

2621A/P National Terminal



owner's manual

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## A Guide to Using This Manual

This owner's manual is written to introduce you to the HP 2621A and 2621P Terminals. The HP 2621A is the basic terminal while the HP 2621P provides a self-contained thermal printer together with the basic terminal.

Within this manual, the term HP 2621 is used to reference features and capabilities applicable to either version. The term HP 2621A or HP 2621P is used to reference features and capabilities unique to either the A version or the P version, respectively.

Detailed information about specific features is included so that you may use this manual as a reference guide to operating the terminal. An index of terms and phrases is included at the back of the manual to assist you in quickly locating reference material.

This owner's manual includes the following sections:

**Section I - Introducing the HP 2621.** This section is a general description of the terminal and briefly lists its features and capabilities.

**Section II - How to Get Started.** Information is given in this section about how you can identify the options and accessories delivered with your terminal. In addition to this information, you are instructed about how to prepare your terminal for use.

**Section III - The Terminal's Display Characteristics.** This section contains a complete description of the display screen and display memory. Included is information about the initial state of the display after the main power switch is turned on, screen and memory organization, and cursor positioning.

**Section IV - The Terminal's Keyboard.** A description of the keyboard is provided in this section. Examples of keyboard interaction with the terminal's display are included.

**Section V - Using the Terminal as an Input/Output Device.** This section describes the data communication capabilities of the HP 2621. Included is information about the terminal's configuration, operating modes, and transmission of data between the HP 2621 and an external data processing device.

**Section VI - The HP 2621P.** This section describes the HP 2621P Terminal with self-contained thermal printer. A complete description of operating procedures together with reference material is included.

**Section VII - Preventive Maintenance.** This section contains information about the care and cleaning of your terminal to keep it in the best operating condition.

**Section VIII - Diagnosing Problems.** Problem conditions and the messages associated with these conditions are discussed in this section. In addition to this information, this section includes a description of the self-test feature, recovery (resetting the terminal) in case of an error, and information about where to get help if you have difficulty solving a problem.

**Appendix Section -** This section contains a reference table in Appendix A that includes the ASCII and ISO coded character set, and control codes and escape sequence codes. Appendix B contains tables that list cabling assignments. Primary status information is presented in Appendix C and Cursor Sensing is described in Appendix D.



# Introducing the HP 2621 National

## Section I

The HP 2621 National Terminal is designed to provide you with a simple, efficient character-mode terminal device. This terminal offers many powerful features that are easy to use. The HP 2621 National terminal can be ordered with a keyboard and display character set customized to match the language of your country. Language sets are selected as options when ordering the terminal. The possible national options are as follows:

- Option -001 Swedish/Finnish (S/SU)
- 002 Norwegian/Danish (DK/N)
- 003 French (F)
- 004 German (D)
- 005 United Kingdom (UK)
- 006 Spanish (E)

The national terminals replace certain ASCII character symbols with national character symbols. The following table indicates the changed characters:

		DECIMAL VALUE											
		35	64	91	92	93	94	96	123	124	125	126	
ASCII (U.S.)		#	@	[	\	]	^	`	{		}	~	
Swedish/Finnish (S/SU)	001	#	£	Å	Ö	Ä	Ü	É	Ä	Ö	Ä	Ü	
Norwegian/Danish (DK/N)	002	#	@	Æ	Ø	Å	^	`	æ	ø	å	~	
French (F)	003	£	à	·	ç	§	^	`	é	ù	è	..	
German (D)	004	£	§	Å	Ö	Ü	^	`	ä	ö	ü	ß	
United Kingdom (UK)	005	£	@	[	\	]	^	`	{		}	~	
Spanish (E)	006	#	@	i	N	¿	·	`	{	ñ	}	~	

Among the features offered by the HP 2621 are:

### Display Memory and Screen

- Bright, Clear Screen Display
- 24 Line by 80 Character Display Area
- Uppercase and Lowercase Character Set
- Displayable Control Code Characters
- Character-by-Character Underlining
- Cursor Position Relocation
- 48 Line by 80 Character Display Memory (Two Pages)
- Roll, Home-up, and Home-down Display Control

### Keyboard

- 68 Key Typewriter-style Keyboard Layout
- Embedded Calculator-style Numeric Key Pad
- Eight Variable Function Keys
- Labels Key

### Function Keys

- Redefinable Configuration
- Self-test
- Clear Line
- Clear Display
- Printer Output Control (HP 2621P Only)
- Display Function Code Enable/Disable
- Tabulation and Margin Control
- Text Editing Control
- Transmit Pre-defined Escape Sequences

### Configuration

- Screen Displayable Configuration Data
- Redefinable Configuration via Function Keys
- Data Transmission Baud Rate Control
- Data Parity Control
- Duplex Control
- Strapping Control
- Communications Handshake Control
- User-definable RETURN Key
- User-definable Transmission Start Column
- Configuration Memory Protection

### Data Communications

- Data Transfer Rate up to 9600 Baud
- Character or Line Mode Transfers
- Support of EIA RS232C or CCITT V.24 Interface
- Full Duplex Data Transmission
- 8-Bit Data Transmission



## Display Screen

The HP 2621 Terminal has a screen with a 6 X 8 inch viewing area capable of displaying up to 1,920 characters in 24 lines of 80 character positions. Each character is formed by a 7 x 9 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. The combination of these features gives you a bright, easy-to-read display.

Refer to Section III for a detailed description of the display screen.

## Display Memory

Your terminal's display memory can store up to 3,840 characters (48 lines of 80 character positions). A "page" of data is the maximum number of lines that can be displayed on the screen at one time (24 lines). Thus, you can store up to two pages of data in display memory. You can examine any portion of text within display memory by using the home-up, home-down, or roll Function keys on your keyboard.

A detailed description of display memory is contained in Section III.

## Keyboard

The HP 2621 keyboard is a separate unit that is linked to the display portion of the terminal via a flexible cable. The keyboard layout is similar to that used for standard office typewriters. The keyboard can be ordered with a variety of national character sets. It has 68 keys that include eight Function keys, and a Labels key. The remaining keys support the ASCII-coded character set. A numeric key pad similar to that used for calculators is embedded within the alphanumeric keys. Included within the keyboard unit is a speaker used to sound the terminal's bell tone.

Refer to Section IV for a detailed description of the keyboard.

## Function Keys

The Function keys are the eight light-colored keys located across the top of the keyboard and the Labels key (an unmarked light-colored key located to the right of the keyboard). These keys provide you with access to several sets of functions. Similar to the other keys on the keyboard, the Function keys are used either unshifted or shifted.



Unshifted, the keys perform cursor and screen control functions that are labeled directly on the key caps.

Shifted, these keys perform the functions indicated by a screen label associated with each key. The screen labels are displayed in inverse video across the bottom of the screen (row 25). The labels are selected by using the Labels key. Some of the screen labeled Function keys are transition keys that result in a branch to a new set of labels. For example, the [config] and [edit] Function keys.

See Section IV for a detailed description of the Function keys.

## Configuration

The HP 2621 provides you with the ability to change the terminal's configuration directly from the keyboard using a set of Function keys. You can cause the terminal's current configuration to be displayed on the screen in a coded format and then make changes to the configuration simply by pressing the appropriate Function key. The portion of memory used to store this configuration data is nonvolatile. A battery is used to protect this portion of memory whenever the main power source should be intentionally or accidentally shut off.

Section V contains detailed information about the configuration of your terminal.

## Data Communications

You can transfer data to and from a host computer in Character mode (character-by-character) using the terminal as a completely interactive device. In addition to Character mode, you may select Line mode operation (transmit data to the computer a line at a time). In Line mode, you can compose a line of data, then verify and correct the data before you transmit it to the computer. The terminal can be set to communicate using 7-bit and parity or 8-bit characters.

The terminal operates at a data transfer rate of up to 9600 baud and offers asynchronous point-to-point data communications using the EIA RS232C and CCITT V.24 communications interface specifications.

Connection to the computer is direct or through a modem. In addition to these features, the HP 2621P provides an integral thermal line printer which can be used to produce a permanent copy of your data communications transactions.

Section V contains detailed information about 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 terminal's operating condition. See Section VIII for information about the terminal's Self-test function.



Identifying 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 2-1). The first section of this label states the power requirements of the terminal. The next section states the model number and the serial number. The third section lists any options included with the terminal.

Table 2-1 is a list of options available for the HP 2621A Terminal (see Section VI for HP 2621P options).

Table 2-2 is a list of accessories available for the HP 2621A Terminal (see Section VI for HP 2621P accessories).

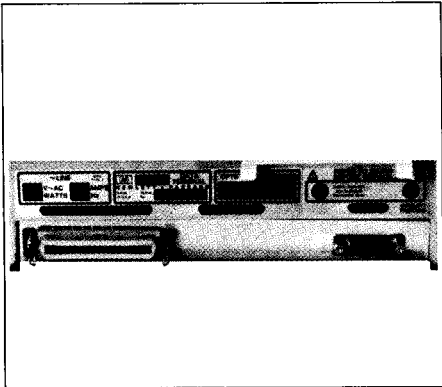


Figure 2-1. HP 2621 Identification Label, Rear Panel

When communicating with Hewlett-Packard regarding your terminal, specify the model, serial, and 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 "Power Switch (ON/OFF)".

Table 2-1. HP 2621A Options

Option No.	Description
013	50Hz, 240V, 0.3A, 75W Power
014	60Hz, 100V, 0.6A, 60W Power
015	50Hz, 220V, 0.4A, 75W Power
016	50Hz, 100V, 0.6A, 60W Power

Table 2-2. HP 2621A Accessories

Accessory No.	Description
13222N	U.S.A. Modem Cable (Male Connector)
13222M	European Modem Cable (Male Connector)
13222C	RS232C Cable (Female Connector)
13222W	HP 300 Cable (Female Connector)
13222Y	Three Wire Cable (Male Connector)
13222Z	Three Wire Cable (Female Connector)

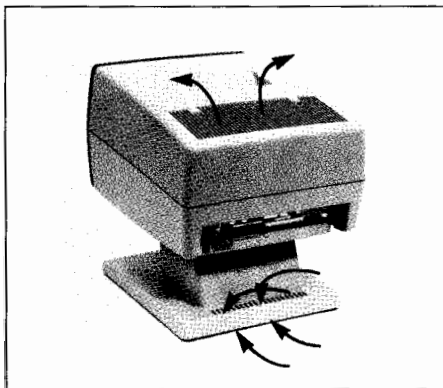
## Preparing Your Terminal for Use

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.

### CAUTION

The terminal should be opened only by a qualified service person. Please refer to the HP 2621 Service Manual, HP Part No. 02620-90002.

To install your terminal, complete the following steps:



AIR FLOW

Step 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. For example, do not use a typewriter pad beneath the terminal.

Step 2. Connect and secure the keyboard cable hood connector to the socket connector labeled KYBD on the terminal's rear panel (see Figure 2-2).

Step 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 labeled DATA COM on the terminal's rear panel. The cable hood connector must be securely held in place by the wire clamps provided with the socket connector.

Connect the other end of this cable to the appropriate external device.

Step 4. Set the main power switch on the terminal's rear panel (see Figure 2-2) to the OFF position.

Connect the power cord to the connector located just below the main power switch.

Step 5. ENSURE THAT THE VOLTAGE TO BE SUPPLIED MATCHES YOUR TERMINAL'S POWER REQUIREMENTS (see the power requirements label on the rear panel of the terminal).

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

### CAUTION

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

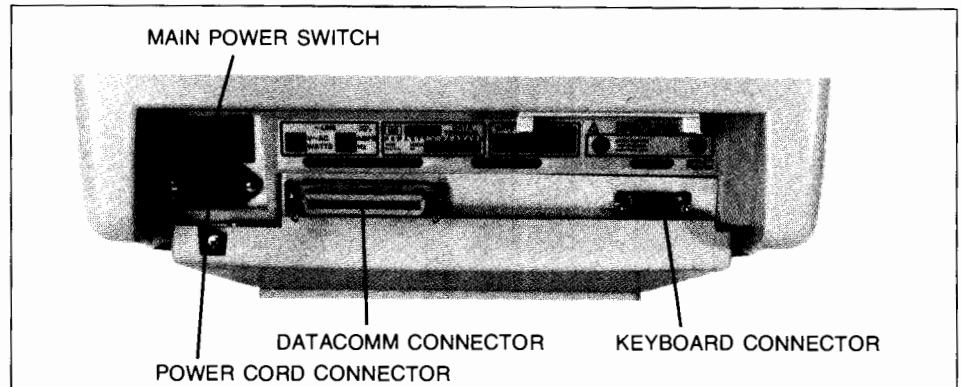


Figure 2-2 HP 2621 Power Switch and Connector Positions, Rear Panel

## Power Switch (ON/OFF)

### ON

Step 1. When the installation of your terminal is completed, set the main power switch on the rear panel (see Figure 2-2) to the ON position.

After approximately 15 seconds, the terminal is ready to use. Figure 2-3 illustrates the condition of the display screen as it appears following the initial application of power to the terminal.

As shown in Figure 2-3, when the terminal is ready to use, the cursor is displayed in screen column 1, row 1. In addition to the cursor, the first level of function key labels is displayed across the bottom of the screen.

The battery that protects nonvolatile memory may be accidentally jarred loose during shipment or unpacking. In this case, the terminal comes up initially in configuration mode when power is supplied. If this occurs, ensure that the battery pack is securely seated (see Section VII for instructions about removing and replacing the battery pack).

Step 2. (Optional) Try using the Self-test function to see the result. Press and hold down **SHIFT** while you press the function key associated with the screen label TEST (that is, key **F2**). A pattern of ASCII characters is written to the screen. This pattern should be similar to the test pattern shown in Section VIII if your terminal is operating properly.

### OFF

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

#### NOTE

If you intend to use the terminal interactively as an input/output device for a computer, you must configure the terminal to match the requirements of the computer. Detailed information about configuring the terminal is presented in Section V.



### 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 VIII. A list of messages and their meaning is given there. In addition to the list of messages, Section VIII contains information about error recovery, testing the terminal, and where to get service assistance should you require it.

Each time you switch the main power ON, it is possible that the terminal will start up either in Configuration mode or in "continuous" Self-test mode.

If the terminal starts up in Configuration mode (that is, configuration data and function key labels are displayed on the screen), it is likely that the memory-protect mechanism for nonvolatile memory failed while the main power was off. Check that the battery is functioning properly (see Section VII for instructions). If the battery is jarred loose or disconnected, the terminal will go into language configuration mode when turned on.

Select the language corresponding to the keyboard (using the appropriate function key). Press the **ESC** key to return to normal configuration mode. Refer to Section V for configuration information.

If the terminal starts up with the Self-test repeating continuously, simply reset the terminal (hold down **SHIFT** and **CTRL** while pressing **BREAK**). This action halts execution of continuous Self-test.

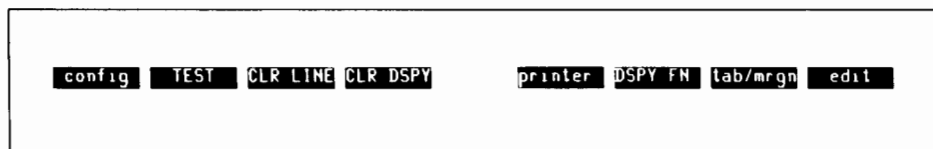


Figure 2-3. HP 2621 Initial Screen Display



# The Terminal's Display Characteristics

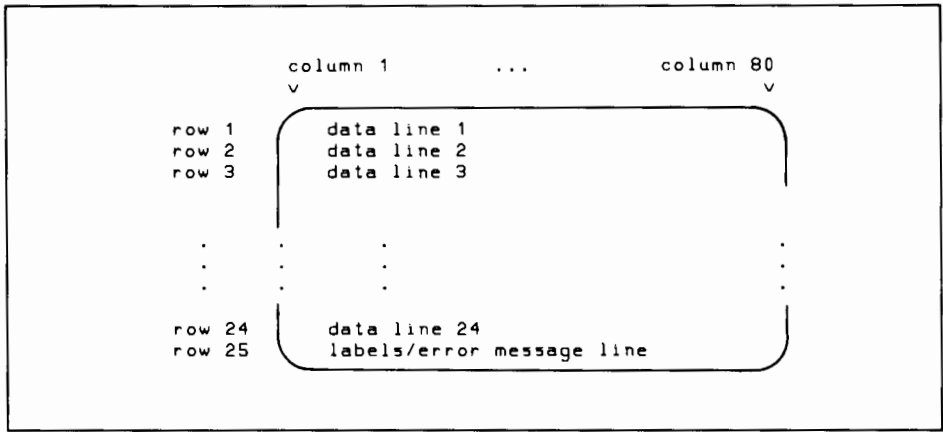
# Section III

The display portion of your terminal consists of the display screen (where data appears as alphanumeric and special control characters), and display memory (where the displayable data is stored).

## Screen

The display screen is capable of showing up to 24 contiguous lines of display memory data. For the HP 2621, these 24 lines are considered to be one page of data.


The screen actually provides 25 rows of 80 character positions each for the display. Rows 1 through 24 are used to display the content of display memory. Row 25, at the bottom of the screen, is used to display the currently active set of function key labels, a current cursor position column indicator, and any error messages that may be generated.

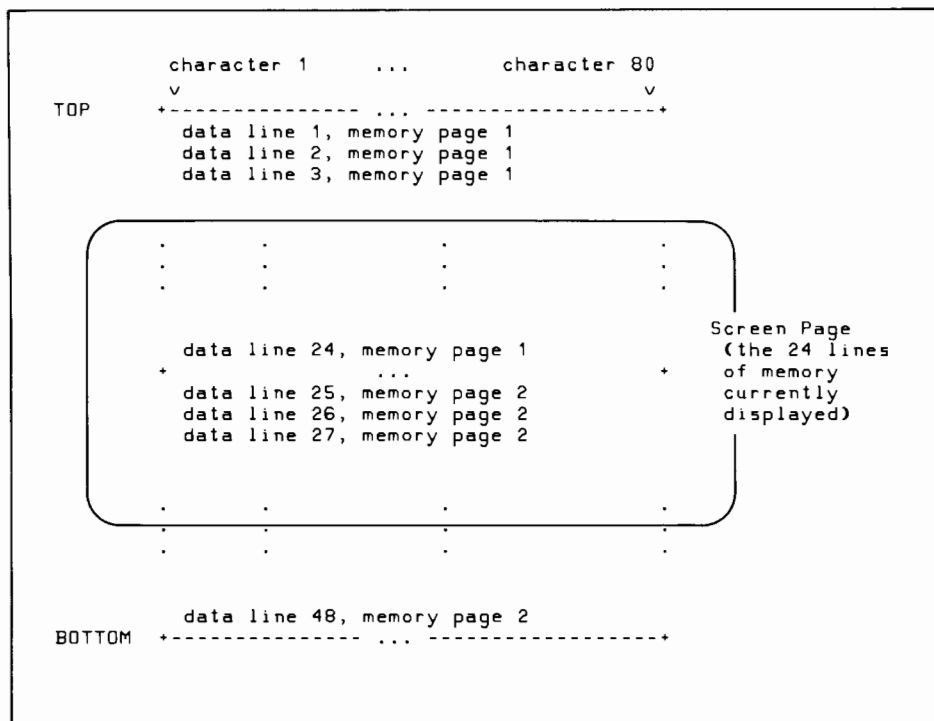


## Memory

Display Memory can accommodate up to 48 lines of data (two pages). Each line has 80 character positions.

When you enter lines of data into memory, each line appears in its proper line position on the display screen until you have filled one page (24 lines). At this point, display memory rolling begins. When you enter line 25, the first line in Page 1 is rolled off the top of the display screen (it still exists within memory) and line 25 appears at the bottom of your screen. You can enter up to 48 lines into memory and examine them on the screen by using the Roll Function keys. Once you exceed 48 lines, the line first entered (at the "top" of display memory) is discarded to make room for the new line (at the "bottom" of display memory).

Note that if you fill 48 lines of memory with data and press  (home cursor down), you will lose the first line of data in memory because the home down operation positions the cursor to a blank line following the last data line in memory. One line is deleted from the top of memory to accomplish the home down operation.





## Display Enhancement

You can enhance the display of data by placing an underline in any character position on your screen. You accomplish this by defining an enhanced field within a display line. Once you define the beginning of an enhanced field, the display enhancement remains in effect until the end of the current line or until you define the end of the enhanced field, whichever occurs first. A field consists of one or more character positions in any display line.

To define an enhanced field, position the cursor to the column where you want the field to begin, and then enter the following escape code key sequence:

```
esc & d A
```

(the last or terminating character may be any uppercase character from the letter set A through O).

The cursor marks the beginning of the enhanced field. Characters entered subsequent to this column position appear underlined on the screen until the end of the line or until you terminate the enhanced field whichever occurs first.

To terminate the enhanced field, enter the following escape code key sequence:

```
esc & d @
```

When you insert or delete a character in an enhanced field, the result is the same whether the underline enhancement is enabled or disabled. For insert or delete operations, an underline character is inserted into or deleted from any enhanced field. When you replace a character, the result depends upon whether the display enhancement is enabled or disabled. The display enhancement must be enabled to replace any character with an underlined character.

Note that the underline enhancement differs from the `UNDRLINE` function (see "Edit Control Function Set" in Section IV).

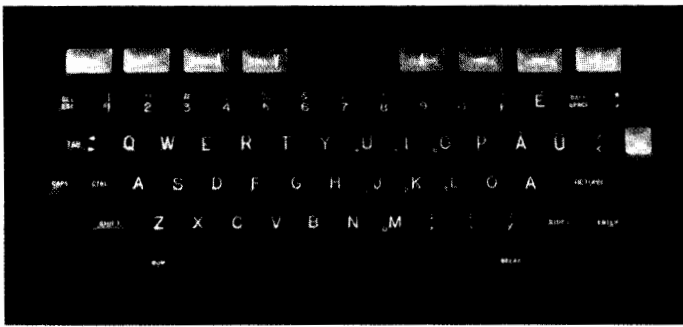
The underline Enhancement causes any character entered to appear underlined. The `UNDRLINE` function places an underline beneath any existing character.

### Exercise

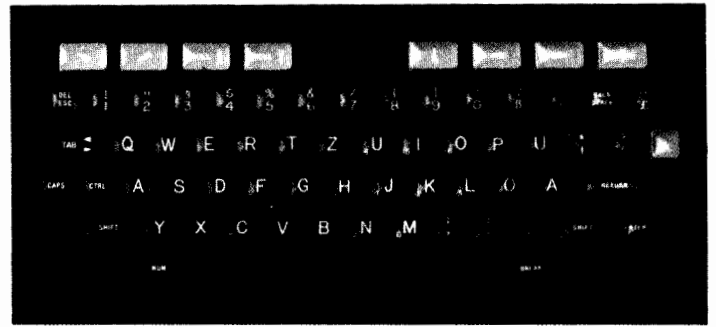
Make sure that the terminal is in local mode (REMOTE disabled). Then, display data on the screen and edit it. For example, sit at the keyboard and enter your name. Notice that the cursor moves across the screen character—by—character as you type. This action shows you where the next display character will appear when you press a key.

```
Alexander Hamilton_
```

**Changing A Character.** To change a character displayed on the screen to another character, position the cursor under the character to be changed (using `↑`, `←`, `→`, `↓` keys). Now press the desired character key. The original character is replaced by the new character entered, both on the screen and in display memory.



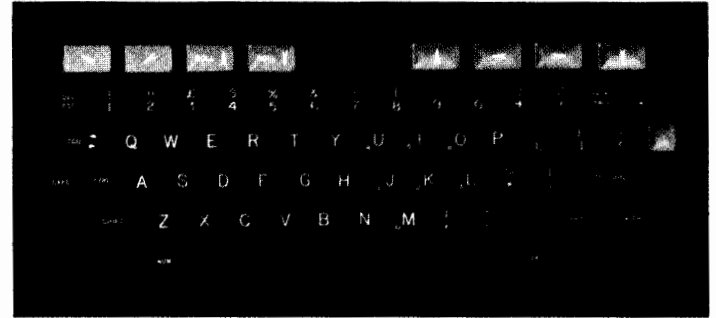
Option 001 Swedish/Finnish (S/SU)



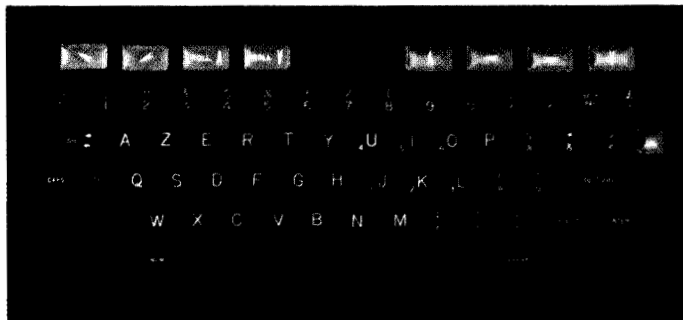
Option 004 German (D)



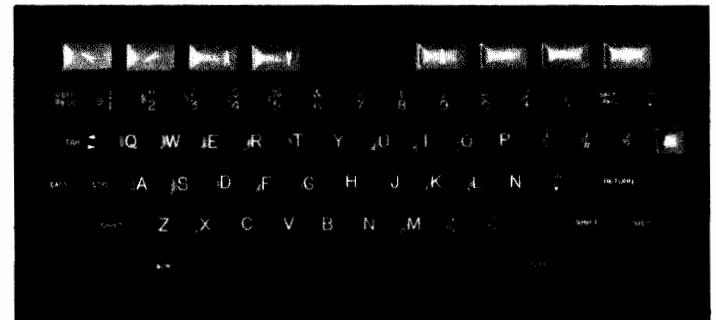
Option 002 Norwegian/Danish (N/DK)



Option 005 United Kingdom (UK)



Option 003 French (F)



Option 006 Spanish (E)

Figure 4-1. HP 2621 National Keyboards

## The Terminal's Keyboard

## Section IV

Before learning how to transfer data, you should become familiar with the terminal's keyboard. This simple, compact keyboard consists of the following functional groups:

- **Character Set Group.** The layout of these keys is similar to an ISO data entry keyboard. In addition to the alphanumeric character keys, this group includes typical data terminal keys such as **BREAK**, **CTRL**, **ENTER**, and so forth.

When one of the national options is ordered, certain graphic symbol keys are replaced with national symbols. In some cases the position of keys on the keyboard will also change. Figure 4-1 shows the optional national keyboard configuration.

- **Numeric Pad Group.** This group is a calculator-type numeric key pad that is embedded into the character set keys. You may use this pad for entering large amounts of numeric data such as that required for financial reporting.
- **Function Key Group.** This group of keys is used to access screen and cursor control, and special functions that are available in the HP 2621.

### Character Set Group

The alphabetic, numeric, symbolic, keyboard control, and data transfer keys are located in the Character Set Group. This is the largest group of keys. The character set is made up of 128 ISO or ASCII coded characters. This includes the uppercase and lowercase alphabetic characters, numeric characters, punctuation and commercial symbols and control codes. The keyboard can generate the ISO/ASCII character code set (see Appendix A). Figure 4-2 shows the Character Set Group.

Eleven of the ASCII characters # @ [ \ ] ^ \_ { | } and ~ are used as "national replacement characters". These characters are replaced with a particular set of national characters when one of the national language options is ordered.

The standard character symbols are indicated on the key caps. The **SHIFT** key selects the uppercase or shifted characters. The **BACK SPACE** and **RETURN** keys are used in the same manner as those same keys on a typewriter. The **RETURN** key can be configured to transmit a two-character string each time it is pressed (See Section V).

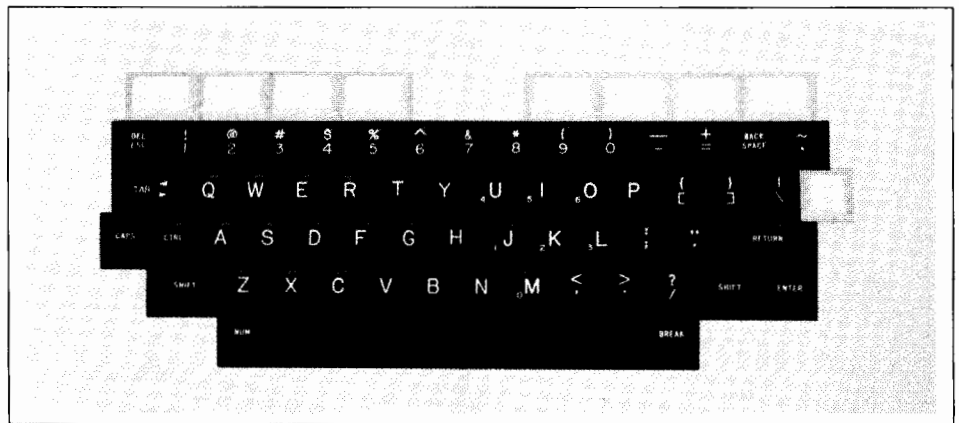


Figure 4-2. HP 2621 Keyboard Character Set Group

## The Terminal's Keyboard

The **TAB** key is used to generate a move to a TAB stop position within the current row or to the next or previous row if no TAB stop exists in the current row. Used by itself, tabular moves may be performed to the right along the row. Used in combination with the **SHIFT** key, tabular moves may be performed to the left along the row. The TAB stop positions are set via a Function key (see "Function Key Group") or by an escape code sequence.

When you enter **TAB** (TAB right), the cursor skips forward to the next tabulation stop to the right of the current cursor position, or to the default TAB stop at the left margin of the next row if no stops exist in the current row.

When you enter **SHIFT** and **TAB** (TAB left), the cursor skips backward to the next tabulation stop to the left of the current cursor position, or to the first TAB stop encountered in the previous row if no stops exist in the current row.

A Power Off followed by a Power On (or holding down **CTRL** and **SHIFT** while pressing **BREAK**) resets the terminal to default conditions with a TAB stop at the left margin (in this case, column 1).

The **CAPS** key is a toggle switch that changes state each time you press it. When the terminal is generating lowercase alphabetic characters, press the **CAPS** key once to cause a shift to uppercase. Only keys with uppercase letters on the keycaps

are affected. Press it again to return to lowercase. Note that the **SHIFT** key remains active even when you have enabled the **CAPS** key. That is, if you have enabled the **CAPS** key, pressing the **SHIFT** key causes a shift to lowercase for as long as the **SHIFT** key is held down. The action of this key differs from that of the Caps Lock Function key (see Section V). A Power Off followed by Power On (or holding down **CTRL** and **SHIFT** while pressing **BREAK**) resets the terminal to default conditions with the **CAPS** key disabled.

THE **DEL** key has two purposes. Used by itself, it generates the ASCII escape character. Used in combination with the **SHIFT** key, it generates the ASCII delete character.

The **CTRL** key is used in combination with other keys to generate control sequences.

The **ENTER** key is used to initiate a line data transfer via the data communications interface within the terminal. For Line mode and Modify mode, the data transmitted via the **ENTER** key is appended with the same string configured into the **RETURN** key (see Section V). The **ENTER** key is ignored in Local mode (the REMOTE function disabled).

The **BREAK** key is used to interrupt data communications between the terminal and an external host computer. To reset the terminal to the initial Power On state, press and hold **CTRL** and **SHIFT** and then

press the **BREAK** key. When REMOTE is enabled, pressing this key has no effect on the Data Communications line. The **BREAK** key is ignored in Local mode (the REMOTE function disabled).

Note that the use of the space bar on this terminal is normally destructive. A blank space is placed in the current character position (marked by the cursor) whenever you press the space bar.

### Exercise

Make sure the terminal is in Local mode (REMOTE disabled). Then, type in a few lines of text to get used to the keyboard. This part of the terminal works much like a typewriter. Note that you can use the backspace key to overwrite and change characters on the screen.

### Language Differences:

Keyboard layout and operation varies depending on the national option selected. During configuration (Section V) you can select either US (United States) or a national mode of operation. Your terminal however, will be equipped to operate in only one national language. The language available will depend on the option ordered with the terminal. (See Section II.)

Note that while you may select any language during configuration, the terminal will only be equipped to display characters for one language option. Selecting a language other than the option ordered may produce erroneous results.

If your terminal is equipped with the French language (option -003) you can select one of two modes of operation. The keyboard layout for option -003 is shipped with the top row of keys beginning "A", "Z". (See figure 4-1.)

An alternate keyboard layout is available. The top row of keys can be configured with "Q" and "W" by holding the **CTRL** key down when selecting the French language configuration (see Section V "Configuration").

Q W E R T Y  
A S D  
Z X

Note that the A, Z, Q, and W keys will have to be removed and reinstalled in the alternate layout if the "QWERTY" sequence is desired. Instructions for moving keycaps are given in the service manual (02620-90002).

## Numeric Pad Group

This group of keys supplements the standard keyboard numeric keys. The numeric pad consists of 12 keys that are embedded into the Character Set Group, and a **NUM** key used to enable or disable the numeric pad. Figure 4-3 shows the location of the keys in the Numeric Pad Group.

The numeric pad includes the characters 0 through 9, decimal point (period), and comma. These keys are arranged in a format similar to that used for calculators.

The numeric pad character symbols are imprinted on the key caps. The characters 0 through 6 appear in the lower left corner of the alphabetic character keys M, J, K, L, U, I, and O, respectively. The remaining numeric pad characters (7 through 9, decimal point, and comma) make use of those same characters from the Character Set Group.

Note that although use of the **NUM** key enables the Numeric Pad Group of keys, all of the other keys on the keyboard remain active and, if pressed, generate a character.

The **NUM** key has both an unshifted and shifted mode, as follows:

### **NUM** Key Unshifted Mode

When used by itself (unshifted), the **NUM** key enables the Numeric Pad Group of keys. Press **NUM** and hold it down for as long as you want access to the numeric pad. Release **NUM** to return to the standard character set.

### **NUM** Key Shifted Mode

When the **NUM** key is pressed in combination with the **SHIFT** key, access to the Numeric Pad Group is "locked" into the enabled state. When you have finished using the numeric pad and wish to return to the standard character set, simply press and release the **NUM** key to disable the pad.

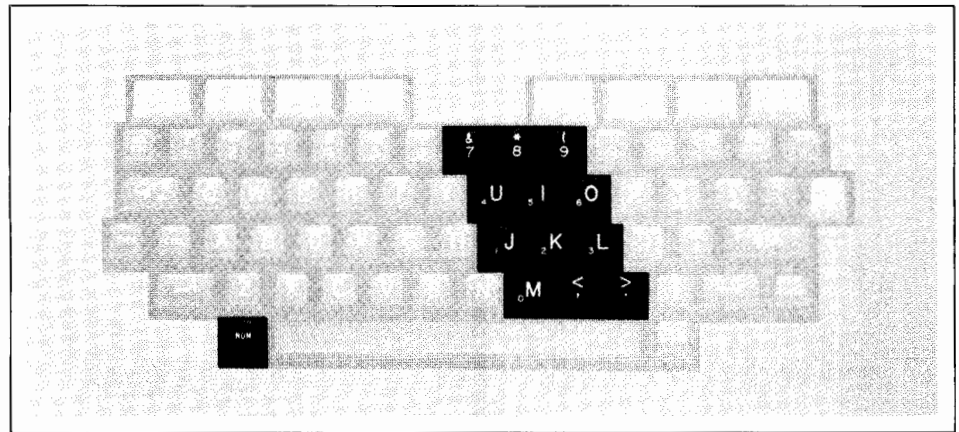


Figure 4-3. HP 2621 Keyboard Numeric Pad Group

Function Key Group

The Function Key Group consists of eight Function keys located across the top of the keyboard, and a Labels key located at the right edge of the character set group. Figure 4-4 shows the Function Key Group.

Function Key Unshifted Mode

When these keys are used by themselves (unshifted mode) they cause execution of the cursor or text control function imprinted on the key cap. The unshifted mode functions are:

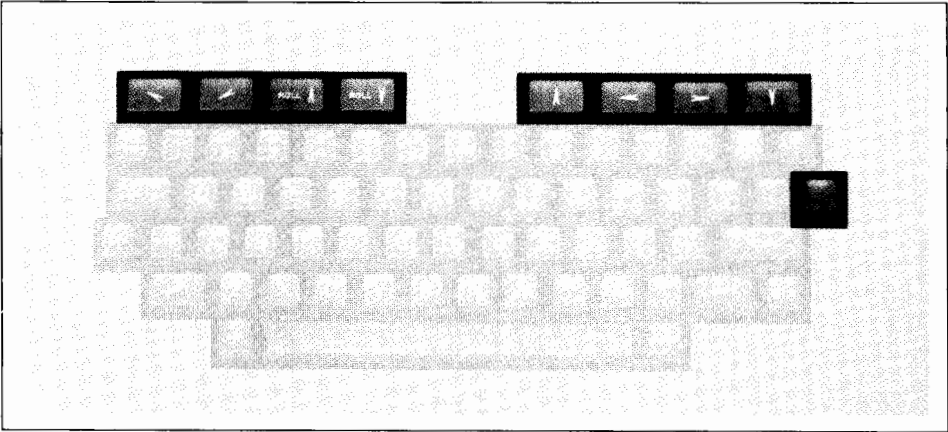










Figure 4-4. HP 2621 Keyboard Function Key Group

Key	Function
	Home Cursor Up — Positions the cursor to the top left corner of the display screen (row 1, left margin) and rolls the text in display memory down as far as possible so that the first line of text in memory appears in row 1 of the screen.
	Home Cursor Down — Positions the cursor to the bottom left corner of the display screen (row 24, left margin) and rolls the text in display memory up as far as possible so that the last line of text in memory plus one blank line appears at the bottom of the screen. If there are fewer than 24 lines of text in display memory, the cursor is positioned to the left margin of a blank line following the last screen row containing text. In the home down position, the cursor is always in a blank screen row.

Key	Function
	Roll Text Up — Each time this key is pressed, the text in display memory is rolled upward one row on the screen. The top row of text is rolled off the screen but is not destroyed. If you hold this key down, text continues to roll upward until the last line of text in memory appears on the screen, at which time the rolling action stops. Normally, the rolling action stops whenever there is no additional data to display.
	Roll Text Down — Each time this key is pressed, the text in display memory is rolled downward one row on the screen. The bottom row of text may be rolled off the screen but is not destroyed. If you hold this key down, text continues to roll downward until the first line of text in memory appears on the screen, at which time the rolling action stops. Normally, the rolling action stops whenever there is no additional data to display.
	Move Cursor Up — Each time this key is pressed, the cursor is moved upward one row in the current column position. If you hold the key down, upward movement continues row-by-row. When the cursor is in screen row 1, any text in memory is rolled down one line. This action continues as long as the key is held down until the first line of text in memory is reached.

Key	Function
	Move Cursor Left — Each time this key is pressed, the cursor is moved one column to the left in the current screen row. If you hold the key down, the cursor continues to move left. When the cursor is in column 1 of the row, it will wrap around to column 80 of the preceding row. When the cursor is in column 1 of row 1, pressing this key causes the text in display memory to be rolled down one line and the cursor moves to column 80 of the new line. This action continues as long as the key is held down until column 1 of the first line of text in display memory is reached.
	Move Cursor Right — Each time this key is pressed, the cursor is moved one column to the right in the current screen row. If you hold the key down, the cursor continues to move right. When the cursor is in column 80 of the row, it will wrap around to column 1 of the succeeding row. When the cursor is in column 80 of row 24, pressing this key causes the text in memory to be rolled up one line and the cursor moves to column 1 of the new line. This action continues as long as the key is held down until column 80 of the last line of text in display memory is reached.
	Move Cursor Down — Each time this key is pressed, the cursor is moved downward one row in the current column position. If you hold the key down, downward movement continues row-by-row. When the cursor is in screen row 24, any text in display memory is rolled up one line. This action continues as long as the key is held down until the last line of text in memory is reached.



### Labels Key

This key is located to the right of the character set group and is the only unmarked key on the keyboard (see Figure 4-4). The Labels key is used to manipulate the screen display of the Function labels.

## Screen Labels

There are several levels of screen displayed function labels. The initial display is a primary set of screen labels. The structure of the screen labels function set is shown in Figure 4-5.

### NOTE

To return to the primary set of labels from any of the other sets, press the **ESC** key and the **ESC** key. To return to the previous set of labels, press **ESC**.

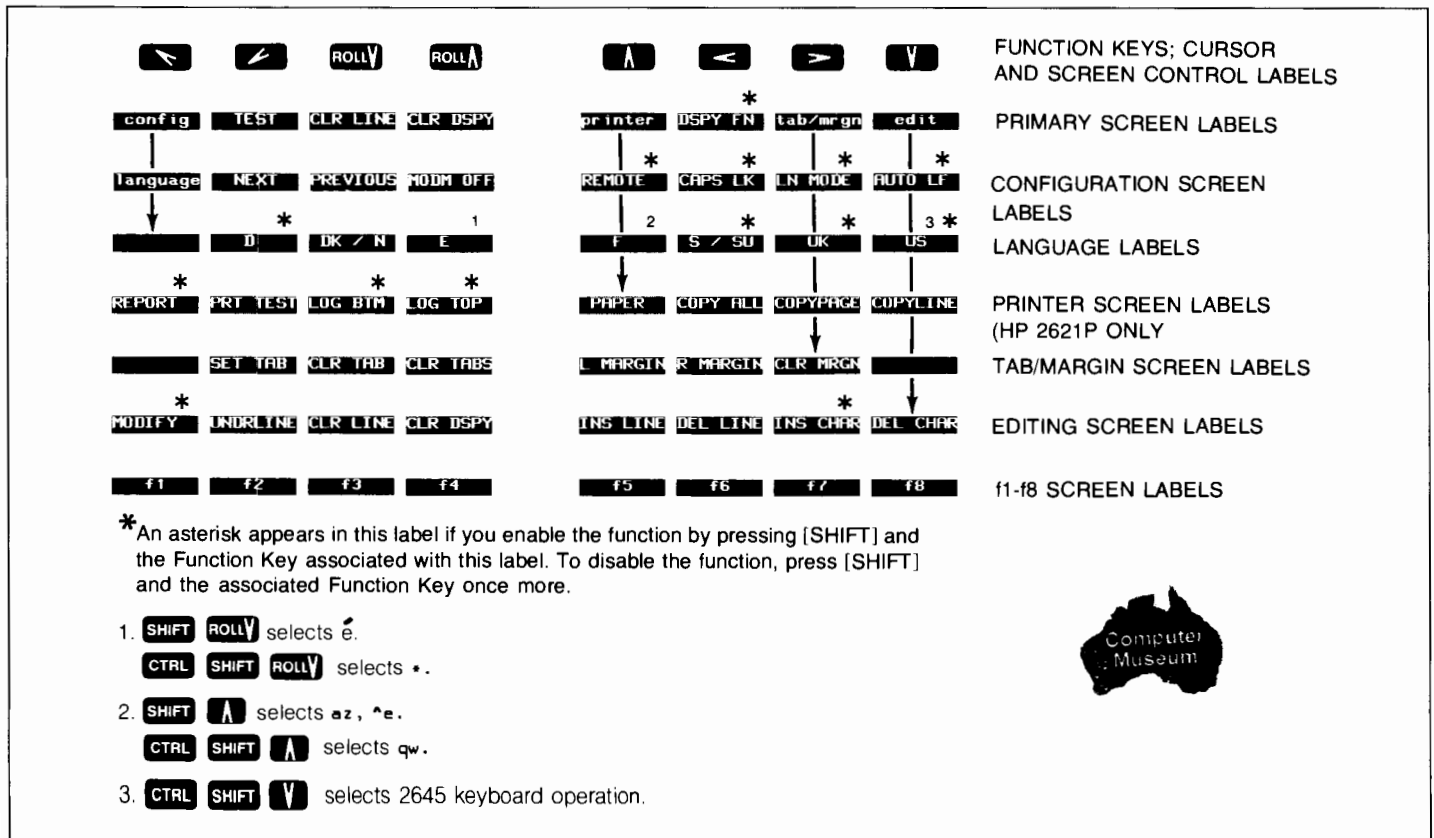


Figure 4-5. HP 2621 Screen Labels Structure

## The Terminal's Keyboard

The Labels key is used by itself (unshifted), in combination with the **SHIFT** key (shifted), or in combination with the **CTRL** and **SHIFT** keys (control shifted) to obtain various results, as explained in the following paragraphs.

### Labels Key, Unshifted

Usually, you use the Labels key to return to the primary set of screen labels from one of the subsets. You also can turn on the display of screen labels when it has been shut off.

When either of these conditions exists (the screen labels display is a subset such as config, tab/mrgn, or edit, or the screen labels display has been shut off), press the Labels key by itself to cause the primary set of labels to return to the screen. For results when the f1—f8 subset is displayed, see the following section.

### Labels Key, Shifted

You use the Labels key in combination with the **SHIFT** key to cause the display of the f1—f8 screen labels:

A row of function keys labeled f1, f2, f3, f4, f5, f6, and f7. The keys are dark with light-colored text. f1 and f2 are clearly visible, followed by f3, f4, f5, f6, and f7.

When the primary set of screen labels, or any subset of screen labels (except the config subset) is displayed, press and hold down the **SHIFT** key and then press the Labels key to cause the display of the f1—f8 screen labels subset.

To terminate the f1—f8 function subset, simply press the Labels key by itself. Control returns to the set of screen labels (either primary or a subset) from which you requested the f1—f8 screen labels.

For example, if you were using the TAB and margin control functions and had the tab/mrgn screen labels displayed when you pressed the **SHIFT** and Labels keys, the tab/mrgn screen labels are replaced by the f1—f8 screen labels. Now, when you press the Labels key by itself, the screen labels display returns to the tab/mrgn screen labels. You must press the Labels key once more (unshifted) to get to the primary set of screen labels.

### Labels Key, Control Shifted

To shut off the display of the screen labels, press and hold down the **CTRL** and **SHIFT** keys and then press the Labels key. The display of the screen labels is shut off until you press the Labels key (or shifted Labels key) once again.

The screen labels display line includes an "active modem" indicator asterisk and a cursor position column indicator. These indicators are shut off whenever the screen labels are shut off. See "Function Labels, Shifted Mode" for a description of the indicators. If you are using the terminal to communicate with a computer via a modem and the "active modem" indicator is required by your facility, do not shut off the screen labels.

## Function Key Shifted Mode

When the function keys are used in combination with the **SHIFT** key (shifted mode), they cause execution of the functions named by the function labels that are displayed at the bottom of your screen.

The primary Function labels appear as follows:






```
config  TEST  CLR LINE  CLR DSPY  a nn  printer  DSPY FN  tab/mrgn  edit
```




- a* An asterisk is displayed in this position if the Data Set Ready control line (RS232C CC line or CCITT V.24 107 line) is high (true). This indicator disappears from the display if the Data Set Ready control line goes low (false), or if the screen labels display is shut off (control shifted Labels key).

Normally, this indicator is used when your terminal is connected to a computer via a modem. The indicator signals that the modem line is active. Do not shut off the screen labels display if your facility requires the use of the active modem indicator.

- nn* A number appears in this position that identifies the current column position of the cursor (in the range 1–80). This column number is incremented or decremented each time the cursor is moved to a new position on the screen.

The shifted mode functions are described beginning on the following page:

Function Label	Key Stroke	Function
[config]	Shifted 	Set the terminal into Configuration mode: The current configuration is displayed on the screen together with a set of configuration function key labels that you may use to manipulate the terminal's configuration. The configuration data requires three lines of display memory. When memory is full (48 lines of data), you will lose data from memory upon requesting Configuration mode. Section V contains details about the configuration of the terminal.
[TEST]	Shifted 	Perform a diagnostic test of the terminal: check ROM, Video RAM, Program RAM, Keyboard Chip, then display the full character set and the status bytes. If an error condition is encountered, an appropriate message is displayed. Section VIII contains a description of the Test function.
[CLR LINE]	Shifted 	Clear Line — this function clears (erases) the content of the current line from the character marked by the cursor through the last character in the line. Move the cursor to the character position where you want the line deletion to begin and press the shifted Function key associated with this label.
[CLR DSPY]	Shifted 	Clear Display — this function clears (erases) the content of display memory from the character marked by the cursor through the last character in memory. Move the cursor to the character position where you want the memory deletion to begin and press the shifted Function key associated with this label.
[printer]	Shifted 	Applicable only to the HP 2621P Interactive Terminal. See Section VI. This label is blank in an HP 2621A.

Function Label	Key Stroke	Function
[DSPY FN]	Shifted 	<p>Cause terminal control function codes, such as escape sequences, to be displayed symbolically on the screen rather than being executed by the terminal. An asterisk appears on the screen immediately to the right of this label when this function is enabled (for example, [DSPY FN*])</p> <p>When Display Functions is enabled in Local operating mode, all characters are displayed. The Return character (CR) is displayed and a Return/Linefeed (CR/LF) is executed.</p> <p>In Remote operating mode, the Null and Delete characters are used for padding. They are not displayed. If the ENQ/ACK handshake is enabled (See Configuraiton, Section V), the ENQ character is executed but not displayed. If the ENQ/ACK handshake is disabled, ENQ is not executed but is displayed.</p> <p>To terminate the display of function codes, press this key again. The asterisk disappears from the label and function codes are no longer displayed on the screen.</p>
[tab/mrgn]	Shifted 	<p>Display a set of function key labels that you may use to set TAB stop positions, clear any single TAB stop position, or clear all TAB stop positions. You may also define the position of the left and right margins of the display screen, and clear these margins.</p>
[edit]	Shifted 	<p>Display a set of function key labels that you may use to perform editing operations upon text in display memory. Editing operations provided include: Modify, underline, clear line or display, insert or delete line, and insert or delete character.</p>

## Configuration Function Set

When you request Configuration mode (press **SHIFT** together with the Function key labeled [config]), you are able to examine and change the internal configuration of your terminal. The process of reconfiguration is described in Section V.

**SET TAB CLR TAB CLR TABS**







## Printer Control Function Set

The printer functions apply only to the HP 2621P. These functions are described in Section VI.

**L MARGIN R MARGIN CLR MRGN**

## TAB and Margin Control Function Set


When you request TAB and Margin Control (press **SHIFT** together with the Function key labeled [tab/mrgn]), a new set of Function labels appears on your screen, as follows:






Function Label	Key Stroke	Function
[SET TAB]	Shifted 	Set TAB Stop — this function sets a tabulation stop at the current position of the cursor. Move the cursor to the column where you want a TAB stop and press the shifted Function key associated with this label.
[CLR TAB]	Shifted 	Clear TAB Stop — this function clears (erases) any tabulation stop at the current position of the cursor. Position the cursor to the column where you want to remove a TAB stop and press the shifted Function key associated with this label. Note that the default TAB stop at the left margin can be cleared using this function. The TAB key is ignored when no TAB stops are defined.
[CLR TABS]	Shifted 	Clear All TAB Stops — this function clears (erases) all existing tabulation stops. Simply press the shifted Function key associated with this label. Following execution of this function, a default TAB stop is set at the left margin.
[L MARGIN]	Shifted 	Set Left Margin — this function sets the left text margin at the current position of the cursor. Move the cursor to the column where you want the left margin and press the shifted Function key associated with this label. A default TAB stop is set at the left margin whenever this function is executed.
[R MARGIN]	Shifted 	Set Right Margin — this function sets the right text margin at the current position of the cursor. Move the cursor to the column where you want the right margin and press the shifted Function key associated with this label. It is illegal to set the right margin to the left of the left margin. If you attempt to do this, the terminal ignores your request and sounds a bell tone.
[CLR MRGN]	Shifted 	Clear Margins — this function clears (erases) any left and right margin set between column 2 and 79 inclusive. The left margin is reset at column 1 and the right margin is reset at column 80. A default TAB stop is set at the left margin (in this case, column 1).

## Edit Control Function Set



The edit control functions allow you to perform various editing operations upon text in display memory. When you request Edit Control (press **SHIFT** together with the Function key labeled **[edit]**), a new set of Function labels appear on the screen, as follows:

**MODIFY** **UNDRLINE** **CLR LINE** **CLR DSPY**      **INS LINE** **DEL LINE** **INS CHR** **DEL CHAR**

Function Label	Key Stroke	Function
<b>[MODIFY]</b>	Shifted 	<p>Modify Text — this function enables Modify mode while you are interacting with a host computer. For example, if you are in Character mode and transmit an erroneous command string to the host computer and receive an error message in response, you can enable Modify mode, correct the error in the command string on the screen, and retransmit the command without having to retype the entire string. To enable Modify mode, press the shifted Function key associated with this label. An asterisk is displayed within the label to indicate that the Modify mode is in the enabled state. Move the cursor to the line you want to change and use the Edit Functions to make the desired changes. When the line is changed to what you want, press <b>ENTER</b> or <b>RETURN</b> to transmit the changed line to the host computer. The use of the <b>ENTER</b> or <b>RETURN</b> key executes Modify mode. The current line (marked by the cursor) is transmitted to the computer and the asterisk is removed from the <b>[MODIFY]</b> screen label.</p> <p>To disable modify mode (before you press either <b>ENTER</b> or <b>RETURN</b>), press the shifted function key associated with the <b>[MODIFY*]</b> screen label. The asterisk is removed from the label and Modify mode is disabled.</p> <p>The amount of data retransmitted is a function of the Line mode transmission rules. See "Sending Data To The Computer" in Section V for a discussion of Line mode data transmission.</p>

Function Label	Key Stroke	Function
[UNDRLINE]	SHIFTED 	Display Underline — this function adds an underline character at the current cursor position. Each time the [UNDRLINE] Function key is pressed an underline character is added to the current character. If you hold this key down the underline repeats along the line until you release the Function key. Note that this underline function differs from the ASCII-coded underline character.
[CLR LINE]	Shifted 	Clear Line — this function clears (erases) the content of the current line from the character marked by the cursor through the last character in the line. Move the cursor to the character position where you want the line deletion to begin and press the shifted Function key associated with this label.
[CLR DSPY]	Shifted 	Clear Display — this function clears (erases) the content of display memory from the character marked by the cursor through the last character in memory. Move the cursor to the character position where you want the memory deletion to begin and press the shifted Function key associated with this label.
[INS LINE]	Shifted 	Insert Line — this function inserts a blank line into display memory immediately preceding the line marked by the cursor. Move the cursor to the line before which you want to insert a line and press the shifted Function key associated with this label. A new blank line is inserted into memory and the cursor position remains unchanged (it remains in the same row and column).  When memory is full (48 lines of data) and the cursor is at row 1, an insert request deletes a line from the bottom of memory to make room for the line to be inserted. When memory is full and the cursor is at any row other than 1, an insert request deletes a line from the top of memory.
[DEL LINE]	Shifted 	Delete Line — this function deletes an entire line at the current cursor position. Move the cursor to any character position within the line you want deleted and press the shifted Function key associated with this label. The entire line is deleted from display memory. The cursor position is unchanged (it remains in the same row and column).



Function Label	Key Stroke	Function
[INS CHR]	Shifted 	<p>Insert Character — this function enables the Insert Character mode. When enabled, any character that you enter is inserted into display memory in the position immediately preceding the cursor. Move the cursor to the character position at which you want to insert one or more characters and press the shifted Function key associated with this label. An asterisk is displayed within the label to indicate that the Insert Character mode is enabled. Then, insert new characters. While inserting characters, any existing characters are shifted to the right one character position within the same line for each new character entered.</p> <p>Any characters shifted beyond the right margin setting are lost. No wraparound occurs.</p> <p>To disable Insert Character mode, simply press the shifted Function key associated with this label. The asterisk is removed from the label and you cannot insert new characters. Any characters entered when Insert Character mode is disabled overwrite existing characters in the line.</p>
[DEL CHAR]	Shifted 	<p>Delete Character — this function deletes one character marked by the cursor. Move the cursor to the character you want deleted and press the shifted Function key associated with this label. The character is erased from memory. Remaining characters within the same line are shifted to the left one character position for each character deleted.</p>



# Using the Terminal as an Input/Output Device

## Section V

The HP 2621 Terminal can be connected, either directly or through a modem, to an external data processing device such as a computer.

You may be required to select specific characteristics that define the terminal operation before you can use it as a data communications device. This set up procedure is called "configuring" the terminal.

For the HP 2621, configuration parameters are maintained within programmable fields that are displayable on the screen. Included among these fields are:

- Values that define the terminal's data transfer baud rate.
- Keywords that define the type of parity generated by the terminal and the duplex setting of the terminal.
- Single-character mnemonics that define the data handling straps and the type of data communications handshake.
- Values that match the frequency of your local A.C. electric power and the starting column position for the transmission of data across the data communications line.

- National language to be used.
- A two-character redefinable string associated with the **RETURN** and **ENTER** keys.

You use the cursor left or right **<** , or **>** keys to position the cursor for modification of the desired parameter.

You may use the TAB right or left **TAB>** , or **TAB<** key to position the cursor to the beginning of any displayed field in the configuration data.

The configuration function descriptions follow:

You use the **[config]** function key to enter configuration mode and display the configuration parameters on the screen. When requested, these parameters are displayed together with a set of function key labels with which you may change the parametric values. Using the keys associated with these labels, you configure the terminal to match your Local mode requirements or the Remote mode requirements of an external computer system.



## Using the Terminal as an Input/Output Device

The initial HP 2621 configuration data is displayed on the screen in the following format:

<u>Baud Rate</u>	<u>Parity</u>	<u>Duplex</u>	<u>Straps</u>	<u>Handshake</u>	<u>Hz</u>	<u>Start Col</u>	<u>Return</u>
2400	NONE (0)	FULL	abcgHxz	Etx	60	1	(9)

language	NEXT	PREVIOUS	MODM OFF	REMOTE	CAPS LK	LN MODE	AUTO LF
----------	------	----------	----------	--------	---------	---------	---------


Note that the configuration data uses three lines of display memory. Thus, if memory is full and you request the configuration data, you may lose up to three lines from display memory.







When you are in Configuration mode and make changes to the displayed configuration fields, these changes do not become effective until you terminate the Configuration mode.




### Configuration Function Keys

The NEXT and PREVIOUS functions are used to manipulate the displayed configuration data.

The remaining functions define conditions such as Modem Disconnect, REMOTE mode enable/disable, uppercase character (CAPS) lock/unlock (teletypewriter simulation), Line mode enable/disable, automatic linefeed enable/disable, and language.









Configuration Mode is terminated by pressing the  key. The configuration data and screen labels disappear from the screen and are replaced by the content of display memory and the primary set of screen labels.

Function Label	Key Stroke	Function
[Language]	Shifted 	The language function causes a national language menu to be displayed. The cursor can then be moved to select the desired language. When a language is selected an asterisk (*) will appear in the language menu to indicate which language has been selected.
[NEXT]	Shifted 	The NEXT function sets the current configuration parameter (the cursor marks the current parameter) to the next available value. For the straps and for handshake, NEXT simply changes the state of the parameter from lowercase to uppercase, or vice versa. For Baud Rate, Parity, Duplex, Hz, and Start Col, the next available value replaces the current value each time you execute NEXT. The RETURN field is not affected by the NEXT function.
[PREVIOUS]	Shifted 	The PREVIOUS function sets the current configuration parameter (the cursor marks the current parameter) to the previous available value. For the straps and for handshake, PREVIOUS changes the state of the parameter from lowercase to uppercase, and vice versa. For Baud Rate, Parity, Duplex, Hz, and Start Col, the previous available value replaces the current value each time you execute the PREVIOUS function. The RETURN field is not affected by the PREVIOUS function.
[MODEM OFF]	Shifted 	Modem Disconnect – This function directs the terminal to “hang-up” the modem. The Data Terminal Ready signal is immediately lowered and the cursor disappears from the screen for approximately three seconds.
[REMOTE]	Shifted 	This function enables the connection to a remote computer via the data communication interface. An asterisk appears in the label when this function is enabled (for example, [REMOTE*]). To disable this mode (that is, to allow Local mode) press the function key associated with this label once again.
[CAPS LK]	Shifted 	This function causes the terminal's alphabetic keys to be locked into uppercase characters. Specifically, the terminal generates only the ASCII characters a through tilda (not characters with code values 97-126). If the characters ` and ~ are present on the keyboard, they are ignored. (Refer to the ASCII coded character set in Appendix A.) When a lowercase national character key is pressed and there is no equivalent uppercase national character (e, e, u, or s), a Roman capital character (E, U, or S) will be generated. An asterisk appears in the label when this function is enabled (for example, [CAPS LK*]).

Function Label	Key Stroke	Function
[LN MODE]	Shifted 	<p>When Caps Lock is disabled, the complete ASCII Character Set (128 characters) is generated by the terminal. For remote operation, the HP 2621 always accepts the complete 128 characters whether Caps Lock is enabled or disabled.</p> <p>This function enables Line Mode. When Line Mode is enabled, data entered into display memory appears on the screen but is not transmitted across the data communications link until after the <b>ENTER</b> or <b>RETURN</b> key is pressed and the host computer has responded. An asterisk appears in the label when this function is enabled (for example, [LN MODE*]).</p> <p>In Line mode, the amount of data transmitted is determined as follows: If you have created the line to be transmitted using the keyboard, data is transmitted from the point where you started typing data. If the remote computer created the line to be transmitted (and you have not typed anything into the line) data is transmitted from the point defined by the Start Col field in Configuration mode. Trailing blanks are suppressed. If you have typed data into a computer-generated line of data, transmission begins at the point where you started typing.</p> <p>When this function is disabled, the terminal operates in Character Mode. Each character entered is transmitted immediately across the data communications link when the character's key is pressed.</p>
[AUTO LF]	Shifted 	<p>This function enables Automatic Linefeed. When enabled, a Linefeed is generated automatically each time the <b>RETURN</b> or <b>ENTER</b> key is pressed. This function should be enabled when you operate the terminal in local mode and should be disabled when you operate the terminal in remote mode, depending on the requirements of the host computer. An asterisk appears in the label when Automatic Linefeed is enabled (for example, [AUTO LF*]).</p>
[Labels]		<p>This function terminates Configuration mode. The screen returns to the screen conditions that existed before you requested configuration mode. You also may terminate Configuration mode by pressing the Labels key.</p>

Baud Rate Configuration

The speed at which data transfers occur between the terminal and the host computer is determined by the value set into the Baud Rate parameter field. The available Baud Rate values are EXT., 110, 150, 200, 300, 600, 1200, 1800, 2400, 3600, 4800, and 9600. The value you select must match the capability of the host computer or that of the modem link between the terminal and computer. The defaulted baud rate value is 2400.









To change the Baud Rate value, use the cursor left  or cursor right  key to position the cursor beneath the first character of the current Baud Rate value on the screen. You also may use  or  to move the cursor to this field. Then execute the NEXT or PREVIOUS function (  and  or  and  ) until the appropriate value is displayed.

Parity Configuration

The type of parity generated for each data byte is determined by the value set into the Parity parameter field. The available parity types are NONE(0), NONE(1), EVEN, ODD, and 8-BIT. The type selected must match the requirements of the host computer. The defaulted parity is NONE(0).

The available parity types are:

NONE(0)	No parity is generated; eighth bit is always 0.
NONE(1)	No parity is generated; eighth bit is always 1.
EVEN	Even parity is generated; eighth bit is parity result.
ODD	Odd parity is generated; eighth bit is parity result.
8-bit	Generates 8-bit codes for extended character sets.









To change the Parity value, use the cursor left  or cursor right  key to position the cursor beneath the first character of the current Parity value on the screen. You also may use  or  to move the cursor to this field. Then, execute the NEXT or PREVIOUS function (  and  or  and  ) until the appropriate value is displayed.

Duplex Configuration

The type of echo duplex for data communications transmission can be determined by the keyword set into the Duplex parameter field. The available duplex types are FULL and HALF. The default type is FULL Duplex.









In Character mode, FULL duplex indicates that the terminal transmits a character to the computer and the computer should provide the echo to the display screen.

HALF duplex indicates that the terminal both transmits a character to the computer and echoes that character locally to the display screen.

To change the Duplex keyword, use the cursor left  or cursor right  key to position the cursor beneath the first character of the current Duplex keyword on the screen. You also may use  or  to move the cursor to this field. Then, execute the NEXT or PREVIOUS function (  and  or  and  ).

Strap Configuration

Each strap is represented on the screen by a single alphabetic character. You enable or disable a strap by changing the state of the displayed character from lowercase to uppercase, or vice versa. Table 5—1 lists the straps and their condition when either lowercase or uppercase. A description of each strap follows Table 5—1.

When the configuration parameters are displayed, you use the cursor left  or cursor right  key to move the cursor to a position beneath the character representing the strap you want to change. You may use  or  to move the cursor to this field. When the cursor is positioned correctly, the state of the strap character can be changed by executing either the NEXT or PREVIOUS function; that is,  and  or  and .





**Escape Sequence Transmission.** Enabling the A strap (A displayed in configuration line) will cause the terminal to send some keyboard escape sequences to the computer. If the terminal is set for remote, certain terminal keys will send their equivalent escape sequences to the computer when pressed. The [CURSOR UP] key for example will not move the cursor up but will instead send  to the computer. A list of escape sequences is given in Appendix A. These are often used by the CPU to monitor cursor position.

Table 5—1. HP 2621 Strapping Configuration

Strap	Closed	Open
Escape Sequence Transmission	a (disabled)	A (enabled)
Space Overwrite (SPOW) Latch	b (disabled)	B (enabled)
Wraparound Cursor, End—Of—Line	c (enabled)	C (disabled)
Short Transfer Trigger Handshake (Block Transfer Handshake)	g (enabled)	G (disabled)*
Long Transfer Warning Handshake (Inhibit  )	h (enabled)	H (disabled)
Data Speed Select	x (disabled)	X (enabled)
Parity Check	z (enabled)	Z (disabled)

\* Although the Short Transfer Trigger Handshake is disabled, transfer conditions become dependent on the state of the Long Transfer Warning Handshake strap. For further information, see the description for these straps, below.

**Space Overwrite (SPOW) Latch.** When this strap is enabled, the SPOW latch can be turned on by a Return character (CR), and turned off by , a Linefeed, or . When the SPOW latch is on, the space bar causes the cursor to move to the right along the current line without overwriting existing characters. When the SPOW latch is off, the space bar causes an overwrite of blank (space) characters as the cursor moves along the current line.

When this strap is disabled (the defaulted state), the SPOW latch is not accessible.

**Wraparound Cursor, End—Of—Line.** When enabled (the defaulted state), this strap causes the cursor to wrap around to the beginning of the next line on the screen whenever the right margin of any line is exceeded. The terminal generates a Return and a Linefeed character to accomplish this.

When this strap is disabled, no Return or Linefeed character is generated at the end of a line. The cursor remains in, and overwrites the content of the right margin.



**Short Transfer Trigger Handshake (Block Transfer Handshake). Long Transfer Warning Handshake (Inhibit DC2).** The HP 2621 provides three kinds of data transfer operations that are meaningful in Remote mode only; Long Transfer in Line mode, Long Transfer in Character Mode, and Short Transfer.

#### Long Transfer, Line Mode

A data transfer operation initiated via the **ENTER** or **RETURN** key while the terminal's Line mode or Modify function is enabled.

#### Long Transfer, Character Mode

A data transfer operation initiated via the **ENTER** or **RETURN** key while the terminal's Line mode or Modify function is disabled.

#### Short Transfer

A data transfer operation involving:

1. Terminal Status
2. f1 through f8 functions
3. Completion Status Indicator (S, F, or U) following a remote print operation request via escape code sequence (HP 2621P only).
4. Cursor Sensing

If more than one transfer request is pending simultaneously, the execution priority is:

1. Status Requests
2. Cursor Sense Requests
3. f1-f8 Function Requests
4. **ENTER** or **RETURN** Key Line Transfer Requests
5. Completion Status Responses

The complete DC1/DC2 handshake protocol consists of a "trigger" signal (DC1) sent from the host computer to inform the terminal that a data transfer is possible. In response, the terminal sends a "warning" signal (DC2) to the host computer indicating that the data to be transferred is ready. The host computer sends another trigger signal (DC1) to enable the transfer. Figure 5-1 illustrates the handshake protocol.

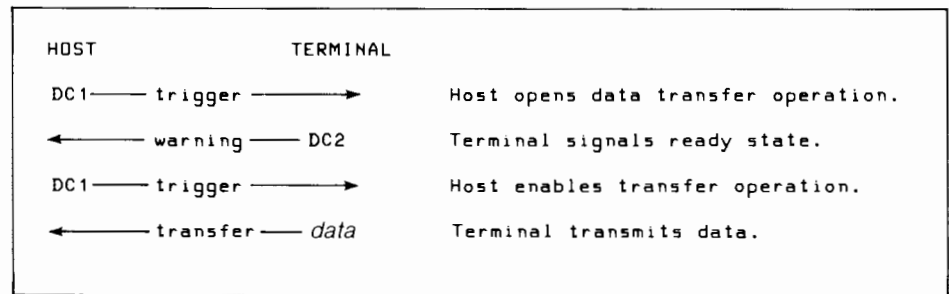
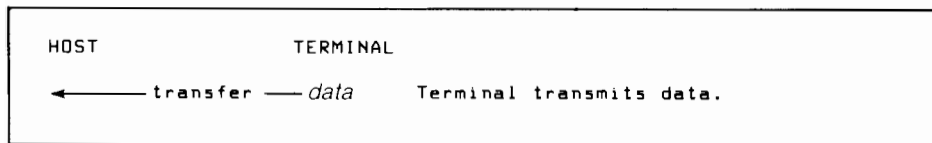


Figure 5-1. DC1/DC2 Handshake Protocol

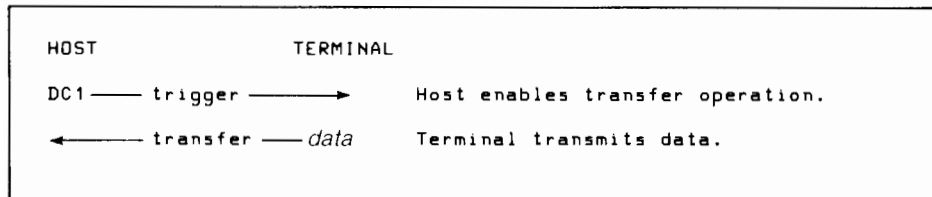
## Using the Terminal as an Input/Output Device

Depending on the state of the g and h straps, one of three subsets of the handshake protocol shown in Figure 5-1 is used by the terminal, as follows:

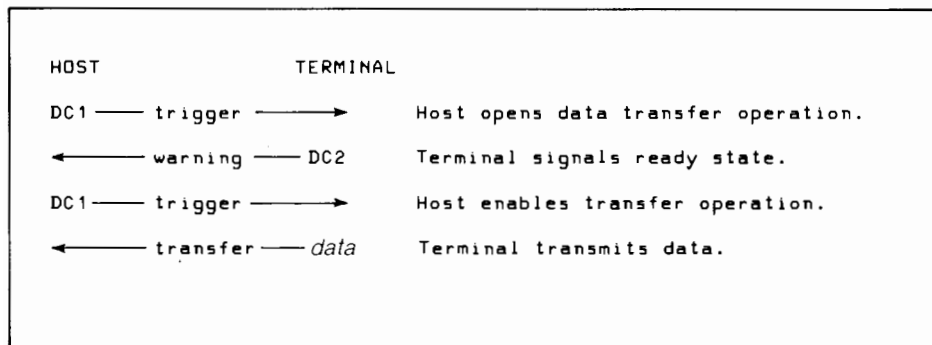
### TYPE 1 (No Handshake)



### TYPE 2 (DC1 Trigger Handshake)



### TYPE 3 (DC1/DC2/DC1 Warning Handshake)



The effect of the various g and h strap states is shown in Table 5–2.

Table 5–2. DC1/DC2 Handshake Protocol Strapping Effects

Strap State	Transfer Category		
	Long (Line Mode)	Short	Long (Char Mode)
g,h	TYPE 3	TYPE 2	TYPE 1
g,H	TYPE 1	TYPE 2	TYPE 1
(default)	TYPE 3	TYPE 3	TYPE 3
G,h	TYPE 1	TYPE 1	TYPE 1
G,H			

**Data Speed Select.** This strap allows the operation of modems that support dual speed data transmission. When this strap is enabled, the data speed signal (RS232C CH line or CCITT V.24 111 line) is in the High (on) state.

When disabled (the defaulted state), the data speed signal (RS232C CH line or CCITT V.24 111 line) is in the Low (off) state.

**Parity Check.** When the Parity Check strap is enabled (the defaulted state), a parity check for even or odd parity is performed by the terminal upon received data.

When this strap is disabled, no parity check is performed.

Note that parity is never checked for received data if the terminal is not generating parity, i.e., is configured for either NONE(0) or NONE(1) parity.

Handshake Configuration

Each handshake type is represented on the screen by a single alphabetic character. You enable or disable the type of handshake by changing the state of the displayed character from lowercase to uppercase, or vice versa. Table 5-3 lists the handshake types and their condition when either lowercase or uppercase. A description of each handshake type follows Table 5-3.







When the configuration parameters are displayed, you use the cursor left  or cursor right  key to move the cursor to a position beneath the character representing the handshake you want to change. You may use  or  to move the cursor to this field. When the cursor is positioned correctly, press and hold down  while you press . This executes the NEXT function which results in a change of state for the handshake character. Either the NEXT or PREVIOUS function may be used to change a character's state.

Table 5-3. Data Communications Handshake Configuration

Handshake	Closed	Open
ENQ/ACK Handshake	e (disabled)	E (enabled)
Transmit Handshake	t (disabled)	T (enabled)
XON/XOFF Handshake	x (disabled)	X (enabled)

**ENQ/ACK Handshake.** This type of handshake may be used to ensure that the terminal has an empty input buffer before the host computer transmits more data. When this strap is enabled (the defaulted state), an acknowledge signal (ACK) is transmitted by the terminal each time an enquiry signal (ENQ) is encountered from the host computer. Any data contained in the buffer is processed before the ACK signal is transmitted. The buffer size is 128 characters. You should transmit an ENQ from the computer following 120 characters (maximum).

When this strap is disabled, any enquiry signal (ENQ) encountered from the host computer is treated by the terminal as a normal data character. No acknowledge signal (ACK) is generated.

**Transmit Handshake.** When this handshake type is enabled (T), the host computer can transmit a "busy" signal across the Clear To Send (RS232C CB or CCITT V.24 106) or Received Line Signal Detector (RS232C CF or CCITT V.24 109) line to temporarily stop the transmission of data

from the terminal (temporarily set the signal to the false state).

When this handshake type is disabled (the defaulted state), data transmission continues uninterrupted by the computer.

**XON/XOFF Handshake.** This handshake protocol allows the terminal to signal the host computer to stop transmitting data and, subsequently, to resume transmitting data as the input buffer fills and empties.

When this strap is enabled, the input buffer fills to within approximately 40 bytes of its capacity. At this point, the terminal sends a Transmit Off (XOFF) signal to cause the computer to stop sending data. When the buffer has emptied below one-fourth of its capacity (32 characters), the terminal sends a Transmit On (XON) signal which causes the computer to resume sending data. This process is repeated until the current data transfer operation is completed.

When this handshake type is disabled (the defaulted state), no XON/XOFF handshake occurs between the terminal and the computer.

Note that the XON signal is represented by a DC1 (CTRL Q) character transmission. The XOFF signal is represented by a DC3 (CTRL S) character transmission.

### Hz Configuration

The value set for this strap must match the frequency of your local A.C. power (that is, the frequency on your power line). For an area with a 60-cycle power frequency (such as the U.S.A. or Canada), set this value to 60 (the defaulted state). For Europe and elsewhere with 50-cycle power frequency, set this value to 50.

Setting this strap merely changes the refresh rate for screen data. It does not change or affect the type of input power supplied to the terminal.

For information concerning input power requirements, consult the HP 2621 Service Manual, HP Part No. 02620-90002.

To change the state of the Hz Configuration, use the cursor control keys **←** or **→** to position the cursor at the first character of this field. You also may use **TAB→** or **TAB←** to move the cursor to this field. Press **SHIFT** and **↙**, or **SHIFT** and **↘** to change the state within the Hz field. Either the NEXT or PREVIOUS function may be used to change the frequency value from 60 to 50, and vice versa.

### Start Column Configuration

You may specify a column number from which data transmission is to begin on the screen. Any characters to the left of the starting column are ignored when the **ENTER** or **RETURN** key is pressed. This allows you to retransmit a line without having to physically remove the computer's prompt character. For example, if the computer issues a 1-character prompt in response to your entries, you can specify a starting column of 2. Lines later re-entered are transmitted from column 2 to the end of the line.

This parameter is overridden by the logical start-of-text pointer maintained by the terminal. See "Sending Data to the Computer" for a description of the logical start-of-text pointer.

The defaulted starting column is 1. To change this value, use the cursor left **←** or cursor right **→** key to position the cursor to the first position within the Start Col field. You also may use **TAB→** or **TAB←** to move the cursor to this field. Then, use the NEXT or PREVIOUS Function key to increment or decrement the starting column value (press **SHIFT** and **↙**, or **SHIFT** and **↘**).

**D** **DK / N** **E**

### Return Key Configuration

You can specify one or two characters that will be transmitted each time the **RETURN** or **ENTER** key is pressed. Any ISO character is legal, however, these are usually control codes that you wish to pass to the host computer. See Appendix A for a table of legal ISO characters.

Note that the **RETURN** and **ENTER** key perform the same transmit operation only in Line and Modify mode. Their operations differ in Character mode.

To specify RETURN key characters, use the cursor left **←** or cursor right **→** key to move the cursor to the first character position in the RETURN parameter field. You may use **TAB→** or **TAB←** to move the cursor to this field. Enter the desired character or characters from the keyboard. The default value is **CR**.

### Language Configuration

The terminal can be configured to operate with several national language options. These options are described in Section I. To configure the terminal for a national language option use the language key **SHIFT** and **↙** to select language configuration. This will cause the language menu to be displayed.

**F** **S / SU** **UK** **US**

The function keys can then be used to select the desired language.

When a language is selected, an "\*" will be displayed in the label field. The French language will display an "AZ" or "QW" to indicate the keyboard version selected. The French and Spanish languages will display an accent character to indicate that mute mode is not selected.

If French language operation is selected, the accents " and ^ will be mute. If Spanish language operation is selected, 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 use the **SHIFT** key when selecting the 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.

If **CTRL** is held down while French is selected the "QWERTY" keyboard configuration will be selected.

Example: Select the French national option.

Step 1. Select configuration mode by pressing config **SHIFT** **↵**.

Step 2 Enter language configuration by pressing language **SHIFT** **↵**.

Step 3. Select French by pressing the corresponding function key **SHIFT** **^**.

Step 4. Return to the basic Configuration mode by pressing the **↵** key. To return to normal terminal operation press the **↵** key again.

#### NOTE

The language configuration must match the terminal option ordered to ensure proper operation.

Language configuration information is stored in non-volatile memory along with the other configuration information.

### Terminating the Configuration Mode

When you are satisfied with the configuration data on the screen, terminate Configuration Mode by pressing the [Labels] key. The configuration data is stored in nonvolatile memory, protected from destruction by a battery should the main power source be interrupted for any reason.

### Selecting The Remote Operating Mode

Before the terminal can send and receive data via the data communications interface, you must enable remote operation. You accomplish this by enabling the REMOTE function. Press **SHIFT** and **↵** keys to obtain the Configuration screen labels. The labels appear in the following format:

language **NEXT** **PREVIOUS** **MODM OFF**

To execute the REMOTE function, press and hold down **SHIFT** while you press **^**.

An asterisk appears in the REMOTE function label to indicate that the function is enabled. For example, (REMOTE\*).

To disable Remote mode, press Shifted **^** once more. The asterisk disappears from the label and Local mode is in effect.

### Modem Considerations

If you are communicating with the host computer through a modem, it may be necessary for you to turn on a modem power switch or make modem parity setting changes. The modem's baud rate and parity settings should be the same as those configured in the terminal.

The HP 2621 supports the Bell 103A, Bell 212A, or equivalent type of modem.

Whenever the modem line (Data Set Ready) is active, an asterisk appears between the fourth and fifth screen label at the bottom of the screen. If your facility requires the display of this "active modem" indicator, do not shut off the screen labels display.

### Sending Data To The Computer

You enter the data to be sent to the host computer into display memory from the terminal's keyboard. If your terminal is configured for Character mode, the data is transmitted character-by-character as you type it.

**REMOTE** **CAPS LK** **LN MODE** **AUTO LF**

When a character is obtained from a single keystroke (t<sup>o</sup>, t<sup>u</sup>, etc.) the single ISO code assigned to the key will be generated. National character combinations that are obtained using two keystrokes (t<sup>•</sup>, t<sup>•</sup> for e circumflex) will be sent as two individual character codes.

If 8-bit operation has been selected, all national language characters are sent as single 8-bit codes. A table of 8-bit codes is given in Appendix A.

In character mode (remote), everytime a key is pressed a code is sent on data comm. Everytime a code is received from data comm a character is put into display memory. In French or Spanish, if a mute accent is received and mute mode is on, the cursor does not advance, the next character is displayed instead, and the accent is lost. If mute mode is off, both characters are displayed normally.

If eight bit mode is on, any national replacement character key generates an eight-bit character. When 8-bit characters are received from data comm and the terminal is equipped to display the graphic for the character it will be displayed. If the terminal is not equipped to display the character, the default graphic for the 8-bit code will be displayed instead.

If the **ENTER** key is pressed, the displayed line containing the cursor (from start of text) is transmitted as it is seen on the display. Characters which have been dis-

played as default characters are transmitted as the default characters. Accents lost by mute mode are not transmitted.

### Note

Characters generated with two keystrokes are always sent as two distinct character codes when in character mode.

If your terminal is configured for Line mode, you type a single line and use the **ENTER** or **RETURN** key to transmit data.

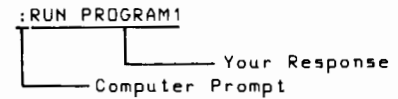
Line mode allows you to enter into memory an entire line of up to 80 characters. The data that you type into the line is not transmitted to the computer until you press either **ENTER** or **RETURN**. The line appears on the screen and you can make changes to the displayed data at any time before you press **ENTER** or **RETURN**.

The amount of data transferred to the computer is dependent on the logical start-of-text pointer or the value set into the Configuration mode Start Column field.

A logical start-of-text pointer is maintained by the terminal for each line in memory. The pointer is zero until a character is typed into the line. Then, the pointer is set to the column number where the first character was entered. Note that the setting of the logical start-of-text pointer occurs only at the bottom (last) line of memory.

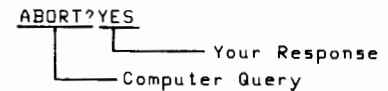
Examples:

1. Assume that the computer sends a single-character colon prompt (:) to the terminal and that you enter a system command in response to this prompt:



The logical start-of-text pointer for this line (at the bottom of memory) is zero until you enter the RUN command, at which time the pointer is set to column 2.

2. Assume that the computer sends a query message that, in turn, you respond to with "YES":



In this case, the logical start-of-text pointer is set in column 7.

The logical start-of-text pointer is used for Line mode, Modify mode or when using the **ENTER** key in Character mode. Either this pointer or the Configuration Start Column value affect the amount of data transmitted to the computer.

When the value of the logical start-of-text pointer is zero, the Configuration Start Column value is used to determine the starting point of the data transmission.

When the value of the logical start-of-text pointer is any value greater than zero, the pointer itself is used to determine the starting point of the data transmission.

Modify mode (a screen labeled Edit function) places your terminal in temporary Line mode. When you want to change the content of a line in memory, enter Modify mode and position the cursor to the appropriate line on the screen. Type in the changes you want to make within the line and then press **ENTER** or **RETURN**. The line marked by the cursor is transmitted to the computer and Modify mode is disabled automatically.

The amount of data transferred is governed by the logical start-of-text pointer or the Configuration mode Start Column value described for Line mode, above. The start-of-text pointer has greater priority than the Start Column pointer.

## Receiving Data From The Computer

No special action is required to receive data from the host computer other than having the REMOTE function enabled. Data is displayed on the screen as it is received from the computer.

It may be necessary to configure for a specific type of handshake when you transmit control codes, escape sequences, or are using the HP 2621P printer.

If national language operation has been selected, valid national character codes will be converted to the appropriate display characters. If the terminal is in mute mode, the cursor will not be advanced when certain national characters ^, ", ' are received.

Table 5-4. Escape Sequences, Cursor and Screen Control

Function	Code	Description
Cursor Up	esc A	Move cursor up by one row.
Cursor Down	esc B	Move cursor down by one row.
Cursor Right	esc C	Move cursor right by one column.
Cursor Left	esc D	Move cursor left by one column.
Home Down	esc F	Cursor Home Down.
Home Up	esc H	Cursor Home Up.
	esc h	Cursor Home Up.
Roll Up	esc S	Scroll display up by one line.
Roll Down	esc T	Scroll display down by one line.

Table 5-5. Escape Sequences, Terminal Control

Function	Code	Description
Reset Terminal	esc E	Set terminal to power ON state.
Test Terminal	esc z	Self-test, terminal.
Display Functions On	esc Y	Disable execution of any control functions, but display their code; display asterisk in screen label (IDSPY FN*1).
Display Functions Off	esc Z	Enable execution of any control functions; do not display their code; remove asterisk from screen label (IDSPY FN 1).



Table 5-6. Escape Sequences, TAB and Margin Control

Function	Code	Description
Set TAB Stop	esc 1	Set a tabulation stop at current cursor position.
Clear TAB Stop	esc 2	Delete a tabulation stop at current cursor position.
Clear All TAB Stops	esc 3	Delete all tabulation stops.
Set Left Margin	esc 4	Set left margin at current cursor position.
Set Right Margin	esc 5	Set right margin at current cursor position.

## Escape Code Sequences

The HP 2621 recognizes a set of escape code sequences that can be transmitted from a host computer. These sequences are used to control cursor and screen display, the terminal, margin and tabulation stop settings, editing, cursor addressing, display enhancement, cursor sensing, and so forth (see table 5-12).

In addition to the escape code sequences recognized upon receipt from a host computer, you can transmit some escape code sequences from the terminal to a host computer via the Function keys. To access these codes, press and hold down **SHIFT**, and then press the Labels key. The following Function labels are displayed across the bottom of the screen.

Table 5-7. Escape Sequences, Edit Control

Function	Code	Description
Clear Line	esc K	Delete current line from current cursor position to end-of-line.
Clear Display	esc J	Clear display memory from current cursor position to end-of-memory.
Insert Line	esc L	Insert blank line at current cursor position.
Delete Line	esc M	Delete entire line at current cursor position.
Insert Character On	esc Q	Enable Insert Character Function; display asterisk in screen label; subsequent character—entry inserts a character into line at current cursor position.
Insert Character Off	esc R	Disable Insert Character Function; remove asterisk from screen label.
Delete Character	esc P	Delete character at current character position.

f1

f2

f3

f4

f5

f6

f7

f8

Table 5-8. Escape Sequences, Miscellaneous Control

Code	Description
$\text{Esc } @$	Delay; generate a one second pause within the terminal.
$\text{Esc } ^$	Primary status request; generate the terminal's primary status bytes and transmit them to the requesting computer. See Appendix C for information about the terminal's Primary status.
$\text{Esc } d$	Enable Line Transfer (ENTER key function).
$\text{Esc } f$	Modem Disconnect; Set CD signal (RS232C) or 108.2 signal (CCITT V.24) on modem line low for 3 seconds.
$\text{Esc } i$	Backtab; move cursor left to TAB stop position.
$\text{Esc } * s 1 ^$	Identify; causes the terminal to return 2621A or 2621P.
$\text{Esc } & q 0 L$	Configuration: Unlock; releases the configuration parameters so that the terminal can be reconfigured.
$\text{Esc } & q 1 L$	Configuration Lock; causes the configuration parameters to be locked so that they cannot be accidentally modified. Only the Modem Off parameter can be changed.

Table 5—9a. Escape Sequences, Cursor Sensing

Function	Code	Description
Absolute Cursor Sense	$\text{esc } a$	Obtain absolute column and row location of cursor within display memory.
Relative Cursor Sense	$\text{esc}$	Obtain column and row location of cursor relative to the beginning of the currently displayed screen page.

Most escape sequences are affected by the A strap (Escape Sequence Transmission). Refer to Appendix A for additional information on the transmission of escape sequences.

**NOTES:**

1) Generally, actual cursor positional values are referenced in the following notation:

- screen column positions—1 through 80
- screen row positions—1 through 24
- memory row positions—1 through 48

2) For cursor sensing and addressing, the positional values are referenced in the following notation:

- screen column positions—0 through 79
- screen row positions—0 through 23
- memory row positions—0 through 47

3) The form of the response for the cursor sense sequence is given in Appendix D.

Table 5–9b. Escape Sequences, Cursor Address Control

Note that the base sequence is `esc & a`

Code	Description
<code>esc &amp; a</code> <i>memory row number r</i> <i>column number C</i>	Absolute Memory Addressing; move cursor to any displayable position by using absolute memory coordinates. The range of <i>memory row number</i> is 0–47. The range of <i>column number</i> is 0–79.
<code>esc &amp; a</code> <i>screen row number y</i> <i>column number C</i>	Absolute Screen Addressing; move cursor to any position currently displayed on the screen by using screen relative coordinates. The range of <i>screen row number</i> is 0–23. The range of <i>column number</i> is 0–79.
<code>esc &amp; a +/-</code> <i>memory row number r</i> <i>column number C</i>	Relative Memory Addressing; move cursor to any displayable position by using memory coordinates relative to the current cursor position (+ or – memory row; + or – column).
<code>esc &amp; a +/-</code> <i>screen row number y</i> <i>+/- column number C</i>	Relative Screen Addressing; move cursor to any position currently displayed on the screen by using screen coordinates relative to the current cursor position (+ or – screen row; + or – column number).

These sequences always must be terminated with an uppercase character (rather than a lowercase character) to inform the terminal that the sequence has ended. For example, in the sequence `esc & a 12r 45C`, the uppercase C character is the sequence terminator.

Table 5–10. Escape Sequences, Display Enhancement Control

Note that the base sequence is `esc & d`

Code	Description
<code>esc &amp; d A through O</code>	Enable Underline Function; subsequent character entries include underline on display screen.
<code>esc &amp; d @</code>	Disable Underline Function.

Table 5–11. Escape Sequences, Screen Labels Control

Note that the base sequence is `esc & j`

Function	Code	Description
Clear Labels	<code>esc &amp; j @</code>	Clear Screen Labels. Turn off display of screen labels.
Display Labels	<code>esc &amp; j A</code>	Display Primary Screen Labels. Turn on display of first level of screen labels.
Display f1 – f8 Labels	<code>esc &amp; j B</code>	Display Function Keys f1 through f8. Turn on display of f1–f8 screen labels.

Table 5-12. Escape Code Sequences Transmitted by the HP 2621

Code	Description	
<code>esc\ 7-byte status data</code>  S, F, or U	Primary Status Response; When an <code>esc ^</code> sequence is received, the terminal generates this 7-byte status response and transmits it to the requesting computer. HP 2621P Only; device completion response transmitted following any printer control escape sequence, <code>esc &amp; p . . . .</code> . The terminal responds with S to indicate that the print operation was successful; F to indicate failure; or U to indicate user interference (for example, the RETURN key was held down preventing completion of the print operation).	
Function	Code	Description
Transmit Key [ f 1 ]	<code>esc p</code>	Transmit <code>esc p</code> sequence to computer.
Transmit Key [ f 2 ]	<code>esc q</code>	Transmit <code>esc q</code> sequence to computer.
Transmit Key [ f 3 ]	<code>esc r</code>	Transmit <code>esc r</code> sequence to computer.
Transmit Key [ f 4 ]	<code>esc s</code>	Transmit <code>esc s</code> sequence to computer.
Transmit Key [ f 5 ]	<code>esc t</code>	Transmit <code>esc t</code> sequence to computer.
Transmit Key [ f 6 ]	<code>esc u</code>	Transmit <code>esc u</code> sequence to computer.
Transmit Key [ f 7 ]	<code>esc v</code>	Transmit <code>esc v</code> sequence to computer.
Transmit Key [ f 8 ]	<code>esc w</code>	Transmit <code>esc w</code> sequence to computer.

Note that the terminating character for each code transmitted is the string configured into the **RETURN** key together with a line-feed character if automatic linefeed is enabled. The transmission occurs under control of the g and h strap state for a Short Transfer Trigger Handshake (Block Transfer Handshake); see Section V.



Table 5-13. ISO/ASCII-coded Control Codes

ASCII Code		Code Definition
(hexadecimal)	(decimal)	
07	7	Bell
08	8	BACKSPACE
09	9	Horizontal TAB
0A	10	Linefeed
0D	13	RETURN
05	5	ENQ — Enquiry; if ENQ/ACK hankshake is enabled, terminal responds with 006 (ACK Acknowledge).
0C	12	Form Feed to printer (HP 2621P only); if Report Mode is enabled, printer skips to top of new page. If Report Mode is disabled, Form Feed code is ignored.
11	17	DC1; depending on which type of DC1/DC2 handshake protocol is enabled, the terminal responds with data, DC2, or nothing.
1B	27	ESC; signals start of an escape sequence.

This section describes the features offered by the HP 2621P Interactive Terminal. The HP 2621P provides all of the features described in the preceding sections of this manual, plus an integral thermal printer mechanism.

A set of screen labeled printer control functions is available with which you can control the form and content of printer output data. In addition to the control functions, the HP 2621P supports a set of printer control es-

cape sequences. You may use these escape sequences to programmatically control the form and content of printer output data from an external computer.

When communicating with Hewlett-Packard regarding your terminal, specify the model, serial, and 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.

Identifying Options and Accessories

Table 6-1 lists options available for the HP 2621P Terminal. Table 6-2 lists accessories available for the HP 2621P Terminal.

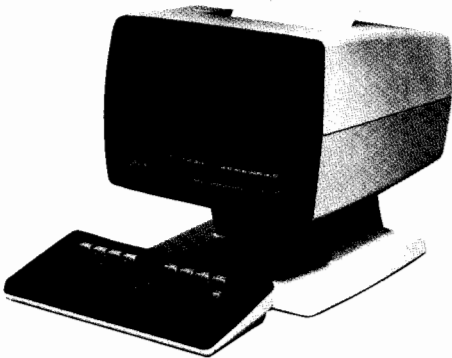
Table 6-1. HP 2621P Options

Option No.	Description
015	50Hz, 220V, 1.2A, 170W Power
016	50Hz, 115V, 2.4A, 170W Power

Tables 6-1 and 6-2 list options and accessories available for the HP 2621P Terminal.

Table 6-2. HP 2621P Accessories

Accessory No.	Description
13222N	U.S.A. Modem Cable (Male Connector)
13222M	European Modem Cable (Male Connector)
13222C	RS232C Cable (Female Connector)
13222W	HP 300 Cable (Female Connector)
13222Y	Three Wire Cable (Male Connector)
13222Z	Three Wire Cable (Female Connector)



## Thermal Printer Paper

The HP 2621P mechanism uses a thermal printing paper produced specifically for use by this product. 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, HP Part No. 92160A (blue) or 92160B (black).

It is recommended that you always use this HP Thermal Paper in your terminal. If you have an HP Warranty and Service Contract, you must use HP Thermal Paper to maintain a valid contract. HP Warranty and Service Contracts are available through your local HP Sales and Service Office.

### Paper Loading

The print mechanism is shown in Figure 6-1.

To load a roll of Thermal Paper into the printer, refer to Figure 6-1 and use the following instructions:

1. Lift the top cover of the printer mechanism. An illustration of the correct paper position and flow is embossed on the underside of this cover.
2. Press the latch (Figure 6-1) 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 center paper core is held in place by a metal rod inserted through the center of the core. Grasp the core and lift forward and upward along the guide slots to remove the paper core and rod.
5. Remove the rod from the old core and insert the rod through the core of a new roll of paper.
6. The Thermal Paper is coated with print material on one side and must be inserted into the printer correctly to produce the print image. The paper must feed toward the front of the terminal from the underside of the paper roll (see the embossed illustration on the top cover).

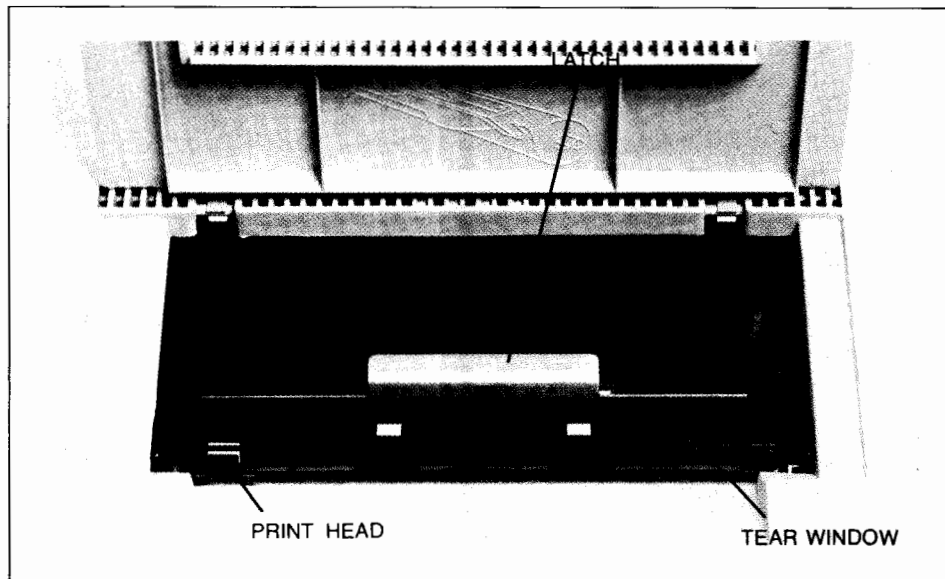


Figure 6-1. Printer Mechanism



7. Place the ends of the metal rod into the guide slots on either side of the print mechanism and press downward and then toward the back of the terminal until the rod snaps into place.
8. Feed the leading edge of the paper through the latching frame (between the latching frame and the clear plastic guide window). Be careful not to sharply strike the print head because damage may result.
9. Each new roll of paper has a glue spot near the leading edge of the roll that holds the paper roll intact. You should not allow the print head 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. Lower the latching frame without locking it into place.  
  
Align the sides of the paper with the guide lines embossed on each side of the guide window.
12. **IMPORTANT!** Press down the latch until it locks into place with an audible click sound.
13. Tear off excess paper using the edge of the guide window as a cutting edge.
14. Close the top cover securely.











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

## Printer Control Functions

The printer control functions allow you to copy data from display memory to the internal line printer. When you request printer control functions (press **SHIFT** together with the Function key labeled `[printer]`), a new set of screen labels appear, as follows:

REPORT PRT TEST LOG BTM LOG TOP

PAPER COPY ALL COPYPAGE COPYLINE

Function Label	Key Stroke	Function
[REPORT]	Shifted 	Enable REPORT print mode; display an asterisk in label. For example, [REPORT *]. Subsequent print operations are in paged format, i.e., print 60 lines, skip 3 lines, print a tic mark for a page break, skip 3 lines, then print 60 lines, and so forth. To disable REPORT print mode, press the Shifted Function key once more.
	Control Shifted 	Enable Metric REPORT mode; press and hold down the <b>CTRL</b> and <b>SHIFT</b> keys while you press  . An asterisk is displayed in the REPORT label. For example, [REPORT *]. Subsequent print operations are in metric paged format; that is, print 64 lines, skip 3 lines, print a tic mark for a page break, skip 3 lines, then print 64 lines, and so forth. To disable Metric REPORT print mode, press either the Shifted Function key or Control Shifted Function key once more.
[PRT TEST]	Shifted 	Printer Test; execute test of internal printer mechanism. Display test pattern on printer.
[LOG BTM]	Shifted 	Enable Logging from Bottom of Memory; display asterisk in label. For example, [LOG BTM*]. Current line entry is copied to the printer upon the cursor leaving this line.
[LOG TOP]	Shifted 	Enable Logging from Top of Memory; display asterisk in label. For example [LOG TOP*]. Subsequent line that rolls off top of memory is copied to printer.
[PAPER]	Shifted 	Paper advance on Printer; move printer paper up one line.
[COPY ALL]	Shifted 	Copy all data from memory to printer (from current line position marked by cursor to end-of-memory).
[COPYPAGE]	Shifted 	Copy all data on screen to printer (from current line position marked by cursor to end-of-screen).
[COPYLINE]	Shifted 	Copy current line on screen (marked by cursor) to printer.

The control code for a Form Feed produces various results depending on the conditions existing when a Form Feed is encountered. If REPORT mode is disabled, Form Feed is ignored.

If REPORT mode is enabled, and LOG TOP and LOG BTM are disabled, Form Feed results in a top-of-page operation on the printer (skip to new page and print tic mark).

If REPORT mode is enabled, and LOG TOP is enabled, Form Feed results in completion of logging from the screen to the printer, a top-of-page operation on the printer (skip to new page and print tic mark), and a top-of-page operation on the screen (home up, clear display).

If REPORT mode is enabled, and LOG BTM is enabled, Form Feed results in a top-of-page operation on the printer (skip to new page and print tic mark), and a top-of-page operation on the screen (home up, clear display).

The cursor does not leave its current position when either LOG TOP or LOG BTM are enabled and a COPY ALL, COPY PAGE, or COPY LINE operation is requested. The copy operation is performed and the cursor remains stationary.

Control codes for operations such as Form Feed and Escape that are displayed on the screen are transferred to the printer during logging or copy operations. However, displayed control codes for Carriage Return and Linefeed are not transferred from the screen to the printer. Instead, a period character is substituted for the Carriage Return and Linefeed during the print operation.

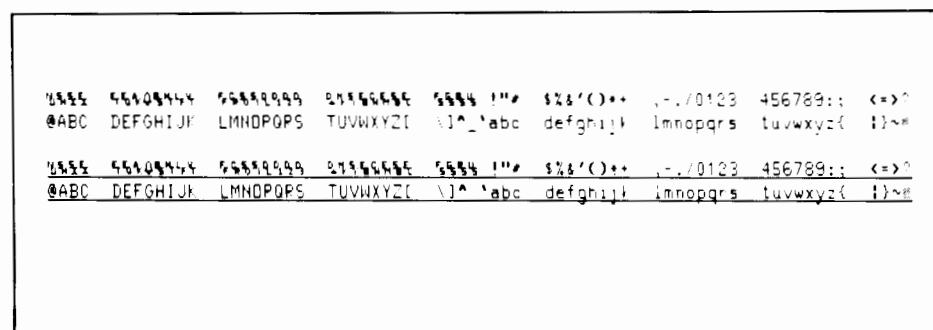


Figure 6-2. Printer Test Display

## Printer Control Escape Sequences

Note that for each printer control sequence (`esc & p ....`) received from a host computer, the terminal generates a device completion status response character to inform the computer of the final disposition of the requested print operation. An S is returned to indicate successful completion, F to indicate a failed completion, or U to indicate that the user interfered with the completion of the requested operation (for example, the **RETURN** key was held down which prevented the operation from being completed).

Table 6—3. HP 2621P Escape Sequences, Printer Control

Function	Code	Description
Copy All Memory	esc 0	Position the cursor to the left margin of first line of memory data and copy all of memory to printer.
Log Data From Memory Bottom	esc & p 11 C	Enable data logging from the bottom of memory (print the current entry line).
Log Data From Memory Top	esc & p 12 C	Enable data logging from the top of memory (print line as it rolls off top of memory).
Log Data Function Off	esc & p 13 C	Disable data logging (top or bottom, whichever is enabled).
Copy All Memory	esc & p M	Print all data in memory from current line (marked by cursor) to end of memory.
Copy One Page	esc & p F	Print all data on screen from current line (marked by cursor) to end of screen.
Copy One Line	esc & p B	Print current line (marked by cursor).

### Cleaning the Screen and Keyboard

The display screen and the keyboard should be cleaned regularly to remove dust and grease. First, lightly dust the entire terminal using a damp, lint-free cloth or paper towel. The cloth or paper towel should be damp enough to pick up any dust, but should not be wet. Avoid wiping dust or lint into the key area of the keyboard.

Greasy smudges and fingerprints can be removed using most conventional spray cleaners. Avoid spraying between the keys.

DO NOT use petroleum-based cleaners such as lighter fluid, or cleaners containing benzene, trichlorethylene, ammonia, dilute ammonia, or acetone because the terminal's plastic surfaces may be damaged.

### Battery Maintenance

The nonvolatile portion of memory that contains the terminal's configuration data is protected against destruction by a battery that is located just above the rear panel of your terminal. Figure 7-1 shows the rear panel and the location of the battery.

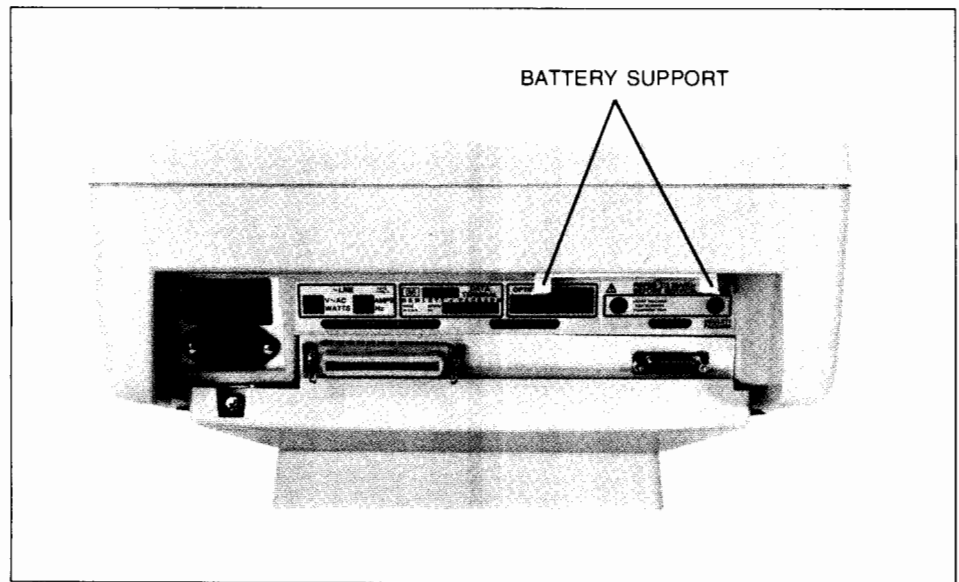


Figure 7-1. HP 2621 Battery Location, Rear Panel

## Preventive Maintenance

There is no care or maintenance required for the battery. The battery should be replaced with a new battery every 12 months. A new battery can be obtained through commercial sources. Request a 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 2621A/P 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 in the terminal's memory should be destroyed while the battery is not in place. You can use the following form to record the Configuration data:

Date battery replaced (Month, Day, Year):		_____					
BAUD RATE (circle one):	EXT.	110	150	200	300	600	
		1200	1800	2400	3600	4800	9600
PARITY (circle one):	NONE(0)	NONE(1)	EVEN	ODD			
DUPLEX (circle one):	FULL	HALF					
STRAPS (record state - uppercase or lowercase - in box):							
	b	c	g	h	x	z	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
HANDSHAKE (record state - uppercase or lowercase - in box):							
	e	t	x				
	<input type="text"/>	<input type="text"/>	<input type="text"/>				
HZ (circle one):	60	50					
START COL (record starting column number in box):							<input type="text"/>
RETURN (record state in blank space):	[CR ]						

To replace the battery:

1. Use your thumb and index finger to grasp the battery support at points A and B (see Figure 7-2).
2. Squeeze the tabs at points A and B toward the center of the battery support with enough pressure to disengage the flanges that hold the battery support in place.
3. Gently pull the support downward until it is completely free of the terminal housing.
4. Remove the old battery from the support.
5. Insert a new battery making sure that the positive end of the battery matches the positive end of the support (+ to + and - to -).
6. Reinsert the battery support into the terminal. A slotted guide along one side of the battery support ensures that the battery support is inserted correctly. The slotted guide must be facing away from the terminal case when you reinsert the support.

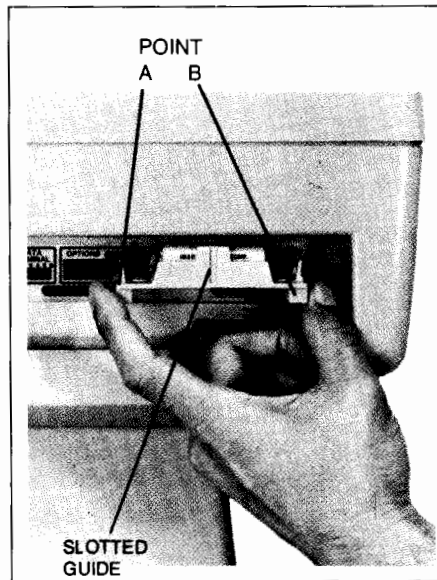


Figure 7-2. HP 2621 Battery Support





Press **SHIFT** together with the **[TEST]** Function key to perform a diagnostic test of the terminal. The test checks ROM, Video RAM, Program RAM, and the keyboard processor chip. In addition to these checks, a list of the full character set is displayed on the screen followed by a list of the terminals status bytes. Figure 8-1 shows the Self-test screen display. Appendix C defines the terminal's Primary status data.

If an error condition is encountered, an appropriate error message is displayed across the bottom of the screen (line 25). Table 8-1 contains a list of the error messages that may be generated as a result of test execution.

A diagnostic test of the terminal's data communication transmit, receive, and control lines can be performed under specific conditions. The data communications self-test is executed when you press both **CTRL** and **SHIFT** together with the **[TEST]** Function key. During the data communications test, signals are generated and transmitted from the terminal which must be "looped back" to the terminal to check the functioning of the data and control lines. This loop-back can be either a connector hood assembly or a modem interface that has an integral loop-back mode.

Detailed information about performing the data communications self-test and an interpretation of any resultant message is contained in the HP 2621 Service Manual, HP Part No. 02620-90002.

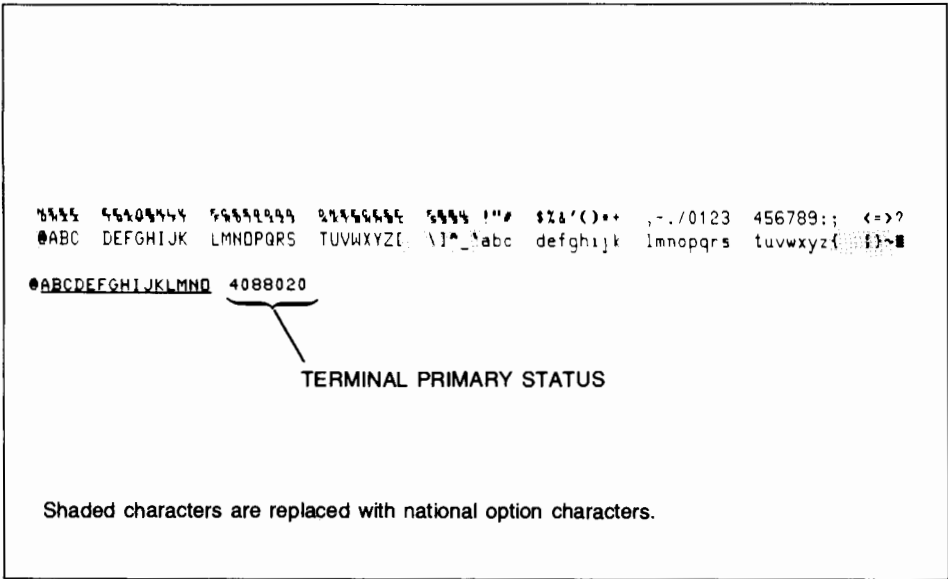


Figure 8-1. Self-Test Screen Display

Table 8-1. HP 2621 Diagnostic Error Messages

Message	Meaning	Action
PROGRAM RAM? <i>n1</i>	Error condition encountered in the Program RAM indicated by the value of <i>n1</i> which is in the range 0 through 1.	Contact a qualified service person (see the HP 2621 Interactive Terminal Service Manual).
DISPLAY RAM? <i>n2</i>	Error condition encountered in the Display RAM indicated by the value of <i>n2</i> which is in the range 0 through 7.	Contact a qualified service person (see the HP 2621 Interactive Terminal Service Manual).
ROM? <i>n3</i>	Error condition encountered in the ROM indicated by the value of <i>n3</i> which is in the range 0 through 1.	Contact a qualified service person (see the HP 2621 Interactive Terminal Service Manual).
KYBD CHIP?	Error condition encountered in the Keyboard Chip.	Contact a qualified service person (see the HP 2621 Interactive Terminal Service Manual).
PRINTER?	Error condition encountered in the printer mechanism.	Check to ensure that the latch or top cover is securely closed; check that the printer has a supply of paper.
PRINTER CHIP?	Error encountered in the printer chip.	Contact a qualified service person (see the HP 2621 Interactive Terminal Service Manual).

The following is a list of possible problem conditions that might occur together with suggested action for correcting the problem condition.

Problem	Action
1. When you turn on the Main Power Switch, the terminal comes up in Configuration mode.	This indicates a possible problem with the memory—protect battery. Check to make sure that the battery is installed properly (+ to + and securely seated). If this action does not correct the problem, replace the battery.
2. When you turn on the Main Power Switch, the terminal comes up with Self-test running continuously.	Press and hold down <b>CTRL</b> and <b>SHIFT</b> while you press the <b>BREAK</b> key to reset the terminal.
3. When you press a character key on the keyboard and nothing appears on the screen.	This indicates that the terminal may have Remote mode enabled. Enter the Configuration mode to make sure that Remote mode is disabled.
4. In Remote Mode, the DEL character appears on the screen.	This indicates that there may be a Data Communications error, or a buffer overflow condition.

## Resetting the Terminal

You reset the terminal by pressing and holding down the **CTRL** and **SHIFT** keys while you press the **BREAK** key. The result of this action is a reset to the initial Power On state. The Configuration parameters and screen labeled functions are not affected because they are protected from change within nonvolatile memory. The following default conditions do occur when the terminal is reset:

CAPS Lock — disabled  
 NUM Key — disabled  
 TAB Stops — cleared except for left margin (column 1)  
 Left Margin — set to column 1  
 Right Margin — set to column 80  
 DSPY FN — disabled  
 MODIFY — disabled  
 INS CHAR — disabled  
 REPORT (HP 2621P only) — disabled  
 LOG BTM (HP 2621P only) — disabled  
 LOG TOP (HP 2621P only) — disabled

## Hewlett-Packard ISO/ASCII-coded Character Set

## Appendix A

If the terminal is configured for 7-bit operation and a national language has been selected, the shaded characters in the ISO/ASCII table ( $B_8=0$ ) are replaced with the national language graphic.

		DECIMAL VALUE											
		35	64	91	92	93	94	96	123	124	125	126	
ASCII (U.S.)		#	@	[	\	]	^	`	{		}	~	
Swedish/Finnish (S/SU)	001	#	é	ä	ö	Å	ü	é	ä	ö	ä	ü	
Norwegian/Danish (DK/N)	002	#	@	æ	ø	Å	^	`	æ	ø	ä	~	
French (F)	003	£	à	·	ç	§	^	`	é	ù	è	~	
German (D)	004	£	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß	
United Kingdom (UK)	005	£	@	[	\	]	^	`	{		}	~	
Spanish (E)	006	#	@	í	ñ	¿	·	`	{	ñ	}	~	

The terminal can use 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. This allows national language as well as standard ISO character codes. Note that only the graphics supported by the one option ordered with the terminal can be displayed. The terminal can convert 8-bit Extended Roman characters into default character. The following table lists the standard ISO/ASCII ( $B_8=0$ ) and Extended Roman ( $B_8=1$ ) characters.

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

### Note

In order for characters to be properly received, displayed, and retransmitted, they must be in the ISO character set for which the terminal is equipped.

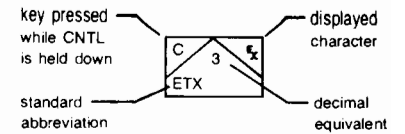
Characters shown in the upper left corner of the extended Roman characters are default characters. If the terminal is not configured for the extended character code received, the default character will be used.

BIT 4321	CONTROL (CNTL) CHARACTERS				DISPLAYABLE CHARACTERS			
	0 0	0 1	0 1	0 1	0 1	0 1	0 1	0 1
0000	@ NUL	P DLE	16 DL	SP	0	@	P	p
0001	A SOH	Q DC1	17 D1	I	1	A	Q	q
0010	B STX	R DC2	18 D2	"	2	B	R	r
0011	C ETX	S DC3	19 D3	#	3	C	S	s
0100	D EOT	T DC4	20 D4	S	4	D	T	t
0101	E ENQ	U NAK	21 Nk	%	5	E	U	e u
0110	F ACK	V SYN	22 Sv	&	6	F	V	f v
0111	G BEL	W ETB	23 Eb	,	7	G	W	g w
1000	H BS	X CAN	24 Cn	(	8	H	X	h x
1001	I HT	Y EM	25 Em	)	9	I	Y	i y
1010	J LF	Z SUB	26 Sb	*	:	J	Z	j z
1011	K VT	[ ESC	27 Ec	+	:	K	[	k {
1100	L FF	\ FS	28 Fs	,	<	L	\	l ;
1101	M CR	 GS	29 Gs	-	=	M		m }
1110	N SQ	^ RS	30 Rs	.	>	N	^	n ~
1111	O SI	_ US	31 Us	/	?	O	_	o DEL

B <sub>8</sub> = 1									
EXTENDED ROMAN CHARACTERS									
0 0	0 0	0 1	0 1	0 1	1 0	1 0	1 0	1 1	1 1
			-	-	a	á	A	Á	
					e	é	i	í	
					o	ó	O	Ó	
			SP	.	u	ú	A	Æ	
					a	á	a	á	
			c	ç	e	é	i	í	
			N	ñ	o	ó	o	ó	
			n	ñ	u	ú	a	æ	
			/	!	i	à	A	Ä	
			/	?	e	è	i	ì	
			^	#	o	ò	o	ö	
			"	#	u	ù	U	Ü	
			~	~	a	ä	E	É	
			SP	§	e	ë	i	ï	
					o	ö	ß	ß	
			#	£	u	ü			

- ACKNOWLEDGE
- BELL
- BACKSPACE
- CANCEL LINE
- CARRIAGE RETURN
- DATA LINK ESCAPE
- DEVICE CONTROL 1
- DEVICE CONTROL 2
- DEVICE CONTROL 3
- DEVICE CONTROL 4
- DELETE
- END OF MEDIUM
- ENQUIRY
- END OF TRANSMISSION
- ESCAPE
- END OF BLOCK
- END OF TEXT
- FORM FEED
- FILE SEPARATOR
- GROUP SEPARATOR
- HORIZONTAL TAB
- LINE FEED
- NEGATIVE ACKNOWLEDGE
- RECORD SEPARATOR
- SHIFT IN
- SHIFT OUT
- SPACE
- START OF HEADING
- START OF TEXT
- SUBSTITUTE
- SYNCHRONOUS IDLE
- UNIT SEPARATOR
- VERTICAL TAB

Control Character Legend:



		ESCAPE SENT FIRST													
BIT 4321	7 6 5	0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1			
0000		SP	①	0	PRINT ALL	DELAY 1 SEC	@	P	RELATIVE CURSOR SENSE	③	p				
0001		!	1	↑	CURSOR TAB	A	↑	Q	ABSOLUTE CURSOR SENSE	a	q				
0010		"	2	↓	CURSOR TAB	B	↓	R		b	r				
0011		#	3	→	CLEAR ALL TABS	C	→	S		c	s				
0100		\$	4	←	SET LEFT MARGIN	D	←	T		d	t				
0101		%	5		SET RIGHT MARGIN	E		U		e	u				
0110		&	6		CURSOR HOME DOWN	F		V	MODEM DIS CONNECT	f	v				
0111		'	7		CURSOR RETURN	G		W		g	w				
1000		(	8		HOME CURSOR	H		X	HOME CURSOR	h	x				
1001		)	9		HORI ZONTAL TAB	I		Y	BACK TAB	i	y				
1010		*	:		CLEAR DSPLY	J		Z		j	z				
1011		+	;		ERASE TO END OF LINE	K				k					
1100		,	<		INSERT LINE	L	②		PRIMARY STATUS RESPONSE	l					
1101		-	=		DELETE LINE	M				m					
1110		.	>			N			TERM PRIMARY STATUS	n					
1111		/	?			O				o					

## NOTES:

1. The **ESC** parameter sequences are:

### Memory and Screen Addressing

<b>ESC</b> <b>A</b> <i>memory row number r column number C</i>	Absolute Memory Addressing
<b>ESC</b> <b>B</b> <i>screen row number y column number C</i>	Absolute Screen Addressing
<b>ESC</b> <b>A</b> <i>±memory row number r column number C</i>	Relative Memory Addressing
<b>ESC</b> <b>B</b> <i>±screen row number y ±column number C</i>	Relative Screen Addressing

### Display Enhancement

<b>ESC</b> <b>d</b> <i>A through D</i>	Enable Enhancement
<b>ESC</b> <b>d</b> <i>E</i>	Disable Enhancement

### Screen Labels Control

<b>ESC</b> <b>j</b> <i>E</i>	Clear Screen Labels
<b>ESC</b> <b>j</b> <i>A</i>	Display Screen Labels
<b>ESC</b> <b>j</b> <i>B</i>	Display f1 — f8 Screen Labels

### Printer Control (HP 2621P Only)

<b>ESC</b> <b>p</b> <i>11 C</i>	LOG BTM On
<b>ESC</b> <b>p</b> <i>12 C</i>	LOG TOP On
<b>ESC</b> <b>p</b> <i>13 C</i>	LOG BTM/LOG TOP Off
<b>ESC</b> <b>p</b> <i>M</i>	Copy All Memory
<b>ESC</b> <b>p</b> <i>B</i>	Copy Current Line
<b>ESC</b> <b>p</b> <i>F</i>	Copy Current Page

### Configuration Lock

<b>ESC</b> <b>q</b> <i>0</i> <b>L</b>	Unlock Configuration
<b>ESC</b> <b>q</b> <i>1</i> <b>L</b>	Lock Configuration

### Identify

<b>ESC</b> <b>s</b> <i>1</i> <b>^</b>	Return Identity
---------------------------------------	-----------------

2. In REMOTE Mode, upon receipt of **ESC****A**, the terminal responds with:  
**ESC****\** *terminal primary status bytes* (see Appendix C)

3. These escape sequences (**ESC****p** through **ESC****w**) are transmit sequences only.

4. In REMOTE Mode, upon receipt of **ESC****`**, the terminal responds with:  
**ESC****A** *column number c screen row Y*

5. In REMOTE Mode, upon receipt of **ESC****a**, the terminal responds with:  
**ESC****A** *column number c memory row R*

6. Shaded escape sequences are sent to the computer if the A strap (Escape Sequence Transmission) is enabled and the terminal is set to REMOTE and Full Duplex. The sequence is sent instead of executing the function whenever a terminal function key is pressed.

### Note

If **ESC** space through **ESC** / is sent to the terminal, the keyboard will be locked until a capital letter (A-Z) is received as data communications input.

Escape sequences that are not used by the terminal are ignored. However, they still must be terminated by a capital letter (A-Z) before the terminal can return to normal operation.





## Cable Connector Pin Assignments

## Appendix B

HP 13222N U.S.A. Modem Cable Connector Pin Assignments

50-Pin Terminal Connector Pin Number	RS232C/CCITT V.24 Code Descrip- tion	25-Pin Modem Connector Pin Number
7	DA/113 Transmit Signal Element Tim- ing	24
9	CE/125 Ring Indicator	22
12	BA/103 Transmitted Data (Data Out)	2
13	CA/105 Request To Send	4
14	CD/108.2 Data Terminal Ready	20
15	SCA/120 Secondary Request To Send	11
24	AA/- Protective Ground	1
40	CH/111 Data Signal Rate Selector	23
41	DB/114 Transmission Signal Element Timing	15
42	BB/104 Received Data (Data In)	3
43	DD/115 Receiver Signal Element Tim- ing	17
44	CB/106 Clear To Send	5
45	CC/107 Data Set Ready	6
46	CF/109 Received Line Signal Detec- tor	8
47	SCF/122 Secondary Received Line Signal Detector	12
48	AB/102 Signal Ground (Common Re- turn)	7

## Cable Connector Pin Assignments

### HP 13222M European Modem Cable Connector Pin Assignments

50-Pin Terminal Connector Pin Number	RS232C/CCITT V.24 Code Description	25-Pin Modem Connector Pin Number
7	DA/113 Transmit Signal Element Timing	24
9	CE/125 Ring Indicator	22
12	BA/103 Transmitted Data (Data Out)	2
13	CA/105 Request To Send	4
14	CD/108.2 Data Terminal Ready	20
15	SCA/120 Secondary Request To Send	19
24	AA/— Protective Ground	1
40	CH/111 Data Signal Rate Selector	23
41	DB/114 Transmission Signal Element Timing	15
42	BB/104 Received Data (Data In)	3
43	DD/115 Receiver Signal Element Timing	17
44	CB/106 Clear To Send	5
45	CC/107 Data Set Ready	6
46	CF/109 Received Line Signal Detector	8
47	SCF/122 Secondary Received Line Signal Detector	12
48	AB/102 Signal Ground (Common Return)	7

## HP 13222C RS232 Data Comm Cable Connector Pin Assignments

50-Pin Terminal Connector Pin Number	RS232C/CCITT V.24 Code Description	25-Pin RS 232 Connector Pin Number
12	BA/103 Transmitted Data (Data Out)	2
13	CA/105 Request To Send	4
14	CD/108.2 Data Terminal Ready	20
15	SCA/120 Secondary Request To Send	11 (USA), 19 Europe
24	AA/— Protective Ground	1
34	x16 Clock In	25
42	BB/104 Received Data (Data In)	3
44	CB/106 Clear To Send	5
46	CF/109 Received Line Signal Detector	8
47	SCF/122 Secondary Received Line Signal Detector	12
48	AB/102 Signal Ground (Common Return)	7
49	x8 Clock Out	16
50	x16 Clock Out	24



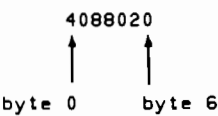
Primary Status

The primary status of the terminal is shown as the last data item whenever the terminal self-test function is executed. In addition to obtaining a display of primary status using self-test, you may request the primary status programmatically by sending the status request escape sequence (`esc ^`) from a computer to your terminal.

Upon receipt of the status request escape sequence, the terminal responds with an `esc \` followed by seven status bytes represented in ASCII character notation and a terminator. The terminator included in the response is usually a Return character but its value depends on the content of the configuration data Return field and the state of the automatic linefeed function.

The primary status bytes provide information about the terminal's current status, i.e., display memory size, strap states, keyboard interface configuration, and terminal error

conditions. The seven status bytes are referred to as byte 0 through byte 6 and are displayed as seven ASCII characters. For example:



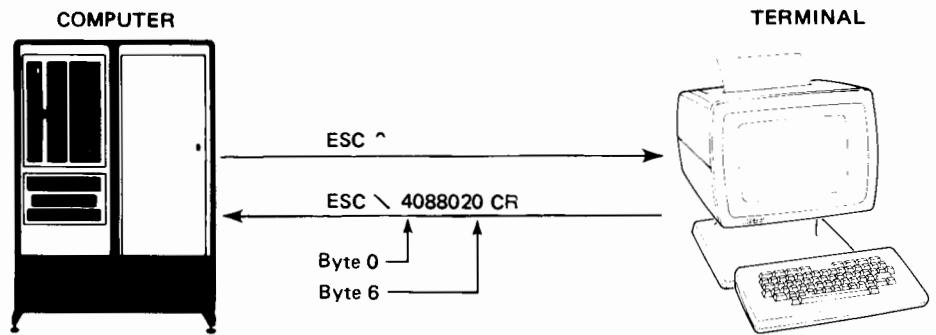
The status data is contained in the lower four bits of each byte. The upper four bits are set so that the entire byte represents an ASCII character. Thus, each status byte is interpreted as one ASCII character. These characters are defined in Table C-1.

Table C-1. Status Byte Interpretation

ASCII Character	Binary Value	ASCII Character	Binary Value
0	0011 0000	8	0011 1000
1	0011 0001	9	0011 1001
2	0011 0010	:	0011 1010
3	0011 0011	;	0011 1011
4	0011 0100	<	0011 1100
5	0011 0101	=	0011 1101
6	0011 0110	>	0011 1110
7	0011 0111	?	0011 1111

## Terminal Status

Figure C—1 shows an example of a typical status request and response interchange between a computer and a terminal.



BYTE	ASCII	BINARY	STATUS
0	4	0011 0100	4,096 bytes of display memory
1	0	0011 0000	Escape Function Transmission disabled (a) Space overwrite latch disabled (b) Cursor wraparound enabled (c)
2	8	0011 1000	Short transfer handshake disabled (g) Long transfer handshake enabled (H)
3	8	0011 1000	CAPS LK disabled LN MODE disabled AUTO LF disabled
4	0	0011 0000	No Cursor Sense pending No Function key transfer pending No ENTER key transfer pending
5	2	0011 0010	No data communication errors Last Self-Test successful
6	0	0011 0000	No device completion pending

Figure C—1. Example: Typical Terminal Status

Figure C-2 is an illustration of the binary characteristics of each byte together with an interpretation of its meaning in the terminal's status response.

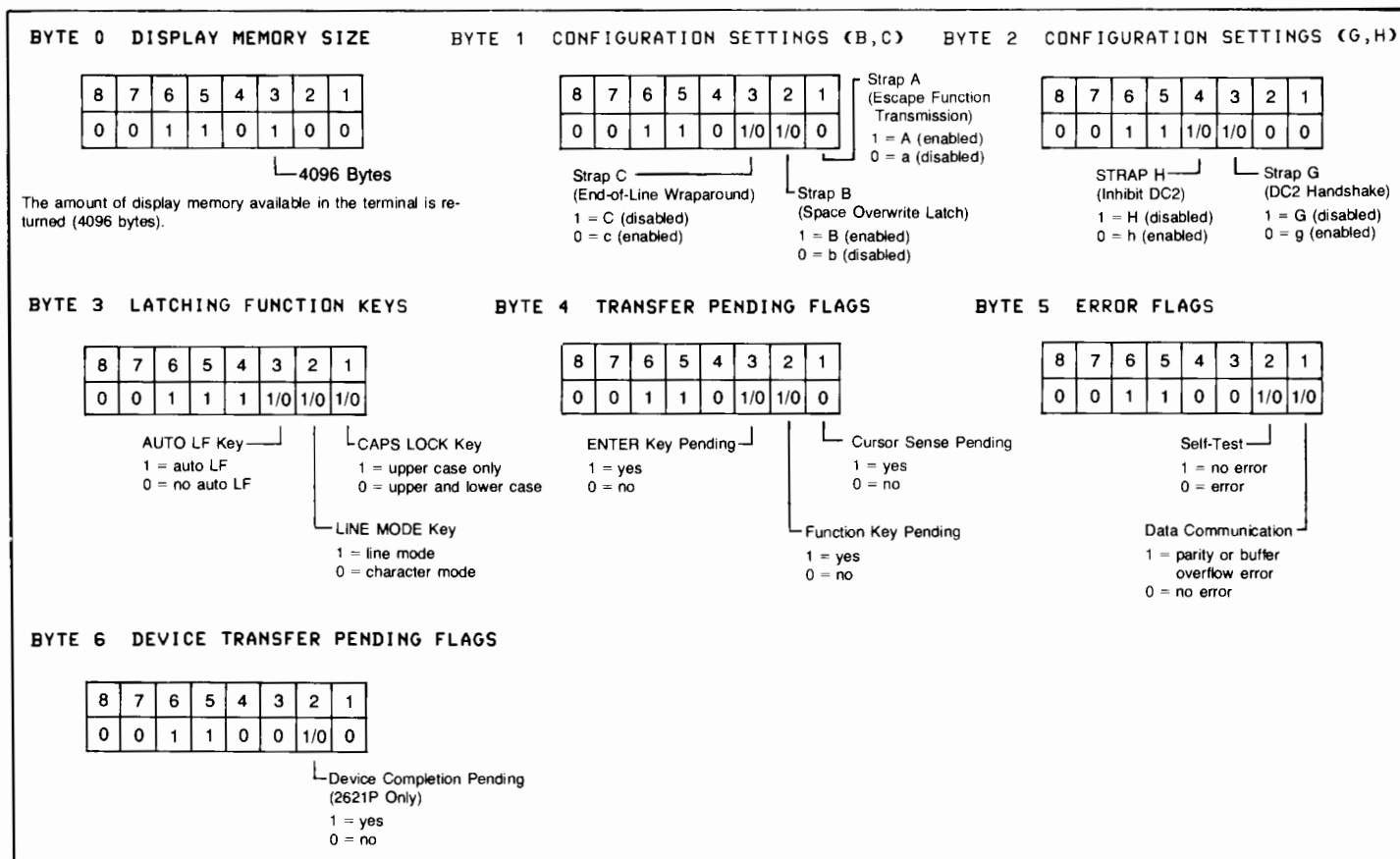


Figure C-2. Primary Status Byte Characteristics





## Cursor Sensing

You can obtain the current position of the screen cursor via an escape sequence. You may issue a request either for the absolute position of the cursor in display memory, or for the cursor position relative to the beginning of the current screen page. The terminal's response to these requests is a Short Transfer Trigger Handshake and is affected by the setting of the g and h straps (see Strap Configuration in Section V).

### NOTES:

- 1) Generally, actual cursor positional values are referenced in the following notation:
  - screen column positions—1 through 80
  - screen row positions—1 through 24
  - memory row positions—1 through 48
- 2) For cursor sensing and addressing, the positional values are referenced in the following notation:
  - screen column positions—0 through 79
  - screen row positions—0 through 23
  - memory row positions—0 through 47

### Absolute Cursor Sensing

You determine the absolute position of the cursor within display memory by issuing the following escape sequence:

```
esc a
```

In response to this request, the terminal generates an `esc & a` followed by numeric values that specify the column and row number at which the cursor currently resides within display memory.

For example, assume that the cursor resides at column 20, memory row 40.

You cause the following escape sequence to be issued from the computer:

```
esc a
```

The terminal responds with:

```
esc & a 019c 039R
```

You use this response to determine the absolute position of the cursor, where 019c represents physical column 20 and 039R represents physical memory row 40.

## Appendix D

### Relative Cursor Sensing

You determine the position of the cursor relative to the beginning of the currently displayed screen page by issuing the following escape sequence:

```
esc `
```

In response to this request, the terminal generates an `esc & a` followed by numeric values that specify the column number and the row number at which the cursor resides relative to screen row 0.

For example, assume that the cursor resides at column 20, memory row 40, and screen row 0 is at memory row 35.

You cause the following escape sequence to be issued from the computer:

```
esc `
```

The terminal responds with:

```
esc & a 019c 005Y
```

You use this response to determine the position of the cursor relative to the beginning of the currently displayed screen page, where 019c represents physical column 20 and 005Y represents physical screen row 6.



# Terms Used in This Manual

A glossary of terms pertinent to the HP 2621 Interactive Terminal is given in the following table. Being familiar with these terms and their definitions will help you to understand the descriptive material in this manual.

Column	A single character position within a row or line of data on the display screen. Beginning with the first character position at the left side of your display screen, the columns are numbered from 1 through 80.
Configuration Data	Your HP 2621 has no hardware straps or switches for data transmission baud rate and parity values. Instead, this information is stored in nonvolatile memory as part of your terminal's configuration. You may redefine the configuration data via function keys.
Cursor	The cursor acts as a pointer for subsequent character—entry action. The cursor is a blinking underline that appears on the display screen to show you where the next character or space will occur. You can control cursor movement via cursor positioning keys, or escape sequence codes.
Data Communication	The means by which your terminal handles the transfer of data between itself and an external data processing device, such as a computer. The HP 2621 supports asynchronous point-to-point data communication.

Data Transfer Operation

The process of transferring data from one device to another. For example, the transfer of data from the display screen (or display memory) to a remote computer, or to a peripheral device such as a line printer.

Display Memory

The random access display memory (RAM) portion of your terminal in which the results of your keyboard or data transfer operations are stored. The display memory stores up to 48 text lines of 80 character positions per line.

Display Screen



The cathode ray tube (CRT) screen portion of your terminal upon which the results of your keyboard or data transfer operations are displayed. The display screen format is 25 rows of 80 character positions per row. Text from the display memory appears in screen rows 1 through 24. Row 25 is used to display the current function key labels and error messages.

Function Keys

A set of nine light-colored keys on your keyboard that cause execution of special functions such as cursor and text control, terminal control, and so forth. Eight of the function keys are located across the top of your keyboard. The remaining key (the Labels key) is located to the right of the character keys. The Labels key cap is unmarked. It is the only blank key cap on the keyboard.

Home Cursor	The cursor has two home positions; the left margin setting of the first row of display memory data (home cursor up), and the left margin setting of the blank line following the last row of display memory data (home cursor down). These home positions are obtained via cursor control function keys, or escape sequence codes.	Numeric Pad	A calculator-type numeric key pad is incorporated into the ASCII-character keyboard. This pad is useful for entering large amounts of numeric data. The numeric pad is accessed via the <b>NUM</b> key.
Labels Key	This is the function key located to the right of the character keys. The Labels key is used to select various screen labeled functions which you can access via the function keys.	Page	The 24 lines of data (including blank lines) that can be displayed on your terminal's screen at any given time.
Line	A string of from 0 through 80 characters appearing on your display screen and/or stored in display memory. A zero-length line is displayed as a blank line on the screen. The terms line and row are synonymous. Generally, line is used in reference to data in display memory while row is used for data displayed on the screen. See "Display Memory".	Parity	Parity refers to a check bit that is added as the high bit of each byte as it is transmitted and checked for the correct value as it is received over the data communications line.
Local Operation	The off-line operation of your terminal. That is, without the aid of an external data processing device such as a computer.	Remote Operation	The on-line operation of your terminal; that is, using the terminal while actively connected to an external data processing device such as a computer.
Nonvolatile Memory	The portion of memory that contains your terminal's configuration data (strapping, baud rate, and parity) is protected from destruction by a battery. If the terminal's main power source is interrupted for any reason, the data in this portion of memory remains intact.	Row	A single horizontal line on the display screen capable of containing a line of data from display memory. There are 25 rows on your terminal's screen. The first 24 rows are used for displaying text from display memory. Row 25 is used to display function key labels, the active modem indicator, current column position pointer, and error messages. The terms row and line are synonymous. Generally, row is used in reference to data displayed on the screen while line is used for data in display memory. See "Display Screen".

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Hewlett-Packard Australia Pty. Ltd.  
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Cable: HEWPARD Brisbane

### BANGLADESH

The General Electric Co. of  
Bangladesh Ltd.  
Magnet House 72  
Dikusha Commercial Area  
**Motijheel**, Dacca 2  
Tel: 252415, 252419  
Telex: 734  
Cable: GECDAC Dacca

### ETHIOPIA

Abdella Abdullaik  
P.O. Box 2635  
**Addis Ababa**  
Tel: 11 93 40

### GUAM

Guam Medical Supply, Inc.  
Suite C, Airport Plaza  
P.O. Box 8947  
**Tamuning** 96911  
Tel: 646-4513  
Cable: EARMED Guam

### HONG KONG

Hewlett-Packard Hong Kong Ltd.  
Room 105, Austin Centre  
1st Floor  
21 Austin Avenue  
TST P.O. Box 98524

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Tel: 3-697446 (5 lines)  
Telex: 36678 HX  
Cable: HEWPACK Hong Kong

Medical/Analytical Only  
Schmidt & Co. (Hong Kong) Ltd.  
Wing On Centre, 28th Floor  
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### Hong Kong

Tel: 5-455644  
Telex: 74766 SCHMX HX

### INDIA

Blue Star Ltd.  
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414/2 Vir Savarkar Marg  
Prabhadevi

### Bombay 400 025

Tel: 45 78 87  
Telex: 011-4093  
Cable: FROSTBLUE

Blue Star Ltd.  
Band Box House  
Prabhadevi

### Bombay 400 025

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Telex: 011-3751  
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Blue Star Ltd.  
Bhavdeep  
Stadium Road  
**Ahmedabad** 380 014  
Tel: 43922  
Telex: 012-234  
Cable: BLUEFROST

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7 Hare Street  
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Telex: 021-7655  
Cable: BLUESTAR

Blue Star Ltd.  
Bhandari House  
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Telex: 031-2463  
Cable: BLUESTAR

Blue Star Ltd.  
T.C. 7/603 'Poornima'  
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**Trivandrum** 695 013  
Tel: 65799  
Telex: 0884-259  
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11 Magarath Road  
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Cable: BLUESTAR

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Meeakshi Mandiram  
XXXXV-1379-2 Mahatma  
Gandhi Rd.

**Cochin** 682 016  
Tel: 32069  
Telex: 085-514  
Cable: BLUESTAR

Blue Star Ltd.  
1-1-117/1 Sarojini Devi Road

### Secunderabad 500 033

Tel: 70126  
Telex: 0155-459  
Cable: BLUESTAR

Blue Star Ltd.  
133 Kodambakkam High Road  
**Madras** 600 034  
Tel: 82057  
Telex: 041-379  
Cable: BLUESTAR

### INDONESIA

BERCA Indonesia P.T.  
P.O. Box 496/Jkt.  
Jln. Abdul Muis 62  
**Jakarta**  
Tel: 349255, 349886  
Telex: 46748 BERSIL IA  
Cable: BERSAL

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P.O. Box 174/Sby.  
23 Jln. Jimerto

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Tel: 42027  
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29-21, Takaido-Higashi 3-chome  
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Telex: 232-2024 YHP-Tokyo  
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Yokogawa-Hewlett-Packard Ltd.  
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Yokogawa-Hewlett-Packard Ltd.  
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11-2 Shimosasajima-cho,  
Nakamura-ku, **Nagoya**, 450  
Tel: 052 571-5171

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### Yokohama, 221

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105, 1-chome, San-no-maru  
**Mito**, Ibaragi 310  
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1348-3, Asahi-cho, 1-chome  
**Atsugi**, Kanagawa 243  
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Yokogawa-Hewlett-Packard Ltd.  
Kumagaya Asahi  
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ADCOM Ltd., Inc.  
P.O. Box 30070

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Telex: 22639  
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P.O. Box 19012

Nairobi Airport

### Nairobi

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Telex: 22201/22301  
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Telex: SAMSAN 27364

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Jalan Ampang  
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Protei Engineering  
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Kuching, **Sarawak**  
Tel: 53544

Cable: PROTELENG  
**MOZAMBIQUE**

A.N. Goncalves, Ltd.  
162, 1º Apt. 14 Av. D. Luis  
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### Maputo

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Telex: 6-203 NEGON Mo  
Cable: NEGON

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Development Bank Building  
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Telex: NZ 31291

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Tel: 794-091

Northrup Instruments & Systems Ltd.  
Terrace House, 4 Oxford Terrace  
P.O. Box 8388  
**Christchurch**  
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## NIGERIA

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N6B/770 Oyo Road  
Oluseun House  
P.M.B. 5402  
**Ibadan**  
Tel: 461577  
Tel: 31231 TEIL NG  
Cable: THETIEL Ibadan

The Electronics Instrumentations Ltd.  
144 Agege Motor Road, Mushin  
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Mushin, **Lagos**  
Cable: THETIEL Lagos

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Oosman Chambers  
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Tel: 2894  
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10, Bazar Rd.  
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**Islamabad**  
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The Online Advanced Systems Corporation  
Rico House  
Amorsolo cor. Herrera Str.  
Legaspi Village, Makati  
P.O. Box 1510

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Telex: 3274 ONLINE

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Tel: 8-4782  
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## SRI LANKA

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Telex: 1377METROLTD CE  
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Telex: 375

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205 Tun Hsu North Road  
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## THAILAND

UNIMESA Co. Ltd.  
Elcom Research Building  
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**Bangchak, Bangkok**  
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Cable: UNIMESA Bangkok

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Cable: ARJAYTEE, Lusaka

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Hewlett-Packard (Canada) Ltd.  
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**Pointe Claire H9R 1G7**  
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Biotron S.A.C.I.y M.  
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9 piso  
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Hewlett-Packard do Brasil  
I.e.C. Ltda.  
Rua Padre Chagas, 32  
90000 **Pôrto Alegre-RS**  
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Cable: HEWPACK Pôrto Alegre

Hewlett-Packard do Brasil  
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22471-1 **Rio de Janeiro**  
Tel: 286-0237

Telex: 021-21905 HPBR-BR  
Cable: HEWPACK Rio de Janeiro

### CHILE

Jorge Calcagni y Cia. Ltda.  
Arturo Burtie 065  
Casilla 16475  
Correo 9, **Santiago**  
Tel: 220222  
Telex: JCALCAGNI

### COLOMBIA

Instrumentación  
Henrik A. Langebaek & Kier S.A.  
Carrera 7 No. 48-75  
Apartado Aéreo 6287  
**Bogotá, D.E.**  
Tel: 269-8877  
Telex: 44400  
Cable: AARIS Bogotá

Instrumentación  
H.A. Langebaek & Kier S.A.  
Carrera 63 No. 49-A-31  
Apartado 54098

### Medellin

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### COSTA RICA

Cientifica Costarricense S.A.  
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Apartado 10159

### San José

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Edificio Sarah 1148  
**San Salvador**  
Tel: 252787

**GUATEMALA**  
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Zona 9  
**Guatemala City**  
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ext. 9  
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Hewlett-Packard Mexicana,  
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Tel: 017-74-507

Hewlett-Packard Mexicana,  
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Ave. Constitución No. 2184  
**Monterrey**, N.L.  
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**PANAMA**  
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Panama 5  
Calle Samuel Lewis  
Edificio "Alfa," No. 2  
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Cable: ELECTRON Panama

**PERU**  
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San Isidro Casilla 1030  
**Lima** 1  
Tel: 41-4325  
Telex: Pub. Booth 25424 SISIDRO  
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Surtel Radio Holland N.V.  
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Cable: Surtel  
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TOBAGO**  
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Caribbean Telecoms Ltd.  
P.O. Box 732  
69 Frederick Street  
**Port-of-Spain**  
Tel: 62-53068

**URUGUAY**  
Pablo Ferrando S.A. de C.V.  
Avenida Italia 2877  
Casilla de Correo 370  
**Montevideo**  
Tel: 40-3102  
Tel: 702 Public Booth  
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Cable: RADIUM Montevideo

**VENEZUELA**  
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P.O. Box 50933  
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Tel: 239-4133 (20 lines)  
Tel: 25146 HEWPACK  
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**Nicosia**  
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Pisemny styk  
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Vyvojova a Provozni Zakladna  
Vyzkumnych Ustavu v Bechovicich  
CSSR-25097 **Bechovice u  
Prahy**  
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Institute of Medical Bionics  
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**Le Mirail**-Cédex  
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Hewlett-Packard France  
Le Ligoures  
Place Romée de Villeneuve  
13100 **Aix-en-Provence**  
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Hewlett-Packard France  
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35100 **Rennes**  
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TWX: 740912F  
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67300 **Schiltigheim**  
Tel: (88) 83 08 10  
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Hewlett-Packard France  
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rue van Gogh  
59650 **Villeneuve D'Ascq**  
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Hewlett-Packard France  
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Printed in U.S.A. 4/80