TELEVIDEO
965 VIDEO DISPLAY TERMINAL
OPERATOR'S MANUAL

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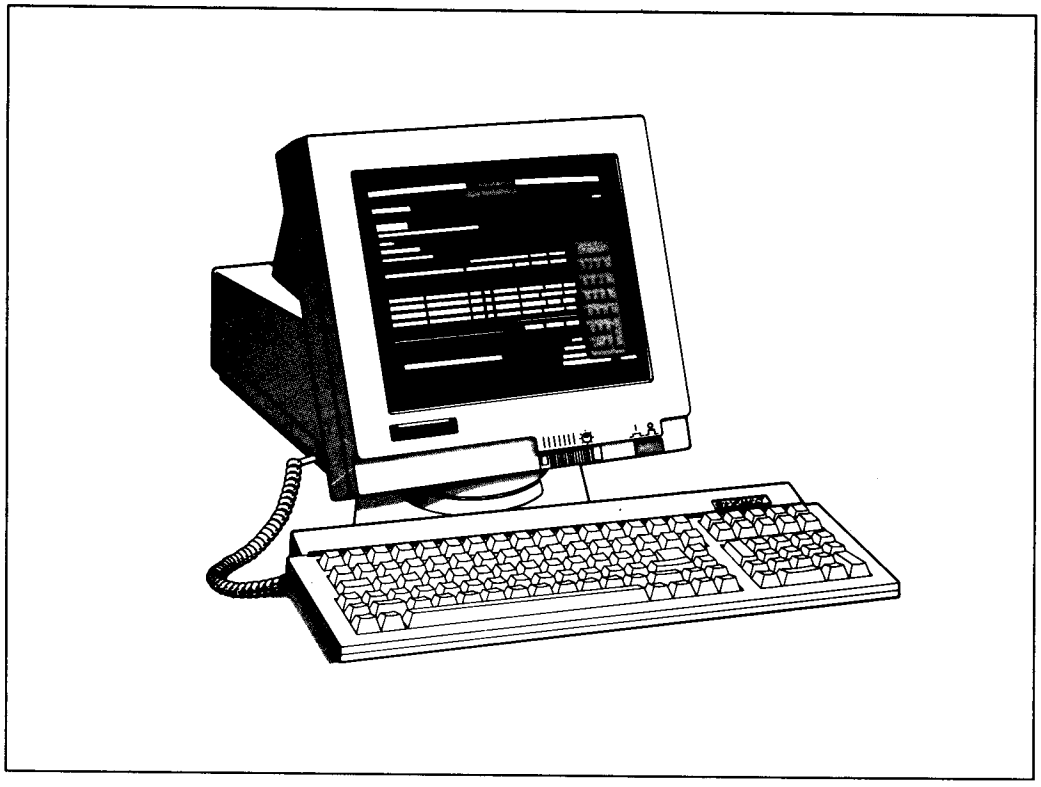
This device is classified as a Class A computing device. Class A devices may only be used in commercial, business, or industrial environments. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it may cause interference with radio emissions. This equipment has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against radio frequency interference (RFI) when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own risk and expense will be required to correct the interference. The use of nonshielded I/O cables may not guarantee compliance with FCC RFI limits.

Contents

INTRODUCTION

Meet the 965

The TeleVideo 965 is a high-performance terminal, designed to operate in the ASCII, ANSI, and PC terminal environments, providing considerable flexibility. It has also been designed to be user friendly. You'll find that the 965 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 965 Terminal

About This Manual

This manual is organized in three parts:

- **Operation** Installation, set-up, daily operation, and problem-solving. Since the 965 is like no other terminal you've ever used, read this portion of the manual. It's written to help you take best advantage of all the time- and work-saving features of the 965. Chapters 1-5.
- **Programming** Native-mode commands and some technical details about terminal operation. Chapters 6-12.
- **Reference** RS-232C signals, specifications, code tables, and operational references. Appendices A-H.

Attention, Please

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.

1 Installation

This chapter contains step-by-step instructions for installing the terminal. Following the installation steps is a section on connecting the terminal to a computer or a printer with RS-232C serial interfaces.

PREPARATION

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

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

Choosing a Site for the 965

- 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.

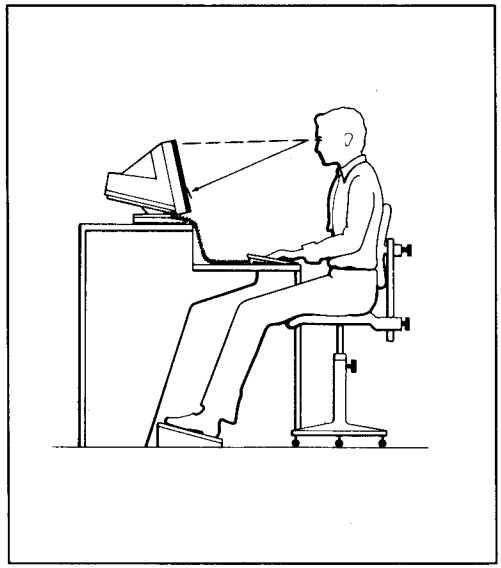


Figure 1-1. Selecting a Site

Checking the Voltage Setting

Before you connect the 965 to power or the computer line, make sure its voltage matches your outlet. Check the label on the carton indicating either 115 or 230 volts. Most U.S. power systems require 115 volts; most European systems, 230 volts.

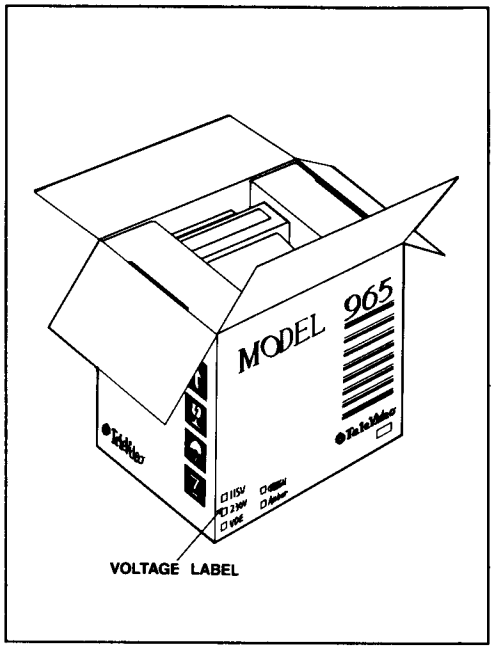


Figure 1-2. Location of the Voltage Label

Contact your dealer or distributor for instructions if you need to change the voltage setting.

Interface Types and Cables

The type of interface you select depends on the distance between the host connection 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 965 offers several interface options for distances greater than 50 feet, available through your dealer: RS-422, RS-423, current loop, external modem, and serial-to-parallel converter. Ask your dealer or distributor for help in selecting the appropriate interface.

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

INSTALLATION STEPS

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 service technician if you feel any service to the interior of the terminal is necessary.

Unpacking the 965 STEP 1

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.

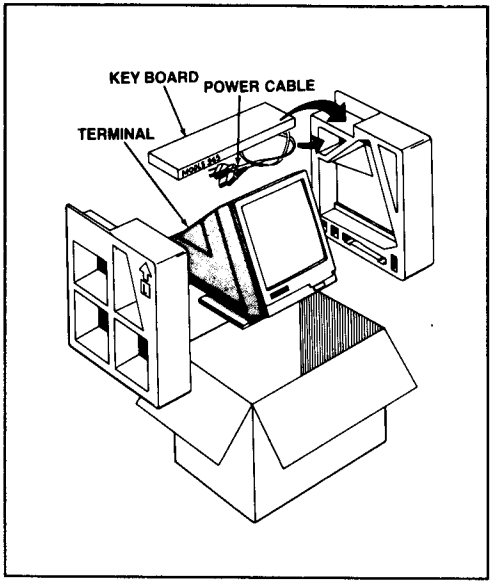


Figure 1-3. Unpacking the 965

Attaching the Keyboard STEP 2

Plug the end of the coiled keyboard cable into the left side of the terminal.

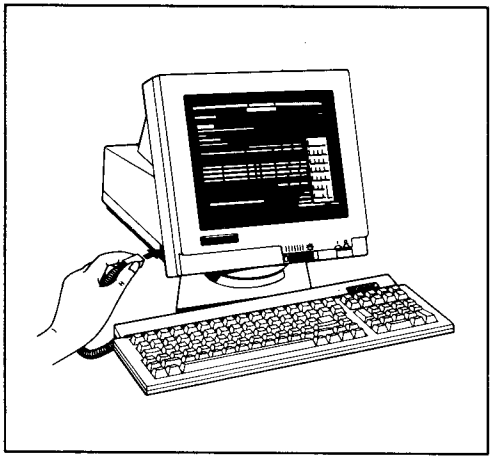


Figure 1-4. Plugging in the Keyboard

CAUTION

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

Connecting the 965 to a Host Computer STEP 3

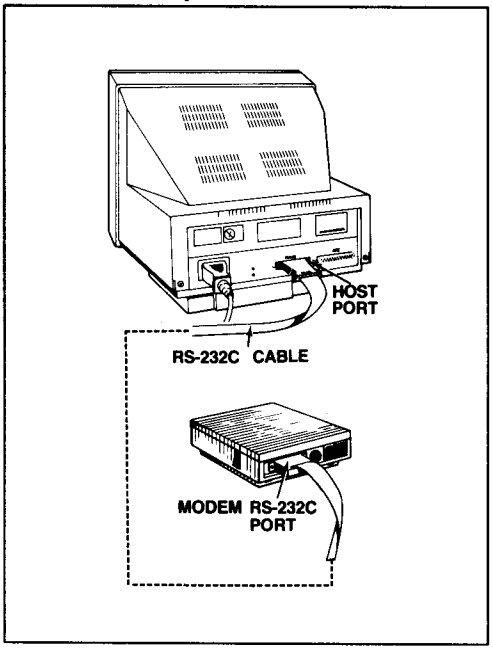


Figure 1-5. Connecting to a Modem

Make sure you are using the appropriate interface, as discussed at the beginning of this chapter. For an RS-232C interface, connect the cable between the 965 main 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 Signal Assignments" later in this chapter.

Connecting Your Printer to the 965

STEP 4

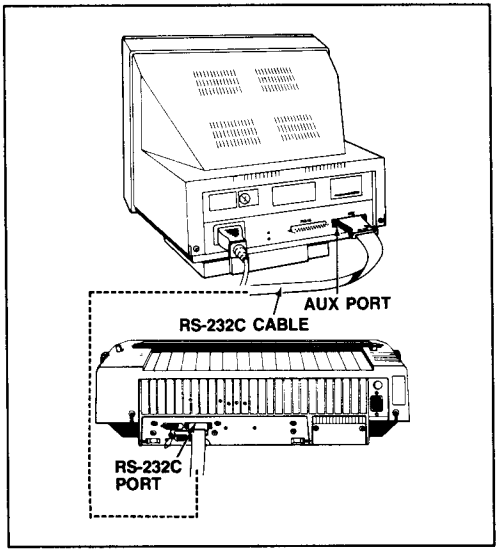


Figure 1-6. Connecting to a Printer

Check that your printer is set up to receive data through its serial port (check that it has a serial port!). Connect an RS-232C interface cable to the auxiliary port on the 965 and the serial port on the printer. See the pin signal tables at the back of this chapter for information on configuring the cable connectors for proper communication.

> **NOTE:** If your printer uses a parallel interface, a parallel adapter is available for the 965.

Your application programs also affect printer operation. Consult your program manuals, check with a technician, or contact your dealer or distributor if you have problems getting your terminal and printer to communicate properly.

Plugging In the 965

STEP 5

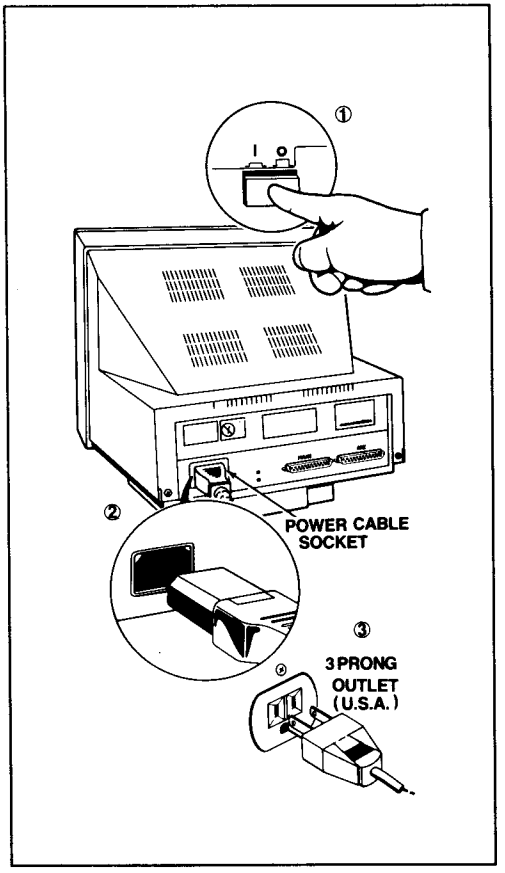


Figure 1-7. Plugging in the 965

Make sure the power switch is OFF (not pushed in) before plugging in the 965.

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 STEP 6

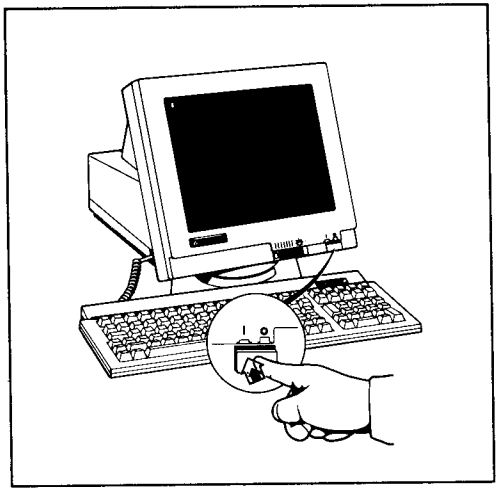


Figure 1-8. Turning on the 965

Press the power switch to turn on the terminal. After a moment, the beeper will sound; after 10 to 15 seconds, the cursor will appear.

NOTE: Immediately after installation, before going on line, enter set-up and perform a default reset. See Chapter 2 for instructions.

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

RS-232C SIGNAL ASSIGNMENTS

The 965 has two 25-pin D subminiature female EIA RS-232C communication ports: a main (host) port labeled MAIN and an auxiliary (printer) port labeled AUX. This section contains pin-out tables for the two ports.

Port Pin-Outs

When connecting the terminal to an RS-232C port on a host or peripheral, start by answering two questions:

- Which signals does each unit require for proper communication? Typically, the 965 requires only Transmit Data, Receive Data, and Signal Ground (pins 2, 3, and 7) to communicate with a computer and printer.
- Is the serial port for each interface a data communication equipment (DCE) or data terminal equipment (DTE) type?

Table 1-1. Main Port (DTE) Signals

Pin	Signal Name	Direction
1	Frame Ground	n/a
2	Transmit Data	Output
3	Receive Data	Input
4	Request to Send	Output
5	Clear to Send	Input
6	Data Set Ready	Input
7	Signal Ground	n/a
8	Data Carrier Detect	Input
20	Data Terminal Ready	Output

Table 1-2. Printer Port (DCE) Signals

Pin	Signal Name	Direction
1	Frame Ground	n/a
2	Receive Data	Input
3	Transmit Data	Output
5	Clear to Send	Output
6	Data Set Ready	Output
7	Signal Ground	n/a
8	Data Carrier Detect	Output
20	Data Terminal Ready	Input

Check your computer and printer manuals for information about their port type, required signals, and signal direction.

If your computer has a 25-pin DCE port and your printer has a 25-pin DTE port, you should be able to connect the terminal to each with a standard interface cable, without any modifications.

However, your computer or printer may not have a 25-pin connector (some units have a 9-pin connector, for example). Or the DCE/DTE interfaces may not match up. In such cases, consult a technician or your dealer for assistance. This manual cannot specify pin connections for the multitude of nonstandard configurations available.

After you determine signal connections, you may find the cable connector needs rewiring. A service technician can rewire the connector, or your computer dealer may carry a ready-made adapter.

If your computer or printer fails to communicate properly after you connect them to the terminal, ask a service technician or your dealer for assistance.

2 Set-Up

THIS chapter tells how to check operating characteristics (parameters) and, if desired, change them in set-up mode.

The 965 is ready to operate the first time 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, the 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. (Do you prefer silent or clicking keys? dark or light screen background?)

When in doubt about a particular parameter, don't change it. The 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.

CAUTION

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

These are the set-up menu names and the parameters each menu controls:

COMMAND Exit; save parameters; reset values; clear screen and communications.

GENERAL Port configuration; terminal modes: personality, communication, monitor, line wrap, edit, font load, send acknowledge, received carriage return.

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

KEYBOARD Keyclick, key repeat, key lock; margin bell, RETURN, ENTER, and

BREAK key functions, national character sets, WordStar mode.

2

MAIN Main port communication values.

AUX Auxiliary 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.

To enter set-up mode, press SETUP (SHIFT and NO SCROLL together). Then use the cursor keys to move through a series of eight screen menus and the space bar to toggle values.

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 submenus where you can reprogram keys and messages.

To enter set-up mode, press SETUP (SHIFT and NO SCROLL together). Then use the cursor keys to move through a series of eight screen menus and the space bar to toggle values. The menus present parameters from which you can either choose a value or toggle an action.

To save your choices, select the COMMAND menu, and select SAVE PARAMETERS. To exit from set-up mode, either press SETUP (SHIFT and NO SCROLL together) or select the COMMAND menu, then EXIT.

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

PARAMETER MENUS

This section presents the first seven set-up menus (COMMAND, GENERAL, DISPLAY, KEYBOARD, MAIN, AUX, and ATTRIBUTE). The eighth menu (PROGRAM) is described in a separate section.

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.

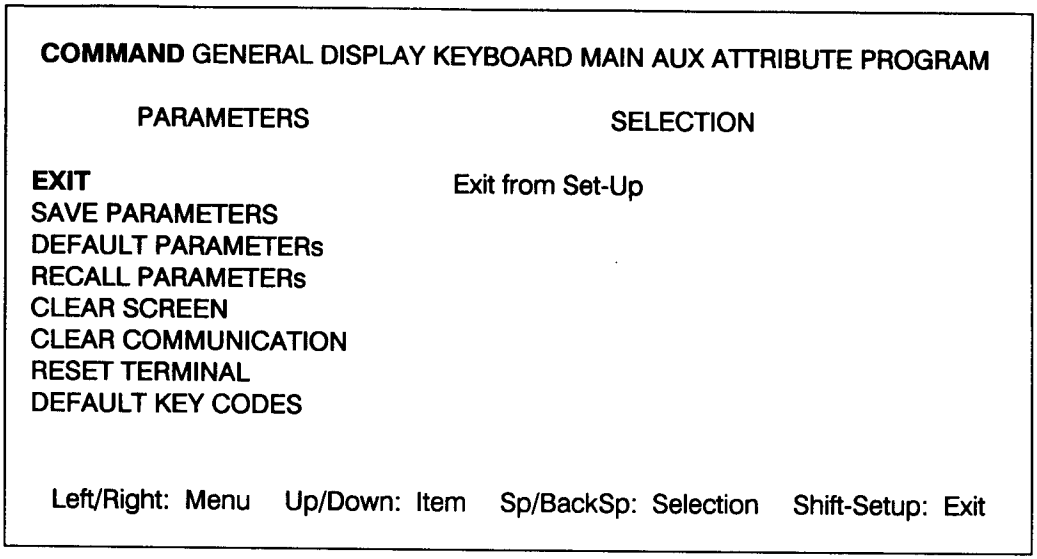


Figure 2-1. The Command Menu

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

DEFAULT PARAMETERS Resets all parameters to factory default values. (Chapter 6)

WARNING

This action destroys all reprogrammed operating values!

RECALL PARAMETERS Returns current set-up values to those last saved in nonvolatile (permanent) memory. If you accidentally mess up set-up values, this action recalls the last saved values.

CLEAR SCREEN Clears screen display.

CLEAR COMMUNICATION Unlocks the keyboard; clears the host and auxiliary port 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)

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

WARNING

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

PERSONALITY NATIVE and other terminal emulations: set-up menu and Chapter

The General Menu

The General menu controls a number of terminal operating modes, as shown in Figure 2-2 and the paragraphs that follow.

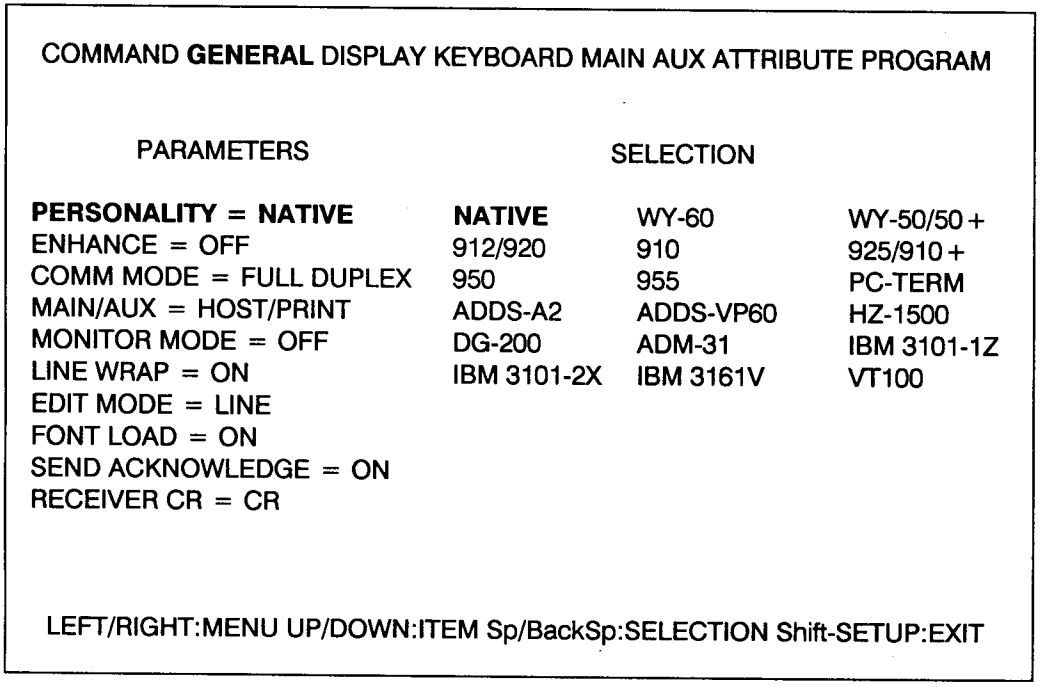


Figure 2-2. The General Menu

6 show all selections; see Appendix C for code sets.

CAUTION

Avoid loss of data! Selecting a new personality clears the screen and resets many terminal operating states. See Chapter 6 for details.

ENHANCE **OFF** or ON: Command sets of non-native personalities include additional 965 commands. (Chapter 6, Appendix C)

COMM MODE Communication modes: half duplex, full duplex, block, local. (Chapter 11)

MAIN/AUX **HOST/PRINT** sends data to the host out the main port and data to the printer out the auxiliary port; PRINT/HOST reverses configuration. (Chapter 11 for commands and Chapter 1 for port pin-outs)

MONITOR MODE ON or OFF: Terminal displays control characters on the screen as

characters (ON) instead of interpreting them as commands (**OFF**). (Chapters 3, 7)

LINE WRAP **ON** or OFF: When the cursor reaches the end of the line during data entry, it wraps to the beginning of the next line (**ON**) or remains at the end of line (OFF). (Autowrap Mode, Chapter 9)

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

FONT LOAD When personality and/or screen configuration change, character set automatically changes to match (**ON**) or does not change (OFF). (Chapter 10)

SEND ACKNOWLEDGE Mode **ON** means the terminal sends the ASCII ACK character (06h) after it completes operations that require the host to temporarily suspend transmission. (Chapter 11)

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

The Display Menu

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

COMMAND GENERAL **DISPLAY** KEYBOARD MAIN AUX ATTRIBUTE PROGRAM

PARAMETERS		SELECTION	
COLUMNS = 80	**80**	80/132	80 Economy
LINES = 24	132		
PAGE LENGTH = 1 X LINES			
STATUS LINE = REVERSE			
TOP LINE = STATUS			
BOTTOM LINE = NONE			
CURSOR TYPE = BLK STEADY			
BACKGROUND = DARK			
SCREEN SAVER = 10			
SCROLL SPEED = JUMP			

Left/Right: Menu Up/Down: Item Sp/BackSp: Selection Shift-Setup: Exit

Figure 2-3. The Display Menu

COLUMNS Number of columns displayed on the screen (**80**, 132, 80/132, 80 ECONOMY). (Chapters 3, 7)

CAUTION

Save screen data before selecting 80 economy mode (above) or changing the number of data lines (below). Enabling 80 economy mode or changing the number of data lines clears the screen, destroying any existing 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)

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, FLABEL. (Chapter 12)

BOTTOM LINE Contents of the bottom information line: **NONE**, STATUS, USER 1, USER 2, FLABEL. (Chapter 12)

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

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

SCREEN SAVER Screen goes blank after **10**, 20, or 30 minutes of inactivity; or remains displayed (mode OFF). (Chapter 7)

SCROLL SPEED Data can scroll onto the screen at the rate of reception (**JUMP**) or at a preset number of lines per second (SMOOTH 1, 2, 4, 8). (Chapter 7)

NONE means the cursor wraps from the bottom of the page to the top, so data cannot scroll off the page and be lost. (Autoscroll Mode, Chapter 8)

KEYCLICK ON or OFF: Controls whether keys make a sound when pressed. (Chapter 7)

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.

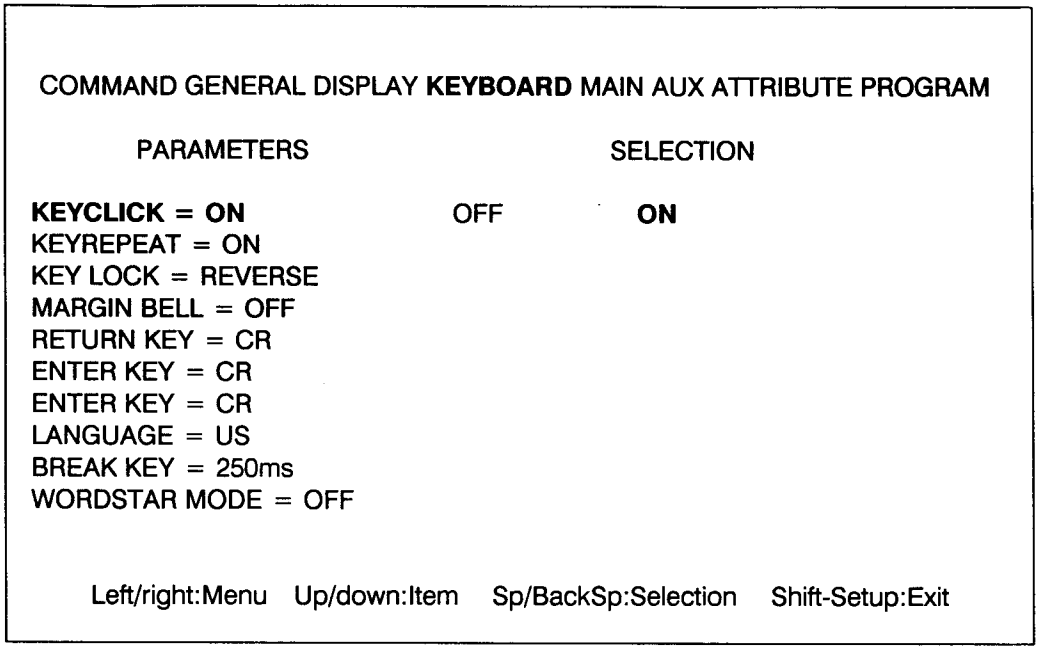


Figure 2-4. The Keyboard Menu

KEY REPEAT **ON** or OFF: Controls whether most keys repeat when held down for one-half second. (Chapter 7)

KEY LOCK In **CAPS** mode, the SHIFT key uppercases letters, whether CAPS LOCK is engaged or released; in REVERSE mode, pressing SHIFT with a letter reverses the effect of CAPS LOCK. (Chapter 7)

MARGIN BELL ON or **OFF**: Controls whether the bell 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)

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

BREAK KEY Break signal can be **250 ms**, 170 ms, 500 ms, 2 sec, or none. (Chapter 7)

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

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

The Main Menu

Set communication parameters for the main port in this menu. If you select PRINT/HOST for MAIN/AUX in the General menu, this port handles text to a printer (e.g., a page print) and assumes the current print mode. If so, select communication values for a terminal to a peripheral. Chapters 1 and 11 explain communication between a terminal and the host or peripheral devices.

COMMAND GENERAL DISPLAY KEYBOARD **MAIN** AUX ATTRIBUTE PROGRAM

PARAMETERS	SELECTION		
BAUD RATE = 4800	38.4K	50	75
DATA BIT = 8	110	135	150
STOP BIT = 1	300	600	1200
PARITY = NONE	1800	2400	3600
XMIT HANDSHAKE = DTR DCD	**4800**	7200	9600
REC HANDSHAKE = XON/XOFF	19.2K		
BUFFER THRESHOLD = 16			
XMIT DELAY = NONE			
PARITY CHECK = ON			
PRINT MODE = NONE			

Left/right: Menu Up/down: Item Sp/BackSp: Selection Shift-Setup: Exit

Figure 2-5. The Main Menu

DATA BIT **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 965 begins handshaking can be **16**, 32, 64, or 128.

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

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

PRINT MODE Selects local print option: **none**, copy print, transparent print, or bidirectional print.

The AUX Menu

Set communication parameters for the auxiliary port in this menu. If you select PRINT/HOST for MAIN/AUX in the General menu, this port handles text to a host (e.g., a block sendt) and assumes the current host communication mode. If so, select communication values for a terminal to a host. Chapters 1 and 11 explain communication between a terminal and the host or peripheral devices.

COMMAND GENERAL DISPLAY KEYBOARD MAIN **AUX** ATTRIBUTE PROGRAM

PARAMETERS	SELECTIONS		
BAUT RATE = 1200	38.4K	50	75
DATA BIT = 8	110	135	150
STOP BIT = 1	300	600	**1200**
PARITY = NONE	1800	2400	3600
XMIT HANDSHAKE = DTR/DCD	4800	7200	9600
REC HANDSHAKE = XON/XOFF	19.2K		
BUFFER THRESHOLD = 16			
XMIT DELAY = NONE			
PARITY CHECK = ON			
PRINT MODE = NONE			

Left/right: Menu Up/down: Item Sp/BackSp: Selection Shift-Setup: Exit

Figure 2-6. The AUX Menu

BAUD RATE Select from 50 to 38.4K; default **1200.**

DATA BIT **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, **DSR**, none, or both.

XMT HANDSHAKE Handshaking signal accepted by the terminal when transmitting data can be XON/XOFF, DTR, none, or **both.**

BUFFER THRESHOLD The number of bytes from the top of the modem port buffer at which the 965 begins handshaking can be **16**, 32, 64, or 128.

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

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

PRINT MODE Selects local print option: **none**, copy print, transparent print, or bidirectional print.

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.

```
COMMAND GENERAL DISPLAY KEYBOARD MAIN AUX ATTRIBUTE PROGRAM

        PARAMETERS                          SELECTION

ATTRIBUTE = CHAR                CHAR        LINE        PAGE
WPRT INTENSITY = NORMAL
WPRT REVERSE = OFF
WPRT UNDERLINE = OFF
965 ATTRIBUTE = NO SPACE

    Left/right: Menu  Up/down: Item  Sp/BackSp: Selection  Shift-Setup: Exit
```

Figure 2-7. The Attribute Menu

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

CAUTION

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

WPRT INTENSITY Write-protected characters may be displayed in NORMAL or **DIM** intensity.

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

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

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

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

THE PROGRAM MENUS

The Program menus consist of five submenus (F-Key, Edit Key, Keypad, Answerback, and Delimiter), named in the SELECTION 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.

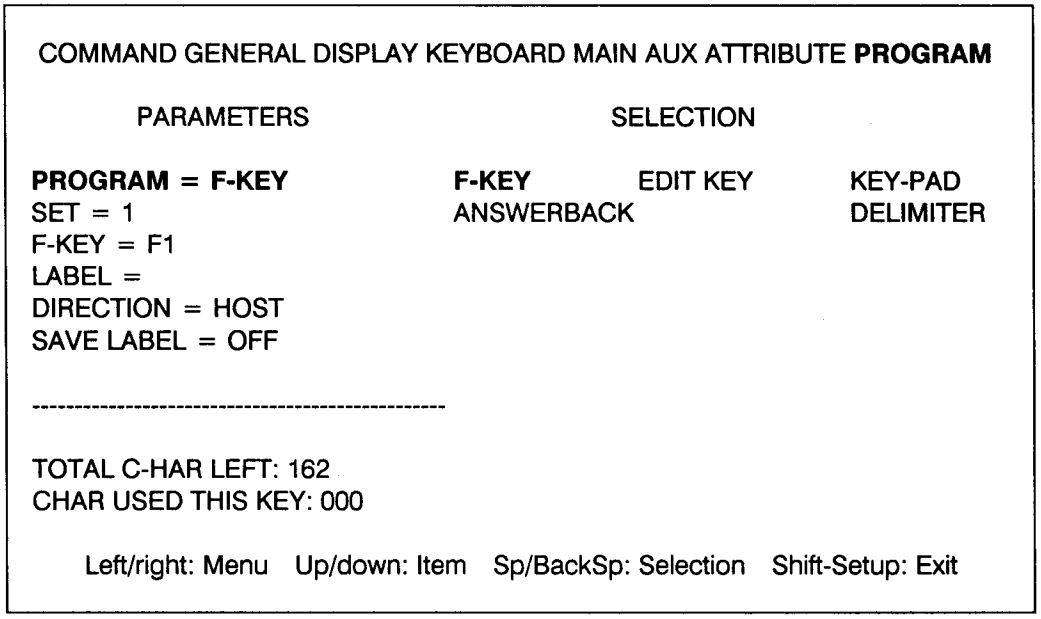


Figure 2-8. The Program Menu: Function Keys

The terminal has four logical sets of function keys. The 16 function keys 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.

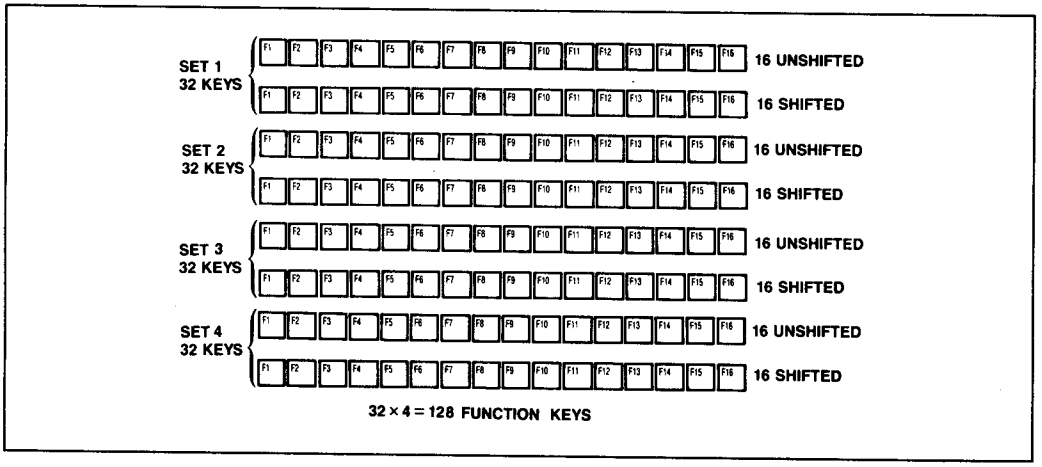


Figure 2-9. The Four Sets of Function Keys

Each function key set holds up to 256 characters (bytes), apportioned among the 32 keys as you wish. You can load any 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 set-up, or your program may do it for you.

Follow these steps to reprogram the function keys:

1. Highlight the SET field.

2. Press the space bar until the number of the desired function key set (1, 2, 3, 4) is highlighted.

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 other set-up value. If you don't save the set, it will remain in effect only until you reset the terminal.

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 SELECTION window. If you press a shifted key, an s appears in front of the key number.

5. Press ENTER in the numeric keypad to start reprogramming the message.

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

   Arrow keys Move the cursor around in the message.

   CHAR INSERT Toggles between insert and write-over modes, as indicated at the bottom of the screen.

   CE Clears the current message. You can restore the message by pressing ESC immediately.

   ESC Aborts the reprogramming session; message returns to previous saved message.

   ENTER Begins and ends a reprogramming session; saves the current message in nonvolatile memory.

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

6. 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. Type CTRL-[to enter the ESC character in an escape sequence.

   If you make a mistake, move the cursor with the arrow keys back to the position of the error and correct the mistake.

   Each function key set has a total memory capacity of 256 bytes, 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.

7. Press ENTER to end the loading process and save the message.

8. Move to the LABEL field, press ENTER; then type up to nine characters (80 columns) or sevens (132 columns) as a label for the key. Use the keys described in Step 5 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.

9. 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

2

Editing keys send ASCII characters (codes) that control editing operations, data transmission, and cursor movement. This submenu 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.

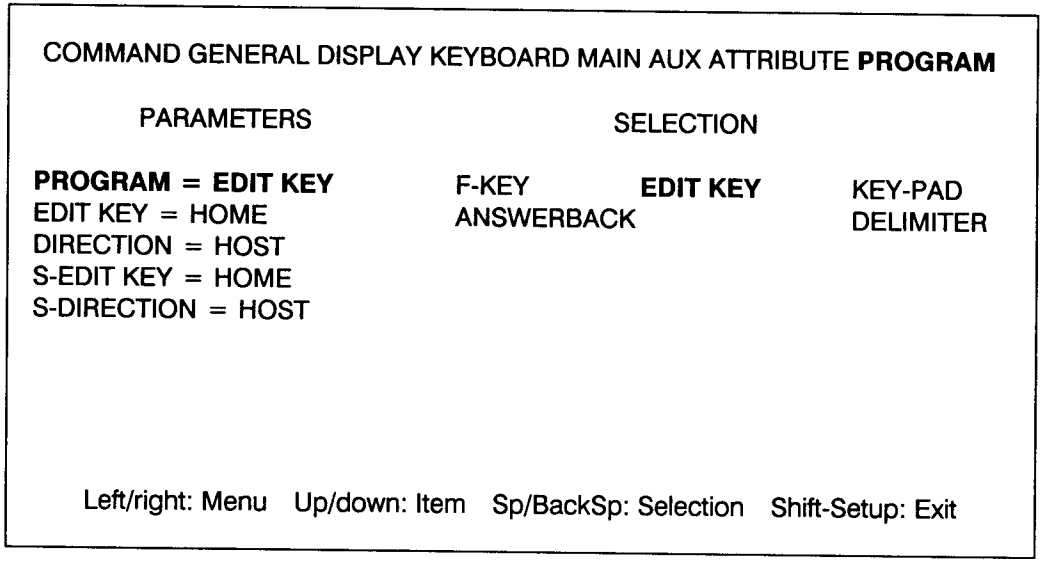


Figure 2-10. The Program Menus: Editing Keys

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 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 EDIT KEY submenu.

2. Move the cursor down to the EDIT KEY = or S-EDIT KEY = (for the shifted keys) field.

   A list of editing keys appears in the SELECTION 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.

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.

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.

7. The 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.

The Keypad Submenu

The numeric keypad submenu is very similar to the editing key submenu. It lets you change the characters sent by the keys in 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.

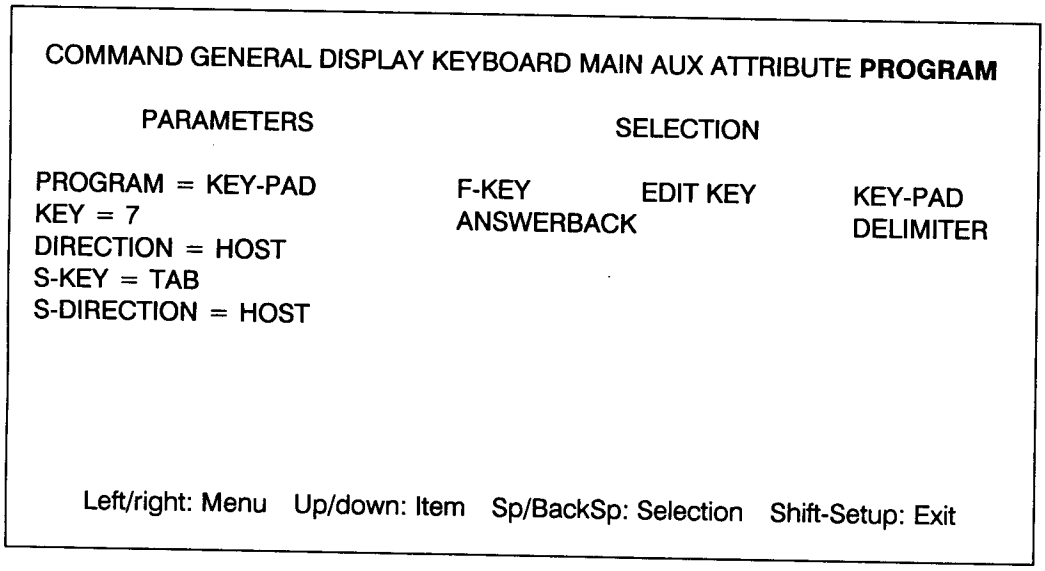


Figure 2-11. The Program Menus: Keypad Keys

The steps below 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 KEYPAD submenu.

2. Move the cursor down to the KEY = or S-KEY = (for the shifted keys) field.

   A list of keys appears in the SELECTION 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.

   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.

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.

7. The DIRECTION field lets you determine where the key code goes when you press one of the three shifted 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 non-volatile memory.

The steps below tell how to load an answerback message.

The Answerback Submenu

The terminal sends an answerback message to the computer in response to a received command. The default 965 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.**

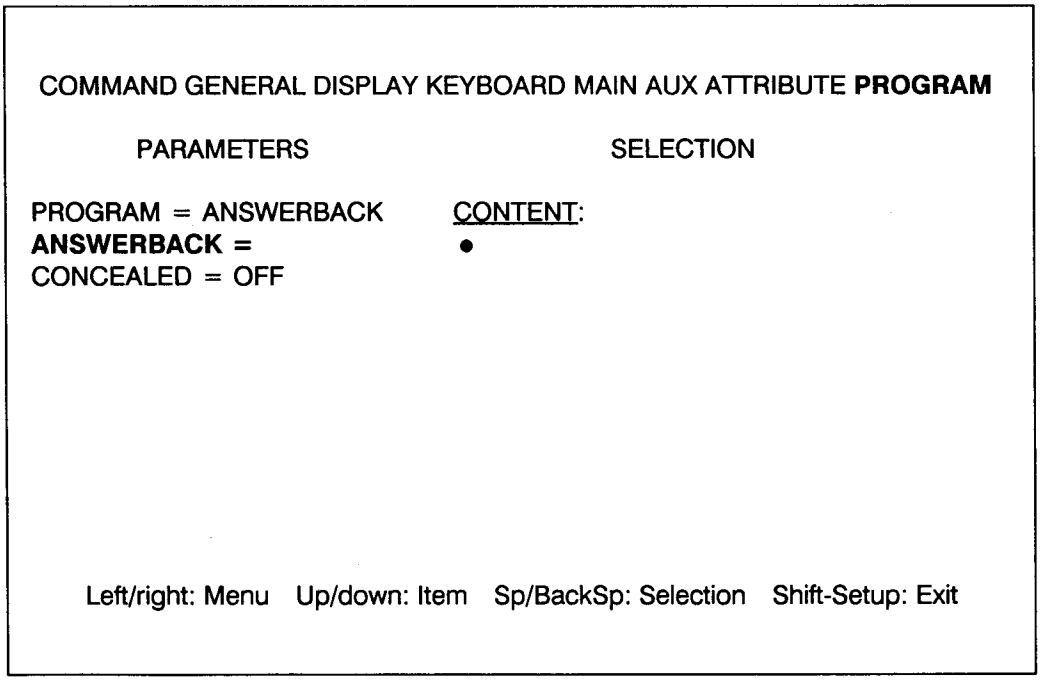


Figure 2-12. The Program Menus: Answerback Message

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. 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 section on reprogramming the function keys.

4. Enter up to 31 bytes as the new message. Press ENTER to end the entry.

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

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

The steps below tell how to reprogram the delimiters.

The Delimiter Submenu

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

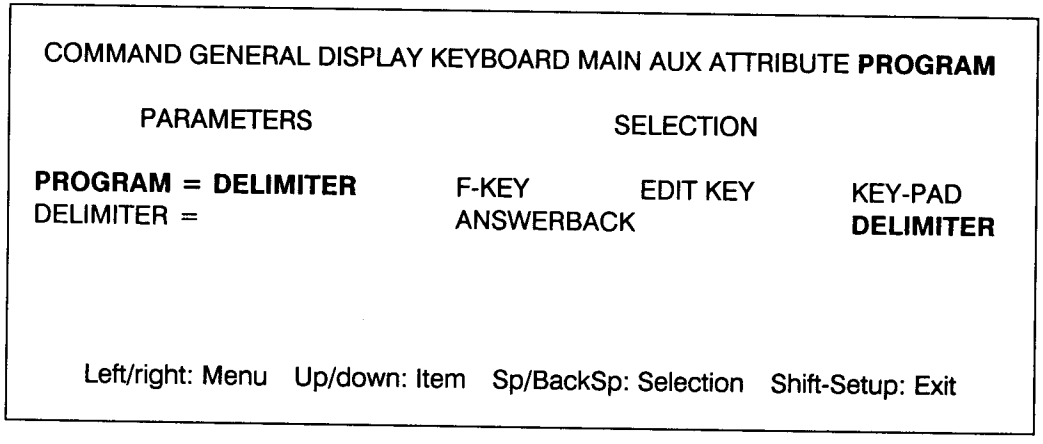


Figure 2-13. The Program Menus: Delimiters

1. Enter the Program set-up menu and press the space bar to display the DELIMITER submenu.

2. Move the cursor down to the DELIMITER = field.

3. Press the space bar to select the delimiter you want to reprogram.

4. Press ENTER to start reprogramming the delimiter.

You can 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.

5. Enter two bytes as the new delimiter. Press ENTER to end the code.

2

3 Operation

This chapter describes how to operate the 965. It starts by showing how to turn on the terminal and adjust it for your comfort, followed by details on display features, the keyboard, printing, communicating with a computer.

The 965'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 when the 965 is off line. As soon as the terminal begins communicating with your computer, 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 dealer or distributor.

NOTE: Immediately after installation, before going on line, enter set-up and perform a default reset. See Chapter 2 for instructions.

STARTING UP

This section assumes that the 965 is already installed. If the terminal is not yet installed, see Chapter 1, "Installation," for instructions.

Turning On the 965

To turn on the 965, press the on/off switch, as shown in Figure 3-1.

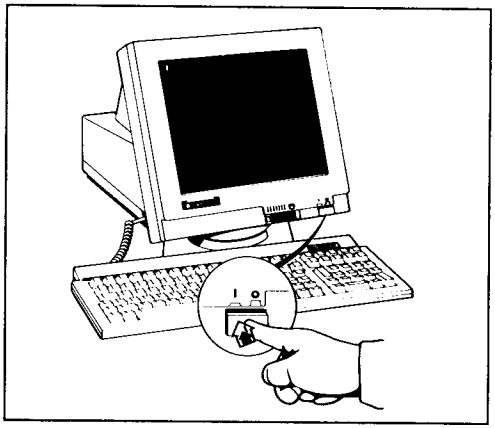


Figure 3-1. The On/Off Switch

A few seconds after you turn it on, the terminal beeps. Presently the cursor appears in the upper left corner of the screen. 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.

Adjusting the Screen and Keyboard

You can adjust the screen and keyboard to your own preference. The figures below show how to regulate the screen contrast for your lighting conditions, tilt the case vertically and horizontally, and flip out the keyboard supports for a more comfortable typing angle.

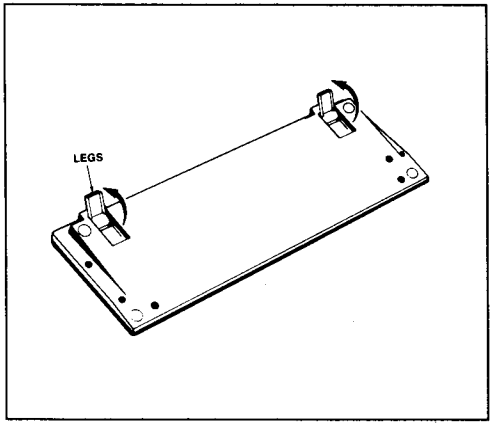


Figure 3-2. Adjusting the Keyboard

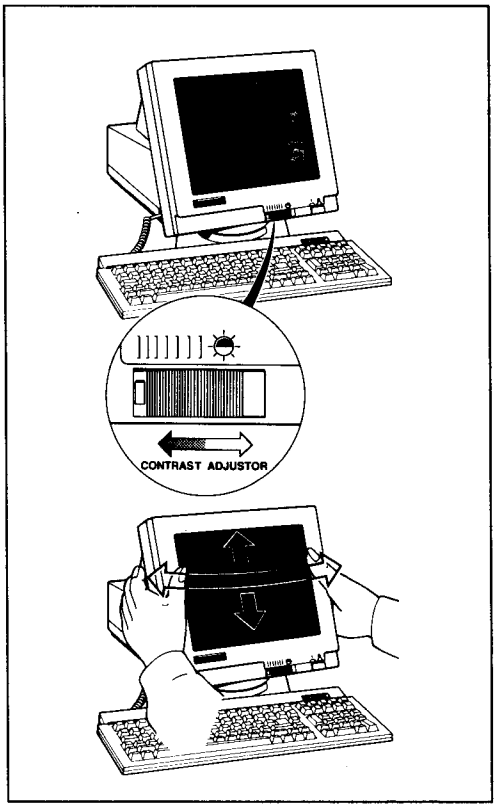


Figure 3-3. Adjusting the Screen

DISPLAY FEATURES

The 965 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.

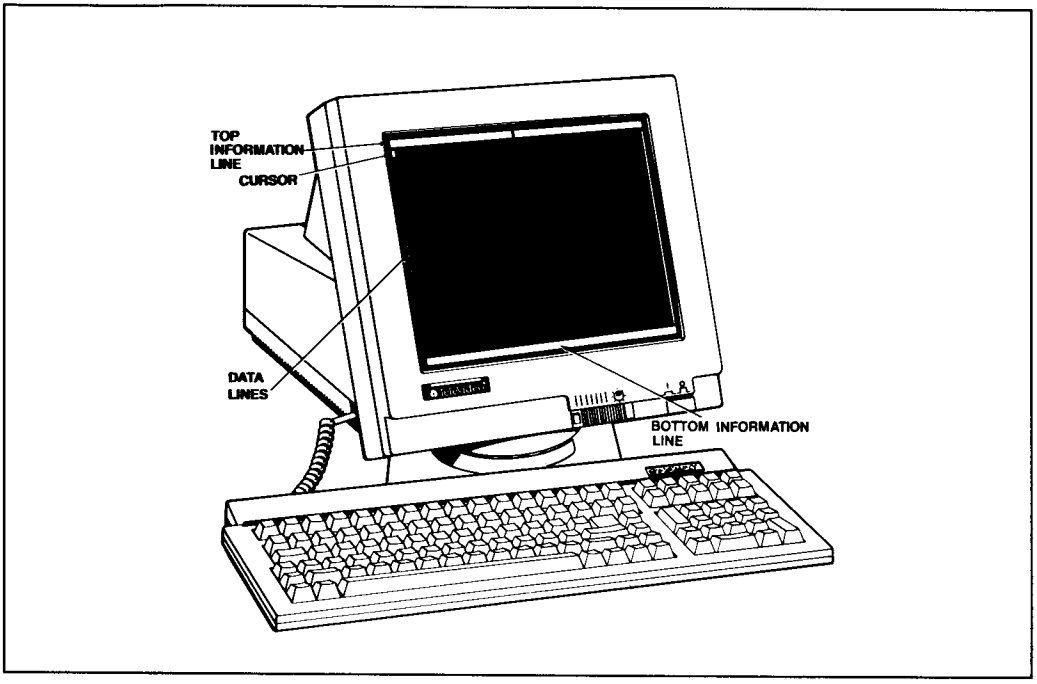


Figure 3-4. Display Features of the 965

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.

The 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.

You can toggle the status line on and off by pressing CTRL-right arrow. Your program may also turn it off or move it to the bottom information line.

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

Function key labels In the Program set-up menu, you can write small labels identifying the contents of your function keys. You can then select in the Display menu to display the labels on the 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 label 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.

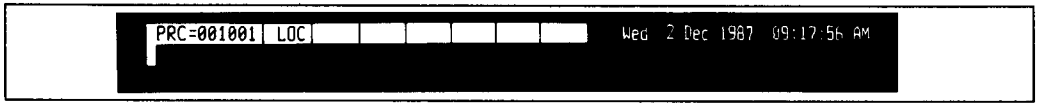


Figure 3-5. The Status Line

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

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

> **NOTE** It's not difficult to write user messages. If you want to write your own user messages, first read "Entering Commands" in Chapter 6, then "Loading User Messages" in Chapter 12.

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

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

Data Lines

The 965 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.

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. Pressing CTRL-PAGE lets you move the cursor between windows.

Number of Columns

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

Choosing 80/132-column 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 with the left or right arrow scrolls the display along the 132-column line, so you can find the cursor again.

In 80/132 column 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. Pressing CTRL-CLEAR SPACE instantly turns on screen-saver—very convenient if you want to hide the display.

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 965 does not have a dedicated reset key, but it offers several ways to reset:

Partial reset Press CTRL-SHIFT-SETUP or 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.

Nonvolatile reset Turn the terminal off and back 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, and operating parameters return to the last values saved in permanent memory.

Default reset Enter set-up and select DEFAULT PARAMETERS. This returns all operating parameters to factory-set values.

CAUTION

A default reset destroys all reprogramming, including function key messages! Do not use this reset once you have begun using the terminal on a day-to-day basis.

3

THE KEYBOARD

This section describes the 965 keyboard and then lists the keys that let you control the terminal locally (at the keyboard). The 965 ASCII keyboard is shown in Figure 3-6.

Types of Keys

Terminal manuals may classify the keys on the keyboard in several different ways:

- Keyboard areas, called **keypads**. The illustration on the previous page names the keypads.
- **Alphanumeric** or **special**. 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. You must 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. Appendix D lists the command codes sent by the remote keys when the terminal is off line.

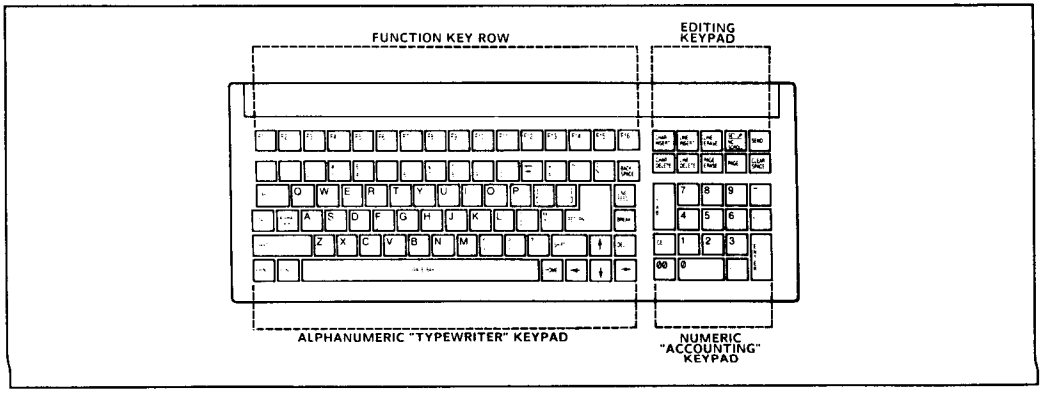


Figure 3-6. The 935 Keyboard

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

The following pages provide a quick reference of local key operations for the ASCII keyboard. For more information on the functions of the VT220, Enhanced PC, or RT/316x keyboards, refer to Appendix E.

Local Key Operations

Any punctuation or numerals shown here must be pressed on the numeric keypad.

SHIFT SETUP Enter/exit set-up mode

CTRL SHIFT SETUP Partial reset (unlock keyboard)

CTRL BREAK Send a 250ms break.

CTRL SHIFT ENTER Toggle between block and current duplex mode

CTRL SHIFT BREAK Toggle port configuration

CTRL SHIFT PRINT Toggle current print mode to copy, and copy off/on

CTRL . Toggle WordStar mode on/off (see Chapter 10 and Appendix E)

CTRL SHIFT 1 Toggle monitor mode on/off

CTRL CHAR INSERT Toggle insert mode on/off

CTRL ENTER Toggle keyclick off/on

CTRL CLEAR SPACE Activate screen saver

CTRL SHIFT CLEAR SPACE Clear the screen

FUNCT F1 Enter VideoDesk clock
FUNCT F2 Enter VideoDesk calendar
FUNCT F3 Enter VideoDesk calculator
FUNCT F4 Enter VideoDesk ASCII chart

CTRL 0 Display page 0
CTRL 1 Display page 1
CTRL 2 Display page 2
CTRL 3 Display page 3
CTRL 4 Display page 4
CTRL 5 Display page 5
CTRL 6 Display page 6

CTRL right arrow Toggle status line on/off

CTRL SHIFT left/right arrow Scroll the display horizontally during 80/132-column mode

CTRL - (hyphen) Raise/lower split
CTRL ,

CTRL PAGE Move to next page/window

CTRL SHIFT PAGE Move to previous page/window

CTRL up/down arrow Scroll display up/down

CTRL SHIFT up/down arrow Increase/decrease scrolling rate

NO SCROLL Toggle screen activity on/off

PRINTER PORT CONTROLS

This section describes how to send data to the printer port. (Remember that either physical port may be the printer port. Pressing CTRL-SHIFT-BREAK toggles the printer port between the main and auxiliary ports on the back of the terminal.)

The 965 offers two methods of communicating with a serial device, such as a printer, connected to the printer 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 the printer 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 port communication modes (explained later in this chapter), the 965 comes from the factory with all printer port modes disabled. You (or your program) must enable a printer port mode to pass data between the host and the printer port.

If you have a problem with printing, see the troubleshooting suggestions in Chapter 5.

Printer Port Modes

Four printer port 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 printer without affecting the screen display. The display freezes during transmission.

Bidirectional 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 printer 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 printer port; data from the host or keyboard goes only to the screen.

Page Print

A page print sends data on the current page (up to the cursor position) to the 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 ap-

pearance of the printed output varies, depending on the amount of space characters the data contains.

Pressing CTRL-SHIFT-SETUP interrupts transmission from the terminal to the printer.

HOST PORT COMMUNICATION

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

The 965 communicates with the computer (sends and receives data) through the host port. Remember that either physical port may be the host port. Pressing CTRL-SHIFT-BREAK toggles the host port between the main and auxiliary ports on the back of the terminal.

Host Port Communication Modes

The host 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 965 in full duplex communication mode. Your 965 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 terminal. 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.

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.

See the troubleshooting suggestions in Chapter 5 if double characters or no characters at all appear when you enter data.

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.

Pressing CTRL-SHIFT-SETUP interrupts transmission from the terminal to the host.

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 965 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.

4 VideoDesk™

The 965's VideoDesk program consists of four pop-up accessories:

- 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.

  If you have a printer attached to your 965, you can also direct your calculations to the printer.
- An ASCII chart that shows decimal, octal, hexadecimal, and binary values for the currently loaded character set.

The accessories appear in windows that overlay your current text display, but do not destroy any on-screen data. You can also move the windows around so you can see any desired portion of the screen.

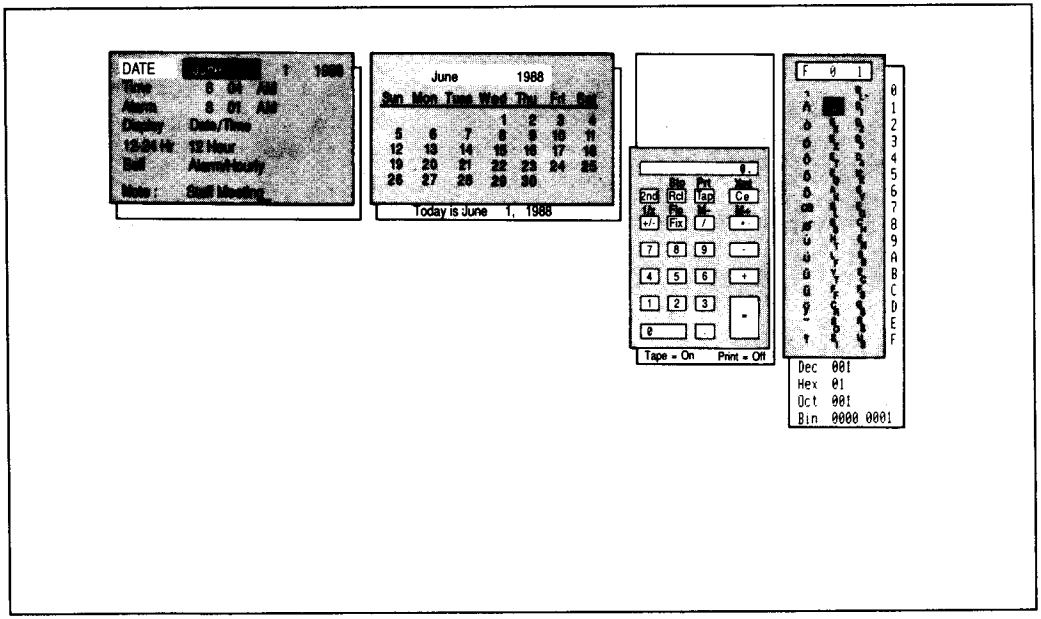


Figure 4-1. The VideoDesk Accessories

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, press FUNCT plus the appropriate function key (F1 through F4).

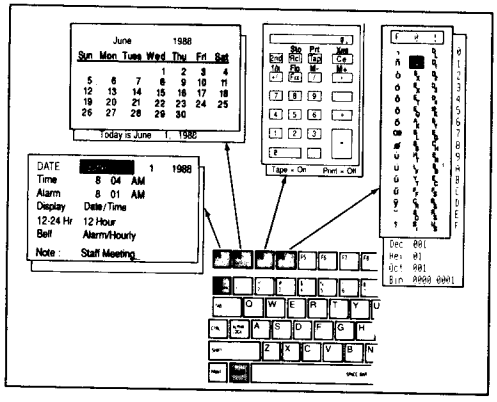


Figure 4-2. VideoDesk Selection Keys

To leave VideoDesk, press ESC.

Moving From One Window to Another

Once you are in VideoDesk, you can move from any one window to any other by pressing the appropriate function key by itself (Figure 4-3).

Once you have selected one of the VideoDesk accessories, you can move from one accessory to another by simply pressing one

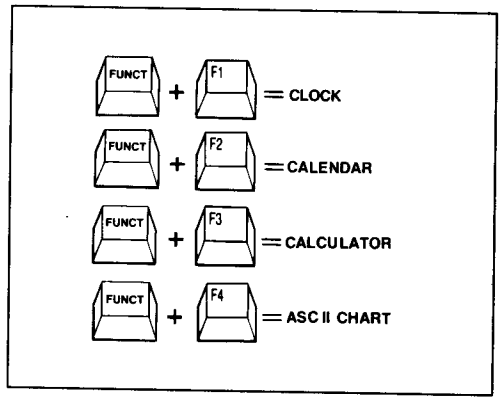


Figure 4-3. Inside Selection Keys

of the four function keys alone (without FUNCT). Here is a brief summary:

F1	Clock	F3	Calculator
F2	Calendar	F4	ASCII Chart

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 (Figure 4-4).

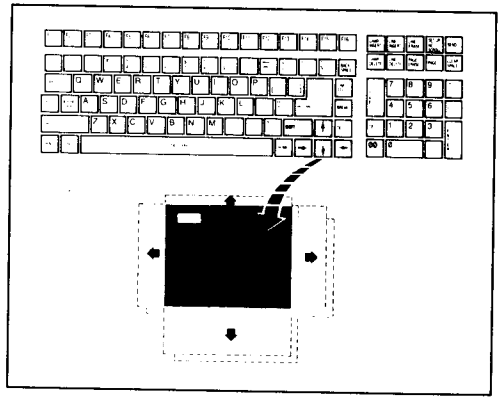


Figure 4-4. Window Motion Keys

The first thing you may want to do in VideoDesk is set the time and date. Press FUNCT-F1 to pop the clock window up on your screen.

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

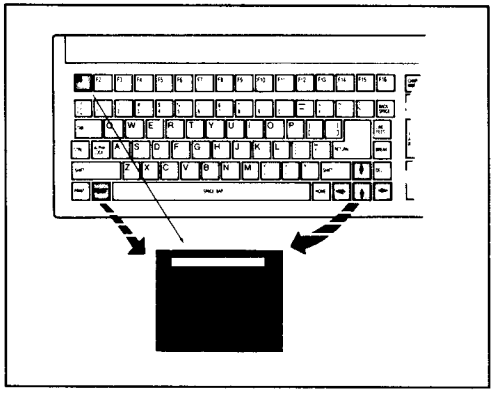


Figure 4-5. The VideoDesk Clock

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 the → key 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 965, 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!

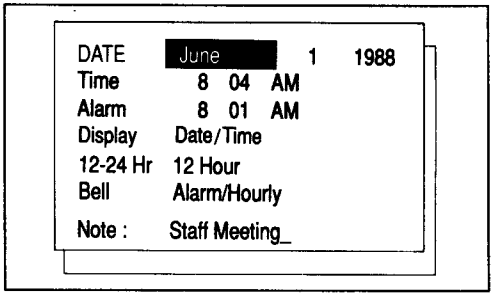


Figure 4-6. Setting the Clock/Calendar

Displaying the Date and Time

The 965 can display the date and time in the status line. You select the date/time display in two areas:

- Select NONE, TIME, DATE, or DATE/TIME in the VideoDesk clock Display field.
- Select the status line display values in the TOP LINE and BOTTOM LINE parameters in the Display set-up menu.

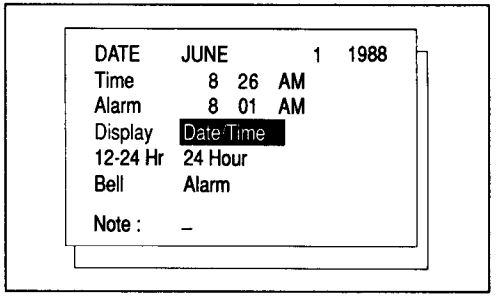


Figure 4-7. Displaying the Date and Time

12- or 24-hour modelets 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 display.)

Setting the Alarm Clock and Bell

4

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.

To disable the alarm, set the Bell field for either None or Hourly.

When the alarm goes off, the bell sounds and the clock pops up on your screen. Press ESC to remove it.

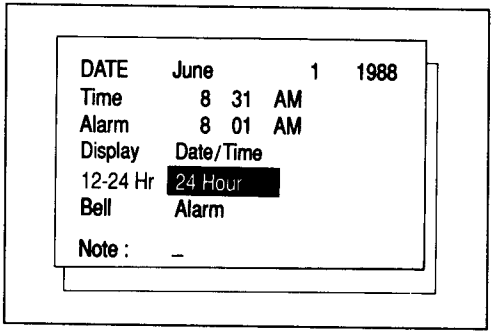


Figure 4-8. Setting the Alarm Clock

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 the BACK SPACE key to erase the current message, and start typing.

> **NOTE:** Move the cursor with the space bar and BACK SPACE key, not the cursor keys.

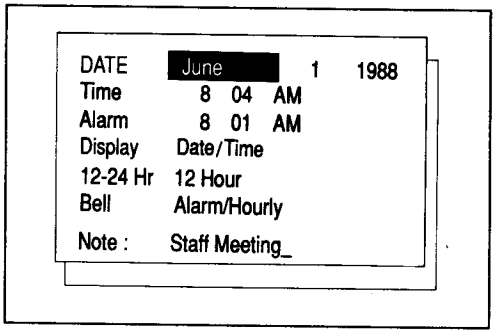


Figure 4-9. The Notepad

THE CALENDAR FUNCT-F2

Press FUNCT-F2 to display the calendar window on your screen.

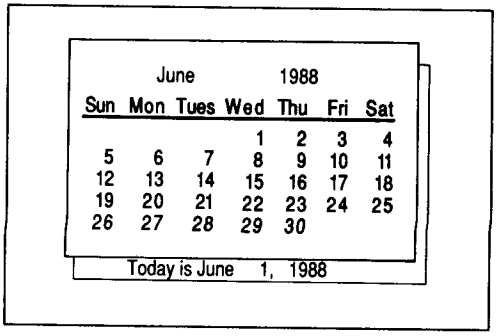


Figure 4-10. The Calendar

The calendar 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 (F1) or reset the terminal.

THE CALCULATOR FUNCT-F3

Press FUNCT-F3 to display the calculator.

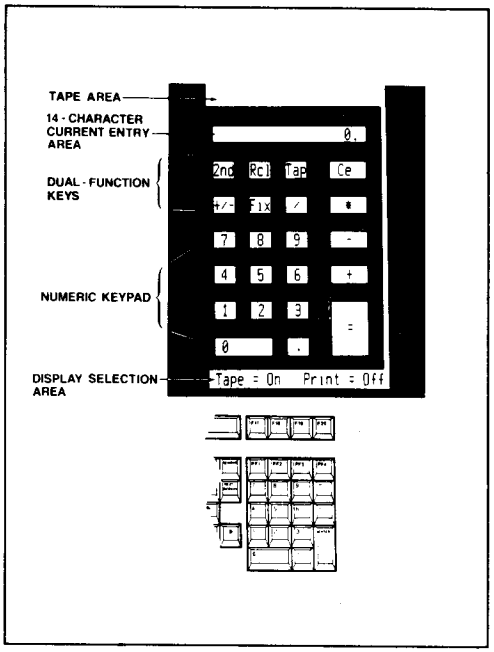


Figure 4-11. The Calculator

The calculator uses the accounting-style numeric keypad and the editing keys above it, at the far right of your keyboard. To avoid confusion, disregard the legends on 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 the tape or to your printer (or both). The line at the bottom of the calculator indicates whether the tape and printer output 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 (press FUNCT-F3), 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 =. In reality, you will press , for + and ENTER for =. 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.

Now enter the calculator again (press FUNCT-F3) 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 FUNCT-F4

Shown below is the default ASCII chart that appears when you press FUNCT-F4.

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.

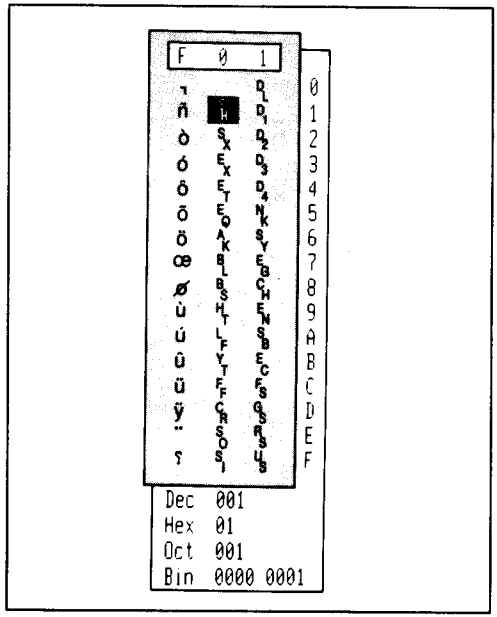


Figure 4-12. The ASCII Chart

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.

5 Trouble-Shooting

IF A PROBLEM OCCURS

Once you have properly installed your 965 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 troubleshooting list below 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 computer or modem correctly wired? Check the computer port pin signals (see Chapter 1). Ensure 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 printer port communication format match that of your serial peripheral?
- Is the interface between the terminal and the peripheral correctly wired?

Check the printer 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?

If nothing happens when you type on the keyboard:

- Is the keyboard correctly plugged in?

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? Press CTRL-SHIFT-SETUP or reset the terminal.
- Does your communication mode send keystrokes to the screen? Try block or local communication mode.

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

1. Be sure the terminal is in 965 mode. You cannot run the test in any other personality. Press SETUP (SHIFT-NO SCROLL). The Command set-up menu appears.
2. Press 1. The test screen appears (see Figure 5-2).
3. Check the screen:
   - 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.
4. Press CTRL-SHIFT-CLEAR SPACE to clear the test from the 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. Figure 5-1 shows an example of command and printable characters on the screen in monitor mode.

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).

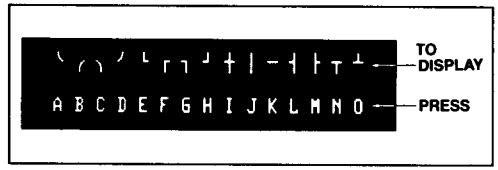


Figure 5-1. Monitor Mode Display

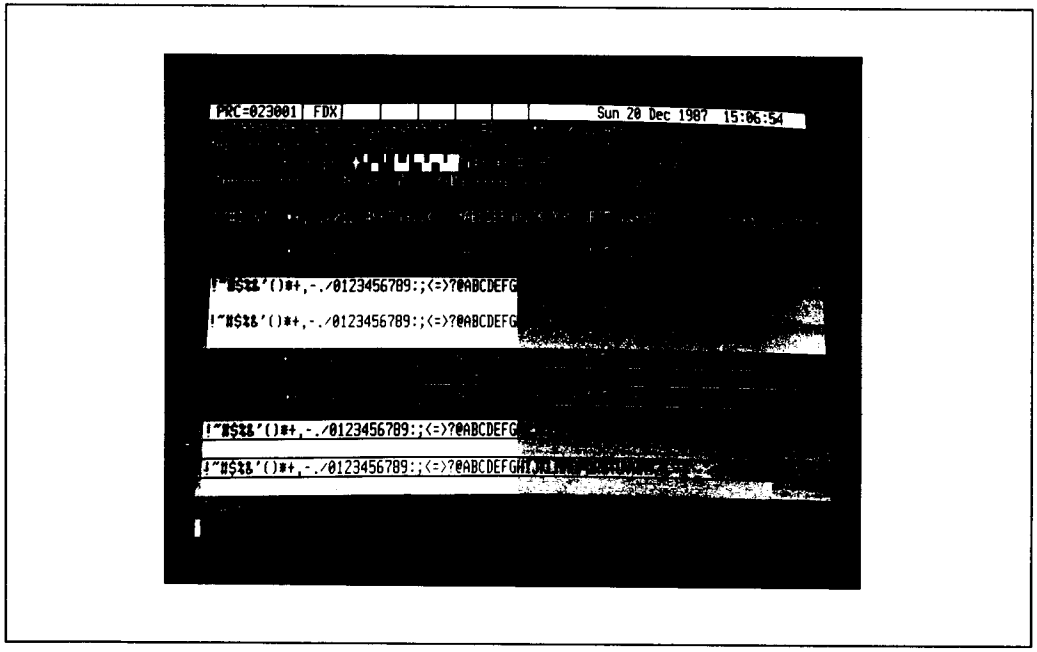


Figure 5-2. The Test Screen

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. You can obtain on-site or carry-in service from authorized third-party service agencies.

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

Keep this manual; don't return it with the unit.

6 Introduction to Programming

This chapter introduces the basics of programming the 965 terminal. It then presents the commands for changing the terminal personality, saving reprogrammed set-up values, and resetting the terminal.

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 965 command set is a superset of the TeleVideo 955 terminal commands. Most native mode commands follow the format of the 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 the 965 to a broad range of programming environments.

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

ENTERING COMMANDS

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

Sending Commands From the Host

How you incorporate commands into your programs depends on your programming language. The 965 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.

Entering 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 965 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 lowercase character, a number **one** or a lowercase **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 sequence

ESC c

involves pressing only the ESC key, then a lowercase 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 example, look at the command to change the cursor style:

Cursor Style **Set-Up**

Select cursor style **ESC . Ps**

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

Set-Up indicates that the parameter can also be selected in set-up.

Select cursor style 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 in commands are usually shown as **Ps**, to represent a selective value. The effects of variables are described in the text following each command.

PERSONALITY MODES

Selecting the Terminal Personality

Set-Up

Select terminal personality **ESC [10 ; Ps v**

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

WARNING

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

When you select the personality mode, the screen clears and many operating modes reset to a state compatible with the new personality. Table 6-1 shows the states to which the terminal resets when it enters various personalities. See the command above for each personality's value of **Ps**.

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 (default: 965 native).

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

NOTE Set-up values not listed in Table 6-1 remain the same when the personality mode changes. This means you can enable a terminal feature in native mode that is not normally available in some other personality, then select a new personality mode and retain the feature.

6

Table 6-1. Terminal States After Personality Mode Reset

Mode/Condition	State	Personality (Ps Value)
DISPLAY		
Visual attribute setting	Normal	All
Visual attribute base	Character	7,8,9,12,17
	Page	0,1,2,3,6,10,11
	Line	4,5,13

Table 6-1. Terminal States After Personality Mode Reset (continued)

Mode/Condition	State	Personality (Ps Value)
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
Autowrap mode	On (wrap)	All others
	Off (no wrap)	17
EDITING MODES		
Receive CR mode (CR, CR-LF)	CR	All
Tab stops	Clear all	All others
	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
Function and editing key reprogramming	No reset unless selected in set-up	All

Table 6-1. Terminal States After Personality Mode Reset (continued)

Mode/Condition	State	Personality (Ps Value)
CHARACTER SETS		
Graphics mode	Off	All
Replacement character	Space	All
Font bank assignments	Reset to default	All
Primary/secondary character set definitions	Reset to default	All
HOST/PRINTER COMMUNICATIONS		
ACK mode	On	0,1,3,4,5,6,7
	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 Set-Up

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 965 native mode. Then the set-up value is retained when you switch to another terminal personality.

Return to native mode (from VT100, DG 200, and PC TERM) **ESC ! 9**

Return to native mode (from all other modes) **ESC ~ 9**

Returns the 965 to native mode from any other mode. By entering native mode, then returning to another mode (ESC [10 ; Ps v), it is possible to retain some native features in another mode. However, any native command that is either destructive or in conflict with another mode will be erased when you enter that other mode.

CAUTION

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

SAVING AND RESETTING VALUES

Saving Set-Up Values — Set-Up

Save current set-up values in nonvolatile memory — ESC [0 ; 1 }

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.

6

Resetting the Terminal — Set-Up

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 to factory default values — ESC ~ 0

CAUTION

This command erases any reprogramming you may have loaded into nonvolatile memory.

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

Reset operating values to nonvolatile memory values — ESC ~ 1

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 factory default values — ESC ~ 2

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

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

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

Load the date (native mode) — ESC x 9 *mmddyyyy*

Load the date (Wyse mode) — ESC c 9 *mmddyyyy*

This command loads the date for the Video-Desk calendar, using these values:

mm = two-digit month code

dd = two-digit day code

yyyy = four-digit year code

7 Keyboard and Screen

This chapter covers the following. Chapter 12 covers information line messages.

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

THE KEYBOARD

Locking and Unlocking the Keyboard

Lock (disable) the keyboard **ESC #**
Unlock (enable) the keyboard (default) **ESC "**

When the keyboard is locked, only the SHIFT, CTRL, and SETUP keys operate. To unlock the keyboard, enter set-up and execute CLEAR COMMUNICATION, or reset the terminal. See "Resetting the Terminal" in Chapter 6 for the effects of resetting.

Auto Repeat Mode **Set-Up**

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 one-half second.

Auto repeat off **ESC [= 8 l**

Keyclick **Set-Up**

Keyclick on (default) **ESC >**
Keyclick off **ESC <**

This command temporarily overrides the set-up menu value.

Disabling Specific Keys **Set-Up**

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

Ps	Key	Ps	Key
11	SET-UP	13	CLEAR SPACE
12	ESC	14	BREAK

Disabling these keys prevents operator interference.

Selecting the BREAK Key Signal

Select the BREAK key signal **ESC [15 ; Ps v**

Ps	Signal
0	Disabled
1	170 ms
2	**250 ms** (default)
3	500 ms
4	2 sec

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 to the signal 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 caps reverse mode as engaging the CAPS LOCK key.

The CAPS LOCK key 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, alphanumeric keys generate uppercase letters, as if the CAPS LOCK key were engaged. When caps reverse mode is also enabled, pressing an alphanumeric key with SHIFT generates a lowercase key (see the table below).

Caps Reverse Mode Set-Up

Enable caps reverse mode **ESC [= 25 h**

Disable caps reverse mode (default) **ESC [= 25 l**

The following table shows the difference between normal and caps reverse mode:

THE BEEPER

Sounding 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).

Alphabetic Keys Plus SHIFT & CAPS LOCK	Mode	
	Normal	Reverse
Alone	lowercase	lowercase
With SHIFT	UPPERCASE	UPPERCASE
Alone, CAPS LOCK engaged or CAPS LOCK mode enabled	UPPERCASE	UPPERCASE
With SHIFT, CAPS LOCK engaged or CAPS LOCK mode enabled	UPPERCASE	lowercase

Margin Bell Mode — Set-Up

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

THE 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 — Set-Up

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 — Set-Up

Select the screen saver time — ESC [8 ; Ps v

Ps	Effect	Ps	Effect
0	None (default)	2	20 minutes
1	10 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.

> **NOTE** Press CTRL-CLEAR SPACE to enable screen saver immediately.

Cursor Appearance — Set-Up

Select the 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 965 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

965 native 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-based 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 be embedded or nonembedded, and the fields may be line-based or page-based:

- **Embedded** 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).
- **Nonembedded** 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 are 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 the Attribute Type — Set-Up

Select the attribute type — **ESC F Ps**

Ps	Attribute Type
0	Embedded field (default)
1	Nonembedded field
2	Character

CAUTION

This command can cause loss of text! Changing between field and character attributes clears the display.

If the terminal is already in field attribute mode, changing between embedded and nonembedded 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 Set-Up

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 cause loss of 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	**Half**	**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 and blink
7	w	Invisible reverse and blink
8	x	Underline
9	y	Invisible underline
:	z	Underline and blink
;	{	Invisible underline and blink
,	|	Reverse and underline
<	}	Invisible reverse and underline
>	~	Reverse and underline and blink
?	DEL	Invisible reverse and underline and blink

This command defines visual attributes for unprotected text—not for write-protected characters or the information lines.

NOTE The terminal accepts this command only during character-based attribute mode.

The invisible attribute affects only the appearance of the characters: the cursor is still visible and data is transmitted to the host.

Normal Intensity Mode — Set-Up

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 while protect mode is 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" earlier in this chapter

The information areas and the text areas have the same attribute type (selected with the command **ESC F Pn** or in set-up). Notice 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 — Set-Up

Select status line attribute(s) — **ESC [3 ; Ps v**

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

Write-Protected Character Attributes **Set-Up**

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

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

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

LINE APPEARANCE

The commands in this section let you display from 40 to 132 character on a line.

Selecting the Number of Columns per Line **Set-Up**

Select 80 columns per line (default) **ESC [= 3 l**
ESC . :

Select 132 columns per line **ESC [= 3 h**
ESC . ;

These commands affect both the information lines and the data display lines. 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 redisplay the lines programmed for the new column width.

If 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 undisplayed columns. 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 80/132-column mode in set-up, and scroll the display horizontally with CTRL-SHIFT-arrow keys. See Chapter 1 for more information about terminal behavior during 80/132-column mode.

80-Column Economy Mode

Enable 80-col econ. mode **ESC [= 24 h**

Disable 80-col. econ. mode (default) **ESC [= 24 l**

CAUTION

This command can cause loss of data!

Eighty-column economy mode lets you configure the terminal for more pages of display memory (see Tables 8-2 and 8-3).

Enabling 80-column economy mode causes the following:

- Both the data and information lines clear
- All display memory is configured strictly for 80 columns

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 SHIFT-CTRL-CLEAR SPACE, or send a clear command to clear the screen.

Monitor Mode

Monitor mode on **ESC U**
Monitor mode off (default) **ESC X**
ESC u

Mode on The terminal displays commands (control and escape sequence characters) on the screen, instead of acting on them.

Mode off Terminal processes commands normally.

Chapter 5 shows a photo of a typical monitor mode display. 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.

NOTE Press CTRL-SHIFT-1 (on the numeric keypad) to toggle monitor mode from the keyboard.

8 Display and Pages

This chapter presents commands that control the following features:

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

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	965, 955, WY-60, 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.

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Table 8-2. Line/Page Capabilities, Personality Set 1

Data Lines in Display	Lines Per Page	Pages for 80 or 132 Cols/Line	Pages for Econ. Mode 80 Cols/Line
24	24	2	3
	48	1	1
	24 on p. 1; the rest on p. 2	24 on p. 1; 24 on p. 2	24 on p. 1; 56 on p.2
25	25	1	3
	50	N/A	1
	25 on p.1; the rest on p. 2	N/A	25 on p. 1; 55 on p. 2

Table 8-2. Line/Page Capabilities, Personality Set 1 (Continued)

Data Lines in Display	Lines Per Page	Pages for 80 or 132 Cols/Line	Pages for Econ. Mode 80 Cols/Line
42	42	1	1
43	43	1	1
48	48	1	1
49	49	1	1

No other combinations of lines per page and number of pages of memory are available in personality set one. Attempts to enable other combinations will cause the terminal to default to a 24-line display and page.

Table 8-3. Line/Page Capabilities, Personality Set 2

Data Lines in Display	Lines Per Page	Pages for 80 or 132 Cols/Line	Pages for Econ. Mode 80 Cols/Line
24	24	4	7
	48	2	3
	96	1	1
	24 on p. 1; the rest on p. 2	24 on p. 1; 79 on p. 2	24 on p. 1; 145 on p.2
25	25	4	7
	50	2	3
	100	1	1
	25 on p. 1; the rest on p. 2	25 on p. 1; 78 on p. 2	25 on p. 1; 144 on p.2
42	42	2	4
	84	1	2
	168	N/A	1
	42 on p. 1; the rest on p. 2	42 on p. 1; 61 on p. 2	42 on p. 1; 127 on p.2
43	43	2	3
	86	1	1
	43 on p. 1; the rest on p. 2	43 on p. 1; 60 on p. 2	43 on p. 1; 126 on p.2
48	48	2	3
	96	1	1
	48 on p. 1; the rest on p. 2	48 on p. 1; 55 on p. 2	48 on p. 1; 121 on p.2

Table 8-3. Line/Page Capabilities, Personality Set 2 (continued)

Data Lines in Display	Lines Per Page	Pages for 80 or 132 Cols/Line	Pages for Econ. Mode 80 Cols/Line
49	49 98 49 on p. 1; the rest on p. 2	1 1 49 on p. 1; 54 on p. 2	1 1 49 on p. 1; 120 on p.2

Selecting the Number of Display Lines

Set-Up

Select the number of display lines ESC [14 ; Ps v

Ps	Lines	Ps	Lines
0	**24** (defalut)	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.

Selecting Lines per Page

Set-Up

Define the number of lines per page ESC \ Ps

Ps	Lines per Page
1	24
2	48
4	Same as number of display lines
5	Twice the number of display lines (where possible)
7	Page 1 same as number of display lines, page 2 contains all lines remaining in display memory

CAUTION

This command can cause loss of data!

When you execute this command, the terminal

- 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 the number of lines per page as less than the number of display lines.

The term **page** (i.e., document) refers to an amount of memory. Do not confuse number of lines in a page of memory 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 a portion of one page displayed on the screen.

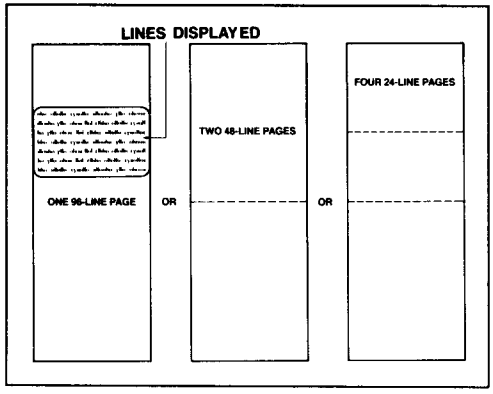


Figure 8-1. Display Memory for the 965

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, the 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.

Splitting the Screen Without Clearing the 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.

Splitting the Screen and Clearing 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 or 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 965 can have up to seven pages, which are numbered 0 through 6.

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 Mode

Autopage mode on **ESC v**

Autopage mode off **ESC w**

Autopage 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.

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 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 Because of Scrolling

Key	Command	Function
LINE FEED SHIFT-DOWN	CTRL J	Line feed
SHIFT-UP	ESC j	Reverse line feed
RIGHT	CTRL L	Cursor right
Alpha-numeric	—	Text entry from host or keybd.

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/second) **ESC 8**

Select jump scroll **ESC 9**

Set the scrolling rate **ESC . Ps**

Ps	Rate (Lines Per Second)
<	Smooth scroll at 1
=	Smooth scroll at 2
>	Smooth scroll at 4
?	Smooth scroll at 8
@	Jump scroll

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

Ps	Rate (Lines Per Second)
0	Jump
1	Normal (4)
2	Slow (2)
3	Fast (8)
4	Very slow (1)

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 area 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 l 1**
ESC . H

Disable line lock **ESC l 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.

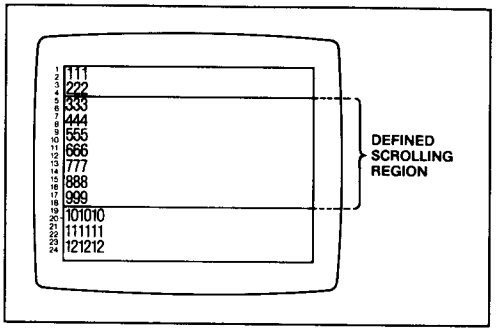


Figure 8-2. Scrolling Region

The command to disable line lock unlocks all locked lines.

9 Editing and Cursor Movement

EDITING MODES

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.

Write-Protect and 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 movementor 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.

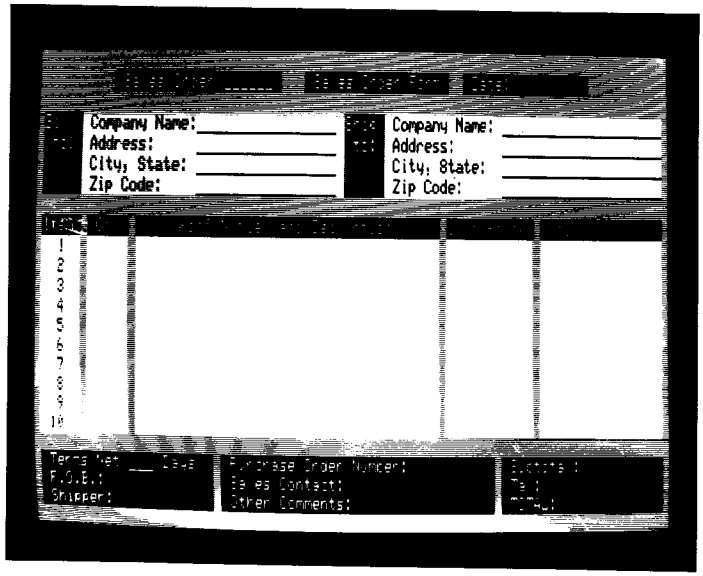


Figure 9-1. A Typical Protected Form

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. Enter

   ESC)

   to enable write protect mode.

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. Enter

   ESC (

   to turn off write protect mode.

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.

Editing Key Mode — Set-Up

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
DOWN	PRINT
UP	SEND
LEFT	CE
RIGHT	PAGE
LINE INS	CHAR INS
LINE DEL	CHAR DEL
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 — Set-Up

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 — Set-Up

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 Mode

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 and Replace Mode

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 Replacement 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 position 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 Null Characters

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 and replace with replacemt. chars. 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 replacemt. chars. ESC ; CTRL Z

Clear unprotected in page and replace with null characters ESC :

Clear all in page and replace with replacemt. chars. (disable protect and write-protect modes) ESC +

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

Clear unprotected in page and replace with specified character ESC <sp> Pc

Pc = 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 a column of unprotected at cursor position and replace with w.p. replacemt. chars. ESC x O

Erase a column of unprotected at cursor position and replace with nulls ESC x K

Erase a column of unprotected 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 with replacement or null characters. The cursor and existing text do not move.

Erase from cursor to end of line; replace with repl. chars. ESC T

Erase spec. chars. in curr. line; replace with repl. chars. ESC [Ps K

Erase from cursor to prot. field or end of line; replace with nulls **ESC t**

Erase from cursor to end of line; replace with nulls **ESC x L**

Erase from cursor to end of page; replace withrepl. chars. **ESC Y**

Erase spec. char. in page; replace with repl. chars. **ESC [Ps J**

Erase from cursor to end of screen; replace with nulls **ESC y**

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 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** **ESC [Pn A**
Move the cursor down	**CTRL V** **ESC [Pn B**
Move the cursor right	**CTRL L** **ESC [Pn C**
Move the cursor left (back space)	**CTRL H** **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 (usually home position, row 1 and column 1). It has no effect if the cursor is already there.

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 cursor 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 the 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 the cursor is on the last unprotected position, it wraps around to the first unprotected position.
- Autowrap mode **off** If the cursor is on the last unprotected position, it stops.

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**
Move cursor up Pn lines	**ESC [Pn T**

Pn = A decimal figure for the desired number of lines

CAUTION

These commands can cause loss of data!

These commands move the cursor up or down within 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 new lines of replace-

ment 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.

The following paragraphs summarize how autoscroll and protect modes affect cursor movement after a reverse line feed command:

- Autoscroll and protect modes **on** When the cursor reaches the top line, it does not move any farther.
- Autoscroll mode **on**, protect mode **off** When the cursor reaches the top line, data scrolls down. A new top line filled with replacement characters appears, and the old bottom line is lost.
- Autoscroll mode **off** When the cursor reaches the first line of the page, it does not move.

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 from the cursor coordinate table in Appendix G for the row (line).

c = An ASCII character from Appendix G for the columns.

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 characters from the cursor coordinate table in Appendix G representing the row and column, 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.

Addressing the Cursor in Decimal Units

Address the cursor to line and column of the current page in decimal units **ESC [Pl ; Pc H** **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 the Cursor in Decimal Units

Read the cursor row and column in decimal units **ESC [6 n**

Read the cursor page, row, and, column 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 lowercase 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 the TAB key; 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

Move cursor forward to next field tab stop ESC 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 backward to previous typewriteror 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.

9

10 Character Sets

The 965 can display an extensive range of alphanumeric, special symbol, and graphics characters. You may also design and download custom characters.

SELECTING A CHARACTER SET

The 965 has seven character sets available: Native Mode ASCII, 965 Line Graphics, 965 Multinational, IBM 7-Bit, IBM 8-Bit, Wyse 60 7-Bit, and Wyse 60 Line Graphics.

Changing the sets from the default group can be fairly complex. Here is a summary of the steps that would be involved in selecting nondefault 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 native 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 sets in the font banks.

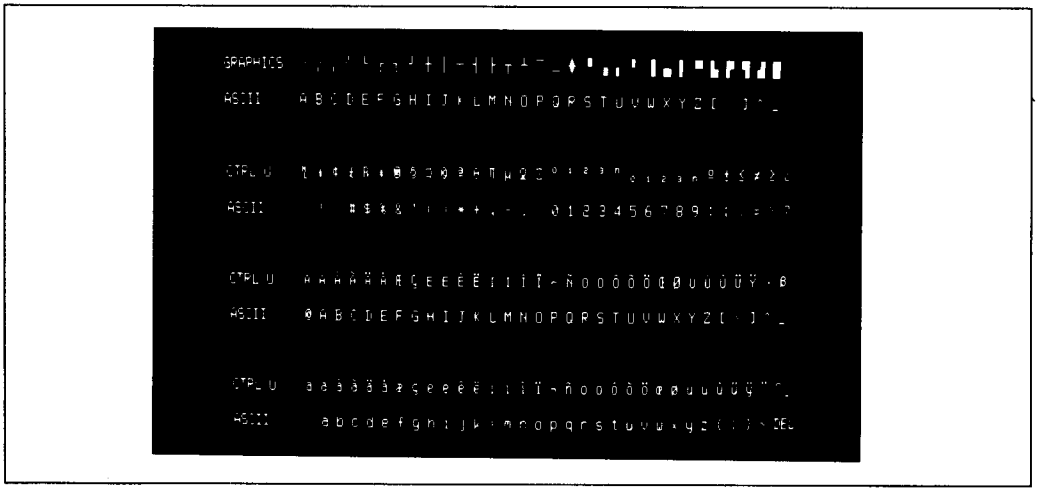


Figure 10-1. Native ASCII, Graphics, and Multinational

5. Select a primary and a secondary character set from the sets in the font banks.

6. Display the primary or secondary character set.

Figures 10-1 through 10-4 show the character sets as displayed on screen. Note that native mode control characters (00h to 1Fh) are replaced by 32 special graphics characters. Appendix B shows control and display characters with their code equivalents.

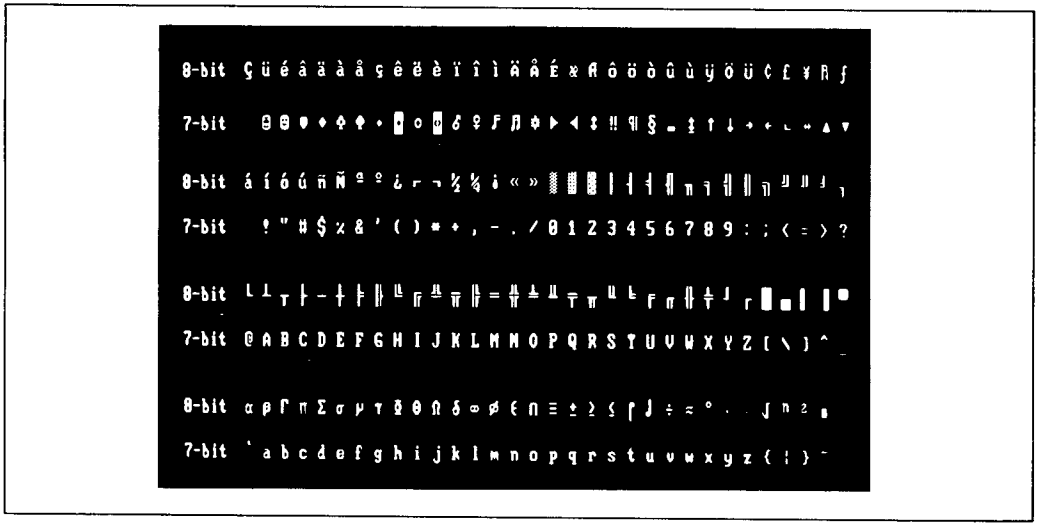


Figure 10-2. IBM 7- and 8-Bit Character Sets

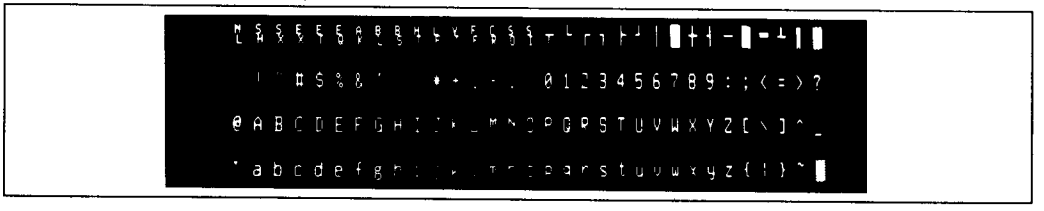


Figure 10-3. Wyse 60 Native Mode Characters

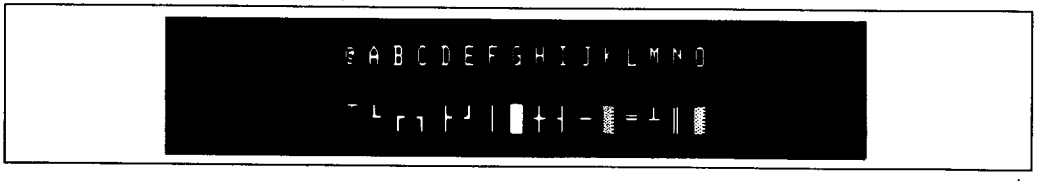


Figure 10-4. Wyse 60 Graphics Characters

NOTE Figure 10-4 shows each graphics character aligned with the key you press to produce it.

The sections below 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.

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.

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
@	**965 native mode (default)**
A	965 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 965
a	Small 965 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 redesignated character set when you reload the font bank.

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.

To create soft characters, first load the soft character set (**Ps** = H) into a font bank, and then load the soft characters into the set.

The "small" character sets are intended for display when the screen is configured for 42 to 49 lines. See the section "Anatomy of a Character Cell," later in this chapter, for a description of standard and small characters.

The terminal sends ACK after executing these commands.

Default font bank loading is as follows:

Bank Ps		Character Set
0	@	965 native mode
1	A	965 multinational
2	‘	Small 965
3	a	Small 965 multinational

Automatic Font Loading — Set-Up

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. The photo at the top of page 90 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 %

Designating the 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 Set-Up

Select an international keyboard layout **ESC [9 ; Ps v**

Ps	Char. Set	Ps	Char. Set
0	U.S. ASCII (default)		
1	U.K.	7	Italian
2	French	8	Danish
3	German	9	Swiss German
4	Spanish	10	Swiss French
5	Finnish	11	Swedish
6	Norwegian	12	Fr. 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.

DESIGNING 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 965 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, 25	10 x 16 (three-pixel descenders)	7 x 11
42, 43 48, 49	10 x 8 (one-pixel descenders)	5 x 7

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.)

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

10 x 16 Cell, 7 x 11 Matrix
Three-line Descenders

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

10 x 8 Cell, 5 x 7 Matrix
One-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, shown below is the pixel matrix of

the uppercase Greek character sigma, in a 10 x 16 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 and 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.

Bi = 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 10 x 16 or 10 x 10 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 four-bit units ("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:

1. 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 the lines above and below. Remember that pixel values in column 0 are duplicated in columns A and B.

2. Calculate the binary value of each scan line. Assign hex values to the most-significant and least-significant four-bit units:

Line	Binary MSB (7-4)	LSB (3-0)	Hex
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

3. Send **ESC x A** to begin the command sequence. If you are entering this command from the keyboard, press the **LOC ESC** key.

4. Enter the variables for the font bank and character position:

Variable	Value	Specifies
Pb	3	Font bank 3
Pp	20	The 33rd position in the font bank

5. 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.

6. Enter **CTRL Y** to end the command.

The complete command is **ESC x A 3 20 FE4020100804020408102040FE000000 CTRL Y**

BLOCK GRAPHICS

You can draw two types of blocks. Chapter 7 contains commands to clear a rectangle and to fill it with specified characters.

Creating a Measured Block

Define a 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 F 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.

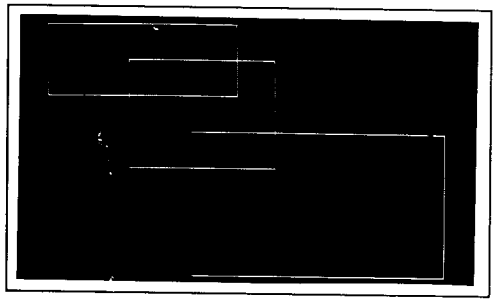


Figure 10-5. Three Blocks on the Screen

Creating a Positioned Block

Define a block **ESC x G r c**

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

c = An ASCII character from Appendix F 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.

10

11 Data Transmission

This chapter presents the commands that control data communication and transmission.

PROGRAMMING THE PORTS

These commands let you configure the main and auxiliary ports for host or printer communication.

Selecting the Host Communication Port

Setup

Select the main port for host communication (default) ESC [= 22 l

Select the auxiliary port for host communication ESC [= 22 h

When you select one port for host communications, the other port becomes the printer port. The port selected for host communications assumes the current host communication mode (full or half duplex, block, local). The port selected for printer communication assumes the current print mode.

However, the physical ports, main and auxiliary, 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 auxiliary 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., 1200 baud), and it is still a DCE port.

Programming the Ports

Setup

Program the main port ESC { p1 p2 p3 p4

Program the aux. port ESC } p1 p2 p3 p4

p1	Baud Rate	p1	Baud Rate
1	50	9	1800
2	75	:	2400
3	110	;	3600
4	135	<	4800
5	150	=	7200
6	300	>	**9600** (main)
7	600	?	19200
8	**1200** (aux)	@	38400

p2	Stop Bits	p4	Word Length
0	**1**	**0**	**8 bits**
1	2	1	7 bits

p3	Parity	p3	Parity
0	**No**		
1	Odd	5	Mark
3	Even	7	Space

This command assigns communication values to the main or auxiliary 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 auxiliary port values become

Baud rate	4800
Stop bits	1
Parity	Even
Word length	7 bits

Data Word Mode — Setup

Although special graphics characters are contained in the character generator at positions 80h through 9Fh, generating them by sending those codes from the host may cause software incompatibilities.

Read 7-bit data words — **ESC [= 1 l**

The terminal ignores (masks) the eighth bit in each data word received from the host.

Read 8-bit data words — **ESC [= 1 h**

The terminal reads all eight bits of received data words. This permits the terminal to interpret and generate characters in the code range A1h to FEh without any special character set commands. (The characters at A0h and FFh are reserved for firmware control.)

Selecting the Transmit Delay Rate — Setup

Select the character transmit delay rate — **ESC [0 ; Pn v**

Pn = 0 to 7 character 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

Selecting Handshaking Protocols — Setup

Disable main port X-On/X-Off; enable DTR line — **CTRL N**
Enable main port X-On/X-Off; disable DTR line (default) — **CTRL O**

Select the main port receive protocol (default: X-On/X-Off) — **ESC [1 ; Ps v**
Select the main port transmit protocol (default none) — **ESC [11 ; Ps v**

Select the auxiliary port receive protocol(default DRS) — **ESC [12 ; Ps v**
Select the auxiliary port transmit protocol (default both) — **ESC [13 ; Ps v**

Ps	Protocol
0	No protocol
1	X-On/X-Off
2	DTR (main receive, aux transmit) DCD/DSR (main transmit) DSR (aux receive)
3	Both (except main transmit)

CTRL N and CTRL O are compatible with the 955 command set. They apply only to the main 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 main 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 Setup

Transmission control on ESC [= 0 h

When X-On/X-Off is selected as the main 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 Setup

Select the receive buffer fill limit ESC [2 ; Ps v

Ps	Fill Limit (Bytes)
0	**16** (default)
1	32
2	64
3	128

When the main port receive buffer fills to the selected limit, the terminal signals 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 main or auxiliary port operating values
- A page print
- Loading or clearing a font

Disable data acknowledge mode ESC [= 28 l

DATA TRANSMISSION MODES

Setting the Host Mode Setup

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 re-establish 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 the next section), it transmits screen data to the computer. The terminal can receive data from the computer 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 previous conversational mode from block or local mode **ESC C**

Setting the Printer Port Mode Setup

The printer port communication mode determines how data is transmitted through the 965 to or from a device connected to the port configured as the printer port. Default: all modes disabled.

All the printer port modes are *buffered*. This permits the main and printer 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 printer 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 auxiliary port in a page print.

Block Start Mode

Start at the top of the page (default) **ESC [= 17 l**

Start at the top of the 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 the 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.

The control characters listed in Table 11-2 are the default delimiters. If you don't want these characters in your transmissions, you can reprogram them with the commands in the next section.

Table 11-2. Default Delimiter Values

Delimiter	ASCII Character	Hex
Field separator	FS NUL	1C 00
Start prot. field	ESC)	1B 29
End prot. field	ESC (	1B 28
End of line	US NUL	1F 00
End of message	CR NUL	0D 00

NOTE: The terminal does not transmit the nulls in the delimiter codes to the computer.

Programming Delimiters **Setup**

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.

Defining 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 11-2 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 965 sends ESC G Ps for visual 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 965 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 965 receives a page print command, it sends a block of text to the printer or other device connected to the auxiliary 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 965 responds to the selected handshaking signals from the receiving peripheral during transmission.

After the transmission, the 965 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 with the command presented later in this chapter.

> **NOTE:** The 965 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 **Setup**

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.

12 Reprogramming

This chapter covers key codes, information line messages, and the terminal answerback and ID.

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 non-volatile memory.

Reprogramming One Key

Reprogram one key **ESC 0 Ps p1 ... p5**

Editing Key	Ps Unshifted	Shifted
HOME	@	`
DOWN	A	a
UP	B	b
LEFT	C	c
RIGHT	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 (keypad)	Q	q
CE	R	r
ENTER	S	s
RETURN	T	t
LINE FEED	U	u
ESC	V	v
DEL	W	w

Numeric Key	Ps	Numeric Key	Ps
0	0	7	7
1	1	8	8
2	2	9	9
3	3	,	:
4	4	-	;
5	5	.	<
6	6	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

pi = 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 the 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 DOWN and UP keys.

3. Now continue entering five bytes of code apiece for the remaining editing keys.

THE FUNCTION KEYS

The 965 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 function 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 — Setup

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 nonvolatile 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 — Setup

Load function keys in nonvolatile 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 the Function Keys — Setup

Reprogram a function key — **ESC | p1 p2** *message* **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	Computer
2	Terminal (screen)
3	Computer and terminal
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 field separator (FS) delimiters (1Ch). Your command would look like this:

ESC | 0 p2 *message* F1 FS
p2 *message* F2 FS p2 *message* F3 FS...
p2 *message* Fn 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** *message* **CTRL Y**). You need only enter

ESC | *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 | to start the programming sequence.

> **NOTE:** Press LOC ESC if you are entering the command from the keyboard.

2. Send (or press) A to specify the shifted F1 key

3. Send (or press) 2 to send the message to the terminal.

   Now 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 only count the bytes in the message.

Entry	Bytes	Entry	Bytes
ESC	1	ESC	1
=	1	g	1
7	1	ESC	1
o	1	P	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 the Contents of a Function Key

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.

Loading the 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-column mode
1-7 characters in 132-column mode

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 shown in the following diagram:

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

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).

THE FUNCT KEY

The FUNCT key sends the ASCII code of the next alphanumeric key pressed, bracketed by the start-of-header (SOH) and carriage return (CR) control characters. It works only with alphanumeric keys; don't press it with an editing key.

Press and hold down the FUNCT key while you press the other key, as you would the SHIFT or CTRL key.

INFORMATION LINES

The top and bottom information areas can display the following reprogrammable information:

- 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 more details about the information lines. Appendix H contains a list of all status line messages.

> **NOTE:** If the screen is configured for 25, 43, or 49 data display lines, the last data line overwrites the bottom information line.

Selecting the Contents of the Information Lines (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 (FLABEL line 1)
3	User message 2 (FLABEL 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 operator must elect in set-up to display them (user messages one and two).

Loading the 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 (965 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 the keyboard, press LOC ESC (SHIFT-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 the User Messages

Send a user message to the computer **ESC Z Ps**

Ps	Message
0	User message 1
1	Message field in status line
2	User message 2

This command sends the desired message to the 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 the Terminal Identification

Send terminal identification **ESC M**

When the terminal receives this command, it returns the identification message **TVS965** *R.0* **CTRL M** to the host.

R = Firmware revision level
0 = Firmware revision sublevel

A Specifications

Part number	132985-00: White screen, 115V 132985-01: White screen, 230V 133040-00: Green screen, 115V 133040-01: Green screen, 230V
Case	Touch tilt (-5 to +26°); swivel (360°); front-mounted power switch and brightness adjustment; side-mounted keyboard connector
Screen	14 inches measured diagonally; P31 green or P4 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, 80/132, 80 economy
Display memory	Up to seven pages
Character formation	
24/25 lines	7 x 11 matrix in a 10 x 16 cell
42/43/48/49 lines	5 x 7 matrix in a 10 x 8 cell
Character sets	US ASCII standard (96 upper- and lowercase display with descenders, 32 control) and 955 multinational (8-bit); IBM ASCII and 8-bit multinational; Wyse 50; Wyse 50 graphics; 955 graphics; block graphics
Visual attributes	Character or page/line, embedded/nonembedded field; combinable full/half intensity blink, blank, underline, reverse

Line attributes	Combinable 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 965 Native Mode; 910/910+, 912/920, 905/925, 950, 955; WY-60, WY-50/50+; ADM-3A/5/31, ADDS VP-A2, VP-60; DG200, Hazeltine 1500; IBM 3101-1X, 3101-2X, 3161; VT100; PC TERM.
Programmable messages	Answerback, status line field, user line, function key labels
Communication modes	Conversational (full or half duplex), block; local; secondary receive; local or duplex edit; monitor
Print capabilities	Formatted/unformatted page print; buffered copy, transparent, and bidirectional modes
Communication interfaces	RS-232C 256-character, buffered transmit/receive main and auxiliary ports; reconfigurable for host/printer 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
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; reprogrammable send and print delimiters

Keyboard Detached, slim-line, typewriter-style with sculptured keycaps; sealed key switches; N-key rollover with ghost key lockout; accounting-style numeric keypad with TAB and ENTER keys; on/off repeat and keyclick; reprogrammable remote special keys.

Choice of ASCII, VT220 (ANSI), or Enhanced PC keyboard.

Power requirements 115/230 Vac, 50/60 Hz

Dimensions

	Height (in.) (cm)	Width (in.) (cm)	Depth (in.) (cm)
Cabinet	13.6 34.5	12.9 32.7	13.9 35.4
Keyboard			
ASCII	1.5 3.8	17.7 45.2	7.2 18.4
ANSI, Enhanced PC	1.5 3.8	19.5 49.6	7.1 18.0

Footprint 8.6 x 8.0 in.

Weight
- **Net** 17.5 lb. (CRT); 3 lb. (kybd)
- **Shipping** 23.5 lb. (CRT); 3.5 lb. (kybd)

Environmental requirements
- **Ventilation** 4 inches 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.
  - **Nonoperating** 10%-85% noncondensing.
- **Maximum power** 25 watts

Option board	
Available power (beyond normal load)	+5V 200 mA +12V 0 A -12V 100 mA
Options	20-mA current loop, RS-422, RS-423 interfaces; serial-to-parallel converter; international keycap sets

B Code and Character Sets

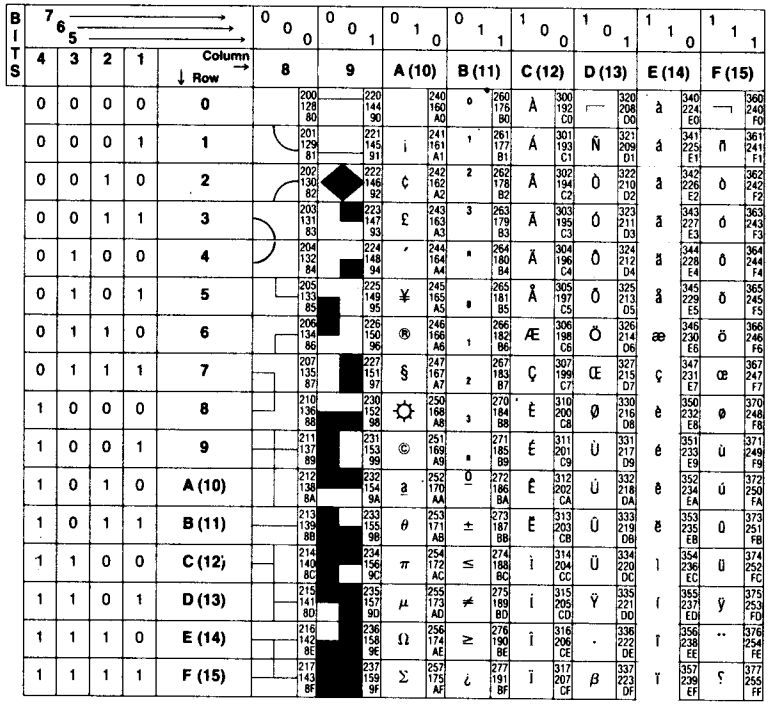
Table B-1. Seven-Bit ASCII Character Set

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 | 27 DECIMAL | 1B HEX

Table B-2. Eight-Bit Multinational Character Set



BITS 4	3	2	1	Row ↓ / Column → 8	9	A (10)	B (11)	C (12)	D (13)	E (14)	F (15)
0	0	0	0	0			°	À		à	
0	0	0	1	1	¡	±	'	Á	Ñ	á	ñ
0	0	1	0	2	¢	²	²	Â	Ò	â	ò
0	0	1	1	3	£	³	³	Ã	Ó	ã	ó
0	1	0	0	4	'	"	"	Ä	Ô	ä	ô
0	1	0	1	5	¥	µ	¶	Å	Õ	å	õ
0	1	1	0	6	®	¶	·	Æ	Ö	æ	ö
0	1	1	1	7	§	·	¸	Ç	Œ	ç	œ
1	0	0	0	8	☼	¸	¸	È	Ø	è	ø
1	0	0	1	9	©	¹	¹	É	Ù	é	ù
1	0	1	0	A (10)	ª	º	Õ	Ê	Ú	ê	ú
1	0	1	1	B (11)	θ	»	»	Ë	Û	ë	û
1	1	0	0	C (12)	π	¼	¼	Ì	Ü	ì	ü
1	1	0	1	D (13)	µ	½	½	Í	Ÿ	í	ÿ
1	1	1	0	E (14)	Ω	¾	¾	Î	·	î	"
1	1	1	1	F (15)	Σ	¿	¿	Ï	β	ï	ˇ

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 OCTAL 27 DECIMAL 1B HEX

Table B-4. Eight-Bit IBM Character Set

B

BITS 8 7 6 5				Column → / ↓ Row	1 0 0 0	1 0 0 1	1 0 1 0	1 0 1 1	1 1 0 0	1 1 0 1	1 1 1 0	1 1 1 1
4	3	2	1		8	9	A (10)	B (11)	C (12)	D (13)	E (14)	F (15)
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 F5
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	ø 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 27 1B	OCTAL DECIMAL HEX

Table B-5. Monitor Mode ASCII Control Characters

Control Code	ASCII Character	Hex 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	DC 2	12	D_2
CTRL S	DC 3	13	D_3
CTRL T	DC 4	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

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

C TeleVideo Command Summaries

The 965 offers 24 different terminal emulations. The commands for these terminals are summarized in Appendices C and D in the tables shown below.

Appendix C

Table	Terminals	Table	Terminals
C-1	TeleVideo 965 TeleVideo 955 TeleVideo 950	C-2	TeleVideo 925/905 TeleVideo 910/910+ TeleVideo 912/920

Appendix D

Table	Terminals	Table	Terminals
D-1	Wyse WY-60 Wyse WY-50/50+	D-2	ADDS VP A2 ADDS VP 60 LSI ADM 3A/5/31 Hazeltine 1500
D-3	DEC VT100 Data General DG200	D-4	PC TERM IBM 3101-1X/2X IBM 3161-V

NOTE The terminal recognizes **boldfaced** commands only during enhanced compatibility mode (enabled in the General set-up menu).

Table C-1. TeleVideo 965, 955, and 950 Commands

Command	965	955	950
VERIFYING OPERATIONS			
Run self test	ESC V	ESC V	ESC V
Monitor mode on	ESC U	ESC U	ESC U
Monitor mode off	ESC X	ESC X	ESC X
	ESC u	ESC u	ESC u
CHANGING OPERATING VALUES			
Reset terminal	ESC ~ Pn	ESC ~ Pn	ESC ~ Pn
Save set-up values	ESC [0;1 }	ESC [0;1 }	ESC [0;1 }
Enhanced mode on	ESC [= 20 h		
Enhanced mode off	ESC [= 20 l		
KEYBOARD AND BELL			
Enable keyboard	ESC "	ESC "	ESC "
Disable keyboard	ESC #	ESC #	ESC #
Keyclick on	ESC >	ESC >	ESC >
Keyclick off	ESC <	ESC <	ESC <
Key repeat on	ESC [= 8 h	ESC [= 8 h	
Key repeat off	ESC [= 8 l	ESC [= 8 l	
SETUP enabled	ESC [= 11 h	ESC [= 11 h	
SETUP disabled	ESC [= 11 l	ESC [= 11 l	
ESC enabled	ESC [= 12 h	ESC [= 12 h	
ESC disabled	ESC [= 12 l	ESC [= 12 l	
CLR SPC enabled	ESC [= 13 h	ESC [= 13 h	
CLR SPC disabled	ESC [= 13 l	ESC [= 13 l	
BREAK enabled	ESC [= 14 h	ESC [= 14 h	
BREAK disabled	ESC [= 14 l	ESC [= 14 l	
Set break signal	ESC 15; Ps v		
CAPS LOCK on	ESC [= 26 h		
CAPS LOCK off	ESC [= 26 l		
Normal CAPS LOCK	ESC [= 25 l		
Reverse CAPS LOCK	ESC [= 25 h		
Margin bell on	ESC [= 4 h	ESC [= 4 h	
Margin bell off	ESC [= 4 l	ESC [= 4 l	
Set bell column	CTRL W	CTRL W	
Sound the beeper	CTRL G	CTRL G	CTRL G
Set number of data lines	ESC [14;Ps v		
Set number of lines per page	ESC \ Ps	ESC \ Ps	ESC \ Ps

Table C-1. TeleVideo 965, 955, and 950 Commands (continued)

Command	965	955	950
THE SCREEN DISPLAY			
Screen saver on	ESC [8 ; Ps v	ESC [8 ; Ps v	
Screen saver off	ESC [8 ; 0 v	ESC [8 ; 0 v	
Screen on	ESC n ESC . 9	ESC n	ESC n
Screen off	ESC o ESC . 8	ESC o	ESC o
Light background	ESC b	ESC b	ESC b
Dark background	ESC d	ESC d	ESC d
Attribute base			
Character	ESC F 2		
Embedded	ESC F 0	ESC F 0	
Nonembedded	ESC F 1	ESC F 1	
Line	ESC [= 2 l	ESC [= 2 l	
Page	ESC [= 2 h	ESC [= 2 h	
Set cursor attr.	ESC . n	ESC . n	ESC . n
Set line attribute	ESC G Ps	**ESC G Ps**	ESC G Ps
80-column mode	ESC [= 3 l ESC . :	ESC [= 3 l	**ESC [= 3 l**
132-column mode	ESC [= 3 h ESC . ;	ESC [= 3 h	**ESC [= 3 h**
80-column economy mode on		ESC [= 24 h	
80-column economy mode off		ESC [= 24 l	
Set attribute	ESC G n	ESC G n	ESC G n
Attribute in box	ESC x I hw Pa		
Set write protect attribute	ESC . Pn		
Full intensity	ESC [= 5 h	ESC [= 5 h	
Half intensity	ESC [= 5 l	ESC [= 5 l	
Set information line attribute	ESC _ Pn Ps ESC [3; Ps v	ESC [3 ; Ps v	
WordStar mode on	ESC [= 21 h		
WordStar mode off	ESC [= 21 l		
Application mode on	ESC [= 23 h		
Application mode off	ESC [= 23 l		
Line lock on	ESC ! 1 ESC . H	ESC ! 1	ESC ! 1
Line lock off	ESC ! 2 ESC . I	ESC ! 2	ESC ! 2

Table C-1. TeleVideo 965, 955, and 950 Commands (continued)

Command	965	955	950
CHARACTER SETS AND BLOCK GRAPHICS			
Select char set	ESC [9;Ps v	ESC [9; Ps v	
Load font banks	ESC x @ Pb Ps		
Clear font banks	ESC x ? Pb		
Auto font load on	ESC [= 29 h		
Auto font load off	ESC [= 29 l		
Set primary set	ESC x B Pb		
Set secondary set	ESC x C Pb		
Display primary set	ESC x D		
Display second. set	ESC x E		
Display char from secondary set	CTRL U	CTRL U	
Create a soft character	ESC x A Pb B1 ... Bn CTRL Y		
Graphics mode on	ESC $	ESC $	ESC $
Graphics mode off	ESC %	ESC %	ESC %
Draw a box	ESC H wh ESC x G r c	ESC H w h	
EDITING MODES			
Line wrap on	ESC [= 7 h	ESC [= 7 h	
Line wrap off	ESC [= 7 l	ESC [= 7 l	
New line mode on	ESC [= 6 h	ESC [= 6 h	
New line mode off	ESC [= 6 l	ESC [= 6 l	
DOWN = CTRL J	ESC [= 9 h	ESC [= 9 h	
DOWN = CTRL V	ESC [= 9 l	ESC [= 9 l	
Protect mode on	ESC &	ESC &	ESC &
Protect mode off	ESC '	ESC '	ESC '
Write protect on	ESC)	ESC)	ESC)
Write protect off	ESC (	ESC (	ESC (

Table C-1. TeleVideo 965, 955, and 950 Commands (continued)

Command	965	955	950
ADDITIONAL SCREEN MEMORY			
Split the screen	ESC \ C Ps		
Split and clear	ESC \ E Ps		
Split 2 pages	ESC \ A Ps		
Split 2 and clear	ESC \ D Ps		
Activate window			
Upper	ESC \ H		
Lower	ESC \ I		
Raise split line	ESC \ R		
Lower split line	ESC \ P		
Display page			
Next	ESC K	ESC K	ESC K
Previous	ESC J	ESC J	ESC J
Pn	ESC [1 ; Pn }	ESC [1 ; Pn }	
Close the window	ESC \ @		
Close and clear	ESC \ O		
Auto page mode on	ESC v	ESC v	ESC v
Auto page mode off	ESC w	ESC w	ESC w
SCROLLING			
Autoscroll mode on	ESC [= 19 h		
Autoscroll mode off	ESC [= 19 l		
Jump scroll	ESC 9	ESC 9	ESC 9
Smooth scroll	ESC 8	ESC 8	ESC 8
Set scroll rate	ESC [6 ; Ps v ESC . Ps	ESC [6 ; Ps v	
Scroll up	ESC [Pn S	ESC [Pn S	
Scroll down	ESC [Pn T	ESC [Pn T	
Define scrolling region	ESC [t ; b r	ESC [t ; b r	
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

Table C-1. TeleVideo 965, 955, and 950 Commands (continued)

Command	965	955	950
TAB STOPS Continued			
Address the cursor			
Row, column	ESC = *r c*	ESC = *r c*	ESC = *r c*
Row, column 132	ESC = *r* ~ *c*	ESC = *r* ~ *c*	
Row, column decimal	ESC [*r* ; *c* H	ESC [*r* ; *c* H	
	ESC [*r* ; *c* f	ESC [*r* ; *c* f	
Page, row, column	ESC - *p r c*	ESC - *p r c*	ESC - *p r c*
Read the cursor			
Row, column	ESC ?	ESC ?	ESC ?
Row, col. decimal	ESC [6 n	ESC [6 n	
Page, row, column	ESC /	ESC /	ESC /
Page row column decimal	ESC ? [6 n	ESC ? [6 n	
CURSOR CONTROL			
Cursor home	CTRL ^	CTRL ^	CTRL ^
New line	CTRL _	CTRL _	CTRL _
Carriage return	CTRL M	CTRL M	CTRL M
Line feed	CTRL J	CTRL J	CTRL J
Cursor up	CTRL K	CTRL K	CTRL K
Pn times	ESC [*Pn* A	ESC [*Pn* A	
Cursor down	CTRL V	CTRL V	CTRL V
Pn times	ESC [*Pn* B	ESC [*Pn* B	
Cursor right	CTRL L	CTRL L	CTRL L
Pn times	ESC [*Pn* C	ESC [*Pn* C	
Cursor left	CTRL H	CTRL H	CTRL H
Pn times	ESC [*Pn* D	ESC [*Pn* D	
Reverse line feed	ESC j	ESC j	ESC j
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	ESC q
Replace mode	ESC r	ESC r	ESC r

Table C-1. TeleVideo 965, 955, and 950 Commands (continued)

Command	965	955	950
EDITING TEXT Continued			
Insert			
Character	ESC Q	ESC Q	ESC Q
Pn characters	ESC [*Pn* @	ESC [*Pn* @	
Column of nulls	ESC x M		
Line	ESC E	ESC E	ESC E
Pn lines	ESC [*Pn* L	ESC [*Pn* L	
Delete			
Character	ESC W	ESC W	ESC W
Pn characters	ESC [*Pn* P	ESC [*Pn* P	
Cursor column	ESC x J		
Line	ESC R	ESC R	ESC R
Pn lines	ESC [*Pn* M	ESC [*Pn* M	
Erase			
Line to spaces	ESC T	ESC T	ESC T
	ESC [Ps K	ESC [Ps K	
Line to nulls	ESC t	ESC t	ESC t
	ESC x L		
Page to spaces	ESC Y	ESC Y	ESC Y
	ESC [Ps J	ESC [Ps J	
Page to nulls	ESC y	ESC y	ESC y
Clear page			
Unprotected	CTRL Z	CTRL Z	CTRL Z
to spaces	ESC ;	ESC ;	ESC ;
All to spaces	ESC +	ESC +	ESC +
Unprotected to nulls	ESC :	ESC :	ESC :
All to nulls	ESC *	ESC *	ESC *
Unprotected to w.p. spaces	ESC ,	ESC ,	ESC ,
Uprotected to character	ESC sp Ps		
Field	CTRL X	CTRL X	CTRL X
Clear column			
To w.p. space	ESC x O		
To nulls	ESC x K		
To character	ESC x N Pc		
Clear box			
Unprotected to character	ESC x F r c Pc		
All to character	ESC x H r c Pc		

Table C-1. TeleVideo 965, 955, and 950 Commands (continued)

Command	965	955	950
CHANGING PORT OPERATING VALUES			
Configure ports			
Main	ESC *p1 ... p4*	ESC { *p1 ... p4*	ESC { *p1 ... p4*
Auxiliary	ESC } *p1 ... p4*	ESC } *p1 ... p4*	ESC } *p1 ... p4*
SETTING UP HOST COMMUNICATIONS			
Communication mode			
Block	ESC B	ESC B	ESC B
Conversational	ESC C	ESC C	ESC C
FDX	ESC D F	ESC D F	ESC D F
HDX	ESC D H	ESC D H	ESC D H
Local	ESC c	ESC c	ESC c
Local edit on	ESC k	ESC k	ESC k
Local edit off	ESC l	ESC l	ESC l
Set main as host	ESC [= 22 l		
Set aux. as host	ESC [= 22 h		
Set main handshk.	ESC [1 ; Ps v		
Set handshaking			
Main receive	ESC [1 ; Ps v		
Main transmt	ESC [11 ; Ps v		
Aux. receive	ESC [12 ; Ps v		
Aux. transmt	ESC [13 ; Ps v		
X-On/X-Off on	CTRL O	CTRL O	CTRL O
X-On/X-Off off	CTRL N	CTRL N	CTRL N
Hold host transmission	CTRL S	CTRL S	CTRL S
Resume host transmission	CTRL Q	CTRL Q	CTRL Q
Transmission control			
mode on	ESC [= 0 h	ESC [= 0 h	
mode off	ESC [= 0 l	ESC [= 0 l	
7 data bits	ESC [= 1 l	ESC [= 1 l	
8 data bits	ESC [= 1 h	ESC [= 1 h	
Set receive buffer fill limit	ESC [2 ; Ps v	ESC [2 ; Ps v	
Set transmit delay rate	ESC [0 ; Ps v	ESC [0 ; Ps v	
ACK mode on	ESC [= 28 h		
ACK mode off	ESC [= 28 l		

Table C-1. TeleVideo 965, 955, and 950 Commands (continued)

Command	965	955	950
SETTING UP HOST COMMUNICATIONS Continued			
Send/print block boundaries			
From screen top	ESC [= 17 h		
From page top	ESC [= 17 l		
End of display	ESC [= 18 h		
End at cursor	ESC [= 18 l		
SENDING SCREEN DATA			
Send			
Unprotected line	ESC 4	ESC 4	ESC 4
Unprotected page	ESC 5	ESC 5	ESC 5
Entire line	ESC 6	ESC 6	ESC 6
Entire page	ESC 7	ESC 7	ESC 7
Unprotected message	ESC S	ESC S	ESC S
Entire message	ESC s	ESC s	ESC s
Messsage line 1	ESC Z 0	ESC Z 0	ESC Z 0
Message line 2	ESC Z 2	ESC Z 2	
Status line	ESC Z 1	ESC Z 1	ESC Z 1
Terminal ID	ESC M	ESC M	ESC M
Answerback	CTRL E	CTRL E	CTRL E
LOADING AND SENDING MESSAGES			
Display user one on bottom line	ESC g	ESC g	ESC g
Turn on bottom line	ESC h	ESC h	ESC h
Display status line on top line	ESC . b		
Turn off top line	ESC . c		
Set top line	ESC 4 ; Ps v	ESC 4 ; Ps v	
Set bottom line	ESC 5 ; Ps v	ESC 5 ; Ps v	
Load 25th line	ESC f *message* CTRL Y	ESC f *message* CTRL Y	ESC f *message* CTRL Y
Load user message	ESC _ p1 p2 *message* CTRL M	ESC _ p1 p2 *message* CTRL M	
Load/display function key labels	ESC _ Ps *message* CTRL M		
Load time of day	ESC x 8 *hh mm*		

Table C-1. TeleVideo 965, 955, and 950 Commands (continued)

Command	965	955	950
PRINTING			
Print modes			
Copy on	ESC @	ESC @	ESC @
Copy off	ESC A	ESC A	ESC A
Transparent on	ESC ‘	ESC ‘	ESC ‘
Transparent off	ESC a	ESC a	ESC a
Bidirectional on	CTRL R	CTRL R	CTRL R
Bidirectional off	CTRL T	CTRL T	CTRL T
Secondary rec. on	ESC [= 27 h		
Secondary rec. off	ESC [= 27 l		
Page print			
Formatted	ESC P	ESC P	ESC P
All	ESC [0 ; 0 i	ESC [0 ; 0 i	
Unprotected	ESC [0 ; 1 i	ESC [0 ; 1 i	
Unformatted	ESC L	ESC L	ESC L
All	ESC [0 ; 4 i	ESC [0 ; 4 i	
Unprotected	ESC [0 ; 5 i	ESC [0 ; 5 i	
Page print flip on	ESC [= 15 h	ESC [= 15 h	
Page print flip off	ESC [= 15 l	ESC [= 15 l	
FUNCTION KEYS			
Select function key set	ESC [7 ; Ps v	ESC [7 ; Ps v	
Load function key	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	
Function key save off	ESC [= 10 l	ESC [= 10 l	
Send function key message	ESC [*Pn* |	ESC [*Pn* |	
Load editing key	ESC 0 Ps *p1 p2 p3*	ESC 0 Ps *p1 p2 p3*	ESC 0 Ps *p1 p2 p3*
Load all editing keys	ESC] Ps *p1...p60*	ESC] Ps *p1...p60*	ESC] Ps *ps...p60*
Load replace character	ESC e Ps	ESC e Ps	ESC e Ps
Program message	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
Reprogram print terminator	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
VERIFYING OPERATIONS			
Self test	ESC V		ESC V
Monitor mode on	ESC U	ESC U	ESC U
Monitor mode off	ESC X	ESC X	ESC X
	ESC u	ESC u	ESC u
CHANGING OPERATING VALUES			
Reset	**ESC ~ Pn**	**ESC ~ Pn**	**ESC ~ Pn**
KEYBOARD AND BELL			
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
THE SCREEN DISPLAY			
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 attrib.	ESC . n	**ESC . n**	
Toggle cursor on/off			ESC .
Set line attribute	**ESC G n**		**ESC G n**
CHARACTER SETS AND BLOCK GRAPHICS			
Display control char			ESC F Pc
Graphics mode on	ESC $	**ESC $**	**ESC $**
Graphics mode off	ESC %	**ESC %**	**ESC %**
Draw a box	**ESC H w h**		

Table C-2. TeleVideo 925/905/, 912/920, and 910 Commands (continued)

Command	925/905/910+	912/920	910
EDITING MODES			
Write protect on	ESC)	ESC)	ESC)
Write protect off	ESC (	ESC (	ESC (
Protect mode on	ESC &	ESC &	ESC &
Protect mode off	ESC '	ESC '	ESC '
ADDITIONAL SCREEN MEMORY			
Auto page			
Mode on	ESC v	ESC v	ESC v
Mode off	ESC w	ESC w	ESC w
Display page			
Next	ESC K	ESC K	ESC K
Previous	ESC J	ESC J	ESC J
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 _

Table C-2. TeleVideo 925/905/, 912/920, and 910 Commands (continued)

Command	925/905/910+	912/920	910
CURSOR CONTROL Continued			
Address the cursor			
Row, column	ESC = *rc*	ESC = *rc*	ESC = *rc*
Row			ESC [*r*
Column			ESC] *c*
Page, row, column	ESC - *prc*	ESC - *prc*	
Read the cursor			
Row, column	ESC ?	ESC ?	ESC ?
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
Line to nulls	ESC t	ESC t	**ESC t**
Page to spaces	ESC Y	ESC Y	ESC Y
Page to nulls	ESC y	ESC y	**ESC y**
Clear			
Unprotected	CTRL Z	CTRL Z	CTRL Z
to spaces	ESC ;	ESC ;	ESC ;
	ESC +	ESC +	
All to spaces		ESC +	
Unprotected	ESC :	ESC :	ESC :
to nulls			
All to nulls	ESC *	ESC *	ESC *
Unprotected to w.p. spaces	ESC ,		
Field	CTRL X	**CTRL X**	**CTRL X**

Table C-2. TeleVideo 925/905/, 912/920, and 910 Commands (continued)

Command	925/905/910+	912/920	910
SETTING UP HOST COMMUNICATIONS			
X-On/X-Off on	CTRL O	CTRL O	CTRL O
X-On/X-Off 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
Communication mode			
Block	ESC B	ESC B	ESC B
Conversational	ESC C	ESC C	ESC C
FDX	ESC D F		
HDX	ESC D H		
Local edit on	ESC k		
Local edit off	ESC l		
SENDING SCREEN TEXT			
Send			
Unprotected line	ESC 4	ESC 4	ESC 4
Unprotected page	ESC 5	ESC 5	ESC 5
Entire line	ESC 6	ESC 6	ESC 6
Entire page	ESC 7	ESC 7	ESC 7
One character			ESC M
Reprogram send delimiters	ESC x *Ps p1 p2*		
LOADING AND SENDING MESSAGES			
Send			
Unprot. message	ESC S	ESC S	ESC S
Entire message	ESC s	ESC s	ESC s
Terminal ID	ESC M	ESC M	
Answerback	CTRL E	CTRL E	CTRL E
Display			
Message line	ESC g		
Status line	ESC h		
Load 25th line	ESC f *msg* CTRL Y		
Program answerback message	ESC ^ *msg* CTRL Y		

Table C-2. TeleVideo 925/905/, 912/920, and 910 Commands (continued)

Command	925/905/910 +	912/920	910
PRINTING			
Print modes			
Copy on	ESC @	ESC @	ESC @
Copy off	ESC A CTRL T	ESC A CTRL T	ESC A CTRL T
Transparent on	ESC ‘	ESC ‘	**ESC ‘** CTRL R
Transparent off	ESC a	ESC a	**ESC a** CTRL T
Bidirectional on	CTRL R	CTRL R	
Bidirectional off	CTRL T	CTRL T	
Page print			
Formatted	ESC P	ESC P	ESC P
Unformatted	ESC L	ESC L	ESC L
Reprogram print terminator	ESC p Ps		
FUNCTION KEYS			
Load function key	ESC | p1 p2 *message* CTRL Y	**ESC | p1 p2** *message* **CTRL Y**	**ESC | p1 p2** *message* **CTRL Y**

C

D Other Command Summaries

The 965 offers 24 different terminal emulations. The commands for these terminals are summarized in Appendices C and D in the tables shown below.

Appendix C

Table	Terminals	Table	Terminals
C-1	TeleVideo 965 TeleVideo 955 TeleVideo 950	C-2	TeleVideo 925/905 TeleVideo 910/910+ TeleVideo 912/920

Appendix D

Table	Terminals	Table	Terminals
D-1	Wyse WY-60 Wyse WY-50/50+	D-2	ADDS VP A2 ADDS VP 60 LSI ADM 3A/5/31 Hazeltine 1500
D-3	DEC VT100 Data General DG200	D-4	PC TERM IBM 3101-1X/2X IBM 3161-V

NOTE The terminal recognizes **boldfaced** commands only during enhanced compatibility mode (enabled in the General set-up menu).

Table D-1. WY-60 and WY-50/50+ Commands

Command	WY-60	WY-50/50+
VERIFYING OPERATIONS		
Monitor mode on	ESC U	ESC U
Monitor mode off	ESC X	ESC X
	ESC u	ESC u
CHANGING OPERATING VALUES		
Reset terminal	ESC ! Pn	
Save set-up values	ESC ! 2	
KEYBOARD AND BELL		
Enable keyboard	ESC "	ESC "
	CTRL N	CTRL N
Disable keyboard	ESC #	ESC #
	CTRL O	CTRL O
Keyclick on	ESC e %	
Keyclick off	ESC e $	
Key repeat on	ESC e -	
Key repeat off	ESC e ,	
CAPS LOCK on	ESC e &	
CAPS LOCK off	ESC e '	
Normal CAPS LOCK	ESC e U	
Reverse CAPS LOCK	ESC e V	
Sound the beeper	CTRL G	CTRL G
THE SCREEN DISPLAY		
Screen saver on	ESC e Q	
Screen saver off	ESC e P	
Screen on	ESC ' 9	ESC ' 9
Screen off	ESC ' 8	ESC ' 8
Light background	ESC A 04	ESC A 04
Dark background	ESC A 00	ESC A 00
Set attribute	ESC G n	ESC G n
Write protect on	ESC)	ESC)
Write protect off	ESC (	ESC (
Set w.p. attribute	ESC ' Pn	ESC ' Pn

Table D-1. WY-60 and WY-50/50+ Commands (continued)

Command	WY-60	WY-50/50+
THE SCREEN DISPLAY Continued		
Set information line attribute	ESC A Pn Ps	ESC A Pn Ps
Attribute base		
Character	ESC e 0	
Nonembedded	ESC e 1	
Line	ESC e 3	
Page	ESC e 2	
Set cursor attribute	ESC ' n	ESC ' n
Set line attribute	ESC G Ps	
Set number of data lines	ESC e Ps	
80-column mode	ESC ' :	ESC ' :
132-column mode	ESC ' ;	ESC ' ;
80-column economy on	ESC e G	
80-column economy off	ESC e F	
CHARACTER SETS AND BLOCK GRAPHICS		
Auto font load on	ESC e O	
Auto font load off	ESC e N	
Graphics mode on	ESC H Ps	ESC H Ps
Graphics mode off	ESC H Ps	ESC H Ps
Draw a box	ESC c G rc	
EDITING MODES		
Line wrap on	ESC d /	
Line wrap off	ESC d .	
New line mode on	ESC e 5	
New line mode off	ESC e 4	
WordStar mode on	ESC ~ /	
WordStar mode off	ESC ~ .	
Application mode on	ESC ~ 3	
Application mode off	ESC ~ 2	
Protect mode on	ESC &	ESC &
Protect mode off	ESC '	ESC '

Table D-1. WY-60 and WY-50/50+ Commands (continued)

Command	WY-60	WY-50/50+
ADDITIONAL SCREEN MEMORY		
Set number of lines per page	ESC w Ps	
Split the screen	ESC x C Pl	ESC x C Pl
Split and clear	ESC x 3 Pl	ESC x 3 Pl
Split two pages	ESC x A Pl	ESC x A Pl
Split two pages and clear	ESC x 1 Pl	ESC x 1 Pl
Activate window		
Upper	ESC]	ESC]
Lower	ESC }	ESC }
Raise split line	ESC x R	ESC x R
Lower split line	ESC x P	ESC x P
Display a page		
Next page	ESC K	ESC K
Previous page	ESC J	ESC J
Page *Pn*	ESC w *Pn*	ESC w *Pn*
Close the window	ESC x @	ESC x @
Close and clear	ESC x 0	ESC x 0
Auto page mode on	ESC d +	ESC d +
Auto page mode off	ESC d *	ESC d *
SCROLLING		
Autoscroll mode on	ESC O	ESC O
Autoscroll mode off	ESC N	ESC N
Jump scroll	ESC ' @	ESC ' @
Smooth scroll	ESC ' =	ESC ' =
Set scroll rate	ESC ' Ps	ESC ' Ps
Line lock on	ESC ' H	ESC ' H
Line lock off	ESC ' I	ESC ' I
TAB STOPS		
Tab	CTRL I	CTRL I
Field tab	ESC i	ESC i
Back tab	ESC I	ESC I
Set tab stop	ESC 1	ESC 1
Clear cursor tab	ESC 2	ESC 2
Clear all tabs	ESC 0	ESC 0

Table D-1. WY-60 and WY-50/50+ Commands (continued)

Command	WY-60	WY-50/50+
CURSOR CONTROL		
Cursor home	CTRL ^	CTRL ^
	ESC {	ESC {
Cursor up	CTRL K	CTRL K
Cursor down	CTRL V	CTRL V
Cursor right	CTRL L	CTRL L
Cursor left	CTRL H	CTRL H
New line	CTRL _	CTRL _
Carriage return	CTRL M	CTRL M
Line feed	CTRL J	CTRL J
Reverse line feed	ESC j	ESC j
Address the cursor		
Row, column	ESC = *rc*	ESC = *rc*
Row, col decimal	ESC a *rc*	ESC a *rc*
Page, row, column	ESC - *prc*	ESC - *prc*
	ESC w @ *prc*	
Read the cursor		
Row, column	ESC ?	ESC ?
Row, col. decimal	ESC b	ESC b
Page, row, column	ESC /	ESC /
Page, row, column decimal	ESC w ‘	
EDITING TEXT		
Page edit mode	ESC e #	
Line edit mode	ESC e "	
Insert mode	ESC q	ESC q
Replace mode	ESC r	ESC r
Insert		
Character	ESC Q	ESC Q
Column of nulls	ESC c M	
Line	ESC E	ESC E
Delete		
Character	ESC W	ESC W
Cursor column	ESC c J	
Line	ESC R	ESC R

Table D-1. WY-60 and WY-50/50+ Commands (continued)

Command	WY-60	WY-50/50+
EDITING TEXT Continued		
Erase		
Line to spaces	ESC T	ESC T
Line to nulls	ESC t ESC c L	ESC t
Page to spaces	ESC Y	ESC Y
Page to nulls	ESC y	ESC y
Clear page		
Unprotected	CTRL Z	CTRL Z
to spaces	ESC ;	ESC ;
All to spaces	ESC +	ESC +
Unprotected to nulls	ESC :	ESC :
All to nulls	ESC *	ESC *
Unprotected to w.p. spaces	ESC ,	ESC ,
Uprotected to characters	ESC . Ps	ESC . Ps
Clear column		
To w.p. space	ESC V	ESC V
To nulls	ESC c K	
To character	ESC c I Pc	
Clear box		
Unprotected to character	ESC c F *r c Pc*	
All to character	ESC c H *r c Pc*	
SETTING UP HOST COMMUNICATIONS		
Configure ports		
Main	ESC c 0	
Auxiliary	ESC c 1	
Set main as host	ESC e 8	
Set aux. as host	ESC e 9	
Set handshaking		
Main receive	ESC c 2 n	
Main transmt	ESC c 4 n	
Aux. receive	ESC c 3 n	
Aux. transmit	ESC c 5 n	
Communication mode		
Block	ESC B	ESC B
Conversational	ESC C	ESC C
FDX	ESC D F	ESC D F
HDX	ESC D H	ESC D H

Table D-1. WY-60 and WY-50/50+ Commands (continued)

Command	WY-60	WY-50/50+
SETTING UP HOST COMMUNICATIONS		
Local edit on	ESC k	ESC k
Local edit off	ESC l	ESC l
Hold host transmission	CTRL S	CTRL S
Resume host transmission	CTRL Q	CTRL Q
Set transmit delay rate	ESC c 6 n	
ACK mode on	ESC e 7	
ACK mode off	ESC e 6	
Send/print block boundaries		
From screen top	ESC d '	
From page top	ESC d &	
End of page/line	ESC e E	
End at cursor	ESC e D	
Send		
Unprotected line	ESC 4	ESC 4
Unprotected page	ESC 5	ESC 5
Entire line	ESC 6	ESC 6
Entire page	ESC 7	ESC 7
Unprotected message	ESC S	ESC S
Entire message	ESC s	ESC s
One character	ESC M	
Terminal ID	ESC sp	
Answerback	CTRL E	CTRL E
LOADING AND SENDING MESSAGES		
Set status line	ESC ' Ps	
Load user message	ESC F *msg* CTRL M	
Load time of day	ESC c 8 *hh mm*	
Enhanced mode on	ESC ~ !	
Enhanced mode off	ESC ~ sp	

Table D-1. WY-60 and WY-50/50+ Commands (continued)

Command	WY-60	WY-50/50+
PRINTING		
Print modes		
Copy on	CTRL R	CTRL R
Copy off	CTRL T	CTRL T
Transparent on	ESC d #	
	CTRL X	
Transparent off	CTRL T	
Bidirectional on	ESC d %	
Bidirectional off	ESC d $	
Secondary receive on	ESC d !	
Secondary receive off	ESC d sp	
Page print		
Formatted	ESC P	ESC P
Unprotected	ESC @	ESC @
Unformatted	ESC L	ESC L
	ESC p	ESC p
FUNCTION KEYS		
Load function	ESC z p1 p2 *msg* DEL	ESC z n *msg* DEL
Load/display function key labels	ESC z Ps *msg* CTRL M	
REPROGRAMMING EDITING KEYS		
Load editing key	ESC Z p1 p2 *msg* DEL	

Table D-2. VP A2, VP 60, ADM, and HZ 1500 Commands

Command	VP A2	VP 60	ADM3A/ 5/31	HZ 1500
KEYBOARD AND BELL				
Enable keyboard	ESC 6 CTRL B	ESC 6	ESC " **CTRL N**	~CTRL F
Disable keyboard	ESC 5 CTRL D	ESC 5	ESC # **CTRL O**	~CTRL U
Sound the bell	CTRL G	**CTRL G**	CTRL G	CTRL G
THE SCREEN DISPLAY				
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 attr.		ESC 0 a		
Store control		ESC Z c		
CHARACTER SETS AND BLOCK GRAPHICS				
Graphics mode on	**ESC 1**	ESC 1		
Graphics mode off	**ESC 2**	ESC 2		
EDITING MODES				
Write protect on	CTRL N		ESC)	~CTRL Y
Write protect off	CTRL O		ESC (	~CTRL _
Cursor on	CTRL X			
Cursor off	CTRL W			
ADDITIONAL SCREEN MEMORY				
Display page				
Next			ESC K	
Previous			ESC J	
Auto page				
Mode on		ESC v		
Mode off			ESC w	
Forms mode		ESC R		
Modify mode		ESC C		

Table D-2. VP A2, VP 60, ADM, and HZ 1500 Commands (continued)

Command	VP A2	VP 60	ADM3A/ 5/31	HZ 1500
TAB STOPS				
Tab	CTRL I	CTRL I	CTRL I	CTRL I
Enable		ESC H		
Disable	ESC h			
Field tab			ESC i	CTRL I
Back tab	**ESC O**	CTRL 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		~CTRL K
Cursor right	CTRL F	CTRL F	CTRL L	CTRL P
Cursor left	CTRL U	CTRL U	CTRL H	CTRL H
	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 the cursor				
Row, column	ESC Y *r c*	ESC Y *r c*	ESC = *r c*	
Column, row		CTRL P *c r*		~CTRL Q *c r*
Row, column 132			**ESC = r ~ c**	
Row	CTRL K *r*	VT *r*		
Column	CTRL P *c*	DLE *c*		
Page, row, column			ESC - *p r c*	
Read the cursor				
Row, column		ESC ?		~CTRL E
Page, row, column			ESC /	
EDITING TEXT				
Insert mode			ESC q	
Replace mode			ESC r	
Insert				
Character	**ESC F**	ESC F	ESC Q	
Character (page)	ESC f			
Line	**ESC M**	ESC M	ESC E	~CTRL Z
Pn lines	ESC [*Pn* L			

Table D-2. VP A2, VP 60, ADM, and HZ 1500 Commands (continued)

Command	VP A2	VP 60	ADM3A/ 5/31	HZ 1500
EDITING TEXT Continued				
Delete				
Character	**ESC E**	ESC E	ESC W	
Character (page)	ESC e			
Line	**ESC l**	ESC l	ESC R	~CTRL S
Erase				
Line to spaces	ESC K	**ESC K**	ESC T	~CTRL O
Line to nulls			ESC t	
Page to spaces	ESC k **ESC J**	ESC k	ESC Y	~CTRL X
Page to w.p. space				~CTRL W
Page to nulls			ESC y	
Variable data		ESC G		
Clear page				
Unprotected to spaces		CTRL Z ESC ;		~CTRL]
All to spaces	CTRL L	CTRL L	ESC +	~CTRL \
Unprotected to nulls		ESC :		
All to nulls		ESC *		
Unprotected to w.p. spaces			ESC ,	
SETTING UP HOST COMMUNICATIONS				
Communication mode				
Block	**ESC t**	ESC t	ESC B	
Conversational	**ESC T**	ESC T	ESC C	
Full duplex			ESC D F	
Half duplex			ESC D H	
Conversational		ESC V		
Page		ESC U		
Message	ESC u			
Transmit		ESC DC1		
Read status		ESC ENQ		
Hold host transmission	CTRL S			
Resume host transmission	CTRL Q			

Table D-2. VP A2, VP 60, ADM, and HZ 1500 Commands (continued)

Command	VP A2	VP 60	ADM3A/ 5/31	HZ 1500
SENDING SCREEN TEXT				
Reprogram send delimiters			**ESC . n m**	
Send				
Unprotected line		ESC 4		
Unprotected page		ESC 5		
Entire line			ESC 6	
Entire page			ESC 7	
Unprotected message			ESC S	
Entire message	ESC s			
One character				~CTRL T
Terminal ID				
Answerback			CTRL E	
PRINTING				
Print modes				
Copy on	CTRL R	CTRL R	CTRL R **ESC A 2**	**CTRL R**
Copy off	CTRL T	CTRL T	CTRL T **ESC A 0**	**CTRL T**
Transparent on	ESC 3	ESC 3	**ESC A 1**	**ESC ***
Transparent off	ESC 4	ESC 4	CTRL T	**ESC /**
Page print				
Formatted	**ESC X**	ESC X	ESC P	
Unprotected			**ESC @**	
Unformatted	**ESC x**	ESC x	ESC L	
LOADING AND SENDING MESSAGES				
Display				
Message line	**ESC B**	ESC B	**ESC {**	**~CTRL N**
Status line	**ESC b**	ESC b	**ESC }**	**~CTRL P**
FUNCTION KEYS				
Load function key	**ESC | p1 p2** *msg* CTRL Y		**ESC |**	*msg* CTRL Y
REPROGRAMMING EDITING KEYS				
Load replace character			**ESC . 8 m**	

Table D-3. DG200 and VT100 Commands

Command	DG200	VT100 ANSI	VT52
Basic Modes			
Alternate Keyboard Mode On		ESC =	ESC =
Alternate 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 motion			
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

Table D-3. DG200 and VT100 Commands (continued)

Command	DG200	VT100 ANSI		VT52
Address the cursor				
Row, column		ESC [Pl ; Pc H		
Column, row	CTRL P c r			ESC Y r c
Cursor and attributes				
Select character attribute		ESC [Ps;...;Ps m		
Save cursor and 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		
Clear page all to spaces	CTRL L			
Erase				
Line to spaces	**CTRL K**			
Page to spaces	RS F			
Cursor to end of line		ESC [0 K		ESC K
Beg. of line to cursor		ESC [1 K		
Entire cursor line		ESC [2 K		
Cursor to end of scr.		ESC [0 J		ESC J
Beginning of screen to cursor		ESC [1 J		
Entire screen		ESC [2 J		
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
Define scrolling region		ESC [Pt ; Pb r		
Autoscroll mode on	CTRL R			
Autoscroll mode off	CTRL S			
Tab stops				
Set a single tab		ESC H		
Clear a single tab		ESC [0 g		
Clear all tabs		ESC [3 g		

Table D-3. DG200 and VT100 Commands (continued)

Command	DG200	VT100 ANSI	VT52
Screen attributes			
Blinking on	CTRL N		
Blinking off	CTRL O		
Underline on	CTRL T		
Underline off	CTRL U		
Write protect on	CTRL \		
Write protect off	CTRL]		
Print modes			
Copy on	RS ETX		
Copy off	RS STX		
Transparent on	RS SOH		
Transparent off	RS STX		
Print from cursor line			
All	CTRL Q		
Unprotected	CTRL A		
Reports			
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 3161, and 3101 Commands

Command	PC TERM	IBM 3161	IBM 3101
Monitor Mode			
Monitor mode on	ESC U	ESC <sp>:	
Monitor mode off	ESC X 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[1]
Terminal and Keyboard			
Unlock keyboard	ESC "	ESC;	ESC;
Unlock keyboard and reset MDT		ESC ! s	
Lock keyboard	ESC #	ESC:	ESC:
Keyclick on	ESC >		
Keyclick off	ESC <		
Sound beeper	CTRL G		
Set margin bell	ESC o		
Clear margin bell	ESC n		
Redefining the Keys			
Program function key definition	ESC | p1 p2 *message* CTRL Y	ESC ! = Fn Ff Fp ESC	
Set default function key		ESC t Fn	
Set all default function keys		ESC <sp> t	
Screen and Cursor			
Screen display on	ESC N		
Screen display off	ESC O		
Display test pattern	ESC F		
Dark text on light background	ESC b		
Light text on dark background	ESC d		
Load text into the message line	ESC f *text* CTRL M		
Display the message line	ESC g		
Display send mark		ESC E	ESC E[1]
Display previous page	ESC J		
Display next page	ESC K		

1 Model 2X only

Table D-4. PC TERM, IBM 3161, and 3101 Commands (Continued)

Command	PC TERM	IBM 3161	IBM 3101
Attributes			
Set field attribute		ESC 3 *Pa1 ... Pa4*	
Set character attribute		ESC 4 *Pa1*	
Define visual attribute	ESC G Ps		
Set cursor attribute	ESC . Ps		
Protecting Data			
Write-protect mode on	ESC)		
Write-protect mode off	ESC (		
Protect mode on	ESC &		
Protect mode off	ESC '		
Graphics Characters			
Graphics mode on	ESC $		
Graphics mode off	ESC %		
Viewport/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
New line (LF/CR)	CTRL _		
Carriage return	CTRL M	ESC 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
Cursor down	CTRL V	ESC B	ESC B
Cursor right	CTRL L	ESC C	ESC C
Cursor left	CTRL H	ESC D	ESC D

Table D-4. PC TERM, IBM 3161, and 3101 Commands (continued)

Command	PC TERM	IBM 3161	IBM 3101
Address the cursor			
Row, column	ESC = *r c*	ESC Y *Pr Pc*	ESC Y *r c*
Cursor location		ESC Z	
Page, row, column	ESC - *p r c*		
Set buffer address			ESC X
Insert cursor			ESC Z
Read row, column	ESC ?		
Buffer Address			
Set buffer address		ESC X *Pr Pc*	
Reset buffer address mode		ESC Z	
Editing			
Set tab stop	ESC 1	ESC 0	ESC 0
Clear tab stop	ESC 2	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[1]
Start field			ESC 3 x[1]
Insert mode on	ESC Z		
Replace mode on	ESC r		
Insert space	ESC Q		
Insert line of spaces	ESC E	ESC N	ESC N
Delete line	ESC R	ESC O	ESC O
Insert a character		ESC P Pa	ESC P
Delete character	ESC W	ESC Q	ESC Q
Erasing Data			
Erase EOL/F		ESC I	ESC I
Erase input		ESC K	ESC K
Erase EOP		ESC J	ESC J

1 Model 2X only

Table D-4. PC TERM, IBM 3161, and 3101 Commands (continued)

Command	PC TERM	IBM 3161	IBM 3101
Clearing Data			
Clear all to nulls		ESC ! L	
Clear page to nulls	ESC *	ESC L	ESC L
Clear page to w.p. spaces	ESC ,		
Clear unprotected	ESC ;		
page to spaces	ESC +		
	CTRL Z		
Clear unprotected page to nulls	ESC :		
Clear unprot. page to sp. from cursor	ESC Y		
Clear unprot. page to nulls from cursor	ESC y		
Clear unprot. line to sp. from cursor	ESC T		
Clear unprot. line to nulls from cursor	ESC t		
Sending 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
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
Report terminal model		ESC ! 6	ESC Y r c
Report cursor address		ESC 5	
Report attribute under cursor	ESC D		
Report setup			ESC 7 c0 c1
Program the answer-	ESC] *msg*		
back message	CTRL M		
Send the answerback message	CTRL E		
Set/Read Control			
Set Control			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	

Table D-4. PC TERM, IBM 3161, and 3101 Commands (continued)

Command	PC TERM	IBM 3161	IBM 3101
Set/Read Control (continued)			
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		
Print Functions			
Set print terminator	ESC p Ps		
Define delimiters	ESC x Ps P1 P2		
Print all unprotected	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[1]
Print message			ESC V[1]
Print page			ESC W[1]

1 Model 2X only

E Key Codes

Key Legend	VT100 Function	Key Legend	VT100 Function
Line Delete	PF1	Prev/Next Page	PF3
Page Erase	PF2	Clear Space	PF4

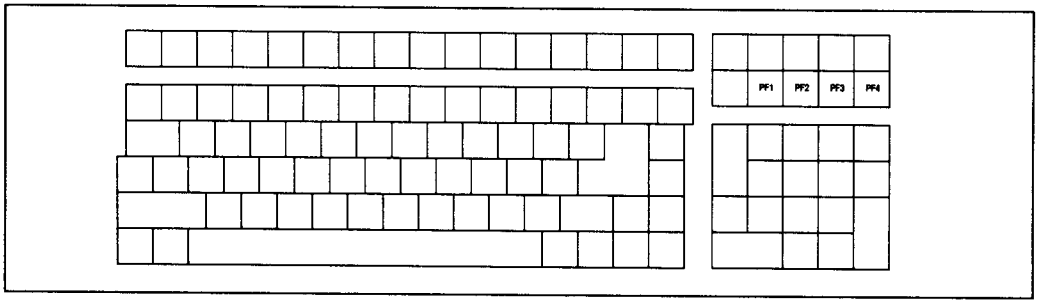


Figure E-1. ASCII Keyboard in VT100 Mode

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

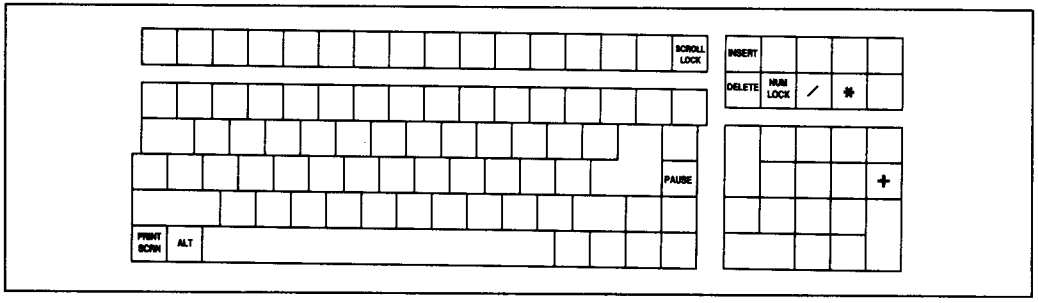


Figure E-2. ASCII Keyboard in PC TERM Mode

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

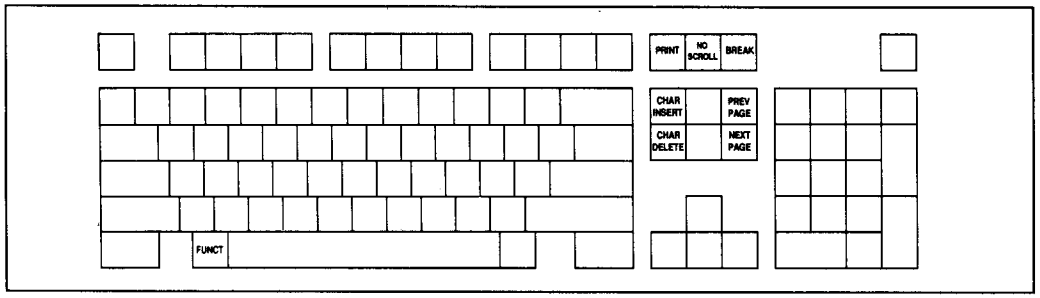


Figure E-3. Enhanced PC Keyboard in ASCII Mode

Key Legend	VT100 Function
Print Screen	Print
Scroll Lock	No Scroll
Pause	Break
Num Lock	PF1
/	PF2
*	PF3
-	PF4

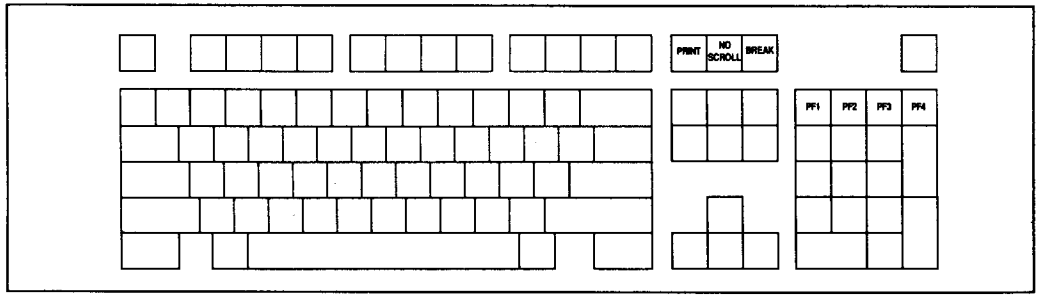


Figure E-4. Enhanced PC Keyboard in VT100 Mode

Key Legend	ASCII Function
F17	Print
F18	Break
F19	Set-Up/No Scroll
F20	Send
Compose	Funct

Key Legend	ASCII Function
Insert	Char Insert
Remove	Char Delete
Prev Screen	Prev Page
Next Screen	Next Page

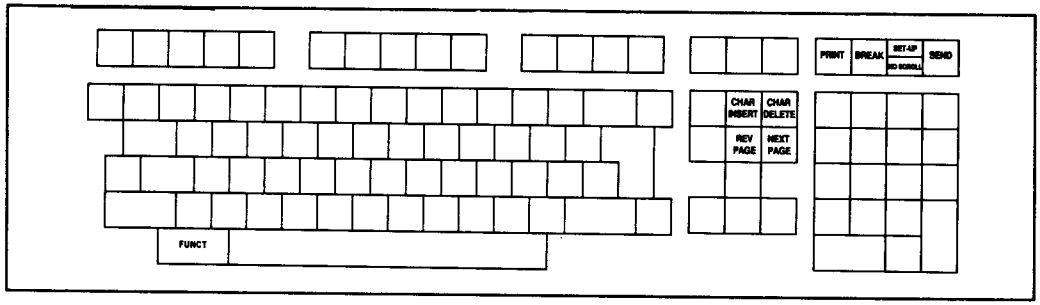


Figure E-5. ANSI Keyboard in ASCII Mode

Key Legend	PC TERM Function
F17	Print Screen
F18	Pause
F19	Set-Up/No Scroll
Compose	Alt
Insert	Home
Remove	PgUp
Prev Screen	End
Next Screen	PgDn

Key Legend	PC TERM Function
Find	Insert
Select	Delete
PF1	Num Lock
PF2	/
PF3	*
PF4	-
, (keypad)	+

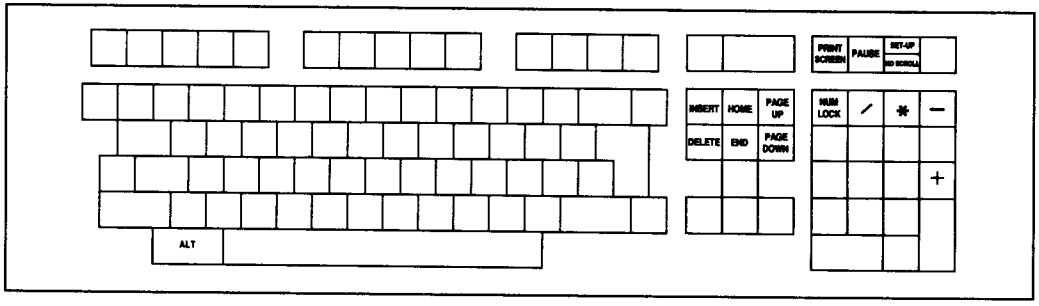


Figure E-6. ANSI Keyboard in PC TERM Mode

Table E-1. 965 Local Keyboard Functions[1]

In this table, ^ means **Ctrl** and § means **Shift**

Function	ASCII	Enhanced PC	ANSI
Enter/Exit Set-Up	§ Setup	§ Setup	§ F19
Partial Reset	^ § Setup	^ § Setup	^ § F19
Block/Duplex	^ § Enter	^ § Enter	^ § Enter
Toggle Port	^ § Break	^ § Break	^ § F18
Copy Print On/Off	^ § Print	^ § Prt Scr	^ § F17
WordStar Mode +/-	^ .[2]	^ .[2]	^ .[2]
Monitor Mode +/-	^ § 1[2]	^ § 1[2]	^ § 1[2]
Insert/Replace Mode	^ Char Insrt	^ § Insert	^ Insert
Keyclick On/Off	^ Enter	^ Enter	^ Enter
Screen Saver +/-	^ Clear Spc	— — —	^ Remove
Clear Screen	^ § Clr Sp	— — —	^ § Remove
Clock	Funct F1	^ F1	Compose F1
Calendar	Funct F2	^ F2	Compose F2
Calculator	Funct F3	^ F3	Compose F3
ASCII Chart	Funct F4	^ F4	Compose F4
Page 0	^ 0	^ 0	^ 0
Page 1	^ 1	^ 1	^ 1
Page 2	^ 2	^ 2	^ 2
Page 3	^ 3	^ 3	^ 3
Page 4	^ 4	^ 4	^ 4
Page 5	^ 5	^ 5	^ 5
Page 6	^ 6	^ 6	^ 6
Status Line +/-	^ —	^ —	^ —
Horiz Scroll (80)	^ § —	^ § —	^ § —
Horiz Scroll (132)	^ § —	^ § —	^ § —
Raise/Lower Split	^ -[2]/^ ,[2]	^ -2/^ ,[2]	^ -[2]/^ ,[2]
Next Page/Window	^ Page	^ Page Up	^ Next Screen
Prev Page/Window	^ § Page	^ Page Dwn	^ Prev Screen
Scroll Up/Down	^ ↑ ↓	^ ↑ ↓	^ ↑ ↓
Incr/Decr Scroll	^ § ↑ ↓	^ § ↑ ↓	^ § ↑ ↓

1 In PC TERM mode, Setup is the only local keybaord function supported.
2 Located on the Numeric Keypad.

Table E-2. Native Mode Key Codes

Editing Keys

Key	Code Alone	Shifted	Key	Code Alone	Shifted
HOME	CTRL ^	CTRL ^	CE	CTRL X	ESC 0
DOWN	CTRL V	CTRL J	CHAR INSRT	ESC Q	ESC Q
UP	CTRL K	ESC j	CHAR DELTE	ESC W	ESC W
RIGHT	CTRL L	CTRL L	LINE INSERT	ESC E	ESC E
LEFT	CTRL H	CTRL H	LINE DELETE	ESC R	ESC R
BACK SPACE	CTRL H	CTRL H	LINE ERASE	ESC T	ESC t
TAB (main)	CTRL I	ESC I	PAGE ERASE	ESC Y	ESC y
LINE FEED	CTRL J	CTRL J	TAB (kypad)	CTRL I	CTRL I
ENTER	CTRL M	CTRL M	SEND	ESC 7	ESC 6
RETURN	CTRL M	CTRL M	PRINT	ESC P	ESC L
CLEAR SPACE	CTRL Z	ESC *	PAGE	ESC K	ESC J

Function Key Codes

Key	Set One Alone	Shifted	Set Two Alone	Shifted
F1	SOH @ CR	SOH ' CR	SOH P CR	SOH p CR
F2	SOH A CR	SOH a CR	SOH Q CR	SOH q CR
F3	SOH B CR	SOH b CR	SOH R CR	SOH r CR
F4	SOH C CR	SOH c CR	SOH S CR	SOH s CR
F5	SOH D CR	SOH d CR	SOH T CR	SOH t CR
F6	SOH E CR	SOH e CR	SOH U CR	SOH u CR
F7	SOH F CR	SOH f CR	SOH V CR	SOH v CR
F8	SOH G CR	SOH g CR	SOH W CR	SOH w CR
F9	SOH H CR	SOH h CR	SOH X CR	SOH x CR
F10	SOH I CR	SOH i CR	SOH Y CR	SOH y CR
F11	SOH J CR	SOH j CR	SOH Z CR	SOH z CR
F12	SOH K CR	SOH k CR	SOH [CR	SOH { CR
F13	SOH L CR	SOH l CR	SOH \ CR	SOH | CR
F14	SOH M CR	SOH m CR	SOH] CR	SOH } CR
F15	SOH N CR	SOH n CR	SOH ^ CR	SOH ~ CR
F16	SOH O CR	SOH o CR	SOH _ CR	SOH ▒ CR

Table E-3. Application Mode Key Codes

Editing and Special Keys

Key	Hex Code Unshifted	Shifted
LEFT	88	80
TAB (main)	89	81
DOWN	8A	82
UP	8B	83
RIGHT	8C	84
RETURN	8D	85
HOME	8E	86
BACK SPACE	8F	87
LINE FEED	90	A0
PRINT	92	A2
CLEAR SPACE	93	A3
CHAR INSRT	94	A4
CHAR DELTE	95	A5

Key	Hex Code Unshifted	Shifted
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 (kypad)	F6	F7
CE	F8	F9
BREAK	FB	FC
NO SCROLL	FD	–

Function Keys

Key	Hex Code Unshifted	Shifted
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

Numeric Keypad

Key	Hex Code
0	B0
1	B1
2	B2
3	B3
4	B4
5	B5
6	B6
7	B7
8	B8
9	B9
,	BC
-	BD
.	BE
00	FA

Table E-4. WordStar Mode Key Codes

Key	Unshifted	Command	Shifted	
HOME	^QE	Top of screen	^QR	Beginning of file
DOWN	^X	Down line	^Z	Up line
UP	^E	Up line	^W	Down line
LEFT	^S	Left character	^A	Left word
RIGHT	^D	Right character	^F	Right word
TAB (main)	^I	Tab right	^QB	Block beginning
TAB (kypad)	^I	Tab right	^QK	Block end
PAGE	^C	Up screenful	^R	Down screenful
CLEAR	^QX	Bottom of screen	^QC	End of file
CHAR INSRT	^V	Insert on/off	^QP	Previous position
CHAR DELTE	^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	^U	Interrupt	^KJ	Delete file
PRINT	^PB	Boldface beg./end	^PS	Underscore beg./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 line
F4	^OS	Line space setting	^OG	Paragraph tab
F5	^KB	Mark block beg.	^KK	Mark block end
F6	^QF	Find string	^QA	Find & replace
F7	^L	Find/replace again	^QV	Start of last find/replace
F8	^JH	Set help level	^QQ	Repeat next cmand.
F9	^QZ	Continuous up scroll	^QW	Continuous down scr.
F10	.HE	Heading	.FO	Footing
F11	.PA	New page	^PD	Double strk. beg./end
F12	^PV	Subscript beg./end	^PT	Superscript beg./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 edit

E

F Keyboard Layouts

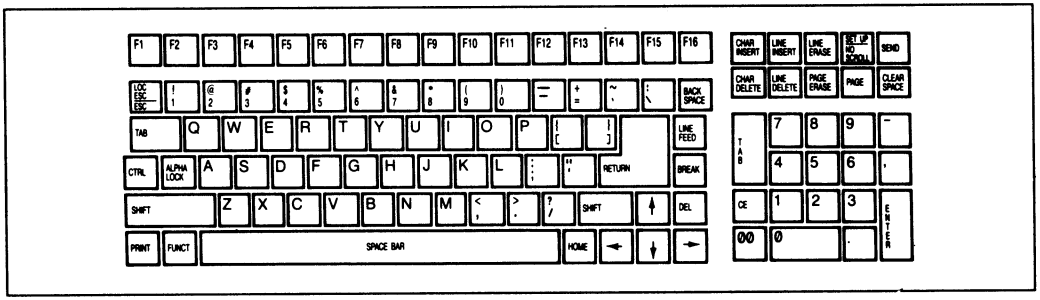


Figure F-1. U.S. ASCII Keyboard Layout

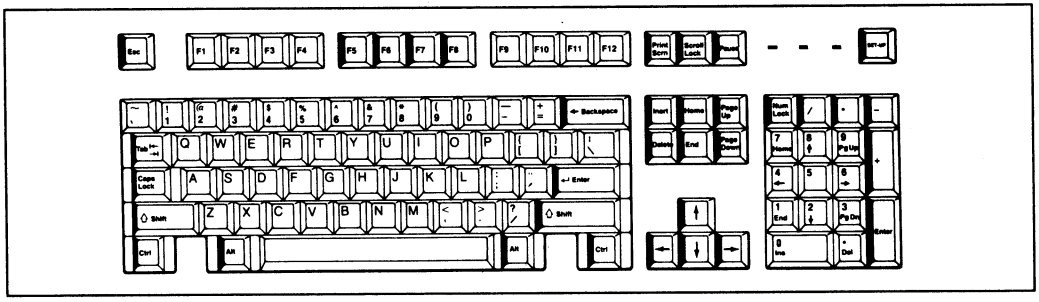


Figure F-2. U.S. Enhanced PC Keyboard Layout

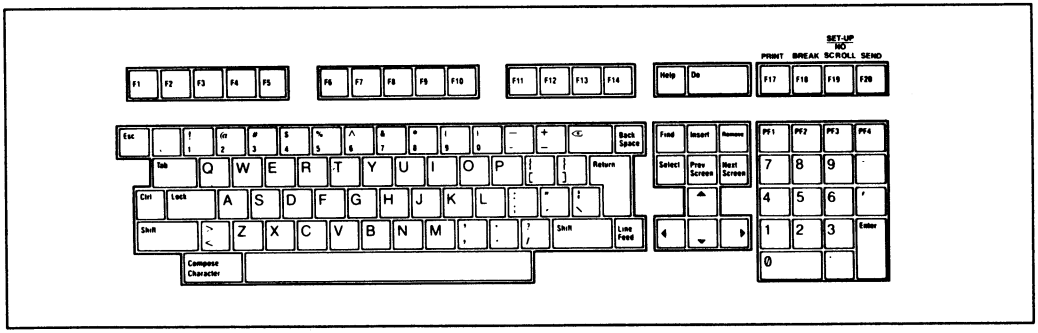


Figure F-3. U.S. ANSI Keyboard Layout

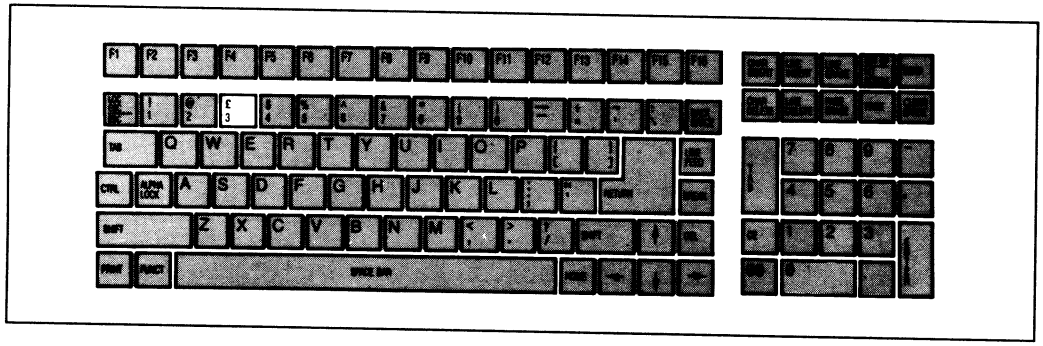


Figure F-4. U.K. Keyboard Layout

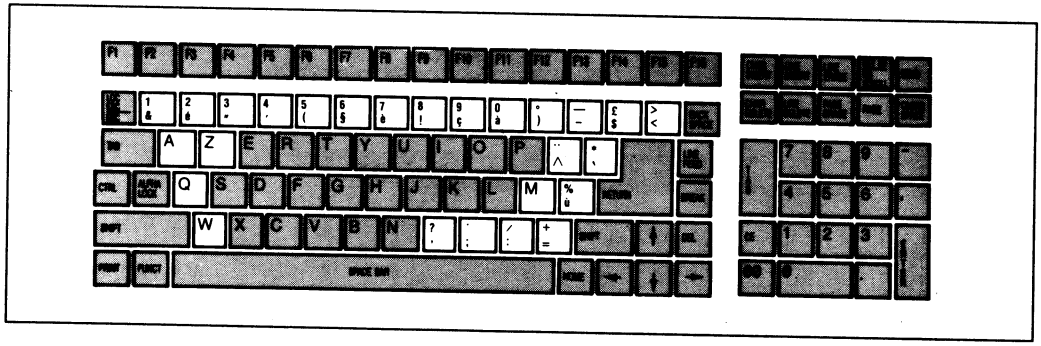


Figure F-5. French Keyboard Layout

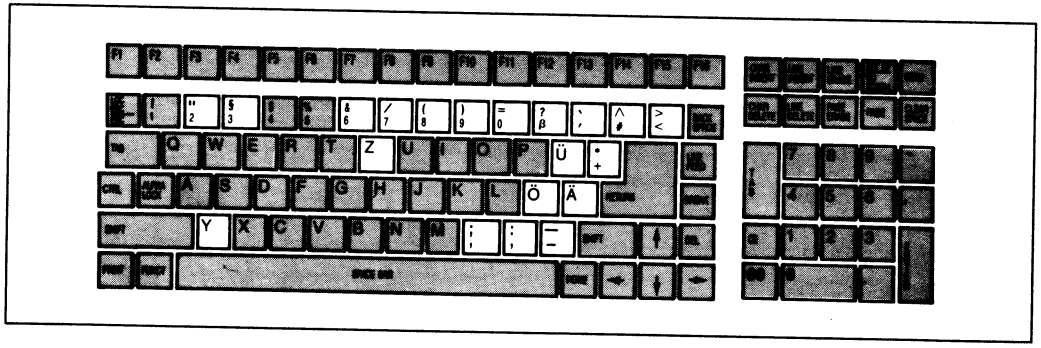


Figure F-6. German Keyboard Layout

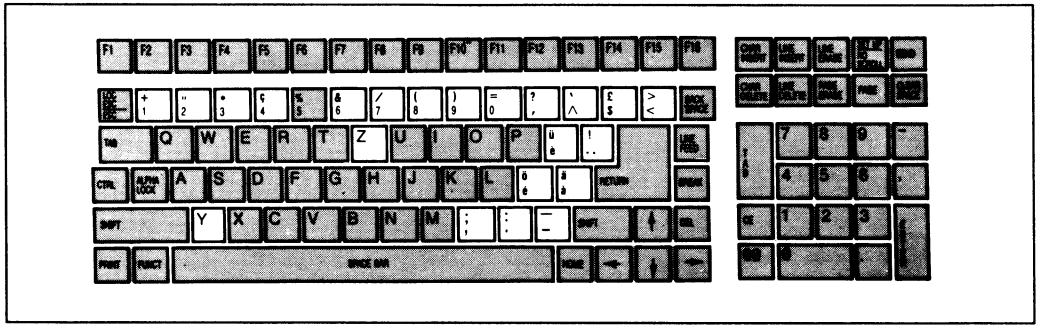


Figure F-7. Swiss (French) Keyboard Layout

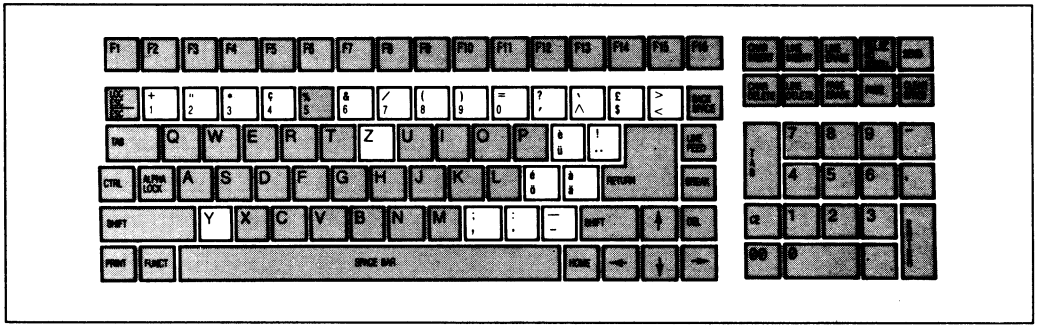


Figure F-8. Swiss (German) Keyboard Layout

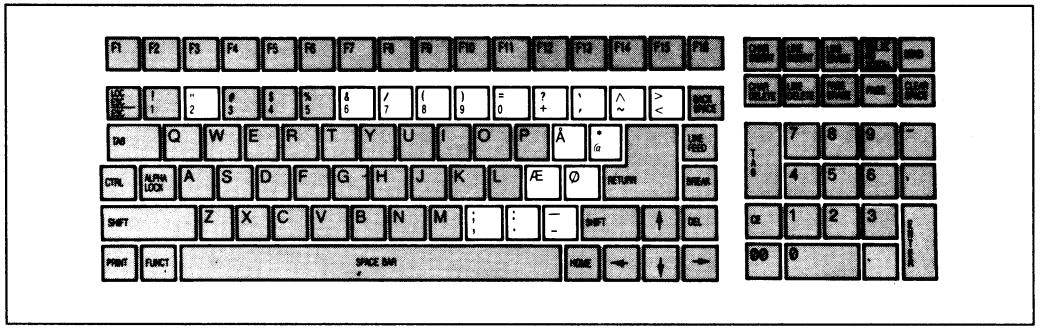


Figure F-9. Danish Keyboard Layout

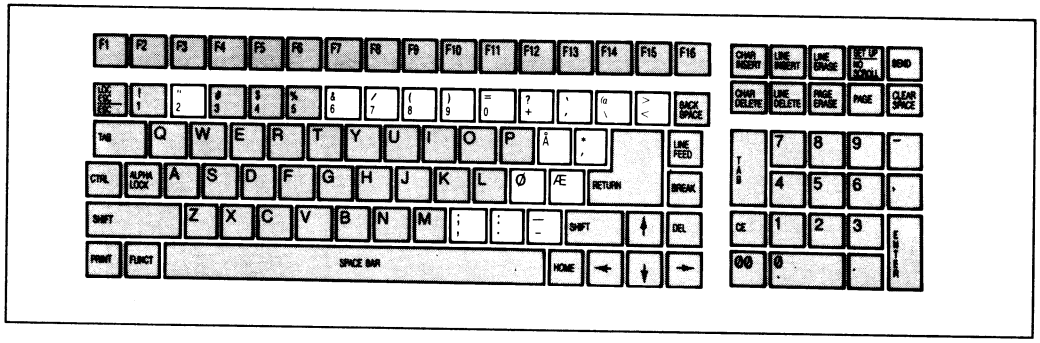


Figure F-10. Norwegian Keyboard Layout

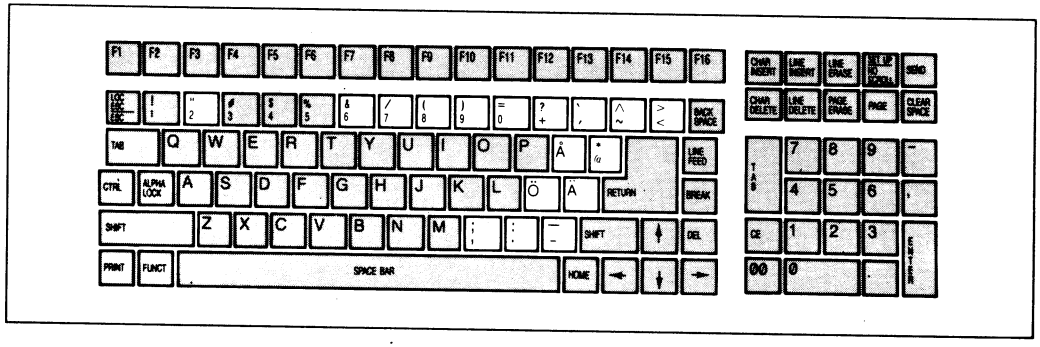


Figure F-11. Swedish/Finnish Keyboard Layout

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

G

H Status Line Messages

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

H

Glossary

ACK An ASCII character (hex 06) meaning acknowledgement. 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 9220 terminals are connected to the computer, the fifth 9220 terminal could be programmed to reply, "9220 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.

bidirectional 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 digi**t**. 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: cathode ray tube. 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: Clear to Send. 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: Data Carrier Detected. 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: Data Communications Equipment. 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 lowercase character that hangs below the main body of the character. The tail of the lowercase **y** is a descender. A terminal with true descenders (such as TeleVideo's) displays the tail below the main line of text.

DIP Switches Acronym: Dual In-Line Package. A panel of very small switches.

display The amount of data that can be viewed on the terminal screen at one time. See **page, screen.**

display characters Characters that appear on the terminal's screen, including alphanumeric and graphic symbols. See **char-**

acters, 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: **D**ata **T**erminal **R**eady. 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 Bidirectional 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: **E**nd of **M**essage. An ASCII control character (hex 19) sometimes marking the end of a block transmission.

EPROM Acronym: **E**rasable, **P**rogrammable **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: **E**nd of **T**ext. 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 rollover 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.

nonvolatile 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 **nonvolatile 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: **R**ead-**O**nly **M**emory. 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: **R**equest **t**o **S**end. 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 redisplay 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) signalling 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 terminal 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, bidirectional print, page print.**

unformatted Screen data that contains no delimiters markingline 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.**

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