HEWLETT PACKARD

Graphics Terminal

2623A

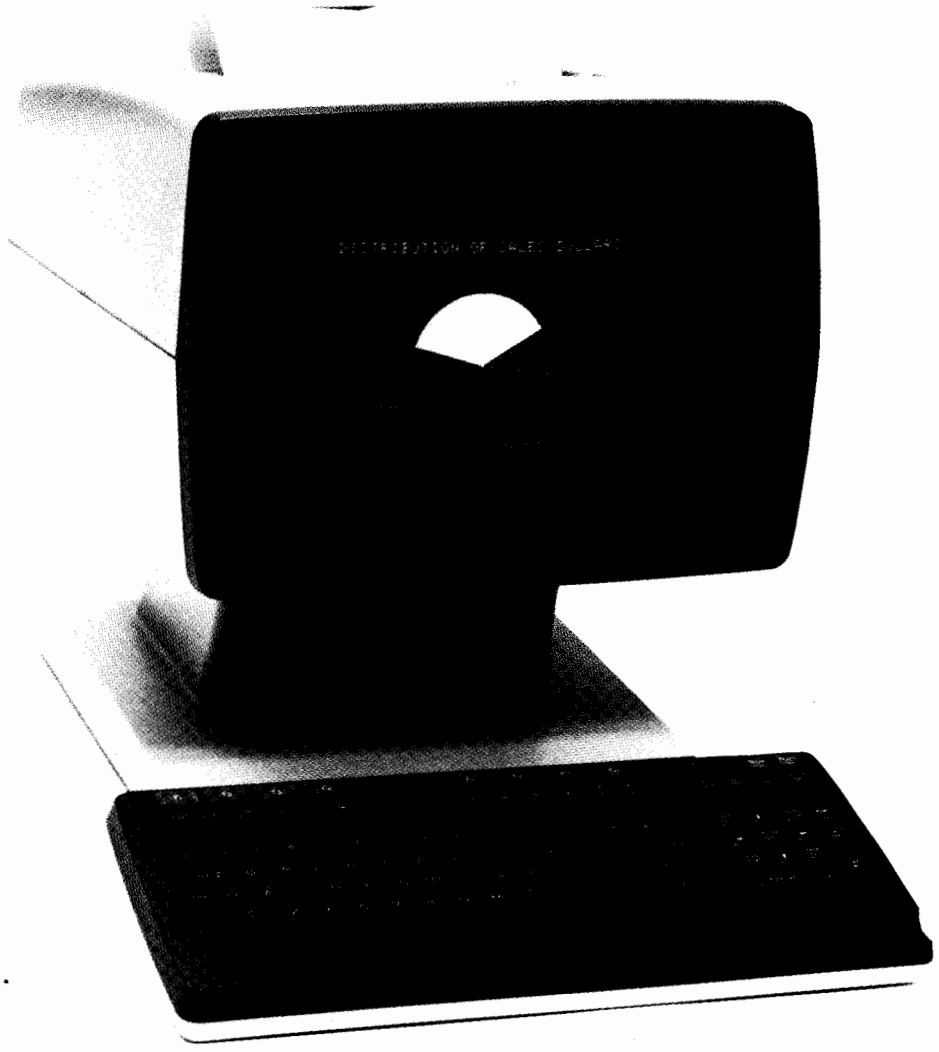
user manual

Congratulations!

You have chosen Hewlett-Packard's new 2623A Display Station, another technological advance in reliable terminals. The terminal's flexibility, extensive features, and ease of operation can save you valuable time and computer resources in a wide range of applications.

This user's manual has been prepared to acquaint you with your terminal and to serve as an aid to achieving optimum performance. This manual tells you how to install and use the terminal both off-line (by itself) and on-line (connected to a computer). It should answer most questions you have about how to use the terminal.

Detailed programming and accessory installation information is contained in the HP 2623A Reference Manual 02623-9002. The HP 2623A Service Manual 02622-90007 (ordered separately) provides information regarding troubleshooting, repair, and theory of operation.



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STATEMENT

The Federal Communications Commission (in Subpart J, of Part 15, Docket 20780) has specified that the following notice be brought to the attention of the users of this product.

WARNING

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. As temporarily permitted by regulation it has not been tested for compliance with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

5955-6301

How To Use This Manual

This manual is written as an introduction to the terminal. It describes most of the terminal's features so that you can become familiar with its capabilities without worrying about all of the functional details. Once you have become familiar with the terminal, or if you desire detailed information on specific features, you can refer to the Reference Manual. If you are already familiar with HP 262X-series terminals, you need not read the entire manual. You can use the index at the back of the manual to locate answers to specific questions you may have.

This manual consists of the following sections and appendixes.

Section 1 — *Introducing The HP 2623A.* This section provides a general description of the terminal and briefly describes its capabilities.

Section 2 — *Getting To Know Your Terminal.* This section explains how to identify terminal options and accessories. In addition, it gives instructions for preparing your terminal for use.

Section 3 — *The Keyboard.* This section gives the location and describes the function of each of the major key groups.

Section 4 — *Function Keys.* This section describes and tells how to use the function keys; eight keys to which various functions can be assigned.

Section 5 — *Configuring Your Terminal.* This section describes how to configure your terminal to suit your needs.

Section 6 — *Using Your Terminal In Alphanumeric Mode.* This section gives step-by-step examples of using the terminal in typical non-graphics operations. These operations can be performed without peripheral devices or a computer system.

Section 7 — *Using Your Terminal In Graphics Mode.* This section describes how to use the terminal's graphics capabilities.

Section 8 — *Using Your Terminal In Compatibility Mode.* This section describes how to control your terminal's graphics capabilities with the software used to drive other compatible graphics terminals.

Section 9 — *Using Your Terminal With A Computer.* This section explains how to use the terminal with a computer system.

Section 10 — *Using Your Terminal With The Integral Printer Or External Device.* This section provides information on how to use the terminal with a printer.

Section 11 — *Maintenance.* This section gives instructions for cleaning the terminal.

Section 12 — *In Case Of Difficulty.* This section explains what to do if the terminal does not work properly.

Appendix — The appendix contains condensed programming information for all the terminals features and pictures of the foreign language keyboards which are offered as options.

Index — An index is provided for quick access to all information contained in the manual.

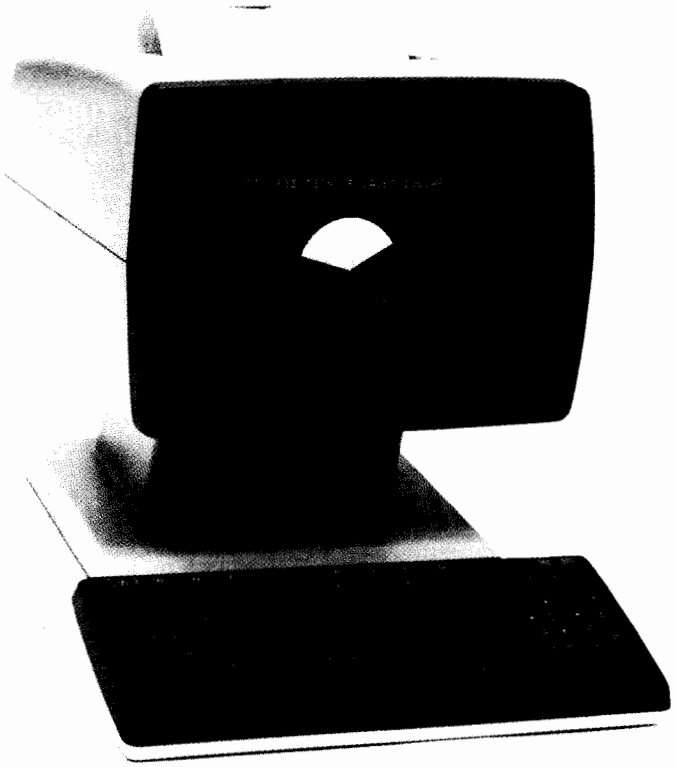
Terms Used In This Manual

A brief glossary of terms that you should know is given in the following table. Being familiar with these terms will help you to better understand the material presented in this manual.

TERM	DESCRIPTION
ALPHANUMERIC MEMORY	The RAM memory in which alphanumeric data (as opposed to graphics data) for display is stored. Also called display memory.
ALPHANUMERIC CURSOR	The blinking underline on the display that tells you where the next character or space will appear when entered.
DATACOMM	Abbreviation for "data communication" (transfer of data between the terminal and a computer).
DATA TRANSFER OPERATION	The process of transferring (or copying) data from one device to another.
DESTINATION DEVICE	The device that receives the data in a data transfer; also defined as the "to" device.
DEVICE CONTROL OPERATION	The process of skipping lines, moving printer paper, or transferring data between devices.
FORM FEED	Moves the printer paper to the top of the next page.
GRAPHICS CURSOR	The crosshair on the display in graphics text mode which indicates where the end point of a vector or the next character will appear.
FUNCTION KEYS	Eight keys located at the top of the keyboard which are used in association with eight labels displayed along the bottom of the screen. The function of each key can be changed by changing the associated label.
GRAPHICS MEMORY	The RAM memory in which graphics data for display is stored.
LINE	A row of characters; may be thought of as a line of text in a book.
LOCAL MODE	Operating the terminal without the aid of a computer system (that is, "off-line").
PAGE	The number (24) of display memory lines which can be displayed on the screen.
REMOTE MODE	Operating the terminal with the aid of a computer system (that is, "on-line").
SOURCE DEVICE	The device that supplies the data in a data transfer. Also defined as the "from" device.
VECTOR	A line drawn as a graphics operation.

1

Introducing The HP 2623A



The HP 2623A Display Terminal is a graphics terminal with many of the alphanumeric capabilities of the 262X family of terminals. These capabilities include block mode and format mode for data entry applications. Forms may be displayed and enhanced by the optional line drawing set. The terminal can display up to 80 characters per line and has an optional printer for printing graphic or alphanumeric data.

Highlights of the HP 2623A are:

High Quality Display

- Bright, clear screen display.
- Selective erase.
- 512 x 390 displayable points.
- Enhanced 7 x 11 dot characters in a 9 x 15 dot cell.
- 24-line by 80-character screen; 48-line by 80-character alphanumeric memory.

Graphic Software Support

- Graph 1000-II Compatible.
- DSG 3000 Compatible.

Optional Built-In Graphics And Alphanumeric Hardcopy

- Graphics Hardcopy in 30 to 60 seconds.
- Quiet thermal printer.
- Prints data-entry type forms.

Fast Vector Generation

- 9600 baud data communications.
- Eleven definable line types.

Graphics Text

- USASCII and six foreign languages.
- Normal or slanted type.
- Variable character size.
- Variable character orientation.

Rectangular Area Shading

- User definable patterns.

Alphanumeric Features

- High resolution display.
- Display enhancements.
- Format mode.
- Character/Block modes.
- Editing.

Ease Of Use

- Eight user-definable function keys.
- Soft configuration.
- Separate graphics and alphanumeric cursors.
- Keyboard control of graphics cursor.
- Simultaneous graphics and alphanumeric displays.
- Embedded numeric keypad.
- Typewriter-style keyboard.
- International character sets.
- RS232 printer port.

Data Communication

- EIA RS232-C.
- 20ma current loop.
- Full-duplex asynchronous.

Reliability and Serviceability

- Self-test.
- Modular design.

Independent Graphics And Alphanumeric Memories

The graphics memory, consisting of 32K bytes of RAM, stores a 390 by 512 dot pattern for the graphics image. The alphanumeric display memory can store two pages of information. Graphics and alphanumeric data can be displayed simultaneously on the screen with keyboard keys available to delete or return either type of data.

Vector Generation

The graphics vectors are generated automatically by the terminal's hardware.

Alphanumeric Text Composition Within Graphics Memory

Both the alphanumeric and graphics memories allow characters to be entered on the screen. For graphics text, the characters can be either normal upright or slanted. Also, the characters can be expanded to eight different sizes and may be displayed in any one of four directions and six languages.

High Resolution Display

Each alphanumeric character is formed by a 7 x 11 dot matrix within a 9 x 15 dot cell. This permits the precise formation of complex character symbols with ample separation between adjacent characters, both vertically and horizontally.

Compatibility Mode

The 2623A may be configured, via the keyboard or an application program, to be compatible with other graphics software. It may be possible, by configuration or by sending an escape sequence to the terminal from a program, to produce graphics input/output while under control of your existing software.

Keyboard

The HP 2623A keyboard is a separate unit that is linked to the display portion of the terminal by a flexible cable. The keyboard layout is similiar to that used for standard office typewriters. It has 68 keys that include eight function keys and three keys for specifying the family of functions to be assigned to the function keys. Most of the remaining keys support the ASCII-coded character set. A graphics/numeric pad, similiar to the numeric pad used for calculators, is included for use as either a graphics keypad or for numeric entry. An optional line-drawing set ROM can be installed and the line segments which it contains can be assigned to the keyboard keys.

Optional character ROMs are available for an extension of the Roman character set. Also, ROMs are available for one of six languages (Swedish/Finnish, Danish/Norwegian, French, German, United Kingdom, and Spanish) together with the appropriate keyboard.

Function Keys

The function keys are the eight keys located across the top of the keyboard. These keys perform the functions indicated by screen labels assigned to each key. The screen labels are displayed in half bright inverse video across the bottom of the screen (rows 25 and 26).

Function Control Keys

Three additional keyboard keys are used to select the family of functions available through the function keys. The USER KEYS key allows each of the function keys to be assigned a string of up to 80 characters selected by the user. The MODES key assigns terminal operating modes to the function keys for selection by the user. The AIDS key accesses a tree of functions assignable to the function keys by user selection. This tree comprises most of the functions assignable to the functions keys.

See Section 4 for a discussion of the function keys and function control keys.

Configuration

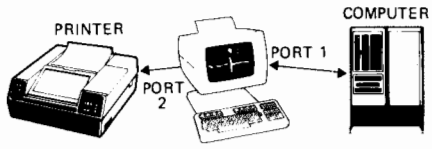
The HP 2623A provides you with the ability to change the configuration of the terminal directly from the keyboard using the function keys. The current configuration can be displayed on the screen and then changed by simply pressing the appropriate function key. The portion of memory used to store this configuration is non-volatile; a battery is used to preserve it whenever the main power source is shut off.

Data Communications

You can transfer data to and from a computer in character mode (one character at a time), block line mode (one line at a time), or block page mode (the entire contents of the display). Block line or block page mode enable you to compose text and edit it before sending it to the computer.

The terminal operates at a transfer rate of up to 9,600 baud and offers full-duplex, asynchronous, point-to-point communications using the EIA RS-232-C communications interface specifications. Connection to a computer is direct or through a modem.

In addition to these features, the HP 2623A provides, as an option, an integral thermal printer which can be used to produce a permanent copy of your data transactions.



Section 9 contains further information on data communications.

Self-Test

This terminal is engineered for high reliability, ease of testing, and, if required, rapid repair. By using the test function, you get a go/no go indication of the terminals operating condition. Refer to Section 12 for further information on the terminal's self-test function.

2

Getting To Know Your Terminal 2

How To Identify Options And Accessories

Any options you request when you order the terminal are delivered installed within the terminal. Accessories, such as data communication cables, are delivered with the terminal, usually in the same carton but packaged separately. Upon delivery of the terminal, verify that the options and/or accessories you ordered are included in the shipment received.

An identification label is located on the rear panel of your terminal (see figure 2-1). The first section of this label states the power requirements of the terminal. The next section states the model number and the serial number. The third section lists any options included with the terminal.

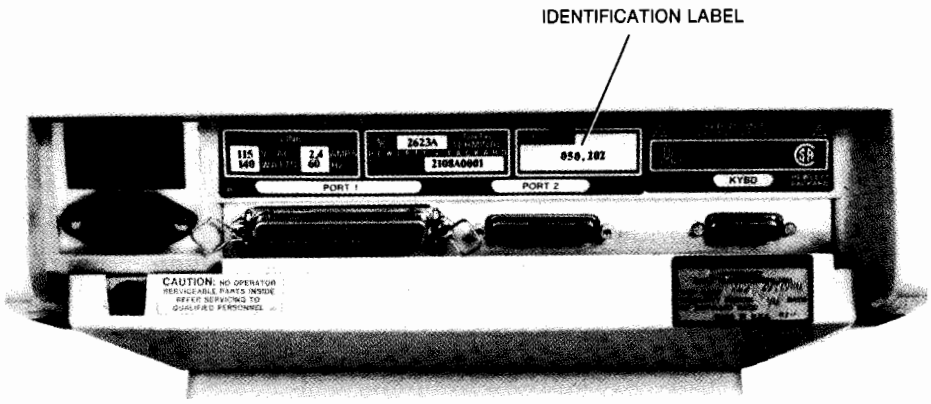


Figure 2-1. HP 2623A Identification Label, Rear Panel

Table 2-1 is a list of options available for the HP 2623A Display Station.

Table 2-1. HP 2623A Options

OPTION	DESCRIPTION
001	Swedish/Finnish Keyboard
002	Danish/Norwegian Keyboard
003	French Keyboard
004	German Keyboard
005	United Kingdom Keyboard
006	Spanish Keyboard
015	50 Hz, 230 V Power
016	50 Hz, 115 V Power
050	Integral Printer
202	Line Drawing Character Set

✓ 013 240V 50Hz

When communicating with Hewlett-Packard regarding your terminal, specify the model, serial, and the option numbers to ensure accurate identification by Hewlett-Packard. A list of Hewlett-Packard Sales and Service Offices is included at the back of this manual.

NOTE

If your terminal is already installed, you can ignore the following material and proceed to "Turning The Terminal ON And OFF".

Preparing The Terminal For Use

This terminal is designed to operate in a wide range of environments. It is self-contained and provides easy access to the operator controls so that normal installation does not require that you open the unit. The terminal should be opened only by a qualified service person (refer to the HP 2623A Service Manual).

To install the terminal, complete the following steps:

1. Place the terminal on any sturdy, convenient surface such as a desk, table, or stand designed for such a purpose. Avoid plush or spongy surfaces that might restrict the flow of air through the vents in the base of the terminal (figure 2-2). For example, do not use a typewriter pad beneath the terminal.

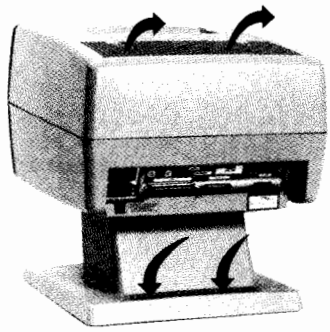


Figure 2-2. Cooling Airflow Through The Terminal

2. Connect and secure the keyboard cable hood connector to the socket connecter labeled KYBD on the terminal's rear panel (see figure 2-3).
3. This step is required to connect the terminal to an external data processing device, such as a computer. Connect and secure the data communications cable hood connector to the datacomm socket connector on the terminal's rear panel. The cable hood connector must be securely held in place by the wire clamps provided with the socket connector. Connect the other end of this cable to the appropriate external device.
4. Set the main power switch on the terminal's rear panel (see figure 2-3) to the OFF position.
5. Connect the power cord to the connector located just below the main power switch. Ensure that the voltage to be supplied matches your terminal's power requirements (see the power requirements label on the rear panel of the terminal).
6. Plug the 3-prong connector into the outlet for the main power source.

WARNING

For your safety, a 3-prong grounded power outlet must always be used.

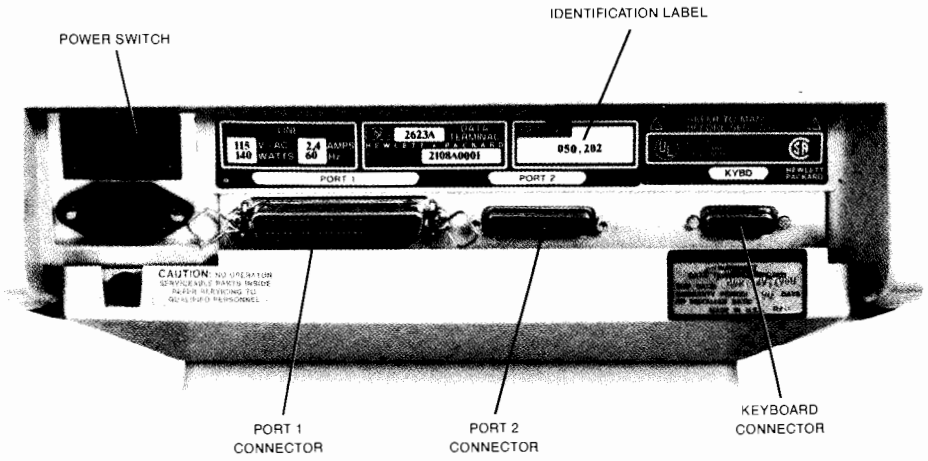


Figure 2-3. HP 2623A Power Switch And Connector Positions

Figure 2-4. HP 2623A Initial Screen Display

Turning The Terminal ON And OFF

ON

When the installation of the terminal is completed, set the main power switch on the rear panel (see figure 2-3) to the ON position. After approximately 15 seconds, the terminal is ready to use. If the terminal beeps more than once during power up, the terminal may be faulty; refer to Section 12, Terminal Test, to check for proper operation. Figure 2-4 illustrates the condition of the display screen as it appears following the initial application of power to the terminal.

When the terminal is ready to use, the cursor is displayed in screen column 1, row 1. In addition to the cursor, the primary level of function key labels is displayed across the bottom of the screen (figure 2-4).

If the message `DEFAULT CONFIG USED` is present at the bottom of the screen, the battery that protects non-volatile memory may have been accidentally jarred loose during shipment or unpacking. Ensure that the battery pack is securely seated (see Section 9 for instructions about removing and replacing the battery pack), then turn off the power and turn it on again. If the message remains, perform a terminal test (refer to Section 12, Terminal Test, for instructions) to determine if the terminal is malfunctioning or if the battery is dead or missing. If the test completes successfully, replace the battery. If the message persists after the battery has been replaced, contact your nearest Hewlett-Packard sales and service office (listed at the end of this manual) for help.

OFF

To shut off your terminal, simply set the main power switch to the OFF position.

3

The Keyboard 3

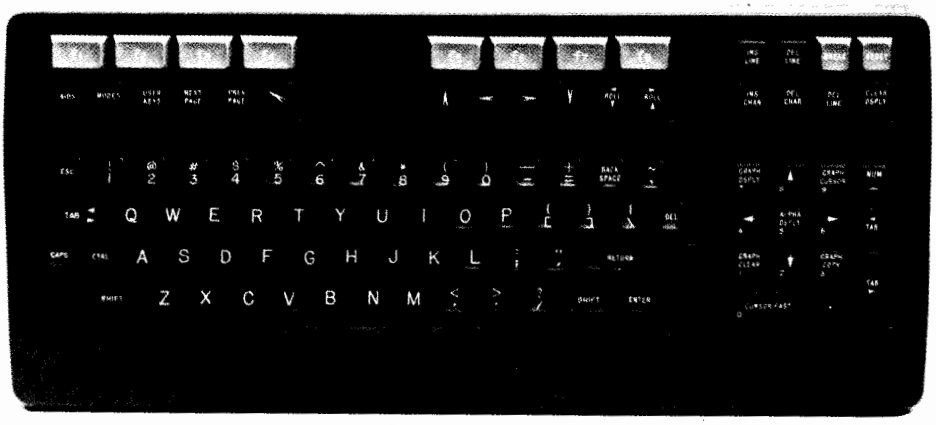


Figure 3-1. Terminal Keyboard

Before learning to control devices and transfer data, you should become familiar with the keyboard. Figure 3-1 shows the keyboard layout. The keyboard consists of the following functional groups:

- **Character Set Group.** This group of keys is similiar to a standard typewriter keyboard. It is used for entering data into the terminal workspaces.
- **Graphics/Numeric Control Group.** These keys have dual functions; they can be used as graphics control keys or as a numeric pad.
- **Display Control Group.** This group controls movement of the display to view or operate on portions of the display memory. It also controls the cursor position.
- **Edit Group.** Text can be easily changed using the insert and delete functions of the edit group.
- **Terminal Control Group.** This group is used to initialize the terminal or interrupt data communications operations while in remote mode.
- **Function Keys Group.** Keys in this group can either be assigned a function from a selection of functions or be assigned a unique function by the user.
- **Function Control Keys.** Three keys, each used to select one of three separate families of functions to be assigned to the function keys.

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

Character Set Group

The alphabetic, numeric, and symbol keys are all located in the character set group. This is the largest group of keys on the keyboard. The basic character set is made up of 128 characters. This includes upper and lower case alphabetic characters, punctuation, and some commercial symbols. In addition, several non-displaying characters are also available. The non-displaying characters are used primarily for special applications. Refer to the Reference Manual for additional information on non-displaying characters.

The standard or base character set is indicated on the keys. The SHIFT key selects upper case or shifted characters and is also used for adding a function to several other keys (USER KEYS , TAB , AIDS , and HOME keys). The BACK SPACE and RETURN keys are used in the same manner as on a typewriter. Three TAB keys are available. The primary TAB key, at the left side of the keyboard, can be used to tab either left or right. When it is pressed, the cursor moves to the next tab stop to the right. A SHIFT TAB moves the cursor to the next tab stop to the left. A right tab key (TAB ▶) and a left tab key (TAB ◀) are located in the numeric pad group. (These tab keys and the . key are disabled when the graphics/numeric keypad is set for graphics operation.) The CAPS key selects all capital letters, however, it is overridden by the Caps Lock selection on the Terminal Configuration menu.

EXERCISE

Try typing a few lines of text to get used to the keyboard. Remember, this part of the terminal works very much like a typewriter. Note that, by using the BACK SPACE key, you can overwrite and change characters.

The ESC and CTRL keys are used to provide additional character codes and to generate special control codes for various terminal operations. The use of the ESC and CTRL keys is explained below.

ESC Key Operations

The ESC key is used to extend the operating functions of the terminal. Unlike the CTRL key, the ESC key is pressed first, then released, before pressing any other keys. Some functions require only that one key be pressed following the ESC key to perform the function; while other functions require a sequence of character keys be pressed following the ESC key. These sequences must always be terminated with an upper case character, rather than a lowercase character, to tell the terminal that the sequence has ended. All the escape code functions are listed in the appendix at the end of the manual.

CTRL Key Operations

The CTRL is used to add a second function (hard reset) to the RESET key. It is also used together with other keys to generate ASCII control codes (see appendix). (Be sure to hold down the CTRL key while pressing the RESET key.)

ENTER Key Operations

When the terminal is set for Remote (on-line) mode, the ENTER key allows you to send blocks of data to a computer. The ENTER key functions differently depending upon whether the terminal is in Format mode (ESC W) and on the BLOCK MODE and REMOTE MODE key settings. Refer to the Reference Manual for information on use of the ENTER key in Remote mode.

In Local mode, the ENTER key can be used to produce a copy of all data in the display on the destination device(s).

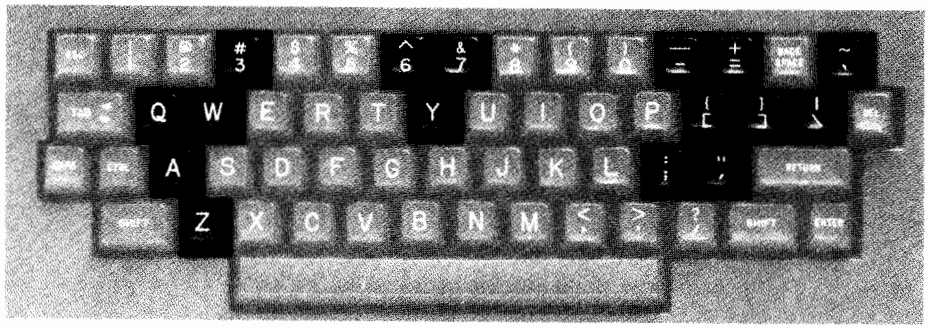


Figure 3-2. Location Of Keys Which May Change With Character Set Selection

Selectable Character Sets

USASCII is the standard character set with optional Swedish/Finnish, Danish/Norwegian, French, German, United Kingdom, and Spanish character sets. You can select either "QWERTY" or "AZERTY" French keyboard configurations. When a national language option is installed, it adds the extended Roman character set to the USASCII character set. Refer to Section 5, Configuring the Terminal, and Appendix B for information on character set selection. There are 16 keys which might be different depending on the character set selected. Figure 3-2 locates the keys and table 3-1 associates the key location, the character set, and the character produced when the key is pressed.

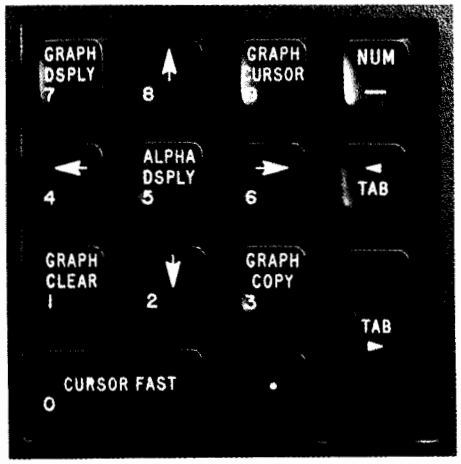
Several "mute" keys are used in French and Spanish character sets. These are keys used to produce certain characters which contain both the alphabetic character and a diacritic mark (such as ^ or '). When the diacritic mark is typed, it remains on the screen but the cursor remains in the same position awaiting the alphabetic character. When one of the acceptable characters (a, e, i, o, u, A, O, U) is typed in, the cursor moves on to the next character position. If the character typed in is not one of the acceptable characters, the last character typed in is displayed and the cursor moves to the next position.

Table 3-1. Characters Which Change With Character Set Selection

LANGUAGE	CHARACTERS																	
USASCII	#	^	&	-	+	~	Q	W	Y	{	}	!	A	:	"	Z	@	<	>	?
	3	6	7	-	=	`	q	w	y	[	]	\	a	;	'	z	2	,	.	/
SVENSK/SUOMI	#	&	/	?	£	*	Q	W	Y	Å	ü	>	A	ö	Ä	Z	"	;	:	_
	3	6	7	+	é	'	q	w	y	å	ü	<	a	ö	ä	z	2	,	.	-
DANSK/NORSK	#	&	/	?	^	~	Q	W	Y	Å	*	>	A	Æ	Ø	Z	"	;	:	_
	3	6	7	+	@	`	q	w	y	å	ì	<	a	æ	ø	z	2	,	.	-
FRANCAIS azM, az	§	+	/	?	"	£	A	Z	Y	ç	*	>	Q	è	°	W	"	;	:	_
	3	6	7	'	^	`	a	z	y	à	&	<	q	é	`	w	2	,	.	-
FRANCAIS qwM, qw	§	+	/	?	"	£	Q	W	Y	ç	*	>	A	è	°	Z	"	;	:	_
	3	6	7	'	^	`	q	w	y	à	&	<	a	é	`	z	2	,	.	-
DEUTCH	ç	&	/	?	`	^	Q	W	Z	ü	*	>	A	ö	ä	Y	"	;	:	_
	3	6	7	ß	'	£	q	w	z	ü	*	<	a	ö	ä	y	2	,	.	-
UK	£	&	^	?	/	~	Q	W	Y	{	}	>	A	@	!	Z	"	;	:	_
	3	6	7	+	'	`	q	w	y	[	]	<	a	*	\	z	2	,	.	-
ESPANOL M and ESPANOL	¿	&	¡	?	/	~	Q	W	Y	{	}	>	A	Ñ	@	Z	"	;	:	_
	3	6	7	+	'	`	q	w	y	°	#	<	a	ñ	*	z	2	,	.	-

Graphics/Numeric Control Group

The graphics/numeric control keys at the right of the keyboard serve both as the control keys for the graphics display and as a numeric pad.

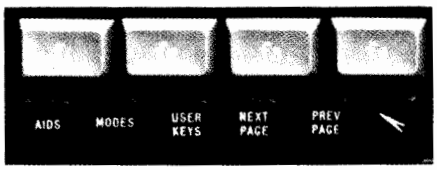


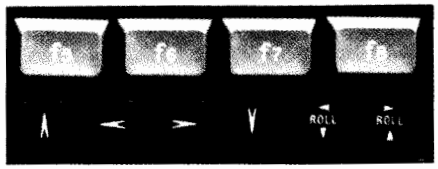
When used as graphics control keys, the keys enable turning on and off graphics and graphics text video and the graphics cursor, clearing graphics memory, and copying the screen to a printer.

When used as a numeric pad, they act in the same way as the keys in the alphanumeric group. These keys are arranged to make it easy to enter numeric data and use tabs. In addition to the numeric keys, the pad holds a "dash" or "minus" key, a TAB◄, a TAB►, and a decimal point . key.

After a power on, the graphics/numeric pad is set for graphics operation. It can be set for numeric operation by pressing the SHIFT and NUM keys, simultaneously. Whether the pad is set for graphics or numeric operation, it can be set for the other type operation by pressing the SHIFT and NUM keys simultaneously.

Refer to Section 8 for details on use of the graphics/numeric pad keys for graphics operations.





Display Group

The display group keys are used to control the alphanumeric cursor and select the portion of alphanumeric memory to be displayed. They consist of the ∧, <, >, ∨, ROLL UP and ROLL DOWN keys, NEXT PAGE, PREV PAGE, and ↖ keys. The ∧, <, >, ∨, and ↖ keys are used to position the cursor and the ROLL UP and ROLL DOWN keys, NEXT PAGE, and PREV PAGE keys are used to select the data for display.

The display screen holds up to 24 lines of 80 characters each. This is called a "page". You can select the previous page or the next page for display. When the display has been filled with data, the top line rolls off the screen. As you type each line, the display will roll up to make room for the new line. This continues until display memory (which holds 48 lines) is filled. At this point, if you enter another line, one line will be lost from display memory to make room for the new line. The display group keys allow you to "page" or scroll through the alphanumeric memory to display characters that have rolled off the screen.

The ROLL UP and ROLL DOWN keys allow you to scan the display memory one line at a time. The NEXT PAGE and PREV PAGE keys allow you to move the display one page forward or backward in the alphanumeric memory. When you press these keys, the information presently displayed is replaced with the next or previous page of the alphanumeric memory.

Moving The Alphanumeric Cursor

The cursor position is controlled by five keys. The ∧ and ∨ keys move the cursor in the vertical dimension, the < and > keys move it in the horizontal dimension, and the ↖ key locates it at the left margin of the first line in the screen and displays the first page in the alphanumeric memory.

Table 3-2 describes the function of each key.

Table 3-2. Alphanumeric Cursor Control Key Functions

KEY	FUNCTION
∧	Cursor Up—Moves the cursor up one row each time the key is pressed. If the key is held down, the cursor moves up until either the key is released or it reaches the top row of the display memory where it wraps around to row 24 of the screen.
∨	Cursor Down—Moves the cursor down one row each time the key is pressed. If the key is held down, the cursor moves down until either the key is released or the last displayed row is reached; then it wraps around to row 1 of the screen.
<	Cursor Left—Moves the cursor left one column each time the key is pressed. If the key is held down, the cursor moves left until either the key is released or the first column of the display is reached. If the key is held down after the first column is reached, the cursor moves to the last column of the preceding row. This action continues as long as the key is held down or until column 1 of the first line of text in alphanumeric memory is reached; then the cursor moves to column 80 of row 24.
>	Cursor Right—Moves the cursor right one column each time the key is pressed. If the key is held down, the cursor moves right until either the key is released or the last column of the display is reached. If the key is held down after the last column is reached, the cursor moves to the first column of the following row. This actions continues as long as the key is held down or until column 80 of the last displayed line of text is reached; then the cursor moves to column 1 of row 1.
↖	Home Cursor—The cursor is moved to the left margin of the first row of the display memory and rolls the text in alphanumeric memory down as far as possible so that the first line of text in memory appears in row 1 of the screen.
SHIFT ↖	Cursor Home Down—The cursor is moved to the left margin of the row following the last used row in the alphanumeric memory. If the cursor line is not displayed when the keys are pressed, the display is scrolled up until the cursor line is displayed.

Scanning The Alphanumeric Memory

The display is controlled by the ROLL UP and ROLL DOWN keys, and the NEXT PAGE and PREV PAGE keys. With these keys, the contents of the alphanumeric memory can be scrolled vertically past the display screen, or the next or previous set of lines (page) can be called to the display screen (figure 3-3).

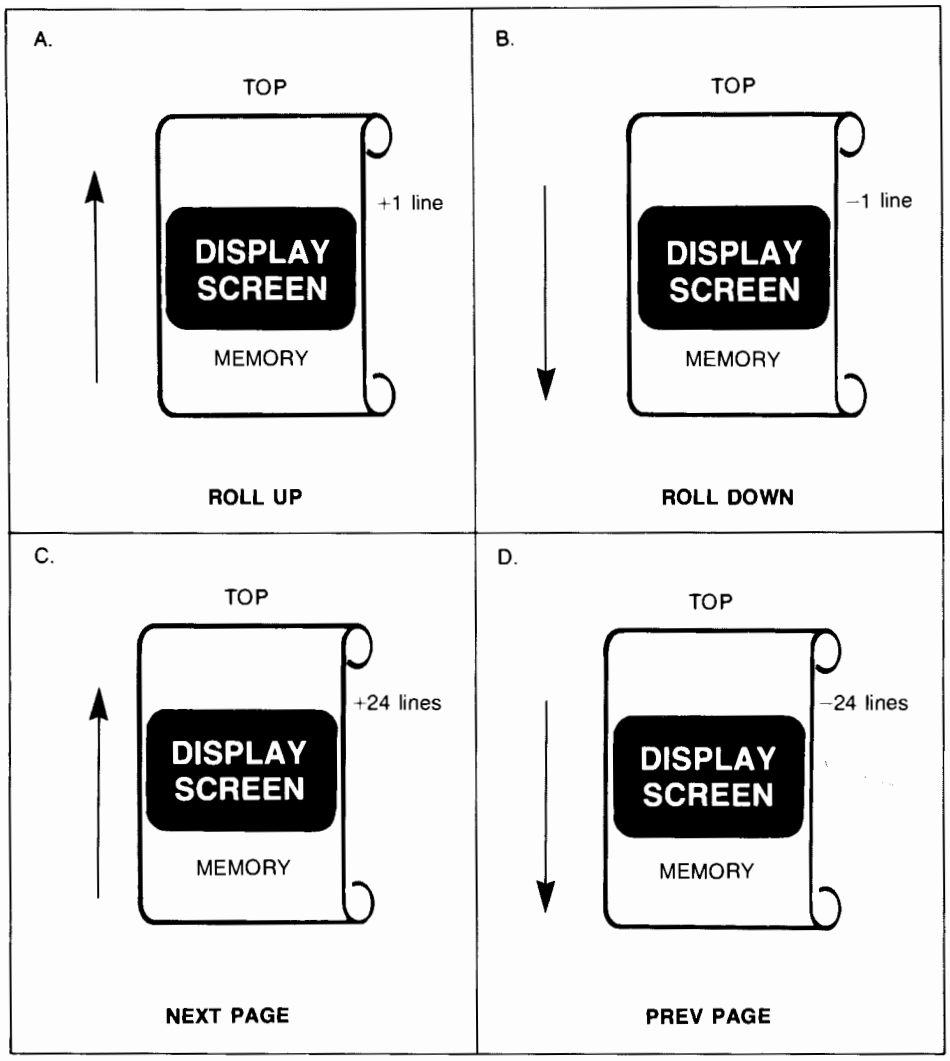
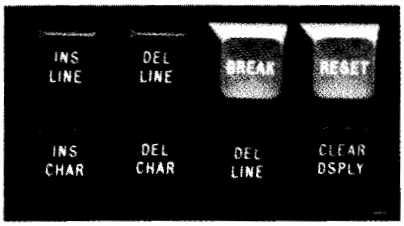


Figure 3-3. Operation Of ROLL UP And ROLL DOWN Keys

Table 3-3 describes the function of the ROLL UP and ROLL DOWN, and the PREV PAGE and NEXT PAGE keys.

Table 3-3. Display Control Key Functions

KEY	FUNCTION
ROLL DOWN	Scrolls the contents of alphanumeric memory down one row each time the key is pressed. If the key is held down, the contents of alphanumeric memory is scrolled down until either the key is released or the first row of alphanumeric memory is displayed as the first row of the display screen.
ROLL UP	Scrolls the contents of alphanumeric memory one row each time the key is pressed. If the key is held down, the content of alphanumeric memory is scrolled up until either the key is released or the last row of alphanumeric memory is displayed as the first row of the display screen.
NEXT PAGE	Allows you to display the next 24 lines.
PREV PAGE	Allows you to display the previous 24 lines.



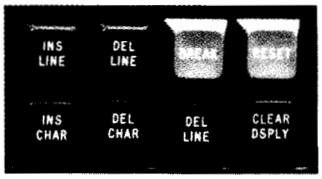
Edit Group

Displayed data can be edited by inserting or deleting characters or lines, deleting the portion of a line to the right of the cursor, or deleting all data in alphanumeric memory beginning at the cursor position.

Table 3-4 lists the function of each edit key.

Table 3-4. Edit Key Functions

KEY	FUNCTION
CLEAR DSPLY	Clears the display from the cursor position to the end of the alphanumeric memory.
CLEAR LINE	Clears the line from the cursor to the end of the line.
INSERT LINE	Inserts a blank line preceding the one in which the cursor is located. The line in which the cursor is located and subsequent lines are pushed down one line and the cursor is moved to the left margin of the blank line.
DELETE LINE	Deletes the line in which the cursor is located. Subsequent lines are scrolled up to take its place and the cursor is moved to the left margin.
INSERT CHAR	This key allows you to insert characters into a line without overwriting existing characters. The new characters are inserted at the cursor position. The existing characters are shifted right one character position for each character entered. Characters shifted past the right margin are lost. When this insert character function is enabled, the characters "IC" are displayed in the status line at the bottom of the screen. To deactivate the insert character function, press the INSERT CHAR key a second time. After this, any characters entered will overwrite existing characters, as usual.
DELETE CHAR	This key deletes the character at the cursor position. When you press down the DELETE CHAR key, characters to the right of the deleted character (up to the right margin) will be shifted left one character position for each character deleted.



Terminal Control Group

The terminal control group keys, which consist of the RESET and BREAK keys, are located in the upper right corner of the keyboard. These keys are used to reset the terminal and temporarily interrupt datacomm operations.

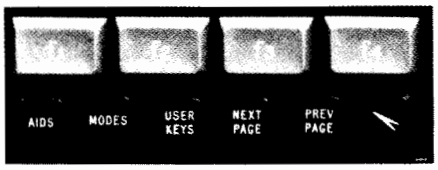
RESET Key

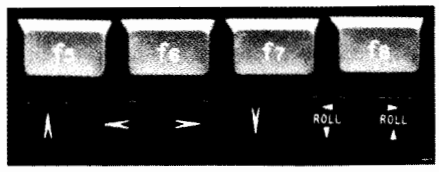
Soft Reset. Pressing the RESET key once results in a "soft reset" which unlocks the keyboard, clears any error messages, turns off Display Functions mode, stops printer operations and data communication transfers, and rings the keyboard bell.

Hard Reset. Pressing the SHIFT, CTRL, and RESET keys simultaneously produces a "hard reset". This causes the terminal to be set to the initial power-on state (reinitialization of the datacomm channel, the screen cleared, and the user keys reset to the default values) and the keyboard bell to be rung. This key should not be used unless necessary to clear the terminal (refer to Section 12, In Case Of Difficulty).

BREAK Key

The BREAK key can be used to interrupt the operation of the terminal's data communication to the computer function. Refer to the Reference Manual for additional information.

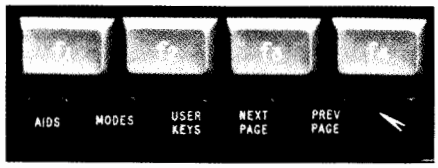




Function Keys Group

The function keys group consists of keys f1 through f8. The eight function key labels along the bottom of the display are associated with keys f1 through f8 in a positional relationship. For example, the third label from the left is associated with the third key from the left (f3). When the key is pressed, the function suggested by the label is performed. By changing the functions assigned to the labels, each key can be made to perform multiple functions. The functions assigned to the labels are changed using the Function Control keys (AIDS, MODES, and USER KEYS) and certain function keys.

Many of the functions needed for routine data entry (and which are normally initiated by keyboard keys) are incorporated into the function keys on the HP 2623 terminal. Refer to Section 4, Function Keys, for information on accessing these functions.



Function Control Keys Group

The function control keys consist of the AIDS, MODES, and USER KEYS keys. These three keys are used to select the family of functions available to the function keys.

AIDS Key

The AIDS key accesses multiple sets of function key labels (eight labels in a set, one for each function key). Most of the terminal functions are accessed through the AIDS key.

MODES Key

The MODES key selects only one set of function labels which are used to select terminal operating modes. These are Line Modify, Modify All, Block mode, Remote mode, Terminal Test mode, Memory Lock mode, Display Functions mode, and Auto Linefeed mode. The labels for these modes are also displayed when the terminal is initialized after a power-on or reset.

USER KEYS Key

Pressing SHIFT USER KEYS enables you to assign up to 80 characters of data to each function key. You can also assign 16-character labels to the function keys and specify the disposition of the data assigned to each key. The data can be specified for local use at the terminal only, for transmission to the computer only, or to be treated as data entered normally from the keyboard. Refer to "User Definable Function Keys" in Section 4 for instructions on loading and executing the user keys.

What to Do In Case Of Difficulty

If the key or function you try does not work properly, or if an error message appears on the screen, refer to Section 12; a list of messages and their meanings is given there. In addition to the list of messages, Section 12 contains information about error recovery, testing the terminal, and where to get service assistance if you should require it.

4

Function Keys 4

The function keys consist of keys f1 through f8 located along the top of the keyboard. They are used in association with function key labels displayed along the bottom of the screen. The function suggested by the label is performed when the associated key is pressed. The association between the labels and the function keys is positional. For example, the third label from the left is associated with the third key from the left (f3) (see figure 4-1).

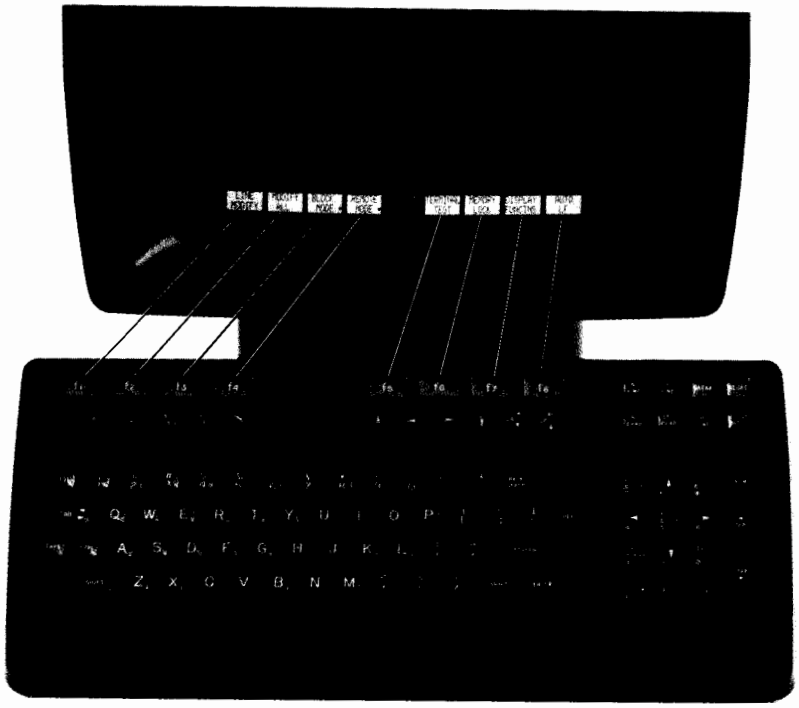


Figure 4-1. Function Keys And Labels

Each function key can be made to perform various functions by changing the corresponding function key label. The function key labels are changed using the MODES, MORE, and USER KEYS keyboard keys and the function keys themselves. There are three groups of function key labels:

- Mode function key labels.
- Predefined function key labels.
- User-definable function key labels.

The mode function key labels, which are accessed through the MODES key, enable selection of seven modes in which the terminal can operate. These labels also appear on the screen after a hard reset or power-on operation. Most of the user-initiated operations are accessed using the MORE key. The user-definable function key capability enables the user to assign functions and labels of his own choosing to the eight function keys. This capability is accessed through the SHIFT and USER KEYS keys.

Labels — Upper And Lower Case

The titles in the function key labels are written in both upper- and lower-case letters. Those written in lower-case letters are used only to change to another set of function key labels. Those written in upper-case letters perform the function suggested in the label.

Labels With An Asterisk

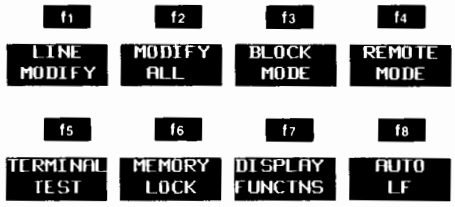
Two types of function key labels might contain an asterisk; those which can be changed from on to off (toggled), and those which are mutually exclusive with other labels. The asterisk indicates that the function displayed in the label is selected; absence of the asterisk indicates the function is not selected. Alternate presses of keys that can be toggled display an asterisk in the associated label.

Other function keys which have an asterisk capability cannot be toggled but have a mutually exclusive nature. Such keys exist as a group in which only one label can contain an asterisk at a given time. The EXPAND PRINT, COMPRESS PRINT set of labels and the REPORT PRINT and METRIC PRINT set of labels are such a group in that only one type of print can be selected at a given time.

To return the terminal to normal operation after using the predefined function keys, simply press the AIDS key. Any selections you have made using toggling function keys will still be in effect, and the AIDS set of labels will be displayed.

MODES Function Key Labels

The MODES key displays the Modes set of function key labels, as follows:



Except for TERMINAL TEST, these labels are used to activate or deactivate the major terminal modes. Each of the function keys, when these labels are displayed, can activate the mode denoted by the label (the label contains an asterisk when the mode is active). Alternately pressing the function key produces and deletes the asterisk. Table 4-1 describes the functions of the function keys when the Modes labels are displayed.

Table 4-1. MODES Key Set Of Function Key Labels

LABEL	FUNCTION
LINE MODIFY*	Used only in Remote mode. When enabled, this mode allows editing a line of data while in Character mode, then using the ENTER or RETURN key to transmit the line to the computer as a block. Line Modify mode ends when the ENTER or RETURN key is pressed.
MODIFY ALL*	Similiar to **LINE MODIFY** except that Modify All mode is not ended by the ENTER or RETURN key. Modify All mode transmits a line to the computer as a block. When Modify All mode is active, an asterisk is present in the label. When Modify All mode is not active, the asterisk is absent from the label.
BLOCK MODE*	This label is used only in Remote mode. When active (asterisk present in the label), typed data is displayed but not sent to the computer until after the ENTER key has been pressed. Otherwise, the terminal is in Character mode and each character is transmitted to the computer as typed.
REMOTE MODE*	When selected (an asterisk present in the label), the terminal is in Remote mode (prepared for communications with the computer). When not selected (asterisk is absent from label), the terminal is selected for Local mode.
TERMINAL TEST*	Initiates a go/no go test of overall terminal operation. On completion of the test, a test pattern, which includes all character sets the terminal is capable of displaying, is displayed on the screen.
MEMORY LOCK*	Operates in two modes; overflow protect and display lock. **Overflow Protect.** When Memory Lock mode is activated and the cursor is in the first line of the display, data can be entered to the end of alphanumeric memory. When the end of memory is reached, no more data can be entered and the bell sounds.

Table 4-1. MODES Key Set Of Function Key Labels (Continued)

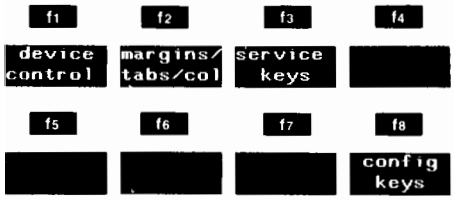
LABEL	FUNCTION
	Display Lock. Invoked by activating Memory Lock mode; deactivated by leaving Memory Lock mode. When Display Lock mode is entered, all data from the first displayed line to the line above the cursor is frozen. Then, when new data is entered following the displayed data, the new data, when it is entered beyond the last line on the screen, scrolls up under the frozen data. The lines scrolled up off the screen are inserted in memory immediately preceding the first line of frozen data. When the ROLL UP key is pressed in Display Lock mode, the lines succeeding the frozen lines roll up under the frozen lines so that they precede the frozen data.
DISPLAY FUNCTNS*	When on, the action normally produced by any keyboard control key, such as RETURN, TAB, or any of the display or edit groups of keys, is not performed. Instead, an ASCII character or escape sequence representing the function is displayed on the screen.
AUTO LF*	When on, generates a line feed with every carriage return (RETURN key).

AIDS Function Key Labels

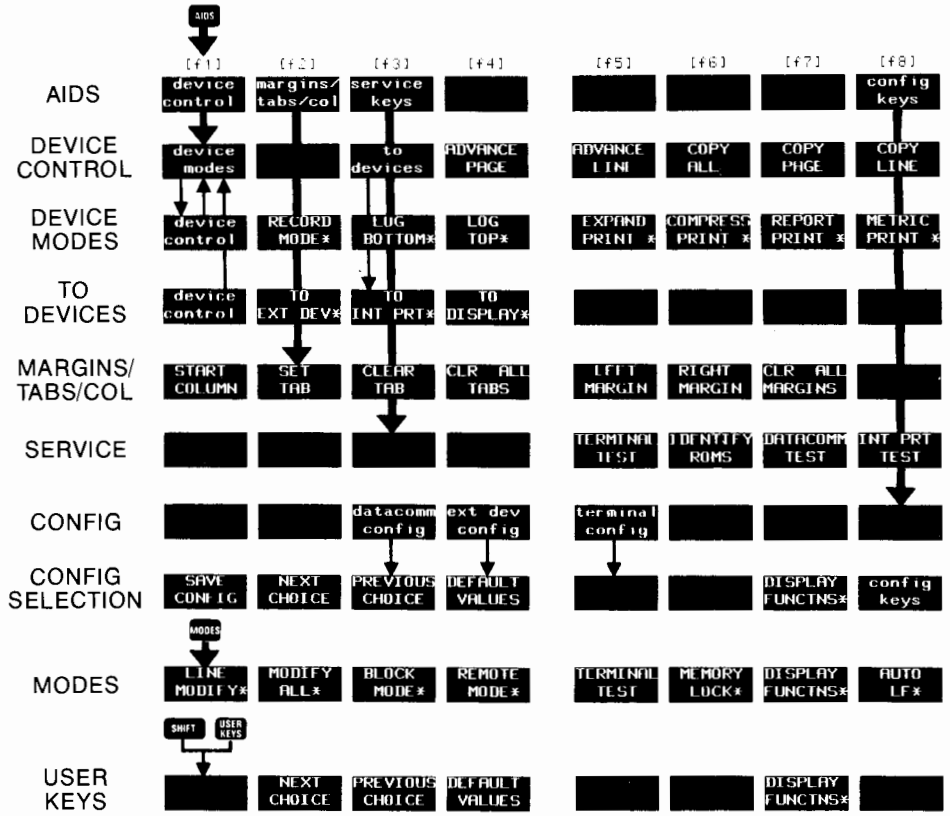
Most of the terminal capabilities are accessed, directly or indirectly, through the AIDS key. Some of these capabilities are listed below:

- Set or clear margins.
- Set or clear tabs.
- Send data to the internal printer.
- Select the start column for data transmissions.
- Select either of three types of configuration menus for configuration changes.
- Execute terminal tests.

There are four predefined function key labels which are accessed by pressing the AIDS key. These function key labels are shown below:



The remaining sets of labels are accessed, directly or indirectly, through the Aids set. Figure 4-2 illustrates how to access each set of labels.



NOTE

Those labels which include an asterisk (*) signify functions which, when enabled, include the asterisk to indicate that the function is enabled.

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

Aids Set

The Aids set of labels is used only to access other sets of labels. Each label in the Aids set names another set of labels. Some sets of labels are not directly accessible from the Aids set. In such cases, several such sets form a group, with one of the sets accessible from the Aids set. The other sets in the group are then accessible through the key that was pressed in the Aids set. There are two such groups: the Device Modes group and the Config group. (The Config group will not be covered in detail in this manual; see the Reference Manual.) Table 4-2 describes the functions of the Aids set.

Table 4-2. AIDS Key Set Of Function Key Labels

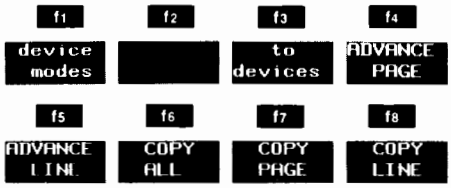
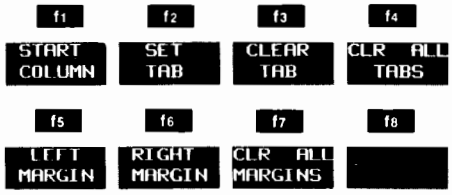
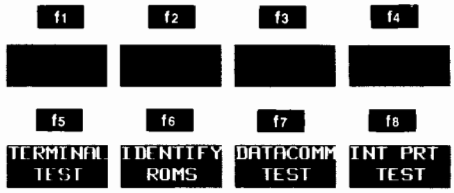
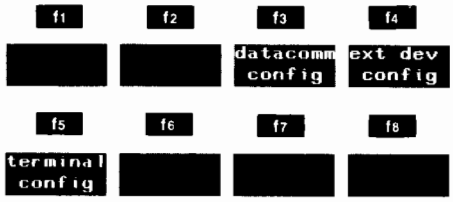
LABEL	FUNCTION
device control	Displays the following set of labels which are used to control the transfer of data to the integral printer: 
margins/ tabs/col	Displays the following set of labels which enable control of margins, tabs, and selection of the start column for transmission of data to a computer in Remote mode: 

Table 4-2. AIDS Key Set Of Function Key Labels (Continued)

LABEL	FUNCTION
service keys	Displays the following set of service labels which allow for a terminal test, identification of all ROMs used in the terminal, a datacomm test, and an integral printer test:



config keys	Displays the following set of key labels for selecting the datacomm, terminal, or external device configuration menus:



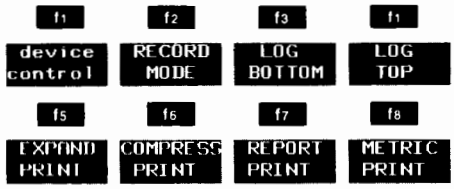
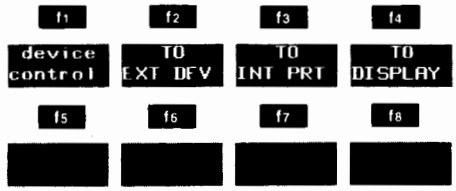
Device Control Set

The Device Control set of keys is accessed by pressing

and consists of the following set of labels:

The Device Control set of keys is used to select the amount of data to be copied (all, page, or line) to the internal or external printer and allows skipping one page or one line on the internal printer. Table 4-3 describes the functions of the Device Control set.

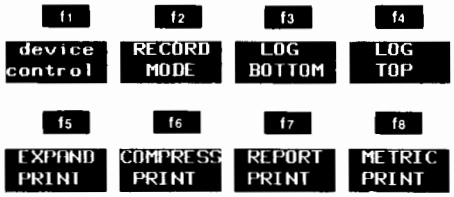
Table 4-3. Device Control Set Of Function Key Labels

LABEL	FUNCTION
device modes	Displays the following Device Modes set of labels: 
to devices	Displays the following To Devices set of labels: 
ADVANCE PAGE	If the integral printer has been selected as the destination device and Metric or Report mode is selected, this key causes the printer to skip to the top of the next page. If not in Metric or Report mode, the printer advances one line.
ADVANCE LINE	If the integral printer has been selected as the destination device, this key causes the printer to skip the next line, leaving it blank.
COPY ALL	If the integral printer has been selected as the destination device, all contents of the display memory, starting with the line in which the cursor is positioned, are copied to the printer.
COPY PAGE	If the integral printer has been selected as the destination device, all lines in the display memory which are displayed on the screen, starting with the line in which the cursor is positioned, are copied to the printer.
COPY LINE	If the integral printer has been selected as the destination device, the line in which the cursor is positioned is copied to the printer.

Device Modes Set

The Device Modes set of keys is accessed by pressing, in sequence

and consists of the following set of labels:



This set enables copying the entire screen, transferring a line of data to the integral printer using either the "log top" or "log bottom" method (refer to Section 7 for details on top and bottom logging), printing in expanded or compressed form, and printing in 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

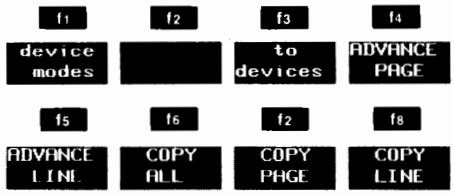
LABEL	FUNCTION
device control	Displays the following Device Control set of labels: 
RECORD MODE*	In Record mode while in Remote mode, data from the computer is sent directly to the selected "to device", bypassing the terminal's display memory. If the terminal isn't in Remote mode, the contents of the terminal's display memory is sent to the "to device". While in record mode, the keyboard is disabled except for the BREAK, RESET, and **RECORD MODE** keys. Record mode can be terminated by pressing the **RECORD MODE** or RESET keys or by pressing the SHIFT, CNTL, and RESET keys simultaneously.
LOG BOTTOM*	Log bottom is applicable only to the integral printer. When log bottom is selected, a line feed (whether produced directly or from an end-of-line wraparound) results in the line the cursor leaves being copied to the integral printer (provided it has been selected). The data in alphanumeric memory is not changed. The **LOG BOTTOM** and **LOG TOP** labels are mutually exclusive; if one is selected while the other is selected, the one previously selected is automatically deselected.
LOG TOP*	Log top is applicable only to the integral printer. If a line is added after the display memory is filled with data, the line which is scrolled off the top of the display memory is copied to the integral printer (provided it has been selected). The **LOG TOP** and **LOG BOTTOM** labels are mutually exclusive; if one is selected while the other is selected, the one previously selected is deselected.

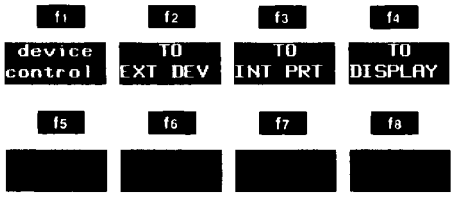
Table 4-4. Device Modes Set Of Function Key Labels (Continued)

LABEL	FUNCTION
EXPAND PRINT *	The integral printer will print 5 characters per inch (approximately double the normal width to produce 40 characters per line). The vertical height remains the same. EXPAND PRINT and COMPRESS PRINT are mutually exclusive; if one is selected, the other is deselected.
COMPRESS PRINT *	The integral printer will print characters which are compressed horizontally (16.2 characters per inch—132 characters per line). The vertical height remains the same. EXPAND PRINT and COMPRESS PRINT are mutually exclusive; if one is selected, the other is deselected.
REPORT PRINT *	Report format is selected for the integral printer and produces an 11-inch page. Report format is a three-line top margin, 60 lines of text, and a three-line bottom margin with a small tic mark to indicate the end of one page and the start of a new one. REPORT PRINT and METRIC PRINT are mutually exclusive; if one is selected, the other is automatically deselected.
METRIC PRINT *	Metric format is selected for the integral printer. Metric format is a three-line top margin, 64 lines of text, and a three-line bottom margin with a small tic mark to indicate the end of one page and the start of a new one. REPORT PRINT and METRIC PRINT are mutually exclusive; if one is selected, the other is automatically deselected.

To Devices Set

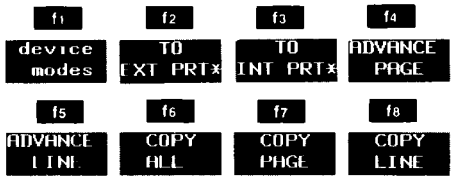
The To Devices set of keys is accessed by pressing the following keys in sequence:

and consists of the following set of labels:



This set enables selection of the external device, integral printer, or the display as the destination device for data transfers. 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
device control	Displays the following set of labels which are used to control the transfer of data to the integral printer: 
TO EXT PRT*	Selects the external printer as the destination device. When on, an asterisk is displayed in the label.
TO INT PRT*	Selects the integral printer as the destination device. When on, an asterisk is displayed in the label.
TO DISPLAY*	Selects the display as the destination device.

Margins/Tabs/Col Set

The margins/tabs/col set of keys is accessed by pressing

and consists of the following set of labels:

This set is used to set or clear tabs and the left and right margins and to set Start Column. Table 4-6 describes the functions of the Margin/Tab/Col set.

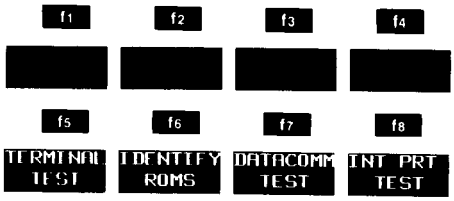
Table 4-6. Margins/Tabs/Col Function Key Labels

LABEL	FUNCTION
START COLUMN	Used only in Line Modify or Modify All mode. Sets the Start Column to the column the cursor is in when the key is pressed. This value is entered as the **Start Col** entry of the Terminal Configuration menu. The Start Column thus entered on the menu is overridden by the logical start-of-text pointer under certain circumstances, as described below. In Remote mode (provided the terminal is not in Format or Block mode), for the last line in memory on which text is entered, a logical start-of-text pointer is set at the column of the line in which the user types the first character. Then, when the user presses the ENTER or RETURN key, the terminal starts transmitting from the column indicated by the logical start-of-text pointer. However, if the terminal was not in Remote mode when the data was entered, if the line on which data is entered is not the last line in memory, or if the line was entered by the computer, no logical start of text pointer is generated by the terminal. In this case the terminal starts transmitting text from the Start Column as indicated in the **Start Col** field of the Terminal Configuration menu.
SET TAB	Sets a tab in the column in which the cursor is located.
CLEAR TAB	Clears any tab set in the column in which the cursor is located.
CLR ALL TABS	Clears all tabs.
LEFT MARGIN	Sets the left margin at the column in which the cursor is positioned.
RIGHT MARGIN	Sets the right margin at the column in which the cursor is positioned.
CLR ALL MARGINS	Sets the left margin at column 1 and the right margin at column 80 (default margins).

Service Set

The Service Set of keys is accessed by pressing

and consists of the following set of labels:



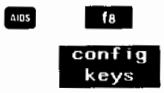
This set is used to run the self-tests shown above. Table 4-7 describes the functions of the service set of keys.

Table 4-7. Service Set Of Function Key Labels

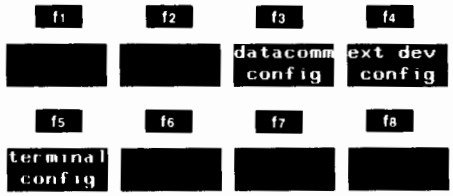
LABEL	FUNCTION
TERMINAL TEST	Performs a test of the terminal.
IDENTIFY ROMS	Displays a list of the ROM's installed in the terminal, supplying their part numbers and data codes (a code identifying the version of firmware code contained in the ROM).
DATACOMM TEST	Initiates the data communications test.
INT PRT TEST	Initiates the integral printer test.

Config Set

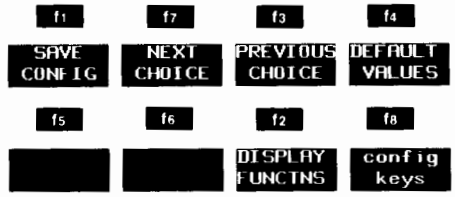
The Config Set of keys consists of two sets of labels; the first set is accessed by pressing



and consists of the following set of labels:



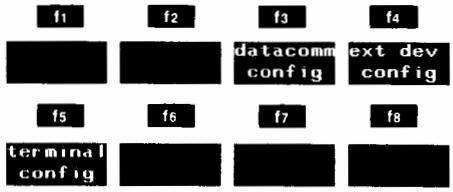
Once the above set of key labels is accessed, pressing f3, f4, or f5 will access the following set of labels:



The first set of labels above is used to select three configuration menus: Datacomm Configuration, External Device Configuration, and Terminal Configuration. The second set of labels above is used to set values in the specific configuration menu. Refer to Section 5 and the Reference Manual for more information on configuration. The functions of the Configuration set are described in table 4-8.

Table 4-8. Configuration Set Of Key Labels

LABEL	FUNCTION
datacomm config	Displays the datacomm configuration menu, which is then used to select the datacomm parameters.
ext dev config	Displays the configuration menu for an external printer. The menu is used to select printer control parameters.
terminal config	Displays the terminal configuration menu, which is then used to select the terminal operating characteristics for both local and remote operation.
SAVE CONFIG	Saves the current configuration in non-volatile memory.
NEXT CHOICE	Used with the configuration menus. The cursor is positioned in one of the menu fields, and the NEXT CHOICE key selects the next parameter of the list for that field.
PREVIOUS CHOICE	Selects the previous parameter of a menu field.
DEFAULT VALUES	Displays the configuration menu's default values.
DISPLAY FUNCTNS	When on, the action normally produced by any keyboard control key, such as RETURN, TAB, or any of the display or edit groups of keys, is not performed. Instead, an ASCII character or escape sequence representing the function is displayed.
config keys	Displays the following configuration key labels:



User Definable Function Keys

Each function key can be programmed with a character string of up to 80 characers. A Type character (L, T, or N) is assigned to the character strings. The type can be defined for local use only (with the letter "L" assigned to it), for transmission to the computer only (with the letter "T" assigned to it), or to act as data entered normally from the keyboard (with the letter "N" assigned to it). Programmed this way, the function keys are useful for entering any often-used character string of up to 80 characters with no more than a couple of keystrokes.

Each of the eight function keys can be assigned a label of up to 16 characters. The label can serve as a reminder of the content of the character string when the character string is not displayed.

The function keys have default assignments which become effective whenever the terminal is turned on, a hard reset is performed, or the **DEFAULT VALUES** function key is pressed. These assignments are shown in figure 4-3. The default character string assignments for the eight function keys consist of two characters each (the ESC character and one lower-case letter). The default Type character for all function keys is "T", as shown in the figure. The default character strings have no preassigned meanings. One use for them is to transmit them to a computer where they can be interpreted by a program. The program can apply any desired interpretation to the character string, thus accomplishing a complex operation with a couple of keystrokes. For example, the program might be designed to output a complex data entry form to the terminal when prompted by receipt of the character string from one of the function keys.

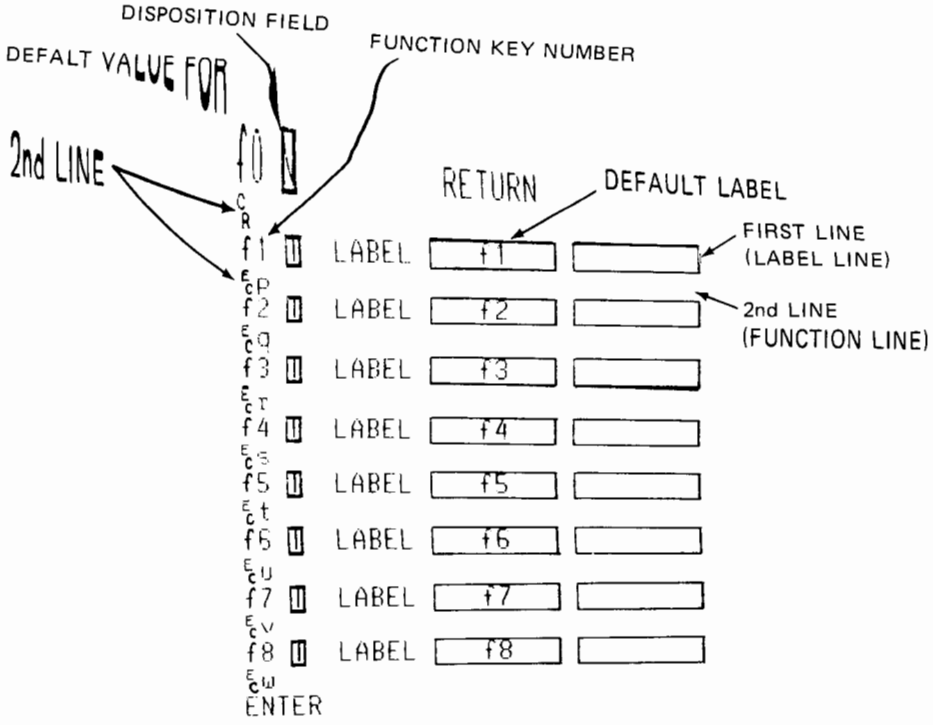


Figure 4-3. User-Definable Function Key Menu With Default Values

User Key Modes

The function keys are associated with user-definable functions in two modes: Definition mode and Use mode. In Definition mode, the function keys are assigned labels, Type characters, and character strings. In Use mode, the keys are made active so that, when the key is pressed, the character string assigned to the key will be printed out on the display (provided the Type character assigned to the key is "L" or "N" and the terminal is in Local mode). If the Type character is "T" and the terminal is in Remote mode, the character string will be transmitted to the computer. However, the character string will not be displayed on the terminal screen. When Use mode is entered (by pressing USER KEYS), the labels assigned to the keys appear along the bottom of the screen in the normal label position.

DEFINITION MODE

Initiating Definition Mode. To initiate Definition Mode, press the USER KEYS key while holding down the SHIFT key. This causes the current key assignments to be displayed. Use the tab keys or cursor-positioning keys to position the cursor for making entries on the User Keys menu.

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 treatment as though it were entered from the keyboard). Use either the PREVIOUS CHOICE or the NEXT CHOICE function key to select your choice of entry. (The default type is T.)

Next, enter the label to be assigned to the function key. The label appears on the definition menu as two 8-character blocks. The first block appears on the screen located above the second block when the label is displayed at the bottom of the screen in Use mode. The default labels for the keys are the labels f1 through f8.

Finally, type in the character string on the line below the label blocks. Use the DISPLAY FUNCTNS function key to enter keystrokes from the Edit and Display groups of keyboard keys. When entered in Display Functions mode, the keystroke operation will not be performed until the function key to which it is assigned is pressed. For example, if a ↖ keystroke is assigned to one of the function keys in Display Functions mode, the cursor will be homed when the function key is pressed in Use mode.

Leaving Definition Mode. Definition mode can be terminated by pressing any one of three keys: AIDS, MODES, or USER KEYS. The AIDS or MODES key returns the terminal to the normal screen display. To enter Use mode, refer to the following paragraph.

USE MODE

Initiating Use Mode. To initiate Use mode, press the USER KEYS key once.

EXAMPLE

This example assigns a company name and address to key f1 to appear as follows:

```
ACME Co.
1000 Star Rt.
New York, NY
```

- Press the MODES key and check whether an asterisk is present in the AUTO LF label. If so, press the associated function key to remove the asterisk.
- Press the USER KEYS key while holding down the SHIFT key. This initiates Definition mode and displays the User Key menu.
- Locate the cursor under the Type field for f1 and press the NEXT CHOICE function key until an "L" appears in the field. This indicates the character string is for use at the terminal only.
- Move the cursor to the label line and type in your choice of label for the function key.
- Move the cursor to the left margin of the character string field.
- Press the DISPLAY FUNCTNS function key to produce an asterisk in the DISPLAY FUNCTNS label.
- Type "ACME Co. RETURN 1000 Star Rt. RETURN New York, NY RETURN".
- Press the DISPLAY FUNCTNS function key to remove the asterisk from the label. (This turns off Display Functions mode.)
- Press the MODES key, then press the AUTO LF function key to add an asterisk to the label. (This turns on Auto LF mode.)
- Press the USER KEYS key, note that your label has replaced the "f1" label. Press the function key with your label on it. The data you typed into the function line on the User Keys menu should appear on the screen. Note that because AUTO LF is selected, a line feed is added following each RETURN when the function key is pressed in Use mode.

Leaving Use Mode. To leave Use mode and to display the formerly displayed set of labels, simply press the USER KEYS key.

5

Configuring Your Terminal 5

The tool provided for making terminal configuration changes is a configuration menu, which consists of a set of configuration parameters which are displayed on the screen. Each parameter has an associated space for a value which you select. Many of the parameters have a system-defined list of values. For others, you must enter the value from the keyboard. For parameters with system-defined values, two function key labels are displayed with the menu to enable you to scroll forward (NEXT CHOICE) or backward (PREVIOUS CHOICE) through the list of values.

Sufficient information is supplied in this section to enable you to configure the terminal provided you know the function or purpose of the menu fields on the Terminal, Datacomm, and External Device configuration menus. Functional information is available in the Reference Manual.

The terminal contains a battery-powered portion of memory called non-volatile memory in which the set of configuration values is stored to save it when power to the terminal is shut off. The set saved is the one last stored by the user. If none has been stored by the user, the default set is stored. When a menu is called to the display screen, the values currently in use are displayed. When power to the terminal is turned on, the set of configuration values stored in non-volatile memory becomes the active set.

The sequence for changing a set of configuration values is to display the menu, make the desired changes, and store the values in non-volatile memory. The act of storing the values in non-volatile memory also makes them the active set.

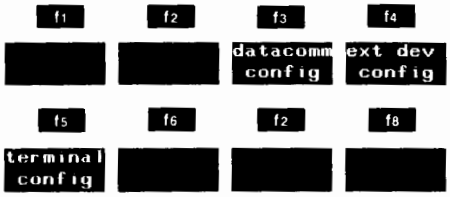
Configuration Menus

All configuration requirements for the terminal are contained in three menus; the Terminal Configuration menu for selection of terminal characteristics, a Datacomm Configuration menu for selecting datacomm protocol, and an External Device menu for selecting parameters for data transmission to the external device.

How To Display A Menu

To display a menu, perform the following:

1. Press the key to display the Primary set of function key labels.
2. Press the **config keys** function key to display the configuration set of function key labels shown below.



3. Press the **datacomm config** (f3), **ext dev config** (f4), or **terminal config** (f5) key to display the next set of function key labels shown below.

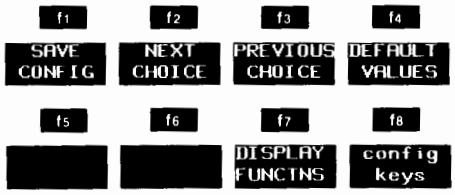


Table 5-1 lists the function key labels and their functions.

Table 5-1. Configuration Mode Function Key Labels

LABEL	FUNCTION
SAVE CONFIG	Saves the displayed configuration parameters in non-volatile memory, makes the set of parameters the active configuration set, and returns to normal operating mode with the Modes set of function key labels displayed.
NEXT CHOICE	Most of the fields on the menus have a list of acceptable values (some have only two). These keys scroll forward or backward through the list.
PREVIOUS CHOICE	
DEFAULT VALUES	Displays the default values for the configuration.
DISPLAY FUNCTNS	When on, the action normally produced by any keyboard control key, such as RETURN, TAB, or any of the display or edit groups of keys, is not performed. Instead, an ASCII character sequence representing the function is displayed on the screen. This key is also used in making entries into the **ReturnDef**, **BlkTermnator**, and **FldSeparator** fields on the Terminal Configuration menu.
config keys	Ends Configuration mode without saving the displayed values. Any changes made on the menu are lost unless they were saved using the **SAVE CONFIG** key. Returns to normal operating mode with the Configuration set of function key labels displayed.

How To Print A Menu

If the terminal is equipped with an integral printer, the configuration menus can be printed by displaying the menu on the screen with the terminal in local mode; then pressing the ENTER key.

Configuring

To change a selection on a menu, perform the following steps:

1. Place the cursor at the character position to be changed. This can be done using the TAB key or the cursor-positioning keys. The TAB key moves the cursor to the next selection field each time the key is pressed.
2. If the choices are restricted to a system-defined list of selections (such a field is underlined), use either the NEXT CHOICE or PREVIOUS CHOICE function key to cycle through the list of selections until the desired one is displayed.
3. If the choices are not restricted to a system-defined list (not underlined), enter the desired value from the keyboard. (The DISPLAY FUNCTNS function key must be used to make entries in the ReturnDef, BlkTermnator, and FldSeparator fields on the Terminal Configuration menu.)
4. To store the new menu values in non-volatile memory after you have made all desired changes, press the SAVE CONFIG function key.

To Return To Normal Operation

Pressing the SAVE CONFIG key will return the previous display contents to the display and save the displayed configuration values in non-volatile memory. However, if you wish to return the previous display contents to the display without saving the displayed configuration values, you can press the AIDS, MODES, or USER KEYS keyboard keys or the config keys function key to do so.

Terminal Configuration

Figure 5-1 illustrates the terminal configuration and the default values. Refer to the Reference Manual for a description of the menu fields.

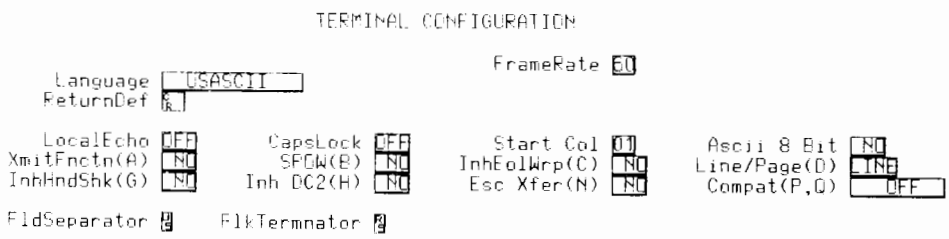


Figure 5-1. Terminal Configuration Menu

Datacomm Configuration

The Datacomm Configuration menu is shown in figure 5-2. The values shown are default values. Refer to the Reference Manual for a description of all menu fields.

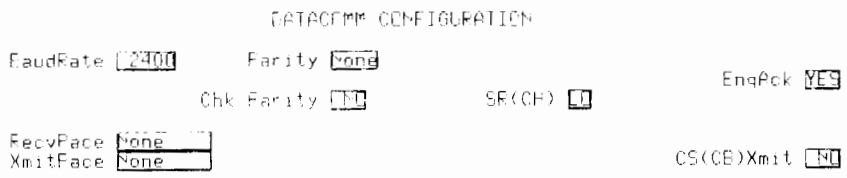


Figure 5-2. Datacomm Configuration Menu

External Device Configuration

Figure 5-3 illustrates the External Device Configuration menu. The values shown are the default values. Refer to the Reference Manual for a description of all menu fields.

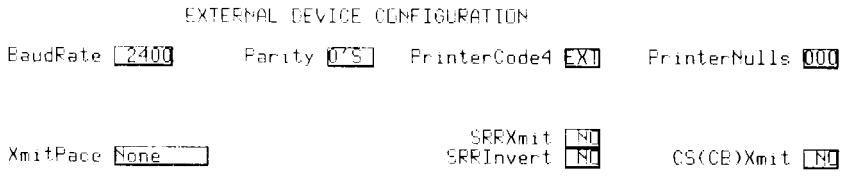


Figure 5-3. External Device Configuration Menu

6

Using Your Terminal By Itself

This section is concerned only with alphanumeric mode operations. For details on operation of the terminal in graphics mode, refer to Sections 7 and 8.

The terminal can store up to two pages of characters (48 lines of 80 characters each) and can be used without being connected to a computer (Local mode). It can be used alone when first learning to use it or when preparing data for printing or later transmission to the computer.

We will use the terminal in Local mode to learn how to enter and correct data. Once you have been introduced to the basic terminal, later sections will describe how to use the terminal with a computer and with the integral printer.

Screen

The display screen is capable of displaying up to 24 contiguous lines of display memory data. These 24 lines of data are considered to be one page of data.

The screen actually provides 26 rows of 80 character positions each for the display. Rows 1 through 24 are used to display the content of one page of alphanumeric memory. Rows 25 and 26, at the bottom of the screen, are used to display the currently active set of function key labels and several status indicators (a current cursor position column and row indicator, datacomm transmit indicator, and the letters "IC" to indicate Insert Character mode). The status indicator locations are shown in figure 6-1.

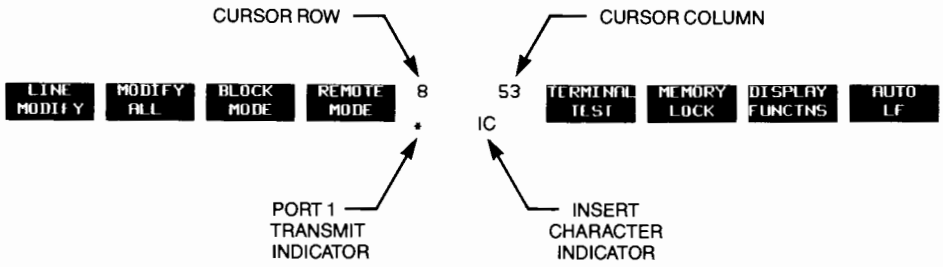


Figure 6-1. Status Indicator Locations

Entering Data

One of the most important uses of the terminal is data entry. Data is entered using the keyboard. It can then be sent to a computer, printed out on a printer, or both.

As an example, enter the following name and date:

```
John Doe      July 7, 1981
```

Correcting Data

If you make an error or wish to change an entry you have made, you can use any of the cursor or edit keys discussed earlier. For example, to add the middle initial "L" to the entry in the previous example, move the cursor under the "D", press the INS CHAR key (the letters "IC" are displayed in line 26 at the bottom of the screen), and type "L".

```
John L. Doe   July 7, 1981
```

Press the INS CHAR key again to return to normal overwrite mode.

Techniques Of Data Entry

To simplify data entry, you can use tabs, margins, specially defined data fields, and data forms. The following text describes how to use tab stops and margins. Refer to the Reference Manual for information on specially defined data fields and data forms.

Tabs

SETTING TABS. To set a tab, move the cursor to the desired column and press the AIDS key to display the Aids set of function key labels. Then press the `margins/tabs/col` function key to display the Margin/Tab/Col set of function key labels. Now press the `SET TAB` function key. Once a tab is set, the Tab keys (one located on the left side of the keyboard and the other two in the numeric pad) can be used to move the cursor to the next tab setting.

USING TABS. Once tab positions have been set, you can tab using the Tab keys in the same manner that you would on a typewriter. You can tab backwards to the previous tab position by pressing the TAB key at the left of the keyboard while holding down the SHIFT key. When you are at 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 has reached the first tab position in the first line of memory, no further backtabbing movement is made. The left margin is always treated as a tab.

CLEARING TABS. You can clear individual tabs by moving the cursor to the tab position, accessing the Margin/Tab/Col set of labels, and pressing the `CLEAR TAB` function key. All of the tab stops can be cleared at once without having to position the cursor. Simply press the `CLR ALL TABS` function key.

Margins

You can set the left and right margins to make the entry of data easier. When the terminal is turned on or a hard reset is performed, the margins are set at columns 1 and 80. You can set new margins as described below.

LEFT MARGIN. Move the cursor to the desired left margin setting. With the Margin/Tab/Col labels displayed, press the LEFT MARGIN key.

RIGHT MARGIN. Move the cursor to the desired right margin setting. With the Margin/Tab/Col labels displayed, press the RIGHT MARGIN key.

The terminal will beep when you are eight character spaces from the right margin. When the right margin is reached, the cursor will move to the left margin of the next line if end-of-line wraparound is selected at the InhEolWrp(C) entry of the Terminal Configuration menu.

If the cursor is moved using the → key, the terminal will not beep when you are near the right margin. When column 80 is reached, the cursor will move to the left margin of the new line whether or not end-of-line wraparound is selected.

The left margin cannot exceed the right margin. An invalid margin setting will not be accepted and will cause the terminal to beep.

```
column numbers
2         3         4         5         6
0         0         0         0         0

This is an example using margins to control dat
a entry.
```

EXAMPLE

Set the margins for a 40 column page centered on the screen.

With the Margin/Tab/Col labels displayed, move the cursor to column 20 and press the LEFT MARGIN function key. Then move the cursor to column 59 and press the RIGHT MARGIN function key.

Place the cursor back at column 20 by pressing RETURN and begin typing.

Margins are changed by setting new margins (or restored to the default left margin at column 1 and the right margin at column 80 by a hard reset). They are cleared by pressing the CLR ALL MARGINS function key. The margins are also set to their default values when Format mode is entered.

Moving A Block Of Text To Another Location On The Display

You can move blocks of text using Memory Lock mode.

For example, in the following text, move the paragraphs into the proper order.

Initial order:

(Top of Screen)

```
3. This is paragraph 3.
   It should be last in
   this group.
2. This is paragraph 2.
   It should be second.
1. This is paragraph 1.
   It should be first
   (blank line).
```

1. Press the ↖ key and type in the paragraphs as shown. Be sure to type RETURN following the last line.
2. Position the cursor in the first line of paragraph 2.
3. Press the MODES key, then press the MEMORY LOCK function key to turn on Memory Lock mode.
4. Use the ROLL UP key until the remaining paragraphs have rolled up under the cursor position and off the screen.
5. Turn off Memory Lock mode by pressing the MEMORY LOCK function key so the asterisk disappears from the label.
6. Press the ↖ key. The display should appear as follows:

(Top of Screen)

```
2. This is paragraph 2.
   It should be second.
1. This is paragraph 1.
   It should be first.
3. This is paragraph 3.
   It should be last in
   the group.
```

7. Now move paragraph 1 by positioning the cursor in the first line of paragraph 1 and turning on Memory Lock mode as described in step 3.
8. Use the ROLL UP key until the cursor is in the first line of paragraph 3.
9. Turn off Memory Lock mode, as described in step 5, and press the ↖ key. The paragraphs should now be in order, as shown below:

(Top of Screen)

```
1. This is paragraph 1.
   It should be first.
2. This is paragraph 2.
   It should be second.
3. This is paragraph 3.
   It should be last in
   the group.
```

Note that if the data is not on the first page of memory, the ROLL UP key can be used instead of the ↖ key to view the newly ordered text.

Display Features

The terminal provides the following display features:

- **DISPLAY ENHANCEMENTS**—Parts of the display can be underlined, blinking, inverse video, or half bright or any combination of these.
- **LINE DRAWING CHARACTER SET**—The keyboard can be used to select characters from Line Drawing character set, providing the terminal contains the line drawing set option.

The following features are available in Format mode:

- **PROTECTED FIELDS**—Data cannot be entered and changed. Data will not be sent to the computer.
- **UNPROTECTED FIELDS**—Data can be entered and changed. Data will be sent to the computer.
- **TRANSMIT ONLY FIELDS**—Displayed data will be sent to the computer but cannot normally be changed.

Forms can be created with these features to make data entry easier and reduce the chance of errors. The forms used are similar to paper forms except that they are displayed on the terminal screen. Forms are made by defining "fields" of one or more characters. Each character can be given one or more of the display features. Once a form is created, it can be stored in the computer and displayed as needed. Refer to the Reference Manual for information on using these features.

Using Display Enhancements

The terminal includes, as a standard feature, the following display enhancement capabilities:

- **Half Bright**—Characters are displayed at half intensity (gray).
- **Underline**—An underline is displayed below the normal character.
- **Inverse Video**—The screen is white and the characters are black.
- **Blinking**—Characters blink. This includes the inverse video, underline, and half bright features blink.

The display enhancements are used by assigning one or more of them to a field. The selection sequence is ESC & D followed by an enhancement character. The enhancement character (@, A through O) is used to select the combination of display enhancements to be assigned to the field. The following table lists the enhancement character for each of the combinations. The field is ended by the sequence ESC & D @, by selecting another enhancement, or by the end of the current line.

	ENHANCEMENT CHARACTER															
	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Half bright									x	x	x	x	x	x	x	x
Underline					x	x	x	x					x	x	x	x
Inverse video			x	x			x	x			x	x			x	x
Blinking		x		x		x		x		x		x		x		x
End enhancement	x															

EXAMPLE

Define columns 10 through 14 of line 5 to be inverse video and blinking.

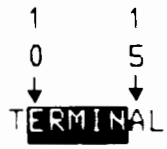
Step 1. Position the cursor at column 10 in line 5.

Step 2. Type ESC & D SHIFT C.

Step 3. Move the cursor to column 15 in line 5.

Step 4. Type ESC & D @ (this ends the enhancements). The field should be white.

Step 5. Type the word TERMINAL beginning in column 9 of line 5. The display shoud be as shown below with the characters in the enhancement field blinking.



Using The Alternate Character Set

If your terminal has the line-drawing set option 202 (options 001 through 006 also contain the line-drawing set option), it can display 128 line-drawing set characters in addition to the standard ASCII set.

Switching from the base character set (the set selected on the Terminal Configuration menu) to the line-drawing set can be done on a character-by-character basis. For example, a line-drawing character can be displayed next to characters in the base set. This is done by selecting the line-drawing set as the active alternate character set and then selecting the alternate character set as the keyboard set (the set displayed when the keys are struck).

Either the line-drawing set or the extended Roman character set may be selected as the active alternate character set. The selection is made with an escape sequence which may be entered either from the keyboard or from a program. ESC) B or ESC) C selects the line-drawing set as the active alternate character set. Then pressing, simultaneously, the CTRL and N keys connects it to the keyboard.

To return to the base character set from the alternate character set, press the CTRL and O keys simultaneously.

7

Using Your Terminal In Graphics Mode 7

Introducing Graphics Mode

The terminal contains separate memories for alphanumeric and graphics data enabling separate control of each. The contents of both memories can be displayed simultaneously or the contents of one memory can be displayed alone. The terminal's graphics capabilities can be controlled either from the keyboard's graphics keys or, more extensively, using escape sequences. The escape sequences may be entered locally from the keyboard; however, they are usually sent by computer program when the terminal is online. Refer to the Reference Manual for programming information.

Graphics Control From The Keyboard

The graphics/numeric keypad is set for graphics operation after a power-up or hard reset. It can be changed to numeric operation by simultaneously pressing the SHIFT and NUM keys. When it is set for numeric operation, it can be returned to graphics operation by again pressing the SHIFT and NUM keys. The functions of the graphics/numeric pad keys, when set for graphics operation, are listed in table 7-1.

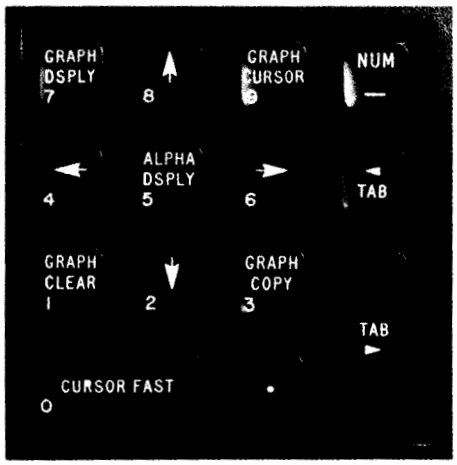


Table 7-1. Graphics Keypad Functions

KEY	FUNCTION
GRAPH DSPLY	Alternate presses turn on and off the graphics display to display the contents of graphics memory (both text and vectors). The graphics display must be on to enable turn on of the graphics cursor.
GRAPH CURSOR	Alternate presses turn on and off the graphics cursor. However, to turn the cursor on, the graphics display must be on.
ALPHA DSPLY	Alternate presses turn on and off the alphanumeric display.
GRAPH CLEAR	Clears all contents of graphics memory.
GRAPH COPY	Copies the contents of graphics memory to either the internal printer (if the terminal contains one) or an external printer (if one is connected to the terminal) depending on which device is selected as the destination by the Device Control function keys.
∧, ∨, <, and >	Move the graphics cursor in the direction indicated by the engraving on the key. Two keys can be pressed simultaneously to move the cursor in a diagonal direction provided they are not opposing keys.(An example of opposing keys is the < and > keys.)
CURSOR FAST	When pressed simultaneously with one of the four cursor movement keys, provides a higher speed cursor movement.

Graphics Control From A Program

The escape sequences for the various graphics functions are given in the Programmer's Reference table in Appendix A. The Reference Manual gives complete instructions for programming the terminal using escape sequences.

Graphics Vectors

No keycaps are provided for drawing vectors on the screen from the terminal. However, escape sequences are available for doing so programatically. Refer to the Reference Manual for programming information.

Graphics Text Mode

The displayable characters on the keycaps of the Character Set Group of the keyboard can be entered into graphics memory. The characters can be displayed either slanted or upright in eight different sizes (figure 7-1). (The smallest size is the default selection.) Also, the text lines can be displayed at four different angles (90-degree increments) (figure 7-2). Refer to the Reference Manual for further information on text size and slant control.

The extended Roman character set characters can also be displayed in Graphic Text mode. See Appendix B for details.

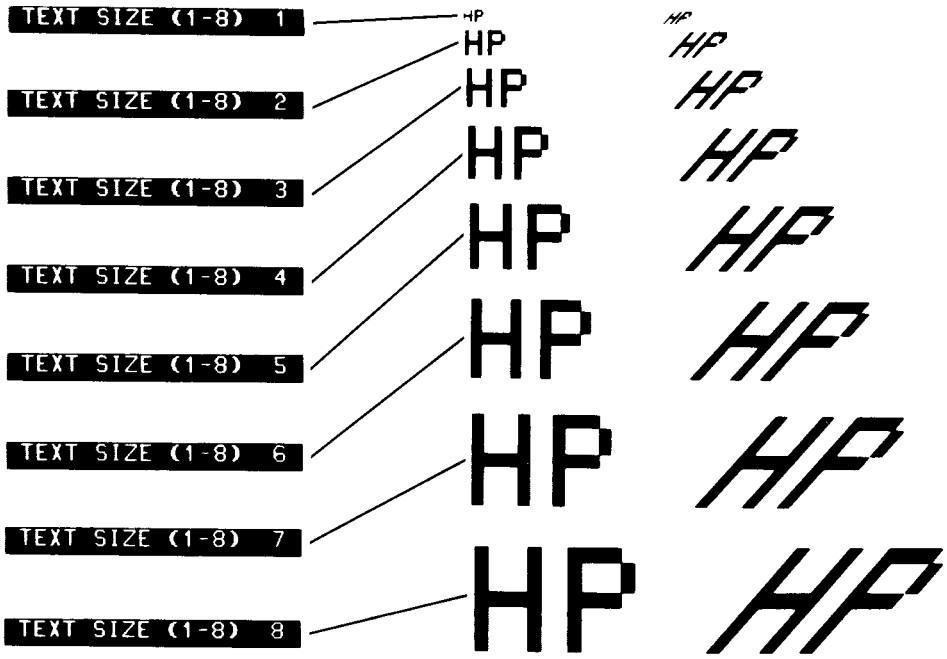


Figure 7-1. Graphics Text Sizes

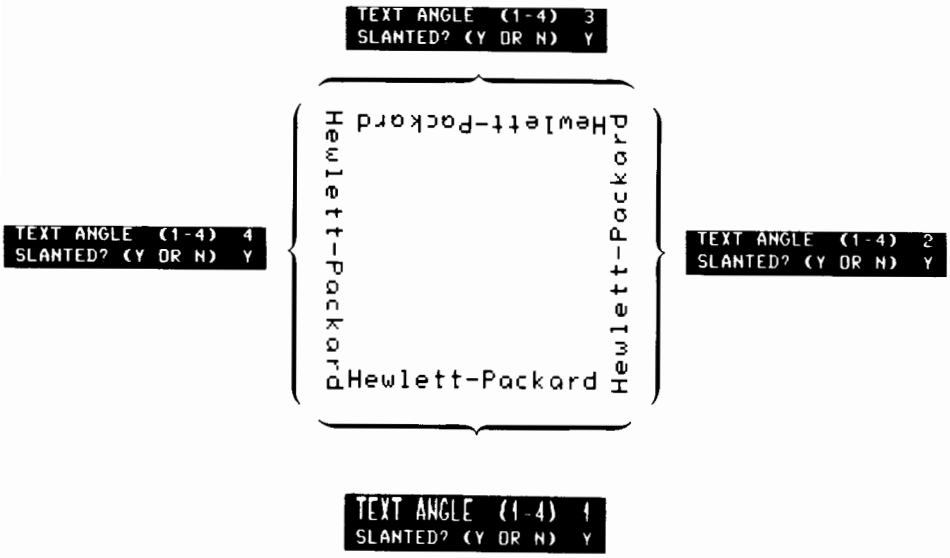


Figure 7-2. Graphics Text Orientation

To enter graphics text, Graphics Text mode must be selected. (Graphics Text mode is entered by entering the escape sequence ESC * d S, and turned off by entering the sequence ESC * d T. These sequences can be entered from the keyboard or from a program.) When a key is pressed, the letter is entered, in the default size, at the graphics cursor position.

Display Control

The graphics and alphanumeric displays can be turned on and off separately or displayed simultaneously. Also the graphics memory can be set or cleared.

Graphics/Alphanumeric Video On/Off

The graphics memory display can be turned on and off by G DSP. The alphanumeric memory display can be turned on and off by A DSP. Information stored in either is not lost when the video is turned off.

Erasing The Graphics Display

Pressing the graph clear will erase all graphics (including graphics text) from the graphics memory. The data erased is lost and cannot be recovered.

Clear/Set Graphics Memory

The graphics memory can be completely cleared (screen all black) or set (screen all white) independent of the alphanumeric display memory. Graph clear will clear the display, and typing ESC * d B will set the display. When either cleared or set, all data is erased from graphics memory.

Cursor Control

Alphanumeric Cursor

The alphanumeric cursor is turned on and off when the alphanumeric video is turned on and off (A DSP). Also, typing `ESC * d R` will turn off the cursor, and `ESC * d Q` will turn it on.

Graphics Cursor

The graphics cursor can be turned on and off by G CURSOR . The cursor will not be displayed, however, if the graphics video is turned off. The cursor arrows on the keypad move the cursor to any position on the display. The CURSOR FAST key may be held down while pressing the cursor arrow keys to increase the cursor move speed. Any two cursor arrow keys at right angles to each other may be held down simultaneously to move the cursor diagonally.

Copying Graphics Data

The contents of graphics memory may be copied to either the integral printer (if installed) or to an external printer (if an external printer is connected to the terminal) by selecting the internal or external printer as the destination device using the `device control` and "to devices" function keys and pressing the `graph copy` key.

8

Using Your Terminal In Compatibility Mode 8

Compatibility mode enables the 2623A terminal to display graphics data developed for other terminals having more addressable points on their display screen (figure 8-1). In Compatibility mode, either the input data is scaled to fit on the terminal's display (Scaled mode), or an unscaled subset of the input data is selected for display (Unscaled mode). The following discussion assumes a familiarity with alphanumeric memory, graphics memory, and Graphics Text mode. For information on these items, refer to Section 7.

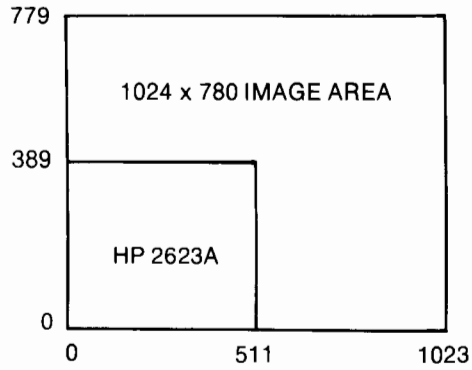


Figure 8-1. Display Area Comparison

Turning Compatibility Mode ON And OFF

Compatibility mode is enabled using the Terminal Configuration menu. When the **Compat(P,Q)** field of the menu is set to either SCALED or UNSCALED, Compatibility mode is enabled. It is disabled when the **Compat(P,Q)** field is set to OFF. To change the field entry, display the Terminal Configuration menu by pressing the following keys, in sequence:

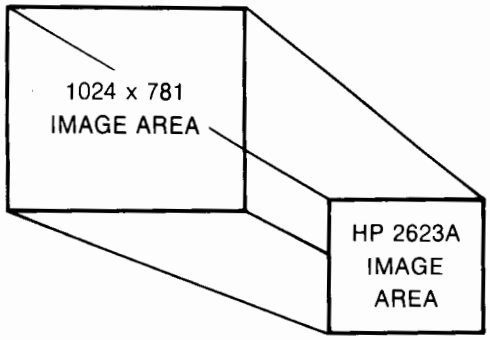
f8 f5

With the menu displayed, select the **Compat(P,Q)** field with either the Tab keys or the cursor-positioning keys. Then use the **NEXT CHOICE** or **PREVIOUS CHOICE** key to select the desired entry (**ON** or **OFF**).

Escape sequences are available for turning Compatibility mode on and off programmatically. It is turned on by entering either Scaled or Unscaled mode. (Refer to the following paragraphs for the escape sequences required to turn Scaled and Unscaled modes.) Compatibility mode can be turned off with the escape sequence **ESC &s 0p 0Q**.

Scaled Mode

Scaled mode reduces a 780 x 1024 image (by one-half) to fit on the terminal display. (Figure 8-2 shows the scaled image terminal screen.) Characters will also be scaled. Scaled mode can be turned on with the escape sequence **ESC &s 1p 0Q** by sending it from a computer program or by entering it locally from the keyboard (refer to the Reference Manual for details).



Note: The top row of dots will be lost when the data is scaled down.

Figure 8-2. 780 x 1024 Image Area Scaled To Fit The HP 2623A Image Area

If Graphics Text mode is off while in Scaled mode, all characters are written into alphanumeric memory. If it is on, the characters are written into graphics memory. When text is written into the graphics memory in Scaled mode, the size and angle are fixed to allow for 35 lines of text, as in some graphics terminals.

Unscaled Mode

Unscaled mode displays a 390 x 512 subset of a 780 x 1024 display. Vectors going off screen are clipped. This mode allows full use of the terminal's resolution, but may require that you modify scaling statements in the user software to put the complete picture on the terminal screen. The 390 x 512 subset displayed can be varied by changing the relocatable origin.

The relocatable origin is subtracted from all incoming coordinates in Unscaled mode. If it is set to 0,0 (default value), the area X=0 to 511, Y=0 to 389 will be displayed (figure 8-3). Setting the origin to 0,390 would cover the area X=0 to 511, Y=390 to 799. To display an area larger than 390 x 512, scaling statements in the program must be changed. When characters are drawn in graphics memory in Unscaled mode, the size and angle currently selected at the terminal are used. These can be changed with escape sequences to give the user maximum flexibility for labeling. Refer to the Reference Manual for information on the use of escape sequences.

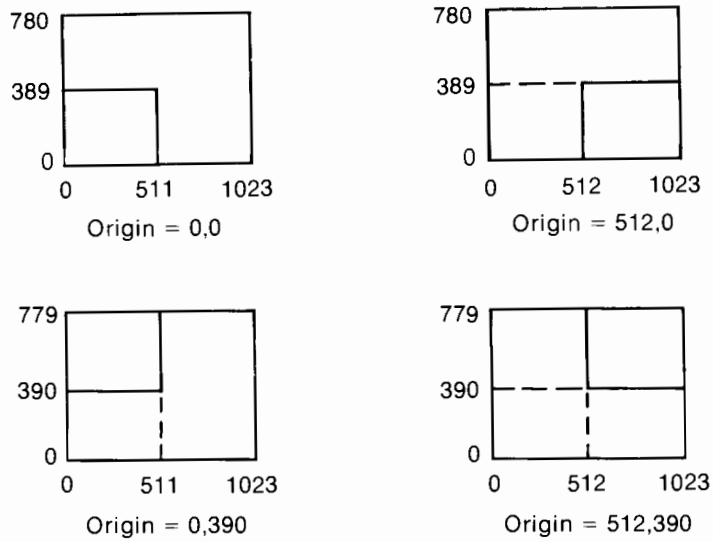


Figure 8-3. Using The Relocatable Origin To Cover the 780 x 1024 Display

Vectors are drawn using the current line type and drawing mode, giving you the capability of drawing dotted and dashed lines, etc., if you change your program to send the additional escape sequences. In general, all of the features of the terminal are accessible in Unscaled mode.

Compatibility mode can be turned on by selecting either Scaled or Unscaled mode. If Graphics Text mode is off, all text goes into alphanumeric memory. If it is on, characters are drawn in graphics memory. In Unscaled mode (unlike Scaled mode), the size and angle of characters can be changed.

FUNCTION	ESCAPE SEQUENCE
Turn on Scaled mode	ESC &s 1p 0Q
Turn on Unscaled mode	ESC &s 1q 0P
Turn off Compatbility mode	ESC &s 0p 0Q or ESC &s 1p 1Q

Control Codes

The terminal accepts the following control codes in Compatibility mode:

CODE	ACTION
ESC ENQ	Read status and alphanumeric cursor position.
ESC ETB ESC ENQ	Read graphics cursor position.
ESC ETB	Read graphics cursor position when key is struck.
ESC ESC	Make hardcopy.
ESC FF	Clear screen, terminate Graphics mode, and home the cursor.
ESC	Enter Graphics mode (draw vectors).
ESC	Enter Alphanumeric mode.

ENQ/ACK Handshake Protocols

Since the ENQuiry/ACKnowledge handshake is disabled in Compatibility mode, the baud rate may need to be lowered, or fill characters added, to prevent loss of data when running at high speed (refer to the Reference Manual).

Configuration

The following escape sequences select configuration options in the terminal. (In the following escape sequences, the symbols "<" and ">" are used to enclose selectable values and are not part of the sequence.)

- Select Terminator for Graphic Input:

  ESC *t <x>A

x	Meaning
0	Carriage return only (default option)
1	Carriage return and EOT (end of transmission)
2	No carriage return, no EOT

- Set Page Full Break Option:

  ESC *t <x>B

x	Meaning
0	Unselected
1	Selected

- Set Page Full Busy Option:

  ESC *t <x>C

x	Meaning
0	Unselected
1	Selected

A software package used to control a graphics terminal of a different type may be used to control this terminal; however, you should consider the following:

- The screen for this terminal may be smaller than for some other terminals; vectors that go off this terminal's screen do not wrap around. However, Scaling mode can be used to reduce the image to fit on this terminal's screen.
- To prevent losing data at transfer rates above 2400 baud, fill characters must be used.

9

The HP 2623A can be connected to a computer system either directly or through a modem.

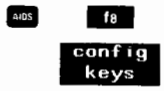
Preparing The Terminal
For Use On-Line

Preparing the terminal for use on-line consists of configuring the datacomm port, if necessary, and selecting the operating modes. The following procedures are not complete; they consist only of those procedures most likely to be needed. For complete information on configuring the terminal/computer link, refer to the Reference Manual.

Configuring The Datacomm Port

Following is a suggested procedure for selecting the configuration values to be associated with the datacomm port.

- Display the Config set of function key labels by pressing the following keys, in sequence:

- Display the datacomm menu by pressing the `datacomm config` key (f3).
- Make any necessary changes to the menu, then save the values in non-volatile memory by pressing the `SAVE CONFIG` key.

Selecting Operating Modes

The MODES key is used for selecting Remote, Block, Modify All, and Auto LF modes.

REMOTE MODE. For the terminal to communicate with the computer, Remote mode must be selected. To select Remote mode, press the MODES key to display the Modes labels, then, if no asterisk is present in the `REMOTE MODE` label, press the associated function key to produce an asterisk in the label.

BLOCK MODE. Block mode is used to select whether data will be sent to the computer character-by-character or in blocks of characters. When Block mode is not selected, the characters are sent to the computer as they are typed. This mode of operation is used for conversational exchanges with the computer. In Block mode, the characters are stored in the terminal as they are typed. They are not sent to the computer until the ENTER key is pressed. This enables you to edit your data before sending it to the computer. The block is sent by pressing the ENTER key. The block can be one of two sizes, a line or a page. The block size selection is made on the terminal configuration menu.

To select the block size, display the terminal configuration menu by pressing the following keys, in sequence:

Then place the cursor in the `Line/Page` field and use the `NEXT CHOICE` key to display your choice of block size. With your choice displayed, press the `SAVE CONFIG` key to store the displayed configuration values in non-volatile memory.

AUTO LF MODE. Normally, automatic line feed is not selected when communicating with a computer. To select it, display the Modes labels by pressing the MODES key, then, if no asterisk is present in the `AUTO LF` label, press the associated function key once to produce an asterisk in the label.

CAPS LOCK MODE. Unless the computer system to which your terminal is connected accepts lower-case letters, Caps Lock mode should be selected. Caps Lock mode is selected on the terminal configuration menu and overrides the CAPS LOCK key on the keyboard. To access the menu, press the following keys, in sequence:

With the menu displayed, position the cursor at the `Caps Lock` field and use the `NEXT CHOICE` key to display your choice of `ON` or `OFF`; then press the `SAVE CONFIG` key to store the configuration values in non-volatile memory.

When Caps Lock mode is enabled, the terminal generates only teletype-compatible codes: upper case ASCII (00-5F, hex) and DEL (7F, hex). Unshifted alphabetic keys (a–z) generate the codes for their uppercase equivalents; the `{`, `|`, and `}` keys generate codes for `[`, `\`, and `]`, respectively, and the `` ` `` and `~` keys are ignored.

Caps Lock mode is not the same as Caps mode. Caps mode is enabled by pressing the CAPS key. When Caps mode is enabled, all unshifted alphabetic keys generate uppercase letters and all shifted alphabetic keys generate lowercase letters. This mode is used primarily as a typing convenience and only affects the 26 alphabetic keys.

If A Modem Is Used

If a modem is used, it may be necessary to turn on the modem, make modem speed and parity settings, or dial a telephone number. Baud rate and parity settings should be the same values used for the terminal. These settings can be observed by displaying the datacomm configuration menu.

Sending Data To The Computer

Data can be sent to the computer from the keyboard in either Character or Block mode. Block mode enables editing the data before sending it. Modify mode is available for editing data before transmission while operating in Character mode.

Character Mode

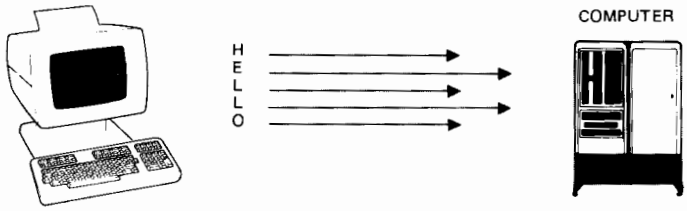
NORMAL OPERATION. In Character mode, each character is sent to the computer, automatically, as it is typed into the keyboard.

MODIFY MODES. While operating in Character mode, two Modify modes can be used to edit data already displayed on the screen before sending it to the computer. These modes are Line Modify and Modify All. For example, if you have transmitted to the computer a string of data which contains an error and the computer returns an error message, instead of retyping the data you can enter Line Modify mode, correct the error using the keyboard edit keys, and retransmit the string by pressing the RETURN or ENTER key.

Modify All mode is used in the same manner as Line Modify mode except that, unlike Line Modify mode, Modify All mode does not end when the RETURN or ENTER key is pressed. To enter Line Modify mode, press

The mode is ended when the ENTER or RETURN key is pressed. To enter Modify All mode, press

An asterisk is present in the **MODIFY ALL** label when the mode is activated. Pressing the **MODIFY ALL** key while in Modify All mode ends the mode and removes the asterisk from the label.



USING START COLUMN. The start column feature is used only in Line Modify or Modify All mode. Provided certain conditions are met, it can be used to transmit data to the computer, ignoring any data to the left of a selected column.

It works as follows: Under certain conditions, the terminal firmware sets a "logical start-of-text" pointer for each line of text. The conditions required to generate a "logical start-of-text" pointer are as follows:

1. The terminal must be in Remote mode but not Block or Format mode when the line is entered.
2. The character to which the pointer applies must be entered from the keyboard (not from the computer).
3. At the time the line is entered, it must be the bottommost, nonblank line in memory.

This logical start-of-text pointer is set at the leftmost column in which a character is entered from the keyboard. Then, when you press the ENTER or RETURN key to transmit the text to the computer, transmission starts at the column indicated by the pointer. However, if no pointer exists for the line, transmission starts at the column specified in the Start Col field of the Terminal Configuration menu or the Start Column set using the Margins/Tabs/Col function keys.

EXAMPLE

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

```
: BUILD TF;REC=128,1,F,BINARY;DEV=DISC;code=0;DISC=1023,8,1
└Computer prompt          └──── Your response
```

The logical start-of-text pointer for this line (which is the last line in memory) does not exist until you enter the B in the BUILD command, at which time the pointer is set to column 3.

When Line Modify or Modify all mode is enabled in Character mode, the logical start-of-text pointer is used as the starting point for data transmission when the RETURN or ENTER key is pressed. If the line has no logical start-of-text pointer, the value entered in the `Start Col` field of the Terminal Configuration menu is used as the starting point of the data transmitted.

If you are in Character mode, there may be times when you will receive an error message as a response when transmitting a command string to the computer. To correct this command string without retyping the whole line again, you simply enter Line Modify mode. Line Modify mode permits you to select any line of memory, edit the line and transmit it.

EXAMPLE

Assume you entered a BUILD command, pressed RETURN and the computer returned an error message, as follows:

```
: BUILD TF;REC=128,1,F,DINARY;NOCCTL;DEV=DISC;CODE=0;DISC=1023,8,1

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

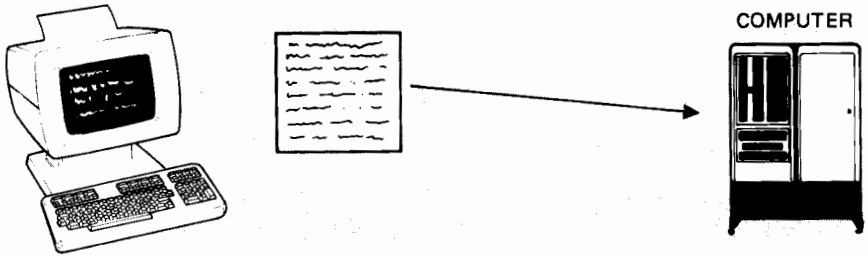
To correct this statement, simply enter Line Modify mode and position the cursor to the appropriate line and character on the screen. Retype BINARY and press ENTER or RETURN. The BUILD command is transmitted to the computer without the necessity of retyping the whole line.

Block Mode

In Block mode, data is stored in the terminal until the ENTER key is pressed, then it is transmitted as a block of data. The block size can be either a line or a page, as selected on the terminal configuration menu for the terminal connected to the computer. To enter Block mode, press

MODES f3 BLOCK MODE*

An asterisk is present in the BLOCK MODE label while Block mode is active. To return to Character mode, remove the asterisk from the label by pressing the BLOCK MODE key again.



Receiving Data From The Computer

To The Display

No special action is required to receive data from the computer other than making sure the baud rate and parity selections match those of the computer. When the terminal is in Remote mode, data is normally displayed on the screen as it is received.

To The Integral Printer

The terminal can be set to perform on-line data logging—automatically routing data, when it is received from the computer, to the integral printer. You can do this using two methods; logging from the top of display memory or logging from the bottom (figure 9-1). When data is logged from the top, the top line in display memory is routed to the integral printer when it is crowded off the top of display memory by lines added at the bottom. When bottom logging is used, a line is routed to the printer when the cursor leaves the line to begin a new line. If top logging is used, the data remaining in display memory when communication with the computer is completed is left uncopied to the printer. To perform either top or bottom logging, proceed as follows:

- Display the TO INT PRT label by pressing

  AIDS f1

  device control

- Display the Device modes set of labels by pressing **device modes**.
- Select either LOG BOTTOM (f3) or LOG TOP (f4).

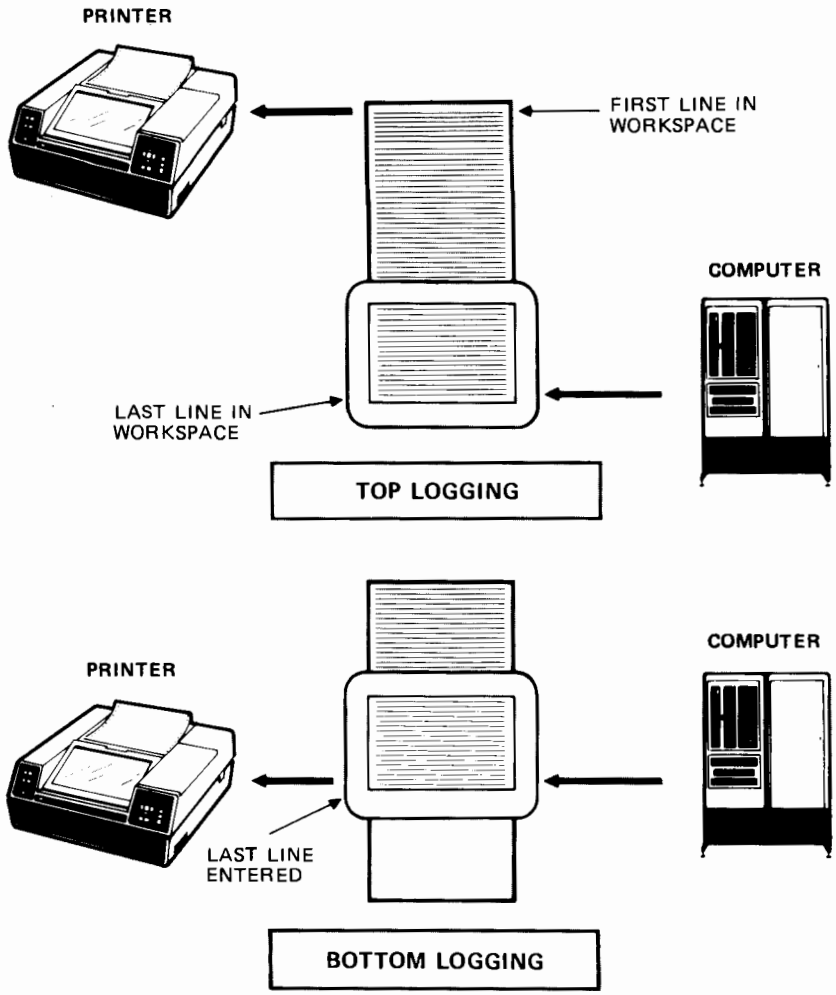


Figure 9-1. Data Logging

10

Using Your Terminal With The Integral Printer Or External Device 10

You can copy alphanumeric and graphic data from the display to the integral printer or an external device connected to the secondary port.

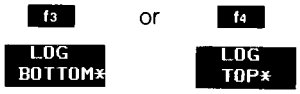
Copying Alphanumeric Data To A Printer

Two methods can be used for copying alphanumeric data: copying data after all data entry has been completed or copying while data is being entered into display memory (data logging). The procedure is similiar for both methods. The steps for copying data by either method are as follows:

- Display the Device Control labels by pressing, in succession:

- Select the integral printer by pressing the TO INT PRT key or select an external printer by pressing the TO EXT DEV key.
- If data logging is to be used, display the Device modes set of labels by pressing, in succession:

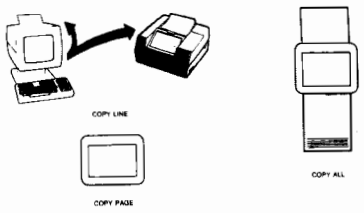
Then select either



For the data logging method, this completes the setup procedure; at this point, you can begin to enter data. To disengage the printer after data entry is completed, press the LOG BOTTOM or LOG TOP key to remove the asterisk from the function key label.

- If data logging is not used, display the Device Control set of labels (if they are not already displayed) by pressing the f1 key.

If you wish to skip a line or a page on the integral printer before beginning printing, you can do so by pressing the ADVANCE LINE or ADVANCE PAGE key. (ADVANCE PAGE works only in Report or Metric mode.) Then select the amount to be printed by pressing the COPY ALL, COPY PAGE, or COPY LINE key. COPY ALL copies all data in alphanumeric memory between the line containing the cursor and the end of display memory.



Once the selected amount of data has been printed, printing stops.

Copying Graphics Data To The Integral Printer Or An External Device

The contents of graphics memory can be copied to the integral printer or a graphics data compatible external device. The procedure is listed below:

- Select the "to devices" set of function key labels by pressing, in succession:

- Select either the integral printer or the external device as the destination device by pressing one of the following keys:

- If the graphics/numeric pad isn't set for graphics operation, press the SHIFT and NUM keys, simultaneously.
- Press the graph clear key.

11

Maintenance 11

Maintenance of the terminal consists of loading paper into the integral printer (for terminals containing one), replacing the battery which powers non-volatile memory under power off conditions, and cleaning the screen, plastic housing, and keyboard to remove dust and grease.

Loading Printer Paper

The integral printer uses a thermal printing paper produced specifically for use in the integral printer. Printer paper can be purchased through your local HP Sales and Service office using the following nomenclature and part number:

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

It is recommended that you always use the HP thermal paper in your integral printer because use of non-HP paper can shorten the life of the print head and the print quality might be affected. Also, If you have an HP Warranty Service Contract, you must use HP Thermal Paper to maintain a valid contract.

Load printer paper according to the following instructions:

1. Lift the top cover of the printer mechanism (figure 11-1). An illustration of the correct paper position and flow is embossed on the underside of the cover.

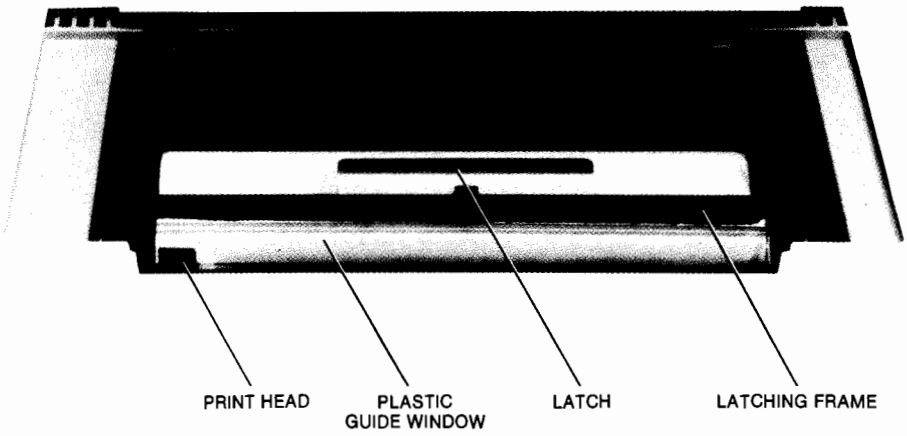


Figure 11-1. Printer Mechanism.

2. Press the latch toward the front of the terminal to release the latching frame. Lift the hinged latching frame to its forward position.
3. Remove any paper remaining in the printer.
4. The cardboard cylinder on which the paper is rolled is held in place by a metal rod which passes through the cylinder. Lift the cylinder upward and forward along the guide slots to remove the cylinder and rod.
5. Remove the rod from the cylinder and insert it in the new roll of paper.

NOTE

The paper is coated with print material on one side only and must be inserted correctly in the printer 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.

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 11-1) is relatively fragile and susceptible to damage; be careful not to strike it while loading paper.

7. Feed the leading edge of the paper through the latching frame between the latching frame and the clear plastic guide window.
8. Lower the latching frame into place without locking it.
9. Align the sides of the paper with the guide lines embossed on each side of the guide window.

NOTE

Each new roll of paper has a glue spot, used to hold the roll intact, near the leading edge of the roll. The print head should not be allowed to pass over this glue spot during print operations.

10. Feed approximately 12 inches of paper through the latching frame so that the glue spot is beyond (outside) the print head and guide window.
11. Press down the latch until it locks into place with an audible click. If the latch is not locked, a printer error will be printed at the bottom of the screen when a printer operation is attempted.
12. Tear off any excess paper using the guide window as a cutting edge.
13. Close the top cover.

NOTE

If subsequent print operations appear normal except that no print image appears, the paper may have been installed backwards. An image can be printed on only one side of the paper.

Battery Replacement

Configuration data stored in non-volatile memory is protected from destruction by a storage battery located above the rear panel of the terminal (figure 11-2). The battery should be replaced every 12 months. A new battery can be obtained through commercial sources by requesting Mallory Battery, Type TR133. In addition to commercial sources, you can order batteries through your local HP Sales and Service Office using the following nomenclature and part number:

HP 2623A Battery, HP Part No. 1420-0259.

You may want to record the configuration data on paper before removing the old battery in case the configuration data should be destroyed when the battery is removed (although, normally, data will not be lost if terminal power is left on while the battery is replaced).

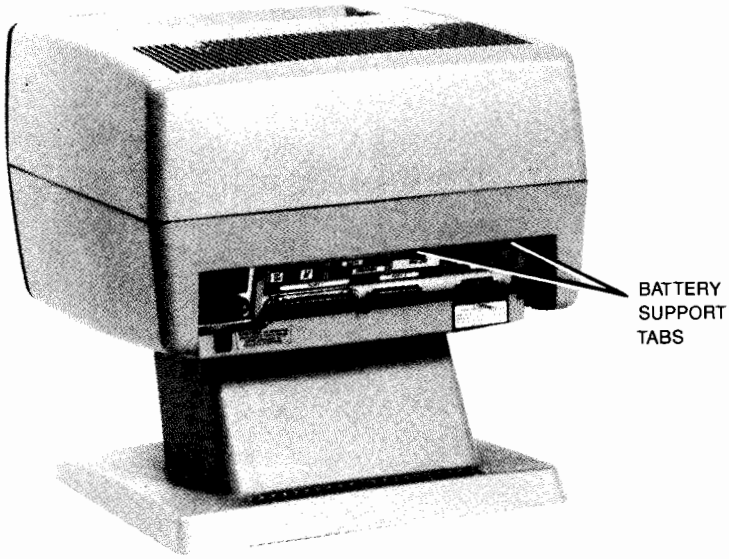


Figure 11-2. Battery Support Location

To replace the battery, perform the following procedures:

1. If the terminal power is off, turn it on and wait until the terminal is ready to operate. (This will prevent loss of data in the configuration menus.)
2. Squeeze the tabs (figure 11-3) toward the center of the battery support with enough pressure to disengage the flanges which hold the battery support in the terminal, and pull down to free the battery support from the terminal.
3. Remove the old battery from the support.
4. Insert the new battery in the support making sure the positive end of the battery is located at the positive end of the support (+ to + and − to −).
5. Reinsert the battery support in the terminal. A slotted guide in the outward-facing side of the support ensures that the battery support is inserted with the right polarity.

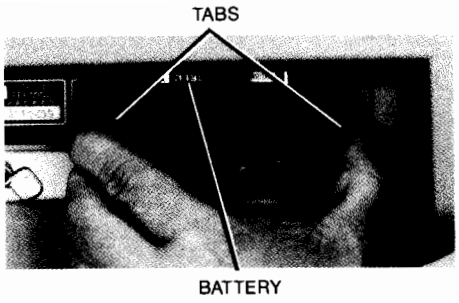


Figure 11-3. Battery Replacement

Cleaning

First, dust lightly using a damp, lint-free cloth. The cloth should not be wet, but just damp enough to pick up dust. Paper towels are fine. Avoid wiping dust or lint into the keyboard area.

CAUTION

Do not use petroleum-based cleaners, such as lighter fluid, or cleaners containing benzene, trichloroethylene, dilute ammonia, ammonia, or acetone. These cleaners could harm the plastic surfaces. Also, avoid spraying cleaner between the keyboard keys.

Smudges and fingerprints can be removed using most conventional cleaners (such as "SNAP" glass and plastic cleaner, manufactured by Mist Products Inc., 16 Watch Hill Road, Croton-on-Hudson, NY 10520).

12

In Case Of Difficulty 12

This section contains instructions for determining if a malfunction has actually occurred, error recovery instructions, and testing information. Once you have determined that the terminal is not functioning properly, procedures for requesting service are included at the end of this section under the heading "How To Get Help".

Error Messages

The terminal generates two kinds of error messages of concern to the user; user error messages and printer test error messages. User error messages occur when the user makes an error while using the terminal, and printer test error messages occur while the integral printer is being tested. The messages appear on lines 25 and 26, replacing the function key labels. To clear an error message and restore the labels, press the RETURN key. User error messages and their meanings are listed in table 12-1. Printer test error messages and their meanings are listed later under the heading "Printer Test".

Table 12-1. User Error Message Meanings

MESSAGE	MEANING
Default configs used Press RETURN to clear	This message occurs whenever non-volatile memory is found to be malfunctioning or cannot be read for any reason. In this case, a default set of configuration parameters is used. See the Reference Manual for more detailed information.
Integral printer error Press RETURN to clear	Something is wrong with the integral printer. It may only be that the printer is out of paper or the metal latch (under the plastic cover) may not be pressed down securely.
No "to" device Press RETURN to clear	You attempted to perform a device-to-device data transfer without having first defined a "to" device.

Malfunction At Power-On

When the power switch is set to ON, the terminal should beep once. Then a power-on test, lasting for about 15 seconds, should be performed. After successful completion of the test, the terminal should beep once and display the initial screen display as shown in figure 2-4.

However, if the terminal fails to beep at all, make sure the keyboard is properly connected.

If the terminal beeps continuously, 1 to 14 times after the initial beep and the primary level of function key labels is not displayed, refer to the "How To Get Help" paragraph at the end of this section.

Configuration Checking

Sometimes what appears to be a terminal malfunction may be caused by incorrect configuration for the job you are trying to do. When the terminal appears to malfunction, the usual procedure is to reset the terminal, then, if the problem isn't corrected, a terminal test is performed and a call for service is made if the test fails. However, resetting the terminal disrupts printer and datacomm operations and resets (hard reset only) some of the configurable items to the values stored in non-volatile memory. Check the configurable items to ensure that the configuration is compatible with the task you are trying to perform. Refer to Section 5 for configuration instructions.

Resetting The Terminal

It may be necessary to use the RESET key to clear the terminal of an error condition. There are two types of reset: a soft reset and a hard reset. Either type resets printer and datacomm operations. In addition, a hard reset resets the active configuration values to the values stored in non-volatile memory, and all data in display memory is destroyed. For these reasons, you may not wish to hard reset the terminal unless you are quite certain it is necessary.

SOFT RESET. A soft reset is performed by pressing the RESET key. The effects are listed below. Configuration values are preserved during a soft reset.

- The keyboard bell rings.
- The keyboard is unlocked.
- If the Display Functions capability is active, it is turned off.
- Line Modify mode is turned off.
- Operations of all devices controlled by the terminal are stopped.
- All datacomm transfers are cancelled and any data stored in the datacomm buffer is cleared out.
- The screen is not cleared.

HARD RESET. A hard reset is performed by simultaneously pressing the CNTL, SHIFT, and RESET keys. A hard reset has the following effects:

- User keys f1 through f8 are reset to the default values.
- All data in display memory is destroyed.
- All configurations are reset to the values stored in non-volatile memory.
- The keyboard, if disabled, is enabled.
- Caps mode is turned off.
- The Modes set of function key labels is displayed.
- The left margin is set to column 1 and the right margin is set to column 80.
- All tabs are cleared.
- The following capabilities, if on, are turned off:
  1. Display functions.
  2. Line Modify mode.
  3. Insert character.
  4. Memory Lock mode.
- The following functions are turned off for terminals containing an integral printer:
  1. Report mode selection.
  2. Log top or log bottom selection.

Self-Tests

Two tests are available to the user: a terminal test, for checking the terminal for proper operation; and a datacomm test, for checking the datacomm configuration.

Terminal Test

The terminal test will tell whether or not the terminal is operating correctly. The test can be initiated by any one of the procedures listed below.

1. Press the following keys, in sequence:

2. Press, in sequence:

If the test is successful, indicating the terminal is operating correctly, a test pattern (figure 12-1) will appear on the screen. If the test pattern does not appear or an error message replaces the function key labels, refer to the "How To Get Help" paragraph at the end of this section.

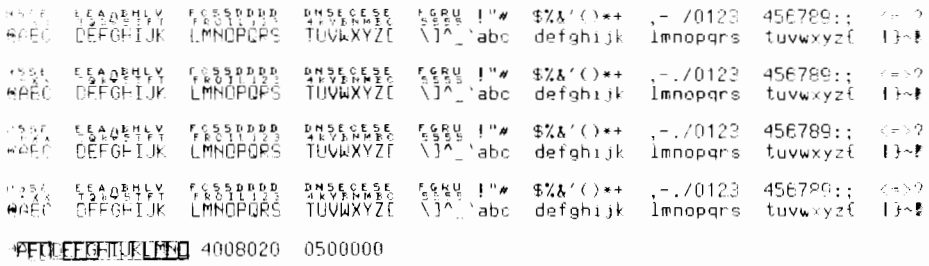


Figure 12-1. Terminal Test Pattern (With Line-Drawing Set Option)

Printer Test

The printer test checks out only the integral printer. To initiate the test, press the following keys, in sequence:

If the test results are satisfactory, a printer test pattern which includes all the characters the terminal can produce is printed out (figure 12-2). If the test is unsatisfactory, an error message, INTEGRAL PRINTER ERROR will be printed out. This means the printer latch is not locked, the printer is out of paper, or the printer self-test has failed.

Figure 12-2. Printer Test Pattern

How To Get Help

If the terminal doesn't complete the terminal test correctly, the terminal is probably malfunctioning. At this point you can either perform further tests, as described in the Reference Manual, or contact your nearest Hewlett-Packard service office. A list of service offices is supplied at the end of this manual.

A

DISPLAY ENHANCEMENTS

To start and end display enhancements:

ESC & d <char>	Selects the display enhancement indicated by <char> to begin at the present cursor position. Note that <char> must be a capital letter, terminating the escape sequence.

<char>	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Half Bright									X	X	X	X	X	X	X	X
Underline					X	X	X	X					X	X	X	X
Inverse Video			X	X			X	X			X	X			X	X
Blinking		X		X		X		X		X		X		X		X
End Enhancement	X															

SELECTION OF ACTIVE ALTERNATE CHARACTER SET

The active alternate character set is selected with the following escape codes:

CODE	MODE	SET SELECTED
ESC) 0	7-bit	Language selected on Terminal Configuration menu
ESC) 0	8-bit	USASCII
ESC) A	7-bit	Language selected on Terminal Configuration menu
ESC) A	8-bit	Extended Roman
ESC) B	7-bit	Line-drawing set
ESC) B	8-bit	Line-drawing set
ESC) C	7-bit	Line-drawing set
ESC) C	8-bit	Line-drawing set

NUMERIC AND DISPLAY CONTROL

COMMAND	KEY	FUNCTION
ESC A	∧	Cursor UP
ESC B	∨	Cursor DOWN
ESC C	>	Cursor RIGHT
ESC D	<	Cursor LEFT
ESC F	SHIFT + ↖	Cursor HOME DOWN
ESC H	↖	Cursor HOME UP
ESC I	TAB ▶	Tab
ESC J	CLEAR DSPLY	Clear display from cursor
ESC K	CLEAR LINE	Clear to end of line
ESC S	ROLL UP	Roll up one line
ESC T	ROLL DOWN	Roll down one line
ESC U	NEXT PAGE	Next page (up 24 lines)
ESC V	PREV PAGE	Previous page (down 24 lines)
ESC 0	COPY ALL	Print all
ESC 1	SET TAB	Set tab
ESC 2	CLEAR TAB	Clear tab
ESC 3	CLR ALL TABS	Clear all tabs

NUMERIC AND DISPLAY CONTROL (Continued)

COMMAND	KEY	FUNCTION
ESC 4	LEFT MARGIN	Set left margin
ESC 5	RIGHT MARGIN	Set right margin
ESC 9	CLR ALL MARGINS	Clear all margins
ESC i	TAB ◀	Back tab
ESC j	USER KEYS	Turn on softkey definition display
ESC k	USER KEYS	Turn off softkey definition display

EDITING GROUP

COMMAND	KEY	FUNCTION
ESC L	INSERT LINE	Inserts a blank line
ESC M	DELETE LINE	Delete a line
ESC Q	INSERT CHAR	Insert character mode ON
ESC R	INSERT CHAR	Insert character mode OFF
ESC P	DELETE CHAR	Delete character

CONTROL FUNCTIONS

COMMAND	FUNCTION
^[a	Cursor sensing, absolute
^['	Cursor sensing, screen relative
^[b	Keyboard enable
^[c	Keyboard disable
^[g	Soft reset, clears IO, frees keyboard
^[l	Memory overflow protect ON; display lock ON
^[m	Memory overflow protect OFF
^[&a	Cursor addressing: absolute, relative
^[^	Primary status
^[~	Secondary status
^[x	Datacomm self-test
^[z	Terminal self-test
^[@	One-second delay
^[E	Hard reset
^[G	Cursor return
^[Y	Display functions ON
^[Z	Display functions OFF

PROGRAMMABLE MODES

The HP 2623A programmable modes are set on or off with an ^[& k sequence. The format is:

^[& k [{0,1} <mode code>]

where

0 — turn state off

1 — turn state on

<mode code> — designates the mode to be set on or off. More than one mode may be set in one escape sequence.

The AUTO LF, BLOCK MODE, REMOTE, and MODIFY ALL key states are saved with configurations in non-volatile memory. Similarly, the CAPS LOCK state is saved in the terminal configuration.

The ^[& k sequence does not change non-volatile memory. Any state set with ^[& k, therefore, will be lost if the terminal is hard reset or powered off.

MODE CODE	FUNCTION
^[& k A	Auto linefeed
^[& k B	Block mode
^[& k C	Caps lock
^[& k J	Frame rate: 0 => 60 Hz, 1 => 50 Hz
^[& k L	Local echo
^[& k M	Modify mode
^[& k P	Caps mode
^[& k R	Remote mode

CONFIGURATION STATES

Several configuration states can be set with an ESC & s escape sequence. These states are lost (the states saved in non-volatile memory take effect again) when a hard reset occurs or when the terminal is powered off.

The format for the ESC & s sequence is:

ESC & s [{0,1} <state code>]

where

0 — turn state off

1 — turn state on

<state code> — designates the state to be set on or off.

STATE CODE	CONFIGURATION FUNCTION
ESC & s A	Transmits function key escape sequence (XmitFnctn)
ESC & s B	SPOW enable
ESC & s C	End-of-line cursor wrap (InhEolWrp)
ESC & s D	Line/page for block transmissions (Line = 0; page = 1)
ESC & s G	Handshake determination (InhHndShk)
ESC & s H	Handshake determination (InhDC2)

SOFT KEY CONTROL

To enable and disable the soft keys (f1) through (f8), use the following escape sequence:

ESC & j <soft key level code>

ESCAPE CODE	FUNCTION
ESC & j @	Disable the soft keys and clear the screen labels.
ESC & j A	Display the top level of the soft key tree; same as pressing the AIDS key.
ESC & j B	Display the user-defined labels; same as pressing the USER KEYS key.
ESC & j R	Re-enable the AIDS, MODES, and USER KEYS keys.
ESC & j S	Disable the AIDS, MODES, and USER KEYS keys ("lock" the current set of labels).

PROGRAMMABLE SOFT KEYS

The f1 through f8 function keys (soft keys) can be programmed with the Ec& f sequence.

To display the programmable soft keys, use an Ec& j B sequence or the USER KEYS key. The fields in a soft key form are defined as follows:

1. The "TYPE" field indicates the type of key. The choices are L (local), N (normal), and T (transmit).

2. The "LABEL" field is a 16-character field. The first eight characters are displayed above the second eight characters.

3. The second line for each key is used for the soft key definition string.

The format of the escape sequence is:

```
Ec&f <attribute> a/A
     <key #> k/K
     <label length> d/D
     <definition length> l/L
     <label string>
     <defintion string>
```

where

a/A = the "TYPE" field attribute, as follows:

1 — Normal (N)
2 — Local only (L)
3 — Transmit only (T)

k/K = key number, as follows:

1 — f1 function key
2 — f2 function key
3 — f3 function key
4 — f4 function key
5 — f5 function key
6 — f6 function key
7 — f7 function key
8 — f8 function key

d/D = label length, 0 through 15 (16 displayable characters)

l/L = definition length, 0 through 79 (80 displayable characters)

label string = the first 16 displayable characters of the label are displayed (the string can be up to 256 characters)

definition string = the first 80 displayable characters of the definition are displayed (the string can be up to 256 characters)

For example,

key #1 attribute 2 (transmit only)

definition string

```
Ec & f 1 k 2 a 6 d 13 LLOG-ONHELLO MYACCT%
```

label string

label length = 6

definition length = 13 (note that uppercase L terminates escape sequence)

B

Keyboards and Character Sets

Depending on the option selected, a terminal comes with one of three types of character ROM installed, as shown below:

OPTION	CHARACTER SET(S)
Standard	USASCII
001-006	USASCII, Extended Roman, and Line-Drawing sets
202	USASCII and Line-Drawing sets

Figures B-1 through B-7 show the national keyboards which are available as options 001 through 006. These options also include the extended Roman character set ROM. This ROM contains many characters used in the languages represented in options 001 through 006 but not found in the USASCII character set (see tables B-1 and B-2).

Table B-1. Standard USASCII Character Codes

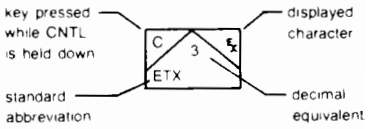
BIT 7 6 5 / 4 3 2 1	CONTROL (CNTL) CHARACTERS 0 0 0	CONTROL (CNTL) CHARACTERS 0 0 1	DISPLAYABLE CHARACTERS 0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
0000	@ 0 NUL	P 16 DLE	SP	0	@	P	`	p
0001	A 1 SOH	Q 17 DC1	!	1	A	Q	a	q
0010	B 2 STX	R 18 DC2	"	2	B	R	b	r
0011	C 3 ETX	S 19 DC3	#	3	C	S	c	s
0100	D 4 EOT	T 20 DC4	$	4	D	T	d	t
0101	E 5 ENQ	U 21 NAK	%	5	E	U	e	u
0110	F 6 ACK	V 22 SYN	&	6	F	V	f	v
0111	G 7 BEL	W 23 ETB	'	7	G	W	g	w
1000	H 8 BS	X 24 CAN	(	8	H	X	h	x
1001	I 9 HT	Y 25 EM	)	9	I	Y	i	y
1010	J 10 LF	Z 26 SUB	*	:	J	Z	j	z
1011	K 11 VT	27 ESC	+	;	K	[	k	{
1100	L 12 FF	28 FS	,	<	L	\	l	|
1101	M 13 CR	29 GS	-	=	M	]	m	}
1110	N 14 SO	^ 30 RS	.	>	N	^	n	~
1111	O 15 SI	_ 31 US	/	?	O	_	o	DEL

Table B-2. Extended Roman Character Codes

BIT 7 6 5 / 4 3 2 1	$B_8 = 1$ EXTENDED ROMAN CHARACTERS 0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
0000	@ 0 NUL	P 16 DLE		¯ / –	â	Â		
0001	A 1 SOH	Q 17 DC1			ê	î		
0010	B 2 STX	R 18 DC2			ô	Ø		
0011	C 3 ETX	S 19 DC3		•	û	Æ		
0100	D 4 EOT	T 20 DC4			á	å		
0101	E 5 ENQ	U 21 NAK		Ç	é	Í		
0110	F 6 ACK	V 22 SYN		Ñ	ó	ø		
0111	G 7 BEL	W 23 ETB		ñ	ú	æ		
1000	H 8 BS	X 24 CAN	¸ ´	¡	à	Ä		
1001	I 9 HT	Y 25 EM	`	¿	è	ì		
1010	J 10 LF	Z 26 SUB	^	¤	ò	Ö		
1011	K 11 VT	27 ESC	¨	£	ù	ü		
1100	L 12 FF	28 FS	~		ä	É		
1101	M 13 CR	29 GS		§	ë	ï		
1110	N 14 SO	^ 30 RS			ö	ß		
1111	O 15 SI	_ 31 US	£		ü			

- ACKNOWLEDGE — ACK
- BELL — BEL
- BACKSPACE — BS
- CANCEL LINE — CAN
- CARRIAGE RETURN — CR
- DATA LINK ESCAPE — DLE
- DEVICE CONTROL 1 — DC_1
- DEVICE CONTROL 2 — DC_2
- DEVICE CONTROL 3 — DC_3
- DEVICE CONTROL 4 — DC_4
- DELETE — DEL
- END OF MEDIUM — EM
- ENQUIRY — ENQ
- END OF TRANSMISSION — EOT
- ESCAPE — ESC
- END OF BLOCK — ETB
- END OF TEXT — ETX
- FORM FEED — FF
- FILE SEPARATOR — FS
- GROUP SEPARATOR — GS
- HORIZONTAL TAB — HT
- LINE FEED — LF
- NEGATIVE ACKNOWLEDGE — NAK
- RECORD SEPARATOR — RS
- SHIFT IN — SI
- SHIFT OUT — SO
- SPACE — SP
- START OF HEADING — SOH
- START OF TEXT — STX
- SUBSTITUTE — SUB
- SYNCHRONOUS IDLE — SYN
- UNIT SEPARATOR — US
- VERTICAL TAB — VT

Control Character Legend



The French keyboard (option 003), when delivered, is physically arranged in the AZERTY layout; a keycap extraction tool comes with it. To change the keyboard to the QWERTY layout, the A, Z, Q, and W keys must be rearranged to be as shown in figure B-4.

Figure B-1. Swedish/Finnish Keyboard (Option 001)

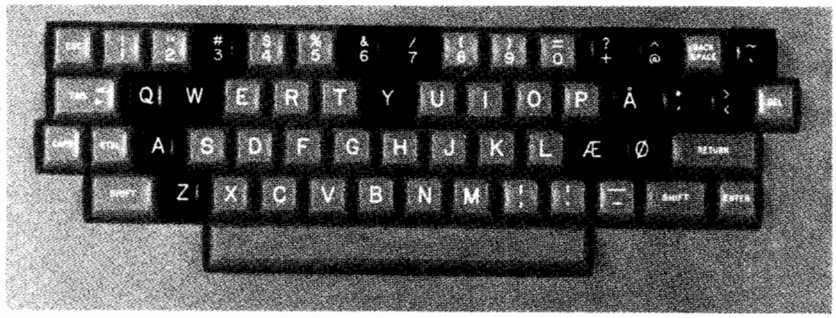


Figure B-2. Danish/Norwegian Keyboard (Option 002)

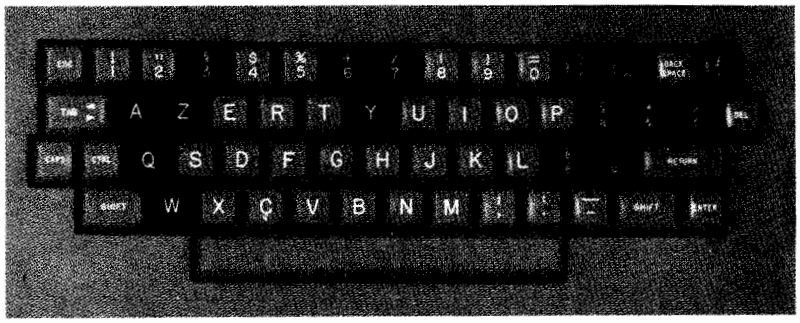


Figure B-3. French Keyboard (Option 003), AZERTY Layout

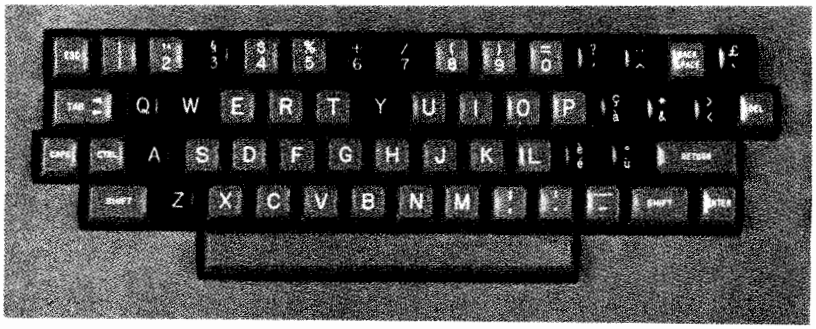


Figure B-4. French Keyboard (Option 003), QWERTY Layout

7-Bit vs. 8-Bit Operation

The terminal can operate in 7-bit or 8-bit mode. It is configured for 7-bit operation by setting the ASCII 8 Bit field of the Terminal Configuration menu to "NO". If this field is set to "YES", the terminal is configured for 8-bit operation. Parity operation is allowed only in 7-bit mode; in 8-bit mode, the Parity field (on the Datacomm and External Device menus) must be set to "NONE" for communication with the computer or external device.

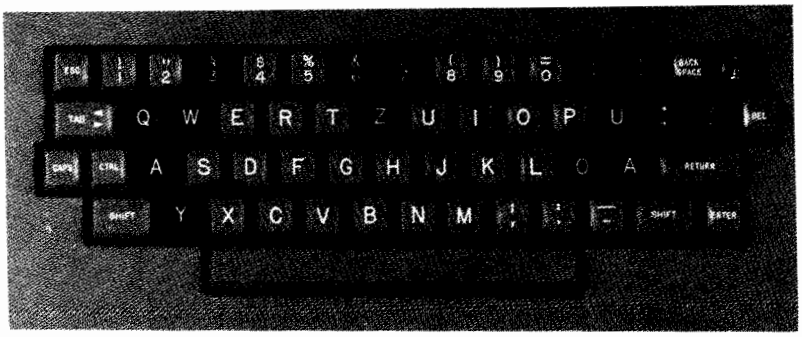


Figure B-5. German Keyboard (Option 004)

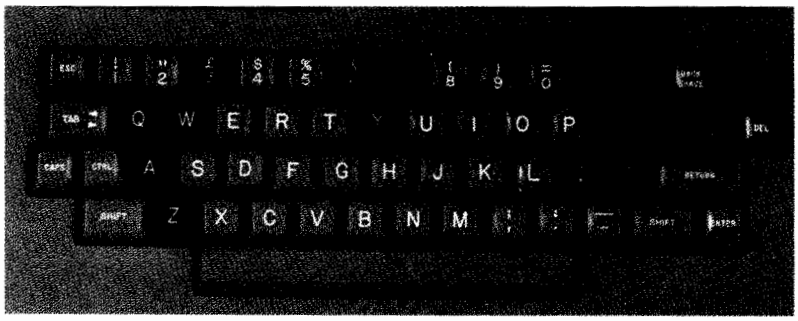


Figure B-6. United Kingdom Keyboard (Option 005)

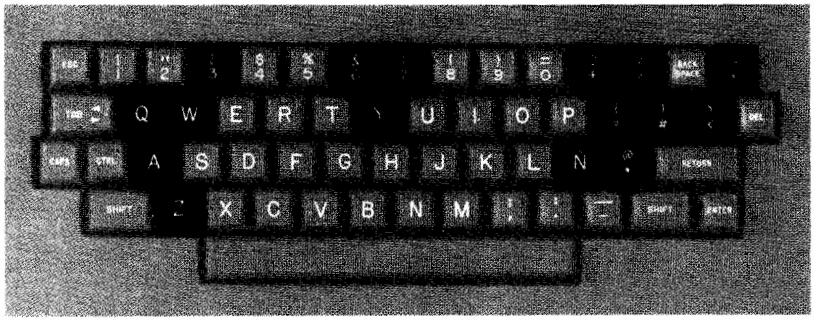


Figure B-7. Spanish Keyboard (Option 006)

Alternate Character Set Selection

The "base" language for the terminal is the language selected on the Terminal Configuration menu; the alternate character set can be the line-drawing set (which comes with options 001 through 006 and option 202) or the extended Roman character set (which comes with options 001 through 006). One of these two sets is selected as the "active" alternate character set using an escape sequence, which can be entered from either a program or the keyboard. Provided the terminal is in 8-bit mode, ESC) A selects the extended Roman character set as the active alternate character set. If the terminal is in 7-bit mode, ESC) B selects the line-drawing set as the active alternate character set. At power-up time or after a hard reset, the terminal defaults to the extended Roman character set as the active alternate character set if the terminal is configured for 8-bit operation and to the line-drawing set if the terminal is configured for 7-bit operation.

Pressing the CTRL and N keys simultaneously selects the active alternate character set as the character set accessed by the keyboard keys. Pressing the CTRL and O keys simultaneously returns the terminal to the base language.

When the terminal is in 7-bit mode and the active alternate character set is selected as the character set accessed by the keyboard, it remains as the character set accessed by the keyboard to the end of the current line. The alternate character set must be selected anew for each line.

When the active alternate character set is selected as the keyboard character set in 8-bit mode, it remains in effect until the base set is reselected with a CTRL O.

The extended Roman character set characters can be displayed in Graphics Text mode when a language which uses these characters is selected on the Terminal Configuration menu. This is true for both 7-bit and 8-bit modes.

When the terminal is in 8-bit mode, they can also be displayed by selecting the alternate character set as the character set accessed by the keyboard. This can be done by pressing simultaneously the CNTL and N keys. This cannot be done in 7-bit mode. Also, the extended Roman character set is the only character set selectable for display as graphics text by the CNTL N method.

USASCII Character Set

If the terminal is equipped with the ROM containing the extended Roman character set (table B-2), and is configured for 7-bit operation, the characters #, @, [, \,], ^, `, {, |, }, and ~ in table B-1 are replaced on the screen with one of the following sets of characters, depending on the national language selected on the Terminal Configuration menu.

	KEYBOARD	DECIMAL VALUE										
LANGUAGE	OPTION #	35	64	91	92	93	94	96	123	124	125	126
USASCII	(standard)	#	@	[	\	]	^	`	{	|	}	~
Swedish/Finnish	001	#	É	Ä	Ö	Å	ü	é	ä	ö	å	ü
Danish/Norwegian	002	#	@	Æ	Ø	Å	^	`	æ	ø	å	~
French	003	£	à	°	ç	§	^	`	é	ù	è	¨
German	004	£	§	Ä	Ö	ü	^	`	ä	ö	ü	ß
United Kingdom	005	£	@	[	\	]	^	`	{	|	}	~
Spanish	006	#	@	¡	Ñ	¿	^	`	{	ñ	}	~

Extended Roman Character Set

All USASCII (table B-1) and extended Roman characters (table B-2) are accessible using the keyboard keys under the following conditions:

a. The terminal is configured for 8-bit operation.

b. The extended Roman character set is selected as the active alternate character set.

c. The active alternate character set is selected as the keyboard set (by pressing the CTRL and N keys).

In 8-bit mode, the eighth data bit is used by the firmware code to select either the USASCII or extended Roman character set. If the terminal is configured for 8-bit mode but does not include the 8K ROM which contains the extended Roman character set, the eighth bit is still used for selection of the USASCII character set, but any keystrokes, which would access the extended Roman characters if the appropriate ROM was present, display spaces.

If the terminal is configured for 7-bit operation, the extended Roman character set is selected as the active character set, and the active alternate character set is selected as the keyboard set (by pressing the CTRL N keys), the terminal defaults to the base character set.

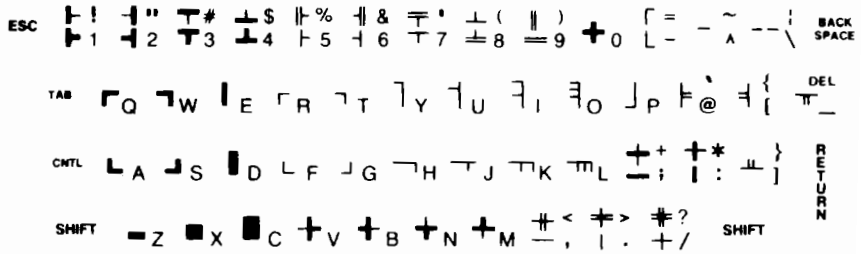


Figure B-8. Line-Drawing Set Elements

Line-Drawing Set

The line-drawing set consists of various line segments. Using it, you can construct data entry forms by combining different line segments. Each line segment is associated with one of the keyboard keys as shown in figures B-8 and B-9.

The line-drawing set line segments are accessed by selecting the line-drawing set as the active alternate character set using the escape sequence Esc) B and then selecting it as the character set accessed by the keyboard keys by pressing the CTRL and N keys, simultaneously.

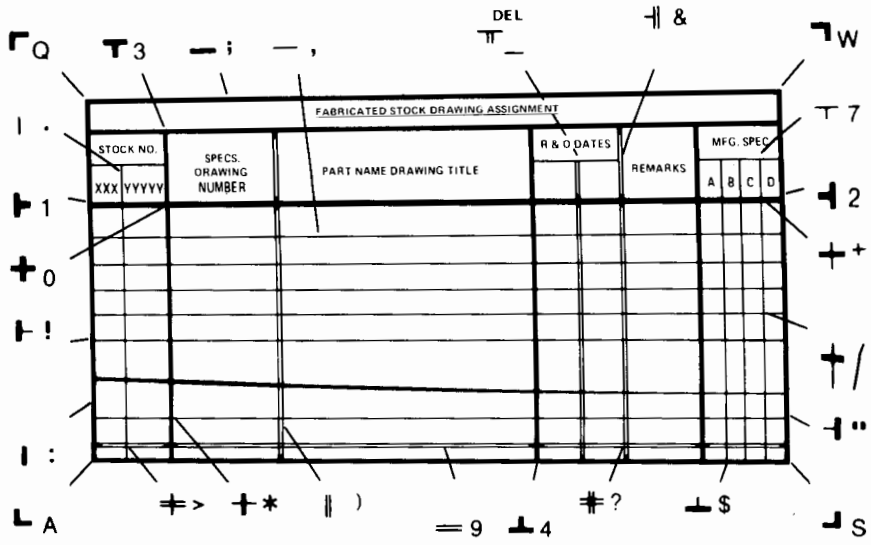


Figure B-9. Sample Data Entry Form

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