    CDT32570
25EA  4302 0006      3259  STATW4  B     6(R2)             RETURN                                   CDT32580
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SYSTEM TEST SEQUENCES - TEST C

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                        3261  * ****************************************************************      CDT32600
                        3262  *                                                                       CDT32610
                        3263  *       T E S T   C                                                     CDT32620
                        3264  *                                                                       CDT32630
                        3265  * PURPOSE OF TEST:                                                      CDT32640
                        3266  * TEST C CHECKS OVERLAPPING SEEK FUNCTIONS, QUEUEING OF SEEK            CDT32650
                        3267  * INTERRUPTS, AND MULTIPLE-SECTOR NORMAL-MODE DATA TRANSFERS            CDT32660
                        3268  * USING TWO DRIVES SELECTED BY THE DRIVE AND XFILE OPTIONS.             CDT32670
                        3269  *                                                                       CDT32680
                        3270  * ASSUMPTIONS:                                                          CDT32690
                        3271  * TWO DRIVES OF THE SAME TYPE MUST BE ATTACHED TO THE DISK              CDT32700
                        3272  * CONTROLLER. BOTH DRIVES MUST BE ON-LINE, AND NOT WRITE-               CDT32710
                        3273  * PROTECTED. BOTH DISK PACKS MUST BE PROPERLY FORMATTED ON              CDT32720
                        3274  * THE CYLINDER SPECIFIED BY 'LOCYL'. THE DRIVE AND XFILE               CDT32730
                        3275  * OPTIONS MUST NOT BE EQUAL TO ONE ANOTHER, OR REFER TO FILES           CDT32740
                        3276  * WITHIN THE SAME PHYSICAL DRIVE UNIT.                                  CDT32750
                        3277  *                                                                       CDT32760
                        3278  * DESIGN SPECIFICATIONS:                                               CDT32770
                        3279  * BOTH DRIVES ARE RESTORED, THEN XFILE IS INTERRUPT-SEEKED TO THE       CDT32780
                        3280  * MAXIMUM VALID CYLINDER ADDRESS, AND DRIVE IS INTERRUPT-SEEKED TO      CDT32790
                        3281  * CYLINDER 1. WHEN DRIVE INTERRUPTS, THE STATUS IS CHECKED, AND THE     CDT32800
                        3282  * PROGRAM WAITS FOR XFILE TO INTERRUPT. WHEN XFILE INTERRUPTS,         CDT32810
                        3283  * XFILE IS SEEKED TO LOCYL. THE WRITE BUFFER IS THEN FILLED WITH       CDT32820
                        3284  * RANDOM DATA, WHICH IS WRITTEN/READ/CHECKED ON LOCYL OF DRIVE,        CDT32830
                        3285  * THEN XFILE. THIS LAST SEQUENCE IS REPEATED X'100' TIMES.             CDT32840
                        3286  *                                                                       CDT32850
                        3287  * HOW TO RUN THE TEST:                                                 CDT32860
                        3288  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE,AND        CDT32870
                        3289  * XFILE OPTIONS, AND ENTER 'RUN'. NO MANUAL INTERVENTION IS            CDT32880
                        3290  * REQUIRED.                                                            CDT32890
                        3291  *                                                                       CDT32900
                        3292  * OPTIONS:                                                             CDT32910
                        3293  * LOOP, CONTIN, SELCH, DISCON, DRIVE, XFILE, PACTYP, RETRY, SECNUM,    CDT32920
                        3294  * SECTOR, LOCYL, INBUF, OUTBUF                                         CDT32930
                        3295  *                                                                       CDT32940
                        3296  * ERRORS:                                                              CDT32950
                        3297  * 0C0000 - 0CFFFF                                                      CDT32960

25EE  41F0 1FAE         3299  TESTC    BAL   R15,MODINIT                                            CDT32980
25F2  00C8              3300           DCX   00C8              XFILE TO BE USED, TSECT,              CDT32990
                        3301  *                                ANY VALID SECNUM.                     CDT33000
25F4  41F0 2AC4         3302           BAL   R15,RESTORE       RESTORE DRIVE                         CDT33010
25F8  4850 192A         3303           LH    FUT,SECFILAD                                            CDT33020
25FC  4050 1910         3304           STH   FUT,STATE         'STATE' = SECONDARY DRIVE             CDT33030
2600  41F0 2AC4         3305           BAL   R15,RESTORE       RESTORE XFILE                         CDT33040
2604  48B0 18FC         3306           LH    TRACK,MAXCYL                                            CDT33050
2608  27B1              3307           SIS   TRACK,1                                                 CDT33060
260A  41F0 2A98         3308           BAL   R15,SETCYL                                             CDT33070
260E  41F0 2B14         3309           BAL   R15,PANLWRIT                                           CDT33080
2612  4120 307C         3310           BAL   R2,SETCODE                                             CDT33090
2616  0020              3311           DCX   0020              =SEEK OPERATION                       CDT33100
2618  DE50 18EC         3312           OC    FUT,ISKCMD        INTPT SEEK XFILE MAXCYL-1             CDT33110
261C  41E0 2D5E         3313           BAL   R14,CWAIT         WAIT FOR CONTROLLER IDLE              CDT33120
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2620  000F            3314          DCX   000F                                    CDT33130
2622  24B1            3315          LIS   TRACK,1            CYLINDER 1         CDT33140
2624  4850 1928       3316          LH    FUT,FUTADRS                             CDT33150
2628  4050 1910       3317          STH   FUT,STATE                               CDT33160
262C  41F0 2A98       3318          BAL   R15,SETCYL                              CDT33170
2630  DE50 18EC       3319          OC    FUT,ISKCMD          INTPT SEEK DRIVE CYL 1 CDT33180
2634  41E0 2CB6       3320          BAL   R14,INSERT          INSERT DRIVE INTERRUPT VECTOR CDT33190
2638  1928            3321          DC    Z(FUTADRS),Z(MDINT1)                    CDT33200
263A  2640
263C  41E0 2A52       3322          BAL   R14,INTSK2          WAIT FOR INTERRUPT CDT33210


                      3324  * SEEK INTERRUPT HANDLER FOR DRIVE                    CDT33230
2640  E100 357E       3325  MDINT1  SVC   0,PBLK04            TEST DRIVE STATUS = X'00' (INTPT) CDT33240
2644  E130 357E       3326          SVC   3,PBLK04            TEST AGAIN (SENSE STATUS) CDT33250
2648  C800 00B4       3327          LHI   R0,180                                  CDT33260
264C  41F0 0F82       3328          BAL   R15,TIMER           KEEP XFILE INTERRUPT QUEUED CDT33270
2650  41E0 2CB6       3329          BAL   R14,INSERT          DELETE DRIVE INTERRUPT VECTOR: CDT33280
2654  1928            3330          DC    Z(FUTADRS),Z(0)                         CDT33290
2656  0000
2658  41E0 2CB6       3331          BAL   R14,INSERT          INSERT XFILE VECTOR: CDT33300
265C  192A            3332          DC    Z(SECFILAD),Z(MDINT2)                   CDT33310
265E  266C
2660  4850 192A       3333          LH    FUT,SECFILAD                            CDT33320
2664  4050 1910       3334          STH   FUT,STATE           'STATE' = SECONDARY DRIVE CDT33330
2668  41E0 2A52       3335          BAL   R14,INTSK2          WAIT FOR INTERRUPT.  CDT33340


                      3337  * SEEK INTERRUPT HANDLER FOR XFILE                    CDT33360
266C  E100 357E       3338  MDINT2  SVC   0,PBLK04            TEST XFILE STATUS = X'00' (INTPT) CDT33370
2670  E130 357E       3339          SVC   3,PBLK04            TEST AGAIN (SENSE STATUS) CDT33380
2674  41E0 2CB6       3340          BAL   R14,INSERT          DELETE XFILE INTPT VECTOR: CDT33390
2678  192A            3341          DC    Z(SECFILAD),Z(0)                        CDT33400
267A  0000


                      3343  * MULTIDISK DATA TRANSFERS START HERE                 CDT33420
267C  C800 0201       3344          LHI   R0,X'0201'                              CDT33430
2680  4000 18E6       3345          STH   R0,WCMD                                 CDT33440
2684  0200            3346          NOPR                      ***MODIFY FOR LONGER DELAY*** CDT33450
2686  4000 1926       3347          STH   R0,COUNTER          FOR X'0100' COMPLETE OPERATIONS CDT33460
268A  4850 1928       3348  MDDATA  LH    FUT,FUTADRS         MAIN DRIVE         CDT33470
268E  2401            3349          LIS   R0,1                                    CDT33480
2690  4400 1926       3350          NH    R0,COUNTER          EVEN PHASE ?       CDT33490
2694  2133            3351          BNZS  MDDAT.0             BRANCH: YES.       CDT33500
2696  4850 192A       3352          LH    FUT,SECFILAD        SECONDARY DRIVE    CDT33510
269A  4050 1910       3353  MDDAT.0 STH   FUT,STATE           DRIVE IN USE       CDT33520
269E  4190 2AF4       3354          BAL   WK3,TSECT           GET HEAD, SECTOR, CYLINDER CDT33530
26A2  080D            3355          LDAR  R0,SECT                                 CDT33540
26A4  4A00 17BC       3356          AH    R0,SECNUM+$VALU1    COMPUTE ENDING SECTOR CDT33550
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26A8   4B00 18F8          3357            SH    R0,MAXSEC           .                              CDT33560
26AC   2325               3358            BNPS  MDDAT.1             BRANCH: ALL ON ONE TRACK       CDT33570
26AE   4810 1922          3359            LH    R1,HEAD             STARTING ON HEAD 0 ?           CDT33580
26B2   4230 1D00          3360            BNZ   ERROR1              BRANCH: INVALID SECNUM OPTION  CDT33590
26B6   41F0 2E04          3361  MDDAT.1   BAL   R15,XFERSIZL         GET 'SIZE'                     CDT33600
26BA   41F0 2EDE          3362            BAL   R15,RANDFILL         FILL BUFFER WITH RANDOM DATA   CDT33610
26BE   4810 1836          3363            LH    R1,WTFADR+2                                        CDT33620
26C2   4800 1610          3364            LH    R0,MOD32            16-BIT MACHINE ?               CDT33630
26C6   2333               3365            BZS   MDDAT.2             BRANCH: YES.                   CDT33640
26C8   5810               3366            DC    X'5810',Z(WTFADR)   * L R1,WTFADR                  CDT33650
26CA   1834
26CC   4051 0000          3367  MDDAT.2   STH   FUT,0(R1)           INSERT DRIVE IDENTIFIER        CDT33660
26D0   41F0 2FDE          3368            BAL   R15,WRIT            WRITE                          CDT33670
26D4   41F0 2FBE          3369            BAL   R15,READ            READ                           CDT33680
26D8   41F0 2F44          3370            BAL   R15,TDATA           TEST.                          CDT33690
26DC   41F0 2BDA          3371            BAL   R15,CNTDOWN         CONTINUE, OR EXIT              CDT33700
26E0   268A               3372            DAC   MDDATA              CONTINUATION VECTOR            CDT33710
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                        3374  * ********************************************************************  CDT33730
                        3375  *                                                                      CDT33740
                        3376  *       T E S T   D                                                    CDT33750
                        3377  *                                                                      CDT33760
                        3378  * PURPOSE OF TEST:                                                     CDT33770
                        3379  * TEST D CHECKS NORMAL-MODE READ/WRITE OPERATIONS WITH A WORST-CASE    CDT33780
                        3380  * DATA PATTERN SELECTED BY THE USER. ONE OR TWO SECTORS, SPECIFIED     CDT33790
                        3381  * BY THE SECTOR, LOCYL, AND BUFSIZ OPTIONS, ARE TESTED.               CDT33800
                        3382  *                                                                      CDT33810
                        3383  * ASSUMPTIONS:                                                        CDT33820
                        3384  * THE SELECTED DRIVE MUST BE ON-LINE AND NOT WRITE-PROTECTED.         CDT33830
                        3385  * THE DISK PACK USED MUST BE PROPERLY FORMATTED.                      CDT33840
                        3386  *                                                                      CDT33850
                        3387  * DESIGN SPECIFICATIONS:                                              CDT33860
                        3388  * THE DATA BUFFER IS FILLED WITH WORST-CASE DATA, SPECIFIED BY THE    CDT33870
                        3389  * 'DATA' OPTION. THE DATA IS WRITTEN TO THE SPECIFIED SECTOR(S),      CDT33880
                        3390  * READ BACK, AND TESTED, ACCORDING TO THE 'SCOPE' OPTION SELECTED.    CDT33890
                        3391  * THE TEST TERMINATES AFTER 1500 ITERATIONS, OR WHEN THE BREAK        CDT33900
                        3392  * KEY IS DEPRESSED.                                                  CDT33910
                        3393  * SELECTING THE LAST SECTOR IN THE CYLINDER WITH 'BUFSIZ' = 1         CDT33920
                        3394  * CAUSES A CYLINDER OVERFLOW ERROR PRINTOUT. THIS ALLOWS A           CDT33930
                        3395  * TEST OF THAT FUNCTION WITHIN A SCOPE LOOP.                         CDT33940
                        3396  *                                                                      CDT33950
                        3397  * HOW TO RUN THE TEST:                                               CDT33960
                        3398  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, LOCYL,   CDT33970
                        3399  * SECTOR, BUFSIZ, AND SCOPE OPTIONS, AND ENTER 'RUN'. NO MANUAL       CDT33980
                        3400  * INTERVENTION IS REQUIRED.                                          CDT33990
                        3401  *                                                                      CDT34000
                        3402  * OPTIONS:                                                           CDT34010
                        3403  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, RETRY, LOCYL, SECTOR,  CDT34020
                        3404  * BUFSIZ, SCOPE, BYCKAD, INBUF, OUTBUF                               CDT34030
                        3405  *                                                                      CDT34040
                        3406  * ERRORS:                                                            CDT34050
                        3407  * 0D0000 - 0DFFFF                                                    CDT34060

26E2  41F0 1FAE         3409  TESTD   BAL   R15,MODINIT                                           CDT34080
26E6  02C2              3410          DCX   02C2              NO ABORT; TSECT; ANY SECTOR          CDT34090
                        3411  *                               ANY VALID SECNUM.                    CDT34100
26E8  C800 0201         3412          LHI   R0,X'0201'        NORMAL MODE COMMANDS                 CDT34110
26EC  4000 18E6         3413          STH   R0,WCMD                                                CDT34120
26F0  C800 00FF         3414          LHI   R0,LRECL-1        SET SIZE TO 256                      CDT34130
26F4  4880 17B0         3415          LH    WK2,BUFSIZ+$VALU1 CHECK SIZE OPTION                    CDT34140
26F8  2333              3416          BZS   TSTD.1                                                 CDT34150
26FA  C800 01FF         3417          LHI   R0,2*LRECL-1      OPTION = 1                           CDT34160
26FE  4000 192C         3418  TSTD.1  STH   R0,SIZE           STORE BYTE COUNT                     CDT34170
2702  41F0 2ECA         3419          BAL   R15,WCASFILL      FILL BUFFER WITH WORST-CASE DATA     CDT34180


                        3421  * ---------------------------------- SCOPE LOOP STARTS HERE           CDT34200
2706  C800 2716         3422  SCOP    LDAI  R0,SCOP2                                               CDT34210
270A  4000 1966         3423          STA   R0,RERN+4-ADC                                          CDT34220
270E  C800 05DC         3424          LHI   R0,1500                                                CDT34230
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SYSTEM TEST SEQUENCES - TEST D

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2712   4000 1926          3425          STH   R0,COUNTER                                          CDT34240
2716   4800 17A4          3426  SCOP2   LH    R0,SCOPE+SVALU1     1 = READ; 2 = WRITE             CDT34250
                          3427  *                                 0 = WRITE/READ; 3 = WRITE/READ/TEST CDT34260
271A   233E               3428          BZS   SCOP3                                               CDT34270
271C   2702               3429          SIS   R0,2                                                CDT34280
271E   211E               3430          BMS   SCOP4               BRANCH: SCOPE = 1               CDT34290
2720   2338               3431          BZS   SCOP6               BRANCH: SCOPE = 2               CDT34300
2722   41F0 2FDE          3432          BAL   R15,WRIT            SCOPE = 3                       CDT34310
2726   41F0 2FBE          3433          BAL   R15,READ                                            CDT34320
272A   41F0 2F44          3434          BAL   R15,TDATA                                           CDT34330
272E   2308               3435          BS    SCOP5                                               CDT34340
2730   41F0 2FDE          3436  SCOP6   BAL   R15,WRIT                                           CDT34350
2734   2305               3437          BS    SCOP5                                               CDT34360
2736   41F0 2FDE          3438  SCOP3   BAL   R15,WRIT                                           CDT34370
273A   41F0 2FBE          3439  SCOP4   BAL   R15,READ                                           CDT34380
273E   41F0 2BDA          3440  SCOP5   BAL   R15,CNTDOWN         CONTINUE, OR EXIT               CDT34390
2742   2716               3441          DAC   SCOP2               CONTINUATION VECTOR             CDT34400
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                        3443  * ************************************************************      CDT34420
                        3444  *                                                                  CDT34430
                        3445  *       T E S T   E                                                CDT34440
                        3446  *                                                                  CDT34450
                        3447  * PURPOSE OF TEST:                                                 CDT34460
                        3448  * TEST E CHECKS FORMAT-MODE READ/WRITE OPERATIONS WITH A WORST-CASE CDT34470
                        3449  * DATA PATTERN SELECTED BY THE USER. ONE OR TWO SECTORS, SPECIFIED CDT34480
                        3450  * BY THE SECTOR, LOCYL, AND BUFSIZ OPTIONS, ARE TESTED.            CDT34490
                        3451  *                                                                  CDT34500
                        3452  * ASSUMPTIONS:                                                     CDT34510
                        3453  * THE SELECTED DRIVE MUST BE ON-LINE AND NOT WRITE-PROTECTED.      CDT34520
                        3454  * IF SCOPE = 1, THE DISK PACK USED MUST BE PROPERLY FORMATTED.     CDT34530
                        3455  * THE CONTROLLER MUST BE IN THE FORMAT MODE.                       CDT34540
                        3456  *                                                                  CDT34550
                        3457  * DESIGN SPECIFICATIONS:                                           CDT34560
                        3458  * THE DATA BUFFER IS FILLED WITH THE CORRECT HEADER AND GAP        CDT34570
                        3459  * INFORMATION, AND WORST-CASE DATA SPECIFIED BY THE 'DATA' OPTION. CDT34580
                        3460  * THE DEF SEC (DEF TRK) AND WRT PROT BITS ARE RESET. THE DATA IS   CDT34590
                        3461  * WRITTEN TO THE SPECIFIED SECTOR(S), READ BACK, AND/OR TESTED,    CDT34600
                        3462  * ACCORDING TO THE SCOPE OPTION SELECTED. THE TEST TERMINATES AFTER CDT34610
                        3463  * 1500 ITERATIONS, OR WHEN THE BREAK KEY IS DEPRESSED.             CDT34620
                        3464  * SELECTING THE LAST SECTOR IN THE CYLINDER WITH 'BUFSIZ' = 1      CDT34630
                        3465  * RESULTS IN A CYLINDER OVERFLOW ERROR MESSAGE BEING PRINTED.      CDT34640
                        3466  *                                                                  CDT34650
                        3467  * HOW TO RUN THE TEST:                                            CDT34660
                        3468  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, LOCYL,CDT34670
                        3469  * SECTOR, BUFSIZ, AND SCOPE OPTIONS, AND ENTER 'RUN'. NO MANUAL    CDT34680
                        3470  * INTERVENTION IS REQUIRED.                                        CDT34690
                        3471  *                                                                  CDT34700
                        3472  * OPTIONS:                                                        CDT34710
                        3473  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, RETRY, LOCYL, SECTOR,CDT34720
                        3474  * BUFSIZ, SCOPE, INBUF, OUTBUF                                    CDT34730
                        3475  *                                                                  CDT34740
                        3476  * ERRORS:                                                         CDT34750
                        3477  * 0E0000 - 0EFFFF                                                 CDT34760

2744  41F0 1FAE         3479  TESTE    BAL   R15,MODINIT                                       CDT34780
2748  02C3              3480           DCX   02C3              EVALUATE; NO ABORT; TSECT        CDT34790
                        3481  *                                ANY SECTOR; ANY VALID SECNUM.    CDT34800
274A  4800 18FA         3482           LH    R0,PRECL          1 SECTOR SIZE                    CDT34810
274E  4810 17B0         3483           LH    R1,BUFSIZ+$VALU1                                   CDT34820
2752  2332              3484           BZS   TSTE.1                                             CDT34830
2754  0A00              3485           AAR   R0,R0             2 SECTOR SIZE                    CDT34840
2756  2701              3486  TSTE.1   SIS   R0,1                                               CDT34850
2758  4000 192C         3487           STH   R0,SIZE           SET TRANSFER SIZE                CDT34860
275C  2611              3488           AIS   R1,1              SECTOR COUNT                     CDT34870
275E  41F0 29FE         3489           BAL   R15,FMSUDFA       SET UP SECTOR BUFFER(S)          CDT34880
2762  41F0 2DC6         3490           BAL   R15,HEADER        LOAD R1                          CDT34890
2766  4800 190A         3491           LH    R0,LRCC                                            CDT34900
276A  4820 18FA         3492           LH    R2,PRECL                                           CDT34910
276E  CA12 FFFE         3493           AHI   R1,-2(R2)                                          CDT34920
2772  4001 0000         3494           STH   R0,0(R1)          CALCULATED LRCC                  CDT34930
2776  0A21              3495           AAR   R2,R1                                              CDT34940
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SYSTEM TEST SEQUENCES - TEST E

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2778   4002 0000          3496           STH   R0,0(R2)            LRCC FOR SECOND SECTOR          CDT34950
277C   D360 1738          3497           LB    WK0,SECTOR+$VALU1   SPECIFIED HEAD                 CDT34960
2780   C80D 0001          3498           LHI   R0,1(SECT)                                          CDT34970
2784   4500 18F8          3499           CLH   R0,MAXSEC           AT LAST SECTOR IN TRACK ?       CDT34980
2788   2183               3500           BLS   TSTE.2              BRANCH: NO.                     CDT34990
278A   2400               3501           LIS   R0,0                                                CDT35000
278C   2661               3502           AIS   WK0,1                                               CDT35010
278E   9165               3503  TSTE.2   SLLS  WK0,5              POSITION HEAD BIT               CDT35020
2790   066D               3504           OAR   WK0,SECT                                            CDT35030
2792   9466               3505           EXBR  WK0,WK0                                             CDT35040
2794   92B6               3506           STBR  TRACK,WK0                                           CDT35050
2796   4061 0002          3507           STH   WK0,2(R1)           HEADER FOR SECOND SECTOR        CDT35060
                          3508  *                                                                  CDT35070
279A   C800 0605          3509           LHI   R0,X'0605'          FORMAT READ/WRITE CMDS          CDT35080
279E   4000 18E6          3510           STH   R0,WCMD                                             CDT35090
27A2   4300 2706          3511           B     SCOP                                                CDT35100
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                        3513  * ***************************************************************      CDT35120
                        3514  *                                                                      CDT35130
                        3515  *       T E S T   F                                                    CDT35140
                        3516  *                                                                      CDT35150
                        3517  * PURPOSE OF TEST:                                                     CDT35160
                        3518  * TEST F FORMATS A SINGLE SECTOR WITH THE DEF SEC (DEF TRK) BIT        CDT35170
                        3519  * SET IN THE SECTOR HEADER, THEN CHECKS NORMAL-MODE READ/WRITE        CDT35180
                        3520  * OPERATIONS ON THE SAME SECTOR.                                       CDT35190
                        3521  *                                                                      CDT35200
                        3522  * ASSUMPTIONS:                                                        CDT35210
                        3523  * THE SELECTED DRIVE MUST BE ON-LINE AND NOT WRITE-PROTECTED.         CDT35220
                        3524  * SCOPE = 1 OR SCOPE = 3 ARE INVALID OPTIONS. THE CONTROLLER MUST     CDT35230
                        3525  * BE IN THE FORMAT MODE.                                              CDT35240
                        3526  *                                                                      CDT35250
                        3527  * DESIGN SPECIFICATIONS:                                              CDT35260
                        3528  * THE DATA BUFFER IS FILLED WITH CORRECT HEADER AND GAP INFORMATION,   CDT35270
                        3529  * AND WORST-CASE DATA SPECIFIED BY THE 'DATA' OPTION. THE DEF SEC     CDT35280
                        3530  * (DEF TRK) BIT IS SET, AND THE WRT PROT BIS IS RESET. THE DATA IS    CDT35290
                        3531  * WRITTEN TO THE SPECIFIED SECTOR IN THE FORMAT MODE, THEN ATTEMPTS   CDT35300
                        3532  * ARE MADE TO WRITE AND/OR READ THE SECTOR IN NORMAL MODE,            CDT35310
                        3533  * ACCORDING TO THE 'SCOPE' OPTION SELECTED. DEF SEC (DEF TRK)         CDT35320
                        3534  * STATUS IS EXPECTED FOR ALL NORMAL-MODE TRANSFER ATTEMPTS.           CDT35330
                        3535  * THE TEST TERMINATES AFTER 1500 ITERATIONS, OR WHEN THE BREAK        CDT35340
                        3536  * KEY IS DEPRESSED.                                                   CDT35350
                        3537  *                                                                      CDT35360
                        3538  * HOW TO RUN THE TEST:                                                CDT35370
                        3539  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, LOCYL,   CDT35380
                        3540  * SECTOR, AND SCOPE OPTIONS, AND ENTER 'RUN'. NO MANUAL               CDT35390
                        3541  * INTERVENTION IS REQUIRED.                                           CDT35400
                        3542  *                                                                      CDT35410
                        3543  * OPTIONS:                                                            CDT35420
                        3544  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, RETRY, LOCYL, SECTOR,   CDT35430
                        3545  * SCOPE, INBUF, OUTBUF                                               CDT35440
                        3546  *                                                                      CDT35450
                        3547  * ERRORS:                                                             CDT35460
                        3548  * 0F0000 - 0FFFFF                                                     CDT35470

27A6  41F0 1FAE         3550  TESTF   BAL   R15,MODINIT                                            CDT35490
27AA  02D3              3551          DCX   02D3              NO ABORT; ANY SECTOR; EVALUATE;       CDT35500
                        3552  *                               SCOPE 1,3 INVALID; TSECT;           CDT35510
                        3553  *                               ANY VALID SECNUM.                   CDT35520
27AC  C800 358A         3554          LDAI  R0,PBLK08         TO TEST CTRLR STATUS = X'2E'        CDT35530
27B0  4000 196A         3555          STA   R0,RXERFL+4-ADC                                       CDT35540
27B4  41F0 29FC         3556          BAL   R15,FMSUDF                                            CDT35550
27B8  41F0 2DC6         3557          BAL   R15,HEADER        SET UP GOOD HEADER                  CDT35560
27BC  C80D 0040         3558          LHI   R0,X'40'(SECT)    DEF SEC (DEF TRK) BIT               CDT35570
27C0  D201 0000         3559          STB   R0,0(R1)          SET BIT IN HEADER                   CDT35580


                        3561  * ------------------------ COMMON PROCESS STARTS HERE                 CDT35600
                        3562  *                                                                      CDT35610
27C4  C800 2820         3563  SCOPX   LDAI  R0,SCOP5X                                             CDT35620
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27C8   4000 1966          3564           STA   R0,RERN+4-ADC       RERUN ADDRESS                      CDT35630
27CC   C800 05DC          3565           LHI   R0,1500             LOOP COUNT                         CDT35640
27D0   4000 1926          3566           STH   R0,COUNTER                                               CDT35650
27D4   C800 0601          3567  SCOPXA   LHI   R0,X'0601'          FORMAT WRITE/NORMAL READ           CDT35660
27D8   4000 18E6          3568           STH   R0,WCMD                                                  CDT35670
27DC   4800 18FA          3569           LH    R0,PRECL                                                 CDT35680
27E0   2701               3570           SIS   R0,1                TRANSFER LENGTH                    CDT35690
27E2   4000 192C          3571           STH   R0,SIZE                                                  CDT35700
27E6   41F0 2FDE          3572           BAL   R15,WRIT            WRITE 'FAULTY' SECTOR              CDT35710
                          3573  *                                                                      CDT35720
27EA   4120 307C          3574           BAL   R2,SETCODE                                               CDT35730
27EE   0090               3575           DCX   0090                =TESTING CTRLR ERROR STATUS        CDT35740
27F0   C800 0201          3576           LHI   R0,X'0201'          NORMAL MODE READ/WRITE             CDT35750
27F4   4000 18E6          3577           STH   R0,WCMD                                                  CDT35760
27F8   C800 00FF          3578           LHI   R0,LRECL-1          TRANSFER SIZE                      CDT35770
27FC   4000 192C          3579           STH   R0,SIZE                                                  CDT35780
2800   4800 196A          3580           LDA   R0,RXERFL+4-ADC                                          CDT35790
2804   4000 196E          3581           STA   R0,ERRFLG+4-ADC     ERROR CHECK PBLKNN ADRS            CDT35800
2808   4800 1634          3582           LH    R0,BTESTNO                                               CDT35810
280C   C500 0010          3583           CLHI  R0,X'10'            TEST 10 ?                          CDT35820
2810   2336               3584           BES   SCOP3X              BRANCH: YES. BYPASS WRITE.         CDT35830
2812   41F0 2FEC          3585           BAL   R15,WRITX           ATTEMPT NORMAL WRITE               CDT35840
2816   4800 17A4          3586           LH    R0,SCOPE+$VALU1                                          CDT35850
281A   2133               3587           BNZS  SCOP5X                                                   CDT35860
281C   41F0 2FCC          3588  SCOP3X   BAL   R15,READX           ATTEMPT NORMAL READ                CDT35870
2820   41F0 2BDA          3589  SCOP5X   BAL   R15,CNTDOWN         CONTINUE OR EXIT                   CDT35880
2824   27D4               3590           DAC   SCOPXA              CONTINUATION VECTOR                CDT35890
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                        3592  * ****************************************************************      CDT35910
                        3593  *                                                                      CDT35920
                        3594  *       T E S T   1 0                                                  CDT35930
                        3595  *                                                                      CDT35940
                        3596  * PURPOSE OF TEST:                                                     CDT35950
                        3597  * TEST 10 FORMATS A SINGLE SECTOR WITH AN INCORRECT NORMAL-MODE LRCC    CDT35960
                        3598  * CHECKWORD, THEN CHECKS NORMAL-MODE READ OPERATIONS ON THE SAME       CDT35970
                        3599  * SECTOR.                                                              CDT35980
                        3600  *                                                                      CDT35990
                        3601  * ASSUMPTIONS:                                                         CDT36000
                        3602  * THE SELECTED DRIVE MUST BE ON-LINE AND NOT WRITE-PROTECTED.          CDT36010
                        3603  * SCOPE = 1 OR SCOPE = 3 ARE INVALID OPTIONS. THE CONTROLLER           CDT36020
                        3604  * MUST BE IN THE FORMAT MODE.                                          CDT36030
                        3605  *                                                                      CDT36040
                        3606  * DESIGN SPECIFICATIONS:                                               CDT36050
                        3607  * THE DATA BUFFER IS FILLED WITH CORRECT HEADER AND GAP INFORMATION,   CDT36060
                        3608  * AND WORST-CASE DATA SPECIFIED BY THE 'DATA' OPTION. THE NORMAL-      CDT36070
                        3609  * MODE LRCC CHECKWORD IS FORCED INCORRECT. THE DATA IS WRITTEN TO      CDT36080
                        3610  * THE SPECIFIED SECTOR IN THE FORMAT MODE, THEN ATTEMPTS ARE MADE      CDT36090
                        3611  * TO WRITE AND/OR READ THE SECTOR IN NORMAL MODE, ACCORDING TO THE     CDT36100
                        3612  * SCOPE OPTION ENTERED. DATA TRANSFER ERROR IS EXPECTED FOR ALL        CDT36110
                        3613  * NORMAL-MODE READ ATTEMPTS. THE TEST TERMINATES AFTER 1500            CDT36120
                        3614  * ITERATIONS, OR WHEN THE BREAK KEY IS DEPRESSED.                      CDT36130
                        3615  *                                                                      CDT36140
                        3616  * HOW TO RUN THE TEST:                                                 CDT36150
                        3617  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, LOCYL,    CDT36160
                        3618  * SECTOR, AND SCOPE OPTION, AND ENTER 'RUN'. NO MANUAL INTERVENTION    CDT36170
                        3619  * IS REQUIRED.                                                         CDT36180
                        3620  *                                                                      CDT36190
                        3621  * OPTIONS:                                                             CDT36200
                        3622  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, RETRY, LOCYL, SECTOR,    CDT36210
                        3623  * SCOPE, INBUF, OUTBUF                                                 CDT36220
                        3624  *                                                                      CDT36230
                        3625  * ERRORS:                                                              CDT36240
                        3626  * 100000 - 10FFFF                                                      CDT36250

2826  41F0 1FAE         3628  TEST10  BAL   R15,MODINIT                                            CDT36270
282A  02D3              3629          DCX   02D3              NO ABORT; EVALUATE; ANY SECTOR;      CDT36280
                        3630  *                               SCOPE 1,3 INVALID; TSECT             CDT36290
                        3631  *                               ANY VALID SECNUM.                    CDT36300
282C  C800 358E         3632          LDAI  R0,PBLK09         TO TEST CTRLR STATUS = X'03'         CDT36310
2830  4000 196A         3633          STA   R0,RXERFL+4-ADC                                        CDT36320
2834  41F0 29FC         3634          BAL   R15,FMSUDF                                             CDT36330
2838  41F0 2DC6         3635          BAL   R15,HEADER        ESTABLISH GOOD HEADER                CDT36340
283C  2712              3636          SIS   R1,2                                                   CDT36350
283E  4A10 18FA         3637          AH    R1,PRECL                                               CDT36360
2842  4800 190A         3638          LH    R0,LRCC           COMPUTED CHECKSUM                    CDT36370
2846  C700 F0F0         3639          XHI   R0,X'F0F0'        FORCE INCORRECT                      CDT36380
284A  4001 0000         3640          STH   R0,0(R1)          LRCC                                 CDT36390
284E  4300 27C4         3641          B     SCOPX                                                  CDT36400
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                        3643  * ****************************************************************      CDT36420
                        3644  *                                                                       CDT36430
                        3645  *       T E S T   1 1                                                   CDT36440
                        3646  *                                                                       CDT36450
                        3647  * PURPOSE OF TEST:                                                      CDT36460
                        3648  * TEST 11 FORMATS A SINGLE SECTOR WITH AN INCORRECT CYLINDER ADDRESS     CDT36470
                        3649  * IN THE SECTOR HEADER, THEN CHECKS NORMAL-MODE READ/WRITE OPERATIONS    CDT36480
                        3650  * ON THE SAME SECTOR                                                    CDT36490
                        3651  *                                                                       CDT36500
                        3652  * ASSUMPTIONS:                                                          CDT36510
                        3653  * THE SELECTED DRIVE MUST BE ON-LINE AND NOT WRITE-PROTECTED.           CDT36520
                        3654  * SCOPE = 1 OR SCOPE = 3 ARE INVALID OPTIONS. THE CONTROLLER MUST       CDT36530
                        3655  * BE IN THE FORMAT MODE.                                                CDT36540
                        3656  *                                                                       CDT36550
                        3657  * DESIGN SPECIFICATIONS:                                                CDT36560
                        3658  * THE DATA BUFFER IS FILLED WITH CORRECT HEADER AND GAP INFORMATION,     CDT36570
                        3659  * AND WORST-CASE DATA SPECIFIED BY THE 'DATA' OPTION. THE CYLINDER       CDT36580
                        3660  * ADDRESS DATA IS FORCED INCORRECT, AND THE DATA IS WRITTEN TO THE       CDT36590
                        3661  * SPECIFIED SECTOR IN THE FORMAT MODE. ATTEMPTS ARE THEN MADE TO        CDT36600
                        3662  * WRITE AND/OR READ THE SECTOR IN NORMAL MODE, ACCORDING TO THE         CDT36610
                        3663  * SCOPE OPTION ENTERED. HEADER COMPARE FAILURE (ADDRESS COMPARE         CDT36620
                        3664  * FAIL) IS EXPECTED FOR ALL NORMAL-MODE TRANSFER ATTEMPTS. THE         CDT36630
                        3665  * TEST TERMINATES AFTER 1500 ITERATIONS, OR WHEN THE BREAK KEY          CDT36640
                        3666  * IS DEPRESSED.                                                        CDT36650
                        3667  *                                                                       CDT36660
                        3668  * HOW TO RUN THE TEST:                                                  CDT36670
                        3669  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, LOCYL,     CDT36680
                        3670  * SECTOR, AND SCOPE OPTIONS, AND ENTER 'RUN'. NO MANUAL INTERVENTION    CDT36690
                        3671  * IS REQUIRED.                                                          CDT36700
                        3672  *                                                                       CDT36710
                        3673  * OPTIONS:                                                              CDT36720
                        3674  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, RETRY, LOCYL, SECTOR,     CDT36730
                        3675  * SCOPE, INBUF, OUTBUF                                                  CDT36740
                        3676  *                                                                       CDT36750
                        3677  * ERRORS:                                                               CDT36760
                        3678  * 110000 - 11FFFF                                                       CDT36770

2852  41F0 1FAE         3680  TEST11   BAL   R15,MODINIT                                            CDT36790
2856  02D3              3681           DCX   02D3              NO ABORT; EVALUATE; ANY SECTOR;       CDT36800
                        3682  *                                SCOPE 1,3 INVALID; TSECT              CDT36810
                        3683  *                                ANY VALID SECNUM                      CDT36820
2858  C800 3592         3684           LDAI  R0,PBLK0A         TO TEST CTRLR STATUS = X'4E'          CDT36830
285C  4000 196A         3685           STA   R0,RXERFL+4-ADC                                         CDT36840
2860  41F0 29FC         3686           BAL   R15,FMSUDF                                              CDT36850
2864  48B0 18FC         3687           LH    TRACK,MAXCYL                                            CDT36860
2868  41F0 2DC6         3688           BAL   R15,HEADER        SET INVALID CYL ADRS IN HEADER        CDT36870
286C  48B0 1720         3689           LH    TRACK,LOCYL+SVALU1 CORRECT CYLINDER                     CDT36880
2870  4300 27C4         3690           B     SCOPX                                                   CDT36890
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SYSTEM TEST SEQUENCES - TEST 12

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                        3692  * ****************************************************************      CDT36910
                        3693  *                                                                       CDT36920
                        3694  *       T E S T   1 2                                                   CDT36930
                        3695  *                                                                       CDT36940
                        3696  * PURPOSE OF TEST:                                                      CDT36950
                        3697  * TEST 12 FORMATS A SINGLE SECTOR WITH AN INCORRECT HEAD ADDRESS        CDT36960
                        3698  * IN THE SECTOR HEADER, THEN CHECKS NORMAL-MODE READ/WRITE OPERATIONS   CDT36970
                        3699  * ON THE SAME SECTOR.                                                   CDT36980
                        3700  *                                                                       CDT36990
                        3701  * ASSUMPTIONS:                                                          CDT37000
                        3702  * THE SELECTED DRIVE MUST BE ON-LINE AND NOT WRITE-PROTECTED.           CDT37010
                        3703  * SCOPE = 1 OR SCOPE = 3 ARE INVALID OPTIONS. THE CONTROLLER MUST       CDT37020
                        3704  * BE IN THE FORMAT MODE.                                                CDT37030
                        3705  *                                                                       CDT37040
                        3706  * DESIGN SPECIFICATIONS:                                                CDT37050
                        3707  * THE DATA BUFFER IS FILLED WITH CORRECT HEADER AND GAP INFORMATION,    CDT37060
                        3708  * AND WORST-CASE DATA SPECIFIED BY THE 'DATA' OPTION. THE HEAD ADDRESS  CDT37070
                        3709  * DATA IS FORCED INCORRECT, AND THE DATA IS WRITTEN TO THE SPECIFIED     CDT37080
                        3710  * SECTOR IN THE FORMAT MODE. ATTEMPTS ARE THEN MADE TO WRITE AND/OR     CDT37090
                        3711  * READ THE SECTOR IN NORMAL MODE, ACCORDING TO THE SCOPE OPTION         CDT37100
                        3712  * ENTERED. HEADER COMPARE FAILURE (ADDRESS COMPARE FAIL) IS EXPECTED    CDT37110
                        3713  * FOR ALL NORMAL-MODE TRANSFER ATTEMPTS. THE TEST TERMINATES AFTER      CDT37120
                        3714  * 1500 ITERATIONS, OR WHEN THE BREAK KEY IS DEPRESSED.                  CDT37130
                        3715  *                                                                       CDT37140
                        3716  * HOW TO RUN THE TEST:                                                  CDT37150
                        3717  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, LOCYL,     CDT37160
                        3718  * SECTOR, AND SCOPE OPTIONS, AND ENTER 'RUN'. NO MANUAL INTERVENTION    CDT37170
                        3719  * IS REQUIRED.                                                          CDT37180
                        3720  *                                                                       CDT37190
                        3721  * OPTIONS:                                                              CDT37200
                        3722  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, RETRY, LOCYL, SECTOR,     CDT37210
                        3723  * SCOPE, INBUF, OUTBUF                                                 CDT37220
                        3724  *                                                                       CDT37230
                        3725  * ERRORS:                                                               CDT37240
                        3726  * 120000 - 12FFFF                                                       CDT37250

2874  41F0 1FAE         3728  TEST12  BAL   R15,MODINIT       SCOPE 1,3 INVALID; TSECT;             CDT37270
2878  02D3              3729          DCX   02D3              NO ABORT; EVALUATE; ANY SECTOR;       CDT37280
                        3730  *                               ANY VALID SECNUM.                     CDT37290
287A  C800 3592         3731          LDAI  R0,PBLK0A         TO TEST CTRLR STATUS = X'4E'          CDT37300
287E  4000 196A         3732          STA   R0,RXERFL+4-ADC                                         CDT37310
2882  41F0 29FC         3733          BAL   R15,FMSUDF                                              CDT37320
2886  2401              3734          LIS   R0,1                                                    CDT37330
2888  4700 1922         3735          XH    R0,HEAD                                                 CDT37340
288C  4000 1922         3736          STH   R0,HEAD           FORCE INCORRECT                       CDT37350
2890  41F0 2DC6         3737          BAL   R15,HEADER        SET WRONG HEAD ADRS IN HEADER         CDT37360
2894  D300 1738         3738          LB    R0,SECTOR+$VALU1                                        CDT37370
2898  4000 1922         3739          STH   R0,HEAD           CORRECT HEAD                          CDT37380
289C  4300 27C4         3740          B     SCOPX                                                   CDT37390
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SYSTEM TEST SEQUENCES - TEST 13

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                        3742  * ****************************************************************      CDT37410
                        3743  *                                                                       CDT37420
                        3744  *       T E S T   1 3                                                   CDT37430
                        3745  *                                                                       CDT37440
                        3746  * PURPOSE OF TEST:                                                      CDT37450
                        3747  * TEST 13 PERFORMS A READ-CHECK ON THE SECTOR SPECIFIED BY THE          CDT37460
                        3748  * SECTOR AND LOCYL OPTIONS.                                            CDT37470
                        3749  *                                                                       CDT37480
                        3750  * ASSUMPTIONS:                                                         CDT37490
                        3751  * THE SELECTED DRIVE MUST BE ON-LINE.                                   CDT37500
                        3752  * THE DISK PACK USED MUST BE PROPERLY FORMATTED.                        CDT37510
                        3753  * THE 'BYCKAD' OPTION *MUST* BE ZERO (0).                              CDT37520
                        3754  *                                                                       CDT37530
                        3755  * DESIGN SPECIFICATIONS:                                               CDT37540
                        3756  * THE HEADS ARE SEEKED TO THE CYLINDER SPECIFIED BY THE LOCYL          CDT37550
                        3757  * OPTION. THE SECTOR ON THE HEAD AND SECTOR OSPECIFIED BY THE SECTOR    CDT37560
                        3758  * OPTION IS READ-CHECKED. THE TEST TERMINATES AFTER 1500 READ-CHECK     CDT37570
                        3759  * OPERATIONS HAVE BEEN PERFORMED.                                      CDT37580
                        3760  *                                                                       CDT37590
                        3761  * HOW TO RUN THE TEST:                                                 CDT37600
                        3762  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, LOCYL,     CDT37610
                        3763  * AND SECTOR OPTIONS, AND ENTER 'RUN'. NO MANUAL INTERVENTION IS        CDT37620
                        3764  * REQUIRED.                                                            CDT37630
                        3765  *                                                                       CDT37640
                        3766  * OPTIONS:                                                             CDT37650
                        3767  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, RETRY, LOCYL, SECTOR     CDT37660
                        3768  *                                                                       CDT37670
                        3769  * ERRORS:                                                              CDT37680
                        3770  * 130000 - 13FFFF                                                      CDT37690

28A0  41F0 1FAE         3772  TEST13   BAL   R15,MODINIT                                            CDT37710
28A4  03C2              3773           DCX   03C2              NO ABORT; TSECT; DOESN'T WRITE DISC.  CDT37720
                        3774  *                               ANY SECTOR; ANY VALID SECNUM.         CDT37730
28A6  C800 28BA         3775           LDAI  R0,TST13.1        RERUN ADDRESS                         CDT37740
28AA  4000 1966         3776           STA   R0,RERN+4-ADC                                           CDT37750
28AE  C800 05DC         3777           LHI   R0,1500                                                 CDT37760
28B2  4000 1926         3778           STH   R0,COUNTER                                              CDT37770
28B6  41F0 2B38         3779  TST13.0  BAL   R15,CKADSRX       DO READ-CHECK                         CDT37780
28BA  41F0 2BDA         3780  TST13.1  BAL   R15,CNTDOWN       CONTINUE, OR EXIT.                    CDT37790
28BE  28B6              3781           DAC   TST13.0           CONTINUATION VECTOR                   CDT37800
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SYSTEM TEST SEQUENCES - TEST 14

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                        3783  * ********************************************************************  CDT37820
                        3784  *                                                                     CDT37830
                        3785  *       T E S T   1 4                                                 CDT37840
                        3786  *                                                                     CDT37850
                        3787  * PURPOSE OF TEST:                                                    CDT37860
                        3788  * TEST 14 PERFORMS A CHECK OF THE SEEK-RESTORE OPERATION BY           CDT37870
                        3789  * SEEKING TO A SELECTED CYLINDER AFTER A RESTORE, OR BY SEEKING      CDT37880
                        3790  * BETWEEN SELECTED CYLINDERS.                                        CDT37890
                        3791  *                                                                     CDT37900
                        3792  * ASSUMPTIONS:                                                       CDT37910
                        3793  * THE SELECTED DRIVE MUST BE ON-LINE.                                CDT37920
                        3794  * THE DISK PACK MUST BE PROPERLY FORMATTED IF BYCKAD = 0.            CDT37930
                        3795  *                                                                     CDT37940
                        3796  * DESIGN SPECIFICATIONS:                                             CDT37950
                        3797  * A SEEK IS MADE TO LOCYL. IF SEEK = 1, A SEEK IS THEN MADE TO       CDT37960
                        3798  * HICYL; ELSE, IF SEEK = 0, THE HEADS ARE RESTORED. A READ-CHECK IS  CDT37970
                        3799  * MADE ON THE HEAD AND SECTOR SPECIFIED BY THE 'SECTOR' OPTION       CDT37980
                        3800  * FOLLOWING EACH SEEK OR RESTORE, UNLESS BYCKAD = 1.                 CDT37990
                        3801  * THE TEST TERMINATES AFTER 512 OPERATIONS IF SEEK = 0               CDT38000
                        3802  * (2048 OPERATIONS IF SEEK = 1), OR WHEN THE BREAK KEY IS DEPRESSED. CDT38010
                        3803  *                                                                     CDT38020
                        3804  * HOW TO RUN THE TEST:                                               CDT38030
                        3805  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, LOCYL,  CDT38040
                        3806  * HICYL, SECTOR, SEEK, AND BYCKAD OPTIONS, AND ENTER 'RUN'.          CDT38050
                        3807  * NO MANUAL INTERVENTION IS REQUIRED.                                CDT38060
                        3808  *                                                                     CDT38070
                        3809  * OPTIONS:                                                           CDT38080
                        3810  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, RETRY, LOCYL, HICYL,   CDT38090
                        3811  * SECTOR, SEEK, BYCKAD                                              CDT38100
                        3812  *                                                                     CDT38110
                        3813  * ERRORS:                                                            CDT38120
                        3814  * 140000 - 14FFFF                                                    CDT38130

28C0  41F0 1FAE         3816  TEST14   BAL   R15,MODINIT                                          CDT38150
28C4  0340              3817           DCX   0340              DOESN'T WRITE DISK; ANY VALID SECNUM CDT38160
28C6  C800 28FE         3818           LDAI  R0,TST14.4        ANY SECTOR.                        CDT38170
28CA  4000 1966         3819           STA   R0,RERN+4-ADC     RERUN ADDRESS                      CDT38180
28CE  C810 0800         3820           LHI   R1,2048           SEEK COUNT                         CDT38190
28D2  4800 17C8         3821           LH    R0,SEEK+$VALU1                                       CDT38200
28D6  2132              3822           BNZS  TST14.0                                              CDT38210
28D8  9012              3823           SRLS  R1,2              RESTORE COUNT                      CDT38220
28DA  4010 1926         3824  TST14.0  STH   R1,COUNTER                                          CDT38230
28DE  4190 2AF4         3825  TST14.1  BAL   WK3,TSECT         GET LOCYL, HEAD, SECTOR            CDT38240
28E2  41F0 2B32         3826           BAL   R15,CKADSR        READ-CHECK                         CDT38250
28E6  4800 17C8         3827           LH    R0,SEEK+$VALU1                                       CDT38260
28EA  2134              3828           BNZS  TST14.2                                              CDT38270
28EC  41F0 2AC4         3829           BAL   R15,RESTORE       SEEK = 0; DO RESTORE.              CDT38280
28F0  2305              3830           BS    TST14.3                                              CDT38290
28F2  48E0 172C         3831  TST14.2  LH    TRACK,HICYL+$VALU1                                   CDT38300
28F6  41F0 2AA4         3832           BAL   R15,SKSR          SEEK HICYL                         CDT38310
28FA  41F0 2B32         3833  TST14.3  BAL   R15,CKADSR        READ-CHECK                         CDT38320
28FE  41F0 2BDA         3834  TST14.4  BAL   R15,CNTDOWN       CONTINUE, OR EXIT.                 CDT38330
2902  28DE              3835           DAC   TST14.1           CONTINUATION VECTOR                CDT38340
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                        3837  * ***************************************************************      CDT38360
                        3838  *                                                                      CDT38370
                        3839  *       T E S T   1 5                                                  CDT38380
                        3840  *                                                                      CDT38390
                        3841  * PURPOSE OF TEST:                                                     CDT38400
                        3842  * TEST 15 PERFORMS A NORMAL-MODE READ OF ALL SECTORS FROM LOCYL TO      CDT38410
                        3843  * HICYL INCLUSIVELY, WITH NORMAL ERROR CHECKING.                       CDT38420
                        3844  *                                                                      CDT38430
                        3845  * ASSUMPTIONS:                                                        CDT38440
                        3846  * THE SELECTED DISK DRIVE MUST BE ON-LINE.                            CDT38450
                        3847  * THE DISK PACK USED MUST BE PROPERLY FORMATTED.                      CDT38460
                        3848  * IF 'SECNUM' IS GREATER THAN X'0017', NO HEADS MAY BE DELETED.       CDT38470
                        3849  *                                                                      CDT38480
                        3850  * DESIGN SPECIFICATIONS:                                              CDT38490
                        3851  * A SEEK IS MADE TO LOCYL, AND THE FIRST NON-DELETED HEAD IS SELECTED. CDT38500
                        3852  * (SECNUM+1) SECTORS ARE READ, WITH NORMAL ERROR CHECKING.            CDT38510
                        3853  * ALL SECTORS ARE READ FOR CYLINDERS (LOCYL:HICYL), FOR ALL NON-      CDT38520
                        3854  * DELETED HEADS. DATA ON THE DISK IS NOT DESTROYED. AUTOMATIC         CDT38530
                        3855  * RE-READ IS NOT PERFORMED; NO DISTINCTION IS MADE BETWEEN 'HARD'     CDT38540
                        3856  * AND 'SOFT' READ ERRORS.                                            CDT38550
                        3857  *                                                                      CDT38560
                        3858  * IN THE CASE OF SECNUM = X'002F', THE FIRST TRANSFER BEGINS WITH     CDT38570
                        3859  * HEAD 0, SECTOR 0, AND CONTINUES THROUGH THE LAST SECTOR REQUIRED.   CDT38580
                        3860  * IF CYLINDER OVERFLOW IS EXPECTED, THAT STATUS IS TESTED FOR. EACH   CDT38590
                        3861  * SUBSEQUENT READ BEGINS ON SECTOR 0 OF THE FOLLOWING HEAD, UNTIL     CDT38600
                        3862  * READS HAVE BEEN INITIATED FOR ALL HEADS.                            CDT38610
                        3863  *                                                                      CDT38620
                        3864  * IT IS POSSIBLE TO PLACE THE READ BUFFER BELOW THE WRITE BUFFER, IF   CDT38630
                        3865  * READING LARGE BLOCKS OF DATA WITH LIMITED MEMORY CONFIGURATION.      CDT38640
                        3866  * THIS ELIMINATES THE REQUIREMENT FOR A LARGE WRITE BUFFER (USE THE    CDT38650
                        3867  * LAST HALFWORD OF MEMORY), AND THE 'INVALID OUTBUF OPTION' MESSAGE.  CDT38660
                        3868  *                                                                      CDT38670
                        3869  * HOW TO RUN THE TEST:                                               CDT38680
                        3870  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, LOCYL,    CDT38690
                        3871  * HICYL, SECNUM, AND BYCKAD OPTIONS, AND ENTER 'RUN'.                  CDT38700
                        3872  * NO MANUAL INTERVENTION IS REQUIRED.                                 CDT38710
                        3873  *                                                                      CDT38720
                        3874  * OPTIONS:                                                           CDT38730
                        3875  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, RETRY, LOCYL, HICYL,    CDT38740
                        3876  * SECNUM, INBUF, HEADS                                               CDT38750
                        3877  *                                                                      CDT38760
                        3878  * ERRORS:                                                            CDT38770
                        3879  * 150000 - 15FFFF                                                    CDT38780

2904  41F0 1FAE         3881  TEST15   BAL   R15,MODINIT                                           CDT38800
2908  0142              3882           DCX   0142              NO ABORT; LARGE SECNUM;             CDT38810
                        3883  *                                DOESN'T WRITE DISC.                 CDT38820
290A  48B0 1720         3884           LH    TRACK,LOCYL+$VALU1 (DOESN'T USE TSECT)                CDT38830
290E  41F0 2E04         3885           BAL   R15,XFERSIZL      GET 'SIZE'                          CDT38840
2912  C800 0201         3886           LHI   R0,X'0201'                                          CDT38850
2916  4000 18E6         3887           STH   R0,WCMD                                             CDT38860
291A  C800 297E         3888  TST15.1  LDAI  R0,TST15.4                                          CDT38870
291E  4000 1966         3889           STA   R0,RERN+4-ADC     RERUN ADDRESS FOR SEEK ERRORS       CDT38880
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SYSTEM TEST SEQUENCES - TEST 15

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2922  41F0 30A2          3890            BAL   R15,ILLADD                                    CDT38890
2926  297E               3891            DAC   TST15.4          BYPASS DESTINATION           CDT38900
2928  41F0 2AA4          3892            BAL   R15,SKSR          SEEK                         CDT38910
292C  41F0 2BBA          3893            BAL   R15,FIRSTHD       GET FIRST NON-DELETED HEAD   CDT38920
2930  2936               3894            DAC   TST15.1A          CONTINUATION VECTOR          CDT38930
2932  4300 1D60          3895            B     ERROR16           INVALID 'HEADS' OPTION       CDT38940
2936  C800 2972          3896  TST15.1A  LDAI  R0,TST15.3                                     CDT38950
293A  4000 1966          3897            STA   R0,RERN+4-ADC     RERUN ADDRESS FOR READ ERRORS CDT38960
293E  24D0               3898            LIS   SECT,0                                        CDT38970
2940  4120 307C          3899  TST15.2   BAL   R2,SETCODE                                    CDT38980
2944  0070               3900            DCX   0070              =READ OPERATION              CDT38990
                         3901  * COMPUTE SECTORS LEFT ON CYLINDER                            CDT39000
2946  2400               3902            LIS   R0,0              ACCUMULATE SECTOR COUNT:     CDT39010
2948  4810 1922          3903            LH    R1,HEAD           CURRENT HEAD                 CDT39020
294C  4510 18FE          3904  TST15.2A  CLH   R1,MAXHEAD        LAST HEAD ACCOUNTED FOR ?    CDT39030
2950  2385               3905            BNLS  TST15.2B          BRANCH: YES.                 CDT39040
2952  4A00 18F8          3906            AH    R0,MAXSEC         INCLUDE ANOTHER TRACK OF SECTORS CDT39050
2956  2611               3907            AIS   R1,1              INCREMENT HEAD COUNT         CDT39060
2958  2206               3908            BS    TST15.2A                                      CDT39070
295A  0B0D               3909  TST15.2B  SAR   R0,SECT           SUBTRACT SECTORS DONE, CURRENT TRACK CDT39080
295C  2701               3910            SIS   R0,1              ADJUST FOR SECNUM CONVENTION CDT39090
295E  C810 35A2          3911            LDAI  R1,PBLK0E         TO TEST CTRLR STATUS = X'02' CDT39100
2962  4500 17BC          3912            CLH   R0,SECNUM+$VALU1  WILL CYL OVERFLOW OCCUR ?    CDT39110
2966  2382               3913            BNLS  TST15.2C          BRANCH: NO.                  CDT39120
2968  2718               3914            SIS   R1,PBLK0E-PBLK0C  TO TEST CTRLR STATUS = X'1E' CDT39130
296A  4010 196E          3915  TST15.2C  STA   R1,ERRFLG+4-ADC   PBLKNN ADDRESS              CDT39140
296E  41F0 2FCC          3916            BAL   R15,READX         PERFORM READ, TEST STATUS    CDT39150
2972  41F0 2B94          3917  TST15.3   BAL   R15,NEWSEC        GET NEXT SECTOR NUMBER       CDT39160
2976  2940               3918            DAC   TST15.2           CONTINUATION VECTOR          CDT39170
2978  41F0 2BAA          3919            BAL   R15,NEWHEAD       GET NEXT HEAD NUMBER         CDT39180
297C  2936               3920            DAC   TST15.1A          CONTINUATION VECTOR          CDT39190
297E  41F0 2BCE          3921  TST15.4   BAL   R15,NEWCYL        GET NEXT CYLINDER NUMBER     CDT39200
2982  291A               3922            DAC   TST15.1           CONTINUATION VECTOR          CDT39210
2984  4300 0D16          3923            B     TSTEND            EXIT.                        CDT39220
```

SYSTEM TEST SEQUENCES - TEST 16

```
                        3925  * ************************************************************          CDT39240
                        3926  *                                                                      CDT39250
                        3927  *       T E S T   1 6                                                  CDT39260
                        3928  *                                                                      CDT39270
                        3929  * PURPOSE OF TEST:                                                     CDT39280
                        3930  * TEST 16 PERFORMS A SIMPLE GO/NO GO FORMATTING OPERATION ON THE       CDT39290
                        3931  * TRACK SPECIFIED BY THE 'LOCYL' AND 'SECTOR' OPTIONS.                 CDT39300
                        3932  * TEST 16 SHOULD BE RUN WHEN A TEST WRITING IN FORMAT MODE             CDT39310
                        3933  * HAS BEEN RUN, TO PRESERVE THE FORMAT OF THE DISC.                    CDT39320
                        3934  *                                                                      CDT39330
                        3935  * ASSUMPTIONS:                                                         CDT39340
                        3936  * THE SELECTED DISK DRIVE MUST BE ON-LINE. THE CONTROLLER MUST         CDT39350
                        3937  * BE IN THE FORMAT MODE. THE DRIVE MUST NOT BE WRITE-PROTECTED.        CDT39360
                        3938  *                                                                      CDT39370
                        3939  * DESIGN SPECIFICATIONS:                                               CDT39380
                        3940  * THE HEADS ARE SEEKED TO LOCYL; THE HEAD SPECIFIED BY THE 'SECTOR'    CDT39390
                        3941  * OPTION IS SELECTED. PROPER FORMAT IS WRITTEN TO EACH SECTOR ON       CDT39400
                        3942  * THE TRACK, AND EACH SECTOR IS READ-CHECKED. A FORMAT-MODE           CDT39410
                        3943  * READ IS PERFORMED FOR EACH SECTOR, AND THE DATA IS CHECKED.          CDT39420
                        3944  * ANY ERROR CAUSES THE SECTOR TO BE FLAGGED AS DEFECTIVE.             CDT39430
                        3945  * IF THE 'FMTSEC' OPTION IS NOT ZERO, EACH SECTOR IN THE TRACK IS     CDT39440
                        3946  * FLAGGED IF ANY SECTOR IS DEFECTIVE. ANY DEFECTIVE SECTOR FLAG       CDT39450
                        3947  * IS TESTED.                                                          CDT39460
                        3948  *                                                                      CDT39470
                        3949  * HOW TO RUN THE TEST:                                                 CDT39480
                        3950  * ENTER THE APPROPRIATE VALUES FOR THE SELCH, DISCON, DRIVE, LOCYL,    CDT39490
                        3951  * SECTOR, AND HEAD OPTIONS, AND ENTER 'RUN'. NO MANUAL INTERVENTION    CDT39500
                        3952  * IS REQUIRED.                                                        CDT39510
                        3953  *                                                                      CDT39520
                        3954  * OPTIONS:                                                             CDT39530
                        3955  * LOOP, CONTIN, SELCH, DISCON, DRIVE, PACTYP, RETRY, LOCYL,           CDT39540
                        3956  * INBUF, OUTBUF, SECTOR (HEAD PORTION).                               CDT39550
                        3957  *                                                                      CDT39560
                        3958  * ERRORS:                                                              CDT39570
                        3959  * 160000 - 16FFFF                                                     CDT39580

2988  4800 1904         3961  REFORMAT LH    R0,RFMTFLG        REFORMAT REQUIRED ?                  CDT39600
298C  4330 0D16         3962           BZ    TSTEND            BRANCH: NO. EXIT TEST.               CDT39610
2990  4800 1810         3963           LH    R0,NOAUTO+$VALU1  AUTOMATIC FUNCTION OVERRIDDEN ?      CDT39620
2994  4230 0CB4         3964           BNZ   $KEEP2            BRANCH: YES. ADVANCE TO NEXT TEST.   CDT39630
2998  4800 191A         3965           LH    R0,FLAGS          LOOK AT MODULE FLAGS                 CDT39640
299C  C300 0100         3966           THI   R0,X'0100'        DOES TEST WRITE TO DISK ?            CDT39650
29A0  4230 0D16         3967           BNZ   TSTEND            BRANCH: NO. NO REFORMAT.             CDT39660
29A4  E150 1BE3         3968           SVC   5,MSG32           'ATTEMPTING REFORMAT'                CDT39670

29A8  41F0 1FAE         3970  TEST16   BAL   R15,MODINIT                                            CDT39690
29AC  80C0              3971           DCX   80C0              REFORMAT IN PROGRESS; TSECT          CDT39700
                        3972  *                               ANY VALID SECNUM.                    CDT39710
29AE  41F0 29FC         3973           BAL   R15,FMSUDF        SET UP DATA FIELD                    CDT39720
29B2  C800 29E4         3974           LDAI  R0,REF.3          RERUN ADDRESS                        CDT39730
29B6  4000 1966         3975           STA   R0,RERN+4-ADC                                          CDT39740
29BA  24D0              3976           LIS   SECT,0                                                 CDT39750
29BC  C800 0605         3977  REF.1    LHI   R0,X'0605'        FORMAT WRITE/READ CMDS               CDT39760
```

SYSTEM TEST SEQUENCES - TEST 16

```
29C0   4000 18E6          3978          STH   R0,WCMD                                  CDT39770
29C4   41F0 2DC6          3979          BAL   R15,HEADER                               CDT39780
29C8   4800 18FA          3980          LH    R0,PRECL                                 CDT39790
29CC   2701               3981          SIS   R0,1                                     CDT39800
29CE   4000 192C          3982          STH   R0,SIZE          TRANSFER SIZE           CDT39810
29D2   41F0 2FDE          3983          BAL   R15,WRIT         FORMAT WRITE            CDT39820
29D6   41F0 2B38          3984          BAL   R15,CKADSRX      READ-CHECK              CDT39830
29DA   41F0 2FBE          3985          BAL   R15,READ         FORMAT READ             CDT39840
29DE   41F0 2F44          3986          BAL   R15,TDATA        CHECK ALL DATA          CDT39850
29E2   2303               3987          BS    REF.4            CONTINUE IF NO ERRORS   CDT39860
29E4   41E0 2E1C          3988  REF.3   BAL   R14,FLAGIT       FLAG SECTOR, TEST FLAG  CDT39870
29E8   26D1               3989  REF.4   AIS   SECT,1                                   CDT39880
29EA   45D0 18F8          3990          CLH   SECT,MAXSEC      AT MAXIMUM YET ?        CDT39890
29EE   4280 29BC          3991          BL    REF.1            BRANCH: NO.             CDT39900
29F2   2400               3992          LIS   R0,0                                     CDT39910
29F4   4000 1904          3993          STH   R0,RFMTFLG       REFORMAT COMPLETE;      CDT39920
29F8   4300 0CB4          3994          B     $KEEP2           RUN ONCE ONLY.          CDT39930
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TEST SEQUENCE SUPPORT ROUTINES

```
                        3996  *        FORMAT MODE DATA FIELD SETUP                                    CDT39950
                        3997  *CALL:   LHI    WK0,DATABYTES                                           CDT39960
                        3998  *        LHI    R1,SECTORCOUNT                                          CDT39970
                        3999  *        BAL    R15,FMSUDF                                              CDT39980
                        4000  *        DOES NOT ESTABLISH ADDRESS FIELD OR LRCC.                       CDT39990
                        4001  * REGISTERS MODIFIED: R0,R1,R14,WK1,WK2,WK3                             CDT40000

      0000 29FC         4003  FMSUDF   EQU    *                                                       CDT40020
29FC  2411              4004           LIS    R1,1                FOR 1 SECTOR                        CDT40030
29FE  4860 1798         4005  FMSUDFA  LH     WK0,DATA+$VALU1     WORST-CASE DATA PATTERN             CDT40040
2A02  4870 1836         4006           LH     WK1,WTFADR+2        ASSUME 16-BIT MACHINE               CDT40050
2A06  4890 1610         4007           LH     WK3,MOD32           SERIES 32 ?                         CDT40060
2A0A  2333              4008           BZS    FMSU.1              BRANCH: NO.                         CDT40070
2A0C  5870              4009           DC     X'5870',Z(WTFADR)   * L WK1,WTFADR                      CDT40080
2A0E  1834
2A10  2711              4010  FMSU.1   SIS    R1,1                DECREMENT SECTOR COUNT              CDT40090
2A12  021F              4011           BMR    R15                 RETURN IF DONE.                     CDT40100
2A14  D300 18F1         4012           LB     R0,GAP1             GAP BYTE                            CDT40110
2A18  2482              4013           LIS    WK2,2                                                   CDT40120
2A1A  C897 0009         4014           LHI    WK3,9(WK1)          LIMIT                               CDT40130
2A1E  4007 0002         4015  FMSU.2   STH    R0,2(WK1)           STORE GAP BYTE                      CDT40140
2A22  C170 2A1E         4016           BXLE   WK1,FMSU.2                                               CDT40150
2A26  D300 18F2         4017           LB     R0,SYNC                                                 CDT40160
2A2A  4007 0000         4018           STH    R0,0(WK1)           SYNC BYTES = X'0003'                CDT40170
2A2E  2672              4019           AIS    WK1,2                                                   CDT40180
2A30  C897 0100         4020           LHI    WK3,LRECL(WK1)      NEW LIMIT                           CDT40190
2A34  4067 0000         4021  FMSU.3   STH    WK0,0(WK1)          DATA BYTES                          CDT40200
2A38  C170 2A34         4022           BXLE   WK1,FMSU.3                                              CDT40210
2A3C  4300 2A10         4023           B      FMSU.1              DO WHOLE BLOCK.                     CDT40220
                        4024  *                                   SET UP FOR 2.5,10 MB.               CDT40230
                        4025  * LENGTH=270 BYTES. +2,4,6,8 GET ZERO. +10 GETS '03'.                   CDT40240
                        4026  * +268 GETS CRC. +0 GETS SECT, +1 GETS TRACK (BYTE ONLY)                 CDT40250


                        4028  * INTERRUPT SEEK SUBROUTINE                                             CDT40270
                        4029  * CALL:  LHI    TRACK,CYLADRS                                           CDT40280
                        4030  *        BAL    R14,INTSK                                               CDT40290

2A40  40E0 1962         4032  INTSK    STA    R14,INTSKR+4-ADC    SAVE RETURN ADDRESS                 CDT40310
2A44  41F0 2A98         4033           BAL    R15,SETCYL                                              CDT40320
2A48  4120 307C         4034           BAL    R2,SETCODE                                              CDT40330
2A4C  0020              4035           DCX    0020                =SEEK OPERATION                     CDT40340
2A4E  DE50 18EC         4036           OC     FUT,ISKCMD          INTERRUPT SEEK TO CYLINDER          CDT40350
2A52  C800 0200         4037  INTSK2   LHI    R0,512                                                  CDT40360
2A56  2306              4038           BS     INTSK4                                                  CDT40370
                        4039  *                                                                       CDT40380
2A58  480E 0000         4040  INTSK3   LH     R0,0(R14)           CALLER'S SPECIAL TIME VALUE         CDT40390
2A5C  26E2              4041           AIS    R14,2                                                   CDT40400
2A5E  40E0 1962         4042           STA    R14,INTSKR+4-ADC                                        CDT40410
2A62  41E0 2A7E         4043  INTSK4   BAL    R14,ITMLP           WAIT FOR INTERRUPT                  CDT40420

                        4045  * SEEK INTERRUPT                                                        CDT40440
```

TEST SEQUENCE SUPPORT ROUTINES

```
                        4046  *                                                                    CDT40450
2A66   D3A0 1614        4047  SKINTA   LB    STAT,INTSTA          INTERRUPT STATUS                CDT40460
2A6A   48E0 1962        4048           LDA   R14,INTSKR+4-ADC     RETURN ADDRESS                  CDT40470
2A6E   C5E0 222C        4049           CLAI  R14,TST4.1                                           CDT40480
2A72   033E             4050           BER   R14                  TESTING ILLEGAL ADDRESS STATUS  CDT40490
2A74   E100 357E        4051           SVC   0,PBLK04            TEST DRIVE INTERRUPT STATUS = X'00' CDT40500
2A78   E130 357E        4052           SVC   3,PBLK04            TEST AGAIN (SENSE STATUS)       CDT40510
2A7C   030E             4053           BR    R14                                                  CDT40520


                        4055  * INTERRUPT TIMER LOOP                                               CDT40540
                        4056  *                                                                    CDT40550
       0000 2A7E        4057  ITMLP    EQU   *                                                      CDT40560
2A7E   4860 0A54        4058           LH    WK0,PSW3             ASSUME 16-BIT MACHINE           CDT40570
2A82   4880 1610        4059           LH    WK2,MOD32                                            CDT40580
2A86   2333             4060           BZS   ITML.1               BRANCH: 16-BIT MACHINE          CDT40590
2A88   7360             4061           DC    X'7360',Z(PSW3)      * LHL WK0,PSW3                  CDT40600
2A8A   0A54
2A8C   9586             4062  ITML.1   EPSR  WK2,WK0               ENABLE INTERRUPTS               CDT40610
2A8E   CF00 0004        4063           SLHA  R0,4                 INCREASE TIMEOUT FOR PRECISION  CDT40620
2A92   4120 2DAE        4064  ITML.2   BAL   R2,SMALTIME                                           CDT40630
2A96   2202             4065           BS    ITML.2               TIMEOUT GIVES ERROR TTCC40      CDT40640


                        4067  * TO WRITE CYLINDER ADDRESS TO DRIVE, SET CYLINDER                   CDT40660
                        4068  * CALL:  LHI   TRACK,CYLADRS                                         CDT40670
                        4069  *        BAL   R15,SETCYL                                            CDT40680
                        4070  *                                                                    CDT40690
2A98   40B0 1924        4071  SETCYL   STH   TRACK,CURCYL         CURRENT CYLINDER NUMBER         CDT40700
2A9C   C8C0 0010        4072           LHI   OPKEY,X'10'          SET CYLINDER OPERATION          CDT40710
2AA0   985B             4073           WHR   FUT,TRACK            CYL ADRS TO DRIVE               CDT40720
2AA2   030F             4074           BR    R15                  RETURN                          CDT40730


                        4076  * ROUTINE SEEKS HEADS TO SPECIFIED CYLINDER                          CDT40750
                        4077  * CALL:  LHI   FUT,DRIVE.ADDRESS                                     CDT40760
                        4078  *        LHI   DCAD,CONTROLLER.ADDRESS                               CDT40770
                        4079  *        LHI   TRACK,CYLINDER.ADDRESS                                CDT40780
                        4080  *        BAL   R15,SKSR                                              CDT40790
                        4081  *                                                                    CDT40800
2AA4   40F0 195E        4082  SKSR     STA   R15,SKRTN+4-ADC      SAVE RETURN                     CDT40810
2AA8   41F0 2A98        4083           BAL   R15,SETCYL           WRITE CYL ADDRESS TO DRIVE      CDT40820
2AAC   4120 307C        4084           BAL   R2,SETCODE                                           CDT40830
2AB0   0020             4085           DCX   0020                 =SEEK OPERATION                 CDT40840
2AB2   DE50 18EA        4086           OC    FUT,SEEKC            SEEK CMD TO DRIVE               CDT40850
2AB6   41F0 2CE8        4087           BAL   R15,FRSSR1          RETURN WHEN DRIVE READY         CDT40860
2ABA   E130 357E        4088           SVC   3,PBLK04            TEST DRIVE STATUS = X'00'       CDT40870
2ABE   48F0 195E        4089           LDA   R15,SKRTN+4-ADC                                      CDT40880
2AC2   030F             4090           BR    R15                  RETURN.                         CDT40890
```

TEST SEQUENCE SUPPORT ROUTINES

```
                         4092  * TO 'RESTORE' HEADS TO CYLINDER 000                                  CDT40910
      0000 2AC4          4093  RESTORE  EQU   *                                                      CDT40920
2AC4  40F0 1952          4094           STA   R15,RSRET+4-ADC                                        CDT40930
2AC8  4120 307C          4095           BAL   R2,SETCODE                                             CDT40940
2ACC  0030               4096           DCX   0030                =RESTORE OPERATION                 CDT40950
2ACE  DE50 18EB          4097           OC    FUT,RESTOC          RESTORE CMD TO DRIVE               CDT40960
2AD2  41E0 2D5E          4098           BAL   R14,CWAIT           WAIT FOR CONTROLLER IDLE           CDT40970
2AD6  000F               4099           DCX   000F                                                   CDT40980
2AD8  41E0 2D76          4100           BAL   R14,DWAIT           WAIT FOR DRIVE READY               CDT40990
2ADC  1500               4101           DCX   1500                                                   CDT41000
2ADE  24B0               4102           LIS   TRACK,0                                                CDT41010
2AE0  40B0 1924          4103           STH   TRACK,CURCYL        CURRENT CYLINDER ADRS = 0          CDT41020
2AE4  48F0 1952          4104           LDA   R15,RSRET+4-ADC                                        CDT41030
2AE8  C5F0 222C          4105           CLAI  R15,TST4.1          TESTING ILLEGAL ADDRESS ?          CDT41040
2AEC  033F               4106           BER   R15                 BRANCH: YES.                       CDT41050
2AEE  E130 357E          4107           SVC   3,PBLK04           TEST DRIVE STATUS = X'00'          CDT41060
2AF2  030F               4108           BR    R15                 RETURN                             CDT41070


                         4110  * ROUTINE SEEKS (LOCYL), LOADS REGISTER SECT AND LOCATION HEAD WITH    CDT41090
                         4111  * VALUES SPECIFIED BY 'SECTOR' OPTION.                                 CDT41100
                         4112  * CALL:   BAL  WK3,TSECT   ;OR                                        CDT41110
                         4113  *         BAL  WK3,TSECTA  (TO AVOID SEEK)                            CDT41120
                         4114  * REGISTERS MODIFIED: R0,WK0,WK1,R14,R15                              CDT41130
                         4115  *                                                                     CDT41140
2AF4  48B0 1720          4116  TSECT    LH    TRACK,LOCYL+$VALU1                                    CDT41150
2AF8  41F0 30A2          4117           BAL   R15,ILLADD          TEST CE PACK VOID AREAS            CDT41160
2AFC  1D40               4118           DAC   ERROR11                                                CDT41170
2AFE  41F0 2AA4          4119           BAL   R15,SKSR            SEEK LOCYL                         CDT41180
2B02  4860 1738          4120  TSECTA   LH    WK0,SECTOR+$VALU1   (HEAD:SECTOR)                     CDT41190
2B06  93D6               4121           LBR   SECT,WK0            GET SECTOR                         CDT41200
2B08  9068               4122           SRHLS WK0,8                                                  CDT41210
2B0A  4060 1922          4123           STH   WK0,HEAD            GET HEAD                           CDT41220
2B0E  40D0 1920          4124           STH   SECT,CURSECT        CURRENT SECTOR NUMBER              CDT41230
2B12  0309               4125           BR    WK3                 RETURN                             CDT41240


                         4127  * ROUTINE WRITES (CYLINDER-HEAD-SECTOR) TO DISPLAY PANEL               CDT41260
                         4128  * REGISTERS MODIFIED: R0,R1                                           CDT41270
                         4129  *                                                                     CDT41280
      0000 2B14          4130  PANLWRIT EQU   *                                                      CDT41290
2B14  2411               4131           LIS   R1,1                                                   CDT41300
2B16  DE10 1616          4132           OC    R1,INCR                                                CDT41310
2B1A  024F               4133           BTCR  4,R15               RETURN IF FSYNC.                   CDT41320
2B1C  DA10 1921          4134           WD    R1,CURSECT+1        SECTOR NUMBER                      CDT41330
2B20  DA10 1923          4135           WD    R1,HEAD+1           HEAD NUMBER                        CDT41340
2B24  4800 1924          4136           LH    R0,CURCYL                                              CDT41350
2B28  9400               4137           EXBR  R0,R0                                                  CDT41360
2B2A  9810               4138           WHR   R1,R0               CYLINDER NUMBER                    CDT41370
2B2C  DE10 1615          4139           OC    R1,NORM                                                CDT41380
2B30  030F               4140           BR    R15                 RETURN                             CDT41390
```

TEST SEQUENCE SUPPORT ROUTINES

```
                        4142  * ROUTINE PERFORMS READ CHECK ON CURRENT CYLINDER, HEAD, SECTOR.          CDT41410
                        4143  * NO OPERATION IF BYCKAD = 1.                                            CDT41420
                        4144  * INPUT REGISTERS:                                                       CDT41430
                        4145  *        FUT   = DRIVE ADDRESS                                           CDT41440
                        4146  *        DCAD  = CONTROLLER ADDRESS                                      CDT41450
                        4147  *        TRACK = CYLINDER ADDRESS                                        CDT41460
                        4148  *        SECT  = SECTOR ADDRESS                                          CDT41470
                        4149  * MEMORY LOCATIONS:                                                      CDT41480
                        4150  *        HEAD  = HEAD ADDRESS                                            CDT41490
                        4151  *        PACTYP = CE OR USER PACK IDENTIFIER                             CDT41500
                        4152  *                                                                        CDT41510
                        4153  * REGISTERS MODIFIED: R0,WK0,WK1,STAT,OPKEY,R14                          CDT41520
                        4154  *                                                                        CDT41530
2B32  4800 1750         4155  CKADSR   LH    R0,BYCKAD+$VALU1    BYPASS READ CHECK ?                 CDT41540
2B36  023F              4156           BNZR  R15                 BRANCH: YES.                        CDT41550
2B38  40F0 1956         4157  CKADSRX  STA   R15,RWSAVE+4-ADC                                         CDT41560
2B3C  2400              4158           LIS   R0,0                                                     CDT41570
2B3E  4000 1902         4159           STH   R0,RDER             RESET READ ERROR INDICATOR          CDT41580
2B42  41F0 2CE8         4160  CKRDX    BAL   R15,FRSSR1          RETURN WHEN DRIVE READY             CDT41590
2B46  985B              4161           WHR   FUT,TRACK           CYL ADRS TO CTRLR FOR HEADER MATCH  CDT41600
2B48  41E0 2D5E         4162           BAL   R14,CWAIT           WAIT FOR CTRLR IDLE                 CDT41610
2B4C  000F              4163           DCX   000F                                                     CDT41620
2B4E  41F0 2DEE         4164           BAL   R15,CHEDR           WRITE HEADER TO CONTRCLLER          CDT41630
2B52  4120 307C         4165           BAL   R2,SETCODE                                               CDT41640
2B56  0050              4166           DCX   0050                =READ-CHECK OPERATION               CDT41650
2B58  D300 18E8         4167           LB    R0,RCHECK                                                CDT41660
2B5C  4000 1912         4168           STH   R0,RWOCMD                                                CDT41670
2B60  9E30              4169           OCR   DCAD,R0             COMMAND READ-CHECK                  CDT41680
2B62  41E0 2D5E         4170           BAL   R14,CWAIT           WAIT FOR CONTROLLER ILLE            CDT41690
2B66  0FFF              4171           DCX   0FFF                                                     CDT41700
2B68  E120 35B2         4172           SVC   2,PBLK14            TO ERRCK AFTER ANY ERROR PRINT      CDT41710
2B6C  4800 1902         4173           LH    R0,RDER             DID IT FAIL THE FIRST READ ?        CDT41720
2B70  2333              4174           BZS   CKTL1               BRANCH: NO.                         CDT41730
2B72  E150 1B39         4175           SVC   5,MSG23             'SOFT READ ERROR'                   CDT41740
2B76  48F0 1956         4176  CKTL1    LDA   R15,RWSAVE+4-ADC                                         CDT41750
2B7A  030F              4177           BR    R15                 RETURN                              CDT41760

2B7C  4800 1902         4179  ERRCK    LH    R0,RDER             PREVIOUS ERROR                      CDT41780
2B80  2336              4180           BZS   ERRCK1              BRANCH: NO.                         CDT41790
2B82  E150 1B29         4181           SVC   5,MSG22             'HARD READ ERROR'                   CDT41800
2B86  48F0 1966         4182           LDA   R15,RERN+4-ADC      CALLER'S RERUN ADDRESS              CDT41810
2B8A  030F              4183           BR    R15                 RETURN TO CALLER.                   CDT41820
2B8C  4050 1902         4184  ERRCK1   STH   FUT,RDER            INDICATE 2ND READ CHECK             CDT41830
2B90  4300 2B42         4185           B     CKRDX               CHECK WHETHER ERROR IS RECOVERABLE  CDT41840


                        4187  * ROUTINE ADVANCES TO NEXT VALID SECTOR                                  CDT41860
                        4188  * CALL:  BAL   R15,NEWSEC                                               CDT41870
                        4189  *        DAC   CONTINUATION.VECTOR                                       CDT41880
                        4190  *                                                                        CDT41890
2B94  4AD0 17BC         4191  NEWSEC   AH    SECT,SECNUM+$VALU1                                       CDT41900
2B98  26D1              4192           AIS   SECT,1                                                   CDT41910
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TEST SEQUENCE SUPPORT ROUTINES

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2B9A  45D0 18F8          4193            CLH   SECT,MAXSEC                                          CDT41920
2B9E  4280 2BE4          4194            BL    CONTINUE                                              CDT41930
2BA2  26F3               4195  FALLTHRU  AIS   R15,ADC+ADC-1       ADVANCE PAST 'DAC' PARAMETER       CDT41940
2BA4  C4F0 FFFE          4196            NHI   R15,0-ADC                                             CDT41950
2BA8  030F               4197            BR    R15                                                   CDT41960


                         4199  * ROUTINE ADVANCES TO NEXT VALID HEAD                                 CDT41980
                         4200  * CALL:   BAL   R15,NEWHEAD                                           CDT41990
                         4201  *         DAC   CONTINUATION.VECTOR                                   CDT42000
                         4202  *                                                                     CDT42010
2BAA  4800 1922          4203  NEWHEAD   LH    R0,HEAD             GET CURRENT HEAD                  CDT42020
2BAE  2036               4204            BNZS  FALLTHRU            BRANCH: ALL DONE.                 CDT42030
2BB0  2601               4205            AIS   R0,1                SELECT HEAD 1                     CDT42040
2BB2  4000 1922          4206            STH   R0,HEAD             .                                 CDT42050
2BB6  4300 2BE4          4207            B     CONTINUE            RETURN TO CALLER                  CDT42060


                         4209  * ROUTINE FINDS FIRST NON-DELETED HEAD                                CDT42080
                         4210  * CALL:   BAL   R15,FIRSTHD                                           CDT42090
                         4211  *         DAC   CONTINUATION.VECTOR                                   CDT42100

2BBA  24E0               4213  FIRSTHD   LIS   R14,0                START WITH HEAD 0                 CDT42120
2BBC  4800 181C          4214            LH    R0,HEADSA           DELETED HEADS                     CDT42130
2BC0  2314               4215            BNMS  FIRST.1             BRANCH: HEAD 0 ALLOWED            CDT42140
2BC2  4230 2BA2          4216            BNZ   FALLTHRU            BRANCH: BOTH HEADS DELETED        CDT42150
2BC6  24E1               4217            LIS   R14,1               HEAD 1 ALLOWED                    CDT42160
2BC8  40E0 1922          4218  FIRST.1   STH   R14,HEAD             SELECT FIRST HEAD                 CDT42170
2BCC  230C               4219            BS    CONTINUE            RETURN TO CALLER                  CDT42180


                         4221  * ROUTINE ADVANCES TO NEXT CYLINDER                                   CDT42200
                         4222  * CALL:   BAL   R15,NEWCYL                                            CDT42210
                         4223  *         DAC   CONTINUATION.VECTOR                                   CDT42220
                         4224  *                                                                     CDT42230
2BCE  26B1               4225  NEWCYL    AIS   TRACK,1                                              CDT42240
2BD0  49B0 172C          4226            CH    TRACK,HICYL+$VALU1                                    CDT42250
2BD4  2328               4227            BNPS  CONTINUE                                            CDT42260
2BD6  4300 2BA2          4228            B     FALLTHRU                                              CDT42270


                         4230  * ROUTINE MAINTAINS COUNTS FOR SCOPE LOOP TESTS                       CDT42290
                         4231  * CALL:   BAL   R15,CNTDOWN                                           CDT42300
                         4232  *         DAC   CONTINUATION.VECTOR                                   CDT42310
                         4233  * REGISTERS MODIFIED: R0                                             CDT42320
                         4234  *                                                                     CDT42330
2BDA  2501               4235  CNTDOWN   LCS   R0,1                                                CDT42340
2BDC  6100 1926          4236            AHM   R0,COUNTER          DECREMENT COUNTER                 CDT42350
2BE0  4320 2988          4237            BNP   REFORMAT            CHECK IF REFORMAT REQUIRED.       CDT42360
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TEST SEQUENCE SUPPORT ROUTINES

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                         4238  *                                        WILL GO TO TSTEND.                    CDT42370
2BE4   26F1              4239  CONTINUE AIS   R15,ADC-1                                                      CDT42380
2BE6   C4F0 FFFE         4240           NHI   R15,0-ADC                 POINT TO 'DAC' PARAMETER              CDT42390
2BEA   48FF 0000         4241           LDA   R15,0(R15)                AND LOAD IT;                          CDT42400
2BEE   030F              4242           BR    R15                       CONTINUE                              CDT42410


                         4244  * ROUTINE EVALUATES TRACK FOR USE IN FORMAT-MODE TESTING.                      CDT42430
                         4245  * ALL SECTORS IN THE TRACK MUST REPORT NO ERRORS.                              CDT42440
                         4246  * CALL:  BAL   R15,TENSECT                                                     CDT42450
                         4247  *                                                                             CDT42460
       0000 2BF0         4248  TENSECT  EQU   *                                                              CDT42470
2BF0   C800 2C3A         4249           LDAI  R0,GOCHECK2                                                    CDT42480
2BF4   4000 1966         4250           STA   R0,RERN+4-ADC             RERUN ADDRESS                        CDT42490
2BF8   40F0 197A         4251           STA   R15,TEMPC+4-ADC           RETURN ADDRESS                       CDT42500
2BFC   48D0 18F8         4252           LH    SECT,MAXSEC                                                    CDT42510
2C00   27D1              4253           SIS   SECT,1                    START WITH MAX VALID LOGICAL SECTOR   CDT42520
2C02   41F0 2B38         4254  TENS.1   BAL   R15,CKADSRX               DO READ-CHECK                        CDT42530
2C06   27D1              4255           SIS   SECT,1                                                         CDT42540
2C08   2213              4256           BNMS  TENS.1                                                         CDT42550
                         4257  *                                                                             CDT42560
2C0A   2405              4258           LIS   R0,X'0005'                FORMAT READ CMD,ONLY                 CDT42570
2C0C   4000 18E6         4259           STH   R0,WCMD                                                        CDT42580
2C10   2403              4260           LIS   R0,3                                                           CDT42590
2C12   4000 192C         4261           STH   R0,SIZE                   FOR 4-BYTE XFER SIZE                 CDT42600
2C16   24D0              4262           LIS   SECT,0                                                         CDT42610
2C18   C800 35AA         4263  GOCHECK  LDAI  R0,PBLK10                 DON'T CHECK DTE (PARITY) FOR THESE    CDT42620
2C1C   4000 196E         4264           STA   R0,ERRFLG+4-ADC                                                CDT42630
2C20   41F0 2FCC         4265           BAL   R15,READX                 READ DATA FROM PHYSICAL SECTOR       CDT42640
2C24   41F0 2DC6         4266           BAL   R15,HEADER                SET UP PROPER HEADER IMAGE           CDT42650
2C28   41F0 2F44         4267           BAL   R15,TDATA                 AND CHECK AGAINST THAT READ          CDT42660
2C2C   26D1              4268           AIS   SECT,1                                                         CDT42670
2C2E   45D0 18F8         4269           CLH   SECT,MAXSEC               TRACK ALL DONE ?                     CDT42680
2C32   208D              4270           BLS   GOCHECK                  BRANCH: NOT YET.                     CDT42690
2C34   48F0 197A         4271           LDA   R15,TEMPC+4-ADC                                                CDT42700
2C38   030F              4272           BR    R15                       RETURN                               CDT42710
                         4273  *                                                                             CDT42720
2C3A   E150 1B72         4274  GOCHECK2 SVC   5,MSG26                   'SELECT NEW SECTOR OPTION'           CDT42730
2C3E   4300 1D8E         4275           B     .ABORT                    EXIT TEST                            CDT42740


                         4277  * ROUTINE SETS UP SELCH FOR DATA TRANSFER                                      CDT42760
                         4278  *                                                                             CDT42770
       0000 2C42         4279  SLCH     EQU   *                                                              CDT42780
2C42   DE40 18F0         4280           OC    SLAD,STOPCMD              STOP SELCH                           CDT42790
2C46   E110 3572         4281           SVC   1,PBLK01                  ENSURE SELCH NOT BSY                 CDT42800
2C4A   C810 1828         4282           LDAI  R1,RDFADR                 READ BUFFER POINTER                  CDT42810
2C4E   D300 18F3         4283           LB    R0,SLCHCMD                SELCH COMMAND TO BE USED             CDT42820
2C52   9006              4284           SRLS  R0,6                      SELCH TO READ ?                      CDT42830
2C54   2182              4285           BCS   SL.1                      BRANCH: YES.                         CDT42840
2C56   261C              4286           AIS   R1,WTFADR-RDFADR          WRITE BUFFER POINTER                 CDT42850
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TEST SEQUENCE SUPPORT ROUTINES

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2C58  4800 1610          4287  SL.1      LH    R0,MOD32             16-BIT MACHINE ?                        CDT42860
2C5C  4330 2C90          4288            BZ    SLCH16               BRANCH: YES.                            CDT42870
                         4289  *                                                                            CDT42880
2C60  5811               4290  SLCH32    DC    X'5811',X'0000'      * L R1,0(R1)                            CDT42890
2C62  0000
2C64  5010               4291            DC    X'5010',Z(SA)        * ST R1,SA                              CDT42900
2C66  1944
2C68  5010               4292            DC    X'5010',Z(EXSELAD)   * ST R1,EXSELAD (OFFSET 0 BYTES)        CDT42910
2C6A  1940
2C6C  4A10 192C          4293            AH    R1,SIZE                                                      CDT42920
2C70  5510               4294            DC    X'5510',Z(MEMTOP)    * CL R1,MEMTOP                          CDT42930
2C72  193C
2C74  2182               4295            BLS   SL.32A               BRANCH: GOOD.                           CDT42940
2C76  213B               4296            BNES  GO.ERR12             BRANCH: NO GOOD.                        CDT42950
2C78  5010               4297  SL.32A    DC    X'5010',Z(FA)        * ST R1,FA (END ADDRESS)                CDT42960
2C7A  1948
2C7C  DA40 1945          4298            WD    SLAD,SA+1                                                    CDT42970
2C80  D840 1946          4299            WH    SLAD,SA+2                                                    CDT42980
2C84  DA40 1949          4300            WD    SLAD,FA+1                                                    CDT42990
2C88  4300 2CB2          4301            B     SL.2                                                         CDT43000
                         4302  *                                                                            CDT43010
2C8C  4300 1D46          4303  GO.ERR12  B     ERROR12              BRANCH: MEMORY LIMIT EXCEEDED.          CDT43020
                         4304  *                                                                            CDT43030
2C90  4811 0002          4305  SLCH16    LH    R1,2(R1)                                                     CDT43040
2C94  4010 1946          4306            STH   R1,SA+2              START ADDRESS                           CDT43050
2C98  4A10 192C          4307            AH    R1,SIZE                                                      CDT43060
2C9C  2088               4308            BCS   GO.ERR12             BRANCH: BUFFER OUT OF MEMORY            CDT43070
2C9E  4510 193E          4309            CLH   R1,MEMTOP+2           ABOVE TOP OF MEMORY ?                   CDT43080
2CA2  2182               4310            BLS   SL.16A               BRANCH: NO                              CDT43090
2CA4  203C               4311            BNES  GO.ERR12             BRANCH: NO GOOD                         CDT43100
2CA6  4010 194A          4312  SL.16A    STH   R1,FA+2              END ADDRESS                             CDT43110
2CAA  4010 1942          4313            STH   R1,EXSELAD+2         (OFFSET 0 BYTES)                        CDT43120
2CAE  D840 1946          4314            WH    SLAD,SA+2                                                    CDT43130
2CB2  9841               4315  SL.2      WHR   SLAD,R1                                                      CDT43140
2CB4  030F               4316            BR    R15                  RETURN                                  CDT43150


                         4318  * ROUTINE ADJUSTS INTERRUPT VECTORS                                          CDT43170
                         4319  *                                                                            CDT43180
      0000 2CB6          4320  INSERT    EQU   *                                                          CDT43190
2CB6  481E 0000          4321            LH    R1,0(R14)            WHERE TO GET ADRS                       CDT43200
2CBA  4801 0000          4322            LH    R0,0(R1)             LOAD ADRS                               CDT43210
2CBE  C510 1928          4323            CLHI  R1,FUTADRS           DRIVE ?                                 CDT43220
2CC2  2334               4324            BES   INS.1                BRANCH: YES.                            CDT43230
2CC4  C510 192A          4325            CLHI  R1,SECFILAD          XFILE ?                                 CDT43240
2CC8  2133               4326            BNES  INS.2                BRANCH: NO.                             CDT43250
2CCA  C400 FFFE          4327  INS.1     NHI   R0,X'FFFE'           ON INTERRUPT, THIS BIT IS ZERO.         CDT43260
2CCE  C810 0012          4328  INS.2     LHI   R1,18                                                        CDT43270
2CD2  4501 185E          4329  INS.3     CLH   R0,DEVSADR(R1)                                               CDT43280
2CD6  2333               4330            BES   INS.4                BRANCH: MATCH.                          CDT43290
2CD8  2712               4331            SIS   R1,2                                                         CDT43300
2CDA  2204               4332            BS    INS.3                                                        CDT43310
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TEST SEQUENCE SUPPORT ROUTINES

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2CDC  480E 0002          4333  INS.4    LH    R0,2(R14)                                  CDT43320
2CE0  4001 1874          4334           STH   R0,DEVINT(R1)       NEW VECTOR           CDT43330
2CE4  430E 0004          4335           B     4(R14)              RETURN               CDT43340


                         4337  * FILE READY TO SEEK/READ/WRITE ROUTINE                  CDT43360
                         4338  * CALL:  BAL   R15,FRSSR                                 CDT43370
                         4339  * RETURNS WHEN CONTROLLER IDLE AND DRIVE READY.          CDT43380
                         4340  *                                                        CDT43390
2CE8  E110 3572          4341  FRSSR1   SVC   1,PBLK01           TEST SELCH NOT BUSY  CDT43400
2CEC  41E0 2D5E          4342           BAL   R14,CWAIT           WAIT FOR CONTROLLER IDLE CDT43410
2CF0  000F               4343           DCX   000F                                     CDT43420
2CF2  E130 35AE          4344           SVC   3,PBLK13            TEST DRIVE STATUS    CDT43430
2CF6  41E0 2D76          4345           BAL   R14,DWAIT           WAIT FOR DRIVE READY CDT43440
2CFA  1500               4346           DCX   1500                                     CDT43450
2CFC  030F               4347           BR    R15                 RETURN               CDT43460


                         4349  * ROUTINE WAITS FOR 'SELCH IDLE'                         CDT43480
                         4350  *                                                        CDT43490
2CFE  480E 0000          4351  SWAIT    LH    R0,0(R14)           TIMEOUT VALUE        CDT43500
2D02  CF00 0004          4352           SLHA  R0,4                INCREASE FOR PRECISION CDT43510
2D06  26E2               4353           AIS   R14,2                                    CDT43520
2D08  4040 1612          4354           STH   SLAD,ERRDEV         FOR ERROR PRINTOUT   CDT43530
2D0C  9D4A               4355  SWA.1    SSR   SLAD,STAT           SELCH IDLE ?         CDT43540
2D0E  2385               4356           BFFS  BSY,SWA.2           BRANCH: YES.         CDT43550
2D10  4120 2DAE          4357           BAL   R2,SMALTIME         TEST TIMEOUT         CDT43560
2D14  9D4A               4358           SSR   SLAD,STAT                              CDT43570
2D16  2185               4359           BTFS  BSY,BACKGRND        (FOR CRITICAL TIMING) CDT43580
2D18  DE40 18F0          4360  SWA.2    OC    SLAD,STOPCMD        STOP SELCH           CDT43590
2D1C  4300 2D6C          4361           B     CWA.1               WAIT FOR CTRLR IDLE... CDT43600
                         4362  *                                                        CDT43610
      0000 2D20          4363  BACKGRND EQU   *                                        CDT43620
2D20  4200 2D20          4364           NOP   *                   USER LINKS IN HERE   CDT43630
2D24  0200               4365           NOPR                      .                    CDT43640
2D26  D000 3694          4366           STM   R0,RSAVE                                 CDT43650
2D2A  D2D0 0000          4367           STB   SECT,0                                   CDT43660
2D2E  D4D0 0000          4368           CLB   SECT,0                                   CDT43670
2D32  213E               4369           BNES  BCK.1               BRANCH: BACKGROUND FAILURE CDT43680
2D34  4850 1610          4370           LH    FUT,MOD32           SERIES 32 ?          CDT43690
2D38  2337               4371           BZS   BACKEXIT           BRANCH: NO.          CDT43700
2D3A  E000               4372           DCX   E000,0000           * TS 0               CDT43710
2D3C  0000
2D3E  2118               4373           BMS   BCK.1               BRANCH: FAILURE      CDT43720
2D40  E000               4374           DCX   E000,0000           * TS 0               CDT43730
2D42  0000
2D44  2315               4375           BNMS  BCK.1               BRANCH: FAILURE.     CDT43740
                         4376  *                                                        CDT43750
      0000 2D46          4377  BACKEXIT EQU   *                                        CDT43760
2D46  4850 1910          4378           LH    FUT,STATE           RESTORE DEDICATED REGISTER CDT43770
2D4A  4300 2D0C          4379           B     SWA.1               CONTINUE TO WAIT FOR IDLE CDT43780
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TEST SEQUENCE SUPPORT ROUTINES

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                        4380  *                                                                    CDT43790
2D4E   DE40 18F0        4381  BCK.1    OC     SLAD,STOPCMD       STOP SELCH                     CDT43800
2D52   E110 3572        4382           SVC    1,PBLK01           TEST SELCH NOT BSY             CDT43810
2D56   E190 35BE        4383           SVC    9,PBLK20           'BACKGROUND FAILURE'           CDT43820
2D5A   4300 34EE        4384           B      RERUN                                             CDT43830


                        4386  * ROUTINE WAITS FOR 'CONTROLLER IDLE'                              CDT43850
                        4387  *                                                                  CDT43860
2D5E   480E 0000        4388  CWAIT    LH     R0,0(R14)          TIMEOUT VALUE                  CDT43870
2D62   CF00 0004        4389           SLHA   R0,4               INCREASE FOR PRECISION         CDT43880
2D66   26E2             4390           AIS    R14,2                                             CDT43890
2D68   4030 1612        4391           STH    DCAD,ERRDEV                                       CDT43900
2D6C   9D3A             4392  CWA.1    SSR    DCAD,STAT          CONTROLLER GOING IDLE ?        CDT43910
2D6E   022E             4393           BTCR   IDLE,R14            BRANCH: IS IDLE.               CDT43920
2D70   4120 2DAE        4394           BAL    R2,SMALTIME        TEST TIMEOUT                   CDT43930
2D74   2204             4395           BS     CWA.1                                             CDT43940


                        4397  * ROUTINE WAITS FOR 'DRIVE READY'                                  CDT43960
                        4398  *                                                                  CDT43970
2D76   480E 0000        4399  DWAIT    LH     R0,0(R14)          TIMEOUT VALUE                  CDT43980
2D7A   CF00 0004        4400           SLHA   R0,4               INCREASE FOR PRECISION         CDT43990
2D7E   26E2             4401           AIS    R14,2                                             CDT44000
2D80   4050 1612        4402           STH    FUT,ERRDEV                                        CDT44010
2D84   9D5A             4403  DWA.1    SSR    FUT,STAT           DRIVE READY ?                  CDT44020
2D86   03FE             4404           BFCR   15,R14             BRANCH: SHOULD BE.             CDT44030
2D88   C3A0 0063        4405           THI    STAT,X'63'         ERROR STATUS ?                 CDT44040
2D8C   2134             4406           BNZS   DWA.2              BRANCH: ERROR.                 CDT44050
2D8E   4120 2DAE        4407           BAL    R2,SMALTIME        TEST TIMEOUT                   CDT44060
2D92   2207             4408           BS     DWA.1              CONTINUE.                      CDT44070

2D94   D2A0 1614        4410  DWA.2    STB    STAT,ERRSTA                                       CDT44090
2D98   E100 35CA        4411           SVC    0,PBLK30           TESTS DRIVE STATUS = '08' (NO RETURN)  CDT44100


                        4413  * ONE-MILLISECOND (TYP) COUNTDOWN TIMER                            CDT44120
                        4414  * CALL:  LHI   WK1,TIMEOUTVALUE                                    CDT44130
                        4415  *        BAL   R14,MILSEC                                          CDT44140
                        4416  *                                                                  CDT44150
2D9C   2771             4417  MILSEC   SIS    WK1,1                                             CDT44160
2D9E   2314             4418           BNMS   MILS1              BRANCH: NOT TIMED-OUT          CDT44170
2DA0   27E4             4419           SIS    R14,4                                             CDT44180
2DA2   E14E 0000        4420           SVC    4,0(R14)           TIMEOUT; LOG MESSAGE.          CDT44190
2DA6   2401             4421  MILS1    LIS    R0,1               FOR 1-MS DELAY                 CDT44200
2DA8   41F0 0F82        4422           BAL    R15,TIMER          CALL ETPE DELAY ROUTINE        CDT44210
2DAC   030E             4423           BR     R14                RETURN TO CALLER.              CDT44220
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TEST SEQUENCE SUPPORT ROUTINES

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                        4425  * ROUTINE CHECKS TIMEOUTS IN SUB-MILLISECOND GRANULARITY                CDT44240
                        4426  *                                                                       CDT44250
2DAE   4810 0A5A        4427  SMALTIME LH     R1,STIMVAL          GROSS TIMEOUT VALUE               CDT44260
2DB2   9014             4428           SRLS   R1,4                FINE TIMEOUT VALUE                CDT44270
2DB4   2711             4429  SMAL.1   SIS    R1,1                                                  CDT44280
2DB6   2021             4430           BPS    SMAL.1                                                CDT44290
2DB8   2701             4431           SIS    R0,1                TIMEOUT ?                         CDT44300
2DBA   0312             4432           BNMR   R2                  BRANCH: NOT YET.                  CDT44310
2DBC   40C0 1914        4433           STH    OPKEY,OPCODE                                          CDT44320
2DC0   27F4             4434           SIS    R15,4                                                 CDT44330
2DC2   E14F 0000        4435           SVC    4,0(R15)            TIMEOUT ERROR (NO RETURN).        CDT44340


                        4437  * ROUTINE SETS UP SECTOR HEADER FOR ONE SECTOR                          CDT44360
                        4438  *                                                                       CDT44370
       0000 2DC6        4439  HEADER   EQU    *                                                     CDT44380
2DC6   4810 1836        4440           LH     R1,WTFADR+2         ASSUME 16-BIT MACHINE             CDT44390
2DCA   4800 1610        4441           LH     R0,MOD32                                              CDT44400
2DCE   2333             4442           BZS    HDR.1               BRANCH: SERIES 16                 CDT44410
2DD0   5810             4443           DC     X'5810',Z(WTFADR)   * L R1,WTFADR                    CDT44420
2DD2   1834
2DD4   4800 1922        4444  HDR.1    LH     R0,HEAD             HEAD TO BE USED                   CDT44430
2DD8   9105             4445           SLLS   R0,5                 POSITION BIT TO BIT 2 OF BYTE     CDT44440
2DDA   060D             4446           OAR    R0,SECT             ADD SECTOR ADRS                   CDT44450
2DDC   9400             4447           EXBR   R0,R0                                                 CDT44460
2DDE   92B0             4448           STBR   TRACK,R0            ONLY 8 BITS OF TRACK INFO         CDT44470
2DE0   4001 0000        4449           STH    R0,0(R1)            ID INFORMATION                    CDT44480
2DE4   4800 190A        4450           LH     R0,LRCC             CALCULATED LRCC                   CDT44490
2DE8   4001 010C        4451           STH    R0,LRECL+12(R1)     GOOD LRCC                         CDT44500
2DEC   030F             4452           BR     R15                 RETURN.                           CDT44510


                        4454  * ROUTINE WRITES HEADER INFORMATION TO DISK CONTROLLER                  CDT44530
                        4455  *                                                                       CDT44540
       0000 2DEE        4456  CHEDR    EQU    *                                                     CDT44550
2DEE   4800 1922        4457           LH     R0,HEAD                                               CDT44560
2DF2   9105             4458           SLLS   R0,5                 POSITION TO BIT 2 OF BYTE         CDT44570
2DF4   060D             4459           OAR    R0,SECT                                               CDT44580
2DF6   40D0 1920        4460           STH    SECT,CURSECT                                          CDT44590
2DFA   9A30             4461           WDR    DCAD,R0             HEAD, SECTOR INFO TO CONTROLLER   CDT44600
2DFC   030F             4462           BR     R15                 RETURN.                           CDT44610


                        4464  * ROUTINE SETS UP TRANSFER SIZE, BASED ON 'SECNUM' OPTION               CDT44630
                        4465  * REQUIRES NO MORE THAN 64 KB SIZE BE REQUESTED.                        CDT44640
                        4466  *                                                                       CDT44650
2DFE   4820 18FA        4467  XFERSIZP LH     R2,PRECL            FOR FORMAT MODE                   CDT44660
2E02   2303             4468           BS     XFS.0                                                 CDT44670
                        4469  *                                                                       CDT44680
2E04   C820 0100        4470  XFERSIZL LHI    R2,LRECL            FOR NORMAL MODE                   CDT44690
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TEST SEQUENCE SUPPORT ROUTINES

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2E08  4810 17BC      4471  XFS.0   LH    R1,SECNUM+$VALU1                          CDT44700
2E0C  2400           4472          LIS   R0,0                                      CDT44710
2E0E  0A02           4473  XFS.1   AAR   R0,R2                                     CDT44720
2E10  2711           4474          SIS   R1,1                                      CDT44730
2E12  2212           4475          BNMS  XFS.1           BRANCH: ANOTHER SECTOR.   CDT44740
2E14  2701           4476          SIS   R0,1                                      CDT44750
2E16  4000 192C      4477          STH   R0,SIZE                                   CDT44760
2E1A  030F           4478          BR    R15             RETURN TO CALLER.         CDT44770


                     4480  * ROUTINE FLAGS SECTOR AS DEFECTIVE, CHECKS FLAG        CDT44790
                     4481  *                                                       CDT44800
2E1C  40E0 195A      4482  FLAGIT  STA   R14,FLGRTN+4-ADC                          CDT44810
2E20  4800 17D4      4483          LH    R0,FMTSEC+$VALU1  FORMAT BY SECTOR ?      CDT44820
2E24  2132           4484          BNZS  FLAG.A            BRANCH: YES.          CDT44830
2E26  24D0           4485          LIS   SECT,0            FLAG WHOLE TRACK.     CDT44840
2E28  C800 0605      4486  FLAG.A  LHI   R0,X'0605'        FORMAT WRITE/READ     CDT44850
2E2C  4000 18E6      4487          STH   R0,WCMD                                   CDT44860
2E30  41F0 2DC6      4488          BAL   R15,HEADER        GET R1 LOADED. HEADER NOT USED.  CDT44870
2E34  C80D 0040      4489          LHI   R0,X'40'(SECT)    DEFECTIVE SECTOR FLAG CDT44880
2E38  D201 0000      4490          STB   R0,0(R1)                                  CDT44890
2E3C  41F0 2FDE      4491          BAL   R15,WRIT          WRITE WITH DEF SEC FLAG SET  CDT44900
2E40  C8E0 0FA4      4492          LDAI  R14,HEXASC                                CDT44910
2E44  081B           4493          LDAR  R1,TRACK                                  CDT44920
2E46  2403           4494          LIS   R0,3                                      CDT44930
2E48  C820 1A2D      4495          LDAI  R2,MSG05+16                               CDT44940
2E4C  01FE           4496          BALR  R15,R14           BUILD FLAG MESSAGE....  CDT44950
2E4E  4810 1922      4497          LH    R1,HEAD                                   CDT44960
2E52  2402           4498          LIS   R0,2                                      CDT44970
2E54  2624           4499          AIS   R2,4                                      CDT44980
2E56  01FE           4500          BALR  R15,R14                                   CDT44990
2E58  081D           4501          LDAR  R1,SECT                                   CDT45000
2E5A  2623           4502          AIS   R2,3                                      CDT45010
2E5C  01FE           4503          BALR  R15,R14                                   CDT45020
2E5E  E150 1A1D      4504          SVC   5,MSG05           'DEF SEC FLAGGED....'   CDT45030
                     4505  *                                                       CDT45040
2E62  C800 0201      4506          LHI   R0,X'0201'        NORMAL MODE WRITE/READ CMDS  CDT45050
2E66  4000 18E6      4507          STH   R0,WCMD                                   CDT45060
2E6A  4120 307C      4508          BAL   R2,SETCODE                                CDT45070
2E6E  0093           4509          DCX   0093              =TESTING CTRLR ERROR (DEF SEC/TRK)  CDT45080
2E70  C800 35C6      4510          LDAI  R0,PBLK25         TO TEST CTRLR STATUS = X'2E'  CDT45090
                     4511  *                               ERROR TRANSFERS TO FLAG.0  CDT45100
2E74  4000 196E      4512          STA   R0,ERRFLG+4-ADC                           CDT45110
2E78  41F0 2FCC      4513          BAL   R15,READX         TEST SECTOR FLAG        CDT45120
2E7C  2303           4514          BS    FLAG.1                                    CDT45130
2E7E  E150 1A37      4515  FLAG.0  SVC   5,MSG06          'FLAG REJECTED'         CDT45140
2E82  4800 17D4      4516  FLAG.1  LH    R0,FMTSEC+$VALU1  FORMAT BY SECTOR ?      CDT45150
2E86  2136           4517          BNZS  FLAG.2            BRANCH: YES.          CDT45160
2E88  26D1           4518          AIS   SECT,1            ADVANCE TO NEXT SECTOR  CDT45170
2E8A  45D0 18F8      4519          CLH   SECT,MAXSEC        ALL DONE ?            CDT45180
2E8E  4280 2E28      4520          BL    FLAG.A            BRANCH: FLAG WHOLE TRACK.  CDT45190
2E92  48E0 195A      4521  FLAG.2  LDA   R14,FLGRTN+4-ADC                         CDT45200
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TEST SEQUENCE SUPPORT ROUTINES

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2E96  030E            4522          BR    R14               RETURN                          CDT45210


                      4524  * ROUTINE GETS WRITE BUFFER START AND END ADDRESSES              CDT45230
2E98  4810 1836       4525  LIMITS  LH    R1,WTFADR+2                                       CDT45240
2E9C  4820 1610       4526          LH    R2,MOD32                                          CDT45250
2EA0  2336            4527          BZS   LIM.1                                             CDT45260
2EA2  5810            4528          DC    X'5810',Z(WTFADR)   * L R1,WTFADR                 CDT45270
2EA4  1834
2EA6  7320            4529          DC    X'7320',Z(SIZE)     * LHL R2,SIZE                 CDT45280
2EA8  192C
2EAA  2303            4530          BS    LIM.2                                             CDT45290
2EAC  4820 192C       4531  LIM.1   LH    R2,SIZE                                           CDT45300
2EB0  0A21            4532  LIM.2   AAR   R2,R1              START ADDRESS + SIZE          CDT45310
2EB2  2721            4533          SIS   R2,1               A(LAST HALFWORD IN BUFFER)    CDT45320
2EB4  0300            4534          BR    R0                 RETURN.                       CDT45330


                      4536  * ROUTINE FILLS WRITE BUFFER WITH SPIRAL DATA                    CDT45350
                      4537  *                                                                 CDT45360
2EB6  4100 2E98       4538  SPIFILL BAL   R0,LIMITS                                         CDT45370
2EBA  2400            4539          LIS   R0,0                                              CDT45380
2EBC  0521            4540  SPIF.1  CLAR  R2,R1                                           CDT45390
2EBE  028F            4541          BLR   R15                BRANCH: ALL DONE.            CDT45400
2EC0  4001 0000       4542          STH   R0,0(R1)                                          CDT45410
2EC4  2602            4543          AIS   R0,2                                              CDT45420
2EC6  2612            4544          AIS   R1,2                                              CDT45430
2EC8  2206            4545          BS    SPIF.1                                            CDT45440


                      4547  * ROUTINE FILLS WRITE BUFFER WITH WORST-CASE DATA                CDT45460
                      4548  *                                                                 CDT45470
      0000 2ECA       4549  WCASFILL EQU  *                                                 CDT45480
2ECA  4100 2E98       4550          BAL   R0,LIMITS          GET BUFFER LIMITS              CDT45490
2ECE  4800 1798       4551          LH    R0,DATA+SVALU1     WORST-CASE DATA                CDT45500
2ED2  0521            4552  WCAS.1  CLAR  R2,R1                                           CDT45510
2ED4  028F            4553          BLR   R15                RETURN.                       CDT45520
2ED6  4001 0000       4554          STH   R0,0(R1)                                          CDT45530
2EDA  2612            4555          AIS   R1,2                                              CDT45540
2EDC  2205            4556          BS    WCAS.1                                            CDT45550


                      4558  * ROUTINE FILLS WRITE BUFFER WITH RANDOM DATA                    CDT45570
                      4559  *                                                                 CDT45580
      0000 2EDE       4560  RANDFILL EQU  *                                                 CDT45590
2EDE  4100 2E98       4561          BAL   R0,LIMITS                                         CDT45600
2EE2  080F            4562          LDAR  R0,R15             SAVE LINK                      CDT45610
2EE4  0521            4563  RAND.1  CLAR  R2,R1                                           CDT45620
2EE6  0280            4564          BLR   R0                 RETURN ON COPY OF LINK         CDT45630
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TEST SEQUENCE SUPPORT ROUTINES

```
2EE8  41F0 308E          4565          BAL   R15,RAND          GET 'RANDOM NUMBER'                    CDT45640
2EEC  4061 0000          4566          STH   WK0,0(R1)                                              CDT45650
2EF0  2612               4567          AIS   R1,2                                                   CDT45660
2EF2  2207               4568          BS    RAND.1                                                 CDT45670


                         4570  * ROUTINE FILLS READ BUFFER WITH ZEROS BEFORE READ ATTEMPT             CDT45690
                         4571  *                                                                      CDT45700
2EF4  4810 182A          4572  ZEROFILL LH   R1,RDFADR+2       READ BUFFER START                    CDT45710
2EF8  4820 192C          4573          LH    R2,SIZE                                                CDT45720
2EFC  4800 1610          4574          LH    R0,MOD32                                               CDT45730
2F00  2335               4575          BZS   ZERF.1                                                 CDT45740
2F02  5810               4576          DC    X'5810',Z(RDFADR)  * L R1,RDFADR                       CDT45750
2F04  1828
2F06  7320               4577          DC    X'7320',Z(SIZE)    * LHL R2,SIZE                       CDT45760
2F08  192C
2F0A  0A21               4578  ZERF.1  AAR   R2,R1              START ADDRESS + SIZE                 CDT45770
2F0C  4280 1D46          4579          BC    ERROR12            BRANCH: MEMORY LIMIT EXCEEDED        CDT45780
2F10  2721               4580          SIS   R2,1               A(LAST HALFWORD IN BUFFER)           CDT45790
2F12  4800 1610          4581          LH    R0,MOD32                                               CDT45800
2F16  2335               4582          BZS   ZERF.1A            BRANCH: 16-BIT.                      CDT45810
2F18  5520               4583          DC    X'5520',Z(MEMTOP)  *CL R2,MEMTOP                       CDT45820
2F1A  193C
2F1C  2384               4584          BNLS  ZERF.1B            BRANCH: TOP-OF-MEMORY EXCEEDED       CDT45830
2F1E  2305               4585          BS    ZERF.1C                                                CDT45840
2F20  4520 193E          4586  ZERF.1A CLH   R2,MEMTOP+2                                            CDT45850
2F24  4380 1D46          4587  ZERF.1B BNL   ERROR12            BRANCH: TOP-OF-MEMORY EXCEEDED.      CDT45860
2F28  2400               4588  ZERF.1C LIS   R0,0                                                   CDT45870
2F2A  0521               4589  ZERF.2  CLAR  R2,R1              END LESS THAN START ?                CDT45880
2F2C  028F               4590          BLR   R15                BRANCH: YES, DONE. (SEE WRAP IN "SLCH CDT45890
2F2E  4002 0000          4591          STH   R0,0(R2)           STORE ZERO DATA                      CDT45900
2F32  2722               4592          SIS   R2,2                                                   CDT45910
2F34  2205               4593          BS    ZERF.2                                                 CDT45920


                         4595  * DATA TEST ROUTINE                                                    CDT45940
                         4596  * CALL:  OUTBUF HOLDS WRITTEN DATA;                                    CDT45950
                         4597  *        INBUF HOLDS READ DATA                                         CDT45960
                         4598  *        SIZE CONTAINS BYTE COUNT                                      CDT45970
                         4599  *        BAL   R15,TDATA                                               CDT45980

2F36  26F2               4601  TDATAX  AIS   R15,2              ENTER HERE FOR BUFFER OFFSET         CDT46000
2F38  D000 36D4          4602          STM   R0,INTSAV                                                CDT46010
2F3C  27F2               4603          SIS   R15,2              POINT TO PASSED PARAMETER            CDT46020
2F3E  48FF 0000          4604          LH    R15,0(R15)         GET SPEC'D OFFSET                    CDT46030
2F42  2304               4605          BS    TDA.0                                                  CDT46040
                         4606  *                                                                      CDT46050
2F44  D000 36D4          4607  TDATA   STM   R0,INTSAV                                              CDT46060
2F48  24F0               4608          LIS   R15,0              NO OFFSET TO BE USED                 CDT46070
2F4A  4840 1836          4609  TDA.0   LH    R4,WTFADR+2                                            CDT46080
2F4E  4830 182A          4610          LH    R3,RDFADR+2        READ BUFFER START (16-BIT)           CDT46090
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TEST SEQUENCE SUPPORT ROUTINES

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2F52  4880 1942          4611          LH    R8,EXSELAD+2        TRANSFER END (16-BIT)                  CDT46100
2F56  4800 1610          4612          LH    R0,MOD32                                                   CDT46110
2F5A  2337               4613          BZS   TDAT.0              BRANCH: 16-BIT MACHINE.                CDT46120
2F5C  5880               4614          DC    X'5880',Z(EXSELAD)  * L R8,EXSELAD                         CDT46130
2F5E  1940
2F60  5830               4615          DC    X'5830',Z(RDFADR)   * L R3,RDFADR                          CDT46140
2F62  1828
2F64  5840               4616          DC    X'5840',Z(WTFADR)   * L R4,WTFADR                          CDT46150
2F66  1834
      0000 2F68          4617  TDAT.0  EQU   *                                                          CDT46160
2F68  0583               4618          CLAR  R8,R3               ANY XFER OCCURRED AT ALL ?             CDT46170
2F6A  4330 2F98          4619          BE    TDXIT               BRANCH: NO. NO CHECK.                  CDT46180
2F6E  2783               4620          SIS   R8,3                FORCE VALID END FOR CHECK              CDT46190
2F70  0B83               4621          SAR   R8,R3               ADJUST FOR BUFFER START                CDT46200
2F72  0A4F               4622          AAR   R4,R15              ADD OFFSET TO EFFECTIVE A(WTF)         CDT46210
2F74  C480 FFFE          4623          NHI   R8,X'FFFE'          ALIGN LIMIT TO FINAL HALFWORD          CDT46220
2F78  4120 307C          4624          BAL   R2,SETCODE                                                 CDT46230
2F7C  0080               4625          DCX   0080                =TESTING DATA READ                     CDT46240
2F7E  2460               4626          LIS   R6,0                START COUNT                            CDT46250
2F80  4060 1940          4627          STH   R6,BCOUNT           ZERO HIGH HALF                         CDT46260
2F84  2472               4628          LIS   R7,2                INCREMENT                              CDT46270
2F86  4854 0000          4629  TDA.1   LH    R5,0(R4)            EXPECTED DATA                          CDT46280
2F8A  4553 0000          4630          CLH   R5,0(R3)            ACTUAL DATA                            CDT46290
2F8E  2138               4631          BNES  TDA.2               BRANCH: NOT AS EXPECTED.               CDT46300
2F90  2632               4632          AIS   R3,2                                                       CDT46310
2F92  2642               4633          AIS   R4,2                                                       CDT46320
2F94  C160 2F86          4634          BXLE  R6,TDA.1            CONTINUE...                            CDT46330
2F98  D100 36D4          4635  TDXIT   LM    R0,INTSAV                                                  CDT46340
2F9C  030F               4636          BR    R15                 RETURN TO CALLER.                      CDT46350

2F9E  4050 1916          4638  TDA.2   STH   R5,EDATA            EXPECTED, FOR PRINTOUT                 CDT46370
2FA2  4853 0000          4639          LH    R5,0(R3)                                                   CDT46380
2FA6  4050 1918          4640          STH   R5,RDATA            ACTUAL, FOR PRINTOUT                   CDT46390
2FAA  4060 1942          4641          STH   R6,BCOUNT+2         SOFTWARE BYTE COUNT                    CDT46400
2FAE  D100 36D4          4642          LM    R0,INTSAV                                                  CDT46410
2FB2  48F0 1956          4643          LDA   R15,RWSAVE+4-ADC    CALLER'S LOCATION                      CDT46420
2FB6  C86F FFFC          4644          LHI   WK0,-4(R15)                                                CDT46430
2FBA  E176 0000          4645          SVC   7,0(WK0)            LOG ERROR MESSAGE (NO RETURN).         CDT46440


                         4647  * READ/WRITE ROUTINE                                                     CDT46460
                         4648  * CALL:  BAL   R15,READ                                                  CDT46470
                         4649  *        OR                                                              CDT46480
                         4650  *        BAL   R15,WRIT                                                  CDT46490
                         4651  *                                                                        CDT46500
                         4652  *        BUT IF EXPECTING ERRORS:                                        CDT46510
                         4653  *        BAL   R15,READX                                                 CDT46520
                         4654  *        OR                                                              CDT46530
                         4655  *        BAL   R15,WRITX                                                 CDT46540
                         4656  *        WHICH DO NOT CHANGE "ERRFLG" OR "OPKEY"                         CDT46550

                         4658  * INPUT REGISTERS:                                                       CDT46570
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TEST SEQUENCE SUPPORT ROUTINES

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                        4659  * FUT   = DRIVE ADDRESS                                                    CDT46580
                        4660  * TRACK = CYLINDER ADDRESS                                                 CDT46590
                        4661  * SLAD  = SELCH ADDRESS                                                    CDT46600
                        4662  * DCAD  = CONTROLLER ADDRESS                                               CDT46610

                        4664  * MEMORY LOCATIONS:                                                        CDT46630
                        4665  * WCMD  = WRITE/READ CONTROLLER COMMANDS                                   CDT46640
                        4666  * HEAD  = HEAD ADDRESS                                                     CDT46650
                        4667  * INBUF = READ BUFFER                                                      CDT46660
                        4668  * OUTBUF= WRITE BUFFER                                                     CDT46670

                        4670  * REGISTERS MODIFIED:                                                      CDT46690
                        4671  * R0,R6,WK0,WK1,WK2,WK3,OPKEY,STAT,R14                                      CDT46700

2FBE   C800 35C2        4673  READ     LDAI  R0,PBLK23          TEST CTRLR STATUS = X'02' (READ)        CDT46720
2FC2   4000 196E        4674           STA   R0,ERRFLG+4-ADC                                            CDT46730
2FC6   4120 307C        4675           BAL   R2,SETCODE                                                 CDT46740
2FCA   0070             4676           DCX   0070               =PERFORMING NO-ERROR READ               CDT46750
2FCC   40F0 1956        4677  READX    STA   R15,RWSAVE+4-ADC                                          CDT46760
2FD0   41F0 2EF4        4678           BAL   R15,ZEROFILL       MAKE VIRGIN READ BUFFER                 CDT46770
2FD4   D370 18E7        4679           LB    WK1,RCMD           READ COMMAND                            CDT46780
2FD8   C880 0030        4680           LHI   WK2,X'30'          SELCH READ COMMAND                      CDT46790
2FDC   230E             4681           BS    RWCOM              ENTER COMMON PROCESS                    CDT46800

2FDE   C800 35B6        4683  WRIT     LDAI  R0,PBLK16          TEST CTRLR STATUS = X'02' (WRITE)       CDT46820
2FE2   4000 196E        4684           STA   R0,ERRFLG+4-ADC                                            CDT46830
2FE6   4120 307C        4685           BAL   R2,SETCODE                                                 CDT46840
2FEA   0060             4686           DCX   0060               =PERFORMING NO-ERROR WRITE              CDT46850
2FEC   40F0 1956        4687  WRITX    STA   R15,RWSAVE+4-ADC                                          CDT46860
2FF0   D370 18E6        4688           LB    WK1,WCMD           WRITE COMMAND                           CDT46870
2FF4   C880 0010        4689           LHI   WK2,X'10'          SELCH WRITE COMMAND                     CDT46880
2FF8   4070 1912        4690  RWCOM    STH   WK1,RWOCMD         CONTROLLER COMMAND USED                 CDT46890
2FFC   D280 18F3        4691           STB   WK2,SLCHCMD        SELCH COMMAND USED                      CDT46900
3000   2400             4692           LIS   R0,0                                                       CDT46910
3002   4000 1902        4693           STH   R0,RDER            RESET 'READ-RETRIED' INDICATOR          CDT46920
                        4694  *                                                                          CDT46930
3006   41F0 2C42        4695  RDAGN    BAL   R15,SLCH           SET UP SELCH                            CDT46940
300A   985B             4696           WHR   FUT,TRACK          CYL ADRS FOR CTRLR SECTOR MATCH         CDT46950
300C   41E0 2D5E        4697           BAL   R14,CWAIT          WAIT FOR CTRLR IDLE                     CDT46960
3010   000F             4698           DCX   000F                                                       CDT46970
3012   41F0 2DEE        4699           BAL   R15,CHEDR          WRITE HEADER TO CONTROLLER              CDT46980
3016   2406             4700           LIS   R0,X'06'                                                   CDT46990
3018   4400 1912        4701           NH    R0,RWOCMD                                                  CDT47000
301C   2706             4702           SIS   R0,X'06'           WRITING IN FORMAT MODE ?                CDT47010
301E   2133             4703           BNZS  FMTSAFE            BRANCH: NO.                             CDT47020
3020   40F0 1904        4704           STH   R15,RFMTFLG        YES. SET FLAG.                          CDT47030
3024   DE30 1913        4705  FMTSAFE  OC    DCAD,RWOCMD+1      START CONTROLLER                        CDT47040
3028   DE40 18F3        4706           OC    SLAD,SLCHCMD       START SELCH                             CDT47050
302C   41E0 2CFE        4707           BAL   R14,SWAIT          WAIT FOR SELCH & CTRLR IDLE             CDT47060
3030   0FFF             4708           DCX   0FFF               TIMEOUT CONSTANT                        CDT47070
3032   4810 196E        4709           LDA   R1,ERRFLG+4-ADC                                            CDT47080
3036   C510 FFFF        4710           CLHI  R1,-1              UNCONDITIONAL RETURN ?                  CDT47090
303A   4330 3076        4711           BE    SPL.RTN            BRANCH: YES.                            CDT47100
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TEST SEQUENCE SUPPORT ROUTINES

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303E  E121 0000          4712            SVC   2,0(R1)              PERFORM SPECIFIED TEST ON CTRLR        CDT47110
                         4713  *                                                                           CDT47120
3042  4810 196E          4714  RDRTRY    LDA   R1,ERRFLG+4-ADC      RELOAD PBLKNN ADDRESS                  CDT47130
3046  C510 35C2          4715            CLAI  R1,PBLK23            NO-ERROR READ ?                        CDT47140
304A  4230 3072          4716            BNE   RW.RTN               BRANCH: NO AUTO-RETRY                  CDT47150
304E  4800 1906          4717            LH    R0,ERRFLG1           WAS ERROR DETECTED, THIS READ ?        CDT47160
3052  2137               4718            BNZS  DXTL.4R              BRANCH: YES.                           CDT47170
3054  4800 1902          4719            LH    R0,RDER              IS THIS 2ND READ ?                     CDT47180
3058  233D               4720            BZS   RW.RTN               BRANCH: NO ERRORS, FIRST READ.         CDT47190
305A  E150 1B39          4721            SVC   5,MSG23              'SOFT READ ERROR'                      CDT47200
305E  230A               4722            BS    RW.RTN                                                      CDT47210
3060  4800 1902          4723  DXTL.4R   LH    R0,RDER              SECOND ERROR ?                         CDT47220
3064  2135               4724            BNZS  DXTL.5R              BRANCH: YES.                           CDT47230
3066  4050 1902          4725            STH   FUT,RDER             SET '1ST ERROR' FLAG                   CDT47240
306A  4300 3006          4726            B     RDAGN                RETRY READ.                            CDT47250
306E  E150 1B29          4727  DXTL.5R   SVC   5,MSG22              'HARD READ ERROR'                      CDT47260
      0000 3072          4728  RW.RTN    EQU   *                                                           CDT47270
3072  E160 359E          4729            SVC   6,PBLK0D             READ & TEST SELCH ADDRESS              CDT47280
3076  48F0 1956          4730  SPL.RTN   LDA   R15,RWSAVE+4-ADC                                            CDT47290
307A  030F               4731            BR    R15                                                         CDT47300


                         4733  * ROUTINE LOADS OPKEY, UPDATES OPCODE FROM PASSED PARAMETER                 CDT47320
                         4734  * CALL:   BAL   R2,SETCODE                                                  CDT47330
                         4735  *         DCX   OPCODE                                                      CDT47340
                         4736  *                                                                           CDT47350
307C  24C0               4737  SETCODE   LIS   OPKEY,0                                                     CDT47360
307E  40C0 1912          4738            STH   OPKEY,RWOCMD         SET 'NO COMMAND' FOR ERROR HDLR        CDT47370
3082  48C2 0000          4739            LH    OPKEY,0(R2)          GET PASSED PARAMETER                   CDT47380
3086  40C0 1914          4740            STH   OPKEY,OPCODE         STORE FOR ERROR PRINT                  CDT47390
308A  4302 0002          4741            B     2(R2)                RETURN.                                CDT47400


                         4743  * PSEUDO-RANDOM NUMBER GENERATOR                                            CDT47420
                         4744  * CALL:   BAL   R15,RAND                                                    CDT47430
                         4745  * RETURNS RESULT IN WK0                                                     CDT47440
                         4746  *                                                                           CDT47450
308E  4860 190C          4747  RAND      LH    WK0,RND1             FIBONACCI                              CDT47460
3092  4870 190E          4748            LH    WK1,RND2             NUMBER                                 CDT47470
3096  4070 190C          4749            STH   WK1,RND1             GENERATOR                              CDT47480
309A  0A67               4750            AAR   WK0,WK1                                                     CDT47490
309C  4060 190E          4751            STH   WK0,RND2                                                    CDT47500
30A0  030F               4752            BR    R15                  RETURN                                 CDT47510


                         4754  * ROUTINE CHECKS IF SELECTED CYLINDER ALLOWED FOR A 'CE' PACK.              CDT47530
                         4755  * 'CE' PACK DETERMINED BY 'PACTYP' OPTION.                                  CDT47540
                         4756  * CALL:   LHI   TRACK,CYLADRS                                               CDT47550
                         4757  *         BAL   R15,ILLADD                                                  CDT47560
                         4758  *         DAC   VOID.TRACK.RETURN                                           CDT47570
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TEST SEQUENCE SUPPORT ROUTINES

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                         4759  * REGISTERS MODIFIED: R0,R14                                                    CDT47580
                         4760  *                                                                               CDT47590
30A2   26F1              4761  ILLADD   AIS   R15,ADC-1                                                       CDT47600
30A4   C4F0 FFFE         4762           NHI   R15,0-ADC                                                       CDT47610
30A8   48EF 0000         4763           LDA   R14,0(R15)          BYPASS ADDRESS                              CDT47620
30AC   26F2              4764           AIS   R15,ADC             RETURN ADDRESS                              CDT47630
30AE   C800 00CE         4765           LHI   R0,X'CE'                                                        CDT47640
30B2   D400 1744         4766           CLB   R0,PACTYP+$VALU1    CE DISK PACK ?                              CDT47650
30B6   2138              4767           BNES  ILLA.1              BRANCH: NO.                                 CDT47660
30B8   4800 1634         4768           LH    R0,BTESTNO          BINARY TEST NUMBER:                         CDT47670
30BC   2335              4769           BZS   ILLA.1              BRANCH: TEST 0 OKAY                         CDT47680
30BE   CB00 0015         4770           SHI   R0,X'0015'          TEST 15 IS OKAY, TOO...                     CDT47690
30C2   4230 1D40         4771           BNZ   ERROR11             BRANCH: 'INVALID CYLADRS - CE PACK'         CDT47700
30C6   49B0 172C         4772  ILLA.1   CH    TRACK,HICYL+$VALU1  EXCEEDS HICYL OPTION ?                    CDT47710
30CA   022E              4773           BPR   R14                 BRANCH: YES. REJECT THIS ONE.               CDT47720
30CC   45B0 1720         4774           CLH   TRACK,LOCYL+$VALU1  LESS THAN LOCYL OPTION ?                   CDT47730
30D0   028E              4775           BLR   R14                 BRANCH: YES. REJECT THIS ONE.               CDT47740
30D2   030F              4776           BR    R15                 ELSE, ACCEPTED. RETURN.                     CDT47750
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                        4778  * ****************************************************************      CDT47770
                        4779  *                                                                       CDT47780
                        4780  *              E R R O R   H A N D L E R                                CDT47790
                        4781  *                                                                       CDT47800
                        4782  *                                                                       CDT47810
                        4783  * SVC.DRV IS THE COMMON STATUS-TEST ROUTINE USED BY ALL TEST MODULES.    CDT47820
                        4784  * THE ROUTINE IS ENTERED BY EXECUTING A 'SVC N,PARBLK' INSTRUCTION.     CDT47830
                        4785  * FOR AN SVC 6 CALL, AN SVC 2 CALL *MUST* HAVE PRECEDED, FOR THE SAME   CDT47840
                        4786  * DISK READ/WRITE/READCHECK OPERATION.                                  CDT47850
                        4787  *                                                                       CDT47860
                        4788  * FOR SVC'S 0, 1, 2, 3:                                                CDT47870
                        4789  * DEVICE STATUS IS 'ANDED' WITH A MASK, AND THE RESULT IS COMPARED      CDT47880
                        4790  * WITH THE REQUIRED STATUS IMAGE. COMPARE FAILURE NORMALLY CAUSES       CDT47890
                        4791  * AN ERROR MESSAGE TO BE PRINTED. FOLLOWING AN ERROR, CONTROL MAY      CDT47900
                        4792  * OPTIONALLY BE PASSED TO A TRANSFER LOCATION, AND ERROR PRINTOUT       CDT47910
                        4793  * MAY OPTIONALLY BE DEFINED AS SUPPRESSED.                             CDT47920
                        4794  *                                                                       CDT47930
                        4795  * AN SVC 2 WHICH DETECTS AN UNEXPECTED DEF SEC STATUS DOES NOT         CDT47940
                        4796  * PRODUCE AN ERROR PRINTOUT, BUT PRINTS 'DEC SEC FOUND', FOLLOWED      CDT47950
                        4797  * BY THE HEAD, CYLINDER, AND SECTOR OF THE SECTOR CAUSING THE          CDT47960
                        4798  * ERROR BIT TO SET. THE EXPECTED SELCH END ADDRESS IS SET EQUAL        CDT47970
                        4799  * TO THE SELCH ADDRESS READ, IF ANY CONTROLLER ERROR STATUS IS         CDT47980
                        4800  * PRESENTED WHICH WOULD CAUSE SELCH ABORT.                             CDT47990
                        4801  *                                                                       CDT48000
                        4802  * ON TERMINATION OF THE STATUS TEST, CONTROL IS PASSED TO THE          CDT48010
                        4803  * INSTRUCTION FOLLOWING THE SUPERVISOR CALL (SVC), UNLESS AN ERROR      CDT48020
                        4804  * IS DETECTED. REGISTERS R0, R1, AND STAT ARE MODIFIED BY THIS         CDT48030
                        4805  * ROUTINE WHEN EXECUTED ON A 16-BIT PROCESSOR.                         CDT48040

30D4  D3A0 1614         4807  SVC0.OP  LB    STAT,INTSTA       LAST-INTERRUPTING-DEVICE'S STATUS   CDT48060
30D8  4800 1612         4808           LH    R0,INTDEV         ADDRESS OF THE DEVICE               CDT48070
30DC  2410              4809           LIS   R1,0              SET ENTRY CODE                      CDT48080
30DE  230C              4810           BS    BS.SVC1                                               CDT48090

30E0  4800 175C         4812  SVC1.OP  LH    R0,SELCH+SVALU1   SELECTOR CHANNEL STATUS TEST       CDT48110
30E4  9D0A              4813           SSR   R0,STAT                                               CDT48120
30E6  2411              4814           LIS   R1,1                                                  CDT48130
30E8  2307              4815           BS    BS.SVC1                                               CDT48140

30EA  4800 1768         4817  SVC2.CP  LH    R0,DISCON+SVALU1  DISK CONTROLLER STATUS TEST        CDT48160
30EE  9D0A              4818           SSR   R0,STAT                                               CDT48170
30F0  D2A0 18F4         4819           STB   STAT,SVC2STAT     SAVE FOR SUBSEQUENT SVC6            CDT48180
30F4  2412              4820           LIS   R1,2                                                  CDT48190
30F6  230A              4821  BS.SVC1  BS    BS.SVC                                                CDT48200

30F8  4800 1910         4823  SVC3.OP  LH    R0,STATE          CURRENT DRIVE STATUS TEST           CDT48220
30FC  9D0A              4824           SSR   R0,STAT                                               CDT48230
30FE  2413              4825           LIS   R1,3                                                  CDT48240
3100  2305              4826           BS    BS.SVC                                                CDT48250

3102  4800 1612         4828  SVC4.OP  LH    R0,ERRDEV         TIMEOUT ERROR                       CDT48270
3106  9D0A              4829           SSR   R0,STAT                                               CDT48280
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3108  2414            4830          LIS   R1,4                                    CDT48290
310A  230E            4831  BS.SVC  BS    SVC.DRV                                 CDT48300

310C  2415            4833  SVC5.CP LIS   R1,5             TEXT MESSAGE, ONLY      CDT48320
310E  230C            4834          BS    SVC.DRV                                 CDT48330

3110  4800 175C       4836  SVC6.OP LH    R0,SELCH+$VALU1   SELCH FINAL ADDRESS ERROR CDT48350
3114  9D0A            4837          SSR   R0,STAT                                 CDT48360
3116  2416            4838          LIS   R1,6                                    CDT48370
3118  2307            4839          BS    SVC.DRV                                 CDT48380

311A  4800 1612       4841  SVC7.OP LH    R0,ERRDEV         DATA COMPARE ERROR      CDT48400
311E  9D0A            4842          SSR   R0,STAT                                 CDT48410
3120  2417            4843          LIS   R1,7                                    CDT48420
3122  2302            4844          BS    SVC.DRV                                 CDT48430

3124  2419            4846  SVC9.CP LIS   R1,9             BACKGROUND TESTING FAILURE CDT48450


      0000 3126       4848  SVC.DRV EQU   *                                       CDT48470
3126  4010 191C       4849          STH   R1,SVCNUM                               CDT48480
312A  4000 1612       4850          STH   R0,ERRDEV         DEVICE IN ERROR       CDT48490
312E  D2A0 1614       4851          STB   STAT,ERRSTA       SAVE ERROR STATUS     CDT48500
3132  4800 1610       4852          LH    R0,MOD32          32-BIT MACHINE ?      CDT48510
3136  2135            4853          BNZS  DRV.1             BRANCH: NO.           CDT48520
3138  D000 36D4       4854          STM   R0,INTSAV         SAVE 16-BIT REGISTERS CDT48530
313C  D1D0 0094       4855          LM    R13,X'94'         GET PBLK ADDRESS, OLD LOC CDT48540
3140  D0E0 1934       4856  DRV.1   STM   R14,SVCPSW        RETURN PSW            CDT48550
3144  27F4            4857          SIS   R15,4             POINT OLD LOC TO SVC INSTRUCTION CDT48560
3146  D0E0 15F8       4858          STM   R14,OLDPSW        FOR ERROR MESSAGES.   CDT48570
314A  40D0 1932       4859          STA   R13,BLKADRS+4-ADC ADDRESS OF PARAM BLOCK CDT48580
314E  4800 175C       4860          LH    R0,SELCH+$VALU1                         CDT48590
3152  DD00 197C       4861          SS    R0,STATTAB        GET SELCH STATUS FOR SEQ3 CDT48600
                      4862  *                                                     CDT48610
3156  2400            4863          LIS   R0,0                                    CDT48620
3158  4000 1906       4864          STH   R0,ERRFLG1        RESET 'ERROR DETECTED' FLAG CDT48630
315C  2411            4865          LIS   R1,1                                    CDT48640
315E  4820 191C       4866  DRV.2   LH    R2,SVCNUM         GET CALLING CODE      CDT48650
3162  0A22            4867          AAR   R2,R2                                   CDT48660
3164  4802 354A       4868          LH    R0,SEQTAB(R2)     GET SEQUENCE INFORMATION CDT48670
3168  CD01 0000       4869          SLHL  R0,0(R1)          TEST BIT N            CDT48680
316C  2185            4870          BCS   DRV.4                                   CDT48690
316E  4330 31A4       4871          BZ    SEQEXIT           BRANCH: NO MORE TO DO. CDT48700
3172  2611            4872  DRV.3   AIS   R1,1              INCREMENT SHIFT COUNT CDT48710
3174  220B            4873          BS    DRV.2             AND TRY AGAIN.        CDT48720
3176  C800 2020       4874  DRV.4   LHI   R0,C'  '                               CDT48730
317A  4000 1ADE       4875          STH   R0,MSG17+12       INITIALIZE BUFFER     CDT48740
317E  4000 1AE0       4876          STH   R0,MSG17+14       INITIALIZE BUFFER     CDT48750
3182  C8C0 0FA4       4877          LDAI  R12,HEXASC        (GLOBAL REGISTER)     CDT48760
3186  4010 191E       4878          STH   R1,SEQPTR         SAVE FOR NEXT ARGUMENTS CDT48770
318A  9111            4879          SLLS  R1,LADC           (R1) = SEQUENCE NUMBER + 1 * ADC CDT48780
318C  4801 355C       4880          LDA   R0,SEQVECTS-ADC(R1) GET HANDLER VECTOR  CDT48790
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ERROR HANDLER

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3190  01D0           4881          BALR  R13,R0              AND GO TO IT.                          CDT48800

3192  41F0 1060      4883  NEXTSQ  BAL   R15,PRINT           PRINT THE LINE.                        CDT48820
3196  2400           4884  NXTSQ.1 LIS   R0,0                                                       CDT48830
3198  4000 1624      4885          STH   R0,ISITERR                                                 CDT48840
319C  4810 191E      4886          LH    R1,SEQPTR                                                  CDT48850
31A0  4300 3172      4887          B     DRV.3               CONTINUE...                            CDT48860

31A4  4810 1906      4889  SEQEXIT LH    R1,ERRFLG1          WAS ERROR DETECTED ?                   CDT48880
31A8  4230 34B4      4890          BNZ   TSOLID              BRANCH: YES. CHECK ABORT.              CDT48890
      0000 31AC      4891  COMRETN EQU   *                   EXIT FROM ERROR CHECK ROUTINE          CDT48900
31AC  41F0 2B14      4892          BAL   R15,PANLWRIT        SHOW CYL, SECT, HEAD                   CDT48910
31B0  4800 191A      4893          LH    R0,FLAGS            ATTEMPTING REFORMAT ?                  CDT48920
31B4  2113           4894          BMS   COMR.1              BRANCH: YES. IGNORE BREAK.             CDT48930
31B6  41F0 125C      4895          BAL   R15,TSTBRK          CHECK BREAK KEY                        CDT48940
31BA  2400           4896  COMR.1  LIS   R0,0                                                       CDT48950
31BC  4000 1624      4897          STH   R0,ISITERR                                                 CDT48960
31C0  4800 1610      4898          LH    R0,MOD32            32-BIT PROCESSOR ?                     CDT48970
31C4  2133           4899          BNZS  COMR.2              BRANCH: YES.                           CDT48980
31C6  D100 36D4      4900          LM    R0,INTSAV           RESTORE 16-BIT REGISTERS               CDT48990
31CA  C200 1934      4901  COMR.2  LPSW  SVCPSW              RETURN                                 CDT49000

      0000 31CE      4903  SEQ0    EQU   *                   TESTS DEVICE STATUS                    CDT49020
31CE  4820 191C      4904          LH    R2,SVCNUM           SVC NUMBER                             CDT49030
31D2  2726           4905          SIS   R2,6                SVC 6 ?                                CDT49040
31D4  4230 323E      4906          BNZ   SEQ0.8              BRANCH: NO.                            CDT49050
31D8  4840 175C      4907  SEQ0.1  LH    SLAD,SELCH+$VALU1   SELCH ADDRESS                          CDT49060
31DC  DE40 18F0      4908          OC    SLAD,STOPCMD        SELCH STOP                             CDT49070
31E0  4800 1610      4909          LH    R0,MOD32            SERIES 32 ?                            CDT49080
31E4  2333           4910          BZS   SEQ0.2              BRANCH: NO.                            CDT49090
31E6  DB40 1941      4911          RD    SLAD,EXSELAD+1      SELCH FINAL ADDRESS                    CDT49100
31EA  D940 1942      4912  SEQ0.2  RH    SLAD,EXSELAD+2      .                                      CDT49110
31EE  D3A0 18F4      4913          LB    STAT,SVC2STAT       CONTROLLER STATUS, THIS OP'N.          CDT49120
31F2  C3A0 00F5      4914          THI   STAT,X'F5'          CONTROLLER ERROR STATUS ?              CDT49130
31F6  2339           4915          BZS   SEQ0.3              BRANCH: NO.                            CDT49140
31F8  4800 1940      4916          LH    R0,EXSELAD          SET EXPECTED ADDRESS = ACTUAL ADDRESS  CDT49150
31FC  4000 1948      4917          STH   R0,FA               .                                      CDT49160
3200  4800 1942      4918          LH    R0,EXSELAD+2        .                                      CDT49170
3204  4000 194A      4919          STH   R0,FA+2             .                                      CDT49180
                     4920  *                                                                        CDT49190
3208  4820 191C      4921  SEQ0.3  LH    R2,SVCNUM                                                  CDT49200
320C  2726           4922          SIS   R2,6                SVC 6 ?                                CDT49210
320E  233C           4923          BZS   SEQ0.6              BRANCH: YES.                           CDT49220
3210  C3A0 0020      4924          THI   STAT,DEFSEC         DEFECTIVE SECTOR STATUS ?              CDT49230
3214  2339           4925          BZS   SEQ0.6              BRANCH: NO.                            CDT49240
                     4926  *                                                                        CDT49250
3216  2402           4927          LIS   R0,2                                                       CDT49260
3218  4000 1624      4928          STH   R0,ISITERR          LEVEL 2 SUPPRESSION                    CDT49270
321C  41F0 1048      4929          BAL   R15,SPRINT                                                 CDT49280
3220  1AE3           4930          DAC   MSG30               'DEF SEC FOUND'                        CDT49290
3222  4300 3370      4931          B     SEQ4                TELL USER WHERE.                       CDT49300
                     4932  *                                                                        CDT49310
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ERROR HANDLER

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3226  4800 1940          4933  SEQ0.6   LH    R0,EXSELAD          CHECK SELCH FINAL ADDRESS              CDT49320
322A  4500 1948          4934            CLH   R0,FA              AS EXPECTED ?                          CDT49330
322E  2136               4935            BNES  SEQ0.7             BRANCH: NO.                            CDT49340
3230  4800 1942          4936            LH    R0,EXSELAD+2        .                                      CDT49350
3234  4500 194A          4937            CLH   R0,FA+2            .                                      CDT49360
3238  233A               4938            BES   SEQ0.9             BRANCH: ALL IS WELL.                   CDT49370
323A  4300 3278          4939  SEQ0.7    B     SEQ0.11            LOG ERROR                              CDT49380
                         4940  *                                                                           CDT49390
323E  4810 1932          4941  SEQ0.8    LDA   R1,BLKADRS+4-ADC   PBLK ADDRESS                          CDT49400
3242  D321 0000          4942            LB    R2,0(R1)           STATUS MASK                            CDT49410
3246  042A               4943            NAR   R2,STAT            MASK OFF UNTESTED BITS                 CDT49420
3248  D421 0001          4944            CLB   R2,1(R1)           AND COMPARE WITH REQUIRED IMAGE        CDT49430
324C  4330 31AC          4945  SEQ0.9    BE    COMRETN            BRANCH: NO ERROR.                      CDT49440
3250  4820 191C          4946            LH    R2,SVCNUM          SVC NUMBER                             CDT49450
3254  2722               4947            SIS   R2,2               SVC 2 ?                                CDT49460
3256  2135               4948            BNZS  SEQ0.10            BRANCH: NO. SERVICE ERROR.             CDT49470
3258  4800 1912          4949            LH    R0,RWOCMD          CTRLR COMMAND, THIS OPERATION          CDT49480
325C  C300 0004          4950            THI   R0,4               FORMAT MODE ?                          CDT49490
3260  213C               4951  SEQ0.10   BNZS  SEQ0.11            BRANCH: YES. ERROR.                    CDT49500
3262  C300 0003          4952            THI   R0,3               READ/WRITE/RDCHECK ?                   CDT49510
3266  2339               4953            BZS   SEQ0.11            BRANCH: NO. ERROR.                     CDT49520
3268  C3A0 0020          4954            THI   STAT,DEFSEC        DEFECTIVE SECTOR STATUS ?              CDT49530
326C  2336               4955            BZS   SEQ0.11            BRANCH: NO.                            CDT49540
326E  D301 0001          4956            LB    R0,1(R1)           GET EXPECTED STATUS FROM PBLKNN        CDT49550
3272  9006               4957            SRLS  R0,6               DEFECTIVE SECTOR EXPECTED ?            CDT49560
3274  4380 31D8          4958            BNC   SEQ0.1             BRANCH: NO. TELL USER DEF SEC FOUND.   CDT49570
                         4959  *                                                                           CDT49580
3278  2501               4960  SEQ0.11   LCS   R0,1                                                      CDT49590
327A  4000 1906          4961            STH   R0,ERRFLG1         SET 'SVC ERROR' FLAG                   CDT49600
327E  4810 1932          4962            LDA   R1,BLKADRS+4-ADC   PBLK ADDRESS                          CDT49610
3282  4821 0002          4963            LH    R2,2(R1)           GET TRANSFER PARAMETER                 CDT49620
3286  4210 352A          4964            BM    XFER               BRANCH: IMMEDIATE VECTOR.              CDT49630
328A  4300 3196          4965            B     NXTSQ.1                                                   CDT49640


      0000 328E          4967  SEQ1      EQU   *                  PRINTS 'ERROR...','LOC...'             CDT49660
328E  2401               4968            LIS   R0,1                                                      CDT49670
3290  6100 1632          4969            AHM   R0,TOTERR          INCREMENT ETPE ERROR COUNTER           CDT49680
3294  4000 1906          4970            STH   R0,ERRFLG1         SET SVC.DRV ERROR FLAG                 CDT49690
3298  2501               4971            LCS   R0,1                                                      CDT49700
329A  6100 178E          4972            AHM   R0,RRCTR           DECREMENT RETRIES REMAINING            CDT49710
329E  41F0 2B14          4973            BAL   R15,PANLWRIT                                              CDT49720
32A2  4810 1658          4974            LH    R1,MTESTNO         GET ASCII TEST NUMBER                  CDT49730
32A6  4010 1624          4975            STH   R1,ISITERR         FORCE MESSAGE PRINT                    CDT49740
32AA  4010 1626          4976            STH   R1,NOERR           SUPPRESS THIS PRINT                    CDT49750
32AE  4010 1BDC          4977            STH   R1,MSG31+6                                                CDT49760
32B2  41F0 103C          4978            BAL   R15,CRLF                                                  CDT49770
32B6  2420               4979            LIS   R2,0                                                      CDT49780
32B8  4800 191C          4980            LH    R0,SVCNUM          SVC CODE                               CDT49790
32BC  C300 0004          4981            THI   R0,X'0004'         PARAMETER BLOCK USED ?                 CDT49800
32C0  2137               4982            BNZS  SEQ1.1             BRANCH: NO (SVC'S 4,5,6,7)             CDT49810
32C2  4820 1932          4983            LDA   R2,BLKADRS+4-ADC   LOAD PBLKNN ADRS                        CDT49820
32C6  D322 0003          4984            LB    R2,3(R2)           EXTRACT ERROR NUMBER (NN)              CDT49830
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ERROR HANDLER

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32CA  C420 000F          4985          NHI   R2,X'000F'                                  CDT49840
32CE  9104               4986  SEQ1.1  SLLS  R0,4                                       CDT49850
32D0  0620               4987          OAR   R2,R0                                       CDT49860
32D2  4810 1914          4988          LH    R1,OPCODE          GET ERROR CODE (CC)      CDT49870
32D6  9411               4989          EXBR  R1,R1                                       CDT49880
32D8  9221               4990          STBR  R2,R1              BUILD COMPOSITE ERROR CODE CDT49890
32DA  2404               4991          LIS   R0,4                                        CDT49900
32DC  C820 1BDE          4992          LDAI  R2,MSG31+8         DESTINATION              CDT49910
32E0  01FC               4993          BALR  R15,R12                                     CDT49920
32E2  41F0 1048          4994          BAL   R15,$PRINT         'ERROR TTCCNN'           CDT49930
32E6  1BD6               4995          DAC   MSG31                                       CDT49940
32E8  2400               4996          LIS   R0,0                                        CDT49950
32EA  4000 1624          4997          STH   R0,ISITERR         LEVEL 0 SUPPRESSION      CDT49960
32EE  41E0 0EFC          4998          BAL   R14,ERRL1          'LOC LLLL'               CDT49970
32F2  4300 3196          4999          B     NXTSQ.1                                     CDT49980

      0000 32F6          5001  SEQ2    EQU   *                  PRINTS DEVICE, EXPECTED/ACTUAL STATUS CDT50000
32F6  2402               5002          LIS   R0,2                                        CDT50010
32F8  4000 1624          5003          STH   R0,ISITERR         LEVEL 2 SUPPRESSION      CDT50020
32FC  4800 191C          5004          LH    R0,SVCNUM          GET SVC CODE             CDT50030
3300  2703               5005          SIS   R0,3               PARAMETER BLOCK USED ?   CDT50040
3302  2325               5006          BNPS  SEQ2.1             BRANCH: YES.             CDT50050
3304  41E0 0EBA          5007          BAL   R14,ERRDS1         'DEV DDD STA SS'         CDT50060
3308  4300 3196          5008          B     NXTSQ.1                                     CDT50070
                         5009  *                                                         CDT50080
330C  41E0 0EBA          5010  SEQ2.1  BAL   R14,ERRDS1         'DEV DDD STA SS'         CDT50090
3310  4810 1932          5011          LDA   R1,BLKADRS+4-ADC                            CDT50100
3314  D301 0000          5012          LB    R0,0(R1)           STATUS MASK              CDT50110
3318  D311 0001          5013          LB    R1,1(R1)           STATUS IMAGE             CDT50120
331C  D320 1614          5014          LB    R2,ERRSTA          ERROR STATUS             CDT50130
3320  0410               5015          NAR   R1,R0              IMAGE.AND.MASK           CDT50140
3322  C700 FFFF          5016          XHI   R0,-1                                       CDT50150
3326  0420               5017          NAR   R2,R0              STATUS.AND.(.NOT.MASK)   CDT50160
3328  0612               5018          OAR   R1,R2              LOGICAL OR YIELDS EXPECTED STATUS CDT50170
332A  2402               5019          LIS   R0,2                                        CDT50180
332C  C820 1ADC          5020          LDAI  R2,MSG17+10        DESTINATION              CDT50190
3330  01FC               5021          BALR  R15,R12            TO HEXASC                CDT50200
3332  C850 1AD2          5022          LDAI  R5,MSG17                                    CDT50210
3336  030D               5023          BR    R13                'SHOULD BE......'        CDT50220
                         5024  *                                                         CDT50230

      0000 3338          5026  SEQ3    EQU   *                  PRINTS ALL DEVICE STATUSES CDT50250
3338  2412               5027          LIS   R1,2                                        CDT50260
333A  2421               5028          LIS   R2,1                                        CDT50270
333C  4801 185E          5029  SEQ3.1  LH    R0,DEVSADR(R1)     GET DEVICE ADDRESS       CDT50280
3340  DD02 197C          5030          SS    R0,STATTAB(R2)     PUT STATUS IN TABLE      CDT50290
3344  2612               5031          AIS   R1,2                                        CDT50300
3346  2621               5032          AIS   R2,1                                        CDT50310
3348  C520 000A          5033          CLHI  R2,10                                       CDT50320
334C  2088               5034          BLS   SEQ3.1             FOR ALL DEVICES IN TABLE CDT50330
334E  2430               5035          LIS   R3,0               TABLE INDEX              CDT50340
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ERROR HANDLER

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3350  4030 1624          5036           STH   R3,ISITERR          LEVEL 0 SUPPRESSION                CDT50350
3354  C820 1B9B          5037           LDAI  R2,MSG27+7          DESTINATION                        CDT50360
3358  2402               5038           LIS   R0,2                                                   CDT50370
335A  D313 197C          5039  SEQ3.2   LB    R1,STATTAB(R3)      STATUS (HEX)                       CDT50380
335E  01FC               5040           BALR  R15,R12             TO HEXASC                          CDT50390
3360  2623               5041           AIS   R2,3                                                   CDT50400
3362  2631               5042           AIS   R3,1                                                   CDT50410
3364  C530 000A          5043           CLHI  R3,10               TEN DEVICES REPORTED               CDT50420
3368  2087               5044           BLS   SEQ3.2                                                 CDT50430
336A  C850 1B94          5045           LDAI  R5,MSG27                                               CDT50440
336E  030D               5046           BR    R13                 'STATUS S1 S2...'                  CDT50450

      0000 3370          5048  SEQ4     EQU   *                   PRINTS CYLINDER, HEAD, SECTOR      CDT50470
3370  2405               5049           LIS   R0,5                                                   CDT50480
3372  4000 191E          5050           STH   R0,SEQPTR           FOR SVC6, ENTERED HERE BY BRANCH - CDT50490
3376  4800 1914          5051           LH    R0,OPCODE           OPERATION ATTEMPTED:               CDT50500
337A  C500 0060          5052           CLHI  R0,X'60'            SELCH WAS ACTIVE ?                 CDT50510
337E  2387               5053           BNLS  SEQ4.1              BRANCH: ASSUME YES.                CDT50520
3380  4850 1922          5054           LH    R5,HEAD             GET CURRENT HEAD,                  CDT50530
3384  4800 1920          5055           LH    R0,CURSECT          CURRENT SECTOR,                    CDT50540
3388  4300 340C          5056           B     SEQ4.8              GO REPORT STARTING SECTOR.         CDT50550

338C  4810 1942          5058  SEQ4.1   LH    R1,BCOUNT+2         SOFTWARE BYTE COUNT (TDATA)        CDT50570
3390  C500 0080          5059           CLHI  R0,X'80'            SOFTWARE BYTE COUNT TO BE USED ?   CDT50580
3394  4330 33C8          5060           BE    SEQ4.2              BRANCH: YES (DATA TEST)            CDT50590
3398  4830 191C          5061           LH    R3,SVCNUM           SVC NUMBER                         CDT50600
339C  2732               5062           SIS   R3,2                SVC 2 ?                            CDT50610
339E  213A               5063           BNZS  SEQ4.1B             BRANCH: NO.                        CDT50620
33A0  4840 175C          5064           LH    SLAD,SELCH+$VALU1   SELCH DEVICE ADRS                  CDT50630
33A4  4830 1610          5065           LH    R3,MOD32            SERIES 32 ?                        CDT50640
33A8  2333               5066           BZS   SEQ4.1A             BRANCH: NO.                        CDT50650
33AA  DB40 1941          5067           RD    SLAD,EXSELAD+1      READ                               CDT50660
33AE  D940 1942          5068  SEQ4.1A  RH    SLAD,EXSELAD+2      .  SELCH FINAL ADDRESS             CDT50670
                         5069  *                                                                      CDT50680
33B2  4810 1942          5070  SEQ4.1B  LH    R1,EXSELAD+2        END ADDRESS (ASSUME S16)           CDT50690
33B6  4B10 1946          5071           SH    R1,SA+2             LESS START ADRS = LENGTH AT ERROR  CDT50700
33BA  4800 1610          5072           LH    R0,MOD32                                               CDT50710
33BE  2335               5073           BZS   SEQ4.2              BRANCH: SERIES 16                  CDT50720
33C0  5810               5074           DC    X'5810',Z(EXSELAD)  * L R1,EXSELAD                     CDT50730
33C2  1940
33C4  5B10               5075           DC    X'5B10',Z(SA)       * S R1,SA                          CDT50740
33C6  1944
33C8  D300 197D          5076  SEQ4.2   LB    R0,STATTAB+1        GET REPORTED CTRLR STATUS          CDT50750
33CC  9001               5077           SRLS  R0,1                'DATA TRANSFER ERROR' BIT SET ?    CDT50760
33CE  2386               5078           BNCS  SEQ4.3              BRANCH: NO.                        CDT50770
33D0  4800 1910          5079           LH    R0,STATE            CURRENT DRIVE                      CDT50780
33D4  9D00               5080           SSR   R0,R0               DRIVE STATUS ERROR ?               CDT50790
33D6  2172               5081           BTFS  7,SEQ4.3            BRANCH: YES.                       CDT50800
33D8  2712               5082           SIS   R1,2                CORRECT PRINTOUT FOR LRCC ERROR    CDT50810
33DA  4820 18FA          5083  SEQ4.3   LH    R2,PRECL            BYTES PER PHYSICAL SECTOR          CDT50820
33DE  2404               5084           LIS   R0,X'04'                                               CDT50830
33E0  4400 1912          5085           NH    R0,RWOCMD           FORMAT MODE CTRLR COMMAND ?        CDT50840
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ERROR HANDLER

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33E4  2133           5086          BNZS  SEQ4.4              BRANCH: YES.                          CDT50850
33E6  C820 0100      5087          LHI   R2,LRECL            BYTES PER LOGICAL SECTOR              CDT50860
33EA  4850 1922      5088  SEQ4.4  LH    R5,HEAD             STARTING HEAD                         CDT50870
33EE  4840 18F8      5089          LH    R4,MAXSEC           SECTORS/TRACK                         CDT50880
33F2  4800 1920      5090          LH    R0,CURSECT          STARTING SECTOR                       CDT50890
33F6  0504           5091          CLAR  R0,R4               VALID STARTING SECTOR ?               CDT50900
33F8  238A           5092          BNLS  SEQ4.8              BRANCH: NO. FROM SCOPE LOOP.          CDT50910
33FA  0B12           5093  SEQ4.5  SAR   R1,R2               SUBTRACT BYTES/SECTOR                 CDT50920
33FC  2113           5094          BMS   SEQ4.7              BRANCH: DONE                          CDT50930
33FE  2601           5095          AIS   R0,1                INCREMENT SECTOR COUNT                CDT50940
3400  2203           5096          BS    SEQ4.5                                                    CDT50950
3402  0504           5097  SEQ4.7  CLAR  R0,R4               PASSED HEAD BOUNDARY ?                CDT50960
3404  2184           5098          BLS   SEQ4.8              BRANCH: NO.                           CDT50970
3406  0B04           5099          SAR   R0,R4               ADJUST SECTOR NUMBER,                 CDT50980
3408  2651           5100          AIS   R5,1                ADVANCE HEAD NUMBER                   CDT50990
340A  2204           5101          BS    SEQ4.7              CHECK FOR LARGE XFERS.                CDT51000
                     5102  *                                                                       CDT51010
340C  0810           5103  SEQ4.8  LDAR  R1,R0               COPY SECTOR NUMBER                    CDT51020
340E  2402           5104          LIS   R0,2                BYTE COUNT                            CDT51030
3410  4000 1624      5105          STH   R0,ISITERR          LEVEL 2 PRINT SUPPRESSION             CDT51040
3414  C820 1B07      5106          LDAI  R2,MSG18+21         DESTINATION                           CDT51050
3418  01FC           5107          BALR  R15,R12             CONVERT LOGICAL SECTOR NUMBER         CDT51060
341A  0815           5108          LDAR  R1,R5               COPY HEAD NUMBER                      CDT51070
341C  2728           5109          SIS   R2,8                (21-13)                               CDT51080
341E  01FC           5110          BALR  R15,R12             CONVERT HEAD NUMBER                   CDT51090
3420  4810 1924      5111          LH    R1,CURCYL                                                 CDT51100
3424  2403           5112          LIS   R0,3                                                      CDT51110
3426  2729           5113          SIS   R2,9                (13-4)                                CDT51120
3428  01FC           5114          BALR  R15,R12             CONVERT CYLINDER ADRS                 CDT51130
342A  C850 1AF2      5115          LDAI  R5,MSG18                                                  CDT51140
342E  030D           5116          BR    R13                 'CYL CC HEAD NN...'                   CDT51150

      0000 3430      5118  SEQ5    EQU   *                   LOGS COMMENTARY MSG VIA SVC           CDT51170
3430  4850 1932      5119          LDA   R5,BLKADRS+4-ADC    MESSAGE ADDRESS                       CDT51180
3434  4050 1624      5120  SEQ5.1  STH   R5,ISITERR          FORCE PRINT                           CDT51190
3438  030D           5121          BR    R13                 LOG MESSAGE                           CDT51200

      0000 343A      5123  SEQ6    EQU   *                   PRINT SELCH FINAL ADRS ERROR          CDT51220
343A  4800 1906      5124          LH    R0,ERRFLG1          PROCESSING ERROR ?                    CDT51230
343E  4330 3196      5125          BZ    NXTSQ.1             BRANCH: NO. DEF SEC.                  CDT51240
3442  2401           5126          LIS   R0,1                                                      CDT51250
3444  4000 1624      5127          STH   R0,ISITERR          LEVEL 1 PRINT SUPPRESSION             CDT51260
3448  4810 1942      5128          LH    R1,EXSELAD+2        RELOAD SELCH FINAL ADDRESS            CDT51270
344C  4800 1610      5129          LH    R0,MOD32            SERIES 32 ?                           CDT51280
3450  2333           5130          BZS   SEQ6.1              BRANCH: NO.                           CDT51290
3452  5810           5131          DC    X'5810',Z(EXSELAD)  * L R1,EXSELAD                        CDT51300
3454  1940
3456  2406           5132  SEQ6.1  LIS   R0,6                DIGIT COUNT                           CDT51310
3458  C820 1ACA      5133          LDAI  R2,MSG16+9          DESTINATION                           CDT51320
345C  01FC           5134          BALR  R15,R12             CONVERT ACTUAL FA                     CDT51330
345E  41F0 1048      5135          BAL   R15,$PRINT          SELCH FA .....'                       CDT51340
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ERROR HANDLER

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3462  1AC1            5136          DAC   MSG16                                  CDT51350
3464  4810 194A       5137          LH    R1,FA+2          EXPECTED END ADDRESS  CDT51360
3468  48F0 1610       5138          LH    R15,MOD32        SERIES 32 ?           CDT51370
346C  2333            5139          BZS   SEQ6.2          BRANCH: NO.           CDT51380
346E  5810            5140          DC    X'5810',Z(FA)    * L R1,FA             CDT51390
3470  1948
3472  C820 1ADC       5141  SEQ6.2  LDAI  R2,MSG17+10      DESTINATION           CDT51400
3476  01FC            5142          BALR  R15,R12                                CDT51410
3478  C850 1AD2       5143          LDAI  R5,MSG17                               CDT51420
347C  030D            5144          BR    R13              'SHOULD BE....'       CDT51430

      0000 347E       5146  SEQ7    EQU   *                PRINTS DATA COMPARE ERROR  CDT51450
347E  4810 1942       5147          LDA   R1,BCOUNT+4-ADC  BYTE COUNT AT DATA COMPARE ERROR  CDT51460
3482  2406            5148          LIS   R0,6                                   CDT51470
3484  C820 1AB0       5149          LDAI  R2,MSG15+6       DESTINATION           CDT51480
3488  01FC            5150          BALR  R15,R12          CONVERT BYTE COUNT    CDT51490
348A  2404            5151          LIS   R0,4             BYTE COUNT            CDT51500
348C  4810 1916       5152          LH    R1,EDATA         EXPECTED DATA         CDT51510
3490  C820 1ADC       5153          LDAI  R2,MSG17+10      DESTINATION           CDT51520
3494  01FC            5154          BALR  R15,R12          CONVERT GOOD DATA     CDT51530
3496  4810 1918       5155          LH    R1,RDATA         DATA READ             CDT51540
349A  C820 1ABC       5156          LDAI  R2,MSG15+18      DESTINATION           CDT51550
349E  01FC            5157          BALR  R15,R12          CONVERT BAD DATA      CDT51560
34A0  41F0 1048       5158          BAL   R15,$PRINT       'BYTES .... READ ....'  CDT51570
34A4  1AAA            5159          DAC   MSG15                                  CDT51580
34A6  C850 1AD2       5160          LDAI  R5,MSG17                               CDT51590
34AA  030D            5161          BR    R13              'SHOULD BE ....'      CDT51600

      0000 34AC       5163  SEQ9    EQU   *                PRINTS BACKGROUND FAILURE MESSAGE  CDT51620
34AC  C850 1BF8       5164          LDAI  R5,MSG33                               CDT51630
34B0  4300 3434       5165          B     SEQ5.1           'BACKGROUND FAILURE'  CDT51640

      0000 34B4       5167  TSOLID  EQU   *                DECIDES IF TO ABORT TEST ON ERROR  CDT51660
                      5168  * RESET SELCH, CONTROLLER                            CDT51670
34B4  4840 175C       5169          LH    SLAD,SELCH+$VALU1                      CDT51680
34B8  DE40 18F0       5170          OC    SLAD,STOPCMD     STOP SELCH            CDT51690
34BC  9D40            5171          SSR   SLAD,R0          ENSURE PRIVATE BUS CONNECTED  CDT51700
34BE  4830 1768       5172          LH    DCAD,DISCON+$VALU1                     CDT51710
34C2  DE30 18E9       5173          OC    DCAD,RESET       RESET CONTROLLER      CDT51720
34C6  240F            5174          LIS   R0,15                                  CDT51730
34C8  41F0 0F82       5175          BAL   R15,TIMER        UNCONDX 15 MSEC WAIT  CDT51740
                      5176  * DECIDE WHETHER TO RETRY OR ABORT                   CDT51750
34CC  4800 178C       5177          LH    R0,RETRY+$VALU1                        CDT51760
34D0  2338            5178          BZS   EURC             ALWAYS ABORT ON 'NO RETRIES'  CDT51770
34D2  2402            5179          LIS   R0,2                                   CDT51780
34D4  4400 191A       5180          NH    R0,FLAGS         'DO NOT ABORT' ?      CDT51790
34D8  213B            5181          BNZS  RERUN            BRANCH: YES.          CDT51800
34DA  4800 178E       5182          LH    R0,RRCTR         RETRIES EXHAUSTED ?   CDT51810
34DE  2318            5183          BNMS  RERUN            BRANCH: NOT EXHAUSTED YET.  CDT51820
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ERROR HANDLER

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      0000 34E0          5185  EURC    EQU   *                SOLID ERROR - ABORT SUBTEST.        CDT51840
34E0  4810 0A52          5186        LH    R1,PSW2          SPEC'D AS X'30F0'                   CDT51850
34E4  9501               5187        EPSR  R0,R1            SELECT USER REGISTER SET            CDT51860
34E6  C850 1A9D          5188        LDAI  R5,MSG14         'SOLID ERROR:'                      CDT51870
34EA  4300 1D7E          5189        B     PRINTIT          WILL DECIDE IF SUBTEST,             CDT51880
                         5190  *                            REFORMAT ABORTED.                   CDT51890

      0000 34EE          5192  RERUN   EQU   *                ATTEMPTS ERROR RECOVERY             CDT51910
34EE  C800 06D6          5193        LHI   R0,1750          TIMEOUT CONSTANT                    CDT51920
34F2  48B0 1924          5194        LH    TRACK,CURCYL                                       CDT51930
34F6  4850 1910          5195        LH    FUT,STATE        CURRENT DRIVE                       CDT51940
34FA  9D5A               5196        SSR   FUT,STAT                                           CDT51950
34FC  232F               5197        BFFS  SEEKINC,RER1     BRANCH: NO RESTORE NECESSARY        CDT51960
34FE  DE50 18EB          5198        OC    FUT,RESTOC       RESTORE                             CDT51970
3502  41F0 0F82          5199        BAL   R15,TIMER        UNCONDX WAIT 1750 MSEC              CDT51980
3506  985B               5200        WHR   FUT,TRACK        TO RESEEK CURRENT CYLINDER          CDT51990
3508  240F               5201        LIS   R0,15                                              CDT52000
350A  41F0 0F82          5202        BAL   R15,TIMER        UNCONDX WAIT 15 MSEC                CDT52010
350E  DE50 18EA          5203        OC    FUT,SEEKC        SEEK CURRENT CYLINDER               CDT52020
3512  C800 05DC          5204        LHI   R0,1500                                            CDT52030
3516  41F0 0F82          5205        BAL   R15,TIMER        UNCONDX WAIT 1500 MSEC              CDT52040
351A  D1E0 1934          5206  RER1    LM    R14,SVCPSW       SVC RETURN PSW                      CDT52050
351E  48F0 1966          5207        LDA   R15,RERN+4-ADC   GET RERUN ADDRESS                   CDT52060
3522  4800 191C          5208        LH    R0,SVCNUM                                          CDT52070
3526  2703               5209        SIS   R0,3             XFER LEGAL (SVC'S 0-3) ?            CDT52080
3528  212D               5210        BPS   RER3            BRANCH: NO.                         CDT52090
352A  4810 1932          5211  XFER    LDA   R1,BLKADRS+4-ADC                                   CDT52100
352E  D321 0002          5212        LB    R2,2(R1)         GET TRANSFER SPEC                   CDT52110
3532  C420 007F          5213        NHI   R2,X'7F'                                           CDT52120
3536  2336               5214        BZS   RER3             BRANCH: NO VECTOR TO TAKE           CDT52130
3538  9121               5215        SLLS  R2,LADC                                            CDT52140
353A  4822 35D0          5216        LDA   R2,XFERTAB-ADC(R2)                                 CDT52150
353E  2332               5217        BZS   RER3             DON'T ALLOW ZERO XFER ADDRESS       CDT52160
3540  08F2               5218        LDAR  R15,R2                                             CDT52170
3542  D0E0 1934          5219  RER3    STM   R14,SVCPSW       RETURN PSW                          CDT52180
3546  4300 31AC          5220        B     COMRETN          RETURN TO RERUN ADDRESS             CDT52190

      0000 354A          5222  SEQTAB  EQU   *                BIT TABLE FOR SEQUENCING PRINTOUT   CDT52210
354A  F800               5223        DCX   F800             SVC 0                               CDT52220
354C  F800               5224        DCX   F800             SVC 1                               CDT52230
354E  F800               5225        DCX   F800             SVC 2                               CDT52240
3550  F800               5226        DCX   F800             SVC 3                               CDT52250
3552  7800               5227        DCX   7800             SVC 4                               CDT52260
3554  0400               5228        DCX   0400             SVC 5                               CDT52270
3556  FA00               5229        DCX   FA00             SVC 6                               CDT52280
3558  7900               5230        DCX   7900             SVC 7                               CDT52290
355A  0000               5231        DCX   0000             SVC 8 RESERVED                      CDT52300
355C  4040               5232        DCX   4040             SVC 9                               CDT52310
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ERROR HANDLER

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355E                        5234           ALIGN ADC                                                CDT52330
      0000 355E             5235  SEQVECTS EQU   *                PRINTOUT MODULE ENTRY ADDRESSES  CDT52340
355E  31CE                  5236           DAC   SEQ0             STATUS TESTS                     CDT52350
3560  328E                  5237           DAC   SEQ1             'ERROR..','LOC...'               CDT52360
3562  32F6                  5238           DAC   SEQ2             'DEV...STA...','SHOULD BE...'    CDT52370
3564  3338                  5239           DAC   SEQ3             'STATUS S1,S2...'                CDT52380
3566  3370                  5240           DAC   SEQ4             'CYL...HEAD..SECT...'            CDT52390
3568  3430                  5241           DAC   SEQ5             MESSAGES                         CDT52400
356A  343A                  5242           DAC   SEQ6             'SELCH FA...','SHOULD BE...'     CDT52410
356C  347E                  5243           DAC   SEQ7             'BYTES READ...','SHOULD BE...'   CDT52420
356E  0000                  5244           DAC   0                SEQ8 RESERVED                    CDT52430
3570  34AC                  5245           DAC   SEQ9             'BACKGROUND FAILURE'             CDT52440
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PARAMETER BLOCKS

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                        5248  * PARAMETER BLOCKS DEFINED HERE ARE USED BY THE SVC.DRV COMMON STATUS     CDT52470
                        5249  * TEST ROUTINE. ENTRIES IN THE PARAMETER BLOCK HAVE THE FOLLOWING        CDT52480
                        5250  * MEANINGS:                                                              CDT52490
                        5251  *                                                                       CDT52500
                        5252  *        +0   -   STATUS MASK                                           CDT52510
                        5253  *        +1   -   STATUS IMAGE                                          CDT52520
                        5254  *        +2   -   TRANSFER CONTROL                                      CDT52530
                        5255  *                 BIT 0                                                 CDT52540
                        5256  *                   IF BIT 0 = 0, TRANSFER IS TAKEN AFTER ERROR PRINT   CDT52550
                        5257  *                   IF BIT 0 = 1, TRANSFER TAKEN IMMEDIATELY ON ERROR   CDT52560
                        5258  *                 BITS 1:7                                              CDT52570
                        5259  *                   INDEX FOR THE 127-ENTRY (MAX) VECTOR TABLE          CDT52580
                        5260  *        +3   -   ERROR NUMBER NN                                       CDT52590

                        5262  * ------------------------------------------------------------------    CDT52610
                        5263  *                                                                       CDT52620
                        5264  *        DRIVE STATUS DICTIONARY                                        CDT52630
                        5265  *                                                                       CDT52640
                        5266  *  80:   BIT 0 DRIVE WRITE PROTECT                                      CDT52650
                        5267  *  40:   BIT 1 WRITE CHECK                                              CDT52660
                        5268  *  20:   BIT 2 ILLEGAL ADDRESS                                          CDT52670
                        5269  *  10:   BIT 3 DISK ADDRESS INTERLOCK                                   CDT52680
                        5270  *  08:   BIT 4 DRIVE NOT READY (NOT RSRW)                               CDT52690
                        5271  *  04:   BIT 5 EXAMINE STATUS                                           CDT52700
                        5272  *  02:   BIT 6 SEEK INCOMPLETE                                          CDT52710
                        5273  *  01:   BIT 7 DRIVE OFF LINE (DISK NOT READY)                          CDT52720
                        5274  *                                                                       CDT52730
                        5275  *                                                                       CDT52740
                        5276  *        CONTROLLER STATUS DICTIONARY                                   CDT52750
                        5277  *                                                                       CDT52760
                        5278  *  80:   BIT 0 OVERRUN                                                  CDT52770
                        5279  *  40:   BIT 1 ADDRESS (HEADER) COMPARE FAILURE                         CDT52780
                        5280  *  20:   BIT 2 DEFECTIVE SECTOR (TRACK)                                 CDT52790
                        5281  *  10:   BIT 3 CYLINDER OVERFLOW                                        CDT52800
                        5282  *  08:   BIT 4 BUSY (SHOULD BE IGNORED)                                 CDT52810
                        5283  *  04:   BIT 5 EXAMINE STATUS                                           CDT52820
                        5284  *  02:   BIT 6 CONTROLLER IDLE                                          CDT52830
                        5285  *  01:   BIT 7 DATA TRANSFER ERROR                                      CDT52840
                        5286  *                                                                       CDT52850
                        5287  * ------------------------------------------------------------------    CDT52860

3572  0800              5289  PBLK01   DB    BSY,0              NOT BUSY, SELCH                      CDT52880
3574  0011              5290           DCX   0011               ERROR NUMBER                         CDT52890

3576  7E0A              5292  PBLK02   DB    X'7E',BSY+IDLE     BSY+IDLE, CTRLR (DTE=DON'T CARE)     CDT52910
3578  0021              5293           DCX   0021               ERROR NUMBER                         CDT52920

357A  8000              5295  PBLK03   DB    WRTPRT,0           NOT WRITE-PROTECTED, DRIVES          CDT52940
357C  0031              5296           DCX   0031               ERROR NUMBER                         CDT52950

357E  7F00              5298  PBLK04   DB    X'7F',0            STATUS 00 OR 80, DRIVES              CDT52970
3580  0031              5299           DCX   0031               ERROR NUMBER                         CDT52980
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PARAMETER BLOCKS

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3582  2424              5301  PBLK05  DB    ILGADR+EX,ILGADR+EX ILLEGAL ADDRESS, DRIVES                CDT53000
3584  0032              5302          DCX   0032                ERROR NUMBER                           CDT53010

3586  2000              5304  PBLK06  DB    ILGADR,0            ILGADR RESET, DRIVES                   CDT53030
3588  0031              5305          DCX   0031                ERROR NUMBER                           CDT53040

358A  B424              5307  PBLK08  DB    X'B4',DEFSEC+EX     DEF TRK, CTRLR (HDR ERR=DON'T CARE)    CDT53060
358C  0022              5308          DCX   0022                ERROR NUMBER                           CDT53070

358E  F501              5310  PBLK09  DB    X'F5',DATERR        LRC ERROR, CTRLR                       CDT53090
3590  0022              5311          DCX   0022                ERROR NUMBER                           CDT53100

3592  F444              5313  PBLK0A  DB    X'F4',HDFAIL+EX     HEADER FAILURE, CTRLR                  CDT53120
3594  0022              5314          DCX   0022                ERROR NUMBER                           CDT53130

3596  8686              5316  PBLK0B  DB    X'86',OVERRUN+EX+IDLE OVERRUN, CTRLR                       CDT53150
3598  0022              5317          DCX   0022                ERROR NUMBER                           CDT53160

359A  F514              5319  PBLK0C  DB    X'F5',CYLOV+EX      CYLINDER OVERFLOW, CTRLR               CDT53180
359C  0022              5320          DCX   0022                ERROR NUMBER                           CDT53190

359E  0800              5322  PBLK0D  DB    BSY,0               NOT BUSY, SELCH                        CDT53210
35A0  0061              5323          DCX   0061                ERROR NUMBER                           CDT53220

35A2  F702              5325  PBLK0E  DB    X'F7',IDLE          IDLE, CTRLR                            CDT53240
35A4  0021              5326          DCX   0021                ERROR NUMBER                           CDT53250

35A6  0909              5328  PBLK0F  DB    BSY+OFFLINE,BSY+OFFLINE BOTH SET, DRIVES                   CDT53270
35A8  0032              5329          DCX   0032                ERROR NUMBER                           CDT53280

35AA  F602              5331  PBLK10  DB    X'F6',IDLE          (DTE = DON'T CARE), CTRLR              CDT53300
35AC  0521              5332          DCX   0521                (TRANSFER) ERROR NUMBER                CDT53310

35AE  7500              5334  PBLK13  DB    X'75',0             BSY+ILGADR NOT TESTED, DRIVES          CDT53330
35B0  0031              5335          DCX   0031                ERROR NUMBER                           CDT53340

35B2  F702              5337  PBLK14  DB    X'F7',IDLE          IDLE ONLY, CTRLR (BSY=DON'T CARE)      CDT53360
35B4  0121              5338          DCX   0121                (TRANSFER) ERROR NUMBER                CDT53370

35B6  F702              5340  PBLK16  DB    X'F7',IDLE          IDLE, CTRLR                            CDT53390
35B8  0021              5341          DCX   0021                ERROR NUMBER                           CDT53400

35BA  FF80              5343  PBLK18  DB    X'FF',WRTPRT        WRITE PROTECT, DRIVES.                 CDT53420
35BC  0032              5344          DCX   0032                ERROR NUMBER                           CDT53430

35BE  0000              5346  PBLK20  DB    0,0                 BACKGROUND TEST FAILURE                CDT53450
35C0  0091              5347          DCX   0091                ERROR NUMBER                           CDT53460

35C2  F702              5349  PBLK23  DB    X'F7',IDLE          IDLE ONLY, CTRLR                       CDT53480
35C4  0221              5350          DCX   0221                (TRANSFER) ERROR NUMBER                CDT53490

35C6  2424              5352  PBLK25  DB    DEFSEC+EX,DEFSEC+EX DEFECTIVE TRK (SECTOR)                 CDT53510
35C8  0322              5353          DCX   0322                (TRANSFER) ERROR NUMBER                CDT53520
```

PARAMETER BLOCKS

```
35CA   7F08              5355  PBLK30   DB    X'7F',NOTRDY       NOT READY, DRIVES          CDT53540
35CC   0031              5356           DCX   0031               ERROR NUMBER               CDT53550

35CE                     5358           DS    4                  DUMMY                      CDT53570

       0000 35D2         5360  XFERTAB  EQU   *                  TRANSFER VECTOR TABLE      CDT53590
35D2   2B7C              5361           DAC   ERRCK              VECT 01                    CDT53600
35D4   3042              5362           DAC   RDRTRY             VECT 02                    CDT53610
35D6   2E7E              5363           DAC   FLAG.0             VECT 03                    CDT53620
35D8   0000              5364           DAC   0                  DUMMY                      CDT53630
35DA   2C3A              5365           DAC   GOCHECK2           VECT 05                    CDT53640


       0000 35DB         5367  LNZB     EQU   *-1                                           CDT53660
```

PARAMETER BLOCKS

```
                        5369  **CHKSUM ETPER05 DATA STATEMENTS                                  CDT53680
35E0                    5370          ALIGN 8                                                   CDT53690
      0000 35E0         5371  PSWSAVE EQU   *       PPF PSW SAVE AREA (MOVES)                   CDT53700
35E0                    5372  $TBRKSV DS    8       STORAGE FOR TSTBRK ROUTINE                  CDT53710
35E8                    5373  $R15SAV DS    4                                                   CDT53720
35EC                    5374  $R14SAV DS    8       MUST BE SEPARATE                            CDT53730
35F4                    5375  $OUTBUF DS    $BUFLEN LENGTH IS $BUFLEN                           CDT53740
3644                    5376  $INBUF  DS    $BUFLEN LENGTH IS $BUFLEN                           CDT53750
3694                    5377          ALIGN 4                                                   CDT53760
3694                    5378  RSAVE   DS    64      REGISTER SAVE AREA                          CDT53770
36D4                    5379  INTSAV  DS    64      REGISTERS ON EXT/IMM INTERRUPT              CDT53780
3714                    5380  ERRSAVE DS    64      STORAGE FOR ERROR ROUTINES                  CDT53790
                        5381  **END ETPER05 DATA STATEMENTS                                     CDT53800


      0000 3754         5383  WTF     EQU   *       DEFAULT WRITE BUFFER                        CDT53820
3754                    5384          DS    272*4                                             CDT53830
      0000 3B94         5385  RDF     EQU   *       DEFAULT READ BUFFER                         CDT53840
3B94                    5386          DS    272*4                                             CDT53850
      0000 3FD4         5387  DEFEND  EQU   *       DEFAULT BUFFER END                          CDT53860
      0000 9D54         5388  MAXEND  EQU   272*48*2+WTF MAX BUFFER SPACE REQ'D                 CDT53870
```

CHKSUM/M17 PUNCHER

```
3FD4  2400           5390  $CHKSUM  LIS   R0,0            PUNCH M17 TAPE WITH CHECKSUM          CDT53890
3FD6  9510           5391           EPSR  R1,R0           SELECT REG. SET 0 & CLEAR PSW         CDT53900
                     5392  *                                                                    CDT53910
3FD8  C810 0A00      5393           LDAI  R1,ORIGIN1      LOAD START ADDRESS                    CDT53920
3FDC  2421           5394           LIS   R2,1            LOAD INCREMENT VALUE                  CDT53930
3FDE  C830 35DB      5395           LDAI  R3,LNZB         LOAD FINAL ADDRESS                    CDT53940
3FE2  2440           5396           LIS   R4,0            INITIALIZE CHKSUM BYTE                CDT53950
                     5397  *                                                                    CDT53960
3FE4  D351 0000      5398  $GEN     LB    R5,0(R1)                                            CDT53970
3FE8  0745           5399           XAR   R4,R5           CALCULATE CHKSUM BYTE                 CDT53980
3FEA  C110 3FE4      5400           BXLE  R1,$GEN                                               CDT53990
3FEE  D240 0099      5401           STB   R4,MN+3         CHECKSUM BYTE TO BOOT LOADER          CDT54000
                     5402  *                                                                    CDT54010
3FF2  C810 0080      5403  $TAPE    LHI   R1,X'0080'                                            CDT54020
3FF6  9411           5404           EXBR  R1,R1                                                 CDT54030
3FF8  9501           5405           EPSR  R0,R1           HALT PROCESSOR                        CDT54040
                     5406  *                                                                    CDT54050
                     5407  *--------------------------------                                   CDT54060
                     5408  *                                                                    CDT54070
3FFA  D360 007A      5409  $PUNCH   LB    R6,X'7A'        GET BOUTDV (PUNCH) ADDRESS.           CDT54080
3FFE  DE60 007B      5410           OC    R6,X'7B'        START TAPE PUNCH                      CDT54090
4002  9D60           5411           SSR   R6,R0                                                 CDT54100
4004  2081           5412           BTBS  8,1                                                   CDT54110
4006  41F0 4046      5413           BAL   R15,$TAPL       PUNCH LEADER                          CDT54120
400A  C810 0080      5414           LHI   R1,X'80'                                              CDT54130
400E  C830 00CF      5415           LHI   R3,X'CF'                                              CDT54140
                     5416  *                                                                    CDT54150
4012  DA61 0000      5417  $PNCH1   WD    R6,0(R1)        PUNCH BOOT LOADER                     CDT54160
4016  9D60           5418           SSR   R6,R0                                                 CDT54170
4018  2081           5419           BTBS  8,1                                                   CDT54180
401A  C110 4012      5420           BXLE  R1,$PNCH1                                             CDT54190
401E  41F0 404C      5421           BAL   R15,$TAPL1      PUNCH ONE-FOLD GAP.                   CDT54200
                     5422  *                                                                    CDT54210
4022  D340 0099      5423           LB    R4,MN+3         GET CHECKSUM BYTE                     CDT54220
4026  C810 0A00      5424           LDAI  R1,ORIGIN1      (NORMALLY X'A00')                     CDT54230
402A  C830 35DB      5425           LDAI  R3,LNZB                                               CDT54240
                     5426  *                                                                    CDT54250
402E  D351 0000      5427  $PNCH2   LB    R5,0(R1)        PUNCH PROGRAM                         CDT54260
4032  0745           5428           XAR   R4,R5                                                 CDT54270
4034  9A65           5429           WDR   R6,R5                                                 CDT54280
4036  9D60           5430           SSR   R6,R0                                                 CDT54290
4038  2081           5431           BTBS  8,1                                                   CDT54300
403A  C110 402E      5432           BXLE  R1,$PNCH2                                             CDT54310
403E  41F0 4046      5433           BAL   R15,$TAPL       PUNCH TRAILER.                        CDT54320
4042  4300 3FF2      5434           B     $TAPE           DISPLAY CHECKSUM, HALT PROCESSOR.     CDT54330
```

```
                        5436  * CHKSUM/M17 PUNCHER                                    CDT54350


4046   C800 0100        5438  $TAPL    LHI   R0,256          TO PUNCH BLANK LEADER    CDT54370
404A   2303             5439           BS    $TAPLP                                   CDT54380
                        5440  *                                                      CDT54390
404C   C800 0080        5441  $TAPL1   LHI   R0,128          TO PUNCH 1-FOLD GAP      CDT54400
                        5442  *                                                      CDT54410
4050   2701             5443  $TAPLP   SIS   R0,1                                    CDT54420
4052   032F             5444           BNPR  R15              RETURN                   CDT54430
4054   2430             5445           LIS   R3,0                                     CDT54440
4056   9A63             5446           WDR   R6,R3            PUNCH BLANK FRAME        CDT54450
4058   9D68             5447           SSR   R6,R8                                    CDT54460
405A   2081             5448           BTBS  8,1                                      CDT54470
405C   2206             5449           BS    $TAPLP           CONTINUE.                CDT54480


405E                    5451           END                                            CDT54500
```

ASSEMBLED BY CAL 03-066R07-00 (32-BIT)

START OPTIONS: T=16,ERLST

NO CAL ERRORS
NO CAL WARNINGS
3 PASSES

```
$BRKEND   0000 1703    989   1724*
$BRKFLG   0000 1620    216    233    985    986   1159   1184   1671*
$BS.COMM  0000 1572   1556   1561   1566   1572*
$BUFIO    0000 0000     64*   923   1037
$BUFLEN   0000 0050     40*   736   1093   5375   5376
$CHKSUM   0000 3FD4   5390*
$CKROUT   0000 0006     35*   260    285    374    386    389    401    404    893    896    912    917   2031
                      2037   2038
$CLKSTRT  0000 1617   1661*
$CLOCK    0000 0001     62*   762    764    782
$COMM1    0000 159A   1608   1610   1613*
$COMM2    0000 15B0   1619*  1621
$COMM3    0000 15E4   1633   1635*
$CON      0000 0A5C    192*   274
$CONPAS   0000 161A   1134   1214   1255   1664*
$DECASC   0000 0000     60*   852
$DECHEX   0000 0000     59*   336
$DECTAB   0000 0000     58*  1689
$DISPLAY  0000 0001     63*   493    556
$DU.X     0000 1326   1229   1231*
$ERRF1    0000 1584   1318   1598*
$ERRF2    0000 1574   1304   1576*
$ERRF3    0000 1506   1311   1503*  1544   2266
$ERRF4    0000 14CE   1431   1437   1477*
$ERRF5    0000 1580   1363   1590*
$ERRF5A   0000 157C   1342   1585*
$ERRF6    0000 14D2   1442   1482*
$ERRF7    0000 1564   1366   1560*
$ERRF8    0000 1568   1360   1565*
$ERRF9    0000 156C   1329   1570*  1933
$GEN      0000 3FE4   5398*  5400
$HEXA.1   0000 0FAE    843*   850
$INBUF    0000 3644    252    262    294    416    735   1088   5376*
$IS.DU    0000 1324   1213   1222   1227   1230*
$KBINT    0000 0000     61*  1260   1372   1423   1667
$KBR.1    0000 1362   1257   1259*
$KEEP.1   0000 0C88    430    434*   437
$KEEP.2   0000 0C90    435    438*
$KEEP1    0000 0CAE    450*   509
$KEEP2    0000 0CB4    452*   466    499   2471   3964   3994
$KEEP2.1  0000 0CD8    461    463*
$KEEP3    0000 0CF6    476*   498
$KEEP5    0000 0D3A    455    504*
$KEEP5.1  0000 0D54    511    513*
$KEEP5.2  0000 0D66    516    519*
$KEEP7    0000 0D7E    524    532*
$LCOR1    0000 1386   1288*  1291
```

```
$LCOR2     0000 139C      1295   1298*
$LCOR3     0000 13A0      1299*  1301
$LCOR3A    0000 13D8      1321   1323*
$LCOR4     0000 13E6      1330*  1332
$LCOR5     0000 1410      1337   1352*
$LCORXIT   0000 1438      1347   1369*
$LINCNT    0000 1842       379    413   1767*
$LINEPOS   0000 162A       957   1059   1676*
$LOOK      0000 0ADC       245*   420
$LOOK.0    0000 0AE4       247*   258    267
$LOOK.1    0000 0AE6       248*
$LOOK.2    0000 0AF0       252*   261
$LOOK.3    0000 0B12       256    264*
$LOOK.4    0000 0B22       265    269*
$LOOK.5    0000 0B42       280*
$LOCK.6    0000 0B58       286    288*
$LSTB.0    0000 0FE6       894*   908
$LSTB.1    0000 0FFC       897    901*
$LSTB.2    0000 1008       905*
$LSTB.2A   0000 100A       895    906*
$LSTB.2B   0000 1026       913    915*
$LSTB.2C   0000 1036       918    920*
$LSTB.A    0000 0FDA       890*   916
$LSTB.B    0000 0FE4       889    893*
$LSTBIT    0000 0FCA       393    883*  2040
$LSTPAS    0000 161C      1112   1218   1665*
$MAXIO     0000 0006       133*   369   1102
$MM.1      0000 1538      1510   1519*
$MM.2      0000 153E      1512   1521*
$MM.3      0000 154E      1513   1520   1521   1544*
$MM.3A     0000 1560      1548   1550*
$MM16.1    0000 152A      1507   1515*
$MSGPRT    0000 0F26       655    664    677    717*
$MSGPRT1   0000 0F36       646    722*
$NOT.DU    0000 1320      1224   1228*
$OPT.0     0000 0BE2       367    374*
$OPT.2     0000 0BF8       382*   387
$OPT.3     0000 0C22       391    399*
$OPT.5     0000 0C3A       394    406*
$OPT.6     0000 0C6E       421*
$OPT.A     0000 0BEE       378*   411    421
$OPT.B     0000 0BF4       380*   414
$OPTNAME   0000 0000        34*
$OPTPRT    0000 0BCA       270    366*
$OPTV.0    0000 0F48       735*   740    751
$OPTV.2    0000 0F62       744*   747
$OPTV.3    0000 0F6E       745    749*
$OTC.0     0000 10E6      1001*  1012
$OTC.1     0000 10EA      1002*  1007
$OTC.2     0000 10F6      1006*  1014
$CTC.3     0000 10FE      1005   1009*
$OTC.4     0000 1112      1000   1008   1016*
$OTC.5     0000 111A      1018*  1026
$OTC.6     0000 1138      1028*  1033
$OTC.7     0000 1146      1003   1019   1021   1024   1029   1031   1034*
```

$OUTBUF	0000 35F4	383	389	401	404	540	541	543	899	902	910	951	2033	2037
		5375*												
$P0	0000 1060	948	955*											
$P1	0000 1064	942	952	956*	1092									
$PAUSE	0000 1638	1001	1006	1016	1683*									
$PNCH1	0000 4012	5417*	5420											
$PNCH2	0000 402E	5427*	5432											
$PRINT	0000 1048	218	470	513	517	535	537	944*	991	1150	1495	1642	2013	2048
		2056	2065	2123	2127	4929	4994	5135	5158					
$PRT.2	0000 1086	968*	974	977										
$PRT.3	0000 10A4	971	979*											
$PRT.3A	0000 10CE	991*	1193											
$PRT.4	0000 10D4	990	993*											
$PRTFLG	0000 162C	975	984	1185	1677*									
$PUNCH	0000 3FFA	5409*												
$R14SAV	0000 35EC	645	652	661	670	683	699	712	724	1285	1369	5374*		
$R15SAV	0000 35E8	577	581	586	591	597	603	636	5373*					
$R5BIN	0000 0000	57*	814											
$RD.1	0000 1150	1057*	1086											
$RD.2	0000 1152	1058*	1087	1094										
$RD.3	0000 1158	1060*	1095											
$RD.3A	0000 1178	1066	1072*											
$RD.4	0000 1186	1075	1077*											
$RD.5	0000 11A2	1082	1085*											
$RD.6	0000 11AC	1084	1088*											
$RD.7	0000 11BE	1090	1093*											
$READ	0000 114C	239	415	1056*	2019									
$RSAVRET	0000 0F9E	810*	851	959	966	987								
$RUNIT	0000 0C72	272	425*											
$SETUP	0000 1364	1017	1275*											
$SHUTDWN	0000 163A	510	1684*											
$STC.1	0000 11DA	1104	1106*											
$STC.2	0000 11E0	1107	1109*											
$STC.3	0000 11FE	1114	1119*											
$STC.4	0000 123E	1136	1139*											
$STC.5	0000 124C	1142	1144*											
$STIM1	0000 0F86	772*	777											
$STRUC1	0000 000C	33*	38	246	247	406								
$TAPE	0000 3FF2	5403*	5434											
$TAPL	0000 4046	5413	5433	5438*										
$TAPL1	0000 404C	5421	5441*											
$TAPLP	0000 4050	5439	5443*	5449										
$TBRKSV	0000 35E0	1157	1165	5372*										
$TESTOP	0000 0B60	276	292*											
$TIMER	0000 0F82	763*	1451											
$TIMRET	0000 0F98	778	803*											
$TIMVAL	0000 0A5A	191*	774	4427										
$TIMXT	0000 0F9C	804*	1453											
$TSTB.1	0000 126C	1163*	1175	1177	1180	1199								
$TSTB.1A	0000 1272	1165*	1186											
$TSTB.2	0000 1278	1161	1168*											
$TSTB.3	0000 128A	1171	1173*											
$TSTB.4	0000 12A4	1182*	1207											
$TSTB.5	0000 12C8	1173	1195*											
$TSTB.6	0000 12D6	1197	1200*	1206										

```
DEFTESTS  0000 1894    292   293   1789*
DEVINT    0000 1874   1436  1778*  2381  4334
DEVMSG    0000 1681    679  1704*  1705  1706  1707
DEVMSG2   0000 1690    657  1708*  1709
DEVSADR   0000 185E   1430  1771*  2182  2184  2189  2193  2206  2223  2382  4329  5029
DISCON    0000 1760   1742*  2183  2394  3022  4817  5172
DISPLAY   0000 0DC2    494   558*
DRIVE     0000 176C   1743*  2074  2200
DRV.1     0000 3140   4853  4856*
DRV.2     0000 315E   4866*  4873
DRV.3     0000 3172   4872*  4887
DRV.4     0000 3176   4870  4874*
DWA.1     0000 2D84   4403*  4408
DWA.2     0000 2D94   4406  4410*
DWAIT     0000 2D76   4100  4345  4399*
DXTL.4R   0000 3060   4718  4723*
DXTL.5R   0000 306E   4724  4727*
EDATA     0000 1916   1878*  4638  5152
EOTMSG    0000 16D8    514  1718*
ERR       0000 0DE8    577*  1623
ERR1      0000 0E8C    621   645*
ERRALL    0000 0E28    603*  1489
ERRCK     0000 2B7C   4179*  5361
ERRCK1    0000 2B8C   4180  4184*
ERRCOM    0000 0E36    578   582   587   592   599   604   611*
ERRCOM1   0000 0E62    579   584   589   595   601   607   625*
ERRCOM2   0000 0E82    630   635*
ERRD      0000 0DF2    581*
ERRD1     0000 0E96    583   593   652*
ERRDEV    0000 1612    654   672  1656*  3203  4354  4391  4402  4828  4841  4850
ERRDS     0000 0E0A    591*
ERRDS1    0000 0EBA    605   670*  5007  5010
ERRFLG    0000 196C   1907*  2827  2833  2840  2854  2920  2985  3581  3915  4264  4512  4674  4684
                      4709  4714
ERRFLG1   0000 1906   1870*  4717  4864  4889  4961  4970  5124
ERRL      0000 0E18    597*
ERRL1     0000 0EFC    600   699*  4998
ERRL1A    0000 0F14    706   709*
ERRLVL    0000 16D6   1486  1717*
ERRMSG    0000 165C    647  1699*  1700  1701
ERRNO     0000 1664   1484  1491  1615  1624  1701*
ERROR1    0000 1D00   2071*  2161  2366  3360
ERROR11   0000 1D40   2092*  4118  4771
ERROR12   0000 1D46   2094*  2295  4303  4579  4587
ERROR13   0000 1D4E   2096*  2208
ERROR14   0000 1D54   2098*  2293  2297
ERROR15   0000 1D5A   2100*  2290
ERROR16   0000 1D60   2102*  2372  3145  3895
ERROR2    0000 1D06   2073*  2197
ERROR3    0000 1D0C   2075*  2167
ERROR4    0000 1D12   2077*  2165
ERROR5    0000 1D18   2079*  2171  2174  2416
ERROR6    0000 1D1E   2081*  2387
ERROR7    0000 1D2E   2086*  2142
ERROR8    0000 1D34   2088*  2354
```

```
                          5120   5127
ISKCMD      0000 18EC     1827*  3312   3319   4036
ITML.1      0000 2A8C     4060   4062*
ITML.2      0000 2A92     4064*  4065
ITMLP       0000 2A7E     3010   4043   4057*
KBREAD      0000 1348     1060   1252*
LADC        0000 0001      481   4879   5215
LCORE       0000 137C      212    439   1285*
LDWT        0000 00C8      113*   116
LEADER      0000 00A2       97*   101
LEVEL       0000 0BC2      333*  1755   1756
LIM.1       0000 2EAC     4527   4531*
LIM.2       0000 2EB0     4530   4532*
LIMITS      0000 2E98     4525*  4538   4550   4561
LNZB        0000 35DB       91   5367*  5395   5425
LOAD        0000 00AC      102*   110
LOCMSG      0000 16B6      700   1714*
LOCYL       0000 1718     1736*  2076   2166   2975   3137   3689   3884   4116   4774
LOOP        0000 17D8      497   1753*
LPADR       0000 0A1A      140*
LPWRT       0000 0A3C      170*
LRCC        0000 190A     1872*  2787   3491   3638   4450
LRECL       0000 0100     1863*  2821   2846   2900   2913   2915   3414   3417   3578   4020   4451   4470   5087
MAXBIT      0000 1900     1867*  2153   2519
MAXCYL      0000 18FC     1865*  2145   2164   2533   2541   2593   2692   2697   3306   3687
MAXEND      0000 9D54     5388*
MAXHEAD     0000 18FE     1866*  2022   2147   2170   3904
MAXSEC      0000 18F8     1861*  2149   2363   2415   2898   2917   3357   3499   3906   3990   4193   4252   4269
                          4519   5089
MAXTST      0000 18C6      303   1793*
MDDAT.0     0000 269A     3351   3353*
MDDAT.1     0000 26B6     3358   3361*
MDDAT.2     0000 26CC     3365   3367*
MDDATA      0000 268A     3348*  3372
MDINT1      0000 2640     3321   3325*
MDINT2      0000 266C     3332   3338*
MEMTOP      0000 193C     1894*  2252   2269   2273   2280   2285   4294   4309   4583   4586
MICROBUS    0000 0A22      144*
MILS1       0000 2DA6     4418   4421*
MILSEC      0000 2D9C     3244   3254   4417*
MMSW        0000 160C     1508   1511   1516   1518   1631   1634   1652*
MMSWMSG     0000 1698     1643   1710*  1711
MN          0000 0096       94*  5401   5423
MOD.00      0000 1FE8     2333   2335   2339*
MOD.0A      0000 2000     2344   2347*
MOD.0B      0000 2014     2346   2354*
MOD.0C      0000 2018     2340   2348   2352   2356*
MOD.1       0000 2028     2357   2362*
MOD.2       0000 2040     2364   2369*
MOD.2A      0000 204A     2368   2372*
MOD.3       0000 204E     2331   2370   2374*
MOD.4       0000 2064     2381*  2390
MOD.4A      0000 2082     2392*  2392
MOD.4X      0000 207A     2383   2388*
MOD.5       0000 20B8     2406   2408*
```

MOD.6	0000	20C6	2410	2412*										
MOD.6A	0000	20D8	2414	2417*										
MOD.7	0000	20EA	2418	2420	2424*									
MOD32	0000	1610	209	688	705	1294	1320	1336	1449	1468	1506	1547	1607	1632	1654*
			2003	2042	2051	2271	2281	3364	4007	4059	4287	4370	4441	4526	4574
			4581	4612	4852	4898	4909	5065	5072	5129	5138				
MODINIT	0000	1FAE	2320*	2458	2516	2587	2638	2685	2768	2891	2970	3132	3200	3299	3409
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MREADC	0000	0A44	174*												
MSG01	0000	19B7	1951*	2014											
MSG02	0000	19CA	1952*	2108	2112										
MSG03	0000	19E2	1953*	2092											
MSG04	0000	1A0C	1955*	2336											
MSG05	0000	1A1D	1956*	4495	4504										
MSG06	0000	1A37	1957*	4515											
MSG07	0000	1A4D	1958*	1959	3205										
MSG08	0000	1A50	1959*												
MSG09	0000	1A60	1960*	3211	3231										
MSG10	0000	1A72	1961*	1962	3223										
MSG11	0000	1A75	1962*												
MSG12	0000	1A88	1963*	1964	3217										
MSG13	0000	1A8B	1964*	2088											
MSG14	0000	1A9D	1965*	5188											
MSG15	0000	1AAA	1966*	5149	5156	5159									
MSG16	0000	1AC1	1967*	5133	5136										
MSG17	0000	1AD2	1969*	4875	4876	5020	5022	5141	5143	5153	5160				
MSG18	0000	1AF2	1971*	5106	5115										
MSG19	0000	1B0A	1972*	2081	2084										
MSG20	0000	1B1D	1973*	2345											
MSG21	0000	1B23	1974*	2353											
MSG22	0000	1B29	1975*	4181	4727										
MSG23	0000	1B39	1976*	4175	4721										
MSG24	0000	1B4A	1978*	2119	2128										
MSG25	0000	1B5C	1979*	2094											
MSG26	0000	1B72	1980*	4274											
MSG27	0000	1B94	1981*	5037	5045										
MSG28	0000	1BB9	1985*	2045	2049										
MSG29	0000	1BC7	1986*	2054	2057										
MSG30	0000	1AE3	1970*	4930											
MSG31	0000	1BD6	1988*	4977	4992	4995									
MSG32	0000	1BE3	1989*	3968											
MSG33	0000	1BF8	1990*	5164											
MSG34	0000	1C0B	1991*	2124											
MSG35	0000	19FA	1954*	2066											
MTESTNO	0000	1658	468	614	1697*	2118	4974								
NEWCYL	0000	2BCE	3167	3921	4225*										
NEWHEAD	0000	2BAA	2906	3165	3919	4203*									
NEWPSW	0000	1600	483	484	1448	1458	1650*								
NEWSEC	0000	2B94	3163	3917	4191*										
NEXTSQ	0000	3192	4883*												
NOAUTO	0000	1808	1757*	2063	2334	2419	3963								
NOERMSG	0000	1678	518	1703*											
NOERR	0000	1626	628	1674*	2129	4976									
NOH.1	0000	1C6E	2021*												
NOH.2	0000	1C80	2009	2027*											

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NOHEADR   0000 1C42   1759  2008*
NOMSG     0000 17F0    215   965  1158  1212  1755*
NORM      0000 1615    568  1659* 4139
NOTRDY    0000 0008   1857* 5355
NULLMSG   0000 1704    536  1725* 1726
NUMTAB    0000 18DC   1816* 2156
NXTSQ.1   0000 3196   4884* 4965  4999  5008  5125
OFFLINE   0000 0001   1859* 5328  5328
OLDPSW    0000 15F8    598   684   701  1421  1473  1613  1649*  4858
OPCODE    0000 1914   1877* 3242  4433  4740  4988  5051
OPKEY     0000 000C   1945* 2323  2324  2381  3241  3242  4072  4433  4737  4738  4739  4740
OPT       0000 170C    246   377  1734*
OPTEND    0000 1838   1765*
OPTEND2   0000 1814    407  1758*
OPTIN     0000 0AAE    226* 1078  1080  1644
OPTIN1    0000 0AB6    229*  289   320   408   418   520   993  1152  1497  1628  2006  2028  2067
                      2125
OPTION    0000 1838    269   374  1766*  1767
OPTIONAD  0000 1C88   1766  2030*
OPTNAD.1  0000 1CBA   2043  2045*
OPTNAD.2  0000 1CD8   2052  2054*
OPTNAD.3  0000 1C8E   2032* 2035
OPTRTN    0000 0BEA    375   377* 2058
OPTVAL    0000 0F44    282   302   368   731*  2021
ORIGIN1   0000 0A00     90   119* 5393  5424
ORIGIN2   0000 0A04    121*
ORIGIN3   0000 0A08    122*
ORIGIN4   0000 0A0C    123*
OSCT1     0000 21B0   2594* 2602
OSCT2     0000 21B8   2597* 2605
OSCT3     0000 21C6   2598  2601*
OUT.SAV   0000 163C    997  1034  1685*
OUTBUF    0000 182C   1763* 1764  2101
OUTCHR    0000 10D8    236   238   969   980   982   997*  2016  2018
OVERRUN   0000 0080   1843* 5316
PACTYP    0000 173C   1739* 2087  2140  2186  2198  4766
PANLWRIT  0000 2B14   3309  4130* 4892  4973
PASLADR   0000 0A12    136* 1220
PBLK01    0000 3572   2461  4281  4341  4382  5289*
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PBLK08    0000 358A   2826  3554  5307*
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PBLK0C    0000 359A   2926  2928  3914  5319*
PBLK0D    0000 359E   2929  3014  3017  3020  4729  5322*
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PBLK10    0000 35AA   4263  5331*
PBLK13    0000 35AE   4344  5334*
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PBLK23	0000 35C2	4673	4715	5349*									
PBLK25	0000 35C6	4510	5352*										
PBLK30	0000 35CA	4411	5355*										
PRECL	0000 18FA	1862*	2151	2771	2789	3482	3492	3569	3637	3980	4467	5083	
PRECLTAB	0000 18D8	1812*	2150										
PRINT	0000 1060	711	723	954*	2115	4883							
PRINTIT	0000 1D7E	2095	2113*	2338	5189								
PSW	0000 0A50	186*	479										
PSW2	0000 0A52	187*	195	229	488	612	1445	1487	1537	1617	2264	5186	
PSW3	0000 0A54	188*	4058	4061									
PSWMSG	0000 16AA	693	1712*	1713	1714	1715							
PSWSAVE	0000 35E0	88	89	1334	5371*								
PURETOP	0000 0000R												
QMSG	0000 16E4	1151	1720*										
QUESTN	0000 124E	245	1149*										
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		625	626	635	653	662	671	675	687	691	704	708	771	776
		803	810	839	840	884	885	891	905	920	940	950	955	956
		957	964	965	1018	1027	1028	1056	1061	1063	1116	1117	1120	1131
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		4236	4249	4250	4258	4259	4260	4261	4263	4264	4283	4284	4287	4322
		4327	4329	4333	4334	4351	4352	4366	4388	4389	4399	4400	4421	4431
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		562	562	563	564	565	565	566	566	567	612	613	627	628
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		2189	2193	2194	2209	2213	2215	2217	2219	2222	2223	2227	2229	2230
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		5393	5398	5400	5403	5404	5404	5405	5414	5417	5420	5424	5427	5432
R10	0000 000A	76*	1404	1408	1408	1439	1440	1441	1485	1485	1486	2061	2063	
R11	0000 000B	77*	2254	2256	2261									
R12	0000 000C	78*	245	250	281	284	298	304	317	327	331	335	370	372
		426	433	619	622	748	2001	2003	2023	2026	4877	4993	5021	5040
		5107	5110	5114	5134	5142	5150	5154	5157					
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		1516	1519	4855	4859	4881	5023	5046	5116	5121	5144	5161		
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		312	368	464	479	483	510	512	598	621	622	623	645	646
		652	655	661	664	670	677	683	684	685	699	701	712	713
		717	718	719	721	722	724	725	737	742	758	1145	1157	1165
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		620	633	636	637	674	694	702	705	710	711	720	723	743
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		1004	1009	1101	1106	1108	1110	1111	1115	1116	1117	1127	1128	1129
		1130	1137	1137	1138	1140	1220	1221	1402	1419	1422	1432	1571	1578
		1585	1600	1611	1640	2031	2032	2033	2034	2038	2042	2045	2051	2054
		2081	2186	2190	2190	2200	2201	2203	2205	2206	2217	2219	2220	2265
		2279	2286	2289	2292	2294	2296	2321	2341	2342	2342	2343	2349	2350
		2350	2351	2380	2381	2382	2388	2389	2544	2699	2704	2823	2834	2841
		2923	2986	2991	3204	3210	3216	3222	3230	3238	3241	3248	3251	3257
		3259	3310	3492	3493	3495	3496	3574	3899	4034	4064	4084	4095	4165
		4357	4394	4407	4432	4467	4470	4473	4495	4499	4502	4508	4526	4531

		4532	4533	4540	4552	4563	4573	4578	4580	4586	4589	4591	4592	4624
		4675	4685	4739	4741	4866	4867	4867	4868	4904	4905	4921	4922	4942
		4943	4944	4946	4947	4963	4979	4983	4984	4984	4985	4987	4990	4992
		5014	5017	5018	5020	5028	5030	5032	5033	5037	5041	5083	5087	5093
		5106	5109	5113	5133	5141	5149	5153	5156	5212	5213	5215	5216	5216
		5218	5394											
R3	0000 0003	69*	91	92	93	248	252	254	260	262	263	268	377	381
		390	399	406	407	465	735	736	738	755	756	757	774	840
		841	842	844	849	888	890	894	1069	1102	1103	1106	1123	1124
		1125	1126	1138	1139	1140	1143	1402	1420	2008	2020	2027	2173	2264
		2265	2280	2294	4610	4618	4621	4630	4632	4639	5035	5036	5039	5042
		5043	5061	5062	5065	5395	5415	5425	5445	5446				
R4	0000 0004	70*	95	96	97	99	107	109	235	237	252	257	262	264
		266	280	283	294	295	297	313	315	366	378	379	388	389
		416	417	419	425	539	540	541	735	739	741	744	843	844
		845	846	846	847	898	899	909	910	968	970	979	981	984
		986	1027	1060	1061	1063	1071	1073	1074	1076	1077	1079	1081	1083
		1088	1089	1132	1133	1134	1135	1135	1141	1141	1259	1334	1341	1355
		1356	1357	2015	2017	2025	4609	4622	4629	4633	5089	5091	5097	5099
		5396	5399	5401	5423	5428								
R5	0000 0005	71*	97	99	100	100	102	103	104	107	109	115	249	253
		255	257	392	688	693	700	722	888	890	941	946	951	968
		972	973	975	989	1091	1429	1430	1434	1436	1438	1441	2039	2084
		2088	2092	2094	2105	2107	2109	2112	2336	4629	4630	4638	4639	4640
		5022	5045	5054	5088	5100	5108	5115	5119	5120	5143	5160	5164	5188
		5398	5399	5427	5428	5429								
R6	0000 0006	72*	94	104	111	251	253	259	288	303	307	308	325	329
		333	369	371	371	373	463	731	749	750	757	1111	1112	1113
		1113	1430	1432	1436	1446	1477	1482	1483	1484	1491	1492	1494	1555
		1560	1565	1570	1576	1590	1598	1609	1614	1615	1616	1624	1625	1627
		1999	2000	2002	2008	2022	2135	2136	2137	2138	2169	2170	2177	2178
		2181	2182	2183	2184	2187	2188	2189	2228	2229	4626	4627	4634	4641
		5409	5410	5411	5417	5418	5429	5430	5446	5447				
R7	0000 0007	73*	113	114	115	733	887	911	917	2140	2141	2143	2144	2146
		2148	2150	2152	2188	2192	2193	2198	2199	2203	2215	4628		
R8	0000 0008	74*	105	106	111	112	293	300	312	319	457	458	459	462
		465	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	4611	4618
		4620	4621	4623	5447									
R9	0000 0009	75*	292	299	310	318	1064	1065	1067	1068	1069	1071	1255	
RAND	0000 308E	2643	4565	4747*										
RAND.1	0000 2EE4	4563*	4568											
RANDA1	0000 251E	3129	3156*											
RANDA3	0000 2522	3151	3154	3158*										
RANDA4	0000 2536	3158	3163*											
RANDFILL	0000 2EDE	3156	3362	4560*										
RBUFIN	0000 1C1C	1761	1996*											
RCHECK	0000 18E8	1823*	4167											
RCLDON	0000 2542	3138	3141	3167*										
RCMD	0000 18E7	1822*	4679											
RDAGN	0000 3006	4695*	4726											
RDATA	0000 1918	1879*	4640	5155										
RDER	0000 1902	1868*	4159	4173	4179	4184	4693	4719	4723	4725				
RDF	0000 3B94	1761	5385*											
RDFADR	0000 1828	1762*	1996	2041	2044	2279	2284	4282	4286	4572	4576	4610	4615	
RDRTRY	0000 3042	4714*	5362											

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SEQ0        0000 31CE       4903*  5236
SEQ0.1      0000 31D8       4907*  4958
SEQ0.10     0000 3260       4948   4951*
SEQ0.11     0000 3278       4939   4951   4953   4955   4960*
SEQ0.2      0000 31EA       4910   4912*
SEQ0.3      0000 3208       4915   4921*
SEQ0.6      0000 3226       4923   4925   4933*
SEQ0.7      0000 323A       4935   4939*
SEQ0.8      0000 323E       4906   4941*
SEQ0.9      0000 324C       4938   4945*
SEQ1        0000 328E       4967*  5237
SEQ1.1      0000 32CE       4982   4986*
SEQ2        0000 32F6       5001*  5238
SEQ2.1      0000 330C       5006   5010*
SEQ3        0000 3338       5026*  5239
SEQ3.1      0000 333C       5029*  5034
SEQ3.2      0000 335A       5039*  5044
SEQ4        0000 3370       4931   5048*  5240
SEQ4.1      0000 338C       5053   5058*
SEQ4.1A     0000 33AE       5066   5068*
SEQ4.1B     0000 33B2       5063   5070*
SEQ4.2      0000 33C8       5060   5073   5076*
SEQ4.3      0000 33DA       5078   5081   5083*
SEQ4.4      0000 33EA       5086   5088*
SEQ4.5      0000 33FA       5093*  5096
SEQ4.7      0000 3402       5094   5097*  5101
SEQ4.8      0000 340C       5056   5092   5098   5103*
SEQ5        0000 3430       5118*  5241
SEQ5.1      0000 3434       5120*  5165
SEQ6        0000 343A       5123*  5242
SEQ6.1      0000 3456       5130   5132*
SEQ6.2      0000 3472       5139   5141*
SEQ7        0000 347E       5146*  5243
SEQ9        0000 34AC       5163*  5245
SEQEXIT     0000 31A4       4871   4889*
SEQPTR      0000 191E       1882*  4878   4886   5050
SEQTAB      0000 354A       4868   5222*
SEQVECTS    0000 355E       4880   5235*
SET.RTN     0000 1640       1275   1280   1687*
SETCODE     0000 307C       2321   2544   2699   2704   2823   2834   2841   2923   2986   2991   3310   3574   3899
                            4034   4084   4095   4165   4508   4624   4675   4685   4737*
SETCYL      0000 2A98       2542   3308   3318   4033   4071*  4083
SETKB       0000 1334        227    234   1119   1149   1240*  3237
SETLST      0000 133E        443   1246*  3240
SETMSG      0000 1D66       2071   2073   2075   2077   2079   2086   2090   2096   2098   2100   2102   2105*
SETMSG1     0000 1D6C       2107*  2111
SINK        0000 1618       1254   1663*
SIZE        0000 192C       1889*  2773   2822   2847   2901   2910   2916   2931   2983   3418   3487   3571   3579
                            3982   4261   4293   4307   4477   4529   4531   4573   4577
SKINTA      0000 2A66       2690   2974   4047*
SKRTN       0000 195C       1903*  4082   4089
SKSR        0000 2AA4       2526   2535   2538   2599   2649   3142   3832   3892   4082*  4119
SL.1        0000 2C58       4285   4287*
SL.16A      0000 2CA6       4310   4312*
SL.2        0000 2CB2       4301   4315*
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SL.32A     0000 2C78      4295   4297*
SLAD       0000 0004      1937*  2377   2378   2379   3005   4280   4298   4299   4300   4314   4315   4354   4355
                          4358   4360   4381   4706   4907   4908   4911   4912   5064   5067   5068   5169   5170
                          5171
SLCH       0000 2C42      2994   4279*  4695
SLCH16     0000 2C90      4288   4305*
SLCH32     0000 2C60      4290*
SLCHCMD    0000 18F3      1834*  2993   4283   4691   4706
SMAL.1     0000 2DB4      4429*  4430
SMALTIME   0000 2DAE      4064   4357   4394   4407   4427*
SPIF.1     0000 2EBC      4540*  4545
SPIFILL    0000 2EB6      2902   3150   4538*
SPIRAL     0000 2512      3060   3150*
SPL.RTN    0000 3076      4711   4730*
STAMSG     0000 1689       666   1706*
START      0000 0A5E       119    121    195*
START3     0000 0A72       122    202*
START4     0000 0A74       123    204*
STARTA     0000 0A76       196    202    204    206*   554
STAT       0000 000A      1943*  2405   3015   3016   3228   3247   3248   4047   4355   4358   4392   4403   4405
                          4410   4807   4813   4818   4819   4824   4829   4837   4842   4851   4913   4914   4924
                          4943   4954   5196
STATE      0000 1910      1875*  2396   2468   3304   3317   3334   3353   4378   4823   5079   5195
STATTAB    0000 197C      1912*  4861   5030   5039   5076
STATW1     0000 25C0      3244*  3255
STATW2     0000 25E0      3255*  3258
STATW3     0000 25E4      3249   3257*
STATW4     0000 25EA      3252   3259*
STATWAIT   0000 25A4      3204   3210   3216   3222   3230   3237*
STCON      0000 11CA       211   1100*  1619
STOP       0000 18EE      1829*  2270
STOPCMD    0000 18F0      1831*  2275   2378   4280   4360   4381   4908   5170
STOPFLAG   0000 1908      1871*  2116   2138   2324   2385   2388
SVC.DRV    0000 3126      4831   4834   4839   4844   4848*
SVC0.OP    0000 30D4      1925   4807*
SVC1.OP    0000 30E0      1926   4812*
SVC2.OP    0000 30EA      1927   4817*
SVC2STAT   0000 18F4      1835*  3016   4819   4913
SVC3.OP    0000 30F8      1928   4823*
SVC4.OP    0000 3102      1929   4828*
SVC5.OP    0000 310C      1930   4833*
SVC6.OP    0000 3110      1931   4836*
SVC7.OP    0000 311A      1932   4841*
SVC9.OP    0000 3124      1934   4846*
SVCNUM     0000 191C      1881*  4849   4866   4904   4921   4946   4980   5004   5061   5208
SVCPSW     0000 1934      1893*  4856   4901   5206   5219
SVCVECTS   0000 1986      1924*  2237
SW1SAV     0000 194C      1899*  3131   3147
SWA.1      0000 2D0C      4355*  4379
SWA.2      0000 2D18      4356   4360*
SWAIT      0000 2CFE      4351*  4707
SWRSEK     0000 24EE      3138*  3168
SWRSW1     0000 250C      3147*  3164
SWRTST     0000 24D4      3061   3095   3131*
SYNC       0000 18F2      1833*  4017
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TST13.0    0000 28B6      3779*  3781
TST13.1    0000 28BA      3775   3780*
TST14.0    0000 28DA      3822   3824*
TST14.1    0000 28DE      3825*  3835
TST14.2    0000 28F2      3828   3831*
TST14.3    0000 28FA      3830   3833*
TST14.4    0000 28FE      3818   3834*
TST15.1    0000 291A      3888*  3922
TST15.1A   0000 2936      3894   3896*  3920
TST15.2    0000 2940      3899*  3918
TST15.2A   0000 294C      3904*  3908
TST15.2B   0000 295A      3905   3909*
TST15.2C   0000 296A      3913   3915*
TST15.3    0000 2972      3896   3917*
TST15.4    0000 297E      3888   3891   3921*
TST3.1     0000 21E0      2643*  2648   2652
TST4.1     0000 222C      2699*  4049   4105
TST6.1     0000 23B2      2907   2908*
TST7.2     0000 2450      2990   2993*
TST7.3     0000 2472      3001   3003*
TSTB.0     0000 25A0      3229   3235*
TSTBRK     0000 125C       476    976    983   1156*  3245   4895
TSTD.1     0000 26FE      3416   3418*
TSTDU      0000 12EC       507    523    633    958   1002   1211*  1620
TSTE.1     0000 2756      3484   3486*
TSTE.2     0000 278E      3500   3503*
TSTEND     0000 0D16       488*  2552   2595   2712   2933   3169   3235   3923   3962   3967
TSTMSG     0000 1652       471   1696*  1697
UNARY      0000 0F78       464    755*  2024   2172
WBUFIN     0000 1C22      1763   1998*
WCAS.1     0000 2ED2      4552*  4556
WCASFILL   0000 2ECA      3153   3419   4549*
WCMD       0000 18E6      1821*  2779   2820   2897   3136   3345   3413   3510   3568   3577   3887   3978   4259
                          4487   4507   4688
WK0        0000 0006      1939*  2591   2601   2644   2645   2646   3497   3502   3503   3504   3505   3505   3506
                          3507   4005   4021   4058   4062   4120   4121   4122   4123   4566   4644   4645   4747
                          4750   4751
WK1        0000 0007      1940*  2107   2108   2592   2603   2604   3243   3253   4006   4014   4015   4016   4018
                          4019   4020   4021   4022   4417   4679   4688   4690   4748   4749   4750
WK2        0000 0008      1941*  2106   2108   2110   2593   2594   2596   3415   4013   4059   4062   4680   4689
                          4691
WK3        0000 0009      1942*  2411   2980   3354   3825   4007   4014   4020   4125
WORCAS     0000 2518      3094   3153*
WRIT       0000 2FDE      2780   2791   2797   2803   2814   2903   3160   3368   3432   3436   3438   3572   3983
                          4491   4683*
WRITX      0000 2FEC      2829   2844   2850   2855   2925   3585   4687*
WRTPRT     0000 0080      1854*  5295   5343
WTF        0000 3754      1763   2000   5383*  5388
WTFADR     0000 1834      1764*  1998   2050   2053   2278   2283   3363   3366   4006   4009   4286   4440   4443
                          4525   4528   4609   4616
XFER       0000 352A      4964   5211*
XFERSIZL   0000 2E04      3134   3361   3885   4470*
XFERSIZP   0000 2DFE      2277   4467*
XFERTAB    0000 35D2      5216   5360*
XFILE      0000 1778      1744*  2097   2209
```

XFS.0	0000 2E08	4468	4471*						
XFS.1	0000 2E0E	4473*	4475						
XIERR1	0000 14D4	1478	1483*						
XIERR2	0000 1502	1493	1497*						
ZERF.1	0000 2F0A	4575	4578*						
ZERF.1A	0000 2F20	4582	4586*						
ZERF.1B	0000 2F24	4584	4587*						
ZERF.1C	0000 2F28	4585	4588*						
ZERF.2	0000 2F2A	4589*	4593						
ZEROFILL	0000 2EF4	4572*	4678						
ZERONE	0000 0BB2	325*	1740	1749	1751	1752	1754	1757	2011

Serial Printer Setup:

Set New Locations:
A10 = 0101
A12 = 0010 - Keyb
A14 = 0013 - Serial Printer, 9600 Bd, 8 bits, no parity, XON/XOFF

Requires two Pasios at addresses 10 & 12

Operation: