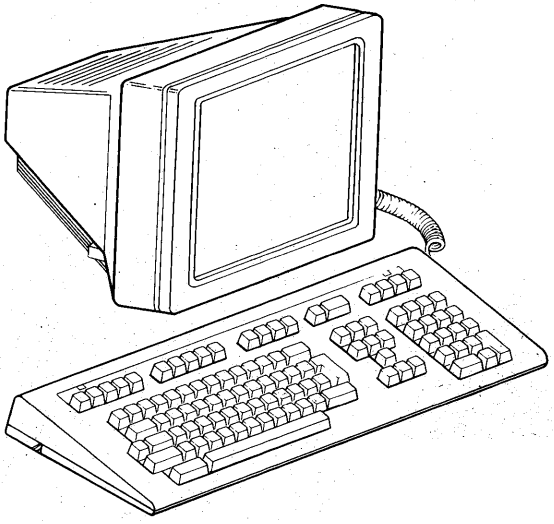
EK-VT320-UU-001

Installing and Using

The VT320

Video Terminal



International Model

digital™

EK-VT320-UU-001

Installing and Using

The VT320

Video Terminal

Prepared by Educational Services
of Digital Equipment Corporation

1st Edition, June 1987

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FCC Notice: This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Move the computer away from the receiver.
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the booklet *How to Identify and Resolve Radio/TV Interference Problems,* prepared by the Federal Communications Commission, helpful. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

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DECserver	MicroVAX	RSX	Work Processor
DECUS			

This manual was prepared using DECpage software and other in-house documentation software.

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ABOUT THIS MANUAL

This manual provides the information you need to install, operate, and maintain your VT320 video terminal. The manual also provides a summary of the control functions that programmers can use when writing applications for the VT320 terminal. For more detailed programming information, you can order the *VT320 Programmer Reference Manual* from Digital. See Appendix B for ordering information and a complete list of related documentation.

This manual describes the international version of the VT320 terminal, for Western European countries. A North American version is also available.

ORGANIZATION

This manual has seven chapters and five appendices.

- Chapter 1, "Installation", describes how to connect your terminal to a host computer system and select the correct baud rate.
- Chapter 2, "A Look at the Terminal", gives you an overview of the VT320 terminal and its features.
- Chapter 3, "The Keyboard", describes the function of the keyboard's keys, bells, and indicator lights.
- Chapter 4, "Set-Up" describes the VT320 set-up screens. You use the set-up screens to change the settings of operating features from the keyboard.
- Chapter 5, "Composing Characters", describes how to select characters that do not appear as standard characters on your keyboard (for example, accented letters).

- Chapter 6, "Printers and Modems", describes how to use a printer or modem with the terminal.
- Chapter 7, "Solving Problems and Getting Service", provides suggested solutions for typical operating problems and tells you where to get more help.
- Appendix A lists VT320 specifications.
- Appendix B lists options, related documentation, and ordering information.
- Appendix C provides detailed information on communication with a host computer system, including cables and connector signals.
- Appendix D shows each keyboard model for the VT320 terminal.
- Appendix E is a summary of the control functions that programmers can use with the VT320 terminal. The appendix shows the character sets built into the terminal.

CONVENTIONS

Warnings, cautions, and notes appear throughtout this manual. They have the following meanings.

- Warnings provide information to prevent personal injury.
- Cautions provide information to prevent damage to the equipment.
- Notes provide general operating information.

Set-up features and keyboard keys appear in bold type.

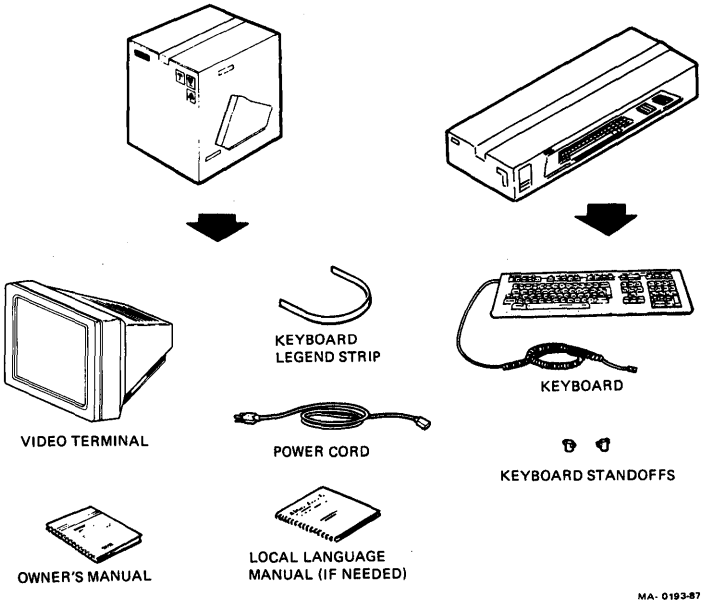
Examples: Press the **Return** key.
Use the **Clear Comm** feature in the Set-Up Directory screen.

INSTALLATION 1

This chapter provides step-by-step instructions to install and turn on your terminal. Perform each step in order.

Unpack and check the contents of each carton.

If you have missing or damaged items, contact your sales representative and delivery agent.

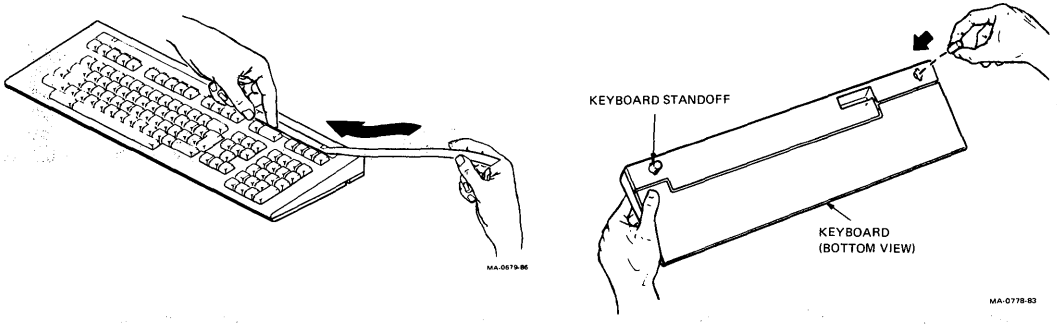


Place the terminal on a level surface.

If you have the optional tilt-swivel base, install it now. The base comes with installation instructions. To order the base, see Appendix B.

Install the keyboard's legend strip and standoffs.

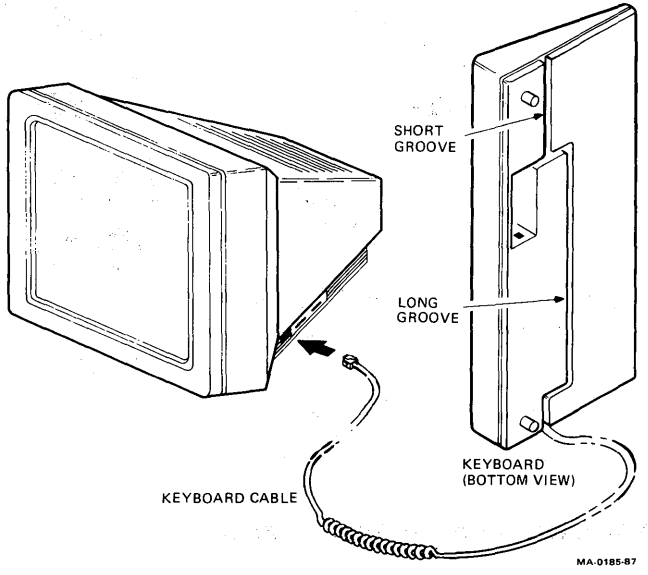
To install the legend strip, slide it under the tabs.



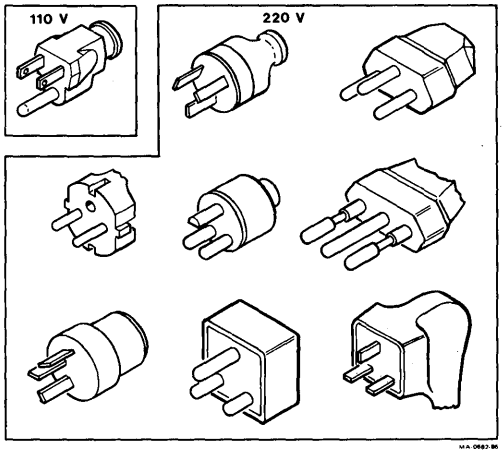
Connect the keyboard to the video terminal.

1. The keyboard cable is already connected to the keyboard and routed to the left. If you want the cable routed to the right, remove the cable from the short groove and press it into the long groove.

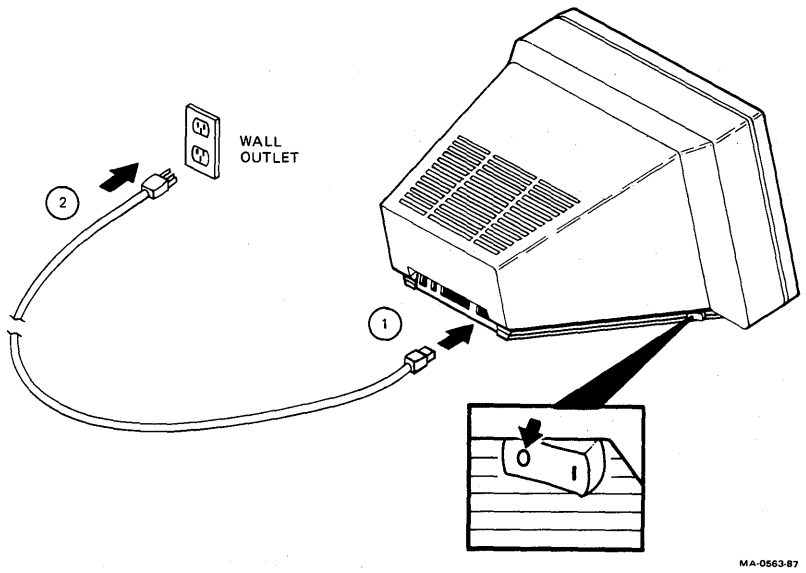
2. Insert the other end of the cable into the connector on the right side of the terminal.



Match the power cord to your wall outlet.

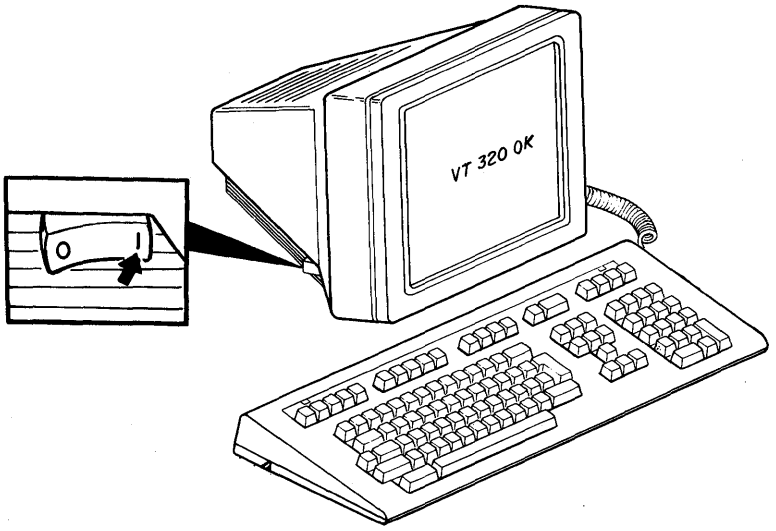


Make sure the power switch is off (0). Then plug the power cord into the terminal and into the wall outlet.



Turn on your terminal.

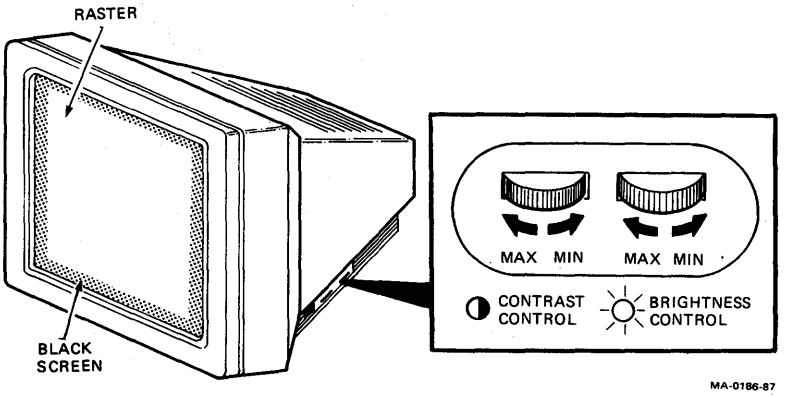
1. Turn the power switch on (1).
2. Listen for a bell tone from the keyboard. Then wait about 15 seconds for a "VT320 OK" message to appear on the screen.



NOTE: If you had problems, see "Operating Problems" in Chapter 7.

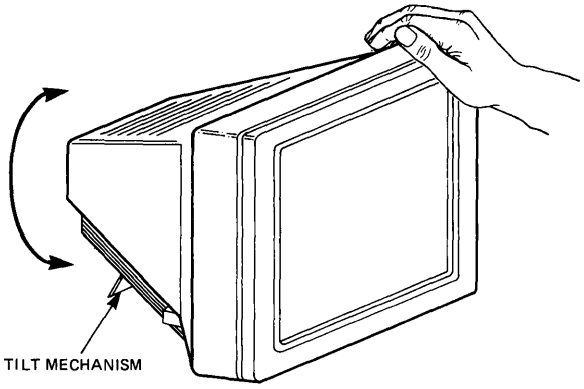
Set the brightness and contrast controls.

1. Set the brightness and contrast to maximum.
2. Decrease the brightness until the background (raster) just disappears.
3. Decrease the contrast to the desired intensity.

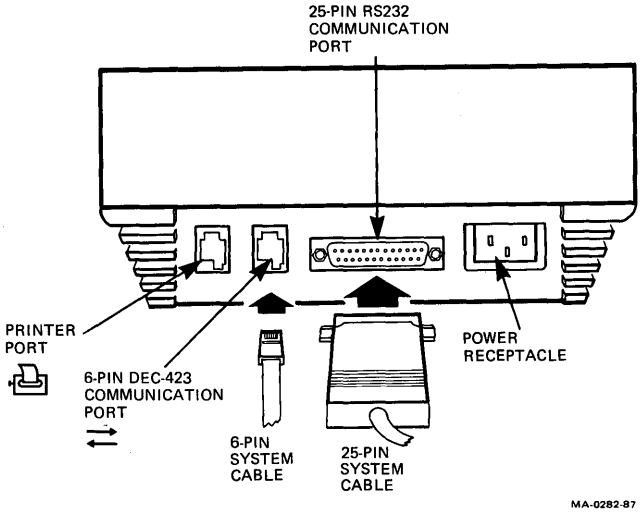


Adjust the viewing angle.

Grasp the terminal and raise the rear, until the screen is at the desired viewing angle.



Connect the system cable and printer cable (if used).



You connect your system cable to one of the two communication ports on the rear of the terminal — the 25-pin RS232 connector or the 6-pin DEC-423 connector. Check your system cable to see whether you have a 25-pin plug or a 6-pin jack.

Only one communication port is active at a time. By default, the 25-pin RS232 port is active.

If you use a 25-pin system cable: Simply plug the cable in. Then go on to the next section, "Selecting the Correct Keyboard Language".

If you use a 6-pin system cable: You must set the **Host Port Selection** feature in the Communications Set-Up screen to "DEC-423, Data Leads Only", as follows.

NOTE: Chapter 4 shows each set-up screen.

1. Press the **Set-Up** key to display the Set-Up Directory.
2. Use the → key to move the cursor to "Comm". Press the **Enter** key to display the Communications Set-Up screen.
3. Use the arrow keys to move the cursor to "RS232, Data Leads Only". Press **Enter** to change the setting. Each time you press **Enter**, a new setting appears. Stop when the setting reads "DEC-423, Data Leads Only". If you go too far, keep pressing **Enter** until the setting is correct.
4. Use the arrow keys to move the cursor to "To Directory". Press **Enter** to display the Set-Up Directory again.
5. Move the cursor to "Save". Press **Enter** to save your new setting. Each time you turn on the terminal, the VT320 will use the "DEC-423, Data Leads Only" setting.
6. Press **Set-Up** to leave set-up.

After you connect the system cable, the terminal is ready for use with your host system. If your terminal fails to operate, see "Operating Problems" in Chapter 7.

SELECTING THE CORRECT KEYBOARD LANGUAGE

You must select the appropriate keyboard language from the Set-Up Directory screen, as follows.

NOTE: Chapter 4 shows each set-up screen.

1. Press the **Set-Up** key to display the Set-Up Directory.
2. Use the arrow keys to move the cursor to "North American Keyboard".
3. Press the **Enter** key to select the setting you want. Each time you press **Enter**, the setting changes. There are 15 possible settings.

4. Move the cursor to "Save". Press the **Enter** key to save your new keyboard language setting. Each time you turn on the terminal, the VT320 will use your saved settings.

5. Press **Set-Up** to leave set-up.

SELECTING THE CORRECT BAUD RATE

The VT320 is initially set to a baud rate of 9600. This setting works with most Digital systems. The baud rate setting must match the baud rate of your host system. If you need to change the setting, use the following steps.

NOTE: Chapter 4 shows each set-up screen.

1. Press the **Set-Up** key to display the Set-Up Directory.

2. Use the → key to move the cursor to "Comm". Press the **Enter** key to display the Communications Set-Up screen.

3. Use the arrow keys to move the cursor to "Transmit = 9600". There are 10 possible settings, from 75 to 19,200 baud. Press **Enter** until the correct setting for your system appears.

4. The receive speed is set to "Receive=Transmit". Do not change this feature, unless your system uses different transmit and receive speeds.

5. Move the cursor to "To Directory". Press **Enter** to display the Set-Up Directory again.

6. Move the cursor to "Save". Press **Enter** to save your new baud rate setting. Each time you turn the terminal on, the VT320 will use this setting.

7. Press **Set-Up** to leave set-up.

2 A LOOK AT THE TERMINAL

The VT320 is a general-purpose video display terminal that lets you interact with software applications on a host computer system. This chapter provides a brief overview of the VT320 terminal and how it operates.

VT320 COMPONENTS

The VT320 terminal has two main components, a monitor/terminal unit and keyboard (Figure 2-1). The monitor/terminal unit is simply called the terminal in the rest of this manual.

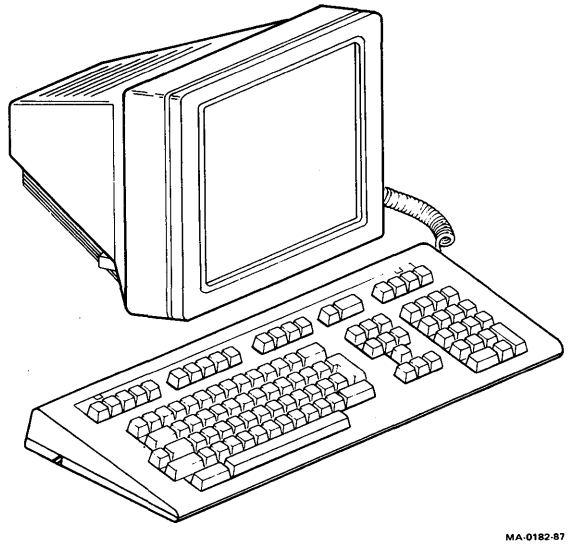


Figure 2-1 VT320 Video Terminal

Terminal

The VT320 uses a 356 mm (14 inch) monochrome screen that can display 24 lines of text, in 80 or 132 columns. Line 25 is reserved for the terminal's status line. You can connect the terminal to a host computer, terminal server, or modem. You can also connect a printer directly to the terminal.

Keyboard

The keyboard has four groups of keys and four indicator lights, described in Chapter 3. The main keypad is similar to a typewriter keyboard. The keyboard cable connects to the right side of the terminal.

There are 15 models of the VT320 keyboard available, for different languages. Appendix D shows the 15 keyboards.

HOW THE VT320 WORKS

You use the keyboard to interact with an application on your system. You send data to the application by typing on the keyboard. Data sent by the application appears as text on the screen. You can print text from the VT320, if you have a printer connected to the terminal.

Applications use programming functions to perform many operations. The VT320 can work with standard American National Standards Institute (ANSI) functions.

Set-Up

The VT320 has a series of set-up screens that list the operating features of the terminal. You can display these screens and change feature settings from the keyboard.

For example, the VT320 has an **On-Line/Local** feature. You can only set this feature from set-up. When you use the "On-Line" setting, the VT320 can communicate with your host system.

To enter set-up, you press the **Set-Up** key. Chapter 4 describes set-up.

Emulating VT Series Terminals

The VT320 can also operate as a VT200 series, VT100 series, or VT52 terminal. You select the operating mode from the General Set-Up screen (Chapter 4). There are four possible settings.

- VT300 mode, 7-bit controls
- VT300 mode, 8-bit controls
- VT100 mode
- VT52 mode

The factory default setting is VT300 mode, 7-bit controls. This mode is fully compatible with VT200 series terminals. Use this mode for VT200 applications. *Factory-default* settings are the initial settings the terminal uses when shipped from the factory. These settings are permanently stored in the terminal's memory. You can use set-up to reset the VT320 to the factory-default settings at any time.

CHARACTER SETS

The VT320 has two types of built-in character sets, for use with different types of computer systems.

8-bit multinational sets
7-bit national replacement character sets

You can select from 2 multinational sets or 12 national replacement character sets (NRCs). You use the **Character Set Mode** feature in the General Set-Up screen (Chapter 4) to select the type of character set: "8-Bit Characters" for multinational sets, or "7-Bit Characters" for NRC sets.

Multinational Character Sets

When you first use your VT320, the terminal uses the DEC Multinational character set. This set contains the characters for the English language, plus most characters used in the Western European languages. Use this set with applications that require strict compatibility with VT200 series terminals.

You can also select the ISO Latin-1 character set of the International Standards Organization. ISO Latin-1 is the new industry-standard set. It is similar to the DEC Multinational character set, with a few different symbols and characters.

Both multinational sets include the standard ASCII character set of the American Standard Code for Information Interchange.

National Replacement Character Sets

NRC sets are for 7-bit computing environments. Each NRC set is for a particular Western European language or dialect. NRC sets are similar to the ASCII set, but replace a few ASCII characters with characters used in that language or dialect.

You can only use one NRC set at a time. You select the NRC set by setting the **Keyboard** feature in the Set-Up Directory (Chapter 4).

If you set the Character Set Mode feature in the General Set-Up screen to "7-Bit Characters", you cannot use the 8-bit multinational character sets. However, if you set Character Set Mode to "8-Bit Characters" you can still use an NRC set. In that case, the NRC set replaces the ASCII set.

Summary

Figure 2-2 summarizes how to select a character set by using set-up features. Appendix E shows each character set.

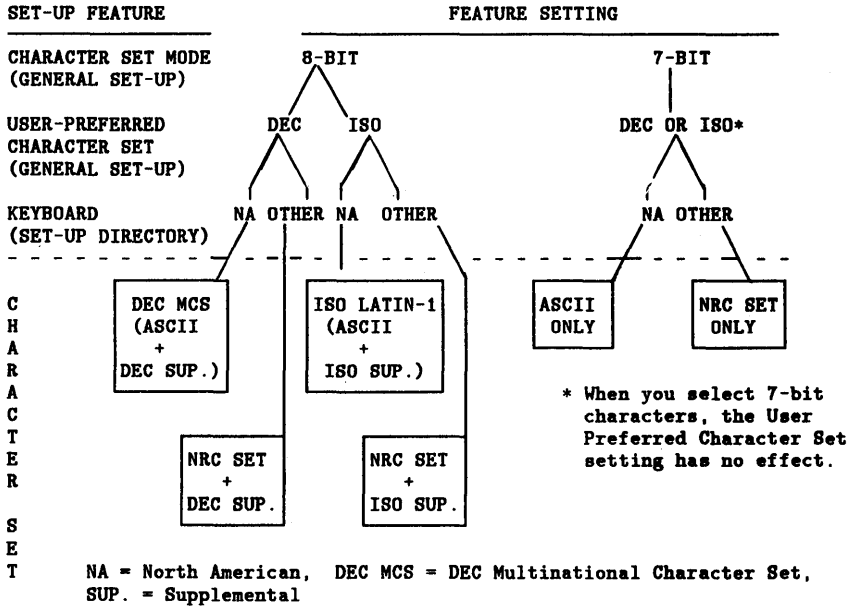


Figure 2-2 Selecting a Character Set

CRT SAVER FEATURE

The VT320 has a CRT saver feature to extend the life of the terminal's screen. The screen automatically goes blank if the terminal is inactive for 30 minutes (no keyboard activity or input from the host system). You do not lose the data that was displayed. To reactivate the screen, press any key.

When the CRT saver feature is on, a blinking block cursor appears at the lower-right corner of the screen. The cursor indicates that the terminal is still on and the CRT saver feature is activated.

3 THE KEYBOARD

The keyboard (Figure 3-1) has four groups of keys, four indicator lights, and two audible indicators. There are 15 models of the keyboard available (Appendix D). This chapter shows the North American/United Kingdom keyboard. The keys are grouped by function.

Main keypad
Editing keypad
Numeric keypad
Top-row function keys

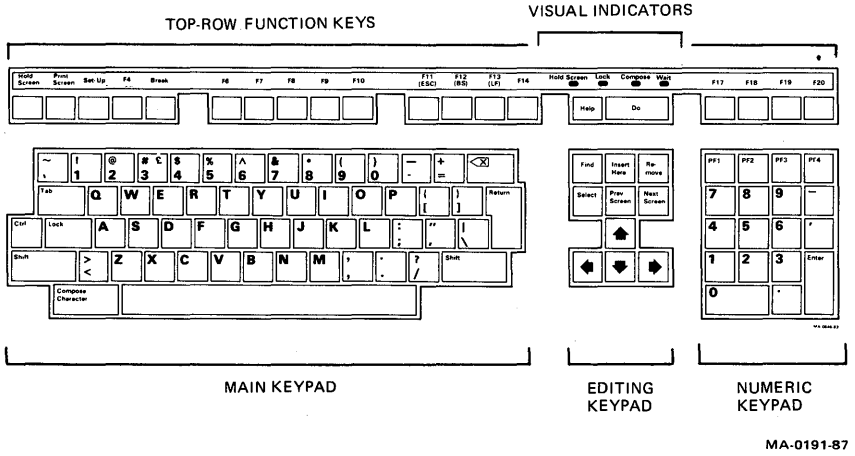


Figure 3-1 Keyboard

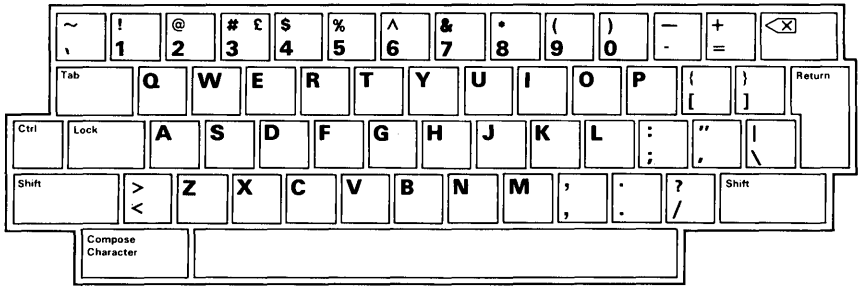


Figure 3-2 Main Keypad

MAIN KEYPAD

This keypad (Figure 3-2) is similar to a standard typewriter keyboard. The main keypad has the following special function keys.

Tab The **Tab** key sends a horizontal tab, which normally moves the cursor to the next tab stop on the line. You can use the Tab Set-Up screen (Chapter 4) to select tab stops.

Ctrl Holding down the **Ctrl** key and pressing another key sends a control code to the system. For example, **Ctrl-Z** means to hold down **Ctrl** and press the **Z** key. A control code tells the system to perform a special function.

Lock If you use the "Caps Lock" setting in the Keyboard Set-Up screen (Chapter 4), pressing **Lock** makes the alphabetic keys send uppercase characters. If you use the "Shift Lock" setting, pressing **Lock** makes all keys send the top character on the key. When you release **Lock**, all keys send their bottom character.

Shift Holding down the **Shift** key and pressing another key sends the uppercase (or top) character on the key.

In some cases, you use **Shift** with another key to perform a local function. For example, **Shift-Print Screen** means to hold down **Shift** and press the **Print Screen** key.

Return The **Return** key sends either a carriage return or a carriage return and line feed (selected in the General Set-Up screen, Chapter 4).

Pressing **Return** usually moves the cursor to the next line. Many applications use **Return** to indicate the end of a command.

<x] (Delete) The <x] key sends either a delete (DEL) character or a backspace (BS) character (selected in the Keyboard Set-Up screen, Chapter 4). Many applications use <x] to erase one character to the left of the cursor. Pressing Ctrl-<x] sends a CAN (cancel) character.

Compose Character This key lets you generate characters that do not appear as standard keys on your keyboard. See Chapter 5.

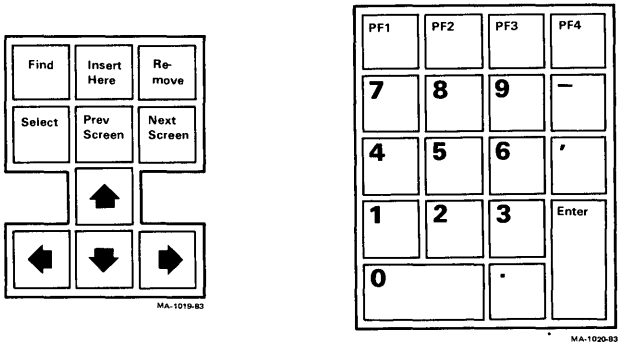


Figure 3-3 Editing and Numeric Keypads

EDITING KEYPAD

The editing keypad (Figure 3-3) has six editing keys and four arrow keys. Pressing an arrow key normally moves the cursor in the direction of the arrow. For example, pressing the ↓ key moves the cursor down one line. The function of the editing keys depends on the software application you use. See your application manuals for details.

NUMERIC KEYPAD

Numeric keypad keys (Figure 3-3) often have functions assigned by your application software — especially **PF1**, **PF2**, **PF3**, and **PF4**. See your application manuals for details. Some applications let you use the numeric keypad to enter numeric data as you would with a calculator.

Enter The **Enter** key normally works like the **Return** key. That is, **Enter** sends a carriage return or a carriage return and line feed (selected in the General Set-Up screen, Chapter 4). You also use **Enter** to change set-up feature settings and select set-up action features.

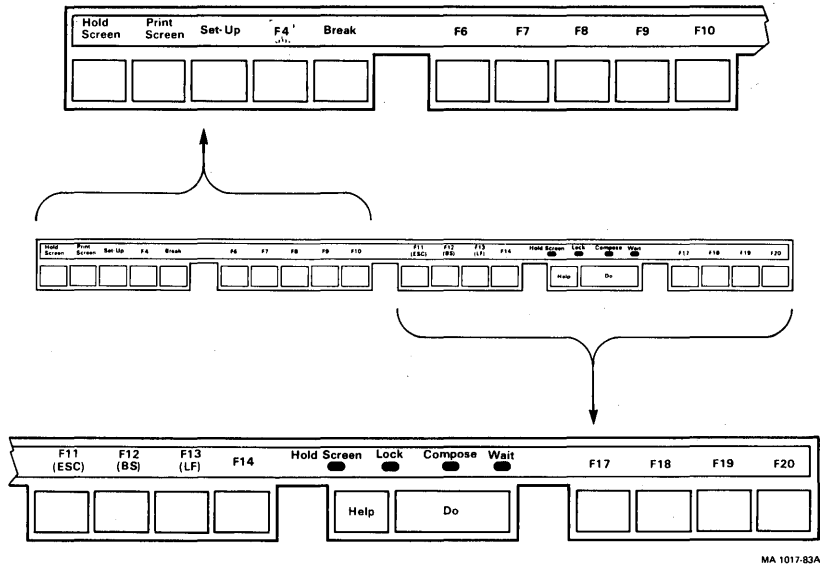


Figure 3-4 Top-Row Function Keys and Indicator Lights

TOP-ROW FUNCTION KEYS

The first five top-row keys on the left (Figure 3-4) have predefined functions, described below. You cannot change these functions. Your application software can define the function of the remaining top-row keys. See your application manuals for details.

Hold Screen This key freezes data on the screen, so you can read it. When you press **Hold Screen**, the Hold Screen indicator turns on.

Pressing **Hold Screen** again releases the screen, so new data can appear. The Hold Screen indicator turns off.

Print Screen This key sends text from the screen to a printer connected to the terminal.

Pressing **Ctrl-Print Screen** turns auto print mode on or off. See "Auto Print Mode" in Chapter 6.

Set-Up This key lets you enter or leave set-up (Chapter 4).

F4 This key is disabled.

Break This key works alone or with other keys to perform functions that affect communication between your terminal and system. You can disable the **Break** function in the Keyboard Set-Up screen (Chapter 4).

- In some applications, pressing **Break** ends communication with your system.
- Pressing **Shift-Break** ends communication with a modem.
- Pressing **Ctrl-Break** sends the answerback message to the system. See the Keyboard Set-Up screen (Chapter 4).

F11 (ESC) **F11** is a function key often defined by application software. In VT100 and VT52 modes, **F11** sends an escape (ESC) character.

F12 (BS) **F12** is a function key often defined by application software. In VT100 and VT52 modes, **F12** sends a backspace (BS) character.

F13 (LF) **F13** is a function key often defined by application software. In VT100 and VT52 modes, **F13** sends a line feed (LF) character.

INDICATOR LIGHTS

The keyboard has four indicator lights (Figure 3-4).

Hold Screen Turns on or off when you press the **Hold Screen** key.

Lock Turns on or off when you press the **Lock** key.

Compose Turns on when you are typing a compose sequence (Chapter 5).

Wait Turns on when the keyboard is locked (cannot send data). You can clear a locked keyboard by selecting the **Clear Comm** feature from the Set-Up Directory screen (Chapter 4).

AUDIBLE INDICATORS

The keyboard has two audible indicators, a keyclick and a bell. You can use a margin bell, warning bell, or both. You select the keyclick and bell setting from the Keyboard Set-Up screen (Chapter 4).

Keyclick All keys that send a code or perform a function make a clicking sound when pressed, except under the following exceptions.

- You press Shift or Ctrl. These keys never make a keyclick sound.
- The Wait indicator is on. No keys can make a keyclick sound.
- You turn off the **Keyclick** set-up feature.

Bell

The margin bell sounds when the cursor is eight characters from the right margin.

The warning bell tone sounds for any of the following conditions.

- During the power-up self-test
- When the terminal receives a bell (BEL) character from the system
- After a compose character error

4 SET-UP

OVERVIEW

The VT320 has seven set-up screens that list the settings for the terminal's operating features.

Set-Up Directory	Communications	Keyboard
Display	Printer	Tab
General		

You can display these screens and change settings from the keyboard. This chapter describes the set-up screens and how to change settings.

Most set-up features are initially set to a factory-default setting that works with most Digital systems. The VT320 has these factory-default settings permanently stored. If you change settings, you can use set-up to reset the terminal to the factory-default settings.

You can also select and save settings to match your host system. The VT320 saves your selections in nonvolatile memory, along with the factory-default settings. When you shut power off, you do not lose your saved settings.

You can change all set-up features from the keyboard. Your host system can also change some settings, as described in the *VT320 Programmer Reference Manual.* See Appendix B to order other VT320 manuals.

ENTERING AND LEAVING SET-UP

To enter or leave set-up, you press the Set-Up key (the third key from the left on the top row of the main keypad). When you enter set-up, any text on the screen disappears, and the Set-Up Directory appears. When you leave set-up, the text that was on the screen reappears.

The Set-Up Directory lists all the set-up screens. You can select any set-up screen from the Set-Up Directory. You can also move from screen to screen. You can return to the Set-Up Directory from any set-up screen. You can only display one set-up screen at a time.

SET-UP SCREEN FORMAT

The terminal displays set-up screens on the bottom third of the screen. Figure 4-1 shows the set-up screen format.

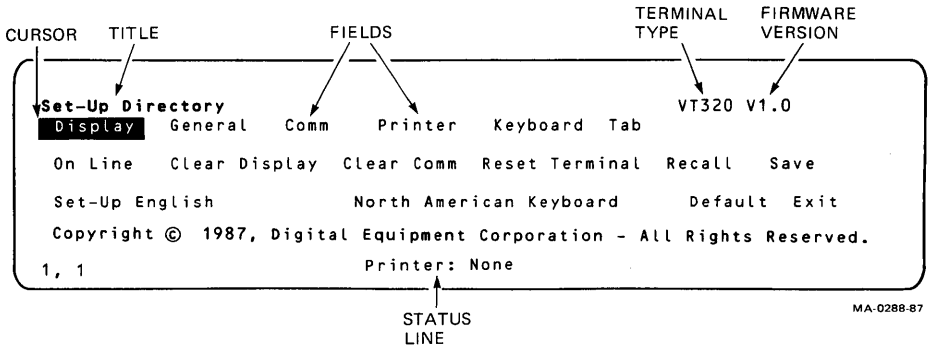


Figure 4-1 Set-Up Screen Format

HOW TO CHANGE SETTINGS

You use the arrow keys to move the set-up cursor to a particular feature on a set-up screen. Most features have two or more possible settings. You use the **Enter** key to change the setting of the feature highlighted by the cursor. Each time you press **Enter**, the setting changes. Depending on the feature, the change takes effect immediately or when you leave set-up.

Some features are action fields. When you move to an action field and press the **Enter** key, the terminal performs the action. For example, six of the set-up screens have an action field that reads **To Directory**. When you move to this feature and press **Enter**, the Set-Up Directory screen replaces the current screen.

Example
This example shows how to change the screen display from 80 to 132 columns.

1. Press **Set-Up** to enter set-up. The Set-Up Directory appears. The cursor is on the **Display** field.
2. Press **Enter**. The Display Set-Up screen appears.
3. Use the arrow keys to move the cursor to "80 Columns". Press **Enter** to change the setting to "132 Columns".
4. Press **Set-Up** to leave set-up.

When you change a feature setting, the VT320 uses that setting until you turn the terminal off or change the setting again. To save a new setting, read the next section.

HOW TO SAVE YOUR SETTINGS

You can save the feature settings you select. When you do, the VT320 automatically uses your settings each time you turn the terminal on. In this way, you can set the VT320 to your computing environment.

You use the **Save** feature to save your settings. After you change settings to match your host computer, return to the Set-Up Directory. Use the arrow keys to move the cursor to the **Save** feature, then press **Enter**. The VT320 saves all current set-up settings and displays a "Done" message on the status line. The terminal uses these settings until you or an application save a new set of settings.

If you temporarily change some settings without saving them, you can **Recall** your last set of saved settings from the Set-Up Directory.

STATUS LINE

The status line shows you the current position of the screen cursor, the printer status, and the modem status (if used). Table 4-1 describes the three status line fields, from left to right. The status line appears on line 25 at the bottom of the screen. If you display the status line outside of set-up, the line appears in reverse video.

By default, the status line only appears in set-up. You can use the **Status Display** feature in the Display Set-Up screen to control the status line. The feature has three settings.

No Status Display (default)	The status line appears only in set-up or when selected by the host system.
Indicator	The status line appears at all times.
Host-Writable	The host system can write messages in place of the status line.

You can display the indicator status line in English, French, or German. Use the **Set-Up Language** feature in the Set-Up Directory screen to select the language.

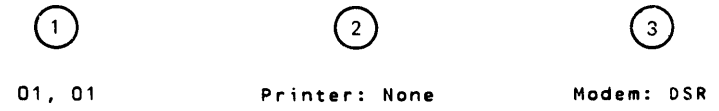


Table 4-1 Status Line Messages

Field	Value	Meaning
1		**Cursor position**
	(l,c)	The cursor is currently at line l, column c.
2		**Printer status**
	Ready	The printer is ready.
	Not Ready	The printer is not ready.
	None	No printer is connected.
	Auto	The terminal is in auto print mode.*
	Controller	The terminal is in printer controller mode. See Chapter 6.
3		**Modem status***
	DSR	The modem is ready to send or receive data.
	No DSR	The modem is not ready to send or receive data.

* This field appears only when the VT320 has a modem connected.

A GUIDE TO SET-UP FEATURES

Table 4-2 lists the features available on each set-up screen.

Table 4-2 A Guide to Set-Up Features

Set-Up Directory	Display Set-Up	General Set-Up
Display Set-Up	To Next Set-Up	To Next Set-Up
General Set-Up	To Directory	To Directory
Communications Set-Up	80/132 Columns	Terminal Mode
Printer Set-Up	Display/Interpret Controls	Terminal ID
Keyboard Set-Up	Auto Wrap	UDK Lock
Tab Set-Up	Smooth/Jump Scroll	User Features Lock
On-Line/Local	Light/Dark Screen	Character Set Mode
Clear Display	Cursor	Keypad Mode
Clear Communications	Cursor Style	Cursor Key Mode
Reset Terminal	Status Display	New Line
Recall Saved Settings		User-Preferred Set
Save Settings		
Set-Up Language		
Keyboard Language		
Factory Defaults		
Exit Set-Up		

Communications Set-Up	Printer Set-Up	Keyboard Set-Up
To Next Set-Up	To Next Set-Up	To Next Set-Up
To Directory	To Directory	To Directory
Transmit Speed	Transmit/Receive Speed	Typewriter/D.P. Keys
Receive Speed	Printer to Host Comm	Caps/Shift-Lock
XOFF	Print Mode	Auto Repeat
Data Bits/Parity	XON/XOFF	Keyclick
Stop Bits	Data Bits/Parity	Margin Bell
Local Echo	Stop Bit	Warning Bell
Host Port Selection	Print Page	Break
Disconnect	Printed Data Type	Compose Key
Transmit Rate Limit	Print Terminator	<x] DEL/BS
Auto Answerback		,, and .. Keys
Answerback=	**Tab Set-Up**	< > Key
Concealed		‘ ~ Key
	To Next Set-Up	
	To Directory	
	Clear All Tabs	
	Set 8 Column Tabs	
	Tab Fields and Ruler	

SET-UP DIRECTORY SCREEN

This screen always appears when you enter set-up. You can select any set-up screen from the Set-Up Directory. You can also perform such functions as saving and recalling feature settings. Table 4-3 describes the Set-Up Directory features. All features, except **On-Line/Local**, are action fields.

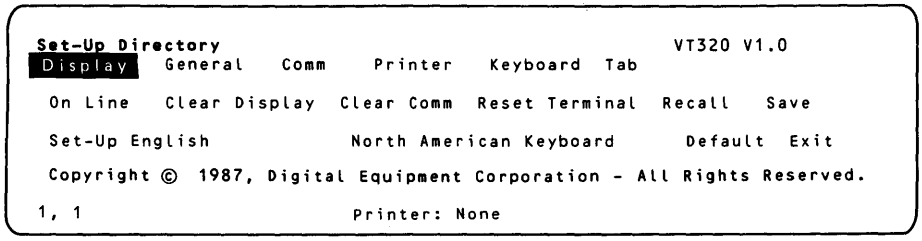


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Table 4-3 Set-Up Directory Features

Feature	Settings*	Function
Display	Display	These fields display the selected set-up screen. For example, **Display** selects the Display Set-Up screen.
General	General	
Comm	Comm	
Printer	Printer	
Keyboard	Keyboard	
Tab	Tab	
On-Line/Local		Selects whether or not the VT320 can communicate with the host system.
	On-Line	Lets the VT320 communicate with the host system.
	Local	Puts the host system on hold. The VT320 sends keyboard data to the screen only.
Clear Display	Clear Display	Clears the screen when you leave set-up.

* For features with two or more settings, default settings are in bold type.

Table 4-3 Set-Up Directory Features (Cont)

Feature	Settings*	Function
Clear Comm	Clear Comm	Clears communication as follows. • Stops any print operation. • Stops any escape sequence, control sequence, or device control string (DCS). • Stops printer controller mode and returns to normal print mode. • Clears the keyboard buffers. • Clears the receive buffer. • Clears the transmit buffer. • Sends an XON signal to the host. • Resets the XOFF received flags at the printer and host.
Reset Terminal	Reset Terminal	Resets many VT320 operating features to a default setting used by most application programs. The screen, communication, character set modes, and user-defined keys are not affected. See Chapter 13 of the *VT320 Programmer Reference Manual.*
Recall	Recall	Sets all set-up features to their saved values. Clears the screen.
NOTE: If you use a modem, **Recall** *disconnects communication with the host system.*		
Save	Save	Saves all current feature settings in all set-up screens.
Set-Up=_____	**English** Francais Deutsch	Selects the language used to display set-up screens.

* Default settings are in bold type.

Table 4-3 Set-Up Directory Features (Cont)

Feature	Settings*	Function
_____Keyboard		Lets you select one of the following languages or dialects to match your keyboard.
	North American	
	British	
	Flemish	
	Canadian (French)	
	Danish	
	Finnish	
	German/Austrian	
	Dutch	
	Italian	
	Swiss (French)	
	Swiss (German)	
	Swedish	
	Norwegian	
	French/Belgian	
	Spanish	
	Portuguese	
Default	Default	Sets all set-up features to their factory-default settings. Clears the screen and returns the cursor to the upper-left corner.

NOTE: If you use a modem, **Default** *may disconnect communication with the host system.*

Exit	Exit	Lets you leave set-up.

* Default settings are in bold type.

DISPLAY SET-UP SCREEN

This screen lets you select display features such as 80 or 132 columns, smooth or jump scrolling, and a block or underline cursor. Table 4-4 describes the Display Set-Up features.

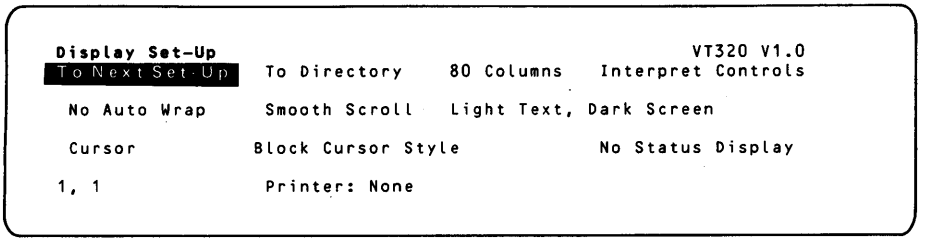

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Table 4-4 Display Set-Up Features

Feature	Settings*	Function
To Next Set-Up	To Next Set-Up	Displays the General Set-Up screen.
To Directory	To Directory	Displays the Set-Up Directory.
_____ Columns	**80 Columns**	Selects an 80 or 132-column screen display for text. Takes effect in set-up and clears the screen.
	132 Columns	
_____ Controls		Selects whether to execute or display control codes from the host system. This feature is useful for debugging programs.
	Interpret Controls	Executes control codes, but does not display them.
	Display Controls	Displays control codes as characters, but does not execute them.
Auto Wrap		Selects whether or not text automatically wraps to the next line when you reach the right margin.
	No Auto Wrap	When the cursor reaches the margin, the VT320 displays each new character

* Default settings are in bold type.

Table 4-4 Display Set-Up Features (Cont)

Feature	Settings*	Function
Auto Wrap (cont)	**No Auto Wrap** (cont)	in the last column of the line. Each new character overwrites the previous character.
	Auto Wrap	When the cursor reaches the margin, the VT320 displays new characters on the next line.
_____ Scroll		Selects how fast lines appear on the screen.
	Smooth Scroll	Limits the speed at which new lines appear on the screen, producing a smooth, steady scroll.
	Jump Scroll	Displays new lines as fast as they are received, producing a jump scroll.
____ Text, ____ Screen		Selects a normal or reverse video display.
	Light Text, Dark Screen	Selects a normal screen display (light text on dark background).
	Dark Text, Light Screen	Selects a reverse video display (dark text on light background).
Text Cursor	**Cursor**	Selects whether or not to display the text cursor.
	No Cursor	
_____ **Cursor Style**	**Block**	Selects a blinking block or blinking underline cursor.
	Underline	
_____**Status Display**		Selects how and when to display the status line at the bottom of the screen.
	No Status Display	The status line only appears when you are in set-up.
	Indicator	The status line appears at all times.
	Host Writable	Host applications can write messages in place of the status line.

* Default settings are in bold type.

GENERAL SET-UP SCREEN

This screen lets you select the terminal's general operating features, such as operating mode and multinational character sets. Table 4-5 describes the General Set-Up features. See Chapter 2 for more on character sets.

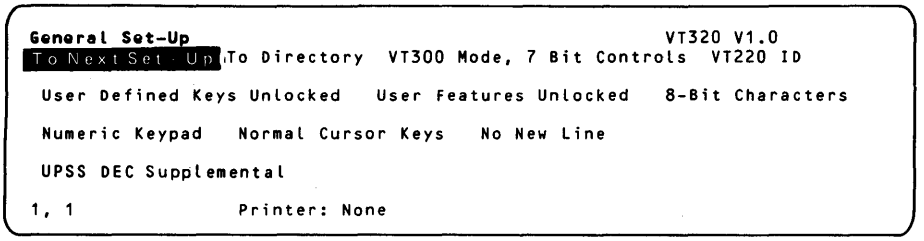

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Table 4-5 General Set-Up Features

Feature	Settings*	Function
To Next Set-Up	To Next Set-Up	Displays the Communications Set-Up screen.
To Directory	To Directory	Displays the Set-Up Directory screen.
____ Mode ____		Selects the terminal's operating mode. Lets the VT320 work as a VT200 series, VT100 series, or VT52 terminal.
	VT300 Mode, 7-Bit Controls	Lets the terminal use all VT320 features. This mode supports 8-bit graphic display characters and 7-bit control characters. Select this mode for all VT200 applications. **Digital recommends this mode for most applications.**
	VT300 Mode, 8-Bit Controls	Lets the terminal use all VT320 features in an 8-bit environment with 8-bit control characters. Select this mode for all VT200 applications that use 8-bit control characters. This mode is the most efficient, but not yet supported by many applications.

* Default settings are in bold type.

Table 4-5 General Set-Up Features (Cont)

Feature	Settings*	Function
____Mode____ (Cont.)	VT100 Mode	Lets the terminal run applications that require strict VT100 compatibility. In general, use **VT300 Mode, 7-Bit** controls if possible.
	VT52 Mode	Lets the terminal run VT52 applications.
Terminal ID	**VT320 ID** VT100 ID VT101 ID VT102 ID VT220 ID	Selects the device attributes response (terminal ID). This response lets the host system know specific operating attributes of the terminal.

NOTE: If you use the VMS operating system, version V4.6 or later can recognize VT320 terminals. If your operating system does not recognize your VT320, select the "VT220 ID" *setting.*

User Defined Keys ____		Selects whether or not the host system can change user-defined key (UDK) definitions.†
	Unlocked	Allows the host to define UDKs.
	Locked	Prevents the host from defining UDKs.
User Features ____		Selects whether or not the host system can change your settings for the following features. Auto Repeat — Tab stops Smooth/Jump Scroll — Keyboard lock Light/Dark Screen
	Unlocked	Lets the host change user features.
	Locked	Prevents the host from changing features.

* Default settings are in bold type.

† You can define the function of some top-row keys by using programming sequences. See Chapter 10 of the *VT320 Programmer Reference Manual.*

Table 4-5 General Set-Up Features (Cont)

Feature	Settings*	Function
NOTE: Some applications expect to control the above user features. For these applications, set **User Features** ___ to " Unlocked".		
Character Set Mode		Selects the type of character sets to use, 8-bit multinational sets or 7-bit national sets.
NOTE: If you set the **Keyboard** *feature the Set-Up Directory to* "North American", *you cannot select* "7-Bit Characters". *If you set the operating mode to* "VT100", *you cannot select* "8-Bit Characters".		
	8-Bit Characters	Supports the 8-bit DEC Multinational or ISO Latin-1 set. Both include the 7-bit ASCII set. You select the specific 8-bit set with the **User-Preferred Character Set** feature in this screen.
	7-Bit Characters	Makes the VT320 use one of the 7-bit national replacement character sets (NRCs). You select the NRC set with the **Keyboard** feature in the Set-Up Directory screen.
_____ Keypad		Selects whether the numeric keypad keys send the characters on their keycaps or programming functions.
	Numeric	The keypad keys send the characters on their keycaps (using ASCII character codes).
	Application	The keypad keys send programming functions defined by an application.
NOTE: If you set the **Keypad** *feature above to* "Numeric", *the* **Enter** *key works like the* **Return** *key.*		

* Default settings are in bold type.

Table 4-5 General Set-Up Features (Cont)

Feature	Settings*	Function
_____ Cursor Keys		Selects whether the arrow keys control cursor movement or send application control functions.
	Normal	The arrow keys move the cursor up, down, left, or right (using ANSI cursor control sequences).
	Application	The arrow keys send application control functions.
_____ New Line		Selects whether or not the Return key moves the cursor to a new line.
	No New Line	The Return key sends a carriage return only.
	New Line	The Return key sends a carriage return and a line feed.
NOTE: When you set the **Keypad** *feature to* "Numeric", *the* **New Line** *feature affects the* **Enter** *key the same as it does the* **Return** *key.*		
User-Preferred Character Set		When Character Set Mode is set to "8-Bit Characters", selects the DEC Multinational set or ISO Latin-1 set for use. The difference between the two sets is their supplemental character set, called a user-preferred set.
	UPSS DEC Supplemental	Selects the DEC Multinational character set. This set is compatible with Digital applications.
	UPSS ISO Latin-1	Selects the International Standards Organization (ISO) character set.

* Default settings are in bold type.

COMMUNICATIONS SET-UP SCREEN

This screen lets you select features that affect how the VT320 communicates with your host system. The default settings work with most of Digital's computer systems. Table 4-6 describes the Communications Set-Up features.

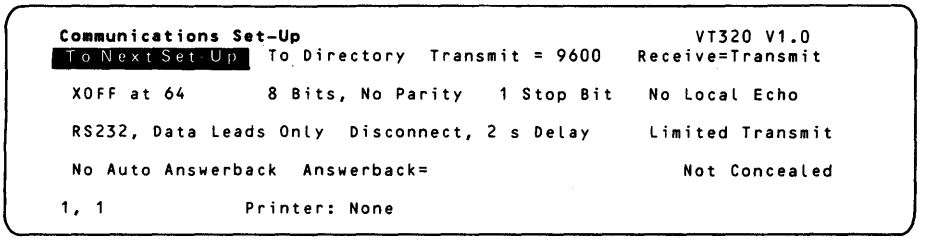

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Table 4-6 Communications Set-Up Features

Feature	Settings*	Function
To Next Set-Up	To Next Set-Up	Displays the Printer Set-Up screen.
To Directory	To Directory	Displays the Set-Up Directory screen.
Transmit= _____ †		Selects the baud rate the VT320 uses to send data to the host system.
	75	The terminal's transmit speed must match the host's receive speed. However, the VT320 can transmit at one speed and receive at another.
	110	
	150	
	300	
	600	
	1200	
	4800	
	9600	
	19200	

* Default settings are in bold type.

† Does not apply to the printer port. See the Printer Set-Up screen.

Table 4-6 Communications Set-Up Features (Cont)

Feature	Settings*	Function
Receive= _____ †	**Receive=Transmit** 75 110 150 300 600 1200 2400 4800 9600 19200	Selects the baud rate the VT320 uses to receive data from the host system. The terminal's receive speed must match the host's transmit speed. However, the VT320 can transmit at one speed and receive at another.
XOFF _____ †	**XOFF at 64** XOFF at 128 No XOFF	Selects how many characters the VT320 can receive before sending the host system an XOFF signal to stop sending data. For example, "XOFF at 64" means the VT320 sends XOFF to the host when the input buffer contains 64 characters. See Appendix C.
__ Bits, __ Parity †	8 Bits, Even Parity 8 Bits, Odd Parity **8 Bits, No Parity** 8 Bits, Even Parity, No Check 8 Bits, Odd Parity, No Check 7 Bits, Even Parity, No Check 7 Bits, Odd Parity, No Check 7 Bits, No Parity 7 Bits, Even Parity 7 Bits, Odd Parity 7 Bits, Mark Parity 7 Bits, Space Parity	Selects the character format used to communicate with the host system. See Appendix B in the *VT320 Programmer Reference Manual.*

* Default settings are in bold type.

† Does not apply to the printer port. See the Printer Set-Up screen.

Table 4-6 Communications Set-Up Features (Cont)

Feature	Settings*	Function
__ Stop Bit †		Selects the number of stop bits (1 or 2) used in the character format.
	1 Stop Bit	Digital recommends using 1 stop bit for most applications.
	2 Stop Bits	Use this setting for baud rates under 300.
Local Echo		Selects whether or not to send the characters you type directly to the screen.
	No Local Echo	Sends keyboard data to the host. The host may or may not send the data back to the screen.
	Local Echo	Sends keyboard data to the screen and to the host.
Host Port Selection		Selects which cable connector you can use on the rear of the VT320 to connect to the host system.
	RS232, Data Leads Only	Selects the 25-pin RS232 connector. Use this setting if you do not have a modem.
	RS232, Modem Control	Selects the 25-pin RS232 connector. Use this setting if you have a modem requiring EIA modem control.
	DEC-423, Data Leads Only	Selects the 6-pin DEC-423 connector. Use this setting if you do not have a modem.
	DEC-423, Modem Control	Selects the 6-pin DEC-423 connector. Use this setting if you have a modem.

* Default settings are in bold type.

† Does not apply to the printer port. See the Printer Set-Up screen.

Table 4-6 Communications Set-Up Features (Cont)

Features	Settings*	Function
NOTE: The next feature only works when you use the "RS232, Modem Control" *setting above.*		
Disconnect, ___Delay		When modem control is in effect, selects the time delay the VT320 uses before disconnecting from the communication line. A disconnect occurs when the VT320 no longer detects the received line signal detection (RLSD) signal.
	Disconnect, 2 s Delay	This setting is for all countries except the United Kingdom.
	Disconnect, 60 ms Delay	This setting is used in the United Kingdom.
_____ Transmit		Selects a limited or unlimited terminal transmit speed.
	Limited	Limits the terminal to sending 150 to 180 characters per second, regardless of the baud rate selected by the **Transmit** feature. This reduces the interrupt burden on the operating system.
	Unlimited	Selects an unlimited terminal transmit speed.
Auto Answerback	**Auto Answerback**	Selects whether or not to send the answerback message to the host system after a communication line connection.
	No Auto Answerback	

* Default settings are in bold type.

Table 4-6 Communications Set-Up Features (Cont)

Feature	Settings*	Function
Answerback=		Lets you type an answerback message of up to 30 characters. When you select this feature, the VT320 displays the prompt "Enter Answerback =" on the status line. You can conceal your message with the Conceal feature in this screen.
NOTE: The VT320 sends this message to the host system when (1) you type **Ctrl-Break**, *or (2) the host requests the message by sending an ENQ character. Host requests do not affect screen data or require aouser response.*		
Concealed		Selects whether or not the VT320 can display the answerback message in set-up.
	Not Concealed	The VT320 can display the answerback message in set-up.
	Concealed	The VT320 cannot display your answerback message. You cannot reset this feature to "Not Concealed", except by entering a new answerback message.

* Default settings are in bold type.

PRINTER SET-UP SCREEN

This screen lets you set up the VT320 to work with different types of printers. Table 4-7 describes the Printer Set-Up features.

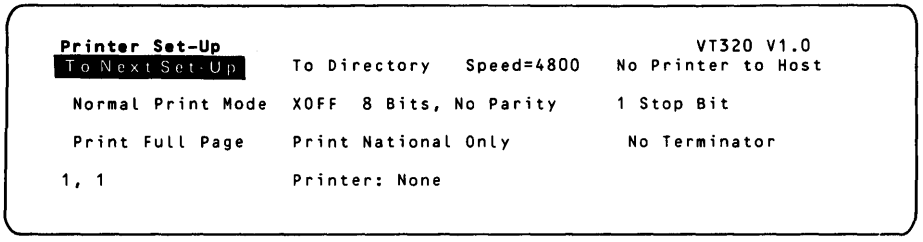

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Table 4-7 Printer Set-Up Features

Feature	Settings*	Function
To Next Set-Up	To Next Set-Up	Displays the Keyboard Set-Up screen.
To Directory	To Directory	Displays the Set-Up Directory.
Speed= ____	75 110 150 300 600 1200 2400 **4800** 9600 19200	Selects the baud rate the VT320 uses to send data to a printer.
Printer to Host Comm		Selects whether or not the printer can send data to the host system.
	No Printer to Host	Data can only move from host to printer.
	Printer to Host	Data can move from host to printer, and from printer to host.

NOTE: XON/XOFF flow control operates independently between the terminal and printer, and between the printer and host.

* Default settings are in bold type.

Table 4-7 Printer Set-Up Features (Cont)		
Feature	**Settings***	**Function**
Print Mode		Determines when and how printing takes place.
	Normal	Lets you start print functions from the keyboard.
	Auto Print	Prints the current line of text when the VT320 receives a line feed, form feed, or vertical tab from the host.
	Controller	Lets the host send data directly to the printer, without displaying the data on the screen.
XOFF		Selects whether or not to use XON/XOFF flow control with the printer. See Appendix C.
	XOFF	
	No XOFF	
___ Bits, ___ Parity		Selects a character format to match the printer's.
	8 Bits, No Parity	
	8 Bits, Even Parity	
	8 Bits, Odd Parity	
	7 Bits, No Parity	
	7 Bits, Mark Parity	
	7 Bits, Space Parity	
	7 Bits, Even Parity	
	7 Bits, Odd Parity	
___ Stop Bit	**1 Stop Bit**	Selects the number of stop bits that match the printer's character format.
	2 Stop Bits	

* Default settings are in bold type.

Table 4-7 Printer Set-Up Features (Cont)

Feature	Settings*	Function
Print _____		Selects how much of the screen to print when you press the **Print Screen** key.
	Full Page	Prints the full screen.
	Scroll Region	Prints only the scrolling region.
Printed Data Type		Lets you select the VT320 character sets that match the Digital printer's character sets.
	National Only	Use with a printer that supports the ASCII set (in "8-Bit" multinational mode) or the current national set (in "7-Bit" national mode). **Examples:** LA34, LA36, and LA120 printers.
	National and Line Drawing	Use with a printer that supports the VT100 line drawing set and (1) the ASCII set (in "8-Bit" multinational mode), or (2) the current national set (in "7-Bit" national mode). **Example:** LA100.
	Print All Characters	Use with a printer that supports the multinational and line drawing sets. **Example:** LA50.
Print Terminator	**No Terminator** Terminator = FF	Selects whether or not the VT320 sends a form feed (FF) at the end of a print operation.

* Default settings are in bold type.

KEYBOARD SET-UP SCREEN

This screen lets you control the function of several keys: Lock, Break, Compose, <x], . (period), , (comma), < >, and ˜. You can also control the keyboard's margin bell, warning bell, and keyclick.

The "____Keys" feature lets you select between standard typewriter characters and data processing characters. This feature affects keys with characters on the right half of their keycaps. Data processing characters allow European model keyboards to use characters that appear as standard typewriter characters on the North American/United Kingdom keyboard.

Table 4-8 describes the Keyboard Set-Up features.

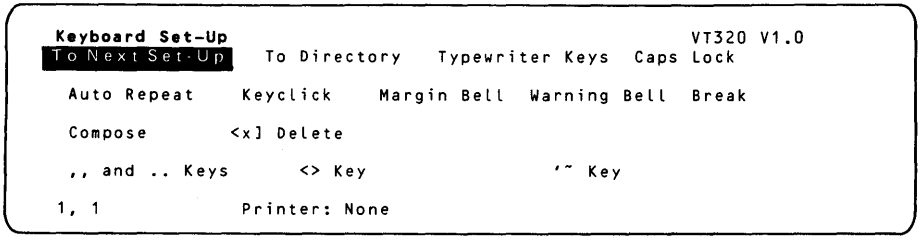

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Table 4-8 Keyboard Set-Up Features

Feature	Settings*	Function
To Next Set-Up	To Next Set-Up	Displays the Tab Set-Up screen.
To Directory	To Directory	Displays the Set-Up Directory.
_____ Keys		Selects the characters sent by keys that have three or more characters on their keycap.
	Typewriter	Selects the characters on the left half of the keycaps.
	Data Processing	Selects the characters on the right half of the keycaps.

NOTE: When you select "Data Processing" *keys, the keyboard can only send ASCII characters. For keys with three or more characters, you cannot use the characters on the left half of the keycap.*

* Default settings are in bold type.

Table 4-8 Keyboard Set-Up Features (Cont)

Feature	Settings*	Function
_____ Lock		Selects the function of the Lock key (Chapter 3).
	Caps Lock	After you press Lock down, the alphabetic keys send their uppercase character. Other keys still send the bottom character on their keycap.
	Shift Lock	After you press Lock down, all keys send the top character on their keycap.
Auto Repeat	Auto Repeat No Auto Repeat	Selects whether or not a key sends its character repeatedly when you hold the key down.†
Keyclick	Keyclick No Keyclick	Selects whether or not keys make a sound when you press them.
Margin Bell	Margin Bell No Margin Bell	Selects whether or not the VT320 makes a bell tone when the text cursor approaches the right margin.
Warning Bell	Warning Bell No Warning Bell	Selects whether or not the VT320 makes a bell tone when (1) operating errors occur, or (2) you press Ctrl-G.
Break	Break No Break	Selects whether or not the Break key sends a break signal (Chapter 3). You can end communication with a modem by pressing Shift-Break, regardless of the Break setting.
Compose	Compose No Compose	Selects whether or not the Compose Character key works (Chapter 5).

* Default settings are in bold type.

† The following keys never repeat: Hold Screen, Print Screen, Set-Up, Return, Break, Lock, and Ctrl.

Table 4-8 Keyboard Set-Up Features (Cont)		
Feature	**Settings***	**Function**
Backarrow Key		Selects whether the <x] key sends a delete (DEL) character or a backspace (BS) character.
	<x] Delete	Pressing <x] sends a DEL character.
	<x] Backspace	Pressing <x] sends a BS character.
,, and .. Keys		Selects which characters the comma and period keys send.
	,, and .. Keys	The comma key sends sends a comma when shifted or unshifted. The period key sends a period when shifted or unshifted.
	,, and .. Keys Send ,< and .>	The comma key sends a comma when unshifted and a < character when shifted. The period key sends a period when unshifted and a > character when shifted.
< > Key †		Selects which characters the angle bracket key sends.
	< > Key	The angle bracket key sends a < when unshifted and a > when shifted.
	< > Key Sends ‘~	The angle bracket key sends a ‘ when unshifted and a ~ when shifted.
‘ ~ Key †		Selects which character the tilde key sends.
	‘ ~ Key	The tilde key sends a ‘ when unshifted and a ~ when shifted.
	‘ ~ Key Sends ESC	The tilde key sends an escape (ESC) character.

* Default settings are in bold type.

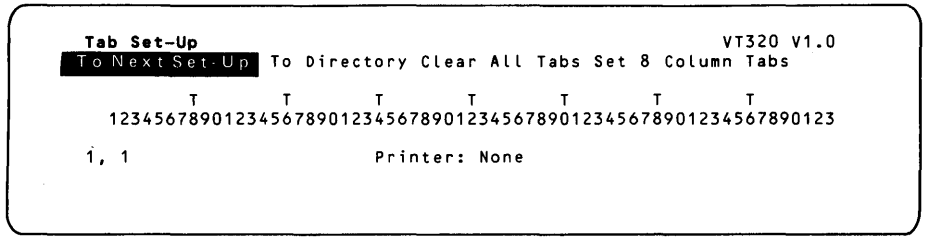
† This feature applies only to the North American/United Kingdom and Dutch keyboards.

TAB SET-UP SCREEN

This screen lets you set the number of tab stops on a line. When you press the **Tab** key outside of set-up, the cursor advances to the next tab stop on the line. Table 4-9 describes the Tab Set-Up features.

There is one tab stop field for each column on the screen. You can use a screen display that is 80 or 132 columns wide. See the **Columns** feature in the Display Set-Up screen.

You can use the arrow keys or **Tab** key to move the set-up cursor to any tab stop field. Press the **Enter** key to place a T in a blank field or erase a T from that field. This screen shows the default tab stop settings.



MA-0293-87

Table 4-9 Tab Set-Up Features

Features	Settings	Function
To Next Set-Up	To Next Set-Up	Displays the Display Set-Up screen.
To Directory	To Directory	Displays the Set-Up Directory.
Clear All Tabs	Clear All Tabs	Clears all tabs previously set.
Set 8 Column Tabs	Set 8 Column Tabs	Automatically sets tabs every 8 columns, starting with column 9.

5 COMPOSING CHARACTERS

The VT320 lets you use more characters than appear on your keyboard, by typing compose sequences. A compose sequence is a series of two or three keystrokes that produces a single compose character. You can use three-stroke sequences on all VT320 keyboards. You can use two-stroke sequences on all keyboards except the North American/United Kingdom and Norwegian/Danish keyboards.

Two basic factors determine which compose sequences you can use.

- your VT320 keyboard model
- the character set the terminal is currently using

WHAT CHARACTERS CAN I USE?

You can only select characters from the character set the terminal is currently using. You can select from 2 multinational sets (DEC Multinational and ISO Latin-1) or 12 national replacement character sets (NRCs). By default, the VT320 uses the DEC Multinational set. See "Character Sets" in Chapter 2.

The **Character Set Mode** feature in the General Set-Up screen sets the terminal to work with 8-bit multinational sets or 7-bit NRC sets.

If You Use a Multinational Character Set

Table 5-1 lists the compose characters you can use. Some characters are only available in one of the multinational character sets, DEC Multinational or ISO Latin-1. You select these sets with the **User-Preferred Character Set** feature in the General Set-Up screen.

If You Use a 7-Bit NRC Set

You select one of the NRC sets by using the ____ Keyboard feature in the Set-Up Directory. The compose characters available also depend on whether you use typewriter or data processing keys. You select typewriter or data processing keys with the _____ Keys feature in the Keyboard Set-Up screen.

NOTE: When you select "Data Processing Keys", *keys that have three or more characters on their keycap send the characters on the right half of the keycap.*

Use Table 5-2 with the "Typewriter Keys" setting. This table lists compose characters by keyboard.

Use Table 5-3 with the "Data Processing Keys" setting.

Table 5-2 shows how to compose characters that do not appear on the given keyboard. If you want to compose a character that is already on the keyboard, refer to Table 5-1 for the character and the correct sequence.

When you use a 7-bit NRC set, some accent marks that appear on some European keyboards are not available. These accent marks are 8-bit characters.

THREE-STROKE SEQUENCES

You can use three-stroke sequences on any VT320 keyboard. All three-stroke sequences start with the Compose Character key. Tables 5-1 and 5-2 list the three-stroke sequences.

NOTE: If the Compose Character *key does not work, check the* Compose *feature in the Keyboard Set-Up screen (Chapter 4).*

If you use a diacritical mark in a three-stroke sequence, the VT320 uses an equivalent character. The North American/United Kingdom and Dutch keyboards do not have diacritical marks.

Diacritical Mark	Equivalent Character
Diaresis (umlaut) mark	Double quote "
Acute accent	Apostrophe '
Grave accent	Single quote ‘
Circumflex accent	Circumflex character ^
Tilde mark	Tilde character ~
Ring mark	Asterisk * or degree °

Using a Three-Stroke Sequence

You can select a three-stroke compose character as follows.

1. Find the character you want in column 1 of Table 5-1 or 5-2.
2. Press the **Compose Character** key. The Compose indicator turns on, indicating the terminal is in compose mode.
3. Type the two characters in column 2 for the character you want.

For example, to select an e with an acute accent, press **Compose Character**, then type **e** and **'** (apostrophe).

TWO-STROKE SEQUENCES

Two-stroke sequences are faster than three-stroke sequences, because you do not use the **Compose Character** key. However, two-stroke sequences are limited to sequences starting with the following nonspacing diacritical marks.

grave accent `	tilde mark ~
acute accent '	diaeresis mark (umlaut) ¨
circumflex accent ^	ring mark °

NOTE: You cannot use two-stroke sequences on the North American/United Kingdom or Dutch keyboards.

Some European keyboards have keys with both a standard character and a diacritical mark. Make sure you select the correct character when you use these keys in compose sequences.

Using a Two-Stroke Sequence

You can select a two-stroke compose character as follows.

1. Find the character you want in column 1 of Table 5-1, 5-2, or 5-3. Check column 3 to make sure you can use a two-stroke sequence for that character.
2. Press the key with the diacritical mark shown in column 3. The Compose indicator comes on, indicating the terminal is in compose mode.
3. Type the second character shown in column 3.

For example, to select an e with a grave accent on a Danish keyboard, you would type ` (grave accent) then **e**.

INVALID SEQUENCES

When you complete a valid compose sequence, the compose character appears on the screen and the Compose indicator turns off. If you use an invalid sequence, the VT320 cancels the sequence and sounds the warning bell. (You can turn the warning bell on or off in the Keyboard Set-Up screen, Chapter 4).

NOTE: Pressing a function key cancels a compose sequence without sounding the bell.

Canceling or Restarting a Compose Sequence

If you accidentally start a compose sequence by pressing the Compose Character key or a diacritical mark key, press the <x] key. This immediately cancels the compose sequence.

If you press Compose Character during a compose sequence, a new three-stroke sequence starts from that point. The first sequence is canceled.

If you press any of the following keys during a compose sequence, they cancel the sequence and perform their usual function.

Tab	Any top-row key
Return	Period (.) key on the numeric keypad
Enter	Any Ctrl-*other key* combination

Key to Tables
In Tables 5-1, 5-2, and 5-3

Column (1) lists the compose characters.

Column (2) lists the three-stroke sequences.

Column (3) lists the two-stroke sequences.

Table 5-1 Compose Sequences for Multinational Characters

(1)		(2)	(3)*	(1)		(2)	(3)*
"	quotation mark	" (sp)	" (sp)	°	degree sign	0 ^	
#	number sign	+ +		±	plus or minus sign	+ -	
'	apostrophe	' (sp)	' (sp)	²	superscript 2	2 ^	
@	commercial at	A A		³	superscript 3	3 ^	
[	opening bracket	((		µ	micro sign	/ U*	
\	backslash	/ / or / <		¶	paragraph sign	P!	
]	closing bracket	))		·	middle dot	. ^	
^	circumflex accent	^ (sp)	^ (sp)	¹	superscript 1	1 ^	
`	grave accent	` (sp)	` (sp)	º	masculine ordinal	O_	
{	opening brace	(-		»	closed angle brackets	> >	
|	vertical line	/ ^		¼	fraction one-quarter	1 4*	
}	closing brace	) -		½	fraction one-half	1 2*	
~	tilde	~ (sp)	~ (sp)	¿	inverted ?	??	
¡	inverted !	!!		À	A grave	A`	`A
¢	cent sign	C / or C |		Á	A acute	A'	'A
£	pound sign	L- or L=		Â	A circumflex	A^	^A
¥	yen sign	Y- or Y=		Ã	A tilde	A~	~A
§	section sign	SO or S! or S0		Ä	A umlaut	A" or "A	"A
¤	currency sign	XO or X0		Å	A ring	A* or A° (degree sign)	°A
©	copyright sign	CO or C0		Æ	A E diphthong	AE*	
ª	feminine ordinal	A_		Ç	C cedilla	C,	
«	open angle brackets	< <		È	E grave	E`	`E
				É	E acute	E'	'E
				Ê	E circumflex	E^	^E

(sp) = space bar.

* You must type the characters for these sequences in the order shown. (Includes all two-stroke and some three-stroke sequences.)

Table 5-1 Compose Sequences for Multinational Characters (Cont)

(1)		(2)	(3)*
Ë	E umlaut	E" or ¨E	¨E
Ì	I grave	I`	`I
Í	I acute	I'	'I
Î	I circumflex	I^	^I
Ï	I umlaut	I" or ¨I	¨I
Ñ	N tilde	N ~	~N
Ò	O grave	O`	`O
Ó	O acute	O'	'O
Ô	O circumflex	O^	^O
Õ	O tilde	O~	~O
Ö	O umlaut	O" or ¨O	¨O
Œ	O E diphthong†	O E*	
Ø	O slash	o/	
Ù	U grave	U`	`U
Ú	U acute	U'	'U
Û	U circumflex	U^	^U
Ü	U umlaut	U" or ¨U	¨U
Ÿ	Y umlaut†	Y" or ¨Y	¨Y
ß	German small sharp s	ss	
à	a grave	a`	`a
á	a acute	a'	'a
â	a circumflex	a^	^a
ã	a tilde	a~	~a
ä	a umlaut	a" or ¨a	¨a
å	a ring	a* or a°	°a
		(degree sign)	
æ	a e diphthong	a e*	
ç	c cedilla	c , (comma)	
è	e grave	e`	`e
é	e acute	e'	'e
ê	e circumflex	e^	^e
ë	e umlaut	e" or ¨e	¨e
ì	i grave	i`	`i
í	i acute	i'	'i
î	i circumflex	i^	^i
ï	i umlaut	i" or ¨i	¨i
ñ	n tilde	n~	~n
ò	o grave	o`	`o
ó	o acute	o'	'o
ô	o circumflex	o^	^o
õ	o tilde	o~	~o
ö	o umlaut	o" or ¨o	¨o
œ	o e diphthong†	o e*	
ø	o slash	o/	
ù	u grave	u`	`u
ú	u acute	u'	'u
û	u circumflex	u^	^u
ü	u umlaut	u" or ¨u	¨u
ÿ	y umlaut†	y" or ¨y	¨y

* You must type the characters for these sequences in the order shown. (Includes all two-stroke and some three-stroke sequences.)

† This character is only available when you use the DEC Multinational character set. See the User-Preferred Character Set feature in the General Set-Up Screen (Chapter 4).

Table 5-1 Compose Sequences for Multinational Characters (Cont)

(1)		(2)	(3)*	(1)		(2)	(3)*
ISO Characters ¦							
NBSP	no break space	sp sp		´	acute accent	' '	
¦	broken vertical bar	| | or !		¸	cedilla	, ,	
¬	logical not	- , *		¨	diaeresis	" "	¨ (sp)
	soft (syllable) hyphen	- -		Ý	Y acute	Y'	'Y
®	registered trademark	R O		ý	y acute	y'	'y
¯	macron	- ^		Þ	capital Icelandic thorn	T H	
¾	three quarters	3 4 *		þ	small Icelandic thorn	t h	
÷	division sign	- :		Ð	capital Icelandic Eth	- D	
×	multiplication sign	x x		ð	small Icelandic Eth	- d	

* You must type the characters for these sequences in the order shown. (Includes all two-stroke and some three-stroke sequences.)

¦ These characters are only available when you use the ISO Latin-1 multinational character set. See the **User-Preferred Character Set** feature in the General Set-Up screen (Chapter 4).

Table 5-2 Compose Sequences for NRC Sets, Using Typewriter Keys

(1)		(2)	(3)*
British			
£	pound sign	L- or L=	
`	grave accent	` (sp)	
Danish			
#	number sign	+ +	
'	apostrophe	' (sp)	
@	commercial at	AA	
`	grave accent	` (sp)	
Dutch			
£	pound sign	L- or L=	
'	apostrophe	' (sp)	
¼	one quarter	1 4*	
½	one half	1 2*	
3/4	three quarters	3 4*	
ij	i j sign	i j*	
fl	Florin	f -*	
`	grave accent	` (sp)	
´	acute accent	' '	
¨	diaeresis	" ^	
Finnish			
#	number sign	+ +	
'	apostrophe	' (sp)	
Flemish and French/Belgian			
£	pound sign	L- or L=	
'	apostrophe	' (sp)	
`	grave accent	` (sp)	
French Canadian			
'	apostrophe	' (sp)	
à	a grave	`a	`a
â	a circumflex	^a	^a
è	e grave	`e	`e
ê	e circumflex	^e	^e
î	i circumflex	^i	^i
ô	o circumflex	^o	^o
ù	u grave	`u	`u
û	u circumflex	^u	^u
German/Austrian			
'	apostrophe	' (sp)	
`	grave accent	` (sp)	
Italian			
'	apostrophe	' (sp)	

(sp) = space bar.

* You must type the characters for these sequences in the order shown. (Includes all two-stroke and some three-stroke sequences.)

Table 5-2 Compose Sequences For NRC Sets, Using Typewriter Keys (Cont)

(1)		(2)	(3)*
Norwegian			
'	apostrophe	' (sp)	
`	grave accent	` (sp)	
Portuguese			
'	apostrophe	' (sp)	
`	grave accent	` (sp)	
Ã	A tilde	~ A	
Õ	O tilde	~ O	
ã	a tilde	~ a	
õ	o tilde	~ o	
Spanish			
£	pound sign	L- or L=	
'	apostrophe	' (sp)	
§	section sign	IS or OS or 0S	
`	grave accent	` (sp)	
~	tilde	~ (sp)	
Swedish			
#	number sign	+ +	
'	apostrophe	' (sp)	
É	E acute	' E	
é	e acute	' e	
Swiss (French) and Swiss (German)			
'	apostrophe	' (sp)	
ê	e circumflex	^ e	^ e
î	i circumflex	^ i	^ i
ô	o circumflex	^ o	^ o
ù	u grave	` u	` u
û	u circumflex	^ u	^ u

(sp) = space bar.

* You must type the characters for these sequences in the order shown. (Includes all two-stroke and some three-stroke sequences.)

Table 5-3 Compose Sequences For NRC Sets, Using Data Processing Keys

(1)		(2)*
"	quotation mark	" (sp)
#	number sign	+ +
'	apostrophe	' (sp)
@	commercial at	aa or AA or aA
[	opening bracket	((
\	backslash	/ <
]	closing bracket	^ (sp)
'	apostrophe	' (sp)
{	opening brace	(-
|	vertical bar	^ /
}	closing brace	) -
~	tilde character	~ (sp)

* There are no two-stroke sequences available with data processing keys.

6 PRINTERS AND MODEMS

PRINTERS

The VT320 has a built-in serial printer interface that supports most draft and letter-quality printers, including the following Digital printers.

LA12	LA38	LA120
LA34	LA50	LQP02
LA35	LA75	LQP03
LA36	LA100/LA210	

You can select from four printing modes in the Printer Set-Up screen (Chapter 4): normal, auto print, printer controller, and local controller.

Normal Mode: Printing Text from the Screen

This mode lets you print displayed text by using the **Print Screen** key.

Auto Print Mode: Printing Text from the Host System

In this mode, the VT320 sends the current display line to the printer when the cursor moves to the next line after a line feed, form feed, vertical tab, or autowrap. Auto print mode lets you print each line of text as it is received from the host.

While selected, "Auto Print Mode" appears on the status line. You can still perform printing functions with the **Print Screen** key in auto print mode.

You can also turn auto print mode on and off by pressing **Ctrl-Print Screen**. When you leave auto print mode, you return to normal print mode.

Printer Controller Mode: Letting the Host Control the Printer

In this mode, the host system can send text directly to the printer, without displaying the text on the terminal's screen. While selected, "Printer Controller Mode" appears on the status line.

The **Print Screen** key does not work in printer controller mode.

Local Controller Mode: Setting Up the Printer

This mode lets you send information directly from the keyboard to the printer, without displaying the information on the screen. You may find this feature useful in setting up certain printers for operation, without involving the host system. To select this mode, you must set two different set-up features (Chapter 4).

1. Set the **On Line/Local** feature in the Set-Up Directory screen to "Local".
2. Set the **Print Mode** in the Printer Set-Up screen to "Printer Controller Mode".

Remember to reset both features when you finish.

MODEMS

A modem lets the VT320 communicate over a telephone line with a remote computer system. You can use a variety of modems with your VT320, such as Digital's DF03 and DF224 modems. You can also use compatible modems, such as the AT&T 103, 113, and 212 types. See Appendix B for information on ordering modems.

The VT320 must be certified for connection to non-AT&T type modems used outside of continental North America. Your local Digital Field Service office has information on terminal certification and use of non-AT&T type modems.

You can connect one of the standard modems listed above to the VT320 as follows.

1. Connect the modem cable to the 25-pin RS232 connector on the rear of the terminal.
2. Go to the Communications Set-Up screen (Chapter 4).
   a. Set the **Host Port Selection** feature to "RS232, Modem Control".
   b. Set the transmit and receive speeds to match your modem's.

7 SOLVING PROBLEMS AND GETTING SERVICE

OPERATING PROBLEMS

Table 7-1 lists some possible operating problems and suggested solutions. If you have a problem with your terminal, check this list before calling for service. If you need service, see "Digital Service" in this chapter.

Table 7-1 Operating Problems

Problem	Suggested Solution
The terminal does not turn on when you set the power switch to 1.	Make sure the power cord is plugged in. Check the power outlet by plugging in a lamp to see if it lights.
After the "VT320 OK" message appears on the screen, there is no reponse from the host when you try to log in.	Make sure your system cable at the rear the terminal is connected securely. Make sure the port that your system cable is connected to is active. Check the Host Port Selection feature in the Communications Set-Up screen (Chapter 4).
The printer does not print.	Make sure the printer is plugged in, and its power switch is on. Make sure the cable connection between the printer and terminal is tight. Make sure the communication settings on the terminal and printer match, such as baud rate and parity. See the Printer Set-Up screen (Chapter 4).

Table 7-1 Operating Problems (Cont)

Problem	Suggested Solution
Text on the screen does not scroll. The Hold Screen indicator is on.	Press the Hold Screen key to resume scrolling.
The keyboard seems to be locked (the Wait indicator may be on), and the VT320 cannot display new text from the host.	Clear the terminal by using the Clear Comm feature in the Set-Up Directory (Chapter 4).
The screen is blank, but the terminal is on. The power is okay.	The CRT saver feature may be on (Chapter 2). Check the lower right of the screen for the blinking CRT saver cursor. If the CRT saver feature is on, press any key to reactivate the screen. Make sure the brightness and contrast controls are correctly adjusted.
The bell tone does not sound when you turn the VT320 on. All keyboard indicator lights are off.	Make sure the keyboard is connected to the terminal.

POWER-UP SELF-TEST

Every time your turn the terminal on, the VT320 automatically runs a power-up self-test. This test checks the operating status of many internal parts in the terminal. During the test, the keyboard indicators turn on and off, and the bell tone sounds. If the test is successful, a "VT320 OK" message appears on the screen.

Error Messages

If the VT320 fails the power-up self-test, the terminal may display one of the error messages in Table 7-2. Only qualified service personnel should try to correct these problems. You should note any error message that appears and call for service (page 59).

The keyboard indicator lights may flash in different patterns during the test. These patterns are codes that provide service personnel with further information about the terminal's operating condition.

Table 7-2 Screen Error Messages	
Error Message	**Problem**
VT320 NVR Error - 1	Nonvolatile memory (set-up storage) is not operating. Call Digital Field Service.
VT320 RS232 Port Data Error - 2	The 25-pin EIA host connector is not working. Call Digital Field Service.
VT320 RS232 Port Controls Error - 3	The 25-pin EIA host connector is not working. Call Digital Field Service.
VT320 Keyboard Error - 4	1. Make sure your keyboard is plugged in. If it is, 2. Turn the VT320 off and on. If the problem continues, 3. Try another keyboard if you have one. If the new keyboard works, replace the old keyboard. 4. If the new keyboard does not work, call Digital Field Service.
VT320 DEC-423 Port Error - 5	The 6-pin host connector is not working. Call Digital Field Service.
VT320 Printer Port Error - 6	The 6-pin printer connector is not working. Call Digital Field Service.

DIGITAL SERVICE

Digital provides a wide range of maintenance programs which cover small systems and terminals. These include on-site, carry-in, and mail-in repair services. You can use these programs to select the plan that best meets your service needs.

On-Site Repair

Digital offers fast, low-cost, quality maintenance performed at your site by Digital-trained Service Specialists. There are several on-site services available.

DECservice

DECservice provides preferred on-site service, with a guaranteed response time when equipment is located within a specified distance of the service facility. DECservice guarantees a continuous repair effort until service is restored. You may choose the hours of coverage, up to 24 hours a day, 7 days a week.

Basic
Basic offers priority response during regular business hours, Monday through Friday.

Site Servicenter
If you have a least 50 terminals and can provide workspace at your site, Digital will provide an on-site technician for a predetermined, periodic time interval. The terminals may include a variety of models (for example, VT200s and VT300s.)

Per Call
This noncontractual offering provides on-site repair based on time and materials. Per call service is available during regular business hours, Monday through Friday.

DECall
DECall is similar to per call service, but has an annual retainer fee. DECall gives you on-site service at a fixed fee per repair call.

Off-Site Services

Carry-In Servicenters
Digital Servicenters are located in major cities around the world. They offer convenient, cost-effective repair service with a 48 hour turnaround time. Both contract and per call coverage is offered.

DECmailer
This is a mail-in service for module and subassembly repairs. DECmailer provides five day turnaround.

HOW TO GET SERVICE

Digital has a central service center in your area to help you keep your system running at peak efficiency. To find out more about Digital's hardware and software service offerings

In the United States
Call 1-800-554-3333 during regular business hours.

Outside the United States
Contact your local Digital Field Service Office.

A SPECIFICATIONS

This appendix lists the specifications for the VT320 video terminal.

Site Planning

Terminal

Height	25.27 cm (9.87 in)
Width	31.36 cm (12.25 in)
Depth	31.49 cm (12.3 in)
Weight	6.6 kg (14.5 lbs)
Adjustable tilt	+5 to -15 degrees

Keyboard

Height	5.1 cm (2 in)
Width	53.3 cm (21 in)
Depth	17.1 cm (6.75 in)
Weight	2 kg (4.5 lbs)

Environment

	Operating	Storage
Temperature	10° to 40° C (50° to 104° F)	-40° to 66° C -40° to 151° F)
Relative humidity	10% to 90%	0% to 95%
Maximum wet bulb	28° C (82° F)	
Minimum dew point	2° C (36° F)	
Maximum altitude	2.4 km (8000 ft)	9.1 km (30,000 ft)

Electrical

Line voltage (U.S.)	100 to 120 Vac nominal 88 to 132 Vrms operating range single-phase, 3-wire
Line voltage (Europe)	220 to 240 Vac nominal 176 to 264 Vrms operating range single phase, 3-wire
Line frequency	50 to 60 Hz
Input power	50 W maximum
Power cord	Detachable, 3-conductor, grounded
Power cord receptacle	EIA specified CEE22-6A

Display

CRT	35.6 cm (14 in) monochrome screen
Format	24 lines of 80 or 132 characters Status line on 25th line
Video attributes	Reverse video, underline, bold, and blinking — selected individually or in any combination Double width/height lines
Cursor styles	Blinking block or blinking underline

B OPTIONS AND DOCUMENTATION

You can order the following options and manuals from Digital for the VT320. See the end of this appendix for ordering information.

OPTIONS

Tilt-Swivel Base

Part Number	Description
VT3XX-CA	Lets the user adjust the direction and viewing angle of the terminal.

Modems

Part Number	Description
DF02-AA	Direct-connect, AT&T 103J equivalent, 300 baud, full-duplex modem with EIA RS232-C interface
DF03-AA	Direct-connect, AT&T 103J/212A equivalent, 300/1200 baud, full-duplex modem with EIA RS232-C interface
DF224-AA	Direct-connect, AT&T 103J/212A equivalent, 2400 baud, full-duplex modem with EIA RS232-C interface.

Cables

Part Number	Length	Connector
Printer Cables and Adapter (VT320 to printer)		
BC16E-10	10 ft (3 m)	6-pin M DEC-423 to
BC16E-25	25 ft (7.6 m)	6-pin M DEC-423
H8751A adapter	—	6-pin F DEC-423 to 6-pin F DEC-423
Extension Cables		
BC22E-10	10 ft (3 m)	25-pin F RS232 to
BC22E-25	25 ft (7.6 m)	25-pin M RS232
Null Modem Cables		
17-00313-01	10 ft (3 m)	25-pin F RS232 to
17-00313-02	25 ft (7.6 m)	25-pin F RS232
17-00313-03	50 ft (15.2 m)	
Communication Cables		
BC16E-10	10 ft (3 m)	6-pin M DEC-423 to
BC16E-25	25 ft (7.6 m)	6-pin M DEC-423
Keyboard Cable		
17-00294-00	6 ft (1.8 m)	Telephone jack
AC Power Cables		
17-00199-12	Austria, Belgium, Finland, France, Germany, Holland, Norway, Portugal, Sweden	
17-00198-07	Australia, New Zealand	
17-00606-02	Canada, Japan, Mexico, USA	
17-00310-05	Denmark	
17-00209-08	Ireland, United Kingdom	
17-00364-08	Italy	
17-00210-05	Switzerland	

RELATED DOCUMENTATION

You can order the following VT320 documents from Digital.

VT320 Programmer Reference Manual **EK-VT320-RM**
Provide information on character processing, character codes, and control functions available for VT320 applications.

VT320 Pocket Service Guide **EK-VT320-PS**
Provides qualified service personnel with information to troubleshoot and repair the VT320.

VT320 Video Terminal IPB **EK-VT320-IP**
Provides a detailed parts breakdown of the terminal's field replaceable units. Does not provide part numbers for printed circuit board components.

VT320 Family Field Maintenance Print Set **MP-02509-01**
Provides a complete set of VT320 electrical and mechanical schematic diagrams.

ORDERING INFORMATION

You can order options, supplies, and documentation by phone or by mail.

Continental USA and Puerto Rico

Call 800-258-1710 or mail to:

Digital Equipment Corporation
P.O. Box CS2008
Nashua, NH 03061

New Hampshire, Alaska, Hawaii

Call 1-603-884-6660.

Outside the USA and Puerto Rico

Mail to:

Digital Equipment Corporation
Attn: Accessories and Supplies Business Manager
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COMMUNICATION C

This appendix provides information on how the VT320 communicates with a host computer, printer, or modem. The appendix shows the cables you can use for different system configurations. It describes how XON and XOFF characters help control data flow. The last section describes the signals carried by the connectors on the rear of the terminal.

The terminal operates on full-duplex asynchronous lines only, with 10 possible transmit and receive speeds. You can use split transmit and receive speeds, but you must use the same speeds as your host system and printer.

To match your host system's speed, use the Communications Set-Up screen. To match your printer's speed, use the Printer Set-Up screen. See Chapter 4.

For more information on communication, see the *VT320 Programmer Reference Manual.*

CABLES

You can connect the VT320 directly to a local host system with a cable. You can also connect the terminal indirectly to a remote host system, using (1) a terminal server, or (2) a modem or acoustic coupler connected to public-switched or dedicated telephone lines. See "Modems" in Chapter 6.

You can connect the VT320 to a local, asynchronous, serial printer by using a null modem cable.

Figure C-1 shows the DEC-423 and RS232 cables you can use to connect the VT320 to a host system or printer. To order cables, see Appendix B.

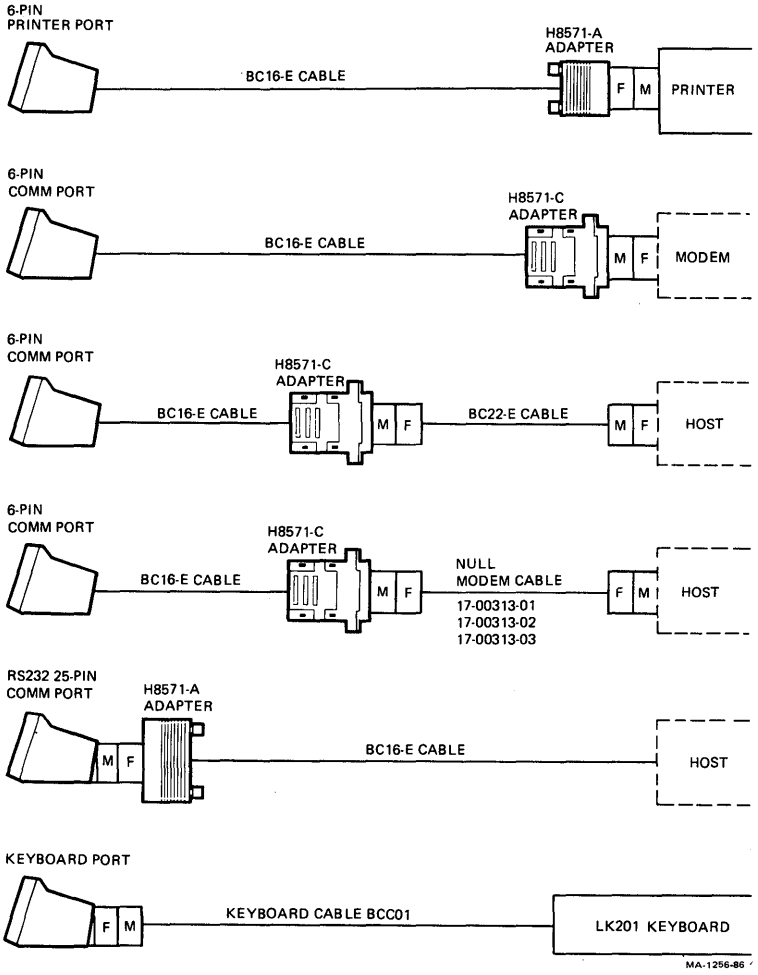


Figure C-1 Cables

XON/XOFF FLOW CONTROL

The VT320 stores incoming characters in a character input buffer. The buffer can hold 254 characters. The terminal processes characters from the buffer on a first-in/first-out basis.

When the input buffer fills to 64 or 128 characters, the terminal sends an XOFF character to stop the host system from sending more characters. The default setting is 64. You can select from three settings — 64, 128, or no XOFF — using the Communications Set-Up screen.

NOTE: If you select "No XOFF" *in set-up, the terminal does not send an XOFF character to the host system when the input buffer fills. Selecting* "No XOFF" *also disables the* **Hold Screen** *key. With XOFF disabled, there is no way to ensure that data will not be lost.*

If the host system fails to respond to the XOFF character, the terminal sends a second XOFF character when the input buffer fills to 220 characters. The terminal sends a third XOFF character when the buffer is full.

When the input buffer falls below 32 characters, the terminal sends an XON character to tell the host system to start sending characters again.

If you enable XON/XOFF, the terminal recognizes received XON and XOFF characters. When the terminal receives XOFF, it stops sending data (except XON/XOFF characters). If the keyboard data buffer overflows, the keyboard locks and the Wait indicator turns on. The terminal resumes transmission when it receives an XON.

MODEM CONNECTIONS AND DISCONNECTIONS

When the VT320 makes a connection to the host system via a modem, the terminal performs the following operations to ensure it is ready to send and receive.

- Unlocks the keyboard (if it was locked).
- Clears any transmisson in progress.
- Clears the keyboard buffer and all message buffers.
- Clears the input buffer.
- Clears XOFF sent and XOFF received.

Any of the following conditions will disconnect the connection to the host system.

- You type **Shift-Break**.
- You use the **Recall** or **Default** features in the Set-Up Directory.
- You change the host port you are using from the RS232 port to the DEC423 port, or from the DEC423 port to the RS232 port. See the **Host Port Selection** feature in the Communications Set-Up screen (Chapter 4).
- The terminal loses the data set ready (DSR) signal.
- The terminal loses the receive line signal detect (RLSD) signal for the period of time you selected in set-up. See the **Disconnect, Delay** feature in the Communications Set-Up screen.
- The terminal receives a self-test command from the host system.

The usual way to disconnect communications is to type **Shift-Break.** The host system's response to the disconnect signal depends on the system and the software.

BREAK FUNCTION

A break condition is the occurrence of a continuous space on a communication line for greater than one character time. If you are using a modem, this condition causes the modem to disconnect the terminal from the host system.

The **Break** key has three functions. You can enable or disable the **Break** key in the Keyboard Set-Up screen.

If enabled, pressing **Break** sends a break signal to the host. If disabled, you can still send a break signal to the host by typing **Shift-Break.**

Pressing **Shift-Break** disconnects communications when you use a modem.

Pressing **Ctrl-Break** sends the answerback message (Communication Set-Up) to the host.

CONNECTOR SIGNALS

The VT320 has two host system (comm) connectors and one printer connector on the rear of the terminal. Table C-1 describes the interface signals for the 25-pin host system connector. Table C-2 describes the signals for the 6-pin host connector and 6-pin printer connector. The following figure shows the pin numbers for the 6-pin connectors.

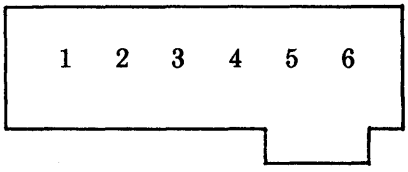


Table C-1 25-Pin RS232-C Comm Port Interface Signals

Pin	Signal	Mnemonic	EIA/CCITT/DIN	Description
2	Transmitted data	TXD	BA/103/D1	*From VT320* Sends serial characters. Held in mark state when characters are not being sent. In modem control modes, sends data only when RTS, CTS, DSR, and DTR signals are on.
3	Received data	RXD	BB/104/D2	*To VT320* Receives serial characters. In modem control modes, ignores characters if RLSD signal is off.
4	Request to send	RTS	CA/105/S2	*From VT320* When on, places the modem in transmit mode.
5	Clear to send	CTS	CB/106/M2	*To VT320* When on, tells the VT320 that the modem is ready to send.
6	Data set ready	DSR	CC/107/M1	*To VT320* When on, tells the VT320 that the modem is in data mode and is ready to exchange RTS, CTS, and RLSD signals.
7	Signal ground	SGND	AB/102/E2	Serves as common ground reference potential for all connector signals, except protective ground.

Table C-1	25-Pin RS232-C Comm Port Interface Signals (Cont)			
Pin	**Signal**	**Mnemonic**	**EIA/CCITT/DIN**	**Description**
8	Receive line signal detect (carrier detect)	RLSD	CF/109/M5	*To VT320* When on, tells the VT320 that the signal received on the communication line is good enough to ensure correct demodulation of received data. When off, indicates no signal received, or signal is unsuitable for demodulation.
12	Speed indicator	SPDI	CI/112/M4	*To VT320* When on, enables a modem to control the terminal's transmit and receive speeds. Sets the speeds to 1200 bits per second, regardless of set-up selection.
20	Data terminal ready	DTR	CD/108.2/S1.2	*From VT320* When on, tells the modem that the terminal is ready to send or receive.
23	Speed select	SPDS	CH/111/S4	*From VT320* When on, tells the modem that the receive speed selected in set-up is greater than 600 bits per second.

Table C-2 6-Pin DEC-423 Comm and Printer Interface Signals

Pin	Signal	Mnemonic	Description
1	Data terminal ready	DTR	*From VT320* When on, tells the modem or printer that the VT320 is ready to send or receive.
2	Transmitted data	TXD+	*From VT320* Sends serial characters. Held in the mark state (-) when characters are not being sent. In modem control modes, sends data only when DSR and DTR signals are on.
3	Transmit signal ground	TDX-	Provides the common ground reference potential for transmitted signals TXD+ and DTR.
4	Receive signal ground	RXD-	Provides the commond ground reference potential for received signals RXD+ and DSR.
5	Received data	RXD+	*To VT320* Receives serial characters.
6	Data set ready	DSR	*To VT320* For the comm line: When on, tells the VT320 that the modem is in the data mode and is ready to communicate. For the printer line: Receives DTR on this line. If DSR is present at power-up, the printer controls print operations. If DSR is not present at power-up, the terminal checks for DSR before each print operation.

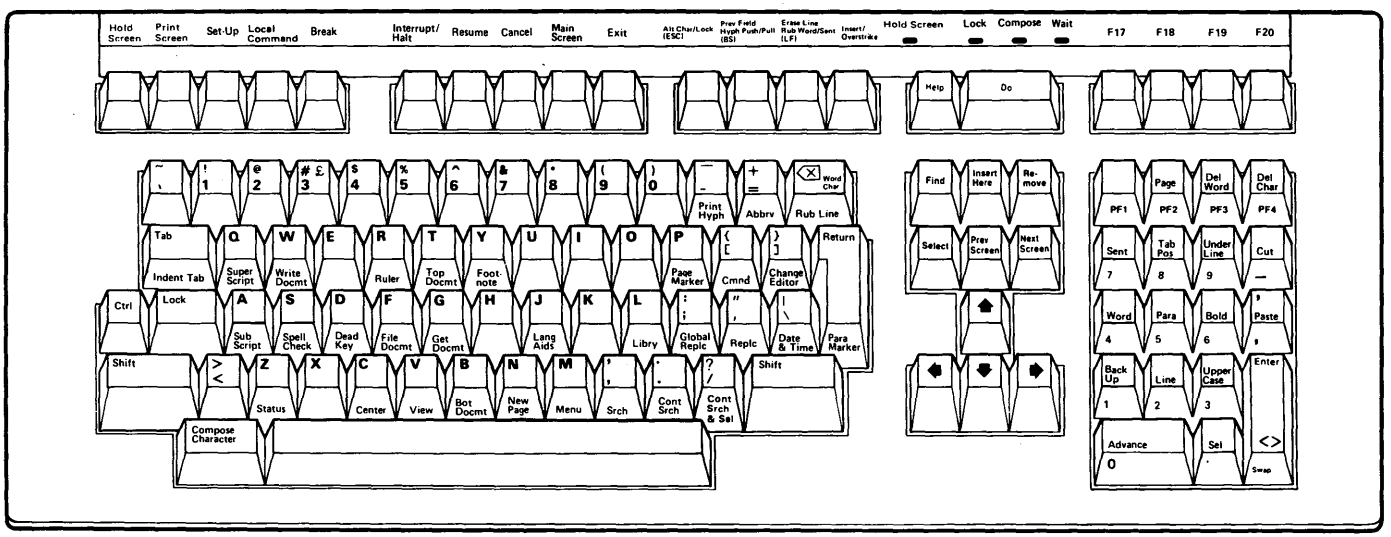
STANDARDS

The VT320 operates in accordance with the following national and international communication standards.

EIA Standard RS232C
CCITT V.24
CCITT V.26 (V.10)
CCITT X.20 (V.21)

D KEYBOARDS

This appendix shows each model of the VT320 keyboard. The North American/ United Kingdom keyboard is available in two versions, standard and word processing. The standard version appears in Chapter 4. The key positions on both versions are the same. However, the word processing version has different labels on some keys, for word processing functions.



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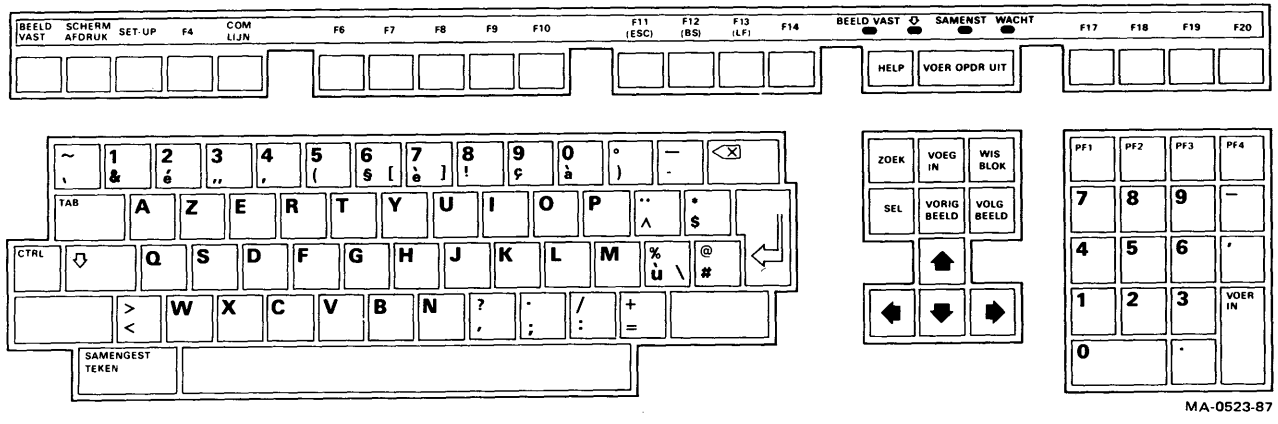
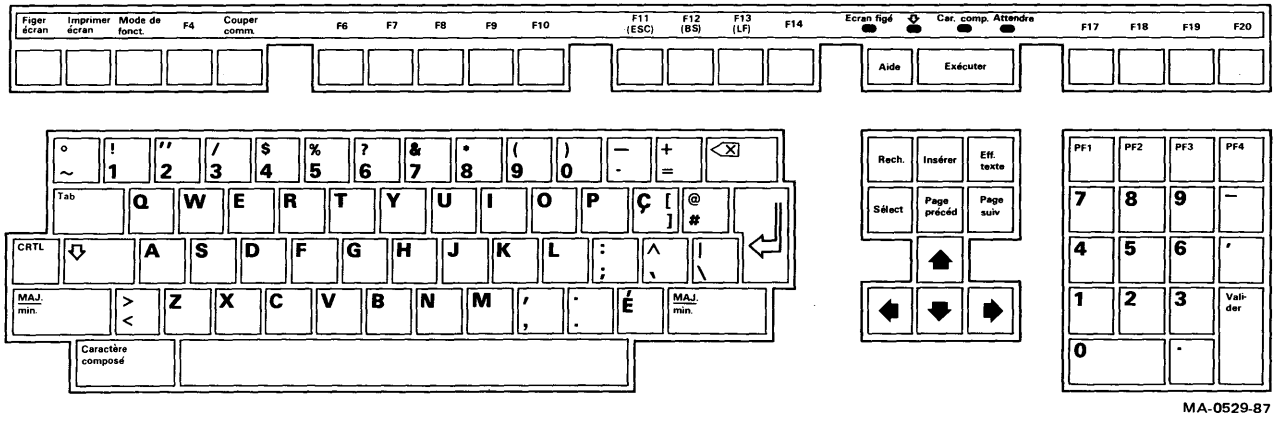
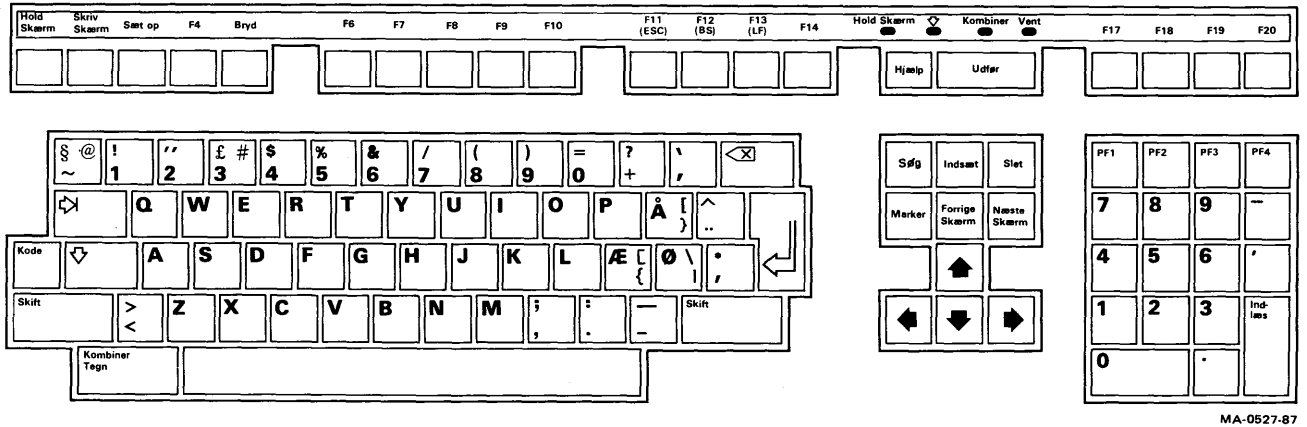
North American/United Kingdom (word processing version)



Beligum (Flemish)

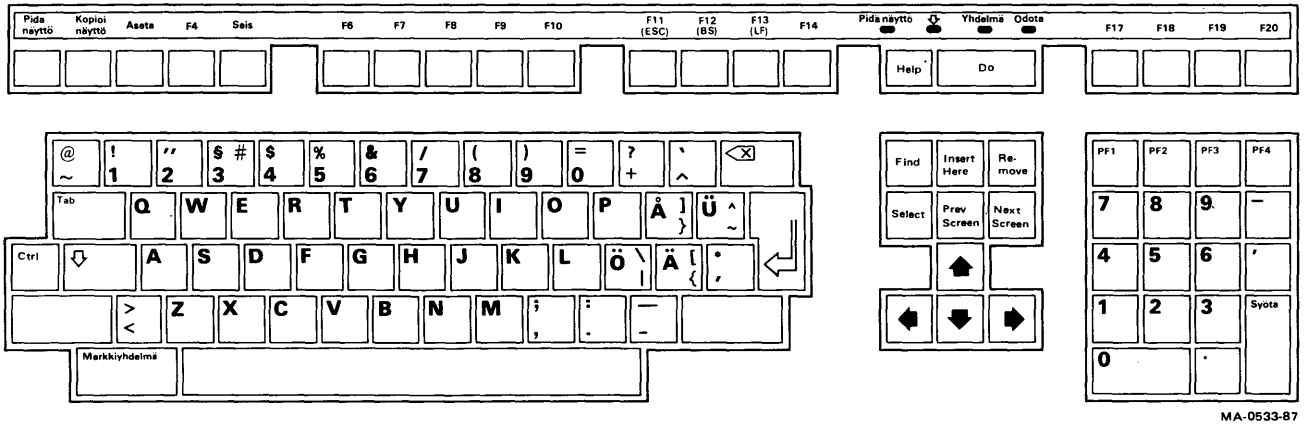


Canada (French)



MA-0527-87

Denmark



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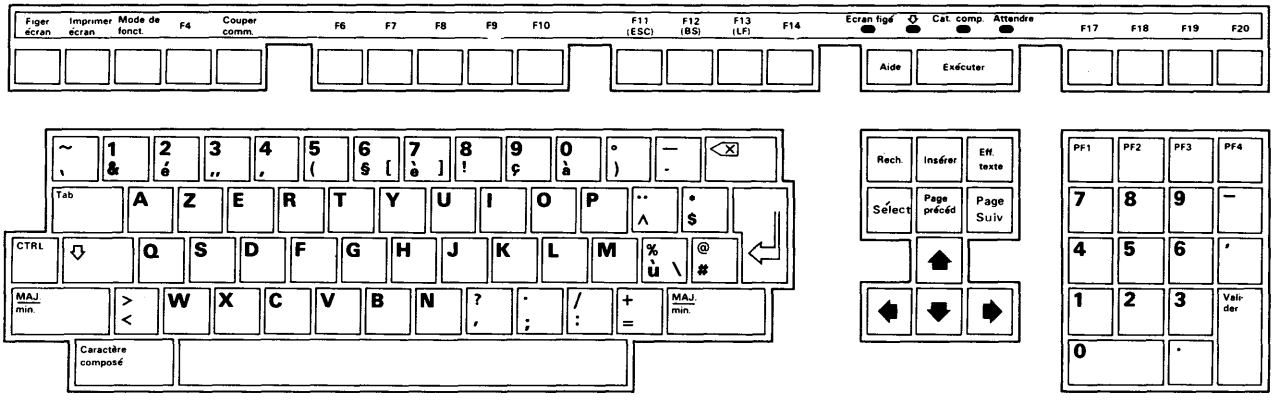
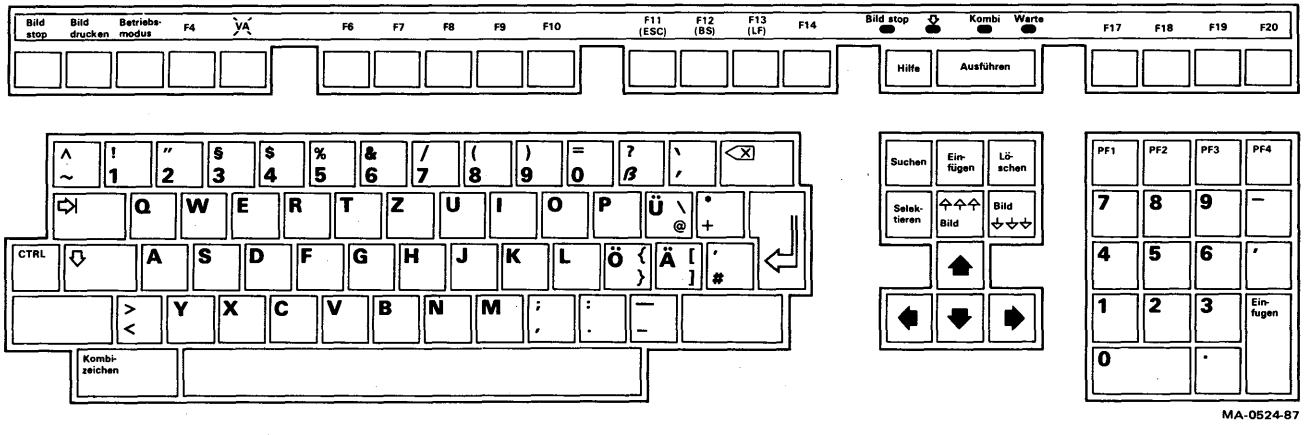
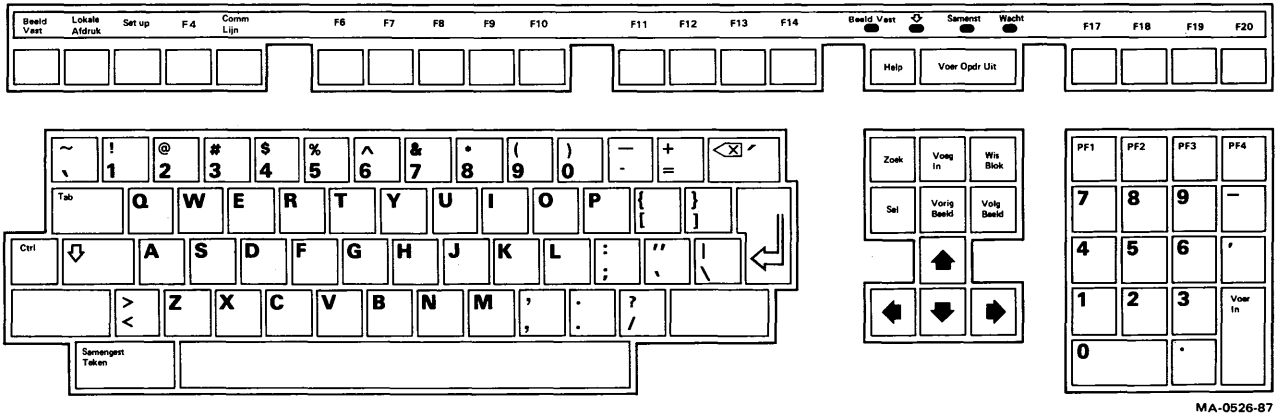
Finland



France/Belgium

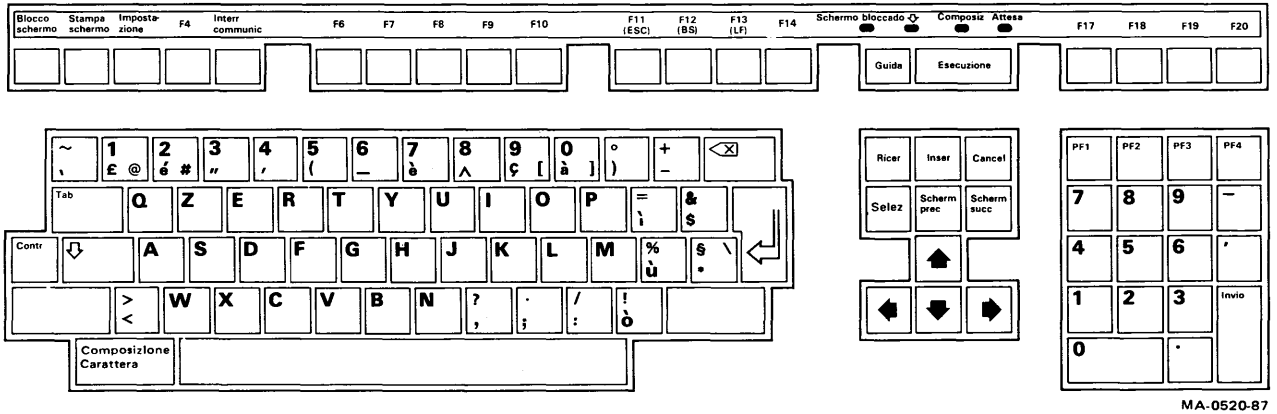


Germany/Austria



MA-0526-87

Holland



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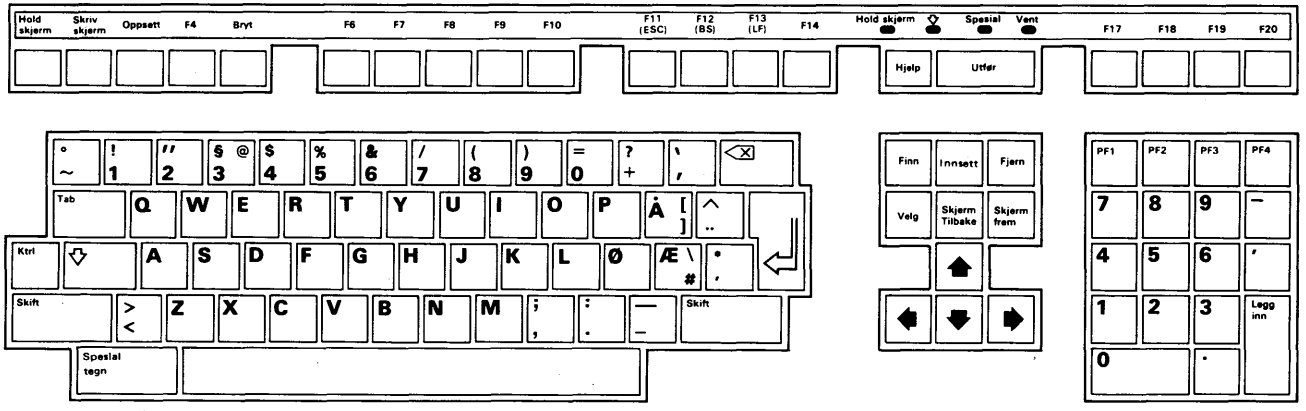
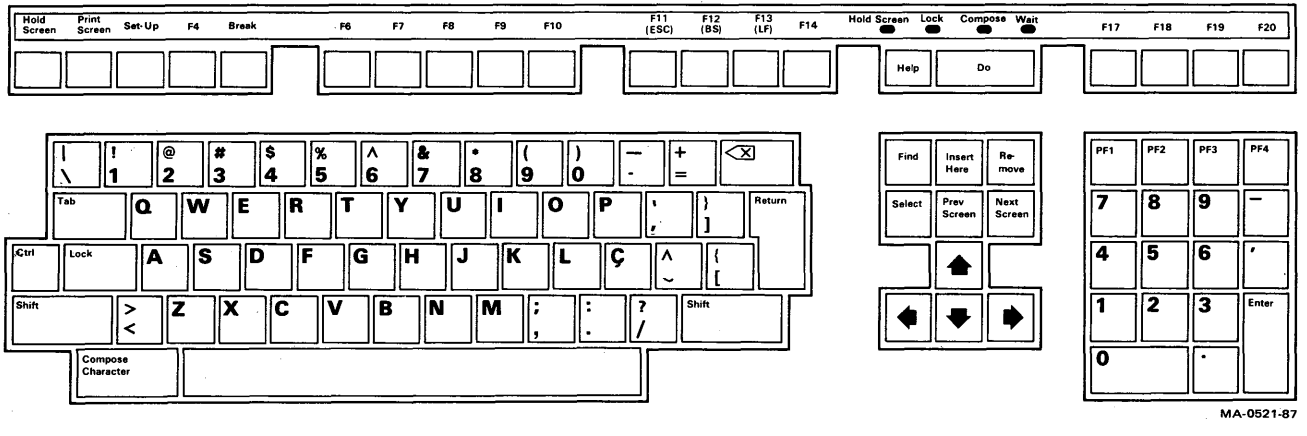
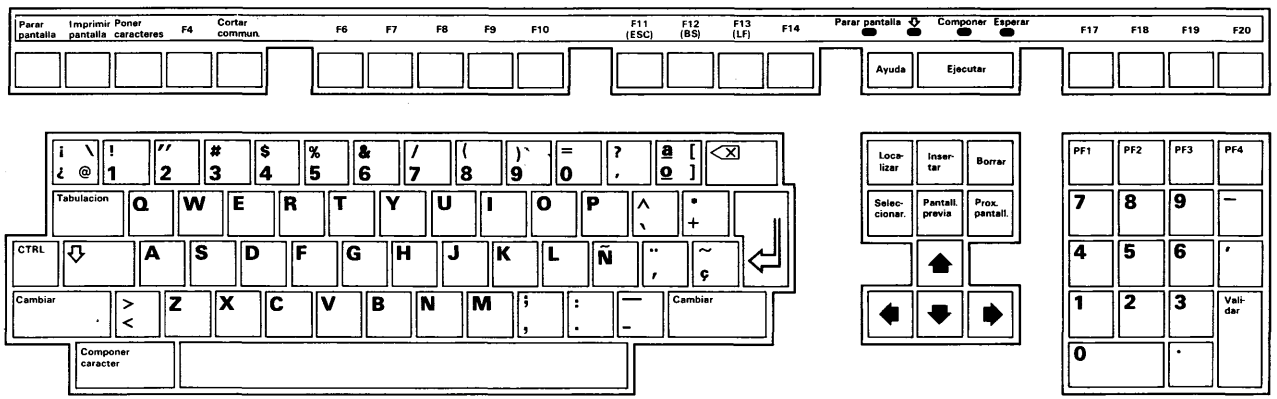
Italy



Norway



Portugual



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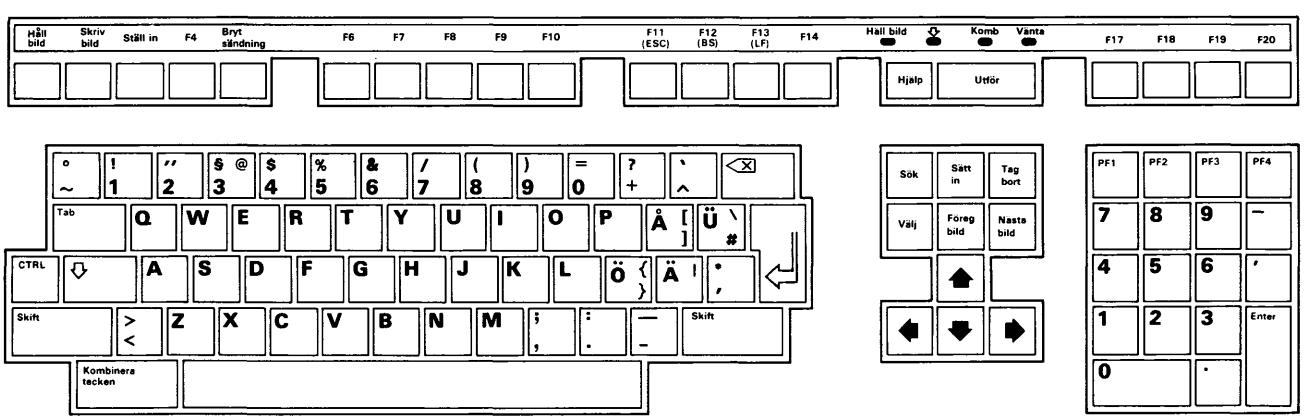
Spain



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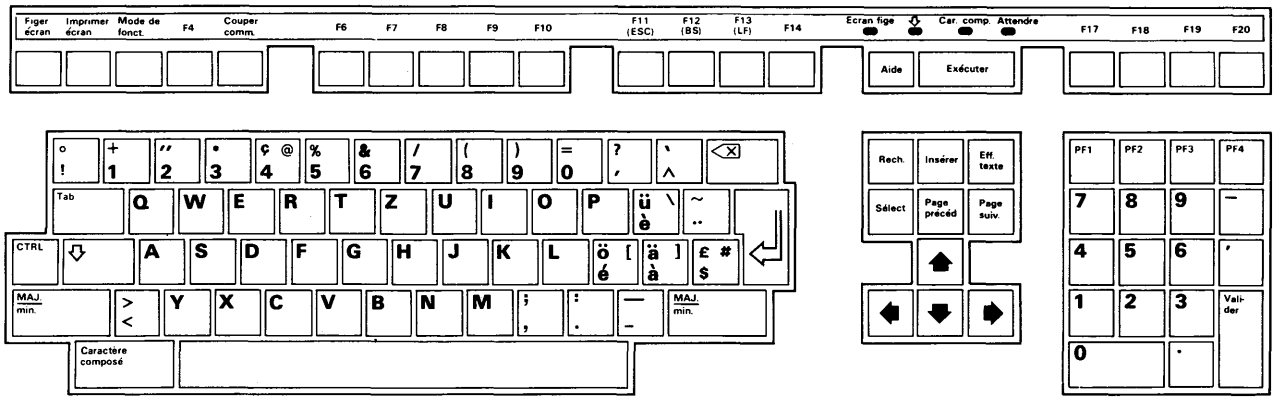
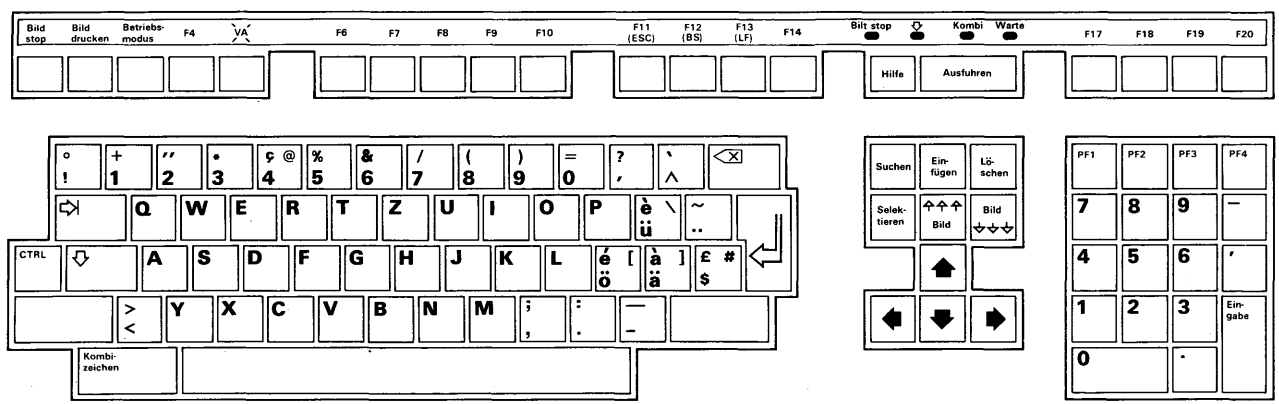
Sweden



MA-0522-87

Switzerland (French)



MA-0532-87

Switzerland (German)

VT320 PROGRAMMING SUMMARY E

This appendix is a summary of the control functions and commands described in the *VT320 Programmer Reference Manual.* If you are a programmer, you can use this appendix as a quick-reference tool to program the VT320.

The appendix is divided into sections that correspond to the chapters of the programmer reference manual. For example, to find out more about

2 CHARACTER ENCODING

you would go to Chapter 2 of the programmer reference manual.

Character Sets and Codes

Computer systems store characters as a series of bits, usually 7 bits or 8 bits long. A bit is a binary digit. The VT320 can work with 7-bit or 8-bit systems. The VT320 provides the following character sets.

- ASCII
- DEC Supplemental Graphic
- ISO Latin-1 supplemental graphic
- DEC Special Graphic
- 12 national replacement character sets (NRCs)

An 8-bit system can use any of these character sets. A 7-bit system can use any set except the supplemental graphic sets.

Each character set has two types of characters, graphic characters and control characters. Graphic characters are the characters you can display on the screen. Control characters make the terminal perform a special function. See "Control Functions" in this appendix.

A code table is a convenient way of showing all the characte in a character set with their codes. Characters appear in row and columns. One way of finding a character in a character set is by its column/row position. For example, in the ASCII character set the character **H** is at 4/8 (column 4, row 8).

Each character in a row uses the same binary code for its fo least significant bits. This value appears at the left or right c each row. Each character in a column uses the same binary code for its three (or four) most signicant bits. This value appears at the top of each column.

Next to each character appears the octal, decimal, and hexidecimal code for the character. Different programmers may prefer using octal, decimal, or hexidecimal values for different purposes.

DEC Multinational Character Set

Left Half – ASCII Set

ROW	0	1	2	3	4	5	6	7
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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

C0 CODES — GL CODES (ASCII GRAPHIC)

KEY

CHARACTER: ESC — 33 OCTAL, 27 DECIMAL, 1B HEX

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Right Half – DEC Supplemental Graphic Set

ROW	8	9	10	11	12	13	14	15
0	200 128 80	DCS 220 144 90	240 160 A0	° 260 176 B0	À 300 192 C0	320 208 D0	à 340 224 E0	360 240 F0
1	201 129 81	PU1 221 145 91	¡ 241 161 A1	± 261 177 B1	Á 301 193 C1	Ñ 321 209 D1	á 341 225 E1	ñ 361 241 F1
2	202 130 82	PU2 222 146 92	¢ 242 162 A2	2 262 178 B2	Â 302 194 C2	Ò 322 210 D2	â 342 226 E2	ò 362 242 F2
3	203 131 83	STS 223 147 93	£ 243 163 A3	3 263 179 B3	Ã 303 195 C3	Ó 323 211 D3	ã 343 227 E3	ó 363 243 F3
IND	204 132 84	CCH 224 148 94	244 164 A4	264 180 B4	Ä 304 196 C4	Ô 324 212 D4	ä 344 228 E4	ô 364 244 F4
NEL	205 133 85	MW 225 149 95	¥ 245 165 A5	µ 265 181 B5	Å 305 197 C5	Õ 325 213 D5	å 345 229 E5	õ 365 245 F5
SSA	206 134 86	SPA 226 150 96	246 166 A6	¶ 266 182 B6	Æ 306 198 C6	Ö 326 214 D6	æ 346 230 E6	ö 366 246 F6
ESA	207 135 87	EPA 227 151 97	§ 247 167 A7	· 267 183 B7	Ç 307 199 C7	Œ 327 215 D7	ç 347 231 E7	œ 367 247 F7
HTS	210 136 88	230 152 98	¤ 250 168 A8	270 184 B8	È 310 200 C8	Ø 330 216 D8	è 350 232 E8	ø 370 248 F8
HTJ	211 137 89	231 153 99	© 251 169 A9	1 271 185 B9	É 311 201 C9	Ù 331 217 D9	é 351 233 E9	ù 371 249 F9
VTS	212 138 8A	232 154 9A	ª 252 170 AA	º 272 186 BA	Ê 312 202 CA	Ú 332 218 DA	ê 352 234 EA	ú 372 250 FA
PLD	213 139 8B	CSI 233 155 9B	« 253 171 AB	» 273 187 BB	Ë 313 203 CB	Û 333 219 DB	ë 353 235 EB	û 373 251 FB
PLU	214 140 8C	ST 234 156 9C	254 172 AC	¼ 274 188 BC	Ì 314 204 CC	Ü 334 220 DC	ì 354 236 EC	ü 374 252 FC
RI	215 141 8D	OSC 235 157 9D	255 173 AD	½ 275 189 BD	Í 315 205 CD	Ý 335 221 DD	í 355 237 ED	ý 375 253 FD
SS2	216 142 8E	PM 236 158 9E	256 174 AE	276 190 BE	Î 316 206 CE	336 222 DE	ì 356 238 EE	376 254 FE
SS3	217 143 8F	APC 237 159 9F	257 175 AF	¿ 277 191 BF	Ï 317 207 CF	ß 337 223 DF	ï 357 239 EF	377 255 FF

C1 CODES — GR CODES (DEC SUPPLEMENTAL GRAPHIC)

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ɔnal Replacement Character Sets (NRCs)

table shows the characters in each NRC set that
· from the ASCII set.

ɔnal Replacement Character Sets

acter	2/3	4/0	5/11	5/12	5/13	5/14	5/15	6/0	7/11	7/12	7/13	7/14
	#	@	[	\	]	^	_	`	{	|	}	~
d lom	£	@	[	\	]	^	_	`	{	|	}	~
ı	£	¼	ÿ	½	|	^	_	`	¨	f	¼	´
ish	#	@	Ä	Ö	Å	Ü	_	é	ä	ö	å	ü
ch	£	à	°	ç	§	^	_	`	é	ù	è	¨
ch dian	#	à	â	ç	ê	î	_	ô	é	ù	è	û
an	#	§	Ä	Ö	Ü	^	_	`	ä	ö	ü	ß
ı	£	§	°	ç	é	^	_	ù	à	ò	è	ì
egian/ ish	#	@	Æ	Ø	Å	^	_	`	æ	ø	å	~
guese	#	@	Ã	Ç	Õ	^	_	`	ã	ç	õ	~
ish	£	§	¡	Ñ	¿	^	_	`	`	°	ñ	ç
ish	#	É	Ä	Ö	Å	Ü	_	é	ä	ö	å	ü
	ù	à	é	ç	ê	î	è	ô	ä	ö	ü	û

Latin Alphabet Nr 1 Supplemental Set

is the right half of the ISO Latin-1 multinational
acter set. The left half is the ASCII character set.

	9		10		11		12		13		14		15		COLUMN
															BITS b7 b6 b5
															b4 b3 b2 b1 ROW
200 128 80	DCS	220 144 90	NBSP	240 160 A0	°	260 176 B0	À	300 192 C0	Ð	320 208 D0	à	340 224 E0	ð	360 240 F0	0 0 0 0 0
201 129 81	PU1	221 145 91	¡	241 161 A1	±	261 177 B1	Á	301 193 C1	Ñ	321 209 D1	á	341 225 E1	ñ	361 241 F1	0 0 0 1 1
202 130 82	PU2	222 146 92	¢	242 162 A2	2	262 178 B2	Â	302 194 C2	Ò	322 210 D2	â	342 226 E2	ò	362 242 F2	0 0 1 0 2
203 131 83	STS	223 147 93	£	243 163 A3	3	263 179 B3	Ã	303 195 C3	Ó	323 211 D3	ã	343 227 E3	ó	363 243 F3	0 0 1 1 3
204 132 84	CCH	224 148 94	¤	244 164 A4	´	264 180 B4	Ä	304 196 C4	Ô	324 212 D4	ä	344 228 E4	ô	364 244 F4	0 1 0 0 4
205 133 85	MW	225 149 95	¥	245 165 A5	µ	265 181 B5	Å	305 197 C5	Õ	325 213 D5	å	345 229 E5	õ	365 245 F5	0 1 0 1 5
206 134 86	SPA	226 150 96	¦	246 166 A6	¶	266 182 B6	Æ	306 198 C6	Ö	326 214 D6	æ	346 230 E6	ö	366 246 F6	0 1 1 0 6
207 135 87	EPA	227 151 97	§	247 167 A7	·	267 183 B7	Ç	307 199 C7	×	327 215 D7	ç	347 231 E7	÷	367 247 F7	0 1 1 1 7
210 136 88		230 152 98	¨	250 168 A8	¸	270 184 B8	È	310 200 C8	Ø	330 216 D8	è	350 232 E8	ø	370 248 F8	1 0 0 0 8
211 137 89		231 153 99	©	251 169 A9	¹	271 185 B9	É	311 201 C9	Ù	331 217 D9	é	351 233 E9	ù	371 249 F9	1 0 0 1 9
212 138 8A		232 154 9A	ª	252 170 AA	º	272 186 BA	Ê	312 202 CA	Ú	332 218 DA	ê	352 234 EA	ú	372 250 FA	1 0 1 0 10
213 139 8B	CSI	233 155 9B	«	253 171 AB	»	273 187 BB	Ë	313 203 CB	Û	333 219 DB	ë	353 235 EB	û	373 251 FB	1 0 1 1 11
214 140 8C	ST	234 156 9C	¬	254 172 AC	¼	274 188 BC	Ì	314 204 CC	Ü	334 220 DC	ì	354 236 EC	ü	374 252 FC	1 1 0 0 12
215 141 8D	OSC	235 157 9D		255 173 AD	½	275 189 BD	Í	315 205 CD	Ý	335 221 DD	í	355 237 ED	ý	375 253 FD	1 1 0 1 13
216 142 8E	PM	236 158 9E	®	256 174 AE	¾	276 190 BE	Î	316 206 CE	Þ	336 222 DE	î	356 238 EE	þ	376 254 FE	1 1 1 0 14
217 143 8F	APC	237 159 9F	¯	257 175 AF	¿	277 191 BF	Ï	317 207 CF	ß	337 223 DF	ï	357 239 EF	ÿ	377 255 FF	1 1 1 1 15

:1 CODES — GR CODES — ISO LATIN-1 SUPPLEMENTAL GRAPHIC

MA-0894D-83

DEC Special Graphic Charater Set

ROW	COLUMN 0	1	2	3	4	5	6	7
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	— 160 112 70 SCAN 3
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	▒ 141 97 61	— 161 113 71 SCAN 5
2	STX 2 2 2	DC2 22 18 12	" 42 34 22	2 62 50 32	B 102 66 42	R 122 82 52	␉ 142 98 62	— 162 114 72 SCAN 7
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	␌ 143 99 63	⎺ 163 115 73 SCAN 9
4	EOT 4 4 4	DC4 24 20 14	$ 44 36 24	4 64 52 34	D 104 68 44	T 124 84 54	␍ 144 100 64	├ 164 116 74
5	ENQ 5 5 5	NAK 25 21 15	% 45 37 25	5 65 53 35	E 105 69 45	U 125 85 55	␊ 145 101 65	┤ 165 117 75
6	ACK 6 6 6	SYN 26 22 16	& 46 38 26	6 66 54 36	F 106 70 46	V 126 86 56	° 146 102 66	┴ 166 118 76
7	BEL 7 7 7	ETB 27 23 17	' 47 39 27	7 67 55 37	G 107 71 47	W 127 87 57	± 147 103 67	┬ 167 119 77
8	BS 10 8 8	CAN 30 24 18	(50 40 28	8 70 56 38	H 110 72 48	X 130 88 58	␤ 150 104 68	│ 170 120 78
9	HT 11 9 9	EM 31 25 19	) 51 41 29	9 71 57 39	I 111 73 49	Y 131 89 59	␋ 151 105 69	≤ 171 121 79
10	LF 12 10 A	SUB 32 26 1A	* 52 42 2A	: 72 58 3A	J 112 74 4A	Z 132 90 5A	┘ 152 106 6A	≥ 172 122 7A
11	VT 13 11 B	ESC 33 27 1B	+ 53 43 2B	; 73 59 3B	K 113 75 4B	[133 91 5B	┐ 153 107 6B	π 173 123 7B
12	FF 14 12 C	FS 34 28 1C	, 54 44 2C	< 74 60 3C	L 114 76 4C	\ 134 92 5C	┌ 154 108 6C	≠ 174 124 7C
13	CR 15 13 D	GS 35 29 1D	- 55 45 2D	= 75 61 3D	M 115 77 4D	] 135 93 5D	└ 155 109 6D	£ 175 125 7D
14	SO 16 14 E	RS 36 30 1E	. 56 46 2E	> 76 62 3E	N 116 78 4E	^ 136 94 5E	┼ 156 110 6E	· 176 126 7E
15	SI 17 15 F	US 37 31 1F	/ 57 47 2F	? 77 63 3F	O 117 79 4F	(BLANK) 137 95 5F	⎽ 157 111 6F SCAN 1	DEL 177 127 7F

C0 CODES — GL CODES (DEC SPECIAL GRAPHIC)

KEY

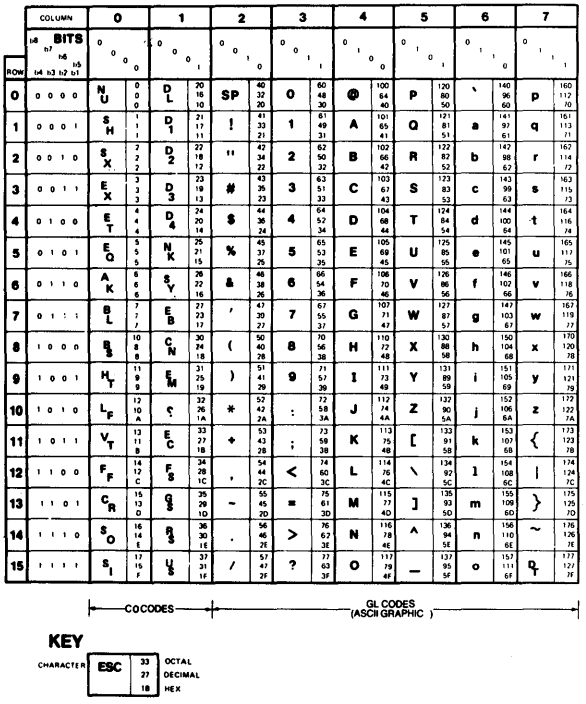
CHARACTER ESC 33 27 1B OCTAL DECIMAL HEX

MA-0893C-83

Display Controls Font

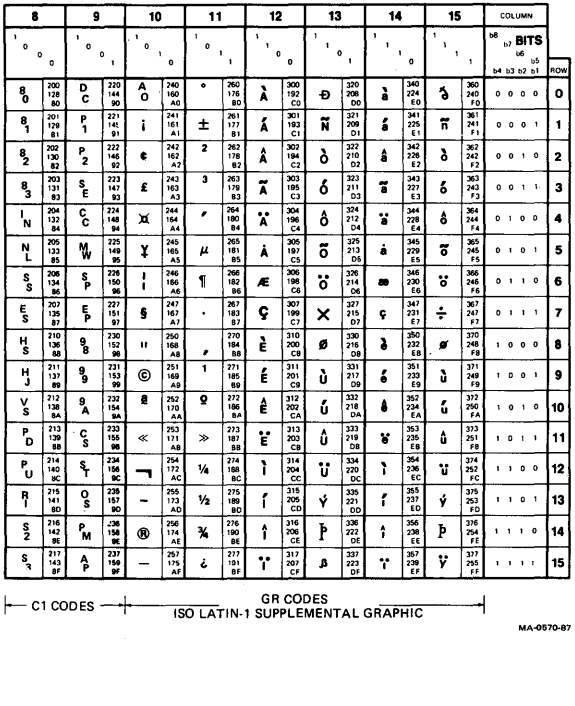
You can have the terminal display the characters in your control functions, rather than performing the functions. This is useful for debugging programs. To display control characters, you use the Controls feature in the Display Set-Up screen (Chapter 4).

Display Controls Font (Left Half)



MA-0569-87

Display Controls Font (Right Half)



MA-0570-87

ıl Functions

mmers use control functions to make the VT320 perform e of special actions, from the simple (moving the cursor) complex (emulating another terminal). The way you ontrol functions in an application depends on two : your computing system and the programming language e.

are two types of control functions, single-character and le-character. Single-character functions, called control ters, perform simpler functions. There are two groups of l characters, C0 and C1. C0 characters appear in ıs 0 and 1 of the code tables. C1 characters appear in ıs 8 and 9. C1 characters are not available in 7-bit s. The next section lists the function of each control ter.

ıl functions can perform more complex functions. There ee types of multiple-character control functions: escape ıces, control sequences, and device control strings. Each egins with a certain control character.

e Sequences

ape sequence begins with the C0 character ESC, fol- by one or more graphic characters from the ASCII set. SC character tells the system that the graphic char- are part of a control function, not characters to played. For example,

6

escape sequence that changes the current line of text to e-width characters. Escape sequences use only 7-bit cters, and can be used in 7-bit or 8-bit systems.

ol Sequences

trol sequence begins with the C1 character CSI, followed e or more ASCII graphic characters. You can also express s two 7-bit characters, ESC [. So you can express control nces as escape sequences. For example, the following two nces perform the same function -- they change the dis- rom 80 to 132 columns per line.

3 h

? 3 h

ever possible use CSI instead of ESC [to introduce a ıl sequence. You can only use CSI in 8-bit systems.

e Control Strings

ice control string begins with the C1 character DCS, ed by one or more ASCII graphic characters, a data , and the C1 character ST (string terminator). For an ple of a device control string, see "Down-Line-Loading t Character Set" in this appendix.

-bit systems, you can express DCS as ESC P. You can ss ST as ESC /.

C0 (7-Bit) Control Characters Recognized

Name	Mnemonic	Function
Null	**NUL**	Ignored.
Enquiry	**ENQ**	Sends the answerback message.
Bell	**BEL**	Sounds the bell tone if the bell is enabled in set-up.
Backspace	**BS**	Moves the cursor one character position to the left. If the cursor is at the left margin, no action occurs.
Horizontal tab	**HT**	Moves the cursor to the next tab stop. If there are no more tab stops, the cursor moves to the right margin. HT does not cause text to auto wrap.
Line feed	**LF**	Causes a line feed or a new line operation, depending on the setting of line feed/new line mode.
Vertical tab	**VT**	Treated as LF.
Form feed	**FF**	Treated as LF.
Carriage return	**CR**	Moves the cursor to the left margin on the current line.
Shift out (Locking shift 1)	**SO** (LS1)	Maps the G1 character set into GL. You designate G1 by using a select character set (SCS) sequence. See the VT320 Programmer Reference Manual, Chapter 5.
Shift in (Locking shift 0)	**SI**	Maps the G0 character set into GL. You designate G0 by using a select character set (SCS) sequence. See the VT320 Programmer Reference Manual, Chapter 5.
Device control 1 (XON)	**DC1**	Also known as XON. If XON/XOFF flow control is enabled in set-up, DC1 clears DC3 (XOFF). This action causes the VT320 to continue sending characters.

C0 (7-Bit) Control Characters Recognized (Cont)

Device control 3 (XOFF)	**DC3**	Also known as XOFF. If XON/XOFF flow control is enabled in set-up, DC3 causes the VT320 to stop sending characters. The terminal cannot resume sending characters until it receives a DC1 control character.
Cancel	**CAN**	Immediately cancels an escape sequence or control sequence in progress. The VT320 does not display any error characters.
Substitute	**SUB**	Immediately cancels an escape sequence or control sequence in progress. The VT320 displays a reverse question mark ? for an error character.
Escape	**ESC**	Introduces an escape sequence. ESC also cancels any escape sequence or control sequence in progress.
Delete	**DEL**	Ignored when received. DEL is not used as a fill character. Digital does not recommend using DEL as a fill character. Use NUL instead.

C1 (8-Bit) Control Characters Recognized

Name	Mnemonic	Function
Index	**IND**	Moves the cursor down one line in the same column. If the cursor is at the bottom margin, data on the screen scrolls up.
Next line	**NEL**	Moves the cursor to the first position on the next line. If the cursor is at the bottom margin, data on the screen scrolls up.
Horizontal tab set	**HTS**	Sets a horizontal tab stop at the column where the cursor is.
Reverse index	**RI**	Moves the cursor up one line in the same column. If the cursor is at the top margin, data on the screen scrolls down.
Single shift 2	**SS2**	Temporarily maps the G2 character set into GL, for the next graphic character. You designate the G2 set by using a select character set (SCS) sequence. See the VT320 Programmer Reference Manual, Chapter 5.

C1 (8-Bit) Control Characters Recognized (Cont)

Single shift 3	**SS3**	Temporarily maps the G3 chara set into GL, for the next graphic character. You designate the G3 by using a select character set (S sequence. See the VT320 Progra Reference Manual, Chapter 5.
Device control string	**DCS**	Introduces a device control strin
Control sequence introducer	**CSI**	Introduces a control sequence.
String terminator	**ST**	Ends a control string. You use S in combination with DCS, APC, PM, or SOS control strings.
Operating system command	**OSC**	Introduces an operating system command.*
Privacy message	**PM**	Introduces a privacy message str
Application program command	**APC**	Introduces an application progra command.*

* The VT320 ignores all following characters, until it rec an ST control character. ESC, CAN, and SUB no longe cancel device control strings.

8-Bit Control Characters and Their 7-Bit Equivalents

Name	8-Bit Character	7-Bit Sequence
Index	**IND**	**ESC D**
Next line	**NEL**	**ESC E**
Horizontal tab set	**HTS**	**ESC H**
Reverse index	**RI**	**ESC M**
Single shift 2	**SS2**	**ESC N**
Single shift 3	**SS3**	**ESC O**
Device control string	**DCS**	**ESC P**
Control sequence introducer	**CSI**	**ESC [**
String terminator	**ST**	**ESC **
Operating system command	**OSC**	**ESC]**
Privacy message	**PM**	**ESC ^**
Application program	**APC**	**ESC _**

YBOARD CODES

s Sent by Editing Keys

	Code Sent	
	VT300 Mode	VT100, VT52 Modes
	CSI 1 ~	The editing keys do not send codes in these two modes.
t Here	CSI 2 ~	
ve	CSI 3 ~	
t	CSI 4 ~	
Screen	CSI 5 ~	
Screen	CSI 6 ~	

s Sent by Arrow Keys

Cursor Key Mode Setting (DECCKM)		
ANSI Mode		VT52 Mode*
Cursor	Application	Cursor or Application
CSI A	SS3 A	ESC A
CSI B	SS3 B	ESC B
CSI C	SS3 C	ESC C
CSI D	SS3 D	ESC D

SI mode applies to VT300 and VT100 modes.
52 mode is not compatible with ANSI mode.

Codes Sent by Numeric Keypad Keys

	ANSI Mode*		VT52 Mode*	
Key	Numeric	Application	Numeric	Application
0	0	SS3 p	0	ESC ? p
1	1	SS3 q	1	ESC ? q
2	2	SS3 r	2	ESC ? r
3	3	SS3 s	3	ESC ? s
4	4	SS3 t	4	ESC ? t
5	5	SS3 u	5	ESC ? u
6	6	SS3 v	6	ESC ? v
7	7	SS3 w	7	ESC ? w
8	8	SS3 x	8	ESC ? x
9	9	SS3 y	9	ESC ? y
-	(minus)	SS3 m	-	ESC ? m
,	(comma)	SS3 l ¦	,	ESC ? l ¦ ≠
.	(period)	SS3 n	.	ESC ? n
Enter	CR or CR LF $	SS3 M	CR or CR LF $	ESC ? M
PF1	SS3 P	SS3 P	ESC P	ESC P
PF2	SS3 Q	SS3 Q	ESC Q	ESC Q
PF3	SS3 R	SS3 R	ESC R	ESC R
PF4	SS3 S	SS3 S	ESC S	ESC S ≠

* ANSI mode applies to VT300 and VT100 modes. VT52 mode is not compatible with ANSI standards.

¦ The last character in the sequence is a lowercase L.

≠ You cannot use these sequences on a VT52 terminal.

$ Keypad numeric mode. **Enter** sends the same codes as **Return**. You can use line feed/new line mode (LNM) to change the code sent by **Return**. When LNM is reset, pressing **Return** sends one control character (CR). When LNM is set, pressing **Return** sends two control characters (CR, LF).

Codes Sent by the Top-Row Function Keys

Name on Legend Strip	Key Number	Code Sent: VT300 Modes	Code Sent: VT100, VT52 Modes
Hold Screen	(F1)*	--	--
Print Screen	(F2)*	--	--
Set-Up	(F3)*	--	--
F4	(F4)*	--	--
Break	(F5)*	--	--
F6	F6	CSI 1 7 ~	--
F7	F7	CSI 1 8 ~	--
F8	F8	CSI 1 9 ~	--
F9	F9	CSI 2 0 ~	--
F10	F10	CSI 2 1 ~	--
F11 (ESC)	F11	CSI 2 3 ~	ESC
F12 (BS)	F12	CSI 2 4 ~	BS
F13 (LF)	F13	CSI 2 5 ~	LF
F14	F14	CSI 2 6 ~	--
Help	F15	CSI 2 8 ~	--
Do	F16	CSI 2 9 ~	--
F17	F17	CSI 3 1 ~	--
F18	F18	CSI 3 2 ~	--
F19	F19	CSI 3 3 ~	--
F20	F20	CSI 3 4 ~	--

* These keys do not send codes. They are local function keys.

Keys Used to Send 7-Bit Control Codes

Control Character Mnemonic	Code Table Position	Key Pressed With Ctrl (All Modes)	Dedicated Function K
NUL	0/00	2 or space bar	--
SOH	0/01	A	--
STX	0/02	B	--
ETX	0/03	C	--
EOT	0/04	D	--
ENQ	0/05	E	--
ACK	0/06	F	--
BEL	0/07	G	--
BS	0/08	H	F12 (BS)*
HT	0/09	I	Tab
LF	0/10	J	F13 (LF)*
VT	0/11	K	--
FF	0/12	L	--
CR	0/13	M	Return
SO	0/14	N	--
SI	0/15	O	--
DLE	1/00	P	--
DC1	1/01	Q ǂ	--
DC2	1/02	R	--
DC3	1/03	S ǂ	--
DC4	1/04	T	--
NAK	1/05	U	--
SYN	1/06	V	--
ETB	1/07	W	--
CAN	1/08	X	--
EM	1/09	Y	--
SUB	1/10	Z	--
ESC	1/11	3 or [	F11 (ESC)*
FS	1/12	4 or /	--
GS	1/13	5 or]	--
RS	1/14	6 or ^	--
US	1/15	7 or ?	--
DEL	7/15	8	Delete

* 7-bit control codes sent in VT100 and VT52 modes only

ǂ 7-bit control codes sent only when XON/XOFF support is off.

ULATING VT SERIES TERMINALS

ing an Operating Level (DECSCL)

: Select VT300 mode to run all VT200 applications.

nce	Level Selected
	Level 1
1 " p	VT100 mode
	Level 2 or 3
3 " p	VT300 mode, 8-bit controls
3 ; 0 " p	VT300 mode, 8-bit controls
3 ; 2 " p	VT300 mode, 8-bit controls
2 " p	VT300 mode, 8-bit controls
2 ; 0 " p	VT300 mode, 8-bit controls
2 ; 2 " p	VT300 mode, 8-bit controls
3 ; 1 " p	**VT300 mode, 7-bit controls (D)**
2 ; 1 " p	VT300 mode, 7-bit controls

ng C1 Controls to the Host

sp F	Select 7-bit C1 controls.
sp G	Select 8-bit C1 controls.

= default.

nal Replacement Character Set Mode NRCM)

lt: Multinational

	Sequence	Function
nal)	CSI ? 4 2 h	The terminal uses 7-bit characters from an NRC set.
i- nal)	CSI ? 4 2 l*	The terminal uses 7-bit and 8-bit characters from the DEC Multinational or ISO Latin-1 set.

5 USING CHARACTER SETS

Selecting a Character

1. Designate the set as G0, G1, G2, or G3.
2. Map the designated set into the in-use table.

Designating Character Sets (SCS Sequences)

ESC Intermediate Final

Intermediate To Select	Use	Final To Select	Use
94-Character Sets		ASCII	B
G0	(	DEC Supplemental Graphic	% 5
G1	)	ISO Latin-1 supplemental	A
G2	*	User-preferred supplemental	<
G3	+	DEC Special Graphic	0
96-Character Sets			
G1	-	NRC Sets*	
G2	.	British	A
G3	/	Dutch	4
		Finnish †	5 or C
		French	R
		French Canadian	Q
		German	K
		Italian	Y
		Norwegian/Danish †	' or E or 6
		Portuguese	% 6
		Spanish	Z
		Swedish †	7 or H
		Swiss	=

* Only one NRC set is available at a time. You must select national mode to use NRC sets. See "National Replacement Character Set Mode" in Section 4.

† Digital recommends using the first code shown.

Mapping Character Sets

With Locking Shifts

Locking Shift	Code	Function
LS0 (locking shift 0)	**SI**	**Map G0 into GL. (D)**
LS1 (locking shift 1)	**SO**	Map G1 into GL.
NOTE: The following locking shift functions are available only in VT300 mode.		
LS1R (locking shift 1, right)	**ESC ~**	Map G1 into GR.
LS2 (locking shift 2)	**ESC n**	Map G2 into GL.
LS2R (locking shift 2, right)	**ESC }**	Map G2 into GR.
LS3 (locking shift 3)	**ESC o**	Map G3 into GL.
LS3R (locking shift 3, right)	**ESC |**	Map G3 into GR.

With Single Shifts

SS2 (single shift 2)	**ESC N**	Maps G2 into GL for the next character.
SS3 (single shift 3)	**ESC O**	Maps G3 into GL for the next character.

Assign User-Preferred Supplemental Set (DECAUPSS)

Default: DEC Supplemental Graphic

Sequence	Function
DCS 0 ! u % 5 ST	Assigns the DEC Supplemental Graphic set as the preferred supplemental set.
DCS 1 ! u A ST	Assigns the ISO Latin-1 supplemental set as the preferred supplemental set.

SOFT CHARACTER SETS

You can only load soft character sets in VT300 mode.

Guidelines for Designing Soft Characters

Character Dimension	80-Column Font	132-Column Font
Cell width	15 pixels	9 pixels
Cell height	12	12
Body width	12	7
Body height	7	7
Ascender height	3	3
Descender height	2	2
Spacing before character	2	1
Spacing after character	1	1

Converting Binary Code to an ASCII Character

Binary Value	Hex Value	Hex Value + 3F Offset	Character Equivalent
000000	00	3F	?
000001	01	40	@
000010	02	41	A
000011	03	42	B
000100	04	43	C
000101	05	44	D
000110	06	45	E
000111	07	46	F
001000	08	47	G
001001	09	48	H
001010	A	49	I
001011	B	4A	J
001100	C	4B	K
001101	D	4C	L
001110	E	4D	M
001111	F	4E	N
010000	10	4F	O
010001	11	50	P
010010	12	51	Q
010011	13	52	R
010100	14	53	S
010101	15	54	T
010110	16	55	U
010111	17	56	V
011000	18	57	W
011001	19	58	X
011010	1A	59	Y
011011	1B	5A	Z
011100	1C	5B	[
011101	1D	5C	\
011110	1E	5D	]
011111	1F	5E	^
100000	20	5F	
100001	21	60	`
100010	22	61	a
100011	23	62	b
100100	24	63	c
100101	25	64	d
100110	26	65	e
100111	27	66	f
101000	28	67	g
101001	29	68	h
101010	2A	69	i
101011	2B	6A	j
101100	2C	6B	k
101101	2D	6C	l
101110	2E	6D	m
101111	2F	6E	n
110000	30	6F	o
110001	31	70	p

erting Binary Code to an ASCII Character (Cont)

y	Hex Value	Hex Value + 3F Offset	Character Equivalent
0	32	71	q
1	33	72	r
0	34	73	s
1	35	74	t
0	36	75	u
1	37	76	v
0	38	77	w
1	39	78	x
0	3A	79	y
1	3B	7A	z
0	3C	7B	{
1	3D	7C	|
0	3E	7D	}
1	3F	7E	~

-Line-Loading a Soft Character Set (DECDLD)

S Pfn ; Pcn ; Pe ; Pcmw ; Pw ; Pt ; Pcmh ; Pcss ; {

s Sxbp1 ; Sxbp2 ;...; Sxbpn ST

DLD Parameter Characters

neter	Name	Description
	Font number	Selects the DRCS font buffer to load. The VT320 has one DRCS font buffer. Pfn has two valid values, 0 and 1. Both values refer to the same DRCS buffer.
	Starting character	Selects where to load the first character in the DRCS font buffer. The location corresponds to a location in the ASCII code table (Section 2). Pcn is affected by the character set size. (See Pcss below.) In a 94-character set, a Pcn value of 0 or 1 means that the first soft character is loaded into position 2/1 of the character table. In a 96-character set, a Pcn value of 0 means the first character is loaded into position 2/0 of the character table. The greatest Pcn value is 95 (position 7/15).

DECDLD Parameter Characters (Cont)

Parameter	Name	Description
Pe	Erase control	Selects which characters to erase from the DRCS buffer before loading the new font. 0 = erase all characters in the DRCS buffer with this number, width, and rendition. 1 = erase only characters in locations being reloaded. 2 = erase all renditions of the soft character set (normal, bold, 80-column, 132-column).
Pcmw	Character matrix width	Selects the maximum character cell width. VT300 modes **0 = 15 pixels wide for 80 columns, 9 pixels wide for 132 columns. (D)** 1 = illegal. 2 = 5 X 10 pixel cell | VT220 3 = 6 X 10 pixel cell | compatible 4 = 7 X 10 pixel cell | 5 = 5 pixels wide. 6 = 6 pixels wide. . . 15 = 15 pixels wide. If you omit a Pcmw value, the terminal uses the default character width. Any Pcmw value over 15 is illegal. Use Pcmw values 2 through 4 with VT220 compatible software. Remember that VT220 fonts appear different on the VT320. Fonts designed specifically for the VT320 should use values 5 through 15.
Pw	Font Width	Selects the number of columns per line (font set size). **0 = 80 columns. (D)** 1 = 80 columns. 2 = 132 columns.

(D) = default.

DECDLD Parameter Characters (Cont)

Parameter	Name	Description
Pt	Text or full-cell	Defines the font as a text font or full-cell font. **0 = text. (D)** 1 = text. 2 = full cell. Full-cell fonts can individually address all pixels in a cell. Text fonts cannot individually address all pixels. If you specify a text cell, the terminal automatically performs spacing and centering of the characters.
Pcmh	Character matrix height	Selects the maximum character cell height. **0 or omitted = 12 pixels high. (D)** 1 = 1 pixel high. 2 = 2 pixels high. 3 = 3 pixels high. . . . 12 = 12 pixels high. Pcmh values over 12 are illegal. If the value of Pcmw is 2, 3, or 4, Pcmh is ignored.
Pcss	Character set size	Defines the character set as a 94- or 96-character graphic set. **0 = 94-character set. (D)** 1 = 96-character set.

The value of Pcss changes the meaning of the Pcn (starting character) parameter above.

Pcss Examples

-- If Pcss = 0 (94-character set)

The terminal ignores any attempt to load characters into the 2/0 or 7/15 table positions.

Pcn	Specifies
1	column 2/row 1
.	
.	
94	column 7/row 14

-- If Pcss = 1 (96-character set)

Pcn	Specifies
0	column 2/row 0
.	
.	
95	column 7/row 15

(D) = default.

DECDLD Parameter Characters (Cont)

Dscs defines the character set name. You use this name in the select character set (SCS) escape sequence. You use the following format for the Dscs name

I I F

where

I I are zero to two intermediate characters, from the range 2/0 to 2/15 in the ASCII character set.

F is a final character in the range 3/0 to 7/14.

Sxbp1 ; Sxbp2 ;...; Sxbpn are the sixel bit patterns for individual characters, separated by semicolons (3/11). Your character set can have 1 to 94 patterns or 1 to 96 patterns, depending on the setting of the character set size parameter (Pcss). Each sixel bit pattern is in the following format.

S...S/S...S

where

the first **S...S** represents the upper columns of sixels of the soft character.

/ (2/5) advances the sixel pattern to the lower columns of the soft character.

the second **S...S** represents the lower columns of the soft character.

Valid DECDLD Parameter Combinations

Pcmw	Pt	Pcmh	Pw
80-Column Fonts			
0 to 12	0, 1	0 to 12	0, 1
0 to 15	2	0 to 12	0, 1
132-Column Fonts			
0 to 7	0, 1	0 to 12	2
0 to 9	2	0 to 12	2

Clearing a Soft Character Set

You can clear a soft character set that you loaded into the terminal by using the following DECDLD control string.

DCS 1;1;2 { sp @ ST

Any of the following actions also clear the soft character s

-- Performing the power-up self-test.
-- Selecting the **Recall** or **Reset** features in the Set-Up Directory.
-- Using a reset to initial state (RIS) or ESC c sequence.

REEN DISPLAY COMMANDS

lay Control Functions

e	Mnemonic	Sequence
/receive mode	SRM	Set: **CSI 12 h** Local echo off. Reset: **CSI 12 l*** Local echo on. (D)
:n mode	DECSCNM	Set: **CSI ? 5 h** Light background. Reset: **CSI ? 5 l*** Dark background. (D)
lling mode	DECSCLM	Set: **CSI ? 4 h** Smooth scroll. (D) Reset: **CSI ? 4 l*** Jump scroll.
:t active s display †	DECSASD	**CSI Ps $ }** Ps = 0, main display. Ps = 1, status line.
:t status type †	DECSSDT	**CSI Ps $ ~** Ps = 0, none. Ps = 1, indicator. Ps = 2, host-writable.

iat Sequences

e	Mnemonic	Sequence
mn mode	DECCOLM	Set: **CSI ? 3 h** 132 columns. Reset: **CSI ? 3 l*** 80 columns. (D)
op and m margins	DECSTBM	**CSI Pt ; Pb r** Pt = top line. Pb = bottom line.
in mode	DECOM	Set: **CSI ? 6 h** Move within margins. Reset: **CSI ? 6 l*** Move outside margins. (D)

= default.

e last character in the sequence is a lowercase L.

ailable in VT300 mode only.

7 VISUAL CHARACTER AND LINE ATTRIBUTES

Character and Line Attribute Sequences

Name	Mnemonic	Sequence
Select graphic rendition	SGR	**CSI Ps...Ps m** Ps = character attribute value(s). (See list below.)
Single-width, single-height line	DECSWL	**ESC # 5**
Double-width, single-height line	DECDWL	**ESC # 6**
Double-width, double-height line	DECDHL	**ESC # 3** (top half) **ESC # 4** (bottom half)

Visual Character Attribute Values

Ps	Attribute
VT300 and VT100 Modes	
0	All attributes off
1	Bold
4	Underline
5	Blinking
7	Reverse video
VT300 Mode Only	
22	Bold off
24	Underline off
25	Blinking off
27	Reverse video off

8 EDITING

Inserting and Deleting Text

Name	Mnemonic	Sequence
Insert/replace mode	IRM	Set: **CSI 4 h** Insert characters. Reset: **CSI 4 l*** Replace characters.
Delete line	DL	**CSI Pn M** Pn lines.
Insert line	IL	**CSI Pn L** Pn lines.
Delete character	DCH	**CSI Pn P** Pn characters.
Insert character †	ICH	**CSI Pn @** Pn characters.

Erasing Text

Name	Mnemonic	Sequence
Erase in display	ED	**CSI Ps J** Ps = 0, cursor to end. (D) Ps = 1, beginning to cursor. Ps = 2, complete display.
Erase in line	EL	**CSI Ps K** Ps = 0, cursor to end. (D) Ps = 1, beginning to cursor. Ps = 2, complete line.
Erase character*	ECH	**CSI Pn X** Pn characters.

(D) = default.

* The last character in the sequence is a lowercase L.

† Available in VT300 mode only.

Selectively Erasing Text

Select character attribute*	DECSCA	**CSI Ps " q** Ps = 0 or 2, erasable Ps = 1, not erasable
Selective erase in display*	DECSED	**CSI ? Ps J** Ps = 0, cursor to end. (D) Ps = 1, beginning to curso Ps = 2, complete display.
Selective erase in line*	DECSEL	**CSI ? Ps K** Ps = 0, cursor to end. (D) Ps = 1, beginning to curso Ps = 2, complete line.

(D) = default.

* Available in VT300 mode only.

9 CONTROLLING THE CURSOR

Enabling the Cursor

Name	Mnemonic	Sequence
Text cursor enable mode	DECTCEM	Set: **CSI ? 25 h** Visible cursor. (D) Reset: **CSI ? 25 l*** Invisible cursor.

* The last character in the sequence is a lowercase L.

Moving the Cursor*

Cursor position	CUP	**CSI Pl ; Pc H** Line Pl, column Pc.
Horizontal and vertical position	HVP	**CSI Pl ; Pc f** Line Pl, column Pc.
Cursor forward	CUF	**CSI Pn C** Pn columns right.
Cursor backward	CUB	**CSI Pn D** Pn columns left.
Cursor up	CUU	**CSI Pn A** Pn lines up.
Cursor down	CUD	**CSI Pn B** Pn lines down.

(D) = default.

* In these sequences, the default value for Pn, Pl, and Pc is 1.

YBOARD AND PRINTING COMMANDS

ard Control Sequences

	Mnemonic	Sequence	
		Set	Reset
ard mode	KAM	**CSI 2 h** Locked.	**CSI 2 l*** Unlocked. (D)
:ed/ ne mode	LNM	**CSI 20 h** New line.	**CSI 20 l*** Line feed. (D)
:peat	DECARM	**CSI ? 8 h** Repeat. (D)	**CSI ? 8 l*** No repeat.
rap	DECAWM	**CSI ? 7 h** Autowrap.	**CSI ? 7 l*** No autowrap. (D)
: keys	DECCKM	**CSI ? 1 h** Application.	**CSI ? 1 l*** Cursor. (D)
d ation/ ic modes	DECKPAM DECKPNM	**ESC =** Application.	**ESC >** Numeric. (D)
ard mode	DECKBUM	**CSI ? 68 h** Data processing.	**CSI ? 68 l*** Typewriter. (D)

amming UDKs

able Keys

ough F14 Help
F17 through F20

JDK Device Control String Format

CS Pc ; Pl | Ky1/St1;...Kyn/Stn ST

the clear parameter.

one =Clear all keys before loading new values (D)
=Clear one key at a time, before loading a new value.

he lock parameter.

one =Lock the keys.
=Do not lock the keys (D).

t1;...Kyn/Stn are the key definition strings.

= default.

e last character in the sequence is a lowercase L.

The key selector number (**Kyn**) indicates which key you are defining.

Key	Value	Key	Value	Key	Value
F6	17	F11	23	Do	29
F7	18	F12	24	F17	31
F8	19	F13	25	F18	32
F9	20	F14	26	F19	33
F10	21	Help	28	F20	34

The string parameters (**Stn**) are the key definitions, encoded as pairs of hex codes.

3/0 through 3/9 (0 through 9)
4/1 through 4/6 (A through F)
6/1 through 6/6 (a through f)

Printing Control Sequences

Name	Mnemonic	Sequence
Printer extent mode	DECPEX	Set: **CSI ? 19 h** Screen.
		Reset: **CSI ? 19 l*** Scrolling region. (D)
Print form feed mode	DECPFF	Set: **CSI ? 18 h** Form feed.
		Reset: **CSI ? 18 l*** No form feed. (D)
Auto print mode	MC	On: **CSI ? 5 i** Off: **CSI ? 4 i**
Printer controller mode	MC	On: **CSI 5 i** Off: **CSI 4 i**
Print screen	MC	**CSI i** or **CSI 0 i**
Print cursor line	MC	**CSI ? 1 i**

(D) = default.

* The last character in the sequence is a lowercase L.

Sequences for VT320 Reports

Name	Mnemonic	Sequence
Primary Device Attributes		
Primary DA request (Host to VT320)	DA	**CSI c** or **CSI 0 c**
Primary DA response (VT320 to host)	DA	**CSI ? Psc; Ps1; ... Psn c** Psc = operating level. 61 = level 1 (VT100 mode). 62,63 = level 3 (VT300 mode). Ps1...Psn = extensions. 1 = 132 columns. 2 = printer port. 6 = selective erase. 7 = soft character set. 8 = user-defined keys. 9 = NRC sets. See Table 1 in this section.
Secondary Device Attributes		
Secondary DA request (Host to VT320)	DA	**CSI > c** or **CSI > 0 c**
Secondary DA response (VT320 to host)	DA	**CSI > Pp; Pv; Po c** Pp = identification code. 24 = VT320 terminal. Pv = firmware version. Po = hardware options. 0 = no options.
Device Status Reports		
VT320 Operating Status		
Request (Host to VT320)	DSR	**CSI 5 n**
Report (VT320 to host)	DSR	**CSI 0 n** No malfunction. **CSI 3 n** Malfunction.
Cursor Position Report		
Request (Host to VT320)	DSR	**CSI 6 n**
Report (VT320 to host)	CPR	**CSI Pl; Pc R** Pl = line number. Pc = column number.

Sequences for VT320 Reports (Cont)

Name	Mnemonic	Sequence
Printer Status		
Request (Host to VT320)	DSR	**CSI ? 15 n**
Report (VT320 to host)	DSR	**CSI ? 13 n** No printer. **CSI ? 10 n** Printer ready. **CSI ? 11 n** Printer not ready.
UDK Status (VT300 Mode Only)		
Request (Host to VT320)	DSR	**CSI ? 25 n**
Report (VT320 to host)	DSR	**CSI ? 20 n** UDKs unlocked. **CSI ? 21 n** UDKs locked.
Keyboard Dialect		
Request (Host to VT320)	DSR	**CSI ? 26 n**
Report (VT320 to host)	DSR	**CSI ? 27; Pd n** Pd = keyboard dialect. 1 = North American. 2 = British. 3 = Flemish. 4 = French Canadian. 5 = Danish. 6 = Finnish. 7 = German. 8 = Dutch. 9 = Italian. 10 = Swiss (French). 11 = Swiss (German). 12 = Swedish. 13 = Norwegian. 14 = French/Belgian. 15 = Spanish. 16 = Portuguese.
Terminal State Reports (VT300 Mode Only)		
Request (Host to VT320)	DECRQTSR	**CSI Ps $ u** Ps = report requested 0 = ignored. 1 = terminal state re
Terminal state report (VT320 to host)	DECTSR	**DCS 1 $ s D..D <checksums 1 and 2> ;** D...D = report data.
Restore terminal state	DECRSTS	**DCS Ps $ p D...D ST** Ps = data string form 0 = error. 1 = terminal state re D...D = restored data.

ces for VT320 Reports (Cont)

	Mnemonic	Sequence
ation State Reports (VT300 Mode Only)		
t o VT320)	DECRQPSR	**CSI Ps $ w** Ps =report requested. 0 =error. 1 =cursor information report. 2 =tab stop report.
ation) to host)	DECCIR	**DCS 1 $ u D...D ST** D..D =data string. See text for description.
op report) to host)	DECTABSR	**DCS 2 $ u D...D ST** D...D =tab stops.
:ation	DECRSPS	**DCS Ps $ t D...D ST** Ps =data string format. 0 =error. 1 =cursor information report. 2 =tab stop report. D...D =data string.
Settings (VT300 Mode Only)		
it mode to VT320)	DECRQM	**CSI Pa $ p** Pa =ANSI mode. (Table 2) **CSI ? Pd $ p** Pd =DEC private mode. (Table 3)
mode 0 to host)	DECRPM	**CSI Pa; Ps $ y** Pa =ANSI mode. (Table 2) Ps =mode state. 0 =unknown mode. 1 =set. 2 =reset. 3 =permanently set. 4 =permanently reset.
ode	SM	**CSI Pa; ... Pa h** Pa =ANSI mode(s). (Table 2) **CSI ? Pd; ... Pd h** Pd =DEC private mode(s). (Table 3)
mode	RM	**CSI Pa; ... Pa l*** Pa =ANSI mode(s). (Table 2) **CSI ? Pd; ... Pd l*** Pd =DEC private mode(s). (Table 3)

Sequences for VT320 Reports (Cont)

Name	Mnemonic	Sequence
Control Function Settings (VT300 Mode Only)		
Request (Host to VT320)	DECRQSS	**DCS $ q D...D ST** D...D =intermediate and/or final characters of function. (Table 4)
Report (VT320 to host)	DECRPSS	**DCS Ps $ r D...D ST** Ps =0, valid request. Ps =1, invalid request. D...D =intermediate and/or final characters of function. (Table 4)

* The last character in the sequence is a lowercase L.

Saving and Restoring the Cursor State

Save cursor state	DECSC	**ESC 7**
Restore cursor state	DECRC	**ESC 8**

User-Preferred Supplemental Set (VT300 Mode)

Request (Host to VT320)	DECRQUPSS	**CSI & u**
Report (VT320 to host)	DECAUPSS	**DCS 0 ! u % 5 ST** DEC Supplemental Graphic **DCS 1 ! u A ST** ISO Latin-1 supplemental

Table 1 Alias Primary DA Responses From the VT320*

Terminal	Identification Sequence	Meaning
VT100 DA	**ESC [? 1; 2 c**	VT100 terminal
VT101 DA	**ESC [? 1; 0 c**	VT101 terminal
VT102 DA	**ESC [? 6 c**	VT102 terminal
VT220 DA	**ESC [? 62; 1; 2; 6; 7; 8; 9; 11; 14 c**	VT220 terminal

* To change these alias responses, you must use the General Set-Up screen. See Chapter 4 of Installing and Using the VT320 Video Terminal.

Table 2 ANSI Modes for DECRQM, DECRPM, SM, and RM

Mode	Mnemonic	Pa
Keyboard action	KAM	2
Control representation	CRM*	3
Insert/replace	IRM	4
Horizontal editing	HEM †	10
Send/receive	SRM	12
Line feed/new line	LNM	20

* The host cannot change the setting of CRM. You can only change CRM from set-up. If CRM is set, the terminal ignores DECRQM and most other control functions.

† The HEM control function is permanently reset.

Table 3 DEC Private Modes for DECRQM, DECRPM, SM, and RM

Mode	Mnemonic	Pd
Cursor keys	DECCKM	1
ANSI	DECANM	2
Column	DECCOLM	3
Scrolling	DECSCLM	4
Screen	DECSCNM	5
Origin	DECOM	6
Autowrap	DECAWM	7
Autorepeat	DECARM	8
Print form feed	DECPFF	18
Printer extent	DECPEX	19
Text cursor enable	DECTCEM	25
National replacement character set	DECNRCM	42
Numeric keypad	DECNKM	66
Keyboard usage	DECKBUM	68

Table 4 Control Functions for DECRQSS Requests

Control Function	Mnemonic	Intermediate and Final Character(s)
Select active status display	DECSASD	$ }
Set character attribute	DECSCA	" q
Set conformance level	DECSCL	" p
Set status line type	DECSSDT	$ ~
Set top and bottom margins	DECSTBM	r
Select graphic rendition	SGR	m

12.0 RESETTING AND TESTING

Resetting and Testing Sequences

Name	Mnemonic	Sequence
Resetting the Terminal		
Soft terminal reset*	DECSTR	**CSI ! p**
Hard terminal reset	RIS	**ESC c** Not recommenc
Tabulation clear	TBC	**CSI 0 g** Clear tab at cu position.
		CSI 3 g Clear all tabs.
Testing the Terminal		
Invoke confidence test	DECTST	**CSI 4; Ps; Ps;** Power-up self-t
Screen alignment pattern	DECALN	**ESC # 8**

* Available in VT300 mode only.

Soft Terminal Reset (DECSTR) States

Mode	Mnemonic	State After DEC
Text cursor enable	DECTCEM	Cursor enabled.
Insert/replace	IRM	Replace.
Origin	DECOM	Absolute (cursor at upper-left of s
Autowrap	DECAWM	No autowrap.
National replacement character set	DECNRCM	Multinational set
Keyboard action	KAM	Unlocked.
Numeric keypad	DECKPNM	Numeric charact
Cursor keys	DECCKM	Normal (arrow k
Set top and bottom margins	DECSTBM	Top margin = 1 Bottom margin =
All character sets	G0, G1, G2, G3, GL, GR	VT320 default se
Select graphic rendition	SGR	Normal rendition
Selective erase attribute	DECSCA	Normal (erasable DECSEL and DECSED).
Save cursor state	DECSC	Home position w VT320 defaults.
Assign user-preferred supplemental set	DECAUPSS	Set selected in se
Select active display	DECSASD	Main display (fir lines).

of a Hard Terminal Reset (RIS)

s all features listed on set-up screens to their saved tings.

uses a communication line disconnect.

ears user-defined keys.

ears the soft character set.

ears the screen.

turns the cursor to the upper-left corner of the een.

s the select graphic rendition (SGR) function normal.

s the selective erase attribute (DECSCA) to isable.

ects the default character sets (ASCII in GL, d DEC Supplemental Graphic in GR).

Confidence Test (DECTST) – Power-Up Self-Test

4 ; Ps ; ... Ps y

ndicates a particular test to run.

Test to Run
All tests (1, 2, 3, 6)
Power-up self-test
RS232 port data loopback test
Printer port loopback test
RS232 port control line loopback test
DEC-423 port loopback test
Repeat other tests in the string.

Alignment Pattern (DECALN)

 # 8
1 2/3 3/8

A VT52 MODE CONTROL CODES

Entering VT52 Mode

CSI ? 2 l*

Exiting VT52 Mode

ESC <

VT52 Escape Sequences

Sequence	Action
ESC A	Cursor up.
ESC B	Cursor down.
ESC C	Cursor right.
ESC D	Cursor left.
ESC F	Enter graphics mode.
ESC G	Exit graphics mode.
ESC H	Cursor to home position.
ESC I	Reverse line feed.
ESC J	Erase from cursor to end of screen.
ESC K	Erase from cursor to end of line.
ESC Y Pn	Move cursor to column Pn.
ESC Z	Identify. (host to terminal)
ESC / Z	Report. (terminal to host)
ESC =	Enter alternate keypad mode.
ESC >	Exit alternate keypad mode.
ESC <	Exit VT52 mode. (Enter VT100 mode.)
ESC ^	Enter autoprint mode.
ESC	Exit autoprint mode.
ESC W	Enter printer controller mode.
ESC X	Exit printer controller mode.
ESC]	Print screen.
ESC V	Print the line with the cursor.

* The last character in the sequence is a lowercase L.

GLOSSARY

Action fields
Features in *set-up* that make the VT320 perform an immediate action.

Application software
A program that performs a specific function for a particular class of computer users. Examples: spreadsheets and word processing programs.

ASCII
American Standard Code for Information Interchange

ANSII
American National Standards Institute

Auto print mode
A method of printing information directly from the host system. The VT320 sends a display line to the printer after a carriage return or form feed character.

CCITT
Comite Consultatif International de Telegraphique et Telephonique (International Telegraph and Telephone Consultative Committee). A standards committee for the communication industry in Europe.

Character set
A group of graphic characters and control characters stored as a unit in the terminal. Graphic characters are characters you can display on the screen. Control characters perform special functions.

Compose character
A character produced when you press two or three keys in a certain sequence. You can use compose sequences to produce characters that do not appear as standard keys on your keyboard.

Cursor
An indicator that highlights the active position on the screen. The VT320 uses different cursor characters for (1) text, (2) set-up, and (3) the CRT saver feature.

Data processing keys
Keys that have three or four characters on the top of their keycap. The characters on the right half of the keycap are data processing characters. To use data processing characters, you must set the _____ Keys feature in the Keyboard Set-Up screen to "Data Processing Keys".

DEC Multinational character set
The default character set for the VT320. The DEC Multinational set is one of two 8-bit sets built into the VT320. The other set is ISO Latin-1. Both 8-bit sets include the standard ASCII character set and a supplemental set. For 7-bit environments, see *NRC* sets.

Diacritical marks
Marks or symbols that indicate a change in the standard pronunciation of a letter. Examples of diacritics are acute accent (’), grave accent (‘), and tilde (˜). On the VT320, you can use diacritical marks (if available on your keyboard) to start two-stroke compose sequences.

Factory default
A standard setting for one of the terminal's operating features, set at the factory. The VT320 uses factory-default settings, unless you select a new setting. For example, many set-up features have default settings.

Full-duplex modem
A *modem* that can handle simultaneous, two-way communications.

Host system
The computer system you connect to the VT320.

ISO
International Standards Organization. ISO Latin-1 is one of the two 8-bit multinational character sets built into the VT320. The other set is the *DEC Multinational* set. For 7-bit environments, see *NRC* sets.

Modem
Modulator - demodulator. A device that converts data from a computer or terminal into signals that can be sent over a telephone line.

Monochrome monitor
A video screen that displays images in shades of one color.

National replacement character (NRC) sets
Built-in VT320 character sets for European languages. NRC sets are for use in 7-bit environments. Each set has 94 characters. NRC sets are similar to the ASCII set, except for a few characters.

Nonvolatile memory
Random access memory (RAM) that does not lose its contents when you turn the terminal off. The VT320 uses this memory to store the *saved settings* of set-up features.

Pixel
Picture elements. The smallest displayable unit on a video screen. To display a character, the terminal turns on a series of pixels.

Port
Another term for connector. All the VT320 connectors are on the rear of the terminal.

Saved settings
The stored settings for set-up features. The VT320 uses these settings when you turn the terminal on. Initially, the saved settings are the *factory-default* settings. You can change the settings in set-up.

Scrolling
Moving information on the screen upward or downward to display more data.

Scrolling region
The area on the screen where you can scroll information. The default scrolling region is the complete screen. Some applications may only use part of the screen.

Set-up
A set of display screens on the VT320 that list the settings of the terminal's operating features. You can use the keyboard to change settings.

Status line
A display line that provides information about the terminal's current operating state. The status line appears on line 25 at the bottom of the screen. Usually,

the status line appears only when you display set-up screens. You can select when to display the status line, using the **Status Line** feature in the Display Set-Up screen.

Terminal server
An intelligent device that can connect a number of asynchronous devices (terminals and printers) to a host system. For example, Digital's DECserver 200 can link eight VT320 terminals to a system in a local area network (LAN), using a high-speed Ethernet cable.

User-defined keys (UDKs)
Any of the 15 keys (**F6** through **F20**) on the top row of the keyboard for which a programmer has defined special functions. UDKs can store frequently used text and commands.

Visual character attribute
A quality of a display character that highlights the character, such as bolding and underlining.

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