HP 3000 Computer System

HP 2680A Page Printer Verifier

Diagnostic Manual

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All pages in this manual are original issue dated 5/81.

PRINTING HISTORY

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ILLUSTRATIONS

GENERAL INFORMATION

SECTION 1

1.0 INTRODUCTION

The 2680A Page Printer Verifier is an online diagnostic program designed to perform the following functions:

- Verifies 2680A configuration.
- Checks HP-IB interface between the 2680A and the HP 3000.
- Commands the HP 3000 to run printer diagnostic tests.
- Verifies 2680A ability to detect invalid operations generated by the host HP 3000.
- Verifies printer electro-mechanical operation by printing test patterns and forms to be checked by the user.

1.1 REQUIRED HARDWARE

The page printer verifier will operate on any HP 3000 system installed as shown in figure 838-1 and 838-2.

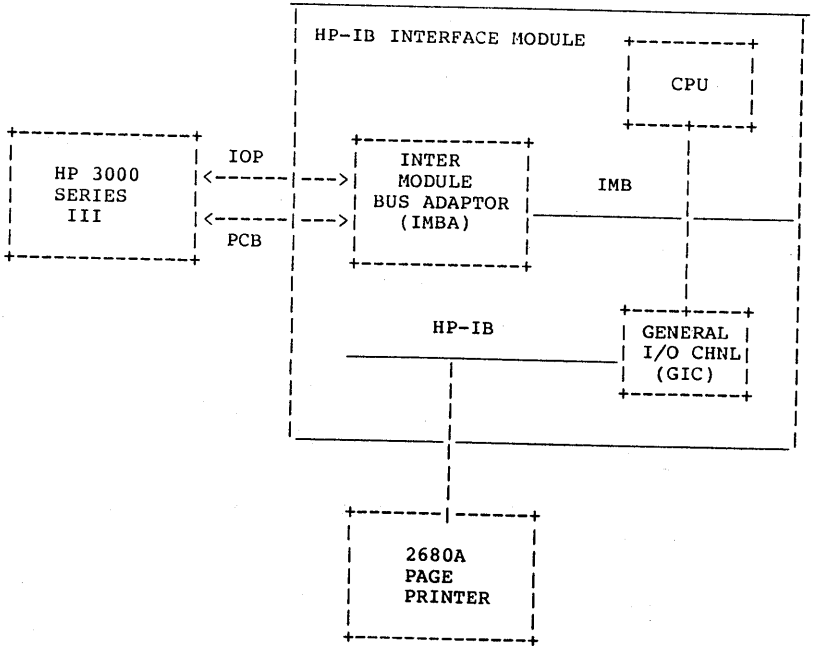


Figure 838.1 2680A Page Printer Verifier Hardware Configuration for HP 3000 Series III/HP30341A HPIB Interface

1.2 REQUIRED SOFTWARE

The Page Printer Verifier is written in Systems Programming Language (SPL) and is identified as PD467A. Program PD467A will reside in the HP32340 group of the Field.Support account. The verifier consists of three separate files describe as follows:

SOFTWARE	DESCRIPTION
Program File PD467A	Diagnostic Program
Environment File D467ENV	Contains character sets, vertical form controls, and forms used by the verifier.
Message Set (22)	Resides in the system message catalog. Contains majority of messages used by the verifier.

1.3 LIMITATIONS

The verifier invokes part of the 2680A microdiagnostics by issuing the self test command. The selftest function tests the printer memory and data control system (DCS). The host system, when invoking self test, cannot exercise the printing capabilities of the page printer.

If the user wants to run the entire set of 2680A microdiagnostics, and thereby test all printer functions, the user must use the 2680A keyboard to issue the appropriate command.

The verifier will test the remaining printer functions, that are not covered by self test, by issuing data, forms, and VFC's.

To maintain system integrity, the verifier should be used by the system manager or system operator.

1.4 MINI-OPERATING INSTRUCTIONS

1. Verify proper online operation.

2. Enter the following system commands:

```
:HELLO FIELD.SUPPPORT,HP32340
:RUN PD467A
```

3. Perform procedures requested by the verifier.

NOTE

Use the printer self-test function (on top panel keyboard) to run the complete set of printer diagnostics.

4. To run printer self test, enter the following commands from the printer keyboard:

a. Press HALT
b. Enter 1 ENT.
c. Press RUN.

1.5 LIST OF ABBREVIATIONS

The following abbreviations are used in this manual.

ABBREVIATION	DESCRIPTION
CPVA	Channel Program Variable Area
DCS	Data Control System
ENT	Enter
HPIB	Hewlett Packard Interface Bus
GIC	General I/O Channel
IMB	Inter Module Bus
IMBA	Inter Module Bus Adaptor
IOP	Input Output Processor Bus
LDEV	Logical Device
LDT	Logical Device Table
LPDT	Logical Physical Device Table
LPT	Logical Page Table
MCS	Machine Control System
OP	Operator
PCB	Port Controller Bus
PHI	Single Chip HPIB Interface (Processor to HPIB Interface)
SM	System Manager
SPL	Systems Programming Language
VFC	Vertical Forms Control

OPERATING INSTRUCTION

SECTION II

2.0 INTRODUCTION

The Page Printer Verifier is an online verifier designed to test the operation of the 2680A Page Printer. The verifier is used by the system manager or operator. The user calls the program and responds to prompts issued by the verifier. The verifier first verifies the configuration and communication links. The user is then asked to select either all or individual tests.

Refer to section IV for a detailed description of each test section of the diagnostic process.

2.1 STANDARD MODE OF OPERATION

1. Verify proper system operation.

2. Enter the following commands to call the verifier:

```
:HELLO FIELD.SUPPORT,HP32340
:RUN PD467A
```

NOTE

When the verifier starts to run, the break key on the user terminal will be disabled and the control Y break enabled. This will allow the verifier to restore the original condition of the logical device under test if the verifier is to be aborted. If the verifier is called from a stream job, the disable break and enable control Y will not be implemented.

NOTE

If more than one 2680A Printer is installed in the system, the user will be asked to select the appropriate unit. If the printer is not installed, the verifier will notify the user and terminate. The verifier will also inform the user if the printer is offline.

3. A display similar to the following will be observed:

```
PD467A PAGE PRINTER VERIFIER  REVISION 0.00
```

```
TERMINAL BREAK DISABLED, CONTROL Y ENABLED BY THE VERIFIER
(D467MSG 536)


THE VERIFIER WILL STOP SPOOLING TO THE 2680A PAGE PRINTER
if spooling was enabled (D467MSG 8)

                    PRESENT 2680A ENVIRONMENT

2680A MEMORY SIZE = 256K WORDS       DCS FIRMWARE DATECODE=2114
NUMBER OF VFC'S LOADED = 1           NUMBER OF FORMS LOADED = 0
PAGE LENGTH = 8.50 INCHES (21.59 CM)PAGE WIDTH = 11.0
                                     INCHES(29.94 CM)
NUMBER OF CHARACTER SETS LOADED=1
```

4. Section 1 tests will be run and when completed, the following message is displayed.

```
TEST SECTION 1 (CONFIG/BASIC COMM TEST) COMPLETE (D467MSG 65)
DO YOU WANT TO RUN INDIVIDUAL SECTIONS OF THE VERIFIER (Y/N)?
(D467MSG 500)
```

5. The user is asked if individual section tests are desired:

NOTE

After section 1 has completed, the user will be asked to run sections 2 through 5 or select individual sections. If the user selects the individual sections, the program will execute the selected sections and allow the user to reselect sections, or exit the program.

6. If individual sections are reqested the following menu is displayed:

```
SECTIONS AVAILABLE TO RUN ARE:

   SECTIONS 2 (LOOPBACK)
   SECTIONS 3 (SELFTEST)
   SECTION  4 (STATUS TESTS)
   SECTION  5 (DATA TESTS)
   SECTION  6 (INTERACTIVE TESTS)
    ENTER  "E" TO EXIT
ENTER SECTION NUMBER(S) (I.E. 2,3,E)
3,5,E
```

7. The user is asked if a given section is to be repeated (loop): If N is selected the following data is displayed:

```
DO YOU WANT TO LOOP ON SECTIONS(S) (Y/N)?  (D467MSG 504)
N
```

```
TEST SECTION 5 (DATA TESTS) COMPLETE    (D467MSG 65)
END OF PASS 1          (D467MSG 508)

TERMINAL BREAK ENABLED, CONTROL Y DISABLED BY THE VERIFIER
(D467MSG 538)
END OF PROGRAM
```

3. If a test section is to be repeated the following data is displayed:

```
DO YOU WANT TO LOOP ON SECTIONS(S) (Y/N)?  (D467MSG 504)
Y

ENTER LOOP COUNT (MAX=20) (D467MSG 506)
10
```

The test will loop for the select loop count and then issue the following message:

```
END OF PASS x (D467MSG 508) X = PASS COUNT

DO YOU WANT TO RUN INDIVIDUAL SECTIONS OF THE VERIFIER (Y/N)
```

User can now reselect sections or EXIT.

4. If all sections tests are to be run respond with N to the following message and verify the following system response.

```
DO YOU WANT TO RUN INDIVIDUAL SECTIONS OF THE VERIFIER(Y/N)
N
TEST SECTION 2 (LOOPBACK COMPLETE)     (D467MSG 65)
TEST SECTION 3 (SELFTEST)COMPLETE)     (D467MSG 65)
TEST SECTION 4 (STATUS TESTS)COMPLETE (D467MSG 65)
TEST SECTION 5 (DATA TESTS)COMPLETE    (D467MDH 65)
END OF PASS 1

TERMINAL BREAK ENABLED, CONTROL Y DISABLED BY THE VERIFIER
END OF PROGRAM
```

2.2 SECTION 6 INTERACTIVE TESTS

When section 6 is selected from the INDIVIDUAL SECTION display, the verifier enters the interactive mode. The user responds to prompts issued by the verifier. The procedure involves operating the page printer keyboard as directed by the verifier. The verifier then processes the manual data and checks the printer response to these commands. The following functions are tested in the interactive mode:

- Halt/Run
- Power Fail
- Page Length of 4.0 inches
- Page Length of 8.5 inches
- Status

2.3 DIAGNOSTIC PROCEDURE

When the 2680A verifier encounters an equipment fault when running a test section, a message is displayed to the user similar to the following:

```
ERROR IN STEP 42 - OPERATION = TEST STATUS BITS (467445 51)

ATTEMPT TO SATURATE THE CHARACTER BLOCK PROCESSOR FAILED
(I/O STATUS WORD 4 BIT 8).    (D467ERR 528)


DO YOU WANT TO DISPLAY PRESENT PRINTER STATUS (V=VERBAL,O=OCTAL,
N=NO)
```

Step 42 refers to section 4 test of the printers ability to detect character block saturation.

The user can display the printer status in two formats. If verbal is selected a message similiar to the following will be displayed.

```
                    PAGE PRINTER I/O STATUS

ATTEMPT TO SELECT AN ILLEGAL LOGICAL PAGE TABLE ENTRY (D467EER47)
 ERROR DETECTED IN RECORD 1 ON SHEET NUMBER 0.

                PAGE PRINTER ENVIRONMENTAL STATUS

2680A MEMORY SIZE = 256 WORDS    DCS FIRMWARE DATECODE=2114
NUMBER OF VFC'S LOADED =1        NUMBER OF FORMS LOADED=0
PAGE LENGTH=8.5 INCHES           PAGE WIDTH =11.0 INCHES
(21.59 CM)                       (27.94 CM)
HPIB DEVICE ADDRESS = 7
SIZE OF THE INCOMING DATA BUFFER = 16 (512 WORD BLOCKS).
NUMBER OF AVAILABLE 20 WORD BUCKETS = 12105.
NUMBER OF BUCKETS USED SINCE LAST JOB OPEN =47
NUMBER OF DATA BLOCKS IN THE INCOMING DATA BUFFER=0
NUMBER OF ACTIVE LOGICAL PAGES=1
NUMBER OF CHARACTER SETS LOADED=1
NUMBER OF CHARACTER SET WORDS=1712
NUMBER OF FORM WORDS=0
NUMBER OF VFC WORDS LOADED=66
```

If octal is selected, a complete dump of both the I/O status and environment status is displayed. Note, the % sign indicates value is presented in octal notation.

WORD	I/O STATUS	ENV STATUS
0	%004004	%000020
1	%000000	%027511
2	%000000	%000057
3	%000000	%010100
4	%001000	%070101
5	%000000	%000654
6	%000000	%000000
7	%000000	%000102
8	%000000	%021156
9	%000000	%000000
10	%000000	%000675
11	%000000	%004102
12	%000000	%000000
13	%000001	%000000
14	%000000	%000000
15	%000000	%000000

Notice that bit 6 in word 4 is on. Refer to the STATUS and CONTROL WORDS section (appendix A) for a description of word 4 bit 6. Word 13 bit 1 indicates error was detected in record one (1) of the transmitted data block.

The octal representation of the environmental octal dump is a duplicate of environmental display and is displayed for information only.

2.4 DATA TESTS

The data test run during test section 5 causes the printer to print specific data and forms. This data is used to verify proper printer operation. Appendix C contains a copy of the data generated during test section 5.

2680 Page Printer Verifier

EXECUTION TIMES

SECTION III

3.0 INTRODUCTION

The following information supplies the time required to run each section of the page printer verifier diagnostic.

NOTE

The execution time for section 1 tests is not listed as time is dependent on spool time, configuration, load, and other factors.

The execution times listed are based on the slowest time (measured on an HP3000 series 30).

SECTION	NAME	RUN TIME
1	Configuration and Basic Communication Test	NA
2	Loopback Test	4 seconds
3	Selftest	3 seconds 13 if looping
4	Status Test	1 min, 15 sec
5	Data Test	1 min, 33 sec
6	Interactive Test	manual

TEST DESCRIPTIONS

SECTION IV

4.0 INTRODUCTION

The 2680 Page Printer Verifier is a diagnostic program to verify the configuration and operation of the 2680A Page Printer. The program is functionally divided into sections and step numbers to allow the program to reference section step numbers when error messages are issued to the user. In this manner the user can refer to this section of the diagnostic manual for detailed information concerning the test performed.

Error messages generated by the verifier will indicate the step where the error occurred. The error message format is as follows:

ERROR IN STEP x (where x equals the step number)

After the error message is generated, the program will issue a problem description, and when possible, a list of probable causes. Messages originating from the system message catalog are identified as Page Printer messages (D467MSG) or Page Printer errors (D467ERR).

System Message Catalog Examples:

SPOOLING TO LDEV 14 (2680A PRINTER) WAS STOPPED BY THE VERIFIER. (D467MSG 4)

2680A PAGE PRINTER IS NOT CONFIGURED INTO THIS SYSTEM.(D467ERR1)

The verifier uses message set 2 in the system message catalog to further explain failures relating to intrinsic commands.

If an I/O error is detected while the verifier is using an intrinsic or external procedure (read, print, GENMSG..etc), the

verifier will first attempt to restore th original spooled state, reset the ALLOW mask for the user, and abort the program by calling th QUIT intrinsic.

Input/output status errors ocurring in the 2680A, while the verifier is in process, will be handled by the verifier. I/O errors are normally handled by the driver. The driver is notified on each request that an I/O request from the verifier is being processed.

Irrecoverable errors, detected by the verifier, will cause the program to report the error; restore the users original ALLOW mask; return the spooler to its original state (providing the spooler was not altered since the verifier began executing); enable the console BREAK function, and disable the control Y break.
All other errors will allow the user to obtain the printer status (I/O and environmental) and display the status for analysis. After each error, the user will have an option to continue or to exit the program.

4.1 TEST SECTIONS

The Page Printer Verifier is divided as follows:

SECTION	STEP RANGE	NAME
1	10-14	Unit configuration and present condition
2	20	HP-IB Loopback
3	30	Selftest
4	41-47	Status Tests
5	50-55	Data Tests
6	60-62	Interactive User Test
7	70	Restore Users Environment

4.2 TEST SECTION DESCRIPTIONS

The test section description is arranged in STEP NO. order to allow the user to quickly locate diagnostic data. The test description contains a functional description of each test step.

10 Verifies user has system manager or operator capability. Prints title message and checks system tables for a 2680A printer.

Verification is accomplished by checking the LDT for a type 32 (printer) and the LPDT for a subtype 8 (2680A). When types 32 and 8 are detected, the LPDT is checked to determine if the printer is a virtual device.

If the printer is a virtual device, as setup by another process, the LDEV and the spool status are not saved. If the printer is not a virtual device, the logical device number (LDEV) and the spooled state information is stored until the entire LDT has been tested.
If more than one 2680A is detected, the verifier will identify the LDEV and request the user to enter the LDEV to be tested.

The step is completed by disabling the user terminal BREAK key and enabling the control Y function.

11 Obtains CPVA address for channel program failures. Verifies 2680A is properly connected by checking printer identification.

Failures encountered at this point can be attributed to one of the following 2680A conditions.

PROBABLE CAUSE

Unit not connected or powered-on.

Unit not configured properly

Unable to identify. Defective General Interface Channel (GIC) chip or DCS PHI chip.

Two devices with the same device number sharing the same GIC.

12 Assumes 2680A control by issuing STOPSPOOL, STARTSPOOL, SUSPENDSPOOL, DOWN, UP, GIVE or TAKE console commands.

If the printer is not active, the verifier will place the device under test into the diagnostic mode.

If an active job is printing or waiting to be printed, the verifier will suspend spooling to the LDEV under test.

The user is notified that the verifier will wait for the active job to complete.

The operator will be notified anytime the spooled state of the LDEV is modified by the verifier. The user will also be notified that the verifier will change the spooled state of the device under test.

13 Obtains printer status. Displays the following information on the console:

PRESENT 2680A ENVIRONMENT

```
2680 MEMORY SIZE=      K WORDS        DCS FIRMWARE DATECODE=
NUMBER OF VFC'S LOADED=               NUMBER OF FORMS LOADED=
PAGE LENGTH=      INCHES (   cm)      PAGE WIDTH=
INCHES( cm)
```

14 Issues job abort and job open commands to the printer. Forces printer to clear previous environment and load default environment.

Reads environmental status and verifies default environment is loaded (1 character set, 1 VFC, 1 active LPT, no forms etc..)

Issues job close command after status is checked to complete job open request.

20 Section 2 HPIB LoopBack

NOTE

User can select and loop on this and any other test section for troubleshooting purposes. After a section is performed, the program returns to this point for test selection or program termination.

20 Verifies integrity of data link between host system and printer. The host system is instructed to transmit 256 data bytes (0-255) to the printer, with a write loopback request. Data is stored in the printer buffer, read back (read loopback request), and compared with the original transmitted data.

Test will loop 100 times to detect any possible intermittent problems.

Section 3 - Selftest

30 Issues printer selftest command. Command activates a portion of the printer's internal micro-diagnostics affecting the printer DCS and memory. Checks selftest results.

The following selftests are performed:

Character block processor test
Main memory test
External register test
Data processor test

NOTE

A ten second delay will be added to the selftest function if section 4 (status) or section 5 (data) are selected with the looping option. Delay is required to insure the laser beam has been turned off before the printer's internal diagnostics are executed.

Section 4 - Status Test

40 Issues a job abort clear to place printer into the default state and issues a job open command. Tests printer ability to:

detect an attempt to print with a deleted character set (status word 5 bit 2)

detect an attempt to select an undefined form (status word 4 bit 6)

select an undefined VFC (status word 4 bit 5)

The character set test is performed first by downloading a character set containing one character and then selecting and deleting the character set (printer does not know data has been deleted until data access is attempted).

An attempt to print using this character set should produce an error.

The form and VFC are tested by downloading a logical page table with erroneous information (undefined VFC and turning forms on without the form being loaded). The printer receives a block of data describing the section and step number. When the printer attempts to link this data, the printer will detect an error in each case (form

and VFC) and set the appropriate status bit. Once the status bit is detected a job abort is issued to prevent the data from being printed

41 Test the printers ability to detect that the pen has been moved off of the logical page (status word 4 bit 7) and selection of an illegal logical page table (LPT) (status word 4 bit 6) will cause an error.

The move pen error is generated by issuing the move pen function to the printer with an "X" coordinate that is off the page. A select logical page function to a non existent logical page table followed by a print request is made to generate a selection of an illegal LPT. Printing will not occur.

42 Test the printers ability to detect saturation of the character block processor (status word 4 bit 8) and an attempt to exceed the maximum number of copies per physical page (status word 4 bit 11).

Saturation of the character block processor occurs by sending one line of data (130 A's) followed by a move pen command of minus ten dots in the Y direction. Another line of data (130 B's) is then sent followed by a move pen of minus ten dots in the Y direction. A line of data (130 C's) followed by another line of data (130 D's) is then sent to the printer to create the error.

Exceeding the maximum copies per physical page error is created by setting the maximum number of copies to two (2), setting the repeat page limit to three (3) and transmitting a line of data to print.

43 Test the printers ability to detect an attempt to select an undefined character set (status word 4 bit 3) and out of memory for an attempted Character Set load (status word 4 bit 0).

test the printers ability to detect the following:

An attemptan attempt to select an undefined character set (status word 4 bit 3)

out of memory condition for an attempted character set load (status word 4 bit 0)

The undefined character set selection error is created by downloading a character set and selecting it, followed by selection of a non-existent character set with an attempt to print data using this non existent character set.

The out of memory error is created by sending the printer a character set that has the number of words per character equal to 8190 and the number characters in the set equal to 128. The printer will compute that the space required to load this set exceeds the printers capacity (256K words).

44 Test printers ability to detect no memory available for an attempted VFC and Form load.

The printers memory is filled up with large VFC's (64K words each). When the last VFC is loaded the printer will obtain the number of words in the VFC table that is about to be loaded (64K), calculate that it cannot fit into the available memory space and generate an error.

The form load error is generated by sending the printer a form load that has 128 triplet words and 8190 dot per bit words in the form descriptor block. The printer will calculate that this amount of data will not fit into the users memory area and generate this error.

45 Test the printers ability to detect an invalid spoolfile block error (status word 1 bit 12).

A write with an invalid printer function code is transmitted to generate this error.

46 Test printers ability to detect a "no memory available for data" error and a "select VFC with LPT word 10 of -1" error.

The first error, no memory available for data, is generated by filling the available users memory area in the printer with VFC's and a form so that there are only approximately 500 words of memory left. A block of data, 1024 words, is then sent to create the error (status word 4 bit 13).

The second error is generated by loading an LPT with word 10 (height of base character set) equal to -1. This LPT is selected and then data describing the test being performed is transmitted to the printer. The attempt to print this data, using the printers default character set, with word 10 being -1 will cause the error (status word 4 bit 14).

47 Test printers ability to create a skip to a non-existing VFC error and its ability to clear forms, VFC's and character sets.

A non-existing VFC error is created by sending a VFC with all zeros to the printer, selecting that VFC and sending data that describes the test being performed. When the

printer attempts to use this VFC it will detect the error (status word 4 bit 15).

The multi-copy forms table error is created by first clearing the previous environment, turning on the multi-copy forms feature in the printer and transmitting data describing the tests being performed. The error (missing multi-copy form table) should be detected immediately and cause I/O status word 4 bit 10 to be set.

48 Test printers ability to clear forms, VFC's and character sets. Activates and deactivates logical page tables (LPT's).

The clearing of forms, VFC's, and character sets are tested by loading the environment file, "D467ENV", and checking if the correct number of forms, VFC's, characters, and active LPT's were loaded. The printer is then commanded to clear all forms, VFC's, and character sets. The printer environmental status is then checked to confirm the cleared status.

The active logical page tables will be tested by loading the environment file "D467ENV" and deselecting LPT's 3,4, and 5. Environmental status is checked to confirm the active LPT's were reduced by three (3). Selection of of two or more LPT's is made and checked for proper operation.

Section 5 - Data tests

This section will exercise the remaining portions of the printer not previously tested by the selftest command. This includes the Machine Control System (MCS) which controls and monitors paper movement and all mechanical functions associated with paper movement.

When the Verifiers environment file (Appendix B) is loaded, all logical pages (0 through 6) sent to the printer will be initially active. The Verifier will deselect and select logical page tables as required. It will also select the appropriate primary and secondary character sets, turn off the multi copy forms overlay feature and back on again when required, turn on and off the auto page eject function and use all three modes of carriage control (~%200, %200-%277 and %300-%317).

This section will generate 17 pages of data. The format of this data is contained in Appendix C. The first page of this data will be reproduced three times on the printer but will be shown once in the Appendix.

50 Refer to figure 838.2.

Issue a Job Open and verify proper operation of the previously loaded default environment by printing three pages of data using the entire ASCII Character Set. One page of data will be transmitted and the Printer will be instructed to repeat this page 3 times. This will test the Printers repeat page feature. A Job Close will be issued to force the last page of data to be printed. The environmental status will be read to determine if the three pages were printed. The Job Close will clear all variables associated with the previous job and toggle the job separation marks.

51 Refer to figure 838.3

Issue a Job Open and load all Logical Page Tables, Character Sets, VFC's and Forms that will be used for the remaining tests. Test Printers ability to print 20.1K characters on one page using a 7 X 11 (dot) character set. The data will be printed in the Portrait Mode (90 degree shift with respect to the direction of paper motion). There will be two character sets selected at this point. The primary character set is 14 X 22 dots in the landscape direction (0 degree shift) and the secondary is 7 X 11 dots in the portrait mode. The character set selection will be done using the eighth bit mode (most significant bit on selects the secondary character set). If the printer fails to select the secondary character set using

the eighth bit mode, the data will be printed in the landscape mode.

A null clear (0) will be issued to force this data to be printed.

52 Refer to Figure 838.4.

Test the Printers ability to print 255 characters/line using a 7 X 11 (dot) secondary character set. Printing will be done in the Landscape Mode (printing is not shifted,same as default mode) using the eighth bit mode to to
select the secondary character set. The primary character set is 14 X 22 dots in the landscape mode.

This step will print the alphabet beginning with ten "A"'s per line and incrementing each line length by ten until the letter "Z" is printed which will only print 255 characters per line. The last line will be repeated ten more times and the alphabet will be decremented by ten characters per line and it will terminate with ten "A" characters on the last line. A null clear will be performed to force the page to be printed.

53 Refer to figures 838.5 through 838.8

Using the default Vertical Forms Control (VFC) test all channels. User will determine if this feature worked properly by checking the printed results. Two forms will be used in this step. The first one provides a border that will indentify the boundaries of each logical page. The second form will provide line numbers (1 - 60) that will be used to verify proper operation of the VFC. Data will be printed in the Landscape Mode (default) using a 7 X 11 (dot) character set. Three logical pages per physical page will be utilized to place more actual data on each physical page. A null clear will be performed to print the last page of data.

The first and third physical page of data will be printed with the printers auto page eject feature on and the second physical page will be printed with this feature off. With VFC's enabled and being utilized, the auto eject feature should have no effect. This step also uses the prespace and postspace mode of printing.

54 Refer to figure 838.9 through 838.11

Print a page of data with multiple character sets and forms using the multicopy forms overlay feature in the printer. Data will be printed in each of the various print directions except the reverse landscape direction (180 degree shift). A null clear will be performed to force the last page of data to be printed.

This step will print a three part form consisting of five individual forms. They are the form itself, a border with the form number and three forms each describing the title of the copy being printed. The only data that is transmitted to the form for printing is the statement "SAMPLE FORM". This statement is positioned on the form using the move pen absolute feature in the printer.

55 Refer to figures 838.12 through 838.14

This step tests the shift in and shift out feature of selecting primary and secondary character sets. The header on the printed page, describing the test being printed, will only appear on the first page. After the header is printed the logical page for the header will be turned off and the only active logical page will be LPT 2 (10.9" X 7.0"). Page switching will be done with the VFC.

The entire ASCII character set, beginning with apostrophe (%41) and ending with tilde (~ %176), will be printed. The two character sets used for this test are:

a. Primary set - (14 x 22 dots) landscape direction
b. Secondary set - 7 x 11 dots) landscape direction

Each line will have 25 ASCII characters printed in the primary character set, shift in mode, followed by a descriptive block of data in the secondary character set, shift out mode. The same data described in the previous line will be repeated once more on each line. The test will continue with the next ASCII character until the last one has been printed.

56 Refer to Figures 838.15 and 838.16

This step will test the page skipping features of the write function (parameter P1) and the page control function (function 140).

This step will begin by activating logical pages 3, 4, and 5, selecting character set zero (0) and performing a physical page eject (function 140 parameter P1=3). The step number information will be printed and a skip to the next logical page (LPT 3) will be issued with a write function P1 parameter of %61. From LPT 3, character set 2 will be selected, two lines of data will be printed, and an unconditional skip (write function P1=%63) to LPT4 will be issued. Two lines of data will be printed from LPT 4 and a conditional skip (write function P1=%61) will be issued. On LPT 5, print one line of data identifying the logical page. A function 3 (file open) is issued to close the physical page of data and move the pen to the top of the next physical page.

Once a new page has been opened, a function 4 (file close) and multiple page ejects using write functions with P1 parameter =%61 will be issued, to verify these functions do not cause multiple page ejects. At this point the step number information and a description of the preceeding lines in this paragraph will appear on the top of this page. The page skipping feature using fuction code 140 will be tested as follows:

a. Select LPT 3 (function 140 P2=3) and print using VFC.
b. Select LPT 5 (function 140 P2=5) and print using VFC.
c. Select LPT 4 (function 140 P2=4) and print using VFC.
d. Select LPT 3 and print without VFC (function P1=4).
e. Select LPT 4 and print without VFC (function P1=4).
f. Select LPT 5 and print without VFC (function P1=4).

Selecting an LPT will cause all forms associated with it to be printed. If the VFC is used, printing will also begin on line number 1. If the VFC is not selected, the printing should begin on the top of the logical page.

At the completion of this step, a job close will be issued. The environmental status will be checked to confirm the proper number of pages were printed.

Section 6 - Interactive user tests

This section will allow the user to test the remaining testable status bits by placing the printer into known states and allowing the Verifier to confirm proper detection of these conditions.

60 Ask user to press the halt button on the printer and type "GO" when ready. I/O status word 1 bit 0 is checked for proper operation.

61 Ask user to power fail the printer, press run key, and type "GO" when ready. I/O status word 1 bit 2 is checked for proper operation

When the printer starts the power on sequence, the "HP2680 PAGE PRINTER" message will be displayed, and approximately 2 seconds later, the "JOB ACTIVE PWR FAIL" message will be displayed.

62 This step tests the ability to change page length from the printers keyboard, test for error when page length is made programmatically that is greater than that just set and verify that an attempt to print a larger logical page onto the smaller one set by the operator causes truncation of the larger logical page.

This step will cause the printer to start a print operation (turn motors on). Printing will not occur if normal operation is achieved.

Section 7 - Restore users environment

70 Restore original spooled state of the device under test. Before this is done the Verifier will check the present spooled state to see if it has been altered since the diagnostic began. If it has, the user will be notified of this occurence and the Verifier will terminate. If not, the original condition will be restored.

Restore users original environment (allow mask), enable terminal break key and disable control Y.

STATUS AND CONTROL WORDS

APPENDIX A

INTRODUCTION

I/O Status

The 2680A status reports contains 16 data words to indicate the condition of the 2680A system. The status report is used to diagnose 2680A system faults. The following is an example of an I/O display in response to the OCTAL command.

NOTE

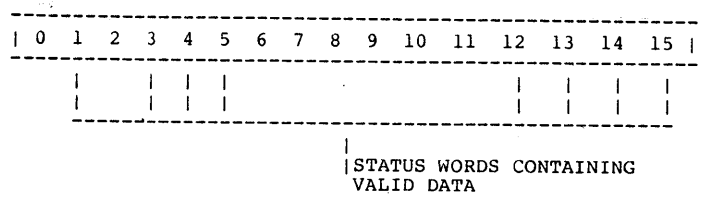
Words 2 through 15 and bits 1,2,3 and 4 of word 1 are cleared whenever the I/O status block is returned to the host system.

WORD	I/O STATUS	ENV STATUS
0	%004004	%000020
1	%000000	%027511
2	%000000	%000057
3	%000000	%010100
4	%001000	%070101
5	%000000	%000654
6	%000000	%000000
7	%000000	%000102
8	%000000	%021156
9	%000000	%000000
10	%000000	%000675
11	%000000	%004102
12	%000000	%000000
13	%000001	%000000
14	%000000	%000000
15	%000000	%000000

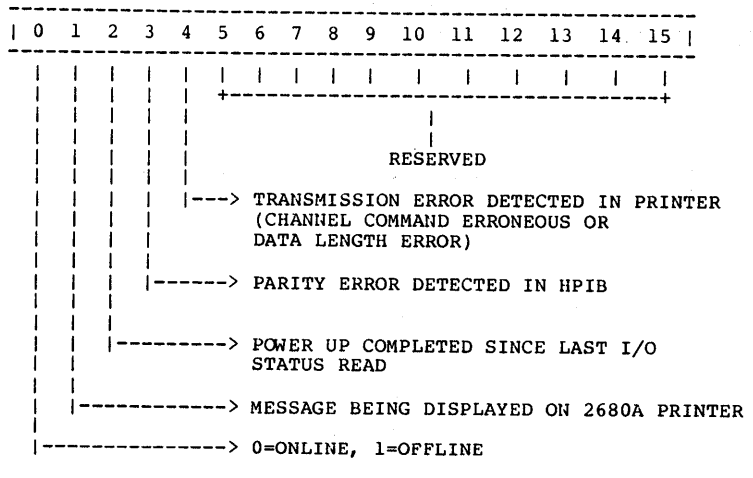
I/O Status Word 0

Word 0 identifies status words containing valid information. Each bit, starting with bit one, indicates the status word (1-15) containing valid information. For example, if bit 4 is set (1), then word four contains valid status data.

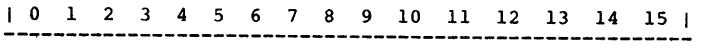
2680A Page Printer Verifier



I/O Status Word 1



I/O Status Word 3 - Machine Control System (MCS) Fault Member



Contains octal word indicating a given machine fault (i.e. paper jam, out-of-paper). The status word is translated to a message and displayed on the printer readoutLED display.

I/O Status Word 4

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

BIT	DESCRIPTION
0	No memory available for attempted character set load
1	No memory available for attempted form load
2	No memory available for attempted VFC load
3	An attempt was made to print data without a selected character set
4	An attempt was made to select an undefined form
5	An attempt was made to print data without a selected VFC
6	An attempt was made to print data without a selected logical page table (LPT)
7	An attempt was made to move pen off the logical page.
8	The printer could not process all data before transfer was made to the drum/paper. Data will be lost.
9	Data block contains format error. Invalid function code or record/block size error
10	Missing multi-copy forms table. An attempt was made to use a multicopy forms table that was not loaded for this job.

2680A Page Printer Verifier

BIT	DESCRIPTION
11	Maximum number of copies per physical page has been exceeded
12	A command or function code was received without a job in process
13	No user memory available. User memory is loaded with character sets, VFC's, forms and data. The current data transmitted cannot be processed and will be lost.
14	A VFC is selected by a logical page table entry which has word ten (line spacing on page) less than or equal to zero.
15	A skip was made to a non-existent VFC

I/O Status Word 5

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

BIT	DESCRIPTION
0 -	Logical page was truncated to fit on the physical page.
1	Page size requested by programmer does not match page length set by operator. The operator-set page length will be used.
2	No character set selected when print record was processed. Record was skipped.

NOTE

I/O status words 12,13,14, and 15 are double word integers.

I/O Status Word 12

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Contains error record number defined by word 4. Information is reported during a JOB function.

I/O Status Word 13

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Contains error record number defined by word 4. Information is reported during a JOB function.

I/O Status Word 14

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Contains sheet number where error occured as defined by word 4. Information is reported during a job function.

I/O Status Word 15

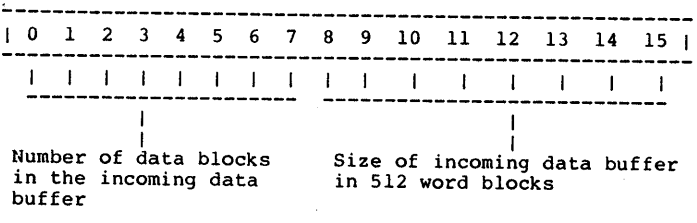
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Contains sheet number where error occured as defined by word 4. Information is reported during a job function.

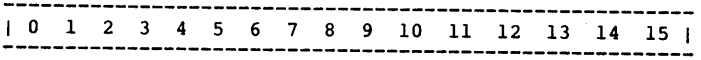
Environmental Status

The environmental status report contains 16 data words indicating current configuration, print job, and printer mode of the 2680A page printer. Data is supplied to assist in the interpretation of diagnostic data.

Environmental Status Word 0

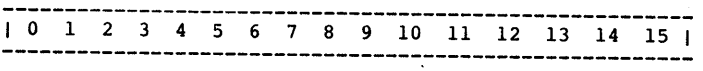


Environmental Status Word 1



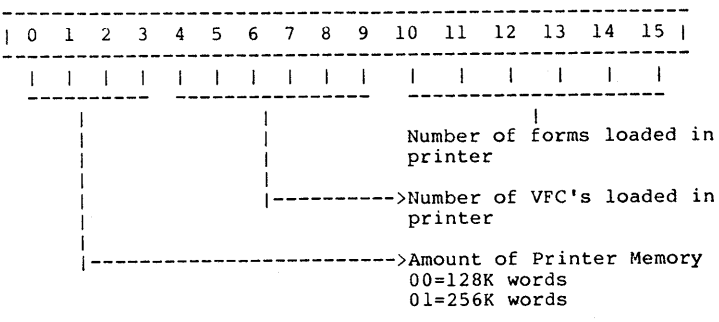
Number of twenty word buckets available.

Environmental Status Word 2

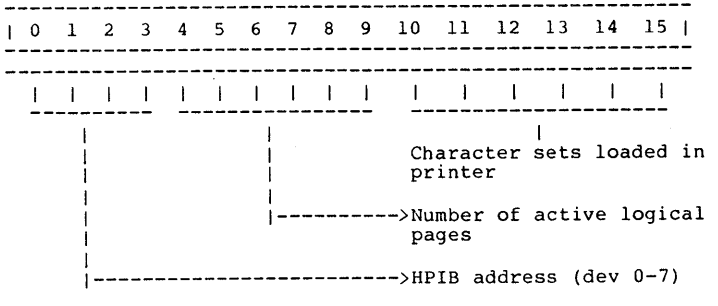


Maximum number of buckets used since last job open.

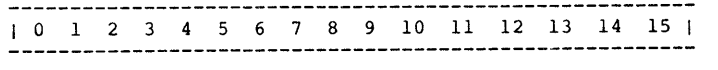
Environmental Status Word 3



Environmental Status Word 4



Environmental Status Word 5



Number of character set dot/bit image (words+3)/4 plus the number of proportional spacing (words used plus 3)/4.

Environmental Status Word 6

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Number of form dots per bit (words + 3)/4 plus the number of form triplet (words plus 3)/4.

Environmental Status Word 7

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Number of VFC words loaded.

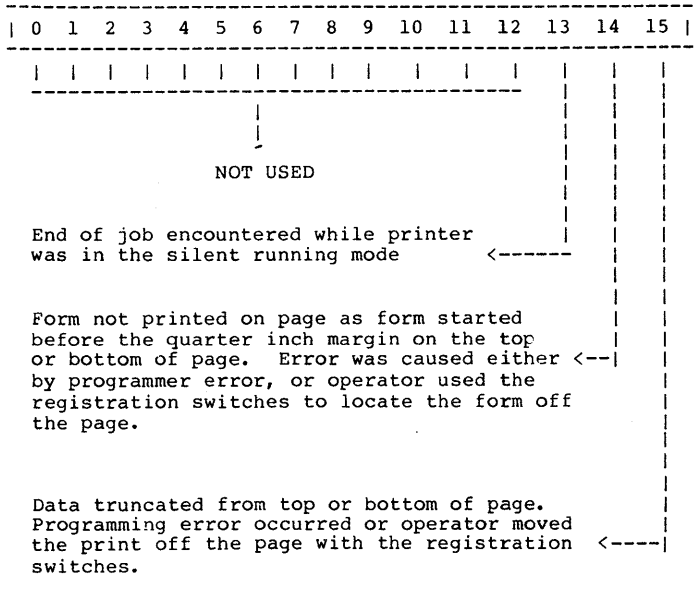
Environmental Status Word 8

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

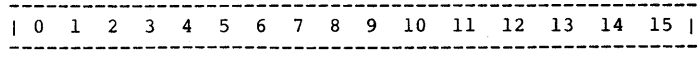
Page length in the direction of of paper motion, in 0.25" increments

Page width in direction of laser scan, in 0.1 inch increments

Environmental Status Word 9

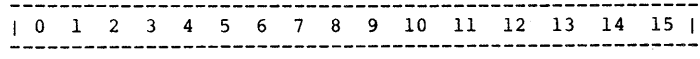


Environmental Status Word 10



Number of USER AREA words actually loaded, plus 3 divided by 4.

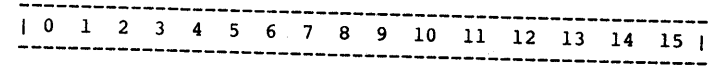
Environmental Status Word 11



2680A Page Printer Verifier

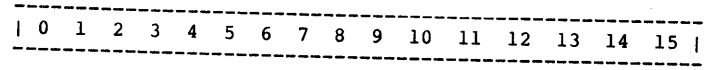
Date code of DCS firmware currently installed

Environmental Status Word 12



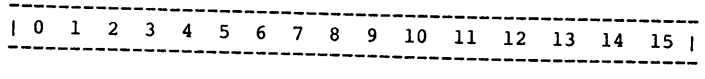
Number of non blank characters clipped (not printed) on this job.

Environmental Status Word 13



Reserved

Environmental Status Word 14 and 15



Number of physical pages printed since last job open (signed double integer). Indicates total number of physical pages printed for this job since the environmental status block read function.

ENVIORNMENT FILE

APPENDIX B

INTRODUCTION

The environment file (D467ENV) used by verifier is described below.

CHARACTER SETS

CHAR SET NO.	CELL HEIGHT	CELL WIDTH	ORIENTATION	CHARACTER CODE LOWEST	CHARACTER CODE HIGHEST	BASE-LINE
0	22"	14"	0 DEGREES	32	126	6
1	11"	7"	90 DEGRESS	32	126	3
2	11"	7"	0 DEGREES	32	126	3

LOGICAL PAGE TABLE

LOGICAL PAGE TABLE NUMBER	PAGE WIDTH	PAGE HEIGHT	ORIENTATION	DISTANCE FROM LEFT	DISTANCE FROM TOP	MARGIN	BASE CHAR SET
0	10"	1"	0 DEGREES	0.5"	0.5"	0	0
1	6.5"	10"	90 DEGREES	1.5"	1.0"	0	1
2	10.9"	6.5"	0 DEGREES	0.1"	1.5"	0	2
3	3.25"	4.06"	0 DEGREES	.25"	2.5"	0.2	2
4	3.25"	4.06"	0 DEGREES	3.75"	2.5"	0.2	2
5	3.25"	4.06"	0 DEGREES	7.25"	2.5"	0.2	2
6	11"	7"	0 DEGREES	0"	1.0"	0	0

FORMS TABLE

FILE NAME	FORM NAME	NUMBER OF SUBFORMS	ASSOCATED WITH LOGICAL TABLE NO
NEWFORMS	COPY1	1	6
NEWFORMS	COPY2	1	6
NEWFORMS	COPY3	1	6
NEWFORMS	HEADBORDER	1	0
NEWFORMS	LOGPAGENUM1	2	3
NEWFORMS	LOGPAGENUM2	2	4
NEWFORMS	LOGPAGENUM3	3	5
NEWFORMS	NEWLINENUMS	1	3,4,5
NEWFORMS	NEWREQFORM	13	6
NEWFORMS	REQBORDER	1	6

APPENDIX C
DATA

INTRODUCTION

Appendix C contains copies of the test printout generated during the performance of test section 5. Data is supplied to show the normal response to the section 5 diagnostic test.

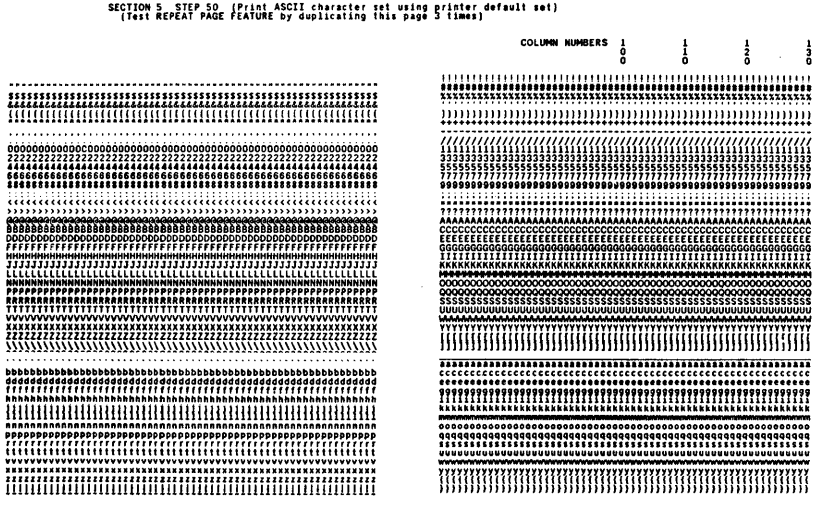


Figure 838.2. Repeat Page Feature Test

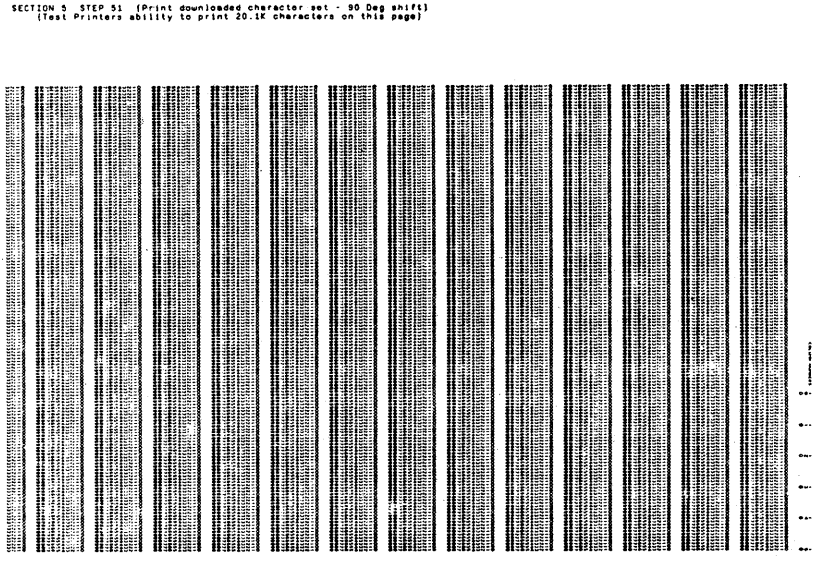


Figure 838.3. Maximum Data Per Page Test (20K Chars+5%)

```
SECTION 5  STEP 52  (Print letters A-Z. Start with 10/line and complete with 255)
(Print 10 more lines of (Z) and continue with letters Y-A at 250/line decrementing by 10/line.
```

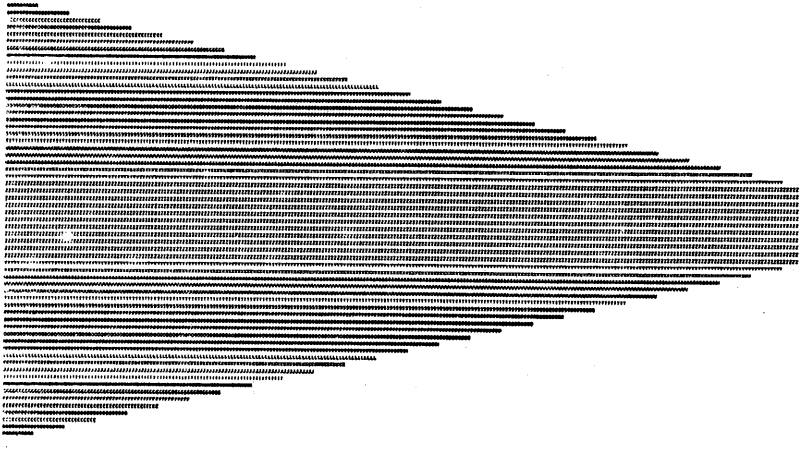


Figure 838.4. Maximum Number of Characters (255) Per Line Test

SECTION 5 STEP 53 (Print using downloaded character set - no shift)
(Test all VFC's - Use 3 logical pages/physical page)

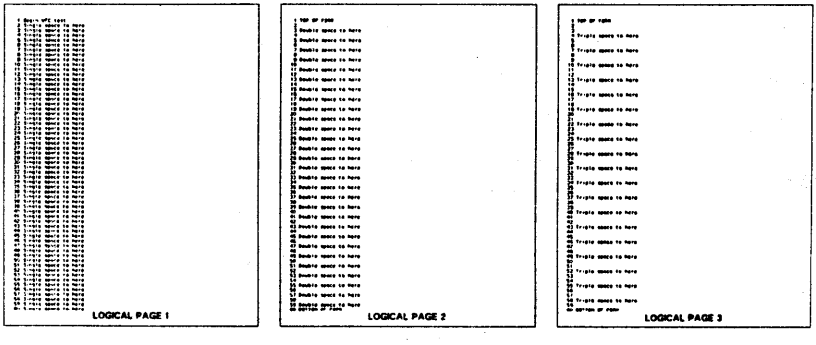


Figure 838.5. VFC CHannel (1,2,3,4 &5) Test

SECTION 5 STEP 53 (Print using downloaded character set - no shift)
(Test all VFC's - Use 3 logical pages/physical page)

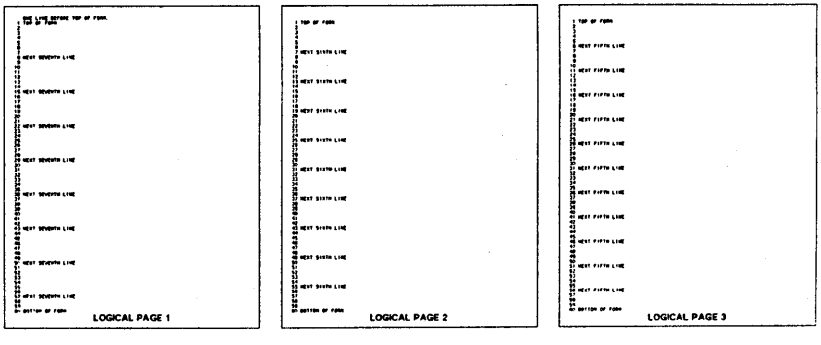


Figure 838.6. VFC Channel (1,2,9,11,12,13,14 & 15) Test

SECTION 5 STEP 53 (Print using downloaded character set - no shift)
(Test all VFC's - Use 3 logical pages/physical page)

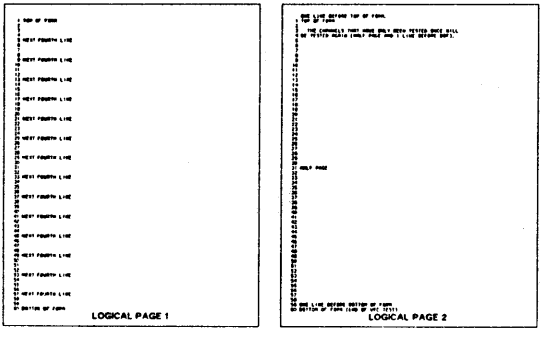


Figure 838.7. VFC Channel (1,2,9,11,12 &16) Test

SECTION 5 STEP 53 (Print using downloaded character set - no shift)
(Test all VFC's - Use 3 logical pages/physical page)

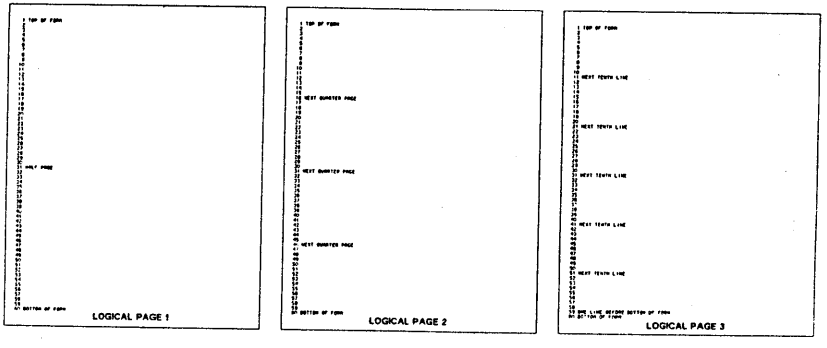
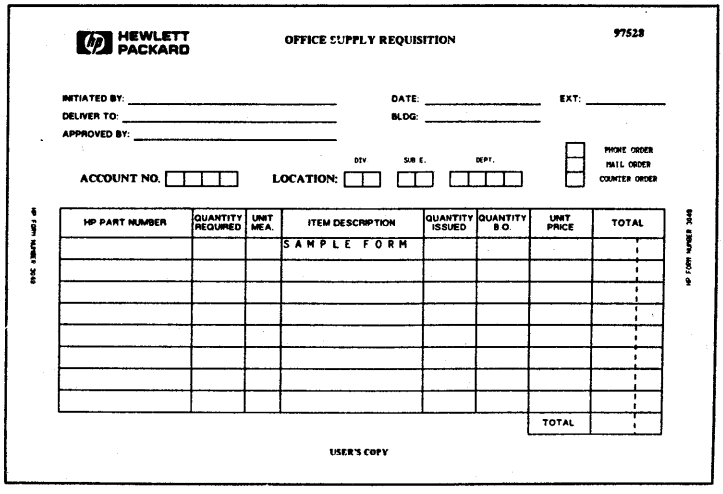


Figure 838.8. VFC Channel (1,2,3,6,7,8,9,10, & 12) Test

SECTION 5 STEP 54 (Print form with no shift)
This step tests the multi copy overlay feature.



HEWLETT PACKARD

OFFICE SUPPLY REQUISITION

97528

INITIATED BY: _____ DATE: _____ EXT: _____

DELIVER TO: _____ BLDG: _____

APPROVED BY: _____

ACCOUNT NO. [ ][ ][ ][ ] LOCATION: DIV [ ][ ] SUB E. [ ][ ] DEPT. [ ][ ][ ][ ]

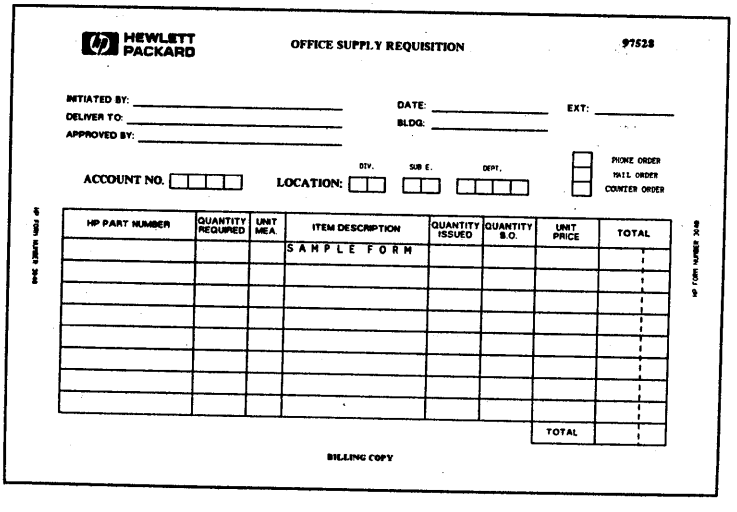
[ ] PHONE ORDER
[ ] MAIL ORDER
[ ] COUNTER ORDER

HP PART NUMBER	QUANTITY REQUIRED	UNIT MEA.	ITEM DESCRIPTION	QUANTITY ISSUED	QUANTITY B.O.	UNIT PRICE	TOTAL
			SAMPLE FORM				
						TOTAL	

USER'S COPY

Figure 838.9. Multicopy Overlay Test - User's Copy

SECTION 5 STEP 54 (Print form with no shift)
This step tests the multi copy overlay feature.



HEWLETT PACKARD

OFFICE SUPPLY REQUISITION

97528

INITIATED BY: _____ DATE: _____ EXT: _____

DELIVER TO: _____ BLDG: _____

APPROVED BY: _____

ACCOUNT NO. [ ][ ][ ][ ] LOCATION: DIV. [ ][ ] SUB E. [ ][ ] DEPT. [ ][ ][ ][ ]

[ ] PHONE ORDER
[ ] MAIL ORDER
[ ] COUNTER ORDER

HP PART NUMBER	QUANTITY REQUIRED	UNIT MEA.	ITEM DESCRIPTION	QUANTITY ISSUED	QUANTITY B.O.	UNIT PRICE	TOTAL
			SAMPLE FORM				
						TOTAL	

BILLING COPY

Figure 838.10. Multicopy Overlay Test - Billing Copy

SECTION 5 STEP 54 (Print form with no shift)
This step tests the multi copy overlay feature.

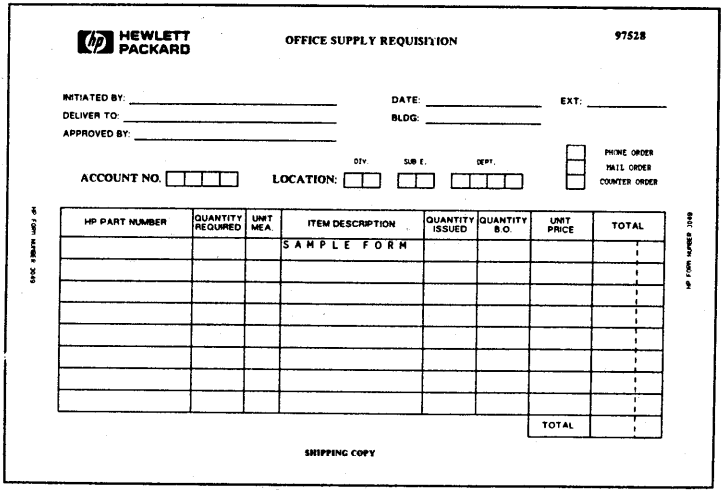


Figure 838.11. Multicopy Overlay Test - Shipping Copy

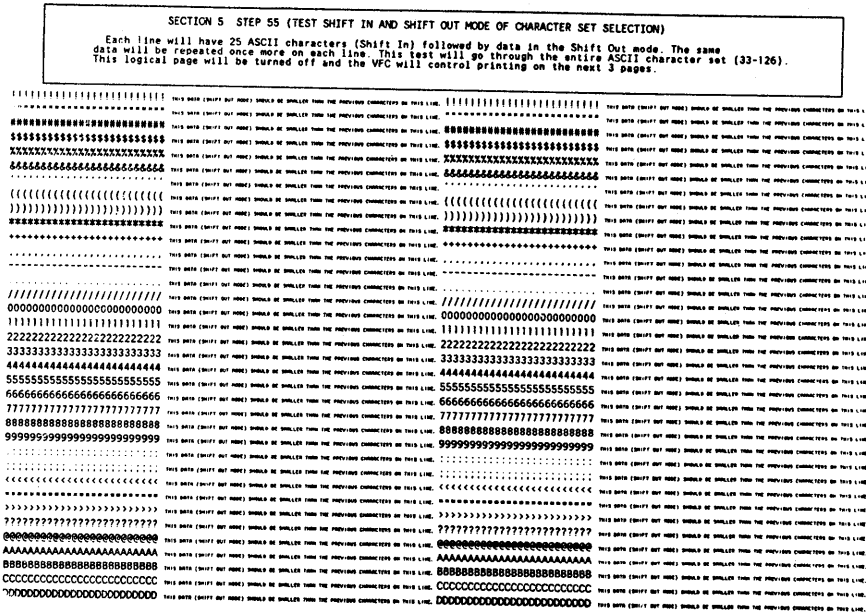


Figure 838.12. Character Set Selection Using Shift In/Shift Out

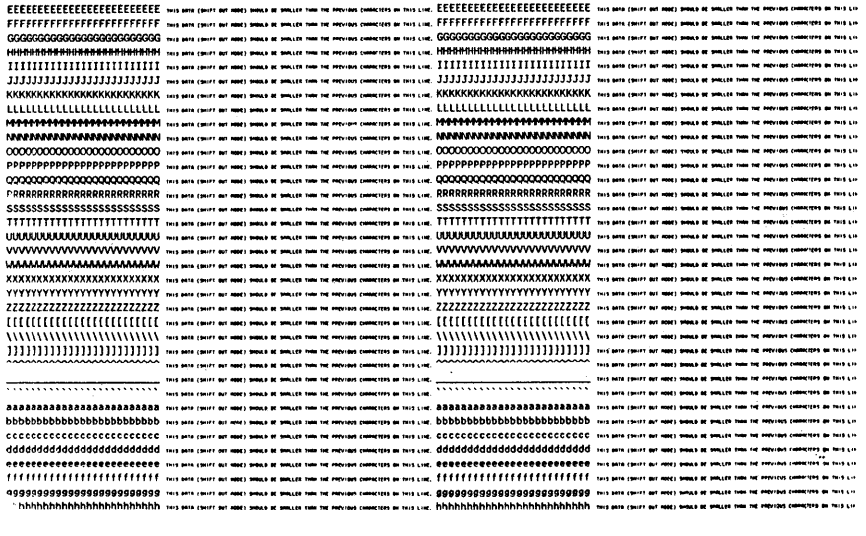


Figure 838.13. Character Set Selection Using Shift In/Shift Out

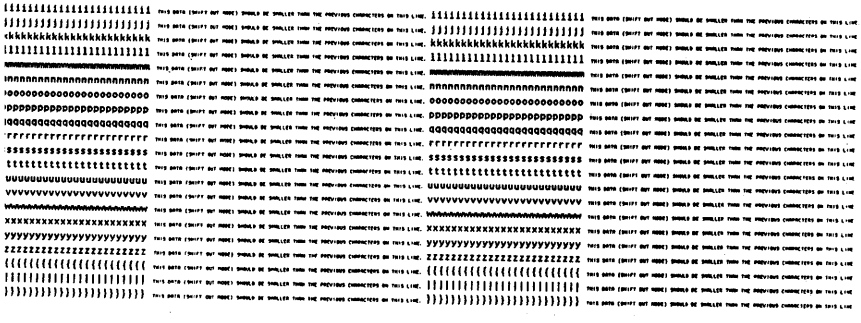


Figure 838.14. Character Set Selection Using Shift In/Shift Out

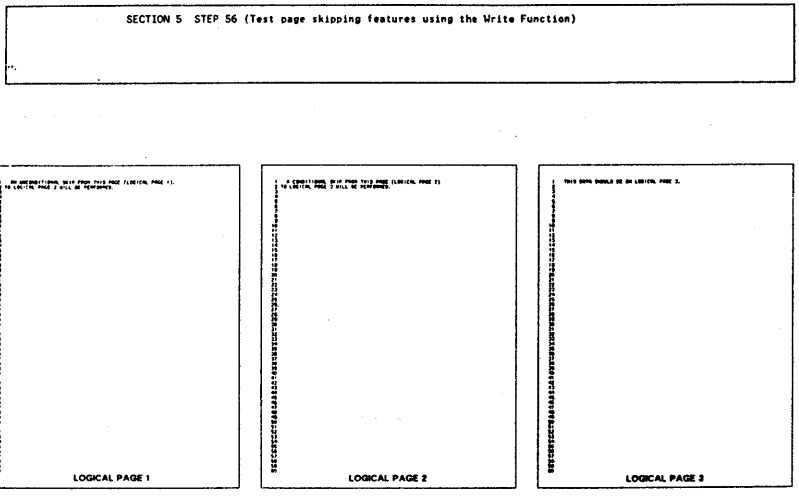


Figure 838.15. Write Function Skip Test

SECTION 5 STEP 56 [Test page skipping features using the LPT Skip Function(140)]

A file open (function code 3) was used to close the previous page of data.
An FCLOSE and multiple page ejects (write using %6]) were issued to confirm that
multiple page ejects do not occur without any data being transmitted.

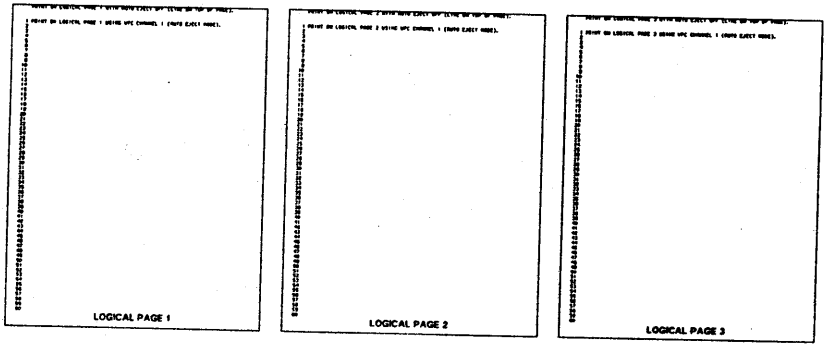


Figure 838.16. LPT Function Skip Test