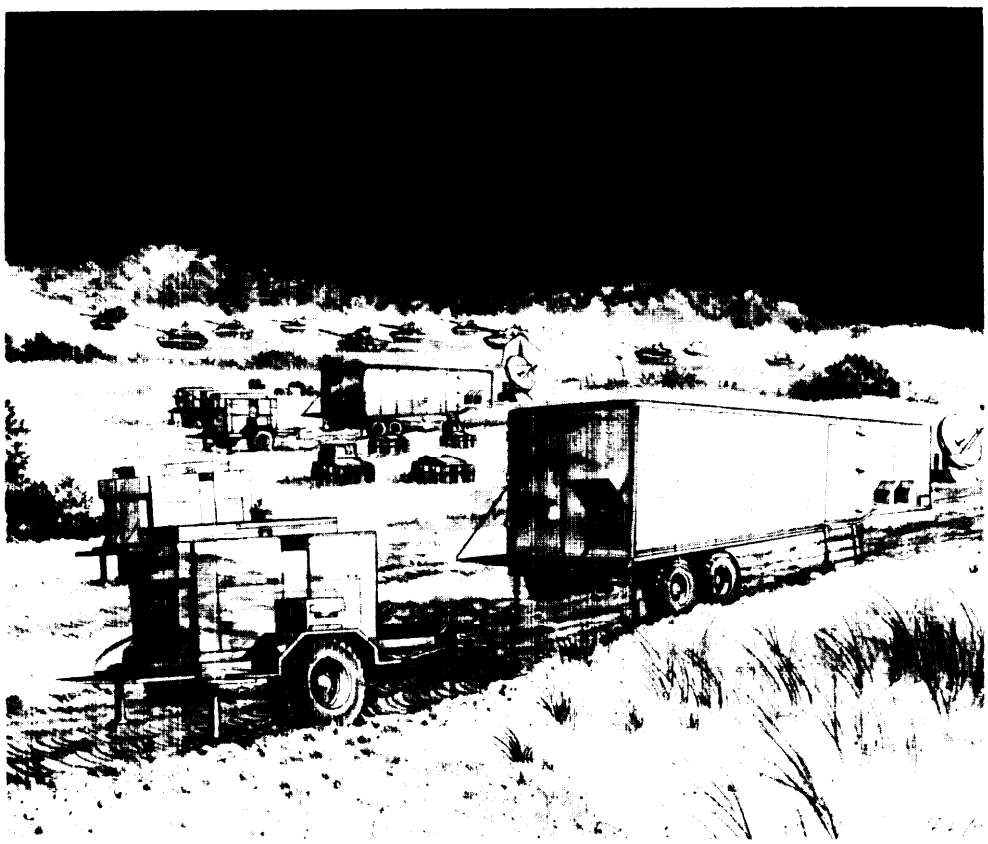
TM 11-7010-205-23-2

ORGANIZATIONAL AND DIRECT SUPPORT MAINTENANCE MANUAL

AUTOMATED DATA PROCESSING SYSTEM AN/MYQ-4A



(NSN 7010-01-158-5397)

HEADQUARTERS DEPARTMENT OF THE ARMY

13 MAY 1985

WARNING

HIGH VOLTAGE

is used in the operation of this equipment.

ELECTROCUTION

may result if personnel fail to observe safety precautions.

Never work on electronic equipment unless there is another person nearby. He/she should be familiar with the operation and hazards of the equipment. He/she should also be competent in giving first aid. When you are helped by operators, you must warn them about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take special care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

Be careful not to contact high-voltage connections when installing or operating this equipment.

Whenever possible, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

WARNING

Do not be misled by the term “low voltage”. Voltages as low as 50 volts can cause death.

For artificial respiration, refer to FM 21-11.

WARNING

Remove rings, bracelets, wristwatches, and neck chains before working around electronic equipment. Jewelry can catch on equipment and cause injury, or may short across an electrical circuit and cause severe burns or electrical shock.

FLAMMABLE AGENTS

Isopropyl alcohol is flammable. Keep away from heat and open flames.

Do not operate utility lights when cooling/ventilation units are not in service. Heat buildup may create a fire hazard.

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1 DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2 IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

3 IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL

4 SEND FOR HELP AS SOON AS POSSIBLE

5 AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C.

ORGANIZATIONAL AND DIRECT SUPPORT MAINTENANCE MANUAL

AUTOMATED DATA PROCESSING SYSTEM DAS3 (DX)

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual, direct to: Commander, US Army Communications and Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. A reply will be furnished to you.

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APPENDIX F
TEST AND VERIFICATION USER'S GUIDE

Index of Test and Verification Programs

* These T & V programs require special setup instructions.

** This T & V program resides on the System Pack.

Section I. PRINCIPLES OF OPERATION

F-1. SCOPE

This guide is divided into two sections. Section I tells you how to use Test and Verification (T & V) software as a diagnostic tool to troubleshoot faults in the ADP and communication subsystems. Section II gives you detailed procedures for setting up and running each T & V program.

F-2. GENERAL DESCRIPTION

Except for T & V SMDG1, the test and verification process described in this guide is often referred to as an "off-line" process. This is because the software routines used to control and manage the software programs which perform diagnostics must be run in place of the GCOS6/MOD400 operating system. Moreover, they are contained on a different disk pack which must be loaded in place of the System Pack-usually on drive 0400. This pack is called the T & V Pack. It is also referred to as the SMUPAC. (SMDG1 resides on the System Pack, not on SMUPAC).

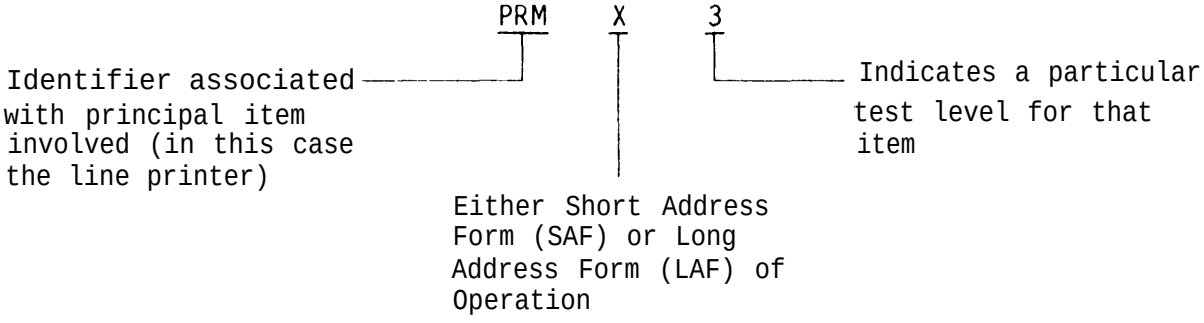
F-3. T & V SYSTEM

The T & V system is the operating software used to load, control, and provide services to the individual off-line T & Vs. When off-line T & Vs are being run, the DAS3 (D/C) is unable to communicate with other units, therefore the ADP system is considered “down”. The T & V programs are contained on the Self Maintained User’s Pack, (SMUPAC) a disk pack which is stored on the top shelf of the spare parts and tools storage rack. The T & V system has built-in load sequences, verification responses, executive instructions and a library of the individual T & Vs.

F-4. TEST AND VERIFICATION PROGRAMS

The T & V programs consist of central subsystem tests, I/O subsystem tests, and communications tests. Each T & V is loaded and started by the T & V system. The success or failure of program is indicated on the console screen.

Each T & V program is identified by a program name displayed on the system console when the T & V is loaded. The program name is represented as follows:



F-5. DIAGNOSTIC OPERATIONAL FLOW

The T & V system and the individual T & V programs are an extension of the Quality Logic Tests (QLTs). The QLTs, the T & V system (which contains the hardcore diagnostics), and the individual T & V programs are a systematic approach to verification of equipment performance, and are designed to notify you when operational or equipment errors or equipment malfunctions occur.

Before attempting to load and execute a T & V program, SMUPAC must be loaded onto disk drive 0400. The peripherals must be powered on and ready on-line, and the system must be initialized. During initialization the QLTs perform a basic confidence test of the central system (CPU). When the QLTs are successfully completed, the T & V system will be read in from the disk drive, initiating the hardcore and the T & V load sequence.

The load sequence provides hardcore testing prior to requesting input from you. The hardcore tests verify the CPU, console, memory, and load path to the extent that subsequent loading of T & V programs can be performed with confidence.

When you select a T & V, the T & V is executed to test a hardware item. While the T & V is running, further actions by you will define the specific type of test required to verify the functionality of the hardware item.

An error reporting feature is designed into the T & V system and into each T & V program. Errors are reported immediately if catastrophic, or delayed until program completion and reported on the error summary.

F-6. SUBSYSTEM TESTS

The subsystem tests allow the execution of individual T & V programs to test specific hardware modules or peripheral devices. When executing a selected T & V program, you must supply the detailed device and test parameters required by the T & V system. Operations performed include:

- Dialog: Full two-way (reports to you, the maintainer; accepts keyboard entries)
- Functionality tested: Full
- Channel Tested: Supplied by you
- End-of-Pass Operation: Displays end-of-pass message and continues to next pass
- Operator intervention: Program execution can be interrupted by pressing or the BRK (Break) key
- Error Reporting: error is reported when encountered; program execution stops if the system is set to stop on error or a halt error is specified via the program control mode. If neither error stop control is set, program execution continues.

F-7. HELP MESSAGES

The T & V system supports Help files for the individual T & V programs. When in doubt about the proper answer to any question asked by a T & V program, you can respond by simultaneously pressing the CTL and H keys (control H) to obtain additional information about the question. In some situations, a T & V program may display the following message:

HELP (Y or N)?:

If you respond with Y, an initial help file is displayed, describing the T & V operating instructions and the error reporting format. If, on the other hand, you respond with N, the program will continue.

F-8. FILE SECURITY

Executing a T & V program can destroy valuable data. This is especially true when testing a disk drive, tape unit, or a storage module device. If you are unsure of any step in the testing process, contact your supervisor for assistance.

F-9. CONSOLE DIALOG

You can communicate with the T & V program through the system console. Your responses are entered to program messages that request specific information. The console dialog is as follows:

o A message that requires a response from you is terminated with:

? :

Example: MODE (R = READ W = WRITE)? :

- You must type the correct response and terminate the entry with a RETURN or Carriage Return (C/R). In a series of individual entries within a response, each entry is separated by a comma.

  Example: MODE (R = READ, W = WRITE)? : R (you terminate the entry with the return key)

The required console entries may be in hexadecimal, decimal, or alphanumeric characters. The T & V programs accept either uppercase or lowercase letters. However, you should use uppercase letters except where lowercase letters are indicated.

A typing mistake is erased one character at a time by typing @ sign and then entering the new character prior to pressing the RETURN key.

An entire line is erased by entering CTLX (Control X) prior to pressing the RETURN key.

NOTE

An entry cannot be deleted prior to the last comma (delimiter) used with the entry.

The four special character keys are:

RETURN = End of line (enter line into software).

, (comma) = End of item within a line.

@ = Erase previous character.

CTLX (Control X) = Erase line.

Most of the T & V programs have two different console dialogs: a full two-way (input and output) dialog and a simple one-way (output only) dialog. With the full dialog, a T & V may ask questions and expect a response by you via the system console. For example:

```
MEDIA TYPE (F = FIXED OR R = REMOVABLE)? : (you must type F or R)
LOOP ( I = INTERNAL, C = CABLE, OR E = EXTERNAL)? :  (you must type I, C or E)
```

Where questions and answers are used as shown above, the T & V program displays the valid responses and their meanings, and then you must type the correct response and terminate the entry by pressing RETURN or Carriage Return (C/R).

In the one-way (output only) dialog, no questions are asked; however, the program displays operational information, such as:

```
DLCP TEST DCMX2 REV (Date)
PROGRAM MAY RUN UP TO 3 MINUTES BEFORE REPORTING
DCMX2 PASS 1
CHANNEL(S)   = OCOO, 0C80
TOTAL  ERRORS  =  O  0
0CMX2 DONE
```

The T & V program displays (program name) DONE when it exits to T & V system (e.g., KCMX3 DONE)

The ! or BRK (Break) key interrupts and returns the T & V program to an internal point where new parameters can be set.

F-10. RELEASE AND DISTRIBUTION

The T & V system is supplied on a removable disk pack in each van. The disk pack contains the latest revision of the T & V programs which are specifically applicable to the equipment in the van. When T & Vs are upgraded, modified or expanded, revisions are distributed to users organizations.

NOTE

It is possible for a T & V to report false errors when new equipment i.e. a new CPU board is installed. This can be caused by a mismatch between the T & V revision and the equipment revision. If you suspect this type of fault inform your supervisor.

F-11. GETTING STARTED

Before attempting to load the T & V system and execute a T & V program, the operating system (GCOS6/MOD400) must be cleared, i.e., you should complete any transactions underway then press S (stop) on the control panel (fig. F-1). Now you remove the System Pack from the disk drive and replace it with the SMUPAC. You must now initialize the T & V system.

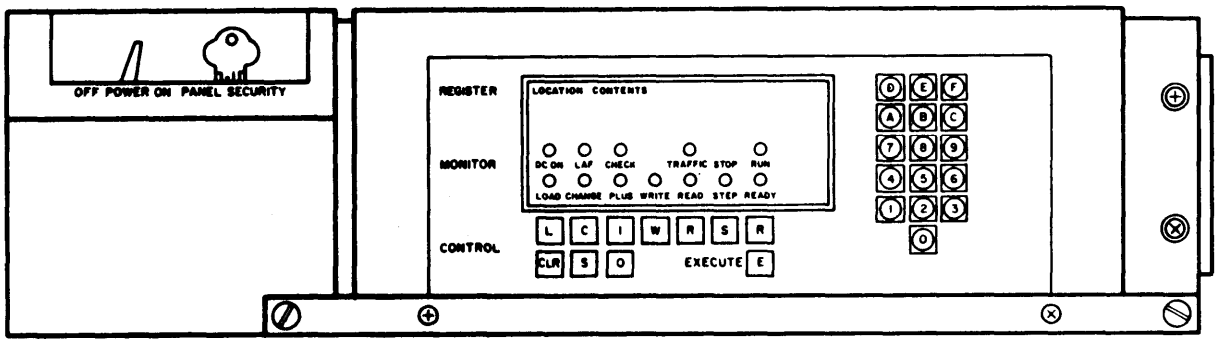


Figure F-1. CPU Control Panel

F-12. T & V SYSTEM INITIALIZATION

The DAS3 (D/C) T & V System is initialized from the console terminal once the QLTs are run. Before attempting to load the T & V system, the DAS3 (D/C) and all ADP devices must be powered up and operating in a stabilized environment. Prior to running any T & Vs ensure the check for operational readiness is performed. Once the system is initialized, and the "E" (execute) button is pressed at the CPU control panel, the load sequence can begin.

F-13. LOAD SEQUENCE

The load sequence automatically provides hardcore tests prior to requesting input from you. The tests verify that the CPU, console, memory, and load path function to the extent that subsequent loading of T & V programs can be performed with confidence. Test status can be monitored through error codes during the load sequence via register D1 on the control panel. This is in addition to the information that appears on the console screen.

F-14. BOOT RECORD

The boot record is read from the disk drive being used upon successful completion of the QLTs. The boot record does not verify any additional function. Its only purpose is to read in the Intermediate Loader.

Upon exiting from the QLTs and entry into the Boot Record, the LOAD indicator on the control panel goes off. If the LOAD indicator does not go off, refer to paragraphs F-19 and F-20 for error reporting.

F-15. INTERMEDIATE LOADER

The intermediate loader tests the CPU functionality which is necessary to load the hardcore and the disk loader, and performs tests to ensure that its own load was successful.

If the intermediate loader module failed to load properly, a halt will occur. Refer to paragraphs F-18 and F-19 for error reporting. On completion, control is transferred to the hardcore test.

F-16. HARDCORE (HARDCO, HARDC1, HARDC2, and HARDC3)

The four modules that make up the hardcore tests are HARDCO, HARDC1, HARDC2, and HARDC3.

a. Modules HARDCO and HARDC1 are the first two modules which verify the additional CPU functionality required to execute the console test (HARDC2). The CPU functionality tested includes software instructions and addressing forms not previously verified. Upon completion, control is transferred to module HARDC3 (not HARDC2).

b. Module HARDC2 verifies all the console functionality that is required by the T & V system and determines the console that is to be used. Then the following is displayed on the console:

```
WITHIN ONE MINUTE ENTER
ABCD
AND PRESS RETURN KEY
STARTUP TEST DONE
```

You should respond by entering characters ABCD followed by pressing the RETURN key on the console keyboard. If you do not respond within one minute, the following message is displayed on the console:

```
NO RESPONSE RECEIVED WITHIN ONE MINUTE
ERR 7800
WITHIN ONE MINUTE ENTER
ABCD
AND PRESS RETURN KEY
```

If you respond with lowercase letters instead of uppercase letters, the following is displayed on the console:

LOWERCASE RESPONSE RECEIVED

c. Module HARDC3 completes verification of all the CPU and memory functionality that is required by the T & V system. Then, control is transferred to module HARDCO, which completes verification of all the load path functionality that is required by the software system. It then loads and invokes the T & V system loader. Refer to paragraphs F-18 and F-19 for error reporting.

F-17. DISK LOADER (ZVDLDR)

Module ZVDLDR is used to read in the remaining modules that are required to complete the load sequence. These modules are:

- System File
- Resource Processor
- Executive Monitor

a. System File (ZVSYFL). The first module called in by the disk loader. This module provides the control for console communications, a fixed constant area for use by the T & V programs, service routines to handle error conditions, a power failure restart routine, and a routine to extract channel numbers for specific IDs.

b. Resource Processor (ZVRPRC). The second module called in by the disk loader. This module first selects a keyboard device in the following manner:

(1) Scans for a system console on an MDC from the lowest channel up (asynchronous).

(2) If an MDC console is not found, it searches for an asynchronous communications terminal on channel OCOO; if none is found, the search continues from the highest communications channel down.

(3) If a console is found, Resource Processor configures the proper parameters, including the baud rate.

(4) If a terminal is not found, it must be configured manually for 1200 baud.

Next, the T & V system revision level is displayed on the console with the address mode, and available system resources (fig. F-2). Each resource is identified as follows:

- Channel number
- Mnemonic descriptor of the hardware
- ID of the hardware
- T & V programs necessary for listing the hardware
- Firmware revision level

CAUTION

A system resource may be omitted from a configuration display (without an error indication) because of a hardware failure within that resource. If the accuracy of the system configuration is in doubt, compare the display with the configuration display produced at system installation time.

The configuration display of any resource can be suppressed by pressing the BRK (Break) key after the first line is displayed. The display of system resources is performed only during the initial load sequence; it is not displayed during execution of the individual T & V programs.

c. Executive Monitor (ZVEXEC). Provides the control and operator interface for the system. You can perform the following functions using ZVEXEC:

- Request that a T & V program be loaded and executed, specifying the operating mode and the extent of testing
- Specify the real-time clock frequency (default = 60). This modifies the media and current memory default (memory default only if allowed in hardware) so that, for subsequent boot loads, the new real-time clock frequency will be used.
- Define the console characteristics, change the console address, and attach alternate output devices

```
TEST AND VERIFICATION REV G

LAF
CHAN  DEVICE          1ST      2ND     FIRMWARE
NUM     TYPE    ID    TEST     TEST      REV
----------------------------------------------
0000    CPU    E430   CPSX1    -----     0090
----     MMU   ----   CPSX1    -----     0090
----     RTC   ----   CPFX1    -----     ----
----     WDT   ----   CPFX1    -----     ----
----    MMEM   ----   CMMX5    -----     ----
0200    CIP    2609   CPFX3    -----     0012
0400    DISK   2361   MSUX6    SMDX2     004E
0480    DISK   2361   MSUX6    SMDX2     004E
0500    DISK   236F   MSUX6    SMDX2     004E
0600    DISK   236F   MSUX6    SMDX2     004E
0680    DISK   236F   MSUX6    SMDX2     004E
```

Figure F-2. Sample Display of System Configuration

- Write a new baud rate value and console address on the media so that these parameters will be used for subsequent boot loads
- Specify error and scrolling control

F-18. TYPES OF FAULTS

Hardware failures may be detected during different phases of system operation. Faults that are detected or reported by the operating system fall into the following classes:

1. Abnormal conditions detected during system QLT operations which are passed from hardcore to TVOS for reporting purposes.
2. Errors detected by hardcore which are passed to TVOS.
3. Errors detected during the scan of system resources and reported in the resource printout.
4. Fault conditions during T & V operations which cause a trap and result in a printout from the TVOS trap handler.
5. Fault conditions detected by the loader while loading a program.
6. Fault detected by the T & Vs.

F-19. HARDCORE ERROR REPORTING

There are two classes of errors: catastrophic errors that must be reported before proceeding, and errors that are detected, but do not preclude continued execution of the hardcore tests, and can be reported after a console is verified.

If the error is not catastrophic, the error routine continues testing and a retry may result.

Errors detected during the load sequence are reported via the console and/or in register D1 of the control panel. The error format is as follows:

ERR YXXX

where:

- Y (bits O through 3) specifies the following types of failure

  0000 = Unspecified
  0001 = CPU
  0010 = Memory
  0011 = Console electronics
  0100 = Boot path
  0101 = Load path
  0110 = Communications electronics
  0111 = Input keyboard
  1000 through 1111 = Reserved

- XXX equals a 12-bit error code (bits 4 through 15) as follows:

  Bit 4 specifies the following types of error:

  0 = Report error and continue
  1 = Catastrophic error, report and halt

  Bits 5 thru 15 identify the specific error

If the control panel is locked, a detected error is communicated to you by the blinking of the TRAFFIC indicator on the control panel. The blinking sequence begins with the TRAFFIC indicator being off for 5 seconds, followed by one to six blinks at the rate of one blink per second. The number of blinks specifies the type of failure as defined above for bits 0 through 3 of the error code. This sequence (5 seconds off followed by the blinks) continues indefinitely.

Table F-1 lists the error messages that are displayed via the console or by the blinking of the TRAFFIC indicator. These error codes are also contained in register D1. Register B2 contains the starting address of a storage area (buffer), which is capable of storing 10 error codes. The contents of the buffer depend on the number of errors encountered and the successful retries of the errors during the load sequence. Register D1 contains the error code of the last error encountered, if more than one error occurred.

Table F-1. Load Sequence System Halts and Diagnostic Error Messages

ERROR CODE IN DI	DESCRIPTION	SUSPECTED ORU'S
0400	Failure in exiting from QLTs, Hardcore was not initiated	CPU
1602	Intermediate loader halt	Operator
1611	Next sector of file being read beyond range of last	Media/Device
1612	Bound unit to be loaded not found on volume major directive	Media
1616	I/O error during load of any module	Media
1800-1948	CPU error in HARDC3	CPU
1AOO-1A5C	CPU error in HARDC1	CPU
1BO1-1BOB	CPU error in BLTDR	CPU
1BOC	Unsolicited trap received	
1F03	Load and halt of T & V System	Operator
1F06	Not a disk device	Device/Controller
1F07	Invalid volume label	Media/Device/Controller
1FOA	ID or status NAK	Device/Controller
1FOD	Not a fixed relative file	Media
1F0E	Record not found in a given file extents	Media
1FOF	Loader logic error	Media
1F12	Program not found	Media/Operator
1F13	Overlay not found	Media/Operator
1F14	Invalid item type	Media
1F15	Wrong density disk	Media/Operator
1F16	I/O status error	Device/Controller

Table F-1. Load Sequence System Halts and Diagnostic Error Messages (Cont)

ERROR CODE IN DI	DESCRIPTION	SUSPECTEO ORU'S
1F8E	Record not found in given directory extents	Media
1F90	SAF bU in LAF mode	Operator
1F91	Remote extent on directory	Media
1F95	Load address too high	Media
2801	Memory error (B1 contains address)	MEMORY
2802	Memory error (trap 15 or 17)	MEMORY
3XXX	Console error in HARDC2	CONSOLE SUBSYSTEM
400F	I/O error while loading BTLDR	
4001	I/O error while loading LDPTH	
400M	I/O error while loading HARDC (M= track with I/O error)	
5086	I/O error while loading DSKLDR	
401F	Checksum error in BLTDR	
401I	Checksum error in LOPTH	
401M	Checksum error in HARDC (M = track with I/O error)	
5096	Checksum error in DSKLDR	
5080	I/O error while reading Vol label of load channel	
5081	I/O error while reading root directory of load channel	
5Z82	I/O error while reading progfile directory of load channel (see Z below)	INPUT Subsystem
5183	I/O error while reading CO, TO, SO of load channel (see Z below)	
5084	No response from load channel	
5ZXY	I/O error while reading progfile member, where: Y = Member number X = Times member read Z = 1 I/O error while doing format read ID on member 2 Media ID did not compare with CWA and/or CWB format read ID overrun buffer	
5885	Invalid load path	CONSOLE SUBSYSTEM
6XXX	Communications error in HAROC2	
7XXX	Console Device (Comm/MDC)	Controller/Console
7800	Input not received	Controller/Console

F-20. ACCESS OF T & V PROGRAMS

The T & V system must be loaded before you can access any individual T & V program. If the load operation is successful, the T & V system displays the following:

```
T & V EXECUTIVE
FOR HELP AT ANY QUESTION, PRESS "?" KEY

C ? :
```

In response to the C ? message, you can access an individual T & V program by entering the proper program name for the desired test at the console keyboard.

F-21. PROGRAM SELECTION

In the DAS3 (D/C), the T & V system contained on SMUPAC is placed on the disk drive addressed as 0400. When you select a T & V program and enter it at the console terminal, the T & V executive searches the disk pack for the program and informs you that it is being executed.

Example: CPST3 REV.F 05FEB 82

If you enter the unacceptable command, the following message appears on the console:

PROGRAM NOT FOUND

Re-enter your command correctly.

F-22. ERROR REPORTING

T & V programs have an error reporting feature which displays a message in the following format:

ERR (four-character code) @ (specific address location)

Example: ERR 5320 @ 39A1

In addition to the above error message format, a program may display additional error messages in a format appropriate for the device being tested. Note that each program displays a starting and ending message on the console.

If the CPU hangs up during a T & V operation, the program can be restarted at the mode question by pressing the S (Stop), CLR (Clear), R (Ready), and E (Execute) pushbuttons. The following statement is displayed:

```
POWER RESTART
T & V XXXXX
MODE (A OR "CONTROL H" FOR HELP) ? :
```

If the console stops after printing this statement, press E (Execute) pushbutton.

Usually, when the system locates a hardware fault, a program trap occurs and the T & V program displays the following:

TRAP NN EXXXX

where:

NN = Decimal trap number
XXXX = Address of the information that caused the trap.

Record and report. this message to your supervisor. Refer to paragraph F-18 for a general classification of the fault, and Table F-2 for a listing of the traps.

Table F-2. Traps and Halt Locations

Trap Number	Event Name	Halt Location
1	Monitor Call	80
2	Trace/Breakpoint	7E
4	Reserved for Software Use	7A
5	Unimplemented Operation	78
6	Integer Register Overflow	76
12	Illegal Remote Data Descriptor	6A
13	Privilege Violation	68
14	Protection Violation	66
15	Unavailable Resource	64
16	Program Error	62
17	Uncorrectable Memory Error	60
23	External processor Unavailable Resource	54
24	External Processor Uncorrectable Memory Error	52

Section II. SETUP PROCEDURES AND T&V PROGRAMS

F-23. CHECK FOR OPERATIONAL READINESS

Before you run any T & V program you should check the system for readiness. Refer to the system operator's manual (TM 11-7010-205-10-1) for the Operational Readiness check procedure. This check, along with the operator's description of the fault or failure symptom, will help you choose the correct T & V program to troubleshoot the problem. Note that paragraphs F-26 thru F-37 provide detailed instructions for the set up required to use the programs listed in the Index of T & Vs.

F-24. TESTING PROCEDURES

Each T & V program in this system has its own name and purpose. For example, CPSX1 is the T & V program used to test the instruction set and the CP board. Note that some T & V programs require special setup instructions to tailor their use to the DAS3 (D/C) configuration. These special instructions are provided in paragraphs F-26 thru F-37.

The first stage of any T & V program is a basic PASS/FAIL check of the equipment. Sometimes you will be directed by the program to perform actions such as pressing keys or reloading punch cards. If the routine passes (runs without reporting errors), you have tested and verified the item in question.

F-25. FAULT ISOLATION USING T & V PROGRAMS

The T & V will start and run automatically, identifying all errors and/or program halts that would indicate an item is faulty and needs to be replaced. The first indication of fault is not always enough to isolate the fault.

Whenever you have an error reporting failure, you should:

a. Rerun the T & V to verify that the fault is permanent and not random or intermittent.

b. Recheck the status word, error code listing for the respective T & V procedure you are using.

c. Run the appropriate T & V for components or devices before and after the item reporting the error to make sure you have isolated the fault correctly.

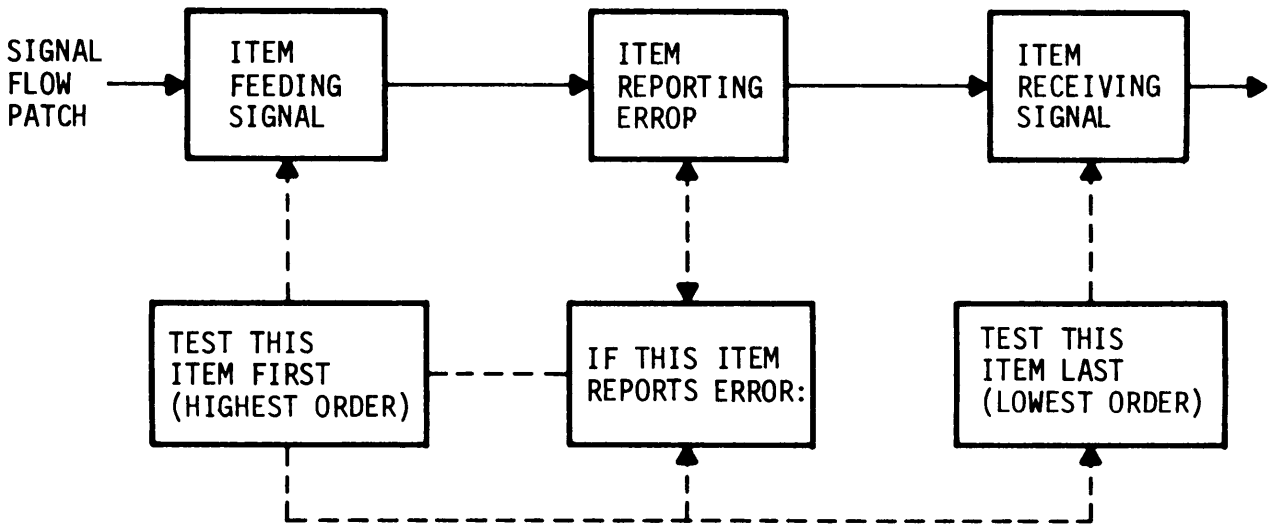


Figure F-3. Fault Isolation Procedure

d. Access the help file if you have a problem during a program run. To do this, when the program asks a question, press the CTL and H ("control H") keys or the ? key. This is a departure form the pattern usually followed in the sample printouts provided with the T & Vs. Those printouts follow a predetermined, simplified pattern for diagnostic testing.

e. Refer to Table F-3 for selecting the correct T & V for the item you wish to test. Table F-3 tells you the channel or the direct connect line the device is on, the board in the CPU to which it is connected, and the appropriate adapter pat.

Table F-3. Device Identification/T & V Selection Guide

CHANNEL OR DIRECT CONNECT	DEVICE ID	ON CABLE	MEGABUS SLOT	ADAPTER PAC LOCATION	FIRST T & V	SECOND T & V	THIRD T & V	FOURTH T & V
0000	CPU				CPSX1	-		
	Memory Management Unit				CPSX1	-		
	Real Time Clock/ Watch Dog Timer	-			CPFX1	-		
	Memory				CMMX1*	-		
	* For up to 1 megabyte of memory run CMMX1 and for greater than 1 megabyte run CMMX5							
0200	Commercial Instruction Processor	Internal	-		CPFX3			
0400	Disk Drive	W6	Slot 3 Disk Control 1		SMDX2	MSUX6		
0480	Disk Drive	W7	Slot 3 Disk Control 1		SMDX2	MSUX6		
0500	Disk Drive	W8	Slot 3 Disk Control 1		SMDX2	MSUX6		
0600	Disk Drive	W2	Slot 4 Disk Control 2		SMDX2	MSUX6		
0680	Disk Drive	W4	Slot 4 Disk Control 2		SMDX2	MSUX6		
0700	Disk Drive	W5	Slot 4 Disk Control 2		SMDX2	MSUX6		
0900	Real Time Adapter		MDC Slot 11	A03/A04	XCSX2			
OCOO	Autocall (Dialer Board)	W6	MLCP Slot 7	AO1	MLCX1	TCSX1		
0C80	Autocall (Dialer Board)	W6	MLCP Slot 7	AO1	MLCX1	TCSX1		
0D00	HDLC (Sync. Autocall)	W5	MLCP Slot 7	AO2	MLCX1	DCMX2		
OE00	Async Line	W4	MLCP Slot 7	AO3	MLCX1	DCMX1		

Table F-3. Device Identification/T & V Selection Guide -- Continued

CHANNEL OR DIRECT CONNECT	DEVICE ID	ON CABLE	MEGABUS SLOT	ADAPTER PAC LOCATION	FIRST T & V	SECOND T & V	THIRD T & V	FOURTH T & V
OE80	KVDT 10	W4	MLCP Slot 7	A03	MLCX1	DCMX1	-	VIPX8
1200	Console KVDT/ Printer	W3	MDC Slot 10	A01	KCMX3	-	-	-
1280	Line Printer	W2	MDC Slot 10	A02	PRMX3	-	-	-
1600	Mag Tape Drive	W9	DRU Slot 8	A01 - A03	MTUX3	-	-	-
1680	Mag Tape Drive	W9	DRU Slot 8	A01 - A03	MTUX3	-	-	-
1C00	CRP (Punch)	W10	MLCP Slot 5	A02	MCLX1	DCMX1	-	XCXS1
1C80	CRP (Read)	W10	MLCP Slot 5	A01	MCLX1	DCMX1		XCSX1
1D00	KVDT03	W9	MLCP Slot 5	A02	MLCX	DCMX1	VIPX8	TCSX1
1D80	KVDT02	W9	MLCP Slot 5	A02	MLCX	DCMX1	VIPX8	TCSX1
1E00	KVDTOO	W8	MLCP Slot 5	A03	MLCX	DCMX1	VIPX8	TCSX1
1E80	Open	W8	MLCP Slot 5	A03	-	-		
1FOO	Open	W7	MLCP Slot 5	A04	-	-	-	
1F80	Open	W7	MLCP Slot 5	A04	-	-	-	
2C00	2780/3780 Synchronous	W14	MLCP Slot 4	Sync A01	MLCX1	DCMX1	-	TCSX1
2C80	2780/3780 Synchronous	W14	MLCP Slot 4	Sync AO1	MLCX1	DCMX1	-	TCSX1
2D00	KVDT04	W12	MLCP Slot 4	Async A02	MLCX1	DCMX1	VIPX8	TCSX1
2D80	KVDTOO	W12	MLCP Slot 4	Async A02	MLCX1	DCMX1	PRUX1	TCSX1
2EO0	KVDT08	W12	MLCP Slot 5	Async A03	MLCX1	DCMX1	VIPX8	TCSX1
2E80	KVDT07	W12	MLCP Slot 5	Async A03	MLCX1	DCMX1	VIPX8	TCSX1
2FO0	KVDT06	W11	MLCP Slot 5	Async A04	MLCX1	DCMX1	VIPX8	TCSX1
2F80	KVDT05	W11	MLCP Slot 5	Async A04	MLCX1	DCMX1	VIPX8	TCSX1
3C00	HDLC	W18	MLCP Slot 3	SYNC HDLC AO1	MLCX1	DCMX2		

Table F-3. Device Identification/T & V Selection Guide -- Continued

CHANNEL OR DIRECT CONNECT	DEVICE ID	ON CABLE	MEGABUS SLOT	ADAPTER PAC LOCATION	FIRST T & V	SECOND T & V	THIRD T & V	FOURTH T & V
3D00	Future	W17	MLCP Slot 3	Async A02	MLCX1	DCMX1		
3D80	Future	W17	MLCP Slot 3	Async A02	MLCX1	DCMX1		
3EO0	KVDTO1	W16	MLCP Slot 3	Async A03	MLCX1	DCMX1	VIPX8	TCSX1
3E80	PRT02	W16	MLCP Slot 3	Async A03	MLCX1	DCMX1	PRUX1	TCSX1
3FO0	KVDT09	W15	MLCP Slot 3	Async A04	MLCX1	DCMX1	VIPX8	TCSX1
3F80	PRTO1	W15	MLCP Slot 3	Async A04	MLCX1	DCMX1	PRUX1	TCSX1

NOTE

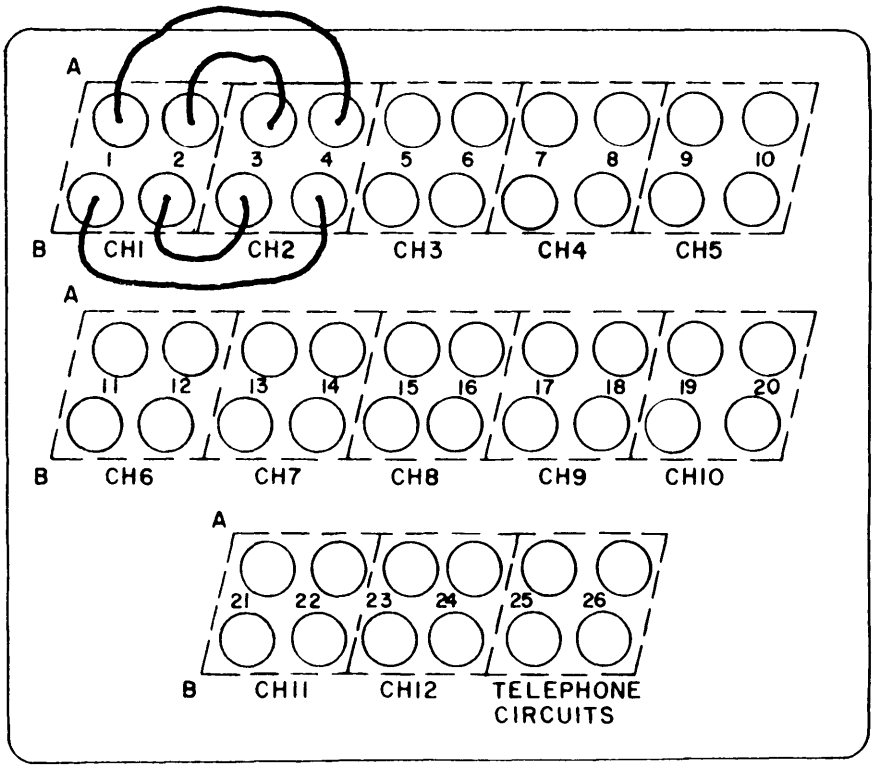
Memory save unit is tested by PSSX1, the power failure test

F-26. DCMX1 SPECIAL SETUP

NOTE

These procedures test the communications circuits within the DAS3 (D/C) and can print out loopback problems and baud rate failures. Converter Loopback checks the circuits through the converter, Modem Loopback tests the circuits through the modems.

Converter Loopback



"A" CABINET

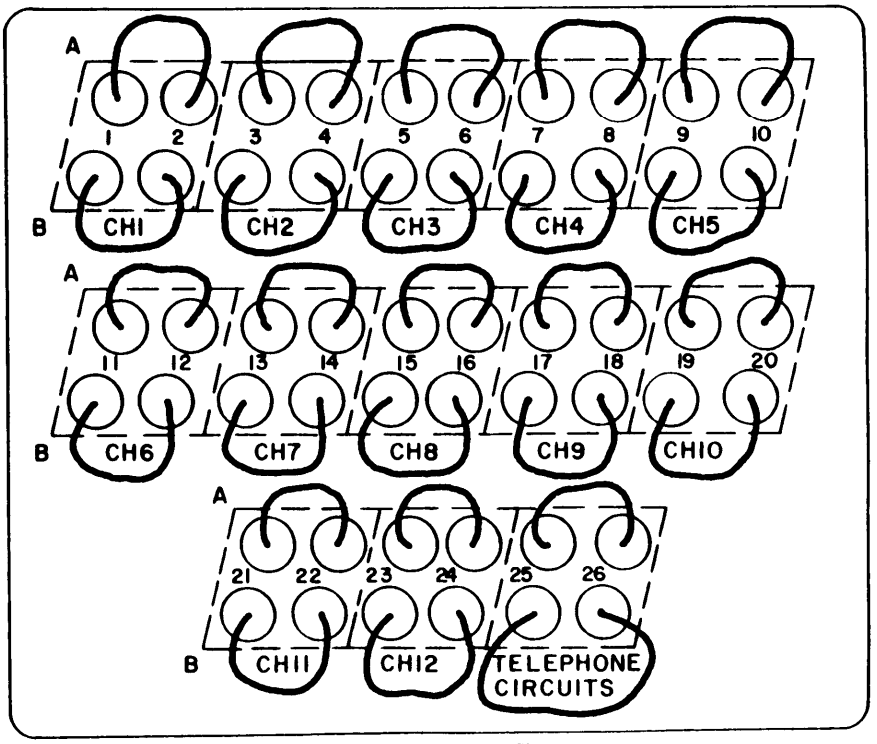
1. Using spare communications wire, install a loopback connection at signal entrance panel on A Cabinet. This will loopback channel 1 to channel 2 as indicated.

(1A - 4A) (2A- 3A)
(1B - 4B) (2B -3B)

F-26. DCMX1 SPECIAL SETUP (CONT)

2. Using spare communications wire, install loopbacks at signal entrance on all channels being tested on B Cabinet.

(1A - 2A) (3A - 39)
(1B - 29) (3B - 49)



"B" CABINET

3. Set MODEM/CONVERTER switches in both “A” and “B” cabinets to CONVERTER.

4. Set Channel 1 1900G converter to REMOTE LOOPBACK.

5. Set A cabinet CONNECTION/BINDING POST switches to BINDING POST. Set B cabinet CONNECTOR BINDING POST switches to BINDING POST position.

6. Check for RLSD indicators on each converter module in slots 1 thru 12 in the 600GR converter assembly and the 1900G converters. (Ensure the RD light is off).

7. Run DCMX1 on the following channels:

ØE8Ø	2CØØ	2EØØ	2F8Ø	3F8Ø
1DØØ	2DØØ	2E8Ø	3E8Ø	
1D8Ø	2D8Ø	2FØØ	3FØØ	

8. Enter “E” loop, 9600 baud rate “A” mode.

9. After 1 pass on all channels, enter BREAK and exit DCMX1.

F-26. DCMX1 SPECIAL SETUP (CONT)

Modem Loopback

1. Set CONVERTER/MODEM switches in both A and B cabinets to MODEM.
2. Open front cover on both V.29 modems and set top left switch to DC.
3. Set thumbwheel rate switch to 1.
4. Ensure all pushbuttons are in OUT position.
5. Clear the left modem (Modem 1) by pressing and holding the LPBK switch to CLEAR, then release it.
6. On the right modem (Modem 2), set LPBK switch to SEND, hold and then release.
   - Red REMOTE light should be lit on right modem
   - Red LOCAL light should be lit on left modem with TEST light blinking
7. Check that CARRIER DETECT lights on modems 1 thru 12 in quasi analog modem assembly rack are lit.
8. Run DCMX1 on following channels (run 8 channels per line, enter (C/R) and when system asks run more channels? enter “Y” and the channel):

ØE8Ø	1DØØ	2CØØ	2D8Ø	
2E8Ø	3FØØ	3E8Ø	1D8Ø	
2DØØ	2EØØ	2FØØ	2F8Ø	3F8Ø

9. Enter “E” loop, 1200 baud rate, “A” mode.
10. After 1 pass on all channels, enter BREAK.
11. Remove the modem card from slot 13 in the quasi analog modem assembly and set it aside.
12. Remove the 2024 modem from slot 12 and install it in slot 13.
13. Set the B Cabinet two-wire/four-wire switch to the four-wire position.
14. Place both VOICE/DATA buttons in DATA mode.
15. Install patch cord from line 2 (pair 26) DTE to line 1 (pair 25) DCE. (Pair 25 and pair 26 are red patch panels.)
16. Check for CARRIER DETECT on modem in slot 13.
17. Run DCMX1 on channel ØEØØ.
18. Enter “E” loop, 1200 baud rate and “A” mode.
19. After 1 pass, hit BREAK and exit DCMX1.

F-26. DCMX1 SPECIAL SETUP (CONT)

20. Remove patch cord.

21. Remove 2024 modem from slot 13, return it to slot 12.

22. Return original modem card to slot 13.

23. Set B Cabinet two-wire/four-wire switch to two-wire position.

24. Press VOICE buttons to return VOICE/DATA switches to VOICE position.

25. Clear both V.29 modems.

26. Set both 1900G converters into the NORM position.

27. DCMX1 is now completed.

F-27. DCMX2 SPECIAL SETUP

NOTE

This information is needed to more accurately test the High Level Data Link Control in the DAS3(D/C). The test is in two parts, Modem Test checks the HDLC through the V.29 modems and Converter Test checks the HDLC through the 1900G converters.

Modem Test

1. Set the 12.12 modem in Channel #13 to LOCAL LOOPBACK.
2. Patch from HDLC “DTE” to Autodin “DCE” in Cabinet “A”.
3. Clear both V.29 modems.
   - Place channel #1 V.29 modem into REMOTE LOOPBACK by pressing and holding LPBK switch to SEND. Hold and release
   - The remote light should be lit on channel #1 V.29 modem; the LOCAL indicator should be lit on channel #2 V.29 modem, with the test indicator blinking on channel 2
4. Run DCMX2 on channels ØDØØ and 3CØØ.
5. Enter “E” loop and “A” mode.
6. After 1 pass, enter BREAK.

Converter Test

1. Set converter/modem switches in Cabinet A to CONVERTER.
2. Place channel #2 1900G converter into REMOTE LOOPBACK position.
3. Run DCMX2 on channel 3CØØ.
4. Enter “E” loop and “A” mode.
5. After 1 pass, enter BREAK and exit DCMX2.
6. Set the loopback switch on the 12.12 modem card in channel #13 to NORMAL position.
7. Remove patch cords.
8. Set both converters to NORM position.
9. Set converter/modem switches in Cabinet A to MODEM position.
10. Clear both V.29 modems. DCMX2 is completed.

F-28. KCMX3 SPECIAL SETUP

NOTE

This test can only be run if system console is an MDC controller device.

1. Load KCMX3.
2. Enter 12ØØ channel, 1AØ setup word, A mode.
3. Follow T & V instructions.
4. After 1 full pass, when system asks for “MODE?”, enter X to exit KCMX3. KCMX3 is completed.

F-29. MLCX1 SPECIAL SETUP

1. Load MLCX1.
2. “C/R” channels (all).
3. Enter “A” mode.
4. After start of pass 2, enter BREAK and exit MLCX1. MLCX1 is complete.

F-30. MSUX6 SPECIAL SETUP

1. Load MSUX6.

NOTE

Step 2 activates the trace capability and is an optional part of test.

2. Enter “P” mode, “C” error control, “N” suppress error printing, “Y” enable trace messages, "Y" enable I/O history, “Y” append bytes transferred.

NOTE

System returns to MODE?

3. Enter “A” mode on drives 480, 500, 600, 680 and 700. (Do not include drive 400.)

4. Chain drives together by answering “N” to the EXECUTE (Y or N)” question on each channel selected. On 700, answer “Y” and testing will start.

5. After 1 pass on all drives, enter BREAK and exit MSUX6. MSUX6 is completed.

F-31. MTUX3 SPECIAL SETUP

CAUTION

If badly worn or stretched tapes are used retryable media errors may occur. Avoid using badly worn or stretched tapes for this T & V program.

1. Place drives into “PE” mode.
2. Load MTUX3.
3. Enter “Z” mode (to initialize tapes), “1600” channel, “Y” write on tape, “Z” mode, “1680” channel, "Y" write on tape.
4. After tapes are initialized, run “Q” test on both channels.
5. Enter “Q” mode, “C/R” channel (enter a carriage return), “Y” execute.
6. After 1 pass of both drives, enter BREAK and exit MTUX3.
7. Place drives into “NRZI” mode.
8. Load MTUX3.
9. Repeat steps 1 thru 5. MTUX3 is completed.

F-32. PRMX3 SPECIAL SETUP

1. Load PRMX3.
2. Enter “1280” channel and “A” mode.
3. After 1 pass, enter BREAK and exit PRMX3. PRMX3 is completed.

F-33. PRUX1 SPECIAL SETUP

1. Determine what channel the remote printer is on.

Printer	Communication Channel	Address
PRTØØ	10	2D80
PRTØ1	11	3F80
PRTØ2	12	3E80

2. Enter PRUX1.

3. Select type “6” printer option.

4. Run “A” test.

5. After 1 pass, enter “I” to test other printers.

6. Enter “X” to exit PRUX1. PRUX1 test is complete.

F-34. PSSX1 SPECIAL SETUP

NOTE

If disk drive Ø4ØØ is set up for remote power up (A1O board), a loader error will occur. If this happens, set the A1O board switch to LOCAL and re-run PSSX1.

If memory straps are not set for the memory save option, the power restart test will fail. Prior to running the test, set memory straps on memory board in CPU correctly.

1. Load PSSX1.
2. Ensure PANEL SECURITY key is set to SECURE position. (Memory save will not operate if control panel is not secure.)
3. When you are ready for power shutoff, set CB3 (30 amp) in technical power panel to OFF.
4. Wait 2 hours and set circuit breaker back to ON.
5. After 1 pass, break and exit PSSX1. PSSX1 is completed.

F-35. TCSX1 SPECIAL SETUP

NOTE

This procedure tests auto dial/answer when a telephone line is available on channels ØCØØ and ØC8Ø.

1. Set TWO-WIRE/FOUR-WIRE switch to TWO-WIRE position.
2. Ensure telephone line is connected to BINDING POST PAIR 26 of Cabinet “B” entrance panel.
3. Set pair 26 VOICE/DATA switch to DATA.
4. Place binding post/connector switch for telephone line #2 to BINDING POST.
5. Load TCSX1.
6. Test Channel ØCØØ.
7. Enter “TRM” mode, “AD” test, enter a local phone number.
8. After 1 pass Ø errors, ensure ACU adapter reports with a “9”.
9. Repeat step 1 but with pair #25 and telephone line 1.
10. Enter “I” for mode.
11. Test channel 0C8Ø.
12. Enter “TRM” mode, “AD” test, enter a local phone number so that you can hear phone ring.
13. After 1 pass, Ø errors, ensure ACU adapter reports with a “5”.
14. Enter “RPT” for mode.
15. When asked to enter telephone number, break and enter “X” for mode. TCSX1 is completed.

F-36. VIPX8 SPECIAL SETUP

NOTE

I/O Terminal Test tests the I/O terminal in the DAS3 (D/C), Remote Keyboard-Display Test transfers console control to a remote terminal.

I/O Terminal Test

1. Load VIPX8.
2. Enter “N” resource scan, “1EØØ” channel and “A” mode.
3. After 1 pass, break and enter “I” for “MODE?”.
4. Enter “N” resource scan, “3EØØ” channel and “A” mode.
5. After 1 pass, enter BREAK and exit VIPX8.

Remote Keyboard - Display Test

1. Determine what remote terminals are connected to your DAS3 (D/C).

Channel #	Binding Post #	Address
1 KVDTØ2	1, 2	1D8Ø
2 KVDTØ3	3, 4	1DØØ
3 KVDTØ4	5, 6	2DØØ
4 KVDTØ5	7, 8	2F8Ø
5 KVDTØ6	9, 10	2FØØ
6 KVDTØ7	11, 12	2E8Ø
7 KVDTØ8	13, 14	2EØØ
8 KVDTØ9	15, 16	3FØØ
9 KVDT1Ø	17, 18	ØE8Ø

F-36. VIPX8 SPECIAL SETUP (CONT)

2. Transfer console control to a remote terminal.

3. Enter new channel ID. Example:

   NC 1D8Ø (C/R)

4. Enter new baud rate of remote. Example:

   NB 12ØØ (C/R)

5. Transfer to remote. Example:

   GN (C/R)

6. At the remote terminal which now has control of the system, run VIPX8 on all channels that have remote terminals.

7. If remote printers are in same area, run "PRUX1" on printers.

8. After all terminals are tested, transfer control back to the system console. Example:

   QT (C/R)

   VIPX8 is completed.

F-37. XCSX1 SPECIAL SETUP

Punch Test

10 Load XCSX1.

2. Enter “E” device, “A” mode, “1CØØ” channel, “4800” baud rate, and “even” parity.

3. After 1 pass, enter BREAK and exit XCSX1.

3. Save card output for read test.

Read Test

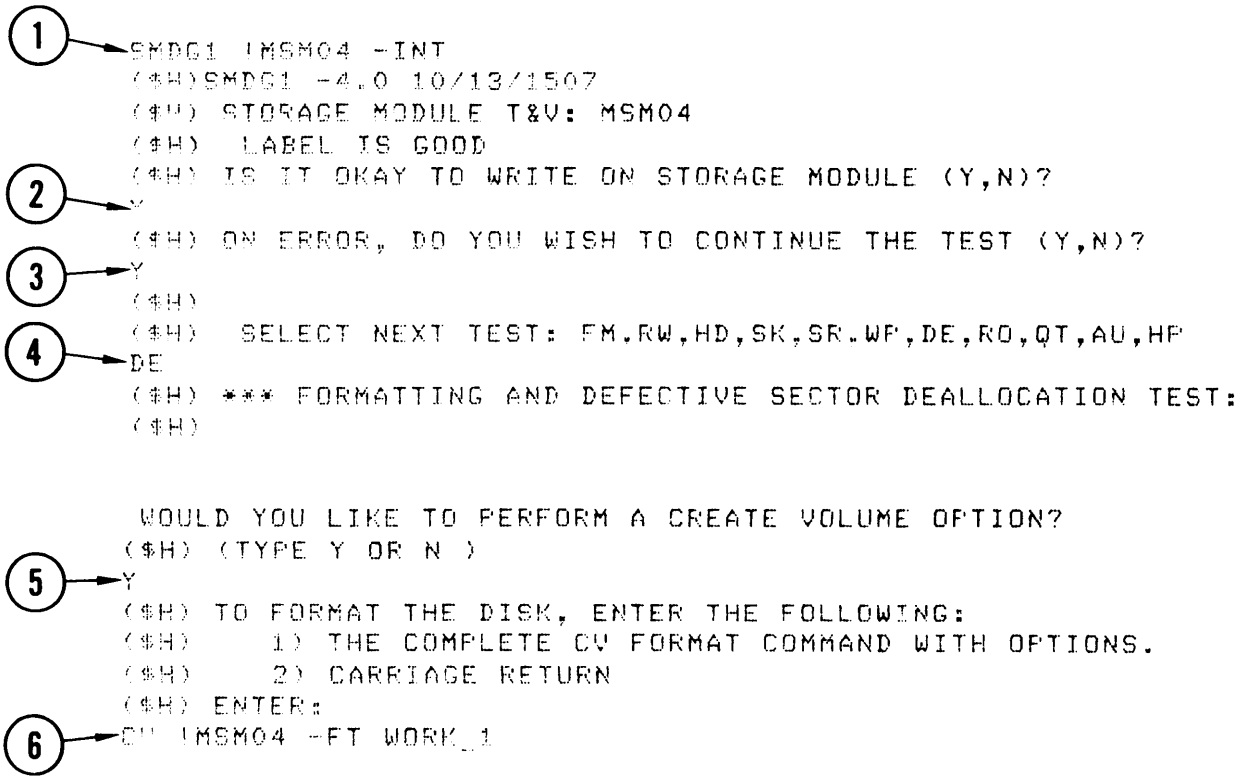
1. Load XCSX1.

2. Enter “D” device, “A” mode, “1C8Ø” channel, “4800” baud rate and “even” parity.

3. Place card output from punch test into read hopper.

4. After 1 pass, break and exit XCSX1. XCSX1 is completed.

SMDG1 T&V PROGRAM--DISK PACK SECTOR CHECK



NOTE

SMDG1 resides on the System pack, not SMUPACK. It will format a new disk pack, do a media verification, i.e. , look for bad sectors or spots, flag them and report the areas as the T & V is being run. Running an on line T & V means the system does not have to be taken down in order to test the disk pack.

1. With system up and running, at console terminal under ($H) enter:

   SMDG1Δ!disk drive IDΔ-FTΔ-INT

2. Enter Y to: okay to write on storage pack?

3. Enter Y to: on error, . . . continue test?

4. Enter DE: to next test query

5. Enter Y to create volume option

6. Enter CV command:
   CVΔ!disk drive IDΔ-FTΔdisk pack name (C/R)

SMDG1 T & V Program -- Disk Pack Sector Check (Cont)

```
($H) CV ENTERED AND WAITING FOR EXECUTION...
($H) (FORMATTING MAY REQUIRE 45 MINUTES FOR COMPLETION.)
($H)CREATE_VOLUME- 03.0- 08/04/1140
($H) CV COMPLETED.
($H) *
($H) DO YOU WANT TO PERFORM DEFECTIVE SECTOR DEALLOCATION?
($H) (TYPE Y OR N )
Y
($H) *** WRITE/READ TEST - BY SECTOR OR BY TRACK (S,T)?
T
```

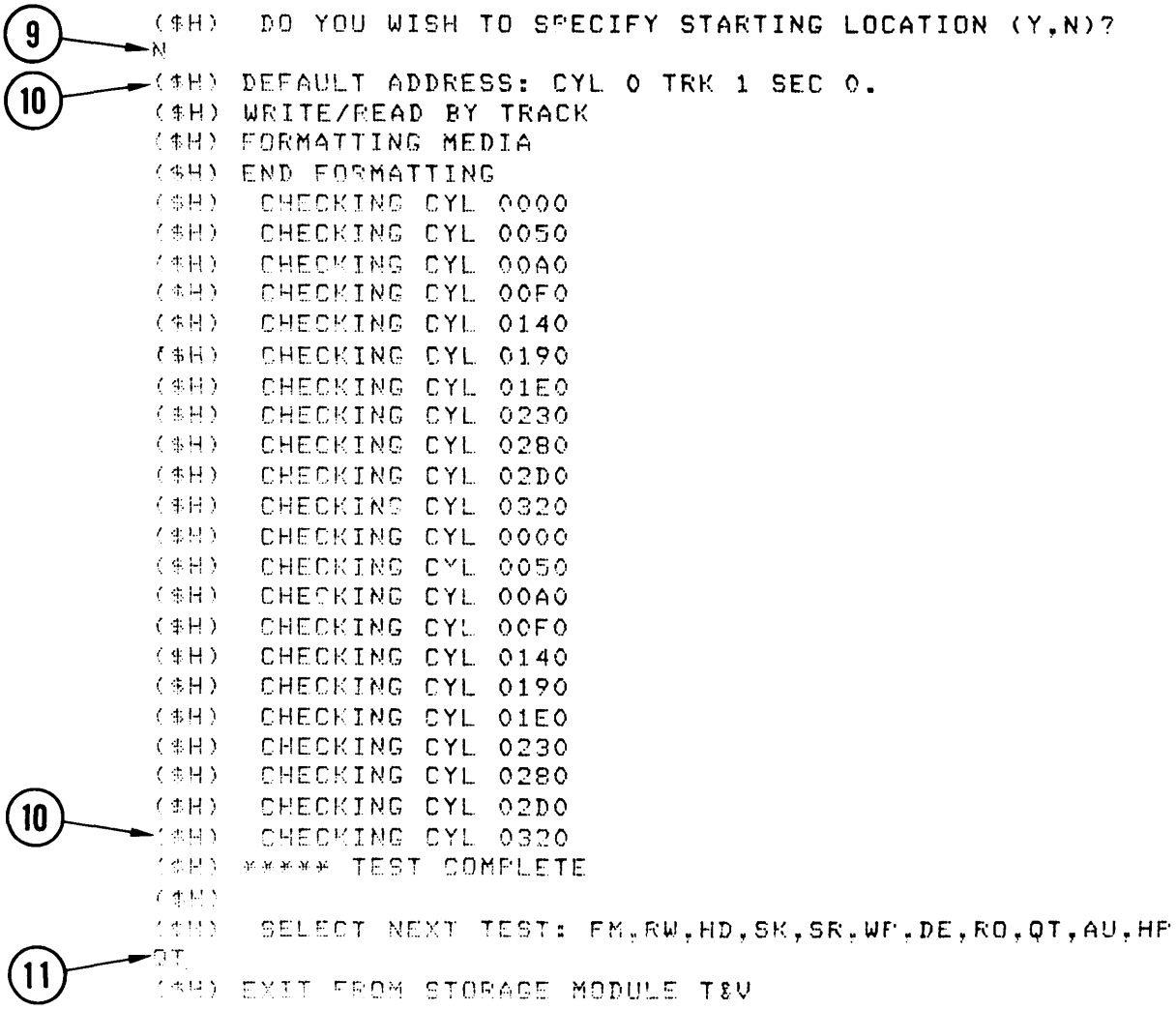
7. Enter Y to DE test query.

NOTE

In TRACK mode, T & V takes 45 minutes to run, in SECTOR mode, T & V may take up to eight hours.

8. Enter T to SECTOR/TRACK query.

SMDG1 T & V Program -- Disk Pack Sector Check (Cont)



NOTE

By entering N to specific start location, system defaults to cylinder Ø, track 1, sector Ø and progresses through the entire pack. Enter N if specific error location is unknown.

9. Enter N to specific start query.

10. Observe test results.

11. When test is complete, enter: QT

12. Resume operation.

CMMX1 T & V PROGRAM—-MEMORY

This T & V supports:

BOARD NO.	DESCRIPTION
BF2MZE*	Controller with EDAC (512K words) double fetch
BS2ST4*	Array-Pat (128K words) for EDAC
BMMU022A	Controller with parity (double fetch)
BCMM026A	Array-Pat (8K words) for parity
BMMU021A	Controller with EDAC (double fetch)
BCMM024A	Array-Pat (8K words) for EDAC
BMMUO1lA	Controller with EDAC (single fetch)
BMMU012A	Controller with parity (single fetch)
BCMMO02A	Array-Pat (8K words) for parity
BMMU031A	Controller with EDAC (128K words)
BMMU032A	Controller with parity (128K words)
BCMM044A	Array-pat (32K words) for EDAC
BCMM046A	Array-Pat (32K words) for parity
BCRM032A	32K words core memory
BCRM016A	16K words core memory
BMWP316A	6/20 16K memory
BMWP332A	6/20 32K memory
BMWP364A	6/20 64K memory

* Used on DAS3 (D/C).

DESCRIPTION

This program will test a central main memory subsystem of 32K to 64K words for SAF mode and up to 1M words for LAF mode, including either Parity or Error Detection and Correction (EDAC) options. The memory can be either MOS or core, or a mixture of both, and can have a mixture of Parity and EDAC options.

GENERAL INSTRUCTIONS

The memory in the system is tested in 32K-word increments referred to as modules (e.g., 32K = 1 module, 64K = 2 modules, 128K = 4 modules). Refer to the locator card to determine the amount and kind of memory in the system.

NOTE

If the total amount of memory configured on the system exceeds 64K words and the system is in SAF mode, testing of memory will be limited to data checking, without any EDAC tests.

To perform the EDAC or Parity test, a switch on the front edge of the controller board is pushed and released, in accordance with the printout, to force bad check bits for test patterns. There is only one switch on each controller board and it is pushed and released once for each 32K words (1 module) of memory contained on the controller board. If the controller board memory is 32K words (1 module), the switch on the controller board is pushed

and released one time. If the controller board memory size is greater than 32K words (1 to 4 modules), the switch on the controller board is pushed and released once for each 32K words (1 module) of memory located on the controller board.

The case may arise where 32K words (one module) of memory is located on two different memory control boards instead of one. If the upper 16K words are located on another memory control board with the same ID number as the lower 16K words memory control board, the memory control board that contains the upper 16K words is defined in this program as the complementary control board. To test the EDAC parity logic for this case, the printout and operator instructions are as follows:

PUSH MEMORY CONTROL BOARD SWITCH (2SECS) & RELEASE-MODULE No. O

In response to this printout, the switch on the lower memory control board is pushed and released. The printout responds with one of the following:

EDAC PRESENT
PUSH COMPLEMENTARY CONTROL BOARD SWITCH (2SECS) AND RELEASE

or

EDAC NOT PRESENT
PUSH COMPLEMENTARY CONTROL BOARD SWITCH (2SECS) AND RELEASE

In response to this printout, the switch on the upper memory control board is pushed and released. The printout responds with one of the following:

EDAC PRESENT

or

EDAC NOT PRESENT

The program then performs the test as indicated.

CMMX1 T & V PROGRAM--MEMORY (CONT)

ERROR REPORTING AND TROUBLESHOOTING PROCEDURE

The error message format is as follows:

"ERR XX AT YYY MD = W"
OR
"ERR XX AT YYY SU = Z MD = W"

where:

XX = ERROR CODE

YYY = LOCATION IN LISTING FOR EXPLANATION. THIS COMMENT WILL INDICATE WHETHER IT IS A MOTHER (CONTROLLER) OR DAUGHTER (ADAPTER) BOARD LISTING.

(USEFUL IN CASE NO CONSOLE PRESENT)

Z = THE NO. OF THE FAILING SUBUNIT (4K OF MEMORY)

W = THE NO. OF THE FAILING MODULE (32K OF MEMORY)

(SUBUNIT = Z, MODULE = W, MEANS FAILING SUBUNIT NO. Z ON MODULE NO. W)

An example of a noncorrectable error:

```
ERR DP1 @ 3312 MD = 0
IF DAUGHTER BOARD SIZE IS    :  8K  8K  32K  32K  128K
AND IF SINGL OR DBL FETCH    :   SF   DF   SF   DF   DF
ORU  IS  THIS  CONTROLLER  BOARD:  O  0  0  0  0
```

*** NOTE ERROR MESSAGE***

PAUSE ON NEXT ERROR (ANSWER Y OR N) C/R ? :

An example of a correctable (yellow) error:

```
ERR YELP @ 2347 SU = D MD = 0
If ADAPTER BOARD SIZE IS : 8K      8K      32K      32K     128K
AND IF SINGL OR DBL FETCH: SF      OF       SF       DF       DF
ORU IS THIS DB ON THIS MB:  3 ON 0 2 ON 0 0 ON 0 0 ON 0 0 ON0
OTHER POSSIBLE ORUs:                ALL           1 0N 1 1 ON 0
                                   ON 1
```

CORRECTABLE MEMORY ERROR LIMIT EXCEEDED ON ORU.
REPLACE AS A PRECAUTION TO PREVENT FUTURE FAILURES.
SYSTEM PERFORMANCE IS NOT AFFECTED BY THIS CONDITION.

*** NOTE ERROR MESSAGE***

PAUSE ON NEXT ERROR (ANSWER Y OR N) C/R ? :

CMMX1 T & V PROGRAM--MEMORY (CONT)

The PAUSE ON NEXT ERROR question allows the operator to evaluate the first error message that is displayed and to determine if the program is to be halted on future errors.

Refer to Table 1 for Error Code information and Figure 1 for Subunit and Module locations.

Table 1. Error Messages

ERROR CODE	TEST AREA	SUSPECTED ORU
ERR XRED	RED/Parity Error	Subunit/Controller
ERR XDATA	Data Mismatch	Subunit/Controller
ERR XYELO	Yellow Error	Subunit
ERR YELP	Yellow Error	Subunit
ERR CA	Module Access	Controller
ERR DBFRED	Double Fetch Read Error	Controller
ERR DBFYEL	Double Fetch Read Error	Subunit
ERR NEDAT	Double Fetch Read Error	Controller
ERR BYRED	Byte Write Test	Subunit
ERR MSMTCH	Byte Write Test	Controller
ERR BYWYEL	Byte Write Test	Subunit
ERR E1	EDAC Test	Controller
ERR E2	EDAC Test	Controller
ERR E3	EDAC Test	Controller
ERR E4	EDAC Test	Controller
ERR E5	EDAC Test	Controller
ERR E6	EDAC Test	Controller
ERR E7	EDAC Test	Controller
ERR E8	EDAC Test	Contoller
ERR E9	EDAC Test	Controller
ERR E99	EDAC Test	Controller
ERR P1	Parity Test	Controller
ERR P2	Parity Test	Controller
ERR P3	Parity Test	Controller
ERR P4	Parity Test	Controller
ERR AP1	Address Test	Subunit
ERR AP2	Address Test	Subunit
ERR AP3	Address Test	Subunit
ERR AP4	Address Test	Controller
ERR AP5	Address Test	Subunit
ERR DP1	Data Path	Controller
ERR DP2	Data Path	Subunit
ERR DPCOB	Data Path	Controller
ERR DPARP	Data Path	Subunit
ERR MA1	MOS Array (Red Error)	Subunit
ERR MA2	MOS Array (Data Mismatch)	Subunit
ERR MA3	MOS Array (Yellow Error)	Subunit

CMMX1 T & V PROGRAM--MEMORY (CONT)

Table 1. Error Messages--Continued

ERROR CODE	TEST AREA	SUSPECTED ORU
ERR MA4	MOS Array (Parity Error)	Subunit
ERR MA5	MOS Array (Data Mismatch)	Subunit
ERR CM1	Core Memory (Noise Error)	Subunit/Controller
ERR CM2	Core Memory (Red Error)	Subunit/Controller
ERR CM3	Core Memory (Selection Error)	Subunit/Controller
ERR BW1	Byte Error	Controller
ERR BW2	Byte Error (Yellow Error)	Subunit
ERR BW3	Byte Error	Controller
ERR BW4	Byte Error (Yellow Error)	Subunit
ERR SA1	Sense Amplitude	Subunit
ERR SA2	Sense Amplitude (Yellow Error)	Subunit
ERR RL1	Refresh Logic	Subunit
ERR RL2	Refresh Logic (Yellow Error)	Controller
ERR YEL	Yellow Error Threshold	Subunit

NOTE

If intermittent Red Errors are suspected, bypass the Yellow Error threshold by entering F at the MODE question in order to change the threshold to 1. The system then returns to the MODE question.

CMMX1 T& V PROGRAM--MEMORY (CONT)

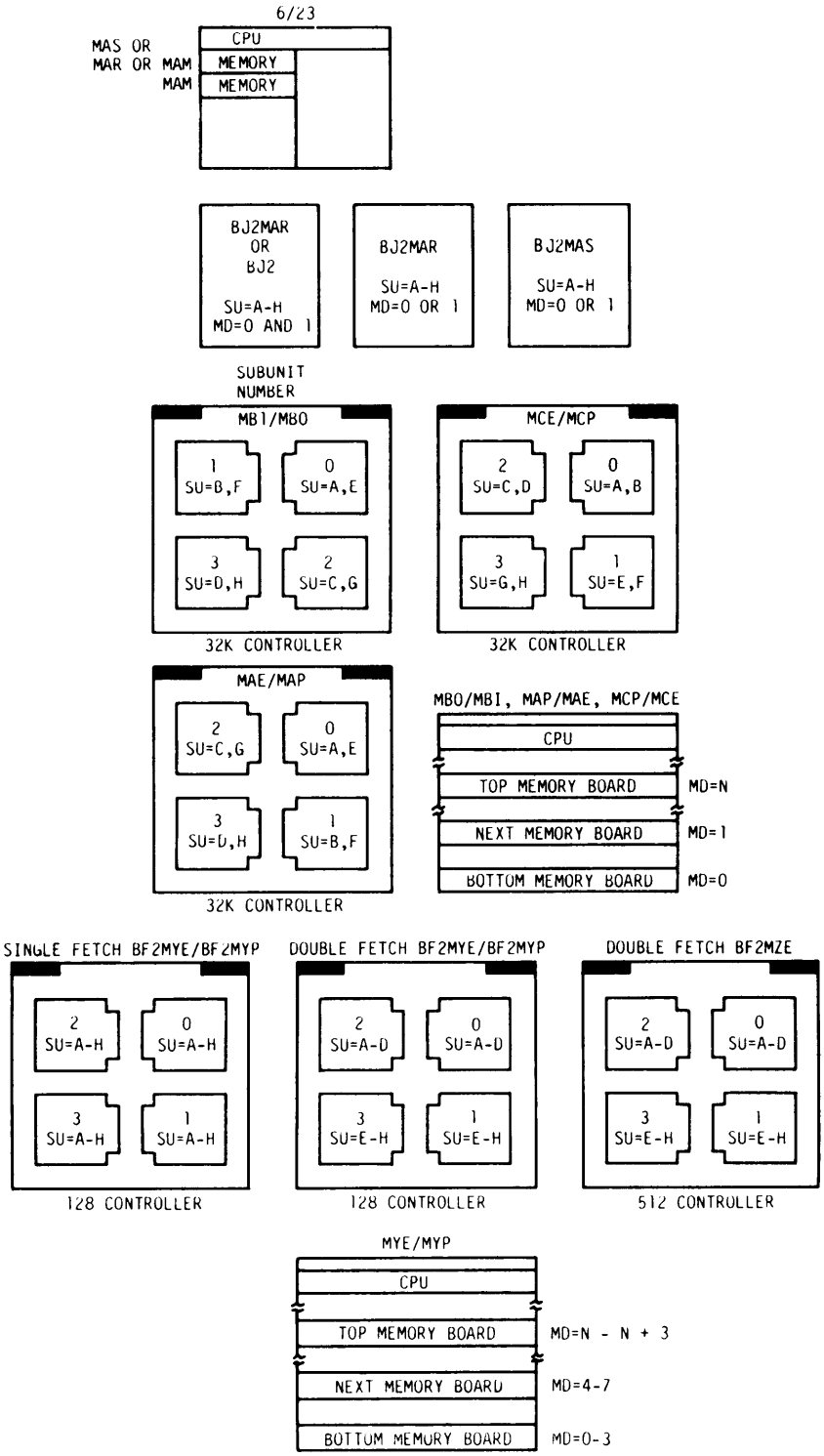
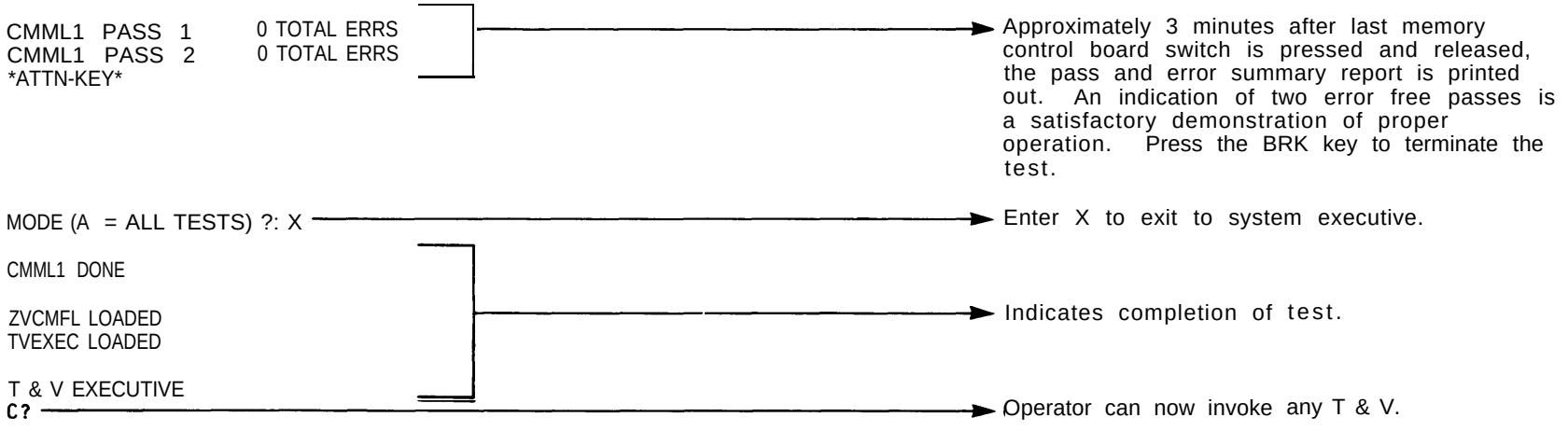


Figure 1. Module Number and Location

SAMPLE CONSOLE DISPLAY	OPERATOR INSTRUCTIONS
NOTE This console display is for explanatory purposes only. The actual console displays depend on the revision of the program being executed.	
C? CMML1	**Enter: CMML1.** If system is in SAF mode, enter: CMMS1.
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT. MEMORY TEST CMML1 REV (Date)	
TOTAL NO. OF 32 K (OR LESS) MODULES IS 8	**This number is the total number of 32K-word** excrements (modules) of memory in the system. See Figure 1 for module number and location.
MODE (A = ALL TESTS) ?: A BREAK WILL TAKE UP TO 15 SECONDS TO RESPOND PROGRAM WILL RUN UP TO 6 MINUTE(S) BEFORE REPORTING EDAC/PARITY TEST	**Enter A to test all memory modules and to** perform EDAC and Parity test on all modules.
PUSH MEMORY CONTROL BOARD SWITCH (2 SECS) & RELEASE-MODULE NO. 0 EDAC PRESENT PUSH MEMORY CONTROL BOARD SWITCH (2 SECS) & RELEASE-MODULE NO. 1 EDAC PRESENT PUSH MEMORY CONTROL BOARD SWITCH (2 SECS) & RELEASE-MODULE NO. 2 EDAC PRESENT PUSH MEMORY CONTROL BOARD SWITCH (2 SECS) & RELEASE-MODULE NO. 3 EDAC PRESENT PUSH MEMORY CONTROL BOARD SWITCH (2 SECS) & RELEASE-MODULE NO. 14 EDAC PRESENT PUSH MEMORY CONTROL BOARD SWITCH (2 SECS) & RELEASE-MODULE NO. 15 EDAC PRESENT	Press the memory control board switch (located) on right front edge of board) for 2 seconds, then release. Repeat as instructed by the printout.


CMML1 PASS 1 0 TOTAL ERRS
CMML1 PASS 2 0 TOTAL ERRS
ATTN-KEY
Approximately 3 minutes after last memory control board switch is pressed and released, the pass and error summary report is printed out. An indication of two error free passes is a satisfactory demonstration of proper operation. Press the BRK key to terminate the test.
MODE (A = ALL TESTS) ?: X
Enter X to exit to system executive.
CMML1 DONE
ZVCMFL LOADED
TVEXEC LOADED
Indicates completion of test.
T & V EXECUTIVE
C?
Operator can now invoke any T & V.

CMMX5 T & V PROGRAM--MEMORY

This T & V supports:

ID	Description
MZE	Memory Controller

NOTE

If the system contains 16K - and 64K-bit memories, use the T & V CMMX1. If in doubt, refer to the System Resource List for the appropriate T & V program to test a memory.

DESCRIPTION

This program will test a central main memory subsystem of up to 1M words for LAF or SAF mode, including either Parity or Error Detection and Correction (EDAC) options.

ERROR REPORTING AND TROUBLESHOOTING PROCEDURE

Detected errors are reported as follows:

ERR CMMX5 WWWW @ XXXX (CB_Y/AP_Z)

where:

WWWW = Coded Error Message

XXXX = Address of Error Explanation in Listing

Y = Controller Board Number (if applicable)

z = Memory Array-Pat Number (if applicable) - see Figure 1

Table 1. Error Messages

ERROR CODE	DESCRIPTION
AD00	ADDRESS PATH ERROR
AD01	RED ERROR
BS00	BUS ERROR
BS01	RED ERROR
BW00	BYTE WRITE ERROR
BW01	RED ERROR
CA00	CONTROLLER ADDRESS ERROR
CA01	RED ERROR

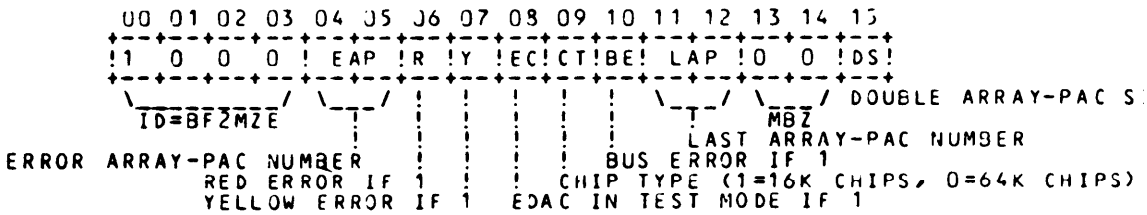
CMMX5 T & V PROGRAM--MEMORY (CONT)

Table 1. Error Messages--Continued

ERROR CODE	DESCRIPTION
CP00 =	UNIMPLEMENTED MEMORY DIAGNOSTIC INSTRUCTION
DM00 =	DISCONTINUITY IN MEMORY ABOVE LAST REPORTED CONTROLLER
DP00 =	DATA PATH BUS ERROR
DP01 =	DATA PATH RED ERROR
DP02 =	DATA PATH YELLOW ERROR
DP03 =	RED ERROR
DP04 =	OBSOLETE ERROR CODE
DP05 =	BUS ERROR
ED00 =	ERROR FREE LOCATIONS NOT FOUND, EDAC TEST BYPASSED
ED01 =	EDAC REPORTS ERROR WHEN NO ERROR EXPECTED
ED02 =	EDAC REPORTS DIFFERENT ERROR THAN EXPECTED
ED03 =	EDAC REPORTS NO ERROR WHEN ERROR EXPECTED
ED04 =	EDAC DATA MISCORRECTED
FD05 =	RED ERROR DID NOT TRAP
ED06 =	EXPECTED RED TRAP RECEIVED WITH RED ERROR BIT IN ID NOT SET
ED07 =	ENCODER ERROR
FD08 =	UNEXPECTED RED TRAP
ED09 =	EDAC REPORTS INCORRECT ERROR ARRAY-PAC
ED10 =	YELLOW ERROR NOT CORRECTED
ID00 =	INVALID ID TYPE
ID01 =	BUS ERROR
ED02 =	ILLEGAL CONFIGURATION, ONLY ONE 32K ARRAY-PAC
ID03 =	EDAC TEST MODE SET
ID04 =	ILLEGAL CONFIGURATION, ODD NUMBER OF DOUBLE SIZED ARRAY-PACS
ID05 =	RED ERROR
ID06 =	DIAGNOSTIC FUNCTIONALITY DISABLED OR NON-DIAGNOSTIC MEMORY
LD00 =	TEXT MESSAGES NOT LOADED
MA00 =	OBSOLETE ERROR CODE
MA01 =	INITIALIZATION ERROR, IGNORE IF RED ERROR IS REPORTED
MA02 =	YELLOW ERROR
MA03 =	RED ERROR
MA04 =	ADDRESSING ERROR
MA05 =	DATA MISCORRECTED
MA06 =	RED ERROR
MA07 =	DATA MISMATCH
RD00 =	RED ERROR
RD01 =	RED TRAP RECEIVED WITH RED ERROR BIT IN ID NOT SET
RF00 =	REFRESH ERROR, IGNORE IF RED ERROR IS REPORTED

CMMX5 T & V PROGRAM--MEMORY (CONT)

BF2MZE MEMORY CONTROLLER BOARD : ID/STATUS WORD CONFIGURATION



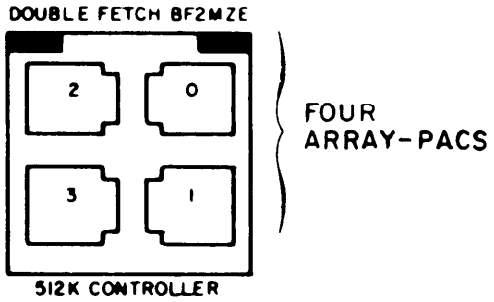


Figure 1. Memory Configuration

Yellow (EDAC correctable) errors are not reported until their number exceeds a predetermined threshold.

If the T & V program fails to detect an intermittent Red Error, invoke Mode P for additional information on Yellow errors.

SAMPLE CONSOLE DISPLAY	OPERATOR INSTRUCTIONS
NOTE This console display is for explanatory purposes only. The actual console displays depend on the revision of the program being executed.	
C?:	
CMMX5	Enter: CMMX5
SYSTEM IS SET TO CONTINUE TESTING AFTER ERROR REPORT. MEMORY TEST CMMX5 REV(Date) CMMX5: MEMORY ID TABLE -- -- -- - -- - - -- -- ------- - -- CONTROLLER O ID = 8018 ------- ------- --------- ------- ------- ------- ---------	Refer to the ID and Status Word Configuration on the previous page.
CMMX5:MODE (A = ALL TESTS) ?:A	Enter: A.
CMMX5: TESTING PROGRAM RESIDENT AREA CMMX5: TESTING CONTROLLER O CMMX5: PASS 1 0 ERRORS O TOTAL ERRORS CMMX5: TESTING PROGRAM RESIDENT AREA	Test runs automatically; no operator intervention is required. The display provides information on the test being performed. One error-free pass indicates satisfactory test results. Press the Break (BRK) key to terminate the test.
ATTN KEY	Break command is accepted.
CMMX5:ACTION (X = EXIT, R = RESTART, C = CONTINUE) ?:X	Enter: X to terminate the program.
CMMX5: DONE ZVCMFL LOADED ZVEXEC LOADED T & V EXECUTIVE C?	Operator may invoke another program.

MODE P USE

Following the selection of Mode P, a Y response to the question:

CMMX5: EXTENDED MEMORY ARRAY TEST (Y OR N)?;

provides extra patterns in the memory array test and causes the following information about Yellow errors under threshold to be reported for each Red error-free controller:

APO= XX%, AP_1 =XX%, AP 2= XX%, AP 3 =XX%

where:

XX is from O to 99 and indicates the number of Yellow errors on the Array-Pat as a percentage of the Yellow threshold.

CPFX1 T & V PROGRAM--REAL TIME CLOCK/WATCHDOG TIMER

DESCRIPTION

This test verifies the operation of the real time clock and watchdog timer. Since CPFX1 is an extension of the CPU test, it should be executed whenever a complete checkout of the CPU is desired.

GENERAL INSTRUCTIONS

If the watchdog timer is not installed (refer to resource printout), the test is performed on the real time clock only. An accurate watch is needed to perform this test.

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

In this test all error messages are prefaced by a three- or four-character code. All error messages pertaining to the Real Time Clock (RTC) have the characters RT as the first two characters of the code. All error messages pertaining to the Watchdog Timer (WDT) have the characters WD as the first two characters of the code.

ERROR MESSAGES

ERROR CODE	DESCRIPTION	SUSPECTED ORU
RT1	RTCP Unsuccessful	CPU Board
RT2	RTCN Unsuccessful	CPU Board or Power Supply
RT3	RTCF Unsuccessful	CPU Board
RT4	No Auto Initialization	CPU Board
RT5	Activity Bit Not Set	CPU Board
RT6	High Priority RUPT Unsuccessful	CPU Board
RT7	Activity Bit Not Set	CPU Board
RT8	Low Priority RUPT Successful	CPU Board
RT9	Activity Bit Not Set	CPU Board
RT1O	No Auto Initialization	CPU Board
WD1	WDTF Unsuccessful	CPU Board
WD2	WDTN Unsuccessful	CPU Board
WD3	WDTF Unsuccessful	CPU Board
WD4	No Interrupt	CPU Board
WD5	RTC Serviced Before WDT	CPU Board
WD7	Activity Bit Not Set	CPU Board
WD8	RTC Time Not Equal to WDT Time	CPU Board

SAMPLE CONSOLE DISPLAY	OPERATOR INSTRUCTIONS
NOTE This console display is for explanatory purposes only. The actual console displays depend on the revision of the program being executed.	
T & V EXECUTIVE REV C?	
CPFX1	Enter: CPFX1.
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT. RTC/WDT TEST CPFX1 REV(Date)	
PRESS CARRIAGE RETURN TO START TIMING:	Press RETURN(C/R).
RTC WDT 00:01 00:01:00.0 00:02 00:02:00.0 00:03 00:03:00.0 00:04 00:04:00.0 00:05 00:05:00.0	Test runs automatically; no operator intervention is required. The display provides information on the test being performed. The time is displayed and updated each minute. Use a watch to ensure that a minute elapses between each line of the display, starting when RTC is displayed. A 5-minute run indicates satisfactory test results. Press the Break (BRK) key to terminate the test.
ATTN-KEY	Break command is accepted.
ACTION (X = EXIT, R = RESTART) ?:X	Enter: X to terminate the program.
CPFX1: DONE ZVCMFL LOADED TVEXEC LOADED	
T & V EXECUTIVE REV C?	Operator may invoke another program.

CPFX3 T & V PROGRAM-COMMERCIAL INSTRUCTION PROCESSOR

This T & V supports:

BOARD NO.	DESCRIPTION
BSCIPO1A	Commercial Instruction Processor (Model 47)

DESCRIPTION

This T & V program verifies proper operation of the Commerical Instruction Processor (CIP) subsystem. Faulty operation of the CIP will be indicated by an error message that will be printed out on the console. A full pass without an error message will indicate that the CIP is operating properly.

ERROR REPORTING AND TROUBLESHOOTING PROCEDURE

If the T & V program detects an error in the operation of the CIP, an error message will be printed out on the console. The error messages will vary in accordance with the type of malfunction.

Detected errors are reported as follows:

ERR CPFX3 KPXX @ YYYY

where:

KP = CIP
^{XX} = Error code
^{YYYY} = Program error location.

Table 1. Error Messages

ERROR CODE	DESCRIPTION
KP01	Error in M3 load and store
KP02	Bad ID return by CIP
KP03	Timeout trying to read CIP ID
KP04	Error in I/0 order simulation of CIP instruction
KP05	Error in RDBR load and store instructions
KP06	Error in indexed or indirect addressing
KP07	Error in canned tests
KP08	Got wrong hash total of XXXX XXXX XXXX
KP09	CIP is broken
KP10	Error in CIP branch instruction
KP11	Got trap for no CIP on system
KP12	Got trap 15 (unavailable resource)
KP13	Got trap 30 (CIP mini-QLT)

SAMPLE CONSOLE DISPLAY	OPERATOR INSTRUCTIONS
NOTE This console display is for explanatory purposes only. The actual console displays depend on the revision of the program being executed.	
CPFX3	Enter: CPFX3.
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT. CIP TEST CPFX3 REV (Date) CPFX3: PASS 1 0 ERRORS 0 TOTAL ERRORS	After one error-free pass, press the BRK (Break) key to terminate the test.
ATTN-KEY	Break commnand is accepted.
ACTION (X = EXIT, R = RESTART, C = CONTINUE) ?:X	Enter: X to terminate the program.
CPFX3: DONE ZVCMFL LOADED ZVEXEC LOADED	
T & V EXECUTIVE C?:	Operator may invoke another program.

CPSX1 T & V PROGRAM--CENTRAL PROCESSOR UNIT

DESCRIPTION

This program is intended to test the instruction set and functionality of the 6/4X CPU.

ERROR REPORTING AND TROUBLESHOOTING PROCEDURE

All errors detected are reported in the following format:

```
ERR CPSS1 AAHH@ NNNN (ORU 1) (ORU 2)
     CPSL1
```

where:

AAHH = the error code
NNNN = the address where the error was detected
(ORU_1) = } the identification of the suspected ORU.
(ORU_2) = }

After the error report, the program either automatically restarts or asks the mode question.

The following is a list of the error codes used by the CPU T & V:

CODES	DESCRIPTION	ORU
GEXX	GENERIC INSTRUCTION TESTING	CPU
BRXX	BRANCH ON REGISTER TESTING	CPU
BIXX	BRANCH ON MNDIGATOV TESTING	CPU
SHXX	SHIFT INSTRUCTION TESTING	CPU
SIXX	SHORT VALUE IMMEDIATE INSTRUCTION TESTING	CPU
SOXX	SINGLE OPERAND INSTRUCTION TESTING	CPU
DOXX	DOUBLE OPERAND INSTRUCTION TESTING	CPU
IOXX	IO INSTRUCTION TESTING	CPU
ASXX	ADDRESS SYLLABLE TESTING GROUP 1	CPU
SYXX	ADDRESS SYLLABLE TESTING GROUP 2	CPU
MMXX	MEMORY MANAGEMENT UNIT TESTING	CPU
INXX	INTERRUPT TESTING	CPU
TRXX	TRAP TESTING	CPU
XIXX	EXTERNAL INTERRUPTS	CPU

SAMPLE CONSOLE DISPLAY	OPERATOR INSTRUCTIONS

NOTE

This console display is for explanatory purposes only. The actual display depends on the revision of the program being executed.

Console display	Operator instructions
T & V EXECUTIVE C?:	
CPSX1	Enter: CPSX1.
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT. CPU TEST CPSS1 REV (Date) CPSL1 : PASS 1 0 ERRORS O TOTAL ERRORS [LOOPS = 00014]	No operator intervention is required. Special attention should be given to the
	Program will cycle indefinitely. Press the Break (BRK) key to terminate testing.
ATTN.KEY	Break command is accepted.
CPSL1: ACTION (X = EXIT, R = RESTART, C = CONTINUE) ?:X	Enter: X to terminate the program.
CPSL1 : DONE ZVCMFL LOADED ZVEXEC LOADED	
T & V EXECUTIVE C?:	Operator may invoke another program.

DCMX1 T & V PROGRAM--COMMUNICATIONS ADAPTER

This T & V supports:

ID	BOARD NO.	DESCRIPTION
-	BMLCOOIB	Multiline Communications Processor
2118*	BMLF101B	Dual Asynchronous Adapter
	BMLF102B	Single Asynchronous Adapter
2158	BMLF103A	Dual Synchronous Adapter
2158	BMLF104A	Single Synchronous Adapter
2138	BMLFCMSA	Single Broadband Current Mode
	BMLFCHSB	Synchronous Adapter
2168	BMLFBLSA	Single Broadband Balanced Line
	BMLFBLSB	Synchronous Adapter
2160	BMLF188A	Single MIL-STD-188C Synchronous Adapter
2110	BMLFCLBA	Single Current Loop Asynchronous Adpater
2110	BMLFCLAA	Dual Current Loop Asynchronous Adapter
2148	BMLFB88A	Single Wideband MIL-STD-188C Synchronous
	BMLFB88B	Adapter
2100	BMLFA88A	Dual MIL-STD-188C Asynchronous Adapter
21F2	BMBDMAS4	Dual RS-422 Direct Connect Adapter

* Used on DAS3 (D/C).

DESCRIPTION

This T & V verifies the proper operation of the Communication Line Adapters (CLAs) and provides a first level of diagnosis when failures are detected. Figure 1 provides an overview of the test limits of this T & V.

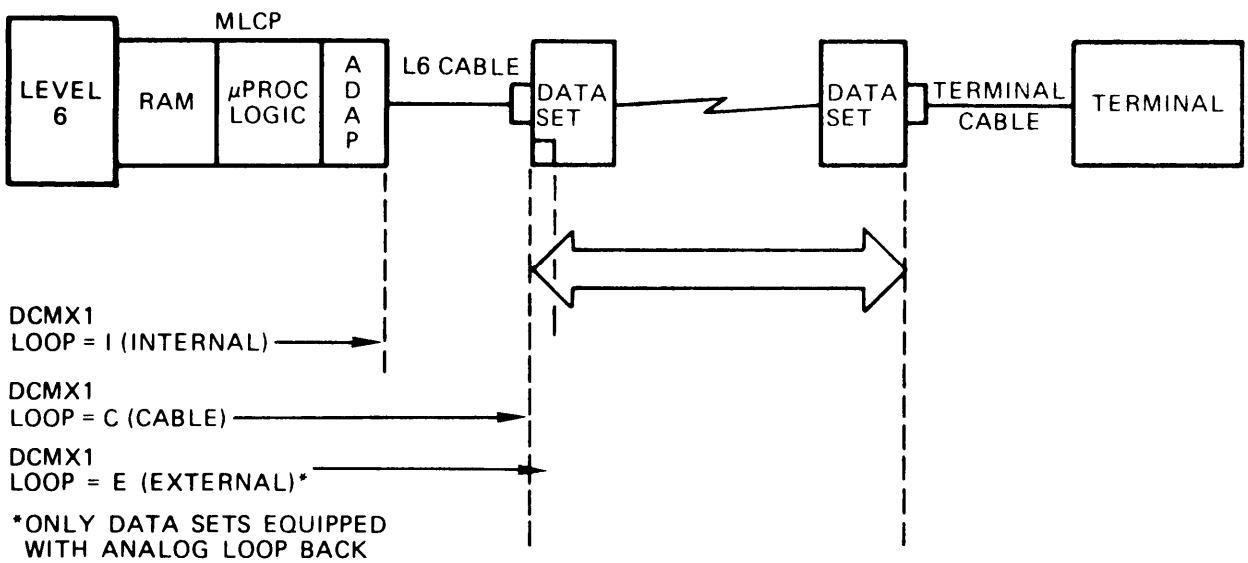


Figure 1. T & V Test Limits

DCMX1 T & V PROGRAM--COMMUNICATIONS ADAPTER (CONT)

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

Detected errors are reported as follows:

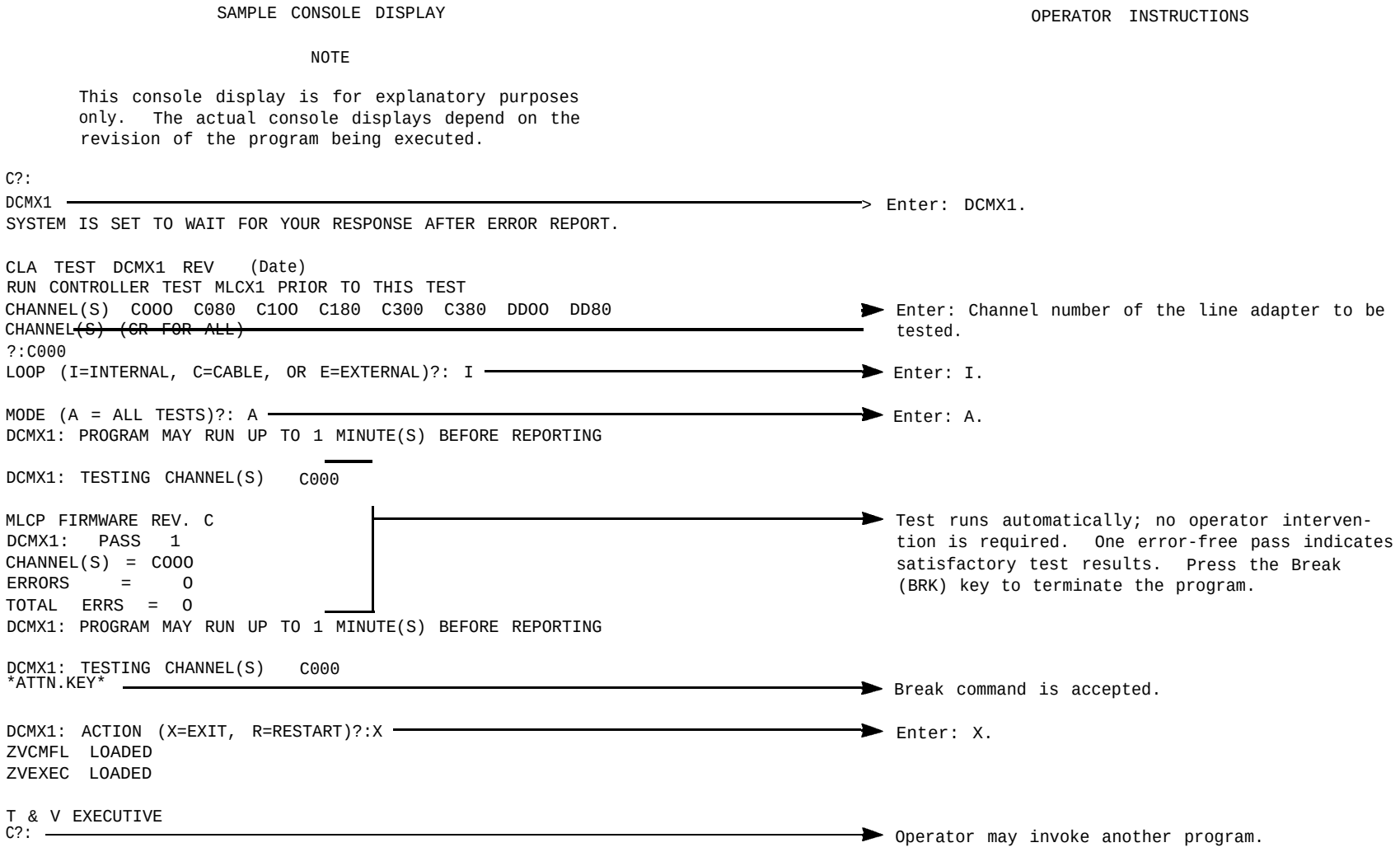
ERR DCMX1 KKXL @ YYYY CCCC ORU

where:

KK = MB (controller) or DB (adapter)
X = Test number
L = Line number of channel
YYYY = Address of error in T & V program
CCCC = Channel number where error occurred
ORU = Optimum Replaceable Unit

The total errors reported at the end of a pass can be cleared only by invoking “I(C/R)” at “MODE (.....) ?:”; otherwise, they are accumulated for every pass of the T & V.

If the internal loop test runs error free and errors are detected while running the cable loop test, either the cable, cable connector, or the ‘line adapter output driver/receivers are bad. Suggested action is to swap the cable or line adapter to isolate the failure.


SAMPLE CONSOLE DISPLAY
OPERATOR INSTRUCTIONS
NOTE
This console display is for explanatory purposes only. The actual console displays depend on the revision of the program being executed.
C?:
DCMX1
> Enter: DCMX1.
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT.
CLA TEST DCMX1 REV (Date)
RUN CONTROLLER TEST MLCX1 PRIOR TO THIS TEST
CHANNEL(S) COOO C080 C1OO C180 C300 C380 DDOO DD80
CHANNEL(S) (CR FOR ALL)
Enter: Channel number of the line adapter to be tested.
?:C000
LOOP (I=INTERNAL, C=CABLE, OR E=EXTERNAL)?: I
Enter: I.
MODE (A = ALL TESTS)?: A
Enter: A.
DCMX1: PROGRAM MAY RUN UP TO 1 MINUTE(S) BEFORE REPORTING
DCMX1: TESTING CHANNEL(S) C000
MLCP FIRMWARE REV. C
DCMX1: PASS 1
CHANNEL(S) = COOO
ERRORS = O
TOTAL ERRS = O
Test runs automatically; no operator intervention is required. One error-free pass indicates satisfactory test results. Press the Break (BRK) key to terminate the program.
DCMX1: PROGRAM MAY RUN UP TO 1 MINUTE(S) BEFORE REPORTING
DCMX1: TESTING CHANNEL(S) C000
ATTN.KEY
Break command is accepted.
DCMX1: ACTION (X=EXIT, R=RESTART)?:X
Enter: X.
ZVCMFL LOADED
ZVEXEC LOADED
T & V EXECUTIVE
C?:
Operator may invoke another program.

DCMX1 T & V PROGRAM--COMMUNICATIONS ADAPTER (CONT)

LOOP DESCRIPTION

Loop (I=Internal, C=Cable or E=External)?:

Internal: Run test with data wrap internal to CLA.

Cable: Run test with data wrap at test connector attached to end of communications cable. Use loop connector 60128816 for RS-232-C or MIL-STD-188C, 60128829 for high speed 301/303, or 60128826 for V.35.

External: Run test with data wrap at modem (refer to modem manual).

PIN CONNECTORS FOR CABLE LOOP

Prior to running this test, disconnect the adapter cable at the data set and connect a loop back connector plug to the cable. The pins of the loop back connector plug must be jumpered as follows:

MIL-STD 188C* (Connector P/N 60128816

PIN	SIGNAL		PIN	SIGNAL
4	RTS	TO	8	CD
4	RTS	TO	5	CTS
20	DTR	TO	6	DSR
2	TR DATA	TO	3	RC DATA
14	NEW SYNC	TO	15	TR CLK
23	SP SEL	TO	22	RING
23	SP SEL	TO	25	UNUSED
14	SP SEL	TO	17	RC CLK

* Used on DAS3 (D/C)

301/303 CURRENT MODE ADAPTER (Connector P/N 60128829)

PIN NO.	SIGNAL		PIN NO.	SIGNAL
D(X)	RTS LR2 BIT 1	TU	F(X)	DSR LR5 BIT 0
D(X)	RTS LR2 BIT 1	TO	M(Y)	CD LR5 BIT 2
D(X)	RTS LR2 BIT 1	TO	c(x)	DTS LR5 BIT 1
M(Y)	DTR LR2 BIT 0	TO	F(Y)	RING LR5 BIT 3
E(X)	TR DATA	TO	K(X)	RC DATA
H(X)	TEST CLK A	TO	J(X)	TR CLK
H(Y)	TEST CLK B	TO	L(X)	RCV CLK

(X) = Center Conductor, (Y) = Outer Conductor

DCMX1 T & V PROGRAM--COMMUNICATIONS ADAPTER (CONT)

V.35 BALANCED LINE ADAPTER (Connector P/N 60128826)

PIN NO.	SIGNAL		PIN NO.	SIGNAL
C	RQS LR2 BIT 1	TO	F	CD LR5 BIT 2
C	RQS LR2 BIT 1	TO	D	CTS LR5 BIT 1
H	DTR LR2 BIT O	TO	E	DSR LR5 BIT O
H	DTR LR2 BIT O	TO	J	RING LR5 BIT
P	XMIT DATA (-)	TO	R	RCV DATA (-)
S	XMIT DATA (+)	TO	T	RCV DATA (+)
U	TEST CLK (+)	TO	Y	TR CLK (+)
U	TESTCLK (+)	TO	V	RCV CLK (+)
W	TEST CLK	TO	AA	TR CLK (-)
W	TEST CLK	TO	X	RCV CLK (-)

RS-422* (Connector P/N 60156667-002)

PIN	SIGNAL		PIN	SIGNAL
2	SEND DATA A	TO	4	REC DATA A
3	OUT CONTROL A	TO	5	IN CONTROL A
6	REC TIME A	TO	7	SEND TIME A
9	SEND DATA B	TO	11	REC DATA B
10	OUT CONTROL B	TO	12	IN CONTROL B
13	REC TIME B	TO	14	SEND TIME B

*15-pin female connector for wrapping data at extender end or at bulkhead.

RS-422** (Connector P/N 60156667-003)

PIN	SIGNAL		PIN	SIGNAL
13	SEND DATA A	TO	16	REC DATA A
14	SEND DATA B	TO	19	REC DATA B

**25-pin female connector for wrapping data at terminal end of 15-to-25 crossover cable.

DCMX2 T & V PROGRAM--HIGH LEVEL DATA LINK CONTROL

This T & V supports:

ID	BOARD NO.	DESCRIPTION
--	BMLCO11C	Multi line Communications Processor Controller
2140	BMLFDLCA	HDLC Communications Line Adapter
2170	BMLFH88A	HDLC Communications Line Adapter (MIL-STD-188C)

RESTRICTIONS

1. The HCLA firmware must be at Revision 2 or greater. The MLCP firmware must be at Revision 8 or greater. Check System Resourse printout at boot of T & V Program to determine revision level for your equipment.

2. This T & V runs only on Megabus-network based systems.

DESCRIPTION

This T & V program tests the HCLAS and provides a first level of diagnosis when failuares are detected. An overview of this T & V is illustrated in Figure 1.

GENERAL INSTRUCTIONS

1. Prior to running this T & V, run the controller test MLCS/L1.

2. Before running DCMX2, ensure that any modem connected to the HCLA adapter is offline. If an error occurs, disconnect the modem connected to the adapter and rerun DCMX2.

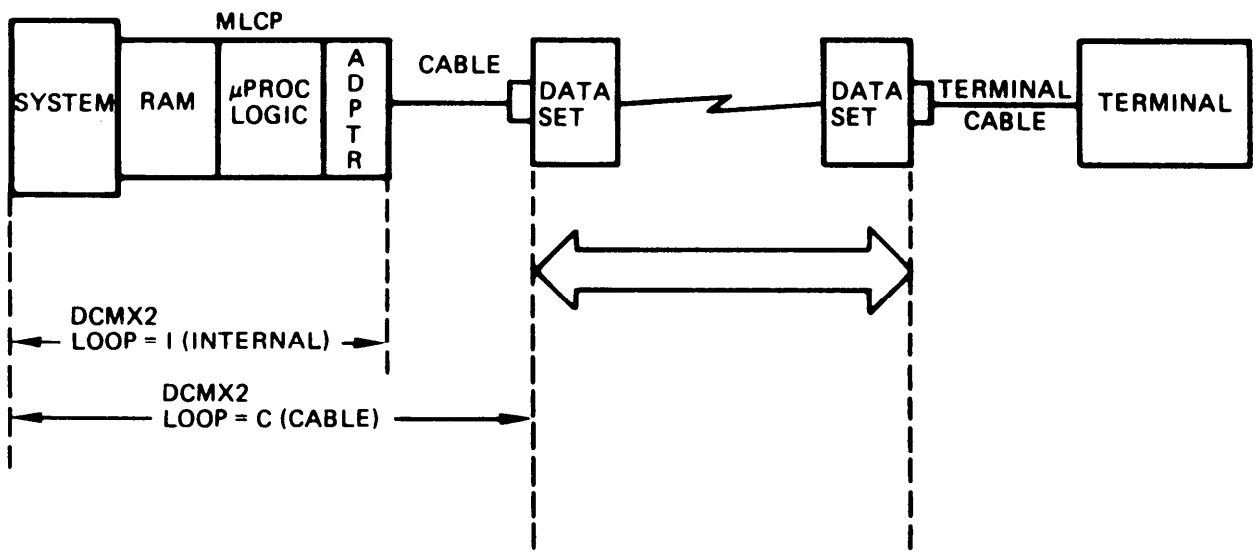


Figure 1. T & V Test Limits

DCMX2 T& V PROGRAM--HIGH LEVEL DATA LINK CONTROL (CONT)

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

If an error occurs, an error message is displayed and the program continues, aborts, or halts, depending upon the response entered to the error control question.

Error messages are displayed in the following format:

```
ERR MBXX AT YYYY ADD = CCCC
67 66 65 64 63 B2 B1 I   Displayed only if
R7 R6 R5 R4 R3 R2 R1 M   specified in P mode
```

or:

```
ERR DBXX AT YYYY LINE ZZ ADD = CCCC
67 66 65 64 63 62 61 I   Displayed only if
R7 R6 R5 R4 R3 R2 R1 M   specified in P mode
```

where:

```
  MB =  Controller board
  DB =  Adapter board
  XX =  Test label
YYYY =  Error location (in listing)
  ZZ =  Line number
CCCC =  Channel number

B1 through 67
R1 through R7  = Contents of Registers
I
M
```

In all cases:

```
R3 =  Channel number
```

In general:

```
R6  = Correct data
R5  = Actual data
R7  = Word number in block transfer
```

SAMPLE CONSOLE DISPLAY	OPERATOR INSTRUCTIONS
NOTE This console display is for explanatory purposes only. The actual console display depends on the revision of the program being executed.	
T & V EXECUTIVE REV C?	
DCMX2	Enter: DCMX2.
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT.	
HCLA TEST DCMX2, REV(Date)	Enter: N.
HELP (Y OR N(C/R)) ?: N	
RUN CONTROLLER TEST MLCX1 PRIOR TO THIS TEST HCLA CHANNEL(S) = EF00 CHANNEL(S) (C/R FOR ALL, [8 MAX]) ?:	Enter: (Channel number of adapter to be tested or press RETURN to test all channels).
LOOP(I-INTERNAL(C/R), C-CABLE OR E-EXTERNAL) ?: I	Enter: I.
MODE? (A OR CONTROL H FOR HELP) ?: A	Enter: A.
PROGRAM WILL RUN UP TO 2 MINUTES/CHANNEL BEFORE REPORTING MLCP FM REV C DCMX2: TESTING HCLA CHANNEL = EF00 HCLA FW REV 2 DATA SET STATUS = 0080 BITS/SEC = 19358 DCMX2 PASS 1 CHANNEL(S) = EF00 TOTAL ERRS = 0 DCMX2: TESTING HCLA CHANNEL = EF00 DCMX2 PASS 2 CHANNEL(S) = EF00 TOTAL ERRS = DCMX2: TESTING HCLA CHANNEL = EF00	Test runs automatically; no operator intervention is required. After one error-free pass per channel tested, press the Break (BRK) key to terminate the test.
ATTN-KEY	Break command is accepted.
MODE? (A OR CONTROL H FOR HELP) ?: X	Enter: X to terminate the program.
ZVCMFL LOADED ZVEXEC LOADED	
T & V EXECUTIVE REV C?:	Operator may invoke another program.

DCMX2 T & V PROGRAM--HIGH LEVEL DATA LINK CONTROL (CONT)

LOOP DESCRIPTIONS

Loop (I = Internal, C = Cable, E = External)?:

Internal: Does all internal DLCP tests, no special equipment needed.

Cable: Does cable test. A 60128816 external loop connector (for RS232 or MIL-STD-188) is needed. The connector must be attached to the line adapter(s) either at the line adapter connector or at the end of the cable.

External: Does a data loop back test. A modem with a loop back capability is such as the Bell 208B. Consult your modem manual before using this test.

PIN CONNECTORS FOR CABLE LOOP

Prior to running this test, disconnect the adapter cable at the data set and connect a loop-back connector to the cable. The pins of the loop-back connector plug must be jumpered as follows:

PIN	SIGNAL		PIN	Unused on HO
4	RTS	TO	8	CD
4	RTS	TO	5	CTS
20	DTR	TO	6	DSR
2	TR DATA	TO	3	RC DATA
14	NEW SYNC	TO	15	TR CLK
23	SP SEL	TO	22	RING
23	SP SEL	TO	25	Unused on HDLC
14	SP SEL	TO	17	RC CLK

Part No. 60128816

KCMX3 T & V PROGRAM--CONSOLE

This T & V supports:

ID	BOARD NO.	DESCRIPTION
	BCON220A	Single Console Controller
	BCON222A	Dual Console Controller
	BBDCOO1B	Multiple Device Controller
	BDCFCNSA	Device Adapter
2018		ASR-33 Teletype Device
2019		KSR-33 Teletype Device
2018		ASR-33 Teletype Device with Auto-Shutdown Feature
2019		KSR-33 Teletype Device with Auto-Shutdown Feature
201C		HIS Italia Keyboard/Serial Printer Device
201C		KSR Keyboard Typewriter Console (30 cps)
201C		KSR Keyboard Typewriter Console (120 cps)
201C		Console Printer (30 cps)
201C		Console Printer (120 cps)
201A		CRT/Keyboard Console (VIP71OO)
201A		CRT/Keyboard Console (VIP7801)
201A		CRT/Keyboard Console (VIP7200)
201A		CRT/Keyboard Console (VIP7205)
201A		Infowriter System
		Receive Only Printer - 30 cps (PRU1OO1)
		Receive Only Printer - 120 cps (PRU1OO2)
		Receive Only Printer - 30 cps (PRU1OO3)
		Receive Only Printer - 120 cps (PRU1OO4)

KCMX3 T & V PROGRAM--CONSOLE (CONT)

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

Refer to Table 1, Error Code Message Format, and note the following:

1. If the error is detected and there is a second console configured on the system, the error is displayed on the second console (the unit not under test). If no second console is configured, the error is reported on the console being tested.

2. A flashing traffic light (on and off) on the control panel indicates that the device has gone to the not ready state.

3. If set-up word (refer to Table 2) bit 15 = 1 and an error occurs, the test returns to the query MODE?:. Otherwise, if bit 15 = O, the test continues despite the error.

4. Error codes are displayed in the following format:

   ERR KCMX3 XXXX @ YYYY ZZZZ

   where:

   XXXX = Error code
   YYYY = Program error location
   ZZZZ = Channel number of device.

5. Listed in Table 1 are the error code messages and the most likely board replacement required to correct the failing symptom:

Table 1. Error Code Message Format

ERROR	SYMPTOM	PROBABLE CAUSE
0000	OBSERVE BAUD RATE IN R3	
2001	CP CAN'T CHANGE LEVEL O	CP
2002	WRONG DEVICE ID DETECTED	ADAPTER
2003	SETUP WORD REQUESTS PAPER TAPE	OPERATOR
2004	WRONG DEVICE ID DETECTED	ADAPTER
2005	ID CHANGED AFTER INITIALIZE	MDC
2006	CONFG WORD A CHANGED	MDC
2007	CONFG WORD B CHANGED	MDC
2008	INTERRUPT CONTROL WORD NON ZERO AFTER INITIALIZE	MDC
2009	MDC NOT INITIALIZE 3E/3F	MDC
2010	MDC LOST LOOPBACK CHARACTER	MDC
2011	MDC OR ADAPTER LOST LOOP BACK CHARACTER	
2012	NO ATTENTION BIT DURING LOOPBACK	Adapter

KCMX3 T & V PROGRAM--CONSOLE (CONT)

Table 1. Error Code Message Format--Continued

ERROR	SYMPTOM	PROBABLE CAUSE
2013	WRONG DATA DURING DMA TEST	MDC
2014	DEVICE READY BIT NOT SET WHILE DMA	ADAPTER OR DEVICE
2015	DMA TRANSFER TOOK TOO LONG	ADAPTER
2016	DEVICE SHOULD INTERRUPT BUT DIDN'T	
2017	DEVICE SHOULD NOT INTERRUPT BUT DID	
2018	PENDING INTERRUPT DID NOT COME	
2019	INTERRUPTED DEVICE WAS NOT A CONSOLE	
2020	ACTIVITY FLAG SET INCORRECTLY DURING INTERRUPT	
2021	ACTIVITY FLAG SET INCORRECTLY DURING INTERRUPT	
2022	ACTIVITY FLAG SET INCORRECTLY	
2023	CP EXECUTED IN WRONG LEVEL CHARACTER	
2024	30 SEC. ELAPSED WITHOUT STOP BIT FOR BREAK KEY	DEVICE OR ADAPTER
2025	UNEXPECTED INTERRUPT CAME	MDC
2026	NO INTERRUPT AT OUTPUT	ADAPTER
2027	OUTPUT DATA TRANSFER TOOK TOO LONG	ADAPTER
2028	NON ZERO RANGE AFTER OUTPUT	MDC
2029	ADDRESS INCORRECT AFTER INPUT ADDRESS	MDC
2030	TASK WORD CHANGED	MDC
2031	THIRTY SECONDS ELAPSED WITHOUT DEV. INTERRUPT	DEVICE
2032	THIRTY SECONDS ELAPSED WITHOUT DEV. INTERRUPT	DEVICE
2033	WRONG RESIDUAL RANGE	MDC
2034	CHARACTER NOT "CANCEL"	DEVICE OPERATOR
2035	THIRTY SECONDS ELAPSED WITHOUT DEV. INTERRUPT	DEVICE
2036	THIRTY SECONDS ELAPSED WITHOUT DEV. INTERRUPT	DEVICE
2037	CHARACTER NOT "CANCEL"	DEVICE OPERATOR
2028	WRONG RESIDUAL RANGE	MDC
2039	NO RESIDUAL RANGE FOUND IN BREAK DETECTION	MDC
2040	30 SEC. ELAPSED WITHOUT ATTENTION BIT SET	ADAPTER
2041	ATTENTION NOT SET ON UNSOLICITED CHARACTER	ADAPTER
2042	UNSOLICITED CHARACTER CHANGED wHILE MDC PROCESSING	MDC
2043	ATTENTION NOT SET ON UNSOLICITED CHARACTER	ADAPTER
2044	UNSOLICITED CHARACTER CHANGED WHILE MDC PROCESSING	MDC

KCMX3 T & V PROGRAM--CONSOLE (CONT)

Table 1. Error Code Message Format--Continued

ERROR	SYMPTOM	PROBABLE CAUSE
2045	30 SECONDS ELAPSED WITHOUT ATTENTION BIT SET	CONTROLLER
2046	UNSOLICITED CHARACTER CHANGED WHILE MDC PROCESSING	MDC
2047	DEVICE READY BIT NOT SET	DEVICE OR ADAPTER
2048	CHARACTER AT THE END WAS NOT RETURN CHARACTER	MDC
2049	DEVICE RESPONDED TO ANSWER BACK	DEVICE
2050	PAPER TAPE READ FAILED	DEVICE OR ADAPTED
2051	WRONG DATA FROM PAPER TAPE	DEVICE OR ADAPTER
2052	PAPER TAPE READ FAILED	DEVICE OR ADAPTER
2053	PAPER TAPE READ FAILED	DEVICE OR ADAPTER
2054	PARITY ERROR WHILE PAPER TAPE READ	ADAPTER
2055	PAPER TAPE READ FAILED	DEVICE OR ADAPTER
2056	PAPER TAPE READ FAILED	DEVICE OR CONTROLLER
2057	NON-ZERO RESIDUAL RANGE AFTER DISPLAY	MDC
2058	NON-ZERO RESIDUAL RANGE AFTER PUNCH	MDC
2059	PARITY ERROR WHILE PAPER TAPE READ	ADAPTER
2060	NON-ZERO RESIDUAL RANGE	MDC
2061	DMA RATE TOO HIGH	MDC
2062	CHARACTER PARITY ERROR	DEVICE ADAPTER
2063	STOP BIT DETECTED	DEVICE OR ADAPTER
2064	NONEXISTENT MEMORY ACCESSED	MDC
2065	BUS PARITY ERROR DETECTED	MDC
2066	UNCORRECTABLE MEMORY ERROR DETECTED	MDC
2067	WRONG CHARACTER RECEIVED	ADAPTER
2068	CHANNEL BUSY (I/0 NAK'D)	ADAPTER
2069	PANEL CHECK LIGHT IS ON	
2070	30 SECONDS ELAPSED WITHOUT ATTENTION BIT SET FOR UNSOLICITED CHARACTER	ADAPTER

KCMX3 T & V PROGRAM--CONSOLE (CONT)

Table 1. Error Code Message Format--Continued

ERROR	SYMPTOM	PROBABLE CAUSE
2071	WRONG CHARACTER RECEIVED	ADAPTER OR DEVICE
2072	WRONG CHARACTER COMBINATION RECEIVED	ADAPTER OR DEVICE
2073	WRONG CURSOR POSITION RECEIVED	DEVICE OR ADAPTER
2074	BREAK DETECTED	OPERATOR
2075	30 SECONDS ELAPSED WITHOUT CHARACTER	ADAPTER OR DEVICE
2076	ATTENTION BIT NOT SET FOR BREAK	CONTROLLER
2077	30 SECONDS ELAPSED WITHOUT INTERRUPT FOR UNSOLICITED CHARACTER	ADAPTER OR DEVICE
2078	2 MINUTES ELAPSED WITHOUT CHARACTER	ADAPTER OR DEVICE
2079	ATTENTION BIT ON AFTER LOOPBACK	ADAPTER
2080	KEYBOARD INPUT EXCEEDS 132 CHARACTER MAXIMUM	MDC

SAMPLE CONSOLE DISPLAY

NOTE

This console display is for explanatory purposes only. The actual console display depends on the revision of the program being executed.

```
T & V EXECUTIVE
C?:
KCMX3
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT.
CONSOLE TEST KCMX3 REV (Date)

TEST 1 CONTROLLER/ADAPTER FUNCTIONS TEST

INTERRUPT TEST

 DO NOT HIT "BREAK" OR ANY OTHER KEYS DURING THIS TEST
 WAIT FOR NEXT MESSAGE (MAX. 40 SEC.)

 CHANNEL ( 500 ) ?:500
 SETUP WORD ( 1AO OR "CONTROL H" FOR HELP ) ?:
 WAIT FOR NEXT MESSAGE

 VERIFY FOLLOWING CONSOLE PARAMETERS
        CHANNEL :    500
    FIRMWARE REV  :  76
      CONSOLE ID :   201A
       BAUD RATE :    299
  CHAR PER LINE  :  80

 EXPECTED CONSOLE ID:
   CRT = 201A     HISI = 201C
   ASR33 = 2019   KSR33 = 2018
 BAUD RATE MAY VARY +/- 2% OF THE ACTUAL VALUE

 MODE ( A = ALL TESTS OR "CONTROL H" FOR HELP) ?: A
 ERROR(S) WILL BE DISPLAYED ON CONSOLE   500

 RESPOND TO ALL REQUESTS WITHIN 30 SECONDS
 TYPE LETTER A
 A
   IT WAS A

 STRIKE CANCEL KEY OR (CTRL+X0
    "CANCEL" RECEIVED

 STRIKE CANCEL KEY OR (CTRL +X)
    "CANCEL" RECEIVED
```

OPERATOR INSTRUCTIONS

Enter: KCMX3

NOTE

This program dialog was obtained on a VIP7200 console.

Enter the channel number of channel/device to be tested.

Enter C/R and default to set-up work of 1AO (see Table 2 for set-up word utilization).

Enter: A.

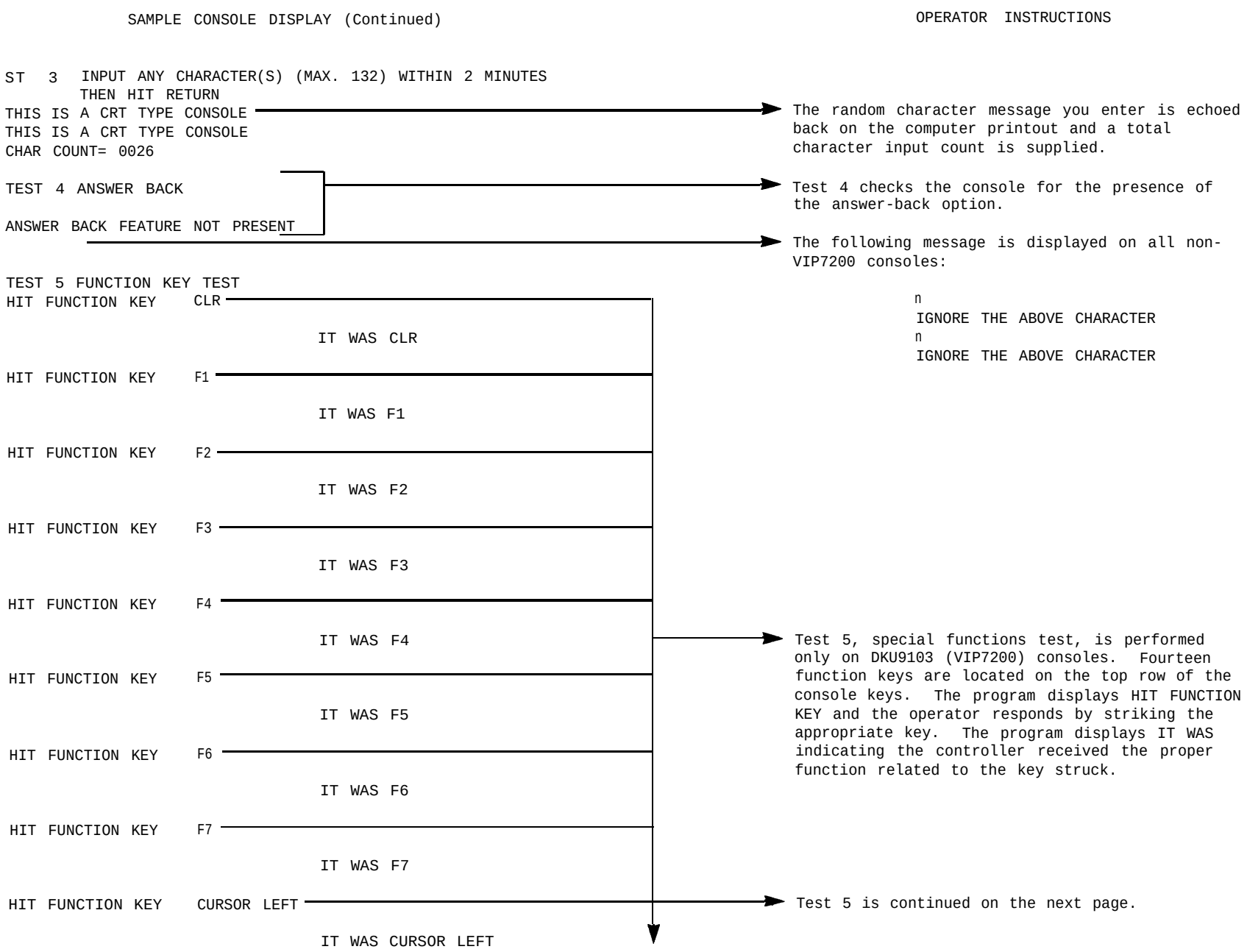
Strrike a key.

Depending on which option is availble, either strike the canel key or while holding th eCTL (control) key depressed, strike the X key.

```
THE ALPHABET WILL PRINT FOR 30 SECONDS
STRIKE BREAK KEY BEFORE IT IS DONE

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuv
  "BREAK"  RECEIVED

TYPE  LETTER  A
  IT WAS A

TYPE  LETTER  B
  IT WAS B

OBSERVE  ECHO DISPLAY IN THE FOLLOWING THREE REQUESTS

TYPE  LETTER  C  C
  IT WAS C

TYPE  LETTER  D  D
  IT WAS D

TYPE 4 CHARACTERS ABCD ABCD
   IT WAS ABCD

THE ALPHABET WILL PRINT FOR 30 SECONDS
STRIKE LETTER A BEFORE IT IS DONE

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
  IT WAS A

TEST 2 PRINT TEST
VERIFY LEFT AND RIGHT MARGINS AND THE OVERALL APPEARANCE
```

Respond to each console request within 30 **seconds.**

On keyboard consoles, the Test 2 print patterns contain 132 columns of information.


SAMPLE CONSOLE DISPLAY (Continued)
OPERATOR INSTRUCTIONS
ST 3 INPUT ANY CHARACTER(S) (MAX. 132) WITHIN 2 MINUTES
THEN HIT RETURN
THIS IS A CRT TYPE CONSOLE
THIS IS A CRT TYPE CONSOLE
CHAR COUNT= 0026
The random character message you enter is echoed back on the computer printout and a total character input count is supplied.
TEST 4 ANSWER BACK
Test 4 checks the console for the presence of the answer-back option.
ANSWER BACK FEATURE NOT PRESENT
The following message is displayed on all non-VIP7200 consoles:
n
IGNORE THE ABOVE CHARACTER
n
IGNORE THE ABOVE CHARACTER
TEST 5 FUNCTION KEY TEST
HIT FUNCTION KEY CLR
IT WAS CLR
HIT FUNCTION KEY F1
IT WAS F1
HIT FUNCTION KEY F2
IT WAS F2
HIT FUNCTION KEY F3
IT WAS F3
HIT FUNCTION KEY F4
IT WAS F4
HIT FUNCTION KEY F5
IT WAS F5
HIT FUNCTION KEY F6
IT WAS F6
HIT FUNCTION KEY F7
IT WAS F7
HIT FUNCTION KEY CURSOR LEFT
IT WAS CURSOR LEFT
Test 5, special functions test, is performed only on DKU9103 (VIP7200) consoles. Fourteen function keys are located on the top row of the console keys. The program displays HIT FUNCTION KEY and the operator responds by striking the appropriate key. The program displays IT WAS indicating the controller received the proper function related to the key struck.
Test 5 is continued on the next page.

```
HIT FUNCTION KEY    CURSOR UP

                                IT WAS CURSOR UP

HIT FUNCTION KEY    CURSOR DOWN

                                IT WAS CURSOR DOWN

HIT FUNCTION KEY    CURSOR RIGHT

                                IT WAS CURSOR RIGHT

HIT FUNCTION KEY    HOME

                                IT WAS HOME

HIT FUNCTION KEY    XMIT
                                IT WAS XMIT

HIT "SHIFT" KEY AND "EOP" KEY AND SEE THE FOLLOWING LINES DISAPPEAR

PPPPPPPPPPPPPPPPP
PPPPPPPPPPPPPPPPP
PPPPPPPPPPPPPPPPP

ENTER "EOL" OR "EOF" AND SEE
THE FOLLOWING LINE DISAPPEAR
EEEEEEEEEEEEEEEEEEEEEEEEEEEEE-

DISPLAY (HIGH/LOW) INTENSITY TEST

XXXXXXXXXXXXXXXXX   HI
XXXXXXXXXXXXXXXXX   LO
XXXXXXXXXXXXXXXXX   HI
XXXXXXXXXXXXXXXXX   LO
XXXXXXXXXXXXXXXXX   HI
XXXXXXXXXXXXXXXXX   LO
XXXXXXXXXXXXXXXXX   HI
XXXXXXXXXXXXXXXXX   LO
XXXXXXXXXXXXXXXXX   HI
XXXXXXXXXXXXXXXXX   LO

TEST 6 NULL BYTES FOLLOW DONE

OBSERVE ONE SPACE BETWEEN "FOLLOW" AND "DONE"

   END-OF-TEST

KCMX3    CHANNEL =     500    PASS =     1          0    ERROR(S)
```

Continued from previous page.

Holding the SHIFT key on the console depressed, strike the EOP key. The three lines of Ps on the CRT display now disappear.

Strike the EOL key on the console and verify the line of Es disappear from the CRT display.

Console CRT displays alternating dark-intensity and light-intensity lines of Xs (this is exaggerated on the computer printout for explanation purposes).

Operator verifies that there is exactly one space between the words FOLLOW DONE.

Test pass complete message, indicating the number of test passes completed and the number of errors encountered (refer to Table 1 for any detected errors).

KCMX3 T& V PROGRAM--CONSOLE (CONT)

Selecting Mode S permits the operator to run Test 5 of the KCMX3 test.

Selecting Mode C causes the operator to return to run with newly selected set-up word.

Selecting Mode R permits the operator to run Test 2 of the KCMX3 test.

Selecting Mode X permits the operator to terminate the current T & V test and return to the command processor (C?) level.

Selecting Mode I causes the operator to return to the CHANNEL?: message in the KCMX3 test.

Set-up words permit the operator to select any individual test in KCMX3. Individual test set-up words are listed as follows:

CONSOLE TYPE				
CRT	KEYBOARD	ASR TELETYPE	KSR TELETYPE	SELECT KCMX3 TEST NO.
01EO	02E0	OCEO	08E0	Electronics test
0110	0210	OC10	0810	Test 1 (Basic Functions)
0120	0220	0C20	0820	Test 2 (Print)
0122	0222	0C22	0822	Loop on Test 2
0130	0230	0C30	0830	Test 3 (Input)
0132	0232	0C32	0832	Loop on Test 3
0140	0240	0C40	0840	Test 4 (Answer Back)
0150				Test 5 (See NOTE below)
0160	0260	0C60	0860	Test 6 (Null Bytes)
		0C70	0870	Test 7 (Paper-Tape Punch)
		0C80	0880	Test 8 (Paper-Tape Read)

Refer to Table 2 for the set-up word format.

NOTE

Test 5 is for Infowriter System and VIP7200 (Special Functions).

KCMX3 T & V PROGRAM--CONSOLE (CONT)

Table 2. Set-up Word Format

DEVICE ID	SET-UP WORD*	MARKETING IDENTIFIER	DEVICE TYPE
2019	OCAO	TTU9101/3	ASR Teletype with Pape-Tape Option
2018	08A0	TTU9102/4	KSR Teletype
201A	O1AO	DKU9101 through DKU9104	CRT Consoles
201C	02A0	TWU9101 TWU9104 TWU9106 TWU9108 TWU9110	Keyboard Consoles
....	0120	TWU1OO1/2 TWU1003/5	Display Only Consoles (Printer Only)

*Set-up word configuration to run all tests.

where:

Bits 0 - 3 = All zeros

Bit 4 = Number of bits per character
1 = 11 bits per character (2 stop bits) for ASR/KSR teletypes
0 = 10 bits per character (1 stop bit) for all other consoles

Bit 5 = Test paper-tape reader and punch
0 = No 1 = Yes

Bits 6, 7 = Number of characters per line of the device being tested
0 = 72 characters (ASR/KSR teletypes)
1 = 80 characters (All CRTs)
2 = 132 characters (HIS Italia)

(continued on next page)

KCMX3 T& V PROGRAM--CONSOLE (CONT)

Bits 8 - 11 = selected individual test
- A = All tests
- E = Electronics test
- 1 = Electronics* CAN character, BBK key, and input tests
- 2 = Electronics* and print tests
- 3 = Electronics* and keyboard input tests
- 4 = Electronics* and answer-back tests
- 5 = Electronics* and Infowriter Systems and VIP7200 special function tests
- 6 = Electronics* and null bytes tests
- 7 = Electronics* and paper-tape punch tests
- 8 = Electronics* and paper-tape read tests

Bits 12, 13 = Both zero

Bit 14 = Loop on test 2 or test 3
- 0 = Does not loop
- 1 = Loop test 3 (input test) or loop test 2 (print test)

Bit 15 = Response after error report
- 1 = Return to mode query
- 0 = Continue after error report

*The electronics test is skipped if the user selects a specific test On the console under test since the electronics test has been previously completed.

NOTE

To terminate the Loop Test, press the BRK (Break) Key.

MLCX1 T & V PROGRAM--MULTILINE COMMUNICATIONS PROCESSOR

This T & V supports:

IPI	NAME
BMLC11C	Multiline Communications Processor

RESTRICTIONS

- Requires 32K words of main memory and will use all of the available memory through 64K words.
- Only tests active channels; that is, channels that have a line adapter present or have their Line Adapter-Here signal tied to ground.

DESCRIPTION

This T & V procedure tests all Multiline Communications Processor Controller board functions that do not require line adapters, including the MLCP memory instruction set and data transfer tests. MLCP interrupts are made on all active channels at multiple levels. The T & V procedure automatically determines which channels are active and tests only these channels.

GENERAL INSTRUCTIONS

1. A minimum satisfactory test for normal operation may be obtained by entering the specific channel number(s) to be tested and completing one pass.

2. If the console is attached to an MLCP channel, the following warning is displayed at the start of the test for that channel:

```
TESTING STARTS MLCP ADD = COOO
*** WARNING - YOUR CONSOLE IS CONTROLLED BY ELECTRONICS
              BEING TESTED.  HITTING "BREAK" KEY WILL
              NOT INTERRUPT THE PROGRAM EXCEPT DURING
              ERROR PRINTOUTS OR DURING A 25 SECOND
              PERIOD AFTER THE END OF PASS PRINTOUT ***
PROGRAM MAY RUN UP TO THREE MINUTES BEFORE REPORTING
 FIRMWARE REV C
```

3. Once the program starts testing another MLCP channel, the following message is displayed:

```
TESTING STARTS MLCP ADD = COOO
*** BREAK OPERATION RESTORED TO NORMAL ***
PROGRAM MAY RUN UP TO THREE MINUTES BEFORE REPORTING
 FIRMWARE REC C
```

indicating that the normal Break (BRK) operation is restored.

MLCX1 T& V PROGRAM--MULTILINE COMMUNICATIONS PROCESSOR (CONT)

4. Before running MLCX1, ensure that any modem connected to the MLCP is offline. If an error occurs, disconnect the modem(s) connected to the failing MLCP and rerun MLCX1.

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

If an error occurs, an error message will be displayed and the program will then continue, abort, or halt, depending upon the response entered to the error control question. All error messages are an indication that the MLCP (ORU) is faulty and should be replaced.

Error displays are as follows:

ERR MBXX AT YYYY

where:

XX= Test Label
YYYY = Error Location (in listing)

SAMPLE CONSOLE DISPLAY

OPERATOR INSTRUCTIONS

NOTE

This console display is for explanatory purposes only. The actual console display depends on the revision of the program being executed.

```
                                                          Enter: MLCX1
MLCX1
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT.
MLCP  TEST  MLCX1  REV(DATE)
MLCX1 BASE CHANNEL ADDRESS(S) =   C1OO  C800  DOOO  D800  EOOO  E800
                                  FOOO F800
                                                          Enter base channel address(es) to be tested or
CHANNEL(S) (CR FOR ALL) ?:C1OO,C8OO                       press the Return key to test all.
MODE (A=ALL TESTS) ?:A                                    Enter: A.


                                                          Program begins testing channel numbers on base
MLCX1:TESTING CHANNEL(S) C1OO C180 C200 C280 C300 C380    channel address C1OO.
TEST MAY RUN UP TO THREE MINUTES BEFORE REPORTING
 MLCP  FIRMWARE  REV  C

 MLCX1 PASS      1
CHANNEL(S) =    C100  C180  C200  C280  C300  C380
ERRORS                0     0     0     0     0
TOTAL ERRS =      0     0     0     0     0     0

                                                          Program begins testing channel numbers on base
MLCX1:TESTING  CHANNEL(S)  C800  C880  C900  C980  CAOO  CA80  CBOO  CB80  channel address C800.
TEST MAY RUN UP TO THREE MINUTES BEFORE REPORTING
 MLCP  FIRMWARE  REV  C

 MLCX1 PASS      1
CHANNEL(S) =   C800  C880  C900  C980  CAOO  CA80  CBOO  CB80
ERRORS     =     0     0     0     0     0     0     0     0
TOTAL ERRS =     0     0     0     0     0           0     0
*** REFRESH TEST IN PROCESS-                              Refresh test is executed after all channels en-
    HITTING BREAK WILL CAUSE UNSPECIFIED RESULTS: ***     tered at the CHANNEL question have been tested.
*** BREAK OPERATION RESTORED To NORMAL ***                Do not interrupt this Refresh test by pressing
                                                          the Break (BRK) key until the BREAK OPERATION
                                                          RESTORED TO NORMAL message is displayed.
                                                          Break key can now be pressed to terminate
                                                          testing.

MLCX1:TESTING CHANNEL(S) C1OO C180 C200 C280 C300 C380
TEST MAY RUN UP TO THREE MINUTES BEFORE REPORTING
*ATTN-KEY*                                                Break command is accepted.

MLCX1: ACTION (X =EXIT, R =RESTART, C =CONTINUE) ?:X      Enter: X to terminate program.
MLCX1 DONE
ZVCMFL  LOADED
ZVEXEC  LOADED

T & V EXECUTIVE
C ?:                                                      Operator may invoke another program.
```

MSUX6 T & V PROGRAM--MASS STORAGE CONTROLLER SUBSYSTEM

This T & V supports:

ID	DESCRIPTION
23--	MPDC (16 BIT) Disk Controller/Adapter
43--	HPDC (32 BIT) Disk Controller/Adapter
23--	6/2X Disk Controller/Adapter
2361*	80 MB SMD
2363	300 MB SMD
--60	40 MD SMD
--62	150 MB SMD
2381	32 MB CMD
2385	96 MB CMD
--80	16 MD CMD
--83	64 MB CMD

* Used on DAS3 (D/C).

GENERAL INSTRUCTIONS

DISK MEDIA FALL INTO ONE OF THE FOLLOWING CATEGORIES:

1. A “TVWORK” Pack is one which has been previously created by running either Mode A, B, Q, W or Z. It will have a non-standard label written in cylinder 0, track 0, sector 7, which the program will recognize and maintain.

2. Diagnostic Disk Media. The diagnostic label format is not supported by the TVOS utilities.

3. A “System” Pack is one whose volume label sector contains a label, “VOL 1------ --”, where the “--------” represents the disk volume name. The pack is assumed to be fully formatted and may be used to run modes ‘R’ and ‘V’. If modes ‘A’ or ‘Q’ are attempted, the program will automatically revert to mode ‘R’ (read only).

4. An “UNRECOGNIZABLE” Pack is one which is neither a “TVWORK” Pack nor a “SYSTEM” Pack. If used to run mode ‘A’ or ‘Q’, it must first be designated a “TVWORK’” pack by means of the dialogue provided in mode ‘A’.

MSUX6 T & V PROGRAM--MASS STORAGE CONTROLLER SUBSYSTEM (CONT)

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

Detected errors are reported using the following format.

```
1: ERR MSUX6 ABCD Q     LLLL  CCCC  (ORU1) (ORU2)
2:           TASK  CWA    CWB  RANGE  STW1  STW2
3:    CONT:   TTTT  AAAA  BBBB  RRRR   S111  S222  (HH:MM:SS)
4:    INIT:   RD/WR AAAA  BBBB  RRRR   S111  S222  LOOP
5:    MEDIA ID:     AAAA  BBBB  RRRR   S111   ----  VOL_NAME

6:    READ BUFFER 0000RRRR; WRITE BUFFER   0000WWWW
7:    BYTE XXXX IS 00YY    SHOULD BE 0022
       II     II   II    II        II    II    II
       II     II   II    II        II    II    II
      ETC..  FOR UP TO EIGHT LINES
```

LINE 1: WILL BE REPORTED FOLLOWING ANY UNSUPPRESSED ERROR.

A--- = MODE (AB-- = MAJOR ERROR LABEL)
-B-- = SUB-TEST
--CD = MINOR ERROR LABEL (REFER T(.) TABLE 1)
LLLL = MEMORY LOCATION IN PROGRAM WHERE ERROR DETECTED
CCCC = CHANNEL NUMBER
ORU1 = MOST LIKELY ORU
0RU2 = NEXT MOST LIKELY ORU

SUB-TESTS

A - INITIALIZE/QLT
B - COMMAND TRANSFER
C - WRAP-AROUND TEST
D - CONTROL WORDS
E - INTERRUPT CONTROL
F - DEVICE INTERFACE
G - VERIFY ID TYPE
I - MEDIA LABEL CHECK
J - CHECK FORMAT
K - SEEK TEST
L - RANGE TEST
M - DATA INTEGRITY
N - MULTI-SECTOR TEST
0 - RANDOM SEEKS
P - EXTENDED DATA TRANSFERS
Q - UPPER MEMORY
R - DEVICE CONTROLS
S - SCATTER/GATHER (HPDC ONLY)
Y - 40 NOP'S (SPARE)
Z - UPDATE AND PRINT PASS COUNT

LINE 2: INDICATES COLUMN HEADINGS FOR ERROR PARAMETERS TO FOLLOW.

MSUX6 T & V PROGRAM--MASS STORAGE CONTROLLER SUBSYSTEM (CONT)

LINE 3: CONTAINS INFORMATION RETURNED FROM THE CONTROLLER.
TTTT = TASK WORD
AAAA = CONFIGURATION WORD "A" FROM CONTROLLER
BBBB = CONFIGURATION WORD "B" FROM CONTROLLER
RRRR = RESIDUAL RANGE FROM CONTROLLER
S111 = STATUS WORD ONE FROM CONTROLLER
S222 = STATUS WORD TWO FROM CONTROLLER
HH:MM:SS = ELAPSED TIME SINCE START OF PROGRAM OR OF MODE "1"

LINE 4: CONTAINS INFORMATION INITIATED OR SENT TO THE CONTROLLER BY THE PROGRAM
RD/WR = "READ" OR "WRITE", DEPENDING ON MOST RECENT OPERATION
AAAA = INITIAL CONFIGURATION WORD "A" SENT TO CONTROLLER
BBBB = INITIAL CONFIGURATION WORD "B" SENT TO CONTROLLER
RRRR = INITIAL RANGE SENT TO CONTROLLER
S111 = STATUS WORD ONE EXPECTED BY THE PROGRAM
S222 = STATUS WORD TWO EXPECTED BY THE PROGRAM
LOOP = LOOP COUNT, THIS MAY CONTAIN ADDITIONAL INFORMATION APPLICABLE TO A SPECIFIC SUB-TEST.

LINE 5: WILL BE DISPLAYED ONLY IF THE ERROR OCCURS DURING A MEDIA WRITE OR READ OPERATION. THE DATA DISPLAYED RESULTS FROM A SUBSEQUENT "FORMAT-READ" Operation.
AAAA = CONFIGURATION WORD "A" FROM THE MEDIA
BBBB = CONFIGURATION WORD "B" FROM THE MEDIA
RRRR = INITIAL RANGE SENT TO CONTROLLER
S111 = STATUS WORD ONE EXPECTED BY THE PROGRAM
VOL-NAME = THE VOLUME NAME ASSIGNED TO THE DISK MEDIUM.

LINE 6: AND LINE 7: WILL BE DISPLAYED IF THE ERROR INVOLVED ERRONEOUS DATA.
RRRR = STARTING LOCATION OF DATA READ BUFFER.
WWWW = STARTING LOCATION OF DATA WRITE BUFFER.
XXXX = RELATIVE BYTE LOCATION WITHIN THE DATA BUFFER.
YY = ACTUAL DATA (IS) IN READ BUFFER AT THAT RELATIVE LOCATION.
ZZ = DATA EXPECTED (SHOULD BE) AT THAT RELATIVE LOCATION.

LINE 7: IS REPEATED AS NECESSARY UP TO A MAXIMUM OF EIGHT TIMES.

LINES 2: THROUGH 7: ARE OPTIONAL AND WILL ONLY BE DISPLAYED AS NECESSARY. PARAMETERS VALUES WHICH ARE NOT PERTINENT TO THE ERROR BEING REPORTED WILL BE FILLED WITH DASHES (E.G. "----").

Table 1. Minor Label Error Indications

MINOR LABEL	DESCRIPTION	MOST LIKELY ORU	NEXT LIKELY ORU
--AR	RECEIVED UNAVAILABLE RESOURCE TRAP WHEN NOT EXPECTED IN RESPONSE TO INITIALIZE	CONTRL	-
--B1	DATA OUTPUTTED WITH SIMPLE FUNCTION CODE WAS NOT RETURNED BY CORRESPONDING INPUT FUNCTION CODE. INPUT FUNCTION CODE IN 'LOOP'.	CONTRL	ADAPTER

MSUX6 T & V PROGRAM--MASS STORAGE CONTROLLER SUBSYSTEM (CONT)

Table 1. Minor Label Error Indications--Continued

MINOR LABEL	DESCRIPTION	MOST LIKELY ORU	NEXT LIKELY ORU
--BY	COMMAND WAS NAK'D WHEN SHOULD HAVE BEEN ACCEPTED	CONTRL	
--CL	DID NOT RECEIVE EXPECTED INTERRUPT FROM RTC	SYSTEM	
--CT	AN IO SEQUENCE TIMED OUT	CONTRL	ADAPTER
--CW	CONTROL WORD OUTPUT TIMED OUT	CONTRL	
--D1	INITIALIZE DID NOT CLEAR INTERRUPT LEVEL	CONTRL	ADAPTER
--D2	INTERRUPT RECEIVED AFTER INITIALIZE	CONTRL	ADAPTER
--D3	NO INTERRUPT WHEN EXPECTED AFTER STOP IO	CONTRL	ADAPTER
--DA	DATA MISCOMPARE		
--DB	DATA UNDER/OVERRUN DURING DEBUG DATA COMPARE	CONTRL	ADAPTER
--DW	ERROR DURING DEBUG WRITE LINE	DEVICE	
--IB	INTERRUPT OUTPUTTED COULD NOT BE READ BACK CORRECTLY	CONTRL	ADAPTER
--IN	MISSED INTERRUPT	CONTRL	
--IP	PROBLEM DETECTED WITH SUBSYSTEM GENERATED INTERRUPT WITH WORDS DEFINED AS; O-MULTIPLE INTERRUPT DETECTED l-CHANNEL AND LEVEL REPORTING 2-CP LEVEL	CONTRL	ADAPTER
--LC	WAS NOT ABLE TO PERFORM LEVEL CHANGE	SYSTEM	CONTRL
--LD	AN IOLD SEQUENCE TIMED OUT	CONTRL	
--NR	DEVICE WAS NOT READY WHEN SHOULD HAVE BEEN	DEVICE	
--PE	THE PROGRAM DETECTED AN ILLEGAL PARAMETER OR SEQUENCE DURING EXECUTION	SYSTEM	OPER
--Q1	COMPARE ERROR DURING UPPER MEMORY TEST	CONTRL	CPU
--Q2	BUFFER UNDER/OVERRUN DURING UPPER MEMORY TEST	CONTRL	CPU
--Q3	DID NOT RECEIVE EXPECTED UNAVAILABLE RESOURCE STATUS BIT. THIS ERROR MAY ALSO OCCUR AS A RESULT OF AN ILLEGAL MEMORY CONFIGURATION.	CONTRL	
--RE	RECALIBRATE OPERATION TIMED OUT	DEVICE	ADAPTER
--KG	RESIDUAL RANGE NOT O	CONTRL	ADAPTER
--S1	DID NOT RECEIVE EXPECTED STATUS AFTER INIT	CONTRL	ADAPTER
--S2	ABNORMAL STATUS RECEIVED IN RESPONSE TO SIMPLE FUNCTION CODE COMMAND (FUNCTION CODE IN 'LOOP').	CONTRL	ADAPTER
--ST	SYSTEM STARTUP ERROR	SYSTEM	
--TP	RECEIVED AN UNEXPECTED TRAP	CONTRL	ADAPTER
--UI	UNEXPECTED INTERRUPT RECEIVED	CONTRL	
--WP	RECEIVED WRITE PROTECTED INDICATION WHEN SHOULD NOT HAVE	DEVICE	
--00	READ ERROR DETECTED DURING MEDIA VERIFY OPERATION	MEDIA	DEVICE
--01	UNABLE TO PERFORM RECALIBRATE	DEVICE	ADAPTER
--02	UNABLE TO PERFORM SEEK	DEVICE	ADAPTER
--03	STATUS ERROR WHILE WRITING DATA DURING MODE W	MEDIA	DEVICE
--04	STATUS ERROR WHILE READING DATA DURING MODE C	MEDIA	DEVICE

MSUX6 T & V PROGRAM--MASS STORAGE CONTROLLER SUBSYSTEM (CONT)

Table 1. Minor Label Error Indications--Continued

MINOR LABEL	DESCRIPTION	MOST LIKELY ORU	NEXT LIKELY ORU
--05	DATA MISCOMPARE DURING MODE C	MEDIA	DEVICE
--06	DATA OVERRUN DURING MODE C	CONTRL	ADAPTER
--07	ERROR DURING DEBUG READ LINK	DEVICE	
--08	FORMATTING ERROR	DEVICE	ADAPTER
--09	MISSED INTERRUPT AFTER FORMATTING OPERATION	CONTRL	ADAPTER
--0A	STATUS ERROR DURING DIAGNOSTIC FORMAT READ DEBUG LINK	DEVICE	ADAPTER
--10	STATUS ERROR DURING FORMAT READ LINK	MEDIA	DEVICE
--11	STATUS ERROR DURING READ MEDIA ID LINK	MEDIA	DEVICE
--12	DATA COMPARISON ERROR DURING RANGE TEST	CONTRL	ADAPTER
--13	DATA UNDER/OVERRUN DURING RANGE TEST	CONTRL	ADAPTER
--14	STATUS ERROR DURING SEEK TEST	DEVICE	ADAPTER
--16	ID FROM MEDIA DID NOT MATCH CW'S DURING SEEK TEST	DEVICE	MEDIA
--17	DATA COMPARE ERROR DURING EXTENDED DATA TRANSFERS. LOOP=INTERRUPT LEVEL.	MEDIA	DEVICE
--18	DATA UNDER/OVERRUN DURING EXTENDED DATA TRANSFERS. LOOP=INTERRUPT LEVEL.	CONTRL	ADAPTER
--19	UNABLE TO WRITE VOLUME LABEL ON DEVICE	DEVICE	ADAPTER
--20	STATUS ERROR WHILE READING DATA AFTER A FORMAT OPERATION	MEDIA	DEVICE
--21	DATA FIELD CREATED BY A FORMAT OPERATION WAS INCORRECT	MEDIA	DEVICE
--22	DATA OVER/UNDERRUN DURING READ AFTER FORMAT OPERATION	CONTRL	ADAPTER
--23	STATUS ERROR WHILE WRITING DATA AFTER FORMAT TRACK	MEDIA	DEVICE
--24	DATA FIELD UPDATED AFTER A FORMAT OPERATION WAS INCORRECT	MEDIA	DEVICE
--25	DATA OVER/UNDERRUN AFTER DATA FIELD UPDATE AFTER FORMAT OPERATION	CONTRL	ADAPTER
--26	STATUS ERROR WHILE READING DATA AFTER AN UPDATE AFTER A FORMATTING OPERATION	MEDIA	DEVICE
--27	STATUS ERROR AFTER A SEEK OPERATION	MEDIA	DEVICE
--28	STATUS ERROR WHILE READING TRACK ID AFTER A SEEK OPERATION	MEDIA	DEVICE
--29	ID OF TRACK SEEKED TO DID NOT MATCH ID EXPECTED	DEVICE	ADAPTER
--2A	STATUS ERROR WHILE READING MASTER MEDIA	MEDIA	DEVICE
--2B	NO INTERRUPT RECEIVED FROM MASTER BEING COPIED	CONTRL	ADAPTER
--2C	STATUS ERROR WHILE WRITING ON COPY MEDIA	MEDIA	DEVICE
--2D	NO INTERRUPT RECEIVED FROM COPY DEVICE	CONTRL	ADAPTER
----	DUMMY LABEL FOR PRINTING SYSTEM PARAMETERS		
--31	QLT STATUS BAD	CONTRL	ADAPTER
7732	SCATTER/GATHER, SCRATCH-PAD DATA ERROR	CONTRL	N/A
--33	SCATTER/GATHER, SCRATCH-PAD DATA OVER-RUN	CONTRL	N/A

MSUX6 T & V PKOGRAM--MASS STORAGE CONTROLLER SUBSYSTEM (CONT)

Table 1. Minor Label Error Indications--Continued

MINOR LABEL	DESCRIPTION	MOST LIKELY ORU	NEXT LIKELY ORU
--34	STATUS NG AFTER BUFFER-DESCRIPTOR WRITE	CONTRL	N/A
--35	STATUS NG AFTER BUFFER-DESCRIPTOR READ	CONTRL	N/A
--36	STATUS NG AFTER BUFFER DESCRIPTOR WRITE	CONTRL	N/A
--37	STATUS NG AFTER BUFFER DESCRIPTOR WRITE	CONTRL	N/A
--38	RANGE SB = 0 AFTER BUFFER DESCRIPTOR WRITE	CONTRL	N/A
--39	STATUS NG AFTER BUFFER DESCRIPTOR READ	CONTRL	N/A
--3A	DATA MISCOMPARE AFTER BUFFER DESCRIPTOR WRT/RD	CONTRL	ADAPTER
--3B	DATA OVER-RUN AFTER BUFFER DESCRIPTOR WRT/RD	CONTRL	ADAPTER
--3C	STATUS NG DURING NORMAL wRITE	MEDIA	DEVICE
--3D	INTERRUPT NOT RECEIVED AFTER NORMAL WRITE	CONTRL	ADAPTER
--3E	STATUS NG DURING SCATTER READ	MEDIA	DEVICE
--3F	INTERRUPT NOT RECEIVED AFTER SCATTER READ	CONTRL	ADAPTER
--40	DATA MISCOMPARE AFTER NORM WRT/SCAT RD	CONTRL	ADAPTER
--41	DATA OVER-RUN AFTER SCATTER READ	CONTRL	ADAPTER
--42	STATUS NG DURING GATHER-WRITE	MEDIA	DEVICE
--43	INTERRUPT NOT RECEIVED AFTER GATHER-WRITE	CONTRL	ADAPTER
--44	STATUS NG DURING NORMAL READ	MEDIA	DEVICE
--45	INTERRUPT NOT RECEIVED AFTER NORMAL READ	CONTRL	ADAPTER
--46	DATA MISCOMPARE AFTER GATH-WRT/NORM-READ	CONTRL	ADAPTER
--47	RFU		
--48	GATHER-wRITE SHOULD HAVE ZERO-FILLED BUFFER	CONTRL	ADAPTER
--49	GATH-WRT DIDN'T TERMINATE ON NULL BUF DESCRIP	CONTRL	ADAPTER
--4A	ERROR DURING CANNED WRITE/READ DATA.	MEDIA	DEVICE
--4B	STATUS NG AFTER WRAP-WRITE	ADAPTER	CONTRL
--4C	STATUS NG AFTER WRAP-READ	ADAPTER	CONTRL
--4D	DATA MISCOMPARE AFTER WRAP WRITE/READ	CONTRL	ADAPTER
--4E	DATA OVER-RUN AFTER WRAP-READ	CONTRL	ADAPTER
--4F	STATUS NG FOLLOWING 'RELEASE' TASK	CONTRL	ADAPTER
--50	STATUS NG FOLLOWING OUTPUT TAG CODE "5"	ADAPTER	DEVICE
--51	STATUS NG FOLLOWING INPUT TAG CODE "5"	ADAPTER	DEVICE
--52	DATA NG AFTER TAG CODE "5" WRITE/READ	ADAPTER	DEVICE
--53	STATUS NG AFTER SEEK TO VALID CYLINDER & HEAD	MEDIA	DEVICE
--54	STATUS NG AFTER RECALIBRATE	MEDIA	DEVICE
--55	INCORRECT STATUS AFTER SEEK TO INVALID CYLINDER	MEDIA	DEVICE
--56	STATUS NG AFTER RECALIBRATE	MEDIA	DEVICE
--57	INCORRECT STATUS AFTER SEEK TO INVALID HEAD	MEDIA	DEVICE
--58	STATUS NG AFTER WRAP-AROUND WRITE	ADAPTER	CONTRL
--59	STATUS NG AFTER WRAP-AROUND READ	ADAPTER	CONTRL
--5A	DATA NG AFTER WRAP-WRITE/READ, BURST MODE	CONTRL	ADAPTER
--5B	DATA OVER-RUN AFTER WRAP-READ	CONTRL	ADAPTER
--5C	INCORRECT STATUS AFTER READ, SB SEARCH ERROR	MEDIA	DEVICE
--5D	STATUS NG AFTER FORMAT READ	DEVICE	ADAPTER
--5E	DATA NG AFTER FORMAT READ ID'S	ADAPTER	DEVICE
--5F	STATUS NG AFTER DIAGNOSTIC FORMAT READ	DEVICE	ADAPTER

MSUX6 T & V PROGRAM--MASS STORAGE CONTROLLER SUBSYSTEM (CONT)

Table 1. Minor Label Error Indications--Continued

MINOR LABEL	DESCRIPTION	MOST LIKELY ORU	NEXT LIKELY ORU
--60	"RPS" GOT TO WRONG SECTOR (DIAG-FMT-READ)	ADAPTER	DEVICE
--61	"EDC" ON MEDIA DOESN'T MATCH EXPECTED CWA/CWB	ADAPTER	DEVICE
--62	DATA NG AFTER FMT-WRITE/DIAG-FMT-READ	ADAPTER	MEDIA
--63	ERROR DURING DIAGNOSTIC-FORMAT-WRITE	MEDIA	DEVICE
--64	STAT SHOULD SHOW EDC EPR AFTER DIAG-FMT-WRT/RD	MEDIA	DEVICE
--65	STATUS NG AFTER NORMAL WRITE	MEDIA	DEVICE
--66	STATUS NG AFTER OFFSET-RANGE DIAGNOSTIC READ	MEDIA	DEVICE
--67	EDAC DATA ON MEDIA NG AFTER OFFSET-RNG DIAG READ	CONTRL	ADAPTER
--68	STATUS NG AFTER NORMAL WRITE (PRIOR TO EDAC READ)	MEDIA	DEVICE
--69	STATUS NG AFTER DIAGNOSTIC READ DATA PLUS EDAC	MEDIA	DEVICE
--6A	DATA (NOT EDAC) NG AFTER DIAG-READ DATA + EDAC	CONTRL	ADAPTER
--6B	STAT NG AFTER DIAG WRT OF MODIFIED DATA + EDAC	MEDIA	DEVICE
--6C	INCORRECT STATUS AFTER EDAC CORRECTION ATTEMPT (IF "LOOP" = 0-3, ERROR SHOULD HAVE BEEN CORRECTABLE IF "LOOP" = 4, ERROR SHOULD HAVE BEEN UNCORRECTABLE)	CONTRL	ADAPTER
--60	DATA NG AFTER ATTEMPTED EDAC CORRECTION	ADAPTER	CONTR
--6E	DATA UNDER/OVER-RUN AFTER EDAC CORRECTION	CONTRL	ADAPTER
--6F	27 RETRIES ON UNCORRECTABLE ERROR TOOK TOO LONG	CONTRL	ADAPTER
--70	STATUS NG AFTER RD ACROSS CYL AND HEAD BOUNDARY	MEDIA	DEVICE
--71	CWA/B FROM MEDIA NG AFTER RD ACROSS CYL/HD BOUND	MEDIA	DEVICE
--72	STAT NG AFTER RD ACROSS HD (& CYL IF 1 HD) BOUND	MEDIA	DEVICE
--73	CWA/B FROM MEDIA NG AFTER RD ACROSS HD BOUND	MEDIA	DEVICE
--74	INCORRECT STAT RDNG PAST END-VOL. SB PROG FAULT	MEDIA	DEVICE
--75	STATUS ERROR DURING "CANNED" 1/0 ROUTINE	MEDIA	DEVICE
--76	INTERRUPT ERROR DURING "CANNED" 1/0 ROUTINE	MEDIA	DEVICE
--77	STATUS SB N/RDY & ATTN AFTER POWER-DOWN	DEVICE	ADAPTER
--78	CYCLE-UP TOOK TOO LONG AFTER POWER-ON	DEVICE	ADAPTER
--7A	DEVICE SHOULD BE UNPROTECTED BY ADAPT	DEVICE	ADAPTER
--7B	DEVICE SHOULD BE PROTECTED BY ADAPT	DEVICE	ADAPTER
--7C	SB DEVICE FAULT IF WRITING WHILE PROTECTED	DEVICE	ADAPTER
--7D	STATUS NG AFTER WRAP WRITE	CONTRL	ADAPTER
--7E	STATUS NG AFTER WRAP-AROUND READ	CONTRL	ADAPTER
--7F	READ ERR ON FIXED VOL (P0SSIBLE ALIGNMENT ERROR)	DEVICE	MEDIA
--80	DATA NG AFTER WRAP-AROUND WRITE/READ	CONTRL	ADAPTER
--81	DATA OVERFLOW AFTER WRAP-AROUND WRITE/READ	CONTRL	ADAPTER
--82	ERR AFTER SEEK TO FIXED AND READING REMOVABLE VOLUME (POSSIBLE ALIGNMENT ERROR)	DEVICE	MEDIA
--83	READ ERROR ON REMOVABLE VOLUME (POSSIBLE ALIGNMENT ERROR)	DEVICE	MEDIA
--84	ERR AFTER SEEK TO REMOVABLE AND READING FIXED VOLUME (POSSIBLE ALIGNMENT ERROR)	DEVICE	MEDIA
--85	STATUS ERROR DURING SEEK TO MINIMUM CYLINDER	CONTRL	ADAPTER
--86	STATUS ERROR DURING SEEK TO MAXIMUM CYLINDER	CONTRL	ADAPTER
--T1	CAN'T FIND MATCH FOR ID IN DESCRIPTOR BLOCKS	ADAPTER	CONTRL

MSUX6 T & V PROGRAM--MASS STORAGE CONTROLLER SUBSYSTEM (CONT)

CONFIGURATION WORD “A”:
THE BITS OF CONFIGURATION WORD “A” HAVE THE FOLLOWING SIGNIFICANCE:

0000 VCCC CCCC CCCC (BITS 0-15)

WHERE :
V = VOLUME ADDRESS (0 = REMOVABLE, 1 = FIXED)
C = CYLINDER ADDRESS (’0 - '336, IE. 823 CYLINDERS)

CONFIGURATION WORD “B”:
THE BITS OF CONFIGURATION WORD “B” HAVE THE FOLLOWING SIGNIFICANCE:

HHHH HHHH SSSS SSSS (BITS 0-15)

WHERE:
H = HEAD ADDRESS ('00 - '12)
S = SECTOR ADDRESS ('00 - '3F)

STATUS WORDS:
THE ADAPTER STATUS WORD BITS HAVE THE FOLLOWING SIGNIFICANCE:

BIT	STATUS WORD 1	BIT	STATUS WORD 2
0	DEVICE READY	0	CORRECTED READ ERROR
1	ATTENTION	1	SUCCESSFUL RETRY
2	HARDWARE PARITY ERROR	2	RFU
3	DEVICE FAULT	3	DEVICE SEIZED
4	READ ERROR	4	DEVICE RESERVED
5	PROGRAM ERROR	5	RFU
6	QLT FAULT	6	RFU
7	SEARCH/FORMAT ERROR	7	RFU
8	MBZ	8	NO HEAD-SELECT
9	SUCCESSFUL ERROR RECOVERY	9	WRITE FAULT
10	DUAL PORT MODULE	10	WRT/RD & OFF CYLINDER
11	RFU	11	WRITE & READ FAULT
12	CORRECTED MEMORY ERROR	12	VOLTAGE FAULT
13	NON-EXISTENT RESOURCE	13	HEAD SELECT FAULT
14	BUS PARITY ERROR	14	SEEK ERROR
15	UNCORRECTED MEMORY ERROR	15	WRITE-PROTECTED

MSUX6 T & V PROGRAM--MASS STORAGE CONTROLLER SUBSYSTEM (CONT)

TASK WORD:

BITS 0-7 OF THE TASK WORD HAVE THE FOLLOWING SIGNIFICANCE:

BIT- 0 1 2 3	4 5 6 7	TASK
0 0 0 0	0 0 0 0	RECALIBRATE
0 0 0 0	0 0 0 1	SEEK
1 0 A B	C 0 0 0	FORMAT WRITE/READ ID PLUS DATA
1 0 A B	C D O 1	WRITE/READ DATA [SCATTER/GATHER]
1 0 A B	C 0 1 0	DIAGNOSTIC FORMAT WRITE/READ
1 0 A B	C o i l	DIAGNOSTIC WRITE/READ DATA
1 0 A B	C 1 0 0	FORMAT READ ID ONLY
1 1 0 0	0 0 0 E	WRAP-AROUND WRITE/READ
1 1 0 0	1 0 0 F	SEIZE IF “F” = 1, RELEASE IF “F” = 0
1 1 0 1	O G G G	TAG CODE IN/OUT (“GGG” = TAG CODE)
1 1 1 0	0 0 0 0	BUFFER DESCRIPTOR WRITE/READ

"D" = SCATTER/GATHER BIT
"C" = AUTOMATIC “RPS” BIT
"B" = SECTOR SIZE (=1 FOR LARGE SIZE)
"A" = AUTOMATIC SEEK BIT

NOTE

Remember that significant bits are counted from right to left, but are displayed on this chart from left to right.

NOTE

This console display is for explanatory purposes only. The actual console display depends on the revision of the program being executed.

```
C?:
MSUX6 ------------------------------------------------------------> Enter:  MSUX6
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT.
SMD/CMD TEST   REV D   MARCH 31, 1983

MPDC CONTROLLER FIRMWARE REV: 004E
CHANNEL 0400 80 M BYTE SMD. READY.
CHANNEL 0480 80 M BYTE SMD. READY.
CHANNEL 0500 80 M BYTE SMD. NOT READY.

MPDC CONTROLLER FIRMWARE REV: 004E
CHANNEL 0600 80 M BYTE SMD. NOT READY.
CHANNEL 0680 80 M BYTE SMD. NOT READY.
CHANNEL 0700 80 M BYTE SMD. NOT READY.

MODE (A = ALL TESTS) ?: P ----------------------------------------> Enter:  P

ENTER ERROR CONTROL (A,C,H, OR R) ?: C ---------------------------> Enter:  C
SUPPRESS ERROR PRINTING (Y OR N) ?: N ----------------------------> Enter:  N
ENABLE TRACE MESSAGES (Y OR N) ?: Y - ----------------------------> Enter:  Y
ENABLE 1/0 HISTORY WITH ERRORS (Y OR N) ?: Y ---------------------> Enter:  Y
APPEND BYTES TRANSFERRED TO EOP MESSAGE (Y OR N) ?: Y ------------> Enter:  Y

OPTIONS SELECTED: -TRACE -HISTORY -SUMMARY
MODE (A = ALL TESTS) ?: A ----------------------------------------> Enter:  A
CHANNEL ( 0400 0480 0500 )
        ( 0600 0680 0700 ) ?: 0600 ---------------------------------> Enter:  0600
EXECUTE (Y OR N) ?: Y --------------------------------------------> Enter:  Y
```

SAMPLE CONSOLE DISPLAY (Continued) OPERATOR INSTRUCTIONS

```
MSUX6:TESTING CHANNEL 0600 (00:06:08)
TRACE A/0600 SUBTEST A - INITIALIZE/QLT (00:06:09)
TRACE A/0600 SUBTEST B -COMMAND TRANSFER (00:06:11)
TRACE A/0600 SUBTEST C - WRAPAROUND TEST (00:06:12)

TRACE A/0600 SUBTEST P - EXTENDED DATA TRANSFERS (00:07:11)
TRACE A/0600 SUBTEST Q - UPPER MEMORY (00:07:33)
TRACE A/0600 SUBTEST R - DEVICE CONTROLS (00:07:40)
PRESS START/STOP CONTROL ON CHANNEL 0600, THEN PRESS RETURN KEY !:
PRESS START/STOP CONTROL ON CHANNEL 0600, THEN PRESS RETURN KEY !:
  WAIT. . .
SET WRITE-PROTECT ON CHANNEL 0600, THEN PRESS RETURN KEY !:
RESET WRITE-PROTECT ON CHANNEL 0600, THEN PRESS RETURN KEY !:
TRACE A/0600 SUBTEST S - SCATTER/GATHER (00:09:45)
TRACE A/0600 SUBTEST Y - 40 NOP'S (00:09:46)
TRACE A/0600 SUBTEST Z - UPDATE AND PRINT PASS COUNT (00:09:47)
MSUX6: PASS 1 CHANNEL A/0600; 0 ERRORS; 0 TOTAL ERRORS (00:09:48)
0 SUCCESSFUL RETRIES; 24B11E BYTES READ; 227FBA BYTES WRITTEN

*ATTN-KEY*

MSUX6: ACTION (X = EXIT,R = RESTART,? = HELP) ?: X
CHANNEL 0480 VOLUME NAME IS DIAGS
MSUX6: DONE
ZVCMFL LOADED
ZVEXEC LOADED

T & V EXECUTIVE
C?:
```

→ Repeat as instructed by printout.

→ Enter: X to terminate program.

→ Operator may invoke another program.

MTUX3 T & V PROGRAM--PE/NRZI NINE-TRACK MAGNETIC TAPE

This T & V supports:

ID	IPI	DESCRIPTION
	BMTCOO1B	NRZI Tape Controller
		PE/NRZI Tape Controller with Adapter and Formatter
	BMTFNR9A	NRZI Tape Adapter
2045		NRZI, 800 bpi, 45 ips Tape Drive
2046		NRZI, 800 bpi, 75 ips Tape Drive
204D*		PE/NRZI, 800/1600 bpi, 45 ips Tape Drive
204E		PE/NRZI, 800/1600 bpi, 75 ips Tape Drive
204D		PE, 1600 bpi, 45 ips Tape Drive
204E		PE, 1600 bpi, 75 ips Tape Drive

* Used on DAS3 (D/C)

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

CAUTION

When multiple magnetic tape units are configured on an MTC, the last device on the daisy chain must have its power turned ON to provide termination voltage for the 1/0 lines. If the power is not ON, the 1/0 lines are floating and unspecified results occur when running T & V program MTUX3.

Detected errors are reported as follows:

```
ERR LABEL     LOC     UNIT   TASK  CONF  RANGE  STAT1  STAT2

ERR ABCD @    LLLL  M(UUUU)  KKKK  FFFF  EEEE   XXXX   YYYY
    HHH HEX FILES     INIT:  TTTT  CCCC  RRRR   AAAA   BBBB
```

(continued next page)

MTUX3 T & V PROGRAM--PE/NRZI NINE-TRACK MAGNETIC TAPE (CONT)

where:

THE FIRST LINE (ERROR HEADING) IS PRINTED PRIOR TO THE FIRST REPORTED ERROR ONLY.

AB = MAJOR LABEL, REFERS TO SUB-TEST BEING PERFORMED
CB = MINOR LABEL, INDICATED SPECIFICALLY WHERE ERROR WAS DETECTED
M = MODE SELECTED ON THIS CHANNEL
LLLL = HEX LOCATION IN PROGRAM WHERE THE ERROR WAS DETECTED.
UUUU = CHANNEL NUMBER OF THE UNIT UNDER TEST
KKKK = HEX TASK WORD (ACTUAL VALUE FROM SCRATCHPAD)
FFFF = HEX CONFIGURATION WORD (ACTUAL VALUE FROM SCRATCHPAD)
EEEE = HEX RANGE WORD (ACTUAL VALUE FROM SCRATCHPAD)
XXXX = HEX STATUS WORD #1 (ACTUAL VALUE FROM SCRATCHPAD)
YYYY = HEX STATUS WORD #2 (ACTUAL VALUE FROM SCRATCHPAD)
HHH = FILES COMPLETED SO FAR (IN MODES B, V & R = NO. OF RECORDS)
TTTT = HEX TASK WORD INITIATED BY PROGRAM
CCCC = HEX CONFIGURATION WORD INITIATED BY PROGRAM
RRRR = HEX RANGE WORD INITIATED BY PROGRAM
AAAA = HEX STATUS WORD #1 AS IT SHOULD BE
BBBB = HEX STATUS WORD #2 AS IT SHOULD BE

Table 1. Program Major Labels

MAJOR LABEL	DESCRIPTION
AA--	WRITE FILE AND RECORD ADDRESS IN FIRST RECORD
AB--	WRITE AND/OR READ& CHECK RECORD OF ZEROS
AC--	WRITE AND/OR READ & CHECK 1'S IN BIT 8 OF EACH BYTE (LSB)
AD--	WRITE AND/OR READ & CHECK 1'S IN BIT 7 OF EACH BYTE
AE--	WRITE AND/OR READ & CHECK 1'S IN BIT 6 OF EACH BYTE
AF--	WRITE AND/OR READ& CHECK 1'S IN BIT 5 OF EACH BYTE
AG--	WRITE AND/OR READ & CHECK 1'S IN BIT 4 OF EACH BYTE
AH--	WRITE AND/OR READ& CHECK 1'S IN BIT 3 OF EACH BYTE
AI--	WRITE AND/OR READ & CHECK 1'S IN BIT 2 OF EACH BYTE
AJ--	WRITE AND/OR READ& CHECK 1'S IN BIT 1 OF EACH BYTE (MSB)
AK--	WRITE AND/OR READ & CHECK ALL 1'S
AL--	WRITE AND/OR READ & CHECK CHECKER-BOARD PATTERN
AM--	WRITE AND/OR READ & CHECK CHECKER-BOARD PATTERN, OPPOSITE PHASE
AN--	WRITE AND/OR READ & CHECK RANDOM LENGTH RECORD, RANDOM DATA
AO--	WRITE AND/OR READ & CHECK RANDOM LENGTH RECORD, RANDOM DATA
AP--	WRITE RANDOM DATA FROM STANDARD WRITE BUFFER
AW--	READ PREVIOUS RECORD INTO RANDOMLY LOCATED BUFFER
AR--	WRITE RANDOM DATA FROM RANDOMLY LOCATED BUFFER
AS--	READ PREVIOUS RECORD INTO STANDARD READ BUFFER
AT--	WRITE (SPACE OVER) FILE MARK AT END OF DATA FILE
AU--	ARBITRARILY SKIP AROUND WITHIN PRECEDING FILE, CHECK DATA.
AX--	EOT TEST

MTUX3 T & V PROGRAM--PE/NRZ1 NINE-TRACK MAGNETIC TAPE (CONT)

Table 1. Program Major Labels--Continued

MAJOR LABEL	DESCRIPTION
BF--	BACK-SPACE FILE TEST
BR--	BACK-SPACE RECORD TEST
CK--	CHECK MEDIA ROUTINE, CHECK TAPE LABEL (NOT A TEST)
CT--	CALIBRATE CPU AGAINST RTC FOR TIMING TESTS
D1--	DEBUG MODE, INITIAL SET-UP
DD--	DEBUG MODE, DATA COMPARISON ROUTINE
DE--	DEBUG MODE, ERASE
DM--	DEBUG MODE, WRITE A FILE MARK
DO--	DEBUG MODE, BACKSPACE A FILE
DR--	DEBUG MODE, READ A RECORD
DT--	DEBUG MODE, BACKSPACE A RECORD
DO--	DEBUG MODE, REWIND TO B-O-T
DV--	DEBUG MODE, FORWARD SPACE A RECORD
DW--	DEBUG MODE, WRITE A RECORD
DY--	DEBUG MODE, FORWARD SPACE A FILE
EF--	WRITE FILE OVER PREVIOUS FILE
EM--	FROM BOT ERASE 6 TIME, WRITE FILE MARK, REWIND, WRITE 4 RECS, BACK 2 RECORDS, ERASE, REWIND, READ 3 RECORDS (LAST ONE IS FM).
EP--	WRITE AND CHECK END-OF-PASS RECORD.
ER--	ERASE TEST
FF--	FORWARD-SPACE FILE TEST
F1--	WRITE FILE MARK DELIMITER (MODE ‘A’)
FM--	FILE MARK TEST
FR--	FORWARD-SPACE RECORD TEST
MU--	MEDIA TEST
MI--	CHANNEL CONFIGURATION ROUTINE (NOT A TEST)
MZ--	WRITE TAPE LABEL MODE
MX--	NEXT ROUTINE, SELECT MODES AND CHANNELS (NOT A TEST)
QL--	QLT TEST FOR CONTROLLER ONLY
RO--	RANDOMLY DO EITHER A READ, WRITE OR BACKSPACE TASK UNTIL 12 RECORDS HAVE BEEN WRITTEN, EACH WITH A DIFFERENT PATTERN, THEN WRITE A FILE MARK.
KP--	INTERRUPT LOGIC AND POLLING TEST
RW--	REWIND TEST
SA--	SET AND RESET ALL STATUS BITS
SB--	OPERATION CHECK AND FUNCTIONALITY N/AVAILABLE (READ REVERSE)
SC--	READ RECORD WITH RANGE =0
SD--	UNEQUAL LENGTH CHECK
SE--	OPERATION CHECK WITH DIFFERENT DIRECTION FOR IOLD AND TASK
SF--	CHECK ANSI INHIBIT MODE
SG--	LRC, VRC, CRC CHECK
SH--	DATA SERVICE RATE ERROR CHECK (ONLY WITH “BDC2” FIRMWARE)
SI--	NONEXISTENT RESOURCE ERROR
TA--	BDC2 CONTROLLER TEST, DATA=OO, RNG=1
TB--	BDC2 CONTROLLER TEST, DATA=FF, RNG=1

MTUX3 T & V PROGRAM--PE/NRZ1 NINE-TRACK MAGNETIC TAPE (CONT)

Table 1. Program Major Labels--Continued

MAJOR LABEL	DESCRIPTION
TC--	BDC2 CONTROLLER TEST, DATA=DD, RNG=2
TD--	BDC2 CONTROLLER TEST, DATA=FF, RNG=2
TE--	BDC2 CONTROLLER TEST, DATA=OO, RNG=15 DECIMAL
TF--	BDC2 CONTROLLER TEST, DATA=FF, RNG=15
TG--	BDC2 CONTROLLER TEST, DATA=OO, RNG=16 DECIMAL
TH--	BDC2 CONTROLLER TEST, DATA=FF, RNG= 16
TI--	BDC2 CONTROLLER TEST, DATA=AA5555AA..., RNG=16
TJ--	BDC2 CONTROLLER TEST, DATA=O1O2O3.... WRITE & READ OFFSETS
TK--	BDC2 CONTROLLER TEST, DATA=O1O2O3.... ONLY WRITE OFFSET
TL--	BDC2 CONTROLLER TEST, DATA=010203.... ONLY READ OFFSET
TM--	BDC2 CONTROLLER TEST, DATA=RANDOM, RNG=16
VA--	VERIFY MODE
XO--	GET READY TO RUN NEXT SUBTEST ON NEXT UNIT (NOT A TEST)
ZA--	WRITE TAPE LABEL AT END OF PASS
ZB--	WRITE (OR READ) TAPE LABEL BEFORE WRITE/READ SUBTEST

Table 2. Program Minor Labels

MINOR LABEL	DESCRIPTION	PROBABLE ORU
--01	SYSTEM SHOULDN'T BE BUSY BEFORE WRITE IN DEBUG MODE	OEV
--02	SHOULD HAVE BEEN READY BEFORE WRITE IN DEBUG MODE	DEV
--03	STATUS ERROR AFTER READ IN TEST EF	DEV
--04	STATUS ERROR AFTER ERASE IN TEST FM	DEV
--05	STATUS INDICATES P.E. DRIVE, ID DOESN'T	ADA
--06	STATUS INDICATES NRZI DRIVE, ID DOESN'T	ADA
--07	STATUS WORD 1 AND/OR 2 NG AFTER READ	DEV, ADA
--08	STATUS ERROR AFTER READ IN TEST EM	DEV
--09	TURN-AROUND TEST, RANGE ERROR	ADA
--10	STATUS ERROR AFTER WRITE IN TEST EM	DEV
--11	STATUS NG DURING REWIND, S6 0000-0000	DEV
--12	STATUS NG AFTER REWIND, SB C200-8000	DEV
--13	STATUS NG AFTER REWIND FROM BOT	UEV
--14	STATUS NG AFTER REWIND	DEV
--15	STATUS NG AFTER A WRITE OPERATION	DEV
--16	SHOULD HAVE BEEN READY PRIOR TO A READ OPERATION	DEV
--17	INITIALIZE TOOK TOO LONG	MDC
--18	SYSTEM SHOULD HAVE BEEN READY WHEN ABOUT TO WRITE	DEV
--19	STATUS NG AFTER ERASE, S6 8000-8000	DEV
--20	TIMING ERROR ON A 45 IPS DRIVE	DEV
--21	STATUS NG AFTER WRITING A FILE MARK, S6 8400-8000	ADA, DEV
--22	TIMING ERROR ON A 75 IPS DRIVE	DEV
--23	EOT NOT DETECTED	OEV

MTUX3 T & V PROGRAM--PE/NRZI NINE-TRACK MAGNETIC TAPE (CONT)

Table 2. Program Minor Labels--Continued

MINOR LABEL	DESCRIPTION	PROBABLE ORU
--24	INITIALIZE DID NOT SET INTERRUPT WORD TO ZERO	MDC
--25	STATUS NG AFTER BACK SPACE A FILE, SB 8400-8000	ADA, DEV
--26	FM SHOULDN'T BE DETECTED WHEN BACKSPACING A NORMAL RECORD	DEV
--27	STATUS SHOULD BE 8010-8010 AFTER READ REVERSE	ADA
--28	STATUS SHOULD BE 8210-8000 FOR WRITE W/RANGE =0	ADA
--29	STATUS NG AFTER FORWARD SPACING A RECORD WHICH IS A FILE MARK	ADA, DEV
--30	STATUS NG AFTER BACK SPACING A FILE, SB 8400-8000	ADA, DEV
--31	STATUS NG AFTER FORWARD SPACING A FILE	ADA, DEV
--32	STATUS WORD 1 SB FM AFTER BACKSPACE A RECORD	ADA, DEV
--33	SHOULDN'T TAKE ANY TIME TO BACK SPACE RECORD AT BOT	ADA, DEV
--34	STATUS NG AFTER BACKSPACE RECORD FROM BOT	ADA, DEV
--35	SHOULDN'T TAKE ANY TIME TO BACK SPACE A FILE AT BOT	ADA, DEV
--36	SHOULD HAVE INTERRUPTED BUT DIDN'T	ADA
--37	INTERRUPTED WHEN IT SHOULDN'T HAVE	ADA
--38	DIDN'T INTERRUPT WHEN CP LEVEL WENT TO 63	ADA
--39	INTERRUPTING DEVICE WAS NOT A TAPE	SYS
--40	"S" REGISTER IN SAVE AREA IS INCORRECT	SYS
--41	ACTIVITY FLAG IS ON WHEN IT SHOULDN'T BE	SYS
--42	ACTIVITY FLAG IS OFF WHEN IT SHOULD BE ON	SYS
--43	CPU TRIED TO INTERRUPT	SYS
--44	STATUS NG AFTER BACK SPACE A FILE FROM BOT	ADA, DEV
--45	STATUS SB FCFF-8FFF AFTER STATUS SET TO FFFF-FFFF, NOP	MDC
--46	STATUS SB BCF9-8FFF AFTER STATUS SET TO FFFF-FFFF, NOP AND INPUT STATUS TWICE	MUC
--47	STATUS SB FFFF-8FFF AFTER STATUS SET TO FFFF-8FFF AND NOP	MDC
--48	STATUS SHOULD BE 8080-8000 FOR READ W/RANGE =0	MDC
--49	RANGE SHOULD BE =0, DATA SHOULD BE 3333 AFTER READ WITH RNG=O	MDC
--50	STATUS SB 8080-8000, RANGE SB =1, LAST DATA SB =33 AFTER READ WITH RANGE 1 BYTE TOO BIG	MDC
--51	STATUS SHOULD BE 8080-8000, RANGE SB =0, LAST BYTE+1 SB =33 AFTER READ WITH RANGE 1 BYTE TOO SMALL	MDC
--52	STATUS SHOULD BE 8210-8000 FOR READ IOLD AND WRITE TASK	MDC
--53	STATUS SHOULD BE 8000-8000 AFTER ANS 1 INHIBIT WRITE	MDC
--54	STATUS SHOULD BE 80O0-8000 FOR SPACING OVER 2 BYTE RECORD	ADA, DEV
--55	STAT SB 8000-8000 FOR SPACING OVER 2 BYTE REC W/ANS I INHIBITED	ADA, DEV
--56	STATUS SB A040-8602 AFTER DIAG WRITE WITH FAKE CRC, LRC	ADA
--57	STATUS SB AOOO-8700 AFTER READ OF RECORD WITH BAD CRC, LRC	ADA
--58	DATA SERVICE RATE ERROR NOT DETECTED	MDC
--59	STATUS SHOULD INDICATE "FUNCTIONALITY NOT AVAILABLE" AFTER ATTEMPT TO WRITE ABOVE HIGH MEMORY	MDC
--60	ERASE MARKS WERE NOT BYPASSED AS NOISE	DEV
--61	DIDN'T GET INTERRUPT WHEN EXPECTED	ADA
--62	DEVICE SHOULDN'T HAVE INTERRUPTED WHEN IT'S RUPT LEVEL =0	ADA
--63	OUTPUT CONTROL TO STOP IO SHOULD ALWAYS BE ACK'ED	MDC
--64	OPERATION TIMED OUT, SHOULD BE LESS THAN 5 SECONDS	DEV

MTUX3 T & V PROGRAM--PE/NRZI NINE-TRACK MAGNETIC TAPE (CONT)

Table 2. Program Minor Labels--Continued

MINOR LABEL	DESCRIPTION	PROBABLE ORU
--65	STATUS SB XXXX-8000 AFTER SET TO FFFD-FFFF AND NOP TASK (XXXX=8000 FOR BDC2, =COOO FOR BDC3 FIRMWARE)	MDC
--66	MISSING RESOURCE TRAP. RESTART AT “MODE ?:”.	SYS
--67	INVALID SPEED INDICATED BY ID CODE	ADA
--68	STATUS NO GOOD AFTER WRITING A FILE MARK	ADA, DEV
--69	STATUS ERROR ON READING RECORD PRECEDING A REWRITTEN RECORD	DEC
--DA	DATA COMPARISON ERROR	DEV, ADA
--DO	DMA OVERFLOW	DEV, ADA
--E1	STATUS NG AFTER ERASE OPERATION	ADA, DEV
--F1	STATUS NG AFTER FORWARD SPACE A FILE AND WAIT	ADA, DEV
--F4	STATUS NG AFTER BACK SPACE A FILE AND WAIT	ADA, DEV
--IL	IOLD NOT ACKNOWLEDGED	MDC
--IO	IO NOT ACKNOWLEDGED	MDC
--R1	STATUS NG AFTER FORWARD SPACE A RECORD AND WAIT	ADA, DEV
--R4	STATUS NG AFTER BACK SPACE A RECORD AND WAIT	ADA, DEV

DEV = Device
ADA = Adapter
MDC = Controller Board
SYS = System
SB = Should be
IOLD = Input/Output Load
NG = Not acknowledged

MTUX3 T & V PROGRAM--PE/NRZI NINE-TRACK MAGNETIC TAPE (CONT)

Table 3. Status Words

WORD	BIT	STATUS
1	0	READY
	1	ATTENTION
	2	RETRYABLE MEDIA ERROR
	3	RFU - MBZ
	4	CORRECTED MEDIA ERROR
	5	TAPE MARK DETECTED
	6	B-O-T
	7	E-O-T
	8	UNEQUAL LENGTH CHECK
	9	NON-RETRYABLE ERROR
	10	RFU - MBZ
	11	OPERATION
	12	CORRECTED MEMORY ERROR
	13	NON-EXISTENT RESOURCE ERROR
	14	BUS PARITY ERROR
	15	UNCORRECTED MEMORY ERROR
WORD		
2	0	ON LINE
	1	REWINDING
	2	FILE IN PROTECT
	3	HIGH DENSITY SELECTED
	4	DATA SERVICE RATE ERROR
	5	UNCORRECTABLE CHARACTER ERROR
	6	NRZI CRC ERROR / P.E. SINGLE TRACK ERROR
	7	NRZI LRC ERROR / P.E. MULTIPLE TRACK ERROR
	8	ID BURST AREA ERROR
	9	RFU - MBZ
	10	TIME-OUT CHECK
	11	FUNCTIONALITY NOT AVAILABLE
	12	BEGINNING-OF-BLOCK-EARLY ERROR
	13	BEGINNING-OF-BLOCK-LATE ERROR
	14	END-OF-BLOCK-EARLY ERROR
	15	END-OF-BLOCK-LATE ERROR

MTUX3 T & V PROGRAM--PE/NRZI NINE-TRACK MAGNETIC TAPE (CONT)

If the error involves erroneous data, the report will be followed by from one to eight lines of the following:

BYTE XXXX SB YY, IS ZZ RETRY ABORT

where:

XXXX = RELATIVE BYTE LOCATION IN DATA BUFFER (O-OFF)
YY = DATA IN WRITE BUFFER (SHOULD BE)
XX = ACTUAL DATA IN READ BUFFER AT THAT LOCATION (IS)
RETRY = TYPED ONLY AFTER THE LAST DATA ERROR DETECTED (NOT TO EXCEED EIGHT ERRORS)
ABORT = TYPED ONLY AFTER FOUR READ ATTEMPTS

NOTE

Before attempting to read, the read buffer is filled with 33 (00110011) in all bytes. A failure to transfer data is indicated by YY being 33 hex. If data errors are detected during the normal data transfer tests, the program will attempt to reread the record up to three more times. If the retry is successful, the program will go on with the test. If not successful, it will type “ABORT” and then go on to the next test.

A write error is retried up to seven times. If the eighth write fails, then the test will be terminated on that channel and the following message will be output.

WRITE FAILURE. EITHER THE TAPE MEDIA OR THE WRITE CIRCUITRY IS BAD.

MTUX3 T & V PROGRAM--PE/NRZI NINE-TRACK MAGNETIC TAPE (CONT)

Table 4 lists the probable Optimum Replaceable Unit (ORU) for the OLT test labels.

Table 4. QLT Test Labels

LABEL	INDICATION	PROBABLE ORU
QLTO	QLT NEVER RAN	CHECK HEX ROTARY SWITCH
QLT2	QLT FAILURE	BUS OR MDC
QLPO	QLT FAILURE	ADAPTER PORT 0
QLP1	QLT FAILURE	ADAPTER PORT 1
QLP2	QLT FAILURE	ADAPTER PORT 2
QLP3	QLT FAILURE	ADAPTER PORT 3
QL7F	MDC, INTERNAL	MDC
QL9F	CAI, INDETERMINATE	MDC OR ADAPTER
QLBF	CAI, MDC IMPLICATED	MDC
QLDF	CAI, ADAPTER IMPLICATED	ADAPTER
QLEF	ADAPTER, INTERNAL	ADAPTER
QLF7	ADAPTER, PE FUNCTION	ADAPTER
QLF9	DAI, INDETERMINATE	ADAPTER OR DRU
QLFB	DAI, ADAPTER IMPLICATED	ADAPTER
QLFD	DAI, DRU IMPLICATED	DRU
QLFE	DRU OR READ CLOCK	DRU OR CLOCK

SAMPLE CONSOLE DISPLAY

NOTE

This console display is for explanatory purposes only. The actual console display depends on the revision of the program being executed.

```
T & V EXECUTIVE REV
C?
MTUX3
9-TRK PE/NRZI MAG TAPE TEST  MTUX3  REV (Date)
ZV$LIB  REV.
MEMORY LOW  00007747
HELP (Y OR N)?:N

BDC2  FIRMWARE REV    24
NRZI  DRIVE ON CHANNEL  1600   IS READY
NRZI  DRIVE ON CHANNEL  1680   IS NOT READY
NRZI  DRIVE ON CHANNEL  1700   IS NOT READY
NRZI  DRIVE ON CHANNEL  1780   IS NOT READY
  -(1600)  -(1680)  -(1700)  -(1780)

MODE (A,Q OR "CONTROL H" FOR HELP) ?:Q

CHANNEL(S) (  1600  1680  1700  1780)   ?: 1680@@@@

EXECUTE (Y OR N)?:Y
CHANNEL  1600  IS NOT ONLINE. CAN ONLY TEST CONTROLLER
WILL RUN MODE T ON CHANNEL  1600
CHANNEL  1680  HAS A SCRATCH TAPE MOUNTED.
CHANNEL  1700  IS NOT ONLINE. CAN ONLY TEST CONTROLLER
WILL RUN MODE T ON CHANNEL  1700
CHANNEL  1780  IS NOT ONLINE. CAN ONLY TEST CONTROLLER
WILL RUN MODE T ON CHANNEL  1780

PROGRAM MAY RUN UP TO     7 MINUTE(S) PER PASS
MTUX3 CHANNEL T(1600)  PASS     1     0 ERR(S)
MTUX3 CHANNEL T(1700)  PASS     1     0 ERR(S)
MTUX3 CHANNEL T(1780)  PASS     1     0 ERR(S)
MTUX3 CHANNEL T(1600)  PASS     2     0 ERR(S)
MTUX3 CHANNEL T(1700)  PASS     2     0 ERR(S)
MTUX3 CHANNEL T(1780)  PASS     2     0 ERR(S)
MTUX3 CHANNEL Q(1680)  PASS     1     0 ERR(S)    11 HEX FILES
RETRIES (DECIMAL):    READ      0    WRITE      0
```

OPERATOR INSTRUCTIONS

Prior to running the program, the operator must mount a work tape on all drives that are to be fully tested and ensure they are ready (online).

Enter: MTUX3.

Enter: N.

Device status.

Enter: Q.

Press the RETURN key to test all channels.

Enter: Y.

The first pass is now completed without any detected errors. The second pass starts immediately after the first pass is completed. This test sequence is repeated until the BRK key is pressed. Press the BRK key to terminate testing.

SAMPLE CONSOLE DISPLAY (Continued)	OPERATOR INSTRUCTIONS
ATTN-KEY T(1600) Q(1680) T(1700) T(1780)	Break command is accepted.
MODE (A,Q OR "CONTROL H" FOR HELP) ?:X MTUX3 DONE	Enter: X to terminate the program.
LOADING ZVCMFL LOADING TVEXEC T & V EXECUTIVE REV C?	Operator may invoke another program.
C? MTUX3 9-TRK PE/NRZI MAG TAPE TEST MTUX3 REV (DATE) ZV$LIB REV. MEMORY LOW 00007F51	Enter: MTUX3. **NOTE** A RETURN must be entered to terminate operator entries.
HELP (Y OR N)?:N	Enter: N.
BDC2 FIRMWARE REV 24 NRZI DRIVE ON CHANNEL 1600 IS READY NRZI DRIVE ON CHANNEL 1680 IS NOT READY NRZI DRIVE ON CHANNEL 1700 IS NOT READY NRZI DRIVE ON CHANNEL 1780 IS NOT READY -(1600) -(1680) -(1700) -(1780)	Device Status
MODE (A,Q OR "CONTROL H" FOR HELP) ?:P	Enter: P to set the error parameters.
ERROR CONTROL (A,C,H OR R) ?:C	Enter: C to continue after the error.
TRACE (Y OR N)?:N PRINT I/O HISTORY (Y OR N)?:N	Enter: N.
SUPPRESS ERROR REPORTS (Y OR N) ?:Y	Enter: Y to inhibit the error display.
PRINT READ ERROR RATES (Y OR N)?:N -(1600) -(1680) -(1700) -(1780) SUPPRESS	Enter: N.
MODE (A,Q OR "CONTROL H" FOR HELP) ?:	Select the mode.(See next page)

SAMPLE CONSOLE DISPLAY (Continued)

MODE "P", USE
RESPONDING WITH "P" TO "MODE?" CAUSES THE FOLLOWING QUESTIONS TO BE ASKED:

ERROR CONTROL (A,C,H OR R)?:

WHERE:
A = CURRENT SUBTEST IS ABORTED AFTER ERROR
C == TEST CONTINUES AFTER ERROR (DEFAULT)
H = HALT AFTER ERROR AND CONTINUE WHEN
"DEPRESSC/RWHEN DONE " IS ANSWERED
(IF ANSWERED WITH "M", GO TO PATCH ROUTINE)
(IF ANSWERED WITH "D", GO TO DEBUG MODE)
R = LOOP ON CURRENT SUBTEST UNTIL
ERROR GOES AWAY.

TRACE (Y OR N)?:

WHERE :
Y = PRINT SUBTEST HEADING AS EACH ONE STARTS
N = DO NOT PRINT HEADINGS FOR SUBTESTS (DEFAULT)

PRINT I/0 HISTORY (Y OR N)?:

WHERE:
Y = STORE LAST 10 I/0 FUNCTION CODES IMME-
DIATELY PRECEDING AN ERROR TO BE PRINTED
AFTER EACH ERROR REPORT.
N = NO I/0 CODES WILL BE PRINTED. (DEFAULT)

SUPPRESS ERROR REPORTS (Y OR N)?:

WHERE :
Y = DO NOT PRINT OUT ANY ERROR REPORTS
N = PRINT ALL ERROR REPORTS

PRINT READ ERROR RATES (Y OR N)?:

WHERE:
Y = PRINT THE FOLLOWING MESSAGE ABOUT
EVERY 30000 BYTES READ AND AT THE
END OF PASS REPORT:
"CHANNEL M (XXXX) BYTE READ ERROR RATE
(DECIMAL) BBBB/ITTT"
BBBB = TOTAL BAD BYTES
TTTT = TOTAL BYTES READ SINCE LAST
REPORTED
N = DON'T PRINT ERROR RATES AT ALL (DEFAULT)

SAMPLE CONSOLE DISPLAY (Continued)	OPERATOR INSTRUCTIONS
STSP SUPPRESS MODE (A,Q OR "CONTROL H" FOR HELP) ?:D	Enter: D to enter debug mode.
CHANNEL (1600 1680 1700 1780) ?: 1600 WARNING! THIS MODE WILL WRITE ON THE TAPE.	Enter: CHANNEL number of device to be tested (this example tested device on channel 1680).
RANGE, DATA (12-800 HEX, 00-FF HEX)?:120,FF	Enter: 120,FF to set parameters of: record length = 120 and data pattern = FF (all ones).
LINKS (UP TO 20)?:FFFFFW	Enter: FFFFFW to fill the write buffer five times and write one record (Start/Stop). The subtest will cycle until the EOT is sensed then rewind and continue until the BRK key is pressed. Press the BRK key to terminate testing.
ATTN-KEY	Break command is accepted.
LINKS (UP TO 20)?:X	Enter: X to terminate the test.

CAUTION

THE DEBUG (D) MODE MAY OVERWRITE AND DESTROY MEDIA DATA. ENSURE THAT A SCRATCH OR WORK TAPE IS INSTALLED BEFORE RUNNING THE T & V IN D MODE

MODE "D",USE

THE DEBUG MODE ALLOWS THE OPERATOR TO LINK TOGETHER AND EXECUTE A NUMBER OF DIFFERENT SUBROUTINES FOR THE PURPOSE OF LOCATING SPECIFIC HARDWARE PROBLEMS. THIS MODE CANNOT BE RUN WITH OTHER MODES AND CAN ONLY RUN ON ONE CHANNEL AT A TIME. THE AVAILABLE SUBROUTINES ARE:

LINK	LINK
A - PRINT CONTENTS OF WRITE BUFFER	N - GENERATE RANDOM PARAMETERS (LENGTH, DATA)
B - PRINT CONTENTS OF READ BUFFER	O - BACK-SPACE A FILE
C - INITIALIZE	P - PRINT PARAMETER SET (UNIT, HEX LENGTH, DATA, W/BUF, R/BUF)
D - COMPARE READ BUFFER TO WRITE BUFFER	Q - TRANSFER RED BUFFER TO WRITE BUFFER
E - ERASE A BLOCK OF TAPE	R - READ A RECORD (DON'T CHECK DATA)
F - FILL WRITE BUFFER, FIXED DATA	S - INPUT STATUS WORDS
G - FILL WRITE BUFFER, RANDOM DATA	T - BACK-SPACE A RECORD
H - HALT EXECUTION, RETURN TO DEBUG	U - BACK-SPACE A RECORD
I - FILL WRITE BUFFER WITH ASCENDING DATA PATTERN	V - FORWARD-SPACE A RECORD
J - ESTABLISH RANDOM WRITE BUFFER	W - WRITE A RECORD
K - ESTABLISH RANDOM READ BUFFER	X - EXIT TO "MODE ?:
L - SPARE SUBROUTINES (NOP'S)	Y - FORWARD-SPACE A FILE
M - WRITE A TAPE MARK	Z - PRINT STATUS, RANGE, FILE NUMBER, RECORD NUMBER, (ALL HEX)

SAMPLE CONSOLE DISPLAY (Continued)	OPERATOR INSTRUCTIONS
-(1600) -(1680) -(1700) -(1780) SUPPRESS MODE (A,Q OR "CONTROL H" FOR HELP) ?:D	Enter: D to enter debug mode.
CHANNEL (1600 1680 1700 1780) ?: 1600	Enter: CHANNEL number of device to be tested.
WARNING! THIS MODE WILL WRITE ON THE TAPE. RANGE, DATA (12-800 HEX, 00-FF HEX)?:800,FF	Enter: 800,FF to set parameters of: record length = 800 and data pattern = FF (all ones).
LINKS (UP TO 20)?:FW	Enter: FW to fill the write buffer and write a record (write all ones tape). The subtest will cycle until EOT is sensed or the BRK key is pressed. Press the BRK key to terminate testing.
ATTN-KEY	Break command is accepted.
LINKS (UP TO 20)?:X	Enter: X to terminate the test.
-(1600) -(1680) -(1700) -(1780) SUPPRESS MODE (A,Q OR "CONTROL H" FOR HELP) ?:D	Enter: D to enter debug mode.
CHANNEL (1600 1690 1700 1780) ?: 1600	Enter: CHANNEL number of device to be tested.
WARNING: THIS MODE WILL WRITE ON THE TAPE. RANGE, DATA (12-800 HEX, 00-FF HEX)?:1OO,FF	Enter: 100,FF to set parameters of: record length = 100 and data pattern = FF (all ones).
LINKS (UP TO 20)?:WWWWWU	Enter: WWWWWU to write five records and rewind to BOT. The subtest will cycle indefinitely until the BRK key is pressed. Press the BRK key to terminate the test.
ATTN-KEY	Break command is accepted.
LINKS (UP T0 20)?:X	Enter: X to terminate the test.

SAMPLE CONSOLE DISPLAY (Continued)	OPERATOR INSTRUCTIONS
-(1600) -(1680) -(1700) -(1780) SUPPRESS MODE (A,Q OR "CONTROL H" FOR HELP) ?:D	Enter: D to enter debug mode.
CHANNEL (1600 1680 1700 1780) ?: 1600 WARNING: THIS MODE WILL WRITE ON THE TAPE. RANGE, DATA (12-800 HEX, 00-FF HEX)?:1OO,FF	Enter: CHANNEL number of device to be tested. Enter: 100,FF to set parameters of: record length = 100 and data pattern = FF (all ones).
LINKS (UP TO 20)?:RRRRRTTTTT	Enter: RRRRRTTTTT to read five records and back space five records. The subtest will cycle indefinitely until the BRK key is pressed. Press the BRK key to terminate testing.
ATTN.KEY	Break commandis accepted.
LINKS (UP TO 20)?:X	Enter: X to terminate the test.
-(1600) -(1680) -(1700) -(1780) SUPPRESS MODE (A,Q OR "CONTROL H" FOR HELP) ?:D	Enter: D to enter debug mode.
CHANNEL (1600 1680 1700 1780) ?: 1600 WARNING; THIS MODE WILL WRITE ON THE TAPE. RANGE, DATA (12-800	Enter: CHANNEL number of device to be tested. Enter: RETURN; entering RETURN (C/R) leaves the record length and data pattern at whatever the most recent value was or at 800,FF (default at load time).
LINKS (UP TO 20)?:U	Enter: U to rewind to BOT. The subtest will cycle on the rewind command indefinitely until the BRK key is pressed. Press the BRK key to terminate testing.
ATTN-KEY	Break command is accepted.
LINKS (UP T020)?:X	Enter: X to terminate the test.

SAMPLE CONSOLE DISPLAY (Continued)	OPERATOR INSTRUCTIONS
-(1600) -(1680) -(1700) -(1780) SUPPRESS MODE (A,Q OR "CONTROL H" FOR HELP) ?:D	Enter : D to enter debug mode.
CHANNEL (1600 1680 1700 1780) ?: 1600	Enter: CHANNEL number of device to be tested.
WARNING; THIS MODE WILL WRITE ON THE TAPE. RANGE, DATA (12-800 HEX, 00-FF HEX)?:	Enter: RETURN; entering RETURN (C/R) leaves the record length and data pattern at whatever the most recent value was or at 800,FF (default at load time).
LINKS (UP T0 20)?:S	Enter: S to input both status words. The subtest will cycle on the input status words command indefinitely until the BRK key is pressed. Press the BRK key to terminate testing.
ATTN-KEY	Break command is accepted.
LINKS (UP TO 20)?:X	Enter: X to terminate the test.
-(1600) -(1680) -(1700) -(1780) SUPPRESS MODE (A,Q OR "CONTROL H" FOR HELP) ?:D	Enter: D to enter debug mode.
CHANNEL (1600 1680 1700 1780) ?: 1600	Enter: CHANNEL number of device to be tested.
WARNING: THIS MODE WILL WRITE ON THE TAPE. RANGE, DATA (12-800 HEX, 00-FF HEX)?:	Enter: RETURN; entering RETURN (C/R) leaves the record length and data pattern at whatever the most recent value was or at 800,FF (default at load time).
LINKS (UP to 20)?:UV	Enter: UV to rewind to BOT and forward space a record. The subtest will cycle indefinitely until the BRK key is pressed. Press the BRK key to terminate testing.
ATTN-KEY	Break command is accepted.
LINKS (UP TO 20)?:X	Enter: X to terminate the test.

SAMPLE CONSOLE DISPLAY (Continued)	OPERATOR INSTRUCTIONS
-(1600) -(1680) -(1700) -(1780) SUPPRESS MODE (A,Q OR "CONTROL H" FOR HELP) ?:D	Enter: D to enter debug mode.
CHANNEL (1600 1680 1700 1780) ?: 1600 WARNING; THIS MODE WILL WRITE ON THE TAPE. RANGE, DATA (12-800 HEX, 00-FF HEX)?:	Enter: CHANNEL number of device to be tested. Enter: RETURN; entering RETURN (C/R) leaves the record length and data pattern at whatever the most recent value was or at 800,FF (default at load time).
LINKS (UP TO 20)?:VVVTTT	Enter: VVVTTT to forward space three records and then back space three records. The subtest will cycle indefinitely until the BRK key is pressed. Press the BRK key to terminate testing.
ATT-KEY	Break command is accepted.
LINKS (UP TO 20)?:X -(1600) -(1680) -(1700) -(1780) SUPPRESS	Enter: X to terminate the test.
MODE (A,Q OR "CONTROL H" FOR HELP) ?:X MTUX3 DONE LOADING ZVCMFL LOADING TVEXEC	Enter: X to terminate the program.
T & V EXECUTIVE REV C?	Operator may invoke another program.

PRMX3 T&V PROGRAM--LINE PRINTER

This T & V supports:

ID	BOARD NO.	DESCRIPTION
+	BBDCOO1B	Multiple Device Controller
+	BPNT200A	Printer Adapter, Model 2X
-+	BDCFPRTB	Device Adapter
2004		Serial Printer, 64-Character
2006	-	Serial Printer 96-Character
2002/2003*+	-	Line Printer, 96-Character
2000/200l*	-	Line Printer, 64-Character
2002/2003*	-	Line Printer, 96-Character
2000/200l*	-	Line Printer, 64-Character
2002/2003*	-	Line Printer, 96-Character
2000/200l*	-	Line Printer, 64-Character
	-	HIS Printer, 96-Character
	-	HIS Printer, 96-Character
	-	12-Channel VFU for Line Printers
2001/3	-	Dot-Matrix Line Printer (Ultimate)**

*Line printers with VFU installed.
**Connected to MDC with firmware Rev. 23 or 57.
+ Used on DAS3 (D/C).

PRMX3 T & V PROGRAM--LINE PRINTER (CONT)

RESTRICTIONS

- The VFU tapes must have a punch for every channel, and an end-of form punch.
- A minimum of 32K memory locations are required to execute this program.

DESCRIPTION

The T & V program verifies the proper operation of the printer subsystem. It provides a first level of diagnosis when failures are detected, and makes facilities available to support extensive problem investigation.

NOTE

While this program is running, there will be short periods of apparent system inactivity. Check the TRAFFIC indicator on the control panel to determine the system status.

ERROR MESSAGE REPORTING

Errors detected during test execution are reported in the following format:

ERR ERXX @ AAAA

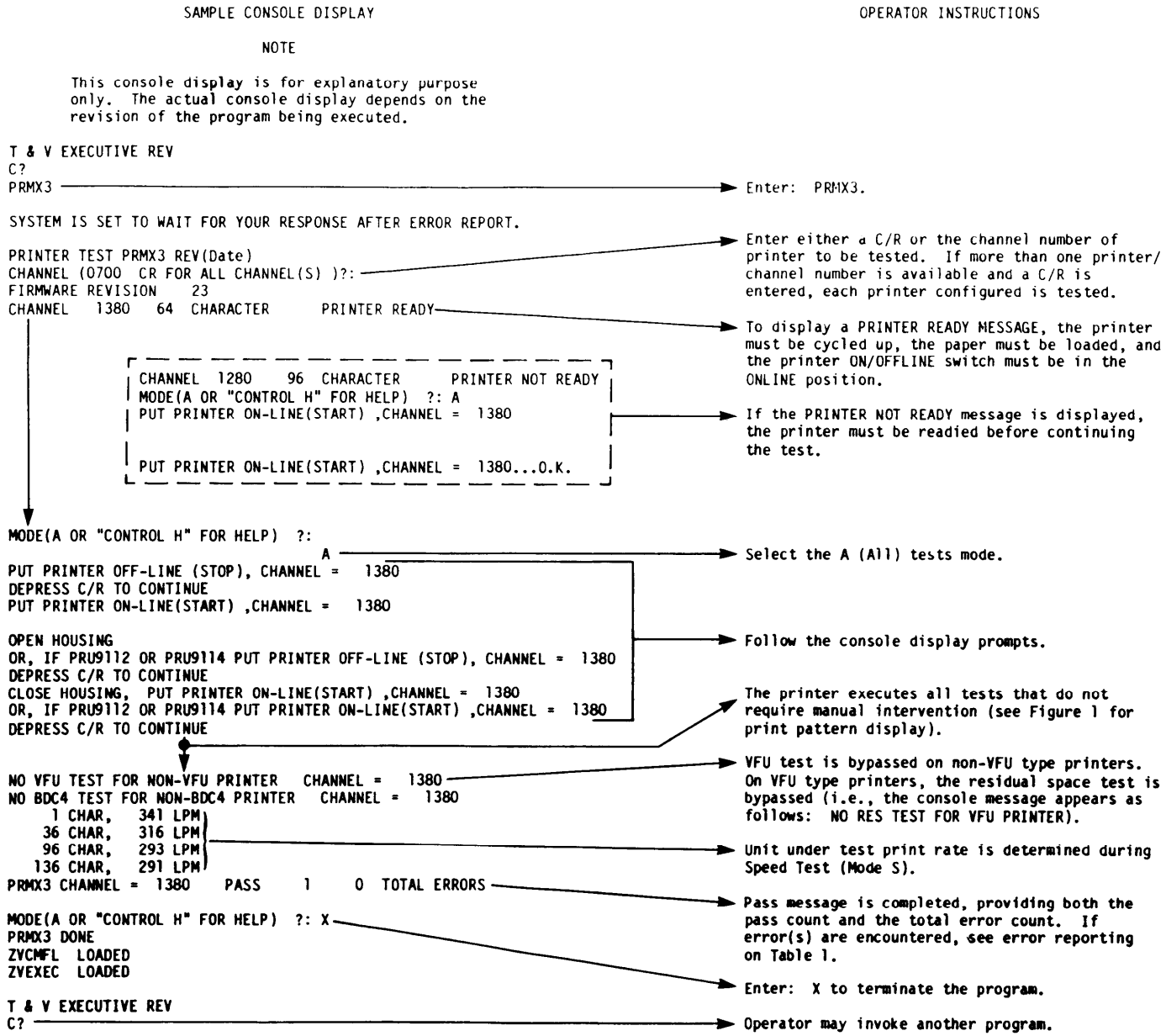
where:

ERXX = Error code.
AAAA = Hex location where error was detected.

Table 1. Error Messages

ERROR CODE	SYMPTOM	SUGGESTED REPLACEMENT		ERROR CODE	SYMPTOM	SUGGESTED REPLACEMENT	
		MODEL 2X	MODELS 3X, 4X, 5X			MODEL 2X	MODELS 3X, 4X, 5X
ER01	CPU CAN'T CHANGE LEVEL	CPU	CPU	ER23	WRONG STATUS WHILE ON/OFFLINE	CONTROLLER	ADAPTER
ER02	DEVICE CAN'T BE PUT OFFLINE	DEVICE OR CONTROLLER	DEVICE OR MDC	ER24	WRONG STATUS WHILE ON/OFFLINE	CONTROLLER	ADAPTER
ER03	CAN'T READ DEVICE ID	CONTROLLER	MDC	ER25	WRONG STATUS WHILE ON/OFFLINE	CONTROLLER	ADAPTER
ER04	CAN'T READ DEVICE ID	CONTROLLER	MDC	ER26	WRONG STATUS WHILE ON/OFFLINE	CONTROLLER	ADAPTER
ER05	1/0 INITIALIZE FAILS	CONTROLLER	MDC	ER27	WRONG STATUS WHILE ON/OFFLINE	CONTROLLER	ADAPTER
ER06	CAN'T READ INTERRUPT CONTROL WORD	CONTROLLER	N/A	ER28	WRONG STATUS WHILE ON/OFFLINE	CONTROLLER	ADAPTER
ER07	CAN'T READ TASK WORD	CONTROLLER	N/A	ER29	WRONG STATUS WHILE ON/OFFLINE	CONTROLLER	ADAPTER
ER08	STOP 1/0 FAILED	CONTROLLER	N/A	ER30	DATA INCORRECT DURING DMA	N/A	ADAPTER
ER09	INITIALIZE FAILED	CONTROLLER	N/A	ER31	DEVICE BUSY	CONTROLLER	ADAPTER
ER10	BUSY FLOP DIDN'T SET	CONTROLLER	N/A	ER32	CHANNEL BUSY	CONTROLLER	ADAPTER
ER11	BUSY FLOP DIDN'T CLEAR	CONTROLLER	N/A	ER33	NO INTERRUPT WHILE ON/OFFLINE	DEVICE	DEVICE
ER12	DEVICE SHOULD INTERRUPT BUT DIDN'T	CONTROLLER	MDC	EK34	WRONG STATUS WHILE ON/OFFLINE	CONTROLLER	ADAPTER
ER13	DEVICE SHOULDN'T INTERRUPT BUT DID	CONTROLLER	MDC	ER35	PANEL CHECK INDICATOR IS ON	-	
ER14	PENDING INTERRUPT DIDN'T OCCUR	CONTROLLER	MDC	ER36	DEVICE OFFLINE WHEN IT SHOULD BE ONLINE	DEVICE OR CONTROLLER	DEVICE OR MDC
ER15	INTERRUPTED DEVICE AT WRONG LEVEL	CONTROLLER	MDC	ER37	NAK'D INITIALIZE	CONTROLLER	MDC
ER16	S-REGISTER WRONG IN INTERRUPT SAVE AREA	CONTROLLER	MDC	ER38*	NO END-OF-FORM WITH VFU	DEVICE	DEVICE
ER17	ACTIVITY FLAG SET WHEN IT SHOULDN'T HAVE	CONTROLLER	MDC	ER39*	NO END-OF-FORM FOR ADV	CONTROLLER	MDC
ER18	ACTIVITY FLAG CLEARED WHEN IT SHOULDN'T HAVE	CONTROLLER	MDC	ER40	FAILED TO INTERRUPT AFTER IOLD RANGE WENT TO ZERO	CONTROLLER	MDC
ER19	CPU INTERRUPTED DEVICE WHEN IT SHOULDN'T HAVE	CONTROLLER	MDC	ER41	DEVICE WENT OFFLINE BEFORE END OF TEST	DEVICE	DEVICE
ER20	WRONG STATUS DURING LOOPBACK TEST	N/A	ADAPTER				
ER21	WRONG STATUS DURING LOOPBACK TEST	N/A	ADAPTER				
ER22	DATA REGISTER INCORRECT DURING LOOPBACK TEST	N/A	ADAPTER				

*Error will occur on 6/20 printer boards which are less than 2.2 and may be ignored.


SAMPLE CONSOLE DISPLAY
OPERATOR INSTRUCTIONS
NOTE
This console display is for explanatory purpose only. The actual console display depends on the revision of the program being executed.
T & V EXECUTIVE REV
C?
PRMX3
Enter: PRMX3.
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT.
PRINTER TEST PRMX3 REV(Date)
CHANNEL (0700 CR FOR ALL CHANNEL(S))?:
Enter either a C/R or the channel number of printer to be tested. If more than one printer/ channel number is available and a C/R is entered, each printer configured is tested.
FIRMWARE REVISION 23
CHANNEL 1380 64 CHARACTER PRINTER READY
To display a PRINTER READY MESSAGE, the printer must be cycled up, the paper must be loaded, and the printer ON/OFFLINE switch must be in the ONLINE position.
CHANNEL 1280 96 CHARACTER PRINTER NOT READY
MODE(A OR "CONTROL H" FOR HELP) ?: A
PUT PRINTER ON-LINE(START) ,CHANNEL = 1380
PUT PRINTER ON-LINE(START) ,CHANNEL = 1380...O.K.
If the PRINTER NOT READY message is displayed, the printer must be readied before continuing the test.
MODE(A OR "CONTROL H" FOR HELP) ?:
A
Select the A (All) tests mode.
PUT PRINTER OFF-LINE (STOP), CHANNEL = 1380
DEPRESS C/R TO CONTINUE
PUT PRINTER ON-LINE(START) ,CHANNEL = 1380
OPEN HOUSING
OR, IF PRU9112 OR PRU9114 PUT PRINTER OFF-LINE (STOP), CHANNEL = 1380
DEPRESS C/R TO CONTINUE
CLOSE HOUSING, PUT PRINTER ON-LINE(START) ,CHANNEL = 1380
OR, IF PRU9112 OR PRU9114 PUT PRINTER ON-LINE(START) ,CHANNEL = 1380
DEPRESS C/R TO CONTINUE
Follow the console display prompts.
The printer executes all tests that do not require manual intervention (see Figure 1 for print pattern display).
NO VFU TEST FOR NON-VFU PRINTER CHANNEL = 1380
NO BDC4 TEST FOR NON-BDC4 PRINTER CHANNEL = 1380
VFU test is bypassed on non-VFU type printers. On VFU type printers, the residual space test is bypassed (i.e., the console message appears as follows: NO RES TEST FOR VFU PRINTER).
1 CHAR, 341 LPM
36 CHAR, 316 LPM
96 CHAR, 293 LPM
136 CHAR, 291 LPM
Unit under test print rate is determined during Speed Test (Mode S).
PRMX3 CHANNEL = 1380 PASS 1 0 TOTAL ERRORS
Pass message is completed, providing both the pass count and the total error count. If error(s) are encountered, see error reporting on Table 1.
MODE(A OR "CONTROL H" FOR HELP) ?: X
PRMX3 DONE
ZVCMFL LOADED
ZVEXEC LOADED
Enter: X to terminate the program.
T & V EXECUTIVE REV
C?
Operator may invoke another program.

- RIPPLE PATTERN (MODE B)

```
!"#$%&'()*+,-./0123456789:;<=>? !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRS
"#$%&'()*+,-./0123456789:;<=>? !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRST
#$%&'()*+,-./0123456789:;<=>? !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTU
$%&'()*+,-./0123456789:;<=>? !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUV
%&'()*+,-./0123456789:;<=>? !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVW
&'()*+,-./0123456789:;<=>? !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWX

UVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>? !"#$%&'
VWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>? !"#$%&'(
WXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>? !"#$%&'()
XYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>? !"#$%&'()*
YZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>? !"#$%&'()*+
Z[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>? !"#$%&'()*+,
```

- VFU CHANNEL ADVANCE (MODE V) - TAPE VFU

NOTE

THIS TEST WILL BE RUN ONLY ON PRINTERS EQUIPPED WITH TAPE VFU. FOR ALL OTHER PRINTERS, AMESSAGE WILL BE DISPLAYED ON CONSOLE AS:

NO VFU TEST FOR NON-VFU PRINTER

HEAD-OF-FORM FOR VFU / CHANNEL 0

GO-TO-CHAN 1

GO-TO-CHAN 2

GO-TO-CHAN 8
GO-TO-CHAN 9
GO-TO-CHAN 10
GO-TO-CHAN 11 END-OF-FORM

NOTE

LINES WHERE VFU APPLIES ARE SPACED PER THE FORMAT TAPE.

NOTE

ON MODEL 23 PRINTER ADAPTER BOARDS BELOW RELEASE 2.2, A "NO END-OF-FORM FOR VFU TEST" MESSAGE OCCURS AND SHOULD BE IGNORED.

Figure 1. PRMX3 (Mode A) Display (1 of 5)

● ADVANCE LINE TEST (MODE F)

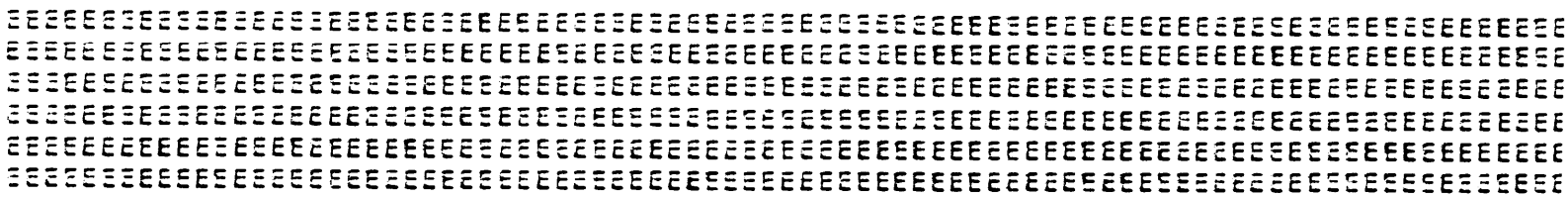
```
HEAD-OF-FORM  FOR LINES ADVANCE
ADV  1 LINES
ADV  2 LINES
ADV  3 LINES

ADV 13 LINES         END-OF-FORM IS DETECTED      ON MODEL 23 PRINTER ADAPTER BOARDS BELOW RELEASE 2.2, A
                                                  "NO END-OF-FORM FOR ADV TEST" MESSAGE OCCURS AND SHOULD BE
                                                  IGNORED.
ADV 14 LINES
ADV 15 LINES
```

NOTE

GO PLACIDLY AMID THE NOISE AND HASTE, AND REMEMBER WHAT PEACE THERE MAY BE IN SILENCE. AS FAR AS POSSIBLE WITHOUT SURRENDER BE-ON GOOD TERMS WITH ALL PERSONS. SPEAK YOUR TRUTH QUIETLY AND CLEARLY! AND LISTEN TO OTHERS, EVEN THE DULL AND IGNORANT! THEY TOO HAVE THEIR STORY.

GO PLACIDLY AMID THE NOISE AND HASTE, AND REMEMBER WHAT PEACE THERE MAY BE IN SILENCE. AS FAR AS POSSIBLE WITHOUT SURRENDER BE ON GOOD TERMS WITH ALL PERSONS. SPEAK YOUR TRUTH QUIETLY AND CLEARLY: AND LISTEN TO OTHERS, EVEN THE DULL AND IGNORANT! THEY TOO HAVE THEIR ATORY.

• PRINT ALL E TESTS (MODE L)*



*B300/600 printer with EVFU prints all Ms.

• CLEAR MESSAGE TEST (MODE G)

Figure 1. PRMX3 (Mode A) Display (2 of 5)

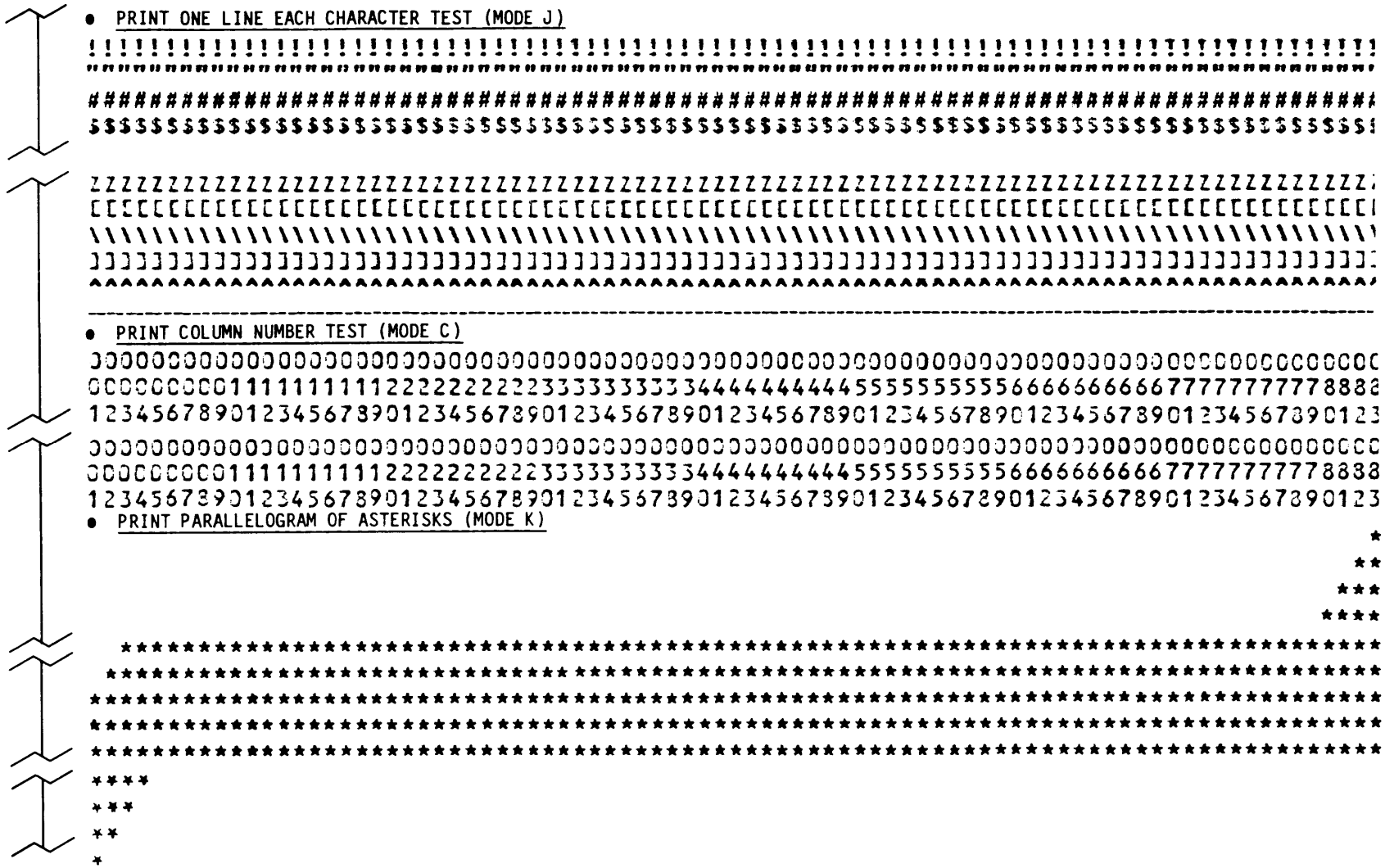


Figure 1. PRMX3 (Mode A) Display (3 of 5)

- RESIDUAL SPACE TEST (MODE U)

NOTE

THIS TEST DOES NOT RUN ON VFU TYPE PRINTER. IF THIS TEST IS ATTEMPTED ON A VFU PRINTER, THE FOLLOWING MESSAGE OCCURS:

NO RES TEST FOR VFU PRINTERS

THIS IS THE TOP OF RESIDUAL SPACE TEST

NOTE

VERIFY THAT THERE ARE 14 BLANK LINES BETWEEN THESE TWO MESSAGES.

15 LINES AFTER TOP OF RESIDUAL SPACE

- SPEED TEST (MODE S)*

```
A
A
A
A
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
A
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789 !"#$%&'()*+,-./:;<=>?
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789 !"#$%&'()*+,-./:;<=>?
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789 !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~abcdefghijkl
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789 !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~abcdefghijkl
A
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789 !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~abcdefghijkln
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789 !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~abcdefghijkln
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789 !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~abcdefghijkln
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789 !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~abcdefghijkln
```

*B300/600 printer prints out a 132-character by 40-line block.

Figure 1. PRMX3 (Mode A) Display (4 of 5)

● TEST MDC II (BDC4) ADAPTER TEST (MODE B)

```
 THIS LINE SHOULD HAVE FOLLOWED A FORM FEED.
THERE SHOULD ALSO BE A SPACE BETWEEN THIS LINE AND THE NEXT 10 LINES.

"A PRIMAL TERMITE KNOCKED ON WOOD
TASTED IT AND FOUND IT GOOD
AND THAT IS WHY YOUR AUNTY MAY
FELL THROUGH THE PARLOR FLOOR TODAY
AND HOW ABOUT THE ANT WHO HAS MADE HIMSELF ILLUSTRIOUS
THROUGH CONSTANT INDUSTRY INDUSTRIOUS
SO WHAT, WOULD YOU BE CALM AND PLACID
IF YOU WERE FILLED WITH FORMIC ACID?
AND LASTLY, GOD IN HIS GREAT WISDOM MADE THE FLY
AND THEN FORGOT TO TELL US WHY"

7 - BIT ASCII WITH FOLD OVER, CHARACTERS (HEX) 00 THRU 1F.

 !"#$%&'()*+,-./0123456789:;<=>?
 !"#$%&'()*+,-./0123456789:;<=>?
THE PREVIOUS TWO LINES ARE TO BE COMPARED AND SHOULD BE IDENTICAL

7-BIT ASCII, LOWER ORDER, NO-FOLD OVER TEST, (HEX) 00 THRU 1F*

          [67 blank lines, assuming 6 lines per inch]

                FOLD OVER TEXT DONE
                FOLD OVER TEXT DONE
THE PREVIOUS TWO LINES ARE TO BE COMPARED AND SHOULD BE IDENTICAL
THIS LINE IS PRINTED IN "UPPER" CASE FOR 64 CHARACTER (SET) PRINTERS
     THIS MESSAGE SHOULD APPEAR -
     ON TWO LINES
```

Figure 1. PRMX3 (Mode A) Display (5 of 5)

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER

This T & V supports the devices and data sets listed in the following tables:

MI	ID	BOARD NO.	DESCRIPTION
*MLC9103		BMLCOO1B	Multi line Communications Processor
	2900	BNMLCO1A	New Multi line Communications Processor
*DCM9101	2118+	BMLF101B	RS-232-C Asynchronous Communications Line (two lines) Adapter
*DCM9102	2118	BMLF102E	RS-232-C Asynchronous Communications Line (one line) Adapter
*DCM9103	2158	BMLF103A	RS-232-C Synchronous Communications Line (two lines) Adapter
*DCM9 04	2158	BMLF104A	RS-232-C Synchronous Communications Line (one-line) Adapter
*DCM9 11	2110	BMLFCLBA	Current Loop Asynchronous Communications Line (one line) Adapter
	21F2		RS-422 Asynchronous Communications Line (two lines) Adapter
*DCM9114	2110	BMLFCLAA	Current Loop Aysnchronous Communications Line (two lines) Adapter
*DCM9109	2160	BMLF188A	MIL-STD-188C Synchronous Communications Line (one line) Adapter
*DCM9116	2100	BMLFA88A	MIL-STD-188C Asynchronous (Medium Speed) Communications Line (two lines) Adapter
**DCM9301	3118	BDCM201A	RS-232-C Dual Line Communications (two lines) Adapter Controller
**DcM9302	3158	BDCM202A	RS-232-C Dual Line Communications (one sync line) Adapter Controller
**DCM9303	3158	BDCM203A	RS-232-C Dual Line Communications (two sync lines) Adapter Controller

(Continued next page)

*Used on Level 6, Model 3X, 4X, 5X, and 6XX Systems; and on DPS 6 3X-9X Systems.

**Used only on Level 6, Model 2X and Infowriter Systems.

*Used on DAS3 (D/C).

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

MI	ID	BOARD NO.	DESCRIPTION
**DCM9304	3118 3158	BDCM204A	RS-232-C Dual Line Communications (one sync and one async line) Adapter Controller
PRU1001			30 CPS (300 baud) Read-Only Serial Impact Terminal Printer
PRU1003			10/20/30 CPS (110/200/300 baud) Read-Only Serial Impact Terminal Printer
PRU1005			120 CPS (1200 baud) Read-Only Serial Impact Terminal Printer
PRU1004 PRU1004 CPX9617			55 CPS (1200 baud) Read-Only Letter-Quality Printer (NEC)
PRU7070 PRU7071 PRU7075 PRU7076			100 CPS, 80/132 columns (300/1200/9600 baud) Read-Only Serial Printer (ASPI)
PRU7007 PRU7017 CPX9616			35 CPS (1200 baud) Read-Only Letter-Quality Printer (NEC)
PRU7061 PRU7066			100 CPS, 80/132 columns (1200/9600 baud) Read-Only Serial Printer (NINA)
TWU1001			30 CPS (300 baud) Send-Receive Serial Impact Typewriter Terminal
TWU1003			10/20/30 CPS (110/200/300 baud) Send-Receive Serial Impact Typewriter Terminal
TWU1005			120 CPS (120 baud) Send-Receive Serial Impact Typewriter Terminal
TermiNet 2120			150 CPS (110, 300, 1200, 2400, 4800, 9600 baud) Receive - Only Serial Impact Terminal Printer. Used as a remote printer on DAS3 (D/C).
***VIP7800 SERIES			Synchronous and Asynchronous Keyboard Display Terminal
***PRU7003			30 CPS (300 baud) Printer Terminal

(Continued next page)

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

MI	DESCRIPTION
***PRU7005	120 CPS (1200 baud) Printer Terminal
***VIP7714	30 CPS (300 baud) VIP Read Only Serial Printer (pin-feed).
***VIP7716	30 CPS (300 baud) VIP Read Only Serial Printer (tractor-feed)
***VIP7717	120 CPS (1200 baud) VIP Read Only Serial Printer (tractor-feed)

*** This T & V procedure supports only the VIP7800 Keyboard-Display Series that contains the Buffered Printer Adapter Option VAF7821 (IPI # BBPAOO1A) with PRU7003/7005, PRU7061/7066, and VIP7714/16/17 Printers. The VIP7714/16/17 Printers are also supported by this procedure without the VAF7821 Buffer Printer Option.

T & V SUPPORTED ASYNCHRONOUS DATA SETS

DATA SET	SERVICE	SPEED (baud)	NOTES
103A3*	dial up	300	
103F*	point-to-point	300	
103J*	dial up	300	(DATA-phone 300)
202S	dial up	1200	(DATA-phone 1200)
202T**	point-to-point	1800	(DATA-phone 1800)
212A*	dial up	300/1200	(DATA-phone 300/1200)
3405*	dial up	1200	

LEGEND:

*Fu1l duplex sets.
**202T data sets are full duplex only on 4-wire point-to-point service.

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

T & V SUPPORTED ASYNCHRONOUS DATA SETS

DATA SET	SERVICE	SPEED (baud)	NOTES
201C-LIC	ODD	2400	(DATA-phone 2400)
201C-LID	PL	2400	(DATA-phone 2400)
208A	PL	4800	(DATA-phone 4800)
208B	DDD	4800	(DATA-phone 4800)

LEGEND:

DDD = Direct Distance Dialing
PL = Private Line

DESCRIPTION

This T & V procedure verifies proper printer operation of a variety of serial printers when connected through the following controllers and adapters:

- Multiline Communications Processor (MLCP) and Asynchronous Communications Line Adapter (ACLA), Synchronous Communications Line Adapter (SCLA), Current Loop Communications Line Adapter (CCLA), and RS-422 CLA
- New Multiline Communications Processor (NMLCP) (see T & V NMLXl for supporting adapters and flaps)
- Buffered Printer Adapter of a VIP7800 Series Terminal
- Dual Line Communications (two asynchronous lines) adapter (ACLA) Controller
- Dual Line Communications (one synchronous and one asynchronous line) Adapter (ACLA) Controller
- Dual Line Communications (one synchronous line) Adapter (SCLA) Controller
- Dual Line Communications (two synchronous lines) Adapter (SCLA) Controller.

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

GENERAL INSTRUCTIONS

NOTE

Before running this T & V procedure, ensure that the Multiline Communications Controller (MLCP) and the Communications Line Adapter (DCM9101/02/03/04/09/ 11/14/16) or Dual Line Communications Controller (DCM9301/02/03/04) have been tested by the following T & V procedures:

DEVICE	T & V PROCEDURE
*MLCP and DCM9101/02/03/04/09/11/14/16	MLCX1 DCMX 1
NMLCP and Adapter/Flap	MLCX3 NMLX1
DCM9301/02/03/04	DLCS1 DLCS2
VIP7804 Buffered Printer Adapter Option VAF7821 (with PRU7003/05, VIP7714/16/17, or PRU7061/7066).	VIPX4
VIP7801 Buffered Printer Adapter Option VAF7821 (with PRU7003/05, VIP7714/16/17, or PRU7061/7066).	VIPX8

* Used on DAS3 (D/C)

This T & V procedure was run on a Level 6, Model 53 system and the console printout was obtained from the testing of a 35 CPS (1200 baud) Read-Only Letter-Quality Printer with a cut-sheet guide connected to a DCM9102 RS-232-C Asynchronous Communications Line Adapter (ACLA) mounted on an MLC9103 Multi line Communications Processor (MLCP).

Refer to Table 1 for specific printer tests per type of printer being tested. The printer tests are divided into the following categories:

- Tests that run automatically (loop indefinitely)
- Printer Selective Tests
- Optional Tests.

PRUX1 T& V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

The program default communications parameters are as follows:

ASYNCHRONOUS		SYNCHRONOUS	
Channel	FFOO	Channel	FFOO
Baud rate	1200	Poll address	0
Parity	E	Modem connection	N
Stop bits	1	Line length	132
Line length	132		

Table 1. Printer Tests

PRINTER TEST	PRU/TWU 1001	PRU/TWU 1003/1005	VIP 7714/16/17	PRU 7070/1/5/6	PRT/PRU 1004/7007	ALL OTHERS
T1 RIPPLE PATTERN	X	X	X	X	X	X
T2 ALL E's	X	X	X	X	X	X
T3 PRINT CHARACTER	X	X	X	X	X	X
T4 PARALLELOGRAM	X	X	X	X	X[d]	X
T5 MESSAGE	X	X	X	X	X	X
T6 FORWARD & BACK	N/A	N/A	N/A	N/A	X	N/A
T7 GRAPHICS	N/A	N/A	N/A	N/A	X	N/A
T8 WHEEL SPIN	N/A	N/A	N/A	N/A	X	N/A
T9 NORMAL HORIZONTAL	N/A	X[b]	X[b]	N/A	X	N/A
TA ABSOLUTE HORIZONTAL	N/A	N/A	N/A	N/A	X	N/A
TB FORM FEED	N/A	N/A	ii/A	N/A	X[d]	N/A
TC PRINT SUPPRESSION	N/A	N/A	N/A	N/A	N/A	N/A

PRUX1 T& V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

Table 1. Printer Tests--Continued

PRINTER TEST	PRU/TWU 1001	PRU/TWU 1003/1005	VIP 7714/16/17	PRU 7070/1/5/6	PRT/PRU 1004/7007	ALL OTHERS
TD SLEW TEST	N/A	N/A	N/A	N/A	N/A	N/A
TE MARGINS	N/A	N/A	N/A	N/A	X	N/A
TG FORM FEED	N/A	X	N/A	X	N/A	N/A
TH MOTOR ON/OFF	N/A	X		N/A	N/A	N/A
TI GRAPHICS 1710/30)	N/A	N/A	N/A	X	N/A	N/A
TJ PROGRAM	N/A	N/A	N/A	N/A	X[e]	N/A
PT[a] CONSOLE PATTERN	X	X	X	X	X	X
PL[a] LOOP, SFU	N/A	X[b,c]	X[b]	N/A	N/A	N/A
VT[a] VERTICAL TAB	N/A	X[b,c]	N/A	N/A	N/A	N/A
EM[a] ECHO TEST	X	X	X[b]	N/A	N/A	X

[a]Optional tests (PT, PL, VT, and EM).

[b]This test is void if the Buffered Printer Option is present in the VIP7800 or VIP7804.

[c]Test is void if this printer provides hard copy for a VIP7200.

[d]Test is void when a cut sheet feeder/guide is present. However, T4 will be done if sheet is at least 66 lines long.

[e]Test is void when font type 01 is mounted.

PRUX1 T& V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

NOTE

All printer tests will loop indefinitely when invoked separately.

The Echo Test (EM) is valid only for TWU (Teletypewriter) type printers with keyboards. This test should be disabled for buffered printers.

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

The printer tests which are specific to the type of printer being tested (see Table 1), must be visually verified for proper printer operation. This is accomplished by comparing the printer generated test patterns with the printer test pattern examples that are shown in Figures 2 through 19.

NOTE

The style of the printer test patterns depend on the typewriter font, but the test patterns generated should match the test pattern examples (Figures 2 through 19).

Immediately after the Parity Prompt or Modem Prompt message, error messages (EMO1 & EM02) are displayed if the data link to the printer is not yet established. Error messages EM03 through EM61 are displayed if there is a data link or electronics problem while the printer tests are being performed.

NOTE

One of the Communications Line Error messages (EMO1 through EM61) is issued if the parameters entered to the T & V procedure (especially Baud Rate or Poll Address) do not match the switch settings on the terminal (printer) being tested. The proper terminal switch setting and/or T & V procedure supplied parameters (BAUD RATE prompt) should be verified.

For the VIP7800 Series Terminal Buffered Printer operation, the baud rate requested is that of the VIP7800 Series Terminal, not of the attached printer.

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

Errors occurring in this test are reported as follows:

```
ERR PRUX1 EMXX @   YYYY CCCC (ORU) (ORU) . . .
EMXX: TEXT MESSAGE
```

where:

EMXX = Error Code
YYYY = Memory Address of Test
CCCC = Channel Number Being Tested
(ORU) = Optimum Replaceable Unit

"EMXX: . .." is a text statement describing the nature of the error.

If a break is sent by the printer because of a PAPER OUT OR JAM condition while the printer is being tested, the operator can correct the situation and then enter the command "GO" on the system console which will return the T & V procedure to the test where the break occurred.

SAMPLE CONSOLE DISPLAY

NOTE

This console display is for explanatory purposes only. The actual console display depends on the revision of the program being executed.

```
c?:
PRUX1
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT.

COMMUNICATIONS PRINTERS TEST PRUX1 REV (Date)

RUN CONTROLLER TEST AND ADAPTER TEST PRIOR TO THIS TEST.

DO YOU WANT A COMMUNICATIONS RESOURCE SCAN (Y OR N)?:N

CHANNEL NUMBER     ?:1C80
```

OPERATOR INSTRUCTIONS

Enter: PRUX1.

Enter: N. Enter Y to cause the program to list all devices connected to the system via communications lines that can be tested by PRUX1.

Enter channel number (XXXX) of communications controller that has the attached printer to be tested.

After the channel number has been entered, the program may request (where applicable) the printer baud rate, poll address, and parity type as well as whether the printer is connected to the system by a modem. This information is requested if the system cannot automatically detect it or the printer is modem-connected or was powered down when the channel number was entered. See Figure 1A and lB for both asynchronous and synchronous prompt messages.

- If the TERM BAUD RATE message is displayed, enter the baud rate (XXXX) of the printer under test.
- If the TERM POLL message is displayed, enter the poll address (XX) of the printer under test.
- If THE PARITY message is displayed, enter parity type O (Odd), E (Even), N (None), or S (Space) of printer under test.
- If the MODEM message is displayed, enter Y (modem present) or N (modem not present).

NOTE

For VIP7800 buffered printer operations, the parameters that are entered at the preceding messages should be those of the VIP7800 terminal, not of the printer that is attached to the terminal.

SAMPLE CONSOLE DISPLAY (Continued)

NOTE

If either of the following error messages are displayed:

EM01 : ESTABLISH DATA LINK. WAITING FOR DEVICE/MODEM READY (MI?) (DSR)

EM02 : ESTABLISH DATA LINK. WAITING FOR CLEAR-TO-SEND (CS) (CTS)

ensure that the printer (and in the case of the buffered printer, the VIP7800 Series Terminal) is powered up, is set for online (local light not lit) operation, and is either direct-connected or modem-connected to the system. If either of the above messages is displayed repeatedly (every 2 minutes), even when the data link appears to be established, the communications link to the printer (terminal) is faulty.

OPERATOR INSTRUCTIONS

If terminal (printer), modem, or communications line malfunction, console Error Messages (EM0 and/or EM02) are displayed during this time (refer to Error Reporting and Troubleshooting Procedures).

NOTES

1. Error messages EM03 - EM61 are issued if the parameter supplied to the T & V procedure (especially BAUD RATE or POLL ADDRESS) do not match the communications terminal. Verify and/or correct proper switch setting and/or supplied parameters.

2. At this point in the T & V procedure, if a telephone connection (via data sets) is to be established, Error Messages EMO1 and EM02 will print out (one time) while the communications connections are being established.

SELECT ONE OF THE FOLLOWING PRINTER TYPES

PRESS FOR

1 PRU/TWU 1003/05
2 VIP 7714/16/17
3 PRT/PRU 1004/7007
4 PRU/TWU 1001
5 PRU 7070/71/75/76
6 OTHER PRINTER
7 VIP 78xx WITH BUFFERED PRINTER (VAF 7821/44)

PRINTER TYPE ?: 3

PRESS RESET AT PRINTER WITHIN 4 MINUTES !:

DO YOU WANT TO RUN SINGLE SHEET MODE (Y OR N) ?: Y

Enter number corresponding to type of printer under test.

NOTE

If the response to this prompt is any other printer type number than 3, the program goes directly to the MODE question.

Press Reset button on printer.

Enter Y (Yes) for cut-sheet printers and N (No)

NOTE

If the response to this question is N (No) the program goes directly to the FONT TYPE question.

SAMPLE CONSOLE DISPLAY (Continued)

OPERATOR INSTRUCTIONS

```
LEFT MARGIN ?: 30
RIGHT MARGIN ?: 110
PAGE LENGTH ?: 54
```

Enter requested parameters--that is, numbers at which right and left margins are set and number of lines per page. The following table describes the cut sheet feeder options:

```
SELECT A CUT SHEET FEEDER TYPE

PRESS FOR
  1   MODEL A (CUT SHEET GUIDE)
  2   MODEL D (PRF 9007)
  3     MODEL C (PRF 1008)
  4   MODEL D (PRF XXXX)
  5   OTHER MODEL
  6   HELP!!!!
```

SELECTION NUMBER	DESCRIPTION
1	Single-sheet feeder
2	Single-bin Rutishauser feeder
3	Dual-tray BDT feeder
4	RFU
5	Manual load
6	Help file information

```
CUT SHEET FEEDER TYPE ?: 1
MINIMUM OF 14 SHEETS NEEDED PER PASS
```

Enter the number corresponding to the type of cut-sheet guide or feeder on printer under test. This message will not be displayed if N was entered at SINGLE SHEET MODE question.

```
IF SHEET FEEDER READY, PRESS RETURN KEY !:
```

Press the RETURN key after ensuring that cut-sheet guide or feeder is ready for operation.

```
IS A FONT TYPE OTHER THAN 01 MOUNTED (Y OR N) ?: Y
```

Enter Y (Yes) if the font type has proportional spacing. The Program Mode Test (TJ) will not run if N (No) is entered.

```
MODE (A = ALL TESTS) ?: A
```

ENTER: A.

```
PRUX1 :   TESTING CHANNEL    1 C80
```

SAMPLE CONSOLE DISPLAY (Continued)

OPERATOR INSTRUCTION

```
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE !:

  T1  PRINT 10 LINES OF RIPPLE PATTERN
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE !:

  T2  PRINT 10 LINES OF ALL E"S
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE !:

  T3  PRINT ONE LINE OF EACH %&'()*+,-.
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE !:

  T5  PRINT A MESSAGE IN UPPER AND LOWER CASE
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE !:

  T6  PRINT FORWARD AND BACKWARD (">" AND "<" CHARACTERS) 5 TIMES
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE!:

  T7  GRAPHIC MODE, VARIABLE SPACING TEST
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE !:

  T8  PRINTWHEEL SPIN TEST; PRINT 10 LINES OF "A(" PATTERN
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE !:

  T9  NORMAL HORIZONTAL TAB TEST
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE !:

  TA  ABSOLUTE HORIZONTAL TAB TEST
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE !:

  TE  LEFT VS. RIGHT MARGIN TEST
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE !:

  TJ  PRT/PRU 1004/7007 PROGRAM MODE TEST
```

T & V program starts testing. Refer to Table 1 for those tests that are applicable to a specific printer.

Printout identifies only those tests being executed. See Figures 2 through 23 for sample printer test patterns for all tests.

```
BASIC TESTS COMPLETED

PRUX1 PASS         1
CHANNEL      =  1C80
TOTAL ERRORS =     0

PRUX1: TESTING CHANNEL   1C80
MANUALLY LOAD PAPER, PUSH RESET WHEN DONE !:

*ATTN-KEY*

MODE (A = ALL TESTS) ?: X
PRUX1 DONE
ZVCMFL  LOADED
ZVEXEC  LOADED

T & V EXECUTIVE
C?:
```

Mode A has completed one pass of all applicable tests. Program will cycle indefinitely. Press the BRK (Break) key to terminate testing.

Break command is accepted.

Enter X to terminate program.

NOTE

To exit the T & V program from the printer under test, put the printer in Local mode.

Operator may invoke another T & V program.

PRUX1 T& V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

```
CHANNEL NUMBER    ?:1C80
TERM BAUD RATE (1200) ?:300
PARITY (E)        ?:



(A) Asynchronous Prompt Display Message



CHANNEL NUMBER    ?:CCOO
TERM POLL(O to 31)?: O
MODEM (Y or N)    ?: N



(B) Synchronous Prompt Display Message
```

Figure 1. Typical Asynchronous and Synchronous Prompt Display Messages

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

```
T1  PRINT 10 LINES OF RIPPLE PATTERN

 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`ab
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abc
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcd
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcde
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdef
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefgh
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghi
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghij
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijk
```

Figure 2. Printer Test Pattern T1

```
T2  PRINT 10 LINES OF ALL E"S

EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
```

Figure 3. Printer Test Pattern T2

```
T3  PRINT ONE LINE OF EACH %&'()*+,-.

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
(((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((
)))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))
***************************************************************************
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
-------------------------------------------------------------------
...................................................................
```

Figure 4. Printer Test Pattern T3

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

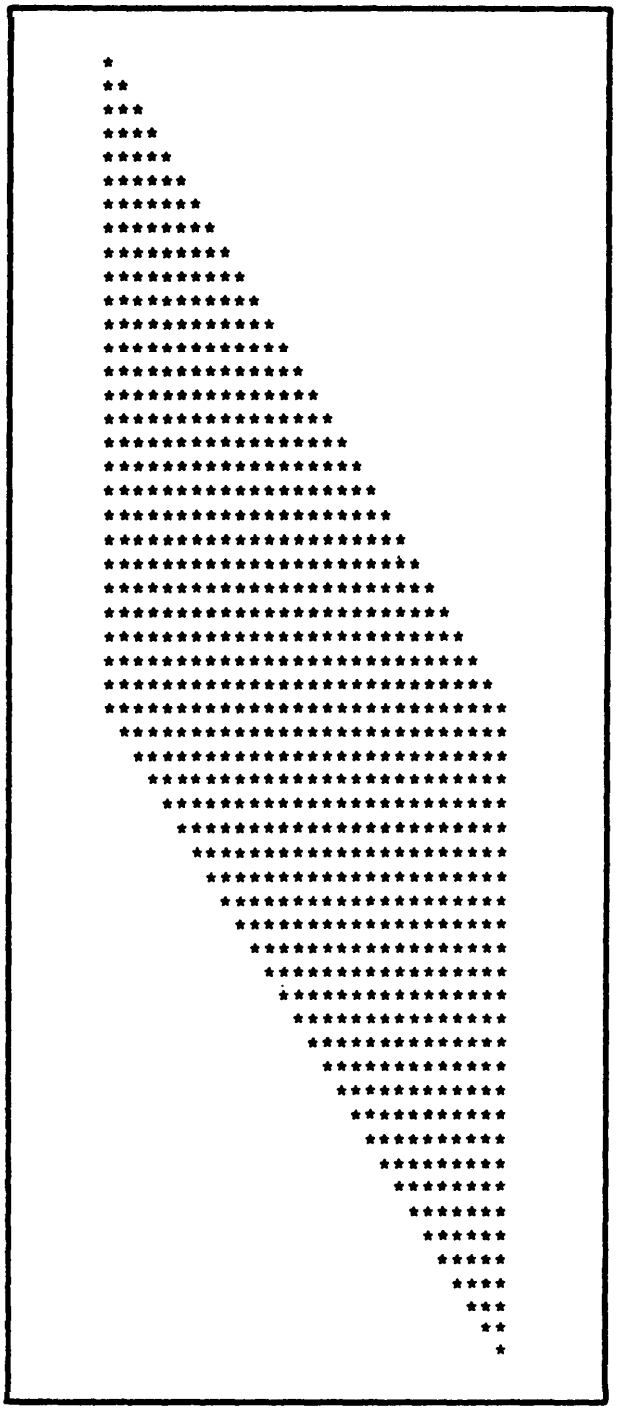


Figure 5. Printer Test Pattern T4

PRUX1 T & V PROGRAM--COMMUNICATI0NS LINE PRINTER (CONT)

```
T5 PRINT A MESSAGE IN UPPER AND LOWER CASE

SPACE, THE FINAL FRONTIER.  THESE ARE THE VOYAGES OF THE STARSHIP ENTERPRISE.
ITS FIVE YEAR MISSION, TO EXPLORE STRANGE NEW WORLDS, TO SEEK OUT NEW LIFE AND
NEW CIVILIZATIONS, TO BOLDLY GO WHERE NO MAN HAS GONE BEFORE!!

Space, the final frontier.  These are the voyages of the Starship Enterprise.
Its five year mission, to explore strange new worlds, to seek out new life and
new civilizations, to boldly go where no man has gone before!!
```

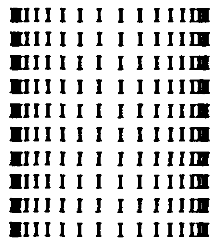
Figure 6. Printer Test Pattern T5

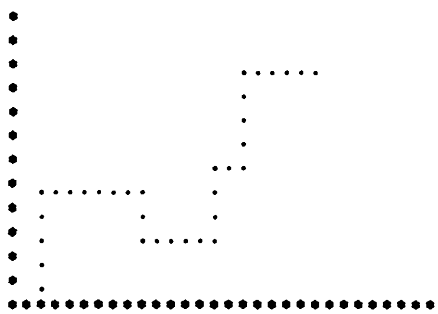
```
T6  PRINT FORWARD AND BACKWARD (">" AND "<" CHARACTERS) 5 TIMES

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
```

Figure 7. Printer Test Pattern T6

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

T7 GRAPHIC MODE, VARIABLE SPACING TEST





NOTE

The graph at the left is applicable only to PRT/PRU1004/7007 printers with the bidirectional forms tractors or Model B cut-sheet feeder (PRF1008).

Figure 8. Printer Test Pattern T7

T8 PRINTWHEEL SPIN TEST: PRINT 10 LINES OF “A(” PATTERN

```
A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A
A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A
A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A
A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A
A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A
A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A
A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A
A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A
A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A
A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A(A
```

Figure 9. Printer Test Pattern T8

PRUX1 T& V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

T9 NORMAL HORIZONTAL TAB TEST

TAB-A	REFERENCE TABS	TAB-B
TAB-1		TAB-2
TAB-1		TAB-2
TAB-1		TAB-2
TAB-1		TAB-2
TAB-1		TAB-2
TAB-1		TAB-2
TAB -1		TAB-2
TAB-1		TAB-2
TAB-1		TAB-2
TAB-1		TAB-2

NOTE

The printer should print each TAB-1 so that it aligns under TAB-A and each TAB-2 so that it aligns under TAB-B.

Figure 10. Printer Test Pattern T9

TA ABSOLUTE HORIZONTAL TAB TEST

TAB-A	REFERENCE TABS	TAB-B
TAB-1		TAB-2
TAB-1		TAB-2
TAB -1		TAB-2
TAB-1		TAB-2
TAB -1		TAB-2
TAB-1		TAB-2
TAB-1		TAB-2
TAB-1		TAB-2
TAB-1		TAB-2
TAB-1		TAB-2

NOTE

The printer should print each TAB-1 so that it aligns under TAB-A and each TAB-2 so that it aligns under TAB-B.

Figure 11. Printer Test Pattern TA

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

```
*** LOGICAL FORM FEED; READ FORM LENGTH SWITCH ***









1 ***** TOP OF FORM - VERTICAL TABS FROM HERE ******
2
3
4
5 VERTICAL TAB-5
6
7
8 VERTICAL TAB-8
9
```

Figure 12. Printer Test Pattern TB

NOT AVAILABLE

Figure 13. Printer Test Pattern TC

NOT AVAILABLE

Figure 14. Printer Test Pattern TD

PRUXl T & V PROGRAM--C0MMUNICATI0NS LINE PRINTER (CONT)

```
TE LEFT VS. RIGHT MARGIN TEST

      LEFT MARGIN                          RIGHT MARGIN

      LISTEN TO THE ALARM WHEN THE CARRIAGE CROSSES THE RIGHT MARGIN
      LISTEN TO THE ALARM WHEN THE CARRIAGE CROSSES THE RIGHT MARGIN
      LISTEN TO THE ALARM WHEN THE CARRIAGE CROSSES THE RIGHT MARGIN
      LISTEN TO THE ALARM WHEN THE CARRIAGE CROSSES THE RIGHT MARGIN
      LISTEN TO THE ALARM WHEN THE CARRIAGE CROSSES THE RIGHT MARGIN
      LISTEN TO THE ALARM WHEN THE CARRIAGE CROSSES THE RIGHT MARGIN
      LISTEN TO THE ALARM WHEN THE CARRIAGE CROSSES THE RIGHT MARGIN
      LISTEN TO THE ALARM WHEN THE CARRIAGE CROSSES THE RIGHT MARGIN
      LISTEN TO THE ALARM WHEN THE CARRIAGE CROSSES THE RIGHT MARGIN
```

Figure 15. Printer Test Pattern TE

```
TB PRU/TWU 1003/05/07, AND PRU 7070/71/75/76 FORM FEED TEST

*** LOGICAL FORM FEED (12 LINES OR 4 SPROCKET HOLES) ***











*** END OF FORM FEED ***
```

The printer should execute a 12-line or 4-sprocket hole form feed.

Figure 16. Printer Test Pattern TG

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

```
  THE MOTOR ON/OFFLINE TEST

THE MOTOR OR ONLINE LIGHT WILL GO OFF FOR 10 SECONDS

THE PRINTER IS ON LINE AGAIN
```

Figure 17. Printer Test Pattern TH

T1 PRU 7061/66 & PRU 7070/71/75/76 ATTRIBUTE, GRAPHICS TEST

AT 6 LINES PER INCH:

DO NOT **EXPAND**, SQUEEZE, OR **MUTILATE** THIS TEXT!!!
The quick brown fox jumps over the lazy dog.
DO NOT **EXPAND**, SQUEEZE, OR **MUTILATE** THIS TEXT!!!
The quick brown fox jumps over the lazy dog.

THE LINE GRAPHICS SHOULD RESEMBLE A PANE WINDOW

NOTE

The window graphic to the left is not applicable to PRU7061/ 7066 printers.

AT 8 LINES PER INCH:

DO NOT **EXPAND**, SQUEEZE, OR **MUTILATE** THIS TEXT!!!
The quick brown fox jumps over the lazy dog.
DO NOT **EXPAND**, SQUEEZE, OR **MUTILATE** THIS TEXT!!!
The quick brown fox jumps over the lazy dog.

Figure 18. Printer Test Pattern T1

PRUX1 T& V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

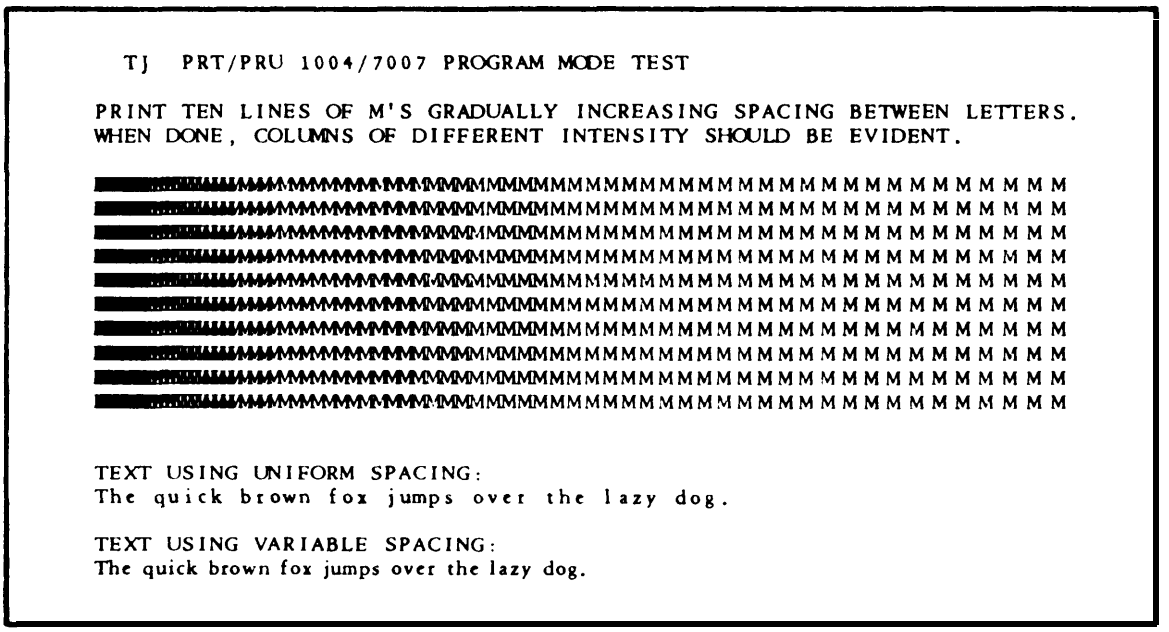


Figure 19. Printer Test Pattern TJ

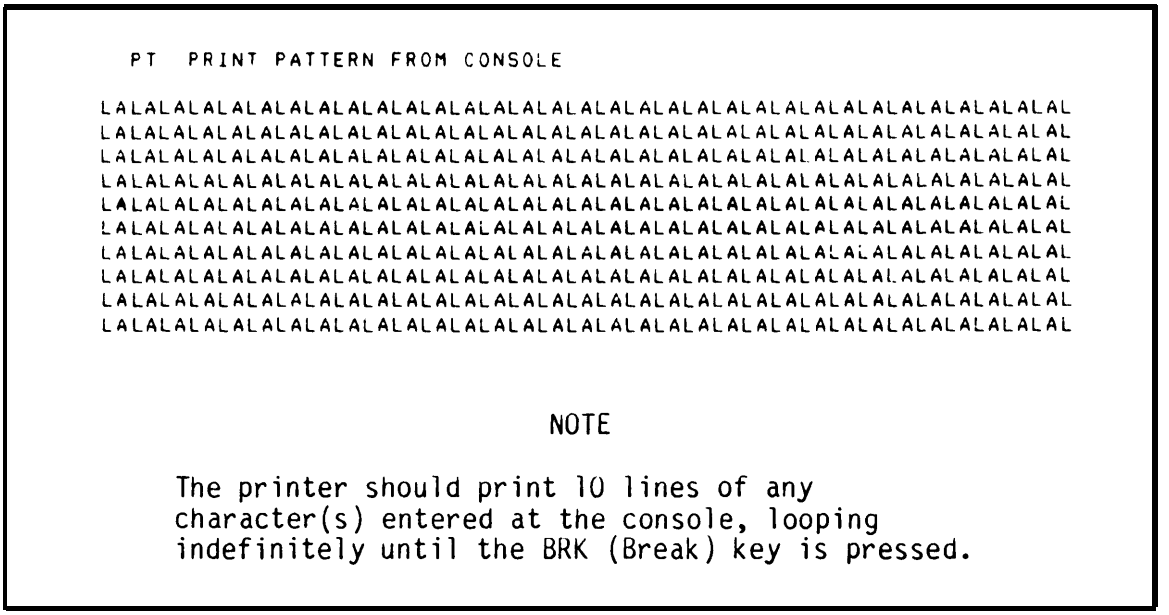


Figure 20. Printer Test Pattern PT

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

```
  PL PAPER LOOP READER, SYNCHRONIZED FORMAT UNIT TEST

IF PAPER LOOP READER PRESENT:  GO TO LOCAL MODE AND READ IN LOOP

IF SYNCHRONIZED FORMAT UNIT PRESENT:  GO TO LOCAL MODE, HIT FF, AND POSITION
PAPER AT LINE 1
WHEN FINISHED STRIKE (C/R) AT THE CONSOLE

CAUTION:  LOCAL MODE WILL DROP ON MODEM, TO RESTART, REDIAL









*** START FORM FEED ***









*** END OF FORM FEED ***









*** START VERTICAL TAB ***



   TAB-1



*** END OF TEST ***
```

Figure 21. Printer Test Pattern PL

PRUX1 T & V PROGRAM--COMMUNICATIONS LINE PRINTER (CONT)

```
  VT PRU/TWU 1003/05/07 VERTICAL TAB TEST



*** VERTICAL TABS SHOULD BE 2, 5 LINES BELOW THIS LINE ***
1
2   VERTICAL TAB-2
3
4
5   VERTICAL TAB-5

COMPARE THIS PATTERN WITH THE FOLLOWING ONE, THE PATTERNS SHOULD BE THE SAME
WITHOUT NUMBERS, BACK SPACE ALSO TESTED ON TAB PRINTS


*** VERTICAL TABS SHOULD BE 2, 5, LINES BELOW THIS LINE ***

    VERTICAL TAB-2



    VERTICAL TAB-5
```

Figure 22. Printer Test Pattern VT

```
  EM KEYBOARD ECHO TEST

LEVEL 6 WILL ECHO ANY KEY(S) TYPED BUT FIRST, PRESS THE “RETURN” KEY WITHIN 2
MINUTES!:   IF AN ECHOPLEX SWITCH IS PRESENT, TURN IT ON. IF ONE IS NOT
PRESENT, DOUBLE KEYSTROKES WILL BE PRINTED.  PRESS “Q (RETURN)” TO END KEYBOARD
TEST.

THIS IS A TEST.
Q ------------------------------------------------------------>Test Message Example
```

NOTE

This test verifies the operation of the keyboard and cable of a TWU printer. Any message entered at the keyboard loops through the system and returns to the printer. For asynchronous printers with disabled echoplex switch, each character of the message will appear twice--one for the local copy and one for the looped copy. Also, the “RETURN” KEY part of the prompt is printed only if a TWU1OO1 or VIP7714/16/17 is under test.

Figure 23. Printer Test Pattern EM

PSSX1 T & V PROGRAM--POWER FAILURE TEST

This T & V supports:

ID	BOARD NO.	DESCRIPTION
-	BBBU060B	Memory save for up to 64K words (low density) or 256K words (high density) with autorestart tabletop unit
-	BBBU060B	Memory save for up to 64K words with autorestart - rack-mountable unit
-	BBBU260A	Minimemory save - M23 (5 to 10 minutes)
-*	BBBU060C	Memory save for up to 1MW for Level 6 systems

* Used on DAS3 (D/C)

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

Detected errors are reported as follows:

```
ERR PSSX1 XXX(X) TRAP 17 @ AAAA
ERR PSSX1 XXX(X) MEMORY CHECK FAILED AFTER PFI @ AAAA
* BAD READ AT LOCATION YYYY(Y)
```

where:

XXX(X) = Console code in error message list.

YYYY(Y) = Address of bad memory location.

AAAA = Error location in listing.

PSSX1 T & V PROGRAM--POWER FAILURE TEST (CONT)

ERROR MESSAGES

The following table lists and describes the error messages.

CONTROL CODED R1	PANEL HALT R2	CONSOLE ERROR CODE	DESCRIPTION	SUSPECTED ORU
5045	3320	PE2	P Counter Not Saved	CPU Board or Power Supply
5045	3320	PE3	Activity Bit Not Set	CPU Board
5045	3220	PE4	No RTC Interrupt	CPU Board
5045	3520	PE5	Memory Accessible After 1.9 Mini-seconds	Memory Board (Both if 32K)
5045	3720	PE7	Memory Check Failed Before PFI	Memory Board (Run Memory Diagnostic)
5045	3820	PE8	One Bit Error	Memory Board
5045	3920	PE9	Trap 17	Memory Board
5045	3130	PE10	Memory Check Failed During PFI	Memory Board or Power Supply
5045	3131	PE11	Memory Check Failed After PFI	Memory Board
5045	3132	PE12	Memory Accessible in Less Than 1.6 Milliseconds	Memory Board (Either One if 32K)
5045	3133	PE13	Trap 3	Memory Board
5045	3134	PE14	Trap 5	Memory Board
5045	3135	PE15	Trap 15	Memory Board
5045	3136	PE16	Trap 16	Memory Board

If the program does not run when power is restored, and pressing the Run and Execute push buttons does not help, visually check the memory indicator light on the memory save power supply. If the indicator light is off, the memory save power supply is faulty.

SAMPLE CONSOLE DISPLAY	OPERATOR INSTRUCTIONS
NOTE This console display is for explanatory purposes only. The actual console display depends on the revision of the program being executed.	
T & V EXECUTIVE REV C? PSSL1	Enter: PSSX1.
BBU TEST PSSL1 REV (Date) ZV$LIB REV. MEMORY LOW 00003C5E	
MEMORY IS GREATER THAN 64K SET SYSTEM TO LAF MODE. OTHERWISE IT WILL TEST ONLY UP TO 64K LOCATIONS. LOAD PROGRAM: "PSSL1"	
HELP (Y OR N) ?:N	Enter: N.
* OPERATING INSTRUCTIONS *	Operating instructions start printing out automatically.
TO TEST BOTH THE POWER FAILURE INTERRUPT PROCEDURE AND THE BATTERY BACKUP OPTION, THE POWER DISTRIBUTION UNIT MUST BE DISCONNECTED FROM THE AC LINE VOLTAGE. IN A TABLETOP SYSTEM (I.E., 5-CARD CHASSIS WITH THE BATTERY BACKUP ALSO ACTING AS THE POWER DISTRIBUTION UNIT) THE BATTERY BACKUP CABLE MUST BE DISCONNECTED FROM THE AC LINE. IN A RACK MOUNTED SYSTEM THERE IS A SPECIAL POWER DISTRIBUTION UNIT WHICH MUST BE DISCONNECTED. THIS IS EASILY DONE BY SWITCHING OFF THE CIRCUIT BREAKER ON ITS FRONT PANEL.	
PRINT MORE (Y, N OR R-REST) ?: R	Enter: R if the output device is a printer. Enter: Y if the output device is a video display.
PUTTING THE CONTROL PANEL SWITCH IN THE OFF POSITION AND THEN TO THE ON POSITION WILL TEST THE POWER FAILURE PROCEDURE, BUT NOT THE BATTERY BACKUP OPTION. HOWEVER, FOR A COMPLETE CHECK OF THE SYSTEM, THIS LOCAL TYPE OF POWER FAILURE SHOULD ALSO BE TESTED.	Operating instructions continue printing out automatically.
AT THE MESSAGE, "YOU ARE NOW READY FOR A POWER SHUTOFF" THE PROGRAM IS NOW READY FOR THE USER TO PROVIDE A POWER SHUTOFF, BY EXECUTING THE FOLLOWING STEPS.	
1. IF A CONTROL PANEL SECURITY KEY IS PRESENT, IT MUST BE TURNED (COUNTER CLOCKWISE) TO THE OFF POSITION, AND REMAIN IN THE OFF POSITION FOR THE DURATION OF THE TEST. IF IT IS NOT IN THE LOCKED POSITION, THE AUTO-RESTART FEATURE IS DISABLED AND THE PROGRAM WILL HALT AT LOCATION ZERO. THE MINI CONTROL PANEL HAS NO KEY AND IS CONSIDERED TO ALWAYS BE IN THE LOCKED POSITION.	Observe that when the security key is in the off position it extinguishes the register indicator and its contents on the control panel.
2. SWITCH THE CONTROL PANEL SWITCH TO THE OFF POSITION. POWER MAY BE RESTORED IMMEDIATELY. THE CONSOLE WILL THEN DISPLAY: "PSSX1: PHASE 1 TEST O.K." "READY FOR AC POWER SHUTOFF"	
3. REMOVE THE AC POWER AS DESCRIBED ABOVE FOR THE RACK MOUNTED OR TABLETOP MODELS. POWER MAY BE RESTORED IMMEDIATELY.	

SAMPLE CONSOLE DISPLAY (Continued)

OPERATOR INSTRUCTIONS

THE CONSOLE WILL THEN DISPLAY:
"PSSX1: PASS **01"
"READY FOR THE NEXT POWER SHUTOFF"
THIS SIGNIFIES THAT A SINGLE PASS HAS BEEN EXECUTED SUCCESSFULLY AND THAT ANOTHER PASS IS READY TO BE EXECUTED.
TO EXECUTE THE NEXT PASS, REPEAT STEPS 1, 2 AND 3.
MULTIPLE PASSES SHOULD BE EXECUTED TO TEST THOROUGHLY
TO EXIT THE TESTING LOOP, DEPRESS THE BREAK KEY
THE CONSOLE WILL THEN DISPLAY:
ATTN-KEY
ACTION (X = EXIT, R = RESTART, C = CONTINUE) ? :
TYPE "X" AND A CARRIAGE RETURN.
MESSAGE "PSSX1: DONE: WILL BE DISPLAYED.

Operating instructions continue printing out automatically.

End of operating instructions.

YOU ARE NOW READY FOR A POWER SHUTOFF.

On all control panels, turn off the power switch. Power shutoff is completed. After 2 seconds, turn the power switch on. Power on is completed.

A brief pause takes place between the time of power on and printout acknowledgment.

MEMORY SAVED = 512 K
***** PLEASE CONFIRM MEMORY SAVE CAPACITY. *****

Specifies the amount of memory being protected.

NOTE

The protected memory size is listed under Start Up Procedures in the Operator's Guide.

PSSL1 : PHASE 1 TEST O.K.
READY FOR AC POWER SHUTOFF

To confirm the memory save capacity, check the memory save unit being used against the number of main memory boards, and the size of memory (refer to: This T & V Supports on page 1 of this program).

PSSL1 : PHASE 1 TEST O.K.
READY FOR AC POWER SHUTOFF

Control panel power off is completed.
Set the circuit breaker, located on the front panel of the PDU, to the off position. Power down is completed. After 2 seconds, set the PDU circuit breaker to the on position. Power up is completed.

PSSL1 : PASS **01
READY FOR THE NEXT POWER SHUTOFF

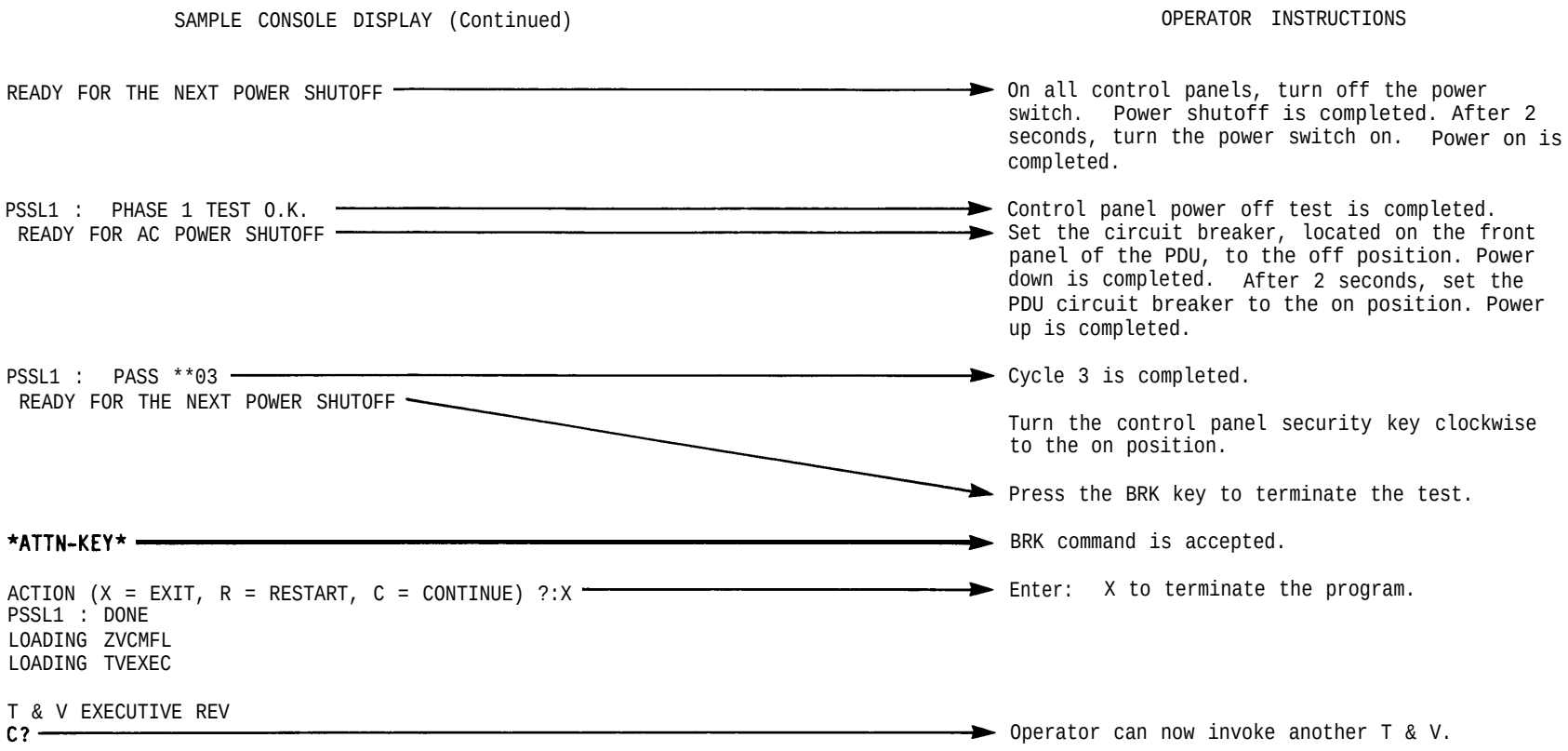
Cycle 1 is completed.
On all control panels, turn off the power switch. Power shutoff is completed. After 2 seconds, turn the power switch on. Power on is completed.

PSSL1 : PHASE 1 TEST O.K.
READY FOR AC POWER SHUTOFF

Control panel power off is completed.
Set the circuit breaker, located on the front panel of the PDU, to the off position. Power down is completed. After 2 seconds, set the PDU circuit breaker to the on position. Power up is completed.

PSSL1 : PASS **02

Cycle 2 is completed.


SAMPLE CONSOLE DISPLAY (Continued)
OPERATOR INSTRUCTIONS
READY FOR THE NEXT POWER SHUTOFF
On all control panels, turn off the power switch. Power shutoff is completed. After 2 seconds, turn the power switch on. Power on is completed.
PSSL1 : PHASE 1 TEST O.K.
Control panel power off test is completed.
READY FOR AC POWER SHUTOFF
Set the circuit breaker, located on the front panel of the PDU, to the off position. Power down is completed. After 2 seconds, set the PDU circuit breaker to the on position. Power up is completed.
PSSL1 : PASS **03
Cycle 3 is completed.
READY FOR THE NEXT POWER SHUTOFF
Turn the control panel security key clockwise to the on position.
Press the BRK key to terminate the test.
ATTN-KEY
BRK command is accepted.
ACTION (X = EXIT, R = RESTART, C = CONTINUE) ?:X
Enter: X to terminate the program.
PSSL1 : DONE
LOADING ZVCMFL
LOADING TVEXEC
T & V EXECUTIVE REV
C?
Operator can now invoke another T & V.

SMDX2 T & V PROGRAM--STORAGE MODULE DRIVE

This T & V supports:

BOARD NO.	DESCRIPTION
BK4B4A	40M Byte Storage Module Drive
BK5B4A*	80M Byte Storage Module Drive
BK6A3A	150M Byte Storage Module Drive
BK7A3A	300M Byte Storage Module Drive
BK4B3A	40M Byte Storage Module Drive (Second Unit)
BK5B3A	80M Byte Storage Module Drive (Second Unit)

* Used on DAS3 (D/C)

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

Error messages are up to three lines long. Each error report is preceded by the information prompting line:

```
ERR LABEL LOC UNIT TASK CWA CWB RANGE STAT1 STAT2          (LINE 1)
```

ERR = ERROR
LABEL = DICTIONARY ENTRY
LOC = PRESENT PROGRAM COUNTER
UNIT = CHANNEL
TASK = TASK WORD
CWA = CONFIGURATION WORD A (CYLINDER)
CWB = CONFIGURATION WORD B (TRACK/SECTOR)
RANGE = RANGE IN WORDS
STAT1 = STATUS WORD ONE
STAT2 = STATUS WORD TWO
ALL LINE 1 VALUES READ FROM CONTROLLER

```
INIT: OPERATION CWA CWB RANGE STAT1 STAT 2                 (LINE 2)
```

INIT: INITIAL VALUES
OPERATION = READ, WRITE, OR SEEK
CWA = CWA BEFORE TEST STARTED
CWB = CWB BEFORE TEST STARTED
RANGE = RANGE BEFORE TEST STARTED
STAT1 = STATUS WORD ONE EXPECTED
STAT2 = STATUS WORD TWO EXPECTED

```
MEDIA ID: CWA CWB RANGE STAT1 STAT2                        (LINE 3)
```

NOTE

Refer to Appendix B for the SMDX2 Fault Dictionary. The dictionary entry will indicate the failed ORU and provide an extended procedure, where applicable.

SMDX2 T & V PROGRAM--STORAGE MODULE DRIVE (CONT)

OUTPUT TASK WORD

BITS 0-7 - COMMAND CODE

0000 0000 - RECALIBRATE
0000 0001 - SEEK
10AA A000 - FORMAT READ/WRITE
10AA A001 - READ/WRITE DATA
10AA A010 - DIAGNOSTIC FORMAT READ/WRITE
10AA A011 - DIAGNOSTIC READ/WRITE DATA
10AA A100 - FORMAT READ ID/WRITE

'A' IMPLIES THE BIT HAS SPECIFIC MEANING FOR COMMAND AS FOLLOWS:

If at BIT 2, AUTOMATIC SEEK

0 = CURRENT CYLINDER
1 = USER DWA/NO SEEK COMPLETE INTERRUPT

If at BIT 3, SECTOR SIZE

0 = 256 BYTES
1 = 2304 BYTES

If at BIT 4, AUTOMATIC RPS

0 = SEARCH/ID/CWA&B
1 = CURRENT SECTOR

CONFIGURATION WORD A

BITS

0-5 RSU
6-15 CYLINDER NUMBER

CONFIGURATION WORD B

BITS

0-2 RSU
3-7 TRACK NUMBER
8-15 SECTOR NUMBER

SMDX2 T & V PROGRAM--ST0RAGE MODULE DRIVE (CONT)

STATUS WORDS:

THE TWO STATUS WORDS HAVE THE FOLLOWING SIGNIFICANCE:

FIRST STATUS WORD

BIT	STATUS
0	READY
1	ATTENTION
2	OVERRUN/UNDERRUN
3	DEVICE FAULT
4	READ ERROR
5	ILLEGAL SEEK
6	MISSED DATA SYNCH
7	UNSUCCESSFUL SEARCH
8	MISSING CLOCK PULSE
9	SUCCESSFUL RECOVERY
10	DUAL PORT
11	RFU
12	CORRECTED MEMORY ERROR
13	NONEXISTENT RESOURCE ERROR
14	BUS PARITY ERROR
15	UNCORRECTED MEMORY ERROR

SECOND STATUS WORD

BIT	STATUS
0	CORRECTED READ ERROR
1	SUCCESSFUL RETRY
2	OVERRUN/UNDERRUN RECOVERY
3	DEVICE SEIZED
4	DEVICE RESERVED
5	RFU
6	RFU
7	RFU
8	NO HEAD SELECT
9	WRITE FAULT
10	(WRITE/READ) OFF CYL.
11	WRITE/READ FAULT
12	VOLTAGE FAULT
13	HEAD SELECT FAULT
14	SEEK ERROR
15	WRITE PROTECTED

SMDX2 T & V PROGRAM--STORAGE MODULE DRIVE (CONT)

BUS-IN BYTES REPORTED AS “IS” / “SB”.
THE BUS-IN BYTES HAVE THE FOLLOWING SIGNIFICANCE:

TAG 1 BYTE

BIT	STATUS
0-7	BUS-OUT BITS WRAPPED ON BUS-IN

TAG 2 BYTE

BIT	STATUS
0	NO HEAD SELECT
1	WRITE FAULT
2	WRITE & READ CYL.
3	WRITE & READ FAULT
4	VOLTAGE FAULT
5	HEAD SELECT FAULT
6	SEEK ERROR
7	WRITE PROTECTED

TAG 3 BYTE

BIT	STATUS
0	START
1	SPEED
2	LOAD*&RTZ*
3	DIBIT FAULT
4	HEADS LOADED
5	SLOPE
6	FINE
7	RFU

TAG 5 BYTE

BIT	STATUS
0-7	RPS-COUNTER

FLAG BIT 15 = PASS INDICATOR
FLAG BIT 14 = BYPASS INDICATOR
FLAG BIT 13 = 10 MILLISECOND TIME INDICATOR
FLAG BIT 12 = SLOW SEEK INDICATOR
FLAG BIT 11 = TIMER OVERFLOW

SAMPLE CONSOLE DISPLAY

NOTE

This console display is for explanatory purposes only. The actual console displays depend on the revision of the program being executed.

OPERATOR INSTRUCTIONS

NOTE

Prior to running the program, the operator must mount a scratch (work) media on all drives that are to be fully tested and ensure that they are ready (online).

```
C?
SMDX2                                                    Enter: SMDX2.
STORAGE MODULE TEST, REV     SMDX2, (Date)
ZV$LIB REV.
MEMORY LOW 000052F0

MAXIMUM RANGE (HEX) :   0800
READ BUFFER ADDRESS :   52F0                             Program information.
WRITE BUFFER ADDRESS :  56F0

HELP (Y OR N)?: N                                        Enter: N.
STORAGE MODULE CONTROLLER FIRMWARE REV. 4E
 CHANNEL   0800, SMD, 19 SURFACES, READY
 CHANNEL   0880,  SMD, 19 SURFACES, READY
 -( 0800) -( 0880)
MODE (A, Q, OR "CONTROL H" FOR HELP) ?: A                Enter: A.
CHANNEL ( 0800   0880 )?: 0880                           Select channel to be tested.

EXECUTE (Y OR N)?: Y
UNFORMATTED SCRATCH PACK MOUNTED ON CHANNEL   0880
MODE A(0880) WILL RUN UP TO 9 MINUTES BEFORE REPORTING
INSTALL LOGIC PLUG     O ON CHANNEL 0880                 Follow prompting instructions.
DEPRESS C/R TO CONTINUE
REMOVE LOGIC PLUG      0
DEPRESS C/R TO CONTINUE

DRIVE NO. (O, 1, 2, 0R 3) ?: O
DEVICE ID (2361, 2362, OR 2363) ?: 2363
INSTALL LOGIC PLUG     O ON CHANNEL   0880
DEPRESS C/R TO CONTINUE
OBSERVE THE START INDICATOR ON THE DEVICE
IF ILLUMINATED, PRESS START SWITCH AND ENTER (Y)
IF NOT ILLUMINATED, ENTER (N)?: Y                        Follow prompting instructions.
PRESS START SWITCH (CYCLE UP) ON CHANNEL   0880
DEPRESS C/R TO CONTINUE
PRESS START SWITCH (CYCLE DOWN) ON CHANNEL   0880
DEPRESS C/R TO CONTINUE
PRESS START SWITCH (CYCLE UP) ON CHANNEL   0880
DEPRESS C/R TO CONTINUE
```

SAMPLE CONSOLE DISPLAY (Continued)

OPERATOR INSTRUCTIONS

```
SUBTEST 603 MAY TAKE UP TO 3 MINUTES TOTAL PASS TIME
     28MS AVE. SEEK TIME
CYLINDER NO. (HEX) ?: 85
DO YOU WISH TO RUN SUBTEST 0604 INDEFINITELY (Y OR N) ?: N
ENTER LOOP COUNT(DECIMAL)?: 100
     55MS MAX. FWD TIME
     54MS MAX. REV TIME
     54MS AVE. SEEK TIME
IS WRITE PROTECT SWITCH LIGHT ON CHANNEL   0880(Y OR N)?: Y
RESET WRITE PROTECT SWITCH ON CHANNEL   0880
DEPRESS C/R TO CONTINUE
OK TO WRITE ON PACK (Y OR N)?: Y
ARE YOU SURE? THIS WILL ERASE DATA (Y OR N)?:Y
CYLINDER NO.(HEX) ?: 335
SECTOR NO.(HEX) ?: 0
TRACK NO.       0
TRACK NO.       1
TRACK NO.       2
TRACK NO.       3
TRACK NO.       4
TRACK NO.       5
TRACK NO.       6
TRACK NO.       7
TRACK NO.       8
TRACK NO.       9
TRACK NO.      10
TRACK NO.      11
TRACK NO.      12
TRACK NO.      13
TRACK NO.      14
TRACK NO.      15
TRACK NO.      16
TRACK NO.      17
TRACK NO.      18
MODE A( 0880) PASS   0000   0001 TOTAL ERRS

 -( 0800) -( 0880)
MODE (A, Q, OR "CONTROL H" FOR HELP) ?:
```

Follow prompting instructions.

Operator may invoke another mode.

TCSX1 T & V PROGRAM--TERMINALS

This T & V supports:

TERMINAL TYPE	BAUD RATE **	CHAR SIZE	STOP BITS	PARITY*	NOTES
TTY	110	8	2	E	M-3/M-35 typical set up
TTYC	See Data Set Table	8	1	E	VIP7200 typical set up
TTYR	See Data Set Table	8	1	E	VIP71OO typical set up
7100	See Data Set Table	8	1	E	VIP 7100 may use no parity (parity = N)
7200	See Data Set Table	8	1	E	VIP7200/7201/7202 may use no parity (parity = N)
7300	See Data Set Table	8	1	E	VIP7300
7800	See Data Set Table	8	1	E	VIP7801 used on DAS3 (D/C)
PRU1	300	8	1	E	PRU1OO1
PRU2	1200	8	1	E	PRU1OO2
PRU3	110	8	2	E	PRU1OO3
	200	8	1	E	
	300	8	1	E	
PRU5	1200	8	1	E	PRU1OO5 (ROSY 26.1)
TWU1	300	8	1	E	TWU1OO1 (SARA 20)
TWU2	1200	8	1	E	TWU1OO2
TWU3	110	8	1	E	TWU1OO3 (ROSY 24.1)
	200	8	1	E	
	300	8	1	E	
TWU5	1200	8	1	E	TWU1005 (ROSY 26.1)
WST1	See Data Set Table	8	1	E	WST1200 office terminal

*Parity on asynchronous lines is typically even, rarely if ever odd, but sometimes none.

**If connected to a data set (see Data Set Table to determine speed) for example, a PRU1 (PRU1001) at 300 bps uses a 103J data set. If the data rate is not specified in this table, the rate is determined by the terminal (usually a hexadecimal rotary switch) and a compatible data set. If the terminal is connected direct, the data rate is determined by the host processor and the terminal.

TCSX1 T & V PROGRAM--TERMINALS (CONT)

Data sets supported by this T & V include, but are not limited to:

DATA SET	MAXIMUM SPEED
V.23	1200 bps
600G	9600 bps
1900G	9600 bps
V.29	9600 bps
103J	300 bps
1030 CVS	1200 bps
201B	2400 bps
201C	2400 bps

TCSX1 T & V PROGRAM--TERMINALS (CONT)

VIP Parameter Options

TERMINAL TYPE	TERMINAL ADDRESS	POLL/ NONPOLL	TIMING SOURCE	DISPLAY/ PRINTER	NOTE
7700	0-31	Poll	L or T	D or P	VIP7700; cassette not supported.
7700	0-31	Poll	L or T	D or P	VIP7700R
7760	0-31	Poll	L or T	D or P	VIP7760 with 7706 or 7707 display
7765	0-31	Poll	L or T	D or P	VIP7765 with 7708 display
7804	0-31	Poll	L or T	D or P	VIP7804/7814
POLY	0-31	Poll	L or T	P	PRU/TWU 1901 (POLY 21)

NOTES

1. If L is selected, the system supplies the clock (timing source). If T is selected, the clock may come from a data set, the EMIU, or the terminal.

2. The choice of printer determines if a printer is attached to the terminal as a remote printer.

3. Nonpoll is not supported.

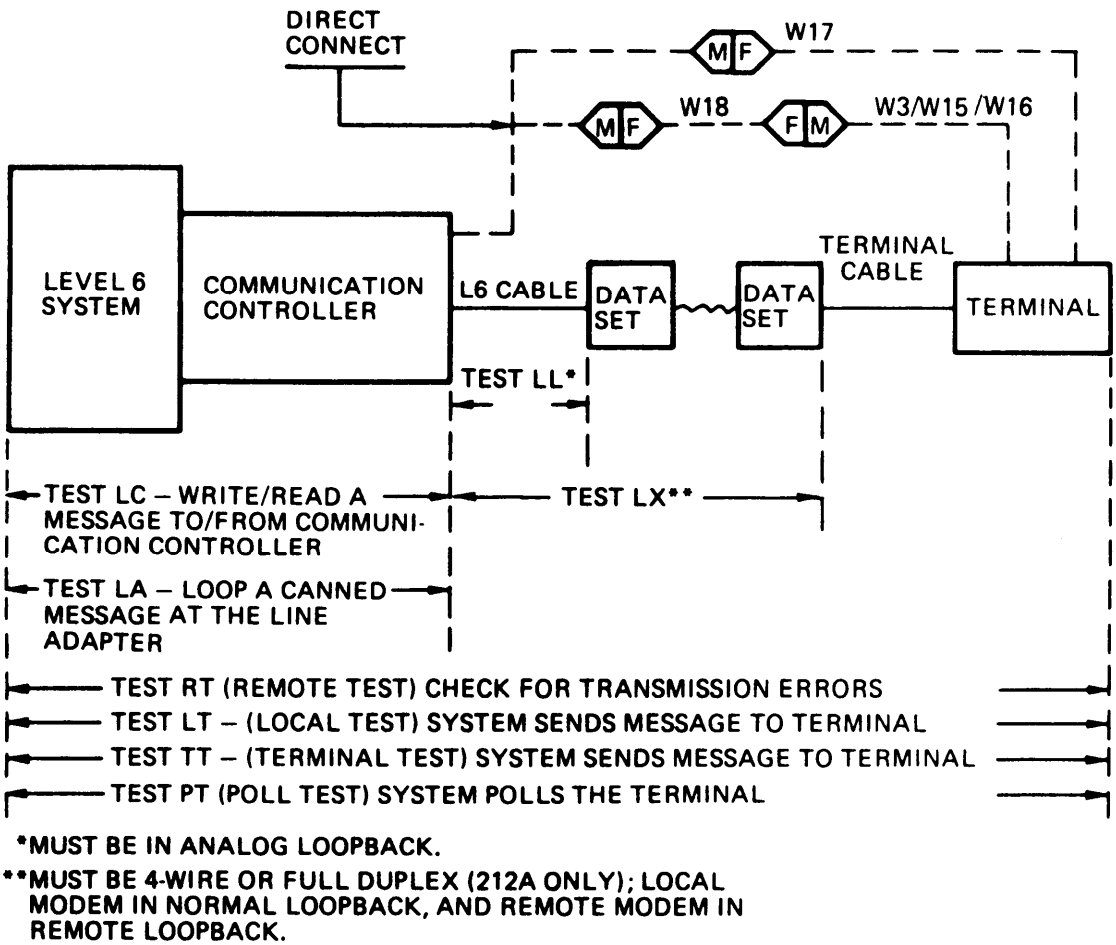
4. All of the above terminals operate with the Honeywell VIP protocol. Terminals using the BSC or HDLC (SDLC) protocol are not tested.

TCSX1 T & V PROGRAM--TERMINALS (CONT)

DESCRIPTION

The terminal/autocall unit T & V program tests the operation of the Multiline Communications Processor (MLCP), the Asynchronous Communications Line Adapter (ACLA), the Synchronous Communications Line Adapter (SCLA), the Dual Autocall Unit and attached terminals.

The following is an overview of the hardware tested by the subtests of TCSX1:

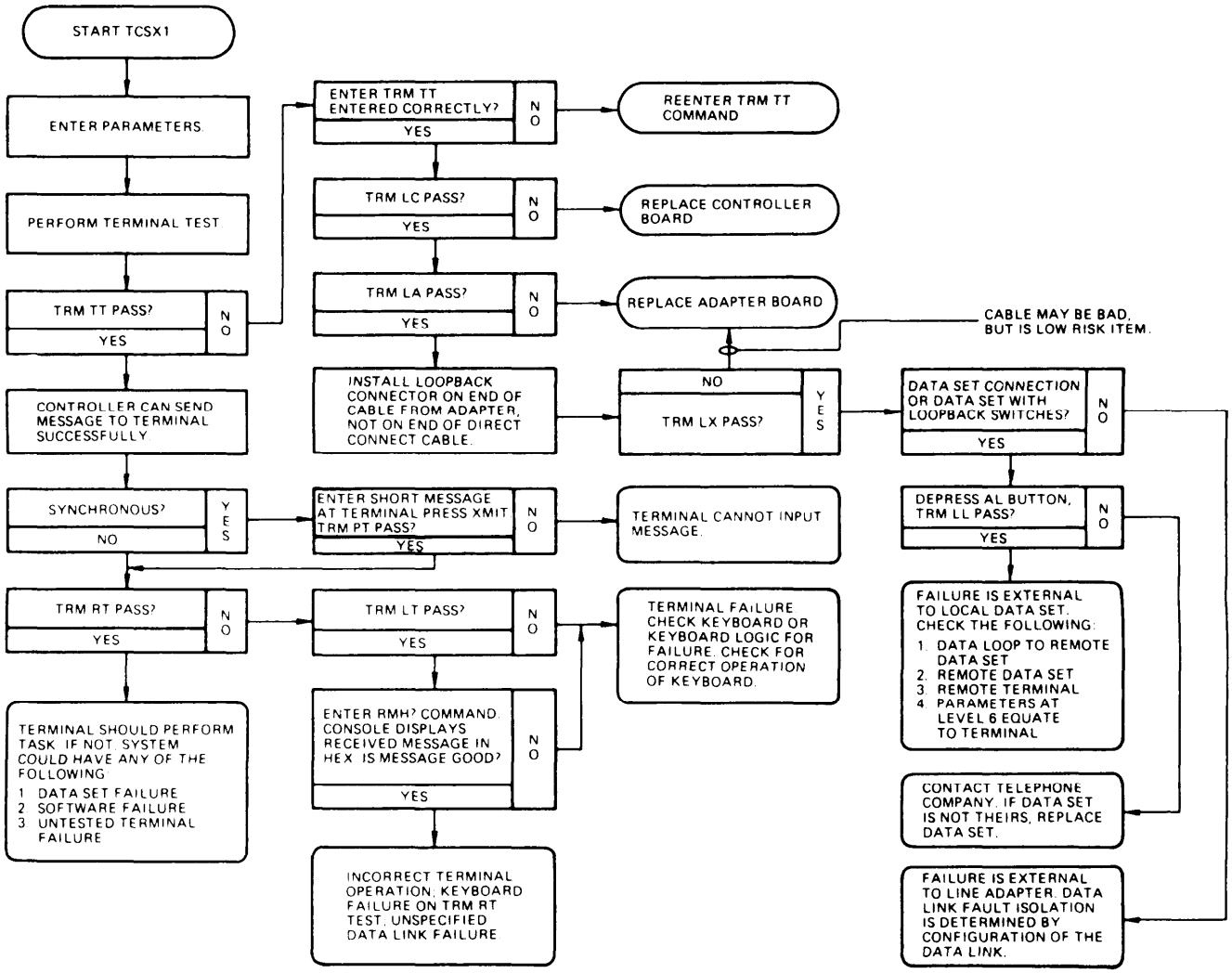


TCSX1 T & V PROGRAM--TERMINALS (CONT)

The following flow chart guides the maintainer through a sequence of tests without TCSS1 and helps the maintainer isolate the failing ORU within the terminal subsystem.

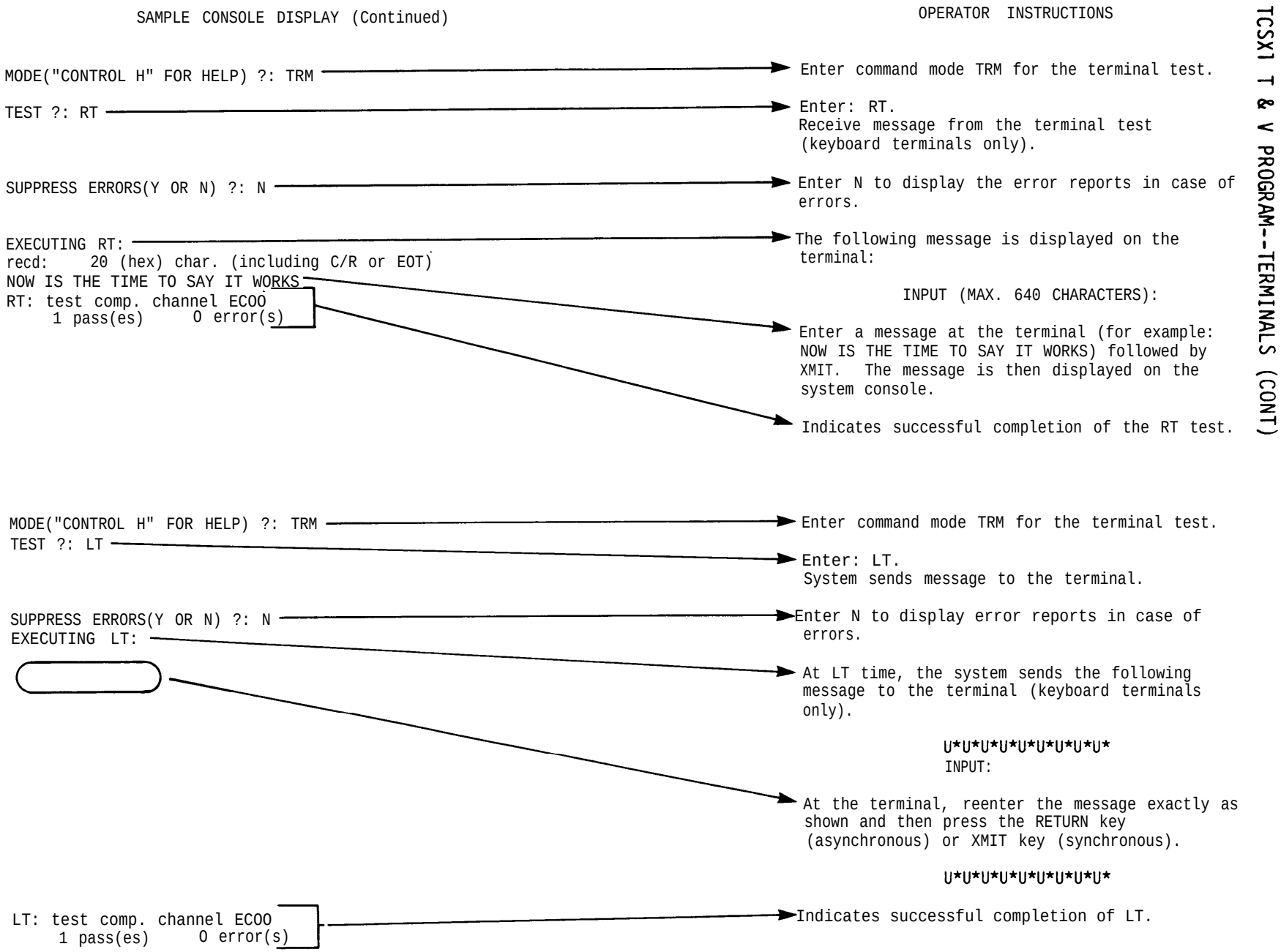
NOTE

Before running TCSX1, run the appropriate controller and adapter T & Vs.



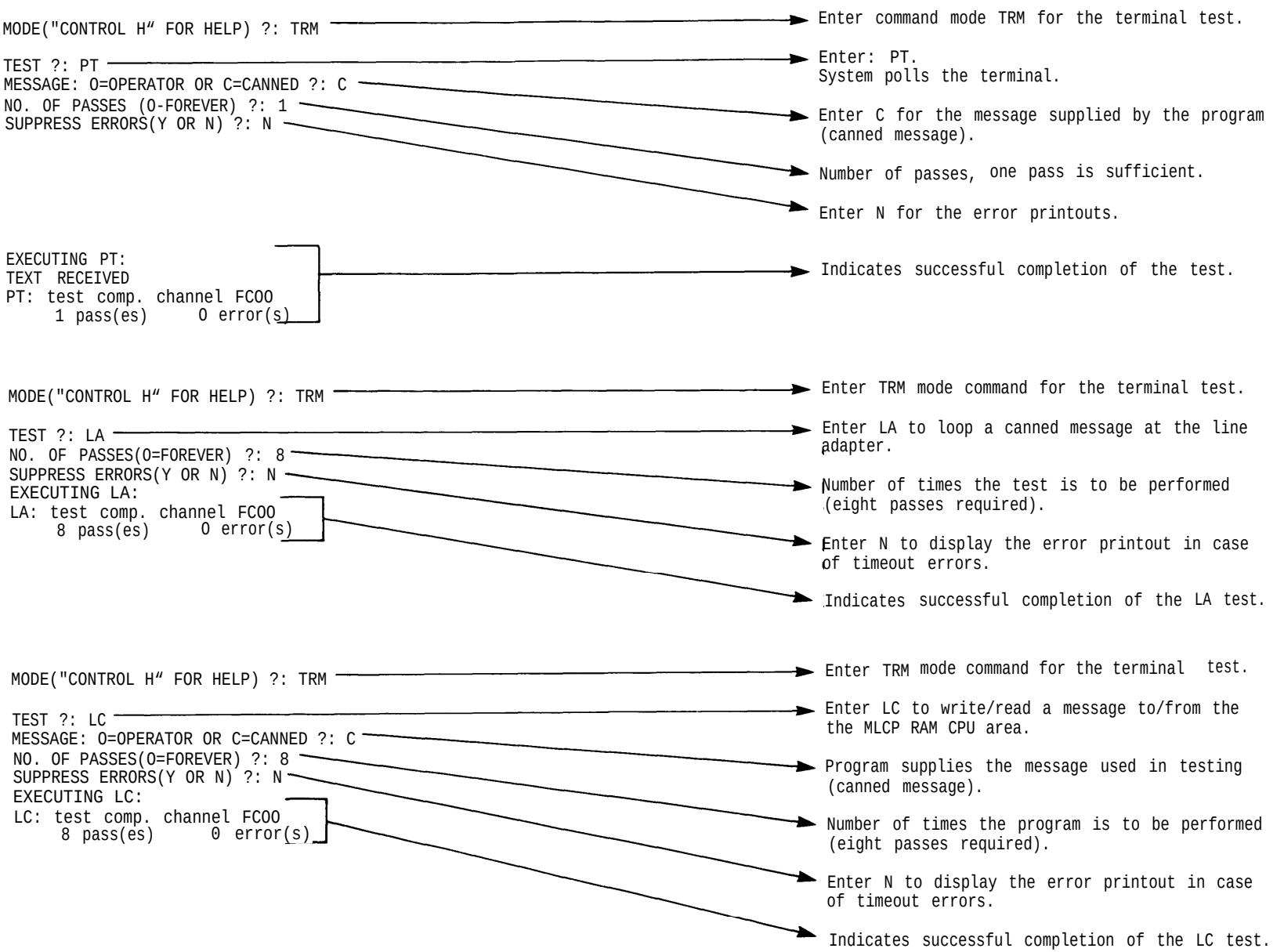
SAMPLE CONSOLE DISPLAY	OPERATOR INSTRUCTIONS
NOTE This console display is for explanatory purposes only. The actual console display depends on the revision of the program being executed.	Units to be tested must be cycled up and in the online mode. (Refer to the appropriate maintenance manual or operator's guide.)
C? TCSS1	Enter: TCSS1. If system is in LAF mode, enter: TCSL1.
TERMINALS TEST TCSS1 REV(Date) *** DO NOT REMOVE LOAD MEDIA DURING THIS TEST *** ZV$LIB REV. 9.0 MEMORY LOW 00007BFB	
CHANNEL ?: FC00	Enter communications adapter address to be tested.
LOADING TCSSM TERMINAL REQUIRED(Y=yes, N=no) ?: Y	If a device is present, enter Y. (If device is not present, enter N. Only the electronics portion of the system test is performed.)
TERMINAL TYPE(71OO) ?: 7700	Enter the type of device to be tested. (Refer to page 1 of this program.)
	NOTE If the Help File does not specify VIP7201 or VIP7814 as being supported by TCSX1, enter 7200 for 7201 or 7804 for 7814.
D=DIRECT CONNECT or M=MODEM ?: D	For direct connect enter D. If connected through a data set, enter M for modem.
P=POLL or N=NON-POLL ?: P	Enter: P. (The system does not support nonpoll.)
POLL ADDRESS(0-31) ?: 1	Enter the poll address.
TIMING SOURCE(L=LEVEL 6,T=EXTERNAL) ?: L	Enter: L. (When connected through modems, this question is omitted.)
D=DISPLAY(TERMINAL), P=PRINT(PRINTER) ?: D	Enter D to display on the terminal. (If a printer is connected to the terminal, enter P.)

SAMPLE CONSOLE DISPLAY (Continued)	OPERATOR INSTRUCTIONS
MODE("CONTROL H" FOR HELP) ?: TRM	Enter the TRM command for the terminal test. If a display of the available command is desired, hold the control (CTL) key down while striking the H key. Available modes are: MSG = input operator message MSG? = print operator message MSH = input operator msg in Hex MSH? = print op msg in Hex PAR = input parameters PAR? = print parameters TRM = input terminal command TRM? = print last term command RPT = execute last term cmd RMH? = print rcvd msg in Hex X = exit I = restart ?:
TEST ?: TT MESSAGE: O=OPERATOR OR C=CANNED ?: C NO. OF PASSES(O=FOREVER) ?: 8	Enter test TT to transmit a message to the terminal. Enter C to transmit the program message (canned). A minimum of eight error free passes are required to ensure proper operation of the device being tested. Enter: O to transmit operator message. If no operator message was previously specified by the MSG or MSH commands, the default operator message "U*U*...et." will be transmitted to the terminal.
SUPPRESS ERRORS(Y OR N) ?: N EXECUTING TT:	Enter N to permit the error to be displayed.
ACK RECEIVED	This message occurs only during testing of the synchronous terminal. Verify that the following message was transmitted to the terminal (once per pass): THE QUICK BROWN FOX JUMPS OVER A LAZY DOG the quick brown fox jumps over a lazy dog !"#$%&'()*+,-./0123456789:;<=>?@[\]^-`{|}~
TT : test comp. channel FDOO 8 pass(es) 0 error(s)	This message indicates successful completion of TT test.

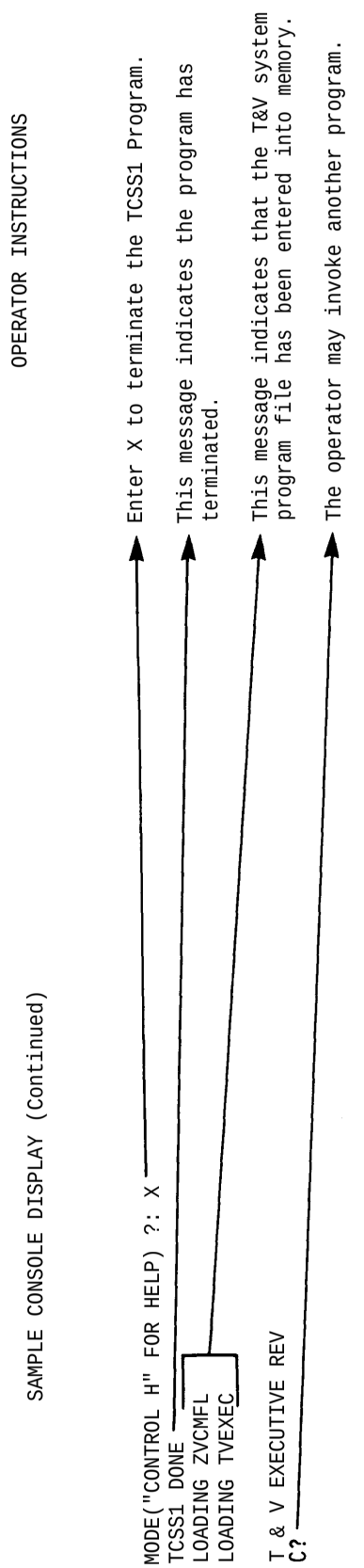

SAMPLE CONSOLE DISPLAY (Continued)
OPERATOR INSTRUCTIONS
MODE("CONTROL H" FOR HELP) ?: TRM
Enter command mode TRM for the terminal test.
TEST ?: RT
Enter: RT.
Receive message from the terminal test (keyboard terminals only).
SUPPRESS ERRORS(Y OR N) ?: N
Enter N to display the error reports in case of errors.
EXECUTING RT:
recd: 20 (hex) char. (including C/R or EOT)
NOW IS THE TIME TO SAY IT WORKS
RT: test comp. channel EC00
1 pass(es) 0 error(s)
The following message is displayed on the terminal:
INPUT (MAX. 640 CHARACTERS):
Enter a message at the terminal (for example: NOW IS THE TIME TO SAY IT WORKS) followed by XMIT. The message is then displayed on the system console.
Indicates successful completion of the RT test.
MODE("CONTROL H" FOR HELP) ?: TRM
Enter command mode TRM for the terminal test.
TEST ?: LT
Enter: LT.
System sends message to the terminal.
SUPPRESS ERRORS(Y OR N) ?: N
Enter N to display error reports in case of errors.
EXECUTING LT:
At LT time, the system sends the following message to the terminal (keyboard terminals only).
U*U*U*U*U*U*U*U*U*
INPUT:
At the terminal, reenter the message exactly as shown and then press the RETURN key (asynchronous) or XMIT key (synchronous).
U*U*U*U*U*U*U*U*U*
LT: test comp. channel EC00
1 pass(es) 0 error(s)
Indicates successful completion of LT.

SAMPLE CONSOLE DISPLAY (Continued)

OPERATOR INSTRUCTIONS



TCSX1 T & V PROGRAM--TERMINALS (CONT)



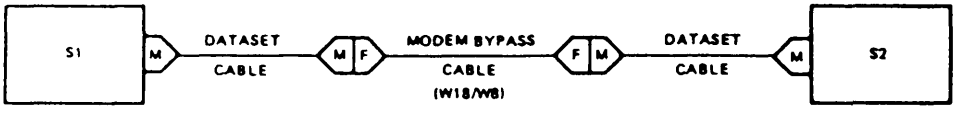
TCSX1 T & V PROGRAM--TERMINALS (CONT)

TO EXECUTE THE LK/EK TESTS ON TWO LEVEL 6 SYSTEMS CONNECTED DIRECTLY (VIA MODEM BYPASS CABLE), IN AN ASYNCHRONOUS TO ASYNCHRONOUS CONFIGURATION, PERFORM THE CABLING IN ACCORDANCE WITH FIGURE 1. MODEM BYPASS CABLE W18 OR W8 MAY BE USED FOR THE CONNECTION. AFTER THE SYSTEMS ARE CONNECTED, PERFORM THE FOLLOWING:

- SET THE PARAMETERS AS IF ASYNCHRONOUS TERMINALS ARE TO BE USED ON BOTH SYSTEMS.
- BE SURE THE BAUD RATE, STOP BITS, CHARACTER SIZE, AND PARITY VALUES ARE THE SAME ON BOTH SYSTEMS.
- LOAD TCSS1/L1 INTO BOTH SYSTEMS.
- EXECUTE THE LK/EK TESTS ON SYSTEM (S1) BEFORE INVOKING THE LX TEST ON SYSTEM (S2).

TO EXECUTE THE LK/EK TESTS ON TWO LEVEL 6 SYSTEMS CONNECTED DIRECTLY (VIA MODEM BYPASS CABLE), IN A SYNCHRONOUS TO SYNCHRONOUS CONFIGURATION, PERFORM THE CABLING IN ACCORDANCE WITH FIGURE 1. MODEM BYPASS CABLE W18 MUST BE USED FOR THE CONNECTION AND THE END MARKED CLOCK SOURCE MUST BE CONNECTED TO SYSTEM (S2). AFTER THE SYSTEMS ARE CONNECTED, PERFORM THE FOLLOWING:

- SET THE PARAMETERS AS IF SYNCHRONOUS TERMINALS ARE TO BE USED ON BOTH SYSTEMS.
- TIMING SOURCE FOR SYSTEM (S1) IS EXTERNAL AND TIMING SOURCE FOR SYSTEM (S2) IS INTERNAL.
- LOAD TCSX1 INTO BOTH SYSTEMS.
- EXECUTE THE LK/EK TESTS ON SYSTEM (S1) BEFORE INVOKING THE LX TEST ON SYSTEM (S2).



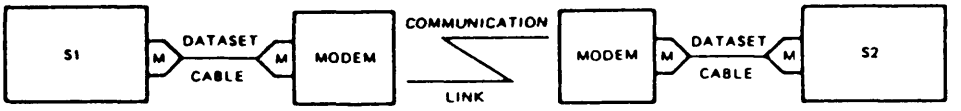
NOTE: M = MALE PLUG
F = FEMALE RECEPTACLE

Figure 1. Direct Connection via Modem Bypass Cable

TCSX1 T & V PROGRAM--TERMINALS (CONT)

TO EXECUTE THE LK/EK TESTS ON TWO LEVEL 6 SYSTEMS CONNECTED BY MODEMS IN AN ASYNCHRONOUS TO ASYNCHRONOUS CONFIGURATION, PERFORM THE CABLING IN ACCORDANCE WITH FIGURE 2. AFTER THE SYSTEMS ARE CONNECTED, PERFORM THE FOLLOWING:

- SET THE PARAMETERS AS IF ASYNCHRONOUS TERMINALS ARE TO BE USED ON BOTH SYSTEMS.
- SELECT THE SAME BAUD RATE ON BOTH SYSTEMS. THE RATE HAS TO BE SLOWER OR EQUAL TO THE SPEED OF THE MODEMS USED.
- LOAD TCSS1/L1 INTO BOTH SYSTEMS.
- ENTER M WHEN THE QUESTIONS DIRECT CONNECT OR MODEM IS ASKED.
- EXECUTE THE LK/EK TESTS ON SYSTEM (S1) BEFORE INVOKING THE LX TEST ON SYSTEM (S2).



NOTE: M = MALE PLUG

Figure 2. Connection with Modems

VIPX8 T & V PROGRAM--ASYNCHRONOUS VIP7300/VIP7801 TERMINAL

This T & V supports the devices and data sets listed in the following two tables:

ID	BOARD NO.	DESCRIPTION
-	BMLCOO1B	Multi line Communications Processor
2900	BNMLCO1A	New Multi line Communications Processor (See Extended ID for Adapter and FLAPs)
2118*	BMLF1O1B	RS-232-C Asynchronous Communications Line (two lines) Adapter
2118	BMLF1O2B	RS-232-C Asynchronous Communications Line (one line) Adapter
2110	BMLFCLBA	Current Loop Asynchronous Communications Line (one line) Adapter
2110	BMLFCLAA	Current Loop Asynchronous Communications Line (two lines) Adapter
2100	BMLFA88A	MIL-STD-188C Asynchronous (medium speed) Communications (two lines) Adapter
3118	BDCM201A	RS-232-C Dual Line Communications (two asynchronous lines) Adapter Controller
3118	BDCM204A	RS-232-C Dual Line Communications (one synchronous and one asynchronous line) Adapter Controller
21F2	BMBDMAS4	Dual RS-422 Direct Connect Adapter
-	-	VIP7201/02 Display Terminal
-	-	VIP7300 Asynchronous Keyboard Display Terminal
-	-	VIP7801/03/08/09/13/14/39 Series Asynchronous Keyboard Display Terminals
-	-	VDF7811 72-line Scrolling Option
-	-	VAF7821 Buffered Printer Adapter Option
-	-	WST Office Automation Terminal
-	-	microSystem 6/10 (VIPX8A)

* Used on DAS3 (D/C).

VIPX8 T & V PROGRAM--ASYNCHRONOUS VIP7300/VIP7801 TERMINAL (CONT)

Data sets supported by this T & V include, but are not limited to:

DATA SET	MAXIMUM SPEED
V.23	1200 bps
600G	9600 bps
1900G	9600 bps
V.29	9600 bps
103J	300 bps
1030 CVS	1200 bps
201B	2400 bps
201C	2400 bps

DESCRIPTION

This T & V procedure verifies the proper operation of the VIP7300/O1/05/07 Asynchronous Terminal and the VIP7801/03/08/09/13/14/39 Asynchronous Terminal Series and options (i.e., VDF7811 and VAF7821) when connected through the following controllers and adapters:

- Multiline Communications Processor (MLCP) and Asynchronous Communications Line Adapter (ACLA/CCLA/A188/RS-422)
- New Multiline Communications Processor (NMLCP), Line Adapters, and FLAPS

VIPX8 T & V PROGRAM--ASYNCHRONOUS VIP7300/VIP7801 TERMINAL (CONT)

- Dual Line Communications (two asynchronous lines) Adapter (ACLA) Controller for Model 2X only
- Dual Line Communications (one synchronous and one asynchronous line) Adapter (SCLA/ACLA) Controller (SCLA portion is not uses) for Model 2X only
- VIP7300 connected to local/remote console port of the System Control Facility (SCF) or DPS 6/40.

If the Buffered Printer Adapter Option is present, it can be tested and a terminal display printout can be obtained from the following T & V supported printers:

- PRU7003
- PRU7005
- VIP7714
- VIP7716
- VIP7717
- PRU7061
- PRU7066
- PRU7070
- PRU7075.

The VIPX8 mode runs tests to exercise and extensively checkout the terminal and terminal options (where applicable).

The commands and tests of the VIP7300 and the VIP7801 Asynchronous Terminal Series and Options test are listed in the following table:

NOTE

The tests are arranged in the table according to the order in which they are performed.

TEST COMMAND	TEST
CD	Carrier Detect Test
SW	Display Switch Positions on VIP
WW	Worst Word Pattern Test
ID	Get/Print PROM Chip IDs
CG	Character Generator Test
VA	Video Attributes Test
LG	Line Graphics Test
DA*	Display All Symbols
KB/KM	Keyboard Test
TR	Top Row (keyboard) Test
CE	Cursor Control/Editing Keys Test
EM	Echo Mode Test

*This command is not applicable to the VIP7300.

VIPX8 T & V PROGRAM--ASYNCHRONOUS VIP7300/VIP7801 TERMINAL (CONT)

GENERAL INSTRUCTIONS

Before running this T & V procedure, ensure that the Multiline Communications Controller (MLCP) and the Communications Line Adapter (DCMs) or Dual Line Communications Controller (DCMs) have been tested by the following T & V procedures:

- DCMX1
- DLCS1
- DLCS2
- MLCX1
- MLCX3
- NMLX1/A.

NOTES

1. After installing the terminal and determining that its operation is satisfactory, the terminal-specific information displayed on Terminal Display Screen No. 2 and 5 during the first pass of VIPX8 should be recorded for future test verification.

2. Three beeps indicate that operator intervention is required.

To verify or set the line speed for the VIP/WST7801/02/03/05/09 terminal, refer to the following table:

Asynchronous Terminal Line Speed Switch (S6) Settings

	S6 POSITIONS								
	2	5	6	7	8	10	12	14	15
LINE SPEED	110	300	600	1200	1800	2400	4800	9600	19200

To verify or set the parity for the VIP7801/02/03/08/09 terminal, refer to the following table:

Asynchronous Terminal Parity Switch (S2) Settings

S2 POSITIONS		
6	7	PARITY
Up	Up	E (Even)
Down	Up	O (Odd)
Down	Down	S (Space)
Up	Down	M (Mark)

VIPX8 T & V PROGRAM--ASYNCHRONOUS VIP7300/VIP7801 TERMINAL (CONT)

To verify or set the baud rate for the VIP/WST7300/05 and VIP/WST7813/14/39 terminal, refer to the following table:

Asynchronous Terminal Line Speed
Switch (S1-6, S1-7, S1-80) Settings

LINE SPEED	S1-6 S4-6	S1-7 S4-7	S1-8 (VIP/WST7300/05) S4-8 (VIP/WST7813/14/39)
300	Down	Down	Down
600	Down	Down	Up
1200	Down	Up	Down
1800	Down	Up	Up
2400	Up	Down	Down
4800	Up	Down	Up
9600	Up	Up	Down
19200	Up	Up	Up

To verify the parity for the VIP/WST7300/05 or VIP/WST7813/14/39 terminal, refer to the following table:

Asynchronous Terminal Parity
Switch Settings

S1-5 S4-1 POSITIONS	(VIP/WST7300/05) (VIP/WST7813/14/39) PARITY
Up	Even
Down	Mark

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

Immediately after the Parity message, error messages EMO1 and EM02 are displayed if the data link to the terminal is not yet established (refer to Diagnostic Operation). Error messages EM03 through EM07 are displayed if there is a data link or electronics problem while the terminal tests are being performed (refer to diagnostic Operation). The communications line error messages and Optimum Replaceable Units (ORUs) are listed in the following table:

Communications Line Error Messages/ORUs

ERROR MESSAGE NUMBER	DISPLAY MESSAGES	MOST PROBABLE DIAGNOSIS	ORU
EM01	ESTABLISH DATA LINK. WAITING FOR DEVICE/MODEM (MR) (DSR)	1. Device powered down	1. Communication cable
EM02	ESTABLISH DATA LINK. WAITING FOR CLEAR-TO-SEND (CS) (CTS)	2. Device offline	2. Modem
		3. Communications link not established	3. Controller
EM03	NO CARRIER DETECT (CD), NO DATA RECEIVED	1. Electronics problem	1. Communication cable
EM04	CARRIER DETECT (CD), NO DATA RECEIVED	2. Data link problem	2. Controller
EM05	NO CARRIER DETECT (CD), GOOD DATA RECEIVED		
EM06	CARRIER DETECT (CD), BAD DATA RECEIVED		
EM61	NO CARRIER DETECT (CD), BAD DATA RECEIVED		
EM07	WORST WORD PATTERN FAILED SENT : X_____X RCVD: X_____X		
EM29	**DEVICE WENT OFF LINE (DSROFF)**		1. Device 2. Cable

LEGEND:

XXXX = Received Bad Data in Hexadecimal Form.
X__X = Sent and Received Data.

VIPX8 T & V PROGRAM--ASYNCHRONOUS V1P7300/VIP7801 TERMINAL (CONT)

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

A fault is detected if an error message (EMB, EM1O, EM11) is displayed during T & V operation and the keyboard keys were pressed according to the prompting instructions. These messages and their ORUs are listed in the following table:

Visual Fault Error Messages/ORUs

ERROR MESSAGE NUMBER	DISPLAY MESSAGE	ORU
EM8	VIDEO TEST FAILED	Terminal's main logic board
EM1O	(PLUS TEXT MESSAGE)	1. Keyboard 2. Terminal
EM11	NO DATA RECEIVED	Terminal's main logic board
EM16 through EM20	TEXT MESSAGE	1. Printer 2. Buffered Printer Option

NOTE

If any terminal screen prompt message indicates a faulty unit, the operator must retry the test at least one additional time to ensure that a wrong key was not pressed or that the prompt message was not misinterpreted.

The following table lists the most probable cause of a failed test and the ORU for each VIPX8 test:

(FAILED) TEST	MOST PROBABLE CAUSE	ORU
CD	Data link problem	Communications cable
WW	Electronics problem	Modem Terminal's main logic board
SW*	Terminal switches set to wrong positions	Controller
CG VA LG DA*	Electronics problem	Terminal's main logic board
KB/KM	Electronics problem	Key
TR*		Keyboard
CE*		Keyboard cable
EM		Terminal's main logic board

*Bypasses when VIPX8A invoked to test microSystem 6/10 console, or any new "CAMP" terminals.

VIPX8 T & V PROGRAM--ASYNCHRONOUS VIP7300/VIP7801 TERMINAL (CONT)

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

During most T & V operations, if any central processor hangups occur, press the S (Step), CLR (Clear), C (Change) to set the EO register to 0100, R (Ready), and E (Execute) buttons on the control panel, and a text statement will be displayed as follows:

```
T & V TITLE
MODE (A = ALL TESTS) ?:
```

At this point, any of the HELP FILE commands are valid commands. If the console is ever stopped at this point, press E (Execute) on the control panel.

If the program traps, the T & V procedure displays the following trap information:

TRAP NN @ XXXX

where:

NN	=	Decimal trap number
XXXX	=	Address of the instruction that caused the trap

SAMPLE CONSOLE DISPLAY

NOTES

1. This console display is for explanatory purposes only. The actual display depends on the revision of the program being executed.

2. This display represents what appears on the CRT console, not on the printer console.

```
C?:
VIPX8
SYSTEM IS SET TO WAIT FOR YOUR RESPONSE AFTER ERROR REPORT.

VIP/WST 7800, 7300, 7201 SERIES TERMINAL TEST VIPX8 REV(Date)
RUN CONTROLLER AND ADAPTER TESTS PRIOR TO THIS TEST.
DO YOU WANT A COMMUNICATIONS RESOURCE SCAN (Y=YES, N=NO) ?: Y
CAUTION: IT MAY TAKE UP TO 1 MINUTE TO DETECT A TERMINAL.

  COMMUNICATIONS RESOURCE LIST
  (ONLY DIRECT CONNECT DEVICES ARE LISTED)

  CHANNEL     BAUD PARITY DEVICE
  NUMBER      RATE TYPE   TYPE
 ----------------------------------

    C000      9600   E     7300


THE FOLLOWING ASYNC CHANNELS HAD DATA SET READY OFF.
  DAOO DA80 DBOO DB80 C1OO C180 C200 C280
  C300 C380 C480 C500 C600 C680 C700 C780

CHANNEL NUMBER    ?:C000

EMO1: ESTABLISH DATA LINK.   WAITING FOR DEVICE/MODEM READY (MR) (DSR)

EM02: ESTABLISH DATA LINK.   WAITING FOR CLEAR-TO-SEND (CS) (CTS)

MODE (A = ALL TESTS) ?: A
```

OPERATOR INSTRUCTIONS

CONSOLE ACTIVITY

Enter: VIPX8 (VIPX8A for microSystem 6/10).

Enter: Y for a resource list.

Enter channel number of communications controller that is attached to the terminal under test.

If there is a terminal, modem, or communications line malfunction, console error messages EMO1 and/or EM02 are displayed (refer to Error Reporting and Troubleshooting Procedures).

NOTES

1. If a telephone connection is to be established, error messages EMO1 and EM02 will be displayed while the connection is being established.

2. If error messages EMO1 and/or EM02 are displayed, ensure that the terminal is powered up, online (i.e., LOCAL key not depressed), and either direct- or modem-connected to the system.

3. If EMO1 or EM02 is displayed when the data link appears to be established, either the communications link to the terminal or the terminal's main logic board is faulty.

Enter A to run all tests. For other modes, see Optional Operations or Repair Operations.

T & V program starts testing the terminal.

SAMPLE CONSOLE DISPLAY (Continued)

OPERATOR INSTRUCTIONS

BEGIN DATA_LINK AND TERMINAL TEST CHANNEL = COOO
SYSTEM CONTROL FACILITY DETECTED
TERMINAL STATUS BYTES ARE:
1-4 5,6 7,8 9,10

This message appears if the System Control Facility (SCF) is configured on the system and is on the same channel as the terminal under test.

7300 2020 5020 4304

At this point in the T & V program, the console display is used only for reports and program termination. All further operator activity occurs at the terminal being tested.

NOTES

1. Error messages EM03 through EM61 are displayed if one of the parameters supplied to the T & V program does not match the communications terminal being tested. Verify the proper switch settings and supplied parameters.

2. For communications line error messages (EMO1 through EM07) and ORUs, refer to the Error Reporting and Troubleshooting Procedures.

TERMINAL ACTIVITY

Follow the terminal screen prompting.

SCREEN DISPLAY NO. 1

BEGIN DATA_LINK AND TERMINAL TEST

IGNORE ANY “INVALID COMMAND” ON LINE 25

NO OPERATOR ACTION IS REQUIRED

NOTE

The second line of Screen Display No. 1 does not appear on the VIP7300.

DATA_LINK PASSED BASIC TESTS

BEGIN WORST WORD PATTERN TEST

SCREEN DISPLAY NO. 2

NOTES

1. Screen Display No. 2 will rapidly flash by if a VIP7300 terminal is used.

2. Firmware revisions will be visible if a VIP7800 terminal is used.

3. If a VIP7800 terminal is used and the buffered printer option is present, the following message is displayed on the printer:

   BUFFERED PRINTER DETECTED AND WORKING

4. When the terminal that is under test is also the console, and a VIP/WST7300/01/03/07 appear:

   NOTE: TO EFFECT A “BREAK” ON THIS TERMINAL, HOLD DOWN THE “CTL” KEY AND PRESS THE “DEL” OR “ESC” KEY.

SCREEN DISPLAY NO. 3

DATA LINK PASSED BASIC TESTS

NO OPERATOR ACTION IS REQUIRED

SCREEN DISPLAY NO. 4

BEGIN WORST WORD PATTERN TEST

U*U* (Series of 31 U*s)

NO OPERATOR ACTION REQUIRED

SAMPLE CONSOLE DISPLAY

```
CHARACTER GENERATOR TEST:
VIDEO ATTRIBUTE TEST:
LINE GRAPHICS TEST:
WAITING FOR TERMINAL KBD RESPONSE.
```

OPERATOR INSTRUCTIONS

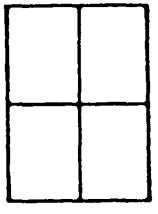
SCREEN DISPLAY NO.7

CHARACTER GENERATOR TEST:
THE QUICK BROWN FOX JUMPS OVER A LAZY DOG
the quick brown fox jumps over a lazy dog
!"#$%&'()*+,-./0123456789:;<=>?@[\]^_`{|}~
THE EDITING SYMBOLS ARE: →

VIDEO ATTRIBUTE TEST:
NEXT LINE SHOULD BE A BLACK SCAN LINE ON A LOW INTENSITY BLANK CHARACTER LINE:

LINE GRAPHICS TEST:

The line graphic should appear as a window of normal intensity.



WITHIN 2 MINUTES, RESPOND TO GOOD SCREEN IMAGE BY PRESSING THE "G" KEY OTHERWISE, PRESS THE "BREAK" OR THE "N" KEY.

OPERATOR ACTION IS REQUIRED

NOTES

1. The VIP7800 terminal will display a row of four windows that exhibit various characteristics.
2. The VIP7201/02 will display a window like the one above, and then a block pattern of graphics resembling a "House."
3. Respond to prompt message on last two lines of screen.
4. If BREAK or N is the response, error message EM8 is issued at the console.
5. The VIP7201/02 will not do the video attribute test.

SAMPLE CONSOLE DISPLAY (Continued)

BASIC KEYBOARD TEST

OPERATOR INSTRUCTIONS

SCREEN DISPLAY NO. 8, 9, 10

NOTES

1. Screen Display No. 8, 9, and 10 are keyboard tests and will be prompted by the screen. Respond to all prompt messages.

2. If the unit is faulty, error messages E10 and/or E11 are issued at the console.

OPERATOR ACTION IS REQUIRED

SCREEN DISPLAY NO. 11

THE SYSTEM WILL NOW ECHO ANY ALPHA-NUMERIC KEY(S) PRESSED.

PRESS “Q (RETURN)” TO END KEYBOARD TEST.

OPERATOR ACTION IS REQUIRED

NOTE

Respond to prompt message by entering any test message and then entering Q to terminate keyboard test.

SAMPLE CONSOLE DISPLAY (Continued)

OPERATOR INSTRUCTIONS

SCREEN DISPLAY NO. 12

EXAMINE REAR-PANEL SWITCHES NAMED BELOW. IF THEY ARE NOT IN THE POSITION AS DESCRIBED BELOW, UNIT IS FAULTY.

S1, POSITIONS 1,2,3 ARE: DN, DN, UP
S1, POSITIONS 5, 6, 7, 8, 9 ARE: UP, UP, UP, DN, DN

TO RESTART T & V, PRESS "RETURN" KEY AFTER BELL SOUNDS.

OPERATOR ACTION IS REQUIRED

NOTES

1. Respond to all prompt messages.
2. If neither the 72-line scolling option or buffer printer adapter option is installed, screen displays NO OPTIONS DETECTED instead of OPTION(S) DETECTED.
3. Last line flashes on and off until operator responds.

End of terminal display screen prompting.

T & V procedure completed first cycle of terminal tests.

SAMPLE CONSOLE DISPLAY (Continued)

OPERATOR INSTRUCTIONS

```
VIPX8 PASS         1
 CHANNEL         C000
 TOTAL ERRORS       0
WAITING FOR TERMINAL INPUT - HIT BREAK KEY TO ESCAPE
```

CONSOLE ACTIVITY

T & V procedure automatically recycles and loops through the terminal test if the RETURN key is pressed on the terminal. Press the BRK (Break) Key to terminate the test.

```
*ATTN-KEY*
```

Break command is accepted.

```
MODE (A = ALL TESTS) ?: X
VIPX8: DONE
CALLING ZVCMFL
CALLING TVEXEC

T & V EXECUTIVE
C?:
```

Enter: X to terminate the program

Operator may invoke another program.

CABLES AND MODEMS

CD Carrier Detect Test:

```
MODE (A = ALL TESTS) ?: CD
TEST LOOPS UNTIL BREAK PRESSED AT CONSOLE.
TERMINAL STATUS BYTES ARE:
 1-4  5,6   7,8 9,10
7300 2020 5020 4304
*ATTN-KEY*
```

Enter: CD.
This test checks out the cables and modems attached to the terminal and displays the status bytes of the terminal and printer on the console

To discontinue the test, press the console BRK key.

End of CD operation.

SAMPLE CONSOLE DISPLAY (Continued)	OPERATOR INSTRUCTIONS
	WW WORST WORD PATTERN TEST:
MODE (A = ALL TESTS) ?: WW TEST LOOPS UNTIL BREAK PRESSED AT CONSOLE. BEGIN WORST WORD PATTERN TEST	Enter: WW. This test checks out data transmitted and received through the cables and modems attached to the terminal.
PRESS "'" KEY WITHIN NEXT FIVE SECONDS TO EXIT TEST LOOP	This message is displayed only when the terminal under test is also the console.
ATTN-KEY	To discontinue the test, press the console BRK key.
	End of WW operation.
	TERMINAL ELECTRONICS AND DISPLAY SCREEN
	CG Character Generator Test:
MODE (A = ALL TESTS) ?: CG TEST LOOPS UNTIL BREAK PRESSED AT CONSOLE.	Enter: CG. This test allows the operator to check the terminal display screen for missing or imperfectly formed characters.
CHARACTER GENERATOR TEST: PRESS ":" KEY WITHIN NEXT FIVE SECONDS TO EXIT TEST LOOP	This message is displayed only when the terminal under test is also the console.
ATTN-KEY	To discontinue the test, press the console BRK key.
	End of CG operation.
	VA Video Attributes Test.
MODE (A = ALL TESTS) ?: VA TEST LOOPS UNTIL BREAK PRESSED AT CONSOLE. VIDEO ATTRIBUTE TEST:	Enter: VA. This test allows the operator to check the video attributes of the terminal display screen.
PRESS ":" KEY WITHIN NEXT FIVE SECONDS TO EXIT TEST LOOP	This message is displayed only when the terminal under test is also the console.
ATTN-KEY	To discontinue the test, press the console BRK key.
	End of VA operation.

SAMPLE CONSOLE DISPLAY (Continued)

OPERATOR INSTRUCTIONS

KEYBOARD

EM Echo Mode Test:

MODE (A = ALL TESTS) ?: EM
TEST LOOPS UNTIL BREAK PRESSED AT CONSOLE.

Enter: EM.
This test allows questionable problems to be duplicated.

PRESS "!" KEY WITHIN NEXT FIVE SECONDS TO EXIT TEST LOOP

This message is displayed only when the terminal under test is also the console.

ATTN-KEY

To discontinue the test, press the console BRK key.

End of EM operation.

DA Display All Symbols Test:

MODE (A = ALL TESTS) ?: DA
TEST LOOPS UNTIL BREAK PRESSED AT CONSOLE.
DISPLAY-ALL SYMBOLS TEST

Enter: DA.
This test allows the operator to visually check hexadecimal characters 1 - 20 (not applicable for the VIP7300).

PRESS "!" KEY WITHIN NEXT FIVE SECONDS TO EXIT TEST LOOP

This message is displayed only when the terminal under test is also the console.

NOTE

When the VIP7800 is under test, set switch S4, position 8, to down, before discontinuing the DA test. Switch S4 is located at the rear of the terminal.

ATTN-KEY

To discontinue the test, press the console BRK key.

End of DA operation.

XCSX1 T & V PROGRAM--8045/8010 CARD READER/PUNCH

This T & V supports the card reader/punch (D-8045/8010).

GENERAL INSTRUCTIONS

Before running this T & V procedure, ensure that the Multiline Communications Processor (MLCP) and the Communications Line Adapter (CLA) have been tested by the following:

- MLCX1
- DCMX1
- DCMX2

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

Error messages have the following format:

ERR XCSX1 ABCD @XXXXXX CCCC (ORU-1) (ORU-2) MSG

where:

```
    AB  = Major error code label (refer to Table 1)
    CB  = Minor error code label (refer to Table 2)
XXXXXX  = T & V software location
  CCCC  = Channel number
 ORU-1  = Most probable ORU
 ORU-2  = Second most probable ORU
   MSG  = Message further explaining the error; includes status word
          information
```

Table 1. Major Error Code Labels

DEVICE	MAJOR ERROR LABEL	DESCRIPTION
Card Reader	D0	Initialization
	DA	Read Hollerith deck
	DB*	Reader mode test
	DC	Reader stacker test
	DD	Reader hopper test
	DE	Reader jam/misfeed test
	DF	Reader door interlock test
	DG	Read binary EOP
	DH	Read binary deck
	D2	Termination

*Not applicable to 8010.

XCSX1 T & V PROGRAM--8010 CARD READER/PUNCH (CONT)

Table 1. Major Error Code Labels--Continued

DEVICE	MAJOR ERROR LABEL	DESCRIPTION
Card Punch	E0	Initialization
	EA	Punch Hillerith deck
	EB*	Punch mode test
	EC	Punch stacket test
	ED	Punch hopper test
	EE	Punch jam/misfeed test
	EF	Punch door interlock test
	EG	Punch binary EOF
	EH	Punch binary deck
	E2	Termination

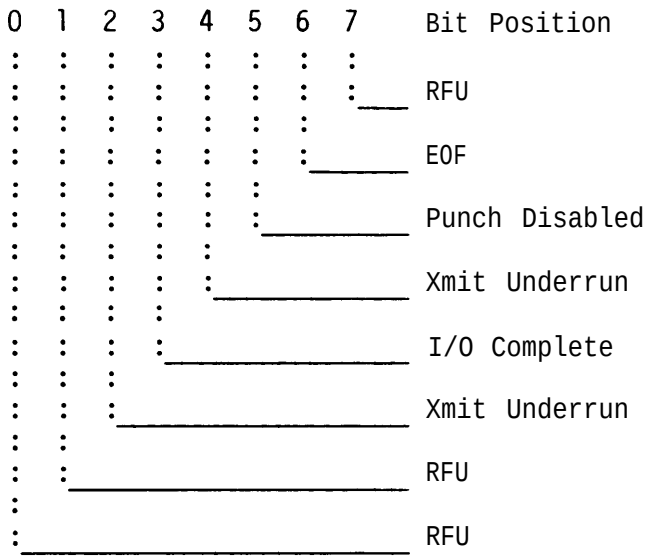
Table 2. Minor Error Code Labels

ERROR CODE	DESCRIPTION	MOST LIKELY ORU	SECOND MOST LIKELY ORU
--01	IO Operation did not complete	Contrl	Adapter
--02	Data Compare Error	Device	Media
--03	Device Not Ready	Device	--
--04	Transmit Operation did not complete	Adapter	Contrl
--05	Receive Operation did not complete	Device	Adapter
--06	Transmit CCB Status Incorrect	Device	Adapter
--07	Receiver CCB Status Incorrect	Device	Adapter
--08	Card Reader Status Incorrect	Device	Adapter
--09	Card Punch Status Incorrect	Device	Adapter
--13	Parity Incorrect	Device	--

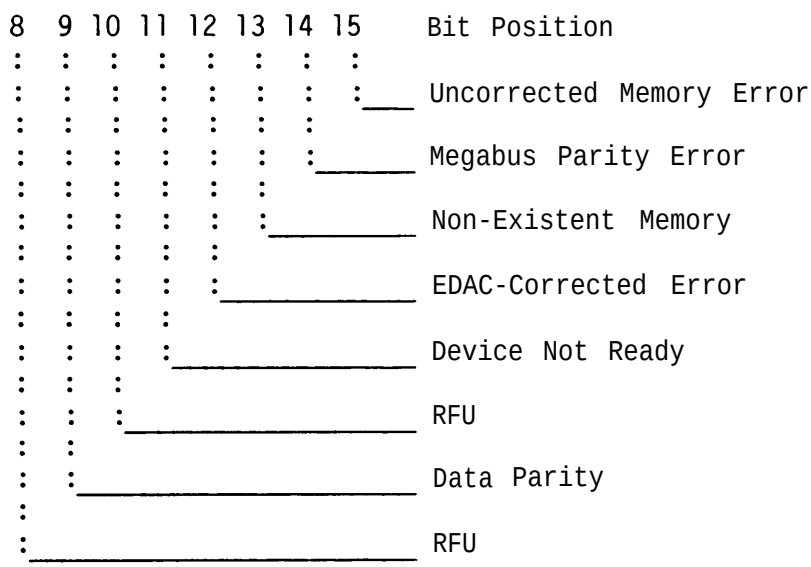
XCSX1 T & V PROGRAM--8045/8010 CARD READER/PUNCH (CONT)

STATUS REGISTER DESCRIPTION FOR MINOR ERROR CODE--06

1. HIGH-ORDER BYTE



2. LOW-ORDER BYTE



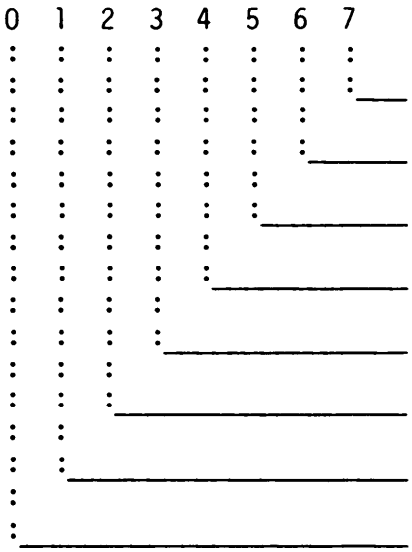
NOTE

Remember that significant bits are counted from left to right, but are displayed from right to left in this chart.

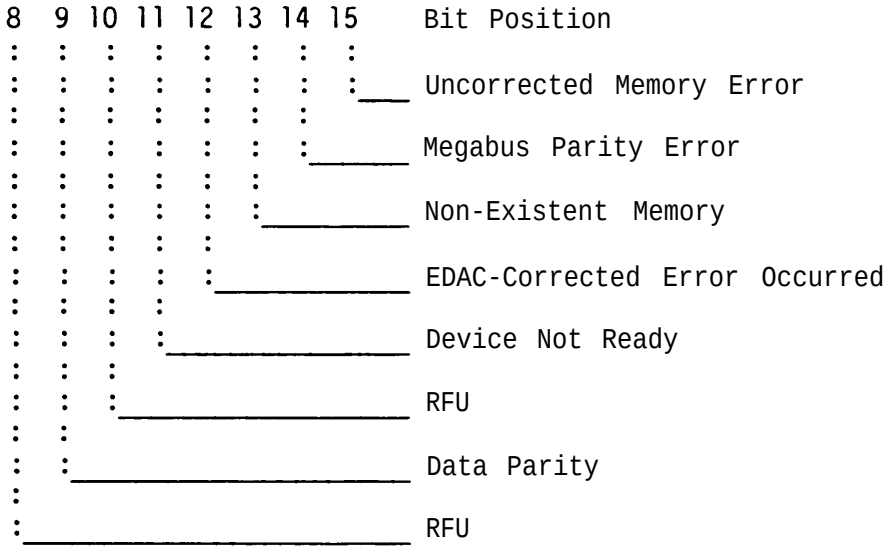
XCSX1 T & V PROGRAM--8010 CARD READER/PUNCH (CONT)

STATUS REGISTER DESCRIPTION FOR MINOR ERROR CODE--07

1. HIGH-ORDER BYTE



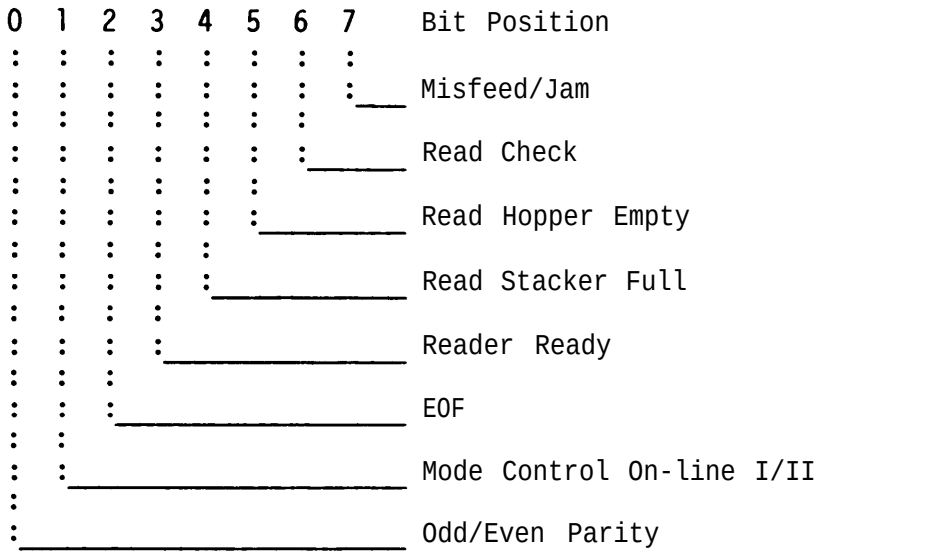
2. LOW-ORDER BYTE



XCSX1 T & V PROGRAM--8010 CARD READER/PUNCH (CONT)

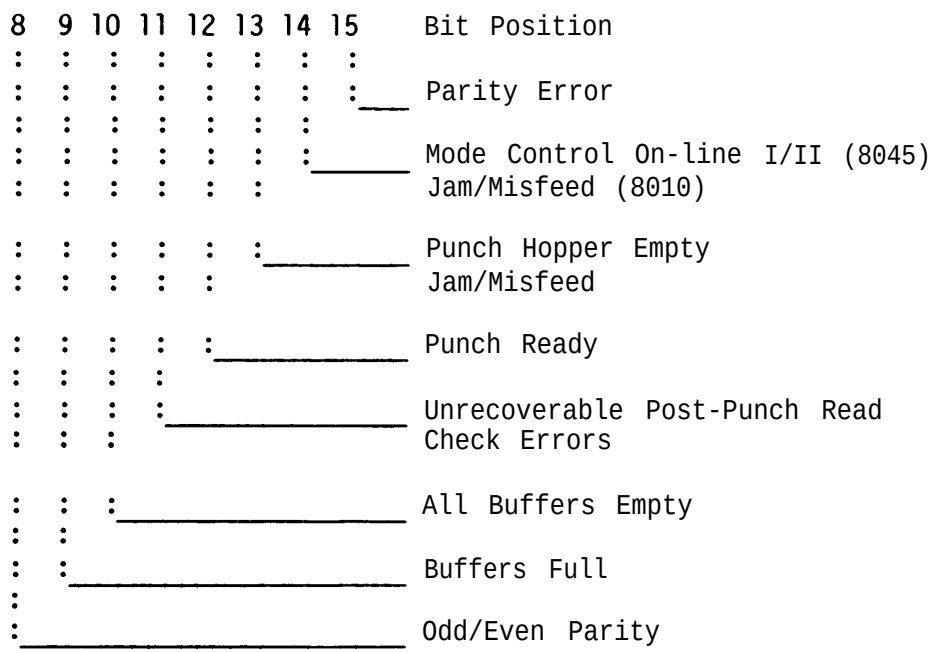
STATUS REGISTER DESCRIPTION FOR MINOR ERROR CODE--08

READER STATUS BYTE



STATUS REGISTER DESCRIPTION FOR MINOR ERROR CODE--09

PUNCH STATUS BYTE



SAMPLE CONSOLE DISPLAY

NOTE

This console display is for explanatory purposes only. The actual display depends on the revision of the program being tested.

```
C?:
XCSX1
SYSTEM IS SET TO CONTINUE TESTING AFTER ERROR REPORT.

CARD READER PUNCH TEST XCSX1    REV    (DATE)
DEVICE (D = READER, E = PUNCH) ?: E
MODE (A = ALL TESTS) ?: A
CHANNEL FCOO FC80 FDOO FD80 FEOO FE80
CHANNEL ?: FCOO
PARAMETERS ARE:
9600 BAUD EVEN PARITY
RESPOND:
CHANGE PARAMETERS (Y OR N) ?:
TESTING CHANNEL FCOO

PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER
THEN PRESS RETURN KEY:

29 UNPUNCH CARDS ARE REQUIRED FOR EACH PASS
PRESS STOP. RESET, START BUTTONS ON CRP CONTROLLER
THEN PRESS-RETURN-KEY:

MAKE THE PUNCH STACKER FULL
THEN PRESS RETURN KEY:
MAKE THE PUNCH STACKER "NOT" FULL
THEN PRESS RETURN KEY:
```

OPERATOR INSTRUCTIONS

Enter: XCSX1

Enter: E (punch tests).

NOTES

1. The punch tests should be performed before the reader tests in order to create the special cards required for reader tests DA, DG, and DH.
2. The RESET button on the controller panel should be pressed only when specified in the operator instructions.
3. Ensure that there are a sufficient number of cards in the punch hopper--approximately 300--to perform all the punch tests.

Enter: A.

Enter channel number of device under test.

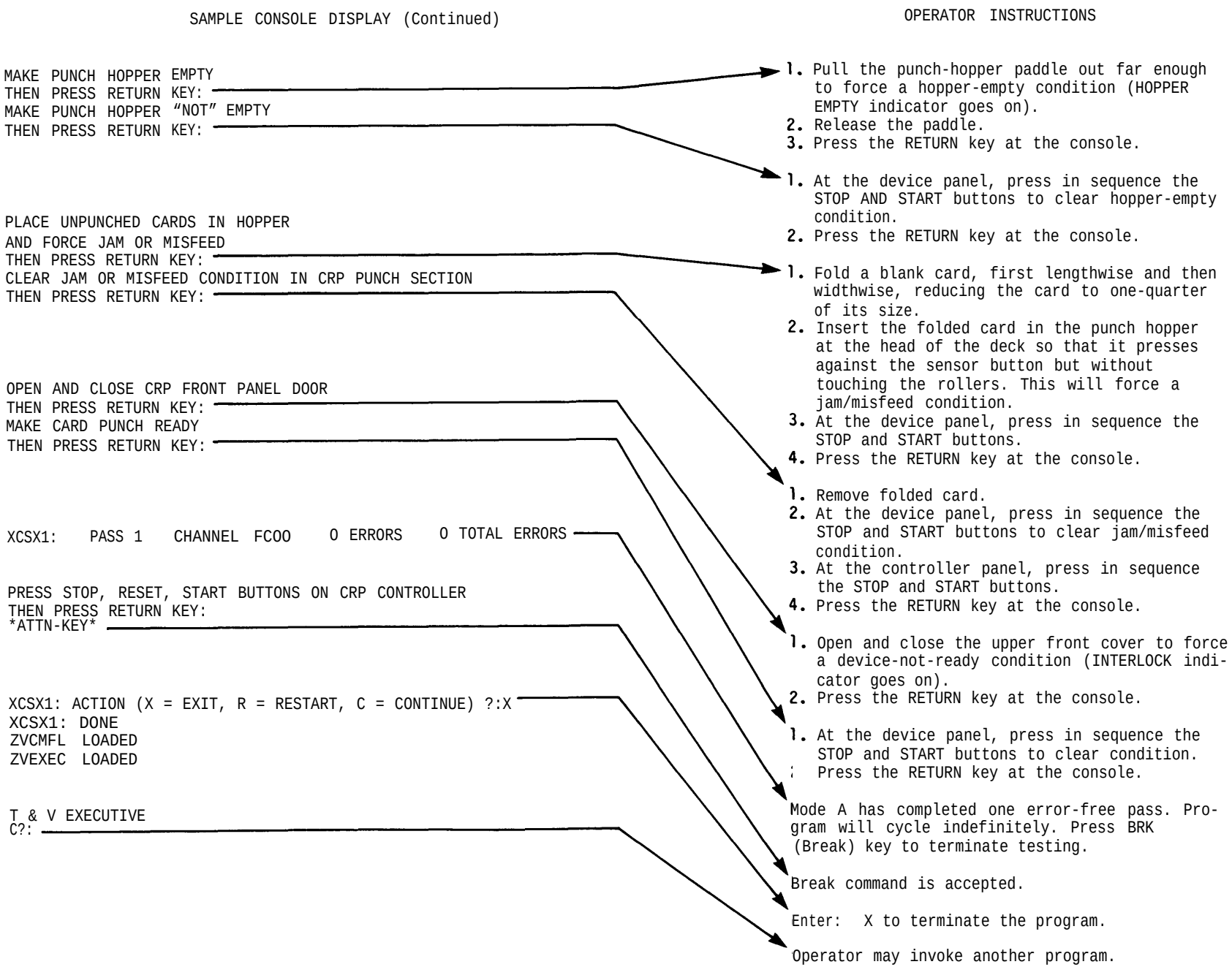
Press the RETURN key if parameters are OK.

At the controller panel, press in sequence the STOP, RESET, and START buttons in order to clear the buffers.

1. At the controller panel, press in sequence the STOP, RESET, and START buttons in order to clear the buffers.
2. Press the RETURN key at the console.

1. At the punch stacker (on the left), pull out the paddle to force a stacker-full condition (STACKER FULL indicator goes on).
2. Press the RETURN key at the console.

1. At the device panel, press in sequence the STOP and START buttons to clear the stacker-full condition.
2. Press the RETURN key at the console.


SAMPLE CONSOLE DISPLAY (Continued)
OPERATOR INSTRUCTIONS
MAKE PUNCH HOPPER EMPTY
THEN PRESS RETURN KEY:
MAKE PUNCH HOPPER "NOT" EMPTY
THEN PRESS RETURN KEY:
1. Pull the punch-hopper paddle out far enough to force a hopper-empty condition (HOPPER EMPTY indicator goes on).
2. Release the paddle.
3. Press the RETURN key at the console.
1. At the device panel, press in sequence the STOP AND START buttons to clear hopper-empty condition.
2. Press the RETURN key at the console.
PLACE UNPUNCHED CARDS IN HOPPER
AND FORCE JAM OR MISFEED
THEN PRESS RETURN KEY:
CLEAR JAM OR MISFEED CONDITION IN CRP PUNCH SECTION
THEN PRESS RETURN KEY:
1. Fold a blank card, first lengthwise and then widthwise, reducing the card to one-quarter of its size.
2. Insert the folded card in the punch hopper at the head of the deck so that it presses against the sensor button but without touching the rollers. This will force a jam/misfeed condition.
3. At the device panel, press in sequence the STOP and START buttons.
4. Press the RETURN key at the console.
OPEN AND CLOSE CRP FRONT PANEL DOOR
THEN PRESS RETURN KEY:
MAKE CARD PUNCH READY
THEN PRESS RETURN KEY:
1. Remove folded card.
2. At the device panel, press in sequence the STOP and START buttons to clear jam/misfeed condition.
3. At the controller panel, press in sequence the STOP and START buttons.
4. Press the RETURN key at the console.
1. Open and close the upper front cover to force a device-not-ready condition (INTERLOCK indicator goes on).
2. Press the RETURN key at the console.
XCSX1: PASS 1 CHANNEL FCOO 0 ERRORS 0 TOTAL ERRORS
1. At the device panel, press in sequence the STOP and START buttons to clear condition.
2. Press the RETURN key at the console.
PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER
THEN PRESS RETURN KEY:
ATTN-KEY
Mode A has completed one error-free pass. Program will cycle indefinitely. Press BRK (Break) key to terminate testing.
XCSX1: ACTION (X = EXIT, R = RESTART, C = CONTINUE) ?:X
XCSX1: DONE
ZVCMFL LOADED
ZVEXEC LOADED
Break command is accepted.
T & V EXECUTIVE
C?:
Enter: X to terminate the program.
Operator may invoke another program.

SAMPLE CONSOLE DISPLAY

NOTE

This console display is for explanatory purposes only. The actual display depends on the revision of the program being tested.

```
C?:
XCSX1
SYSTEM IS SET TO CONTINUE TESTING AFTER ERROR REPORT.

CARD READER PUNCH TEST XCSX1 REV     (DATE)
DEVICE (D = READER, E = PUNCH) ?: D
MODE (A = ALL TESTS) ?: A
CHANNEL FCOO FC80 FDOO FD80 FEOO FE80
CHANNEL ?: FC0O
PARAMETERS ARE:
9600 BAUD EVEN PARITY
RESPOND:
CHANGE PARAMETERS (Y OR N)?:
TESTING CHANNEL FCOO

PLACE HOLLERITH DECK FROM TEST EA INTO READ HOPPER
LAST CARD MUST BE END OF FILE CARD
PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER
THEN PRESS RETURN KEY:
```

OPERATOR INSTRUCTIONS

Enter: XCSX1

Enter: D (reader Tests).

NOTES

1. The punch tests should be performed before the reader tests in order to create the special cards required for reader tests DA, DG, and DH.
2. The RESET button on the controller panel should be pressed only when specified.
3. Reader tests DB, DC, DD, DE, and DF will read a card if a deck is in the reader

Enter: A.

Enter channel number of device under test

Press the RETURN key if parameters are OK.

1. Place the cards from punch test EA in reader hopper.
2. At the controller panel, press in sequence the STOP, RESET, and START buttons in order to clear the buffers.
3. At the device panel, press in sequence the STOP AND START buttons.
4. Press the RETURN key at the console.

SAMPLE CONSOLE DISPLAY (Continued)

OPERATOR INSTRUCTIONS

PLACE BINARY DECK FROM TEST EH INTO READ HOPPER
LAST CARD MUST BE END OF FILE CARD
PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER
THEN PRESS RETURN KEY:

1. Place the cards from punch test EA in reader hopper.
2. At the controller panel, press in sequence the STOP, RESET, and START buttons in order to clear the buffers.
3. At the device panel, press in sequence the STOP and START buttons.
4. Press the RETURN key at the console.

PLACE BINARY EOF CARD INTO READ HOPPER
PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER
THEN PRESS RETURN KEY:

1. Place the cards from punch test EA in reader hopper.
2. At the controller panel, press in sequence, the STOP, RESET, and START buttons in order to clear the buffers.
3. At the device panel, press in sequence the STOP and START buttons.
4. Press the RETURN key at the console.

PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER
MAKE READ STACKER FULL
THEN PRESS RETURN KEY:

1. At the controller panel, press in sequence the STOP, RESET, AND START buttons in order to clear the buffers.
2. At the reader stacker on the right, pull out the paddle to force a stacker-full condition (STACKER FULL indicator goes on).
3. Press the RETURN key at the console.

PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER
MAKE READ STACKER "NOT" FULL
THEN PRESS RETURN KEY:

1. At the controller panel, press in sequence the STOP, RESET, and START buttons in order to clear the buffers.
2. Press in sequence the STOP and START buttons on the device panel to clear the stacker-full condition.
3. Press the RETURN key at the console.

SAMPLE CONSOLE DISPLAY (Continued)	OPERATOR INSTRUCTIONS
PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER MAKE READ HOPPER EMPTY THEN PRESS RETURN KEY: →	1. At the controller panel, press in sequence the STOP, RESET, and START buttons in order to clear the buffers. 2. At the reader-hopper, pull the paddle out far enough to force a hopper-empty condition (HOPPER EMPTY indicator goes on). 3. Press the RETURN key at the console.
MAKE READ HOPPER "NOT" EMPTY PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER THEN PRESS RETURN KEY: →	1. At the device panel, press in sequence the STOP and START buttons. 2. At the controller panel, press in sequence the STOP, RESET, and START buttons in order to clear the buffers. 3. Press the RETURN key at the console.
PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER FORCE JAM OR MISFEED CONDITION IN CRP READER SECTION THEN PRESS RETURN KEY →	1. At the controller panel, press in sequence the STOP, RESET, and START buttons in order to clear the buffers. 2. Fold a blank card, first lengthwise and then widthwise, reducing the card to one-quarter of its size. 3. Insert the folded card in the reader hopper at the head of the deck so that is presses against the sensor button but without touching the rollers. This will force a jam/misfeed condition. 4. At the device panel, press in sequence the STOP and START buttons. 5. Press the RETURN key at the console.

SAMPLE CONSOLE DISPLAY (Continued)	OPERATOR INSTRUCTIONS
CLEAR JAM OR MISFEED CONDITION IN CRP READER SECTION PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER THEN PRESS RETURN KEY:	1. Remove folded card. 2. At the device panel, press in sequence the STOP and START buttons. 3. At the controller panel, press in sequence the STOP, RESET, and START buttons in order to clear the buffers. 4. Press the RETURN key at the console.
PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER OPEN AND CLOSE CRP FRONT PANEL DOOR THEN PRESS RETURN KEY:	1. At the controller panel, press in sequence the STOP, RESET, and START buttons in order to clear the buffers. 2. Open and close the upper front cover to force a device-not-ready condition (INTERLOCK indicator goes on). 3. Press the RETURN key at the console.
PRESS STOP AND START BUTTONS ON CRP PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER THEN PRESS RETURN KEY:	1. At the device panel, press in sequence the STOP and START buttons. 2. At the controller panel, press in sequence the STOP, RESET, and START buttons in order to clear the buffers. 3. Press the RETURN key at the console.
XCSX1: PASS 1 CHANNEL FCOO 0 ERRORS 0 TOTAL ERRORS PRESS STOP, RESET, START BUTTONS ON CRP CONTROLLER THEN PRESS RETURN KEY: *ATTN-KEY*	Mode A has completed one error-free pass. Program will cycle indefinitely. Press the BRK (Break) key to terminate testing. Break command is accepted.
XCSX1: ACTION (X = EXIT, R = RESTART, C = CONTINUE) ?:X XCSX1: DONE ZVCMFL LOADED ZVEXEC LOADED T&V EXECUTIVE C?:	Enter: X to terminate the program. Operator may invoke another program.

MODE P USE

```
MODE(A = ALL TESTS ) ?: P
SELECT TEST FOR MODE P TEST LIST
TEST ?:
FROM 1 TO 30 TEST SELECTIONS MAY BE MADE.
AFTER THE TEST QUESTION.
ENTER THE TEST LETTER
THEN PRESS THE RETURN KEY.
TO TERMINATE TEST SELECTION PRESS THE RETURN KEY ONLY.

TESTS ARE:

O  PUNCH INITIALIZATION
A  PUNCH HOLLERITH DECK
B  PUNCH MODE TEST
C  PUNCH STACKER TEST
D  PUNCH HOPPER TEST
E  PUNCH JAM/MISFEED STATUS TEST
F  PUNCH DOOR INTERLOCK TEST
G  PUNCH BINARY EOF
H  PUNCH BINARY DECK
K  PUNCH MESSAGE TEST
2  PUNCH TERMINATION
```

XCSX2 T & V PROGRAM--REAL TIME ADAPTER

This T & V supports the Real Time Adapter (RTA).

ERROR REPORTING AND TROUBLESHOOTING PROCEDURES

Error messages have the following format:

ERR XCSX2 ABCD @XXXXXX CCCC (ORU-1) (ORU-2) MSG

where:

AB = Major error code label (refer to Table 1)
CB = Minor error code label (refer to Table 2)
XXXXXX = T & V software location
CCCC = Channel number
ORU-1 = Most probable ORU
ORU-2 = Second most probable ORU
MSG = Message further explaining the error; includes status word information

Table 1. Major Error Code Labels

ERROR CODE	TEST
RO--	Initialization
RA--	48 bit timer
RB--	Counter 1
RC--	Counter 2
RD--	Counter 3
RE--	Time test
RF--	Display date/time
RG--	Set date/time
RZ--	Termination

Table 2. Minor Error Code Labels

ERROR CODE	DESCRIPTION	MOST LIKELY ORU	SECOND MOST LIKELY ORU
--01	IO Operation did not complete	MDC	RTA
--02	Data Compare Error	RTA	--
--03	Device Not Ready	RTA	--
--11	No Interrupt from RTA	RTA	MDC
--21	Incorrect RTA Status	RTA	---
--22	Unable to load counter 1	MDC	RTA
--23	Unable to read counter 1	MDC	RTA
--24	Counter 1 contains incorrect value	RTA	---
--25	Unable to load counter 2	MDC	RTA
--26	Unable to read counter 2	MDC	RTA
--27	Counter 2 contains incorrect value	RTA	---

XCSX2 T & V PROGRAM--REAL TIME ADAPTER (CONT)

Table 2. Minor Error Code Labels--Continued

ERROR CODE	DESCRIPTION	MOST LIKELY ORU	SECOND MOST LIKELY ORU
--28	Unable to load counter 3	MDC	RTA
--29	Unable to read counter 3	MDC	RTA
--30	Counter 3 contains incorrect value	RTA	---
--31	Unable to load 48-bit time of day timer	MDC	RTA
--32	Unable to read 48-bit time of day timer	MDC	RTA
--33	48-bit time of day timer contains incorrect value	RTA	---
--34	Counter 2 contains incorrect value at l-millisecond clock rate	RTA	---
--35	Incompatible versions of the MDC and RTA	RTA	MDC
--36	48-bit timer not interrupting at correct interval	RTA	MDC
--37	Unexpected Interrupt	--	--
--38	No Interrupt--Counter 1	RTA	MDC
--39	No Interrupt--Counter 2	RTA	MDC
--40	No Interrupt--Counter 3	RTA	MDC
--41	Incorrect Value, Counter 1 in Preset Mode	RTA	MDC
--42	Incorrect Value, Counter 2 in Preset Mode	RTA	MDC
--43	Incorrect Value, Counter 3 in Preset Mode	RTA	MDC

STATUS WORD DESCRIPTION FOR MINOR ERROR CODE--21

The hexadecimal value contained in the high-order status byte (bits 0-7) indicates one of the following conditions:

RTA (F/W rev. 0)	RTA (F/W rev. 1/2)	DESCRIPTION
01	41	Microprocessor Branch Error
02	42	Index Register Error
03	43	RAM Error
04	44	PROM Error
OC	4C	Incorrect Initialization of Counters
OD	4D	Failure of Counters to Count
OE	4E	Malfunction of MC6821 PIA
A1	E1	Data Transfer Error
A2	E2	Interrupt Error
A3	E3	Task Error
A4	E4	Time Definition Error
91	D1	Counter 1 Interrupt
92	D2	Counter 2 Interrupt
93	D3	Counter 3 Interrupt
94	D4	External
95	D5	Time of Day Interrupt
96	D6	Interval Timer Interrupt
80	C0	Ready

SAMPLE CONSOLE DISPLAY	OPERATOR INSTRUCTIONS
NOTE This console display is for explanatory purposes only. The actual display depends on the revision of the program being tested.	
C?:	Enter: XCSX2
XCSX2 SYSTEM IS SET TO CONTINUE TESTING AFTER ERROR REPORT.	
RTA TEST XCSX2 REV (DATE) NUMBER OF PASSES: (FOR CONTINUOUS LOOP, PRESS RETURN KEY) ?:	Enter number of passes program is to cycle or press the Return key for continuous loop.
MODE (A = ALL TESTS) ?: A CHANNEL 1200	Enter: A.
CHANNEL ?: 1200 TESTING CHANNEL 1200 RTA FIRMWARE REV 0200 MDC FIRMWARE REV 000D	Enter channel number of device under test.
RF DISPLAY DATE/TIME DATE: 1982/11/10 TIME: 1358:06	
RA 48 BIT TIMER TEST RB COUNTER 1 TEST RC COUNTER 2 TEST RD COUNTER 3 TEST RE TIME TEST	If RTA firmware rev. 1 is installed, test RE will not execute, and the following message will be displayed: TEST NOT APPLICABLE
INITIAL TIME 0000:08.5 0000:18.5 0000:28.5 0000:38.5 0000:48.5 0000:58.5 0000:08.5	Times should be printed out in 10-second intervals.
RF DISPLAY DATE/TIME DATE: 1901/01/01 TIME: 0001:22	
RG SET DATE/TIME INPUT DATE: 1982/11/09 1145	Enter the date (yy/mm/dd) and time (military time: hhmm), separated by a space character.
RF DISPLAY DATE/TIME DATE: 1982/11/11 TIME: 0001:22 XCSX2: PASS 1 CHANNEL 1200 0 ERRORS 0 TOTAL ERRORS	Mode A has completed one error-free pass. Program will cycle indefinitely. Press the Break (BRK) key to terminate testing.
TESTING CHANNEL 1200 RA 48 BIT TIMER TEST *ATTN-KEY*	Break command is accepted.
XCSX2: ACTION (X = EXIT, R = RESTART, C = CONTINUE) ?:X	Enter: X to terminate the program.
SCSX2: DONE ZVCMFL LOADED ZVEXEC LOADED	
T & V EXECUTIVE C?:	Operator may invoke another program.

GLOSSARY

Section I. DEFINITION OF ABBREVIATIONS

The following is a list of abbreviations that are commonly used with DAS3.

ACK	Acknowledge
ACL	Access control list
ACLA	Asynchronous communications line adapter Automatic calling unit
ADP	Automated data processing
ALML	Alarm light
ALPHA	Alphabetical
ALRM	Alarm
ANS	Answer back
ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
ASM	Assembly
ASR	Asynchronous send/receive
ASYNC	Asynchronous
AUTO	Automatic
AUX	Auxiliary
BDC	Basic device controller
BE L	Bell
BELS	Bell signal
BOT	Beginning of tape
BOT	Beginning of test
BPI	Bits per inch
BPS	Bits per second
BRK	Break
BS	Backspace
CACL	Common access control list
CAN	Cancel
CAP	Capital
CE	Clean entry
CI	Control interval
CIP	Commercial instruction processor
CLM	Configuration load manager
CLR	Clear
COEI	Components of end item
COMM	Communications
CONS	Console
CONT	Continued
CONT (PANEL)	Control panel
CONTRL	Controller (board)
CORR	Correction
CP	Command processor
CP	Console printer
CPI	Characters per inch
CPS	Characters per second
CPU	Central processor unit
CR	Carriage return
CRB	Clock request block

CRBAR	Crowbar
CRT	Cathode ray tube
CT	Console terminal
CTB	Clock timer block
CTC	Cleaner transport control
CTL	Control
DAA	Data access arrangement
DC1	Device control 1
DC2	Device control 2
DC 3	Device control 3
DC4	Device control 4
DCE	Data communications equipment
DD	Disk drive
DEL	Delete
DEVC	Device
DLCP	Dual-line communications processor
DLE	Data link escape
DMA	Direct memory access
DRU	Data recovery unit
DSR	Data set ready
DTE	Data terminal equipment
DUP	Duplicate
ECHO	Echoplex
EDAC	Error detection and correction
EIA	Electronic Industries Association
EM	End of medium
EMG	Emergency
EMI	Electromagnetic interference
ENQ	Enquiry
EOF	End of file
EOI	End of tape
EOT	End of test
EOT	End of transmission
ESC	Escape
ETB	End of transmission block
ETX	End of text
FCB	File control block
FCNT	Full count (signal)
FDB	File description block
FF	Form feed
FIB	File information block
FILE PROT	File protect
FL	Filter
FS	Field separator
FSK	Frequency shift keying
FTU	Field test unit
GO	Ground
GRD	Ground

HEX	Hexadecimal
HVS	High voltage switcher board
INT	Interface
IO, I/0	Input/Output
IORB	Input/output request block
IPS	Inches per second
ISA	Interrupt save area
KSR	Keyboard send/receive
LAF	Long address format
LCP	Control panel circuit board (line printer)
LED	Light emitting diode
LHD	Line hammer decoder board
LF	Line feed
LOG	Logic
LPT	Line printer
MAC	Maintenance allocation chart
MCB	Motor control board
MDC	Multiple device controller
MEM SAV PS	Memory save power supply
MLCP	Multi-line communications processor
MMU	Memory management unit
MPDC	Medium performance disk controller
MSC	Mass storage controller
MSU	Mass tape unit
MTC	Magnetic tape (unit) controller
MTU	Magnetic tape unit
MULT	Multiple
MUX	Multiplexer
NAK	Negative acknowledgment
NRZ	Nonreturn to zero
NRZI	Nonreturn to zero inverted
NUL	Null
OPT	Option/Optional
ORU	Optimum replaceable unit
PC	Print complete (signal)
PDU	Power distribution unit
PE	Phase encoded
PIO	Physical input/output
PLO	Phase lock oscillator
PROG	Program
PROM	Programmable read only memory
PSR	Power supply regulator board
PWB	Printed wiring board
QLT	Quality logic test

RA	Right adjust
-RA	Minus right adjust
RAM	Random access memory
REL	Release
RET	Return
RFI	Radio frequency interference
RFP	Ready for printing (signal)
ROM	Read only memory
ROP	Receive only printer
RPT	Repeat
RS	Reader stop
RSU	Reserved for system use
RTC	Real time clock
RX	Receive/receiver
SERVO	Servo motor or mechanism
SI	Shift in
SO	Shift out
SOH	Start of heading
SOP	Standard operating procedure
SP	Space
STX	Start of text
SUB	Substitute
SYN	Synchronous idle
SYNC	Synchronous
TC	Tape cleaner
TD	Tape drive
T & V	Test and verification
TMDE	Test, measurement and diagnostic equipment
TP	Test point
TRIAC	Three-element semiconductor
TRB	Task request block
TS	Troubleshooting
TSA	Trap save area
TX	Transmit
TYP	Typical
UAR/T	Universal asynchronous receiver/transmitter
US	Unit separator
USART	Universal synchronous/asynchronous receiver/transmitter
VER	Verify
VFU	Vertical format unit
VT	Vertical tabulation
WDT	Watch dog timer
XPS	Power control board (line printer)

Section II. DEFINITION OF UNUSUAL TERMS

ADAPTER. A printed circuit board which is attached to a controller board. Used as an interface control between the computer and a peripheral device. Also called daughter board or pat.

ALINEMENT DISK PACK. Magnetic disk pack used to aline the heads in the disk drive. Also called CE Pack.

ANALOG. When used in telecommunications, means a continuous electrical signal that varies in frequency or amplitude in relation to a digital input. Since digital signals cannot be transmitted, the modem is used to convert digital data into analog signals which can be transmitted.

APPLICATION PROGRAM. A user-written program for the solution of a business, industrial, or scientific problem.

ARGUMENT. User-selected items of data that are passed to a procedure. For example, system service macro call arguments that are passed to the called system service, or command arguments passed to the invoked task (see parameter).

ASCII. American Standard Code for Information Interchange. The standard used for transmission of data between computer systems and remote terminals over telephone lines.

ASYNCHRONOUS. Data communications which is not time related. Uses stop and start bits instead of time pulses to organize data for transmission.

ATTRIBUTE. A characteristic of a display field by which the field is enhanced, modified, or limited.

BACKPANEL. See bus.

BACKPLANE. See bus.

BAUD. A unit of measure for data transmission. One baud equals one bit per second.

BAUD RATE. Rate of data transmission expressed in bauds.

BOOTSTRAP. A procedure used by a computer operator to load a software program into the computer from an input device. Procedure may also call up program for use.

BOOTSTRAP ROUTINE. A routine, contained in a single record that is read into memory by a ROM bootstrap loader, which reads the operating system into memory. (See ROM bootstrap loader.)

BREAK. A user action, initiated by pressing the break or interrupt key, that interrupts a running task so that commands can be entered. After the break, the interrupted task can be restarted or terminated.

BUFFER, 1/0. A storage area used to compensate for the differences in the flow rates of data transmitted between peripheral devices and memory.

BUFFER MEMORY. An electronic memory which stores data column by column until all 80 columns are accounted for; and from which cards are punched and printed.

BUS. An assembly used to join several logic boards into one working component. For example, the bus in a minicomputer may join device controller boards, memory boards and a compiler into one working unit. Also called backpanel, backplane, or megabus.

BYTE . A sequence of eight consecutive binary digits operated upon as a unit.

CE PACK. See alinement pack.

CHECKPOINT. A point in the user's program to which control can be returned and processing resumed following a task group abort. When the user takes a checkpoint, the system records the current contents of user memory and the current status of tasks, files, and screen forms on a checkpoint file. See restart.

CHECKPOINT FILE. A user-named file on which the system records the current status of the group request when a checkpoint is taken. Checkpoint files are created in pairs and checkpoints are written alternately to each file.

CLEANPOINT. A point in the user's processing in which the user considers all file updates to be valid. See rollback.

CLOCK MANAGER. A monitor component that handles all requests to control tasks based on real-time considerations, and requests for the time-of-day and date in ASCII format.

CLOCK REQUEST BLOCK. A control structure supplied by a task to request a service from the Clock Manager.

CLOCK SCAN CYCLE. The time in milliseconds between clock-generated interrupts.

CLOCK TIMER BLOCK. The control structure used by the clock manager to control the clock-related processing of tasks.

COMM PAC. Adapter board used for communications interface.

COMMAND . An order that is processed by the command processor.

COMMAND INPUT FILE (COMMAND-IN). Any file or device from which commands to the command processor are read.

COMMAND LANGUAGE. The set of commands that can be issued by a user to control the execution of the user's on-line or batch task.

COMMAND LEVEL. The state of the command processor, when it is capable of accepting commands, indicated by the display of the RDY (ready) message.

COMMAND PROCESSOR. A software component that interprets control commands issued by the operator or a user, and invokes the required function.

COMMERCIAL INSTRUCTION PROCESSOR. A computer component that includes an enhanced instruction set providing native commercial mode instructions.

COMMERCIAL SIMULATOR. A software component that executes a set of business-oriented instructions.

COMMON ACCESS CONTROL LIST. A list specifying the access rights to all files or directories subordinate to the directory in which the list is established.

COMMUNICATIONS DEVICE. A device that transfers data over communications lines and is connected through the MLCP.

CONTROL CHARACTER. An ASCII character interpreted by a device (such as a terminal) as having a keyboard control function.

CONTROL INTERVAL. The unit of transfer between main memory and the storage medium (primarily disk devices). Incomparable to a “block” for tapes. The size is specified by the user and remains constant for a file. For disk files, the size of the CI Must be a multiple of 256 bytes. A UFAS file is composed of CI'S which are numbered starting at one. The control interval also determines the buffer size.

CROWBAR. A signal from the power regulator on the power supply board (XPS) to the crowbar circuit on the power supply regulator board (PRS) that turns off the high voltage supply in case of overcurrent detection.

CRT. Cathode-ray tube. An electron tube used for visual display purposes.

CURRENT LOOP. Serial method of transmitting data through wire, such as the interface wiring between two devices.

DAA CONNECTOR. Data Access Arrangement connector. Manufacturer’s name for modem connector leading to transmission lines.

DAUGHTER BOARD. See adapter and device pat.

DEVICE PAC. An adapter used as the interface between the CPU and peripheral devices.

DIBIT. A group of two bits. In four phase modulation each dibit is encoded as one of four unique carrier phase shifts.

DIPSWITCH. Miniature rocker switch used to select configurations of circuit boards.

DISK. A generic name for mass storage devices such as diskette, cartridqe disk, and storage module.

DTE CONNECTOR. Data Terminal Equipment connector. Manufacturer’s name for modem connector leading to computer.

DUAL-LINE COMMUNICATIONS PROCESSOR. A programmable interface between a central processor and communications devices consisting of two lines.

ECHO (ECHOPLEX). Communications mode in which a data signal must pass through the computer before it is displayed at the terminal. Also called echoplex.

EDAC. Error Detection and Correction. Memory circuit which automatically corrects hardware-caused single bit data errors.

EIA. Electronic Industries Association. A trade organization of the electronics industry which sets technical standards used by government agencies and the electronics industry.

EMI. Electro-Magnetic Interference. Electronic signals which can interfere with the operation of equipment such as data processing devices.

ERROR LOGGING. Collection of memory and/or hardware-related error statistics for selected peripheral devices.

FIELD. A group of adjacent columns on a 80-column card, all of which contain either alphabetic or numeric data. Each type of field may also contain blank columns.

FIRMWARE. Programs or instructions stored in read-only memories. Software stored in hardware form.

FONT. Set of print characters in a particular size or style.

FREQUENCY SHIFT KEYING. A modulation-demodulation technique that shifts between two preset frequencies. A one bit is transmitted at one frequency and a zero bit is transmitted at the other frequency.

FULL DUPLEX. Communications mode which allows transmission and reception at the same time.

HALF DUPLEX. Communications mode which allows transmission and reception but not at the same time.

HALT . Automatic interruption in data processing caused by software or hardware fault.

HEAT SINK. A metal device used for absorbing and dissipating heat.

HEXADECIMAL. A base 16 number system using O, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F as numerical symbols.

HYSTERESIS. Residual magnetic force left in iron after a magnetic field is passed through it.

HYSTERESIS BRAKE. Stopping device built into an electric motor which uses hysteresis effect to prevent coasting after motor is powered off. Used in tape drive units to prevent tape from unraveling when unit is stopped.

INITIALIZE. Operator action required to ready a computer system for operation. Includes power ON and bootstrapping procedures.

INPUT/OUTPUT DEVICE. A peripheral or communications device such as a keyboard video display terminal.

INPUT/OUTPUT REQUEST BLOCK. A control structure used for communication between a program and an 1/0 driver outside of the file system.

INTERFACE BOARD. An electronic printed circuit board that enables a computer to communicate with a peripheral device such as the card reader/punch.

INTERRUPT. Signal which tells computer to stop current processing to begin program having a higher priority.

JUMPER . A removable metal device for jumpering two pins together. Various jumper positions are available to configure a circuit for use with a specified system.

KEY. An identifier for a specific record within a disk file.

LAF. Long Address Format. 20-bit main memory addressing.

LEADER. Short length of magnetic tape at beginning and end of reel (usually before BOT marker and after EOT marker). Used for threading only. Should never contain recorded data.

MDC. Multiple Device Controller for peripheral devices other than cartridge disk, storage module, and magnetic tape.

MEDIA. An item such as a punch card, magnetic disk, print paper, punch tape, or magnetic tape on which data may be stored.

MEGABUS. See bus.

MEMORY MANAGEMENT UNIT. A hardware feature which intercepts all addresses generated by the CPU (virtual addresses) and transforms them to real memory addresses via its mapping array.

MEMORY PAC. Memory adapter board mounted on the memory controller.

MEMORY SAVE AND AUTORESTART UNIT. A hardware feature that can preserve the memory image during a power failure lasting up to two hours.

MINUS RIGHT ADJUSTED FIELD. A numeric card field in which data has been moved from the leftmost columns to the rightmost columns and to which a minus (negative) value has been assigned. Primarily used for dollar-value fields.

MISFEED. A card either does not feed from a hopper, or feeds to a wrong position in the card transport sections of the mechanical assembly.

MISTOR. Magnetic sensor which detects changes in a magnetic field.

MODEM. Modulator-Demodulator. A device which converts digital data to analog form so it can be transfixed. Also receives analog form and converts it to digital data so it can be processed by a computer system.

MOTHER BOARD. See controller.

MSC. Mass Storage Controller for disk packs.

MTC. Magnetic Tape Controller for magnetic tapes.

MULTILINE COMMUNICATIONS PROCESSOR (MLCP). A programmable interface between a central processor and one or more communications devices. Can be programmed to handle specific communications devices.

NRZ. Non Return to Zero. A method of recording data on magnetic tape.

NRZI. Non Return to Zero Inverted. An inverted form of the NRZ recording method.

PAC. Any adapter or device board which plugs into a controller board. Also called daughter board.

PACK, DISK PACK. Magnetic media used for storage of data.

PACKING DENSITY. The number of useful storage elements per unit of dimensions, also the number of bits (characters) per inch stored on a magnetic tape.

PADDLEBOARD. A type of cable connector shaped like the broad end of a paddle.

PARABOLA. Moulded plastic component. Uses a curved reflecting surface to send light from a lamp through the punched holes of an 80 column card and into a light sensor device.

PARALLELISM. Refers to a constant distance between printhead and platen over the full length of head travel.

PARITY INHIBIT. Process of preventing parity bit additions and parity checks.

PARITY (BITS). A common technique for error detection in data transmission. Parity check bits are added to the data so that each group of bits adds up to an even number for even parity and an odd number for odd parity.

PE. Phase Encoded. A method of recording data on magnetic tape.

PERIPHERAL. Any component of a data processing system such as terminal, printer, tape drive, or disk drive.

PHASE ENCODED. A method of recording data on magnetic tape.

PHYSICAL INPUT/OUTPUT. Physical input/output, or physical 1/0, which is initiated through a request I/0 macro call, outside of the file system, using IORBs.

PLATEN. Cylinder behind the paper in a printer. Provides hard striking surface for printing mechanism.

PLUGMOLD. Type of ac power outlet containing molded connectors in a strip.

PROM . Programmable Read Only Memory. A high speed permanently coded metal oxide semiconductor memory can be erased and reprogrammed.

QLT. Quality Logic Test. A hardware verification routine stored in the firmware of the CPU.

QUASI-ANALOG. A method of changing digital data to analog form using frequency shift keying as the analog form. See analog and modem.

RADIO FREQUENCY INTERFERENCE. See electro-magnetic interference.

RAM. Random Access Memory. A high speed, semiconductor memory commonly used for registers.

RANGE. The number of bytes transferred during an 1/0 operation.

RECORD . A user-created collection of logically related data fields. Records are treated as a unit by the user and may be fixed or variable in length.

RED ERROR. Error code indicating probable hardware failure. Usually given after a series of yellow errors.

REQUEST I/0. Macro call, issued to a driver that performs physical input/output.

RESIDUAL RANGE. The difference between the number of bytes requested and the number of bytes transferred during an I/0 operation.

RESONATOR. Tuned circuit in power input transformer used to reduce hysteresis effect.

RESTART. A user-initiated process in which the system locates the most recently completed checkpoint on the checkpoint file and reads the checkpoint image, rebuilding the Executive data structures and memory blocks, reloading bound units, and repositioning active user files. See also checkpoint.

RIGHT ADJUSTED FIELD. Card field in which data has been moved from the leftmost columns to the rightmost columns, leaving leftmost columns blank. (Leftmost columns may be zero-filled at operator option.)

ROM BOOTSTRAP LOADER. A firmware routine (activated by pushing the Load key on the control panel) that reads the first record from a designated disk into memory.

RS-232-C INTERFACE. An EIA standard interface used to connect printers, terminals and modems to a computer system.

SAF. Short address format. 16-bit main memory addressing.

SCRATCH PACK. A blank disc pack (or pack containing worthless data) that can be placed in a dish drive for temporary data storage.

SERVO. A device or mechanism which automatically moves a control or series of controls.

SERVO HEAD. A mechanism used to move data heads to the read/write location on a disk pack. The servo head reads data from the magnetic surface of disk and uses it to position read/write heads.

SOFTWARE. Programs, routines and codes which instruct a computer to perform its function in a data processing system.

SOURCE DOCUMENT. Paper or papers defining fields to be used and information to be keypunched into cards.

SPANNED RECORD. A record that spans a control interval or block.

SPEED TRANSDUCER. A device which measures the speed of a spinning disk pack and converts it to an electronic signal used to operate a control.

STANDARD I/0 FILES. The command-in, user-in, user-out, operator-out, and error-out files.

STRAP. A jumper used across specific terminals to preset conditions for a peculiar application.

SYNC. Any signal that allows one device to operate precisely in step with another.

SYNCHRONOUS. Data communications which operates at one baud rate and does not need stop and start bits for transmission.

TECHNICAL POWER. Ac power which is controlled and filtered safe for use by ADP equipment.

TERMINAL. An input/output device. Also, a device specified for use in interactive communications between the computer operator and application software.

TERMINATE. A system service macro call request issued by the currently executing task at the end of its normal processing.

TERMINATOR. Board used to provide circuit continuity at either end of a bus.

TRANSDUCER. A device which measures a quantity such as speed and converts it to an electrical signal. An analog device.

TRANSPARENT MODE TRANSMISSION. A data transmission mode that allows data consisting of bytes having any bit configuration to be transmitted over communications lines. Thus, control characters can be transmitted as data.

TRIAC. A three-element solid state device used to control current in power circuits.

T&V. Test and Verification Program. Software routines used to test hardware, consists of central subsystem tests, 1/0 subsystem tests, and communication subsystem tests. Usually stored on a disk pack or tape.

UNPROTECTED FIELD. A display field for which the operator can use the keyboard to enter, modify, or erase data.

UTILITY POWER. Uncontrolled power which can be used for lights and some support equipment. Not safe for use by ADP equipment.

VERIFYING. Process of determining the accuracy of data punched in an 80-column card. Data on the card is read into memory and compared with data keyed in from the same source document as used for punching the card.

VOLTAGE TRANSIENTS. A temporary stray voltage which may consist of voltage spikes, static variations, or a second erratic voltage wave superimposed on the incoming voltage.

WAIT. A task is in the wait state when it causes its own execution to be interrupted until a time request is satisfied, until another task releases a semaphore, until another task terminates, or until an 1/0 operation terminates.

WORD. A sequence of 16 consecutive binary digits operated upon as a unit; two consecutive bytes.

YELLOW ERROR. An error code which tells the operator the EDAC memory has found and corrected a bit error during processing.

I N D E X

F

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H

I

J

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M

M (Cont)

M (Cont)

N

P

R

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V

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DATE SENT
10 July 1975

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5840-340-12	23 Jan 74	Radar Set AN/PRC-76

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PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO	
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure the the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		FO3		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

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SSG I. M. DeSpiritof 999-1776

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I. M. DeSpiritof

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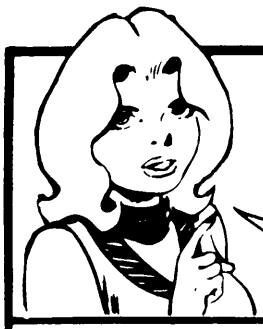

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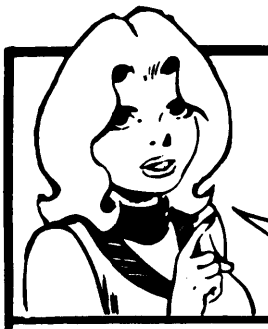

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