TeleVideo® Video Display Terminal Operator's Manual



TeleVideo Systems, Inc.

TeleVideo[®] 924 Video Display Terminal Operator's Manual

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Introduction

Understanding how to use the features of this new terminal will ensure you receive the maximum benefit from them. The manual explains the terminal's features and tells you how to install, operate, program, and troubleshoot the terminal.

Take a moment to become familiar with the manual first. The first few chapters contain general information, while the last few increase in complexity. Each chapter is summarized below.

GLOSSARY

Definition of technical terms from this manual

1. INSTALLATION

How to install the terminal and turn it on; how to add optional features

2. RECONFIGURING THE TERMINAL

How to set up the terminal to work with your computer and printer and change many operating values in the set up lines or the status line

3. OPERATOR CONTROLS

Purpose of each special key and the ASCII code it sends; how to edit, transmit, and print from the terminal

4. PROGRAMMING CONTROLS

How you can control the terminal from application programs or from the keyboard

5. REPROGRAMMING THE TERMINAL

How to reprogram many of the keys and terminal functions

6. TROUBLESHOOTING

Solutions for many common problems; how to change fuses, run self tests, and obtain assistance

APPENDICES

Specifications, limited warranty, reference tables

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QUICK REFERENCE GUIDE

Control codes and escape sequences

The manual is written for two types of users: **relatively new terminal operators** and **experienced programmers**. If you are relatively inexperienced, skip the programming chapters (Chapters 4 and 5) until you are ready to try more advanced operations. Look at the chart below to select the chapters corresponding to your current level of experience.

	Chapters													
	Reader	Glossary	1	2	3	4	5	6						
	Installer		x	х				x						
	New user	x		x	х			х						
	Experience user	ed		х	x	х		х						
	Programm	er		х	х	х								
	Experience programm	ed er		х	х	x	х							
Conventions														
Notes	Two types	of notes mark inforr	mation o	fspecial	importa	nce:								
	NOTE! In:	ormation for everyo	ne.											
	STOP! Wa STOP and	arning concerning y I read the note bef c	our safe p re proc e	ty or pos eeding!	ssible los	ss of dat	a. When	you see ti	his note,					
Terminology	The optional lines of memory allow you to create pages longer than the 24-line screen display. The manual differentiates between the terms screen and page .													
	Screen	The terminal's view	ing area											
	Page	An amount of mem 48, or 96 lines. Sind visible all at once.	nory, def ce the so	ined by t creen dis	he mem plays 24	ory chip l lines at	s installe a time, a	ed. May con a longer pa	ntain 24, ge is not					
Figures	The amount of data contained within a page of memory or displayed on the screen is not shown to scale in the figures. Shaded areas denote protected fields, unless otherwise noted. Areas with slanted lines show how much data is sent by a command. Dots indicate space characters.													
Status and Set Up Line Parameters	You can change some of the modes and functions described in the chapter on programming from the keyboard in the status and set up lines. These parameters are indicated in Chapter 4 by the words SET UP and STATUS next to the section heading.													
Entering Commands	Enter each command exactly as shown or it won't work as expected. (Spaces shown in the commands, however, are included only to make the command easier to read.)													
	Notice whe or a lower pressed w	Notice whether the command requires uppercase or lowercase characters, the number one or a lowercase L, a zero or an uppercase O. Make sure the ALPHA LOCK key is not depressed when you want a lowercase character												

Using the ESC Key	Although escape sequences are printed with a space before the alphanumeric character(s), that space is only included so the sequence is easier to read; it is not actually part of the sequence. For example, if the sequence is shown as
	ESC U
	you should
	Press and release the ESC key Hold down the SHIFT key while you press and release the u key
	NOTE! To enter an escape sequence, always press and release the ESC key before pressing the next key(s). Don't press the space bar after pressing the ESC key. The spaces shown in the commands are included only to make the command easier to read.
Using the CTRL Key	Pressing the CONTROL (CTRL) key by itself has no effect—you must hold it down while you press the other character in the control sequence.

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Glossary

ACK	An ASCII character meaning acknowledgement. Usually sent by the terminal to the computer indicating page print or some local function is finished.
address	Noun: A number specifying a location in the computer's memory where information is stored. Similar to a post office box number. Verb: To send something to a particular location. The addressable cursor can be sent by the computer to a specific line and column position on the screen.
alphanumeric characters	The alphabetic, numeric, and special symbol characters.
answerback	A programmable response sent to the computer upon request. Can be used to identify a par- ticular terminal when several terminals are connected to a computer. Each terminal can be sent a unique answerback. If 50 924 terminals are connected to the computer, the fifth 924 terminal could be programmed to reply, "924 5." Answerback codes are also used with modems.
ASCII	Acronym: American Standard Code for Information Interchange, pronounced ask -key. The code structure most commonly used to represent letters, numbers, and other characters in data transmission. An ASCII character is expressed as a group of 7 bits; therefore, 128 characters can be expressed.
autowrap	A mode that allows the cursor to automatically move to the beginning of the next line after reaching the end of the cursor's current line.
baud rate	A measure of the maximum number of binary bits that can be transmitted (per second) over a line between two serial communication devices. See serial transmission.
bidirectional print	A communication mode that connects the printer port to the computer port, allowing data to flow in both directions.
bit	Acronym: binary digit. The simplest unit of data; always a one or a zero (meaning yes/no, on/off). Eight bits equal one byte, and one byte equals a character.
block attribute	An attribute that defines the visual appearance of an area of the screen. By selecting one or more visual attributes before defining the area, all data within the defined block is displayed with that visual attribute(s).
block mode	A local mode that displays on the screen text entered from the keyboard. Allows you to check and correct it before sending it as a block of data to the computer.
BREAK key	Causes the line to go to the space condition for 250 milliseconds. The computer's current operation may stop while it waits for more instructions.
buffer	A temporary storage location for data within the terminal's memory. Can be used to compen- sate for differences in transmission rates or temporarily store characters until the computer or printer can accept them. For example, buffers allow data to be sent from the computer to the terminal at a different baud rate than it is sent from the terminal to the printer.
buffered print	A print mode (either transparent or extension) that uses the terminal's buffer(s). This mode lets you set different baud rates between the computer and terminal and the terminal and printer. See also transparent print, extension print, and buffer.
byte	A group of bits representing a character.

connector	The physical plug that connects the cable and the electrical interface of the computer, termi- nal, printer, etc. For RS-232 applications, they are commonly D-shaped, and contain many pins (male connector) or holes (female connector). The number of pins varies between equip- ment manufacturers. TeleVideo terminals have 25-pin female connectors.
conversational mode	An interactive communications mode that lets data flow from one communications device to another. See full and half duplex modes.
copy print	Same as buffered extension print.
CRT	Acronym: cathode ray tube. A tube whose surface is the video screen in terminals and monitors.
Cursor	A marker showing where the next character will normally appear. Can be blinking or steady, a block or an underline, or invisible. See also hidden cursor.
current loop	A method of sending data as 20-milliampere current pulses over a serial line (up to 700 meters). Although usually slower than RS-232, it permits accurate communication over longer distances. Either the computer or the terminal may be able to supply the current. The configuration chosen (active or passive) depends on whether the terminal or computer is supplying the power. If the terminal supplies the current, configure the terminal's current loop for active; if the computer supplies the current, configure the terminal for passive. To determine correct configuration, think of a person holding a garden hose with a nozzle on the end. If the house is the active device and the person is passive device. However, if opening and closing the nozzle causes water to flow from (i.e., suctioned out of) a holding tank within the house, the person is the active device and the house is the passive device.
СТЅ	Acronym: Clear to Send. An RS-232 line indicating that the computer is ready to receive more data from the terminal.
DCD	Acronym: Data Carrier Detected. An RS-232 line that indicates whether or not the data carrier in the phone system is active and the device at the other end of the phone line is available.
DCE	Acronym: Data Communications Equipment. Usually the computer or the equipment connected to it.
default	A value or instruction used until otherwise defined.
delete	To remove the character/line/page at the cursor position and move the following data to take its place. Data appears to fall into a hole.
delimiter	A code transmitted at the end of a predefined area (field) of data. Could be a field, end of line, or end of text delimiter.
descender	That part of a lowercase character that hangs below the main body of the character. The tail of the lowercase y is a descender. A terminal with true descenders (such as TeleVideo's) displays the tail below the main line of text.
DIP Switches	Acronym: Dual In-Line Package. A panel of very small switches.
display	The amount of data that can be viewed on the terminal screen at one time. See also page and screen.
download	To copy (read) data from the computer into the terminal's memory.

DSR	Acronym: Data Set Ready. An RS-232 line indicating when the data coming from the computer is meant for your device.
DTE	Acronym: Data Terminal Equipment.
DTR	Acronym: Data Terminal Ready. An RS-232 line used by the terminal to tell another device such as the computer when it is ready to receive data. See also handshaking protocol.
duplex	Bidirectional communication. See conversational mode, half duplex, and full duplex.
EOM	Acronym: End of Message. An ASCII character sometimes used to mark the end of a block transmission.
EPROM	Acronym: Erasable, Programmable ROM. A read-only memory chip that can be erased and reprogrammed.
erase	To remove from memory the data starting at the cursor position through the end of the line or page and replace it with insert characters. See also delete and insert character.
escape sequence	A command introduced by an escape character to control the functions of the terminal, com- puter, or printer.
ЕТХ	Acronym: End of Text. An ASCII character sent when block transmission has ended.
execute	To carry out an instruction or series of instructions.
extension print	A print mode that sends data to the printer and the screen at the same time.
field	A group of characters sharing the same write-protect attribute.
full duplex	A conversational communication mode that allows the terminal and the computer to transmit and receive simultaneously. The transmitted data is not printed locally unless it is "echoed back" by the computer.
graphics	Pictorial information; data depicted by lines and figures instead of printed characters.
graphics characters	Special characters used to draw pictures.
half duplex	A conversational communication mode that allows the terminal to transmit and receive data in separate, consecutive operations. Transmitted data can be printed locally.
handshaking protocol	Prearranged signals sent by the computer, the terminal, and the printer to control the flow of data. The signals can be ASCII characters or they can result from raising or lowering the voltages on RS-232C lines used for that purpose. These signals allow the computer and the peripherals to tell each other when they are ready to send or receive information. Prevents data from being sent when the other device is not able to accept or handle more data at that time. See also DTR, RTS, CTS, X/ON-X/OFF, DCD, and DSR.
half-dot shift	A way of designing the dot patterns of characters so they appear to have smooth instead of ragged diagonal lines.
hertz	A unit of frequency equal to one cycle per second. If the terminal's hertz rate does not match the hertz rate of the incoming alternating current, the display may waver. Abbreviated Hz.
hexadecimal	A numbering system with a base of 16. Commonly used by programmers to indicate locations and contents of a computer's memory. Uses 0 through 9 and A through F. Abbreviated hex. See ASCII Code Conversion Table in Appendix C.

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home	The first character position on the page.
insert character	The character that occupies the position previously occupied by an erased character. Unless you define it, it is a space character. See also edit, delete, erase, and space.
interface	A circuit that connects devices in a computer system (i.e., the computer and peripherals). See also current loop, RS-232C, RS-422.
keyboard	The interface between the operator and the terminal's intelligence.
local mode	A mode that disables both the transmitting and receiving capabilities of the terminal's com- puter port. Data entries or changes go only to the screen. See also block mode and conversa- tional mode.
menu	A displayed list of parameters from which the operator can select different values.
message line	A line containing a message to the operator from the computer program. Displayed on the screen's 25th line. Sometimes called user line.
mode	A method of operation. When the terminal is in a particular mode, it has a different reaction to some commands or situations. For instance, when the terminal is in monitor mode, it displays everything (including control codes and escape sequences), not just alphanumeric characters. The terminal can be in several modes at the same time; i.e., protect and duplex edit modes. Modes are always either on or off.
modem	Acronym: mo dulator/ dem odulator) An electronic device that allows one computer to send and receive information to another computer by encoding digital signals for use over telephone lines.
monitor	Hardware: A video screen on which you can see computer output and input.
monitor monitor mode	Hardware: A video screen on which you can see computer output and input. A mode that allows users to see all ASCII characters as they are received.
monitor monitor mode N-key rollover	Hardware: A video screen on which you can see computer output and input.A mode that allows users to see all ASCII characters as they are received.A keyboard feature that allows you to type faster than the keyboard can transmit without locking up or missing a character. Also permits you to strike a series of keys simultaneously, with the characters being transmitted in the order in which the keys are pressed.
monitor monitor mode N-key rollover nonvolatile memory	 Hardware: A video screen on which you can see computer output and input. A mode that allows users to see all ASCII characters as they are received. A keyboard feature that allows you to type faster than the keyboard can transmit without locking up or missing a character. Also permits you to strike a series of keys simultaneously, with the characters being transmitted in the order in which the keys are pressed. A permanent memory storage area. Not affected by loss of power. A RAM with a constant power source is a nonvolatile memory device.
monitor monitor mode N-key rollover nonvolatile memory null	 Hardware: A video screen on which you can see computer output and input. A mode that allows users to see all ASCII characters as they are received. A keyboard feature that allows you to type faster than the keyboard can transmit without locking up or missing a character. Also permits you to strike a series of keys simultaneously, with the characters being transmitted in the order in which the keys are pressed. A permanent memory storage area. Not affected by loss of power. A RAM with a constant power source is a nonvolatile memory device. An ASCII character that normally does nothing and is ignored. While a space character occupies a space, the null character is a void (nothing). Used because it occupies no space and is not transmitted.
monitor monitor mode N-key rollover nonvolatile memory null page	 Hardware: A video screen on which you can see computer output and input. A mode that allows users to see all ASCII characters as they are received. A keyboard feature that allows you to type faster than the keyboard can transmit without locking up or missing a character. Also permits you to strike a series of keys simultaneously, with the characters being transmitted in the order in which the keys are pressed. A permanent memory storage area. Not affected by loss of power. A RAM with a constant power source is a nonvolatile memory device. An ASCII character that normally does nothing and is ignored. While a space character occupies a space, the null character is a void (nothing). Used because it occupies no space and is not transmitted. As used in this manual, refers to an amount of memory. However, since the screen displays 24 lines of text at a time, you may not see the entire page. See also display, screen.
monitor monitor mode N-key rollover nonvolatile memory null page page print	 Hardware: A video screen on which you can see computer output and input. A mode that allows users to see all ASCII characters as they are received. A keyboard feature that allows you to type faster than the keyboard can transmit without locking up or missing a character. Also permits you to strike a series of keys simultaneously, with the characters being transmitted in the order in which the keys are pressed. A permanent memory storage area. Not affected by loss of power. A RAM with a constant power source is a nonvolatile memory device. An ASCII character that normally does nothing and is ignored. While a space character occupies a space, the null character is a void (nothing). Used because it occupies no space and is not transmitted. As used in this manual, refers to an amount of memory. However, since the screen displays 24 lines of text at a time, you may not see the entire page. See also display, screen. A print command that sends all data on the terminal's screen between the home and cursor position to the printer connected to the terminal. Can be formatted (including line delimiters such as CR, LF, and null) or unformatted.
monitor monitor mode N-key rollover nonvolatile memory null page page print parity	 Hardware: A video screen on which you can see computer output and input. A mode that allows users to see all ASCII characters as they are received. A keyboard feature that allows you to type faster than the keyboard can transmit without locking up or missing a character. Also permits you to strike a series of keys simultaneously, with the characters being transmitted in the order in which the keys are pressed. A permanent memory storage area. Not affected by loss of power. A RAM with a constant power source is a nonvolatile memory device. An ASCII character that normally does nothing and is ignored. While a space character occupies a space, the null character is a void (nothing). Used because it occupies no space and is not transmitted. As used in this manual, refers to an amount of memory. However, since the screen displays 24 lines of text at a time, you may not see the entire page. See also display, screen. A print command that sends all data on the terminal's screen between the home and cursor position to the printer connected to the terminal. Can be formatted (including line delimiters such as CR, LF, and null) or unformatted. A method of checking the data bits received to make sure they are complete and accurate. See also start bit, stop bit.

port	The location at which data goes in and out of the device. See connectors.
protect mode	A mode that allows specific data to be protected from accidental operator change. Block mode transmission can exclude or only include these areas.
RAM	Acronym: Random-Access Memory. The changeable part of the computer/terminal's mem- ory. Memory that can be read and written into during normal operation. It is erased (lost) when power to the RAM chip is turned off. RAM is the type of memory used in all computers to store the instructions of programs being run. See also ROM.
read the cursor	Report the cursor's position and content to the computer.
refresh	To change or update the screen with new data.
resolution	The sharpness of the characters on the display. When a character contains a lot of small dots (pixels), it is much sharper than a character containing only a few large dots.
reverse video	A terminal feature that produces the opposite combination of characters and background from the one usually employed (i.e., light characters on a dark background if normally characters are dark on a light background).
RS-232C	A standard technical specification written by the Electronic Industry Association for data sent as voltage pulses over a serial cable at distances up to 50 feet (although shielded wires allow greater length). See also interface, current loop, RS422.
RS-422	A technical specification for high-speed communication between the computer and a peripheral. When used, sends data faster than RS-232C while allowing the peripheral to be located up to 4,000 feet from the computer. See also interface, current loop, RS-232C.
RTS	Acronym: Request to Send. A line whose voltage changes to control data flow between com- puter, terminal, and printer. See also handshaking protocol.
screen	The terminal viewing area that shows 24 lines of data and one status/user/set up line. See also display and page.
screen updating	The changing of data on the terminal's screen as new data is received from the computer or printer terminal.
scroll	The action that moves lines up or down on the display so you can see data on that page of memory but just beyond the 24-line viewing area. The direction, rate, and evenness of the scrolling can be controlled. See page, screen.
scrolling region	The same area of memory as defined by page. Movement of the cursor is limited to the scrolling region.
self-test	A procedure that causes the terminal (or a program or peripheral) to check its own operation.
serial transmission	A method of sending one bit of data at a time in a stream. See parallel, RS-232C.
SET UP	In this manual, denotes a command that can also be changed in the set up lines.
set up	Refers to the mode used to change the terminal's operating parameters.
set up lines	A line that can appear on the bottom line on the screen. Contains descriptions of the termi- nal's ports and modes that can be changed from the keyboard. The appearance of the set up lines cannot be changed; they are always displayed in reverse video. The parameters

	changed in the set up line are temporarily displayed in normal video until you leave the set up mode. When you reenter set up mode and look at that line again, that parameter is displayed in reverse video. Changes made in the set up lines are not lost when the power is turned off. See 25th line.
SOH	Acronym: Start of Header. An ASCII character that frames the start of block of data to be transmitted. See EOM.
space	A blank space created by a space character. Not the same as a null, which looks like a space but contains nothing (i.e., a void). A space occupies an amount of memory while a null does not. The terminal transmits space characters, while it does not transmit null characters.
status line	A line that can appear on the bottom line on the screen. Contains descriptions of the termi- nal's ports and modes that can be temporarily changed from the keyboard. The appearance of the status line cannot be changed; it is always displayed in reverse video. Changes made in the status line are lost when the power is turned off. See 25th line.
start bit	The space that signals the beginning of data transmission. It is always a one (1). See parity bit, stop bit.
stop bit	A space that signals the end of data transmission; always a one (1). The terminal can use either one or two stop bits, depending on the computer's requirements. See parity bit, start bit.
STX	Acronym: Start of Text. An ASCII character signalling that text transmission follows.
system sign-on message	The message sent to the terminal screen by the computer when the system is first turned on (i.e., boots up).
tab stop	A preset place indicating where the cursor will go when the TAB key is pressed or the terminal receives the tab command. Tab stops can be changed or deleted on command.
trace	In this manual, the soldered connection between two pins.
transmit	To send data between a peripheral such as the terminal and the computer.
transparent print	A printer port mode that sends all data received by the terminal to the printer without display- ing it on the screen. See extension print, bidirectional print, page print.
25th line	The bottom line of the screen. Displays the status, set up, or message lines or can be blank. See status line, user's message line, set up line.
VDT	Acronym: video display terminal. A terminal containing a cathode ray tube on which informa- tion received from the computer or keyboard can be displayed. Different than a terminal that uses a printer to display data. Video display terminals include a keyboard, while printer termi- nals may not.
visual attributes	The description of a character's appearance. The character can be steady or blinking, full or half intensity, visible or blank (invisible), normal or reverse video, and underlined.
word structure	The arrangement of bits in each piece of transmitted data. Consists of a start bit, the data bits, a parity bit (optional) and one or two stop bits.
X/On-X/Off	ASCII characters that control data flow between terminal, printer, and computer. Any device connected to the printer port may signal the terminal to stop sending data or to resume sending data by using this signal. See also handshaking protocol and DTR.

1. Installation

Introduction	Installing the terminal involves the following steps:
	Inspecting the terminal for shipping damage
	Selecting an appropriate site
	Connecting the terminal to the computer and printer
	Turning it on
	The last section summarizes the installation procedure.
	WARNING! Do not open the terminal case as shown in this manual unless you are a qualified technician. Opening the case exposes you to potential shock hazards.
Inspecting the Terminal	After you unpack the terminal, keep the shipping carton and packing material to use if you move or ship the terminal again.
	In the packing carton you should find the terminal, a keyboard, a coiled keyboard cable, a power cable, and the manual. If anything is missing, call your dealer.
	1. Inspect the keyboard, cabinet, and video screen for shipping damage.
	2. Remove the two screws on the back of the case, as shown in Figure 1-1.
	3. Pull the cover gently toward you and up to remove the top of the case (Figure 1-2).
	STOP! Keep your hands out of the case. If the CRT is broken, do not touch any frag- ments since they are extremely sharp and the tube's inner coating is poisonous.
	4. Visually inspect the CRT (Figure 1-3). If it is cracked or broken, call a service technician.
	5. Replace the cover and screws.
	Figure 1-1 Location of Screws in Cover









Selecting a Good Location

Although the 924 was designed with your comfort in mind, where you place the terminal can also affect your comfort. Choose a site with indirect lighting, away from windows and other sources of bright light, as shown in Figure 1-4. Reflections and bright light are the most common causes of eye strain.

Figure 1-4 Correct Terminal Placement



Prevent operator fatigue by selecting furniture whose design is conducive to good working posture and placing the terminal at the correct height. Figure 1-5 shows the ideal relationship between the terminal and the operator. Since a high keyboard would be awkward for the operator, the keyboard is lower than the terminal screen.

Figure 1-5 Optimum Terminal Placement



Space Requirements

Allow 4 inches (10.2 cm) around the terminal for ventilation.

Installing the Terminal

Connecting the Keyboard

Plug the ends of the coiled keyboard cable into the back of the keyboard case and the back of the terminal (Figure 1-6).

Figure 1-6 **Connecting the Keyboard Cable**



Setting the Power Select Switch

The 924 requires 115 volt (60 hertz) or 230 volt (50 hertz) ac power.

- 1. Look at the power select switch under the left rear of the terminal (Figure 1-7). A blocking strip holds the power select switch in position for either 115 volt (US) or 230 volt (international) operation.
- 2. Remove the blocking strip and change the power select switch, if necessary. Figure 1-8 shows the two possible switch positions.

1157 230

 \odot .

3. Replace the blocking strip.

Figure 1-7 **Location of Power Select Switch**



Figure 1-8 **Power Select Switch Settings**



If you need a neutral fuse to meet international standards, ask your service technician to install it for you.

Connecting theMTerminal to a ComputertillSystemn

Measure the distance between the terminal and computer or modem before connecting them. You can use an RS-232C interface cable (with a 25-pin connector) between the terminal and the computer if the distance is less than 50 feet and the baud rate is 9600 or less. For distances between 50 and 1,000 feet, install a current loop board, as described in the section on field modifications.

If you are able to use the RS-232C cable, follow these steps:

- 1. Compare the suggested pin connector assignments, listed in Table 1-1, with those required by your computer. (Figure 1-9 shows the pin numbers assigned to the terminal's pin connectors.) If necessary, change the interface cable's pin assignments or ask your service technician to do it for you.
- 2. Connect the interface cable to the terminal's port labeled RS232 (Figure 1-10) and to the computer's RS-232C port.

NOTE! Not all computers have a one-to-one pin compatibility with standard RS-232C pin assignments. Only pins 2, 3, 7, and 20 are required to transmit data between the terminal and the computer. If your computer fails to operate properly, call the computer manufacturer for assistance in wiring the interface cable. If the pin connections are correct but the computer still fails to operate properly, call TeleVideo for technical assistance.

 Pin No.	Signal Name ¹	Direction	
1	Frame Ground		
2²	Transmit Data	Output	
3²	Receive Data	Input	
4	Request to Send	Output	
5	Clear to Send	Input	
6	Data Set Ready	Input	
7 ²	Signal Ground		
8	Data Carrier Detect	Input	
2 0 2	Data Terminal Ready	Output	

 Table 1-1

 RS-232C Computer (DCE) Interface Connector Assignments

1. Refer to the EIA's Standard RS-232C for signal definitions.

2. The terminal requires these signals.

Figure 1-9 Pin Numbers (25-pin RS-232 Connector)



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Connecting the Terminal to a Printer

- 1. Check your printer's pin connector configuration with the pin assignments of the terminal's printer port (Table 1-2).
- 2. Connect an RS-232C interface cable which includes a 25-pin connector to the terminal's port labeled RS232 (Figure 1-10) and to an RS-232C-compatible serial printer.

NOTE! Not all printers have a one-to-one pin compatibility with standard RS-232C pin assignments. Only pins 3 and 7 as well as 2 and/or 20 are required to transmit data from the terminal to the printer. If your printer fails to operate properly, call the printer manufacturer for assistance in wiring the interface cable. If the pin connections are correct but the printer still fails to operate properly, call TeleVideo for technical assistance.

Pin No.	Signal Name ¹	Direction	
 1	Frame Ground		
2	Receive Data	Input	
3	Transmit Data	Output	
4	Request to Send	Input	
5	Clear to Send	Output	
6	Data Set Ready	Output	
7	Signal Ground		
8	Data Carrier Detect	Output	
11	Printer Busy ²	·	
20	Data Terminal Ready	Input	

 Table 1-2

 RS-232C Printer (DTE) Interface Connector Assignments

1. Reference EIA Standard RS-232C for signal definitions.

2. Nonstandard handshaking signal used by several printers such as Epson, Texas Instruments, and Okidata. To use pin 11 instead of pin 20, remove the logic board (as described in the field modification section). Either add a jumper to the logic board at P3 between W8A and W8B or cut the trace at P4 between W7A and W7B and add a jumper between W7C and W7D.

Plugging In and Turning On the Terminal

Now you are ready to plug in the terminal and turn it on.

1. Plug the power cable into the terminal and into a grounded wall outlet (Figure 1-11).

In the United States, use a 3-prong electrical outlet with a National Electrical Manufacturers Association (NEMA) Standard 5-15R rating. If you use a two-prong adapter, ground it with a pigtail.

Internally, the power cord wires have the following color codes:

Green	Earth ground
Black/red	Primary power (hot)
White	Primary power return (neutral)

- 2. Push the white dot on the ON/OFF switch on the front of the terminal (Figure 1-12).
- 3. Listen for the terminal to "beep" within about a second.
- 4. Look for the cursor in the top left corner of the screen after 10 to 15 seconds.
- 5. Adjust the angle of the terminal by pushing on the case until you can see the screen easily. The terminal case tilts and swivels on the base.

Figure 1-11 Plugging the Power Cord into the Terminal and Wall Outlet



Figure 1-12 Turning On the Terminal



Before operating the terminal, check its configuration, as described in the following chapter.

Field Modifications By following the instructions in this section, you can modify the terminal or add several options at any time. As you perform these modifications, refer to the next section whenever you need to open the case and remove the logic board.

NOTE! Unless you are an experienced service technician, ask your dealer or distributor to perform these modifications for you.

General Instructions 1. Disconnect all interface cables and the keyboard cable.

- 2. Unplug the terminal from the wall outlet.
- 3. Unscrew the two Phillips head screws holding on the terminal cover (Figure 1-1).
- 4. Lift the cover toward you and up (Figure 1-2).

STOP! Do not touch the video module (shown in Figure 1-3) or the black suction cup connected to the top of the CRT (which can retain an electrical charge of up to 15,000 volts—even with the power turned off—unless a qualified technician discharges the voltage first).

5. If the modification does not involve removing the logic board, skip to Step 9.

If the modification requires removing the logic board, remove the two screws holding the logic board and shroud on the terminal case (Figure 1-13).

- 6. Disconnect the white video connector from location P2 on the logic board (Figure 1-14).
- 7. Disconnect the red power supply connector from location P5 on the logic board (Figure 1-14).

NOTE! Although two connectors are attached to the internal power supply, only one (either one) is attached to the board. The other connector is tied back.

- 8. Lift the shroud and logic board out of the card guide, as shown in Figure 1-15.
- 9. Follow the specific field modification instructions.
- 10. If you disconnected the video and power supply connectors and removed the logic board and shroud (Steps 5 through 7), follow Steps 11 through 17. Otherwise, skip to Step 15.
- 11. Slide the logic board back into the center slot on the card guides (Figure 1-15).
- 12. Position the shroud between the logic board and case back, matching the connector and screw holes.
- 13. Replace the two screws in the shroud lip and back case.
- 14. Reattach the white video connector to P2 and the red power supply connector to P5 (Figure 1-14).
- 15. Replace the cover and screws, being careful not to overtighten the screws.
- 16. Reattach the interface and keyboard cables.
- 17. Plug the power cord into the terminal and wall outlet.

Figure 1-13

Screws Holding Logic Board and Shroud to Terminal Case



GOLLING

Figure 1-14 Connectors P2 and P5 on Logic Board



Figure 1-15 Removing the Logic Board and Shroud from the Card Guide



Current Loop

If your installation requires a current loop interface, order a current loop kit (TeleVideo Part 2131000) from your dealer.

Either the terminal or the computer must provide a 20 mA current source to drive a current loop signal. If the terminal provides the current source, the configuration is **active**. If the computer provides the current source, the configuration is **passive**.

STOP! If you select full duplex current loop configuration, do not configure the set up line for half duplex or use the escape sequence for half duplex (ESC D H). To do so could seriously damage both the terminal and the computer.

Consult your computer's documentation if you are not sure if the computer can provide the current.

1. Based on that information, choose one of the following configurations:

Full duplex, active transmit, active receive

Full duplex, active transmit, passive receive

Full duplex, passive transmit, active receive

Full duplex, passive transmit, passive receive

Half duplex, active transmit/receive

Half duplex, passive transmit/receive

2. Modify the current loop board, as described in Table 1-3.

Table 1-4 lists the pin connector assignments of the RS-232C port when it is configured for current loop.

- 3. Connect the current loop board's pin connector to the socket labeled P6 on the logic board. See Figure 1-16.
- 4. Assemble the two boards, together with the spacer, washers, and nut, as shown in Figure 1-16. Insert and tighten the screw.
- 5. Follow the general instructions to reassemble the terminal.
- 6. Connect the terminal's computer port, labeled **RS232** (Figure 1-10), and the computer's RS-232C port, using a 25-pin RS-232C interface cable.

Table 1-3 Configuration of Current Loop Board

-	-				
Configuration	20 mA Current Source ¹	Cuts	Jumpers	Pin No.²	Connector Polarity
Full duplex transmit	Active	W2 to W3	W1 to W2 W3 to W4	13 25	+ -
	Passive			25 13	+ -
Full duplex receive	Active	W6 to W7	W5 to W6 W7 to W8	24 12	+ -
	Passive	_		12 24	+ -
Half duplex transmit/receive	Active	_	W1 to W2 P3-12 to P3-13	24 7	+ -
	Passive	—	P3-12 to P3-13	25 24	+ -

1. Where the source is the terminal.

2. In the interface connector.

Table 1-4 Current Loop Computer (DCE) Interface Connector Assignments

Pin No.	Signal Name	Direction	
 9	20 mA source (+ 12V, no load)		
10	Detected Current Loop Data		
12	Current Loop	Receive	
13	Current Loop	Transmit	
14	20 mA source (+12V, no load)		
24	Current Loop	Receive	
25	Current Loop	Transmit	





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Adding More Screen Memory

You can install more screen memory in the terminal. If you ordered the terminal with additional memory, this modification has already been made.

You need two 8k x 8 (64k bit) static RAM chips with a maximum access time of 150 nanoseconds (TeleVideo Part 132093-00).

- 1. Open the case and remove the logic board as described in the general instructions.
- 2. Cut the traces between W1B and W1C and between W4B and W4C. Add a jumper between W1A and W1C and between W4A and W4C.
- 3. Replace the chips at locations U4 and U11 on the logic board with the new chips. You can discard the original chips.

NOTE! Handle the chip carefully to avoid bending the pins. Make sure the chip's halfmoon notch or depression (Figure 1-17) matches the orientation of the other chips.

4. Replace the logic board and cover, as described in the general instructions at the beginning of this section.

Figure 1-17 Notches and Depressions in Chips



Adding a Monitor

The composite video option allows you to connect an additional monitor to the terminal. You need an Amphenol BNC connector, Part 227169-5.

- 1. Open the case and remove the shroud and logic board, following the general instructions at the beginning of this section.
- 2. Gently pry off the cover plate below the pin connectors (Figure 1-10), exposing the four prepunched holes shown in Figure 1-18.

Figure 1-18 Removable Cover Plate on Rear Panel



- 3. Install the BNC connector in the opening labeled RS422 (OPT).
- 4. Connect the center lead of the BNC connector to P10 pin 1 on the logic board. Connect the BNC ground lead to P10 pin 2 on the logic board.
- 5. Break apart the scored cover plate to expose the hole where you installed the BNC connector. Snap the other cover plate sections back in place.
- 6. Replace the logic board and cover, following the general instructions at the beginning of this section.
- 7. Install a coaxial cable less than 10 feet long between the terminal's BNC connector and the monitor.

Adding a European Base Plate The optional European base plate raises the height of the terminal by doubling the thickness of the base. The only tool you need is a small Phillips head screwdriver.

- 1. Unplug the terminal from the wall outlet.
- 2. Carefully turn the terminal on its side.
- 3. Remove the small Phillips head screw inside each rubber foot. Lay the feet aside.
- 4. Hold the European base plate against the conventional base. Install the four screws (supplied in the kit) in the small holes near the holes for the feet (Figure 1-19).
- 5. Position a rubber foot over each outer hole and replace the screws removed from the conventional base plate.
- 6. Return the terminal to its upright position and plug in the power cord again.

Figure 1-19 Attaching the Optional European Base Plate



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Installation Summary Plug the keyboard cable into the terminal and the keyboard.

Check the power select switch setting.

Connect the appropriate interface cable between the computer system and the terminal.

Attach a printer interface cable (if you are connecting a printer to the terminal).

Plug the power cord into both the terminal and the wall outlet.

Turn on the terminal and watch for the cursor to appear.

2. Reconfiguring the Terminal

Is Necessary	When you receive the terminal, its operating values are already set. This is its configuration . However, that configuration may not necessarily fit the requirements of your computer and printer. After checking these requirements, you will probably need to reconfigure the terminal so it can communicate with them.			
How To Reconfigure the Terminal				
Selecting a Method	You must initially reconfigure the terminal by changing values in the five set up lines that can be displayed on the screen's bottom (25th) line. After that you can reconfigure the terminal with the set up lines or the status line (a one-line summary of a few current terminal parameters).			
	Changing the status line only changes the terminal's current configuration; not its permanent (i.e., nonvolatile) memory. As soon as you turn the terminal off, any changes not stored in the nonvolatile memory are lost. The next time you turn the terminal on, its configuration returns to the values in effect before you changed the status line.			
	NOTE! The current configuration is also changed when the terminal receives an escape sequence from the computer or the keyboard.			
	Changing the set up lines (in set up mode as described here or with the sequence ESC $\}$ (code) described in Chapter 4) changes both the terminal's current configuration (as shown in the status line) and its nonvolatile memory.			
Changing the Set Up Lines	NOTE! Although you can put the terminal in set up mode at any time, you should wait unt any data transmission in progress is finished.			
	1. Press SHIFT and SET UP at the same time. This puts the terminal in set up mode.			
	STOP! Unless you press the SHIFT key while pressing the SET UP key, you may stop all data transmission from the computer to the terminal.			
	2. Look for the cursor in the status line.			
	3. Press the n or N key to look at the next 25th line (which is the first set up line).			
	Each set up line relates to a particular area of the terminal, as listed in Table 2-1.4. Look for the cursor in the second field in the first set up line. (Figure 2-1 shows the initi display of the first set up line.)			
	5. Press the t or T key (for toggle) until the desired field value appears. Table 2-2 lists all the field values for the first set up line.			
	Table 2-1 Set Up Lines			
	Set Up Line Changes			
	1Computer port2Printer port3Screen4Page handling and keyboard5Miscellaneous			

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- 6. Move the cursor to the next field with a cursor control key (← and →). Then press the t or T key again to select another value.
- 7. Make sure the values selected for the field names shown in boldface type in Table 2-2 match the requirements of your computer and printer.

NOTE! These fields have no right or wrong values except in relationship to your computer and printer.

- 8. Press the \uparrow and \downarrow keys if you want to change the screen's brightness.
- 9. Press the n or N key to see the next set up line. Figures 2-1 through 2-5 show the initial values of the five set up lines.
- 10. Review the values in all five set up lines. Tables 2-2 through 2-6 describe the possible values.
- 11. Press the I or L key (for last) to see the previous set up line.
- 12. Press SHIFT and SET UP to leave set up mode and return the cursor to the main part of the screen.

Figure 2-1

Initial Values of First Set Up Line

1 BAUD 600 WORD 8 PRTY NO STOP 1 COMM FDX PRTC X-ON

Field Name ¹	Possible Values	Description
BAUD rate of computer port	150 300 1200 1800 2400 4800 9600 19.2k	Sets baud rate (speed at which data is sent to the computer from the terminal's RS-232C computer port).
WORD structure of computer port	8	Computer port recognizes/transmits only 8-bit words to/ from computer.
	7	Computer port recognizes/transmits only 7-bit words to/ from computer.

Table 2-2 Changeable Values in First Set Up Line (Computer Port)

1. Values of fields in bold print must match computer's requirements before communication can occur.

Table 2-2 Continued		
Field Name ¹	Possible Values	Description
PRTY (parity of computer port)	NO	No parity.
	ODD	Parity is odd.
	EVEN	Parity is even.
STOP bits for computer port	1	Sends a bit (always with a value of one) to signal that a character has been sent.
	2	Sends two bits (both ones) to signal that a character has been sent.
COMM (communication mode)	FDX	Permits simultaneous transmission and reception of information. Keyboard entries are sent only to computer.
	HDX	Lets terminal transmit or receive data (but not simultaneously). Sends keyboard entries to computer and to screen.
		STOP! If you selected full duplex current loop configuration, do not configure the set up line for half duplex or use the escape sequence for half duplex (ESC D H) or you could seriously damage both the terminal and the computer.
	BLK	Sends keyboard entries to screen only.
PRTC (print control)	X-ON	Lets terminal control the receipt of data during printing by sending X-On/X-Off signals to computer.
	DTR	Lets terminal control the receipt of data by lowering and raising voltage on the DTR line to computer.

1. Values of fields in bold print must match computer's requirements before communication can occur.

Figure 2-2 Second Set Up Line

2 BAUD 1800 UORD 8 PRTY NO STOP 1 PMOD

Field Name ¹	Possible Values	Description
BAUD rate of printer port	150 300 1200 1800 2400 4800 9600 19.2k	Sets baud rate (speed at which data is sent is sent to printer from terminal's printer port).
WORD structure of printer	8	Printer port sends only 8-bit words to printer.
port	7	Printer port sends only 7-bit words to printer.
PRTY (parity of printer port)	NO	No parity.
	ODD	Parity is odd.
	EVEN	Parity is even.
STOP bits for printer port	1	Causes terminal to send a bit with a value of one when a character code has been sent.
	2	Sends two bits (both ones) to signal that a character has been sent.
PMOD ² (print mode)	blank	No print mode.
	TRSP	Turns on transparent print mode. Terminal does not display data on screen as it is printed. Lets baud rates of computer and printer ports differ.
	BDIR	Turns on bidirectional communication between computer and printer ports so two-way communication can occur between the computer and a printer connected to terminal.
		NOTE! Enabling bidirectional communication automatically configures the printer port with the configuration of the computer port. Disabling bidirectional communication returns the printer port to its previous configuration.
	COPY	Turns on extension print mode so terminal displays data on screen as it is printed. Lets baud rates of computer and printer ports differ.

Table 2-3 Changeable Values in Second Set Up Line (Printer Port)

1. Values of fields in bold print must match the printer's requirements before communication can occur.

2. Refer to Chapter 4 for a detailed description of print modes.

Figure 2-3 Third Set Up Line

3 HZ 60 BACK GOB TOB OFF 25TH OFF SHTH OFF RATE 6

Changeable Values in Third Set Up Line (Screen)		
Field Name	Possible Values	Description
HertZ	6Ø1	Terminal refreshes screen at 60 hertz.
	50'	Terminal refreshes screen at 50 hertz.
BACKground	GOB	Screen background is dark with light characters.
	BOG	Screen background is light with dark characters.
TOB (time out blank)	OFF	Screen remains on even while terminal is idle.
	ON	If the terminal receives no data from the computer or the keyboard for 15 minutes, the screen becomes blank. When you press any key, the terminal does not display the key's character or transmit its code to the computer—it only turns on the screen. The exception is CTRL RESET, which also resets the terminal.
25ТН	OFF	Twenty-fifth line is blank.
	ON	Twenty-fifth line display is on. Displays status line unless you display set up lines or the program turns it off.
SMTH (smooth scroll)	OFF	Screen scrolls normally (not smoothly). (Sometimes called jump scroll.)
		NOTE! While this parameter is off, setting the rate of scroll (next field) has no effect.
	ON	Screen scrolls smoothly.
		NOTE! Set the scrolling rate in the next field.
RATE of scrolling	6	Data scrolls at rate of 6 lines per second (if smooth scroll is on).
	12	Data scrolls at rate of 12 lines per second (if smooth scroll is on).

1. Unless this value matches your power line's hertz rate, the screen display may waver.

Figure 2-4 Fourth Set Up Line

Table 2-4

4 | WRAP ON | FLIP OFF | KLIK ON | CR CR | DOWN ^/V | EDTK DUPE
Field Name	Possible Values	Des	cription			
WRAP (autowrap mode)	ON	When you enter a character after the cursor reaches the line's last position, the cursor automatically advances to the first unprotected character position on the next scrollable line.'				
		she alatu A B C D E F G H I J K L M alaa lat N O P Q R S T U V V X Y Z A B C D E ha alath gyada alataa ya alaa dana gya alaa lat alata ya alaa ya dana gya alaa lat alata ya alata bo yilo oloo loi alat alata alata ya alata hio alalu gyada alatabe yilo oloon	The diletti A B C D E F G H I J K L M their lief N O P Q R S T U V W X Y Z A B C D E F the dilettic gradie alforder yilo obout allottic yilo obout lief clubo olioflu cynolloc bio yilo obout lief clubo olioflu cynolloc bio olioflu cynolloc alloutie yilo obout			
		BEFORE	AFTER			
		If autopage and write pro mode is on, entering a ch unprotected position retu unprotected position.	otect modes are off but protec haracter on the page's last rns the cursor to the page's firm			
		chiefte cyacile ulterior ylle chon llol c in cynolle ulterior ylle chon llol chih lo ohon llol chiho ollollu cynollo ul ollollu cynolle ulterior yllo ohon llol chi u cynolle ulterior yllo ohon llol chi ic chan llol chiho ollollu cynolle ul le ohon llol chiho ollollu cynolle ul le ohon llol chiho ollollu cynolle al ubo ollollu cynollo ulterior ynolle g ulterior yllo ohon llol chibo ollollu cynolle ho yllo ohon llol chibo ollollu cynolle ho ollollu cynollo ulterior ynolle ohon ulterio yllo ohon llol chibo ollollu cynolle ho ollollu cynolle ulterio yllo ohon ulterio yllo ohon llol chibo ollollu cynolle ho yllo ollollu cynolle allouno yllo ohon ulterio yllo ohon llol chibo ollollu cynolle ho yllo ohon llol chibo ollollu cynolle ho yllo ollollu cynolle allouno yllo ohon ho ollollu cynolle allouno yllo ohon ho ollollu cynolle allouno yllo ohon ho ollollu cynolle allou ohon hol chibo ho ollollu cynolle allouno yllo ohon ho ollollu cynolle allou ohon hol chibo ho ollollu chibo ohon hol chibo ohon hol chibo ho ollollu cynolle allou ohon hol chibo hol chibo ohon hol chibo ohon hol chibo ohon hol chibo hol chibo ohon hol chibo ohon hol chibo ohon hol chibo	ulto allolle spacile allocide plo obomu illenho yllo obon thei chiho allollu synoll ho yllo obon thei chiho allollu synoll iho allollu synollo allocidu yllo obomu illenho yllo obon thei chibo allollu synoll ho yllo obon thei chibo allollu synoll ho yllo allon thei chibo allollu synollo ibo yllo allon thei chibo allollu synollo allon obon thei chibo allollu synollo al allollu synollo allonho yllo abon thei chib lo allon illenho yllo abon thei chib lo allon illenho yllo abon thei chib lo allon thei chibo allollu synollo al allollu synollo allonho yllo allon thei chib lo allon thei chibo allollu synollo allo allollu synollo allonfa yllo alian thei si bi synollo allonho yllo alian thei si bi synollo allonho yllo alian thei si bi synollo allonho ytto alian thei si			
		BEFORE	AFTER			
		If write protect and protect mode is off, entering a cha unprotected position move unprotected position.	at modes are on and autopage aracter on the line's last as the cursor to the page's nex			
		lu cynollo ullonho yllo ohon llol elbh lo ohon llol chhio ollollu cynollo ul ollollu cynollo ullonho yllo ohon llol c lu cynollo ullonho yllo ohon llol elbh lu ohon llol elbh ullonho yllo ohon llol elbh	ollolla cynello ullonho yllo ohon llol c la cynollo ullonho yllo ohon llol cllih lo ohon llol clliho ollolla cynollo ul ollolla cynollo nllonho ylla ohon llol clli la cynollo allonho yllo abon llol cllif o ohon llol clliho cynollo ul			
		nho ottottu cyaolla ullanho ylla ohonn ullanho ylla ohon llai chho ollottu cyaoll ha ylla ohon llai chho ollottu cyaolla hina ollottu cyaolla ullanha ylla ohonn ullanha ylla ohon llai chha adlottu cyaolla hi ytla ohon llai chha adlottu cyaolla hi ettallu cyaolla ullanha ylla ohonn hi cyaoll	nho niki chino onono cynono ni nhodia yła chun hol chino olicine cynol ho yła oban kiel chino nichine cynol bie alkoliu cynollo ukonko yłki obaru alkadar yłki oban kiel chino alkoliu cynol bie alkoliu cynol bie alkoliu cynol ho yłki alkan kiel chino alkoliu cynol bie alkal			
		lo obor	be typell			

1. Chapter 4 discusses autopage, write protect, and protect modes.

•

Table 2-5 Continued

Field Name	Possible Values	Description				
WRAP	ON	If no unprotected positions exist, the terminal turns off write protect and protect modes. (If autopage mode is on, the cursor advances to the next page's first unprotected position.)				
		to alion that ethico allallu eynalla ut allallu eynalla uttanha ytta alion tal ethico allallu eynalla ut allallu eynalla uttanha ytta alion tal ethi to alian eynalla uttanha ytta alian eynalla uttanha ytta alian alian ethico allallu eynalla uttanha ytta alian alian ethico alian eynalla uttanha ytta alian ethico alian alian ethico alian eynalla uttanha ytta alian ethico alian eynalla alian ethico alian eynalla uttanha ytta alian ethico alian eynalla alian ethico alian eynalla uttanha ytta alian ethico alian eynalla				
		ho ytto ohon ttol ethino ottollu cynellioe, hino ettellu cynello uttentio ytto ohon ttol ethino ettellu cynello illennio ytto ohon ttol ethino ettellu cynello hino ettellu cynello ethino ettellu cynello hino ettellu cynello uttentio ytto ohon ttol ethino ettellu cynello hino ettellu cynello ethino ethellu cynello hino ettellu cynello ethino ethellu cynello hino ethellu cynello ethino ethellu cynello ethino ethellu cynello hino ethellu cynello ethino ethe				
		le cynelle ullenho ylle chen llet clini le eben llet chine alfellu cynelle al ollellu cynelle allenho ylle chen llet chine alfellu cynelle allenho ylle chen llet chi ollellu cynelle allenho ylle chen llet c BEFORE				
		NOTE! Autowrap mode does not change cursor movement caused by → and ← keys and cursor right and cursor left commands. The cursor only moves to the next line when the terminal receives data (via keyboard or computer) on a line's last unprotected position.				
	OFF	Each character entered after the cursor reaches the line's last position replaces the one previously entered there.				
		When cursor reaches last the unprotected position on the current line while write protect and protect modes are on, it writes data there before moving to the page's nex unprotected position.				
		nhe ollollu cynollo ullonho yllo ohonn ullonho yllo ohon llol chho ollollu cynoll ho yllo ohon llol chho ollollu cynoll				
		BEFORE AFTER				
FLIP	OFF	Turns off autopage mode. If memory contains more that one page, data scrolls up when the cursor tries to go pas the page's last line.1				
	ON	Turns on autopage mode. If memory contains more that one page, receipt of a line feed or reverse line feed cod or data (via keyboard or computer) by terminal scrolls display to end of the current page (if it contains more than 24 lines). When the cursor reaches the end of the page, the display shows first 24 lines of the next page. ¹				
KLIK	ON	Lets all keys click when pressed.				
	OFF	Keeps keys from clicking when pressed.				

1. Chapter 4 discusses autopage, write protect, and protect modes.

Table 2-5

Continued	
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Field Name	Possible Values	Description
CR ²	CR	When the terminal receives a carriage return code from the computer, the cursor returns to the current line's first position; it does not advance to the next line. ³ Pressing the RETURN key sends only a carriage return code.
	CRLF	When the terminal receives a carriage return code from the computer, the cursor moves to the beginning of the next line (i.e., the terminal performs a carriage return and then a line feed). ³ Pressing the RETURN key sends a carriage return code.
DOWN	^/V	The \downarrow key sends a cursor down code (CTRL V). ³
	^/J	The ↓ key sends a line feed code (CTRL J) instead of cursor down code (CTRL V). ³
EDTK	DUPE	Codes sent by editing keys affect terminal and are also transmitted to computer (except in block mode).
	LOCE	Codes sent by editing keys affect terminal but are not transmitted to computer.

2. Values of fields in bold print must match computer's requirements before communication can occur.

3. A line feed code is commonly used as a delimiter by computers. Some computers automatically add a line feed code (CTRL J) to each carriage return code. Others automatically add a carriage return code to each line feed code. Consult your computer's documentation before selecting a value.

Figure 2-5 Fifth Set Up Line

5 CURS IBLK CHAR U.S. EDIT LINE ATAB OFF

Table 2-6

Changeable Values in Fifth Set Up Line (Miscellaneous)

Field Name	Possible Values	Description	
CURS	BBLK	Cursor is a blinking block.	
	SBLK	Cursor is a steady block.	
	BUND	Cursor is a blinking underline.	
	SUND	Cursor is a steady underline.	

Table 2-6 Continued

Field Name	Possible Values	Description
CHAR ¹	U.S.	Character set is US English (ASCII).
	U.K.	Character set is United Kingdom English.
	FREN	Character set is French.
		NOTE! If the terminal receives a caret code (5E hex) when the character set is French, the caret is displayed but the cursor does not move until the terminal receives the next input character. If that is a lowercase vowel, it is displayed with the caret above it and the cursor moves. If it is not a lowercase vowel, the caret disappears and the second character is displayed alone.
	GERM	Character set is German.
	SPAN	Character set is Spanish.
		NOTE! If the terminal receives an accent mark code (60 hex) while the character set is Spanish, it is displayed but the cursor stays there until the terminal receives the next input character. If that is a lowercase vowel, it is displayed with an accent mark above it and the cursor moves. If it is not a lowercase vowel, the terminal ignores the accent character and displays the second character.
	FIN/SWED	Character set is Finnish/Swedish.
	DAN/NORW	Character set is Danish/Norwegian.
	PORT	Character set is Portuguese.
EDIT modes	LINE	Enables line edit mode so character insert/ delete commands affect only current line. ²
	PAGE	Enables page edit mode so character insert/delete commands affect the entire page. ²
ATAB (autotab mode)	OFF	Disables autotab mode. The cursor tabulates forward or backward only within the current line.
		the effective cruelle attentive where the effective cruelle attentive cruelle attentive where the effective cruelle attentive where the effective cruelle attentive crueelle attentive cruelle cruelle attentive cruelle att

When no more tab stops exist in that line, the cursor stops responding to tab commands.

See Appendix H for character set differences and keyboard layouts.
 Edit modes are discussed in Chapter 4.

Table 2-6 Continued			
Field Name	Possible Values	Description	
ATAB	ON	Enables autotab mode Permits the cursor to ta typewriter tab stop on t	if protect mode is off. abulate to the next the next or previous line. ³
		nho allahu cysalla ullanha ylla ohonu illanha ylla ohon llat chha allali cysall ha ylla ohin llat chha allali cysall ha ylla ohin llat chha allalin cysallac hha allahu ylla ohon llat chha allallu cysall ha ylla ohin llat chha allallu cysall ha ylla ohin llat chha allallu cysallac hha allallu cysalla shlauha ylla ohonu	nho allalite cynalla ullanho Xila ahann illeuha yla ahan lad ethia allalin cynall ho ylla abur llad ethia allalin cynalla ho allalite cynalla ullanha Xila ahann illeuha ylle ahan llad ethia allanhi cynall ho ylla ahan llad ethia allalin cynalla ho allalite cynalla ullanha Xila ahan
		BEFORE	AFTER
		If autopage mode is off the page's last tab stor move any further. To obou Itol dho olicilu cynollo olicilu cynollo ulicuho yllo obou Itol d to obou Itol dhibo olicilu cynollo olicilu cynollo ulicuho yllo obou Itol d to obou Itol dhibo olicilu cynollo olicilu cynollo ulicuho yllo obou Itol to obou Itol chibo olicilu cynollo ulicuho Itol ohibo ulicilu cynollo ilicuho Itol ohibo ulicilu cynollo ilicuho Itol ohibo Itoli dhi cynollo ilicuho zito obou Itol dhibo olicilu cynollo ilicuho zito ibou Itol dhibo olicilu cynollo ibo olicilu cynollo ulicuho yli obou ilicuho zito obou Itol dhibo olicilu cynollo ibo olicilu cynollo ulicuho yli obou BEFORE AND AFTER	when the cursor reaches b, the cursor does not
		If autopage mode is on the first tab stop on the	, the cursor tabulates to
		In ohon llot cliho ollollu cynollo ul ollollu cynollo ullouho yllo ohon llot clih o ohon llot cliho ollollu cynollo ul ollollu cynollo ullouho yllo ohon llot clih o ohon llot cliho ollollu cynollo ul uho ollollu cynollo ullouhe yllo ohon llot clih o ohon llot cliho ollollu cynollo ul uho ollollu cynollo ullouhe yllo ohon ullouho yllo ohon llot cliho ollollu cynollo bo yllo ohon llot cliho ollollu cynollo bo ollollu cynollo ullouhe yllo ohonu ullouho yllo ohon llot cliho ollollu cynollo bo yllo ohon llot cliho ollollu cynollo bo yllo ohon llot cliho ollollu cynollo bo ollollu cynollo ullouhe yllo ohonu ullouho yllo ohon llot cliho ollollu cynollo bo ollollu cynollo ullouhe yllo ohonu illouho yllo ohon llot cliho ollollu cynollo bo ollollu cynollo ullouhe yllo ohonu yllo ohon illot ullouhe yllo ohonu bo ollollu cynollo ullouhe yllo ohonu yllo ohon illot cliho ollollu cynollo bo ollollu cynollo ullouhe yllo ohonu bo ollollu cynollo ullouhe yllo bo ohonu cynollo ullouhe yllo bo ohonu bo ollollu cynollo bo ollollu cynollo ullouhe yllo bo ollollu cynollo ullouhe yllo bo ollollu cynollo bo ollollu cynollo ullouhe yllo bo ollollu cynollo bo ollollu cynollo bo ollollu cynollo ullouhe yllo bo ollollu cynollo bo ollollu cynollo ullouhe yllo bo ollouhe yllou ollouhe	nho olloffi cynolio ullonho yla ohonn ullonho yla ohon iloi chiho ollofla cynollo ho yla ohon iloi chiho ollofla cynolloc hho olloffi cynollo ullonho yla ohonn ullonho yla ohon iloi chiho ollofla cynollo ho yllo ahon iloi chiho ollofla cynollo ho olloffi cynollo ullonho yla ohon iloi cynollo ullonho yllo ohon iloi chi olloffi cynollo ullonho yllo ohon iloi chi olloffi cynollo ullonho yllo ohon iloi chi olloffi cynollo ullonho yllo ohon iloi chi o ohon iloi chiho olloflu cynollo u olloffi cynollo ullonho yllo ohon iloi chi o ohon iloi chiho olloflu cynollo u olloffi cynollo ullonho yllo ohon iloi chi u cynollo ullonho yllo ohon iloi chi page 2

3. Protect mode is discussed in Chapter 4.

Field Name	Possible Values	Description	
ATAB	ON	If the cursor is on the fir first line and memory co page, the status of auto number on which the cu determines where cursor receives a back tab coo on, memory contains or cursor is on the first tab two or more, the displa- page and the cursor more on the last line.	rst tab stop on a page's ontains more than one opage mode and the page ursor is located or goes when the termina de. If autopage mode is ver one page, and the o stop on line one of page y flips to the previous oves to the last tab stop
		nho olicilu Guello ultoutio yilo ohonn idenho yilo ohon llot chino diollu cyuello ho yilo ohon llot chino diollu cyuelloc hho olicilu cyuello ultoutio yilo ohonn idenho yilo ohon llot chino olicilu cyuelloc hho olicilu cyuello diona identio yilo ohonn llo cyuello ultouto yilo ohon llot chihi lo ohon llot chiho olicilu cyuello ul olicilu cyuello ultouto yilo ohon llot chi lo ohon llot chiho olicilu cyuello ul olicilu cyuello ultouto yilo ohon llot chi lo ohon llot chiho olicilu cyuello ul olicilu cyuello ultouto yilo ohon llot chi lo ohon llot chiho olicilu cyuello ul olicilu cyuello ultouto yilo ohon llot chi lu cyuello ultouto yilo ohon llot chih lo ohon llot chiho olicilu cyuello ul olicilu cyuello ultouto yilo ohon llot chih lo chon llot chiho olicilu cyuello ultouto pilotilu cyuello ultouto yilo ohon llot chihi lo chu cyuello ultouto yilo ohon llot chihi	In ohon the clinic offolio cynolio in olidiu cynolio illenino yllo ohon the lu cynolio illenino yllo ohon the poletiu cynolio illenino yllo ohon the
		BEFORE AN	ND AFTER

Changing the StatusNOTE! Although you can change the terminal's status line at any time, wait until any data
transmission in progress is finished.

1. Press SHIFT and SET UP at the same time to put the terminal in set up mode and display the status line.

STOP! Unless you press the SHIFT key while pressing the SET UP key, you may stop all data transmission from the computer to the terminal.

- 2. Look for the cursor to appear in the status line. Figure 2-6 shows the initial status line.
- 3. Press the T or t key to look at another value in the cursor's present field. Press it until you find the value you want to use. Table 2-7 lists the possible status line values.
- 4. Move the cursor to the next field you want to change, using the → or ← keys. Then press the t or T key again to select another value.
- 5. Press the \uparrow and \downarrow keys if you want to change the screen's brightness.
- 6. Press SHIFT and SET UP together when you want to leave set up mode and return the cursor to the main part of the screen.

Figure 2-6 Initial Status Line

PRC=00101							羻		1		I FDX	9600	DUPE	LINE
	a tha an	**************************************	r t aa 4966 966	104 NOONEY			4 1000					And A setting of	***********	Anna an
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Table 2-7 Status Line Values

No.	Values	Description
1	P RR CC	Visible cursor's current position:
		P = Page of memory R = Row (line) C = Column
2	XXXX/blank	Handshaking status:
		CBSY = Computer busy (computer has sent X-Off to terminal) ¹ CTS = Voltage on Clear to Send line has dropped ² DSR = Voltage on Data Set Ready line has dropped ³ DCD = Voltage on Data Carrier Detect line has dropped ⁴
3	TBSY/blank	Terminal busy⁵
4	PBSY/blank	Printer busy ⁶
5	XXXX/blank	Print type: PAGE = Page print TRSP = Buffered transparent print COPY = Buffered copy (extension) print BDIR = Bidirectional port communication Blank = All print types off
6	KLOK/blank	Keyboard locked/unlocked
7	SEND/blank	Sending/not sending a block of data
8	MONT/blank	Monitor mode on/off
9	PROT/blank	Protect mode on/off

1. If the computer sends X-Off to the terminal, the terminal stops sending data to the computer and displays CBSY in the status line. When the terminal receives X-On from the computer, it sends data to the computer again.

2. If the voltage drops on pin 5 of the computer interface line (P3), the terminal stops sending data to the computer. When the terminal's output buffer becomes full, the terminal locks up and the status line displays CTS. When the line voltage rises, the terminal sends the buffer's contents to the computer.

3. If the voltage drops on pin 6 of computer interface line (P3), terminal stops sending data to computer. When the terminal's output buffer becomes full, the terminal locks up and status line displays DSR. When voltage on the line rises, the terminal sends the buffer's contents to the computer.

4. When voltage drops on pin 8 of the computer interface line (P3), terminal receives no more data from the computer and displays DCD on the status line. When the voltage rises, characters sent by the computer are finally received.

5. Indicates the terminal's 256-character receive buffer (containing data received through the computer port) has room for fewer than 32 characters. This causes the terminal to send X-Off to the computer or lower the voltage on its DTR line, telling the computer to stop sending data.

6. Indicates the terminal received X-Off from the printer or voltage dropped on the DTR line.

Table 2-7
Continue

Continu	ed		
No.	Values	Description	
10	W.P./blank	Write protect mode on/off	
11	SMTH/blank	Smooth/normal (jump) scroll	
12	FDX/BLK/HDX	Full duplex/block mode/half duplex	
13	XXXXX	Computer port's baud rate	
		150 300 1200 1800 2400 4800 9600 19200	
14	DUPE/LOCE	Duplex/local edit key mode	
15	PAGE/LINE	Page/line edit mode	

Reconfiguration Summary

Up to now, we have described how to change the terminal using the set up mode. You can also change (i.e., reset) the terminal by sending escape sequences to the terminal from the computer or keyboard or by pressing certain keys, as described in Table 2-8.

Table 2-8 Summary of Res	set Methods		
Method	Clears Screen?	Changes Status Line?	Function
CTRL shifted BREAK	No	Yes	Performs partial reset. Refreshes the status line with nonvolatile memory values (including latest set up line values, reprogrammed function and editing keys, and reprogrammed answerback code).
			Also turns off no scroll, print, write protect, and protect modes.
CTRL BREAK	No	No	May break communication with the computer by bringing the transmit data line to a space condition for 250 milliseconds and lowering voltage on the DTR line.
CTRL RESET	Yes	Yes	Performs a hardware reset. Refreshes the status line with nonvolatile memory values (including latest set up line values, reprogrammed function and editing keys, and reprogrammed answerback code).
			Same as sending ESC ~1 from the computer or turning power off and back on. Any common status and set up line values now match.
BREAK	No	No	Has no effect.

Table 2-8 Continued			
Method	Clears Screen?	Changes Status Line?	Function
ESC ~1	Yes	Yes	Performs a software reset. Refreshes the status line with nonvolatile memory values (including latest set up line values, reprogrammed function and editing keys, and reprogrammed answerback code).
			Has same effect as pressing CTRL RESET on the keyboard or turning power off and back on.
ESC ~Ø	Yes	Yes	Resets software to factory values. Returns nonvolatile memory to factory values.
			STOP! This sequence permanently destroys any reprogrammed values previously loaded into the nonvolatile memory.
ESC } (code)	No	Yes	Changes set up values in nonvolatile memory and the displayed set up line values.
ESC¦nn (code)	No	No	Only changes the function keys' values.
ESC ^ 1 (codes)	No	No	Only changes the answerback code.
ESC Ø n <3 bytes>	No	No	Only changes the value of one editing key.
ESC]n(60 bytes)	No	No	Only changes all shifted or unshifted editing keys.

Summary of Set Up Mode Procedures

Table 2-9 summarizes how you can change the terminal's operating parameters.

Table 2-9 Summary of Set Up Mode Controls

Function	Кеу
Enter set up mode, display status line on 25th line, and put cursor in status line	SET UP (shifted NO SCROLL)
See another value	t (or T)
Move cursor to another field in status or set up line	\leftarrow or \rightarrow
Replace status line with first set up line	n (or N)
Display next set up line	n (or N)
Display previous line	l (or L)
Increase contrast	↑
Decrease contrast	Ļ
Leave set up mode; return cursor to upper part of screen	SET UP (shifted NO SCROLL)

3. Operator Controls

Introduction	This chapter tells you how to control the terminal from the keyboard. It includes:
	The function of each key and the code it sends to the computer
	How to control communication between the terminal and computer and printer
	How to edit data
	How to send information to the computer in block mode
	How to print
The Keyboard	The keyboard is divided into two areas: the main keypad and an accounting keypad. Some keys are duplicated in both areas (for example, the keyboard has two TAB keys).
	This chapter describes the default key functions. Since all editing keys [HOME, \uparrow , \leftarrow , \downarrow , \rightarrow , TAB (both), BACK TAB, CLEAR SPACE, PRINT, CHAR INSERT, CHAR DELETE, LINE INSERT, LINE DELETE, LINE ERASE, PAGE ERASE, PAGE, SEND, CE, ENTER] can be reprogrammed, their effect may have been changed after the terminal was received.
	NOTE! In the tables describing the keys, if the shifted name of a key is different from the unshifted name (e.g., SET UP/NO SCROLL), each name is entered separately. For example, the table lists SET UP, not "Shifted NO SCROLL."
Character Keys	The unshaded keys in Figure 3-1 are the character keys . They include all alphabetic charac- ters (a through z), numbers (0 through 9), punctuation marks, and mathematical symbols.
	NOTE! These keys repeat when pressed for more than one-half second.



Fl	F2	F3.	F4	F5	F6	R	F8	F9	F10 P	11	12	13 F14	F15	F16		CHAR INSERT	une Insert	LINE ERASE	<u>Set up</u> No Scroll	SEND
	1	@	#	S	%	٨	å	•][- 1			BACK	Ħ	CHAR Delete	line Delete	PAGE ERASE	PAGE	reset
ESC TAB				_][⁴ Ξ][F]₽				SPACE CLEAR SPACE			7	8	9	-
CTRL	alpha Lock	Α	S	D	F	G	1				1	RETUR	н	BREAK		8	4	5	6	,
BACK Tab	SHIFT	Z	X			В	N	М	< ,	<u>}</u>	? /	SHIFT		DEL		CE	1	2	3	
PRINT	FUNCT		Jac		s	PACE BAR				но			1			0		00		I III

Special Keys

Table 3-1 summarizes the function of the unshaded keys in Figure 3-2. These keys are unique: they have no effect on the terminal and send no code to the computer unless you press them with another key. Unless noted, they also repeat when held down more than one-half second.

The modes controlling the terminal's operation (i.e., set up, protect, autopage, autotab, autowrap, etc.) can affect many keys. The next chapter discusses modes in more detail.

Figure 3-2 Special Keys Requiring Another Key

F1 F2 F3 F4	F5 F6 F7 F8 F9	F10 F11 F12	F13 F14 F15	F16	CHAR NSEPT	NE UNE NSERT ERASE	SET UP NO SCROLL	SENO
			+ ~ (BACK	CHAR DELETE	INE DELETE ERASE	PAGE	Reset
				SPACE CLEAR		7 8	9	-
TALPHA A S				BREAK		4 5	6	,
40K SHIET Z X					CE	1 2		
						00		Ì

Table 3-1Special Key Functions

Key Name	Effect
ALPHA LOCK	Causes an alphabetic key to send code for its uppercase character. Press once to lock; press again to release. Has no effect when used alone.
BREAK	Has no effect when pressed by itself. Causes other keys to send a different code.
CTRL (CONTROL)	Pressing CTRL with another key generates a control code that is normally not displayed. Control codes cause the terminal and/or computer program to take special action. When the CTRL key is pressed with an alphanumeric or some symbol keys, the character transmitted is changed.
	NOTE! Hold the CTRL key down while pressing the other key. CTRL alone has no effect.
FUNCT	Pressing FUNCT with another key transmits an SOH character, the next key's code, and a CR character. Has no effect by itself. Does not repeat.
SHIFT	Selects upper character shown on key, changes operation of many special keys, and capitalizes alphabetic characters. Unless pressed simultaneously with another key, has no effect.

The special keys within the second group, shown in Figure 3-3 and described in Table 3-2, function much like the alphanumeric keys shown in Figure 3-1. Editing modes do not affect these keys. Unless noted, they repeat when held down more than half a second.

NOTE! Refer to Chapters 2 and 4 for a description of the modes mentioned in this section.

Figure 3-3 Alphanumeric-Type Special Keys



Table 3-2 Alphanumeric-Type Special Key Functions

Key Name	Effect
BACK SPACE	Moves the cursor left one character. If autopage mode is on when the cursor reaches the beginning of the page, flips the display to the previous page. Not affected by autowrap mode. Same as ← key.
DEL (DELETE)	Does not cause the terminal to perform or display anything when it receives this code. In monitor mode, displays DEL character. [Sends a DEL code (7F hex) to the computer.]
ESC (ESCAPE)	Sends the escape code to the computer (i.e., momentarily leaving the application program) so a special feature or function can be used. The ESC key introduces an escape sequence. Does not repeat.
	NOTE! Press and release the ESC key before pressing the next key.
F1 through F16	Each function key sends a reprogrammable three-code sequence capable of initiating a special computer program subroutine so the terminal displays or performs a special function. Does not repeat.
Shifted F1 through F16	Same as F1 through F16 but enables F17 through F32. Does not repeat.
LINE FEED	Moves the cursor down one line within the current column. Affected by protect and autopage modes.
Shifted LINE FEED	Same as LINE FEED.
LOC ESC (Shifted ESC)	Allows the next character(s) in an escape sequence to change only the terminal (i.e., does not send it to the computer). Does not repeat.
	NOTE! To change only the terminal, press LOC ESC instead of ESC before entering the desired escape sequence on the keyboard.

Table 3-2 Continued	
Key Name	Effect
NO SCROLL	Press once to stop the display of incoming data on the screen (i.e., stop screen updating); press again to allow the display to continue. Does not repeat.
	If the terminal's receive buffer fills up while screen updating is disabled, the sends X-Off to the computer or lowers the level of the DTR line, stopping data transmission from the computer. When updating is reenabled, buffer empties, X-On is sent or voltage on DTR line is raised, and data transmission from the computer resumes.
RETURN	Sends a carriage return code to the computer. If the entire current line is protected, moves the cursor to the next unprotected position on the page. Does not repeat.
SET UP (Shifted NO SCROLL)	When pressed once, turns on set up mode and displays the status line. Displayed data is not lost. When pressed again, returns the cursor to the screen display. Does not repeat.
Space Bar	Sends a space character to the screen and the computer.

Editing mode affects all keys shown in Figure 3-4. Unless noted, each repeats when held down more than half a second. Table 3-3 describes the function of these special keys.

NOTE! Refer to Chapters 2 and 4 for a description of the modes mentioned in this section.

Figure 3-4 Special Keys Affected by Editing Mode



Key Name	Effect
BACK TAB	Returns cursor to previous typewriter tab stop (protect mode off) or to the start of current or previous unprotected field (i.e., field tab stop with protect mode on).
Shifted BACK TAB	Same as BACK TAB.
CE (CLEAR ENTRY)	Replaces all data on the current page with space characters. With protec mode off, clears data between typewriter tab stops and moves the curso back to the beginning of the current field. Clears the entire line if it has no tab stops. With protect mode on, clears all data in the cursor's unprotected field. Does not repeat.
Shifted CE (CLEAR ENTRY	Same as unshifted CE.
CHAR DELETE	Deletes the cursor character and shifts all succeeding characters one position to the left until they reach the previous write-protected field. Adds a space character at the end of the shifted text.
Shifted CHAR DELETE	Same as CHAR DELETE.
CHAR INSERT	Adds a space character at the cursor position, shifting all succeeding characters right one position. All characters shifted past 80th column are lost unless page edit mode is on. If page edit and autowrap modes are on the whole page can shift until the shifted character encounters a write- protected position.
Shifted CHAR INSERT	Same as CHAR INSERT.
CLEAR SPACE	Replaces all unprotected characters on the page with space characters in the current visual attribute.
Shifted CLEAR SPACE	Replaces all unprotected data with null characters. Resets visual attribute and turns off protect mode.
←	Moves cursor left one character. Can wrap the cursor around to the previous line, regardless of autowrap mode's status.
Shifted ←	Same as unshifted ←.
↑	Moves the cursor up one line within the same column until it reaches a write-protected position (where it stops). Stops at the top line or first write-protected position. Moves cursor only within current page, regardless of autopage mode.
Shifted ↑	Reverse line feed. Moves the cursor up to the previous line within the same column. Once it reaches the page's first line, data scrolls down one line. Data on the page's last line is lost if autopage and protect modes are off. If autopage is off and protect mode is on, has no effect. If autopage is on, display flips to previous page and the cursor moves to last line of new page. If the current page is the first page, code has no effect.
Ļ	Moves the cursor down one line within the same column. If the cursor is on the display's bottom line and the page has more than 24 lines, data moves up one line (top line is not lost). When the cursor is on the page's bottom line, nothing happens. The cursor moves only within the current page, regardless of autopage mode.

Table 3-3

Key Nome	
	Effect
Shifted ↓	Same effect as LINE FEED key.
\rightarrow	Moves the cursor right one position. Can wrap the cursor to the next line regardless of autowrap mode's status.
Shifted →	Same as unshifted →.
ENTER	Sends a carriage return code to the computer, regardless of how you configure RETURN key in set up line. Affected by local/duplex edit modes. If the entire current line is protected, moves the cursor to next unprotected position on page.
Shifted ENTER	Same as unshifted ENTER. Does not repeat.
HOME	Moves the cursor to the current page's first unprotected character position (called home position and usually column one of line one). Transmits ASCII RS character. Does not repeat.
LINE DELETE	Removes the current line and shifts lines below it up one line. Fills the las line of the page or scrolling region with a line of space characters in the current visual attribute. Ignored if protect mode is on.
Shifted LINE DELETE	Same as unshifted LINE DELETE.
LINE ERASE	Replaces data from cursor to end of line with space characters. With protect mode on, the effect is limited to current field.
Shifted LINE ERASE	Replaces data from cursor to end of line with null characters. With protect mode on, its effect is limited to current field.
LINE INSERT	Adds a line of space characters (with current visual attribute) on the cursor line. Data below that line shifts down one line. If the cursor is on the page's last line when terminal receives this code, that line is lost. Has no effect when protect mode is on.
Shifted LINE INSERT	Same as unshifted LINE INSERT.
PAGE	Shows the next page with the cursor on its previous position there. However, if logical attribute mode is on, the cursor is on the first unprotected position. Does not repeat.
Shifted PAGE	Shows the previous page with the cursor on its previous position there. However, if logical attribute mode is on, the cursor is on the first unprotected position. Does not repeat.
PAGE ERASE	Replaces unprotected data between the cursor and the end of the page with space characters. Has no effect when write protect or protect modes are on. Does not repeat.
Shifted PAGE ERASE	Replaces unprotected data between the cursor and the end of the page with null characters. Has no effect while write protect or protect modes are on. Does not repeat.
PRINT	Prints everything on the page between home and cursor positions. Replaces special graphics and write-protected characters with space characters. Sends carriage return, line feed, and null characters to printer after each line. Does not repeat.

Table 3-3 Continued	
Key Name	Effect
Shifted PRINT	Prints everything between home and cursor positions on the current page. Replaces special graphics and write-protected characters with space characters. Pages are unformatted (unless printer does it automatically) because carriage return, line feed, and null characters are not sent to printer after each line. Does not repeat.
SEND	Sends all data between first column position and cursor to computer. Does not repeat.
Shifted SEND	Sends all data between home and cursor positions to the computer. Does not repeat.
ТАВ	If protect mode is off, moves the cursor forward to the next typewriter tab stop. If protect mode is on, moves it to the next field tab stop (start of next unprotected field).
Shifted TAB	Same as TAB.

Keys highlighted in Figure 3-5 reset the terminal. Table 3-4 describes their effect. None of these keys has repeat action or any effect when pressed alone.

Figure 3-5 Terminal Reset Keys

F1 F2 F3 F4	F5 F6 F7 F8	F9 F10 F11 F1	2 F13 F14 F	15 F16	CHAR LINE NSERT INSERT	LINE SE ERASE NO SC	r <u>up</u> Roll
₩ 1 1 1	5 8 8 8	160 166 166 -	- + -	виск	CHAR Delete Delete	PAGE ERASE PA	GE
				CLEAR	7	8 9	
			2				

Table 3-4 Reset Keys

Key Name	Effect
CTRL BREAK	May break communication with computer by bringing transmit data line to space state for 250 milliseconds.
CTRL shifted BREAK	Refreshes the status line with nonvolatile memory values (including latest set up line values, reprogrammed function and editing keys, and reprogrammed answerback code). Turns off no scroll, print, write protect, and protect modes.
RESET	Has no effect when pressed alone.
CTRL RESET	Returns terminal to latest set up line configuration. (Same as turning power off and back on.) Does not repeat.
Shifted RESET	Has no effect when pressed alone.

The Cursor

The cursor is a contrasting rectangular block or underline (selected in the set up line) that indicates the position of the next entered character. The cursor can be invisible, steady, or blinking.

You can move the cursor with the $\uparrow, \leftarrow, \rightarrow, \downarrow$, TAB, BACK TAB, or BACK SPACE keys (described in the previous section).

Editing

The special editing keys described in Table 3-3 make it easy to change data after you enter it. To remove data, you can either erase it, delete it, or clear it. You can also insert additional space characters.

Erasing replaces characters with space characters, starting at the cursor position and continuing through the end of the line or page (depending on whether line or page edit mode is on), as shown in Figure 3-6. Erasing does not move any data.

Figure 3-6 Erasing Data



Deleting a character removes the character at the cursor position and pulls the next character back into that position. If you hold the CHAR DELETE key down, the amount of data that can flow backward depends on the edit boundary mode in effect (either line edit or page edit). See Figure 3-7.

Figure 3-7 Data Movement Caused by Deleting Text



When you clear data, you replace all unprotected data on the current page with space characters. Unlike erasing, which starts at the cursor position and can be limited by the edit boundary modes, clearing is independent of the cursor's position and is unaffected by the current edit boundary mode.

Communication Modes

Communication modes determine when and where data goes after you enter it at the keyboard and how interaction with the computer takes place. You can change the current communication mode in the status or set up lines (Chapter 2). Communication between the terminal and the computer can be in any one of the following modes:

Block

Half duplex (conversational)

Full duplex (conversational)

Figure 3-8 shows how data flows in each mode. Table 3-5 describes each communication mode.



Table 3-5 Communication Modes

Name	Effect
Block	The terminal first sends data only to the screen so you can check and correct it if needed. You determine when the block of data is sent to the computer. Block mode allows you to make all corrections before sending data to the computer (with the SEND key or an escape sequence).
Half Duplex	The terminal sends keyboard entries to the screen and to the computer at the same time. Although it is a conversational mode, it does not permit the terminal to transmit and receive simultaneously.
Full Duplex	The terminal sends keyboard entries only to the computer. If the computer is programmed to act upon a code generated by a keyboard entry, it may echo the result back to the terminal. The terminal can transmit and receive simultaneously.

Sending Data to the Computer

If you enter data while the terminal is in block mode, it does not go to the computer until you send it. This lets you make additions or corrections first. When you finish editing, you can transmit it to the computer with the SEND key—if the terminal is in block mode. (If the terminal is not in block mode when you press SEND, the key merely sends the escape sequence to the computer.)

Once started, block mode transmits faster than the conversational modes because the terminal can transmit faster than you can enter data on the keyboard.

The unshifted SEND key sends all data on the cursor line, starting at the first column position and continuing through (i.e., including) the cursor position. See Figure 3-9.

Figure 3-9 Data Sent by Unshifted SEND Key



The shifted SEND key sends all data on the page, from the home position through (i.e., including) the cursor position. See Figure 3-10.

NOTE! You could also use any of the escape sequences described in Chapter 4.

Figure 3-10 Data Sent by Shifted SEND Key



Printing

If you have a printer connected to the terminal, pressing the PRINT key prints the current page. This is called **page print**. How much is printed depends on whether you press the shifted or unshifted PRINT key. Refer to Table 3-6.

NOTE! If the PRINT key is to function as described while the terminal is in full duplex, the terminal must be in local edit mode or the computer must echo the escape sequence back.

Printing Data from the Screen					
Key	Sends to Printer				
Unshifted PRINT	All characters (except graphics) between home and cursor positions. Includes any delimiters that format data. ¹ (Called formatted page print .)				
Shifted PRINT	All characters (except graphics) between home and cursor positions. Since formatting delimiters (CR and LF) are not included, the appearance of the printed copy depends on whether or not the printer automatically adds delimiters. (Called unformatted page print .)				

Table 3-6Printing Data from the Screen

1. See the discussion of delimiters and formatted and unformatted printing in Chapter 4.

4. Programming Controls

Introduction	This chapter describes commands that both programmers and operators can use to control the terminal.
Using These Commands in Your Programs	Incorporating these commands in your computer programs lets you control the terminal remotely.
Frograms	How you incorporate these commands depends on your programming language. The multi- tude of languages and syntaxes recognized by each language makes it impossible to show you specifically how to incorporate commands in each program. The terminal's response is based on the control code or escape sequence received, regardless of the format and syntax used by a programming language to send it to the terminal. If you need help with the proper syntax, refer to your programming language's documentation.
	NOTE! To receive a TeleVideo booklet describing how to incorporate terminal controls in a BASIC program, return the reader comment card from this manual with the appropriate box checked.
Entering These Commands on the Keyboard for Local Display	If you only want to change data displayed on the screen and in the terminal's screen memory, press the LOC ESC key instead of ESC in the escape sequences in this chapter. The computer will not be aware of these commands or the changes caused by them unless you send the revised data to it.
	You can also use the editing keys without sending anything to the computer while local edit mode (discussed later in this chapter) is on.
Figures	Many figures are included in this chapter to help you visualize the difference between similar commands. However, the amount of data contained within a page of memory or displayed on the screen is not shown to scale. Shaded areas denote protected fields, unless labeled otherwise. Slanted lines show how much data a send command can transmit to the computer. Dots indicate space characters.
Conventions	The modes and functions that can also be controlled in the status and set up lines are marked with the words STATUS and SET UP (printed even with the section title).
Monitor Mode	Monitor mode onSTATUSMonitor mode offESC UESC XESC X
	Program debugging is easier when you put the terminal in monitor mode so you can see the control and escape commands received by the terminal. In monitor mode, commands are displayed (Figure 4-1) but not acted upon.
	NOTE! If you precede a control character with an ESC character, you can display it without putting the terminal in monitor mode.
	Table D-1 in Appendix D shows how control characters appear in monitor mode. For example, the ASCII character SOH (entered as CTRL A in the program) appears on the screen during monitor mode as S_H . Escape sequences include an E_c for the ESC character. A null character appears as N_L .

Figure 4-1 Typical Monitor Mode Display



Table 4-1 Set Up Memory Bit Map

.

Char- acter No.	Value	Bit 3 Name	Bit 2 Name	Bit 1 Name	Bit Ø Name
		. Comr	nunication Mode	Edit Mode	Edit Key
1	Ø 1	FDX HDX	 BLK	Line Page	DUPE LOCE
2	Ø 1	Autotab Off On	Unused	Scroll Type Normal Smooth	Scroll Rate 6 lines 12 lines
3	Ø 1	Protocol X-On/Off DTR	RETURN key CR CR and LF	↓key CTRL V CTRL J	Must be Ø
			Characte	r Set	Time Out
4	Ø 1		See Table	e 4-2	Off On
5	Ø 1	Autopage Off On	Autowrap Off On	Status line Undisplayed Displayed	Keyclick Off On
				Cursor Attribute	
6	Ø 1	Must be Ø	Displayed Invisible	Block Underline	Blinking Steady
				Computer Port Baud	Rate
7	Ø 1	Must be Ø		See Table 4-3	
		Stop Bits	Computer F Parity Bit	Port	Word Length
8	Ø 1	1 2	Send No	Even Odd	7 bits 8 bits
				Printer Port	
9	Ø 1	Must be Ø		See Table 4-3	
		Stop Bits	Printer Port Parity Bit		Word Length
10	Ø 1	1 2	Send No	Even Odd	7 bits 8 bits
		Refresh		Background	Screen Contrast
11	Ø 1	60 Hz 50 Hz	Must be Ø	Dark Light	See Table 4-4
			Sc	reen Contrast	
12	Ø 1		S	ee Table 4-4	

Table 4-2 Character Set Bit Map

	Bit No.					
Language	3	2	1			
US ASCII	Ø	Ø	Ø			
UK	Ø	Ø	1			
French	Ø	1	Ø			
German	0	1	1			
Spanish	1	Ø	0			
Finnish/Swedish	1	Ø	1			
Danish/Norwegian	1	1	Ø			
Portuguese	1	1	1			

Table 4-3 Baud Rate Bit Map

	Bit No.				
Baud Rate	2	1	0		
150	0	Ø	Ø		
300	Ø	Ø	1		
1200	0	1	Ø		
1800	0	1	1		
2400	1	Ø	Ø		
4800	1	Ø	1		
9600	1	1	Ø		
19200	1	1	1		

Table 4-4 Contrast

	Bit No.					
Level	4	3	2	1	Ø	
 Dimmest	0	Ø	Ø	Ø	Ø	
	Ø	Ø	Ø	Ø	1	
Default	1	Ø	Ø	Ø	Ø	
 Brightest	1	1	1	1	1	

The computer can establish the set up line values in the terminal's memory and read the current values of the set up lines. When the terminal receives the command to set the values, it changes the bit map in memory as well as the terminal's current configuration.

When the computer reads the values, it receives 12 characters. Refer to Tables 4-1 through 4-4 here (or Tables E-1 through E-4 in Appendix E) to interpret the setting represented by these characters.

For example, suppose the computer receives the following 12 ASCII characters:

rr∼p{qwswssx

This sequence is explained in Table 4-5.

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Table 4-5 Example Set Up Memory Sequence

Character No.	ASCII Character ¹	Lower No.	Four Bits Value	Effect
1	r	3 2 1 Ø	Ø Ø 1 Ø	Full duplex Block off Page edit Duplex edit keys
2	r	3 2 1 Ø	0 0 1 0	Autotab off No effect Smooth scroll 6 lines/second
3	~	3 2 1 Ø	1 1 1 Ø	DTR CR and LF CTRL J Required value
4	p	3 2 1 Ø	0 0 0 0	US ASCII US ASCII US ASCII Time out off
5	{	3 2 1 Ø	1 Ø 1 1	Autopage on Autowrap off Status line displayed Keyclick on
6	q	3 2 1 Ø	0 0 0 1	Required value Displayed cursor Block cursor Steady cursor
7	W	3 2 1 Ø	Ø 1 1	Required value Computer port 19.2k baud Computer port 19.2k baud Computer port 19.2k baud
8	S	3 2 1 Ø	0 0 1 1	Computer port uses 1 stop bit Computer port sends parity bit Computer port's parity bit is even Computer port's word length is 8 bits
9	W	3 2 1 Ø	Ø 1 1	Required value Printer port 9600 baud Printer port 9600 baud Printer port 9600 baud
10	S	3 2 1 Ø	Ø Ø 1 1	Printer port uses 1 stop bit Printer port sends parity bit Printer port's parity bit is even Printer port's word length is 8 bits
11	S	3 2 1 Ø	0 0 1 1	Refresh screen at 60 Hz Required value Light background Brightest contrast
12	X	3 2 1 Ø	1 Ø Ø	Default contrast Default contrast Default contrast Default contrast

1. As shown in the ASCII Chart in Appendix C, any of eight ASCII characters share the same values in their lower four bits. For instance, the value of the lower four bits are the same for NUL, DLE, SP, Ø, @, P, `, and p. In this example, the ASCII characters are taken from the table's far right column.

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Send Message/Status	Send message or status line to computer ESC 2						
	where						
	n defines	the type of line to be sent.					
	n Value	Sends					
	Ø 1	80-byte message line 80-byte status line					
Send Terminal	Send current c	r nonvolatile memory configurations to computer	ESC p n				
Configurations	where						
	n defines	the type of configuration to be sent.					
	n Value	Sends					
	Ø 1	Current terminal configurations (12 bytes) Nonvolatile set up memory (12 bytes)					
Locking/Unlocking the Keyboard	Lock (disable) Unlock (enable	the keyboard) the keyboard	STATUS ESC # ESC "				
	You can prever board; however A more precise entry while the	It the keyboard from sending any codes. This is often called lockin r, since the keys can still be depressed, that term is somewhat of a r e term is disabling the keyboard. You might use this feature to pre program builds a special form.	g the key- nisnomer. vent data				
	To unlock the k puter, or turn tl unlocks the key	eyboard, either press the CTRL RESET keys, or send ESC '' from ne power off and back on again. (Pressing CTRL RESET resets the board, and clears the screen of all data.)	the com- terminal,				
Cursor Style	No displayed o Blinking block Steady block o Blinking under Steady underli	ursor cursor ursor line cursor ne cursor	SET UP ESC . 0 ESC . 1 ESC . 2 ESC . 3 ESC . 4				
	You have a cho mains in effect the terminal.	ice of five cursor styles. The style you select with one of these community on the set up line, out in the set up line, out it with another command, change the set up line, out it with another command, change the set up line, out it with another command, change the set up line, out it with another command, change the set up line, out it with another command, change the set up line, out it with another command, change the set up line, out it with another command, change the set up line, out it with another command, change the set up line, out it with another command, change the set up line, out it with another command, change the set up line, out it with another command.	mands re- or turn off				
Keyclick and Bell	Keyclick on Keyclick off Ring bell		SET UP ESC < 1 ESC < 0 CTRL G				
	Your program of The bell rings at insert command	an ring the terminal's bell and control whether the keys click wher utomatically whenever the terminal receives an illegal command (suc d while protect mode is on).	i pressed. h as a line				

Display Controls	These commands let you change the appearance and contents of the screen display. You car control what is displayed on the bottom line and the color (light or dark) of the characters or the screen.				
Contents of the 25th Line	The screen displays up to	o 24 lines of data. The 25th line can display three types of lines:			
	Name	Description			
	Set up line	Any of five set up lines			
	Status line	Status of terminal's current operating parameters			
	Message line	A message to the operator			

Table 4-6 lists the attributes that can be included in the 25th line.

Table 4-6 Attributes of the 25th Line

Attribute/	25th Line		
Characteristic	Message Line	Status and Set Up Lines	
Screen background	Reverse of other lines	Reverse of other lines	
Visual attributes	Can be controlled	Can not be controlled	
Character sets	Can use any	Always US ASCII	

Controlling the 25th Line's Display	Define contents	s of 25th line	SET UP ESC s n
	where		
	n defines	the type of display.	
	n Value	Effect	
	Ø 1 2	No display (blank) Message line Status line	
The Status Line	The status line (and displays bu	described in Chapter 2) summarizes some of the currer sy messages.	nt terminal parameters
The Message Line	Program messa	age line	ESC f (text) CTRL Y
	The 25th line ca This is the mess	n also display a special message to the operator from tl sage line.	he computer program.

Appearance—To vary the appearance of the message line, include any of the visual attributes (described later in this chapter). For instance, the line might include both dark characters on a light background and light characters on a dark background, with some parts also blinking.

Clearing the Message Line—The message line is cleared whenever the terminal's power is turned off.

Programming the Message Line—Until you program a message for the message line, it is blank.

1. Display the message line (if you want to see the message as you enter it) with the command

ESC s 1

2. Enter the command

ESC f

- 3. Enter a visual attribute command for the first character position if desired. Default is steady characters in reverse video.
- 4. Enter up to 80 characters of text. If you displayed the message line before entering the message, the message appears on the message line as you enter it. However, the cursor does not enter the message line during the data entry.
- 5. You can also include any of the 15 visual attributes (described in a later section). (Since visual attributes do not occupy a space, do not count them as part of the 80 text characters.)
- 6. Include the command

CTRL P

when the next command is a CTRL Y or CTRL P that you want to be displayed in the message line.

7. Enter

CTRL Y

to end the message.

Screen Display	Turn screen on Turn screen off	ESC n Ø ESC n 1
	These commands determine whether or not the screen can displ	ay data.
Screen Attributes	Light background with dark characters Dark background with light characters	ESC b ESC d
	The screen's background is either light with dark characters or d	ark with light characters.

Remember that you can also change the background in the set up line. The effect of the screen background command depends on the background chosen with the set up line. If the terminal receives a command that is the same as the current background, no change occurs.

Visual Attributes

Define visual attribute(s)

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ESC G n

where

n defines the visual attribute and its intensity.

n V	/alue	
Full	Half	
Intensity	Intensity	Visual Attribute
Ø	sp	Normal (default) video
1	!	Invisible normal video
2	,,	Blink
3	#	Invisible blink
4	\$	Reverse current background
5	%	Invisible reverse
6	&	Reverse and blink
7	,	Invisible reverse and blink
8	(Underline
9)	Invisible underline
:	*	Underline and blink
;	+	Invisible underline and blink
<	,	Reverse and underline
_	-	Invisible reverse and underline
>		Reverse and underline and blink
?	/	Invisible reverse and underline and blink

Visual attributes:

Do not occupy a character position (you can also enter a character in that position)

Affect all subsequent characters until you change the attribute

To set a visual attribute, place the cursor where you want the attribute to start; then enter the appropriate escape sequence.

Changing how characters appear can dramatically change the appearance of the screen. Remember this feature when you create forms.

The visual attributes incorporate these effects:

Name	Effect
Normal video	Restores background of screen to value in set up line (either dark or light).
Reverse video	Changes screen's background to reverse of current background. If screen background was dark with light characters, it is now light with dark characters.
Underline	Creates a solid line below character(s).
Blink	Causes character(s) to blink.
Invisible	Makes all subsequent data entered invisible (although cursor is still visible and data is transmitted to computer). Often used to enter a password, payroll, or other security-sensitive information.
Half intensity	Decreases the normal intensity by one half (on a character-by-character basis). All other visual attributes can include half intensity.

Block Attributes

Define block of attributes

ESC F w h

where

- w = The width of the block in character positions, starting with the current cursor position and extending forward.
- h = The height of the block in lines, starting with the current cursor line.

w and h are values from the cursor coordinate table in Appendix E.

NOTE! While protect mode is on, this command is ignored.

You can create blocks filled with the current visual attribute. If the blocks overlap, the last block entered hides those already entered. Figure 4-2 illustrates a display with three blocks of visual attributes. The block filled with horizontal lines was the last block entered.

Figure 4-2

Display with Three Blocks of Attributes



To fill an area with visual attributes:

- 1. Position the cursor on the upper left corner of the area to be defined.
- 2. Define the visual attribute for the area (ESC G n) if necessary.
- 3. Make sure protect mode is off.
- 4. Enter

ESC F w h

5. Repeat Steps 1 through 4 for each block.

NOTE! Block attributes are limited by the length of the page and the defined scrolling region. Although the block can extend beyond the display, only part of it may be visible. Entering values greater than the screen results in a block which ends at the right or bottom margin of the screen.

ESC H w h

Block Graphics

Define block graphics area

where

- w = A value from the cursor coordinate table (Appendix E) representing the length in character positions of the horizontal line to be generated by this command. The line starts at the cursor and extends to the right.
- h = A value from the cursor coordinate table (Appendix E) representing the height in character positions of the vertical line to be generated by this command. The line starts at the cursor and extends down.

The w and h values define the outside dimensions of the rectangle.

The status of special graphics mode is irrelevant.

You can outline one or more areas with horizontal and vertical lines. Figure 4-3 shows how the screen might appear with three overlapping blocks.

Figure 4-3 Display with Three Blocks of Graphics



NOTE! Block graphics are limited by the length of the page and the defined scrolling region. If the block extends beyond the limits of the display, only part of it is visible. Entering values greater than the page results in a block that ends at the right or bottom margin. This command has no effect while protect mode is on.

To create a block graphics area:

1. Position the cursor where you want the top left corner before entering the sequence.

NOTE! Executing this sequence does not move the cursor.

2. Define the width and height of the area with

ESC H w h

where w defines the width in character positions and h is the height in lines.

Special Graphics Mode	Special graphics mode on; alphanumeric mode off
	Special graphics mode off; alphanumeric mode on

ESC c n

You can incorporate 64 special graphics characters in your program. Figure 4-4 shows these characters and the keys that produce them. The terminal generates them only while it is in special graphics mode. You can protect special graphics characters as you would any other character.

Figure 4-4 **Special Graphics Characters**

abcdefghijkImnopqrstuvwxyz{:}}~ def ∎[] | | | | | - | T⊥| | | |][¬]Γ∟°. ±≤≥∏≠ βθλμ0ΩΣ

Character Set

Select character set

where

n defines the next character set in which data will be displayed.

	n			
	Value	Character Set		
	Ø	US ASCII		
	1	UK		
	2	French		
	3	German		
	4	Spanish	2.	
	5	Finnish/Swedi	sh	
	6	Danish/Norwe	gian	
	7	Portuguese		
Additional Screen Memory	after it receive quence. The s Unless the ter scribed in this	es this sequence equence does no minal contains th section have no e	will be displayed in the char t change data already display he chips for additional screer ffect.	acter set specified by this se- ed. In memory, the commands de-
Configuring Memory	Define numbe	er of lines on eac	n page	$ESC\setminusn$
	where			
	n is a va	lue for the lines	ber page.	
	n	Lines	Number	
	Value	per page	of Pages	
	1	24	4	
	2	48	2	
	3	96	1	

1

STOP! When you execute this command, the terminal:

Clears all pages of memory Fills all pages with space characters Displays page one with the cursor on the home position Redefines the scrolling region as the entire 24 lines

NOTE! The term **page** (i.e., document) refers to an amount of memory (ranging from 24 to 96 lines).

Not to be confused with the term **page**, **screen** refers to the face of the tube on which data appears. The **display** is the amount of data which can be viewed on the screen at one time— the viewable region.

Since the screen displays 24 lines at a time, the display you see on the screen may not contain the entire page. See Figure 4-5.

You can divide the terminal's total screen memory into one, two, or four pages (Figure 4-6). (Without additional memory, the single page contains 24 lines.)

Figure 4-5 Partial Page of Memory Displayed on the Screen

lo ohon llol clinho ollollu cynollo ni ollollu cynollo nilonho yllo ohon llol c lu cynollo nilonho yllo ohon llol clin lo ohon llol clinho ollollu cynollo ni nho ollollu cynollo nilonho yllo ohon illonho yllo ohon llol clinho ollollu cynollo ho ollollu cynollo nilonho yllo ohonn illonho yllo ohon llol clinho ollollu cynollo ho ollollu cynollo nilonho yllo ohonn illonho yllo ohon llol clinho ollollu cynollo ho ollollu cynollo nilonho yllo ohon llol clinh

lo ohou llot chino oltollu cynollo n oltollu cynollo nlionho yllo ohou llot c

Figure 4-6 Dividing Memory into Pages



Autopage Mode

Autopage	mode	on
Autopage	mode	off

SET UP ESC v 1 ESC v Ø

Autopage mode determines whether the screen scrolls or flips to the next page when the terminal receives a code to move the cursor beyond the current page.

With autopage mode on, you can only scroll within the current page (if it contains more than 24 lines). Once the cursor reaches the page's boundary, a command to move the cursor further (with cursor right, cursor left, tab, back tab, or cursor addressing keys or commands) flips the display to the adjoining page (as shown in Figure 4-7). What happens is similar to turning the pages of a book. The whole screen changes at once, not just one line at a time.

NOTE! You can not move the cursor into another page with the \uparrow or \downarrow keys or cursor up or down codes, regardless of the status of autopage mode.

You can move the cursor to the first or last line of an adjoining page with a line feed or reverse line feed command, while the cursor remains in the same column.

fino ollollu cynollo nlionho yllo oho

illonho yllo ohon liot cihilo otioliu cynoli

ha yila ahan llat clinia allattu cynallae

hha allallu cynalla nllanha ylla ahann nllanha ylla ahan llal clhha allallu cynall

ho yllo ohou llot clinho ollollu cynolloc

hho ollollu cynollo ulloubo yllo obonu lu cynollo ulloubo yllo chon llol clhh

to ohou llot ethilo ollottu eyuotto ut

offolla cynollo ullonho yllo ohon llol c

to cynolio ullonho yllo ohon itol clihi

to ohon ttol ethho ottollu eyuotto ut

ollollu cynollo ullouho yllo ohou llot c

lu cynollo ullonho yllo ohon llot chh

PAGE 2

AFTER

Figure 4-7 Cursor Movement During Autopage Mode

lo ohon llol clinho oltollu cynollo ni oltollu cynollo nilonho yllo ohon llol clinh lo ohon llol clinho oltollu cynollo ni oltollu cynollo nilonho yllo ohon llol clinh lu cynollo nilonho yllo ohon llol clinh lo ohon llol clinho oltollu cynollo ni

nha ollollu cynollo nllonho yllo ohonn nllonho yllo ohon llol clhha ollollu cynoll ha yllo ohon llol clhha ollollu cynolloc hha ollollu cynollo nllonho yllo ohonn nllonho yllo ohon llol clhao ollollu cynolloc ha yllo ohon llol clhao ollollu cynolloc hha ollollu cynollo nllonilo yllo ohon

> PAGE 1 BEFORE

Moving to a Different Page

Move to the next page Move to the previous page

ESC K ESC J

When memory contains two or more pages, these commands let you move to an adjacent page, regardless of the autopage mode. If the entire adjacent page is write protected, this command turns off protect mode.

NOTE! If the cursor is in a field requiring total or some data entry while the logical attribute mode is on, these commands are ignored. Move the cursor out of the field first.

Remember, the screen displays only part of the page when the page contains 48 or 96 lines.

The cursor's position on the next page depends on whether you moved the cursor into it while autopage was on or whether you turned to that page with the next or previous page command. When you continue moving the cursor into another page, the cursor moves to the first unprotected position (either on the next line or in the same column). But advancing or returning to another page returns the cursor to its former position (if any) on that page, as shown in Figure 4-8.

Figure 4-8 Cursor Movement Between Adjacent Pages

who olioliti cynolio utlanho ytlo ahonn dlanho yta ohon tloi chlua olioliti cynoli bo ytla ohon tloi chlua olioliti cynoli bho atlalti cynollo utlanho ytla ohonn dlanho ytla ohon tloi chlub otloiti cynolic bho atlati cynollo utlanho ytla ohonn hho atlate cynollo utlanho ytla ohonn PAGE 1

who offolly cyndia allonho yllo ohonn allonho yllo ohon lloi chino olloilu cynoll ho yllo ohon lloi clihio olloilu cynoll iho olloilu cynolla allonha yllo ohon allonho yllo ohon lloi chiho olloilu cynollo ho yllo ohon lloi cliho olloilu cynollo hho olloilu cynolla allonho yllo ohonn PAGE 2 nho oltaliu cynalta nilanha ylla ahann nilanha yl<mark>a</mark> ahan llat cihino altaliu cynalta ha ylla, ahan llat cihino altaliu cynalta hino altaliu cynalta nilanha ylla ahan ylla ahan ylla ahan ylla ahan llat cihino altaliu cynalt ha altaliu cynalta nilanha ylla ahann ha altaliu cynalta nilanha ylla ahann

PAGE 1

Scrolling

Smooth scroll mode on Normal scroll mode on

SET UP/STATUS ESC 8 1 ESC 8 0

The terminal's scrolling can be smooth or normal. Smooth scroll mode moves text at an even rate, regardless of how fast the terminal receives it. Normal scroll mode displays data as it is received. (Normal scroll is sometimes called **jump scroll** since the display is not regulated by the terminal.)

NOTE! Specify the scrolling rate of smooth scroll mode during set up mode.

Scrolling moves data up or down on the screen so you can view other parts of the current page.

Scrolling is similar to taking a movie of a movie screen. The movie camera corresponds to the terminal's screen and the movie screen that you are photographing is the terminal's page of memory. You can move the movie camera around to photograph different areas of the movie screen. However, if you move the movie camera too far, it also takes a picture of "nothing" (beyond the movie screen). But as long as you keep the camera focused on the movie screen, it photographs only the movie.

When the terminal screen moves (scrolls) within a page filled with data, the screen displays only data. However, if the screen scrolls into a memory area without data (empty memory space), a line of spaces appears on the terminal screen. Unlike taking a movie of a movie screen, once the terminal screen encounters a blank area of memory while scrolling, it remains blank when you scroll back the other way (until you enter more data to fill the area again). See Figure 4-9.

Figure 4-9 Scrolling Movement Within Page of Memory

uho ollollu cynollo ullouho yllo oloon illouho yllo ohon tloi cilulu ollollu cynollo ho yllo ohon tloi cilulu ollollu cynollo ho yllo ohon tloi cilulu ollollu cynollo ollollu cynollo ullouho yllo ohon ho yllo ohon tloi cilulu cynollo ho ollollu cynollo ullouho yllo ohon ho cynollo ullouho yllo ohon tloi cilul lo cynollo ullouho yllo ohon tloi cilul lo cynollo ullouho yllo ohon tloi cilu lu cynollo ullouho yllo ohon tloi cilu lu cynollo ullouho yllo ohon tloi cilu lo ohon tloi cilulu cynollo ul ollollu cynollo ullouho yllo ohon tloi cilu ollollu cynollo ullouho yllo ohon tloi cilu ollollu cynollo ullouho yllo ohon tloi ci

1

illenho yilo ohon iloi chino olioilu cyuoli ho yilo ohon iloi chino olioilu cyuoli hio olioilu cyuolla allenho yilo ohonu uho olioilu cyuolla allenho yilo ohonu uho olioilu cyuolla allenho yilo ohonu ilo yuolla allenho yilo ohon iloi chin lo ohon iloi chino olioilu cyuolla al olioilu cyuolla ullenho yilo ohon iloi c lu cyuolla ullenho yilo ohon iloi chi lo ohon iloi chino olioilu cyuolla al olioilu cyuolla ullenho yilo ohon iloi c lu cyuolla ullenho yilo ohon iloi chin olioilu cyuolla ullenho yilo ohon iloi c ho allenho yuolla ullenho yilo ohon iloi c

DATA

LOST



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Defining	а	Scrolling
Region		

Define a scrolling region

ESC _tb

where

- t = A value from the cursor addressing table (Appendix E) for the first (top) line in the scrolling region
- b = A value from the cursor addressing table (Appendix E) for the last (bottom) line in the scrolling region

To control the lines that can scroll, turn autopage off and define a scrolling region. Otherwise the entire screen can scroll.

Figure 4-10 shows line movement when the screen is scrolled up and then down within one page of memory.

NOTE! You can not change data outside the scrolling region. It remains fixed on the screen, although data within the scrolling region can move. Remember that changing the page length redefines the scrolling region as the whole screen.

Figure 4-10 Scrolling Movement Within a Scrolling Region

~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		
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	88888	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
66666666666666666666666666666666666666		F F F F F F F F F F F F F F F F F F F
нимининининининининининининининин	GGGGGG	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
	ннини	нинининининининининининини
	د ا د د د د د د	
************	NSCROLLING REGION	**********
		accentication and a second second second
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P P P P P P P P P P P P P P P P P P P	00000	
000000000000000000000000000000000000000		P P P P P P P P P P P P P P P P P P P
* * * * * * * * * * * * * * * * * * * *	مممممم	
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* * * * * * * * * * * * * * * * * * * *	\$ \$ \$ \$ \$ \$ \$	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
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		2
***************************************	Cocces	
000000000000000000000000000000000000000	000000	
	FEFFF	
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	CHARACTERS	
*****************	8 B B B B B B	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	FFFFF	FFFFFFFFFFFFFFFFFFFFFFFFFFFF
	L. L	
******	*****	*******
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	Constraint	CERTIFICATION CONTRACTOR CONTRACTOR

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и ни	С. 17 14 С С С С С С Н Н Н Н Н Н Н Н Н Н Н М М М М М N N N N N С 00 000	G G G G G G G G G G G G G G G G G G G
и ки и ки и и и и и и и и и и и и и и и	С. 17 14 С G G G G G Н Н Н Н Н Н Н Н Н Н Н Н Н Н Н	G G G G G G G G G G G G G G G G G G G
и ни	С С С С С С С С С С С С С С С С С С С	G G G G G G G G G G G G G G G G G G G
и ни		G G G G G G G G G G G G G G G G G G G
и ни	С С С С С С С С С С С С С С С С С С С	G G G G G G G G G G G G G G G G G G G

4

Creating Protected Forms

Why Protect Mode and Logical Attributes Are Available Protect mode permits you to create forms with permanent (protected) headings and blank areas to be filled later with certain types of data. Figure 4-11 shows a typical form. Unless you protect the headings first, an operator could accidentally delete or change them.

Figure 4-11 Sample Protected Form with Spaces Left for Data Entry

Sale	es Order	Sales Order F	form 🗾 Date: / /	
te: Address: City, St Zip Code	ate:	to: Add	iress: 	
Item: 0ty: 1 2 3 4 5 6 7 8 9 10	Part Number a	nd Decription:	Unit Price: Tote	Cost:
Terms Net F.O.B.: Shipper:	Days Purchas Sales (Other (se Order Number: Contact: Comments:	Subtotal Tax: TOTAL:	•

Protect mode allows you to:

Protect designated areas of a page from accidental change

Specify (with logical attributes) the type and amount of data that the operator can enter in an unprotected area

Control transmission of those areas

For example, suppose you need to create a payroll form. Some information must be furnished and the type of information is always the same. The social security number always has nine numbers and alpha characters are never used. You can create a form that includes those requirements by assigning a **logical** attribute to that area. If the operator accidentally enters an alpha character in the social security number space, the bell rings. The incorrect data is not displayed on the screen; the cursor remains in that area until the entry is corrected.

Assigning Logical Attributes Assign logical attribute(s) to current unprotected field

ESC g n

where

n = One or more values defining the data allowed in the next unprotected area
Value Attribute

n

- 1 Can enter only alphabetic characters^{1, 2}
- 2 Can enter only numeric characters^{2, 3}
- 4 Must enter some data of any type
- 5 Must enter only alphabetic characters
- 6 Must enter only numeric characters
- 8 Must fill totally with any data⁴
- 9 Must fill totally with only alphabetic characters⁴
- : Must fill totally with only numeric characters⁴
- Alphabetic only data is defined as all upper/lowercase alphabetic characters plus space, comma, and period.
- 2.Alphabetic only and numeric only fields can not be defined concurrently; i.e., can not be 3, 7, and semicolon.
- 3. Numeric only data is defined as all numerals (0 through 9), plus the symbols asterisk, plus sign, comma, hyphen, period, and slash.
- 4. Any total fill field is also a must enter field.

When protect mode is on, this command is ignored.

NOTE! Each logical attribute value occupies one character position and appears as a space. Use insert mode if necessary to maintain the current number of spaces. Each logical attribute decreases the line's data capacity by one (even if more than one value is given to the attribute). For example, if you enter a total of six logical attribute values for three unprotected areas, the line can contain 77 characters, not 74.

Logical Attribute Mode Logical attribute mode on or off

ESC o n

where

n defines whether the mode is off or on.

n Value	Effect
0	Off
1	On

You must turn on protect mode before turning on this mode.

This command moves the cursor to the page's first unprotected position and turns off the write protect mode.

While this mode is on, the only valid cursor movement commands are cursor right, cursor left, field tab, field back tab. All other cursor movement commands (such as line feed, reverse line feed, cursor up, cursor down, cursor addressing, carriage return, and new line) are illegal and cause the terminal to ring the bell.

Space and null characters resulting from clear commands (i.e., clear unprotected data, erase to end of line or page, and clear entry) are not considered as characters while this mode is enabled.

If the operator enters the wrong type of character, the bells rings. The incorrect character is not displayed.

	If the current field is defined as a total fill field and at least one position is ur when the terminal receives a cursor right or field tab command, the bell ring the cursor moves to the first unfilled position in that field and remains in the until it is totally filled. If autopage mode is on when any of the four cursor control commands (up, or right, and left) move the cursor to the page boundary, the display flips to the page and the cursor moves to that page's first unprotected position. While protect and logical attribute modes are on, moving the cursor to the ne previous page no longer returns it to its previous position on that page. Inste goes to the first unprotected position.	ıfilled s and ∋ field Jown, ∋ next ext or ⊧ad, it
Controlling Protected Writing and Protect Modes	Write protect mode on ST. Write protect mode off E Protect mode off E	ATUS ESC) ESC(ESC& ESC;
	Make sure protect and logical attribute modes are disabled before turning on write prode. If they are not, the bell will ring. Turning off protect mode also turns off the leastribute mode.	rotect ogical
Steps Involved in	Protect mode involves two procedures:	
Protect Mode	1. Enter data to be protected in write protect mode	
	2. Guard all data by turning on protect mode	
Procedure for Entering Data To Be Protected	1. Position the cursor where you want to enter the first protected character.	
	2. Enter	
	to activate write protect mode.	
	NOTE! You must turn on write protect mode before entering data to be protected of can not protect the information later.	ər you
	3. Look for W.P. in the status line (if the status line is displayed). This confirms that yo protect this data later.	u can
	4. Enter any visual attributes, then enter the information to be protected in that screen	area.
	5. Proofread the entry and correct it if necessary.	
	6. Enter	
	ESC (
	to turn off write protect mode.	
	7. Decide if you want to include a logical attribute to define the type and amount of data entered in the next unprotected area. If so, enter it now.	to be

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8. Move the cursor to the next area to be write-protected and repeat Steps 1 through 7.

NOTE! The form you create is not limited by the line capacity of the screen, only by the defined page.

9. Turn on protect mode. This protects the whole form from change.

10. Turn on logical attribute mode.

NOTE! The cursor can be anywhere when you turn on protect mode. If it is in a write-protected field, however, it moves to the next unprotected character position (now a field tab, as described below) since it can not remain in a protected field.

If you attempt to turn on protect mode while the entire screen is write protected, the terminal ignores the command to enable protect mode. Or if you enter a whole page in write protect mode, then leave the page and later try to return to that page, the terminal automatically turns off protect mode.

The status line contains **PROT** when protect mode is on, indicating that no one can change data in the protected fields.

When protect mode is off, the form has no protection. The absence of **PROT** on the status line indicates that protect mode is off.

Effects of Protect Mode Tab Stops—The first unprotected position after a write-protected field automatically becomes a field tab stop as soon as you enable protect mode.

Data Appearance—Protected data appears with the visual attribute(s) in effect when it was written.

Cursor Movement—You can never move the visible cursor into a write-protected field. To move it into a write-protected area, remove the protection by turning off protect mode.

NOTE! The hidden cursor can enter any area, without restriction.

Protect mode protects data from possible loss. (Since protected data can not scroll off the page, it is not lost when the terminal receives line feed or reverse line feed codes.)

While protect mode is on, the TAB key or tab command moves the cursor to the first unprotected position following a write-protected position (since it automatically became a field tab stop when you enabled protect mode).

Data Entry—Entering a character on the page's last unprotected position while write protect and protect modes are on turns off write protect and protect modes. This ensures that the cursor does not rest in a protected field.

Cursor Control

Line Feed and Reverse	Line feed	CTRL J
Line Feed	Reverse line feed	ESC j
	A line feed code moves the cursor down one line within the same column. A recode moves it up instead.	everse line feed

The defined scrolling region and the autopage and protect modes determine where the terminal moves the cursor after it receives a line feed or reverse line feed code. Tables 4-7 and 4-8 summarize these effects. **STOP!** Under certain conditions, line feed and reverse line feed codes received by the terminal may result in the loss of data. Read the following tables carefully.

Moo Autopage	des Protect		Effect	
Off	Off	Advances the cursor to the cursor is on the scrolling re	next line. Each line feed code received wh gion's bottom line rolls the display up one	hile the line.
		nho allallu cyualla ullanho ylla ohann illanho ylla ohan llal chho allallu cyuall ho ylla ohan llal chhu allallu cyuallac hho allallu cyualla ulla <mark>lla ylla ohann illanho ylla ohan llal chho allallu cyuallac ho ylla ohan llal chho allallu cyuallac hho allallu cyualla ullanho ylla ohann</mark>	nha ollollu cynollo ullouho yllo ohonn illenho yllo ohon llol ethia ollollu cynoll ho yllo ehon llol ethia ollollu cynolloc ihio ollollu cynollo ullouho yllo ohonn illenho yllo ohon llol ethia ollollu cynolloc ho yllo ohon llol ethia ollollu cynolloc hio ollollu cynollo ullouho yllo ohonn	
		to cynette uttentie ytte chen ttel ethi te onen ttel ethio ottellu cynette ut attellu cynette uttentie ytte chen ttel e tu cynette uttentie ytte ohen ttel ethi te ohen ttel ethio ottellu cynette uttentie ottellu cynette uttentie ytte ohen ttel ethi	to cynollo ullauho ytla ohon llof ethi lo ohon llot ethiho ollalla cynollo ul ollolla cynollo ullauho ytla ohon llof e la cynollo ullauho ytla ohon llof ethih lo ohon llof ethiho ollolla cynollo ul ollolla cynollo ullauho ytla ohon llof e lu cynollo ullauho ytla ohon llof ethih	
		BEFORE	AFTER	
		If the cursor is at the botton characters appears at the b as shown below.	n of the page (not the screen), a new line of bottom of the page and the page's top line	space is lost,
		lo ohon ilal clinho oltallu cynailo ut altallu cynaito nitonino ytta ohon ilat c tu cynaito nitonino ytta ohon ilat clinh o ohon ilat clinho attallu cynaita ut altaltu cynaita nitonino ytta ohon ilat c tu cynaita nitonino ytta ohon ilat clinh ta ohon ilat clinho attallu cynaita ni	the other cynolic alloche ylle other to ohon llet clifte ether ylle other llet c tu cynolic alloche ylle ohon llet clift to ohon llet clifte ether ether ether llet olicitu cynolic alloche ylle ohon llet c tu cynolic alloche ylle ohon llet clifte olicitu cynolic alloche ylle ohon llet clifte te ohon llet clifte olicitu ether ether llet c te ohon llet clifte olicitu ether ether ether ether te ohon llet clifte olicitu ether ether ether ether ether te ohon llet clifte olicitu ether ether ether ether ether ether te ohon llet clifte olicitu ether ethere	
		nho oltollu synolio ultonho yllo ohonn iltonho yllo ohon lloi chho oltollu synoll ho yllo ohon lloi chho oltollu synolloc hho oltollu synollo ultonho yllo ohonn iltonho yllo ohon lloi chho oltollu synollo ho yllo ohon lloi chho oltollu synollo hho oltollu synollo ultonho yllo ohojin	nhe elfelle synelle ulleuhe ylle ehesun illenhe ylle ehen liel chho elfellu cynell he ylle ehen liel chho elfellu cynelle hhe elfellu cynelle ullenhe ylle ehenn illenhe ylle ehen liel chho elfellu cynelle he ylle ehen liel chho elfellu cynelle	ERS
Off	On	A line feed code received v moves the cursor down to t regardless of its column po	when the cursor is just above a protected a he next unprotected character position, sition.	area
		nho ollollu cynollo ullouho yllo ohonn allouho yllo ohon lloi chhu challu cynoll ho yllo ohon lloi chhuo allollu cynolloc bhu olloidu cynolla allouho yllo ohonu allouho yllo ohon lloi chho ollollu cynoll he yllo ohon lloi chho ollollu cynolloc bho ollollu cynollo allouho yllo ohonn	nho ollollu cyuollo ullonho yllo ohonn ullonho yllo ohon llol chho ollollu cyuoll ho yllo ohon llol china aliallu cyuollac bha aliallu cyuolla alianda yllo alianu fauho yllo ohon llol china ollollu cyudl he yllo ohon llol chino ollollu cyuolloc bho ollollu cyuollo ullonbo yllo ohonn	
		BEFORE	AFTER	

ollottu eynalla nilantia ytta ation llot e tu cynolla ultonho yllo ohon llol elbh to ohou that ethino oltativ cynalta ut ollollu cynollo ullouho yllo ohou llol c lu cynollo alleatio yllo ohoa llof clifi to ohou llot elhho oltollu cynollo nt ollollu cynollo ullouho yllo ohou llot c lu cynollo ullonho yllo ohou llol clhh to ohou llot clinho ollollu cynollo ul ollollu cynollo ullonho yllo ohou llet c te cynolla ullanha ylla ahan llal dhh to ohon flot ethilo offolia cynollo af ollollu cynollo ullonho yllo ohon llol c PAGE 1

to about that ething offerthe cynollic at

ollollu cynollo ullonho yllo ohon llol c tu cynollo ullonho yllo ohon llot clhh to abou llat ethila allallu cynalia ut ollollu cynollo nllonha yllo ohan llol c lu cynollo ullouho yllo ohou llol clhh to ohon ttol clinho ollottu cynollo ul nho ottottu cynollo uttouho ytto ohou illonho yllo ahan llot chhia allallu cysall ho ylla ohon Hol clinha allallu cynalla hho ollollu cynollo ullonho yllo ohom illouho yllo obon lloi **e**liho ellotto eynoll he ylla ahan llat ellilie allalla cynallae o ollollo gaollo allonho yllo ab

to ohou ttol ethho ollottu cynollo ut

nha allalla cynalla nllanha ylla alua denter ylle alum llet clidio ollettu cynoll he ylle oben ttel chho ottellu cynelled hha allallu cynalla nllanha ylla ahann illonho yllo ohon llot ethho ollottu cynoll ho yllo ohon llot elliho ollollu cynolloe hho ollollu cynollo nllonho yllo ohonn lu cynollo ullonho yllo ohou llot clhh to alion that ethilis attallu cynollo n ollalla cynolla ullanha ylla ohan llol c to cynollo ultouho yllo ohou llot clhh to ohon ttol clinho ottollu cynollo ul ollollu cynollo ullouho yllo ohou llol c lu cynollo ullonho yllo ohou llol chh PAGE 1

to ohou ltot ellihio oltottu eyuolto ut ollottu cynollo utlonho yllo ohon tlol c tu cynollo ullonho yllo ohon tlot elhh to ohon llot clhho ollollu cynollo ul ollollu cynollo ullonho yllo ohon llol c lu cynollo ullouho yllo ohou llot cliih to ohon the clinto offollo cynollo ut ollollu cynollo ullonho yllo ohon llol \mathfrak{c} lu cynolfo nllonho yllo ohon llol clhh to ohon ltot ethho ollollu eynollo al ollollu cynollo nllonho yllo ohon llel c lu cynollo ullouho yllo ohou lloi clish to abou that ethila allatta cynallo al ollolla cynollo allonho yllo oban llol c

PAGE 2

AFTER

advances to the first unprotected line of the first page.

TeleVideo Systems, Inc.

Table 4-7

wide	es			
Autopage	Protect		Effect	
Off	On	After the cursor reacher feed code returns the c	es the last unprotected line sursor to the first unprotected	of the page, another line ed line on the current page
		lo ohou lloi dhiho ollollu çyuolla ollollu çyuolla ullonho yilo ohou lli tu çyuolla ullonho yilo ohou lli o ohou lloi dhiho ollollu çyuolla ollollu çyuolla ullonho yilo ohou lli tu çyuolla ullonho yilo ohou lli o ohou lloi dhiho ollollu çyuolla uhu ollollu çyualla ullonho yilo oh ullonho yilo ohou lloi dhiho ollollu çyu ba yilo ohou lloi dhiho ollollu çyua hibi ollollu çyualla ullonha yilo oh ullonho yilo ohou lloi dhiho ollollu çyua hibi ollollu çyualla ullonha yilo oh ullonha yilo ohou lloi dhiho ollollu çyua hibi ollollu çyualla ullonha yilo oh hibi ollollu çyualla ullonha yilo <u>l</u> oi	The offethic synche attention yields the offethic synche attention yields of the offethic synche attention of the synche attention of the synche attention of the synche attention yields of the synche attention of the synches attention of th	Notifi Yandi Giloc Kenni Yundi Olloc Kenni Cilih o ul Ref c Cilih
On	Off/On	Line feed advances the reaches the last unpro- unprotected line on the that next page.	e cursor to the next line on tected line on that page, it e next page and the screen	the page. When the curse advances to the first displays the first 24 lines of
on llot chho oltollu () o (yuello ultonho yllo ol nollo ultonho yllo obou on llot chho oltollu () o gynollo ultonho yllo obou ou llot chho oltollu () itollu (yuollo ultonho yl > yllo ohou llot chho oltol o ohou llot chho oltollu yllotlu (yuollo ultonho yi yllo ulton ho chino yi	ynollo ul lie ion llol c olle ilol clish lie juollo ul lie lion llol c olle llol clish lie ynollo ul lo llo clonn lo llo cynollo lie o cynolloc lo cynollo lie o cynolloc lo	ohou Hel cibia allollu cynello ut ohou Hel cibia allollu cynello ut cynello utlendio ytlo ohou Hel c cynello utlendio ytlo ohou Hel cibi ohou Hel cibia elfelio cynello at allu cynello utlendio ytlo ohou Hel c cynello utlendio ytlo ohou Hel cibi ohou Hel cibio otlellu cynello ut allu cynello utlendio ytlo ohou Hel c cynello utlendio ytlo ohou Hel cibi ohou Hel cibio otlellu cynello ut allu cynello utlendio ytlo ohou Hel c cynello utlendio ytlo ohou Hel cibi ohou Hel cibio otlellu cynello ut	lo ohou Hol clinho ollollu cyuollo ul ollollu cyuollo ullouho ylio ohou Hol c lu cyuollo ullouho ylio ohou Hol c lu cyuollo ullouho ylio ohou Hol clinh ollollu cyuollo ullouho ylio ohou Hol c lu cyuollo ullouho ylio ohou Hol clinh o ohou Hol clinho ollollu cyuollo ul	nha alfalla cynella alfanha ylle ohan alfanho ylla ohan llot chha alfalla cynaf ha ylla ahau llot chha alfalla cynaf his alfalla cynallo alfalla cynaf bis alfalla cynallo alfanha yllo ohar his alfalla cynallo alfanha yllo ohar hi cynallo alfanho yllo ohar llot ch lo ohan llot chha alfallu cynallo alfalla cynallo alfanha yllo ohan llot la cynallo alfanho yllo ohan llot la cynallo alfanho yllo ohan llot la cynallo alfanho alfallu cynallo alfallu cynallo alfanho yllo ahan llot ch
o ohou tlat clubo ottotlu		•		
o ohou ttol clubo ottollu Motte cynollo uttouho yl	lo oligini olic	llu cynollo ullonho yllo ohon llol c	oliollu cynolio nlionho ylio ohon liol c	lu cynollo ullouho yllo ohou llot cl

.

Table 4-8	
Effect of Reverse Line Feed Codes on Cursor Movement	

Modes Autopage Protect		t	Effect	
Off	Off	The display scrolls down current page. Data on the second	n one line when the cursor i ne page's last line is lost.	s on the first line of the
		the effective cynelle pleaster ytte ohe tikulte ytte ohen ttel ethte effective yn he ytte ohen ttel ethte effective ynell hie effective cynelle allenbe ytte ohe diante ytte ohen ttel ethte effective cynel his ytte ohen ttel ethte effective ynel hie effective ynelle allenbe ytte ohen he cynelle allenbe ytte ohen ttel et	un oli oc un oli litore	SPACE CHARACTERS
		to ahou that ethina ottallu cynaita attalla cynaita uttanha ytte ahou tha tu cynaita uttanha ytte ahou that et a ahou that ethino attallu cynaita attalla cynaita uttanha ytta ahou tha tu cynaita uttanha ytta ahou tha et	ul lo ohon thet ethio offalla cynollo Le offalla cynollo ntlanho ytte ohon the hh lu cynollo ntlanho ytte ohon thet e ut lo ohon thet ethio attautu cynollo Le offalla cynollo ntlanho ytto ohon the hh lu cynollo ntlanho ytto ohon the hho attatte cynollo ntlanho ytto oho	ul Ibih ul DATA LOST
		BEFORE	AFTER	
On	Off	When the cursor reaches line of the previous page	s the first line of the current e.	page, it moves to the last
> ohon Het chho alloi Haltu cynolla ullauha yl i cynolla ullauha ylla c i ohon Het chho alloi Haltu cynolla ullauha ylla c i cynolla ullauha ylla c i ohon Het chho alloi Haltu cynolla ullauha ylla c i ohon Het chho alloi Haltu cynolla ullauha ylla i cynolla ullauha ylla	la cynollo il lo ohon llol c shon llol clihi la cynollo il lo ohon llol c shon llol clihi lo ohon llol clihi lo chon llol clihi lo chon llol clihi lo chon llol c chi	the elfelle cyacle allende ylle elsen illende ylle olen llei clidie elfelle cyacle he ylle olen llei clidie elfelle cyacle idende ylle olen llei clidie elsen ylle elsen illende ylle olen llei clidie elsen ylle elsen illende ylle elsen llei clidie cyacle he gliedle cyacle allende ylle elsen ille olen ylle elsen ylle elsen ille cyacle allende ylle elsen i cyacle allende ylle chen llei clidi odfelle cyacle allende ylle elsen llei c i cyacle allende ylle elsen llei clid else chen llei clidie ylle elsen llei clidi i chen llei the olielle cyacle al	to ohon the clinto offellu cynollo u offellu cynollo uttenho ytto ohon ttet c tu cynollo uttenho ytto ohon ttet clint o dioni ttet chho offellu cynollo ut offellu cynollo uttenho ytto ohon ttet clint o ohon ttet clinto ohon ttet clint o ohon ttet clinto offellu cynollo ut into offellu cynollo uttenho ytto ohoni ittenho ytto ohon ttet clinto offellu cynoll ho ottettu cynollo uttenho ytto ohoni uttenho ytto ohon ttet clinto offellu cynoll ho ottettu cynollo uttenho ytto ohoni uttenho ytto ohon ttet clinto ottettu cynoll ho ottettu cynollo uttenho ytto ohoni uttenho ohon ttet clinto ottettu cynolli	lo ohon lloi chho ollollu cynollo ui ollollu cynollo uilonho yllo ohon lloi c fu cynollo uilonho yllo ohon lloi c fu cynollo uilonho yllo ohon lloi c diollu cynollo uilonho yllo ohon lloi c fu cynollo uilonho yllo ohon lloi chh
o ohou llot clilito ollot ilollu cynollo ulloubo yf	lu cynollo al lo chou llol c	ollottu cynollo ntlonho ytto ohon llot c hu cynollo ntlonho ytto ohon llot c	ha ytto ohon llat cluba allallu cynallac hha allallu cynalla allanha ytto abann	lo ohou llot chiho ollollu cynollo ul ollollu cynollo ullonho yllo ohou llot c
PAGE 1		PAGE 2	PAGE 1	PAGE 2

BEFORE

AFTER

When the cursor reaches the first line of the first page, it does not move any further.



Mod Autopage	les Protect		Effect
On	On	A reverse line feed code re position moves the cursor regardless of the column p	ceived when the cursor is just below a protected up to the first unprotected character position, osition.
		nho allalla cynalla nifautho ylio ahann ullanha yllo ahan llal chluo allalla cynall bo ylio abni llal chluo allalla cynallae tho allalla cynalla allanha ylio chann ilanha ylio abni llal chluo allalla []mall bo ylio ahan llal chluo allalla cynallae hho allalla cynalla ullanho ylio ahann	nho olidilu cynollo ullouho yllo ohoun ullouho yllo ohou llol chino oliollu cynoll ho yllo pon lloi chino oliollu cynoll ho yllo don cynollo ullouho yllo ohouu iliadio yllo ohou lloi chino oliollu cynoll ho yllo ohou lloi chino oliollu cynollo ho allollu cynollo ullouho yllo ohoun
		BEFORE	AFTER
Off	On	If the terminal receives a re unprotected character pos- tion ritolia synche alloube yile dismi- ilentic yile chan flet chine alloub cynall he yile oben flet chine alloub cynall he yile oben flet chine alloub yile oben ulunhe yile oben flet chine alloub cynall he yile oben flet chine alloub yile oben ulunhe yile oben flet chine alloub yile oben he oliollu cynalle alloube yile oben flet chi fe olioni flet chine alloube yile oben flet i cynalle alloube yile oben flet chi oliollu cynalle alloube yile oben flet chi fe olioni flet chine alloube yile oben flet chi oliollu cynalle alloube yile oben flet chi i cynalle alloube yile oben flet chin fe olioni flet dhis oliollu cynalle alloube yile oben flet chin fe olioni flet dhis oliollu cynalle alloube yile oben flet chin fe olioni flet dhis oliollu cynalle alloube yile olioni flet chin fe olioni flet dhis oliollu cynalle alloube yile olioni flet chin fe olioni flet chine alloube yile olioni flet chin fe olioni flet chine alloube yile olioni flet chin fe olioni terenti cynalle alloube yile olioni flet chine flet chine terenti chine alloube yile olioni flet chine flet chine terenti cynalle alloube yile olioni flet chine terenti chine terenti cynalle alloube yile olioni flet chine terenti chine terenti chine terenti cynalle alloube yile olioni flet chine terenti chine ter	verse line feed code when the cursor is on the firs ition on the page, the cursor does not move.

Directional Cursor Movement

	SELUP
Move cursor up	CTRL K
Move cursor down	CTRL V
Move cursor left	CTRL H
Move cursor right	CTRL L
Carriage return	CTRL M
Move cursor to home position	CTRL ^
New line (carriage return and line feed)	$CTRL_{-}$

NOTE! The cursor right and left commands move the cursor over a protected field; the cursor up and down commands can not. Table 4-9 summarizes directional cursor movement commands.

Control Code	Moc Autopage ¹	les Protect		Effect
Cursor up	Off/ On	Off	Moves the cursor up one I until it reaches the top of line is below the page's fir display down one line unti first line. Additional CTRL	line within the present column the display. If the first displayed st line, each code rolls the il the cursor reaches the page's K codes have no effect.
	lo ohou ulua olla ultanto y ho ylla a dianto y ho ylla a hito alla hito alla hito alla lo ahou allalla c hito abou allalla c	Ilei chino olioliu cy llu cyneile ullenine yll ile ohon llei chino olioliu shon llei chino olioliu llu cyneile ullenine yll ile ohon llei chino olioliu ile cyneile ullenine yll ile ullenine ylle ohon llei chino olioliu cy yneile ullenine ylle ohon ilei chino olioliu cy yneile ullenine ylle ohon ilei chino olioliu cy yneile ullenine ylle oh BEFORE	nollo ni a chonu la cynella ywellor ywellor ywellor a chonu la cynell a chonu la cynell a chonu la cynello a chonu la chonu la cynello a chonu la cynello a chonu la cho	allo ul ohoun ohoun i cyuolt yuolloc ohoun i cyuolt yuolloc ohoun i cyuolt yuolloc ohoun i cyuolt yuolloc ohoun o cyuolt yuolloc ohoun o cyuolt yuolloc ohoun o cyuolt yuolloc ohoun o cyuolt yuolloc ohoun o cyuolt o choun o cyuolt o choun o cyuolt o choun o cyuolt o choun liot chho ollollu cyuolto bho ollollu cyuolto ullouho yllo ohoun i cyuolto ullouho yllo choun liot chh o ohoun liot chhoo ollollu cyuollo ul ollollu cyuolto ullouho yllo ohoun liot chh o ohoun liot chhoo ollollu cyuollo ul ollollu cyuolto ullouho yllo ohoun liot chh o ollollu cyuolto ullouho yllo ohoun liot chh o ollollu cyuolto ullouho yllo ohoun liot chh o ollollu cyuolto ullouho yllo ohoun liot chh o thou ullouho yllo ohoun liot chh o AFTER
	On	On	A cursor up command red below a protected position unprotected character position. The ellellu cyaelle allenhe ylle ehean the ylle ehea llel chine ellellu cyaelle bhe ellellu cyaelle allenhe ylle ehean diode ylle ehea llel chine ellellu cyaelle bhe ellellu cyaelle allenhe ylle ehean bio ellellu cyaelle allenhe ylle ehean bio ellellu cyaelle allenhe ylle ehean	the oldelle cyacile allenhe yille ohem the oldelle cyacile allenhe yille ohem thenhe yille ohem tiel chille ohem thenhe yille ohem tiel chille ohem the oldelle cyacile allenhe yille ohem thenhe yille ohem tiel chille oldelle cyacil the oldelle cyacile allenhe yille ohem thenhe yille ohem tiel chille oldelle cyacil the oldelle cyacile allenhe yille ohem the oldelle cyacile allenhe yille ohem
	Off	On	If the terminal receives a r cursor is on the page's first position, the cursor does r it can not move to the pre- lo ohou llot of the ohou llot c to cynollo ullouho yllo ohou llot chb to chou llot chbuo ollollu cynollo ul ollollu cynollo ullouho yllo ohou llot chbu	reverse line feed code when the st unprotected character not move. (Since autopage is off, evious page's last line.) offelle große ullenbe ylle ohen flet c in große ullenbe ylle ohen flet ohen flet große ullenbe ylle ohenn flenbe ylle ohen flet clibe offelle große ihe offelle große ullenbe ylle ohenn flenbe ylle ohen flet clibe offelle große ihe offelle große utlenbe ylle ohenn flenbe ylle ohen flet clibe offelle große ihe offelle große utlenbe ylle ohenn flenbe ylle ohen flet clibe offelle große ihe offelle große utlenbe ylle ohenn flenbe ylle ohen flet clibe offelle große ihe offelle große utlenbe ylle ohenn

1		
Moc Autopage ¹	les Protect	Effect
Off/ On	Off	Moves the cursor down one line within column. When it reaches the screen's 24th line, each code rolls the screen up until the cursor reaches the page's last line. Subsequent CTRL V codes have no effect.
		NOTE! Set up parameters determine whether or not the key transmits this code or CTRL J.
lu cynollo lo ohou l ottoltu cyn lu cynollo lo ohou l nho ottolu dhadu yla ho ytto oh bho ottolt illauho yla ho ytto oh bho ottolt illauho yla ho ytto oh bho ottolt illauho yla ho ytto oh	ulionho yilo ohon ilo lot clinho oliollu yuo ollo ulionho yilo ohon ilo lot clinho oliollu yuo cynollo ulionho yilo c ohon iloi clinho oliollu y oyuollo ulionho yilo c ohon iloi clinho oliollu y yuollo ulionho yilo c on iloi clinho oliollu y guadio ulionho yilo alionho yilo chon ilo lot clinho oliollu yuo BEFORE	china chon hơi china viao hon hơi china chon hơi china viao hon hơi ch
Off/ On	On	Same as line feed except the cursor does not move when it reaches the page's last line.
Off/ On	Off/ On	Same effect as BACKSPACE key. Moves the cursor left to the previous unprotected position. If the cursor is in the line's first column, it moves to the previous line's last column, regardless of autowrap mode.
the old illente y he ylle e film olde illente y he ylle e bhe olde	lu cynollo allonho yllo lo chan lloi chho ollolli shon lloi chho ollolli c lu cynollo ullonho yllo lo chan lloi chho ollolli c lu cynollo ullonho yllo BEFORE	ohomin o cynoll ynolloc ohomin o cynoll ynolloc ohomin o cynoll nho ollollu cynollo ullouho yllo ohomin llouho yllo ohomin o cynoll ynolloc ohomin ynolloc ohomin ynolloc nho ollollu cynollo thino ollollu cynoll ynolloc ohomin ynolloc nho ollollu cynollo thino ollollu cynollo homin ynolloc ohomin ynolloc nho ollollu cynollo thino ollollu cynoll ynolloc ohomin ynolloc nho ollollu cynollo thino ollollu cynollo homin ynolloc nho ollollu cynoll thino ollollu cynollo thino ollollu cynollu cynollo thino ollollu cynollu cynollo thino ollollu cynollo thino ollollu cynollo thino ollollu cynollu cynollu cynollu c
Off	Off/ On	If autopage is off and the cursor is on the first page's first unprotected position, additional CTRL H codes have no effect.
		The show a spectra in the spectra in
	Mod Autopage1 Off/ On Ur cynollo to ohon I ollollu cyn Ur cynollo to ohon I who diollu dloube yllo be yllo oh bhe ollollu dloube yllo be yllo oh dloube yllo be yllo ob dloube yllo be yllo ob	Modes Protect Off/ Off On Off Off Off Off Off Off On Off Off Off Off Off Off Off Off On On Off On Off On Off Off Off Off Off Off

1. If optional memory is installed.

Control Code	N Autopage	lodes e ¹ Protect	Effec	t
	On	Off/ On	If the cursor is on the page's firs moves to the previous page's lat the cursor is on the first page's additional CTRL H codes have r	it unprotected position, it st unprotected position. It first unprotected position, no effect.
ohon liol dihio olia silu cynello ullouho ylo ohon liol dihio olia dio cynello ullouho ylo ohon liol chino olia dio cynello ullouho ylo ohon liol chino olia	Illo cynollo ul dlo ohon llol c ohon llol clluh dlu cynollo ul dlo ohon llol c ohon llol clluh dlu cynollo ul dlo ohon llol c chon llol clluh llu cynollo ul dlo ohon llol c dhon llol clluh dlu cynollo ul dlo ohon llol c	ha allulte spache allache y fanta ylla alan lei chia al a ylio alan lei chia al a ylio alan lei chia alla ha allalla spacha lei chia al a ylio ahan lioi chia allan ha allalla spacha illonho ylio alan a allalla spacha illonho ylio alan a alan lioi chia allanho ylio al a spacha illonho ylio alan kalla spacha illonho ylio alan bia allan spacha allanho ylio alan y spacha illonho ylio alan page 2	Ite choine offic critical in cynelloc ito cynelloc illouho yllo ohoni lol ch in cynelloc illo ohoni lol chhio ollollu cynello illouho yllo ohoni lol ch in cynello illouho yllo ohoni lol ch i cynello illouho yllo ohoni lol chi i cynello illouho yllo ohoni lol chi o yllo ohoni lol chi i chi cynello illouho yllo ohoni i chi chi cynello illouho yllo ohoni i chi chi cynello ohoni lol chi i chi chi i cynello illouho yllo ohoni loi chi i cynello illouho yllo ohoni i chi chi i cynello illouho yllo ohoni loi chi i cynello illouho yllo ohoni i chi i cynello illouho yllo ohoni i chi i cynello illouho yllo ohoni i chi i chi i cynello illouho yllo ohoni i cynello illouho yllo ohoni i chi i cynello illouho yllo ohoni i c	lo ohon fiel clino offoliu cynello offoliu cynello nitenito ytto eton fiel lu cynello nitenito ytto eton fiel lu cynello nitenito ytto eton fiel diottu cynello nitenito ytto eton fiel lu cynello nitenito ytto eton fiel cli lo eton fiel clinto ettenite cynello offoliu cynello nitenito ytto eton fiel cli le eton fiel clinto ettenite cynello offoliu cynello nitenito ytto eton fiel cli le eton fiel clinto ettenite cynello offoliu cynello nitenito ytto eton fiel le eton fiel clinto ettenito eton fiel le eton fiel clinto ettenito eton fiel le eton fiel clinto ettenito fiel eton fiel di le eton fiel clinto ytto eton fiel le eton fiel clinto ettenito eton fiel eto eton fiel clinto ettenito ytto eton fiel page 2
	BEFOR	E	AI	TER
Cursor right	Off/ On	Off/ On	Moves the cursor right one posit moves to the next line's first pos autowrap mode.	ion. If it is on column 80, i sition, regardless of
	nhe ille ho hhe dio hs	- allalla cynalla nilanha ylla nin ylla ahan llai chha allal ylla ahan llai chha allal ylla ahan llai chha allanha ylla ahan llai chha allallu ylla ahan llai chha allallu	 ohann nha ollollu cynalla illonha yllo ohann ha ollollu cynalla illonha yllo ohann tidanha yllo ohann thal ethiba ollollu cynalle ohann by yllo ohann thal ethiba ollollu cynalle tha ollollu cynalla illonha yllo ohann thal ethiba ollollu cynalle yandlae yandlae hy yllo ohann thal ethiba ollollu cynalle yandlae yandlae hy yllo ohann thal ethiba ollollu cynalle yandlae hy yllo ohann thal ethiba ollollu cynalle yandlae hy yllo ohann thal ethiba ollollu cynalle 	who allalla cynalla ullanho yllo ahan iflanho yllo ahan llaf chha allailu cyna ho yllo ahan llaf chha allailu cynallc Ma allallu cynallo ullanho yllo ahan illanho yllo ahan llaf chha allaili cynall ho yllo ahan llaf chho allailu cynallc hha allallu cynallo ullanho yllo ahan
		BEFORE	AFTER	AFTER
	Off	Off	If the cursor is on column 80 of p scrolls down one line and the ne space characters. The cursor m the next line.	bage's last line, the screer aw 24th line is filled with oves to the first column o
			lo ohon lloi chino oliollu cynollo ni oliollu cynollo ulionho ytio ohon lloi chin lu cynollo ulionho ytio ohon lloi chin oliollu cynollo ulionho ytio ohon ilionho ytio ohon lloi chino oliollu cynollo hin oliollu cynollo ulionho ytio ohon hin olionho ytio ohon hin olionho ytio ohon	alle cyaolle allande vila elana n llot ethio ollolla cynollo al cynollo allando yilo chan llot ethi n llot ethio ollolla cynollo al ilo allando yilo chan llot ethi n llot ethio ollolla cynollo al cynollo allando yilo ohan llot ethi a llot ethio ollolla cynollo al olla chan llot ethio ollolla cynoll ohan llot ethio ollolla cynoll ohan llot ethio ollolla cynoll ethia ethio ollolla cynollo ella cynollo allando yllo ohann yllo ohan llot ethio ollolla cynollo ella cynollo allando ollolla cynollo ella cynollo allando yllo ohann yllo ohan llot ethio ollolla cynollo ella cynollo allando ollolla cynollo ohan llot ethio ollolla cynollo
			BEFORE	AFTER

1. If optional memory is installed.

Control		Modes				
Code	Autopa	nge ¹ Protect		· E	ffect	х.
	On	Off/ On	If the mov the l unpr	e cursor is on the page es to the next page's fi ast page, it advances t otected position.	's last rst un o the	unprotected position, protected position. If o first page's first
n hol chho ollohu cyndlo ullanho yllo ollo ullanho yllo ollo ullanho yllo n hol chho ollohu cynollo ullanho yllo ollo illanho yllo ohu kolu cynollo ullanho yllo ohun kol chho oll kolu cynollo ullanho yllo dinu kol chho e ohun kol chho olla kolu cynollo ullanho yllo dinu kol dha e ohun kol chho e	cynollo al ohon llol c on llol clish cynollo al ohon llol c on llol clish cynollo al yllo ohonn llollu cynollo al yllo ohonn dlollu cynolloc yllo ohonn dlollu cynolloc yllo ohonn dlollu cynolloc yllo ohonn dlollu cynolloc	In ohme that chine adfathe oblate synolic ullentro yile of te synolic ullentro yile of te synolic ullentro yile of te synolic ullentro yile of te ohme that chine ollentre te ohme that chine ollentre oblate synolic ullentro yile of te synolic ullentro yile of te synolic ullentro yile of te ohme that chine ollentre ollente synolic ullentro ollentre te synolic ullentro yile of te synolic ullentro yile of te ohme that chine ollentre te ohme that chine ollentre	cynollo al ahon llol c i llol clih cynollo al ahon llol c i llol clihi cynollo al ahon llol c i llol clihi cynollo al ahon llol c i llol clihi cynollo al ahon llol c	to ohou tiot chiho oliollu cynolle oliollu cynolle ullenho yllo ohou l lu cynolle ullenho yllo ohou llo lu cynolle ullenho yllo ohou llo oldelu cynolle ullenho yllo ohou llo lu cynolle ullenho yllo chou llo	o ut Itol c cllub o ut Itol c cllub o ut Itol c cllub cellub cellub cellub cellub cellub cellub cellub cellub cellub cellub	nhe allahe cynelle allanha. In ohe illenho yllo ohon lloi chiho oliollu cyn ho yllo abou lloi chiho oliollu cyn ho yllo abou lloi chiho allanlu cyn ho oliollu cynollo ullonho yllo ahe illenho yllo abou lloi chiho allailu cyna ho allanlu cynollo ullonho yllo ahe lu cynello ullonho yllo abou lloi c io abou lloi chiho allailu cynal b cynollo ullonho yllo ahon lloi c lu cynello ullonho yllo ahon lloi c lu cynello ullonho yllo ahon lloi c allailu cynello ullonho yllo ahon lloi c
PAGE 1		PAGE 2		PAGE 1		PAGE 2
	Off	On	If the model of the second sec	the cursor is on the page ves to the current page been lied cline clientin cynelles of a cynelle allegite chan lied chin the cynelle allegite chan lied chin ter lied cline olicitu cynelle al a cynelle allegite ylle chan lied chin ter lied cline olicitu cynelle al a cynelle allegite olicitu cynelle clicitu cynelle allegite olicitu cynelle olicitu cynelle allegite olicitu olicitu cynelle allegite olicitu cynelle a	e's las s's firs alta o altada bo yile bo yile bo yile bo yile bo yile bo yile bo yile bo o bo yile bo o bo olfollu bu syi bo ob altada bu syi bo ob altada bu syi bo ob altada bu syi	st unprotected position, st unprotected position, st unprotected position. Influe space and the file offering spice chear the file offering space in a chear the file offering space itelite space with the offering space itelite space with the spice chear the chear the the offering space itelite space with the spice of the spice of the spice of the spice itelite spice with the spice of the spice of the spice of the spice itelity of the spice of the spice itelity of the spice of the spice spice of the spice of
Carriage return	Off/ On	Off/ On	Move positi dead he y block he y he	es the cursor to the cur tion. ² allallu cyualla ullauha ylla ahau u ylla ahau lia chiha allallu cyuall the ahau lia chiha allallu cyuallac allallu cyualla ullauh. Ylla ahau ta ahau lia chiha allallu cyuallac allallu cyualla ullauha ylla ahauu before	rent l dono ol dicorbo ho yile ho yile ho yile	Ine's first unprotected Indu cynolio allonho yllo ohonu yllo ohon lloi clihin ollollu cynollo nohon lloi clihin ollollu cynollo fichir cynollo ullonho yllo ohonu o ohon lloi clihin ollollu cynollo nohon lloi clihin ollollu cynollo nohon lloi clihin ollollu cynollo thollu cynollo ullonho yllo ohonu AFTER
	Off <i>i</i> On	" On	If the does alloub bis st bho a alloub bho a	e cursor is on the line's s not move. slidle cyadio allouho yllo ohoun o yle ohou iloi china oledia cyadio o chou iloi chiloj allolla cyadio allolla cyadio allouho yllo ohoun o yllo ohou iloi chiho oledia cyadio lo ohou iloi chiho oledia cyadio lo ohou iloi chiho oledia cyadio oledia cyadio allouho yllo ohoun	only	unprotected position, it

1. If optional memory is installed.

2. When carriage return/line feed parameter has been selected in set up line, performs a carriage return, then a line feed.

Table 4-9 Continued	L			
Control Code	Mode Autopage ¹	es Protect		Effect
Home	Off	On	Moves the cursor to the p Has no effect if it is alread	page's first unprotected position dy there.
			to ohou the chine offette cytectle at oblate cytectle attention of the chine the cytectle attention with other the chine to cytectle attention with other the chine to chose the cithe offette cytectle at other the cytectle attention with other the cytectle attention with the citectle cytectle at the other the citectle cytectle at the other the citectle cytectle attention with other the citectle cytectle attention with other the other citectle cytectle the other the citectle citectle cytectle the other the citectle citectle cytectle the other the citectle citectle cytectle the other the cytectle attention with other the citectle cytectle the other the cytectle attention with comparison of the citectle cytectle the other the cytectle attention with cytectle cytectle the other the cytectle attention with cytectle cytectle cytectle attention with other the cytectle attention with other attention with other the cytectle attention with other attention with other the cytectle attention with other attention with other the cytectle attention with other	the allolar crucks allow, yile chean illente yile cheat for this effective cyacil he yile cheat for this effective cyacil he yile cheat for this effective cyacil he dictive cyacile alloute yile chean illente yile ohen for this effective cyacile he dictive cyacile alloute yile ohen he dictive cyacile alloute yile ohen he dictive cyacile alloute yile ohen for this is ohen for this offettive cyacile all offetti cyacile alloute yile ohen for this is ohen for this offetti cyacile all offetti cyacile alloute yile ohen for this he ohen for the offetti cyacile all offetti cyacile alloute yile ohen for this he ohen for the offetti cyacile all offetti cyacile alloute yile ohen for this he ohen for the offetti cyacile allout offetti cyacile alloute yile ohen for this
			BEFORE	AFTER
New line	Off/ On	Off/ On	Same as carriage return a	and line feed.
			nha altallu synalia ulianha ylla ohonn ulianha ylla ohon llat chiha altallu synali ha ylla ohon llat chiha altallu synali hha altallu synalia ulianha ylla ohonn ulianha ylla ohon llat chiha altallu synali ha ylla ohon llat chiha altallu synali ha ylla ohon llat chiha altallu synali ha ylla ohon llat chiha altallu synali	nha allallu cyualla ullautha yila ahaan ullautha yila ahaa lial china allallu cyuall ha yila ahaa lial china allallu cyuallac Jua allallu cyualla ullautha yila ahaan ullautha yila ahaa lial china allallu cyualla ha yila ahaa lial china allallu cyuallac hha allallu cyualla ullautha yila ahaan
			BEFORE	AFTER

1. If optional memory is installed.

Addressing and Reading the Cursor

Addressing the Cursor	Send (address) Send (address)	ESC - p r c ESC = r c					
	where						
	p is a value	p is a value for the page number.					
	p Value	Page					
	Ø 1 2 3	One Two Three Four					
	NOTE! The installed.	e maximum value of p is determined by the number of μ	pages of memory				

r is an ASCII character from Appendix E for the row (line).

c is an ASCII character from Appendix E for the column.

NOTE! If your computer inserts nulls between characters, addressing the cursor moves it to an unpredictable position. If the cursor address is in a nonexistent or nonscrolling area, the command has no effect on the cursor.

The computer can move (address) the cursor to a particular location by sending one of these commands to the terminal. If a scrolling region has been defined, line numbers refer only to the lines within the scrolling region. Figure 4-12 shows line numbers in relation to a screen without a scrolling region and in relation to a screen with a scrolling region.

Figure 4-12 Line Numbers in Relation to Scrolling Region

 nho ollollu cynollo ullonho yllo ohonn ullonho yllo ohon llol ethho ollollu cynoll ha yllo ohon flol ethho ollollu cynollo inias ollollu cynflibs ullonha yffo ohonn ullonho yffo ohon flol ethho ollollu cynollo ha yllo ohon flol ethho ollollu cynollo hho ethollu fynollo ullonho yffo ohonn 	 lo ohon llot chho oltollu cynollo ni ollollu cynollo nilonho yllo ohon llot c lu cynollo nilonho yllo ohon llot chhi lo ohon llot chho oltollu cynollo ni ollollu cynollo nilonho yllo ohon llot c lu cynollo nilonho yllo ohon llot c lu cynollo nilonho yllo ohon llot chh ololu cynollo nilonho yllo ohon llot chh ohon llot chho oltollu cynollo ni
DEFINED SCROLLING REGION	 8 who olicilla cynello allenho yllo ohonn illenho yllo ohon lloi chiho olicilla cynell ho yllo ohon lloi cliho olicilla cynello chi illenho yllo ohon lloi cliho olicilla cynello c illenho yllo ohon lloi cliho olicilla cynello bo yllo ohon lloi cliho olicilla cynello ho olicilla cynello allenho yllo ohonn ho olicilla cynello allenho yllo ohon honn ho olicilla cynello allenho yllo ohonn ho ohonn ho olicilla cynello allenho yllo ohonn ho ohonn ho

These commands allow the computer to position the cursor in a specific location within a page of the terminal's memory. This function is called **addressing** or **loading** the cursor.

For example,

ESC = '' Q

sends the cursor to row 9, column 50 of the current page when the scrolling region starts on line 8.

Reading the Cursor	Read cursor's page, row, and column position	ESC /
	Read cursor's row and column position	ESC ?

where

The terminal's response contains values for the cursor's page, row (line), and column positions.

The page number is one of the following values:

0	One
1	Two
2	Three
3	Four

Row and column positions are reported as values from Appendix E.

The report is terminated with a carriage return code.

These commands tell the terminal to report (i.e., read) the cursor's current position to the computer.

Hidden Cursor	Send data to hidden	cursor	ESC L p r c (text) CTRL Y		
	where				
	p is a value for	the page number.			
	p Value	Page			
	0 1 2 3	One Two Three Four			
	The maximum v	value of p is determined by the number of	pages in the memory.		
	r is a row (line) page's memory	value from from Table E-1 in Appendix E (unrelated to the defined scrolling region	E referring to a line of that i).		
	c is a column va	alue from Table E-1 in Appendix E.			
	Entering CTRL I	P in the text stores the next character, even	if it is a CTRL P or CTRL Y.		
	NOTE! All modes and defined scrolling regions are irrelevant. You can address the hid- den cursor to any location in the screen's memory.				
	Define any visu through the hid afterwards.	al attribute or enable write protect mode Iden cursor. Then redefine the visual attr	iust before sending data ibute or change the mode		
	This command allows tion is not currently dis or outside the current	the computer to send text to any position i splayed. Only with hidden cursor can you a ly defined scrolling region.	n memory, even if that posi- dd data to a protected area		
	The type of data writte	en (i.e., protected or unprotected) depends	on which mode is in effect.		
	The command display ple, if the terminal rece ter position instead o chapter.)	vs all ASCII characters received. No function eives a CR code through the hidden cursor, in f performing a carriage return. (Refer to n	is are performed. For exam- t displays CR in one charac- nonitor mode earlier in this		
	You might use the hid the page and redefine	den cursor feature to build a form on a pag the scrolling region.	e without having to display		
Function Keys	The function keys (F1 computer, or to the co and unshifted), as sho	I through F16) send a programmable sequomputer and the display. You can reprogration wn in the next chapter.	ence to the display, to the many function key (shifted		
Default Values	Table 4-10 lists the de	efault five-code sequences sent by each fun	ction key.		
	NOTE! The function come from the nonvol	key values shown here are the factory defa latile memory, they may have been subsequ	ault values. Since the values uently reprogrammed.		

Function	Co	ode ¹
Key	Unshifted	Shifted
F1	SOH @ CR	SOH ' CR
F2	SOH Ă CR	SOH a CR
F3	SOH B CR	SOH b CR
F4	SOH C CR	SOH c CR
F5	SOH D CR	SOH d CR
F6	SOH E CR	SOH e CR
F7	SOH F CR	SOH f CR
F8	SOH G CR	SOH g CR
F9	SOH H CR	SOH Ň CR
F10	SOH I CR	SOH i CR
F11	SOH J CR	SOH į CR
F12	SOH K CR	SOH K CR
F13	SOH L CR	SOH I CR
F14	SOH M CR	SOH m CR
F15	SOH N CR	SOH n CR
F16	SOH O CR	SOH o CR

Table 4-10		
Default Function	Key	Codes

1. Refer to ASCII Code Conversion Table in Appendix C.

NOTE! Function key codes are transmitted sequentially. If you press a function key while other data is being transmitted, the function key's code is transmitted after the terminal transmits the other data. If your computer cannot accept codes at that speed, you may have to modify your software program, lower the baud rate to the computer, or change the handshaking protocol between the terminal and computer.

How the computer will respond to a function key's code depends entirely on how the computer is programmed to respond to the transmitted codes.

The FUNCT Key Not to be confused with the function keys described in the previous section, the FUNCT key transmits the ASCII code of the next alphanumeric key depressed, bracketed by SOH (start of header) and carriage return (CR) ASCII characters. (Refer to the ASCII Code Conversion Table in Appendix C.)

For example, if a word processing program requires the sequence **SOH C CR**, hold down the FUNCT key while pressing the C key. (The FUNCT key is similar to the SHIFT key.) But do not press a numeric key on the keypad or an editing key with the FUNCT key.

The communication mode in effect is irrelevant. The terminal only transmits the codes to the computer; it does not echo them to the screen.

NOTE! You may need to program your computer's input/output string routine to catch the entire string and then process it. (If you are using an interrupt-driven computer, you do not need to worry about data being lost.)

Tab Stops

Two types of tab stops are available:

Typewriter

Field

Typewriter tabs are recognized only when protect mode is off. Field tabs are recognized only when protect mode is on.

Set Tab Stops Create column of typewriter tab stops at current cursor column (protect ESC 1 mode off); create column of field tab stops from cursor's current position downward (protect mode on)

NOTE! Be sure you enter a number one. A lowercase L turns on duplex edit mode.

Move the cursor to the desired column before executing the command.

When protect mode is off, this command establishes an invisible column of typewriter tab stops at the cursor's current column position.

When protect mode is on, this command creates a half-intensity, write-protected column extending down from the cursor's current position to the first protected position. All data within this column (i.e., below the original cursor position) is now write protected.

NOTE! As long as protect mode remains on, the visible cursor is excluded from this writeprotected column. After protect mode is turned off, this column of half-intensity field tabs remains visible.

The cursor moves to the next unprotected column position (since it cannot remain in a protected area). The cursor column, starting at the cursor and extending down to the first writeprotected position, contains field tab stops.

Each protected field created with the protected writing mode also automatically sets a field tab stop on the next unprotected character position. (This field tab stop does not extend downward.)

Table 4-11 summarizes the effect of the set tab command.

Mode		
Autopage	Protect	Effect
Off/On	Off	Sets a column of typewriter tab stops on the cursor's current position.
		nho ollollu cyuollo illonho yllo ohonn illonho yllo ohon lloli thio ollollu cyuoll ho yllo ohon llol thio ollollu cyuollo hho ollollu cyuolla illonho yllo ohonn illonho yllo ohon llol thio ollollu cyuoll ho yllo ohon llol thio ollollu cyuolla iho ollollu cyuolla illonha yllo ohonn
		INVISIBLE COLUMN OF TAB STOPS
Off/On	On	Creates a half-intensity, write-protected column from the cursor line down to the first write-protected position or end of page, whichever is first. Moves the cursor to the next column position and generates a column of field tab stops there down to the first write-protected position or end of page, whichever comes first.
		the effective cynelle attende yffe ekenn allenhe yffe ekenn he yffe ekenn allenhe yffe ekenn he yffe ekenn allenhe yffe ekenn he offellu cynelle attende yffe ekenn allenhe yffe ek
		BEFORE AFTER
		WRITE-PROTECTED POSITION

Table 4-11 Effect of ESC 1 (Set Tab Stop) Command

Moving the Cursor to a Tab Stop	 Move cursor forward to next typewriter tab stop (protect mode off); to next field tab stop (protect mode on) 	
-	Move cursor forward to next field tab stop (protect mode on)	ESC i
	Move cursor backward to previous field tab stop (protect mode on); to	ESC I
	previous typewriter tab stop (protect mode off)	

Protect mode affects all tabulation commands. CTRL I and ESC I move the cursor to a typewriter tab stop when protect mode is off, but to a field tab stop when it is on. When protect mode is off, ESC i has no effect. See Table 4-12.

Table 4-12 Summary of Tabulation Commands

Command	Cursor Movement	Protect Mode	Type of Tab Stop to Which Cursor Moves
CTRL I	Forward	Off	Typewriter
CTRL I	Forward	On	Field
ESC i	Forward	Off	None (has no effect)
ESC i	Forward	On	Field
ESC I	Backward	Off On	Typewriter Field

Autopage mode also affects tabulation commands, as described in Tables 4-13 through 4-15.

Table 4-13
Effect of CTRL I (Forward Tabulation) Command on Cursor Position

Auto- page	Modes Pro- tect	Auto- tab	Effect
Qff/On	Off	Off	Moves the cursor to the next typewriter tab stop.
			the effective synchic utherite yills obsurn disarbor yills along the childs attable cynadi bo yills along the childs attable cynadi inho attable cynadia blandie yills along yills along the childs attable cynadia bo yills along the childs attable bo attable cynadia the childs at
			If no more tab stops exist, the cursor does not move.
		On	Moves the cursor to the first tab stop on the next line.

nha allalla cynalla nllanha ylla abann	uha allallu çyualla ullarıhla yıla ahan
illanha ylla ahan hol chha allalla cynall	ullarıha yıla ahan ilel cihina allarlu çyual
ho ylla ahan hol chha allalla cynallac	ha yıla ahan ilel cihina alfatlu çyualla
hha allalla cynalla nllanha ylla abann	iha alicilu çyualla ullarıhla yıla ahan
illouha yila ohon llot ethba allattu eynalt	illonho ytio pion ttoi clinho ettottu cyno
ha yila ohan llot ethba allattu eynaltae	ho ytio ohon toi clinho attottu cynolia
hha allattu eynalta ullouha yila abaum	hho ottottu cynolia uttonho ytia ahon
BEFORE	AFTER

BEFORE

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Continu	led			
Auto- page	Pro- tect	Auto- tab		Effect
Off	On	On/ Off	Moves the cursor to the firs (i.e., next field tab stop).	t position in the next unprotected field
			In ohon liel chiho oliellu çanılla n nin allalın çanılla allanıha yila ahanı hayan yila ohon liel chiha allalın çanılla hayan yila ohon liel chiha allalın çanılla hayan yila ohon liel chiha allalın çanılla hayan yila allaha allalın çanılla hayan yila allaha allalın çanılla hayanlı allanıha yila ohon liel chih oliellu çanılla allanıha yila ohon liel chi oliellu çanılla allanıha yila ohon liel chi bi alanı fiel chiha allanıha yanılla al oliellu çanılla allanıha yila ohon liel chi oliellu çanılla Burtha yila ohon liel chi oliellu çanılla Burtha yila ohon liel chi	In chon liel chine allella cynolle a ale allella cynolle allenhe ylle chon allenhe ylle chon liel chine olfella cynoll be ylle alean liel chine allella cynoll be ylle alean liel chine allella cynolle be allella cynolle allenhe ylle chon allenhe ylle olen liel chine be cynolle allenhe ylle chon liel chin le cynolle allenhe ylle chon liel chin be cynolle allenhe ylle chon liel chin le cynolle allenhe ylle chon liel chin be cynolle allenhe ylle chon liel chin be chon liel chine oliella cynolle al be cynolle allenhe ylle ohon liel chin be cynolle allenhe ylle ohon liel chin chine cynolle allenhe ylle ohon liel chin allenhe cynolle allenhe ylle ohon liel chin chine cynolle allenhe ylle ohon liel chin chine cynolle allenhe ylle ohon liel chin allenhe cynolle allenhe ylle ohon liel chin chine cynolle allenhe chine chin
			If the current page has no n up to the first unprotected	nore unprotected fields, the cursor moves position on that page.
			to otion the ≩uho oltellu cynollo ut oltellu cynollo ultenho yllo ohon tlet c lu cynollo ultenho yllo ohon tlet chih he ohon tlet chiho oltellu cynollo ul oltettu cynollo ultenho yllo ohon tlet c lu cynollo ultenho yllo ohon tlet chih lo ohon tlet chiho oltellu cynollo ul uho oltellu cynollo ultenho yllo ohon tlet chih he ohon tlet chiho oltellu cynollo ul uho oltellu cynollo ultenho yllo ohon ultenho yllo ohon tlet chiho oltellu cynollo he yllo ohon tlet chiho oltellu cynollo hio fletlu cynollo ultenho yllo otionu ultenho yllo ohon tlet chiho oltellu cynollo hio fletlu cynollo ultenho yllo otionu ultenho yllo ohon tlet chiho otionic cynollo hio fletlu cynollo ultenho yllo otionu ultenho yllo ohon tlet chiho otionic cynollo hio yllo ohon tlet chiho otionic cynollo hio yllo ohon tlet chiho otionic cynollo	như aliahi syndiga alianha yila ohonn nhanha yila ahan liai tibha aliahi cynall bo yila ahan liai tibha aliahu cynall ha yila ahan liai tibha aliahu cynallac hho aliahu cynalla alianha yila ahann alianha yila ahan liai tibha aliahu cynalla bo yila ahan liai tibha aliahu cynallac hho aliahu cynalla alianha yila ahann ho aliahu cynalla alianha yila ahann ho aliahu cynalla alianha yila ahan ho aliahu cynalla alianha yila ahan ho aliahu cynalla alianha yila ahan liai cynalla alianha yila ahan liai c ho cynalla alianha yila ahan liai c ho cynalla alianha yila ahan liai c aliadhi cynalla alianha yila ahan liai c ho cynalla alianha yila ahan liai c ho cynalla alianha yila ahan liai c
			BEFORE	AFTER D TAB STOP

 Table 4-14

 Effect of ESC i Command on Cursor Position

Auto- page	Modes Pro- tect	Auto- tab		Effect
On	On	Off	Moves the cursor to the ne position after next protected	xt field tab stop (i.e., first unprotected ed field).
			The allalla cynalla allanha ylla chean allanio yla chea llot chigo ellalla cynall ho ylla chean llot chigo ellalla cynalla hho olleth cynalla allanha flo chean allanho ylla chea llot chho ellethu cynall ho ylla chea llot chho ellethu cynalla ho ylla chea llot chho ellethu cynalla	The allalla cynalla ullandia ylla ahann illendia ylla ohan lla chigi allalla cynall ha ylla ohan lla chigi allalla cynallac bha allalla cynalla ullandi ylla ahann illenda ylla ohan lla chiba allalla cynall ha ylla ohan lla chiba allalla cynalla bha allalla cynalla ullandia ylla ohann
			BEFORE	AFTER
			////, = FIEL	D TAB STOP

Table 4-14 Continued			
Auto- page	Modes Pro- tect	Auto- tab	Effect
On	On	Off	If no more unprotected fields exist on that page, the cursor advances to the first unprotected position on the next page.
llot ethho ol nollo utlonho lo utlonho ytle	tollu cynollo n yllo ohon llot c x ohon llot clhh	lo olion llet i ollollu cynollo lu cynollo nlle	Unio vilo ana ilo ana ilo ana ilo ana ilo ana ilo ana alla cynalla ana alla ana alla alla alla ana an

ollollu cy lu cynol to ohon llot elliho ollollu eynollo ul ollottu cynollo ullonho ytto ohon ttol c lu cyuollo ullouho yllo ohou llot clhh to ohou llot clinto ollollu cyuollo ul nho ollollu cynollo utlonho yllo ohom illouho yllo ohon ilol clifito ollollu cyuoli ho yllo ohon llol elliho ollollu eynolloe hho ollellu cynollo ulleuho yllo ohonu uleuho yl<mark>o</mark> ohou llet ethha ollettu cynoll ha ylla ahau Hol elliha allallu eyuallae hha allaha cynolla nllanha ylla ohan

lo ohou

to abou that ethha allallu eyualla ut ollollu cynollo nllonho yllo ohon llol \mathfrak{c} lu cynollo ullonho yllo ohou llot ellih to ohon llot clifino ollottu cynollo ni ollollu cynollo ullouho yllo ohou ilol \mathfrak{c} to cynollo ullonko ytto ohon llot ellih to ohou ttol ethho ollottu cyuollo ut ollollu cynello nllonho yllo ohon llet c tu cyuolla ullanho ylla ahau llat dhh to ohou ltot ethho ottottu eynotto ut allallu cynalla nllanha ylla ahan llat c

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to ohon flot clinho oliollu cynolio ul ollollu cynollo nllonho yllo ohon llol c lu cynollo ullonho yllo ohon llol clihi to ohou llot ethho allottu cynollo ut offollo cynollo ullogho yllo ohou llol c hi cynollo ullouko yllo ohon llol ellih to ohou flot ethho offollu cynollo af ollollu cynello ullonho yllo ohon llel c lu cynollo nllonho yllo ohon llol chhi to ohon that ethins offering cynollo at offolla cynalla allanha ylfa chan llof c

PAGE 1

hho ollollu cynollo ullouho yllo ohom illouho yllo ohoa llot clinho ollottu cyuott ho yllo ohon llot eliho ottotlu cynolloe hho ollollu cynollo utlanha ylla ahann lu cynollo ullouho yllo ohon llot clhh to ohon that ethino allattu eynalla ut allalla cynollo ullanho ytto ohan llat c hi cynollo ullonho yllo ohon llot clhh to ohou ttot ethho attottu eynotto ut ollollu cynollo ullonho yllo ohou llot c

lu cynollo ullonho yllo ohon llot ethh

PAGE 2

PAGE 1

BEFORE

AFTER

If the next page is completely write protected, the terminal turns off ae.

PAGE 1	PAGE 2	PAGE 1	PAGE 2
hho ollollu cynollo ullouho yllo ohonn	allalla α nalla ullanha ylle ohan llat \mathfrak{c}	ollollu cynollo nllonho ylla ahon llol c	lu cynollo ullonho yllo ohon llot chù
ha yllo ohon llot clidia allalla cynollae	lo ahan Ilal clitha allalla cynalla al	to ohou ttol citilio ottottu cyuatto ut	ollaliu cynalla ullanha ylla ahan llat c
illouho yllo ohon llol clhho ollollu cynoll	la cynolla nllanha ylla ahan llaf clhh	hi cynollo ullouho yllo ohon llol dhh	to ohon llot clhho ollottu cynollo n
hho ollollu cynollo ullonho yllo ohonu	ollalla synello allonta yllo ohon llel c	ollollu cynollo nllonho yllo ohon llet c	lu cynalia ullanha ylla ahan llat elhh
ho ylla ahan llal clina allallu cynallac	to alian flat cliffia attalla cynalia at	to ohou llot chho ollottu cyuollo ul	ottollu cynollo ultonho ytto ohon llot c
illouho yllo ohon llot chho olloitu cyuolt	he cynollo allonho yllo chou llol clhh	lu cynollo ntlonko ytto ohon llot clhh	lo ohou llot chho ollottu cynollo ul
nho ollollu guollo ullouho yllo ohouu	allallo cymllo alladia yllo ohai llot c	oliollu cynollo ullonho yllo ohou llot c	la cynollo ullonho yllo chou llot clhh
to ohou tiot clinto ottottu cyuotto ut	to alion that ethilio attalla cruatto ut	to ohou ttol clinto ottottu cynollo ut	hho ollollu cynollo nllonho yllo ohonn
lu cynollo ntionho yllo ohon tiol clihi	to cynollo alleabo yllo obou llol elbb	lu cynollo nllenho yllo ohou llol clhh	ho yllo ohon llot elliho ollottu cynolloe
ollollu cynollo ullouho yllo ohon ilol c	citolla cyaollo allouha yllo ohoa llot c	ollallu cynalla ullanha ylla ahan llal c	dlouho yllo ohou llot chiho otlottu cynoll
lo ohou Hol chho ollollu cyuollo u	to ohou that china alletha cynallo ut	la ahan llat clinia allattu cynalla n	hho ollollu cyuollo ullouho yllo ohonu
tu cynollo utlouho yllo ohon llot clhh	la cynalla allanha ylla ohan llot chh	tu cyualta ultanha yila ahau ttat ethih	ho yllo ohou llot elihio ottottu cynolloe
ollollu cynollo ullouho yllo ohou llot c	altalla cynolla allanha ylla abon llat r	ollathi cynalla nllanha ylla ahan llal c	illouho yllo ohon llot ethio ottoitu eyuott
to ohou ttol ethho ollottu cyuollo ul	to alon the cline offello gradie at	la ohon llat chho allallu cynalla ni	The effettu cynelle ullenhe ylle ehenn

BEFORE

AFTER

Table 4-15 Effect of ESC I (Back Tab) Command on Cursor Position

Auto- page	Modes Pro- tect	Auto- tab		Effect
Off/ On	Off	Off/ On	Moves the cursor back to the olicilii gradia ulteriti yile chean ulteriti yile chen lei chine ellette yuelt to yile ohen lei chine ellette yuelt hie olicilii gradia ulteriti yile ohenn ulteriti yile ohen liet chine ellette yuelt be yile ohen liet chine ellette yuelt hie olicilii gradia ulteriti yile ohenn hie olicilii gradia ulteriti yile ohenn	the previous typewriter tab stop. The allollu gradie ulleube yile ohean dicube yile along ted clibbe allollu cyaalt he yile along ted clibbe allollu cyaalt he allollu gradie ulleube yile along dicube yile along ted clibbe allollu cyaalt he yile along ted clibbe allollu cyaalt he yile along ted clibbe allollu cyaalt he yile along ted clibbe allollu cyaalte he allollu gradie ulleube yile along
			BEFORE	AFTER

PAGE 74

Mo			
Auto- page	Pro- tect	Auto- tab	Effect
 Off/ On	Off	Off	Has no effect if the cursor is already on the line's first tab position or if no other tabs are set.
			nha altaltir cynalla ullauha ștla abaru ullauha ștla altan tal clihia altaltir cynalla ba ștla altan tal clihia altaltir cynalla tha altaltir cynalla ullauha ștla altanu ullauha ștla altan tal clihia altaltir cynalla ha ștla altan tal clihia altaltir cynalla
		On	If the cursor is already on the line's first tab position or no other tab stops exist between the cursor and the line's first position, the cursor moves to the previous line's last tab position.
	nha dtoo bo dho ho ho	ollolin cynolio al dio ylla ahon llol c ylla ahon llol chh ollol ii cynolio al dio ylla ahon llol c ylla ahon llol chh ollolin cynolio al	ionho glio chonn Ihio alfalla cynalla onho glio honn Intentio glio dioni lloi chino alfalla cynalla onho glio chonn Ihio alfalla cynalla onho glio chonn Ihio alfalla cynalla onliata cynalla
	-		BEFORE AFTER
Off	On	Off/ On Bio allallu cyna ullauha ylla ahau ha ylla ahau dia	Moves the cursor back to the first position in the current unprotected field. Another back tab command moves the cursor back to the beginning of the previous unprotected field.
		hho allalla iyuu illauha yila ahaii hə yila ahaii ilal hho allallu iyua	Intender yfte elsener her affelde cynelles intender yfte allende y
			If the page contains no previous unprotected positions, the cursor does not move.
			ahie allalla zynalie allangi yllo ohonn illeadin yllo ohon lloi ellahi ellahi ylloi ohonn illeadin yllo ohon lloi ellahi ellahi eynalla ihon allalla zynalla allanda ylloi alaani iionha yllo ohon lloi ellahia allalla eynalla iio alaali eynalla allanda ylloi allan iio eynalla allanha ylloi alaan lloi ellahi io ohon illoi ellahia ylloi allan eynalla iii eynalla allanha ylloi alaan lloi ellahi io ohon illoi ellahia ylloi ohonn illoi ellahi io eynalla allanha ylloi alaan illoi ellahi io ellan illoi ellahia ylloi ohon illoi ella
			allalu çynalla ullanha ylla alam llal c

M Auto- page	odes Pro- tect	Auto- tab		Effect	
On	On	Off/ On	If the cursor is the first charac	on the page's first unprotec ter in the previous page's la	ted position, it moves to st unprotected field.
i ohon Hol chho bloftu cynollo ullou hu cynollo ullouhu io ohon Hol chho ollollu cynollo ullou hu cynollo ullou hu cynollo ullou hu cynollo ullou fu cynollo ullou fu cynollo ullou fu cynollo ullou fu cynollo ullouhu io ohon Hol chho ollollu cynollo ullou ollollu cynollo ullou PAC = FIELD TA	ollollu cynollo ul dro yllo ohon llol c yllo ohon llol chh ollollu cynollo ul dro yllo ohon llol c yllo ohon llol chh ollollu cynollo ul dro yllo ohon llol c yllo ohon llol c yllo ohon llol c yllo ohon llol c yllo ohon llol c silo ohon llol c yllo ohon llol c silo ohon llol c silo silo e gynollo ul dro yllo ehon llol c si 1 BET	isha allalla illouha yila ha yila aha hha allallu illouha yila ha allallu allallu çyuc la çyualla la allalu çyuc la ahan lla ollallu çyuc	cynelle attenti, ytte ohonn ohon tlei chho ollollu cynellu u llei chho ollollu cynellu cynelle attentio ytte ohonn ohon tlei chho ollollu cynellu cynelle attentio ytte ohonn ohon tlei chho ollollu cynellu u llei chho ollollu cynelle at attentio ytte ohon tlei c uttentio ytte ohon tlei c page 2	So ohon iloi chino olioilu cynollo ul olioilu cynollo uliouho ylio ohon iloi chi o cynollo uliouho ylio ohon iloi chi o ohon iloi chino olioilu cynollo ul olioilu cynollo uliouho ylio ohon iloi chi o ohou iloi chino olioilu cynollo ul uha olioilu cynollo uliouho ylio ohon ihonio ylio ohon iloi chino olioilu cynollo uha olioilu cynollo ulioilu cynollo iloi ba ylio ohon iloi chino olioilu cynollo ino ylio ohon iloi chino olioilu cynollo ino ulioile chino olioilu cynollo ino ulioile chino olioilu cynollo ino ulioile cynollo ulioilo olioilu cynollo ino ulioile cynollo ulioilo ylio ohon ihonio ylio ohon iloi chino olioilu cynollo ino ulioile cynollo ulioilo ylio ohon ylioi ohon iloi chino olioilu cynollo ino ulioile cynollo ulioilo ylio ohon ylioi ohon iloi chino olioilu cynollo ino ulioile cynollo ulioilo ylio ohon ylioi ohon iloi chino olioilu cynollo ino ulioile cynollo ulioilo ylio ohon ylioi ohon iloi chino olioilu cynollo ino ulioile cynollo ulioilo ylio ohon ylioi ohon iloi chino olioilu cynollo ino ulioile cynollo ulioilo ylio ohon ylioi ohon iloi chino olioilu cynollo ino ulioile cynollo ulioilo ylio ohon ylioi ohon iloi chino olioilu cynollo ino ulioile cynollo ulioilo ylio ohon ylioi ohon iloi chino olioilu cynollo ino ylio ohon iloi chino olioilu cynollo ylioi ohon ylioi ohon iloi chino olioilu cynollo ino ylio ohon iloi chino olioilu cynollo ino ylio ohon ylioilo ohon iloi chino olioilu cynollo ylioilo ohon iloi chino ylioilo ohon ylioilo ohon yli	to ohoic the chino sitelife cynollo in oblotti cynollo ultenho yllo ohon liot to cynollo ultenho yllo ohon liot chi o ohon liot chiho oliottu cynollo in oblottu cynollo ultenho yllo ohon liot to chon liot chiho oliottu cynollo in oblotu cynollo ultenho yllo ohon liot to chon liot chiho oliottu cynollo in oblotu cynollo ultenho yllo ohon liot to chon liot chiho oliottu cynollo in oblotu cynollo ultenho yllo ohon liot tu cynollo ultenho yllo chon liot oliottu cynollo ultenho yllo chon liot tu cynollo ultenho yllo

to also that ellabo attalla cynollo at ollottu cynalla ultanha ytta ahau llot c tu cyuollo ullanho yllo ohou llot elhir to abou list ethic allella cyaolla al ollolla qualla allonha yllo alian llol c to cynallo ultoubo yllo obon llot ellib to abou llot elbho allatto cyualta al ottalla cynollo ullouho ylla ohou llul e to cynollo nllanho yllo chon llot chh to ahou that ethtus attatta cynalta ut ollalla cynella allanha ylla ahan llel c he cynollo allouho yllo ohun flot ethi to ohou ttol ethto attollu cynollo ul allalla cynalla allauha ylla ohan llal e

PAGE 1

I FIELD TAB STOP

moves the cursor to home on that page.



If the cursor is on the first page's first unprotected position, this code has no effect.



I FIELD TAB STOP

Clearing a Typewriter Tab Stop(s)	Clear typewriter tab stop at cursor Clear all typewriter tab stops ¹	location ESC ESC			
	1. The position of the cursor when the te	erminal receives this code is irrelevant.			
	NOTE! Protect mode does not affe	ct commands to clear a typewriter tab stop.			
Clearing a Field Tab Stop	You can not clear field tab stops with you turn protect mode off and restor	n a command. They are all automatically disabled whe ed when you turn it on again.			
Communication					
Modes	Block mode on Half duplex mode on Full duplex mode on Return to previous conversational block mode ¹	SET UP/STATU ESC ESC D ESC D ESC D ESC D ESC D			
	 For example, the terminal was in full duplex before you changed it to block duplex. To return to full duplex, enter either ESC C (conversational) or ESC D F (full duplex). 				
	You can control communication be escape sequences or by changing the	ween the terminal and the computer by entering thes ne status or set up lines. Three modes are possible:			
	Block				
	Half duplex (conversational)				
	Full duplex (conversational)				
Edit Modes	Activate local edit mode Activate duplex edit mode	SET U ESC k ESC k			
	Edit modes determine whether changes made with the editing keys are sent to the computer (called duplex edit) or to the terminal (local edit). In duplex edit mode, the codes from the editing keys are transmitted as though they came from an alphanumeric key. In local edit mode, the editing keys do not send a code to the computer.				
	Local edit mode lets you change tex the computer (i.e., all changes affect following keys do not send codes to	t without transmitting the changes or the commands t the displayed text but not anything in the computer). Th the computer during local edit mode:			
	BACK TAB CHAR DELETE CHAR INSERT CE (CLEAR ENTRY) CLEAR SPACE ENTER	HOME LINE DELETE LINE ERASE LINE INSERT PAGE PAGE ERASE PRINT SEND TAB (both)			

During local edit mode, all other keys operate normally.

During duplex edit mode, the codes generated by the editing keys named above are treated like alphanumeric keys. Thus the communication mode, half or full duplex, determines where the codes are sent.

For example, during half duplex mode, both the alphanumeric and editing keys operate in half duplex mode.

Changing Data You can change data in five ways:

Write over existing text1

Erase existing text (leaving space or null characters in its place)

Delete a character, line, or page of existing text

Insert space characters

Clear data (not dependent on cursor position)

1. No special command is needed to write over existing text.

Edit Boundary Modes

Page edit mode on Line edit mode on SET UP ESC N 1 ESC N Ø

Edit boundary modes determine whether insert and delete commands (described next) affect the current cursor line or the current page. If you try to move data beyond the boundary established by the current edit mode, it can be lost as it "falls off" the edge.

NOTE! The terminal is always in either page or line edit mode.

Page Edit Mode—As you insert characters during page edit mode, the existing text moves down to the next line as necessary. The "page" length is determined by the number of lines of memory for that page. For example, if you installed extra memory and configured the memory for one 96-line page, the text (of which you can see 24 lines at a time) can flow forward within that 96-line area. However, when the text being pushed forward by the inserted spaces moves beyond column 80 of the page's last line, it is lost.

When you delete characters in page edit mode, the character in column one of any line moves to column 80 of the previous line (i.e., backward wraparound).

During page edit mode, the insert and delete codes can only affect the current unprotected area.

NOTE! This allows you to limit editing fields by inserting a protected character anywhere in the screen. Insert and delete codes can only affect the area above that protected character.

The status line contains PAGE during page edit mode.

Line Edit Mode—Line edit mode limits the effect of character insert or delete commands to the current cursor line. Characters move forward or backward until they reach either column one or column 80. Text can be lost (i.e., "fall off") either end of the line being edited.

The status line contains LINE during line edit mode.

Editing Commands

ESC Q
ESC W
ESC E
ESC R
ESC T
ESC t
ESC Y
ESC y

Erase and delete commands remove only unprotected characters. If both write protect and protect modes are on when an erase line or erase page command is received, the command is ignored.

Line insert and delete commands are illegal while protect mode is on; they ring the bell.

Both edit and protect modes affect the action of character insert and delete commands, as described in Table 4-16. Table 4-17 describes the other editing commands, including their action during protect mode.

NOTE! All of these commands are affected by a defined scrolling region. In the following table, it is assumed that the scrolling region is defined as the entire screen.

 Table 4-16

 Effect of Edit and Protect Modes on Character Insert and Delete Commands

Modes		odes	
Command	Edit	Protect	Effect
Insert character	Page	Off	Enters a space character in the current visual attribute at the cursor position and moves the characters right one column, starting at the cursor. The character at column 80 wraps to column one of next line, regardless of autowrap mode. Data pushed past last position on page is lost.
			lo ohou iloi chiho oltottu cyuollo ut lo ohou iloi chiho oltottu cyuollo ut oltottu cyuollo ut oltottu cyuollo ut oltottu cyuollo utottu cyuo
			nho ollollo cyualla ullanho yila ahann ullanho yila ahan llai chho ollollu cyualla ho yila ahan llai chho ollollu cyualla hho ollollu cyualla chho ollollu cyualla hho ollollu cyualla ullanho yila ahann Aanaanaanaanaanaanaanaanaanaanaanaanaana
			BEFORE AFTER LOST
		On	Same as protect mode off except moves only unprotected characters in current field. Characters reaching the first protected position are lost.
			STUPPPPPPPPPPPPPPPVWXYZAB
			AFTER STUPPERETER STUPPERETER STUPPERETER STUPPERETER
			SPACE CHARACTER LOST

Command	Edit	Modes Protect	Effect
Insert character	Line	Off	Enters a space character in the current visual attribute at the cursor's position; moves the cursor character right one position. Data pushed past column 80 is lost.
			ВЕFORE
			AFTER AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
		On	Same as protect off except data is lost when it reaches a protected position or end of line.
			BEFORE PPPPABCEFPPPPGHIJKLMNOPOR
			AFTER PRPPABC DEPERPER SPACE CHARACTER LOST
Delete character	Line	Off	Deletes the cursor character; pulls following characters left one position. Adds a space character in the current visual attribute at column 80.
			BEFORE ABCDEFGHIJKLMNOPORSTUVWXYZABC
			AFTER ABCDEFGHIJKLMNOBRSTUVWXYZABC.
		On	Same as unprotected except deletes only unprotected characters within the cursor's field. Adds a space character the current visual attribute at the end of that field.
			BEFORE PERPARCE GHERERIJKLMNOPORS
			AFTER

Table 4-16 Continued

	м	odes		
Command	Edit	Protect		Effect
Delete character	Page	Off	Deletes the cursor charact one position. Moves the fir the last position in the curr the current visual attribute	er; pulls following characters left st character of any following line to ent line. Adds a space character in at the page's last position.
			lo ohon liol clihio oliollu cyuollo ul oliollu cyuollo ullouho yilo chon liol c iu cynollo ullouho yilo ohon liol clihi io ohon liol clihio oliollu cyuollo ul oliollu cyuollo ullouho yilo ohon liol clihi io ohon liol clihio oliollu cyuollo ul uho oliollu cyuollo ullouho yilo ohonu uliouho yilo ohon liol clihio oliollu cyuoll ho yilo ohon liol clihio oliollu cyuollo hho oliollu cyuollo ullouho yilo ohonu uliouho yilo ohon liol clihio oliollu cyuoll ho yilo ohon liol clihio oliollu cyuollo hho oliollu cyuollo ullouho yilo ohonu ullouho yilo ohon liol clihio oliollu cyuoll ABCOEFGHIJKLMNOPARSTUVWXYZ	to ohon that ethic altabut eyualla ni allallu eyualla nilanha yita ahan that e hu eynalla nilanha yita ahan that ethi la ahan that ethica altabut eynalla ni allallu eynalla nilanha yita ahan that e hu eynalla nilanha yita ahan that e hu eynalla nilanha yita ahan that la ahan that ethica altabut eynalla ni ahan altabu eynalla nilanha yita ahan nilanha yita ahan tia ethica altabut eynalla ha ahan that ethica altabut eynalla ha yita ahan that ethica altabut eynalla ha yita ahan that ethica altabut eynalla ha altabut eynalla altabut eynalla ha yita ahan that ethica altabut eynall ha yita ahan that ethica altabut eynall ha yita ahan that ethica altabut eynall ha atabut eynalla altabut eynall ha ethica eynalla altabut eynalla eynall ha ethica eynalla altabut eynalla eynal
			BEFORE	
		On	Same as protect mode off adds a space character in that field.	except deletes cursor character and the current visual attribute at end o
			nho ollollu cynollo ullanho ylla ohann dlanha ylla ohan llal chha ollollu cynoll ha ylla ohan llal chha ollollu cynolloc hha ollollu cynolla ullanha ylla ohann dlanha ylla ohan llal chha ollollu cynolloc ha ollollu cynolla illanha ylla ohann ha ollollu cynolla ullanha ylla ohann	nho allallu cynalla ullanho ylla ahann illanho ylla ahan llal ethia allallu cynall ho ylla ahan llal ethia allallu cynalloc hho allallu cynalla ullanho ylla ahann illanho ylla ahan llal ethia allallu cynall ho ylla ahan llal ethia allallu cynalloc hho allallu cynalla ullanhi ylla ahann
			BEFORE	AFTER SPACE CHARACTER

Table 4-17 Effect of Protect Mode on Other Editing Commands

Command	Protect Mode	Effect
Delete line	Off	Deletes the cursor line and moves following lines up one line. Moves the cursor back to the line's first position. Fills the page's last line with space characters in the current visual attribute.
		BEFORE AFTER SPACE CHARACTERS
	On	Does not delete line but rings bell.

Command	Protect Mode	Effect
Insert line	Off	Inserts a line of space characters in the current visual attribute on the current line and moves all lines below it down one line. Moves the curso to the new line's first position. The page's last line is lost.
		HHNN NNN NNN NNN NNN NNN NNN NNN HHNN NNN NNN NNN NNN NNN NNN SOCOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
	On	BEFORE AFTER
Erase to end of line with spaces	Off	Replaces all characters from cursor through column 80 with space characters in the current visual attribute.
		BEFORE ABCDEFGHI KLMNOPORSTUVWXYZ
		AFTER ABCDEFGHI
	On	Same as protect off except erases unprotected data starting at the cursor and extending through the current field or end of current line, whichever comes first.
		BEFORE ABODEFGHIJKIMNOPORSTUVWXYZ
		AFTER AB
		Ignored if write protect and protect modes are both on.
Erase to end of line with nulls	Off	Replaces all characters from the cursor through column 80 with null characters in the current visual attribute.
		BEFORE ABCDE GHIJKLMNOPORSTUVWXYZ

Command	Protect Mode	Effect
Erase to end of line with nulls	On	Same as protect off except erases unprotected data starting at the cursor and extending through the current field or end of current line, whichever comes first.
		BEFORE
		AFTER ABCDEFEH
		NULL CHARACTERS
		Ignored if write protect and protect modes are both on.
Erase to end of	Off	Replaces characters from the cursor through the end of the page with space characters in the current visual attribute.
page with spaces		Into allollu cynallo ullanho yllo aham ilionho yllo bion lloi clihio allollu cynallo ibo yllo ahan lloi clihio allollu cynallo ibo ahan lloi clihio allollu cynallo ullonho yllo ahan lloi clihi io ahan lloi clihio allollu cynallo io allollu cynallo ullonho yllo ahan lloi clihi io ahan lloi clihio allollu cynallo io allollu cynallo ullonho yllo ahan lloi clihi io ahan lloi clihio allollu cynallo io allollu cynallo ullonho yllo ahan lloi clihi io ahan lloi clihio allollu cynallo iollollu cynallo ullonho yllo ahan lloi clihi io allollu cynallo ullonho yllo ahan lloi clihi io allonu cynallo ullonho yllo ahan lloi clihi iollollu cynallo ullonho yllo ahan lloi clihi
		BEFORE
		uhe ollollu synollo nlombo yllo ohom uhe ohom <
		SPACE CHARACTERS

Command	Protee Mode	> >	Effect	
Erase to end of page with spaces	On	Same as protect me the cursor and exte page, whichever co are both on.	ode off except erases unpr nding through the current mes first. Ignored if write p	otected data starting at field or end of current rotect and protect modes
a ohen 161 zihna olleile Hollu çyuella ullanha yila e u çyuella ullanha yila e a ohen 1101 chiha ollallu a Unite zyuella ullanha yila ohen a zyuella ullanha yila ohen a ohen 1101 chiha olleilu a ha ollalu çyuella ullanha yi onha jila ohen 1101 chiha ollal ha ollalu çyuella ullanha yi onha yila ohen 1101 chiha ollallu ha ollalu çyuella ullanha yi onha yila ohen 1101 chiha ollallu ha ollalu çyuella ullanha yi olla ohen 1101 chiha ollallu ha ollalu çyuella ullanha yila	cynolla af shon llol c i llol clibh cynollo af shon llol c i llol clibh cynollo af flo ohonn afte cynollo af c	lo ohou iloi chino oltollu cynollo ni oltoltu cynollo nilonho ytlo ohou iloi c lu cynollo nilonho ytlo ohou iloi c tu cynollo nilonho ytlo ohou iloi c	In ohan hai china ohahi cyualla ul allallu cyualla ullauha yila ahan lal chi u cyualla ullauha yila ahan lal chi la ahan hai china oyila ahan lal chi la ahan hai china oyila ahan lal chi la ahan lal china allalu cyualla u ahan allauha yila ahan lal china la ahan lal china allalu cyualla u ahan allalu cyualla ullauha yila ahan dhama],	io ohon lloi chiho oltollu cynollo n oltollu cynollo nllonho yllo ohon lloi lu cynollo nllonho yllo ohon lloi lu cynollo nllonho yllo ohon lloi ellollu cynollo nllonho yllo ohon lloi lu cynollo nllonho yllo ohon lloi chi lo ohon lloi chiho oltollu cynollo n oltollu cynollo nllonho yllo ohon lloi lu cynollo nllonho yllo ohon lloi
PAGE 1		PAGE 2	SPACE CHARACTERS PAGE 1	PAGE 2
Erase to end of page with nulls	Off	Replaces characters null characters in cu to ohor the dhho ollollu cynollo u ollollu cynollo ullonho yllo ohon the c	s from the cursor through t rrent visual attribute.	he end of the page with to about the clifting of the standard
culus ythe ohen the clinic elit > ythe ohen the clinic elitic sources and the clinic elitic outre ythe ohen the clinic elitic > ythe ohen the clinic elitic outre ythe ohen the clinic elitic outre ythe ohen the clinic ythe ohen the clinic elitic elitic to yuelle uther of the ohen ohen the clinic ythe ohen ohen the clinic ohen ohen the clinic ohen ohen the clinic elitic elitic ohen ohen the clinic elitic elitic ohen ohen the clinic elitic elitic elitic elitic elitic ohen the clinic elitic elitic elitic elitic elitic elitic ohen the clinic elitic elitic elitic elitic elitic elitic ohen the clinic elitic elitic elitic elitic elitic ohen the clinic elitic elitic elitic elitic elitic elitic elitic elitic e	odla cynollac Ila ohann olla cynollac Ila ohann olla cynollac Ila ohann Ila ohannn Ila ohannn Ila ohann Ila ohannn Ila ohann Ila ohannnn	lu cynallo ullonho yllo ohon llot elhi lo ohon llot elhino oliollu cynallo ni ollollu cynallo nllonho yllo ohon llot e lu cynallo nllonho yllo ohon llot elhi lo ohon llot elhino allollu cynallo ni ollollu cynallo nllonho yllo ohon llot e hu cynallo nllonho yllo ohon llot e lu cynallo nllonho yllo ohon llot e lu cynallo nllonho yllo ohon llot e ollollu cynallo nllonho yllo ohon llot e		In synollo ullonho yllo ohon lloi sla lo ohon lloi shho oltellu synollo u ollollu synollo ullonho yllo ohon lloi lu synollo ullenho yllo ohon lloi sla lo ohon lloi shho ollollu synollo u ollollu synollo ullonho yllo ohon lloi lu synollo ullonho yllo ohon lloi sla lo ohon lloi shho ollollu synollo u ollollu synollo ullonho yllo ohon lloi lu synollo ullonho yllo ohon lloi sla
lellu cynollo nllenho yllo o - cynollo nllenho yllo chen	hou ilot c Ilot chh	to ohon ttol chino ottoliu cynotto ni ottoliu cynollo nttonho ytto ohon ttol c		- lo ohon llot chho ollollu cynollo n - ollollu cynollo ullonho yllo ohon llot
PAGE 1	BEFO	PAGE 2 RE	PAGE 1	PAGE 2
	On	Same as protect of cursor and extendir whichever comes fil both on.	f except erases unprotecte ng through the current field rst. Ignored if write protect	ed data starting at the or end of current page, and protect modes are

to obouillot ethho ollottu essiollo iil ollollu cynollo ullouho yllo ohou llol c iu cynollo ullonho yllo ohon llot clhh to ohon that ethilia ollatia cynalia at ollollu cynollo ullonho yllo ohon llol c lu cynollo ullonho yllo ohon llol cllub to ohon ttol clinho olkollu cynollo ut

nho ollollu cynollo ullonho yllo obour illenhetstle ehen llet ellihis ottelle eysell ho yilo ohon llol clime ellettu çucitac hho ollottu çucita ullonta yilo alienn illouho yllo ohon llot ellibio ottottu cynol ho yllo ohou llot clililo ollottu cynolloc hho ollollu cynollo ullouho yllo ohoi

to obon the clinto offollo cynollo at ollottu cynotto ntionho ytto ohon tiol c lu cynollo ullonho yllo ohon llot clhh to ohou ttol clinho oltottu cynollo ut ollollu evuollo ullonho yllo ohou llol e lu cynollo ullonho yllo ohon llol clhh to ohou llot clinio ollottu cyuollo ul ollollu cynollo ullouho yllo ohou llol c lu cynollo nllonho yllo ohon llol clhh to also that dhine offelly cynolle it ollollu cynollo nllonho yllo ohon llel \mathfrak{c} to cynollo ullonho yllo ohou llot dhh to ohou ltot ethho oltottu eyuollo ut ollollu cynollo nllonho yllo ohon llol \mathfrak{c}

to ohow that ethino obtailly equally at ollollu cynollo ullonho yllo obou llol c lu cynollo ullouho yllo ohou llot clhh to obou llot clinho ollollu cynollo u ollollu cynollo ullonho yllo ohou llol c tu cyuollo ullouho yllo ohou llol clhh to ohon llot clinio allallu cynalla ul nho ollollu cynollo ullouho yllo ohour · · · · · clino oliaila cynall illouho 🛛 🖯 🖓 🗸 ho yilo ohun llot cliliho ollottu cynolloi hho ollollu uttoubo yllo obc tynollo illouho yilo olon llot cline ottolle cym dhho ollollo cynoll ha yllo ahan hho ollollu cyu ullouho yllo ohou NULL CHARACTERS PAGE 1 AFTER

to ohow that ethno offolly expolte at ollottu cynollo ullonho yllo ohon llot c lu cynollo allonho yllo ohon llol clhh to ahou that ethina allattu cynalla ul ollollu cynollo ullonho yllo ohon llol c lu cynollo ullenho yllo ohon llol clihi to abou that ethic allotte cynollo ut ollollu cynollo ullonho ytto ohou llol c le cynollo ulloubo yllo ohou llot clhh to ohon llot ethho ottottu eynotto ut ollollu cynollo ullonho yllo ohon lloi c hi cynollo utlonho yllo obon llot clhh to ohou ttol clinto ottollu cynollo ut ollollu cynollo nllonho ytlo chan llot c

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PAGE 1
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BEFORE

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	Command	Effect		
	Table 4-18 Clear Commands			
	NOTE! If both write prote data to either nulls or spac	ct and protect modes are on, any command to c es is ignored. Refer to Table 4-18.	clear unprotected	
	Clear commands remove data from the screen's current page of memory and replace it with either space or null characters. The cursor moves to the home position (or, if protect mode is on, to the page's first unprotected position). Unlike insert and delete commands, the area affected by clear commands does not depend on the cursor position.			
	characters. Return curson (protect mode on) or else whole line and move curs field or line (protect mode	r to last unprotected position clear current tab field or or to beginning of current tab e off)		
	Clear current unprotected	d field and replace with space	or CTRL Z CTRL X	
Memory	Clear unprotected charac Clear unprotected charac	ters and replace with null characters ters and replace with space characters	ESC * 2 ESC * 3	
	Clear all characters and r	eplace with space characters	ESC * 1	
Clearing Data from	Clear all characters and r	eplace with null characters	FSC * Ø	

 Clear all to nulls
 Changes all data on the current page to null characters with normal visual attribute. Clears all previous visual attributes. Moves the cursor to home position. Turns off protect, logical attribute, and write protect modes, if on. (The cursor's initial position is irrelevant.)

 In ohom lld this olidity cynollo at to ohom the clinity cynollo at olidity cynollo at the olidity cynollo at olidity cynollo attributes.

ollollu cynollo ullonho yllo ohon llol c lu cynollo ullonho yllo ohon llol chh lo ohon llol chho ollollu cynollo nl ollollu cynollo ullonho yllo ohon llol c lu cynollo ullonho yllo ohon llol c lu cynollo ullonho yllo ohon llol c lho ollollu cynollo ullonho yllo ohonu ullonho yla ohon llol chho ollollu cynollo hho ollollu cynollo ullonho yllo ohonu illonho yla ohon llol chho ollollu cynollo hho ollollu cynollo ullonho yllo ohonu illonho yllo ohon llol chho ollollu cynollo ho ollollu cynollo ullonho chollu cynollo lho yllo ohon llol chho ollollu cynollo

sho allalla cynalla nllanha ylla ahan

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lo ohou ttol clinto ollottu cynollo ul ottoltu cynollo ultonito ytto ohou ttol c tu cynollo ultonito ytto ohou ttol c tu cynollo ultonito ytto ohou ttol clint to ohou ttol clinto oltoltu cynollo ut ettoltu cynollo ultonito ytto ohou ttol clint to ohou ttol clinto ytto ohou ttol clint to ohou ttol clinto ytto ohou ttol c in cynollo ultonito ytto ohou ttol clint to ohou ttol clinto ytto ohou ttol cho to cynollo ultonito ytto ohou ttol chu to ohou ttol clinto oltoltu cynollo ut oltoltu cynollo ultonito ytto ohou ttol chin to ohou ttol clinto oltoltu cynollo ut

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BEFORE

Clear all to spaces

Changes all data on the current page to space characters with normal visual attribute. Clears all previous visual attributes. Moves the cursor to home position. Turns off protect, logical attribute, and write protect modes, if on. (The cursor's initial position is irrelevant.)

lo ohon llot chino oltollu cynollo u allallu cynollo ultanho yllo ahon llot c hu cynollo ultanho yllo ahon llot chin lo ohon llot chino oltollu cynollo u allallu cynallo ultanho yllo ahon llot chi lo ahon llot chino oltollu cynollo ul lo ahon llot chino oltollu cynollo u

nha allallu cyaalla ullanha ylla ohoon ullanha ylla ohon llal chha allallu cyaall ha ylla ohon llal chha allallu cyaalla hha allallu cyaalla ullanha ylla ohonn ullanha ylla ohon llal chha allallu cyaalla hy ylla ohon llal chha allallu cyaallac hha al<mark>a</mark>llu cyaalla ullanha ylla ohonn lo ohon thei chino oliollu cynollo ul oliottu cynollo ulionho ytlo ohon thei c lu cynollo ulionho ytlo ohon thei clibi lo ohon thei chino oliollu cynollo ul olioltu cynollo ulionho ytlo ohon thei chin la ohon thei chino oliottu cynollo ul oliottu cynollo ulionho ytlo ohon thei chin la ohon thei chino oliottu cynollo ul oliottu cynollo ulionho ytlo ohon thei chin la ohon thei chino oliottu cynollo ul oliottu cynollo ulionho ytlo ohon thei chi la ohon thei chino oliottu cynollo ul oliottu cynollo ulionho ytlo ohon thei c lu cynollo ulionho ytlo ohon thei c lu cynollo ulionho ytlo ohon thei c lu cynollo ulionho ytlo ohon thei chin o ohon thei chino oliottu cynollo ul

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SPACE CHARACTERS

PAGE 1



lo ohon iloi clubo ollollu cynollo ul ottollu cynollo ullonho yllo ohon iloi c iu cynollo ullonho yllo ohon iloi club lo ohon iloi clubo ollollu cynollo ul ottollu cynollo ullonho yllo ohon iloi c iu cynollo ullonho yllo ohon iloi cho iu cynollo ullonho yllo chon iloi chu ottollu cynollo ullonho yllo chon iloi chu

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lu cynollo ullonho yllo ohou llot clhh

to ohou ttol ethho oltollu cyuollo ut

ottollu cynollo ullonho yllo ohou llol c lu cynollo ullonho yllo ohou llol clhh

to ahou llot clinto allallu cynallo ul

ollollu cynollo ullonho yllo ohou llol c

to cynollo ullonko ytto ohou llot elhh

to ohou llot clinho oltollu cyuollo ut

ollollu cynollo ullonho yllo ohon llol c

to cynollo ullonho yllo ohou llol ellih

to ohou llot ethilio ollottu eyuotto ut

ollollu cynollo ullonho yllo ohon llol c

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AFTER

PAGE 1

BEFORE

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to alon that ethic attalla cynalia at to ohow that ethno attalla cynollio at to ohou thet ethno offollir cynolic af allallu cyacho ultanha ylio ahau llat c stalla cruelle allenhe ylle ohen llet e ollolla cynolla ullonho ylla obon llol c lu cynollo illonho yllo ohon llol dhh Π le cynollo ultonho yllo ohon llol clinh to ohon that ethno allathi cynalla at to ohon that ethino attatha eynalla at to abou that albha altellir cynalle al ollothi cynollo ullouho ylla ahau ttol c ollollo cynollo nllouho ylla ohou llot c allalla cynalla ultanha ylla ahan llat e lu cynollo allonho yllo ohou llol clhh lu cynollo ullouho yllo ohou llot clhh to ohou flot dhho olloffu cyuollo at to alian that dhine allattic cynalta iit SPACE ollolla cynollo atlanha ylla ahon llal c aha allalla qualla ullauba ylla ahaa aha ollolla cynollo ullonha yllo ohan CHARACTERS to cynalla ullanha ylla ahan tlal elbh illenha ylla ahan llat elbha altalla eynalt illouba ylla ahmi llat elbha atlattu eynall to abou that ethics allottu cynalto ut ho yllo ohon llot elhho ollottu cynolloe hha allallu cynalla nllanha ylla ahann allello cynelle allenin ylle ehen llel e hha allalla cynalla ullanha ylla ahona dlonho yllo ohan llot clhho ollathi cynall to cyualla ultanha ylla abau thi ethti illonho ylla ohon llat ethha ottathu cynall ho yto ohoii llot elliho ottottu cynolloe Charles and the state of the st to ohon that ethino offettu cynalfo n no ollolla Criollo illonno Alto oporu ollolly exually allouby vite about lot c PAGE 1 PAGE 2 PAGE 1 BEFORE AFTER

to ohen flot chine allella cynelle al ollafla cynelle ulfonlae yffo abear flot c lu cynelle ulfonlae yffo abear flot c lu cynelle ulfonlae yffo dann flot c c cynelle ulfonlae yffo dann flot c c cynelle ulfonlae yffo dann flot c c cynelle ulfonlae yffo dann flot c ddellu cynelle ulfonlae yffo dann flot c ddellu cynelle ulfonlae yffo dann flot c ddellu cynelle ulfonlae yffo dan flot c ddellu cynelle ulfonlae yffo dan flot c flo ohon flot chino olfolfu cynelle u do ohon flot chino olfolfu cynelle u u cynelle ulfonlae yffo dan flot clid b o dan flot chino olfolfu cynelle u

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If protect and write protect modes are on, the bell rings (no data is cleared).

Clear unprotected field to spaces If protect mode is on, replaces all characters in the current unprotected field with space characters and moves the cursor to the first position in the current unprotected field.

CHARACTERS	
nho oltalla cynollo attouha ylto ohona	nho ottollu cynollo uttonho yllo ohonn
allouha ylla ohna llat ethto ethda eyaalt ha ylla ohon llat ethto ollettu eyaaltoe	illenho ytto ohou llot cililio allatio cynalt ha ytto chou llot cililio allattu cynallac
hha allahu guollo utlanha ylla ohann	hho ollollu cynollo nllonho yllo ohonn
illouha ylla olian llat	illouho yllo ohon llot chho olloliv cynoli
	ha ytta ahan Hat ethna attattu cynattae
hha allattu esnatta altanha stha ohann	hho allalla cynalla ullauha ylla abaun
lu cynollo ntlonho ytto ohon ttol clifi	h cynollo ullonho yllo ohon llot dhh
to above that ethilise attack of the state o	o ahan ttal ethha attaltu eynatta nt
ollollu cynollo ullonho yllo ohon llol c	ollollu cynollo ullonho yllo ohon llol c
lu cynollo ullouho yflo ohon llot clhh	tu cynalla ulfanha ylla ahan llat ethh
to abou that ethina allathi, espaila at allathi espaila attantia sita abou that e	lo ohon that clinic catalla cynolia at allella cynalla nllanha yllo ahon that c
lu cynollo ullouho yllo ohon ltol ethh	to cynollo ullonho yllo ohon ilol ethin
AFTER	BEFORE

If write protect and protect modes are both on, has no effect.

Table 4-18 Continued

Command

Effect

Clear field If protect mode is off and typewriter tab stops are set, clears all characters between to spaces the typewriter tab stops surrounding the cursor to space characters and moves the cursor to beginning of that field.



If no typewriter tab stops exist, replaces the current line with space characters and returns the cursor to the beginning of the current line.



Selecting a Handshaking Protocol	Disable X-On/X-Off and enable DTR line Enable X-On/X-Off and disable DTR line	SET UP CTRL N CTRL O
	Both X-On/X-Off and Data Terminal Ready (DTR) are available for the ha between the terminal and the computer. Handshaking prevents data los connected to the terminal and data is received from the computer faster print it or when smooth scroll mode is on.	ndshaking protocol ss when a printer is than the printer can
X-On/X-Off	The terminal's 256-character receive buffer holds data received through When this buffer has room for fewer than 32 characters, the terminal tra computer, asking it to stop sending data. When only 16 characters remair er after the screen has been updated, the terminal sends the computer (telling it to resume data transmission to the terminal).	the computer port. Insmits X-Off to the in the receive buff- an X-On character
	If the terminal receives X-Off from the computer, all data transmission to a until the terminal receives X-On from the computer.	the computer stops
	While X-On/X-Off is enabled, voltage on the DTR line remains high.	

Data Terminal Ready The DTR line is activated whenever X-On/X-Off is disabled. This allows the voltage on the DTR line to drop when the terminal's 256-character receive buffer (from the computer port) receives 224 bytes from the computer. When only 16 characters remain in the receive buffer, the voltage on the DTR line is raised, indicating that the computer may resume sending data to the terminal.

Transmitting Data During full or half duplex mode, data entered on the keyboard immediately goes to the computer. But during block mode, sending it to the computer is a separate step. You can either press the preprogrammed shifted/unshifted SEND key (described in Chapter 5) or enter an escape sequence to send specific data (described below).

You can define how much data some send commands will send by inserting markers in the text. Use a start of text (STX) ASCII character to mark where you want data transmission to begin and an end of text (ETX) ASCII character to mark where you want it to stop. You can insert them while the terminal is in monitor mode or you can include ESC CTRL B (for STX) or ESC CTRL C (for ETX).

NOTE! Since STX and ETX are ASCII characters, they occupy a character position.

Some transmission commands cause the terminal to automatically include delimiters to indicate the beginning or end of a field, the end of a line, or the end of the transmission.

Unless these delimiters are reprogrammed (as described in Chapter 5), the terminal sends an FS character as a field separator, a US character after each line, and a CR character after each transmission.

Sending Data

Define data to be sent

ESC S n

where

n is the value for the amount and type of data to be sent.

n Value	Amount Sent
1	Unprotected characters (except special graphics characters) in cursor line up to and including cursor
2	Protected characters (except special graphics characters) in cursor line up to and including cursor
3	Entire line of data (except special graphics characters) up to and includ- ing cursor
5	Unprotected page of data (except special graphics characters) up to and including cursor
6	Protected page of data (except special graphics characters) up to and including cursor
7	Entire page of data (except special graphics characters) up to and in- cluding cursor
9	Unprotected message (except special graphics characters) between start of text (STX) ¹ and end of text (ETX) ²
:	Protected message (except special graphics characters) between start of text (STX) ¹ and end of text (ETX) ²
• •	Entire message (except special graphics characters) between start of text (STX) ¹ and end of text (ETX) ²
?	Form (home through end of page, regardless of cursor position) ³
 If no STX If no ETX 	character is present, sends starting at home position. character is present, sends through end of page.

3. Includes ESC G n for start of visual attribute, ESC \$ and ESC % for graphics character fields, and ESC) and ESC (for any write-protected fields.

Send commands have no effect when protect mode is on.

Unless STX and ETX characters are visible they are ignored.

Nulls in the delimiters are not sent.

If the data contains more than one set of STX and ETX characters, only the STX character that is above and nearest the cursor and the ETX character following this STX character have any effect on the data transmission.

You can define the quantity and type of data sent to the computer in block mode with this command (Table 4-19).

Table 4-19 Send Commands

Command	Effect
Send unpro- tected line	Unprotected line to cursor—Sends all unprotected data on the line between and including column one and the cursor.
	Delimiters ¹ —Sends a field separator for each protected field and a termination character after the transmission. ²
Send protected line	Protected line to cursor — Sends only protected data, starting at column one through the cursor position.
	DATA SENT BY ESC S2 COMMAND
	Delimiters ¹ —Sends a field separator for each unprotected field and a termination character after the transmission. ²
Send line	Entire line to and including cursor—Sends all data between (and including) home and cursor positions.
	DATA SENT BY ESC S3 COMMAND

Delimiters¹—Sends a termination character after the transmission.²

^{1.} Default delimiters are given in the next section.

^{2.} Transmission does not include any video attributes or the status of special graphics and write protect modes.

Command	Effect
Send unpro- tected	Unprotected page to and including cursor—Sends only unprotected data between and including the page's first unprotected position and the cursor position.
page	la ahan Hal Ahha allalla aynalla ut ettella aynalla allanlar ylia (Anh Kal y (J. 1. 1954) YhAN AND Ang Yal Yal Ia ahan Hal Ang Mally Angal y
	atteritier expectitier yn fysfyr fysfyr fysfyr fysfyr 10. expectitier atterityd yn yn yn yn yn yn yn fysfyr 1997 fysfyr fyn y syn yn y
	hy the state of the state state of the state state of the state of the state of the state of the state s
	Delimiters ¹ —Sends a field separator in place of each protected field, line
	delimiter after each line, and a termination character after the transmission. ²
Send pro- tected	Protected page to and including cursor—Sends only protected data at and including the page's first protected position and the cursor position.
page	i style llot chloto silollo (spil) (k) Stalik synollo ullouho silo olon llot c Stalik synollo ullouho silo olog llot Stalik spiello ullouho silo olog llot c (spis) spillo ullouho silo olog llot c
	1. July
	Delimiters ¹ —Sends a field separator in place of each protected field, line
	delimiter after each line, and a termination character after the transmission. ²
Send page	Entire page to and including cursor—Sends all data between and including home and cursor positions.
	hey shigh free fishey shigh freehold freehold and Shigh freehold freehold freehold freehold a for some high shigh shigh shigh freehold free high freehold freehold freehold freehold free Shigh freehold freehold freehold free
	۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲
	Joy John Laghan John Mandar Jang Kang Laghan Kang Mandar Laghan Manang Jan
	14 All and the the office cycolloc

 $\label{eq:Delimiters1} \begin{array}{l} \textbf{Delimiters1} - \textbf{Sends line delimiter after each line and a termination character after the transmission.^2 \end{array}$

- 1. Default delimiters are given in the next section.
- 2. Transmission does not include any video attributes or the status of special graphics and write protect modes.

Table 4-19 Continued





If the page lacks an STX character, sends all unprotected characters starting at first unprotected position and continuing until ETX character. Moves cursor to ETX character position.






Table 4-19 Continued

Command

Send unprotected message

If the page has no STX or ETX characters, sends all unprotected data on the page.

Effect



Delimiters¹—Sends a field separator in place of each protected field, line delimiter after each line, and a termination character after the transmission.²



Protected message (STX to ETX)—Sends protected data between the STX and ETX characters. Moves the cursor to the ETX character.



If no STX character is present, sends from the page's first protected position up to the ETX character. Moves the cursor to the ETX character.



- 1. Default delimiters are given in the next section.
- 2. Transmission does not include any video attributes or the status of special graphics and write protect modes.

Table 4-19 Continued

Command

Send protected message

If the page lacks an ETX character, sends all protected data located between the STX character and the cursor (if the cursor follows the STX character) or the first protected position and the cursor (if the cursor precedes the STX character). Moves the cursor to the page's first unprotected position.

Effect



If the cursor is before STX character, sends protected data from the first protected position through the end of the page. Moves the cursor to the page's first unprotected position.



If the page lacks both STX and ETX characters, sends all protected data on the page. Moves the cursor to the page's first unprotected position.

allalla crastic atlantic rite chon the c المردالوالية كوالعرائم الماذالع الموالمواليكونا lu cyuollo ullouho yllo ohou llot dhh ollollu cynollo ullonho yllo ohou to abou that ethina allattu cynalla ul nha yila ahan llat china allallu ayuall ollollu cynollo nllonho yllo ohon llol c vilo obou iloi clinto oliottu cyuotto la cyualla ullanha yila ahan llal club n ohan llat citika allallu cynalla n nho ollollu cynollo ullonho yllo ohuu the ohou flot clinte off ollolle cynollo ulloube illouho yllo olion llot ethini ultallu eynal ho yllo ohou llot elhho <mark>ollottu cyn</mark>die suollo ultoubo xllo of hho allallu cynalla ullauha ylla aha hau llat clhha allallu 🖊 Ŀ illouho yllo ohon llot <mark>chho allollo cyn</mark>a r cynollo ullonho yllo olle ha yilo ohon ilat clihy Dialla cynalla uollo allouho yllo ohoa llot cihh a allalla cynalla illanha ylla ahan Who ottolly cynollo ut o yllo ohon llot elhh Monto yllo ohon llot c BEFORE AFTER CURSOR CURSOR

Table 4-19 Continued	
Command	Effect

Delimiters¹—Sends field separator for each unprotected field, line delimiter after each line, and termination character after the transmission.²

Send entire message

Entire message (STX to ETX)—Sends all data located between either the STX character (if the cursor follows the STX character) or home (if the cursor is before the STX character) and the ETX character. Moves the cursor to the ETX character.



If the page lacks an STX character, transmission starts at home position through the ETX character. Moves the cursor to the ETX character.



- 1. Default delimiters are given in the next section.
- 2. Transmission does not include any video attributes or the status of special graphics and write protect modes.

Table 4-19 Continued

Command

Effect

If the page lacks an ETX character, the terminal sends all data between either the STX character (if the cursor follows the STX character) or home (if the cursor is before the STX character) and end of page. Moves the cursor to home or first unprotected position.



If the page has no STX or ETX characters, sends the entire page. Moves the cursor to home or first unprotected position.



Delimiters¹—Sends line delimiter after each line, and termination character after the transmission.²

1. Default delimiters are given in the next section.

2. Transmission does not include any video attributes or the status of special graphics and write protect modes.

	Table 4-19 Continued				
	Command		Effect		
	Send form	Entire form—Sends everyt including escape sequence move cursor.	hing between (and including s for embedded visual attrib	3) home and outes (ESC	d end of page, G n). Does not
			lo ohou lloi chino oliollu cyuollo ul oliollu cyuollo uliouho ylio ohou lloi c lu cyuollo uliouho ylio ohou lloi c lu cyuollo uliouho ylio ohou lloi clihi lo ohou lloi chino oliollu cyuollo ul oliottu cyuollo uliouho ylio ohou lloi clihi lo ohou lloi chino oliollu cyuollo ul nho oliollu cyuollo uliouho ylio ohouu uliouho ylio ohou lloi clihio oliollu cyuoll ho ylio ohou lloi clihio oliollu cyuollo hho oliollu cyuollo uliouho ylio ohouu uliouho ylio ohou lloi clihio oliollu cyuollo hho oliollu cyuollo uliouho ylio ohouu uliouho ylio ohou lloi clihio oliollu cyuollo hho oliollu cyuollo uliouho ylio ohouu ho ylio ohou lloi clihio oliollu cyuollo ho oliollu cyuollo uliouho ylio ohouu		לאיז איז איז איז איז איז איז איז איז איז
			BEFORE		AFTER
	 Default delimite Transmission d modes 	Delimiters ¹ —Sends ESC) write-protected field, line de the transmission. Marks are and ESC %. ers are given in the next sectio oes not include any video attri	before each write-protected elimiter after each line, and t eas containing special graph n. butes or the status of special	field, ESC ermination lics charact	(after each character after ers with ESC \$
Defining How Much Will Be Sent	The amount of d fined with delim sent (i.e., a field, values	lata sent to the computer b i ters . Delimiters are data s , a line) or the end of the tr	y the previous commands separators used to indica ansmission. Table 4-20 li	are, in so ate how m ists the de	me cases, de- uch has been fault delimiter
	Table 4-20 Default Delimiter	r Values			
	Delimite	er en		Value P ₁	s p ₂
	Field Line End of te	ext		FS US CR	null null null
Miscellaneous Send	Send terminal's	identification (TVS 924 R	EV. n CR)		ESC M
Commands	where				
	n is an upp nal's firmv	percase alphabetic charac vare.	ter that identifies the rev	ision leve	l of the termi-
	The terminal ide	ntifies itself to the compute	r when it receives this co	mmand.	
	Send answerba	ck code			ESC ^ Ø

This command tells the terminal to send its unique answerback code (identifying the terminal) to the computer. Unless you reprogram the answerback code (as described in the next chapter), the terminal sends the terminal identification **TVS 924 REV. n** (described above) as the answerback code.

Send the message line or current status line

ESC Z n

where

n defines which line is sent.

n Value	Sends	
-		

Message line¹
 Current configuration of status line¹

1. Transmission is followed by a CR character.

This command sends the current message or status line to the computer.

Printing

	SET UP
Buffered extension print mode on	ESC @
Buffered extension print mode off	ESC A
Buffered transparent print mode on	ESC È
Buffered transparent print mode off	ESC a
Print page	ESC P n
Bidirectional port communication on	CTRL R
Bidirectional port communication off	CTRLT

where

n defines the type of data printed and whether it is formatted.

n Value	Type of Page Print	

- 1 Formatted unprotected^{1, 2}
- 2 Formatted protected²
- 3 Formatted all²
- 4 Unformatted all^{3, 4}

1. Same as PRINT key unless it is reprogrammed.

2. Does not print special graphics characters.

3. Same as shifted PRINT key unless it is reprogrammed.

4. Does not send CR, LF, and null characters to printer at end of each line.

NOTE! All print modes except page print are mutually exclusive; i.e., you can only enable one at a time. After a page print, the terminal returns to previous print mode.

If you sound the bell or turn keyclick on or off (from either the keyboard or the computer) during any buffered print mode, the printer may slow down.

These commands specify how much is printed and whether or not the data is displayed on the screen at the same time. Table 4-21 describes the printing modes and commands.

Table 4-21 Print Escape Sequences

Name

Buffered extension print on

Enables buffered extension print mode. Sends all data received from the computer to the screen and to the terminal's printer. Allows baud rates to computer and printer to differ.

Effect



Buffered extension print off

Buffered transparent print on Disables buffered extension print mode. Screen continues to display new data. Any data remaining in the terminal's print buffer continues going to the printer until the print buffer is empty.

All data received from the computer passes through the terminal to the printer without being displayed on the screen. Baud rates can differ.



Buffered transparent print off

Page print command¹

Printing stops as soon as the terminal's print buffer empties. Data goes to the screen if it is received from the computer after the terminal receives this command.

Sends a page of data (starting with page's first character position and continuing through the cursor position) to the device attached to the terminal's printer port. Prints data from page's first position through cursor.

Allows terminal to print a page while accepting data and displaying it on a new page (if additional memory is configured as more than one page). However, when logical attribute mode is on and the cursor is in a field with logical attribute of total fill or must enter and memory contains two or more pages, prints the current page but the does not flip the display to the next page. Sends space characters in place of each special graphics character.²

Can be used while any print mode is on. The terminal returns to the previous print mode when page print is finished.

1. Page print is a command, not a print mode.

2. A termination character (default ACK) indicates transmission is finished.

Name	Effect
Page print command	
Formatted unprotected	Prints all unprotected characters on the screen from the page's first position through the cursor position. Space characters replace any protected and special graphics characters. Adds CR, LF, and null characters after each line.
Formatted protected	Only prints protected characters from the page's first position through the cursor. Space characters replace any unprotected and special graphics characters. Adds CR, LF, and null characters after each line.
Formatted all	Prints all characters on page between page's first position through cursor (except special graphics characters, which are replaced with space characters).
Unformatted all	Prints data from the page's first position through the cursor position. Not limited to screen display if extra memory has been added; i.e., advances screen to the next page. Does not add CR, LR, and null characters at the end of each line.
Bidirectional on	Enables bidirectional communication between devices attached to the terminal's computer and printer ports. Data sent from the computer goes to the screen and terminal's printer (can lock keyboard). Data sent from a KSR printer to the computer passes through the terminal but does not affect it (can't unlock keyboard if it has been locked). Does not display data sent through the printer port to the computer port.
	Since both devices attached to the terminal must use the same baud rate, parity, word structure, and stop bits, the printer port automatically changes to match the computer port's configuration when you turn on bidirectional communication. When you turn it off, the printer port returns to its previous configuration.
	nto ntt i ctto yttomitio oh outti i u Inur A chuo
	COMPUTER COMPUTER
	COMPUTER PORT PRINTER PORT
Bidirectional off	Turns off bidirectional communication between terminal's ports; resets printer port's baud rate.

The appearance of the printed copy depends on whether the data is formatted or unformatted. Figure 4-13 shows data as it might be displayed on the screen and the different ways the printed copy could appear.

Figure 4-13

Appearance of Printed Copy from Formatted and Unformatted Data

a. Displayed Data



b. Case 1



Case 2

C.



d. Case 3

(ААААААА
	B B B B B B B B B B B B B B B B B B B
	ссссссс
•	

Unformatted Printing—In Case 1, you cleared the screen to null characters before entering data and entering the ESC P 4 command. The printer automatically added CR and LF delimiters after each printed line, so this printed copy includes all of the data. However, since you first cleared the screen to null characters, the text lacks the spaces needed to make it resemble the displayed text.

In Case 2, you cleared the screen to spaces before entering data and entering the ESC P 3 command. The printer does not automatically add CR and LF delimiters at end of each line as it prints, so this printed copy contains only one line of data. The remainder of the data accumulated (piled up) on the last cursor position.

In Case 3, you cleared the screen to space characters before entering data and entering the ESC P 4 command. The printer automatically added CR and LF delimiters after each printed line, so this hardcopy includes all the data. Since the screen was cleared to spaces, the printed copy includes the spaces needed to make it resemble the screen display.

Formatted Printing—The page of data shown in Case 3 also reflects what the ESC P 3 command prints. Because the printer received CR and LF delimiters with the data from the terminal, the printed copy duplicates the screen image. The printer's ability to add delimiters (and the method used) and whether or not you cleared the screen first is irrelevant.

Protocols If a printer connected to the terminal sends X-Off to the terminal or lowers the DTR line's voltage, the terminal stops sending more data to the printer until the printer sends X-On or raises the DTR line's voltage. Table 4-22 describes how the print mode or command affects handshaking protocols.

Print Mode/Command	Handshaking Protocol
Buffered extension	If terminal receives X-Off from printer or DTR line voltage drops, terminal stops sending data from its print buffer. Print buffer fills up first, then receive buffer. When receive buffer contains 224 characters, terminal sends X-Off to computer or lowers DTR line voltage.
	When receive buffer contains only 16 characters, terminal sends X-On to computer or raises DTR line voltage.
Buffered transparent print	If terminal receives X-Off from printer or DTR line voltage drops, terminal stops sending data from its print buffer. When print buffer fills up, terminal sends X-Off to computer. If computer fails to respond to first X-Off and receive buffer contains 224 characters, terminal sends second X-Off to computer or raises DTR line voltage.
	When receive buffer contains only 16 characters, terminal sends X-On to computer or raises DTR line voltage.
Page print	Computer should stop sending data to terminal. If printer sends X-Off to terminal or lowers DTR line voltage, terminal stops sending data to printer until printer sends X-On or raises DTR line voltage. Status line contains PBSY, indicating printer is busy. When all data has been sent to printer port, terminal sends ACK (ASCII character) to computer, signaling it to resume sending data to terminal.
Bidirectional port	Uses no handshaking protocols.

Table 4-22 Printer Port Handshaking Protocols¹

1. Assumes printer or modem is connected to terminal's printer port.

5. Reprogramming the Terminal

Introduction

This chapter helps you reprogram many of the terminal functions described in Chapters 2 through 4.

Port Control

 $\begin{array}{c} \textbf{SET UP} \\ \textbf{ESC} \left\{ \, m \, p_{_{1}} \, p_{_{2}} \, p_{_{3}} \, p_{_{4}} \right. \end{array}$

where

m is the terminal's port whose parameters are to be changed.

m Value

Define port parameters

0 Computer port

Port

1 Printer port

 p_1 is the baud rate.

p, Value	Baud Rate
Ø	150
1	300
2	1200
3	1800
4	2400
5	4800
6	9600
7	19200

p, defines the word structure.

p₂ Value	Word Length
Ø	7 bits
1	8 bits

p₃ is parity.

p₃ Value	Parity
0	Even (receive/transmit)
1	Odd (receive/transmit)
2	No

 p_4 is the number of stop bits.

p₄	Stop
Value	Bits
Ø	1
1	2

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NOTE! The parameters defined with this command are effective only until the power is turned off.

With this command you can temporarily change the parameters of either of the terminal's ports.

For example, if you enter

ESC { 0 5 0 0 0

the computer port's parameters become

Baud rate	4800
Word length	7 bits
Parity	Even
Stop bits	One

Delimiters

Define delimiter code

ESC x (code)

where

(code) must contain the byte values for a total of eight ASCII characters.

To change a delimiter character, determine the byte value of the new character. Each delimiter contains two ASCII characters.

– – – –

Enter the byte values for all codes (listed below) in sequence.

Delimiter	ASCII Character	t Byte Value
Field separator	FS NUL	1C 00
Line separator	US NUL	1F 00
Send terminator	CR NUL	0D 00
Page print terminator	ACK NUL	06 00

NOTE! Nulls in the delimiter code are not sent to the computer.

Answerback Change answerback text Message

ESC ^ 1 (text) CTRLY

where

(text) is a message containing up to 16 characters.

To include a CTRL Y or CTRL P in the text, precede it with a CTRL P (which is not counted as a character in the text).

You can change the response (called the answerback) given by the terminal when the computer asks the terminal to identify itself. Video Display Terminal Operator's Manual

Keys

One Editing Key

Reprogram one editing key

ESC Ø m a b c

where		Default Function			Def	ault Co	des	
m	Key	Unshifted		Hex	Don		ASCII	
0	HOME	Cursor home	1E	00	00	RS	NUL	NUL
Ă	Ļ	Cursor down	16	00	00	SYN	NUL	NUL
В	ŕ	Cursor up	ØВ	00	00	VT	NUL	NUL
С	←	Cursor left	Ø8	00	00	BS	NUL	NUL
D	\rightarrow	Cursor right	ØC	00	00	FF	NUL	NUL
E	TAB ¹	Tab cursor	Ø9	00	00	HT	NUL	NUL
F	BACK TAB	Back tab	1B	49	00	ESC	Ι	NUL
G	CLEAR	Clear unprotected to spaces	1A	00	00	SUB	NUL	NUL
н	PRINT	Print unprotected page	1B	50	31	ESC	Р	1
1	CHAR INSERT	Insert character	1B	51	00	ESC	Q	NUL
J	CHAR DELETE	Delete character	1B	57	00	ESC	W	NUL
ĸ	LINE INSERT	Insert line	1B	45	00	ESC	E	NUL
Ĺ	LINE DELETE	Delete line	1B	52	00	ESC	R	NUL
M	LINE ERASE	Erase line with spaces	1B	54	00	ESC	Т	NUL
N	PAGE ERASE	Erase page with spaces	1B	59	00	ESC	Y	NUL
Ö	PAGE	Next page	1B	4B	00	ESC	К	NUL
P	SEND	Send line	1B	53	33	ESC	S	3
Q	TAB ²	Tab cursor	Ø 9	00	00	HT	NUL	NUL
Ř	CE	Clear entry	18	00	00	CAN	NUL	NUL
S	ENTER	Carriage return	ØD	00	00	CR	NUL	NUL

Default Function Shifted

•	HOME	Cursor home	1E	00	00	RS	NUL	NUL
а	Ļ	Line feed	ØA	00	00	LF	NUL	NUL
b	Ť	Reverse line feed	1B	6A	00	ESC	j	NUL
С	←	Cursor left	Ø8	00	00	BS	NUL	NUL
d	\rightarrow	Cursor right	ØC	00	00	FF	NUL	NUL
е	TAB ¹	Tab cursor	Ø 9	00	00	HT	NUL	NUL
f	BACK TAB	Back tab	1B	49	00	ESC	Ι	NUL
g	CLEAR	Clear all to nulls	1B	2A	30	ESC	*	Ø
ĥ	PRINT	Print all page	1B	50	33	ESC	Р	3
i	CHAR INSERT	Insert character	1B	51	00	ESC	Q	NUL
j	CHAR DELETE	Delete character	1B	57	00	ESC	W	NUL
k	LINE INSERT	Insert line	1B	45	00	ESC	E	NUL
1	LINE DELETE	Delete line	1B	52	00	ESC	R	NUL
m	LINE ERASE	Erase line with nulls	1B	74	00	ESC	t	NUL
n	PAGE ERASE	Erase page with nulls	1B	79	00	ESC	У	NUL
0	PAGE	Previous page	1B	4A	00	ESC	J	NUL
р	SEND	Send page	1B	53	37	ESC	S	7
q	TAB ²	Tab cursor	Ø 9	00	00	HT	NUL	NUL
r	CE	Clear entry	18	00	00	CAN	NUL	NUL
S	ENTER	Carriage return	ØD	00	00	CR	NUL	NUL

1. On alphanumeric section of keyboard

2. On accounting keypad

a, b, and c are the three ASCII characters being programmed into the key.

	Nulls ca	an be include	d but are not transmitted	d.	
	This commar shifted/unshi	nd allows you ifted editing k	to change the code that ey is pressed.	t the terminal sends w	hen the specified
All Editing Keys	Reprogram a	all editing key	S		ESC] n (codes)
	where				
	n	Key			
	Ø 1	Unshifted Shifted			
	(codes)	must contai	n 60 bytes for all 20 editi	ng keys.	
	To repro differen	ogram both sl It n values.	nifted and unshifted editi	ng keys, send the com	mand twice with
	This comman changing the	d allows you code sent by	o change function of any it.	editing key listed in th	e above table by
	NOTE! This of to and includi to reprogram key.	command diffe ing the key to a all editing key	ers from the preceding col be changed must be reen vs; use the previous comn	mmand in that the value tered. Use this commar nand when you want to	es for each key up nd when you want o change only one
How Much Can Be Programmed into Each Key	Each editing three).	key can send	up to three codes (i.e., s	shifted sends three and	d unshifted sends
Entering a Sample Program	To illustrate h fect of the sh cause a rever	ow to reprogr ifted ↑ and ↓ se line feed ar	am an editing key, let's e keys. After the terminal r nd the shifted † key will ca	nter a command that v receives this code, the ause a line feed.	vill reverse the ef- shifted ↓ key will
	1. Press				
	ESC] 1	I			
	to start the program.	e programming	g sequence. Everything er	ntered after this is cons	idered part of the
	2. Enter, in a	string without	spaces, the following cod	des for shifted keys:	
	RS NI LF NI ESC j	JL NUL JL NUL NUL	(This leaves the home ke (This changes the ↓ key' (This changes the ↑ key'	ey's function unchange s function.) s function.)	d.)
	NOTE! Since The compute	e the remainde r assumes de	er of the values are not cha ault values for the remain	anged, you do not need ing shifted keys.	d to reenter them.

Function Key(s)

Reprogram a function key

ESC | p, p, (message) CTRL Y

where

p, is a value for the	function key's number.
-----------------------	------------------------

	p, Va	lue
Key	Unshifted	Shifted
F1	1	А
F2	2	В
F3	3	С
F4	4	D
F5	5	E
F6	6	F
F7	7	G
F8	8	Н
F9	9	Ι
F10	:	J
F11	;	K
F12	<	L
F13	=	М
F14	>	N
F15	?	0
F16	0	Р

p, is a value for the communication mode.

p₂	
Value	Effect

1	Send	code	to	computer
---	------	------	----	----------

- 2 Send code to terminal
- 3 Send code to both computer and terminal

(message) is the message to be transmitted by that function key. The message can contain any combination of alphanumeric characters, control code(s), or escape sequences. Enter a CTRL P when the next character in the message is a CTRL Y or CTRL P to be embedded (incorporated) as part of the message.

CTRL Y ends the programming sequence.

How Long Can the
Message Be?The memory for all function keys contains 512 bytes (256 shifted and 256 unshifted). If each
key's program were to be the same size, each could include 16 characters less one character
per key for control purposes. The maximum text length for each key (shifted or unshifted) is 63
characters.

To determine how much can be programmed in each key, you need to know how many keys are going to be used. If you don't need all 32 keys, the message for the few keys you do use can be larger.

What Can the Message Include? The message can include an alphanumeric message displayed on the screen plus control codes and escape characters. For instance, you could tell the terminal to move the cursor to the end of the page, remind the operator to turn on the printer, and instruct the terminal to print the contents of the current page. The message to the operator appears on the screen while the messages to the terminal are stored as escape sequences.

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Determining Where the Program Goes	The value entered for p_2 determines the destination of the program. If you send it to the screen, the computer or terminal cannot act upon it. And if you send it only to the computer, the message can not appear on the screen. ¹ Think about who needs to receive the message and enter the appropriate p_1 value.
	1. Unless the computer echoes it back to the terminal. This may occur if the computer is in full duplex.
Entering a Sample Program	To illustrate how a function key is reprogrammed, let's enter a command to print the contents of the current page on a printer connected to the terminal whenever the shifted function key F1 is pressed.
	1. Press
	ESC
	to start the programming sequence. Everything entered after this and before the terminat- ing CTRL Y code is considered part of the program.
	2. Press
	A
	designating you want to change the value of the shifted F1 key.
	3. Press
	2
	to send the message to the terminal. (Since the printer is not connected to the computer, the computer is not involved in this procedure.)
	4. Press
	ESC = 7 n
	where 7 and n are the values of the current page's last row (line) and column position.
	When the terminal receives this sequence, it moves the cursor to the end of the page to define the amount to be printed.
	5. Press
	ESC s 1
	to display the message line.
	6. Press
	ESC f
	to send the following message to the message line.

7. Enter

TURN ON THE PRINTER CTRL P CTRL Y

When the terminal receives this message, it displays it on the message line.

8. Press

ESC P 3

to turn on page print.

9. Press

ESC s 2

to turn on the status line.

10. Press

CTRL Y

to end the program contained by the shifted F1 key.

To calculate the bytes in this example, let's look at it in its entirety.

ESC! A 2 ESC = 7 n ESC s 1 ESC f TURN ON THE PRINTER CTRL P CTRL Y ESC P 3 ESC s 2 CTRL Y

Now let's tally the bytes.

Bytes	Entry	Bytes	Entry
1	ESC	1	Н
1	=	1	E
1	7	1	(space)
1	n	1	P
1	ESC	1	R
1	S	1	I
1	1	1	Ν
1	ESC	1	Т
1	f	1	Е
1	Т	1	R
1	U	Ø	CTRL P
1	R	1	CTRL Y
1	Ν	1	ESC
1	(space)	1	Р
1	0	1	3
1	Ν	1	ESC
1	(space)	1	S
1	T	1	2

This message contains 35 bytes.

Whenever the shifted F1 key is pressed, the terminal moves the cursor to the end of the current page, displays the message TURN ON THE PRINTER, performs a page print, then turns the status line display on again.

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Message Line

Load text into message line

ESC f (text) CTRL Y

where

 $\langle text \rangle$ is up to 80 printable, displayable characters plus up to 15 visual attribute commands for each character in the text.

The message line's current visual attribute is included unless you change it. (Default is reverse video.)

This command lets you load a message in RAM for the message line.

By displaying the 25th line first, you can see the data on the 25th line as you enter it.

NOTE! Until you program the message line, it is blank.

6. Troubleshooting

Introduction This chapter tells you what to check before placing a service call. It also shows you how to change the fuses and obtain assistance. You can verify the proper operation of the terminal's video display circuitry and the computer **Self Tests** and printer ports by running two self tests. If the terminal passes both tests and the terminal still fails to operate correctly, consult the troubleshooting guide in Table 6-1 before placing a service call. **STOP!** Running either self test clears the current page. Self Testing the Video The first self test checks the video display circuitry. The test shows all displayable characters **Display Circuitry** and the 32 possible visual attributes. **NOTE!** Before starting the test, put the terminal in full duplex mode. 1. Press (in sequence): SET UP 1 **NOTE!** You could enter the sequence ESC V instead. 2. Watch for the test screen (shown in Figure 6-1) to appear. Figure 6-1 **Screen During First Self Test** SABCDEFGHIJKLMNOPQRSTUVWXYZ[∖] abcdefghijklmnopqrstuvwxyz{ (áéicúáéicú£aéùĕĭßAaöcÅåÉ⊘⊘ÆæÃãÕõ⊢¤ÑÑić 'RG°GSéüü ¯,°•±<u>∕</u>π≠βθλμ⊛ΩΣ ╘╓┙╪╎╾┥┝┑ 0123456789::<<=>?0ABCDEFGHIJKLMNOPQRSTUVW %123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVW 012345678911x=>700BCDEFGH1.1XUMNOFORSTUVI. 122456767:1 = TAABCDEFGALAKLMNORGRSTIM 0123456789::<<=>?@ABCDEFGHIJKLMNOPORSTUVW 0123456789::<<=>?@ABCDEFGHIJKLMNOPORSTUV 0123456789::<=>?0ABCDEFGH1JKLMNOPQRSTUVU 2343672911CA PERECIEFCHIJKL

PEC-W2201 BLK 19.2 DUPE PA33

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3. Check the screen with the screen shown in the figure.

Four lines should blink.

All characters should be displayed.

Each character should be formed properly.

You should not see any extra dots and no dots should be missing.

All visual attributes and decreased intensity characters should appear as shown in the figure.

4. Press SET UP to stop the test.

Self Testing Port Communications

The second self test checks the computer and printer ports by sending two sets of data from each port to the other.

NOTE! Before starting the test, make sure each port is configured with the same parity, stop bits, and word length.

- 1. Connect pins 3 and 4 on the RS-232C computer port to pins 3 and 4 on the printer port (using a prefabricated test cable with 25-pin RS-232C male connectors at each end). (The pin numbers are shown in Figure 1-9.)
- 2. Press (in sequence):

SET UP 2

- 3. Wait a second or two while the terminal performs the four tests. (Nothing appears on the screen during the actual tests.)
- 4. Watch the screen. The word PASS or FAIL appears on the screen after each test. (Tests 1 and 2 send data from the computer port to the printer port; tests 3 and 4 send data from the printer port to the computer port.)
- 5. If any tests fail, check the baud rates, stop bits, and word length for each port. They should be the same for each port. Make sure the interface cable is securely attached and configured correctly. Run the test a second time.

If any of the tests fail again and you are sure the port configurations and interface cable are correct, place a service call.

- 6. Press SET UP again to stop the test and reenable the previous communication mode.
- 7. Press CLEAR to clear the self test display from the screen.

Before placing a service call, find the symptom in Table 6-1 and try the solution listed there.

Troubleshooting **Procedures**

Symptom	Possible Solution
Terminal dead (no beep; no	Unplug power cord and plug in both ends again
cursor)	Check and replace line supply fuse
	Check and replace power supply fuse(s)
	Remove cover and inspect connectors and chips on logic board
	Turn on power switch
	Check power select switch setting
Terminal dead; cursor may	Unplug power cord and change line supply fuse
appear	Check and replace power supply fuse(s)
Terminal will not go on line	Make sure system is "up"
	Disconnect all cables and check for damage, then reattach
	Check RS-232C (computer) port interface cables:
	Pins 1 and 7 must be grounded
	Pin 2 must be connected to computer receiver
	Pin 3 must be connected to the computer transmitter
	Pins 5, 6, and 8 must be driven by \pm 12 volt dc power or be disconnected
	Turn on modem
	Connect a different modem
	Check handset position in modem cradle
Cursor will not appear	Adjust screen contrast
	Remove cover and inspect power supply and video connectors; chec for loose chips on logic board (see next section)
Computer does not respond while on line	Set parity, word structure, and stop bits to match computer's requirements
No keyboard response	Unplug and reattach both ends of keyboard cable
	STOP! This may reset the terminal, which would clear the screen.
	Change to half duplex with set up mode
Terminal locked up	Press CTRL and RESET
	Review all set up line parameters
Terminal prints correct data	Check computer system's parity needs
prints @ signs	Review stop bits and word structure in set up lines

Table 6-1 Troubleshooting Terminal Problems

Symptom	Possible Solution							
Display is wavy or beep sounds unusual	Change hertz setting in set up line							
Display is blurry	Remove cover and inspect power supply and video connectors; che for loose chips on logic board (see next section); adjust focus on vid module.							
Printer does not print what	Check print mode and command							
	Check baud rate, parity and word structure of printer port							
	Check printer cable's pin assignments							
	Pins 4 and 20 must be driven by $+$ 12 volt dc or disconnected							
	Pin 3 must be connected to printer data input							
	Pin 2 must be connected to printer data output for operation w X-On/X-Off control							
	Check printer parameters in set up lines							
Escape and control codes	Check escape sequences and control codes							
expected	Make sure upper- and lowercase letters are used as required. Is a o used instead of lowercase letter L? Zero for uppercase O?							
	Make sure the ALPHA LOCK key is not engaged.							
	Disconnect the interface from the terminal's computer port; connect the interface from the terminal's computer port's pins 2 and 3; try operating in full duplex							
	Try ESC sequences with LOC ESC key							

STOP! Do not proceed with the directions in this section unless you are a trained service technician. This procedure exposes components that retain hazardous voltages even after you turn off the power.

- 1. Disconnect all interface cables and the keyboard cable.
- 2. Unplug the terminal from the wall outlet.
- 3. Unscrew the two Phillips head screws holding on the terminal cover (Figure 1-1).
- 4. Lift the cover towards you and up (Figure 1-2).

STOP! DO NOT TOUCH THE BACK OF THE CATHODE RAY TUBE (CRT). The black suction cup connected to its top is a high-voltage connector which can retain a potentially fatal electrical charge of up to 15,000 volts—even with the power turned off unless a qualified technician discharges the voltage.

Table 6-1

Inspection

- 5. Remove the two screws holding the logic board and shroud on the terminal case (Figures 1-13 and 1-14).
- 6. Disconnect the white video connector from location P2 on the logic board (Figure 6-2).
- 7. Disconnect the red power supply connector from location P5 on the logic board (Figure 6-2).

NOTE! There are two connectors attached to the internal power supply. Only one (either one) is attached to the board; the other one is tied back.

- 8. Lift out the shroud and logic board (Figure 6-3).
- 9. Inspect the logic board and connectors for:

Loose chips

Loose video connector (upper center area of board)

Loose power supply connector (upper right area of board)

Loose keyboard connector (lower right area of board)

Figure 6-2 Logic Board and Connectors



Figure 6-3 Removing the Logic Board from the Card Guide



TeleVideo Systems, Inc.

- 10. Tighten any loose components.
- 11. Reattach the video and power supply connectors (see Step 5).
- 12. Slide the logic board back into the center slot on the card guides (Figure 6-3).
- 13. Position the shroud between the logic board and case back, matching the connector and screw holes.
- 14. Replace the two screws in the shroud lip and back case.
- 15. Replace the cover and screws, being careful not to overtighten the screws.
- 16. Reattach the interface and keyboard cables.
- 17. Plug the power cord into the terminal and wall outlet.
- 18. Retest the terminal again. If the terminal still has no power, check the power supply fuses (next section).

Checking the Fuses

Power Supply Fuses

The two power supply fuses are clipped onto the power supply assembly inside the terminal, as shown in Figure 6-4. If you suspect one of the power supply fuses is defective:

- 1. Unplug the terminal's power cord.
- 2. Remove the cover (following Steps 1 through 4 in the previous section).
- 3. Find the power supply fuses, shown in Figure 6-4.
- 4. Slip each fuse out of its clip and compare it to Figures 6-5 and 6-6.
- Figure 6-4 Power Supply Fuses





PAGE 116

- 5. Replace the suspected fuse with a 5-ampere, fast-blow fuse if necessary.
- 6. Replace the cover (Steps 13 through 15).
- 7. Retest the terminal.

Line Fuse

To check the line fuse:

Figure 6-7

- 1. Turn off the power and unplug the terminal's power cord (either from the terminal or from the wall outlet).
- 2. Remove the fuse holder by unscrewing it counterclockwise (Figure 6-7).



3. Slip the glass fuse out of the holder and examine it.

If the thin wire inside the fuse is intact (Figure 6-5), the fuse should be functional. If the thin strip is broken and/or the glass is slightly black (Figure 6-6), the fuse has blown and must be replaced. (A totally black fuse can indicate a problem with the power outlet. If that happens, call your service technician.)

- 4. Replace a blown fuse with a 1-ampere, fast-blow fuse for 110-volt applications or a 0.5ampere, fast-blow fuse for 220-volt applications.
- 5. Replace and tighten the fuse holder.
- 6. Plug in the terminal power cord.

If the newly replaced fuse blows out immediately, do not replace it again. Call your service technician.

If You Need Assistance

TeleVideo has two service departments available to help you.

Call Technical Assistance when you want to know how to use the terminal in a particular computer environment or need marketing information.

Call Customer Service when you need help troubleshooting a hardware problem or want to return the terminal for repair.

Technical Assistance	For Technical Assistance, call between 8:30 a.m. and 5:00 p.m., Pacific time, Monday through Friday (except holidays).							
Customer Service	Before you place a service call, refer to the Troubleshooting Guide in Table 6-1. Refer also to the index and find the section in the manual which covers that subject. Have the terminal and manual by the phone.							
	You can reach the Customer Service department by calling between 7:00 a.m. and 5:00 p.m., Pacific time, Monday through Friday, except holidays. If the line is busy, leave a message with the TeleVideo operator. We will return your call as soon as possible.							
Service Under Warranty	The terminal is covered by a limited warranty (see Appendix B). No warranty registration is required.							
	If you need service while the terminal is covered by the limited warranty, call our Customer Service Department (see previous section) for a Return Material Authorization number.							
Reshipping the	Should you need to reship the terminal, follow these procedures:							
Terminal	1. Remove the cover (described earlier in this chapter).							
	2. Check the integrity of the cabling and the security of the internal mounting hardware.							
	3. Replace the cover, being careful not to overtighten the screws.							
	4. Repark the terminal using either the original TeleVideo shipping container or other suit-							

4. Repack the terminal, using either the original TeleVideo shipping container or other suitable materials.

Appendices

- **A** Specifications
- **B** Statement of Limited Warranty

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- C ASCII Code Tables
- **D** Monitor Mode Control Characters
- E Cursor Coordinates
- **F** Control Codes
- **G** Escape Sequences
- **H** Character Sets
- I Set Up Memory Bit Map

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Appendix A Specifications

SCREEN

Size	12 inches measured diagonally
Attributes	P31 green nonglare phosphor with timeout Touch tilt (-5° to $\pm 20^{\circ}$) Swivel (360°)
DISPLAY FORMAT	24 80-column lines 25th status/set up/message line
CHARACTER FORMATION	7 x 8 dot matrix 8 x 10 cell with half-dot shift
CHARACTER SETS	US ASCII, UK, French, German, Spanish, Finnish/Swedish, Danish/Norwegian, and Portuguese
DISPLAYED CHARACTER SET	128 ASCII characters (96 upper- and lowercase alphanumeric with descenders, 32 control); 64 special graphics characters
CURSOR CONTROL	Home, up, down, right, left, carriage return, line feed, next page, previous page, typewriter and field tabs (forward and backward), addressable/readable visible cursor; hidden cursor
COMMUNICATIONS INTERFACE	Computer: RS-232C 256-character buffered transmit/receive port Printer: RS-232C 256-character buffered port
COMMUNICATIONS MODES	Conversational (full or half duplex); block; monitor; local or duplex edit; self test
WORD STRUCTURE	7 or 8 data bits; 1 or 2 stop bits; 10- or 11-bit word
PARITY	Odd, even, none
COMMUNICATIONS PROTOCOL	X-On/X-Off or Data Terminal Ready at either RS-232C port
BAUD RATES	8 for each port (150 to 19,200 Kb)
PRINT CAPABILITIES	Page print (formatted/unformatted); extension (copy) print (buffered/bidirectional); trans- parent print (buffered/bidirectional)
CURSOR ATTRIBUTES	Block (blinking or steady); underline (blinking or steady); none
VIDEO ATTRIBUTES	Nonembedded, character-by-character, combinable; blink, blank, underline, half intensity, and reverse video; block graphics; block attributes
EDITING	Character/line insert/delete; line/page erase; smooth, normal, or no scrolling
KEYBOARD	Detached, slim-line, typewriter-style with sculptured keycaps; sealed key switches; N-key rollover with ghost key lockout; accounting-style numeric keypad with TAB and ENTER keys; 32 nonvolatile, programmable function keys; reconfigurable keyboard
FIELDS	Protected/unprotected; logical attributes; definable scrolling region; reprogrammable delimiters

Appendix A Continued

POWER REQUIREMENTS	115/230 volt a	c, 50/60 Hz					
DIMENSIONS	Hei	ight	Wi	dth	Depth		
	(in.)	(cm)	(in.)	(cm)	(in.)	(cm)	
Cabinet	14.0	35.6	12.5	31.8	11.5	29.2	
Keyboard	1.5	3.8	17.6	44.7	7.3	18.4	
Footprint			12.4	31.3	10.9	27.7	

WEIGHT

Net Shipping

26 pounds 6 ounces 30 pounds

OPTIONS

Current loop Neutral fuse 72 additional lines of screen memory European base plate

Appendix B Statement of Limited Warranty

TeleVideo Systems, Inc. ("TeleVideo") warrants to its distributors, systems houses, and OEMs ("Buyer"), that products manufactured by TeleVideo are free from defects in materials and workmanship. TeleVideo's obligations under this warranty are limited to repairing or replacing, at TeleVideo's option, the part or parts of the products which prove defective in material or workmanship within 180 days after shipment by TeleVideo. Buyer may pass along to its initial customer or user ("Customer") a maximum of 90 days coverage within this 180-day warranty period, provided that Buyer gives TeleVideo prompt notice of any defect and satisfactory proof thereof.

Products may be returned by Buyer only after a Return Material Authorization number ("RMA") has been obtained from TeleVideo by telephone or in writing. Buyer will prepay all freight charges to return any products to the repair facility designated by TeleVideo and include the RMA number on the shipping container. TeleVideo will, at its option, either repair the defective products or parts or deliver replacements for defective products or parts on an exchange basis to Buyer, freight prepaid to the Buyer or the Customer. Products returned to TeleVideo under this warranty will become the property of TeleVideo. With respect to any product or part thereof not manufactured by TeleVideo, only the warranty, if any, given by the manufacturer thereof, applies.

Exclusions

This limited warranty does not cover losses or damage which occur in shipment to or from Buyer or Customer, or are due to, (1) improper installation or maintenance, misuse, neglect or any cause other than ordinary commercial or industrial application, or (2) adjustment, repair, or modifications by other than TeleVideo-authorized personnel, or (3) improper environment, excessive or inadequate heating or air conditioning and electrical power failures, surges, or other irregularities, or (4) any statements made about TeleVideo's products by salesmen, dealers, distributors or agents, unless confirmed in writing by a TeleVideo officer.

If the firmware or hardware is altered or modified by the Buyer or Customer, this firmware and hardware is not covered within this limited warranty and the Buyer or Customer bears sole responsibility and liability for that firmware and hardware.

THE FOREGOING TELEVIDEO LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRAN-TIES, WHETHER ORAL, WRITTEN, EXPRESSED, IMPLIED, OR STATUTORY. IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE DO NOT APPLY. TELEVIDEO'S WARRANTY OBLIGATIONS AND DISTRIBUTER'S REMEDIES HEREUNDER ARE SOLELY AND EXCLUSIVELY AS STATED HEREIN.

TELEVIDEO'S LIABILITY, WHETHER BASED ON CONTRACT, TORT, WARRANTY, STRICT LIABILITY, OR ANY OTHER THEORY, SHALL NOT EXCEED THE PRICE OF THE INDIVID-UAL UNIT WHOSE DEFECT OR DAMAGE IS THE BASIS OF THE CLAIM. IN NO EVENT SHALL TELEVIDEO BE LIABLE FOR ANY LOSS OF PROFITS, LOSS OF USE OF FACILI-TIES OR EQUIPMENT, OR OTHER INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAM-AGES.

Appendix C ASCII Code Tables

Table C-1 ASCII Code Chart

						and the second se						the second se	
Rite	7 -	6 5			* *	°°0	⁰ 0 ₁	⁰ 1 ₀	⁰ 1	¹ 0 ₀	¹ 0 ₁	¹ 1 ₀	¹ 1
DIUS	4	3	2	1	Column + Row	0	1	2	3	4	5	6	7
	0	0	0	0	0	NUL	DLE	SP	0	0	P	•	р
	0	0	0	1	1	SOH	DC1	!	1	A	Q	а	q
	0	0	1	0	2	STX	DC2	"	2	в	R	b	r
	0	0	1	1	3	ETX	DC3	#	3	С	S	с	s
	0	1	0	0	4	EOT	DC4	\$	4	D	т	d	t
	0	1	0	1	5	ENQ	NAK	%	5	E	υ	e	u
	0	1	1	0	6	ACK	SYNI	&	6	F	v	t	v
	0	1	1	1	7	BEL	ЕТВ	,	7	G	w	g	w
	1	0	0	0	8	BS⊢	CAN	(8	н	x	h	x
	1	0	0	1	9	SKIP HT	EM)	9	Ι	Y	i	у
	1	0	1	0	10 (a)	LF	SUB	*	:	J	z	j	z
	1	0	1	1	11 (b)	VT⁺	ESC	+	;	к	[k	{
	1	1	0	0	12 (c)	FF	FS	,	<	L	١	I	-
	1	1	0	1	13 (d)	CR	GS	-	=	м]	m	}
	1	1	1	0	14 (e)	so	HOME RS		>	N	۸	n	~
	1	1	1	1	15 (f)	SI	NEW LINE US	/	?	ο	-	o	DEL RUB

Table C-2 ASCII Control Character Abbreviations

NUL	null	FF	form feed	CAN	cancel
SOH	start of heading	CR	carriage return	EM	end of medium
STX	start of text	so	shift out	SUB	substitute
ETX	end of text	SI	shift in	ESC	escape
EOT	end of transmission	DLE	data link escape	FS	file separator
ENQ	enquiry	DC1	device control 1	GS	group separator
ACK	acknowledge	DC2	device control 2	RS	record separator
BEL	bell	DC3	device control 3	US	unit separator
BS	backspace	DC4	device control 4	SP	space
нт	horizontal tabulation	NAK	negative acknowledge	DEL	delete
LF	linefeed	SYN	synchronous idle		
νт	vertical tabulation	ЕТВ	end of transmission block		

Appendix C Continued

Table C-3 ASCII Code Conversion Listing												
Binary												
ASCII Character	Bit Binary Value	7 128	6 64	5 32	4 16	3 8	2 4	1 2	0 1	Octal	Decimal	Hex
NUL		Ø	Ø	Ø	0	Ø	0	0	0	000	000	00
SOH		Ø	Ø	0	Ø	Ø	Ø	Ø	1	001	001	01
STX		Ø	Ø	Ø	Ø	Ø	0	1	Ø	002	002	Ø 2
ETX		Ø	Ø	Ø	Ø	Ø	0	1	1	003	003	03
EOT		Ø	Ø	Ø	Ø	Ø	1	Ø	Ø	004	004	04
ENQ		Ø	Ø	Ø	Ø	Ø	1	Ø	1	005	005	Ø 5
ACK		Ø	Ø	Ø	Ø	Ø	1	1	Ø	006	006	Ø 6
BEL		Ø	Ø	Ø	Ø	Ø	1	1	1	007	007	07
BS		Ø	Ø	0	Ø	1	Ø	Ø	0	010	008	Ø 8
HT		Ø	Ø	Ø	Ø	1	Ø	Ø	1	011	009	Ø 9
LF		Ø	Ø	Ø	Ø	1	0	1	Ø	012	010	ØA
VT		Ø	Ø	Ø	Ø	1	Ø	1	1	Ø13	011	ØB
FF		Ø	Ø	0	0	1	1	Ø	Ø	014	012	ØC
CR		Ø	Ø	Ø	Ø	1	1	Ø	1	015	013	ØD
SO		Ø	Ø	Ø	Ø	1	1	1	Ø	016	014	ØE
SI		Ø	Ø	Ø	Ø	1	1	1	1	017	015	ØF
DLE		Ø	Ø	Ø	1	Ø	Ø	Ø	Ø	020	Ø 16	10
DC1		0	Ø	Ø	1	Ø	Ø	Ø	1	021	017	11
DC2		0	Ø	Ø	1	Ø	Ø	1	Ø	022	018	12
DC3		Ø	Ø	Ø	1	0	Ø	1	1	Ø 23	019	13
DC4		0	Ø	Ø	1	Ø	1	Ø	Ø	Ø24	020	14
NAK		Ø	Ø	0	1	Ø	1	0	1	Ø 25	021	15
SYN		Ø	Ø	Ø	1	Ø	1	1	Ø	Ø 26	0 22	16
ETB		0	Ø	Ø	1	Ø	1	1	1	027	023	17
CAN		0	Ø	0	1	1	Ø	0	Ø	030	0 24	18
EM		0	Ø	Ø	1	1	0	0	1	031	Ø 25	19
SUB		0	Ø	Ø	1	1	Ø	1	Ø	Ø 32	Ø 26	1A
ESC		0	Ø	Ø	1	1	Ø	1	1	Ø33	Ø 27	1B
FS		Ø	Ø	Ø	1	1	1	Ø	0	Ø 34	Ø 28	1C
GS		Ø	Ø	Ø	1	1	1	Ø	1	Ø 35	Ø 29	1D
RS		Ø	Ø	Ø	1	1	1	1	Ø	Ø 36	030	1E
US		Ø	Ø	Ø	1	1	1	1	1	037	031	1F
SP		Ø	Ø	1	Ø	Ø	Ø	Ø	Ø	040	Ø 32	20
!		Ø	Ø	1	Ø	Ø	Ø	Ø	1	041	033	21

.

Table C-3

С

Ø

0 0 0 0

1 1

103

Ø67

43

1

Appendix C Continued

Continued Binary ASCII Bit 7 6 5 4 3 2 1 0 Character **Binary Value 128** 32 8 4 2 64 16 1 Octal Decimal Hex ,, Ø Ø 1 Ø Ø Ø 1 Ø **Ø**42 034 22 Ø Ø 1 Ø Ø Ø 1 1 043 **Ø**35 # 23 \$ Ø Ø Ø Ø Ø Ø 1 1 Ø44 Ø36 24 % Ø Ø 1 Ø Ø 1 Ø 1 **0**45 Ø37 25 & Ø Ø 1 Ø Ø 1 1 Ø **Ø**46 Ø38 26 ' (apostrophe) Ø Ø Ø 047 **Ø**39 27 Ø 1 1 1 1 Ø Ø 1 Ø 1 Ø Ø Ø 050 040 28 () Ø Ø 1 Ø 1 Ø Ø 1 051 041 29 * Ø Ø Ø Ø 1 1 Ø 1 **Ø**52 **0**42 2A + Ø Ø 1 Ø 1 Ø 1 1 **Ø**53 Ø43 2B Ø , (comma) Ø 0 1 1 Ø 0 **Ø**54 2C 1 044 - (hyphen) Ø Ø Ø Ø **Ø**55 **Ø**45 2D 1 1 1 1 . (period) Ø Ø Ø 1 1 Ø Ø56 Ø46 2E 1 1 1 Ø 1 2F Ø Ø 1 1 1 1 Ø57 Ø47 Ø Ø Ø 1 Ø Ø Ø Ø 060 Ø48 30 1 1 Ø Ø 1 1 Ø Ø Ø 1 061 **Ø**49 31 2 Ø Ø Ø 1 1 Ø 0 1 **0**62 050 32 3 Ø Ø 1 Ø Ø 1 Ø63 051 33 1 1 4 Ø 0 1 1 Ø 1 0 Ø 064 Ø52 34 5 Ø Ø 1 1 Ø 1 Ø 1 Ø65 **Ø**53 35 6 Ø Ø 1 1 Ø 1 1 Ø Ø66 **Ø**54 36 7 Ø Ø 1 1 Ø 1 1 1 067 **Ø**55 37 8 Ø Ø 1 1 1 Ø Ø Ø 070 **Ø**56 38 9 Ø Ø 1 1 1 Ø Ø 1 071 Ø57 39 : Ø Ø 1 1 1 0 1 Ø 072 Ø58 ЗA Ø Ø 1 1 1 Ø 1 1 Ø73 Ø59 ЗB ; <Ø Ø 1 1 1 1 Ø Ø Ø74 060 ЗC ----Ø Ø 1 1 1 1 Ø 1 Ø75 Ø61 3D Ø Ø 0 **Ø**62 >1 1 1 1 1 **Ø**76 3E ? Ø Ø 1 1 077 Ø63 3F 1 1 1 1 Ø 0 Ø 1 Ø Ø Ø Ø Ø 100 **Ø**64 40 А Ø Ø Ø Ø 0 Ø 101 **Ø**65 1 1 41 В Ø 0 Ø 1 Ø Ø 1 Ø 102 **Ø**66 42

Appendix C Continued

Table C-3
Continued

Binary												
ASCII Character	Bit Binary Value	7 128	6 64	5 32	4 16	3 8	2 4	1 2	0 1	Octal	Decimal	Hex
D		0	1	Ø	0	0	1	Ø	Ø	104	Ø68	44
E		Ø	1	Ø	Ø	Ø	1	Ø	1	105	Ø 69	45
F		Ø	1	Ø	0	Ø	1	1	Ø	106	070	46
G		0	1	Ø	Ø	Ø	1	1	1	107	071	47
Н		Ø	1	Ø	0	1	Ø	0	Ø	110	072	48
Ι		Ø	1	0	Ø	1	0	Ø	1	111	073	49
J		Ø	1	Ø	Ø	1	0	1	Ø	112	074	4A
К		Ø	1	Ø	Ø	1	0	1	1	113	Ø 75	4B
L		Ø	1	Ø	Ø	1	1	Ø	Ø	114	Ø 76	4C
М		0	1	0	Ø	1	1	0	1	115	077	4D
Ν		0	1	0	0	1	1	1	Ø	116	Ø78	4E
0		0	1	Ø	Ø	1	1	1	1	117	Ø 79	4F
Ρ		Ø	1	0	1	Ø	0	Ø	Ø	120	080	50
Q		Ø	1	Ø	1	Ø	0	0	1	121	Ø81	51
R		Ø	1	Ø	1	Ø	Ø	1	0	122	Ø82	52
S		Ø	1	Ø	1	Ø	0	1	1	123	Ø83	53
т		Ø	1	Ø	1	Ø	1	Ø	0	124	Ø 84	54
U		Ø	1	Ø	1	Ø	1	Ø	1	125	Ø 85	55
V		Ø	1	Ø	1	Ø	1	1	0	126	Ø 86	56
W		Ø	1	Ø	1	Ø	1	1	1	127	Ø 87	57
Х		Ø	1	Ø	1	1	Ø	Ø	Ø	130	Ø 88	58
Y		Ø	1	Ø	1	1	Ø	0	1	131	Ø 89	59
Z		Ø	1	Ø	1	1	Ø	1	Ø	132	090	5A
[Ø	1	Ø	1	1	Ø	1	1	133	091	5B
λ		Ø	1	Ø	1	1	1	Ø	Ø	134	Ø 92	5C
]		Ø	1	Ø	1	1	1	Ø	1	135	Ø 93	5D
^		Ø	1	Ø	1	1	1	1	0	136	Ø 94	5E
(unde	rline)	Ø	1	Ø	1	1	1	1	1	137	Ø 95	5F
•		Ø	1	1	Ø	Ø	Ø	Ø	Ø	140	096	60
а		Ø	1	Ø	Ø	Ø	Ø	Ø	1	141	Ø 97	61
b		0	1	1	Ø	Ø	Ø	1	0	142	Ø 98	62
С		Ø	1	1	Ø	Ø	Ø	1	1	143	Ø 99	63
d		Ø	1	1	Ø	Ø	1	Ø	Ø	144	100	64
е		Ø	1	1	0	0	1	0	1	145	101	65
Table C-3 Continued

					Bin	ary						
ASCII Character	Bit Binary Value	7 128	6 64	5 32	4 16	3 8	2 4	1 2	0 1	Octal	Decimal	Hex
f		Ø	1	1	Ø	Ø	1	1	0	146	102	66
g		Ø	1	1	Ø	Ø	1	1	1	147	103	67
h		Ø	1	1	Ø	1	Ø	0	0	150	104	68
i		Ø	1	1	Ø	1	Ø	Ø	1	151	105	69
j		Ø	1	1	Ø	1	Ø	1	Ø	152	106	6A
k		Ø	1	1	Ø	1	Ø	1	1	153	107	6B
1		Ø	1	1	Ø	1	1	Ø	Ø	154	108	6C
m		0	1	1	0	1	1	Ø	1	155	109	6D
'n		Ø	1	1	0	1	1	1	Ø	156	110	6E
0		Ø	1	1	0	1	1	1	1	157	111	6F
р		0	1	1	1	Ø	Ø	0	Ø	160	112	70
q		0	1	1	1	0	0	0	1	161	113 🕔	71
r		0	1	1	1	Ø	Ø	1	Ø	162	114	72
S		0	1	1	1	0	Ø	1	1	163	115	73
t		Ø	1	1	1	0	1	Ø	Ø	164	116	74
u		0	1	1	1	Ø	1	Ø	1	165	117	75
v		Ø	1	1	1	0	1	1	0	166	118	76
w		0	1	1	1	Ø	1	1	1	167	119	77
х		Ø	1	1	1	1	Ø	Ø	Ø	170	120	78
У		0	1	1	1	1	Ø	Ø	1	171	121	79
z		0	1	1	1	1	0	1	Ø	172	122	7A
{		0	1	1	1	1	0	1	1	173	123	7B
ł		0	1	1	1	1	1	Ø	Ø	174	124	7C
}		Ø	1	1	1	1	1	Ø	1	175	125	7D
~		Ø	1	1	1	1	1	1	Ø	176	126	7E
DEL		0	1	1	1	1	1	1	1	177	127 -	7F

Appendix D Monitor Mode Control Characters

Code	ASCII	Hex	Character Displayed	
CTRL @	NULL	00	NL	
CTRL A	SOH	Ø 1	s _H	
CTRL B	STX	Ø 2	s _x	
CTRL C	ETX	Ø 3	EX	
CTRL D	EOT	Ø4	Ε _Τ	
CTRL E	ENQ	Ø 5	EQ	
CTRL F	ACK	Ø 6	А _К	
CTRL G	BEL	07	BL	
CTRL H	BS	08	B _S	
CTRL I	HT	09	н _т	
CTRL J	LF	ØA	۲	
CTRL K	VT	ØB	v _T	
CTRL L	FF	ØC	F _F	
CTRL M	CR	ØD	с _R	
CTRL N	SO	ØE	s _o	
CTRL O	SI	ØF	s _I	
CTRL P	DLE	10	DL	
CTRL Q	DC1	11	D ₁	
CTRL R	DC2	12	D ₂	
CTRL S	DC3	13	D ₃	
CTRLT	DC4	14	D ₄	
CTRL U	NAK	15	N _K	
CTRL V	SYN	16	s _y	
CTRL W	ETB	17	EB	
CTRL X	CAN	18	С _N	
CTRL Y	EM	19	EM	
CTRL Z	SUB	1A	s _B	

Code	ASCII	Hex	Character Displayed	
 CTRL [ESC	1B	EC	
	FS	1C	Fx	
CTRL]	GS	1D	GX	
CTRL ^	RS	1E	R _S	
CTRL	US	1F	υ _s	
 DEL	DEL	7F	%	

Appendix E Cursor Coordinates

Row/ Column	ASCII Code Transmitted	Row/ Column	ASCII Code Transmitted	Row/ Column	ASCII Code Transmitted
1	Space	28	;	55	V
2	. !	29	<	56	W
3	"	30		57	Х
4	#	31	>	58	Y
5	\$	32	?	59	Z
6	%	33	0	60	[
7	&	34	Ă	61	Ň
8	,	35	В	62]
9	(36	С	63	^
10	j	37	D	64	
11	*	38	E	65	•
12	+	39	F	66	а
13	,	40	G	67	b
14	-	41	н	68	С
15		42	1	69	d
16	/	43	J	70	е
17	0	44	К	71	f
18	1	45	L	72	g
19	2	46	М	73	ĥ
20	3	47	Ν	74	i
21	4	48	0	75	j
22	5	49	Р	76	k
23	6	50	Q	77	1
24	7	51	R	78	m
25	8	52	S	79	n
26	9	53	Т	80	0
27	:	54	U		

Appendix F Control Codes

Code	Function	Corresponding Key
CTRL G	Ring bell	
CTRL H	Cursor left	BACK SPACE
		←
CTRL I	Tabulate to tab stop (typewriter, protect mode off; field, protect mode on)	ТАВ
CTRL J	Line feed	LINE FEED Shifted ↓
CTRL K	Cursor up	↑
CTRL L	Cursor right	\rightarrow
CTRL M	Carriage return	RETURN ENTER
CTRL N	Disable X-On/X-Off; enable DTR line	
CTRL O	Enable X-On/X-Off; disable DTR line	
CTRL R	Bidirectional communication on	
CTRL T	Bidirectional communication off	
CTRL V	Cursor down'	Ļ
CTRL X	Clear current unprotected field to spaces	CE
CTRL Z	Clear all unprotected to spaces	CLEAR SPACE
CTRL ^	Cursor home	HOME
CTRL	New line (carriage return and line feed)	

1. Depends on set up parameter for DOWN.

Appendix G Escape Sequences

Sequence	Function	Corresponding Key
ESC a	Buffered transparent print mode off	
ESC A	Buffered extension print mode off	
ESC b	Light background	
ESC B	Block mode on	
ESC C	Previous conversation mode on; block mode off	
ESC d	Dark background	
ESC D H	Half duplex mode on	
ESC D F	Full duplex mode on	
ESC E	Insert line	LINE INSERT
ESC f (text) CTRL Y	Program message line	
ESC F w h	Define block of attributes	
ESC g n	Assign logical attribute(s) to current field	
ESC G n	Define visual attribute(s)	
ESC H w h	Define block graphics area	
ESC i	Tabulate to next field tab stop (protect mode on)	
ESC I	Back tab (typewriter, protect mode off; field, protect mode on)	ВАСК ТАВ
ESC j	Reverse line feed	Shifted †
ESC J	View previous page	Shifted PAGE
ESC k Ø	Duplex edit mode on	
ESC k 1	Local edit mode on	
ESC K	View next page	PAGE
ESC L p r c (text) CTRL Y	Send data to hidden cursor	
ESC M	Send terminal identification	
ESC N 1	Page edit mode on	
ESC NØ	Line edit mode on	
ESC o n	Logical attribute mode on/off	

Sequence	Function	Corresponding Key
ESC p n	Send current/nonvolatile memory to computer	
ESC P n	Print page	PRINT Shifted PRINT
ESC Q	Insert space	CHAR INSERT
ESC R	Delete line	LINE DELETE
ESC s n	Define 25th line	
ESC S n	Define data to be sent	Shifted SEND
ESC t	Erase from cursor to end of line with nulls	Shifted LINE ERASE
ESC T	Erase from cursor to end of line with spaces	PAGE ERASE
ESC U	Monitor mode on	
ESC v Ø	Autopage mode off	
ESC v 1	Autopage mode on	
ESC W	Delete character	
ESC X	Monitor mode off	
ESC y	Erase from cursor to end of page with nulls	
ESC Y	Erase from cursor to end of page with spaces	
ESC Z 2	Report values from set up lines	
ESC Z n	Send message/status line to computer	
ESC Ø m a b c	Reprogram editing key	
ESC 1	Set column of typewriter tab stops at cursor column (protect mode off) or field tab stops from cursor downward (protect mode on)	
ESC 2	Clear current typewriter tab stop	
ESC 3	Clear all typewriter tab stops	
ESC 8 1	Smooth scroll mode on	
ESC 8 Ø	Normal scroll mode on	
ESC * Ø	Clear all to nulls	Shifted CLEAR SPACE
ESC * 1	Clear all to spaces	

Sequence	Function
ESC * 2	Clear unprotected to nulls
ESC * 3	Clear unprotected to spaces
ESC ^ Ø	Send answerback code
ESC @	Buffered extension print mode on
ESC `	Buffered transparent print mode on
ESC ∖ n	Define lines per page
ESC t b	Define scrolling region
ESC)	Write protect mode on
ESC (Write protect mode off
ESC &	Protect mode on
ESC '	Protect mode off
ESC - p r c	Address cursor (page, row, column)
ESC = rc	Address cursor (row and column)
ESC /	Read cursor (page, row, column)
ESC ?	Read cursor (row, column)
ESC ~ Ø	Load nonvolatile memory with factory default values
ESC ~ 1	Reset terminal to set up/status line values
ESC } ‹codes›	Establish set up line values
ESC #	Lock keyboard
ESC ''	Unlock keyboard
ESC . Ø	Invisible cursor
ESC . 1	Blinking block cursor
ESC . 2	Steady block cursor
ESC . 3	Blinking underline cursor
ESC . 4	Steady underline cursor
ESC < 1	Keyclick on
ESC < Ø	Keyclick off

Sequence	Function
ESC \$	Special graphics mode on; alphanumeric mode off
ESC %	Alphanumeric mode on; special graphics mode off
ESC { m $p_1^{}$	Define port parameters
ESC x (code)	Define delimiter code
ESC ^ 1 (text) CTRL Y	Change answerback text
ESC] n (codes)	Reprogram all editing keys
ESCIp,p2 (message) CTRLY	Reprogram function key

ú.

Appendix H Character Sets

Table H-1		
Character	Set	Differences

Hex Code	US	UK	Germ	French	Span	Port	Dan/ Norw	Fin/ Swed
23	#	£	#	£	#	#	#	#
40	0	@	§	à	ż	§	0	É
5B	[[Ä	0	ñ	Ã	Æ	Ä
5C	١	١	ö	Ç	i	Ç	Ø	Ö
5D]]	Ü	§	Ñ	Õ	Å	Å
5E	^	^	^	^	^	•	Ü	Ü
60	•	•	-	ë	-	•	-	é
7B	{	{	ä	é	{	ã	æ	ä
7C	1	ł	ö	ù	ł	Ç	ø	ö
7D	}	}	ü	è	}	õ	å	å
7E	~	~	β	ï	0	0	ü	ü

Figure H-1 US ASCII Keyboard Layout

F1 F2	F3 F4 F	5 F6 F7	F8 F9	F10 F11	F12 F13	F14 F15	F16		CHAR INSERT	LINE INSERT	LINE ERASE	SET UP NO SCROLL	SEND
	@ # S	% ^	& *][][+		BACK	1	CHAR DELETE	LINE DELETE	PAGE ERASE	PAGE	RESET
					┙ <u>└╴</u> ╵╵╴ ╸╶╹┎╴╶╹┎		SPACE	┦┣			8	٥	
						EED	SPACE		T A	Ľ	Щ	Ľ	
CTRL ALPHA LOCK	A S D	F G	HJ	KL	;	RETURN	BREAK		Б	4	5	6	,
BACK TAB SHIFT	ZX	С V В	ΝΜ	< > , ·	? / Shi	FT	DEL		CE	1	2	3	E N
PRINT FUNCT		SPACE BA	1		номе				Ø		00		E R

Figure H-2 UK Keyboard Layout

F1	F2 F3	F4 F5	F6 F7	F8 F	-9 F1	0 F11	F12	F13 F	14 F15	F16		CHAR INSERT	LINE INSERT	LINE ERASE	ET UP SEND
	! @		%							ВАСК		CHAR DELETE	LINE DELETE	PAGE ERASE P/	IGE RESET
ESC ESC		J₃ l₄ V]E]R								SPACE	╎		7	8 9	- [
			F G	 [H][J			<u>الـ</u> [:][FEED	TURN	BREAK		T A B		5 6	 ;
BACK][∨ _][B		∟][M][< >		SHIFT				CE		2	 }
PRINT	FUNCT					<u></u> [HOME	-][0		00 .	N F R

Figure H-3 French Keyboard Layout

F1 F2 F3	F4 F5 F6 F	F7 F8 F9	F10 F11	12 F13	F14 F15	F16	CHAR	LINE	SET UP	SEND
							CHAR DELETE	INSERT ERASE	PAGE	RESET
ESC ESC TAB A)][,][⊮	LE S	SPACE CLEAR SPACE		7 8	9	
CTRL ALPHA Q			K L N		RETURN	BREAK	T A B	4 5	6	,
BACK TAB SHIFT	W X C V	B N ?) : / ; :	+ = Shif	1 <	DEL	CE	1 2	3	E N T
PRINT FUNCT	SPA	CE BAR	н	ME -	H It		0	00	ŀ	E R

NOTE! SEND and PRINT keys send accent code and lowercase vowel instead of the accented vowel characters.

Figure H-4 German Keyboard Layout

F1 F2 1 ESC 1 TAB Q	$\begin{bmatrix} 3 \\ 5 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 6 \\ 7 \\ 8 \\ 6 \\ 7 \\ 8 \\ 1 \\ 7 \\ 8 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$	F10 F11 F12 F13 F14	F15 F16 BACK SPACE CLEAR SPACE	CHAR INSER DELE	IT LINE LINE LINE INSERT LERASE LINE PAGE DELETE PAGE FASE	SET UP NO SCROLL SEND PAGE RESET 9 –
BACK TAB PRINT FUNCT	Y X C V B N M SPACE BAR	?, ! SHIFT HOME + ↓		CE Ø	1 2 00	3

Figure H-5 Spanish Keyboard Layout

F1 F2 F3	F4 F5 F	6 F7 F8	F9 F10	F11 F12	F13	F14 F15	F16]	CHAR	LINE	LINE	SET UP	SEND
	# \$?	· / &					BACK		INSERT CHAR DELETE	INSERT LINE DELETE	PAGE ERASE	NU SCROLL PAGE	RESET
							CLEAR SPACE		T A	7	8	9	
CTRL ALPHA LOCK BACK TAB SHIFT	Z X C		J K		' SHIFT	RETURN	BREAK DEL		CE	4	5 2	6 3	, E
PRINT FUNCT		SPACE BAR		HOME		+ H			0		00	·	T E R

NOTE! SEND and PRINT keys send accent code and lowercase vowel instead of the accented vowel characters.

Figure H-6 Finnish/Swedish Keyboard Layout



Figure H-7 Danish/Norwegian Keyboard Layout

F1 F2	F3 F4 F5	F6 F7	F8 F9	F10 F11	F12 F	-13 F14	F15	F16	CHAR			SET UP	SEND
									CHAR		PAGE	SČROLL	RESET
LOC ESC ESC 1	" # \$ 2 3 4	% & 5 6	7 (7 8) = 9 Ø	2	Ü		BACK SPACE					
TAB Q	WE	A T Y		0	P Á	LINE FEED		CLEAR SPACE	T	7	8	9	_
CTRL ALPHA LOCK	A S D	FG	ΗJ	KL	ØA	RETURN		BREAK	В	4	5	6	,
BACK TAB SHIFT	ZXC	VB	ΝΜ	; :		SHIFT	> <	DEL	CE	1	2	3	E N
PRINT FUNCT		SPACE BAR			номе	-][+][†	-	0		00		E R

Figure H-8 Portuguese Keyboard Layout



Appendix I Set Up Memory Bit Map

Table I-1 Set Up Memory Bit Map Char-Bit Ø Bit 3 Bit 2 Bit 1 acter Value Name Name Name No. Name **Communication Mode** Edit Mode Edit Key Ø FDX DUPE 1 Line _ 1 HDX BLK Page LOCE Autotab Scroll Type Scroll Rate Unused Ø 2 Off Normal 6 lines Smooth 12 lines 1 On **RETURN** key ↓key Protocol 3 0 CTRL V X-On/Off Must be Ø CR 1 DTR CR and LF CTRL J Character Set Time Out Ø Off 4 See Table I-2 On 1 Autowrap Status line Keyclick Autopage 5 Ø Off Off Undisplayed Off On Displayed On 1 On Cursor Attribute 6 Ø Must be Ø Displayed Block Blinking Invisible Underline Steady 1 Computer Port Baud Rate 7 Ø Must be Ø See Table I-3 1 **Computer Port** Stop Bits Parity Bit Word Length 7 bits 8 Ø Send Even 1 Odd 8 bits 2 No 1 Printer Port 9 Ø Must be Ø See Table I-3 1 Printer Port Stop Bits Parity Bit Word Length Ø 7 bits 10 Send Even 1 1 2 No Odd 8 bits Screen Refresh Background Contrast 11 Ø 60 Hz Must be Ø Dark See Table I-4 50 Hz Light 1 Screen Contrast 12 Ø See Table I-4 1

Table I-2 Character Set Bit Map					
			Bit N	0.	
	Language	3	2	1	
	US ASCII	Ø	0	0	
	UK	Ø	Ø	1	
	French	Ø	1	0	
	German	Ø	1	1	
	Spanish	1	0	Ø	
	Swedish/Finnish	1	Ø	1	
	Norwegian/Danish	1	1	Ø	
	Portuguese	1	1	1	

Table L-2

Table I-3 **Baud Rate Bit Map**

		Bit N	D.	
Baud Rate	2	1	Ø	
150	0	0	0	
300	0	Ø	1	
1200	Ø	1	Ø	
1800	0	1	1	
2400	1	Ø	Ø	
4800	1	0	1	
9600	1	1	Ø	
19200	1	1	1	

Table I-4 Contrast

			Bit No	D.	
Level	4	3	2	1	Ø
Dimmest	0	0	0	Ø	0
	Ø	Ø	Ø	Ø	1
Default	1	Ø	Ø	Ø	Ø
Brightest	1	1	1	1	1

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Function	Key	Function	Command
RECONFIGURATION (page 27)		Full intensity normal video	FSC G Ø
Load status line with nonvolatile	CTRL shifted	Full intensity invisible video	ESC G 1
memory disable no serell print		Full intensity hinking video	
memory, disable no scroll, print,	DREAK	Full intensity blinking video	
write protect, protect modes		Full intensity invisible blinking video	
Reset status line with set	CIRL RESET	Full intensity reverse background	
up/nonvolatile values		Full Intensity invisible reverse	ESC G 5
		background	500.00
	Command	Full intensity blinking reverse	ESC G 6
		background	
MONITOR MODE (page 39)		Full intensity invisible blinking	ESC G 7
Monitor mode on	ESC U	reverse background	
Monitor mode off	ESC X	Full intensity underline	ESC G 8
		Full intensity invisible underline	ESC G 9
RESETTING THE TERMINAL (page 4	40)	Full intensity blinking underline	ESC G :
Reset nonvolatile memory to factory	ESC ~Ø	Full intensity invisible blinking	ESC G ;
default values		underline	
Reset terminal to set up/status line	ESC ~1	Full intensity reverse underline	ESC G $<$
values		Full intensity invisible reverse	ESC G =
Establish set up line values	ESC } (codes)	underline	
Report values from set up lines	ESC Z 2	Full intensity reverse blinking	ESC G $>$
Send message line to computer	ESC Z Ø	underline	
Send status line to computer	ESC Z 1	Full intensity invisible reverse	ESC G ?
Send terminal configuration to	ESC p Ø	blinking underline	
computer	p	Half intensity normal video	ESC G sp
Send nonvolatile memory to	ESC p 1	Half intensity invisible video	FSC G !
computer	200 p	Half intensity blinking video	FSC G ''
Comparei		Half intensity invisible blinking video	FSC G #
		Half intensity reverse background	ESC G \$
Lock keyboard	ESC #	Half intensity invisible reverse	ESC G %
Liplock keyboard	E00 # E9C "	background	
OTHOCK REYDOATU	ESO	Half intensity blinking reverse	FSCG&
		han intensity blinking reverse	
Invisible ourser	ESC A	Half intensity invisible blinking	ESC G '
Disking block ourgan		roverse background	L00 U
Steady block cursor		Half intensity underline	
Sleady block cursor		Half intensity invisible underline	
Blinking underline cursor		Half intensity Invisible underline	
Steady underline cursor	ESC. 4		
			E30 G T
KEYCLICK AND BELL (page 44)	FOO < 1		500.0
Keyclick on	ESC < 1	Half intensity reverse underline	ESCG,
Keyclick off	$ESC < \emptyset$	Half intensity invisible reverse	ESC G -
Ring bell	CIRLG	underline	500.0
		Half intensity reverse blinking	ESC G.
DISPLAY CONTROLS (page 45)		underline	
Define 25th line as blank	ESC s Ø	Half intensity invisible reverse	ESC G /
Define 25th line as message line	ESC s 1	blinking underline	
Define 25th line as status line	ESC s 2	Define block of attributes	ESC F w h
Program message line	ESC f	Define block graphics area	ESC H w h
	(text)	Special graphics mode on;	ESC \$
	CTRL Y	alphanumeric mode off	
Turn screen on	ESC n Ø	Special graphics mode off;	ESC %
Turn screen off	ESC n 1	alphanumeric mode on	
Light background	ESC b		
Dark background	ESC d		

Quick Reference Guide Continued

Function	Command
ADDITIONAL SCREEN MEMORY (P Define memory as 4 24-line pages Define memory as 2 48-line pages Define memory as 1 96-line page Autopage mode on Autopage mode off Move to next page Move to previous page Smooth scroll mode on Normal scroll mode on Define scrolling region	age 50) ESC \ 1 ESC \ 2 ESC \ 3 ESC v 1 ESC v 0 ESC K ESC J ESC 8 1 ESC 8 0 ESC t b
CREATING PROTECTED FORMS (p. Logical attribute allows only	a ge 55) ESC g 1
Logical attribute allows only	ESC g 2
Logical attribute requires data entry Logical attribute requires	ESC g 4 ESC g 5
Logical attribute requires numeric	ESC g 6
Logical attribute requires total data fill	ESC g 8
Logical attribute requires total fill with alphanumeric characters	ESC g 9
Logical attribute requires total fill with numeric characters	ESC g :
Logical attribute mode off Logical attribute mode on Write protect mode on Write protect mode off Protect mode on Protect mode off	ESC o Ø ESC o 1 ESC) ESC (ESC & ESC '
CURSOR CONTROL (page 58) Line feed Reverse line feed Cursor up Cursor down Cursor left Cursor right Carriage return Cursor home New line (carriage return and line feed)	CTRL J ESC j CTRL K CTRL V CTRL H CTRL L CTRL M CTRL ^ CTRL

ADDRESSING AND READING THE CURSOR (page 67)

Address cursor to page, row, ESC - prc column

- p = Page Ø One
- Two 1
- 2 Three
- 3 Four

Function	Command
Address cursor to row and column Read cursor on page, row, column Read cursor row, column Send data to hidden cursor p = Page 0 One 1 Two 2 Three 3 Four	ESC = r c ESC / ESC ? ESC L p r c (text) CTRL Y
TAB STOPS (page 70) Set column of typewriter tab stops at cursor column (protect mode off) or field tab stops from cursor downward (protect mode on)	ESC 1
protect mode off; field, protect mode on)	CIRLI
Tabulate to next field tab stop	ESC i
Back tab (typewriter, protect mode	ESC I
Clear current typewriter tab stop at	ESC 2
cursor Clear all typewriter tab stops	ESC 3
COMMUNICATION MODES (page 77 Block mode on Half duplex mode on Full duplex mode on Previous conversation mode on; block mode off	7) ESC B ESC D H ESC D F ESC C
EDIT MODES (page 77) Local edit mode on Duplex edit mode on	ESC k 1 ESC k Ø
CHANGING DATA (page 78) Page edit mode on Line edit mode on Insert space character Delete character Insert line of spaces Delete line Erase to end of line with spaces Erase to end of page with spaces Erase to end of page with nulls	ESC N 1 ESC N Ø ESC Q ESC W ESC E ESC R ESC R ESC T ESC t ESC Y ESC Y

Model 924 Video Display Terminal

TeleVideo Systems, Inc.

Function	Key
RECONFIGURATION (page 27) Load status line with nonvolatile memory; disable no scroll, print,	CTRL shifted BREAK
write protect, protect modes Reset status line with set up/nonvolatile values	CTRL RESET
	Command
MONITOR MODE (page 39) Monitor mode on Monitor mode off	ESC U ESC X
RESETTING THE TERMINAL (pag Reset nonvolatile memory to factory	e 40) / ESC ~0
Reset terminal to set up/status line	ESC ~1
Establish set up line values Report values from set up lines Send message line to computer Send status line to computer Send terminal configuration to computer	ESC } (codes) ESC Z 2 ESC Z 0 ESC Z 1 ESC p 0
Send nonvolatile memory to computer	ESC p 1
LOCKING/UNLOCKING THE KEY Lock keyboard Unlock keyboard	BOARD (page 44) ESC # ESC ''
CURSOR STYLE (page 44)	
Invisible cursor Blinking block cursor	ESC . Ø
Steady block cursor	ESC . 2
Blinking underline cursor Steady underline cursor	ESC . 3 ESC . 4
KEYCLICK AND BELL (page 44) Keyclick on Keyclick off Ring bell	ESC < 1 ESC < Ø CTRL G
DISPLAY CONTROLS (page 45) Define 25th line as blank Define 25th line as message line Define 25th line as status line Program message line	ESC s Ø ESC s 1 ESC s 2 ESC f (text)
Turn screen on	ESCnØ
Turn screen off	ESC n 1
Dark background	ESC d
Full intensity normal video	ESC G Ø
Full intensity invisible video Full intensity blinking video	ESC G 1 ESC G 2
Full intensity invisible blinking video	ESC G 3
Full intensity invisible reverse	ESC G 5
background Full intensity blinking reverse	ESC G 6
background Full intensity invisible blinking	ESC G 7
Full intensity underline	ESC G 8
Full intensity invisible underline	ESC G 9
Full intensity invisible blinking	ESC G ;
Full intensity reverse underline Full intensity invisible reverse underline	ESC G < ESC G =
Full intensity reverse blinking	ESC G $>$
Full intensity invisible reverse	ESC G ?
Half intensity normal video	ESC G sp
Half intensity invisible video Half intensity blinking video	ESC G ! ESC G ''
Half intensity invisible blinking video	ESC G #
Half intensity reverse background Half intensity invisible reverse	ESC G \$ ESC G %
background	200 0 //

Function	Command
Half intensity blinking reverse	ESC G &
Half intensity invisible blinking	ESC G
Half intensity underline	ESC G (
Half intensity invisible underline	ESC G)
Half intensity blinking underline Half intensity invisible blinking	ESC G +
underline	
Half intensity reverse underline	ESC G ,
underline	L30 G -
Half intensity reverse blinking underline	ESC G .
Half intensity invisible reverse	ESC G /
Define block of attributes	ESC F w h
Define block graphics area	ESC H w h
Special graphics mode on;	ESC \$
Special graphics mode off;	ESC %
alphanumeric mode on	
ADDITIONAL SCREEN MEMORY (P	age 50)
Define memory as 4 24-line pages	ESC \ 1
Define memory as 1 96-line pages	ESC \ 2 ESC \ 3
Autopage mode on	ESC v 1
Autopage mode off	ESC v Ø
Move to previous page	ESC N
Smooth scroll mode on	ESC 8 1
Normal scroll mode on	ESC 8 Ø
Denne scronnig region	ESC 1 D
CREATING PROTECTED FORMS (p	age 55)
alphabetic entries	LOUGI
Logical attribute allows only	ESC g 2
Logical attribute requires data entry	ESC g 4
Logical attribute requires	ESC g 5
Logical attribute requires numeric	ESC g 6
Logical attribute requires total data	ESC n 8
Z	200 g 0
tul Logical attribute requires total fill	ESC a 9
Logical attribute requires total fill with alphanumeric characters	ESC g 9
ful Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters	ESC g 9 ESC g 9
hil Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off	ESC g 9 ESC g : ESC oØ
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode on	ESC g 9 ESC g 9 ESC g : ESC 00 ESC 01
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode on Write protect mode on Write protect mode off	ESC g 9 ESC g 9 ESC g : ESC 00 ESC 01 ESC) ESC (
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode on Write protect mode on Write protect mode off Protect mode on	ESC g 9 ESC g 9 ESC 0 2 ESC 0 1 ESC 0 ESC (ESC (ESC &
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode on Write protect mode on Write protect mode off Protect mode on Protect mode off	ESC g 9 ESC g 9 ESC 0 g ; ESC 0 0 ESC 0 1 ESC 0 ESC 0
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode on Write protect mode on Write protect mode on Protect mode on Protect mode off CURSOR CONTROL (page 58)	ESC g 9 ESC g 9 ESC of ESC 01 ESC (ESC (ESC & ESC '
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode on Write protect mode on Write protect mode off Protect mode off Protect mode off CURSOR CONTROL (page 58) Line feed	ESC g 9 ESC g 9 ESC g ; ESC 00 ESC 01 ESC (ESC (ESC & ESC (ESC & ESC '
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode on Write protect mode on Write protect mode off Protect mode off Protect mode off CURSOR CONTROL (page 58) Line feed Cursor up	ESC g 9 ESC g 9 ESC 0 g ; ESC 0 0 ESC 1 ESC 1 ES
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill use the total fill Logical attribute mode off Logical attribute mode off Logical attribute mode on Write protect mode on Write protect mode off Protect mode off Protect mode off Protect mode off CURSOR CONTROL (page 58) Line feed Cursor up Cursor down	ESC g 9 ESC g 9 ESC 0 9 ESC 0 1 ESC 0 ESC 1 ESC
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode off Virite protect mode on Write protect mode on Write protect mode off Protect mode off Protect mode off CURSOR CONTROL (page 58) Line feed Reverse line feed Cursor up Cursor down Cursor left	ESC g 9 ESC g 9 ESC g ; ESC 00 ESC 01 ESC 0 ESC 1 ESC
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode off Logical attribute mode off Write protect mode off Protect mode off Protect mode off CURSOR CONTROL (page 58) Line feed Reverse line feed Cursor up Cursor down Cursor right Cursor right Carriage return	ESC g g ESC g g ESC g ; ESC 0 ESC 0
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode on Write protect mode on Write protect mode off Protect mode off Protect mode off Protect mode off CURSOR CONTROL (page 58) Line feed Cursor up Cursor down Cursor right Carsinge return Cursor right Cursor right	ESC 9 9 ESC 9 9 ESC 9 ; ESC 0 9 ESC 0 9 ESC 0 ESC 0 ES
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode off Logical attribute mode off Protect mode on Write protect mode off Protect mode off Protect mode off CURSOR CONTROL (page 58) Line feed Cursor up Cursor down Cursor left Carriage return Cursor left Carriage return New line (carriage return and line feed)	ESC 9 9 ESC 9 9 ESC 9 ; ESC 0 0 ESC 0 ESC 0 ESC 1 ESC 1 ESC 1 ESC 1 ESC 1 ESC 1 CTRL J CTRL H CTRL M CTRL M CTRL M CTRL M
till Logical attribute requires total fill with alphanumeric characters Logical attribute requires total fill with numeric characters Logical attribute mode off Logical attribute mode off Protect mode off Protect mode off Protect mode off Protect mode off CURSOR CONTROL (page 58) Line feed Cursor up Cursor up Cursor down Cursor left Carriage return Cursor left Cursor cheme New line (carriage return and line feed)	ESC 9 9 ESC 9 9 ESC 9 : ESC 0 8 ESC 0 ESC 1 ESC 1 ESC 1 ESC 2 ESC 2 ESC 2 CTRL J ESC 1 ESC

Model 924

Video Display Terminal

Televideo Systems, Inc.

Function	Command	Fu
		50
Address cursor to page, row,	ESC - prc	cu
column		Se
p == Page		be
Ø One		Se
2 Three		50
3 Four		ET
Address cursor to row and column	FSC = rc	Se
Read cursor on page, row, column	ESC /	Se
Read cursor row, column	ESC ?	50
Send data to hidden cursor	ESCLprc	Se
p = Page		
1 Two	Offici	PF
2 Three		Bu
3 Four		Bu
TAR STORS (page 70)		Bu
Set column of typewriter tab stops	ESC 1	Pri
at cursor column (protect mode off)		Pri
or field tab stops from cursor		Pri
downward (protect mode on)	CTDL I	Bic
protect mode off: field, protect	GIRLI	Bic
mode on)		
Tabulate to next field tab stop	ESC i	PC
(protect mode on)	500 I	00
Back tab (typewriter, protect mode	ESCI	
Clear current typewriter tab stop at	ESC 2	
cursor		
Clear all typewriter tab stops	ESC 3	
COMMUNICATION MODES (page 7	7)	
Block mode on	FSC B	
Half duplex mode on	ESC D H	
Full duplex mode on	ESC D F	
Previous conversation mode on;	ESC C	
block mode on		
EDIT MODES (page 77)		
Local edit mode on	ESC k 1	
Duplex edit mode on	ESC K Ø	
CHANGING DATA (page 78)		
Page edit mude on	ESC N 1	
Line edit mode on	ESC N Ø	
Insert space character	ESC Q	
Insert line of spaces	ESC F	
Delete line	ESC R	
Erase to end of line with spaces	ESC T	
Erase to end of line with nulls	ESC t	
Erase to end of page with spaces	ESC Y	
Erase to end of page with halls	200 y	
CLEARING DATA FROM MEMORY (page 85)	
Clear all with nulls	ESC * Ø	
Clear all with spaces	ESC * 2	D
Clear unprotected with spaces	ESC * 3	De
	or CTRL Z	
Clear current unprotected field to	CTRL X	AI
spaces		0
SELECTING A HANDSHAKING PRO	TOCOL (page 87)	
Disable X-On/X-Off; enable DTR	CTRL N	KE
line	OTDI O	Re
Enable X-On/X-Off; disable DTR	CIRLO	110
TRANSMITTING DATA (page 88)		_
Send unprotected characters in	ESC S 1	He
current line, to and including cursor	FSC S 2	
current line, to and including cursor	100 0 2	
Send line up to and including cursor	ESC S 3	м
Send unprotected page up to and	ESC S 5	Lo
Including cursor	ESC S 6	
including cursor	20000	

nction	Command
nd page up to and including	ESC S 7
nd unprotected message tween STX and FTX	ESC S 9
nd protected message between X and ETX	ESC S :
nd message between STX and x	ESC S ;
nd form nd terminal identification nd answerback code nd message line nd status line	ESC S ? ESC M ESC ^0 ESC Z 0 ESC Z 1
INTING (page 97) Iftered extension print mode on Iftered extension print mode off Iftered transparent print mode off Iftered transparent print mode off nt formatted unprotected page nt formatted protected page nt ormatted page to unformatted page interctional communication on Iirectional communication off	ESC @ ESC A ESC A ESC P ESC P 1 ESC P 2 ESC P 3 ESC P 3 ESC P 4 CTRL R CTRL R
IRT CONTROL fine port parameters	ESC { m $p_1 p_2 p_3 p_4$
m Port	
0 Computer 1 Printer port	
p, Baud Rate 0 150 1 300 2 1200 3 1800 4 2400 5 4800 6 9600 7 19200 p ₂ Word Length 0 7 bits 1 8 bits p ₃ Parity 0 Even (receive/transmit) 1 Odd (receive/transmit) 2 No	
p₄ Stop Bits Ø 1 1 2	
· w.	
ELIMITERS (page 103) fine delimiter code	ESC x (code)
SWERBACK MESSAGE (page 1)	13)
ange answerback text	ESC ^1 (text) CTRL Y
EYS (page 104) program one editing key program all editing keys n Key 0 Unshifted 1 Shifted	ESC 0 m a b c ESC] n (codes)
program function key	ESC p, p, (message) CTRL Y
ESSAGE LINE (page 109) ad message line	ESC f (text)

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