HEWLETT PACKARD
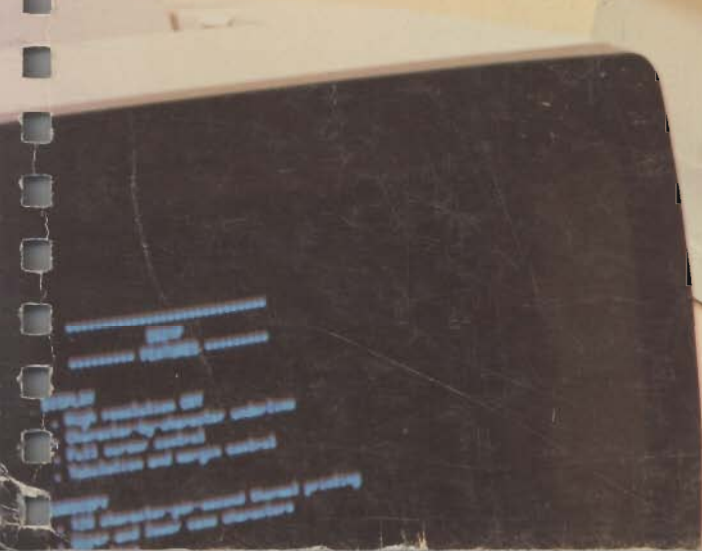
2621A/P Interactive Terminal

owner's manual

Congratulations.....

You have selected Hewlett-Packard's Model 2621 Interactive Terminal. The HP 2621 is a simple, efficient terminal designed to serve your requirements for the processing of alphabetic and/or numeric data.

This owner's manual is provided to acquaint you with the characteristics of this terminal and to aid you in using them to your advantage. Included in the manual are instructions for installing and using your terminal. In addition to installation and usage information, reference material is provided for including this terminal as an input/output device within a computer system environment.

For information regarding repair and functional operation, see the HP 2621 Interactive Terminal Service Manual, HP Part No. 02620-90002.

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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 Interactive 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 Interactive 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-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

The HP 2621 Interactive 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.

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
- Communciations 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

Display Screen

The HP 2621 Interactive 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. 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 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.

How To Get Started

Section II

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 Interactive Terminal (see Section VI for HP 2621P options).

Table 2—2 is a list of accessories available for the HP 2621A Interactive Terminal (see Section VI for HP 2621P accessories).
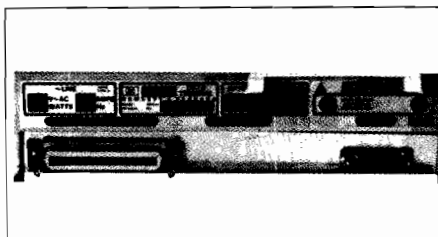
Figure 2—1. HP 2621 Identification Label, Rear Panel

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)
13265A	300 Baud Modem
13266A	Current Loop Converter

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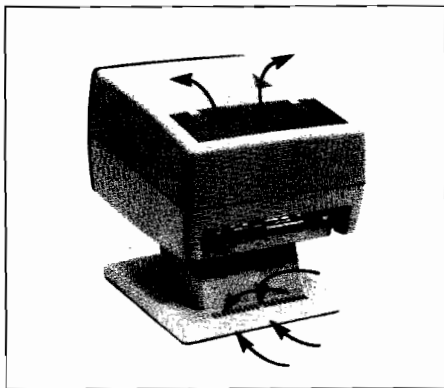
Step 1. Place the terminal on any sturdy, convenient surface such as a desk, table, or stand designed for such a purpose. Avoid plush or spongy surfaces that might restrict the flow of air through the vents in the base of the terminal. For example, do not use a typewriter pad beneath the terminal.

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.

AIR FLOW

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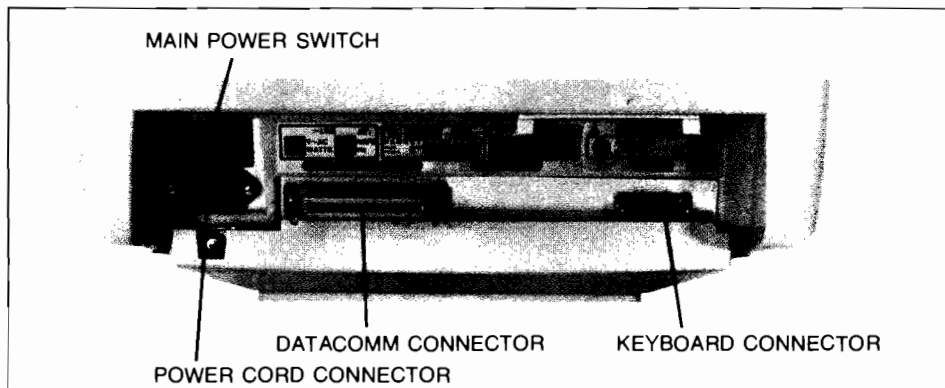
After approximately 15 seconds, the terminal is ready to use. Figure 2—3 illustrates the condition of the display screen as it appears following the initial application of power to the terminal.

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 accidently 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).
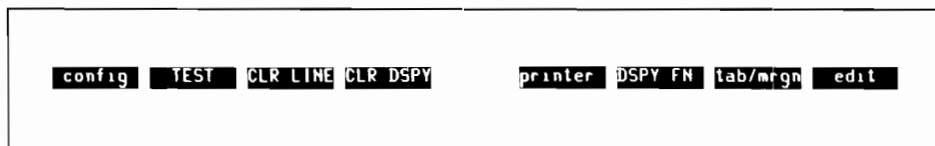
Step 2. (Optional) Try using the Self—test function to see the result. Press and hold down **SHIFT** while you press the function key associated with the screen label TEST (that is, key **✐**). A pattern of ASCII characters is written to the screen. This pattern should be similar to the test pattern 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 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.

config   TEST   CLR LINE   CLR DSPY   printer   DSPY FN   tab/mrgn   edit

Figure 2—3. HP 2621 Initial Screen Display
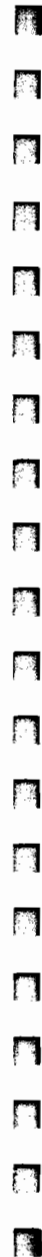
The Terminal's Display Characteristics

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.

```
                 column 1            . . .           column 80
                 v                                    v
      row 1    /     data line 1                           \
      row 2    |     data line 2                           |
      row 3    |     data line 3                           |
               |                                           |
               |  .        .    .                     .    |
               |  .        .    .                     .    |
               |  .        .    .                     .    |
      row 24   |     data line 24                          |
      row 25   \     labels/error message line            /
```
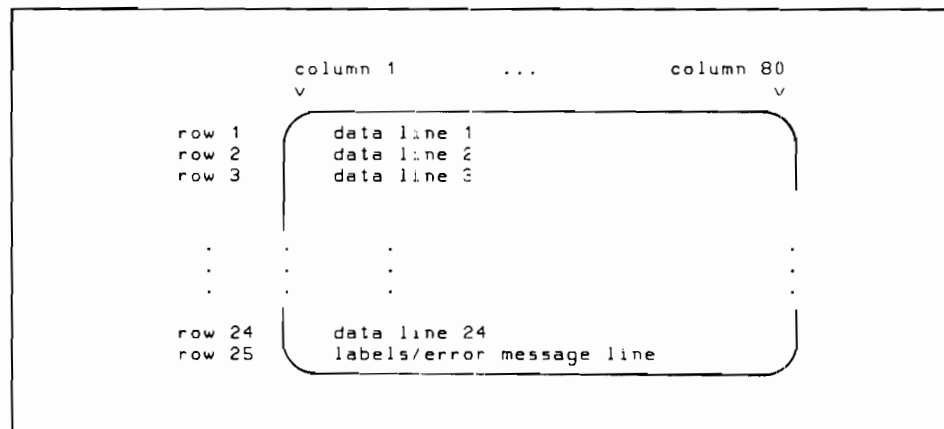
Memory

Display Memory can accomodate 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 it's 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.

```
                    character 1        ...         character 80
                    v                                         v
        TOP     +--------------- ... -------------------+
                    data line 1, memory page 1
                    data line 2, memory page 1
                    data line 3, memory page 1

                     .        .           .              .
                     .        .           .              .            Screen Page
                     .        .           .              .            (the 24 lines
                    data line 24, memory page 1                       of memory
                +                ...                    +             currently
                    data line 25, memory page 2                       displayed)
                    data line 26, memory page 2
                    data line 27, memory page 2

                     .        .           .              .
                     .        .           .              .

                    data line 48, memory page 2
        BOTTOM  +--------------- ... -------------------+
```
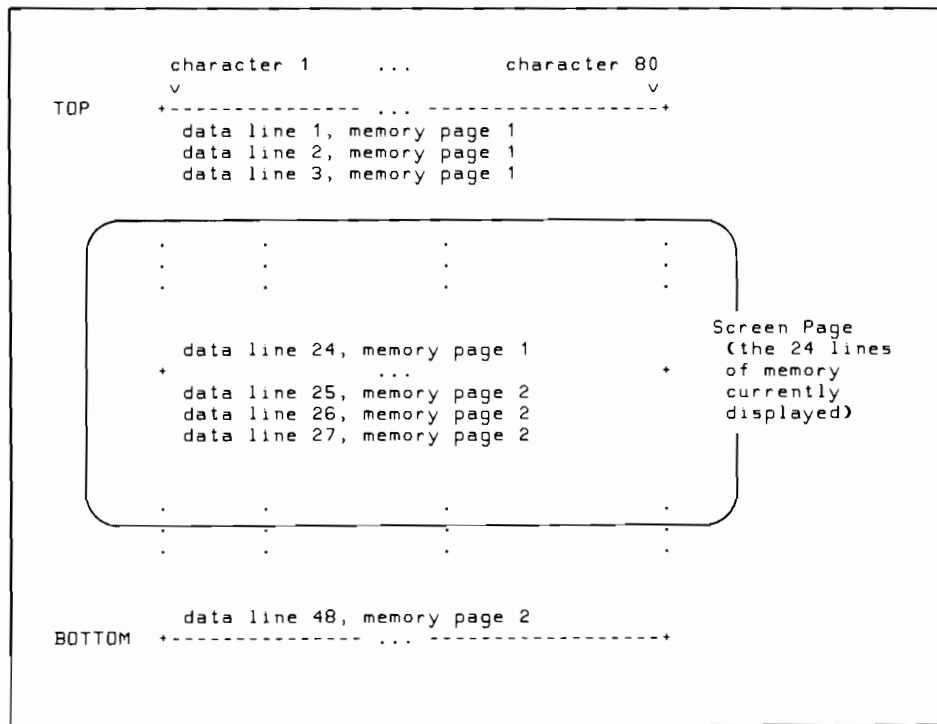
Display Enhancement

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 enchanced 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 up-percase 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 enchanced 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.

The Terminal's Keyboard

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 a standard typewriter keyboard. In addition to the alphanumeric character keys, this group includes typical data terminal keys such as **BREAK** , **CTRL** , **ENTER** , and so forth.

- 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 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 entire ASCII character code set (see Appendix A). Figure 4—1 shows the Character Set Group.

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).
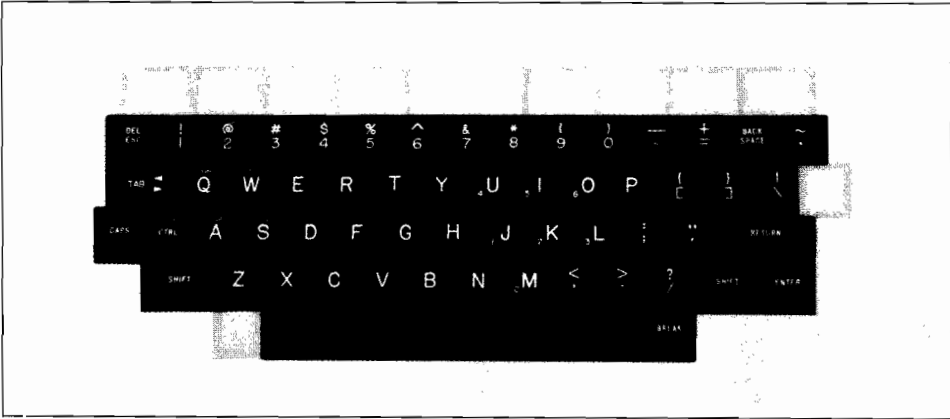

Figure 4—1. HP 2621 Keyboard Character Set Group

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 the alphabetic characters A through Z 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 ESC** 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.

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—2 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.
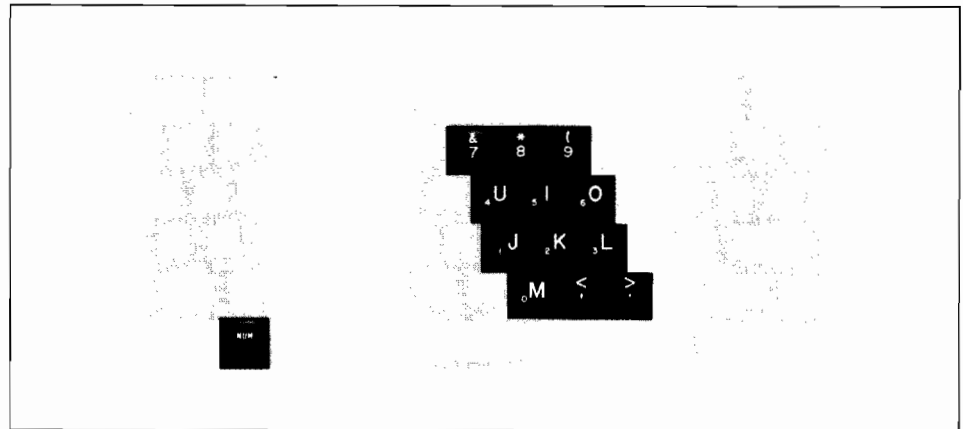

Figure 4—2. HP 2621 Keyboard Numeric Pad Group

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—3 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
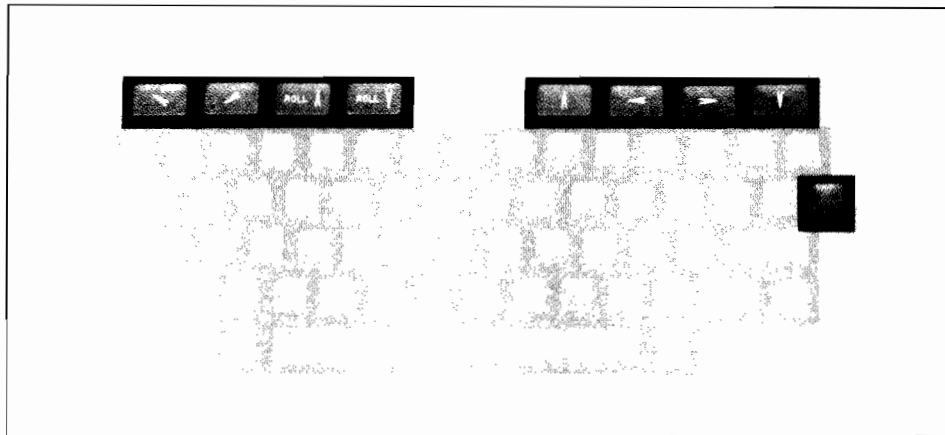on the key cap. The unshifted mode func-
tions are:

Figure 4—3. 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↑	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↓	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 un-marked key on the keyboard (see Figure 4-3). The ■ key is used to manipulate the screen display of the Function labels.

Screen Labels

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

NOTE

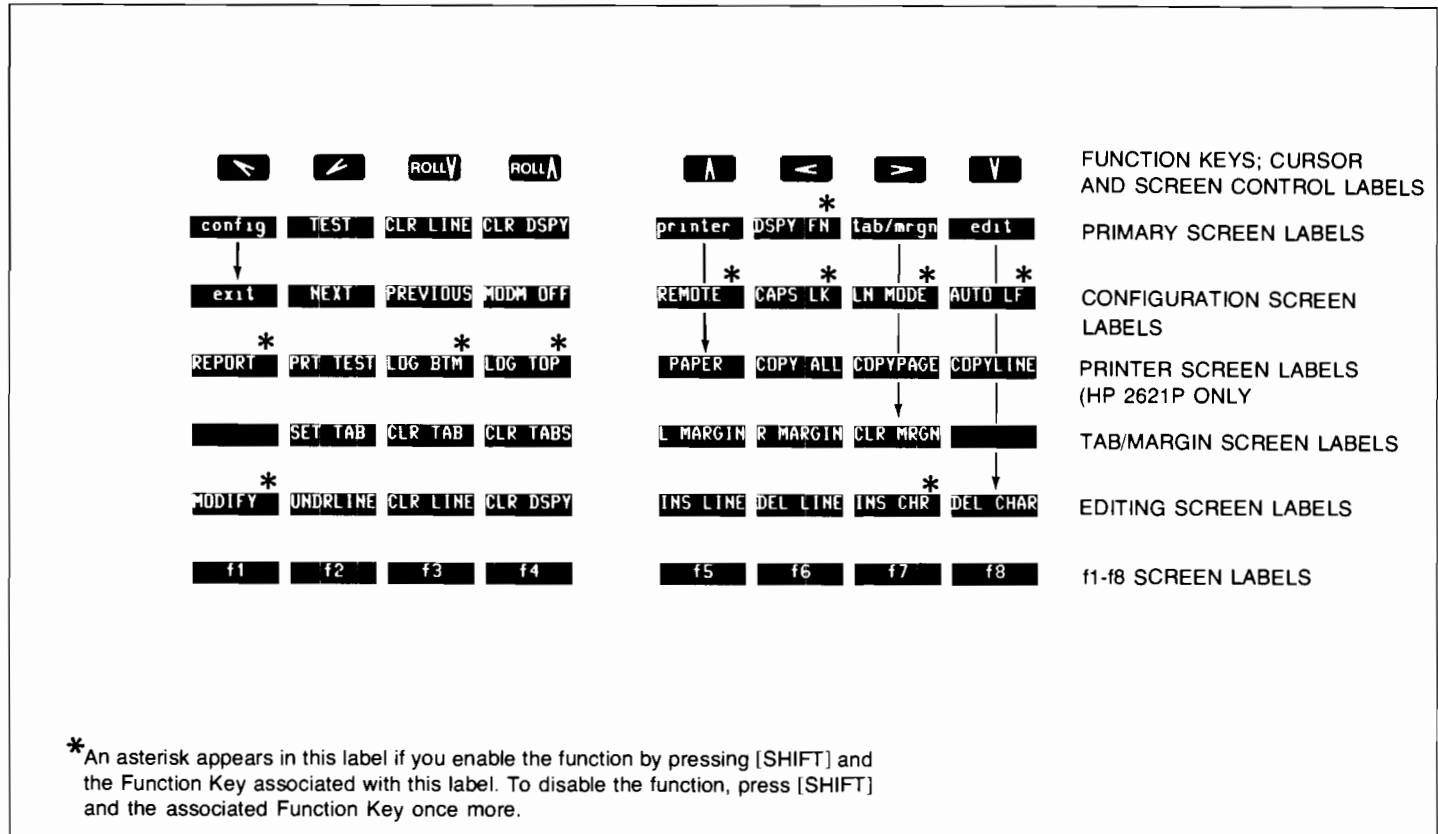To return to the primary set of labels from any other sets, press the ■ key.

↖	**↗**	**ROLL▼**	**ROLL▲**	**∧**	**◄**	**►**	**▼**	FUNCTION KEYS; CURSOR AND SCREEN CONTROL LABELS
config	TEST	CLR LINE	CLR DSPY	printer	DSPY FN*	tab/mrgn	edit	PRIMARY SCREEN LABELS
exit	NEXT	PREVIOUS	MODM OFF	REMOTE*	CAPS LK*	LN MODE*	AUTO LF*	CONFIGURATION SCREEN LABELS
REPORT*	PRT TEST	LOG BTM*	LOG TOP*	PAPER	COPY ALL	COPYPAGE	COPYLINE	PRINTER SCREEN LABELS (HP 2621P ONLY
	SET TAB	CLR TAB	CLR TABS	L MARGIN	R MARGIN	CLR MRGN		TAB/MARGIN SCREEN LABELS
MODIFY*	UNDRLINE	CLR LINE	CLR DSPY	INS LINE	DEL LINE	INS CHR*	DEL CHAR	EDITING SCREEN LABELS
f1	f2	f3	f4	f5	f6	f7	f8	f1-f8 SCREEN LABELS

*An asterisk appears in this label if you enable the function by pressing [SHIFT] and the Function Key associated with this label. To disable the function, press [SHIFT] and the associated Function Key once more.

Figure 4—4. HP 2621 Screen Labels Structure

The ■ 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.

■ Key, Unshifted

Usually, you use the ■ 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/margn, or edit, or the screen labels display has been shut off), press the ■ 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.

■ Key, Shifted

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

| f1 | f2 | f3 | f4 |

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 ■ key to cause the display of the f1—f8 screen labels subset.

To terminate the f1—f8 function subset, simply press the ■ 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/margn screen labels displayed when you pressed the **SHIFT** and ■ keys, the tab/mrgn screen labels are replaced by the f1—f8 screen labels. Now, when you press the ■ key by itself, the screen labels display returns to the tab/mrgn screen labels. You must press the ■ key once more (unshifted) to get to the primary set of screen labels.

| f5 | f6 | f7 | f8 |

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 ■ key. The display of the screen labels is shut off until you press the ■ key (or shifted ■ 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 combi-
nation 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:

The Terminal's Keyboard

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 ROLL▲	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 ROLL▼	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 ◄	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*]).
		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.
		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.
		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.
[tab/mrgn]	Shifted ►	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.
[edit]	Shifted ▼	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.

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 **ROLL↑**	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 **ROLL↓**	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
[MODIFY]	Shifted ◥	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 **ENTER** or **RETURN** to transmit the changed line to the host computer. The use of the **ENTER** or **RETURN** key executes Modify mode. The current line (marked by the cursor) is transmitted to the computer and the asterisk is removed from the [MODIFY] screen label. To disable modify mode (before you press either **ENTER** or **RETURN**), press the shifted function key associated with the [MODIFY*] screen label. The asterisk is removed from the label and Modify mode is disabled. 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.

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 ROLL▲	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 ROLL▼	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 ▶	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. Any characters shifted beyond the right margin setting are lost. No wraparound occurs. 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.
[DEL CHAR]	Shifted ▼	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.

Using the Terminal as an Input/Output Device

The HP 2621 Interactive 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 define the frequency rate for your local A.C. electric power and the starting column position for the transmission of data across the data communications line.

- 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.

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

```
Baud Rate   Parity   Duplex   Straps   Handshake   Hz   Start Col        Return

2400        NONE(0)  FULL     bcgHxz   Etx         60   1                (↴)
```

```
 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 configuration function "exit" terminates Configuration mode. You may also press the ▉ key to terminate Configuration mode. In either case, 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.

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, and automatic linefeed enable/disable.

| Function Label	Key Stroke	Function
[exit]	Shifted ◥	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 ■ key.
[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 ROLL⬆	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.
[MODM OFF]	Shifted ROLL⬇	Modem Disconnect — This function directs the terminal to "hang–up" the modem. The action resulting from pressing the function key associated with this label occurs immediately. 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.

Function Lable	Key Stroke	Function
[CAPS LK]	Shifted **◄**	This function causes the terminal's alphabetic keys to be locked into upper-case characters. Specifically, when Caps Lock is enabled, the terminal generates the uppercase characters for the set of characters a through }. The characters ˙ and ~ are ignored. (Refer to the ASCII-coded Character Set in Appendix A.) An asterisk appears in the label when this function is enabled (for example, [CAPS LK•]).
		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.
[LN MODE]	Shifted **►**	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 **ENTER** or **RETURN** key is pressed and the host computer has responded. An asterisk appears in the label when this function is enabled (for example, [LN MODE•]).
		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.
		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.
[AUTO LF]	Shifted **▼**	This function enables Automatic Linefeed. When enabled, a Linefeed is generated automatically each time the **RETURN** or **ENTER** 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•]).

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 cabability 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 **TAB►** or **TAB◄** to move the cursor to this field. Then execute the NEXT or PREVIOUS function (**SHIFT** and **✗** or **SHIFT** and **ROLL↑**) 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, and ODD. 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.

To change the Parity value, use the cursor left ◄ or cursor right ► key to postion the cursor beneath the first character of the current Parity value on the screen. You also may use **TAB►** or **TAB◄** to move the cursor to this field. Then, execute the NEXT or PREVIOUS function (**SHIFT** and **✗** or **SHIFT** and **ROLL↑**) 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 **TAB►** or **TAB◄** to move the cursor to this field. Then, execute the NEXT or PREVIOUS function (**SHIFT** and **✗** or **SHIFT** and **ROLL↑**).

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 `TAB►` or `TAB◄` 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, `SHIFT` and `▶` or `SHIFT` and `ROLL▲` .

Table 5—1. HP 2621 Strapping Configuration

Strap	Closed	Open	Default
Space Overwrite (SPOW) Latch	b (disabled)	B (enabled)	disabled
Wraparound Cursor, End-of-Line	c (enabled)	C (disabled)	enabled
Short Transfer Trigger Handshake (Block Transfer Handshake)	g (enabled)	G (disabled)*	enabled
Long Transfer Warning Handshake (Inhibit DC2)	h (enabled)	H (disabled)	enabled
Data Speed Select	x (disabled)	X (enabled)	disabled
Parity Check	z (enabled)	Z (disabled)	enabled

* 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 ◣ (home up), a Linefeed, or `TAB►` . 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 operationsthat 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.


```
HOST              TERMINAL

DC1——— trigger ————————➤      Host opens data transfer operation.

◄——————— warning ——— DC2      Terminal signals ready state.

DC1——— trigger ————————➤      Host enables transfer operation.

◄——————— transfer——— data     Terminal transmits data.
```
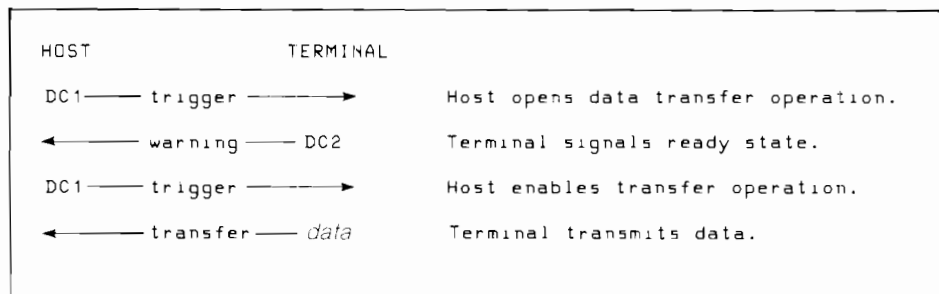
Figure 5−1. DC1/DC2 Handshake Protocol

Using the Terminal as an Input/Output Device

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

TYPE 1 (No Handshake)

```
HOST                TERMINAL

  ◄────── transfer ── data    Terminal transmits data.

```
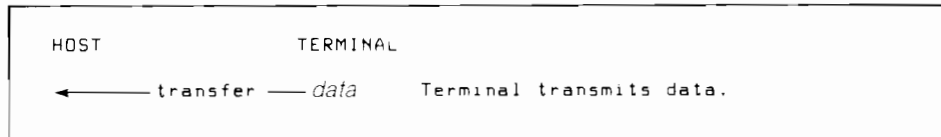
TYPE 2 (DC1 Trigger Handshake)

```
HOST                TERMINAL

DC1 ────── trigger ────────►     Host enables transfer operation.

  ◄──────── transfer ── data     Terminal transmits data.

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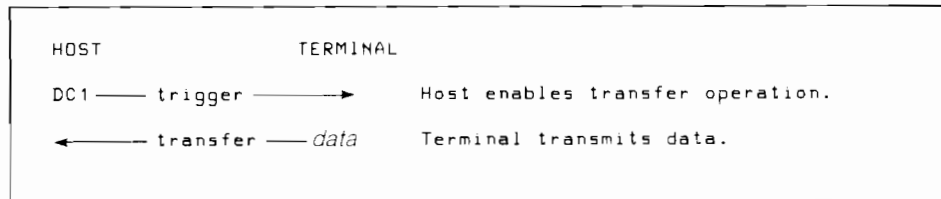
TYPE 3 (DC1/DC2/DC1 Warning Handshake)

```
HOST                 TERMINAL

DC1 ────── trigger ────────►      Host opens data transfer operation.

  ◄──────── warning ── DC2        Terminal signals ready state.

DC1 ────── trigger ────────►      Host enables transfer operation.

  ◄──────── transfer ── data      Terminal transmits data.

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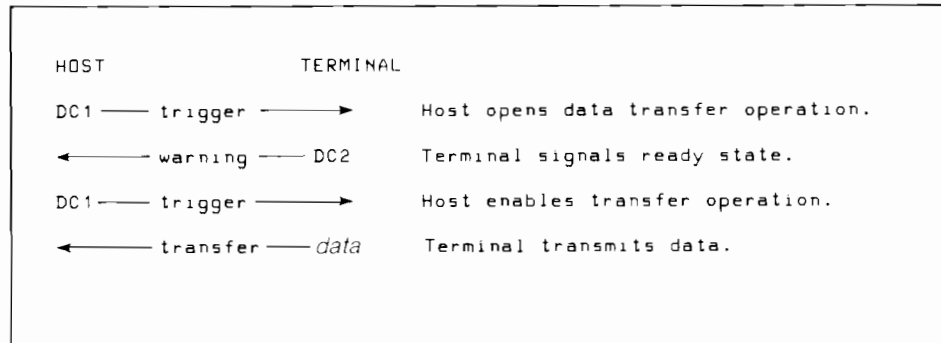
The effect of the various g and h strap
states is shown in Table 5—2.

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			
(default)	TYPE 1	TYPE 2	TYPE 1
G,h	TYPE 3	TYPE 3	TYPE 3
G,H	TYPE 1	TYPE 1	TYPE 1

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 re-
ceived 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 TAB► or TAB◄ to move the cursor to this field. When the cursor is positioned correctly, press and hold down SHIFT 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.

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

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)

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, 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 16 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, 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 **ROLL↑** 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. Subsequent entry lines 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 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 **ROLL↑**).

Return Key Configuration

You can specify one or two characters that will be transmitted each time the **RETURN** or **ENTER** key is pressed. Any ASCII 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 ASCII 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].

Terminating the Configuration Mode

When you are satisfied with the configuration data on the screen, you terminate the Configuration Mode by executing the exit function (**SHIFT** and **↘**), or by pressing the ■ 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:

exit **NEXT** **PREVIOUS** **MODM OFF**

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

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 or equivalent type of modem.

Whenever the modem line 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.

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

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**

When you enter data the terminal remembers, for each line, which character was the first character that you entered and sets a logical start-of-text pointer. The pointer is stored with the data line in display memory and is retained if you access that line later.

To set a logical start-of-text pointer, the following conditions must be true:

• The terminal must be on-line (in remote mode).

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

• The line in which you are entering data must be the bottom (last) line in display memory.

Example:

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

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

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

Even though the logical start-of-text pointer is used in character mode, it only affects the Line mode, Modify mode, and **ENTER** operations. If the line has no logical start-of-text pointer, the Configuration Start Column value is used to determine the starting point of the data transmitted.

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

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

Example:

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

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

To correct this statement, simply enter Modify mode and position the cursor to the appropriate line and character on the screen. Retype BINARY and press **ENTER** or **RETURN**. The BUILD command is transmitted to the computer, and there was no need to retype the whole line.

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

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.

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.

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 ■ key. The following Function labels are displayed across the bottom of the screen:

<div>

▬ f1 ▬ ▬ f2 ▬ ▬ f3 ▬ ▬ f4 ▬   ▬ f5 ▬ ▬ f6 ▬ ▬ f7 ▬ ▬ f8 ▬

</div>

See Table 5-12 for escape sequence function definitions.

The terminal also recognizes and acts upon a set of ASCII-coded control codes transmitted from a host computer. The escape code sequences and control codes recognized by the terminal are listed and defined in Tables 5-4 through 5-13.

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	
Roll Up	esc S	Scroll display up by one line.
Roll Down	esc T	Scroll display down by one line.

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.

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 (⌐DSPY FN*⌐).
Display Functions Off	esc Z	Enable execution of any control functions; do not display their code; remove asterisk from screen label (⌐DSPY FN ⌐).

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 curosr 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.

Table 5-8. Escape Sequences, Miscellaneous Control

Code	Description
esc @	Delay; generate a one second pause within the terminal.
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.
esc d	Enable Line Transfer (ENTER key function).
esc f	Modem Disconnect; Set CD signal (RS232C) or 108.2 signal (CCITT V.24) on modem line low for 3 seconds.
esc i	Backtab; move cursor left to TAB stop position.

Table 5—9a. Escape Sequences, Cursor Sensing

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

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

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

Note that the base sequence is esc & a

Code	Description
esc & a *memory row number* r *column number* C	Absolute Memory Addressing; move cursor to any displayable position by using absolute memory coordinates. The range of *memory row number* is 0—47. The range of *column number* is 0—79.
esc & a *screen row number* y *column number* C	Absolute Screen Addressing; move cursor to any position currently displayed on the screen by using screen relative coordinates. The range of *screen row number* is 0—23. The range of *column number* is 0—79.
esc & a +/— *memory row number* r *column number* C	Relative Memory Addressing; move cursor to any displayable position by using memory coordinates relative to the current cursor position (+ or — memory row; + or — column).
esc & a +/— *screen row number* y +/— *column number* C	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
esc & d A through O	Enable Underline Function; subsequent character entries include underline on display screen.
esc & d @	Disable Underline Function.

Table 5—11. Escape Sequences, Screen Labels Control

Note that the base sequence is esc & j

Function	Code	Description
Clear Labels	esc & j @	Clear Screen Labels. Turn off display of screen labels.
Display Labels	esc & j A	Display Primary Screen Labels. Turn on display of first level of screen labels.
Display f1 — f8 Labels	esc & j B	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
esc\ 7-byte status data	Primary Status Response; When an esc ^ sequence is received, the terminal generates this 7-byte status response and transmits it to the requesting computer.
S, F, or U	HP 2621P Only; device completion response transmitted following any printer control escape sequence, esc & p . . . . . 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 (f1)	esc p	Transmit esc p sequence to computer.
Transmit Key (f2)	esc q	Transmit esc q sequence to computer.
Transmit Key (f3)	esc r	Transmit esc r sequence to computer.
Transmit Key (f4)	esc s	Transmit esc s sequence to computer.
Transmit Key (f5)	esc t	Transmit esc t sequence to computer.
Transmit Key (f6)	esc u	Transmit esc u sequence to computer.
Transmit Key (f7)	esc v	Transmit esc v sequence to computer.
Transmit Key (f8)	esc w	Transmit esc w sequence to computer.

Note that the terminating character for each code transmitted is the string configured into the **RETURN** key together with a linefeed 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. ASCII-Coded Control Codes

ASCII Code		Code Definition	Key Sequence	Display Character
(hexadecimal)	(decimal)			
07	7	Bell	G^c	⍾
08	8	BACKSPACE	H^c	ᵇₛ
09	9	Horizontal TAB	I^c	ᴴₜ
0A	10	Linefeed	J^c	ᴸ_F
0D	13	RETURN	M^c	ᶜ_R
05	5	ENQ — Enquiry; if ENQ/ACK handshake is enabled, terminal responds with 006 (ACK Acknowledge).	E^c	ᵉ_Q
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.	L^c	ᶠ_F
11	17	DC1; depending on which type of DC1/DC2 handshake protocol is enabled, the terminal responds with data, DC2, or nothing.	Q^c	ᴰ₁
1B	27	ESC; signals start of an escape sequence.	E^c	ᵉ_c

The HP 2621P

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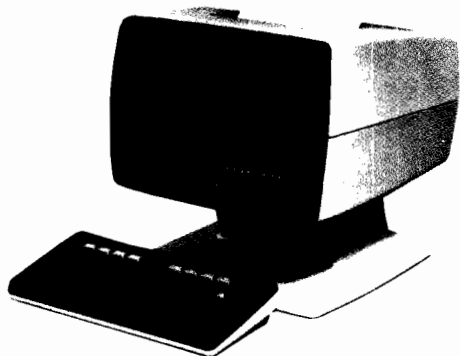
Identifying Options and Accessories

The options and accessories you requested are delivered with your terminal. When you receive the terminal make sure that all of the items that were ordered are present. Tables 6-1 and 6-2 list the options and accessories available for the HP 2621P Interactive Terminal.

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.

Table 6-1. HP 2621P Options

Option No.	Description
015	50 Hz, 230V Power
016	50 Hz, 115V Power

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)
13265A	300 Baud Modem
13266A	Current Loop Converter

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 CTRL and SHIFT 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 ROLL▲	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 ROLL▼	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.
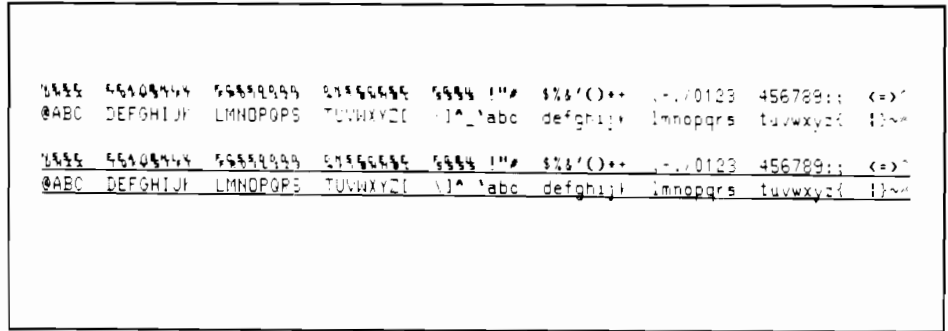
Figure 6—2. Printer Test Display

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).

Preventive Maintenance

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.
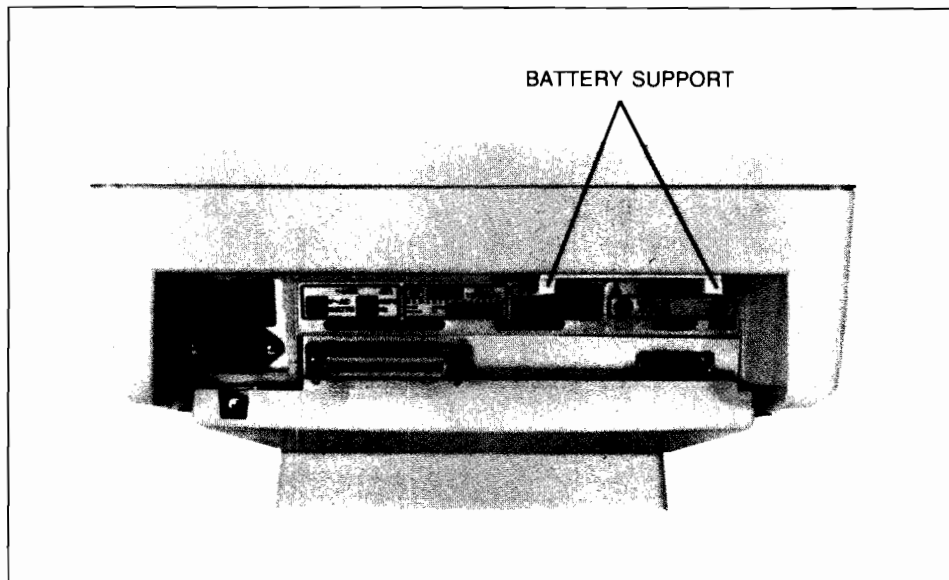

Figure 7—1. HP 2621 Battery Location, Rear Panel

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
      +----+----+----+----+----+----+
      |    |    |    |    |    |    |
      +----+----+----+----+----+----+


HANDSHAKE (record state - uppercase or lowercase - in box):
           e    t    x
         +----+----+----+
         |    |    |    |
         +----+----+----+


HZ (circle one):    60    50

START COL (record starting column number in box):  +----+
                                                   |    |
                                                   +----+

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.
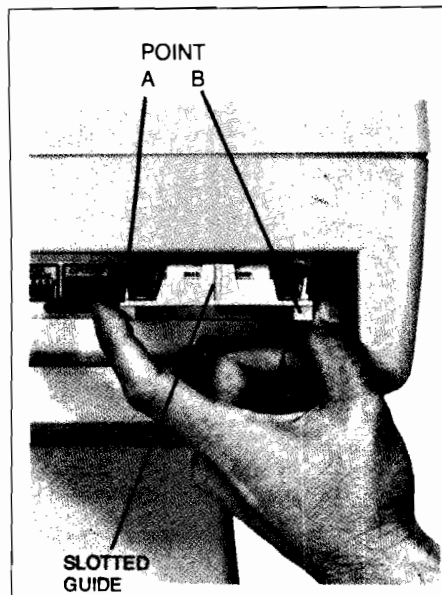

Figure 7—2. HP 2621 Battery Support

Diagnosing Problems

Press [SHFT] 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 [SHFT] 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 loopback 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.
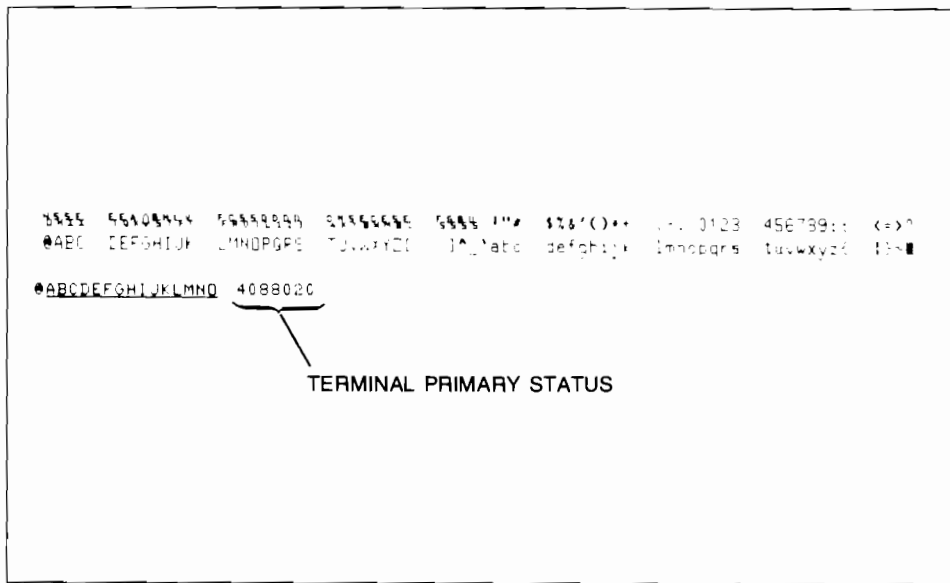

Figure 8—1. Self—Test Screen Display

Table 8−1. HP 2621 Diagnostic Error Messages

Message	Meaning	Action
PROGRAM RAM? $n1$	Error condition encountered in the Program RAM indicated by the value of $n1$ which is in the range 0 through 1.	Contact a qualified service person (see the HP 2621 Interactive Terminal Service Manual).
DISPLAY RAM? $n2$	Error condition encountered in the Display RAM indicated by the value of $n2$ which is in the range 0 through 7.	Contact a qualified service person (see the HP 2621 Interactive Terminal Service Manual).
ROM? $n3$	Error condition encountered in the ROM indicated by the value of $n3$ 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 securly 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 **CTRL** and **SHIFT** while you press the **BREAK** 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
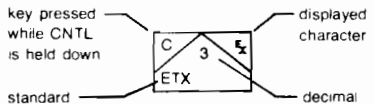LOG BTM (HP 2621P only) — disabled
LOG TOP (HP 2621P only) — disabled

Hewlett–Packard ASCII–coded Character Set   Appendix A

Left chart

BIT 4321	CONTROL (CNTL) CHARACTERS 765=000	CONTROL (CNTL) CHARACTERS 765=001	DISPLAYABLE 010	DISPLAYABLE 011	DISPLAYABLE 100	DISPLAYABLE 101	DISPLAYABLE 110	DISPLAYABLE 111
0000	@ 0 N_U / NUL	P 16 D_L / DLE	SP	0	@	P	`	p
0001	A 1 S_H / SOH	Q 17 D_1 / DC1	!	1	A	Q	a	q
0010	B 2 S_X / STX	R 18 D_2 / DC2	"	2	B	R	b	r
0011	C 3 E_X / ETX	S 19 D_3 / DC3	#	3	C	S	c	s
0100	D 4 E_T / EOT	T 20 D_4 / DC4	$	4	D	T	d	t
0101	E 5 E_Q / ENQ	U 21 N_K / NAK	%	5	E	U	e	u
0110	F 6 A_K / ACK	V 22 S_Y / SYN	&	6	F	V	f	v
0111	G 7 △ / BEL	W 23 E_B / ETB	'	7	G	W	g	w
1000	H 8 B_S / BS	X 24 C_N / CAN	(	8	H	X	h	x
1001	I 9 H_T / HT	Y 25 E_M / EM	)	9	I	Y	i	y
1010	J 10 L_F / LF	Z 26 S_B / SUB	*	:	J	Z	j	z
1011	K 11 V_T / VT	[27 E_C / ESC	+	;	K	[	k	{
1100	L 12 F_F / FF	\ 28 F_S / FS	,	<	L	\	l	|
1101	M 13 C_R / CR	] 29 G_S / GS	–	=	M	]	m	}
1110	N 14 S_O / SO	^ 30 R_S / RS	.	>	N	^	n	~
1111	O 15 S_I / SI	_ 31 U_S / US	/	?	O	_	o	DEL ●

Legend

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

Control Character Legend:

key pressed while CNTL is held down — C — displayed character — ^E_X — 3 — decimal — ETX — standard

Right chart — ESCAPE SENT FIRST

BIT 4321	765=010	765=011	765=100	765=101	765=110	765=111
0000	SP	① 0 PRINT ALL	@ DELAY 1 SEC	P DELETE CHAR	` RELATIVE CURSOR SENSE	③ f_1 p
0001	!	1 SET TAB	A , CURSOR UP	Q INSERT CHAR ON	a ABSOLUTE CURSOR SENSE	f_2 q
0010	"	2 CLEAR TAB	B CURSOR DOWN	R INSERT CHAR OFF	b	f_3 r
0011	#	3 CLEAR ALL TABS	C CURSOR RIGHT	S ROLL UP	c	f_4 s
0100	$	4 SET LEFT MARGIN	D CURSOR LEFT	T ROLL DOWN	d ENTER	f_5 t
0101	%	5 SET RIGHT MARGIN	E RESET TERMINAL	U	e	f_6 u
0110	& PARAMETER SEQUENCE	6	F CURSOR HOME DOWN	V MODEM DIS CONNECT	f	f_7 v
0111	'	7	G CURSOR RETURN	W	g	f_8 w
1000	(	8 HOME CURSOR	H	X HOME CURSOR	h	x
1001	)	9 HORIZONTAL TAB	I DISPLAY FUNCTIONS ON	Y BACK TAB	i	y
1010	*	: CLEAR DSPLY	J DISPLAY FUNCTIONS OFF	Z TERMINAL SELF TEST	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	DEL

Hewlett-Packard ASCII-coded Character Set

NOTES:

1. The ^E_C& parameter sequences are:

    Memory and Screen Addressing

    ^E_C&a *memory row number* r *column number* C — Absolute Memory Addressing

    ^E_C&a *screen row number* y *column number* C — Absolute Screen Addressing

    ^E_C&a ±*memory row number* r *column number* C — Relative Memory Addressing

    ^E_C&a ±*screen row number* y ±*column number* C — Relative Screen Addressing

    Display Enhancement

    ^E_C&d A through O — Enable Enhancement

    ^E_C&d ● — Disable Enhancement

    Screen Labels Control

    ^E_C&j ® — Clear Screen Labels

    ^E_C&j A — Display Screen Labels

    ^E_C&j B — Display f1 — f8 Screen Labels

    Printer Control (HP 2621P Only)

    ^E_C&p 11 C — LOG BTM On

    ^E_C&p 12 C — LOG TOP On

    ^E_C&p 13 C — LOG BTM/LOG TOP Off

    ^E_C&p M — Copy All Memory

    ^E_C&p B — Copy Current Line

    ^E_C&p F — Copy Current Page

2. In REMOTE Mode, upon receipt of ^E_C^, the terminal responds with:

    ^E_C\ *terminal primary status bytes* (see Appendix C)

3. These escape sequences (^E_Cp through ^E_Cw) are transmit sequences only.

4. In REMOTE Mode, upon receipt of ^E_C`, the terminal responds with:

    ^E_C&a *column number* c *screen row* Y

5. In REMOTE Mode, upon receipt of ^E_Ca, the terminal responds with:

    ^E_C&a *column number* c *memory row* R

Note

If ^E_C space through ^E_C / 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 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	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 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 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:

```
      4088020
       ↑     ↑
  byte 0    byte 6
```

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.

COMPUTER   TERMINAL

ESC ^

ESC \ 4088020 CR

Byte 0
Byte 6
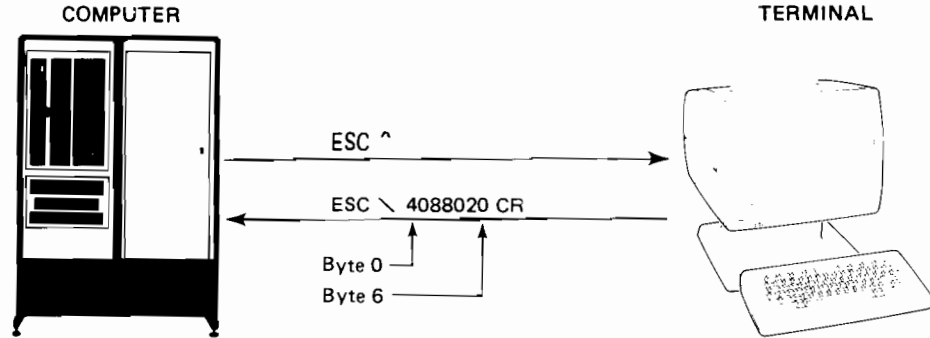
BYTE	ASCII	BINARY	STATUS
0	4	0011 0100	4,096 bytes of display memory
1	0	0011 0000	Space overwrite latch disabled, strap b Cursor wraparound enabled, strap c
2	8	0011 1000	Short transfer handshake disabled, strap g Long transfer handshake enabled, strap H
3	8	0011 1000	CAPS LK disabled LN MODE disabled 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.

BYTE 0   DISPLAY MEMORY SIZE

8	7	6	5	4	3	2	1
0	0	1	1	0	1	0	0

└─4096 Bytes

The amount of display memory available in the terminal is returned (4096 bytes).

BYTE 1   CONFIGURATION SETTINGS (B,C)

8	7	6	5	4	3	2	1
0	0	1	1	0	1/0	1/0	0

Strap C ——————
(End-of-Line Wraparound)
1 = C (disabled)
0 = c (enabled)

└Strap B
(Space Overwrite Latch)
1 = B (enabled)
0 = b (disabled)

BYTE 2   CONFIGURATION SETTINGS (G,H)

8	7	6	5	4	3	2	1
0	0	1	1	1/0	1/0	0	0

STRAP H——┘
(Inhibit DC2)
1 = H (disabled)
0 = h (enabled)

└─ Strap G
(DC2 Handshake)
1 = G (disabled)
0 = g (enabled)

BYTE 3   LATCHING FUNCTION KEYS

8	7	6	5	4	3	2	1
0	0	1	1	1	1/0	1/0	1/0

AUTO LF Key——┘
1 = auto LF
0 = no auto LF

└CAPS LOCK KEY
1 = upper case only
0 = upper and lower case

└ LINE MODE Key
1 = line mode
0 = character mode

BYTE 4   TRANSFER PENDING FLAGS

8	7	6	5	4	3	2	1
0	0	1	1	0	1/0	1/0	1/0

ENTER Key Pending——┘
1 = yes
0 = no

Function Key Pending ——————
1 = yes
0 = no

└── Cursor Sense Pending
1 = yes
0 = no

BYTE 5   ERROR FLAGS

8	7	6	5	4	3	2	1
0	0	1	1	0	0	1/0	1/0

Self-Test——┘
1 = no error
0 = error

Data Communication ──┘
1 = parity or buffer
    overflow error
0 = no error

BYTE 6   DEVICE TRANSFER PENDING FLAGS

8	7	6	5	4	3	2	1
0	0	1	1	0	0	1/0	0

└─Device Completion Pending
(2621P Only)
1 = yes
0 = no

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.

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.
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.
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".
Local Operation	The off—line operation of your terminal. That is, without the aid of 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.

Numeric Pad	A calulator—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 **NUM** key.
Page	The 24 lines of data (including blank lines) that can be displayed on your terminal's screen at any given time.
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.
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.
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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2621 A/P Owner's Manual

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Thank you for your help.

1. Did you have any difficulty in understanding or applying the material presented in this manual?

   ☐ None   ☐ Minimal Difficulty   ☐ Difficulty   ☐ Considerable Difficulty

   If so:

   a. What were the "difficult" areas?

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

   b. How could we clarify these areas? _____

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

   _____
   _____

3. What was your level of programming knowledge before you started using this manual?

   ☐ None   ☐ Beginner   ☐ Intermediate   ☐ Expert

4. What is your major application of the terminal?

   ☐ Business Administration   ☐ Interfacing   ☐ Medicine
   ☐ General Computation   ☐ Education   What kind?
   ☐ Engineering   ☐ Data Entry   ☐ Other
   What kind?   ☐ Control

5. What best describes how you use the terminal?

   ☐ Run programs written by others   ☐ Do applications programming   ☐ Hobbyist
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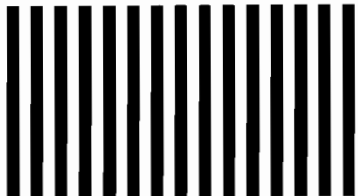*Thank you for your help. No postage necessary if mailed in the U.S.A.*

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