EK-CPL12-OP-001

DECwriter Correspondent

Operator Guide

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DECwriter Correspondent

Operator Guide

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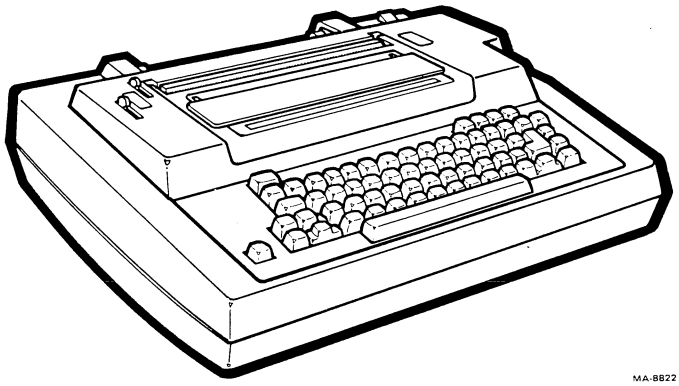

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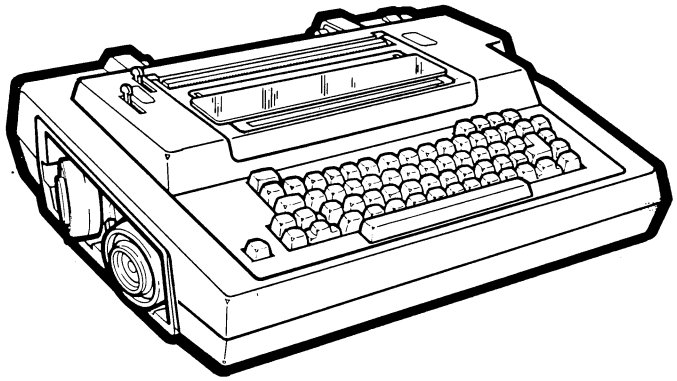


MA-8823

Product Introduction

The DECwriter Correspondent is a portable, impact dot matrix, printer terminal. There are four models of the terminal designed to fill the requirements of a wide variety of customers.

Model A — Keyboard Send Receive (KSR) terminal with a 300/1200 baud direct connect integral modem, a 300 baud integral acoustic coupler, and a 50 to 9600 baud EIA port.

Model B — KSR terminal with a 300/1200 baud direct connect integral modem and a 50 to 9600 baud EIA port.

Model C — KSR terminal with a 300 baud acoustic coupler and a 50 to 9600 baud EIA port.

Model D — KSR terminal with a 50 to 9600 baud EIA port.

Book Introduction

The DECwriter Correspondent User Documentation Package covers all models of terminals and is written for three general audiences:

- The hardware installer requiring installation and checkout information
- The operator requiring set up and operating information
- The applications programmer requiring programming and control function information

The documentation for the DECwriter Correspondent is divided into five books:

- Installation Guide
- Operators Guide
- Programmers Reference Manual
- Pocket Service Guide
- Technical Manual

This book describes the information required to operate the terminal. The operator should use this manual as a reference when operating the terminal.

The Operator Guide is divided into the following chapters:

Chapter 1 Controls and Indicators -- Provides a general introduction to the DECwriter Correspondent operation and shows all the controls and indicators of the terminal.

Chapter 2 Ribbon and Paper Installation -- Describes the procedures required to change ribbon cartridges, install paper or preprinted forms, adjust the printhead and set the top of form.

Chapter 3 SET-UP Features -- Describes the procedure to enter and exit SET-UP and each SET-UP feature in detail.

Chapter 4 Communication -- Describes each of the methods used to communicate with the host computer and the related communication features.

Chapter 5 Maintenance and Troubleshooting -- Describes the general cleaning and care recommendations. The chapter also provides a list of checks the operator should make before requesting service.

WARNINGS, CAUTIONS AND NOTES

In this book, warnings, cautions, and notes are used for specific purposes. Warnings provid information used to prevent personal injury. Cautions provid information used to prevent damage to the terminal. Notes provide information which explains instructions.

CHAPTER 1
CONTROLS AND INDICATORS

GENERAL

This chapter describes each DECwriter Correspondent control and indicator. Detailed operating information may depend on the computer software. The terminal has many different controls and indicators which are used by the operator to control and monitor terminal operation. The controls and indicators chapter is organized as follows.

Terminal controls
Keyboard
Visual indicators
Audible indicators

TERMINAL CONTROLS

The following paragraphs describe the function of the terminal controls.

Voltage Selector Switch

The voltage selector switch (Figure 1-1) changes the terminal to match the available ac input voltage range. Refer to the Installation Guide for more detail.

CAUTION: Failure to set the voltage selector switch to the correct voltage range may damage the power supply.

Power On/Off Switch

The power on/off switch turns power to the terminal on or off (Figure 1-2). The on position is labeled "1" and the off position is labeled "Ø".

Paper Release Lever

The paper release lever (Figure 1-3) is used to reposition or remove friction feed paper from the terminal.

Bail Bar Lever

This lever (Figure 1-3) is used to hold paper securely against the platen during printing.

Printhead Adjustment Lever

The printhead adjustment lever (Figure 1-3) controls the space between the printhead and the platen to adjust the printhead for clear printing on single or multipart forms.

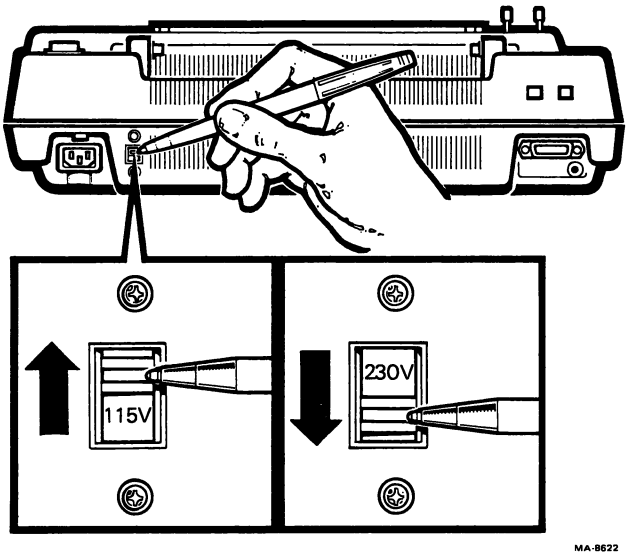


Figure 1-1 Voltage Selector Switch

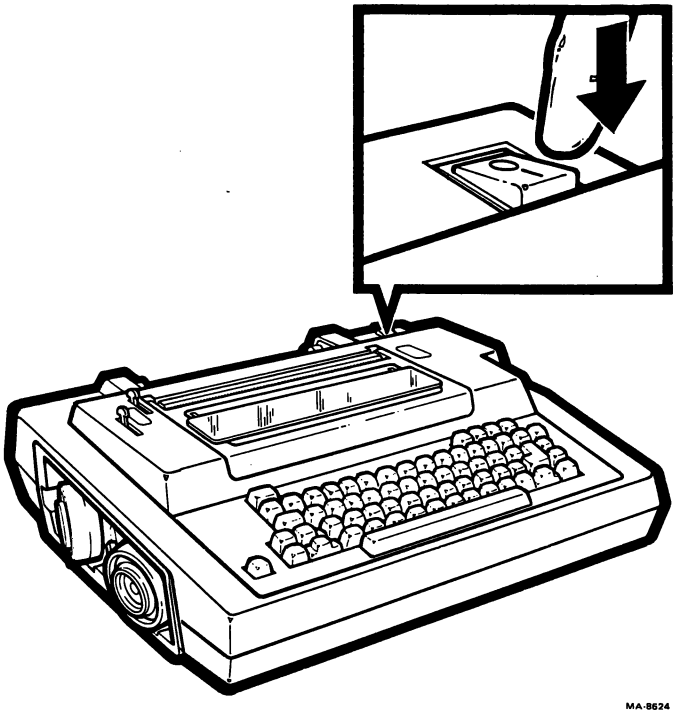


Figure 1-2 Power ON/OFF Switch

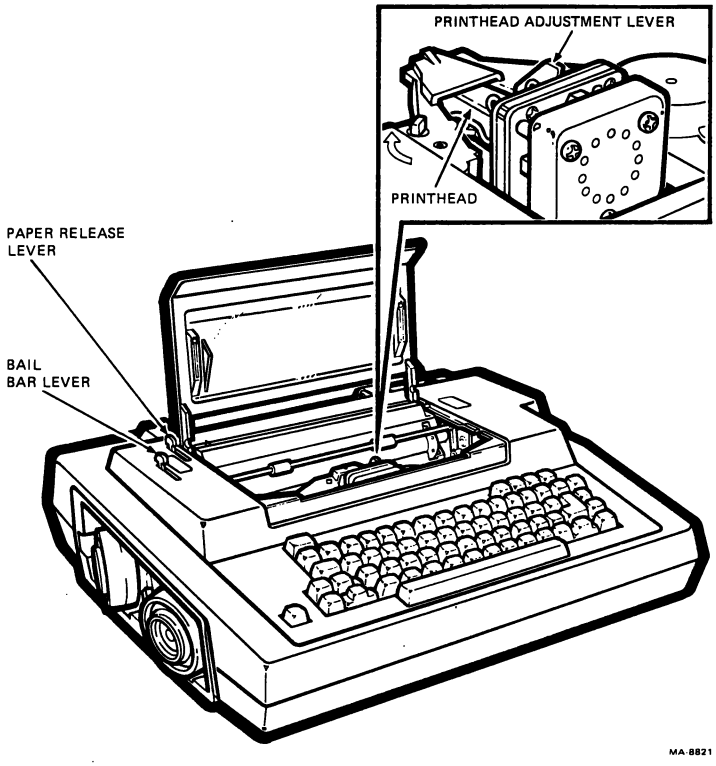


Figure 1-3 Printer Control Levers

Ribbon Adjust Knob

The ribbon adjust knob (Figure 1-4) is used to tighten the ribbon when installing a new ribbon cartridge.

KEYBOARD

The keyboard (Figure 1-5) is arranged like a standard office typewriter and operates in a similar manner. It includes an imbedded keypad (shaded keys) which are used for rapid entry of numeric data. The keyboard keys are described in four groups:

- Standard Keys
- Function Keys
- SET-UP Keys
- Imbedded Keypad Keys

Standard Keys

The shaded keys in Figure 1-6 are standard typewriter keys. These keys are used to send characters to the computer. In local mode or when local echo is selected, they operate the same as typewriter keys.

Auto Repeat

When a key is pressed and released, its character is sent once. If the key is held down for more than Ø.5 seconds, the code is sent repeatedly until the key is released. All keys will auto repeat, except:

- SETUP
- VIEW/RESET
- ESC
- NUM KEY MODE
- HERE IS
- LOC FF
- BREAK
- RETURN
- Any key pressed with CTRL

NOTE: The auto repeat feature may be disabled during terminal set up procedures if desired. Refer to Chapter 3 for more detail.

CAPS LOCK

The **CAPS LOCK** key is a two-position locking key which is similar to the LOCK key on a standard typewriter. However, in the down position only the alphabetic keys generate uppercase characters (regardless of **SHIFT** key position). The numeric, special symbol, function and imbedded keypad keys are not affected by this key.

In the up position, the alphabetic keys generate lowercase characters.

SHIFT

Either of these keys cause all standard keys on the keyboard to generate uppercase characters. The **SHIFT** keys do not affect the function keys or the imbedded keypad keys.

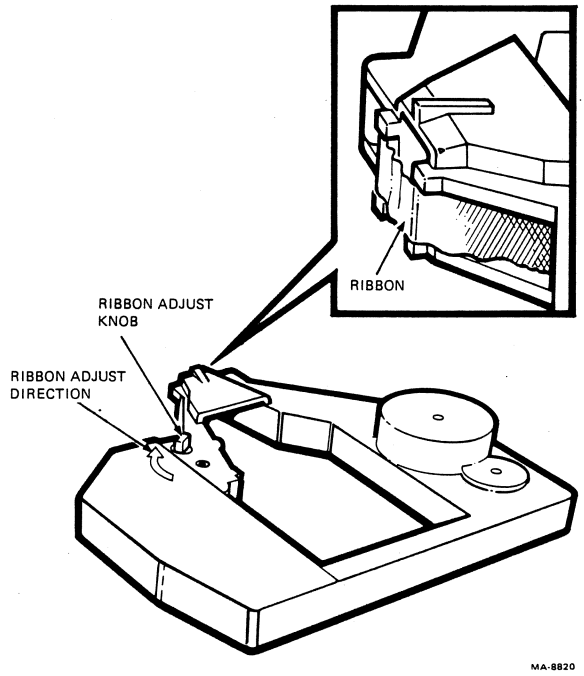


Figure 1-4 Ribbon Adjust Knob

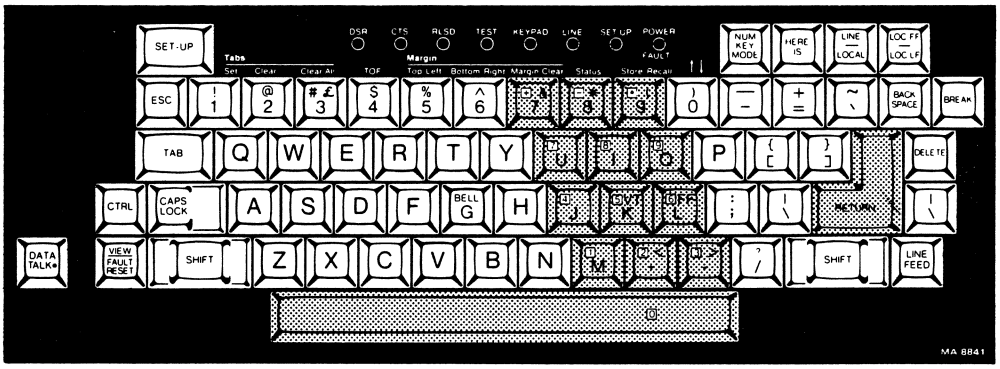


Figure 1-5 Standard Keyboard with Imbedded Keypad

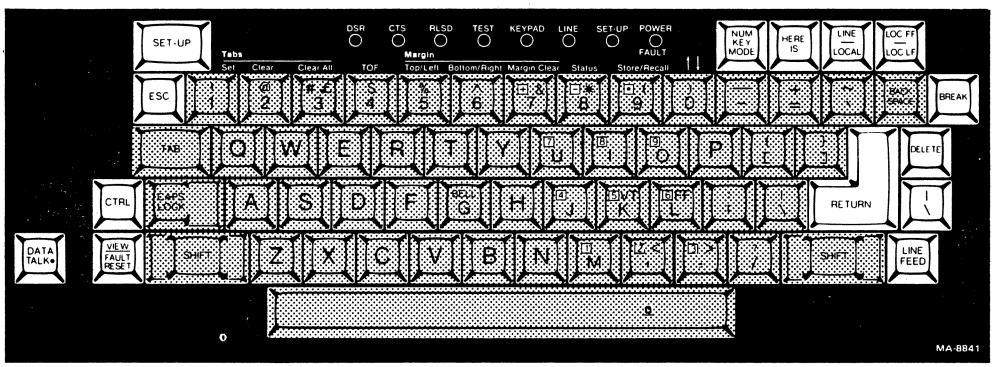


Figure 1-6 Standard Keys

Function Keys
Figure 1-7 shows the function keys on the keyboard. The following paragraphs describe each function key.

DATA
TALK.

This key is used to establish terminal-to-computer communications through the integral direct connect modem.

ESC

This key causes the terminal to generate the escape control character.

TAB

This key causes the terminal to generate the horizontal tab control character. It advances the printhead to the next tab position when in local or when local echo is selected.

CTRL

This key causes the terminal to generate control characters when certain standard keys on the keyboard are pressed while holding the CTRL key down. Control characters are not printed out by the terminal. Refer to Chapter 4 for a list of standard keys used to generate control characters.

VIEW/FAULT
RESET

This key performs two functions:

VIEW -- When this key is pressed (during normal terminal operation) the print head moves to the right so the operator can see the last printed character. This feature is called manual last character view (LCV).

When this key is pressed with CTRL held down, last character view is switched from manual to automatic and the print head moves to the right automatically after each printed character. Switching back to manual LCV is performed the same way.

FAULT RESET -- After a fault condition has been detected and corrected, this key is pressed to reenable terminal operation.

LINE/
LOCAL

This key is used to switch the terminal between on-line mode and local mode. When the terminal is on-line, the LINE indicator is on.

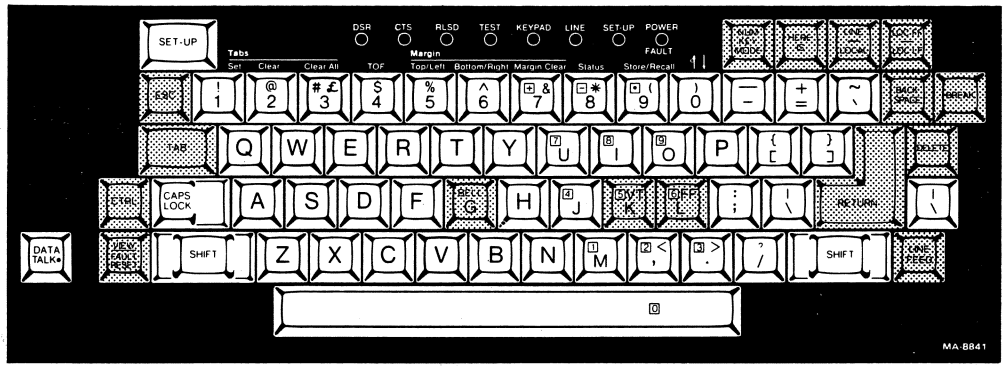


Figure 1-7 Function Keys

HERE
IS

When this key is pressed, the answerback message is sent to the host, if the terminal is on-line and an answerback message has been defined and stored.

LOC FF/
LOC LF

This key is the local paper feed key. It is used to advance paper to the next line or to the next top of form. Pressing this key does not send signals to the host.

> LOC LF -- With the shift key up, pressing this key advances paper by one line at the current vertical pitch.
>
> LOC FF -- With the shift key down, pressing this key advances paper to the next top of form.

BACK
SPACE

This key causes the terminal to generate the back space control character. It causes the print head to move back one character when in local or local echo has been selected.

BREAK

This key causes the terminal to transmit a short break signal with a fixed time duration. When pressed while pressing the SHIFT key, the terminal generates a long break disconnect signal. Refer to the Programmer's Reference Manual for more details on the use of the break signal.

NOTE: The BREAK key can be disabled in SET-UP. Refer to Chapter 3 for more detail.

DELETE

This key causes the terminal to generate the delete control character.

RETURN

This key causes the terminal to generate the carriage return control character. When in local or when local echo has been selected, the carraige returns to the left margin.

When the Auto Line Feed Feature is selected in SET-UP, this key generates both the carriage return control character and the line feed control character. When in local or when local echo has ben selected, the carriage returns to the left margin and the paper advances one line. Refer to Chapter 3 for more detail.

LINE
FEED

This key causes the terminal to generate the line feed control character. It advances the paper one line when in local or when local echo has been selected.

FF
L FORM FEED
This key generates the control character for form feed when pressed at the same time as the CTRL key. It advances paper to top margin of next form when in local or when local echo has been selected.

BELL
G BELL
This key when pressed at the same time as the CTRL key, it generates a bell control character. It sounds the bell tone when in local or when local echo has been selected.

VT
K VERTICAL TAB
This key generates the control character for vertical tab when pressed at the same time as the CTRL key. It advances paper to the next vertical tab when in local or when local echo has been selected.

NUM
KEY
MODE

This key is used to switch operation of the keyboard from normal mode to numeric keypad mode. In normal mode, the imbedded keypad keys function as standard keys. (See Figure 1-15.) In numeric keypad mode, these keys are used as calculator keys and the other standard keys are disabled.

SET-UP Keys
The shaded keys in Figure 1-8 perform special functions during SET-UP. The following paragraphs include a short description of the use of each key. A detailed description of SET-UP and the SET-UP features is provided in Chapter 3 and should be read before using these keys.

SET-UP
This key is used to enter and exit SET-UP. It is normally used with the CTRL key to enter SET-UP and change a number of terminal features. However,it also may be held down alone to temporarily enter SET-UP and change a single feature.

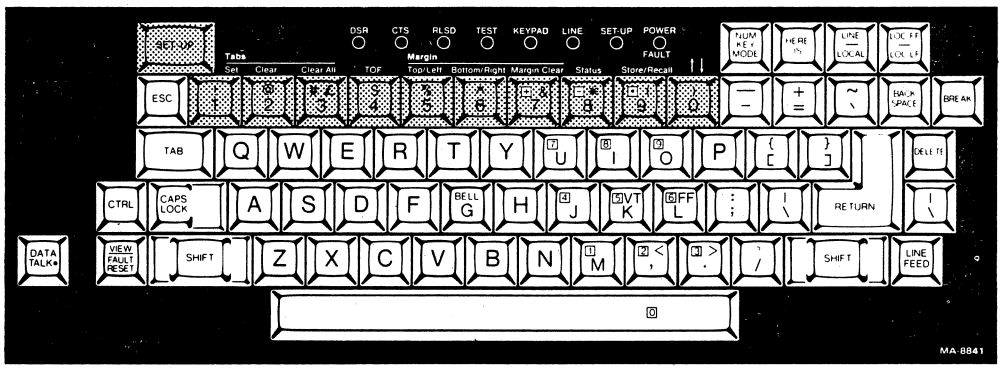


Figure 1-8 SET-UP Keys

! SET TABS
1

This key sets a horizontal tab stop at the current column when pressed with SHIFT key up. It sets a vertical tab stop at the current line when pressed with the SHIFT key down.

@ CLEAR TABS
2

This key clears a horizontal tab stop at the current column when pressed with SHIFT key up. It clears a vertical tab stop at the current line when pressed with the SHIFT key down.

CLEAR ALL TABS
3

This key clears all horizontal tab stops when pressed with the SHIFT key up. It clears all vertical tab stops when pressed with the SHIFT key down.

$ TOF (Top of Form)
4

This key selects the current paper position as the top of form (line 1) when the SHIFT key is up. It performs no function and causes an error indication (bell tone) when pressed with the SHIFT key down.

% TOP/LEFT MARGIN
5

This key sets the left margin at the current column when pressed with the SHIFT key up. It sets the top margin at the current line when pressed with the SHIFT key down.

^ BOTTOM/RIGHT MARGIN
6

This key sets the right margin at the current column when pressed with the SHIFT key up. It sets the bottom margin at the current line when pressed with the SHIFT key down.

+& MARGIN CLEAR
7

This key clears both the left and right margins when pressed with the SHIFT key up. It clears both the top and bottom margins when pressed with the SHIFT key down.

-* STATUS
8

This key causes the terminal to print the status message with the SHIFT key up. The status message is a list of the currently selected SET-UP features. It performs no function and causes an error indication (bell tone) when pressed with the SHIFT key down.

.(STORE/
9 RECALL

This key recalls the SET-UP features stored in user permanent (non-volatile) memory when pressed with the SHIFT key up. It stores the contents of the operating memory into user permanent memory when pressed with the SHIFT key down.

)
Ø ↑ ↓ (Vernier Paper Position)

This key is used for precise paper positioning. When it is pressed with the SHIFT key up, the paper moves up 1/24 inch (.Ø4 inches). When it is pressed with the SHIFT key down, the paper moves down 1/24 inch.

Imbedded Keypad Keys
The imbedded keypad keys (Figure 1-5) are built into the standard keyboard for use in performing calculator type operations. The NUM KEY MODE key is used to enable use of this function while disabling normal operation of the keys. The KEYPAD indicator is on when the numeric keypad mode has been selected.

To activate the imbedded keypad, the terminal must not be in SET-UP mode. These keys keys will auto repeat if held down for more than Ø.6 seconds.

VISUAL INDICATORS (Figure 1-9)
The following paragraphs describe the visual indicators. At power up, all indicators are on for approximately 2.Ø seconds so that you may check for a bad indicator.

POWER/FAULT Indicator
This indicator stays on when power is turned on. If the indicator is blinking, it indicates that there is a fault in the terminal. Refer to Chapter 5 for more detail.

SET-UP Indicator
This indicator blinks when the terminal is in SET-UP. The indicator stays on for approximately 1Ø seconds when the features are being stored into the customer permanent (non-volatile) memory.

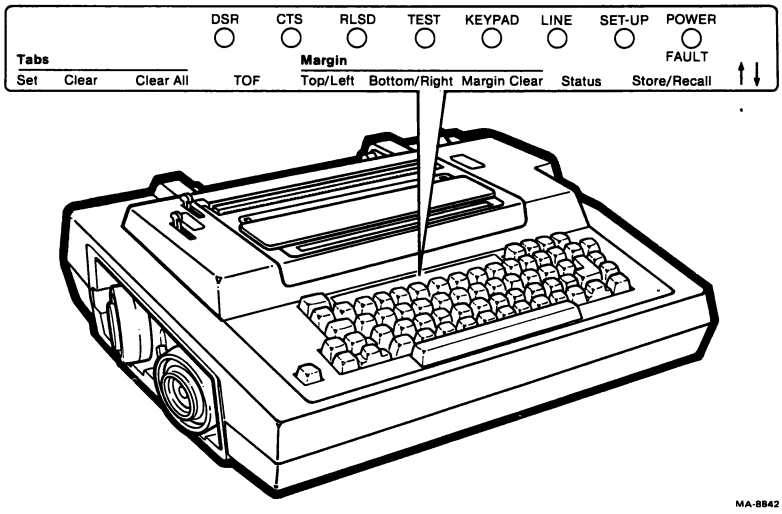


Figure 1-9 Operator Control Visual Indicators

LINE Indicator
When this indicator is on, the terminal is ON-LINE. When it is off, the terminal is OFF-LINE.

KEYPAD Indicator
When this indicator is on, the imbedded keypad is operational.

TEST Indicator
When this indicator is on it indicates that the terminal is in one of its self-test modes. Refer to Chapter 5 for more detail

RLSD Indicator (Data Carrier Ready)
When this indicator is on, the data carrier is present at the terminal input. The state of this indicator is always controlled by the selected communication interface.

CTS Indicator (Clear to Send)
When this indicator is on, the terminal is ready to transmit. This indicator will not come on when the acoustic coupler or 20 mA loop (optional) interfaces are being used.

DSR Indicator (Data Set Ready)
When this indicator is on, it indicates that the attached data set is ready for operation. The terminal assumes that the host is ready in the non-modem control mode (for example:20 mA port select, or FDX A protocol select).

Column Indicator (Figure 1-10)
This indicator shows the current position (by column) of the printhead. Scales are included for the four standard (single--width) horizontal pitch selections.

AUDIBLE INDICATORS
There are two audible indicators in the terminal. A keyclick sound occurs when any key is pressed if the keyclick feature is selected in SET-UP. A bell tone sounds under a number of conditions. Table 1-1 lists the conditions under which bell tones are sounded.

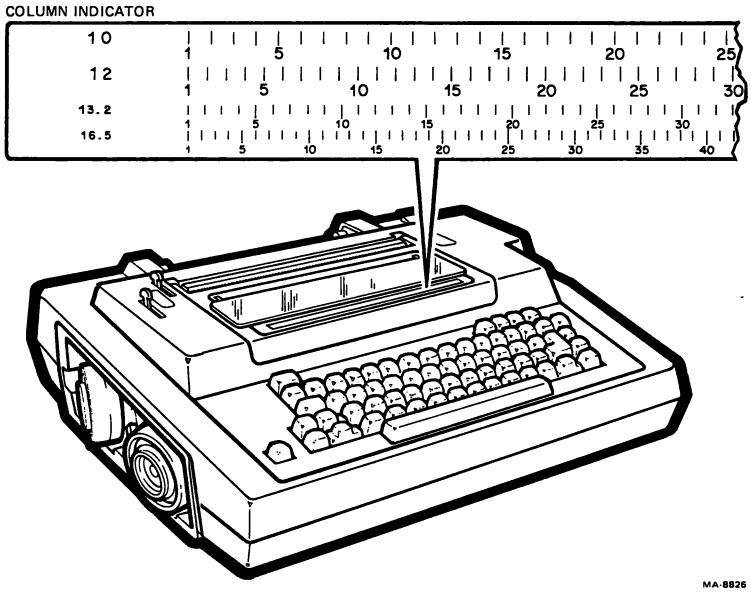


Figure 1-1Ø Column Indicator

Table 1-1 Bell Tone Indications

Cause	Action/Comments
Input buffer overflow	If the terminal is not able to process characters from the input buffer before the buffer fills, an input buffer overflow can occur. During an overflow condition, the bell tone sounds. Refer to the Communication Chapter for more detail.
Keyboard buffer overflow	Typing faster than the terminal can transmit characters from the keyboard buffer causes a keyboard buffer overflow. When the keyboard buffer is full every character typed causes a bell tone and the character is discarded. Refer to the Communication Chapter for more detail.
Bell code	Each bell code received by the terminal causes the bell tone to sound.
Printhead jam	This condition causes a flashing POWER/FAULT indicator and multiple bell tones.
Incorrect entry of the answerback message	Attempting to type more than 30 characters for the answerback message causes a bell tone and erases the message. Refer to the SET-UP Features Chapter for more detail.

CHAPTER 2
RIBBON AND PAPER INSTALLATION

GENERAL

This chapter describes how to change ribbon cartridges, install paper or preprinted forms and adjust the printhead.

RIBBON CARTRIDGE INSTALLATION

The disposable ribbon cartridge used in the DECwriter Correspondent terminal is capable of providing legible copy for at least ten million text mode characters. If the print density is too light, check the printhead adjustment . If the printhead is adjusted correctly and the print density is still too light, replace the ribbon cartridge.

One fresh sealed black print cartridge is shipped with each terminal.

CAUTION: Only ribbon cartridges recommended by DIGITAL (DEC P/N LA12 R) or equivalent should be used with this terminal. Using other cartridges may damage the printhead and void the warranty. Refer to the Accessories and Supplies chapter for ordering information.

Perform the following procedure to install a ribbon cartridge.

NOTE: Power should not be turned off when installing a ribbon cartridge.

1. Open the access cover (Figure 2-1).
2. Remove the old cartridge by lifting it off as shown (Figure 2-1).
3. Turn the adjust knob on the ribbon cartridge clockwise to tighten the ribbon (Figure 2-2).
4. Line up the snap buttons on the new ribbon cartridge with the mounting holes in the carriage assembly (Figure 2-2).
5. Slowly press the new ribbon cartridge onto the carriage assembly.
6. Repeat step 3.

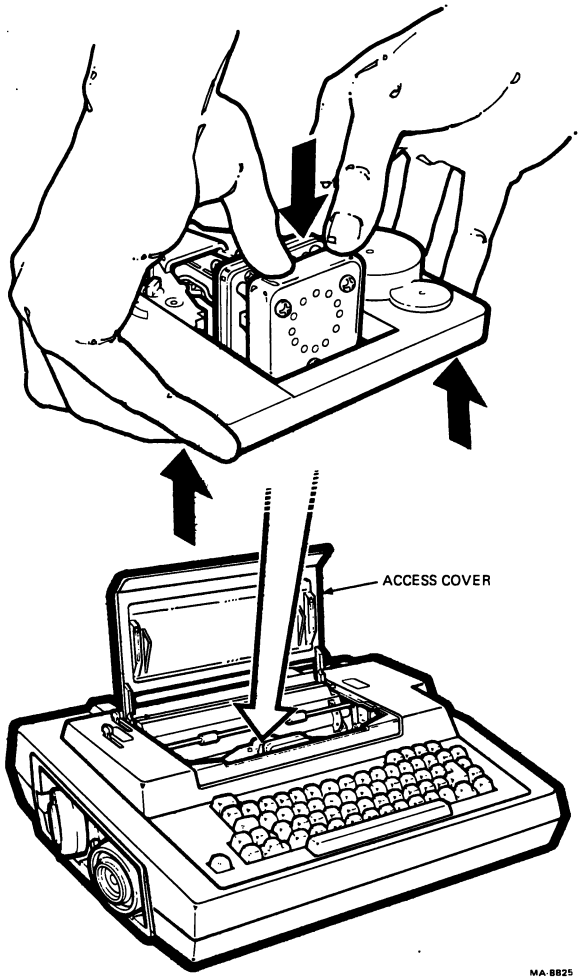


Figure 2-1 Ribbon Cartridge Removal

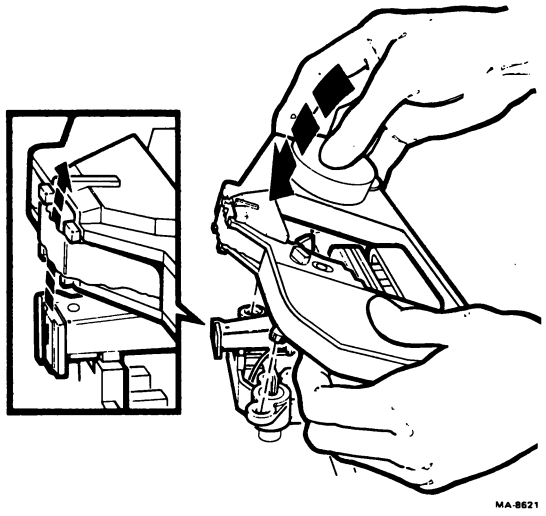


Figure 2-2 Ribbon Cartridge Replacement

7. While watching the ribbon adjust knob, manually move the printhead to the right and left two or three times. The ribbon adjust knob should turn in a clockwise direction. This means the ribbon is advancing correctly.

8. Close the access cover and press the VIEW/FAULT RESET key.

9. Adjust the printhead as described in this chapter.

LOADING PAPER

The terminal can handle single sheet paper, roll paper, and sprocket feed paper.

Single sheet and roll paper may have a maximum width of 8.5 ±.Ø3 inches. The sprocket feed paper may have a maximum width of 9.5 ±.Ø3 inches (with sprocket holes centered at 9 inches).

All paper is limited to bond paper weights of 1Ø to 2Ø pounds. These limits allow a single carbon to be used.

Loading Friction Feed Paper

The following paragraphs describe how to load friction feed paper, including single sheet and roll paper. Do not turn the power off to load friction feed paper.

Single Sheet Paper -- To load a single sheet of paper, refer to Figure 2-3, and perform the following procedure.

1. Move both the bail bar lever and the paper release lever forward.

2. Feed a sheet of paper into the rear paper slot and around the platen until the paper approaches the access cover.

3. Open access cover. Pull paper up and guide through output path.

4 Align top edges of paper and hold. Position left edge of paper against paper guide.

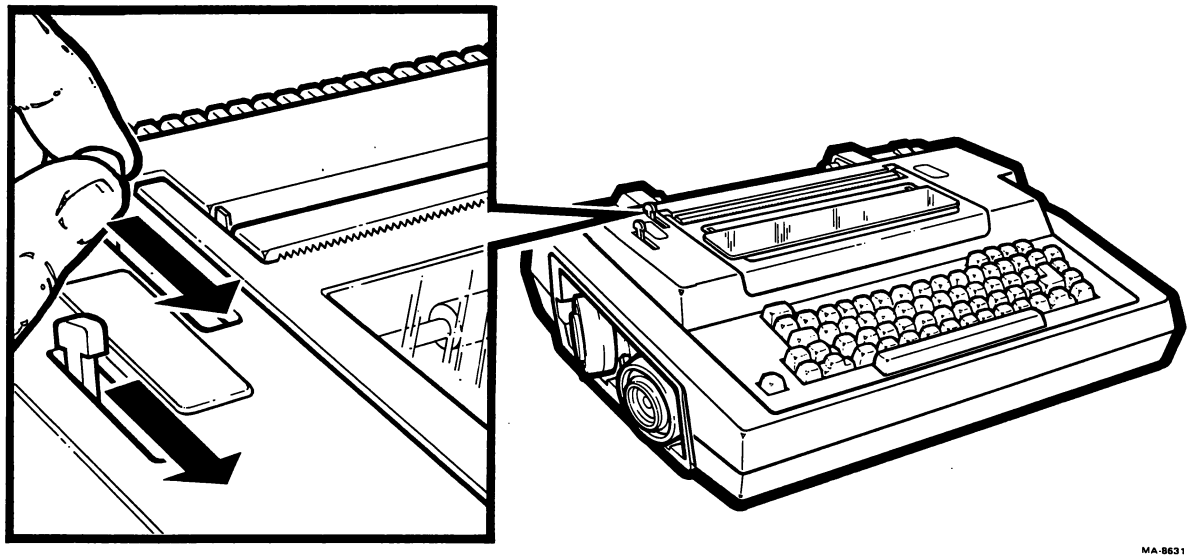
5. Move the paper release lever and then the bail bar lever fully back.

6. If needed, adjust the printhead.

7. Close access cover and press VIEW/FAULT RESET KEY to clear the "cover open" fault.

8. For further paper positioning, press the LOC LF/LOC FF key to advance the paper one line at a time.

9. For fine paper positioning, enter SET-UP and use the)/Ø key to move the paper up or down. Refer to Chapter 1 for more detail.



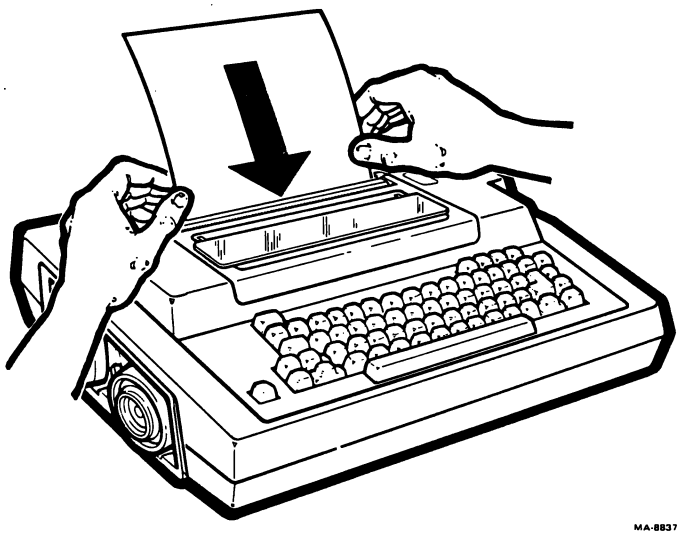
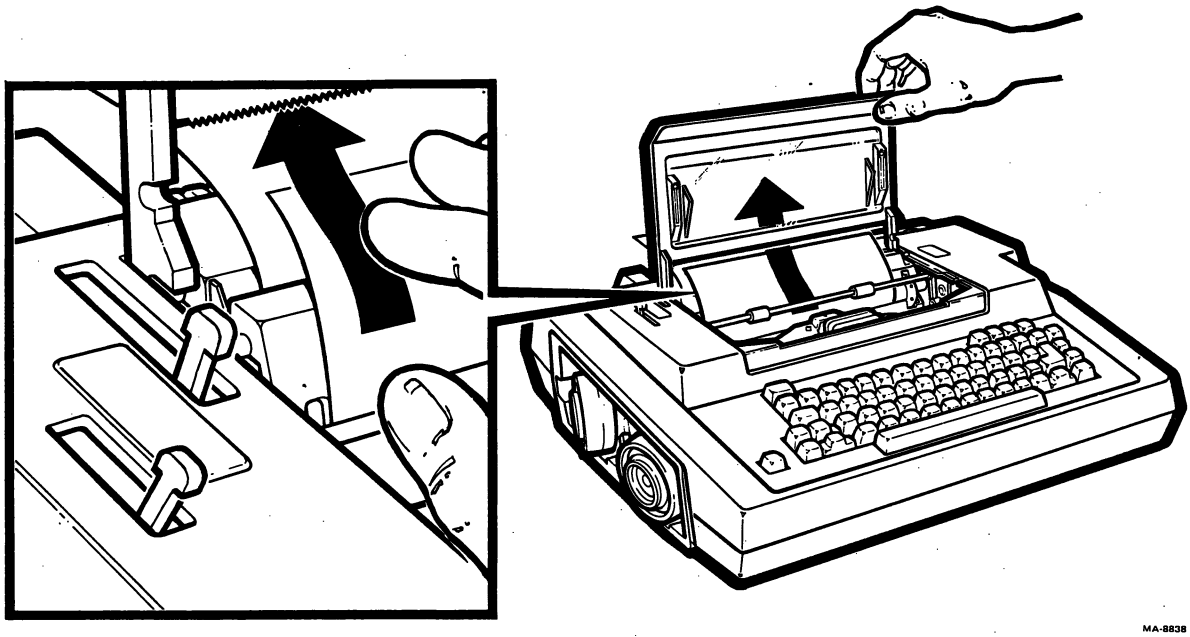


Figure 2-3 Loading Single Sheet Paper (Sheet 1 of 3)



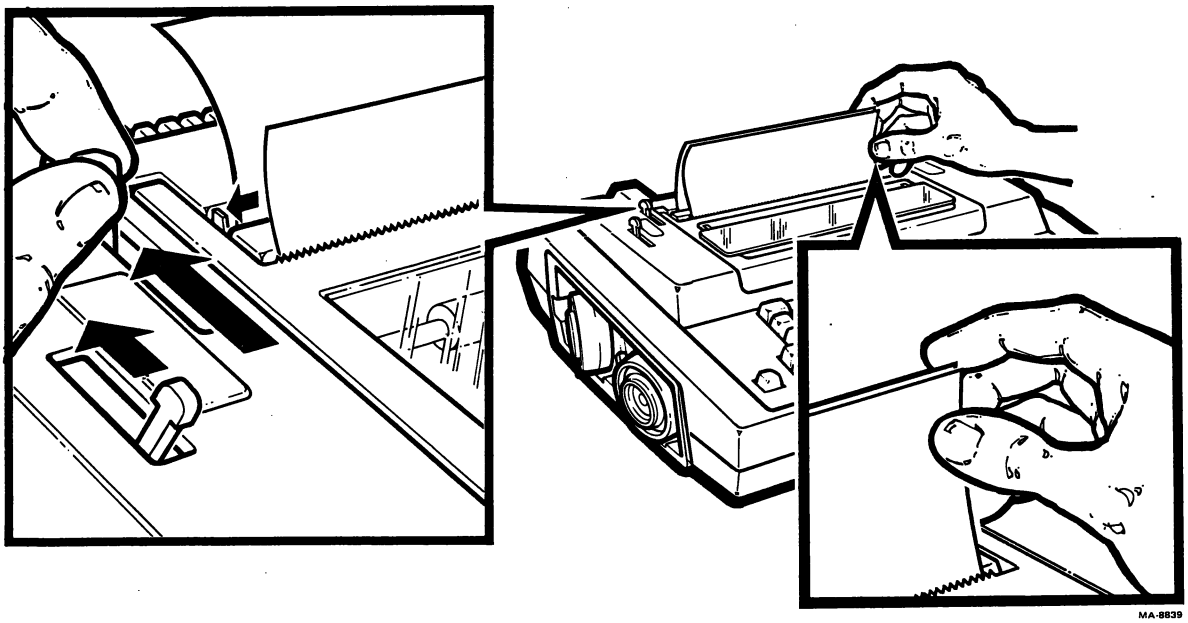


Figure 2-3 Loading Single Sheet Paper (Sheet 2 of 3)

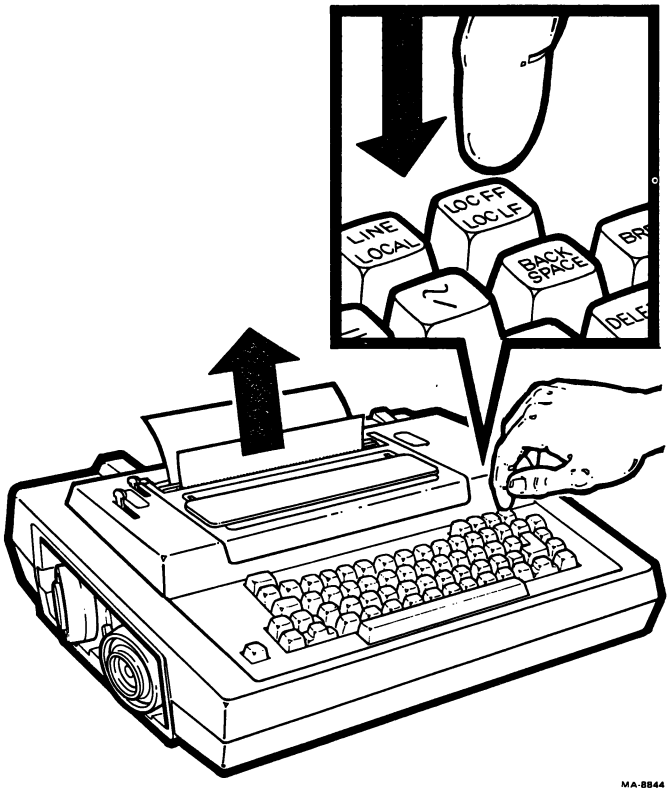


Figure 2-3 Loading Single Sheet Paper
(Sheet 3 of 3)

Roll Paper -- Perform the following procedures to load friction feed roll paper into the terminal.

PAPER ROLL MOUNTING (Figure 2-4)

1. Grasp paper roll with leading edge at bottom
2. Engage paper roll core on left-hand mounting stub
3. Push roll to left
4. Hold tension device down
5. Engage paper roll core on right-hand mounting stub

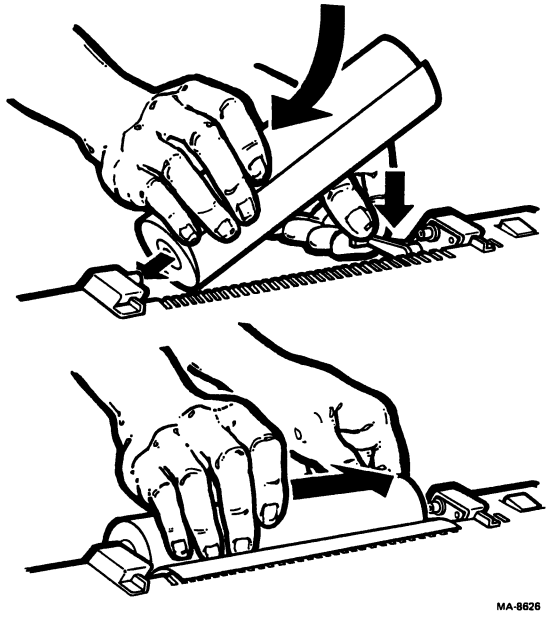


Figure 2-4 Paper Roll Mounting

ROLL PAPER LOADING (Figure 2-5)

1. Move bail bar lever and paper release lever fully forward

2. Take paper from bottom of roll and feed through rear paper slot

3. Feed paper under platen as far as possible

4. Raise access cover

5. Guide paper through front paper slot and close access cover

6. Align paper edges and hold

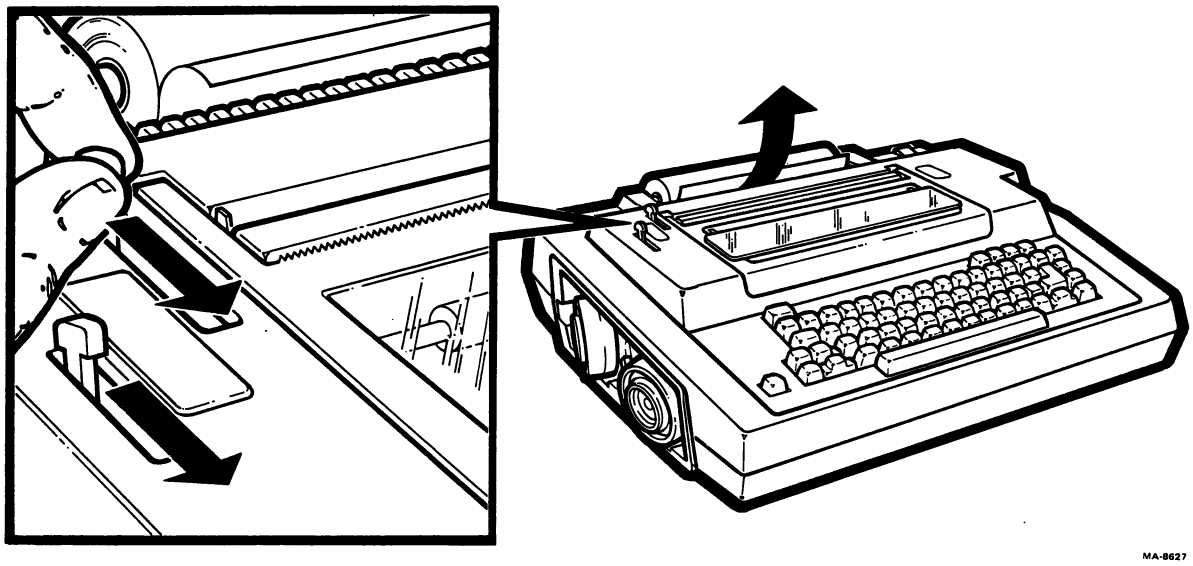
7. Move left paper edge against paper guide

8. Move paper release lever and then bail bar lever to rear while holding paper edges aligned

9. For further paper positioning, press the VIEW/FAULT RESET key. Then press the LOC LF/LOC FF key to advance the paper one line at a time.

10. For fine paper positioning, enter SET-UP and use the)/Ø key to move the paper up or down. Refer to Chapter 1 for more detail.

11. Adjust the printhead if necessary.



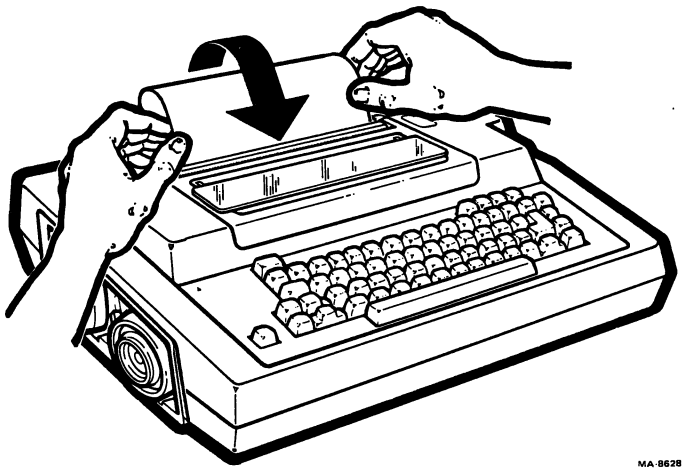
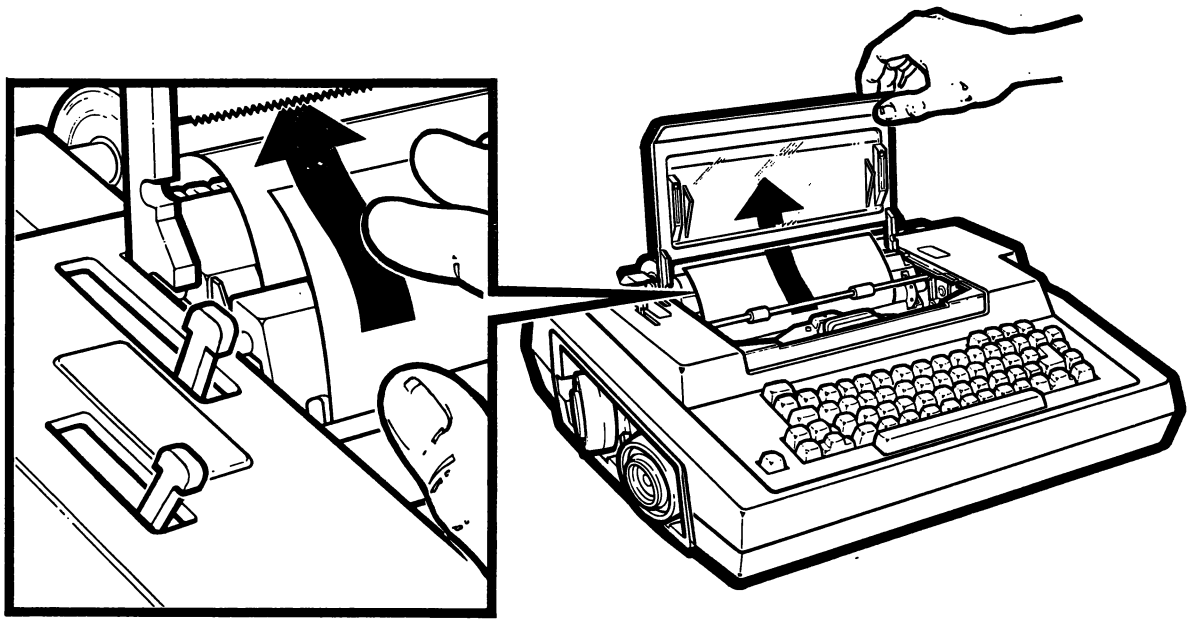


Figure 2-5 Loading Roll Paper (Sheet 1 of 3)



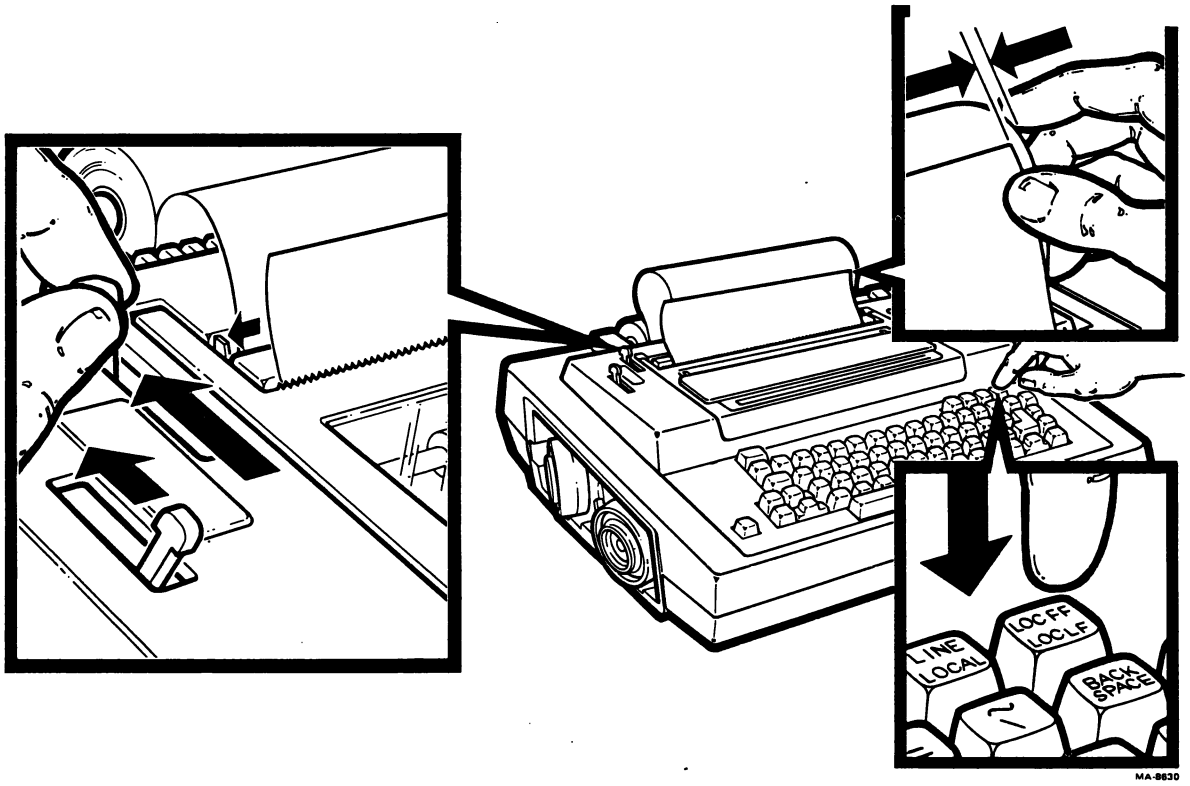


Figure 2-5 Loading Roll Paper (Sheet 2 of 3)

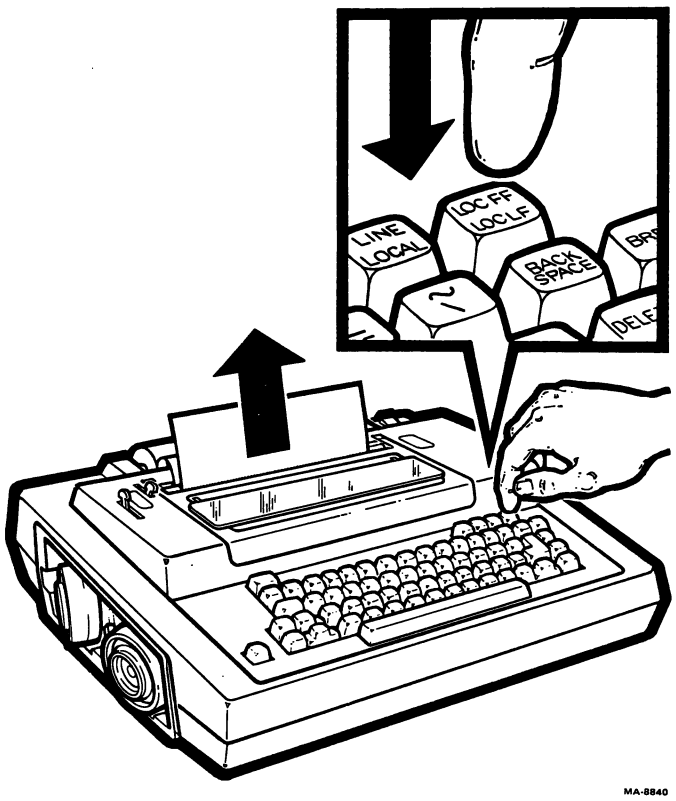


Figure 2-5 Loading Roll Paper (Sheet 3 of 3)

Loading Sprocket Feed Paper (Figure 2-6) -- Perform the following procedure to load sprocket feed paper into the terminal.

1. Move bail bar lever and paper release lever fully forward
2. Feed paper into rear paper slot with both hands
3. Moving paper slightly from side to side, continue feeding into slot and under platen until paper edge appears at front
4. Open access cover.
5. Pull paper up until it catches on sprocket pins
6. Line up paper perforations with sprocket pins
7. Hold paper against platen
8. Move bail bar lever to rear
9. Close access cover and press the VIEW/FAULT RESET key.
10. Press the LOC FF/ LOC LF key to advance paper through front paper slot

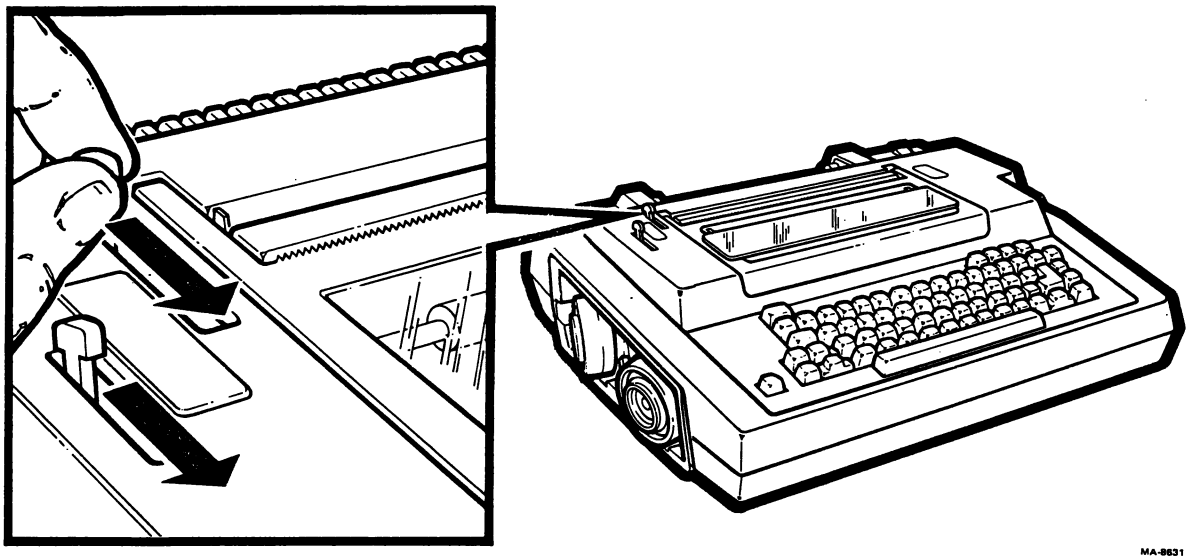
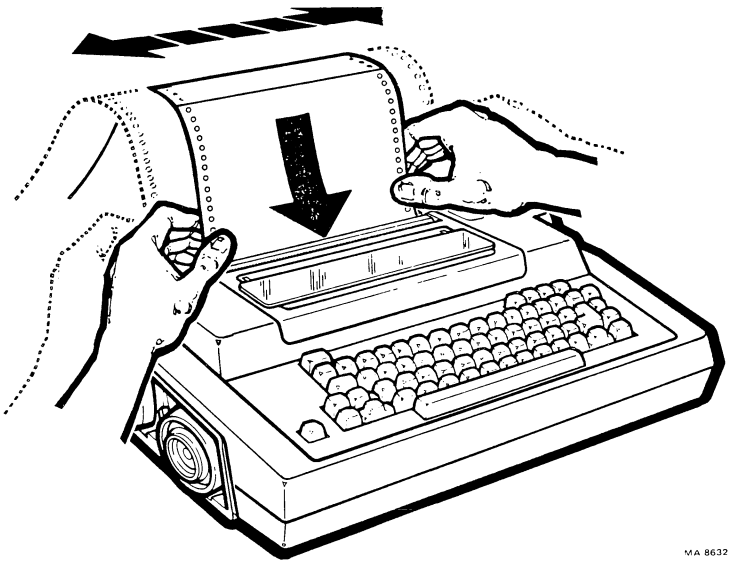


Figure 2-6 Loading Sprocket Feed Paper (Sheet 1 of 3)



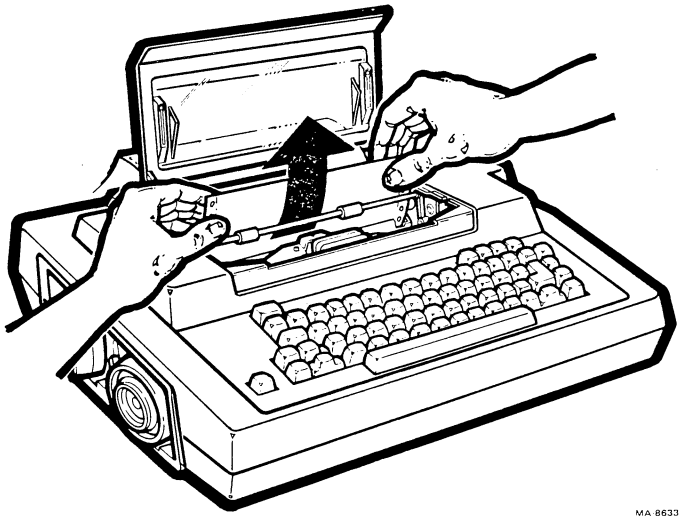
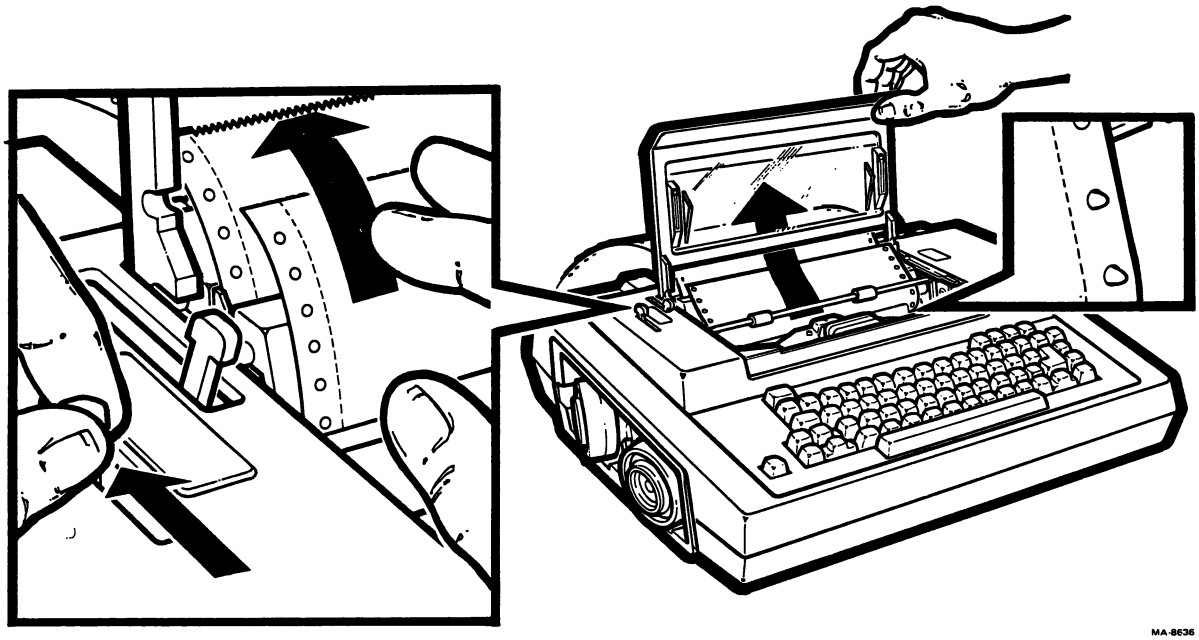


Figure 2-6 Loading Sprocket Feed Paper
(Sheet 2 of 3)



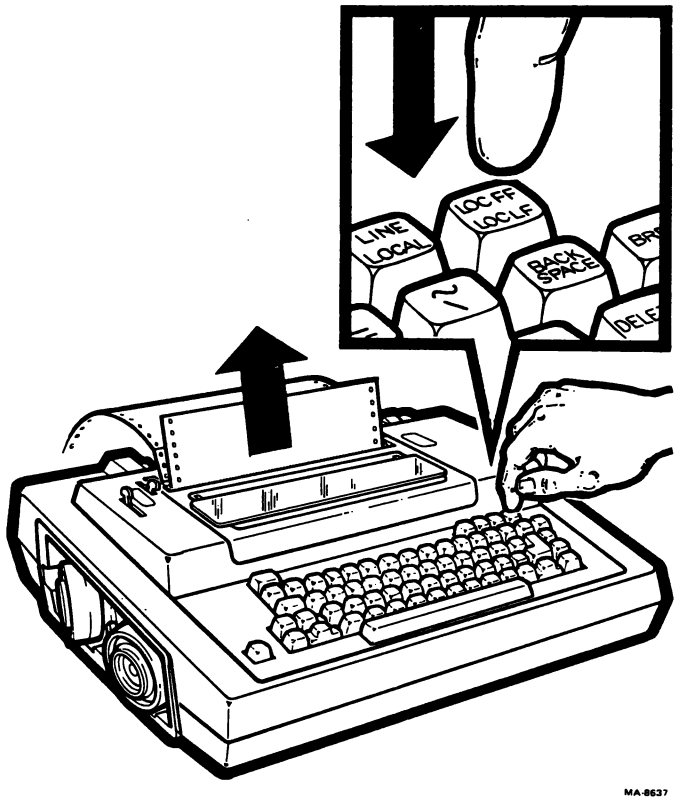


Figure 2-6 Loading Sprocket Feed Paper (Sheet 3 of 3)

PRINTHEAD ADJUSTMENT

Perform the following procedure to adjust the printhead for good print impression:

1. Set the terminal power ON/OFF switch to ON. Press and lock the LINE/LOCAL key in the LOCAL (down) position.

2. Open the access cover and move the printhead adjustment lever all the way to the left (Figure 2-7).

3. Carefully move the printhead adjustment lever half way to the right.

4. Manually move the printhead to the right and left to check for smudging. If the ribbon smudges, first verify that the paper is installed correctly. If the paper is installed correctly, move the printhead adjustment lever to the left until the smudging stops.

5. Close the access cover and press the VIEW/FAULT RESET key to clear the "cover open" fault.

6. Print a line of characters and check the print quality.

7. Move printhead adjustment lever as necessary for best print quality.

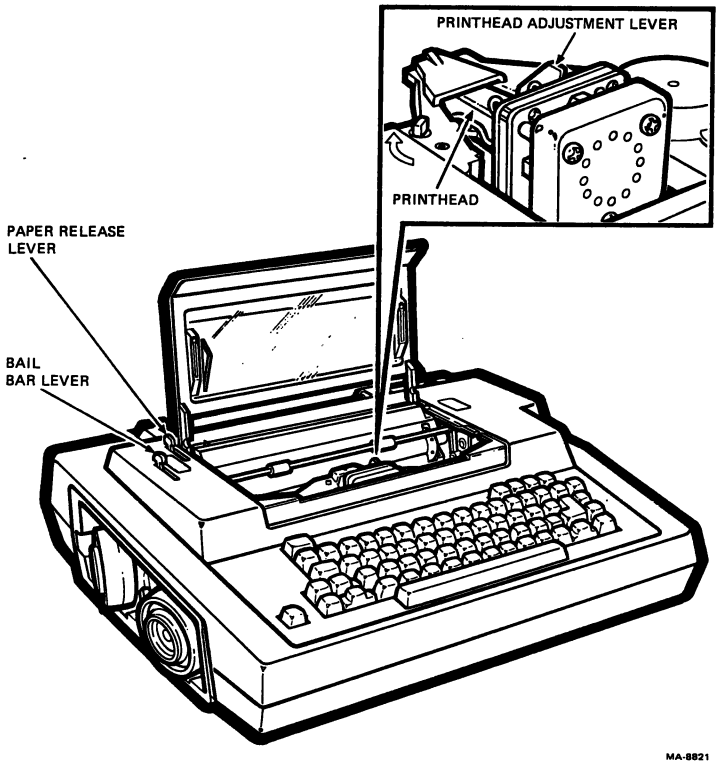


Figure 2-7 Printhead Adjustment Lever

CHAPTER 3
SET-UP FEATURES

GENERAL

This chapter describes the operator-selectable SET-UP features of the terminal.The SET-UP features prepare the terminal for use in specific applications. For example, features are selected to make the terminal compatible with a particular computer or communication system. Other features prepare the printer to handle different forms.

This chapter defines the SET-UP mode of terminal operation and explains each of the SET-UP features.It also describes the methods used for storing features in nonerasable memory.

The chapter is arranged as follows:

- SET-UP
- Communication features
- Keyboard features
- Printer features
- Feature memories

SET-UP

The operator selectable features can only be changed while the terminal is in SET-UP. The recommended sequence to change or select SET-UP features is as follows:

1. Enter SET-UP.
2. Print a status message to check feature settings.
3. Change one or more features such as tabs, baud rate, etc.
4. Store the features, if desired.
5. Print a second status message to check that all features are correct.
6. Exit SET-UP.

NOTE: Storing a feature saves the feature for future use. Refer to the Feature Memories section in this chapter for more detail.

SET-UP can be entered while ON LINE or LOCAL. However, to prevent the loss of data, SET-UP should only be entered while the computer is not transmitting characters, or if the restraint control (XON/XOFF) feature is selected and is recognized by the computer.

When changing more than one SET-UP feature it is not necessary to enter and exit SET-UP each time.

Operator Error Handling
Whenever the operator makes an error by striking the wrong key or by attempting to perform a function improperly,the terminal will provide immediate visual and audible indications of the error. The error indications are as follows:

- Prints character if wrong key is struck
- Prints "?"
- Sounds bell tone
- Performs line feed

Entering and Leaving SET-UP
Perform the following procedure to enter and leave(exit) SET-UP.

Procedure	Indication/Comments
Hold the CTRL key down. Press and release the SET-UP key. Release the CTRL key.	The SET-UP indicator flashes.
Press the SET-UP key to exit SET-UP.	The SET-UP indicator stops flashing.

STATUS MESSAGE
The terminal provides a list of all features which are operator-selectable and the current selection for each feature. This list is called a Status Message. It is separated into three major feature categories as follows:

- Communications
- Keyboard
- Printer

The status message may be used as a starting point for determining which features need changing, as a work sheet for feature selections and then as a permanent record of all currently selected features.

Figure 3-1 is a typical printout of a status message, showing the three categories of features and the sequence in which they are printed. It is recommended that all features be changed in this sequence.

```
COMMUNICATIONS

Auto-Ansbk=no
Buffer=1024
Comm port=EIA
Disc-HDX=none
Echo-local=no
Fault=xoff(DC3)
G-HDX start mode=Rcv
H-Hi Speed(bps)=1200
L-Lo Speed(bps)=300
M-line prot=FDX-data leads
O-Rcv error ovride=no
Parity=7/M
Q-SRTS polarity=Lo
Restraint=xon/xof
S-Speed select=Lo
Turn char=none
U-power up=line
V-Frequency=Bell 103

KEYBOARD

Auto-linefeed=no
Break=yes
C-Keyclick=yes
Keypad=normal
Language=USA
Repeat=yes

PRINTER

A-G0 char set=USA
B-G1 char set=USA
C-G2 char set=USA
D-G3 char set=USA
End-of-line=wrap
Form Length=264
G-Print ctrl chars=no
Horiz pitch (cpi)=10
NewLine char.=none
Print Force=hi
Vert pitch (lpi)=6

VERSION

V=V1.2
```

MA-8732

Figure 3-1 Typical Status Message

Printing Out A Terminal Status Message

Perform the following procedure to print out a terminal status message:

Procedure	Indication/Comments
Enter SET-UP	The SET-UP indicator flashes.
Press - 8 * Key	Feature status messages for communication, keyboard, and printer are printed out.
Exit SET-UP	The SET-UP indicator stops flashing.

COMMUNICATION FEATURES

To transmit and receive data, the terminal must be compatible with the computer and the communication system. The communication feature selections provide the means for matching the terminal to the system.

Table 3-1 contains a list of communication features with brief descriptions. Refer to Chapter 4 for more complete information on communication.

Table 3-1 Communication Features

Feature	Description
Auto-Ansbk	Controls automatic transmission of the answerback message when a communication connection is made
Buffer	Controls size of input buffer for small or large text files
Comm port	Selects internal device (EIA, DCM, ACM) for communication with computer
Disc-HDX	Selects character to be used to disconnect (stop) communication (HDX only)
Echo-local	Controls internal echo of transmitted characters for printing
Fault	Selects terminal response to a fault condition
G-HDX start mode	Selects direction of communication (transmit or receive) for the terminal when a communication connection is made (HDX only)

Table 3-1 Communication Features (Cont)

Feature	Description
H-Hi speed (bps)	Selects individual speed (baud rate) in high speed range
I-Power up	Determines terminal state (On-line or local operation) when turned on
L-Lo speed (bps)	Selects individual speed (baud rate) in low speed range
M-line prot	Selects communication protocol (method) to adapt the terminal to the system
O-Rcv error ovride	Enables the terminal to override (ignore) errors in received characters
Parity	Selects parity (error check) method, and bits per character to match system requirements
Q-SRTS polarity	Selects condition of SRTS line to be used in communication restraint control
Restraint	Selects method the terminal will use for communication restraint (stop-start) control
S-Speed select	Selects high speed or low speed operating range (baud rate range)
Turn char	Selects character to be used to control communication lines in half-duplex communication
V-Frequency	Selects frequencies to match U.S. and European requirements

Communications Status Message

The communications status message lists all communication features and the current selection for each feature. Figure 3-2 shows a typical message.It is recommended that the status message be printed out for reference before selecting individual features.

The status meessage print out may be used as a work sheet to record the desired feature changes for reference when following the instructions in this chapter. After all desired features have been changed, a second status message verifies proper selections and is a permanent record of current selections.

Printing a Communications Status Message

Perform the following procedure to print out a communications status message.

Procedure	Indication/Comments
Press:	
C RETURN	The current communication status message is printed out

Selecting Communications Features

When selecting a communications feature, the first step should be to print out the help message for that feature.This message lists the available choices and the current selection, thereby providing you with the information to make a change if required.

In each of the following paragraphs, the first sequence of keystrokes in each feature selection procedure prints the help message for that feature.

Answerback -- Answerback is a message of up to 30 characters that identifies the terminal for the computer. Both printable characters and control characters may be used in this message. This feature can be used to automatically log onto a system.

The answerback message is entered into the terminal by the user. It is then automatically transmitted to the computer upon request or manually controlled by pressing the HERE IS key on the keyboard.

The answerback message cannot be printed by the terminal during operation. You can only see the answerback message when it is being entered.

```
COMMUNICATIONS

Auto-Ansbk=no
Buffer=1024
Comm port=EIA
Disc-HDX=none
Echo-local=no
Fault=xoff(DC3)
G-HDX start mode=Rcv
H-Hi Speed(bps)=1200
L-Lo Speed(bps)=300
M-line prot=FDX-data leads
O-Rcv error ovride=no
Parity=7/M
Q-SRTS polarity=Lo
Restraint=xon/xof
S-Speed select=Lo
Turn char=none
U-power up=line
V-Frequency=Bell 103
```

Figure 3-2 Typical Communication Status Message

Entering/Deleting The Answerback Message
Perform the following procedure to enter or delete the answerback message.

Procedure	Indication/Comments
Press C Z =	
Type the message delimiter	The message delimiter can be any printable character or control character. The message delimiter is not part of the answerback message.
Type in up to thirty characters as the answerback message	The first typed character starts the message. The answerback message can include any printable character or control character except for the selected delimiter.

NOTE: If more than 30 characters are typed after the message delimiter, a ? is printed, a bell tone sounds, and the terminal performs a carriage return with a line feed. This informs the operator that answerback message entering is being aborted.

Type the message delimiter again	This ends the message. The message delimiter is not part of the answerback message.

NOTE: If you do not want to store the answerback message in user permanent memory, skip the following step.

Press SHIFT and 9	The SET-UP light stays on for about 9 seconds while the answerback message is stored in user permanent memory.

Auto Answerback -- This feature causes the terminal to automatically transmit the answerback message when a communication connection is established.

NOTE: Auto answerback does not affect use of the HERE IS key or response of the terminal to the control character ENQ.

Perform the following procedure to turn the auto answerback feature on or off.

Procedure	Indication/Comments
Press:	
CA RETURN	Prints selections and current setting.
CA = A RETURN	Turns auto answerback off
CA = B RETURN	Turns auto answerback on

Buffer Control -- This feature provides two sizes of input buffer for storage of received data. The large buffer is most useful in printing large data files.

- 200 Characters
- 1024 Characters

Perform the following procedure to select the input buffer size.

Procedure	Comments/Indication
Press:	
CB RETURN	Prints selections and current setting
CB = A RETURN	Selects 200 character buffer
CB = B RETURN	Selects 1024 character buffer

Communications Port -- This feature selects the communications port (device) to be used between the terminal and the computer. There are three standard choices for the Correspondent terminals and one optional choice. The ports which are available on your terminal depend upon the model you have. The ports are:

- EIA Interface
- Direct Connect Modem (DCM)
- Acoustic Coupled Modem (ACM)
- 20 mA Interface (optional)

NOTE: Refer to Chapter 4 for more information on communications ports.

Selecting Communications Port
Perform the following to select the desired communications port:

Procedure	Indication/Comments
Press:	
CC RETURN	Prints selections and current setting
CC = A RETURN	Enable EIA interface
CC = B RETURN	Enable Direct Connect Modem (DCM)
CC = C RETURN	Enable Acoustic Coupled Modem (ACM)
CC = D RETURN	Enable 20 mA interface (optional)

Half Duplex-Disconnect Character -- This feature selects the disconnect character for use in half-duplex communications. This feature functions only when the EIA port has been selected for communications.

Selecting Half-Duplex Disconnect Character
Perform the following procedure to select the half-duplex communications character:

Procedure	Indication/Comments
Press:	
CD RETURN	Prints selections and current setting
CD = A RETURN	Set disconnect character to "none"
CD = B RETURN	Set disconnect character to ETX
CD = C RETURN	Set disconnect character to EOT

Local Echo -- When the local feature is on, every character sent to the computer is also printed by the terminal (Figure 3-3). If local echo is off, characters transmitted to the computer are not printed by the terminal. The computer must transmit (echo) the characters back to the terminal for printing when the local echo feature is off.

NOTE: If the terminal prints double characters, turn the local echo feature off as the computer is performing the echo function. ENQ characters are never echoed.

Selecting Local Echo/No Local Echo
Perform the following procedure to turn the local echo feature on or off.

Procedure	Indication/Comments
Press:	
CE RETURN	Prints selections and current settings
CE = A RETURN	Turn local echo off
CE = B RETURN	Turn local echo on

Fault Action Feature -- The fault action feature selects the action the terminal takes when a fault occurs. Selection of the terminal action is dependent upon the system in which it is being used.

There are three physical faults which the terminal can detect and act upon: cover open, paper out and head jam.

Cover Open
When the access cover is opened, the POWER/FAULT light flashes and any further printing stops. Printing will resume after the cover is closed and the VIEW/FAULT RESET key is pressed. The computer never receives a signal when the cover open fault occurs.

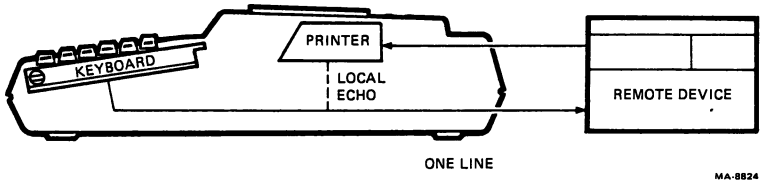


Figure 3-3 Local Echo Feature

Paper Out

When the paper supply is about to run out, the POWER/FAULT light flashes and any further vertical paper motion stops. Excess paper can be removed by pressing the VIEW/FAULT RESET key and then both the SHIFT key and the LOC FF/LOC LF key. After the paper supply is restored and the VIEW/FAULT RESET key is pressed, vertical paper motion will resume.

Printhead Jam

If the printhead jams, the POWER/FAULT flashes and any further printing stops. At the same time, the bell will sound eight times or less if the access cover is opened. Printing will resume after the jam is cleared and the VIEW/FAULT RESET key is pressed. Printing begins with the character after the character on which the head jammed.

Fault Responses

Four communication responses to the above faults are available: no action, send XOFF, send short break and perform disconnect.

No action is usually selected for hardwire installations or when no disconnect is desired.

When the XOFF response is selected, the terminal responds to the fault by sending an XOFF to the computer. When the fault is corrected, an XON is automatically sent to the computer.

Send short break causes the terminal to transmit a 275 ms + 25 ms BREAK signal when a fault occurs.

Disconnect causes the terminal to immediately turn Data Terminal Ready off.

Selecting Fault Response

Perform the following procedure to select the desired fault response.

Procedure	Indication/Comments
Press:	
CF RETURN	Prints selections and current setting.
CF = A RETURN	Selects no action
CF = B RETURN	Selects send XOFF
CF = C RETURN	Selects send break to cause disconnect
CF = D RETURN	Selects disconnect by turning off DTR

Half-Duplex (HDX) Initial Direction -- When the terminal initiates communication with a computer, the HDX initial calling direction is checked. This direction determines if the terminal starts in a receive data state or in a transmit data state. This feature functions only when the EIA port has been selected for communication.

Selecting HDX Initial Direction
Perform the following procedure to select HDX initial calling direction:

Procedure	Indication/Comments
Press:	
CG RETURN	Prints selections and current setting.
CG = A RETURN	Sets direction to receive data
CG = B RETURN	Sets direction to transmit data

Speed (Baud Rate) Selection -- This feature allows the operator to select either the high speed or low speed operating range. The operator can also select individual speeds (baud rates) within each range. In some systems, transmit and receive speeds are different (split baud rates). The speed selection feature allows the operator to adapt the terminal to all compatible systems.

NOTE: The speed select feature with high and low operating ranges is provided for compatibility with Bell 212A modems. Either range may be used for operation with other modems.

Selecting Speed Range
Perform the following procedure to select the operating speed (baud rate) range:

Procedure	Indicator/Comments
Press:	
CS RETURN	Prints selections and current setting.
CS = A RETURN	Selects the high speed range
CS = B RETURN	Selects the low speed range
CS = C RETURN	Allows modem to select either high or low speed range (EIA and DCM only)

NOTE: Modem control of speed select (CS = C) can only be used when the terminal is communicating through the integral direct connect modem or is communicating with an external Bell 212A modem. Also, it can only be used in Half-Duplex answer mode.

Selecting Individual Speeds
Perform the following procedure to select individual speeds within each range:

NOTE: Pressing "H" key in place of "*" below sets the baud rates to high speed. Pressing "L" key in place of "*" below sets the baud rates to low speed.

C* = A RETURN	50 baud
C* = B RETURN	75 baud
C* = C RETURN	110 baud
C* = D RETURN	134.5 baud
C* = E RETURN	150 baud
C* = F RETURN	200 baud
C* = G RETURN	300 baud
C* = H RETURN	600 baud
C* = I RETURN	1200 baud
C* = J RETURN	1800 baud
C* = K RETURN	2400 baud
C* = L RETURN	4800 baud
C* = M RETURN	7200 baud
C* = N RETURN	9600 baud
C* = O RETURN	75 baud send/600 baud receive
C* = P RETURN	75 baud send/1200 baud receive
C* = Q RETURN	150 baud send/600 baud receive
C* = R RETURN	150 baud send/1200 baud receive
C* = S RETURN	300 baud send/2400 baud receive
C* = T RETURN	300 baud send/4800 baud receive
C* = U RETURN	600 baud send/2400 baud receive
C* = V RETURN	600 baud send/4800 baud receive

Modem Protocol -- This feature enables selection of a protocol that matches your system communication protocol. See Chapter 4 for more information.

Selecting Modem Protocol
Perform the following procedure to select modem protocol.

Procedure	Indication/Comments
Press:	
CM RETURN	Prints selections and current setting.
CM = A RETURN	Full-duplex -- data leads only
CM = B RETURN	Full duplex -- full control
CM = C RETURN	Half-duplex -- supervisory (EIA only)
CM = D RETURN	Half-duplex -- coded without reverse channel (EIA only)

Receive Error Override -- The receive error override feature allows the parity bit of all received characters to either be checked or ignored. This feature is useful when the received parity bit is not the same as the transmitted parity bit or when there is no received parity bit.

If the feature is set to check, the parity bit of the received character is checked according to the parity and data bit feature selection described in the next paragraph.

If a parity error occurs in any received character, the terminal replaces the known bad character with the control character SUB (substitue). When the SUB character is processed by the printer, the "▒" character is printed instead.

When the feature is set to override, the terminal does not check for parity errors in the received characters and all characters are printed as received.

Selecting Receive Error Override
Perform the following procedure to turn the receive error override feature on or off.

Procedure	Indication/Comments
Press:	
CO RETURN	Prints selections and current setting.
CO = A RETURN	Received parity bits are checked and terminal prints error characters as "▒"
CO = B RETURN	Received parity bits are ignored and terminal prints all received characters

Parity -- The parity procedure selects two separate but related features; data bits per character and parity. The data bits per character can be set to 7 or 8 data bits. Parity selects the type of parity bit that the terminal generates for transmitted and checks for received characters (see receive error override).

Selecting Parity
Perform the following procedure to select the parity and data bit feature.

Procedure	
CP RETURN	Prints selections and current setting.
CP = A RETURN	No parity, 7 data bits, 8th bit set to mark
CP = B RETURN	No parity, 7 data bits, 8th bit set to space
CP = C RETURN	Even parity, 7 data bits
CP = D RETURN	Odd parity, 7 data bits
CP = E RETURN	Even parity, 8 data bits
CP = F RETURN	Odd parity, 8 data bits

NOTE: CP = E and CP = F cannot be selected if the terminal is operating in the DCM communication mode.

Polarity -- Secondary Request To Send (SRTS)
This feature sets up conditions for use of the SRTS line in restraint control (described in the next paragraph). Signals generated by the terminal on this line may be set to go either high or low to indicate that the terminal is not ready to process received data, and transmission should be suspended

Selecting SRTS Polarity
Perform the following procedure to select SRTS polarity:

Procedure	Indication/Comments
Press:	
C Q RETURN	Prints selections and current setting.
CQ = A RETURN	Selects SRTS line going low to signal restraint
CQ = B RETURN	Selects SRTS line going high to signal restraint.

Restraint Control -- This feature provides a signal to inform the computer that it should temporarily suspend data transmission to prevent an overflow in the input data buffer.The signal (or signals) are generated whenever a preset "high water" mark is detected in the buffer. Restraint control may be provided by the XOFF/XON signals, by signal transitions on the SRTS line or by both means. Restraint control may also be disabled when desired.

Selecting Restraint Control
Perform the following procedure to select the desired restraint control:

Procedure	Indication/Comments
Press:	
CR RETURN	Prints selections and current setting.
CR = A RETURN	Selects no restraint control
CR = B RETURN	Selects XOFF/XON (DC3,DC1) for restraint control
CR = C RETURN	Selects SRTS line for restraint control
CR = D RETURN	Selects both XOFF/XON and SRTS line for restraint control

Half-Duplex Turnaround Character -- This feature selects the control character which will be used to turn the line around from being controlled by the computer to being controlled by the terminal, or vice-versa. When it is received, the terminal begins to control the communication lines. When it is transmitted, the computer controls the lines.

Perform the following procedure to select the half-duplex turnaround character:

Procedure	Indication/Comments
Press:	
CT RETURN	Prints selections and current setting.
CT = A RETURN	Disables turnaround character
CT = B RETURN	Selects RETURN as turnaround character
CT = C RETURN	Selects LINE FEED as turnaround character
CT = D RETURN	Selects DC1 as turnaround character
CT = E RETURN	Selects EOT as turnaround character
CT = F RETURN	Selects ETX as turnaround character
CT = G RETURN	Selects DC3 as turnaround character

Power Up - Initial State -- This feature is used to select the on-line or off-line state of the terminal when it is turned on (power up).

Perform the following procedure to select the terminal initial state at power up:

Procedure	Indication/Comments
Press:	
CU RETURN	Prints selections and current setting.
CU = A RETURN	Selects local operation
CU = B RETURN	Selects on line operation without local echo
CU = C RETURN	Selects on line operation with local echo

Modem Frequency Selection -- This feature allows modem operation to be compatible with both domestic and European communication requirements.

Procedure	Indication/Comments
Press:	
CV RETURN	Prints selections and current setting.
CV = A RETURN	Selects frequencies for U.S. (e.g.; Bell 103) and others
CV = B RETURN	Selects European CCITT V.21 frequencies

KEYBOARD FEATURES

The keyboard features are used to adapt the keyboard to the various terminal applications. Some features are operator preferences.

Table 3-2 contains a list of keyboard features with general descriptions. Following this table are the individual features with detailed descriptions and procedures for setting up each feature.

Keyboard Status Message

If desired, a keyboard status message alone may be printed out for reference in selecting individual features.

A typical keyboard status message is shown in Figure 3-4.

Perform the following procedure to print out a keyboard status message, if desired. Feature selections may differ from the list shown.

Procedure	Indication/Comments
Press:	To select:
K RETURN	A current status message is printed out.

```
KEYBOARD

Auto-linefeed=no
Break=yes
C-KeyclicK=yes
Keypad=normal
Language=USA
Repeat=yes
```

Figure 3-4 Typical Keyboard Status Message

Table 3-2 Keyboard Features

Feature	Description
Auto-linefeed	Permits RETURN key to generate both a carriage return and a line feed command when desired
Break	Controls operation of the BREAK key. Disables this key to prevent sending a break signal by mistake
C-Keyclick	Allows operator to permit or prevent the keyclick sound each time a character key is pressed
Keypad	Controls operation of external numeric keypad (optional) to permit generation of single character codes or escape sequences
Language	Adapts the keyboard to printer operation in different languages. Requires changing keycaps for most languages
Repeat	Enables or disables automatic repeating of most key codes when keys are held down

Keyboard Feature Selections

When selecting a keyboard feature, the first step should be to print out the help message for that feature. This message provides the available choices and the current selection, thereby providing you the information to make a change if required. In the following paragraphs, the first step in each feature selection will provide the help message for that feature.

Auto Line Feed -- This feature changes the characters generated by the **RETURN** and **ENTER** keys (External Keypad only). When the auto line feed feature is off and the **RETURN** or **ENTER** key is pressed, the terminal generates a carriage return control character. When the auto line feed feature is on, the terminal generates the carriage return and line feed control characters.

NOTE: If the terminal performs double line feeds, turn the auto line feed feature off as the computer is also performing this function.

Perform the following procedure to turn the auto line feed feature on or off.

Procedure	Indication/Comments
Press:	
KA RETURN	Prints selections and current setting.
KA = A RETURN	Turns auto line feed off (send carriage return only)
KA = B RETURN	Turns auto line feed on (send carriage return and line feed)

Break Key -- A break signal(short break) is a transmitted space condition for .25Ø seconds. A long break disconnect is a transmitted space condition for approximately 3.8 seconds.

A break signal is generated from the keyboard pressing the **BREAK** key. A long break disconnect is generated from the keyboard by pressing the **BREAK** key while holding the **SHIFT** key down. The **BREAK** key feature allows the user to disable or enable the **BREAK** key and prevent typing the BREAK key by mistake.

NOTE: This feature does not affect the terminal response to a fault condition when the terminal is set to send a break signal. Refer to the fault feature in this chapter for more detail.

Perform the following procedure to turn the **BREAK** key on or off.

Procedure	Indication/Comments
Press:	
KB RETURN	Prints selections and current setting.
KB = A RETURN	Disables BREAK key
KB = B RETURN	Enables BREAK key

Keyclick -- Keyclick is a sound generated each time a key is pressed. The **SHIFT** and **CTRL** keys do not generate keyclicks because they do not generate character codes. Keyclick can be turned off for low noise environments. However, research has shown that people type more accurately with the keyclick feature ON.

NOTE: If the keyboard buffer is full, a bell tone will be sounded for any character that has been lost in the overflow, but there will be no keyclick.

Perform the following procedure to turn the keyclick feature on or off.

Procedure	Indication/Comments
Press:	
KC RETURN	Prints selections and current setting.
KC = A RETURN	Keyclick is off
KC = B RETURN	Keyclick is on

Keyboard Language -- This feature permits the keyboard to be matched to the printer for terminal operation in different languages. Whenever a language other than United States is selected, the corresponding key caps (optional) should be installed.

Perform the following procedure to change the keyboard selection.

Procedure	Indication/Comments
Press:	
KL RETURN	Prints out the available character sets and current selection.
KL = A RETURN	United States
KL = B RETURN	United Kingdom
KL = C RETURN	French Canada
KL = D RETURN	Germany
KL = E RETURN	Sweden
KL = F RETURN	France
KL = G RETURN	Finland
KL = H RETURN	Norway and Denmark

NOTE: Selection of the United Kingdom or French Canada keyboard will not cause rearrangement of the keyboard.

Repeat Keys -- When an auto repeating key is typed, its code is sent at once. If the key is held down longer than Ø.5 seconds, the code will be sent at a rate of 1Ø characters per second (approximately) until the key is released. All keys auto repeat except the following:

- SET-UP
- VIEW/FAULT RESET
- ESC
- NUM KEY MODE
- HERE IS
- LOC FF
- BREAK
- RETURN
- Any key pressed With CTRL

Procedure	Indication/Comments
Press:	
KR RETURN	Prints selections and current setting.
KR = A RETURN	Enables repeat keys function
KR = B RETURN	Disables repeat keys function

External Keypad (optional) -- This feature allows the optional external keypad to function in two different ways; to generate single characters, or to generate escape sequences. Refer to the Programmers Reference Manual for the characters and escape sequences that the keypad transmits when it is in numeric mode and in alternate mode.

NOTE: When alternate mode is on and the terminal is local, the external keypad does not function.

Perform the following procedure to select either numeric or alternate mode for the external keypad.

Procedure	Indication/Comments
Press:	
KK RETURN	Prints selections and current setting.
KK = A RETURN	Numeric mode is selected
KK = B RETURN	Alternate mode is selected

Last Character View

NOTE: The terminal does not have to be in SET-UP mode to select this feature.

This feature allows the operator to see the last character printed. After printing activity stops, the printhead moves to the right to show the last character printed and then automatically moves back to continue printing. This feature can occur automatically, or only after the operator presses the VIEW/FAULT RESET KEY. Perform the following procedure to select manual or automatic last character view.

Procedure	Indication/Comments
Hold the CTRL key down, press the VIEW/FAULT RESET key and release both keys.	The terminal switches between manual and auto-last character view each time the CTRL and VIEW keys are pressed. Manual last character view is selected when the printhead moves right after the VIEW key is pressed. Auto-last character view is selected when the printhead moves to right after any printing activity stops (the VIEW key does not function).

PRINTER FEATURES

When setting up a typewriter to print on a form, you must position the form, set the left and right margins, and set tabs. Setting up a terminal to print on forms is very similar.

Table 3-3 contains a list of printer features with general descriptions. Following this table are the individual features with detailed descriptions and procedures for setting up each feature.

Table 3-3 Printer Features

Feature	Description
A-GØ char set	Selects primary language to be used in normal, everday terminal operation
B-G1 char set	Selects secondary language to be used when data transmission or reception must be in a language different from the primary language
C-G2 char set	Permits individual characters to be transmitted or received in a third language
D-G3 char set	Permits individual characters to be transmitted or received in a fourth language
End-of-line	Permits the printer to automatically return to the left margin when the printhead reaches the right margin
Form length	Permits selection of form lengths which are variable in increments of 1/24 inch
G-Prnt ctrl chars	Allows the terminal to print control characters as graphic symbols. Control Characters are usually not printed
Horiz pitch (cpi)	Permits selection of various type sizes (widths). Double-width characters are selectable
NewLine char.	Controls terminal action in response to received RETURN and line feed characters
Print Force	Controls printing pressure for lighter or darker image
Vert pitch (lpi)	Permits selection of various line spacing to fit different forms

Printer Status Message

If desired, a printer status message may be printed out for reference in selecting individual features. A typical printout is shown in Figure 3-5.

```
PRINTER

A-G0 char set=USA
B-G1 char set=USA
C-G2 char set=USA
D-G3 char set=USA
End-of-line=wrap
Form Length=264
G-Print ctrl chars=no
Horiz pitch (cpi)=10
NewLine char.=none
Print Force=hi
Vert pitch (lpi)=6

VERSION

V=V1.2
```

MA-8732

Figure 3-5 Typical Printer Status Message

Perform the following procedure to print out a Printer status message. The selected form features may be stored in permanent memory if desired.

Procedure	Indication/Comments
Press:	
P RETURN	A current status message is printed out.

NOTE: Form settings can be automatically loaded into the terminal by the computer. Refer to the Programmer's Reference Manual for more detail.

Recommended Sequence

The following recommended sequence is provided as a guide when setting up a form. You do not have to use all of the features listed. However, the order in which the features are presented must be followed.

1. Set the horizontal pitch
2. Clear horizontal margins
3. Set the left horizontal margin
4. Clear the horizontal tabs if desired
5. Set the horizontal tabs
6. Set the right horizontal margin
7. Set the vertical pitch
8. Set the form length
9. Set the top of form
10. Clear the vertical margins if desired
11. Set the top vertical margin
12. Clear the vertical tabs if desired
13. Set the vertical tabs
14. Set the bottom vertical margin
15. Store the form settings if desired.

NOTES: If you change horizontal pitch in step 1, step 2 will be performed automatically.

Printer Feature Selections

When selecting a Printer feature, the first step should be to print out the help message for that feature. This message provides the available choices and the current selection, thereby providing you the information to make a change if required. In the following paragraphs, the first step in each feature selection will provide the help message for that feature.

Printer Character Set -- The terminal has the capability of printing only 94 characters (one character set) at a time. Therefore, the characters printed by the terminal are divided into twelve character sets to allow a larger selection of printable characters. The operator can designate any of the following twelve character sets as the primary (GØ), second (G1), third (2) and fourth (G3) character sets:

USASCII
United Kingdom
French Canada
Germany
Sweden
France
Finland
Norway and Denmark
Italy
Spain
APL
Line Drawing (VT1ØØ)

NOTE: The computer can also change the GØ, G1, G2 and G3 character sets. See the Programmer's Reference Manual for more detail.

Use the following procedure to select GØ to G3 character sets.

NOTE: The GØ through G3 character sets are designated by pressing the following characters in place of "*".

"A" for (GØ) "C" for (G2)
"B" for (G1) "D" for (G3)

Procedure	Indication/Comments
Press:	To select:
P* RETURN	Printout of available character sets and current setting.
P* = A RETURN	United States
P* = B RETURN	United Kingdom
P* = C RETURN	French Canadian
P* = D RETURN	Germany
P* = E RETURN	Sweden
P* = F RETURN	France
P* = G RETURN	Finland
P* = H RETURN	Norway and Denmark
P* = I RETURN	Italy
P* = J RETURN	Spain
P* = K RETURN	APL
P* = L RETURN	Line Drawing (VT1ØØ)

End of Line Control (Wrap mode) -- This feature controls the printer function when it reaches the right hand margin during printing operation. In wrap mode the carriage automatically returns to the left margin and the paper advances one line.

In terminate mode the carriage remains at the right margin until the printer receives a specific instruction.

Procedure	Indication/Comments
Press:	
PE RETURN	Prints available selections and current setting.
PE = A RETURN	Disables Wrap Around
PE = B RETURN	Enables Wrap Around

Form Length -- The form length is measured in increments of 1/24 of an inch. The form length can be no longer than 21 inches. To set form length, first ensure that the terminal is at the top of form. Measure the form length in inches. Multiply the result by 24.

Procedure	Indication/Comments
Measure the length of the form in inches	
Multiply the result by 24.	
Press:	To select:
PF RETURN	Prints current form length value.
PF = n RETURN	Substitute the numeric result obtained in the first two steps for n.

NOTE: If you do not wish to use vertical formatting (e.g.; with roll paper, select a form length of Ø (PF = Ø RETURN). The smallest form length you can have is two lines (not one) since the smallest line size is 1/12 inch.

Control Character Printing -- This feature allows the terminal to process received control characters as printable characters. When the control character printing feature is on, control characters received do not perform their usual function. They are printed as the characters listed in Table 3-4. Also, escape and control sequences are not processed.

Table 3-4 Printed Control Characters

Control Character	Character Mnemonic	Character Printed
Start of Heading	SOH	
Start of Text	STX	
End of Text	ETX	
end of Transmission	EOT	
enquire	ENQ	
Acknowledge	ACK	
Bell	BEL	
Back Space	BS	
Horizontal Tabulation	HT	
Line Feed	LF	
Vertical Tabulation	VT	
Form Feed	FF	
Carriage Return	CR	
Shift Out	SO	
Shift In	SI	
Data Link Escape	DLE	
Device Control 1	DC1 (XON)	
Device Control 2	DC2	
Device Control 3	DC3 (XOFF)	
Device Control 4	DC4	
Negative Acknowledge	NAK	
Synchronous Idle	SYn	
End of Transmission Block	ETB	
Cancel Previous Word of Character	CAN	
End of Medium	EM	
Substitute	SUB	
Escape	ESC	
File Separator	FS	
Group Separator	GS	
Record Separator	RS	
Unit Separator	US	
Null	NUL	
Delete	DEL	

When the control character printing feature is off control characters, escape sequences, and control sequences are processed as usual.

Procedure	Indication/Comments
Press:	
PG RETURN	Prints available selections and current setting.
PG = A RETURN	Disables Control Character Printing
PG = B RETURN	Enables Control Character Printing

NOTE: When entering the answerback message, the terminal prints control characters automatically. Automatic control character printing stops as soon as the message is entered.

Horizontal Pitch (Characters Per Inch) -- The horizontal pitch of a character is the width of the character as well as the spacing between characters. The terminal has eight different horizontal pitch selections (Figure 3-6).

NOTE: Changing horizontal pitch resets the left margin to column 1 and the right margin to the maximum column for the selected pitch. Table 3-5 lists the maximum columns for each horizontal pitch.

Figure 3-6 Horizontal Pitch Examples

Table 3-5 Maximum Right Margins

Horizontal Pitch	Maximum Right Margin
10	80
12	96
13.2	105
16.5	132
5	40
6	48
6.6	52
8.25	66

Perform the following procedure to set or change the horizontal pitch feature.

Procedure	Indication/Comments
Press:	
PH RETURN	Prints list of horizontal pitch selections and current setting.
PH = A RETURN	Selects 10 characters per inch
PH = B RETURN	Selects 12 characters per inch
PH = C RETURN	Selects 13.2 characters per inch
PH = D RETURN	Selects 16.5 characters per inch
PH = E RETURN	Selects 5 characters per inch
PH = F RETURN	Selects 6 characters per inch
PH = G RETURN	Selects 6.6 characters per inch
PH = H RETURN	Selects 8.25 characters per inch

New Line Request Character -- THis feature controls the terminal's response to a received line feed or carriage return control character. The terminal responds in one of three different ways as described in Table 3-6. Perform the following procedure to select or change the printer new line feature.

Procedure	Indication/Comments
Press:	
PN RETURN	Prints available selections and current setting.
PN = A RETURN	Selects no new line character
PN = B RETURN	Selects RETURN as new line character
PN = C RETURN	Selects LINE FEED as new line character

Table 3-6 New Line Request Selections

Selected Feature	Received Carriage Return Control Character	Received Line Feed Control Character
No new line	Terminal performs carriage return	Terminal performs line feed
Line feed new line	Terminal performs carriage return	Terminal performs carriage return and line feed
Carriage return line feed	Terminal performs carriage return and line feed	Terminal performs line feed

Printing Pressure -- This feature allows the terminal to print lighter or darker images. The lightest (low pressure) selection is provided for quiet environments. The darkest (high pressure) selection is most useful for highlighting selected portions of text or tabular material.

Procedure	Indication/Comments
Press:	
PP RETURN	Prints available selections and current setting.
PP = A RETURN	Sets print pressure high
PP = B RETURN	Sets print pressure medium
PP = C RETURN	Sets print pressure low

Vertical Pitch (Lines Per Inch) -- Vertical pitch is spacing between lines, not the height of the printed characters. The terminal has six different vertical pitch selections (Figure 3-4). This feature allows the terminal to print on a large number of different forms.

Perform the following procedure to select or change the vertical pitch feature.

Procedure	Indication/Comments
Count the number of lines per inch on your form (Figure 3-7).	
Set the terminal to the desired number of lines per inch.	
Press:	
PV RETURN	Prints list of vertical pitch selections and current setting.
PV = A RETURN	Selects 6 lines per inch
PV = B RETURN	Selects 8 lines per inch
PV = C RETURN	Selects 12 lines per inch
PV = D RETURN	Selects 2 lines per inch
PV = E RETURN	Selects 3 lines per inch
PV = F RETURN	Selects 4 lines per inch

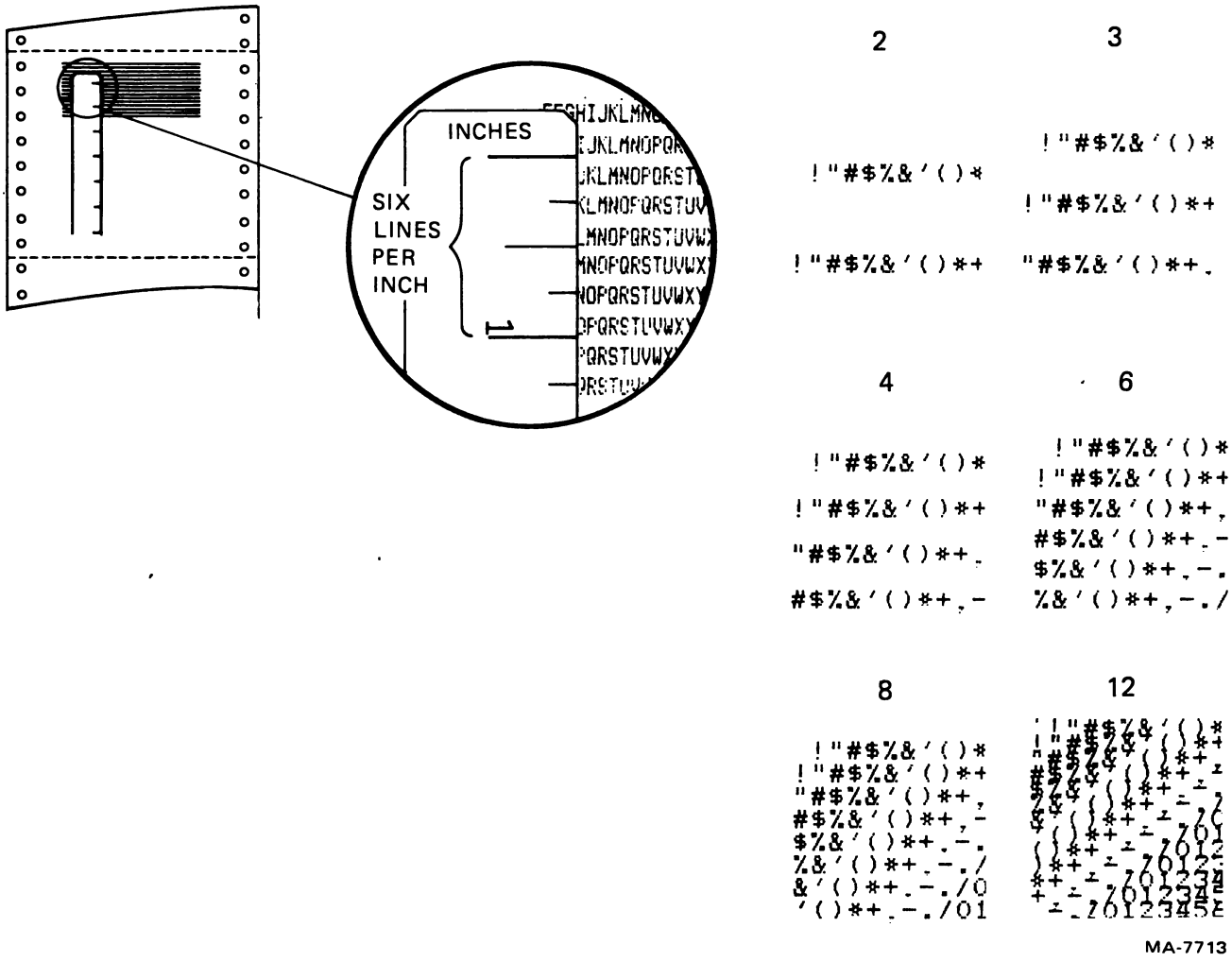


Figure 3-7 Vertical Pitch

Horizontal Margins and Tabs -- The left margin specifies the first column in which to print, and the right margin specifies the last column in which to print (Figure 3-8).

A horizontal tab stop is a preselected column to which the printhead advances when a horizontal tab control character is received (Figure 3-8). For example, if a horizontal tab stop is set at column nine and a horizontal tab control character is received, the printhead advances to column nine. Perform the following procedures to set or clear horizontal margins and tabs.

NOTE: It is recommended that last character view LCV) be set to manual during the setting of horizontal margins and tabs so that the print head can mark the current column (position).

Clearing Horizontal Margins

Procedure	Indication/Comments
Press + & 7	The left and right horizontal margins are set to maximum.

Setting Left Horizontal Margin

Procedure	Indication/Comments
Press % 5	The left margin is set at present column.

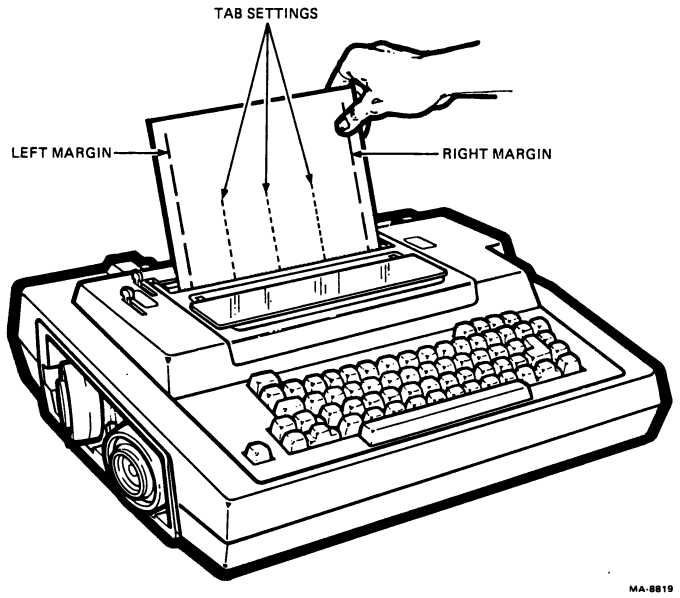


Figure 3-8 Horizontal Margins and Tabs

Clearing A Single Horizontal Tab

Procedure	Indication/Comments
Press TAB to move the printhead to the desired tab stop.	The printhead advances to the horizontal tab stop.
Press @ 2	The horizontal tab is cleared.

Clearing All Horizontal Tabs

Procedure	Indication/Comments
Press # ⇇ 3	All horizontal tab stops are cleared.

Setting Horizontal Tabs

Procedure	Indication/Comments
Clear the horizontal tab stops if desired.	
Use the space bar to advance the printhead to the desired column.	
Press ! 1	The horizontal tab is set
Repeat the last two steps for each additional tab stop.	

Setting Right Horizontal Margin

Procedure	Indication/Comments
Use the space bar to advance the printhead to the desired column.	
Press ^ 6	The right margin is set.

Top Of Form (TOF) -- The top of the form (TOF) is the physical top edge of the paper and line one of the paper. Do not confuse the top of form with the top margin. The top margin is the line where you want printing to begin (Figure 3-9).

NOTE: To avoid losing the TOF setting when turning the power off, press the LOC FF key before setting the power (I/O) switch to off (O).

Perform the following procedure to set top of form.

Procedure	Indication/Comments
Use the LOC FF key and the)/Ø key to set the form perforation even with the top of the printhead (Figure 3-9).	
Press $ 4	Top of form is set. If the top margin is not set to line one, the paper immediately advances to the top margin.

Vertical Margins and Tabs -- The top margin is the line where you want printing to begin. The bottom margin is the line where you want printing to end (Figure 3-9).

A vertical tab is a preselected line to which the printhead advances when a vertical tab control character is received by the terminal (Figure 3-9). Vertical tabs can be set or cleared at any time. However, when setting up a new form, the best time to set tabs is after setting the top margin. Use the following procedures to set or change the vertical margins or tabs features.

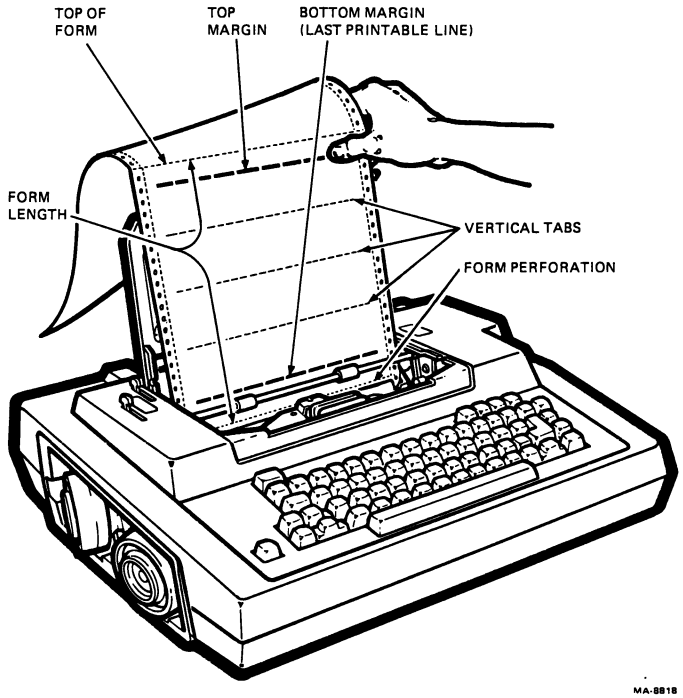


Figure 3-9 Vertical Form Setting

Clearing Vertical Margins

Procedure	Indication/Comments
While pressing SHIFT press + & 7	The top and bottom vertical margins are cleared.

Setting Top Vertical Margin

Procedure	Indication/Comments
Clear old vertical margins if desired.	
Press the LOC FF/LOC LF key to advance the paper to the desired line.	
While pressing SHIFT press % 5	The top margin is set at the current line.

Clearing A Single Vertical Tab

Procedure	Indication/Comments
While pressing CTRL press 5 VT K	The form advances to the vertical tab stop.
While pressing SHFIT press @ 2	The vertical tab is cleared.

Clearing All Vertical Tabs

Procedure	Indication/Comments
While pressing SHIFT press # ↳ 3	The vertical tabs are cleared.

Setting Vertical Tabs

Procedure	Indication/Comments
Use the LOC FF/LOC LF key to advance the paper to the line requiring a tab.	
While pressing SHIFT press ! 1	The vertical tab is set.
Repeat the last two steps for each additional tab.	

Setting Bottom Vertical Margin

Procedure	Indication/Comments
Press the LOC FF/LOC LF key to advance the paper to the desired line.	
While pressing SHIFT press ^ 6	The bottom margin is set.

FEATURE MEMORIES

The terminal features are contained in three memories as shown in Figure 3-10. There is an operating memory and two permanent memories. The following paragraphs describe the feature memories.

Operating Memory

The terminal operates according to the features entered in the operating memory. The operator can change a feature in operating memory by entering SET-UP and changing the feature. The computer can also change some of the features in operating memory. The features in operating memory that the operator and computer can change are listed below.

- Horizontal pitch
- Horizontal margins
- Horizontal tabs
- Vertical pitch
- Form length
- Vertical margins
- Vertical tabs
- Auto new line at right margin
- Printer character sets

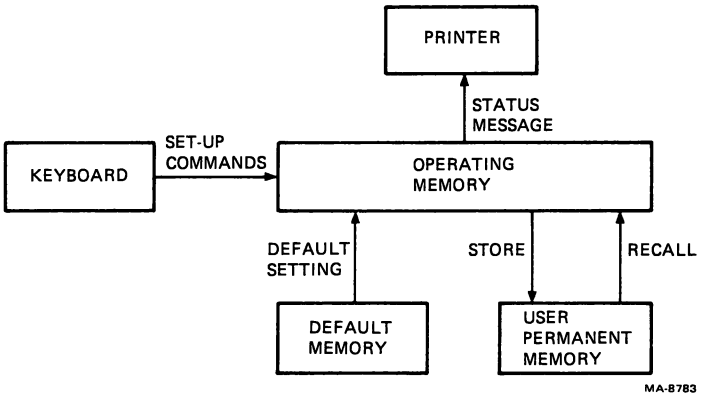


Figure 3-1Ø Feature Memories

The features in operating memory are automatically erased and replaced with the features in user permanent memory when power is turned off and then back on. If power to the terminal is turned off and on and no features are stored in user permanent memory, the features in operating memory are replaced with the features in default memory.

User Permanent Memory
The user permanent memory is used to store operator selected features. The computer cannot change the features stored in this memory. The operator can change the features in user permanent memory by changing the feature and performing a store procedure while in SET-UP. The operator can enter the features from user permanent memory into operating memory by performing a recall procedure.

The following paragraphs describe the store and recall procedures.

Store -- enters the operating memory features into user permanent memory. Storing features can only be performed from the keyboard. The computer cannot store features. Perform the following procedure to store the features into user permanent memory.

NOTE: If the terminal prints NVM err when performing the store procedure, a logic board fault is possible. Repeat the procedure to verify a fault. If verified, refer to the Testing and Troubleshooting Chapter (Chapter 5) for troubleshooting details.

Procedure	Indication/Comments
Enter SET-UP	The SET-UP indicator flashes.
While pressing SHIFT, press (9	The features in operating memory are stored in user permanent memory. The SET-UP indicator stays on for approximately nine seconds. When the SET-UP indicator starts to flash again, the store is complete.
Exit SET-UP	The SET-UP indicator stops flashing.

Recall -- enters the features stored in user permanent memory into operating memory. All features previously stored in operating memory are erased. Perform the following procedure to recall the features stored in user permanent memory.

NOTE: If the terminal prints NVM err when performing the recall procedure, a logic board fault is possible. Repeat the procedure to verify a fault. If verified, refer to the Testing and Troubleshooting Chapter (Chapter 5) for troubleshooting details.

The terminal automatically loads the default feature selections into the operating memory while printing NVM err. The terminal may be used with these values until repair can be completed.

Procedure	Indication/Comments
Enter SET-UP	The SET-UP indicator flashes.
Press .(RETURN 9	The features stored in user permanent memory are entered into operating memory. The SET-Up indicator stays on for approximately one second.
Exit SET-UP	The SET-UP indicator stops flashing.

Default Memory

The default memory contains typical selections for each SET-UP feature. The features stored in this permanent memory cannot be changed by either the operator or the computer.

If no SET-UP information is stored in the user permanent memory when power is turned on, the default selections are automatically entered into the operating memory. The operator can transfer default selections into operating memory by performing a terminal reset procedure at the keyboard. The default selections for the terminal are listed in Table 3-7.

Perform the following procedure to reset the terminal operating features.

Procedure	Indication/Comments
Enter SET-UP	The SET-UP indicator flashes.
Press I RETURN	The terminal default settings are entered into operating memory.
Exit SET-UP	The SET-UP indicator stops flashing.

Table 3-7 Feature Default Values

Feature	Default Selection
Communications	
Auto-Answerback	No
Buffer size	1Ø24
Communication port	EIA interface
Disconnect-HDX	None
Local echo	No
Fault action	None
HDX start mode	Receive
High speed baud rate	12ØØ baud
Low speed baud rate	3ØØ
Line protocol	FDX A
Receive error override	No
Parity	7/M
SRTS polarity	Low
Restraint	XON/XOFF
Speed select	High
Turnaround character	None
Power up state	Line
Frequency	Bell 1Ø3
Answerback message entry	Ø (no answerback message present)

Table 3-7 Feature Default Values (Cont)

Feature	Default Selection
Keyboard	
Auto-line feed	No
Break key	No
Keyclick	No
External keypad mode	Normal
Language	USASCII
Repeat mode control (Auto-repeat control)	Yes
Printer	
GØ, Gl, G2, G3 character sets	USASCII
End of line	Wrap
Form length (multiples of 1/24 inch)	264
Graphic rendition of control characters	No
Horizontal pitch	1Ø characters per inch
Horizontal tab stops Left margin Right margin	Set every 8 spaces Column 1 Column 8Ø
New line character	None
Print force	High force
Vertical pitch (lines per inch)	6 lines per inch
Vertical tab stops Top margin Bottom margin	None Line 1 Line 66

CHAPTER 4
COMMUNICATION

GENERAL

This chapter describes how the terminal communicates with a computer using each of its interface ports and its available communications features. Selection of the desired interface and the appropriate communications features may only be accomplished at the terminal. The host can not control selection of any communication features. All communications features may be stored in permanent memory unless otherwise indicated.

CONNECTING TO THE COMPUTER

The terminal is connected to a computer directly or through a common carrier facility (telephone line). The following interface ports (devices) are provided to support both of these communications methods.

A. EIA Connector
B. Integral Direct Connect Modem (DCM)
C. Integral Acoustic Coupler
D. Integral 20mA Loop (optional)

When the terminal is connected directly to a computer or to an external direct connect modem, a standard Electronic Industry Association (EIA) cable is used. The terminal is compatible with only the Bell 212A-type and Bell 103J-type modems. It is also compatible with a Vadic modem when it has been set to "212-compatible" mode. In all cases, the selected modem must be compatible with the computer.

When connecting the terminal to the computer through a telephone line, the integral DCM or acoustic coupler are used. The modem or acoustic coupler changes the serial characters transmitted between terminal and computer into signals that can be transmitted over the telephone line.

Electronic Industry Association (EIA) Interface

The EIA communication interface is a DB-25 (EIA RS-232-C type) male connector mounted on the rear of the terminal (Figure 4-1). This connector meets Electronic Industry Association (EIA) standard RS-232-C.

When connecting to a device that meets EIA standard RS-232-C, the terminal can operate at speeds up to 9600 baud using communication cables up to 15.2 meters (50 feet) in length.

Integral Direct Connect Modem Interface

The DCM interface consists of two type RJ11C telephone jacks mounted on an insert in the rear of the terminal; one for connection to the telephone handset and the other for connection to the telephone line. An interface telephone cable is provided for connecting to the line.

The integral DCM features are:

1. 0-300 bps and 1200 bps baud rates
2. Full duplex operation only
3. Originate and auto-answer modes
4. US communication support. No European support
5. No split speed support
6. 10 bit words in 1200 bps mode (only)
7. Auto-speed selection in answer mode
8. Manual speed selection in originate mode

Integral Acoustic Coupled Modem Interface

The integral acoustic coupled modem interface consists of a pair of standard telephone handset muffs mounted in a recessed area on the side of the terminal.

The integral acoustic coupled modem features are:

1. 0-300 bps baud rate
2. Full duplex operation only
3. Originate only. No auto-answer mode
4. European/US frequency selection at keyboard providing European/US compatibility and CCITT V.21/Domestic compatibility

20 mA Current Loop Interface Option

The 20 mA current loop interface consists of a multi-pin connector installed on the side of the terminal. This option can only be installed in the Model LA-12B and LA12D terminals.

The 20 mA current loop interface option provides character transmission at speeds up to 9600 baud (bits per second) at distances up to 304.8 meters (1000 feet). Both active and passive modes of operation are available and are selected by a switch on the option board.

COMMUNICATION MODES

The terminal provides four different communications modes (choices), all of which are selectable from the keyboard. The operator selects the proper communications mode to be used with the selected communications port. In all cases, the selected mode must be compatible with the host computer.

There are two full duplex modes available and two half duplex modes. Refer to Table 4-1 for a listing of modes which may be used with each communications port.

Full Duplex Modes

1. FDX A — No modem controls. Mode for " hard line" connections.
2. FDX B — Full modem controls. Mode for standard full duplex modem (telephone line) connections.

Half Duplex Modes

1. HDX A — Supervisory control mode
2. HDX B — Coded control without reverse channel.

Full Duplex A (FDX A) Communication

Full duplex A communication is communication without modem control. This mode allows data to be transmitted and received at the same time. Data transmission and reception are always enabled while the terminal is on-line.

No modem control allows the terminal to communicate directly with a computer (null modem configurations) or with full-duplex modems that do not support DSR (Data Set Ready) or RLSD (Receive Line Signal Detect). The terminal may then communicate with the computer or modem/acoustic coupler using a minimum number of EIA signals.

Connection Conditions

When the terminal is on-line and a disconnect is not being performed, the terminal is always assumed to be connected to the computer. Therefore, the terminal transmits and receives data regardless of conditions on the EIA signal lines.

Full Duplex B (FDX B) Communication

Full duplex B communication is communication with full modem control. This mode requires that both the terminal and the modem recognize the proper EIA signals before transmitting or receiving data.

Modem control allows the terminal to communicate with a computer using modems such as Bell 103J, 212A, or equivalent.

NOTE: The terminal provides automatic speed control when it is used with Bell 212A modems and the speed control feature is selected by the operator. Refer to auto-speed paragraph in this chapter.

Connection Conditions

When the terminal is on-line and a disconnect is not being performed, the terminal is considered connected when the DSR, CTS and RLSD signals from the modem are active.

Full-Duplex Disconnect

The terminal performs full-duplex disconnect by turning DTR (Data Terminal Ready) off for at least 2 seconds plus the DSR (Data Set Ready) delay time, but no greater than 3.8 seconds. Characters are not transmitted or received during a disconnect. The following conditions cause a full-duplex disconnect.

Auto-Disconnect

- DSR turns off after a connection has been established and DTR is on.
- RLSD (carrier) turns off for more than two seconds after a connection has been established.
- Wrong number time out (DSR is on and then RLSD does not turn on within 30 seconds).
- Paper fault response is set to disconnect and a paper out condition occurs.

Manual Disconnect

- Operator presses SHIFT and BREAK keys (long break disconnect) at the same time. The terminal sends a 3.5 second break signal followed by a disconnect.
- Operator switches from ON-LINE to LOCAL. This turns DTR off for as long as the terminal remains in LOCAL. The disconnect starts as soon as the terminal returns ON-LINE.
- Operator turns terminal on. Whenever the terminal is powered up, a disconnect is executed even if ON-LINE operation has been selected and stored in permanent memory.

Break Signal

The terminal can transmit a break signal. A break signal is a transmitted space condition for Ø.25Ø seconds ±1Ø percent. The computer response to the break signal depends on the computer and software used. The break signal is generated from the keyboard.

Long Break Disconnect

A long break disconnect is a transmitted space condition for 3.8 seconds ±1Ø percent. After a long break disconnect the Data Terminal Ready (DTR) signal is turned off. The long break disconnect is generated from the keyboard.

When using properly configured modems connected to the terminal EIA interface, the long break disconnect causes both the local and remote modems to disconnect. For modems that are connected with the 2Ø mA current loop interface option, the long break disconnect may only disconnect the remote modem.

Coded Disconnect

The EOT control character is the normal disconnect character unless it has been selected as the turnaround character for half-duplex communications. In that case, another disconnect character must be selected. This is an operator-selectable feature only. Refer to Chapter 3 for more detail.

Answerback

The terminal transmits an answerback message during full-duplex operation in accordance with the following:

Auto-Answerback

- This is an operator-selectable feature which causes the answerback message to be sent whenever the terminal starts to transmit for the first time.

Manual Answerback

- This is an operator function which cause the answerback message to be sent whenever the HERE IS key is pressed.

Coded Answerback

- This is an automatic terminal function which causes the terminal to send the answerback message whenever the ENQ character is received.

Auto-Speed Control

When the terminal is operating in full-duplex with modem control (FDX B), the auto-speed select feature may be selected by the operator. This feature permits the modem to automatically select the high or low speed range to adapt the terminal to the speed of the modem. The baud rates within these ranges must be selected during setup for this feature to be operational. This feature can only be used in answer mode when the terminal responds to a call from the computer.

Restraint Control

This feature provides a signal to inform the computer that it should temporarily suspend data transmission to prevent an overflow in the input data buffer.The signal (or signals) are generated whenever a preset "high water" mark is detected in the buffer. Restraint control may be provided by the XOFF/XON signals, by signal transitions on the SRTS line or by both means. Restraint control may also be disabled when desired.

Restraint Line

The SRS (secondary request to send) line may be selected by the operator for use in restraint control during full-duplex communication operations. In this case, either the positive transitions or the negative transitions on this line are used to signal an approaching input buffer overflow. The operator selects the proper transmission for compatibility with the system.

When the restraint line is used for this function, its state represents only the status of the input buffer and not the receive-ready status of the terminal.

XON/XOFF

The XON/XOFF feature may also be selected to prevent input buffer overflow. When XON/XOFF is selected, the terminal sends XOFF to the computer to signal an approaching input buffer overflow. This feature may be used to stop the computer from sending data during other conditions when the terminal is not ready.

The following conditions cause the terminal to send an XOFF:

- Number of characters in the input buffer exceeds 1Ø0 characters in the small buffer or 8Ø0 characters in the large buffer.
- Access cover is open.
- Paper out is detected.
- Printhead is jammed.

The terminal signals (XON) to the computer to resume data transmission during the following conditions.

- XOFF is transmitted and there are less than 2Ø characters remaining in the input buffer.
- the fault condition (paper out, printhead jam, cover open) is corrected and the **VIEW/FAULT RESET** key is pressed.

Half-Duplex (HDX) Communication

Due to the "one at a time" definition of half duplex communication, elaborate protocols (compared to full duplex) are needed to define whether the terminal should transmit or receive data at any given time. Each time the transmitter and receiver exchange functions the line is "turned around." Basically this consists of switching the end of the line that asserts RTS. RTS reverses the transmit/receive mode of the modem and switches the carrier generation from one end to the other.

The terminal incorporates two methods of controlling line turnaround. In supervisory control mode, the host controls all line turnarounds by manipulating the secondary control lines. Reverse channel is mandatory for this mode. The other protocol (coded control w/o reverse channel) allows the transmitting device to control line turnaround using specific control characters.

Initial Direction Determination

The terminal attempts to either transmit or receive, depending on the HDX initial direction determination SET-UP command. If the terminal attempts to enter receive mode and RLSD is not asserted by the modem within 5 seconds, the normal timeout disconnect occurs.

Reverse Channel

Reverse channel transmits supervisory control signals. These signals flow in the opposite direction from which data is being transferred. due to the relative lower bandwidth of the reverse channel (to the forward channel), it is not used for data exchange.

Turnaround Characters

The two turnaround characters, EOT and ETX, initiate line turnaround when received or transmitted. Any characters sent after the turnaround character are lost. The terminal automatically sends the turnaround character each time the RETURN key is typed, after sending the normal code for that key.

Half-Duplex Break
Half-duplex break operates in three modes:

- Transmit mode (RTS true) - a space on the transmit data line for 233 ms.
- Receive mode (RTS false) - a space on the SRTS line for 233 ms. When operating with 'coded-no reverse channel' the break is ignored when in receive mode.
- While switching modes - if neither receive nor transmit is enabled the break is not processed until a definite line direction is established.

Loss of Data Set Ready
When DSR is lost, all control lines are set to their initial state.

Half-Duplex Disconnect
Hanging up the phone to disconnect from the line is accomplished by dropping DTR for 70 ms, and resetting all control lines to their initial state.

Auto-Disconnect
The following line conditions will cause an auto-disconnect:

- A line connection is not established within 20 seconds of a ring indication. (connection is defined as the assertion of DTR).
- In supervisory control operation, if SRLSD goes off and RLSD has not come on within 30 seconds.
- Line turnaround is not completed within 5 seconds.
- In coded control operation, if the turnaround character has been transmitted and RLSD has not come on within 30 seconds.

Manual Disconnect

- Operator presses SHIFT and BREAK keys (long break disconnect) at the same time. The terminal sends a 3.5 second break signal followed by a disconnect.
- Operator switches from ON-LINE to LOCAL. This turns DTR off for as long as the terminal remains in LOCAL. The disconnect starts as soon as the terminal returns ON-LINE.
- Operator turns terminal on. Whenever the terminal is powered up, a disconnect is executed even if ON-LINE operation has been selected and stored in permanent memory.

INPUT BUFFER OVERFLOW PREVENTION

When the terminal receives a character (other than the NUL and DEL characters), the terminal places the character in its input buffer. When the printer is ready, characters are removed from the input buffer and printed. If received characters are placed in the input buffer faster than the characters are processed, the input buffer begins to fill with characters. When the input buffer is full, a bell tone sounds with each character received, the character is lost and the substitute character (⁒) is printed by the terminal. There are four methods of input buffer overflow prevention.

- Restraint Control - The computer can prevent input buffer overflows using the restraint control feature. With this feature,the terminal signals the computer when to temporarily stop sending data due to a full buffer and then when to resume sending data.

- Fill Characters - The computer can prevent input buffer overflows by transmitting fill characters during communication. Fill characters are not placed in the input buffer. Fill characters allow the terminal to process received characters before receiving more usable characters.

- Number of Characters Limit - Input buffer overflow can be prevented by limiting the number of characters in the message sent to the terminal to the input buffer size. If the buffer is empty at the beginning of the transmission, the terminal can receive a message of about 200 characters when the small buffer is used and 1024 characters when the large buffer is used without causing a buffer overflow.

- Low Speed Operation - Input buffer overflows are prevented when the terminal receives characters at a speed slower than the characters are processed. During low speed operation, the terminal always removes characters from the input buffer faster than the characters can be received from the computer.

XON and XOFF Control Characters

When using the restraint control feature, control characters or the restraint line (or both)are used to prevent input buffer overflows. When the input buffer receives more characters than a specified upper limit, the terminal transmits the selected signal (XOFF or SRTS line transition) to the computer.The computer then stops transmitting characters.

The upper limits for the terminal are as follows.

Small buffer	100 characters
Large buffer	800 characters

As the terminal continues to remove and print characters, the number of characters in the buffer decreases. When the input buffer holds 10 characters, the terminal transmits a second signal (XON or the opposite SRTS line transition) to the computer. The computer then resumes transmission.

Fill Time Formulas
When receiving data at 300 baud or less, the terminal can keep up with normal character reception. Very short lines and multiple form feeds cannot be printed this fast. Fill characters may be used to slow down the effective data transmission speed in these cases. Fill characters do not enter the input buffer; they are stripped out of the data stream when received.

The printhead and form movements (horizontal and vertical) of the terminal are directly related to the fill time required to slow down the effective data transmission speed. The fill time required to compensate for these movements can be converted to the number of fill characters needed using the following formula.

Number of fill characters = fill time required/character execution time

NOTE: NUL is the only recommended fill character, even though some other characters achieve the same result in special cases.

Fill Time Required

Horizontal Movement (Includes Horizontal Tabs and Horizontal Positoning Sequences) -- First figure the actual number of columns moved. Allow 15 ms for each of the first ten columns (30 ms in double-width pitches: 5, 6, 6.6, 8.25) and 5.5 ms for each additional column (11 ms in double-width pitches) to figure the correct fill time required.

Vertical Movement (Includes Line Feeds, Vertical Tabs, Form Feeds, and Vertical Positioning Sequences) -- Convert the number of lines moved to actual distance moved using this formula.

Inches moved = Number of lines moved/Vertical Pitch

Then allow 38 ms for the first line moved up to 1/6 inch and 168 ms for each additional inch to figure the correct fill time required.

Character Execution Time
This time is given in milliseconds and is based on a given baud rate. The character execution time is the time it takes the computer to slow down the effective data transmission speed to the printer.

Fill Time Formula Examples

1. Horizontal Movement
   Assumed values: Baud Rate = 1200, Horizontal Pitch = any single width pitch (10, 12, 13.2, 16.5). Also assume that horizontal tab stops are set at columns 9, 17, and 25 and printing begins at column 9. If the next two characters received are TAB TAB, calculate the number of fill characters required in the following way.

   First, calculate the number of columns moved using the following formula.

   Number Columns Moved = Final Column -- Current Column

   Number Columns Moved = 25 -- 9 = 16

   Then allow 15 ms per column for the first 10 columns and 5.5 ms per column for the remaining columns.

   15 ms X 10 = 150 ms

   5.5 ms X 6 = 33 ms

   150 + 33 ms = 183 ms

   The fill time required is 183 ms.

   Next, divide the fill time required by the character execution time found in Table 7-4.

$$\text{Number Fill Characters Required} = \frac{183 \text{ ms}}{8.3 \text{ ms}} = 22.04$$

   The number of fill characters required is 22.04. Round this number off to the next whole number, which is 23. Twenty three (23) fill characters (NUL) should follow the two tabs.

2. Vertical Movement
   Assumed values: Baud Rate = 1200 baud, Vertical Pitch = 6 lines per inch and paper is set to line 10. Also assume the next characters received are nine line feeds.

   First, calculate the actual distance moved using the following formula.

$$\text{Number Inches Moved} = \frac{\text{Lines Moved}}{\text{Vertical Pitch}}$$

$$\text{Number Inches Moved} = \frac{9}{6} = 1\ 1/2 \text{ inches}$$

Then allow 38 ms for the first 1/6 inch moved and 168 ms for the remaining number of inches moved.

168 ms X 1-2/6 inches = 224 ms

224 ms + 38 ms = 262 ms

The fill time required is 262 ms

Next, divide the fill time required by the character execution time.

$$\text{Number fill characters required} = \frac{262 \text{ ms}}{8.3 \text{ ms}} = 31.56$$

The number of fill characters required is 31.56. Round this number off to the next whole number, which is 32. Thirty two (32) fill characters (NUL) should follow the nine line feeds.

KEYBOARD TRANSMIT BUFFER

The keyboard transmit buffer holds characters generated by the terminal before they are transmitted to the computer. Up to 16 keystrokes are stored in the keyboard buffer. If the keyboard buffer overflows, the bell tone sounds with each character and the character is discarded.

CHAPTER 5
TESTING AND TROUBLESHOOTING

GENERAL

This chapter describes the terminal self tests, a troubleshooting checklist, and all maintenance procedures. The troubleshooting section lists a series of checks to make before requesting service. The maintenance section describes the procedures to keep the terminal in good operating condition.

TERMINAL SELF-TESTS

There are a selection of terminal self-tests. The first test occurs automatically when the terminal is turned on. It provides an initial visual indication of terminal operation. The other tests may be keyboard-operated for further testing of terminal operation. The self-tests are keyed to the troubleshooting table. When performing a particular test and a fault symptom occurs, refer to the table for repair procedures. The self-tests are as follows:

Test	Comments
Power-up self-test	Performs intitial test of terminal operation
Printer self-test	Internal test only. Does not test communication lines
EIA operation self-tests	
Analog Loopback	Tests internal circuits and data input-output lines
Baud rate and line signal	Tests EIA communication signals and data transmission at all baud rates
Integral modem (DCM) self-tests	
Analog loopback	Internal test only. Does not test communication lines
Remote data loopback	Tests internal circuits and communication lines between the terminal and the remote modem
Acoustic coupled modem (ACM)	
Analog Loopback	Internal test only. Does not test communication lines

Self-Test Help Message

A self-test help message is available to indicate the required keystrokes for any of the terminal self-tests. Figure 5-1 shows a printout of the self-test help message.

Test Patterns

There are three test patterns which are available for testing in the printer self-test, the analog loopback test and the remote data loopback test. These tests are:

Character pattern
Single character (repeated)
Nonprinting

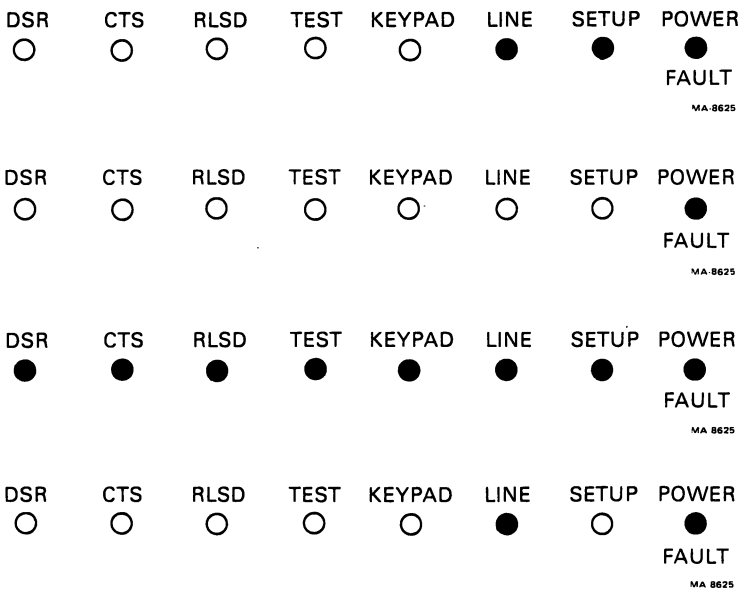
Figure 5-2 shows a typical example of the character (ripple) pattern self-test. The character pattern for the printer self-test prints all character symbols continuously within the selected margins.

Figure 5-3 shows an example of the single character self-test. This test prints any selected character continuously. The nonprinting test prints spaces but does not slew.

Power-Up Self-Test

The terminal performs a power-up self-test whenever it is turned on. This self-test checks initial terminal operation. If faulty operation is indicated, refer to Table 5-1 for troubleshooting guides.

Procedure	Comments/Indications
Set power (Ø/1) switch to on (1)	Observe the following sequence of visual and audible indications



The bell sounds at the same time

The printhead moves slowly to the left margin, stops and then moves a short distance to the right.

If Auto last character view (LCV) has been selected and stored in permanent memory, the printhead will move another short distance to the right.

NOTE

Manual LCV is the default condition in these terminals.

```
TEST

TB-Baud Rate + Line Signal Test(EIA)
TL-Analog Loop Back(EIA,DCM,ACM)
TR-Remote Data Loop Back(DCM)
TT-Printer Self-Test
```

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Figure 5-1 Self-Test Help Message

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

MA-8734

Figure 5-2 Character Pattern Printout

```
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
```

MA-8735

Figure 5-3 Character Printout

Table 5-1 Operator Troubleshooting

Symptom	Probable Cause	Remedy
Power-Up Self-Test		
No response when power switch is set to 1 (on). LED indicators are off, carriage does not move	Power cord not plugged in	Plug in power cord
	Fuse	Replace fuse
	No power at wall receptacle	• Try another receptacle • Check circuit breaker • Call electrician
	115 V/220 V selector switch	Check switch for proper setting
Power/Fault light flashes (no bell tone)	Out of paper	Install paper. Press VIEW/FAULT RESET key.
	Access Cover open	Close cover, press VIEW/FAULT RESET key.
Power/Fault light flashes	Carriage or head jam	• Check for smooth movement of carriage • Check clearance between printhead and paper. Readjust print impression • Clear jam and reset fault by pressing the VIEW/FAULT RESET Key. Make sure that printhead is properly seated
Printer Self-Test		
No printing, carriage moves	Printhead adjustment	Adjust printhead
	Ribbon cartridge	Replace ribbon cartridge
	Printhead	Check printhead for proper seating. Remove printhead and check connector on bottom. Refer to Figure 5-7.

Table 5-1 Operator Troubleshooting (Cont)

Symptom	Probable Cause	Remedy
Print is too light	Printhead	Adjust printhead
	Ribbon cartridge	Replace ribbon cartridge
	Print pressure SET-UP feature incorrect	Check SET-UP feature
Print density impression drops off	Ribbon cartridge	Replace ribbon cartridge
Print density varies randomly across paper	Ribbon cartridge	Replace ribbon cartridge
Prints, light-to-dark or dark-to-light	Printhead	Replace printhead.
Missing dots on any printable character (always same row)	Printhead cable	Check printhead connector (J1 at the printhead). Replace printhead
	Printhead	Replace printhead
Missing dots only on some characters	Printhead	Replace printhead
Prints incorrect characters	Incorrect character set	Select correct character set in SET-UP.
No line feeds	Paper jam	Remove paper jam and reload paper.
Improper line feeds (inconsistent vertical motion)	Paper path obstructed	Clean paper path
	Dirty platen	Clean platen
Print line slanted in friction feed	Paper path obstructed	Clean paper path
	Platen dirty	Clean platen

Table 5-1 Operator Troubleshooting (Cont)

Symptom	Probable Cause	Remedy
Print line slanted in pin feed application	Paper routing	Check for proper paper path
	Paper path obstructed	Clear paper path
Anyone character does not print	Keyboard	Call for service
Printer prints NVM err during store procedure or recall procedure	Defective logic board	Call for service
EIA Analog Loopback Test		
No key codes transmitted (EIA operation).	LINE/LOCAL key set to LOCAL	Select LINE mode
Local operation normal	SET-UP features	Check SET-UP features
	Wrong loopback connector used	Use loopback connector (P/N 1215336-Ø1)
Prints double characters	Local echo feature set	Disable local echo SET-UP feature
Acoustic Coupler and Direct Connect Modem Tests		
NOTE Refer to Printer Self-Test section for printing and line feed troubles.		
Acoustic coupler test fails	Internal failure	Call for service
Acoustic coupler test passes but there is no communication	Incorrect SET-UP	Check communication features

Table 5-1 Operator Troubleshooting (Cont)

Symptom	Probable Cause	Remedy
Direct connect modem test fails in analog loopback mode	Internal failure	Call for service
Direct connect modem fails in remote data loopback mode	Incorrect SET-UP feature	Check features

Printer Self-Tests

The printer self-tests provide a visual indication that internal operation is normal. Perform any of the following self-tests to determine if a problem exists. If faulty operation is indicated during a test, refer to Table 5-1 for troubleshooting guides.

Perform the following procedures to operate the self-tests.

Procedure	Comments/Indications
Enter SET-UP	The SET-UP indicator flashes.
Press:	
T T RETURN	The character pattern prints
T T SPACE	The nonprinting test starts
T T any character	The selected character prints
Exit SET-UP	The SET-UP indicator stops flashing.

NOTE

To end any of the three tests and remain in SET-UP, press any character key (or space bar) on the keyboard except the SET-UP key.

EIA Operation Self-Tests

Analog Loopback Test

In the analog loopback test, the EIA transmit and receive lines are connected together through a loopback connector (Figure 5-4). The operator can then transmit characters on the transmit lines and the characters will be received on the receive lines. None of the control signals are checked. If faulty operation is indicated during the test, refer to Table 5-1 for troubleshooting guides.

Test Setup

Perform the following procedure to setup the terminal for test:

Procedure	Comments/Indications
Enter SET-UP	The SET-UP indicator is on flashing
Press:	
C C = A RETURN	Selects EIA comm. port
C S = A RETURN	Selects Hi speed baud rate
C H = I RETURN	Sets rate to 1200 baud
Install EIA loopback connector (Figure 5-5)	The DSR,CTS and RLSD indicators are on

Test Procedure

Perform the following procedure to operate the test:

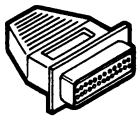
Procedure	Comments/Indications
Press:	
T L	The TEST indicator is on
Press:	
RETURN	The character pattern prints
SPACE	The nonprinting test starts
Any character	The selected character prints
Exit SET-UP	

NOTE

To end any of the three tests and remain in SET-UP, press any character key (or space bar) on the keyboard except the SET-UP key.

Remove EIA loopback connector	The DSR,CTS and RLSD indicators are off

CONNECTORS



FROM PIN	TO PIN	TO PIN
2	3	–
4	5	–
20	6	–
19	22	–
12	23	8

EIA

MA-7266B

Figure 5-4 EIA Loopback Connector

Baud Rate and Line Signal Test
Full Duplex - Data Leads Only

Test Setup
Perform the following procedure to setup the terminal for test:

Procedure	Comments/Indications
Enter SET-UP	The SET-UP indicator flashes
Press:	
C C = A RETURN	Selects EIA comm. port
C S = A RETURN	Selects Hi speed baud rate
C H = I RETURN	Sets rate to 1200 baud
C M = A RETURN	Selects full duplex-data leads only
Install EIA loopback connector (Figure 5-5)	The DSR,CTS and RLSD indicators are on

Test Procedure
Perform the following procedure to operate the test:

Procedure	Comments/Indications
Press:	
T B	The printer prints: Start data path test, enter <CR>
Press:	
RETURN	The TEST indicator is on After a short time, the printer prints: CONTROL LINES OK DATA PATH OK
Exit SET-UP	The SET-UP indicator stops flashing

NOTE
To end any of the three tests and remain in SET-UP, press any character key (or space bar) on the keyboard except the SET-UP key.

Remove EIA loopback connector	The DSR,CTS and RLSD indicators are off

Full Duplex-Full Control

Test Setup

Perform the following procedure to setup the terminal for test:

Procedure	Comments/Indications
Enter SET-UP	The SET-UP indicator flashes
Press:	
C C = A RETURN	Selects EIA comm. port
C S = A RETURN	Selects Hi speed baud rate
C H = I RETURN	Sets rate to 1200 baud
C M = B RETURN	Selects full duplex-full control
Install EIA loopback connector (Figure 5-5)	The DSR,CTS and RLSD indicators are on

Test Procedure

Perform the following procedure to operate the test:

Procedure	Comments/Indications
Press:	
T B	The printer prints: Start data path test, enter <CR>
Press:	
RETURN	The TEST indicator is on After a short time, the printer prints: CONTROL LINES OK DATA PATH OK The TEST indicator is off
Exit SET-UP	The SET-UP indicator stops flashing
Remove EIA loopback connector	The DSR,CTS and RLSD indicators are off

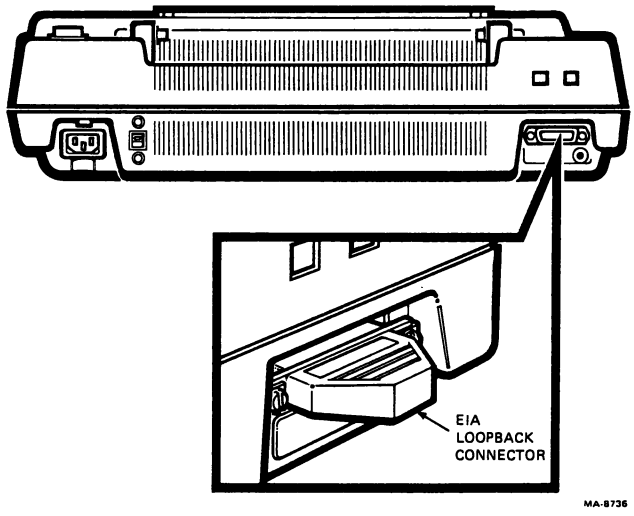


Figure 5-5 Installing EIA Loopback Connector

Integral Modem (DCM) Tests

In the analog loopback test, the internal circuits are checked but the communication lines are not.In the remote data loopback test, communication and data lines are established with the remote modem. This permits both control signals and data to be sent to the remote modem and then looped back to the terminal thereby permitting a test of the complete interface circuits.

> NOTE
> The operator at the remote location must be informed that a remote data loopback test is going to be performed so that his modem can be set up for the test.

Perform any of the following self-tests to determine if a problem exists. If faulty operation is indicated during a test, refer to Table 5-1 for troubleshooting guides.

Analog Loopback Test

Test Setup

Perform the following procedure to setup the terminal for test:

Procedure		Comments/Indications
Enter SET-UP		The SET-UP indicator flashes
Press:		
	C C = B RETURN	Selects DCM comm. port
	C S = A RETURN	Selects Hi speed baud rate
	C H = I RETURN	Sets rate to 1200 baud
	C M = B RETURN	Selects full duplex-full control

Test Procedure

Perform the following procedure to operate the test:

Procedure		Comments/Indications
Press:		
	T L	The TEST indicator is on The DSR,CTS AND RLSD indicators are on
Press:		
	RETURN	The character pattern prints
	SPACE	The nonprinting test starts
	Any character	The selected character prints
Exit SET-UP		The SET-UP indicator stops flashing. The TEST indicator is off The DSR,CTS and RLSD indicators are off

NOTE

To end any of the three tests and remain in SET-UP, press any character key (or space bar) on the keyboard except the SET-UP key.

Remote Data Loopback Test

Test Setup

Perform the following procedure to setup the terminal for test:

Procedure	Comments/Indications
Enter SET-UP	The SET-UP indicator flashes
Press:	
C C = B RETURN	Selects DCM comm. port
C S = A RETURN	Selects Hi speed baud rate
C H = I RETURN	Sets rate to 1200 baud
C M = B RETURN	Selects full duplex-full control
Exit SET-UP	The SET-UP indicator stops flashing

Communications Setup

Perform the following procedure to establish remote communications:

1. Press and lock DATA/TALK key in TALK (down) position.
2. Dial telephone number.
3. Listen for carrier tone.
4. Release DATA/TALK key to DATA (up) position.
5. Observe that DSR, RLSD AND CTS indicators come on in sequence.
6. Hang up telephone.

Test Procedure

Perform the following procedure to operate the test:

Procedure	Comments/Indications
Enter SET-UP	The SET-UP indicator flashes.
Press:	
T	The TEST indicator is on
R	The CTS indicators goes off and then comes back on
Press:	
RETURN	The character pattern prints
SPACE	The nonprinting test starts
Any character	The selected character prints
Exit SET-UP	The set-up indicator stops flashing. The TEST and CTS indicators are off

NOTE

To end any of the three tests and remain in SET-UP, press any character key (or space bar) on the keyboard except the SET-UP key.

Acoustic Coupled Modem(ACM) Test

The analog loopback test for the acoustic coupled modem provides a visual indication that operation through the internal circuits is normal. Communication circuits and devices are not checked.

Perform any of the following self-tests to determine if a problem exists. If faulty operation is indicated during a test, refer to the Table 5-1 for troubleshooting guides.

Analog Loopback Test

Test Setup

Perform the following procedure to setup the terminal for test:

Procedure		Comments/Indications
Enter SET-UP		The SET-UP indicator flashes
Press:		
	C C = C RETURN	Selects acoustic coupler comm. port
	C S = B RETURN	Selects Lo speed baud rate
	C L = G RETURN	Sets rate to 300 baud
	C M = B RETURN	Selects full duplex-full control

Test Procedure

Perform the following procedure to operate the test:

Procedure		Comments/Indications
Enter SET-UP		The SET-UP indicator flashes.
Press:		
	T L	The TEST and RLSD indicators are on
Press:		
	RETURN	The character pattern prints
	SPACE	The nonprinting test starts
	Any character	The selected character prints
Exit SET-UP		The SET-UP indicator stops flashing. The TEST and RLSD indicators are off

NOTE

To end any of the three tests and remain in SET-UP, press any character key (or space bar) on the keyboard except the SET-UP key.

TROUBLESHOOTING

If you are unable to turn power on, or if terminal operation appears to be faulty, refer to Table 5-1. This table describes the checks for the user to make before requesting service.

PREVENTIVE MAINTENANCE

The terminal requires no preventive maintenance other than surface cleaning by the user. Clean the external surfaces and platen with a damp cloth only. Do not use cleaners with solvents or excessive amounts of water. Rubbing the keycaps with a dry or barely moist cloth is enough to clean them.

CAUTION: Do not remove the keycaps for more thorough cleaning. Damage to the switch contacts can occur if the keycaps are replaced incorrectly.

The terminal covers are not meant to be weatherproof. There are several openings in the covers through which liquids, coins, paper clips and other objects can fall. Metal objects will disturb the electronic operation of the terminal if they come into contact with the circuitry. For this reason, do not place drinks or metal objects on any part of the terminal.

Keep the ventilation slots on the top and bottom of the terminal clear. The terminal will overheat if these slots are blocked.

CORRECTIVE MAINTENANCE

The only corrective maintenance procedures that the user can perform on the terminal are printhead replacement and fuse replacement. Be sure to follow the replacement procedure carefully and observe the warnings before beginning.

WARNING

Before performing either of the following procedures:

- **Set the power switch (1/Ø switch) to Ø (off).**
- **Unplug the ac power cord from the ac prime power socket.**

Printhead Replacement

Perform the following procedure to remove and replace the printhead:

WARNING

If the terminal has just been used, the printhead may be hot. Wait for five minutes and then be careful when handling.

1. Open access cover and move the printhead to approximate center of the carriage assembly.

2. Remove the ribbon cartridge (Figure 5-6).

3. Remove the printhead as follows:

CAUTION

The printhead adjust lever and slide are secured to the carriage by the printhead. Be sure that they stay in place when removing the printhead (Figure 5-7).

   a. Release the printhead clamp in direction of arrow (Figure 5-7).

   b. Disconnect plug (P2) from connector (J1) on the bottom of the printhead (Figure 5-7).

   c. Carefully bend ribbon cable just enough to release one side from the ribbon guide, then slide cable free from the other side.

4. Install new printhead by reversing steps 1 through 3.

Fuse Replacement

Perform the following procedure to remove and replace the fuse.

1. Disconnect the power cord at the rear of the terminal (Figure 5-8).

2. Insert a blade screwdriver into the fuseholder slot. Push in slightly while turning counterclockwise.

3. Pull out fuse with its base holder and remove the fuse.

4. Install fuse by reversing steps 1 through 3.

CAUTION

Before installing the replacement fuse, check to be sure that it has the proper rating.

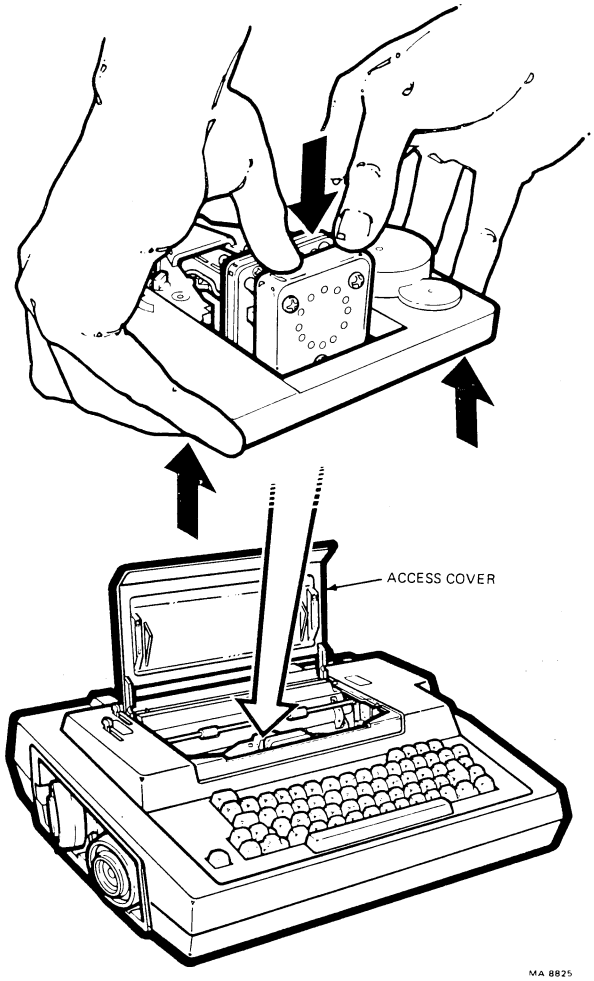


Figure 5-6 Ribbon Cartridge Removal

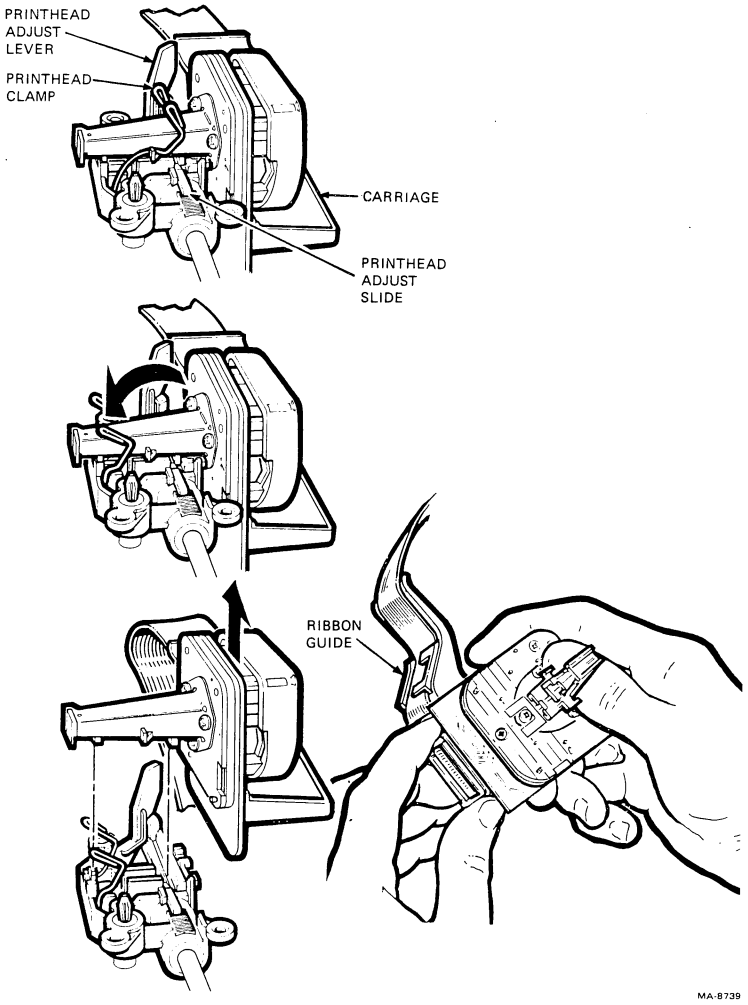


Figure 5-7 Removing Print Head

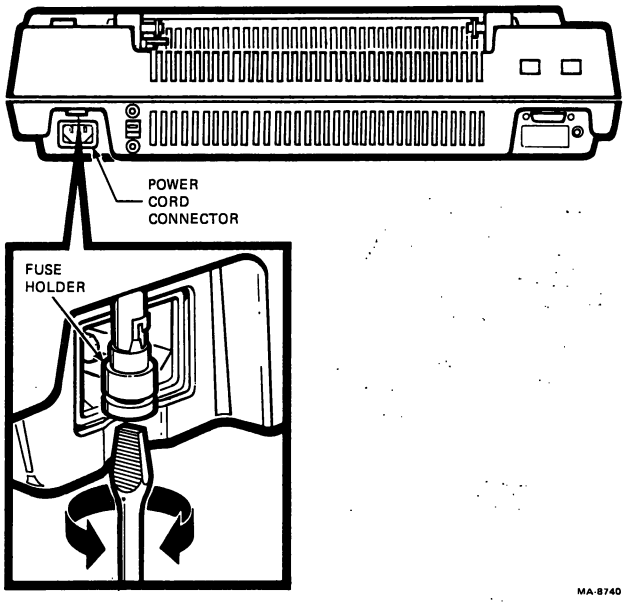


Figure 5-8 Fuse Removal