TeleVideo 990

User's Guide

TeleVideo®

TeleVideo
990 Video Display Terminal
USER'S GUIDE

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Note Change: TUBE SIZE 14-inch
(12.0 Inch Diagonal Viewable Area)
CE Mark Compliance
(Selected Models)

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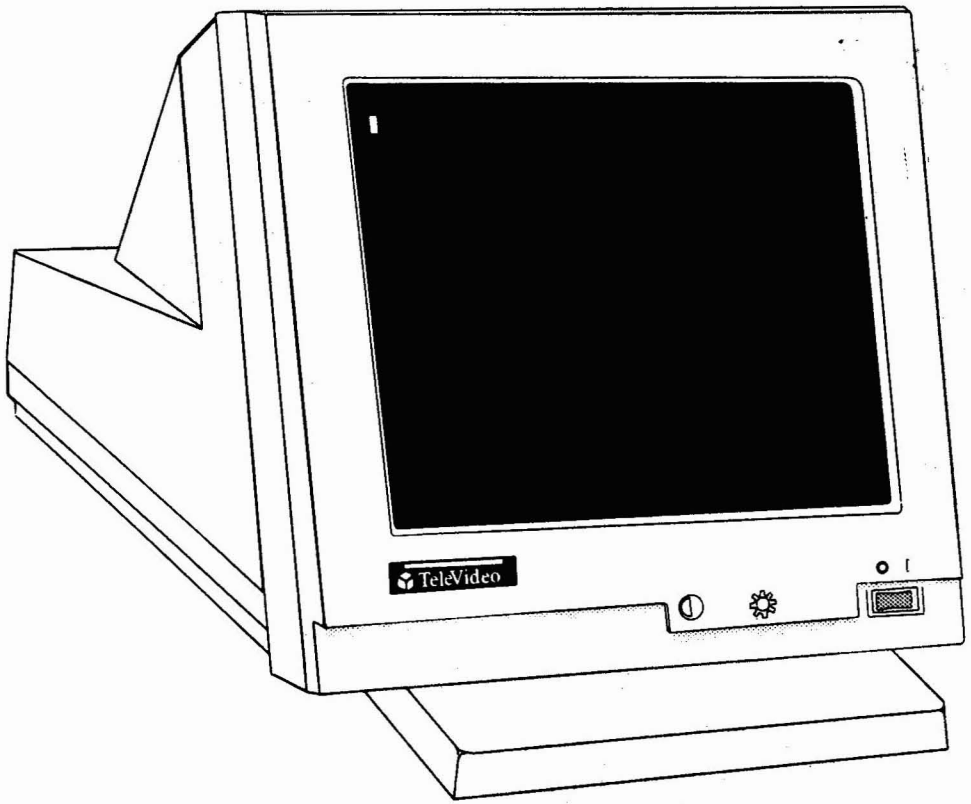
Chapter 3 OPERATION

The TeleVideo 990 is a high-performance terminal, designed to operate in the PC terminal, ASCII, and ANSI environments, providing considerable flexibility. It has also been designed to be user friendly. You'll find that the terminal is very easy to use, with many features that simplify your work.

Keep this manual near the terminal for future reference. The terminal will provide you with many years of trouble-free service.



The 990 Terminal

This manual is organized as follows:

- **Operation**: Installation, setup, daily operation, and problem-solving. Read this portion of the manual. It's written to help you take the best advantage of all the time-saving and work-saving features of the terminal. Chapters 1-4.

Procedural Keystrokes

Within procedural steps, you will be directed to press certain keys. The keys to be pressed will be shown with a box around the keycap legend. For example, the procedure may tell you to press

Ctrl →

This means to hold down the **Ctrl** key until you press the → key.

Similarly, the **Shift** and **Alt** keys are simultaneously pressed with other keys.

Escape Key Sequences

The terminal responds to escape sequences from the host or from the keyboard. To enter an escape sequence from the keyboard, momentarily press the **Escape** key, then sequentially press the keys for the string of characters shown in the escape sequence. To keep the command sequence on a local basis,, hold down the **Shift** key when you press the **Escape** key. (An unshifted Escape key sends the command sequence to the host.)

Command Code Variables

Command codes may have variable values as part of the code to be entered. Variables are shown in italics. For example, if you are directed to enter a date, it will be shown as *mm dd yy*.

Special Notices

This manual has three types of notices that require special attention:

NOTE Information of special interest or importance about a feature.

CAUTION

This procedure might destroy data or damage equipment. Make sure you read and understand thoroughly what you are doing before proceeding.

VORSICHT

Durch diesen Vorgang könnten Daten verloren gehen oder Hardware beschädigt werden. Stellen Sie sicher, daß Sie die Verfahren vor Beginn genauestens verstehen.

WARNING

This procedure might cause you physical harm. Stop what you're doing and read instructions carefully before proceeding. Call a service technician, if necessary.

WARNUNG

Dieses Verfahren könnte zu Körperverletzungen führen. Sofort das Verfahren stoppen und die Gebrauchsanweisungen sorgfältig vor Beginn durchlesen.

Chapter 1
Installation

This chapter contains instructions for installing the terminal. Following this is a section on connecting the COM1 (or COM2) serial port to a host computer, the COM2 (or COM1) serial port to a second host or serial printer, and the parallel port to a parallel printer.

Preparation

Before you start the installation process, plan your system layout:

- Prepare the site.
- Decide on a computer interface type and obtain all cables.

Choosing a Site

- Choose a location with indirect lighting from windows or other sources of indirect light.
- Allow about 4 inches (10 cm) of clearance for ventilation on all sides.
- Place the keyboard lower than the screen.
- Select furniture conducive to good working posture.

Interface Types and Cables

The type of interface you select depends on the distance between the host and the terminal.

If the distance between the terminal and your computer or modem is less than 50 feet, connect them with an interface cable that mates with the serial ports on the terminal.

Cables for connecting the terminal to a computer, modem, or printer are not included with the terminal. The service technician in your organization should be able to obtain the cables, or you can contact a computer supply dealer.

Installation

Review the entire installation procedure before you start. Make sure you have the necessary cables and have prepared a suitable location, as instructed in the previous sections.

WARNING

Never open the terminal case. You can receive a serious electrical shock, even when the terminal is off and unplugged. Always call a technician to service the interior of the terminal.

WARNUNG

Öffnen Sie niemals das Datenstationsgehäuse. Dies könnte zu einem schweren elektrischen Schlag führen, sogar wenn die Datenstation augeschaltet oder augesteckt ist. Wenden Sie sich immer an Ihren Service-Techniker, wenn Sie glauben, daß irgenwelche Arbeit innerhalb der Datenstation nötig ist.

Unpacking the Terminal

Inspect all parts for damage. If anything is missing or damaged, contact your distributor or dealer. Save the shipping material in case you move or ship the terminal again.

Attaching the Keyboard

CAUTION

Never disconnect or connect the keyboard when the power is on. Doing so can seriously damage the terminal.

Plug the end of the coiled keyboard cable into its connector on the rear panel (see Figure 1-1).

Connecting a Parallel Printer

Make sure your printer is a Centronics-compatible printer. Connect its cable between the (default) PARALLEL port on the terminal (Figure 1-1) and the parallel port on the printer. See the pin assignment tables at the end of this chapter to verify the type of cable required.

Connecting a Serial Printer

If you use a serial printer, connect its cable to the COM2 (or COM1) serial port (Figure 1-1) on the terminal. See the pin assignment tables at the end of this chapter to help you determine the type of cable for your printer. Since a serial printer is not the default configuration you need to run set up (Chapter 2) before printing.

Host Connections

Make sure you have the appropriate interface, as discussed at the beginning of this chapter. For an RS-232C interface, connect the cable between the COM1 port and the RS-232C port on the host or modem. The COM2 port has a 9-pin connector. If you have to rewire the cable for proper communication with the computer, see the pin assignments for COM1 and COM2 ports on the following pages.

Port Pin Assignments

The terminal has two serial communication ports and a parallel printer port.

Serial Ports

Determine the signals that each unit requires. Typically, the terminal requires only Transmit Data, Receive Data, and Ground for serial communication. Some computers, however, may require additional signals. Find out if the serial port for each interface is data communication equipment (DCE) or data terminal equipment (DTE) type. Check the host computer and printer manuals for data on port type, required signals, and signal direction.

NOTE: Before buying any cables, check pin assignments in Table 1-1, Table 1-2, and for the connector on the host computer. Make sure the connectors at each end mate (male to female) properly.

COM1 Serial Port

The COM1 port has a female 25-pin D-connector; your computer or printer may not have a 25-pin connector (some units have a 9-pin connector) or the DCE/DTE interfaces may not match up. In such cases, consult a technician or your dealer for assistance. When connecting the COM1 port to a host computer, refer to its manual and Table 1-1.

Table 1-1. COM1 Port (DTE) Signals

Pin	Mnemonic	Function	Direction
1		Frame ground	n/a
2	TXD	Transmit data	Output
3	RXD	Receive data	Input
4	RTS	Request to send	Output
5	CTS	Clear to send	Input
6	DSR	Data set ready	Input
7	GND	Signal ground	n/a
8	DCD	Data carrier detect	Input
20	DTR	Data terminal ready	Output

COM2 Serial Port

The COM2 port has a male 9-pin D-connector; please note that its pin connections are not the same as on the COM1 port.

Since the terminal has the capability to toggle (Host 1 or Host 2) between two host computers, use the COM2 port to connect to the second host.

NOTE: Before buying any cables, check pin assignments for COM1 and COM2 (Tables 1-1 and 1-2) and for the connector on the device. Make sure the connectors at each end mate (male to female) properly.

Check the port connector on the second host. Make sure the cable you use has connectors (9-pin or 25-pin) that mate with connectors on the terminal and host computer.

If you connect the COM2 port to a serial printer, use a cable with a female 9-pin D-connector; the other end must mate with the printer connector.

When connecting the COM2 port to a computer or other serial device, refer to Table 1-2, and to the manual supplied with the computer or device.

Table 1-2. COM2 Port Signals

Pin	Mnemonic	Signal Name	Direction
1	DCD	Data carrier detect	Input
2	RXD	Receive data	Input
3	TXD	Transmit data	Output
4	DTR	Data terminal ready	Output
5	GND	Signal ground	n/a
6	DSR	Data set ready	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9		Not connected	n/a

Serial Port Verification

Verify correct cabling to each computer or serial device. Run Set Up; verify that parameters in the COM1 and COM2 menus agree with the manufacturer's parameters for each device. If the terminal then fails to communicate properly with the computers (or serial printer), ask a service technician or your dealer for assistance.

Table 1-3. PARALLEL Port Signals

Pin	Mnemonic	Signal Name	Direction
1	STB	Data strobe	Output
2	PD0	Data bit 0	Output
3	PD1	Data bit 1	Output
4	PD2	Data bit 2	Output
5	PD3	Data bit 3	Output
6	PD4	Data bit 4	Output
7	PD5	Data bit 5	Output
8	PD6	Data bit 6	Output
9	PD7	Data bit 7	Output
10	ACK	Acknowledge	Input
11	BUSY	Printer is busy	Input
12	PE	Paper empty	Input
13		No connection	n/a
14		No connection	n/a
15	ERR	Printer error state	Input
16		No connection	n/a
17-25	GND	Signal ground	n/a

PARALLEL Port

The parallel port has a 25-pin D-connector, with Centronic-compatible signal levels. At a print command, the STROBE signal gates the first byte of data out on data lines DO-D7 to the printer. The printer responds with acknowledge signal ACK, and the process repeats until the last byte is sent to the printer. The presence of any other input signal from the printer (BUSY, PE, or ERR) will inhibit all data lines to the printer. Pin assignments are shown in Table 1-3.

Plugging In the Terminal

Do not push in the power switch before plugging in the terminal. Plug the power cable into the terminal first, then plug the cable into a grounded wall outlet.

> **NOTE**: In the United States, use a three-prong electrical outlet with a National Electrical Manufacturer's Association (NEMA) Standard 5-15R rating. If you use a two-prong adapter, make sure it is properly grounded.

Turning On the Power

To turn on the power, press the right side of the green rocker switch on the front of the terminal; make sure the switch is illuminated.

After 10 to 15 seconds, a cursor appears. (The default cursor is a blinking block.) There may be a status line above the cursor, and you may see a login message if the terminal is connected to a host computer.

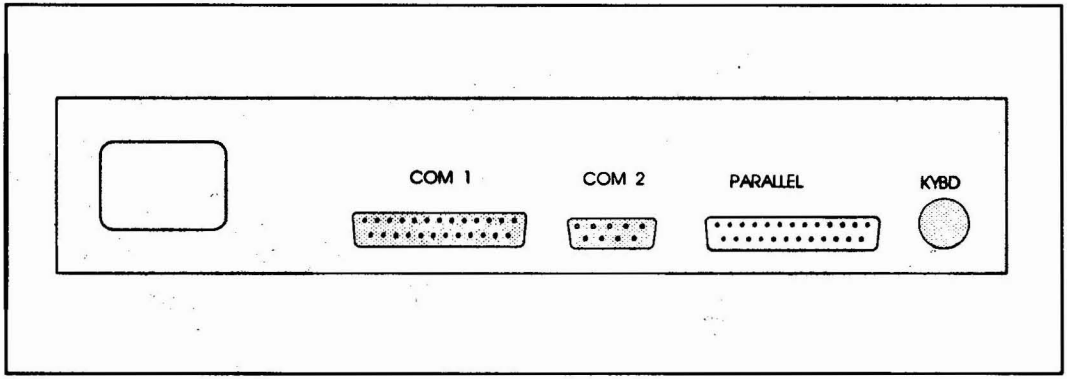


Figure 1-1. Rear Connector Panel

Chapter 2
SET UP

The terminal is ready to operate when you turn it on, but you need to check that its parameters agree with your host, your printer and other peripherals, and your application programs.

There are three basic types of set-up parameters:

- Communication values that must match those of other system components. (For example, terminal and host must communicate at the same data rate.)
- Operating values that must agree with your application program. (Does your spread sheet require 80 or 132 characters per line? What terminal emulation mode does your program require?)
- Personal preference values. (silent or clicking keys? dark or light screen background?)

When in doubt about a particular parameter, don't change it. Default (factory set) values are those commonly employed in system communication and data entry/processing.

Application programs often reset terminal parameters for you automatically. Refer to your computer and application program manuals first, or consult your system manager, for specific information about your system.

Parameter Menus

This chapter presents the set-up menus. Their names are displayed near the top of the screen. See Figure 2-1.

The menu names and the parameters each menu controls are as follows:

COMMAND Exit, save parameters, recall parameters, default parameters, clear screen, clear communications, reset terminal, and default key codes.

GENERAL Personality, enhanced mode, commmunication mode, monitor mode, line wrap, edit, font choice, send acknowledge, received carriage return, host port, dual host, maximum pages/host, printer port, print mode, print page flip, print data bits, and auto page flip.

DISPLAY Number of lines and columns per page, page length, status line attribute, top and bottom line content, cursor attributes, screen saver, refresh rate, screen and window background, and scrolling speed.

KEYBOARD Language, key click, caps lock, margin bell, edit key functions, left Alt key use, transmit keycode, programmable keys, and speaker attributes.

COM1 Serial port communication values.

COM2 Serial port communication values.

ATTRIBUTE Visual attribute characteristics, write-protect attributes.

ANSI Special for VT320, VT220, VT100/52 or SCO CONSOLE emulations only.

PROGRAM Function, editing, and numeric keypad key codes; plus answerback message and block send delimiters.

Entering Set Up

CAUTION

Before changing the personality or display configuration (number of lines, columns, or pages of memory), save any data on the screen before entering set up. Changing parameters clears the screen.

To enter set-up mode, use the procedure that is appropriate for your keyboard:

On an AT keyboard, press

Ctrl **Alt** **Esc**

On an ASCII keyboard, press

Shift **Set Up**

On a DEC style keyboard, press

F3

NOTE: Menus conform to keycap legends on the keyboard used. The menus shown are for an AT keyboard.

Use the cursor keys to move through the screen menus, and the space bar to toggle values.

The first eight menus present parameters from which you can choose a value or toggle an action. The Program menu branches to a group of submenus to reprogram keys and messages.

To save your choices, enter the COMMAND menu, and select SAVE PARAMETERS.

To exit without saving, select the COMMAND menu, then EXIT. Alternatively, follow the exit instructions in the help lines.

Help Lines

The two lines at the bottom of the menu show you how to move the cursor and choose options. Also shown are commands to print the screen, to save changes and exit, and to exit without saving.

The Command Menu

Each field in the Command menu brings about a terminal action, shown in Figure 2-1 and explained in the paragraphs that follow.

EXIT Leaves set up and returns to the previous screen display and operating modes. Does not save set-up values.

> NOTE: If you select any of the following commands with the spacebar, the screen will display the question "ARE YOU SURE (Y/N)?." If you press the **y** key, the command will be executed. If you press the **n** key, the command will be aborted.

SAVE PARAMETERS Saves current set-up values in nonvolatile memory.

CAUTION

The following action destroys all reprogrammed operating values!

RECALL PARAMETERS Resets current set-up values to those last saved in nonvolatile memory. If you accidentally change to incorrect values, this action recalls the last saved values.

DEFAULT PARAMETERS Resets set-up parameters to factory default values (except key codes and keyboard languages) if you are in single-host mode. If you are in dual-host mode, it resets set-up parameters (except key codes and keyboard languages) to factory default values for current session.

CLEAR SCREEN Clears screen display.

CLEAR COMMUNICATIONS Unlocks the keyboard; clears COM1 and COM2 buffers; disables any print mode enabled.

RESET TERMINAL Same as the power-on reset. Returns all operating values to those last saved in nonvolatile memory; leaves set up.

CAUTION

The following action destroys all reprogramming in the function and editing keys!

DEFAULT KEY CODES Returns editing and function keys to default codes of the current personality.

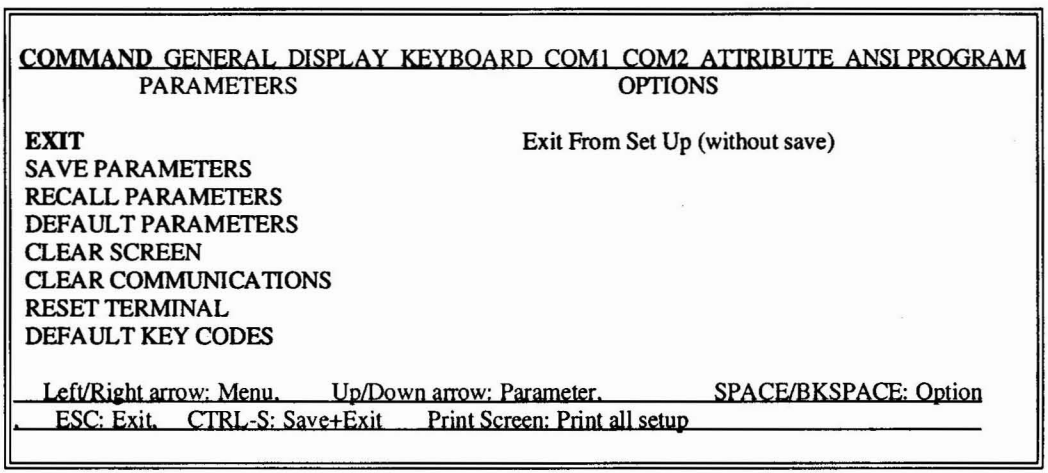


Figure 2-1. COMMAND Menu

The General Menu

The General menu (Figure 2-2) controls operating modes, described as follows:

PERSONALITY = **990** and other terminal emulations.

CAUTION

Avoid loss of data! Selecting a new personality clears the screen and resets many terminal parameters.

ENHANCE MODE = OFF or **ON**. Command sets of non-native personalities include additional native commands.

COMM MODE = Communication modes: HALF DUPLEX, **FULL DUPLEX**, BLOCK, LOCAL.

MONITOR MODE = OFF or ON: Terminal displays control characters (ON) instead of interpreting them as commands (**OFF**). (Chapter 3)

LINE WRAP = ON or OFF: When cursor reaches end of a line during data entry, it wraps to the beginning of next line (**ON**) or stays at the end of line (OFF).

EDIT MODE = Editing commands affect data to end of **LINE** or end of PAGE.

FONT CHOICE = When personality or screen configuration changes, character set automatically changes to match **PERSONALITY**, LAST USED, or PC.

SEND ACKNOWLEDGE = **OFF** or ON. ON means the terminal sends the ASCII ACK character (06h) after operations that require the host to temporarily suspend transmission.

RECEIVE CR = The terminal responds to a carriage return code (CTRL-M) with **CR** or CR/LF.

HOST PORT = **COM1** or COM2 sends data to (and receives data from) the host through the selected port. (Chapter 1)

PRINTER = **PARALLEL**, COM2, or COM1. Serial port available only with single host, none when you are connected to two hosts.

PRINT MODE = **NONE**, COPY, TRANSPARENT, or BIDIRECT(IONAL).

PRINT PAGE FLIP = **ON** or OFF.

PRINT DATA = 8 or **7**.

AUTO PAGE FLIP = ON or **OFF**.

COMMAND **GENERAL** DISPLAY KEYBOARD COM1 COM2 ATTRIBUTE ANSI PROGRAM

PARAMETERS	OPTIONS
PERSONALITY = TVI 990	**TVI 990**
ENHANCE MODE = ON	TVI955
COMM MODE = FULL DUPLEX	TVI950
MONITOR MODE = OFF	WY60/150/120
LINE WRAP = ON	WY/50+/50
EDIT MODE = LINE	PCTERM
FONT CHOICE = PERSONALITY	VT320/220
SEND ACKNOWLEDGE = OFF	VT100/52
RECEIVE CR = CR	SCO CONSOLE
HOST PORT = COM1	
PRINTER PORT = PARALLEL	
PRINT MODE = NONE	
PRINT PAGE FLIP = OFF	
PRINT DATA = 8	
AUTO PAGE FLIP = OFF	

Left/Right arrow: Menu. Up/Down arrow: Parameter. SPACE/BKSPACE: Option
ESC: Exit. CTRL-S: Save+Exit Print Screen: Print all setup

Figure 2-2. The GENERAL Menu

The Display Menu

The menu parameters affect the configuration and appearance of the screen, as shown in Figure 2-3 and described in the paragraphs that follow.

COLUMNS = Number of columns per page of memory: **80**, 132. (Chapter 3)

LINES = Number of data lines on the screen (**24**, 25, 42, 43, 48, 49).

CLS @ COLUMN CHANGE = ON or **OFF**. Clears the screen when you change the number of columns.

CAUTION

Save screen data before changing the number of data lines. Doing so clears all existing screen data.

PAGE LENGTH = Number of lines per page of memory (**1 X LINES**, 2 X LINES.

NUMBER OF PAGES = 1 or **2** memory pages. Default is dependent on the personality selected in the general menu.

STATUS LINE ATTR. = Appearance (attribute) of the status line: NORMAL, **REVERSE**, UNDERLINE, UND. BLINK.

TOP LINE = Contents of the top information line: NONE, **STATUS**, USER 1, USER 2, FUNCTION KEY LABEL.

BOTTOM LINE = Contents of the bottom information line: **NONE**, STATUS, USER 1, USER 2, FUNCTION KEY LABEL. CURSOR TYPE = Appearance (attributes) of the cursor: **BLINKING BLOCK**, STEADY BLOCK, BLINKING UNDLN, STEADY UNDLN, NONE.

SCREEN SAVER = Screen goes blank after **10**, 20, or 30 minutes of inactivity, or remains displayed if OFF is selected.

SCROLL SPEED = Data scrolls onto the screen at the rate of reception (**JUMP**), smoothly at a relative rate: SMOOTH 8 (fast), 4, 2, or 1 (slow). NO SCROLL means that the cursor wraps from the bottom of the page to the top, so data cannot scroll off the page and be lost.

REFRESH RATE = 60 Hz or **80** Hz.

SCREEN BACKGROUND = **DARK** or LIGHT.

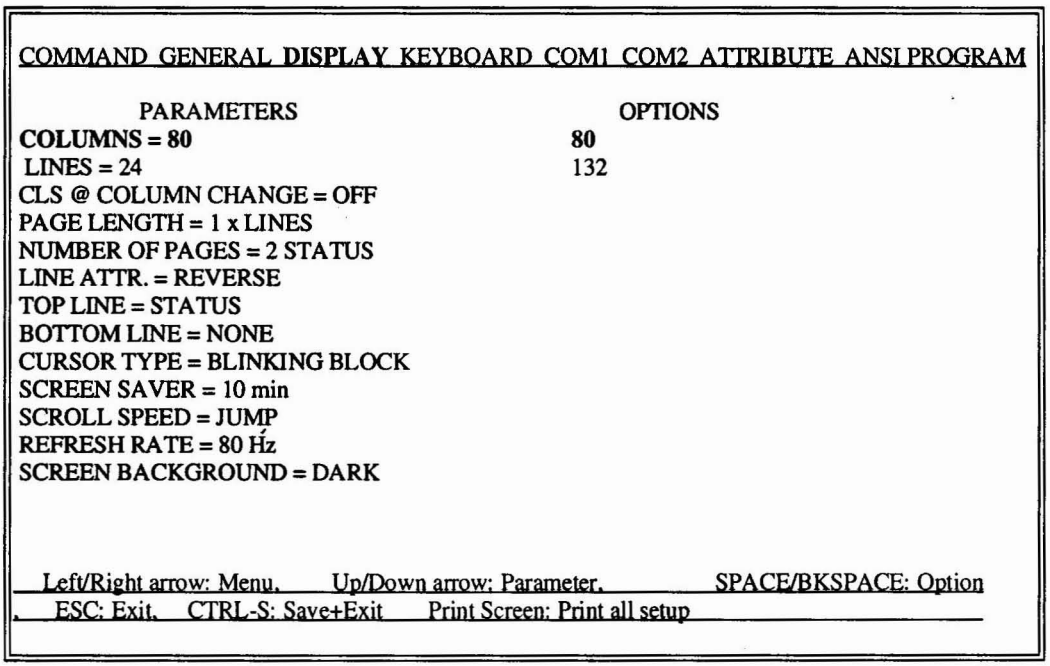


Figure 2-3. The DISPLAY Menu

The Keyboard Menu

Keyboard modes and specific keys, plus the displayed character set, are controlled in the Keyboard menu, as shown in Figure 2-4 and the paragraphs that follow.

LANGUAGE = National character set can be **US** or one of 4 international character sets.

KEY CLICK = ON or OFF: Controls whether keys make a sound when pressed.

CAPS LOCK + SHIFT = In CAPS mode, the **Shift** key upper-cases letters, whether CAPS LOCK is engaged or released; in **lwr case** mode, pressing **Shift** makes characters lower case when CAPS LOCK is on.

MARGIN BELL = ON or **OFF**: Controls whether the bell (beep) sounds when data entry reaches the margin column.

ENTER KEY = Key function can be carriage return (**CR**), carriage return and line feed (CR-LF), or TAB.

ENTER KEY (num pad) = Key function can be carriage return (**CR**), carriage return and line feed (CR-LF), or TAB.

DELETE = **DELETE** sets up the Delete key to delete the character at the cursor location; BACKSPACE sets it up to backspace, deleting the character at the left of the cursor.

BACKSPACE = **BACKSPACE** sets up the Back Space key to move the cursor left one column; DELETE sets it up to backspace, deleting the character to the left of the cursor.

BREAK KEY = Break signal can be **250ms**, 170ms, 500ms, 2 Sec, or NONE.

LEFT ALT/FUNCT KEY On an AT keyboard or an ASCII keyboard, options are **FUNCT**, META, 3rd LEGEND, or COMPOSE. On a DEC-style keyboard, options are **FUNCT**, META, or 3rd LEGEND. (Chapter 3)

> NOTE: If you are using a DEC-style keyboard, use the **Compose** key to accomplish the compose function.

TRANSMIT KEYCODE = options: **ASCII CODE** or SCAN CODE. When keys are pressed, ASCII key codes or PC scan codes are generated.

NAT'L REPLACEMENT CHARS = **OFF** or ON. Turns the national replacement character off or on.

CAPS LOCK SAVE = **NO** or YES. Default NO disables CAPS LOCK at power-on. A YES selection saves the condition of CAPS LOCK at power-off; it stays the same at power-on.

PROGRAMMABLE KEYS = **PERSONALITY** or LAST USED.

SPEAKER VOLUME = **WEAK** or LOUD.

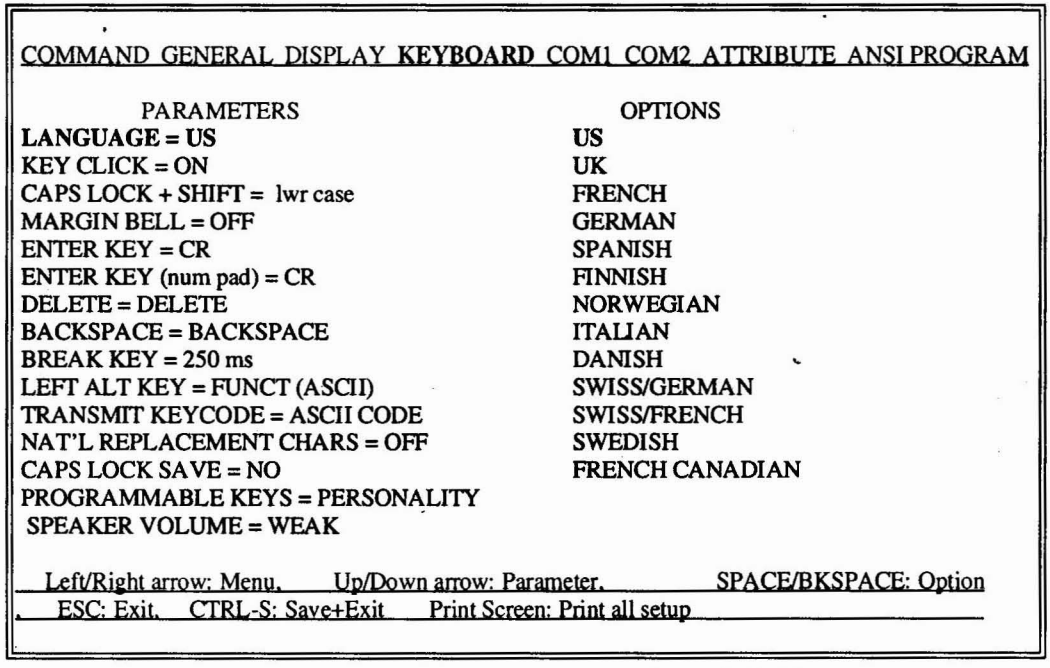


Figure 2-4. The KEYBOARD Menu

The COM1 Menu

Set communication parameters for the COM1 port in this menu (Figure 2-5). Chapter 1 explains communication between the terminal and the host or peripheral devices.

BAUD RATE = Select from 300 to 115.2K; default is **9600**. Data rate units are bits per second (bps), sometimes referred to as baud.

DATA BITS = **8** or 7.

STOP BIT = **1** or 2.

PARITY = **NONE**, ODD, or EVEN.

HANDSHAKE = Handshaking signal sent by the terminal when receiving data (or accepted by the terminal when transmitting data) can be **XON/XOFF**, DTR (DCD/DSR), NONE, or BOTH.

XMIT DELAY = Selects number of character delays per character transmitted (**NONE**, 1-7). Does not change the baud rate.

PARITY CHECK = Port parity checking function may be ON or **OFF**.

EIGHTH DATA BIT = **PROCESS** or IGNORE. Default is PROCESS for the 990 personality; other personalities may have IGNORE as their default.

COMMAND GENERAL DISPLAY KEYBOARD **COM1** COM2 ATTRIBUTE ANSI PROGRAM

PARAMETERS	OPTIONS
BAUD RATE = 9600	300
DATA BITS = 8	1200
STOP BIT = 1	2400
PARITY = NONE	4800
HANDSHAKE = XON/XOFF	**9600**
XMIT DELAY = NONE	19.2K
PARITY CHECK = OFF	38.4K
EIGHTH DATA BIT = PROCESS	57.6K
	115.2 K

Left/Right arrow: Menu. Up/Down arrow: Parameter. SPACE/BKSPACE: Option
ESC: Exit. CTRL-S: Save+Exit Print Screen: Print all setup

Figure 2-5. The COM1 Menu

The COM2 Menu

Set communication parameters for the COM2 port in this menu (Figure 2-6). Chapter 1 explains communication between the terminal and the host or peripheral devices.

BAUD RATE = Select from 300 to 115.2K; default is **9600.** Data rate units are bits per second (bps), sometimes referred to as baud.

DATA BITS = **8** or 7.

STOP BIT = 1 or 2.

PARITY = **NONE**, ODD, or EVEN.

HANDSHAKE = Handshaking signal sent by the terminal when receiving data (or accepted by the terminal when transmitting data) can be **XON/XOFF**, DTR (DCD/DSR), NONE, or BOTH.

XMIT DELAY = Selects number of character delays per character transmitted (**NONE**, 1-7). Does not change the baud rate.

PARITY CHECK = Port parity checking function may be ON or **OFF**.

EIGHTH DATA BIT = **PROCESS** or IGNORE. Default is PROCESS for the 990 personality; other personalities may have IGNORE as their default.

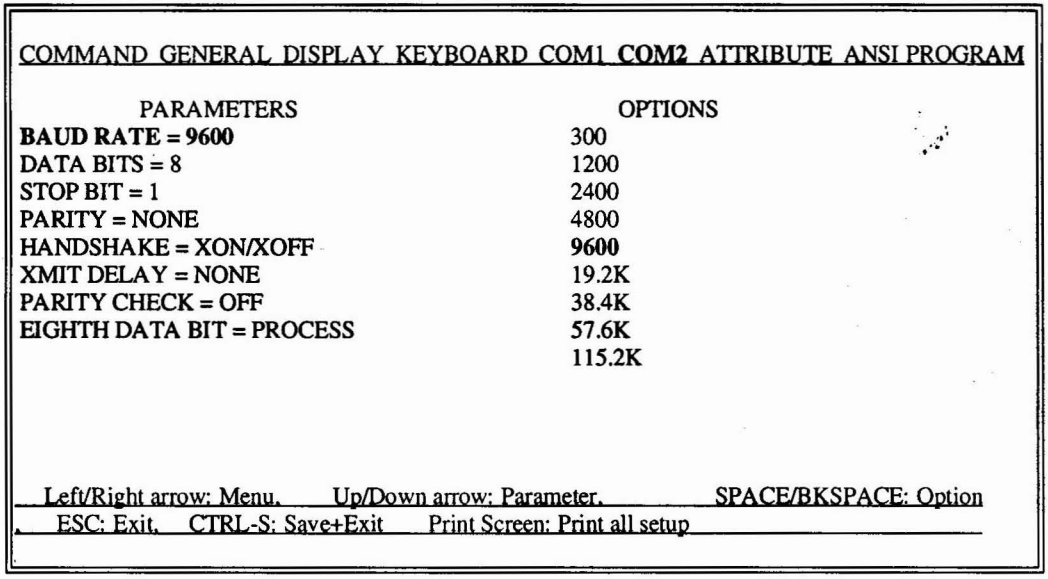


Figure 2-6. The COM2 Menu

The Attribute Menu

The Attribute menu (Figure 2-7) parameters affect the nature and extent of visual attributes and specify the attributes of write-protected characters.

ATTRIBUTE = Visual attributes may be by **CHARACTER**, LINE, or PAGE. (In 955 and 950 emulation modes, only LINE or PAGE attributes are available.)

CAUTION

Changing between character and line or page attributes clears the screen!

955 ATTRIBUTE = Line- or page-based attributes may occupy a **SPACE** on screen or NO SPACE.

WRITE PROTECT INTENSITY = Write-protected characters will be displayed in NORMAL or **DIM** intensity.

+ REVERSE = Write-protected characters may also be displayed with the reverse attribute **OFF** or ON.

+ UNDERLINE = Write-protected characters may also be displayed with the underline attribute **OFF** or ON.

+ BLINKING = Write-protected characters may also be displayed with the blink attribute **OFF** or ON.

+ BLANK = Write-protected characters may also be displayed with the blank attribute **OFF** or ON.

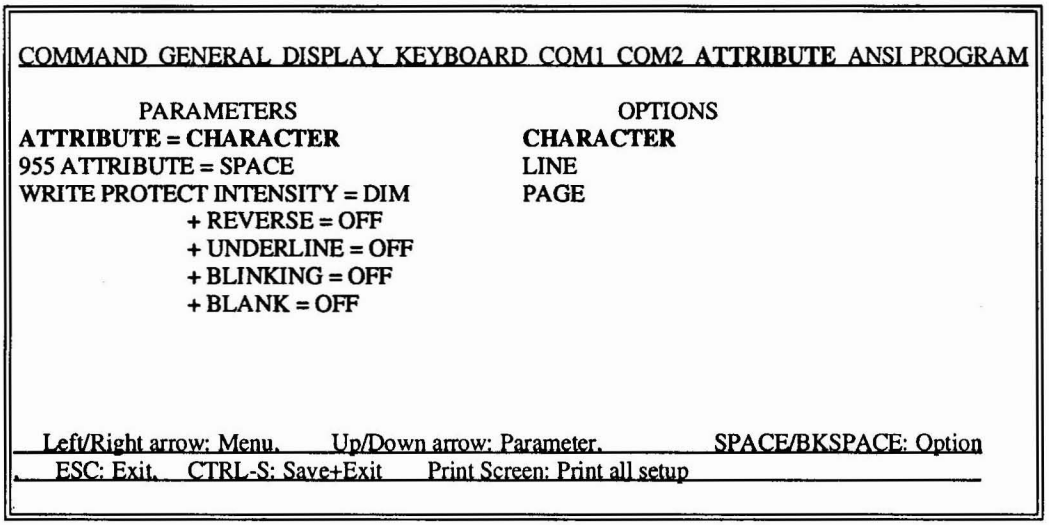


Figure 2-7. The ATTRIBUTE Menu

ANSI Menu

In order to access the ANSI menu (Figure 2-8), you must have selected the VT320, VT220, or VT100/52 personality in the GENERAL menu.

CONTROL BITS = **7** or 8

FONT SET = **DEC SUPPLEMENT**(AL) or ISO LATIN-1

LOAD SOFT FONT = **ON** or OFF

NUM PAD = **NUMERIC** or APPLICATION

CURSOR PAD = **CURSOR** or APPLICATION

KEYS = **TYPEWRITER** or DATA PROCESSING

LOCK USER FEATURES = **OFF** or ON

TRANSMIT = LIMITED or **UNLIMITED**

AUTO FORM FEED = **OFF** or ON

AUTO ANSWERBACK = **OFF** or ON

LOCK FUNCTION KEY = **OFF** or ON

PAGE PRINT = **FULL REGION** or SCROLL REGION

AUTO PRINT MODE = **OFF** or ON

ID TYPE = VT100, VT220, or VT320. Default is the personality option you selected in the GENERAL menu.

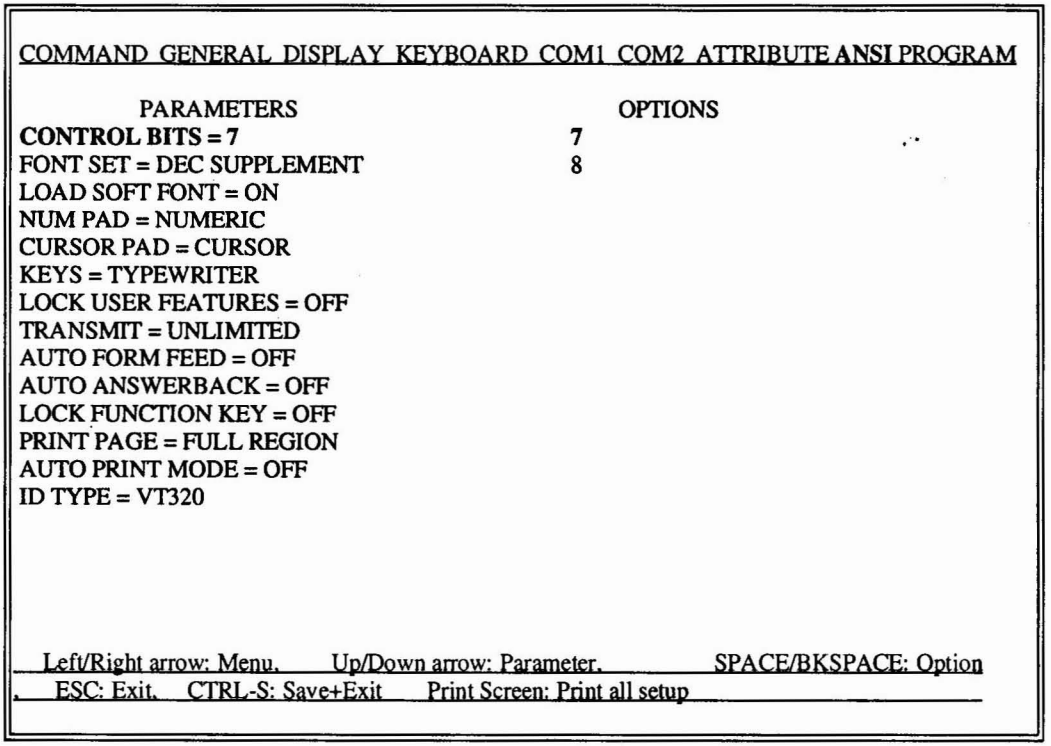


Figure 2-8. ANSI Menu

Program Menus

The Program menu (Figure 2-9) gives you six choices under OPTIONS: F-KEY, EDIT KEY, KEYPAD, ANSWERBACK, DELIMITER, and AW CONTROL. Press the space bar one or more times to select the desired option; each has its own submenu. The PARAMETERS side contains fields of the current submenu.

To select a field within a submenu, press the up/down arrows. Once you select a field in the submenu, you can choose one of the options for that field (or enter a message or label).

Function Key Logical Sets

The terminal has ten logical sets of function keys. Within a given set, you can send twice as many messages as you have function keys. Pressing a key alone sends one message, and pressing the same key with **Shift** sends another.

The AT keyboard has 12 function keys, the ASCII keyboard has 16 function keys, and the DEC keyboard has 13 programmable function keys.

Each function key set holds up to 256 characters (bytes), apportioned among the 32 keys as you wish. You can load any message or command into a function key, such as your logon sequence, an access code, or frequently typed words and phrases. You can reprogram the function keys here in setup, or your application program may do it for you.

Follow these steps to reprogram function keys:

1. Use the down arrow to select the SET = field.
2. Use the space bar to select the number of the desired function key set (1, 2, 3, 4, 5, 6, 7, 8, 9, or 10).

> NOTE: The current function key set—the one most recently programmed—is active (but not saved) when you leave set up. You must save the set as you would any individual value. If you don't save the set, it will remain in effect only until you reset the terminal.

3. Use the down arrow to select the F-KEY = field.
4. Press the spacebar to step through the F-key choices for your keyboard. You can also press any unshifted or shifted function key to select it for reprogramming.

   The F-key number appears under PARAMETERS (if you press a shifted key, an s appears in front of the key number). The F-key message appears under OPTIONS.
5. To start reprogramming the message, press
   Enter

> NOTE: After pressing Enter, contents of the bottom two menu information lines will change.

6. Enter the new message. It can be any combination of alphanumeric characters and control codes. For example, to enter the carriage return character, press
   Ctrl **M**
7. Use the arrow keys to move the cursor within the message. To edit the message, use the **Insert** key and **Delete** key (as indicated in the bottom information line).
8. To enter the ESC character in an escape sequence, type
   Ctrl **[**
9. Each function key set has a total memory capacity of 255 bytes for a single host (127 bytes for dual host), which can be distributed any way among the keys. Two fields at the bottom the PARAMETERS window show the number of characters remaining in the function key set memory and the number of characters programmed into the current key. As you program, the figures update. When memory is full, the terminal beeps.
10. To end the loading process and save the message, press
    Enter
11. Move to the F-KEY LABEL = field, press **Enter**; then type up to nine characters (in 80-column mode) or seven characters (in 132-column mode) as a label for the key. Use the keys described in Step 7 to edit the label. (Labels for keys **F8** and **F16** (on the ASCII keyboard) take only eight characters.)

> NOTE: To display function key labels on the bottom (or top) line, you must have selected that option in the Display menu.

The XMIT DIRECTION = field lets you choose where the message goes when you press a function key: See the following table.

Option	Destination
HOST	To the host computer
LOCAL	To the terminal (screen)
HOST+LOCAL	To host and terminal
PRINTER	To the printer

The message destination, like the function key message, is automatically saved in nonvolatile memory.

If you want to save the function key label you have entered, move to the SAVE F-KEY LABEL field and select the ON option.

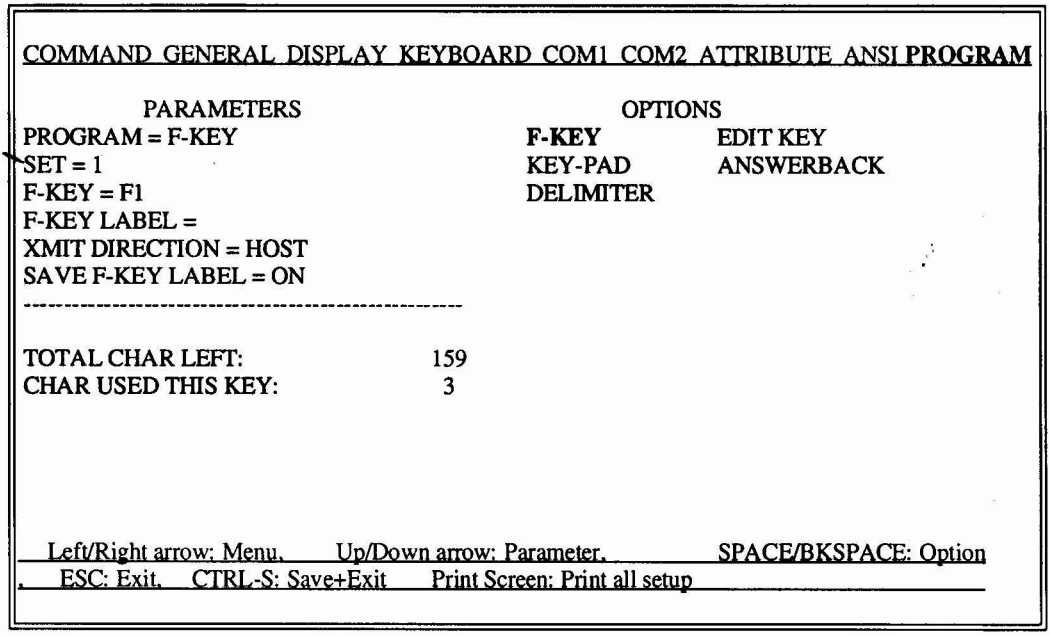


Figure 2-9. Program Menu: F-KEY

The Editing Key Submenu

Editing keys send ASCII characters (codes) that control editing operations, data transmission, and cursor movement. This submenu (Figure 2-10) lets you change the codes sent by the editing keys listed in the PARAMETERS window and specify their destination (i.e., editing key mode). Your application program can also change the key codes and destination mode.

> NOTE: On the ASCII keyboard, only the main Tab key is reprogrammable in this submenu. To reprogram the Tab key on the numeric pad, refer to the KEYPAD submenu.

The steps below tell how to reprogram the editing keys and set the editing key mode. Procedures similar to reprogramming the function keys are not repeated in full here; refer to Chapter 11 for a complete explanation.

1. Enter the Program menu and use the space bar to select the EDIT KEY submenu.
2. Move the cursor down to the EDIT KEY = or SHIFT/EDIT KEY = (for shifted keys) field. A list of editing keys appears in the OPTIONS window, and the current code of the highlighted key appears in the CONTENT: field at the bottom of the window. An asterisk (*) in front of the code indicates the code display is the default code.
3. Use the space bar to select the desired key.
4. Press
   Enter
   to start reprogramming the key.
5. Enter up to five bytes as the new key code. The new codes will be displayed in the CONTENT: field as you enter them.
6. Use the arrow keys to move the cursor within the message. To edit the message, use the **Insert** key and **Delete** key (as indicated in the bottom information line).
7. To end the loading process, press
   Enter
   This automatically saves the new key code in nonvolatile memory.

The XMIT DIRECTION field lets you determine where the key code goes when you press an editing key:

- **HOST** To the host
- LOCAL To the terminal (screen)
- COMM MODE Determined by the communication mode

The message destination, like the key code, is automatically saved in nonvolatile memory.

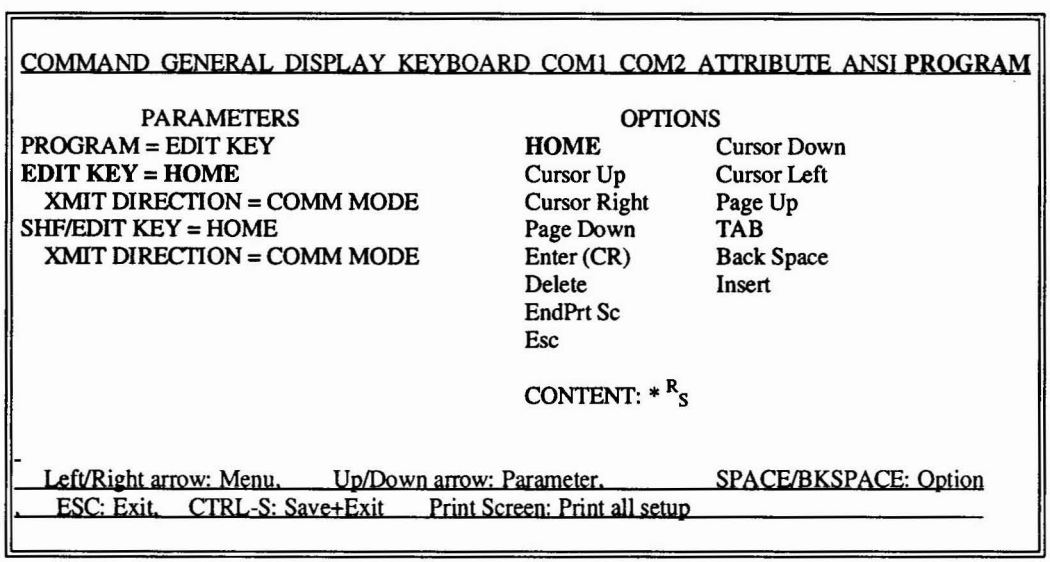


Figure 2-10. Program Menu: EDIT KEY

Numeric Pad Submenu

The numeric pad submenu is very similar to the editing key submenu. It lets you change the characters sent by the keys in the numeric keypad. You can reprogram all the unshifted keys. (On the ASCII keyboard numeric pad, you can also reprogram the shifted **Tab**, **CE**, and **Enter** keys.) The DIRECTION field lets you specify the destination of the shifted keys. Your application program can also do this reprogramming, but cannot specify destination of the key codes.

The following steps tell how to reprogram the numeric keypad keys. Procedures similar to reprogramming the function keys are not repeated in full here; refer to the instructions for reprogramming function keys for a complete explanation.

1. Enter the Program menu and use the spacebar to select the KEYPAD option.
2. Move the cursor down to the KEY = field.

   A list of keys appears under OPTIONS, and the current code of the highlighted key appears in the CONTENT: field at the bottom (Figure 2-11).
3. Use the spacebar to select the desired key.
4. Press

   Enter

   to start reprogramming the key.
5. Enter up to five bytes as the new key code. The new codes display in the CONTENT: field as you enter them.
6. Use the arrow keys to move the cursor within the message. To edit the message, use the **Insert** key and **Delete** key (as indicated in the bottom information line).
7. To end the loading process, press

   Enter

   This automatically saves the new key contents in nonvolatile memory.

The XMIT DIRECTION field lets you determine where the key code goes when you press one of the selected (shifted or unshifted) keys:

- **HOST** To the host computer
- **LOCAL** To the terminal (screen)
- **COMM MODE** Determined by the communication mode

The message destination, like the key code, is automatically saved in nonvolatile memory.

```
COMMAND GENERAL DISPLAY KEYBOARD COM1 COM2 ATTRIBUTE ANSI PROGRAM

        PARAMETERS                    OPTIONS
PROGRAM = KEYPAD              0          1
KEY = 0                       2          3
  XMIT DIRECTION = COMM MODE  4          5
                              6          7
                              8          9
                              .          +
                              -          *
                              /          Enter


                            CONTENTS: *0

 Left/Right arrow: Menu,    Up/Down arrow: Parameter,        SPACE/BKSPACE: Option
  ESC: Exit,  CTRL-S: Save+Exit    Print Screen: Print all setup
```

Figure 2-11. Program Menu: NUMERIC PAD

The Answerback Submenu

The terminal sends an answerback message to the host in response to a received command. The default answerback message is blank.

You can load an answerback message of up to 31 characters in this submenu. You can then elect to display or conceal the message.

The steps below tell how to load an answerback message.

1. Enter the Program menu and use the spacebar to select the ANSWERBACK option.
2. Use the Åì keys to select the ANSWERBACK = field.
3. To start reprogramming the key, press **Enter**
4. Enter up to 31 bytes (characters) as the new message.
5. Use the arrow keys to move the cursor within the message; use the **Insert** and **Delete** keys to edit the message.
6. To end the entry, press **Enter**
7. Move the cursor to the CONCEALED = field; make sure the default option is OFF (Figure 2-12).

CAUTION

Once you select CONCEALED = ON, you cannot redisplay or alter the answerback message without erasing it. Pressing the space bar again to select OFF erases the message.

8. To conceal the message, press the space bar to highlight the ON option.
9. To reprogram a concealed message, select CONCEALED = OFF. This destroys the existing message. Then return to the ANSWERBACK = field and load a new message.

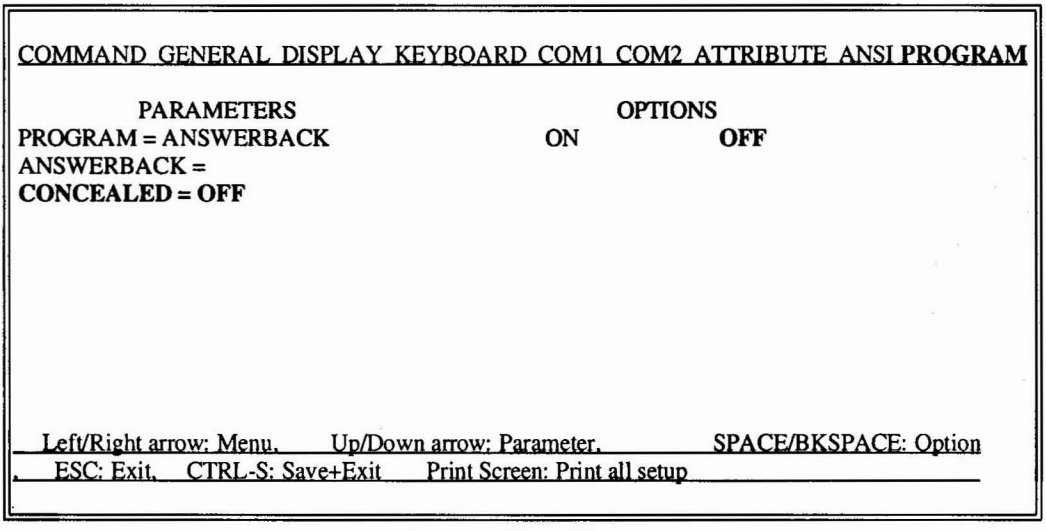


Figure 2-12. Program Menu: ANSWERBACK Message

The Delimiter Submenu

The terminal automatically inserts field, line, and message delimiters when it transmits text to the host. You can reprogram content of the control characters used as delimiters in this submenu.

The following steps tell how to reprogram the delimiters.

1. Enter the Program menu and use the spacebar to select the DELIMITER option.
2. Under PARAMETERS, use the down-arrow key to select DELIMITER = FIELD SEP (See Figure 2-13).
3. Use the spacebar to select the delimiter you want to reprogram. Options are field separator (FIELD SEP), end of line (EOL), start protected field (START PROT), end protected field (END PROT), end of message (EOM), and end of page (EOP).
4. To start reprogramming the delimiter, press **Enter**
5. Enter two bytes (characters) as the new delimiter.
6. Use the arrow keys to move the cursor within the delimiter. To edit the delimiter, use the **Insert** key and **Delete** key (as indicated in the bottom information line).
7. To end the code, press **Enter**

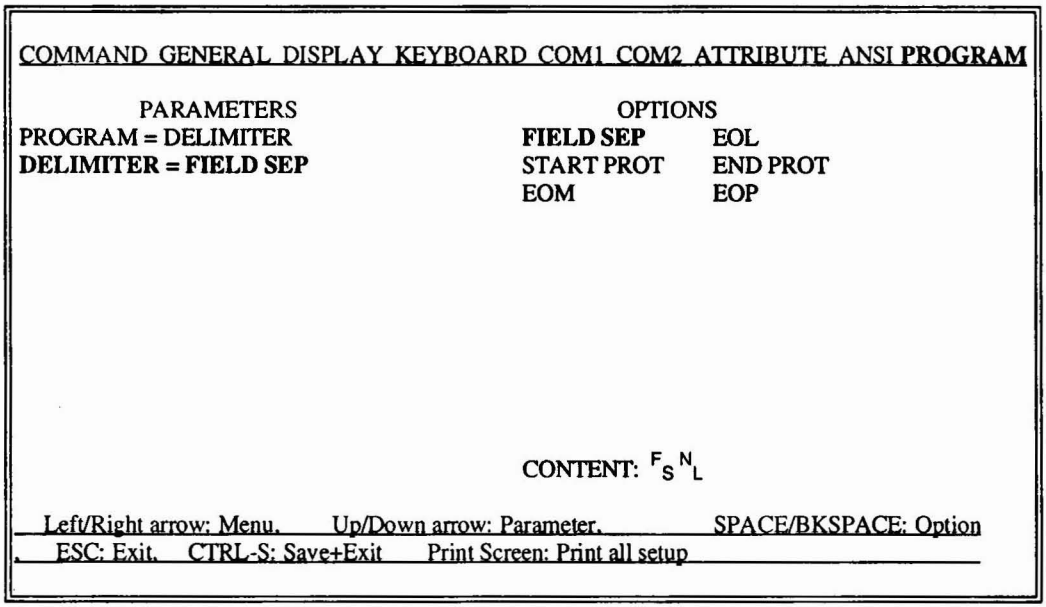


Figure 2-13. Program Menu: DELIMITER

Chapter 3
OPERATION

This chapter describes how to operate the terminal. It tells how to adjust the screen and keyboard for your comfort, followed by details on display features, the keyboard, communicating with a computer, and printing.

Troubleshooting procedures are covered in Chapter 4.

You will encounter frequent references to choosing operating values in set-up mode. Chapter 2 explains how you can control the terminal's operations in set-up mode.

The descriptions in this chapter apply to local keyboard functions, and to communications with your host computer(s). Many of the functions described in this chapter can be changed by your operating system or an application program. If a feature described here does not operate as expected, contact your system manager or consult the manuals for your computer and application program.

If you suspect the terminal is not working properly, first look at the troubleshooting suggestions in Chapter 4. Then if you need help, call your system administrator, dealer, or distributor.

Starting Up

This section assumes that the terminal is already installed. If it has not been installed, see Chapter 1, *Installation*, for instructions.

Turn on the terminal by pressing the power switch, which illuminates when power is on. See Figure 3-1.

After a few seconds, the terminal beeps once. Presently the cursor appears in the upper left corner of the screen; a status line may appear above the cursor. You may also see messages from your operating system.

The cursor can be steady or blinking, block or underline, or invisible. You can select its appearance in set up.

The cursor position is sometimes called the active position. It is where the next character is entered or program function takes place.

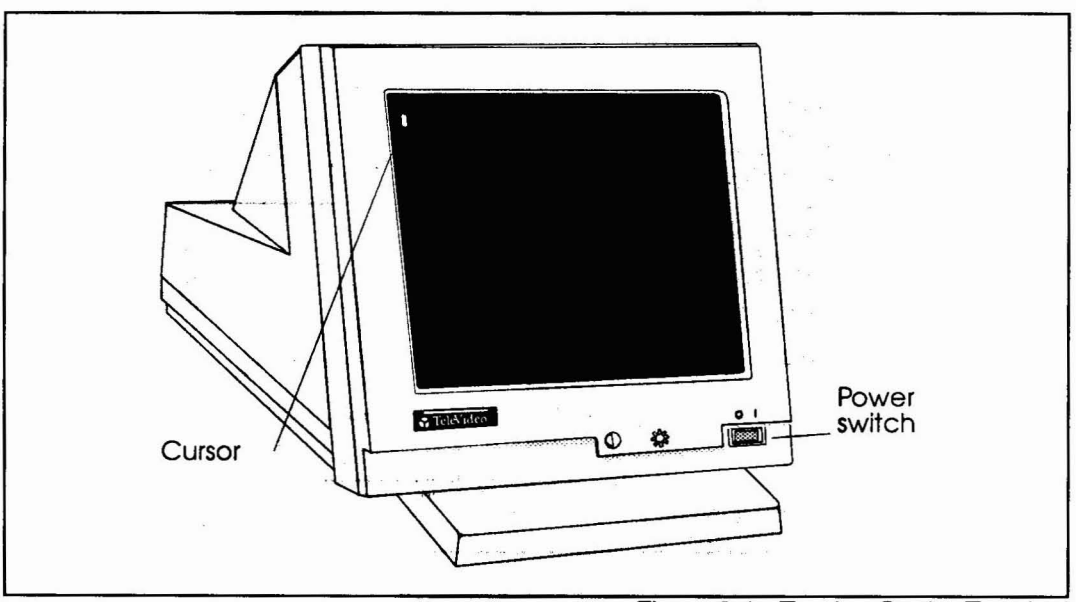


Figure 3-1. Turning On the Terminal

Adjusting Screen and Keyboard

You can adjust the screen and keyboard to your own preference. Adjust the contrast control for best screen clarity, and the brightness control for best level for your lighting conditions. See Figure 3-2.

Tilt the case vertically (and horizontally) to adjust for your seated position.

Adjust the two 2-position supports underneath the keyboard for the most comfortable typing angle.

Display Features

The screen has three display areas:

- A top information line
- Data lines (24 to 49)
- A bottom information line

This section describes the screen areas and other display features (such as the number of columns on the screen). Chapter 2 tells how to control display features in the set-up menus. Your program may also change them. See the paragraph titled *Local Key Commands*, later in this chapter, for a summary of keys that control many display features.

Information Lines

The top and bottom information lines may contain a variety of information:

- The status line
- User messages
- Function key labels

You can choose the contents of the information lines in set up (in the Display menu). As you read the descriptions in this section, you may find it helpful to enter set up and look at the Display and Program menus.

Your program can also control the contents and display of the information lines, overriding your set up choices.

> NOTE: When 25, 43, or 49 data lines are displayed, the last data line always overwrites the bottom information line.

Status line

The status line normally appears on the top information line. It has fields for the cursor position, a number of terminal operating states, and the time/date display. See Appendix B.

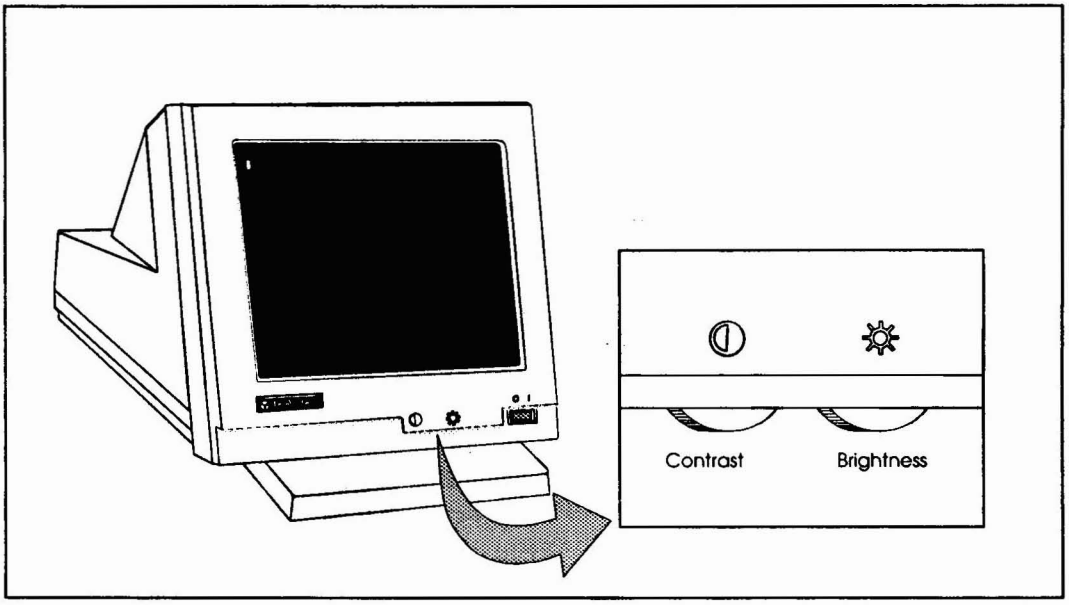


Figure 3-2. Adjusting the Terminal

To toggle the status line on and off, press

Ctrl →

Your application program may also turn it off or move it to the bottom information line.

The cursor position (page, row, and column) and communication mode are always displayed in the status line. Other codes appear only when the terminal enters special modes (see Appendix B).

User messages

Your program can display a user message in a full-width (80- or 132-column) message line at the top or bottom of the screen, or in place of time and date in the status line.

You can choose where to display user messages, but you cannot write them in set up.

> NOTE If you want to write your own user messages, first read *Entering Commands* in Chapter 5, then *Loading User Messages* in Chapter 11.

Function key labels

In the Program set up menu, you can write small labels identifying the contents of your function keys. Use the Display menu to select F-labels for an information line.

Labels for all function keys (shifted and unshifted) appear on a single line. However, only one set of labels (shifted or unshifted) can occupy the line at a time.

With 80-column displays, you can display only eight labels at a time. The one that appears at any given moment is the one that was most recently defined.

Pressing

Shift

(by itself) temporarily displays labels for the shifted function keys. Unshifted key labels return when you release the key.

Data Lines

The screen can display 24 to 49 data lines. You may select the number of lines in set up, or your program can automatically change the number of lines.

CAUTION

Changing the number of displayed lines clears data from the screen. Save and exit files before changing the number of lines.

When you change the number of lines, your character set may also change size.

Number of Columns

You may choose either 80 or 132 columns on the screen. Many programs make that choice for you. The 132-column display is convenient for spreadsheets or horizontal-format documents.

Screen-Saver

The screen-saver feature makes the screen go blank after 10, 20, or 30 minutes of inactivity. You can change this time-out in set up. To turn the screen saver on or off, refer to the local key commands for your keyboard (later in this chapter).

Blanking out the display conserves the phosphor coating inside the face of the screen. Any new data from the keyboard or host makes the display reappear.

Resetting the Terminal

The terminal offers several ways to reset:

Partial reset

Enter set up and select CLEAR COMMUNICATION. This disables any currently enabled print mode, clears the COM1 and COM2 port buffers, and unlocks the keyboard.

Nonvolatile reset

Turn the terminal off and on again, or enter set up and select RESET TERMINAL. This severs all communication with other system units (computer, printer, etc.),so data not saved in permanent memory may be lost. Operating parameters revert to the last values saved in permanent memory.

CAUTION

A default reset destroys all reprogramming, including function key messages!

Default reset

Make sure you have selected single-host operation. Enter set up; in the GENERAL menu, select DEFAULT PARAMETERS. This returns all operating parameters to factory-set values.

Your dealer, system administrator, or programmer may have set up your terminal specifically for your data processing system. Do not use this reset once you have begun using the terminal on a day-to-day basis.

Funct/Alt Key

With this terminal, you have a choice of three keyboards: AT, ASCII, or DEC style. One of the keys (located left of the space bar) has a different name on each keyboard. On the ASCII keyboard, it is labeled **Funct**; on the AT and DEC-style keyboards, it is the left **Alt** key.

With an AT or ASCII keyboard, the KEYBOARD menu options are: FUNCT, META, 3rd LEGEND, or COMPOSE.

With a DEC-style keyboard, the same menu and command code options are: FUNCT, META, or 3rd LEGEND.

NOTE: If you are using a DEC-style keyboard, use the **Compose Character** key to accomplish the compose function.

The FUNCT Option

Once defining the key, pressing it and another key sends the ASCII code for that key, bracketed by the start-of-header (SOH) and carriage return (CR) control characters. It works only with alphanumeric keys, not with the editing keys.

The META Option

The Funct/Alt key, pressed simultaneously with an alphanumeric key, sends the alphanumeric key's code, with the high bit set.

The 3rd LEGEND Option

This function is for the AT keyboard; international keycap sets for this keyboard have three legends on some keys. The unshifted key sends a code that corresponds with the first legend; the shifted key sends a code that corresponds to the second legend. When you press the key while holding down the left Alt key, you send a code that corresponds to the third legend engraved on the key.

The COMPOSE Option

You may have the need to enter a nonstandard character, but can't find it on your keyboard.

The Funct/Alt key (Compose Character key on a DEC-style keyboard) is used in sequence with a pair of other keys to compose any of the characters listed in Table 3-1.

These sequences are similar to Esc command codes in that you do not hold down any of the keys, but press them in sequence.

For example, to compose the character æ from an AT keyboard, press and release

Alt

then press and release

a

and finally, press and release

e

To compose the same æ character from an ASCII keyboard, press and release

Funct

then press and release

a

and finally, press and release

e

To compose the same æ character from a DEC style keyboard, press and release

Compose Character

then press and release

a

and finally, press and release

e

Table 3-1.
Composing Nonstandard Characters

Press the Funct/Alt/Compose key, then a pair below, all in sequence	Composed Character
L= *or* l= *or* L- *or* l-	£
/^	|
((	[
))	]
0^	°
!!	¡
??	¿
s s *or* S S	ß
" "	¨
a ‘	à
a ’	á
a ^	â
a "	ä
A "	Ä
a *	å
A *	Å
a e	æ
A E	Æ
c ,	ç
e ‘	è
E ’	É
e ’	é
e ^	ê
i ‘	ì
i ’	í
i ^	î
N ~	Ñ
n ~	ñ
o ‘	ò
o ^	ô
o "	ö
O "	Ö
u ’	ú
u ‘	ù
o /	ø
O /	Ø
u ^	û
u "	ü
U "	Ü

AT Keyboard

This section describes the AT keyboard. If you have an ASCII keyboard or a DEC style keyboard, refer to the corresponding sections on following pages.

Types of Keys

Keyboard areas are shown in Figure 3-3.

- Function keys (F1 through F12) are programmable by the user.
- Alphanumeric keys produce a printable letter, number, or symbol, just like typewriter keys. Special keys (Ctrl, Alt, and Shift) in this area control computer operations.
- Editing keys are used to move pages onto the screen, to move the cursor about on the displayed page, and to modify displayed characters.
- Numeric keypad number keys are active if Num Lock is on. The keypad is typically used for calculator functions.

NOTE: Some of the numeric keypad keys have a second legend; these keys perform an editing function when Num Lock is off.

Remote keys

Remote keys send signals (printable characters or operating messages) to the computer when the terminal is on line. When remote key signals go to the computer, your program then controls their effect. For example, the Backspace key may erase the character to the left of the cursor in some programs, and move the cursor in other programs. Most keys (even alphanumeric keys!) are remote keys. This means that when the computer controls the terminal, this manual cannot predict what happens when you press a remote key. Consult your software manual.

When the terminal is not on line to the computer, it receives signals from the remote keys and responds to their commands.

Local keys

Local keys send codes only to the terminal itself. They cause the same terminal operations regardless of communication or terminal personality mode.

Local Key Commands

NOTE: The **Enter** key and numerals referenced in the following commands are located on the numeric keypad.

To enter set up, press
Ctrl **Alt** **Esc**

To toggle screen activity on/off, press
Scroll Lock

To display page *n* (*n* = 0 - 1), press
Ctrl **n**

To display the next page, press
Ctrl **Page Up**

To toggle the status line on/off, press
Ctrl →

To scroll up, press
Ctrl ↑

To scroll down, press
Ctrl ↓

To toggle the insert mode on/off, press
Ctrl **Insert**

To toggle the key click on/off, press
Ctrl **Enter**

To send a 250 ms break, press
Ctrl **Break**

To toggle between block & duplex mode, press
Ctrl **Shift** **Enter**

To toggle ports, press
Ctrl **Shift** **Break**

To toggle copy mode on/off, press
Ctrl **Shift** **Print Screen**

To display the previous Page, press
Ctrl **Page Down**

To increase the scrolling rate, press
Ctrl **Shift** ↑

To decrease the scrolling rate, press
Ctrl **Shift** ↓

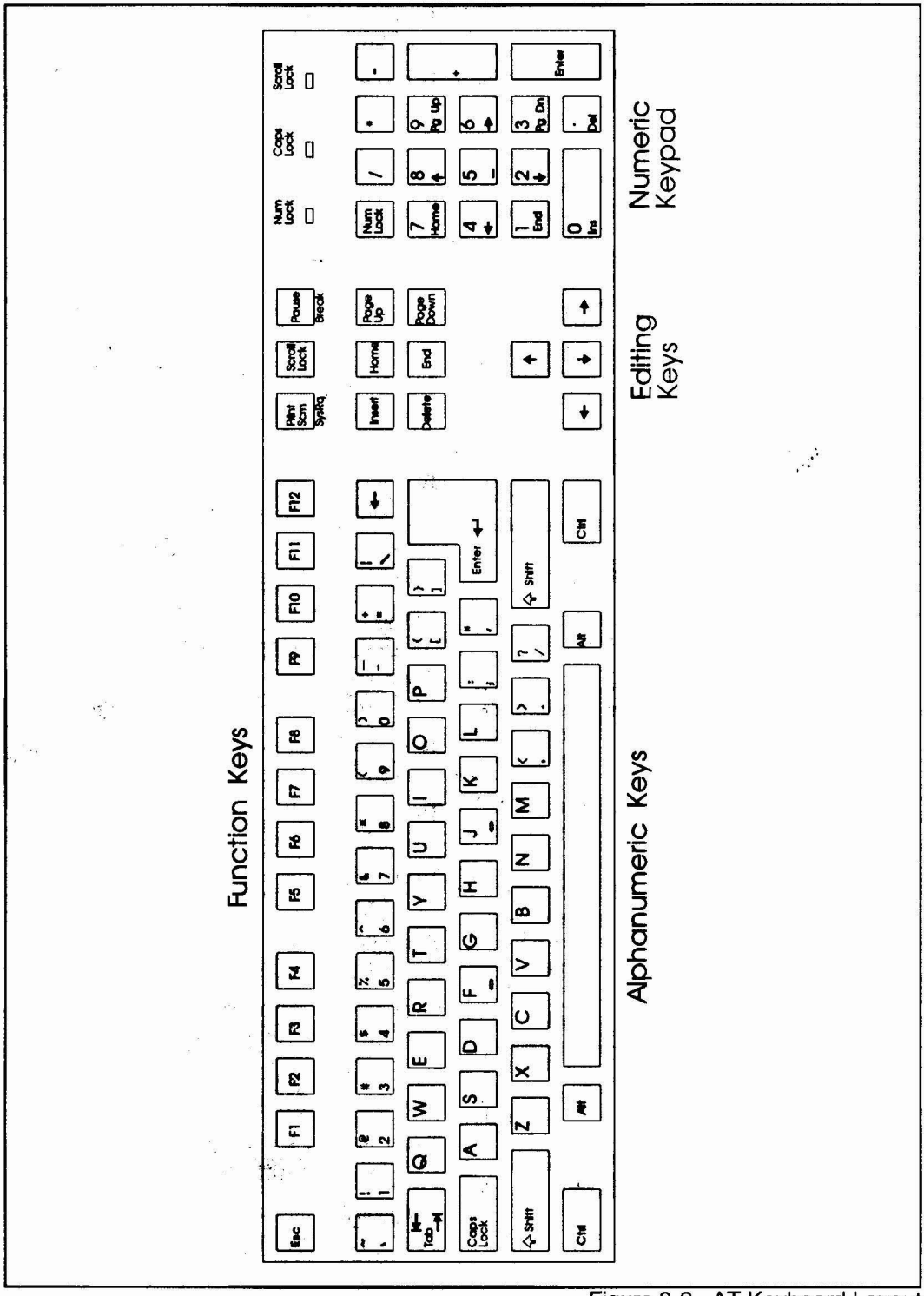


Figure 3-3. AT Keyboard Layout

ASCII Keyboard

This section describes the ASCII keyboard. If you have an AT keyboard, refer to the previous section; if you have a DEC style keyboard, refer to the next section.

Types of Keys

Keyboard areas are shown in Figure 3-4.

- Function keys (F1 through F16) are programmable by the user.
- Alphanumeric keys produce a printable letter, number, or symbol, just like typewriter keys. Special keys (Ctrl, Shift, and Funct) in this area control computer operations.
- Editing keys are used to move pages onto the screen, to move the cursor about on the displayed page, and to modify displayed characters.
- Numeric keypad keys are typically used for calculator functions.

Remote keys

Remote keys send signals (printable characters or operating messages) to the computer when the terminal is on line. When remote key signals go to the computer, your program then controls their effect. For example, the Backspace key may erase the character to the left of the cursor in some programs, and move the cursor in other programs. Most keys (even alphanumeric keys!) are remote keys. This means that when the computer controls the terminal, this manual cannot predict what happens when you press a remote key. Consult your software manual.

When the terminal is not on line to the computer, it receives signals from the remote keys and responds to their commands.

Local keys

Local keys send codes only to the terminal itself. They cause the same terminal operations regardless of communication or terminal personality mode.

Local Key Commands

NOTE: The **Enter** key and numerals referenced in the following commands are located on the numeric keypad.

To enter set up, press
Shift **Set Up**

To toggle screen activity on/off, press
No Scroll

To display page *n* (*n* = 0 - 1), press
Ctrl **n**

To display the next page/window, press
Ctrl **Page**

To toggle the status line on/off, press
Ctrl **→**

To scroll up, press
Ctrl **↑**

To scroll down, press
Ctrl **↓**

To toggle the insert mode on/off, press
Ctrl **Char Insert**

To toggle the key click on/off, press
Ctrl **Enter**

To toggle the screen saver on/off, press
Ctrl **Clear Space**

To clear the screen, press
Ctrl **Shift** **Clear Space**

To send a 250 ms break, press
Ctrl **Break**

To toggle between block & duplex mode, press
Ctrl **Shift** **Enter**

To toggle ports, press
Ctrl **Shift** **Break**

To toggle copy mode on/off, press
Ctrl **Shift** **Print**

To display the previous Page/window, press
Ctrl **Shift** **Page**

To increase the scrolling rate, press
Ctrl **Shift** **↑**

To decrease the scrolling rate, press
Ctrl **Shift** **↓**

To toggle the monitor mode on/off, press
Ctrl **Shift** **1**

Figure 3-4. ASCII Keyboard Layout

DEC Style Keyboard

This section describes the DEC style keyboard. If you have an ASCII keyboard or an AT keyboard, refer to the previous sections.

Types of Keys

Keyboard areas are shown in Figure 3-5.

- Function keys F1-F5 are dedicated; F6-F20are programmable by the user. (In VT52/VT100 modes, F11, F12, and F13 send Esc, BS, and LF characters, respectively.)
- Alphanumeric keys produce a printable letter, number, or symbol, just like typewriter keys. Special keys (Ctrl, Alt, Shift, and Compose) in this area control computer operations.
- Editing keys are used to move pages onto the screen, to move the cursor about on the displayed page, and to modify displayed characters.
- Numeric keypad keys are typically used for calculator functions.

Remote keys

Remote keys send signals (printable characters or operating messages) to the computer when the terminal is on line. When remote key signals go to the computer, your program then controls their effect. For example, the Backspace key may erase the character to the left of the cursor in some programs, and move the cursor in other programs. Most keys (even alphanumeric keys!) are remote keys. This means that when the computer controls the terminal, this manual cannot predict what happens when you press a remote key. Consult your software manual.

When the terminal is not on line to the computer, it receives signals from the remote keys and responds to their commands.

Local keys

Local keys send codes only to the terminal itself. They cause the same terminal operations regardless of communication or terminal personality mode.

Local Key Commands

NOTE: The **Enter** key and numerals referenced in the following commands are located on the numeric keypad.

To enter set up, press
[F3]

To toggle screen activity on/off, press
[F1]

To display page *n* (*n* = 0 - 1), press
[Alt] [n]

To display the next page/window, press
[Alt] [Next Screen]

To toggle the status line on/off, press
[Alt] [→]

To scroll up, press
[Alt] [↑]

To scroll down, press
[Alt] [↓]

To toggle the insert mode on/off, press
[Alt] [Insert]

To toggle the key click on/off, press
[Alt] [Enter]

To toggle screen saver on/off, press
[Alt] [Find]

To clear the screen, press
[Alt] [Shift] [Find]

To send a 250 ms break, press
[Alt] [F5]

To toggle between block & duplex mode, press
[Alt] [Shift] [Enter]

To toggle ports, press
[Alt] [Shift] [F5]

To toggle copy mode on/off, press
[Alt] [Shift] [Remove]

To display the previous Page/window, press
[Alt] [Prev Screen]

To increase the scrolling rate, press
[Alt] [Shift] [↑]

To decrease the scrolling rate, press
[Alt] [Shift] [↓]

Figure 3-5. DEC Style Keyboard Layout

Serial Communication Modes

The serial port communication mode determines where data goes when you press a key — to the screen, the computer, or both.

Full duplex Most "interactive" application programs (those where you enter commands or data and the computer responds) work best with the terminal in full duplex communication mode. Your terminal is set for full duplex mode when it comes from the factory.

In full duplex mode, the terminal sends key codes only to the host and not to the screen. However, hosts often "echo" key codes back to the terminal, so the printable characters you type appear on your screen.

Half duplex If your host does not echo key codes back to the terminal, you can set it for half duplex. Then the terminal sends key codes both to the host and to the screen.

Block Data you enter goes only to the screen until you send it to the host by pressing the SEND key. However, the terminal can still receive any data the host sends.

Local The terminal turns off all communication with the computer. Data entered at the keyboard goes to the screen, and the terminal does not receive any data from the computer. All keys act as local keys.

> NOTE: Once the terminal is in local mode, it cannot receive any commands from the computer to change to another mode! To restore communication, you must reset the terminal or enter set up and change the mode.

Sending Blocks of Data

You can send screen data to the host only when the terminal is in block mode.

For a page send, press and release **Esc**, then 7.

All data from the top of the screen through the cursor position goes to the host.

For a *line send*, press and release **Esc** then press

Shift 7

To interrupt transmission from the terminal to the host, use the Local Key Command (for your keyboard) to initiate a partial reset.

Editing Key Modes

Editing key modes affect most editing keys (keys that control cursor movement, editing, and data transmission). Application programs usually determine this mode, but you can also change it in set up (Program menu).

> NOTE: If your editing keys do not operate as expected, check the communication and editing key modes.

The terminal has three editing key modes:

Local Editing key commands go only to the screen, in all communication modes. In effect, the editing keys become local keys. So you can always use the editing keys to move the cursor, change data on the screen, and send data to the computer and printer.

Host Editing key commands go only to the computer, in all communication modes except local. How the computer handles them depends entirely on its programming.

Normal Editing key commands are handled the same as other characters you type—they go to the computer and/or the screen, depending on the communication mode.

Serial Printer Control

This section describes how to send data to a serial printer from a serial port. Make sure you have selected the COM1 or COM2 option for the PRINTER parameter in the general set-up menu.

The terminal offers two methods of communicating with a serial device, such as a printer, connected to a serial port:

- Enabling a printer port mode, which **passes data through the terminal** between the computer or keyboard and a device (e.g., a printer) connected to a serial port. Depending on the print mode, the data may or may not appear on the terminal screen.
- Executing a page print, which **sends on-screen data** to the printer (much like the **Prt Sc** key function of a personal computer)

Unlike the host communication modes, the terminal comes from the factory with all serial printer port modes disabled. You (or your program) must enable a serial printer mode to pass data between the host and the serial printer. If you have a problem with printing, see the troubleshooting suggestions in Chapter 4.

Operation with a Serial Printer

> NOTE: If you don't use a serial printer, leave the PRINTER parameter at the PARALLEL option (default). In this case, disregard the following procedure.

You need to specify the serial port connected to the host, and the serial port connected to a serial printer or other serial device. Most users connect the host to the first serial port. If they have only a serial printer, they connect it to to the second serial port. To do this, perform the following steps:

1. In Set Up, go to the GENERAL menu.
2. Move down to the HOST PORT parameter and make sure that the COM1 (or COM2) option is selected.
3. Move down to the PRINTER parameter and select the COM2 (or COM1) option.
4. If your host is connected to the COM2 port, select COM1 for your serial printer.

Serial Printer Modes

Four serial printer modes can be enabled by your program or in set up. Use the local key command (for your keyboard) to toggle the copy mode. Doing this has two effects on print modes: It first changes the current print mode to copy mode, and then toggles copy mode on and off.

Copy Sometimes called "typewriter" or "type-through" mode. Characters from the keyboard or host are simultaneously displayed on the screen and sent to the printer.

Transparent Characters from the host or keyboard are sent to the serial printer port without affecting the display. The display freezes during transmission.

Bi-directional Data from the host or keyboard goes to both the screen and peripheral, just like copy mode. In addition, the device (printer or other peripheral) connected to the serial port can send data through the terminal to the computer. When data flows from the peripheral to the computer, it is not displayed.

Secondary receive The terminal passes data to the host from the device connected to the serial port; data from the host or keyboard goes only to the screen.

Page Print

A page print sends data on the current page (from the home position to the cursor position) to the serial printer port. The terminal flips the next page of display memory onto the screen, unless page print flip mode has been disabled.

For a formatted page print, use the appropriate key (for your keyboard) to print the screen (Print, Print Screen, or F2). Each line sent to the printer ends with a carriage return and line feed, so the printed copy resembles the screen.

For an unformatted page print, press the Shift key and the above print-screen key. Without formatting, the appearance of the printed output varies, depending on the amount of space characters the data contains.

To interrupt transmission from the terminal to the host, use the local key command (for your keyboard) to initiate a partial reset.

Parallel Printer Control

The parallel port is a one-way port. Data goes only from the terminal to the device, not from the device to the terminal. This section describes how to send data from the terminal to a parallel printer connected to the parallel port. The terminal comes from the factory with the parallel printer port enabled. Make sure the PARALLEL option is selected for the PRINTER item in the general set up menu.

The terminal offers two methods of communicating with a printer connected to the parallel port:

- Enabling a parallel printer mode, which **passes data through the terminal** from the computer or keyboard to a device (e.g., a printer) connected to the parallel port. Depending on the print mode, the data may or may not appear on the terminal screen.
- Executing a page print, which **sends on-screen data** to the printer (much like the **Prt Sc** key function of a personal computer).

If you have any problems with printing, see the troubleshooting suggestions in Chapter 4.

Parallel Printer Modes

Two parallel printer modes can be enabled by your program or in set up. Using the local key command (for your keyboard) to toggle the copy mode has two effects on print modes: It first changes the current print mode to copy mode, and then toggles copy mode on and off.

Copy Sometimes called "typewriter" or "type-through" mode. Characters from the keyboard or host are simultaneously displayed on the screen and sent to the printer.

Transparent Characters from the host or keyboard are sent to the printer port without affecting the display. The display freezes during transmission.

Page Print

A page print command sends data on the current page (up to the cursor position) to the parallel port. The terminal does not automatically flip the next page of display memory onto the screen. To send another page, use the apppropriate key (for your keyboard) to call up a different page, then use the local key command (for your keyboard) to toggle the copy mode.

For a formatted page print, use the appropriate key (for your keyboard) to print the screen (Print, Print Screen, or F2). Each line sent to the printer ends with a carriage return and line feed, so the printed copy resembles the screen.

For an unformatted page print, press the Shift key and the above print-screen key. Without formatting, the appearance of the printed output varies, depending on the amount of space characters the data contains.

Chapter 4
TROUBLESHOOTING

If A Problem Occurs

Once you have properly installed your terminal and matched its operating values with those of your computer and printer, it should give you years of trouble-free service. However, if it does not operate properly, check the following list before calling your dealer or distributor.

Troubleshooting Checklist

If the terminal doesn't operate at all, check these items:

- Are all cables firmly plugged in at both ends? (You'd be surprised how often this is the problem!)
- Are all system units turned on?
- Is the terminal locked up? Turn it off and back on.

If the terminal doesn't communicate with the host or modem:

- Are you in the proper operating mode? The correct communication mode? Check the status line.
- Is your computer operating system booted up?
- Do the terminal and computer communication formats match? Check the set-up menu of the port selected as the host port for the terminal communication format.
- Is the interface between the terminal and the computer or modem correctly wired? Check the computer port pin signals (see Chapter 1 pin assignments).
- Is your modem operating correctly? Check its instructions; if necessary, contact the manufacturer for assistance.

If the terminal doesn't communicate with the printer or other peripheral:

- Is the interface cable firmly plugged in at both ends?
- Is your application program correctly configured for your peripheral?
- Are the communication, editing key, print key operation and print modes set so the terminal receives the print key codes and printing commands?
- Does the serial port communication format match that of your serial peripheral?
- Is the interface between the terminal and the peripheral correctly wired? Check serial and parallel port pin signals (see Chapter 1).

If the screen display is faint or the cursor does not appear correctly:

- Have you adjusted the screen brightness?
- What cursor style is specified in set up?

CAUTION

Do not plug or unplug the keyboard cable while the terminal is turned on. A power surge may result, which could severely damage the terminal.

- Is the keyboard locked? Reset the terminal from setup or turn power off, then on again.

Running Self Test

You can verify proper operation of the terminal video display circuit by running the self test.

NOTE: Running self test erases any data on the screen.

1. Enter set up, go to the local mode, then exit set up.
2. In sequence, press **Esc**, the spacebar, and any character. (The same sequence can be sent by the host.)
3. Verify that the screen is filled with the character chosen in step 2.
4. To clear the test from the screen, press
   [Ctrl] [z]

Monitor Mode

A terminal usually displays printable (alphanumeric) characters such as letters, numbers, and punctuation symbols on the screen. But it also receives many other characters (called codes) that are commands. They do not appear on the screen; instead, the terminal interprets and responds to them. (For example, when the terminal receives the command Ctrl Z, it clears the screen.)

When monitor mode is enabled, the terminal no longer responds to commands from the computer or keyboard. It displays all data (printable characters and command codes) on the screen.

Programmers use monitor mode to display the contents of a program on the screen, or to find out what code an editing key sends.

To toggle monitor mode on and off, press
[Shift] [Ctrl] [1]
(numeric keypad one).

Stand-Alone Test

This test checks the transmit and receive capabilities of the COM1 serial communication port; it also checks terminal functions in the communication mode.

With all communication cables disonnected, connect a jumper from pin 2 to pin 3 of the COM1 port.

> **NOTE**: A wire paper clip can be easily bent so its ends will fit into the COM1 connector. As viewed from the rear of the terminal, pins 2 and 3 are the second and third from the right, on the top row.

Make sure the power cord is properly connected to the terminal and plugged into a live wall receptacle. Power up the terminal by pressing the POWER switch (Figure 1-1); listen for a beep sound.

> **NOTE**: Lack of a beep sound may indicate a power supply or logic board failure, and require service.

After the beep sounds, the terminal should be in the communication mode. The cursor should appear in the upper left corner of the screen. A status line may be just above the cursor.

For those users not displaying a status line, check the COMM MODE in the GENERAL set up menu. The option selected should be FULL DUPLEX, HALF DUPLEX, or BLOCK. Enter several keystrokes and observe the screen.

In full duplex mode, each character should be displayed as typed.

In half duplex mode, each character you type will be repeated on the screen. For example, if you type an "a," the screen will display "aa."

If You Need Assistance

Your dealer can help you solve problems and obtain service. Before calling your dealer, review the troubleshooting checklist in this chapter and check the operating parameters (turn to Chapter 2 to review them). Try to place the terminal by the phone. Have the terminal serial number, found on the rear of the case, and this manual at hand.

The terminal is covered by a limited warranty, which should be packed with the terminal (see your dealer if by chance it was omitted from your package). No warranty registration is required.

If you need service during the warranty period, call your dealer.

Should you need to ship the terminal for repair, ask your dealer to secure a Return Material Authorization (RMA) number. Terminals are not accepted for repair without an RMA number. Then carefully pack the terminal, using either the original shipping container or other suitable materials.

CAUTION

If returning the terminal for a communication failure, have your system ports and cables checked. A miswired or short circuited system could damage a newly repaired terminal.

VORSICHT

Bei Rückgabe Ihres Terminals im Falle einer Kommunikationsstörung, die Systemanschlüsse und Kabel überprüfen. Ein nicht sachgemäß angeschlossenes oder falsch verdrahtetes System könnte das reparierte Terminal beschädigen.!

Keep this manual; do not return it with the unit.

WARNING

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturere. Dispose of used batteries according to the manufacturer's instructions.

Appendix A
SPECIFICATIONS

Case	Touch tilt (-5 to +26°); swivel (300°); front-mounted power switch and brightness adjustment; rear-mounted keyboard connector
Screen	14 inches measured diagonally; green or white nonglare phosphor; screen saver; selectable on/off and background color
Configuration	9 set up menus, 5 program submenus
Format	
Columns	80 or 132
Data lines	24, 25, 42, 43, 48, or 49
Status/message line	Selectable
Character matrix	16 x 16
Display memory	Up to 2 pages of dynamically allocatable memory
Resident character sets	ASCII, PC multinational, DEC special graphics, DEC multinational, ISO Latin, 11 international character sets: US, UK, French, German, Spanish, Norwegian, Danish, Finnish, Italian, Swedish, Swiss/German, Swiss/French, and French-Canadian.
Visual attributes	Embedded or nonembedded character, field and line based. Combinative full/half intensity blink, blank, underline, reverse
Line attributes	Combinative single/double high/wide
Cursor attributes	Block (blinking or steady), underline (blinking or steady), none
Cursor control	Home, up, down, right, left; carriage return, line feed, reverse line feed, new line; typewriter and field tabs (forward and backward); address, read
Editing	Character/line/column insert/delete; line/page/field erase; field/page/column/block clear; jump/smooth scroll, definable scrolling region, line lock; protect mode; insert/replace and page/line edit modes; programmable replacement character
Compatibility/Personalities	ASCII TeleVideo 990 (native) mode, 955, 950 Wyse WY-60, WY-150/120/50+/50 ANSI DEC VT320/220, VT100/52, SCO Console PC Terminal PC TERM
Programmable messages	Answerback, status line field, user line, function key labels
Communication modes	Conversational (full or half duplex), block, half-block, local, secondary receive, local or duplex edit, monitor
Print capabilities	Page print, buffered copy, transparent, bidirectional, and secondary print modes

Communication interfaces	RS-232C 256-character, buffered transmit/receive COM1 and COM2 ports, configurable for host and serial device communication, selectable character transmit delay rate, reprogrammable parameters
Word structure	7 or 8 data bits, 1 or 2 stop bits, 10- or 11-bit word, 7- or 8-bit multinational characters
Parity	Odd, even, or none
Data rates	300, 1200, 2400, 4800, 9600, 19.2k, 38.4k 57.6k, or 115.2k baud
Communication protocols	X-On/X-Off, DTR, DCD/DSR, none, Reprogrammable send and print delimiters
Keyboard	Detached, slim-line, typewriter-style with sculptured keycaps, sealed key switches, N-key roll-over with ghost key lockout, accounting-style numeric keypad, on/off repeat and key click, reprogrammable remote special keys. Choice of AT keyboard, ASCII keyboard, or DEC-style keyboard.

Dimensions	**Height in. (cm)**	**Width in. (cm)**	**Depth in. (cm)**
Cabinet	13.6 (34.5)	13.1 (32.7)	14.4 (35.4)
Keyboard			
AT	1.5 (3.8)	19.0 (49.6)	8.0 (18.0)
ASCII	1.5 (3.8)	17.7 (45.2)	7.2 (18.4)
DEC style	1.5 (3.8)	19.5 (49.6)	7.1 (18.0)
Footprint		11.0 (27.9)	11.0 (27.9)

Net weight	
Terminal	17.5 lb. (8.0 kg)
Keyboard	3 lb. (1.4 kg)
Shipping weight	
Terminal	28.5 lb. (10.7 kg)
Keyboard	3.5 lb. (1.6 kg)
Environmental requirements	
Ventilation	4 inches (10 cm) minimum on all sides
Temperature	
Operating	32° F (0° C) to 113° F (45° C)
Storage	40° F (-40° C) to 149° F (65° C)
Relative humidity	
Operating	10%-85% noncondensing.
Non operating	10%-85% noncondensing.

Power requirements	90 to 270 Vac , 48 to 63 Hz (Power supply automatically senses the source voltage and adjusts to it.)
Maximum power dissipation	25 watts
Power-save mode dissipation	10 watts

Appendix B
STATUS LINE MESSAGES

Field	Values	Description
1	*p rrr ccc*	*p* = Page of memory (0-1) *r* = Row (1-168) *c* = Column (1-132)
3	*	Monitor mode on/off (blank)
	w	WordStar mode on/off (blank)
	mode	Communication mode: FDX = full duplex HDX = half duplex BLK = block LOC = local
4	W.P.	Write protect mode on/off (blank)
5	PROT	Protect mode on/off (blank)
6	N	Num Lock (Enhanced PC keyboard only)
	S	Scroll Lock key engaged/released (blank)
	C	CAPS LOCK key engaged/released (blank)
7	GRAF	Graphics mode on/off (blank)
8	*mode*	COPY = Copy print mode TRSP = Transparent print mode BDIR = Bidirectional print mode
9	*mode*	UFPG = Unformatted page print FMPG = Formatted page print KLOK = Keyboard locked
	SEND	Block send in progress
	TBSY	Terminal has sent X-Off to host or dropped DTR.
10	COMP	Compose function selected for the Funct/Alt key