

User's Manual
for
HP 2625A Dual-System Display Terminal
and
HP 2628A Word-Processing Terminal

Part Number: 02625-90001



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Congratulations!

You have chosen one of Hewlett-Packard's new data entry terminals that represent another technological advance in terminal reliability. Your terminal's flexibility, extensive feature set, and ease of operation will save you valuable time and computer resources in a wide range of applications.

This User Manual acquaints you with your terminal. It tells you how to install and use the terminal both off-line (by itself) and on-line (connected to a computer). It should answer all your questions about the terminal's keyboard operations.

The Reference Manual (02625-90002) gives detailed information on programming your terminal through use of escape sequences. The Service Manual (02625-90003), which you may order separately, discusses trouble-shooting and maintenance procedures.



How To Use This Manual

This manual describes your terminal's keyboard operations. If you ever require information on the programmatic control of your terminal, you should refer to the Reference Manual. Those users familiar with other HP 262X terminals may use the index to answer specific questions.

Depending upon its feature set, your terminal assumes one of two product personalities. As this manual describes both products, portions of the text may pertain to features that are missing from your terminal. Additionally, your terminal's personality predetermines the function key labels. Those labels which may vary appear darkened. If "blank fields" replace these labels upon your screen, your terminal lacks the corresponding option.

This manual is organized into sections and appendices. The ten sections describe features that are shared by both products. The first three appendices describe special options that determine a product's personality. Read Section 1 to find which options apply to your terminal. Then read the remaining portions of this manual as your needs dictate.

Section 1—Getting To Know Your Terminal. This section describes the different terminal products and tells how you may identify which options apply to your terminal.

Section 2—Preparing Your Terminal For Use. This section tells how to ready your terminal for use.

Section 3—The Keyboard. This section locates and describes each of the major key groups.

Section 4—Function Keys. This section describes how the function keys may simplify your work at the terminal.

Section 5—Using Your Terminal By Itself. This section shows how your terminal manipulates information.

Section 6—Using Your Terminal's Alphanumeric Capabilities. This section describes the terminal's enhanced alphanumeric features.

Section 7—Using Your Terminal With A Computer. This section tells how to put your terminal "on line" with a computer.

Section 8—Using Your Terminal With An External Device. This section provides information on using your terminal with an external printer.

Section 9—Using Your Terminal With The Integral Printer. This section describes the optional integral printer.

Preface

Section 10—In Case Of Difficulty. This section describes preventive maintenance, the tests which verify your terminal's correct operation, and procedures to follow if you encounter problems.

Appendix A—Using Your Terminal In Graphics Applications. This appendix describes graphics keypad operations and introduces "compatibility mode". Since escape-sequence programming controls graphics design, the Reference Manual provides full details.

Appendix B—Using Your Terminal For Word Processing. This appendix describes the keyboard templates for HPWORD. See the HPWORD manual for details on word processing.

Appendix C—Using Your Terminal In IBM Applications. This appendix describes the keyboard features that allow you to use your HP terminal as an IBM 3276/78 display station. See the appropriate IBM manuals for details on operation.

Appendix D—Exploring Your Terminal's Features. This appendix uses examples to demonstrate your terminal's operation.

Index. The index provides quick access to the manual's information.

Terms Used In This Manual

The following table is a brief glossary of terms used in this manual. Being familiar with these words will aid your reading and increase your understanding of the material presented.

ALPHANUMERIC MEMORY	A storage area that holds alphanumeric information. (Also called display memory because the terminal displays this data upon the screen.) See GRAPHICS MEMORY.
ALPHANUMERIC CURSOR	The mark on the screen that shows where the next-entered character will appear. You can select the cursor's form to be either an underline or a rectangular box.
DATA	A general term for describing information. Examples of data are names, numbers, words, and instructions. Computers manipulate data.
DATACOMM	An abbreviation for "data communications". This refers to the transfer of data between the terminal and a computer system.
DATA TRANSFER	The process of transferring (or "copying") data from one device to another.
DESTINATION DEVICE	The device that receives data during a data transfer. Also called the "to" device.
DEVICE CONTROL OPERATION	The process of skipping lines, moving printer paper to the top of the next page, or copying data between devices.
DISPLAY MEMORY	Another term for alphanumeric memory. Display memory is distinct from graphics memory.
ESCAPE SEQUENCE	A sequence of characters beginning with ϵ (the ASCII escape character), followed by one, or more, additional characters. The terminal recognizes these sequences as special commands rather than data. The Reference Manual covers escape sequence programming.
FILE	A collection of text or data. A file normally consists of one or more lines.
FORM	A specially-designed layout that organizes information into fields for easy entry, retrieval, and interpretation.

FORM FEED	A command that advances printer paper to the top of the next page.
FORMAT MODE	An operating mode where the terminal prevents the user from entering data into "protected" areas (such as a form's outline or its headings).
"FROM" DEVICE	The device that supplies the data in a data transfer operation. Also called the "source" device.
FUNCTION KEYS	The eight keys at the top of the keyboard that associate with the eight labels appearing along the bottom of the screen. The function of each key changes as its label changes.
FUNCTION CONTROL KEYS	The F0 , F0/00 , and USER KEYS keys. These keys assign initial values to the function key labels.
GRAPHICS CURSOR	The crosshair on the display, when in graphics mode, that shows where either the next character or vector end point will appear.
GRAPHICS MEMORY	The storage area (also called raster memory) that holds graphics display data. The terminal stores graphics data and alphanumeric data in separate memories.
LABEL LINE	The two lines toward the bottom of the screen that display the function key labels. See STATUS LINE.
LINE	A row of characters. You may envision a line as being a row of text in a book.
LOCAL MODE	The operating state where the terminal functions independently from a computer. Also referred to as being "off line".
MEMORY	The internal medium within a computer or terminal that stores information.
NATIONAL LANGUAGE	The language spoken in a particular country or region.
PAGE	The number of data lines that the terminal can display on the screen. The maximum page size is 24 lines.
REMOTE MODE	The operating state where the terminal functions with the aid of a computer. Also referred to as being "on line".
SIMULTANEOUSLY PRESS	Correct use of the Control and Shift keys requires your pressing and continuing to hold down the CTRL or SHIFT key while pressing and releasing another appropriate key. This manual uses the phrase "simultaneously press" to describe this procedure.

SOURCE DEVICE

The device that supplies the data in a data transfer. Also called the "from" device.

STATUS LINE

The screen's last line. It displays information on the terminal's operating state.

"TO" DEVICE

The device that receives data during a data transfer. Also called the "destination" device.

WINDOW

The upper 24 lines on the display screen. These lines may display information stored within workspace memory.

WORD PROCESSING

The interactive entering and editing of text using a computer's resources.

WORKSPACE

A block of display memory that stores information.



Getting To Know Your Terminal _____ 1

INTRODUCTION

This manual describes two new data terminals that share several features. Depending upon your terminal's basic feature set, it assumes one of the following personalities:

The HP 2625A: Dual-System Display Terminal

- Primary Personality (offering Hewlett-Packard features)
 - (1) Graphics option available
 - (2) HPWORD word processing option available
 - (3) PORT 1 HP communications (RS-232-C or direct connect type 422 standard) at 19.2K baud
- Alternate Personality (offering IBM* 3276 display station features)
 - (1) Overlays for keyboard show placement of IBM keys
 - (2) PORT 2 IBM Binary Synchronous Communications (BSC)
- Smooth Scroll
- 128K RAM

The HP 2628A: Word Processing Terminal

- HPWORD compatibility
- Graphics option:
 - (1) 2623A compatible with 512 X 390 dot graphics screen resolution
 - (2) enhanced features include: polygonal area fill, rubberband line, and compatibility with the TEKTRONIX® 4014 graphics terminal
- PORT 1 RS-232-C/direct connect type 422
- PORT 2 RS-232-C printer port
- Transmission rate at 19.2K baud
- Smooth Scroll
- 160K RAM

As this manual describes both products, you should identify which features apply to your terminal, then read the appropriate information.

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HOW TO IDENTIFY OPTIONS AND ACCESSORIES

Find the identification label on the terminal's rear panel (see figure 1-1). It contains two lines.

The first line consists of three sections:

- The first section states your terminal's product number.
- The second section gives the terminal's serial number.
- The third section lists any options included with the terminal.

The second line states the terminal's power requirements.

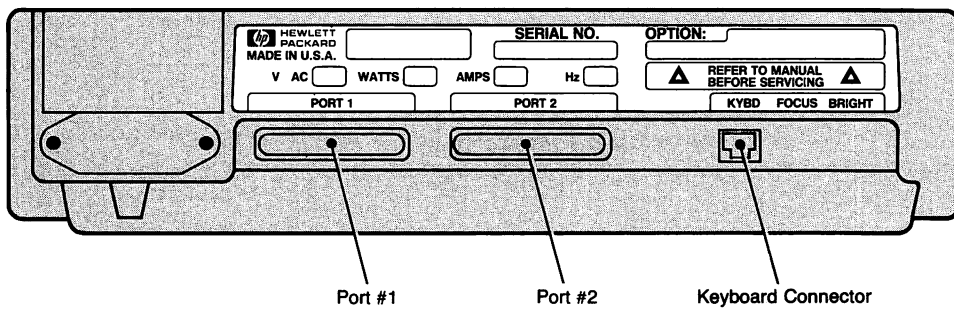


Figure 1-1. Identification Label

In communications with Hewlett-Packard concerning your terminal, please specify the product number, serial number, and any option numbers. This ensures proper identification. You will find a list of the major Hewlett-Packard Sales and Service Centers at the back of this manual.

The following labeled paragraphs list the terminal's options and also the various cables that are available. Refer to these tables for any information you need.

TERMINAL OPTIONS

The terminal comes installed with any options that were ordered. If requests for accessories were placed with the original order, the accessories arrive in separate packages.

Table 1-1 lists the various options by their part numbers and tells to which terminal each option applies.

Table 1-1. Terminal Options

PART NUMBER	DESCRIPTION	AVAILABLE WITH
001	Swedish keyboard	2625A, 2628A
002	Norwegian keyboard	2625A, 2628A
004	German keyboard	2625A, 2628A
005	United Kingdom keyboard	2625A, 2628A
006	Spanish keyboard	2625A, 2628A
007	French Canadian keyboard	2625A, 2628A
008	French typewriter keyboard	2625A, 2628A
009	Italian keyboard	2625A, 2628A
010	Dutch keyboard	2625A, 2628A
011	Finnish keyboard	2625A, 2628A
012	Danish keyboard	2625A, 2628A
013	240 Vac, 50 Hz	2625A, 2628A
014	100 Vac, 60 Hz	2625A, 2628A
015	220 Vac, 50 Hz	2625A, 2628A
016	100 Vac, 50 Hz	2625A, 2628A
021	PORT 1 DSN/Data Link	2625A, 2628A
022	PORT 1 262X Datacomm Pod Adapter	2625A, 2628A
026	PORT 1 HP-IB and RS-232-C (ONLY available with option 523)	2625A
027	PORT 1 HP First Multipoint Async/Sync	2625A, 2628A
028	PORT 1 HP Daisy Chain Multipoint Async	2625A, 2628A
038	PORT 1 HP Daisy Chain Multipoint Sync	2625A, 2628A
046	PORT 2 HP-IB and RS-232-C (ONLY available with option 523)	2628A
047	PORT 2 IBM Datacomm First BiSync	2625A
048	PORT 2 IBM Datacomm Daisy Chain BiSync	2625A
050	Integral thermal printer	2625A, 2628A
061	Green CRT	2625A, 2628A
062	Amber CRT	2625A, 2628A
401	Tilt and swivel base	2625A, 2628A
523	Add Graphics (includes Keyboard overlays)	2625A, 2628A
528	Add HPWORD (includes Keyboard overlays)	2625A

CABLES

When ordering the terminal, you can specify the following cables as options. Subsequently, after receiving your terminal, you may order any of these cables as accessories.

Table 1-2. Terminal Cables

CABLE	PART NUMBER
U.S. hardwired/modem cable (same as the 13242N)	301
European modem cable (same as the 13242M)	302
RS-232-C datacomm cable (same as the 40242C)	303
HP direct connect type 232 cable (same as the 13242X)	304
EMP protect cable (same as the 13242Y)	305
HP direct connect type 422 cable (same as 13242P)	306
HP-IB cable (same as the 45529B) For use with option 026	308
Daisy chain multipoint async or sync cable (same as the 13242Q)	309
First multipoint sync cable with receive clock (same as the 13242R)	310
First multipoint sync cable without receive clock (same as the 13242S)	311
First multipoint async cable (same as the 13242T)	312

NOTE: This section uses the terminology "HP-IB" for consistency with existing products. However, since your terminal only supports a subset of HP-IB, the remainder of this manual refers to this interface as an "alternate peripheral interface".

Preparing Your Terminal For Use

2

INTRODUCTION

Although your terminal may be ready for you to use, you should be familiar with the following procedures:

- connecting the necessary cables
- powering the terminal on
- configuring the terminal
- powering the terminal off

This section describes these procedures.

INSTALLATION

If your terminal is already properly installed, you may skip to the heading "TURNING ON TERMINAL POWER".

When installing the terminal, place it on a sturdy, convenient surface such as a desk, table, or stand designed for this purpose. Avoid plush or spongy surfaces. Such surfaces restrict the cooling air flow through the vents in the terminal's base (figure 2-1). For example, never place a typewriter pad beneath the terminal.

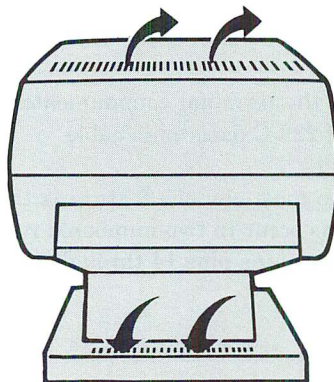


Figure 2-1. Cooling Airflow Through The Terminal

CONNECTING CABLES

You may connect several cables to the terminal. These include:

- keyboard cable
- datacomm cables
- power cable

Keyboard Cable

The keyboard cable ends in a standard telephone connector. To attach the keyboard to the terminal, simply insert the keyboard connector into the socket labeled KYBD on the terminal's rear panel (see figure 2-2). The plastic latch on the bottom of the connector aligns with the slot at the bottom of the socket. When the connector is completely inserted, the latch secures the connection.

To remove the keyboard cable from its socket, lift the plastic latch up and slide the connector out.

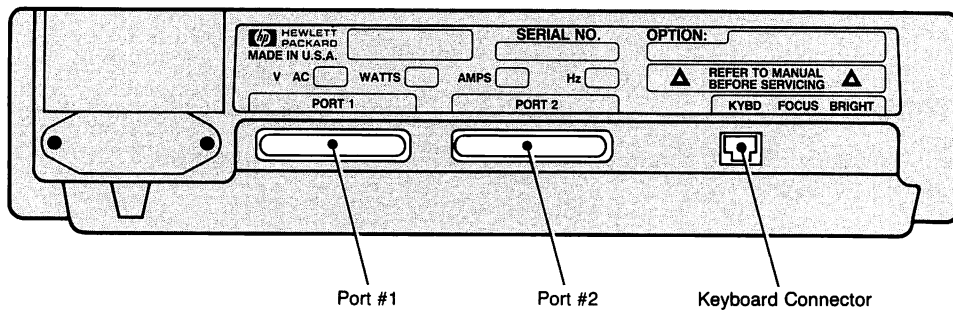


Figure 2-2. Terminal Rear Panel

Datacomm Cables

With its standard configuration, the terminal communicates with a Hewlett-Packard computer through Port 1 over an RS-232-C datacomm cable.

Inspect the cable's connector. The most obvious feature is the receptacle which contains a series of pins. Notice that the pins occur in two numbered rows: the top row contains pins 1 through 13 and the bottom row contains pins 14 through 25.

The cable connector only fits when it is properly aligned. To ensure proper alignment, invert the connector so that the pins numbered 1-13 are on the bottom. After fully inserting the connector into Port 1, tighten the two screws to secure the connection.

Depending upon your terminal's options, a variety of cables are available for supporting external devices. See the Reference Manual for a discussion of the cables that pertain to your terminal.

Power Cable

Insert the power cord into the socket located beside the main power switch. Ensure that the supplied voltage matches your terminal's power requirements. (You may find what voltage your terminal requires by inspecting the identification label on the terminal's rear panel.)

Plug the 3-prong connector into the outlet for the main power source.

WARNING

For your safety, you should only use a 3-prong connector.

TURNING ON TERMINAL POWER

To power on your terminal, press the rocker switch on the rear panel to the "ON" position. After approximately 45 seconds, the terminal should be ready for use. Figure 2-3 illustrates the initial screen display for a terminal in its "primary" HP personality. (Your terminal may display a different set of function key labels when operating in its "alternate" personality. See Appendix C for the initial IBM displays.) If your terminal fails to reach the correct state, or if an error message appears at the bottom of the screen, consult Section 10 for directions on how to proceed.

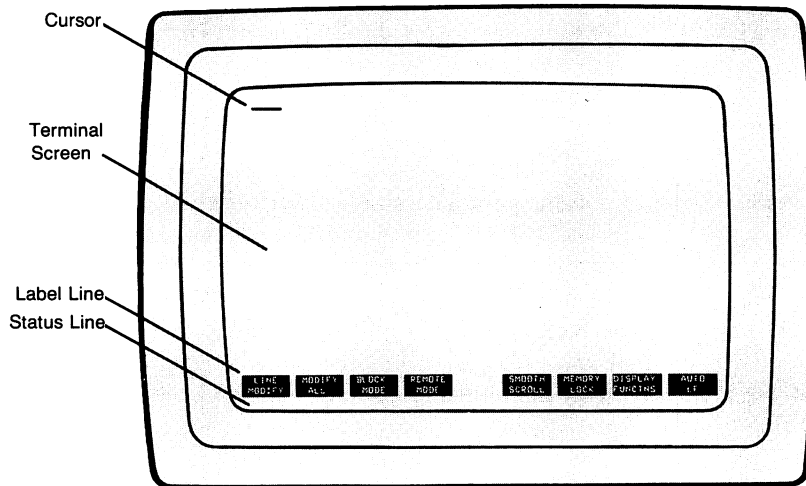


Figure 2-3. Initial Screen Display

Notice that the terminal displays the cursor in the upper left corner. This is screen row 1, column 1. The screen's bottom line is a "status" line. It contains information on the terminal's current operating state. The two lines directly above the Status Line display the primary level of function key labels. Figure 2-4 shows the primary labels for a terminal operating in any HP mode.



Figure 2-4. Initial HP Label Set

If the message `Default Configurations Used` replaces the function key labels, the battery that protects non-volatile memory may have failed or have been jarred loose. Section 10 describes how to ensure that the battery pack is properly seated and how to test the terminal to isolate the malfunction. If this message persists after following these procedures, you should contact the nearest Hewlett-Packard sales and service office for help.

CONFIGURING YOUR TERMINAL

You must configure the terminal so it conforms to the requirements of your installation. All configuration parameters are contained in configuration menus. Table 2-1 gives a brief description of the configuration menus.

Table 2-1. Configuration Menus

MENU	FUNCTION
Global	Contains parameters that control "key click" and the relative intensity of the background and foreground.
Datacom1	Contains parameters for configuring Port 1 to communicate with a host computer.
Ext Dev	Contains parameters for configuring Port 2 to communicate with an external device.
Terminal	Contains parameters that affect terminal operating characteristics for both Local and Remote modes.

The following discussion tells how you may use your keyboard to display a menu, make menu selections, then return to normal operation. In all likelihood, someone will have properly configured your terminal for you. However, if this task falls on you, you should refer to the Reference Manual for a complete discussion of the various parameters. You should also read Section 4 of this manual (which describes the function keys) before attempting to configure your terminal.

Selecting A Configuration Menu

You can display the available selection of configuration menus by pressing:



The function key labels take on the following values:



Pressing the appropriate function key selects the menu of your choice. For example, pressing **f5** displays the Terminal Configuration menu.

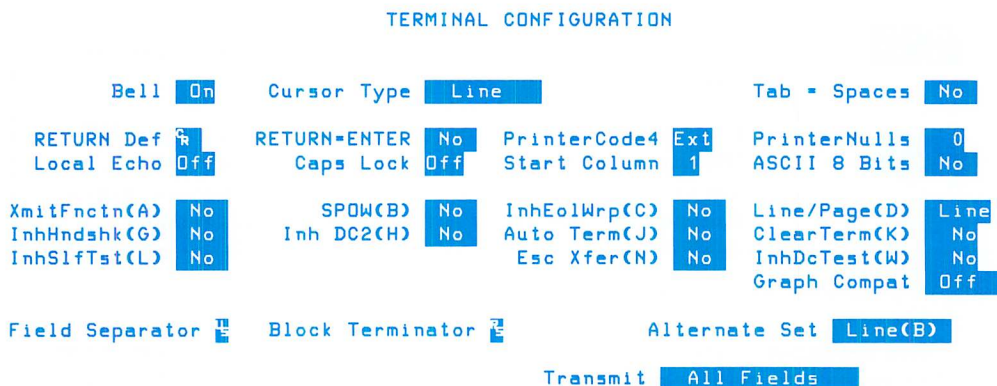


Figure 2-5. Terminal Configuration Menu







Making Menu Selections

The menu being displayed determines the initial values for the function key labels. When you display the Terminal Configuration menu, the function key labels assume the following values:





Table 2-2 explains each key.



Table 2-2. Configuration Menu Function Keys

LABEL	FUNCTION
	<p>After you have set the menu fields to the desired values, you may activate them and save them in non-volatile memory by pressing this key.</p>
	<p>This key and the following key allow you to select parameters that are restricted to a system-defined list. (Such fields are underlined.) You may use the NEXT CHOICE key to cycle forward through the list or the PREVIOUS CHOICE key to cycle backward until you find the desired entry.</p>
	
	<p>This key changes the function key labels to values that allow you to rapidly set your terminal to one of four standard HP system configurations.</p>
	<p>Pressing this key alternately enables and disables Display Functions mode. (You need this ability to enter certain keyboard characters into specific menu fields.)</p>
	<p>Pressing this key removes the menu from the screen WITHOUT activating any of the selections or storing them in non-volatile memory. The terminal resumes normal operation, and the “config” set of function key labels reappears.</p>

To change a parameter in a menu field, perform these steps:

- Step 1.** Place the cursor at the beginning of the field you want to change. You may use the Tab keys or the cursor-positioning keys. The  key automatically moves the cursor to the next menu field each time you press this key.
- Step 2.** If the choices are restricted to a system-defined list of parameters (such fields are underlined), use either the **NEXT CHOICE** or **PREVIOUS CHOICE** function key to cycle through the list of selections until you display the entry you want.
- Step 3.** When the choices are not restricted to a system-defined list, you enter the desired value from the keyboard.
- Step 4.** After making the necessary changes, you store the new values in non-volatile memory by pressing  (the **SAVE CONFIG** function key).

Returning To Normal Operation

Pressing the **SAVE CONFIG** key returns the previously displayed contents to the screen and saves the configuration parameters in non-volatile memory. However, if you wish to return the previous screen display without saving the configuration values, you can press the , or  keys or the **config keys** function key to do so.



TURNING OFF TERMINAL POWER

To shut off the terminal, simply press the main power switch on the rear panel to the "OFF" position.

IN CASE OF DIFFICULTY

If a key seems to malfunction, or if an error message appears on the screen, refer to Section 10, In Case Of Difficulty. Besides a list of error messages, this section describes error recovery and terminal tests.



INTRODUCTION

Before learning to control devices and transfer data, you should become familiar with the keyboard. Figure 3-1 shows the basic keyboard layout.

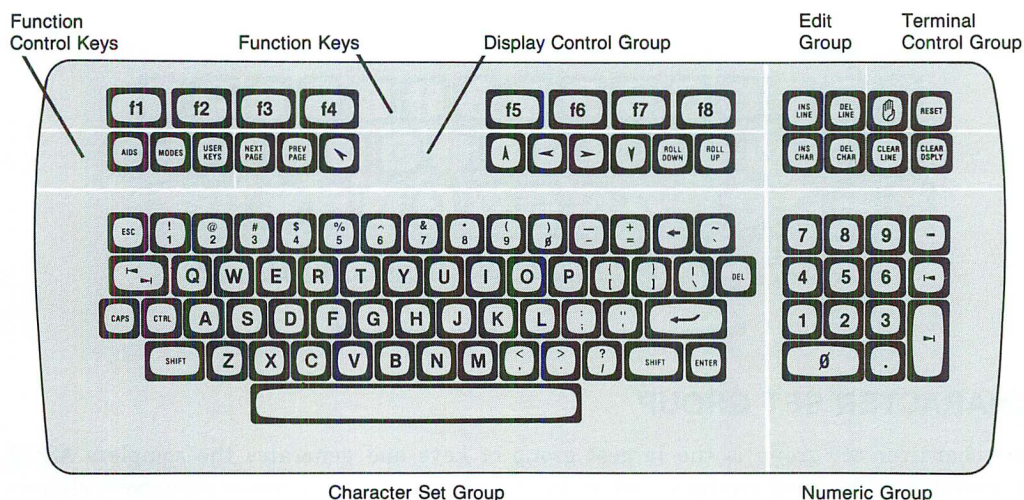


Figure 3-1. Terminal Keyboard

NOTE: Some options (for example, graphics, HPWORD support, and IBM emulation) require your placing plastic overlays on various groups of keys. The appropriate appendices describe these templates.

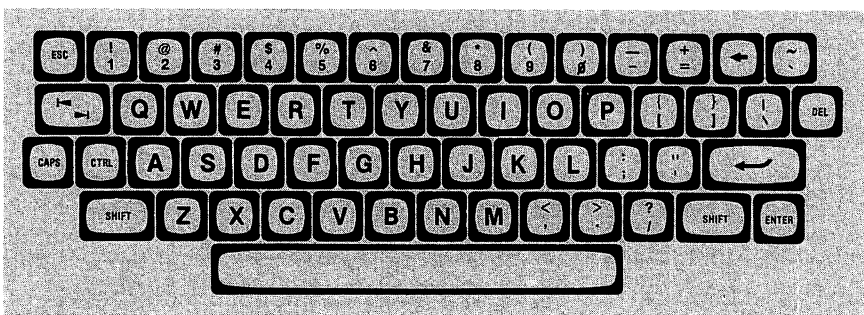
The basic keyboard consists of the following functional groups:

- **Character Set Group.** This group resembles a standard typewriter keyboard. You use these keys for entering information or for communicating with a host computer.
- **Numeric Control Group.** This group resembles a calculator keypad. These keys ease the entry of numeric data.
- **Display Control Group.** This group controls cursor movement and determines which portion of the workspace you see through the viewing window.

The Keyboard

- **Edit Group.** This group modifies text through insert and delete operations.
- **Terminal Control Group.** This group resets (“initializes”) the terminal or breaks (“interrupts”) data communications.
- **Function Keys Group.** This group uses single keystrokes to accomplish complicated tasks. Most tasks are predefined (configuring the terminal, selecting devices, etc.), but you can also program these keys to do tasks of your choosing.
- **Function Control Group.** This group assigns one of three sets of labels to the function keys group.

The remainder of this section briefly describes each of the keyboard groups.



CHARACTER SET GROUP

The character set group is the largest group of keys and generates the complete ASCII character set. The basic character set includes uppercase and lowercase alphabetic characters, the decimal digits, punctuation marks, and some commercial symbols.

Several non-displaying control characters are also available. As most control characters serve in special applications, the Reference Manual describes their use.

The keys highlighted in figure 3-2 have special functions that are described below.

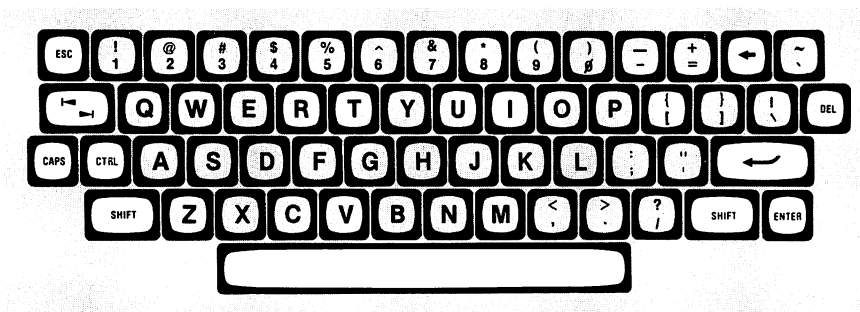


Figure 3-2. Special Character Set Keys

Shift Key

The **SHIFT** key normally selects uppercase alphabetic characters or the top symbol on keycaps with two symbols. (The **CAPS** key “reverses” shift-key operations. See the next labeled paragraph for more information.)

Additionally, the **SHIFT** key extends the function of several other keys (for example, **USER KEYS**, **TAB**, and **mouse** keys). Whenever this occurs, the discussion of the affected key explains both the normal and the extended operations.






In any keystroke combination involving the **SHIFT** key, you must press and continue to hold down the **SHIFT** key while you press and release the other key. Even though you must fully press the **SHIFT** key first, the terminal rapidly senses which keys are being activated. Therefore, the remainder of this manual uses the phrase “simultaneously press” to describe this keystroke procedure.

Caps Key

Certain applications require that all alphabetic characters be capitalized. To avoid “shifting” on every keystroke, the **CAPS** key selects uppercase letters. However, after enabling CAPS mode, you can print lowercase letters by simultaneously pressing the **SHIFT** key and the desired character key. CAPS mode only affects the alphabetic characters. The number and symbol keys are unaffected.


When you initiate CAPS mode, a “CAPS” indicator appears in the Status Line. Pressing the **CAPS** key a second time returns the keyboard to its normal operation. (The “CAPS” indicator disappears.)


Tab Keys

Three Tab keys are available. The primary  key resides in the character set group. Pressing this key advances the cursor to the next tab stop to the right. Simultaneously pressing the  key and  key moves the cursor to the preceding tab stop on the left. Two Tab keys reside within the numeric keypad. The  key advances the cursor to the next tab stop to the right while the  key moves the cursor to the previous tab stop on the left. As this requires no “shifting”, these keys ease the entry of numeric data into columns.

Return, Backspace, And Space Keys



In general, these keys resemble their typewriter counterparts.






The  (Return) key positions the cursor to the left margin of the current line. When you are using your terminal “off-line” from a computer, you can direct the terminal to advance to the next line by selecting automatic linefeed (`AUTO LF`) through the Modes set of function key labels.



The  (Backspace) key moves the cursor back to the left, one space, each time you press this key until the cursor reaches the beginning of that line. It provides an easy way to position the cursor to overwrite typing mistakes.

The Space bar prints a blank character. Although typists use the space bar to position a typewriter’s printing head, you should avoid using the keyboard’s Space bar for this purpose. Normally, when you “space” over existing text, the original characters are replaced by blanks.

Control And Escape Keys

The  and  keys provide additional character codes and generate special control codes for various terminal operations. These keys aid the programmer but have limited use for the keyboard operator.

The  key generates special ASCII control characters. Similar to the  key, you must continue to press the  key while pressing the other key. For example, Control G is the ASCII `“Bell”` character, and simultaneously pressing the  key and  key “rings” the terminal’s bell.

The  key extends the terminal’s operating functions. Most functions that you can perform manually over the keyboard can also be executed programmatically through escape sequences. Since they are sequences, you must press the  key first, then release it, before pressing the remaining character keys.

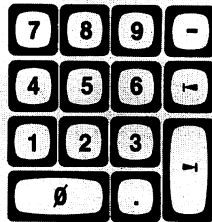
The Reference Manual gives full details on Control Codes and Escape Sequences.

Enter Key

You may use your terminal to enter and edit data, then send an entire “block” of information to the computer. For example, if your terminal is in Remote mode (that is, “on-line” to a computer), you can fill in an entire form, make any corrections, then send the completed form to the computer by pressing the **ENTER** key.

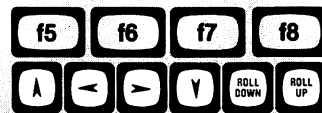
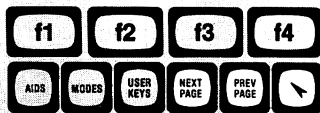
A variety of configuration settings determine what data the terminal sends. (See the Reference Manual for a detailed account of Enter key operation.)

When your terminal is in Local mode (“off-line”), you can press the **ENTER** key to copy all of display memory to the selected destination device(s).



NUMERIC CONTROL GROUP

The numeric keypad resembles the arrangement of keys on an adding machine or calculator. This arrangement eases the entry of numeric data. In addition to the numeric keys, the pad holds a “minus” **-** key, a “decimal point” **.** key, and two tab-positioning keys.



DISPLAY CONTROL GROUP

The display group allows you to “page” or scroll through the workspace to view characters that have rolled off the screen. Since the operation of these keys depends upon the dimensions of the display screen, the following terminology differentiates specific areas. (See figure 3-3.)

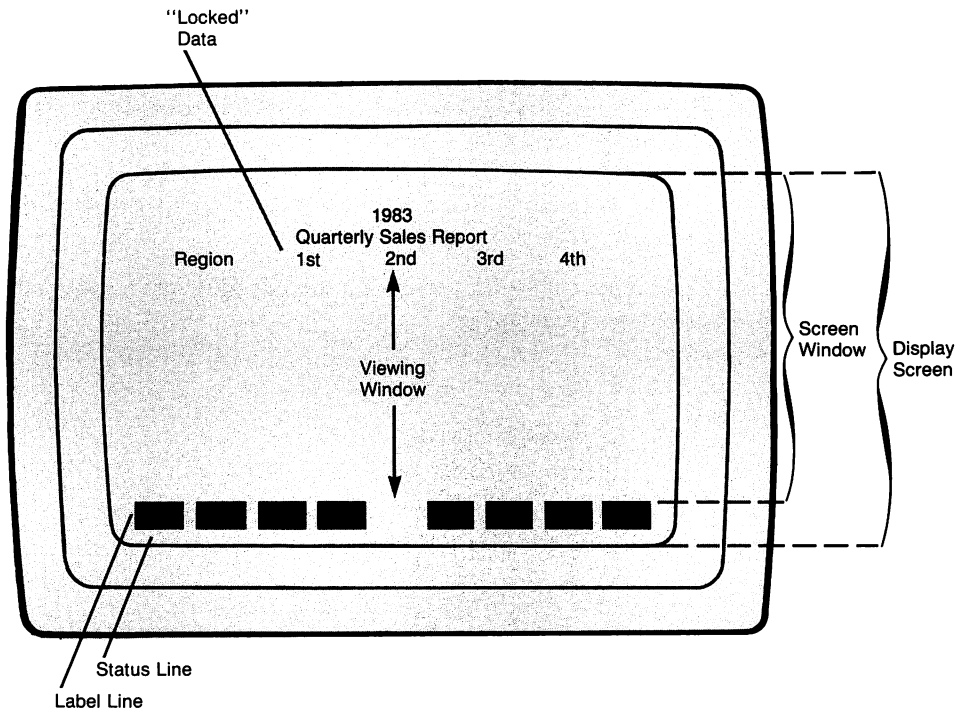


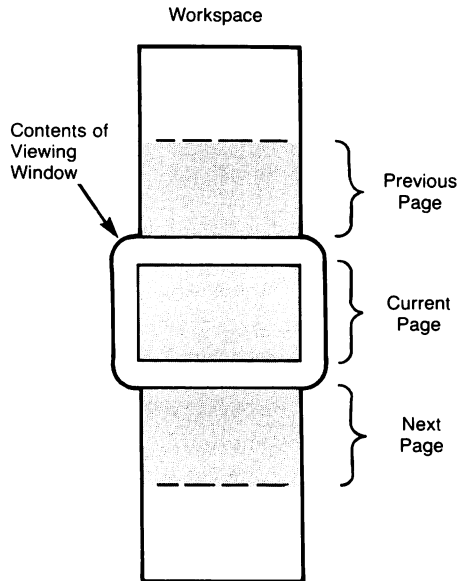
Figure 3-3. Partitioning The Display Screen

The "display screen" contains 27 rows; each row is 80 columns wide. The terminal reserves the bottom three lines for its use. You are prevented, therefore, from displaying your data in this area.

The "screen window" occupies screen rows 1 through 24. This is the maximum size of your viewing area into display memory. However, you can "lock" information (such as column headings) at the top of the screen, thereby restricting the number of rows that display data.

The "viewing window" contains the number of screen rows available for displaying your data. As a minimum, this window contains one line (the line where the terminal displays the cursor). At its fullest extent, the viewing window fills the screen window.

The information displayed within the viewing window forms a “page” of data. “Paging” replaces the viewing window with the next (or previous) set of displayable rows.



The display control keys fall into two categories:

- (1) those that move the cursor one position along a row or column
- (2) those that select which portion of the terminal workspace appears in the viewing window





Moving The Alphanumeric Cursor

Four keys control the movement of the alphanumeric cursor. These keys operate within the boundaries of the screen window (that is, they can access any character position across the width of the screen between screen rows 1 through 24).






The **A** and **V** keys move the cursor vertically along a column. The **<** and **>** keys move the cursor horizontally along a row. Even though the **>** key repositions the cursor, it may also affect which portion of the workspace the terminal displays. Therefore, this key is treated with the other display control keys.

Table 3-1 describes the function of the Cursor Control keys.

Table 3-1. Alphanumeric Cursor Control Key Functions

KEY	FUNCTION
	<p>Cursor Up—Moves the cursor up one row each time you press the key. If you hold the key down, the cursor moves up until you release the key or the cursor reaches the top row of the screen window. In this latter case, the cursor wraps around to the bottom of the screen window (screen row 24).</p>
	<p>Cursor Down—Moves the cursor down one row each time you press the key. If you hold the key down, the cursor moves down until you release the key or the cursor reaches the bottom row of the screen window. In this latter case, the cursor wraps around to the top of the screen window (screen row 1).</p>
	<p>Cursor Left—Moves the cursor left one column each time you press the key. If you hold the key down, the cursor moves left until either you release the key or the cursor reaches the first column of the screen window. Continuing to hold down the key moves the cursor to the last column of the preceding row. This action continues as long as you hold the key down or until the cursor reaches column 1 of row 1 in the screen window. In the latter case, pressing this key moves the cursor to column 80 of row 24.</p>
	<p>Cursor Right—Moves the cursor right one column each time you press the key. If you hold the key down, the cursor moves right until either you release the key or the cursor reaches the last column of the screen window. Continuing to hold down the key moves the cursor to the first column of the following row. This action continues as long as you hold the key down or until the cursor reaches column 80 of the last line in the screen window. In the latter case, pressing this key moves the cursor to column 1 of row 1.</p>

Scanning The Alphanumeric Memory

You can select which portion of the workspace the terminal displays by pressing the   keys, the   keys, and the  key. As the window remains stationary, these keys bring different portions of the workspace into view.

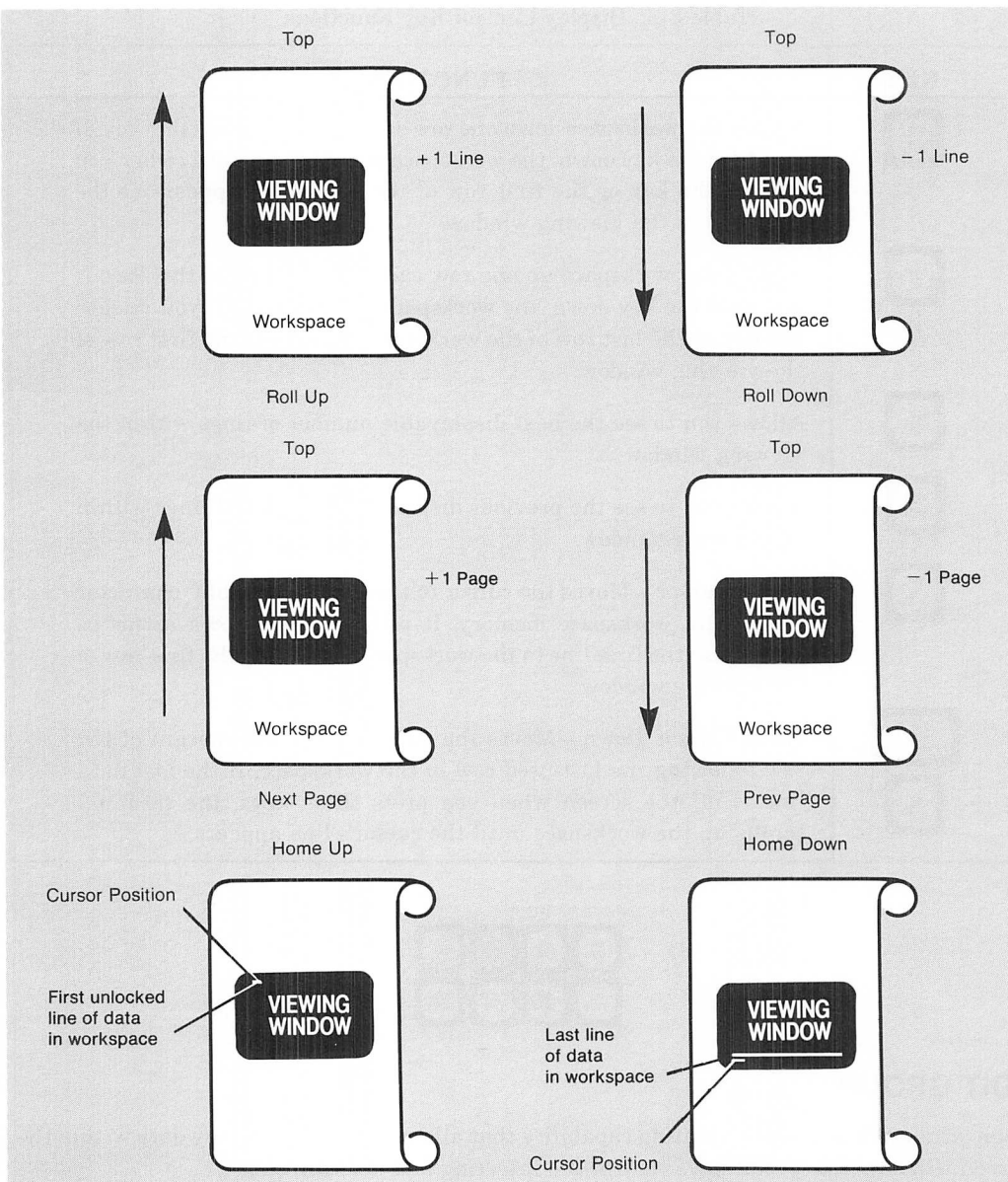








Figure 3-4. ROLL And PAGE Key Operations

Whereas the cursor-control keys operate within the borders of the screen window, the display-control keys operate on the boundaries of the "viewing" window.

Table 3-2 describes the function of the Display Control keys.

Table 3-2. Display Control Key Functions

KEY	FUNCTION
	<p>Scrolls the workspace down one row each time you press this key. If you hold the key down, the workspace scrolls down until either you release the key or the first row of the workspace appears as the first row in the viewing window.</p>
	<p>Scrolls the workspace up one row each time you press this key. If you hold the key down, the workspace scrolls up until you release the key or the last row of the workspace appears as the first row of the viewing window.</p>
	<p>Allows you to see the next displayable number of lines within the viewing window.</p>
	<p>Allows you to see the previous displayable number of lines within the viewing window.</p>
	<p>Home Cursor—Moves the cursor to the first “accessible” character position in workspace memory. It rolls any text down as far as possible so the first line in the workspace appears in the first row of the viewing window.</p>
	<p>Home Cursor Down—Moves the cursor to the left margin of the row following the last-used row in the workspace. If the last data line is off the screen when you press these keys, the terminal scrolls up the workspace until the cursor’s line appears.</p>
















EDIT GROUP

Your terminal has a built-in editing capability that allows you to modify any data within the screen window. Six special keys control the inserting and deleting of text.

Table 3-3 lists the function of the Edit keys.

Table 3-3. Edit Key Functions

KEY	FUNCTION
	<p>Clears the display from the cursor's position to the end of the current workspace.</p>
	<p>Clears the line from the cursor's position to the end of the line.</p>
	<p>Inserts a blank line before the line which contains the cursor. To "create" the blank line, the terminal pushes the cursor's line and all subsequent lines down one, then moves the cursor to the left margin of the blank line.</p>
	<p>Deletes the line that contains the cursor. The terminal scrolls up subsequent lines to fill the void, and the cursor moves to the left margin.</p>
	<p>Inserts characters into a line without overwriting existing characters. The terminal inserts all new characters at the cursor's current position. Existing characters are shifted right one character position for each character entered. Characters shifted past the right margin are lost.</p> <p>When you enable this insert character function, the message "Ins Char" appears in the Status Line. Pressing the  key a second time disables the insert character operation.</p>
 	<p>Simultaneously pressing these keys enables Insert Character with Wraparound. In this mode, when the inserting of text forces characters from a line, the terminal "wraps" these characters onto the next line.</p>
	<p>When you enable this insert character function, the message "Ins Wrap" appears in the Status Line. To disable the insert wrap-around function, simply press the  key a second time.</p>
	<p>Deletes the character at the cursor's position. When you delete a character, all characters to the right of the deleted character (up to the right margin) shift left one character position to fill the void.</p>
 	<p>Simultaneously pressing these keys enables Delete Character with Wraparound. The operation resembles Delete Character since all characters to the right of the deleted character shift left. However, the character at the left margin of the next line moves to the right margin of the cursor's line to keep that line full. (This function only affects the cursor's line and the succeeding line.)</p>



TERMINAL CONTROL GROUP

The terminal control group contains two keys: the **RESET** key and the **Break** key.

Reset Key

SOFT RESET. Pressing the **RESET** key once results in a “soft reset”. This unlocks the keyboard, clears any error messages, turns off Display Functions mode, stops any printer operations or data communication transfers, and rings the terminal’s bell.

HARD RESET. Pressing the **SHIFT**, **CTRL**, and **RESET** keys simultaneously produces a “hard reset”. This sets the terminal to its initial power-on state and rings the terminal’s bell. Section 10, In Case Of Difficulty, gives more details on soft and hard resets.

WARNING

Reset operations may destroy data. When an error message appears on the screen, you should press the **Break** key to clear the error message and unlock the keyboard. Avoid using the Reset key for this purpose.

Break Key

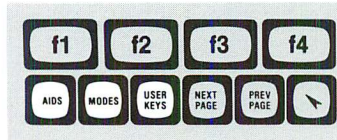
The **Break** key signals the computer that you want its attention by “interrupting” the data communications line. See the Reference Manual for additional information.



FUNCTION KEYS GROUP

The function keys are the eight keys at the top of the keyboard. Although the physical keys bear the labels “f1” through “f8”, the function performed by a key corresponds to the labels displayed on the screen. The relationship between keys and screen labels is positional.

For example, the third screen label from the left associates with the third key from the left (**f3**). By changing the labels, the terminal assigns multiple functions to these keys. You select the labels' initial value by pressing the **AIDS**, **MODES**, or **USER KEYS** key. Within the Aids set of keys, pressing a function key might display another set of labels. Section 4 fully describes the function keys.



FUNCTION CONTROL GROUP

The function control keys consist of the **AIDS**, **MODES**, and **USER KEYS** keys. These three keys set the labels of the eight function keys to the initial value for their particular family of functions.

Aids Key

Pressing the **AIDS** key accesses a hierarchy of function key labels. You can set most of the terminal's functions through the Aids key.

Simultaneously pressing the **SHIFT** and **AIDS** keys removes the function key labels and the Status Line messages from the display screen. However, the terminal still prevents you from entering data into this area.

NOTE: The Status Line contains a modem indicator. Some countries require that the terminal displays this indicator at all times. If your country has this legal requirement, you should never use the "Shift-Aids" function.

Modes Key

The **MODES** key accesses those function key labels that select the terminal's operating modes. These modes are Line Modify, Modify All, Block, Remote, Smooth Scroll, Memory Lock, Display Functions, and Auto Linefeed. When first powered on, or after a hard reset, any terminal operating in its primary HP personality displays the Modes set of function key labels.

User Keys Key

Pressing **USER KEYS** gives the function key labels their user-defined titles. If you have left these functions undefined, the labels appear with their default titles ('`f1``' through '`f8``'). Refer to Section 4 for instructions on defining and executing the user-defined function keys.

NATIONAL LANGUAGE SUPPORT

Although USASCII characters form the standard base character set, your terminal can access characters from the following languages:

- Danish
- Dutch
- English (United Kingdom)
- English (USASCII)
- Finnish
- French
- French Canadian
- German
- Italian
- Norwegian
- Spanish
- Swedish

Section 6 explains how you can print any of these characters by entering Extended Characters mode.

National Keyboards

National keyboards are available as options for each of the international languages. Not only do the keyboards approximate typewriter keypads for their respective countries, but also the keycap symbols, function key labels, configuration menus, and error messages appear in translated form.

INTRODUCTION

From the keyboard, you can perform two basic tasks. The first is entering and editing information. Section 3 gives details on those operations. The second task is terminal control. The Break and Reset keys allow direct terminal control. However, you may also select between groups of terminal operating states by pressing one of three keys:

- **AIDS** (for terminal operations, device control)
- **MODES** (for operating modes)
- **USER KEYS** (for user-defined functions)

The three function control keys, together with the eight function keys, ease the control of complex terminal operations. This section describes these functions and the friendly user interface that your terminal provides.

THE FUNCTION KEYS

The function keys are the eight keys located along the top of the keyboard. They associate with the eight function key labels displayed along the bottom of the screen. Pressing a key performs the function that the corresponding label suggests. The association between function keys and labels is positional. For example, **f3** (the third key from the left) corresponds to the third label from the left. (See figure 4-1.)

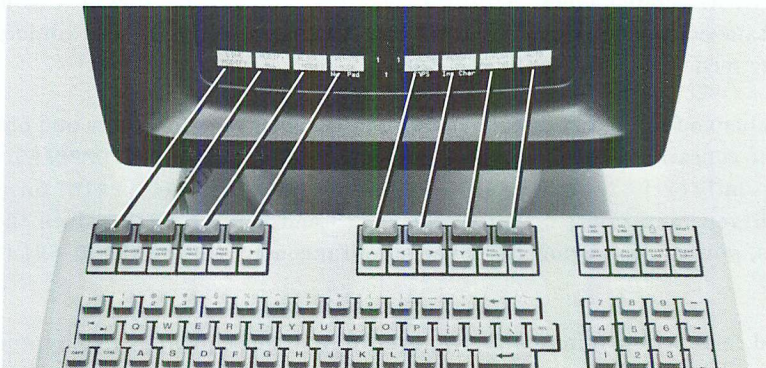


Figure 4-1. Function Keys And Labels

As the labels change, the logical function performed by the physical key also changes. Thus, one key may perform multiple tasks.

LABELS

You select the initial label values by pressing the **AIDS**, **MODES**, or **USER KEYS** key. The **MODES** and **USER KEYS** present one level of labels. The **AIDS** key accesses a hierarchy of function key labels. The function key labels appear directly over the Status Line (the screen's bottom line). The terminal displays them in inverse video and blocks them together in two groups of four labels each. The first group corresponds to function keys **f1** - **f4**; the second group corresponds to **f5** - **f8**. As the keyboard similarly places the physical keys in two groups of four keys, you can quickly associate each label to its corresponding key.

NOTE: Since this manual describes all terminal options, the following diagrams of function key labels show the complete set available at any level. These diagrams may differ from what you see on your screen as your terminal "blanks out" all labels that refer to unordered options. In the following illustrations, you may quickly identify those labels that vary between products as they appear "darkened" compared to those labels which always occur.

Labels—Upper And Lower Case

The titles in the function key labels are written in either uppercase or lowercase letters. Lowercase titles change the value of the function key labels to another set of titles. Uppercase titles perform the function suggested by that label's title.

Labels With An Asterisk

Two types of function key labels might contain an asterisk: those that toggle on and off; and those that are mutually exclusive with other labels. The asterisk indicates that the function named in the label is active. Alternate presses of toggle keys display, then remove, the asterisk in the associated label. Within a control group, several toggle functions may be active simultaneously. For example, within the Modes control group, you could select Block mode, Remote mode, Smooth Scroll, and Auto Linefeed.

Mutually exclusive function keys behave differently. Such keys form sets and only one label in each set can contain an asterisk at any moment. **EXPAND PRINT** and **COMPRESS PRINT** form one set of mutually exclusive labels, while **REPORT PRINT** and **METRIC PRINT** form a different set. Although you may select both **EXPAND PRINT** and **REPORT PRINT** since they occur in different sets, you could, obviously, never simultaneously select **EXPAND PRINT** and **COMPRESS PRINT**.

Once selected, a function remains active, even if you subsequently display another set of labels. To cancel a selection, you must press the corresponding function key to delete the asterisk.

MODES FUNCTION KEY LABELS

The **MODES** key displays the Modes set of function key labels:



These labels activate or deactivate the major terminal modes. The terminal displays them at power on or after a hard reset. All eight labels are toggle functions. An asterisk indicates a particular mode is active.

Table 4-1 describes the functions of the Modes labels.

Table 4-1. Modes Set Of Function Key Labels











LABEL	FUNCTION
	Used only in Remote mode. Once enabled, this mode allows editing a line of data while in Character mode. When you press either the ENTER or the ← key, the terminal transmits the line to the computer as a block. Pressing the ENTER or ← key also ends Line Modify mode.
	Modify All mode also transmits characters to the computer as a block. It resembles "Line Modify" except Modify All remains active after you press the ENTER or ← key. To deactivate Modify All mode, you must press f2 to remove the asterisk from the MODIFY ALL label.
	Used only in Remote mode. When activated, as you key in data, the terminal displays the information but sends nothing to the computer until you press the ENTER key. When the asterisk is absent, the terminal functions in Character mode; that is, the terminal transmits characters to the computer as you enter them.
	Selecting this mode prepares the terminal for communications with a computer. When the asterisk is absent from the label, the terminal operates in Local mode.
	When activated, directs the terminal to "gradually flow" characters vertically across the screen rather than "jumping" the characters by lines.

Table 4-1. Modes Set of Function Key Labels (Continued)

LABEL	FUNCTION
<p>MEMORY LOCK *</p>	<p>Operates in two modes: Overflow Protect and Display Lock.</p> <p>Overflow Protect prevents data from being accidentally lost when workspace memory becomes full. To achieve overflow protection, you must select Memory Lock while the cursor is positioned within the screen's first line. Then, upon reaching the end of the workspace (by entering text, tabbing, or doing line feeds), the keyboard locks, the bell rings, and the message: MEMORY FULL appears on the screen.</p> <p>To continue entering text, you must press the  key to clear the error message and unlock the keyboard. Then you may either delete some of the existing text or disable Memory Lock. (In the latter case, you may want to enable top logging to keep a record of the data forced from display memory.)</p> <p>Display Lock "freezes" selected lines upon the screen. You select Display Lock by pressing f6 to place an asterisk in the MEMORY LOCK label. When you press this key, all lines above the cursor's current line become locked in place. Then, you may enter data in the normal manner. When the viewing window becomes full, entering more data forces the first line of unfrozen text to scroll under the frozen data. All lines scrolled off the screen are inserted in memory immediately preceding the first line of frozen data.</p> <p>Pressing f6 to remove the asterisk from the label cancels Display Lock.</p>
<p>DISPLAY FUNCTNS*</p>	<p>When selected, Display Function mode inhibits the action normally produced by keyboard control keys (such as , , or , or any control character received over the datacomm line. Instead, the terminal displays the ASCII character or escape sequence that represents this function.</p>
<p>AUTO LF *</p>	<p>When selected, Automatic Linefeed mode advances the cursor to the next line whenever you press the  key.</p>

AIDS FUNCTION KEY LABELS

The **AIDS** key gives keyboard access to most of the terminal's features. Some of these features include:

- sending data to a destination device
- setting or clearing margins and tabs
- selecting service tests to verify the terminal's proper operation
- using video enhancements
- defining the fields of a form
- selecting a configuration menu, then altering it

To select any of these features, press the **AIDS** key to display the following function key labels:



NOTE: The shaded label for **f4** applies to the IBM emulation option. If your terminal lacks this option, a blank field replaces the **NEXT SYSTEM** label.

Since the label for **f4** is capitalized, pressing **f4** performs the indicated function. As all other labels are in lowercase titles, they form "stepping stones" to deeper levels within the Aids set. Figure 4-2 illustrates how you access each set of labels.

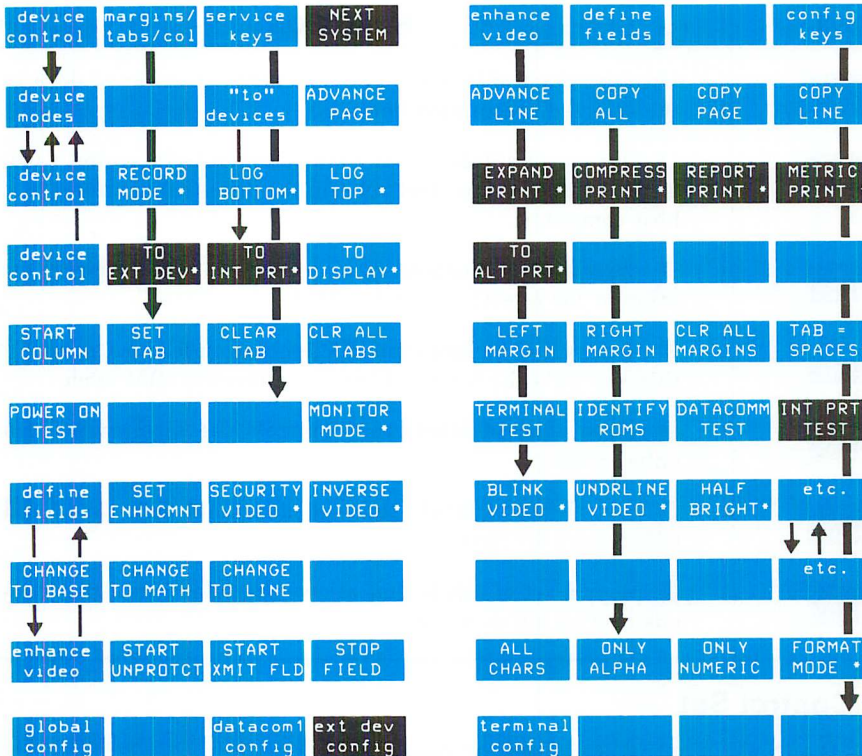


Figure 4-2. Function Key Labels Accessed Through The **AIDS** Key

NOTE: A label shown with an asterisk (*) signifies a function which, when enabled, includes the asterisk to indicate its active state. This does not imply that a similar sequence of labels will appear on your screen. For example, under Device Modes, since **LOG BOTTOM** and **LOG TOP** are mutually exclusive, the screen can never simultaneously display both labels with an asterisk.

Aids Set

Except for **NEXT SYSTEM**, the Aids set of labels accesses other label sets. For example, **margins/tabs/col** accesses the labels which manipulate margins and tabs. Some sets of labels are only indirectly accessible. For example, it is impossible to select a destination device in a single step. Rather, from the Aids set, you must select **device control**. From this level, by pressing **f3** (**``to'' devices**), you enter a third level of labels that allows selection of the destination device. In such cases, the multiple level of labels form a group. Your terminal has two such groups: the Device Modes group and the Config group.

Table 4-2 describes the functions of the Aids set.

Table 4-2. Aids Set Of Function Key Labels

LABEL	FUNCTION
device control	Displays a set of labels that controls the transfer of data to the selected destination device(s).
margins/tabs/col	Displays a set of labels that enables control of margins, tabs, and selection of the start column for data transmission to a host computer.
service keys	Displays a set of labels for testing the terminal's proper operation or for selecting Monitor Mode.
NEXT SYSTEM	If the terminal includes the IBM emulation feature, pressing this key puts the terminal into its alternate IBM mode.
enhance video	Displays a set of labels that controls the terminal's video enhancements.
define fields	Displays a set of labels that specifies field definitions and edit checks for forms.
config keys	Displays a set of labels that allows the selection of the various configuration menus.

Device Control Set

You access the Device Control set of keys by pressing:

```

AIDS  f1
device control
    
```

This keystroke sequence displays the following set of labels:








```

f1      f2      f3      f4      f5      f6      f7      f8
device  ADVANCE  "to"  ADVANCE  ADVANCE  COPY    COPY    COPY
modes   PAGE     devices  LINE     LINE    ALL     PAGE    LINE
    
```

The Device Control set of keys selects the amount of data copied to the destination device. This set also allows the proper positioning of printer paper.

Table 4-3 describes the functions of the Device Control set.

Table 4-3. Device Control Set Of Function Key Labels

LABEL	FUNCTION
	Displays the Device Modes set of labels that governs the way data is transferred or formatted.
	Displays the To Devices set of labels that allows selection of a destination device.
	If you have selected the integral printer as the destination device and also specified Metric or Report Print, this key "skips" the printer to the top of the next page. When not in Metric or Report Print, the integral printer advances one line. If an external printer is the destination device, pressing this key always generates a form feed.
	If you have selected a destination device, this key causes the printer to leave the next line blank by advancing the paper one line.
	If you have selected a destination device, this key copies the current workspace, starting with the line in which the cursor is positioned, to the destination device.
	If you have selected a destination device, this key copies all lines in the viewing window, starting with the line in which the cursor is positioned, to the destination device.
	If you have selected a destination device, this key copies the cursor's current line to the destination device.

Device Modes Set

You access the Device Modes set of keys by pressing:



Function Keys

This keystroke sequence displays the following set of labels:

f1	f2	f3	f4	f5	f6	f7	f8
device control	RECORD MODE	LOG BOTTOM	LOG TOP	EXPAND PRINT	COMPRESS PRINT	REPORT PRINT	METRIC PRINT

This set allows you to copy the entire screen or transfer a line, by data logging, to a destination device. (Section 8 provides details on top and bottom logging.) If the terminal contains an integral printer, these keys also select expanded or compressed print, and report or metric format.

Table 4-4 describes the functions of the Device Modes set.

Table 4-4. Device Modes Set Of Function Key Labels.

LABEL	FUNCTION
device control	Displays the Device Control set of labels that controls the transfer of data to the destination device.
RECORD MODE *	<p>The way Record mode operates depends upon the Remote mode setting. In Local mode, the RECORD MODE key sends the contents of workspace memory to the selected destination device(s). In Remote mode, the computer sends data directly to the selected destination device(s), bypassing the terminal's display memory, unless display memory was explicitly selected as a destination device.</p> <p>You may end Record mode by again pressing the RECORD MODE function key, or by performing either a soft or hard reset.</p>
LOG BOTTOM*	<p>Log bottom affects the selected destination device. (Multiple selections are permissible.)</p> <p>With bottom logging, when the terminal detects a line feed (whether directly produced or indirectly produced from an end-of-line wraparound), the terminal copies to the selected destination device the line which the cursor just left. The data in alphanumeric memory remains unchanged. LOG BOTTOM and LOG TOP are mutually exclusive. Selecting one cancels any previous selection of the other.</p>
LOG TOP *	<p>Log top affects the selected destination device. (Multiple selections are permissible.)</p> <p>With top logging, when you enter a line of text after a workspace becomes full, the terminal copies the line which is forced from the top of the workspace to the selected destination device. LOG TOP and LOG BOTTOM are mutually exclusive. Selecting one cancels any previous selection of the other.</p>

Table 4-4. Device Modes Set of Function Key Labels (Continued)

LABEL	FUNCTION
EXPAND PRINT *	When selected, the integral printer prints five characters per inch (40 characters per line). The vertical height remains the same. EXPAND PRINT and COMPRESS PRINT are mutually exclusive; selecting one cancels any previous selection of the other.
COMPRESS PRINT *	When selected, the integral printer prints 16.4 characters per inch (132 characters per line). The vertical height remains the same. EXPAND PRINT and COMPRESS PRINT are mutually exclusive; selecting one cancels any previous selection of the other.
REPORT PRINT *	When selected, the integral printer produces an 11-inch page. Report format consists of a three-line top margin, 60 lines of text, and a three-line bottom margin. A small tic mark shows the end of one page and the beginning of the next. REPORT PRINT and METRIC PRINT are mutually exclusive; selecting one cancels any previous selection of the other.
METRIC PRINT *	When selected, the integral printer produces a page with 70 lines (a three-line top margin, 64 lines of text, and a three-line bottom margin). A small tic mark shows the end of one page and the beginning of the next. REPORT PRINT and METRIC PRINT are mutually exclusive; selecting one cancels any previous selection of the other.

To Devices Set

You access the To Devices set of keys by pressing:



This keystroke sequence displays the following set of labels:



This set selects the destination device for data transfers. Since the destination devices are not mutually exclusive, you can make multiple selections.

Table 4-5 describes the functions of the To Devices set of keys.

Table 4-5. To Devices Set Of Function Key Labels

LABEL	FUNCTION
<div style="background-color: #0056b3; color: white; padding: 2px; display: inline-block;">device control</div>	Returns the Device Control set of labels to allow the transferring of data to the destination device.
<div style="background-color: #0056b3; color: white; padding: 2px; display: inline-block;">TO EXT DEV*</div>	Selects the external printer as the destination device.
<div style="background-color: #0056b3; color: white; padding: 2px; display: inline-block;">TO INT PRT*</div>	Selects the integral printer as the destination device.
<div style="background-color: #0056b3; color: white; padding: 2px; display: inline-block;">TO DISPLAY*</div>	Selects the screen display as the destination device.
<div style="background-color: #0056b3; color: white; padding: 2px; display: inline-block;">TO ALT PRT*</div>	Selects a printer on the alternate peripheral interface as the destination device.

Margins/Tabs/Col Set

You access the Margins/Tabs/Col set of keys by pressing:



This keystroke sequence displays the following set of labels:



These labels set the start column, and set or clear margins and tabs.

Table 4-6 describes the functions of the Margins/Tabs/Col set.

Table 4-6. Margins/Tabs/Col Function Key Labels

LABEL	FUNCTION
<p>START COLUMN</p>	<p>Sets the Start Column to the cursor's current column. (This value becomes the Start Column entry in the Terminal Configuration menu.) When the terminal detects conditions that preclude the use of the logical start-of-text pointer (see below), it transmits text to the host beginning with the Start Column value. The terminal uses the Start Column only if these conditions exist:</p> <ul style="list-style-type: none"> • no logical start-of-text pointer exists. • the terminal is in Remote mode but not functioning in Format mode or Block mode. (That is, the terminal is "on-line" and sending data to a computer one character at a time.) • you request a retransmission of data by enabling either Line Modify or Modify All. <p>If set, the logical start-of-text pointer overrides the Start Column value. However, the terminal sets the logical start-of-text pointer only if these conditions exist:</p> <ul style="list-style-type: none"> • the terminal is in Remote mode when it receives the data. • the data was entered from the keyboard and not received from the computer. • the just-entered data is the last-used line in workspace memory.
<p>SET TAB</p>	<p>Sets a tab at the cursor's current column position.</p>
<p>CLEAR TAB</p>	<p>Clears any tab set at the cursor's current column position.</p>
<p>CLR ALL TABS</p>	<p>Clears all tabs.</p>
<p>LEFT MARGIN</p>	<p>Sets the left margin to the cursor's current column position.</p>
<p>RIGHT MARGIN</p>	<p>Sets the right margin to the cursor's current column position.</p>
<p>CLR ALL MARGINS</p>	<p>Sets the left margin at column 1 and the right margin at column 80 (the default settings).</p>
<p>TAB + SPACES*</p>	<p>When an asterisk indicates that this mode is active, a "tab" generates the appropriate number of spaces to move the cursor to the next tab stop while a "backtab" generates the appropriate number of back spaces to move the cursor to the previous tab stop.</p>

Service Keys Set

You access the Service Set of keys by pressing:



This keystroke sequence displays the following set of labels:



This set selects the self-tests shown above or initiates Monitor Mode.


NOTE: The Service Keys may be programmatically locked to prevent unauthorized access. If your installation has adopted this policy, pressing one of these keys displays an error message and locks the keyboard. You must press the  key to clear this condition. Then contact the appropriate person in your group if you must access these keys.

Table 4-7 describes the functions of the Service set of keys.

Table 4-7. Service Set Of Function Key Labels

LABEL	FUNCTION
POWER ON TEST	Initiates the terminal's power-on test (the test that the terminal automatically performs when you power the terminal on.)
MONITOR MODE *	When enabled, makes the terminal display all data that passes through its datacomm port.
TERMINAL TEST	Performs a test of the terminal.
IDENTIFY ROMS	Lists the ROMs installed in the terminal, giving their part number and a date code.
DATACOMM TEST	Initiates the data communications test.
INT PRT TEST	Initiates the integral printer test.

Enhance Video Set

You access the Video Enhancement set of keys by pressing:



This keystroke sequence displays the following set of labels:



This set enables, or disables, the terminal's video enhancements.

Table 4-8 describes the functions of the Video Enhancement set of keys.

Table 4-8. Video Enhancement Function Key Labels

LABEL	FUNCTION
define fields	Displays the Define Fields set of function key labels which specify field definitions and edit checks for forms.
SET ENHNCMNT	Activates the currently selected state (either on or off) for every enhancement. You must use this key to enable or disable any enhancement.
SECURITY VIDEO *	Prevents the characters that are entered in this field from being displayed. (Their place on the screen is left blank.)
INVERSE VIDEO *	Inverts the intensity of the background and any characters within its field.
BLINK VIDEO *	Causes characters in the field to blink on and off.
UNDRLINE VIDEO *	Underscores all characters (including blanks).
HALF BRIGHT *	Displays all characters in the field at half intensity (gray).
etc.	Displays the remainder of the enhancement labels:



Table 4-8. Video Enhancement Function Key Labels (Continued)

LABEL	FUNCTION
CHANGE TO BASE	Selects the base character set to be the active character set.
CHANGE TO MATH	Selects the math character set to be the active character set. (Simultaneously updates the Alternate Set field in the Terminal Configuration menu to "Math(A).")
CHANGE TO LINE	Selects the line drawing character set to be the active character set. (Simultaneously updates the Alternate Set field in the Terminal Configuration menu to "Line(B).")
etc.	Returns the function key labels to the initial Video Enhancement values which select the various display enhancements.

Define Fields Set

You access the Field Definition set of keys by pressing:



This keystroke sequence displays the following set of labels:








Table 4-9 describes the functions of the Field Definition set of keys.

Table 4-9. Field Definition Function Key Labels

LABEL	FUNCTION
enhance video	Displays the first of two sets of enhancement labels which set the various display enhancements.
START UNPROTCT	Defines all character positions between the cursor and either the start of the next field, a "stop field" marker, or the end of the line (whichever occurs first) as an unprotected field. The terminal transmits all data in unprotected fields to the computer when in Remote and Format modes.
START XMIT FLD	Defines all character positions between the cursor and the start of the next field, a "stop field" marker, or the end of the line (whichever occurs first) as a transmit-only field. The terminal transmits all data in transmit-only fields to the computer when in Remote and Format modes.

Table 4-9. Field Definition Function Key Labels (Continued)

LABEL	FUNCTION
	Defines the end of any unprotected or transmit-only field by generating a "stop field" marker.
	Defines all character positions between the cursor and the end of the line, the start of the next field, or a "stop field" marker (whichever occurs first) as an "all character" field. Such fields accept any character.
	Defines all character positions between the cursor and the end of the line, the start of the next field, or a "stop field" marker (whichever occurs first) as an "alphabetic" field. Such fields accept both uppercase and lowercase alphabetic characters and also the space character.
	Defines all character positions between the cursor and the end of the line, the start of the next field, or a "stop field" marker (whichever occurs first) as a "numeric" field. Such fields accept the numeric digits, the space character, the plus sign, the minus sign, the comma, and the period.
	<p>Alternately pressing this key enables and disables Format mode. In Format mode, the terminal enforces field specifications to prevent the accidental overwriting of protected areas.</p> <p>When you enable Format mode, the terminal positions the cursor at the beginning of the first "unprotected" field. If no "unprotected" fields exist, the cursor homes to row 1, column 1.</p>

Config Set

You access the Config Set of keys by pressing:

```





```

This keystroke sequence displays the following set of labels:

```














```

Most configuration information lies beyond the scope of this manual. Section 2 briefly discusses your using the keyboard for displaying a menu, making menu selections, then returning to normal operation. In most instances, someone in your installation will have correctly configured your terminal. However, if you need access to this information, you should consult the Reference Manual.

Table 4-10 describes the function of the Configuration set.

Table 4-10. Configuration Set Of Function Key Labels

LABEL	FUNCTION
global config	Displays the global configuration menu which sets background inverse and key "click".
datacom1 config	Displays the currently configured protocol menu for datacomm port 1. This menu configures the port to communicate with a computer.
ext dev config	Displays the currently configured protocol menu for datacomm port 2. This menu configures the port to communicate with external devices.
terminal config	Displays the terminal configuration menu which selects the terminal operating characteristics for both Local and Remote modes.

USER DEFINABLE FUNCTION KEYS

Besides the function keys predefined meanings, you can program each key to accomplish a particular task. Used in this manner, the function keys reduce any repetitive task to a couple of keystrokes. You define the task with a "definition" string that may contain a maximum of 80 characters.

You also assign each key a "type" character that tells the terminal how to interpret the definition string. The three type characters are L, T, and N:

- L (local execution)—the terminal performs the function locally; nothing is transmitted to the computer.
- T (transmit)—the terminal transmits the definition string to the computer; nothing happens locally.
- N (normal keyboard operation)—the terminal interprets the definition string as though you entered it directly from the keyboard.

You can assign your own label to each of the function keys. The label should remind you which function that key performs. (The maximum label size is 16 characters: 8 characters being displayed in the label's upper half and 8 characters in the label's lower half.)

Until you define and save your own definition strings, the User Keys function keys have default assignments that take effect when you power the terminal on, perform a hard reset, or press the **DEFAULT VALUES** function key while the definition menu is displayed. Figure 4-3 shows the User Keys Definition Menu with its default values.

The default definition string for each of the eight function keys consists of two characters: the escape character (`␣`) and a lowercase letter. The default definition strings have no preassigned meanings. However, by pressing the appropriate key, you can transmit a message to the computer where an application program may interpret it. For example, the program could output a complex data entry form to the terminal upon receiving the characters "`␣t`".

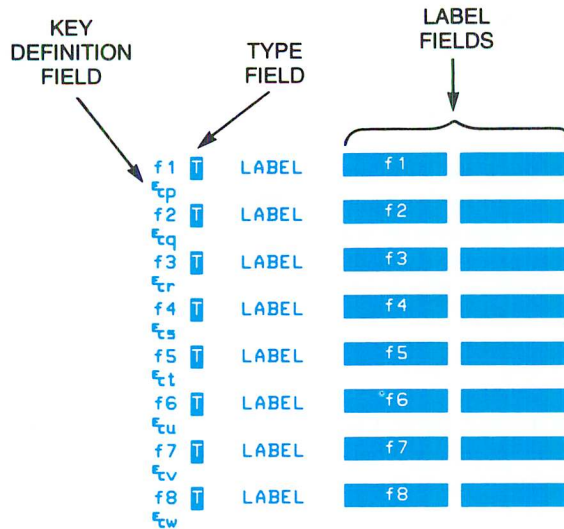


Figure 4-3. User Definable Function Key Menu With Default Values

USER KEY MODES

Utilizing the user-definable function keys involves two modes of operation. In Definition mode, you assign the function keys their labels, “type” characters, and definition strings. In Use mode, you activate the keys so their labels become the ones currently displayed. Then, by pressing the corresponding function key, the terminal processes the string as the type character directs.

Definition Mode

INITIATING DEFINITION MODE. To initiate Definition Mode, simultaneously press the **SHIFT** key and **USER KEYS** key. The terminal displays the User Key Definition Menu. (If you have made no previous entries to the menu, all fields show their default settings.) By pressing the Tab keys, or using the cursor-positioning keys, you can move the cursor to each menu field.

DEFINING A FUNCTION KEY. To define a function key, first choose the type character: L for local use only, T for transmit only, and N for “normal” treatment (as though it were entered through the keyboard). The default type is “T”. Use the **NEXT CHOICE** or **PREVIOUS CHOICE** function key to make your selection.

Next, enter the function key’s label. On the definition menu, the label appears in inverse video as two 8-character blocks. The first block forms the upper half of the label; the second block, the lower half. The default labels for the keys are the titles “f1” through “f8”.

Finally, type the definition string on the line below the label blocks. Use the **DISPLAY FUNCTNS** function key to enter keystrokes from the Edit and Display groups of keys. When entered in Display Functions mode, any keystroke operation is inhibited until you press the function key to which it is assigned. For example, if you include the **HOME** key in one of the definition strings, the cursor “homes” when you press the appropriate function key in Use mode.

LEAVING DEFINITION MODE. To save the definition menu in non-volatile memory, you must press **f1** (**SAVE CONFIG**). This replaces the default definitions with your definitions. As the terminal preserves these values, you only need to enter a complex definition string once. Thereafter, the terminal restores these values each time you power the terminal on.

If you only need to retain the User Keys definitions for the current log-on session, you may also end Definition mode by pressing either the **AIDS**, **MODES**, or **USER KEYS** key. All three keys return the terminal to the window display that was visible before the terminal entered Definition mode. Pressing the **AIDS** key assigns the Aids set of labels, while pressing the **MODES** key assigns the Modes set of labels. Pressing **USER KEYS** displays the labels you just defined.

Use Mode

INITIATING USE MODE. You enter Use mode by pressing the **USER KEYS** key. The terminal displays the user-defined function key labels across the bottom of the screen. When no labels have been defined, the default values (**f1-f8**) appear.

Certain application programs may require your entering one of the default definition strings for it to interpret. Regardless of a function key's current value, you can key in the default value by simultaneously pressing the **SHIFT** key and the appropriate function key. For example, if you have defined function key **f1** to be your log-on string and if you must enter **␣p** (the default string for **f1**) so an application program will display the next data-entry form, you can press **SHIFT f1** to generate this code.

LEAVING USE MODE. To end Use mode and also display the previously shown set of labels, simply press the **USER KEYS** key. Pressing the **AIDS** key ends Use mode and displays the Aids set of labels. Pressing the **MODES** key ends Use mode and displays the Modes set of labels.

An example summarizes the many new concepts presented in this section.

EXAMPLE: This example assigns your name and address to function key **f1**. When executed, the key should send nothing to the computer, but print on the terminal screen the following:

```
Your Name
House Number and Street
Your Town, State   ZIP
```

- Step 1.** Press the **MODES** key and check whether an asterisk occurs in the **AUTO LF** label. If so, press **f8** to disable Auto Linefeed.
- Step 2.** Simultaneously press the **SHIFT** and **USER KEYS** keys. This initiates Definition mode by displaying the User Key Definition menu.
- Step 3.** The terminal positions the cursor in the field where it was left last. If the cursor is not at the type field for function key "f1", press **␣** to move the cursor to this field. Then press **f2** (the **NEXT CHOICE** function key) until an "L" appears in that field. This makes the definition string executable at the terminal only.

Step 4. Tab the cursor to the label line and enter a title for the function key; for example, RETURN ADDRESS.

Step 5. Tab the cursor to the left margin of the definition string field.

Step 6. Enable Display Functions by pressing **f7**. (An asterisk appears in the DISPLAY FUNCTNS label.) This will inhibit the action of the **←** key as you enter the address.

NOTE: If you mistype a character while doing Step 7, you must disable Display Functions by pressing **f7** before you can use the cursor-control or edit keys. After correcting the entry, press **f7** to reactive Display Function mode.

Step 7. Type:
Your Name **←** House Number and Street **←** Your Town, State ZIP **←**.

Step 8. Press the DISPLAY FUNCTNS function key to disable Display Function mode. Now when the terminal encounters the "Return" character, it executes it.

Step 9. Press the **MODES** key to display the Modes labels. Press **f8** to enable Auto Linefeed. After this mode is activated, each carriage return advances the cursor to the left margin of the next line.

Step 10. Press the **USER KEYS** key to enter Use mode. (Notice that your title has replaced the "f1" label.)

Step 11. Press the **f1** function key. The address, as you entered it, appears on the screen.



Using Your Terminal By Itself _____ 5

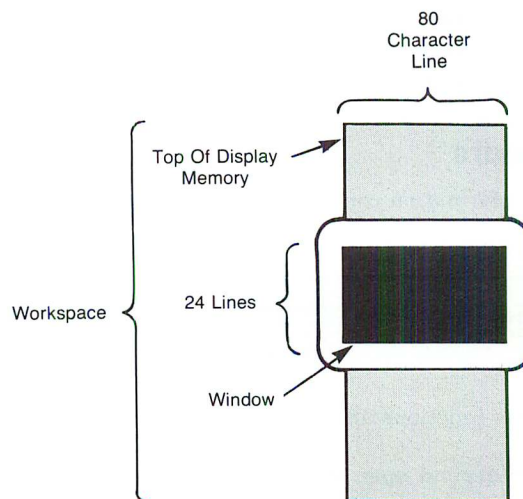
INTRODUCTION

You may use many of your terminal's features without being connected to a computer. This is called putting the terminal "off-line" or operating in Local mode. You select Local mode by not activating Remote mode. That is, one of these two modes always takes effect. Later on, this section tells how to select Remote mode through the Modes function key labels. Failing to do so puts the terminal in Local Mode.

Throughout this section, you will use your terminal in Local mode to gain familiarity with basic keyboard operations. In this regard, several of your terminal's features parallel the capabilities of a typewriter. Section 6 describes your terminal's advanced alphanumeric features. Appendix A mentions graphics capabilities for those terminals that have the graphics option.

TERMINAL MEMORY

Local mode is possible because the terminal stores and maintains the data being manipulated on the screen in the terminal's display memory. This workspace area is 80 characters wide. The length is a minimum of 48 lines, but its actual extent varies depending upon which options were ordered.



DISPLAY SCREEN

The terminal's screen consists of 27 lines (figure 5-1). The terminal reserves the three bottom lines for its use. The 27th line is the Status Line. The 25th and 26th lines display the function key labels. You control the remaining 24 lines.

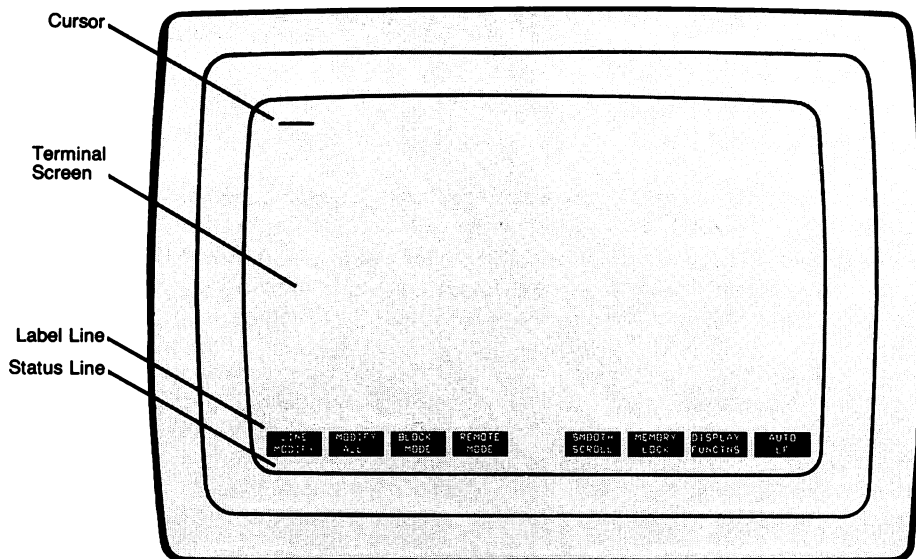


Figure 5-1. Screen Layout

The terminal always displays the cursor's current line. (This is the line where you are actively adding text or editing existing text.) Therefore, after the screen fills, the addition of more text forces the top line off the screen. You may enter a minimum of 48 lines of text without worrying about any information being lost. (The discussion of Memory Lock in this section describes ways to safeguard information.) As the workspace stores more information than the terminal can display, the screen, in essence, becomes a viewing window. By scrolling and paging, you bring different portions of the workspace into view.

Status Line Indicators

The Status Line gives information concerning the terminal's operating state. The line consists of nine sections:

Keyboard Locked	Extended Characters	Tab - Spaces	Keypad Function	Active Personality and Transmit Indicators	CAPS Mode	Inserting Characters	Currently Blank	Currently Blank
-----------------	---------------------	--------------	-----------------	--	-----------	----------------------	-----------------	-----------------

Table 5-1 lists the various functions and their corresponding indicator.

NOTE: Some indicators depend upon optional features. If your terminal lacks the corresponding option, its section of the Status Line remains permanently blank.

Table 5-1. Status Line Indicators

FUNCTION	SYMBOL
Keyboard Locked	KB Lockd
Accessing "Extended" Characters	Alt Shft
Equating Tab to Spaces	Tab=Spac
Function of Number Pad: Numeric Operations	Num Pad
Graphics Operations	Grph Pad
Activity Field:	
Primary Personality	1
Alternate Personality	2
Transmit Indicators	*
CAPS Mode	CAPS
Insert Character	Ins Char
Insert Char/Wraparound	Ins Wrap

SETTING YOUR TERMINAL FOR LOCAL USE

If your terminal is turned off, press the rocker switch on the terminal's rear panel to the "ON" position. When the terminal is ready for use, the Modes function key labels appear at the bottom of the screen.



NOTES: (1) As the terminal's alternative personality lacks the equivalent of these functions, a different set of labels may appear. See Appendix C for details on the IBM function key labels and how you return your terminal to its "primary" personality.

(2) If your terminal has been in use and a different set of HP labels appears on the screen, you can display the Modes labels by pressing the **MODES** key.

The eight Modes labels correspond to the function keys at the top of the keyboard. Pressing a function key selects the logical function named in the label. For example, pressing **f1** selects "Line Modify" while pressing **f5** selects "Smooth Scroll". An asterisk appears in the label when you select a function to be in its active state. To cancel the selection, simply press the corresponding function key again. That is, the function keys serve as on-off switches. If the logical function is off (no asterisk), pressing the function key turns it on. If the logical function is on (asterisk present), pressing the function key turns it off.

For the remainder of this section, you want your terminal in Local Mode. Therefore, if an asterisk appears in the **REMOTE MODE** label, press **f4** to remove it. When the asterisk is absent, Remote mode is "off", and the terminal operates in Local mode. You should also activate automatic linefeed. Auto linefeed advances the cursor to a new line whenever you press the **←** key. Press **f8**, as required, to display an asterisk in the **AUTO LF** label.

ENTERING DATA

A basic use of your terminal is entering information. While the terminal is set for Local mode, you can enter data only from the keyboard. But once data becomes stored in terminal memory, you may copy this information to a printer, or you may change the terminal to Remote mode and send the information to a computer.

For a simple example of entering text, type the following name and date:

```
John Hancock      July, 1776
```

EDITING DATA


Whenever you want to change an entry, you choose the appropriate cursor-positioning and edit keys (as described in Section 3). For example, to add the day “4” to the above date, proceed as follows:

Step 1. Use the cursor-positioning (“arrow”) keys to move the cursor under the comma.

Step 2. Press the  key. (The message “Ins Char” appears in the Status Line.)

Step 3. Press the Space bar, then the  key. The line should appear as follows:

```
John Hancock      July 4, 1776
```


Step 4. Pressing the  key again turns off Insert Character Mode. (“Ins Char” disappears from the Status Line, and the terminal resumes overwrite operation.)

TECHNIQUES OF DATA ENTRY

In many instances, you must enter data within specific bounds. To simplify this procedure, your terminal provides margin settings and tab stops.

Tabs

SETTING TABS. Setting a tab stop requires access to the “Margins/Tabs/Col” function key labels. Follow this simple procedure:

Step 1. Press the  key.

The function key labels assume the following values:

							
device control	margins/ tabs/col	service keys	NEXT SYSTEM	enhance video	define fields		config keys

NOTE: Those labels which appear “darken” in relationship to other labels indicate that the corresponding label depends upon that option being installed in your terminal. If your terminal lacks this option, the corresponding label on your screen will be blank.

Step 2. Press **f2** (the function key corresponding to the `margins/tabs/col` label.)

The function key labels change to the following values:

f1	f2	f3	f4	f5	f6	f7	f8
START COLUMN	SET TAB	CLEAR TAB	CLR ALL TABS	LEFT MARGIN	RIGHT MARGIN	CLR ALL MARGINS	TAB = SPACES

Step 3. Move the cursor to the desired column.

Step 4. Press **f2** to set the tab stop. (Although you have pressed **f2** twice in this procedure, notice that its logical function has changed.)

USING TABS. Once you have set the desired tab stops, you can use the Tab keys as you would on a typewriter. You tab forward by using the **TAB** key in the character set group, or by using the **TAB** key in the numeric keypad. You can tab backwards by simultaneously pressing the **SHIFT** key and the **TAB** key. (Alternatively, you may backtab by using the **TAB** key in the numeric keypad.) When the cursor rests on the first tab position in a line and you backtab, the cursor moves to the last tab position in the previous line. Once the cursor reaches the first tab position of the first line in memory, further backtabbing is impossible.

NOTE: The left margin always serves as a tab stop.

CLEARING TABS. Clearing tab stops also requires access to the “Margins/Tabs/Col” function key labels. (If these labels are not displayed, follow the first two steps in the procedure under “SETTING TABS”.) Once the labels are present, you clear an individual tab by moving the cursor to the tab’s location, then pressing **f3** (**CLEAR TAB**). To clear all tab stops with a single keystroke, simply press **f4** (**CLR ALL TABS**).

EXAMPLE: This example sets tab stops to ease the entry of numeric data into columns. For your reference while doing this example, the following illustration shows the way your screen should appear after you enter the last number.

First Column	Middle Column	Last Column
123	456	789
123	456	789
123	456	789_


















↙ cursor

Step 1. If the “Margins/Tabs/Col” labels are not displayed, press the **AIDS** key and then **f2** to display these labels.

Step 2. To ensure that no previous margins or tab stops exist, press **f4** to clear all tabs and **f7** to clear all margins.

Step 3. Press the **←** key. This positions the cursor at the beginning of workspace memory.


Using Your Terminal By Itself

- Step 4.** Press the  key. This action clears the screen as pressing this key “erases” any information stored in workspace memory.
- Step 5.** Use the  key to move the cursor to column 20. Notice that the cursor’s row/column location appears in the label line between the fourth and fifth function key labels. Therefore, it is unnecessary to “count spaces” when positioning the cursor.
- Step 6.** Press  (SET TAB). This sets a tab stop at column 20. Then enter the text: `First Column`
- Step 7.** Use the  key to move the cursor to column 40 and press  to set a tab stop at this location. Then enter the text: `Middle Column`
- Step 8.** Use the  key to move the cursor to column 60 and press  to set a tab stop at this location. Then enter the text: `Last Column`
- Step 9.** Press the  key. Observe that the cursor returns to the left margin (column 1) of the next line.
- Step 10.** On this line and the following two lines, do the following:
- Press the  key and enter the numbers “123” beginning at column 20.
 - Press the  key and enter the numbers “456” beginning at column 40.
 - Press the  key and enter the numbers “789” beginning at column 60.
- For the first two lines, after entering the “9”, press the  key to advance to the next line.
- Step 11.** Experiment with the  key in the character set group and the  key in the numeric keypad. Also try backtabbing with the  key or by simultaneously pressing the  and  keys. In particular, notice that the left margin serves as a tab stop but the right margin does not.

Margins

When you power on the terminal, or after a hard reset, the terminal sets the left and right margins to the width of the screen. That is, column 1 becomes the left margin and column 80 becomes the right margin. However, you may change these settings to ease data-entry.

LEFT MARGIN. Setting margins requires access to the “Margins/Tabs/Col” function key labels. Follow this simple procedure:

Step 1. Press the  key.

The function key labels assume the following values:

							
<code>device control</code>	<code>margins/ tabs/col</code>	<code>service keys</code>	<code>NEXT SYSTEM</code>	<code>enhance video</code>	<code>define fields</code>	<code>config keys</code>	

Step 2. Press **f2** (**margins/tabs/col**).

The function key labels take on the following values:

f1	f2	f3	f4	f5	f6	f7	f8
START COLUMN	SET TAB	CLEAR TAB	CLR ALL TABS	LEFT MARGIN	RIGHT MARGIN	CLR ALL MARGINS	TAB = SPACES

Step 3. Move the cursor to the desired column.

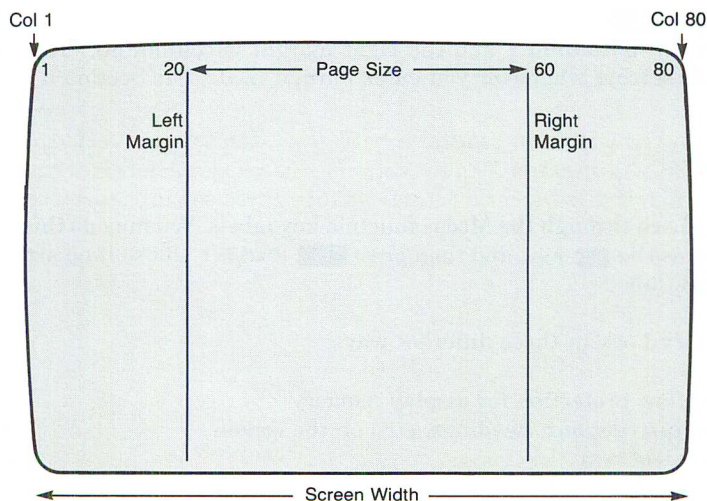
Step 4. To set the left margin, simply press **f5** (**LEFT MARGIN**).

RIGHT MARGIN. To set the right margin, follow a similar procedure. However, a new rule applies: the right margin can never be to the left of the left margin setting. (The terminal rejects any invalid selection with an audible “beep”.) After positioning the cursor to the desired column, press **f6** (**RIGHT MARGIN**) to set the right margin.

The terminal bell sounds a warning when the cursor reaches a position eight character spaces from the right margin. Upon reaching the right margin, if “end-of-line wraparound” is in effect, the cursor automatically moves to the left margin of the next line. (“End-of-line wraparound” is the normal (default) setting for the `InhEoLWrp(C)` field in the Terminal Configuration menu. Unless you specifically change this field, your terminal functions as described above.)

When you position the cursor with the **→** key, the terminal bell remains silent as the cursor nears the right margin. Upon reaching column 80, the cursor moves to the left margin of the new line regardless of the setting of the end-of-line wraparound field. That is, the cursor-positioning keys ignore margin settings and operate on the boundaries of the screen window.

EXAMPLE: This example sets the margins for a “40-column page”, centered on the screen. (Since the page width includes both margins, the actual page size is 41 columns.)



Step 1. Display the “Margins/Tabs/Col” labels by pressing:

```
  a1ds      f2
  margins/
  tabs/col
```

Step 2. To set the left margin, use the cursor-positioning keys to move the cursor to column 20. Press **f5** (**LEFT MARGIN**).

Step 3. To set the right margin, use the cursor-positioning keys to move the cursor to column 60. Press **f6** (**RIGHT MARGIN**). Both margins are now set.

Step 4. Press the **←** key. Notice that the cursor returns to the left margin, not to the edge of the screen window.

Step 5. To see how the terminal confines data within these boundaries, enter the following sentence:

```
  Through margins, this examples forces textual data to the next line.
```

Your final results should resemble:

```
  Through margins, this example forces text
  ual data to the next line.
```

CLEARING MARGINS. You change margins by setting new margins. You clear margins by pressing function key **f7** (**CLR ALL MARGINS**). This returns the terminal to its normal state where the left margin is column 1 and the right margin is column 80. (The margins also assume this default setting whenever you enter Format mode. See Section 6.)


Memory Lock

You select Memory Lock through the Modes function key labels. You may do this as a two-step procedure. First press the **MODES** key, and then press **f6** (**MEMORY LOCK**) if no asterisk appears in the Memory Lock label.

You may use Memory Lock in three different ways:

- to provide overflow protection for display memory
- to “lock” lines (instructions, headings, etc.) on the screen
- to relocate blocks of text

OVERFLOW PROTECTION. To enable Overflow Protection, you must position the cursor within the screen's first row. Therefore follow this procedure:

Step 1. Using the "up-arrow" () key, move the the cursor to the top of the display screen.

Step 2. Press the  key to display the Modes function key labels.

Step 3. Press  to enable Memory Lock. This protects the entire workspace.

Then, when the workspace becomes full, if you attempt to enter more data, the keyboard locks, the bell rings, and the terminal displays the message: **MEMORY FULL**.

DISPLAY LOCK. To "lock" lines (such as column headings) on the screen, you activate Memory Lock after you have positioned the cursor on the line below the last line of data that you want retained on the screen. Then, as the viewing window becomes full, these locked lines remain on the screen while unlocked lines continue to roll into the display memory workspace.

RELOCATING BLOCKS OF TEXT. You can also use Memory Lock to move blocks of text.


For an example, move the following paragraphs into their proper order.


Initial order:



```
(Top of screen)  I'm paragraph 3.
                  Although I arrived first, they want me last.

                  I'm paragraph 2.
                  I'll be content in the middle.

                  I'm paragraph 1.
                  Shouldn't the first be last; and the last, first?
                  (blank line)
                  _ (cursor's current position)
```

(As a blank line separates each paragraph, you must enter a blank line after the last paragraph and then press the  key to position the blank line ABOVE the cursor's current line.)

Step 1. Press the  key to display the Modes labels. Verify that Memory Lock is disabled (the label appears without an asterisk).

Step 2. Press the  key and type the above paragraphs as shown. Be sure to press the  key twice after entering the question mark. (This creates the necessary spacing between paragraphs.)

Step 3. Move the cursor to the first line of paragraph 2.

- Step 4.** Press **f6** (**MEMORY LOCK**) to enable Memory Lock mode. (An asterisk appears in the label.)
- Step 5.** Press the **ROLL UP** key until the remaining lines have rolled under the cursor position and off the screen.
- Step 6.** Turn off Memory Lock mode by pressing **f6**. (The asterisk disappears from the **MEMORY LOCK** label.)
- Step 7.** Press the **↵** key. The display should appear as follows:

(Top of screen) I'm paragraph 2.
 I'll be content in the middle.

 I'm paragraph 1.
 Shouldn't the first be last; and the last, first?

 I'm paragraph 3.
 Although I arrived first, they want me last.

- Step 8.** Now position paragraph 1 by moving the cursor into the first line of paragraph 1 and turning on Memory Lock by pressing **f6**.
- Step 9.** Press the **ROLL UP** key until the cursor is in the first line of paragraph 3.
- Step 10.** Turn off Memory Lock mode by repressing **f6**, then press the **↵** key. This puts the bickering paragraphs into their proper place:

(Top of screen) I'm paragraph 1.
 Shouldn't the first be last; and the last, first?

 I'm paragraph 2.
 I'll be content in the middle.

 I'm paragraph 3.
 Although I arrived first, they want me last.

If the data were not at the beginning of the workspace, you could use the **ROLL UP** key, instead of the **↵** key, to view the rearranged text.

Using Your Terminal's Alphanumeric Capabilities _____ 6

INTRODUCTION

Your terminal can display data in a variety of ways to highlight certain information or, conversely, to conceal information. Additionally, it gives access to special character sets containing mathematical symbols or line-drawing elements. With the line-drawing set, for example, you could create a form's layout. Then you could divide the form into logical fields, where each field accepts specific data. When you set your terminal for Format mode, the terminal channels incoming data to designated fields thus preventing you from overwriting "protected" areas. Such features ease data-entry and reduce the chances for error. This section describes these features.

USING DISPLAY ENHANCEMENTS

As a standard feature, your terminal includes the following display enhancements:

- **Half Bright:** The terminal displays characters at half intensity (gray).
- **Underline:** The terminal highlights a character by underscoring it.
- **Inverse Video:** The terminal inverts the intensity of the background and the corresponding characters within this field. (See Background Inverse.)
- **Blinking:** Characters blink.
- **Security:** The terminal accepts characters but displays nothing on the screen. (This feature is commonly used for "passwords".)
- **Background Inverse:** This feature selects dark characters on a light background. (The screen normally displays light characters on a dark background.)

From the keyboard, you access the video enhancement function key labels by pressing:



Using your Terminal's Alphanumeric Capabilities

This keystroke sequence displays the following set of labels:

f1	f2	f3	f4	f5	f6	f7	f8
define fields	SET ENHNCMNT	SECURITY VIDEO	INVERSE VIDEO	BLINK VIDEO	UNDRLINE VIDEO	HALF BRIGHT	etc.

You may set all the display enhancements except Background Inverse by using these keys. As Background Inverse affects the terminal's operation, you select this enhancement through the Global Configuration menu.

Pressing **f8** (**etc.**) accesses the labels that activate the terminal's different character sets. These labels are:

f1	f2	f3	f4	f5	f6	f7	f8
CHANGE TO BASE	CHANGE TO MATH	CHANGE TO LINE					etc.

At this level, pressing **f8** (**etc.**) returns the previous set of labels. That is, by using the **etc.** function key, you may cycle through all the display enhancements then return to the initial "enhance video" set.

The "function-key" video enhancements (Half Bright, Underline, Inverse Video, Blinking, and Security) are toggle functions. An asterisk appears in the corresponding label when you select that enhancement. If you change your mind, you can cancel the selection by pressing the appropriate function key to remove the asterisk from the label.

When you press **f2** (**SET ENHNCMNT**), all "starred" enhancements take effect and the asterisks disappear from the corresponding labels. (The latter action prepares the labels for the next round of selections.)

The cursor's current position determines where an enhancement begins. An enhancement lasts until (1) another enhancement begins, (2) the current line ends, or (3) you explicitly turn off the enhancement. You turn off an enhancement by setting no enhancements. That is, you press **f2** (**SET ENHNCMNT**) when none of the enhancement labels contain an asterisk. Since the terminal automatically removes the asterisks when you set the enhancements, it is an easy procedure to position the cursor, make your selections, press **f2**, move the cursor to the end of the field, and press **f2** to terminate the enhancement. The following example illustrates these steps.

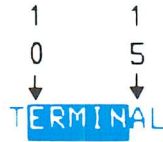
EXAMPLE: This example defines columns 10 through 14 of line 5 to be inverse video and blinking.

Step 1. Press the **AIDS** key to display the Aids set of function key labels. Then press **f5** (**enhance video**) to display the video enhancement labels.

Step 2. Use the cursor-positioning ("arrow") keys, to move the cursor to line 5, column 10.

Step 3. Press **f4** (**INVERSE VIDEO**) and **f5** (**BLINK VIDEO**) to select these enhancements. (Once activated, an asterisk appears in the label.)

- Step 4.** Press **f2** (**SET ENHNCMNT**). The "starred" enhancements take effect. (Notice that the asterisks have disappeared from the labels.)
- Step 5.** Using the Space bar, move the cursor to column 15. Notice that the field appears in inverse video.
- Step 6.** Press **f2** (**SET ENHNCMNT**). From column 15 on, since no enhancements were starred, none take effect. In essence, this defines the desired enhancement field between columns 10 and 14.
- Step 7.** Move the cursor back to column 9 of line 5. Type the word: **TERMINAL**. The display should appear as shown with the characters in the enhancement field blinking.



USING ALTERNATE CHARACTER SETS

At any given moment, you may access one of two character sets from the keyboard. These sets are called the "base" set and the "alternate character" set.

You can select between these sets by using control codes. Simultaneously pressing the Control key and "N" key (**CTRL N**) selects the alternate character set, while simultaneously pressing "Control O" (**CTRL O**) selects the base set. The Reference Manual describes using control codes and escape sequences to print characters from the alternate character sets. The following paragraphs tell how you may use the function keys to achieve similar results.

The function keys that activate the different character sets are a subset of the video enhancement function key labels. You access these labels by pressing:



This keystroke sequence displays the following labels:



By pressing **f2** or **f3**, you may select either the math set or the line-drawing set to be the "active" character set. (The terminal determines what symbol to display depending upon which character set is active.)





When you activate either of these sets, characters from that set propagate through the line until:

- they encounter a video enhancement that currently exists within that line
- you select another character set to be the active set
- the current line ends

Base Character Set

The base character set consists of the characters that you normally access when you press the alphanumeric keys. The standard keyboard generates the USASCII character set. For the national languages, the keyboard option determines which characters the base set contains.

The base set is usually the active set. However, if you have previously activated another set, you can return to the base set by pressing:

- | | | | |
|---|------------------|---|---|
|  | | : | displays the Aids label set. |
|  | (enhance video) | : | displays the video enhancement label set. |
|  | (etc.) | : | displays the alternate character set labels. |
|  | (CHANGE TO BASE) | : | activates the base set so that subsequent keystrokes display the corresponding symbols from this set. |

Line-Drawing Set

The line-drawing set contains various line segments. You can combine these segments to construct complex data entry forms (see figure 6-1).

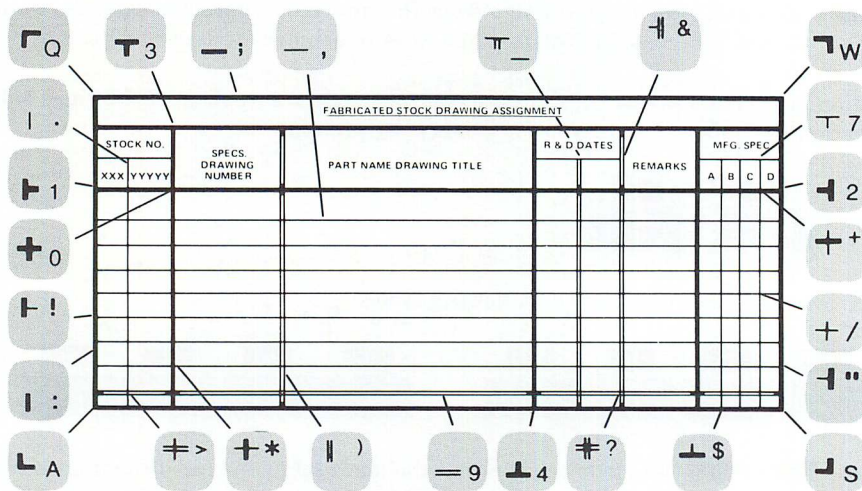






Figure 6-1. Sample Data Entry Form

Figure 6-2 shows the keycap location for each line segment character. To access these characters, you must make the line-drawing set the active character set. To do so, sequentially press the following keys:

-  : displays the Aids label set.
-  (enhance video) : displays the video enhancement label set.
-  (etc.) : displays the alternate character set labels.
-  (CHANGE TO LINE) : activates the line-drawing set so that subsequent keystrokes display the corresponding symbols from this set.

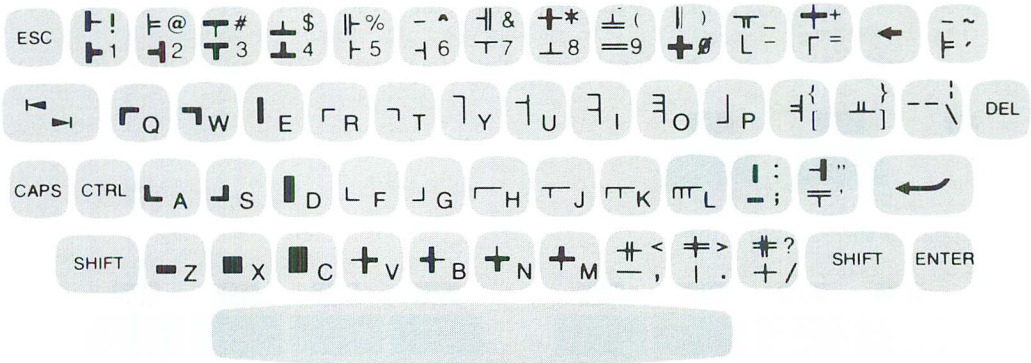


Figure 6-2. The Line-Drawing Set

Math Character Set

Figure 6-3 shows the location of mathematical symbols upon the keyboard.

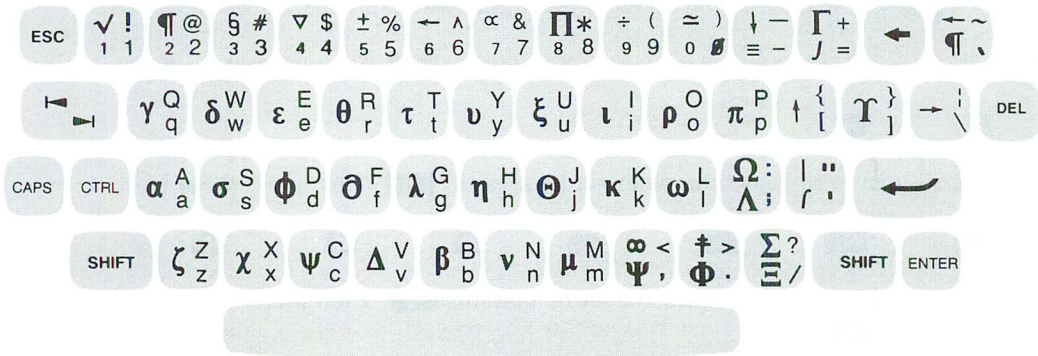






Figure 6-3. The Math Set

Using your Terminal's Alphanumeric Capabilities

To access these symbols, you must select the math set to be the active set. You accomplish this by sequentially pressing the following keys:

		:	displays the Aids label set.
	(enhance video)	:	displays the video enhancement label set.
	(etc.)	:	displays the alternate character set labels.
	(CHANGE TO MATH)	:	activates the math set so that subsequent keystrokes display the corresponding symbols from this set.

EXAMPLE: This example demonstrates how you may “mix” characters from two different character sets. The task is to display the basic trigonometric identity `sin2θ + cos2θ = 1`

Step 1. Display the function key labels that select the alternate character sets by pressing:






This displays the following labels:




Step 2. At the beginning of a new line, press the following keys:




NOTE: Although the letters are shown as being capitalized, the case of the letters is immaterial. Therefore, you needn't press the  key. Whenever you **MUST** hold the  key to display the correct symbol, the text explicitly shows both keys.

Step 3. Activate the Math character set by pressing . Then press these keys:




Step 4. Return to the base character set by pressing . Then press these keys:



Step 5. Activate the Math character set by pressing . Then press:



Step 6. To finish the equation, return to the base set by pressing  and enter:



Using your Terminal's Alphanumeric Capabilities

This keystroke sequence displays the following set of labels:

f1	f2	f3	f4	f5	f6	f7	f8
enhance video	START UNPROTCT	START XMIT FLD	STOP FIELD	ALL CHARS	ONLY ALPHA	ONLY NUMERIC	FORMAT MODE

Function key **f2** starts an “Unprotected” field; **f3** starts a “transmit-only” field. All areas on the screen that are not one of these two fields become “Protected” fields. These three fields are the only ones the terminal recognizes when in Format mode.

When you press **f2** or **f3**, the cursor's position determines where the field begins. One of three conditions (whichever occurs first) ends the field. These conditions are:

- a “stop field” marker is encountered.
- another field begins.
- the current line ends, unless the first character position of the next line redefines the same field. In this case, the field continues across line boundaries.


PROTECTED FIELDS. When the terminal is in Format mode, it safeguards any information that occurs in a protected field. You cannot enter data into these fields. If you press a character key, the cursor advances to the next unprotected field before the terminal accepts the character. All areas that you do not explicitly define as either unprotected or transmit-only fields become protected fields.

UNPROTECTED FIELDS. These fields accept data. The terminal positions the cursor to the next unprotected field under these conditions:

- you request the next field by pressing the **TAB** key.
- you have entered a character in the last character position of the current field.
- you attempt to enter data in a protected area.

TRANSMIT-ONLY FIELDS. The information in these fields rarely changes. Each time you transmit data to the computer, the terminal sends this information, but it also “retains” a copy on the terminal screen in preparation for the next transfer. Thus, you need not fill in these fields on every form. (Common examples might be the day's date or the identification number of the keyboard operator who is filling out the forms.) Most cursor movements (such as those “automatically” generated by the terminal or your pressing the **TAB** key) skip transmit-only fields. To change the entry in a transmit-only field, you must move the cursor to the field by using the cursor-positioning keys.

Data Checking

Your terminal can test incoming data to verify that it is either alphabetic or numeric. If an input character fails the test, the terminal gives a warning “beep”, displays an error message indicating what type of data this field accepts, and locks the keyboard. Pressing the  key clears the error condition. You may then enter the correct information.

To have the terminal perform edit checks, you must define fields with edit-checking capabilities. This also involves displaying the Define Fields set of labels.


You display the Field Definition labels by pressing:




This keystroke sequence displays the following set of labels:



Pressing  allows a field to accept any character.

Pressing  defines a field as being “alphabetic”.

Pressing  defines a field as being “numeric”.



If you omit specifying an edit check, an unprotected field accepts any character.

ALL CHARS. These fields accept any keyboard character.

ONLY ALPHA. Alphabetic fields only accept uppercase letters (“A” through “Z”), lowercase letters (“a” through “z”), and the space character.

ONLY NUMERIC. Numeric fields only accept the decimal digits (“0” through “9”), the space character, the plus sign “+”, the minus sign “-”, and the decimal point character (either period “.” or comma “,”).

Entering Format Mode

By pressing  (**FORMAT MODE**), you place the terminal in Format mode. When the terminal is in Format mode, all character positions on the screen are protected except those fields that you have specifically defined as “unprotected” or “transmit-only”. The terminal prevents you from entering data into protected fields. If you try, the cursor automatically moves to the next unprotected field before the terminal accepts the character. When an unprotected field becomes full, the cursor automatically moves to the next unprotected field. You must use the cursor-positioning keys to access transmit-only fields. Pressing the  key advances the cursor to the next unprotected field.



Using Your Terminal With A Computer

7

INTRODUCTION

Your terminal may be directly connected to a computer system through a datacomm line, or indirectly connected to the system through a modem. In either case, the terminal and computer must be in complete agreement concerning the format of all data passed between them. To ensure that this occurs, you must configure the datacomm port and select the proper operating modes.

As most configuration information lies beyond the scope of this manual, this section stresses the selection of operating modes. In all likelihood, someone else has already made the proper configuration selections for you. If you ever require this information, the Reference Manual provides complete details.

IF A MODEM IS USED

Your installation should have a standard procedure to follow when modems are being used. This may consist of turning on the modem, making proper modem speed and parity settings, and dialing a telephone number.

SELECTING OPERATING MODES

The terminal has several operating modes that interface with a computer. Subsequent paragraphs discuss the following modes: Remote, Block or Character, Line Modify, Modify All, Auto Lf, and Caps Lock.

You access Caps Lock through the Terminal Configuration menu. You access the remaining modes through the Modes function key labels.

The terminal must be in Remote mode to communicate with the computer. In Remote mode, it can operate in either Character mode or Block mode. While in Character mode, however, you may select two forms of Block mode (Line Modify or Modify All) for the retransmission of data. Caps Lock mode "forces" teletype compatibility. Depending upon the application, Auto Lf may be disabled when operating in Remote mode.

Remote Mode

Remote Mode enables communication between your terminal and its host computer. To select Remote mode, press the **MODES** key to display the Modes labels. Then, if no asterisk appears in the **REMOTE MODE** label, press **f4** to activate Remote mode.

While operating in Remote mode, the terminal may send data to the computer character-by-character or in blocks. When the computer transmits data to the terminal, the terminal normally displays this information upon the screen. (See "RECEIVING DATA FROM THE COMPUTER" later in this section for further information.)

Auto Lf Mode

Auto linefeed appends a linefeed character to every Return character you enter from the keyboard.

When operating in Character mode, this is probably extraneous information. Therefore, under these circumstances, you should disable automatic linefeed. To determine the state of Auto Linefeed mode, press the **zmodis** key to display the Modes labels. If an asterisk indicates Auto Lf is active, press **fb** to disable it. (The asterisk disappears from the label.)

Caps Lock Mode

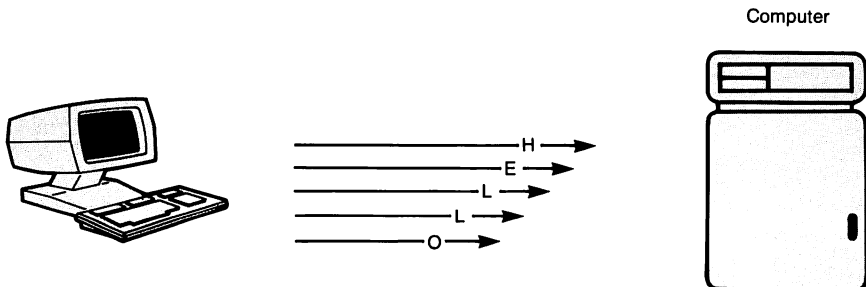
Some computer systems only accept "teletype-compatible" codes. If your terminal is connected to such a system, you should select Caps Lock mode in the Terminal Configuration menu. (See the Reference Manual for details on setting this field.)

Once Caps Lock mode becomes active, the terminal generates only teletype-compatible codes. The terminal converts unshifted alphabetic keys ("a"-"z") to their uppercase equivalents. It maps the "{" and "}" keys into the "[" and "]" characters, and the ";" key to the "\" character. The terminal does not generate codes for either the "~" or "\`" keys. Pressing either of these keys rings the terminal's bell.

Caps Lock mode differs from CAPS mode. You enable CAPS mode by pressing the **caps** key. When CAPS mode is active, all unshifted alphabetic keys generate uppercase letters and all shifted alphabetic keys generate lowercase letters. CAPS mode is a typing convenience and only affects the 26 alphabetic keys.

Character Mode

When the terminal is operating in Character mode, it sends characters to the computer as you type them. This allows constant interaction between you and the computer. The terminal operates in Character mode unless you explicitly select Block mode.

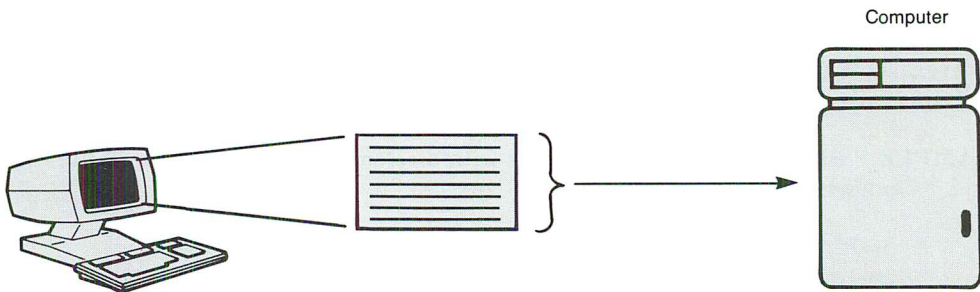


Block Mode

The state of the **BLOCK MODE** function key label determines whether the terminal sends data to the computer character-by-character or in blocks of characters.

To enter Block mode, press the **MODES** key to display the Modes labels. If no asterisk appears in the **BLOCK MODE** label, the terminal is in Character mode. To select Block mode, press **f3**. (The asterisk in the **BLOCK MODE** label indicates that Block mode is active.) Certain Block mode applications may require your selecting Auto Lf. When this is necessary, press **f8**, as required, to display an asterisk in the **AUTO LF** label.

In Block mode, the terminal stores the characters as you enter them. This allows you to edit your data before transmission. Pressing the **ENTER** key sends the selected block of data to the computer. Two block sizes are possible: line or page. You specify the block size in the Terminal Configuration menu (see Reference Manual for details).



Modify Modes

While operating in Character mode, you can enter two Modify modes to edit data before retransmitting it to the computer. These modes are Line Modify and Modify All. For example, if you send an erroneous string of data to the computer and the computer returns an error message, you can enter Line Modify mode, correct the error using the keyboard edit keys, then press the **←** or **ENTER** key to retransmit the string.

To enter Line Modify mode, press:



Line Modify mode ends when you press the **←** or **ENTER** key.

To enter Modify All mode, press:



Modify All mode resembles Line Modify except Modify All remains active after you press the **ENTER** or **←** key. An asterisk appears in the **MODIFY ALL** label when the mode is active. Pressing the **f2** key while in Modify All mode ends the mode and removes the asterisk from the label.

USING START COLUMN. The Start Column feature only applies in Line Modify or Modify All modes. Provided certain conditions are met, the terminal uses this value when it retransmits data to the computer. The terminal ignores any characters (such as computer prompts) that occur to the left of the Start Column.

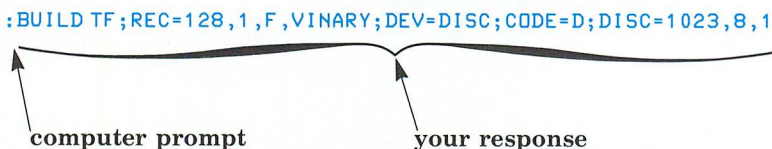
Under most circumstances, a start-of-text pointer marks the first character that is typed within a line of text. The terminal sets the logical start-of-text pointer if these conditions exist:

- When it receives the data, the terminal is in Remote mode, but not operating in Block or Format mode.
- The data comes from the keyboard, not from the computer.
- When the line is entered, it represents the last-used line in the workspace.

However, when the terminal fails to set the logical start-of-text pointer because improper conditions exist, transmission begins from the Start Column value.

EXAMPLE: Assume the computer prompts with a colon (:), and you enter a BUILD command, as follows:

```
:BUILD TF;REC=128,1,F,VINARY;DEV=DISC;CODE=D;DISC=1023,8,1
```




computer prompt your response

The terminal establishes the logical start-of-text pointer when you enter the “B” in “BUILD”.

Upon transmitting the command, the computer returns the error message:

```
EXPECTED ``ASCII`` OR ``BINARY``. (CIERR 274)
```

Realizing that you misspelled “BINARY”, you enter Line Modify mode, position the cursor under the “V” in “VINARY”, and enter a “B”. When you press the  key, the terminal transmits the line, beginning from the second character position. It does not transmit the prompt character to the computer.

RECEIVING DATA FROM THE COMPUTER

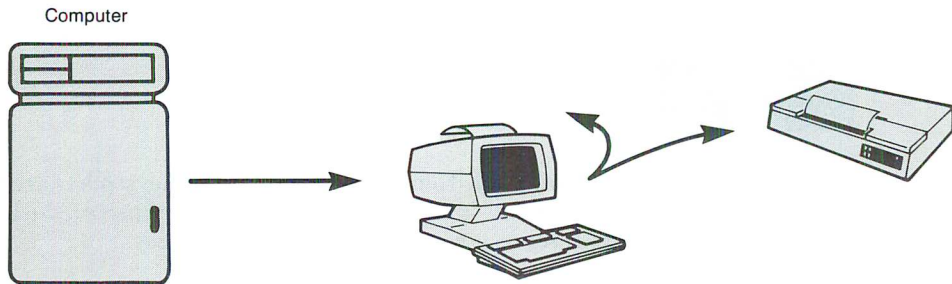
As you have seen, you can assert considerable control over the way the terminal transmits data to the computer. The following paragraphs describe your ways of controlling data reception.

To The Display

Once you have configured the terminal for Remote operation, no further action is necessary to receive data transmissions. Unless directed to do differently, the computer always sends its data to the display screen.

To A Destination Device

You can set the terminal to perform "on-line" data logging. Under these circumstances, the terminal not only displays the data upon the screen but also automatically routes any data it receives from the computer to a destination device. Section 8 describes logging data to an external printer while Section 9 describes logging data to the integral printer.



Record Mode

You enable Record mode through the Device Modes function key labels.

To display the Device Modes labels, press:





If no asterisk appears in the **RECORD MODE** label, pressing **f2** enables Record mode. You can end Record mode by pressing **f2** again, or by performing a soft or hard reset. Except for these keys, the Break key, and the Return key (the latter with special restrictions), selecting Record mode disables the keyboard.

The operation of Record mode depends upon the Remote mode setting. In Local mode, pressing the **RECORD MODE** function key sends the contents of workspace memory to the selected destination device(s). If you have omitted selecting a destination device, the terminal inhibits the transmission of the data and displays an error message.

Using Your Terminal With A Computer

In Remote mode, pressing the **RECORD MODE** function key transfers data directly from the datacomm line to the selected destination device(s).

EXAMPLE: To demonstrate Record mode, this example prints a listing of your files to a selected destination device.


The HP 3000 command "**LISTF,2**" generates a detailed listing of your files. The computer responds when you press the  key. Therefore, to utilize Record mode requires your selecting Record mode after you type the command but before you press the  key.


Step 1. To the computer prompt, type the command:


LISTF,2

Step 2. Display the Device Modes labels by pressing:



Step 3. Activate Record mode by pressing . Hereafter, the only valid keystrokes are the Break key (to signal the host), the "f2" function key (to cancel Record mode), the keys necessary to generate a soft reset or a hard reset, or the Return key.

Step 4. Press the  key. This "enters" the command and the computer sends the requested data to both the screen and the selected destination device.

NOTE: After you press the  key, the terminal disables subsequent use of this key until you cancel Record mode.

Using Your Terminal With An External Device

8

INTRODUCTION

You can copy both alphanumeric and graphic data from the display to a selected destination device. This section describes copying alphanumeric data to an external printer. Section 9 describes copying alphanumeric data to the integral printer. Appendix A covers graphics copy operations.

NOTE: You must ensure that the "straps" on the external printer match the settings in the External Device Configuration menu. Consult the Reference Manual for the necessary details.

COPYING ALPHANUMERIC DATA

You may select between two methods for copying alphanumeric data. Data logging copies data while it is being entered. Screen copy operations copy data after data entry is complete. The procedure is similar for both methods.

Selecting An External Printer

In any copy operation, the first task is selecting a destination device.

You select a destination device by pressing:



This keystroke sequence displays the following set of labels:



Pressing **f2** (**TO EXT DEV**) selects a printer with an RS-232-C interface; whereas pressing **f5** (**TO ALT PRT**) selects a printer connected to an alternate peripheral interface. The alternate peripheral interface supports the following printers: 2602A, 2631B, 2671A, and the 82905B.

Data Logging

When you set the terminal to perform data logging, the terminal automatically routes data to the external printer. Two methods of data logging are available: top logging and bottom logging.

In top logging, the terminal copies the top line in display memory to the printer when the line is forced from the workspace by lines being added at the bottom. In bottom logging, the terminal copies the cursor's current line to the printer whenever the cursor leaves that line and begins the next. Thus, bottom logging progressively copies the entire workspace. If you have selected top logging, any data not forced from the workspace remains in display memory and is left uncopied to the printer.

To perform either top or bottom logging, follow this procedure:

Step 1. Select the external printer as the destination device. (See discussion in previous paragraph on "Selecting An External Printer".)

Step 2. After selecting the destination device(s), you must access the Device Modes labels to enable data logging. If the "To" Device labels are displayed, you should press **f1** (device control). This returns the labels to their previous values:

f1	f2	f3	f4	f5	f6	f7	f8
device modes		"to" devices	ADVANCE PAGE	ADVANCE LINE	COPY ALL	COPY PAGE	COPY LINE

Alternatively, you may press **INS**, **f1** (device control) to access these same values, regardless of the initial label set.

Step 3. Press **f1** to display the Device Modes label set:

f1	f2	f3	f4	f5	f6	f7	f8
device control	RECORD MODE	LOG BOTTOM	LOG TOP	EXPAND PRINT	COMPRESS PRINT	REPORT PRINT	METRIC PRINT

At this level, pressing **f3** enables bottom logging. (If top logging had been active, enabling bottom logging cancels the top logging selection.)

Alternatively, pressing **f4** enables top logging. (If bottom logging were active, enabling top logging cancels the bottom logging selection.)

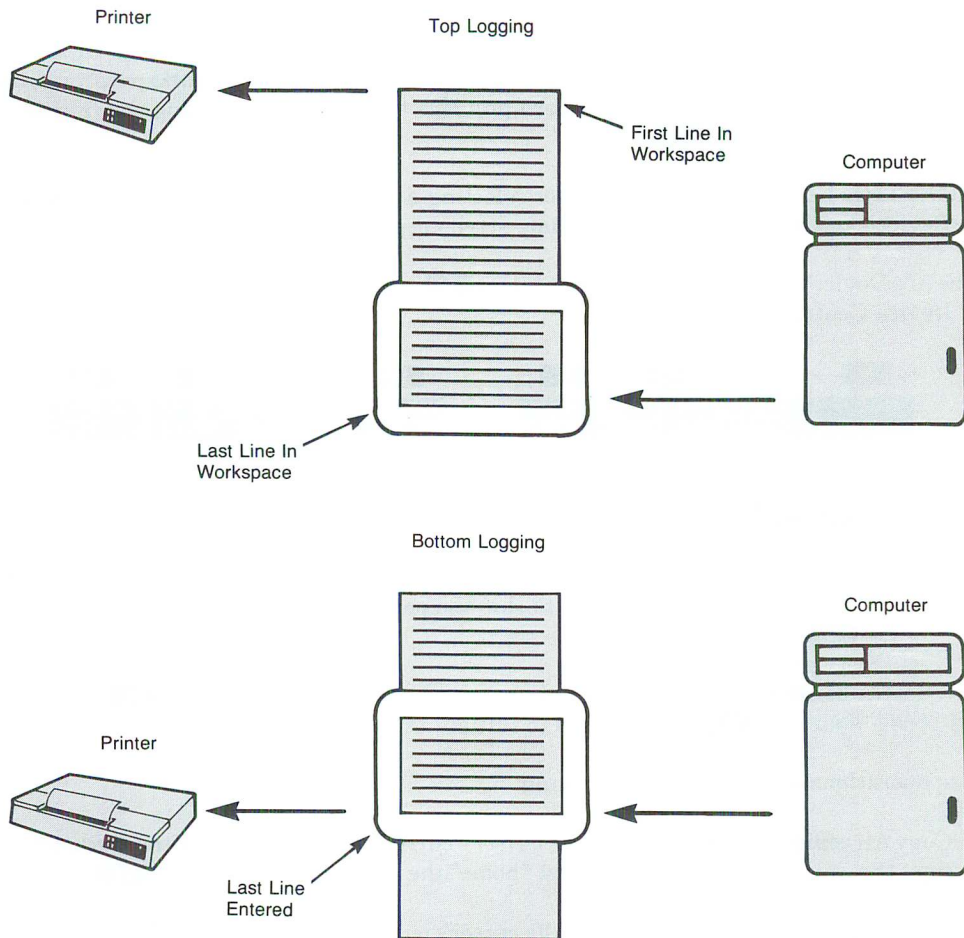


Figure 8-1. Data Logging

This completes the set-up procedure for data logging. You then enter data, as normal. The terminal automatically routes the information to the selected destination device(s).

To disengage the printer after you have completed the data entry task, press **f3** (**LOG BOTTOM**) or **f4** (**LOG TOP**) to disable the mode. (The asterisk disappears from the corresponding label.)

Screen Copy

In many instances, you want to copy data that currently appears on the screen. (Also, after a top logging operation, you may want to copy the remainder of the workspace to obtain a complete listing of the file.) The keyboard provides two methods: (1) using the function key labels or (2) pressing the **ENTER** key.

USING THE FUNCTION KEYS. After selecting a destination device, you must return to the Device Control set of labels to initiate screen copy operations.

If the "To Device" set of labels are visible, press **f1** (**device control**) to return the labels to the Device Control values:



Alternatively, if another set of labels are displayed, you may access the Device Control labels by pressing **AIDS**, **f1** (**device control**).

If you wish the printer to skip a line before printing begins, you can press **f5** (**ADVANCE LINE**). Likewise, if you want to skip the paper to the top of the next page (a "form feed"), press **f4** (**ADVANCE PAGE**).

Next, determine the amount of information you want printed, then press **f6** (**COPY ALL**), **f7** (**COPY PAGE**), or **f8** (**COPY LINE**) to initiate the copy operation.

These operations accomplish the following:

- Copy All copies all the data from the cursor's current line to the end of the workspace. (To copy the entire workspace, you must "home" the cursor before pressing **f6**.)
- Copy Page copies all the data from the cursor's current line to the end of the viewing window.
- Copy Line copies the line that contains the cursor.

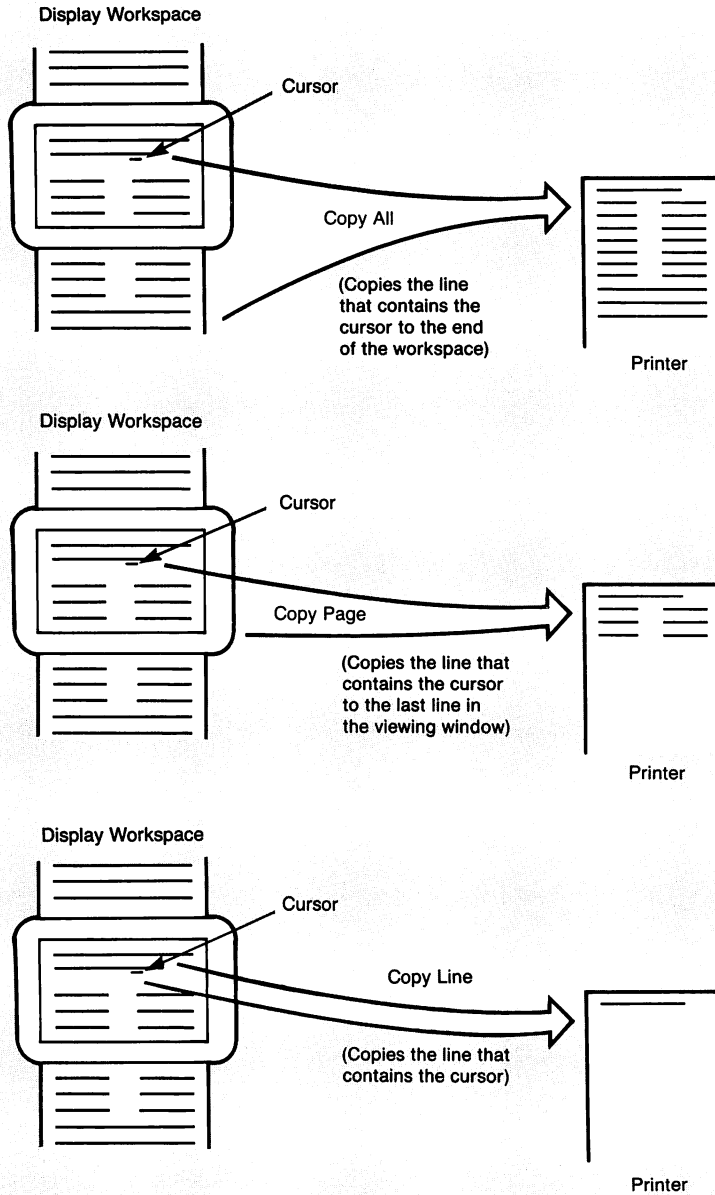


Figure 8-2. Copy All, Copy Page, Copy Line

USING THE ENTER KEY. If the terminal is set for Local mode, pressing the **ENTER** key copies the contents of display memory to the selected destination device(s).



Using Your Terminal With The Integral Printer _____ 9

INTRODUCTION

As an added convenience, your terminal may have the optional integral printer which can provide printed copies of any data that you display on the screen. Additionally, you may direct the computer to print directly to this printer. Although the integral printer can copy graphics data, this section only addresses alphanumeric text. Appendix A covers graphics operations, including the copying of graphic images.

COPYING ALPHANUMERIC DATA

The terminal provides two methods for copying alphanumeric data. Data logging copies data while you enter it. Screen copy operations copy data after it has been entered. The procedure is similar for both methods.

Selecting The Integral Printer

Your first task is selecting the integral printer as the destination device.

To set the destination device, press:



This keystroke sequence displays the following set of labels:



Pressing **f3** (TO INT PRT) selects the integral printer as the destination device.

Data Logging

When you set the terminal to perform data logging, the terminal automatically routes data to the integral printer. Two methods of data logging are available: top logging and bottom logging.

In top logging, the terminal copies the top line in display memory to the printer when that line is forced from the workspace by lines being added at the bottom. In bottom logging, the terminal copies the cursor's current line to the printer whenever the cursor leaves that line and begins the next. Thus, bottom logging progressively copies the entire workspace. With top logging, any data remaining in display memory is left uncopied to the printer.

To perform either top or bottom logging, follow this procedure:

Step 1. Select the integral printer as the destination device. (See discussion in previous paragraph on selecting the integral printer.)

Step 2. After selecting the destination device, you must access the Device Modes labels to enable data logging. If the "To" Device labels are displayed, you should press **f1** (**device control**). This returns the labels to their previous values:



Alternatively, you may press **AIDS**, **f1** (**device control**) to access these same values, regardless of the initial label set.

Step 3. Press **f1** to display the Device Modes label set:



At this level, pressing **f3** enables bottom logging. (If top logging had been active, enabling bottom logging cancels the top logging selection.)

Alternatively, pressing **f4** enables top logging. (If bottom logging were active, enabling top logging cancels the bottom logging selection.)

This completes the set-up procedure for data logging. You then enter data, as normal. The terminal automatically routes the information to the integral printer.

To disengage the printer after you have completed the data entry task, press **f3** (**LOG BOTTOM**) or **f4** (**LOG TOP**) to disable the mode. The asterisk disappears from the corresponding label.

Screen Copy

You may select between two screen copy operations. By using the function keys, you have considerable control over both the format and the quantity of data that is transferred. By using the Enter key, you copy the entire contents of the memory workspace to the integral printer.

USING THE FUNCTION KEYS. After selecting the integral printer as the destination device, you must return to the Device Control set of labels to initiate screen copy operations.

If the "To" Device set of labels is visible, press **f1** (**device control**) to return the labels to the Device Control values:



Alternatively, if another set of labels are displayed, you may access the Device Control labels by pressing **↵**, **f1** (**device control**).

If you wish to skip a line on the printer before initiating a copy operation, you can press **f5** (**ADVANCE LINE**).

When the integral printer is operating in Report or Metric Print, you can direct the printer to go to the top of the next page by pressing **f4** (**ADVANCE PAGE**). When neither Report Print nor Metric Print is active, the integral printer advances one line if you press this key.

After correctly positioning the paper, you may copy the selected amount of information by pressing **f6** (**COPY ALL**), **f7** (**COPY PAGE**), or **f8** (**COPY LINE**).

USING THE ENTER KEY. If the terminal is set for Local mode, pressing the **ENTER** key copies the contents of workspace memory to the integral printer. For example, this method can be used to obtain copies of the various configuration menus since it is impossible to access the necessary Device Control labels while a menu is being displayed.

PRINTER TEST AND MAINTENANCE PROCEDURES

The following paragraphs describe the printer test and the procedure for changing the roll of printer paper. Additional information on maintaining the printer may be found in the Service Manual.

Printer Test

The printer test verifies the proper operation of the integral printer. It does not test external devices. You initiate this test by pressing:



When the test completes successfully, the printer prints the test pattern illustrated in figure 9-1. If the test fails, the terminal displays the message: **Integral Printer Error**. This could mean the printer latch is open, the printer is out of paper, or the test was unsuccessful. In the latter case, contact your nearest Hewlett-Packard sales and service center for help.

```
@ABC DEFGHIJK LMNOPQRS TUVWXYZ{ \]^_`abc defghijk lmnopqrs tuvxyz{ |}~■
@ABC DEFGHIJK LMNOPQRS TUVWXYZ{ \]^_`abc defghijk lmnopqrs tuvxyz{ |}~■
@ABC DEFGHIJK LMNOPQRS TUVWXYZ{ \]^_`abc defghijk lmnopqrs tuvxyz{ |}~■ !"#%&'()*+,-./ 01234567 89:;<=? @ABCDEFGHI
@ABC DEFG @ABC DEFG @ABC DEFG @ABC DEFG
```

Figure 9-1. Printer Test Pattern

Maintaining The Integral Printer

PRINTER PAPER. The integral printer uses a special form of thermal printing paper. You may purchase this paper through your local HP sales and service office by using the following names and part numbers:

1 box (24 rolls) Thermal Paper (blue), HP part no. 9270-0638.

1 box (24 rolls) Thermal Paper (black), HP part no. 9270-0656.

CAUTION: We recommend that you use only HP Thermal Paper in your integral printer. Using other paper can shorten the life of the print head and reduce the print quality. Also, if you have an HP Warranty Service Contract, you must use HP Thermal Paper to keep the contract valid.

LOADING PRINTER PAPER. To load the printer paper, follow these instructions:

Step 1. Lift the top cover of the printer mechanism (figure 9-2). An illustration of the correct paper position and flow is embossed on the underside of the cover.

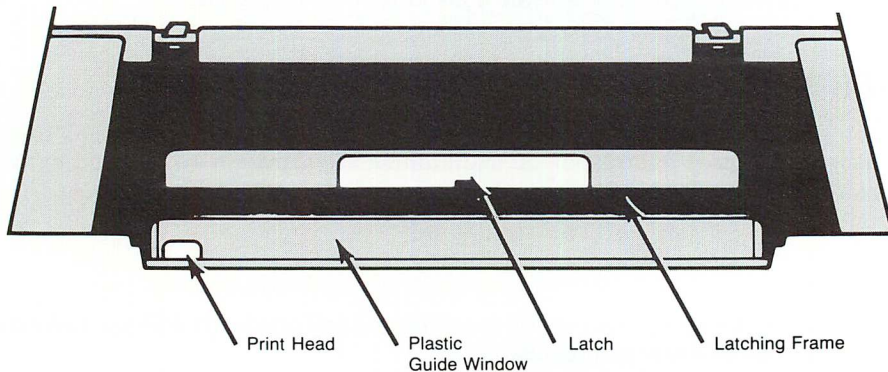



Figure 9-2. Printer Mechanism



Step 2. Press the latch toward the front of the terminal to release the latching frame. Lift the hinged latching frame to its forward position.

Step 3. Remove any paper remaining in the printer.


Step 4. The paper comes rolled on a cardboard cylinder. A metal rod, passing through the cylinder, holds the cylinder in place. Lift the cylinder upward and forward along the guide slots to remove the cylinder and rod.

Step 5. Remove the rod from the old cylinder and insert it into the new cylinder for the next roll of paper.

NOTE: The print material only occurs on one side of the paper. Therefore, you must insert the paper correctly to produce print. The paper must feed toward the front of the terminal from the underside of the paper roll. See the embossed illustration on the underside of the top cover.

Step 6. Place the ends of the metal rod in the guide slots on either side of the print mechanism and press down and toward the rear until the rod snaps into place.

CAUTION: The print head (figure 9-2) is relatively fragile and susceptible to damage. Be careful not to strike the print head while loading the paper.



Step 7. Feed the leading edge of the paper through the latching frame between the latching frame and the clear plastic guide window.

Step 8. Lower the latching frame into place without locking it.

Step 9. Align the sides of the paper with the guide lines embossed on each side of the guide window.


Step 10. Each new roll of paper has a glue spot, near the leading edge of the roll, which holds the roll intact. Feed approximately 12 inches of paper through the latching frame so the glue spot is beyond (outside) the print head and guide window.

NOTE: You should never allow the print head to pass over the glue spot during print operations.

Step 11. Press down the latch until it locks into place with an audible click. If the latch fails to lock, the terminal displays an error message when you attempt your first printer operation.

Step 12. Tear off any excess paper by using the guide window as a cutting edge.

Step 13. Close the top cover.



NOTE: If subsequent print operations appear normal except no image appears, the paper may be installed backwards. Refer to the embossed illustration on the underside of the top cover and verify that the paper is feeding through correctly.



In Case Of Difficulty _____ 10

INTRODUCTION

At certain times, the terminal displays error messages across the bottom of the screen. Some errors diagnose wrong keyboard input. Other errors indicate improper configuration settings. A few errors show a terminal malfunction.

The first part of this section tells how you may isolate the problem and determine what form of error you have. The latter part of this section gives some simple preventive maintenance procedures.

NOTE: A qualified service engineer should perform all maintenance procedures that require opening this unit. The controls available to you are readily accessible. Under no circumstances should you open your terminal to expose its internal circuitry.

ERROR MESSAGES

The terminal generates several kinds of status checks and diagnostic error messages. You should concern yourself with two: user-error messages and system-error messages.

Most user-error messages occur when you enter data that the terminal was not expecting or request a service that the terminal cannot perform. However, some errors result from incompatible settings in the configuration menus.

System-error messages may indicate the integral printer is malfunctioning (see Section 9 if this option applies to your terminal) or that the battery protecting non-volatile memory has failed (see appropriate paragraphs later in this section).


The error messages appear on lines 25 and 26; they replace the function key labels. Pressing the  key clears the error message, restores the labels, and unlocks the keyboard.

Table 10-1 lists the most common error messages and their meanings.

Table 10-1. User Error Messages

MESSAGE	MEANING
Configuration Must Be FULL DUPLEX HARDWIRED	Multipoint or modem configurations are invalid.
Default Configurations Used	This message occurs whenever the terminal cannot read non-volatile memory or finds it malfunctioning for any reason. In this case, the terminal uses a default set of configuration parameters.
Device Busy	A device selected for a data transfer is currently being used by another process.
Function Locked	An attempt to perform a function that has been programmatically "locked".
Illegal For Edit Type: ALPHABETIC	While in Format mode, an attempt to enter invalid data into a field defined as "alphabetic only".
Illegal For Edit Type: NUMERIC	While in Format mode, an attempt to enter invalid data into a field defined as "numeric only".
Illegal or No Destination Device	Either no destination device was specified or the selection is invalid.
Illegal or No Source Device	Either no source device was selected or the selection is invalid.
Illegal Unit Device	The specified unit is an invalid selection.
Integral Printer Error	Integral printer is malfunctioning. It may just be out of paper or the metal latch (under the plastic printer lid) may be ajar.
Invalid Configuration	A conflict exists between two interrelated fields in the displayed configuration menu. (An example would be disagreement between the DataBits and Parity fields in the Terminal Configuration menu.)
MEMORY FULL	Display memory is full and Overflow Protect is preventing accidental loss of data. Either disable Memory Lock (and, perhaps, enable data logging) or delete some lines from the workspace.
No Device Driver	No hardware device exists for the sending or receiving of data.

Table 10-1. User Error Messages (Continued)

MESSAGE	MEANING
Pod/Driver Types Not Matched	Either the configuration settings specify "Multipoint" but the hardware supports "Point-to-Point" or the configurations settings specify "Pt-to-Pt" while the hardware supports "Multipoint".
Source = Destination	An attempt to perform a data transfer between devices except one of the "to" devices is the same as the "from" device.
Use NEXT or PREVIOUS Key	An attempt was made to enter data through the keyboard to change a configuration field that is underlined. Such fields can only be changed by using the "NEXT CHOICE" or "PREVIOUS CHOICE" function keys.
Value Out Of Range	The configuration menu field marked by the cursor contains a value that falls outside the acceptable range.

MALFUNCTION AT POWER ON

When you power the terminal on, the terminal performs a power-on test. The test lasts for approximately 45 seconds. After successful completion of the test, the terminal "beeps" once and displays the initial screen image. Figure 10-1 shows the initial screen display for a terminal in its primary HP personality. See Appendix C for the initial display when the terminal "comes up" in its alternate IBM state.

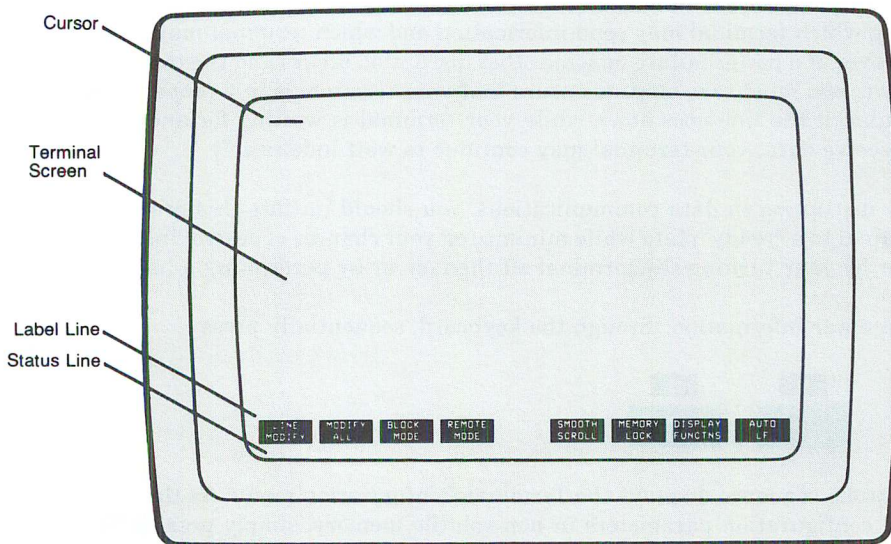


Figure 10.1. Initial HP Screen Display

If the terminal fails to reach this state, turn the power switch off and call your nearest Hewlett-Packard sales and service office for help.

“Default Configurations Used”

If the terminal displays the message: **Default Configurations Used**, the battery protecting non-volatile memory may have jarred loose. Follow the procedure given later in this section on removing, inspecting, then replacing the battery support. Now, turn off the power to the terminal then turn it back on. If the same message reappears, see the paragraph in this section on performing the Terminal Test.

If the Terminal Test completes successfully, the battery is probably faulty, so replace it. However, if that fails to solve the problem, contact your local sales and service office for help.

Centering The Screen Image

The terminal stores in non-volatile memory a value that it uses to center the visual image upon the screen. If the “**Default Configurations Used**” message appears, you may have to recenter the screen manually. To do so, follow this procedure.

Shifting the screen’s image requires your pressing four keys simultaneously. With your left hand, press and hold down the **SHIFT** and **CTRL** keys. Use the thumb on your right hand to hold down the right **SHIFT** key. Then pressing the **←** key with your right index finger shifts the screen to the left. In a similar fashion, pressing the **→** key with your index finger shifts the screen to the right.

MALFUNCTION IN A MULTIPOINT ENVIRONMENT


In a multipoint environment, several terminals share the same communication line to a computer. To avoid the garbling of data over this line, the computer assumes complete control concerning which terminal may send information and which terminal may receive information. However, if a power failure or some other disruption occurs and the communication line comes down, you must take steps to ensure that your terminal is in a proper receiving state. In particular, if the line goes down while your terminal is waiting for another terminal to send or receive data, your terminal may continue to wait indefinitely.

After any disruption in data communications, you should initiate this procedure to return your terminal to a “ready” state while minimizing your chances of destroying information (as may occur by your turning the terminal off then on, or by performing a hard reset).

If you can enter information through the keyboard, sequentially press:



This keystroke sequence displays the Terminal Configuration menu. As the terminal stores the active configuration parameters in non-volatile memory, simply press **f6** (**SAVE CONFIG**). This returns the terminal to its initial operating state where it can accept commands from the host computer.



If your keyboard is locked, you must do a soft reset (by pressing the **RESET** key) to unlock the keyboard before undertaking the above procedure. (See the following discussion for further details on “soft” and “hard” resets.)


TROUBLE-SHOOTING PROCEDURES

Other terminal problems may arise during normal operation. You should conduct the following procedures (in their presentation order) before calling a service representative.

Configuration Checking


What sometimes appears to be a terminal malfunction may rather be an incorrect terminal-computer configuration. When the terminal appears to malfunction, before resetting the terminal or conducting any tests, you should verify that the parameters in each configuration menu are correct for the task at hand. If you believe configuration settings may be the problem, see the Reference Manual, or the appropriate person within your installation, for help.

Resetting The Terminal



Occasionally, you may find it necessary to reset the terminal to clear an error condition. There are two types of reset: a soft reset and a hard reset. Both types stop printer and datacomm operations. Additionally, a hard reset activates the configuration values stored in non-volatile memory and destroys all data in workspace memory. (That is, a hard reset returns the terminal to its power-on condition.) For these reasons, you should use discretion when considering a reset operation.

SOFT RESET. You perform a soft reset by pressing the **RESET** key. A soft reset has these effects:

- The terminal bell rings.
 - The active configuration values remain in effect.
 - The terminal preserves all data stored in workspace memory.
 - The window maintains the current screen display.
 - The terminal unlocks the keyboard.
 - If Display Functions is enabled, the terminal disables it.
 - If Record Mode is active, the terminal cancels its selection.
 - The terminal stops all operations by devices (such as printers) which it controls.
 - The terminal stops transferring data to the datacomm line.
- 

HARD RESET. You perform a hard reset by simultaneously pressing the **CTRL**, **SHIFT**, and **RESET** keys. A hard reset has these effects:

- The terminal bell rings.
- The terminal resets all configuration parameters to the values stored in non-volatile memory.
- The terminal destroys any data stored in workspace memory.
- The terminal resets the user-defined function keys to the values stored in non-volatile memory.
- The terminal unlocks the keyboard.
- The terminal displays the Modes set of function key labels.
- The terminal sets the left margin to column 1 and the right margin to column 80.
- The terminal clears all tabs.
- If enabled, the terminal disables the following capabilities:
 1. Display Functions
 2. Line Modify
 3. Insert Character
 4. Memory Lock
 5. CAPS Mode
 6. Record Mode
 7. Monitor Mode
 8. Any special datacomm modes
 9. Extended Characters Mode
 10. Top or Bottom Logging
- If an integral printer is present, the terminal turns off any Report Print or Metric Print selection.

Self Tests

Your terminal can test itself. You may select between five tests by displaying the Service Set of function key labels.

You display these labels by pressing:



This keystroke sequence displays the following labels:



If your installation has not programmatically locked the Service Keys, you can initiate a test by pressing the appropriate key.

This section describes the Terminal Test. Section 9 describes the Integral Printer Test. See the Reference Manual for information on the remaining tests.

TERMINAL TEST. The Terminal Test verifies whether the terminal is operating correctly. Once the Service Keys labels are visible, pressing **f5** (**TERMINAL TEST**) initiates this test.

When the test completes successfully, the terminal displays a test pattern on the screen (see figure 10-2). If the test pattern does not appear or if an error message replaces the function key labels, you could conduct additional tests to isolate the problem, or you could contact your nearest Hewlett-Packard sales and service office for help.

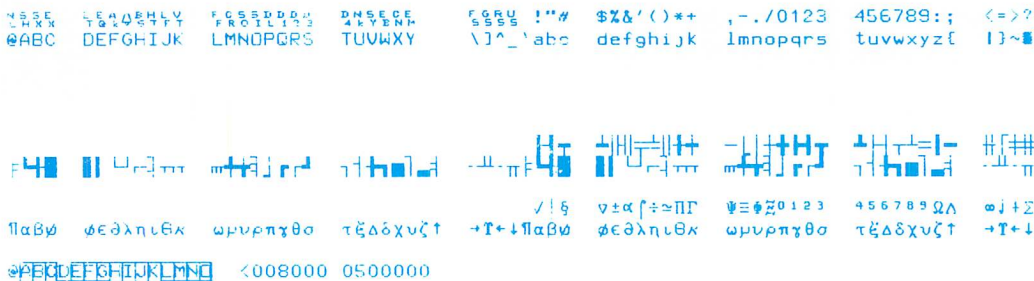


Figure 10-2. Terminal Test Pattern

PREVENTIVE MAINTENANCE

Two simple procedures which you may do to help ensure the proper operation of your terminal are (1) regularly replacing the battery that protects non-volatile memory and (2) keeping the screen and keyboard clean.

Protecting Non-Volatile Memory

NON-VOLATILE MEMORY. Display Memory is volatile memory; that is, it loses stored information upon power failure. Non-volatile memory is a battery-maintained portion of RAM memory that stores configuration parameters. Without the battery power supply, this information would also be lost whenever power to the terminal is turned off.

BATTERY REPLACEMENT. To safeguard non-volatile memory, you should replace the battery every 12 months. You can obtain a new battery through commercial outlets by requesting a Mallory Battery, Type TR133. Alternatively, you can order batteries through your local HP Sales and Service Office by using the following name and part number:

Terminal Battery, HP Part No. 1420-0259

By leaving the terminal powered on, configuration data should be protected when you replace an old battery. However, because someone bumping the terminal could accidentally jar the battery loose, it is prudent to keep a record of the terminal's configuration menus. Since you can copy the screen's display to a printer (either external or integral), it is a simple task to display each menu then copy it. (See Part 8 of Appendix D for this procedure.)

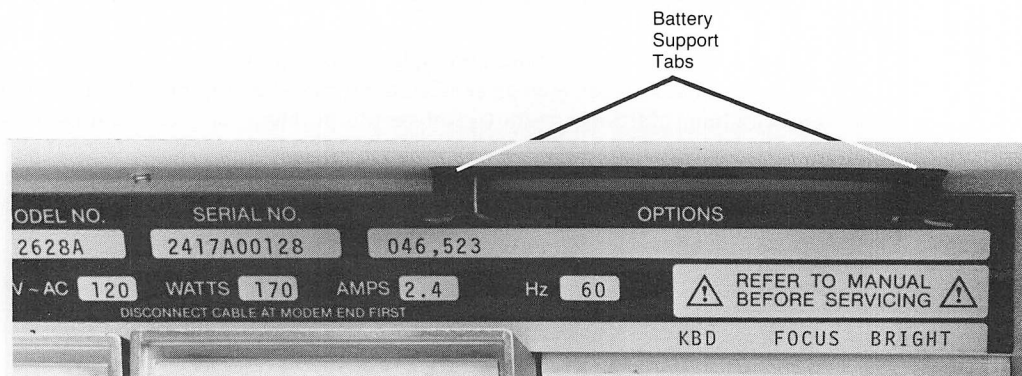


Figure 10-3. Battery Support Location

The battery is located above the terminal's rear panel (figure 10-3). To replace the battery, perform the following procedure:

- Step 1.** If terminal power is off, turn it on and wait until the terminal is ready for use. (The terminal now supplies power to non-volatile memory. This "protects" the configuration menus while you replace the battery.)
- Step 2.** Refer to figure 10-4. Squeeze the tabs toward the center of the battery support with enough pressure to disengage the flanges which hold the battery support in place. Pulling down frees the battery support from the terminal.
- Step 3.** Remove the old battery from the support.

Step 4. Insert the new battery into the support. Be sure the positive end of the battery corresponds to the positive end of the support (+ to + and - to -).

Step 5. Insert the battery support into the terminal. A slotted guide in the outward-facing side of the support ensures that you replace the battery support with the right polarity.

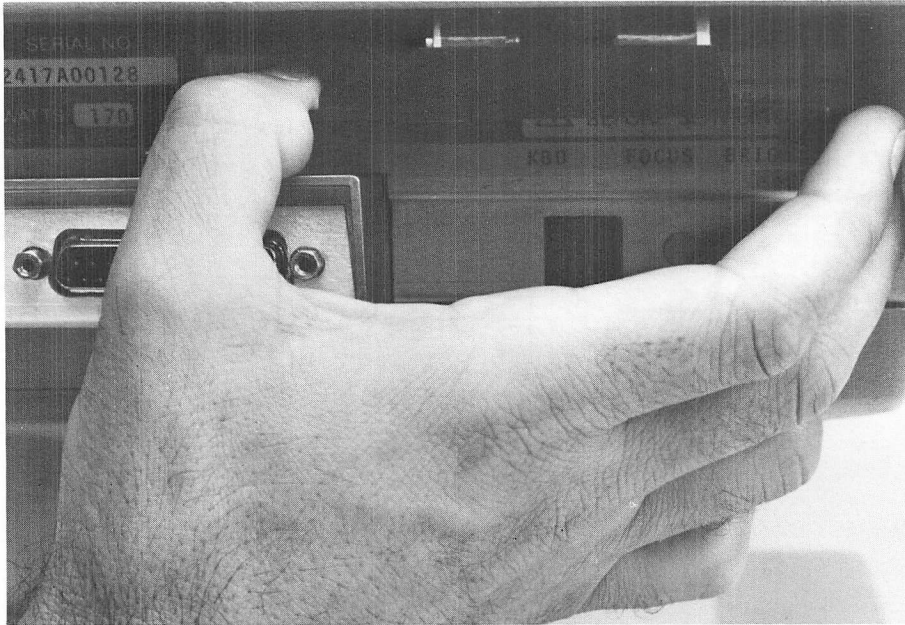


Figure 10-4. Battery Replacement

Cleaning The Screen And Keyboard

You should regularly clean your terminal to remove dust and grease. First, dust lightly using a damp, lint-free cloth. (Paper towels are fine.) The cloth should be just damp enough to pick up dust. Avoid wiping dust or lint into the keyboard area.

If smudges or fingerprints persist, you can use a mild solution of soap and water. Remember to wring the cloth thoroughly; otherwise, rubbing the dirty areas will drip water over the terminal. Avoid getting any liquid between the keys.

CAUTION: Never use petroleum-based cleaners, such as lighter fluid, or cleaners containing benzene, trichloroethylene, dilute ammonia, ammonia, or acetone. These cleaners may harm the plastic surfaces.

DISPLAY ADJUSTMENTS

The terminal has two display adjustments that you may use if the screen's image appears fuzzy or dim.

Brightness

The Brightness Control knob is located on the terminal's rear panel (figure 10-5). If you are facing the rear panel, turning the knob clockwise increases the brightness. Turning the knob counter-clockwise decreases the brightness.

Position the cursor near the middle of the screen and enter a few characters. Then adjust the brightness so the image is comfortable to your eyes.



Figure 10-5. Brightness and Focus Control

Focus

The Focus knob is located beside the Brightness Control knob. Using the characters that you just centered on the screen, turn the Focus knob to the right or left until the characters appear in sharp focus.

Appendix A

Using Your Terminal In Graphics Applications

INTRODUCING GRAPHICS MODE

As an option, your terminal can support graphics applications. In such cases, the terminal maintains distinct memories for alphanumeric and graphics data. It provides separate control of each allowing you to display the contents of either memory alone or both simultaneously. Through the “graphics” keypad, you have limited control over the terminal’s graphics features. Escape sequences provide complete control. This section describes the graphics keys and summarizes some of the graphics capabilities. The Reference Manual describes escape-sequence programming.

GRAPHICS KEYPAD

With the graphics option, the numeric keypad assumes an extended role. A plastic template overlays the numeric keypad and shows the various keys’ operation when they are functioning in graphics mode. Where the template lacks a label, the corresponding key has no extended function. For example, both tab-positioning keys are inoperable in graphics mode.

Figure A-1 depicts the correspondence between the graphics keys and the numeric keypad.

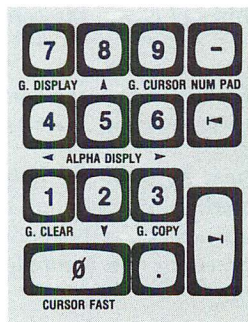



Figure A-1. Graphics Operations Of The Numeric Keypad

The terminal stores the keypad's operating state in non-volatile memory. Thus, when you power the terminal on (or do a hard reset), the terminal "remembers" the mode in which you last left the keypad.

The Status Line shows the keypad's current operating state. You change the keypad to graphics operation by simultaneously pressing the Shift and "Minus" keys. When set for graphics operation, you return the keypad to numeric operation by again pressing the Shift and "Minus" keys. That is, these two keys switch the keypad between both modes of operation.

Table A-1 lists the function for the graphics keys when the keypad is in graphics mode.

Table A-1. Graphics Keypad Functions

KEY	FUNCTION
G. DISPLAY	A toggle switch that alternately turns the graphics display off then on. The graphics display views the contents—both text and vectors—of graphics memory.
G. CURSOR	A toggle switch that alternately turns the graphics cursor off then on. However, to view the cursor, the graphics display must be on.
 NUM PAD	A toggle switch that alternates the numeric keypad between graphic operations and its normal numeric state. The Status Line indicates the keypad's current mode of operation.
ALPHA DSPLY	A toggle switch that alternately turns the alphanumeric display off then on.
G. CLEAR	Pressing this key clears the contents of graphics memory.
G. COPY	Pressing this key copies the contents of graphics memory to the selected destination device(s).
↑, ↓, ←, and →	Pressing these keys moves the graphics cursor in the direction indicated by the symbol shown on the key. Simultaneously pressing two orthogonal keys moves the cursor in a diagonal direction. (An example of orthogonal keys is the ↓ and → keys.)
CURSOR FAST	Simultaneously pressing this key with any of the four cursor movement keys speeds cursor movement.

GRAPHICS CONTROL FROM A PROGRAM

The Reference Manual gives complete instructions on programming the terminal for graphics operations. This includes drawing vectors since no keys provide this function.

GRAPHICS TEXT MODE

Graphics memory may contain vectors, graphics characters, or both. You may enter any displayable character from the terminal's base character set into graphics memory. (You may also enter the special characters for each of the local languages.) You specify whether the characters should be upright ("normal" print) or slanted ("italicized") and choose between eight character sizes. The smallest size is the default selection. See figure A-2.

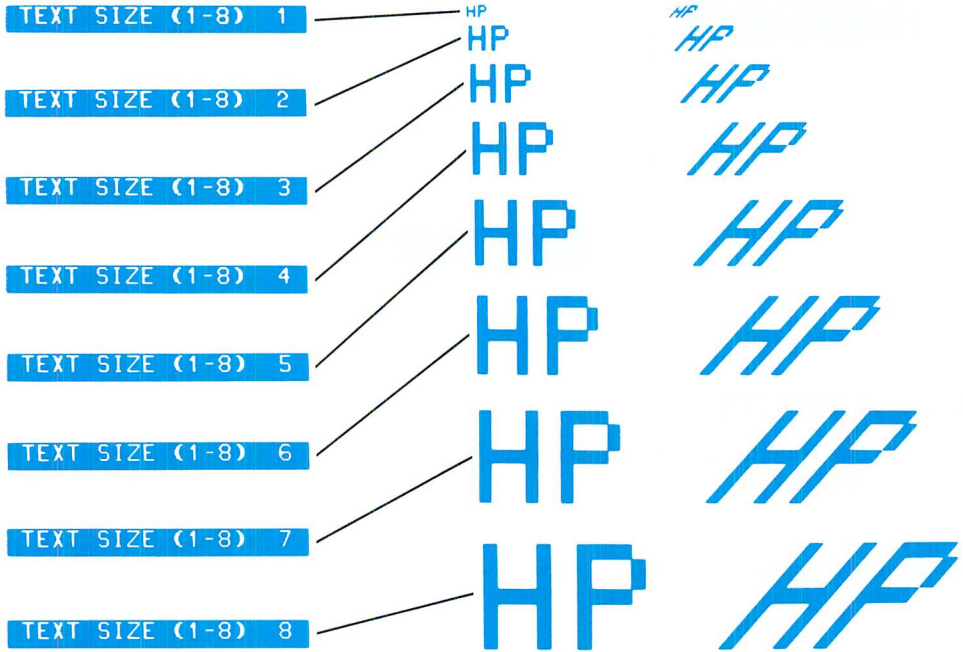


Figure A-2. Graphics Text Sizes

Additionally, you can display lines of text at four different angles (in 90-degree increments.) See figure A-3. The Reference Manual provides further information on both text size and slant control and also information on graphics text origin/justification.

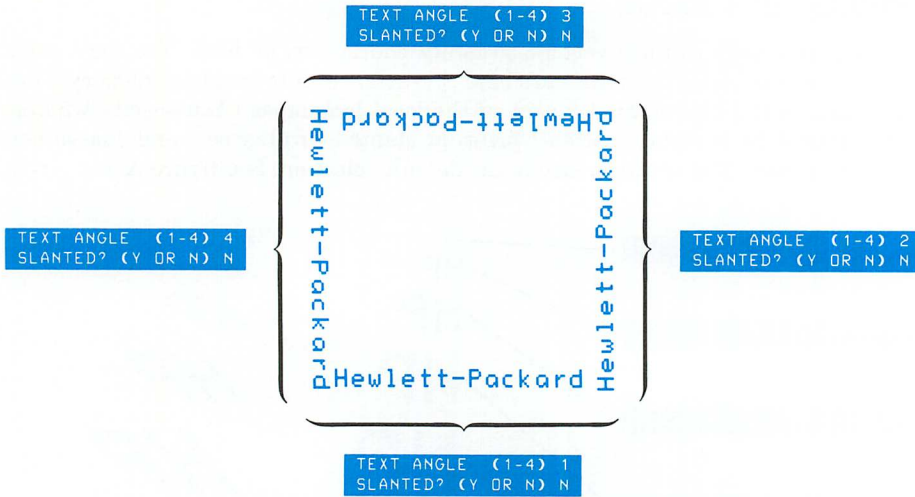


Figure A-3. Graphics Text Orientation

DISPLAY CONTROL

You can manipulate the graphics and alphanumeric displays so they are displayed separately or simultaneously.

Remember: Turning a video display window on or off differs radically from clearing the respective workspace. (See following paragraphs.)

Graphics/Alphanumeric Video On/Off

You turn the graphics display on and off by pressing the G. DISPLAY key. You turn the alphanumeric display on and off by pressing the ALPHA DSPLY key.

The terminal maintains the data for both displays in separate memory areas. Under no circumstance is information lost when you turn off the video for either display.

Erasing The Graphics Display

As one keystroke (**CLEAR DSPLY**) clears the alphanumeric workspace, you may also clear graphics memory with a single keystroke.

Pressing the G. CLEAR key clears graphics memory. This erases the entire graphics workspace (including any graphics text). Once erased, the data is lost. You cannot recover it.

CURSOR CONTROL

Alphanumeric Cursor

The alphanumeric cursor is tied to the alphanumeric display. Using the ALPHA DSPLY key to turn the alphanumeric video on and off also turns the alphanumeric cursor on and off. (However, through an escape sequence, you may turn the cursor on and off independently from the alphanumeric display. See the Reference Manual for details.)

Graphics Cursor

You can turn the graphics cursor on and off by pressing the G. CURSOR key. The cursor is visible, however, only when graphics video is turned on. The arrows on the graphics/numeric keypad move the cursor to any position on the display window. Simultaneously pressing the CURSOR FAST key and the cursor keys increases the speed at which the cursor travels. Simultaneously pressing two cursor arrow keys that occur at right angles to each other moves the cursor diagonally.

COPYING GRAPHICS DATA

You can copy the contents of graphics memory to a selected destination device. You select the destination device by pressing:



After the "To Device" set of labels appears, you can enable an external device, the integral printer, or both.

The alternate peripheral interface provides Decision Support Graphics (DSG) compatibility for the following HP devices:

- printers: 2631G, 2671G, 2673A, 2932A, 2934A, and the 82906A
- plotters: 7470A, 7475A, 7580B, 7585B, and the 9872C/T

Pressing the G. COPY key initiates the data transfer. You can cancel the operation by pressing the **RETURN** key. Otherwise, the terminal copies the entire contents of graphics memory to the destination device.

COMPATIBILITY MODE

Compatibility mode enables your terminal to use graphics packages designed for terminals that have more addressable points on their display screen. Tek 4010 mode supports applications designed for screens with twice the linear dimensions of your screen (four times the area). See figure A-4. Tek 4014 mode supports applications designed for screens with four times the linear dimensions of your screen (16 times the area). While the following discussion pertains to Tek 4010, similar concepts apply to Tek 4014.

Your terminal accomplishes Compatibility mode in one of two ways. In Scaled mode, the terminal scales the incoming data so the entire image fits onto the display screen. In Unscaled mode, the terminal only displays a portion of the entire image. However, through movements of the viewing window, you can display the different portions of the image.

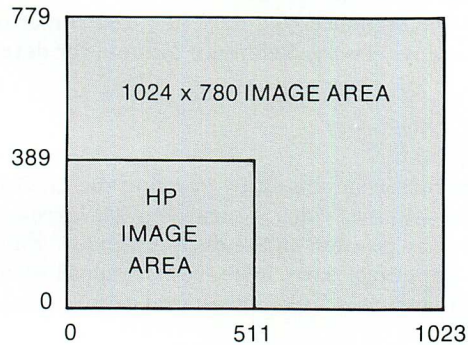


Figure A-4. Display Area Comparison

Turning Compatibility Mode On And Off

You select Compatibility mode through the Terminal Configuration menu. Setting the `Graph Compat` field to either `Scaled`, `Sc1 4014`, `Unscaled`, or `Uns 4014` enables Compatibility mode. Compatibility mode is disabled when you set the `Graph Compat` field to `Off`. (This is the default setting). To change the field entry, display the Terminal Configuration menu by pressing:



Once the menu appears, use the `f10` key to position the cursor in the `Graph Compat` field. Then use the `NEXT CHOICE` or `PREVIOUS CHOICE` keys to choose between `"Scaled"`, `"Sc1 4014"`, `"Unscaled"`, or `"Uns 4014"`.

Scaled Mode

Scaled mode halves a 1024 X 780 image so the image fits onto your terminal's screen. (Figure A-5 depicts this scaling technique.) Characters are also scaled.

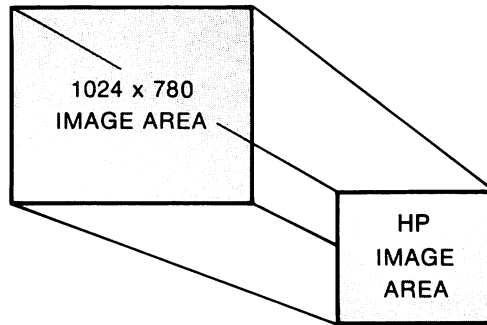


Figure A-5. 1024 X 780 Image Area Scaled To Fit Your Terminal's Image Area

Setting the terminal for Scaled mode forces graphics text mode. Furthermore, the terminal fixes the text size to "1" and the angle of the characters to "0" to accommodate 35 lines of text.

Unscaled Mode

Unscaled mode displays a 512 X 390 subset of a 1024 X 780 display. The terminal "clips" any vectors going off the screen. This mode allows full use of the terminal's resolution but requires you to modify scaling statements in the software package if you want to display the complete image on the terminal screen.

By moving the relocatable origin, you can change which subset of the image the terminal displays. The terminal subtracts the relocatable origin from all incoming coordinates. If the origin is set to 0,0 (the default setting), the terminal displays the area between $x = 0$ to 511, and $y = 0$ to 389 (figure A-6). Setting the origin to 0,390 covers the area between $x = 0$ to 511, and $y = 390$ to 779. To display an area larger than 512 X 390 requires your changing the program's scaling statements.

If you enter alphanumeric characters into graphics memory, the terminal uses the currently selected size and angle. You may subsequently change these values by using escape sequences. This gives you maximum flexibility for writing labels. (See the Reference Manual for details on these features.)

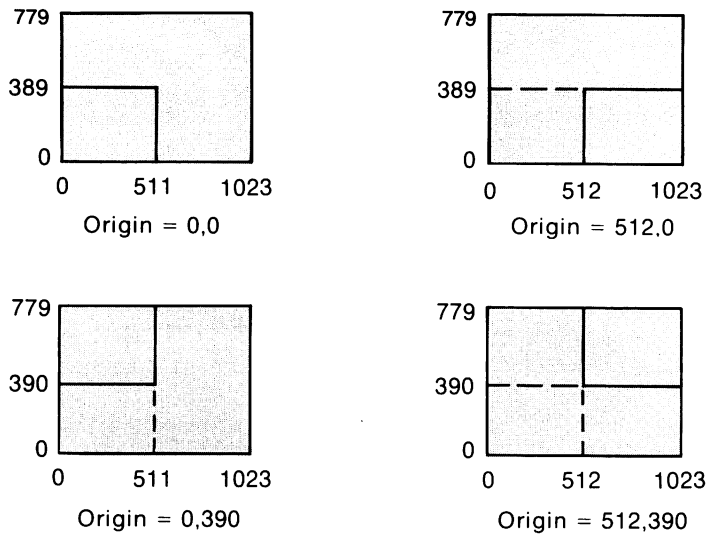


Figure A-6. Using The Relocatable Origin To Cover The 1024 X 780 Display

In summary, you turn Compatibility mode on by selecting either a "scaled" or "unscaled" mode. When Graphics Text mode is off, the terminal stores all text into alphanumeric memory. When Graphics Text mode is on, the terminal stores alphanumeric characters in graphics memory. In Unscaled mode, you may vary the size and angle of characters. In Scaled mode, the terminal fixes both of these values.

Appendix B

Using Your Terminal For Word Processing

The 2628A supports HPWORD, a HP 3000 software package that eases the entering and editing of text. Additionally, you may order HPWORD support as an option for the 2625A.

The HPWORD documentation fully describes this utility program. You should have access to the following manuals:

- HPWORD Reference Guide 32120-90001
- HPWORD Quick Reference Guide 32120-90002
- Using HPWORD Self-Paced Training 22839A

HPWORD requires overlays for the character set group, the display control group, and the numeric keypad. Figure B-1 illustrates the keyboard templates for HPWORD.

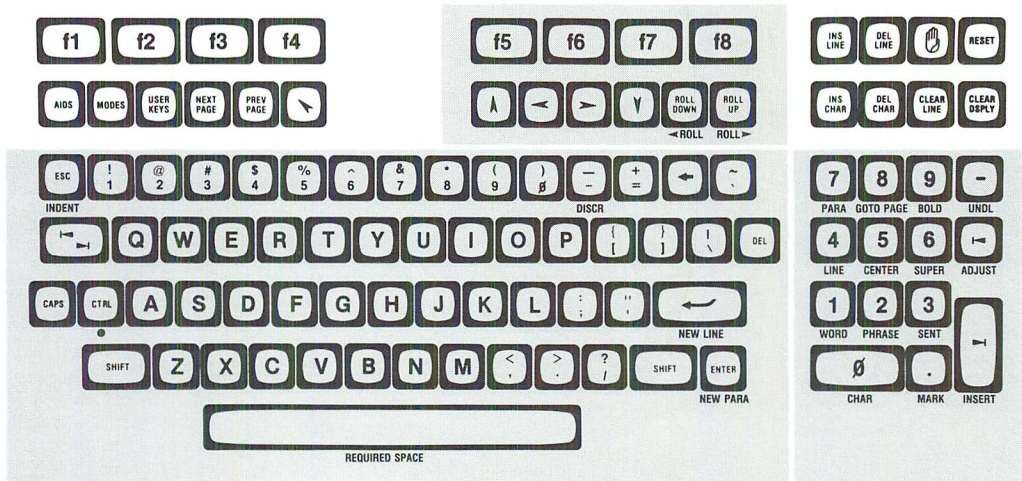


Figure B-1. Layout Of Keys For HPWORD

Refer to the appropriate HPWORD manuals for details on the operation of the various keys.

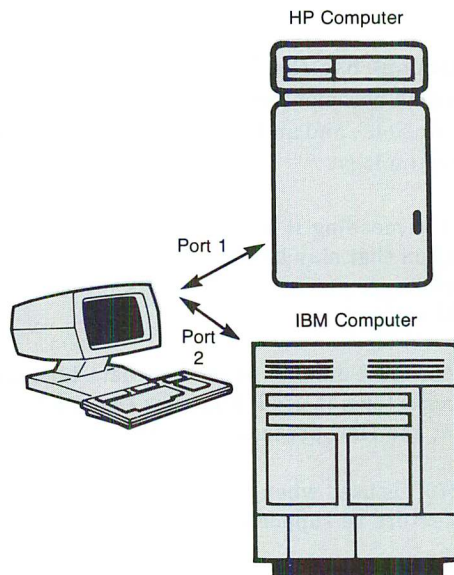


Appendix C

Using Your Terminal In IBM Applications

INTRODUCTION

The terminal is your means of communicating with a computer system. A computer's design and complexity, however, often prevents terminals from communicating with computers that were manufactured by different companies. With the proper options, your terminal may serve within a Hewlett-Packard system, an International Business Machines Corporation (IBM) system, or an IBM-compatible system. You may even simultaneously connect your terminal to HP and IBM systems. In essence, your terminal takes on a "dual personality".



When your terminal assumes its primary HP personality, it resembles other Hewlett-Packard data entry terminals. (A few function key labels may change to support the IBM option on Port 2.) When ordered with the appropriate options, the terminal also supports graphics and/or HPWORD applications.

When your terminal assumes its alternate personality, it functions as an IBM 3276 control unit/display station. Because its operation is similar to an IBM 3276, you should refer to the appropriate IBM manuals for a complete description of terminal operations.

Even though your terminal may function as an IBM 3276 control unit, it doesn't replace this terminal. For example, the following restrictions apply. You cannot connect an IBM 3278 display station to your terminal. Special features, such as the "selector light pen" and the "magnetic slot reader", are unavailable. Furthermore, where applications require the "security keylock" or the "encrypt/decrypt" feature, you must still use the IBM terminal.

However, in the daily tasks of communicating with a computer, data entry, and inquiry/update applications, you may use your terminal as an IBM display station.

The remainder of this appendix provides more details on your terminal's operation in an IBM environment.

NOTE: Except for this appendix, the word "terminal" adequately describes your work station without ambiguity.

However, if your terminal has the IBM option, it may function as one of two "terminals". Therefore, it becomes necessary to distinguish between the physical box, an IBM "display station", and an HP "terminal". The remainder of this appendix uses the following terminology:

- "terminal retains the meaning it has held throughout this manual. It refers to a "general" work station that may be configured for special applications by ordering appropriate options. (Since you are reading this appendix, it is assumed your "terminal" has the IBM option.)
- "HP 2625A" is the product number of the new data terminal with the IBM option. Whenever this specific term is used, it implies that your terminal not only has the IBM option but that the IBM personality is currently active.
- "IBM 3276" or ("3276") is used when it is necessary to differentiate between the implementation of a feature as supported by IBM and Hewlett-Packard.

PREPARING YOUR TERMINAL FOR USE

Cable Connections

No special actions are required for connecting either power or the keyboard to your terminal (see Section 2.) You also connect your terminal to an HP computer in the same manner.

Supporting IBM data communications requires special hardware. Therefore, the factory configures Port 2 as the IBM datacomm port. Although you have some flexibility in configuring Port 1, you must always connect Port 2 to the IBM (or IBM-compatible) system.

Switching Between Personalities

If you connect your terminal to two different systems, it functions as an IBM terminal when it communicates with the IBM host, and it functions as an HP terminal when it communicates with an HP host.

The terminal partitions its display memory between both personalities. Memory allocation is sufficient so both personalities may operate simultaneously without loss of data.

The keyboard sends its input to the active personality. Therefore, when the terminal is serving as an IBM terminal, the terminal directs all keyboard data to the IBM workspace. Likewise, when the HP personality is active, all keyboard data goes to the HP workspace.

Data transfers from a host computer go to the proper workspace, regardless of which personality is currently active. That is, an IBM computer always sends data to the IBM workspace, and an HP computer always sends data to the HP workspace.

The screen is a viewing window into the active workspace. Changing personalities updates the screen to show the contents of the newly selected workspace. The function key labels and the Status Line also change to reflect the new personality.

The middle portion of the Status Line shows the terminal's "active" personality. One function key (**NEXT SYSTEM**) switches the terminal between personalities. As each workspace area is distinct, switching between personalities never causes information to be lost.

Initial Screen Display

The initial screen display depends upon whether the terminal is configured for an external printer on Port 1 (as specified by the entry in the **Ext Printer** field of the 3276/8 Configuration menu).

INITIAL "HP" DISPLAY. If Port 1 is configured for a HP computer, the terminal comes up in its primary HP personality and displays the Modes function key labels. To change your terminal to its alternate IBM personality, you must press the **AIDS** key to display the Aids set of function key labels. Pressing **f4** (**NEXT SYSTEM**) accesses the IBM personality and displays the following function key labels:

f1	f2	f3	f4	f5	f6	f7	f8
	TO ALT PRT	TO INT PRT	NEXT SYSTEM		ADVANCE LINE	LOCAL PRINT	3276/8 config

NOTE: If your terminal lacks the appropriate options, the function key labels for **f2**, **f3**, **f6**, and **f7** appear as blank fields.

When your terminal is functioning as an IBM terminal, you may switch to the HP personality by pressing **f4** (**NEXT SYSTEM**).

INITIAL "IBM" DISPLAY. If the terminal was turned off while Port 1 was configured for an external device, this information is stored in non-volatile memory, and the terminal is restricted from accessing the HP function key labels. Therefore, the terminal powers on as an IBM terminal, and the function key labels assume the following values:



These values form the basic IBM "Aids" level when Port 1 is configured for an external device.

NOTE: Since you can configure Port 1 for an external printer only when it is not connected to an HP computer, the label for selecting the external printer replaces the softkey that switches your terminal between personalities. Thus, while you are using your terminal with an IBM system and an RS-232-C printer, the terminal excludes you from accessing the HP Modes, Aids, and User Keys function key labels.

Configuring For IBM Mode

The 3276/8 Configuration menu contains parameters that pertain to the IBM personality. For example, you must state in the configuration menu whether an external printer is connected to Port 1. Furthermore, certain features that an IBM user accomplishes through key strokes, you must do through menu selections.

Displaying The IBM Configuration Menu

Once the Aids set of IBM function key labels appear on the screen, you may display the 3276/8 Configuration menu by pressing **f8** (3276/8 config).

Figure C-1 shows the menu and its default ("normal") settings.

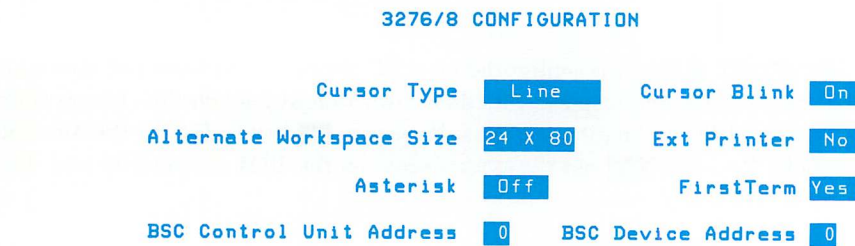


Figure C-1. 3276/8 Configuration Menu

Where appropriate, some of the following text refers to fields in this menu. However, the Reference Manual provides a full description of all menu fields and how you make menu selections. You should also refer to the Reference Manual for the necessary information on data communications.



USING YOUR TERMINAL WITH A COMPUTER

See the first part of this manual for details on using your terminal in HP applications.

In IBM applications, your terminal operates as an IBM display station. It connects to an IBM computer through a remote bisynchronous connection. For a group of terminals, the first terminal must be connected to a modem. Subsequent terminals connect to the first in daisy-chain fashion. The Reference Manual provides the necessary details.

NOTE: Your terminal only supports Binary Synchronous Communications (BSC). It offers no support for Synchronous Data Link Control (SDLC) or for local channel connections to an IBM host.

APPLICATION PROGRAMS

An IBM 3278 display station normally serves as an inquiry/update or data entry terminal. An application program running on the host system interacts with each terminal. The program sets the format for the display screen and determines how certain keys are interpreted and how the system responds to the operator. You should see the appropriate manual for the implementation of any application program that you are using.



THE DISPLAY

The screen's display contains a fixed number of horizontal rows. Depending upon the configuration, your "screen" may consist of 24 lines, 32 lines, or 43 lines. Each row contains 80 columns.

Displays may be formatted or unformatted. An unformatted display has no defined fields. A formatted display contains at least one defined field, which may be either protected or unprotected. The terminal prevents you from entering data from the keyboard into a protected field. Since you may enter characters into unprotected fields, they are also called "input" fields.

An attribute byte defines each protected and unprotected field. A field remains defined until the occurrence of the next attribute byte. Therefore, fields may wrap across a line or several lines, and may wrap from the bottom line of the format area to the top of the screen.

An application program issues a Start Field order to set each attribute byte. The byte contains the video and field enhancements which pertain to that field. The character that corresponds to the attribute byte appears as a blank on the display screen.

VIDEO ENHANCEMENTS

Once defined within an attribute byte, video enhancements propagate throughout their field.

The HP 2625A supports the following video enhancements:

- HIGH INTENSITY (implemented as HP's Full Bright)
- NORMAL INTENSITY (implemented as HP's Half Bright)
- NONDISPLAYABLE (implemented as HP's Security Video)

The HP 2625A does not support the SELECTOR PEN DETECTABLE video enhancement. Instead, it supports the Cursor Selectable field enhancement and the Cursor Select (**CURSR SEL**) key.

FIELD ENHANCEMENTS

An application program may define fields to be:

- PROTECTED. The terminal restricts you from entering data into (or modifying the data within) a protected field.
- UNPROTECTED. You may enter (and edit) characters within an unprotected field.
- NUMERIC ONLY. You may only enter the numeric digits (0 through 9), the minus sign (-), a decimal point (.), or the DUP character within a numeric field.
- AUTO SKIP. When the Auto Skip feature is encountered, the cursor advances to the next unprotected location.
- MODIFIED DATATAG. The MDT bit shows whether any data within this field has been entered, edited, or erased since the last input/output sequence.
- CURSOR SELECTABLE. This enhancement permits the Cursor Select key to function, provided that the first character of the field is a properly defined designator character.

COMMANDS AND ORDERS

An application program interacts with your terminal through "Commands" and "Orders". Commands allow data to be either written from the host or read from the display. Orders further define write operations.

Commands

The HP 2625A supports three types of commands: write commands, read commands, and control commands.

WRITE COMMANDS. The HP 2625A supports three types of write commands that control the writing of data to the display. A Write Control Character may supply additional information.

- **WRITE** - This command transfers (“writes”) data from the host computer to the terminal.
- **ERASE/WRITE** - This command erases the entire display before implementing the write operation.
- **ERASE/WRITE ALTERNATE** - This command erases the entire display and sets the alternate screen size before implementing the write operation. The normal (“default”) screen size is 24 lines by 80 characters. You may set an alternate screen size in the 3276/8 Configuration menu.

The WCC (Write Control Character) contains information associated with a write command. The information shows whether to reset the keyboard, ring the bell, or reset the MDT (Modified Data Tag) bits.

READ COMMANDS. The HP 2625A supports two types of read commands. These commands control the reading of data from the display.

- **READ BUFFER** - This command is primarily used in diagnostic tests. It initiates the transfer of the entire display to the IBM host from the buffer position where reading begins to the last buffer location in the display.
- **READ MODIFIED** - This command reads those fields where the MDT bit is set. Depending upon which key you pressed to request this operation, the Read Modified command initiates one of two actions:
 - a) **Read Modified**—pressing the **ENTER** key, the **CURSOR SEL** key (when a ampersand is the designator character), or a **PF** key transfers all modified fields to the program.
 - b) **Short Read**—pressing either the **CLEAR** key or one of the three **PA** keys transmits a code signifying which one of these keys was pressed.

CONTROL COMMANDS. There are two control commands:

- **ERASE ALL UNPROTECTED** - This command erases all data within unprotected fields.
- **COPY** - This command transfers data between devices. The HP 2625A offers no support for this command. (See the following discussion on “PRINT OPERATIONS” for ways to obtain printed copies with your HP 2625A.)

Orders

An IBM 3276 recognizes two types of orders: buffer control orders and print-out format orders.

BUFFER CONTROL ORDERS. Six types of buffer control orders facilitate the writing of information to the display:

- **START FIELD (SF)** - The SF order notifies the terminal that the next byte in the data stream is an attribute byte.
- **SET BUFFER ADDRESS (SBA)** - The SBA order specifies a new buffer address from which write operations start or continue.
- **INSERT CURSOR (IC)** - The IC order moves the cursor to the location specified by the current buffer address.
- **PROGRAM TAB (PT)** - The PT order advances the current buffer address to the address of the first character position within the next unprotected field.
- **REPEAT TO ADDRESS (RA)** - The RA order stores a specified alphanumeric or null character in all buffer locations from the current buffer address up to the specified stop address.
- **ERASE UNPROTECTED TO ADDRESS (EUA)** - The EUA order inserts nulls in all unprotected buffer locations from the current buffer address up to the specified stop address.

PRINTOUT FORMAT ORDERS. The printout format orders are stored in the buffer as control characters. They are executed during a printout operation. As the HP 2625A provides alternate means for printing data, it offers no support for the 3276 format orders.

THE IBM KEYBOARD

Templates overlay the HP keyboard to show the placement of the differing IBM keys. Figure C-2 shows the layout of the IBM keys for an HP USASCII keyboard.

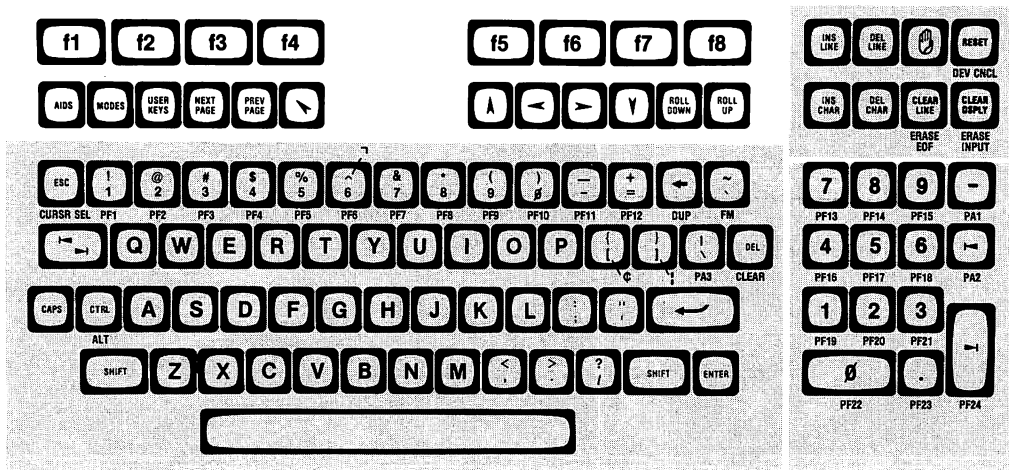


Figure C-2. IBM Key Locations On HP Keyboard

On the templates, the “names” for the keys appear in one of two colors. Brown labels show that the indicated key replaces the corresponding key on the HP keyboard. For example, the **CURS_R SEL** (Cursor Select) key replaces the **ESC** key. Although the **ALT** (Alternate Shift) key replaces the **CTRL** key, it appears in blue print. For keys that function as Alternate Shift keys, you must simultaneously press the **ALT** key and the corresponding key to select that function. These keys also appear in blue print. Since the way of accessing certain functions differ between their HP and IBM implementations, the blue color scheme quickly identifies all Alternate Shift keys.

The HP 2625A offers support for the following languages:

- Danish
- Dutch
- English (United Kingdom)
- English (USASCII)
- Finnish
- French
- French Canadian
- German
- Italian
- Norwegian
- Spanish
- Swedish

With the national languages, the templates also show which keys in the character set group may have been relocated.

IBM CHARACTER KEYS

The 3276 provides three keys that are not available on standard HP keyboards. These keys are the cent sign (¢), the split vertical bar (|), and the logical not sign (¬). Likewise, IBM does not support three HP USASCII characters: the left bracket ([), the right bracket (]), and the circumflex (^). Therefore, when your terminal functions as an IBM terminal, the terminal maps the left bracket into the cent sign, the right bracket into the vertical bar, and the circumflex into the logical not sign. (The template for the character set group shows all “replaced” keys.) Besides these six keys, the HP-USASCII character set parallels the IBM-EBCDIC character set.

Table C-1 summarizes the keys on an IBM keyboard and their HP implementation. For those users familiar with IBM terminals, this may suffice. For further information on key operation, read the remainder of this section.

Table C-1. Comparison Of IBM And HP Keyboards

KEY/SWITCH	IBM 3276		HP 2625A	
	Alternate?	Repeating?	Alternate?	Repeating?
(A,a/A)	No	No	Not supported	
SHIFT	No	No	No	No
SHIFT LOCK	No	No	supported by CAPS key	
ALT	No	No	No	No
Alphabetic	No	Yes	No	Yes
Numeric	No	Yes	No	Yes
Symbolic	No	Yes	No	Yes
Cursor Control	No	Yes	No	Yes
C Left Twice	Yes	Yes	Not supported	
C Right Twice	Yes	Yes	Not supported	
NEW LINE	No	Yes	No	Yes
TAB FORWARD	No	Yes	No	Yes
BACK TAB	No	Yes	"Shifted"	Yes
HOME	Yes	Yes	No	Yes
BACKSPACE	No	Yes	No	Yes
ATTENTION	No	No	Not supported	
SYSTEM REQUEST	Yes	No	Not supported	
CURSOR SELECT	No	No	No	No
CLEAR	Yes	No	No	No
ERASE INPUT	Yes	No	No	No
ERASE EOF	No	No	No	No
CURSR BLINK	No	No	Menu selection	
ALT CURSR	Yes	No	Menu selection	
PRINT	No	No	"Softkey" implementation	
IDENTIFY	Yes	No	Not supported	
CLICK	No	No	Menu selection	
TEST	Yes	No	Not supported	
RESET	No	No	No	No
DEVICE CANCEL	Yes	No	Yes	No
DUP	No	No	Yes	No
FIELD MARK	No	No	Yes	Yes
PA1 and PA2	Yes	No	No	No
PA3	Not supported		Yes	No
INSERT	No	No	No	No
DELETE	No	No	No	Yes
ENTER	No	Yes	No	Yes
PF1-PF12	Yes	Yes	Yes	Yes
PF13-PF24	No	No	No	No
SPACE BAR	No	Yes	No	Yes

The following discussion describes how your terminal implements the functions accessible from an IBM 3276 keyboard. The IBM implementation is given first; HP's implementation follows.

NOTE: IBM uses icons to "name" several of their keys. Throughout this appendix, IBM keys are shown in bold type and capitalized letters. For HP's version of the IBM keyboard, the HP keycap is shown when you must press an "existing" key. Whenever you must press a key that the template has renamed, that key is also shown as bold, capitalized text.

CHARACTER SELECTION KEYS

Four keys impact which character is selected, or displayed, when you press a particular key.

Shift Key

IBM 3276. The **SHIFT** key accesses uppercase letters or the topmost character on keycaps displaying two characters. Accessing these functions require your continually pressing the **SHIFT** key while you press and release the other key.

HP 2625A. Pressing the **SHIFT** key duplicates this operation.

Alt Key

IBM 3276. Pressing the **ALT** key accesses the function printed on the face of the appropriate keycaps. The **ALT** key operates like the **SHIFT** key since you must press and hold the **ALT** key while you press and release the other key to select the alternate function.

HP 2625A. Pressing the **ALT** key duplicates this operation. However, since the template serves as the face of your keys, blue color titles indicate the "Alternate-Shift" functions on your keyboard.

Shift Lock Key

IBM 3276. The **SHIFT LOCK** key resembles the Shift Lock key on a typewriter. Once activated, the terminal only types uppercase letters and the top symbol on keycaps with two symbols. Pressing either the left or right **SHIFT** key cancels the Shift Lock operation.

HP 2625A. The Shift Lock function is unsupported. Instead, you may print all capital letters by pressing the **CAPS** key. The operation of the **CAPS** key is identical to its operation when in HP mode. Important differences between IBM and HP's implementations are:

- The **CAPS** key only affects the alphabetic keys; the numeric and symbolic keys retain their normal operation.
- Pressing the **SHIFT** key while in Caps mode prints lowercase letters; it does not cancel the selection of Caps mode.
- The **CAPS** key toggles Caps mode on and off. (The Status Line indicates whether Caps mode is active.)

(A,a/A) Switch

The Dual Case/Mono Case (**A,a/A**) Switch determines how the terminal displays characters upon the screen. Selecting Dual Case (**A,a**) prints both uppercase and lowercase letters while selecting Mono Case (**A**) restricts the display to uppercase letters. Regardless of the setting of this switch, the terminal transmits the code for the “pressed” character. For this reason, the HP 2625A doesn’t support this feature.

FIELD-ORIENTED CURSOR MOVEMENT KEYS

Because a major use of the IBM 3278 terminal is data entry, four keys provide easy access to the next “input” field. These keys are

- TAB FORWARD
- BACK TAB
- NEW LINE
- HOME

For each key, the screen’s format determines the cursor’s final position.

The Tab Keys

The Tab keys access the next or previous input field. Both Tab keys repeat their function if you continue to hold the key down.

Tab Forward

IBM 3276. Pressing the **TAB FORWARD** key advances the cursor to the first character position in the next input field. Depending upon the screen’s format, the cursor may wrap over lines and around screen boundaries.

When the screen contains either an unformatted display or a formatted display with only protected fields, the **TAB FORWARD** key “homes” the cursor to the first character position on the first line.

HP 2625A. Pressing the  key duplicates these operations.

Back Tab

IBM 3276. In unprotected fields, the Back Tab action depends upon the cursor's initial position:

- When the cursor is within a field, pressing the **BACK TAB** key moves the cursor to the beginning of that field.
- When the cursor is at the first character position of a field, pressing the **BACK TAB** key moves the cursor to the first character position of the previous unprotected field.

Depending upon the screen's format, the cursor may wrap over lines and around screen borders.

When the screen contains either an unformatted display or a formatted display with only protected fields, the **BACK TAB** key "homes" the cursor to the first character position on the first line.

HP 2625A. Simultaneously pressing the **SHIFT** and **TAB** keys duplicates the 3276's Back Tab function.

NOTE: As the keys in the numeric keypad have assumed an IBM "role", you can no longer use these keys for "tabbing" the cursor.

New Line Key

IBM 3276. Pressing the **NEW LINE** key advances the cursor from its current line. Its final position depends upon the screen's format:

- When the screen contains an unformatted display, pressing the **NEW LINE** key moves the cursor to the first character position in the next line.
- When the screen contains a formatted display but all the fields are protected, pressing the **NEW LINE** key "homes" the cursor to the first character position of the first line.
- If the display is formatted and contains unprotected fields, pressing the **NEW LINE** key moves the cursor to the first unprotected position of the next line. If the next line contains only protected fields, the cursor continues forward until it encounters the first unprotected field. The cursor can wrap from the end of the display to the beginning of the display. (It may even return to its original line if that is the only line containing input fields.)

Holding down the **NEW LINE** key repeats the New Line function.


HP 2625A. Pressing the **←** key duplicates the operation of the **NEW LINE** key.

Home Key

IBM 3276. Simultaneously pressing the **ALT** key and the **HOME** key moves the cursor to the first unprotected position on the screen. (Depending on the screen's format, this could be the middle of the screen.)

When the screen contains either an unformatted display or a formatted display with only protected fields, simultaneously pressing the **ALT** and **HOME** keys moves the cursor to the first character position on the first line.

The Homing function repeats if you continue to hold both keys down (but once the cursor reaches its "home" location, no further movement is apparent).





HP 2625A. Pressing the  key duplicates the Homing operation.

CHARACTER-ORIENTED CURSOR MOVEMENT KEYS

The IBM 3276 provides five keys that move the cursor a character at a time. All of these keys repeat their function if you continue to hold them down.

Vertical Movement Keys

IBM 3276. The **CURSOR UP** and the **CURSOR DOWN** keys move the cursor vertically through a column. Depending upon the model number, a 3276 terminal may display 24, 32, or 43 lines (where each line is 80 columns wide). The vertical cursor movement keys wrap on the top and bottom lines of the screen format, not the physical dimensions of the screen.



HP 2625A. The  and  keys duplicate the action of the **CURSOR UP** and **CURSOR DOWN** keys. However, when the screen format exceeds 24 lines and the cursor is in the bottom line, pressing the  keys rolls the workspace up one row so that the cursor appears in the next row. Similarly, when the cursor is in the top line of the screen window and text exists beyond the window's bounds, pressing the  keys rolls the workspace down one row so the cursor appears in the appropriate row.

NOTE: You may also use the Roll and Page keys to view lines that have rolled off the screen.

Horizontal Movement Keys

IBM 3276. The **CURSOR LEFT** and **CURSOR RIGHT** keys move the cursor one character position in the indicated direction each time you press the key. When the cursor reaches the screen border, pressing the **CURSOR LEFT** key wraps the cursor to the last character position in the previous line, whereas pressing the **CURSOR RIGHT** key wraps the cursor to the first character position of the next line.


The 3276 also provides “double-speed” horizontal movement keys that are the Alternate Shift counterparts of the **CURSOR LEFT** and **CURSOR RIGHT** keys. They behave similarly to these keys except they move the cursor two character positions at a time.

HP 2625A. The  and  keys duplicate the operation of the **CURSOR LEFT** and **CURSOR RIGHT** keys. If pressing a key accesses a row position that is beyond the viewing window, the terminal “rolls” the workspace to bring that line into view.

As these keys repeat at a relatively rapid pace if you continue to hold them down, the HP 2625A does not support the double-speed cursor positioning keys.

Backspace Key

IBM 3276. The **BACKSPACE** key duplicates the operation of the **CURSOR LEFT** key.

HP 2625A. The  key provides an identical implementation.

CURSOR DEFINITION KEYS

For its cursor, the 3276 displays either an underline (the normal form) or a rectangular box (the alternate form). Either type of cursor can appear as blinking or non-blinking. Two keys allow you to select these features.

Alternate Cursor (ALT CURSR) Key

IBM 3276. Alternate presses of the **ALT CURSR** key select either an underline or a rectangular box for the cursor’s form.

HP 2625A. You may select either “Line” or “Box” in the 3276/8 Configuration menu.

Cursor Blink (CURSR BLINK) Key

IBM 3276. Alternate presses of the **CURSR BLINK** key alter the cursor’s appearance so it either blinks or does not.

HP 2625A. You may select blinking or non-blinking in the 3276/8 Configuration menu.

ERASING THE DISPLAY

The 3276 has three keys (**CLEAR**, **ERASE EOF**, and **ERASE INPUT**) that erase all or part of the display. The resulting operation may also reposition the cursor.

Clear Key

IBM 3276. Simultaneously pressing the **ALT** key and the **CLEAR** key initiates these actions:

- The cursor moves to the first position in the first line of the display and the entire screen is cleared. This converts the screen to an unformatted display.
- If an alternate screen size is in effect, the Clear function changes the format to the default workspace size.
- As the **CLEAR** key is an I/O key, pressing the **CLEAR** key locks the keyboard and the "DO NOT ENTER - TIME" message appears in the Status Line.

HP 2625A. Pressing the **CLEAR** key duplicates this operation, except the status message reads: "X System".

Erase End Of Field (ERASE EOF) Key

IBM 3276. Pressing the **ERASE EOF** key leaves the cursor at its current location and erases from the cursor's position forward depending upon the screen format:

- When the cursor is in an unprotected ("input") field, pressing this key erases all character positions from the cursor's current location to the end of that field. When a field wraps around screen boundaries, the erase operations also wraps around to the end of the field.
- When the screen contains an unformatted display, pressing the **ERASE EOF** key erases all character positions from the cursor's current location to the last character position in the display.
- If the cursor is at an attribute byte or in a protected field when you press the **ERASE EOF** key, the keyboard locks and the message "Go Elsewhere" appears in the Status Line.

HP 2625A. Pressing the **ERASE EOF** key duplicates this operation.

Erase Input Key

IBM 3276. Simultaneously pressing the **ALT** key and the **ERASE INPUT** key moves the cursor and clears portions of the screen depending upon the screen's format:

- If the screen contains a formatted display with input fields, simultaneously pressing the **ALT** key and the **ERASE INPUT** key erases all input areas and moves the cursor to the first unprotected character position on the screen.

- If the screen contains a formatted display with only protected fields, simultaneously pressing the **ALT** key and the **ERASE INPUT** key moves the cursor to the first character position on the first line but nothing is erased.
- If the screen has an unformatted display, simultaneously pressing the **ALT** key and the **ERASE INPUT** key moves the cursor to the first character position of the first line and erases the entire screen.

HP 2625A. Pressing the **ERASE INPUT** key duplicates this operation.

TESTS, ERRORS, AND RECOVERY

The **SYSTEM REQUEST** and **TEST** keys request testing routines to be run on the 3276. A change in the “click” sound indicates that the terminal’s keyboard is locked and an error condition has occurred. The **RESET** key serves in error recovery.

System Request Key

IBM 3276. Simultaneously pressing the **ALT** key and the System Request (**SYS REQ**) key initiates one of two actions:

- Simultaneously pressing these keys clears the screen and switches the terminal between application and control programs.
- The terminal sends a test request message to the host system.

In both cases, the keyboard locks, the “**DO NOT ENTER - TIME**” message appears in the Status Line, and Insert Mode (if active) is turned off.

HP 2625A. Your terminal offers no support for this key.

Test Key

IBM 3276. Simultaneously pressing the **ALT** key and the **TEST** key prepares the terminal to run tests that reside in the 3276 control unit. Upon completion of the test procedures, you must again press both the **ALT** and **TEST** keys to return the terminal to its normal operating state.

HP 2625A. The HP 2625A does not support the IBM test features. To test the integrity of your terminal, you should switch the terminal to its HP personality then use the Service Keys set of function key labels.

Click Key

IBM 3276. The **CLICK** key controls whether pressing the keyboard keys produces an audible sound. The key toggles between producing a “click” or not producing a “click”.

Your selection determines how the keys function when the terminal is operating normally. When an error condition occurs, the keyboard “locks”, and pressing the keys produces the alternate “sound”. For example, if you select no click for normal operation, the clicking sound indicates an error condition.

HP 2625A. While the terminal is in its primary HP personality, you may select “**Click**” in the Global Configuration menu. However, this affects the operating state of the terminal and not a particular personality. In particular, the “click” sound functions as in all HP terminals as you may either choose that the keys always click or that they never do. The sound doesn’t change to indicate an error condition. Instead, the terminal bell rings.

Reset Key

IBM 3276. You must press the **RESET** key to recover from “**DO NOT ENTER**” error conditions. Once the keyboard is disabled, no other keyboard operation is honored. You may also use the **RESET** key to exit Insert Mode.

HP 2625A. Pressing the **RESET** key duplicates these functions, except that the **AIDS** and function keys still work.

I/O INITIATION AND PROGRAM INTERACTION

These keys initiate host communication and may specify to the application program what action to invoke.

Enter Key

IBM 3276. Pressing the **ENTER** key notifies the program that you have completed entering your data and are ready to transmit the data to the system. The keyboard locks and the “**DO NOT ENTER - TIME**” message appears in the Status Line. Even though this key repeats if you continue to hold it down, this practice is discouraged as the operation of the program becomes unpredictable.

HP 2625A. Pressing the **ENTER** key duplicates this operation, except the status message reads: “**X System**”.

Program Function (PF) Keys

IBM 3276. Pressing one of the **PF** keys accesses the function that an application program may have assigned to that key. On the IBM 3276, **PF1** through **PF12** are Alternate Shift keys, whereas **PF13** through **PF24** are not. Upon pressing any **PF** key, the “DO NOT ENTER - TIME” message appears in the Status Line.

HP 2625A. The **PF** keys function similarly, both in their operation and in which keys are Alternate Shift keys, except the status message reads: “X System”.

Program Access (PA) Keys

IBM 3276. Pressing a **PA** key signals the application program that you want its attention. On the IBM 3276, **PA1** and **PA2** are Alternate Shift keys. Upon pressing the key, the keyboard locks and the “DO NOT ENTER - TIME” message appears in the Status Line. The 3276 with a data entry keyboard offers a **PA3** key while the typewriter keyboard model does not.

HP 2625A. Your terminal offers the **PA1** and **PA2** keys and also a **PA3** key. **PA1** and **PA2** are standard-operation keys while **PA3** is an Alternate Shift key. When you press one of these keys, the status message reads: “X System”.

Cursor Select (CURSR SEL) Key

IBM 3276. The **CURSR SEL** key duplicates the function of the Selector Light Pen feature as it allows you to select items from a table or menu.

This key works in conjunction with “Cursor Selectable” fields. The terminal recognizes two types of Cursor Selectable fields: “Selection” fields and “Attention” fields. A special designator character, which must be the first character in the field, differentiates the two types of fields.

- A question mark (?) or a greater-than sign (>) shows a selection field.
- An ampersand (&) or a blank character shows an attention field.

Once the terminal displays a selection menu, you locate those fields beginning with a question mark to view the available choices.

To “select” an item, you move the cursor within the selection field of your choice, then press the **CURSR SEL** key. This action changes the designator character to the greater-than sign to show that this item was selected. If you decide to cancel the selection, you must position the cursor within the field then press the **CURSR SEL** key. The designator character reverts to its question mark form.

After you have made all your choices, you notify the program of your selections by moving the cursor to an attention field and pressing the **CURSR SEL** key. This locks the keyboard and a “DO NOT ENTER - TIME” message appears. (Consult the appropriate application manuals to see how your program uses this feature.)

HP 2625A. Pressing the **CURSR SEL** key duplicates this operation, except the status message reads: “X System”.

Attention (ATTN) Key

IBM 3276. The Attention key signals the program that you want its attention. Pressing this key displays the "DO NOT ENTER - TIME" message and disables the keyboard. The application program determines how to interpret this key and the appropriate response to send to the terminal.

HP 2625A. Your terminal only supports Binary Synchronous Communications (BSC) between the terminal and host computer. As the IBM implementation of BSC does not support the Attention key, neither does the HP 2625A.

PRINTER FUNCTION KEYS

IBM 3276

The 3276 provides local print control to an external printer. This may involve the use of three keys: the **PRINT** key, the **IDENT** key, and the **DEV CNCL** key.

PRINT KEY. The **PRINT** key copies the contents of the screen to the printer assigned to your display station.

IDENTITY KEY. The **IDENT** key performs one of two functions:

- You may use it to request or change the Printer ID/Printer Class for a print operation.
- You may use it to display the current valid printer ID for that display station.

DEVICE CANCEL (DEV CNCL) KEY. You must press the **DEV CNCL** key to recover from errors that indicate that the printer is busy or inoperable. Pressing the **RESET** key has no effect under these conditions.

HP 2625A

Your terminal does not support the **PRINT** key or the **IDENT** key. Instead, by using the function key labels presented at the IBM Aids level, you may copy the contents of the screen to a selected destination device.

While copying data from the HP 2625A, you may simultaneously press the **ALT** key and the **DEV CNCL** key to cancel the print operation. (See the description of print operations which follows later in this appendix.)

EDITING CAPABILITIES

The 3276 edits on a character basis through the use of the **INSERT** and **DELETE** keys.



Insert Key

IBM 3276. During normal operation, your terminal overwrites existing text when you enter characters onto a line. To type in characters without overwriting text requires your setting the terminal for Insert mode.

Pressing the **INSERT** key puts the terminal into Insert mode. To return the terminal to its normal overwrite operation requires your pressing the **RESET** key or any key that causes host communication (such as the **ENTER** key, the **PA** keys, or the **PF** keys).

The effect of Insert mode depends upon the screen's format:



- In an unformatted display, as you insert characters, existing text is shifted to the right. These characters may wrap across lines or from the bottom line of the display to the top line.
- After entering Insert mode, if you try to enter a character into a protected field or an attribute byte, the keyboard locks and the "Go Elsewhere" message appears in the Status Line.
- If the cursor is within an unprotected field, you may insert characters into the field as long as space is available between the cursor's current position and the end of the field. Characters forced from one line automatically wrap to the next line. When the field to the right of the cursor completely fills with data, the keyboard locks, and the message "Too Much Data" appears in the Status Line.

HP 2625A. Insert mode functions similarly. If you attempt to add more data than the field can accommodate, the message "Too Much Data" appears in the Status Line. To enter Insert mode, press the  key. You may exit Insert mode as you do on the IBM 3276. Additionally, you may again press the  key to cancel Insert mode. (This follows the HP practice of exiting Insert mode; this feature is not provided on a 3276.)

Delete Key

IBM 3276. The operation of the **DELETE** key depends on the screen's format:

- Within an unprotected field (or with an unformatted display), pressing the **DELETE** key erases the character at the cursor's current position. The cursor retains its position while the remaining characters on that line shift one position to the left. Subsequent lines are unaffected.
- If you press the **DELETE** key when the cursor is within a protected field or an attribute byte, the keyboard locks and the "Go Elsewhere" message appears in the Status Line.

HP 2625A. Pressing the  key duplicates the delete operation of the 3276. (However, continuing to hold down the  key repeats the delete operation. The 3276 does not provide this feature.)

UNIQUE DISPLAYABLE CHARACTERS

IBM has two special characters, Duplicate (DUP) and Field Mark (FM). Both provide the application program with special information that aids data entry.

Depending upon the setting of the (**A,a/A**) Switch, these characters take one of two forms.

- When set for Dual Case (A,a) the DUP character appears as an asterisk with an overscore (⌘). The FM character appears as a semicolon with an overscore (⌘;).
- When set for Mono Case (A), both characters lose their overscore so that the DUP character appears as an asterisk (*) and the FM character appears as a semicolon (;).

The Duplicate (DUP) Key

IBM 3276. The DUP operation allows you to duplicate input data that occurs repeatedly.

If the cursor is in an unprotected field when you press the **DUP** key, the 3276 displays a DUP character in the field and moves the cursor to the first character position of the next unprotected field.

If the cursor is in a protected field or at an attribute byte when you press the **DUP** key, the keyboard locks, and the message “Go Elsewhere” appears in the Status Line.

HP 2625A. Simultaneously pressing the **ALT** key and the **DUP** key implements the function of the **DUP** key. As the HP 2625A doesn't support Mono Case, your terminal displays the DUP character as an asterisk with an UNDERSCORE (⌘).

The Field Mark (FM) Key

IBM 3276. When the screen contains an unformatted display, you may use the **FM** key to show an application program where a field ends.

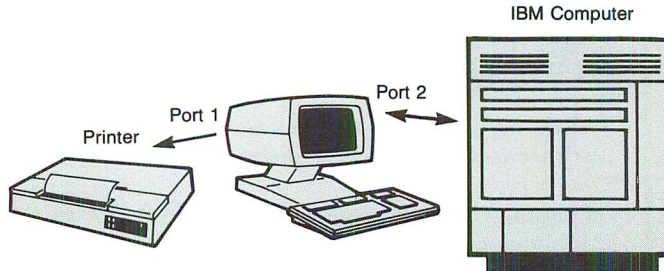
If the cursor is in an unprotected field when you press the **FM** key, the 3276 displays a FM character at the cursor's position and moves the cursor to the first character position of the next unprotected field.

If the cursor is in a protected field or at an attribute byte when you press the **FM** key, the keyboard locks and the message “Go Elsewhere” appears in the Status Line.

HP 2625A. Simultaneously pressing the **ALT** key and the **FM** key implements the Field Mark function. As the HP 2625A doesn't support Mono Case, your terminal displays the FM character as a semicolon with an UNDERSCORE (⌘;).

PRINT OPERATIONS

Your terminal offers no support for the Print or Copy routines supported by the IBM 3276. Instead, you may configure Port 1 for an external device and use the function key labels to obtain a printed copy of the screen display.



Furthermore, if your terminal has the integral printer option, you may print the contents of the screen to the integral printer without worrying about cable connections or configuration settings. The following paragraphs describes these features.

Copying Data To An External Printer

After connecting and configuring an external printer to Port 1, you may obtain a printed copy of the screen display by using the IBM Aids function key labels:

f1	f2	f3	f4	f5	f6	f7	f8
	TO ALT PRT	TO INT PRT	TO EXT DEV	ext dev config	ADVANCE LINE	LOCAL PRINT	3276/8 config

Table C-2 describes the function of these labels.

Table C-2. The External Device Function Key Labels

LABEL	FUNCTION
	Alternate presses of this key selects or cancels a device on the alternate peripheral interface as the destination device.
	Alternate presses of this key selects or cancels the integral printer as the destination device.
	Alternate presses of this key selects or cancels the external printer as the destination device.
	Pressing this key displays the External Device Configuration menu.
	After a destination device is selected, pressing this key causes the printer to skip a line.
	After a destination device is selected, pressing this key copies the entire contents of the IBM workspace.
	Pressing this key displays the 3276/8 Configuration Menu.

To select an external printer as a destination device, you must press the appropriate function key to display an asterisk in the corresponding label. Pressing (**TO EXT DEV**) selects a printer connected to an RS-232-C interface while pressing (**TO ALT PRT**) selects a printer connected to the alternate peripheral interface.

NOTE: If you omit selecting a destination device, pressing either (**ADVANCE LINE**) or (**LOCAL PRINT**) locks the keyboard and displays the error message: "No To Devices Press RETURN To Clear" in the function keys' Label Line.

After pressing (**LOCAL PRINT**), you may cancel the print operation by simultaneously pressing the **ALT** key and the **DEV CNCL** key.

Copying Data To The Integral Printer

If your terminal has the optional integral printer, you may also obtain a printout of the data on the screen by printing the screen's contents to the integral printer.

When you have configured Port 1 for an HP host computer, the IBM Aids labels have the following values:

	TO ALT PRT	TO INT PRT	NEXT SYSTEM		ADVANCE LINE	LOCAL PRINT	3276/8 config

The **NEXT SYSTEM** function key switches the terminal to its HP personality. The other function keys perform the same operations as indicated in table C-2.

To select the integral printer, you must press **f3** before initiating any print operation.

By simultaneously pressing the **ALT** key and the **DEV CNCL** key, you may stop a print operation that is in progress.

STATUS LINE ERROR MESSAGES

While the IBM 3276 displays icons to indicate error messages and to show the terminal's operating state, your terminal uses written text for these purposes.

Table C-3 lists the various messages that may appear within the Status Line. See Section 10 for a list of those error messages that replace the function keys labels.

Table C-3. IBM Status Messages

MESSAGE	MEANING
2	The IBM personality of your terminal is ready or working.
CAPS	The terminal selects uppercase letters; the remaining keys are unaffected.
Ins Char	The terminal is in Insert Character mode.
X Go Elsewhere	Press the RESET key. Then move the cursor to another location on the screen or take another action.
X Numeric Only	Press the RESET key. Then enter only "numeric" data into this field.
X Printer Busy	The printer connected to your terminal is currently busy.
X Prog nn	(Where "nn" is a 2-digit number.) The terminal has detected a programming error in the data it received from the host. Press the RESET key. If the problem persists, refer to your 3276 Problem Determination Guide for further information.
X DC nn Error	(Where "nn" is a 2-digit number.) A problem exists in the datacomm line. Press the RESET key. If the problem persists, refer to your 3276 Problem Determination Guide for more information.
X System	The host system has locked the keyboard. Wait for an additional message or press the RESET key to cancel the operation.
X Too Much Data	You attempted to enter more information than this field can hold. Press the RESET key, then correct the entry.
X ? +	Press the RESET key, then try the operation again.



Appendix D

Exploring Your Terminal's Features

PART 1: GETTING TO KNOW YOUR TERMINAL

One of your terminal's greatest assets is its ability to assume one of several personalities. Depending on what options were ordered, you may use your terminal for data entry, word processing, graphics applications, or as a substitute for an IBM 3276/78 terminal. Section 1 of this manual explains how you can identify what options apply to your terminal.

Regardless of your terminal's optional capabilities, it supports a basic set of powerful features. This appendix acquaints you with these features. The first seven exercises (Parts 2 through 8) apply to all terminals. Read Part 9 if your terminal has an integral printer. Part 10 demonstrates terminal test procedures and error messages.

The following examples are simplistic. They only illustrate potential uses. How you finally use the terminal in your daily work depends upon your creativity.

PART 2: PREPARING YOUR TERMINAL FOR USE

The following exercise shows how parameters in a configuration menu determine the terminal's operating state.

NOTE: Your installation may have set the parameters in the various menus to the necessary values, then "programmatically locked" the menus to prevent accidental changes. Ask your supervisor whether you can change selected values in the Terminal Configuration menu.

Terminology

To understand the configuration process, you must first understand the terminology.

A MENU is a list of available items. The key word is "available". As you choose a dinner from available courses, you configure your terminal through available parameters. The menu forms a working outline. By filling in appropriate values, you configure your terminal for a particular application. That is, CONFIGURATION implies adding the necessary details to fully specify an operating state.

Setting The Terminal For Local Operation

This exercise (and most of the following exercises) requires your setting the terminal for "Local" operation. To set the proper operating modes, perform these steps:

- Step 1.** Press the **MODES** key to display the labels for the terminal's major operating modes.
- Step 2.** If an asterisk appears in the **REMOTE MODE** label, press **f4** to disable Remote mode. (Disabling Remote mode activates Local mode.)
- Step 3.** If no asterisk appears in the **AUTO LF** label, press **f8**. This enables automatic linefeed. (That is, when you press the **←** key, the terminal not only repositions the cursor to the left margin but also advances the cursor to the next line).
- Step 4.** You may also select Smooth Scroll. You should disable the remaining five modes, however, by pressing the appropriate function key until each of the corresponding labels appears without an asterisk.

You can take the following steps to clear existing margins and then clear the screen window of any information (by erasing the workspace memory) without performing a "hard" reset.

- Step 1.** Press **AIDS** to display the Aids set of function key labels.
- Step 2.** Press **f2** to display the Margins/Tabs/Col label set, then press **f7** to clear any previous margins.
- Step 3.** Press **↶** to "home" the cursor (that is, position it at row 1, column 1).
- Step 4.** Pressing **CLEAR WS** clears the entire workspace.

Configuring The Terminal

In this example you type a line of text and observe the terminal's normal operation. ("Normal" implies that the menu's default values are active for the two parameters being tested.) Next, you display the Terminal Configuration menu, change these two parameters, then reenter the same line of text and observe any differences.

- Step 1.** Enter the following text as a continuous stream, without regard to screen boundaries:

```
Starting out there was an abundance of room, but now  
I'm at the end of the line with my mother-in-law.
```

Notice the following:

- As you approach the edge of the screen (the default right margin) a warning bell rings.
- As you continue typing, all excess characters flow over to the next line. (This is known as "wraparound".)

The screen display should appear as follows:

```
Starting out there was an abundance of room, but now I'm at the end of the line
with my mother-in-law.
```

Step 2. Display the Terminal Configuration menu by pressing:

```

AIDS
  f8
  config
  keys
  f5
  terminal
  config

```

Once the menu appears, do Step 3 to change the entry in the **Bell** field to "Off". (Notice that the **Bell** field is the first field in the menu and that the terminal automatically positions the cursor to this field.)

Step 3. Press **f2** (**NEXT CHOICE**) to change the **Bell** value from "On" to "Off". Since the field is underlined, you must use the function keys to make your selection. If you try typing "Off", the terminal "beeps", the keyboard locks, and an error message appears in the label line.

Step 4. Using the **TAB** key, move the cursor to the **InhEolWrP(C)** field. (This field inhibits end-of-line wraparound.) The default (normal) setting is "No". Press **f2** (**NEXT CHOICE**) to change this value to "Yes".

Step 5. Save these new configuration settings by pressing **f1** (**SAVE CONFIG**). Upon saving the values, the menu disappears and the previous window display returns to the screen.

Step 6. Press the **←** key twice (to skip a line and advance to the beginning of the next line), then reenter the same line of text. This time notice that the bell gives no warning and that the cursor does not advance to the next line. Instead, the cursor remains in column 80 and continually overwrites each character as you enter the next.

Your final display should appear as follows:

```
Starting out there was an abundance of room, but now I'm at the end of the line
with my mother-in-law.
```

```
Starting out there was an abundance of room, but now I'm at the end of the line.
```

As the warning bell and end-of-line wraparound are “friendly features”, you should undo the changes you made.

Step 7. Display the Terminal Configuration menu by pressing `Alt`, `F8`, `F5`.

Step 8. Since the cursor is in the `Bell` field, press `F2` (NEXT CHOICE) to change “Off” to “On”.

Step 9. Tab the cursor to the `InhEolWrp(C)` field and press `F2` to change “Yes” to “No”.

Step 10. Pressing `F1` saves this configuration and the terminal returns to its original operating state.

PART 3: THE KEYBOARD

The following exercise demonstrates the Display Control keys and Edit keys.

The Cursor

The cursor is the blinking mark that appears on the screen. (Through an entry in the Terminal Configuration menu, you may select the cursor to appear either as a rectangular box or as an underline.)



The cursor serves one of two functions. It either points to a specific location on the terminal screen or it marks the position where the terminal will enter the next character. The exercise at the end of Section 2 illustrated the cursor's role in entering data.



While entering data, the cursor must be positioned at a valid data entry point. Therefore, the terminal can take special action to ensure that this occurs. For example, the terminal keeps the cursor within the bounds set by existing margins. Or, at the end of one line, the terminal can wrap the cursor to the beginning of the next line (depending on the terminal's configuration settings).

When the cursor functions as a pointer, it obeys a different set of rules. In particular, the cursor must be able to access any point on the screen. Therefore, the cursor-positioning (“arrow”) keys work on screen boundaries; they ignore margin settings. The `▶` key never rings the terminal bell as it approaches the screen's edge. The horizontal movement keys always wrap around to the next row, regardless of the end-of-line wraparound setting in the Terminal Configuration menu.

To familiarize yourself with these differences, perform this simple exercise.

Step 1. Power the terminal on. Notice that the terminal positions the cursor in the upper left corner. Under normal circumstances, when no margins are set and Memory Lock is disabled, this location represents the cursor's “home base”. “Homing the cursor”, therefore, implies moving the cursor to the first accessible character position in workspace memory. Pressing the `↵` key homes the cursor. (Because this key works on workspace boundaries, it differs from the remaining “arrow” keys which operate on screen boundaries.)

Step 2. Use the  and  keys to move the cursor horizontally along a screen row. Observe the cursor's response at screen boundaries.


Step 3. Use the  and  keys to move the cursor vertically along a screen column. Do you see any difference when the cursor reaches a screen boundary?

Unlike the horizontal positioning keys, which always wrap to the next line, the vertical positioning keys never leave their respective column.

Step 4. Finally, position the cursor to the last column in the last row (screen row 24, column 80). From this position, pressing the  key wraps the cursor from the screen's last addressable point back to the screen's first addressable point (screen row 1, column 1).

Edit Keys

Your terminal has a built-in editing capability allowing you to modify text without using a special editor program.


The following exercise illustrates the  key. The important point to remember is that the insert operation does not automatically wrap excess characters to the next line (as normally happens when you are entering text). To achieve "wraparound", you must explicitly request it.


This example assumes that the margins are set to the width of the screen (the default condition).

Step 1. Set your terminal for local operation. (See the exercise in Part 2 if you need help.)

Step 2. Enter the following 80-character line as a continuous line of text.

```
A boring sentence drags on forever or until it exhausts
all its allocated space.
```

Step 3. Using the cursor-positioning keys, move the cursor back to the beginning of the line. (Pressing the  key suffices as the cursor should normally wrap to row 2, column 1 in preparation for the next character.)

Step 4. Press the  key. (The terminal displays the message "Ins Char" in the Status Line.) Now observe what happens at the end of the line while you enter the following text:




```
Through use of the insert character feature,
```

trailing space

Exploring Your Terminal's Features

Your screen display should appear as follows:

```
Through use of the insert character feature, A boring sentence drags on forever
```


- Step 5.** Press the  key to disable the insert character operation. (The “Ins Char” message disappears from the Status Line.)
- Step 6.** In many cases, you want text forced from one line to be entered on the next line. To enable Insert Character With Wraparound, simultaneously press the  and  keys. (In this operating state, the terminal displays the message “Ins Wrap” in the Status Line.)
- Step 7.** Use the cursor-positioning keys to move the cursor back to the “f” in “feature”.
- Step 8.** Enter the following text:

```
with wraparound
```


trailing space

The screen display should appear as:

```
Through use of the insert character with wraparound feature, A boring sentence drags on forever
```

- Step 9.** You may also delete characters while in Insert Character mode. Use the cursor-positioning keys to place the cursor under the capital “A” before “boring”. Press the  key. The terminal deletes the “A”. Since the terminal is still in insertion mode, enter a lower-case “a”. This produces the final screen display:

```
Through use of the insert character with wraparound feature, a boring sentence drags on forever.
```

- Step 10.** Press  to end Insert Character With Wraparound. (The “Ins Wrap” message disappears from the Status Line.)

PART 4: FUNCTION KEYS

This exercise demonstrates how you may program the function keys to do a repetitive task. It also shows how you may employ margins to force text within specific bounds.

The task is to create the following screen display:

```
1.  This is 1 rows of text.
2.  This is 2 rows of text.
3.  This is 3 rows of text.
4.  This is 4 rows of text.
5.  This is 5 rows of text.
6.  This is 6 rows of text.
7.  This is 7 rows of text.
8.  This is 8 rows of text.
9.  This is 9 rows of text.
```



Before beginning the following procedure, you must set your terminal for local operation. (Refer to the exercise in Part 2 if you need assistance.)

Step 1. Display the User Keys Definition menu by simultaneously pressing the **SHIFT** and **USER KEYS** keys.

For your reference while performing this exercise, when you complete filling out the definition menu, it should appear as follows:

```
f1 [L] LABEL  digits  [ ]
123456789
f2 [L] LABEL  period  string
.....
f3 [L] LABEL  first   text
This is^
f4 [L] LABEL  last    text
rows of text.^
f5 [T] LABEL  f5     [ ]
^t
f6 [T] LABEL  f6     [ ]
^tu
f7 [T] LABEL  f7     [ ]
^tv
f8 [T] LABEL  f8     [ ]
^tw
```


NOTE: This sample definition menu follows the convention of centering a title within its eight-character field. (To show necessary spaces, quotation marks surround the text that you must enter. You should omit the surrounding quotes and enter only the intervening text.) Alternatively, you may elect to "left-justify" the titles within each box.

Step 2. Press the  key to position the cursor at the type field for function key 1, then press  (NEXT CHOICE) twice to display an "L" for "Local".







Step 3. Tab the cursor to the title field and in the first box enter the word: "digits"

Step 4. Tab to the definition line and enter the nine decimal digits as a continuous string: "123456789"






Step 5. Define function key "f2" to contain nine consecutive dots:

- Tab to the type field. Press  twice to display an "L" in the field.
- Tab to the title field.
In the first box enter: "period"
Tab to the second box and enter: "string"
- Tab to the definition line and enter nine consecutive dots: "....."

Step 6. Define function key "f3" to be the initial text in the line:

- Set the type character to "L" as done above.
- Tab to the title field.
In the first box enter: "first"
Tab to the second box and enter: "text"
- Tab to the definition line and enter the text: "This is"
- Press the  key. Since you enabled automatic linefeed when you configured your terminal for Local mode, press  to disable Auto Lf.
- Press  to redisplay the definition menu.
- Press  to enable Display Functions mode.
- Press the  key to append a carriage return at the end of "This is"
- Press  to disable Display Functions. (You must do this before attempting to move the cursor.)

Step 7. Define function key "f4" to be the remaining text:

- Set the type character to "L" as done above.
- Tab to the title field.
In the first box enter: "last"
Tab to the second box and enter: "text"
- Tab to the definition line and enter the text: "rows of text."
- Press  to enable Display Functions mode.
- Press the  key to append a carriage return at the end of the string.
- Press  to disable Display Functions.
- Press the  key. Press  to enable Auto Lf.

This completes the set-up procedure. (As `SAVE CONFIG` was not used to leave the definition menu, these values take effect but leave undisturbed the previous definitions that were stored in non-volatile memory.)

To generate the desired screen display requires alternately using the margin function keys to define a working area then the user-definable function keys to enter the text.

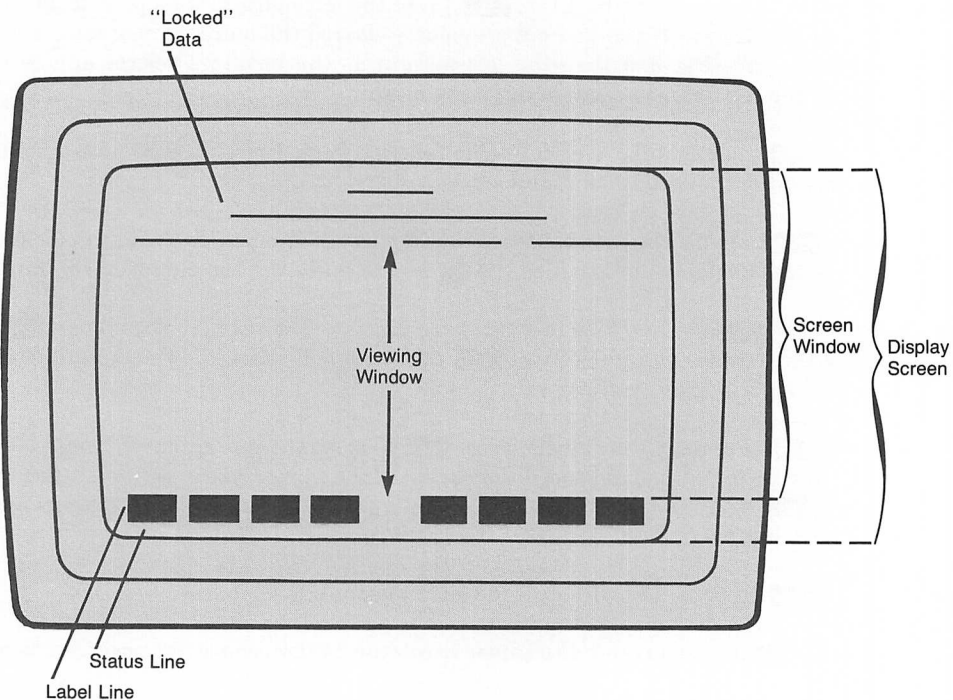
- Step 8.** Press the `AIDS` key then `f2` to display the Margins/Tabs/Col label set. Press `f7` to clear any previous margin settings. Press `↵` to “home” the cursor. Press `f6` to set the right margin. As the left margin is already at column 1, this sets both the left and right margins to column 1. For now, the terminal restricts all data to this single column.
- Step 9.** Press `USER KEYS`. Notice that your titles appear as the first four labels. Press `f1`. This prints the column of digits.
- Step 10.** Press `↵` to home the cursor.
- Step 11.** Using the `>` key, move the cursor to column 2.
- Step 12.** Press the `AIDS` key then `f2` to display the Margins/Tabs/Col label set. Press `f7` to clear the existing margins. Press `f5` to set the left margin, then press `f6` to set the right margin. (If you had not previously cleared the margins, you must set the right margin first and then the left margin as the terminal rejects any setting where the left margin exceeds the right margin.)
- Step 13.** Press `USER KEYS` to enable the user-definable function keys. Pressing `f2` adds a column of dots after the column of digits.
- Step 14.** Press `↵` to home the cursor. Notice that the cursor “homes” to the left margin and not to the screen boundary. Use the `>` key to move the the cursor to column 5.
- Step 15.** Press the `AIDS` key then `f2` to display the Margins/Tabs/Col label set. Press `f7` to clear the existing margins. Press `f5` to set the left margin. (The default setting for the right margin suffices.)
- Step 16.** Press `USER KEYS` to display your labels. Press `f3` to print the initial text in line 1. Notice that the terminal has advanced the cursor to the proper place in line 2; therefore, press `f2` again. Repeat pressing `f2` until you have entered the first part of the sentence for every line.
- Step 17.** Press `↵` to home the cursor to the left margin of the top row.
- Step 18.** Use the `>` key to advance the cursor to column 14 (two character positions beyond the “s”).
- Step 19.** Press the `AIDS` key then `f2` to display the Margins/Tabs/Col label set. Press `f7` to clear the existing margins. Press `f5` to set the left margin. Press `f6` to set the right margin. (This again defines a working area one-column wide.)

- Step 20.** Press the **USER KEYS** key. Press **f1**. The numerical column appears in its proper place.
- Step 21.** Press the **←** key to return the cursor to the left margin of the top row. Use the **→** key to move the cursor two columns to the right (column 16).
- Step 22.** Press the **AIDS** key then **f2** to display the Margins/Tabs/Col label set. Press **f7** to clear the existing margins. Press **f5** to set the left margin. (The default setting for the right margin suffices.)
- Step 23.** Press the **USER KEYS** key, then press **f4** nine times to complete the data entry task.




For the simplistic task involved, this procedure is more complex than entering the text. Yet you gained adequate experience in both programming the keys and using them. Furthermore, you can now use margins to channel data within precise bounds.

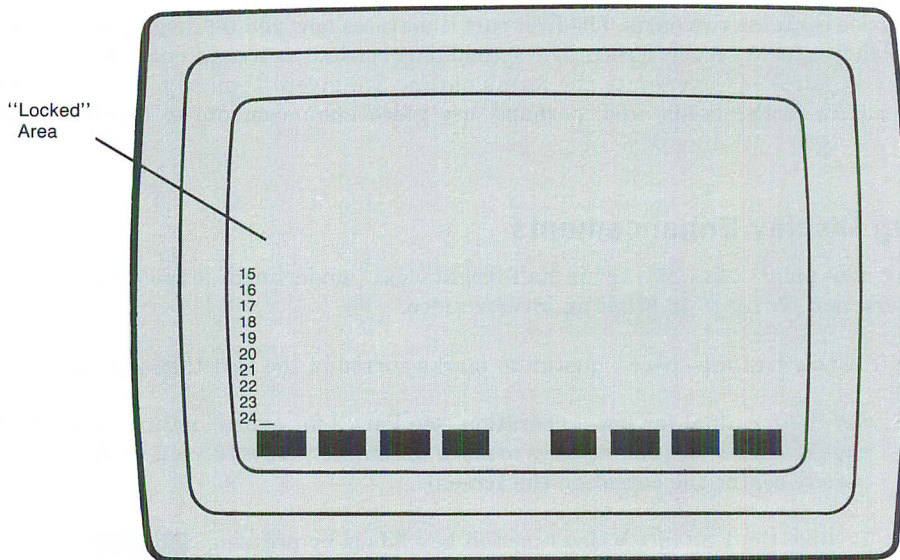
PART 5: USING YOUR TERMINAL BY ITSELF


Section 3 introduced several definitions to describe the action of the cursor-control and display-control keys. The following exercise uses Memory Lock to visually demonstrate this terminology.



Refer back to the exercise in Part 2 if you need help in accomplishing the first two steps.





- Step 1.** Set your terminal for Local operation. While the Modes function key labels are visible, ensure that Memory Lock is currently inactive (that is, no asterisk appears in this label.)
- Step 2.** Clear the complete contents of the current workspace.
- Step 3.** Use the down-arrow () key to position the cursor in line 15. (This is one line BELOW the last line to be retained on the screen.)
- Step 4.** Press  to display the Modes function key labels and then press  to enable Memory Lock. This "freezes" the top 14 rows on the screen.
- Step 5.** Normally the screen holds 24 data lines. To see how Memory Lock has restricted this area, enter the numbers 1 through 24 on 24 consecutive lines. (That is, enter "1" on the cursor's current line, "2" on the next line, "10" on the tenth line, "20" on the twentieth line, and "24" on the last line.)
- Step 6.** Inspect the viewing window. It should appear as follows:



NOTE: If you pressed the  key after entering the "24", the top row contains "16" and the cursor occupies the first character position of the last row.

Notice that the terminal only displays data between the area protected by Memory Lock and the function key labels. This "viewing window" consists of ten lines (24 total - 14 "frozen" = 10 "available").

Exploring Your Terminal's Features

- Step 7.** Home the cursor by pressing . As the top 14 screen rows are protected, the cursor “homes” to row 15, column 1 (the first “accessible” character position). Notice that the viewing window now shows rows “1” through “10”.
- Step 8.** Press the  key. The terminal replaces the viewing window with rows “11” through “20” (the next “page” of data).
- Step 9.** Press the  key again. The terminal updates the window with rows “21” through “24” (with the remaining 6 data lines left blank).
- Step 10.** Also experiment with the  key. Pressing this key once displays rows 11-20 while pressing it again displays rows 1 through 10.

In summary, the display screen has 27 lines. You may enter data into the upper 24 lines. These 24 lines form the screen window and normally constitute a “page” of data. However, by using Memory Lock, you can retain information at the top of the screen; thus restricting the number of lines on which the terminal can display data. The “viewing window” is that portion of the screen that displays data. Its extent determines the current page size.





PART 6: USING YOUR TERMINAL'S ALPHANUMERIC CAPABILITIES

This exercise contains two parts. The first part illustrates how you set display enhancements and how they appear on the screen. The second part constructs a data entry form. Only the necessary keystrokes to generate the form's outline are given. Typically, you would assign characteristics to the fields, and, perhaps, use video enhancements to highlight specific areas.

Setting Display Enhancements

The task is to print “Dull White” in half-bright, “vs.” underlined, “Flashing” in blinking characters, and “Bright” in blinking inverse video.

NOTE: To show trailing spaces, quotation marks surround the text that you should enter.

- Step 1.** Set the terminal for Local operation (see Part 2 for additional information). Then use the cursor-positioning keys to move the cursor to row 10, column 20 (or approximately center the cursor on the screen).
- Step 2.** Display the Enhance Video function key labels by pressing , .
- Step 3.** Press  to select Half Bright. Remember, this only “selects” the enhancement. To activate it, you must press  (SET ENHNCMNT). (Notice that the asterisk disappears from the HALF BRIGHT label.)
- Step 4.** Enter the text: “Dull White”

Step 5. As the cursor is one character position beyond the end of the field, press **f2** (**SET ENHNCMNT**). Since no enhancements were "starred", this sets no enhancements from the cursor's current position forward. (In essence, the terminal has set the precise field width with the minimum amount of effort on your part.)

Step 6. Press the space bar to enter a space character. (The space character will have no enhancement.)


Step 7. Press **f6** to select Underlining, then **f2** to activate it.

Step 8. Enter the abbreviation: "vs."

Step 9. Press **f2** to end this field.

Step 10. Enter a space.

Step 11. Press **f5** to select blinking video and **f2** to activate it.

Step 12. Enter the word: "Flashing"


Step 13. Starting a new enhancement field also ends the previous one. Press **f5** to select blinking and **f4** to select inverse video. Activate both by pressing **f2**.

Step 14. Enter the word: "Bright"

Step 15. Press **f2** to end the last enhancement field.

Observe how the terminal displays the various enhancements.

As an additional experiment, you could change the **Inverse Background** field in the Global Configuration menu and see what happens.

Using The Line-drawing Character Set

The task is to draw the following form by switching between the line-drawing set and the base character set.

Department Personnel Record	
Name :	
Home Address :	
Home Phone : () -	
Year Joined Company :	Year Joined Dept :
Job Title :	Form #AB-123C

Normally, after constructing the form's physical layout, you would next use the Define Fields function key labels to assign edit checks and field specifications to individual fields. You might also use display enhancements to highlight different fields. For space considerations, this example only draws the form. (As it is, the written explanation appears formidable. However, you will soon observe a pattern between successive steps, and you'll find constructing the form an easy task.)

To center the form on the screen, set the left margin to column 10:

- Press the `↵` key, then `f2` to display the Margins/Tabs/Col set of function key labels.
- Use the `▶` key to position the cursor at column 10.
- Press `f5` to set the left margin at this position.

When you begin each line, the terminal reverts to the base character set as the "active" character set. Thus your first action on each line is selecting the line-drawing set.

As you must continually change between the line-drawing set and the base character set, display the alternate character set function key labels by pressing:



NOTE: Each of the following steps creates one line of the form. These conventions are used.

(1) When you **MUST** press the **SHIFT** key to display the proper character, the text explicitly shows both keys. Otherwise, the case of the character is immaterial.

(2) Quotation marks surround the text that you must enter. Enter only the text and not the quotation marks.

Step 1. Construct the first line of the form:

- If the cursor is not at column 10 (the left margin) press the **←** key to move the cursor to this location.
- Press **f3** to select the line-drawing set.
- Press **Q** to draw the upper left corner.
- For columns 11 through 69 continually press the semi-colon key (**;**) to generate the top line.
- In column 70, enter the upper right corner by pressing **W**.
- Go to line 2 by pressing the **↵** key.

Step 2. Construct the second line of the form:

- Press **f3** to select the line-drawing set.
- Simultaneously press **SHIFT ;** (a colon) to draw the left border.
- Change to the base set by pressing **f1**.
- Space over to column 25.
- From column 25, enter the text:
"Department Personnel Record".
- Space over to column 70.
- Reactivate the line-drawing set by pressing **f3**.
- In column 70, enter the right boundary by simultaneously pressing **SHIFT ;**.
- Go to line 3 by pressing the **↵** key.

Step 3. Construct the third line of the form:

- Press **f3** to select the line-drawing set.
- Press the One key (**1**) to create the left border.
- For columns 11 through 69, continually press the Nine key (**9**) to draw the double-width dividing line.
- In column 70, press the Two key (**2**) to draw the right border.
- Press the **↵** key to go to line 4.

Step 4. Construct the fourth line of the form:

- Press **f3** to select the line-drawing set.
- Simultaneously press **SHIFT ;** to draw the left border.
- Change to the base set by pressing **f1**.
- Space over to column 13.
- From column 13, enter the text: "Name:".
- Space over to column 70.
- Reactivate the line-drawing set by pressing **f3**.
- In column 70, enter the right border by simultaneously pressing **SHIFT ;**.
- Go to line 5 by pressing the **↵** key.

Step 5. Construct the fifth line of the form:

- Press **f3** to select the line-drawing set.
- Simultaneously press **!** (the exclamation point) to create the left border.
- For columns 11 through 69, continually press the comma key (**,**) to draw the single-width dividing line.
- In column 70, simultaneously press **SHIFT** **"** (a quotation mark) to draw the right border.
- Press the **←** key to go to line 6.

Step 6. Construct the sixth line of the form:

- Press **f3** to select the line-drawing set.
- Simultaneously press **SHIFT** **:** to draw the left border.
- Change to the base set by pressing **f1**.
- Space over to column 13.
- From column 13, enter the text: "Home Address:".
- Space over to column 70.
- Reactivate the line-drawing set by pressing **f3**.
- In column 70, enter the right border by simultaneously pressing **SHIFT** **:**.
- Go to line 7 by pressing the **←** key.

Step 7. Construct the seventh line of the form:

- Press **f3** to select the line-drawing set.
- Simultaneously press **SHIFT** **!** to create the left border.
- For columns 11 through 69, continually press the comma key to draw the single-width dividing line.
- In column 70, simultaneously press **"** to draw the right border.
- Press the **←** key to go to line 8.

Step 8. Construct the eighth line of the form:

- Press **f3** to select the line-drawing set.
- Simultaneously press **SHIFT** **:** to draw the left border.
- Change to the base set by pressing **f1**.
- Space over to column 70.
- Reactivate the line-drawing set by pressing **f3**.
- In column 70, enter the right border by simultaneously pressing **SHIFT** **:**.
- Go to line 9 by pressing the **←** key.

Step 9. Construct the ninth line of the form:

- Press **f3** to select the line-drawing set.
- Simultaneously press **SHIFT** **!** to create the left border.
- For columns 11 through 69, continually press the comma key to draw the single-width dividing line.
- In column 70, simultaneously press **SHIFT** **"** to draw the right border.
- Press the **←** key to go to line 10.

Step 10. Construct the tenth line of the form:

- Press **f3** to select the line-drawing set.
- Simultaneously press **SHIFT** **:** to draw the left border.
- Change to the base set by pressing **f1**.
- Space over to column 13.
- From column 13, enter the text: "Home Phone: () -".
- Space over to column 70.
- Reactivate the line-drawing set by pressing **f3**.
- In column 70, enter the right border by simultaneously pressing **SHIFT** **:**.
- Go to line 11 by pressing the **↵** key.

Step 11. Construct the form's eleventh line:

- Press **f3** to select the line-drawing set.
- Simultaneously press **SHIFT** **!** to create the left border.
- For columns 11 through 39, continually press the comma key to draw the single-width dividing line.
- In column 40, press the Seven key (**7**).
- For columns 41 through 69, press the comma key (**,**).
- In column 70, simultaneously press **SHIFT** **"** to draw the right border.
- Press the **↵** key to go to line 12.

Step 12. Construct the form's twelfth line:

- Press **f3** to select the line-drawing set.
- Simultaneously press **SHIFT** **:** to draw the left border.
- Change to the base set by pressing **f1**.
- Space over to column 13.
- From column 13, enter the text: "Year Joined Company:".
- Space over to column 40.
- Change to the line-drawing set by pressing **f3**.
- In column 40, press the period key (**.**).
- Press **f1** to revert to the base set.
- Space over two positions and enter the text: "Year Joined Dept:".
- Space over to column 70.
- Reactivate the line-drawing set by pressing **f3**.
- In column 70, enter the right border by simultaneously pressing **SHIFT** **:**.
- Go to line 13 by pressing the **↵** key.

Step 13. Construct the form's thirteenth line:

- Press **f3** to select the line-drawing set.
- Simultaneously press **SHIFT** **!** to create the left border.
- For columns 11 through 39, continually press the comma key to draw the single-width dividing line.
- In column 40, press the Eight key (**8**).
- For columns 41 through 54, press the comma key (**,**).
- In column 55, press the Seven key (**7**).
- For columns 56 through 69, press the comma key (**,**).
- In column 70, simultaneously press **SHIFT** **"** to draw the right border.
- Press the **↵** key to go to line 14.

Step 14. Construct the form's fourteenth line:

- Press **f3** to select the line-drawing set.
- Simultaneously press **SHIFT** **:** to draw the left border.
- Change to the base set by pressing **f1**.
- Space over to column 13.
- From column 13, enter the text: "Job Title:".
- Space over to column 55.
- Change to the line-drawing set by pressing **f3**.
- In column 55, press the period key (**.**).
- Press **f1** to revert to the base set.
- Enter the text: "Form #AB-123C".
- Space over to column 70.
- Change to the line-drawing set by pressing **f3**.
- In column 70, enter the right border by simultaneously pressing **SHIFT** **:**.
- Go to line 15 by pressing the **↵** key.

Step 15. Construct the form's last line:

- Press **f3** to select the line-drawing set.
- Press **A** to draw the lower left corner.
- For columns 11 through 54 continually press the semi-colon key (**;**) to generate the bottom line.
- In column 55, simultaneously press **SHIFT** **S** (the dollar sign symbol).
- For column 56 through 69, press the semi-colon key to draw the remaining portion of the bottom line.
- In column 70, enter the lower right corner by pressing **S**.

PART 7: USING YOUR TERMINAL WITH A COMPUTER

Previous exercises have demonstrated several of the terminal's features. All were done without computer assistance. In this exercise, you set the proper operating modes to communicate with an HP 3000 computer.

Setting The Terminal For Remote Operation

To communicate with a computer, you must set your terminal for Remote operation. This involves more than merely selecting Remote mode. As a minimum, the following four steps are normally required.

Step 1. Press the **MODES** key to display the function key labels for the terminal's major operating modes.

Step 2. If no asterisk appears in the **REMOTE MODE** label, press **f4** to activate Remote mode.

- Step 3.** Depending upon the application, you should next select between Block and Character mode. Filling out forms, editing them, then transmitting them to the computer is a common application for Block mode. For this exercise, you want to converse interactively with the computer. This requires character-by-character transmissions. Therefore, inspect the **BLOCK MODE** label. If an asterisk appears in the label, press **f3** to disable Block mode. (This simultaneously enables Character mode).
- Step 4.** While conversing with the computer in Character mode, you should disable Automatic Linefeed if this mode is active. Therefore, if an asterisk appears in the **AUTO LF** label, press **f8** to disable Auto Lf. (The asterisk disappears from the label.)

Configuring The Terminal

In most instances, someone will have configured your terminal to meet the requirements established by your installation. However, if no one has done this task and you must configure the terminal, your terminal provides assistance when you are using a standard HP computer configuration.

Pressing **msd** then **f8** (**config keys**) displays the available selection of configuration menus.

Port 1 is always the datacomm port for the primary HP personality. Pressing **f3** displays the "Datacom1 Configuration" menu.

This also changes the function key labels to the following values:

f1	f2	f3	f4	f5	f6	f7	f8
SAVE CDNFIG	NEXT CHDICE	PREVIOUS CHOICE	system defaults		config menus	DISPLAY FUNCTNS	config keys

At this level, pressing **f4** (**system defaults**) displays labels which you may use to establish default values for the configuration parameters. Thus, without understanding what the various fields mean, you may still configure your terminal if you know to which computer your terminal connects and how that connection is made.

The terminal provides default values for the following set-ups:

- HP 1000 in a point-to-point environment
- HP 1000 in a multipoint environment
- HP 3000 in a point-to-point environment
- HP 3000 in a multipoint environment

For example, if you know your host computer is an HP 3000 and that a cable directly connects the terminal to the computer, you should press **f4** (**system defaults**) to display the following labels:

f1	f2	f3	f4	f5	f6	f7	f8
config	POWER ON VALUES	ACTIVE VALUES	DEFAULT VALUES	HP 1000 PT. PT.	HP 1000 MULTIPT	HP 3000 PT. PT.	HP 3000 MULTIPT

Exploring Your Terminal's Features

Pressing **f7** automatically sets up the datacomm port to agree with the normal ("default") HP 3000 point-to-point settings.

The labels have returned to their previous values:



Pressing **f1** (**SAVE CONFIG**) both activates and stores these configuration parameters in non-volatile memory.

You should then follow a similar procedure to set the terminal for an HP 3000 point-to-point environment. This would involve displaying the Terminal Configuration menu, pressing **f4** to select system defaults, pressing **f7** to set the HP 3000 point-to-point parameters, then saving these parameters by pressing **f1** (**SAVE CONFIG**).

A Computer Session

To communicate with the computer requires your "logging-on" to the system. This varies between installations. Ask someone what procedure you need to follow.

Once you have successfully logged on, the computer requests information by "prompting" you with a special character (for example, a colon (:), a pound sign (#), or, perhaps, a dollar sign (\$)).

To notify the computer that you have finished your request, you must end each line by pressing the **↵** key. Normally, your request will be a "command" and typing in the command then pressing the **↵** key is called "entering" a command.

A computer system can only recognize commands that it "expects" to see. The following examples use "MPE" commands for an HP 3000 computer.

Step 1. Enter the command:

```
listf
```

This command prints a listing of the files in your account.

Step 2. Enter the command:

```
showme
```

This command shows you who the computer thinks you are.

Step 3. Enter the command:

```
showtime
```

This command shows the day, the date, and the time in hours and minutes.

If your terminal is connected to another computer model, ask your neighbors for some commands that work for your system.

PART 8: USING YOUR TERMINAL WITH AN EXTERNAL DEVICE

Even though the terminal stores the parameter settings for all configuration menus in non-volatile memory, you are wise to keep a printed record of the usual settings for your terminal. This exercise copies the four configuration menus to an external device.

Step 1. Set your terminal for local operation. (See the exercise for Part 2.)

Step 2. See the Reference Manual for details on configuring Port 2 for an external printer.

Step 3. Display the To Device set of labels by pressing `↵`, `f1`, `f3`. If no asterisk appears in the `TO EXT DEV` label, select the external printer by pressing `f2` (`TO EXT DEV`).

Step 4. Display the Config set of function key labels by pressing `↵`, `f8`.

Step 5. Press `f1` to display the Global Configuration menu.

Step 6. Pressing the `ENTER` key copies the menu to the selected destination device.

Step 7. When the first print operation finishes, press `f8` (`config keys`) to redisplay the different menu selections.

Step 8. Press `f3` to display the "Datacom1 Configuration" menu.

Step 9. Copy the menu to the printer by pressing the `ENTER` key.

Step 10. Press `f8` to display the menu selections.

Step 11. Press `f4` to display the "Ext Dev Configuration" menu.

Step 12. Press the `ENTER` key to copy this menu to the printer.

Step 13. Press `f8` to display the menu selections.

Step 14. Press `f5` to display the Terminal Configuration menu.

Step 15. Press the `ENTER` key.

This completes the task of copying the menus.

NOTE: If your terminal has the integral printer option, you could select the integral printer as the destination device, then follow this procedure to copy the menus to the integral printer.

PART 9: USING YOUR TERMINAL WITH THE INTEGRAL PRINTER

This exercise demonstrates logging data to the integral printer.

- Step 1.** Set your terminal for Remote operation by enabling Remote mode and disabling both Block and Auto Lf modes. (See Steps 1-4 in the exercise for Section 7.)
- Step 2.** Display the To Device set of function key labels by pressing `⌘105`, `f1`, `f3`. If no asterisk appears in the `TO INT PRT` label, press `f3` to select the integral printer as the destination device.
- Step 3.** Press `f1` (`device control`) to display the Device Control labels.
- Step 4.** Press `f1` to display the Device Modes labels. If no asterisk appears in the `LOG BOTTOM` label, press `f3` to enable bottom logging.
- Step 5.** Request the host computer to send data to your terminal. The "command language" for your computer should have several such commands. For example, you can request a listing of files or a listing of system devices. Find a suitable command for your system and enter it. (An adequate amount of data can be generated on a HP 3000 by asking the system to list all system devices.) If your computer system is an HP 3000, enter the command: `SHOWDEV`

As the terminal routes information to the printer, notice that the printer starts copying data "immediately". When the computer finishes transmitting one line and proceeds to the next, the terminal sends the just entered line to the printer. After the printer stops, verify that the printed copy contains the last line transmitted from the computer.

Repeat this experiment, but this time select top logging. (See Steps 6 and 7.) Notice that the printer only starts copying data once workspace memory fills. You should also observe that only the "overflow" lines occur on the printed copy. Thus top logging yields an incomplete listing.

- Step 6.** To enable top logging, press `f4` (`LOG TOP`). Selecting top logging automatically cancels the bottom logging selection.

- Step 7.** To the computer prompt, enter `SHOWDEV` (or a similar command for your system).

PART 10: IN CASE OF DIFFICULTY




Your terminal can perform several tests to verify its proper operation or to isolate a problem if difficulties arise. The first part of this exercise illustrates the Terminal Test. The second part demonstrates error messages.

Terminal Test

- Step 1.** To perform the Terminal Test, press `⌘105` then `f3` to display the Service Keys labels.
- Step 2.** Pressing `f5` initiates the Terminal Test.



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