# TeleVideo 9065

# User's Guide

TeleVideo®

# TeleVideo
# 9065 Video Display Terminal
# USER'S GUIDE

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# Table of Contents

## Chapter 3 OPERATION



## Chapter 4 VIDEODESK

## Chapter 10 CHARACTER SETS

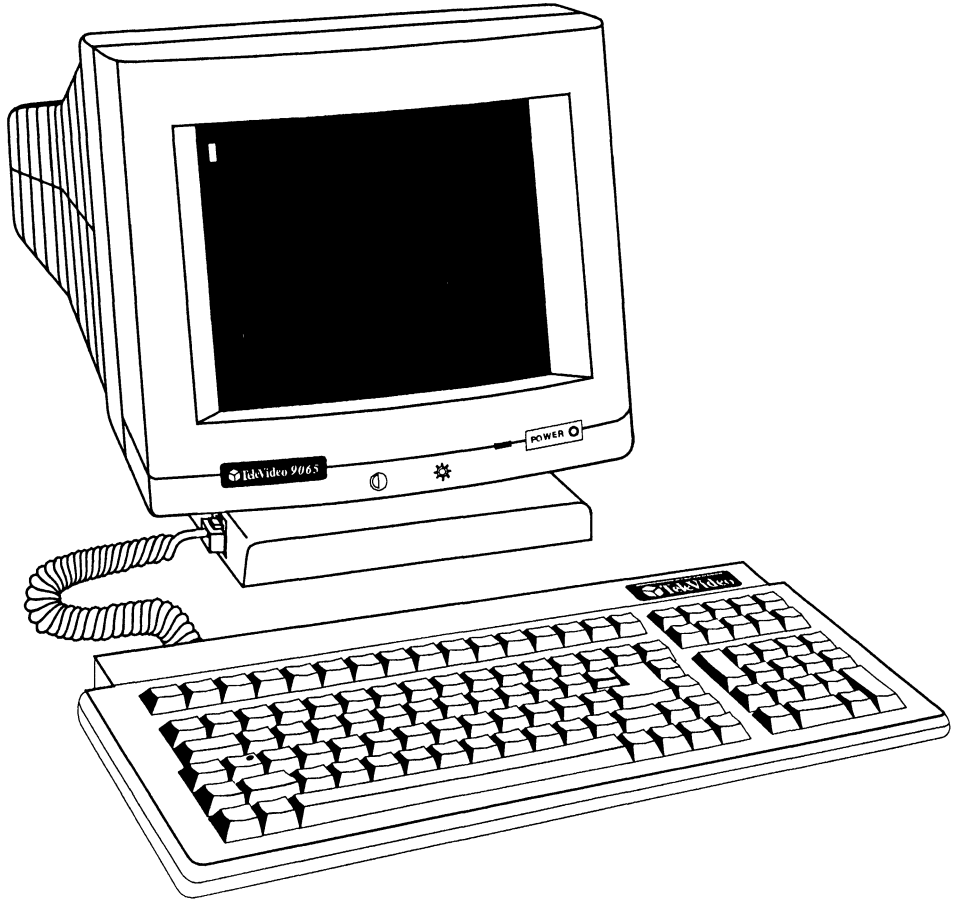


## Chapter 11 DATA TRANSMISSION

## Chapter 12 REPROGRAMMING

# Introduction

The TeleVideo 9065 is a high-performance terminal, designed to operate in the ASCII, PC terminal, and ANSI environments, providing considerable flexibility. It has also been designed to be user friendly. You'll find that the terminal is very easy to use, with many features that simplify your work. Keep this manual near the terminal for future reference. This terminal will provide you with many years of trouble-free service.




The 9065 Video Data Terminal

# About This Manual

This manual is organized in three parts:

- **Operation** Installation, setup, daily operation, and problem-solving. Read this portion of the manual. It's written to help you take best advantage of all the time-saving and work-saving features of the terminal. Chapters 1-5.
- **Programming** 9065-mode commands and some technical details about terminal operation. Chapters 6-12.
- **Reference** Specifications, code tables, and operational references. Appendices A-H.

## Local Keys

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

Ctrl C

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

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

## Escape Key Sequences

The terminal responds to escape sequences from the host or from the keyboard. To enter an escape sequence from the keyboard, momentarily press the **Esc** key, then sequentially press the keys for the string of characters shown in the escape sequence.

## Command Code Variables

Command codes listed in Appendices C and D (and described in Chapters 6 -12) may have variable values as part of the code to be entered. Variables are shown in italics. For example, if you are directed to enter a date, it will be shown as *mm dd yy*.

## Special Notices

This manual has three types of notices that require special attention

**NOTE** Information of special interest or importance about a feature.

**CAUTION**

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

**WARNING**

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

# Chapter 1
# INSTALLATION

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

## Preparation

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

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

## Choosing a Site

- Choose a location with indirect lighting, away from windows or other sources of bright, direct light.
- Allow 4 inches (10.2 cm) of clearance for ventilation on all sides.
- Place the keyboard lower than the terminal screen.
- Select furniture conducive to good working posture.

You can sit as close to the screen as you wish, without fear of radiation. Tests performed on TeleVideo terminals by Underwriters Laboratories indicate they emit virtually no radiation and pose no health hazard.

## Interface Types and Cables

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

If the distance between the terminal and your computer or modem is less than 50 feet, connect them with an RS-232C interface cable.

The terminal offers several interface options for distances greater than 50 feet, available through your dealer: RS-422, current loop, and internal modem. Ask your dealer or distributor for help in selecting the appropriate interface.

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

## Installation

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

**WARNING**

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

## Unpacking the Terminal

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

## Attaching the Keyboard

**CAUTION**

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

Plug the end of the coiled keyboard cable into the left side of the terminal (Figure 1-1).

## Connecting a Parallel Printer

Make sure your printer is a Centronics compatible printer. Connect its cable between the (default) PARALLEL port on the terminal (Figure 1-2) and the parallel port on the printer. See the pin assignment tables at the end of this chapter to verify the type of cable required.

## Connecting a Serial Printer

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

## Host Connections

Make sure you have the appropriate interface, as discussed at the beginning of this chapter. For an RS-232C interface, connect the cable between the COM1 (or COM2) port and the RS-232C port on the host or modem. If you have to rewire the RS-232C connector for proper communication with the computer, see "RS-232C Pin Assignments" later in this chapter.

This completes the installation steps. See Chapter 3 for adjustment and operating instructions.

## Port Pin Assignments

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

## Serial Ports

Determine the signals that each unit requires. Typically, the terminal requires only Transmit Data, Receive Data, and Ground (pins 2, 3, and 7) for serial communication. Some computers, however, may require additional signals. Find out if the serial port for each interface is a data communication equipment (DCE) or data terminal equipment (DTE) type. Check the computer and printer manuals for data on port type, required signals, and signal direction.

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

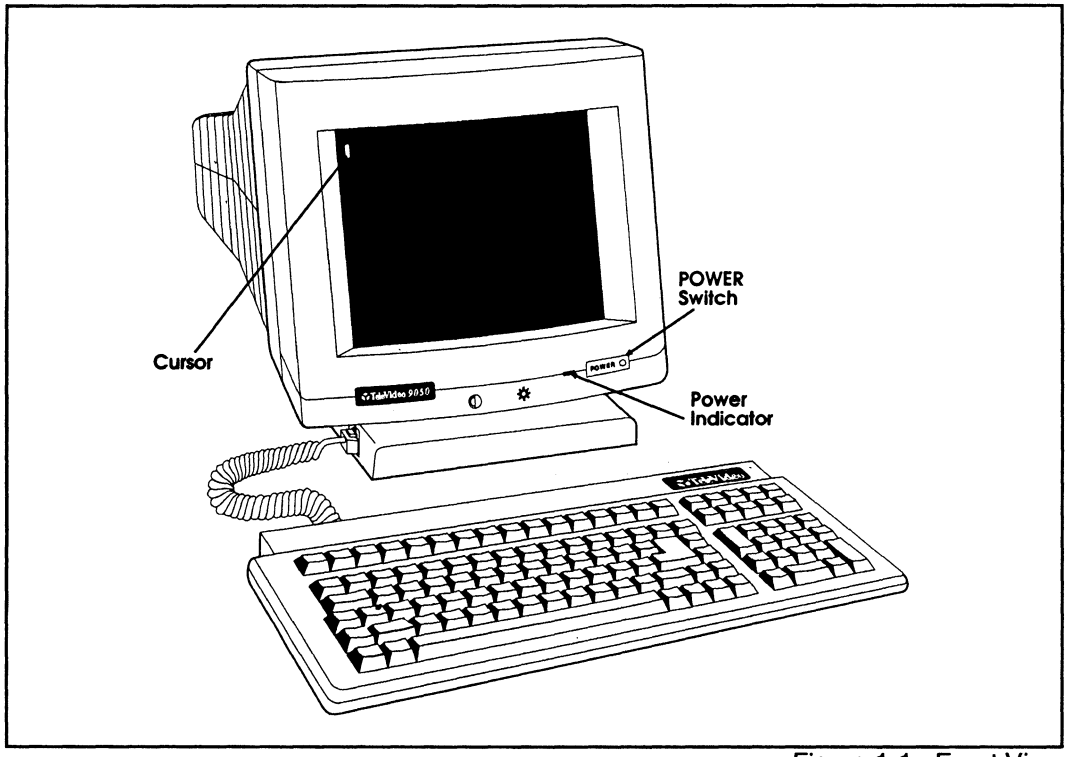



Figure 1-1. Front View

## COM1 Serial Port

The COM1 port has a male 25-pin D-connector; your computer or printer may not have a 25-pin connector (some units have a 9-pin connector) or the DCE/DTE interfaces may not match up. In such cases, consult a technician or your dealer for assistance. When connecting the COM1 port to a host computer, refer to its manual and Table 1-1. Active-high TTL signals in the table are followed by +, active-low signals by -.

**Table 1-1. COM1 Port (DTE) Signals**

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

## COM2 Serial Port

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

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

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

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

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

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

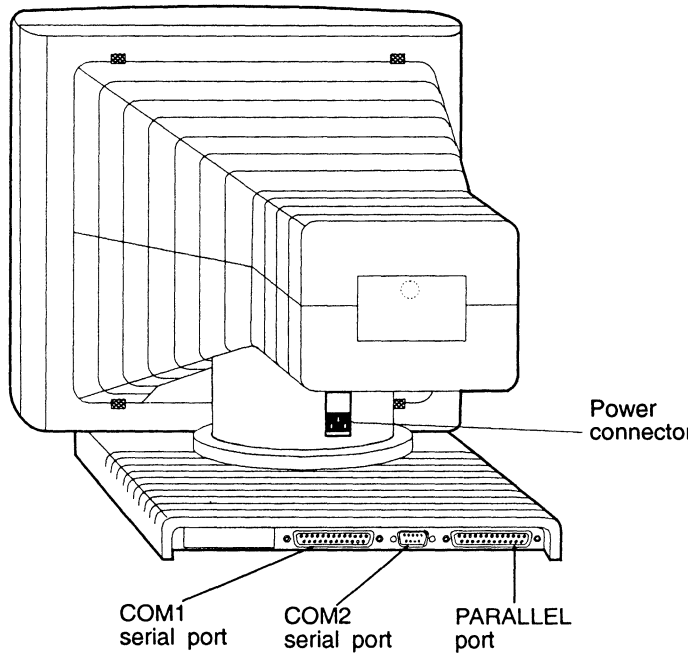



Figure 1-2. Rear View

the manual supplied with the computer or device. Active-high TTL signals in the table are followed by +, active-low signals by -.

Table 1-2. COM2 Port Signals

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

## Serial Port Verification

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

## PARALLEL Port

The parallel port has a 25-pin D-connector, with Centronic-compatible signal levels. At a print command, the STROBE- signal gates the first byte of data out on data lines D0-D7 to the printer. The printer responds with acknowledge signal ACK-, and the process repeats until the last byte is sent to the printer. The presence of any other input signal from the printer (BUSY+, P E+, or ERR-) will inhibit all data lines to the printer. Pin assignments are shown in Table 1-3.

**NOTE:** Mnemonics for active-high signals are followed by a + sign (e.g. BUSY+); active-low signals are followed by a - sign (e.g. STB-).

Table 1-3. PARALLEL Port Signals

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

## Plugging In the Terminal

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

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

## Turning On the Power

Press the power switch (Figure 1-1) to turn on power; make sure the green power indicator is on. After a moment, the beeper sounds; after 10 to 15 seconds, the self-test display appears.

## Self-Test

The terminal self-test program automatically checks the display memory, the system memory, and the keyboard circuit. After successful completion of this test, the screen should display messages similar to those shown in Figure 1-3.

The "PRESS ANY KEY TO CONTINUE" message should be blinking. If you forgot to connect the keyboard, you should see the following message:

```
Keyboard  ==> Disconnected/Failed
```

Any memory failures will also be displayed.

Turn power off and correct the indicated problem.

Turn power on; verify a successful self-test as indicated in Figure 1-3.

To continue to the next procedure, press any key. This places the terminal in the communication mode.

After the self-test display is no longer displayed, you should see the cursor in the upper left corner. You may also see a status line above the cursor.

```
*. Display Memory  ==>    OK

*. System Memory   ==>    OK

*. Keyboard        ==>    OK

                          TVS 9065  REV B.0


PRESS ANY KEY TO CONTINUE
```

Figure 1-3. Self Test message

# NOTES

# Chapter 2
# SET UP

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

In general, there are three types of set up parameters:

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

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

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

## Parameter Menus

This chapter presents the set up menus; the set up menu names and the parameters each menu controls are as follows:

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

**GENERAL** Terminal modes: personality, communication, monitor, autowrap, edit, font choice, send acknowledge, received carriage return, port configuration, and dual session choices.

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

**KEYBOARD** Key click, key repeat, caps lock; margin bell, editing key functions, international character mode, WordStar mode.

**COM1** Serial port communication values.

**COM2** Serial port communication values.

**ATTRIBUTE** Visual attribute characteristics, write-protect attributes.

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

## Entering Set Up

**CAUTION**

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

To enter set up mode, press

[Shift] [Set Up/No Scroll]

Use the cursor keys to move through eight screen menus, and the space bar to toggle values. From these menus you can either choose a new value or toggle an action.

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

To save your choices, select the COMMAND menu, and select SAVE PARAMETERS. To exit from set up mode, either press

[Shift] [Set Up/No Scroll]

or select the COMMAND menu, then EXIT.

## Help Lines

At the bottom of each menu are two lines that show you how to move the cursor and choose options. Also shown are the commands **Ctrl P** to print the screen, **Ctrl S** to save and exit, and **Esc** to exit without saving any changes.

## The Command Menu

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

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

**SAVE PARAMETERS** Saves current set up values in permanent memory. (Chapter 6)

**CAUTION**

The following action destroys all reprogrammed operating values!

**DEFAULT PARAMETERS** Resets set up parameters to factory default values if you are in single session mode. If you are in dual-session mode, it resets set up parameters (except language) to factory default values for current session. (Chapter 6)

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

**CLEAR SCREEN** Clears screen display.

**CLEAR COMMUNICATIONS** Unlocks the keyboard; clears COM1 and COM2 buffers; disables any print mode enabled. (Chapter 7)

**RESET TERMINAL** Returns all operating values to those last saved in nonvolatile memory; leaves set up. (Chapter 6)

**CAUTION**

This action destroys all reprogramming in the function and editing keys!

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

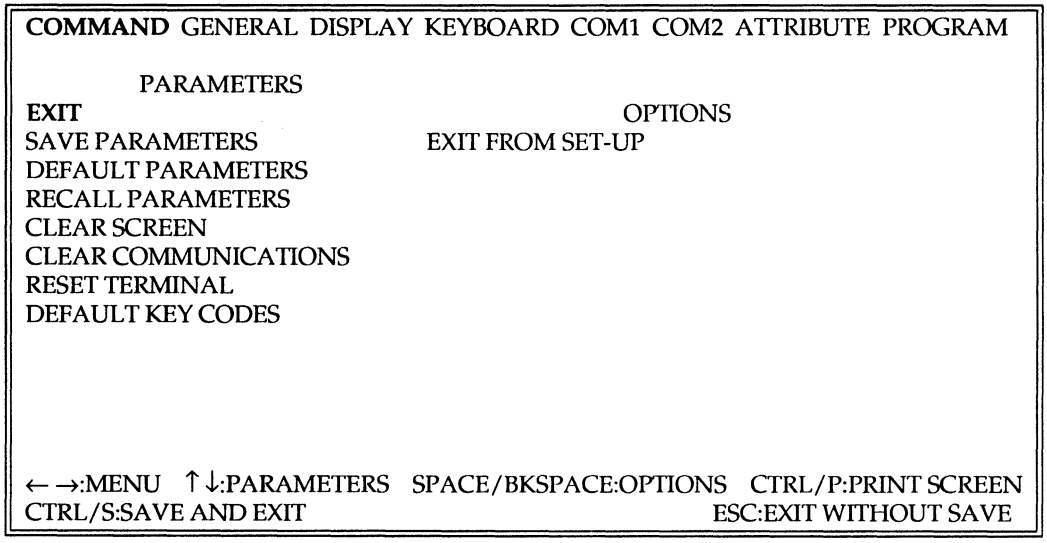



Figure 2-1. COMMAND Menu

## The General Menu

The General menu (Figure 2-2) controls a number of operating modes, as described in the following paragraphs.

**PERSONALITY = 9065** and other terminal emulations, (Chapter 6, Appendix C).

**CAUTION**

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

**ENHANCE MODE = OFF** or ON. Command sets of non-native personalities include additional native commands. (Chap. 6, Appendix C)

**COMM MODE** = Communication modes: HALF DUPLEX, **FULL DUPLEX**, BLOCK, HALF BLOCK, LOCAL. (Chapter 11)

**MONITOR MODE** = ON or **OFF**: Terminal displays control characters (ON) instead of interpreting them as commands (**OFF**). (Ch. 3, 7)

**AUTOWRAP = ON** or OFF: When cursor reaches end of the line during data entry, it wraps to the beginning of the next line (**ON**) or stays at the end of line (OFF). (Autowrap Mode, Ch. 9)

**EDIT MODE** = Editing commands affect data to end of **LINE** or end of PAGE. (Chapter 9)

**FONT CHOICE** = When personality or screen configuration changes, character set automatically changes to match **PERSONALITY,** LAST USED, or PC. (Chapter 10)

**SEND ACKNOWLEDGE = OFF** or ON. ON means the terminal sends the ASCII ACK character (06h) after operations that require the host to temporarily suspend transmission. (Ch. 11)

**RECEIVE CR** = The terminal responds to a carriage return code (CTRL-M) with **CR** or CR/LF. (New Line Mode, Chapter 9)

**HOST PORT = COM1** or COM2 sends data to the host out the selected port (Chapter 11 for commands and Chapter 1 for port pin-outs)

**DUAL SESSION = OFF** or On. (See Chapter 3 for description of dual session vs. single session)

**PRINTER = PARALLEL**, COM2, or COM1. Serial ports available only in single session.

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

**PRINT PAGE FLIP = ON** or OFF

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

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

| PARAMETERS | OPTIONS | |
|---|---|---|
| **PERSONALITY = 9065** | **9065** | 965 |
| ENHANCE MODE = OFF | 912/920 | 910 |
| COMM MODE = FULL DUPLEX | 925/910+ | 950 |
| MONITOR MODE = OFF | 955 | WY-160 |
| AUTOWRAP = ON | WY-120/150 | WY-60 |
| EDIT MODE = LINE | WY-50/50+ | PC-TERM |
| FONT CHOICE = PERSONALITY | ADDS-A2 | ADDS-VP60 |
| SEND ACKNOWLEDGE = OFF | HZ-1500 | DG-200 |
| RECEIVE CR = CR | ADM-31 | IBM3101-1X |
| HOST PORT= COM1 | IBM3101-2X | IBM3161V |
| DUAL SESSION = OFF | VT-100/52 | |
| PRINTER = PARALLEL | | |
| PRINT MODE = NONE | | |
| PRINT PAGE FLIP = ON | | |
| AUTO PAGE FLIP = OFF | | |

←→:MENU ↑↓:PARAMETERS SPACE/BKSPACE:OPTIONS CTRL/P:PRINT SCREEN
CTRL/S:SAVE AND EXIT ESC:EXIT WITHOUT SAVE

Figure 2-2. The GENERAL Menu

## The Display Menu

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

**COLUMNS** = Number of columns per page of memory: **80**, 132 80 DSPLY (132 with only 80 displayed), 132. (Chapters 3 & 7)

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

**CAUTION**

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

**LINES** = Number of data lines on the screen (**24**, 25, 42, 43, 48, 49). (Chapter 8)

**PAGE LENGTH** = Number of lines per page of memory (**1 X LINES**, 2 X LINES, 4 X LINES, 1 + MEM). (Chapter 8)

**NUMBER OF PAGES** = 1 to **7** memory pages.

**STATUS LINE** = Appearance (attribute) of the status line: NORMAL, **REVERSE**, UNDERLINE. (Chapter 7)

**TOP LINE** = Contents of the top information line: NONE, **STATUS**, USER 1, USER 2, F-KEY LABEL. (Chapter 12)

**BOTTOM LINE** = Contents of the bottom information line: **NONE**, STATUS, USER 1, USER 2, F-KEY LABEL. (Chapter 12)

**CURSOR TYPE** = Appearance (attributes) of the cursor: **BLK BLINK**, BLK STEADY, UNDL BLINK, UNDL STEADY, NONE. (Chapter 7)

**SCREEN SAVER** = Screen goes blank after **10**, 20, or 30 minutes of inactivity, or remains displayed if NONE is selected. (Chapter 7)

**SCROLL RATE** = Data scrolls onto the screen at the rate of reception (**JUMP**), smoothly at a relative rate (SMOOTH 8, 4, 2, or 1). (Chapter 7) NO SCROLL means that the cursor wraps from the bottom of the page to the top, so data cannot scroll off the page and be lost. (Chapt. 8)

**OVRSCAN BORDER** = Overscan Options are: BKGROUND, DARKEST, 2, 3, 4, and LIGHTEST.

**CHAR CELL** = Character cell options are **10x16**, 10x14, or 10x12 with 24/25 lines, or 10x8 with 42/43/48/49 lines.

**BACKGROUND** = Screen background: **DARK** or LIGHT. (Chapter 7)

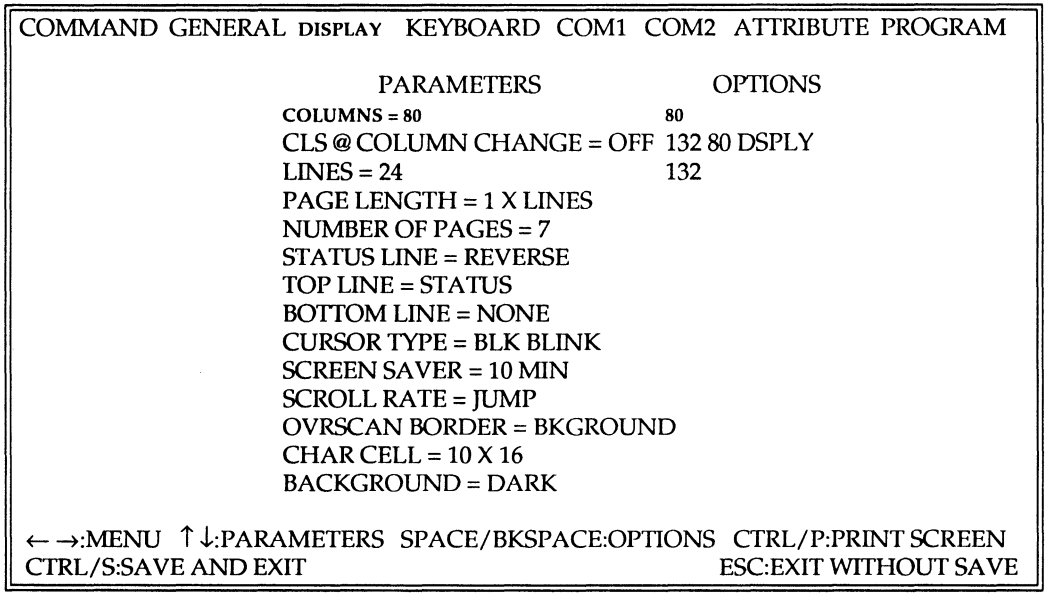



Figure 2-3. The DISPLAY Menu

## The Keyboard Menu

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

**LANGUAGE** = National character set can be **US** or one of 12 other international character sets. (Chapter 10)

**KEY CLICK = ON** or OFF: Controls whether keys make a sound when pressed. (Chapter 7)

**KEY REPEAT = ON** or OFF: Controls whether keys repeat when held down a half second. (Chapter 7)

**CAPS LOCK+SHFT** = In **CAPS** mode, the **Shift** key upper-cases letters, whether CAPS LOCK is engaged or released; in LWR CASE mode, pressing **Shift** will make characters lower case when CAPS LOCK is on. (Chapter 7)

**MARGIN BELL** = ON or **OFF**: Controls whether the bell (beep) sounds when data entry reaches the margin column. (Chapter 7)

**RETURN KEY** = Key function can be carriage return (**CR**), carriage return and line feed (CR/LF), or TAB. (Chapter 12)

**ENTER KEY** = Key function can be carriage return (**CR**), carriage return and line feed (CR/LF), or TAB. (Chapter 12)

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

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

**BREAK KEY** = Break signal can be **250ms**, 170ms, 500ms, 2 Sec, or NONE. (Chapter 7)

**WORDSTAR MODE** = ON or **OFF**: Controls whether editing and function keys send WordStar commands. (Chapter 12, Appendix D)

**FUNCT/ALT/COMPOSE KEY** = options are **FUNCT**, META, 3rd LEGEND, or COMPOSE. (Chapters 3, 12)

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

**INT'L CHAR MODE** = Options are: **7** or 8. You can choose between 7-bit or 8-bit character mode.

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

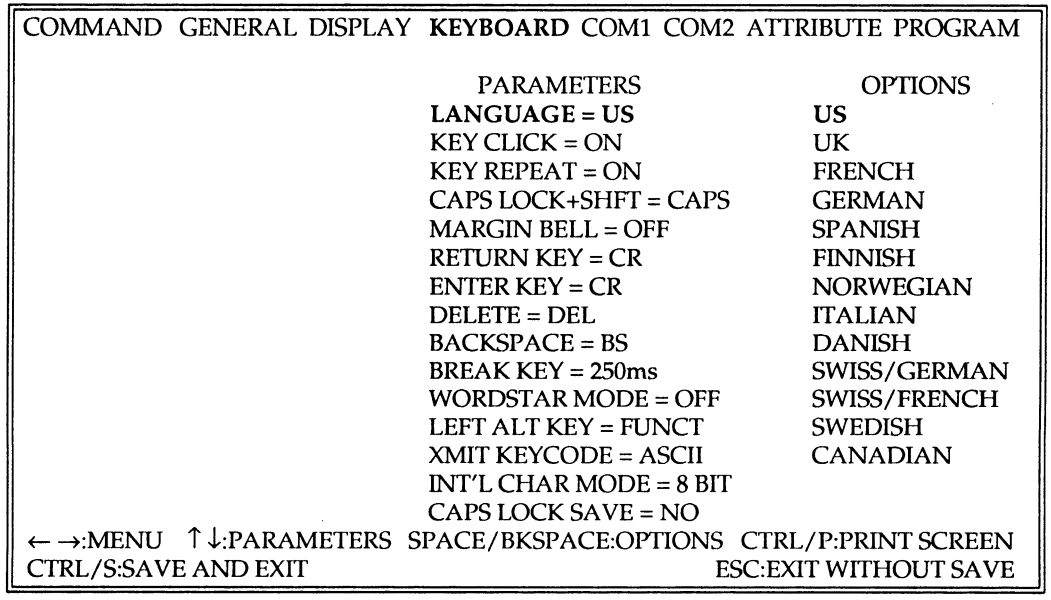



Figure 2-4. The KEYBOARD Menu

## The COM1 Menu

Set communication parameters for the COM1 port in this menu. Chapters 1 and 11 explain communication between the terminal and the host or peripheral devices.

**BAUD RATE** = Select from 50 to 38.4K; default **9600**.

**DATA BITS** = **8** or 7.

**STOP BIT** = **1** or 2.

**PARITY** = **NONE**, ODD, EVEN, MARK, SPACE.

**REC HANDSHAKE** = Handshaking signal sent by the terminal when receiving data can be **XON/XOFF**, DTR, NONE, or BOTH.

**XMT HANDSHAKE** = Handshaking signal accepted by the terminal when transmitting can be XON/XOFF, DCD/DSR, or **NONE**.

**BUFFER THRESHOLD** = The number of bytes from the top of the modem port buffer at which the terminal begins handshaking can be **16**, 32, 64, or 128.

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

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

**EIGHTH DATA BIT** = **IGNORE** or PROCESS.

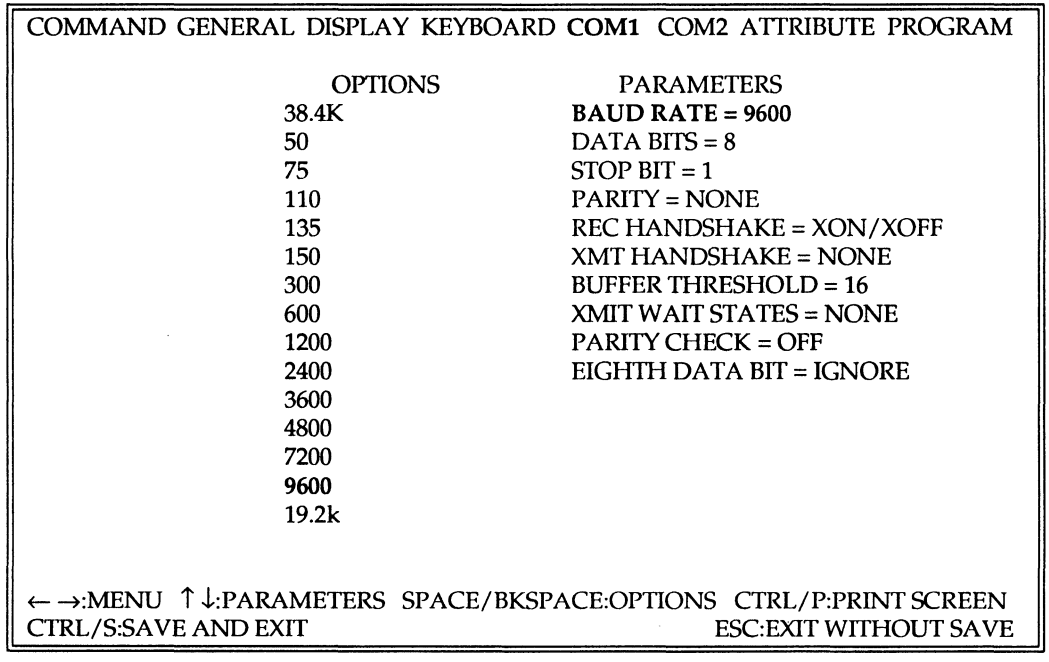



Figure 2-5. The COM1 Menu

## The COM2 Menu

Set communication parameters for the COM2 port in this menu. Chapters 1 and 11 explain communication between the terminal and the host or peripheral devices.

**BAUD RATE** = Select from 50 to 38.4K; default **9600.**

**DATA BITS = 8** or 7.

**STOP BIT = 1** or 2.

**PARITY** = **NONE**, ODD, EVEN, MARK, SPACE.

**REC HANDSHAKE** = Handshaking signal sent by the terminal when receiving data can be XON/XOFF, **DCD/DSR**, NONE, or BOTH. (In dual session, default is XON/OFF.)

**XMT HANDSHAKE** = Handshaking signal accepted by the terminal when transmitting data can be XON/XOFF, DTR, NONE, or **BOTH**. (In dual session, default is NONE.)

**BUFFER THRESHOLD** = The number of bytes from the top of the modem port buffer at which the terminal begins handshaking can be **16**, 32, 64, or 128.

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

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

**EIGHTH DATA BIT = IGNORE**, or PROCESS

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

| OPTIONS | PARAMETERS |
|---|---|
| 38.4K | **BAUD RATE = 9600** |
| 50 | DATA BITS = 8 |
| 75 | STOP BIT = 1 |
| 110 | PARITY = NONE |
| 135 | REC HANDSHAKE = DCD/DSR |
| 150 | XMT HANDSHAKE = BOTH |
| 300 | BUFFER THRESHOLD = 16 |
| 600 | XMIT WAIT STATES = NONE |
| 1200 | PARITY CHECK = OFF |
| 2400 | EIGHTH DATA BIT = IGNORE |
| 3600 | |
| 4800 | |
| 7200 | |
| **9600** | |
| 19.2K | |

←→:MENU ↑↓:PARAMETERS SPACE/BKSPACE:OPTIONS CTRL/P:PRINT SCREEN
CTRL/S:SAVE AND EXIT ESC:EXIT WITHOUT SAVE

Figure 2-6. The COM2 Menu

## The Attribute Menu

The Attribute menu parameters affect the nature and extent of visual attributes and specify the attributes of write-protected characters. See Chapter 7 for a detailed explanation of visual attributes.

**ATTRIBUTE** = Visual attributes may be by **CHAR**acter, LINE, or PAGE. See comment at the end of the descriptions below.

**CAUTION**

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

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

### WRITE PROTECT ATTRIBUTES:

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

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

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

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

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

**Character**-based attributes are available in 9065, 965, WY-60, WY-120/150, WY-160, VP A2, VP 60, PC Term, IBM 3101 and 3161, VT100, and DG200 modes. **Field**-based attributes are available in 9065, 965, 955, 910/910+, 912/920, 925/905, 950, WY-60, WY-50/50+, Hazeltine 1500, and ADM 31 modes.

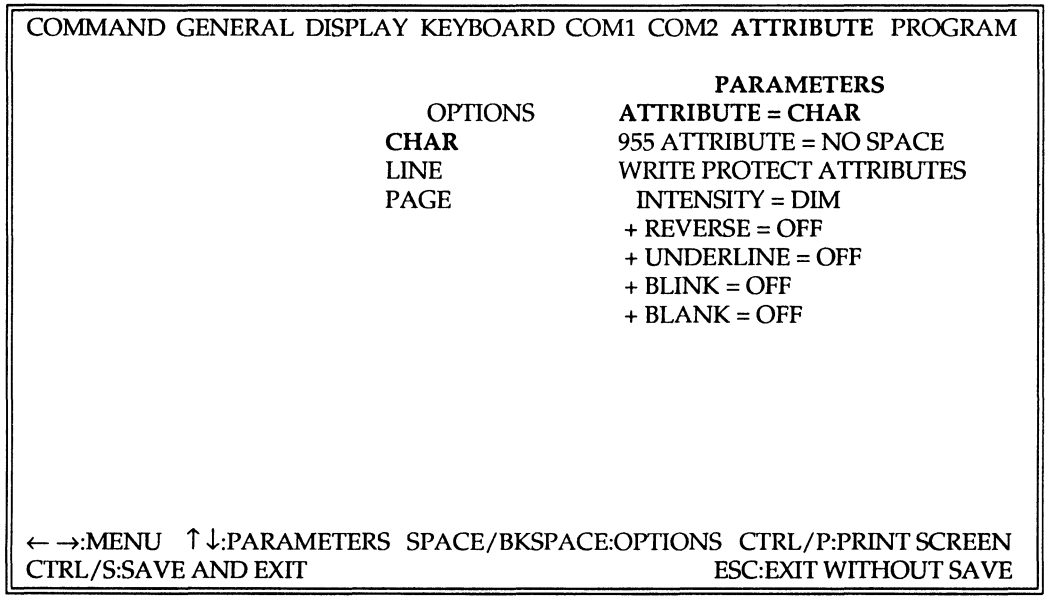



Figure 2-7. The ATTRIBUTE Menu

## PROGRAM MENUS

The Program menus consist of five subordinate menus (F-Key, Edit Key, Key-pad, Answerback, and Delimiter), named in the OPTIONS window when you enter each submenu. The remaining display in the PARAMETERS window contains fields of the current submenu.

To display other submenus, highlight the Program = field in the PARAMETERS window and press the space bar. To select fields in each submenu, press the up/down arrows.

Reprogramming is also explained in Chapter 12.

If you select a programmable function, the following message appears on the menu:

```
PRESS <ENTER> TO BEGIN PROGRAMMING
```

### Function Key Logical Sets

The terminal has four logical sets of function keys. The 16 function keys (F1 through F16) in each set can send 32 separate messages, since pressing a key alone sends one message, and pressing the same key with **Shift** sends another. So a total of 128 function keys are available.

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

Follow these steps to reprogram function keys:

1. Highlight the SET field.
2. Press the space bar until the number of the desired function key set (1, 2, 3, or 4) is highlighted.
3. Now move to the F-KEY field.
4. Press any unshifted or shifted function key to select it for reprogramming. The key number appears in the PARAMETERS window, with the current message in the OPTIONS window. If you press a shifted key, an **s** appears in front of the key number.
5. To start reprogramming the message, press **Enter**

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

After pressing **Enter** on the numeric pad, you should see the following messages on the menu.

```
<ESC> TO ABORT PROGRAM
          <ENTER> TO EXIT PROGRAM
```

```
COMMAND GENERAL DISPLAY KEYBOARD COM1 COM2 ATTRIBUTE PROGRAM

                                          PARAMETERS
                    OPTIONS               PROGRAM = F-KEY
F-KEY               EDIT KEY  NUMERIC PAD SET = 1
ANSWERBACK          DELIMITER             F-KEY = F1
                                          F-KEY LABEL =
                                          XMIT DIRECTION = HOST
                                          SAVE F-KEY LABEL = OFF
                                          ----------
                                          TOTAL CHAR LEFT:   159
                                          CHAR USED THIS KEY: 003

←→:MENU ↑↓:PARAMETERS SPACE/BKSPACE:OPTIONS CTRL/P:PRINT SCREEN
CTRL/S:SAVE AND EXIT                        ESC:EXIT WITHOUT SAVE
```

Figure 2-8. Program Menu: F-KEY

6. Use keys listed at the bottom of the screen to edit your message and move the cursor:

   ←↑↓→: Move the cursor around in the message.

   **BKSPACE**: Clears the current message. You can restore the message by pressing **Esc** immediately.

   **DEL**: Deletes characters to the right of the cursor one at a time.

   **INSERT**: Toggles between character insert and character replace modes.
7. Enter the new message. It can be any combination of alphanumeric and control characters. Press control keys (**Ctrl** + key) to enter commands in the message. For example, to enter the carriage return character, press

   [Ctrl] [M]
8. To enter the ESC character in an escape sequence, type

   [Ctrl] [[]

   If you make a mistake, move the cursor with the arrow keys back to the position of the error and correct the mistake.
9. Each function key set has a total memory capacity of 255 bytes in single session (127 bytes in dual session), which can be distributed any way among the keys. Two fields at the bottom the PARAMETERS window show the number of characters remaining in the function key set memory and the number of characters programmed into the current key. As you program, the figures update. When memory is full, the terminal beeps.
10. To end the loading process and save the message, press

    [Enter]
11. Move to the LABEL field, press **Enter**; then type up to nine characters (80 columns) or seven characters (132 columns) as a label for the key. Use the keys described in Step 6 to edit the label. (Labels for keys **F8** and **F16** take only eight characters.)

**NOTE:** Enable display of the function key labels on screen in the Display set up menu.

The DIRECTION field lets you determine where the message goes when you press a function key:

- **HOST** To the host computer
- **LOCAL** To the terminal (screen)
- **BOTH** To host and terminal
- **PRINTER** To the printer

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

## The Editing Key Submenu

Editing keys send ASCII characters (codes) that control editing operations, data transmission, and cursor movement. This submenu (Figure 2-9) lets you change the codes sent by the editing keys listed in the PARAMETERS window and specify their destination (i.e., editing key mode). Your program can also change the key codes and destination mode.

**NOTE:** Only the main keyboard **Tab** key is reprogrammable in this submenu. Reprogram the numeric keypad **Tab** key in the KEYPAD submenu.

The steps below tell how to reprogram the editing keys and set the editing key mode. Procedures similar to reprogramming the function keys are not repeated in full here; refer to Chapter 12 for a complete explanation.

1. Enter the Program set up menu and press the space bar to display the EDIT KEY submenu.
2. Move the cursor down to the EDIT KEY = or SHIFT/EDIT KEY = (for shifted keys) field. A list of editing keys appears in the OPTIONS window, and the current code of the highlighted key appears in the CONTENT: field at the bottom of the window. An asterisk (*) in front of the code indicates the code display is the default code.
3. Press the space bar to highlight the desired key.

NOTE: When you select a programmable function, the following message appears on the menu:

```
PRESS <ENTER> TO BEGIN PROGRAMMING
```

4. Press
   **Enter**
   to start reprogramming the key. You can use the keys listed at the bottom of the screen to edit your message and move the cursor. See the explanation of key operations in the function key reprogramming section for more information.
   Once you enable the programming function, the following messages appear on the menu.

```
<ESC> TO ABORT PROGRAM
        <ENTER> TO EXIT PROGRAM
```

5. Enter up to five bytes as the new key code. The new codes display in the CONTENT: field as you enter them.
6. Press
   **Enter**
   to end the loading process. This automatically saves the new key contents in nonvolatile memory.

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

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

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

```
COMMAND GENERAL DISPLAY KEYBOARD COM1 COM2 ATTRIBUTE PROGRAM

                                                PARAMETERS
                    OPTIONS                     PROGRAM = EDIT KEY
F-KEY               EDIT KEY   NUMERIC PAD      EDIT KEY = HOME
ANSWERBACK          DELIMITER                     XMIT DIRECTION = NORMAL
                                                SHF/EDIT KEY = HOME
                                                 XMIT DIRECTION = NORMAL

←→:MENU ↑↓:PARAMETERS  SPACE/BKSPACE:OPTIONS  CTRL/P:PRINT SCREEN
CTRL/S:SAVE AND EXIT                          ESC:EXIT WITHOUT SAVE
```

Figure 2-9. Program Menu: EDIT KEY

## Numeric Pad Submenu

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

> **NOTE:** Only the numeric keypad **Tab** key is reprogrammable in this submenu. Reprogram the main keyboard **Tab** key in the EDIT KEY submenu.

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

1. Enter the Program set up menu and press the space bar to display the NUMERIC PAD submenu.
2. Move the cursor down to the KEY = or SHIFT/KEY = (for the shifted keys) field.

   A list of keys appears in the OPTIONS window, and the current code of the highlighted key appears in the CONTENT: field at the bottom of the window.
3. Press the space bar to highlight the desired key.
4. Press

   **Enter**

   to start reprogramming the key.

   Once you enable the programming function, the following messages appear on the menu.

```
<ESC> TO ABORT PROGRAM
        <ENTER> TO EXIT PROGRAM
```

5. Use the keys listed at the bottom of the screen to edit your message and move the cursor. See the explanation of key operations in the function key reprogramming section for more information.
6. Enter up to five bytes as the new key code. The new codes display in the CONTENT: field as you enter them.
7. Press

   **Enter**

   to end the loading process. This automatically saves the new key contents in nonvolatile memory.

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

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

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

```
COMMAND GENERAL DISPLAY KEYBOARD COM1 COM2 ATTRIBUTE PROGRAM

                                              PARAMETERS
                    OPTIONS                   PROGRAM = NUMERIC PAD
F-KEY               EDIT KEY      NUMERIC PAD KEY = 7
ANSWERBACK          DELIMITER                   XMIT DIRECTION = NORMAL
                                              SHF/KEY = TAB
                                                XMIT DIRECTION = NORMAL

←→:MENU ↑↓:PARAMETERS SPACE/BKSPACE:OPTIONS CTRL/P:PRINT SCREEN
CTRL/S: SAVE AND EXIT                          ESC: EXIT WITHOUT SAVE
```

Figure 2-10. Program Menu: NUMERIC PAD

## The Answerback Submenu

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

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

**CAUTION**

Once you conceal the answerback message, **you cannot display it again.**

The steps below tell how to load an answerback message.

1. Enter the Program set up menu and press the space bar to display the ANSWERBACK submenu.
2. Move the cursor down to the ANSWERBACK field.
3. To start reprogramming the key, press **Enter**

   Once you enable the programming function, the following messages appear on the menu.

```
<ESC> TO ABORT PROGRAM
          <ENTER> TO EXIT PROGRAM
```

4. Use the keys listed at the bottom of the screen to edit your message and move the cursor. See the section on reprogramming the function keys.
5. Enter up to 31 bytes as the new message.
6. To end the entry, press **Enter**
7. To conceal the message, move the cursor down to the CONCEALED field and press the space bar to highlight the ON value.

**CAUTION**

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

8. To reprogram a concealed message, select CONCEALED = OFF. This destroys the existing message. Then return to the ANSWERBACK = field and load a new message.

```
COMMAND GENERAL DISPLAY KEYBOARD COM1 COM2 ATTRIBUTE PROGRAM

                                          PARAMETERS
                                    PROGRAM = ANSWERBACK
                OPTIONS             ANSWERBACK
F-KEY      EDIT KEY   NUMERIC PAD   CONCEALED = OFF
ANSWERBACK DELIMITER

←→:MENU ↑↓:PARAMETERS SPACE/BKSPACE:OPTIONS CTRL/P:PRINT SCREEN
CTRL/S:SAVE AND EXIT                        ESC:EXIT WITHOUT SAVE
```

Figure 2-11. Program Menu: ANSWERBACK Message

## The Delimiter Submenu

The terminal automatically inserts field, line, and message delimiters when it transmits text to the host. Chapter 11 describes the function of delimiters in transmissions to the host. You can reprogram the transmission delimiters in this submenu.

The following steps tell how to reprogram the delimiters.

1. Enter the Program set up menu; repeatedly press the space bar until the word DELIMITER is highlighted on the OPTIONS window.
2. On the PARAMETERS window, move the cursor down to highlight DELIMITER = FIELD SEP.
3. Press the space bar to select the delimiter you want to reprogram.
4. To start reprogramming the delimiter, press **Enter**

   Once you enable the programming function, the following messages appear on the menu.

```
<ESC> TO ABORT PROGRAM
          <ENTER> TO EXIT PROGRAM
```

5. Use the keys listed at the bottom of the screen to edit the code and move the cursor. See the explanation of key operations in the function key reprogramming section for more information.
6. Enter two bytes as the new delimiter. To end the code, press **Enter**

```
COMMAND GENERAL DISPLAY KEYBOARD COM1 COM2 ATTRIBUTE PROGRAM

                                                PARAMETERS
                                              PROGRAM = DELIMITER
                    OPTIONS                   DELIMITER = FIELD SEP
  F-KEY             EDIT KEY   NUMERIC PAD
  ANSWERBACK        DELIMITER

←→:MENU  ↑↓:PARAMETERS  SPACE/BKSPACE:OPTIONS  CTRL/P:PRINT SCREEN
CTRL/S:SAVE AND EXIT                          ESC:EXIT WITHOUT SAVE
```

Figure 2-12. Program Menu: DELIMITER

# Chapter 3
# OPERATION

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

The terminal's desktop accessory program, VideoDesk,™ is explained in Chapter 4. Trouble-shooting procedures are covered in Chapter 5.

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

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

If you suspect the terminal is not working properly, first look at the troubleshooting suggestions in Chapter 5. Then if you need help, call your system administrator, dealer, or distributor.

## Starting Up

This section assumes that the terminal is already installed. If the terminal is not yet installed, see Chapter 1, "Installation," for instructions.

Turn on the terminal. After a few seconds, the terminal beeps; the self-test display should indicate that memory and keyboard are OK. Press any key to clear the screen.

Presently the cursor appears in the upper left corner of the screen; a status line may appear above the cursor. You may also receive boot and login messages from your operating system.

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

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

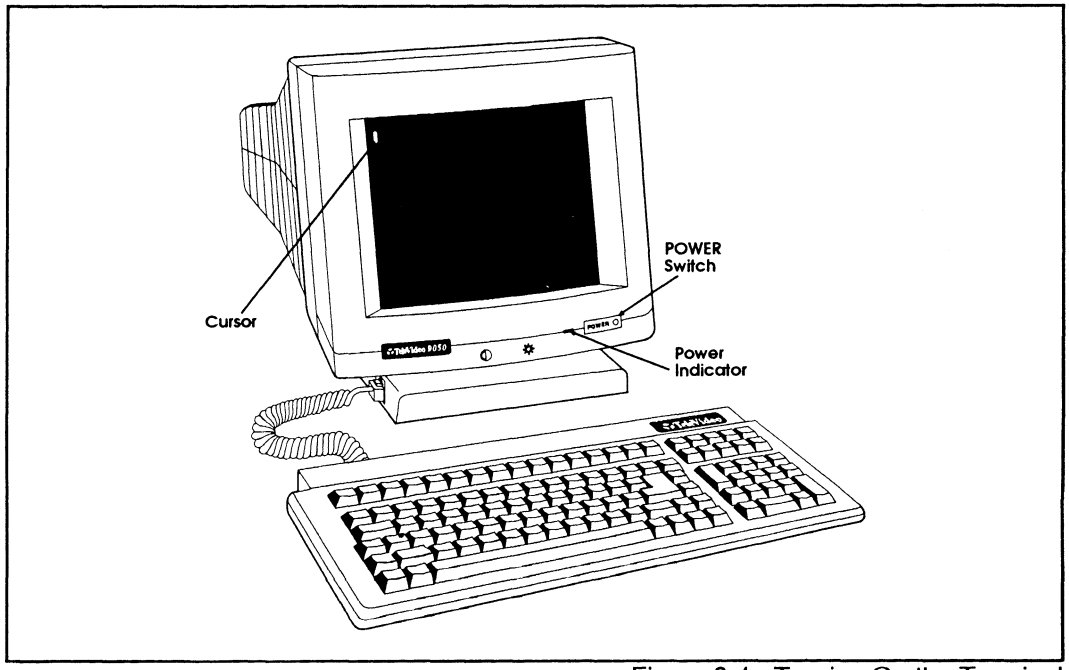



Figure 3-1. Turning On the Terminal

## Adjusting Screen and Keyboard

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

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

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

## Display Features

The screen has three display areas:

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

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

## Information Lines

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

- The status line
- User messages
- Function key labels

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

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

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

### Status line

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

To toggle the status line on and off, press

Ctrl →

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

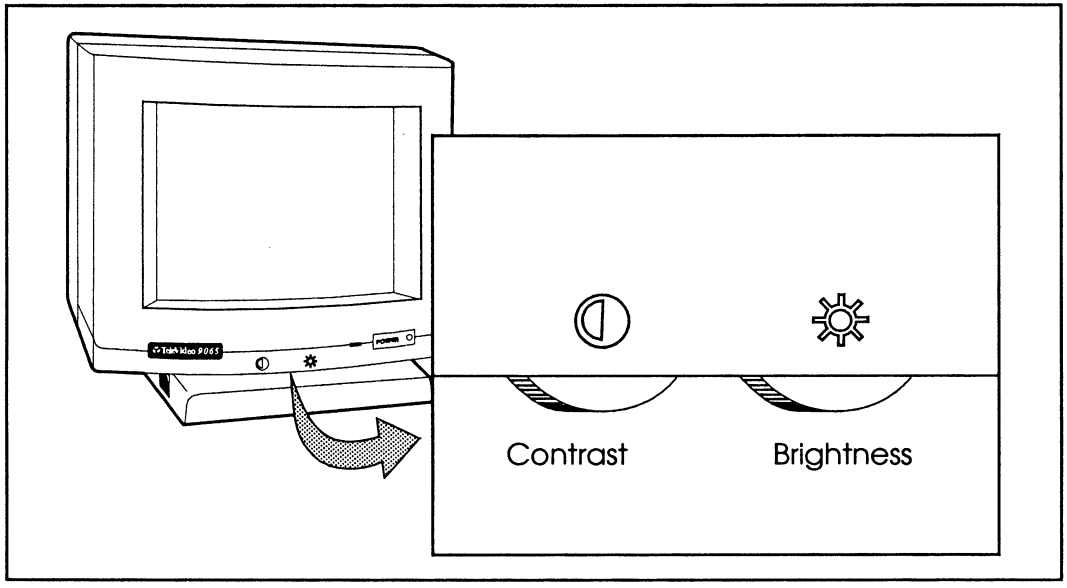



Figure 3-2. Adjusting the Terminal

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

The time of day appears in the status line if you elect in VideoDesk to display it by selecting TIME, DATE, or DATE/TIME in the clock Display field. If your program writes a message over the time/date display, you can re-enable it in VideoDesk. See Chapter 4 for instructions.

## User messages

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

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

**NOTE** If you want to write your own user messages, first read "Entering Commands" in Chapter 6, then "Loading User Messages" in Chapter 12.

## Function key labels

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

Labels for all function keys (**F1-F16**, shifted and unshifted) appear on a single line. However, only one set of labels (shifted or unshifted) can occupy the line at a time.

With 80-column displays, you can display only eight labels at a time. The one that appears at any given moment is the one that was most recently defined. For example, referring to the diagram below, if **F11** is defined after **F3**, then the label for **F11** will occupy the third label space.

| F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 |
|---|---|---|---|---|---|---|---|
| F9 | F10 | F11 | F12 | F13 | F14 | F15 | F16 |

Pressing

Shift

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

## Data Lines

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

**CAUTION**

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

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

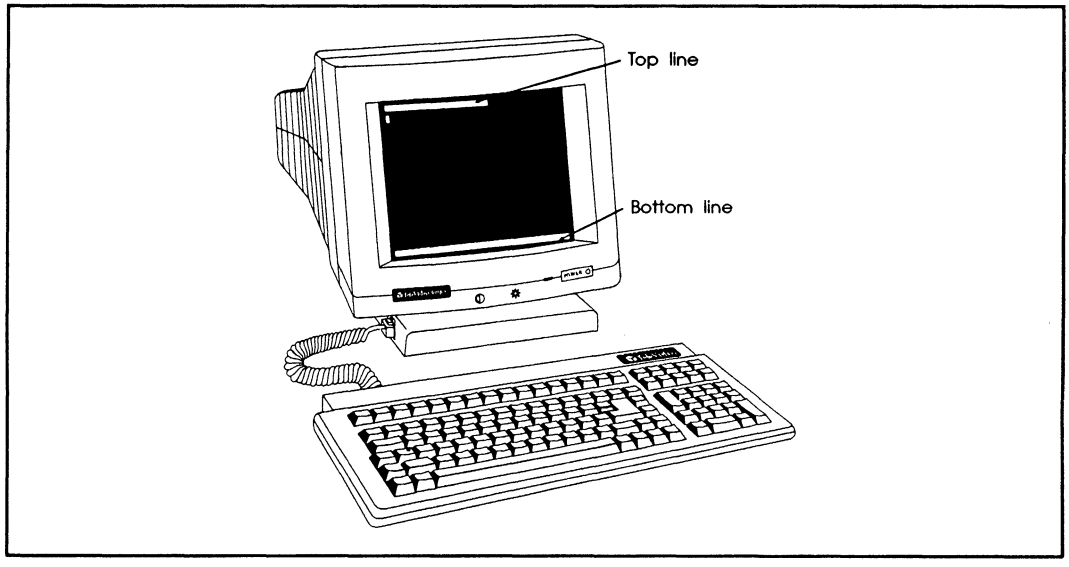



Figure 3-3. Information Lines

## Splitting the Screen

The screen can be split into windows that show two different pages of terminal display memory. Many programs employ this split-screen feature. Refer to the local key menu for your keyboard for the keystrokes that let you move to the next window or the previous window.

## Number of Columns

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

Choosing 132 80 DSPLY mode in set up lets the screen display 80 columns, but lines are actually 132 columns wide. The active position (cursor/data entry location) can be beyond the display margins. Pressing

Ctrl Shift →

or

Ctrl Shift ←

scrolls the display along the 132-column line, so you can find the cursor again.

In 132 80 DSPLY mode, the cursor moves to the right edge of the display, no matter what column that is, then wraps to the next line. You must scroll the display so column 132 is at the right margin if you want to enter data continuously from column 1 to column 132.

## Screen-Saver

The screen-saver feature makes the screen go blank after 10, 20, or 30 minutes of inactivity. You can change this time-out in set up. To turn the screen saver on or off, refer to the local key menu for your keyboard. Local key menus are in the sections following this page.

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

## Resetting the Terminal

The terminal offers several ways to reset:

**Partial reset** Enter set up and select CLEAR COMMUNICATION. This disables any currently enabled print mode, clears the main and auxiliary port buffers, and unlocks the keyboard.

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

**CAUTION**

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

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

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

## Funct/Alt/Compose Key

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

The KEYBOARD menu (or a command code described in Chapter 12) allows you to select one of the key's four functions: FUNCT, META, 3rd LEGEND, or COMPOSE.

## The FUNCT Selection

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

## The META Selection

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

## The 3rd LEGEND Selection

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

## The COMPOSE Selection

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

The Funct/Alt/Compose key is used in sequence with a pair of other keys to compose any of the characters listed in Table 3-1. These sequences are similar to Esc command codes in that you do not hold down any of the keys, but press them in sequence.

For example, to compose the character æ from a PC Enhanced keyboard, press and release

**Alt**

then press and release

**a**

and finally, press and release

**e**

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

**Funct**

then press and release

**a**

and finally, press and release

**e**

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

**Compose Character**

then press and release

**a**

and finally, press and release

**e**

Table 3-1.
Composing Nonstandard Characters

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

## The ASCII Keyboard

This section describes the ASCII keyboard. If you have a PC Enhanced (AT) keyboard or and ANSI keyboard, refer to the appropriate section on the following pages.

## Types of Keys

- Keyboard areas called **keypads** are shown in Figure 3-4.
- **Alphanumeric** or **special keys.** Alphanumeric keys produce a printable letter, number, or symbol, just like typewriter keys. Special keys control computer operations.
- **Remote** or **local.** This distinction is most important to a terminal operator:

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

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

Appendices C and D list the command codes sent by the remote keys.

**Local keys** Local keys send codes only to the terminal itself. They cause the same terminal operations regardless of communication or terminal personality mode. To access the local key menu (Figure 3-5), press

Funct Shift Set Up

**NOTE:** The **Enter** key, numerals, and punctuation marks referenced in the local key menu are located on the numeric keypad.

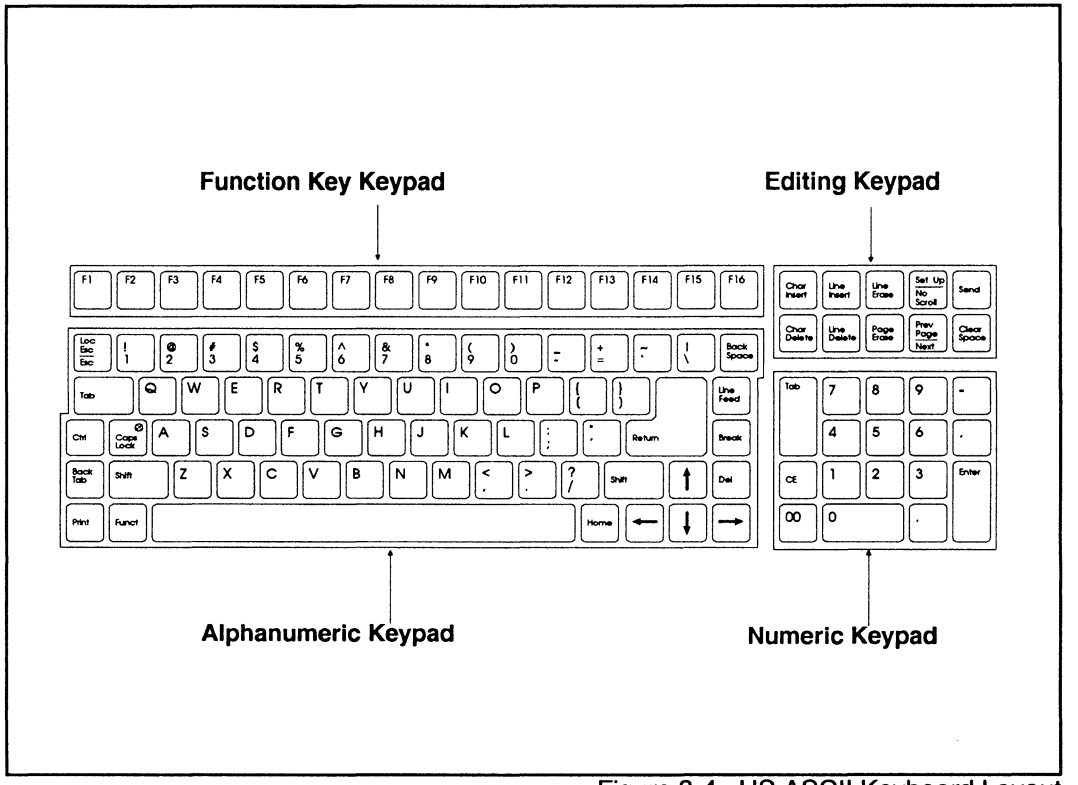



Figure 3-4. US ASCII Keyboard Layout

**LOCAL KEY MENU**

FUNCT F1 VideoDesk - clock
FUNCT F2 VideoDesk - calendar
FUNCT F3 VideoDesk - calculator
FUNCT F4 Video Desk - ASCII chart
SHIFT SET UP Enter/exit set up
FUNCT SHIFT PAGE Session change
NO SCROLL Screen activity on/off
CTRL . Toggle WordStar on/off
CTRL - Raise split line
CTRL , Lower split line
CTRL 0 - 6 Display page 0 - 6
CTRL PAGE Next page/window
CTRL → Status line on/off
CTRL ↑↓ Scroll up/down
CTRL CHAR INS Insert mode on/off
CTRL ENTER Key click on/off
CTRL CLEAR SPACE Screen saver on

CTRL BREAK Send a 250 ms break
CTRL SHIFT CLEAR SPACE Clear screen
CTRL SHIFT 1 Monitor mode on/off
CTRL SHIFT SET UP Partial Reset
CTRL SHIFT ENTER Block/Duplex Mode
CTRL SHIFT BREAK Toggle Ports
CTRL SHIFT PRINT Copy Mode On/Off
CTRL SHIFT PAGE Previous Page/window
CTRL SHIFT ←→
Horizontal scroll in 132 80 DSPLY mode
CTRL SHIFT ↑↓
Increase/decrease scrolling rate

**To exit, press ESC or Funct-Shift-Set Up key**

Figure 3-5. ASCII Keyboard Local Key Menu

## PC Enhanced Keyboard

This section describes the PC Enhanced (AT) keyboard. If you have an ASCII keyboard , refer to the section on the preceding pages. If you have an ANSI keyboard, refer to the section on the following pages.

## Types of Keys

- Keyboard areas called **keypads** are shown in Figure 3-6.
- **Alphanumeric** or **special keys.** Alphanumeric keys produce a printable letter, number, or symbol, just like typewriter keys. Special keys control computer operations.
- **Remote** or **local.** This distinction is most important to a terminal operator:

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

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

Appendices C and D list the command codes sent by the remote keys.

**Local keys** Local keys send codes only to the terminal itself. They cause the same terminal operations regardless of communication or terminal personality mode. To access the local key menu (Figure 3-7), press

Alt Shift Select

**NOTE:** The **Enter** key, numerals, and punctuation marks referenced in the local key menu are located on the numeric keypad.

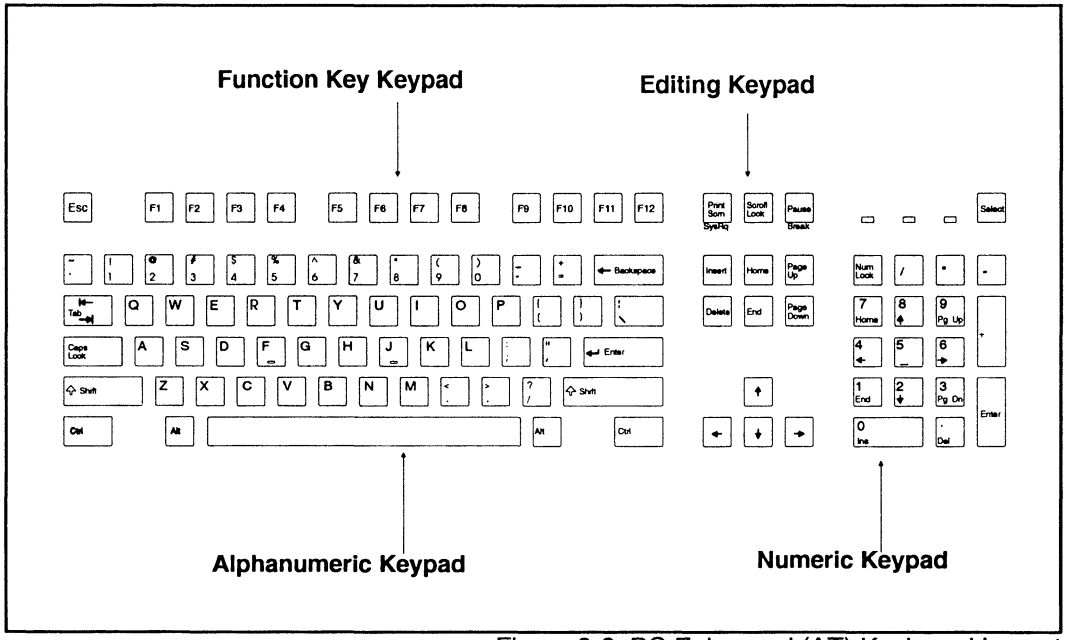



Figure 3-6. PC Enhanced (AT) Keyboard Layout

**LOCAL KEY MENU**

LEFT ALT F1 VideoDesk - clock
LEFT ALT F2 VideoDesk - calendar
LEFT ALT F3 VideoDesk - calculator
LEFT ALT F4 Video Desk - ASCII chart
SHIFT SELECT Enter/exit set up
ALT SHIFT PAGE UP Session change
SCROLL LOCK Screen activity on/off
CTRL . Toggle WordStar on/off
CTRL - Raise split line
CTRL + Lower split line
CTRL 0 - 6 Display page 0 - 6
CTRL PAGE UP Next page/window
CTRL → Status line on/off
CTRL ↑↓ Scroll up/down
CTRL INSERT Insert mode on/off
CTRL ENTER Key click on/off
CTRL BREAK Send a 250 ms break

CTRL SHIFT 1 Monitor mode on/off
CTRL SHIFT SELECT Partial Reset
CTRL SHIFT ENTER Block/Duplex Mode
CTRL SHIFT BREAK Toggle Ports
CTRL SHIFT PRINT SCRN Copy Mode On/Off
CTRL PAGE DOWN Previous Page/window
CTRL SHIFT ← →
Horizontal scroll in 132 80 DSPLY mode
CTRL SHIFT ↑↓
Increase/decrease scrolling rate

**To exit, press ESC or Alt-Shift-Select key**

Figure 3-7. PC Enhanced (AT) Keyboard Local Key Menu

## ANSI Keyboard

This section describes the ANSI keyboard. If you have an ASCII keyboard or a PC Enhanced (AT) keyboard, refer to the sections on the preceding pages.

## Types of Keys

- Keyboard areas called **keypads** are shown in Figure 3-8.
- **Alphanumeric** or **special keys**. Alphanumeric keys produce a printable letter, number, or symbol, just like typewriter keys. Special keys control computer operations.
- **Remote** or **local**. This distinction is most important to a terminal operator:

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

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

Appendices C and D list the command codes sent by the remote keys .

**Local keys** Local keys send codes only to the terminal itself. They cause the same terminal operations regardless of communication or terminal personality mode. To access the local key menu (Figure 3-9), press

Compose F3

**NOTE:** The **Enter** key, numerals, and punctuation marks referenced in the local key menu are located on the numeric keypad.

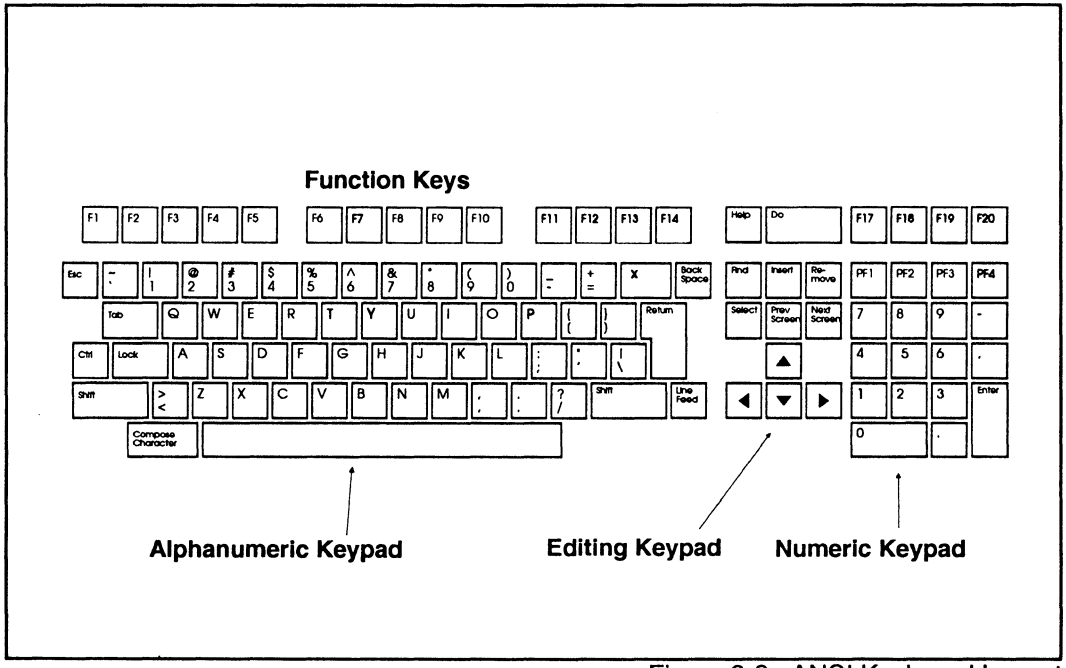



Figure 3-8. ANSI Keyboard Layout

**LOCAL KEY MENU**

COMPOSE F6 VideoDesk - clock
COMPOSE F7 VideoDesk - calendar
COMPOSE F8 VideoDesk - calculator
COMPOSE F9 Video Desk - ASCII chart
F3 Enter/exit set up
COMPOSE SHFT PREV-SCRN Session chg
F1 Screen activity on/off
CTRL . Toggle WordStar on/off
CTRL - Raise split line
CTRL , Lower split line
CTRL 0 - 6 Display page 0 - 6
CTRL NEXT-SCREEN Next page/window
CTRL → Status line on/off
CTRL ↑↓ Scroll up/down
CTRL INSERT Insert mode on/off
CTRL ENTER Key click on/off
CTRL REMOVE Screen saver on

CTRL F5 Send a 250 ms break
CTRL SHIFT REMOVE Clear screen
CTRL SHIFT 1 Monitor mode on/off
CTRL F3 Partial Reset
CTRL SHIFT ENTER Block/Duplex Mode
CTRL SHIFT F5 Toggle Ports
CTRL SHIFT F2 Copy Mode On/Off
CTRL PREV-SCREEN Previous Page/window
CTRL SHIFT ← →
Horizontal scroll in 132 80 DSPLY mode
CTRL SHIFT ↑↓
Increase/decrease scrolling rate

**To exit, press ESC or Compose F3**

Figure 3-9. ANSI Keyboard Local Key Menu

## Host Communication

This section describes the host port communication modes and related terminal operations.

The terminal communicates with a computer (sends and receives data) through a serial port. If you have a single-host environment, use single-session operation; for a two-host environment, use dual-session operation.

## Dual-Session Operation

Factory default setting is with the dual-session option turned off. To turn it on, perform the following steps:

1. Enter Set Up (Chapter 2).
2. Move to the GENERAL menu.
3. Move down to the DUAL-SESSION item, and select the ON option.
4. To save and exit from set up, press
   [Ctrl] [S]
5. Verify that "S1" appears in the status line.
6. Enter Set Up. Verify that the following message is blinking at the lower part of the screen.

```
*** SET UP FOR SESSION 1 ***
```

7. To exit from set up, press
   [Esc]

## Dual Session Configuration

Configuration of each session, including the associated COM port configuration, is accomplished independent of the other session. The configuration information is stored in C-MOS memory in its entirety.

When selecting the dual session option, specify the COM port, just as you would for a single-session terminal. At the completion of session 1 configuration, press

[Ctrl] [S]

to save and exit set up. Use the appropriate keyboard sequence to toggle the active session and; enter set up again and verify the following message blinking at the lower part of the screen (all menus).

```
*** SET UP FOR SESSION 2 ***
```

Configure the terminal with the appropriate parameters; save these and exit.

Please note that when selecting the dual session mode, the printer is automatically set to PARALLEL and the default for session 1 port is COM1. If you select COM 2 for session 1, then the default for session 2 will be COM1.

> **NOTE:** A session using alternate communication methods (internal modem, current loop option, or RS422 option) must be assigned to COM1.

During operation, the keyboard switches sessions with with the appropriate COM port and display screen. The inactive session will update its host generated data only until the receive buffer is full (about 128 characters). It will then generate the appropriate flow control signal to stop the host transmission until such time that the session is reactivated from the keyboard.

## Switching between Sessions

You must be in the dual-session mode. On the ASCII keyboard, switch sessions by pressing

[Funct] [Shift] [Page]

On the PC Enhanced keyboard, press

[Alt] [Shift] [Page Up]

On the ANSI keyboard, switch by pressing

[Compose] [Shift] [Prev Screen]

If you plan to continue using the dual-session feature, remember to SAVE PARAMETERS in the COMMAND menu, or save and exit by pressing

[Ctrl] [S]

## Single Session Operation

Single session operation is accomplished by selecting the OFF option for the DUAL-SESSION item in the GENERAL menu (factory default).

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

1. In Set Up, go to the GENERAL menu.
2. Move down to the HOST PORT item and make sure that the COM1 option is selected.

3. Move down to the PRINTER item and select the COM2 option.

> **NOTE:** If you don't use a serial printer, leave the PRINTER item at the PARALLEL option (default).

4. If your host is connected to the COM2 port, select COM1 for your serial printer.

## Serial Communication Modes

In either single session or dual session, the serial port communication mode determines where data goes when you press a key —to the screen, the computer, or both. Following is a brief explanation of each communication mode.

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

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

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

> **NOTE:** You can switch between the current conversational mode (full or half duplex) and block mode by pressing CTRL-BREAK

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

**Half block** May be used for modem communication. Similar to block mode, but the Request To Send (RTS) line is used to control transmission and receipt of data.

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

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

## Sending Blocks of Data

The Send key sends screen data to the host when the terminal is in block mode.

For a *page send*, press

[Send]

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

For a *line send*, press

[Shift] [Send]

Data on the cursor line through the cursor goes to the host.

To interrupt transmission from the terminal to the host, press

[Ctrl] [Shift] [Set Up]

## Editing Key Modes

Editing key modes affect most editing keys (keys that control cursor movement, editing, and data transmission). Your application program usually determines the editing key mode, but you can also change it in set up (in the Program menu).

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

The terminal has three editing key modes:

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

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

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

## Serial Printer Control

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

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

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

Unlike the host communication modes, the terminal comes from the factory with all serial printer port modes disabled. You (or your program) must enable a serial printer mode to pass data between the host and the serial printer. If you have a problem with printing, see the troubleshooting suggestions in Chapter 5.

## Serial Printer Modes

Four serial printer modes can be enabled by your program or in set up. Pressing

[Ctrl] [Shift] [Print]

has two effects on print modes: It first changes the current print mode to copy mode, and then toggles copy mode on and off.

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

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

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

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

## Page Print

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

For a formatted page print, press

[Print]

Each line sent to the printer ends with a carriage return and line feed, so the printed copy resembles the screen.

For an unformatted page print, press

[Shift] [Print]

Without formatting, the appearance of the printed output varies, depending on the amount of space characters the data contains.

Pressing

[Ctrl] [Shift] [Set Up]

interrupts transmission from the terminal to the serial printer port.

## Parallel Printer Control

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

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

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

The terminal comes from the factory with the parallel printer port enabled. If you have a problem with printing, see the troubleshooting suggestions in Chapter 5.

## Parallel Printer Modes

Two parallel printer modes can be enabled by your program or in set up. Pressing

[Ctrl] [Shift] [Print]

has two effects on print modes: It first changes the current print mode to copy mode, and then toggles copy mode on and off.

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

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

## Page Print

A page print command sends data on the current page (up to the cursor position) to the parallel port. The terminal does not automatically flip the next page of display memory onto the screen. To send another page, use the

[Next/Prev Page]

key to call up a different page, then press

[Ctrl] [Shift] [Print]

For a formatted page print, press

[Print]

Each line sent to the printer ends with a carriage return and line feed, so the printed copy resembles the screen.

For an unformatted page print, press

[Shift] [Print]

Without formatting, the appearance of the printed output varies, depending on the amount of space characters the data contains.

Pressing

[Ctrl] [Shift] [Set Up]

interrupts transmission from the terminal to the serial printer port.

# NOTES

# Chapter 4
# VIDEODESK

The terminal's VideoDesk program comprises four pop-up accessory windows:

- A clock that can display the time and date in the status line as you work in a program. It also has an alarm function.
- A calendar for the years 1901 to 2099.
- A calculator that can transfer calculations from VideoDesk to the display and can give you a "tape" print-out of your calculations (or send them to a printer).
- An ASCII chart that shows decimal, octal, hexadecimal, and binary values for the currently loaded character set.

The windows overlay your current display, but do not destroy any data. You can move the windows around to see any portion of the screen.

## General Information

This section presents the operating details common to all four VideoDesk accessories. Following are separate sections that describe in detail the operation of each accessory.

### Entering and Leaving VideoDesk

To enter an accessory window, refer to the Local Key Menu for your keyboard (Chapter 3).

To exit from VideoDesk, press:

Esc

### Going From One Menu to Another

Once you have selected one of the VideoDesk accessories, you can move from one accessory to another by simply pressing one of the four function keys alone.

Refer to the Local Key Menu that applies to your keyboard, for access to the VideoDesk accessories. See Chapter 3.

### Moving the Window

You can move a VideoDesk window left, right, up, or down on the screen by pressing an arrow key together with the Shift key.

## The Clock

The first thing you may want to do in VideoDesk is set the time and date. To display the clock window (Figure 4-1) on your screen, refer to the Local Key Menu for your keyboard (Chapter 3).

The right and left arrow keys move the highlight bar from field to field. The up and down arrows step through values in the highlighted field.

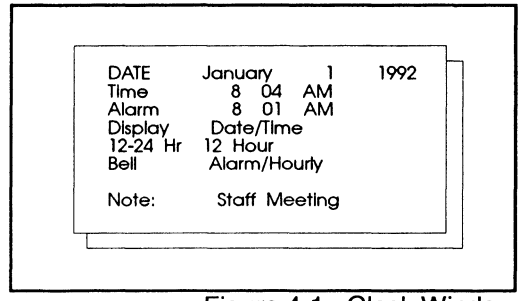



Figure 4-1. Clock Window

### Setting the Clock/Calendar

When the clock appears, the highlight bar is in the month area of the Date field. Press the up or down arrow until the correct month appears.

Now press

→

to move to the **day** and **year** areas. In each area, set the correct values with the up and down arrows. Do the same in the **hour**, **minute**, and **AM/PM** areas of the **Time** field.

If you reset the terminal, it remembers the VideoDesk time, date, and other values. But the clock does not run while the terminal is turned off. For example, if you turn the terminal off at 5 p.m. and back on at 8 a.m. the next morning, the clock/calendar resumes from 5 p.m. of the previous day!

## Displaying the Date and Time

The terminal can display the date and time in the status line. You select the date/time in two areas:

- Select None, Time, Date, Or Date/Time in the VideoDesk clock Display field.
- Select the status line display values in the TOPLINE and BOTTOMLINE parameters in the Display set up menu.

**12- or 24-hour mode** lets you select either a 12-hour clock that displays a.m./p.m. with the time, or a 24-hour (military) clock. (When you select 24-hour mode, the terminal automatically converts the 12-hour time from the VideoDesk Time field to 24-hour time in the status line.)

## Setting the Alarm Clock and Bell

To set and turn on the alarm, first set the alarm time as you would the clock time. Then set the Bell field to either Alarm or Alarm/Hourly. When the alarm goes off, the bell sounds and the clock pops up on your screen. To disable the alarm, set the Bell field for None. To remove the clock from the screen, press

Esc

## The Notepad

At the bottom of the clock is a 20-character notepad, handy for inserting a reminder when you set the alarm. To write a message, first move the highlight bar to the Note field. Press

Back Space

to erase the current message, and enter your message.

**NOTE:** Move the cursor with the space bar and Back Space key, not the cursor keys.

## The Calendar

To display the calendar window on your screen, press the key(s) specified in the Local Key Menu for your keyboard (Chapter 3).

The calendar (Figure 4-2) automatically displays the month you set in the **Date** field of the clock. To display other months of the current year, press the right and left arrows; to display other years, press the up and down arrows.

You need not return the calendar to the current date; it resets automatically when you return to the clock or reset the terminal.

January 1992

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

Today is January 1, 1992

Figure 4-2. Calendar Window

## The Calculator

To display the calculator, press the key(s) specified in the Local Key Menu for your keyboard (Chapter 3).

The calculator (Figure 4-3) uses the accounting-style numeric keypad and the editing keys above it. To avoid confusion, disregard the legends on

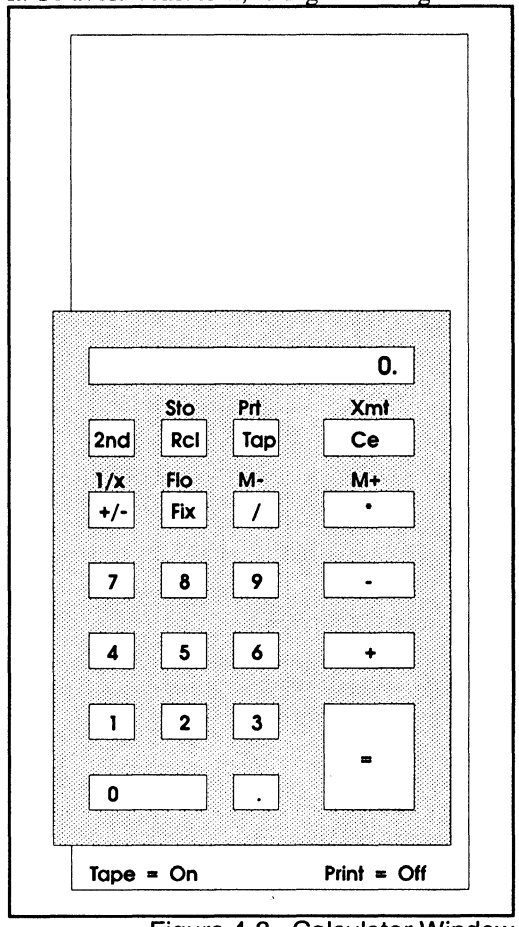



Figure 4-3. Calculator Window

the actual keyboard, and keep your eyes on the on-screen calculator pad as you calculate. The active key (the key last pressed) is displayed in reverse video.

The full-intensity area above the calculator pad on screen is the "tape" area. Every calculator entry can be output to tape or printer (or both). The line at the bottom of the calculator indicates whether tape and printer outputs are on or off.

## Key Functions

Here's a summary of what the (on-screen) calculator keys do:

**0-9** Numbers displayed in current entry area.

**.** Decimal point.

**+, -, *, /, =** Operands (add, subtract, multiply, divide, equals).

**M+** Adds current entry to the number in memory.

**M-** Subtracts current entry from the number in memory.

**Fix** Enables fixed decimal point, zero to four places, depending on number of times pressed (default two).

**Flo** Enables floating decimal point.

**+/-** Toggles the sign of the current entry.

**1/x** Computes the inverse of the current entry.

**Ce** Clears the current entry; clears the operation and starts a new calculation when pressed twice.

**Xmt** Transmits the current entry to the active position in your program; also exits VideoDesk.

**Tap** Toggles tape display on/off.

**Prt** Toggles printer output on/off.

**Rcl** Recalls the number stored in memory.

**Sto** Stores the current entry in memory.

**2nd** Selects the second function of a key (displayed above the calculator key). Press and release this key, then press the desired key to invoke its second function.

## Examples

The best way to learn how to use the calculator is just to start in using it. Display the calculator, position your right hand over the keyboard numeric keypad (keep your eyes on the screen), and begin:

**Simple arithmetic; clearing an error** Enter **64+128=**. On the ASCII or ANSI keyboards, use the comma (,) as a plus (+) sign. On all keyboards, use **Enter** instead of the equal (=) sign. If you make a mistake, press **Ce** to clear the current entry line, and start the current entry again. Each time you press an operand, the current entry goes to the tape.

**Selecting the second function; storing a number in memory** The result of the above calculation is 192 (64 + 128 = 192). It should be displayed in the current entry line. Press **2nd**, then press **Rcl**. This invokes the **Sto** key and stores **192** in memory.

**More simple arithmetic** Now enter **16*32=**. This multiplies 16 times 32. The result, 512, appears in the current entry line.

**Adding to the number in memory** Press **2nd**, then press *. This invokes the **M+** key, adding the current entry, 512, to the number in memory (192). The result, 704, appears as the current entry.

**Toggling the sign** Press **+/-**. The number in the current entry line, 704, changes to -704.

**Transferring a number to the screen** Press **2nd**, then **CE**. This transfers the current entry (-704) to the cursor position in your program and leaves VideoDesk.

Display the calculator again by pressing the key(s) specified in the Local Key Menu for your keyboard (Chapter 3) and start another set of examples:

**Turning the printer output on** Press **2nd**; then press **Tap**. This toggles the printer display on. The display selection area at the bottom of the calculator changes from **Tape = On Print = Off** to **Tape = On Print = On**. Now you will both see your calculations in the tape area and have a record of them from your printer.

**Changing to fixed decimal point format** Before starting any calculations, press **Fix** to change the decimal point format from floating to fixed. Continue to press **Fix** until the desired number of decimal places (zero to four) appears. (In this case, choose two places.) Note that the fixed decimal format always returns to the number of places previously set.

**NOTE:** Fixed decimal format truncates a value, rather than rounding it off. It displays 2.229, for example, as 2.22, rather than 2.23.

**Simple arithmetic** Enter **347-18=**. The answer, 329, appears in the current entry area. Press **/6=** to divide this figure by six. The result, 54.8333, is truncated at two decimal places.

**Storing a number in memory** Press **2nd**, then press **Rcl**. This invokes the **Sto** key and stores **54.8333** in memory.

**Finding the inverse** Enter **.47**. Press **2nd**, then **+/-** to invoke the **1/x** key and find the inverse amount. The answer, 2.1276, is truncated to 2.12.

**Subtracting the number in memory** Press **2nd**, then **/**. This invokes the **M-** key and subtracts the current entry, 2.1276, from the number you previously stored in memory, 54.8333. The result, truncated to 52.70, appears in the current entry area and is also stored in memory.

**Recalling a number from memory** Now press **695.99/Rcl**. In turn, this displays and sends to the printer 695.99/, then 52.70, then the result (13.20).

## THE ASCII Chart

Figure 4-4 shows the default ASCII chart that appears when you press the key(s) specified in the Local Key Menu for your keyboard (Chapter 3).

The ASCII chart can display up to 256 characters and give the decimal, hexadecimal, octal, and binary values of the active position shown in reverse video. But the characters that appear in the chart depend entirely on which character set is loaded in the terminal's character generator.

Press the four arrow keys to move the active position around in the chart. Note that the ASCII chart displayed here does not match the ASCII tables shown in Appendix B in all emulations. Under the emulations listed below, hex codes 10-1F of the seven-bit ASCII set are converted to hex codes 80-8F of the Multinational set.

This takes place under the following emulations:

- TeleVideo 912/920
- TeleVideo 910
- TeleVideo 925/910+
- TeleVideo 950
- Lear-Siegler ADM 31
- Hazeltine 1500

Unfortunately, memory limitations make these conversions necessary for the emulations listed.

Finally, under VT100 emulation, hex codes E0-FF display a variety of symbols from different character sets.

Apart from these exceptions, the VideoDesk ASCII chart displays the characters shown in Appendix B.

TeleVideo regrets any inconvenience to its customers that may be caused by these internal corrections.

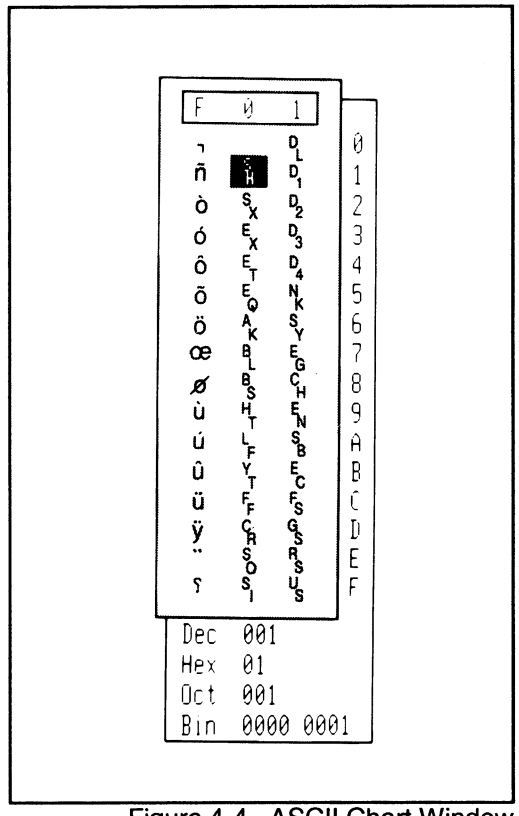



Figure 4-4. ASCII Chart Window

# Chapter 5
# TROUBLESHOOTING

## If A Problem Occurs

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

## Troubleshooting Checklist

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

- Are all cables firmly plugged in at both ends? (You'd be surprised how often this is the problem!)
- Are all system units turned on?
- Is your terminal locked up? Turn it off and back on.
- Do you need to replace the line fuse? See the instructions in the next section.

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

- Are you in the proper operating mode? The correct communication mode? Check the status line.
- Is your computer operating system booted up?
- Do the terminal and computer communication formats match? Check the set up menu of the port selected as the host port for the terminal communication format.
- Is the interface between the terminal and the ccmputer or modem correctly wired? Check the computer port pin signals (see Chapter 1). Make sure that pins 1, 2, 3, 7, and 20 are connected as specified.
- Is your modem operating correctly? Check its instructions; if necessary, contact the manufacturer for assistance.

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

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

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

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

**CAUTION**

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

- Is the keyboard locked? Reset the terminal or press

Ctrl Shift Set Up

## Running Self Test

You can verify proper operation of the terminal video display circuitry by running the self test. The test shows all displayable characters and visual attributes.

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

1. Be sure the terminal is in 9065 mode. Enter set up by pressing
   [Shift] [Set Up]
2. After the set up menu appears, press
   [1]
3. Verify that the test screen appears (Figure 5-1).
4. Check the screen for the following items:
   - Four lines should blink.
   - All 256 characters (ASCII control and display; graphics) should be displayed.
   - Each character should be formed properly, with no extra or missing dots.
   - The screen should show all the visual attributes in both full and half intensity.
   - The firmware revision level should appear in the lower left corner.
5. To clear the test from the screen, press
   [Ctrl] [Shift] [Clear Space]

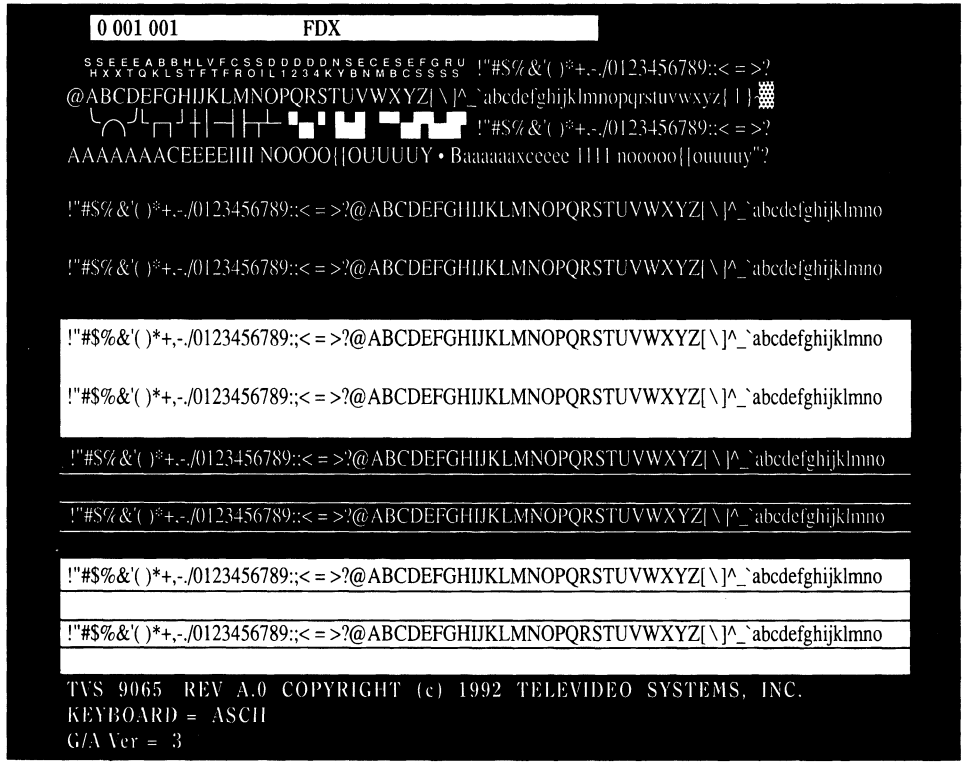



Figure 5-1. The Test Screen

## Monitor Mode

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

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

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

To toggle monitor mode on and off, press

Shift Ctrl 1

(numeric keypad one).

## Stand-Alone Test

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

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

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

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

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

After the beep sounds, self-test results should be displayed (provided the contrast and brightness controls are not turned down). The screen will indicate any memory or keyboard failures; these should be logged and noted for any unit returned for repair.

Pressing any key will clear the screen and place the terminal in the communication mode. For those users not displaying a status line, check the COMM MODE in the GENERAL set up menu. The option selected should be FULL DUPLEX, HALF DUPLEX, or BLOCK. Enter several keystrokes and observe the screen.

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

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

In the block mode, each character is repeated when the **Send** key is pressed.

## If You Need Assistance

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

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

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

Should you need to ship the terminal to TeleVideo for repair, ask your dealer to first contact TeleVideo and secure a Return Material Authorization (RMA) number. TeleVideo does not accept items for repair without an RMA number. Then carefully pack the terminal, using either the original TeleVideo shipping container or other suitable materials.

**CAUTION**

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

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

# Chapter 6
# PROGRAMMING

This chapter introduces the basics of programming the terminal. It then presents the commands for changing the terminal personality, saving reprogrammed set up values, and resetting the terminal.

**NOTE**: Command code descriptions in this chapter are for the TeleVideo 9065. Codes for TeleVideo emulations are listed in Appendix C; codes for all other emulations are listed in Appendix D.

**CAUTION**

Avoid loss of data! When you select a new terminal personality, the screen clears and many values reset. Read the information in this chapter about selecting a personality and saving reprogrammed set up values.

The 9065 command set is a superset of TeleVideo 955 and 965 terminal commands. Most 9065 mode commands follow the format of industry-standard TeleVideo 950/955 command sets. But some terminal functions are also controlled by duplicate commands structured in the style of Wyse 60 commands. These duplications are intended to adapt this terminal to a broad range of programming environments.

**PROGRAMMERS:** If you are not experienced in sending commands directly (locally) from the keyboard, read " Commands From the Keyboard," starting in the next column.

## Entering Commands

The terminal responds to commands either sent from the host or entered at the keyboard.

### Commands From the Host

How you incorporate commands into your programs depends on your programming language. The terminal responds to control codes and escape sequences from the host regardless of your programming language format and syntax.

The multitude of languages and syntaxes makes it impossible to show you in this manual how to incorporate commands in each program. If you need help with the proper syntax, refer to the documentation for your programming language.

Appendix B contains an ASCII chart that shows the ASCII characters and corresponding numeric values in various systems.

### Commands From the Keyboard

Sending programming commands from the keyboard lets an operator control many aspects of terminal operation not available in set up.

Two factors affect the response of the terminal to commands from the keyboard:

- Communication mode
- Correct key sequence

**Communication mode** To ensure that commands from the keyboard go to the terminal, enable block or local communication mode. If you enter commands at the keyboard during full or half duplex communication mode, the results are unpredictable. The computer receives the commands, and its response depends on the operating system and application program.

However, you can send escape sequences to the terminal during full or half duplex mode by entering the commands with the **Loc Esc** key (**Shift-Esc**) instead of **Esc**. This sends commands to the terminal only.

**Correct key sequence** Always press the **Ctrl** key first and hold it down while you press the other key (as you would the **Shift** key). Always press and release the **Esc** key before pressing the next key.

Enter characters exactly as shown. Notice whether the command requires an upper- or lower-case character, a number **one** or a lower-case **L**, a **zero** or an uppercase **O**. Make sure the **Caps Lock** key is not locked.

Commands are printed in this manual with a space between the characters. Do *not* type this space as part of the sequence; it is included only for clarity. For example, the command **Esc c** means press the **Esc** key, then a lower-case **c**.

## Command Format

This manual presents programming commands in a format that shows the section title, values selectable in set up, default values, command function, ASCII command characters, and variable values. For the cursor style selection command, see Table 6-1 for choice of attributes.

### Cursor Style

Cursor style selection Esc . ***Ps***

Table 6-1. Cursor Style Selection

| *Ps* | Cursor Attribute |
|---|---|
| 0 | Not displayed |
| 1 | **Blinking block** (default) |
| 2 | Steady block |
| 3 | Blinking underline |
| 4 | Steady underline |
| 5 | Blinking block |

**Cursor Style** is the title of the section, which contains one or more commands

**Cursor Style Selection** defines the function of the command.

**Esc . *Ps*** is the command in ASCII characters. Appendix B contains ASCII charts with binary, decimal, octal, or hexadecimal values.

Variables are usually shown in italics as ***Ps***, to represent a selected value. The effects of variables are dEscribed in the text following each command.

## Personality Modes

### Selecting a Terminal Personality

**CAUTION**

The following command can cause loss of data! Save all data before sending this command.

Select a personality Esc [ 10 ; ***Ps*** v

Table 6-2. Selecting a Personality

| *Ps* | Personality |
|---|---|
| 0 | TeleVideo 955 |
| 1 | TeleVideo 950 |
| 2 | Wyse 50/50+ |
| 3 | TeleVideo 912/920 |
| 4 | TeleVideo 910 |
| 5 | TeleVideo 925/905/910+ |
| 6 | TeleVideo 965 |
| 7 | Wyse 60 |
| 8 | PC Term |
| 9 | ADDS A2 |
| 10 | ADDS VP60 |
| 11 | Hazeltine 1500 |
| 12 | DG 200 |
| 13 | ADM 31 |
| 14 | IBM 3101-1X |
| 15 | IBM 3101-2X |
| 16 | IBM 3161 |
| 17 | VT100/52 |
| 18 | Wyse 150 |
| 19 | Wyse 160 |
| 20 | **TeleVideo 9065** |

When you select the personality mode, the screen clears and many operating modes reset to a state compatible with the new personality. See Table 6-2 for each personality's *Ps* value. Table 6-3 shows the states to which the terminal resets when it enters various personalities.

Reprogrammed function and editing keys retain their reprogramming when you select a new terminal personality unless you elect in set up to return them to the default codes of the new personality.

Appendices C and D contain summaries of code sets for the terminal personalities.

NOTE Set up values not listed in Table 6-3 remain the same when the personality mode changes. This means you can enable a terminal feature in 9065 mode that is not normally available in some other personality, then select a new personality mode and retain the feature. (Any mode harmful to a new personality is automatically inhibited.)

Table 6-3. Terminal States after Personality Mode Reset

| Mode | Condition | State | Personality (*Ps* value) |
|---|---|---|---|
| DISPLAY MODES | Visual attribute setting | Normal | All |
| | Visual attribute base | Character | 7, 8, 9, 12, 17 |
| | | Page | 0, 1, 2, 3, 6, 10, 11, 20 |
| | | Line | 4, 5, 13 |
| | Write protect attribute | Half intensity | All |
| | Line attribute | Single high/wide | All |
| | Display (on/off) | On, cleared | All |
| | Cursor display (on/off) | On | All |
| | Column width | 80 | All |
| | Number of lines per page | 24 | All but 8 |
| | | 25 | 8 |
| | Number of lines per screen | 24 | All but 8 |
| | | 25 | 8 |
| | Line lock | All lines unlocked | All |
| | Scrolling regions | Clear | All |
| | Split screen | Clear | All |
| | Monitor mode | Off | All |
| | Auto scroll mode | On | All |
| | Auto page mode | Off | All |
| | Auto wrap mode | On (wrap) | All but 17 |
| | | Off (no wrap) | 17 |
| EDITING MODES | Receive CR mode (CR,CR-LF) | CR | All |
| | Tab stops | Clear All | All but 4, 17 |
| | | Set 8 column stops | 4, 17 |
| | Edit mode (page, line | Line | All |
| | Protect mode | Off | All |
| | Insert/replace mode | Replace | All |
| KEYBOARD | Wordstar mode | No reset | All |
| | Application mode | No reset | All |
| | F-key, edit key reprogramming | No reset unless selected in set up | All |
| CHARACTER SETS | Graphics mode | Off | All |
| | Replacement character | Space | All |
| | font bank assignments | Reset to default | All |
| | 1st/2nd character set definitions | Reset to default | All |
| HOST/PRINTER COMMUNI-CATIONS | ACK mode | On | 0, 1, 3, 4, 5, 6, 7, 20 |
| | | Off | All others |
| | Print modes | Off | All |
| | Page print | On | 1,5 |
| | Page flip mode | Off | All others |
| | Answerback message | No reset | All |

### Enhanced Personality Mode

Enable enhanced mode Esc [ = 20 h

Disable enhanced mode Esc [ = 20 l

Enhanced mode provides additional commands in some terminal personalities. Appendix C indicates enhanced mode commands by setting them in **bold** type.

**NOTE** Enable enhanced mode during 9065 mode. Some set up values are retained when you switch to another personality.

Return to 9065 mode Esc ! 9
(from VT100, DG 200, and PC TERM)
Return to 9065 mode Esc ~ 9
(from all other modes)

Returns the terminal to 9065 mode from any other mode. By entering 9065 mode, then returning to another mode (Esc [ 10 ; *Ps* v), it is possible to retain some 9065 features in another mode. However, any 9065 command that is either destructive or in conflict with another mode will be erased when you enter that mode.

**CAUTION**

This command can cause loss of data. Save all data before using this command.

## Saving/resetting Values

### Saving Set Up Values

Save current set up values Esc [ 0 ; 1 }
in nonvolatile memory

Most reprogrammed operating values are not saved in nonvolatile memory. (Exceptions, such as key contents, answerback message, send delimiters, and page print termination character, are noted in their descriptions.) This command saves reprogrammed values that can also be changed in set up and that are not automatically saved in nonvolatile memory. The section earlier in this chapter called "Command Format" tells how to identify set up values.

**CAUTION**

The following command erases any reprogramming you may have loaded into non volatile memory.

### Resetting the Terminal

Be careful when you reset the terminal. These commands void any values previously changed by commands from the keyboard or host that have not been saved.

Reset operating values Esc ~ 0
to factory default values

Resets software; returns nonvolatile memory to factory default values; clears the screen.

Reset operating values Esc ~ 1
to nonvolatile memory values

Returns the terminal to nonvolatile memory values (including latest set up menu values and reprogrammed function keys), unlocks the keyboard, and clears the screen. Same as turning the power off and on again.

Reset function keys to Esc ~ 2
factory default values

Restores codes sent by function keys to factory default values; does not clear the screen.

Reset editing and numeric Esc ~ 3
keypad keys to factory
default values

Restores codes sent by editing and numeric keypad keys to factory default values; does not clear the screen.

Load the date Esc x 9 ***mmddyyyy***

This command loads the date for the VideoDesk calendar, using these values:

***mm*** = two-digit month code

***dd*** = two-digit day code

***yyyy*** = four-digit year code

# Chapter 7
# KEYBOARD AND SCREEN

This chapter covers the following.

- Keyboard and beeper functions
- Screen appearance
- Character, line, and cursor attributes
- Attributes of the information lines

(Chapter 12 covers messages on the lines.)

NOTE: Command code descriptions in this chapter are for the TeleVideo 9065. Codes for TeleVideo emulations are listed in Appendix C; codes for all other emulations are listed in Appendix D.

## Keyboard Functions

### Lock/Unlock the Keyboard

Lock (disable) the keyboard Esc #
Unlock (enable) the keyboard (default) Esc "

With the keyboard locked, only the **Shift**, **Ctrl**, and **Set Up** keys operate. To unlock the keyboard, enter set up and execute CLEAR COMMUNICATIONS, or reset the terminal. See "Resetting the Terminal" (Chapt. 6) for the effects of resetting.

### Auto Repeat Mode

Auto repeat on (default) Esc [ = 8 h

Keys (except Clear Space, Home, Send, Page, Ce, Enter, Return, Esc, Loc Esc, Print, Line Erase, Page Erase, and the function keys) repeat when pressed for more than a half second.

Auto repeat off Esc [ = 8 l

### Key click

Key click on (default) Esc >
Key click off Esc <

This command temporarily overrides the set up menu value.

### Num Lock

Num Lock on Esc [ = 33 h

Num Lock off Esc [ = 33 l

With Num Lock on, the numeric pad number keys are active; with it off, they are inoperative.

### Disabling Specific Keys

Enable specified key(s) (default) Esc [ = ***Ps*** h
Disable specified key(s) Esc [ = ***Ps*** l

| *Ps* | Key |
|---|---|
| 11 | Set Up |
| 12 | Esc |
| 13 | Clear Space |
| 14 | Break |

Disabling these keys prevents operator interference.

### BREAK Signal Time-out

Select the **Break** key signal Esc [ 15 ; ***Ps*** v

| *Ps* | Key |
|---|---|
| 0 | Disabled |
| 1 | 170 ms |
| **2** | **250 ms** (default) |
| 3 | 500 ms |
| 4 | 2 seconds |

The **Break** key holds the communication line (pin 2 of the main port RS-232C connector) in the 0 (low) state for a specified time. How your computer responds depends entirely on its program. A break signal may disconnect a modem.

### CAPS LOCK Mode

Enable CAPS LOCK mode Esc [ = 26 h

Enabling CAPS LOCK mode has the same effect during reverse mode as pressing

Caps Lock

CAPS LOCK affects only the letter keys. All other number and symbol keys must be pressed with Shift to generate the upper key symbol.

Disable CAPS LOCK mode (default) Esc [ = 26 l

During CAPS LOCK mode, letter keys generate uppercase letters, as if the CAPS LOCK key were engaged.

## Caps Reverse Mode

Enable caps reverse mode — Esc [ = 25 h

Disable caps reverse mode (default) — Esc [ = 25 l

When caps reverse mode is also enabled, pressing a letter key with **Shift** generates a lower-case letter, as shown in the following table.

| Alphabetic Keys | Normal Mode | Reverse Mode |
|---|---|---|
| Alone | lower-case | lower-case |
| Shifted | UPPERCASE | UPPERCASE |
| CAPS LOCK | UPPERCASE | UPPERCASE |
| CAPS LOCK, Shifted | UPPERCASE | lower-case |

## The Beeper

Sound the beeper — Ctrl G

You can insert this command whenever you want the terminal beeper to sound.

## Selecting the Bell Column

Load the margin bell column — Ctrl W

This command sets the margin bell column at the current cursor location. The bell sounds when the cursor reaches the column during keyboard data entry. The defaults are 72 (80 columns) and 124 (132 columns).

## Margin Bell Mode

Enable the margin bell — Esc [ = 4 h

The margin bell sounds when the cursor reaches the bell column, determined by the command Ctrl W (above).

Disable the margin bell (default) — Esc [ = 4 l

## Screen Display

### Visibility

Screen display on (default) — Esc n or Esc . 9

Screen display off — Esc o or Esc . 8

Turning the display off does not clear data from the screen; it merely hides it.

## Background

Dark background (default) — Esc d

Light background — Esc b

The screen background is either light with dark characters or dark with light characters.

## Screen Saver

Select screen saver time — Esc [ 8 ; ***Ps*** v

| *Ps* | Time-out |
|---|---|
| **0** | **None** (default) |
| 1 | 10 minutes |
| 2 | 20 minutes |
| 3 | 30 minutes |

If there is no keyboard or host activity for the time period indicated, the screen goes blank to conserve the phosphor. Any new activity restores the display.

To enable the screen saver immediately, press

Ctrl Clear Space

## Cursor Appearance

Select cursor appearance — Esc . ***Ps***

| *Ps* | Cursor appearance |
|---|---|
| 0 | Invisible |
| 1 | **Blinking block** (default) |
| 2 | Steady block |
| 3 | Blinking underline |
| 4 | Steady underline |
| 5 | Blinking block |

## Visual Attributes

Visual attributes determine the appearance of characters on the screen. The terminal has a wide range of visual attribute choices. If you are unfamiliar with the characteristics of visual attributes, read the following pages.

## Visual Attribute Types

The 9065 mode gives you a choice of field- or character-based visual attributes. The field attributes can be line- or page-based. The following paragraphs discuss each.

**CAUTION**

Changing between field and character attributes clears the display, causing loss of all unsaved text.

**Character-based** Attributes are a function of time. Characters entered anywhere on the screen are displayed in the currently defined attribute. When you redefine the attribute, characters displayed in previously defined attributes do not change. Only subsequently entered characters display the new attribute.

For example, suppose you enable the blinking underline attribute and enter a character, a space, and a character. Then you change to reverse attribute and enter a character in the space between the two blinking underlined characters. You end up with a blinking underlined character, a reversed character, and another blinking underlined character.

**Field-based** Attributes are a function of location. Any time you enter a character within an attribute field, it has the attribute of that field. The display may contain any number of different attributes in various locations. An attribute field extends to the end of the line or page, or until it encounters another attribute.

For example, you could define a field of reverse attributes. No matter when you type in the field, the entry appears in reverse-attribute characters. If the field is followed by a field of underline attributes, positioning the cursor anywhere in the reverse-attribute field and entering a normal attribute creates a field of normal attributes from the cursor to the beginning of the underline attribute field. Field-based attributes are write protected. They may (or may not) occupy a space, and the fields may be line-based or page-based:

- **Space** Visual attributes occupy a character space. Entering a character in that space destroys the attribute (unless protect mode is enabled, since attributes are write-protected).
- **No Space** Visual attributes do not occupy character spaces. The first character you enter never destroys the attribute. But **after you enter the first character,** entering a character where the attribute starts destroys the attribute.

Since attributes can be write protected, you can avoid destroying them by turning on protect mode when you want to re-enter a character where an attribute starts.

- **Line-based** The attribute field, unless previously disabled, automatically terminates at the end of the current line.
- **Page-based** The attribute field, unless previously disabled, extends to the end of the page.

## Selecting Attribute Type

Select attribute type Esc F ***Ps***

| *Ps* | Attribute type |
|---|---|
| 0 | **Space** (default) |
| 1 | No Space |
| 2 | Character |

**CAUTION**

This command can destroy data! Changing between field and character attributes clears the display.

If the terminal is already in field attribute mode, changing between embedded and non embedded attributes does not clear the display.

This command controls the attribute type for both the text and information areas. See the previous discussion of attributes for an explanation of each attribute type.

## Selecting the Attribute Base

The following commands allow you to base your field attributes on pages or lines.

Select page-based (default) Esc [ = 2 h

Select line-based Esc [ = 2 l

**CAUTION**

These commands can destroy data! Changing from character to field attributes clears the display.

If the terminal is already in field attribute mode, changing between page- and line-based attributes does not clear the display.

## Defining Visual Attributes

Define visual attribute(s) Esc G ***Ps***

| *Ps* (full intensity) | *Ps* (half intensity) | Attribute |
|---|---|---|
| **0** | p | **Normal** (default) |
| 1 | q | Invisible normal video |
| 2 | r | Blink |
| 3 | s | Invisible blink |
| 4 | t | Reverse video |
| 5 | u | Invisible reverse |
| 6 | v | Reverse & blink |
| 7 | w | Invisible reverse & blink |
| 8 | x | Underline |
| 9 | y | Invisible underline |
| : | z | Underline & blink |
| ; | { | Invisible underline & blink |
| , | \| | Reverse & underline |
| = | } | Invisible reverse & underline |
| > | ~ | Reverse, underline & blink |
| ? | Del | Invisible reverse, underline, & blink |

The **Esc G** *Ps* command defines visual attributes for unprotected text—not for write-protected characters or the information lines.

## Normal Intensity Mode

Normal attribute is half intensity Esc [ = 5 h

This command resets the normal visual attribute to half-intensity. It does not reset the half-intensity attribute to full intensity.

Normal attribute is full intensity (default) Esc [ = 5 l

## Filling a Rectangle with Attributes

Define character-based attributes in a rectangle Esc x I ***r c Ps***

*r* = An ASCII character from Appendix G for the row (line) at which the sides of the block, extending from the cursor row, terminate.

*c* = An ASCII character from Appendix G for the column at which the top and bottom of the block, extending from the cursor column, terminate.

*Ps* = Any value of *Ps* on the previous page

This command removes the write-protect attribute, as well as any other attribute, from the characters in the specified rectangle and assigns the designated attribute to the characters. The variables *r* and *c* define the row and column framing two sides of the block. The cursor anchors the opposite corner.

The terminal accepts this command only during character-based attribute mode. It does not accept this command with protect mode enabled.

You cannot specify a value of *r* or *c* beyond line or column 96.

## Information Area Attributes

Select area attribute Esc _ ***Pa Ps***

| *Pa* | Information Area |
|---|---|
| 4 | Status line |
| 5 | Status line message field |
| 6 | User message one |
| 7 | User message two |

*Ps* = A variable from "Defining Visual Attributes" table.

The information areas and text areas have the same attribute type (selected with the command **Esc F** *Pn* or in set up). Note that the first position in an area contains an attribute character. The following table shows the default attributes of the various information areas:

| Information Area | Attribute |
|---|---|
| Status line | Reverse |
| Status line message field | Normal |
| User message one | Normal |
| User message two | Normal |

## Status Line Attributes

Select status line attribute Esc [ 3 ; ***Ps*** v

| *Ps* | Attribute |
|---|---|
| 0 | Normal |
| 1 | **Reverse** (default) |
| 2 | Underline |

## Write-Protected Characters

Select the attribute(s) of write-protected characters Esc . ***Ps***

| *Ps* | Attribute |
|---|---|
| 6 | Reverse |
| 7 | **Half intensity** (default) |
| A | Normal |
| B | Blinking |
| C | Blank (invisible) |
| E | Underline |
| F | Reverse |
| G | Half intensity |

Define attributes of write-protected characters separately from those of normal text characters.

## Line Appearance

The commands in this section let you display from 80 to 132 characters on a line.

## Selecting the Number of Columns

Select 80 columns per line (default) Esc [ = 3 l or Esc . :

Select 132 columns per line Esc [ = 3 h or Esc . ;

These commands affect both the information lines and the data display lines. If the 80/132 Change Clear feature is off, they do not clear the screen, but you should clear the message and function key label lines before changing the number of columns per line, then display the lines programmed for the new column width.

If the 80/132 Change Clear feature is off and you change from 132 to 80 column mode, data in columns 81-132 remains in display memory. The cursor also remains in its current position, even if it is beyond the right margin of the display, and you can enter data in the columns that are not displayed. But once you move the cursor into the display, you cannot go back into the undisplayed columns.

To retain an 80-column display, but be able to access the entire 132 columns, select 132 80 DSPLY in set-up, and scroll the display horizontally with Ctrl-Shift-arrow keys. See Chapter 1 for more information about terminal behavior during this mode.

## 80/132 Change Clear Feature

80/132 Change Clear ON Esc [ = 61 h

80/132 Change Clear OFF Esc [ = 61 l

With this feature on, each time you change the number of columns, the screen is cleared and all data in display memory is lost.

## Line Attributes

Define the line attribute(s) Esc G ***Ps***

| *Ps* | Attribute |
|---|---|
| @ | **Single high, wide** (default) |
| A | Single high, double wide |
| B | Top half double high, single wide |
| C | Bottom half double high, single wide |
| D | Top half, double high, wide |
| E | Bottom half, double high, wide |

**CAUTION**

Changing from single width to double width destroys all characters on the right half of the line.

Line attributes affect all characters on the cursor line and any entered on that line after you change attributes. Line attributes affect **only** the cursor line. The screen can contain lines with different attributes.

Lines of double-width characters can contain only half as many characters as a single-width line can. When you enable the double-wide attribute, the cursor moves to the screen's right margin if it is in a column that moves beyond the right margin.

Specify double-height lines in pairs (top line first) and send the same data to both. (The display may look strange until both lines are on the screen.)

Most printers print one character for each character position. For example, printing a page of double-high/wide characters could result in four printed characters for each display character.

## Test Displays

### Self Test

Run the self test — Esc V

This command starts the self test described in Chapter 5. After you run the test, press

Ctrl Shift Clear Space

or send a clear command to clear the screen.

### Monitor Mode

Monitor mode on — Esc U

Monitor mode off (default) — Esc X or Esc u

**Mnitor mode on** The terminal displays commands (control and Escape sequence characters) on the screen, instead of acting on them.

**Monitor mode off** Terminal processes commands normally.

Seeing command characters on the screen can help you debug a program. Appendix B shows how control characters appear on the screen in monitor mode.

If you want to display a control character without putting the terminal in monitor mode, send an Escape character (or press LOC Esc) just before the control character.

To toggle monitor mode from the keyboard, press

Ctrl Shift 1

using the number on the numeric pad.

# Chapter 8
# DISPLAY & PAGES

This chapter presents commands that control the following features:

- Lines per display and per page
- Split screen
- Scrolling

**NOTE:** Command code descriptions in this chapter are for the TeleVideo 9065. Codes for TeleVideo emulations are listed in Appendix C; codes for all other emulations are listed in Appendix D.

## Configuring Lines and Pages

The concepts in this section are fairly complex; you may need to study the tables carefully and then look over the line and page configuration commands that follow.

The terminal **automatically** divides display memory into pages. The number of pages selected depends on these factors:

- Number of lines per page
- Current personality mode
- Columns per line mode

In addition, the number of lines per page is affected by the number of display lines selected, since you cannot configure the display for more lines than the page has.

Table 8-1. Personality Mode Sets

| Set | Pages | Personalities |
|---|---|---|
| 1 | 3 | 9065, 965, 955, WY-60, WY-120/150, WY-160, VPA2 60, DG200,VT100, PC TERM, Hazeltine 1500 |
| 2 | 7 | 910/910+, 912/920, 925/905, 950, WY-50/50+, ADM 31 |

For the 1500 and the 910, enhanced mode must be on. All other personalities are capable of single-page support only.

Table 8-2 lists the maximum number of pages available for the 9065 personality. Changing to other personalities may limit the number of pages available.

### Selecting Number of Lines

Select the number of display lines — Esc [ 14 ; ***Ps*** v

| *Ps* | Lines | *Ps* | Lines |
|---|---|---|---|
| **0** | **24** (default) | 3 | 43 |
| 1 | 25 | 4 | 48 |
| 2 | 42 | 5 | 49 |

**CAUTION**

This command clears the screen and may cause loss of data!

If you select 25, 43, or 49 lines, the bottom line overwrites the bottom information line.

Table 8-2. Maximum Pages Available

| Display Lines | Page length =1 x lines | | Page length = 2 x lines | | Page length = 4 x lines | | Pg length = 1 + mem | |
|---|---|---|---|---|---|---|---|---|
| | Single Session | Dual Session | Single session | Dual Session | Single Session | Dual Session | Single Session | Dual Session |
| 24 | 7 pages | 3 pages | 4 pages | 2 pages | 2 pages | 1 page | 2 pages | 2 pages |
| 25 | 6 pages | 3 pages | 2 pages | 1 page | 2 pages | 1 page | 2 pages | 2 pages |
| 42 | 4 pages | 2 pages | 2 pages | 1 page | n/a | n/a | 2 pages | 2 pages |
| 43 | 4 pages | 2 pages | 2 pages | 1 page | n/a | n/a | 2 pages | 2 pages |
| 48 | 4 pages | 2 pages | 2 pages | 1 page | n/a | n/a | 2 pages | 2 pages |
| 49 | 4 pages | 2 pages | 2 pages | 1 page | n/a | n/a | 2 pages | 2 pages |

## Selecting Lines per Page

Define page length Esc \ ***Ps***

| *Ps* | Page Length |
|---|---|
| 1 | 1 x number of display lines |
| 2 | 2 x number of display lines |
| 3 | 4 x number of display lines |
| 7 | 1 + Memory: Page 1 same as number of display lines, page 2 contains all lines remaining in display memory |

**CAUTION**

The **Esc \ *Ps*** command can cause loss of data!

When you execute the **Esc \ *Ps*** command, the terminal performs the following functions:

- Clears all pages of memory to space characters
- Displays page one with the cursor at home position
- Defines the display as one full screen
- Redefines the scrolling region as the entire display

You cannot define page length as less than the number of display lines.

The term **page** (i.e., document) refers to an amount of memory. Do not confuse page length with the number of lines on the **display**—the amount of data that can be viewed on the screen at one time.

Figure 8-1 shows the terminal's memory divided into pages, with part of one page displayed.

## The Split Screen

You may split the screen into two horizontal windows. The top window shows the current (active) page; the page that appears in the bottom window depends on the total number of pages of memory. You can then move the cursor between windows (change the active page) and change the size of the windows.

While the screen is split, commands to display another page of memory are still valid.

**NOTE** Splitting the screen disables protect mode, and you cannot enable protect mode while the screen is split.

## Split Screen w/o Clearing Pages

Split without clearing Esc \ A ***Pn***
(two pages of memory only)

Split without clearing Esc \ C ***Pn***
(one or more than two pages of memory)

***Pn*** = a line number code from Appendix G that indicates where the lower window starts (default = 8)

**One page of memory** The top line of the upper window is line 1 of the page. The top line of the lower window is line *Pn* of the page.

**Multiple pages of memory** The top line of the upper window is line one of the current page. The top line of the lower window is line one of the next sequential page. If the upper window contains the last configured page, the lower window contains page zero. When you split the screen, the cursor moves to home position.

## Split Screen and Clear Pages

Split, and clear both pages Esc \ D ***Pn***
(two pages of memory only)

Split, and clear both pages Esc \ E ***Pn***
(one or more than two pages of memory)

***Pn*** = a line number code from Appendix G that indicates where the lower window starts (default = 8)

This command has the same effects as the previous command to split the screen without clearing the pages, except that both affected pages are cleared to replacement characters.

## Sizing the Windows

Lower the horizontal split Esc \ P

Raise the horizontal split Esc \ R

Each time you send one of these commands to the terminal, the windows increase/decrease by one line. Data that scrolls off the screen remains in memory.

This command is ignored if the screen is not in a split screen mode.

## Closing the Windows

| | |
|---|---|
| Return the active window to full display size | Esc \ @ |
| Return the active window to full display size and clear the pages | Esc \ 0 |

**Pages not cleared** The current page is displayed on the full screen. The page in the inactive window is saved in display memory.

**Pages cleared** Pages in both windows are cleared to replacement characters. The active page is displayed on the full screen, with the cursor in home position.

## Moving to Another Page/Window

| | |
|---|---|
| Activate the upper window | Esc \ H |
| Activate the lower window | Esc \ I |
| Display the previous page or activate the other window | Esc J |
| Display the next page or activate the other window | Esc K |
| Display page ***Pn*** | Esc [ 1 ; ***Pn*** } |

***Pn*** = A decimal value from 0 through 6 (default = 0)

NOTE The terminal can have up to seven pages, which are numbered 0 through 6. See Table 8-1.

These commands let you move the cursor between windows (or pages). The command to display page *Pn* lets you move to any page in memory regardless of the page currently displayed. The status of autopage mode is irrelevant.

If you have already displayed the next or previous page, or when you are working with a split screen, the cursor returns to its last location there after a next or previous page command. Otherwise, the cursor goes to the first unprotected (home) position.

## Page Movement Modes

### Autopage Flip Mode

| | |
|---|---|
| Autopage Flip on | Esc v |
| Autopage Flip off | Esc w |

**Autopage Flip on** A new page in the terminal's memory moves onto the screen when the terminal receives a command to move the cursor beyond the current page.

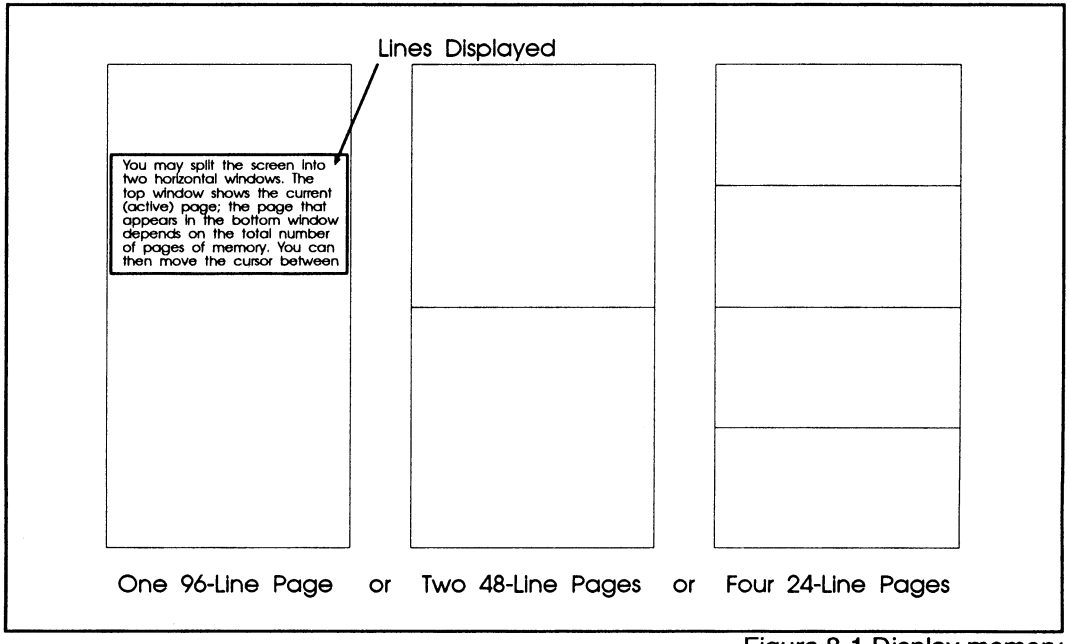



Figure 8-1 Display memory

A line feed or reverse line feed command moves the cursor to the first or last line of an adjoining page (while remaining in the same column position.)

A cursor right, cursor left, or cursor addressing command displays the adjoining page when the cursor reaches the beginning or end of a page. When the cursor reaches the end of the last page, it returns to the beginning of the first page.

Text on a page that moves off the screen is not cleared. When you return to that page, your text reappears.

**Autopage Flip off** When autopage mode is disabled, autoscroll mode, described in the next section, determines the effects of cursor movement on page and data display.

## Autoscroll Mode

Autoscroll mode on Esc [ = 19 h

Autoscroll mode off Esc [ = 19 l

**Autoscroll on** If autopage and protect modes are turned off, data scrolls up (or down) one line when the cursor moves past the last (or first) line of the page. The line that scrolls off the screen is lost and a new line of replacement characters appears at the other end of the display.

**CAUTION**

This mode can cause loss of text!

Table 8-4 lists the keys and commands that can cause loss of text. To prevent loss of text, enable protect or autopage mode.

Table 8-4. Data Loss Due to Scrolling

| Key | Command | Function |
|---|---|---|
| Line Feed<br>Shift-down | Ctrl J | Line feed |
| Shift-Up | Esc j | Reverse line feed |
| Right | Ctrl L | Cursor right |
| Alphanumeric | - | Text entry from host or keyboard |

**Autoscroll off** The cursor does not move beyond the top or bottom of the page.

## Scrolling

Scrolling is the movement of text on the screen. There are two types of scrolling:

- The flow of text received from the host onto the screen
- The movement of displayed text lines as you move the cursor or enter text from the keyboard

If **page** size is greater than the number of **display lines,** text entry or cursor movement can cause lines of text to scroll up or down into other areas of the page.

## Setting the Scrolling Rate

Select normal smooth scroll (4 lines per second) Esc 8

Select jump scroll Esc 9

Set the scrolling rate Esc . ***Ps***

| *Ps* | Scroll Rate |
|---|---|
| < | Smooth scroll at 1 line per second |
| = | Smooth scroll at 2 lines per second |
| > | Smooth scroll a 4 lines per second |
| ? | Smooth scrill at 8 lines per second |
| @ | Jump scrill |

Set the scrolling rate Esc [ 6 ; ***Ps*** v

| *Ps* | Scroll Rate |
|---|---|
| 0 | Jump scrol |
| 1 | Normal (4 lines per second) |
| 2 | Slow (2 lines per second) |
| 3 | Fast (8 lines per second) |
| 4 | Very slow (1 line per second) |

NOTE: Jump scrolling displays data at the rate it is received.

## Defining the Scrolling Region

Define the scrolling region Esc [ ***Pt*** ; ***Pb*** r

***Pt*** = The decimal number of the top line in the scrolling region

***Pb*** = The decimal number of the bottom line in the scrolling region

This command fixes certain lines on the screen, while permitting the display to scroll through a section of the screen. You can design pages, such as a business form, with a defined head and foot, and a center area through which data can scroll.

Count ***Pt*** and ***Pb*** from the screen's top line (line 1), in single-height lines, even when you have configured the display for double-height lines. Values range from 1 to 24.

The area outside the defined scrolling region is called the **memory-locked area** (see Figure 8-2). You cannot move the cursor into that area or scroll its text.

Defining a scrolling region moves the cursor to the first character position of the top line of the scrolling region.

Figure 8-2 shows a screen containing all double-height lines, with the defined scrolling region starting at line five and ending at line 18 (*Pt* = 5, *Pb* = 18)..

## Locking One Line

Enable line lock Esc ! 1
Esc . H

Disable line lock Esc ! 2
Esc . l

You can lock selected lines on the screen with this command, so they remain fixed regardless of the scrolling of the rest of the display. To lock a line, place the cursor on the desired line and send the command. You may lock all but one of the displayed lines. The command to disable line lock unlocks all locked lines.

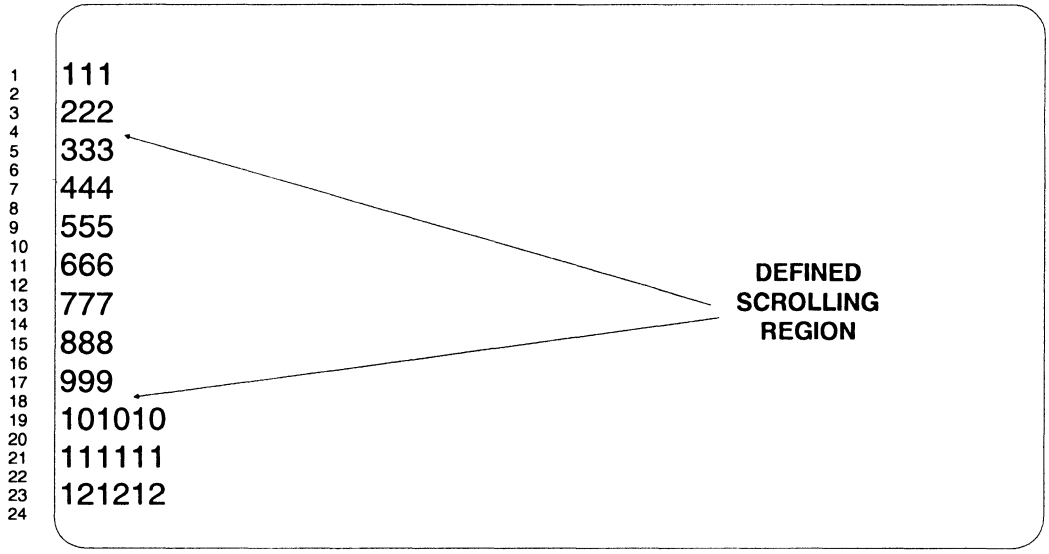



Figure 8-2. Scrolling Region

# NOTES

# Chapter 9
# EDITING & CURSOR MOVEMENT

Editing modes affect the action of many editing commands, some of which can cause loss of data. If you are unsure about the setting of a mode or the effect of a command, experiment on data you don't mind losing.

> **NOTE:** Command code descriptions in this chapter are for the TeleVideo 9065. Codes for TeleVideo emulations are listed in Appendix C; codes for all other emulations are listed in Appendix D.

## Protected Modes

### Write-Protect & Protect Modes

| | |
|---|---|
| Enable write-protect mode | Esc ) |
| Disable write-protect mode | Esc ( |
| Enable protect mode | Esc & |
| Disable protect mode | Esc ' |

While write-protect mode is enabled, any data then entered is write-protected. When you later enable protect mode, only certain commands can edit and transmit write-protected characters.

Protect mode guards all write-protected characters on the screen. Cursor position is irrelevant when you enable protect mode.

> **NOTE:** You cannot enable protect mode when the screen is split.

The effects of protect mode are described below. Steps for entering write-protected text and enabling protect mode follow.

**Data entry** The cursor skips over protected fields during data entry.

**Cursor** Cursor movement commands cannot cause protected movement or unprotected data to scroll off the screen.

The cursor skips over protected fields in response to cursor movement commands.

**Tabulation** The first unprotected position after a protected field becomes a field tab stop. Sending a tab command moves the cursor to the first field tab stop following a protected field.

**Editing** Most editing commands affect only unprotected data. Only some clear commands (see the section titled "Clearing Data") can affect protected data.

**Data transmission** Only specific commands transmit protected characters.

### Creating a Protected Form

Using write-protect and protect modes, you can create forms with permanent (protected) headings and blank areas for an operator to fill in later. Protecting the headings keeps them from being accidentally deleted or changed.

Figure 9-1 shows a typical form with protected areas.

Creating protected data, such as a form, takes two steps:

- Turn on write protect mode and enter the data you want to protect.
- Turn on protect mode to guard the write-protected data.

Follow these steps to enter protected data:

1. Position the cursor where you want to enter the first protected character.
2. To enable write-protect mode, enter
   [Esc] [)]
3. Enter the information you want to protect.

> **NOTE:** Bracketing existing data with the commands to enable and disable write-protect mode does not write-protect the field. To write-protect existing data, you must enable write-protect mode, then retype the desired characters.

4. To disable write-protect mode, enter
   [Esc] [(]
5. After entering all data you want to protect and disabling write-protect mode, turn on protect mode. All write-protected areas are now protected.

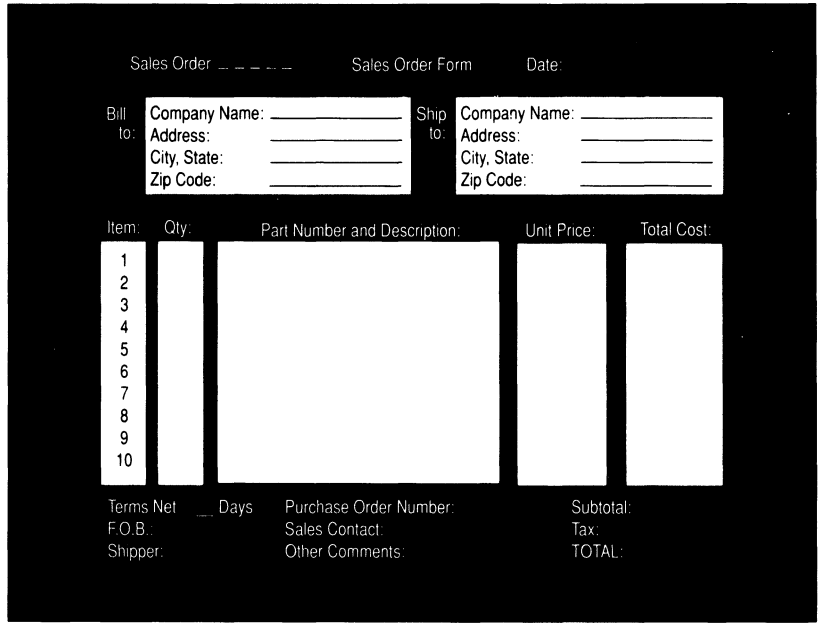



Figure 9-1. A Typical Protected Form

## Editing Keys

Enable local editing key mode Esc k

Even in a conversational communication mode, codes from the following keys act locally (go to the screen only):

| | |
|---|---|
| Home | Return |
| ↓ | Print |
| ↑ | Send |
| ← | CE |
| → | Page |
| Line Insert | Char Insert |
| Line Delete | Char Delete |
| Line Erase | Page Erase |
| Line Feed | Clear Space |
| Tab (both) | |

**NOTE:** The effects of this command do not completely correspond to the effects of redirecting editing key codes in Set Up.

Enable duplex editing key mode (default) Esc l

The communication mode determines the destination of all key codes.

## Down Arrow Key Mode

Down arrow sends Ctrl V (default) Esc [ = 9 l

Down arrow sends Ctrl J Esc [ = 9 h

See the section about the line feed command for information about the effects of Ctrl J.

## Autowrap Mode

Autowrap mode on (default) Esc [ = 7 h

The cursor wraps from the end of one line to the start of the next line during data entry. Autowrap mode does not change the effect of the cursor movement commands.

Autowrap mode off Esc [ = 7 l

Each character entered after the cursor reaches the line's last unprotected position overwrites the previous one.

## New Line Mode

New line mode on — Esc [ = 6 h

A carriage return code (Ctrl M), from the host or the keyboard, moves the cursor down one line and then to the start of the new line (LF/CR), just as a new line code (Ctrl _) does.

New line mode off (default) — Esc [ = 6 l

Carriage return code causes only a carriage return (CR).

> **NOTE**: When protect mode is on, LF/CR is different from CR/LF. A line feed can move the cursor into a protected field; a carriage return cannot.

## Editing Modes

Enable page edit mode — Esc N

Existing data wraps around from line to line. Data moves to the end of the page before it is lost. When protect mode is on, the terminal ignores the command to enable page edit mode.

Enable line edit mode (default) — Esc O

When you insert or delete characters, existing data moves forward or backward only on the current line. Data pushed beyond the end of the line is lost. The terminal automatically enables line edit mode when you turn on protect mode.

## Insert/Replace Modes

Enable insert mode — Esc q

Existing data is pushed aside (to the right) by new data. Data pushed to the end of the line or page (depending on edit mode, below) is lost.

Enable replace mode (default) — Esc r

New data replaces (writes over) existing data.

## The Replacement Character

Load a replacement character — Esc e ***Ps***

***Ps*** = Any ASCII character (default = space)

Some editing commands replace data with a predefined replacement character. You can reprogram this character as any ASCII character. This terminal capability lets you replace data with characters such as an underline or asterisk.

# Editing Text

This section explains the commands to insert, delete, erase, and clear characters.

## Inserting Characters

Insert a replacement character at the cursor position — Esc Q

Insert ***Pn*** replacement characters, starting at the cursor position — Esc [ ***Pn*** @

When protect mode is off, either of these commands enters replacement character(s) at the cursor and moves existing characters right. Data pushed past the end of the line or page is lost.

When protect mode is on, only unprotected characters in the current field move. Characters reaching the first protected position or the end of the line (whichever comes first) are lost.

Insert a line of replacement characters on the current line — Esc E

Insert ***Pn*** lines of replacement characters, starting at the current line — Esc [ ***Pn*** L

When protect mode is off, either of these commands inserts line(s) of replacement characters starting at the current line; moves all following lines down. Cursor moves to column one of the new line. Lines pushed off the screen are lost.

When protect mode is on, there is no action.

***Pn*** = A decimal value

## Inserting Nulls

Insert a column of nulls at the cursor position — Esc x M

This command inserts a column of null characters from top to bottom of the page. Characters to the right of the column on every line are Shifted one position to the right.

**CAUTION**

This command can cause loss of data! The last character on each line or before a protected field is pushed "off the edge" and lost.

## Repeating a Character

Repeat the next character *Pn* times — Esc [ ***Pn*** b

***Pn*** = A decimal character

This command writes the character received immediately after the command for a specified number of times (***Pn***). When a protected field is encountered, the cursor skips over it and continues writing. Characters are pushed ahead of the cursor or overwritten, depending on the status of insert/replace mode.

## Deleting Text

Deleting removes unprotected text only, starting at the cursor position, and pulls the remaining characters back to the left. Replacement characters appear at the end of the line or page.

Delete a character — Esc W

Delete ***Pn*** characters — Esc [ ***Pn*** P

When protect mode is off, either command deletes character(s) starting at the cursor and pulls the following characters left.

When protect mode is on, only unprotected characters are deleted.

Delete the cursor column — Esc x J

Delete the current line — Esc R

Delete ***Pn*** lines — Esc [ ***Pn*** M

***Pn*** = A decimal value

When protect mode is off, either command deletes line(s) starting at the cursor line, moves remaining lines up, and moves the cursor back to the first position.

When protect mode is on, nothing happens.

## Clearing a Field

Clear the current tab field; replace with new characters. — Ctrl X

**Protect mode off** **Ctrl X** clears all characters in the cursor tab field (or the line, if no tab stops are set) to replacement characters. The cursor moves to the beginning of the field (or line).

**Protect mode on** **Ctrl X** clears the unprotected characters in the cursor field to replacement characters. The cursor moves to the beginning of that field.

Clear unprotected in page and replace with write-protected spaces (disable protect mode) — Esc ,

Clear unprotected in page and replace with new characters. — Esc ; Ctrl Z

Clear attributes and unprotected text in page: replace text with new. — Esc x V

Clear unprotected in page; replace with null characters — Esc :

Clear attributes and unprotected text in page; replace with nulls. — Esc x U

Clear all in page; replace with new characters (disable protect and write-protect modes) — Esc +

Clear all in page; replace with nulls (disable protect and write-protect modes) — Esc *

Clear unprotected in page; replace with specified character — Esc <sp> ***Ps***

***Ps*** = Any ASCII character

Clearing replaces data with space, replacement, or null characters. Unlike erasing and deleting, clear commands (except **Ctrl X**) do not relate to the cursor position; what you clear depends only on the command you give.

All clear commands except **Ctrl X** move the cursor to home or the first unprotected position.

## Erasing a Column

Erase unprotected column at cursor position and replace with new write-protected characters. — Esc x O

Erase unprotected column at cursor position and replace with nulls — Esc x K

Erase unprotected column at cursor position and replace with specified characters. — Esc x N ***Ps***

***Ps*** = Any ASCII character

The erased column extends from top to bottom of the display.

## Erasing Unprotected Text

These commands replace only unprotected characters (text) with replacement or null characters. The cursor and protected text do not move.

Erase from cursor to end of line; replace with new characters. — Esc T

Erase from cursor to protected field or end of line; replace with new characters — Esc t

Erase from cursor to end of line; replace with nulls — Esc x L

Erase from cursor to end of page; replace with new characters. — Esc Y

Erase from cursor to end of screen; replace with nulls — Esc y

Erase specific characters in current line; replace with new characters — Esc [ ***Ps*** K

Erase specific characters in page; replace with new characters. — Esc [ ***Ps*** J

| ***Ps*** | Amount Erased |
|---|---|
| 0 | From cursor to end of line/field or page |
| 1 | Start of line/field or home position to cursor |
| 2 | Entire line/field or page |

**NOTE:** Write-protected text is not protected until you enable protect mode. To avoid losing write-protected text, enable protect mode before erasing.

## Erasing Unprotected Text and Attributes

These commands erase unprotected text and attributes in specific areas; text is replaced as noted. Cursor and protected text do not move.

Clear attributes and erase text from cursor to end of line; replace text with new. — Esc x R

Clear attributes and erase text from cursor to protected field or end of line; replace text with new. — Esc x S

Clear attributes and erase text from cursor to end of line; replace text with nulls. — Esc x T

Clear attributes and erase text from cursor to end of page; replace text with new. — Esc x P

Clear attributes and erase text from cursor to end of screen; replace text with nulls. — Esc x Q

## Erasing a Rectangle

Erase unprot. chars. in a rectangle; replace with ***Ps*** — Esc x F ***r c Ps***

Erase all chars. in a rectangle; replace with ***Ps*** — Esc x H ***r c Ps***

***r*** = An ASCII character from Appendix G for the row (line) at which the sides of the block, extending from the cursor row, terminate.

***c*** = An ASCII character from Appendix G for the column at which the top and bottom of the block, extending from the cursor column, terminate.

***Ps*** = Any ASCII character.

Variables ***r*** and ***c*** define the row and column framing two sides of the block. The cursor anchors the opposite corner.

**CAUTION**

Erasing all characters can cause loss of data! The command erases even protected characters.

The area erased with these commands may extend above or below the cursor, and to the right or left. It may extend on a page or a defined scrolling region beyond the edge of the display. You cannot specify a value of **r** or **c** beyond line or column 96.

Chapter 8 contains commands to draw a rectangle on the screen.

## Cursor Control

Many cursor movements are affected by protect and autoscroll modes. The paragraphs that follow each set of commands explain how they are affected.

## Cursor Movement

| | |
|---|---|
| Move the cursor up | Ctrl K<br>Esc [ ***Pn*** A |
| Move the cursor down | Ctrl V<br>Esc [ ***Pn*** B |
| Move the cursor right | Ctrl L<br>Esc [ ***Pn*** C |
| Move the cursor left (back space) | Ctrl H<br>Esc [ ***Pn*** D |
| Move the cursor to home | Ctrl ^ |
| Carriage return | Ctrl M |

***Pn*** = A decimal value

When the cursor reaches the top or bottom of the page, it does not move any further.

The home command moves the cursor to the first unprotected screen position unless already there (usually row 1 and column 1).

During protect mode, right and left commands skip the cursor over a protected field, but up and down commands move the cursor into the field.

When autowrap mode is disabled, the cursor right and left commands do not wrap the cursor from its current line to the next or previous line.

The cursor right command can cause text to scroll off the screen under certain circumstances, as described below:

- Autowrap and autoscroll modes **on**, protect mode **off**. If cursor is on the last column of the last line, data scrolls up one line. The first line is lost, and a new bottom line of replacement characters appears.
- Autowrap and protect modes **on**. If cursor is on the last unprotected position, it wraps around to the first unprotected position.
- Autowrap mode **off**. If cursor is on the last unprotected position, it stops. Beyond that point, all characters entered will appear in the 80th column.

## Line Feed and Reverse Line Feed

| | |
|---|---|
| Line feed | Ctrl J |
| Reverse line feed | Esc j |
| New line (LF/CR) | Ctrl _ |
| Move cursor down ***Pn*** lines | Esc [ ***Pn*** S<br>or Esc [ ***Pn*** B |
| Move cursor up ***Pn*** lines | Esc [ ***Pn*** T<br>or Esc [ ***Pn*** A |

***Pn*** = A decimal figure for the desired number of lines

**CAUTION**

These commands can destroy data!

These commands move the cursor up or down on the page. When the cursor reaches the top or bottom of the page or defined scrolling region, the lines scroll if protect mode is off. The lines that scroll off the screen are lost, and lines of new characters appear at the other end of the screen.

The following paragraphs summarize how autoscroll and protect modes affect cursor movement after a line feed command:

- Autoscroll and protect modes **on**. If the cursor is at the bottom of the page, it wraps around to the top line.
- Autoscroll mode **on**, protect mode **off**. If the cursor is at the bottom of the page, the display scrolls up one line. The top line is lost, and a new bottom line of replacement characters appears.
- Autoscroll mode **off**. When the cursor reaches the last line, it wraps around to the first line.

## Addressing the Cursor

| | |
|---|---|
| Address (send) cursor to row and columns 1-80 | Esc = ***r c*** |
| Address (send) cursor to row and columns 81-132 | Esc = ***r*** ~ ***c*** |
| Address (send) cursor to page, row, and columns 1-80 | Esc - ***p r c*** |
| Address (send) cursor to page, row, and columns 81-132 | Esc - ***p r*** ~ ***c*** |

***r*** = An ASCII character for the row (line) from the cursor coordinate table in Appendix G.

***c*** = An ASCII character for the column (from Appendix G).

To calculate the value of *c* for columns 81-132, subtract 80 from the column number and find the corresponding ASCII character.

| *p* | Page |
|---|---|
| 0 | 1 |
| 1 | 2 |
| 2 | 3 |
| 3 | 4 |
| 4 | 5 |
| 5 | 6 |
| 6 | 7 |

This command lets you move the cursor to a specified screen location. If your computer inserts nulls between characters, the terminal response to this command is unpredictable.

For example, **Esc = ( Q** sends the cursor to row 9, column 50; and **Esc = ( ~ Q** sends the cursor to row 9, column 130.

## Reading the Cursor

Read cursor row and column position — Esc ?

Read cursor page, row, column position — Esc /

The terminal responds to these commands with row/column characters from the cursor coordinate table in Appendix G, as shown in the cursor addressing examples above. A carriage return character terminates the report.

If you send **Esc /**, the terminal sends a zero for page 0, a one for page 1, and so forth.

## Cursor Address (Decimal Units)

Address the cursor to line and column of the current page in decimal units — Esc [ ***Pl*** ; ***Pc*** **H** or Esc [ ***Pl*** ; ***Pc*** **f**

***Pl*** = A decimal value for the line

***Pc*** = A decimal value for the column

If you address the cursor to a nonexistent area, it moves as far as logical to the right and down.

If you enter no variables, the cursor moves to home position.

## Reading Cursor in Decimal Units

Read cursor row and column in decimal units — Esc [ 6 ***n***

Read cursor page, row, and, column ***n*** in decimal units — Esc [ ? 6 ***n***

The terminal responds in the format

Esc [ ***Pl*** ; ***Pc*** R.

or Esc [ ***Pp*** ; ***Pl*** ; ***Pc*** R

with ***Pp*** and ***Pl*** in decimal units.

## Tabulation

The terminal has two types of tab stops:

- Typewriter (recognized only when protect mode is off)
- Field (recognized only when protect mode is on)

## Setting Tab Stops

Set field (protect mode on) or typewriter (protect mode off) tabs — Esc 1

**CAUTION**

This command can destroy data during protect mode.

Field tab stops can be set in two ways:

- Enabling protect mode automatically sets field tab stops at the first unprotected position after each protected field.
- Sending **Esc 1** while protect mode is enabled creates a column of protected space characters at the cursor position, destroying the characters that occupy that column.

The column extends down from the cursor line until it encounters a protected character. The first unprotected position after the protected replacement character in each line becomes a field tab stop. The cursor moves from its previous position, now a protected replacement character, to the new field tab stop.

After protect mode is disabled, the protected column remains as a column of write-protected replacement characters.

When protect mode is off, sending **Esc 1** creates a tab stop in every line at the current column position.

Be sure you enter a number one in the command. A lower-case **l** turns on duplex edit mode.

## Clearing Tab Stops

Clear typewriter tab stop at cursor location — Esc 2

Clear all typewriter tab stops — Esc 3

The cursor position is irrelevant when you clear all typewriter tab stops.

Turning protect mode off automatically clears field tab stops. Turning it on again automatically resets them.

## Moving the Cursor to a Tab Stop

To tab forward, press

[Tab]

To tab backward, press

[Ctrl] [Tab]

To set a tab stop, press

[Shift] [Tab]

Move cursor forward to next typewriter or field tab stop — Ctrl I

If protect mode is off, **Ctrl I** moves the cursor to the next typewriter tab stop. If no more tab stops exist, the cursor does not move.

If protect mode is on, **Ctrl I** moves the cursor to the first position in the next unprotected field (next field tab stop). If the screen has no more unprotected fields, the cursor returns to the first unprotected position.

Move cursor forward to next field tab stop — Esc i

If protect mode is on or off, **Esc i** moves the cursor to the next unprotected field (next field tab stop).

Move cursor backward to previous typewriter or field tab stop — Esc I

If protect mode is off, **Esc I** moves the cursor back to the previous typewriter tab. If the cursor is already on the first tab position on the line, or if no other tabs exist, the cursor moves to the first column of the line.

If protect mode is on, **Esc I** moves the cursor back to the first position in the current or previous unprotected field. If the screen has no previous unprotected positions, the cursor does not move.

# Chapter 10
# CHARACTER SETS

The terminal can display an extensive range of alphanumeric, special symbol, and graphics characters. You may also design and download custom characters.

> NOTE: Command code descriptions in this chapter are for the TeleVideo 9065. Codes for TeleVideo emulations are listed in Appendix C; codes for all other emulations are listed in Appendix D.

## Selecting A Character Set

There are seven character sets available: 9065 Mode ASCII (default), 9065 Line Graphics, 9065 Multinational, IBM 7-Bit, IBM 8-Bit, Wyse 60 7-Bit, and Wyse 60 Line Graphics.

Changing sets from the default group is complex. Here is a summary of the steps for selecting non-default values all the way. In most cases, you'd go with the default values at some point, and the process wouldn't be so long.

1. Decide which set(s) you want to load in place of the default set(s).
2. Change the 9065 mode character set from U.S. ASCII to one of the other national character sets before loading the font banks.
3. Load the desired character set(s) into the font bank(s) (character generator).
4. If desired, load custom (soft) characters into one of the font bank sets.
5. Select a primary and a secondary character set from the sets in the font banks.
6. Display primary or secondary character set.

Figures 10-1 through 10-4 show the character sets as displayed on screen. Note that 9065 mode control characters (00h to 1Fh) are replaced by 32 special graphics characters. Appendix B shows control and display characters with their code equivalents. The following sections present the commands to select, load, and display character sets. The command to create and load a soft character is presented in a separate section.


Figure 10-1. 9065 ASCII, Graphics, and Multinational

**NOTE** When you change terminal personality mode or the number of display lines, the character set changes to match the new configuration, unless you disable auto font load.

**NOTE** Figure 10-4 shows each graphics character aligned with the key you press to produce it.

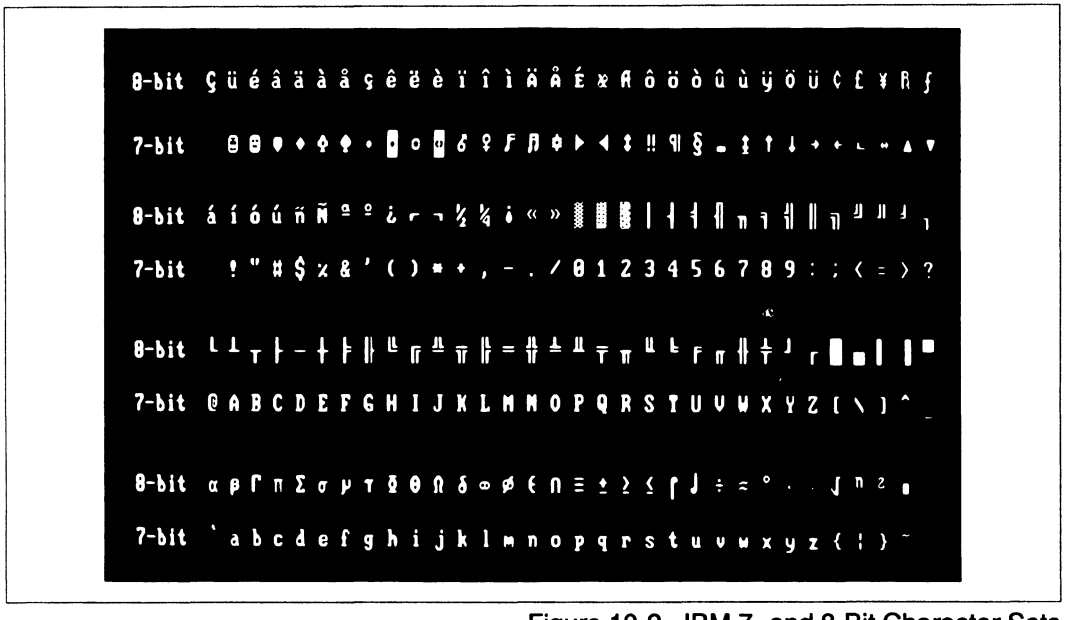



Figure 10-2. IBM 7- and 8-Bit Character Sets

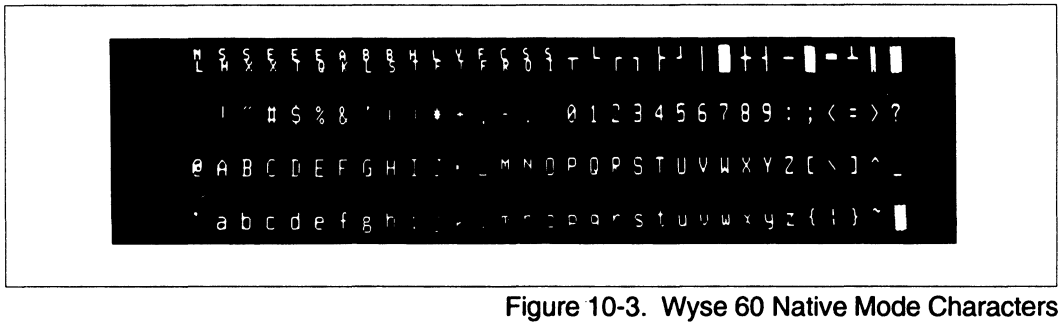


Figure 10-3. Wyse 60 Native Mode Characters

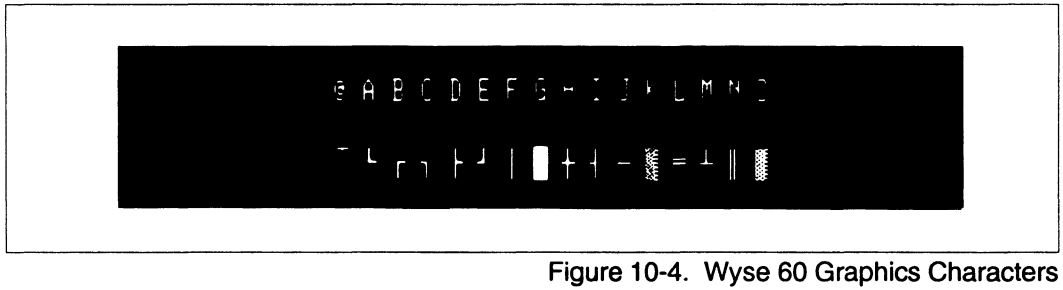


Figure 10-4. Wyse 60 Graphics Characters

**NOTE:** When you change the terminal personality, the character set changes to the set appropriate for the new personality, unless you have disabled auto font load.

## Loading the Font Banks

Load a character set into a font bank — Esc x @ ***Pb Ps***

Clear a font bank — Esc x ? ***Pb***

***Pb*** = A decimal number from 0 to 3 that selects the corresponding font bank (default = 0)

| *Ps* | Character Set |
|---|---|
| @ | **9065 mode** (default) |
| A | 9065 multinational |
| B | Wyse 60 native mode |
| C | Wyse 16-character graphics |
| D | IBM 7-bit |
| E | IBM 8-bit |
| F | Reserved |
| G | Reserved |
| H | Soft characters |
| ‘ | Small 9065 |
| a | Small 9065 multinational |
| b | Small Wyse 60 native mode |
| c | Small IBM 7-bit |
| d | Small IBM 8-bit |

NOTE: If you clear the font bank containing the currently displayed character set, the screen goes blank. Data reappears in the re-designated character set when you re-load the font bank.

To create soft characters, first load the soft character set (***Pb*** = H) into a font bank, and then load the soft characters into the set. The terminal sends ACK after executing these commands.

The "small" character sets are intended for display when the screen is configured for 42 to 49 lines. See "Anatomy of a Character Cell" for a description of standard and small characters.

Default font bank loading is as follows:

| Bank | *Ps* | Character Set |
|---|---|---|
| 0 | @ | 9065 mode |
| 1 | A | 9065 multinational |
| 2 | ‘ | Small 9065 |
| 3 | a | Small 9065 multinational |

## Automatic Font Loading

Enable auto font loading (default) — Esc [ = 29 h

Disable auto font loading — Esc [ = 29 l

When you enable auto font mode, the terminal automatically loads and displays the correct character set for the selected terminal personality mode and number of display lines.

**NOTE** Switching between personalities does not reset auto font loading mode.

## Special Graphics Characters

Enable special graphics mode — Esc $

The terminal converts 7-bit alphanumeric characters to 32 write-protected special graphics characters. The first 16 are compatible with the 950 terminal graphics characters. Figure 10-1 shows the 32 graphics characters and the keys you press to produce them. (The last character is a space, which occupies a position but is not visible.)

Graphics characters are automatically write protected. Protect mode and visual attribute commands affect them as they would any other write-protected character.

Disable special graphics mode (default) — Esc %

Enter a graphics character — Esc x Y ***Ps***

Select the graphics character you want from the top row in Figure 10-1. ***Ps*** = the ASCII character just below it. You do not need the graphics mode on to enter a graphics character with this command.

## Designating Primary and Secondary Character Sets

Define the primary character set — Esc x B ***Pb***

Define the secondary character set — Esc x C ***Pb***

***Pb*** = The number (0 to 3) of the font bank containing the character set designated as primary or secondary (default: 0 for primary, 1 for secondary)

This command defines two of the four character sets loaded into the font banks as primary and secondary character sets. The terminal displays

the primary character set unless the secondary set is chosen with the command below.

## Displaying a Character Set

Display the primary character set (default) — Esc x D

Display the secondary character set — Esc x E

This command determines the character set actually displayed when you enter data.

## Displaying One Character from the Secondary Set

Display one character from the secondary character set — Ctrl U ***Ps***

***Ps*** = Any character from ! (21h) to ~ (7Eh)

Once you have loaded and designated the primary and secondary sets, you can display characters from the secondary set one at a time. When you send **Ctrl U**, followed by a character from the primary set, the screen displays the character from the secondary set that occupies the corresponding position in the font bank.

The multinational character sets are at positions A1h to FEh in the character generator. When you enable 8-bit mode, you can send these characters from the host in that range. (The characters at A0h and FFh are reserved for firmware control.)

## Selecting a Keyboard Layout

Select an international keyboard layout — Esc [ 9 ; ***Ps*** v

| *Ps* | Keyboard Layout (character set) |
|---|---|
| 0 | U.S. ASCII (default) |
| 1 | U. K. |
| 2 | French |
| 3 | German |
| 4 | Spanish |
| 5 | Finnish |
| 6 | Norwegian |
| 7 | Italian |
| 8 | Danish |
| 9 | Swiss/German |
| 10 | Swiss/French |
| 11 | Swedish |
| 12 | Canadian |

This command redefines the native mode character set, supplementing it with any international characters required for a given keyboard. Before selecting an international keyboard layout, first send this command; then load the font banks, and designate and select the character sets.

You can order keycaps for the keyboard layout that you are using. Some of the keyboard layouts are shown in Appendix F; consult your TeleVideo dealer about the availability of international keycap sets.

## Custom Characters

You can create "soft" (custom) characters, one at a time, and load them into a font bank.

> **NOTE** Read the following explanations, including the example, before attempting to program a soft character.

## Anatomy of a Character Cell

The figures on the following pages illustrate the explanations below. Each character cell is a matrix of pixels whose dimensions vary according to the number of data lines on the screen:

| Data Lines | Cell Size | Matrix Size |
|---|---|---|
| 24 or 25 | 10x16 (3-pixel dEscender) | 7x11 |
| 42 to 49 | 10x8 (1-pixel dEscender) | 5x7 |

> **NOTE** The number of columns per line (80 or 132) does not affect the dimensions measured in pixels of the character cell and alphanumeric character. The characters are smaller because the pixels are closer together.

The vertical columns of the character cell are numbered from bit 7 (most significant bit) to bit 0 (least significant bit), plus A and B. (A and B are not included in the programming command bit count.)

Note that the alphanumeric character matrix (indicated by c's and d's in the figures) is confined to columns 7 through 1. Only graphics characters extend into columns 0, A, and B.

The bit value of pixels in column 0 (one or zero) is automatically duplicated in columns A and B. This permits graphics characters to extend completely across the character cell, so that adjacent characters can touch to form a larger figure. (Graphics figures may also extend from scan line 1 through line 16, for the same reason.)

Table 10-1. 24/25-Line Cell

| Scan Line | Bit 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | A | B |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | x | x | x | x | x | x | x | x | x | x |
| 2 | c | c | c | c | c | c | c | x | x | x |
| 3 | c | c | c | c | c | c | c | x | x | x |
| 4 | c | c | c | c | c | c | c | x | x | x |
| 5 | c | c | c | c | c | c | c | x | x | x |
| 6 | c | c | c | c | c | c | c | x | x | x |
| 7 | c | c | c | c | c | c | c | x | x | x |
| 8 | c | c | c | c | c | c | c | x | x | x |
| 9 | c | c | c | c | c | c | c | x | x | x |
| 10 | c | c | c | c | c | c | c | x | x | x |
| 11 | c | c | c | c | c | c | c | x | x | x |
| 12 | c | c | c | c | c | c | c | x | x | x |
| 13 | y | y | y | y | y | y | y | x | x | x |
| 14 | y | y | y | y | y | y | y | x | x | x |
| 15 | y | y | y | y | y | y | y | x | x | x |
| 16 | x | x | x | x | x | x | x | x | x | x |
| 10x16 Cell, 7x11 Matrix, 3-line DEscenders | | | | | | | | | | |

Table 10-2. 42- to 49-Line Cell

| Scan Line | Bit 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | A | B |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | x | x | a | a | a | a | a | x | x | x |
| 2 | x | x | a | a | a | a | a | x | x | x |
| 3 | x | x | c | c | c | c | c | x | x | x |
| 4 | x | x | c | c | c | c | c | x | x | x |
| 5 | x | x | c | c | c | c | c | x | x | x |
| 6 | x | x | c | c | c | c | c | x | x | x |
| 7 | x | x | c | c | c | c | c | x | x | x |
| 8 | x | x | d | d | d | d | d | x | x | x |
| 10x8 Cell, 5x7 Matrix, 1-line DEscenders | | | | | | | | | | |

Each pixel in the matrix is assigned zero if it is background (not in the character) or one if it is foreground (in the character). For example, Table 10-3 shows a pixel matrix of the uppercase Greek character sigma (Σ) in a 10 x 16 character cell.

Table 10-3. Graphics Character Cell

| Scan Line | Bit 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | A | B |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Creating a Soft Character

Create & load a soft character:

Esc x A ***Pb Pp B1 ... Bn*** Ctrl Y

***Pb*** = A decimal number from 0 to 3 indicating the font bank that contains the target character set (default = 0)

***Pp*** = A hex value between 00h and 7Fh defining the position of the character in the font bank (default = 0)

The characters created in this command are intended to load into the soft character set (selected with variable ***Ps*** = H in the command to load a character set into a font bank). You may also load a soft character into an existing character set, overwriting the character in the selected position.

**NOTE** Do not confuse the hex values for the 128 positions with the hex values of the actual characters themselves. Each font bank has 128 character positions, even when the characters themselves are in the range 80h-FFh.

*B1* = 32 or 20 hexadecimal digits (0h-Fh) derived from the binary values of scan lines 1 through 16 (large cell) or 1 through 10 (small cell).

Each scan line has an eight-bit binary value found by assigning a value of 1 to foreground pixels in the character and a 0 value to background pixels.

However, the character creation command uses hexadecimal numbers to define the composition of each scan line. To derive the hex value for each line, convert its eight-bit binary value into a two-character hex value, using the ASCII and supplemental character code tables in Appendix B. Depending on whether you are creating a character in a 10x16 or 10x10 character cell, the command requires 32 or 20 figures.

Since the command requires a series of single hex figures, you can more easily find them by dividing each scan line into most-significant and least-significant half-bytes (nibbles). The units will range in value from 0h to Fh. Just be sure to enter all the figures in the correct sequence: from the most-significant four-bit unit of scan line 1 through the least-significant four-bit unit of scan line 16 or 10.

## Example

Suppose you want to create the Greek letter sigma, and you want to put it in the 33rd position of font bank 3:

Lay out a grid of the character cell and design the character you want. If desired, leave room at the top and bottom of the character for separation from lines above and below. Remember that pixel values in column 0 are duplicated in columns A and B.

Calculate the binary value of each scan line. Assign hex values to the most-significant and least-significant nibbles (Table 10-4).

Send **Esc x A** to begin the command sequence. If you are entering this command from an ASCII keyboard, first press

**Loc Esc**

Enter the variables for the font bank and character position:

| Variable | Value | Specifies |
|---|---|---|
| Pb | 3 | Font bank |
| Pp | 20 | 33rd position in font bank |

Enter the string **FE 40 20 10 08 04 02 04 08 10 20 40 FE 00 00 00** for the character sigma. Be sure you send all 32 figures.

Enter

**Ctrl** **Y**

to end the command.

The complete command is **Esc x A 3 20 FE 40 20 10 08 04 02 04 08 10 20 40 FE 00 00 00 Ctrl Y**

Table 10-4. Graphic Character Example

| Scan Line | Binary | | Hexadecimal-decimal |
|---|---|---|---|
| | MS half byte (Bits 7-4) | LS half byte (Bits 3-0) | |
| 1 | 1111 | 1110 | FE |
| 2 | 0100 | 0000 | 40 |
| 3 | 0010 | 0000 | 20 |
| 4 | 0001 | 0000 | 10 |
| 5 | 0000 | 1000 | 08 |
| 6 | 0000 | 0100 | 04 |
| 7 | 0000 | 0010 | 02 |
| 8 | 0000 | 0100 | 04 |
| 9 | 0000 | 1000 | 08 |
| 10 | 0001 | 0000 | 10 |
| 11 | 0010 | 0000 | 20 |
| 12 | 0100 | 0000 | 40 |
| 13 | 1111 | 1110 | FE |
| 14 | 0000 | 0000 | 00 |
| 15 | 0000 | 0000 | 00 |
| 16 | 0000 | 0000 | 00 |

## Block Graphics

You can draw two types of blocks. This chapter contains commands to clear a rectangle and to fill it with specified characters.

## Creating a Measured Block

Define a measured block Esc H ***w h***

***w*** = An ASCII character from the cursor coordinate table in Appendix G whose row/column number equals the width of the block, measured in columns. The top and bottom lines start at the cursor position and extend to the right.

***h*** = An ASCII character from the cursor coordinate table in Appendix G whose row/column number equals the height of the block, measured in rows. The sides start at the cursor position and extend down.

A block created with this command may extend on a page or a defined scrolling region beyond the edge of the display. But a block defined to extend beyond the page or scrolling region ends at the right or bottom margin.

Figure 10-5 shows how the screen might appear with three overlapping blocks created with this command.

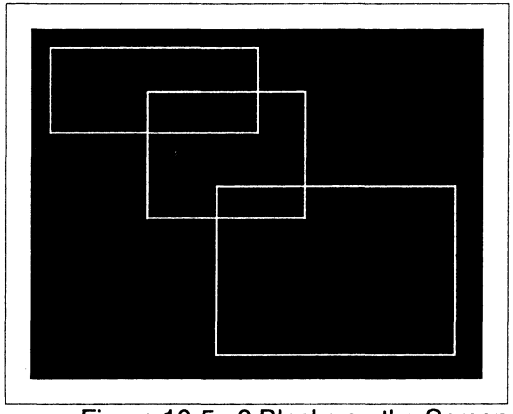


Figure 10-5. 3 Blocks on the Screen

## Creating a Positioned Block

Define a positioned block Esc x G ***r c***

***r*** = An ASCII character from Appendix G for the row (line) at which the sides of the block, extending from the cursor row, terminate.

***c*** = An ASCII character from Appendix G for the column at which the top and bottom of the block, extending from the cursor column, terminate.

The variables ***r*** and ***c*** define the row and column that are two sides of the box. The cursor anchors the corner opposite the junction of ***r*** and ***c***. The lines drawn with this command may extend above or below the cursor, and to the right or left.

A block created with this command may extend on a page or a defined scrolling region beyond the edge of the display. But a block defined to extend beyond the page or scrolling region ends at the right or bottom margin.

## Moving a Block

Move a Block Esc x Z ***Pa Sp*** P ***Ssr*** R ***Ssc*** C ***Ser*** R ***Sec*** C ***Dp*** P ***Dsr*** R ***Dsc*** C

With this command you can swap a block at a source location with a block at a destination location, copy a block to a new destination (leaving the original block intact), or move a source block to a new destination.

| *Pa* | Function |
|---|---|
| 0 | Swap source block with destination block |
| 1 | Copy (replicate) source block at destination |
| 2 | Move source block to new destination |

***Sp*** = Source page number

***Ssr*** = Source starting row

***Ssc*** = Source starting column

***Ser*** = Source ending row

***Sec*** = Source ending column

***Dp*** = Destination page number

***Dsr*** = Destination starting row

***Dsc*** = Destination starting column

# NOTES

# Chapter 11
# DATA TRANSMISSION

This chapter presents the commands that control data communication and transmission.

**NOTE:** Command code descriptions in this chapter are for the TeleVideo 9065. Codes for TeleVideo emulations are listed in Appendix C; codes for all other emulations are listed in Appendix D.

## Programming The Ports

Although the set up program (Chapter 2) configures the communication ports, you can also reconfigure them from the keyboard.

When you select one serial port for host communications, the other serial port may be connected to another computer (dual-session mode) or to a serial printer (single-session mode). The port selected for host communications assumes the current host communication mode (full or half duplex, block, local).

However, the physical ports, COM1 and COM2, retain their previous communication format baud rate, stop bits, parity, data bits, transmit and receive handshaking protocol, and port pin-outs.

For example, when you select the COM2 port for host communication, the terminal sends data to the host through it. But the port's default communication format remains the same (i.e., 9600 baud), and it is still a DCE port.

### Dual Session

Dual Session off (default) Esc [ = 60 l

Dual Session on Esc [ = 60 h

Session Change Esc \ S

### Selecting the Host Port(s)

Select COM1 as host (default) Esc [ = 22 l

Select COM2 as host port Esc [ = 22 h

### Selecting the Printer Port

Select PARALLEL as printer port (default) Esc \ Q 1

Select COM1 as printer port Esc \ Q 2

Select COM2 as printer port Esc \ Q 3

## Programming the Serial Ports

Program COM1 port Esc { ***p1 p2 p3 p4***

Program COM2 port Esc } ***p1 p2 p3 p4***

| *p1* | Baud | *p1* | Baud |
|---|---|---|---|
| 1 | 50 | 9 | 1800 |
| 2 | 75 | : | 2400 |
| 3 | 110 | ; | 3600 |
| 4 | 135 | < | 4800 |
| 5 | 150 | = | 7200 |
| 6 | 300 | > | 9600 |
| 7 | 600 | ? | 19200 |
| 8 | 1200 | @ | 38400 |

| *p2* | Stop bits | *p3* | Parity | *p4* | Data bits |
|---|---|---|---|---|---|
| 0 | 1 | 0 | None | 0 | 8 |
| 1 | 2 | 1 | Odd | 1 | 7 |
| | | 3 | Even | | |
| | | 5 | Mark | | |
| | | 7 | Space | | |

This command assigns communication values to the COM1 or COM2 port, regardless of whether you have selected the port for host or printer communication. The changes are temporary; unless you save the new values in nonvolatile memory, they are lost after a reset.

For example, if you enter **Esc } < 0 3 1** the COM2 port values become:

Baud rate = 4800
Stop bits = 1
Parity = Even
Word length = 7 bits

### Host Null Characters

Accept Esc [ = 34 h

Ignore Esc [ = 34 l

Determines whether the terminal will accept or ignore null characters received from the host.

## Data Word Mode

Although the character generator has special graphics characters at positions 80h through 9Fh, generating them by sending the codes from the host may cause software incompatibilities.

Read COM1 7-bit words Esc [ = 1 l

Read COM2 7-bit words Esc [ = 62 l

The terminal ignores (masks) the eighth bit in each data word from the host, even if "process" is selected in set up.

Read COM1 8-bit words Esc [ = 1 h

Read COM2 8-bit words Esc [ = 62 h

The terminal reads all eight bits of received data words. If "process" is selected in set up, this permits the terminal to interpret and generate characters in the code range A1h to FEh without any special commands. (Characters at A0h and FFh are reserved for firmware control.)

## Transmit Delay Rate

Select the character transmit delay rate Esc [ 0 ; ***Pn*** v

***Pn*** = 0...7 delays per character transmitted

This command causes the terminal to insert from zero to seven character delays per character transmitted. It does not change the baud rate.

## Handshaking Protocols

Disable COM1 port X-On/X-Off; enable DTR line Ctrl N

Enable COM1 port X-On/X-Off; disable DTR line (default) Ctrl O

Select the COM1 port receive protocol (default: X-On/X-Off) Esc [ 1 ; ***Ps*** v

Select the COM1 port transmit protocol (default none) Esc [ 11 ; ***Ps*** v

Select the COM2 port receive protocol (default DCD/DCD/DSR) Esc [ 12 ; ***Ps*** v

Select the COM2 port transmit protocol (default both) Esc [ 13 ; ***Ps*** v

| *Ps* | Protocol |
|---|---|
| 0 | None |
| 1 | Xon/Xoff |
| 2 | DTR (COM1 receive, COM2 transmit)<br>DCD/DSR (COM1 transmit)<br>DSR (COM2 receive) |
| 3 | Both (except COM1 transmit) |

**Ctrl N** and **Ctrl O** are compatible with the 955 command set. They apply only to the COM1 port receive protocol. These commands set the protocol mode; the commands that follow are the actual X-On/X-Off signals.

## Sending X-On/X-Off Characters

Enable transmission (X-On) Ctrl Q

Disable transmission (X-Off) Ctrl S

If the handshaking protocol between the host and the COM1 port is X-On/X-Off, the host can command the terminal to stop sending characters with the X-Off (DC3) command. Sending X-On (DC1) signals the terminal to resume sending characters.

## Transmission Control Mode

Transmission control on Esc [ = 0 h

When X-On/X-Off is selected as the COM1 port receive protocol, the terminal accepts signals from the computer.

Transmission control off (default) Esc [ = 0 l

The terminal ignores X-On/X-Off signals from the computer.

## Receive Buffer Fill Limit

Select the receive buffer fill limit Esc [ 2 ; ***Ps*** v

| *Ps* | Fill Limit in Bytes |
|---|---|
| 0 | 16 (default) |
| 1 | 32 |
| 2 | 64 |
| 3 | 128 |

When the COM1 receive buffer fills to its limit, the terminal tells the host to stop sending data.

## Data Acknowledge Mode

Enable data acknowledge mode — Esc [ = 28 h

The terminal sends the ASCII ACK character (06h) to the computer, to indicate it is ready to receive data, after the following operations:

- Changing the COM1 or COM2 port operating values
- A page print
- Loading or clearing a font

Disable data acknowledge mode — Esc [ = 28 l

# Data Transmission Modes

## Host Mode

These commands let you move between communication modes during a program. Of course, once you enable local mode, the operator must change the mode to reestablish communication with the computer. Keep in mind that your choice of communication mode always applies the port designated for host communication.

Enable local mode — Esc c

No communication with the computer.

Enable block mode — Esc B

Keyboard data and editing key codes go only to the screen, as in local mode. When the terminal receives a send command (see next section), it transmits screen data to the computer. It can also receive data from the host during block mode.

Enable full duplex mode — Esc D F

The terminal sends keyboard entries only to the computer. (The computer may echo keystrokes back to the terminal.) The terminal can transmit and receive simultaneously.

Enable half duplex mode — Esc D H

The terminal sends keyboard entries to the screen and to the computer at the same time.

Return to last conversational mode from block or local mode — Esc C

## Parallel Printer Mode

You can send data to the PARALLEL port with a page print command during any printer port mode. Chapter 1 contains an illustration of the flow of data in print modes.

Enable copy print — Esc @

Disable copy print — Esc A

Data from the host or keyboard goes both to the screen and printer.

Enable transparent print — Esc '

Disable transparent print — Esc a

Data from the host or keyboard goes to the printer only. The screen display freezes.

## Serial Printer Mode

The serial printer port communication mode determines how data is transmitted through the terminal to or from a device connected to the port configured as the serial printer port. Default: all modes disabled.

All printer port modes are *buffered.* This permits COM1 and COM2 port baud rates to differ.

You can send data to the printer port with a page print command during any printer port mode. Chapter 1 contains an illustration of the flow of data in print modes.

Enable copy print — Esc @

Disable copy print — Esc A

Data from the host or keyboard goes both to the screen and printer.

Enable transparent print — Esc '

Disable transparent print — Esc a

Data from the host or keyboard goes to the printer only. The screen display freezes.

Enable bidirectional mode — Ctrl R

Disable bidirectional mode — Ctrl T

Data from the host or keyboard goes to both the screen and peripheral device. Data sent from the peripheral goes to the host only.

Enable secondary receive mode — Esc [ = 27 h

Disable secondary receive mode — Esc [ = 27 l

Data from the host or keyboard goes only to the screen. Data from the device connected to the COM2 port goes to the host only.

## Sending Text

This section tells how to send screen data to the host port in a *page send* or to the COM2 port in a page print.

### Block Start Mode

Start at top of page (default) Esc [ = 17 l

Start at top of display Esc [ = 17 h

This command applies to data sent with a block send command, the **Send** key, a page print command, or the **Print** key.

### Block End Mode

End at cursor position (default) Esc [ = 18 l

End at end of the display Esc [ = 18 h

This command defines the end of the block.

### Delimiters

The terminal automatically inserts field, line, and message delimiters in a page send.

Control characters listed in the table below are the default delimiters. If you don't want these characters in your transmissions, reprogram them with the commands in the next section.

Table 11-1. Default Delimiters

| Delimiter | ASCII Character | Hex |
|---|---|---|
| Field separator | FS NUL | 1C00 |
| Start protected field | Esc ) | 1B29 |
| End protected field | Esc ( | 1B28 |
| End of line | US NUL | 1F00 |
| End of message | CR NUL | 0D00 |

**NOTE:** The terminal does not transmit nulls in the delimiter codes to the host.

### Programming Delimiters

Program delimiters Esc x ***Ps p1 p2***

| *Ps* | Delimiter |
|---|---|
| 0 | Field Separator |
| 1 | End of line |
| 2 | Start of protected field |
| 3 | End of protected field |
| 4 | End of message |

***p1*** = Any ASCII characters

***p2*** = Any ASCII characters

This command changes the delimiters included when the terminal sends screen data. If you don't want any delimiters, program *p1* and *p2* as nulls. The terminal does not send null characters to the host in a delimiter.

The reprogrammed delimiter characters are saved in nonvolatile memory.

### Text Blocks for Transmission

The ASCII start-of-text (STX) and end-of-text (ETX) control characters (hex 02 and 03) define the portion of text transmitted by the page send commands **Esc S** and **Esc s** (presented on the next page). Insert these characters where you want the block to begin and where you want it to end.

Normally the terminal does not display ASCII control characters on the screen. But you can display a control character, as if it were an alphanumeric character, in two ways: Position the cursor where you want the STX or ETX character (the character occupies a space in the display); next, either press **Loc Esc** (keyboard) or enable monitor mode (program); then transmit either **Ctrl B** or **Ctrl C.**

### Page Send Commands

During full or half-duplex modes, data entered at the keyboard goes to the computer immediately, but during block mode, sending it to the computer is a separate step. You can either press the **Send** key or enter one of these commands to send a text block.

These commands define the data sent to the computer in a page send. If the data contains more than one set of STX and ETX characters, the STX above and nearest the cursor and the following ETX define what goes to the computer. You cannot send data to the computer in local mode.

Turn back to Table 11-1 for default delimiter values.

Send unprotected characters in cursor line up to and including cursor Esc 4

**Esc 4** sends all unprotected data on the line between column one and the cursor.

**Delimiters Esc 4** sends a field separator in place of each protected field and a termination character after the transmission.

Send unprotected page up to and including cursor Esc 5

**Esc 5** sends unprotected data between the first unprotected position and the cursor.

**Delimiters Esc 5** sends a field separator for each protected field, line delimiter after each line, and a termination character after the transmission.

Send entire line of data up to and including cursor — Esc 6

**Esc 6** sends all data between the first and the cursor positions.

**Delimiters Esc 6** sends a termination character after the transmission. Brackets protected fields with start and end protected field delimiters. When protect mode is on, each field of graphics characters is bracketed by **Esc $** and **Esc %**, and the terminal sends **Esc G** *Ps* for v isual attributes.

Send entire page up to and including cursor — Esc 7

**Esc 7** sends all data between the first and the cursor positions.

**Delimiters Esc 7** sends line delimiter after each line and a termination character after the transmission. Brackets protected fields with start and end protected field delimiters. When protect mode is on, each field of graphics characters is bracketed by **Esc $** and **Esc %**, and the terminal sends **Esc G** *Ps* for visual attributes.

Send unprotected data between STX and ETX characters — Esc S

**Esc S** sends all unprotected data between either STX (if the cursor follows STX) or first unprotected position (if the cursor is before STX) and ETX. Cursor moves to ETX.

If the page has no ETX, **Esc S** sends all unprotected data between either STX (if cursor follows STX) or the first unprotected position (if the cursor is before STX) and the end of the page; moves the cursor to the first unprotected position. If the page has no STX or ETX, **Esc S** sends all unprotected data.

If there is no STX, starting position is defined by block start mode. If there is no ETX, ending position is defined by block end mode.

**Delimiters Esc S** sends a field separator in place of each protected field, line delimiter after each line, and a termination character after the transmission.

Send all data between STX and ETX characters — Esc s

**Esc s** sends all data between STX (if the cursor follows STX) or home (if the page lacks STX or the cursor is before the STX) and ETX; moves the cursor to ETX.

If page has no ETX, the terminal sends all data between either STX (if the cursor follows STX) or home (if the cursor precedes STX) and the end of the page; moves the cursor to the home or first unprotected position.

If there is no STX, starting position is defined by block start mode. If there is no ETX, ending position is defined by block end mode. If page has no STX or ETX, **Esc s** sends everything; moves the cursor to home or the first unprotected position.

**Delimiters Esc s** sends a line delimiter after each line and a termination character after the transmission. Each protected field is bracketed by start and end protected field delimiters. When protect mode is on, each field of graphics characters is bracketed by **Esc $** and **Esc %**, and the 965 sends **Esc G** *Ps* for visual attributes.

## Page Print

When the terminal receives a page print command, it sends a block of text to the printer or other device connected to the COM2 port. The extent of the text block is determined by the setting of block start and block end modes.

A page print can be *formatted* or *unformatted*. A formatted page print sends a carriage return and a line feed after each line and space characters for all protected characters. An unformatted page print sends all characters, without any formatting controls, so the appearance of the printed copy is unpredictable.

Use a formatted page print for output to a printer. An unformatted page print command is appropriate for data transmissions to another type of data communication device, where control characters in the data file would be unwanted.

During a page print, the terminal flips the next page of display memory onto the screen, unless page print flip mode has been disabled. The terminal responds to the selected handshaking signals from the receiving peripheral during transmission.

After the transmission, the terminal sends ACK (hex 06) to the host as a signal to resume screen updating. If your computer does not need this signal, or may respond to it in an inappropriate way, you can reprogram the page print termination signal (last of the page-print commands).

**NOTE:** The terminal responds to a page print command during any print mode (page print is an action command, not a mode.)

## Page Print Commands

Print unprotected formatted page Esc P

Print all unformatted page Esc L

Page print Esc [ 0 ; ***Ps*** i

| *Ps* | Amount Printed |
|---|---|
| 0 | Formatted all |
| 1 | Formatted unprotected |
| 4 | Unformatted all |
| 5 | Unformatted unprotected |

## Page Print Flip Mode

Page print flip on (default) Esc [ = 15 h

During page print, the display flips to the next page of screen memory and the screen continues to accept data from the host or keyboard.

Page print flip off Esc [ = 15 l

The current page of memory remains displayed, and screen updating halts during transmission.

## Page Print Termination Signal

Define the page print termination signal Esc p ***Ps***

***Ps*** = Any ASCII character (default: ACK)

This command reprograms the ASCII character sent to the computer after each page print, to signal the end of the transmission. The reprogrammed value is saved in nonvolatile memory.

# Chapter 12
# REPROGRAMMING

This chapter covers key codes, information line messages, and the terminal answerback and ID.

**NOTE**: Command code descriptions in this chapter are primarily for the TeleVideo 9065, although code descriptions for other emulations may be included. Codes for TeleVideo emulations are listed in Appendix C; codes for all other emulations are listed in Appendix D.

## Key Configuration Modes

### Application Key Mode

Enable application key mode Esc [ = 23 h

Disable application key mode (default) Esc [ = 23 l

Application key mode changes the codes sent by nearly all keys (except the main keypad alphanumeric keys) to eight-bit codes. Table E-2 in Appendix E shows the reconfigured key codes. The terminal must be in 8-bit data word mode when this mode is enabled.

**NOTE:** This mode overrides all other key reprogramming, including WordStar mode and function key, editing key, and numeric key reprogramming.

### WordStar Mode

Enable WordStar mode Esc [ = 21 h

Disable WordStar mode (default) Esc [ = 21 l

In WordStar mode, the editing and function keys send commands used by the WordStar application program. Table E-3 in Appendix E shows the WordStar key codes.

When this mode is enabled, a w shows in the status line.

**NOTE:** This mode overrides all other key reprogramming except application key mode.

## Editing And Numeric Keys

This section tells how to reprogram editing and numeric keypad keys. The reprogrammed codes are saved in nonvolatile memory.

### Reprogramming One Key

Reprogram one key Esc 0 ***Ps p1 ... p5***

Table 12-1. Programming Editing Keys

| Editing Key | Unshifted *Ps* | Shifted *Ps* |
|---|---|---|
| Home | @ | ` |
| ↓ | A | a |
| ↑ | B | b |
| ← | C | c |
| → | D | d |
| Tab(main) | E | e |
| Back Space | F | f |
| Clear Space | G | g |
| Print | H | h |
| Char Insert | I | i |
| Char Delete | J | j |
| Line Insert | K | k |
| Line Delete | L | l |
| Line Erase | M | m |
| Page Erase | N | n |
| Page (Next/Prev) | O | o |
| Send | P | p |
| Tab (numeric pad) | Q | q |
| CE | R | r |
| Enter | S | s |
| Return | T | t |
| Line Feed | U | u |
| Esc | V | v |
| Del | W | w |

Table 12-2. Programming Numeric Keys

| Numeric Key | *Ps* |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| , | : |
| - | ; |
| . | < |
| 00 | = |

You can load up to five bytes (*p1...p5*) into any one editing or numeric keypad key with this command.

## Reprogramming a Set of Keys

Reprogram a set of keys Esc ] ***Ps p1 ... pn***

| *Ps* | Key Set |
|---|---|
| 0 | unshifted editing |
| 1 | Shifted editing |
| 2 | unshifted numeric keypad |
| *p1...pn* = One of five ASCII characters for each key in the set | |

Use this command to reprogram most or all keys in a set, since you must enter, in order, five bytes each for all the keys in the set specified by ***Ps***. Each set of keys, in the order it loads, is listed in the previous command to reprogram one key.

After receiving a value for ***Ps***, the terminal assigns the next 120 bytes (for an editing key set), or 70 bytes (for the numeric keys) that it receives. Then the command automatically terminates. Enter null characters to fill up the required five bytes per key.

The following example starts you out reprogramming the unshifted editing keys. Remember to press **Loc Esc** if you are reprogramming from an ASCII keyboard.

1. Enter **Esc ] 1** to start the command and specify the Shifted editing keys.
2. Enter, in a string without spaces, the following codes for the first three keys:

   **RS NUL NUL NUL NUL**
   **LF NUL NUL NUL NUL**
   **Esc j NUL NUL NUL**

   This string leaves the **Home** key unchanged, then reverses the functions of the ↓ and ↑ keys.
3. Now continue entering five bytes of code apiece for the remaining editing keys.

## The Function Keys

The 9065 has four sets of function key memory, each with 256 bytes. Table E-1 shows the default codes for sets one and two. (Sets three and four have no default codes.) For more information about the keys, read the section in Chapter 3 about reprogramming the function keys.

This section presents the following operations:

- Selecting a function key set
- Saving reprogrammed codes
- Reprogramming the keys
- Sending key codes from a program
- Loading the function key labels

## Selecting the Function Key Set

Select the function key set Esc [ 7 ; ***Ps*** v

| *Ps* | Function Key Set |
|---|---|
| 0 | One (default) |
| 1 | Two |
| 2 | Three |
| 3 | Four |

The terminal does not save the new value in non volatile memory. When you reset the terminal, set one is again the active set, unless you send the command presented in Chapter 4 to save set up values (or enter set up and save the new value).

## Loading Function Keys

Load function keys in non volatile memory Esc [ = 10 h

Load function keys in temporary memory Esc [ = 10 l

If you elect to load key reprogramming in temporary memory, the keys return to default codes when you reset the terminal.

## Reprogramming Function Keys

Reprogram a function key

Esc I *p1 p2 msg* Ctrl Y

| Key | *p1* | |
|---|---|---|
| | Unshifted | Shifted |
| F1 | 1 | A |
| F2 | 2 | B |
| F3 | 3 | C |
| F4 | 4 | D |
| F5 | 5 | E |
| F6 | 6 | F |
| F7 | 7 | G |
| F8 | 8 | H |
| F9 | 9 | I |
| F10 | : | J |
| F11 | ; | K |
| F12 | < | L |
| F13 | = | M |
| F14 | > | N |
| F15 | / | O |
| F16 | @ | P |

| *p1* | All Keys |
|---|---|
| <sp> | Clear memory of current function key set |
| 0 | Load function keys in sequence from F1 |

| *p2* | Message Destination |
|---|---|
| 1 | Host |
| 2 | Local(screen) |
| 3 | Both |
| 4 | Printer |

**Select a value of *p1*** to reprogram any individual key, clear all the keys, or load all the keys in sequence.

When ***p1*** = 0, separate each key's message with a Ctrl \. Your command would look like this:

Esc I 0 *p2 msg* F1 Ctrl \
*p2 msg* F2 Ctrl \
*p2 msg* F3 Ctrl \
*p2 msg* F*n*
Ctrl Y

**CAUTION**

Count your bytes! You can program 256 bytes into each function key set, distributed among its keys as you wish. If the message you are entering exceeds the remaining number of unused bytes in the function key set, the 965 continues to load the message and destroys the existing messages in other keys.

If ***p1*** = a space character, you can omit the remaining command sequence (*p2 msg* Ctrl Y). You need only enter **Esc** I *space*.

Think about where you want the message to go before you enter ***p2***. If you send it only to the terminal (***p2*** = 2), the computer cannot act on it. And if you send it only to the computer (***p2*** = 1), the message may not appear on the screen. (Unless the computer echoes it back to the terminal.)

Each message can contain any combination of display and control characters. If you want to enter **Ctrl P** or **Ctrl Y** as part of the message, preface either character with **Ctrl P**. Otherwise, the terminal interprets **Ctrl P** and **Ctrl Y** as part of the command.

For example, let's program shifted key F1 to tell the terminal to move the cursor to the end of the screen, display user message one (which reminds the operator to turn on the printer) on the bottom information line, and print the page. We'll send these messages to the terminal as Escape sequences.

1. Press **Loc Esc** or send **Esc** I to start the programming sequence. (Use **Loc Esc** if you are entering the command from an ASCII keyboard.)
2. Send (or press) **A** to specify the Shifted F1 key.
3. Send (or press) **2** to send the message to the terminal.

NOTE: Everything you enter after this and before **Ctrl Y** (Steps 4, 5, and 6) is part of the message that goes to the terminal when you press F1.

4. Send (or press) **Esc = 7 o** to address the cursor to the end of the screen. This defines the amount printed with the page print command in the next step. 7 and o are values from Appendix G that indicate the row (line) and column position.
5. Send (or press) **Esc g** to display user message one on the bottom line.
6. Send (or press) **Esc P** to command the terminal to print an unprotected, formatted page.
7. Send (or press) **Ctrl Y** to end the command.

To calculate the bytes in this example, let's look at the entire command. The message portion appears in *italic* type.

**Esc | A 2** ***Esc = 7 o Esc g Esc P*** **Ctrl Y**

Now let's tally the bytes. Remember, you count only the bytes in the message.

| Entry | Esc | = | 7 | o | Esc | g | Esc | P |
|---|---|---|---|---|---|---|---|---|
| Bytes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

The message contains 8 bytes.

Now whenever the shifted F1 key is pressed, the terminal moves the cursor to the end of the screen, displays user message one, and prints the contents of the screen.

## Sending Function Key Contents

Send the contents of a function key — Esc [ ***Pn*** |

| *Pn* | Key |
|---|---|
| 1-16 | unshifted 1-16 |
| 17-32 | Shifted 1-16 |

This command sends the contents of the specified function key to its programmed destination, just as if you pressed the key.

This command loads labels or a full-line message (similar to a user message) into the function key label line.

In 80-column mode, only eight key labels can be displayed at a time. Also, the labels for keys **F8** and **F16** (unshifted and shifted) contain only eight characters, making a total of 79 characters on the label line. The locations of the labels for 80-column mode are as follows:

F1 F2 F3 F4 F5 F6 F7 F8
F9 F10 F11 F12 F13 F14 F15 F16

## Loading Function Key Labels

Load function key labels — Esc _ ***Ps label*** Ctrl M

| Field | *Ps* | |
|---|---|---|
| | Unshifted | Shifted |
| F1 | @ | P |
| F2 | A | Q |
| F3 | B | R |
| F4 | C | S |
| F5 | D | T |
| F6 | E | U |
| F7 | F | V |
| F8 | G | W |
| F9 | H | X |
| F10 | I | Y |
| F11 | J | Z |
| F12 | K | [ |
| F13 | L | \ |
| F14 | M | ] |
| F15 | N | ^ |
| F16 | O | _ |
| Entire line | ( | ) |
| *label* = 1-9 characters in 80-line mode<br>1-7 characters in 132-line mode | | |

Only the label most recently defined will appear. For example, if you define **F12** after you define **F4**, then the label for **F12** will appear in the fourth space in place of the label for **F4**.

To display the labels for the shifted function keys, press the **Shift** key. As soon as you release the **Shift** key, the labels for the unshifted function keys will reappear.

## Shifted Label Mode

Enable shifted label mode (default) — Esc _ *

Disable Shifted label mode — Esc _ +

Normally, the operator can display labels of the Shifted function keys by pressing the **Shift** key (alone). Disabling shifted label mode disables this function.

The rules for displaying labels are the same as for the unshifted key labels (described above).

## Funct/Alt/Compose Key

With this terminal, you have a choice of three keyboards: ASCII, PC enhanced, or ANSI. One key has a different name on each keyboard. On the ASCII keyboard, it is the **Funct** key; on the PC keyboard, it is the left **Alt** key; on the ANSI keyboard, it is labeled **Compose Character**.

You can designate the use of this key in the set up KEYBOARD menu, or with the following commands

Funct/Alt/Compose = Funct Esc \ T 1

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

Funct/Alt/Compose = META Esc \ T 2

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

Funct/Alt/Compose = 3rd legend Esc \ T 3

The key, pressed with an alphanumeric key, sends a third legend code.

**NOTE**: The third legend refers to markings on certain international keycap sets

Funct/Alt/Compose = Compose Esc \ T 4

The key, in sequence with certain other keys, composes nonstandard characters. (Chapter 3)

## Information Lines

The top and bottom information areas can display the following reprogrammable data:

- Time of day (status line)
- Status line message
- Two user messages
- Function key labels

This section lets you select the contents of the top and bottom information lines, load the messages, and send them to the computer. It contains several commands that are redundant or overlapping, for the sake of programming compatibility.

See Chapter 1 for details on information lines, and Appendix H for status line messages.

**NOTE:** If screen is configured for 25, 43, or 49 data display lines, the last data line overwrites the bottom information line.

## Info Line Contents

(default: Ps = 1/0)

Display user message 1 on bottom line Esc g

Turn on bottom status or message line Esc h

Display the status line on the top line Esc . b

Turn off the top line display Esc . c

Select the contents of the top line Esc [ 4 ; ***Ps*** v

Select the contents of the bottom line Esc [ 5 ; ***Ps*** v

| *Ps* | Type of Information |
|---|---|
| 0 | Blank |
| 1 | Status line |
| 2 | User message 1 (F LABEL line 1) |
| 3 | User message 2 (F LABEL line 2) |

Note that these commands do not include the function key label lines. The previous section about the function keys tells how to load function key labels; the user must elect in set up to display them (user messages one and two).

## Loading User Messages

Load text into user message 1 Esc f *text* Ctrl M

Load text into a user message Esc _ ***Pl Ps*** *text* Ctrl M

| *Pl* | User Message |
|---|---|
| 0 | Message field in status line (7 characters, 955-compatible) |
| 1 | User message 1 |
| 2 | User message 2 |
| 3 | Message field in status line (30 characters) |

| *Ps* | Effect |
|---|---|
| 0 | Clears message before loading |
| 1 | Writes over existing message |

**NOTE:** These messages are not saved in nonvolatile memory.

You can enter 79 or 131 display characters and commands in the user messages. Like the screen's other display lines, the information

lines contain 80 or 132 character positions. However, the first character of a message line is always the current visual attribute (default is reverse video). You can change this visual attribute, but you cannot write over it with a display character.

The status line message field contains either 7 characters (955 mode) or 30 characters (9065 mode).

Until you enter text in a message line, it is blank (except for the visual attribute in the first character position).

The following example shows how to enter text into user message one on the bottom information line. If you are entering these commands from an ASCII keyboard, press **Loc Esc** .

1. Enter **Esc g** or **Esc [ 5 ; 2 v** to display user message 1 on the bottom information line (if you want to see the message as you enter it).
2. Enter **Esc f** or **Esc _ 1 0** to clear the previous text and start loading new text into user message one.
3. Change the visual attribute in the first character position if desired. The default attribute is reverse video.
4. Enter up to 79 or 131 characters of text. If you displayed the message line before entering text, you can see the message as you enter it.
5. You can also include visual attributes any place in the message with the command **Esc G Ps.** Remember to include any commands in the character count.
6. Enter **Ctrl M** to end the message.

## Sending User Messages

Send a user message to the host computer — Esc Z ***Ps***

| *Ps* | Message |
|---|---|
| 0 | User message 1 |
| 1 | Message field in status line |
| 2 | User message 2 |

The Esc Z ***Ps*** command sends the desired message to the host computer. It does not display the message in an information line.

## Loading the Time of Day

Load the time of day — Esc x 8 ***hh mm***

***hh*** = two-digit number for the hour

***mm*** = two digit number for the minute

This command loads the time in the VideoDesk clock. You can select there to display the time and/or date in the status line.

Enter military (24-hour) time. For example, enter **Esc x 8 1500** to load three o'clock in the afternoon.

## Terminal Identity Messages

### The Answerback Message

Program the answerback message — Esc ^ message Ctrl Y

Send the answerback message — Ctrl E

The default answerback message is blank. You can program up to 16 control or display characters in the answerback message. To include **Ctrl Y** or **Ctrl P** as a character in the message, precede them with **Ctrl P** (which is not counted as a character in the message). Otherwise, the terminal interprets these codes as part of the command.

The terminal stores the reprogrammed message in nonvolatile memory.

The terminal sends the answerback message to the host when it receives **Ctrl E.**

### Sending Terminal Identification

Send terminal identification — Esc M

When the terminal receives this command, it returns the identification message TVS9065 ***R.0*** Ctrl M to the host.

***R*** = Firmware revision level

***0*** = Firmware revision sub level

# Appendix A
# SPECIFICATIONS

| | |
|---|---|
| **Terminal Part number** | 143301-10: Green screen, VDE<br>143301-11: Green screen, standard<br>143301-20: Amber screen,VDE<br>143301-22: Amber screen, standard<br>143301-30: White screen, VDE<br>143301-33: White screen, standard |
| **Case** | Touch tilt (-5 to +26°); swivel (300°); front-mounted power switch and brightness adjustment; side-mounted keyboard connector |
| **Screen** | 14 inches measured diagonally; P31 green, amber H24, or H47 white nonglare phosphor; screen saver; selectable on/off and background color |
| **Configuration** | 12 set up menus |
| **Display format** | |
| **Data lines** | 24, 25, 42, 43, 48, 49 |
| **Information lines** | Top and bottom; status, user message, function key labels |
| **Columns** | 80, 132, or 132 with 80 displayed |
| **Display memory** | Up to seven pages |
| **Character formation** | |
| **24/25 lines** | 7x11 matrix in a 10x14 or 10x16 cell (10x12 cell @ 72-Hz refresh rate) |
| **42/43/48/49 lines** | 5x7 matrix in a 10x8 cell |
| **Character sets** | US ASCII standard (96 upper- and lower-case display with descenders, 32 control) and 955 multinational (8-bit); IBM ASCII and 8-bit multinational; Wyse 60; Wyse 60 graphics; 955 graphics; block graphics |

| | |
|---|---|
| **Visual attributes** | Character or page/line, space/no space field; combinative full/half intensity blink, blank, underline, reverse |
| **Line attributes** | Combinative single/double high/wide |
| **Cursor attributes** | Block (blinking or steady), underline (blinking or steady), none |
| **Cursor control** | Home, up, down, right, left; carriage return, line feed, reverse line feed, new line; typewriter and field tabs (forward and backward); address, read |
| **Editing** | Character/line/column insert/delete; line/page/field erase; field/page/column/block clear; jump/smooth scroll, definable scrolling region, line lock; protect mode; insert/replace and page/line edit modes; programmable replacement character |
| **Code compatibility** | TeleVideo 9065 Native Mode; 965, 910/910+, 912/920, 905/925, 950, 955; WY-60, WY-50/50+, WY-120/150, WY-160; ADM-3A/5/31, ADDS VP-A2, VP-60; DG200, Hazeltine 1500; IBM 3101-1X, 3101-2X, 3161; VT100/52; PC TERM. |
| **Programmable messages** | Answerback, status line field, user line, function key labels |
| **Communication modes** | Conversational (full or half duplex), block, half-block, local, secondary receive, local or duplex edit, monitor |
| **Print capabilities** | Formatted/unformatted page print; buffered copy, transparent, bidirectional, and secondary print modes |
| **Communication interfaces** | RS-232C 256-character, buffered transmit/receive COM1 and COM2 ports, configurable for host and serial device communication, selectable character transmit delay rate, reprogrammable parameters |
| **Word structure** | 7 or 8 data bits, 1 or 2 stop bits, 10- or 11-bit word, 7- or 8-bit multinational characters |
| **Parity** | Odd, even, mark, space, or none |
| **Baud rates** | 16 main, 15 auxiliary (50 to 38,400/19,200 KB) |
| **Communication protocols** | X-On/X-Off, DTR, DCD/DSR, none,<br>Reprogrammable send and print delimiters |
| **Keyboard** | Detached, slim-line, typewriter-style with sculptured keycaps, sealed key switches, N-key roll-over with ghost key lockout, accounting-style numeric keypad with TAB and ENTER keys, on/off repeat and key click, reprogrammable remote special keys.<br>Choice of PC Enhanced keyboard, ASCII keyboard, or VT220 (ANSI) keyboard. |

| Dimensions | Height in. (cm) | Width in. (cm) | Depth in. (cm) |
|---|---|---|---|
| **Cabinet** | 13.6 (34.5) | 12.9 (32.7) | 13.9 (35.4) |
| **Keyboard** | | | |
| **PC Enhanced** | 1.5 (3.8) | 19.5 (49.6) | 7.1 (18.0) |
| **ASCII** | 1.5 (3.8) | 17.7 (45.2) | 7.2 (18.4) |
| **ANSI** | 1.5 (3.8) | 19.5 (49.6) | 7.1 ( 18.0) |
| **Footprint** | 8.6 x 8.0 in. | | |
| **Net weight** | | | |
| **Terminal** | 17.5 lb. (8.0 kg) | | |
| **Keyboard** | 3 lb. (1.4 kg) | | |
| **Shipping weight** | | | |
| **Terminal** | 23.5 lb. (10.7 kg) | | |
| **Keboard** | 3.5 lb. (1.6 kg) | | |
| **Environmental requirements** | | | |
| **Ventilation** | 4 inches (10 cm) minimum on all sides | | |
| **Temperature** | | | |
| **Operating** | 32° F (0° C) to 113° F (45° C) | | |
| **Storage** | -40° F (-40° C) to 149° F (65° C) | | |
| **Relative humidity** | | | |
| **Operating** | 10%-85% noncondensing. | | |
| **Non operating** | 10%-85% noncondensing. | | |
| **Power requirements** | 90 to 250 Vac , 60/50 Hz (Power supply automatically senses the source voltage and adjusts to it.) | | |
| **Power dissipation (max.)** | 25 watts | | |
| **Option board** | | | |
| **Available power** | 400 mA @+5 Vdc | | |
| **(beyond normal load)** | 100 mA @ +12 Vdc | | |
| | 100 mA @-12 Vdc | | |
| **Options available** | 20-mA current loop<br>RS-422 interface<br>International keycap sets<br>2400 baud internal modem (V.42 MNP5) | | |

# NOTES

# Appendix B
# CODE AND CHARACTER SETS

Table B-1. Seven-Bit ASCII Character Set

| BITS 7 6 5 | | | | 0 0 0 | | 0 0 1 | | 0 1 0 | | 0 1 1 | | 1 0 0 | | 1 0 1 | | 1 1 0 | | 1 1 1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 3 | 2 | 1 | ↓Row Column → | 0 | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | |
| 0 | 0 | 0 | 0 | 0 | NUL | 0 0 0 | DLE | 20 16 10 | SP | 40 32 20 | 0 | 60 48 30 | @ | 100 64 40 | P | 120 80 50 | ` | 140 96 60 | p | 160 112 70 |
| 0 | 0 | 0 | 1 | 1 | SOH | 1 1 1 | DC1 (XON) | 21 17 11 | ! | 41 33 21 | 1 | 61 49 31 | A | 101 65 41 | Q | 121 81 51 | a | 141 97 61 | q | 161 113 71 |
| 0 | 0 | 1 | 0 | 2 | STX | 2 2 2 | DC2 | 22 18 12 | " | 42 34 22 | 2 | 62 50 32 | B | 102 66 42 | R | 122 82 52 | b | 142 98 62 | r | 162 114 72 |
| 0 | 0 | 1 | 1 | 3 | ETX | 3 3 3 | DC3 (XOFF) | 23 19 13 | # | 43 35 23 | 3 | 63 51 33 | C | 103 67 43 | S | 123 83 53 | c | 143 99 63 | s | 163 115 73 |
| 0 | 1 | 0 | 0 | 4 | EOT | 4 4 4 | DC4 | 24 20 14 | $ | 44 36 24 | 4 | 64 52 34 | D | 104 68 44 | T | 124 84 54 | d | 144 100 64 | t | 164 116 74 |
| 0 | 1 | 0 | 1 | 5 | ENQ | 5 5 5 | NAK | 25 21 15 | % | 45 37 25 | 5 | 65 53 35 | E | 105 69 45 | U | 125 85 55 | e | 145 101 65 | u | 165 117 75 |
| 0 | 1 | 1 | 0 | 6 | ACK | 6 6 6 | SYN↓ | 26 22 16 | & | 46 38 26 | 6 | 66 54 36 | F | 106 70 46 | V | 126 86 56 | f | 146 102 66 | v | 166 118 76 |
| 0 | 1 | 1 | 1 | 7 | BEL | 7 7 7 | ETB | 27 23 17 | ' | 47 39 27 | 7 | 67 55 37 | G | 107 71 47 | W | 127 87 57 | g | 147 103 67 | w | 167 119 77 |
| 1 | 0 | 0 | 0 | 8 | BS← | 10 8 8 | CAN | 30 24 18 | ( | 50 40 28 | 8 | 70 56 38 | H | 110 72 48 | X | 130 88 58 | h | 150 104 68 | x | 170 120 78 |
| 1 | 0 | 0 | 1 | 9 | HT | 11 9 9 | EM | 31 25 19 | ) | 51 41 29 | 9 | 71 57 39 | I | 111 73 49 | Y | 131 89 59 | i | 151 105 69 | y | 171 121 79 |
| 1 | 0 | 1 | 0 | A(10) | LF | 12 10 A | SUB | 32 26 1A | * | 52 42 2A | : | 72 58 3A | J | 112 74 4A | Z | 132 90 5A | j | 152 106 6A | z | 172 122 7A |
| 1 | 0 | 1 | 1 | B(11) | VT↓ | 13 11 B | ESC | 33 27 1B | + | 53 43 2B | ; | 73 59 3B | K | 113 75 4B | [ | 133 91 5B | k | 153 107 6B | { | 173 123 7B |
| 1 | 1 | 0 | 0 | C(12) | FF→ | 14 12 C | FS | 34 28 1C | , | 54 44 2C | < | 74 60 3C | L | 114 76 4C | \ | 134 92 5C | l | 154 108 6C | \| | 174 124 7C |
| 1 | 1 | 0 | 1 | D(13) | CR | 15 13 D | GS | 35 29 1D | – | 55 45 2D | = | 75 61 3D | M | 115 77 4D | ] | 135 93 5D | m | 155 109 6D | } | 175 125 7D |
| 1 | 1 | 1 | 0 | E(14) | SO | 16 14 E | RS | 36 30 1E | . | 56 46 2E | > | 76 62 3E | N | 116 78 4E | ^ | 136 94 5E | n | 156 110 6E | ~ | 176 126 7E |
| 1 | 1 | 1 | 1 | F(15) | SI | 17 15 F | US | 37 31 1F | / | 57 47 2F | ? | 77 63 3F | O | 117 79 4F | _ | 137 95 5F | o | 157 111 6F | DEL | 177 127 7F |

**KEY**

| | |
|---|---|
| ESC | 33 OCTAL<br>27 DECIMAL<br>1B HEX |

## Table B-2. Eight-Bit Multinational Character Set

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

**KEY**

| ESC | 33 OCTAL |
|---|---|
| | 27 DECIMAL |
| | 1B HEX |

## Table B-3. Seven-Bit IBM Character Set

| BITS 7 6 5 | 0 0 0 | 0 0 1 | 0 1 0 | 0 1 1 | 1 0 0 | 1 0 1 | 1 1 0 | 1 1 1 |
|---|---|---|---|---|---|---|---|---|
| 4 3 2 1 ↓Row Column → | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 0 0 0 0 | 0 NUL 0 0 0 | 20 16 10 ► | 40 32 20 SP | 60 48 30 0 | 100 64 40 @ | 120 80 50 P | 140 96 60 ` | 160 112 70 p |
| 0 0 0 1 | 1 1 1 ☺ | 21 17 11 ◄ | 41 33 21 ! | 61 49 31 1 | 101 65 41 A | 121 81 51 Q | 141 97 61 a | 161 113 71 q |
| 0 0 1 0 | 2 2 2 ☻ | 22 18 12 ↕ | 42 34 22 " | 62 50 32 2 | 102 66 42 B | 122 82 52 R | 142 98 62 b | 162 114 72 r |
| 0 0 1 1 | 3 3 3 ♥ | 23 19 13 !! | 43 35 23 # | 63 51 33 3 | 103 67 43 C | 123 83 53 S | 143 99 63 c | 163 115 73 s |
| 0 1 0 0 | 4 4 4 ♦ | 24 20 14 ¶ | 44 36 24 $ | 64 52 34 4 | 104 68 44 D | 124 84 54 T | 144 100 64 d | 164 116 74 t |
| 0 1 0 1 | 5 5 5 ♣ | 25 21 15 § | 45 37 25 % | 65 53 35 5 | 105 69 45 E | 125 85 55 U | 145 101 65 e | 165 117 75 u |
| 0 1 1 0 | 6 6 6 ♠ | 26 22 16 ▬ | 46 38 26 & | 66 54 36 6 | 106 70 46 F | 126 86 56 V | 146 102 66 f | 166 118 76 v |
| 0 1 1 1 | 7 7 7 • | 27 23 17 ↨ | 47 39 27 ' | 67 55 37 7 | 107 71 47 G | 127 87 57 W | 147 103 67 g | 167 119 77 w |
| 1 0 0 0 | 10 8 8 ◘ | 30 24 18 ↑ | 50 40 28 ( | 70 56 38 8 | 110 72 48 H | 130 88 58 X | 150 104 68 h | 170 120 78 x |
| 1 0 0 1 | 11 9 9 ○ | 31 25 19 ↓ | 51 41 29 ) | 71 57 39 9 | 111 73 49 I | 131 89 59 Y | 151 105 69 i | 171 121 79 y |
| 1 0 1 0 | 12 10 A ◙ | 32 26 1A → | 52 42 2A * | 72 58 3A : | 112 74 4A J | 132 90 5A Z | 152 106 6A j | 172 122 7A z |
| 1 0 1 1 | 13 11 B ♂ | 33 27 1B ← | 53 43 2B + | 73 59 3B ; | 113 75 4B K | 133 91 5B [ | 153 107 6B k | 173 123 7B { |
| 1 1 0 0 | 14 12 C ♀ | 34 28 1C ∟ | 54 44 2C , | 74 60 3C < | 114 76 4C L | 134 92 5C \ | 154 108 6C l | 174 124 7C ¦ |
| 1 1 0 1 | 15 13 D ♪ | 35 29 1D ↔ | 55 45 2D – | 75 61 3D = | 115 77 4D M | 135 93 5D ] | 155 109 6D m | 175 125 7D } |
| 1 1 1 0 | 16 14 E ♫ | 36 30 1E ▲ | 56 46 2E . | 76 62 3E > | 116 78 4E N | 136 94 5E ^ | 156 110 6E n | 176 126 7E ~ |
| 1 1 1 1 | 17 15 F ☼ | 37 31 1F ▼ | 57 47 2F / | 77 63 3F ? | 117 79 4F O | 137 95 5F _ | 157 111 6F o | 177 127 7F ⌂ |

**KEY**

| | | |
|---|---|---|
| ESC | 33<br>27<br>1B | OCTAL<br>DECIMAL<br>HEX |

## Table B-4. Eight-Bit IBM Character Set

| BITS 4 | 3 | 2 | 1 | ↓ Row / Column → | 8 (1000) | 9 (1001) | A (10) (1010) | B (11) (1011) | C (12) (1100) | D (13) (1101) | E (14) (1110) | F (15) (1111) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | Ç 200 128 80 | É 220 144 90 | á 240 160 A0 | ▒ 260 176 B0 | └ 300 192 C0 | ─ 320 208 D0 | α 340 224 E0 | ≡ 360 240 F0 |
| 0 | 0 | 0 | 1 | 1 | ü 201 129 81 | æ 221 145 91 | í 241 161 A1 | ▒ 261 177 B1 | ┴ 301 193 C1 | ┬ 321 209 D1 | ß 341 225 E1 | ± 361 241 F1 |
| 0 | 0 | 1 | 0 | 2 | é 202 130 82 | Æ 222 146 92 | ó 242 162 A2 | ▒ 262 178 B2 | ┬ 302 194 C2 | ├ 322 210 D2 | Γ 342 226 E2 | ≥ 362 242 F2 |
| 0 | 0 | 1 | 1 | 3 | â 203 131 83 | ô 223 147 93 | ú 243 163 A3 | │ 263 179 B3 | ├ 303 195 C3 | └ 323 211 D3 | π 343 227 E3 | ≤ 363 243 F3 |
| 0 | 1 | 0 | 0 | 4 | ä 204 132 84 | ö 224 148 94 | ñ 244 164 A4 | ┤ 264 180 B4 | ─ 304 196 C4 | ┼ 324 212 D4 | Σ 344 228 E4 | ⌠ 364 244 F4 |
| 0 | 1 | 0 | 1 | 5 | à 205 133 85 | ò 225 149 95 | Ñ 245 165 A5 | ╡ 265 181 B5 | ┼ 305 197 C5 | ┴ 325 213 D5 | σ 345 229 E5 | ⌡ 365 245 E5 |
| 0 | 1 | 1 | 0 | 6 | å 206 134 86 | û 226 150 96 | ª 246 166 A6 | ╢ 266 182 B6 | ╞ 306 198 C6 | ┬ 326 214 D6 | μ 346 230 E6 | ÷ 366 246 F6 |
| 0 | 1 | 1 | 1 | 7 | ç 207 135 87 | ù 227 151 97 | º 247 167 A7 | ╖ 267 183 B7 | ╟ 307 199 C7 | ├ 327 215 D7 | τ 347 231 E7 | ≈ 367 247 F7 |
| 1 | 0 | 0 | 0 | 8 | ê 210 136 88 | ÿ 230 152 98 | ¿ 250 168 A8 | ╕ 270 184 B8 | ╚ 310 200 C8 | ╪ 330 216 D8 | Φ 350 232 E8 | ° 370 248 F8 |
| 1 | 0 | 0 | 1 | 9 | ë 211 137 89 | Ö 231 153 99 | ⌐ 251 169 A9 | ╣ 271 185 B9 | ╔ 311 201 C9 | ┘ 331 217 D9 | Θ 351 233 E9 | • 371 249 F9 |
| 1 | 0 | 1 | 0 | A(10) | è 212 138 8A | Ü 232 154 9A | ¬ 252 170 AA | ║ 272 186 BA | ╩ 312 202 CA | ┌ 332 218 DA | Ω 352 234 EA | · 372 250 FA |
| 1 | 0 | 1 | 1 | B(11) | ï 213 139 8B | ¢ 233 155 9B | ½ 253 171 AB | ╗ 273 187 BB | ╦ 313 203 CB | ▒ 333 219 DB | δ 353 235 EB | √ 373 251 FB |
| 1 | 1 | 0 | 0 | C(12) | î 214 140 8C | £ 234 156 9C | ¼ 254 172 AC | ╝ 274 188 BC | ╠ 314 204 CC | ▒ 334 220 DC | ∞ 354 236 EC | n 374 252 FC |
| 1 | 1 | 0 | 1 | D(13) | ì 215 141 8D | ¥ 235 157 9D | ¡ 255 173 AD | ╜ 275 189 BD | ═ 315 205 CD | ▒ 335 221 DD | ∅ 355 237 ED | ² 375 253 FD |
| 1 | 1 | 1 | 0 | E(14) | Ä 216 142 8E | ₧ 236 158 9E | « 256 174 AE | ╛ 276 190 BE | ╬ 316 206 CE | ▒ 336 222 DE | ∈ 356 238 EE | ■ 376 254 FE |
| 1 | 1 | 1 | 1 | F(15) | Å 217 143 8F | ƒ 237 159 9F | » 257 175 AF | ┐ 277 191 BF | ╧ 317 207 CF | ▒ 337 223 DF | ∩ 357 239 EF | BLANK FF 377 255 FF |

**KEY**

| | | |
|---|---|---|
| ESC | 33 | OCTAL |
| | 27 | DECIMAL |
| | 1B | HEX |

Table B-5. Monitor Mode ASCII Control Characters

| Control Code | ASCII Character | Hexadecimal Value | Character Displayed |
|---|---|---|---|
| CTRL @ | NUL | 00 | $^{N}_{L}$ |
| CTRL A | SOH | 01 | $^{S}_{H}$ |
| CTRL B | STX | 02 | $^{S}_{X}$ |
| CTRL C | ETX | 03 | $^{E}_{X}$ |
| CTRL D | EOT | 04 | $^{E}_{T}$ |
| CTRL E | ENQ | 05 | $^{E}_{Q}$ |
| CTRL F | ACK | 06 | $^{A}_{K}$ |
| CTRL G | BEL | 07 | $^{B}_{L}$ |
| CTRL H | BS | 08 | $^{B}_{S}$ |
| CTRL I | HT | 09 | $^{H}_{T}$ |
| CTRL J | LF | 0A | $^{L}_{F}$ |
| CTRL K | VT | 0B | $^{V}_{T}$ |
| CTRL L | FF | 0C | $^{F}_{F}$ |
| CTRL M | CR | 0D | $^{C}_{R}$ |
| CTRL N | SO | 0E | $^{S}_{O}$ |
| CTRL O | SI | 0F | $^{S}_{I}$ |
| CTRL P | DLE | 10 | $^{D}_{L}$ |
| CTRL Q | DC1 | 11 | $^{D}_{1}$ |
| CTRL R | DC2 | 12 | $^{D}_{2}$ |
| CTRL S | DC3 | 13 | $^{D}_{3}$ |
| CTRL T | DC4 | 14 | $^{D}_{4}$ |
| CTRL U | NAK | 15 | $^{N}_{K}$ |
| CTRL V | SYN | 16 | $^{S}_{Y}$ |
| CTRL W | ETB | 17 | $^{E}_{B}$ |
| CTRL X | CAN | 18 | $^{C}_{N}$ |
| CTRL Y | EM | 19 | $^{E}_{M}$ |
| CTRL Z | SUB | 1A | $^{S}_{B}$ |
| CTRL [ | ESC | 1B | $^{E}_{C}$ |
| CTRL \ | FS | 1C | $^{F}_{S}$ |
| CTRL ] | GS | 1D | $^{G}_{S}$ |
| CTRL ^ | RS | 1E | $^{R}_{S}$ |
| CTRL _ | US | 1F | $^{U}_{S}$ |
| DEL | DEL | 7F | ▒ |

Table B-6. ASCII Control Character Abbreviations

| Abbreviation | Control Character |
|---|---|
| NUL | Null |
| SOH | Start of heading |
| STX | Start of text |
| ETX | End of text |
| EOT | End of transmission |
| ENQ | Enquiry |
| ACK | Acknowledge |
| BEL | Bell |
| BS | Backspace |
| HT | Horizontal tabulation |
| LF | Linefeed |
| VT | Vertical tabulation |
| FF | Form feed |
| CR | Carriage return |
| SO | Shift out |
| SI | Shift in |
| DLE | Data link escape |
| DC1 | Device control 1 |
| DC2 | Device control 2 |
| DC3 | Device control 3 |
| DC4 | Device control 4 |
| NAK | Negative acknowledge |
| SYN | Synchronous idle |
| ETB | End of transmission block |
| CAN | Cancel |
| EM | End of medium |
| SUB | Substitute |
| ESC | Escape |
| FS | File separator |
| GS | Group separator |
| RS | Record separator |
| US | Unit separator |
| SP | Space |
| DEL | Delete |

# Appendix C
# TELEVIDEO COMMAND SUMMARIES

This terminal offers 27 different terminal emulations. The commands for these terminals are summarized in Appendices C and D in the tables shown below. Within the command codes in the tables, variable values are shown in *italics*.

## Appendix C

| Table | Terminals | Table | Terminals |
|---|---|---|---|
| C-1 | TeleVideo 9065<br>TeleVideo 965<br>TeleVideo 955<br>TeleVideo 950 | C-2 | TeleVideo 925/905<br>TeleVideo 910/910+<br>TeleVideo 912/920 |

## Appendix D

| Table | Terminals | Table | Terminals |
|---|---|---|---|
| D-1 | Wyse WY-60<br>Wyse WY-50/50+<br>Wyse WY-120/150<br>Wyse WY-160 | D-2 | ADDS VP A2<br>ADDS VP 60<br>LSI ADM 3A/5/31<br>Hazeltine 1500 |
| D-3 | Data General DG200<br>DEC VT100/52 | D-4 | PC TERM<br>IBM 3161-V<br>IBM 3101-1X<br>IBM 3101-2X |

**NOTE** The terminal recognizes **boldfaced** commands only during enhanced compatibility mode (enabled in the General set up menu).

Table C-1. TeleVideo 9065, 965, 955, and 950 Commands

| | Command | 9065 | 965 | 955 | 950 |
|---|---|---|---|---|---|
| OPERATIONS | Run self test | Esc V | Esc V | Esc V | Esc V |
| | Monitor mode on | Esc U | Esc U | Esc U | Esc U |
| | Monitor mode off | Esc X<br>or Esc u | Esc X<br>or Esc u | Esc X<br>or Esc u | Esc X<br>or Esc u |
| | Reset terminal | Esc ~ *Pn* | Esc ~ *Pn* | Esc ~ Pn | Esc ~ *Pn* |
| | Save set-up values | Esc [ 0;1 } | Esc [ 0;1 } | Esc [ 0;1 } | Esc [ 0;1 } |
| | Enhanced mode on | Esc [ = 20 h | Esc [ = 20 h | | |
| | Enhanced mode off | Esc [ = 20 l | Esc [ = 20 l | | |
| | Dual session on | Esc [ = 60 h | | | |
| | Dual session off | Esc [ = 60 l | | | |
| | Session change | Esc \ S | | | |
| KEYBOARD & BELL | Enable keyboard | Esc " | Esc " | Esc " | Esc " |
| | Disable keyboard | Esc # | Esc # | Esc # | Esc # |
| | PC scan codes generated | Esc [ = 65 h | | | |
| | ASCII keycodes generated | Esc [ = 65 l | | | |
| | Keyclick on | Esc > | Esc > | Esc > | Esc > |
| | Keyclick off | Esc < | Esc < | Esc < | Esc < |
| | Key repeat on | Esc [ = 8 h | Esc [ = 8 h | Esc [ = 8 h | Esc [ = 8 h |
| | Key repeat off | Esc [ = 8 l | Esc [ = 8 l | Esc [ = 8 l | Esc [ = 8 l |
| | Set Up enabled | Esc [ = 11 h | Esc [ = 11 h | Esc [ = 11 h | Esc [ = 11 h |
| | Set Up disabled | Esc [ = 11 l | Esc [ = 11 l | Esc [ = 11 l | Esc [ = 11 l |
| | Esc enabled | Esc [ = 12 h | Esc [ = 12 h | Esc [ = 12 h | Esc [ = 12 h |
| | Esc disabled | Esc [ = 12 l | Esc [ = 12 l | Esc [ = 12 l | Esc [ = 12 l |
| | Clear Space enabled | Esc [ = 13 h | Esc [ = 13 h | Esc [ = 13 h | Esc [ = 13 h |
| | Clear Space disabled | Esc [ = 13 l | Esc [ = 13 l | Esc [ = 13 l | Esc [ = 13 l |
| | Break enabled | Esc [ = 14 h | Esc [ = 14 h | Esc [ = 14 h | Esc [ = 14 h |
| | Break disabled | Esc [ = 14 l | Esc [ = 14 l | Esc [ = 14 l | Esc [ = 14 l |
| | Set break signal | Esc [ 15 ; *Ps* v | Esc [ 15 ; *Ps* v | | |
| | Caps Lock on | Esc [ = 26 h | Esc [ = 26 h | | |
| | Caps Lock off | Esc [ = 26 l | Esc [ = 26 l | | |
| | Normal Caps Lock | Esc [ = 25 l | Esc [ = 25 l | | |
| | Reverse Caps Lock | Esc [ = 25 h | Esc [ = 25 h | | |
| | Num Lock on | Esc [ = 33 h | | | |
| | Num Lock off | Esc [ = 33 l | | | |
| | Margin bell on | Esc [ = 4 h | Esc [ = 4 h | Esc [ = 4 h | |
| | Margin bell off | Esc [ = 4 l | Esc [ = 4 l | Esc [ = 4 l | |
| | Set bell column | Ctrl W | Ctrl W | Ctrl W | |
| | Sound the beeper | Ctrl G | Ctrl G | Ctrl G | Ctrl G |
| | Set number of data lines | Esc [ 14 ; *Ps* v | Esc [ 14 ; *Ps* v | | |
| | Page length | Esc \ *Ps* | Esc \ *Ps* | Esc \ *Ps* | |

| | Command | 9065 | 965 | 955 | 950 |
|---|---|---|---|---|---|
| SCREEN DISPLAY | Select screen saver time | Esc [ 8 ; *Ps* v | Esc [ 8 ; *Ps* v | Esc [ 8 ; *Ps* v | |
| | Screen on | Esc n or Esc . 9 | Esc n or Esc . 9 | Esc n | Esc n |
| | Screen off | Esc o or Esc . 8 | Esc o or Esc . 8 | Esc o | Esc o |
| | Light background | Esc b | Esc b | Esc b | Esc b |
| | Dark background | Esc d | Esc d | Esc d | Esc d |
| | Overscan same as background | Esc \ O 0 | | | |
| | Overscan dark (*1*) to light (*5*) | Esc \ O *1...5* | | | |
| | Attribute base: character | Esc F 2 | Esc F 2 | | |
| | Attribute base: space | Esc F 0 | Esc F 0 | Esc F 0 | |
| | Attribute base: no space | Esc F 1 | Esc F 1 | Esc F 1 | |
| | Attribute base: line | Esc [ = 2 l | Esc [ = 2 l | Esc [ = 2 l | |
| | Attribute base: page | Esc [ = 2 h | Esc [ = 2 h | Esc [ = 2 h | |
| | Set cursor attribute | Esc . *Ps* | Esc . *Ps* | Esc . *Ps* | Esc . *Ps* |
| | Set line attribute | Esc G *Ps* | Esc G *Ps* | **Esc G *Ps*** | Esc G *Ps* |
| | 80-column mode | Esc [ = 3 l<br>or Esc . : | Esc [ = 3 l<br>or Esc . : | Esc [ = 3 l | Esc [ = 3 l |
| | 132-column mode | Esc [ = 3 h<br>or Esc . ; | Esc [ = 3 h<br>or Esc . ; | Esc [ = 3 h | Esc [ = 3 h |
| | Changing columns total (80/132) clears the screen | Esc [ = 61 h | | | |
| | 80/132 change clear off | Esc [ = 61 l | | | |
| | 80-col economy mode on | | Esc [ = 24 h | | |
| | 80-col economy mode off | | Esc [ = 24 l | | |
| | Set visual attribute | Esc G *Ps* | Esc G *Ps* | Esc G *Ps* | Esc G *Ps* |
| | Attribute in a box | Esc x I *r c Pa* | Esc x I *r c Pa* | | |
| | Set write-protect attribute | Esc . *Ps* | Esc . *Ps* | | |
| | Half intensity | Esc [ = 5 h | Esc [ = 5 h | | |
| | Full intensity | Esc [ = 5 l | Esc [ = 5 l | | |
| | Information area attribute | Esc _ *Pa Ps* | Esc _ *Pa Ps* | | |
| | Status line attribute | Esc [ 3; *Ps* v | Esc [ 3; *Ps* v | | |
| | WordStar mode on | Esc [ = 21 h | Esc [ = 21 h | | |
| | WordStar mode off | Esc [ = 21 l | Esc [ = 21 l | | |
| | Application key mode on | Esc [ = 23 h | Esc [ = 23 h | | |
| | Application key mode off | Esc [ = 23 l | Esc [ = 23 l | | |
| | Line lock on | Esc ! 1<br>or Esc . H | Esc ! 1<br>or Esc . H | Esc ! 1 | Esc ! 1 |
| | Line lock off | Esc ! 2<br>or Esc . I | Esc ! 2<br>or Esc . I | Esc ! 2 | Esc ! 2 |

| | Command | 9065 | 965 | 955 | 950 |
|---|---|---|---|---|---|
| CHARACTER SETS | Select character set | Esc [ 9; *Ps* v | Esc [ 9; *Ps* v | Esc [ 9; *Ps* v | |
| | Load font banks | Esc x@ *Pb Ps* | Esc x@ *Pb Ps* | | |
| | Clear font banks | Esc x ? *Pb* | Esc x ? *Pb* | | |
| | Auto font load on | Esc [ = 29 h | Esc [ = 29 h | | |
| | Auto font load off | Esc [ = 29 l | Esc [ = 29 l | | |
| | Set primary character set | Esc x B *Pb* | Esc x B *Pb* | | |
| | Set second character set | Esc x C *Pb* | Esc x C *Pb* | | |
| | Display primary set | Esc x D | Esc x D | | |
| | Display secondary set | Esc x E | Esc x E | | |
| | Display char. from 2nd set | Ctrl U *Ps* | Ctrl U *Ps* | Ctrl U *Ps* | |
| | Create a soft character | Esc x A *Pb Pp B1..Bn* Ctrl Y | Esc x A *Pb Pp B1..Bn* Ctrl Y | | |
| | Set character cell at 10x16 | Esc \ L | | | |
| | Set character cell at 10x14 | Esc \ M | | | |
| | Set character cell at 10x12 | Esc \ N | | | |
| EDITING MODES | Auto wrap on | Esc [ = 7 h | Esc [ = 7 h | Esc [ = 7 h | |
| | Auto wrap off | Esc [ = 7 l | Esc [ = 7 l | Esc [ = 7 l | |
| | New line mode on | Esc [ = 6 h | Esc [ = 6 h | Esc [ = 6 h | |
| | New line mode off | Esc [ = 6 l | Esc [ = 6 l | Esc [ = 6 l | |
| | DOWN = Ctrl J | Esc [ = 9 h | Esc [ = 9 h | Esc [ = 9 h | |
| | DOWN = Ctrl V | Esc [ = 9 l | Esc [ = 9 l | Esc [ = 9 l | |
| | Protect mode on | Esc & | Esc & | Esc & | Esc & |
| | Protect mode off | Esc ' | Esc ' | Esc ' | Esc ' |
| | Write protect on | Esc ) | Esc ) | Esc ) | Esc ) |
| | Write protect off | Esc ( | Esc ( | Esc ( | Esc ( |
| MORE SCREEN MEMORY | Split the screen | Esc \ C *Ps* | Esc \ C *Ps* | | |
| | Split and clear | Esc \ E *Ps* | Esc \ E *Ps* | | |
| | Split 2 pages | Esc \ A *Ps* | Esc \ A *Ps* | | |
| | Split 2 and clear | Esc \ D *Ps* | Esc \ D *Ps* | | |
| | Activate upper window | Esc \ H | Esc \ H | | |
| | Activate lower window | Esc \ I | Esc \ I | | |
| | Raise split line | Esc \ R | Esc \ R | | |
| | Lower split line | Esc \ P | Esc \ P | | |
| | Display next page | Esc K | Esc K | Esc K | Esc K |
| | Display previous page | Esc J | Esc J | Esc J | Esc J |
| | Display page *Pn* | Esc [ 1 ; *Pn* } | Esc [ 1 ; *Pn* } | Esc [ 1 ; *Pn* } | |
| | Close the window | Esc \ @ | Esc \ @ | | |
| | Close and clear | Esc \ O | Esc \ O | | |
| | Autopage flip mode on | Esc v | Esc v | Esc v | Esc v |
| | Autopage flip mode off | Esc w | Esc w | Esc w | Esc w |

| | Command | 9065 | 965 | 955 | 950 |
|---|---|---|---|---|---|
| GRAPHICS | Graphics mode on | Esc $ | Esc $ | Esc $ | Esc $ |
| | Graphics mode off | Esc % | Esc % | Esc % | Esc % |
| | Enter a graphics character | Esc x Y *Ps* | | | |
| | Draw a box | Esc H *w h* or Esc x G *r c* | Esc H *w h* or Esc x G *r c* | Esc H w h | |
| | Swap, copy, or move a box from source page, row, and column to destination page, row, and column | Esc x Z *Pa Sp* P *Ssr* R *Ssc* C *Ser* R *Sec* C *Dp* P *Dsr* R *Dsc* C | | | |
| SCROLLING | Auto scroll mode on | Esc [ = 19 h | Esc [ = 19 h | | |
| | Autoscroll mode off | Esc [ = 19 l | Esc [ = 19 l | | |
| | Jump scroll | Esc 9 | Esc 9 | Esc 9 | Esc 9 |
| | Smooth scroll | Esc 8 | Esc 8 | Esc 8 | Esc 8 |
| | Set scroll rate | Esc [ 6 ; *Ps* v or Esc . *Ps* | Esc [ 6 ; *Ps* v or Esc . *Ps* | Esc [ 6 ; *Ps* v | |
| | Define scrolling region | Esc [ *Pt* ; *Pb* r | Esc [ *Pt* ; *Pb* r | Esc [ *Pt* ; *Pb* r | |
| TABS | Tab | Ctrl I | Ctrl I | Ctrl I | Ctrl I |
| | Field tab | Esc i | Esc i | Esc i | Esc i |
| | Back tab | Esc I | Esc I | Esc I | Esc I |
| | Set tab stop | Esc 1 | Esc 1 | Esc 1 | Esc 1 |
| | Clear cursor tab | Esc 2 | Esc 2 | Esc 2 | Esc 2 |
| | Clear all tabs | Esc 3 | Esc 3 | Esc 3 | Esc 3 |
| CURSOR CONTROL | Address cursor row, column | Esc = *r c* | Esc = *r c* | Esc = *r c* | Esc = *r c* |
| | Address cursor row, col 132 | Esc = *r* ~ *c* | Esc = *r* ~ *c* | Esc = *r* ~ *c* | |
| | Address cursor row, column (decimal) | Esc [ *r* ; *c* H or Esc [ *r* ; *c* f | Esc [ *r* ; *c* H or Esc [ *r* ; *c* f | Esc [ *r* ; *c* H or Esc [ *r* ; *c* f | |
| | Address cursor page, row, col | Esc - *p r c* | Esc - *p r c* | Esc - *p r c* | Esc - *p r c* |
| | Read cursor row, column | Esc ? | Esc ? | Esc ? | Esc ? |
| | Read cursor row, col (decimal) | Esc [ 6 n | Esc [ 6 n | Esc [ 6 n | |
| | Read cursor page, row, column | Esc / | Esc / | Esc / | Esc / |
| | Read cursor page, row, column (decimal) | Esc ? [ 6 n | Esc ? [ 6 n | Esc ? [ 6 n | |
| | Cursor home | Ctrl ^ | Ctrl ^ | Ctrl ^ | Ctrl ^ |
| | New line | Ctrl _ | Ctrl _ | Ctrl _ | Ctrl _ |
| | Carriage return | Ctrl M | Ctrl M | Ctrl M | Ctrl M |
| | Line feed | Ctrl J | Ctrl J | Ctrl J | Ctrl J |
| | Cursor up | Ctrl K Ä | Ctrl K | Ctrl K | Ctrl K |
| | Cursor up *Pn* times | Esc [ *Pn* A or Esc [ *Pn* T | Esc [ *Pn* A or Esc [ *Pn* T | Esc [ *Pn* A or Esc [ *Pn* T | |
| | Cursor down | Ctrl V | Ctrl V | Ctrl V | Ctrl V |
| | Cursor down *Pn* times | Esc [ *Pn* B or Esc [ *Pn* S | Esc [ *Pn* B or Esc [ *Pn* S | Esc [ *Pn* B or Esc [ *Pn* S | |
| | Cursor right | Ctrl L | Ctrl L | Ctrl L | Ctrl L |
| | Cursor right *Pn* times | Esc [ *Pn* C | Esc [ *Pn* C | Esc [ *Pn* C | |
| | Cursor left | Ctrl H | Ctrl H | Ctrl H | Ctrl H |
| | Cursor left *Pn* times | Esc [ *Pn* D | Esc [ *Pn* D | Esc [ *Pn* D | |
| | Reverse line feed | Esc j | Esc j | Esc j | Esc j |

| | Command | 9065 | 965 | 955 | 950 |
|---|---|---|---|---|---|
| TEXT EDITING | Page edit mode | Esc N | Esc N | Esc N | Esc N |
| | Line edit mode | Esc O | Esc O | Esc O | Esc O |
| | Insert mode | Esc q | Esc q | Esc q | Esc q |
| | Replace mode | Esc r | Esc r | Esc r | Esc r |
| | Insert character | Esc Q | Esc Q | Esc Q | Esc Q |
| | Insert *Pn* characters | Esc [ *Pn* @ | Esc [ *Pn* @ | Esc [ *Pn* @ | |
| | Insert column of nulls | Esc x M | Esc x M | | |
| | Insert line | Esc E | Esc E | Esc E | Esc E |
| | Insert *Pn* lines | Esc [ *Pn* L | Esc [ *Pn* L | Esc [ *Pn* L | |
| | Delete character | Esc W | Esc W | Esc W | Esc W |
| | Delete *Pn* characters | Esc [ *Pn* P | Esc [ *Pn* P | Esc [ *Pn* P | |
| | Delete cursor column | Esc x J | Esc x J | | |
| | Delete current line | Esc R | Esc R | Esc R | Esc R |
| | Delete *Pn* lines | Esc [ *Pn* M | Esc [ *Pn* M | Esc [ *Pn* M | |
| | Erase line (or protected field) to character | Esc T or Esc [ *Ps* K | Esc T or Esc [ *Ps* K | Esc T or Esc [ *Ps* K | Esc T |
| | Erase text & attr. to end of line | Esc x R | | | |
| | Erase text to protected field | Esc t | Esc t | Esc t | Esc t |
| | Erase text & attr. to prot. field | Esc x S | | | |
| | Erase line, unprot. to nulls | Esc x L | Esc x L | Esc x L | Esc x L |
| | Erase text & attribute to end of line, replace with nulls | Esc x T | | | |
| | Erase text to end of page | Esc Y | Esc Y | Esc Y | Esc Y |
| | Erase text & attr. to end of pg. | Esc x P | | | |
| | Erase specified field to char. | Esc [ *Ps* J | Esc [ *Ps* J | Esc [ *Ps* J | |
| | Erase text to end of screen | Esc y | Esc y | Esc y | Esc y |
| | Erase text & attributes to end of screen | Esc x Q | | | |
| | Clear unprotected text on page, replace with new | Esc ; or Ctrl Z | Esc ; or Ctrl Z | Esc ; or Ctrl Z | Esc ; or Ctrl Z |
| | Clear attributes & unprotected text on page, replace with new | Esc x V | | | |
| | Clear page, all to character | Esc + | Esc + | Esc + | Esc + |
| | Clear page, unprot. to nulls | Esc : | Esc : | Esc : | Esc : |
| | Clear attibutes and unprot. text on page, replace with nulls | Esc x U | | | |
| | Clear page, all to nulls | Esc * | Esc * | Esc * | Esc * |
| | Clear page, unprotected to write-protected spaces | Esc , | Esc , | Esc , | Esc , |
| | Clear page, unprotected to character | Esc sp *Ps* | Esc sp Ps | | |
| | Clear page field | Ctrl X | Ctrl X | Ctrl X | Ctrl X |
| | Clear column to w.p. spaces | Esc x O | Esc x O | | |
| | Clear unprotected col. to nulls | Esc x K | Esc x K | | |
| | Clear unprot. col. to character | Esc x N *Ps* | Esc x N Ps | | |
| | Clear box unprotected to char. | Esc x F *r c Ps* | Esc x F r c Ps | | |
| | Clear box all to character | Esc x H *r c Ps* | Esc x H r c Ps | | |

| | Command | 9065 | 965 | 955 | 950 |
|---|---|---|---|---|---|
| COMMUNICATIONS | Configure COM1 port | Esc { *p1...p4* | Esc { *p1...p4* | Esc { p1...p4 | Esc { *p1...p4* |
| | Configure COM2 port | Esc } *p1...p4* | Esc } *p1...p4* | Esc } p1...p4 | Esc } *p1...p4* |
| | Block mode | Esc B | Esc B | Esc B | Esc B |
| | Half-block mode | Esc D B | | | |
| | Conversational mode | Esc C | Esc C | Esc C | Esc C |
| | Full duplex (FDX) mode | Esc D F | Esc D F | Esc D F | Esc D F |
| | Half duplex (HDX) mode | Esc D H | Esc D H | Esc D H | Esc D H |
| | Local mode | Esc c | Esc c | Esc c | Esc c |
| | Local edit on | Esc k | Esc k | Esc k | Esc k |
| | Local edit off | Esc l | Esc l | Esc l | Esc l |
| | Set PARALLEL as printer | Esc \ Q 1 | | | |
| | Set COM1 as printer | Esc \ Q 2 | | | |
| | Set COM2 as printer | Esc \ Q 3 | | | |
| | Set COM1 as host | Esc [ = 22 l | Esc [ = 22 l | | |
| | Set COM2 as host | Esc [ = 22 h | Esc [ = 22 h | | |
| | Accept host null characters | Esc [ = 34 h | | | |
| | Ignore host null chatacters | Esc [ = 34 l | | | |
| | COM1 receive handshaking | Esc [ 1 ; *Ps* v | Esc [ 1 ; *Ps* v | | |
| | COM1 transmit handshaking | Esc [ 11 ; *Ps* v | Esc [ 11 ; *Ps* v | | |
| | COM2 receive handshaking | Esc [ 12 ; *Ps* v | Esc [ 12 ; *Ps* v | | |
| | COM2 transmit handshaking | Esc [ 13 ; *Ps* v | Esc [ 13 ; *Ps* v | | |
| | X-on/X-off protocol on | Ctrl O | Ctrl O | Ctrl O | Ctrl O |
| | X-on/X-off protocol off | Ctrl N | Ctrl N | Ctrl N | Ctrl N |
| | Hold host transmission | Ctrl S | Ctrl S | Ctrl S | Ctrl S |
| | Resume host transmission | Ctrl Q | Ctrl Q | Ctrl Q | Ctrl Q |
| | Transmission control mode on | Esc [ = 0 h | Esc [ = 0 h | Esc [ = 0 h | |
| | Transmission control mode off | Esc [ = 0 l | Esc [ = 0 l | Esc [ = 0 l | |
| | Set character mode at 7 bits | Esc [ = 64 l | | | |
| | Set character mode at 8 bits | Esc [ = 64 h | | | |
| | Read COM1 7-bit words | Esc [ = 1 l | Esc [ = 1 l | Esc [ = 1 l | |
| | Read COM1 8-bit words | Esc [ = 1 h | Esc [ = 1 h | Esc [ = 1 h | |
| | Read COM2 7-bit words | Esc [ = 62 l | | | |
| | Read COM2 8-bit words | Esc [ = 62 h | | | |
| | Set buffer threshold | Esc [ 2 ; *Ps* v | Esc [ 2 ; *Ps* v | Esc [ 2 ; *Ps* v | |
| | Set transmit wait state | Esc [ 0 ; *Ps* v | Esc [ 0 ; *Ps* v | Esc [ 0 ; *Ps* v | |
| | ACK mode on | Esc [ = 28 h | Esc [ = 28 h | | |
| | ACK mode off | Esc [ = 28 l | Esc [ = 28 l | | |
| | Send/print block boundaries from screen top | Esc [ = 17 h | Esc [ = 17 h | | |
| | Send/print block boundaries from page top | Esc [ = 17 l | Esc [ = 17 l | | |
| | Send/print block boundaries to end of display | Esc [ = 18 h | Esc [ = 18 h | | |
| | Send/print block boundaries to end at cursor | Esc [ = 18 l | Esc [ = 18 l | | |

| | Command | 9065 | 965 | 955 | 950 |
|---|---|---|---|---|---|
| SEND SCREEN DATA | Send unprotected line | Esc 4 | Esc 4 | Esc 4 | Esc 4 |
| | Send unprotected page | Esc 5 | Esc 5 | Esc 5 | Esc 5 |
| | Send entire line | Esc 6 | Esc 6 | Esc 6 | Esc 6 |
| | Send entire page | Esc 7 | Esc 7 | Esc 7 | Esc 7 |
| | Send unprotected message | Esc S | Esc S | Esc S | Esc S |
| | Send entire message | Esc s | Esc s | Esc s | Esc s |
| | Send message line 1 | Esc Z 0 | Esc Z 0 | Esc Z 0 | Esc Z 0 |
| | Send message line 2 | Esc Z 2 | Esc Z 2 | Esc Z 2 | |
| | Send status line | Esc Z 1 | Esc Z 1 | Esc Z 1 | Esc Z 1 |
| | Send terminal ID | Esc M | Esc M | Esc M | Esc M |
| | Send answerback | Ctrl E | Ctrl E | Ctrl E | Ctrl E |
| LOAD & SEND MESSAGES | Show user 1 on bottom line | Esc g | Esc g | Esc g | Esc g |
| | Turn off bottom line | Esc h | Esc h | Esc h | Esc h |
| | Display status on top line | Esc . b | Esc . b | | |
| | Turn off top line | Esc . c | Esc . c | | |
| | Set top line | Esc [ 4 ; *Ps* v | Esc [ 4 ; *Ps* v | Esc [ 4 ; *Ps* v | |
| | Set bottom line | Esc [ 5 ; *Ps* v | Esc [ 5 ; *Ps* v | Esc [ 5 ; *Ps* v | |
| | Load user message 1 | Esc f *msg* Ctrl M | Esc f *msg* Ctrl M | Esc f *msg* Ctrl M | Esc f *msg* Ctrl M |
| | Load user message | Esc _ *p1 p2* *msg* Ctrl M | Esc _ *p1 p2* *msg* Ctrl M | Esc _ *p1 p2* *msg* Ctrl M | |
| | Load/display F-key labels | Esc _ *Ps* *msg* Ctrl M | Esc _ *Ps* *msg* Ctrl M | | |
| | Load time of day | Esc x 8 *hh mm* | Esc x 8 hh mm | | |
| | Load the date | Esc x 9 *mm dd yy* | Esc x 9 *mm dd yy* | | |
| PRINTING | Copy print mode on | Esc @ | Esc @ | Esc @ | Esc @ |
| | Copy print mode off | Esc A | Esc A | Esc A | Esc A |
| | Transparent print mode on | Esc ‘ | Esc ‘ | Esc ‘ | Esc ‘ |
| | Transparent print mode off | Esc a | Esc a | Esc a | Esc a |
| | Bidirectional print mode on | Ctrl R | Ctrl R | Ctrl R | Ctrl R |
| | Bidirectional print mode off | Ctrl T | Ctrl T | Ctrl T | Ctrl T |
| | Secondary receive mode on | Esc [ = 27 h | Esc [ = 27 h | | |
| | Secondary receive mode off | Esc [ = 27 l | Esc [ = 27 l | | |
| | Print formatted page to cursor | Esc P | Esc P | Esc P | Esc P |
| | Print all formatted pages | Esc [ 0 ; 0 i | Esc [ 0 ; 0 i | Esc [ 0 ; 0 i | |
| | Print formatted unprotected pages | Esc [ 0 ; 1 i | Esc [ 0 ; 1 i | Esc [ 0 ; 1 i | |
| | Print unformatted page to cursor | Esc L | Esc L | Esc L | Esc L |
| | Print all unformatted pages | Esc [ 0 ; 4 i | Esc [ 0 ; 4 i | Esc [ 0 ; 4 i | |
| | Print unformatted unprotected pages | Esc [ 0 ; 5 i | Esc [ 0 ; 5 i | Esc [ 0 ; 5 i | |
| | Page print flip on | Esc [ = 15 h | Esc [ = 15 h | Esc [ = 15 h | |
| | Page print flip off | Esc [ = 15 l | Esc [ = 15 l | Esc [ = 15 l | |

| | Command | 9065 | 965 | 955 | 950 |
|---|---|---|---|---|---|
| FUNCTION KEYS | Select function key set | Esc [ 7 ; *Ps* v | Esc [ 7 ; *Ps* v | Esc [ 7 ; *Ps* v | |
| | Reprogram function key | Esc \| *p1 p2* *text* Ctrl Y | Esc \| *p1 p2* *text* Ctrl Y | Esc \| *p1 p2* *text* Ctrl Y | Esc \| *p1 p2* *text* Ctrl Y |
| | Function key save on | Esc [ = 10 h | Esc [ = 10 h | Esc [ = 10 h | |
| | Function key save off | Esc [ = 10 l | Esc [ = 10 l | Esc [ = 10 l | |
| | Send function key message | Esc [ *Pn* \| | Esc [ *Pn* \| | Esc [ *Pn* \| | |
| | Load editing key | Esc 0 *Ps* *p1 ... p5* | Esc 0 *Ps* *p1 ... p5* | Esc 0 *Ps* *p1 ... p5* | Esc 0 *Ps* *p1 ... p5* |
| | Load all editing keys | Esc ] *Ps* *p1 ... pn* | Esc ] *Ps* *p1 ... pn* | Esc ] *Ps* *p1 ... pn* | Esc ] *Ps* *p1 ... pn* |
| | Load replace character | Esc e *Ps* | Esc e *Ps* | Esc e *Ps* | Esc e *Ps* |
| | Program answerback message | Esc ^ *text* Ctrl Y | Esc ^ *text* Ctrl Y | Esc ^ *text* Ctrl Y | Esc ^ *text* Ctrl Y |
| | Reprogram send delimiters | Esc x *Ps P1 P2* | Esc x *Ps P1 P2* | Esc x *Ps P1 P2* | Esc x *Ps P1 P2* |
| | Reprogram print terminator | Esc p *Ps* | Esc p Ps | Esc p *Ps* | Esc p *Ps* |

Table C-2. TeleVideo 925/905/910+, 912/920, and 910 Commands

| | Command | 925/905/910+ | 912/920 | 910 |
|---|---|---|---|---|
| OPERATIONS | Self test | Esc V | | Esc V |
| | Monitor mode on | Esc U | Esc U | Esc U |
| | Monitor mode off | Esc X<br>or Esc u | Esc X<br>or Esc u | Esc X<br>or Esc u |
| | Reset | Esc ~ *Pn* | Esc ~ *Pn* | Esc ~ *Pn* |
| KEYBOARD | Enable keyboard | Esc " | Esc " | Esc " |
| | Disable keyboard | Esc # | Esc # | Esc # |
| | Keyclick on | Esc > | | Esc > |
| | Keyclick off | Esc < | | Esc < |
| | Sound the beeper | Ctrl G | Ctrl G | Ctrl G |
| SCREEN DISPLAY & MEMORY | Screen on | Esc n | **Esc n** | |
| | Screen off | Esc o | **Esc o** | |
| | Light background | Esc b | **Esc b** | |
| | Dark background | Esc d | **Esc d** | |
| | Set attribute | Esc G *n* | Esc G *n* | |
| | Blinking on | | Esc ^ | |
| | Blank on | | Esc _ | |
| | Blinking/blank off | | Esc q | |
| | Reverse on | | Esc j | |
| | Reverse off | | Esc k | |
| | Underline on | | Esc l | |
| | Underline off | | Esc m | |
| | Set cursor attribute | Esc . *n* | **Esc . *n*** | |
| | Toggle cursor on/off | | | Esc . |
| | Set line attribute | **Esc G *n*** | | Esc G *n* |
| | Autopage mode on | Esc v | Esc v | **Esc v** |
| | Autopage mode off | Esc w | Esc w | **Esc w** |
| | Display next page | Esc K | Esc K | **Esc K** |
| | Display previous page | Esc J | Esc J | Esc J |
| GRAPHICS | Display control character | | | Esc F *Pc* |
| | Graphics mode on | Esc $ | **Esc $** | Esc $ |
| | Graphics mode off | Esc % | **Esc %** | Esc % |
| | Draw a box | **Esc H *w h*** | | |
| EDITING | Write protect on | Esc ) | Esc ) | Esc ) |
| | Write protect off | Esc ( | Esc ( | Esc ( |
| | Protect mode on | Esc & | Esc & | Esc & |
| | Protect mode on | Esc ' | Esc ' | Esc ' |

| | Command | 925/905/910+ | 912/920 | 910 |
|---|---|---|---|---|
| SCROLLING | Scroll mode on/off | | | Esc H |
| | Jump scroll | **Esc 9** | Esc 9 | Esc 9 |
| | Smooth scroll | **Esc 8** | Esc 8 | Esc 8 |
| TAB STOPS | Tab | Ctrl I | Ctrl I | Ctrl I |
| | Field tab | Esc i | Esc i | **Esc i** |
| | Back tab | Esc I | Esc I | Esc I |
| | Set tab stop | Esc 1 | Esc 1 | Esc 1 |
| | Clear cursor tab | Esc 2 | Esc 2 | Esc 2 |
| | Clear all tabs | Esc 3 | Esc 3 | Esc 3 |
| CURSOR CONTROL | Cursor home | Ctrl ^ | Ctrl ^ | Ctrl ^ |
| | Cursor up | Ctrl K | Ctrl K | Ctrl K |
| | Cursor down | Ctrl V | **Ctrl V** | Ctrl V |
| | Cursor right | Ctrl L | Ctrl L | Ctrl L |
| | Cursor left | Ctrl H | Ctrl H | Ctrl H |
| | Carriage return | Ctrl M | Ctrl M | Ctrl M |
| | Line feed | Ctrl J | Ctrl J | Ctrl J |
| | Reverse line feed | Esc j | Esc j | Esc j |
| | New line | Ctrl _ | Ctrl _ | Ctrl _ |
| | Address cursor row, column | Esc = *r c* | Esc = *r c* | Esc = *r c* |
| | Address cursor row | | | Esc [ *r* |
| | Address cursor column | | | Esc ] *c* |
| | Address cursor page, row, column | Esc - *p r c* | Esc - p r c | |
| | Read cursor row, column | Esc ? | Esc ? | Esc ? |
| | Read cursor page, row, column | Esc / | Esc / | |
| EDITING TEXT | Page edit mode | **Esc N** | Esc N | Esc N |
| | Line edit mode | **Esc O** | Esc O | Esc O |
| | Insert mode | **Esc q** | | Esc q |
| | Replace mode | **Esc r** | | Esc r |
| | Insert character | Esc Q | Esc Q | **Esc Q** |
| | Delete character | Esc W | Esc W | **Esc W** |
| | Insert line | Esc E | Esc E | **Esc E** |
| | Delete line | Esc R | Esc R | **Esc R** |
| | Erase line to spaces | Esc T | Esc T | Esc T |
| | Erase line to nulls | Esc t | Esc t | **Esc t** |
| | Erase page to spaces | Esc Y | Esc Y | Esc Y |
| | Erase page to nulls | Esc y | Esc y | **Esc y** |
| | Clear unprotected | Ctrl Z | Ctrl Z | Ctrl Z |
| | Clear unprotected cursor to spaces | Esc ; | Esc ; | Esc ; |
| | Clear all unprotected to spaces | Esc + | Esc + | Esc + |
| | Clear unprotected cursor to nulls | Esc: | Esc: | Esc: |
| | Clear all unprotected to nulls | Esc * | Esc * | Esc * |
| | Clear unprotected to w. p. spaces | Esc , | | |
| | Clear field | Ctrl X | **Ctrl X** | **Ctrl X** |

| | Command | 925/905/910+ | 912/920 | 910 |
|---|---|---|---|---|
| COMMUNICATIONS | X-On/X-Off handshaking on | Ctrl O | Ctrl O | Ctrl O |
| | X-On/X-Off handshaking off | Ctrl N | Ctrl N | Ctrl N |
| | Hold main transmission | Ctrl S | Ctrl S | Ctrl S |
| | Resume main transmission | Ctrl Q | Ctrl Q | Ctrl Q |
| | Block communication mode | Esc B | Esc B | **Esc B** |
| | Coversational mode | Esc C | Esc C | **Esc C** |
| | Full duplex communication mode | Esc D F | | |
| | Half duplex communication mode | Esc D H | | |
| | Local edit on | Esc k | | |
| | Local edit off | Esc l | | |
| SEND SCREEN TEXT/MESSAGES | Send unprotected line | Esc 4 | Esc 4 | **Esc 4** |
| | Send unprotected page | Esc 5 | Esc 5 | **Esc 5** |
| | Send entire line | Esc 6 | Esc 6 | **Esc 6** |
| | Send entire page | Esc 7 | Esc 7 | **Esc 7** |
| | Send one character | | | Esc M |
| | Reprogram send delimiters | Esc x *Ps p1 p2* | | |
| | Send unprotected message | Esc S | Esc S | **Esc S** |
| | Send entire message | Esc s | Esc s | **Esc s** |
| | Send terminal ID | **Esc M** | **Esc M** | |
| | Send answerback | **Ctrl E** | Ctrl E | Ctrl E |
| | Display message line | Esc g | | |
| | Display status line | Esc h | | |
| | Load 25th line | Esc f *msg* Ctrl Y | | |
| | Program answerback message | Esc ^ *msg* Ctrl Y | | |
| PRINTING | Copy print mode on | Esc @ | Esc @ | Esc @ |
| | Copy print mode off | Esc A or Ctrl T | | |
| | Transparent print mode on | Esc ‘ | Esc ‘ | **Esc ‘** or Ctrl R |
| | Transparent print mode off | Esc a | Esc a | **Esc a** or Ctrl T |
| | Bidirectional print on | Ctrl R | Ctrl R | |
| | Bidirectional print off | Ctrl T | Ctrl T | |
| | Prinit formatted page | Esc P | Esc P | Esc P |
| | Print unformatted page | Esc L | Esc L | Esc L |
| | Reprogram terminator | Esc p *Ps* | | |
| F-KEY | Load function key | Esc l *p1 p2 msg* Ctrl Y | **Esc l *p1 p2 msg* Ctrl Y** | **Esc l *p1 p2 msg* Ctrl Y** |

# Appendix D
# OTHER COMMAND SUMMARIES

The 9065 offers 27 different terminal emulations. The commands for these terminals are summarized in Appendices C and D in the tables shown below. Within the command codes in the tables, variable values are shown in *italics*.

## Appendix C

| Table | Terminals | Table | Terminals |
|---|---|---|---|
| C-1 | TeleVideo 9065<br>TeleVideo 965<br>TeleVideo 955<br>TeleVideo 950 | C-2 | TeleVideo 925/905<br>TeleVideo 910/910+<br>TeleVideo 912/920 |

## Appendix D

| Table | Terminals | Table | Terminals |
|---|---|---|---|
| D-1 | Wyse WY-60<br>Wyse WY-50/50+<br>Wyse WY-120/150<br>Wyse WY-160 | D-2 | ADDS VP A2<br>ADDS VP 60<br>LSI ADM 3A/5/31<br>Hazeltine 1500 |
| D-3 | Data General DG200<br>DEC VT100/52 | D-4 | PC TERM<br>IBM 3161-V<br>IBM 3101-1X<br>IBM 3101-2X |

**NOTE** The terminal recognizes **boldfaced** commands only during enhanced compatibility mode (enabled in the General set up menu).

Table D-1. Wyse Emulation Commands

| | Command | WY-60 | WY-50/50+ | WY-120/150 | WY-160 |
|---|---|---|---|---|---|
| TERMINAL & KEYBOARD | Monitor mode on | Esc U | Esc U | Esc U | Esc U |
| | Monitor mode off | Esc X or Esc u | Esc X or Esc u | Esc X or Esc u | Esc X or Esc u |
| | Reset terminal | Esc ! *Pn* | | | Esc c X |
| | Save set up values | Esc ! 2 | | | Esc c V |
| | Save set up values and tabs | | | | Esc c W |
| | Enable keyboard | Esc " or Ctrl N | Esc " or Ctrl N | Esc " or Ctrl N | Esc " or Ctrl N |
| | Disable keyboard | Esc # or Ctrl O | Esc # or Ctrl O | Esc # or Ctrl O | Esc # or Ctrl O |
| | Key click on | Esc e % | Esc e % | Esc e % | Esc e % |
| | Key click off | Esc e $ | Esc e $ | Esc e $ | Esc e $ |
| | Key repeat on | Esc e - | Esc e - | Esc e - | Esc e - |
| | Key repeat off | Esc e , | Esc e , | Esc e , | Esc e , |
| | CAPS LOCK on | Esc e & | Esc e & | Esc e & | Esc e & |
| | CAPS LOCK off | Esc e ' | Esc e ' | Esc e ' | Esc e ' |
| | Normal CAPS LOCK | Esc e T | Esc e T | Esc e T | Esc e T |
| | Reverse CAPS LOCK | Esc e U | Esc e U | Esc e U | Esc e U |
| | Num Lock on | | | | Esc d _ |
| | Num Lock off | | | | Esc d , |
| | Select ASCII key code mode | | | | Esc e H |
| | Select PC scan code mode | | | | Esc e I |
| | Sound the beeper | Ctrl G | Ctrl G | Ctrl G | Ctrl G |
| SCREEN DISPLAY | Screen saver on | Esc e Q | Esc e Q | Esc e Q | Esc e Q |
| | Screen saver off | Esc e P | Esc e P | Esc e P | Esc e P |
| | Screen on | Esc ' 9 | Esc ' 9 | Esc ' 9 | Esc ' 9 |
| | Screen off | Esc ' 8 | Esc ' 8 | Esc ' 8 | Esc ' 8 |
| | Set attribute | Esc G *n* | Esc G *n* | Esc G *n* | Esc G *n* |
| | Write-protect mode on | Esc ) | Esc ) | Esc ) | Esc ) |
| | Write-protect mode off | Esc ( | Esc ( | Esc ( | Esc ( |
| | Set write-protect attribute | Esc ' *Pn* | Esc ' *Pn* | Esc ' *Pn* | Esc ' *Pn* |
| | Set information line attribute | Esc A *Pn Ps* | Esc A *Pn Ps* | Esc A *Pn Ps* | Esc A *Pn Ps* |
| | Attribute base: character mode on | Esc e 0 | Esc e 0 | Esc e 0 | Esc e 0 |
| | Attribute base: character mode off | Esc e 1 | Esc e 1 | Esc e 1 | Esc e 1 |
| | Attribute base: page | Esc e 2 | Esc e 2 | Esc e 2 | Esc e 2 |
| | Attribute base: line | Esc e 3 | Esc e 3 | Esc e 3 | Esc e 3 |
| | Set cursor attribute | Esc ' *n* | Esc ' *n* | Esc ' *n* | Esc ' *n* |
| | Set line attribute | Esc G *Ps* | Esc G *Ps* | Esc G *Ps* | Esc G *Ps* |
| | Set number of data lines | Esc e *Ps* | Esc e *Ps* | Esc e *Ps* | Esc e *Ps* |
| | 80-column mode | Esc ' : | Esc ' : | Esc ' : | Esc ' : |
| | 132-column mode | Esc ' ; | Esc ' ; | Esc ' ; | Esc ' ; |
| | 80-col. economy mode on | Esc e G | Esc e G | Esc e G | |
| | 80-col. economy mode off | Esc e F | Esc e G | Esc e G. | |

| | Command | WY-60 | WY-50/50+ | WY-120/150 | WY-160 |
|---|---|---|---|---|---|
| TABS | Tab | Ctrl I or Esc i | Ctrl I or Esc i | Ctrl I or Esc i | Ctrl I or Esc i |
| | Back tab | Esc I | Esc I | Esc I | Esc I |
| | Set tab stop | Esc 1 | Esc 1 | Esc 1 | Esc 1 |
| | Clear tab stop | Esc 2 | Esc 2 | Esc 2 | Esc 2 |
| | Clear all tabs | Esc 0 | Esc 0 | Esc 0 | Esc 0 |
| GRAPHICS | Graphics mode on | Esc H Ctrl B | Esc H Ctrl B | Esc H Ctrl B | Esc H Ctrl B |
| | Graphics mode off | Esc H Ctrl C | Esc H Ctrl C | Esc H Ctrl C | Esc H Ctrl C |
| | Display a graphics character | Esc H *Ps* | Esc H *Ps* | Esc H *Ps* | Esc H *Ps* |
| | Draw a box | Esc c G *rc* | Esc c G *rc* | Esc c G *rc* | Esc c G *rc* |
| | Swap/copy/move a box (*action* = 0/1/2, *sp* = source page, *ssr* = source start row, *ssc* = source start column, *ser* = source end row *sec* = source end column, *dp* = destination page, *dsr* = destination start row, *dsc* = dest. start column) | | | | Esc c ^ *action sp* P *ssr* R *ssc* C *ser* R *sec* C *dp* P *dsr* R *dsc* C |
| | Auto font load on | Esc e O | Esc e O | Esc e O | Esc e O |
| | Auto font load off | Esc e N | Esc e N | Esc e N | Esc e N |
| EDITING MODES | Line wrap on | Esc d / | Esc d / | Esc d / | Esc d / |
| | Line wrap off | Esc d . | Esc d . | Esc d . | Esc d . |
| | New line mode on | Esc e 5 | Esc e 5 | Esc e 5 | Esc e 5 |
| | New line mode off | Esc e 4 | Esc e 4 | Esc e 4 | Esc e 4 |
| | WordStar mode on | Esc ~ / | Esc ~ / | | |
| | WordStar mode off | Esc ~ . | Esc ~ . | | |
| | Application mode on | Esc ~ 3 | Esc ~ 3 | | |
| | Application mode off | Esc ! 2 | Esc ! 2 | | |
| | Protect mode on | Esc & | Esc & | Esc & | Esc & |
| | Protect mode off | Esc ' | Esc ' | Esc ' | Esc ' |
| ADDITIONAL SCREEN MEMORY | Set number of lines per page | Esc e *Ps* | Esc e *Ps* | Esc e *Ps* | Esc e *Ps* |
| | Split the screen | Esc x C *Pl* | Esc x C *Pl* | Esc x C *Pl* | Esc x C *Pl* |
| | Split and clear | Esc x 3 *Pl* | Esc x 3 *Pl* | Esc x 3 *Pl* | Esc x 3 *Pl* |
| | Split two pages | Esc x A *Pn* | Esc x A *Pn* | Esc x A Pn | Esc x A *Pn* |
| | Split two pages and clear | Esc x 1 *Pl* | Esc x 1 *Pl* | Esc x 1 *Pl* | Esc x 1 *Pl* |
| | Activate upper window | Esc ] | Esc ] | Esc ] | Esc ] |
| | Activate lower window | Esc } | Esc } | Esc } | Esc } |
| | Raise split line | Esc x R | Esc x R | Esc x R | Esc x R |
| | Lower split line | Esc x P | Esc x P | Esc x P | Esc x P |
| | Display next page | Esc K | Esc w C or Esc K[1] | Esc w C or Esc K[1] | Esc w C or Esc K[1] |
| | Display previous page | Esc J | Esc w B or Esc J[1] | Esc w B or Esc J[1] | Esc w B or Esc J[1] |
| | Display page *Pn* | Esc w *Pn* | Esc w *Pn* | Esc w Pn | Esc w *Pn* |
| | Define screen as one window | Esc x @ | Esc x @ | Esc x @ | Esc x @ |
| | Define screen as one window and clear pages | Esc x 0 | Esc x 0 | Esc x 0 | Esc x 0 |
| | Auto page mode on | Esc d + | Esc d + | Esc d + | Esc d + |
| | Auto page mode off | Esc d * | Esc d * | Esc d * | Esc d * |

[1] Screen must not be split

| | Command | WY-60 | WY-50/50+ | WY-120/150 | WY-160 |
|---|---|---|---|---|---|
| SCROLLING | Autoscroll mode on | Esc O | Esc O | Esc O | Esc O |
| | Autoscroll node off | Esc N | Esc N | Esc N | Esc N |
| | Jump scroll | Esc ‘ @ | Esc ‘ @ | Esc ‘ @ | Esc ‘ @ |
| | Smooth scroll | Esc ‘ = | | | |
| | Set scroll rate | Esc ‘ *Ps* | Esc ‘ *Ps* | Esc ‘ *Ps* | Esc ‘ *Ps* |
| | Line lock on | Esc ‘ H | Esc ‘ H | Esc ‘ H | Esc ‘ H |
| | Line lock off | Esc ‘ I | Esc ‘ I | Esc ‘ I | Esc ‘ I |
| CURSOR CONTROL | Cursor home | Ctrl ^ or Esc { | Ctrl ^ or Esc { | Ctrl ^ or Esc { | Ctrl ^ or Esc { |
| | Set cursor at specific line | | | | Esc [ *line* |
| | Cursor up | Ctrl K | Ctrl K | Ctrl K | Ctrl K |
| | Cursor right | Ctrl L | Ctrl L | Ctrl L | Ctrl L |
| | Cursor left | Ctrl H | Ctrl H | Ctrl H | Ctrl H |
| | Cursor down | Ctrl V | Ctrl V | Ctrl V | Ctrl V |
| | New line | Ctrl _ | Ctrl _ | Ctrl _ | Ctrl _ |
| | Carriage return | Ctrl M | Ctrl M | Ctrl M | Ctrl M |
| | Line feed | Ctrl J | Ctrl J | Ctrl J | Ctrl J |
| | Reverse line feed | Esc j | Esc j | Esc j | Esc j |
| | Address cursor row, column (80) | Esc = *r c* | Esc = *r c* | Esc = *r c* | Esc = *r c* |
| | Address cursor row, column (132) | Esc a *r* R *c* C | Esc a *r* R *c* C | Esc a *r* R *c* C | Esc a *r* R *c* C |
| | Address cursor page, row, column | Esc w @ *p r c* | Esc w @ *p r c* | Esc w @ *p r c* | Esc w @ *p r c* |
| | Read cursor row, column | Esc ? | Esc ? | Esc ? | Esc ? |
| | Read cursor row, column (decimal) | Esc b | Esc b | Esc b | Esc b |
| | Read cursor page, row, column | Esc / | Esc / | Esc / | Esc / |
| | Read cursor page, row, col. (dec) | Esc w ‘ | Esc w ‘ | Esc w ‘ | Esc w ‘ |
| EDITING | Page edit mode | Esc e # | Esc e # | Esc e # | Esc e # |
| | Line edit mode | Esc e " | Esc e " | Esc e " | Esc e " |
| | Insert mode | Esc q | Esc q | Esc q | Esc q |
| | Replace mode | Esc r | Esc r | Esc r | Esc r |
| | Insert character | Esc Q | Esc Q | Esc Q | Esc Q |
| | Insert column of nulls | Esc c M | Esc c M | Esc c M | Esc c M |
| | Insert line | Esc E | Esc E | Esc E | Esc E |
| | Delete character | Esc W | Esc W | Esc W | Esc W |
| | Delete cursor column | Esc c J | Esc c J | Esc c J | Esc c J |
| | Delete line | Esc R | Esc R | Esc R | Esc R |

| | Command | WY-60 | WY-50/50+ | WY-120/150 | WY-160 |
|---|---|---|---|---|---|
| CLEARING DATA | Clear all redefineable key definitions | | | | Esc c U |
| | Clear unprotected line to space | Esc T | Esc T | Esc T | Esc T |
| | Clear unprotected line to nulls | Esc t | Esc t | Esc t | Esc t |
| | Erase page to spaces | Esc Y | Esc Y | Esc Y | Esc Y |
| | Erase page to nulls | Esc y | Esc y | Esc y | Esc y |
| | Clear unprotected to end of line with spaces | Esc c O | | | Esc c O |
| | Clear unprotected page foreground to spaces | Esc c P | | | Esc c P |
| | Clear unprotected page foreground to nulls | Esc c Q | | | Esc c Q |
| | Clear unprotected line foreground to spaces | Esc c R | | | Esc c R |
| | Cleat unprotected line foreground to nulls | Esc c S | | | Esc c S |
| | Clear unprotected page to spaces | Esc ; or Ctrl Z | Esc ; or Ctrl Z | Esc ; or Ctrl Z | Esc ; or Ctrl Z |
| | Clear page all to spaces | Esc + | Esc + | Esc + | Esc + |
| | Clear unprotected page to nulls | Esc : | Esc : | Esc : | Esc : |
| | Clear page all to nulls | Esc * | Esc * | Esc * | Esc * |
| | Clear unprotected page to space | Esc , | Esc , | Esc , | Esc , |
| | Clear unprotected page to character | Esc . *Ps* | Esc . *Ps* | Esc . *Ps* | Esc . *Ps* |
| | Clear col. to write-protected space | Esc V | Esc V | Esc V | Esc V |
| | Clear column to nulls | Esc c K | Esc c K | Esc c K | Esc c K |
| | Clear column to character | Esc c I *Pc* | Esc c I *Pc* | Esc c I *Pc* | Esc c I *Pc* |
| | Clear unprotected box to character | Esc c F *rc Pc* | Esc c F *rc Pc* | Esc c F *rc Pc* | Esc c F *rc Pc* |
| | Clear box all to character | Esc c H *rc Pc* | Esc c H *rc Pc* | Esc c H *rc Pc* | Esc c H *rc Pc* |

| | Command | WY-60 | WY-50/50+ | WY-120/150 | WY-160 |
|---|---|---|---|---|---|
| HOST COMMUNICATIONS | Configure COM1 port | Esc c 0 *n* | Esc c 0 *n* | Esc c 0 n | Esc c 0 *n* |
| | Configure COM2 port | Esc c 1 *n* | Esc c 1 *n* | Esc c 1 n | Esc c 1 *n* |
| | Set COM1 port as host | Esc e 8 | Esc e 8 | Esc e 8 | Esc e 8 |
| | Set COM2 port as host | Esc e 9 | Esc e 9 | Esc e 9 | Esc e 9 |
| | Set COM1 receive handshaking | Esc c 2 *n* | Esc c 2 *n* | Esc c 2 *n* | Esc c 2 *n* |
| | Set COM2 receive handshaking | Esc c 3 *n* | Esc c 3 *n* | Esc c 3 n | Esc c 3 *n* |
| | Set COM1 transmit handshaking | Esc c 4 *n* | Esc c 4 *n* | Esc c 4 n | Esc c 4 *n* |
| | Set COM2 transmit handshaking | Esc c 5 *n* | Esc c 5 *n* | Esc c 5 n | Esc c 5 *n* |
| | Block mode | Esc B | Esc B | Esc B | Esc B |
| | Conversational mode | Esc C | Esc C | Esc C | Esc C |
| | Full duplex (FDX) | Esc D F | Esc D F | Esc D F | Esc D F |
| | Half duplex (HDX) | Esc DH | Esc DH | Esc DH | Esc DH |
| | Local edit on | Esc k | Esc k | Esc k | Esc k |
| | Local edit off | Esc l | Esc l | Esc l | Esc l |
| | Ignore null chatacters from host | | | | Esc e R |
| | Accept null characters from host | | | | Esc e S |
| | Hold host transmission | Ctrl S | Ctrl S | Ctrl S | Ctrl S |
| | Resume host transmission | Ctrl Q | Ctrl Q | Ctrl Q | Ctrl Q |
| | Set maximum data transmit rate | Esc c 6 *n* | Esc c 6 *n* | Esc c 6 n | Esc c 6 *n* |
| | Acknowledge (ACK) mode on | Esc e 7 | Esc e 7 | Esc e 7 | Esc e 7 |
| | ACK mode off | Esc e 6 | Esc e 6 | Esc e 6 | Esc e 6 |
| | Send block boundaries from top of page | Esc d ' | Esc d ' | Esc d ' | |
| | Send block boundaries from top of screen | Esc d & | Esc d & | Esc d & | Esc d & |
| | Send end of page/line boundaries | Esc e E | | | |
| | Send boundary to end at cursor | Esc e D | | | |
| | Send unprotected line | Esc 4 | Esc 4 | Esc 4 | Esc 4 |
| | Send unprotected page | Esc 5 | Esc 5 | Esc 5 | Esc 5 |
| | Send entire line | Esc 6 | Esc 6 | Esc 6 | Esc 6 |
| | Send entire page | Esc 7 | Esc 7 | Esc 7 | Esc 7 |
| | Send unprotected message | Esc S | Esc S | Esc S | Esc S |
| | Send entire message | Esc s | Esc s | Esc s | Esc s |
| | Send one character | Esc M | Esc M | Esc M | Esc M |
| | Send terminal ID | Esc <sp> | Esc <sp> | Esc <sp> | Esc <sp> |
| | Send answerback | Ctrl E | Ctrl E | Ctrl E | Ctrl E |
| MESSAGES | Set status line | Esc ' *Ps* | Esc ' *Ps* | Esc ' *Ps* | Esc ' *Ps* |
| | Load user message | Esc F *msg* Ctrl M | Esc F *msg* Ctrl M | Esc F *msg* Ctrl M | Esc F *msg* Ctrl M |
| | Load time of day | Esc c 8 *hh mm* | Esc c 8 *hh mm* | Esc c 8 *hh mm* | Esc c 8 *hh mm* |
| | Enhanced mode on | Esc ~ ! | Esc ~ ! | Esc ~ ! | Esc ~ ! |
| | Enhanced mode off | Esc ~ sp | Esc ~ sp | Esc ~ sp | Esc ~ sp |

| | Command | WY-60 | WY-50/50+ | WY-120/150 | WY-160 |
|---|---|---|---|---|---|
| PRINTING | Copy print mode on | Ctrl R | Ctrl R | Ctrl R | Ctrl R |
| | Copy print mode off | Ctrl T | Ctrl T | Ctrl T | Ctrl T |
| | Transparent print mode on | Esc d # | Esc d #<br>Ctrl X | Esc d #<br>Ctrl X | Esc d # |
| | Transparent print mode off | Ctrl T | Ctrl T | Ctrl T | Ctrl T |
| | Bidirectional print mode on | Esc d % | Esc d % | Esc d % | Esc d % |
| | Bidirectional print mode off | Esc d $ | Esc d $ | Esc d $ | Esc d $ |
| | COM2 receive print mode on | Esc d ! | Esc d ! | Esc d ! | Esc d ! |
| | COM2 receive print mode off | Esc d <sp> | Esc d <sp> | Esc d <sp> | Esc d <sp> |
| | Print formatted page | Esc P | Esc P | Esc P | Esc P |
| | Print unprotected page | Esc @ | Esc @ | Esc @ | Esc @ |
| | Print unformatted page | Esc L<br>or Esc p | Esc L<br>or Esc p | Esc L<br>or Esc p | Esc L<br>or Esc p |
| REPROGRAM | Reprogram function key<br>(see tables below) | Esc Z *p1 p2*<br>*msg* Del | Esc Z *p1 p2*<br>*msg* Del | Esc Z *p1 p2*<br>*msg* Del | Esc Z *p1 p2*<br>*msg* Del |
| | Load/display Funct key labels | Esc Z *Ps*<br>*msg* Ctrl M | Esc Z *Ps*<br>*msg* Ctrl M | Esc Z *Ps*<br>*msg* Ctrl M | Esc Z *Ps*<br>*msg* Ctrl M |
| | Load editing key | Esc Z *p1 p2*<br>*msg* Del | Esc Z *p1 p2*<br>*msg* Del | Esc Z *p1 p2*<br>*msg* Del | Esc Z *p1 p2*<br>*msg* Del |

| *p1* | Direction |
|---|---|
| 0 | Normal |
| 1 | Remote |
| 2 | Local |

Reprogram Wyse function key direction and definition:

Esc Z ***p1 p2*** *msg* Del

| Keyboards | | | *p2* | |
|---|---|---|---|---|
| ASCII | AT | ANSI | Unshifted | Shifted |
| F1 | F1 | | @ | ‘ |
| F2 | F2 | | A | a |
| F3 | F3 | | B | b |
| F4 | F4 | | C | c |
| F5 | F5 | | D | d |
| F6 | F6 | F6 | E | e |
| F7 | F7 | F7 | F | f |
| F8 | F8 | F8 | G | g |
| F9 | F9 | F9 | H | h |
| F10 | F10 | F10 | I | i |
| F11 | F11 | F11 | J | j |
| F12 | F12 | F12 | K | k |
| F13 | | F13 | L | l |
| F14 | | F14 | M | m |
| F15 | | Help | N | n |
| F16 | | Do | O | o |

Table D-2. VP A2, VP 60, ADM, and HZ 1500 Emulation Commands

| | Command | VP A2 | VP 60 | ADM3A/5/31 | HZ 1500 |
|---|---|---|---|---|---|
| KEYBOARD | Enable keyboard | Esc 6 or Ctrl B | Esc 6 | Esc " or **Ctrl N** | ~Ctrl F |
| | Disable keyboard | Esc 5 or Ctrl D | Esc 5 | Esc # or **Ctrl O** | ~Ctrl U |
| | Sound the bell | Ctrl G | **Ctrl G** | Ctrl G | Ctrl G |
| DISPLAY & MEMORY | Screen on | Esc d | Esc d | | |
| | Screen off | Esc D | Esc D | | |
| | Set attribute | Esc 0 *n* | | Esc G *n* | **~ Ctrl G *n*** |
| | Tag bit set | Ctrl N | | | |
| | Tag bit reset | Ctrl O | | | |
| | Set attribute | | Esc 0 x | | |
| | Set video attribute | | Esc 0 a | | |
| | Store control | | Esc Z c | | |
| | Display next page | | | Esc K | |
| | Display previous page | | | Esc J | |
| | Auto page mode on | | | Esc v | |
| | Auto page mode off | | | Esc w | |
| | Forms mode | | Esc R | | |
| | Modify mode | | Esc C | | |
| | Graphics mode on | **Esc 1** | Esc 1 | | |
| | Graphics mode off | **Esc 2** | Esc 2 | | |
| TABS | Tab | Ctrl I | Ctrl I | Ctrl I | Ctrl I |
| | Tab enable | | Esc H | | |
| | Tab disable | | Esc h | | |
| | Field tab | | | Esc i | Ctrl I |
| | Back tab | Esc O | Esc O | Esc I | **~Ctrl I** |
| CURSOR CONTROL | Cursor home | Ctrl A | Ctrl A | Ctrl ^ | ~Ctrl R |
| | Cursor up | Ctrl Z | Ctrl Z | Ctrl K | ~Ctrl L |
| | Cursor down | | Ctrl J | | |
| | Cursor right | Ctrl F | Ctrl F | Ctrl L | Ctrl P |
| | Cursor left | Ctrl H or Ctrl U | Ctrl H or Ctrl U | Ctrl H | Ctrl H |
| | New line | | | Ctrl_ | |
| | Carriage return | Ctrl M | Ctrl M | Ctrl M | Ctrl M |
| | Line feed | Ctrl J | | Ctrl J | Ctrl J |
| | Address cursor row, column | Esc Y *r c* | Esc Y *r c* | Esc = r c | |
| | Address cursor column, row | | Ctrl P *c r* | | |
| | Address cursor row, col 132 | | | **Esc = *r* ~ *c*** | |
| | Address cursor row | Ctrl K *r* | VT *r* | | |
| | Address cursor column | Ctrl P *c* | DLE *c* | | |
| | Address cursor pg, row, col | | | Esc - *p r c* | |
| | Read cursor row, column | | Esc ? | | ~ Ctrl E |
| | Read cursor pg, row, column | | | Esc / | |

| | Command | VP A2 | VP 60 | ADM3A/5/31 | HZ 1500 |
|---|---|---|---|---|---|
| EDITING TEXT | Write-protect mode on | Ctrl N | | Esc ) | ~ Ctrl Y |
| | Write-protect mode off | Ctrl O | | Esc ( | ~ Ctrl _ |
| | Cursor on | Ctrl X | | | |
| | Cursor off | Ctrl W | | | |
| | Insert mode | | | Esc q | |
| | Replace mode | | | Esc r | |
| | Insert a character | **Esc F** | Esc F | Esc Q | |
| | Insert a character (page) | Esc f | | | |
| | Insert a line | **Esc M** | Esc M | Esc E | ~Ctrl Z |
| | Insert *Pn* lines | Esc [ *Pn* L | | | |
| | Delete a character | Esc E | Esc E | Esc W | |
| | Delete a character (page) | Esc e | | | |
| | Delete a line | **Esc I** | Esc I | Esc R | ~Ctrl S |
| | Erase line to space | Esc K | **Esc K** | Esc T | ~ Ctrl O |
| | Erase line to nulls | | | Esc t | |
| | Erase page to space | Esc k | Esc k | Esc Y | ~ Ctrl X |
| | Erase page to nulls | | | Esc y | |
| | Erase variable data | | Esc G | | |
| | Clear pg unprotected to space | | Ctrl Z | | ~ Ctrl ] |
| | Clear page all to spaces | Ctrl L | Ctrl L | Esc + | ~ Ctrl \ |
| | Clear page unprotected to nulls | | Esc : | | |
| | Clear page all to nulls | | Esc * | | |
| | Clear page unprot. to w.p. space | | | Esc , | |
| COMMUNICATIONS | Block mode | **Esc t** | Esc t | Esc B | |
| | Conversational mode | **Esc T** | Esc T | Esc C | |
| | Full duplex mode | | | Esc D F | |
| | Half duplex mode | | | Esc D H | |
| | Page mode | | Esc U | | |
| | Message mode | | Esc u | | |
| | Transmit | | Esc DC1 | | |
| | Read status | | Esc ENQ | | |
| | Hold host transmission | Ctrl S | | | |
| | Resume host transmission | Ctrl Q | | | |
| SENDING TEXT | Reprogram send delimiters | | | **Esc . *n m*** | |
| | Send unprotected line | | | Esc 4 | |
| | Send unprotected page | | | Esc 5 | |
| | Send entire line | | | Esc 6 | |
| | Send entire page | | | Esc 7 | |
| | Send unprotected message | | | Esc S | |
| | Send entire message | Esc s | | | |
| | Send one character | | | | ~ Ctrl T |
| | Send terminal ID answerback | | | Ctrl E | |
| | Display message line | Esc B | Esc B | Esc { | ~ Ctrl N |
| | Display status line | Esc b | Esc b | Esc } | ~ Ctrl P |

| | Command | VP A2 | VP 60 | ADM3A/5/31 | HZ 1500 |
|---|---|---|---|---|---|
| PRINTING | Copy print mode on | Ctrl R | Ctrl R | Ctrl R<br>or **Esc A 2** | Ctrl R |
| | Copy print mode off | Ctrl T | Ctrl T | Ctrl T<br>or **Esc A 0** | Ctrl T |
| | Transparent print mode on | Esc 3 | Esc 3 | **Esc A 1** | Esc * |
| | Transparent print mode off | Esc 4 | Esc 4 | Ctrl T | Esc / |
| | Print formatted page | Esc X | Esc X | Esc P | |
| | Print unprotected page | | | **Esc @** | |
| | Print unformatted page | Esc x | Esc x | Esc L | |
| F-KEY | Load function key | Esc I *p1 p2 msg* Ctrl Y | | Esc I *msg* Ctrl Y | |
| RE-PGM | Load replace character | | | Esc . 8 *m* | |

Table D-3. DEC Emulation Commands

| | Command | DG200 | ANSI | VT100 | VT52 |
|---|---|---|---|---|---|
| MODE | Alt keyboard mode on | | Esc = | | Esc = |
| | Alt keyboard mode off | | Esc | | Esc > |
| | Enter ANSI mode | | | | Esc < |
| OTHER MODES | New line | | Esc [ 20 h | | |
| | Line feed | | Esc [ 20 l | | |
| | Application keys | | Esc [ ? 1 h | | |
| | Cursor keys | | Esc [ ? 1 l | | |
| | ANSI | | Esc [ ? 2 h | | |
| | VT52 | | Esc [ ? 2 l | | |
| | 132 columns | | Esc [ ? 3 h | | |
| | 80 columns | | Esc [ ? 3 l | | |
| | Smooth scroll | | Esc [ ? 4 h | | |
| | Jump scroll | | Esc [ ? 4 l | | |
| | Reverse video | RS D | Esc [ ? 5 h | | |
| | Normal video | RS E | Esc [ ? 5 l | | |
| | Relative origin | | Esc [ ? 6 h | | |
| | Absolute origin | | Esc [ ? 6 l | | |
| | Wrap-around on | | Esc [ ? 7 h | | |
| | Wrap-around off | | Esc [ ? 7 l | | |
| | Auto repeat on | | Esc [ ? 8 h | | |
| | Auto repeat off | | Esc [ ? 8 l | | |
| | Sound the beeper | **Ctrl G** | | | |
| CURSOR CONTROL | Cursor up | Ctrl W | Esc [ *Pn* A | | Esc A |
| | Cursor down | Ctrl Z | Esc [ *Pn* B | | Esc B |
| | Cursor right | Ctrl X | Esc [ *Pn* C | | Esc C |
| | Cursor left | Ctrl Y | Esc [ *Pn* D | | Esc D |
| | Cursor home | Ctrl H | | | |
| | New line | Ctrl J | Esc E | | |
| | Carriage return | Ctrl M | | | |
| | Index | | Esc D | | |
| | Reverse index | | Esc M | | Esc I |
| | Address row, column | | Esc [ *Pl* ; *Pc* H | | Esc Y *r c* |
| | Address column, row | Ctrl P *c r* | | | |
| | Select char attribute | | Esc [ *Ps*;...;*Ps* m | | |
| | Save cursor & attribute | | Esc 7 | | |
| | Restore cursor & attribute | | Esc 8 | | |
| LINE SIZE | Double-height top | | Esc # 3 | | |
| | Double-height bottom | | Esc # 4 | | |
| | Single-width & height | | Esc # 5 | | |
| | Double-width, single-height | | Esc # 6 | | |

| | Command | DG200 | ANSI | VT100 | VT52 |
|---|---|---|---|---|---|
| CLEAR/ERASE | Clear page to all spaces | Ctrl L | | | |
| | Erase line to spaces | **Ctrl K** | | | |
| | Erase page to spaces | RS F | | | |
| | Erase line right of cursor | | Esc [ 0 K | | Esc K |
| | Erase line left of cursor | | Esc [ 1 K | | |
| | Erase entire cursor line | | Esc [ 2 K | | |
| | Erase from cursor to end of screen | | Esc [ 0 J | | Esc J |
| | Erase from beginning of screen to cursor | | Esc [ 1 J | | |
| | Erase entire screen | | Esc [ 2 J | | |
| CH SET | Select character set | | **G0 Set** | G1 Set | |
| | United Kingdom | | Esc ( A | Esc ) A | |
| | U.S. ASCII | | Esc ( B | Esc ) B | Esc G |
| | Special Graphics | | Esc ( 0 | Esc ) 0 | Esc F |
| SCREEN DISPLAY | Blinking on | Ctrl N | | | |
| | Blinking off | Ctrl O | | | |
| | Underline on | Ctrl T | | | |
| | Underline off | Ctrl U | | | |
| | Write-protect mode on | Ctrl \ | | | |
| | Write-protect mode off | Ctrl ] | | | |
| | Define scrolling region | | Esc [ *Pt* ; *Pb* r | | |
| | Autoscroll mode on | Ctrl R | | | |
| | Autoscroll mode off | Ctrl S | | | |
| TABS | Set a single tab | | Esc H | | |
| | Clear a single tab | | Esc [ 0 g | | |
| | Clear all tabs | | Esc [ 3 g | | |
| PRINTING | Copy print mode on | RS ETX | | | |
| | Copy print mode off | RS STX | | | |
| | Transparent print mode on | RS SOH | | | |
| | Transparent print mode off | RS STX | | | |
| | Print all from cursor line | Ctrl Q | | | |
| | Print unprotected from cursor line | Ctrl A | | | |
| REPORT | Cursor position | | Esc [ 6 *n* | | |
| | Terminal status | | Esc [ 5 *n* | | |
| | Terminal ID | RS C | Esc [ 0 c | | Esc Z |

Table D-4. PC TERM & IBM Emulation Commands

| | Command | PC TERM | IBM 3161 | IBM 3101-1X | IBM 3101-2X |
|---|---|---|---|---|---|
| MONITOR | Monitor mode on | Esc U | Esc <sp> : | | |
| | Monitor mode off | Esc X<br>or Esc u | Esc <sp> ; | | |
| | Select G0 character set | | Esc < ***Pa*** | | |
| | Select G1 character set | | Esc > ***Pa*** | | |
| | Reset (RIS) | | Esc <sp> S | | |
| | Cancel | | Esc 5 | | Esc S |
| TERMINAL | Unlock keyboard | Esc " | Esc ; | Esc ; | Esc ; |
| | Unlock keybd, reset MDT | | Esc ! s | | |
| | Lock keyboard | Esc # | Esc : | Esc : | Esc : |
| | Keyclick on | Esc > | | | |
| | Keyclick off | Esc < | | | |
| | Sound beeper | Ctrl G | | | |
| | Set margin bell | Esc o | | | |
| | Clear margin bell | Esc n | | | |
| F-KEYS | Program function key | Esc I *p1 p2*<br>*msg* Ctrl Y | Esc ! = *Fn*<br>*Ff Fp* Esc | | |
| | Set default function key | | Esc t F*n* | | |
| | Set all default function keys | | Esc <sp> t | | |
| SCREEN | Screen display on | Esc N | | | |
| | Screen display off | Esc O | | | |
| | Display test pattern | Esc F | | | |
| | Dark text, light background | Esc b | | | |
| | Light text, dark background | Esc d | | | |
| | Load text into message line | Esc f *text*<br>Ctrl M | | | |
| | Display message line | Esc g | | | |
| | Display send mark | | Esc E | | Esc E |
| | Display previous page | Esc J | | | |
| | Display next page | Esc K | | | |
| ATTR | Set field attribute | | Esc 3<br>*Pa1...Pa4* | | |
| | Set character attribute | | Esc 4 *Pa1* | | |
| | Define visual attribute | Esc G *Ps* | | | |
| | Set cursor attribute | Esc . *Ps* | | | |
| PROTECT | Write-protect mode on | Esc ) | | | |
| | Write-protect mode off | Esc ( | | | |
| | Protect mode on | Esc & | | | |
| | Protect mode off | Esc ' | | | |
| | Graphics mode on | Esc $ | | | |
| | Graphics mode off | Esc % | | | |

| | Command | PC TERM | IBM 3161 | IBM 3101-1X | IBM 3101-2X |
|---|---|---|---|---|---|
| PARTITION | Create viewport | | Esc r *Vt Vid Vdh Vdl Vwh Vwl ...* | | |
| | Select host partition | | Esc <sp> q *Pid* | | |
| | Select active partition | | Esc ! q *Pid* | | |
| | Jump partition | | Esc " A | | |
| CURSOR CONTROL | Cursor home | Ctrl ^ | Esc H | Esc H | Esc H |
| | New line (LF/CR) | Ctrl _ | | | |
| | Carriage return | Ctrl M | Ctrl M | | |
| | Line feed | Ctrl J | | | |
| | Reverse line feed | Esc j | | | |
| | Wrap-around on | Esc ~ | | | |
| | Wrap-around off | Esc 0 | | | |
| | Autoline mode on | Esc 8 | | | |
| | Autoline mode off | Esc 9 | | | |
| | Cursor up | Ctrl K | Esc A | Esc A | Esc A |
| | Cursor down | Ctrl V | Esc B | Esc B | Esc B |
| | Cursor right | Ctrl L | Esc C | Esc C | Esc C |
| | Cursor left | Ctrl H | Esc D | Esc D | Esc D |
| | Address cursor row, column | Esc = *r c* | Esc Y *Pr pc* | Esc Y *r c* | Esc Y *r c* |
| | Address cursor location | | Esc Z | | |
| | Address cursor page, row, column | Esc - *p r c* | | | |
| | Set buffer address | | | Esc X | |
| | Insert cursor | | | Esc Z | Esc X |
| | Read row, column | Esc ? | | | |
| BUF | Set buffer address | | Esc X *Pr Pc* | | |
| | Reset buffer address mode | | Esc Z | | |
| EDITING | Set tab stop | Esc 1 | Esc 0 | Esc 0 | Esc 0 |
| | Clear tab stop | Esc 2 | Esc 1 | Esc 1 | Esc 1 |
| | Clear all tab stops | Esc 3 | Esc <sp> 1 | | |
| | Tabulate cursor | Ctrl I | | | |
| | Field tab | Esc i | | | |
| | Back tab | Esc I | Esc 2 | | Esc 2 |
| | Start field | | | | Esc 3 x |
| | Insert mode on | Esc Z | | | |
| | Replace mode on | Esc r | | | |
| | Insert space | Esc Q | | | |
| | Insert a line of spaces | Esc E | Esc N | Esc N | Esc N |
| | Delete line | Esc R | Esc O | Esc O | Esc O |
| | Insert a character | | Esc P *Pa* | Esc P | Esc P |
| | Delete a character | Esc W | Esc Q | Esc Q | Esc Q |
| | Erase to end of line | | Esc I | Esc I | Esc I |
| | Erase input | | Esc K | Esc K | Esc K |
| | Erase to end of page | | Esc J | Esc J | Esc J |

| | Command | PC TERM | IBM 3161 | IBM 3101-1X | IBM 3101-2X |
|---|---|---|---|---|---|
| CLEARING DATA | Clear all to nulls | | Esc ! L | | |
| | Clear page to nulls | Esc * | Esc L | Esc L | Esc L |
| | Clear page to write-protected spaces | Esc , | | | |
| | Clear unprotected page to spaces | Esc ; or Esc + or Ctrl Z | | | |
| | Clear unprotected page to nulls | Esc : | | | |
| | Clear unprotected page from cursor to spaces | Esc Y | | | |
| | Clear unprotected page from cursor to nulls | Esc y | | | |
| | Clear unprotected line from cursor to spaces | Esc T | | | |
| | Clear unprot. line from cursor to nulls | Esc t | | | |
| SEND DATA | Send entire line | Esc 6 | Esc ! 8 | | |
| | Send unprotected line | Esc 4 | | | |
| | Send entire page | Esc 7 | Esc # 8 | | |
| | send unprotected page | Esc 5 | Esc 8 | Esc 8 | Esc 8 |
| | Send entire block | Esc s | | | |
| | Send unprotected characters in block | Esc S | | | |
| | Send message | | Esc <sp> 8 | | |
| REPORTS | Report terminal status | Esc [ | Esc 6 | Esc 6 *s0 s1* | Esc 6 *s0 s1* |
| | Report terminal model | | Esc ! 6 | Esc Y *r c* | Esc Y *r c* |
| | Report cursor address | | Esc 5 | | |
| | Report attr. under cursor | Esc D | | | |
| | Report set up | | | Esc 7 *c0 c1* | Esc 7 *c0 c1* |
| | Program answerback message | Esc ] *msg* Ctrl M | | | |
| | Send answerback message | Ctrl E | | | |

| | Command | PC TERM | IBM 3161 | IBM 3101-1X | IBM 3101-2X |
|---|---|---|---|---|---|
| SET & READ CONTROL | Set control | | | Esc 9 x | Esc 9 x |
| | Set control 1 | | Esc <sp> 9 *Pa* | | |
| | Read control 1 | | Esc <sp> 7 | | |
| | Set control 2 | | Esc ! 9 *Pa1..Pa3* | | |
| | Read control 2 | | Esc ! 7 | | |
| | Set control 3 | | Esc " 9 *Pa1..Pa2* | | |
| | Read control 3 | | Esc " 7 | | |
| | Set control 4 | | Esc # 9 *Pa* | | |
| | Read control 4 | | Esc # 7 | | |
| | Set control 5 | | Esc $ 9 *Pa1..Pa4* | | |
| | Read control 5 | | Esc $ 7 | | |
| | Set control 6 | | Esc % 9 *Pa1..Pa4* | | |
| | Read control 6 | | Esc % 7 | | |
| | Set control 7 | | Esc & 9 *Pa1..Pa3* | | |
| | Read control 7 | | Esc & 7 | | |
| COMMUNICATION | Full duplex mode | Esc } | | | |
| | Half duplex mode | Esc { | | | |
| | Block mode | Esc B | | | |
| | Conversational mode | Esc C | | | |
| | Enable DTR | Ctrl N | | | |
| | Enable X-on/X-off | Ctrl O | | | |
| PRINTING | Set print terminator | Esc p *Ps* | | | |
| | Define delimiters | Esc x *Ps P1..P2* | | | |
| | Print all unprotetected | Esc L | | | |
| | Print unprotected formatted page | Esc P | | | |
| | Buffered copy print mode on | Esc @ | | | |
| | Buffered copy print mode off | Esc A | | | |
| | Transparent print mode on | Esc ‘ | | | |
| | Transparent print mode off | Esc a | | | |
| | Bidirectional print mode on | Ctrl R | | | |
| | Bidirectional print mode off | Ctrl T | | | |
| | Print line | | | | Esc U |
| | Print message | | | | Esc V |
| | Print page | | | | Esc W |

# Appendix E
# KEY CODES

| Key Legend | VT100 Function | Key Legend | VT100 Function |
|---|---|---|---|
| Line Delete | PF1 | Prev/Next Page | PF3 |
| Page Erase | PF2 | Clear Space | PF4 |

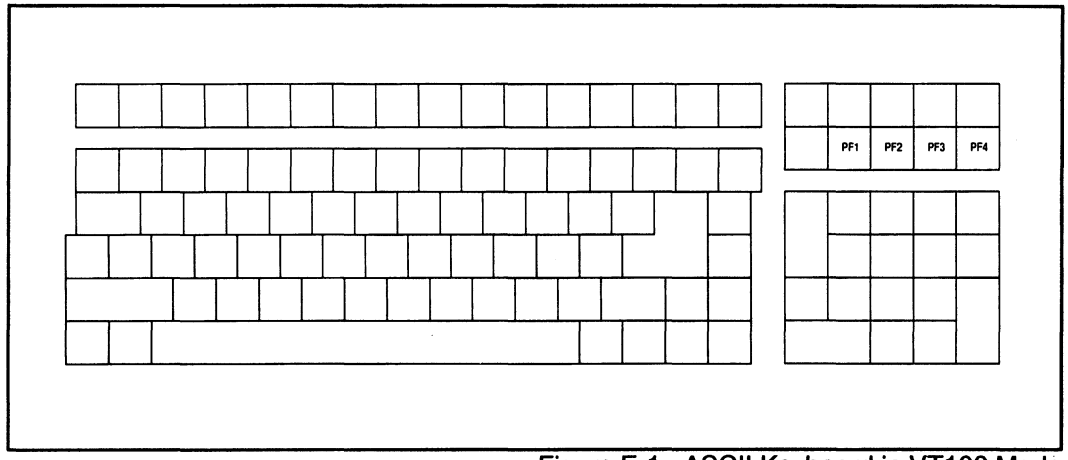



Figure E-1. ASCII Keyboard in VT100 Mode

| Key Legend | PC TERM Function | Key Legend | PC TERM Function |
|---|---|---|---|
| Print | Print Screen | Page Erase | / |
| Funct | Alt | Prev/Next Page | * |
| Char. Insert | Insert | , (keypad) | + |
| Char. Delete | Delete | Break | Pause |
| Line Delete | Num Lock | F16 | Scroll Lock |

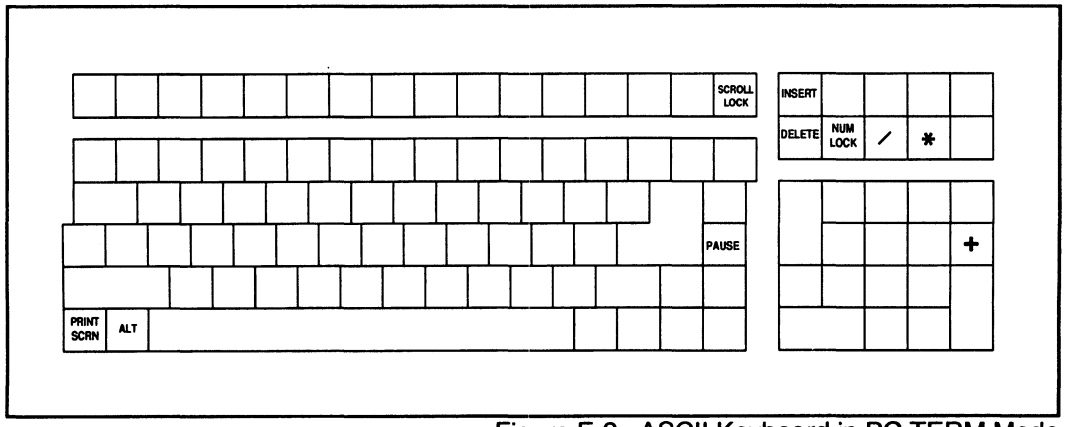



Figure E-2. ASCII Keyboard in PC TERM Mode

| Key Legend | ASCII Function | Key Legend | ASCII Function |
|---|---|---|---|
| Print Screen | Print | Delete | Char Delete |
| Scroll Lock | No Scroll | Page Up | Prev Page |
| Pause | Break | Page Down | Next Page |
| Insert | Char Insert | Alt (left) | Funct |

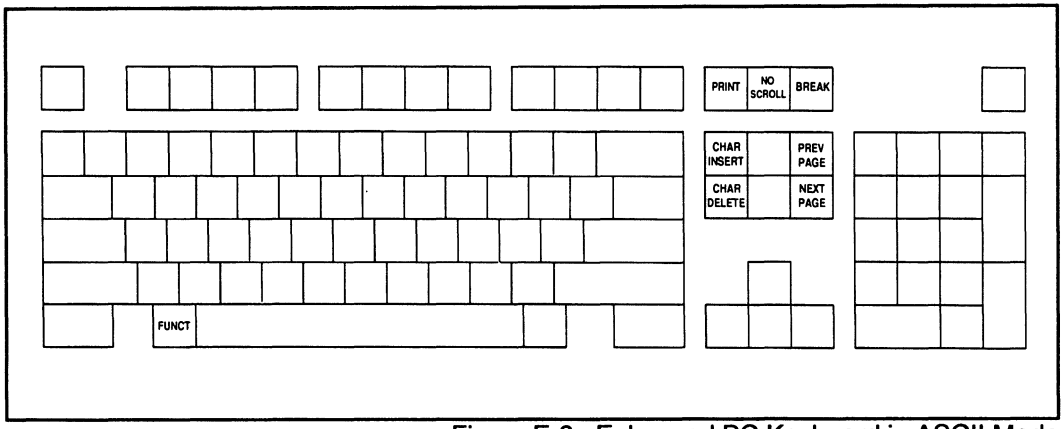



Figure E-3. Enhanced PC Keyboard in ASCII Mode

| Key Legend | VT100 Function |
|---|---|
| Print Screen | Print |
| Scroll Lock | No Scroll |
| Pause | Break |
| Num Lock | PF1 |
| / | PF2 |
| * | PF3 |
| - | PF4 |

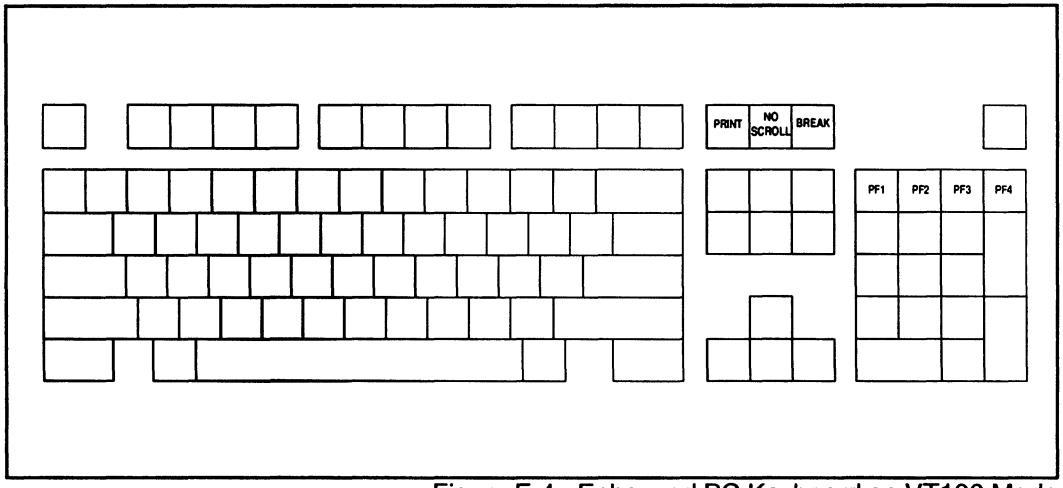



Figure E-4. Enhanced PC Keyboard on VT100 Mode

| Key Legend | ASCII Function | Key Legend | ASCII Function |
|---|---|---|---|
| F2 | Print | Insert | Char Insert |
| F5 | Break | Remove | Char Delete |
| F3 | Shift/Set Up | Prev Screen | Prev Page |
| F20 | Send | Next Screen | Next Page |
| Compose | Funct | | |

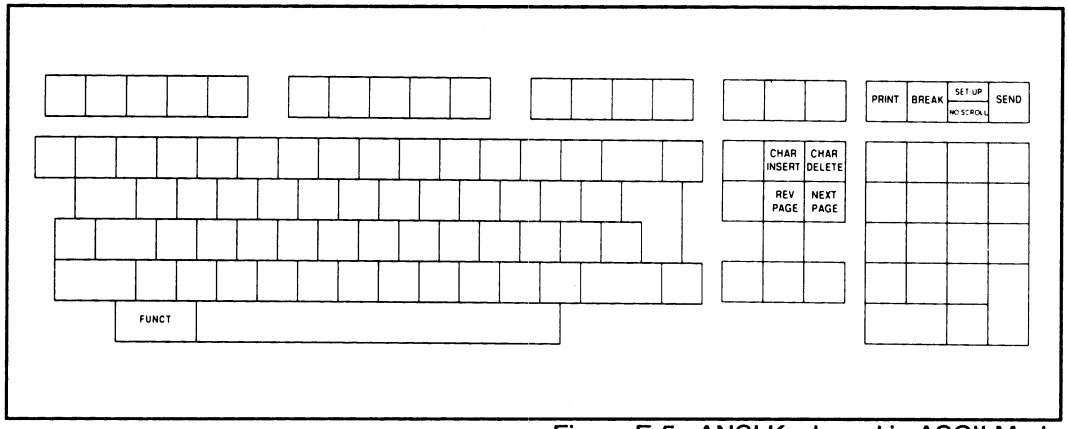



Figure E-5. ANSI Keyboard in ASCII Mode

| Key Legend | PC TERM Function | Key Legend | PC TERM Function |
|---|---|---|---|
| F17 | Print Screen | Find | Insert |
| F18 | Pause | Select | Delete |
| F19 | Set Up/No Scroll | PF1 | Num Lock |
| Compose | Alt | PF2 | / |
| Insert | Home | PF3 | * |
| Remove | PgUp | PF4 | - |
| Prev Screen | End | , (keypad) | + |
| Next Screen | PgDn | | |

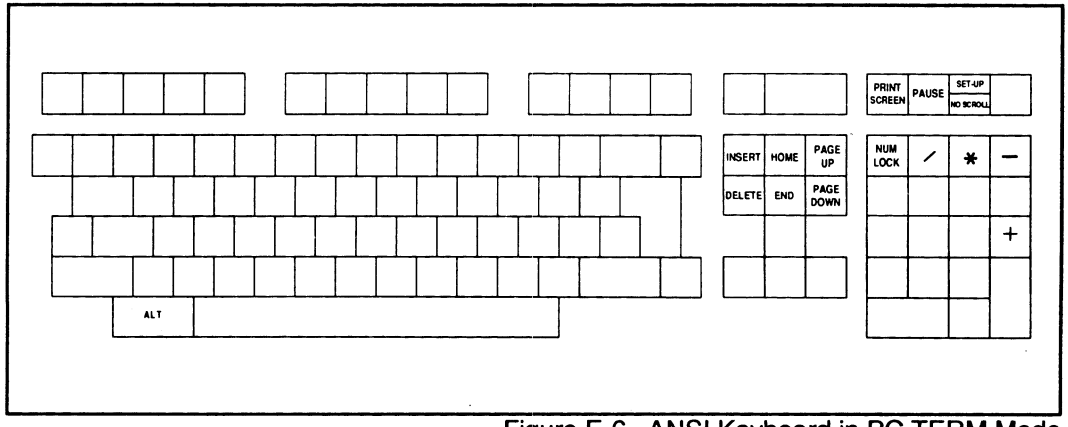



Figure E-6. ANSI Keyboard in PC TERM Mode

Table E1. Local Keyboard Functions

| Function | Keyboard | | |
|---|---|---|---|
| | US Enhanced PC | US ASCII | US ANSI |
| Enter/exit set up | Shift Select | Shift Set Up | F3 |
| Session change (dual-session only) | Alt Shift Page Up | Funct Shift Page | Compose Shift Previous Screen |
| Partial reset | Ctrl Shift Select | Ctrl Shift Set Up | Ctrl F3 |
| Screen activity on/off | Scroll Lock | No Scroll | F1 |
| Block/duplex | Ctrl Shift Enter (note 1) | Ctrl Shift Enter | Ctrl Shift Enter |
| Toggle port (single-session only) | Ctrl Shift Break | Ctrl Shift Break | Ctrl Shift F5 |
| Copy print on/off | Ctrl Shift Print Scrn | Ctrl Shift Print | Ctrl Shift F2 |
| Word Star mode on/off | Ctrl . | Ctrl . | Ctrl . |
| Monitor mode on/off | Ctrl Shift 1 | Ctrl Shift 1 | Ctrl Shift 1 |
| Insert/replace mode | Ctrl Insert | Ctrl Char Insert | Ctrl Insert |
| Keyclick on/off | Ctrl Enter (note 1) | Ctrl Enter | Ctrl Enter |
| Screen saver on/off | | Ctrl Clear Space | Ctrl Remove |
| Clear screen | | Ctrl Shift Clear Space | Ctrl Shift Remove |
| VideoDesk clock | Left Alt F1 | Funct F1 | Compose F6 |
| VideoDesk calendar | Left Alt F2 | Funct F2 | Compose F7 |
| VideoDesk calculator | Left Alt F3 | Funct F3 | Compose F8 |
| VideoDesk ASCII chart | Left Alt F4 | Funct F4 | Compose F9 |
| Display page 0 | Ctrl 0 | Ctrl 0 | Ctrl 0 |
| Display page 1 | Ctrl 1 | Ctrl 1 | Ctrl 1 |
| Display page 2 | Ctrl 2 | Ctrl 2 | Ctrl 2 |
| Display page 3 | Ctrl 3 | Ctrl 3 | Ctrl 3 |
| Display page 4 | Ctrl 4 | Ctrl 4 | Ctrl 4 |
| Display page 5 | Ctrl 5 | Ctrl 5 | Ctrl 5 |
| Display page 6 | Ctrl 6 | Ctrl 6 | Ctrl 6 |
| Status line on/off | Ctrl → | Ctrl → | Ctrl → |
| Horiz. scroll left (132 80 DSPLY) | Ctrl Shift ← | Ctrl Shift ← | Ctrl Shift ← |
| Horiz. scroll right (132 80 DSPLY) | Ctrl Shift → | Ctrl Shift → | Ctrl Shift → |
| Raise split line | Ctrl - | Ctrl - | Ctrl - |
| Lower split line | Ctrl + (num. keypad) | Ctrl , | Ctrl , |
| Next page/window | Ctrl Page Up | Ctrl Page | Ctrl Next Screen |
| Previous page window | Ctrl Page Down | Ctrl Shift Page | Ctrl Prev Screen |
| Scroll up | Ctrl ↑ | Ctrl ↑ | Ctrl ↑ |
| Scroll down | Ctrl ↓ | Ctrl ↓ | Ctrl ↓ |
| Increase scrolling rate | Ctrl Shift ↑ | Ctrl Shift ↑ | Ctrl Shift ↑ |
| Decrease scrolling rate | Ctrl Shift ↓ | Ctrl Shift ↓ | Ctrl Shift ↓ |

Note 1: The Enter key, numerals, and punctuation marks are located on the numeric keypad.
Note 2: In PC TERM mode, Set Up is the only local keyboard function.

Table E-2A. Editing Key Command Codes sent by the ASCII Keyboard

| Key | Code for unshifted key | Code for shifted key |
|---|---|---|
| Home | Ctrl ^ | Ctrl ^ |
| ↓ | Ctrl V | Ctrl J |
| ↑ | Ctrl K | Esc j |
| → | Ctrl L | Ctrl L |
| ← | Ctrl H | Ctrl H |
| Back Space | Ctrl H | Ctrl H |
| Tab (alpha keypad) | Ctrl I | Esc I |
| Line Feed | Ctrl J | Ctrl J |
| Enter (numeric pad) | Ctrl M | Ctrl M |
| Return | Ctrl M | Ctrl M |
| Clear Space | Ctrl Z | Esc * |
| CE (numeric pad) | Ctrl X | Esc 0 |
| Char Insert | Esc Q | Esc Q |
| Char Delete | Esc W | Esc W |
| Line Insert | Esc E | Esc E |
| Line Delete | Esc R | Esc R |
| Line Erase | Esc T | Esc t |
| Page Erase | Esc Y | Esc y |
| Tab (numeric pad) | Ctrl I | Ctrl I |
| Send | Esc 7 | Esc 6 |
| Print | Esc P | Esc L |
| Page | Esc K | Esc J |

Table E-2B. Function Key Command Codes (Set 1) for the ASCII Keyboard

| Key | Code for unshifted key | Code for shifted key |
|---|---|---|
| F1 | SOH @ CR | SOH ' CR |
| F2 | SOH A 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 h CR |
| F10 | SOH I CR | SOH i CR |
| F11 | SOH J CR | SOH j CR |
| F12 | SOH K CR | SOH k CR |
| F13 | SOH L CR | SOH l CR |
| F14 | SOH M CR | SOH m CR |
| F15 | SOH N CR | SOH n CR |
| F16 | SOH O CR | SOH o CR |

Table E-2C. Function Key Command Codes (Set 2) for the ASCII Keyboard

| Key | Code for unshifted key | Code for shifted key |
|---|---|---|
| F1 | SOH P | SOH p |
| F2 | SOH Q | SOH q |
| F3 | SOH R | SOH r |
| F4 | SOH S | SOH s |
| F5 | SOH T | SOH t |
| F6 | SOH U | SOH u |
| F7 | SOH V | SOH v |
| F8 | SOH W | SOH w |
| F9 | SOH X | SOH x |
| F10 | SOH Y | SOH y |
| F11 | SOH Z | SOH z |
| F12 | SOH [ | SOH { |
| F13 | SOH \ | SOH \| |
| F14 | SOH ] | SOH } |
| F15 | SOH ^ | SOH ~ |
| F16 | SOH _ | SOH DEL CR |

Table E-3A. Editing Key Hexadecimal Codes sent by the ASCII Keyboard

| Key | Code for unshifted key | Code for shifted key |
|---|---|---|
| ← | 88 | 80 |
| Tab (alpha keypad) | 89 | 81 |
| ↓ | 8A | 82 |
| ↑ | 8B | 83 |
| → | 8C | 84 |
| Return | 8D | 85 |
| Home | 8E | 86 |
| Back Space | 8F | 87 |
| Line Feed | 90 | A0 |
| Print | 92 | A2 |
| Clear Space | 93 | A3 |
| Char Insert | 94 | A4 |
| Char Delete | 95 | A5 |
| LIne Insert | 96 | A6 |
| Line Delete | 97 | A7 |
| Line Erase | 98 | A8 |
| Page Erase | 99 | A9 |
| Page | 9A | AA |
| Esc | F0 | F1 |
| Send | F2 | F3 |
| Enter | F4 | F5 |
| Tab (numeric pad) | F6 | F7 |
| CE | F8 | F9 |
| Break | FB | FC |
| No Scroll | FD4 | n/a |

Table E-3B. Function Key Hexadecimal Codes sent by the ASCII Keyboard

| Key | Code for unshifted key | Code for shifted key |
|---|---|---|
| F1 | D0 | E0 |
| F2 | D1 | E1 |
| F3 | D2 | E2 |
| F4 | D3 | E3 |
| F5 | D4 | E4 |
| F6 | D5 | E5 |
| F7 | D6 | E6 |
| F8 | D7 | E7 |
| F9 | D8 | E8 |
| F10 | D9 | E9 |
| F11 | DA | EA |
| F12 | DB | EB |
| F13 | DC | EC |
| F14 | DD | ED |
| F15 | DE | EE |
| F16 | DF | EF |

Table E-3C. Numeric Key Hexadecimal Codes sent by the ASCII Keyboard

| Key | Code for unshifted key | Code for shifted key |
|---|---|---|
| 0 | B0 | B0 |
| 1 | B1 | B1 |
| 2 | B2 | B2 |
| 3 | B3 | B3 |
| 4 | B4 | B4 |
| 5 | B5 | B5 |
| 6 | B6 | B6 |
| 7 | B7 | B7 |
| 8 | B8 | B8 |
| 9 | B9 | B9 |
| , | BC | BC |
| - | BD | BD |
| . | BE | BE |
| 00 | FA | FA |

**Table E-4. WordStar Mode Key Codes** (ASCII Keboard)

| Key | Unshifted key | | Shifted key | |
|---|---|---|---|---|
| | Code | Function | Code | Function |
| Home | ^QE | Top of screen | ^QR | Beginning of file |
| ↓ | ^X | Down line | ^Z | Up line |
| ↑ | ^E | Up line | ^W | Down line |
| ← | ^S | Left character | ^A | Left word |
| → | ^D | Right character | ^F | Right word |
| Tab (alpha keypad) | ^I | Tab right | ^QB | Block beginning |
| Tab (numeric pad) | ^I | Tab right | ^QK | Block end |
| Page | ^C | Up screenful | ^R | Down screenful |
| Clear | ^QX | Bottom of screen | ^QC | End of file |
| Char Insert | ^V | Insert toggle on/off | ^QP | Previous position |
| Char Delete | ^G | Delete character | ^T | Delete word right |
| Line Insert | ^N | Carriage return | ^KH | Hide/display block |
| Line Delete | ^Y | Delete line | ^KV | Move block |
| Line Erase | ^QY | Delete to right | ^Q DEL | Delete to left |
| Page Erase | ^KY | Delete block | ^KC | Copy block |
| CE (numeric pad) | ^U | Interrupt | ^KJ | Delete file |
| Print | ^PB | Boldface begin/end | ^PS | Underscore begin/end |
| Send | ^KW | Write block to file | ^KR | Read file into text |
| F1 | ^OL | Left margin set | ^OR | Right margin set |
| F2 | ^OI | Tab set | ^ON | Tab clear |
| F3 | ^B | Reform paragraph | ^OC | Center the line |
| F4 | ^OS | Line space setting | ^OG | Paragraph tab |
| F5 | ^KB | Mark block beginning | ^KK | Mark block end |
| F6 | ^QF | Find string | ^QA | Find and replace |
| F7 | ^L | Find & replace again | ^QV | Start of last find/replace |
| F8 | ^JH | Set help level | ^QQ | Repeat next command |
| F9 | ^QZ | Continuous up scroll | ^QW | Continuous down screen |
| F10 | .HE | Heading | .FO | Footing |
| F11 | .PA | New page | ^PD | Double strike begin/end |
| F12 | ^PV | Subscript begin/end | ^PT | Superscript begin/end |
| F13 | ^OJ | Justification on/off | ^OW | Word wrap on/off |
| F14 | ^K | Block menu | ^Q | Quick menu |
| F15 | ^KD | Save, done edit | ^KX | Save, exit to system |
| F16 | ^KS | Save and resume | ^KQ | Abandon exit |

# NOTES

# Appendix F
# KEYBOARD LAYOUTS

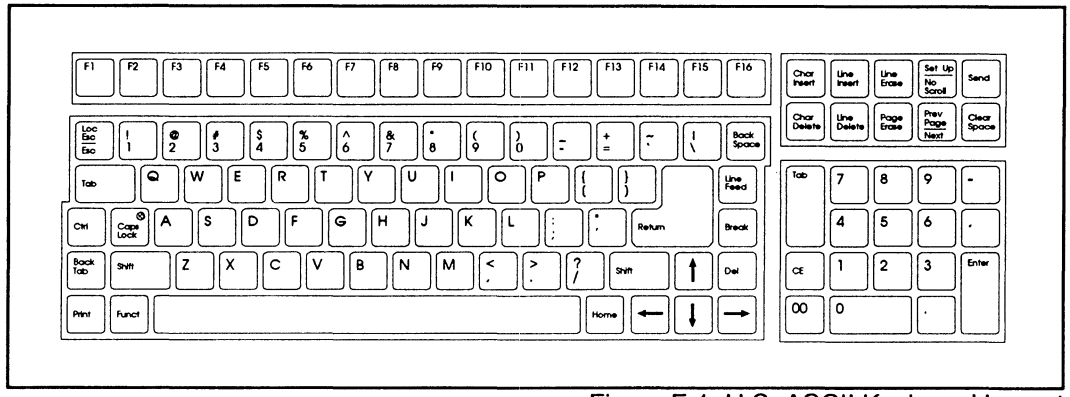



Figure F-1. U.S. ASCII Keyboard Layout

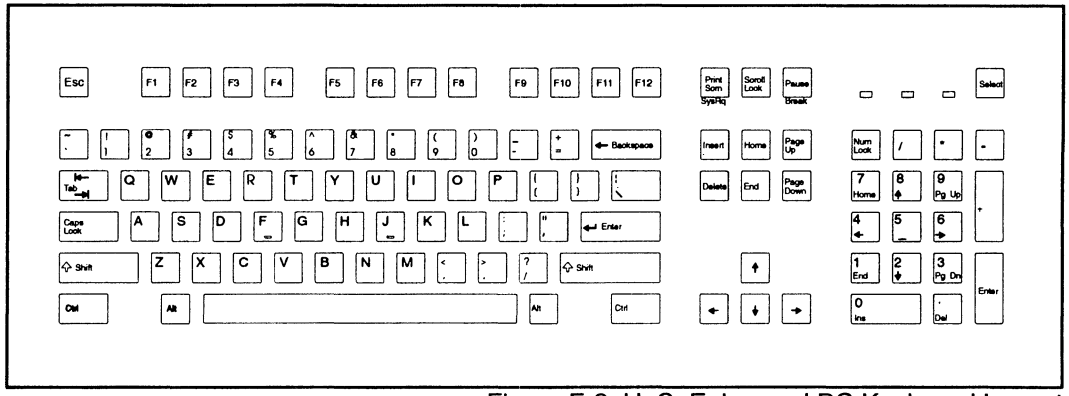



Figure F-2. U. S. Enhanced PC Keyboard Layout

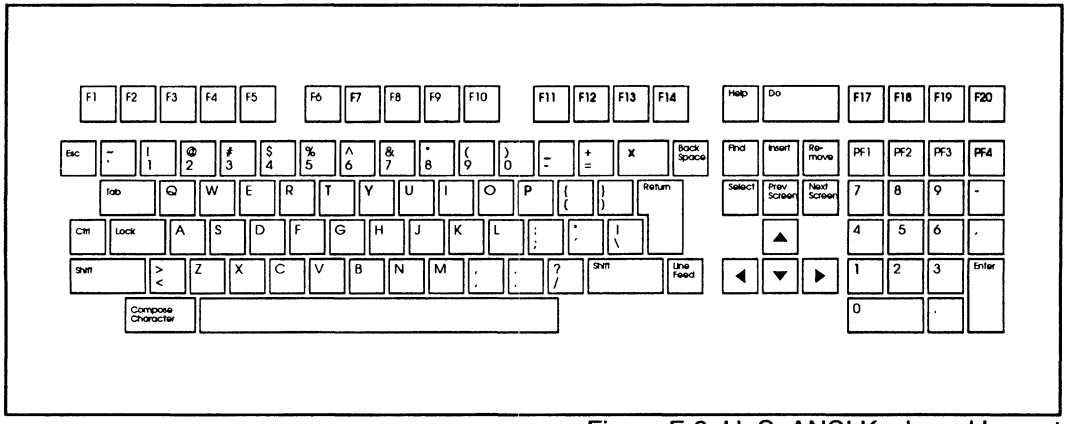



Figure F-3. U. S. ANSI Keyboard Layout

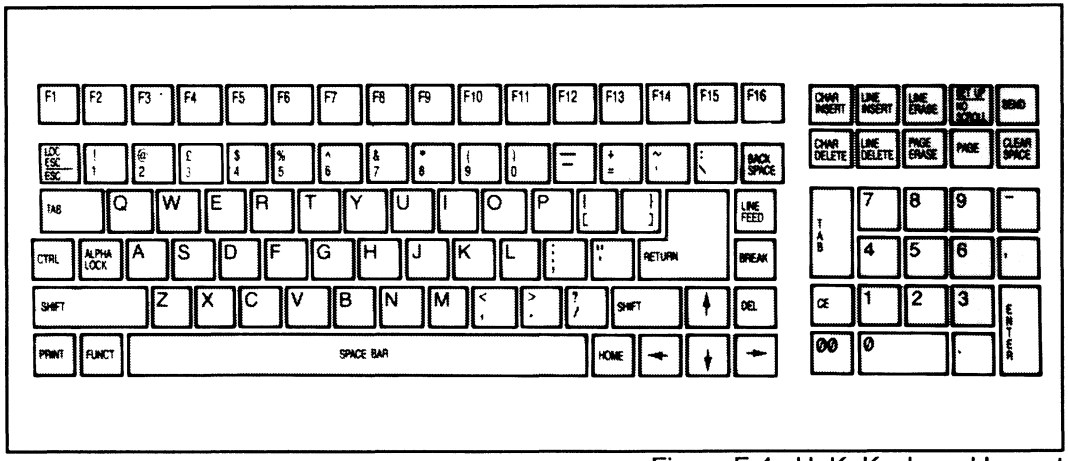



Figure F-4. U. K. Keyboard Layout

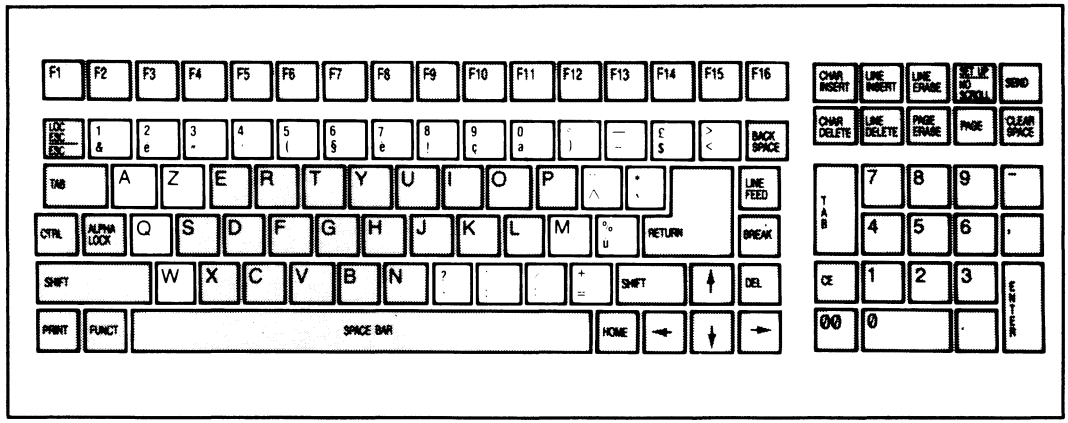



Figure F-5. French Keyboard Layout

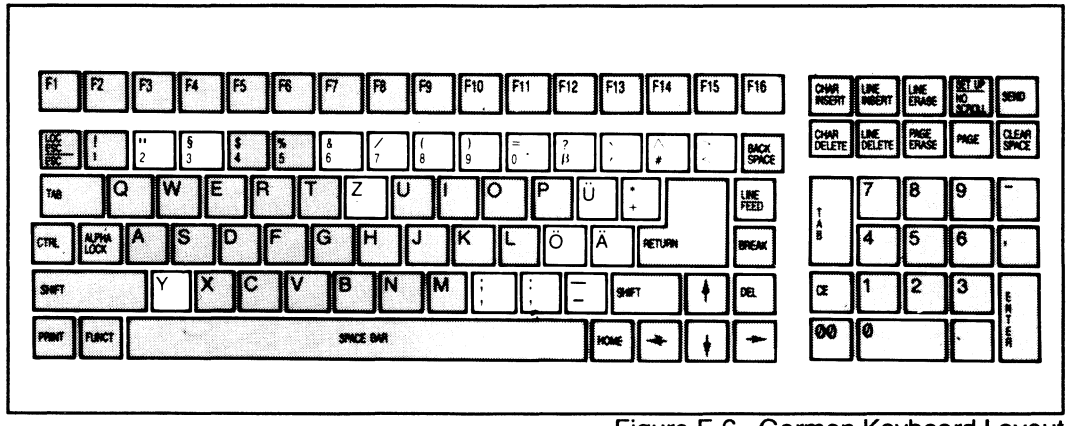



Figure F-6. German Keyboard Layout

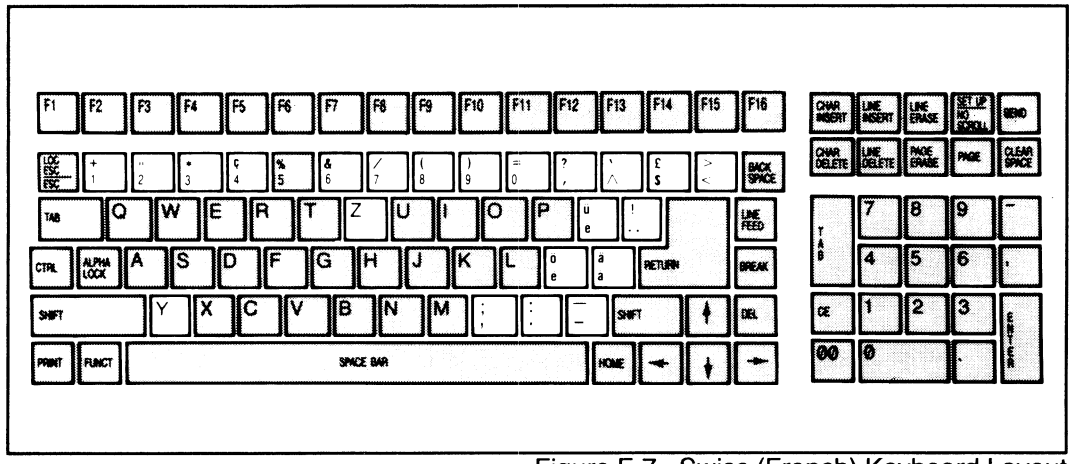



Figure F-7. Swiss (French) Keyboard Layout

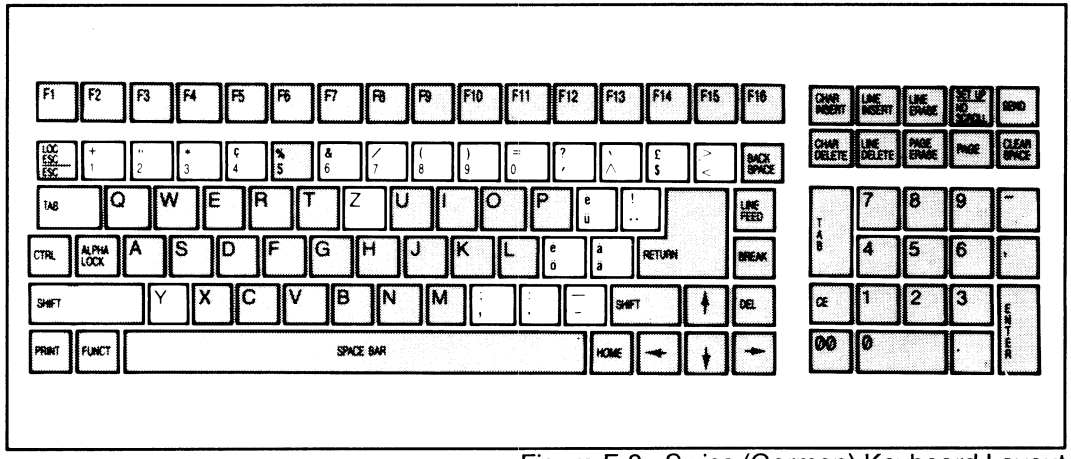



Figure F-8. Swiss (German) Keyboard Layout

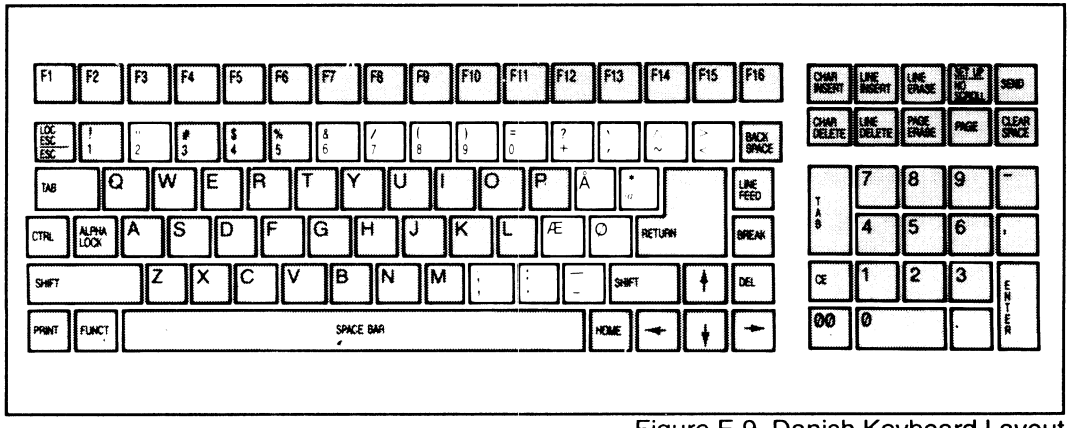



Figure F-9. Danish Keyboard Layout

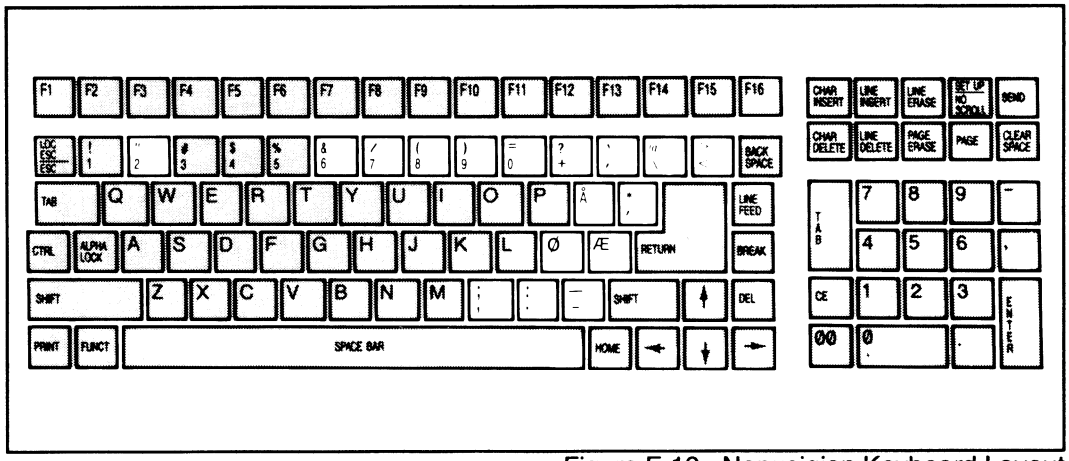



Figure F-10. Norweigian Keyboard Layout

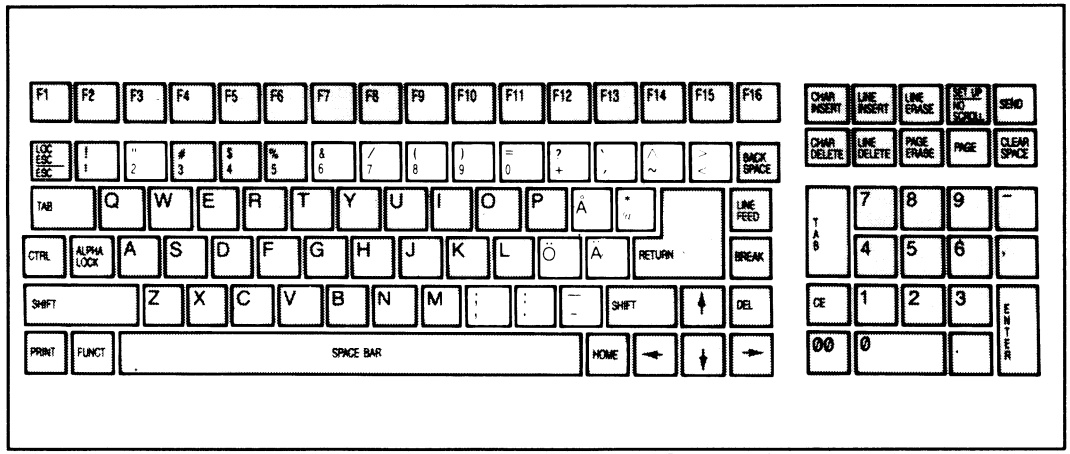



Figure F-11. Swedish/Finnish Keyboard Layout

# Appendix G
# CURSOR COORDINATES

| Row/Column | ASCII Code Transmitted | Row/Column | ASCII Code Transmitted | Row/Column | ASCII Code Transmitted |
|---|---|---|---|---|---|
| 1 | Space | 33 | @ | 65 | ‘ |
| 2 | ! | 34 | A | 66 | a |
| 3 | " | 35 | B | 67 | b |
| 4 | # | 36 | C | 68 | c |
| 5 | $ | 37 | D | 69 | d |
| 6 | % | 38 | E | 70 | e |
| 7 | & | 39 | F | 71 | f |
| 8 | ’ | 40 | G | 72 | g |
| 9 | ( | 41 | H | 73 | h |
| 10 | ) | 42 | I | 74 | i |
| 11 | * | 43 | J | 75 | j |
| 12 | + | 44 | K | 76 | k |
| 13 | , | 45 | L | 77 | l |
| 14 | - | 46 | M | 78 | m |
| 15 | . | 47 | N | 79 | n |
| 16 | / | 48 | O | 80 | o |
| 17 | 0 | 49 | P | 81 | p |
| 18 | 1 | 50 | Q | 82 | q |
| 19 | 2 | 51 | R | 83 | r |
| 20 | 3 | 52 | S | 84 | s |
| 21 | 4 | 53 | T | 85 | t |
| 22 | 5 | 54 | U | 86 | u |
| 23 | 6 | 55 | V | 87 | v |
| 24 | 7 | 56 | W | 88 | w |
| 25 | 8 | 57 | X | 89 | x |
| 26 | 9 | 58 | Y | 90 | y |
| 27 | : | 59 | Z | 91 | z |
| 28 | ; | 60 | [ | 92 | { |
| 29 | < | 61 | \ | 93 | \| |
| 30 | = | 62 | ] | 94 | } |
| 31 | > | 63 | ^ | 95 | ~ |
| 32 | ? | 64 | _ | 96 | DEL |

# NOTES

# Appendix H
# STATUS LINE MESSAGES

| Field | Values | Description |
|---|---|---|
| 1 | *p rrr ccc* | *p* = Page of memory (0-6)<br>*r* = Row (1-168)<br>*c* = Column (1-132) |
| 2 | S1 | Dual-session mode, Session 1 |
| | S2 | Dual-session mode, Session 2 |
| 3 | * | Monitor mode on/off (blank) |
| | w | WordStar mode on/off (blank) |
| | *mode* | Communication mode:<br>FDX = full duplex<br>HDX = half duplex<br>BLK = block<br>LOC = local |
| 4 | W.P. | Write protect mode on/off (blank) |
| 5 | PROT | Protect mode on/off (blank) |
| 6 | N | Num Lock (Enhanced PC keyboard only) |
| | S | Scroll Lock key engaged/released (blank) |
| | C | CAPS LOCK key engaged/released (blank) |
| 7 | GRAF | Graphics mode on/off (blank) |
| 8 | *mode* | COPY = Copy print mode<br>TRSP = Transparent print mode<br>BDIR = Bidirectional print mode |
| 9 | *mode* | UFPG = Unformatted page print<br>FMPG = Formatted page print<br>KLOK = Keyboard locked |
| | SEND | Block send in progress |
| | TBSY | Terminal has sent X-Off to host or dropped DTR. |
| 10 | COMP | Compose function selected for the Funct/Alt/Compose key |

**ACK** An ASCII character (hex 06) meaning acknowledgment. Usually sent by the terminal to the computer to indicate page print or some local function is finished.

**address** Noun: A number identifying a unique 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 computer can **address** the cursor to a specific line and column position on the screen.

**alphanumeric characters** Alphabetic, numeric, and special data symbols. The standard ASCII character set includes 96 alphanumeric characters. See **character, display characters**.

**ANSI** Acronym: American National Standards Institute. A private organization that sets voluntary data processing standards. Sponsor of the ASCII communication standard and the ANSI X3.64 command standard. See **ASCII**.

**answerback** A programmable response sent to the computer upon request. Can identify a particular terminal when several terminals are connected to a computer, since each terminal's answerback can be unique. If 25 9065terminals are connected to the computer, the fifth 9065 terminal could be programmed to reply, "9065-5." Answerback codes are also used with modems.

**applications program** A program to accomplish a specific task, such as word processing, financial analysis, or retrieval of corporate data. See **program, software**.

**ASCII** Acronym: American Standard Code for Information Interchange, pronounced **ask**-key. A standard set of characters used in most data transmission applications in the United States. An ASCII character is expressed as a group of 7 bits. The 128 ASCII characters (found in Appendix C) are divided into 96 alphanumeric (display) and 32 control characters. See **alphanumeric characters, control characters**.

**autowrap** A mode that automatically moves the cursor to the beginning of the next line after it reaches the end of the current line during data entry.

**baud rate** The number of binary bits transmitted per second.

**bi-directional print** A communication mode that enables two-way communication between devices attached to the computer and printer ports. Both devices must have the same baud rate, parity, word structure, and stop bits.

**bit** Acronym: **b**inary dig**it**. The simplest unit of data; always a one or a zero (meaning yes/no, on/off). A group of bits (usually seven or eight) that represents a character is called a byte. See **byte, character**.

**block mode** A communication mode that sends text entered from the keyboard only to the screen until you signal the terminal to send it as a block to the computer.

**break signal** A signal sent by the Break key that holds the communication line (pin 2 of the main RS-232C connector) in the **0** state (low) for 250 milliseconds. It does not affect the terminal's operation and no character appears on the screen. How your computer responds to the signal depends entirely on its programming. A break signal can cause a modem to disconnect.

**buffer** A temporary data storage location in the terminal's memory. Can be used to compensate for differences in transmission rates or temporarily store characters until the computer or printer can accept them. Buffers let data flow from the computer to the terminal at a different baud rate than from the terminal to the printer. See **handshaking protocol, DTR, X-On/X-Off**.

**buffered print** A print mode (either transparent or copy) that stores data in the terminal's buffer(s) when the computer sends data faster than the printer can receive it. See **transparent print, copy print, buffer**.

**byte** A group of bits (usually eight) representing a character. See **bit**.

**character** A unique, transmittable data symbol. See **display character, control character**.

**character keys** The keys that send display (alphanumeric) characters to the terminal and/or computer.

**connector** The device (plug or jack) at the end of the cable and the electrical interface (port) of the computer, terminal, printer, etc. RS-232

connectors are commonly D-shaped and contain pins (male connector) or holes (female connector). The number of pins varies between equipment manufacturers. TeleVideo terminals have 25-pin female connectors.

**control characters** Characters that send a command to the terminal, rather than being displayed on the screen. The standard ASCII control characters are in the range of hex 00 to 1F. See the ASCII Control Chart in Appendix C.

**controls display mode** A mode in which the screen displays all ASCII characters (control and alphanumeric) and does not act on command characters.

**conversational mode** A communication mode that lets data flow interactively from one communication device to another. See **full duplex, half duplex**.

**copy print** A print mode that sends data from the computer to the printer and the screen at the same time. Sometimes called **extension** print. See **transparent print, page print**.

**CRT** Acronym: **c**athode **r**ay **t**ube. An electronic vacuum tube, like a TV picture tube, that displays images. See **screen**.

**cursor** A marker showing where the next character should appear on the screen. Can be blinking or steady, a block or an underline, or invisible.

**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 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 supplies the water pressure to the hose and the person merely opens the nozzle, 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.

**CTS** Acronym: **C**lear **t**o **S**end. A signal on a dedicated RS-232 line indicating that the computer is ready to receive more data from the terminal.

**data** Information that can be coded into bits, to be stored in a computer or terminal's memory and transmitted between devices.

**DCD** Acronym: **D**ata **C**arrier **D**etected. A signal on a dedicated 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: **D**ata **C**ommunications **E**quipment. Usually the computer or the equipment connected to it.

**default** A value or instruction in effect until otherwise defined.

**delete** To eliminate (destroy) data stored in certain memory locations. See **erase**.

**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 lower-case character that hangs below the main body of the character. The tail of the lower-case **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: **D**ual **I**n-Line **P**ackage. A panel of very small switches.

**display** The amount of data that can be viewed on the terminal screen at one time. See **page, screen**.

**display characters** Characters that appear on the terminal's screen, including alphanumeric and graphic symbols. See **characters, alphanumeric characters, graphics characters**.

**download** To copy (read) data from the computer into the terminal's memory.

**DSR** Acronym: **D**ata **S**et **R**eady. A signal on a dedicated RS-232 line indicating when the data coming from the computer is meant for your terminal (or another terminal on a network).

**DTE** Acronym: **D**ata **T**erminal **E**quipment. Equipment that supports data transmission from a terminal.

**DTR** Acronym: Data Terminal Ready. A handshaking protocol that controls the flow of data between the terminal and the computer or printer by lowering and raising the voltage on pin 20 (the DTR line) in the RS-232C connector. See **handshaking protocol, X-On/X-Off, buffer.**

**duplex** Bi-directional communication. See **conversational mode, half duplex, full duplex.**

**echo** To send back received data. For example, in full duplex communication mode, the computer must echo back data it receives from the terminal before that data can be displayed on the screen.

**EM** Acronym: End of Message. An ASCII control character (hex 19) sometimes marking the end of a block transmission.

**EPROM** Acronym: Erasable, Programmable **ROM**. A read-only memory chip that can be erased and reprogrammed.

**erase** To replace data in certain memory locations with replacement characters. See **delete, replacement character.**

**escape sequence** A command introduced by an ASCII escape character (hex 1B) that controls terminal operations.

**ETX** Acronym: End of Text. An ASCII character (hex 03) that marks the end of a block transmission message.

**extension print** See **copy print.**

**field** A group of characters affected in the same way by commands (e.g., a tab field).

**firmware** A program embedded on a chip, usually called an EPROM, inside the terminal that tells the terminal how to operate. See **program.**

**formatted** Screen data that includes the delimiters that signal the line ends (e.g., CR, LF, and null) and end of the transmission. See **delimiter, page print.**

**full duplex** A communication mode that lets the terminal and computer transmit and receive simultaneously. Data from the computer is not displayed on the screen unless the computer echoes it back. See **echo.**

**function keys** Keys that send preset escape sequences whose application is user definable. Many TeleVideo terminals have reprogrammable function keys.

**graphics characters** Special non-ASCII characters used to draw lines, figures, and graphs.

**half duplex** An interactive communication mode that lets the terminal transmit and receive data in separate, consecutive operations. Key codes go to both the computer and the screen.

**handshaking protocol** Prearranged signals the computer and the peripherals send when they are ready to send or receive data. They prevent data loss when the other device is not able to accept or handle more data at that time. They can be ASCII control characters (X-On/X-Off) in the data stream or they can be raised or lowered voltage on RS-232C lines dedicated to that purpose (DTR). See **DTR, X-On/X-Off, DCD, DSR.**

**hardware** The physical components of a system, such as computer, terminals, cables, printers, modems.

**hertz** A unit of frequency (of electrical waves) equal to one cycle per second. If the frequency rate of the terminal does not match the frequency rate of the incoming alternating current, the display may waver. Abbreviated Hz.

**hexadecimal** A numbering system with a base of 16 (digits 0-9 and A-F). Commonly used by programmers to indicate locations and contents of a computer's memory. Abbreviated hex. See the ASCII Code Chart in Appendix C.

**home** The first character position on the page (line 1, column 1). Pressing HOME moves the cursor to this position.

**host** The computer controlling the terminal.

**insert** To add data within existing data, which is usually moved to the right at the point of insertion to make room for the new data.

**interface** An interaction or connection between devices in a computer system (i.e., the computer and peripherals). See **current loop, RS-232C, RS-422.**

**interface cable** A cable with connectors that can be plugged into the port connectors of the components in a system, thus linking the various devices. See **connector, RS-232C, interface.**

**keyboard** An arrangement of keys, similar to a typewriter's, on which an operator can enter data, send commands, and operate the terminal.

**load** To program information into memory.

**local mode** A mode that disconnects the terminal and computer. Keyboard entries go only to the screen. See **block mode, conversational mode.**

**menu** A displayed list of operating values from which the operator can make selections.

**millisecond** 1/1000 of a second.

**mode** An operating state that controls how the terminal operates or reacts to commands. For instance, in controls display mode, the terminal displays all characters (including control codes and escape sequences), not just alphanumeric characters. The terminal can be in several modes at the same time, e.g., autowrap and duplex edit modes.

**modem** Acronym: **mo**dulator/**dem**odulator. An electronic device that changes digital signals (bits) to analog signals (tones), or vice versa. A modem translates digital signals from a computer to analog signals, which can be sent across telephone wires. The modem at the other end translates the analog signals back to digital signals and passes them on to the other computer.

**monitor** Hardware: A video screen on which you can see computer output and input.

**N-key roll-over** A keyboard feature that lets you type faster than the keyboard can transmit without locking up or missing a character. You can strike a series of keys virtually simultaneously, and the characters will be transmitted in the order in which the keys are pressed.

**non volatile memory** A permanent memory storage area not affected by loss of power. This memory is backed up by a lithium battery.

**null** An ASCII character (hex 00) that occupies no space and is not transmitted.

**operating parameter** A value (constant or selectable) that determines terminal operating characteristics, such as the speed of data transmission, the status of an operating mode, and operating appearance (dark or light screen background). See **mode.**

**page** The amount of available screen memory. Can range from 24 to 96 lines, depending on your terminal's configuration. Since the screen displays 24 lines at a time, you may not see the entire page. See **display, screen.**

**page print** A print command that sends data on the terminal's screen to the printer. See **formatted, unformatted.**

**parameter** See **operating parameter.**

**parity** A method of checking received data bits to ensure they are complete and accurate. If two devices are connected, the parity setting for both devices must be the same. See **start bit, stop bit.**

**peripheral** External equipment connected to a computer. The most common peripherals are terminals, disk drives, printers, modems, and cassette-tape recorders.

**permanent memory** See **non volatile memory.**

**port** The location at which data goes in and out of the device, usually the physical connector into which interface cables are plugged. See **connector, RS-232C, interface.**

**program** A set of commands that control a computer or terminal. There are three kinds of programs: firmware, which is burned into the EPROMs that control the system; applications, which accomplish specific tasks; and the operating system, which controls the overall operation of the system, directing the firmware and applications programs. See **firmware, applications program, software.**

**RAM** Acronym: **R**andom-**A**ccess **M**emory. The changeable part of the computer or terminal's 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 used in all computers to store the instructions of programs being run. See **ROM.**

**read the cursor** Report the cursor's position and content to the computer.

**refresh** To change or update the screen with new data.

**replacement character** The character that occupies the position previously occupied by an erased character. Usually a space character. See **delete, erase, space character.**

**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).

**ROM** Acronym: Read-Only Memory. A memory chip that, after manufacture, can be read but not written or altered. Used to store permanent instructions.

**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 **interface, current loop, RS-422.**

**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 **interface, current loop, RS-232C.**

**RTS** Acronym: Request to Send. A line whose voltage changes to control data flow between computer, terminal, and printer. See **handshaking protocol.**

**screen** The terminal viewing area that shows 24 lines of data and a 25th status line. See **display, page.**

**screen saver** A feature that causes the screen to go blank when no data entry or editing occurs for a fixed time span (e.g., 10, 20, or 30 minutes), thus preventing the display pattern from being burned into the phosphor. To re display the screen, press any key. No data is lost.

**screen updating** Data changing on the terminal's screen as new data is received from the computer.

**scroll** The action that moves the display (screen area) up or down in the page so you can see more than 24 lines on that page of memory. The direction, rate, and evenness of the scrolling can be controlled. See **page, display, screen.**

**scrolling region** The area in a page of memory through which the display can scroll. 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 **RS-232C.**

**set up** A terminal mode that lets the operator change the terminal's operating values from the keyboard.

**set up menu** Lines displayed on the screen during set up mode. Set up menus list all terminal operating values that can be changed from the keyboard.

**software** Various programs, including the operating system and the applications programs, that can be loaded into the terminal. See **firmware, program, system.**

**SOH** Acronym: Start of Header. An ASCII character (hex 01) that frames the start of block of data to be transmitted. See **EM.**

**space character** An ASCII alphanumeric character (hex 20) that occupies a character position on the screen and in the terminal's memory. Not the same as a null, which looks like a space but contains nothing (i.e., is a void) and does not occupy memory space. The terminal transmits space characters, while it does not transmit null characters. See **null.**

**special keys** Keys that do not send display characters or editing commands, used for a variety of purposes in controlling the terminal.

**status line** A line appearing on the bottom (25th) line that describes the terminal's current operating conditions.

**start bit** The bit that signals the beginning of data transmission. It is always a one (1). See **parity, stop bit.**

**stop bit** The bit that signals the end of data transmission. It is always a one (1). The terminal can use either one or two stop bits, depending on the computer's requirements. See **parity, start bit.**

**STX** Acronym: Start of Text. An ASCII character (hex 02) signaling that text transmission follows.

**system** The computer, the peripheral devices (such as terminals, printers, and modems), and the programs that work together to accomplish various tasks.

**tab stop** A preset position to which the cursor goes when the TAB key is pressed or the termi-

nal receives the tab command. Tab stops can be changed or deleted on command.

**transmit** To send data between one system component (such as the computer) and another (such as the terminal).

**transparent print** A print mode that sends all data received by the terminal to the printer without displaying it on the screen. See **copy print, bi-directional print, page print**.

**unformatted** Screen data that contains no delimiters marking line ends. See **delimiter**.

**VDT** Acronym: video display terminal. A terminal containing a cathode ray tube on which information 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 terminals may not.

**visual attributes** The aspects of a character's appearance on the screen. 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.

**X3.64** A uniform set of programming commands developed under the American National Standards Institute. See **ANSI, ASCII**.

**X-On/X-Off** A handshaking protocol in which the terminal and computer or printer recognize the ASCII control characters X-On (hex 11) and X-Off (hex 13) as signals to regulate data flow. See **handshaking protocol, DTR**.

# Index

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