HEWLETT-PACKARD
Preliminary

HP 3082A
Industrial Touch
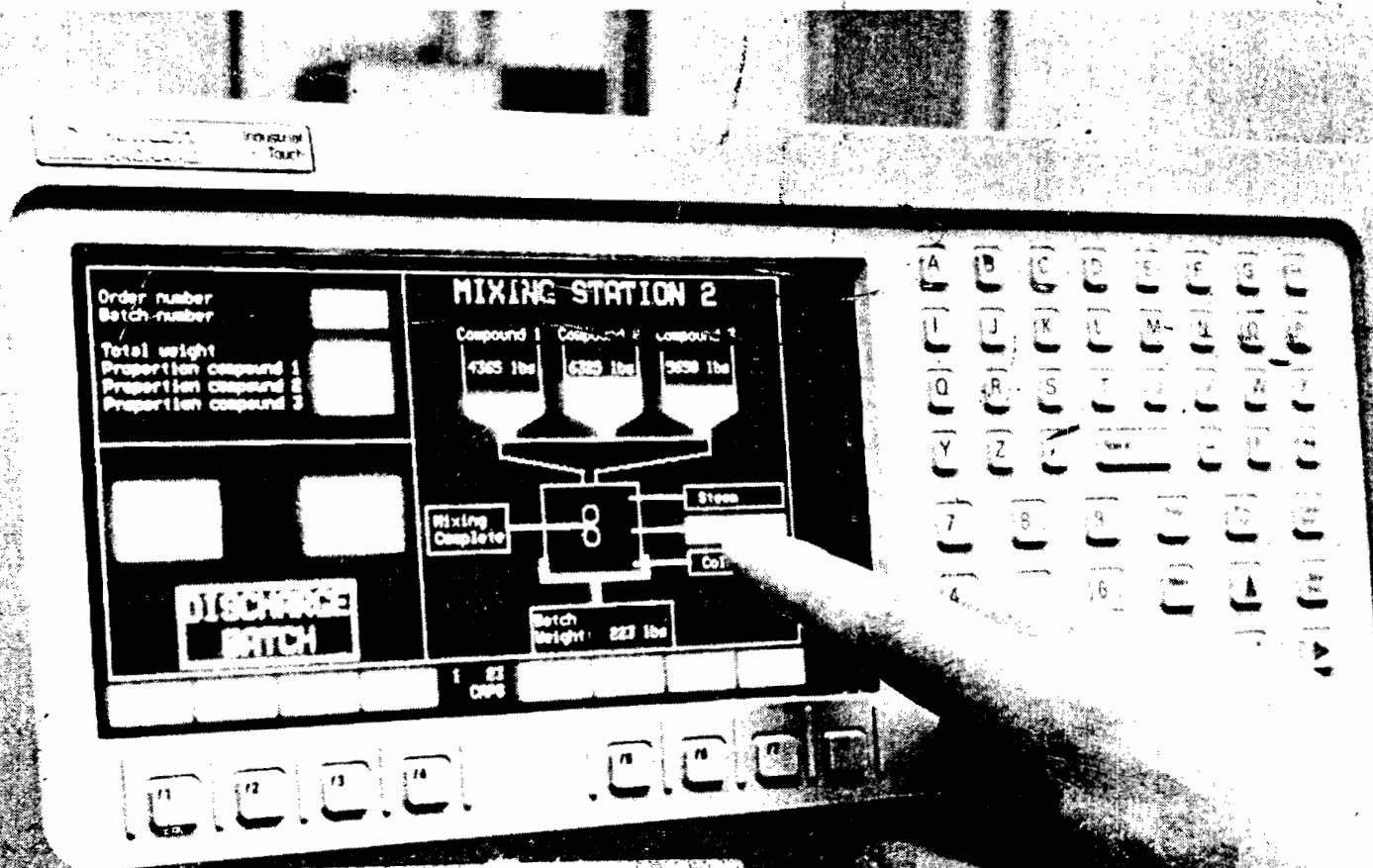
HP 3082A
INDUSTRIAL TOUCH
Display Terminal

Preliminary

User's
and
Screen Designer's
Manual

Caution

Please note that this is a preliminary
manual only. A final version will be
supplied as soon as it is available.

HEWLETT-PACKARD (CANADA) LTD.

Preface

This is the *User's and Screen Designer's Manual* for the HP 3082A Industrial Touch Terminal. Part 1 of this manual tells how to use the terminal to enter, edit, and communicate data. Part 2 tells how to use the terminal's built-in editors to design screens for on-line applications.

Part 1 Operating Industrial Touch

Chapter 1 Introduction to the Terminal

Chapter 1 introduces you to the display screen and keypad of the terminal, as well as the external keyboard and other input devices that may be used with it. Chapter 1 also gives you an overview of the terminal's main operating modes and the way it emulates the HP 2392A, VT100, and VT52 terminals.

Chapter 2 Entering and Editing Data

Chapter 2 starts with basic operating information: how to turn the terminal on and off and reset it. This chapter then gives detailed procedures for entering and editing data on the keypad or keyboard.

Chapter 3 Communicating with the Host Computer

Chapter 3 gives detailed procedures for using Industrial Touch to communicate with host computers in Character Mode, Block Mode, and Forms Mode. In Character Mode, data is sent to the host as you enter it. In Block Mode, you can enter and edit up to four pages of data before sending it to the host. In Forms Mode, data can be entered only in certain fields of a form displayed on the screen, and cursor movements guide data entry.

Chapter 4 Printing and Passing Data To an Auxiliary Device

Chapter 4 tells you how to copy selected data from the display to a printer, how to log data automatically from the screen to a printer, how to pass host data through the terminal to a printer, and how to pass two-way communications between the host and another device through the terminal.

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Part 2 Designing Screens with Industrial Touch

Chapter 5 Introduction to the Screen Editors

Chapter 5 tells what each of the screen editors does and how you can use them to design data-entry screens much more quickly than with individual graphics characters. This chapter explains how to use the HP Mouse and System softkeys with the editors, how to apply video-enhancements to the features you draw with the editors, and how to print screens out and send them to the host computer to be integrated into applications.

Chapter 6 Designing a Data-Entry Form with the Forms and Fields Editors

Chapter 6 tells you how to use the Industrial Touch Forms and Fields editors to design screens that resemble paper data-entry forms, with data entry fields set in a line grid.

Chapter 7 Designing Touch Targets with Touch Editor

Chapter 7 tells how to use the Touch Editor to design touch targets, which enable terminal operators to send information to the host simply by touching specified areas of the screen. Where the earlier method of designing touch targets required you to write lengthy escape sequences, the Touch Editor lets you create multiple targets in less than a minute.

Chapter 8 Designing Process Graphic Diagrams with Graphics Editor

Chapter 8 tells you how to use the Graphics Editor. This editor lets you assemble special graphics characters into process graphic symbols and then manipulate these symbols on screen to form process graphic diagrams.

Chapter 9 Principles of Good Screen Design

Chapter 9 provides some guidance on how to design screens that will work effectively in your system. It tells you how to present information so that it is easy to find on the screen and easy to understand. The chapter also gives advice on integrating screens into your system.

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Appendixes

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PART 1

Operating Industrial Touch

Introduction to the Terminal

1.1 Overview

Industrial Touch is a sealed industrial terminal with a 9-inch flat-panel display and a built-in alphanumeric keypad. This terminal can accept input from a variety of sources and can send output to printers or to any other RS-232 device. It can communicate with host computers in Character or Block Mode, and is plug-compatible with HP 2392, DEC VT100, and DEC VT52 terminals. The Industrial Touch has built-in softkey-driven editors to simplify screen and forms design, configuration menus to simplify system integration, and self-tests to simplify troubleshooting.

Entering Data

To make entering data easier for operators not used to computer keyboards, the letters on the built-in keypad are laid out in alphabetical order. The numbers are arranged as on a calculator. All keys click noticeably when properly pressed.

For the factory floor, Industrial Touch provides several optional input devices as well. With the touchscreen option, operators can send information to the host simply by touching predefined softkey labels and touch targets on the display. Operators may also use bar code wands, slot readers, and laser scanners, as the application requires.

For less rugged environments and for application development, data can also be entered into the terminal through a separate HP keyboard or an HP Mouse connected to its HP-HIL (Human Interface Loop) port. The keyboard has several keys that provide editing and communication-control functions not available on the keypad.

Communicating Data

To make it compatible with a variety of computing environments, Industrial Touch can be configured to emulate an HP 2392, a DEC VT100 (ANSI), or a DEC VT52 terminal. When emulating an HP 2392, it can transmit data a character at a time as it is entered (Character Mode), or it can transmit data in blocks of one line or one page (Block Mode). Whichever of these modes is in use, the terminal can at the same time be placed in a special Forms Mode. In this mode, you can enter data only in predefined fields, and the cursor and beeper guide you through the process. When emulating a DEC VT100 or VT52 computer, Industrial Touch operates in Character Mode only, and Forms Mode is not available.

Industrial Touch also lets you send data from the host and the terminal to printers and other external devices. A special pass-through mode permits two-way communications between the host and external devices such as remote monitoring and control units.

Designing Screens

As an aid to application developers, Industrial Touch provides a set of built-in screen editors that greatly streamline the process of designing screens and forms. This package consists of four menu-driven editors used to design lines, fields, touch targets, and ISA graphic symbols on screen. To design screens with these editors, you use either the external keyboard or the HP Mouse. For complete information on using the editors, see Part 2 of this manual.

Configuring the Terminal

Configuring the Industrial Touch to operate in your computing environment is simplified by the softkey-driven configuration menus. To prevent unauthorized persons from misconfiguring the terminal, access to these menus can be disabled. For full details on how to configure your terminal using these screens, see the *Installation, Configuration, and Maintenance Manual*.

Self-tests

Industrial touch includes a set of built-in self-tests to help locate faults if it isn't operating properly. These tests are run automatically every time the terminal is turned on. They can also be initiated from the keypad using softkeys. The *Installation, Configuration, and Maintenance Manual* provides detailed instructions on self-test mode.
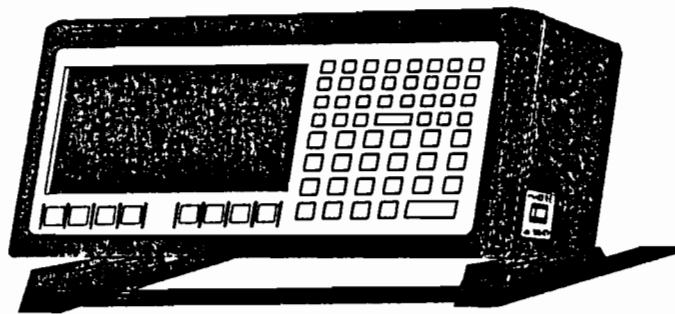
Exhibit 1.1

The HP 3082A Industrial Touch Terminal

1.2 The Display Screen

The display screen contains 28 lines or rows divided into two windows: the display window and the message window. The display window is where the user or host displays data. The message window is under the control of the terminal and displays error messages, softkey labels, and information on the terminal's operating status. Exhibit 1.2a shows the display screen.
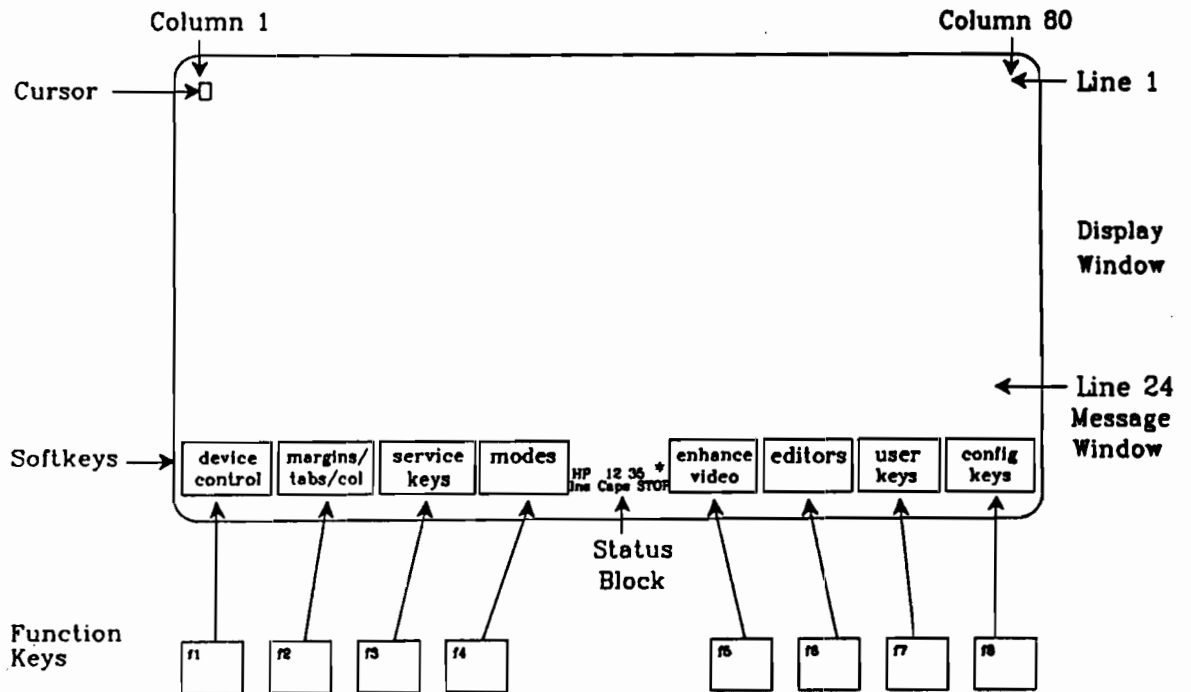
Exhibit 1-2a

The Display Screen of the Industrial Touch.

**Display
Window**

The display window consists of the top 24 lines of the display, where the user can enter data or design screens and where data and screens can be displayed by the host.

All information displayed in this 24-line window is also stored in display memory. In HP mode and in VT100/VT52 multipage mode, display memory can hold up to 96 lines of data at a time. You can display any data in display memory using keys described in sections 2.3 and 2.4.1.

Any area in the display window can be defined as a touch target (see chapter 8). The window can hold up to 32 touch targets.

Message Window

The message window consists of the bottom 4 rows of the screen. It contains:

- a message area
- softkeys
- a status block in the bottom center of the screen.

Message Area

The message area is located on lines 25 and 26. It is used to display error messages as well as menus used with the built-in screen editors.

Softkeys

The softkeys are located on lines 27 and 28 of the display. These eight labelled boxes show the functions currently available from function keys (f1) to (f8) on the keypad and keyboard. For more details on softkeys, see sections 1.4 and 1.5.

Status Block

The status block lies between the two groups of softkeys at the bottom of the screen. It displays information on the the terminal's current operating status. Exhibit 1-2b summarizes the kinds of information displayed in the status block.

Exhibit 1-2b: Meaning of Information Displayed in the Status Block

Status	Meaning
HP	Terminal is operating in HP emulation mode.
VT100	Terminal is operating in VT100 emulation mode.
VT52	Terminal is operating in VT52 emulation mode.
12 35	Cursor is at line 12 and column 35.
•	Data from the host is coming into the datacomm port.
Caps	The (Caps) key on the external keyboard is engaged. All alphabetic keys generate capital letters when not shifted and lower-case letters when shifted.
Ins	Insert mode is on.
STOP	The (Stop) key on the external keyboard has been engaged to halt data flow to the screen.
KbLock	The keypad and keyboard are locked.

1.3 The Keypad

To type in alphanumeric data and to perform various terminal functions, you can use the keypad built into the front of the Industrial Touch. The alphabetic keys are arranged in alphabetical order for ease of use. The keypad is illustrated in Exhibit 1.3. (There is also an optional external keyboard that includes all of the functions of the keypad as well as several others for data editing and communications. The keyboard is described in sections 2.4.)

The keypad built into the front of the Industrial Touch contains four groups of keys, plus four individual keys with special functions.

Alphabetic Group

This group consists of the 26 letters of the alphabet (arranged in alphabetical order) plus a ⬚ key, a (Space) key, and a ⬚ key. The alphabetic keys normally generate uppercase letters. To generate lowercase letters, you must first press the ⬚ key (described below), then press the desired letter.

Numeric Pad Group

This group consists of the numbers 0 to 9 and a decimal point. The number keys are arranged as on a calculator to make entering numbers easier. To enter the blue character on the bottom-right corner of any number key, press the ⬚ key (described below), then the number key.

Display Control Group

These keys move the cursor around the screen and clear display areas.

Function Key Group

These keys trigger the System or User softkeys that are currently displayed in the labelled boxes on the bottom of the screen (see sections 1.4 and 1.5 for descriptions of the System and User softkeys).

(Help)

This key gives access to the **Beeper Control Menu**, which is used to adjust the volume, tone, and duration of the terminal beeper, as well as to turn the touchscreen OFF and ON.

(f)

This key returns the display to the **System Menu** from whichever soft-

key menu is currently on screen, unless the System softkeys have been disabled (see section 1.4).

(Send)

This key is used to send the host blocks of data that are already displayed on the screen (see chapter 3).

(□)

This key, the "blue" key, operates like a "shift" key, giving access to lowercase letters, the blue characters on the numeric keys, and the second set of User softkeys *for one keystroke only*. Press this key first, then press the key with the desired shifted character.
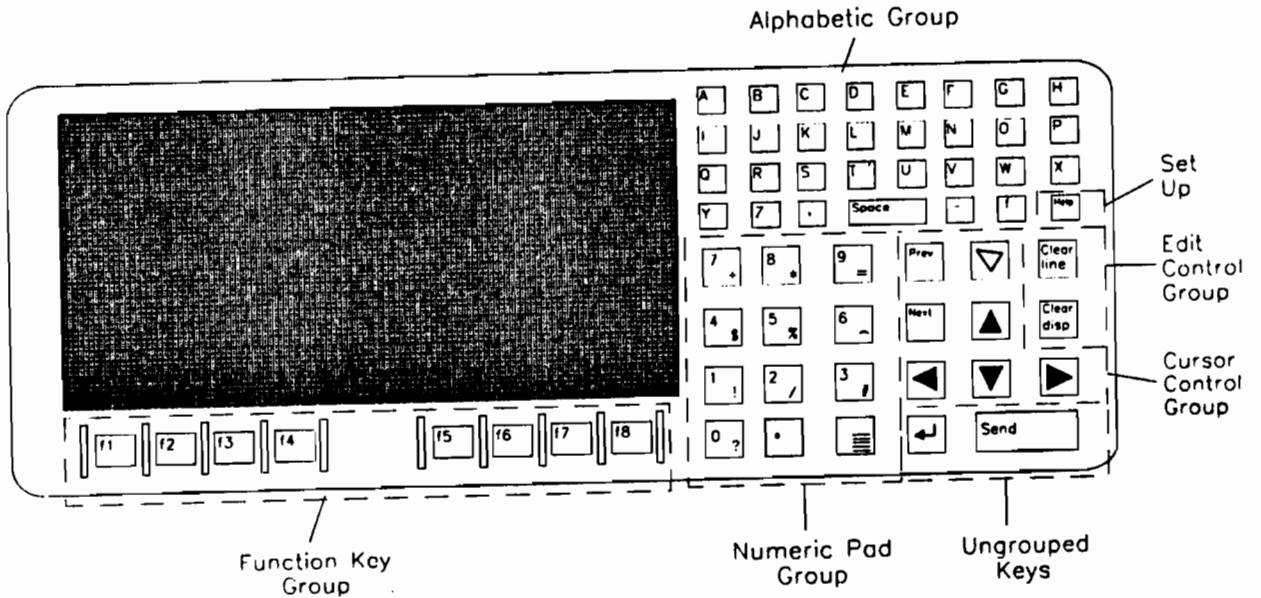
Exhibit 1-3a

The Keypad of the 3082A

1.4 System Softkeys

The system softkeys are a series of built-in functions that control most of the terminal's operational characteristics. These functions are accessed by pressing the function keys (f1) to (f8). The functions that are currently available are displayed in the eight softkeys displayed across the bottom of the screen. The System Softkeys are arranged in a hierarchy of menus. For a complete map of the system softkeys, see Appendix C in this manual.

System Softkey Conventions

Two conventions are used throughout the system softkeys hierarchy to help you understand what the keys do and how they are set:

1. If a softkey has uppercase initial letters, it performs the function described on the label ([Next Choice], for example). If a softkey has all lowercase letters, it causes another menu of softkeys to be displayed ([config keys], for example).

2. Softkeys that alternately enable and disable an operating mode (such as [Block Mode]), display an asterisk (*) in the label when the mode is enabled.

The System Menu

The system menu is the top of the system softkey hierarchy. The keys on this menu give you access to all of the other menus of system softkeys.

The system menu and all of the system keys can be disabled (on the Global Configuration Menu) to prevent unauthorized persons from tampering with the terminal's settings.

If the system menu is *not* disabled, it can be displayed at any time by pressing the (f) key on the keypad. The [Exit] softkey on other system softkey menus also causes the system menu to be displayed, as shown below.

Section 2.4 describes how to access the system softkeys from the optional keyboard.

The keys on the **system menu** cause the following menus to be displayed:

The device control and device modes menus

The softkeys on the **device control** and **device modes** menus are used for controlling an external device and passing data to it. These keys are described in detail in chapter 4.

The margins/tabs/columns menu

The softkeys on the **margins/tabs/col** menu are used for setting and clearing margins and tabs, as well as displaying the display ruler.

The modes menu

The softkeys on the **modes** menu control many of the terminal's operating characteristics. They control transmission of data to the host computer, as well as setting some local conditions.

The editors menu

The softkeys on the **editors** menu give access to the built-in screen and forms editors. The editor softkeys are discussed in detail in chapters 5 to 8.

The user keys menu

The user softkeys can be defined to perform any function. To configure the user softkeys for your own purposes, you use the **User Key Configuration** menu. For details, see section 1.5 in this manual and section 5.7 in the *Installation, Configuration, and Maintainance Manual*.

The config keys menu

The softkeys on the **config keys** menu are used to bring up the various screens used for configuring the terminal. These screens are discussed in detail in the *Installation, Configuration, and Maintainance Manual*.

Triggering System Softkeys

The system softkeys can be triggered in any of the following ways:

- pressing the function key on the keypad that corresponds to the position of the softkey label on the screen.
- pressing the corresponding function key on the optional keyboard.
- touching the softkey label itself, if you have the optional touchscreen.
- clicking on the label with a mouse.

1.5 User Softkeys

The terminal provides two sets of eight User softkeys that can be defined to perform any terminal, system, or application function.

Defining User Softkeys

The two sets of user softkeys are provided so that you can customize your terminal to perform the functions you require quickly and easily. The softkeys can be used for local operations or to trigger operations of an application running on a host computer.

For each of the user softkeys, you can define

- a screen label to identify the function.
- a report string that is generated when the associated function key is pressed.
- a destination code that defines whether the string is processed locally or transmitted to the host for processing.

To define the user softkeys, you use the **User Key Configuration Menu**. For details on defining the user softkeys, see Section 5.7 of the *Installation, Configuration, and Maintenance Manual*.

The *Host Programmer's Reference Manual* gives details on configuring the softkeys using escape sequences sent from the host computer.

Displaying User Softkeys

If the system softkeys are disabled, user softkeys [f1] to [f8] are displayed.

If the system softkeys are enabled, select [User Keys] on the **System Menu** to display user keys [f1] to [f8].

Press the ⊙ key on the keypad to display user keys [f9] to [f16] for one keystroke only.

Section 2.4 describes how to access the user softkeys from the optional keyboard.

How the User Softkeys Work

The two sets of User softkeys operate somewhat differently:

User softkeys f1 to f8 can be displayed continuously and used repeatedly, much like the system softkeys. Their default labels are simply [f1] to [f8], and they transmit the escape sequences E_cp to E_cw to the host.

User softkeys f9 to f16, on the other hand, operate like the blue characters on the keypad's numeric keys: they are displayed for only one keystroke when you press the ▣ key. They are predefined as a set of punctuation marks that are not available on the keypad, in order to aid in data entry, as follows:

These softkeys can be redefined to perform other functions as well, but they always operate for only one keystroke.

1.6 Auxiliary Input and Output Devices

The 3082A can be used with a touchscreen, a barcode reader, an external keyboard, or a mouse. It can also accept input from and send output to any RS-232-C compatible device.

Touchscreen

The optional touchscreen is built into the display screen. It allows you to trigger softkeys, enter data, and perform other operations by touching predefined targets on the display screen.

Touch targets are defined by means of the Touch Editor, discussed in chapter 7, or by escape sequences sent from the host, as described in the *Host Programmer's Reference Manual*.

Barcode Devices

The HP 3082A accepts barcode input from

- an HP-HIL barcode wedge connected to the HP-HIL port on the keyboard
- a barcode wand connected to the barcode-wand port
- a laser scanner or slot reader connected to the laser-scanner port.

Note

All Industrial Touch terminals can accept input from the Smart Hawk laser scanner. For the Industrial Touch to accept input from "dumb" wands or scanners, the barcode option must be installed.

Before the terminal can process input from a barcode wand or laser scanner, you may have to make changes to the Barcode Configuration Menu. For details see the section 5.6 in the *Installation, Configuration, and Maintenance Manual*.

External Keyboard

The optional external keyboard is connected to the terminal's HP-HIL port. It is a standard computer keyboard that is useful for entering large amounts of alphanumeric data and for applications development. Sections 2.4, 2.4.1, and 3.5 describe the external keyboard in greater detail.

Two-button Mouse

To use the optional two-button HP Mouse, you must have the touchscreen option installed. You connect the mouse either directly into the HP-HIL port on the back of the terminal or into an external keyboard. Before using the mouse, you must also press (Help) on the keypad and ensure that the [Touch On] softkey is engaged.

When the HP Mouse is connected to your terminal, a rectangular pointer appears on the screen in addition to the regular cursor. By moving the mouse on a flat surface, you move the pointer on the screen. By operating the two buttons on the mouse, you can move the cursor and trigger softkeys.

Moving the Cursor

To move the cursor with the HP Mouse, move the mouse until the rectangular pointer rests where you want the cursor, then click and release either button on the mouse. The cursor will jump to the new position.

Alternatively, you can hold down either button while moving the mouse, and the pointer will drag the cursor along with it.

Triggering Softkeys

The softkeys are the labelled rectangles on the two bottom rows of the screen that control various terminal functions. If you have the touchscreen option installed and an HP Mouse connected, you can trigger any softkey by placing the pointer over it on the screen, then clicking either button on the mouse. For the other methods of triggering softkeys, see section 1.4.

Using the Mouse To Design Screens

When you are designing application screens and forms with the built-in editors, the HP Mouse lets you work much more quickly than the arrow keys on the keypad or keyboard. For special instructions on using the HP Mouse with the built-in editors, see chapter 5.

RS-232-C Compatible Devices

Any RS-232-C compatible device that generates ASCII output, such as an electronic weighing scale or other data-acquisition device, can be connected to the Auxiliary Port (Port 2).

The Auxiliary Port can also be used to connect an RS-232-C printer or other output device.

Chapter 4 in this manual gives details on using auxiliary devices with the terminal. For details on configuring this port, see the *Installation, Configuration, and Maintenance Manual*.

1.7 Emulation of the HP 2392A Terminal

When this module is written, it will detail the compatibilities and incompatibilities between the 2392A and the 3082A operating in HP mode.

- 3082A compatible with all 2392A escape sequences; HP150 and 2393 A touchscreen escape sequences; for details, see *Host Programmer's Reference Manual*.

- uses 2393 keyboard

- see 2392 Ref manual 10-1 to 10-10

1.8 Emulation of DEC VT100 and VT52 Terminals

When it is emulating a DEC VT100 or DEC VT52, the 3082A incorporates all of the features and operations of the DEC terminal. Because it recognizes and executes the escape sequences specific to the type of terminal it is emulating, the 3082A is compatible with applications written for the DEC terminals. (See sections 5.2 and 5.3 of the *Installation, Configuration, and Maintainance Manual* for details on configuring the terminal for DEC emulations.)

DEC Terminal Emulations

When the HP 3082A is emulating a DEC VT100 or VT52 terminal, it is compatible with most applications written for those terminals. When it is emulating a VT100, the 3082 recognizes and executes the ANSI escape sequences specified in the ANSI documents X3.41-1974 and X3.64-1979, as well as some HP parameterized escape sequences. When it is emulating a VT52 terminal, the 3082 recognizes and executes the DEC VT52 escape sequences. For details on the escape sequences used by the terminal in VT100 or VT52 mode, see the *Host Programmer's Reference Manual*.

In VT100 or VT52 mode, the terminal has the following features:

- The keyboard is re-configured to match a DEC keyboard, as discussed in section 2.5.2.
- The default Display Memory is one page (24 lines).
- Data is transmitted in Character Mode, a character at a time.
- There are a number of DEC-specific selections on the **Terminal Configuration Menu**, as described below.

DEC emulation selections

When you select one of the DEC emulation modes, you can select the following DEC-specific features on the **Terminal Configuration Menu**:

- You can specify an Answerback Message that the terminal will use in response to an "ENQ" signal from the host.
- You can enable "Multi-page" to give you 96 lines of Display Memory rather than the default 24 lines. (This feature may not be compatible with some DEC applications.)
- You can set the backspace key ((◀)) to
  - generate the DEL character when unshifted and move the cursor back when shifted *or*
  - move the cursor back when unshifted and generate the DEL character when shifted.

- You can set the numeric keypad keys (and the cursor-control arrow keys in VT100 mode) on the keyboard to function as "applications" keys for certain DEC applications.

Some of these selections affect the way certain keys on the keyboard operate. These differences are explained in the section on "Editing Data" in this manual.

See sections 5.2 and 5.3 of the *Installation, Configuration, and Maintainance Manual* for details on configuring the terminal for DEC emulations.

Differences between DEC and HP 3082A Operations

There are several features on DEC VT100 and/or VT52 terminals that are different or not available on the HP 3082A.

The following features of a DEC terminal are not available on the 3082A:

- the four applications-controlled LEDs on the VT100 are not represented on the 3082A.

The following features of a DEC terminal are handled differently on the 3082A:

- the 3082A cannot display 132 columns at once. It uses right and left scrolling to display columns 81 to 132.
- Bold Intensity is not available on the 3082A's screen. You can map Bold Intensity onto one of the following video enhancements: normal text, inverse video, blinking text, or underlined text. (See section 5.2 of the *Installation, Configuration, and Maintainance Manual* for details.)

Entering and Editing Data

2.1 Introduction

The 3082A is a full-featured data-entry terminal. But because it is designed for industrial environments and industrial workers, its *alphanumeric* data entry operations are in some ways more limited than those of the HP 2392 and in other ways different (unless the optional external keyboard is attached). This chapter describes how enter and edit data with the terminal off-line. (When the terminal is on-line, some of the operations may be different. For a discussion of data communications, see chapter 3.)

The terminal's data entry are controlled in a number of ways by terminal configuration. Most importantly, the 3082A operates quite differently if it is emulating a DEC terminal than if it is emulating an HP 2392. There are other settings on the configuration screens and the system softkeys that influence some terminal functions, as well. Differences are indicated throughout the discussion that follows.

The Display

The 3082A has a built-in screen with a full 24 lines by 80 columns of display area. It also has a number of features such as margin and tab settings, a display ruler, a margin bell, and automatic wraparound to make displaying data easier.

The Keypad

The terminal keypad provides a full set of alphabetic and numeric characters for data entry, as well as a limited number of punctuation and special characters. However, as an aid to operators who are not used to typing, the keypad keys are in alphabetical order and normally generate uppercase letters. This makes complicated or extensive alphanumeric data entry and interaction with case-sensitive applications from the keypad rather cumbersome. The optional external keyboard should be used for such operations. (See section 2.5 for a description of the keyboard operations.)

The alphanumeric keys and cursor control keys on the keypad all have an auto-repeat feature. If you hold a key down, it repeats its function until you release it.

Alphabetic Group
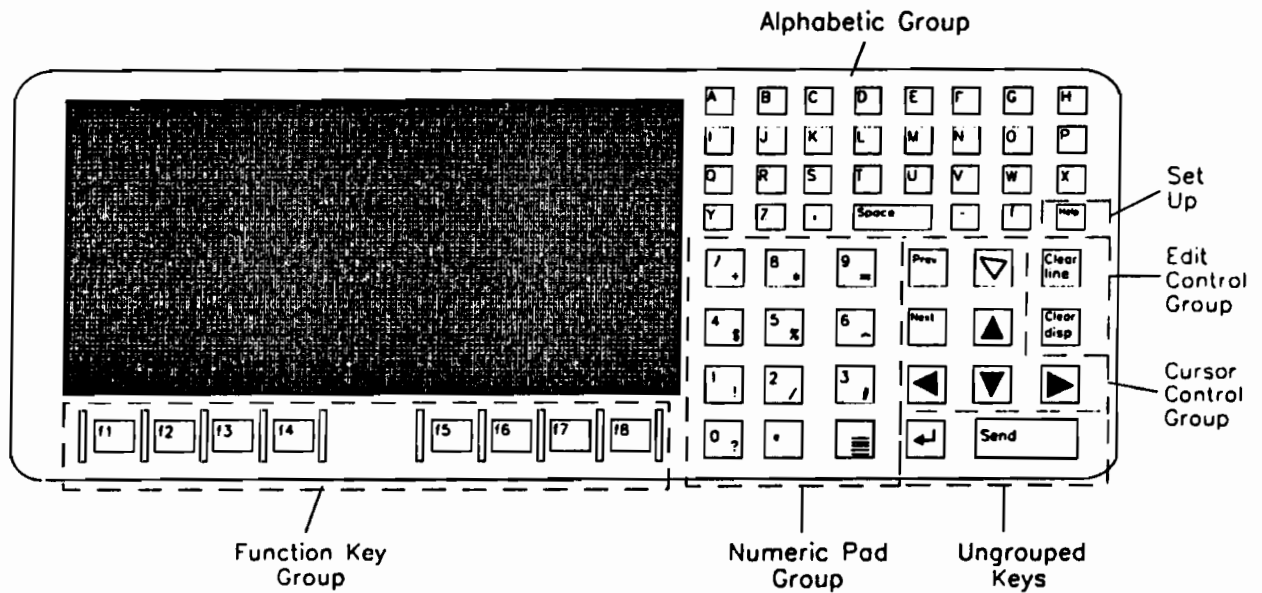
Exhibit 2.1
The Keypad

The Optional Keyboard

The 3082A can be used with an external keyboard that is plugged into the HP-HIL port on the rear of the terminal. The keyboard should be used for extensive and complicated data entry and for applications development. For details of the terminal's operation with an external keyboard, see sections 2.5 and 3.5.

2.2 Switching the Terminal ON and OFF

The terminal power switch is located on the right-hand side of the terminal. To turn the terminal ON or OFF, you simply press the switch in. When you turn the terminal ON, it is configured to the values saved in non-volatile memory. If you turn the power on while pressing the (Help) and (-) keys, all configuration, modes, and function settings are returned to their factory defaults.

Turning the Terminal ON

Turn the terminal ON by pressing the LINE switch on the right side of the terminal. The switch will remain depressed, flush with the surface of the terminal (see Exhibit 2.2).

When you turn the terminal ON, it

1. beeps once, performs self-tests and initializations for about 10 seconds, then beeps again.

2. displays a blank display window, with the cursor positioned in the upper left corner of the screen; the modes menu of softkeys is displayed if system softkeys are enabled; otherwise user softkeys [f1] to [f8] are displayed.

If the terminal does not follow this sequence, but beeps repeatedly or does not display the screen as described above, it has encountered an error in its self-tests and initializations. An error message may be printed on the screen or on an attached printer. Turn the terminal OFF and ON again. If the error repeats, consult chapter 4 in the *Installation, Configuration, and Maintainance Manual*.

Power-on Settings

When you turn the terminal on, it is set as follows:

■ All values set in configuration menus remain as they were before the terminal was powered off.

■ All modes and functions are disabled except Remote Mode, which is turned on.

■ All data transfers through both datacom ports are cancelled, and if XON/XOFF is enabled, XON is sent.

■ Margins and tab stops are set to defaults and the display ruler is turned off.

■ The keypad and keyboard are unlocked.

■ Any error messages are cleared.

Default Power-on

It is possible to restore the terminal's factory default configuration settings by turning the terminal ON while pressing both the (Help) and ⊖ keys.

This procedure is useful if the system keys are disabled and you need to perform system tasks, such as configuration.

Note

If you restore the terminal's defaults, the terminal may have to be re-configured before you can operate it again.

Turning the terminal OFF

Turn the terminal OFF by pressing the LINE switch. When it is released, the switch will protrude from the surface of the terminal (see Exhibit 1.7).

When when you turn the terminal OFF,

- display memory is cleared
- all modes and functions set on the system softkeys are disabled.
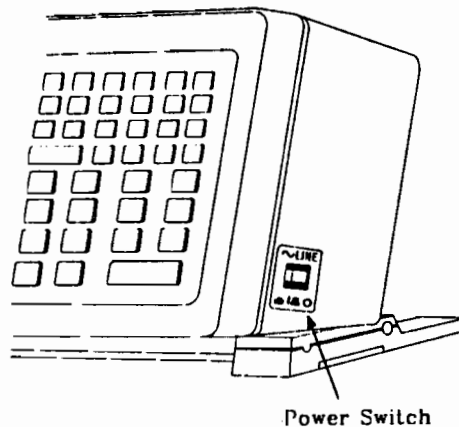
Power Switch

Exhibit 2.2

Location of the Power Switch

2.3 Screen Settings and Display Memory

The 3082A terminal has a built-in display screen that provides 24 rows by 80 columns for data entry and editing. Most of the operating characteristics of the screen can be defined on the configuration menus or the **margins/tabs/columns** menu.

Screen Capacity and Display Memory

The 3082 screen can display up to 24 lines by 80 columns of data at a time. The terminal's display memory, however, can hold up to 96 lines of data at the page width setting of 80 columns, and up to 58 lines at the 132-column setting. Using special video attributes and outsized characters reduces the number of lines memory can hold.

in VT100/VT52 mode, display memory is limited to 24 lines unless Multipage mode has been enabled on the **Terminal Configuration Menu**.

It is useful to think of the screen as a window on display memory and of display memory as a scroll. When there are more lines of data in display memory than can fit in this display window, this scroll can be rolled up or down (and left or right if the 132-column page width is in effect) through the window as illustrated in exhibit 3.1a. (The methods of moving through display memory are described in Section 2.4 and 2.5.1.)

Margins

The default left and right margins are columns 1 and 80 if the page width is set to 80, and columns 1 and 132 if it is set to 132. When operating in HP mode, you can change the margins by means of the **margins/tabs/col** menu.

In VT100 or VT52 emulation mode, you cannot change the margins.

Note

Data entry and editing always occurs within the margins, *unless* you use the cursor control keys to move outside the margins.

Tabs

In the terminal's default configuration, there are no tab settings. For either HP mode or VT100/VT52 mode, you can use the **margins/tabs/col** menu to set new tabs, clear individual tabs, or clear all tabs.

The (Prev) and (Next) keys on the keypad function as forward and

backward tabs.

Ruler

To display a ruler showing the current margin and tab settings, go to the **margins/tabs/col** menu and select [Margin Status]. To turn the ruler off, select [Margin Status] again.

Cursor

The default cursor on the 3082A is a blinking underline. On the configuration screens, however, it is a blinking rectangle. The cursor can be changed using escape sequences (see the *Host Programmer's Reference Manual* for details).

Wrap Around

In the terminal's default configuration, the Wrap Around feature is enabled. If the cursor reaches the right margin while you are typing characters, it moves to the left margin on the next line automatically and continues to display characters.

To disable Wrap Around, use the Global Configuration menu. With Wrap Around disabled, the cursor stops at the right margin and overwrites the last character with subsequent characters typed.

Margin Bell

The terminal's margin bell is disabled by default. If you enable the margin bell using the **Global Configuration Menu**, the terminal will beep when your typing reaches the column eight columns to the left of the right margin. This feature does not work in Remote Mode.

Left Margin
column 1

Right Margin
column 80
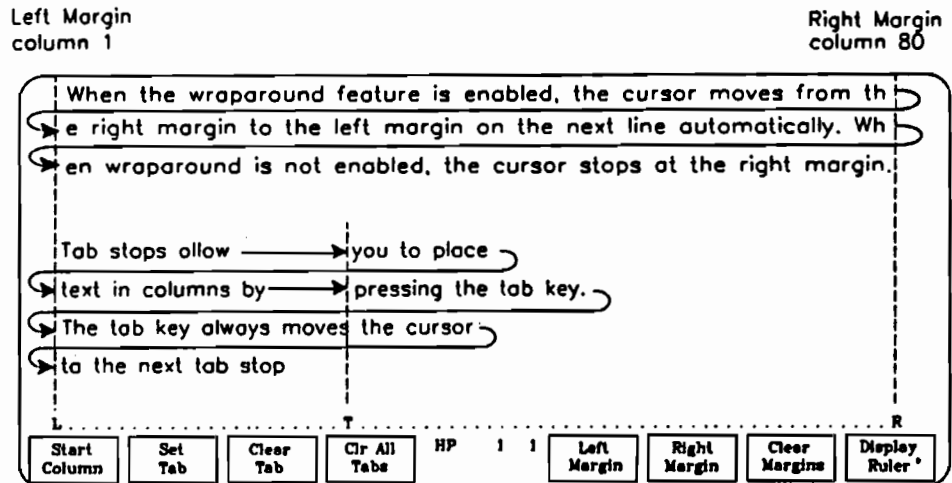
Tab Stops: left margin and column 30

Exhibit 2.3 Display Screen Showing Margins, Tabs, Ruler, and Wrap Around

2.4 Data Entry and Editing with the Keypad

The terminal keypad includes a number of keys that facilitate data entry and editing, besides the alphanumeric keys. These include the ⬛ key, the cursor control keys, and the data clearing keys.

The "Blue" Key

⬛

The terminal keypad does not have a (shift) key, as conventional keyboards do. Instead, the ⬛ key allows you to "shift" the keys on the keypad *for one keystroke only*. This gives access to lowercase alphabetic characters, the blue characters on the lower right corners of the numeric keys, and secondary functions for the cursor keys, as described below.

The ⬛ key also displays a set of eight user-defineable softkeys for one keystroke. These softkeys are by default defined as the following punctuation marks:

You can reconfigure these softkeys using the **User Key Configuration Menu**, but their default definitions allow greater flexibility in data entry. (See the *Installation, Configuration, and Maintainance Manual* for details on re-defining user softkeys.)

It is *not* necessary to hold the ⬛ down while pressing another key, as it is with a conventional shift key.

The Cursor Control Keys

▽

Pressing the ▽ ("home up") key moves the cursor to the left margin on the top row of the screen and rolls the text in display memory down until the first line in display memory appears above the cursor.

⬛ then ▽
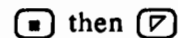
Pressing the ▽ key after pressing the ⬛ key moves the cursor to the left margin on the bottom row of the screen and rolls the text in display memory up until the last line in display memory appears in the

line above the cursor.

⬆ and ⬇

Pressing ⬆ or ⬇ moves the cursor up or down, with wraparound at the the top and bottom margins.

⬛ then ⬆ or ⬇

Pressing ⬆ or ⬇ after pressing ⬛ scrolls the display memory up or down one row while the cursor stays in the same position.

◀ and ▶

Pressing ◀ or ▶ moves the cursor left or right, with wraparound and linefeed at column 1 and at column 80 or 132. *The cursor keys ignore any other margins.*

⬛ then ◀ or ▶

Pressing ◀ or ▶ after pressing ⬛ scrolls the display memory left or right when the screen width is set to 132.

(Next) and (Prev)

Pressing (Next) and (Prev) moves the cursor forward and backward to the next tab stop. The left margin always functions as a tab stop.

(↵)

Pressing (↵) moves the cursor to the left margin of the current line, unless you have selected the [Auto LF] function key on the modes menu, in which case it moves to the left margin on the next line.

Data Clearing Keys

(Clear line)

Pressing (Clear line) deletes all characters from the cursor to the end of the current line.

(Clear disp)

Pressing (Clear disp) deletes all characters from the cursor to the end of display memory.

2.5 The Optional External Keyboard

The optional external keyboard is useful when large amounts of alphanumeric data have to be entered into the terminal. It is a conventional computer keyboard, with alphabetic characters in QWERTY order.

The optional keyboard is a conventional keyboard that generates both capital letters and lowercase letters and provides some editing and other functions that the keypad does not. This keyboard comes in layouts for 17 different languages. The USASCII keyboard is shown in Exhibit 2.5, the others in appendix B. All layouts, however, contain the same six major groups of keys, as described below. (To locate descriptions of individual keys not discussed here, see the Index.)

Alphanumeric Group: These keys are similar to the keys on a standard typewriter and consist of alphabetic, numeric, and symbol keys, plus several individual keys with special control functions.

Numeric Pad Group: These keys are arranged like a calculator keypad to make entering numbers easier.

Cursor Control Group: These keys move the cursor around the screen and scroll the data in display memory. The (Select) key is used to signal the host (see section 3.5).

Edit Control Group: These keys are used to insert and delete lines and characters on the display.

Function Key Group: This group consists of the eight function keys and two softkey control keys ((Menu) and (User System)).

- The function keys, (f1) to (f8), trigger the System or User softkeys that are currently displayed.
- The (Menu) key alternately turns off the softkey display, leaving rows 27 and 28 blank, and brings up the first bank of User softkeys.
- (Shift) and (Menu) displays the second bank of User softkeys.
- The (User System) key displays the System Menu
- (Shift) and (User System) displays the first bank of User softkeys.

Terminal Control Group: These two white keys, (Reset Break) and (Stop), can be used to interrupt terminal-to-computer communications and to reset the terminal (see section 3.5).

Terminal
Control
Group

Function
Key Group

Edit
Control Group

Alphanumeric
Group

Cursor Control
Group

Numeric Pad Group
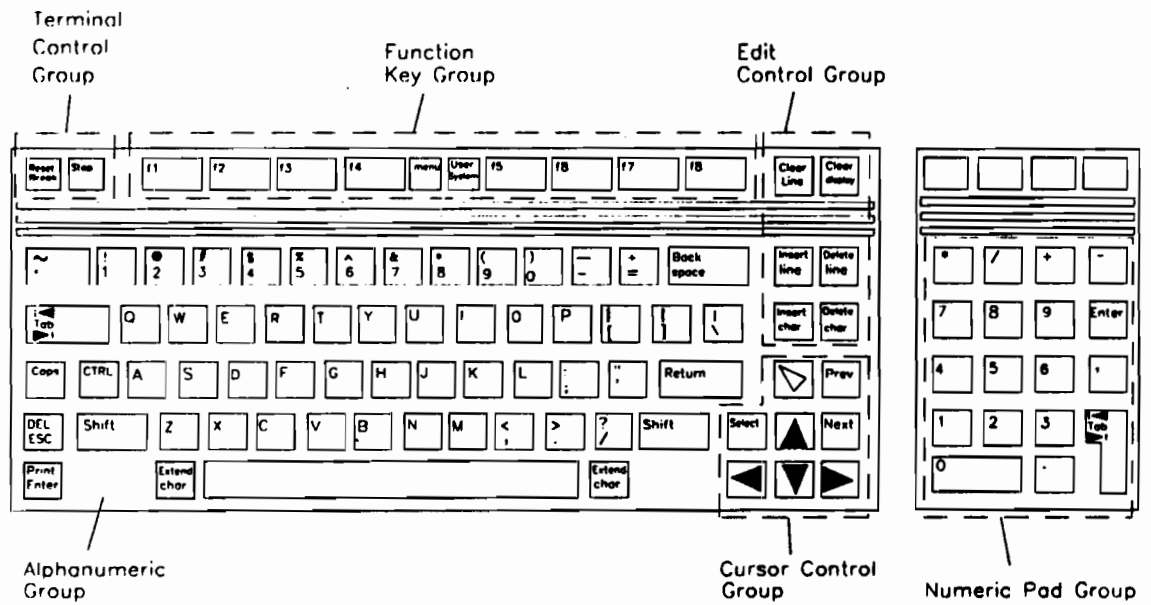
Exhibit 2.5

Standard USASCII Keyboard for the 3082A

Note

When the terminal has been configured to emulate a VT100 or VT52, some of the keys on the keyboard are remapped (see section 1.8.1 for details).

2.5 The Optional External Keyboard

2.5.1 Using the Keyboard for Data Entry and Editing

If you are using the separate keyboard, you have a number of additional data entry and editing features available to you. The most important of these is that you can enter mixed-case text easily and quickly with the standard QWERTY layout and (Shift) key operations. There are several other operations that are easier as well. This section describes the keys that are on the keyboard that are *not* on the terminal keypad. Some of these functions are available only in HP mode.

(Shift) and (▲) or (▼)

Pressing (Shift) and (▲) or (▼) together scrolls display memory up or down one row on the screen.

(Next) and (Prev)

Pressing (Next) and (Prev) scrolls display memory up and down on the screen a page (24 lines) at a time.

Note

The (Next) and (Prev) on the keyboard are different than those on the keypad. On the keypad the (Next) and (Prev) keys function like (Tab) and (Shift) + (Tab) on the keyboard.

(Shift) and (◄) or (►)

Pressing (Shift) and (◄) or (►) together scrolls display memory left or right when screen width is set to 132.

(Tab) and (Shift) + (Tab)

Pressing (Tab) or (Shift) + (Tab) moves the cursor to the next or previous tab stop.

(Back space)

In HP mode, the (Back space) key operates like the (◄) key. It moves the cursor to the left without erasing existing characters.

In default VT100 or VT52 mode, the (Back space) by itself generates the

"delete" control code (control-h) for use with certain applications. Pressed with (Shift), the (Back space) key operates like the (◄) key. These functions can be reversed by changing the "Backspace Key" field on the **Terminal Configuration Menu.**

(Insert Char) (HP mode only)

Pressing (Insert Char) makes it possible to insert characters into text already displayed on the screen, rather than printing over it. Characters pushed past the right margin are lost. Pressing the key a second time disables character insertion.

Characters inserted inside a video-enhanced field will video-enhanced as well.

When character insertion is enabled, the abbreviation "Ins" appears in the status block.

(Delete Char) (HP mode only)

Pressing (Delete Char) causes the character at the cursor to be deleted. Characters between the cursor and the right margin are moved one column to the left.

Deleting characters inside an unprotected or video-enhanced field reduces the range of that field by the number of characters deleted. Deleting the first character in an unprotected field makes the rest of the field protected.

(Insert Line) (HP mode only)

Pressing (Insert Line) inserts a blank line on the row that the cursor is on. Text below the blank line moves down one row and the cursor moves to the left margin of the blank line.

Caution

When display memory is full, inserting one line of data causes another to be lost, unless Overflow Protection is enabled (see section 2.6 for details).

(Delete Line) (HP mode only)

Pressing the (Delete Line) key deletes the line that the cursor is on. Text lines below the deleted line move up one row, and the cursor moves to the left margin.

2.5 The Optional External Keyboard

2.5.2 DEC mode Keyboard Operations

When the terminal is emulating a VT100 or VT52, the optional keyboard is reconfigured to emulate a DEC keyboard as described below. (Exhibit 2.5.2 shows the keys that are reassigned or disabled when the terminal is emulating a VT100 or VT52.)

1. The following Numeric Keypad keys are reassigned:

    ■ the top row of keys (* , / , + , -) are program function keys (PF1) to (PF4). The function of these is defined by the application.

    ■ the (Enter) key becomes a (-) key.

    ■ the (Tab) key becomes the (Enter) key.

    ■ the blank key above the (*) key becomes the (Line Feed) key.

    (The numeric keys on the Keypad can also be assigned to operate as program function keys, by setting the Numeric Keypad to "Applications" mode on the DEC Mode Configuration Menu.)

    A keyboard overlay (HP part number 5180-6303) is available to indicate the functions of the numeric keypad keys on the keyboard when you are operating in a DEC emulation mode.

2. The following keys are disabled:

    ■ the (Insert line) and (Delete line) keys

    ■ the (Insert char) and (Delete char) keys

    ■ the (Select) key

3. Several of the alphanumeric keys are reassigned:

    ■ the (Print Enter) key functions as a (Return) key.

    ■ the (CTRL) and (Break) keys together transmit the "Answerback Message" to the host.

    ■ the (CTRL) and (Stop) keys together transmit a 3.5 second "break" to the host.

    ■ The (Prev) and (Next) keys function only if "Multi-page" Display Memory is turned ON.

Line feed

Program function keys PF1 to PF4

Minus (−)

Return

Disabled*

Enter
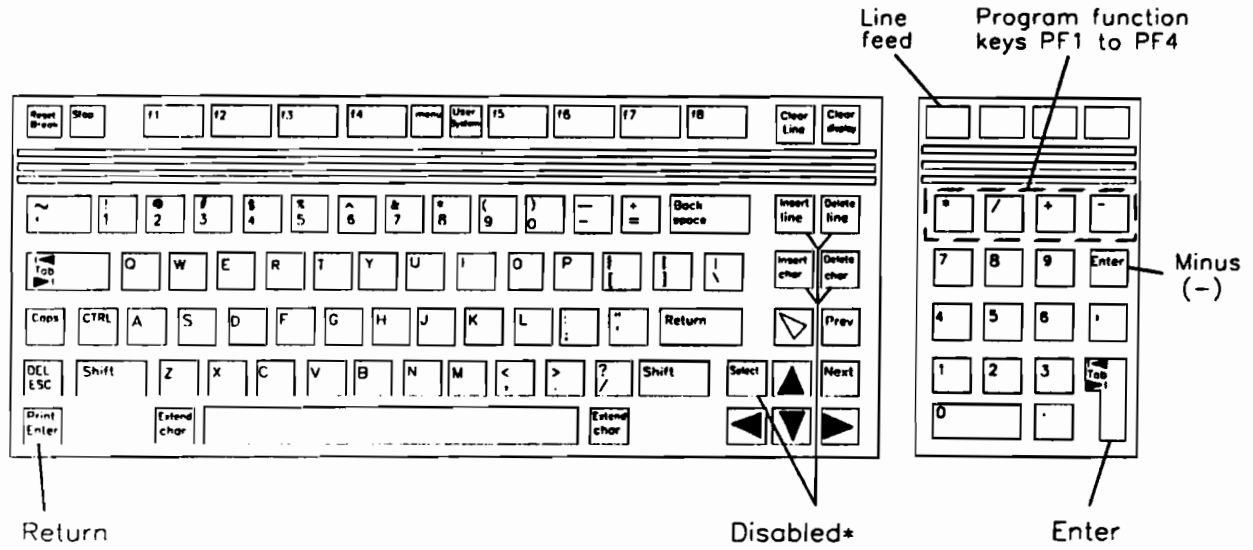
* Shift ▲, shift ▼, Prev, and Next are disabled with single−page Display Memory.

Exhibit 2.5.2

Operation of the Keyboard for DEC Emulations

2.6 Using Overflow Protection and Display Lock

The [Memory Lock] softkey on the **modes** menu accesses two features that are available in HP mode only. The first, Overflow Protection, gives you a way to avoid losing data when display memory is full. The second, Display Lock, lets you keep certain lines of text (such as headings or instructions) displayed at the top of the screen while you work elsewhere in display memory. Display Lock also lets you move blocks of text from one location to another in display memory.

Using Overflow Protection

Normally, if display memory is full and you or the host inserts data, invokes a video enhancement, or makes some other entry that consumes memory, you lose a corresponding amount of data from elsewhere in display memory. (If the first line in display memory is currently on the screen, you lose data from the bottom of display memory. Otherwise, you lose data from the top.)

But if you enable Overflow Protection before you have filled display memory, you prevent data loss. If you or the host tries to make an entry that would consume memory, the system displays the message "MEMORY FULL Press RETURN to clear", and does not accept the entry. (See also Top Logging in Section 4.2.1.)

To enable Overflow Protection:

1. Press ⑦ to take the cursor to the first line in display memory.

2. Display the System Menu and select the [modes] softkey.

    The **modes** menu is displayed.

3. From the **modes** menu, select [Memory Lock].

    An asterisk appears on the softkey label, and Overflow Protection is enabled.

To disable Overflow Protection:

■ Access the **modes** menu and select [Memory Lock] again. The asterisk disappears from the softkey label.

Using Display Lock

To keep certain lines of text (such as headings or command lines) displayed at the top of the screen while you work on other data or scroll or page through display memory, you can use Display Lock. Display Lock also gives you a quick way of moving blocks of text from one location to another in display memory.

Locking Lines on the Screen

To lock lines at the top of the screen:

1. Scroll or page through the text until the first line you want to lock appears on the top row of the screen.

2. Position the cursor on the line *below* the last line you want to lock.

3. Display the System Menu and select the [modes] softkey.

   The modes menu is displayed.

4. From the modes menu, select [Memory Lock].

   An asterisk appears on the softkey label, and Display Lock is enabled.

   All lines above the cursor are now locked. If you scroll or page through memory or continue entering data, the locked lines remain displayed at the top. The other text rolls up or down beneath them, as if the bottom line of the locked text were the top edge of the screen. The actual position of the unlocked text in display memory is thereby altered.

To unlock locked lines, simply access the modes menu and select [Memory Lock] again. The asterisk disappears from the softkey label, and the lines are unlocked.

Moving Blocks of Text

To move a block of text:

1. Lock the block of text as described above.

2. Scroll or page through display memory until the line that should immediately follow the text block in its new position appears directly below the block.

3. Unlock the text as described above.

Note

- Overflow Protection is NOT enabled when you are using Display Lock.

- If you insert a line in a display-locked area, the last line in this area scrolls out of it.

- If you delete a line from a display-locked area, the next line below this area rolls up into it.

2.7 Displaying Control Codes and Escape Sequences

The [Display Functions] key on the **modes** menu lets you enter as text and display control codes and escape sequences generated by the keys on the keypad and keyboard or host computer, rather than having the terminal execute them. This feature can be used for debugging host applications, as well as for transmitting control codes and escape sequences to the host computer.

Enabling Function Display

To enable the Display Functions feature,

1. Select [modes] on the **System Menu**.

   The **modes** menu appears.

2. Select [Display Functions].

   An * appears in the label when Display Functions is enabled.

   Control codes and escape sequences will now be displayed on the screen rather than being executed.

To disable [Display Functions], simply select this key again. A soft reset, hard reset, or powering down will also disable [Display Functions].

Caution

Handshaking can be disrupted if you are using [Display Functions], since the terminal displays the host's signals but doesn't execute them.

Debugging

The [Display Functions] key lets you view on the screen the control characters and escape sequences that the host is sending to the terminal to make it perform various functions. For example, if the host sends an H_T character, the terminal displays this character instead of moving to the next tab setting. If the host sends an $E_t B$, the terminal displays this sequence instead of moving the cursor down one line. This can be very useful for debugging programs written to run on the terminal.

Displaying and Transmitting Control Codes

The [Display Functions] key can also be used to enter and send to the the host the control characters and escape sequences generated by the keys shown in Exhibit 2.7.

When the terminal is in its default configuration and [Display Functions] is not selected, only the (Tab), (Back space), and (Return) keys can

send their codes to the host.

When you select [Display Functions], you can press any control key and have its control code or escape sequence entered and displayed for transmission to the host. If you are communicating in Character Mode, the code is sent to the host right away. If you are in Block Mode, the code becomes part of the block you will send to the host.

Exhibit 2.7 Escape Sequences Generated by Keys

Table - convert keycaps, add control and escape codes
Keyboard and keypad
<k ha>
<k Shift> + <k Tab>
<k ua>
<k Shift> + <k ua>
<k la>
<k Shift> + <k la>
<k ra>
<k Shift> + <k ra>
<k da>
<k Shift> + <k da>
<k Clear line>
<k Clear display>
Keyboard only
<k Tab>
<k Shift> + <k Tab>
<k Back space>
<k Return>
<k Insert line>
<k Delete line>
<k Insert char>
<k Delete char>
<k Prev>
<k Next>
Keypad only
<k Prev>
<k Next>

2.8 Applying Video Enhancements to Text

The [enhance video] softkey on the modes and editors menus brings up the enhance video menu. The enhance video menu lets you vary the appearance of the characters typed at the keypad or keyboard. From this menu, you can select four different video attributes, six different character sizes, and four different character sets.

The enhance video Menu

To change the video attributes or size of the characters you type, or change character sets, you select the [enhance video] softkey on either the modes or the editors menu. The enhance video softkey menu is then displayed, with the choice of character sizes and sets listed on the two lines above it (see exhibit 2.8). The asterisks on the softkeys and the highlights on these lines show what selections are active at the cursor position. Any text you had on the screen remains displayed. (In exhibit 2.8, the text illustrates some of the features selected with the menu.)

This line contains 1 x 1 characters from the Roman-8 set.

This line contains 2 x 2 characters.

Here are some 1 x 2 characters in inverse video.

Here are some ISA-type graphics characters in 2 x 2 size!

Char Size: 1x1 1x2 2x1 2x2 4x4 6x6
Char Set: Roman-8 Line ISA IT-Line

| Save Enhance | Blinking * | Undrline * | Inverse * | 13 53 HP | Security * | Char Size * | Char Set * | exit |
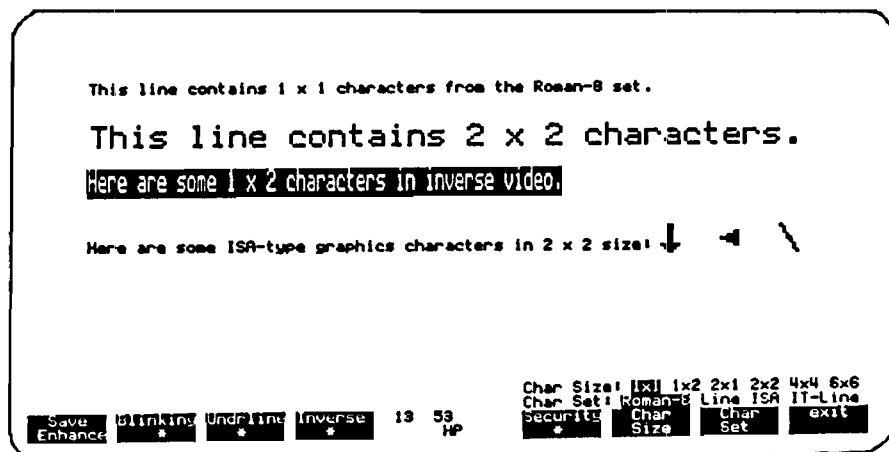
Exhibit 2.8. The enhance video menu

Four softkeys in this menu let you apply the following video attributes to the text you type:

- Blinking video
- Reverse video
- Underline video
- Security video (used as a security feature for passwords, etc; codes and characters are not displayed but are read by the host)

You can apply these attributes singly or in combination.

1

The [Char Size] softkey lets you select any of the 6 character sizes shown, while the [Char Set] key lets you switch among the 4 character sets available on the terminal: Roman 8, ISA symbol drawing, IT line-drawing, and HP or DEC line-drawing set (depending on which type of terminal you are emulating).

Note	By selecting any of these last three sets through the **enhance video** menu, you remap your keypad or keyboard so that you can draw screens by typing in graphics characters. However, if your terminal can perform block transfers, you will find that the Forms Editor and the Graphics Editor give you a much faster and easier means of drawing lines and graphics with the same characters.
	For more information on the Forms and Graphics editors, see chapters 6 and 8. For more information on all the character sets available on the Industrial Touch, see appendixes A and B.

How Enhancements Work

Character size is a **screen enhancement**. When you select a new character size, all characters you type, anywhere on the screen, will be in that size until you select a different one.

The 4 video attributes and 4 character sets are **line enhancements**. When you select an attribute or character set, it applies from the cursor position to the end of the line or the point where you turn it off, whichever comes first.

Video Enhancements within the Editors

Part 2 of this manual discusses the built-in editors that you can use to design screens on the Industrial Touch. Each of these editors contains its own **enhance video** menu that you use to select video enhancements for the objects you are drawing. The differences between these **enhance video** menus and the one that you access from the **modes** menu or the main **editors** menu are discussed in section 6.3.

Here you should simply note that the selections you make on this latter menu do not apply if you go into one of the editors, but become active again once you exit to the main **editors** menu or go to any other menu of System softkeys outside the editors. Likewise, the selections you make on the **enhance video** menus within the individual editors have no effect once you exit these editors.

Sending Enhancements to the Host

When you send the host a block of text that contains video enhancements (video attributes, outsized characters, or characters from alternative sets), they are converted into escape sequences that can be read by the host. For further information on these escape sequences, see chapters 3 and 4 of the *Host Programmer's Reference Manual*.

2.8 Applying Video Enhancements to Text

2.8.1 Selecting Video Enhancements

Using the **enhance video menu**, you can either select video enhancements before you enter text, or apply them afterward. You use the same menu to cancel or change enhancements.

When To Select

To change to a new character size, you must make the selection on the **enhance video menu** before you type. (The only way to change the size of existing text is to select the new size, then type the text over.) For video attributes and character sets, you have a choice: you can either select these enhancements, then type the text, or type the text first, then go back and switch on the enhancements.

Caution

The video attributes and outsized characters that you select with the **enhance video menu** consume display memory. Hence, if display memory is full, invoking these enhancements can cause data loss.

Selecting Enhancements Before Typing

To select video enhancements for text before typing it, proceed as follows:

1. Position the cursor at the point on the screen where you want the enhancements to start.

2. Select [enhance video]. The enhance video menu appears.

3. Select the desired enhancements:

    ■ To select blinking, underline, inverse, or security video, select the corresponding softkey. An asterisk appears on the screen label.

    ■ To select a character set or size other than the one currently highlighted in the message window, select the [Char Set] or [Char Size] softkey as many times as necessary to move the highlight to the set or size you want.

4. Select [Save Enhance] to activate the enhancement and return to the menu where you were working originally.

5. Type in the characters that are to appear with the enhancements you have just selected.

To return to the menu where you were working before without changing any enhancements, select [exit].

Applying Enhancements to Existing Text

To change the video attributes or character set of text already entered, simply follow steps 1 to 4 above. The text will appear with the new enhancements when you select [Save Enhance] and return to the menu where you were working originally. To change character sizes, see "When To Select", above.

Cancelling or Changing Enhancements

Clearing a Line

To erase a line or part of a line and reset the selections to Roman 8, no attributes, place the cursor at the desired position, then press (Clear line). (If you are working with outsized characters, you will have to select 1 x 1 first, then clear one row of the screen at a time.)

Clearing All Lines

To erase all lines from the cursor to the end of display memory and reset them all to Roman 8 character set, no attributes, place the cursor at the desired position, then press (Clear dspl) (on the keypad) or (Clear display) (on the external keyboard).

Cancelling or Changing Within a Line

Within a line, you can cancel or change video enhancements for either existing text or text you are about to type. Proceed as follows:

1. Position the cursor at the point where you want the enhancements to stop or change.

2. Select [enhance video] to return to the enhance video menu.

    - To cancel blinking, underline, inverse, or security video, select the corresponding softkey again. The asterisk disappears, and the enhancement is disabled from the current cursor position forward.

    - To select a new enhancement (attribute, size, or set), proceed as in "Selecting Enhancements" above. The change takes effect from the current cursor position.

3. Select [Save Enhance] to save the changes and return to the menu where you were working originally.

4

Communicating with the Host Computer

3.1 Overview of Host Communications

To communicate with the host computer, the terminal must be in Remote Mode. The terminal can communicate with the host computer in two different modes: character mode and block mode. In character mode, each character is transmitted as you type it. In Block Mode, you can define the size of block that is transmitted as either a line or a page. A special Forms Mode can be invoked along with these basic modes in order to limit data entry to predefined fields on the screen. Which type of communication you use depends on the host's operating system and the application you are running. In many cases, the application will change the terminal's mode to the one required.

Communication Modes

Which modes of communication are available on the 3082 depends on which kind of terminal you are emulating (an HP 2392, a VT100, or a VT52.) Figure 3.1 shows the relationships between Local Mode and Remote Mode and the communication modes available in Remote Mode in each of the three emulations.

If you are emulating a VT100 or VT52 terminal, **Character Mode** is the only communication mode you have: your terminal always sends characters to the host one at a time, as soon as you type them.

If you are emulating an HP 2392, you can use **Character Mode** or **Block Mode**, whichever your application requires. These mode can be selected at the terminal or imposed by the host.

- In **Character Mode**, the terminal transmits each character as you enter it.

- In **Block Mode**, the terminal displays data on the screen as you enter it and stores it in display memory, but does not send it to the host until you press (Send) (on the keypad) or (Enter) (on the keyboard). The size of block that is sent is defined on the "Line/Page Mode" field of the **Terminal Configuration** menu.

If you are emulating an HP 2392, you can also use **Forms Mode**, which is designed for use with forms-oriented software and is usually imposed by a host program rather than selected at the keyboard. In **Forms Mode**, you can enter data only in fields that have been defined as unprotected, and can send only the contents of these fields to the host.

Sections 3.3 through 3.5 describe in detail how to use all the modes shown in exhibit 3.1.
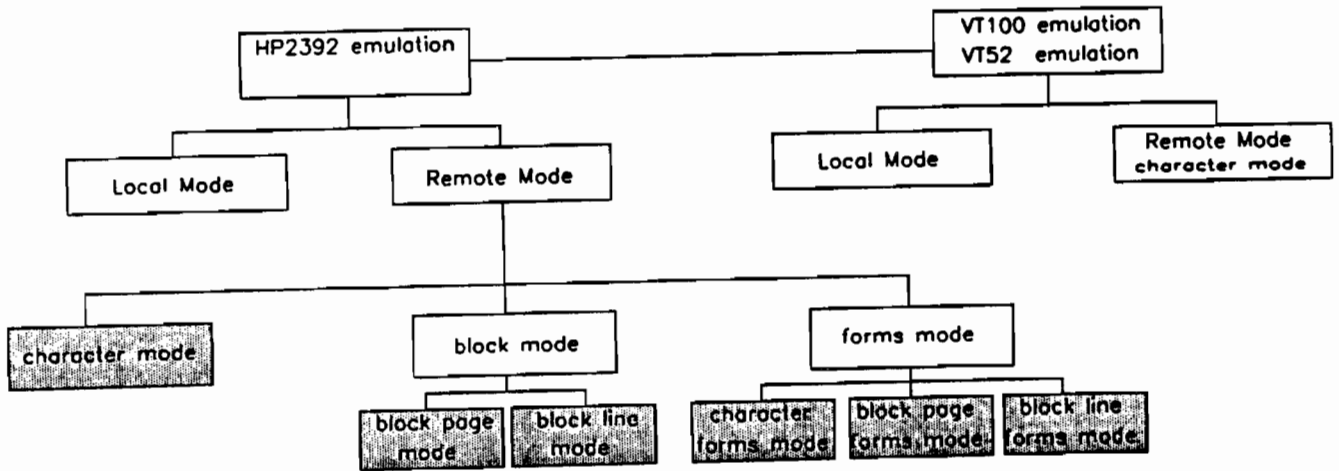
Exhibit 3.1

Relations among Data Communication Modes

3.2 Preparing the Terminal

Before you can communicate with the host computer, you must connect the terminal and configure the Host Port (Port 1) to match the host's communications specifications. You must also make several selections on the **modes** menu of softkeys.

Connecting and Configuring the Terminal

Before you can communicate with the host, you must meet the following conditions:

- You must have the terminal connected to the host via Port 1 (see the *Installation, Configuration, and Maintenance Manual* for details).

- You must have the terminal configured correctly. (To configure the terminal for host communications, use the **Host Port Configuration** menu, the **Global Configuration** menu, and the **Terminal Configuration** menu. See the *Installation, Configuration, and Maintainance* manual for details.)

Note

When you are emulating an HP 2392 terminal and using Block Mode, you must ensure that the terminal is configured so that the proper form of handshaking takes place between the terminal and the host when you press (Send) on the keypad or (Enter) on the keyboard. The DC 1 Handshake and DC 2 Handshake fields in the **HP Terminal Configuration** menu are used for this purpose. For more details on handshaking, see the *Host Programmer's Reference Manual* and the *Installation, Configuration, and Maintainance Manual*.

Selecting Communication Modes

You may also have to make some selections on the **modes** menu of softkeys, which controls the terminal's host communications operations. To get to the modes menu, select [modes] on the **System** menu.

Like all of the system softkeys, these display an asterisk (*) when they

are enabled.

[Remote Mode]   When the terminal is powered on, it always comes up in Remote Mode, in which it is on-line and can communicate with the host. When Remote Mode is disabled, the terminal is in Local Mode.

[Block Mode]   If your host will be using Block Mode, but does not place the terminal in this mode automatically, you must select [Block Mode] from the modes menu. When Block Mode is disabled, the terminal is in character mode.

[Auto LF] and [New Line Mode]   Enabling [Auto LF] in HP mode or [New Line Mode] in VT100 or VT52 mode causes the terminal to insert a line-feed character whenever it receives a carriage-return character.

You should use [Auto LF] or [New Line Mode] when you are working in Local or Block mode so that the cursor moves to the next line when you press (Return). You should also use it if your host does not add the line-feed character automatically in character mode.

The uses of the other softkeys on the modes menu are described in the sections of this manual where they apply.

3.3 Communicating in Character Mode

When you operate the terminal in Character Mode, it sends data to the host one character at a time, as you type. If you strike keys that generate control codes, such as CR and LF, it sends them as well. When your terminal is emulating an HP 2392 terminal, you use Character Mode if your application requires it. When your terminal is emulating a VT100 or VT52 terminal, you always use Character Mode.

Selecting Character Mode

To select Character Mode:

1. On the **System Menu**, select the [modes] softkey.

   The **modes** menu appears.

2. Check the [Remote Mode] label to ensure that the terminal is in Remote Mode. An * should be displayed on the screen label.

3. Check the [Block Mode] label. If it has an * on it, Block Mode is currently selected. Press the [Block Mode] softkey to disable Block Mode and put the terminal in Character Mode.

Local Echo

Most host computers will echo back to your screen the characters you transmit to them. If your host does not, you must set the Local Echo field to "Yes" on the **Host Port Configuration** menu, or else the terminal will not display what you type.

Resending Data in Character Mode

Because the terminal stores data that has already been sent to the host, it is possible to correct errors and resend the data without having to retype it all. [Line Modify] and [Modify All] on the **modes** menu are used for this purpose.

The Line Modify function temporarily takes your terminal off-line so that you can correct errors in a single line without transmitting the new characters as you do so. You can then resend the line.

The Modify All function works just like Line Modify, except that it is not disabled each time you send a corrected line. Hence Modify All is more convenient when you want to correct errors in several lines on the screen.

To use [Line Modify] or [Modify All], proceed as follows:

1. Select the appropriate function on the **modes** menu.

   An * will appear on the label.

2. Move the cursor to the screen line where the error is displayed.

3. Correct the error.

4. Press (Send) on the keypad or (Enter) on the keyboard. Note that you do not use the (Return) key. The corrected line is then resent, beginning with the start-of-text pointer or the start column and ending with the end of the line or a block separator (see below).

If you are using [Line Modify], the function is disabled automatically, and you are returned immediately to normal Character Mode communications.

If you are using [Modify All], you can repeat steps 2 to 4 until all errors are corrected. You should then disable the function to return to normal Character Mode communications.

Note

The Line Modify and Modify All functions can be disabled before resending a corrected line by selecting the appropriate softkey again (the * disappears to confirm that the function has been disabled).

Start-of-Text Pointer

If the line you are correcting was the last line in display memory when it was first displayed, the terminal will have inserted a pointer at the first character that was entered by you rather than by the host. When you press (Send) on the keypad or (Enter) on the keyboard, the terminal starts resending at this pointer, so that the host prompt, for example, is not resent.

Start Column

If the line contains no start-of-text pointer, the terminal starts resending at the Start Column. The default Start Column is column 1. When you are emulating an HP 2392 terminal, you can specify a different Start Column in the HP Terminal Configuration menu (see the *Installation, Configuration, and Maintenance Manual*). When you are emulating a VT100 or VT52, you must accept the default.

Block Terminators

Block terminators are not normally used in character mode, but if the terminal encounters one in a corrected line, it stops transmission with that character. For information on block terminators, see the discussion of Block Mode in section 3.4.

3.4 Communicating in Block Mode

When you use the terminal in Block Mode, data is displayed on the screen and stored in display memory as you enter it, but is not sent to the host until you press (Send) (on the keypad) or (Enter) (on the keyboard). Thus Block Mode lets you edit data off-line until it is exactly as you want it. Block Mode is available only when you are emulating an HP 2392 terminal, and not when you are emulating a VT100 or VT52.

Selecting Block Mode

To select Block Mode:

1. On the System Menu, select the [modes] softkey.

   The modes menu appears.

2. Check the [Remote Mode] label to ensure that the terminal is in Remote Mode. An * appears on the label when Remote Mode is enabled.

3. Check the [Block Mode] label to ensure that the terminal is in Block Mode. An * appears on the label when Block Mode is enabled.

You should also enable [Auto LF] on the modes menu so that the terminal inserts a line-feed when you press the (Return) key. This will make your data entry easier.

Defining Maximum Block Size

The current setting of the Line/Page field on the HP Terminal Configuration menu determines how large a data block the terminal can send the host. If you set this field to "Line", the terminal can send a maximum of one line of data at a time. If you set this field to "Page", the terminal can send all of the data in display memory at one time. (For more information, see the *Installation, Configuration, and Maintenance Manual* .)

For convenience, Block Mode used with the Line setting is called Block Line Mode, and Block Mode used with the Page setting is called Block Page Mode.

Inserting Block Terminators

A block terminator is a character that tells the terminal where to stop transmitting when you send the host a block of data. By typing in block terminator, you can divide display memory into as many data blocks as are needed for your application.

The default block terminator is the ASCII character RS (decimal 30),

which you can enter at the keyboard (but not at the keypad) by pressing (CTRL), (Shift), and (6) simultaneously. You can also change the block terminator to any other ASCII character by writing the character to the Block Terminator field on the **HP Terminal Configuration Menu**. Many applications will provide softkeys or other convenient methods of inserting block terminators.

If the terminal does not encounter a block terminator during a transmission, it transmits the maximum amount of data, either a line or everything in display memory.

Transmitting Data

In Block Mode, you use the (Send) key on the keypad or the (Enter) key on the keyboard to transmit a block of text.

The terminal transmits all characters from the cursor to the end of the block in which the cursor is currently positioned. In most cases the terminal or the host application will move the cursor automatically to the beginning of the block (start of line or start of display memory) before the data is transmitted, so that the entire block will be sent. (For more information on how much text is sent and whether the cursor is "homed up" before the data is transmitted, see the discussion of the (Enter) key in the *Host Programmer's Reference Manual*.)

3.5 Communicating in Forms Mode

Forms Mode is designed for applications in which the terminal opera-
tor fills in a data-entry form displayed on the screen by a host com-
puter. When a terminal is placed in Forms Mode, the operator can
enter data only in those parts of the form that have been defined as
unprotected fields. Forms Mode is available only when the terminal is
emulating an HP 2392, and can be used in combination with Character
mode, Block Line Mode, and Block Page Mode.

**Screen Forms
and
Unprotected
Fields**

Exhibit 3.4 shows the kind of data-entry form that Forms Mode is
typically used with. The shaded areas, called "unprotected fields", are
the only places on the screen where the operator can enter data.

The easiest way to design forms of this type is to use the screen editors
built into the 3082 together with a forms software package such as
Hewlett-Packard VPlus or F/1000. Chapter 7 shows how to use these
editors to design a typical form comprising a line grid, unprotected
fields, and field labels. Section 7.2, in particular, shows how to define
unprotected fields with the fields editor. (Unprotected fields can also
be defined with escape sequences; see the *Host Programmer's
Reference's Manual* for details.)

**Enabling
Forms Mode**

In most cases the host application places the terminal in forms mode
after displaying a pre-designed data-entry form on the screen.

If you want to place the terminal in Forms Mode yourself (to test a
form you just designed, for example), you must go into Local Mode
and type the escape sequence E_cW on the keyboard.

To disable Forms mode from the keyboard, type E_cX.

**Entering and
Editing Data**

Once a form is displayed and the terminal is placed in Forms Mode, all
character positions on the screen are protected except those defined as
unprotected when the form was designed. You cannot overwrite data
in protected positions or transmit data from them, and the host cannot
enter any data in them either. The only place you (or the host) can
enter data is in the unprotected fields.

In Forms Mode, the (Prev) and (Next) keys on the Keypad ((Tab) and
(Shift) + (Tab) on the keyboard) move you forward and backward to the
beginning of the next unprotected field. You can also use the cursor
control keys to move the cursor to other fields.

Data can be entered and edited using the same keys that are used in non-Forms modes, with the restriction that only the unprotected fields are affected. In effect, each unprotected field is treated as a separate line.

If you try to enter data in a protected field, the terminal moves you to the start of the next unprotected field and displays the character there.

When you type a character in the last position of a field, the terminal beeps and moves on to the beginning of the next field, where it displays further characters typed.

When you have filled the last unprotected field on the screen, the terminal beeps and the cursor stops just after the field. At this point you normally send the filled-in form to the host. If you try to type a character instead, the beeper sounds again; the cursor goes to the start of the first unprotected field on the screen and displays the character there, overwriting anything you had entered previously.

Combining with Other Communication Modes

Forms Mode is used in combination with Block Page Mode, Block Line Mode, or Character Mode. Block Page Forms Mode is the most commonly used, since it allows the greatest flexibility in editing and transmits an entire form of data at one time. In general, these modes work the same as their non-Forms Mode counterparts, except that only the data in the unprotected fields is transmitted to the host.

Exhibit 3.4 Typical Data-Entry Form Used in Forms Mode

3.6 Interrupting Communications and Signalling the Host

Several keys on the external keyboard can be used to signal the host for various purposes. The (Reset Break) and (Stop) keys generate signals that can be used to interrupt and resume communications. The (CTRL) key can be used with the (S) and (Q) key for the same purpose. The (Select) and (DEL ESC) keys send codes typically used to report the cursor's position and to delete data from host memory.

Interrupting Communications

When your terminal is connected to the host, properly configured, and operating in Remote Mode, you have a number of ways of interrupting communications from the keyboard. These facilities are not available on the built-in keypad.

(Stop)

Pressing the (Stop) key alternately stops and resumes the transfer of data from the terminal's receive buffer to the screen. (When you stop the data transfer in this way, the word "STOP" appears in the Status Block at the bottom of the screen.)

The (Stop) key *does not* stop the host from transmitting data. However, if the Receive Pacing field on the **Host Port Configuration** menu is set to XON/XOFF, the terminal will send an XOFF signal when the receive buffer is full.

Caution

Using (Stop) without XON/XOFF Receive Pacing enabled could cause you to lose data.

(CTRL) + (S) and (CTRL) + (Q)

Holding down (CTRL) and pressing (S) sends an XOFF to the host to stop the transmission of data. Holding down (CTRL) and pressing (Q) sends an XON to the host to resume transmission.

(Reset Break)

Pressing (Reset Break) sends a 200-ms space to the host. This signal interrupts host operations. Its precise effect is application-dependant.

Resetting the Terminal

(Shift) + (Reset Break)

Holding down (Shift) and pressing (Reset Break) causes a soft reset of the terminal. A soft reset has the following effects on data communications:

- If the terminal is sending any data to the host, it stops.
- The terminal's transmit and receive buffers are cleared.
- If the Receive Pacing field on the **Host Port Configuration** menu is set to XON/XOFF, the terminal sends an XON to the host. The host program can use this signal to resume sending.

The other effects of a soft reset are described in chapter 4 of the *Installation, Configuration, and Maintainance Manual*.

(CTRL) + (Shift) + (Reset Break)

Holding down (CTRL) and (Shift) and pressing (Reset Break) causes a hard reset of the terminal. A hard reset has the same effects on data communications as a soft reset, but also clears display memory. The other effects of a hard reset are described in chapter 4 of the *Installation, Configuration, and Maintainance Manual*.

Other Signal Keys

(Select) (HP mode only)

Some applications use the select key to signal the host for various purposes. The (Select) key has no effect unless it has been enabled by the host. For more details on the (Select) key, see "(Select) Key" in Section 3.1.5 and "Cursor Position: Send" in Section 3.1.1.1 of the *Host Programmer's Reference Manual*.

(DEL ESC)

Pressing (DEL ESC) generates the escape character, Ec, which is used to identify escape sequence strings. If the terminal is on-line, this character and the string following it are sent to the host.

(Shift) + (DEL ESC)

Holding down (Shift) + pressing (DEL ESC) sends the DEL character (ASCII decimal value 127) to the host. How the host interprets the signal is dependant on the application.

Printing and Passing Data to an Auxiliary Device

4.1 Printing Data

When the Auxiliary Port (Port 2) of the 3082 is connected to a printer, you can use the (Print Enter) key or the **device control** menu to make a hard copy of any data currently displayed on the screen or stored elsewhere in display memory. Exhibit 4.1 shows how much data is printed using three of the printing methods.

Before Printing

Before you can print data, you must make sure that

- you have connected your printer to the Auxiliary Port (Port 2) with an RS-232 cable.

- you have filled in the **Auxiliary Port (Port 2) Configuration** and **Printer Configuration** menus with the proper specifications for your printer (see the *Installation, Configuration, and Maintenance Manual* and your printer manual for details).

- You have selected the proper Print Type on the **Printer Configuration** menu:

  - Roman 8 to print out data consisting solely of alphanumeric characters

  - Graphic to dump screens containing graphics characters (for example, forms or process graphics diagrams produced with the Forms and Graphics editors described in part II).

Printing Roman 8 Characters

If you want to to print out data consisting solely of alphanumeric characters, and have Roman 8 selected as your keyboard, you have 4 options. You access the first 3 from the **device control** menu. You can access the fourth option only if you have an external keyboard.

[Copy Line]

To print the line on which the cursor is positioned, select [Copy Line].

[Copy Page]

To print from the line on which the cursor is positioned to the end of the screen, select [Copy Page].

[Copy All]

To print from the line on which the cursor is positioned to the end of display memory, select [Copy All].

(Shift) + (Print Enter) (keyboard only)

1

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- you have connected your printer to the Auxiliary Port (Port 2) with an RS-232 cable.

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- You have selected the proper Print Type on the **Printer Configuration** menu:

  - Roman 8 to print out data consisting solely of alphanumeric characters

  - Graphic to dump screens containing graphics characters (for example, forms or process graphics diagrams produced with the Forms and Graphics editors described in part II).

Printing Roman 8 Characters

If you want to to print out data consisting solely of alphanumeric characters, and have Roman 8 selected as your keyboard, you have 4 options. You access the first 3 from the **device control** menu. You can access the fourth option only if you have an external keyboard.

[Copy Line]

To print the line on which the cursor is positioned, select [Copy Line].

[Copy Page]

To print from the line on which the cursor is positioned to the end of the screen, select [Copy Page].

[Copy All]

To print from the line on which the cursor is positioned to the end of display memory, select [Copy All].

[Shift] + [Print Enter] (keyboard only)

To send the entire contents of display memory to the printer, press the above key combination on the external keyboard. Note that lines locked at the top of the screen with the Display Lock feature will not print, and that this key combination does not work in Forms Mode.

Controlling the Printer

With the Roman 8 print type selected and the **device control menu** displayed, you can stop the printer or make it advance one line or page.

[Return]

To stop the printer, press (⬅) on the keypad or [Return] on the keyboard. The printer stops after the line it is currently printing.

[Advance Line] and [Advance Page]

To advance the printer paper one line or one page, select [Advance Line] or [Advance Page] on the **device control menu**.

Printing Graphics Screens

[Shift] + [Print Enter] (keyboard only)

To print out a pixel dump of the screen currently displayed, select Graphics as the print type on the **Printer Configuration** menu, then press the above key combination.

Insert (3i, Printing Pages)

Exhibit 5.1 Printing One or More Pages from Display Memory

4.2 Passing Data to an Auxiliary Device

The device modes menu gives access to two methods of passing data to an auxiliary device. **Data logging** causes all data sent to the terminal's display (whether from terminal input devices or from the host) to be sent to a printer automatically. **Record Mode** allows data to pass through the terminal, from the host directly to the device and vice versa.

Before Logging or Passing data

Before you can log data to a printer or pass data through to an external device, you must make sure that

- you have connected your device to the Auxiliary Port (Port 2) with an RS-232 cable.

- you have configured the Auxiliary Port to correspond with the device's communications specifications.

- you have checked baud rates and pacing on the Host Port (Port 1) with those of the Auxiliary Port (Port 2) to ensure that data will not be lost because of lack of synchronization. If the host transmits more quickly than the device can receive without proper pacing, it could make the terminal or the printer lose data.

- if the device is a printer, you have filled in the **Printer Configuration** menu with the proper specifications for your printer (see your printer manual for details). *Print type must be set to Roman-8 for logging and recording.*

Logging Data

The terminal allows two types of data logging. Bottom logging causes every line displayed on the screen to be printed at the same time. Top logging causes lines that overflow from display memory to be printed.

See section 4.2.1 for details on bottom and top logging.

Passing Data Through

[Record Mode] allows data transmitted from the host computer to pass directly to the external device and vice versa. This feature can be used to print data from the host without displaying it at the terminal, or to set up two-way communications between the host and a remote data acquisition and control device, for example.

See section 4.2.2 for details on passing data through to an external device.

4.2 Passing Data to an Auxiliary Device

4.2.1 Logging Automatically from the Screen to a Printer

The device modes menu gives access to two forms of data logging. Choose [Log Bottom] to keep a complete record of all data sent to the screen. Choose [Log Top] to save hard copies of any data that overflows display memory. Both Bottom Logging and Top Logging print data sent to the screen, regardless of whether this data comes from the host, the keypad, or another input device. Both types of logging work in Local Mode and in Remote Mode.

Note

The keyboard locks while each line of data is being logged. Hence, if you are receiving and logging large volumes of data from the host, you may not be able to use the keyboard.

Bottom Logging

Bottom Logging lets you maintain a hard copy log of all lines added to the display, in the order in which they were entered locally or received from the host. With Bottom Logging, each time the cursor moves to a new line, the last line is sent to the printer.

Top Logging

When display memory is full, and you or the host inserts more data, you lose a corresponding amount of data elsewhere in display memory. Top Logging, however, causes this data to be printed out before it is deleted.

Caution

If the first line in display memory is displayed, you lose data from the bottom of display memory, and this data cannot be logged.

Enabling Logging

To enable data logging, perform the following:

1. Make sure all the conditions in **Before Logging** in section 4.2 are met.

2. If you are not already on the device modes menu, go to the System Menu and select [device control].

   The device control menu appears.

3. On the device control menu, select [device modes].

   The device modes menu appears as follows:

4. On the device modes menu, select [Log Bottom] or [Log Top].

    An * appears on the softkey, indicating that logging is now active.

To disable logging, simply select the appropriate softkey again. The * will disappear from the softkey label.

4.2 Passing Data to an Auxiliary Device

4.2.2 Passing Data from the Host to an External Device

With Record Mode enabled, the terminal ignores data transmissions from the host and passes them directly to an auxiliary device. You can use Record Mode to print data directly from the host to a printer, or to pass two-way communications between the host and an external device such as the HP 48000 Remote Terminal Unit. This feature can reduce the number of ports and lines required in a data-communication network. Record Mode would normally be invoked by the host computer, which can use escape sequences to send data to the external device, the display or a smart barcode wand. For details, see the *Host Programmer's Reference Manual*.

Note

In order to use record mode, the terminal must be in Remote Mode. However, you cannot enter data at the terminal or transmit to the host.

Recording Host Transmissions

If you want to print a hard copy of the data transmitted by the host, but will not be entering any data yourself, you can select Record Mode instead of Bottom Logging. While using Record Mode, you cannot enter data on the display or send data to the host.

Passthrough Communications

Record Mode can also be used to enable two-way communications between the host and an auxiliary device connected to the terminal.

Exhibit 4.2.2 shows a typical passthrough installation. Industrial Touch is connected through the Host Port (Port 1) to the host and through the Auxiliary Port (Port 2) via modem to an HP 48000 Remote Terminal Unit. With Remote Mode enabled, the host can send a message through the 3082 to poll the RTU for information, and the RTU can respond, without any intervention by the terminal operator.

This same configuration could be used for other purposes. For example, the host program could display a blank data-entry form on the terminal. Then it could signal the RTU to return data and display them in the form on the operator's screen.

Enabling Record Mode

1. Make sure all the conditions listed in section 4.2 are met.

2. If you are not already in the **device modes** menu, go to the System Menu and select [device control].

The device control menu appears.

3. On the device control menu, select [device modes].

   The device modes menu appears.

4. On the device modes menu, select [Record Mode].

   An * appears on this softkey to show it is selected.

   Any data received from the host will now be transmitted directly to the external device and vice versa.

While you are in Record Mode, the keypad and external keyboard are locked, except for the keys mentioned below that are used to exit Record Mode.

To exit Record Mode:

■ On the device modes menu, select the [Record Mode] softkey again.

   The * disappears from the softkey label, confirming that you have left Record Mode.

■ On the separate keyboard, you can also exit Record Mode by resetting the termianl. To perform a soft reset, hold down (Shift) and press (Reset Break).

Insert (3.25i, Passthrough)

Exhibit 4.2.2 System Configured for Passthrough Communications via Industrial Touch

PART 2

Designing Screens with Industrial Touch

Introduction to the Screen Editors

5.1 Overview

The four screen editors built into the firmware of the Industrial Touch terminal provide a fast, easy way to design screens for use with forms packages and custom applications on host computers. (Because you design the screens off-line and upload them as blocks, the editors can be used only with hosts that accepts block transfers.) Each editor produces a different type of feature on the screen. You combine features to design screens for data entry, process control, and other applications.

What the Editors Do

On most computer terminals, you design screens by typing in individual line-drawing characters and escape codes, building up each form one line at a time. On the Industrial Touch, the four built-in screen editors instead let you draw the entire screen quickly and intuitively, just as with a microcomputer graphics package. To select editor functions, you simply trigger softkeys; to draw features, you use either the arrow keys on the keypad or external keyboard or the HP Mouse.

Accessing the Editors

To access the editors, you perform whatever steps are required by the host package, then select the [editors] softkey from the **System Menu.** The terminal then displays the editors menu shown below. shown below. When you select an individual editor from this menu, the terminal goes *off-line*, and you draw the features desired.

The table accompanying the editors menu below shows the type of features each editor produces and the applications these features are most commonly used in.

Insert (1, [Insert figure 5.1 here and table 5.1 here])

1

Switching Between Editors

As you design the screen, you use the editors menu to switch from one editor to another to add different features to the screen. Thus, on a single screen, you can combine lines and boxes, alphanumeric data-entry fields, ISA symbols, and touch targets in virtually any way that suits your application.

Sending Screens to the Host

When done designing the screen, you send it to the host computer to be stored as a permanent file. In most cases, your host software automatically places the terminal in the proper mode for transmitting a screen (Block Page mode, with Remote Mode enabled). If you are not sure, before trying to send the screen, check a) that the [Block Mode] and [Remote Mode] softkeys on the modes menu are enabled, and b) that the "Line/Page" field on the HP Mode Configuration menu is set to "Page" (for instructions on working with configuration menus, see chapter 2 of the *Installation, Configuration, and Maintenance Manual*).

To send the screen, proceed as follows:

1. Exit to the main editors menu, so that the terminal is back on line.

2. Press (▼).

3. Press (Send) on the built-in keypad or (Print Enter) on the external keyboard.

    Your screen is sent to the host, and the host software takes charge of the rest of the screen-design process.

Looking Ahead

Chapters 6 through 8 explain how to use all four Industrial Touch screen editors. For demonstration purposes, these chapters take you step-by-step through the designing of a single screen that incorporates features from all four editors: a data-entry form, touch targets, and a process graphic diagram. The exhibit in section 5.4 shows how the finished screen will look.

Chapter 9 sets out some principles of good screen design.

Note

The built-in editors eliminate the need to design screens manually. But if you have configured your Industrial Touch to emulate an HP 2392 terminal, you can still draw lines with the HP line-drawing characters and define unprotected fields with escape sequences should you wish.

If you are configured to emulate a DEC VT100 or VT52 terminal, you can access the line-drawing character set associated with it.

For details on all line-drawing character sets, see appendix A. For the escape sequences used to define unprotected fields, see the *Host*

5.2 How To Select Softkeys and Apply Video Enhancements

When designing screens with the built-in editors on the Industrial Touch, you use the 8 softkeys on the bottom two rows of the screen to select all the functions you need. To vary the video attributes of the graphics you draw, you can access an **enhance video** menu within each of the editors.

Selecting Softkeys

Whenever you design a screen with the built-in editors, you make extensive use of the 8 softkeys displayed on the two bottom rows of the screen. These softkeys let you access all the features of the editors.

There are 3 ways to select any softkey:

1. Press the function key ((f1) to (f8) at the corresponding location on the keypad or keyboard OR

2. If you have the touchscreen option on your terminal, touch the softkey on the screen OR

3. If you have the touchscreen option installed and an HP Mouse connected, move the mouse pointer until it rests on the softkey, then click either button on the mouse.

If you are using the HP Mouse, there are also two shortcut methods of selecting certain softkeys. For further details, see section 5.3.

Applying Video Enhancements

Each of the editors contains an [enhance video] softkey menu from which you can select blinking, underline, and inverse video attributes. (The Fields Editor also offers security video, so that you can define fields in which the data entered are not displayed but are sent to the host.)

These attributes apply both to the features you draw with the editor and to any characters you key in while using that editor. Note that once you select one of these attributes, it applies to any feature drawn or character typed anywhere on the screen. (As section 2.8 describes, video attributes work differently when selected from outside the editors.)

Procedure

To select video attributes within one of the editors, proceed as follows:

1. If the menu you are currently on does not have an [enhance video] softkey, go to the one that does. Do **not** exit to the main editors menu.

2. Select [enhance video].

The [enhance video] menu appears. The screen you are designing remains displayed, but for the moment you cannot draw anything on it.

3. Select the softkeys for the attributes desired.

    As you select each softkey, an asterisk appears to show it is enabled.

4. To save your selections and return to the menu where you were working originally, select **Save Enhance**. (To exit without saving the changes, select [exit].)

Any graphics you draw or characters you type in from now on appear with the attributes you have just selected.

To turn an attribute off, return to the **enhance video** menu and select the corresponding softkey again. The asterisk disappears to show that the attribute is disabled.

Character Sets and Sizes

In the Forms, Fields, and Touch Editors, the **enhance video** menu does not let you change the size of the characters you type or select alternative character sets. You can key in 1 x 1 Roman-8 characters only. To work with outsized characters or alternative character sets, you can either go to the main **editors** menu and select the **enhance video** menu from there (see section 2.8) or go to the Graphics Editor (see chapter 8).

5.3 How To Use the HP Mouse

The HP Mouse lets you design screens even more quickly than you can with the keypad or keyboard alone. You can move the cursor, select softkeys, and draw graphics without touching the keypad or keyboard.

Before Using

To use the HP Mouse, you must have the touchscreen option installed in your terminal. For information on connecting and enabling the HP Mouse, see section 1.6.

Basic Operations

Moving the cursor and triggering softkeys are the two operations you perform repeatedly while designing screens with the HP Mouse. You perform these operations just as you do when not using the editors. For instructions, see section 1.6.

Mouse/Editor Operations

Pointer versus cursor

When you are using the HP Mouse with the editors, remember that the rectangular pointer is only a means of moving the **cursor**; it is the position of the **cursor** that determines where the features you draw appear on the screen.

Selecting softkeys

When working in one of the editors, you can always select softkeys with the mouse just as you do outside the editors: place the pointer over the softkey, then click either button.

For some softkeys in the editors, however, there are faster alternatives.

- If the softkey causes a highlight to move over a set of options displayed in the message window, you can simply place the pointer over the desired option, then click either button.

- For some of the most commonly used softkeys, instead of having to move the pointer, you just click one of the mouse buttons. This manual tells you when this shortcut is available.

Terms

The procedure descriptions in chapters 6 through 8 use certain short commands to refer to specific operations with the HP Mouse. Exhibit 5.3 defines these commands.

Exhibit 5.3 Short Commands for Mouse Procedure Descriptions

Designing a Data-Entry Form with the Forms and Fields Editors

6.1 Overview

In their most typical application, you use the Forms Editor and Fields Editor to design screens that resemble paper data-entry forms. Designing such a screen is a three-stage process. In Stage 1, you use the Forms Editor to draw the lines and boxes that will appear on the completed screen. In Stage 2, you add labels, headings, and other text material. In Stage 3, you use the Fields Editor to define the fields in which the operator can enter data.

Data-Entry Forms

A typical data-entry form consists of a grid of lines and boxes containing labels and headings that the operator cannot change and unprotected fields in which the operator enters data to be sent to the host. The Forms Editor gives you a quick means of drawing the lines and boxes for such a form. The Fields Editor gives you a quick means of defining the unprotected fields.

Designing a data-entry form with these editors is a three-stage process.

Stage 1

Drawing Lines and Boxes

In Stage 1, you work with the Forms Editor to draw the lines and boxes of the form. Within this editor, you select any of four different modes of drawing these features with your cursor keys or HP Mouse. For each feature you draw, your tasks are:

1. to specify the type of line or box you want (single, double, or bold)

2. to assign video attributes (blinking, underline, or inverse) to the line or box, if desired

3. to draw the feature in the desired size at the appropriate position

4. to anchor the feature in place.

Exhibit 6.1a shows a form at the end of Stage 1, with the grid of lines and boxes in place.

Stage 2

Adding Labels, Headings, and Other Text Material

In Stage 2, you type in all column heads, field labels, and other text materials to appear in the form. (If you want to use outsized characters or special characters, you have to exit Forms Editor to the editors menu and access the enhance video menu from there.)

Stage 3

Defining Data-Entry Fields

In Stage 3, you use the Fields Editor to define the unprotected fields. Within this editor, you select between two different modes of defining fields with your cursor keys or HP Mouse. For each field, your tasks are:

1. to assign any video attributes (blinking, underline, inverse or security) you want it to have

2. to draw the field in the desired length at the desired position

3. to anchor the field in place.

Exhibit 6.1 b shows the data-entry form after labels and unprotected fields have been added in the upper-left corner. (The other parts of the screen are left blank here but will be completed in chapters 8 and 9.)

The remaining sections of Chapter 6, using this screen as an example, give detailed instructions for each of the three stages of designing data-entry forms with the Forms and Fields Editors.

Insert (1, Insert fig7.1a and fig7.1b)

6.2 Stage 1: Drawing Boxes and Lines with Forms Editor

To prepare to draw the lines and boxes that will appear in your completed form, you select [forms editor], then choose one of the four drawing modes. Before beginning to draw, you also select the type of line and any video enhancements you desire.

Choice of Drawing Modes

Each softkey menu in the Forms Editor includes a [Drawing Mode] key. You use this key to switch among the four drawing modes available in the Forms Editor: Line Mode, Segment Mode, Cursor Mode and Box Mode. (The name of the mode currently selected is higlighted in the message window.) Box Mode gives you a quick way to draw boxes (for example, to place a border around the form). The three other modes let you draw straight horizontal or vertical lines in three different ways.

As you switch between drawing modes, the menu of softkeys available on the screen changes. The first time you use the Forms Editor, it comes up in Box Mode. From then on, it comes up in whichever mode you were using last. For a complete map of the Forms Editor and Fields Editor softkeys, see Appendix C.

Box Mode

Box Mode lets you draw all four sides of a box at once instead of separately. You simply identify a point on the screen as one corner of the box, then pull a box out of this point by moving the cursor away from it (see exhibit 6.2.1).

Line Mode

Line Mode lets you draw horizontal and vertical lines from one side of the screen to the other, regardless of what else you have already drawn on the screen.

Segment Mode

Segment Mode lets you place a horizontal or vertical line segment between any two parallel lines you have already drawn on the screen.

Cursor Mode

Cursor Mode lets you draw a horizontal or vertical line segment between any two points on the screen.

Choice of Line Types

Whichever drawing mode you are in, you can draw lines and boxes with any of the following line types:

- Single
- Double

- Bold
- Erase (used to correct mistakes)

The name of the line type currently selected is higlighted in the message window. At any time, you can select [Line Type] to switch from one line type to another.

Choice of Video Enhancements

Whichever drawing mode you are using, the [enhance video] softkey is available throughout the drawing process. To apply a video enhancement to a line or box, you select this softkey before you draw. Selecting this key takes you to the enhance video menu, where you choose the desired video attributes. Then you exit back to the forms editor menu to draw. The enhancement is applied to everything you draw anywhere on the screen, until you either exit Forms Editor or return to the enhance video menu and cancel the selection.

For more details on the enhance video menu, see Section 6.3.

Preparing To Draw

To get ready to draw your first line or box on the screen, proceed as follows. (Appendix C provides a map of all softkeys mentioned here.)

1. From the System Menu, select [editors].

   The editors menu appears.

2. From the editors menu, select [forms editor].

   A menu for one of the four Forms Editor drawing modes appears.

3. If the drawing mode currently selected is the one you want, go to step 4.

   Otherwise, select [Drawing Mode] until the drawing mode you want is highlighted in the message window.

4. If the line type currently highlighted in the message window is the one you want, go to step 5.

   Otherwise, select [Line Type] until your choice is highlighted in the message window.

5. If you want any video enhancements, select [enhance video] to access the enhance video editor. Choose the video attributes you want, then select [exit] to go back to the Forms Editor.

You are now ready to draw your first line or box. To learn how to draw boxes with Box Mode, read section 6.2.1. To learn how to draw with Line, Segment, and Cursor modes, read section 6.2.2.

Insert (1i, Insert fig7.2)

6.2.1 How To Draw Boxes (Box mode)

When you enter Forms Editor and select Box Mode, you can draw all four sides of a box at once instead of separately. First you use the keypad or keyboard cursor keys or the HP Mouse to identify a point on the screen to be one corner of the box. Then you pull a box out of this point by moving the cursor away from it. Lastly, you stretch the box to size and anchor it in place.

Before Drawing

Before drawing a box, you must complete the following steps (see section 6.2 for instructions):

1. Select the Forms Editor.

2. Select Box Mode.

3. Select the Line Type you want to use (Single, Double, or Bold; you select Erase only to erase an existing box, as described later in this module).

4. Select any video enhancements you want the box to have (Blinking, Underline, or Inverse).

Keyboard Procedure

To draw a box using the arrow keys on your keyboard, proceed as follows:

1. Move the cursor to the point where you want the upper-left corner of the box to be.

2. Select [first corner].

   A message appears at the lower right of the screen with the word Size highlighted, indicating that you can now draw the box to the desired size.

3. If you have selected a video enhancement, and want the inside of the box to have this same enhancement once you anchor it, select Fill Box.

   An * appears on this softkey, indicating it is enabled.

4. Move the cursor down and to the right.

   The box emerges from the point you identified in step 2.

5. Keep moving the cursor until you have stretched the box to the size you want, then select [Anchor Box].

   Your box is anchored in position. Even if you exit Forms Editor, it will remain on the screen.

Mouse Procedure

To draw a box using the HP Mouse, proceed as follows (special terms used in these instructions are defined in Section 6.2):

1. Press Left and Drag the mouse until the cursor is at the point where you want the upper-left corner of the box to be.

2. Still Pressing Left, Click Right.

   A message appears at the lower right of the screen with the word Size highlighted, indicating that you can now draw the box to the desired size.

3. If you have selected a video enhancement, and want the inside of the box to have this same enhancement once you anchor it, select Fill Box.

   An * appears on this softkey, indicating it is enabled.

4. Still Pressing Left, Drag the mouse down and to the right.

   The box emerges from the point you identified in step 2.

5. Keep Dragging the mouse until you have stretched the box to the size you want, then, still Pressing Left, Click Right. Release Left.

   Your box is anchored in position. Even if you exit Forms Editor, it will remain on the screen.

Removing Boxes

To remove the last box you anchored, select [Undo Last].

■ (This key works if you have remained within Forms Editor since you anchored the box, or if you have gone directly to and returned directly from Fields Editor via the softkeys at the f7 position. [Undo Last] does *not* work if you have exited from Forms Editor via the [exit] softkey and returned subsequently.)

To remove any other box, proceed as follows:

1. Select [Line Type] as many times as necessary to highlight the "Erase" option in the message window.

2. Move the cursor to the upper-left hand corner of the box you want to remove.

3. Follow the cursor or mouse box-drawing procedure (see above) to redraw the box with blank lines.

Note

Once you become familiar with Box Mode, you can use its features more flexibly.

■ At any time after you have specified the first corner of a box but before you have anchored it, you can switch back and forth between the Size and Move operations by selecting [Operation] (or, with a Mouse, Clicking Right). For example, if you have just

stretched a box to size, but now decide to move it, just switch back to the Move operation. Now you can move the box wherever you want, either with the arrow keys or by Dragging the mouse.

- Once you identify the first corner of a box, you are not really limited to stretching it down and to the right. The point you identify actually works like a pivot. You can pull the box out in any direction. Then you can use the cursor at the opposite corner to swing the box around this pivot 360 degrees, as well to move in toward it or out away from it. Thus you can draw any size box that fits on the screen and has one of its corners at the pivot position.

Insert (1, Insert fig7.2.1)

6.2.2 How To Draw Lines (Line and Segment Modes)

Line Mode always draws a line from screen edge to screen edge, no matter what other lines you already have on the screen. Segment Mode places a line segment between the two parallel lines closest to the cursor on either side. If there are no such lines, then Segment Mode too draws a line from screen edge to screen edge.

Before Drawing

Before drawing with Line or Segment Mode, you must complete the following steps (see section 6.2 for instructions):

1. Select Forms Editor.

2. Select Line or Segment Mode.

3. Select the Line Type you want to use (Single, Double, or Bold; you select Erase only to erase an existing line or segment, as described later in this module).

4. Select any special video attributes you want the line or segment to have (Blinking, Underline, or Inverse).

Note

Whenever you are in Line or Segment Mode, either Horizontal or Vertical orientation is active. The word "Horizontal" or "Vertical" is highlighted in the message window as an indicator. You change the orientation with the [Line Orient'n] softkey, or by Clicking Right with the HP Mouse.

What You See First

When you first enter Line Mode, the display shows a line running from one edge of the screen through the current cursor position to the other edge. The orientation currently selected determines whether this line is horizontal or vertical.

When you first enter Segment Mode, a line segment automatically appears on the screen at the current cursor position. The Segment orientation currently selected in the message window determines whether this segment is horizontal or vertical.

- If the cursor lies between two parallel lines or line segments whose orientation is opposite to the segment orientation currently selected, the line segment runs from one to the other.

- If the segment orientation is horizontal and there is no vertical line to the left of the cursor, the left end of the segment is at column 1. If there is no vertical line to the right of the cursor, the right end of the segment is at column 80.

■ If the segment orientation is vertical, and there is no horizontal line above or below the cursor, rows 1 and 24 act as the default end points.

Keyboard Procedure

To draw a line or segment using the arrow keys on your keyboard, proceed as follows:

1. If the line or segment displayed does not have the orientation you want (horizontal or vertical), select [Line Orient'n] to switch it.

   The line or segment will switch to the desired orientation, and the Orientation highlight in the message window will shift.

2. If the line or segment is not where you want it, use the arrow keys to move it into position.

3. To anchor the line or segment, select [Anchor Line] if you are in Line Mode or [Anchor Segment] if you are in Segment Mode.

   Your line or segment is anchored in position. Even if you exit Forms Editor, it will remain on the screen.

Mouse Procedure

To draw a line or segment using the HP Mouse, proceed as follows (special terms used in these instructions are defined in Section 6.2):

1. If the line or segment displayed does not have the orientation you want (horizontal or vertical), Click Right to change it.

   The line or segment will switch to the desired orientation, and the Orientation highlight in the message window will shift.

2. If the line or segment is not where you want it, Press Left and Drag it into position. Do not Release Left.

3. While still Pressing Left, Click Right to anchor the Line or Segment. Release Left.

   Your line or segment is anchored in position. Even if you exit Forms Editor, it will remain on the screen.

Removing Lines and Segments

To remove the last line or segment you anchored, select [Undo Last].

■ (This key works if you have remained within Forms Editor since you anchored the line or segment, or if you have gone directly to and returned directly from Fields Editor via the softkeys at the f7 position. [Undo Last] does *not* work if you have exited from Forms Editor via the [exit] softkey and returned subsequently.)

To remove any other line or segment, proceed as follows:

1. Select [Line Type] as many times as necessary to highlight the "Erase" option in the message window.

2. Follow the cursor or mouse box-drawing procedure (see above)
   to erase the line or segment.

   Insert (1, Insert fig7-1-1)

6.2.3 How To Draw Lines (Cursor Mode)

In Cursor Mode, you can draw a horizontal or vertical line or line segment anywhere on the screen simply by specifying its starting point and ending point.

Before Drawing

Before drawing with Cursor Mode, you must complete the following steps (see section 6.2 for instructions):

1. Select Forms Editor.
2. Select Cursor Mode.
3. Select the Line Type you want to use (Single, Double, or Bold; you select Erase only to erase an existing line or segment, as described later in this module).
4. Select any special video attributes you want the line or segment to have (Blinking, Underkine, or Inverse).

Unlike Line and Segment modes, Cursor Mode does not display a line or segment automatically.

Keyboard Procedure

To draw a line or segment using the arrow keys on your keyboard, proceed as follows:

1. Move the cursor to the point where you want the line to start.
2. Select [From Cursor].
3. Move the cursor to the point where you want the line to end.
4. Select [To Cursor].

   Your line or segment is anchored in position. Even if you exit Forms Editor, it will remain on the screen.

Mouse Procedure

To draw a line or segment using the HP Mouse, proceed as follows (special terms used in these instructions are defined in Section 6.2):

1. Point to where you want the line to start.
2. To start the line, Press Left and Click Right. *Do not Release Left.*
3. Still Pressing Left, Drag to where you want the line to end. If you Release Left accidentally while drawing the line, just Press Left again and continue drawing.
4. To anchor the line, while still Pressing Left, Click Right. Release Left.

Your line or segment is anchored in position. Even if you exit Forms Editor, it will remain on the screen.

Note

For convenience, Cursor Mode has been designed so that you do not have to keep the cursor on the line you are drawing. With either the arrow keys or the mouse, you can move the cursor perpendicularly away from the line, then resume drawing by moving the cursor parallel to the line (with the mouse, Press Left as you do so).

Line Orientation

When you are in Cursor Mode, the direction in which you move the cursor immediately after specifying the starting point determines the line's orientation automatically. However, after you begin to draw the line but before you anchor it, you can still change its orientation while retaining the same starting point. Just select [Line Orient'n] or Click Right with the HP Mouse.

Removing Lines and Segments

To remove a line or segment you have not yet anchored, select [exit].

To remove the last line or segment you anchored, select [Undo Last].

■ (This key works if you have remained within Forms Editor since you anchored the line or segment, or if you have gone directly to and returned directly from Fields Editor via the softkeys at the f7 position. [Undo Last] does *not* work if you have exited from Forms Editor via the [exit] softkey and returned subsequently.)

To remove any other line or segment, proceed as follows:

1. Select [Line Type] as many times as necessary to highlight the "Erase" option in the message window.

2. Follow the cursor or mouse box-drawing procedure (see above) to erase the line or segment.

6.3 Stage 2: Typing in Labels

Once you have finished drawing all the boxes and lines of your data-entry form, you type in all the headings, field labels, and other text items to appear in it.

Character Sizes and Video Enhancements

You can type the labels, headings, and other text items of your form in any of the following character sizes:

- 1x1 1x2 2x1 2x2 4x4 6x6

You can give any of these items any of the following video enhancements:

- blinking
- underline
- inverse
- security.

1x1 Characters

If you want only 1x1 characters, you can type your field labels and other text items in either Forms Editor or Fields Editor; select Cursor mode to avoid having lines or segments move along with your cursor as you type.

You can apply blinking, underline, or inverse video enhancement to these characters by means of the enhance video menu accessed within these editors.

Note that in either of these editors, you can use the (Insert Char) and (Delete Char) keys without disturbing the grid of lines and boxes, as long as the cursor is not sitting on a line.

Outsize Characters

If you want to type characters in larger sizes, proceed as follows.

1. From whichever Forms Editor or Fields Editor menu you are in, select [exit] to go to the editors menu.

2. From the editors menu, select [enhance video].

3. On the the enhance video menu now displayed, select the desired character size and enhancements, then select Save Enhance to save your selections and return to the editors menu.

4. Type in the labels and headings.

If you make a typing error, cursor back and type over it. At this menu level, the (Insert Char) key does not work, and the (Delete Char) key *can*

disturb lines you drew previously.

Note	Whether you are working within an editor or at the main **editors** menu level:

- Everything you type will automatically be "protected"-when the data-entry form is used on-line in Forms Mode, the terminal operator will not be able to overwrite it.

- Be careful not to type or to use $\boxed{\textsf{Delete Char}}$ when the cursor is positioned on a line, or you may overwrite or erase part of the line.

6.4 Defining Data-entry Fields with Fields Editor

Once you have finished entering labels, headings, and other text material, you use either of the Fields Editor drawing modes to define the unprotected fields of the form (the areas where the terminal operator enters data when your screen is used on-line).

What Fields Editor Does

Fields Editor lets you define the screen fields in which the terminal operator or the host will be able to enter data when the form is used on-line in Forms Mode. These data-entry fields are known as unprotected fields.

An unprotected field is always horizontal. Its length can range from one character to an entire line. The unprotected fields you define with Forms Editor are always 1 character space high and can accept only 1x1 characters when data arre entered in them. To define fields that can accept larger characters, you must use escape sequences instead of the Fields Editor (see section 6.4.3).

Video Enhancements and Bracketed Fields

When you use the default selections in Fields Editor, all unprotected fields are displayed in reverse video, with no square brackets around them. But the [Bracket Field] and [enhance video] softkeys available on all the Fields Editor menus let you bracket the fields and select alternative video attributes for them if you wish.

Choice of Drawing Modes

Each softkey menu in the Fields Editor includes a [Drawing Mode] key. You use this key to switch between the two modes available for defining unprotected fields: Segment Mode and Cursor Mode. (The name of the mode currently selected is higlighted in the message window.)

As you switch between drawing modes, the menu of softkeys available on the screen changes slightly. The first time you use the Fields Editor, it comes up in Segment Mode. But from then on it comes up in whichever mode you were using last.

Segment Mode

Segment Mode lets you quickly define unprotected fields that a) fill the space between vertical lines that you have already drawn, or b) run all the way across the screen. Whenever you position the cursor between vertical lines, an unprotected field appears between them automatically. Whenever you position the cursor anywhere else, a field automatically fills that row on the screen.

Cursor Mode

Cursor Mode lets you manually specify the starting point and ending point of each field, regardless of what else appears on the screen.

Use of Brackets

When the [Bracket Field] softkey is enabled, an * appears on it, and any fields you define will be enclosed in square brackets. To change the state of this softkey from enabled to disabled or vice versa, select it once.

Choice of Video Enhancements

Whichever drawing mode you are using, you can select blinking, underline, inverse, and security video attributes for the unprotected fields you define. (Inverse video is the default.) As in the other editors, to select alternative attributes, you must select [enhance video] before you draw. Selecting this softkey takes you to the enhance video menu, where you choose the desired attributes. Then you exit back to the Fields Editor menu to define the field.

For more details on the enhance video menu, see Section 6.3.

Preparing To Define Fields

To get ready to define the first unprotected field on the screen, proceed as follows.

1. If you are already in the Forms Editor, select [fields editor] at the f7 position. Otherwise, select [fields editor] from the editors menu.

   A Fields Editor menu appears.

2. If the drawing mode currently highlighted in the message window is the one you want, go to step 3.

   Otherwise, select [Drawing Mode], so that the drawing mode you want is highlighted.

3. If the current state of the [Bracket Field] softkey (enabled or disabled; see above) is the one you want, go to step 4.

   Otherwise, select this softkey one time to change its state. (If you are using an HP Mouse, to toggle this softkey, Click Right.)

4. If you want to use non-default video attributes for the unprotected field, select [enhance video] to access the enhance video editor. Choose the video attributes you want, select [Save Enhance, then select [exit] to return to the Fields Editor.

You are now ready to define your first unprotected field. For details on how to define fields in Segment Mode and Cursor Mode, see sections 6.4.1 and 6.4.2, respectively.

6.4.1 How To Define Unprotected Fields in Segment Mode

With Segment Mode, whenever you position the cursor between vertical lines, an unprotected field appears between them automatically. Whenever you position the cursor anywhere else, a field automatically fills that row on the screen.

Before Starting

Before defining an unprotected field, you must follow the procedure given in "Preparing To Define Fields" in section 6.4.

Defining a Field

When you first enter Segment Mode, an unanchored unprotected field appears on the screen. (If the cursor currently lies between two vertical lines, the field runs from one line to the other. Otherwise, the field runs from the left margin to the right margin.) You can then define unprotected fields using either the external keyboard or the HP Mouse.

Keyboard Procedure

To define an unprotected field using the arrow keys on your keyboard, proceed as follows:

1. Use the ⬆ and ⬇ keys to move the cursor to the row where you want the field.

2. If you want the field to fall between two vertical lines that you have already drawn and that intersect that row, move the cursor to any character position between these lines.

3. To anchor the field, select [Anchor Field].

Your field is anchored in position. Even if you exit Fields Editor, it will remain on the screen.

Mouse Procedure

To define an unprotected field using the HP Mouse, proceed as follows (special terms used in these instructions are defined in Section 6.2):

1. Press Left and Drag the cursor to the row where you want the field. Do not Release Left.

2. If you want the field to fall between two vertical lines that you have already drawn and that intersect that row, continue to Press Left and drag the cursor to any character position between these lines.

3. While still Pressing Left, Click Right to anchor the field. Release Left.

Your field is anchored in position. Even if you exit Fields Editor, it will remain on the screen.

6.4.2 How To Define Unprotected Fields in Cursor Mode

To define an unprotected field in Cursor Mode, you simply specify the starting point and ending point of each field.

Before Starting

Before defining an unprotected field, you must follow the procedure given in "Preparing To Define Fields" in section 6.4.

Defining a Field

Unlike Segment Mode, Cursor Mode does not display an unprotected field automatically. You can define unprotected fields in Cursor Mode using either the arrow keys or the HP Mouse.

Keypad/Keyboard Procedure

To define an unprotected field using the arrow keys on your keypad or keyboard, proceed as follows:

1. Use the arrow keys to move the cursor to the point where where you want the field to start.

2. Select [From Cursor].

3. Use the ▶ key to move the cursor to the point where where you want the field to end.

   As you move the cursor, the field appears on the screen in whatever video attributes you selected previously.

4. Select [To Cursor].

Your field is anchored in position. Even if you exit Fields Editor, it will remain on the screen.

Mouse Procedure

To define an unprotected field using the HP Mouse, proceed as follows (special terms used in these instructions are defined in Section 6.2):

1. Point and Click Left to move the cursor to the point where you want the field to start.

2. Press Left and Click Right to select [From Cursor]. Do not Release Left.

3. Still Pressing Left, Drag the cursor to the right until it reaches the point where you want the field to end.

   As you drag the cursor, the field appears on the screen in whatever video attributes you selected previously.

4. Still Pressing Left, Click Right to select [To Cursor]. Release

Left.

Your field is anchored in position. Even if you exit Fields Editor, it will remain on the screen.

6.4.3 Defining Outsized Fields, Removing Fields, and Testing Fields

To define unprotected fields that can accept characters larger than 1 x 1, you must use escape sequences instead of of the Fields Editor. To remove fields you have defined, you use one of two methods. To test fields you have defined, you place the terminal in Forms Mode.

Defining Outsized Fields

You cannot use Fields Editor to define fields that accept characters larger than 1 x 1. Instead, proceed as follows, using an external keyboard.

1. Go to the **modes menu**, ensure [Remote Mode] is not enabled (no *), then select **enhance video**.

2. On the **enhance video menu**, choose the character size you want the field to accept and any video enhancements you want it to have.

3. Select [Save Enhance] to save your selections and return to the **modes menu**.

4. Cursor to the position where you want the field to start, then type in the sequence (ESC) (⌐).

5. Using the space bar (not the (▶) key, move the cursor to where you want the field to end.

6. Type in the sequence (ESC) (⌐).

The unprotected field is now defined with the character size and video attributes you selected.

Removing Unprotected Fields

To remove the last unprotected field you anchored with the Fields Editor, select [Undo Last].

To remove any other unprotected field, you must exit to the System Menu and use the (Delete Char) or (Delete Line) key on the external keyboard.

To remove an outsized unprotected field n character spaces high, place the cursor in the first column of the row above it and press (Delete Line) n times.

Testing Unprotected Fields

To make sure you have defined an unprotected field properly:

1. Go to the **modes menu** and ensure [Remote Mode] is not selected (no *).

2. Press (▼), then type in the sequence (ESC) (W) to place the termi-

nal in Forms Mode.

3. Press (Tab).

   The cursor should move to the first position in the unprotected field.

4. Type in a character string.

   When the cursor reaches the end of the field, the terminal should beep, and the cursor should go on to the start of the next field (if there is one) or return to the start of the current field (if there is not).

If any of these things does not happen, key in (ESC) (X) to exit Forms Mode, then redefine the fields properly.

For more details on Forms Mode, see chapter 4.

Designing Touch Targets with Touch Editor

7.1 Overview

With the Touch Editor, you can design screens that let the terminal operator send information to the host by simply touching screen areas that you define as touch targets. Defining a touch target is a four-stage process. Once you define one touch target on a screen, you can add similar ones very quickly.

Touch Targets

On Industrial Touch terminals that have the touchscreen option, you can enter data by simply touching areas of the screen that have been defined as touch targets. When triggered, these targets, like User softkeys, generate a character string (called the report string) that is either processed locally, sent to the host and processed there, or sent out the auxiliary port.

Touch targets are always square or rectangular. They measure at least 3 character spaces high by 3 character spaces wide, including a border 1 space wide. This border is normally visible, but you can design it to be invisible if you wish. You can make the video attributes of touch targets invert when the operator touches them, to confirm that contact has been made. You can also specify that the terminal should emit an audible beep when the target is triggered.

You can define a maximum of 32 touch targets on a single screen.

To design a touch target, you use the Touch Editor with your HP Mouse, keypad, or external keyboard, accessing editor features through six softkey menus. These menus, shown in Exhibit 7.1, are structured to help you design targets in four easy stages.

Stage 1

Defining How the Target Looks and Anchoring It

In Stage 1, you work with the **create target** menu of the Touch Editor. Your tasks are:

1. to specify what type of line (single, double, bold, or blank) will compose the target border

2. to select video enhancements (blinking, underline, or inverse) for the target border, if desired

3. to specify whether the target should invert its video attributes when touched

4. to move the target to the desired position on the screen and stretch it to the desired size.

Stage 2

Defining How the Target Operates

In Stage 2, you work with the **target operat'n menu.** Your tasks are:

1. to specify whether the target's report string is sent to the host, sent out the auxiliary port, or processed locally when the target is triggered

2. to specify whether the target is triggered on touch, on release, or both, or whether it simulates an ON-OFF toggle switch instead

3. to specify whether the terminal will beep when the target is triggered.

Stage 3

Writing Report Strings

In Stage 3, you use the **Edit Report** menu to write the report string or strings that are generated when the operator triggers the target. Report strings may consist solely of printable characters, or they may include control characters and escape sequences as well.

Stage 4

Testing, Modifying, and Labelling the Target

In Stage 4, you test the target to make sure it looks and operates the way you want. Then you correct it as necessary and label it if you want.

Adding and Saving Targets

After your first target is complete, you can copy or modify it if you want additional targets on the screen. As you anchor each target, it is saved in the terminal's memory. You can also send a screen of touch targets to the host, where it is stored like any other screen file. (The touch editor eliminates the need to encode the touch definitions in the application program.) In the example given in this manual, the touch targets are stored together with the rest of the screen in a single host file.

The rest of Chapter 7 explains all four stages of touch-target design. The exhibits show how three touch targets might be added to the data-entry form designed in Chapter 7.

Insert (1i, Exhibit 7.1 Touch editor softkey map)

7.2 Stage 1: Defining How the Target Looks

In Stage 1 of designing a touch target, you specify how its border will look before the operator touches the target. You also specify what parts, if any, of the target will invert their video attributes when touched, to let the operator know that proper contact has been made. After specifying these characteristics, you move the target into position, stretch it to the desired size, and anchor it in place.

What You Define

The target characteristics that you define in Stage 1 are as follows.

Border Type

Every touch target has a border one character space wide. You must specify whether this border should be a single line, a double line, a boldface line, or a blank line. (A blank border still occupies screen space, and overwrites anything previously drawn at its location. Blank borders are typically used for superimposing invisible touch targets on other graphics, such as process-graphic symbols, discussed in chapter 8.)

Video Enhancements

The border of each target can be displayed in normal, blinking, underline, or inverse video. To specify attributes other than normal, you access the **enhance video** menu from the **create target** menu, select the desired attributes, then return to the **create target** menu to continue designing the target.

Inverted Area

To provide visual feedback, you can specify that the inside of the target, or both the inside and the border, invert video attributes when the operator touches the target.

Target Size and Position

The last step in Stage 1 is to move the target into position, stretch it to size, and anchor it in place.

Procedure

The procedure for Stage 1 amounts to accessing the **create target** menu, making a few softkey selections, and positioning, sizing, and anchoring the target. In the following instructions, "Select" means "select the softkey with the keyboard, touchscreen, or HP Mouse" (see section 6.2). Separate instructions for the HP Mouse are given here only for positioning and sizing the target.

1. From the editors menu, select [touch editor]. The **touch editor**

menu appears.

2. From the touch editor menu, select [create target]. The create target menu appears, with the target you will be working on displayed as a square in the upper-left corner of the screen.

3. If the type of border the target has now is the one you want it to have, go on to step 4.

    Otherwise, select [Border Type] as many times as necessary to shift the highlight in the message window to the desired border type. (The border of the target on the screen changes as you do so.)

4. If the video attributes the target border has now are the ones you want it to have, go on to step 5.

    Otherwise, select [enhance video] to display the enhance video menu. Select the new attributes, then select [Save Enhance]. The create target menu reappears, and the border now has the video attributes you just specified.

5. Now you are ready to move the target into position and stretch it to size.

    ■ With the keyboard

        a. Use the arrow keys to move the target until its upper-left corner is positioned where you want.

        b. Select [Operat'n].

            The Operation highlight in the message window switches from Move to Size, and the cursor moves to the lower-right corner of the target.

        c. Move the cursor down and to the right to stretch the target to the size and shape you want. (If you go too far in either axis, reversing direction will shorten the target.)

        d. To anchor the target, select [Anchor Target]

    ■ With the HP Mouse

        a. Press Left, Drag the target until its upper-left corner is positioned where you want, then Release Left.

        b. Click Right.

            The Operation highlight in the message window switches from Move to Size, and the cursor moves to the lower-right corner of the target.

        c. Press Left and Drag the target down and to the right until it is stretched to the size and shape you want. (If you go too far in either axis, reversing direction will shorten the target.)

        d. To anchor the target, Press Left and Click Right.

Now you have finished defining how the target looks. Go on to Stage 2 to define how it operates.

Note

If you see something wrong with the target after you anchor it, but you are still on the **create target** menu, simply select [**Undo Last**]. You can then change any of the selections on this menu and anchor the target again.

Insert (1, Insert fig8.2 here)

7.3 Stage 2: Defining How the Target Operates

Once you have defined how the target looks, you define how it operates. First, you specify where the target's report string is processed when the target is triggered. Then you specify whether the target is triggered on touch, on release, or both, and whether it simulates an ON-OFF switch. Finally, you specify whether the terminal will beep when the target is triggered.

What You Define

In Stage 2, you define the following three target characteristics, using the target operat'n menu.

Report String Destination

You use the [Report Dest'n] softkey on the target operat'n menu to specify where the report string is sent and processed when the target is triggered. The four possible destinations are Transmit, Auxiliary, Normal, and Local. The table below explains this choice of destinations.

Destinations for Touch Target Report Strings	
Destination	**Meaning**
Transmit	The string is transmitted to the host and processed there according to the host program.
Auxiliary	The string is sent out the Auxiliary Port (Port 2) to be processed by whatever device is connected to it.
Normal	The string is handled the same way as if it had been typed in at the keyboard. If the terminal is in Local Mode, the string will only be processed locally. If the terminal is in Remote Mode, the string will be sent to the host, processed locally, or both, depending on its contents.
Local	The string is not sent to the host, but rather acted on in the terminal. If the string consists simply of characters for the terminal to display, it displays them. If the string contains control sequences for the terminal to execute (for example, the escape sequences that control cursor movement), it executes them.

Feedback Beep

For each target you define, you can use the [Feedback Beep] softkey to specify whether a beeper will sound to let the operator know when the target has been triggered successfully.

Trigger Type

You use the [Trigger Type] softkey to specify whether the target is triggered (sends out a report string):

- as soon as the operator touches it
- only after the operator's finger is removed from the screen (see Note below)
- both times.

You also have a fourth option: to make the target trigger in such a way that it simulates an ON-OFF toggle switch.

Exhibit 7.3 shows, for each of the four Trigger Types, the sequence of events that occurs when a target is touched and released. (For the first three trigger types, the complete sequence occurs when the target is touched and released once; for Toggled targets, twice.) It is assumed that an inverted area other than "None" has been selected in Stage 1, and that [Feedback Beep] has been selected in Stage 2.

Exhibit 7.3. How Trigger Type Affects Target Behavior

Finger Action	Trigger Type		
	"On Touch"	"On Release"	"Both"
Touch	Attributes invert. "On" string sent. Beeper sounds.	Attributes invert.	Attributes invert. "On" string sent. Beeper sounds.
Release	Attributes invert.	Attributes invert. "On" string sent. Beeper sounds.	Attributes invert. "Off" string sent. Beeper sounds.

Finger Action	Trigger Type "Toggled"	
Touch	Target toggles ON:	Attributes invert. "On" string sent. Beeper sounds
Release		No action.
Touch again	Target toggles OFF:	Attributes invert. "Off" string sent. Beeper sounds.
Release		No action.

Note

By designing a target so that its attributes invert when it is touched but it is triggered only on release, you give the operator a chance to avoid triggering the wrong target. The change in appearance alerts the operator that contact with the target has been made. If it is not the right target, sliding the finger away from the target instead of lifting it off will prevent the target from being triggered.

Procedure

The procedure for Stage 2 consists of making two or three softkey selections with the keyboard, touchscreen, or HP Mouse, as described in section 6.2. The instructions below assume that you have just completed Stage 1 and still have the **create target** menu displayed.

Note

The **create target** menu does have a [target operat'n] softkey that lets you define the three features covered in Stage 2, but does not let you go on directly to stage 3 and write report strings. The [target operat'n] softkey on the main Touch Editor lets you perform all four operations. To save you keystrokes, this manual instructs you to use the latter softkey.

1. From the **create target** menu, exit to the main Touch Editor menu.

2. Make sure the cursor is inside the target, then select [target operat'n].

   The **target operat'n** menu appears.

3. Select the [Report Dest'n] softkey as many times as necessary to highlight the desired destination on line 25.

4. Select the [Trigger Type] softkey as many times as necessary to highlight the desired trigger type on line 26.

5. If you want the terminal to beep each time the operator triggers the target, make sure the [Feedback Beep] softkey is enabled (* showing).

You are done defining how the target operates. Now you can go on to Stage 3 to write the report string or strings it will send when triggered.

7.4 Stage 3: Writing Report Strings

Once you have specified how the touch target looks and operates, you go on to Stage 3 and write the report strings: the character strings sent to the host or another external device or processed in the terminal when the operator triggers the touch target. You are then done designing the target and can go on to test it.

String Length

The maximum length for a touch target report string is 80 characters. The total number of characters you can use for all touch target report strings combined is 1K.

Procedure

The following instructions assume you have just finished Stage 2 and are on the **target operat'n** menu, which you have accessed from the main Touch Editor menu.

1. Select [Edit Report].

   The **Edit Report** menu appears, with the cursor at the start of the field in which you type the "On" string.

2. Type in the string.

3. If in stage 2 you selected "Both" or "Toggle" as the trigger type, press (Next) (on the keypad) or (Tab) (on the external keyboard) to move to the start of the field where you type the "Off" string, and type that string in.

4. Select (Save Changes) to save the string or strings you have defined and exit to the **target operat'n** menu.

5. Select [exit] to exit to the **touch editor** main menu.

You are now done defining the target. Its report string, as well as all the characteristics you defined in Stages 1 and 2 are fixed so that you can test them in Stage 4.

Correcting Errors

When typing report strings, you can use certain keys on the keypad or external keyboard to correct errors.

Keypad	Space bar	(Clear Line)	
Keyboard	Space bar	(Back space)	(Insert Char)
	(Delete Char)	(Delete Line)	

If you try to use an editing key not listed in this table ((Clear display),

for example), the terminal beeps, and the key does not work.

There are two ways of quickly erasing any strings displayed.

- To clear the On and Off fields and start over, select the [Default Values] softkey.
- To clear the fields and exit to the **target operat'n** menu, select [exit].

Embedding Control Codes

[Display Functns] and [ESC] softkeys

Often you will need to include control characters or escape sequences in the report string. When you reach the point in the string where you want to embed such a code, select [Display Functns]. Then:

- To embed a character or sequence generated by an individual key (for example, an HT character from the (Tab) key, or the C sequence from the (▶) key), just press the desired key.
- To embed other control characters, type the usual control sequence (for example, (CTRL) + (J) to invoke).
- To type the   character from the built-in keypad if you do not have an   external keyboard, select the [ESC] softkey at the f6 position.

To resume normal typing, disengage the [Display Functns] softkey by selecting it again.

7.5 Stage 4: Testing, Modifying, and Labeling the Target

Once you have finished designing the target, in Stage 4 you test it to make sure it looks and operates the way you want. Then you make any needed changes and type in a label if desired.

Testing Targets

To test any anchored target on the screen, you go to the main editors menu, which makes all targets triggerable. Then you touch and release the target to check that it looks the way you want, behaves as specified in Exhibit 7.3, and generates the proper report strings. (You may want to take notes as you test.)

Checking Report Strings

To check report strings for which you have specified the destination as "Transmit" or "Aux", you will have to connect a protocol analyzer or similar instrument to Port 1 or Port 2, respectively. Strings with the destination defined as "Local" will always be displayed when you trigger the target. Strings with the destination defined as "Normal" will be displayed when you trigger the target, as long as you have placed the terminal in Local Mode (disengaged the [Remote Mode] softkey on the modes menu).

Procedure

The following instructions assume that you have just completed stages 1 through 3 to define an individual target and are still on the the main touch editor menu. But you could also define several targets in succession, then test them all at once.

1. Select [exit] to exit to the main editors menu.

2. Check that the target looks the way it is supposed to before the operator touches it.

3. Touch the target and leave your finger on it.

4. Check that the target behaves as it should (see Exhibit 7.3).

5. Take your finger away, and again check that the target behaves as it should.

6. If you have defined the target as toggled, repeat steps 3 through 5 to check the transition from the On state to the Off state.

Modifying Targets

If you noted anything that needed changing when you tested the target, the [edit target] and [target operat'n] softkeys on the main touch editor menu let you make the changes. This includes moving the target or changing its size and shape.

The following instructions for modifying a target assume that you

have just finished testing the target defined in stages 1 to 3 and are still on the main editors menu. But in fact, you can define several targets in succession, test them all at once, then use the following instructions to select and correct the targets that need changing.

1. Select [touch editor] to access the touch editor main menu.

2. With the arrow keys or the HP Mouse, place the cursor inside the target you want to change.

3. If you want to change the report string, or alter a selection on the **target operat'n** menu, select [target operat'n] to go directly to that menu. Then proceed as in stages 2 and 3.

   In this case the target is still anchored. When done making changes, simply exit to the main **touch editor** menu; you do not have to re-anchor the target first.

4. If you want to change a selection on the **create target** menu, select [edit target], which takes you to that menu. Then proceed as in stage 1.

   In this case the target is unanchored; you can change its size and position, as well as its other characteristics. **You must always re-anchor the target before exiting to the main touch editor menu, and you then have to write the report string or strings over again.**

Labelling Targets

Once you have tested your target and corrected it if necessary, you can type in any label you want inside or next to it. If you want to use 1 X 1 characters, you can type the labels without exiting the Touch Editor. If you want outsized characters or alternate character sets, exit to the main editors menu, select [enhance video], and make your selections on the **enhance video** that is then displayed.

7.6 Copying and Deleting Targets

Once you have defined one touch target, you can add targets quickly without repeating the whole design process. You can make an exact copy of a target, or a variant that differs only in certain characteristics. The procedure differs slightly depending on whether you are working with the last target you anchored or with another target on the screen. You can delete targets from the screen as desired.

Last Target Anchored

Until you exit from the Touch Editor menus to the editors menu, all the characteristics you chose for the last target you anchored remain selected, except for the report string. To make an exact copy or a variant of the last target you anchored, proceed as follows.

1. From whichever menu you are in, go to the **create target** menu.

    If you have not moved the cursor since you anchored the last target, you see no change. If you have moved the cursor, an unanchored copy of that target appears at the cursor position.

2. If you want to make an exact copy of the target, go to step 3.

    If you want the new target to look different in certain respects, change the selections on the **create target** menu.

3. By pressing the arrow keys or dragging the HP Mouse, move the cursor to the spot where you want the new target to be centered.

    The cursor carries a copy out of the last target to the new position.

4. If you want the target to stay the same size, go to step 5.

    If you want to change the target's size, select [Operat'n] or Click Right. The cursor moves to the lower-right corner of the target. Use the arrow keys or the HP Mouse to stretch the target to the desired size.

5. Select [Anchor Target] to anchor the new target.

6. If you want the new target to have a report string, repeat Stage 3 (see section 7.4).

Other Targets

If you want to make a copy or variant of a target other than the last one you anchored, you must select it with the [copy target] softkey and the cursor. After that, the procedure is the same as for the last target you anchored.

1. From whichever menu you are in, go to the **touch editor main menu**.

2. With the arrow keys or the HP Mouse, position the cursor inside

the target you want to work with.

3. Select [copy target].

    The **create target** menu is displayed, and all the characteristics of the target you chose are now selected.

4. Follow the procedure given above for the last target anchored, starting at step 2.

Deleting Targets

To delete any touch target on the screen, proceed as follows:

1. From whichever menu you are in, go to the **touch editor** main menu.

2. With the arrow keys or the HP Mouse, position the cursor inside the target you want to delete.

3. Select [edit target].

    The **create target** menu appears.

4. Select [exit].

    The target is deleted from the screen.

Exhibit: Adapt figure 8.6.1 step to the demonstration screen

Designing Process Graphic Diagrams with Graphics Editor

8.1 Overview of Graphics Editor

The Graphics Editor lets you select and "paste" four different sets of characters on the screen, and is used mainly to construct process graphic diagrams. You use one menu of this editor to select the special characters used for such diagrams. You use the two other menus to construct process graphic symbols by "pasting" these characters together, and to move and copy these symbols on the screen.

Character Sets Available

The Graphics Editor lets you select and "paste" on the screen characters from the following four sets:

- Roman 8 Extension
- HP Line-Drawing
- ISA-type Graphics
- IT Line-Drawing.

The ISA characters are the ones you will probably use most often; these are the characters that can assembled into process graphic symbols on the screen.

The HP and IT line-drawing characters are provided in the Graphics Editor in case your diagram requires line types that you cannot draw with the Forms Editor. Usually, however, when you need to draw lines-to connect two symbols, for example-you just switch from Graphics Editor to Forms Editor via the main editors menu. (For complete instructions on Forms Editor, see chapter 6.)

The Roman 8 Extension set consists of alphabetical characters with diacritical marks. You can access these characters through the (Extend Char) key on the external keyboard. They are provided in Graphics Editor so that you can display them even if you have no keyboard connected; they have no particular graphics application.

Selecting Characters and Constructing Symbols

When you trigger the [select char softkey on the main graphics editor menu, the terminal displays whichever of the four character sets is currently selected. (To change character sets or character size or assign video enhancements, select [enhance video] from this same menu.)

From the set displayed on the screen you select whichever characters you need. Using the arrow keys or the HP Mouse, you then move these characters into place and "paste" them down to form the desired symbol.

Copying, Moving, and Deleting Areas

Once you have drawn symbols and other graphics on the screen, you may need to copy, move, or delete some of them. The **select area** menu lets you define the area that you want to manipulate on the screen, then:

- paste a copy of this area elsewhere on the screen; or

- cut this area away from its current location and repaste it elsewhere; or

- delete this area altogether.

Defining Graphic Symbols as Touch Controls

One powerful tool you can create with the Graphics Editor and Touch Editor combined is a display that lets the terminal operator control processes by simply touching symbols on the screen. The procedure for designing such symbols is quite simple:

1. Construct the symbol on the screen using Graphics Editor.

2. Switch to Touch Editor via the main **editors** menu.

3. Directly on top of the symbol, define a touch target with "Erase" selected as the border type.

The result is an invisible touch target sumperimposed on a visible graphic symbol. (For detailed instructions on designing touch targets, see Chapter 7.)

Accessing the Graphics Editor

You access the Graphics Editor in the same way as the others:

1. If the System Menu is not already displayed, press ⨍ on the keypad or (User System) on the external keyboard to bring it up.

2. From the System Menu, select [editors] to display the **editors** menu.

3. From the editors menu, select [graphics editor].

The main Graphics Editor menu is displayed. You can now select characters and "paste" them into position with the keypad, the keyboard, or the HP Mouse.

Exhibit 8.1: Graphics Editor menu tree

8.2 How To Select Characters and Construct Symbols

To construct a process graphic symbol with the Graphics Editor, you select graphics characters from a set displayed on the full screen. Using the keypad, keyboard, or HP Mouse, you move these characters into place and "paste" them next to each other to form the desired symbol.

Character Size and Attributes

When you trigger the [select char] softkey on the **graphics editor** main menu, the **select char** softkey menu comes up, and one of the four sets of graphics characters that Graphics Editor lets you work with is displayed in 2 x 2 size on the screen. A 2 x 2 cursor appears over one of the characters in this set, indicating that this is the character currently selectable.

Another copy of this character appears at the lower right of the screen in the currently selected size and video attributes. To change character size or video attributes, or switch to another of the four character sets, you access the **enhance video** menu directly from the **select char** menu.

Selecting and Pasting Characters

The procedures for selecting and pasting characters with the keyboard and the HP Mouse are essentially the same, but the mouse provides some quick-selection features that make the process even faster. These features are noted at the appropriate points in the following instructions.

Procedure

1. From the graphics editor main menu, select [select char]. (If you have the HP Mouse, Click Right.)

   The **select char** menu and the current character set are displayed.

2. If this character set is the one you want, and the size and video attributes of the character currently displayed at the lower right are the ones you want, go to step 4.

   If not, select [enhance video] and change the selections on the enhance video menu. (With the HP Mouse, a quick way to select inverse video is Press Left and Click Right.)

3. Select [Save Enhance] to save the changes and return to the select char menu.

   The desired character set is now displayed, and the currently selected character appears at the lower right in the desired size and video enhancements.

4. If this character is the one you want, go to step 5.

   If not, move the cursor until the character you want is highlighted in the character set and displayed at the lower right.

5. Select [select char]. With the HP Mouse, Press Left and Click Right.)

   The character set disappears, and the character you selected is displayed at the current cursor position, in the size and attributes you selected.

6. Move the cursor to drag the character to the point where you want to paste it.

7. To paste the character into position, select [Paste]. With the HP Mouse, Press Left and Click Right.)

8. Repeat steps 1 to 7 until you have constructed the symbol you want.

Note   At any time, you can unpaste the last character you pasted. Just select [Undo Last]. To undo characters other than the last one you pasted, either overwrite them with the (Space) key on the keypad or the space bar on the keyboard, or treat them as an area (see "Deleting An Area" in section 8.4).

Exhibit 8.2 screen showing cursor dragging last character of an ISA symbol into place in the lower right-hand quadrant of the screen being developed in this tutorial

8.3 How To Define A Screen Area

The select area menu of the Graphics Editor lets you enclose any area of the screen in a square or rectangle, so that you can then copy, move, or delete the graphics displayed inside it. These graphics may be symbols you built with the Graphics Editor or lines and boxes you drew with the Forms Editor. You **cannot** move unprotected fields or touch targets in this way.

Area Background

When you define an area, then copy or move it, you are manipulating the blank spaces as well as the graphics inside it. The [Backgrnd] soft-key on the select area menu lets you specify how these blank spaces should act at their new location on the screen.

If you want the blank spaces to overwrite any characters or graphics on which they are overlaid at the new location, use the [Backgrnd] softkey to select the "Opaque" option in the message window. If you want the original characters or graphics to remain visible, select "Transparent".

Defining An Area

The procedures for defining an area with the keypad or keyboard and the HP Mouse are essentially the same, but the mouse provides some quick-selection features that make the process even faster. These features are noted at the apropriate points in the following instructions. (For basic instructions on operating the HP Mouse, including how to move the cursor with it, see section 5.2.)

Procedure

1. From the **graphics editor** main menu, select [select area].

   The **select area**menu is displayed.

2. If the background type highlighted in the message window is not the type you want to use when you move or copy the area, select [Backgrnd]. The highlight in the message window will shift to the other background type.

3. Move the cursor to the point you want to be the upper-left-hand corner of the area you are selecting.

4. Select [Operat'n]. (With the HP Mouse, Press Left and Click Right.)

   The highlight in the message window shifts from "Move" to "Size".

5. Move the cursor right until it reaches the point you want to define as the upper-right hand corner of the area. (The cursor

draws a line as it moves.)

6. Move the cursor down. A box emerges from the line.

7. When the box encloses the entire area you want to select, stop moving the cursor. (If working with the HP Mouse, do **not** Release Left at this time.)

You have finished defining the area. Now you can:

- copy the area elsewhere on the screen;

- "cut" the area away from its current position and place it elsewhere on the screen; or

- delete the area from the screen altogether.

These procedures are given in Section 8.4.

Note

At any point after you define an area but before you copy or "cut" it, selecting [exit] will cancel the current area definition and return you to the main **graphics editor** menu.

8.4 How To Copy, Move, and Delete Screen Areas

Once you have defined a screen area, you can: a) make a copy of it elsewhere on the screen, or b) "cut" it away from its current position and place it elsewhere on the screen, or c) delete it from the screen altogether. You can perform all three procedures either with an external keyboard or with an HP Mouse.

Copying An Area

When you copy an area, all the graphics you enclosed when you defined the area stay where they are, but you pull away a copy and "paste" it elsewhere.

Procedure

The following instructions assume you have just finished defining an area, as described in section 8.3, and are still on the **select area** menu.

1. Select [Copy Area].

   The **graphics editor** main menu is displayed, and the rectangle you used to define the area disappears, but the cursor appears at the area's center. Don't worry; the area is still defined.

2. Move the cursor to the point where you want to paste a copy of the area.

   As you move the cursor, a copy of the area emerges from the original.

3. When you get to the right location, select [Paste]. (With the HP Mouse, Press Left and Click Right.)

   The copy is now pasted into position on the screen.

Moving An Area

To move an area, you "cut" it away from its current position, then "paste" it somewhere else.

Procedure

Follow the same procedure as for copying an area, except select [Cut Area] in step 1. When you move the cursor in step 2, the area you defined moves from its original location to wherever you place it on the screen. When you have the area where you want it, paste it as in step 3 above.

Note

■ At any point after you cut or copy an area, you can cancel the current area definition by selecting [select area] menu or [select char]. If you were copying an area, the original remains on the screen, but the copy disappears. If you were cutting an area, that

area is now deleted. All other areas of the screen remain intact.

- Whether you have copied or cut an area, its definition it still active after you paste it. If you move the cursor with the arrow keys or mouse, another copy of the area will emerge from the last one you pasted. You can move and paste this copy anywhere you want.

Deleting An Area

To delete an area, define it as described in section 8.3, "cut" it as described in "Moving An Area" above, then select [exit], [select char], or [select area] to go to the next menu desired. The area disappears as the menu changes.

Principles of Good Screen Design

9.1 Designing Screens that are Easy to Use

The 3082 editors greatly simplify the task of *creating* screens, but *designing* screens that are easy to use demands careful preparation and planning. A computer screen is usually designed to collect information, but in order to do so, it must also present information. It must tell users what tasks they can and must perform, what sort of information they have to enter, how they should enter it, whether they have made an error, and so on. In effect, everything on the screen, including touch targets and data-entry fields, is information. In order to make a screen easy to use, you must make this information easy to find and easy to understand.

Preparing the Information

Before you can begin designing the screen, you have to determine what information has to be included. Make a list of the following:

1. All of the information that has to be collected. This includes system information such as "I want to go back to the previous screen" as well as the data the screen is designed to collect.

2. The method of input that is best for each piece of information that is to be entered. This will depend on the type and function of the data item as well as the input devices you have available.

   - typed input should be required only in cases where the range of possibilities is virtually unlimited, such as identification numbers or names. Typing is the most prone to error and the least efficient of input methods.

   - barcode input is more accurate and efficient than typed input for items with a wide range of possibilities.

   - menu selection is ideal if input is limited to a discrete list of possibilities. It is easier to use touch targets or function keys to select the appropriate item from a menu than to type in a number or keyword, and mistakes are less likely.

   - if there are a number of related short menus, "slot machine" menus, in which only the current option is visible and the user selects by rolling through the list of possibilities, are efficient and quick to use.

3. All of the information the user requires to perform his or her task. This includes orientation and status information, error messages, titles, labels, instructions, and so on.

Once you have decided what information needs to be presented, you can begin to decide how the information should be presented. That is, you can begin to design the screen. Figure 11-1 shows a well-designed screen with the various types of information it presents.

Note

If your screen is a copy of an already-existing paper form, you should copy the form exactly, line by line, so that the transition from paper to screen is easy. If this is the case, you may not be able to incorporate all of the suggestions in these sections; however, you should still pay attention to as many as possible.

Insert (4i, figure 11-1)

The following two modules give specific guidelines about how to make the information on your screen easy to find and easy to understand.

9.1 Designing Screens that are Easy to Use

9.1.1 Making information easy to find

If users cannot find the information they are looking for, or cannot even discover what information they should be looking for, it will take much longer to perform the task for which the screen is designed. The users will also become frustrated and make more errors. It is important, therefore, to arrange the screen so that all information is easy to find and identify.

Once you know what information you need to include on the screen, you have to decide how to arrange it so that the user can find it. In order to make information easy to find,

1. divide the information into functional groups, such as orientation information, data collection information, system function information, status and error information, and so on.

2. position the groups of information on the screen according to the users' expectations and needs. You will have to decide what positions are appropriate, but here are some suggestions:

   - orientation information, such as the screen title and specific file information, should be at the top of the screen.
   - data collection information (whether it's a list of data entry fields or a touch-target menu to select further functions or screens) should be in the centre of the screen.
   - instructions should be above or to the left of the information to which they refer.
   - function-key labels should be at the bottom of the screen, just above the keys.

3. arrange the items within the groups in some logical order, never in the arbitrary order in which you think of them.

   - depending on the users and the function of the information, you might use such criteria as sequence of use, frequency of use, or importance to determine what the order of items should be.
   - items should be arranged in descending order from top to bottom of the screen and/or left to right.

4. don't clutter the screen. The more information there is on the screen, and the less orderly it is, the harder it is to find any single item.

   - research shows that no more than 25% of the total screen area should be filled.

- items should be arranged neatly in columns and rows with sufficient blank space between them, so the user can scan them quickly.

- centering and right or left justification should be used judiciously to make items easier to find and read.

- field labels should be placed to the left of single entry fields, with at least one blank space between the label and the field, or above multiple entry fields, with one blank line between the label and the first field in the column.

- columns should be at least 5 spaces apart so that they are easily distinguishable.

- lines should not be longer than 50 characters. Two columns of short lines require less eye movement and so are easier to read than one column of long lines.

- blocks of text should be no more than five lines long, and should be separated by a blank line.

You may discover that you have too much information to arrange it neatly and clearly on one screen. If so, you will have to decide what can go on to a second screen, using the same principles of logical organization that you use to lay-out the screen.

9.1 Designing Screens that are Easy to Use

9.1.2 Making information easy to understand

When you have arranged the information on the screen to your satisfaction, it is important to make sure that every item of information is as clear and understandable as possible. Ideally, the user should be able to know exactly what the information means and what should be done with it without having to think twice.

To make information intelligible, you must make sure that it is clear and complete, that there isn't too much information or too little. Here are a few suggestions.

1. Make the operations as similar as possible to operations that users are familiar with. For example, if the screen is replacing a paper form, copy the paper form as closely as possible.

2. Use special effects such as different text fonts, blinking text, or reverse video *only* to distinguish special kinds of information and never simply to decorate the screen. Users interpret everything on the screen, and arbitrary information will only confuse them.

   ■ Use blinking text *only* to draw attention to essential information such as error messages, and give the user an easy and quick way to turn the blinking off.

3. Use simple, clear, and descriptive language that can be read quickly and easily.

   ■ Use descriptive titles for screens and screen areas, as well as clear labels for data-entry fields and menu items.

   ■ Use terms that are already familiar to the users in their jobs.

   ■ Avoid computer jargon and cryptic short-forms and acronyms that the average user will not understand immediately.

   ■ Don't use all upper-case lettering. Mixed-case and lower-case text is easier to read, even for single words, such as function-key labels.

   ■ If you use reverse video, leave a blank before the first character and after the last, so that character strokes on the edges of letters do not blend into the screen background.

4. Distinguish data fields that *must* be filled from those that are optional, using a star preceding the labels or brackets around the fields.

5. If the format in which data should be entered is not obvious, indicate the proper format in parentheses after the label. For example, "Date (ddmmyy):"

6. Indicate default values for any fields that have them.

9.2 Integrating Screens into A System

It is not enough to design brilliant, well-laid-out, easy-to-read screens. You must also integrate the screens into a well-planned system, so that users can interact with them efficiently. Forms mode on the 3082 incorporates a number of features to make data entry more efficient, but to make your system more efficient, you should also incorporate consistency of screen design, ease of moving about the system, and meaningful feedback.

Overall Consistency

When you are designing a number of screens that will be linked together in one application, or that will be used by one group of users, it is best to incorporate a consistent design so users don't have to re-orient themselves with each new screen.

1. Use the same general layout on every screen, so the user knows where to look for a certain type of information. For example, function key labels, status and orientation information, or error messages should always appear in the same area of the screen.

2. Use terms consistently. Don't use the word "edit" in one place, "modify" in another, and "change" in yet another, if they all refer to the same type of operation.

3. If one operation appears on a number of screens, always use the same method of performing it. A "previous screen" function, for example, might always be assigned to function key f3.

4. Be consistent in your use of user aids. For example, if you use reverse video to indicate data-entry fields on one screen, don't use it for entry-field captions on another.

Moving around the System

Forms Mode on the 3082 allows ease of movement about the screen, but you need to organize the screens so users can get where they want to go as quickly and easily as possible.

1. Organize the screen hierarchy logically by function and sequence of use.

   ■ tasks that must be done to perform one function should be on the same screen if possible. Otherwise they should follow each other in one path in order of sequence, so that users don't have to move back and forth between screens to perform one function.

   ■ avoid screen hierarchies that require users to go down more than four levels before they get to a task, since they will lose patience.

2. Give the users methods of moving quickly to the screen they need and also to the top of the hierarchy.

   ■ provide quick alternative routes between related screens so the user is not forced to move through a number of irrelevant screens to get to the required one.

   ■ moving to the opening menu or screen should be a one-step process, so a user who is "lost" in the hierarchy can start over without more confusion.

Meaningful Feedback

It is important to let users know how they are doing at every point in the operation. Here are a few features you should include in your system to keep the user informed.

1. Give each screen a meaningful title, and include orientation information, such as a description of the path to the screen, so users always know where they are in the screen hierarchy.

2. Let users know what the system is doing at any time and when an operation is finished.

3. If you are using a menu, indicate which item is selected, and if you are using touch-targets, indicate when a target has been touched.

4. Indicate errors clearly.

   ■ attract the user's attention by using the beeper or blinking text.

   ■ explain the error clearly in non-treatening language in a consistent area of the screen. (Avoid words like "error," "illegal," and "aborted.")

   ■ explain what the user must do to recover from the error condition.

Appendixes

A

Generating Characters at the Keypad or Keyboard

A.1 Generating Characters in HP Mode

This section tells you how to produce the characters available in HP mode. We describe the character sets potentially available, how configuration settings affect which characters of those sets are available at your keyboard, specifying the character sets you want to be able to access, and selecting one set of characters to output to your screen at any given time. A related topic, printing these characters, follows in the next section.

How Configuration Values Affect Characters Sets

Emulation

The options for the Global Configuration menu's emulation field are HP, VT100, and VT52. It is not possible to change the emulation to gain access to characters unique to other modes as such changes clear display memory.

**Data Bits:
7-bit vs 8-bit
Operation**

7-bit operation. If you set the Data Bits field on the Host Port Configuration menu to 7-bit operation, you can access the USASCII set of the Roman 8 Characters (or a National language equivalent), HP Line Drawing Characters, ISA Characters, or HP 3082 Special Characters.

8-bit operation. If you set the Data Bits field on the Host Port Configuration menu to 8-bit operation, in addition to the character sets available in 7-bit operation, you enable the (Extend Char) key, permitting access to the Roman 8 Extension Set.

**Keyboards:
National**

HP mode allows you to use a USASCII keyboard or any of 16 National keyboards. If you use a National keyboard, you must be aware of character mapping in datacomm operations and how the terminal produces diacritical combinations.

7-bit Operation:

Character Mapping in Datacomm Operations In 7-bit operation the terminal cannot code characters from the Roman extension set (as these require eight data bits), so the terminal substitutes the corresponding character from the USASCII set for transmission and reception. The correct character will always be displayed on the screen. Table 7 shows the replacement characters.

Mapping HP Line Drawing Characters to National Keyboards
Table 3 shows the USASCII characters that correspond to HP Line Drawing characters. Some of the USASCII characters are replaced in National keyboards. Consequently, to get the line drawing character =| while using a Swiss keyboard (in 7-bit operation with the HP Line Drawing set as the "active" character set), you would press the è key. On a USASCII keyboard you would press the > key.

Diacritical Characters on National Keyboards
Some National keyboards allow you to add an alphabetic character to an accent to form a diacritical combination. Refer to Table x to see which characters are accents with your keyboard. In 7-bit operation typing the accent causes the corresponding character code (see Table x) to be transmitted, and, if echoed, the accent is displayed with the cursor under it.

If the second part of the combination is:

- an alphabetic character that forms a valid combination, the combination is displayed, the cursor moves to the next position, and the code of the second character is transmitted.

- an alphabetic character that forms an invalid combination, the alphabetic character overwrites the accent on the screen, the cursor moves to the next position, and the code of the second character is transmitted.

- a space, the accent remains on the screen, the cursor moves to the next position, and the code for the space is transmitted.

- the [Return] key, nothing is transmitted, and the normal return action occurs.

- an escape sequence, the accent disappears. The next character entered after the escape sequence is displayed at the cursor position.

Characters received from the computer will not affect the above descriptions.

8-bit Operation

National keyboards can produce the characters on the corresponding keyboard (x through x) in 8-bit operation. Each National keyboard can produce additional characters when the (Extend Char), key is depressed (see keyboard x).

Diacritical Characters on National Keyboards
Some National keyboards allow you to add an alphabetic character to an accent to form a diacritical combination. Refer to Table 8 to see which characters are accents with your keyboard. In 8-bit operation typing the accent causes the accent to be displayed with the cursor under it, but nothing is transmitted.

If the second part of the combination is:

- an alphabetic character that forms a valid combination, the combination is displayed, the cursor moves to the next position, and the code of the combined character is transmitted.

- an alphabetic character that forms an invalid combination, the alphabetic character overwrites the accent on the screen, the cursor moves to the next position, and the code of the second character is transmitted.

- a space, the accent remains on the screen, the cursor moves to the next position, and the code for the accent is transmitted.

- the [Return] key, the code for the accent is transmitted and the normal return action occurs.

- an escape sequence, the accent disappears. The next character entered after the escape sequence is displayed at the cursor position.

Characters received from the computer between the pressing of the accent key and the second key will not affect the above descriptions.

Specifying the Character Sets

At any given time, the HP 3082 can produce either of two character sets, the *base set* or the *alternate set*. The base character set is defined as the character set produced at the keyboard after you power-on the terminal or after you send it a shift-out control code. In HP mode the base set is always Roman 8.

The alternate character set is defined as the character set produced after you send the terminal a shift-in control code. To be able to select the alternate character set, you must use an escape sequence to specify the character set you want to make available:

The base set and the alternate set can be specified (although the base set will always be Roman 8 and the alternate set will always be the ANSI line drawing set after a power-on or hard reset).

Alternate Set To be able to select the alternate character set, you must use an escape sequence to specify the character set you want to make available:

Specifying the Alternate Set	
To specify:	Use:
the HP line drawing set	E_c)B
the ISA special set	E_c)G
the 3082 special set	E_c)I

Selecting Character Sets

Assume you specified Roman 8 as the base set and at this moment the base set is selected at the terminal. If you want to display characters from the alternate character set, you must use a shift-out (S_o) code; control-N. To return to the base set, use a shift-in (S_i) code; control-O. Note that when an enhanced video field or the end of the line is encountered in HP mode, you return automatically to the base set.

If you use a S_i code while in the base set or a S_o code while in the alternate set, the active character set is not affected, but the invisible control characters are inserted into the line. This can have two unforeseen consequences. Consider the case where you have 80 characters on a line and at columns 1 and 40 there are S_o codes. The first S_o code defines the subsequent characters to be from the alternate set and the second S_o code appears to have no affect. Should you later put an S_i code between columns 1 and 40, say at column 35, the previously placed S_o code will reset the line to the alternate set for columns 40 to 80. Now, having just placed the S_i code at column 35, should you attempt to remove the S_o code at column 40 by using the delete character key, the alternate characters move to the left, so you see that the S_o code is changing position. However, when the S_o code reaches column 35 it is not deleted. Instead, it appears to "jump over" the cursor and it overwrites the S_i code.

A shift-in or shift-out code, once created, can be moved by inserting or deleting characters, or overwritten with the other shift code. To destroy a shift code, you must either delete the entire line or push the unwanted shift code off the edge of the screen by inserting characters.

A.2 Generating Characters in DEC Mode

This section tells you how to produce the characters available in DEC mode. We describe the character sets potentially available, how configuration settings affect which characters of those sets are available at your keyboard, specifying the character sets you want to be able to access, and selecting one set of characters to output to your screen at any given time.

How Configuration Values Affect Characters Sets

Emulation
The options for the Global Configuration menu's emulation field are HP, VT100, and VT52. For the purposes of this section the VT100 and VT52 options are the same and will be called "DEC mode".

It is not possible to change the emulation to gain access to characters unique to the other mode as such changes clear display memory.

Data Bits
DEC mode requires 7-bit characters. You can access Roman 8 characters, the UK character set, and the ANSI Line Drawing Set.

Keyboards
DEC mode allows you to select only a USASCII keyboard.

Specifying the Character Sets

At any given time, the HP 3082 can produce either of two character sets, the *base set* or the *alternate set*. The base character set is defined as the character set produced at the keyboard after you power-on the terminal or after you send it a shift-out control code. The alternate character set is defined as the character set produced after you send the terminal a shift-in control code.

Both the base set and the alternate set can be specified (although the base set will always be Roman 8 and the alternate set will always be the ANSI line drawing set after a power-on or hard reset).

Base Set To change the base character set, you must use an escape sequence:

Specifying the Base Set in DEC Mode	
To specify:	Use:
the UK set	E_c(A
the Roman 8 set	E_c(B
the ANSI line drawing set	E_c(0

The UK character set differs from the USACII character set only in that the USASCII character "#" is exchanged with the UK character "£".

Alternate Set To be able to select the alternate character set, you must use an escape sequence to specify the character set you want to make available:

Specifying the Alternate Set in DEC Mode	
To specify:	Use:
the UK set	E_c)A
the Roman 8 set	E_c)B
the ANSI line drawing set	E_c)0

Selecting Character Sets

Assume you specified Roman 8 as the base set and at this moment the base set is selected at the terminal. If you want to display characters from the alternate character set, you must use a shift-out (S_o) code; control-N. To return to the base set, use a shift-in (S_i) code; control-O. Note that when an enhanced video field or the end of the line is encountered in HP mode, you return automatically to the base set. In DEC mode the alternate set remains in use until you send an S_i code or perform a hard reset.

If you use a S_i code while in the base set or a S_o code while in the alternate set, the active character set is not affected, but the invisible control characters are inserted into the line. This can have two unforeseen consequences. Consider the case where you have 80 characters on a line and at columns 1 and 40 there are S_o codes. The first S_o code defines the subsequent characters to be from the alternate set and the second S_o code appears to have no affect. Should you later put an S_i

code between columns 1 and 40, say at column 35, the previously placed S₀ code will reset the line to the alternate set for columns 40 to 80. Now, having just placed the Sᵢ code at column 35, should you attempt to remove the S₀ code at column 40 by using the delete character key, the alternate characters move to the left, so you see that the S₀ code is changing position. However, when the S₀ code reaches column 35 it is not deleted. Instead, it appears to "jump over" the cursor and it overwrites the Sᵢ code.

A shift-in or shift-out code, once created, can be moved by inserting or deleting characters, or overwritten with the other shift code. To destroy a shift code, you must either delete the entire line or push the unwanted shift code off the edge of the screen by inserting characters.

B

Character Tables

Table 1: Roman 8 Characters USASCII Set (DEC Mode, and 7-bit Operation in HP Mode)									
Hex	left digit	0	1	2	3	4	5	6	7
right digit	Decimal col + row	0 +	16 +	32 +	48 +	64 +	80 +	96 +	112 +
0	0	NUL	DLE*	SP	0	@	P	`	p
1	1	SOH*	DC1	!	1	A	Q	a	q
2	2	STX*	DC2*	"	2	B	R	b	r
3	3	ETX*	DC3	#	3	C	S	c	s
4	4	EOT*	DC4*	$	4	D	T	d	t
5	5	ENQ	NAK*	%	5	E	U	e	u
6	6	ACK*	SYN*	&	6	F	V	f	v
7	7	BEL	ETB*	'	7	G	W	g	w
8	8	BS	CAN	(	8	H	X	h	x
9	9	HT	EM*	)	9	I	Y	i	y
A	10	LF	SUB	*	:	J	Z	j	z
B	11	VT	ESC	+	;	K	[	k	{
C	12	FF	FS*	,	<	L	\	l	|
D	13	CR	GS*	-	=	M	]	m	}
E	14	SO	RS*	.	>	N	^	n	~
F	15	SI	US*	/	?	O	_	o	DEL

The control codes marked with a * are ignored if received in DEC Mode.

Hex	left digit	8	9	A	B	C	D	E	F
right digit	Decimal col + row	128 +	144 +	160 +	176 +	192 +	208 +	224 +	240 +
0	0				—	å	Å	Á	Þ
1	1			À		ê	î	Ã	þ
2	2			Â		ô	Ø	å	
3	3			È	°	û	Æ	Ð	
4	4			Ê	Ç	á	å	đ	
5	5			Ë	ç	é	í	Í	
6	6			Î	Ñ	ó	ø	Ì	—
7	7			Ï	ñ	ú	æ	Ó	‡
8	8			´	¡	à	Ä	Ò	‡
9	9			`	¿	è	ì	Õ	▪
A	10			^	¤	ò	Ö	õ	Ω
B	11			¨	£	ù	Ü	Š	«
C	12			~	¥	ä	É	š	■
D	13			Ù	§	ë	ï	Ú	»
E	14			Û	ƒ	ö	ß	Ÿ	±
F	15			£	¢	ü	Ô	ÿ	

Table 2: Roman 8 Characters
Roman Extension Set (8-bit Operation in HP Mode)

The HP 2392 does not display the characters in the last two columns of this table, although they are stored in memory. The HP 3082 stores and displays the characters.

Table 3: HP Line Drawing Characters									
Hex	left digit	0	1	2	3	4	5	6	7
right digit	Decimal col + row	0 +	16 +	32 +	48 +	64 +	80 +	96 +	112 +
0	0	NUL	DLE	SP	0	@	P	`	p
1	1	SOH	DC1	!	1	A	Q	a	q
2	2	STX	DC2	"	2	B	R	b	r
3	3	ETX	DC3	#	3	C	S	c	s
4	4	EOT	DC4	$	4	D	T	d	t
5	5	ENQ	NAK	%	5	E	U	e	u
6	6	ACK	SYN	&	6	F	V	f	v
7	7	BEL	ETB	'	7	G	W	g	w
8	8	BS	CAN	(	8	H	X	h	x
9	9	HT	EM	)	9	I	Y	i	y
A	10	LF	SUB	*	:	J	Z	j	z
B	11	VT	ESC	+	;	K	[	k	{
C	12	FF	FS	,	<	L	\	l	|
D	13	CR	GS	-	=	M	]	m	}
E	14	SO	RS	.	>	N	^	n	~
F	15	SI	US	/	?	O	_	o	DEL

The HP Line Drawing Set is shown mapped to a USASCII keyboard in Exhibit _____

To map this set to a National keyboard, use Table 7 to see which USASCII characters are replaced with national characters. (In 8-bit operation some of these characters must be accessed by pressing the extend character key.)

The mapping is described under National Keyboards, below.

Table 4: DEC Line Drawing Characters									
Hex	left digit	0	1	2	3	4	5	6	7
	Decimal	0	16	32	48	64	80	96	112
right digit	col + row	+	+	+	+	+	+	+	+
0	0	NUL		SP	0	@	P		
1	1		DC1	!	1	A	Q		
2	2			"	2	B	R	H_T	
3	3		DC3	#	3	C	S	F_F	
4	4			$	4	D	T	C_R	
5	5	ENQ		%	5	E	U	L_F	
6	6			&	6	F	V		
7	7	BEL		'	7	G	W		
8	8	BS	CAN	(	8	H	X	N_L	
9	9	HT		)	9	I	Y	V_T	
A	10	LF	SUB	*	:	J	Z		
B	11	VT	ESC	+	;	K	[		
C	12	FF		,	<	L	\		
D	13	CR		-	=	M	]		
E	14	SO		.	>	N	^		
F	15	SI		/	?	O			DEL

The DEC Line Drawing Set requires the keyboard to be set to USASCII. DEC environments use 7-bit operation.

Table 5: ISA Characters									
Hex	left digit	0	1	2	3	4	5	6	7
right digit	Decimal col + row	0 +	16 +	32 +	48 +	64 +	80 +	96 +	112 +
0	0	NUL	DLE	SP	0	@	P	`	p
1	1	SOH	DC1	!	1	A	Q	a	q
2	2	STX	DC2	"	2	B	R	b	r
3	3	ETX	DC3	#	3	C	S	c	s
4	4	EOT	DC4	$	4	D	T	d	t
5	5	ENQ	NAK	%	5	E	U	e	u
6	6	ACK	SYN	&	6	F	V	f	v
7	7	BEL	ETB	'	7	G	W	g	w
8	8	BS	CAN	(	8	H	X	h	x
9	9	HT	EM	)	9	I	Y	i	y
A	10	LF	SUB	*	:	J	Z	j	z
B	11	VT	ESC	+	;	K	[	k	{
C	12	FF	FS	,	<	L	\	l	|
D	13	CR	GS	-	=	M	]	m	}
E	14	SO	RS	.	>	N	^	n	~
F	15	SI	US	/	?	O	_	o	DEL

ISA Characters always map to the keyboard in the same fashion, regardless of the emulation mode, keyboard setting, or the number of data bits being employed. See Keyboard ISA.

Table 6: HP 3082 Special Character Set									
Hex	left digit	0	1	2	3	4	5	6	7
right digit	Decimal col + row	0 +	16 +	32 +	48 +	64 +	80 +	96 +	112 +
0	0	NUL	DLE	SP	0	@	P	'	p
1	1	SOH	DC1	!	1	A	Q	a	q
2	2	STX	DC2	"	2	B	R	b	r
3	3	ETX	DC3	#	3	C	S	c	s
4	4	EOT	DC4	$	4	D	T	d	t
5	5	ENQ	NAK	%	5	E	U	e	u
6	6	ACK	SYN	&	6	F	V	f	v
7	7	BEL	ETB	'	7	G	W	g	w
8	8	BS	CAN	(	8	H	X	h	x
9	9	HT	EM	)	9	I	Y	i	y
A	10	LF	SUB	*	:	J	Z	j	z
B	11	VT	ESC	+	;	K	[	k	{
C	12	FF	FS	,	<	L	\	l	|
D	13	CR	GS	-	=	M	]	m	}
E	14	SO	RS	.	>	N	^	n	~
F	15	SI	US	/	?	O	_	o	DEL

HP 3082 Special Characters always map to the keyboard in the same fashion, regardless of the emulation mode, keyboard setting, or the number of data bits being employed. See Keyboard HP 3082 Special.

Table 7:
USASCII Characters Replaced by National Characters In HP Mode

Keyboard	Characters													
USASCII	#	'	<	>	@	[	\	]	^	`	{			}	~
Danish	§	´	<	>	@	Æ	Ø	Å	^	`	æ	ø	å	¨
Dutch	#	'	<	>	@	ç	\	§	^	`	ƒ			´	¨
Finnish	#	'	<	>	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Flemmish and French	£	'	<	>	à	°	ç	§	^†	'	é	ù	è	¨†
English Canadian and French Canadian	#	'	<	>	@	[	ç	]	^	`	é	Ç	É	¨
Swiss French/German	£	'	é	è	à	°	ç	§	^	`	ä	ö	ü	¨
German	£	'	<	>	§	Ä	Ö	Ü	^	'	ä	ö	ü	ß
Italian	£	'	<	>	§	°	ç	é	^	ù	ù	à	è	ì
Norwegian	#	´	<	>	@	Æ	Ø	Å	^	`	æ	ø	å	¨
European Spanish	#	´†	<	>	@	¡	Ñ	¿	°	`†	'	ñ	ç	¨†
Latin Spanish	#	´†	<	>	@	¡	Ñ	¿	^	`†	'	ñ	ç	¨†
Swedish	#	'	<	>	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
U.K.	£	'	<	>	@	[	\	]	^	'	{			}	~
Line Drawing														

Characters marked with a † are diacritical marks in 7-bit operation.
See Table 8 for the diacritical marks available in 8-bit operation.

| Table 8: Diacritical Marks Available in 8-bit Operation ||
Keyboard	Diacritical Marks
USASCII	
Danish	´ ` ¨
Dutch	´ ^ ` ¨
Finnish	
Flemmish and French	^ ¨
English/French Canadian	^ ` ¨
Swiss French/German	^ ` ¨
German	
Italian	^
Norwegian	´ ` ¨
European Spanish	´ ` ¨
Latin Spanish	´ ¨
Swedish	
U.K.	
[Extend Char] Key	´ ^ ` ¨ ~

Appendix C Softkey Maps for System Softkeys

In exhibits C.1 through C.4, an asterisk (*) means that an asterisk appears on the softkey in question when it is engaged.

On any enhance video menu, the [Save Enhance] and [exit] keys return you to the menu from which the enhance video menu was selected.

Exhibit C.1. Softkey menus accessed directly from System Menu

modes	Line Modify*	Modify All*	Block Mode*	Remote Mode*	enhance video	Memory Lock*	Display Functns*	Auto LF *
System Menu	device control	margins/ tabs/col	service keys	modes		editors	user keys	config keys
device control	device modes		Advance Line	Advance Page	Copy All	Copy Page	Copy Line	exit
device modes	device control		Log Top*	Log Bottom*	Record Mode*		Send Touch*	exit
margins/ tabs/col	Start Column	Set Tab	Clear Tab	Clear All Tabs	Left Margin	Right Margin	Clear Margins	Display Ruler*
service keys	Start Tests		Previous Choice	Next Choice	Reset Tests	Print Errors*		exit
editors	forms editor	fields editor	graphics editor	touch editor	enhance video			exit
user keys	f1	f2	f3	f4	f5	f6	f7	f8
config keys	global config	terminal config	host prt config	aux port config	barcode config	user key config		exit
enhance video	Save Enhance	Blinking *	Undrline *	Inverse *	Security *	Char Size	Char Set	exit

Except on the enhance video menu, all [exit] keys return you to the System Menu.

To access the System Menu from menus that have no [exit] key, press (f) on the keypad or (System) on the external keyboard.

Exhibit C.2. Forms and Fields Editor Menus

System Menu	device control	margins/ tabs/col	service keys	modes		editors	user keys	config keys
editors	forms editor	fields editor	graphics editor	touch editor	enhance video			exit

Forms Editor

Box mode (1)	Drawing Mode		Line Type	First Corner	enhance video	Undo Last	fields editor	exit
Box mode (2)	Drawing Mode	Operat'n	Line Type	Anchor Box	enhance video	Undo Last	Fill Box*	exit
Line mode	Drawing Mode	Line Orient'n	Line Type	Anchor Line	enhance video	Undo Last	fields editor	exit
Segment mode	Drawing Mode	Line Orient'n	Line Type	Anchor Segment	enhance video	Undo Last	fields editor	exit
Cursor mode (1)	Drawing Mode	Line Orient'n	Line Type	From Cursor	enhance video	Undo Last	fields editor	exit
Cursor mode (2)	Drawing Mode	Line Orient'n	Line Type	To Cursor	enhance video	Undo Last		exit
enhance video	Save Enhance	Blinking *	Undrline *	Inverse *				exit

Fields Editor

Segment mode	Drawing Mode	Bracket Field*		Anchor Field	enhance video	Undo Last	forms editor	exit
Cursor mode (1)	Drawing Mode	Bracket Field*		From Cursor	enhance video	Undo Last	forms editor	exit
Cursor mode (2)	Drawing Mode	Bracket Field*		To Cursor	enhance video	Undo Last		exit
enhance video	Save Enhance	Blinking *	Undrline *	Inverse *	Security *			exit

* Keys marked [forms editor] or [fields editor] always take you to whichever mode of that editor was in use last.

Exhibit C.3 Touch Editor Menus

Menu								
System Menu	device control	margins/ tabs/col	service keys	modes		editors	user keys	config keys
editors	forms editor	fields editor	graphics editor	touch editor	enhance video			exit
touch editor	create target	copy target	edit target		target operat'n	Undo Last		exit
create target	target operat'n	Operat'n	Border Type	Anchor Target	enhance video	Undo Last	Inverted Area	exit
target operat'n	Report Dest'n	Trigger Type	Feedback Beep*					exit
target operat'n	Report Dest'n	Trigger Type	Feedback Beep*	edit report				exit
edit report	Save Changes			Default Values		ESC	Display Functns*	exit
enhance video	Save Enhance	Blinking *	Undrline *	Inverse *				exit

Exhibit C.4 Graphics Editor Menus

System Menu	device control	margins/ tabs/col	service keys	modes		editors	user keys	config keys
editors	forms editor	fields editor	graphics editor	touch editor	enhance video			exit
graphics editor	select area	select char		Paste	enhance video	Undo Last		exit
select area	Backgrnd	Operat'n	Cut Area	Copy Area				exit
select char				select char	enhance video			exit
enhance video	Save Enhance	Blinking *	Undrline *	Inverse *		Char Size	Char Set	exit

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