MODEL 20 DHP OPERATORS MANUAL

TELERAY

Division of RESEARCH, INC.

MODEL 20 DHP
OPERATORS
MANUAL

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The following notice is provided in accordance with the United States Federal Communications Commission's (FCC) regulations.

WARNING:

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

NOTICE:

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

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REVISION HISTORY

SYS	ECO NO.	DESCRIPTION	DRAFT	CHKR	ENG.	DATE
A	------	Initial release				2/86
B	5557	Addition to "How To" section				3/87
C	5660	Add Caution note before section 1-2				6/87
D	6306	Add Notice to title page	DA		DA	1/89

SCOPE

The intent of this manual is to provide enough information to enable the operator to unpack, connect, and operate the Teleray Model 20-DHP.

TABLE OF CONTENTS

SECTION 1 INTRODUCING THE MODEL 20DHP

Most Teleray Model 20DHP's are shipped in a box like the one in Figure 1-1. The terminal is shown in Figure 1-2.

Figure 1-1

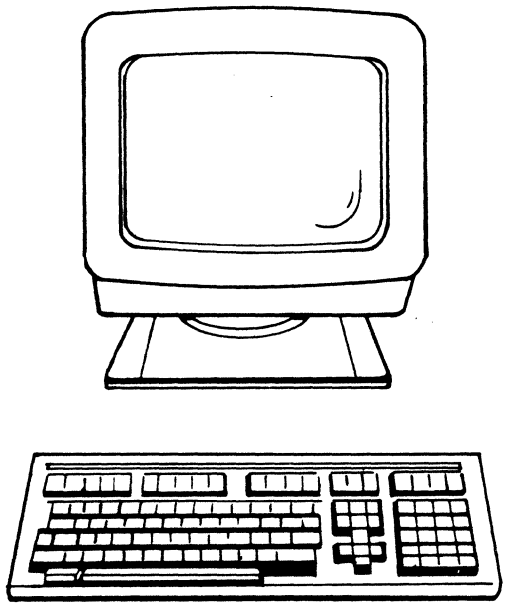


Figure 1-2

Report any shipping damage to the carrier. If this doesn't provide satisfactory results contact either your local Teleray sales organization or Teleray Field Service.

Every Teleray Model 20DHP should come with at least 5 items.

1) Model 20DHP Operators Manual
2) Keyboard
3) Keyboard Overlay
4) Terminal
5) Power Cord

If there are any items missing or not to your satisfaction please inform your Teleray contact. Teleray wants you to be satisfied with our product.

In order to continually improve Teleray quality, we need your feedback. It will benefit both you and Teleray if you return the enclosed response card.

1-1 First Power-up

The first two things that should be done are to connect the power cord and the keyboard to the terminal. This is illustrated in Figure 1-3.

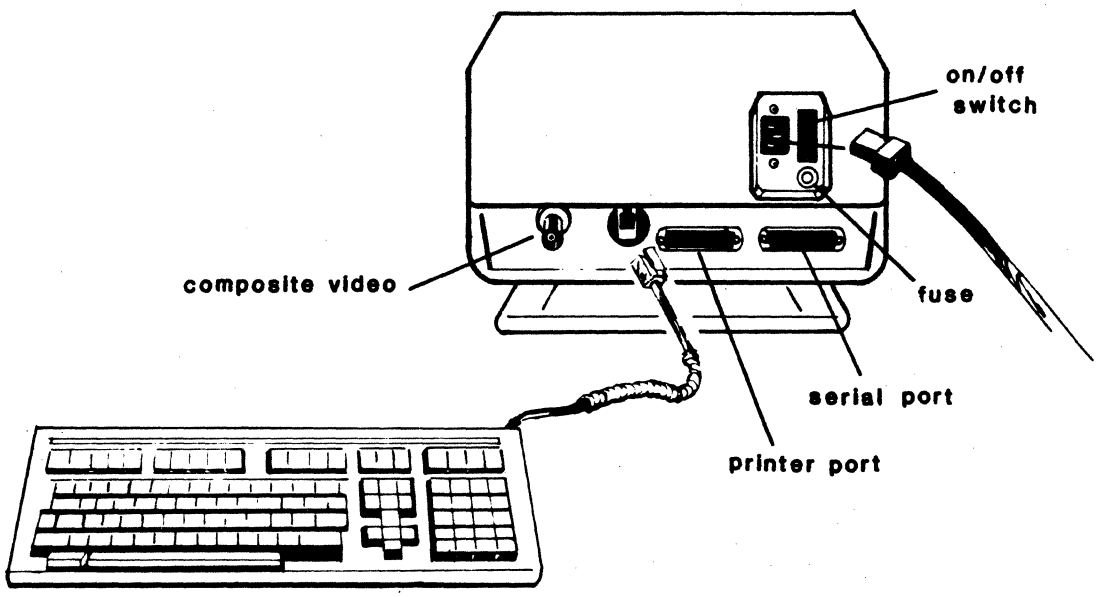


Figure 1-3

As the cord is plugged in, notice the operating voltage for the terminal. If a 115 volt unit is plugged into 230 volts, the terminal will be damaged. The next step is to plug in the terminal and turn it on. The on/off switch is located next to where the power cord was plugged into the terminal.

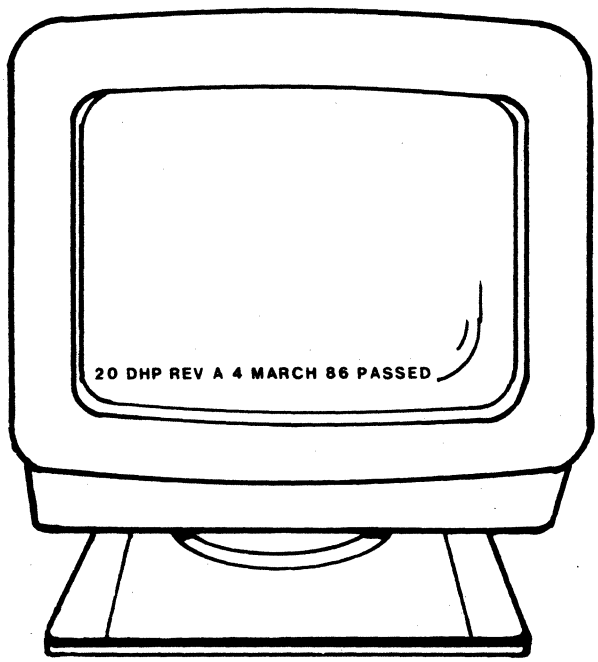


Figure 1-4

After the power is connected it takes a few seconds for the terminal to display the self test message shown in Figure 1-4. If the status line indicates a failure, make a note of the failure type and contact your Teleray service person. **(Teleray hotline 1-800-328-6397).**

CAUTION HIGH VOLTAGE

To prevent dangerous electrical shock, unplug power before removing any cabinet parts. Do not operate with cabinet parts removed. Service should be performed under the direction of qualified authorized service personnel.

1-2 Computer Hook-up

The Model 20DHP is designed to operate with a Hewlett-Packard, DEC or ANSI host computer.

In order to operate the Teleray with a computer, the terminal must be set up. All of the settings for the terminal are changed in an easy-to-use Menu.

The terminal defaults with some common terminal settings, but there are a few settings which should be checked before going "On-line". Some of these settings are: baud rate (speed), parity, and XON/XOFF. These settings should be set the same as the computer for proper communication. Incorrect speed will cause no communication and incorrect parity will cause ?? to display on the screen. Below are listed some of the common parameters that may need to be changed and what their default values are. For information on communication configurations, see Appendix E.

PARAMETER	DEFAULT VALUE	USER SETTING
GENERAL MENU		
TermMode	H2392A	_____
SERIAL COMM MENU		
BaudRate	9600	_____
Parity/Data Bits	0's / 7	_____
XmitPace	None	_____
RecvPace	None	_____
Enq/Ack	Yes	_____
TERMINAL CONFIGURATION MENU		
InhHdShk	No	_____
InhDC2	No	_____

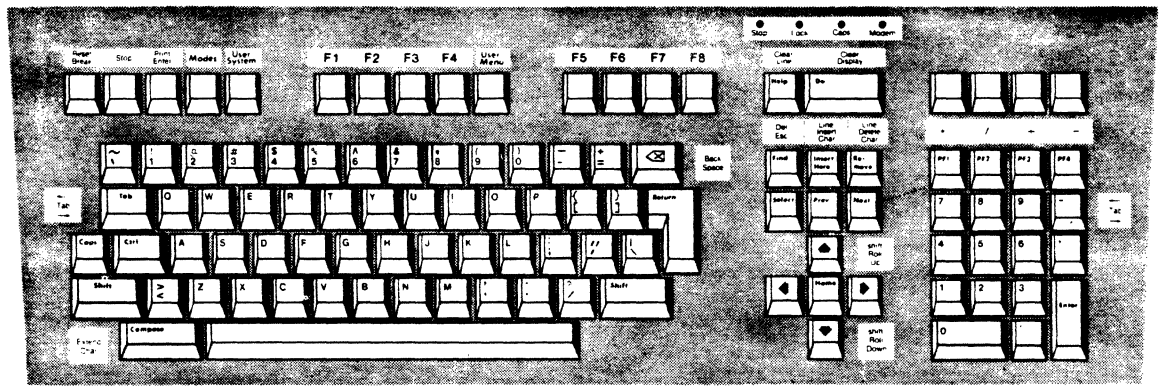
SECTION 2 GENERAL OVERVIEW

2-1 KEYBOARD

General Information

The keyboard is detachable from the terminal for operator comfort and optimal space utilization. The keytops are sculptured with a dimpled (HOME) key in the cursor control pad and "locator bars on the" (F) and (J) keys. The Teleray 20DHP keyboard has four LED indicators: they are used to indicate the terminal status and to alert the operator of application dependent conditions.

The figure below shows the keyboard.



The top row of the keyboard has 8 keys labeled f1-f8. The operation of these keys changes dramatically while the terminal is being used. In either ANSI or HP mode, the operation of the function key is displayed in a corresponding label on the bottom of the CRT screen.

If the labels are not displayed on the bottom of the screen, the operation of the key is described by the OPERATOR MODE DEFAULT TABLE. (i.e., the key has a particular function in ANSI mode that is different in HP mode)

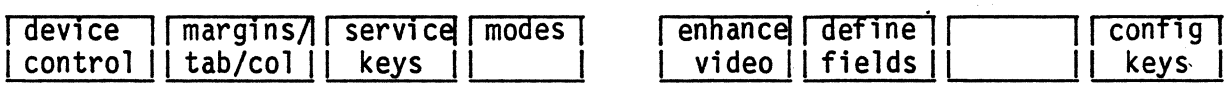
Keyboard mode changes are indicated on a multi-color overlay. One overlay contains all ANSI and HP keycap locations.

HP operations on the overlay are in red. ANSI operations are in gray. Menu handling key operations are in black.

2-2 USER SYSTEM KEYS

When you press the (USER SYSTEM) key, the eight function keys become general control keys. Thru the function keys an operator can configure the terminal, enable and disable display attributes, define qualified areas (HP only), set and clear margins and tabs, etc.

The entire system of function key labels are accessible after pressing the USER SYSTEM key as shown below.



THE USER SYSTEM FUNCTION KEYS ARE BASED ON THE FOLLOWING TWO RULES:

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1. If a key label contains lowercase letters, pressing it will transfer the operator to another level of system function keys.

   Example: pressing "device control" (f1) will cause the screen to display more labels.

2. If a key label contains only uppercase letters, pressing it will perform the operation described in the label.

   Example: pressing "COPY PAGE" (f7) will cause the page to be printed (transmitted out the printer port).

2-3 MODES KEY

When you press the (Modes) key, the 8 function keys become mode selection keys (notice that they are all in upper case). Each mode selection key alternately enables and disables a particular mode. If the mode described in the corresponding label is enabled, an asterisk appears in the lower right corner of the label. If the mode is disabled, the asterisk disappears.

When the (Modes) key is pressed, the following selections appear on the MODES line.

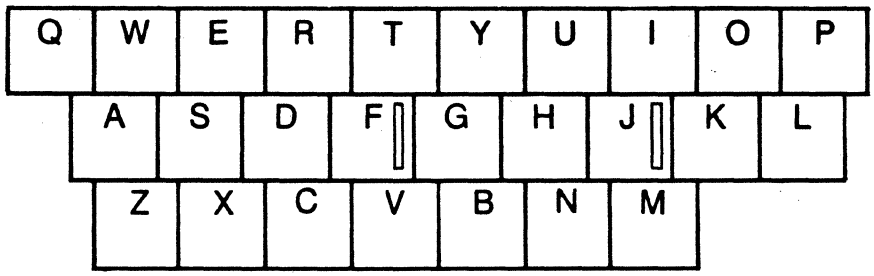
If the terminal is in ANSI mode, this line appears:

If the terminal is in HP mode, this line appears:

For definitions of the (Mode) key selections, see appendix B - Function Key Operations.

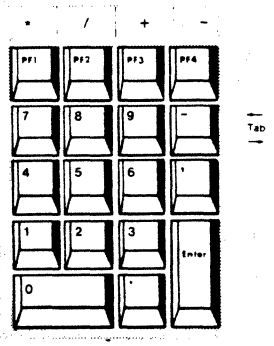
2-4 CHARACTER SET GROUP

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



2-5 NUMERIC GROUP

The numeric keys at the right of the keyboard act in the same way as the keys in the alphanumeric group. These keys are arranged to make it easy to enter numeric data and use tabs.

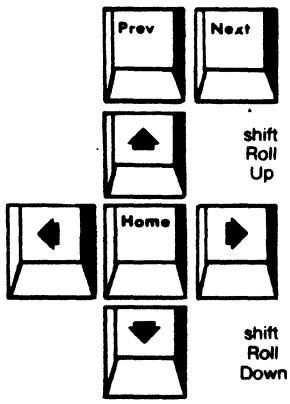


In addition to the numeric keys, when the operator is in HP mode the (-) key performs a tab. Unshifted, the (-) key is a forward tab. Shifted, the (-) key is a back tab.

If the field Enter=Return (found in the Keyboard Menu) is set to YES, the (Enter) key will execute a carriage return while in character mode. In block mode, the (Enter) key operation is uneffected, the (Enter) key executes a block transfer.

2-6 DISPLAY GROUP - HP MODE ONLY

The display group consists of the following keys:



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

The terminal can store more characters than can be displayed on the screen. The screen is used to look at one block or "page" of these characters. Each page is made up of 24 lines.

When the screen has been filled (24 lines of data have been entered), the top line rolls off the screen. As you type each line the display will roll up to make room for the new line. This continues until the memory is filled. At this point if you enter another line, one line will be lost to make room for the new line. Memory lock and edit mode operations (described later) will prevent lines of information from being lost.

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

ROLL DOWN

To activate this key, hold down the (Shift) key and press the cursor down key. This scrolls the contents of memory down one line each time the key is pressed. If the key is held down (with keyboard repeat on), the contents of memory are scrolled down until either the key is released or the first row of memory is displayed as the first row on the screen.

ROLL UP — To activate this key, hold down the (Shift) key and press the cursor up key. This scrolls the contents of memory up one line each time the key is pressed. If the key is held down (with keyboard repeat on), the contents of memory are scrolled up until either the key is released or the last row of memory is displayed as the first row on the screen.

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

NEXT — Moves the display 24 lines (a whole screen) forward in memory. The information presently displayed is replaced with the next 24 lines.

PREV — Moves the display 24 lines (a whole screen) backward in memory. The information presently displayed is replaced with the previous 24 lines.

HOME — HOME CURSOR - The cursor is moved to the left margin of the first row of memory. If this position is not displayed when the key is pressed, the screen is rolled to display it.

SHIFT HOME — The cursor is moved to the left margin of the first row following the last used row in memory. If all rows in memory are used, the first row in memory will be deleted to create a blank row at the end of memory to which the cursor will be moved. If this position is not displayed when the key is pressed, the display is scrolled up until the cursor line is displayed.

CURSOR UP — Moves the cursor up one row each time the key is pressed. If the key is held down (with keyboard repeat on), the cursor moves up until either the key is released or it reaches the top row of the screen. If the key is held down after the cursor reaches the first row of the screen, the cursor moves to the last row of the screen and the process is repeated.

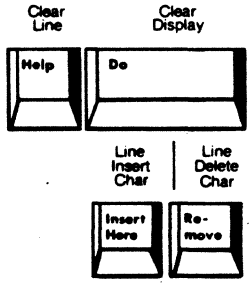
CURSOR DOWN — Moves the cursor down one row each time the key is pressed. If the key is held down (with keyboard repeat on), the cursor moves down until either the key is released or the last row is reached. If the key is held down after the last row is reached, the cursor moves to the top row of the screen and the process is repeated.

CURSOR LEFT — Moves the cursor left one column each time the key is pressed. If the key is held down (with keyboard repeat on), the cursor moves left until either the key is released or the first column of the screen is reached. If the key is held down after the cursor reaches the first column of the screen, the cursor moves to the last column of the preceeding row. If the key is held down when the cursor reaches the first column of the first row, the cursor moves to the last column of the last row and the process is repeated.

CURSOR RIGHT — Moves the cursor right one column each time the key is pressed. If the key is held down (with keyboard repeat on), the cursor moves right until either the key is released or the last column of the screen is reached. If the key is held down after the cursor reaches the last column of the screen, the cursor moves to the first column of the following row. If the key is held down when the cursor reaches the last column of the last row, the cursor moves to the first column of the first row and the process is repeated.

2-7 THE EDIT GROUP - HP MODE ONLY

The Edit Group consists of the following keys:



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

CLEAR LINE — Clears the line from the cursor to the end of the line.

CLEAR DISPLAY — Clears all display memory from the cursor position to the end of memory.

INSERT CHAR — Inserts characters into a line without overwriting existing characters. When you press the key, an IC (Insert Character) appears in the status line, indicating insert character mode is active. To deactivate the mode, press the (INS CHAR) key a second time.

Characters are inserted at the cursor position. The existing characters are shifted right one character position for each character entered. Characters shifted past the right margin are lost.

INSERT LINE — By holding down the shift key and pressing the (INS LINE) key a blank line is inserted preceeding the one in which the cursor is located. The line in which the cursor is located and subsequent lines are pushed down one line and the cursor is moved to the left margin of the blank line.

DELETE LINE — By holding down the shift key and pressing the (DEL LINE) key the line on which the cursor is located is deleted. Subsequent lines are scrolled up to take its place and the cursor is moved to the left margin.

DELETE CHAR — Deletes the character at the cursor position. Press down the (DEL CHAR) key; characters to the right of the deleted character (up to the right margin) will be shifted left one character position for each character deleted.

2-8 TERMINAL CONTROL GROUP

The Terminal Control Group keys, which consists of the "RESET" and "BREAK" keys, are located in the upper left corner of the keyboard. These keys are used to reset the terminal and temporarily interrupt datacomm operations.

RESET Pressing the shifted (RESET) key once results in a "soft reset" which unlocks the keyboard, clears any messages, turns off DISPLAY FUNCTIONS, stops printer operations and datacomm transfers, reinitializes both datacomm channels to the configuration parameters stored in nonvolatile memory, and rings the keyboard bell.

Pressing the (Shift), (Shift) and (RESET) key simultaneously produces a "hard reset". This causes the terminal to be set to the initial power on state, and the keyboard bell to be rung.

BREAK The (BREAK) key can be used to interrupt the operation of the terminal's datacomm function.

SECTION 3 HOW TO...

3-1 HOW TO GET STARTED

1. Follow the installation procedures outlined in section 1-1 [First Power-up].

2. Connect the communications cable to the serial port. The minimum cable configuration for the Teleray 20-DHP is 3 wires; pins 2, 3 and 7. See appendix E [Communications Connections] for additional information.

3. Press the (Modes) key to display the modes function labels. Make sure there is an * in the block labelled REMOTE MODE. If there is not, press (f4).

4. At this point, the Teleray 20-DHP is ready to go on-line with the host. If pressing the (Return) key does not display the proper prompt, continue to step 5.

5. Configure the serial communications port for host baud rate, parity/data bits, stop bits, and flow control (XON/XOF, ENQ/ACK). See section 3-3 [How to configure a menu].

3-2 HOW TO USE THE FUNCTION KEYS

The function keys are the eight keys (labelled f1-f8) located across the top of the keyboard. These keys perform the functions indicated by screen labels assigned to each key.

The screen labels are displayed in inverse video across the bottom rows of the display screen (rows 25 and 26).

The label on the bottom left of the screen is associated with function key number 1. The next label is associated with function key number 2, and so on.

By pressing a function key, the operation described by the associated label will be executed.

Examples:

After depressing the (Modes) key; the label associated with (f5) is [SMOOTH SCROLL]. Pressing (f5) will alternately enable and disable smooth scroll.

After depressing the (User System) key; the label associated with (f1) is [device control]. Pressing (f1) will display the DEVICE CONTROL set of function labels.

3-3 HOW TO CONFIGURE A MENU

To display a menu, perform the following procedures:

1. Press the (User System) key to display the user system function labels.

2. Press the (f8) function key to display the Configuration set of function key labels.

3. Press the function key of your choice; the appropriate menu will be displayed with the current operating values.

   example: press (f3) to display the serial datacomm port menu.

To configure the displayed menu:

1. Place the cursor at the character position to be changed. This can be done using either the cursor control keys or the tab key (located to the left of the alphanumeric keys).

2. If the choices are system-defined from a list, use the (NEXT CHOICE) or (PREVIOUS CHOICE) to cycle through the list of selections.

   If the choices are changed through the keyboard entered values, press the (NEXT CHOICE) key to allow keyboard input into entry field. Use the cursor left key to backup if an error is made. To exit and save the entry field, press the (NEXT CHOICE) key.

3. To exit the menu, press the (EXIT) function key. If you want the menu setting saved, see the following section [How to save the menu settings] before exiting.

3.4 HOW TO SAVE THE MENU SETTINGS

All of the menu features can be saved in non-volatile memory. To save the menu features:

1. Press (Shift) (Modes), this will re-display the last feature selected in the last menu. This step may be skipped if you did not (exit) the menu in step 3 above.

2. Press (f1) to change the MENU FUNCTION KEY LABELS to the MENU DEFAULT LABELS.

3. Press (f6) to save the current settings of ALL of the menus for the current operating mode (HP or ANSI). When all of the settings are saved, the menu will prompt "Your selection has been processed."

4. Press (f8) to exit menu.

3-5 HOW TO USE FEATURE LOCK

Because the 20-DHP has so many more options and menus than the HP 2392A or DEC VT220, Teleray has added FEATURE LOCK. If the operator has any fields that will never be changed in his applications, by using FEATURE LOCK, the operator can "lock out" any attempts to change this through the menu. A locked feature will blink in the menu, and using the (NEXT CHOICE) or (PREVIOUS CHOICE) keys will have no effect until the feature is unlocked.

1. Press (Shift) (Modes), this will re-display the last feature selected in the last menu.

2. Press (f1) to change the MENU FUNCTION KEY LABELS to the MENU DEFAULT LABELS.

3. Go to the feature you want to "lock" using the cursor arrow or tab keys.

4. Press (f7) to lock the current feature. When locked, the feature will blink. By pressing (f7) again, the feature will unlock.

5. Press (f8) to exit menu.

3-6 HOW TO RECALL SAVED FEATURES

In the event that the terminal was re-configured for a temporary application*, the user will want to take advantage of MENU RECALL to restore previous parameters.

1. Press (Shift) (Modes), this will re-display the last feature selected in the last menu.

2. Press (f1) to change the MENU FUNCTION KEY LABELS TO THE MENU DEFAULT LABELS.

3. Press (f5) to recall the current settings of ALL of the menus for the current operating mode (HP or ANSI). When all of the settings have been recalled, the menu will prompt "Your selection has been processed."

4. Press (f8) to exit menu.

* (i.e., the new selections were not "saved" with MENU SAVE)

3-7 HOW TO RESET THE SERIAL AND PRINTER PORTS

If the terminal is suspended by the host, or in the middle of a host initiated "transparent" print, the user may need to clear the ports before resuming normal operation.

1. Press (Shift) (Modes), this will re-display the last feature selected in the last menu.

2. Press (f1) to change the MENU FUNCTION KEY LABELS to the MENU DEFAULT LABELS.

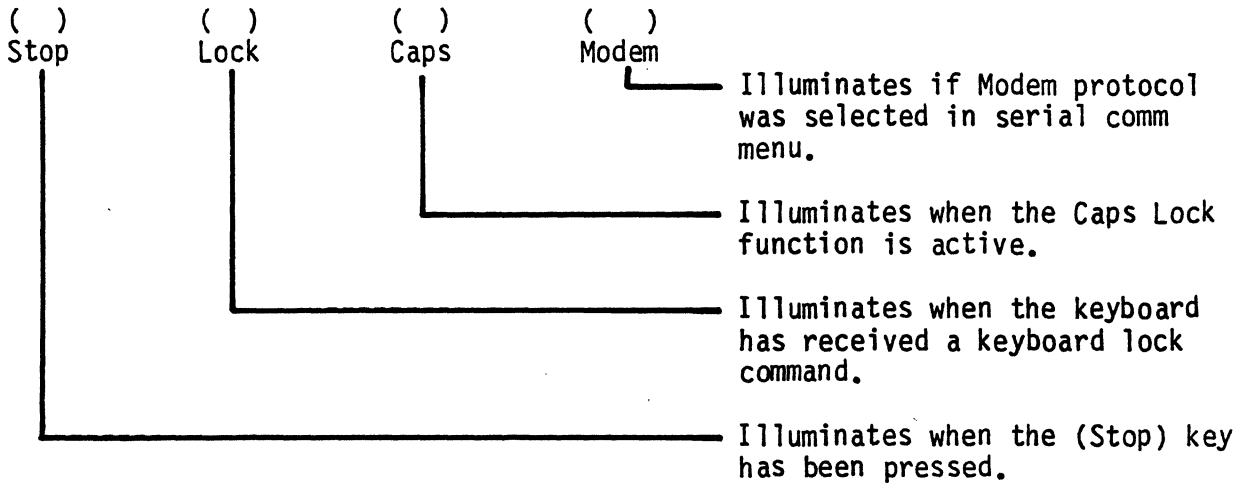
3. Press (f3) to clear the communication ports. When this is accomplished the menu will prompt "Your selection has been processed."

4. Press (f8) to exit menu.

3-8 HOW TO READ THE KEYBOARD INDICATOR LIGHTS

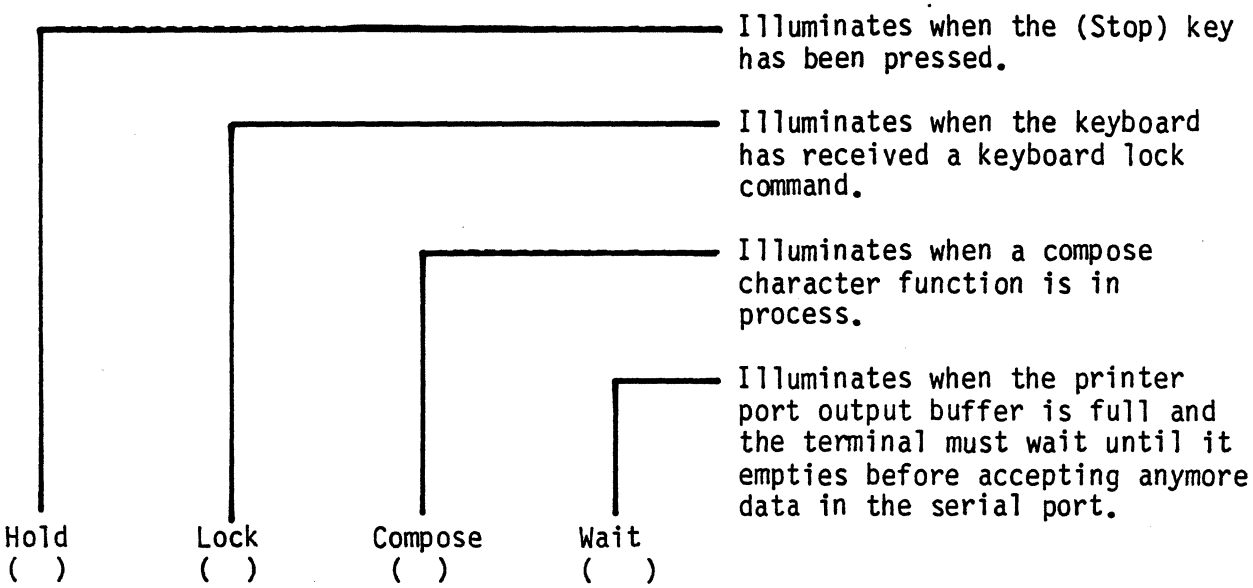
The definitions for the keyboard indicator light change with operating mode.

IN HP MODE:



IN ANSI MODE:

The indicator light name is written in GRAY on the overlay.



3-9 HOW TO USE THE TERMINAL WITH AN EXTERNAL DEVICE

The Teleray 20-DHP comes standard with a bi-directional printer port. See appendix E [Communications Connections] for information on configuring the printer port.

There are several ways to copy data to an external device.

1. PRINTS
2. DATA LOGGING
3. RECORD MODE

3-9.1 HOW TO DO PRINTS

To copy data from the display to the device:

1. Press the (User System) key. This will display the USER SYSTEM function labels.
2. Press (f1), this will display the DEVICE CONTROL function labels.
3. Using the DEVICE CONTROL labels, the operator can selectively print the display data. For DEVICE CONTROL definitions, see appendix B-3.0 [PREDEFINED FUNCTION KEY LABELS].

3-9.2 HOW TO USE DATA LOGGING

The terminal can be set to perform on-line data logging, automatically routing data, when it is received from the host, to the display, printer or both. The procedure for accomplishing this is called DATA LOGGING. There are two types of DATA LOGGING; 1) LOG TOP and 2) LOG BOTTOM.

LOG TOP

When using the LOG TOP, the top line in display memory is reouted to the destination device when it is scrolled off the top of memory by lines added to the bottom.

To enable LOG TOP:

1. Press (User System), this will display the USER SYSTEM function labels.
2. Press (f1) to change the USER SYSTEM labels to the DEVICE CONTROL labels. Make sure there is an * in the block labelled TO EXT DEV. If there is not, press (f4).
3. Press (f1) to display the DEVICE MODE function labels.
4. Press (f4) to enable LOG TOP. When enabled and * will appear in the LOG TOP label. To disable LOG TOP, press (f4) again.

LOG BOTTOM

When using LOG BOTTOM, a line in display memory is routed to the destination device when the cursor leaves the line to begin a new line.

To enable the line to begin a new line.

1. Press (User System), this will display the USER SYSTEM function labels.

2. Press (f1) to change the USER SYSTEM labels to the DEVICE CONTROL labels. Make sure there is an * in the block labelled TO EXT DEV. If there is not, press (f4).

3. Press (f1) to display the DEVICE MODE function labels.

4. Press (f3) to enable LOG BOTTOM. When enabled and * will appear in the LOG BOTTOM label. To disable LOG BOTTOM, press (f3) again.

3-9.3 HOW TO USE RECORD MODE

Record Mode is used to copy data from the host system to the external device, with or without displaying the copied data.

To copy data transparent (not displayed) from host to external device:

1. Press (User System), this will display the USER SYSTEM function labels.

2. Press (f1) to change the USER SYSTEM labels to the DEVICE CONTROL labels. Make sure there is an * in the block labelled TO EXT DEV, and there is not an * in the block labelled TO DISPLAY.

3. Press (f1) to display the DEVICE MODE function labels.

4. Press (f2) to enable RECORD MODE. When enabled an * will appear in the RECORD MODE label. To disable RECORD MODE, press (f2) again.

To copy data interpreted (displayed) from host to external device:

1. Press (User System), this will display the USER SYSTEM function labels.

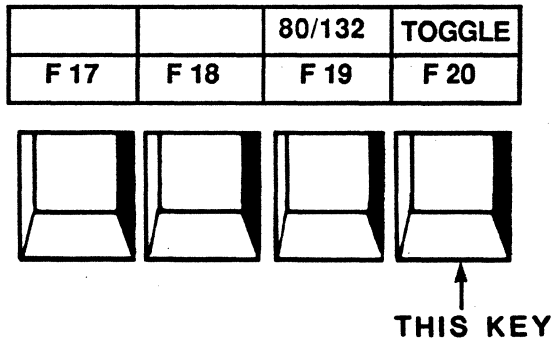
2. Press (f1) to change the USER SYSTEM labels to the DEVICE CONTROL labels. Made sure there is an * in the block labelled TO EXT DEV, and an * in the block labelled TO DISPLAY.

3. Press (f1) to display the DEVICE MODE function labels.

4. Press (f2) to enable RECORD MODE. When enabled and * will appear in the RECORD MODE label. To disable RECORD MODE, press (f2) again.

3-10 HOW TO SWITCH BETWEEN HP MODE AND DEC MODE

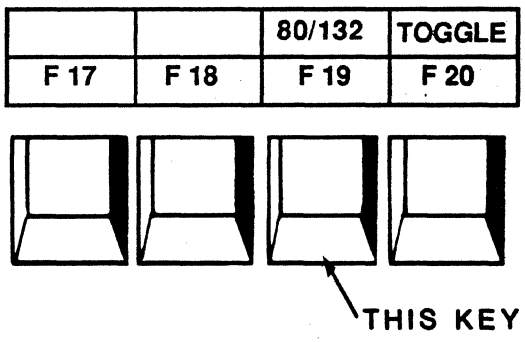
Operating mode is selectable between HP and ANSI (DEC). By default, the following shifted key will toggle between the ANSI and HP operating modes.



When the operator toggles between ANSI mode and HP mode, the menu automatically recalls the "saved" selections for the new operating mode.

3-11 HOW TO SWITCH FROM A 80 COLUMN DISPLAY TO A 132 COLUMN DISPLAY

Display mode is selectable between 80 and 132 columns. By default, the following shifted key will toggle between 80 and 132 column display modes.



When the operator toggles between 80 column mode and 132 column mode, the display is automatically reformatted and any displayed data is cleared.

3-13 HOW TO USE TYPEAHEAD

Typeahead is a feature based on the flow control of the HP system. It will not work with a DEC system.

When the HP host sends the : prompt to the terminal, it also sends a control code DC1 that is not displayed. If typeahead is enabled, whenever the terminal receives the DC1, it will transmit any queued characters up to and including the next CR (return).

As an example:

The operator has a : prompt on the screen (the terminal has received a DC1). The operator types "RUN LONGTEST(CR)". LONGTEST is a make-believe program that takes 20 minutes to run. There is no : prompt returned to the operator because the HP host is running LONGTEST.

At this point, typeahead becomes effective. The operator types RUN LONGERTEST(CR). LONGERTEST is another make-believe program. LONGERTEST takes 30 minutes to run. Nothing has been echoed to the terminal from the host. This is because the terminal has not sent the RUN LONGERTEST command to the host yet.

Approximately 20 minutes into the operators 50 minute lunch, the host completes running LONGTEST. The host sends the terminal a : prompt followed by a DC1. When the terminal receives the DC1, it checks its typeahead buffer. In the typeahead buffer it finds "RUN LONGERTEST(CR)". The terminal sends the command RUN LONGERTEST(CR) to the HP host.

To enable the TYPEAHEAD feature, set the Typeahead selection in the Keyboard Menu to ON. For help configuring menus, see section 3-3 [How to configure a menu].

NOTE:

In some instances an operator may need to temporarily disable the TYPEAHEAD feature (example: Initial system log-on through a data switch). By pressing <shift> <Reset>, the TYPEAHEAD feature is disabled until the terminal receives a DC1 from the host.

3-13 HOW TO PROGRAM A LOG-ON INTO A SCREEN LABEL

The function labels (f1-f8) can be programmed by the user. As a word of caution; most of the HP block mode applications preload the function keys. If a log-on is programmed into one of the (f1-f8) function keys, an HP block mode application may destroy them.

To program the log-on HELLO TELERAY(CR) into screen label number 3:

1. Press the (Modes) key to display the MODES function label line.

2. Press (Shift) (User Menu) to display the PROGRAM MENU.

3. Use the (NEXT CHOICE) key to change the function number to 3.

4. Use the (Tab) key to advance to the [Label Type] field.

5. Press the (PREVIOUS CHOICE) key twice, to decrement from [Label Type] = Port 1 to [Label Type] = Keyboard. The Port 1 label type should only be used by the HP host. If a log-on is defined as Port 1, the terminal will be locked in a wait state looking for HP handshaking initiated from the host when executing the function label.

6. Use the (Tab) key to advance to the [Label Contents] field.

7. Press the (NEXT CHOICE) key to open the "entry field".

8. Type "LOG-ON", followed by the (NEXT CHOICE) key to save the "entry field".

9. Use the (Tab) key to advance to the [Function Contents] field.

10. Press the (NEXT CHOICE) key to open the "entry field".

11. Type "HELLO TELERAY(CR)", followed by the (NEXT CHOICE) key to save the "entry field".

12. Press (User Menu) to exit the menu, and display the user defined function labels.

13. When the User Menu labels are displayed, pressing (f3) will transmit HELLO TELERAY(CR) to the host.

3-14 HOW TO PROGRAM AND USE FUNCTIONS 9-32 IN HP MODE

The function labels (f9-f32) can be programmed by the user. Functions 9-32 are loaded into a "volatile" memory. If the terminal is turned off, they will reinitialized as empty functions.

To program the log-on HELLO TELERAY(CR) into function number 17:

1. Press the (Modes) key to display the MODES function label line.
2. Press (Shift) (User Menu) to display the USER MENU.
3. Use the (NEXT CHOICE) key to change the function number to 17.
4. Use the (Tab) key to advance to the [Function Contents] field.
5. Press the (NEXT CHOICE) key to open the "entry field".
6. Type "HELLO TELERAY(CR)", followed by the (NEXT CHOICE) key to save the "entry field".
7. Press (User Menu) to exit the menu, and display the user defined function labels.
8. To use functions f9-f32, the function labels must be "turned off" by pressing (Shift) (User System).
9. To use function 17, press the key labelled (F17) on the upper right of the keyboard.

The location of all of the function keys in HP mode can be found in appendix B-4.0 [KEYBOARD DEFAULT VALUES].

NOTE: To re-display function labels, press (User System) or (Modes), followed by (User Menu).

3-15 HOW TO CONFIGURE A DUAL HOST INTERFACE

The serial port may be used to communicate with two hosts (HP and DEC), or you may connect the HP to the serial port and the DEC to the peripheral port. The (Datacom/Printer) selection in the General Configuration menu defines which port is the primary port for host interface while in remote mode.

To communicate with both hosts using the serial port, set (Datacom/Printer) = Port 1/Port 2 for both the HP and DEC protocols. In this configuration, communications parameters for both hosts are set up in the Serial Comm menu.

Example:

1. Press the (User System) key to display the User System set of function labels.

2. Press the (Config Keys) key (f8) to display the configuration menus.

3. Press the (General Config) key (f1) to enter the General Configuration menu.

4. Using the (Next Choice) and (Previous Choice) keys, select the (Term Mode)(i.e., H2392A, H2624A, V220 7 bit, etc.).

5. Now confirm that the (Datacom/Printer) selection = Port 1/Port 2. If no, go to the (Datacom/Printer) selection and then press (Next Choice).

6. Go to the Serial Comm menu by pressing the (Next Config) key (f5).

7. After setting the communications parameters, save all the menu selections by pressing the (Default Line) key (f1) followed by the (Save Menu) key (f6).

8. Now press the (Menu Line) key (f1) and return to the General Config menu using the (Previous Conig) key (f6).

9. Repeat steps 4 thru 7 for the alternate protocol.

To use the peripheral port as a host interface, set (Datacom/Printer) = Port 2/Port 1. This allows the peripheral port to become the primary port for host interface while in remote mode.

In this configuration, HP on the serial port and DEC on the peripheral port, communication parameters are set up in the Serial Comm menu and Printer Comm menu respectively.

Follow steps 1 thru 8 in the above example to set up the serial port (HP). To set the peripheral for (DEC), do the following:

1. Using the (Next Choice) and (Previous Choice) keys, select the (Term Mode) (i.e. V220 7 bit, V100, etc.).

2. Set (Datacom/Printer) = Port 2/Port 1.

3. Go the the Printer Comm menu by pressing the (Next Config) keys (f5).

4. After setting the communications parameters, save all the menu selections by pressing the (Default Line) key (f1) followed by the (Save Menu) key (f6).

3-16 HOW TO USE THE RETURN=ENTER KEY

If you are running a character mode operation that requires numeric data entry from the numeric keypad, followed by a (Return), you will want to use [Return=Enter].

When enabled, [Return=Enter] allows the numeric keypad (Enter) key to dynamically redefine itself in applications.

When in character mode, the (Enter) key functions as a (Return) key. When in block mode, the (Enter) key functions as before.

The [Return=Enter] selection is found in the Keyboard Menu.

3-17 HOW TO ENABLE THE (STOP) KEY

The (Stop) key will alternately transmit a DC1 (XON) and DC3 (XOFF) code, if Receive Pace on the serial port is configured for XON/XOFF. If the Receive Pace is set to None, then pressing the Stop key will have no effect.

The setting of the Receive Pace [RecvPace] selection, can be found in the Data Comm Menu. For information displaying menus, reference section 3-3 [HOW TO CONFIGURE A MENU].

3-18 HOW TO RESET THE TERMINAL

SOFT RESET

To "soft" Reset the 20-DHP, press (Shift) (Reset). This accomplishes the following:

1. Halts any current device operations.
2. Unlocks the keyboard.
3. Clears any error conditions.
4. Turns off RECORD MODE.

HARD RESET

To "hard" Reset the 20-DHP, press (Shift) (Shift) (Reset). This accomplishes the following:

1. Halts any current device operations.
2. Rings the terminal bell.
3. Unlocks the keyboard.
4. Clears the display.
5. Clears any error conditions.
6. Resets the terminal to power-on conditions.

3-19 HOW TO DEFAULT THE TERMINAL TO FACTORY SETTINGS

When many of the settings in the menus have been changed to an unknown state, there is a sequence that brings the Teleray back to its original default settings.

To default the terminal:

1. Change the terminal to V220 operating mode by pressing (Shift) (Toggle) until the status line displays VXXX between the function labels.

2. Press the (Modes) key.

3. Press (f4) to disable REMOTE MODE. When disabled, there should not be an * displayed.

4. Type the following sequence (nothing will display on the screen, sp=space, and (ctrl [) means pressing the control key and the left bracket key at the same time):

   (ctrl [) [255 ; 255 sp y

5. After typing the lowercase "y", the terminal will reconfigure itself to its original default state.

6. If you have any trouble defaulting the terminal, Teleray's Hotline is 1-800-328-6397.

APPENDIX A-1.0 MENU OPERATIONS

Changing terminal configuration is accomplished using the configuration menus. Each menu is a list of configuration parameters which are displayed on the screen. Each parameter has a space associated with it. The space is for a user selected value.

Menu parameters are defined by two types:

1) PARAMETERS WITH USER SYSTEM-DEFINED LIST OF VALUES

   To change parameters with system-defined values, two function key labels are displayed with the menu to enable you to scroll forward (NEXT CHOICE) or backward (PREVIOUS CHOICE) through the list of values.

2) KEYBOARD ENTERED VALUES

   To change parameters with keyboard entered values, press the (NEXT CHOICE) key to allow keyboard input into entry field. Use the cursor left key to backup if an error is made. To exit and save the entry field, press the (NEXT CHOICE) key.

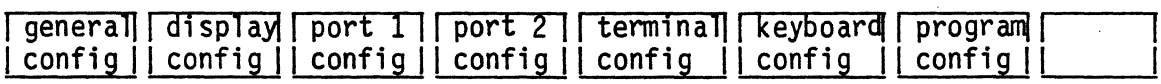
The Teleray Model 20-DHP is organized with two separate operating memories. Both of these operating memories can be changed independently of one another. One memory is used for HP mode, the other for DEC (ANSI) mode.

The two operating memories are located in a portion of memory called non-volatile memory. When the terminal is turned off, the last operating parameters "SAVED" are recalled when the terminal is powered on.

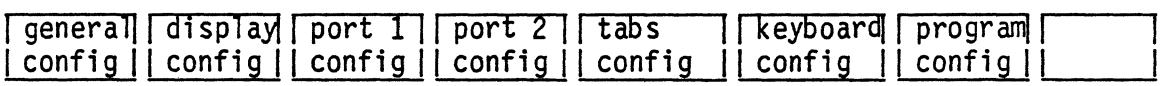
The sequence for changing a set of configuration values is to display the menu, make the desired changes, and "SAVE" the desired changes.

To gain access to the configuration menus through the keyboard, press the (User System) key, followed by the (config keys) key.

The following menu labels appear in HP mode:



The following menu labels appear in DEC mode:



The menus available to the operator are mode dependent. Some menus are accessible in one mode only. The "Terminal Configuration Menu" and the "Define Edits Menu" are accessible in HP mode only. The "Tab Selection Menu" is only accessible in ANSI mode.

	SECTION	ACCESSIBLE IN HP MODE	ANSI Mode
General Menu	A-2.0	YES	YES
Display Menu	A-2.1	YES	YES
Serial Comm Menu	A-2.2	YES	YES
Printer Comm Menu	A-2.3	YES	YES
Terminal Configuration Menu	A-2.4	YES	NO
Define Edits Menu	A-2.5	YES	NO
Tab Selection Menu	A-2.6	NO	YES
Keyboard Menu	A-2.7	YES	YES
Program Menu	A-2.8	YES	YES

NOTE: By pressing (Shift) (Modes) key, the last menu accessed by the operator will appear on the screen.

APPENDIX A-1.1 MENU FUNCTION KEY LABELS

When displaying a menu, the following status line appears at the bottom of the menu screen:

MENU LINE	default line	NEXT CHOICE	PREVIOUS CHOICE	NEXT MENU	PREV MENU		exit

Menu function key label definitions:

DEFAULT LINE — Changes the menu function key labels to the menu default labels.

NEXT — Increments parameters with user system-defined list of values, or allows keyboard entries for parameters with keyboard entered values.

PREVIOUS CHOICE — Decrements parameters with user system-defined list of values.

NEXT CONFIG — Increments menu to next configuration.

PREVIOUS CONFIG — Decrements menu to previous configuration.

exit — Exits from the menu.

menu line		CLEAR COMM	SOFTWARE RESET	MENU RECALL	MENU SAVE	FEATURE LOCK	exit

Menu default label definitions:

menu line — Changes the menu default labels to the menu function key labels.

CLEAR COMM — Resets the serial and peripheral communication ports.

SOFTWARE RESET — Performs a soft reset and clears all communication ports.

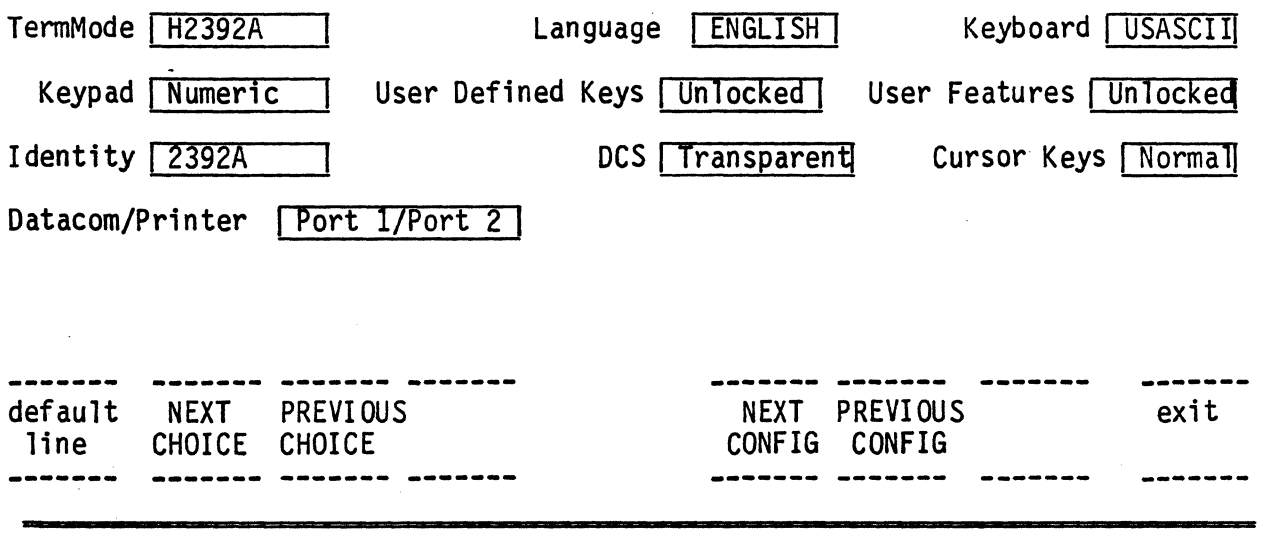
MENU RECALL — Recalls the menu selections that were previously saved.

MENU SAVE — Saves ALL current menu selections in non-volatile memory for operating mode.

FEATURE LOCK — Pressing this key prevents the operator from changing the selected feature in the menu. To unlock feature, press feature lock again.

exit — Exits from the menu.

G E N E R A L M E N U



TermMode

The selections that begin with "V" are for Digital Equipment computers and generic ANSI X3.64 applications.

The selections that begin with "H" are Hewlett Packard compatible terminals.

Values:

V52	V220, 8 Bit
V100	H2392A
V220, 7 Bit	H2624A

Language

The language selection allows an operator to configure the soft key labels in any 1 of 10 languages.

Values: ENGLISH, NEDERLANDS (Dutch), SUOMI (Finnish), FRANCAIS (French), DEUTSCH (German), ITALIANO (Italian), NORSK (Norwegian), ESPANOL (Spanish), SVENSK (Swedish), DANSK (Danish)

Keyboard

The keyboard selection automatically redefines the keyboard to be compatible with the selected country. Optional keycap sets are available, see Appendix C for keyboard layouts. The position of keys generating the same character may differ for the different keyboard selections.

Keyboard (cont'd)

The terminal includes the USASCII character set plus an extended character set that supports the special characters associated with other languages.

Values: USASCII (United States), UK (United Kingdom), NETHERLANDS (Dutch), SUOMI (Finnish), CANADIAN, FRANCAIS (French), VLAAMS (Flemish), DEUTSCH (German), ITALIANA (Italian), NORSK (Norwegian), ESPANOL LAT. (Latin American Spanish), ESPANOL EUR. (European Spanish), SVENSK (Swedish), SCHWEIZ (Swiss German), SUISSE (Swiss French), DANSK (Danish).

Keypad

APPLICATION KEYPAD: When selected, Application Escape sequences are transmitted or executed in place of the characters printed on the numeric pad keytops.

NUMERIC KEYPAD: When selected, ASCII characters corresponding to those on the numeric keys are transmitted or executed.

User Defined Keys

Lock the programmable functions from being programmed by control sequence.

User Features

When "Locked" is chosen it prohibits the following features from being changed by control sequence:
Auto Repeat, Smooth Scroll, Light/Dark Screen, Tab Stops, and Keyboard Lock

Identity

Specifies which Terminal Identification will be sent to the host computer upon an Identity request. The identity can be selected by pressing the "NEXT CHOICE" key, entering new Identity, then pressing the "NEXT CHOICE" key again to save Identity.

DCS

Device Control Strings for programming functions, keys, and characters.

Values: Transparent (will not display during programming)
Interpreted (will display during programming)

Cursor Keys

Application: Escape sequences are transmitted or executed in place of cursor positioning commands.

Normal: The cursor keys cause cursor positioning commands to transmit or execute.

Datacomm/Printer

By using the Datacomm/Printer selection, an operator can alternate communications between Port 1 and Port 2.

D I S P L A Y M E N U

Brightness [58]	Columns [80]	Scroll Type [Smooth, 6 LPS]
Cursor [Blink]	Cursor is [ ]	Text [Light/Dark]
Col/Line [80]	Lines/Page [197]	Number of Pages [1]
Auto Wrap [Right]	Screen Saver [On]	Clear Display
Hor Scroll [Off]		

default line	NEXT CHOICE	PREVIOUS CHOICE		NEXT CONFIG	PREVIOUS CONFIG		exit

Brightness

Changes the screen intensity to any level from 1 to 64 (Default is 58).

Columns

Specifies the maximum amount of characters that will be displayed. If more than the number of characters specified per line are selected, horizontal scrolling may be used to display additional columns. The display clears when the menu is exited, if a change is made.

Values: 80 Columns
132 Columns
40 Columns
66 Columns

Scroll Type

Jump Scroll: New lines appear on the screen as fast as the computer sends them to the terminal. At higher baud rates, the data is very difficult to read due to the rapid movement of the lines.

Smooth Scroll: A limit is placed on the speed at which new lines of data may be sent to the terminal. The movement of lines occurs at a smooth, steady rate, allowing the data to be read as it appears on the screen. The Teleray 20DHP supports two vertical smooth scroll rates: 6 or 12 lines of data per second.

Cursor	None: The data input position will not have any visual indication. Blink: The cursor character will blink once per second when selected. Steady: The cursor character will only blink when it is placed over a "non-space" character.
Cursor Is	Select one of 6 cursors: inverse block, underline, highlighted block, diamond, cross-hair, or checkerboard. The first 3 cursors are non-destructive (do not alternate cursor and text character).
Text	Light on Dark: light characters on a dark background. Dark on Light: dark characters on a light background.
Col/Lines	The number of horizontal spaces (columns) per line. All columns may not appear at the same time. If columns per line are fewer than can be displayed, the remainder of the screen is blanked out.
Lines/Page	The number of vertical spaces (lines) on each page. Only 24 lines may be displayed at one time.
Number of Pages	The number of pages in display memory.

IMPORTANT NOTE:
When operating in HP mode the 20DHP should always be configured to 1 page of 197 lines. The 24 line "paging" feature of the HP terminals is implicitly defined.

Auto Wrap

None: Data entered in the last column of a line will write over previously stored data.

Right: When data is entered into the last column, the cursor will move to the next line for data entry.

All: Along with Right Auto Wrap, the Tab and Back Tab operations will wrap around the right and left margins respectively.

Screen Saver

On: After 10 minutes of inactivity, the Teleray display will automatically shut down to maximize tube life. Any keyboard or I/O activity will instantly restore the display without a loss of data. The SHIFT keyboard key can be used to restore the screen without affecting the Teleray memory.

Off: Will not allow the Teleray display to shut down.

Clear Display

Clears the entire display page when the Menu is exited.

Hor Scroll

Off: No horizontal screen movement occurs.

On: When the number of characters per line is greater than the number of characters displayed.

S E R I A L C O M M M E N U

BaudRate [9600] Transmit=Receive Parity/Databits [0's/7]

StopBits [1] Enq/Ack [YES] Protocol [232 Full Duplex]

RecvPace [None] XmitPace [None] Local Echo [OFF]

Transmit [Unlimited] Disconnect Delayed [60 ms]

Copy Printer to Serial [Off]

default line	NEXT CHOICE	PREVIOUS CHOICE		NEXT CONFIG	PREVIOUS CONFIG		exit

Baud Rate

Specifies what speed you want the data transmission to take place (in bits per second). The computer host and the Teleray must be set to the same speed in order to communicate.

Values:

50	150	1800
75	300	4800
110	600	9600
134	1200	19200

Transmit=Receive

The transmit and receive baud rates are always equal. If split baud rate is a necessity please consult the factory.

Parity/Databits

Provides a check for errors in data transmitted by the host computer. (Note: parity must be set to None for binary transfers.) The number of bits per character transmitted or received must also be set. If a parity error is detected a is displayed.

Values:

None/8	(no parity bit)
0's/7	(parity bit always zero)
ODD/7	(odd parity)
1's/7	(parity bit always one)
EVEN/7	(even parity)
None/7	(no parity bit)
ODD/8	(odd parity)
EVEN/8	(even parity)
1's/8	(parity bit always one)
0's/8	(parity bit always zero)
ODD/7, No Check	(odd parity, no parity check)
EVEN/7, No Check	(even parity, no parity check)
ODD/8, No Check	(odd parity, no parity check)
EVEN/8, No Check	(even parity, no parity check)

Stop Bits

Specifies the number of "stop bits" you wish to follow each character transmitted by the terminal.

Values: 1
2

Enq/Ack

ENQUIRY/ACKNOWLEDGE: This is a flow control initiated by the host. The host sends the terminal an ENQ code before data is transmitted. If the terminal is ready to receive data, the terminal sends the host an ACK code.

Protocol

232 Full Duplex: A communications link in which data can be transmitted in both directions simultaneously.

232 Half Duplex: Select control for multiplexed communications. Use with half-duplex modems.

422/20 mA Loop: This menu setting is identical to Full Duplex setting. It can be used as a reminder that the RS422 or 20mA current loop option is installed.

232 Modem: Full duplex communications with modem control and automatic disconnect.

RecvPace

Mechanism by which the terminal automatically controls (halts and resumes) the transmission of data from the remote device.

None: No receive pacing is used.

XON/XOFF: With XON/XOFF, the terminal will send a flow control character to the host computer when there are 216 characters in the input buffer. When the input buffer has been reduced to 60 characters another flow control character is sent.

Busy/Ready: Busy/Ready operates with the same buffer limits as XON/XOFF, only instead of sending flow control characters, a hand shaking signal line is utilized for control.

Xmit Pace

Mechanism by which the remote device can control (halts and resumes) the transmission of data from the terminal.

None: No transmit pacing is used.

XON/XOFF: With XON/XOFF, the terminal will suspend transmission to the host computer when an XOFF (DC3) code is received.

Local Echo

ON: The characters entered through the keyboard are both displayed on the screen and transmitted to the host computer.

OFF: The characters entered through the keyboard are transmitted to the host computer only.

Disconnect Delayed

The delay after loss of carrier before a disconnect is performed by the terminal can be 2 sec or 60 ms

Values: 2 sec
60 ms

Copy Printer to Serial

Off: Printer port is disabled.

Transparent: Printer port is enabled and input data is transmitted on the serial port.

Interpreted: Printer port is enabled, input data is transmitted on the serial port, and input data is displayed on the terminal screen.

```
P R I N T E R   C O M M   M E N U

BaudRate [4800]          Printer Nulls [1]      Parity/Databits [None/8 ]

StopBits [1]               Enq/Ack [YES]              Protocol [232 Full Duplex]

RecvPace [XON/XOFF]      XmitPace [XON/XOFF]

Transmit [Unlimited]     Disconnect Delayed [60 ms]

Printer Transmit Control [Normal <See Printer Block Transmit>]

-------  -------  -------  -------          -------  -------  -------  -------
default   NEXT    PREVIOUS                    NEXT   PREVIOUS            exit
 line    CHOICE   CHOICE                    CONFIG   CONFIG
-------  -------  -------  -------          -------  -------  -------  -------
```

Baud Rate

Specifies what speed you want the data transmission to take place (in bits per second). The computer host and the Teleray must be set to the same speed in order to communicate.

Values:

50	150	2400
75	300	4800
110	600	9600
134	1200	19200

Printer Nulls

Specifies the number of null codes (0-255) to be transmitted to an external printer after each ASCII control code. (The null code is ASCII character 00.)

Values: 0-255

Parity/Databits

Provides a check for errors in data transmitted by the host computer. (Note: parity must be set to None for binary transfers.) The number of bits per character transmitted or received must also be set. If a parity error is detected a is displayed.

Values:

None/8	(no parity bit)
0's/7	(parity bit always zero)
ODD/7	(odd parity)
1's/7	(parity bit always one)
EVEN/7	(even parity)
None/7	(no parity bit)
ODD/8	(odd parity)
EVEN/8	(even parity)
1's/8	(parity bit always one)
0's/8	(parity bit always zero)
ODD/7, No Check	(odd parity, no parity check)
EVEN/7, No Check	(even parity, no parity check)
ODD/8, No Check	(odd parity, no parity check)
EVEN/8, No Check	(even parity, no parity check)

Stop Bits

Specifies the number of "stop bits" you wish to follow each character transmitted by the terminal.

Values: 1
2

Enq/Ack

ENQUIRY/ACKNOWLEDGE: This is a flow control initiated by the host. The host sends the terminal an ENQ code before data is transmitted. If the terminal is ready to receive data, the terminal sends the host an ACK code.

Protocol

232 Full Duplex: A communications link in which data can be transmitted in both directions simultaneously.

232 Half Duplex: Select control for multiplexed communications. Use with half-duplex modems.

422/20 mA Loop: This menu setting is idential to the 232 Full Duplex setting. It can be used as a reminder that the RS422 or 20mA current loop option is installed.

232 Modem: Full duplex communications with modem control and automatic disconnect.

RecvPace

Mechanism by which the terminal automatically controls (halts and resumes) the transmission of data from the remote device.

None: No receive pacing is used.

XON/XOFF: With XON/XOFF, the terminal will send a flow control character to the host computer when there are 216 characters in the input buffer. When the input buffer has been reduced to 60 characters another flow control character is sent.

Busy/Ready: Busy/Ready operates with the same buffer limits as XON/XOFF, only instead of sending flow control characters, a hand shaking signal line is utilized for control.

Xmit Pace

Mechanism by which the remote device can control (halts and resumes) the transmission of data from the terminal.

None: No transmit pacing is used.

XON/XOFF: With XON/XOFF, the terminal will suspend transmission to the host computer when an XOFF (DC3) code is received.

Disconnect Delayed

The delay after loss of carrier before a disconnect is performed by the terminal can be 2 sec or 60 ms

Values: 2 sec
60 ms

Printer Transmit Control

NORMAL PRINT: The printer port is disabled until a print operation occurs.

TRANSPARENT: The printer port is enabled, serial input is transmitted on the printer port when on line, and keyed data is transmitted on the printer port in local mode.

INTERPRETED: The printer port is enabled, serial input is transmitted on the printer port and displayed on the terminal screen when on line, or if in local mode, keyed data is transmitted on the printer port and displayed.

AUTO PRINT: The current line of text will be printed on receipt of line feed, form feed, or vertical tab.

```
T E R M I N A L   C O N F I G U R A T I O N   M E N U

Tab=Spaces [YES]     Start Col [1]  ASCII 8 Bits[YES]

Xmit Fnctn(A) [NO]     SPOW(B) [NO]    InhEolWrp(C) [NO]    Line/Page(D) [LINE]

InhHndShk(G) [NO]    InhDC2(H) [NO]    AutoTerm(J) [NO]    ClearTerm(K) [NO]

EscXfer(N) [NO]    FldSeparator[US]    BlkTermnator[RS]    Alternate Set [B]

SET @ [USASCII]   SET A [INTERNTL]   SET B [LINE DRAWING]   SET C [EXT. ROMAN]

Decimal Type [US]     Implied Dec Digits [2]     Transmit [All Fields]


-------  -------  -------  -------          -------  -------  -------  -------
default   NEXT    PREVIOUS                    NEXT   PREVIOUS            exit
 line    CHOICE   CHOICE                    CONFIG   CONFIG
-------  -------  -------  -------          -------  -------  -------  -------
```

Tab=Spaces

When enabled, pressing the TAB key generates the number of ASCII space codes required to move the cursor forward to the next tab stop. If no tab stops exist between the cursor position and the end of the line, the bell sounds and no spaces are generated. Similarly, pressing the TAB key generates the number of ASCII backspace codes required to move the cursor backward to the preceding tab stop (if the cursor is already located at the left margin when the backtab is attempted, the bell sounds and no backspace is generated).

Values: YES
NO

StartCol

When you are operating in MODIFY MODE or MODIFY ALL mode, and you press the ENTER key, the data transmission from the terminal normally begins at the logical start-of-text point in the particular line. If the line in which you are entering data is the bottom most used line in display memory the terminal automatically generates a start-of-text pointer to designate the first character that you enter in the line. If the line has no logical start-of-text pointer, the data transmission begins at the default start column. This start column can be defined in memory using the Start Col field of the terminal configuration menu.

ASCII 8 Bits	When enabled, the terminal transmits 8-bit ASCII codes. In these codes the eighth (high-order) bit, when set, indicates that the character is from the alternate character set and if not set, it indicates that it's from the base character set.
XmitFncn(A)	When enabled, the escape code sequences generated by display keys such as "ROLL UP" and "ROLL DOWN" are transmitted to the host computer. When disabled, the escape code sequences are executed locally but not transmitted to the host computer.
SPOW(B)	Space Overwrite: When enabled, the ASCII space code moves the cursor forward without overwriting existing characters. When disabled, the ASCII space code moves forward replacing existing characters with a space.
InhEolWrp(C)	If "Inhibit End of Line Wrap" is disabled (NO) and a space or data entry is initiated from the right margin, the cursor will move to Column 1 of the following logical line. Smooth horizontal scrolls will be initiated if necessary to keep the cursor visible. A space or data entry initiated in the InhEolWrp=YES mode will be ignored if the cursor is on the right margin.
Line/Page(D)	LINE: In block mode, the terminal will transmit data one line at a time. PAGE: In block mode, the terminal will transmit data one page at a time.
InhHdShk(G) and InhDC2(H)	Together, these two fields determine the type of handshaking that is to be used when transferring blocks of data from the terminal to the host computer. When performing block transfers, there are three possible handshakes: 1. NO HANDSHAKE: terminal merely transmits block of data. 2. COMPUTER SENDS <DC1>: terminal transmit is not initiated until block trigger (DC1) is received from the host computer.

3. COMPUTER SENDS <DC1>, TERMINAL RESPONDS WITH <DC2>, COMPUTER RESPONDS WITH ANOTHER <DC1>: terminal transmit is not initiated until second block trigger (DC1) is received from the host computer.

For more information reference Model 20DHP Programmers Manual.

AutoTerm(J)

The Auto Term (automatic terminator) only has an effect when the ENTER key is pressed in block mode.

YES: Insert a non-displaying terminator at the current cursor position and then move the cursor backward to the previous displaying or non-displaying terminator (if none is found, the cursor moves back to the "home" position).

NO: Do NOT insert a non-displaying terminator and do NOT move the cursor backward.

ClearTerm(K)

YES: If the display terminator operation is terminated by encountering a non-displaying terminator, clear the terminator.

NO: Do NOT clear any non-displaying terminators.

EscXfer(N)

Escape Transfer:

YES: When transferring data between display memory and an external printer, escape sequences relating to the display (such as those specifying display enhancements, format mode fields, and alternate character sets) are sent to the external printer if encountered within the data.

NO: Escape sequences relating to the display are not sent to the external printer.

FldSeperator

When you press the ENTER key while the terminal is in block page mode and a display memory contains a formatted display the terminal automatically transmits the specified field separator character at the end of each unprotected field (except the final one).

BlkTermnator

For data transfers between the terminal and a host computer, the terminal transmits the specified block terminator character at the end of the transfer operation.

Altrnate Set

Specifies which character set (@,A,B, or C) is currently enabled as the alternate character set. @ specifies the base set. In response to an ASCII <SO> code (control N) the terminal switches from the base set to the enabled alternate character set; in response to an ASCII <SI> code (control O) the terminal switches from the alternate set back to the base set.

Set @, A, B, C

These fields specify which alternate character set is to correspond to each of the logical character set names @, A, B, and C in the alternate character set selection escape sequences <ESC>@, <ESC>A, <ESC>B, and <ESC>C.

Values: BLANK
USASCII
HP LINE DRAWING
HP EXT ROMAN

Decimal Type

Specifies whether the decimal point is to be in US (.) or European (,) notation.

Implied Dec Digits

Specifies the desired number of character positions to the right of the decimal point in implied decimal unprotected fields.

Transmit

This field specifies whether you want all fields or only those fields which have been modified to be transmitted from a formatted display.

A-2.5 Define Edits Menu - HP Mode Only

```
D E F I N E   E D I T S   M E N U

Field Format [ 0-ALL ]

Entry [ OPTIONAL ]

Field Type [ NO JUSTIFY ]

-------  -------  -------  -------          -------  -------  -------  -------
default   NEXT    PREVIOUS                    NEXT   PREVIOUS            exit
 line    CHOICE   CHOICE                    CONFIG   CONFIG
-------  -------  -------  -------          -------  -------  -------  -------
```

Field Format

0-ALL CHARACTERS: All characters.
1-ALPHA: Upper/lowercase alphabetic characters and spaces.
2-AUTO UPSHIFT: All characters.
3-ALPHANUM.: Upper-lowercase alphabetic characters, digits, spaces, periods, dashes, commas, and plus signs.
4-INTEGER: Digits and spaces.
5-SIGNED DEC.: Digits, minus sign, plus sign, decimal point or comma, and spaces.
6-IMPLIED DEC.: Digits, plus sign, minus sign, decimal point or comma, and spaces.
7-CONSTANT: None.
8-INTEGER/FILL: Digits and spaces.
9-SIGNED DEC./FILL: Digits, minus sign, plus sign, decimal point or comma, and spaces.
10-IMPLIED DEC./FILL: Digits, plus sign, minus sign, decimal point or comma, and spaces.
11-NUM.: Digits, spaces, periods, commas, minus sign, and plus sign.

Entry

OPTIONAL: Does not require an operator to enter data in the field.
REQUIRED: Requires an operator to enter data in the field.

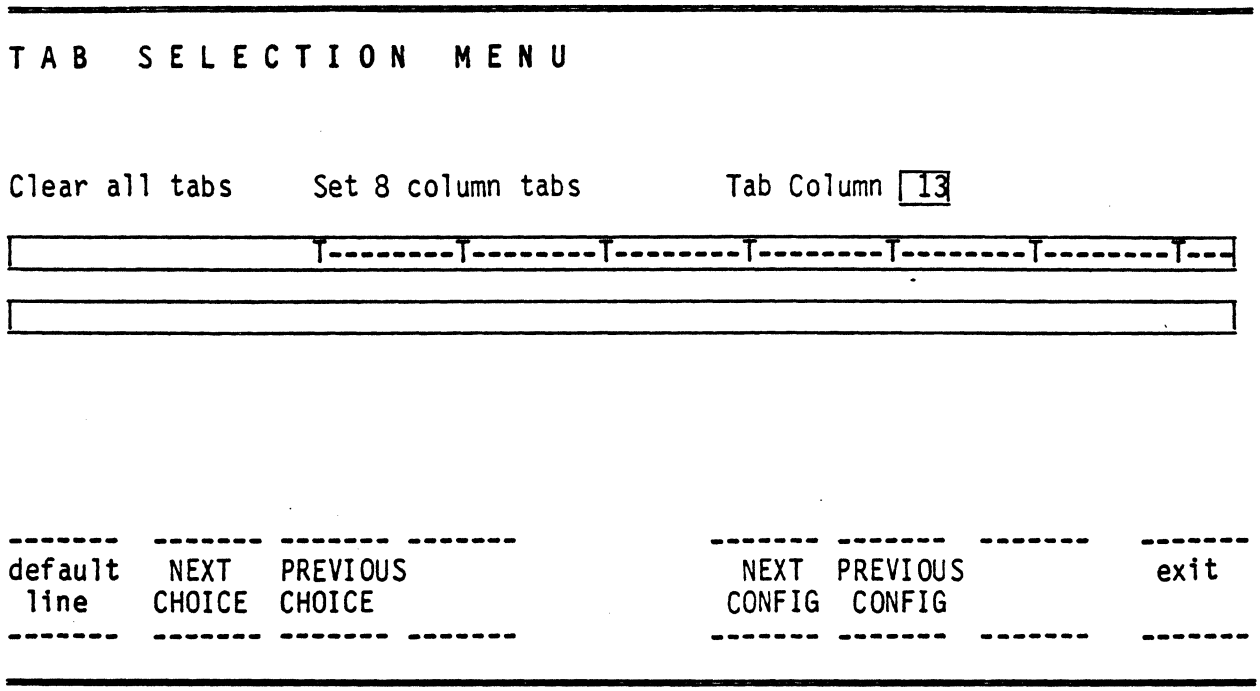
Field Type

JUSTIFY: Justifies the information entered into the field.

NO JUSTIFY: Does not justify the information entered.

TOTAL FILL: Requires the operator to completely fill in the designated number of spaces.

A-2.6 Tab Selection Menu - ANSI Mode Only



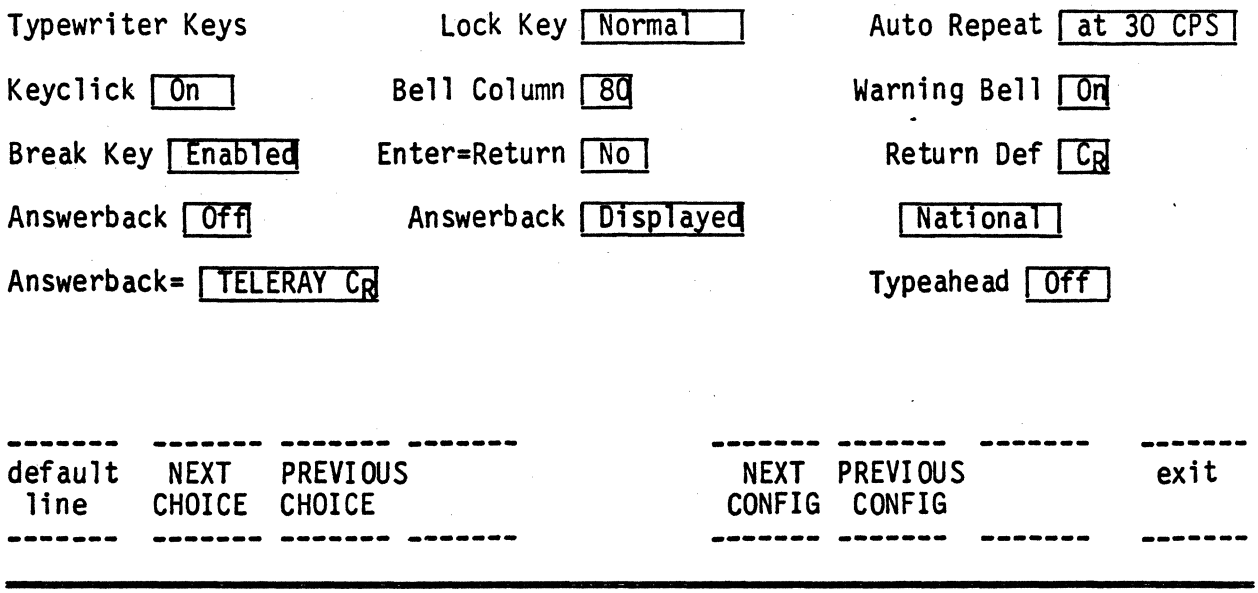
Clear all Tabs — All tab stops are cleared.

Set 8 Column Tabs — Set a tab stop every 8 columns beginning at column 9.

Tab Column — Displays the current tab column at which a tab stop may be set or cleared.

Tab Line — The cursor keys cause the Tab Column to increase or decrease and the Tab line to horizontally scroll across the screen. When the desired Tab Column is reached, a tab stop may be set or cleared in that position by pressing the "NEXT CHOICE" key.

K E Y B O A R D M E N U



Typewriter Keys

The Teleray Model 20DHP standard keyboard is a typewriter style keyboard with all data processing characters. For optional alternate language keycaps, please consult the factory.

Lock Key

Normal: When the "Caps" key is set through the keyboard, all unshifted alphabetic keys generate uppercase letters. Pressing the "Shift" key will generate a lowercase letter when the "Caps" key is set.

Caps Lock: All alphabetic keys generate uppercase letters. The "Caps" key has no effect in this mode.

Shift Lock: All keys generate the shifted key code. Pressing the "Caps" key alternately enables and disables this mode. Pressing the "Shift" key disables this mode, until the "Caps" key is pressed.

Auto Repeat

When is enabled, whenever a key is held down for more than 0.5 seconds will begin to repeat. There are two Auto Repeat rates available: 15 characters per second and 30 characters per second.

Values: Off
at 30 CPS
at 15 CPS

Keyclick

When enabled, whenever a key is pressed, an audible click will indicate to the operator that a key has been pressed.

Values: Off
On

Bell Column

The margin bell can be programmed to ring at any desired column or not sound at all. Typically the bell column is set near the end of the line in order to warn the operator that a carriage return must be used.

Values: 0-Last Column

Warning Bell

When the terminal receives a CTRL-G (bell control code) an audible tone will be generated unless the No Warning bell selection was made.

Values: Off
On

Break Key

The Break key will cause a 250 millisecond break on the transmit line unless the Disabled selection is made.

Values: Enabled
Disabled

Enter=Return

When enabled, pressing the Return key in a HP block mode application will have the same effect as pressing the Enter key.

Values: Yes
No

Return Def

Specifies the definition of the RETURN key. The default definition is an ASCII (CR). The definition may consist of up to two characters. If the second character is a space, it is ignored.

Answerback =

A short, built-in message that allows the Teleray to automatically identify itself to the host computer without operator intervention.

Values: Off
On

Answerback

Concealed: The current answerback message is concealed until a new message is entered.

Not Concealed: The current answerback message is displayed.

Answerback=

Displays the current answerback message if it is not concealed. The answerback message is entered on the status line after the NEXT CHOICE Key is pressed. Up to 30 characters may be entered followed by pressing the NEXT CHOICE Key again to end the message.

National/Multinational

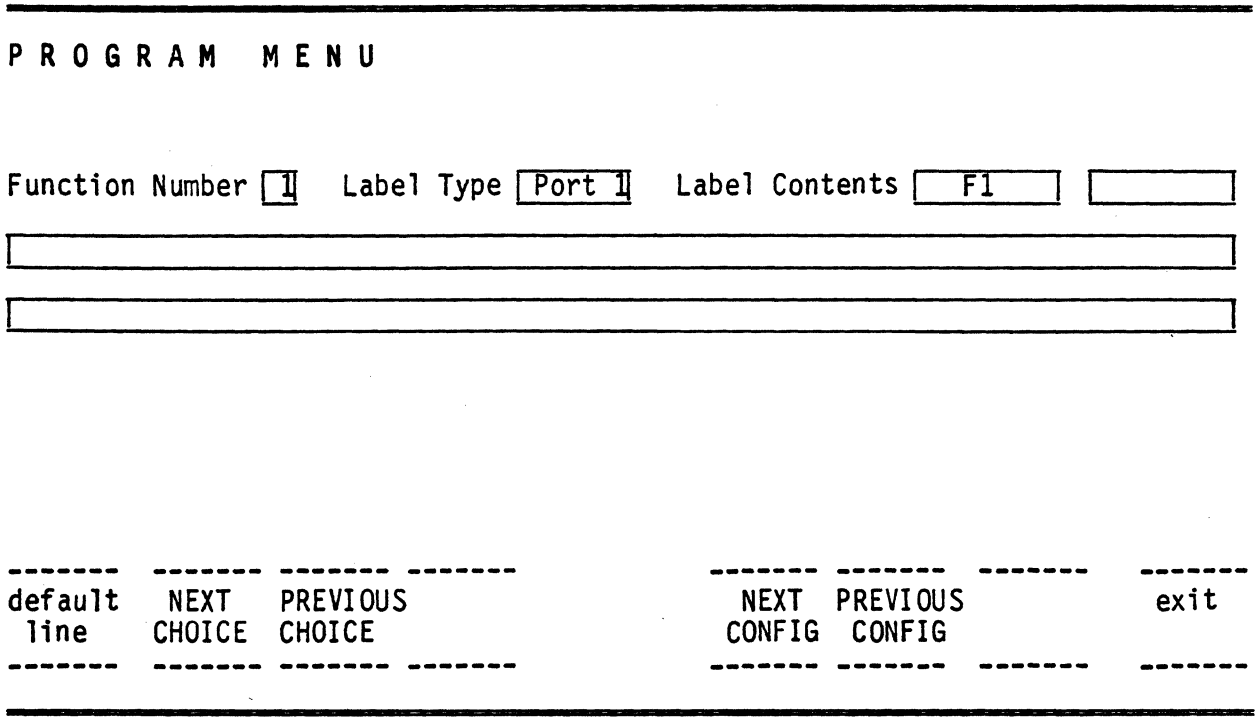
If the 20DHP is in ANSI (V220) mode with 8 bit controls set, the following apply:

National: When selected, the terminal ignores the 8th bit to reference the multinational character set and operates as though it were set to 7 bit mode.

Multinational: When selected, the terminal uses the 8th bit to reference a character from the multinational character set.

Typeahead

Selecting typeahead allows the terminal to buffer commands. NOTE: If typeahead is selected, the operator will not see what is being typed until it is echoed back from the host.



Function Number

Displayed in the upper left corner of the menu is the number of the function label currently being programmed. To increment the function number use the NEXT CHOICE key. To decrement the function number use the PREV CHOICE key.

Label Type

This field signifies whether the content of the particular user key is to be:

Local: Executed locally.
Port 1: Transmitted out Port 1 only.
Port 2: Transmitted out Port 2 only.
Keyboard: Treated as a normal keyboard input. If the terminal is in local mode the function key acts locally. If the terminal is in remote/character mode the function key contents are transmitted.

Label Contents

The pair of eight-character fields to the right of the word "LABEL" allows you to supply the user key's label. When the terminal is in user keys mode, the key labels are displayed from left to right across the bottom of the screen (each displayable label occupies two lines). The first LABEL field in the user keys menu supplies the upper portion of the particular key label while the second supplies the lower portion.

Label Contents (Cont'd)

To enter a user defined label, position the menu field to the Label Contents selection. Press the "NEXT CHOICE" key. Type the label contents in the entry field. To transfer the entry field to the Label Contents selection in the menu, press the "NEXT CHOICE" key again.

Function Contents

The contents of the associated function label that are executed with respect to the label type (local, keyboard, port 1, port 2). Press the "NEXT CHOICE" key. Type the function contents in the entry field. To transfer the entry field to the function contents selection in the menu, press the "NEXT CHOICE" key again.

APPENDIX B-1.0 FUNCTION KEY OPERATIONS

The function keys consist of the keys labelled f1-f8 across the top of the keyboard. They are used with the 8 screen labels displayed on the bottom of the screen. The function displayed by the label is executed when the associated key is pressed. For example, the label on the right of the screen is associated with f8.

There are three types of function key labels.

1. Mode function key labels:

   Accessed by pressing the (Modes) key.

2. Predefined function key labels:

   Accessed by pressing the (User System) key.

3. User-definable key labels:

   Accessed by pressing the (User Menu) key.

APPENDIX B-2.0 MODE FUNCTION KEY LABELS

Following a power-on, if no errors are detected, the "Modes" label line will display on lines 25 and 26. (If an error is detected, reference section 4-4, Testing.)

If the terminal is in ANSI mode, this line appears:

If the terminal is in HP mode, this line appears:

Within the Modes Line are terminal operating modes that can be enabled or disabled.

If the function key associated with the corresponding function label is pressed, the function label mode is alternately enabled or disabled. If the mode described in the corresponding label is enabled, an asterick appears in the lower right corner of the field. If the mode is disabled, the asterick disappears.

LINE MODIFY — Used while the terminal is in "REMOTE" and "CHARACTER" modes. If a long string of text was erroneously types, using LINE MODIFY, the operator does not have to re-type the complete string. By enabling LINE MODIFY mode, the 20DHP is temporarily in block mode. The operator can then reposition to the erroneous line and correct it using the edit keys. By pressing the (Enter) or (Return) keys, the corrected line of text is retransmitted with the "Start Column" being the first column of transmission. After transmit, LINE MODIFY mode is disabled.

MODIFY ALL — Similar to LINE MODIFY mode except that when the (Enter) or (Return) key are pressed, MODIFY ALL mode is not disabled.

BLOCK MODE — When enabled, typed data is displayed but not sent to the computer until after the (Enter) key has been pressed. Otherwise the terminal is in Character Mode and each character is transmitted to the computer as typed.

REMOTE MODE — When an asterick is present in the REMOTE MODE label, REMOTE is selected ON. When an asterick is absent, it is selected for LOCAL MODE.

SMOOTH SCROLL — When enabled, this causes the movement of the lines to occur at a smooth, steady rate, allowing the data to be read as it appears on the screen. The Teleray 20DHP supports two vertical smooth scroll rates: 6 or 12 lines of data per second.

MEMORY LOCK — Applies only when the (MEMORY LOCK) function key is pressed. Operates in two modes; overflow protect and display lock.

When Memory Lock is activated in the first line of the screen, data can be entered to the end of the memory; then, when the end of memory is reached, no more data can be entered and the bell sounds.

Invoked by activating Memory Lock mode; deactivated by leaving Memory Lock mode. When Display Lock mode is entered, all data between the first line and the line above the cursor becomes "frozen". As data is entered beyond the last position of the screen, the lines below the "frozen" data are scrolled up. The "frozen" lines of data will remain in the same place until memory lock has been disabled. No more than 23 lines may be "frozen".

DISPLAY FUNCTIONS — In this mode, the action normally produced by any keyboard control key, such as (Return) or (TAB) is not performed. Instead of ASCII character or escape sequence representing the function is displayed on the screen.

AUTO LF — When enabled, a line feed is added to every carriage return that is received from the host computer.

APPENDIX B-3.0 PREDEFINED FUNCTION KEY LABELS

The USER SYSTEM set of labels are used only to access other sets of labels. Each label in the USER SYSTEM sets names another set of labels. Some sets of labels are not directly accessible from the USER SYSTEM set. In such cases, several such sets form a group; with one of the sets accessible through the USER SYSTEM set. The other sets in the group are accessible through the one accessed from the USER SYSTEM set. There are several such groups; the CONFIG group, the FORMS group, the DEVICE FUNCTIONS group, and the ENHANCEMENTS group.

For example, press the (User System) key to display the USER SYSTEM set of labels. Pressing the (f1) key selects the DEVICE CONTROL group, pressing (f1) again selects the DEVICE MODES subset within that group.

USER SYSTEM LABELS

device control	margins/ tabs/col	service keys	modes	enhance video	define fields		config keys

The USER SYSTEM set of labels are used only to access other sets of labels. Each label in the USER SYSTEM set names another set of labels. Some sets of labels are not directly accessible from the USER SYSTEM set. In such cases, several such sets form a group; with one of the sets accessible through the one accessed from the USER SYSTEM set. THere are several such groups; the Config group, the Forms group, the Device Functions group, and the Enhancements group.

DEVICE FUNCTIONS GROUP

This group is composed of the Device Control and Device Modes sets of labels. These sets are used to transfer data to and from the external printer or any device that is connected to the peripheral port.

[DEVICE CONTROL LABELS]

device modes	TO EXT DEV	TO DISPLAY	ADVANCE PAGE	ADVANCE LINE	COPY ALL	COPY PAGE	COPY LINE

[DEVICE MODES LABELS]

device modes	device control	RECORD MODE	LOG BOTTOM	LOG TOP			

DEVICE CONTROL Set

This set is directly accessible from the USER SYSTEM set of labels. It is used to select the amount of data to be copied (all, page, or line) and allows skipping one page or one line on the "to" device.

device modes	TO EXT DEV	TO DISPLAY	ADVANCE PAGE	ADVANCE LINE	COPY ALL	COPY PAGE	COPY LINE

TO EXT DEV For device-to-device data transfers initiated through the keyboard, display memory is always the source (from) device while the external printer is the destination device. To select the external device, press the (TO EXT DEV) function key (f2). When the external device is selected as the current "to" device, an asterisk will appear in the function key label.

TO DISPLAY When (TO DISPLAY) is selected it sets the terminal display as the "to" device for data being received from the computer in Record Mode.

ADVANCE PAGE Pressing the (ADVANCE PAGE) key (f4) in the [device control] set of system function keys sends an ASCII <FF> control code to the external device. The ASCII <FF> control code causes a form feed to be executed on a printer.

ADVANCE LINE Pressing the (ADVANCE LINE) key (f5) in the [device control] set of system function keys sends an ASCII <CR><LF> control code sequence to the external device.

COPY ALL The (COPY ALL) key will copy all of the display memory from the line containing the cursor through the end of display memory to the external device. Block terminators and non-displaying terminators are ignored.

COPY PAGE Pressing the (COPY PAGE) key will copy all lines displayed on the screen to the external device. Block terminators and non-displaying terminators are ignored.

COPY LINE The (COPY LINE) key will copy the entire line containing the cursor to the external device.

DEVICE MODES Set

This set enables transferring data to the external device using Record mode or Data logging methods.

device control	RECORD MODE	LOG BOTTOM	LOG TOP				

RECORD MODE — This mode operates only when the terminal is in Remote Mode. It causes computer data to be sent in blocks from the buffer to the "to" device (printer or display).

DATA LOGGING

The Teleray 20DHP includes an HP compatible feature called "data logging" whereby data can be automatically routed to the external device. There are two types of data logging: top and bottom.

LOG BOTTOM — With LOG BOTTOM, each time the cursor moves from one line to another as the result of a line feed or an end-of-line-wrap, the line from which the cursor moved is printed. This feature allows you to maintain a hard copy on the external printer of all lines added to display memory in the order in which they were entered and/or received.

LOG TOP — When display memory is filled and another line of data is entered through the keyboard or received over a data comm line, the top line in display memory is purged to make room for the new line. With top logging, each line that is purged from the top of display memory is printed. Thus, while the line is "lost" from display memory, it is maintained in hard copy on the external printer.

B-3.2 MARGIN/TAB/COL SET

This set is used to set or clear tabs and to set the left and right margins.

[MARGINS TABS/COL LABELS]

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

START COLUMN

If the line in which you are entering data is the bottom most used line in display memory (there are no printing or non-printing characters following the current line in display memory), the terminal automatically generates a start-of-text pointer to designate the leftmost character that you enter in the line. This pointer remains with the line in display memory until the line is deleted.

When you are operating in MODIFY MODE or MODIFY ALL mode, and you press the ENTER key, the data transmission from the terminal normally begins at the logical start-of-text pointer in the particular line. If the line has no logical start-of-text pointer, however, the data transmission begins at the designated start column. The active value of this field can also be temporarily redefined using the (START COLUMN) key.

SET TAB

The operator can define a series of tab stops to which you can move the cursor using the tab and back tab functions.

To set a tab stop, move the cursor to the desired column and then press (SET TAB).

CLEAR TAB

To clear a tab stop, move the cursor to the particular tab stop and the press (CLEAR TAB).

CLR ALL TABS

To clear all tabs, press (CLR ALL TABS).

LEFT MARGIN

RIGHT MARGIN

To set the left or right margin, move the cursor to the desired column and then press the appropriate function key, "LEFT MARGIN" or (RIGHT MARGIN). To reset the left margin to column 1, and the right margin to column 80, press (CLR ALL MARGINS).

CLR ALL MARGINS

To clear all margins, press (CLR ALL MARGINS). The terminal then resets the margins to default values (1 and 80).

B-3.3 ENHANCEMENTS GROUP (HP 2624A ONLY)

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

[ENHANCE VIDEO LABELS]

define fields	modify char set	SET ENHNCMNT	SECURITY VIDEO	INVERSE VIDEO	BLINK VIDEO	UNDRLINE VIDEO	DIM/ BOLD

[DEFINE FIELDS LABELS]

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

[MODIFY CHAR SET LABELS]

define fields	enhance video			CHANGE TO BASE	CHANGE TO SET A	CHANGE TO SET B	CHANGE TO SET C

ENHANCE VIDEO Set

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

- SECURITY VIDEO- character display is suppressed (this enhancement is used in conjunction with fields in which passwords or similar security-sensitive data must be entered through the keyboard).
- INVERSE VIDEO- dark characters are displayed against a white background.
- UNDERLINE VIDEO- characters are underlined.
- BLINK VIDEO- characters blink on and off.
- DIM/BOLD- characters (or background for inverse video) are displayed at half intensity.

These enhancements may be used separately or in any combination. When used, they cause control bits to be set within display memory. If the content of display memory is subsequently transmitted in block mode to a host computer, these control bits are translated into escape sequences which are transmitted along with the displayable text characters.

To cause a particular string of text characters to be displayed using one or more of the enhancements, do as follows:

1. Enable the desired enhancement(s) by pressing the associated function key (f4,f5,f6,f7,and/or f8). When an enhancement is enabled, an asterisk appears in the associated label.
2. Position the cursor at the first character in the string.
3. Press (SET ENHNCMNT)(f3). The selected enhancements take effect immediately. You will notice that the enhancements begin at the cursor position and continue through the end of the line (or through the next subsequent column in which another display enhancement begins). You will also notice that when you press (SET ENHNCMNT) (f3), the asterisk automatically disappears from the selected key labels (all enhancements are disabled until you once again explicitly enable them).
4. Position the cursor at the column immediately to the right of the final character in the string.
5. Press (SET ENHNCMNT)(f3). The enhancements disappear from the cursor position through the end of the line (or through the next subsequent column in which another display enhancement begins). You have actually enabled "no enhancements", which is recorded in display memory as a distinct bit pattern that will be translated into an escape sequence.

DEFINE FIELDS Set

This set enables selection of the field types (alpha/numeric, alpha only, numeric only, numeric format, unprotected, protected, transmit, etc).

[DEFINE FIELDS LABELS]

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

DEFINING FIELDS FROM THE KEYBOARD

From the keyboard, you specify the desired field type and explicit attributes using a menu which you access using the following key stroke sequence:

USER / SYSTEM , define fields , define edits

The Field Definition Menu is displayed below:

DEFINE EDITS MENU

Field Format [0-ALL]

Entry [OPTIONAL]

Field Type [NO JUSTIFY]

DEFINE EDITS	save edits	NEXT CHOICE	PREVIOUS CHOICE		NEXT CONFIG	PREVIOUS CONFIG		exit

---

While the menu is displayed on the screen, the terminal is implicitly in format (protect) mode. The menu contains four unprotected fields that you can access using the (TAB) key. While the cursor is positioned in any of these fields, you select the desired parameters by using the (NEXT CHOICE) (f2) and (PREVIOUS CHOICE) (f3) function keys.

When you have selected the desired field type and explicit attributes, you then save them by pressing the (save edits) (f1) function key. When you do this, the menu disappears from the screen and the function key labels change back to the "define fields" set as follows:

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

To define an unprotected field, do the following:

a. If you want the field to include edit checks, use the (define edits) menu to select the field type and explicit attributes, and then press the (save edits) (f4) function key.

b. Using the cursor control keys, move the cursor to the row and column at which you wish the field to begin.

c. If you wish to use any of the video enhancements, press the (enhance video) function key, set the desired enhancement(s), and then press the "define fields" function key.

d. Press the (START XMIT FLD) function key.

e. If you want the field to include edit checks, press the (START EDITS) function key.

f. Using the space bar, enter a space for each character that you wish the field to accommodate.

g. Press the (STOP FIELD) function key.

h. If you had used any video enhancements, go back to the "enhance video" set of function keys and press the (SET ENHNCMNT) function key (this turns off all enhancements starting at the current cursor position).

MODIFY CHAR Set

This set enables selection of a character set to be assigned to the keyboard keys. The selections are; base (@) set, set A, set B, and set C. Sets @,A,B,and C are assigned character sets on the terminal configuration menus from available sets.

define fields	enhance video	CHANGE TO BASE	CHANGE TO SET A	CHANGE TO SET B	CHANGE TO SET C

define fields — Displays the "Define Fields" set of labels.

enhance video — Displays the "Enhance Video" set of labels.

CHANGE TO BASE — Selects the base character set, as defined on the Terminal Configuration Menu, to be the base character set and also the character set used from the cursor position to the end of the line or the start of the next enhancement if one is located between the cursor position and the end of the line.

CHANGE TO SET A — Selects character set A, as defined on the Terminal Configuration Menu, to be the alternate character set and also, the set used from the cursor position to the end of the line or to the start of the next enhancement, if one is located between the cursor position and the end of the line.

CHANGE TO SET B — Selects character set B, as defined on the Terminal Configuration Menu, to be the alternate character set and also, the set used from the cursor position to the end of the line or to the start of the next enhancement, if one is located between the cursor position and the end of the line.

CHANGE TO SET C — Selects character set C, as defined on the Terminal Configuration Menu, to be the alternate character set and also, the set used from the cursor position to the end of the line or to the start of the next enhancement, if one is located between the cursor position and the end of the line.

B-3.4 TERMINAL TESTS

[SERVICE KEYS]

				TERMINAL TEST	IDENTIFY ROMS	PORT 1 TEST	PORT 2 TEST

TERMINAL TEST — This test is used to check out the terminal for proper operation.

To perform the test press the USER SYSTEM key, select service keys, followed by TERMINAL TEST function key.

If the test is successful, and no errors are detected, a test pattern will appear on the screen. If an error occurs a message will appear indicating what the error was.

IDENTIFY ROMS — When selected the date and revision of the ROM chips that are installed in the terminal are displayed.

PORT 1 TEST — This test checks port 1, at the rear of the terminal, for any errors.

PORT 2 TEST — This test checks port 2, at the rear of the terminal, for any errors.

A Loopback plug must be installed for Port 1 or Port 2 tests. To Pass.

B-3.5 USER KEYS

The eight function keys not only allow the operator to alter terminal configuration, but can also be reprogrammed locally by the operator or remotely from a downloadable program residing in the host. A total of eight function labels per operating mode can be defined. By "defined" it is meant that:

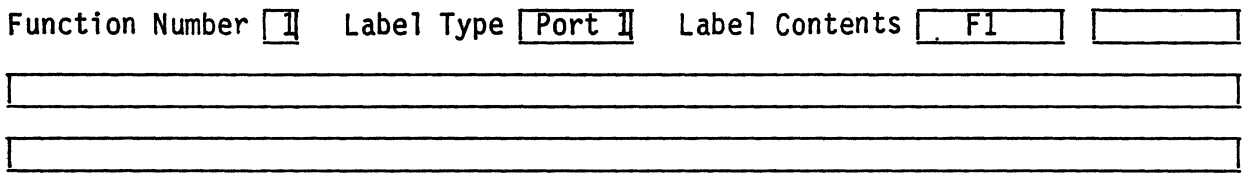
1. Each label can be assigned a string of ASCII characters including control codes.

2. The function keys can be specified to be a local executing key, normal keyboard operation key, or a transmitting only key.

The definition of each user key may contain up to 80 displayable characters (alphanumeric characters, ASCII control characters, and escape sequences).

DEFINING KEYS LOCALLY

To define one or more keys from the keyboard first press the SHIFT and USER MENU keys simultaneously. The program menu shown below will appear on the screen. Note that the screen contains the default values for all of the fields.



The USER MENU displayed always puts the operator in protect mode. This means that the screen is filled with protected fields that the cursor is not able to be positioned into.

To advance through the menu, press the TAB and the BACK TAB keys or you can use the cursor control keys.

For each user key in the menu, their are four fields that can be changed:

1. FUNCTION NUMBER: The function number displayed in the upper left corner of the menu is the number of the function label currently being programmed. To increment the function number use the NEXT CHOICE key. To decrement the function number use the PREV CHOICE key.

2. ATTRIBUTE FIELD: This field defines the operation attribute:

   LOCAL - Executed locally.
   TRANSMIT - Transmitted only.
   Treated as a normal keyboard input. If the terminal is in local mode the function key is acted locally. If the terminal is in remote/character mode the function key contents are transmitted.

3. LABEL FIELDS: The pair of eight-character fields to the right of the word "LABEL" allows you to supply the user key's label. When the terminal is in user keys mode, the key labels are displayed from left to right across the bottom of the screen (each displayable label occupies two lines). The first LABEL field in the user keys menu supplies the upper portion of the particular key label while the second supplies the lower portion. When defining a key label, you may use alternate character sets and any of the video enhancements. See Section 3-9 for programming Label Fields.

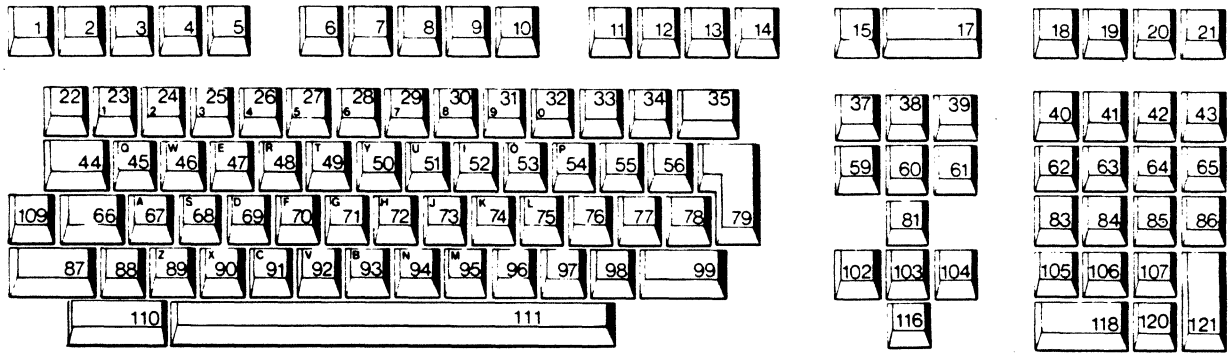
4. FUNCTIONS CONTENTS FIELD: The entire line below the FUNCTION CONTENTS line is available for specifying the character string that is to be displayed, executed, and/or transmitted whenever the particular key is either physically pressed or programmatically triggered. When entering characters into this field, the terminal is implicitly in display functions mode. The cursor control keys can be used to move the cursor position in the field forward or backward. See Section 3-9 for programming Function Contents Fields.

When defining the user keys is completed, the USER MENU can be exited by using any of the three Terminal Configuration keys; USER SYSTEM, MODES, or USER MENU keys.

EXECUTING USER KEY LABELS

To put the terminal in User Keys Mode (activates f1-f8 to execute user functions), press unshifted USER MENU key. The function labels will appear across the bottom of the screen. The labels that appear are the ones that are executable from keystrokes f1-f8.

APPENDIX B-4.0 KEYBOARD DEFAULT VALUES



KEYBOARD LAYOUT

KEY NUMBER	UNSHIFTED DEFAULT	SHIFTED DEFAULT	SHIFT & CONTROL DEFAULT
1	Break Function	Soft Reset	Hard Reset
2	Stop	Stop	
3	Enter	Enter	
4	Modes Status Line	Last Viewed Menu Item	
5	User System Line	Clear Status Line	

KEY NUMBER	UNSHIFTED DEFAULT	SHIFTED DEFAULT	UNSHIFTED DEFAULT	SHIFTED DEFAULT
6	Soft Label f1	Soft Label f1	Function 9	Function 21
7	Soft Label f2	Soft Lable f2	Function 10	Function 22
8	Soft Label f3	Soft Lable f3	Function 11	Function 23
9	Soft Label f4	Soft Lable f4	Function 12	Function 24
10	User Labels	User Menu	User Lables	User Menu
11	Soft Label f5	Soft Lable f5	Function 13	Function 25
12	Soft Label f6	Soft Lable f6	Function 14	Function 26
13	Soft Label f7	Soft Lable f7	Function 15	Function 27
14	Soft Label f8	Soft Lable f8	Function 16	Function 28
15	Esc K	Esc K		
17	Esc J	Esc J		
18	Function 17	Function 29		
19	Function 18	Function 30		
20	Function 19	Function 31		
21	Function 20	Function 32		
22	`	~		
23	1	!		

KEY NUMBER	UNSHIFTED DEFAULT	SHIFTED DEFAULT
24	2	@
26	3	#
27	5	%
28	6	
29	7	&
30	8	*
31	9	(
32	0	)
33	-	_
34	=	+
35	Backspace	Backspace
37	Esc	DEL
38	Esc Q / Esc R	Esc L
39	Esc P	Esc M
40	*	*
41	/	/
42	+	+
43	-	-
44	Tab	Backtab
45	q	Q
46	w	W
47	e	E
48	r	R
49	t	T
50	y	Y
51	u	U
52	i	I
53	o	O
54	p	P
55	[	{
56	[	}
59	Esc & P	Esc & P
60	Esc V	Esc V
61	Esc U	Esc U
62	7	7
63	8	8
64	9	9
65	Tab (hex 08)	Esc i
66	Control	Control
67	a	A
68	s	S
69	d	D
70	f	F
71	g	G
72	h	H

KEY NUMBER	UNSHIFTED DEFAULT	SHIFTED DEFAULT
73	j	J
74	k	K
75	l	L
76	;	:
77	'	"
78	\	
79	Return	Return
81	Esc A	Esc S
83	4	4
84	5	5
85	6	6
86	'	'
87	Shift	Shift
88	<	<
89	z	Z
90	x	X
91	c	C
92	v	V
93	b	B
94	n	N
95	m	M
96	'	'
97	.	.
98	/	?
99	Shift	Shift
102	Esc D	Esc D
103	Esc H	Esc F
104	Esc C	Esc C
105	1	1
106	2	2
107	3	3
109	Caps Lock	Caps Lock
110	Extend Char	Extend Char
111	Space Bar	Space Bar
116	Esc B	Esc T
118	0	0
120	.	.
121	Enter	Print

APPENDIX C-1.1 INTERNATIONAL LANGUAGES

7 BIT OPERATIONS

All of the specific characters used in an international language can be found in the Extended Roman character set.

When transmitting an international language character in 7 bit mode, the 20-DHP transmits a replacement character. The reason for this is because the 20-DHP in 7 bit mode, does not have access to the 8 bit extension characters.

Replacement codes are as follows:

KEYBOARDS	CHARACTERS													
KEYBOARD USASCII	#	'	<	>	@	[	\	]	^	`	{	|	}	~
DANSK	§	´	<	>	@	Æ	Ø	Å	^	`	æ	ø	å	¨
NEDERLANDS	#	'	<	>	@	ç	\	§	^	`	*f*	|	´	¨
SUOMI	#	'	<	>	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
VLAAMS and FRANCIAS	£	'	<	>	à	°	ç	§	^†	¨	é	ù	è	¨†
CANADIAN	#	'	<	>	@	[	ç	]	^	`	é	Ç	É	¨
SUISSE and SCHWEIZ	£	'	é	è	à	°	ç	§	^	`	ä	ö	ü	¨
DEUTSCH	£	'	<	>	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
ITALIANA	£	'	<	>	§	°	ç	é	^	ù	à	ò	è	ì
NORSK	#	´	<	>	@	Æ	Ø	Å	^	`	æ	ø	å	¨
ESPANOL EUR.	#	´†	<	>	@	¡	Ñ	¿	°	`†	'	ñ	ç	¨†
ESPANOL LAT.	#	´†	<	>	@	¡	Ñ	¿	^	`	'	ñ	ç	¨†
SVENSK	#	'	<	>	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
UK	£	'	<	>	@	[	\	]	^	`	{	|	}	~

C-1.2 8 BIT OPERATIONS

When the 20-DHP is in 8 bit mode, all of the characters in the Extended Roman character set may be transmitted. There are no substitute characters.

If the transmitted character is from the Extended Roman character set, bit 8 = 1. If the transmitted character is from the USASCII character set, bit 8 = 0.

C-1.3 DIACRITICAL CHARACTERS

Some of the keyboard options, make use of diacritical characters. A diacritic is an 8 bit character that when used in combination with another character, will create a new 8 bit character. The new character may or may not be already defined on the keyboard.

Diacritics / ^ \ ~

7 BIT DIACRITICS

If the 20-DHP is in 7 bit mode, pressing the diacritic character will cause the equivalent 7 bit code to be immediately transmitted.

8 BIT DIACRITICS

If the 20-DHP is in 8 bit mode, pressing the diacritic character will display the diacritic, and buffer the diacritic code in the terminal. If the following keystroke is a valid diacritic combination, the resulting 8 bit equivalent code will be transmitted.

If the following keystroke is not a valid combination, the keystroke will be transmitted and the new character (from the keystroke) will overwrite the diacritic.

C-1.4 EXTEND KEY

To allow an operator access to the complete Extended Roman character set, the operator presses the Extend Char key.

If the 20-DHP is in 7 bit mode, the terminal responds with a error bell. In 7 bit mode the Extend Char key will not access the Extended Roman character set.

In 8 bit mode, while the operator is pressing the Extend Char key, the keyboard (regardless of defined nationality) will redefine itself to the diagram below. All of the Extended Roman 8 character set can be accessed using the Extend Char key.

APPENDIX C INTERNATIONAL KEYBOARDS

Figures C-0 through C-15 show the various alternate language keyboards which are available.

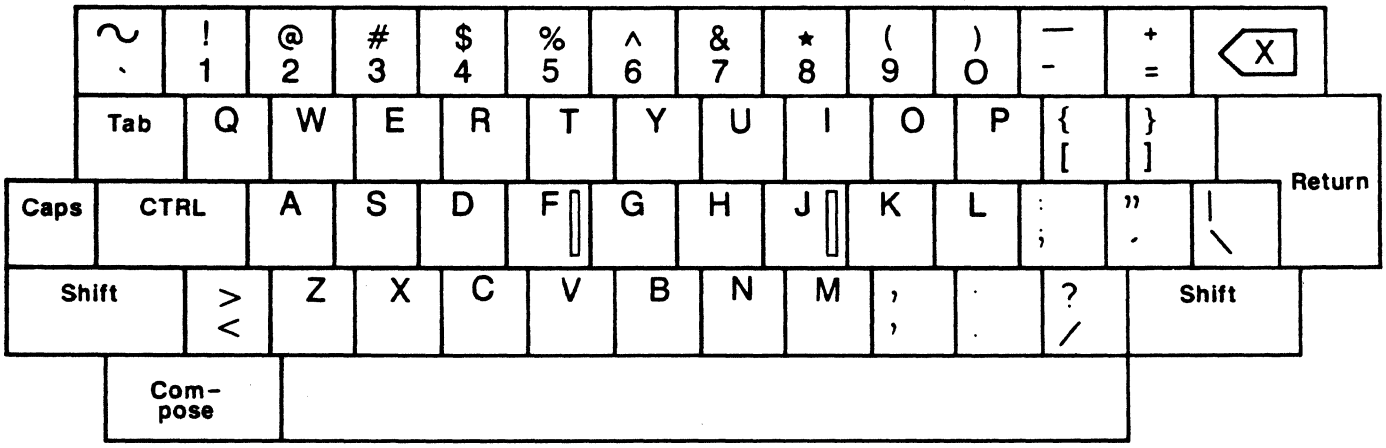


Figure C-0: American USASCII Keyboard (Std)

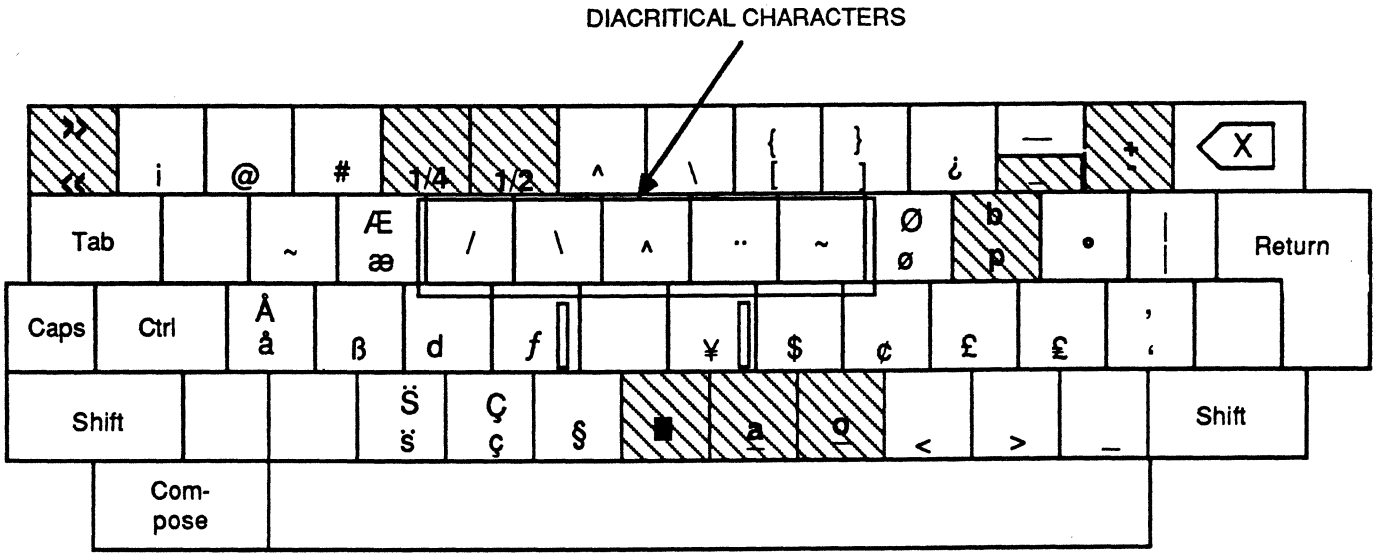


Figure C-1: Mapping of Roman Extension Set

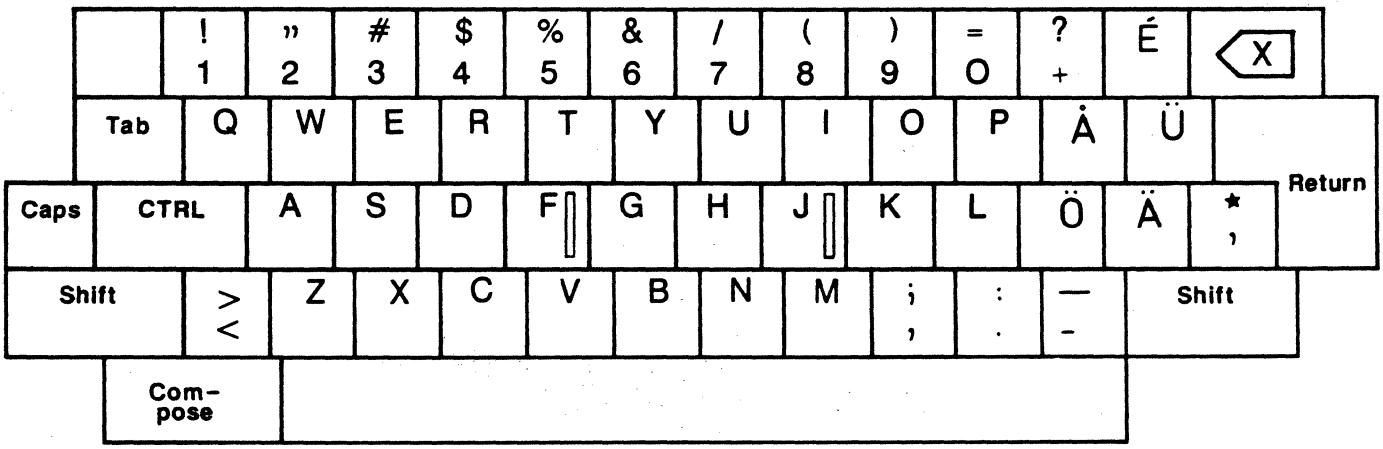


Figure C-2: Swedish / SVENSK

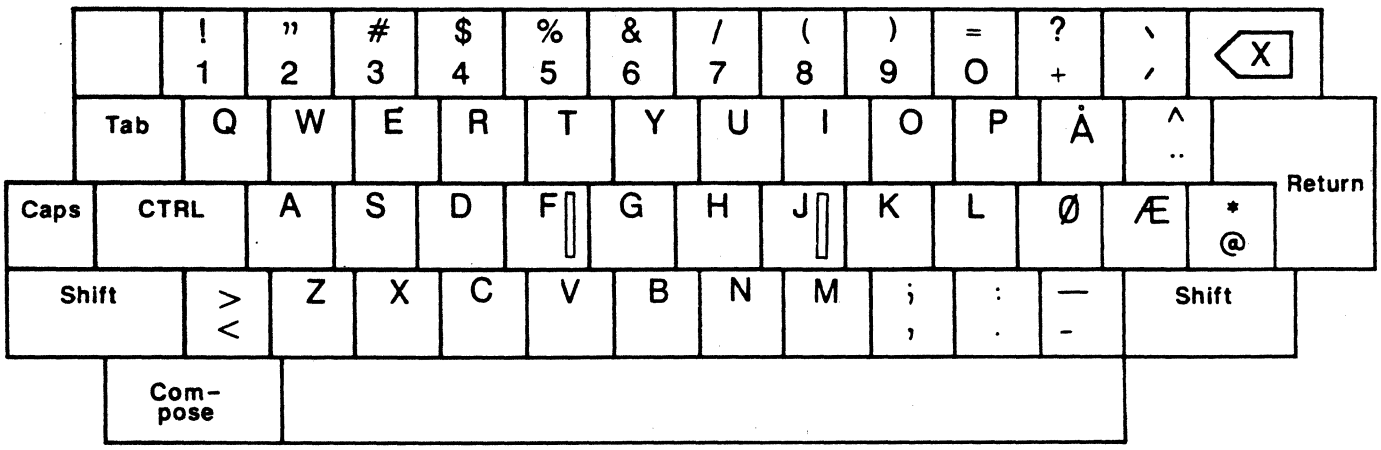


Figure C-3: Norwegian / NORSK

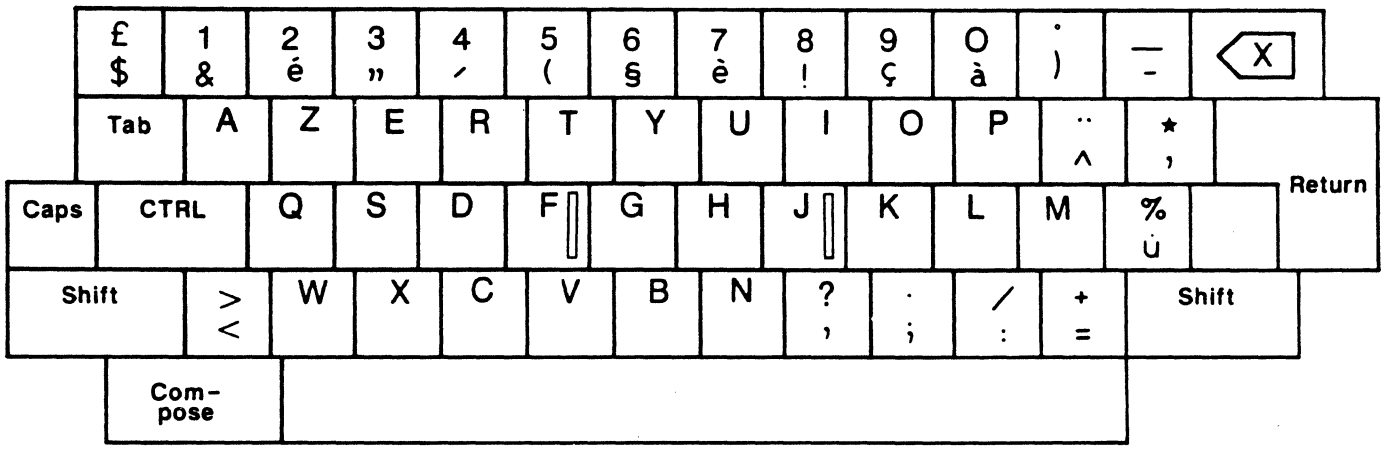


Figure C-4: French / FRANCAIS

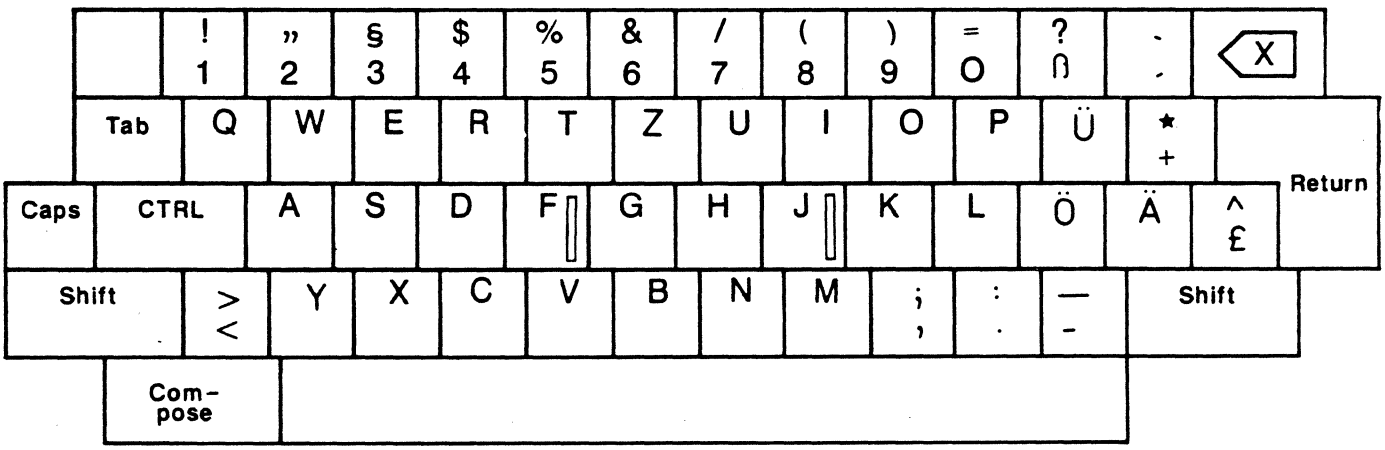


Figure C-5: German / DEUTSCH

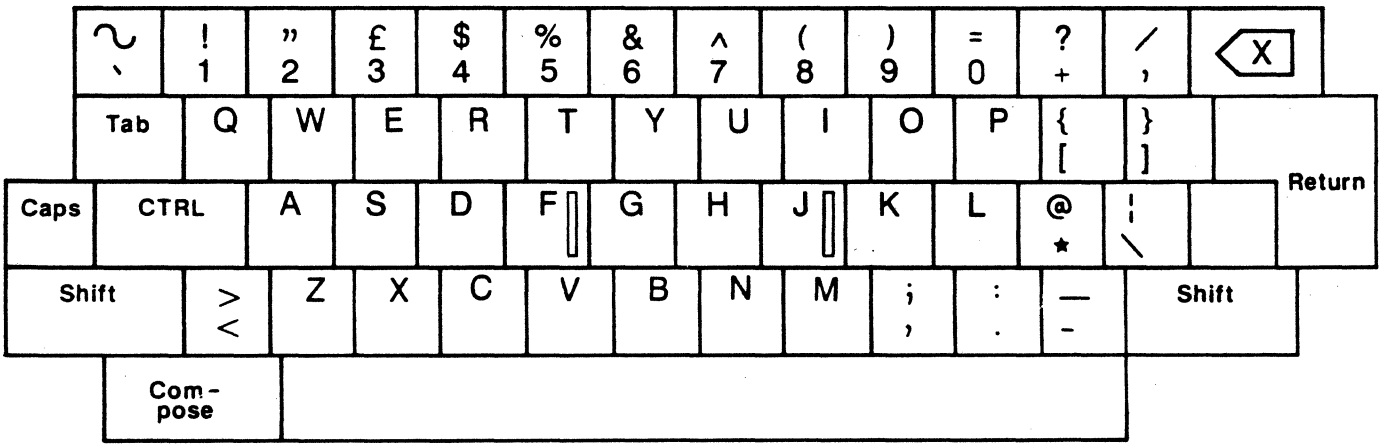


Figure C-6: English / UK

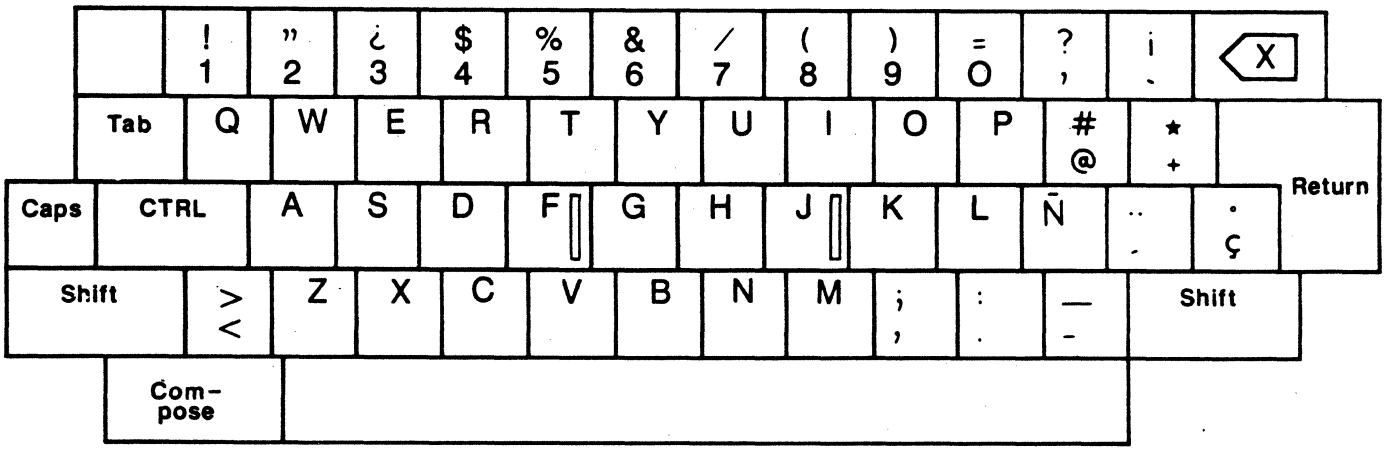


Figure C-7: Spanish (EUR) - ESPANOL EUR.

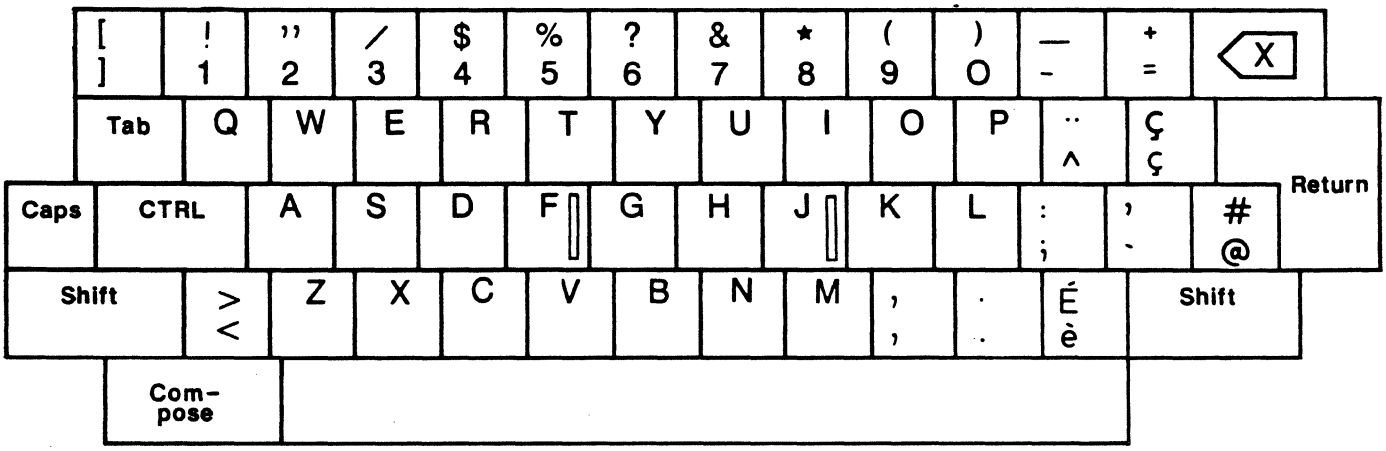


Figure C-8: Canadian / CANADIEN

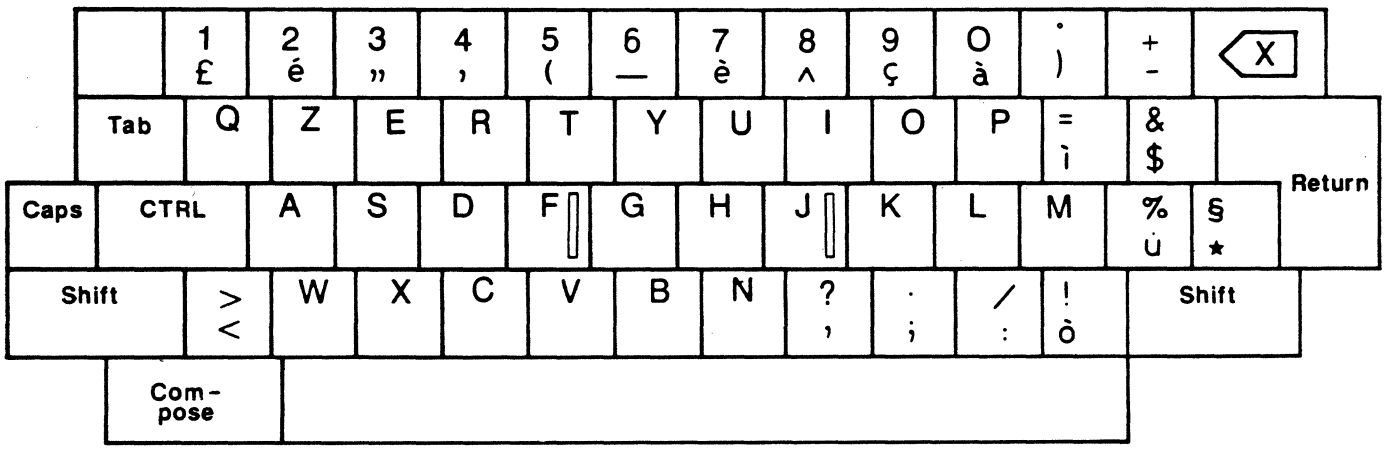


Figure C-9: Italian / ITALIANA

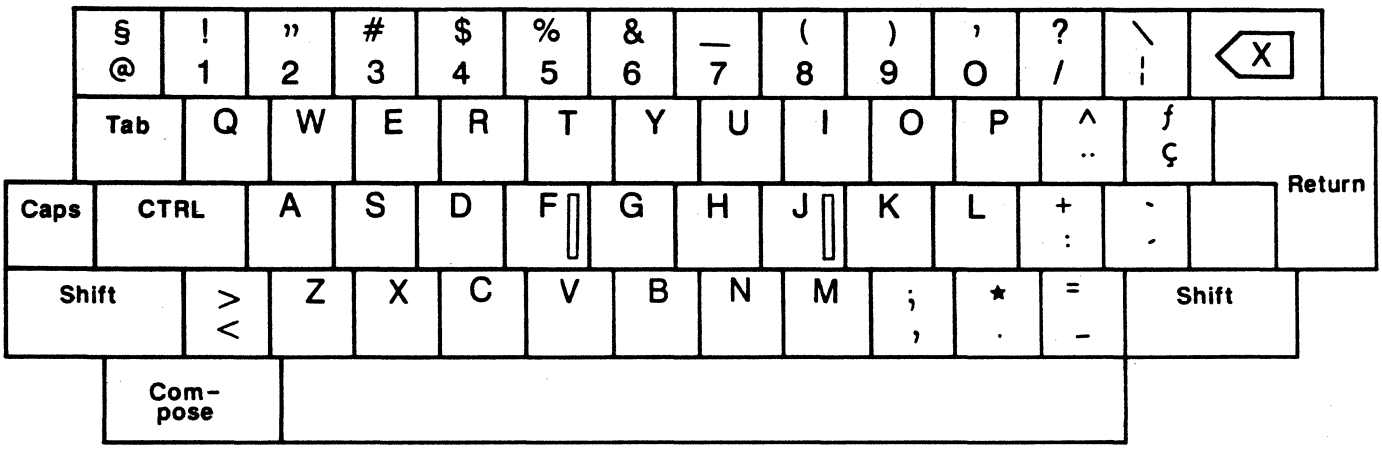


Figure C-10: Dutch / NEDERLANDS

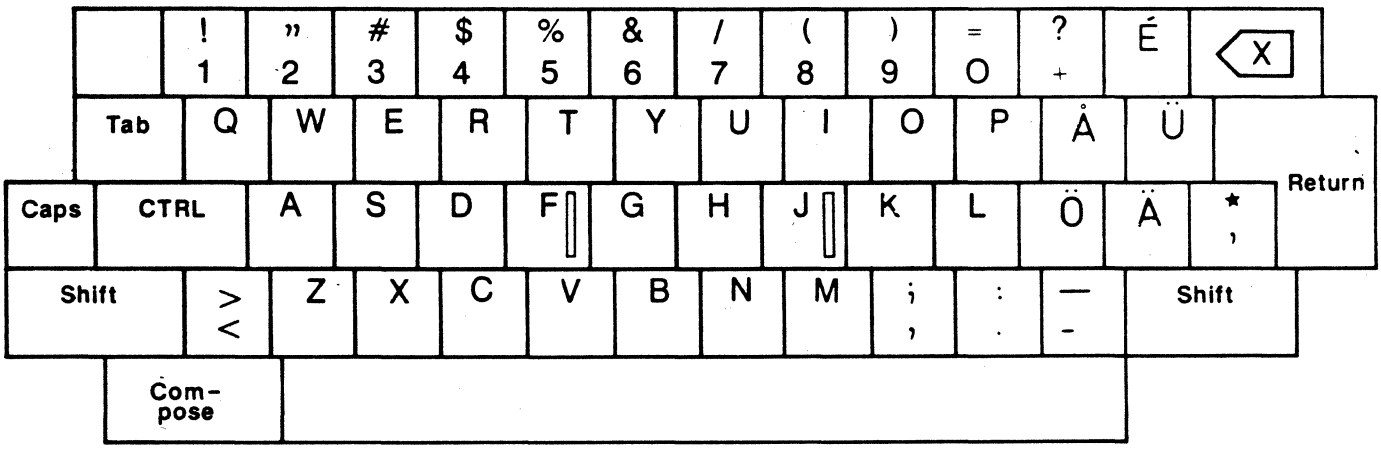


Figure C-11: Finnish / SUOMI

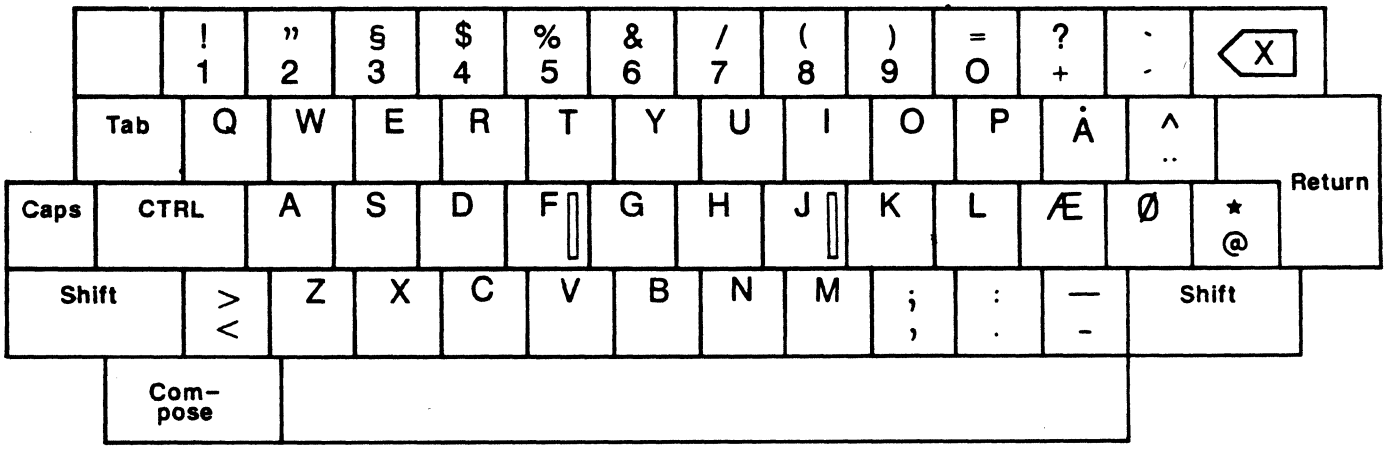


Figure C-12: Danish / DANSK

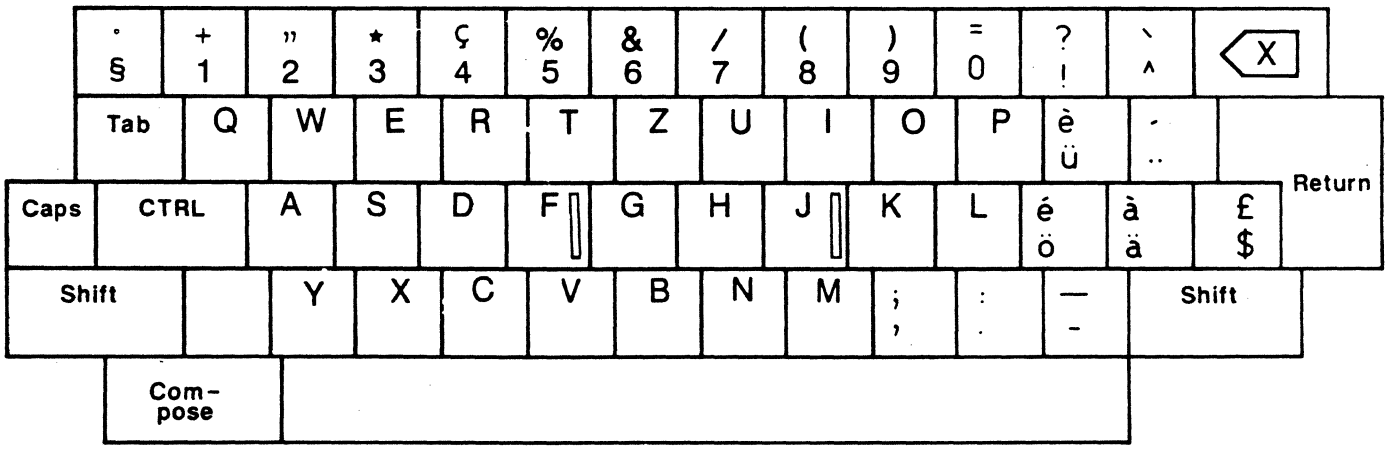


Figure C-13: Swiss (German)

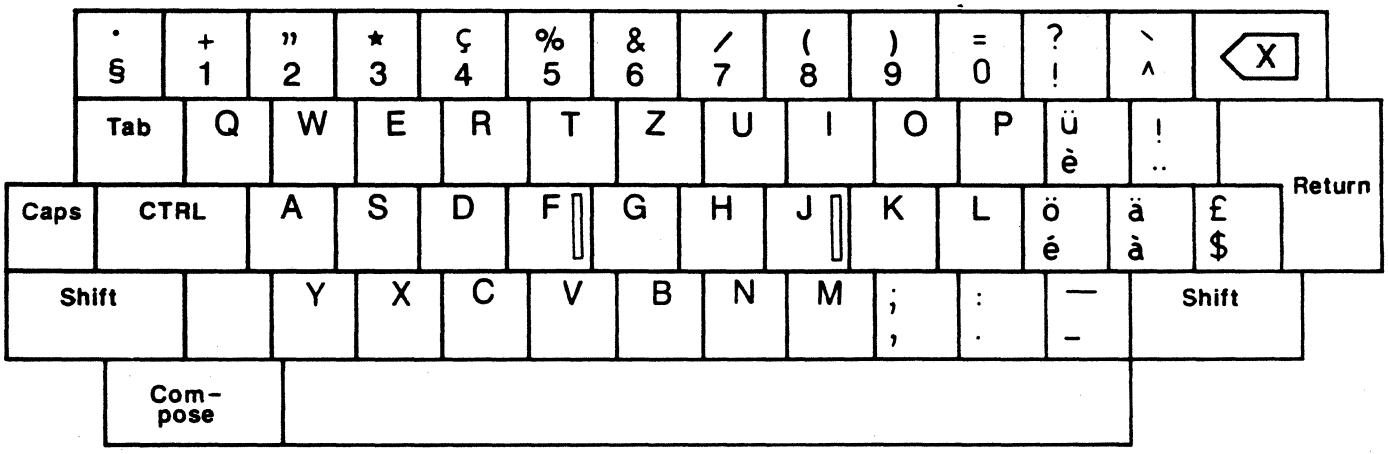


Figure C-14: Swiss (French)

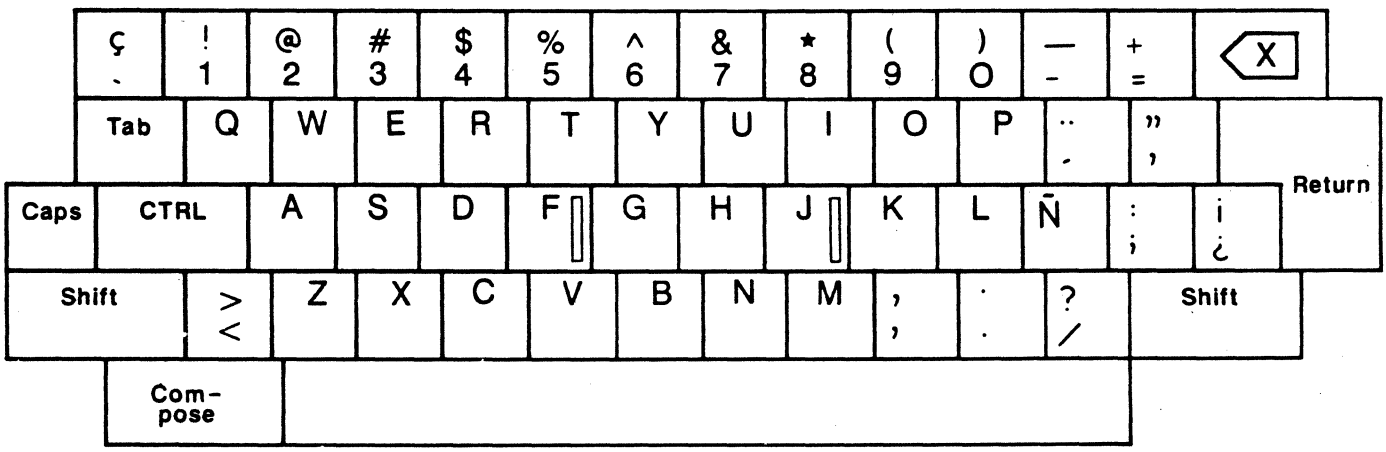


Figure C-15: Spanish (Latin America) / ESPANOL LAT.

APPENDIX B CHARACTERS SETS

ROW \ COLUMN	b4 b3 b2 b1	0 (b8 b7 b6 b5 = 0 0 0 0)		1 (0 0 0 1)		2 (0 0 1 0)		3 (0 0 1 1)		4 (0 1 0 0)		5 (0 1 0 1)		6 (0 1 1 0)		7 (0 1 1 1)	
0	0 0 0 0	NU	0 0 0	DL	20 16 10		40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
1	0 0 0 1	SH	1 1 1	D1	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	SX	2 2 2	D2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	EX	3 3 3	D3	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	ET	4 4 4	D4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	EQ	5 5 5	NK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	AK	6 6 6	SY	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BL	7 7 7	EB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SC	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	EC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	[	133 91 5B	k	153 107 6B	{	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	\	134 92 5C	l	154 108 6C	|	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	-	55 45 2D	=	75 61 3D	M	115 77 4D	]	135 93 5D	m	155 109 6D	}	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	~	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	DT	177 127 7F

◄OCTAL
◄DECIMAL
◄HEXA-DECIMAL

Figure D-1 ASCII Characters

ROW \ COLUMN	b4 b3 b2 b1	8 (b8 b7 b6 b5 = 1 0 0 0)		9 (1 0 0 1)		10 (1 0 1 0)		11 (1 0 1 1)		12 (1 1 0 0)		13 (1 1 0 1)		14 (1 1 1 0)		15 (1 1 1 1)	
0	0 0 0 0	8 0	200 128 80	9 0	220 144 90	A 0	240 160 A0	o	260 176 B0	À	300 192 C0	D 0	320 208 D0	à	340 224 E0	F 0	360 240 F0
1	0 0 0 1	8 1	201 129 81	9 1	221 145 91	¡	241 161 A1	±	261 177 B1	Á	301 193 C1	Ñ	321 209 D1	á	341 225 E1	ñ	361 241 F1
2	0 0 1 0	8 2	202 130 82	9 2	222 146 92	¢	242 162 A2	2	262 178 B2	Â	302 194 C2	Ò	322 210 D2	â	342 226 E2	ò	362 242 F2
3	0 0 1 1	8 3	203 131 83	9 3	223 147 93	£	243 163 A3	3	263 179 B3	Ã	303 195 C3	Ó	323 211 D3	ã	343 227 E3	ó	363 243 F3
4	0 1 0 0	8 4	204 132 84	9 4	224 148 94	A 4	244 164 A4	B 4	264 180 B4	Ä	304 196 C4	Ô	324 212 D4	ä	344 228 E4	ô	364 244 F4
5	0 1 0 1	8 5	205 133 85	9 5	225 149 95	¥	245 165 A5	µ	265 181 B5	Å	305 197 C5	Õ	325 213 D5	å	345 229 E5	õ	365 245 F5
6	0 1 1 0	8 6	206 134 86	9 6	226 150 96	A 6	246 166 A6	¶	266 182 B6	Æ	306 198 C6	Ö	326 214 D6	æ	346 230 E6	ö	366 246 F6
7	0 1 1 1	8 7	207 135 87	9 7	227 151 97	§	247 167 A7	·	267 183 B7	Ç	307 199 C7	Œ	327 215 D7	ç	347 231 E7	œ	367 247 F7
8	1 0 0 0	8 8	210 136 88	9 8	230 152 98	¤	250 168 A8	B 8	270 184 B8	È	310 200 C8	Ø	330 216 D8	è	350 232 E8	ø	370 248 F8
9	1 0 0 1	8 9	211 137 89	9 9	231 153 99	©	251 169 A9	1	271 185 B9	É	311 201 C9	Ù	331 217 D9	é	351 233 E9	ù	371 249 F9
10	1 0 1 0	8 A	212 138 8A	9 A	232 154 9A	ª	252 170 AA	º	272 186 BA	Ê	312 202 CA	Ú	332 218 DA	ê	352 234 EA	ú	372 250 FA
11	1 0 1 1	8 B	213 139 8B	9 B	233 155 9B	«	253 171 AB	»	273 187 BB	Ë	313 203 CB	Û	333 219 DB	ë	353 235 EB	û	373 251 FB
12	1 1 0 0	8 C	214 140 8C	9 C	234 156 9C	¬	254 172 AC	¼	274 188 BC	Ì	314 204 CC	Ü	334 220 DC	ì	354 236 EC	ü	374 252 FC
13	1 1 0 1	8 D	215 141 8D	9 D	235 157 9D		255 173 AD	½	275 189 BD	Í	315 205 CD	Ý	335 221 DD	í	355 237 ED	ý	375 253 FD
14	1 1 1 0	8 E	216 142 8E	9 E	236 158 9E	®	256 174 AE	¾	276 190 BE	Î	316 206 CE	D E	336 222 DE	î	356 238 EE	F E	376 254 FE
15	1 1 1 1	8 F	217 143 8F	9 F	237 159 9F	¯	257 175 AF	¿	277 191 BF	Ï	317 207 CF	ß	337 223 DF	ï	357 239 EF	□	377 255 FF

Figure D-2 International Characters

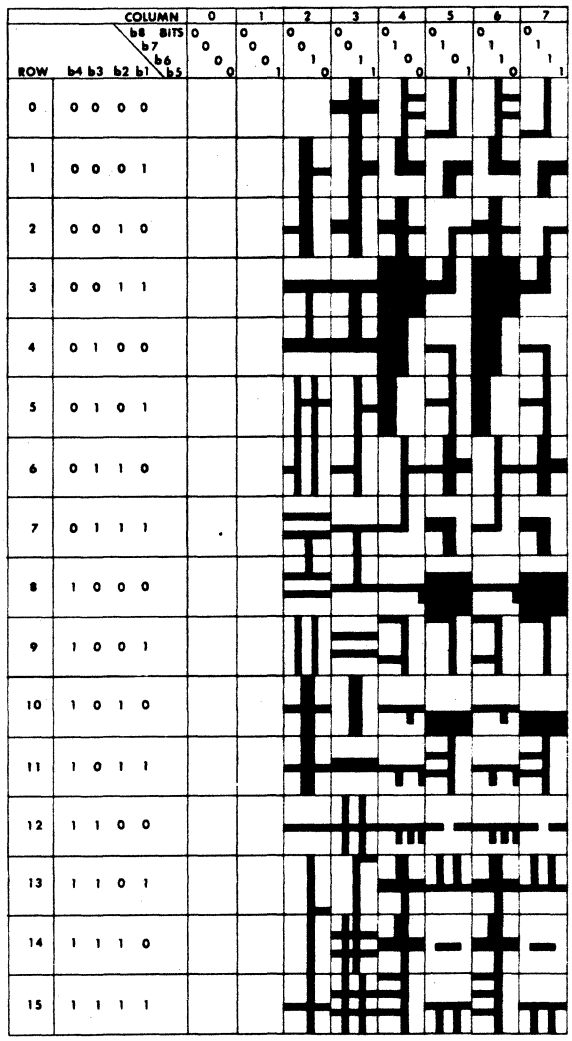
ROW \ COLUMN	b4 b3 b2 b1	0 (b8 b7 b6 b5 = 0 0 0 0)		1 (0 0 0 1)		2 (0 0 1 0)		3 (0 0 1 1)		4 (0 1 0 0)		5 (0 1 0 1)		6 (0 1 1 0)		7 (0 1 1 1)	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10		40 32 20	0	60 48 30	@	100 64 40	P	120 80 50		140 96 60	— SCAN 3	160 112 70
1	0 0 0 1	SH	1 1 1	D1	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51		141 97 61	— SCAN 5	161 113 71
2	0 0 1 0	SX	2 2 2	D2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52		142 98 62	— SCAN 7	162 114 72
3	0 0 1 1	EX	3 3 3	D3	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53		143 99 63	— SCAN 9	163 115 73
4	0 1 0 0	ET	4 4 4	D4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54		144 100 64	├	164 116 74
5	0 1 0 1	EQ	5 5 5	NK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55		145 101 65	┤	165 117 75
6	0 1 1 0	AK	6 6 6	SY	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56		146 102 66	┴	166 118 76
7	0 1 1 1	BL	7 7 7	EB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	±	147 103 67	┬	167 119 77
8	1 0 0 0	BS	10 8 8	CN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58		150 104 68	│	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59		151 105 69	≤	171 121 79
10	1 0 1 0	LF	12 10 A	?	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A		152 106 6A	≥	172 122 7A
11	1 0 1 1	VT	13 11 B	EC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	[	133 91 5B		153 107 6B	π	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	\	134 92 5C		154 108 6C	≠	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	-	55 45 2D	=	75 61 3D	M	115 77 4D	]	135 93 5D		155 109 6D	£	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E		156 110 6E	·	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	SCAN 1	157 111 6F	DEL	177 127 7F

Figure D-3 Line Drawing Characters

b4	b3	b2	b1		2	3	4	5	6	7
0	0	0	0	0		¯	â	Å	Á	Þ
0	0	0	1	1	À		ê	î	Ã	þ
0	0	1	0	2	Â		ô	Ø	ã	
0	0	1	1	3	È	º	û	Æ	Đ	
0	1	0	0	4	Ê	Ç	á	å	đ	
0	1	0	1	5	Ë	ç	é	í	Í	
0	1	1	0	6	Î	Ñ	ó	ø	Ì	–
0	1	1	1	7	Ï	ñ	ú	æ	Ó	¼
1	0	0	0	8	´	¡	à	Ä	Ò	½
1	0	0	1	9	`	¿	è	ì	Õ	ª
1	0	1	0	10	ˆ	○	ò	Ö	õ	º
1	0	1	1	11	¨	£	ù	Ü	Š	«
1	1	0	0	12	˜	Y	ä	É	š	■
1	1	0	1	13	Ù	§	ë	ï	Ú	»
1	1	1	0	14	Û	ƒ	ö	ß	Ÿ	±
1	1	1	1	15	£	¢	ü	Ô	ÿ	

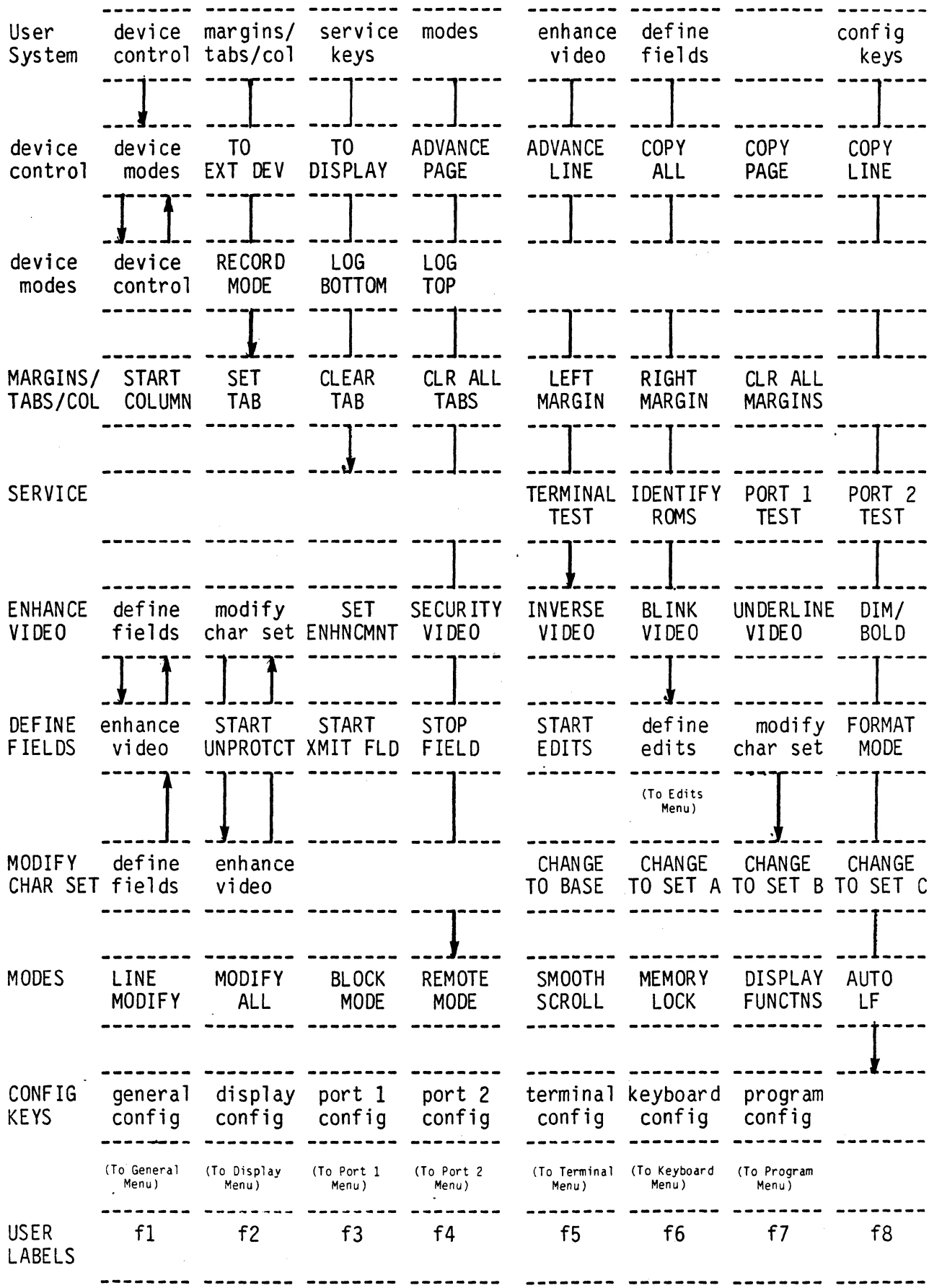
Roman Extension Set

HP Roman Extension Set
Figure D-4

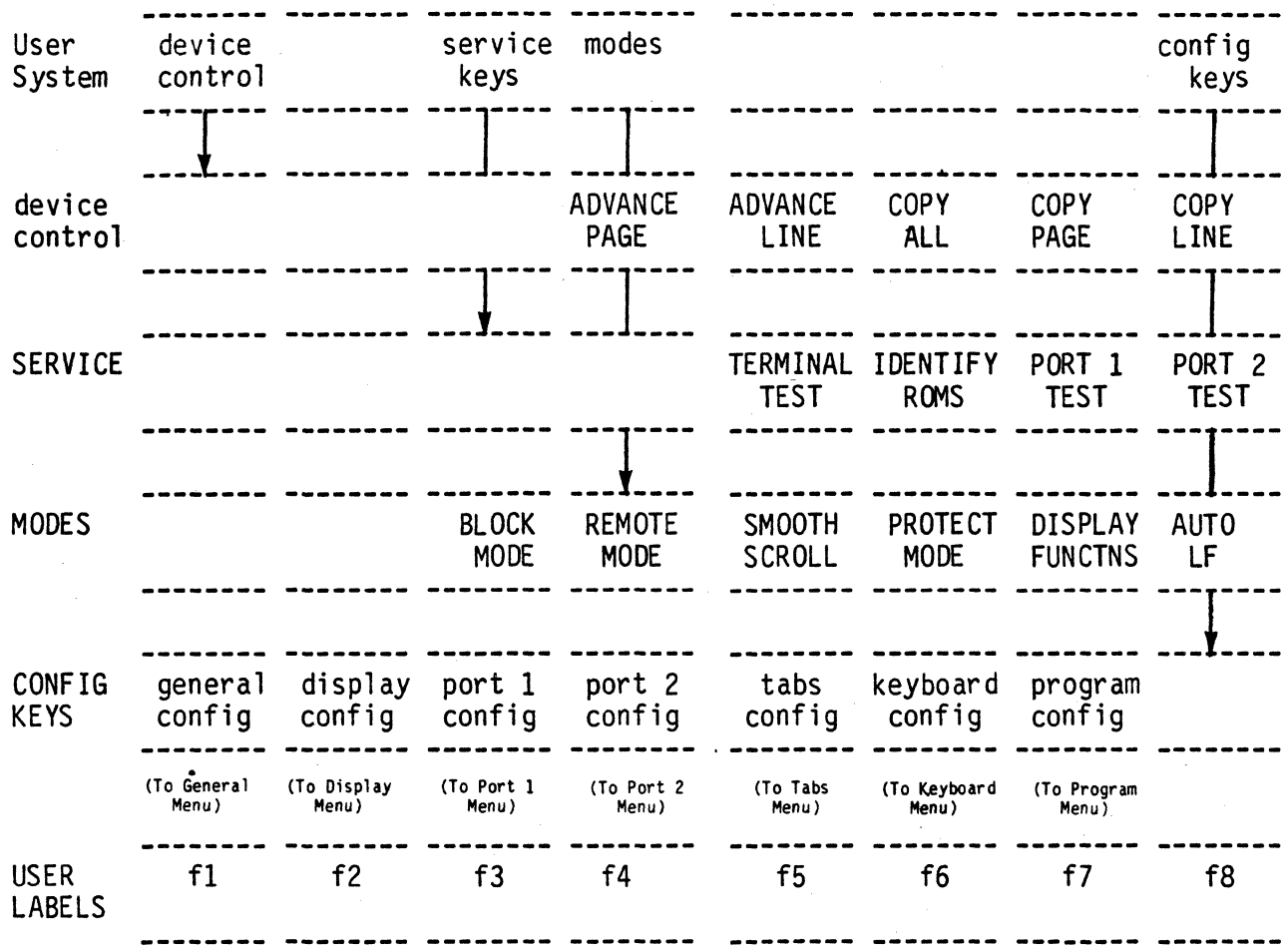


HP Line Drawing
Figure D-5

LABELS ACCESSIBLE WHILE IN HP MODE



LABELS ACCESSIBLE WHILE IN ANSI MODE



E-1.1 Communications Connections

A. Serial I/O Interface

DP25S (female) connector, 25-pin miniature, for on-line communications interfacing in Remote mode. Pin assignments:

RS232C (Standard)

1 - Protective Ground
2 - Transmitted Data
3 - Received Data
4 - Request to Send
5 - Clear to Send
7 - Signal Ground
8 - Carrier Detect - [See "CAUTION" note on following page]
20 - Data Terminal Ready

Electrical Characteristics

Teleray Output Voltages - On all signals designated "from Teleray", the mark, or unasserted state, is -6.0 V to -12.0 V; the space, or asserted state, is +6.0 V to +12.0 V.

Teleray Input Voltages - On signals designated "to Teleray", -25.0 V to -0.75 V or an open circuit is interpreted as a mark or unasserted state, and +25.0 V to +0.75 V is interpreted as a space or asserted state. Voltages greater in magnitude than + 25 V are not allowed. These level are compatible with EIA STD RS232C and CCITT Recommendation V.28.

Full Duplex Protocol

Full duplex operation is implemented for full duplex modems (Bell 103). If local echo is disabled, keyed data transmits from the terminal and is not displayed. If local echo is enabled, keyed data transmits from the terminal and to the display. The Data Terminal Ready signal is asserted and Carrier Detect is ignored. If Clear to Send is connected but not asserted, then no data is transmitted.

Half Duplex Protocol

Half duplex is implemented for half duplex modems (Bell 202). Local echo is enabled causing keyed data to transmit from the terminal and to the display. Request to Send is asserted upon keyboard data entry and negated following transmission of a Line Feed or a Form Feed. In Block mode, Request to Send is asserted during a block transmission only. Clear to Send must be asserted for data to transmit.

Signal descriptions follow:

Protective Ground - Pin 1
This conductor is electrically bonded to the Teleray chassis. Use of this conductor for reference potential purposes is not allowed.

Transmitted Data (from Teleray) - Pin 2
The Teleray transmits serially encoded characters and break signals on this circuit, which is held in the mark state when neither characters nor break signals are being transmitted.

Received Data (to Teleray) - Pin 3
The Teleray receives serially encoded characters generated by the user's equipment on this circuit.

Request to Send (from Teleray) - Pin 4
Asserted at all times when terminal is in Character mode, asserted during transmits in Block mode.

Clear to Send (to Teleray) - Pin 5
Must be asserted to allow the Teleray to transmit. Input for Busy/Ready.

Signal Ground - Pin 7
This conductor establishes the common ground reference potential for all voltages on the interface. It is permanently connected to the Teleray logic ground and to the Teleray chassis.

Carrier Detect (to Teleray) - Pin 8
Must be asserted to allow the Teleray to receive.

Data Set Ready (to Teleray)
Busy Ready - Pin 6
This peripheral port signal is used to control the flow of data to the peripheral port. Its active level and its control effect can be programmed in the Selection Menu or by escape sequence.

Data Terminal Ready (from Teleray) - Pin 20
Data Terminal Ready is asserted at all times except under the following conditions:

1. Terminal is not powered up.
2. Terminal is in Local mode.
3. Busy/Ready selected and terminal busy.

CAUTION:

All Teleray terminals comply with the EIA STD RS232C and CITT Recommendation V.28.

Standard definition for pin 8 (carrier detect) is that the level must be asserted to allow the terminal to receive data.

HP2392A terminals are not compatible with the standard RS232C definition for pin 8 (carrier detect). A low signal level on pin 8 will not effect the HP2392A's ability to receive data.

Although standard wiring practice will not create a communications problem: using a 25 pin direct connect cable to an ATC (Asynchronous Terminal Controller) will.

If the terminal fails to receive data following installation it is very likely that the cabling configuration is such that pin 8 (data carrier detect) is low, by disabling the cable lead going to pin 8 of the 25 pin connector, an internal resistor will reassert the carrier detect level to allow the terminal to receive data.

If you have any further questions, call:

in Minnesota (612) 941-3300
in the rest of the United states) (excluding Alaska and Hawaii 1-800-328-6397

EIA RS232C Signals

CCITT Circuit Number	EIA RS232C	Title	TELERAY Serial I/O Pin No.	Comments
101	AA	Protective Ground	1	Chassis Ground
103	BA	Transmitted Data from terminal	2	Logical "0" = High +12V Logical "1" = Low -12V Idle = Low
104	BB	Received Data to terminal	3	Logical "0" = High +12V Logical "1" = Low -12V Idle = Low
105	CA	Request to Send signal from terminal	4	Goes high when terminal is ready to transmit
106	CB	Clear to Send signal to terminal	5	Must be high to allow terminal to transmit
102	AB	Signal Ground	7	Logic Ground
109	CF	Carrier Detect signal to terminal	8	Must be HIGH to allow terminal to receive
108/2	CD	Data Terminal Ready signal from terminal	20	High when Teleray is On Line

B. Peripheral I/O Interface

The Teleray Model 20 has a bi-directional RS232 peripheral interface.

Pin assignment and electrical characteristics are identical to those of the serial I/O interface.

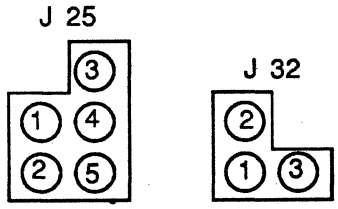
C. Optional Current Loop (for Serial I/O only)

The optional current loop chips install in the logic board module at grid 2C and 3C. When installed, the current loop signals become active in the serial I/O connector on the pins shown on following page.

To activate the current loop, an extra jumper is required on the circuit board at J32 (see Model 20 Service Manual).

Current Loop (Optional)

24	Transmitted Data +
18	Transmitted Data -
23	Received Data +
21	Received Data -



move jumper shunt from J25 1 & 4 to J25 1 & 2

add jumper shunt to J32 1 & 3

In most current loop applications, the Teleray will be connected in a passive configuration (current is supplied to the Teleray). The transmitter and receiver are both passive, and both are optically isolated from the Teleray power and grounding. The transmitter goes to the mark state when power is turned off.

Conversion from active to passive (or vice versa) requires reconfiguring the current loop logic. (See Model 20 Service Manual).

In active mode, either the transmitter or the receiver or both may be connected so that the Teleray sources the 20 mA of current. In active mode, the signals are not electrically isolated from Teleray's ground, and the transmitter will go to the space state when power to the Teleray is turned off.

Electrical Characteristics

The electrical characteristics of the 20 mA current loop interface are shown below:

Transmitter

	Min	Max
Open circuit voltage	5.0 V	60 V
Voltage drop marking	-	3.0 V
Spacing current	-	2.0 mA
Marking current	10 mA	40 mA

Receiver

	Min	Max
Voltage drop marking	-	2.5 V
Spacing current	-	8.0 mA
Marking current	12 mA	40 mA

In addition to the above specifications for passive operation, if the current loop is configured as an active current switch the transmitter and receiver is in series with a source of 12 V + 5% and 600 ohms.

D. RS422 Option

The Teleray RS422 interface (data only) is provided as an option to the standard RS232 interface. It is installed in locations 2D and 3D on the logic board.

RS422 specifies the electrical characteristics of a balanced voltage digital interface circuit, normally used to connect serial binary signals between data terminal equipment and data communications equipment or any point-to-point interconnection of serial binary signals between digital equipment. The balanced voltage digital interface circuit is normally utilized on data timing or control circuits where the data signal rate is up to 10 megabits per second. While the balanced interface is intended for use at high data signaling rates, it may be required or used if any of the following conditions prevail.

1. Interconnecting cable is too long for effective unbalanced operation.
2. The interconnecting cable is exposed to extraneous noise sources that may cause unwanted noise on the signal connector.
3. It is necessary to minimize interference with other signals.
4. Inversion of signals may be required; i.e., plus mark to minus mark may be obtained by inverting the cable pairs.

One RS422 driver has the capability to furnish the DC signal necessary to drive 10 parallel connected receivers. However, the physical arrangement of multiple receivers may degrade dynamic characteristics of the line if not properly implemented. Cabling should be done with twisted pairs.

To activate RS422, extra jumpers are required on the circuit board at J32(1-2), J21(2-3), J23(2-5), J24(1-2), J25(1-2) and J25(3-4). (See Model 20 Service Manual.)

RS422 (Optional)

10 Transmitted Data +
9 Transmitted Data -
18 Received Data +
3 Received Data -

E. Optional Composite Video

The Teleray can be optionally supplied with a composite video output. This output is similar to EIA RS170 with the following exceptions:

1. The signal is non-interlaced.
2. Video rate is 13 MHz, exceeding the band width of some RS170 type monitors.

GLOSSARY

ANSI
: American National Standards Institute; when suffixed, the suffix specifies the ANSI document number of a standard.

ANSI Mode
: A Teleray mode in which the Teleray recognizes and responds only to escape sequences whole syntax and semantics are in accordance with ANSI X3.64 standards.

Answerback
: A short, built-in message that allows the Teleray to automatically identify itself to the host computer without operator intervention. Similar to "identity," but separate messages are provided for identity and answerback.

Area Qualifications
: Teleray terminals allow display areas to permit only certain kinds of data to be entered; for example, numeric data only. Other areas are "protected" or guarded against operator (keyboard) input. These special areas are described in the manual as qualified areas. The specifications of what type of data is allowed in the area qualification.

ASCII
: American Standard Code for Information Interchange as defined by ANSI.

Attribute
: In Teleray terminals, an attribute is a characteristic associated with a character position on the display screen. Each character position can be programmed with attributes such as blink, dim, underscore, reverse video, and protect. Also see area qualifications.

Baud
: The number of data bits transmitted serially each second over a communication line.

Binary
: A numbering system with a radix of two; the two numerals used are 0 and 1.

Bit
: A single unit of information; a digit in the binary numbering system.

Busy/Ready
: An electrical signal used to indicate that a device's input buffer is filled and that the device cannot accept additional data or that the device is ready for more data. This signal is usually electrically compatible with EIA RS232, but pin assignment is randomly selected by printer and computer manufacturers. The signal is also used on printers to indicate a paper out condition, ribbon failure or OFF line status.

Character
: A member of a set of elements used to represent information. Characters are classified in groups called character sets, such as alphabetical characters, numeric characters, special sign and symbol characters, and control characters.

Character Code
A combination of bits that represent a character in a character set.

Character Position
That portion of a visual display that is displaying or is capable of displaying a graphic symbol.

Character Set
A collection of characters grouped together for a special purpose. The central character set contains 32 characters, the Mosaic set 96 and the line drawing character set contains 96 characters.

Control Character
A character contained in Columns 1 and 2 of the ASCII code table which is intended to initiate control functions in the Teleray. A control sequence Introducer followed by certain ASCII characters is also considered a control character.

Control Function
An action that affects processing, transmitting, or interpreting data. This can be a control character or an escape sequence.

Cursor
A visual representation of the active position.

Cursor Control
A function that moves the active position (and the cursor).

Data
A general expression for the information that moves through a computer system or device.

Default
The value or condition that will be assumed by the Teleray if no explicit value is specified.

Display
The current active area of the screen; i.e., the area inside the scrolling region, or the entire screen.

Escape Character (ESC)
A control character used as a control sequence introducer is a prefix affecting the interpretation of a limited number of subsequent characters. Note that this entire sequence may also be considered as a control character.

Escape Sequence
A sequence of characters used to perform a control function. The first character is the escape (ESC) control character.

Graphic Character
A character, other than a control character, that has a visual representation.

Guarded
: Providing protection. For example 1) an area may be guarded from operator meaning input that the operator cannot enter data in this area of 2) an area may be guarded against transmission meaning that subsequent transmit operations will not include this area.

Hexadecimal
: A numbering system with 16 counting elements; decimal has 10 counting elements and 0 thru 9 are used to represent them. Hexadecimal has 16 counting elements and 0 thru 9, A thru F are used to represent them.

Host Computer
: The computer controlling operation of a Terminal.

Home
: The origin character position which is usually the upper left corner of the screen. The home or origin position may be dynamically changed in the Teleray.

Identity
: See answerback.

Local Echo
: Simulating echoing within the Terminal, so that the Terminal executes the keyboard data it transmits, without having it echoed by the receiving device.

Local Mode
: A mode which allows keyboard data to go directly to the screen without being transmitted.

Margins
: The margins define the columns between which the cursor is free to move. The margin settings (column numbers) are programmable and may define a column range running from 1 to 256.

Monitor Mode
: A Teleray mode which allows the display of control characters and escape sequences without acting on these characters. Usually used to analyze received data or macro keys.

No Scroll
: A special key used by the operator to indicate that he is busy (see busy/ready) and does not wish more data immediately. Teleray terminals coordinate this key with the internal busy/ready and suspend/resume protocol. This key is also used to resume data transmission.

Numeric Parameter
: A string of ASCII digit characters which represents a number.

Octal
: A numbering system with a radix of eight; the numeral used to represent an octal number range from 0 to 7. In this manual, octal numbers are enclosed in angle brackets (octal number).

Off-line
: A mode which allows keyboard data to go directly to the screen without being transmitted.

On-line
: The state of a device when it is communicating with a host device. The opposite of Local mode.

Parameter
: (1) A string of one or more numeric digit characters that represents a single value. (2) The value so represented.

Parameter String
: A string of numeric digit characters that represents one or more parameter values.

Parity
: An extra bit that is added to the code of each character and is used for error detection. When odd parity is used, the parity bit is set so the number of binary 1's in a character is odd, for even parity, the parity bit is set to maintain an even number of 1's. Errors can be detected by checking for the correct count of 1's in a character.

Qualifications
: Teleray terminals allow display areas to permit only certain kinds of data to be entered; for example, numeric data only. Other areas are "protected" or guarded against operator (keyboard) input. These special areas are described in the manual as qualified areas. The specifications of what type of data is allowed is the are qualification.

Selective Parameter
: A string of ASCII numeric characters that is used to select one item from several choices.

Serial Communication
: The process whereby bits are transmitted and received one at a time. On a communication line, a character consists of a string of bits, and is not recognized at the receiving end until all of the bits have been received.

Suspend/Resume (XOFF/XON)
: This protocol indicates the busy/ready status of a device by transmitting control codes on the RS232 data lines. The ASCII codes DC3 and DC1 are used for busy and ready conditions, respectively.

Text
: A notation used in examples to indicate the occurrence of user text.

Window
: A window consists of one or more consecutive character rows and columns on the display screen. A window may contain from one to any number of rows or columns depending on the window definition but a memory dimension may not exceed the display memory size. The window contains the cursor and has all the features of a 24 by 80 display screen.

INDEX