



RELEASE DOCUMENTATION

92W0114-001E0

document

SOFTWARE RELEASE
DESCRIPTION (SRD)

system V77

product level 5R0

issue number 1

software category 1

date October 9, 1981

Product:

V70 SERIES SYSTEM TEST

distribution

lists:

 Joe Gory

PREFACE

This Software Release Description (SRD) describes the functions of a product that is released for use on Sperry Univac V77-600, and V77-800 Mini-Computer Systems that are configured to use the VORTEX II operating system.

This description is re-issued with each new release of the product which it describes.

TABLE OF CONTENTS

| | PAGE |
|--|------|
| PREFACE | 3 |
| 1. GENERAL INFORMATION | 3 |
| 1.1 Release Identification | 3 |
| 1.2 Release Description | 3 |
| 1.3 Error Reporting Procedure | 3 |
| 1.4 Related Documents | 3 |
| 1.5 Media Contents | 3 |
| 2. PRODUCT OVERVIEW | 5 |
| 3. SYSTEM ENHANCEMENTS | 5 |
| 3.1 Scope | 5 |
| 3.2 Preliminary Tests | 5 |
| 3.2.1 Preliminary Test Sense Switch Definitions | 5 |
| 3.2.1.2 Preliminary 24 Level PIM Test | 6 |
| 3.2.1.3 Preliminary Real Time Clock Tests | 7 |
| 3.3 System Generation | 7 |
| 3.3.1 System Generation Sense Switch Definitions | 7 |
| 3.3.2 System Generation Dialog Enhancements | 7 |
| 3.3.2.1 Introductory Heading | 7 |
| 3.3.2.2 Question 1 | 8 |
| 3.3.2.3 Question 3 | 8 |
| 3.3.2.4 Question 11 | 8 |
| 3.3.2.5 Question 12 | 9 |
| 3.3.2.6 Question 13 | 10 |
| 3.3.2.7 Question 14 | 10 |
| 3.3.2.8 Question 16 | 11 |
| 3.3.2.9 Question 17 | 11 |
| 3.3.2.10 Question 18 | 11 |
| 3.3.2.11 Dialog Control Commands | 12 |
| 3.4 Configured System Test Enhancements | 12 |
| 3.4.1 Status Command | 14 |
| 3.4.2 Multiple Copies of Unit Programs | 14 |
| 3.4.3 Change Command | 14 |
| 3.4.4 View Command | 14 |
| 3.4.5 Unexpected Interrupt Message | 15 |
| 4. SUPPORTED SOFTWARE | 15 |
| 5. SUPPORTED HARDWARE | 15 |
| 5.1 Minimum System Configuration | 15 |
| 5.2 Supported Hardware | 15 |
| 6. GUIDELINES AND RESTRICTIONS | 16 |
| 6.1 Guidelines | 16 |
| 6.2 Restrictions | 17 |
| 6.2.2 Terminal Tests (M4TT10) | 17 |
| 6.2.3 Disk Test, Model 4, Type DG (M4DG13) | 17 |
| 6.2.4 Disk Test, Model 3, Type DJ (M4DJ13) | 17 |

| | |
|---------------------------------|------------|
| 7. KNOWN PROBLEMS | PAGE 17 |
| 8. DSURS CLOSED BY THIS RELEASE | 18 |
| 9. DOCUMENTATION CHANGES | 18 |

APPENDIX A

APPENDIX B - V77 CARTRIDGE DISK TEST

APPENDIX C - V77 MAGNETIC TAPE TEST

APPENDIX D - V77 LINE PRINTER

APPENDIX E - V77 TERMINAL TEST

APPENDIX F - V77 LASER PRINTER TEST

APPENDIX G - V77 CARD READER TEST

APPENDIX H - V77 UASC TEST

APPENDIX I - V77-800 WRITABLE CONTROL STORE TESTS

1. GENERAL INFORMATION

1.1 Release Identification

Release Number:
V70-SERIES SYSTEM TEST 5R0.0

Release Media:
Magnetic Tape, Cartridge Disk, and Flexible Diskette

1.2 Release Description

This release of the V70-Series System Test incorporates major enhancements to the Executive and unit programs.

1.3 Error Reporting Procedure

Users discovering errors or deficiencies in the performance of the software being released should communicate this information to the local Sperry Univac Branch Office. Use a DIAGNOSTIC SOFTWARE USER REPORT (DSUR), Form UD1-1943, to describe the problem. DSURs should include the release number and a clear description of the problem. The DSUR may be accompanied by a console printout, and memory dump.

The local Sperry Univac personnel will verify that the errors in question are adequately documented and forward the DSUR to:

Diagnostic Software Development
Sperry Univac
P.O. Box C-19504, M.S. 0582
Irvine, CA 92713
Attn: DSUR Coordinator

All inquiries concerning the status of these DSUR's should be directed to the DSUR Coordinator.

1.4 Related Documents

SYSTEM TEST USER GUIDE UP-9098 DATED APRIL 1980

1.5 Media Contents

The contents of the released media are contained in the following list.

| <u>PROGRAM</u> | <u>ID. REV.</u> | <u>FILE NO.</u> |
|---------------------------|-----------------|-----------------|
| 800 SYSTEM TEST EXECUTIVE | M4EX00.E | 0 |

| <u>PROGRAM</u> | <u>ID. REV.</u> | <u>FILE NO.</u> |
|--|-----------------|-----------------|
| V77-600 WCS TEST | M4WC01.0 | 1 |
| V77-600 FPP TEST | M4FP02.0 | 2 |
| 800- MEMORY TEST | M4ME03.0 | 3 |
| DISK TEST MODEL 0 TYPE DF <i>HALK.</i> | M4DF04.A | 4 |
| DISK TEST MODEL 1 TYPE DC, DD, DE | M4DC05.B | 5 |
| DISK TEST MODEL 2 TYPE DH | M4DH06.D | 6 |
| 8:00 MAGNETIC TAPE TEST | M4MT07.B | 7 |
| LINE PRINTER TEST | M4LP08.B | 8 |
| DATA COMMUNICATIONS MULTIPLEXER TEST | M4DM09.A | 9 |
| TERMINAL TEST | M4TT10.A | 10 |
| INTERCOMPUTER LINK TEST | M4CC11.B | 11 |
| LASER PRINTER TEST | M4ZP12.B | 12 |
| DISK TEST MODEL 4 TYPE DG | M4DG13.B | 13 |
| 800 V77-800 WCS/FPP TEST | M4WC15.A | 14 |
| DISK TEST MODEL 3 TYPE DJ | M4DJ16.B | 15 |
| CARD READER | M4CR17.0 | 16 |
| UASC TEST | M4TT18.0 | 17 |

A cross reference of disk type and Sperry Univac type and feature numbers follows.

| <u>DISK TYPE</u> | <u>MODEL</u> | <u>TYPE AND FEATURE NUMBERS</u> |
|------------------|--------------|--|
| DF | 0 | F3094-00, F3094-02, F3094-03 F3310-00, F3310-01, F3310-02 |
| DC, DD, DE | 1 | 2822-00, 2822-02 |
| DH | 2 | 2825-00, 2825-01, 2825-02 2826-00, 2826-01 2824-00, 2842-02 2843-00, 2843-01 |
| DJ | 3 | F3353 |
| DG | 4 | F2823-00, F2823-02, F2823-04, F2823-05 F2824-00, F2824-02, F2824-04, F2824-05 F3091-00 F3092-00 |

2. PRODUCT OVERVIEW

The V70 Series System Test is designed to be used on a VORTEX II configured system. It is intended to be used after the system has successfully executed the appropriate Maintain III diagnostic programs. It is not a replacement nor substitute for Maintain III. The V70 Series System Test consists of Preliminary Tests and Loader, an Executive Program, which includes the System Test Generator, and a library of Unit Programs. The System Test Generator is used to create a Configured System Test.

The Configured System Test is a real time, multiprogrammed, mapped, standalone System Test for Sperry Univac V70 Series mini-computers; that is, mini-computers having memory protection option and an extended instruction set.

The V-70 Series System Test has been designed to provide the following:

- . A real time, multiprogrammed, mapped test environment for running mapped, unit level test programs.
- . Isolation of marginal main frame or peripheral components in the system to the module or Input/Output device controller.
- . A quick validation of system hardware prior to running the VORTEX II operating system.
- . A means of generating a standalone System Test for any VORTEX II system hardware configuration.

3. SYSTEM ENHANCEMENTS

3.1 Scope

This section describes the enhancements to the System Generation and the Configured System Test Executive. New or enhanced Unit Program operating instructions are found in the appendices B thru I. Loading procedure for the Master System Test or the Configured System Test media (may be recorded on magnetic tape, cartridge disk, or flexible diskette) using the appropriate bootstrap routine contained in Appendix A.

3.2 Preliminary Tests

The Preliminary Test includes a 24 level PIM test and a Clock Test along with the instruction and Map 0 Memory Test.

3.2.1 Preliminary Test Sense Switch Definitions

The following Sense Switches in the ON position prior to execution of the bootstrap loader have the following effects.

- . Sense Switch 1 - The Preliminary Test will halt to allow the operator to execute the 24 level PIM Test by entering a non zero into Register A. The operator resets SS1 prior to depressing START, unless SS1 is required for a subsequent option.
- . Sense Switch 2 - Preliminary Test loop on error. Normally this switch is not set when the bootstrap loader is executed. If an error occurs during Preliminary Tests the system will halt, then the operator can set Sense Switch 2 and then depress START. This action will loop on error without halting.
- . Sense Switch 3 - Loops on Preliminary Tests.

3.2.1.2 Preliminary 24 Level PIM Test

This test is optional and may be selected by setting Sense Switch 1 (SS1) prior to booting the system. The program will then halt with 000060 in the instruction register. To run the 24 level PIM Test enter a non-zero value in the A Register. The 24 Level PIM Test uses the masking function to check for proper execution of all 24 interrupt lines. It also checks the disable PIM instruction by use of a sense command. There are 2 halts that are possible if failure occurs. Program halt with 000061 in the instruction register indicates the Sense PIM disabled command did not detect PIM's disabled after execution of a disable PIM's command. Program halt 000062 the A Register contains the address of a table showing the sequence of interrupts received. For program halt with 000063 in the instruction register indicates one or more interrupts did not occur. Each entry in the table has a bit set corresponding to the interrupt line causing the interrupt. The B and X registers indicate interrupts received as follows:

Interrupt lines 07-00 are represented by bits 7-0 of the B Register.

Interrupt lines 17-10 are represented by bits 15-8 of the B Register.

Interrupt lines 27-20 are represented by bits 7-0 of the X Register.

Note: A one bit indicates an interrupt was received. When a numbered halt is indicated, examine the I (Instruction) Register.

A loop on the error may be made by setting Sense Switch 3 and pressing START. If the error is valid for the configuration and you wish to continue, press START.

3.2.1.3 Preliminary Real Time Clock Test (57 HALT)

This test is automatically executed after a successful execution of the Preliminary Memory Test. The test verifies that the Real Time Clock interrupt occurred. Program Halt with 57 in the instruction register indicates an interrupt should have occurred, but did not. To loop on the error, set Sense Switch 3 and press START.

3.3 System Generation

This section describes the enhancements to the System Generation dialogs and the Sense Switches.

3.3.1 System Generation Sense Switch Definitions

The Sense Switches in the 'ON' position prior to booting the System Generation Master media have the following effects.

- . Sense Switch 1 - With SS1 in the 'ON' position prior to executing the bootstrap, loader will stop in the Preliminary Test. Refer to paragraph 3.2.1. If the Sense Switch is left on, the system will halt to allow the operator to change the console device address for the System Generation dialog. Register A contains the default device address of 01. Enter a different device address and press START.
- . Sense Switch 2 - This Sense Switch in the 'ON' position allows the operator to copy the Master System Test to another media. Refer to Appendix A.
- . Sense Switch 3 - This Sense Switch in the 'ON' position will cause the System Generation to store the configured Unit Programs in Map 0 and will not write the configured System Test to the output media.

3.3.2 System Generation Dialog Enhancements

The following paragraphs describe the enhancements to the System Generation dialog.

3.3.2.1 Introductory Heading

The following heading is displayed when the System Generation program is loaded.

V70-SERIES SYSTEM TEST GENERATION--REV E.0

SELECT CONFIGURATION QUESTIONS

NOTE: ACCEPTABLE REPLIES ARE IN ()

DEFAULT=0 OR VALUE AFTER ;

END EACH LINE WITH CARRIAGE RETURN OR PERIOD

IF REPLY IS OMITTED, DEFAULT VALUE IS USED

A=ALL, H=HELP, I=INDEX, N=NO OR NONE, Y=YES

* INDICATES PRESELECTED SYSTEM QUESTION

LEADING 0=OCTAL, MAY BE OMITTED

CNFG? (I,H,A,0,8,9,....18,99;A)

The CNFG replies include the following changes.

- . Question numbers may be repeated to generate multiple copies of the Unit Program.
- . A zero reply indicates that no dialog is required. This is a special case to output the preliminary block and the System Test Executive, but no Unit Programs.

3.3.2.2 Question 1

The following CPU types are now available.

- 0 - V77-500/700/800
- 1 - V77-600, V75, V76
- 2 - V77-900

3.3.2.3 Question 3

*3 MEMORY PARITY EVEN INTERRUPT ADR? (010-076; 060)

3.3.2.4 Question 11

11. HOW MANY DISK CONTROLLERS-UP4,5,6,13,14,16? (0-4) 4.

DISK 1:

MODEL CODE NO?(H,0-05) H.

(0=TYPE DF)

(1=TYPE DC,DD,DE)

(2=TYPE DH)

(3=TYPE DJ)
 (4=TYPE DG)
 (5=TYPE DK)

MODEL CODE NO?(H,0-05) 0.
 DEVICE ADDRESS?(0-076; 16) .
 BIC/BTC EVEN DEVICE ADDRESS?(0-076)
 BIC/BTC COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276)
 EACH SEEK COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276)
 WHICH TRACK,SECTOR (T=0-0312/0625,S=0-027)?(T,S)
 WHICH PLATTERS,UNITS(P=0-3,U=0-3)?(PU,...)

DISK 2:

MODEL CODE NO?(H,0-05) 1.
 DEVICE ADDRESS?(0-076; 15) .
 BIC/BTC EVEN DEVICE ADDRESS?(0-076)
 BIC/BTC COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276)
 SEEK COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276)
 WHICH HEAD?(0-023)
 WHICH UNITS?(0,1,..3) .

DISK 3:

MODEL CODE NO?(H,0-05) 2.
 EVEN DEVICE ADDRESS?(0-076; 14) .
 COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276)
 WHICH CYLINDER,HEAD(C=0-0632/01466,H=0-4/022)?(C,H)
 WHICH UNITS?(0,1,..7) .

DISK 4:

MODEL CODE NO?(H,0-05) 3.
 DEVICE ADDRESS?(0-076; 16) .
 BIC/BTC EVEN DEVICE ADDRESS?(0-076)
 BIC/BTC COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276)
 CONTROLLER COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276)
 WHICH UNITS?(0,1,..3) .

3.3.2.5 Question 12

12. HOW MANY MAG TAPE CONTROLLERS-UP7?(0-4) 1.

MAG TAPE 1:

MODEL CODE NO?(H,0-02) H.
 (0=NO STATUS WORD)
 (1=SINGLE SPEED,STATUS WORD)

(2=MULTI-SPEED,STATUS WORD)

MODEL CODE NO?(H,0-02) 2.
 DEVICE ADDRESS?(0-076; 10) .
 BIC/BTC EVEN DEVICE ADDRESS?(0-076)
 BIC/BTC COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276)
 MOTION COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276)
 WHICH UNITS?(0,1,..3) .

The model code 02 is used on the U24 tape drive at 125 IPS.

3.3.2.6 Question 13

13. HOW MANY PRINTERS-UP8,12?(0-4) 2.

PRINTER 1:

MODEL CODE NO?(H,0-02) H.

(0=LINE PRINTER)
 (1=SUL PRINTER)
 (2=LASER PRINTER)

MODEL CODE NO?(H,0-02) 0.
 DEVICE ADDRESS?(0-076; 35) .
 BIC/BTC EVEN DEVICE ADDRESS?(0-076) 36.
 BIC/BTC COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276) 100.

PRINTER 2:

MODEL CODE NO?(H,0-02) 2.
 DEVICE ADDRESS?(0-076; 36) 7.
 CHANNEL COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276) 100.
 CCB ADDRESS?(0100-0270;0200) 200.

3.3.2.7 Question 14

14. HOW MANY DCM'S-UP9?(0-4) 1.

DCM 1:

MODEL CODE NO?(H,0-03) H.
 (0=ASYNCHRONOUS DIRECT CONNECT)
 (1=ASYNCHRONOUS DATA SET)
 (2=SYNCHRONOUS)
 (3=BI-SYNCHRONOUS)

MODEL CODE NO?(H,0-03) 2.
 DEVICE ADDRESS?(0-076; 70) .
 INTERRUPT ADDRESS ORIGIN?(0100-0260:260) .
 BITS PER BYTE?(5-010;10) .
 LCB MEMORY PAGE?(070-077;75) .
 NON-POLL/BACK-TO-BACK LINES?(N,0,1,...077;A) A.
 POLLING LINES?(N,0,1,...077;A) A.
 TERMINAL-UP10?(Y;N) Y.

Non-poll lines pertain to non-polling type terminals. The back-to-back lines are the lines to be tested. Whenever no terminals are present a back-to-back adapter is used in lieu of the terminals. Polling lines refer to polling type terminals. Model codes 0 and 3 do not support the terminal test.

3.3.2.8 Question 16

16. CARD READER-UP17?(Y;N)

DEVICE ADDRESS?(0-076;30)
 BIC/BTC EVEN DEVICE ADDRESS?(0-076)
 BIC/BTC COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276)

The purpose of this question is to determine whether the Card Reader Unit Program must be included in the Configured System Test. It asks to provide more information about the device address, the BIC/BTC device address, and the BIC/BTC complete even interrupt address.

3.3.2.9 Question 17

17. HOW MANY LOCAL TERMINALS-UP18?(0-7)

Where: n advances from 1 to 7 depending upon the value entered above.
 TTY/CRT N

DEVICE ADDRESS?(0-07;1)
 BIC/BTC EVEN DEVICE ADDRESS?(0-076)
 BIC/BTC COMPLETE EVEN INTERRUPT ADDRESS?(0100-0276)
 READ READY EVEN INTERRUPT ADDRESS?(0100-0276)
 WRITE READY EVEN INTERRUPT ADDRESS?(0100-0276)

The purpose of this question concerns the terminals for which Unit Programs have to be included in the Configured System Test. The maximum number of terminals that can be configured for testing is 7. For each line printer, a series of questions are asked. A zero entry indicates that no terminals are to be tested.

3.3.2.10 Question 18

The Instruction Test is not implemented at this revision level.

When all dialog questions have been answered, the system displays the following directives.

SYSTEM CONFIGURATION DONE

ENTER OPTION:

<CC> =REPEAT DIALOG
 <SP> =OUTPUT CONFIGURED SYSTEM TEST
 < > =RE-BOOT SYS GEN
 <CR> =BOOT SYSTEM TEST

PREPARE OUTPUT DEVICE-ENTER SPACE WHEN READY

3.3.2.11 Dialog Control Commands

The Control C is used to restart the dialog questions in case of a mistake.

A new function, Control K n, can be used to back up the dialog to a previous major numbered question. The n specifies the number of questions to back up.

3.4 Configured System Test Enhancements

A number of enhancements have been made to the System Test Executive which include new operator input commands. The following is a list of all System Test Executive commands.

EXECUTIVE COMMANDS

NOTE: ALL COMMANDS END WITH CR OR . . .

CONTROL C RE-INITIALIZES & RETURNS TO EX**

CONTROL K (N) OBTAINS STATUS REPORT

N=REPORT TIME PERIOD IN MINUTES

/L=OUTPUT TO LPR

/P=OUTPUT TO LPR & TTY/CRT

(K)=MAP KEY

HELP:PRINT COMMAND LIST

H(/L)

INDEX=PRINT UNIT PROGRAM LIST

IN(/L)

RUN:RUN UNIT PROGRAMS

RU(/L) (/F) (/T) (/D) (N1,N2,...)

/L=OUTPUT TO LPR

/P=OUTPUT TO LPR & TTY/CRT

/F=FIXED MODE
/T=TRAP(DEBUG) MODE
/D=DIAGNOSTIC MODE

ENABLE:

PGM(OR DEVICE): EN(N1,N2,...)
PARITY INTERRUPT: DP
CACHE: EC
SPURIOUS INTERRUPT: ES

DISABLE:

PGM(OR DEVICE): DN (N1,N2,...)
PARITY INTERRUPT: DP
CACHE: DC
SPURIOUS INTERRUPT: DS

EDIT:DISPLAY/ALTER KEYS,PAGES
 ED(CR OR .) (K) (.P)

LIST:PRINT ENABLED UNIT PROGRAMS LIST
 LI(/L,/P) (CR OR .)

CHANGE MAP:ALTER NEXT MAP KEY,PAGE
 CM(K) (,P)

LOG:PRINT ERROR LOG TABLE
 L(/L,/P)

REGISTER:DISPLAY/ALTER REGISTERS
 (A) (B) (X) (R) (N) (,K) (CR OR .) (D) (T)
 NOTE:D=NEW DATA,IF ANY
 T=COMMA DISPLAYS/ALTERS NEXT REGISTER
 =OTHER TERMINATES COMMAND

KEY:DISPLAY KEYS/SET DEBUG MAP KEY
 K(/L,/P) (N)

CHANGE:DISPLAY/ALTER MEMORY IN K
 C(X) (,K) (CR OR .) (D) (T)
 NOTE:D=NEW DATA,IF ANY
 T: ,=NEXT: .=PREV; *=INDIRECT;CR=END

VIEW:MEMORY FROM X TO Y, IN K,ON LPR &/OR TTY
 V(/L,/P) (X) (,Y) (,K)
 OR VIEW MAP REGISTERS
 VM(/L,/P) (K)

INSERT:INSERT P INTO X TO Y, IN K
 I(X),(Y) (,P) (,K)

SEARCH:FROM X TO Y, IN K, FOR P MASKED BY M
 S(/L,/P) (X), (Y) (,P) (,M) (,K)

TRAP:TRAP AT X, GO TO Y, IN K
 T (X) (,Y) (,K)

The following paragraphs describe the new commands for the System Test Executive.

3.4.1 Status Command

The status of all running programs may be obtained without re-running by entering a Control k n at any time. This causes the status to be displayed. The status consists of the data supplied by the RUN command. If the n is a period, the status is displayed once, if n is a numeric then the status will be displayed every n minutes.

3.4.2 Multiple copies of Unit Programs

If multiple copies of a Unit Program are configured, each copy can be run, enabled or disabled individually.

3.4.3 Change Command

The Change (C) Command allows for octal, decimal or ASCII characters. The following is an example:

C3002,1 (007301) d
 where d is in the following format

d = positive octal data
 -d = negative octal data
 :d = positive decimal data
 -:d = negative decimal data
 'd = ASCII data

3.4.4 View Command

The View Command now includes the capability to view the map registers and has the following format.

VMK
 where k is the map key from 0-17

3.4.5 Unexpected Interrupt Message

When the System Test Executive displays the UNEXPECTED INTERRUPT AT XXXX Message the interrupt vector address (XXXX) is included as part of the message.

4. SUPPORTED SOFTWARE

V70 Series System Test is being released under one part number (92() 0114-001E0) but currently has 16 component parts as listed in Section 1.5.

5. SUPPORTED HARDWARE

Hardware supported by the System Test is defined as follows:

- (1) Minimum System Configuration
- (2) Supported hardware

5.1 Minimum System Configuration

The minimum system configuration is:

- (1) V70-Series CPU
- (2) 64K (16-bit words) read/write memory
- (3) Teletypewriter or CRT keyboard
- (4) Real time clock
- (5) Megamap

5.2 Supported Hardware

The supported mainframe options are:

- (1) Floating Point Processor
- (2) Writable Control Store
- (3) Cache

The supported peripheral device options are:

- (1) Disk (VORTEX) types DB, DC, DD, DE, DF, DG, DH
- (2) Magnetic tape
- (3) Line printer
- (4) SUL printer
- (5) Laser printer

- (6) DCM
- (7) Terminal
- (8) Intercomputer Link
- (9) Combo I/O which interfaces to the card reader, printer and UASC interface.

6. GUIDELINES AND RESTRICTIONS

6.1 Guidelines

Before attempting a System Generation, UP-9098 should be read and understood. This section of the SRD further clarifies the operation of System Test and the System Generation phase. References will be made to UP-9098 and one should be on hand.

Question number 11 asks for the disk model. The following list gives a cross reference of VORTEX type, model, and feature numbers.

| <u>DISK TYPE</u> | <u>MODEL</u> | <u>TYPE AND FEATURE NUMBERS</u> |
|------------------|--------------|---|
| DF | 0 | F3094-00, F3094-02, F3094-03 F3310-00, F3310-01, F3310-02 |
| DC, DD, DE | 1 | 2822-00, 2822-02 |
| DH | 2 | 2825-00, 2825-01, 2825-02 2826-00, 2826-01 2824-00, 2842-02 2843-00, 2843-01 |
| DJ | 3 | F3353 |
| DG | 4 | F2823-00, F2823-02, F2823-04, F2823-05, F2824-00, F2824-02, F2824-04, F2824-05, F3091-00, F3092-00 |

Question number 12 asks for the magnetic tape model (0-1). The following list is a cross reference by model and feature numbers. All Sperry Univac MCO magnetic tape controllers are software compatible. If the feature number is not listed, use model 0 as the response.

| <u>MODEL</u> | <u>FEATURE NUMBERS</u> |
|--------------|--|
| 0 | F3088-00, F3088-01, F3088-02 F3089-00, F3089-02, F3089-03 |
| 1 | F3093-00, F3093-02, F3093-03 0870-35, 0870-38, 0870-98, 0870-99 |

Question number 14 asks for the DCM model code number. The following is a cross reference between the model and the feature number:

| <u>MODEL</u> | <u>FEATURE NUMBERS</u> |
|--------------|------------------------|
| 0 | F3001-00 |
| 1 | F3001-01,-02,-03 |
| 2 | F3001-04 |
| 3 | F3001-05, F3006-00 |

6.2 Restrictions

6.2.1 Disk Test, Model 2, Type DH (M4DH06.B). In this program, access control is not incorporated in the storage module type disk (DH). When the program is run with dual access, it is possible for one system to lock the other out when the user terminates testing on either system.

6.2.2 Terminal Test (M4TT10.0)

- . Only one terminal is output to at a time, it might seem that all the terminals are working simultaneously, but the speed is what causes this misconception.

6.2.3 Disk Test, Model 4, Type DG (M4DG13.0)

- . The MSC Unit Program diagnostic mode will allow access to any cylinder address. However, any attempt to write any cylinder other than cylinder 560 will be aborted.

6.2.4 Disk Test, Model 3, Type DJ (M4DJ16.0)

- . Closing the door on the drive unit generates an interrupt that is not currently defined during System Generation. This will result in a spurious interrupt (IIA 36) which may be ignored.

7. KNOWN PROBLEMS

Due to equipment and time limitations, not every possible configuration or device has been validated. As configuration problems are discovered, DSUR's should be written so that these problems can be corrected.

On V77-800 systems with the storage module type DH disk, a rate error message from disk test may occur. This is a possible hardware problem and is being investigated.

When the Control-C or interrupt switch is used to terminate the running of the Unit Programs the storage module type DH disk (UP06) and the DCM (UP09) may be left in a state where they are trying to interrupt. When a new run of the Unit Programs is started, unexpected interrupts from these devices may occur. This only occurs at the start of a run. This is not an error indication and can be ignored.

Another general problem is system overloading. It is not always possible to run every device in a system at the same time because of the DMA trap rate. There is a practical limit to how many DMA trap requests the system can handle in a given amount of time. This loading factor varies with the system configuration and is not easily computed. If a DMA overload problem is suspected, reduce the number of devices.

Other problems that have been reported from the Field via Diagnostic Software USER Reports include the following:

| <u>DSUR NO.</u> | <u>PROBLEM</u> |
|-----------------|--|
| 42378 | FECF - Displays 'HOST CAN NOT RECEIVE DATA' when run with any other Unit Programs. |
| 42381 | FECF - Slow op-com speed causes program to report 'HOST CAN NOT RECEIVE DATA' although test runs ok. |
| 49544 | Magnetic Tape Unit Program (M4MT07) - Systems Test Reports Pertec Disc 'Selected Unit Timing Errors' when the disc is run concurrently with a phase encoded (PE) 125 IPS Bristol Mag Tape. |

It is suspected that at 010000, the mag tape program's I/O algorithm is too low for this configuration.

Another problem is with the Card Reader/Printer Combination I/O Controller Test M4CR17. The Diagnostic Wrap-Around Test was written for the T0798 Printer, if other printers are used, the printer cables must be disconnected.

8. DSURS CLOSED BY THIS RELEASE

15294
19254
36760
42642
49526
50136

9. DOCUMENTATION CHANGES

An update to the System Test User Guide (UP-9098) will be released in the future to upgrade the manual to reflect the changes caused by this release.

APPENDIX A

This appendix describes the procedure to generate a Master System Test from Magnetic Tape or Disk (cartridge or Floppy) to a Disk (Cartridge or Floppy).

PROCEDURE:

1. Mount the Master System Test medium.
2. Mount a formatted (VORTEX II or Maintain III) scratch disk.
3. Set sense switch 2 (on).
4. Enter the appropriate bootstrap routine into memory.

| MAG TAPE BOOT | | DISK BOOT | |
|---------------|----------|-----------|-----------------|
| LOCATION | CONTENTS | LOCATION | CONTENTS |
| 200 | 1031BE | 1130 | 1004DA |
| 201 | 005301 | 1131 | 1040DA |
| 202 | 1031B0 | 1132 | 1002DA |
| 203 | 1000BE | 1133 | 005001*(011170) |
| 204 | 1000DA | 1134 | 1031DA |
| 205 | 1012DA | 1135 | 1010DA |
| 206 | 007002 | 1136 | 001141 |
| 207 | 005000 | 1137 | 001000 |
| 210 | 001000 | 1140 | 001135 |
| 211 | 000205 | 1141 | 1025DA |
| 212 | 1000B0 | 1142 | 151167 |
| 213 | 104UDA | 1143 | 001016 |
| 214 | 005141 | 1144 | 001130 |
| 215 | 001000 | 1145 | 1000B0 |
| 216 | 000200 | 1146 | 1003DA |
| | | 1147 | 005102*(021171) |
| | | 1150 | 1032DA |
| | | 1151 | 1031BE |
| | | 1152 | 006010 |
| | | 1153 | 001130*(001127) |
| | | 1154 | 1031B0 |
| | | 1155 | 1000BE |
| | | 1156 | 1000DA |
| | | 1157 | 1014DA |
| | | 1160 | 001157 |
| | | 1161 | 1025DA |
| | | 1162 | 151167 |
| | | 1163 | 001016 |
| | | 1164 | 001130 |
| | | 1165 | 001000 |
| | | 1166 | 000600 |
| | | 1167 | 007760 |
| | | 1170 | 000001*(020000) |
| | | 1171 | 000001*(020001) |

APPENDIX A

NOTE: *-If booting a cartridge disk, use the parenthetical values.
In the above routines, replace BE, BO, DA, and U by:

BE=BIC even address

BO=BIC odd address

DA=device address

U=unit number (0-3)

5. Set the X register to 07000.
6. Start (set the program counter) at 0212 (tape) or 01130 (disk).

After loading, the following message is printed:

V70-SERIES SYSTEM TEST GENERATION--REV E.0

SELECT CONFIGURATION QUESTIONS

NOTE: ACCEPTABLE REPLIES ARE IN ()

DEFAULT=0 OR VALUE AFTER ;

END EACH LINE WITH CARRIAGE RETURN OR PERIOD

IF REPLY IS OMITTED, DEFAULT VALUE IS USED

A=ALL, H=HELP, I=INDEX, N=NO OR NONE, Y=YES

* INDICATES PRESELECTED SYSTEM QUESTION

LEADING O=OCTAL, MAY BE OMITTED

GENERATE MASTER SYSTEM TEST

.SYSTEM GEN INPUT DEVICE?(H,0-3;1)

SELECT THE APPROPRIATE DEVICE AND ENTER THE REQUIRED PARAMETERS.
AFTER THE DATA IS ENTERED, THE FOLLOWING MESSAGE OCCURS:

.SYSTEM GEN OUTPUT DEVICE?(H,0-3;1)

AGAIN, SELECT THE APPROPRIATE DEVICE AND ENTER THE REQUIRED
PARAMETERS.

7. When the generation is complete, the message "DONE" is output. Reset SS2 to proceed with the System Generation dialogue, or remove and save the input and output media.

If any errors occur during the generation of the Master System Test, the entire procedure must be repeated.

APPENDIX B

V77 CARTRIDGE DISK TEST UNIT PROGRAM
(F3094, F3096 and F3310)B.1 PURPOSE AND OPERATION

The purpose of the test is to verify the correct operation of the cartridge disk type configured into the generation of the System Test version being run. The unit configured must be one of the types listed in the test title above.

The Run Command is used to execute all unit programs. The format of this command and the options available are given in Section 6.4.5, page 6-12 of UP9098. The following discussion covers the purpose and operation of the System Mode and the Diagnostic Mode.

B.2 SYSTEM MODE

The System Mode consists of building a buffer full of data, writing the buffer to the disk, clearing the buffer, reading the record and comparing the data read to the pattern written. This is a continuous operation alternating between all disk units being tested. The patterns used in System Mode are 052525 and its complement 125252. The buffer utilized is the logical memory area from the end of the program to the end of memory in the assigned map key. Logical memory is assigned physical memory as it is required. The record size used is random. When all available memory has been used as buffer space, the program exits to the Test Executive. System Mode is an option of the Run Command. See Section 6.4.5, page 6- .

B.3 DIAGNOSTIC MODE

In the Diagnostic Mode the program requests a diagnostic command be input. Each command entered causes the indicated test to be run thru one execution. Then, request for entry of another command is output. Some tests also allow provision of a continuous loop of the test. After entering the diagnostic option of the Run Command, the console will display:

INPUT DIAGNOSTIC COMMAND

Diagnostic Mode commands are positional and must be entered as follows:

command, continuous run flag "C", status mask/unit
or
Z, read retry count, write retry count, fixed record
length, fixed pattern, sector number, track number
one, track number two (for seek only)

APPENDIX B

where:

Command = O,A,C,D,F,H,R,S,T, or W
(see list of valid commands below for meanings of these commands)

Continuous Run Flag = C
(This parameter is not applicable to some commands. See command list, below)

Status Mask = a 16-bit mask corresponding to the following list:

- * B15 - SYNC BYTE NOT FOUND
 - * B14 - FORMAT ERROR
 - * B13 - HEADER COMPARE ERROR
 - B12 - UNIT NOT READY
 - B11 - UNIT WRITE PROTECTED
 - * B10 - END OF TRACK ERROR
 - * B9 - READ CRC ERROR
 - B8 - CRC SEARCH ERROR
 - * B7 - SELECTED UNIT TIMING ERROR
 - B6 - SELECTED UNIT MALFUNCTION
 - B5 - SELECTED UNIT ILLEGAL ADDRESS
 - B4 - SELECTED UNIT ILLEGAL SECTOR
 - B3 - UNIT 3 SEEK COMPLETE
 - B2 - UNIT 2 SEEK COMPLETE
 - B1 - UNIT 1 SEEK COMPLETE
 - B0 - UNIT 0 SEEK COMPLETE
- * WHEN BOTH BITS 7 AND 9 ARE SET (1) STATUS BITS MARKED WITH AN ASTERISK HAVE THE FOLLOWING MEANING:
- B15 - SERIAL PARITY ERROR (BITS 8-15)
 - B14 - SERIAL PARITY ERROR (BITS 0-7)
 - B13 - BUS PARITY ERROR (BITS 8-15)
 - B10 - BUS PARITY ERROR (BITS 0-7)
 - B9 - PARITY ERROR FLAG
 - B7 - PARITY ERROR FLAG

When the status mask is entered, zero bits represent errors that the test will ignore. One bits represent errors the test will report. The status mask default will report all errors.

Unit = Platter-Unit-Device Address applies to the format command only.
(F,,1016 for Platter 1-Unit 0-Device Address 16)

APPENDIX B

The Z command is a special case:

Z, Read Retry Count, Write Retry Count, Fixed Record Length, Fixed Pattern Sector Number, Track Number One, Track Number Two (For Seek Test Only)

This command sets parameters used for all other tests selected. See the list of valid commands for the duration of these parameters.

The parameter values are:

Read Retry Count = 0-32767

Write Retry Count = 0-32767

Fixed Record Length = Word count. If maximum count for the drive under test is exceeded, the program will select the maximum size for the drive.

Fixed Pattern = 0-77777 (octal) a one-word bit pattern.

Sector Number = 1-057 (octal). A 0 indicates a random sector number.
A -1 indicates Sector 0.

Track Number One = 1-0624 (octal). A 0 indicates a random track number.
A -1 indicates track 0.

Track Number Two (Used only for Seek Test) = 1-0624 (octal). A 0 indicates a random track number. A -1 indicates track 0.

After the Z command has been entered,

INPUT DIAGNOSTIC COMMAND

will again be output to the console.

When a command has been entered and executed, exit is to the routine which outputs the Enter Diagnostic command message.

Valid commands are:

0 - Runs as if in System Test Mode. The continuous run flag is not applicable. Any parameters entered with the 'Z' command will apply. At the end of execution the program will exit to the Test Executive and be rescheduled in the Diagnostic Mode in another map key.

APPENDIX B

- A - Unique Address Test. The program starts with Sector 0 and Track 0. Using a fixed record length of 0170 (octal) and a random buffer pattern records are written to every sector and track of the disk. Before writing the record word zero of the buffer is changed to the track number and word one is changed to the sector number. When the last sector (057) of the last track (0624) has been written, the disk is recalibrated. The entire disk is then read and the data is compared to the expected value. This test may be run with the continuous run flag "C" but it should be remembered that one execution of the test takes 25 or more minutes.
- C - Compatability Test. When a unique address test (A) has been run on a cartridge, the cartridge may be mounted on another unit and run using this command to insure compatability between the two drives. This test is the read portion of the unique address test. The continuous run flag is applicable.
- D - Runs as if in System Test Mode. The program will not exit upon completion of the run. Instead it will again output the enter diagnostic command message. The continuous run flag "C" is applicable.
- F - Format Test. The program will format the disk. Requires Platter-Unit-Device Address as third parameter. Example: F,,1016 for Platter 1-Unit 0-Device Address 16.
- H - Help. Lists all valid commands.
- R - Read Test. A fixed length (0170) is read and the program exits. The continuous run flag "C" may be used for continuous reads. This test must be preceeded by the write test (W).
- S - Seek Test. This test seeks back and forth between two tracks. The continuous run flag "C" may be used. The "Z" command should be used preceding this test to set the two track addresses for the seeks.
- T - Sense Test. This test checks various status bits to see if they are properly set and cleared under appropriate conditions. The Sense Seek complete commands is also tested. Bits in the status word which are tested are bits 4,5,8 and 10.
- W - Write Test. A fixed length record (0170) is written and the program exits. The continuous run flag "C" may be used for continuous writes.
- Z - Command Parameters. This command allows certain parameters to be entered. These parameters will apply to all following tests run until the program is rescheduled, another "Z" command is input, or a test is run which overlays any of these fields. The parameters are positional, and missing parameters must be indicated by ",,". The parameters which may be input are:

APPENDIX B

Read Retry Count, Write Retry Count, Fixed Record Length,
Fixed Pattern, Sector Number, Track Number One, Track Number
Two (For Seek Test Only)

The Status word mask may be changed to ignore certain errors by following a command with the desired mask. A "0" bit in the mask causes that bit to be ignored.

B.4 ERROR MESSAGES

Any errors encountered during a System Test run will cause an error message to be output. The unit having the error condition is flagged as down and processing continues as long as there is a unit available for processing. When a unit is in the ready condition, even though it has been flagged as down, another attempt to use the unit will be made.

The first line of each error message is generated by the Test Executive and is described in the Test Executive design description UP9098. The following information is output by the unit program:

BIC ERROR MESSAGES-

(Line 1) (Generated by System Test Executive)

(Line 2) BIC XXXXXX TIMEOUT (error message) ERROR
BIC XXXXXX (error message) ERROR

"ERROR MESSAGE" slot in line 2 will contain one of the following:

BUSY
SETUP
ABNORMAL BIC DEVICE STOP ON WRITE
ABNORMAL BIC DEVICE STOP ON READ
BIC STOPPED-MAP MEMORY
NOT AVAILABLE

(Line 3-where applicable)

INITIAL ADDRESS XXXXXX

(Line 4-where applicable)

FINAL ADDRESS WAS XXXXXX SHOULD BE XXXXXX

APPENDIX B

DEVICE ERROR MESSAGES-

(Line 1) (Generated by System Test Executive)

(Line 2) DK XXXXXX TIMEOUT (error message) ERROR
 DK XXXXXX (error message) ERROR

"ERROR MESSAGE" slot in line 2 will contain one of the following:

.RECALIBRATION
 INITIALIZE CONTROLLER
 FORMAT DISK
 HEADER READ
 VERIFY FORMAT
 WRITE
 READ
 WRITE/READ DATA COMPARE
 OUTPUT TRACK ADDRESS
 OUTPUT SECTOR ADDRESS
 SELECT SEEK MODE
 SELECT SECTOR MODE
 SEEK COMPLETE
 SENSE ERROR
 SELECTED UNIT NOT READY
 UNIT WRITE PROTECTED
 ILLEGAL ADDRESS BIT (5) NOT SET
 ILLEGAL SECTOR BIT (4) NOT SET
 END OF TRACK ERROR (B10) NOT SET
 HEADER WRITE
 SEARCH ERROR (B8) NOT SET
 SEARCH ERROR (B8) SET

(Line 3) TRACK XXXXXX SECTOR XXXXXX

(Line 4-where applicable)

STATUS WORD XXXXXX

(Line 5-n for each bit set)

- * B15 - SYNC BYTE NOT FOUND
- * B14 - FORMAT ERROR
- * B13 - HEADER COMPARE ERROR
- B12 - UNIT NOT READY
- B11 - UNIT WRITE PROTECTED

APPENDIX B

- * B10 - END OF TRACK ERROR
- * B9 - READ CRC ERROR
- B8 - CRC SEARCH ERROR
- * B7 - SELECTED UNIT TIMING ERROR
- B6 - SELECTED UNIT MALFUNCTION
- B5 - SELECTED UNIT ILLEGAL ADDRESS
- B4 - SELECTED UNIT ILLEGAL SECTOR
- B3 - UNIT 3 SEEK COMPLETE
- B2 - UNIT 2 SEEK COMPLETE
- B1 - UNIT 1 SEEK COMPLETE
- B0 - UNIT 0 SEEK COMPLETE

- * WHEN BOTH BITS 7 AND 9 ARE SET (1) STATUS BITS MARKED WITH AN ASTERISK HAVE THE FOLLOWING MEANING:

- B15 - SERIAL PARITY ERROR (BITS 8-15)
- B14 - SERIAL PARITY ERROR (BITS 0-7)
- B13 - BUS PARITY ERROR (BITS 8-15)
- B10 - BUS PARITY ERROR (BITS 0-7)
- B9 - PARITY ERROR FLAG
- B7 - PARITY ERROR FLAG

FORMAT ERROR MESSAGE

(Line 1) (Generated by System Test Executive)

(Line 2) DK XXXXXX FORMAT ERROR-

(Line 3) EXPECTED XXXXXX XXXXXX XXXXXX

(Line 4) FOUND XXXXXX XXXXXX XXXXXX

DATA COMPARE ERROR MESSAGE

(Line 1) (Generated by System Test Executive)

(Line 2) DK XXXXXX BUFFER ADDRESS XXXXXX SIZE (OCTAL) XXXXXX

(Line 3) DATA EXPECTED XXXXXX DATA FOUND XXXXXX

(Line 4) LOCATION XXXXXX

APPENDIX C

V77 MAGNETIC TAPE TEST UNIT PROGRAM - M4MT07

C.1 PURPOSE AND OPERATION

The purpose of the test (M4MT07) is to verify the correct operation of the tape unit type configured into the generation of the System Test version being run. The unit configured must be one of the following types: 0870-XX, F3088-XX MOD 7100, F3089-XX MOD 7102 and 7103, F3093-XX MOD 7104 and 7105.

The RUN Command is used to execute all unit programs. The format of this command and the options available are given in section 6.4.5 in UP9098. The following discussion covers the purpose and operation of the System Mode and the Diagnostic Mode.

C.2 SYSTEM MODE

The System Mode consists of building a buffer full of data, writing the buffer to tape, clearing the buffer, backspacing one record, reading the record and comparing the data read to the pattern written. This is a continuous operation alternating between all tape units being tested. When end of tape is reached, the unit is rewound and processing continues. The pattern used in System Mode are 052525 and its complement 125252. The buffer utilized is the logical memory area from the end of the program to the end of memory in the assigned map key. Logical memory is assigned physical memory as it is required. The record size used is random. When all available memory has been used as buffer space, the program exits to the Test Executive.

C.3 DIAGNOSTIC MODE

The Diagnostic Mode allows the operator to select tests and parameters which can be used to further diagnose a problem in the magnetic tape controller or tape drives. The program displays the following message:

ENTER TEST NUMBERS OR H(ELP)

**DG

The operator has three options available at this time. These are as follows:

- . Entering a period or carriage return will run the previously selected tests.

APPENDIX C

V77 MAGNETIC TAPE TEST UNIT PROGRAM - M4MT07

- Entering the numeric test numbers. Each number must be separated by a comma. A maximum of 8 tests, in any order, can be entered. A zero (0) entry is invalid.
- Entering the H, Help, will display the test menu. Refer to Figure C.3 for the test number descriptions. After the test menu is displayed, the program displays the:

ENTER TEST NUMBERS OR H(ELP) message.

If test numbers are entered these are saved and the program displays the following message.

PARAMETER SELECTION. DEFAULT VALUES (N)

1. RUN COUNT (1). RANGE +1 TO -1
2. ERROR RETRY (2). RANGE +1 TO -1
3. FIXED PATTERN
4. RECORD LENGTH (2)
5. STATUS MASK

The Run Count default is 1 and this value determines the number of times the selected tests will be run. When the Run Count reaches 0, the program displays the:

ENTER TEST NUMBERS OR H(ELP) message.

The Error Retry default is 2. This value is used when an error occurs and determines the number of times the program will retry the function.

The Run Count and Error Retry range is +1 to -1. If a negative value is entered, then the program will operate in a continuous mode.

The Fixed Pattern is optional and the value entered is used instead of the normal patterns.

The Record Length is optional. If the entered value exceeds the maximum count for the drive under test, then the program selects the preset maximum record length.

The Status Mask is optional. The operator can select the status bits to test.

APPENDIX C

V77 MAGNETIC TAPE TEST UNIT PROGRAM - M4MT07

The following is the Status Bit definitions:

| | |
|-----|--------------------------------------|
| B15 | RATE ERROR |
| B14 | LRC ERROR/MULTIPLE DEAD TRACKS (PE) |
| B13 | DEAD TRACK ERROR |
| B12 | FORMATTER FATAL ERROR |
| B11 | CRC ERROR/FALSE POSTAMBLE ERROR (PE) |
| B10 | CHARACTER PARITY ERROR |
| B9 | HIGH DENSITY |
| B8 | NOT USED |
| B7 | REWIND |
| B6 | BOT |
| B5 | EOT |
| B4 | ODD LENGTH |
| B3 | FILE MARK |
| B2 | TRANSPORT NOT READY |
| B1 | WRITE ENABLE |
| B0 | TAPE ERROR |

The operator enters the parameters numbers to be changed or a period or carriage return. The period or carriage return implies no changes to the parameter list and testing will begin.

If parameter numbers are entered, then each parameter is displayed in turn, and the operator enters the appropriate value. When all parameters have been entered, testing begins.

FIGURE C.3 DIAGNOSTIC TEST NUMBERS

1. WRITE TEST. A fixed length record is written (0170).
2. READ TEST. A fixed length record is read (0170).
3. GROWING RECORD TEST. The program starts with a minimum record size (1 or 2) and writes, backspaces, then reads a record. If the data compares, the record length is incremented by one word and the process continues until the maximum record length (9999) or end of tape is reached.
4. WRITE FILE MARK. Writes a file mark.
5. READ FILE MARK. The program reads a fixed record which it expects to be a file mark.

APPENDIX C

V77 MAGNETIC TAPE TEST UNIT PROGRAM - M4MT07

6. FORWARD ONE RECORD. Moves tape forward to the next interrecord gap or to EOT sentinal.
7. BACKSPACE ONE RECORD. Moves tape backward to the next interrecord gap or to BOT sentinal.
10. MOTION TEST. This test checks for tape motion. The test involves re-wind, write file mark, backspace, forward record and writing large and small records. Records are written, then read with comparison of data.
11. RANDOM MOTION TEST. The random motion test writes short records, long records and file marks based on randon number selection. A fixed pattern is used. Tape will be rewound at end of run and exit. Records written are read to insure the correct data was written.
12. COMPATABILITY TEST. When a growing record test (3) has been run on a tape, the tape may be mounted on another tape unit and run using this command to insure compatability between the two drives. This test is the read portion of the growing record test.
13. DIAGNOSTIC TEST. The System Mode tests. Refer to paragraph C.3.2.
14. PARITY TEST. Writes sequential records with a pattern containing a changing bit pattern, then reads them back to determine if a parity error has occurred.
15. REWIND. Rewinds the tape drive.

C.4 ERROR MESSAGES

Any errors encountered during a System Test run will cause an error message to be output. The unit having the error condition is flagged as down and processing continues as long as there is a unit available for processing. When a unit is in the ready condition, even though it has been flagged as down, another attempt to use the unit will be made.

The first line of each error message is generated by the Test Executive and is described in the Test Executive design description UP9098. The following information is output by the unit program:

APPENDIX C

V77 MAGNETIC TAPE TEST UNIT PROGRAM - M4MT07

BIC ERROR MESSAGES

(Line 1) (Generated by System Test Executive)

(Line 2) BIC xxxxxx TIMEOUT (error message) ERROR
BIC xxxxxx (error message) ERROR

ERROR MESSAGE slot in line 2 will contain one of the following:

BUSY
SETUP
ABNORMAL BIC DEVICE STOP ON WRITE
ABNORMAL BIC DEVICE STOP ON READ
BIC STOPPED-MAP MEMORY
NOT AVAILABLE

(Line 3 where applicable)

INITIAL ADDRESS xxxxxx

(Line 4 where applicable)

FINAL ADDRESS WAS xxxxxx SHOULD BE xxxxxx

DEVICE ERROR MESSAGES

(Line 1) (Generated by System Test Executive)

(Line 2) MT xxxxxx TIMEOUT (error message) ERROR
MT xxxxxx (error message) ERROR

ERROR MESSAGE slot in line 2 will contain one of the following:

REWINDING
NOT READY
REWIND
TRANSPORT SELECT
WRITE
WRITE PARITY
BACKSPACE
READ BINARY RECORD
READ FILE MARK INSTEAD OF DATA

APPENDIX C

V77 MAGNETIC TAPE TEST UNIT PROGRAM - M4MT07

READ PARITY
WRITE/READ DATA COMPARE
WRITE FILE MARK
SENSE END OF TAPE
BEGINNING OF TAPE
SENSED HIGH DENSITY
FORWARD ONE RECORD
DID NOT SENSE FILE MARK

(Line 3 where applicable)

STATUS WORD xxxxxxx

(Line 4, n for each bit set)

B15 RATE ERROR
B14 LRC ERROR/MULTIPLE DEAD TRACKS (PE)
B13 DEAD TRACK ERROR
B12 FORMATTER FATAL ERROR
B11 CRC ERROR/FALSE POSTAMBLE ERROR (PE)
B10 CHARACTER PARITY ERROR
B9 HIGH DENSITY
B8 NOT USED
B7 REWIND
B6 BOT
B5 EOT
B4 ODD LENGTH
B3 FILE MARK
B2 TRANSPORT NOT READY
B1 WRITE ENABLE
B0 TAPE ERROR

The systems which have the U24 Magnetic Tape drive and the F3320 controller have a unique status definition for status bits 10 thru 15.

During System Generation, question 12, the model code of 2 is used to denote the special controller F3320.

The status error messages are as follows:

TAPE POSITION OR TAPE RUNAWAY OR I.D. BURST MISSING. This is bit 12 or bit 12 and 9.

APPENDIX C

V77 MAGNETIC TAPE TEST UNIT PROGRAM - M4MT07

NRZI CRC ERROR. This is bit 12 and 11.

P.E. FALSE PREAMBLE. This is bit 12 and 11 and 9.

DATA RECOVERED. This is bit 13 or bit 13 and 9. With this condition the controller recovered the data and the program does not perform a retry.

DATA UNRECOVERABLE ERROR. This is bit 13 or bit 13 and 12.

NRZI LRC ERROR. This is bit 14 and 12.

P.E. MULTIPLE DEAD TRACK ERROR. This is bits 14 and 12 and 9.

RATE ERROR. This is bits 15 and 12.

CHARACTER PARITY ERROR. This is bits 10 and 12.

DATA COMPARE ERROR MESSAGE

(Line 1) (Generated by System Test Executive)
(Line 2) MT xxxxxx BUFFER ADDRESS xxxxxx SIZE (OCTAL) xxxxxx
(Line 3) DATA EXPECTED xxxxxx DATA FOUND xxxxxx
(Line 4) LOCATION xxxxxx

APPENDIX D

V77 LINE PRINTER UNIT PROGRAM
(2819, 2820) (T0789-71 (UNI), -68 (BI)
-81, -78, -75)

D.1 PURPOSE AND OPERATION

The purpose of the test is to verify the correct operation of the printer unit type configured into the generation of the System Test version being run. The unit configured must be one of the types listed in the test title above.

The Run Command is used to execute the Line Printer Program (M4LP08). The format of this command and the options available are given in Section 6.4.5, page 6-12 of UP9098. The following discussion covers the purpose and operation of the System Mode and the Diagnostic Mode.

D.2 SYSTEM MODE

The System Mode consists of advancing to top of form clearing the Print Buffer, filling the Print Buffer with a header, printing the header, skipping one line, filling the Print Buffer with data, printing the data. When forty four lines have been printed it will advance to top of form and continue printing beginning with the header. After eight pages have been printed, the program will time out for one half hour then restart in the next available map key. The pattern used in System Mode consists of a standard 64 ASCII character set in an incrementing Spiral Pattern 104 characters long by 44 lines per page. The buffer utilized is the logical memory area from the end of the program to the end of memory using every tenth page in the assigned map key. Logical memory is assigned physical memory as it is required. When all available memory has been used as buffer space, the program exits to the Test Executive.

System Mode is an option of the Run Command. See Section 6.4.5, page 6-12 of UP9098.

D.3 DIAGNOSTIC MODE

In the Diagnostic Mode the program requests diagnostic parameters to be input beginning with the Run and Retry Counts. All succeeding questions have a menu which will be displayed if desired so by the operator. These parameters are explained in sections D.3.1 thru D.3.5.

APPENDIX D

During execution of Diagnostic Mode the same steps occur advancing to top of form, clearing the print buffer, etc. The program will print eight patterns per count of the Run Count e.g., (Run Count = 2 16 patterns will be printed). When the Run Count has been decremented to zero, control will be returned to the top of the Diagnostic Mode and the questions will be asked again.

D.3.1 This parameter is the Run and Retry Count. The Run Count is the number of how many times you want the program to loop thru memory. The Retry Count is the number of unsuccessful attempts to make before returning to the top of the Diagnostic Mode prompter.

ENTER THE RUN AND RETRY COUNTS
IN THE FOLLOWING FORMAT (RUN/RETRY)

D.3.2 This parameter is the type of printer you are about to test. Input the type of printer accordingly. The SUL printer is a T0789 type of printer.

TYPE IN PRINTER CODE NO.
IF UNKNOWN ENTER H
1=LINE & CHARACTER PRINTER
2=SUL PRINTER

D.3.3 The Character Set number is the maximum ASCII printable code for the print chain.

INPUT CHARACTER SET CODE NO.
IF UNKNOWN ENTER H

CHARACTER SET CODE NO. MENU
1=48 CHARACTER - CHARACTER SET
2=64 CHARACTER - CHARACTER SET
3=96 CHARACTER - CHARACTER SET
4=128 CHARACTER - CHARACTER SET

D.3.4 This parameter is the pattern selection the code will define the pattern accordingly.

INPUT PATTERN CODE NO.
IF UNKNOWN ENTER H

APPENDIX D

PATTERN CODE NO. MENU
 0=FIXED PATTERN
 1=PYRAMID PATTERN
 2=SPIRAL PATTERN

If a fixed pattern was selected, an additional question will be asked.

ENTER CHARACTER FOR FIXED PATTERN

*Only the standard 64 ASCII Character Set is recognized by the Test Executive. To input lower case and special characters, input the octal ASCII equivalent number for that character. e.g., (a=141₈)

D.3.5 Form size will determine the size of the printing, select this parameter accordingly.

ENTER PRINT SIZE
 IF UNKNOWN ENTER H

CHARACTER PRINT SIZE MENU

| CHAR. PER LINE | LINES PER PAGE |
|----------------|----------------|
| 0 = 96..... | 33 |
| 1 = 104..... | 44 |
| 2 = 132..... | 66 |

After this interrogation is complete, the following message will be displayed:

EXECUTION BEGINS.....

This is to notify the operator that execution has begun.

D.4 ERROR MESSAGES

Any errors encountered during the System Mode will cause an error message to be displayed on the opcom. The program will exit to the Test Executive to be rescheduled in another map. However, during the Diagnostic Mode when an error is encountered it will display the error then go back for a retry. Depending on the retry count, it will perform one retry per count of retry for each count of the Run Count.

The first line of each error message is generated by the Test Executive and is described in the Test Executive design description UP9098. The following information is output by the Unit Program:

APPENDIX D

BIC ERROR MESSAGES

(Line 1) (Generated by System Test Executive)
 (Line 2) BIC (Error Message) ERROR

"ERROR MESSAGE" slot in line 2 will contain one of the following:

- BIC BUSY PRIOR TO ACTIVATION
- ABNORMAL DEVICE STOP
- BIC - STOPPED - MEMORY MAP
- TIMEOUT AFTER BIC REQUEST

(Line 3-where applicable)

BIC HALT ADDRESS XXXXXX

(Line 4-where applicable)

BUFFER START ADDRESS XXXXXX

(Line 5-where applicable)

END ADDRESS XXXXXX

DEVICE ERROR MESSAGES

(Line 1) (Generated by System Test Executive)
 (Line 2) LP (Error Message) ERROR

"ERROR MESSAGE" slot in line 2 will contain one of the following:

- PRINTER NOT READY
- BUFFER NOT READY
- PRINTER ERROR
- TIMEOUT AFTER BIC CONNECT
- REPORT STACKER FULL
- REPORT BAND
- REPORT PARITY
- REPORT ACTUATOR
- REPORT TEMPERATURE
- REPORT FORMS RUNAWAY
- REPORT PAPER FEED MOTION
- REPORT FORMS JAM
- REPORT INVALID BAND NO./PROM/TRANSFER
- REPORT DATA PARITY ERROR
- REPORT VFU ERROR
- REPORT POWER LOSS
- REPORT PAPER CHECK

APPENDIX D

PATTERN CODE NO. MENU
 0=FIXED PATTERN
 1=PYRAMID PATTERN
 2=SPIRAL PATTERN

If a fixed pattern was selected, an additional question will be asked.

ENTER CHARACTER FOR FIXED PATTERN

*Only the standard 64 ASCII Character Set is recognized by the Test Executive. To input lower case and special characters, input the octal ASCII equivalent number for that character. e.g., (a=141₈)

D.3.5 Form size will determine the size of the printing, select this parameter accordingly.

ENTER PRINT SIZE
 IF UNKNOWN ENTER H

CHARACTER PRINT SIZE MENU

| CHAR. PER LINE | LINES PER PAGE |
|----------------|----------------|
| 0 = 96..... | 33 |
| 1 = 104..... | 44 |
| 2 = 132..... | 66 |

After this interrogation is complete, the following message will be displayed:

EXECUTION BEGINS.....

This is to notify the operator that execution has begun.

D.4 ERROR MESSAGES

Any errors encountered during the System Mode will cause an error message to be displayed on the opcom. The program will exit to the Test Executive to be rescheduled in another map. However, during the Diagnostic Mode when an error is encountered it will display the error then go back for a retry. Depending on the retry count, it will perform one retry per count of retry for each count of the Run Count.

The first line of each error message is generated by the Test Executive and is described in the Test Executive design description UP9098. The following information is output by the Unit Program:

APPENDIX D

BIC ERROR MESSAGES

(Line 1) (Generated by System Test Executive)

(Line 2) BIC (Error Message) ERROR

"ERROR MESSAGE" slot in line 2 will contain one of the following:

BIC BUSY PRIOR TO ACTIVATION
ABNORMAL DEVICE STOP
BIC - STOPPED - MEMORY MAP
TIMEOUT AFTER BIC REQUEST

(Line 3-where applicable)

BIC HALT ADDRESS XXXXXX

(Line 4-where applicable)

BUFFER START ADDRESS XXXXXX

(Line 5-where applicable)

END ADDRESS XXXXXX

DEVICE ERROR MESSAGES

(Line 1) (Generated by System Test Executive)

(Line 2) LP (Error Message) ERROR

"ERROR MESSAGE" slot in line 2 will contain one of the following:

PRINTER NOT READY
BUFFER NOT READY
PRINTER ERROR
TIMEOUT AFTER BIC CONNECT
REPORT STACKER FULL
REPORT BAND
REPORT PARITY
REPORT ACTUATOR
REPORT TEMPERATURE
REPORT FORMS RUNAWAY
REPORT PAPER FEED MOTION
REPORT FORMS JAM
REPORT INVALID BAND NO./PROM/TRANSFER
REPORT DATA PARITY ERROR
REPORT VFU ERROR
REPORT POWER LOSS
REPORT PAPER CHECK

APPENDIX E

V77 TERMINAL TEST UNIT PROGRAM
UTS10 TTY X3.64 (F3577-00,-01)
U100, U200, UTS20, 40, 60, 400

E.1 PURPOSE AND OPERATION

The purpose of the test is to verify the correct operation of the terminals described above.

The Run Command is used to execute all Unit Programs. The format of this command and its options available are given in Section 6.4.5, in UP9098. The following discussion covers the purpose and operation of the System and Diagnostic modes.

E.2 SYSTEM MODE

The System mode runs in two main loops using common routines. One loop will build a buffer of data, transfer that data to the screen. The data pattern used is an ascending ASCII 253 through 373 octal. The other main loop outputs a poll to the intelligent terminals. Both loops are a continuous operation alternating between all the terminals configured at system time. The buffer utilized for the no traffic, retransmit, messages, etc. and/or for building a buffer of data is the logical memory area from the end of the program to the end of memory in the assigned map key.

Note: Pressing the transmit key will only cause the CRT to sit in a wait state. Do not touch any keyboards operating in System mode.

E.3 DIAGNOSTIC MODE

In the Diagnostic mode the program requests a diagnostic command be input. Each command entered causes the indicated test to be run thru one execution. Then, request for entry of another command is output. After entering the diagnostic option of the Run Command, the program will display:

INPUT DIAGNOSTIC COMMAND
**(1)(2)(3)(4)(5)(6) (H)ELP

where:

Command = 1,2,3,4,5,6, or H (see list below)

APPENDIX E

V77 TERMINAL TEST UNIT PROGRAM
UTS10 TTY X3.64 (F3577-00,-01)
U100, U200, UTS20, 40, 60, 400

The program solicites the Run Count. The range is +1 to -1, the -1 implies continuous run.

When a command has been entered and executed, exit is to the routine which outputs the Enter Diagnostic command message.

Valid commands are:

- 1 - Input/Echo Test. The program displays the same pattern as in System mode, and is waiting for the operator to input a character on the terminal to be tested. When a character is input every terminal will halt display. The message "THIS IS AN ECHO TEST" is displayed. At this time the operator should key in from 1 to 80 characters. Inputting 80 characters will activate ECHO automatically. If less than 80 characters is input, terminate the string with a return, this will activate ECHO. When ECHO is activated all the characters input to the terminal is displayed by the host back on to the screen followed by the message "END OF ECHO TEST". Then the program will resume displaying a pattern on the screens ready for the next terminal to test. The program gives the operator more time to run the test according to the number of terminals which have been configured. There is adequate time for conclusive testing on all the terminals. The program will return to prompter when this time is exhausted.
- 2 - Printer Test. The host will cause a transfer of data from the terminals display memory to the printer. It will function as if the print key had been pressed.
- 3 - Transparent Print Test. In this test the host will turn on the Transparent Print Mode. A TP will appear on the status line to inform the operator. Then a buffer will be filled with 140 characters and transferred to the printer transparently to the display.
NOTE: The Transparent Print Test must be run before the Local Print Test.
- 4 - Cursor Position Test. This test will first display "ENTER TYPE OF CRT, UTS10 = 0, OTHER = 1". Then the program moves the cursor to home and asks the CRT to report the position of its cursor. If there are any discrepancies between where the program told the cursor to move and where the CRT reported the cursor position to be at, then an error message will be displayed.
NOTE: All 1920 positions are tested on each terminal then you are returned to the prompter.

APPENDIX E

V77 TERMINAL TEST UNIT PROGRAM
UTS10 TTY X3.64 (F3577-00,-01)
U100, U200, UTS20, 40, 60, 400

- 5 - Runs as if in System Mode. At the end of execution the program will display its status and then exit to the Test Executive and be rescheduled in the Diagnostic mode in another map key.
- 6 - Echo 400 Mode. This test polls the intelligent terminals similar to Systems mode but will respond with data turn around when data is input to the CRT and the transmit key is depressed. The Run Count on this test is the number of times each terminal will be polled. If no number was specified for the Run Count, then a three is used as a default value.
NOTE: Do not transmit more than eighty characters due to the limited buffer space.
- H - Help. Lists all valid commands.

E.4 ERROR MESSAGES

Any errors encountered during execution of the program will cause an error message to be output. Only timeout errors will cause a line to be downed. On all other errors, processing continues as long as there is a CRT available for testing.

The program won't make another attempt on the CRT until the program is loaded into another map.

The first line of each error message is generated by the Test Executive and is described in the Test Executive design description. The following information is output by the Unit Program.

DCM ERROR MESSAGES

(Line 1) (Generated by System Test Executive)

(Line 2) (Error Message)

"ERROR MESSAGE" in slot 2 will contain one of the following:

DCM ERROR ON LINE (aaaaaa)
DCM TIMEOUT ERROR ON LINE (aaaaaa)
DCM NOT AVAILABLE

APPENDIX E

V77 TERMINAL TEST UNIT PROGRAM
 UTS10 TTY X3.64 (F3577-00,-01)
 U100, U200, UTS20, 40, 60, 400

FRAMING ERRORS
 PARITY ERRORS
 OUTPUT UNDERFLOW
 CONTROL-LINE-IN
 FORMAT ERROR

Where: (aaaaaa) is octal line number

NOTE: In the event of a timeout error, the following additional message will be displayed.

| INTERRUPT EVENT WORD 000000 | INTERRUPT RELIEVED |
|-----------------------------|-------------------------------|
| BIT POSITION | |
| 0 | INPUT BYTE COUNT ZERO |
| 1 | OUTPUT BYTE COUNT ZERO |
| 2 | LINE ERROR |
| 3 | STATUS ERROR |
| 4 | CONTROL CHARACTER DETECTED |
| 5 | CONTROL |
| 15 | LINE COMPLETE (NON-INTERRUPT) |

INTERRUPT ERROR MESSAGES

(Line 1) (Generated by System Test Executive)

(Line 2) (Error Message)

"ERROR MESSAGE" slot in line 2 will contain one of the following:

NO CONTROL INTERRUPT
 LINE ERROR INTERRUPT
 *STATUS CHANGE INTERRUPT

(Line 3-applicable to * above)

STATUS WORD IS xxxxxxx

where xxxxxxx = STATUS REFER TO DCM MANUAL UP-8629

UTS10 ERROR MESSAGES

APPENDIX E

1

V77 TERMINAL TEST UNIT PROGRAM
UTS10 TTY X3.64 (F3577-00,-01)
U100, U200, UTS20, 40, 60, 400

(Line 1) (Generated by System Test Executive)

(Line 2) (Error Message)

"ERROR MESSAGE" in slot 2 will contain one of the following:

DISPLAY BUSY DOING A LOCAL PRINT (aaaaaa)

Where: (aaaaaa) = octal line number

PRINTER ERROR MESSAGES

(Line 1) (Generated by System Test Executive)

(Line 2) (Error Message)

"ERROR MESSAGE" in slot 2 will contain one of the following:

PRINTER NOT ON LINE (aaaaaa)

DEVICE MALFUNCTION (aaaaaa)

PRINTER BUSY (aaaaaa)

Where: (aaaaaa) = octal line number

APPENDIX F

T0777 LASER PRINTER AND F3068 CHANNEL CONTROLLER

F.1 PURPOSE AND OPERATION

The purpose of these tests are to verify the correct operation of the Laser Printer and the F3068 channel interface. There are two modes in which these tests are run; System test is the fast version with preset options, and the Diagnostic Mode where specific tests may be requested with parameter options provided from which to choose.

These tests can be run on both the V77-600 and the V77-800 computer systems. All tests are initiated via the RUN command described in the following discussion of System and Diagnostic operations.

F.2 SYSTEM MODE

The Unit Program is scheduled for System Mode when the RUN command is issued in the format 'RU' or 'RU12', the number 12 being the Unit Program identification number. There are two tests scheduled for execution in System Mode. Test 1 produces three pages of print using the ASCII alpha numeric print set. Each page contains 49 lines of print with the following preset options:

- . Form size 8½ x 11
- . 6 lines per inch spacing
- . Gothic 10 character set
- . 10 characters per inch horizontal spacing

The Unit Program loops on the print advance function until the end of page is detected, signified by the printer status of Channel End, Device End, and Unit Exception. This procedure is repeated for each page printed. Refer to Figure F-1 for sample printout.

Test 2 issues a Mark Form function to the printer, which causes the controller to 'Home' to the top of the page and print three lines of a specified character across the perforation of the form for two consecutive perforations.

When the tests have been completed, the Unit Program calls the System Test Executive to reschedule the program in another map.

F.3 DIAGNOSTIC MODE

The Diagnostic Mode is initiated when the RUN command is issued in the format

APPENDIX F

T0777 LASER PRINTER AND F3068 CHANNEL CONTROLLER

'RU/D12'. The console will display the following message:

'INPUT DIAGNOSTIC TEST SELECTION/(H)ELP'

If the operator is not familiar with the test selections he can enter 'H' for HELP. This will cause a list of all the test selections to be displayed on the console, followed again by the input test selection prompt message.

The tests are assigned numbers which identifies each test in the selection list. In response to the test selection prompt a single test or a series of tests may be requested by inputting the corresponding test numbers in any run order desired.

After the test selection is made the console will display the Diagnostic parameter list. If the operator chooses to let the tests run using the parameter default values, he needs only to press carriage return or the period and testing will begin.

If the operator chooses to change one or more of the parameter values, he must key in the corresponding numbers from the parameter list. The selected entries are displayed again one at a time. When the change value for a parameter is input, the next entry if any, is displayed.

Samples of the Test Selection List and the Parameter List formats are shown in Figures F-2 and F-3 respectively. Note that the default settings are shown in the parameter option list enclosed in parenthesis.

Each parameter has either a set number of options or in the case where the option is a repeat count, a maximum count is shown. An exception is in the case of the error retry count or the test run count, where a -1 indicates a continuous run or no limit.

FIGURE F-2
DIAGNOSTIC TEST SELECTION LIST

M4ZP12.A DA=07 KY=02 PP=0107,06 BP=0115,01 TM=0:0:0
INPUT DIAGNOSTIC TEST SELECTIONS/(H)ELP

DG**
H

M4ZP12.A DA=07 KY=02 PP=0107,06 BP=0115,01 TM=0:0:0
LASER PRINTER DIAG COMMAND LIST
1- PRINT 3 PAGES OF SPIRAL 64 CHARA SET
2- MARK FORMS TEST
3- READ DISK ID AND DISPLAY
4- READ ERROR LOG AND DISPLAY
5- COPY NUMBER FUNCTION
6- OVERPRINT/UNDERScore LOGIC TEST
7- LOAD GRAPHIC CHARACTER MODIFICATION
USE ', ' TO SEPERATE MULTIPLE ENTRYS

M4ZP12.A DA=07 KY=02 PP=0107,06 BP=0115,01 TM=0:0:03
INPUT DIAGNOSTIC TEST SELECTIONS/(H)ELP

DG**
5

The sample list above is an example of the Diagnostic Test Selection List, as it is displayed on the operator console.

In this example, Test 5 has been selected to run.

FIGURE F-3
DIAGNOSTIC TEST PARAMETER OPTION LIST

M4ZP12.A DA=07 KY=02 PP=0107,06 BP=0115,01 TM=0:0:04
LASER PTR DIAG TESTING PARAMETER LIST
DEFAULT VALUES ARE SHOWN IN ()
TO CHANGE 1 OR MORE PARAMETER ARGUMENTS
ENTER PARAM NUMBERS TO BE CHANGED
SEPERATE MULTIPLE ENTRYS WITH A COMMA
ENTER CHANGE VALUES FOLLOWING THE SELECTED
PARAMETER REPEAT MESSAGE

PARAMETER INPUT LIST

1. FORM SIZE (1= 8.5 x 11), 2= 11 x 14
2. CHARA'S/INCH (1= 10 CPI), 2= 12 CPI, 4= 15 CPI
3. LINES/INCH (1= 6 LPI), 2= 8 LPI, 4= 12 LPI
4. NUM OF COPIES, 1,2,(3)...377
5. ADV CODE (1),2,3...17
6. ERROR RETRY COUNT (1)...; -1= NO LIMIT
7. RUN COUNT (1),2,3...; -1= NO LIMIT

DG**

4,7

M4ZP12.A DA=07 KY=02 PP=0107,06 BP=0115,01 TM=0:0:08
4. NUM OF COPIES, 1,2,(3)...377

DG**

10

M4ZP12.A DA=07 KY=02 PP=0107,06 BP=0115,01 TM=0:0:08
7. RUN COUNT (1),2,3...; -1= NO LIMIT

DG**

3

The above is a sample list of the Diagnostic Parameter Option List as it is displayed on the operator console. In this example, parameters 4 and 7 have been selected for change; parameter 4 'number of copies' is set to 10, and parameter 7 'run count' is set to 3.

APPENDIX F

T0777 LASER PRINTER AND F3068 CHANNEL CONTROLLER

F.3.1 DIAGNOSTIC TESTS DESCRIPTION

There are a total of 7 unique Diagnostic Tests which may be scheduled for execution in Diagnostic Mode. They are numbered from 1 to 7, each performing the following task:

- . TEST 1 - This test can be scheduled in either the System Mode or Diagnostic Mode. As previously described under System Mode definition, this test produces three pages of print using the ASCII alpha numeric character set. The difference is that in the Diagnostic Mode the options that are listed in the parameter option list, Figure F-3, are available to the operator to change as he chooses.
- . TEST 2 - This test can also be scheduled in either the System Mode or Diagnostic Mode; the test is normally run in conjunction with Test 1. A Mark Form command is issued to the printer. This function forces the printer to print any pages stored in the print buffer, and causes the form to 'Home' to the top of page and to print three lines across the page perforation.
- . TEST 3 - The program issues the Read Disk I.D. command to the printer channel. The command will cause header information to be read from the diskette currently being utilized by the printer. The header data is read from the diskette in EBCDIC character format. The program converts a portion of the input data into ASCII format. The information that is displayed identifies the feature number of the disk, part number and revision level.
- . TEST 4 - The program issues the Sense Error Log command to the printer channel. In response to this command, the 256 bytes of information stored in the Printer Error Log is transferred into the specified buffer in computer memory.

The program scans through the Error Log data and displays on the operator console this information in octal format. The displayed octal words are grouped at 8 words per line. Just those lines which contain non-zero data input from the Error Log are displayed.

- . TEST 5 - This test issues the Load Copy Number command to the printer channel. The command will cause a line from the print buffer to be printed repeatedly, according to the value set by the copy number parameter, to a maximum of 255₁₀ times.

APPENDIX F

T0777 LASER PRINTER AND F3068 CHANNEL CONTROLLER

- TEST 6 - This is a test of the overprint/underscore logic in the Laser Printer.

To perform the test two print buffers are used; one to overprint or merge with the other by alternate use of the Advance Print (ADVPR) and Print Advance (PRADV) commands.

The test outputs 5 lines to the printer, with each line testing a different combination of the overlay logic.

- LINE 1 - Merges a line of non-space and non-underscore characters with a line of spaces. The results should be that non-space and non-underscore characters will replace spaces.
- LINE 2 - This line is the reverse of the first line in that a line of spaces is merged with a line of non-space and non-underscore characters. The result is the same, in effect, a space will not replace non-space or non-underscore characters.
- LINE 3 - This line is a test of spaces overlaying a line of underscore characters.
- LINE 4 - This line is produced from underscore characters being merged with a line of ASCII characters, demonstrating the overprint feature of the Laser Printer.
- LINE 5 - This line is an attempt to overlay a line of non-space/non-underscore ASCII characters with a second line of ASCII characters. This is an illegal use of the overprint feature, and causes the printer channel status to return a data check error. Also, the second line will not overprint the first line of ASCII character output to the channel. Refer to Figure F-4 for sample of the overprint/underscore test output.

- TEST 7 - Load Graphic Character Modification Command Test. The program tests the use of the Load Graphic character modification feature of the Laser Printer. A unique character is generated that replaces one of the normal alpha/numeric characters in the ASCII print set, used in the diagnostic testing.

APPENDIX F

T0777 LASER PRINTER AND F3068 CHANNEL CONTROLLER

Test 1 is called by the program which produces three pages of print to confirm the graphic character modification.

Refer to Figure F-5 for a sample Load Graphic Character Printout.

F.4 ERROR PROCESSING

Any errors or failures encountered either during System or Diagnostic Modes will cause the program to first of all try to recover by retrying the failed test. Recovery attempts depend on the setting of the program Retry Count, which is given a default value of 1. In Diagnostic Mode however, the Retry Count is an option that can be given any value desired including a no limit indication by setting the count to a -1.

When error recovery can not resolve the error, the error routine determines the printer function which generated the error and calls on the System Test Executive to print the error message, and then to reschedule the program. The error message includes the following information:

- . Printer function when error was detected
- . Channel status word in binary
- . Sense bytes in binary

See Tables F-7 and F-8 for printer and channel status formats, and figure F-6 for a sample of the error message display format.

FIGURE F-6
SAMPLE ERROR MESSAGE DISPLAY

The Status word is displayed in two groups of 8 bits. The left 8 bits is the Printer Status, the right 8 bits is the Channel Controller Status.

The following error message displays indicate the printer function when the error occurred, status word in binary and the 18 sense bytes in binary. The following is an example:

M4ZP12.0 DA=07 KY=03 PP=056,03 BP=061,01 TM=0:01:04

LZP ERROR DURING INITIALIZE PRINTER

| BIT POSITIONS | 01234567 | 01234567 |
|---------------|---------------|---------------|
| STATUS WORD | 10000010 | 00000011 |
| SENSE BYTES | (00) 01000000 | (01) 00000000 |
| | (02) 00000001 | (03) 00001000 |
| | (04) 00000000 | (05) 00001001 |
| | (06) 00000000 | (07) 00000000 |
| | (08) 00000000 | (09) 00000000 |
| | (10) 00100000 | (11) 00000000 |
| | (12) 00000000 | (13) 00000000 |
| | (14) 00000000 | (15) 00000000 |
| | (16) 00000000 | (17) 01110000 |

FIGURE F-7 - PRINTER STATUS

| <u>BIT</u> | <u>DESCRIPTION</u> |
|------------|--------------------|
| 0 | Attention |
| 1 | Status Modifier |
| 2 | Control Unit End |
| 3 | Busy |
| 4 | Channel End |
| 5 | Device End |
| 6 | Unit Check |
| 7 | Unit Exception |

FIGURE F-8 - CHANNEL CONTROLLER STATUS

| BITS 01234567 | OCTAL | DESCRIPTION |
|---------------|-------|---------------------------------|
| 00000000 | 00 | Normal Completion |
| 00000001 | 01 | Halt Channel |
| 00000010 | 02 | Suspend Function |
| 00000011 | 03 | Check C.U. Status |
| 00000100 | 04 | Chain Interrupt |
| 00000101 | 05 | No Unit Response |
| 00000110 | 06 | C.U. Timed Out |
| 00000111 | 07 | Retry Count Exhausted |
| 00001000 | 10 | Control Unit Requesting Service |
| 00001001 | 11 | Parity Error |
| 00001010 | 12 | Buffer Size Error |
| 00001011 | 13 | C.U. Issued Disconnect |
| 00001100 | 14 | CPT Error |
| 00001101 | 15 | CCT Error |
| 00001110 | 16 | C.U. Write Terminate |

APPENDIX G

V77 CARD READER TEST UNIT PROGRAM
(2812-XX)G.1 PURPOSE AND OPERATION

The purpose of the test is to verify the correct operation of the card reader type configured into the generation of the System Test version being run. The unit configured must be one of the types listed in the test title above.

The Run Command is used to execute all Unit Programs. The following discussion covers the purpose and operation of the System mode and the Diagnostic mode.

G.2 SYSTEM MODE

The System mode consists of initializing the card reader, requesting BIC, set up BIC and reading three cards and comparing the data transferred. The data pattern is predefined in Unit Program. Either normal termination or error termination, the program returns to the Test Executive for rescheduling.

Card Test Deck (9250167-044A) is required.

G.3 DIAGNOSTIC MODE

In the Diagnostic mode, the program requests a test number be input. Each valid input entered causes the selected tests to be run through each execution. The Run Count flag will allow the test to be run again n times. Any invalid command will cause help message to be printed. After entering the diagnostic option of the Run Command, the console will display:

ENTER TEST NUMBER OR H (HELP)

- 1 - Read-A-Card Test. As in the System Test Mode, but this only reads one card. The error is reliable and recoverable.
- 2 - Feed-Card Test. This test will feed-cards continuously for 20 seconds about 60 cards.
- 3 - Wrap-Around Test. Test the sense command in both Card Reader and Line Printer. Also test the data turn around (from Line Printer to Card Reader) in either 8-bit or 12-bit. (12-bit is default).

Any other will cause help message to be output.

APPENDIX G

V77 CARD READER TEST UNIT PROGRAM
(2812-XX)

Program then will ask for Run Count.

ENTER RUN COUNT

Default is one (1).

G.3.1 HELP MESSAGE

Any invalid command will cause the following message to be output in the console.

VALID TEST NUMBER:

- 1 = READ-A-CARD TEST
- 2 = FEED-CARDS TEST (MAXIMUM 60 CARDS IN HOPPER)
- 3 = WRAP-AROUND TEST

G.4 ERROR MESSAGES

Any error encountered during the test will cause the error message(s) to be output. In System mode, if unrecovered error occurs, the test will be aborted. In Diagnostic, the program will let the user have a chance to correct it (if possible).

The first line of each error message is generated by the Test Executive and is described in the Test Executive Design Description. The following is output by the Unit Program:

BIC ERROR MESSAGES

(Line 1) (Generated by System Test Executive)

(Line 2) BIC xxxxxx ERROR (error message) ERROR
BIC xxxxxx (error message) ERROR

ERROR MESSAGE slot in line 2 will contain one of the following:

BUSY
NOT AVAILABLE
ABNORMAL BIC DEVICE STOP
BIC STOPPED-MAP MEMORY

APPENDIX G

V77 CARD READER TEST UNIT PROGRAM
(2812-XX)

FINAL ADDRESS IS DIFFERENT
 INITIAL ADDRESS LOAD NOT CORRECTLY
 NO BIC COMPLETE AS EXPECTED
 NOT AVAILABLE

(Line 3 where applicable)

INITIAL ADDRESS xxxxxx

(Line 4 where applicable)

FINAL ADDRESS WAS xxxxxx SHOULD BE xxxxxx

When Card Reader error occurs:

CARD READER ERROR

Accompanied with the above message will be one of the following:

- . If hopper is empty
CARD READER HOPPER IS EMPTY
- . If initialization fails
CARD READER NOT READY AFTER INITIALIZATION
- . If Card Reader has error
CARD READER ERROR SUCH AS MOTION ERROR, PICK FAIL ETC...
- . If Feed-Cards Test Fails
SENSE HOPPER ERROR OR MORE CARDS THAN EXPECTED IN THE FEED-CARDS TEST

WRAP-AROUND ERROR MESSAGE

- . If sense instruction fails
 CR CLEAR
 SENSE xx OF NOT
 LP SET

APPENDIX H

V77 UASC TEST UNIT PROGRAM
(F3004-XX)H.1 PURPOSE AND OPERATION

The purpose of the test is to verify the correct operation of the UASC type configured into the generation of the System Test version being run. The unit configured must be one of the types listed in the test title above.

The Run Command is used to execute all Unit Programs. The format of this command and the options available are given in Section 6.4.5, page 6. The following discussion covers the purpose and operation of the System Test mode and the Diagnostic mode.

H.2 SYSTEM MODE

The System mode consists of initializing the controller, using sense mode to output two lines of buffer. Either normal termination or error termination, the program returns to the Text Executive for rescheduling.

H.3 DIAGNOSTIC MODE

In the Diagnostic mode, the program requests a test number be input. Each valid input entered causes the selected test to be run through each execution. The Run Count flag will allow the test to be run again n times. Any invalid command will cause help message to be printed. After entering the diagnostic option of the Run Command, the console will display:

ENTER TEST NUMBER OR H (HELP)

- 1 - Pyramid and Spiral Test. This will print 70 lines using sense mode and BIC mode (if BIC address is given).
- 2 - Key Echo Test. This test will echo the key that operator entered in the key board (using sense mode only).
- 3 - Back to Back Test. This will enable the data to loop back either with the correct shoe or with Exc 7 command in the combo board. The data is output to one controller and then read back from another to compare.

Any other will cause invalid message to be output.

Program then will ask for Run Count (1 is default).

APPENDIX G

V77 CARD READER TEST UNIT PROGRAM
(2812-XX)

- . If data is not correct
WRAP-AROUND DATA TRANSFER ERROR
COLUMN EXP. DATA REC. DATA
XXXX YYYY ZZZZ

Where:

- xxxx: Data output to Line Printer
- yyyy: Data expected to be when read back from Card Reader
- zzzz: Actual data received from Card Reader

For Wrap-Around Test:

- . To get Line Printer Address
PLEASE ENTER LINE PRINTER ADDRESS
- . Ask for Line Printer and Card Reader disconnect
PLEASE DISCONNECT BOTH CARD READER AND LINE PRINTER CABLES
- . Ask for type of test (12-or 8-bit test)
ENTER 010 FOR 8-BIT TEST

APPENDIX H

V77 UASC TEST UNIT PROGRAM
(F3004-XX)

ENTER RUN COUNT

H.4 ERROR MESSAGE

Any error encountered during the test will cause the error message(s) to be output. In System mode, if unrecovered error occurs, the test will be aborted. In Diagnostic, the program will let the user have a chance to correct it (if possible).

The first line of each error message is generated by the Test Executive and is described in the Test Executive Design Description UP9098. The following is output by the Unit Program:

H.4.1 BIC ERROR MESSAGES

(Line 1) (Generated by the System Test Executive)

(Line 2) BIC xxxxxx ERROR (ERROR MESSAGE)

ERROR MESSAGE slot in line 2 will contain one of the following:

BUSY
NOT AVAILABLE
INITIAL ADDRESS LOADED NOT CORRECTLY
ABNORMAL BIC DEVICE STOP
BIC STOPPED-MAP MEMORY
FINAL ADDRESS IS DIFFERENT

(Line 3) where applicable)

INITIAL ADDRESS xxxxxx

(Line 4 where applicable)

FINAL ADDRESS WAS xxxxxx SHOULD BE xxxxxx

H.4.2 UASC ERROR MESSAGE

When UASC error occurs:

APPENDIX H

V77 UASC TEST UNIT PROGRAM
(F3004-XX)

UASC ERROR

Accompanied with the above message will be one of the following:

- * OUTPUT SHOULD BE READY AFTER INITIALIZATION
- * FRAME OR BREAK ERROR
- * INPUT MUST NOT BE READY AFTER INITIALIZATION
- * INPUT PARITY ERROR
- * INPUT OVERFLOW ERROR
- * TRANSMIT NOT READY
- * RECEIVE NOT READY
- * TIMEOUT - CAN NOT TRANSMIT A CHARACTER
- * TIMEOUT - CAN NOT DO A LF & CR UNDER SENSE MODE
- * DATA ERROR IN BACK TO BACK TEST

TRANSMITTED DATA

xxxxxxx

RECEIVED DATA

xxxxxxx

APPENDIX I

V77-800 WRITABLE CONTROL STORE (WCS)/FLOATING POINT
PROCESSOR (FPP) TEST UNIT PROGRAM - M4WC15I.1 PURPOSE

The purpose of the WCS/FPP test (M4WC15) is to verify the correct operation of the V77-800 Writable Control Store (WCS) and Floating Point Processor (FPP) through execution of firmware.

I.2 SYSTEM MODE

In System Mode the program runs all pages of WCS. The program verifies that WCS is available, writes firmware instructions into WCS and then executes the firmware. Each set of firmware executed tests various functions and capabilities of the firmware in a building block fashion. There are 23 separate tests, one of which verifies the current operation of the FPP. Each test returns data in Registers R0-R7. The Register contents are compared to expected values and an error message is output when a mismatch occurs. Refer to Table I.1 for the firmware test descriptions.

I.3 DIAGNOSTIC MODE

When the program is scheduled in Diagnostic Test Mode the program checks for available pages of WCS. An octal word is developed with a '1' bit set for each available WCS page. The position of the bit indicates the available page. The following message is output:

AVAILABLE WCS PAGES (BIT=1) xxxxxxx

Individual Unit Programs have a diagnostic capability which requires entry of test commands and/or parameters by the operator during program execution. Diagnostic Mode commands are positional and must be entered as follows:

Command, continuous run, page to test (octal)-0=010 default), starting location (octal)/pattern/test number, number of micro-instructions

or

Z, low page of WCS, high page of WCS, page to run test in (010=default), print test complete message. (This command must be entered for each run).

Valid commands are:

0 - Runs as if in System Test Mode. Parameters are not applicable.

D - Dump WCS. Continuous run parameter is not applicable. The page number

APPENDIX I

V77-800 WRITABLE CONTROL STORE (WCS)/FLOATING POINT
PROCESSOR (FPP) TEST UNIT PROGRAM - M4WC15)

parameter is an octal number indicating the page of WCS to be dumped. The starting location is an octal offset from first micro-instruction of WCS. The number of micro-instructions parameter indicates number of micro-words to be dumped.

- E - Execution Test. The continuous run flag is applicable. The page to run the test in may be specified, -1 may be used to test all specified pages or default to page 010. Instructions are loaded thru out a page of WCS and are then executed. The instruction executed is an Increment RF and jump to next location.
- H - Help. Lists all valid commands.
- M - Memory Test. The continuous run flag is applicable. The pattern may be specified or defaulted to a set of patterns. The page to test may be specified or use -1 for all pages. Patterns, and their complement, are written thru out WCS, read back and compared. Any mismatch will cause an error printout and the check of memory will continue.
- R - Runs as if in Systems Test Mode, but returns to diagnostic command entry routine. The continuous run parameter is applicable. If the page parameter is not specified the test will run in page 010.
- S - Single Test. Executes a single test. The continuous run parameter may be used. The test number parameter is the octal number for the test to be run. If the page parameter is not specified, the test will run in page 010.
- U - Unique Address Test. The continuous run flag is applicable. The page to run the test in may be specified, -1 may be used for all or default to page 010. Incremental addresses are written into WCS, read back and compared. A mismatch will cause an error printout and checking will continue.
- Z - Parameter Input. The lowest available page of WCS and the highest available page of WCS must be specified. If the page to run the test in is not specified, page 010 is used as a default. The print test complete field when non-zero will cause a completion message to be printed each time a test has been run.

Information Messages:

APPENDIX I

V77-800 WRITABLE CONTROL STORE (WCS)/FLOATING POINT
PROCESSOR (FPP) TEST UNIT PROGRAM - M4WC15)

WCS xxxxxxx AVAILABLE WCS PAGES (BIT=1)-xxxxxxx

INPUT DIAGNOSTIC COMMAND

Command, continuous run flag (c), octal page to test, starting location
(octal)/pattern/test number, number of micro-instructions

or

Z, low page of WCS, high page of WCS, page to run test in, print test
complete message.

INVALID PARAMETER

Parameter entered was invalid.

INVALID TEST COMMAND

Invalid command entered. Use "H" command to list valid commands.

TEST NUMBER xx COMPLETED

WCS ADDRESS xxxxxxx DATA xxxxxxx xxxxxxx xxxxxxx

Help Command Message:

VALID COMMANDS

O - SYSTEM TEST
D - DUMP WCS
E - EXECUTION TEST
M - MEMORY TEST
R - RUN DIAGNOSTIC
S - SINGLE TEST
U - UNIQUE ADDRESS TEST
Z - PARAMETERS (POSITIONAL)
,LOW WCS PAGE (OCTAL)
,HIGH WCS PAGE (OCTAL)
,TEST WCS PAGE (OCTAL)
,PRINT TEST COMPLETE MESSAGE
COMMAND PARAMETERS
,C (CONTINUOUS RUN)
,PAGE TO TEST (OCTAL)-(-1=ALL, DEFAULT=010)
,STARTING LOCATION (OCTAL)/
PATTERN/

APPENDIX I

V77-800 WRITABLE CONTROL STORE (WCS)/FLOATING POINT
PROCESSOR (FPP) TEST UNIT PROGRAM - M4WC15

(Line 3) WCS PARITY ERROR
(Line 4) PARITY BITS xxxxxx
(Line 5) WCS ADDRESS xxxxxx
(Line 6) DATA FOUND xxxxxx xxxxxx xxxxxx
(Line 7) DATA EXPECTED xxxxxx xxxxxx xxxxxx

(Line 3) EXECUTION TEST FAILURE - PAGE xxxxxx
DATA FOUND xxxxxx DATA EXPECTED xxxxxx

(Line 3) WCS PARITY ENABLE ERROR

(Line 3) WCS PARITY DISABLE ERROR

APPENDIX I

V77-800 WRITABLE CONTROL STORE (WCS)/FLOATING POINT
PROCESSOR (FPP) TEST UNIT PROGRAM - M4WC15

TEST NUMBER (OCTAL)
,NUMBER OF INSTRUCTIONS (OCTAL)

I.4 ERROR MESSAGES

The first line of each error message is generated by the Test Executive and is described in the Test Executive design description. The following information is output by the Unit Program:

SYSTEMS TEST RUN:

(Line 2) WCS xxxxxx TIMEOUT (error message)
 WCS xxxxxx (error message)

(Line 2 error messages)

WCS READ ERROR
WCS WRITE ERROR
NO PAGE OF WCS AVAILABLE FOR TEST
TEST NUMBER xx

(Line 3-11)

REGISTER FOUND EXPECTED

| | | |
|----|---------|---------|
| R0 | xxxxxxx | xxxxxxx |
| R1 | xxxxxxx | xxxxxxx |
| R2 | xxxxxxx | xxxxxxx |
| R3 | xxxxxxx | xxxxxxx |
| R4 | xxxxxxx | xxxxxxx |
| R5 | xxxxxxx | xxxxxxx |
| R6 | xxxxxxx | xxxxxxx |
| R7 | xxxxxxx | xxxxxxx |

DIAGNOSTIC RUN:

(Line 2) WCS xxxxxx MEMORY TEST ERRORS

(Line 2) UNIQUE ADDRESS ERROR - WCS PAGE LOCATION xxxxxx

(Line 3) VALUE EXPECTED xxxxxx VALUE FOUND xxxxxx

(Line 2) WCS ADDRESS xxxxxx

(Line 3) DATA FOUND xxxxxx xxxxxx xxxxxx

(Line 4) DATA EXPECTED xxxxxx xxxxxx xxxxxx

APPENDIX I

V77-800 WRITABLE CONTROL STORE (WCS)/FLOATING POINT
PROCESSOR (FPP) TEST UNIT PROGRAM - M4WC15

TABLE I.1 FIRMWARE TESTS

| TEST NUMBER | PURPOSE |
|-------------|--|
| 1 | Page jump. Allows for dumping contents of the processor's working-storage registers S1 through S6. Also provides common entry, error, and exit code for all tests. |
| 2 | Register swap. Loads registers S1 through S6 with contents of incremented programming registers R0 through R7 then reloads R registers from the S registers. |
| 3 | Register file. Tests the class 1 register file function macros and accumulator I/O. |
| 4 | ALU B-input. Moves source data of the ALU B-input to the R0 through R7 registers. |
| 5 | BS and RF fields. The various uses of the BS and RF fields are tested. |
| 6 | Miscellaneous BS field functions. The various uses of the BS field are tested. |
| 7 | Left shift. Left shift operations specified by the SRC field are tested. |
| 10 | Right shift. Right shift operations specified by the SRC field are tested. |
| 11 | Left/right shift 0. Tests the left and right shift 0 instructions. |
| 12 | RFSD 1 function. Tests the use of the RFSD field, when it contains a 1, for single sources. |
| 13 | RFSD 1 function. Tests the use of the RFSD field, when it contains a 1, for multiple sources. |
| 14 | RFSD 2 function. Tests the use of the RFSD field when it contains a 2. |

APPENDIX I

V77-800 WRITABLE CONTROL STORE (WCS)/FLOATING POINT
PROCESSOR (FPP) TEST UNIT PROGRAM - M4WC15

TABLE I.1 FIRMWARE TESTS (CONTINUED)

| TEST NUMBER | PURPOSE |
|-------------|--|
| 15 | RFSD 2 or 3 functions. Tests the use of the RFSD field when it contains 2 or 3. |
| 16 | JC functions. Tests various JC field functions by alternating contents of ALU. |
| 17 | Miscellaneous functions. Tests miscellaneous JC and SP field functions. |
| 20 | Flag functions of JC and SP fields. Tests flag functions by using various functions of the JC and SP fields. |
| 21 | Operand fetch. Tests operand fetch from memory. |
| 22 | Operand fetch. Tests operand fetch by using indexed and indirect addressing. |
| 23 | Operand store. Tests operand store into memory. |
| 24 | Operand store. Tests indexed operand store into cache. |
| 25 | Stack function. Tests operation of the stack function. |
| 26 | Field selection function. Tests operation of the field selection microinstructions. |
| 27 | Reserved for future use. |
| 30 | Reserved for future use. |
| 31 | FPP. Tests the FPP addition and subtraction operation. |