

DECwriter IV Graphic Printer

Maintenance Advisory

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DECwriter IV Graphic Printer

INTRODUCTION

This maintenance advisory describes the DECwriter IV Graphic Printer. It also describes how the printer differs from the LA34/38 terminal. Any aspect of the DECwriter IV printer not discussed in this advisory remains unchanged from what you learned in the LA34/38 Maintenance Course.

DECwriter IV Graphic Printers are receive only (RO), low cost, desk top printers. The printer uses an impact dot matrix printing technique and operates in two printing modes:

- Text mode
- Graphic mode

The printer is normally in the text mode of operation; and in this mode, characters are processed according to ASCII (American Standard Code for Information Interchange).

To enter the graphic mode, the printer must receive a protocol selector. (Details on selecting the graphic mode are given in the DECwriter IV Graphic Printer User Guide.) In this mode, characters are processed according to a DEC private protocol. In graphic mode, columns of dots are stored in memory and then printed when the DECwriter IV receives one of the following:

- 14 columns
- a carriage motion command

DECwriter IV printers are available in the following three models.

- LA34-RA Basic printer without supplies or options
- LA34-VA Graphic version with roll paper holder, paper low detector, BC22A-25 cable, ribbon cartridge, and roll of paper.
- LA34-WA Text version with tractor assembly, paper out detector, BC22A-25 cable, and ribbon cartridge.

For detailed specifications refer to the DECwriter IV Graphic Printer User Guide.

RESOURCES

DECwriter IV Graphic Printer User Guide, EK-L34R0-UG

DECwriter IV Series Pocket Service Guide, EK-LA34S-PS

LA34/38 Maintenance Course, AV-JB981-A8

OPERATOR CONTROL PANEL AND INDICATORS

The operator control panel (Figure 1) provides the user with four keys and two indicators. The following paragraphs describe the function of each key and indicator.

FORM FEED/
CLEAR FAULT

This key controls three functions.

Pressing this key in the off-line mode advances the paper to the next top of form.

Pressing this key after a fault occurs (paper out, head jam, or access cover open) clears the fault. The clear fault function works both on- and off-line.

NOTE

CLEAR FAULT has priority over all other functions when a fault condition exists.

Pressing the FORM FEED/CLEAR FAULT key in the self-test mode also selects the data loopback test.

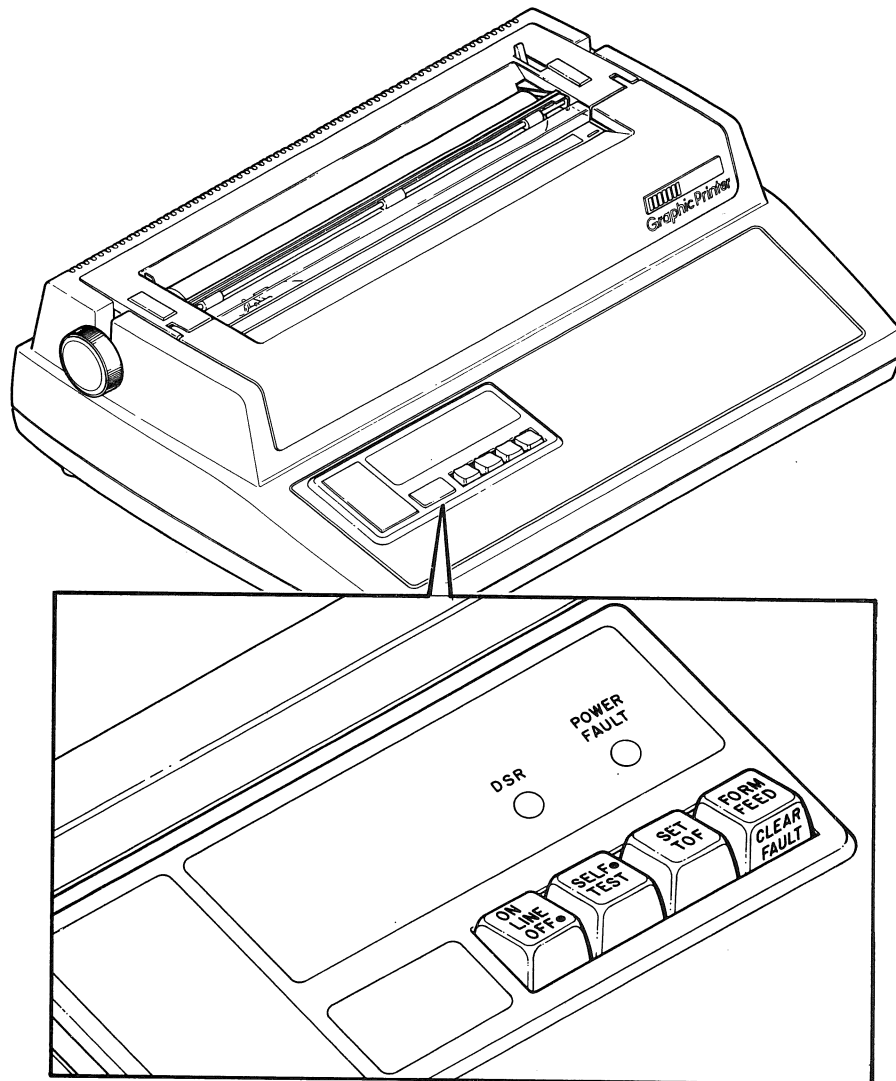
ON
LINE
OFF

When this key is in the up position, the DECwriter IV is on-line and it prints data received from the communication line. The SELF TEST, SET TOF, and FORM FEED/CLEAR FAULT keys are disabled when the printer is on-line.

When this key is in the down position, the DECwriter IV is off-line. When the key is first put in the down position, the printer sends the computer an XOFF command (if XOFF is enabled) to temporarily stop sending data. The SELF TEST, SET TOF, and FORM FEED/CLEAR FAULT key are enabled when the printer is off-line.

SELF
TEST

Pressing the SELF TEST key when off-line causes the DECwriter IV to disconnect from the communication line, exit graphic mode, clear the input buffer, and print the status message. Any of the self-tests can be selected in this mode. The self-tests are described in detail later in this advisory.



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Figure 1 Operator Control Panel Indicators

NOTE

All data sent to the DECwriter IV after SELF TEST has been pressed is lost. If a modem is being used, the communication link with the computer must be restored.

SET

TOF (top of form)

Pressing this key, when the printer is off-line sets the current line as top of form (line one) and moves the paper to the next top margin.

The SET TOF key also selects one of four printing tests when the printer is in the self-test mode.

The following paragraphs describe the two indicators on the control panel.

**POWER
FAULT**

This indicator lights when power is applied to the printer. If the POWER/FAULT indicator flashes, the printer is not ready because of one of the following conditions.

- Paper fault
- Printhead jam
- Access cover open

When in the no-modem control mode, the DSR (data set ready) indicator lights to show the printer is ready to receive data when on-line or off-line. When in the modem control mode, the DSR indicator lights if the DSR signal is asserted.

During the power-up self-test, the POWER/FAULT and DSR indicators display any errors that occur. A detailed explanation of the error indicators is given later in this advisory.

Audible Indicators

The DECwriter IV graphic printer produces a bell tone under the conditions listed in Table 1.

COMMUNICATION FEATURES

The DECwriter IV graphic printer supports two basic types of communication.

- Full-duplex without modem control (no-modem control)
- Full-duplex with modem control

No-modem control allows communication directly with a computer (null modem configuration) or with a full-duplex modem that does not support DSR (data set ready) or RLSD (receive line signal indicator).

Modem control allows communication through modems such as Bell 103, 212, Vadic 3400, or equivalents.

Jumper W12 on the logic board (Figure 2) selects the modem configuration. Installing the jumper selects the no-modem control feature. Removing the jumper selects the modem control feature. The DECwriter IV is shipped with this jumper installed.

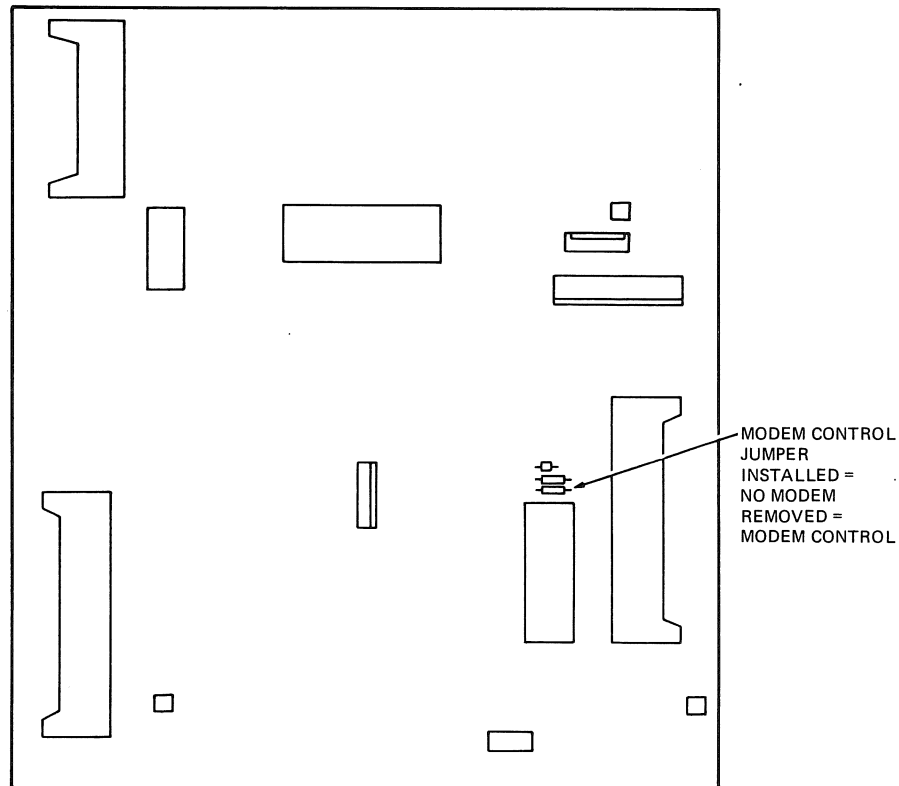
The status message printout shows the communication mode currently selected. The status message prints one of the following messages.

- Modem:N to indicate no-modem control
- Modem:Y to indicate modem control

A 20 mA current option is also available.

Table 1 Audible Indicators

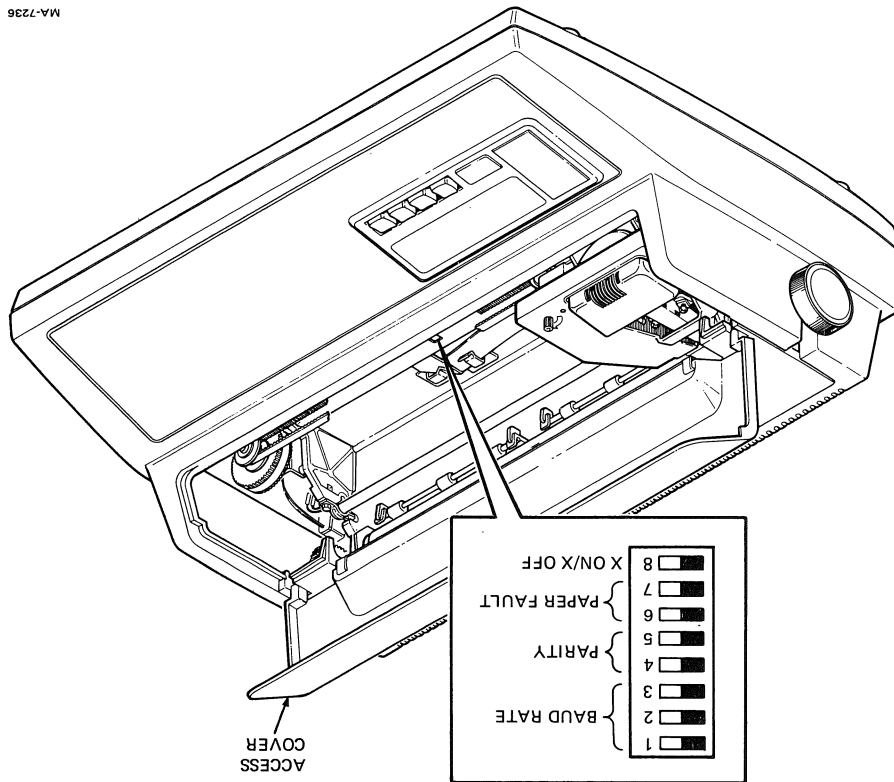
Cause	Action/Comments
Input buffer overflow (when XON/XOFF not selected)	Data received faster than printer can print causes input buffer overflow. During overflow condition, bell tone sounds and input buffer is cleared.
Bell code received	Bell tone sounds
Printhead jam	Multiple bell tones sound
Data loopback test	Bell tone sounds each time 126 characters are transmitted and received during loopback test.



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Figure 2 Logic Board

Figure 3 Data Communication Switches



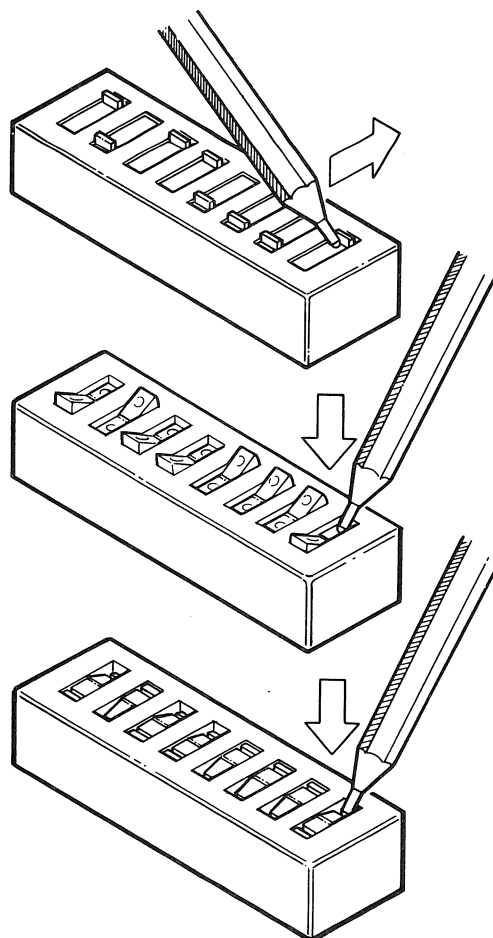
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Data Communication Switches

The DECwriter IV must be compatible with the computer hardware and software to receive data. The data communication switches allow the printer to operate compatibly with a variety of computers. These switches are usually preset and should not be changed unless incompatibility with the computer is verified.

To access the data communication switches, open the access cover and move the printhead to the left side plate. Figure 3 shows the location of the data communication switches and the function of each switch. There are three types of switches that can be used in the printer: two rocker switch types and one slide switch (Figure 4). It is important to identify which type of switch your printer has before trying to change any communication features.

To select a feature with a rocker switch, press down the side of the switch that corresponds to the desired selection. To select a feature with a slide switch, push the switch tab to the side that corresponds to the desired selection.



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Figure 4 Data Communication
Switch Types

CAUTION

Always use a small screwdriver, ball-point pen, or equivalent to change a communication feature. Never use a lead pencil.

After selecting any data communication features, print a status message to make sure the desired features have been selected. Print the status message by performing the following steps.

1. Close the access cover.
2. Press the FORM FEED/CLEAR FAULT key.
3. Place the ON LINE/OFF key in the OFF (down) position.
4. Press the self-test key to print the status message and thus verify that the desired features are selected.

The following paragraphs describe each communication feature in detail and show an example of a status message printout for each feature.

Baud Rate (switches 1, 2, and 3)

The printer is capable of receiving data at various speeds. Table 2 lists these speeds and the switch settings for each speed selection.

Example of status message printout: Speed: 1200

Parity (switches 4 and 5)

The parity feature allows the printer to check the correctness of the data received. In text mode, parity errors are indicated by the data received. In place of the character received in error. In graphic mode, error characters are replaced by a blank column. The parity feature must be compatible with the computer. Parity is only checked when even or odd parity is selected. Table 3 shows the parity selections and the switch settings.

Examples of status message printout: Parity: 0

Parity: E

Parity: M

Parity: S

Parity Fault (switches 6 and 7)

This feature functions when one of the following options is installed.

• Paper Low Option (LAX34-L) -- detects a roll paper fault

• Paper Out Option (LAX34-PL) -- detects a fanfold paper fault

Overriding the option disables paper fault detection.

There are four switch settings for paper fault response. The feature selected responds as described in the following paragraphs. Table 4 lists the feature, response, and the switch settings for each paper fault response.

No Action -- When the XON/XOFF feature (switch 8) is not selected, the printer ignores the paper fault and continues to print. When the XON/XOFF feature is selected, the printer responds to the paper fault by sending an XOFF command to the computer.

This feature is selected for hardwired installations or to prevent disconnection from the computer.

Status message printout: Disconnect: No

Table 2 Baud Rate Selections

Baud Rate	Switch Settings		
	1	2	3
110	R	R	R
300	L	R	R
600	R	L	R
1200	L	L	R
1800	R	R	L
2400	L	R	L
4800	R	L	L
9600	L	L	L

R = right L = left

Table 3 Parity Selections

Parity	Switch Settings	
	4	5
Space	R	R
Mark	L	R
Even	R	L
Odd	L	L

R = right L = left

Table 4 Paper Fault Response Selections

Feature	Printer Response	Switch Settings	
		6	7
No action	None	R	R
Paper low	Drop DTR after carrier detect (CD) is dropped	L	R
Paper out A	Drop DTR	R	L
Paper out B	Send 275 ms break signal	L	L

R = right L = left

Paper Low -- An XOFF command, if enabled, is sent to the computer. Printing continues until the next disconnect, after which the printer does not answer any incoming calls. After the disconnect the POWER/FAULT indicator flashes. This feature is effective only in modem control mode.

Status message printout: Disconnect: Low

Paper Out A -- An XOFF command, if enabled, is sent to the computer. Then the POWER/FAULT indicator flashes and the printer immediately turns off DTR (data terminal ready).

Status message printout: Disconnect: DTR A

Paper Out B -- An XOFF command, if enabled, is sent to the computer. Then the POWER/FAULT indicator flashes and the printer immediately transmits a 275 ms + 25 ms break signal.

Status message printout: BRK B

XON/XOFF (switch 8)

The XON/XOFF feature is used to prevent input buffer overflows. When XON/XOFF is selected, the printer constantly monitors the number of characters stored in the input buffer. The printer sends an XOFF character to the computer to stop sending data during the following conditions.

Number of characters in the input buffer exceeds 112 characters.

Access cover is opened.

Paper out or paper low is detected (if paper out or paper low option is installed and not overridden).

Printhead jam occurs.

Printer is switched off-line.

Printer receives 60 or more characters after transmitting XOFF.

Power to the printer is turned on while it is in the off-line mode (ON LINE/OFF key in down position) and the computer tries to send data.

The printer sends an XON character to the computer to resume data transmission during the following conditions.

Number of characters remaining in the input buffer is less than 112 or drops below 30 characters.

XOFF has been sent and fault condition (paper out, paper low, printhead jam, cover open) is corrected.

Power to the terminal is turned on while it is in the on-line mode (ON LINE/OFF key in the up position).

Status message printout: Xon/Xoff: N
Xon/Xoff: Y

INSTALLATION

Install the DECwriter IV graphic printer in an area free from excessive dust, dirt, corrosive fumes, and vapors. Make sure the ventilation openings at the bottom of the printer are not blocked. Refer to the DECwriter IV Graphic Printer User Guide for unpacking and installation procedures. Refer to Table 5 for the interface cables used with the printer.

SELF-TESTS AND STATUS MESSAGE

The DECwriter IV has the capability of printing a status message and performing the following self tests.

Power-Up self-test
Printer self-tests
Data loopback test

The status message and self-tests are described in the following paragraphs.

Status Message

The status message (Figure 5) lists both features selected at the terminal and by the computer. The status message includes the following feature selections.

Current microcode revision
Data communication features
Character set
Horizontal pitch
Vertical pitch
Current state of the modem/no-modem control jumper

NOTE

The character set, horizontal pitch, vertical pitch, tab stops, and margin features are selected by the computer. They cannot be changed by the operator.

Table 6 shows the feature default values.

Status Message Procedure

Perform the following steps to produce a status message printout.

1. Press and lock the ON LINE/OFF key in the OFF (down) position.
2. Press and lock the SELF TEST key in the down position. The status message is immediately printed.

Table 5 Interface Cables

Part Number	Length	Connector Type	Description
BC22A-10	3 m 10 ft	RS232C female to female	Null modem, 6-conductor, shielded cable. Used for direct connection between printer and computer.
BC22A-25	7.6 m 25 ft	RS232C female to female	Null modem, 6-conductor, shielded cable. Used for direct connection between printer and computer.
BC03M-XX	Variable	RS232C female to female	Null modem, 6-conductor, shielded cable. Used for direct connection between printer and computer instead of the BC22A when required cable length exceeds 25 feet.
BC22B-10	3 m 10 ft	RS232C female to male	Extension, 14-conductor, shielded cable. Used to connect printer to a data set (modem) or acoustic coupler.
BC22B-10	7.6 m 25 ft	RS232C female to male	Extension, 14-conductor, shielded cable. Used to connect printer to a data set (modem) or acoustic coupler.
BC05X-XX*	Variable	Mate-N-Lok	20 mA extension cable. Used for direct connection between printer with a 20 mA option installed and computer.
30-10958-02	2.4 m 8 ft	EIA: RS232C male to female	DF01-A interface cable. Used to connect printer to a DF01-A acoustic telephone coupler.

* A BC05X-15 cable is shipped with the 20 mA current loop option.

PRINTOUT	FEATURE DESCRIPTION
VA1.0	MICROCODE REVISION
Parity: 0	PARITY
Speed: 1200	BAUD RATE
GO: US	CHARACTER SET
G1: US	CHARACTER SET
Cpi: 10	HORIZONTAL PITCH
Lpi: 6	VERTICAL PITCH
Disconnect: DTR A	STATE OF PAPERLOW/PAPER OUT SWITCHES
DATA OK - CTRL OK	DATA LOOPBACK TEST RESULTS
Xon/Xoff: Y	Xon/Xoff
Modem: N	MODEM CONTROL

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Figure 5 Status Message Printout

Table 6 Feature Default Values

Feature	Setting
Modem control	Jumper installed
Character set	US ASCII character set
Horizontal pitch	10 cpi
Left margin	Column 1
Right margin	Column 132
Horizontal tab stops	Columns 1, 9, 17, 25, 33, 41, 49, 57, 65, 73, 81, 89, 97, 105, 113, 121, 129.
Vertical pitch	6 lpi
Form length	66 lines
Top margin	Line 1
Bottom margin	Line 66
Vertical tab stops	Every line
Data communication features	Set according to switches

Power-Up Self-Test
 A power-up self-test is automatically run when power to the printer is turned on. The POWER/FAULT and DSR indicators both light after the printer completes a successful power-up self-test. Any errors that occur during the power-up self-test are displayed by the indicators on the operator control panel. Table 7 shows the power-up self-test indications.

Printer Self-Tests
 The printer self-tests provide visual indication that the printer is working properly. There are four printer self-tests.

- Character pattern
- Vertical bar
- Nonprinting
- Status message

The character pattern self-test continuously prints 94 characters within the selected margins.

The vertical pattern self-test prints vertical lines, at 12 lpi, within the selected margins to check printhead alignment and horizontal registration.

The nonprinting self-test moves the carriage from the left margin to the right margin, then back to the left margin, and finally turns the platen the equivalent of one line.

Printer Self-Test Procedures

Perform the following steps to run the printer self-tests.

1. Place the printer in the off-line mode (ON LINE/OFF key in the down position).

2. Press and lock the SELF TEST key in the down position. This will print the status message.

NOTE

Once the SELF TEST key is pressed, data sent to the DDCwriter IV is lost. If a modem is being used, the communication link with the computer must be restored.

3. Press the FORM FEED key. This selects and prints the character pattern self-test.

4. Press the FORM FEED key again to run the next self-test. The self-tests are performed in the following order:

- Character pattern
- Vertical bar
- Nonprinting
- Status message

Table 7 Power-Up Self-Test Indications

POWER/FAULT Indicator	DSR Indicator	Probable Cause
On	On	On-line/ready to receive data
On	Off	Off-line
Off (no carriage motion)	Off	Power supply
Off (carriage motion)	Off	Defective indicators
Off	On	Defective logic board
Off	Flashing	Defective logic board
Flashing	On or Off	Cover open or paper fault
Flashing (bell tone sounds)	On or Off	Printhead jam

NOTE

The top of form reference is lost when the vertical bar self-test is run.

5. Press the SELF TEST key to stop any of the self-tests.

Data Loopback Test

The data loopback test verifies that the printer is sending and receiving data correctly. To run the test, a loopback connector is used to connect the DECwriter IV transmit and receive lines. The printer transmits a set of characters on its transmit line and receives them on its receive line. The test checks all control signals, including baud rate and parity. During the test the bell sounds each time 126 characters are successfully transmitted at the correct speed and parity. The printer compares the output and input and then prints the status message. The status message will print one of the following messages.

DATA OK -- CTRL OK
 DATA ERR -- CTRL ERR
 DATA ERR -- CTRL OK
 DATA OK -- CTRL ERR (20 mA ?)

NOTE
 If the 20 mA interface is used, the terminal prints 'DATA OK -- CTRL ERR' when the data loopback test is successfully completed. The 20 mA interface does not use CTRL lines.

Data Loopback Test Procedure

Perform the following steps to run the data loopback test.

1. Use the loopback connector to connect the printer's transmit and receive line.
2. Press and lock the ON LINE/OFF key in the off (down) position.
3. Press and lock the SELF TEST key in the down position. (If this key is already in the down position, release it and then relock in the down position.) This will print the status message.

NOTE

Once the SELF TEST key is pressed, data sent to the DECwriter IV is lost. If a modem is being used, the communication link with the computer must be restored.

4. Wait four or five seconds after the status message is printed. Then press the TOF key to start the data loopback test. (During the test the bell sounds each time 126 characters are successfully processed. An OK or ERR message is printed when a pass is completed.)

APPENDIX A
DECWRITER IV GRAPHIC PRINTER SPECIFICATIONS

OPERATING CHARACTERISTICS

This Appendix lists the operating characteristics of the printer. For more detailed specifications, refer to the DECwriter IV Graphic Printer User Guide.

Characteristics	Description
Printing Technique	Impact dot matrix
Print Matrix	7 dots high by 9 dots wide
Maximum Print Rate	
Text mode	45 characters per second
Graphic mode	320 columns per second or 960 dots per second
Vertical Pitch*	2, 3, 4, 6, 8, or 12 lpi (lines per inch)
Horizontal Pitch*	5, 6, 6.6, 8.25, 10, 12, 13.2, 16.5 cpi (characters per inch)
Maximum Line Length* (changes with horizontal pitch)	
5 characters/inch	66 columns
6 characters/inch	79 columns
6.6 characters/inch	84 columns
8.25 characters/inch	108 columns
10 characters/inch	132 columns
12 characters/inch	158 columns
13.2 characters/inch	168 columns
16.5 characters/inch	216 columns
Margins*	Left, right, top, bottom
Tabs*	216 horizontal 168 vertical
Character Sets*	ASCII

* This feature is selected by the computer.

Description
 United Kingdom
 Finland
 Norway/Denmark
 Sweden
 Germany
 French Canadian
 France
 VT100 compatible
 Cover open interlock
 Self-test
 Status message
 Auto-last character view

Other Printer Features

Characteristics

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Your comments and suggestions will help us in our efforts to improve the quality of our publications.

1. How did you use this manual? (Circle your response.)

- (a) Installation (c) Maintenance (e) Training
 (b) Operation/use (d) Programming (f) Other (Please specify.) _____

2. Did the manual meet your needs? Yes No Why? _____

3. Please rate the manual on the following categories. (Circle your response.)

	Excellent	Good	Fair	Poor	Unacceptable
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Clarity	5	4	3	2	1
Completeness	5	4	3	2	1
Table of Contents, Index	5	4	3	2	1
Illustrations, examples	5	4	3	2	1
Overall ease of use	5	4	3	2	1

4. What things did you like *most* about this manual? _____

5. What things did you like *least* about this manual? _____

6. Please list and describe any errors you found in the manual.

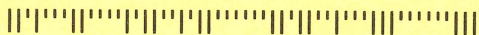
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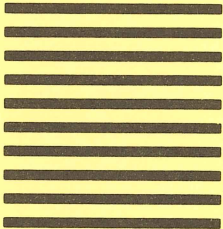
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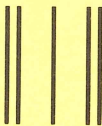
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