HEWLETT PACKARD

Display Station

2624B

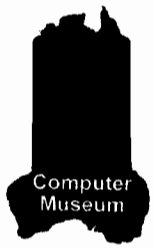
user manual

Congratulations!

You have chosen Hewlett-Packard's new 2624B 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 2624 Reference Manual 02624-90008. The HP 2624 Service Manual 02624-90009 (ordered separately) provides information regarding troubleshooting, repair, and theory of operation.



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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.

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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 desire detailed information on specific features, you can refer to the Reference Manual. If you are already familiar with HP 2624 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 is made up of the following sections and appendix.

*Section 1 - **Introducing the HP 2624B.*** 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 By Itself.*** This section gives step-by-step examples of using the terminal in typical operations. These operations can be performed without the need of peripheral devices or a computer system.

*Section 7 - **Using Your Terminal With A Computer.*** This section explains how to use the terminal with a computer system.

*Section 8 - **Using Your Terminal With Other Devices.*** This section provides step-by-step examples of how to use the terminal with a printer.

*Section 9 - **Maintaining Your Terminal.*** This section gives instructions for cleaning the terminal.

*Section 10 - **In Case of Difficulty.*** This section explains what to do if the terminal does not work properly. Included is a simple test that can be made to verify proper terminal operation.

Appendix. The appendix contains condensed programming information for all of the terminal's 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.

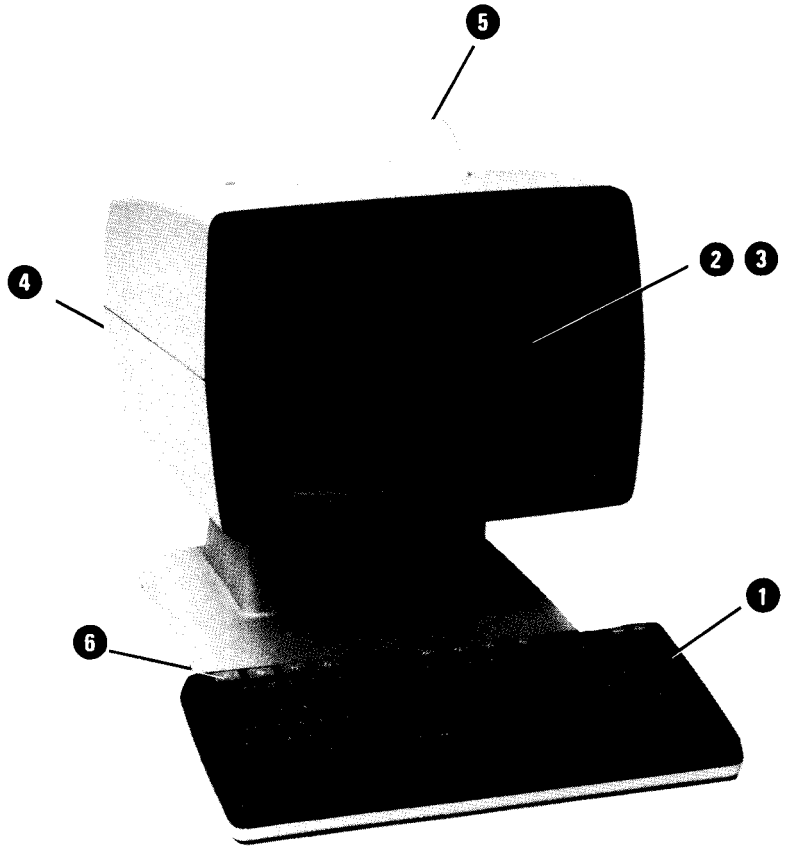
Terms Used In This Manual

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
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.
DEVICE CONTROL OPERATION	The process of skipping lines, moving printer paper, or transferring data between devices.
DIACRITIC MARK	A mark such as an accent, grave, circumflex, tilde, etc. used with an alphabetic character to modify the phonetic nature of the character. Used in this manual in association with foreign languages.
FORM FEED	Moves the printer paper to the top of the next page.
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.
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 amount of data which can be displayed on the screen at one time. Normally 24 lines.
REMOTE MODE	Operating the terminal with the aid of a computer system (that is, "on-line").
SCREEN	The front portion of the CRT viewed by the user.
"TO" DEVICE	The device that receives the data in a data transfer, also defined as the "destination" device.

1

Introducing the HP 2624B



The HP 2624B is a Block Mode terminal. In addition to typical terminal features, the terminal has special features that allow you to easily create and edit forms for data entry applications. The terminal can display lines of up to 80 characters and offers foreign language options and an integral printer option.

Other highlights of the terminal are:

1 Versatile keyboard:

- Easy to use.
- Eight variable function keys.
- 68-key typewriter-style keyboard layout
- Eleven character sets representing nine languages.
- Calculator-style numeric key pad.
- Terminal control keys.
- Display control keys.
- Edit keys.

2 High resolution display:

- Bright, clear screen display.
- Enhanced 7 X 11 dot characters in a 9 X 15 dot cell with half-shifting
- 26-line by 80-character screen.
- 93-line by 80-character display memory.
- Display enhancements include:

  Inverse video.

  Half-bright video.

  Blinking characters.

  Underline characters.

  Non-displaying security mode.
- Displayable control code characters.

❸ Forms design:

- Alternate Line Drawing character set.
- Field checking.
- Forms editing.
- Forms cache (storage).

❹ Two separate data communication ports:

- Point-to-point or multipoint, full or half duplex, synchronous or asynchronous operation.
- Multipoint operation with terminal bypass printing.
- Auxiliary point-to-point data communications port can be used for a serial printer.
- Individually configurable ports.

❺ Integral printer option:

- Can print data entry-type forms.
- Expand print and compress print modes enable printing horizontally-expanded or compressed characters.
- Can operate in report print and metric print modes as well as standard print mode.

❻ Special function keys:

Eight multi-function keys with functions selectable using three keyboard keys:

- AIDS key - Redefinable configuration, forms drawing, testing, printer operations, margin/tab/start column selection, display enhancements.
- MODES key - Local/remote operating mode selection, block mode, modify all, automatic line feed, memory lock, display functions, line modify, terminal test.
- USER KEYS key - Enables user to view function key labels or define functions for the eight function keys.

Configuration:

- Local:

  Configurable from keyboard or by computer program.

  Screen displayable configuration data.

  Redefinable configuration using function keys.

  Keyboard features selectable (caps lock, bell, key click).

  Definable RETURN key.

  Selectable number of null pad characters to be sent to printer.

  Configuration memory protection.
- Remote:

  Data transfer rates up to 9,600 baud.

  Character, line or page data transfers.

  EIA RS232C electrical interface.

Self test:

- Exhaustive self test.

High Resolution Display

The terminal has a screen with a 6 X 8.5 inch viewing area capable of displaying up to 2080 characters on 26 lines of 80 characters. Each 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.

Display Memory

The terminal display memory can store up to approximately 8000 characters (approximately 100 lines of 80 characters each). However, a portion of display memory is used for data communication buffers and these figures assume the buffer size is 128 bytes. Larger buffers decrease the amount of memory available for display characters and forms cache.

Keyboard

The keyboard is a separate unit that is linked to the display portion of the terminal by a flexible cable. The keyboard layout is similar 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 numeric pad, similar to that used for calculators is included.

Any one of 11 character sets covering nine languages can be installed and assigned to the keyboard keys.

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 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.

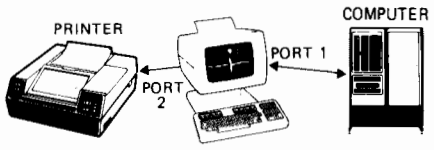
See Section 4 for a discussion of the function and function control keys.

Configuration

The terminal provides you with the ability to change the configuration 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 display memory). In block line or block page mode, you can 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- or half-duplex, ashynchronous or synchronous, point-to-point multipoint communications using the EIA RS232C communications interface specifications. (Port 2 is point-to-point only.) Connection to a computer is direct or through a modem.

In addition to these features, the HP 2624B provides, as an option, an integral thermal printer which can be used to produce a permanent copy of your data transactions. As an alternative, the auxiliary datacomm port can be used to connect an external printer to the terminal.

Section 7 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 10 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 your 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 your 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-l). 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.

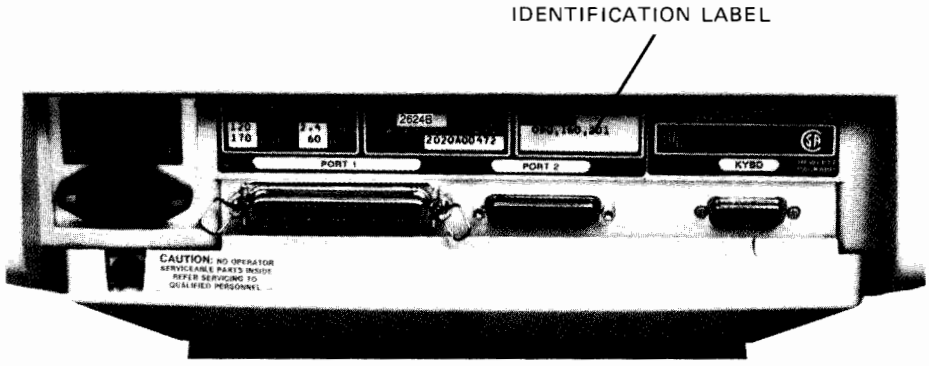


Figure 2-1. Identification Label, Rear Panel

Table 2-1 is a list of options available for the HP 2624B Terminal.

Table 2-1. HP 2624B Options

OPTION	
001	Swedish/Finnish Keyboard and ROM
002	Danish/Norwegian Keyboard and ROM
003	French Keyboard and ROM
004	German Keyboard and ROM
005	United Kingdom Keyboard and ROM
006	Spanish Keyboard and ROM
013	50 Hz, 240V Power
014	60 Hz, 100V Power
015	50 Hz, 230V Power
016	50 Hz, 115V Power
050	Integral Printer
160	+16K Byte Display RAM
201	Math Symbol and Large Character Sets

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 Your 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 2624 Service Manual, HP Part No. 02624-90009).

To install your 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.

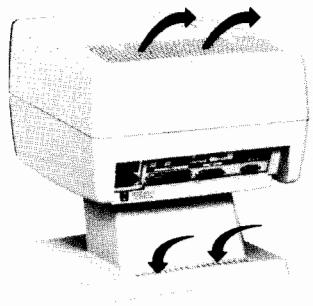


Figure 2-2. Cooling Airflow Through the Terminal

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 socket connector on the terminal's rear panel. The cable hood connector must be securely held in place. 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 terminals power requirements (see the power requirements label on the rear panel of the terminal).

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

WARNING

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

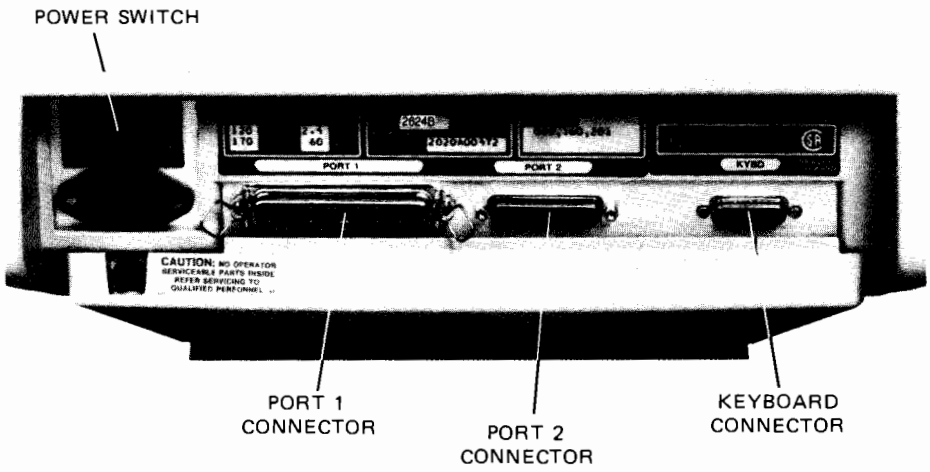


Figure 2-3. Power Switch and Connector Positions, Rear Panel

Figure 2-4. Initial Screen Display

Turning The Terminal On And Off

ON

When the installation of your 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. 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 (or Modes set) of function key labels is displayed across the bottom of the screen (figure 2-4).

If the message **Default Configs Used** is present at the bottom of the screen, the battery that protects nonvolatile memory may have been accidently 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 10, Terminal Test, for instructions) to determine if the terminal is malfunctioning or if the battery is dead. 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

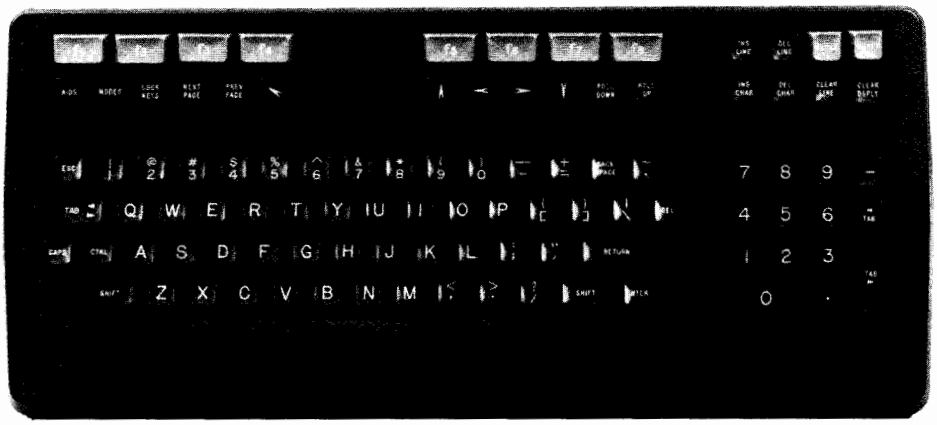
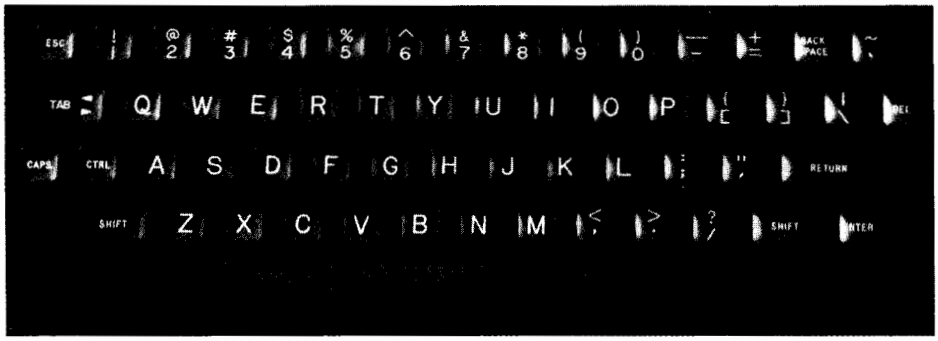


Figure 3-1. Terminal Keyboard

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 terminal memory.
- **Display Group.** This group controls the cursor position and the portion of display memory shown on the screen.
- **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 and RESET). 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 TAB ▶ key and a TAB ◀ key are located in the numeric pad group. The CAPS key selects all capital letters. The RETURN key can be programmed at the keyboard to produce additional functions (refer to Section 4, User Definable Function Key Labels).

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 are 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 an appendix at the end of the manual.

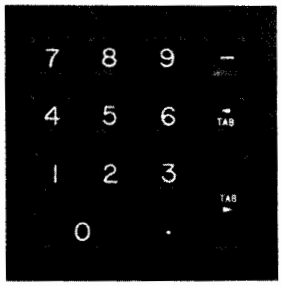
CTRL Key Operations

The CTRL key can be used to add another function 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 other 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 on the **BLOCK MODE**, **FORMAT MODE**, and **REMOTE MODE** key settings.

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



Numeric Group

The numeric keys at the right of the keyboard 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 "period" key, and a TAB◄ and a TAB► key.

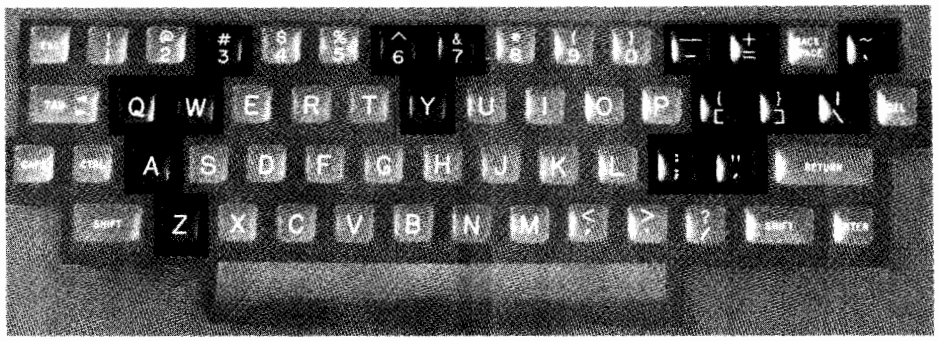


Figure 3-2. Location of Keys which may Change with Character Set Selection

Selectable Character Sets

USASCII is the standard character set with optional Swedish/Finnish, Danish/Norwegian, French, German, United Kingdom, and Spanish character sets. When an optional national language option is installed, it replaces the USASCII character set. Refer to Section 5, Configuring the Terminal, for further 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.

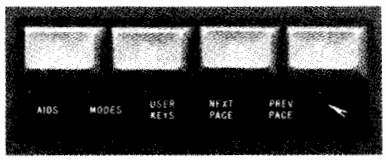
You can select either "QWERTY" or "ASERTY" French keyboard configurations.

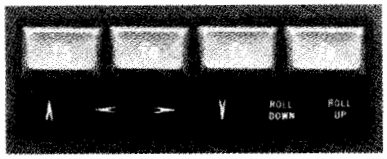
If French language mute operation is selected (**azM** or **qwM**), the accents ¨ and ^ will be mute. If Spanish language mute operation is selected (**M**), the accent ´ will be mute. This means that after the accent is displayed, the cursor will not move to the next column. When another character is received from the keyboard or remote computer it will replace the mute character. This allows the terminal to send the proper national characters to the computer and still maintain a display that is easy to read.

If you select the non muting Spanish or French national languages, the muting function is turned off and the cursor is advanced normally following the accents, ^ and " characters. The e character, for example, would be created by ^ , E and be displayed as ^e.

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





Display Group

The display group consists of the ∧, <, >, ∨, ROLL UP, 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 control the display.

The display group keys allow you to control the position of the cursor on the screen. They also allow you to "page" or scroll through the terminal's memory to display characters that have rolled off the screen.

The terminal can store more characters than can be displayed on the screen. Depending on what memory options are installed in your terminal, you can store over 8000 characters. This is enough to completely fill four screens. The screen is used to look at one block or "page" of these characters at a time. Each page is made up of 24 lines of data.

When the screen has been filled (24 lines of data have been entered), 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 the memory is filled. At this point if you enter another line, one or more lines in memory will be lost to make room for the new line. Memory lock and edit operations (described later) will prevent lines of information from being lost.

The ROLL UP and ROLL DOWN keys allow you to move the screen (like a window) through memory, one line at a time (figure 3-3).

The NEXT PAGE and PREV PAGE keys allow you to move the display one page (24 lines) forward or backward in memory. When you press these keys, the information presently displayed is replaced with the next or previous page of memory.

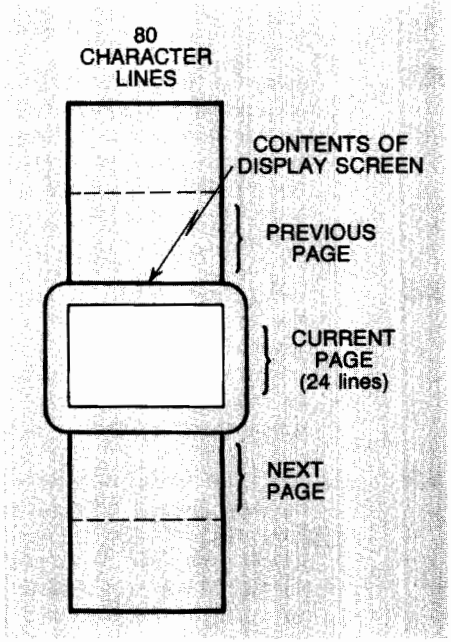


Figure 3-3. Page Locations In Memory

Moving The 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 display memory and displays the first page in memory.

Table 3-2. 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 screen. If the key is held down after the cursor reaches the first row of the screen, the cursor moves to the last row of the screen and the process is repeated.
∨	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 row is reached. If the key is held down after the last row is released, the cursor moves to the top row of the screen and the process is repeated.
<	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 screen 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. If the key is held down when the cursor is in the first column of the first row, the cursor moves to the last column of the last row and the process is repeated.
>	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 screen 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. If the key is held down when the cursor is in the last column of the last row, the cursor moves to the first column of the first row and the process is repeated.
↖	Home Cursor - The cursor is moved to the left margin of the first row of memory. If this position is not displayed when the key is pressed, the screen is rolled to display it.
SHIFT ↖	Cursor Home Down - The cursor is moved to the left margin of the first row following the last used row in memory. If all rows in memory are used, the first row in memory will be deleted to create a blank row at the end of memory to which the cursor will be moved. If this position 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).

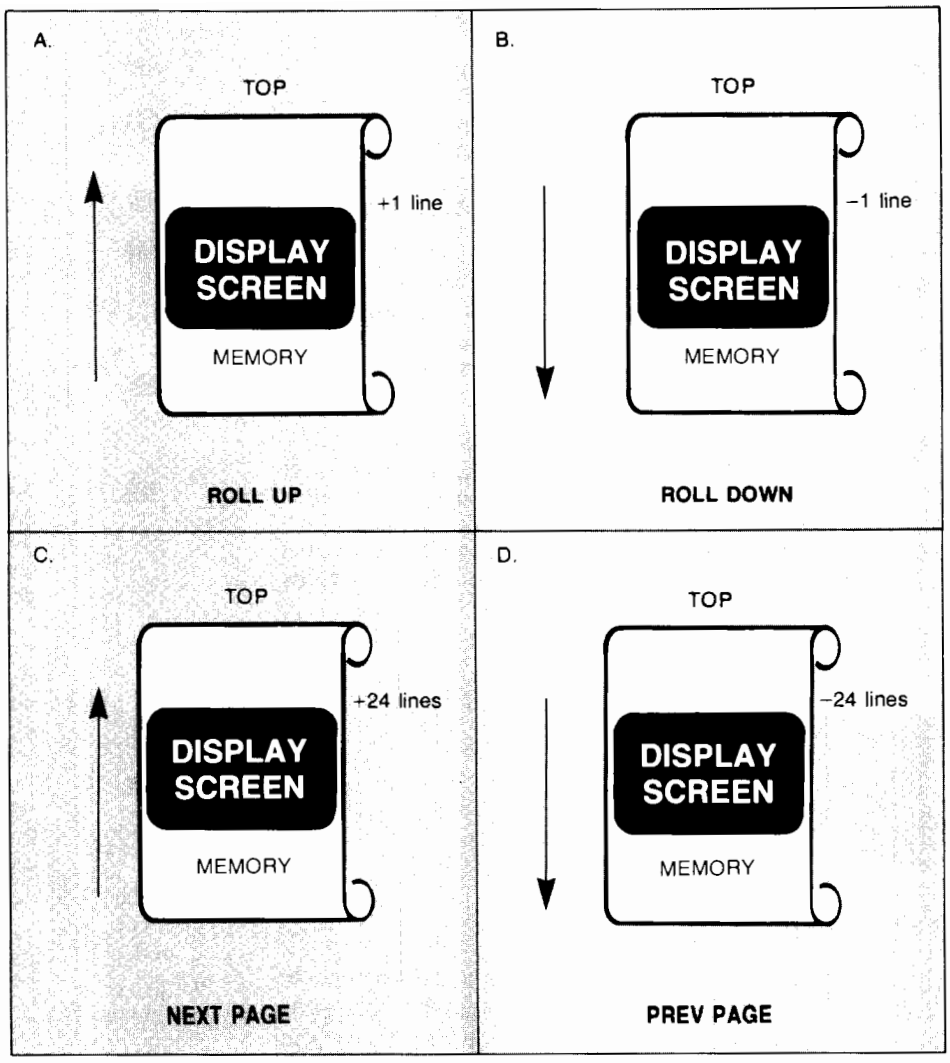
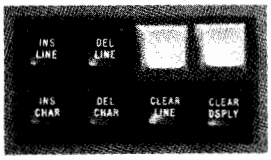


Figure 3-3. Operation Of ROLL UP and ROLL DOWN Keys

Table 3-3. Display Control Key Functions

KEY	FUNCTION
ROLL DOWN	Scrolls the contents of memory down one row each time the key is pressed. If the key is held down, the contents of memory are scrolled down until either the key is released or the first row of memory is displayed as the first row on the screen.
ROLL UP	Scrolls the contents of memory up one row each time the key is pressed. If the key is held down, the contents of memory are scrolled up until either the key is released or the last row of memory is displayed as the first row of the screen.
NEXT PAGE	Moves the display 24 lines (a whole screen) forward in memory. The information presently displayed is replaced with the next 24 lines of memory.
PREV PAGE	Moves the display 24 lines backward in memory. The information presently displayed is replaced with the previous 24 lines of memory.

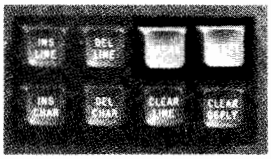


Edit Group

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 memory beginning at the cursor position.

Table 3-4. Edit Key Functions

KEY	FUNCTION
CLEAR DSPLY	Clears all of display memory from the cursor position to the end of memory.
CLEAR LINE	Clears the line from the cursor to the end of the line.
INS 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.
DEL 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.
INS CHAR	Inserts characters into a line without overwriting existing characters. When you press the key, an IC (Insert Character) appears in the status line, indicating insert character mode is active. To deactivate the mode, press the INS CHAR key a second time. 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.
DEL CHAR	Deletes the character at the cursor position. Press down the DEL 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

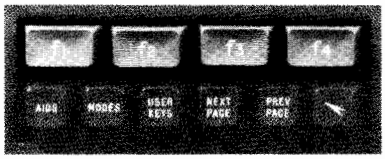
The terminal control group keys, which consists of the RESET and BREAK keys, is located in the upper right corner of the keyboard. These keys are used to reset the terminal and temporarily interrupt datacomm operations.

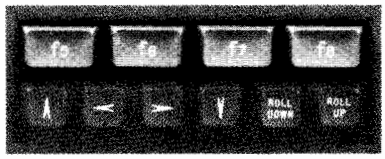
RESET Key

Pressing the RESET key once results in a "soft reset" which unlocks the keyboard, clears any error messages, turns off Display Functions, stops printer operations and data communication transfers, reinitializes both data comm channels to the configuration parameters stored in nonvolatile memory, and rings the keyboard bell. 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 channels) and the keyboard bell to be rung. This function should not be used unless necessary (refer to Section 10, In Case Of Difficulty).

BREAK Key

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

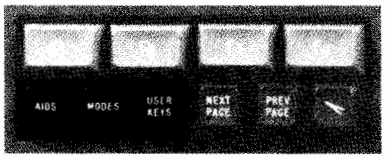




Function Keys Group

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 normally initiated by keyboard keys are incorporated into the function keys on the 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 selectable using 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. Pressing SHIFT, AIDS simultaneously will clear the function key labels from the screen.

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 USER KEYS displays the labels for the user defined function keys f1 - f8 at the bottom of the screen. It also enables the user defined functions assigned to the f1 - f8 keys. Pressing SHIFT , f1 - f8 displays an additional eight user defined function keys.

Pressing SHIFT USER KEYS enables you to assign up to 80 characters of data to each function key. You can also assign the 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.

The RETURN key is also user-definable but does not have labels. Refer to Section 4 for more detail on USER KEYS operations.

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 10. A list of messages and their meanings is given there. In addition to the list of messages, Section 10 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).

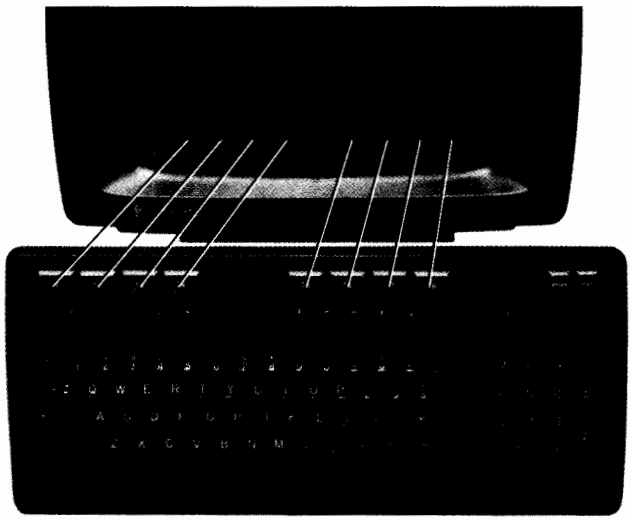


Figure 4-1. Function Keys and Labels.

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, AUX, 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 AUX 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.

MODES Function key Labels

The MODES key displays the Modes set of function key labels; LINE MODIFY, MODIFY ALL, BLOCK MODE, REMOTE MODE, TERMINAL TEST, MEMORY LOCK, DISPLAY FUNCTIONS, and AUTO LF. 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 be toggled (the label contains an asterisk when the mode is active). Alternate presses of the function key produce and delete the asterisk. Table A1 in the appendix describes the functions of the function keys when the Modes labels are displayed.

AIDS Function Key Labels

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

- Set or clear margins.
- Set or clear tabs.
- Enable the keyboard bell.
- Enable the audible "click" to occur when a keyboard key is pressed.
- Select the set of language characters.
- Send data to the internal printer or external printer.
- Select the start column for data transmissions.
- Select alternate character sets (base set, line drawing set, math set, or large character set).
- Select display enhancements (blink, inverse video, underline, half-bright, and security field).
- Select space overwrite (whether spaces generated with the space bar are to replace existing characters with blanks or merely advance the cursor without altering existing characters).
- Record mode copies data from the display or datacomm to the selected "to" device.
- Select end of line wraparound (whether a line feed and carriage return will be automatically generated at the end of a line or the cursor will remain in the last column and overwrite the character in the column as new characters are generated).
- Select one of two types of configuration menus for configuration changes.
- Enable terminal self test.
- Enable datacomm self test.

There are several sets of predefined function key labels which are accessed by pressing the AIDS key. When the AIDS key is pressed, the Aids set of function key labels shown below are displayed.

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. The functions associated with each set of labels accessed through the AIDS key are listed in tables A2 through A15 in the appendix.

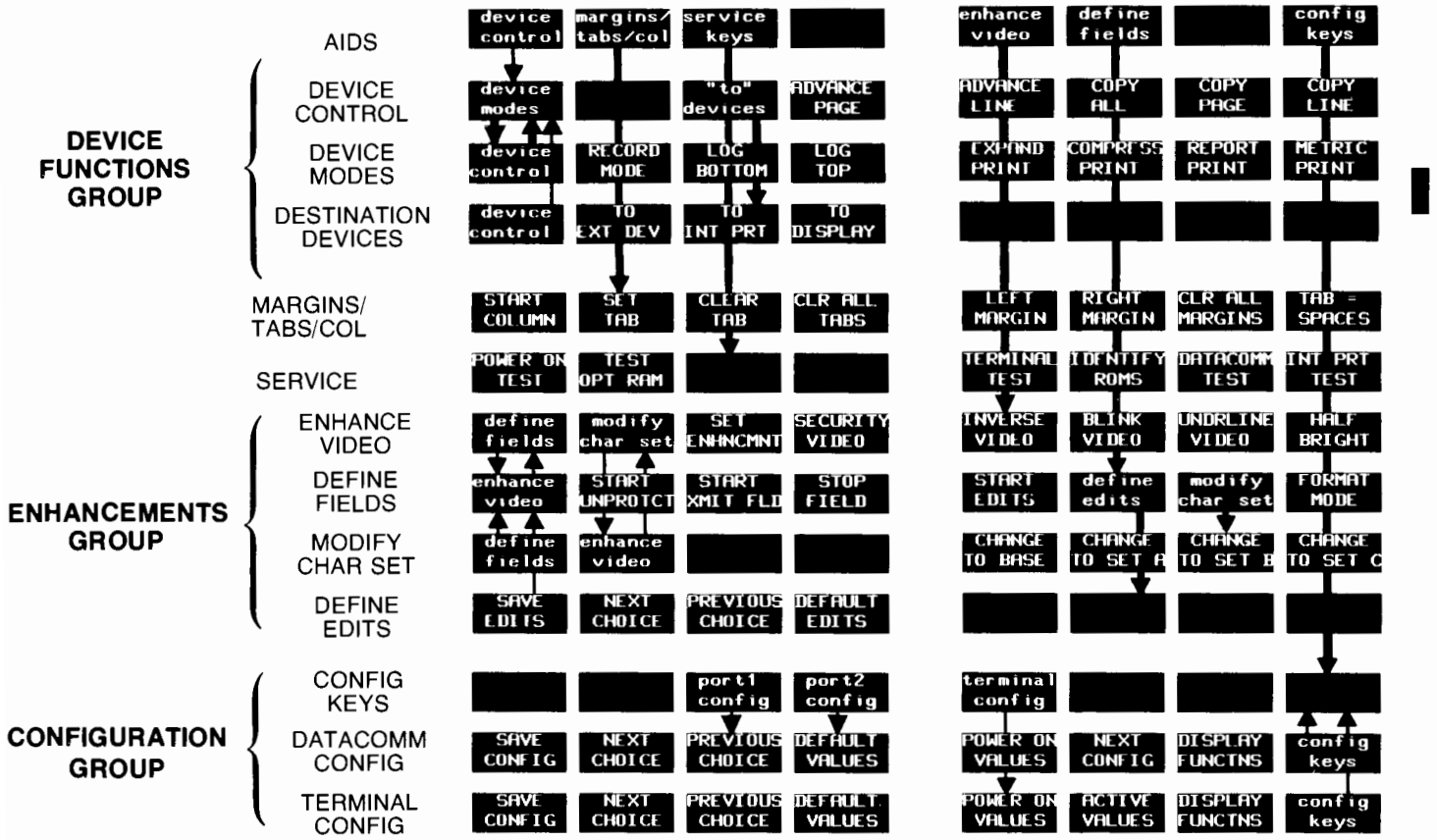


Figure 4-2. Function Key Labels Accessed Through the AIDS Key.

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; labels that can be toggled and mutually exclusive asterisk labels. Some of the predefined function keys have a toggling capability; alternate presses of the key display an asterisk in the associated label. The asterisk indicates the function suggested in the label is selected; absence of the asterisk indicates the function is not selected. In some cases, a "set" function key must be pressed to activate the selection. For example, when the Enhance Video set of function key labels (figure 4-2) are displayed, the SET ENHNCMENT function key (f3) must be pressed before the currently displayed selections will be activated.

To Return To Normal Operation

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

Aids Set

The Aids set of labels are 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 one accessed from the Aids set. There are several such groups; the Config group, the Forms group, the Device Functions group, and the Enhancements group. (The Config group will not be covered in detail in this manual.) Table A2 in the appendix describes the functions of the Aids set.

Device Functions Group

This group is composed of the Device Control and Device Modes sets of labels. These sets are used to transfer data to the optional integral printer or external device.

DEVICE CONTROL Set. This set is directly accessible from the Aids set of labels. It is used to select the amount of data to be copied (all, page, or line) and allows skipping one page or one line on the "to" device (provided it is the external device or internal printer). Table A3 in the appendix describes the functions of the Device Control set.

DEVICE MODES Set. This set enables transferring data from the display or datacomm to the internal printer or external device using either the "log top" or "log bottom" method and Record mode (refer to Section 7 for details on top and bottom logging and Record mode), expanding or compressing the print horizontally, and printing in report or metric format. Table A4 in the appendix describes the functions of the Device Modes set.

DESTINATION DEVICES Set. This set is used to select destination devices (display, internal printer, and external devices). Table A5 in the appendix describes the functions of Destination Devices set.

Margins/Tabs/Col Set

This set is used to set or clear tabs and the left and right margins. Table A6 in the appendix describes the functions of the Margins/Tabs/Col set.

Service Set

This set is used to perform various tests on the terminal. Table A7 in the appendix describes the functions of the Service set.

Enhancements Group

This group is composed of the Enhance Video, Define Fields, and Modify Char Set sets of labels. These sets represent the terminal's display enhancements and alternate character set features.

ENHANCE VIDEO Set. This set is accessible directly from the Aids set. It includes the labels for the display enhancements (security field, underline video, inverse video, blink video, and half-bright). It also includes a **SET ENHNCMNT** label which must be pressed after selection of your choice of display enhancements to enable the enhancements. Table A8 in the appendix describes the functions of the Enhance Video set.

DEFINE FIELDS Set. This set enables selection of the field types (alpha/numeric, alpha only, numeric only, numeric format, unprotected, protected, transmit, etc.). Table A9 in the appendix describes the functions of the Define Fields set. (See Forms Group.)

MODIFY CHAR SET Set. This set enables selection of the character set to be assigned to the keyboard keys. The selections are; base set, set A, set B, and set C. Sets @, A, B, and C are assigned character sets on the terminal configuration menus from the available sets (base set, large character set, math set, and line drawing set). Table A10 in the appendix describes the functions of the Modify Char Set set.

Forms Group

The Forms Group consists of field definition, data checking, and character set selection labels. Labels in the Forms group are used for defining forms for data entry applications. This group is described in Section 6.

FIELD DEFINITION Set. The Field Definition Set is used to define certain portions of a form which can be used to hold data entered by an operator and portions of the form that will hold label information sent by the computer.

DATA CHECKING Set. You can select a variety of edit checking features for the data fields used in a form. You can define the type of data in a given field to be alphabetic, numeric, required, justified, etc. Data Checking is described in Section 6.

CHARACTER SELECTION. You can select the character set to be used (Line Drawing, Math, etc.) Refer to Section 6 for additional information.

CONFIG Set

The Config set of labels is used only to select configuration menus. Two types of menus are selectable; terminal and datacomm. Refer to Section 5 and the Reference manual for more information on configuration. The functions of the Configuration set are described in table A12 in the appendix.

User Definable Function Keys

The RETURN key and each function key can be programmed with a character string of up to 80 characters. A type character (L, T, or N) is assigned to the character strings for the function keys and RETURN key. The character string 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 repeatedly-used character string 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 RETURN key cannot be assigned a label.

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 assignment for the RETURN key is determined by the RETURN Def entry in the Terminal Configuration menu. The default character string assignments for the eight function keys consist of two characters each (the Ec character and one lower-case letter). The default type character for all function keys except the RETURN key is "T", as shown in the figure. The default type character for the RETURN key is "N". The default character strings have no preassigned meanings. One use to which they can be put is to transmit them to a computer where they can be interpreted by a program which the user must provide. 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.

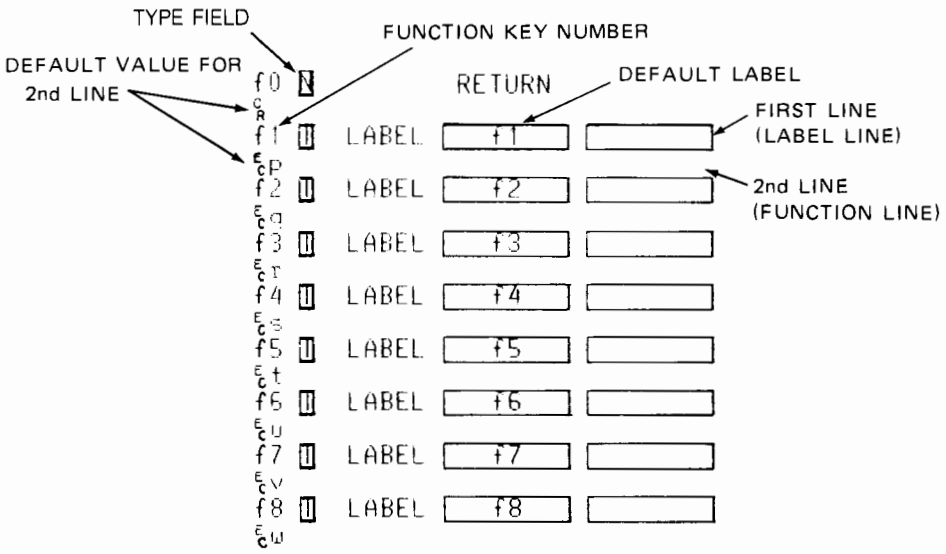


Figure 4-3. User Definable Function Key Menu with Default Values

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 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", the character string will be treated as a block transfer and only if the terminal is in Remote mode.) When Use mode is entered, 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 select the type character (L for local use only, T for transmit only, and N for treatment as though it was entered from the keyboard). Use either the PREVIOUS CHOICE or the NEXT CHOICE function key to select your choice of entry. (Refer to table A15 in the appendix for a description of the functions of each of the function keys in Definition mode.)

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 labels can be entered using any of the display enhancements, including the alternate character sets. The default labels for the keys are the labels f1 through f8.

Then, 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.

The terminal has 16 function keys. However, only the unshifted f1 - f8 function keys can be redefined. The shifted f1 - f8 function keys cannot be redefined. When SHIFT f1 - f8 function keys are pressed, the transmit-only default values of ESCp - ESCw are executed.

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

NOTE

While in the Definition mode, pressing SHIFT AIDS will blank the screen labels.

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 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 since 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 display the formerly displayed set of labels, simply press the USER KEYS key.

NOTE

While in the Use mode, pressing SHIFT AIDS will blank the screen labels.

5

Configuring The Terminal 5

Introduction

The device provided for making terminal configuration changes is a configuration menu. A menu is a list 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 and datacomm configuration menus. This information is available in the Reference manual if you should wish to configure the terminal and do not have the information.

The terminal contains a battery powered portion of memory called non-volatile memory in which the set of configuration values are stored to save them when power to the terminal is shut off. The set stored 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 menus. The terminal configuration menu (enabling selection of terminal characteristics) and the datacomm configuration menu (six menus, each for a different datacomm protocol). One datacomm port is assigned to communicate with the computer, the other port is then automatically assigned to be a printer port.

Descriptions of each type of menu are listed below:

MENU	FUNCTION
`Terminal Configuration`	Contains parameters which apply to both datacomm and local terminal characteristics.
`Datacomm Configuration`	Enables configuration of the datacomm and printer functions. Configuration of the datacomm ports selects many of the datacomm parameters. Additional datacomm parameters are selected using the terminal configuration menu. A different configuration can be given to each port. Four point-to-point protocols are available for selection. Two multipoint protocols are available for port 1.

How To Display A Menu

To display a menu, perform the following procedures:

- Press the AIDS key to display the Primary set of function key labels.
- Press the `config keys` function key to display the Configuration set of function key labels as shown below.

- Press the function key of your choice; the appropriate menu will be displayed with the active values. Table 5-1 lists the function key labels which will be displayed along with their functions. If one of the datacomm function keys was pressed, the menu for the currently active datacomm protocol will be displayed. To access the menu for any other protocol, just press the NEXT CONFIG key until the desired menu is displayed.

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 Aids set of function key labels displayed. If the keyboard is locked or if the configuration is locked, this key has no effect. If an error exists in the set of displayed parameters such as an unacceptable value for one of the parameters, the keyboard bell will sound, the cursor will be positioned at the field in which the error exists, an error message will be displayed in rows 25 and 26 and the configuration menu will remain displayed. To clear the error message, press the RETURN key.
NEXT CHOICE PREVIOUS 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.
DEFAULT VALUES	Displays the default values for the configuration.
POWER ON VALUES	Displays the values stored in non-volatile memory, which become active at power-on time.

Table 5-1. Configuration Mode Function Key Labels (Cont'd)

LABEL	FUNCTION
ACTIVE VALUES	Displays the values which are currently active for the configuration. (The active values might be different from the values stored in non-volatile memory.)
DISPLAY FUNCTNS	Alternately enables and disables Display Functions mode. When enabled, an asterisk is present in the label. This key is used only to make entries on configuration menus and does not affect the selection made using the **DISPLAY FUNCTNS** key which is accessed using the MODES key. Several menus contain fields for which entries cannot be made without entering Display Functions mode. For example, the **Fld Separator** and **Blk Terminator** fields on the Terminal Configuration menu. This key is used only for these type entries.
Config Keys	Ends Configuration mode without saving the displayed values. Any changes made on the menu are lost. Returns to normal operating mode with the Configuration set of function key labels displayed.
NEXT CONFIG	(This label is used only when one of the datacomm configuration menus is displayed.) Displays the configuration menu for the next type of protocol. Menus are displayable for six protocol types.

Configuring

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

- 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.
- 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.
- If the choices are not restricted to a system-defined list, enter the desired value from the keyboard.
- To store the new menu values in non-volatile memory after you have made all desired changes, press the **SAVE CONFIG** function key.

When the menu values are saved, if any of the new values are unacceptable, the bell sounds and an error message is displayed in screen rows 25 and 26 and the cursor is moved to the field containing the error. To clear the error message, press the RETURN key. Then, the entered value must be changed to an acceptable value before the configuration will be accepted by the system.

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

The Terminal Configuration menu (shown in figure 5-1) contains a number of datacomm selections in addition to the local terminal selections listed below. Refer to the Reference manual for a description of all menu fields.

- Local echo.
- Caps lock.
- End-of-line wraparound.
- Space overwrite.
- Enable or disable terminal self test.
- Selection of primary character set, designated set @.
- Format Mode.
- Selection of the alternate character set to be designated set A, set B, or set C.
- Selection of the forms cache size.

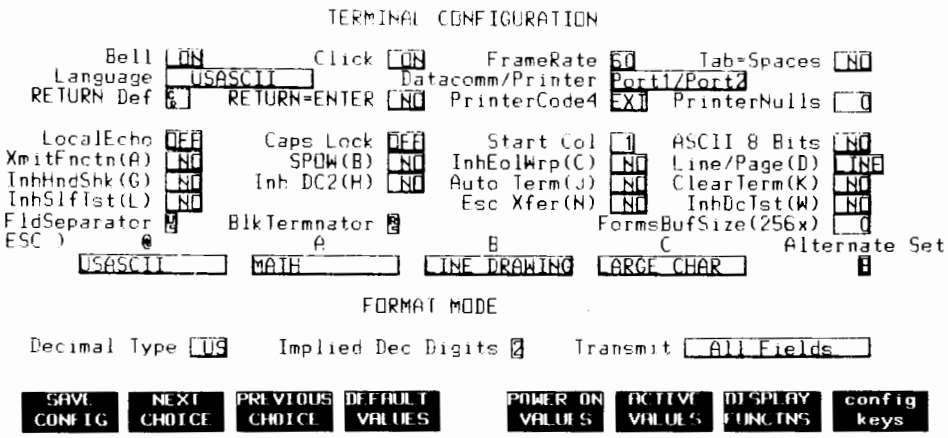


Figure 5-1. Terminal Configuration Menu Showing Default Values

Datacomm Configuration

Six different datacomm configuration menus are available for configuration of the two datacomm ports. All fields on the menus are listed and described in the Reference manual. Figure 5-2 illustrates one of these menus. Each of the following protocols is represented by two menus, except multipoint which is represented by one menu since it is only available on port 1:

- Full duplex hardwired (default selection).
- Full duplex modem.
- Half duplex mainchannel.
- Half duplex reverse channel.
- Asynchronous multipoint
- Synchronous multipoint

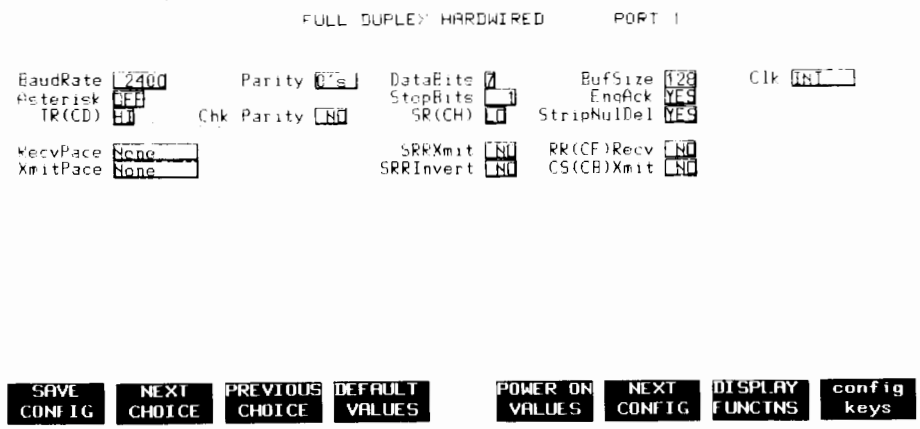


Figure 5-2. Typical Default Datacomm Configuration Menu Showing Default Values

6

Using Your Terminal By Itself 6

The terminal can store approximately 8,000 characters 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 and design forms. Once you have been introduced to the basic terminal, later sections will describe how to use the terminal with a computer and with a printer.

Status Readouts

Several items of useful information are displayed on the screen at all times while the terminal is on. This information is displayed in rows 25 and 26 at the bottom of the screen between function key labels f4 and f5 (figure 6-1). The information consists of the screen row and column in which the cursor is positioned, two asterisks for indicating status information on the two datacomm ports, and IC for indicating Insert Character mode.

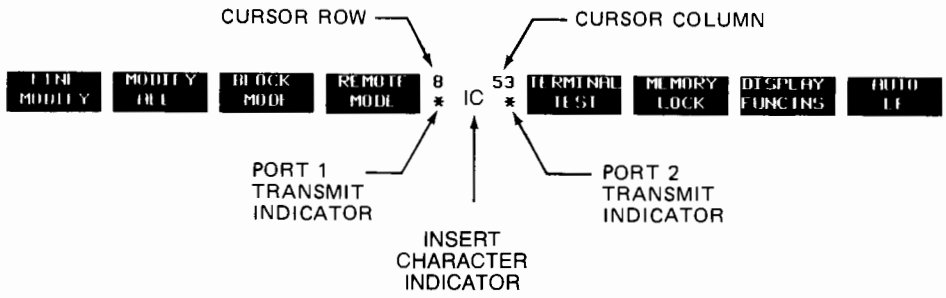


Figure 6-1. Status Indicator Locations

Entering Data

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

EXAMPLE

Enter the following name and date:

John Doe June 1980

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 "T" to the entry in the previous example, move the cursor under the "D", press the INS CHAR key, and type "T" and a space. 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 Margins/Tabs/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 using the backtab key in the numeric pad or 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.

CLEARING TABS. You can clear individual tabs by moving the cursor to the tab position, accessing the Margins/Tabs/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 performed, the margins are set at columns 1 and 80 of display memory. You can set new margins as described below.

LEFT MARGIN. Move the cursor to the desired left margin setting. With the Margins/Tabs/Col labels displayed, press the `LEFT MARGIN` key.

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

The terminal will beep when you are eight characters 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.

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

EXAMPLE

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

With the Margins/Tabs/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 by a hard reset). They are cleared by pressing the CLR ALL MARGINS function key.

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

This is an example using margins to control
data entry.
```

Moving A Block Of Text

You can move blocks of text using Memory Lock mode.

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.

8. Use the ROLL UP key until the cursor is in the first line of paragraph 3.

9. Turn off Memory Lock mode and press the ↖ key. The paragraphs should now be in order.

The display should appear as follows:

(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 half bright, underline, blinking, security video, or inverse video or any combination of these.
- ALTERNATE CHARACTER SETS - The keyboard can be used to select characters from Line Drawing, or other special character sets.

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.
- DATA CHECKING - Data can be checked to determine the field type, such as unrestricted fields, alphabetic fields, integer fields, and signed/implied decimal fields.

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 additional information on using these features.

Using Display Enhancements

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

- Security Video
- Inverse Video
- Underline Video
- Blink Video
- Half Bright

The various display enhancements are enabled and disabled from the keyboard by pressing the AIDS key and the **enhance video** function keys, in sequence. This changes the function key labels to the following:

Table 6-1 lists these function key labels along with their functions.

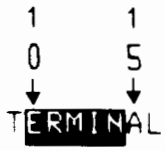
Table 6-1. Enhance Video Set

LABEL	FUNCTION	LABEL	FUNCTION
define fields	Selects the Define Fields set of Enhancement group function key labels.	INVERSE VIDEO	Inverts the intensity of the background and all characters in the field. The characters are made dark on a light background instead of the normal light characters on a dark background.
modify char set	Selects the Modify Char Set of Enhancement group function key labels.	BLINK VIDEO	Causes characters in the field to blink on and off.
SET ENHNCMNT	Activates the currently selected state (whether on or off) of every enhancement. This key must be used to activate or deactivate any enhancement.	UNDERLINE VIDEO	Underlines all characters (including blanks).
SECURITY VIDEO	Characters in a field defined as a security field are stored in memory but are not displayed. Their place on the screen is left blank. If the field is later returned to the unsecure state, the characters will be displayed.	HALF BRIGHT	Causes characters in the field to be displayed at half intensity (grey).

EXAMPLE

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

1. Press the AIDS key to display the primary set of function keys, then press the `enhance video` (f5) function key which displays the video enhancement labels.
2. Press the `INVERSE VIDEO` (f5) and `BLINK VIDEO` (f6) function keys to enable these enhancements. When enabled, an asterisk is present in these key labels.
3. Position the cursor at column 10 in line 5.
4. Press the `SET ENHANCMT` (f3) function key. The selected enhancements take effect when characters are contained in display memory. Notice, the enhancements begin at the cursor position and continue through the end of the line (or through the next subsequent column in which another display enhancement begins.
5. Position the cursor at column 15 in line 5.
6. Press the `SET ENHANCMT` (f3) function key.
7. Type the word `TERMINAL` beginning in column 9 of line 5. It should appear as shown below.



Using Alternate Character Sets

Your terminal can display up to four different character sets. Each character set can contain up to 128 characters or symbols. In addition to the Base and Line Drawing sets, which are standard, the Large Character and Math sets are also available as options along with being able to create character sets tailored for special applications. (For additional information on each of these character sets, refer to Appendix C.)

Switching from one character set to another can be done on a character-by-character basis. For example, a character from the Line Drawing character set can be displayed next to characters from the base set. This is done by defining one or more character positions in a line to be from alternate character sets.

NOTE

The following discussion assumes that the terminal is configured in its default state with the standard USASCII set defined as the Base set (character set " @ "), and the Line Drawing set defined as alternate set "B".

To use the optional character sets, first select the character set to be used as the alternate. Press the AIDS key, define fields, and the `modify char set` function keys, in sequence. This displays the following function keys and allows you to select your desired character set. (Refer to table 6-2 which lists these function keys and their function.)

Table 6-2. Modify Character Set

LABEL	FUNCTION
define fields	Displays the Define Fields set of labels.
enhance video	Displays the Enhance Video set of labels.
CHANGE TO BASE	Selects the base character set to be the alternate character set which is used from the cursor position to the end of the line or the start of the next enhancement if one is located between the cursor position and the end of the line.
CHANGE TO SET A	Selects character set A, as defined on the Terminal Configuration menu, to be the alternate character set and,also, the set used from the cursor position to the end of the line or to the start of the next enhancement, if one is located between the cursor position and the end of the line.
CHANGE TO SET B	Selects character set B, as defined on the Terminal Configuration menu, to be the alternate character set and, also, the set used from the cursor position to the end of the line or to the start of the next enhancement, if one is located between the cursor position and the end of the line.
CHANGE TO SET C	Selects character set C, as defined on the Terminal Configuration menu, to be the alternate character set and, also, the set used from the cursor position to the end of the line or to the start of the next enhancement, if one is located between the cursor position and the end of the line.

To determine which character set corresponds to @, A, B, C, generate the Terminal Configuration menu by pressing the AIDS key, the config keys (f8) function key, and the terminal config (f5) function key, in sequence. The Terminal Configuration menu is then displayed giving you the character sets corresponding to each set.

EXAMPLE

This example defines the USASCII set as the alternate character set.

1. Press the AIDS key, then press the config keys (f8) and the terminal config (f5) function keys, in sequence. The Terminal Configuration menu should be displayed.
2. Move the cursor to the field in which set B (the alternate set) begins.
3. Press the NEXT CHOICE (f2) function key until USASCII is displayed.

Defining Fields in Format Mode

In Format Mode the cursor automatically moves to the start of the first unprotected field in the form. Therefore, you can only enter data into those portions of the display screen which lie within unprotected or transmit-only fields.

Protected Fields

Fields can be protected so that displayed data cannot be overwritten or sent to a computer. When the terminal is placed in Format Mode all character positions on the screen are protected except those fields that have been specifically defined as unprotected or transmit-only.

Unprotected Fields

Data can be written into unprotected fields in the normal manner. After reaching the end of an unprotected field, the cursor moves to the beginning of the next unprotected field. The TAB◄ and TAB► keys can be used to move the cursor to the beginning of the previous unprotected field.

Transmit-Only Fields

The cursor never automatically moves to a transmit-only field; the TAB◄ and TAB► keys skip over any transmit-only fields. When a character is entered into the final position of a transmit-only field, the cursor automatically advances to the start of the next subsequent unprotected field.

NOTE

When defining an unprotected or transmit-only field, you may specify a field type (which has a set of implied attributes) and some explicit field attributes. Some of these attributes are checked as each data character is entered into the field, others are checked when the cursor is ready to leave the field, and still others are checked when the data in the form is to be transmitted to the host computer. (Refer to Table 6-3 for a list of the available attributes by field type and the valid input characters for each.)

Table 6-3. Attributes by Field Type

FIELD TYPE	VALID INPUT CHARACTERS
ALL CHARACTERS	All characters.
ALPHABETIC	Upper/lowercase alphabetic characters and spaces.
AUTO-UPSHIFT	All characters.
ALPHANUMERIC	Upper-lowercase alphabetic characters, digits, spaces, periods, dashes, commas, and plus signs.
INTEGER	Digits and spaces.
SIGNED DECIMAL	Digits, minus sign, plus sign, decimal point or comma, and spaces.
IMPLIED DECIMAL	Digits, plus sign, minus sign, decimal point or comma, and spaces.
CONSTANT	None.
INTEGER FILL	Digits and spaces.
SIGNED DECIMAL FILL	Digits, minus sign, plus sign, decimal point or comma, and spaces.
IMPLIED DECIMAL FILL	Digits, plus sign, minus sign, decimal point or comma, and spaces.
NUMERIC	Digits, spaces, periods, commas, minus sign, and plus sign.

For further information on field attributes, refer to Section 5 of the Reference Manual.

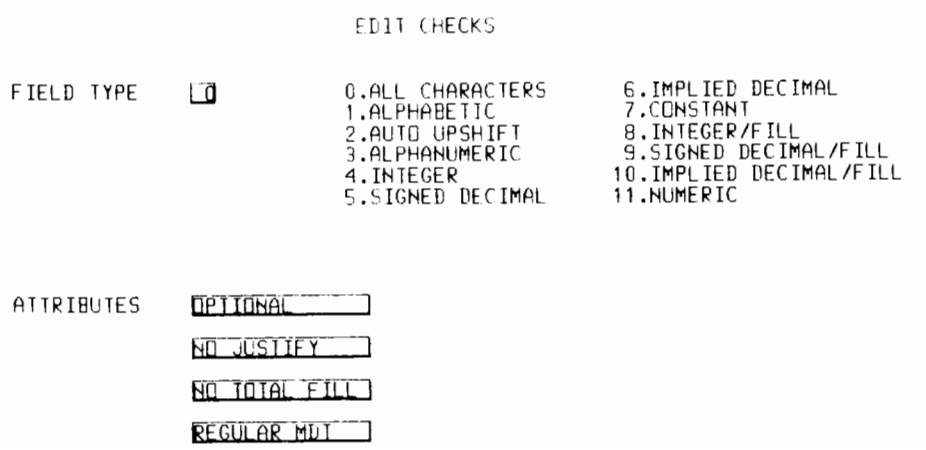
Data Checking

While in Format Mode the terminal can test data to make sure that the right field type is entered. If an invalid character is typed, the character is not entered. The terminal will beep and refuse to accept further entries until the error is cleared by pressing the RETURN key. You then continue entering data. The fields are defined by pressing the AIDS key, then pressing the **define fields** (f6) and the **define edits** (f6) functions keys, in sequence.

EXAMPLE

This example specifies the field type, the attributes used, and a menu, then defines column 1 through 9 as an unprotected field.

1. Press the AIDS key, then press the **define fields** (f6) and the **define edits** (f6) function keys, in sequence. The following **define edits** function key labels and menu are displayed:



SAVE EDITS	NEXT CHOICE	PREVIOUS CHOICE	DEFAULT EDITS				

2. Press the TAB◄ and the TAB► keys to access any of the unprotected fields (field type and attributes) in the menu.

3. Press the NEXT CHOICE (f2) or the PREVIOUS CHOICE (f3) function keys to select the desired field type or attributes.

4. Press the save edits (f1) function key to enable the field type and attributes you selected. When you do this, the menu disappears from the screen and the function key labels change back to the define fields set, as follows:

enhance video	START UNPROTCT	START XMIT FLD	STOP FIELD		START EDITS	define edits	modify char set	FORMAT MODE

5. Move the cursor to column 1 of line 3 in which the unprotected field begins.

6. Press the START UNPROTCT (f2) function key. If you want the field to include edit checks, press the START EDITS (f5) function key.

7. Enter a space for each character that you wish the field to accommodate through column 9.

8. Press the STOP FIELD (f4) function key.

Tables 6-4 and 6-5 list the function key labels for the define fields and the define edits keys along with their functions.

Record Mode

If in local mode, record mode copies the contents from display memory to the selected "to" device. To initiate record mode, press

AIDS , device control , device modes , RECORD MODE *

An asterisk will appear in the function key label to indicate that record mode is enabled. While in record mode, the keyboard is disabled except for the BREAK , RESET , and "RECORD MODE" keys. Pressing RESET , or SHIFT , CTRL , RESET , or "RECORD MODE" function key will terminate record mode.

Table 6-4. Define Field Set

LABEL	FUNCTION
enhance video	Displays the Enhance Video set of labels.
START UNPROTECT	Defines all character positions between the cursor and either the start of the next field, a "stop field" marker, or the end of the line (whichever comes first) as an unprotected field. Any type of character can be entered in an unprotected field. Data in unprotected fields can be transmitted to the computer in Remote mode. (A transmit-only field is started using the START XMIT FLD key.) An unprotected field is ended by either a "stop field" marker (produced with the STOP FIELD key) or the end of the line.
START XMIT FLD	Defines all character positions between the cursor and the start of the next field, a "stop field" marker, or the end of the line (whichever comes first) as a transmit-only field. In Remote mode, data in a transmit-only field is transmitted to the computer along with data in any unprotected field. In Format mode, the TAB keys skip over transmit-only fields. Data can be entered in a transmit-only field by positioning keys. The STOP FIELD key must be used to end a transmit-only field. Transmit-only fields can be further defined as alpha-numeric, alpha-only, numeric only, or any combination of these fields.
STOP FIELD	Defines the end of any unprotected or transmit-only type field (by generating a "stop field marker").
STARTS EDITS	Defines the start of each edited field.
define edits	Displays the field definition menu.
modify char set	Selects the Modify Char Set set of Enhancement group function key labels.
FORMAT MODE	In this mode, the fields (defined using the Define Fields function key label set) are made active. When Format mode is entered, all memory is protected unless specifically defined otherwise using the Define Fields function keys. Normal procedure is to define the display enhancements, field, and character sets, then enter Format mode and enter data into the fields. An asterisk in the FORMAT MODE label indicates the mode is active. Alternate presses of the associated function key activate and deactivate the mode.

Table 6-5. Define Edit Set

LABEL	FUNCTION
save edits	Enables the desired field type and explicit attributes.
NEXT CHOICE	Allows cycling forward or backward through the values of each of the unprotected fields to select the choice for display in that field.
PREVIOUS CHOICE	
DEFAULT VALUES	Displays the default values for the field type and attributes.

Forms Cache

Forms may be designed and stored in display memory for later retrieval and use. The size of forms cache is selected in 256 byte blocks from a field in the terminal configuration menu or from the escape **&q** sequence.

To select the size of forms cache using terminal configuration, initiate the following:

AIDS , config keys , terminal config

Tab over to the **FormsBufSize (256x)** field and enter the amount of 256 byte blocks desired (0-95) and then press **SAVE CONFIG**. Note that the size of forms cache is dependent upon the terminal's datacomm configuration, presence of an internal printer, and the size of random access memory (RAM) available.

Forms cache size can also be selected using the following escape sequence:

Esc & q 4 te f <number of 256 byte blocks> L

Once the size of forms cache has been allocated, forms can be designed, numbered, accessed, transferred, purged, and verified using the escape sequences listed under **FORMS CACHE** in Appendix B. Usage of forms cache is discussed in the Reference Manual.

7

Using Your Terminal With A Computer 7

The Terminal 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 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 port. Essentially, the procedure assigns one of the terminal's datacomm ports to be used to communicate with a remote computer. In addition you can select a variety of protocols and operating parameters. The remaining terminal port can then be used to interface a printer if desired.

Selecting Operating Modes

The terminal can be operated in several modes when connected to a computer. These modes are selected using the MODES key. Among the modes that can be selected are:

- REMOTE/LOCAL
- BLOCK/CHARACTER
- AUTO LF

REMOTE. 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 turn on REMOTE MODE (the function label will produce an asterisk).

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 AIDS, **config keys**, and **terminal config** keys. 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.

When the terminal is in multipoint operation, Block mode will be active even when the asterisk is not present in its label.

AUTO LF. 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. Unless the computer system or application program to which your terminal is connected does not accept lower-case letters, Caps Lock mode should not be selected. Caps Lock is selected on the terminal configuration menu. To access the menu, press the AIDS config keys, and terminal config 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.

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 used in configuring the datacomm port.

Sending Data To The Computer

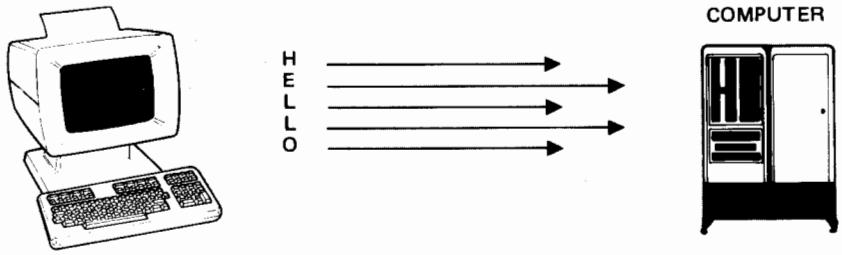
Data can be sent to the computer from the keyboard in either Character or Block mode. Block mode enables editing the data before sending it. Modify mode is available for editing data before transmission while operating in Character mode.

Character Mode

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

MODIFY MODE. 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 like 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 MODES and LINE MODIFY keys. To enter Modify All mode, press the MODES and MODIFY ALL keys. The MODIFY ALL label is displayed with an asterisk 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, not transmitting any data to the left of a selected column. It works as follows. Under certain conditions, a "logical start of text" pointer is set for each line of text by the terminal firmware, at the first column in which a character is entered. Then, when the user presses 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.

The conditions required to generate a "logical start of text" pointer are as follows:

1. The terminal may be in any mode (Remote, Local, Block, Format, or Character mode).

2. The first character entered on a line must be an alphanumeric character, a space, or a backspace. (The cursor control keys have no affect.)

3. At the time the line is entered, it must be the bottommost non-blank line in display memory.

Example:

Assume that the computer prompts you with a colon (:) on the terminal and that you enter a BUILD command to this prompt:

```
:BUILD TF;REC=128,1,F,BINARY;NOCCTL;DEV=DISC;CODE=0;DISC=1023,8,1
└Computer Prompt          └──── Your Response
```

The logical start-of-text pointer for this line (at the bottom of memory) does not exist until you enter the B in the BUILD command, at which time the pointer is set to column 2.

When Line Modify or Modify All are enabled in character mode, the logical start-of-text pointer is used as the starting point for data transmission when the RETURN key or ENTER key is pressed. If the line has no logical start-of-text pointer, the Configuration Start Column value is used to determine the starting point of the data transmitted.

If you are in character mode, there may be times you will find yourself transmitting a command string to the host computer and receive an error message in response. To correct this command string without retyping the whole line again, you simply enable the Line Modify mode.

Line Modify mode permits you to switch temporarily to Modify All mode, select any line of display memory, edit that line, and transmit it.

Example:

Assume you entered a BUILD command, pressed RETURN and the system came back with an error message.

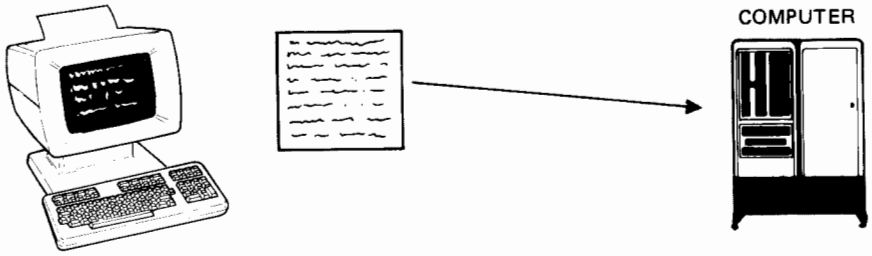
```
:BUILD TF;REC=128,1,F,DINARY;NOCCTL;DEV=DISC;CODE=0;DISC=1023,8,1
                         ^
EXPECTED "ASCII" OR "BINARY".   (CIERR 274)
```

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, and there was no need to retype the whole line.

To free the start-of-text pointer, simply home the cursor above the line you want to begin the deletion and clear display. This will remove the pointer from all the lines below the character marked by the cursor through the last character in memory.

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. To enter Block mode, press the MODES and BLOCK MODE keys. An asterisk is present in the BLOCK MODE label is displayed full-bright 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. When the terminal is in Remote mode, data is normally displayed on the screen as it is received.

To The Integral Printer Or An External Device

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, an external device, or both. You can do this using two methods; logging from the top of display memory or logging from the bottom (figure 7-1). When data is logged from the top, the top line in display memory is routed to the destination device when it is crowded off the top of memory by lines added at the bottom. When bottom logging is used, a line is routed to the destination device when the cursor leaves the line to begin a new line (linefeed). If top logging is used, the data remaining in the memory when communication with the computer is completed is left uncopied to the destination device. To do either top or bottom logging, proceed as follows:

- Select the destination(s). You can select as many destination devices as you like. The selectable destination devices consist of the integral printer or an external device (which must be connected to port 2). When selected, the label for a device contains an asterisk.
- Display the Device Modes set of labels, pressing the **device control** key followed by the **device modes** key.
- Select either LOG TOP or LOG BOTTOM.

Record Mode

If in Remote Mode, record mode copies data from the datacomm line to the selected "to" device. To initiate record mode, press

AIDS, **device control**, **device modes**, **RECORD MODE**.

An asterisk will appear in the function key label to indicate that record mode is enabled. While in record mode, the keyboard is disabled except for the BREAK, RESET, and RECORD MODE keys. Pressing RESET, or SHIFT, CTRL, RESET, or RECORD MODE function key will terminate record mode.

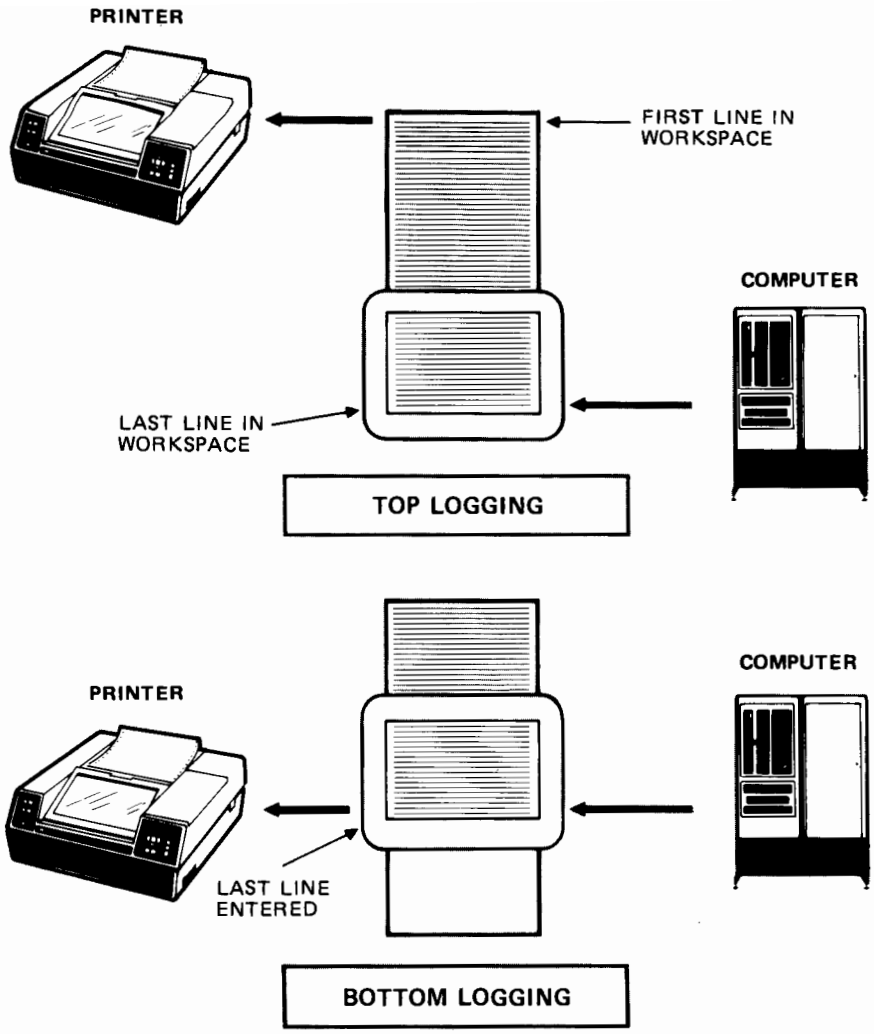


Figure 7-1. Data Logging.

Terminal Bypass

Data may also be copied from a computer through the terminal's bypass feature to an external printer. Terminal Bypass is used only when the terminal is configured for multipoint. Terminal Bypass allows a host computer to send data transparently through the terminal to the external printer (figure 7-2).

Configuring Terminal Bypass

To configure terminal bypass from configuration menus, perform the following sequence:

1. Press AIDS, `config keys`, and `terminal config` function keys.

2. Tab over to the `Datacomm/Printer` field, press `NEXT CHOICE` until `TermBypass` is selected, and then press `SAVE CONFIG`.

3. Press `config keys` and `NEXT CONFIG` function keys until the `MULTIPOINT ASYNC` or `MULTIPOINT SYNC` menu is selected.

4. Tab over to the `PrtrBufSize` field. Select the desired printer buffer size. The printer buffer size may be from 128 to 2048 bytes.

5. Tab over to the **PrinterID** field. A printer ID is necessary to identify the external printer as the recipient of the data instead of the terminal. The printer device ID code may be a decimal ASCII code from 32 to 124. Enter the desired printer ID code.

6. Tab over to the **PrtrNumBufs** field and select the desired number of printer buffers; the buffer range may be from 2 to 16.

7. Press **SAVE CONFIG**. The terminal bypass feature is now ready for use.

Sending Data to an External Device

The computer automatically sends data to the external device (printer) once the above configuration requirements are met. Data may also be sent by the external device to the terminal for storage. The next time the computer requests data from the external device, the stored data will be sent to the computer automatically.

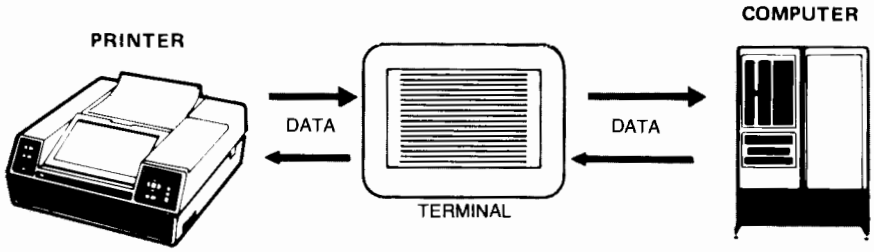


Figure 7-2. Terminal Bypass Feature

8

Using Your Terminal With Other Devices 8

You can use your terminal to copy data from display memory to the integral printer or to an external device. Two copy methods can be used; copying data after all data entry has been completed or copying while data is being entered into display memory. The latter method is called data logging. The procedure is similar for both methods.

Procedure

The steps for copying data by either method are as follows:

- Press the AIDS key and then select **device control**.
- Select the destination(s). You can select one or two destination devices. The selectable destination devices are the integral printer and the external device. When selected, the display label for the device contains an asterisk.
- With the **device control** labels displayed, press **device modes**. Then select either **LOG TOP** or **LOG BOTTOM**. (The label will produce an asterisk when you make a selection.) Additional information on logging is given in Section 7.

  1. When data is logged from the top, the top line in the display memory is routed to the destination device when it is crowded off the top of memory by lines added at the bottom. The data remaining in the memory when communication with the computer is completed is left uncopied to the destination device.

  2. When bottom logging is used, a line is routed to the destination device when the cursor leaves the line to begin a new line (linefeed).

This completes the setup procedure; at this point, you can begin to enter data.

- If data logging is not used, display the Device Control set of labels by pressing the device control key. If you wish to skip a line or a page on the destination device before beginning printing, you can do so by pressing the **ADVANCE LINE** or **ADVANCE PAGE** key. (For the integral printer, **ADVANCE PAGE** works only in Report or Metric mode. Report and Metric modes are described in the Reference Manual.) Then select the amount to be printed by pressing the **COPY ALL**, **COPY PAGE**, or **COPY LINE** key. **COPY ALL** copies all data in the display memory between the line containing the cursor and the end of the memory.

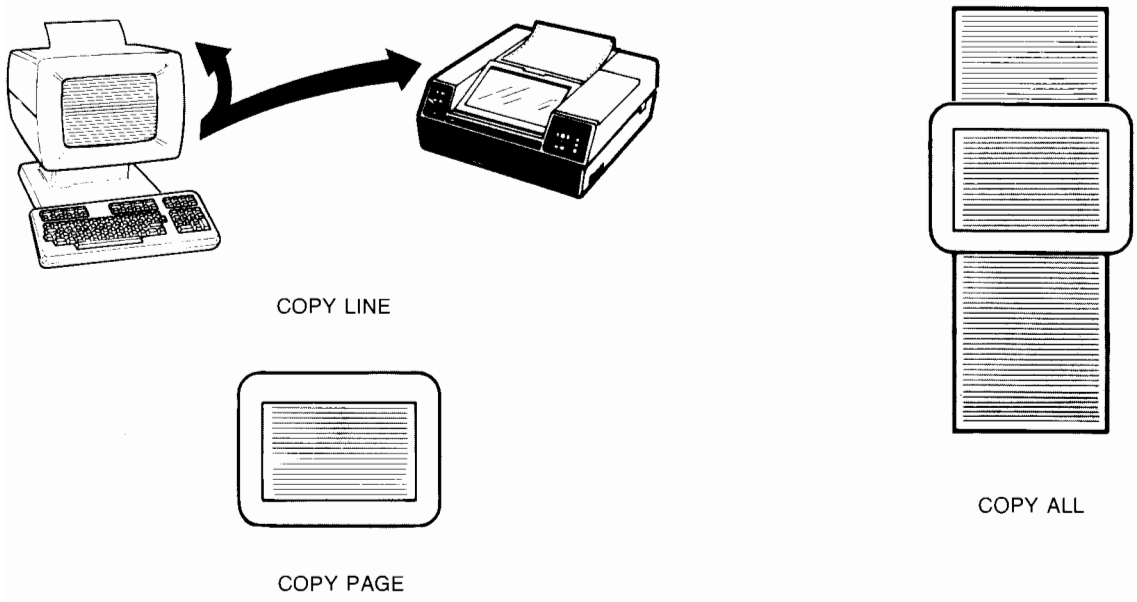


Figure 8-1. Copy Operations

9

Maintenance 9

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. 92160A.

1 box (24 rolls) Thermal Paper (black), HP part no. 92160B.

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 9-1). An illustration of the correct paper position and flow is embossed on the underside of the cover.

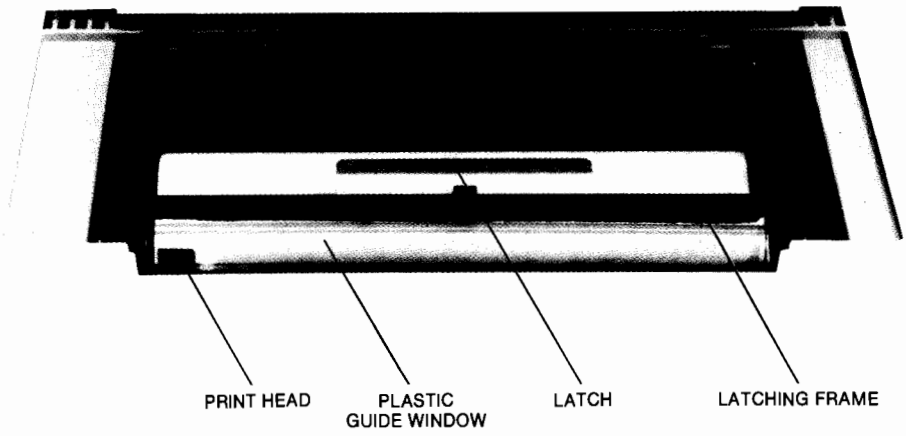


Figure 9-1. Printer Mechanism.

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 used 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 9-1) 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 9-2). 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 number:

HP 2624B 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). If the terminal is equipped with a printer and a Configuration menu is on the screen, you can enter $^{E}_{c}$ 0 from the keyboard to print a copy of the completed menu.

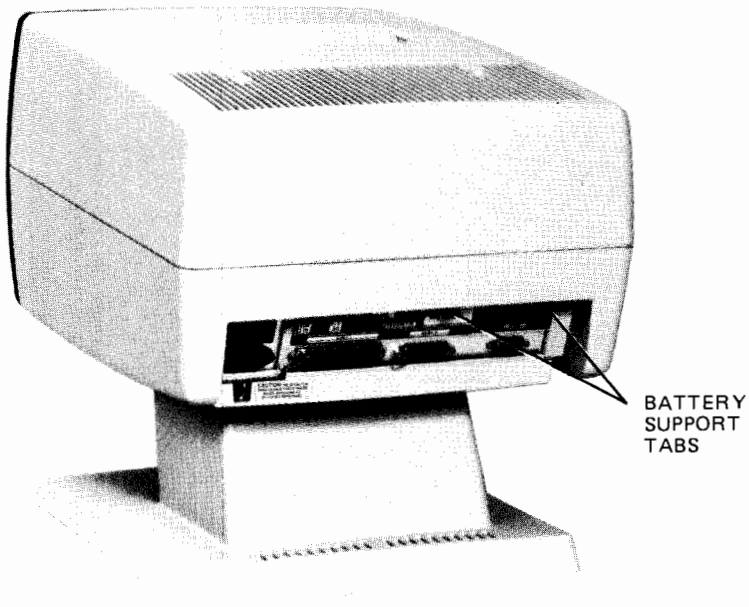


Figure 9-2. Battery Support Location.

To replace the battery, perform the following procedures:

- If the terminal power is off, turn it on and wait till the terminal is ready to operate.
- Squeeze the tabs (figure 9-3) 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.
- Remove the old battery from the support.
- 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 -).
- 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.

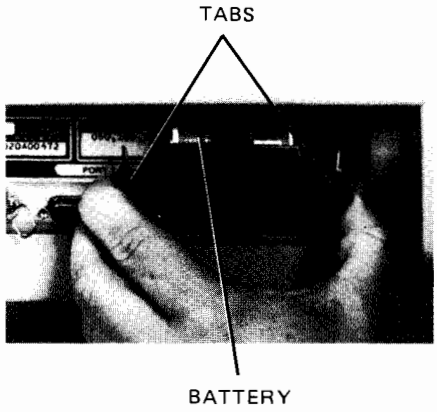


Figure 9-3. Battery Replacement.

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 Rd., Croton-on-Hudson, N.Y. 10520).

10

In Case Of Difficulty 10

This section contains explanations of error messages, 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 10-1. Printer test error messages and their meanings are listed later under the heading "PRINTER TEST".

Table 10-1. 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 Reference Manual for more detailed information.
`This function LOCKED` `Press RETURN to clear`	The function you have attempted to perform has been "locked" programmatically.
`Illegal for edit type: ALPHABETIC` `Press RETURN to clear`	With format mode enabled, you attempted to enter an illegal character into an "**alphabetic**" field.
`Illegal for edit type: ALPHANUMERIC` `Press RETURN to clear`	With format mode enabled, you attempted to enter an illegal character into an "**alphanumeric**" field.
`Illegal for edit type: CONSTANT` `Press RETURN to clear`	With format mode enabled, you attempted to alter a "**constant**" field.
`Illegal for edit type: DECIMAL` `Press RETURN to clear`	With format mode enabled, you attempted to enter an illegal character into a "**decimal**" field.
`Illegal for edit type: IMPLIED DECIMAL` `Press RETURN to clear`	With format mode enabled, you violated the format restrictions in an "**implied decimal**" field.
`Illegal for edit type: INTEGER` `Press RETURN to clear`	With format mode enabled, you attempted to enter an illegal character into an "**integer**" field.
`Illegal for edit type: NUMERIC` `Press RETURN to clear`	With format mode enabled, you attempted to enter an illegal character into a "**numeric**" field.
`Illegal for edit type: REQUIRED` `Press RETURN to clear`	With format mode enabled, you attempted to transmit a form to the host computer (by pressing ENTER, for example) without having entered data into all "**required**" fields.
`Illegal for edit type: SIGNED DECIMAL` `Press RETURN to clear`	With format mode enabled, you violated the format restrictions in a "**signed decimal**" field.

Table 10-1. User Error Message Meanings (Continued)

Illegal for edit type: TOTAL FILL **Press RETURN to clear**	With format mode enabled, you attempted to transmit a form to the host computer (by pressing ENTER, for example) without having completely filled all "**total fill**" fields.
Integral printer error **Press RETURN to clear**	Something is wrong with the integral printer. It may just be out of paper or the metal latch (under the plastic printer lid) may not be pressed down securely.
Invalid config **Press RETURN to clear**	In one of the data comm configuration menus, you specified parity (Even, Odd, 0's or 1's) with the **DataBits** field set to "**8**". You must either reset the **Parity** field to "**None**" or the **DataBits** field to "**7**". Other invalid configuration entries may cause this error to occur.
Line full **Press RETURN to clear**	By including implicit escape sequences (generated using the "**enhance video**" and/or "**modify char set**" function keys), you have created a line that contains more than 240 characters.
Memory full **Press RETURN to clear**	The "**overflow protect**" memory lock feature is enabled and display memory is full. You must disable the memory lock feature or delete some data before any more data can be accepted into display memory. If you disable memory lock, you may wish to first enable top data logging (if there is an integral or external printer available) to maintain a hard copy data trail of all lines forced off the top of display memory.
No "to" device **Press RETURN to clear**	You attempted to perform a device-to-device data transfer without having first defined a "to" device.
Use NEXT or PREVIOUS key **Press RETURN to clear**	You attempted to change the configuration field marked by the cursor by entering data through the keyboard. The field can only be changed by using the "**NEXT CHOICE**" and "**PREVIOUS CHOICE**" function keys.
Value out of range **Press RETURN to clear**	The configuration menu field marked by the cursor contains a value that is not within the allowed range.

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 which may not be desireable. If the current configuration isn't stored in non-volatile memory and you wish to save it, you may want to check the configurable items to ensure that the configuration is compatible with the task you are trying to perform before performing a hard reset. 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 and a hard reset resets the active configuration values to the values stored in non-volatile memory. Also, on a hard reset all data in display memory is destroyed. For these reasons, you may not wish to 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. Except for datacomm configuration values, currently active configuration values are preserved during a soft reset; the values in non-volatile memory do not become the active values as is the case when a hard reset is performed.

- The keyboard bell rings.
- Any error messages present are cleared.
- The keyboard is unlocked.
- If the Display Functions capability is active, it 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.

Hard Reset

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

- All data in 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 on the keyboard.
- All tabs are cleared except the left margin.
- 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. Metric mode selection.
  3. Log top or log bottom selection.

Self Tests

Two tests are available to the user, a terminal test, for checking out the terminal for proper operation, and a printer test for checking out the integral printer only.

Figure 10-1. Terminal Test Pattern

Printer Test

The printer test checks out only the integral printer. To initiate the test, press the following keys, in sequence: AIDS, **service keys**, and **INT PRT TEST**. If the test results are satisfactory, a printer test pattern which includes all the characters the terminal can produce is printed out (figure 10-2). If the test is unsatifactory, an error message, either **INTEGRAL PRINTER ERROR** or **PRINTER** 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 10-2. Printer Test Pattern.

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: AIDS, **service keys**, and **TERMINAL TEST**.
2. Press the MODES key followed by the **TERMINAL TEST** function key.
3. Press the ESC key followed by the "z" key.

If the test is successful, indicating the terminal is operating correctly, a typical test pattern (figure 10-1) will appear on the screen. If an error occurs during the test an error message will be displayed indicating what the failure was. Refer to the "How to Get Help" paragraph at the end of this section if an error message occurs.

How To Get Help

If the terminal doesn't complete the terminal test correctly or an error message occurs, 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

LABEL	FUNCTION

Table A1. MODES KEY SET

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 *	Similar to LINE MODIFY except that Modify All mode is not ended by the ENTER or RETURN key. When Modify All mode is active, an asterisk is present in the label. Pressing the MODIFY ALL function key while the mode is active ends the mode and removes the asterisk from the label.
BLOCK MODE *	The label is used only in Remote mode. When active an asterisk is 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 an asterisk is present in the label, REMOTE is selected. When an asterisk is absent, it 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 are displayed on the screen.
MEMORY LOCK *	Applies only when the MEMORY LOCK function key is pressed. Operates in two modes; overflow protect and display lock. Overflow Protect. When Memory Lock mode is activated in the first line of the screen, data can be entered to the end of memory; then, when the end of memory is reached, no more data is entered and the bell sounds.
	Display Lock. Invoked by activating Memory Lock mode; deactivated by leaving Memory Lock mode. When Display Lock mode is entered, all data between the first line displayed and the line in which the cursor is located 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 and 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 below the frozen area of the screen are rolled up behind the frozen area. The lines of data which were rolled up off the screen are inserted in memory preceding the first line of frozen data.
DISPLAY FUNCTNS *	Applies only when the DISPLAY FUNCTNS function key is pressed. In this mode, 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. However, when a carriage return (CR) is displayed, both a CR and linefeed are performed.
AUTO LF *	Generates a line feed with every carriage return (RETURN key).

*Note: Labels in the first column which are marked with an asterisk have a toggling action. If the mode controlled by the label is inactive, it can be activated by pressing the function key; if it is active, it can be deactivated by pressing the function key. When the mode is active an asterisk is present in the displayed function key label.

Table A2. AIDS KEY SET

LABEL	FUNCTION
device control	Displays the first of two sets of labels for transferring data to one or more of the following: the integral printer, or an external device. The other sets are accessible from the first set.
margins/ tabs/col	Displays a 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.
service keys	Displays the set of service labels which allow the following selections: • Power-on test. • Optional ROM test. • Terminal test. • Identify ROMs used in terminal. • Datacomm test. • Integral printer test.
enhance video	Displays the first of three sets of enhancements labels which represent the terminal's display enhancements and alternate character set selection.
define fields	Displays a set of field enhancements labels.
config keys	Displays the configuration function key labels for selecting the following characteristics: • Characteristics for the terminal configuration. • Characteristics for the two data communication ports.

Table A3. DEVICE CONTROL SET

LABEL	FUNCTION
device modes	Displays the Device Modes set of labels.
"to" devices *	Displays the Destination Devices set of labels.
ADVANCE PAGE	Provided either the integral printer (with Report or Metric mode selected) or the external device has been selected as a destination, this key causes the printer or device to skip to the top of the next page.
ADVANCE LINE	Provided either the integral printer or an external device is selected as the destination device this key causes the printer or device to skip the next line, leaving it blank.
COPY ALL	Provided a destination has been selected, all contents of memory, starting with the line in which the cursor is positioned, are copied to the selected device(s).
COPY PAGE	Provided a destination has been selected, all lines in the memory which are displayed on the screen, starting with the line in which the cursor is positioned are copied to the selected device(s).
COPY LINE	Provided a destination has been selected, the line in which the cursor is positioned is copied to the selected devices(s)

*Note: Labels in the first column which are marked with an asterisk have a toggling action. If the mode controlled by the label is inactive, it can be activated by pressing the function key; if it is active, it can be deactivated by pressing the function key. When the mode is active an asterisk is present in the displayed function key label.

Table A4. DEVICE MODES SET

LABEL	FUNCTION
device control	Displays the Device Control set of labels.
RECORD MODE *	Turns Record mode on or off. Copies data from display memory or datacomm to the destination device.
LOG BOTTOM *	**LOG BOTTOM** is applicable only to the integral printer and the external device. When **LOG BOTTOM** is selected, a line feed results in the line the cursor leaves being copied to the destination device (provided one has been selected). The data in memory is not changed. The **LOG TOP** and **LOG BOTTOM** 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 and the external device. If a line is added to memory after it is filled with data, the line which is scrolled off the top of memory is copied to the destination device (provided one 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.
EXPAND PRINT *	The integral printer will print 5 characters per inch (approximately double the normal width). The vertical height remains the same. **EXPAND** and **COMPRESS PRINT** are mutually exclusive; if one is selected, the other is automatically deselected.
COMPRESS PRINT *	The integral printer will print characters which are compressed horizontally (16.2 characters per inch). The vertical height remains the same. **EXPAND** and **COMPRESS PRINT** are mutually exclusive; if one is selected, the other is automatically 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.

*Note: Labels which are marked with an asterisk have a toggling action. If the mode controlled by the label is inactive. it can be activated by pressing the function key; if it is active, it can be deactivated by pressing the function key. When the mode is active, an asterisk is present in the displayed function key label.

Table A5. DESTINATION DEVICES

LABEL	FUNCTION
device control	Displays the Device Modes set of labels.
TO EXT DEV	Assigns the external device (external printer) as the destination device.
TO INT PRT	Assigns the internal printer as the destination device.
TO DISPLAY	Assigns display as the destination device.

START COLUMN | SET TAB | CLEAR TAB | CLR ALL TABS | LEFT MARGIN | RIGHT MARGIN | CLR ALL MARGINS | TAB = SPACES

Table A6. MARGINS/TABS/COL SOFT KEY

LABEL	FUNCTION
START COLUMN	Used only in Line Modify or Modify All 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, in Remote mode (provided the terminal is not in Format or Block mode) 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 when the data was entered the line was not the last line in memory on which data was entered, or if the line is 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 column 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.
TAB = SPACES	Pressing the TAB► or TAB◄ key generates the number of ASCII space (or backspace) codes required to move the cursor forward (or backward) to the next (or preceding) tab stop. If no tab stop exists between the current cursor position and the end of the line, the bell sounds and no spaces are generated.

Table A7. SERVICE SET

LABEL	FUNCTION
POWER ON TEST	Initiates the power on test (the test automatically performed when power is applied to the terminal). This test is similar to turning off the power, then turning it back on in that all data in display memory is deleted and the configuration values stored in non-volatile memory become the active configuration values.
TEST OPT RAM	Initiates a test to determine if optional RAM is installed in the terminal. If optional RAM is not installed, an error message is always displayed.
TERMINAL TEST	Performs a test of the terminal.
IDENTIFY ROMS	Displays a list of the ROMS installed in the terminal supplying their part numbers and identifying their contents.
DATACOMM TEST	Initiates the data communications test which can be used to check the equipment used for data communications.
INT PRT TEST	Initiates the integral printer test in which all upper and lower case characters are printed out in normal, expanded, and compressed form. Underline capabilities are demonstrated as well as inverse video (boxed characters).

Table A8. ENHANCE VIDEO SET

LABEL	FUNCTION
define fields	Selects the Define Fields set of Enhancement group function key labels.
modify char set	Selects the Modify Char Set of Enhancement group function key labels.
SET ENHNCMNT	Activates the currently selected state (whether on or off) of every enhancement. This key must be used to activate or deactivate any enhancement.
SECURTY VIDEO •	Characters in a field defined as a security field are stored in memory but are not displayed. Their place on the screen is left blank. If the field is later returned to the unsecure state, the characters will be displayed.
INVERSE VIDEO •	Inverts the intensity of the background and all characters in the field. The characters are made dark on a light background instead of the normal light characters on a dark background.
BLINK VIDEO •	Causes characters in the field to blink on and off.
UNDRLINE VIDEO •	Underlines all characters (including blanks).
HALF BRIGHT	Causes all characters in the field to be displayed at half intensity (grey).

Notes:

1. An asterisk next to a label indicates the label has a toggling action. The enhancement is selected to be active when an asterisk is present in the label on the screen and inactive when the asterisk is absent. Alternate presses of the key produce and eliminate the asterisk.

2. Each enhancement must be activated and deactivated using the **SET ENHNCMNT** function key. When the **SET ENHNCMNT** key is pressed, all enhancements with an asterisk in the label are activated and all those without an asterisk in the label are deactivated. The asterisk in the function key label is removed when the **SET ENHNCMNT** key is pressed.

3. Each enhancement is active from the cursor position to the end of the data on the line or to the start of the next enhancement if one has been defined between the cursor position and the end of the line.

enhance video | START UNPROTCT | START XMIT FLD | STOP FIELD

START EDITS | define edits | modify char set | FORMAT MODE

Table A9. DEFINE FIELDS SET

LABEL	FUNCTION
enhance video	Displays the Enhance Video set of labels.
START UNPROTCT	Defines all character positions between the cursor and either the start of the next field, a "stop field" marker, or the end of the line (whichever comes first) as an unprotected field. Any type of character can be entered in an unprotected field. Data in unprotected fields can be transmitted to the computer in Remote mode. (A transmit-only field is started using the START XMIT FLD key.) An unprotected field is ended by either a "stop field" marker (produced with the STOP FIELD key) or the end of the line.
START XMIT FLD	Defines all character positions between the cursor and the start of the next field, a "stop field" marker, or the end of the line (whichever comes first) as a transmit-only field. In Remote mode, data in a transmit-only field is transmitted to the computer along with data in any unprotected (no edit check) field. In Format mode, the TAB keys skip over transmit-only fields. Data can be entered in a transmit-only field by first using the cursor positioning keys to position the cursor in the field and then entering the desired data. A transmit-only field is ended by either a "stop field marker" (produced with the STOP FIELD key) or the end of the line. Transmit only fields may be defined with edit checks by using the START EDITS key.
STOP FIELD	Defines the end of any unprotected or transmit-only type field (by generating a "stop field marker").
START EDITS	Defines an edit on a previously defined unprotected or transmit-only field. The edit is selected on the Field Definition menu, which is displayed with the define edits key.
define edits	Displays the field definition menu.
modify char set	Selects the Modify Char Set set of Enhancement group function key labels.
FORMAT MODE *	In this mode, the fields (defined using the Define Fields function key label set) are made active. When Format mode is entered, all memory is protected unless specifically defined otherwise using the Define Fields function keys. Normal procedure is to define the display enhancements, field, and character sets, then enter Format mode and enter data into the fields. An asterisk in the FORMAT MODE label indicates the mode is active. Alternate presses of the associated function key activate and deactivate the mode. Notes: 1. Three general field types are used in Format mode; protected, unprotected, and transmit-only. Unless previously defined as unprotected or transmit-only, all lines are automatically defined as protected fields. 2. When data is entered into the form designed using the forms-designing sets of labels, the cursor automatically skips to the start of the next unprotected field when a character is entered in the last character space in an unprotected field. The TAB keys advance the cursor to the next unprotected field.

Table A10. MODIFY CHAR SET

LABEL	FUNCTION
define fields	Displays the Define Fields set of labels.
enhance video	Displays the Enhance Video set of labels.
CHANGE TO BASE	Selects the base character set, as defined on the Terminal Configuration menu, to be the character set used from the cursor position to the end of the line or start of the next enhancement if one is located between the cursor position and the end of the line.
CHANGE TO SET A	Selects character set A, as defined on the Terminal Configuration menu, to be the alternate character set and,also, the set used from the cursor position to the end of the line or to the start of the next enhancement, if one is located between the cursor position and the end of the line.
CHANGE TO SET B	Selects character set B, as defined on the Terminal Configuration menu, to be the alternate character set and, also, the set used from the cursor position to the end of the line or to the start of the next enhancement, if one is located between the cursor position and the end of the line.
CHANGE TO SET C	Selects character set C, as defined on the Terminal Configuration menu, to be the alternate character set and, also, the set used from the cursor position to the end of the line or to the start of the next enhancement, if one is located between the cursor position and the end of the line.

LABEL	FUNCTION

Table A11. DEFINE EDITS SET

SAVE EDITS	Enables the desired field type and explicit attributes selected.
NEXT CHOICE PREVIOUS CHOICE	Allows cycling forward or backward through each of the four unprotected fields to select the choice for display in that field.
DEFAULT EDITS	Displays the default values for the field type and attributes selected.

Table A12. CONFIGURATION SET

LABEL	FUNCTION
port 1 config port 2 config	Displays the currently configured protocol menu for the Datacomm port selected. A total of six protocols for port 1 and four protocols for port 2 are selectable using the NEXT CONFIG key. Each protocol menu allows selection of a set of parameters which apply to that protocol.
terminal config	Displays the Terminal Configuration menu which enables selection of a set of parameters that control the general operation of the terminal.

Table A13. DATACOMM CONFIGURATION SET

LABEL	FUNCTION
SAVE CONFIG	Saves the values selected on the form in non-volatile memory and removes the form from the screen.
NEXT CHOICE	Allows cycling forward or backward through all the values within a field in the menu.
PREVIOUS CHOICE	
DEFAULT VALUES	Causes all fields in the menu on the screen to be filled with their default values.
POWER ON VALUES	Causes all fields in the menu on the screen to be filled with the values that are currently stored in non-volatile memory.
NEXT CONFIG	Causes the next data comm configuration menu to be displayed on the screen.
DISPLAY FUNCTNS *	Enables and disables the display functions mode. This mode is used for entering ASCII control characters. When enabled, an asterisk is present in the label.
config keys	Removes the menu from the screen (without activating it or saving it in non-volatile memory) and displays the configuration set of labels.

Table A14. TERMINAL CONFIGURATION SET

LABEL		FUNCTION
SAVE CONFIG		Saves the values selected on the form in non-volatile memory and removes the form from the screen.
NEXT CHOICE		Allows cycling forward or backward through all the values within a field in the menu.
PREVIOUS CHOICE		
DEFAULT VALUES		Causes all fields in the menu on the screen to be filled with their default values.
POWER ON VALUES		Causes all fields in the menu on the screen to be filled with the values that are currently stored in non-volatile memory.
ACTIVE VALUES		Causes all fields in the menu on the screen to be filled with the currently active values.
DISPLAY FUNCTNS	*	Enables and disables the display functions mode. This mode is used for entering ASCII control characters. When enabled, an asterisk is present in the label.
config keys		Removes the menu from the screen (without activating it or saving it in non-volatile memory) and displays the configuration set of labels.

Table A15. USER-DEFINABLE

LABEL	FUNCTION
modify char set	Selects the Modify Char Set set of function key labels for display on the screen. These keys can be used to select any one of the alternate character sets to be used for the label or function being assigned to the key.
NEXT CHOICE	The Disposition field of the menu has a list of three choices: L, T, and N. These keys are used to cycle forward or backward through the list selecting the choice for display in the field.
PREVIOUS CHOICE	
DEFAULT VALUES	Displays the default values for the type, label, and character string for all keys.
enhance video	Selects the Enhance Video set of function key labels for display on the screen. These keys can be used to select the type of enhancement to be used for either the label or the function assigned to the function key.
define fields	Selects the Define Fields set of Enhancement group function key labels.
DISPLAY FUNCTNS *	Alternately enables and disables Display Functions mode. When enabled, an asterisk is present in the label. In this mode, the action normally produced by any keyboard control or cursor control key, such as RETURN, TAB, or any of the display control or edit groups of keys, is not performed. Instead an ASCII character representing the function is entered in the character string; then, when the function key is pressed in Use mode, the action is performed.

B

TERMINAL CONTROL FUNCTION

KEY(S)		CODE	FUNCTION
ENTER	(as used in Local mode)	↰ 0	Copy memory to destination(s)
AIDS	margins/ tabs/col SET TAB	↰ 1	Set tab
AIDS	margins/ tabs/col CLEAR TAB	↰ 2	Clear tab
AIDS	margins/ tabs/col CLR ALL TABS	↰ 3	Clear all tabs
AIDS	margins/ tabs/col LEFT MARGIN	↰ 4	Set left margin
AIDS	margins/ tabs/col RIGHT MARGIN	↰ 5	Set right margin
		↰ 6	Define alphabetic-only field
		↰ 7	Define numeric-only field
		↰ 8	Define unrestricted (all characters) field
AIDS	margins/ tabs/col CLR ALL MARGINS	↰ 9	Clear all margins
		↰ @	Delay one second
∧		↰ A	Cursor up
∨		↰ B	Cursor down
>		↰ C	Cursor right
<		↰ D	Cursor left

KEY(S)		CODE	FUNCTION
CTRL SHIFT RESET		↰ E	Hard reset (power on reset)
SHIFT		↰ F	Cursor home down
RETURN	(with Auto LF disabled)	↰ G	Move cursor to left margin
		↰ H	Cursor home up
TAB or TAB		↰ I	Horizontal tab
CLEAR DSPLY		↰ J	Clear display from cursor to end of memory
CLEAR LINE		↰ K	Clear line from cursor to end of line
INS LINE		↰ L	Insert line
DEL LINE		↰ M	Delete line
DEL CHAR		↰ P	Delete character
INS CHAR		↰ Q	Start insert character mode
INS CHAR		↰ R	End insert character (↰ Q)
ROLL UP		↰ S	Roll up
ROLL DOWN		↰ T	Roll down
NEXT PAGE		↰ U	Next page
PREV PAGE		↰ V	Previous page

TERMINAL CONTROL FUNCTION (continued)

KEY(S)	CODE	FUNCTION
AIDS , define fields, FORMAT MODE	↑c W	Format mode on
AIDS define fields, FORMAT MODE *	↑c X	Format mode off
MODES , DISPLAY FUNCTION	↑c Y	Display Functions mode on
AIDS , DISPLAY FUNCTNS *	↑c Z	Display Functions mode off
AIDS , define fields, START FIELD	↑c [	Start unprotected field
AIDS , define fields, STOP FIELD	↑c]	End unprotected/transmit-only field
	↑c ^	Primary terminal status request
	↑c _	Write non-displaying terminator
	↑c `	Sense cursor position (relative)
	↑c a	Sense cursor position (absolute)
	↑c b	Unlock keyboard
	↑c c	Lock keyboard
	↑c d	Transmit a block of text to computer
	↑c f	Modem disconnect
RESET	↑c g	Soft reset
↖	↑c h	Cursor home up (ignoring transmit fields)
TAB◄ or SHIFT TAB►	↑c i	Backtab
SHIFT USER KEYS	↑c j	Begin User Key Definition mode
USER KEYS or AIDS or MODES	↑c k	End User Keys Definition mode
MODES , MEMORY LOCK	↑c l	Begin Memory Lock mode
MODES , MEMORY LOCK *	↑c m	End Memory Lock mode
f1	↑c p	Default definition for user definition function key f1
f2	↑c q	Default definition for user definable function key f2
f3	↑c r	Default definition for user definable function key f3
f4	↑c s	Default definition for user definable function key f4
f5	↑c t	Default definition for user definable function key f5
f6	↑c u	Default definition for user definable function key f6
f7	↑c v	Default definition for user definable function key f7
f8	↑c w	Default definition for user definable function key f8

KEY(S)		CODE	FUNCTION
TERMINAL CONTROL FUNCTION (continued)			
AIDS	service keys , DATACOMM TEST	↑t x	Initiate datacomm self test
AIDS	service keys , TERMINAL TEST	↑t z	Initiate terminal self test
MODES	TERMINAL TEST		
AIDS	define fields, START XMIT FLD	↑t {	Start transmit only field
		↑t |	Erase non-displaying terminator
		↑t ~	Secondary terminal status request

CURSOR CONTROL OPERATIONS

NOTE

Columns and rows are numbered starting with 0 as the leftmost column and the top row.

↑t &a<col>c <row>Y	Moves the cursor to column "col" and screen row "row" or the screen (screen relative addressing.)
↑t &a <col>c <row>R	Moves the cursor to column "col" and row "row" in memory (absolute addressing).
↑t &a ±<col>c ±<row>Y	Moves the cursor to column "col" and row "row" (on the screen) relative to its present position ("col" and "row" are signed integers). A positive number indicates right or downward movement and a negative number indicates left or upward movement.
↑t &a ±<col>c ±<row>R	Moves the cursor to column "col" and row "row" relative to its present position in memory ("col" and "row" are signed integers). A positive number indicates right or downward movement and a negative number indicates left or upward movement.

CONFIGURATION OPERATIONS

ESC &q 0L Unlock configuration.
ESC &q 1L Lock configuration.

These escape sequences select active values (without changing the values in non-volatile memory).

ESCAPE SEQUENCE	MENU FIELD	ENTRY VALUE	X
ESC &k <x>A	AUTO LF	OFF	x=0
		ON	x=1
ESC &k <x>B	BLOCK	OFF	x=0
		ON	x=1
ESC &k <x>C	Caps Lock	OFF	x=0
		ON	x=1
ESC &k <x>D	Bell	OFF	x=0
		ON	x=1
ESC &k <x>I	ASCII 8 Bits	NO	x=0
		YES	x=1
ESC &k <x>L	LocalEcho	OFF	x=0
		ON	x=1
ESC &k <x>M	MODIFY ALL	OFF	x=0
		ON	x=1
ESC &k <x>P	Caps Mode	OFF	x=0
		ON	x=1
ESC &k <x>Q	Click	OFF	x=0
		ON	x=1
ESC &k <x>R	REMOTE	OFF	x=0
		ON	x=1
ESC &s <x>A	XmitFnctn(A)	NO	x=0
		YES	x=1
ESC &s <x>B	SPOW(B)	NO	x=0
		YES	x=1
ESC &s <x>C	InhEolWrp(C)	NO	x=0
		YES	x=1
ESC &s <x>D	Line/Page(D)	LINE	x=0
		PAGE	x=1
ESC &s <x>G	InhHndShk(G)	NO	x=0
		YES	x=1
ESC &s <x>H	Inh DC2(H)	NO	x=0
		YES	x=1
ESC &s <x>J	Auto Term(J)	NO	x=0
		YES	x=1
ESC &s <x>K	ClearTerm(K)	NO	x=0
		YES	x=1
ESC &s <x>L	InhSlfTst(L)	NO	x=0
		YES	x=1
ESC &s <x>N	Esc Xfer(N)	NO	x=0
		YES	x=1
ESC &s <x>W	InhDcTst(W)	NO	x=0
		YES	x=1

TERMINAL CONFIGURATION MENU OPERATIONS

These escape sequences are applicable to the terminal configuration menus.

Esc &q 0L	Unlock all menus.
Esc &q 1L	Lock all menus.
Esc &q <x>t <y>L	Locks or unlocks menu "x"; where "x" and "y" are as follows:

"x"	Menu
1	Datacomm1
2	Datacomm2
3	Invalid
4-8	Terminal Configuration
9	Service keys (Valid only with lock parameter.)

"y"	Action
0	Unlock
1	Lock

TERMINAL CONFIGURATION MENU OPERATIONS

The following Esc sequences set (without changing the values in non-volatile memory) the active Configuration menu values.

ESCAPE SEQUENCE	MENU FIELD	ENTRY VALUE	x
Esc &k <x>D	Bell	OFF	x=0
		ON	x=1
Esc &k <x>Q	Click	OFF	x=0
		ON	x=1

These Esc sequences are used to change the Configuration menu entry values. The values are also changed in non-volatile memory.

ESCAPE SEQUENCE	MENU FIELD	ENTRY VALUE	x
Esc &q 8te 0{ <x>D	Bell	OFF	x=0
		ON	x=1
Esc &q 8te 0{ <x>Q	Click	OFF	x=0
		ON	x=1
Esc &q 8te 0{ <x>J	FrameRate	50	x=0
		60	x=1
Esc &q 8te 1{ <x>T	Tab=Spaces	NO	x=0
		YES	x=1
Esc &q 8te 1{ <x>L	Language	USASCII	x=0
		Swedish/ Finnish	x=1
		Danish/ Norwegian	x=2
		French azM	x=3
		French qwM	x=4

ESCAPE SEQUENCE	MENU FIELD	ENTRY VALUE	x
TERMINAL CONFIGURATION MENU OPERATIONS (Cont.)			
		French az	x=5
		French qw	x=6
		German	x=7
		United Kingdom	x=8
		Spanish M	x=9
		Spanish	x=10
ESC &q 8te 1{ <x>U	Datacomm/ Printer	Port1/Port2	x=0
		Port2/Port1	x=1
		Term/Bypass	x=2
ESC &q 8te 1{ <x>A	RETURN Def (first char)	See note	
ESC &q 8te 1{ <x>B	RETURN Def (2nd char)	See note	
ESC &q 8te 1{ <x>N	Printer Nulls	"x"=no. of nulls (0-255)	
ESC &q 8te 1{ <x>P	Printer Code 4	Int	x=0
		Ext	x=1
ESC &q 8te 1{ <x>R	RETURN=ENTER	NO	x=0
		YES	x=1

Note: "x" indicates the decimal value of the ASCII code for the desired character.

TERMINAL CONFIGURATION MENU OPERATIONS (Cont.)

These escape sequences select active values without changing the values in non-volatile memory.

ESC &w 12F	Displays the entire screen.
ESC &w 13F	Blanks the screen except the softkey labels.

TERMINAL CONFIGURATION MENU OPERATIONS (Cont.)

These escape sequences are used to change terminal configuration menu entry values. The values are also changed in non-volatile memory.

NOTE

In the following Esc sequences, a number inserted in place of the variable "m" identifies the terminal configuration menu. The value of "m" may be a number from 4-7. Each number identifies the same terminal configuration.

ESCAPE SEQUENCE	MENU FIELD	ENTRY VALUE	x
Esc &q <m>te 0{ <x>A	XmitFnctn(A)	NO YES	x=0 x=1
Esc &q <m>te 0{ <x>B	SPOW(B)	NO YES	x=0 x=1
Esc &q <m>te 0{ <x>C	InhEo1Wrp(C)	NO YES	x=0 x=1
Esc &q <m>te 0{ <x>D	Line/Page(D)	LINE PAGE	x=0 x=1
Esc &q <m>te 0{ <x>G	InhHndShk(G)	NO YES	x=0 x=1
Esc &q <m>te 0{ <x>H	Inh DC2(H)	NO YES	x=0 x=1
Esc &q <m>te 0{ <x>J	Autc Term(J)	NO YES	x=0 x=1
Esc &q <m>te 0{ <x>K	ClearTerm(K)	NO YES	x=0 x=1
Esc &q <m>te 0{ <x>L	InhSlfTst(L)	NO YES	x=0 x=1
Esc &q <m>te 0{ <x>N	Esc Xfer(N)	NO YES	x=0 x=1
Esc &q <m>te 0{ <x>W	InhDcTst(W)	NO YES	x=0 x=1
Esc &q <m>te 1{ <x>A	AutoLF	OFF ON	x=0 x=1
Esc &q <m>te 1{ <x>B	BLOCK	OFF ON	x=0 x=1
Esc &q <m>te 1{ <x>C	Caps Lock	OFF ON	x=0 x=1
Esc &q <m>te 1{ <x>I	ASCII 8 Bits	NO YES	x=0 x=1
Esc &q <m>te 1{ <x>L	LocalEcho	OFF ON	x=0 x=1
Esc &q <m>te 1{ <x>M	MODIFY	OFF ON	x=0 x=1

TERMINAL CONFIGURATION MENU OPERATIONS (Cont.)

ESCAPE SEQUENCE	MENU FIELD	ENTRY VALUE	x
Esc &q <m>te 1{ <x>R	REMOTE	OFF ON	x=0 x=1
Esc &q <m>te 2{ <x>W	Esc) 4	Base set (char set 0)	x=0
		Line drawing (char set 1)	x=1
		Math set (char set 2)	x=2
		Large char set (char set 3)	x=3
Esc &q <m>te 2{ <x>	Esc) A	Same as Esc) @	
Esc &q <m>te 2{ <x>B	Esc) B	Same as Esc) @	
Esc &q <m>te 2{ <x>C	Esc) C	Same as Esc) @	
Esc &q <m>te 2{ <x>D	Alternate Set	@ A B C	0 1 2 3
		Note 1	
Esc &q <m>te 2{ <x>F	FldSeparator	Note 2	Note 2
Esc &q <m>te 2{ <x>R	BlkTermnator	Note 2	Note 2
Esc &q <m>te 2{ <x>S	Start Col	Value entered as "x"	0 thru 160
Esc &q <m>te 2{ <x>L	FormsBufSize	Decimal integer "x" within range 0-255.	
Esc &q <m>te 2{ <x>X	Decimal Type	US x=0 Europe x=1	
Esc &q <m>te 2{ <x>Y	Implied Dec Digits	Decimal integer "x" within range 0-9.	
Esc &q <m>te 2{ <x>Z	Transmit	All Fields x=0 Modified Fields x=1	

Note 1. Character sets 0-3 may vary from terminal to terminal. Character set assignment is determined by ROM type and location during installation.

Note 2. "x" is a decimal integer, from 0 to 27, representing the decimal equivalent of the ASCII character to be used.

DATA OPERATIONS

The following escape sequences control data transfer to and from the integral and external printers and display memory.

`Esc &p <a>d <b>d <c>d <Y>` Copies "Y" amount of data to destination devices "a", "b", and "c". As many destinations as desired can be specified.

a, b, and c	DEVICE
3	Display.
4	Internal or external printer depending on the Printer Code 4 entry on the Terminal Configuration menu.
6	Integral printer.

y	ACTION
B	Copy the Line in which the cursor is located.
F	Copy the display screen from the line in which the cursor is located (cursor line) to the last displayed line.
M	Copy the contents of display memory from the cursor line to the end of memory.

`Esc &p <x>^` Requests the status of device "x".

x	DEVICE
4	Internal or external printer depending on the Printer Code 4 entry on the Terminal Configuration menu.
6	Integral printer.

`Esc &k <x>S` Enables Expanded, Compressed, or Normal Character mode for the integral printer as designated by the character "X".

x	ACTION
0	Disable both Expanded and Compressed Character modes.
1	Initiate Expanded Character mode.
2	Initiate Compressed Character mode.

`Esc &p <x>p <y>u <z>C` Performs the action specified by "z" on device "y".

z	ACTION
0	Generates "1" form feed. (Always ignores "x" for form feeds.)
1	Space "x" lines.
2-10	Generates "1" form feed. (Always ignores "x" for form feeds.)
11	Turn on Log Bottom mode.
12	Turn on Log Top mode.
13	Turn off any logging mode.
14	Print normal characters.
15	Print expanded characters.
16	Print compressed characters.
17	Turn on normal Report mode.
18	Turn on Metric Report mode.
19	Turn off any Report mode.
20	Turn on Record mode; "x" is the decimal value to end Record mode.

"y"	DEVICE
4	Internal or external printer depending on the Printer Code 4 entry on the Terminal Configuration menu.
6	Integral printer.

DATA OPERATIONS (continued)

Ec &p <x> W <data string>	Transfers "x" bytes of the data string from the computer to the selected destination device in binary form.
Ec &p W <data string>	Transfers the data string, in ASCII form, from the computer to the printer selected as the destination device. The string is terminated either by the 256th byte or by an ASCII line feed character.

FORMAT MODE

Ec [	Starts a field.
Ec &e <x>e <y>	Starts an edit rule of type "y" with valid character type "x" specified.

y	MEANING
R	Required
T	Total fill
J	Justify

x	TYPE
0	All characters (default)
1	Alphabetic-only
2	Auto upshift
3	Alphanumeric
4	Integer-only
5	Signed decimal
6	Implied decimal
7	Constant
8	Integer with fill
9	Signed decimal with fill
10	Implied decimal with fill
11	Numeric-only

Ec &k <n>X	Selects the decimal type. For "n"=0, the decimal type is US (default); for "n"=1, the decimal type is European.
Ec &k <x>Y	Selects the number of implied decimal digits "x"; where "x" can be any digit from 0 to 9 and the default is 2.
Ec &k <x>Z	The data transmitted when the ENTER key is pressed is selected by "x".

x	MEANING
0	Transmits data within the unprotected and Transmit-Only fields (default).
1	Transmits data from any unprotected or Transmit-Only fields which have been modified.

Ec]	Ends the field.

FUNCTION KEY AND ERROR MESSAGE OPERATIONS

To enable and disable the function keys (F1 thru F8), use the following escape sequence:

Ec &j <x>

x	MEANING
A	Display the Modes set of function key labels.
B	Enable the User function keys.(The user key labels are displayed.)
C	Clears the message from the screen and returns the last displayed level of function key labels.
@	Remove the function key labels from the screen. The User function keys, however, are still active.

FUNCTION KEY AND ERROR MESSAGE OPERATIONS (continued)

To enable or disable the Function Control keys:

S Disables the AIDS, MODES, and USER KEYS keys.

R Enables the AIDS, MODES, and USER KEYS keys.

To define functions for the RETURN and function keys:

```
ESC &f <attribute>a <key>k <label length>d
    <string length>L <label><string>
```

TERM	SYMBOL	MEANING	DEFAULT
Attribute	0	Normal (N)	0
	1	Local only (L)	
	2	Transmit only (T)	
Key	0	RETURN key	1
	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	
Label length	0 thru 240	Number of characters in the label. (The label length plus the string length must be ≤240 characters).	0
String length	0 thru 240	Number of characters in the string. (The label length plus the string length must be ≤240 characters.)	1
	−1	Clears the content of the string.	
Label	(none)	The label is entered at this point in the sequence. It may contain display enhancement and character set changes.	
String	(none)	The character string is entered at this point in the sequence. It may contain display enhancement and character set changes.	

To execute functions assigned to the RETURN and function keys:

```
ESC &f <x>E
```

X	KEY
0	RETURN
1	f1
2	f2
3	f3
4	f4
5	f5
6	f6
7	f7
8	f8

To replace the function key definition with your own message:

```
ESC &j <string length>L <message>
```

"String Length" — A number (up to 160) indicating the number of characters in the string.

"Message" — The content of the message.

FORMS CACHE (STORAGE)

`Ec & q 4te2{<x>L`	Selects the size of forms cache (storage). Where "x" is the number of 256 byte blocks. It is a decimal value between 0 and 95. The maximum value is a function of the amount of display memory installed and the amount of memory allocated for data comm buffers.
`Ec & p 9^<form#>p`	Returns the forms cache status condition.
`Ec & p 9u<form#>p <x>`	General form to define, purge, and transfer a form. Where "9u" is the device assignment, "form#" specifies the form number from 1-255, and "x" is the following:

x	MEANING
`0L or L`	purge specified form
`f`	transfer a form to the screen
`<form-size>L<form-contents>`	define a form (known length)
`<form-contents>L`	define a form (unknown length, multi-blocked)

Note: The "<" and ">" shown above are part of the escape sequence.

Examples:

To define a form, use either of the two escape sequences:

```
Ec & p 9u<form#>p<form-size>L<form contents>
```

```
Ec & p 9u<form#>p<form-contents>L
```

To purge a form, use the following escape sequence:

```
Ec & p 9u<form#>p0L
```

To transfer a form to the screen, use the following escape sequence:

```
Ec & p 9u<form#>pF
```

An "S" status will be returned at the completion of the transfer sequence, unless an error is detected, another forms activity is in progress, or if the forms cache memory is full. in these cases, an "F" status will be returned.

DISPLAY ENHANCEMENTS OPERATIONS

To start and end display enhancements:

`↰ &d <char>` Selects the display enhancement indicated by "char" to begin at the present cursor position.

	"char"															
	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	S
Half-bright									x	x	x	x	x	x	x	x	
Under-line					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	
Security																	x
End Enhance-ment	x																

`↰ &ds <char>` Turns Security mode on along with the enhancement selected by "char" (as shown in the preceding table.

`↰ &dS` Turns the Security mode on only.

ALTERNATE CHARACTER SET SELECTION

`↰ )<x>` Selects one of the character sets to be the active alternate set.

x	CHARACTER SET
@	Base set
A	Set 1
B	Set 2
C	Set 3

C

Keyboards and Character Sets

National Keyboards

Figures C-1 through C-7 show the various national keyboards which are available as options 001 through 006. Note that these options also include the extended character set ROMs which support all of the national languages, the math set, and the large character set (the line drawing set is standard).

If you order the standard USASCII keyboard and you wish the terminal to include the extended character set ROMs, then you must specifically order the ROMs as option 201.

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, you must physically rearrange the A, Z, Q, and W keys as shown in figure C-4.

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

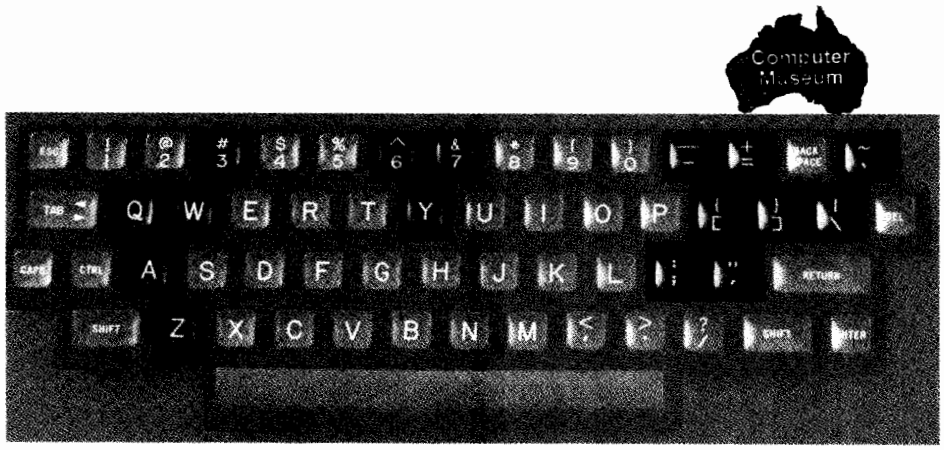


Figure C-2. Danish/Norwegian Keyboard (Option 002)

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

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

Figure C-5. German Keyboard (Option 004)

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

Figure C-7. Spanish Keyboard (Option 006)

7-Bit vs. 8-Bit Operation

The terminal can be configured for 7-bit and 8-bit operation.

When the terminal is configured for the standard 7-bit operation, the ASCII <SO> code (which enables the active alternate character set) applies through the end of the current line; when the cursor moves to the next lower line you must once again issue a <SO> if you wish to continue typing in the active alternate character set.

When the terminal is configured for 8-bit operation, the ASCII **<SO>** code operates as if it was configured for 7-bit operation with the eighth bit used to set the alternate character set (if the alternate character set is not the base set "@").

If the alternate character set is the base set (character set "@"), the terminal configured for 8-bit operation operates as discussed under "ISO/ASCII Character Set."

ISO/ASCII Character Set

The standard ISO/ASCII character set, as shown in table C-1, is used on this terminal.

When the terminal is configured for 7-bit operation and a national language has been selected with the correct character set ROMs installed, the shaded characters in table C-1 are replaced on the screen with the following characters (depending on which national language is specified in the 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	}	~

The terminal also simulates an 8-bit character set. When the terminal is configured for 8-bit operation, the eighth data bit is used to select characters from an extended Roman character set (shown in table C-2). However, when the character received is not part of the extended character set for the language selected, the character is displayed on the screen as a space.

Note

If the terminal is configured for 8-bit operation the alternate set has to be the Base set (@).

The extended character set is used by the HP 300 and HP 250 computer systems and the HP 2631 and HP 2608 printers.

Table C-1. Standard ISO/ASCII Character Codes

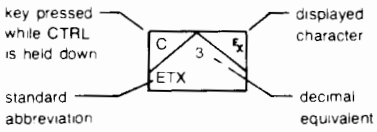
BIT 4321	CONTROL (CNTL) CHARACTERS 000	CONTROL (CNTL) CHARACTERS 001	DISPLAYABLE CHARACTERS 010	DISPLAYABLE CHARACTERS 011	DISPLAYABLE CHARACTERS 100	DISPLAYABLE CHARACTERS 101	DISPLAYABLE CHARACTERS 110	DISPLAYABLE CHARACTERS 111
0000	@ 0 N_U NUL	P 16 DL DLE	SP	0	@	P	`	p
0001	A 1 S_H SOH	Q 17 D_1 DC1	!	1	A	Q	a	q
0010	B 2 S_X STX	R 18 D_2 DC2	"	2	B	R	b	r
0011	C 3 E_X ETX	S 19 D_3 DC3	=	3	C	S	c	s
0100	D 4 E_T EOT	T 20 D_4 DC4	$	4	D	T	d	t
0101	E 5 E_Q ENQ	U 21 N_K NAK	%	5	E	U	e	u
0110	F 6 A_K ACK	V 22 S_Y SYN	&	6	F	V	f	v
0111	G 7 BEL	W 23 E_B ETB	'	7	G	W	g	w
1000	H 8 B_S BS	X 24 C_N CAN	(	8	H	X	h	x
1001	I 9 H_T HT	Y 25 E_M EM	)	9	I	Y	i	y
1010	J 10 L_F LF	Z 26 S_B SUB	*	:	J	Z	j	z
1011	K 11 V_T VT	[27 E_C ESC	+	;	K	[	k	{
1100	L 12 F_F FF	\ 28 F_S FS	,	<	L	\	l	|
1101	M 13 C_R CR	] 29 G_S GS	-	=	M	]	m	}
1110	N 14 S_O SO	^ 30 R_S RS	.	>	N	^	n	~
1111	O 15 S_I SI	_ 31 U_S US	/	?	O	_	o	DEL

Table C-2. Extended Roman Character Codes

BIT 4321	$B_8 = 1$ EXTENDED ROMAN CHARACTERS 000	001	010	011	100	101	110	111
0000				¯ / –	â	Â		
0001					ê	î		
0010					ô	Ø		
0011				•	û	Æ		
0100					á	å		
0101				Ç	é	í		
0110				Ñ	ó	ø		
0111				ñ	ú	æ		
1000			. '	¡	à	Ä		
1001			`	¿	è	Ì		
1010			^	¤	ò	Ö		
1011			¨	£	ù	ü		
1100			~		ä	É		
1101				§	ë	ï		
1110					ö	ß		
1111			£		ü			

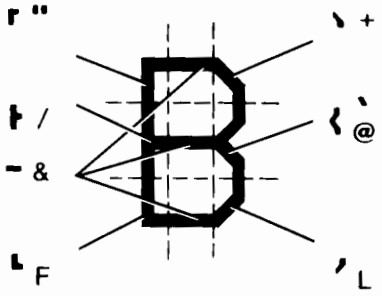
A_K — ACKNOWLEDGE
B_L — BELL
B_S — BACKSPACE
C_N — CANCEL LINE
C_R — CARRIAGE RETURN
D_L — DATA LINK ESCAPE
D_1 — DEVICE CONTROL 1
D_2 — DEVICE CONTROL 2
D_3 — DEVICE CONTROL 3
D_4 — DEVICE CONTROL 4
DEL — DELETE
E_M — END OF MEDIUM
E_Q — ENQUIRY
E_T — END OF TRANSMISSION
E_C — ESCAPE
E_B — END OF BLOCK
E_X — END OF TEXT
F_F — FORM FEED
F_S — FILE SEPARATOR
G_S — GROUP SEPARATOR
H_T — HORIZONTAL TAB
L_F — LINE FEED
N_K — NEGATIVE ACKNOWLEDGE
R_S — RECORD SEPARATOR
S_I — SHIFT IN
S_O — SHIFT OUT
SP — SPACE
S_X — START OF HEADING
S_T — START OF TEXT
S_Y — SUBSTITUTE
S_N — SYNCHRONOUS IDLE
U_S — UNIT SEPARATOR
V_T — VERTICAL TAB

Control Character Legend:



Large Character Set

When LARGE CHAR is selected as the active alternate character set, you construct each large character by combining up to ten individual character segments. Each character segment corresponds to one of the alphanumeric or symbol keys (see figure C-8). For example, you construct the letter "B" using the following nine keystrokes.



As with any of the alternate character sets, you enable the Large Character set with a <SO> control code (control-N) and disable it with a <SI> control code (control-O).

Math Set

When MATH is selected as the active alternate character set, you can generate mathematical symbols using the alphanumeric and symbol keys (see figure C-9). Three of the symbols (left bracket, right bracket, and integral sign) require two or more characters, depending on how many screen rows the entire symbol is to encompass. Some examples of these symbols are as follows:

As with any of the alternate character sets, you enable the Math set with a <SO> control code (control-N) and disable it with a <SI> control code (control-O).

Figure C-8. Large Character Set Elements

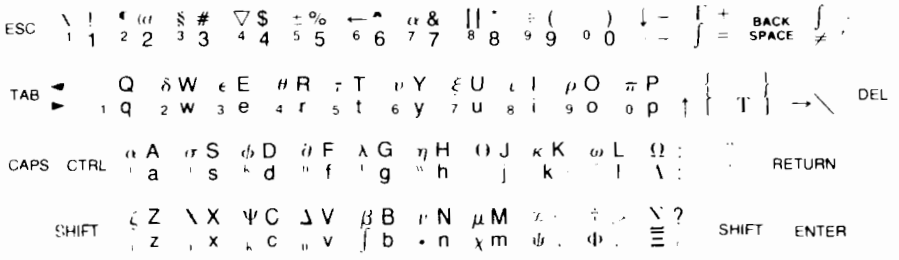


Figure C-9. Math Set Elements

Line Drawing Set

When LINE DRAWING is selected as the active alternate character set, you can construct data entry forms by combining different types of line segments. Each individual type of line segment is associated with one of the alphanumeric or symbol keys (see figure C-10). Figure C-11 illustrates the keystrokes used for generating a sample data entry form.

As with any of the alternate character sets, you enable the Line Drawing set with a **<SO>** control code (control-N) and disable it with a **<SI>** control code (control-O).

Figure C-10. Line Drawing Set Elements

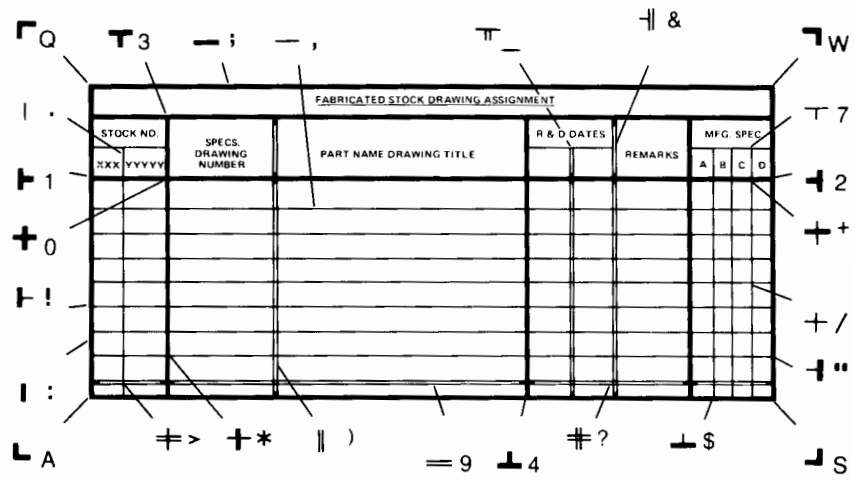
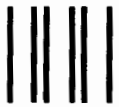


Figure C-11. Sample Data Entry Form



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   a. What were the "difficult" areas?

      ☐ Indexing? ☐ Depth of coverage? ☐ Examples?
      ☐ Organization? ☐ Omitted information? ☐ Other (Please explain)

   b. How could we clarify these areas? _____

      _____

2. What errors or misleading information have you found in the manual? (*Please give page numbers.*)

   _____

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   ☐ General Computation ☐ Education What kind?
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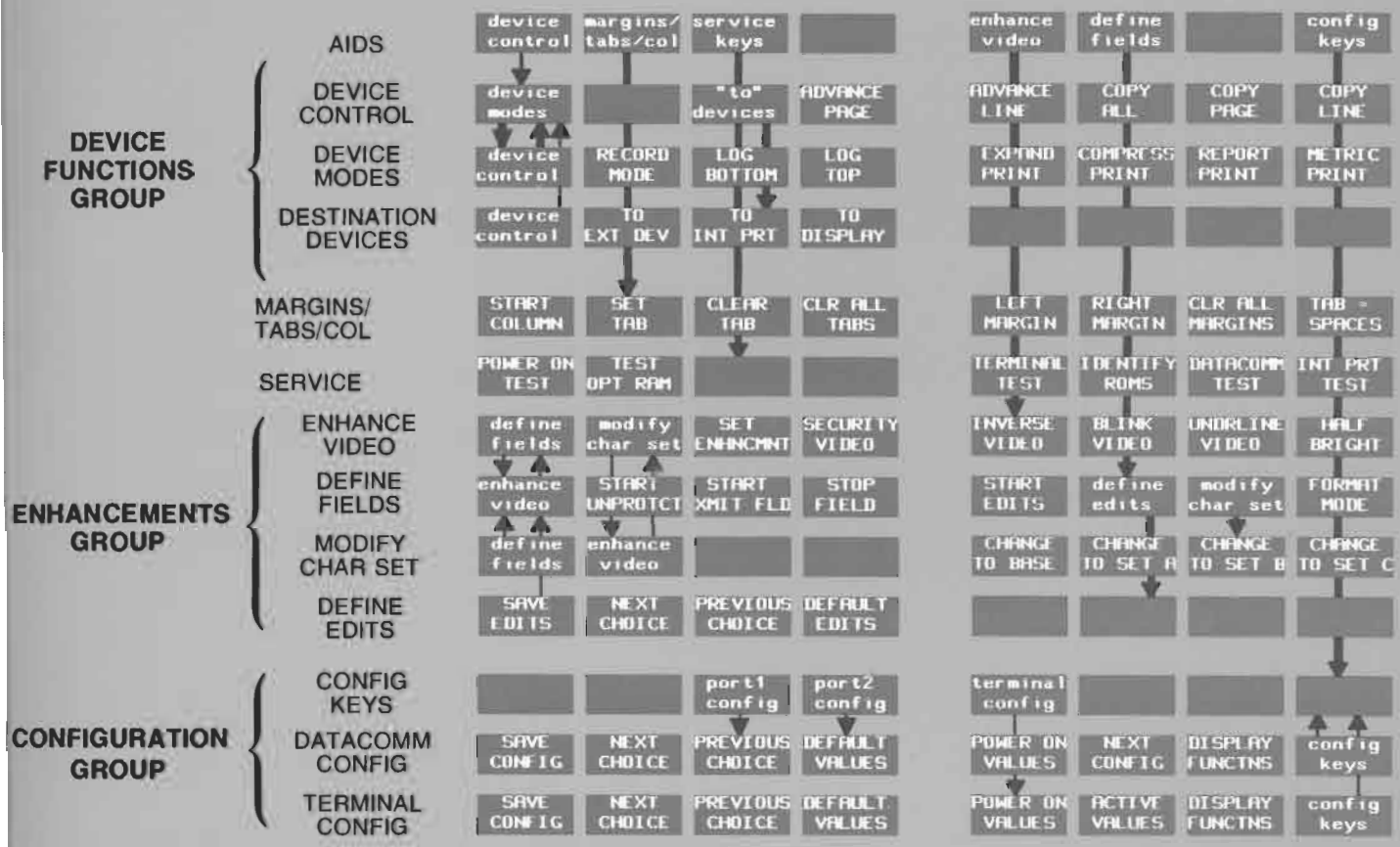
INDEX

INDEX



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