Installing and Using The VT420 Video Terminal With PC Terminal Mode

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About This Guide

This guide provides the information you need to install, operate, and maintain your VT420 video terminal. If you are installing the terminal, you may want to go immediately to the installation section, Chapters 2 and 3.

The guide also provides a summary of the control functions that programmers can use when writing applications for the terminal. For more detailed programming information, you can order the *VT420 Programmer Reference Manual* from Digital. See Appendix B for a list of related documentation.

Organization

This guide has 12 chapters, 4 appendices, and a glossary.

NOTE
A handy summary of keyboard functions appears at the back of the manual.

- Chapter 1, "A Look at the Terminal," gives you an overview of the terminal and its features.

Installing Your Video Terminal

- Chapter 2, "Installation," shows you how to install your terminal and connect it to a host computer system, terminal server, or modem. Depending on your installation, you can use the terminal with two computer systems at the same time.
- Chapter 3, "Getting Started," describes how to set your terminal's operating features to match your installation.

Using Your Video Terminal

- Chapter 4, "The ANSI Keyboard," describes the ANSI keyboard and explains the general function of each key. The chapter also describes the keyboard's indicator lights and sounds, and two status lines displayed on the screen.
- Chapter 5, "The Short ANSI Keyboard," describes the short ANSI keyboard and how it differs from the ANSI keyboard.
- Chapter 6, "The PC Keyboard," describes the PC keyboard and explains the general function of each key. The chapter also describes the keyboard's indicator lights and sounds, and one keyboard indicator line displayed on the screen.
- Chapter 7, "Using Set-Up," describes how to use the terminal's set-up screens. You use set-up screens to examine and change the settings of operating features from the keyboard.
- Chapter 8, "Typing Additional Characters," describes how to select characters that do not appear as standard characters on your keyboard (such as accented letters).
- Chapter 9, "Using Two Sessions, Windows, and the Copy and Paste Feature," describes how to use two sessions and windows on your terminal. Depending on your installation, you can log in to two computer systems and view information from both systems at the same time.
- Chapter 10, "Printers and Modems," describes how to use a printer or modem with your terminal.
- Chapter 11, "Programming Summary," is a summary of control functions that programmers can use with the terminal. The chapter shows the character sets that are built into the terminal.
- Chapter 12, "Solving Problems," provides suggested solutions for typical operating problems and tells you where to get more help.

Appendices

- Appendix A lists the terminal's specifications.
- Appendix B provides ordering information for cables and documentation.
- Appendix C provides detailed information on communication with a host computer system, including cables and connector signals.

- Appendix D shows the different models of the ANSI and PC keyboards.

Conventions

The following conventions are used in this manual:

Cautions	Provide information to prevent damage to equipment.
Notes	Provide general operating information.
Set-up features	The names of features appear in **bold** type. Example: Use the **save** feature in the Set-Up Directory screen. Set-up feature settings and fields appear in this type. Example: The cursor is on the [illegible] field in the Set-Up Directory.
ANSI keyboard keys	Appear as normal text in a box. Example: Press the Return key.
PC keyboard keys	Appear as **bold** text in a **box**. Example: Press the **Enter** key.
ANSI keys (with PC keys)	When a PC command sequence differs from an ANSI command sequence, the PC key sequence appears in parentheses after the ANSI sequence. Example: Press the Return key (**Enter**).
Ctrl key sequences	For Ctrl key sequences, hold down Ctrl and press the other key.
Glossary entries	Appear in *italics* when first used in text. Example: The terminal stores information in its *page memory*.

1

A Look at the Terminal

This chapter introduces you to the VT420 video display terminal. The VT420 is a general-purpose terminal that you use to communicate with a host computer system. The chapter provides an overview of the terminal and its basic operating features. The chapter also tells you where to look in this guide for more information about each feature.

VT420 Components

The VT420 has two main components, a terminal unit and a keyboard. For the rest of this guide, the terminal unit is simply called the *terminal*.

Terminal

The terminal uses a 359 mm (14 inch) monochrome screen. The screen can display 24, 36, or 48 lines of text in 80 or 132 columns.

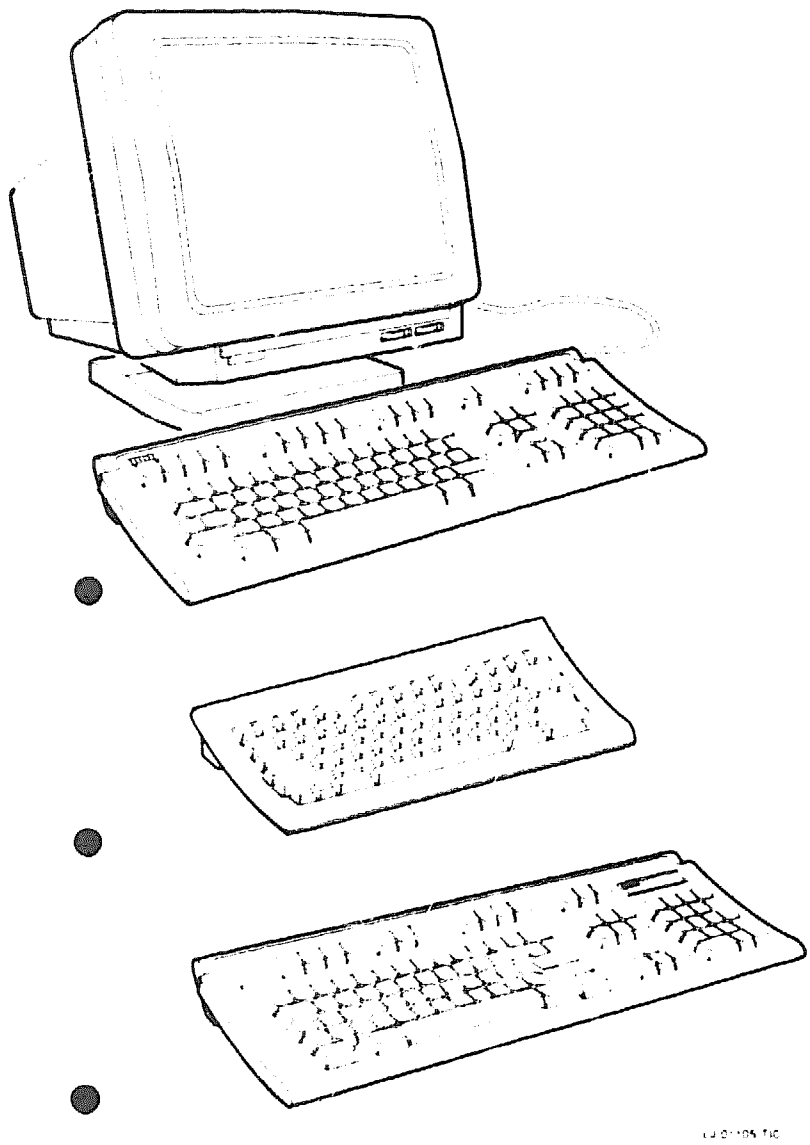
There are three connectors on the rear of the terminal, for connecting to one or two host computer systems. You can also use one of the connectors to connect to a printer. Chapters 2 and 3 describe the terminal's connectors

The terminal's tilt and swivel base lets you adjust the screen to the viewing angle you prefer.

Keyboard

Your VT420 comes with one of three keyboards, for different computing environments.

VT420 Video Terminal with Keyboards



- Digital's ANSI keyboard
- Short ANSI keyboard
- PC keyboard

Digital's ANSI Keyboard

Digital's ANSI keyboard is similar to the keyboards used on previous VT series terminals. For the rest of this guide, this keyboard is simply called the *ANSI keyboard*. If you use the ANSI keyboard, the terminal operates in *VT mode*. In VT mode, you can use software applications designed to work with VT series text terminals. This chapter provides an overview of VT mode.

The name *ANSI* refers to the American National Standards Institute. In VT mode, the terminal operates as an ANSI-style terminal, which refers to the way the terminal communicates with computer systems. The ANSI style of communication differs from the PC style.

Chapter 4 describes the ANSI keyboard. Chapter 7 describes the Keyboard Set-Up screen in VT mode.

Short ANSI Keyboard

The short ANSI keyboard is a compact version of the ANSI keyboard, for those who seldom use the auxiliary editing and numeric keypads. You can still enter keypad keystrokes when needed, by using equivalent two-key sequences. If you use the short ANSI keyboard, the terminal operates in *VT mode*.

Chapter 5 describes the short ANSI keyboard.

PC Keyboard

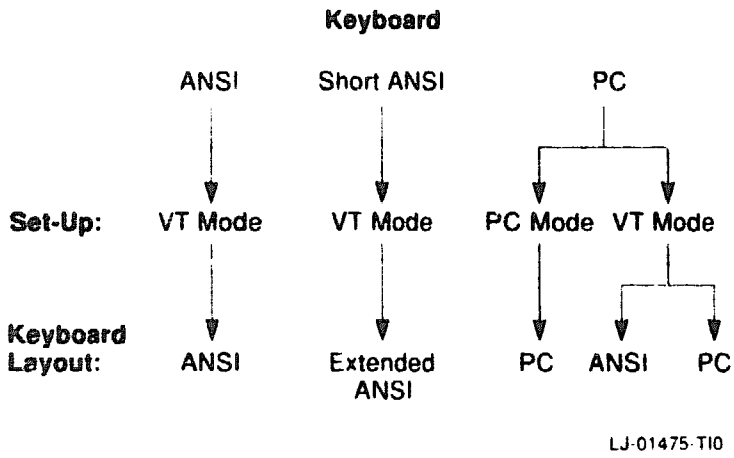
If you use a PC keyboard, the terminal can operate in VT mode or *PC TERM mode*. In PC TERM mode, you can use PC software applications on computer systems connected to your terminal.

In VT mode, you can switch to Digital's ANSI keyboard layout if desired. If you select the ANSI keyboard layout, the top-row function keys and keypad keys work like the corresponding keys on the ANSI keyboard. This feature is useful if you are familiar with the ANSI keyboard. You can save the ANSI keyboard layout setting in set-up.

Chapter 6 describes the PC keyboard. Chapter 7 describes the Keyboard Set-Up screen in PC TERM mode and VT mode.

The following diagram compares the layouts and terminal operating modes used with the three keyboards.

Comparing the Keyboards



Your Computer System

You can use the terminal with one or more computer systems. You have several options for connecting your terminal to a computer. The system you connect to is called the *host*.

You can connect the terminal directly to a computer. In VT mode, you can also connect indirectly through a *terminal server* or *modem*. In PC TERM mode, you can connect through a modem if the modem settings are compatible with the terminal's XON/XOFF communication settings (Appendix C).

How the ANSI Keyboards Work

Normally, the keys you type on your ANSI keyboard or short ANSI keyboard send *scan codes* to the terminal. The terminal converts the scan codes to ASCII character codes or ANSI control functions, then sends the information to the host. The host stores the information and passes it to *application software* programs. For example, your host may have applications that let you do word processing, data entry, or programming.

The host processes the output from the application software and displays it on the terminal's screen. You can print the data by sending it to a printer connected to the terminal.

How the PC Keyboard Works

Your PC keyboard can work in two ways, depending on whether you select VT mode or PC TERM mode.

- **In VT mode,** the PC keyboard works like the ANSI keyboard. The terminal operates as an ANSI terminal. You can set the PC keyboard to the ANSI key layout, if desired (Chapter 6).

  NOTE
  In this manual, when a PC key sequence differs from an ANSI key sequence, the PC key sequence appears in parentheses after the ANSI key sequence.

- **In PC TERM mode,** the PC keyboard keys sends scan codes to the terminal. The terminal converts these scan codes to IBM PC scan codes, then passes them to the host. The host passes the information to the PC application software. Then the host processes information from the software and sends it to the terminal, which displays it on the terminal's screen.

Features

Here are some of the tasks you can perform with a VT420:

This Mode ...	Allows You To ...
PC TERM or VT	Select operating features from set-up screens.
	Open two *sessions* and switch between sessions.
	Use two *windows* to display two sessions at the same time.
	Select different character sets to meet your software application's requirements.
	Store frequently used commands and text in macros.
	Display a keyboard indicator line at the bottom of the screen.
	Fill the screen with a dark or light background, for viewing comfort.
	Check the terminal's operating status.
	Align the screen.
VT Only	Display 24, 36, or 48 lines of text in 80 or 132 columns.
	Copy and paste text between sessions by using a terminal feature.
	Store data locally in the terminal's *page memory* for display.
	Display a status line at the bottom of the screen.
	Operate the terminal as one of Digital's other VT series text terminals, for software compatibility.
	Select a PC or ANSI key layout for the PC keyboard.
PC TERM Only	Use PC software applications on your host system.
	Display 24, 36, or 48 lines of text in 80 columns.
	Select PC character sets.

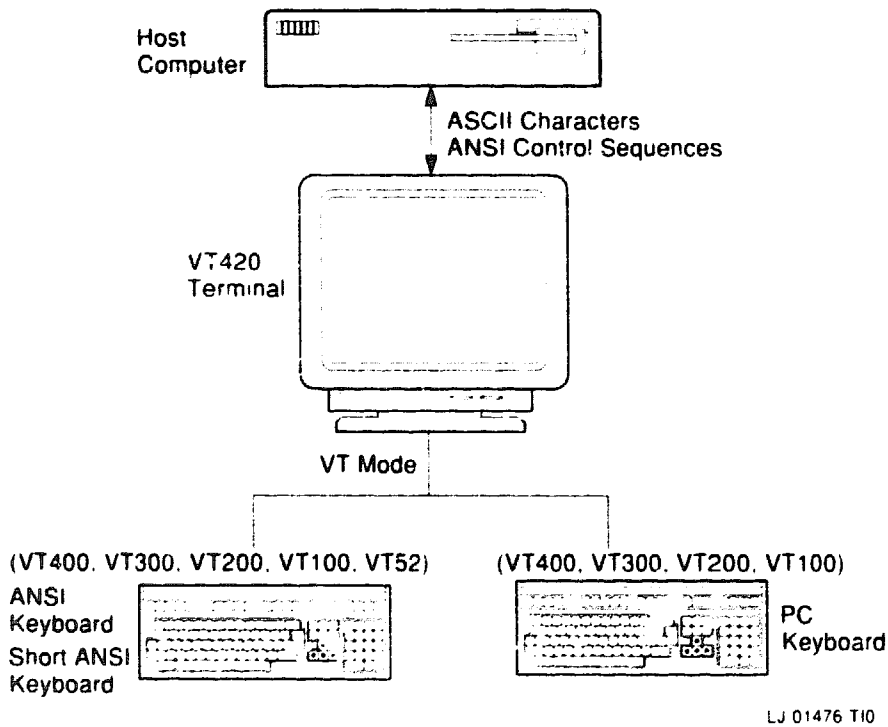
Terminal Operating Modes

The VT420 can operate like a VT series text terminal or a terminal that supports PC software applications. The terminal's operation depends on the operating mode you select and the keyboard you use. You can select PC TERM mode or VT mode from the General Set-Up screen (Chapter 7).

Operating as a VT Series Text Terminal (VT Mode) – If you select VT mode, the VT420 operates like one of Digital's VT series text terminals. You can use either an ANSI keyboard or PC keyboard in this mode. You can operate the terminal as one of the following VT series terminals. This feature enables software to recognize the terminal and select the correct operating mode automatically.

Keyboard	VT Mode Selections
VT	VT400 series, VT300 series, VT200 series, VT100 series, VT52
PC	VT400 series, VT300 series, VT200 series, VT100 series

VT Mode Operation

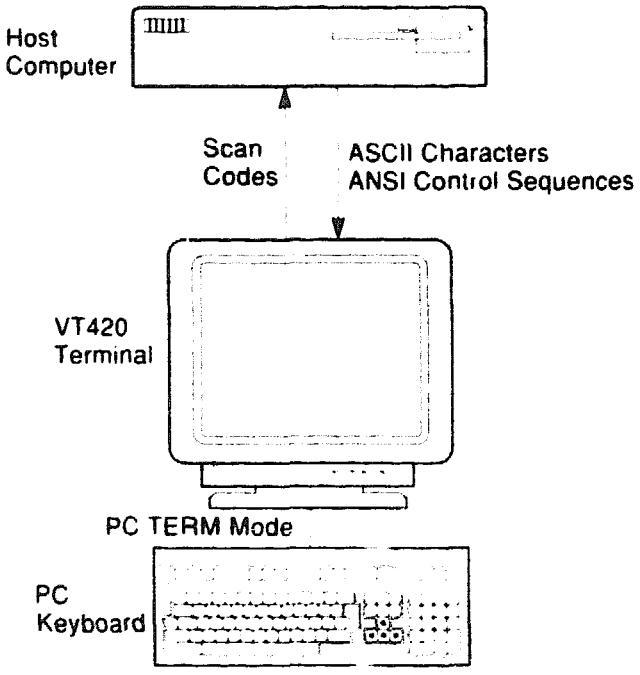


Operating as a Terminal Supporting PC Software (PC TERM Mode) – You can select PC TERM mode if you have a PC keyboard. In this mode, the terminal supports PC software applications only.

PC TERM mode allows the terminal to

- Work with a PC keyboard.
- Send scan codes recognized by PC software applications to the host.
- Display character sets available on a PC.
- Display 25 lines/screen and other PC screen attributes.

PC TERM Mode Operation



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Set-Up

Set-up is a series of display screens that let you examine and change the terminal's operating features from the keyboard. Each screen lists a particular set of operating features for the terminal. For example, one set-up screen lists communication features, while another lists keyboard features.

Some features are for your convenience, and some are required by your host computer system. Each set-up feature has a *factory-default* setting. You can select the settings that are right for your system.

Chapter 7 describes set-up in detail.

Two Sessions

When you use the terminal to communicate with a computer system, you have established a session on that system. The terminal lets you establish two sessions and display data from both sessions at the same time. If you are using a PC keyboard, you can select a different operating mode for each session—VT mode or PC TERM mode. You can also connect the terminal to two different systems, depending on your installation (Chapter 2).

Chapter 3 provides the detailed procedures for setting up your terminal to run two sessions. Chapter 9 describes how to use two sessions.

Windows (VT Mode Only)

You can divide the terminal's screen into two windows. With windows, you can see information from two sessions at the same time. There are two styles of windows, full screen and split screen. The default is a full-screen window.

When you divide the screen into two windows, you can adjust their relative size by moving the border between them up or down. Chapter 9 describes how to use windows.

Number of Lines on the Screen

The terminal lets you select a font size to display 24, 36, or 48 lines on the screen. You use the **lines/screen** feature to select the number of display lines. Chapter 9 describes how to select the number of lines/screen.

Page Memory (VT Mode Only)

In VT mode, the terminal has off-screen memory to store data entered from the keyboard or host system. The terminal can store 144 lines of text. When the terminal is in PC TERM mode, the host stores the data.

The terminal's off-screen memory is called *page memory*, because you can divide the 144 lines into a different number of pages. By default, the terminal uses 6 pages of 24 lines each. If you run two sessions, the default format for each session is 3 pages of 24 lines.

Pages create boundaries that affect the way the terminal displays text. To take advantage of page memory, your applications must be able to recognize these page boundaries.

See the **page arrangement** feature in the "Display Set-Up Screen" section of Chapter 7.

Copy and Paste (VT Mode Only)

In VT mode, the terminal has a copy and paste feature that lets you copy information displayed on the screen and send it to the host system. You can copy and paste text within the same session, or from one session to another. Chapter 9 describes how the terminal lets you copy and paste text in VT mode.

Status Line (VT Mode Only)

In VT mode, the terminal displays a status line at the bottom of the screen. If you are running two sessions, the terminal displays a separate status line at the bottom of each session. The status line has several fields that provide information about the terminal's operating status. For example, one field shows you the current position of the cursor as a set of screen coordinates (row and column number). Applications may also use the status line to send you messages.

Chapter 4 describes the status line displayed in VT mode.

Keyboard Indicator Line

The terminal displays a keyboard indicator line at the bottom of the screen. In VT mode, the keyboard indicator line appears below the status line. For both operating modes, this indicator line has several fields that provide information about the keyboard's operating status. For example, the first field indicates which session you can edit from the keyboard. Other fields indicate if screen data is on hold, if the [illegible] or [illegible] setting is in effect, if a compose sequence is in progress, or if you must wait before entering more keyboard data.

Chapter 4 describes the keyboard indicator line in VT mode. Chapter 6 describes the keyboard indicator line in PC TERM mode.

Screen Alignment

The **screen align** feature on the Set-Up Directory screen lets you adjust the position of the text on your screen for your viewing comfort. If the text is not centered on the screen, you can center it.

Chapter 7 describes the screen alignment feature.

Screen Background

The terminal lets you select a screen background to improve the readability of text on the screen. The **light/dark screen** feature in the Display Set-Up screen (Chapter 7) uses an overscan method to fill the screen background.

Character Sets

The terminal uses coded character sets to exchange information with a host system. A coded character set is a group of graphic symbols, such as letters and numbers, represented by unique bit combinations or codes.

From the General Set-Up screen, you can choose different character sets to match your computer system or to meet your software application requirements. The terminal has two 8-bit multinational sets, the DEC Multinational character set and the ISO 8859 Latin Alphabet No. 1 character set. The terminal also has a DEC Technical character set for certain applications.

8-Bit Multinational Character Sets

DEC Multinational Character Set

The terminal is initially set to use the DEC Multinational character set. This 8-bit character set contains the standard characters for the English language, plus many characters used by major Western European languages.

ISO 8859 Latin Alphabet No. 1 Character Set

You can also select the ISO 8859 Latin Alphabet No. 1 (ISO 8859 Latin-1) character set of the International Organization for Standardization (ISO). The ISO 8859 Latin-1 set is similar to the DEC Multinational set, but it is newer and has more characters.

The ISO 8859 Latin-1 set is the recommended set for most applications. However, if you use the DEC Multinational set, many applications will be unaffected by the differences between the two character sets.

PC Character Sets

If you use a PC keyboard with the terminal, you can select from the following additional character sets:

PC International	PC Multilingual
PC Portuguese	PC Spanish
PC Danish/Norwegian	

National Replacement Character Sets

The terminal also supports twelve 7-bit national replacement character sets (NRCs) for older 7-bit applications. The NRCs are similar to the 7-bit ASCII set, but they replace some symbols with characters for European languages.

Selecting the Character Set

You can select 8-bit character sets or 7-bit NRCs. If you use the 8-bit sets, you can select the DEC Multinational, ISO 8859 Latin-1, or PC character set (if you use a PC keyboard). If you use 7-bit sets, you can select an NRC set. You select character sets from the General Set-Up screen.

Chapter 7 describes the General Set-Up screen. Chapter 11 shows the character sets.

Programming the Terminal

The *VT420 Programmer Reference Manual* explains the control functions used to access the terminal's features. Programmers use these functions in applications they write for the VT420 terminal. The programmer reference manual is intended for users with programming experience.

Chapter 11 of this guide is a summary of the programming control functions and commands described in the programmer reference manual. See Appendix B for information on how to order the *VT420 Programmer Reference Manual*.

Installing Your Video Terminal

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Installation

This chapter provides step-by-step instructions to install your terminal.

Complete all the steps in order. Then go to Chapter 3 to set up the terminal for operation.

Site Considerations

The terminal lets you run one or two sessions on a host computer system. A *session* is an active connection to a computer. For example, when you log into a system, you are running a session. The terminal lets you run two sessions on the same host system or on separate systems.

Cables

If you use PC TERM mode, you need a separate communication cable for each session.

If you use VT mode, you need a separate communication cable for each session, unless your system has Digital's SSU software or a Digital DECserver 200 or later terminal server. If you use SSU software or one of the DECservers, you only need one communication cable to run two sessions.

Appendix C shows the communication cables you can use. To order cables, see Appendix B.

This chapter shows you how to install communication cables. Chapter 3 describes how to set up the terminal for one or two sessions. Chapter 9 describes how to use two sessions.

Preparing the Site

Digital's video terminals have a number of built-in features to provide a more comfortable working environment. Here are some other suggestions for preparing your site.

Arranging the Lighting

- Avoid direct lighting or sunlight on the screen, which causes glare and reflections.
- Try to place lighting behind or to the side of your working position.
- Distribute available light evenly on all work surfaces.

Eliminating Distractions

- Background noise above 65 dBA is tiring. Sound-absorbing materials (curtains, carpeting, and acoustic tile) can help reduce background noise.
- Movement around the work area can be distracting. Use curtains or partitions behind the terminal and to the sides—at least 158 cm (5 ft) for a sitting position, 183 cm (6 ft) for a standing position.
- If you install several terminals near each other, keep them a minimum of 70 cm (28 in) apart (center to center), and preferably 122 cm (48 in) to 152 cm (60 in).

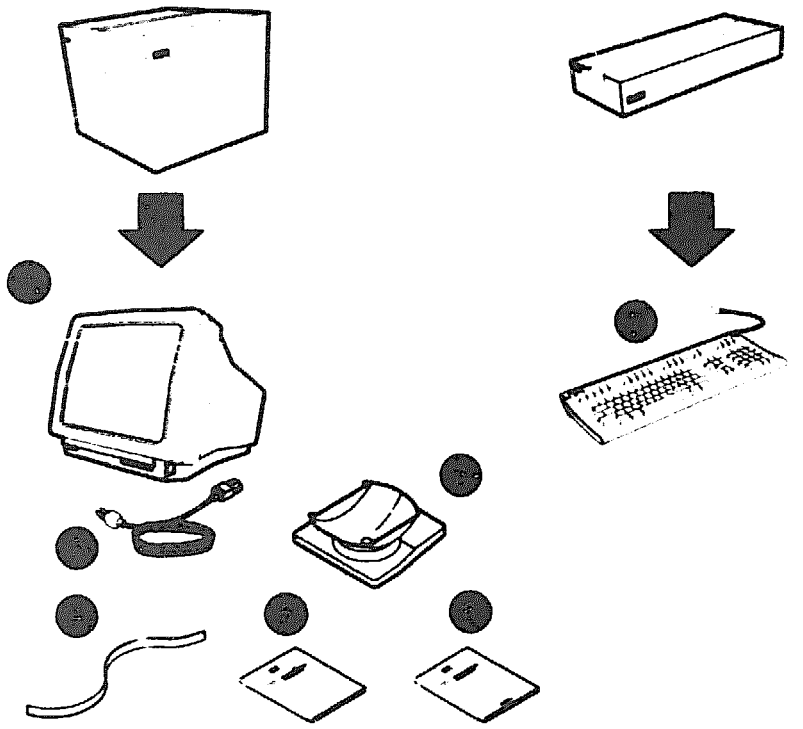
Keeping the Environment Comfortable

- Keep the office temperature between 20° and 23° C (68° and 74° F), at 30 to 70 percent relative humidity.
- Provide adequate air ventilation to operate the equipment and avoid fatigue.
- Control static electricity. Some causes of static electricity are clothing and carpeting materials (such as wool and nylon), metal frame furniture, and poor grounding (two-pronged plugs).

Installation

Unpack and check the contents of each carton.

Make sure you have all the items shown in the following figure. If you have missing or damaged items, contact your sales representative and delivery agent.



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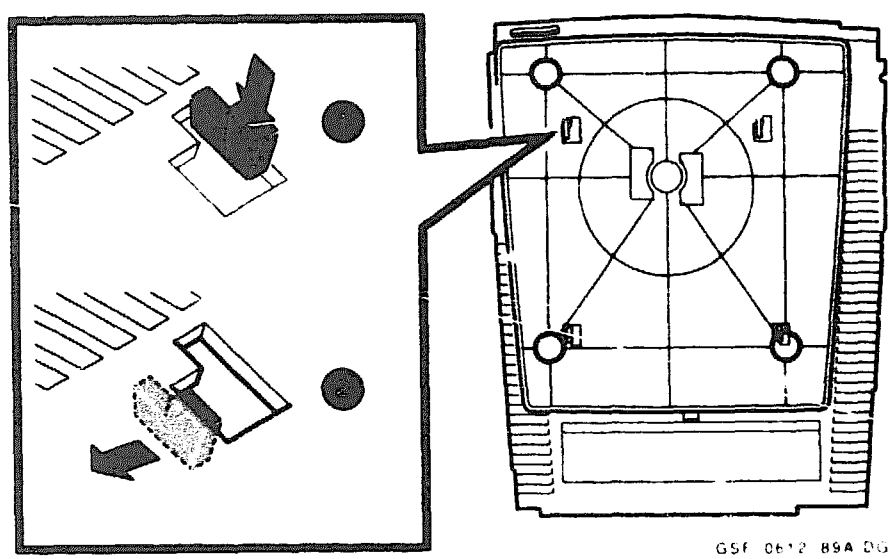
- Video terminal
- Power cord
- Tilt-swivel base
- Keyboard legend strip
- *Installing and Using the VT420 Video Terminal* (English language version)
- *Installing and Using the VT420 Video Terminal* (country-specific version)
- Keyboard (ANSI, short ANSI, or PC version)

Install the tilt-swivel base on the terminal.

1. Place the terminal upside down on a level surface.
2. Position the tilt ball over the terminal so the four tabs on the ball align with the holes on the bottom of the terminal.
3. Place the tabs in the holes.
4. Slide the tilt-swivel assembly to the left, until the assembly snaps into place.



Place the terminal on a level surface.

CAUTION
Do not place objects on top of the terminal. They may block the cooling vents, causing the terminal to overheat.

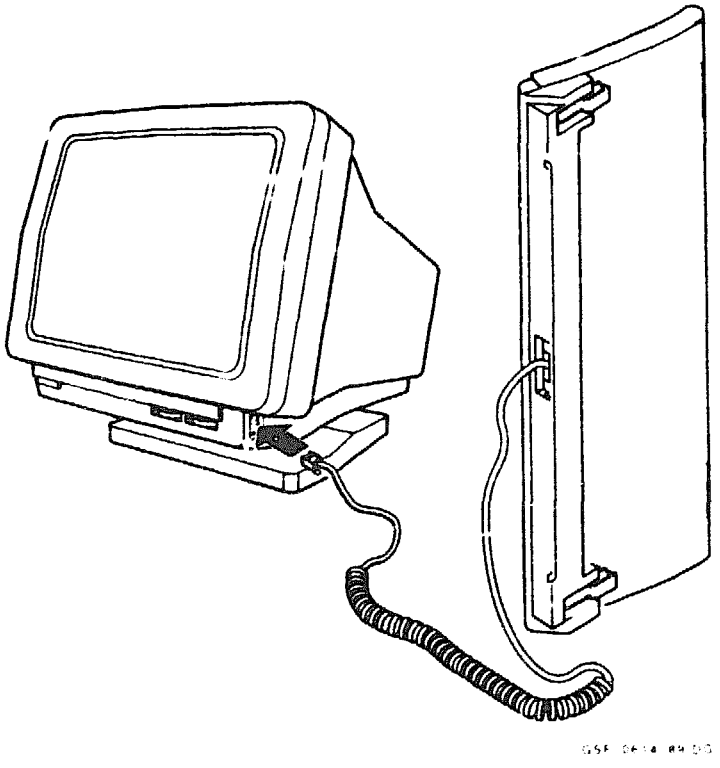
Connect the keyboard to the terminal.

1. The keyboard cable is already connected to the rear of the keyboard.

   If you want the keyboard cable routed to the right or left, press the cable into one of the grooves on the bottom of the keyboard.

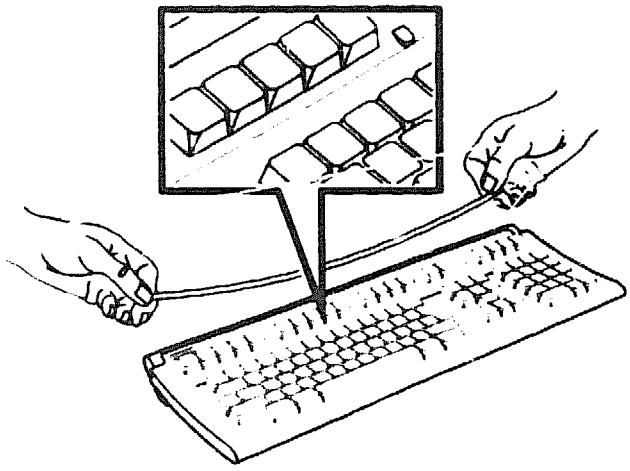
2. Insert the other end of the cable into the keyboard connector on the side of the terminal.

3. Lower the two legs on the bottom of the keyboard.



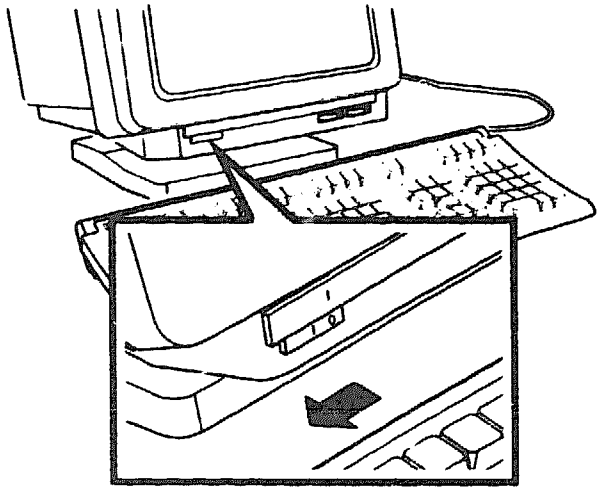
Install the legend strip (ANSI or short ANSI keyboard only).

ANSI: Place below the top-row function keys, as shown.
Short ANSI: Place above the top-row function keys.

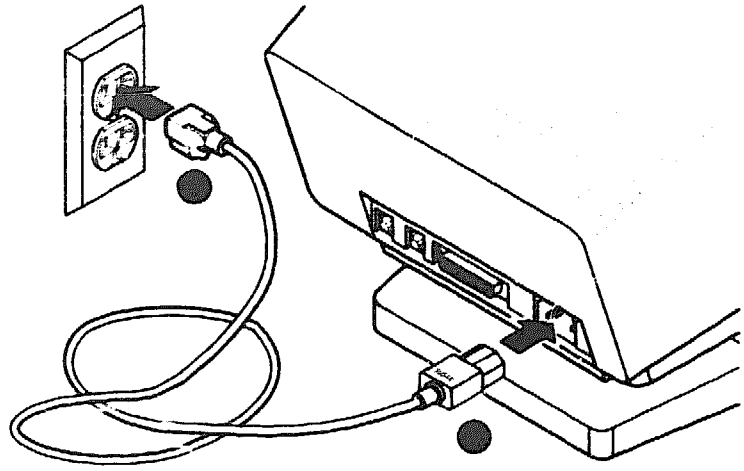


NOTE
After you install the terminal, you must select the appropriate keyboard language from the terminal's Set-Up Directory screen. Chapter 3 shows you how to select the keyboard language.

Make sure the power switch is in the off (0) position.



Plug the power cord into the power receptacle on the terminal, then into the wall outlet.



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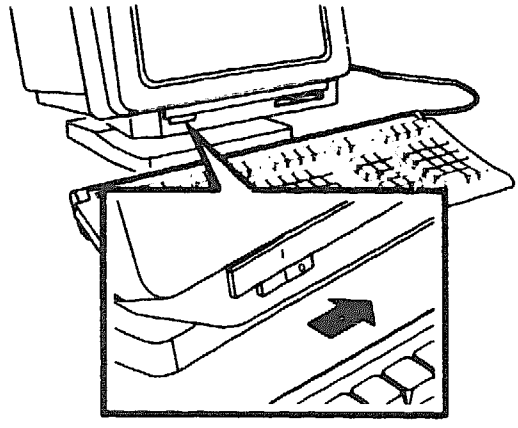
Start up your terminal.

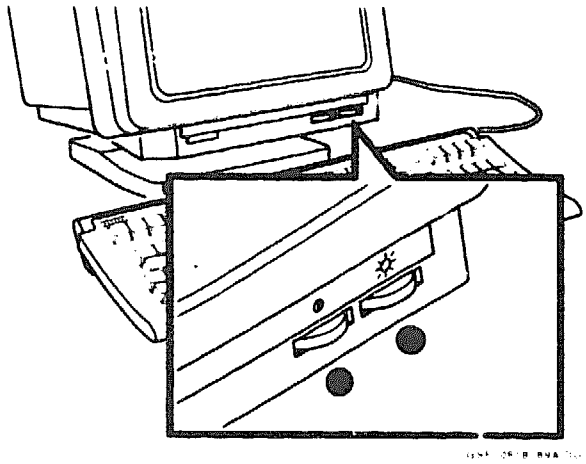
1. Turn the power switch on by moving it toward the (|).



2. Make sure the keyboard lights turn on and off. The screen displays patterns for 10 seconds. Do not press any keys during this time.
3. Wait for a bell tone from the keyboard and the VT420 OK message to appear on the screen.

NOTE
If you have problems, see the "Problem Solving" section at the end of this chapter.

Adjust the brightness and contrast controls for your viewing preference.

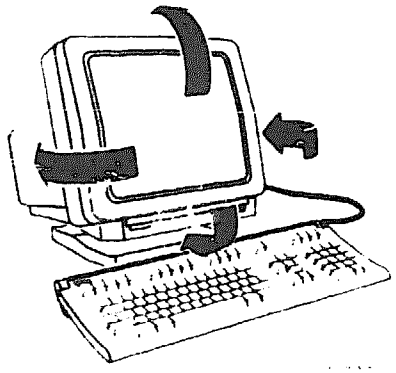


❶ Contrast control ❷ Brightness control

Adjust the tilt-swivel base to a comfortable viewing angle.

To set the angle, tilt the terminal forward or backward to the desired position. You can turn the terminal to any viewing position.

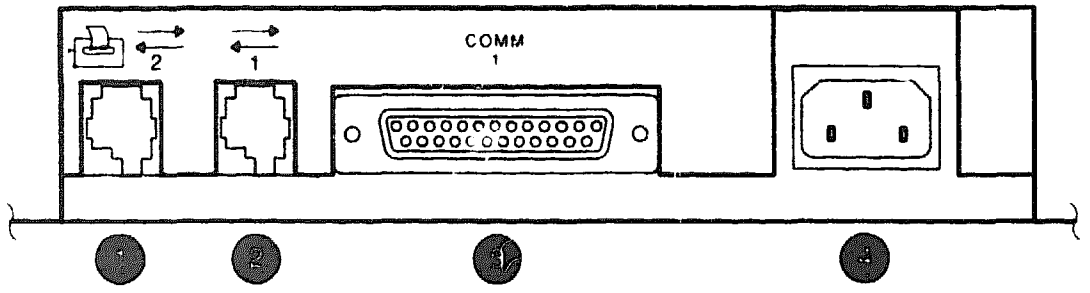
CAUTION
The terminal does not swivel in a complete circle. If you try to swivel the terminal in a complete circle, you may damage the base.



Cable Connections

Identify the cable connectors.

The next four pages show you how to connect the cable(s) from your host system. Use the following figure to identify the cable connectors.



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		Port	Connector	Function
1	2	Comm2	6-pin, DEC-423	Connects the terminal to a printer or a secondary host computer, directly or indirectly (through a terminal server).
2	1	Comm1	6-pin, DEC-423	Connects the terminal to a *primary host* computer, directly or indirectly (through a terminal server or modem).
3		Comm1	25-pin, RS-232	Connects the terminal to a *primary host* computer, directly or indirectly (through a terminal server or modem).
4		Power	IEC	

Connect your communication cable(s) to the rear of the terminal.

You have three cabling options, based on how many sessions you want to use.

- One session (one cable)
- Two sessions (two cables)
- Two sessions with SSU software or a DECserver 200 or later terminal server (one cable, VT mode only)

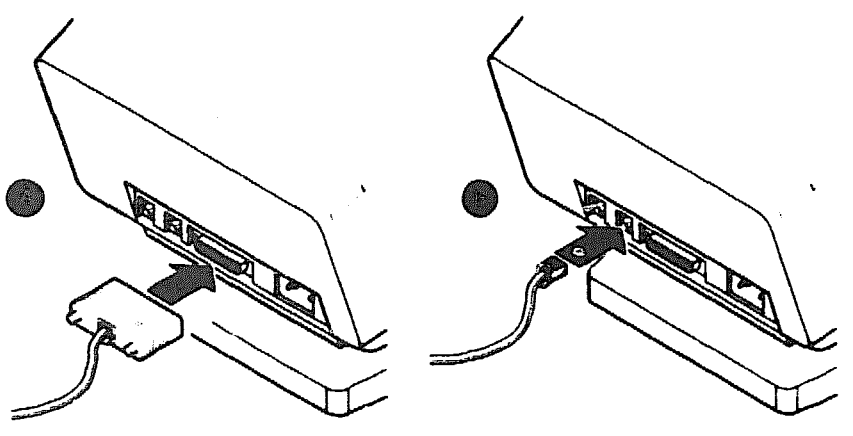
One Session (One Cable)

To run one session on the terminal:

a. Connect an RS-232 cable to the 25-pin Comm1 connector.

or

b. Connect a DEC-423 cable to the 6-pin Comm1 connector.



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IMPORTANT
After you install the terminal, you must set the terminal's operating features to match this cable connection. Chapter 3 shows you what features to set.

Now, go to Chapter 3.

Two Sessions (Two Cables)

There are two ways you can connect cables to run two sessions over separate communication cables:

a. Connect an RS-232 cable to the 25-pin Comm1 connector. Use this port to connect to the primary host computer.

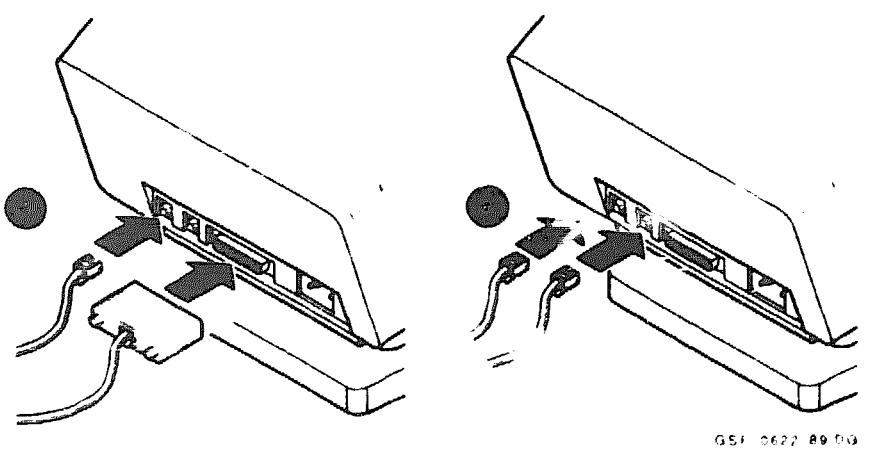
   Connect a DEC-423 cable to the 6-pin Comm2 connector. Use this port to connect to the secondary host computer.

   or

b. Connect a DEC-423 cable to the 6-pin Comm1 connector. Use this port to connect to the primary host computer.

   Connect a DEC-423 cable to the 6-pin Comm2 connector. Use this port to connect to the secondary host computer.

NOTE
You can also use the Comm2 port to connect a printer to the terminal. See Chapter 10.



IMPORTANT
After you install the terminal, you must set the terminal's operating features to match this cable connection. Chapter 3 shows you what features to set.

Now, go to Chapter 3.

Two Sessions with SSU Software (One Cable, VT Mode Only)

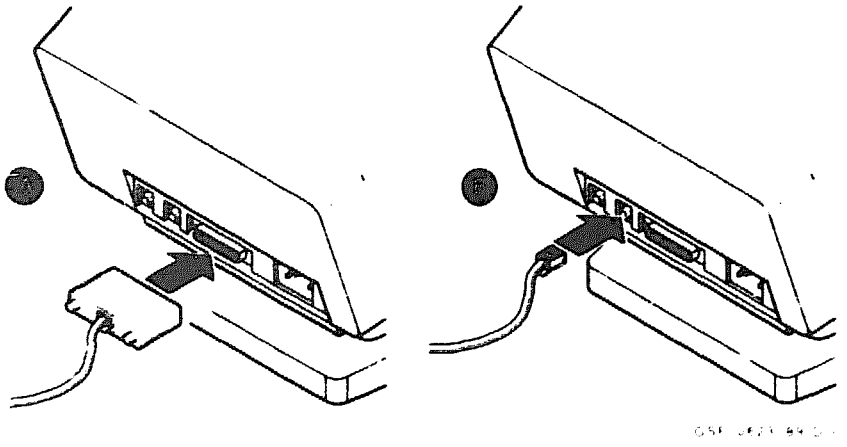
Check with your system manager to see if your host system supports SSU software. If your host does not support SSU software or it does not use a DECserver 200 or later terminal server, you need two cables to run two sessions.

There are two ways you can connect a cable to run two sessions when your host has SSU software.

a. Connect an RS-232 cable to the 25-pin Comm1 connector.

or

b. Connect a DEC-423 cable to the 6-pin Comm1 connector.



IMPORTANT
After you install the terminal, you must set the terminal's operating features to match this cable connection. Chapter 3 shows you what features to set.

You have installed your terminal successfully. Go to Chapter 3.

If the screen's text is not balanced on the left, right, top, and bottom margins, use the **screen align** feature in the Set-Up Directory screen (Chapter 7).

Finding a Comfortable Working Position

Eyesight

- There is no evidence that eye damage can be caused by working at video terminals. Eye fatigue can be caused by a number of factors, such as glare, the image quality of the video display, uncomfortable furniture, and uncorrected eyesight.
- If your eyes cannot focus easily to read at different distances, you may need special glasses to focus at the distance between your working position and the screen.
- When working at the terminal, relax your eyes periodically by looking at distant objects.

Physical Discomforts

- Neck, shoulder, back, and arm discomfort may occur after working for prolonged periods at the terminal. These problems are related to posture and furniture rather than the terminal.
- Take periodic work breaks. Morning, lunch, and afternoon breaks meet most recommendations. Take advantage of work breaks to move around and do simple muscle-relaxing exercises.

Seating Position

- Use a seat that promotes proper posture, with adjustments for seat height and lower back support. Use a headrest, if needed.
- Place feet flat on the floor or footrest, with lower legs approximately vertical and thighs approximately horizontal. Place your weight on the buttocks, not thighs. Avoid compressing the area behind the knees, which could restrict blood flow.
- Keep your upper body erect and support your lower back with a backrest.
- Your upper arms should hang comfortably from your shoulder joints and straight down at the sides. Place your forearms within a 70 to 90 degree angle, so your elbows support your arm weight. Do not flex or extend your wrists more than 15 degrees.
- Incline your head downward, but no more than 15 to 20 degrees.

Problem Solving

Problem	Suggested Solution
The screen is blank.	Turn up the brightness and contrast controls.
The screen is blank and the screen saver indicator is on.	The terminal has a CRT saver that turns off the screen display if you do not use the terminal for 30 minutes. Press any key to reactivate the screen display.
The bell tone does not sound when you turn the terminal on. The keyboard indicator lights do not flash.	Make sure the keyboard is connected to the terminal.
Any message other than VT420 OK appears on the screen.	Call your local Digital Services office for assistance. See Chapter 12.
The screen's text is not balanced on the left and right, or on the top and bottom.	Align the text by using the **screen align** feature in the Set-Up Directory screen (Chapter 7).
Power to the terminal is lost, and you cannot log into your host system.	When power is restored to the terminal, press the F4 key (Alt Scroll Lock) first.

3 Getting Started

After you install your terminal, you must set some of the terminal's operating features to

- Select the correct dialect for your keyboard.
- Run one or two sessions with one or two cables.

This chapter provides step-by-step instructions. All of the terminal's other operating features are already set to a factory-default setting that works with most systems.

You may have to set some features to match your host system. For example, the terminal must use the same communication baud rate as your host system.

Also, the terminal ID must match the software supported by the terminal or running on the host. If the message, `unknown terminal type` appears on the screen, you must set the correct terminal ID.

The default operating mode for the terminal is VT mode. If you have a PC keyboard and want to use PC software applications, you must change the **terminal mode** setting to PC TERM mode. This chapter provides the instructions to

- Set the baud rate.
- Set the correct terminal ID.
- Select PC TERM mode, which supports PC software applications.

The terminal has a series of set-up screens that list the terminal's operating features. You can examine and change feature settings from the keyboard. The procedures in this chapter explain how to use some set-up screens. If you want to know more about set-up, or if you want to set a feature not covered here, see Chapter 7.

Selecting the Correct Keyboard Dialect

The terminal has keyboard models for a number of dialects. The initial setting for the **keyboard dialect** feature is North American Keyboard.

If you have the North American/United Kingdom keyboard, you can skip this procedure, unless you want to use the British dialect. If you have any other keyboard model, you must complete this procedure to select the correct keyboard dialect.

1. Press the F3 (Alt SetUp) key to enter set-up. The Set-Up Directory screen appears (Figure 3–1). The cursor is on the Global field.

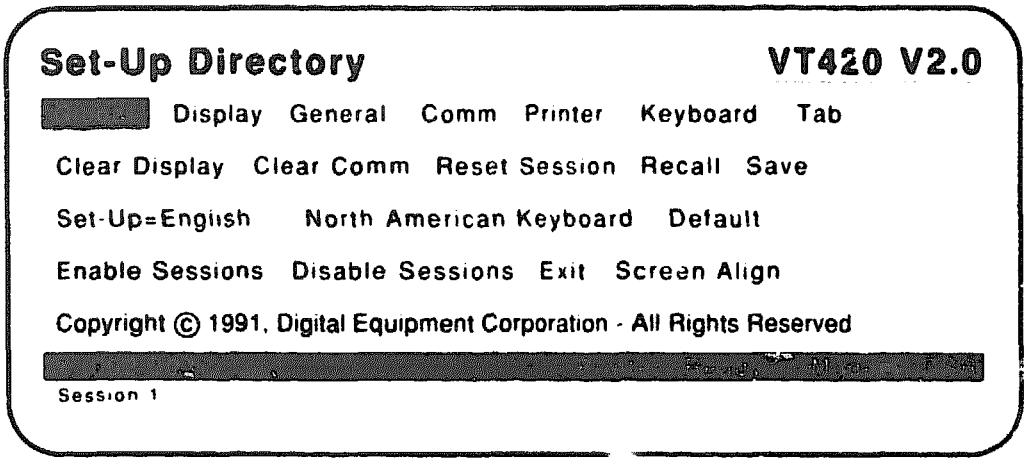


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Figure 3–1 Set-Up Directory

2. Use the arrow keys to move the cursor to the North American Keyboard field.
3. There are many possible settings for the keyboard dialect. Use the Enter key to move through the settings until you find your keyboard dialect.
4. After your setting appears, use the arrow keys to move to the Save field.
5. Press Enter. This saves your keyboard dialect setting.
6. Press F3 (Alt SetUp) to leave set-up.

Two Sessions: If you plan to run two sessions, you must select the keyboard dialect for each session independently. To select the keyboard dialect for the second session, first set up the terminal for two sessions (next section). Then press the F4 (Alt Scroll Lock) key and repeat the procedure above.

Setting Up the Terminal for One or Two Sessions

The terminal has two communication (Comm) ports that let you run one or two sessions: the Comm1 port and the Comm2 port. These ports provide the cable connections to your host system(s). To set up the terminal correctly, you must know

- How many sessions you want to run—one or two.
- Which port(s) you are using: Comm1, Comm2, or both.
- What type of cable(s) you are using: RS-232 or DEC-423.

If you are unsure, see the "Cable Connections" section in Chapter 2. After you identify the port(s) and cables in use, go to the section that matches your installation.

- One session (one cable)
- Two sessions (two cables)
- Two sessions with SSU software (one cable, VT mode only)

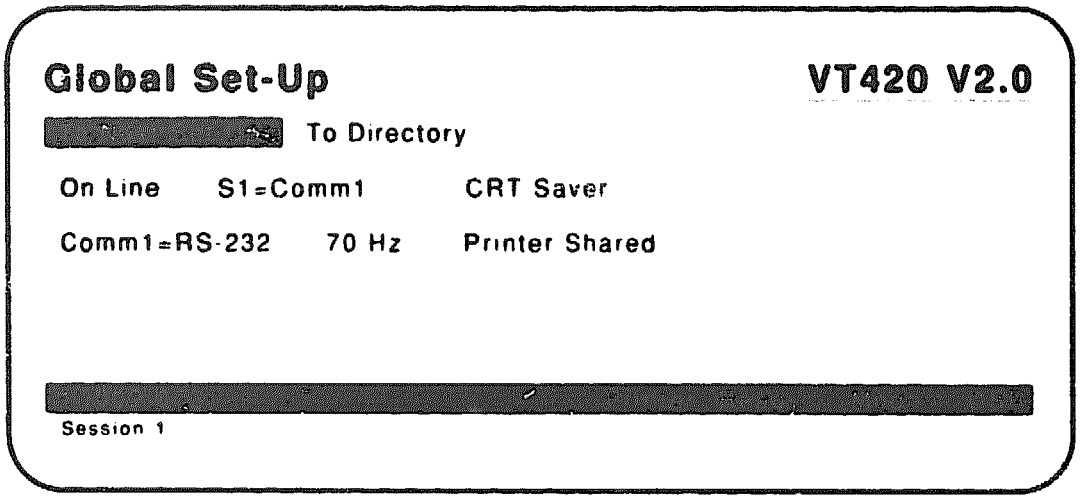
Remember, the terminal must use a separate cable for each session, unless you use VT mode and your system has SSU software or a DECserver 200 or later terminal server. SSU lets you run two sessions over one cable, and these terminal servers have SSU software.

The primary Comm1 port has two connectors: a 25-pin, RS-232 connector and a 6-pin DEC-423 connector. The secondary Comm2 port has a 6-pin, DEC-423 connector. You can also use the Comm2 port to connect a local printer to the terminal.

Setting Up for One Session (One Cable)

You only need one communication cable to run one session. You can connect the cable to either of the connectors on the primary Comm1 port: 25-pin RS-232 or 6-pin DEC-423. After you connect your cable, you must check the settings on the Global Set-Up screen.

1. Press the F3 (Alt SetUp) key to enter set-up. The Set-Up Directory screen appears (Figure 3–1). The cursor is on the `Global` field.
2. Press the Enter key. The Global Set-Up screen appears.



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3. Check the setting of the second field on the second line. This setting assigns a session to the Comm1 or Comm2 connectors. There are four possible settings:

```
S1=Comm1 (default)
S1=Comm1,S2=Comm2
S1=Comm2,S2=Comm1
Sessions on Comm1
```

The correct setting for your setup is the default setting of `S1=Comm1`.

If the setting is correct, go on to the next step.

If the setting is incorrect:

a. Use the arrow keys to move the cursor to the field.

b. Press Enter until the `S1=Comm1` setting appears.

4. Check the setting of the first field on the third line. This setting selects the active connector on the Comm1 port. There are two possible settings:

   ```
   Comm1=RS-232
   Comm1=DEC-423
   ```

   The setting should match the connector you are using. If the setting is correct, go to the next step.

   If the setting is incorrect:

   a. Use the arrow keys to move the cursor to the field.

   b. Press [Enter] until the correct setting appears.

5. If you changed any settings in the previous steps, continue with this procedure.

   If you did not change any settings, you can press [F3] ([Alt] [SetUp]) to leave set-up.

6. After you select the correct settings, use the arrow keys to move to the `To Directory` field.

7. Press [Enter] to return to the Set-Up Directory. The cursor is on the `Global` field.

8. Use the arrow keys to move to the `Save` field.

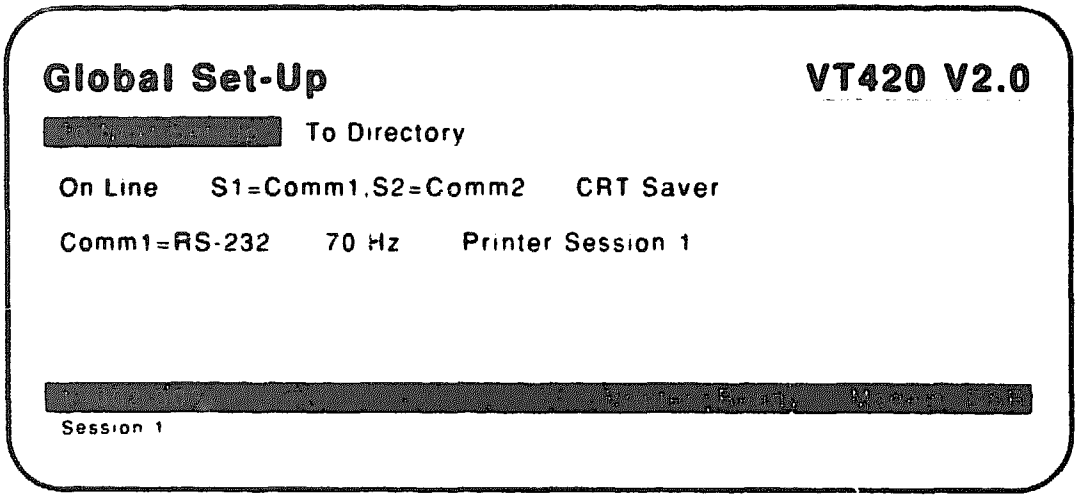
9. Press [Enter] to save all the current settings in each set-up screen. A `Done` message appears at the bottom of the screen.

10. Press [F3] ([Alt] [SetUp]) to leave set-up.

Setting Up for Two Sessions (Two Cables)

When you use two communication cables, you connect one cable to the terminal's Comm1 port and one cable to the Comm2 port. After you connect your cables, you must change some settings on the Global Set-Up screen to match your cable connections.

1. Press the F3 (Alt SetUp) key to enter set-up. The Set-Up Directory screen appears (Figure 3–1). The cursor is on the `Global` field.
2. Press the Enter key. The Global Set-Up screen appears.



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3. Check the setting of the second field on the second line. This field assigns each session to the Comm1 and Comm2 ports. There are four possible settings:

```
S1=Comm1 (default)
S1=Comm1,S2=Comm2
S1=Comm2,S2=Comm1
Sessions on Comm1
```

To run two sessions over two communication cables, you can use one of two settings:

`S1=Comm1,S2=Comm2`	Assigns session 1 to the Comm1 port and session 2 to the Comm2 port.

S1=Comm2, S2=Comm1	Assigns session 1 to the Comm2 port and session 2 to the Comm1 port.

NOTE
When you connect your terminal to two different systems, the terminal always opens session 1 first. You should match session 1 with the computer you use most often.

If the setting is correct, go on to the next step.

If the setting is incorrect:

a. Use the arrow keys to move to the field.

b. Press Enter until the correct setting appears.

4. Check the setting of the first field on the third line. This setting selects the active connector on the Comm port. There are two possible settings:

```
Comm1=RS-232
Comm1=DEC-423
```

The setting should match the connector you are using. If the setting is correct, go to the next step.

If the setting is incorrect:

a. Use the arrow keys to move the cursor to the field.

b. Press Enter until the correct setting appears.

5. If you changed any settings in the previous steps, continue with this procedure.

If you did not change any settings, you can press F3 (Alt SetUp) to leave set-up.

After you select the correct settings, use the arrow keys to move to the `To Directory` field.

6. Press Enter to return to the Set-Up Directory.

7. Use the arrow keys to move to the `Save` field.

8. Press Enter to save all the current settings in each set-up screen. A `Done` message appears at the bottom of the screen.

9. Press F3 (Alt SetUp) to leave set-up.

When you use two cables to run two sessions, you must set the baud rate for each session independently. See "Selecting the Correct Baud Rate" later in this chapter.

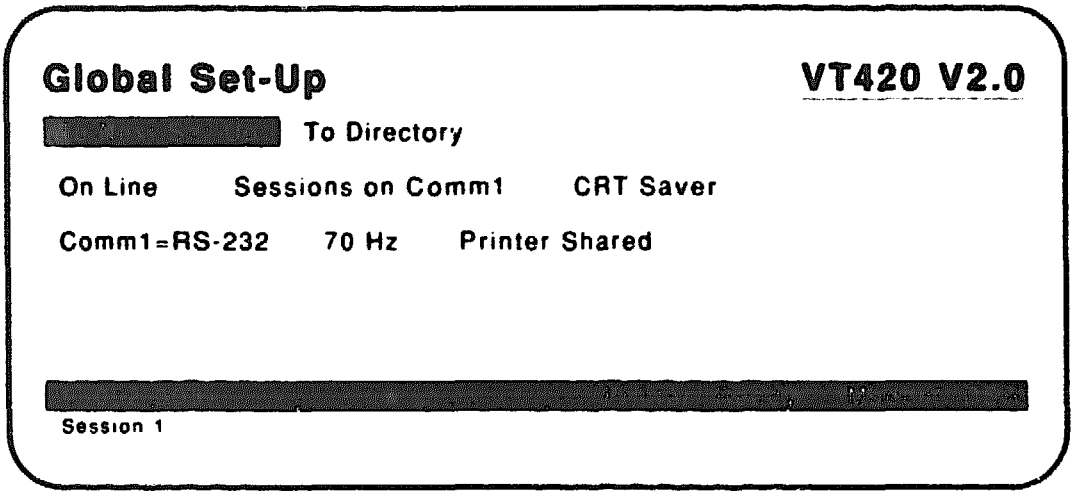
Chapter 9 describes how to use two sessions.

Setting Up for Two Sessions with SSU Software (One Cable, VT Mode Only)

If your host system has SSU software, the terminal can run two sessions over one communication cable. Your system manager can tell you if your host system has SSU software.

Connect the communication cable to either connector on the Comm1 port: the 25-pin, RS-232 connector or the 6-pin, DEC-423 connector. After you connect the cable, change the settings on the Global Set-Up screen to match your cable connection.

1. Press the F3 (Alt SetUp) key to enter set-up. The Set-Up Directory screen appears (Figure 3–1). The cursor is on the `Global` field.
2. Press the Enter key. The Global Set-Up screen appears.



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3. Check the setting of the second field on the second line. This field assigns each session to the Comm1 or Comm2 port. There are four possible settings:

```
S1=Comm1 (default)
S1=Comm1,S2=Comm2
S1=Comm2,S2=Comm1
Sessions on Comm1
```

To assign both sessions to the Comm1 port, you use the `Sessions on Comm1` setting.

If the setting is correct, go on to the next step.

If the setting is incorrect:

a. Use the arrow keys to move to the field.

b. Press Enter until the `Sessions on Comm1` setting appears.

4. Check the setting of the first field on the third line. This setting selects the active connector on the Comm1 port. There are two possible settings:

```
Comm1=RS-232
Comm1=DEC-423
```

The setting should match the connector you are using. If the setting is correct, go to the next step.

If the setting is incorrect:

a. Use the arrow keys to move the cursor to the field.

b. Press Enter until the correct setting appears.

5. If you changed any settings in the previous steps, continue with this procedure.

   If you did not change any settings, you can press F3 (Alt SetUp) to leave set-up.

   After you select the correct settings, use the arrow keys to move to the `To Directory` field.

6. Press Enter to return to the Set-Up Directory.

7. Use the arrow keys to move to the `Save` field.

8. Press Enter to save all the current settings in each set-up screen. A `Done` message appears at the bottom of the screen.

9. Press F3 (Alt SetUp) to leave set-up.

Chapter 9 describes how to use two sessions.

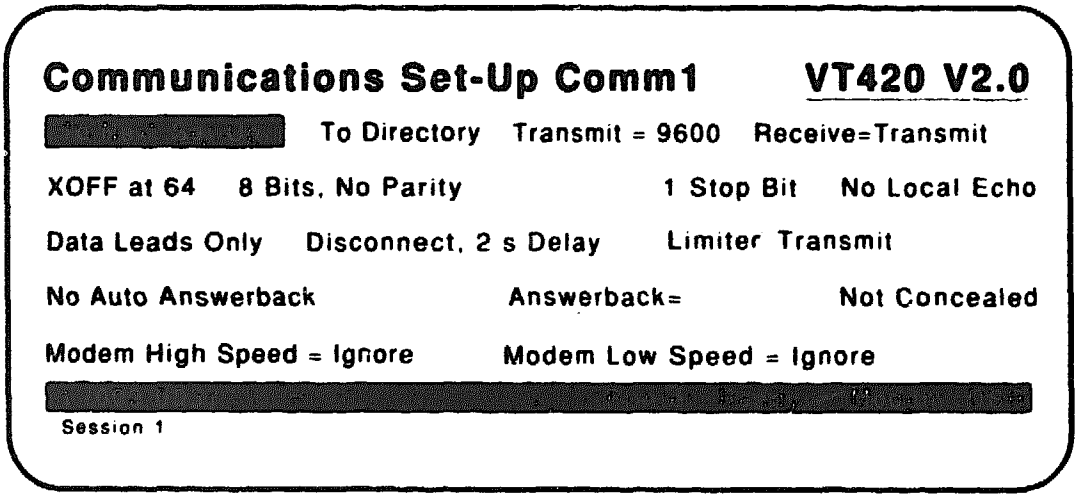
Selecting the Correct Baud Rate

The terminal is initially set to a *baud rate* of 9600. This setting works with most systems. The baud rate setting must match the baud rate of your host system. If you are unsure what baud rate your host system uses, ask your system operator or system manager.

To set the baud rate, you use the **transmit =** and **receive =** features on the Communications Set-Up screen.

1. Press the F3 (Alt SetUp) key to enter set-up. The Set-Up Directory screen appears (Figure 3–1). The cursor is on the `Global` field.
2. Use the arrow keys to move to the `Comm` field.
3. Press the Enter key. The Communications Set-Up screen appears.

NOTE
The following screen shows the Communications Set-Up screen in VT mode.



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4. Use the arrow keys to move to the `Transmit =` field.
5. The `Transmit =` field is initially set to 9600. You should use a setting that matches your host system. There are eight possible settings.

Use the Enter key to scroll through the settings.

NOTE
Next to the transmit = feature is the receive = feature. Most systems use the same speed to transmit and receive. The initial setting for receive= is `Receive=Transmit`**, so the receive speed automatically changes to match the transmit speed you select.**

6. After you select the correct setting, use the arrow keys to move to the `To Directory` field.
7. Press Enter to return to the Set-Up Directory.
8. Use the arrow keys to move to the `Save` field.
9. Press Enter to save all the current settings in each set-up screen. A `Done` message appears at the bottom of the screen.
10. Press F3 (Alt SetUp) to leave set-up.

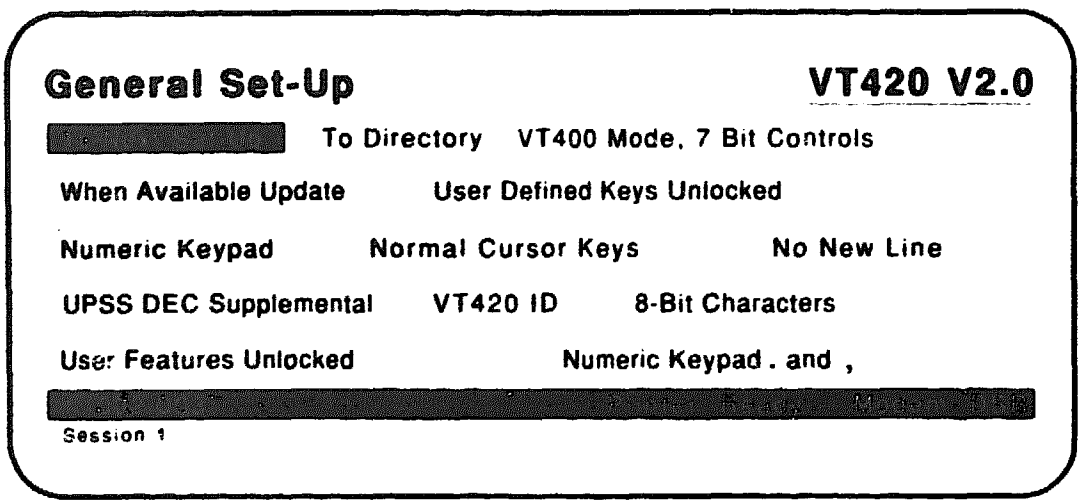
If you plan to run two sessions with two communication cables, you must set the baud rate for each session independently. To set the baud rate for the second session, first set up the terminal for two sessions ("Setting Up for Two Sessions (Two Cables)"). After you complete all the steps in that section, press the F4 (Alt Scroll Lock) key and repeat all the steps in this section.

Selecting the Correct Terminal ID

Different terminals are designed to identify themselves to the host software upon request, so the software can automatically recognize the terminal's operating features. The default setting for the VT420 is `VT420 ID`. If your software has not been updated recently, it may not recognize the `VT420 ID` response. For example, if the message `unknown terminal type` appears on the screen, you should change the **terminal ID** feature as follows:

1. Press the F3 (Alt SetUp) key to enter set-up. The Set-Up Directory screen appears (Figure 3–1). The cursor is on the `Global` field.
2. Use the arrow keys to move to the `General` field.
3. Press the Enter key. The General Set-Up screen appears.

NOTE
The following figure shows the General Set-Up screen in VT mode, when using an ANSI keyboard.



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4. Use the arrow keys to move to the `VT420 ID` field.

   Use the Enter key to scroll to the `VT320 ID` settings.

5. After you select the correct setting, use the arrow keys to move to the `To Directory` field.

6. Press Enter to return to the Set-Up Directory.

7. Use the arrow keys to move to the `Save` field.

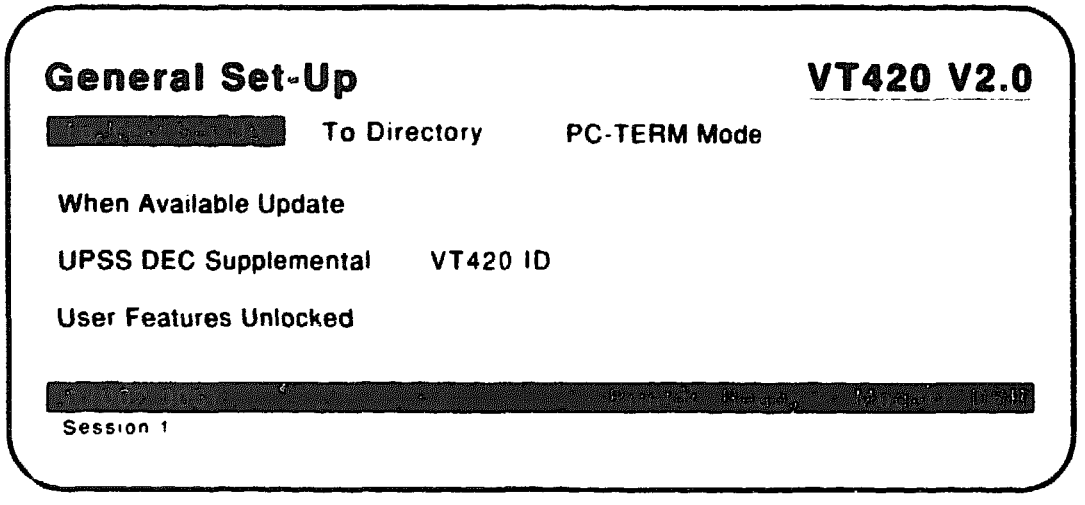
8. Press Enter to save all the current settings in each set-up screen. A `Done` message appears at the bottom of the screen.

9. Press F3 (Alt SetUp) to leave set-up.

Selecting PC TERM Mode (PC Keyboards Only)

If your terminal has a PC keyboard, you can operate the terminal in VT mode or PC TERM mode. By default, a terminal with a PC keyboard is set to VT400 Mode, 7-Bit Controls. To set the terminal to PC TERM mode:

1. Press Alt SetUp to enter set-up. The Set-Up Directory appears (Figure 3–1). The field cursor is on the Global field.
2. Use the arrow keys to move to the General field.
3. Press Enter. The General Set-Up screen appears.
4. Use the arrow keys to move to the VT400 Mode, 7-Bit Controls field.
5. Press Enter until the PC-TERM Mode setting appears.



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6. After you select the PC-TERM Mode setting, use the arrow keys to move to the To Directory field.
7. Press Enter to return to the Set-Up Directory screen.
8. Use the arrow keys to move to the Save field.
9. Press Enter to save all current settings in each set-up screen. A Done message appears at the bottom of the screen.
10. Press Alt SetUp to leave set-up.

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Using Your Video Terminal

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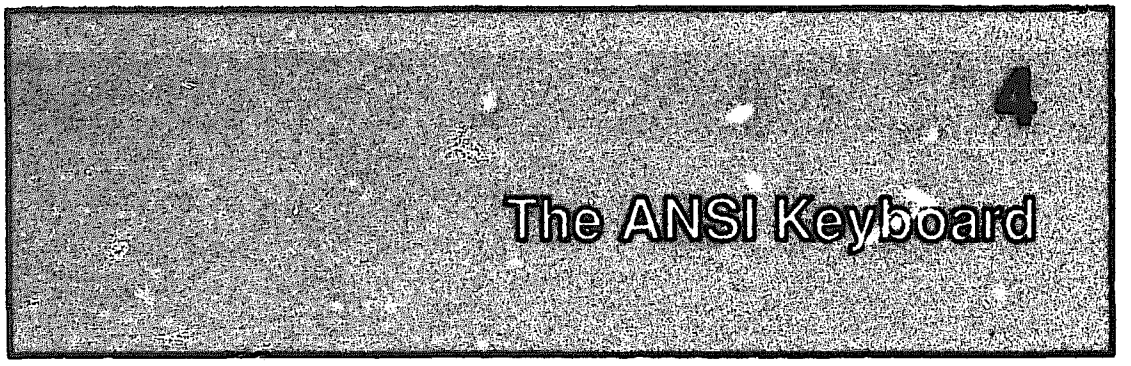


This chapter describes the basic function of each keyboard key and indicator on the ANSI keyboard. If you have a short ANSI keyboard, also see Chapter 5. If you have a PC keyboard, see Chapter 6. The chapter also describes a keyboard indicator line, and a terminal status line you can display on the screen. Later chapters provide more information on keys with special functions.

NOTE
A list of common keyboard functions appears at the end of this guide. You can keep a copy of the list near the terminal, as a quick-reference tool.

The ANSI Keyboard

The ANSI keyboard comes in many models for use in different countries. Most models are available in a standard or word processing (WPS) version. The only physical difference between all keyboards are the legends on the keys. Appendix D shows the standard versions, and the WPS version of the North American/United Kingdom dialect.

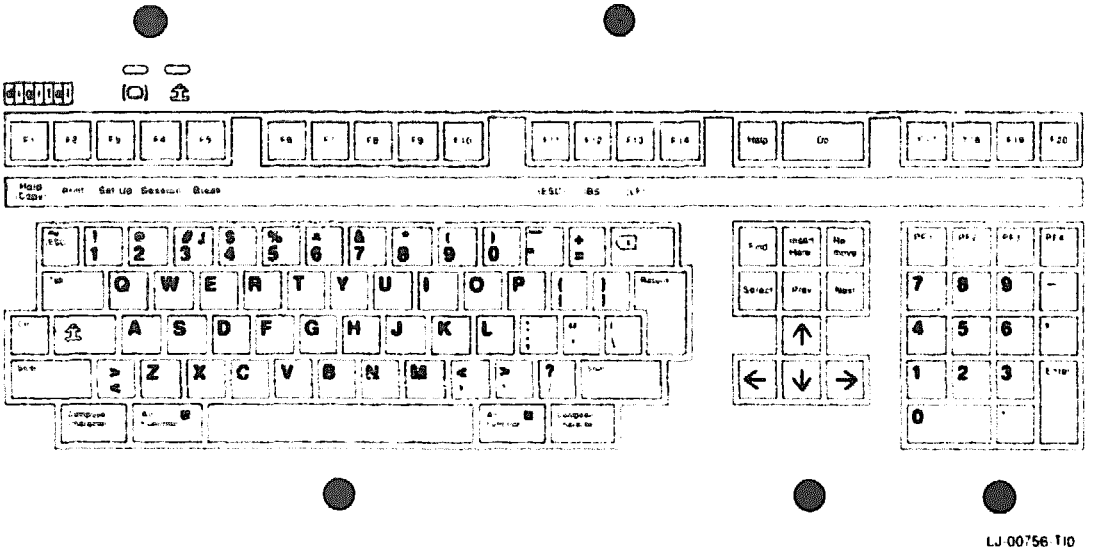
This chapter shows the North American/United Kingdom version of the ANSI keyboard.

Keyboard Dialect

The terminal has a **keyboard dialect** feature that is initially set to the `North American Keyboard`. If you have a keyboard for a different country or want to use the British dialect, you must change the setting of **keyboard dialect** feature in the Set-Up Directory screen. Chapter 3 describes how to select the correct keyboard dialect.

Layout

The keyboard has four groups of keys and two indicator lights. The keys are grouped by function. The keyboard also has two audible indicators, a keyclick and bell.



- Main keypad
- Editing keypad
- Numeric keypad
- Top-row function keys
- Indicator lights

Main Keypad

The layout of the main keypad is similar to a typewriter keyboard, with alphanumeric characters, punctuation marks, and Shift keys. The main keypad also has a number of keys not found on a typewriter, such as the Ctrl modifier key and the Compose Character prefix keys. The German keyboard has a Group Shift key and Alternate Shift key instead of Compose Character keys.

Modifier keys are pressed in combination with another key, to modify the code sent by that key. *Prefix keys* are pressed and released before pressing another key, to change the function of one or more keystrokes.

Special-Function Keys

The main keypad has the following special-function keys:

Tab — Pressing Tab sends a horizontal tab, which normally moves the cursor to the next tab stop. You can select the tab stops on the Tab Set-Up screen (Chapter 7). Applications can also change tab stops.

Ctrl — Holding down Ctrl and pressing another key sends a control code to the host.

For example, Ctrl Z means to hold down Ctrl and press the Z key.

 — Pressing the lock key down puts the keyboard in caps lock mode or shift lock mode. You can select the mode from Keyboard Set-Up screen (Chapter 7). The default setting is `Caps Lock` mode.

- In `Caps Lock` mode, the alphabetic keys send their uppercase or shifted character when pressed alone. You can use a Shift key to send the shifted character on other keys. You turn `Caps Lock` mode on and off by pressing and releasing the lock key.
- In `Shift Lock` mode, all keys on the main keypad send their shifted character. You can turn `Shift Lock` mode on by pressing the lock key. You can turn it off by pressing either the lock key or Shift key.

When the lock key is down, the lock indicator turns on and the lock symbol (or the word `Lock`) appears on the keyboard indicator line.

Shift (left and right) — Holding down Shift and pressing a standard key sends the shifted (top) character on the key.

Holding down Shift and pressing a special-function key starts a predefined control function. For example, Shift F2 means to hold down Shift while pressing the F2 key.

Return — Pressing Return sends either a carriage return or a carriage return and a line feed (selected in the General Set-Up screen, Chapter 7).

Pressing Return normally moves the cursor to the beginning of the next line.

Pressing this key normally sends the ` or ~ character.

You can also use this key to send the escape (ESC) control character, by changing the ` ~ feature setting in the Keyboard Set-Up screen (Chapter 7).

If you use the ` ~ key to send the ESC character, you may want to use the <> key to send the ` and ~ characters. To do this, change the **<> key** feature setting in the Keyboard Set-Up screen (Chapter 7).

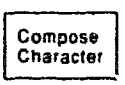

backarrow key

Pressing the <X key normally sends a delete (DEL) control character. Many applications use DEL to erase one character to the left of the cursor.

You can make the <X key send a backspace (BS) character instead of DEL. You use the **<X key** feature in the Keyboard Set-Up screen (Chapter 7).

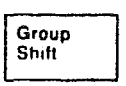
Space bar

Pressing the space bar sends a space (SP) character. You use spaces to separate words or move the cursor forward.


(left and right)

These are prefix keys, used to generate characters that do not appear as standard keys on your keyboard. See Chapter 8.

On the German keyboard, the Compose Character key is replaced by Group Shift and Alternate Shift.


(German)

You use Group Shift as a prefix or modifier key, to type the characters on the right half of keycaps. See Chapter 8.


(German)

Alternate Shift is a modifier key, used to generate a no break space (NBSP) or soft hyphen (SHY) character.

Alternate Shift + space bar = NBSP character.
Alternate Shift + - = SHY character.


(left and right)

You use Alt Function with other keys, to select alternate functions defined by your application software. The Alt Function keys send unique function sequences to the host, when they are pressed or released.

Editing Keypad

The editing keypad has four arrow keys and six editing 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.

You can use the editing keys in several ways.

- For set-up functions (Chapter 7)
- For copying and pasting text between sessions (Chapter 9)
- For panning up or down on a page, or for changing the size of a window on the screen (Chapter 9)
- For special functions defined by application software

Numeric Keypad

Numeric keypad keys often have functions assigned by application software, especially [PF1] to [PF4]. See your application software manuals for information about those keys.

You can use the numeric keypad to enter numeric data as you would with a calculator. Programmers can use this keypad to do hexadecimal compose sequences. See "Hexadecimal Key Sequences (ANSI Keyboards)" at the end of Chapter 8.

[Enter]

The [Enter] key on the numeric keypad has several functions.

- Normally, [Enter] works like the [Return] key. [Enter] sends a carriage return, or a carriage return and a line feed (Keyboard Set-Up, Chapter 7).
- In set-up, you can use [Enter] to select features in set-up screens (Chapter 7).

  Application software may use [Enter] as a special-function key.

. (Comma) . (Period)	If you use the German Keyboard, Spanish Keyboard, or Portuguese Keyboard setting for the **keyboard dialect** feature in the Set-Up Directory, the . (period) and . (comma) keys on the numeric keypad are reversed to match the European convention for numeric entry. You can also change the function of these keys from the General Set-Up screen (Chapter 7).

You can choose the **keypad mode** from the General Set-Up screen.

NOTE
The German keyboard dialect does not affect the application keypad mode.

Top-Row Function Keys

Predefined Keys

The first five top-row keys, F1 to F5, are predefined to perform the following functions. Normally, you do not change these functions. If needed, you can change the functions from the Keyboard Set-Up screen (Table 7–7).

F1 (Hold)	Pressing F1 puts the screen display on hold. This stops the scrolling of text on the screen, for easy reading. The hold indicator turns on and Hold appears on the keyboard indicator line. Pressing F1 again releases the screen display and allows scrolling to resume. *With Two Sessions* When you run two sessions (Chapter 9), F1 only affects the active session.
Ctrl F1	Pressing Ctrl F1 puts the screen display for the inactive session on hold. Pressing Ctrl F1 again releases the screen display for the inactive session. **NOTE** **The hold function does not work if you set the XOFF feature to No XOFF in the Communications Set-Up screen (Chapter 7).**

F1 and editing keys

Pressing F1 with specific keys on the editing keypad performs the copy and paste operation. See "Copying and Pasting Text (VT Mode Only)" in Chapter 9.

F2 (Print)

Pressing F2 sends a page of text from the current session to the printer connected to rear of the terminal. The terminal sends the page that contains the cursor.

A page may or may not correspond to the screen display.

This depends on the set-up settings for page size, font size, and page coupling features, as well as the size of the screen window for the current session. You can change the page size and other features from the Display Set-Up screen (Chapter 7).

Ctrl F2

Pressing Ctrl F2 turns auto print mode on or off. In auto print mode, you can automatically print each line of text as it is received from the host system. See "Selecting a Print Mode (VT Mode)" in Chapter 10.

F3 (Set-Up)

You press F3 to enter or leave set-up. When you enter set-up, the terminal displays the Set-Up Directory screen. You can leave set-up from any set-up screen. Chapter 7 describes set-up.

Ctrl F3

Pressing Ctrl F3 while in set-up causes the terminal to perform a power-up reset. This resets many set-up features for **both** sessions to their saved settings.

F4 (Session)

Pressing F4 changes the active session when you use two sessions. You can switch from session 1 to session 2, or from session 2 to session 1.

F4 does not work when

- You are using set-up.
- The **F4 =** feature (Keyboard Set-Up screen) is set to `F4 = Ignore`.
- The use of two sessions has not been enabled in Global Set-Up, by using the `S1=Comm1` setting.

Ctrl F4

Pressing Ctrl F4 lets you divide the screen into two windows. Windows let you display two sessions at one time.

Pressing Ctrl F4 :

- One time gives you two windows.
- A second time returns you to a full-screen display. The terminal only displays the active session.

See "Windows" in Chapter 9.

F5 (Break)

Pressing F5 generates a break signal on the communication port associated with the current session. Some communication equipment recognizes break as a special attention signal. See your communication equipment manual for details.

Shift F5

Pressing Shift F5 performs a disconnect on the serial communication port associated with the current session. A disconnect normally ends communication with a modem to prepare for another call.

Ctrl F5

Pressing Ctrl F5 sends the answerback message to the active session. See the Keyboard Set-Up screen in Chapter 7.

NOTE
Ctrl F5 sends the answerback message even if you set the conceal answerback message feature in the Communications Set-Up screen (Chapter 7).

User-Defined Keys and Application-Specific Keys

The function of the remaining top-row keys, F6 to F20 , often depends on your application software. Refer to your application software manuals for a description of key functions. You can also define the function of these keys yourself. See Chapter 11 for a list of the predefined codes sent by the function keys on the ANSI keyboard.

F6 to F20

When pressed alone, these keys send predefined programming sequences to the host system (Chapter 11). Applications that recognize these sequences can use the keys to perform various functions.

In VT100 and VT52 modes
Keys F11 , F12 , and F13 send control characters ESC, BS, and LF respectively. Keys F6 to F10 and F14 to F20 do not function.

NOTE
In VT420 mode, you can use the ~ key to send the ESC character. See the Keyboard Set-Up screen in Chapter 7.

Shift F6 to Shift 20

User-defined keys (UDKs)
Pressing Shift and one of these keys sends the user-defined function for that key. You can define keys F6 to F20 by using programming sequences. You can use any sequence of characters in your definitions. Definitions are loaded from the host system.

Data Processing Keys

Most versions of the keyboard have some keys with characters on the left half and right half of their keycap. Normally, you use the characters on the left half of the key. These are called typewriter characters. The characters on the right half are for data processing use.

You can set these keys to send their typewriter or data processing characters, by using the **typewriter/data processing** feature on the Keyboard Set-Up screen (Chapter 7). One exception is the North American/United Kingdom keyboard.

£ Key

The North American/United Kingdom standard keyboard has only one key with three characters.

To use the £ symbol, you select the `British Keyboard` setting in the Set-Up Directory screen. To use the # symbol, you select the `North American`

Keyboard setting. There are no separate data processing legends on the North American/United Kingdom keyboard.

Compose Characters

You can type compose sequences to display many more characters than those shown on the keycaps. For example, you can display accented letters. Chapter 8 describes how to use compose sequences.

Indicator Lights

The keyboard has two indicator lights, hold and lock. When they are activated, Hold and Lock appear on the keyboard indicator line.

Turns on or off when you press the F1 key.

Turns on or off when you press the lock key.

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 7).

Keyclick

You hear the keyclick sound each time you press a key that sends a code or causes the terminal to take some immediate action. If a key is autorepeating, the keyclick will repeat once for each character or key sequence sent. Keys do not click under the following conditions:

- You press Shift or Ctrl. These keys never click except when Shift is leaving the shift-lock state.
- You select Keyclick Off in the Keyboard Set-Up screen.
- You press a key or key combination that does not have a function under the current operating conditions. Examples: F6 to F10 in VT100 mode; invalid control combinations; and keys that generate 8-bit codes, when you use 7-bit national replacements character sets.
- The keyboard Wait indicator is on. The terminal is not accepting keystrokes because the host has reset keyboard action mode, or sent XOFF to the terminal and the keyboard input silo is full. You can

manually clear the wait condition by selecting Clear Comm in the Set-Up Directory screen.

Bell

The bell tone is a beeping sound. You can use the bell as a margin bell, warning bell, or both.

Margin Bell

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

Warning Bell

This bell sounds for any of the following conditions:

- During the power-up self-test
- When the terminal receives a bell (BEL) character from the host system
- After a compose character error
- When SSU errors occur (The bell rings twice.)
- You press an incorrect key while in set-up.
- You press an incorrect key while copying and pasting text.

Keyboard Indicator Line

The keyboard indicator line appears at the bottom of the screen, below the status line. When you use two sessions, there is only one keyboard indicator line for both sessions.

The keyboard indicator line displays text in the smaller, 132-column font and appears in the same video background as the main display.

Keyboard Indicator Line Fields

The keyboard indicator line has six fields that show you:

- Which session the keyboard is connected to (the active session)
- Whether or not the inactive session has been updated
- When the screen is on hold or in a wait state

- When the F1, Compose Character, Group Shift (German keyboard), or lock keys are active

Table 4–1 describes each field.

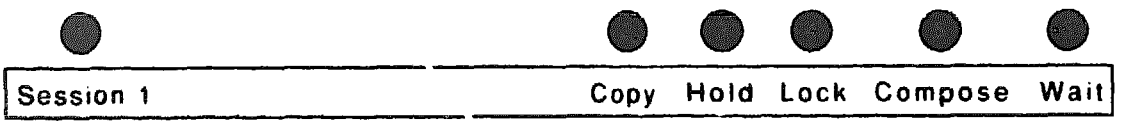


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Table 4–1 Keyboard Indicator Line Fields

Field	Value	Indicates
●		**Active session**
	Session 1	Session 1 is active.
	Session 2	Session 2 is active.
		Inactive session activity*
	Session ■	Session 1 is active. Session 2's page memory is being updated since it was last active.
	Session ■	Session 2 is active. Session 1's page memory is being updated since it was last active.
●	Copy	A copy and paste operation is in progress.
●	Hold	The screen is on hold.
●	Lock	The Caps Lock or Shift Lock setting in the Keyboard Set-Up screen is in effect.
●	Compose	A compose sequence is in progress.
●	Wait	The keyboard is in a wait state and unable to accept typed keystrokes.

*This field appears in reverse video of the keyboard indicator line.

Status Line

The terminal screen can display a status line that provides information about the terminal's current operations. If you are running one session, the status line appears at the bottom of the screen. If you run two sessions, a separate status line appears at the bottom of each session. By default, the status line is disabled.

You can select when to display the status line. You can also let host applications write messages on the status line. To make these selections, you use the **status display** feature in the Display Set-Up screen (Chapter 7).

The **status display** feature has three settings.

No status display (default)	The status line appears when • You select a set-up screen, or • The host system selects the status line.
Indicator status display	The status line appears at all times, providing information on the session (Table 4–2).
Host-writable status display	Applications can write messages on the status line.

NOTE
The terminal uses separate set-up settings for each session. Any changes you make only apply to the session you are in. If you want to change a set-up setting for two sessions, you must make the change in each session.

Status Line Fields

The default status line has four fields that show you:

- The page number of the page displayed
- Cursor position
- Printer status
- Modem status

Table 4–2 describes each field. When you select a *host-writable status line*, applications on your host system can use the status line to send you messages.

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

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Table 4–2 Status Line Fields

Field	Value	Indicates
●		**Page displayed on screen (from page memory)**
	1	Page 1
	2	Page 2
	3	Page 3
	4	Page 4*
	5	Page 5*
	6	Page 6*
●		**Cursor position**
	(x,y)	Text cursor position
		x = row (1 to 144).
		y = column (1 to 132).
		You can use the **80/132 column mode** feature in the Display Set-Up screen to select 80 or 132 columns.
●		**Printer status**
	Printer: Ready	The printer can receive data for printing (on-line).
	Printer: Not Ready	The printer is not ready to receive data for printing (off-line).
	Printer: None	The printer is off or not connected to the terminal.

*These page numbers never appear when you use two sessions. Each session can only use three pages.

Table 4–2 (Cont.) Status Line Fields

Field	Value	Indicates
	Printer: Auto Print	The terminal is in auto print mode. The terminal sends the current display line to the printer when the cursor moves to the next line. To select auto print mode, press Ctrl F2. See Chapter 10.
	Printer: Controller	The terminal is in printer controller mode. The host sends data directly to the printer without displaying data on the screen.
	Printer: Busy	The printer is busy printing data from the other session.
	Printer: Assigned to 1 (or 2)	The printer is assigned to the other session.

NOTE
Use the printer assignment feature in the Global Set-Up screen to assign the printer.

●		**Modem status†**
	Modem: DSR	There is a call connected on the modem.
	Modem: No DSR	The terminal can send commands to the modem, but there is no call connected.

†Field 4 is blank, unless you have a modem connected to the Comm1 RS-232 connector and Modem Control is selected in the Communications Set-Up screen.

5 The Short ANSI Keyboard

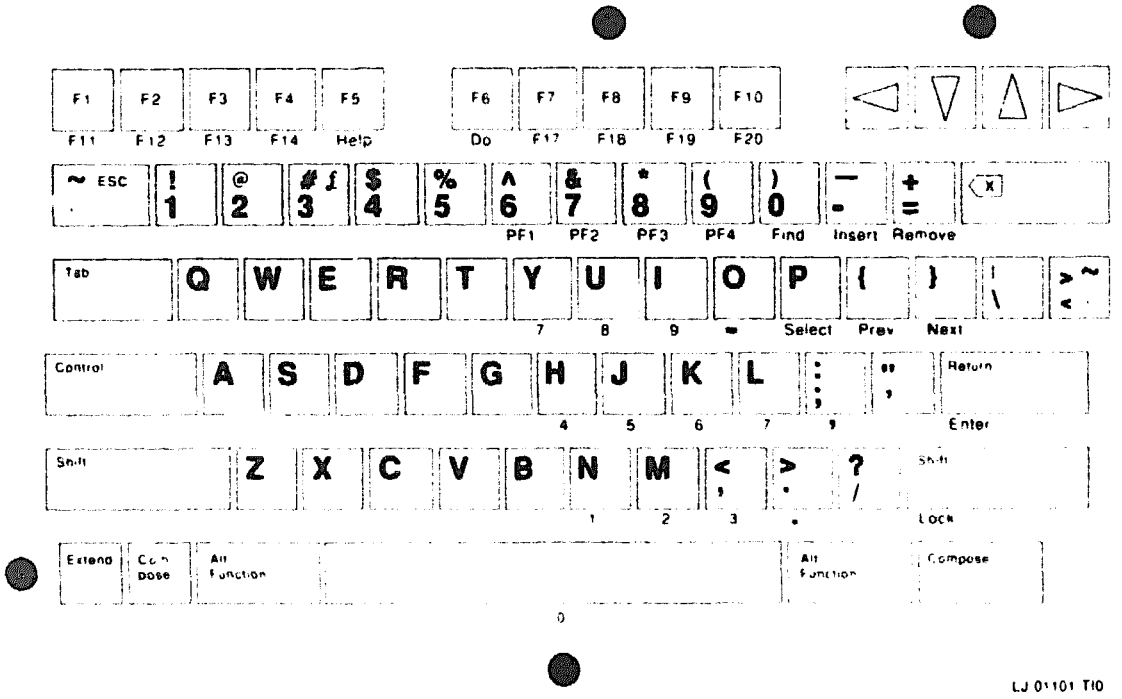
The short ANSI keyboard is a compact version of the ANSI keyboard, for those who make little use of auxiliary editing and numeric keypads. Most keys on the short ANSI keyboard work the same way as on the ANSI keyboard (Chapter 4). This chapter describes how the short ANSI keyboard differs from the ANSI keyboard.

NOTE
A list of common keyboard functions appears at the end of this guide. You can keep a copy of the list near the terminal, as a quick-reference tool.

The Short ANSI Keyboard

The short ANSI keyboard is only available in the North American/United Kingdom version. The keyboard has three groups of keys. The keys are grouped by function.

The keyboard also has two audible indicators, a keyclick and bell.



- Main keypad
- Top-row function keys
- Arrow keys
- Extend key

Main Keypad

The layout of the main keypad is similar to the ANSI keyboard, but includes an Extend key. The Extend key lets you enter the same keystrokes as the keypad and function keys found on the longer ANSI keyboard.

Using [Extend] Key Sequences for Keypad and Function Keys

You can use two-stroke [Extend] key sequences to perform the same functions as the following keys that are on the longer ANSI keyboard:

- [F11] to [F20]
- Editing keypad
- Numeric keypad

These functions are printed on the front of certain keys on the short ANSI keyboard. For example, the [P] key also serves as the [Select] editing key. To access this second function, you press the [Extend] key first. The following table lists all the two-stroke [Extend] key sequences:

To Select ...	Press ...	To Select ...	Press ....
Top-Row Function Keys			
[F11] to [F20]	[Extend] [F1] to [Extend] [F10]		
Editing Keypad Keys			
[Find]	[Extend] [0]	[Select]	[Extend] [P]
[Insert]	[Extend] [ ]	[Prev]	[Extend] [{]
[Remove]	[Extend] [=]	[Next]	[Extend] [}]
Numeric Keypad Keys			
[PF1]	[Extend] [6]	[4]	[Extend] [H]
[PF2]	[Extend] [7]	[5]	[Extend] [J]
[PF3]	[Extend] [8]	[6]	[Extend] [K]
[PF4]	[Extend] [9]	[,]	[Extend] [L]
[7]	[Extend] [Y]	[1]	[Extend] [N]
[8]	[Extend] [U]	[2]	[Extend] [M]
[9]	[Extend] [I]	[3]	[Extend] [,]
[-]	[Extend] [O]	[.]	[Extend] [.]
		[0]	[Extend] space bar

Special-Function Keys

The main keypad has the same special-function keys as the ANSI keyboard. The only difference from the ANSI keyboard is the Extend key.

Extend *front*

Pressing a two-stroke Extend sequence lets you perform the same functions as the following keys on the longer ANSI keyboard: F11 to F20, editing keypad, and numeric keypad. Functions are printed on the front of short ANSI keys.

Extend
right Shift

Pressing the Extend and right Shift keys puts the keyboard in caps lock mode or shift lock mode. You can select the mode from Keyboard Set-Up screen (Chapter 7). The default setting is `Caps Lock` mode.

- In `Caps Lock` mode, the alphabetic keys send their uppercase or shifted character when pressed alone. You can use a Shift key to send the shifted character on other keys. You turn `Caps Lock` mode on and off by pressing the Extend and right Shift keys.
- In `Shift Lock` mode, all keys on the main keypad send their shifted character. You can turn `Shift Lock` mode on by pressing the Extend and right Shift keys. You can turn it off by pressing either the Extend and right Shift keys or the Shift key.

When you press the Extend and right Shift keys down, the lock symbol (or the word `Lock`) appears on the keyboard indicator line.

The ` ~ key and < > key work the same way as on the ANSI keyboard, but the keycap legends are slightly different.

Pressing this key normally sends the ` or ~ character.

You can also use this key to send the escape (ESC) control character, by changing the **` ~ key** feature setting in the Keyboard Set-Up screen (Chapter 7).

If you use the ` ~ key to send the ESC character, you may want to use the < > key to send the ` and ~ characters. To do this, change the **< > key** feature setting in the Keyboard Set-Up screen (Chapter 7).

Arrow Keys

The four arrow keys work the same as on the ANSI keyboard.

Top-Row Function Keys

Predefined Keys

The first five top-row keys, F1 to F5, have the same predefined functions as on the ANSI keyboard. Normally, you do not change these functions. If needed, you can change the functions from the Keyboard Set-Up screen (Table 7–7).

User-Defined Keys and Application-Specific Keys

As on the ANSI keyboard, the function of the remaining top-row keys, F6 to F10 and Extend F1 to Extend F10, often depends on your application software. Refer to your application software manuals for a description of key functions. You can also define the function of these keys yourself. See Chapter 11 for a list of the predefined codes sent by the function keys on the short ANSI keyboard.

F6 to F10 and Extend F1 to Extend F10	When pressed, these keys send predefined programming sequences to the host system (Chapter 11). Applications that recognize these sequences can use the keys to perform various functions. **In VT100 and VT52 modes** Keys Extend F1, Extend F2, and Extend F3 send control characters ESC, BS, and LF respectively. Keys F6 to F10 and Extend F4 to Extend F10 do not function. **NOTE** **In VT420 mode, you can use the ~ key to send the ESC character. See the Keyboard Set-Up screen in Chapter 7.**
Shift F6 to Shift F10 and Shift Extend F1 to Shift Extend F10	**User-defined keys (UDKs)** Pressing Shift and one of these key sequences sends the user-defined function for that key. You can define keys F6 to Extend F10 by using programming sequences. You can use any sequence of characters in your definitions. Definitions are loaded from the host system.

[# £] Key

This key works the same way as on the ANSI keyboard.

To use the £ symbol, you select the `British Keyboard` setting in the Set-Up Directory screen. To use the # symbol, you select the `North American Keyboard` setting.

Compose Characters

The [Compose] keys work the same as the [Compose Character] keys on the ANSI keyboard.

You can type compose sequences to display many more characters than those shown on the keycaps. For example, you can display accented letters. Chapter 8 describes how to use compose sequences.

Indicator Lights

The short ANSI keyboard does not have indicator lights.

Audible Indicators

The short ANSI keyboard has the same two audible indicators as the ANSI keyboard, 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 7).

Keyboard Indicator Line

See Chapter 4 for a description.

Status Line

See Chapter 4 for a description.

6

The PC Keyboard

This chapter describes the basic function of each keyboard key and indicator on the PC keyboard. If you are using an ANSI keyboard, see Chapter 4.

When you use a PC keyboard, you can operate the VT420 in VT mode or PC TERM mode (Chapter 3). This chapter describes the function of the PC keyboard keys in both modes. Later chapters provide more information on keys with special functions.

In VT mode, you can switch the PC keyboard to an ANSI key layout if desired. This feature is useful if you are familiar with the ANSI keyboard. If you use the default PC key layout, this chapter includes a table that lists equivalent keys on the PC keyboard and ANSI keyboard.

NOTE
A list of common keyboard functions appears at the end of this guide. You can keep a copy of the list near the terminal, as a quick-reference tool.

The PC Keyboard

There are two PC keyboards, a worldwide model and a North American model.

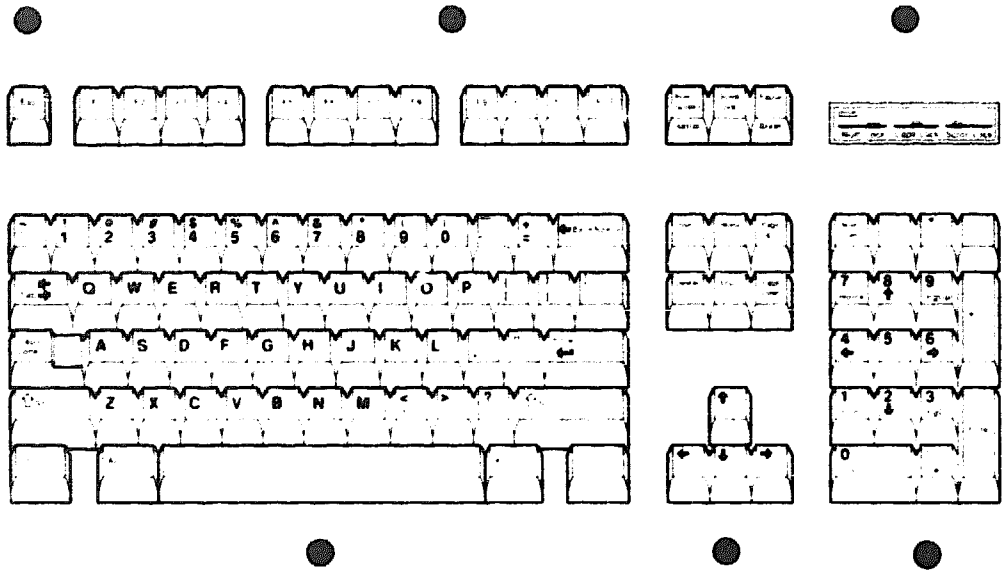
- The worldwide model has 102 keys. The worldwide model comes in many versions, for use in different countries.
- The North American model has 101 keys.

Appendix D shows the standard versions of the PC keyboards.

This chapter shows the North American version of the PC keyboard.

Layout

The PC keyboard has four groups of keys and three indicator lights. The keys are grouped by function. The PC keyboard also has two audible indicators, a keyclick and bell.



1. Main keypad
2. Editing keypad
3. Numeric keypad
4. Top-row function keys
5. Escape key
6. Indicator lights

Main Keypad

The layout of the main keypad is similar to a typewriter keyboard, with alphanumeric characters, punctuation marks, and Shift keys. The main keypad also has a number of keys not found on a typewriter, such as the Ctrl and Alt modifier keys.

Modifier keys are pressed in combination with another key, to modify the code sent by that key. *Prefix keys* are pressed and released before pressing another key, to change the function of one or more keystrokes.

Special-Function Keys

The main keypad and top row have the following special-function keys:

Esc Pressing **Esc** begins a control sequence.

Tab Pressing **Tab** moves the cursor to the next tab stop. You can select the tab stops on the Tab Set-Up screen (Chapter 7). Applications can also change tab stops.

Ctrl Holding down **Ctrl** and pressing another key sends a control code to the host.

For example, **Ctrl** **Z** means to hold down **Ctrl** and press the **Z** key.

Caps Lock Pressing the **Caps Lock** key puts the keyboard in caps lock mode or shift lock mode. You can select the mode from the Keyboard Set-Up screen (Chapter 7). The default setting is Caps Lock mode.

- In Caps Lock mode, the alphabetic keys send their uppercase or shifted character when pressed alone. You can use a **Shift** key to send the shifted characters on other keys. You turn Caps Lock mode on and off by pressing the **Caps Lock** key.
- In Shift Lock mode, all keys on the main keypad send their shifted character. You can turn Shift Lock mode on by pressing the **Caps Lock** key. You can turn it off by pressing either the **Caps Lock** key or the **Shift** key.

Shift Holding down a **Shift** key and pressing a standard key generates the uppercase character on the key.

Enter Pressing **Enter** sends a carriage return to the host, which usually puts the cursor either at the beginning of the next line or at the beginning of the same line. You can select either function in the General Set-Up screen (Chapter 7).

Pressing **Enter** normally moves the cursor to the beginning of the next line.

← Backspace Pressing **← Backspace** deletes one character to the left of the cursor.

Space bar	Pressing the space bar adds a space character. You use spaces to separate words or move the cursor forward.
Alt	Alt is used to generate characters or alternate functions that do not appear as standard keys on your PC keyboard. You can use Alt with another key to generate additional codes, or with the function keys to generate a third-level function for the key. See Chapter 8. Both Alt keys function the same, only when you select the North American keyboard dialect.
AltGr (right)	You use AltGr with *Janus-faced* or front-faced keys to generate the third character on a keycap. The North American PC keyboard does not have an AltGr key.

Janus-Faced and Front-Faced Character Keys

All PC keyboards, except the North American and United Kingdom, have keycaps with more than two characters. In most cases, the third character is on the top of the keycap, to the right of the first character. These keys are called Janus-faced character keys. In other cases the extra characters are on the front of the keycap. These keys are called front-faced character keys.

To display the third character on a Janus-faced or front-faced key:

- Press AltGr and the selected key.

Editing Keypad

The editing keypad has four arrow keys and six editing keys.

You can use the arrow keys in two ways:

- **Normal cursor 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.
- **Application cursor keys**–You can select this option from the General Set-Up Screen (Chapter 7). When the arrow keys are in application mode, the cursor keys generate control sequences.

You can use the editing keys in several ways:

- For copying and pasting text between sessions (Chapter 9).
- For panning up or down a page, or for changing the size of a window on the screen (Chapter 9).
- For special functions defined by the application software.

Numeric Keypad

You can use the numeric keypad in the following ways:

Function	Description
Cursor keypad	By default, the numeric keypad works as a cursor keypad. The arrow keys and Home key work exactly like the arrow keys on the editing keypad. The remaining numeric keys are disabled. The other keys on the keypad provide the function indicated on their keycaps.
Application keypad	You can change Numeric Keypad to Application Keypad from the General Set-Up screen (Chapter 7). In application mode, you can use the numeric keypad to perform special functions defined by an application. See the user's guide for your application.
Number generator mode	If you press the Num Lock key, you can use the numeric keypad to enter numbers and arithmetic operators. When you press the key, the Num Lock indicator at the upper-right of the keyboard turns on.
Character generator mode	You can use the numeric keypad to generate characters that are not available from the main keyboard.

The effect of the Enter key depends on how you use the numeric keypad.

- If you use the numeric keypad as a cursor keypad, a number generator, or a character generator, the Enter key works like the Enter key on the main keypad.
- If you use the numeric keypad as an application keypad, the Enter key sends a control code. The effect of the code depends on your software application.

Top-Row Function Keys (PC TERM Mode)

Predefined Keys

In PC TERM mode, most keys send a scan code to the terminal when pressed. The Scroll Lock and Print Screen/SetUp keys have predefined functions. Normally, you do not change these functions. If needed, you can change the functions from the Keyboard Set-Up screen (Table 7–9).

Alt Scroll Lock	When the **Alt Scroll Lock =** feature in the Keyboard Set-Up screen is set to Session, pressing Alt Scroll Lock allows you to switch back and forth between two sessions.
Alt SetUp	When the **SetUp =** feature in the Keyboard Set-Up screen is set to Set-Up, pressing Alt SetUp displays the General Set-Up Screen. The SetUp key is the same as the Print Screen key.
Shift Print Screen	When the **Print Screen =** feature in the Keyboard Set-Up screen is set to Print, pressing Shift Print Screen sends all text displayed on the screen to the printer.
Pause	This key is not active.

Using the PC Keyboard in VT Mode

In VT mode, some top-row function keys perform different functions than they do in PC TERM mode. VT mode also gives you the option of switching the PC keyboard to Digital's ANSI keyboard layout.

Top-Row Function Keys (VT Mode)

Predefined Keys

In VT mode, the three top-row function keys above the editing keypad and the Del key on the numeric keypad have the following predefined functions. Normally, you do not change these functions. If needed, you can change the functions from the Keyboard Set-Up screen (Table 7–8).

Scroll Lock

Pressing **Scroll Lock** puts the screen display on hold. This stops the scrolling of text on the screen, for easy reading. The Scroll Lock indicator turns on and Hold appears on the keyboard indicator line. Pressing **Scroll Lock** again releases the screen display and allows scrolling to resume.

With Two Sessions

When you run two sessions (Chapter 9), **Scroll Lock** only affects the active session.

Ctrl **Scroll Lock**

Pressing **Ctrl** **Scroll Lock** puts the screen display for the inactive session on hold. Pressing **Ctrl** **Scroll Lock** again releases the screen display for the inactive session.

NOTE
The hold function does not work if you set the XOFF feature to No XOFF **in the Communication Set-Up screen (Chapter 7).**

Scroll Lock and editing keys

Pressing **Scroll Lock** with specific keys on the editing keypad performs the copy and paste operation. See "Copying and Pasting Text (VT Mode Only)" in Chapter 9.

Alt **Scroll Lock**

Pressing **Alt** **Scroll Lock** changes the active session when you use two sessions. You can switch from session 1 to session 2, or from session 2 to session 1.

Alt **Scroll Lock** does not work when

- You are using set-up.
- The use of two sessions has not been enabled in Global Set-Up, by changing the S1=Comm1 setting. See "Setting Up the Terminal for One or Two Sessions " in Chapter 3.

Ctrl **Alt** **Scroll Lock**

Pressing **Ctrl** **Alt** **Scroll Lock** lets you divide the screen into two windows. Windows let you display two sessions at one time.

Pressing **Ctrl** **Alt** **Scroll Lock** :

- One time gives you two windows.
- A second time returns you to a full-screen display. The terminal only displays the active session.

See "Windows" in Chapter 9.

Print Screen

Pressing **Print Screen** sends a page of text from the current session to the printer connected to rear of the terminal. The terminal sends the page that contains the cursor.

A page may or may not correspond to the screen display.

This depends on the set-up settings for page size, font size, and page coupling features, as well as the size of the screen window for the current session. You can change the page size and other features from the Display Set-Up screen (Chapter 7).

Ctrl **Print Screen**

Pressing **Ctrl** **Print Screen** turns auto print mode on or off. In auto print mode, you can automatically print each line of text as it is received from the host system. See "Selecting a Print Mode (VT Mode)" in Chapter 10.

Alt **SetUp**

You press **Alt** **SetUp** to enter or leave set-up. The SetUp key is the same as the Print Screen key. When you enter set-up, the terminal displays the Set-Up Directory screen. You can leave set-up from any set-up screen. Chapter 7 describes set-up.

Ctrl **Alt** **Del**

Pressing **Ctrl** **Alt** **Del** while in set-up causes the terminal to perform a power-up reset. This resets many set-up features for **both** sessions to their saved settings.

Pause

This key is not active.

Alt Break	Pressing Alt Break generates a break signal on the communication port associated with the current session. Some communication equipment recognizes break as a special attention signal. See your communication equipment manual for details.
Shift Break	Pressing Shift Break performs a disconnect on the serial communication port associated with the current session. A disconnect normally ends communication with a modem to prepare for another call.
Ctrl Break	Pressing Ctrl Break sends the answerback message to the active session. See the Keyboard Set-Up screen in Chapter 7.

NOTE
Ctrl Break sends the answerback message even if you set the conceal answerback message feature in the Communications Set-Up screen (Chapter 7).

User-Defined Keys and Application-Specific Keys (VT Mode Only)

The remaining top-row keys, F1 to F12 are programmable. Their function depends on your application software. Refer to your application software manual for specific key functions.

You press the keys in one of the following three sequences: Fn key, Shift Fn keys, or Alt Fn keys. The keys send control codes to the host. See Chapter 11 for a list of the predefined codes sent by the function keys on the PC keyboard and the ANSI keyboard.

Nonspacing Diacritical Characters (VT Mode Only)

You can type key sequences to display many more characters than those shown on the keycaps. For example, you can display accented letters. Chapter 8 describes how to use key sequences to display nonspacing diacritical characters.

Equivalent Keys on ANSI and PC Keyboards (VT Mode Only)

The following table lists equivalent top-row function key sequences on the PC and ANSI keyboards, when you use the PC key layout in VT mode:

ANSI	PC	ANSI	PC
F1	F1	Shift F1	Shift F1
.	.	.	.
.	.	.	.
.	.	.	.
F10	F10	Shift F10	Shift F10
F11	F11 or Alt F1	Shift F11	Shift F11 or Alt Shift F1
F12	F12 or Alt F2	Shift F12	Shift F12 or Alt Shift F2
F13	Alt F3	Shift F13	Alt Shift F3
.	.	.	.
.	.	.	.
.	.	.	.
F20	Alt F10	Shift F20	Alt Shift F10
—	Alt F11	—	Alt Shift F11
—	Alt F12	—	Alt Shift F12

Switching to the ANSI Keyboard Layout (VT Mode Only)

In VT mode, you switch the PC keyboard to Digital's ANSI keyboard layout. When you select the ANSI keyboard layout, the top-row function keys and the editing and numeric keypads work like the corresponding keys on the ANSI keyboard. See Chapter 4 for specific key functions.

To select the ANSI keyboard layout:

Press Alt Num Lock.

To save the ANSI keyboard layout:

1. After you select ANSI keyboard layout, press F3 to enter set-up.
2. Use the arrow keys to move to the Save field.
3. Press Enter to save the setting.
4. Press F3 to leave set-up.

Indicator Lights

The PC keyboard has three indicator lights, above the numeric keypad:

Num Lock	Turns on or off when you press the Num Lock key on the numeric keypad.
Caps Lock	Turns on or off when you press the Caps Lock key on the main keypad.
Scroll Lock	Turns on or off when you press the Scroll Lock function key (top row).

Audible Indicators

The PC 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 7).

Keyclick

You hear the keyclick sound each time you press a key that sends a code or causes the terminal to take some immediate action. If a key is autorepeating, the keyclick will repeat once for each character or key sequence sent. Keys do not click under the following conditions:

- You press Shift, Ctrl, or Alt. These keys never click except when Shift is leaving the shift-lock state.
- You select `Keyclick Off` in the Keyboard Set-Up screen.
- You press a key or key combination that does not have a function under the current operating conditions.
- The keyboard `Wait` indicator is on. The terminal is not accepting keystrokes because the host has reset keyboard action mode, or sent XOFF to the terminal and the keyboard input silo is full. You can manually clear the wait condition by selecting `Clear Comm` in the Set-Up Directory screen.

Bell

The bell tone is a beeping sound. You can use the bell as a margin bell, warning bell, or both.

Margin Bell

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

Warning Bell

This bell sounds for any of the following conditions:

- During the power-up self-test
- When the terminal receives a bell (BEL) character from the host system
- After a compose character error
- When SSU errors occur (The bell rings twice.)
- You press an incorrect key while in set-up.
- You press an incorrect key while copying and pasting text (VT mode).

Keyboard Indicator Line

The keyboard indicator line appears at the bottom of the screen, below the status line. When you use two sessions, there is only one keyboard indicator line for both sessions.

The keyboard indicator line displays text in the smaller, 132-column font and appears in the same video background as the main display.

Keyboard Indicator Line Fields

The keyboard indicator line has six fields that show you:

- Which session the keyboard is connected to (the active session)
- Whether or not the inactive session has been updated
- When the screen is on hold or in a wait state
- When the Scroll Lock, Alt, or Caps Lock keys are active

Table 6–1 describes each field.

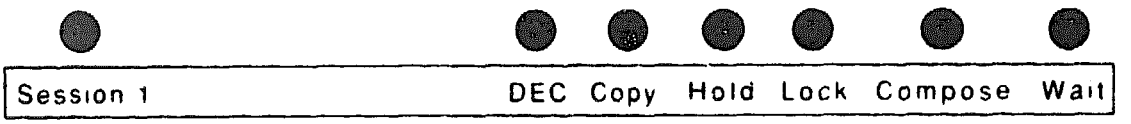


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Table 6–1 Keyboard Indicator Line Fields

Field	Value	Indicates
❶		**Active session**
	Session 1	Session 1 is active.
	Session 2	Session 2 is active.
		Inactive session activity*
	Session ■	Session 1 is active. Session 2's page memory is being updated since it was last active.
	Session ■	Session 2 is active. Session 1's page memory is being updated since it was last active.
❷	DEC	The PC keyboard is set to Digital's ANSI keyboard layout (selected by Alt Num Lock).
❸	Copy	A copy and paste operation is in progress.
❹	Hold	The screen is on hold.
❺	Lock	The [illegible] or [illegible] setting in the Keyboard Set-Up screen is in effect.
❻	Compose	A compose sequence is in progress.
❼	Wait	The keyboard is in a wait state and unable to accept typed keystrokes.

*This field appears in reverse video of the keyboard indicator line.

7

Using Set-Up

Overview

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

Set-Up Directory	General	Keyboard
Global	Communications	Tab
Display	Printer	Screen

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

Most set-up features are initially set to a factory-default setting that works with many systems. The terminal has the factory-default settings permanently stored. If you change settings, you can use the Set-Up Directory to reset the terminal to the factory-default settings.

You can also select and save settings to match your host system. The terminal 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 make all changes to set-up features from your keyboard. Also, your host system can change some settings, as described in the *VT420 Programmer Reference Manual*.

The set-up features available depend on whether you are operating the terminal in VT mode or PC TERM mode. You use the **terminal mode** feature on the General Set-Up screen to select VT mode or PC TERM mode. The set-up feature descriptions in this chapter indicate when a feature is available only in one mode.

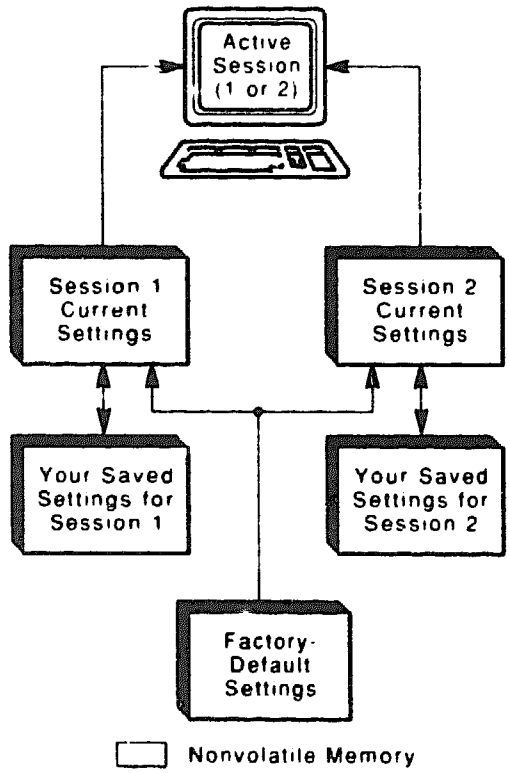
Independent Setups for Two Sessions

The terminal can run two sessions with the host system at the same time. Chapters 2 and 3 explain how to set up the terminal to run two sessions.

When you use two sessions, the terminal stores a separate group of features for each session. Only one session is active at a time. The terminal uses the settings for the active session.

If you forget which session is active, you can check the keyboard indicator line at the bottom of the screen. See the "Keyboard Indicator Line" section in Chapter 4 or 6.

NOTE
You cannot switch sessions in set-up. To switch sessions, you must leave set-up and press the F4 key (Alt Scroll Lock).



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Entering and Leaving Set-Up

To enter set-up -You press the F3 key (Alt SetUp). When you press F3 (Alt SetUp), information on the screen disappears. (This information reappears when you leave set-up.) Then the terminal displays the Set-Up Directory screen.

The Set-Up Directory lists all other set-up screens. You can select any other set-up screen from the Set-Up Directory.

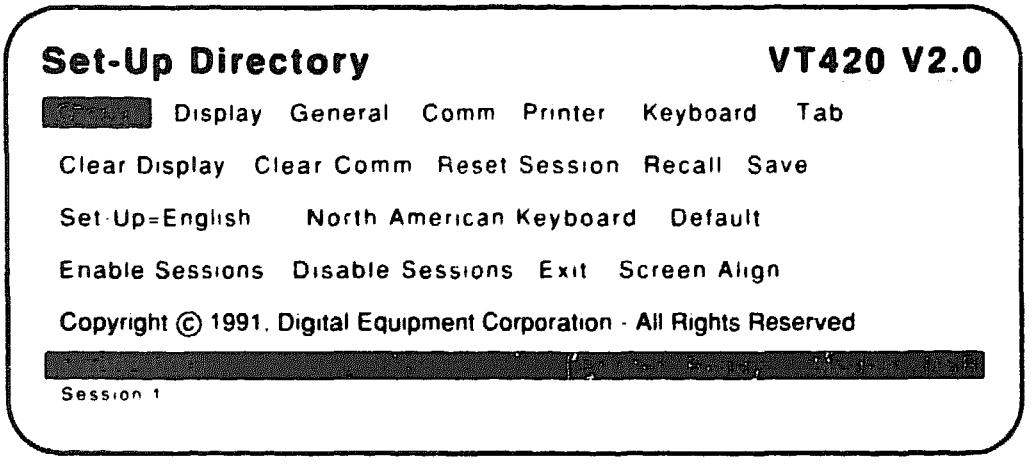
To leave set-up You press F3 (Alt SetUp) again. You can leave set-up from any set-up screen.

NOTE
Most settings that you change take effect when you leave set-up.

Set-Up Directory

When you enter set-up, the Set-Up Directory is always the first screen to appear. You can select any set-up screen from the Set-Up Directory. You can also perform such functions as saving and recalling feature settings.

Set-Up Directory—VT Mode and PC TERM Mode



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Status Line and Keyboard Indicator Line

In set-up, the terminal always displays the status line and the keyboard indicator line for the active session. The status line appears only if the terminal is in VT mode.

Both lines appear at the bottom of the screen. The keyboard indicator line is in the smaller, 132-column font and appears below the status line. The keyboard indicator line is in the same video background as the session at the bottom of the screen. For more information, see the "Keyboard Indicator Line" section in Chapter 4 or 6, and the "Status Line" section in Chapter 4.

Set-Up Cursor

Set-Up uses a field cursor that highlights a screen entry, or *field*, in reverse video. When you enter set-up, the field cursor highlights the Global field in the Set-Up Directory.

You use the arrow keys to move the field cursor to different features.

Action Fields

Most features in the Set-Up Directory are *action fields*. When you select an action field, the terminal immediately performs that action. You press the Enter key to select the action field highlighted by the cursor. Most set-up screens have some action fields.

Some actions do not affect the screen, so the terminal displays a message to let you know if the action was successful. This message appears in place of the keyboard indicator line at the bottom of the screen.

- A [illegible] message indicates the action is complete. The message disappears when you press another key.
- An error message indicates the terminal could not perform the action. See Table 12–2.

The terminal displays messages for the following action fields on the Set-Up Directory screen:

Clear Display	Default (recall factory settings)
Clear Comm	Enable Sessions
Reset Session	Disable Sessions
Recall (saved settings)	Exit
Save (settings)	Screen Align

Set-Up Language

The **set-up language** feature lets you display the set-up screens in one of three languages: English, French, or German. The language you select takes effect immediately in set-up. To change the setting:

1. Press F3 (Alt SetUp). The terminal displays the Set-Up Directory.
2. Use the arrow keys to move the cursor to `Set-Up=English`.
3. Press Enter to change the set-up language setting. Each time you press Enter, the language changes immediately.

Set-Up Directory Fields

Table 7–1 describes the Set-Up Directory features.

Table 7–1 Set-Up Directory Features

Feature	Description
Global Display General Comm Printer Keyboard Tab	These fields select the set-up screen. For example, **Global** selects the Global Set-Up screen.
Clear Display	Clears the screen when you leave set-up.
Clear Comm	Clears communications for the active session. Clear Comm does not affect the on-line/local state, but does the following: • Stops any print operation. • Stops any escape sequence, control sequence, control string, or character string processing (ESC, CSI, DCS, APC, OSC, PM, SOS). • Clears the keyboard buffers. • Clears the receive buffer. • Clears the transmit buffer.

Default settings are in **bold** type.

Table 7–1 (Cont.) Set-Up Directory Features

Feature	Description
	• Stops printer controller mode and returns to normal print mode. • Sends an XON signal to the host. • Sends an XON signal to the printer if the **printer to host** and **XOFF** features are enabled in the Printer Set-Up screen (Chapter 10). • Resets the XOFF received flags at the printer and host ports. • Does not clear the screen. • Clears a keyboard wait condition. • Clears the "printer port has seen DSR since power up" flag.
Reset Session	Resets many of the operating features for the active session to their initial state. The screen, communication, character set modes, and user-defined keys are not affected. See the *VT420 Programmer Reference Manual*
Recall	Sets all set-up features for the active session to their saved values. Clears the screen.

NOTE
If you are using a modem, `Recall` **disconnects communication with the host system.**

Save	Saves all current feature settings in all set-up screens for the active session.
Set-up language **Set-Up=English** Set-Up=Français Set-Up=Deutsche	Selects the language used to display set-up screens.

Default settings are in **bold** type.

Table 7–1 (Cont.) Set-Up Directory Features

Feature	Description
Keyboard dialect **North American Keyboard**	Lets you select one of many languages and dialects to match your keyboard. The default is **North American Keyboard**. **ANSI Keyboards** The other ANSI keyboards are Canadian (French), Danish, Dutch, Finnish, Flemish, French/Belgian, German, Italian, Norwegian, Portuguese, Spanish, Swedish, Swiss (French), and Swiss (German). You can also select "British" for the North American keyboard. **PC Keyboards** The other PC keyboards are the Belgian, British, Danish, Finnish, French, German, Italian, Norwegian, Portuguese, Spanish International, Spanish National, Swedish, Swiss (French), Swiss (German).
Default	Replaces all current settings in all set-up screens with the factory-default settings. This feature may affect both sessions, because the default session configuration is one session. The **default** feature also: • Clears the screen and returns the cursor to the upper-left corner. • Stops any print operation. • Stops any escape sequence, control sequence, control string, or character string processing (ESC, CSI, DCS, APC, OSC, PM, SOS).

NOTE
If you are using a modem, `Default` **disconnects communication with the host system.**

Default settings are in **bold** type.

Table 7–1 (Cont.) Set-Up Directory Features

Feature	Description
Enable Sessions	Lets you resume an interrupted session. A session can be interrupted by a power failure to the terminal or host. To use this feature, your system must have SSU software. Also, you must set the **terminal comm ports** feature in the Global Set-Up screen to `Sessions on Comm1`. When you select this feature, one of the following messages on the status line appear: • Done • Sessions restored • Sessions not selected See Chapter 9 for more information.

NOTE

Enable Sessions will initialize your sessions. To restore interrupted sessions without losing their context, use the F4 (Alt Scroll Lock) key instead.

Disable Sessions	Disconnects or logs out the current SSU sessions.
Exit	Lets you leave set-up. You can also press F3 (Alt SetUp) to leave set-up.
Screen Align	Lets you center or rotate the image on the screen. This feature clears the screen and creates a black border around the screen's perimeter. The text area of the screen appears in reverse video from the border. After you select this feature, follow the directions on the screen to align the image correctly.

Default settings are in **bold** type.

Selecting Set-Up Screens

There are two ways to select set-up screens. You can move from one screen to the next, in the same order listed on the Set-Up Directory. You can also select any screen directly from the Set-Up Directory.

Moving from Screen to Screen

Each set-up screen has a To Next Set-Up field. To move from one screen to the next:

1. Use the arrow keys to move the cursor to To Next Set-Up.
2. Press Enter.

Selecting a Screen from the Set-Up Directory

The Set-Up Directory lists all the set-up screens. To display a selected screen:

1. Use the arrow keys to move the cursor to the name of the desired screen.
2. Press Enter.

Changing and Recalling Settings

This section describes how to change, save, and recall set-up settings when you connect an ANSI keyboard or a PC keyboard.

How to Change Settings

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. 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.

Example

This example shows you how to change the **terminal mode**

- From VT400 Mode, 7-Bit Controls to VT400 Mode, 8-Bit Controls when you connect an ANSI keyboard.
- From VT400 Mode, 7-Bit Controls to PC-TERM Mode when you connect a PC keyboard.

1. Press F3 (Alt SetUp) to enter set-up. The Set-Up Directory appears. The field cursor is on the Global field.
2. Use the arrow keys to move to the General field.
3. Press Enter. The General Set-Up screen appears.
4. Use the arrow keys to move to the VT400 Mode, 7-Bit Controls field.
   - When the terminal is in VT mode and an ANSI keyboard is connected, press Enter until the VT400 Mode, 8-Bit Controls setting appears.
   - When the terminal is in PC TERM mode and a PC keyboard is connected, press Enter until the PC-TERM Mode setting appears.

When you change a feature setting, the terminal 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

If you make changes to current settings, you can save your changes with the save feature in the Set-Up Directory. This feature saves all current settings (in most set-up screens) for the active session. Even after you turn off the terminal, it retains the saved settings. The terminal automatically uses these settings each time you turn it on.

Example

This example shows how to save the PC-TERM Mode setting selected in the previous example.

1. After you select the PC-TERM Mode setting, use the arrow keys to move to the To Directory field.
2. Press Enter to return to the Set-Up Directory screen.
3. Use the arrow keys to move to the Save field.
4. Press Enter to save all current settings.
5. Press Alt SetUp to leave set-up.

If you change settings again, you can recall your saved settings. Read the next section.

How to Recall Saved Settings

For some applications, you may want to make temporary changes to current settings. When you have finished using the temporary settings, you can recall your saved settings with the **recall** feature in the Set-Up Directory.

To recall saved settings:

1. Press F3 (Alt SetUp). The terminal displays the Set-Up Directory.
2. Use the arrow keys to move the cursor to the `Recall` field.
3. Press Enter. The terminal replaces all existing settings with the previously saved settings. A `Done` message on the status line indicates the action is complete.
4. Press F3 (Alt SetUp) to leave set-up.

NOTE
If you are using a modem, `Recall` **disconnects communication with the host system.**

Global Set-Up Screen

This screen has features that affect **both** sessions when you use two sessions. Table 7–2 describes each feature on the Global Set-Up screen.

Two Sessions

You use two features on the Global Set-Up screen to set up the terminal for two sessions.

Terminal comm ports

Comm port selection

The feature settings must match the system cable connections on the rear of the terminal. After you connect the terminal's cables and select the set-up features for two sessions (Chapter 3), refer to Chapter 9 to use two sessions.

Global Set-Up Screen—VT Mode and PC TERM Mode

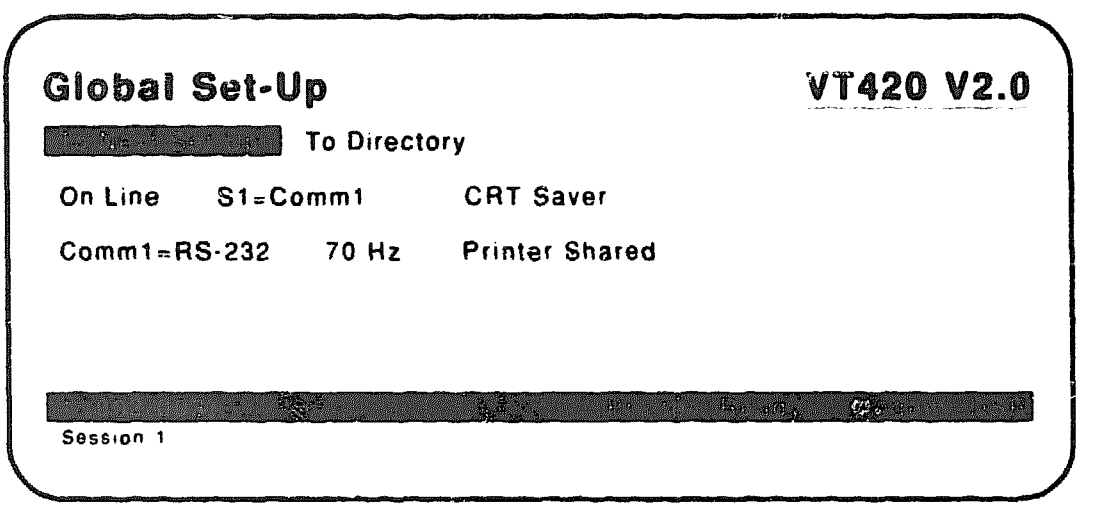

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Table 7–2 Global Set-Up Features

Feature and Settings	Description
On-line/local	Selects whether or not the terminal can communicate with a host system.
On Line	Lets the terminal communicate with a host.
Local	Puts the host on hold. The characters you type go directly to the screen.
Terminal comm ports	Assigns the communication connectors on the rear of the terminal to session 1 or 2.
S1=Comm1	Assigns only one session to the Comm1 connector. The Session indicator does not appear on the keyboard indicator line.
S1=Comm1,S2=Comm2	Assigns session 1 to the Comm1 connector, and session 2 to the Comm2 connector.
S1=Comm2,S2=Comm1	Assigns session 1 to the Comm2 connector, and session 2 to the Comm1 connector.
Sessions on Comm1	Assigns both SSU sessions to the Comm1 connector. Both sessions use the same communication cable.
CRT saver	Increases screen life.
CRT Saver	If the terminal is left on but inactive for 30 minutes, the screen goes blank. You can press any key to reactivate the screen. The host can also reactivate the screen by sending any character.
No CRT Saver	CRT saver feature is disabled.
Comm port selection	Selects the 25-pin, RS-232 or 6-pin, DEC-423 connector as the Comm1 port.
Comm1=RS-232	Selects the 25-pin RS-232 connector as the Comm1 port. The connector conforms to EIA RS-232 standards. You can use this setting for the connection to a host, terminal server, or modem.
Comm1=DEC-423	Selects the 6-pin DEC-423 port as the Comm1 port. The connector conforms to EIA RS-423 standards. You can use this setting for the connection to a host or terminal server.

Default settings are in **bold** type.

Table 7–2 (Cont.) Global Set-Up Features

Feature and Settings	Description
Screen refresh rate	Sets the video refresh rate.
70 Hz	This screen refresh rate is recommended in most environments, to minimize flicker.
60 Hz	Used in environments with electrical noise interference.
Printer assignment	Selects which session can use the printer port.
Printer Shared	Both sessions can use the printer port, but not at the same time.
Printer Session 1	Only session 1 can use the printer port.
Printer Session 2	Only session 2 can use the printer port.

Default settings are in **bold** type.

Display Set-Up Screen

This screen has features that affect the way data appears on the screen. Table 7–3 describes the Display Set-Up features.

Selecting a Page Size (VT Mode Only)

In VT mode, the terminal has *page memory* that can store up to 144 lines of text entered from the keyboard or host system. You can divide the 144 lines into a different number of pages, by using the **page arrangement** feature on the Display Set-Up screen.

There are many page sizes available (Table 7–3). The default page size is the same size as the default screen display area.

- If you use one session, all 144 lines of page memory are available. The default setting is 6 pages of 24 lines each.
- If you use two sessions, each session has 72 lines available. The default setting for each session is 3 pages of 24 lines each.

Pages create boundaries. Before you change the standard page size of 24 lines, you may want to check your application's documentation to make sure the application can recognize the new page boundaries. To display a new page, use the Ctrl Next keys (Ctrl Page Down) and Ctrl Prev keys (Ctrl Page Up).

Selecting the Number of Lines/Screen

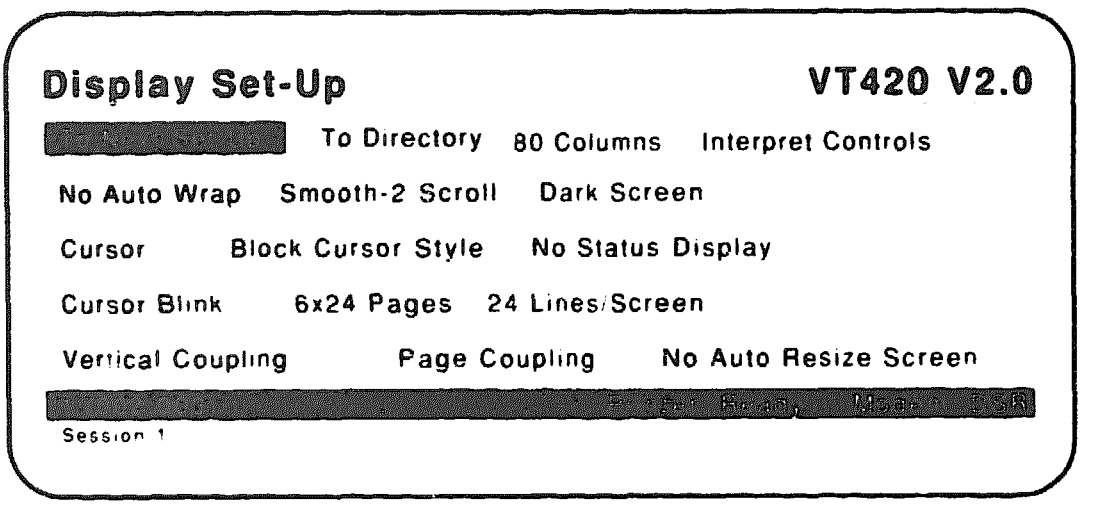
You use the **lines/screen** feature on the Display Set-Up screen to select the number of text lines you see on the screen. The ability for the terminal to display the selected number of lines depends on the following factors:

If ...	Then ...
The page size is less than the number of `Lines/Screen` displayed	The terminal displays only the number of lines on the page.
The page size is greater than the number of `Lines/Screen` displayed	The terminal may display additional lines on the screen. For example, when the **status display** feature is disabled, an additional line of data is put in place of the missing status line.
You use two windows	The number of lines displayed is limited by the screen area allocated to each session.

Coupling the Cursor to the Display (VT Mode Only)

The terminal lets you pan through the information stored on one page or move to another page. The Display Set-Up screen has two features that determine whether or not the display automatically pans to keep the cursor visible: **vertical coupling** and **page coupling**. See Chapter 9 for a description of panning.

Display Set-Up Screen—VT Mode



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Display Set-Up Screen—PC TERM Mode

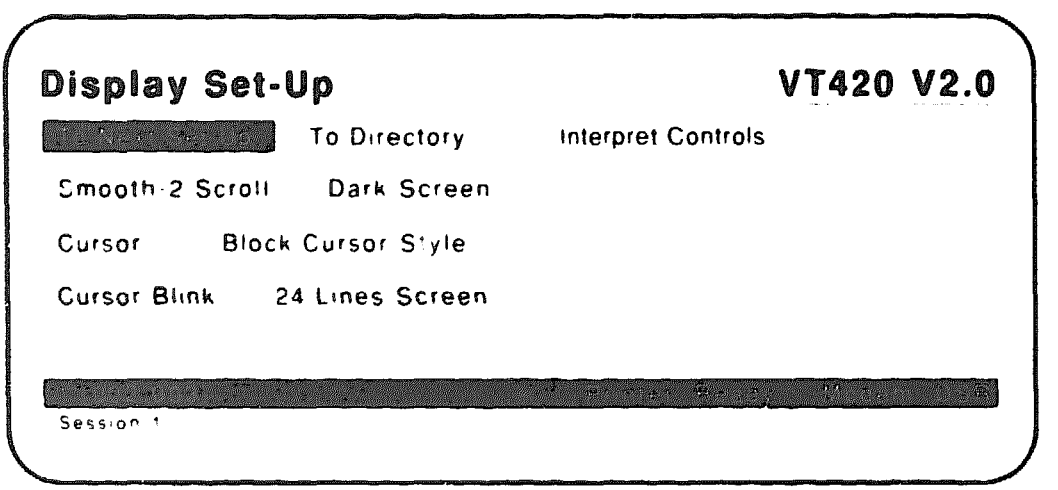

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Table 7–3 Display Set-Up Features

Feature and Settings	Description
80/132 column mode ●	Selects an 80- or 132-column page width for text. The screen display width is the same as the page width.
80 Columns	
132 Columns	
	If you change the current setting, page memory clears.
Control representation mode	Selects whether the terminal processes (interprets) or displays *control characters*. You can use this feature as an aid for debugging programs. See the *VT420 Programmer Reference Manual*.
Interpret Controls	
Display Controls	
Auto wrap ●	Selects whether or not text automatically wraps to the next line when you reach the right margin.
No Auto Wrap	When you reach the margin, the terminal displays each new character in the last column of the line. Each new character overwrites the previous character at that position.
Auto Wrap	When you reach the margin, the terminal displays new characters on the next line.
Smooth/jump scroll	When you select `Smooth-2 Scroll` or `Smooth-4 Scroll`, text on the screen scrolls smoothly. `Smooth-4 Scroll` is twice as fast as `Smooth-2 Scroll`. When you select `Jump Scroll`, text on the screen scrolls as fast as the terminal processes it.
Smooth-2 Scroll	
Smooth-4 Scroll	
Jump Scroll	
Light/dark screen	Selects light text on dark background, or dark text on light background. Takes effect in set-up.
Dark Screen	
Light Screen	
Cursor	Selects whether or not to display the cursor.
Cursor	
No Cursor	
Cursor style	Selects a block or underline cursor.
Block Cursor Style	
Underline Cursor Style	

● VT mode only.
Default settings are in **bold** type.

Table 7–3 (Cont.) Display Set-Up Features

Feature and Settings	Description
Status display ●	Selects how and when to use the status line.
No Status Display	This session does not display a status line outside of set-up.
Indicator Status Display	The terminal displays a status line for the current session.
Host Writable Status Display	The host can display information on the status line for this session.
NOTE **In set-up, the terminal always displays the status line for the current session.**	
Cursor blink	Selects whether or not the cursor blinks (flashes).
Cursor Blink	
Cursor Steady	
Page arrangement ●	Selects the number of lines/page. The effect of this feature depends on whether you are running one session or two sessions.
For Two Sessions	
3x24	Selects 3 pages, with 24 lines/page.
2x25	Selects 2 pages, with 25 lines/page.
2x36	Selects 2 pages, with 36 lines/page.
1x48	Selects 1 page of 48 lines.
1x72	Selects 1 page of 72 lines.
For One Session	
6x24	Selects 6 pages, with 24 lines/page.
5x25	Selects 5 pages, with 25 lines/page.
4x36	Selects 4 pages, with 36 lines/page.
3x48	Selects 3 pages, with 48 lines/page.
2x72	Selects 2 pages, with 72 lines/page.
1x144	Selects 1 page of 144 lines.

● VT mode only.
Default settings are in **bold** type.

Table 7–3 (Cont.) Display Set-Up Features

Feature and Settings	Description
Number of lines/screen*	Selects the number of lines displayed on the screen at one time.
24 Lines/Screen	Selects the 24 lines/screen font.
36 Lines/Screen	Selects the 36 lines/screen font.
48 Lines/Screen	Selects the 48 lines/screen font.
Vertical coupling ● **Vertical Coupling** No Vertical Coupling	Selects whether or not to automatically pan when the cursor moves beyond the top or bottom border of a window. Automatic panning keeps the cursor visible.
Page coupling ● **Page Coupling**	Selects whether or not to automatically display a new page when the cursor moves to a new page in page memory. For more information, see "Windows" in Chapter 9.
No Page Coupling	If the cursor moves to a new page, you cannot see the page or the cursor.

NOTE
The page coupling feature is only useful when the page arrangement feature is set to two or more pages.

Auto resize screen* ● **No Auto Resize Screen**	Selects whether or not to automatically change the number of lines/screen when the page arrangement changes.
Auto Resize Screen	Resizes the screen when the page size changes.

Page size	Screen size
24 lines	24 lines
25	24
36	36
48	48
72	48
144	48

*The **number of lines/screen** is a user preference feature. If you select the **user features locked** feature in the General Set-Up screen and enable **auto resize screen** in the Display Set-Up screen, then the number of lines/screen changes when the page size changes. For more information, see "Selecting the Number of Lines/Screen " at the beginning of this section.

● VT mode only.
Default settings are in **bold** type.

General Set-Up Screen

This screen lets you set general features, such as the terminal mode and character set used to display characters on the screen.

Table 7–5 describes the General Set-Up features.

Selecting an Operating Mode—PC or VT Series

The VT420 can support host software applications used with PCs or other VT series text terminals: VT300 series, VT200 series, VT100 series, and VT52. You can set the terminal to work as a terminal supporting PC applications or as a particular VT model. To select the operating mode, you use two features in the General Set-Up screen, **terminal mode** and **terminal ID**.

To operate as a VT series terminal:

1. Set the **terminal mode** feature to the desired VT mode. The VT420 is compatible with the VT220 and VT320 text terminals, so you should use the VT400 mode setting to support the software applications for these terminals. The **terminal mode** feature also has settings for VT100 and VT52 terminals.
2. Set the **terminal ID** feature to match the desired VT model. This setting lets the VT420 identify itself to the host as a particular terminal model.

To operate as a terminal supporting PC applications:

You must use a PC keyboard. Set the **terminal mode** feature to PC-TERM Mode.

Character Sets

The General Set-Up screen lets you select the type of character set suited for your computing environment, multinational or national. Both types include the characters for many different languages. However, the multinational mode supports 8-bit characters, while the national mode restricts you to 7-bit characters.

You use the **character set mode** feature to select multinational or national mode. Chapter 11 shows all the built-in character sets. By default, the terminal uses the 8-bit DEC Multinational character set.

Multinational Mode—8-Bit Character Sets

This mode supports two 8-bit character sets:

- DEC Multinational character set
- ISO Latin Alphabet No. 1 character set (International Organization for Standardization)

Both character sets have two parts—the U.S. ASCII character set and a supplemental set.

- The U.S. ASCII character set (United States American Standard Code for Information Interchange) contains the letters and numbers for English-speaking countries.
- The supplemental character set contains additional symbols and most characters used in the major European languages. There are two supplemental character sets to select from—the DEC Supplemental character set and ISO Latin-1 supplemental character set.

If you select multinational mode when you connect an ANSI keyboard, you use the **UPSS** (user-preferred supplemental set) feature to select the supplemental character set you prefer, UPSS DEC Supplemental or ISO Latin-1 supplemental. You can enter many of the characters in a supplemental set by using compose sequences (Chapter 8).

By default, the VT420 uses the DEC Multinational character set.

PC Character Sets (8-Bit)

When you connect a PC keyboard, you can select one of the following PC character sets:

PC International
PC Multilingual
PC Danish/Norwegian
PC Portuguese
PC Spanish

Table 7–4 lists which character sets you can use with each PC keyboard.

National Mode—7-Bit Character Sets

This mode supports 12 national replacement character sets (NRCs) built into the terminal. Each 7-bit NRC set is for a particular European language or dialect. You select an NRC set with the **keyboard dialect** feature in the Keyboard Set-Up screen. You can only use one NRC set at a time.

National mode is for 7-bit computing environments. You cannot use the 8-bit multinational character sets in national mode.

NOTE
You cannot select national mode when the keyboard dialect feature is set to North American.

Table 7–4 PC Keyboards and Character Sets

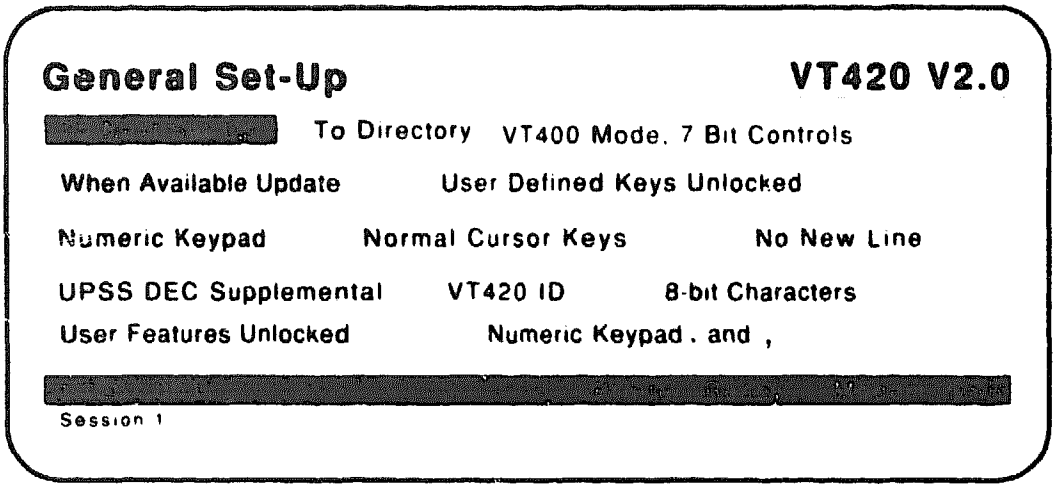
	Character Sets							
	D/N	**P**	**S**	**M**	**I**	**Multi.**	**Natl.**	**ISO**
PC Keyboards								
Belgian	–	–	–	yes	yes	yes	yes	yes
British	–	–	–	yes	yes	yes	yes	yes
Danish	yes	–	–	yes	yes	yes	yes	yes
Finnish	–	–	–	yes	yes	yes	yes	yes
French	–	–	–	yes	yes	yes	yes	yes
German	–	–	–	yes	yes	yes	yes	yes
Italian	–	–	–	yes	yes	yes	yes	yes
North Amer.	–	–	–	yes	yes	yes	–	yes
Norwegian	yes	–	–	yes	yes	yes	yes	yes
Portuguese	–	yes	–	yes	yes	yes	yes	yes
Spanish (national)	–	–	yes	–	yes	yes	yes	yes
Spanish (international)	–	–	yes	yes	yes	yes	yes	yes
Swedish	–	–	–	yes	yes	yes	yes	yes
Swiss (Fr.)	–	–	–	yes	yes	yes	yes	yes
Swiss (Gr.)	–	–	–	yes	yes	yes	yes	yes

Character Set Key

D/N	= PC Danish/Norwegian		
P	= PC Portuguese	Multi.	= Multinational
S	= PC Spanish	Natl.	= National
M	= PC Multilingual	ISO	= ISO 8859/1
I	= PC International		

NOTE
Chapter 11 shows the terminal's character sets.

General Set-Up Screen—VT Mode, ANSI Keyboards



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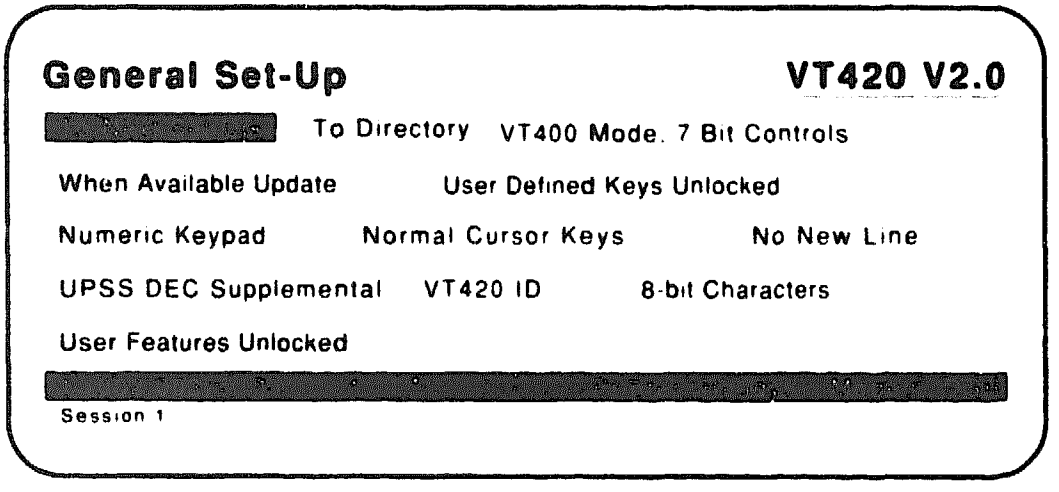
General Set-Up Screen—VT Mode, PC Keyboard



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General Set-Up Screen—PC TERM Mode

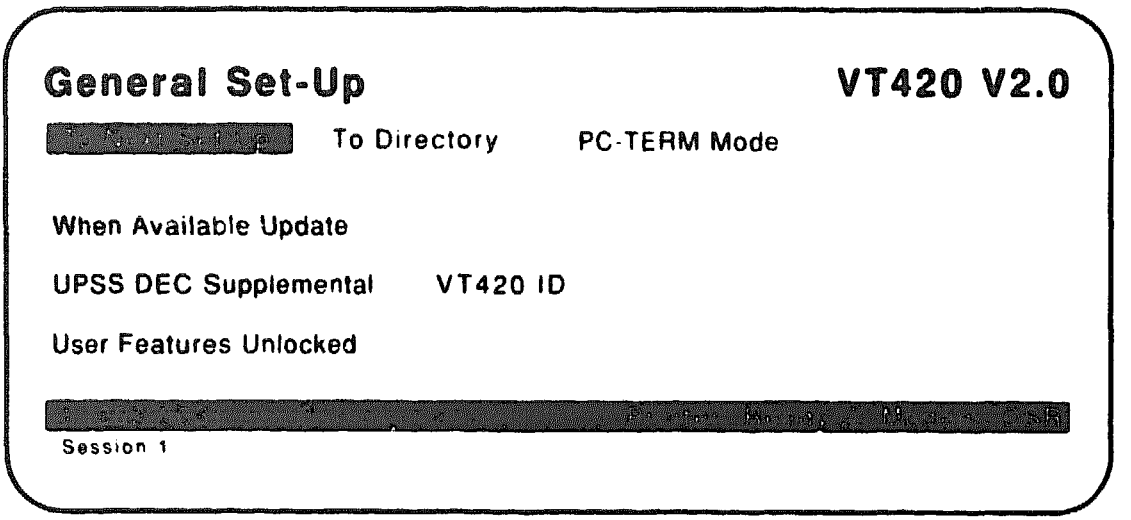

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Table 7–5 General Set-Up Features

Feature and Settings	Description
Terminal mode	Selects the terminal's operating mode. The terminal can operate as a VT series text terminal, or it can support PC software applications on the host (if you connect a PC keyboard).
In VT Mode	
VT400 Mode, 7-Bit Controls	Lets the terminal use all VT420 features. The terminal normally uses 8-bit graphic characters and 7-bit control characters. Select this mode for VT200 and VT300 applications. **Digital recommends this mode for most applications.**
VT400 Mode, 8-Bit Controls	Lets the terminal use all VT420 features. The terminal uses 8-bit control characters. See Chapter 11 for details. Select this mode for all VT200 and VT300 applications that use 8-bit control characters. This mode is the most efficient, but not yet supported by all applications.
VT100 Mode	Use this mode for applications that require VT100 compatibility.
VT52 Mode (With ANSI Keyboards)	Lets the terminal support VT52 applications.
In PC TERM Mode	
PC TERM Mode	Lets the terminal support PC applications. This setting is only available if you connect a PC keyboard to the terminal.
Update method	Selects how and when to update page memory for the inactive session.
When Available Update	Updates page memory for the other session whenever the terminal is not busy with the active session for one second.

● VT mode only. ● ANSI keyboards only.
Default settings are in **bold** type.

Table 7–5 (Cont.) General Set-Up Features

Feature and Settings	Description
Shared Update	Updates page memory for a session whenever the terminal is not busy with the other session. Neither session has priority.
Never Update	Prevents updates to page memory for the inactive session.
User defined keys lock ●	Selects whether or not the host system can change user-defined key (UDK) definitions.
User Defined Keys Unlocked	
User Defined Keys Locked	
Keypad mode ●	Selects the type of characters sent by the numeric keypad.
Numeric Keypad	The keypad sends the numbers shown on the keycaps (using ASCII code).†
Application Keypad	The keypad sends control sequences (used with some applications).†
Cursor key mode ●	Selects whether the arrow keys send ANSI cursor control sequences or application-specific control functions.*
Normal Cursor Keys	
Application Cursor Keys	
New line ●	Selects how the Return key works.
No New Line	Pressing Return sends a carriage return character. The terminal does not automatically move the cursor to a new line.
New Line	Pressing Return sends a carriage return and a line feed. Used for some non-Digital software applications.
User-preferred supplemental set (UPSS)	When the **character set mode** feature is set to 8-bit Characters, this feature selects the 8-bit supplemental character set.

*Chapter 11 shows the terminal's character sets.

†The setting is not saved in nonvolatile memory.

● VT mode only. ● ANSI keyboards only.
Default settings are in **bold** type.

Table 7–5 (Cont.) General Set-Up Features

Feature and Settings	Description
In VT Mode	
UPSS DEC Supplemental	Selects the DEC Supplemental character set, which is part of the 8-bit DEC Multinational character set. See Chapter 11.
UPSS ISO Latin-1 Supplemental	Selects the ISO Latin-1 supplemental character set, which is part of the ISO Latin-1 multinational character set.
In PC TERM Mode	
UPSS DEC Supplemental UPSS ISO Latin-1 Supplemental	Selects one of these two character sets described for VT mode.
PC International PC Multilingual PC Danish/Norwegian PC Portuguese PC Spanish	Selects one of these PC character sets. To select a PC character set, you must have a PC keyboard.
Terminal ID ● **VT420 ID** VT100 ID VT101 ID VT102 ID VT220 ID VT320 ID	Selects the device attributes response (terminal ID). Some applications require specific responses. This response lets the host system know specific operating attributes of the terminal.

NOTE

If your operating system does not recognize the `VT420 ID` **setting, select the** `VT320 ID` **setting (Chapter 3).**

Character set mode ●	Selects whether to use an 8-bit multinational character set or a 7-bit national replacement character (NRC) set.

● VT mode only. ● ANSI keyboards only.
Default settings are in **bold** type.

Table 7–5 (Cont.) General Set-Up Features

Feature and Settings	Description
8-bit Characters	Lets you use one of the 8-bit multinational sets—DEC Multinational or ISO Latin-1. Both include the 7-bit U.S. ASCII set. You can select a specific set with the **UPSS** feature listed in this table.*
	With a PC Keyboard: Lets you use the PC character sets. You can select a specific PC character set with the **UPSS** feature in this set-up screen.*
7-bit NRCS Characters	Lets you use one of the 7-bit NRC sets. You can select the specific NRC set with the **keyboard dialect** feature in the Set-Up Directory screen.*

NOTE
If you set the keyboard dialect feature to North American Keyboard**, the terminal automatically sets the character set mode to** 8-bit Characters.

User features locked **User Features Unlocked** User Features Locked	Selects whether or not the host system can change the settings of the user preference features: **auto repeat, smooth/jump scroll, light/dark screen, tab, keyboard lock**, and **number of lines/screen**. User preference features are intended to be controlled by the user or terminal management software, rather than by application software.
Numeric Keypad . and , ●	Selects the function of the [.] (period) and [,] (comma) keys on the numeric keypad.
Numeric Keypad . and ,	[.] sends a period. [,] sends a comma.
Numeric Keypad . and , Exchanged	[.] sends a comma. [,] sends a period.

*Chapter 11 shows the terminal's character sets.

● VT mode only. ● ANSI keyboards only.
Default settings are in **bold** type.

Communications Set-Up Screen

This screen lets you set up the terminal to communicate with your host system. The default settings are those commonly used on most systems. Make sure the settings you use match the communication settings of your system.

This screen also includes features for use with modems. Chapter 10 has more information on modems.

NOTE
In PC TERM mode, the modem must be compatible with the XON /XOFF points set by the terminal. See "XON/XOFF Flow Control" in Appendix C.

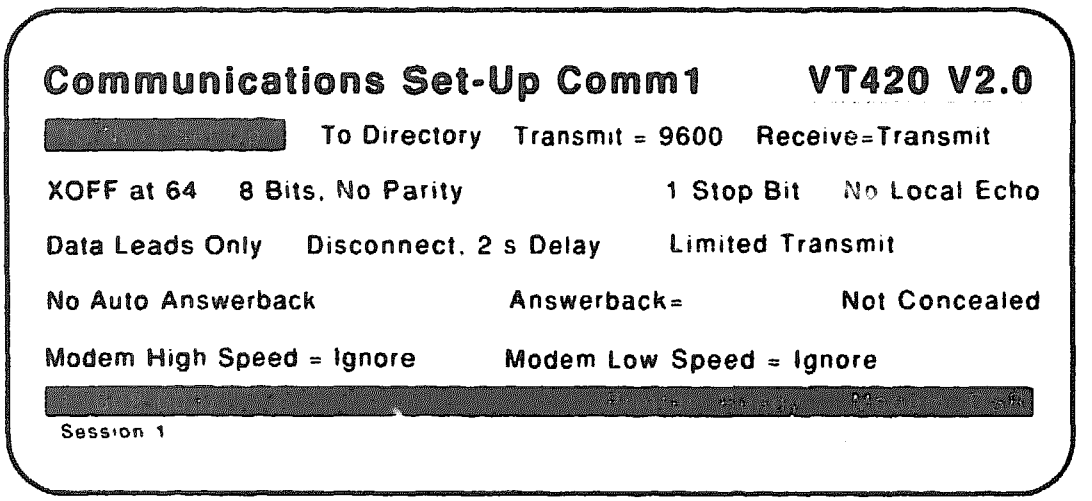
If you use the printer connector to connect a second host system to the terminal, the Communications Set-Up screen indicates which port is in use for the current session. The term Comm or Print appears on the top line of the set-up screen.

Table 7–6 describes the Communications Set-Up features. For more information, see Appendix C and the *VT420 Programmer Reference Manual.*

Note on Answerback Messages

You can enter an answerback message in the Communications Set-Up screen. The terminal saves only one answerback message in memory. If you use two sessions, the terminal saves the answerback message for the last session in which you save set-up settings. This field cannot be changed by host control functions.

Communications Set-Up Screen—VT Mode



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Communications Set-Up Screen—PC TERM Mode

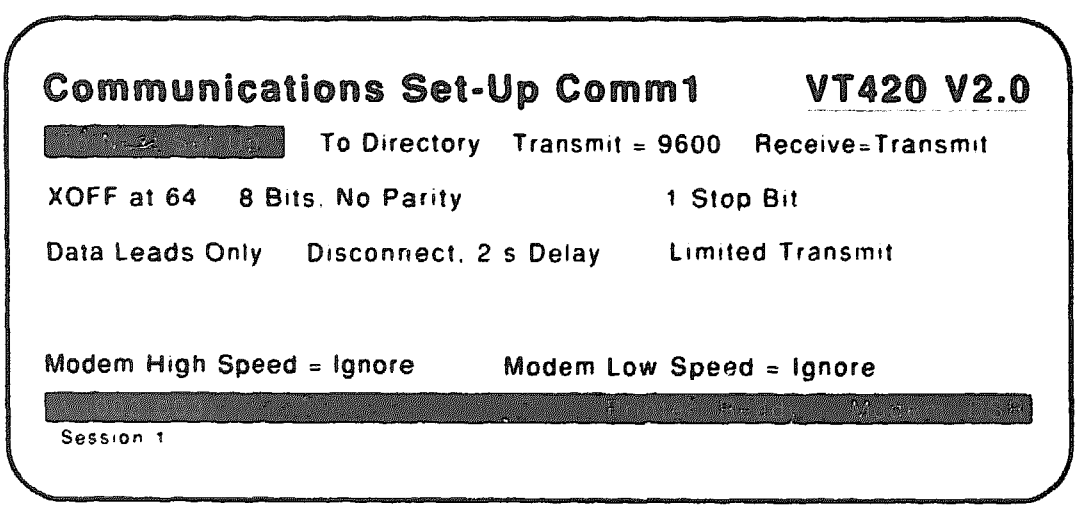

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Table 7–6 Communications Set-Up Features

Feature and Settings	Description
Transmit speed **Transmit=9600**	Selects the baud rate the terminal uses to send data to the host system. The transmit baud rates range from 300 to 38400 bits/second. The default setting of Transmit=9600 works with most systems.
NOTE **The terminal's transmit speed must match the host's receive speed. However, the terminal can transmit at one speed and receive at another.**	
Receive speed **Receive=Transmit**	Selects the baud rate the terminal uses to receive data from the host system. Receive baud rates range from 300 to 38,400 bits/second. The default setting is Receive=Transmit.
NOTE **The terminal's receive speed must match the host's transmit speed. However, the terminal can receive at one speed and transmit at another.**	
XOFF **XOFF at 64**	Selects the number of characters the terminal stores in its input buffer before sending the XOFF flow control signal. If you use one session, you can select an XOFF point of 64 or 128. If you use two SSU sessions, you can select an XOFF point of 64, 256, or 1792 (Appendix C).
No XOFF	Will not send an XOFF signal.
Data bits/parity **8 Bits, No Parity**	Specifies the character format for communicating with the host system, including: • Bits used to send each character (7 or 8) • Parity setting: even, odd, or none • Whether or not to check parity on received characters at the host port If you select a 7-bit environment for the host port, you cannot use 8-bit character sets.
Stop bits **1 Stop Bit** 2 Stop Bits	Selects the number of stop bits used by the host port.

● VT mode only.
Default settings are in **bold** type.

Table 7–6 (Cont.) Communications Set-Up Features

Feature and Settings	Description
Local echo ●	Selects whether or not to send the characters you type directly to page memory.
No Local Echo	Sends keyboard data to the host system. The host decides whether or not to send the data back to the terminal.
Local Echo	Sends keyboard data both to the host and back to the terminal.
Modem control	Configures the terminal to work with various modem features. See Chapter 10.

NOTE

You must select the 25-pin, RS-232 connector on the terminal to use all the modem control features. When you attach a modem to the 25-pin connector, you must also enable the [illegible] setting in the Global Set-Up screen.

If you select the 6-pin, DEC-423 connector on the terminal, you cannot use the modem control features.

Data Leads Only	Modem control pins on the DEC-423 or RS-232 connector are not used.
Modem Control	Uses DSR (pin 6) and DTR (pin 1) of the DEC-423 connector.
Disconnect delay	Selects the delay time allowed for the terminal to disconnect from a communication line. The terminal disconnects when it no longer sees the receive line signal detection (RLSD) signal. The modem control must be enabled.
Disconnect, 2 s Delay	Selects a 2-second delay (used in most countries except the United Kingdom).
Disconnect, 60 ms Delay	Selects a 60-millisecond delay (used in the United Kingdom).
No Disconnect	Does not disconnect from the line when the terminal loses RLSD.

● VT mode only.
Default settings are in **bold** type.

Table 7–6 (Cont.) Communications Set-Up Features

Feature and Settings	Description
Transmit rate limit **Limited Transmit** Unlimited Transmit	Selects whether or not to limit the terminal to sending 150 to 180 characters/second. A limited rate reduces the interrupt burden on the host system.
Auto answerback ● **No Auto Answerback** Auto Answerback	Selects whether or not to send the answerback message to the host system when establishing a connection.
Answerback = ●	Lets you type an answerback message. You can use up to 30 characters. This prompt appears on the status line, indicating the start of the message. If you press the F3 key (Alt SetUp) while entering an answerback message, the terminal deletes the new message and saves the old message.
Conceal answerback ● **Not Concealed** Concealed	Selects whether or not the terminal will display the answerback message.

NOTE
If the conceal answerback feature is set to Concealed, you must enter a new answerback message before you can set it back to Not Concealed.

Modem high speed **Modem High Speed = Ignore**	Selects a baud rate when the modem's speed indicator line is on. The **modem control** feature must be set to Modem Control.* The terminal uses the baud rates selected by the **transmit speed** and **receive speed** features. The baud rates range is from 300 to 38,400 bits/second.
Modem low speed **Modem Low Speed = Ignore**	Selects a baud rate when the modem's speed indicator line is off. The **modem control** feature must be set to Modem Control.* The terminal uses the baud rates selected by the **transmit speed** and **receive speed** features. The baud rates range is from 300 to 38,400 bits/second.

*See the *VT420 Programmer Reference Manual*

● VT mode only.
Default settings are in **bold** type.

Keyboard Set-Up Screen

This screen lets you control the operation of certain keyboard features. For the ANSI keyboards, you can control the function of various keys as well as the keyboard's keyclick, warning bell, and margin bell. For the PC keyboard, you can control the keyboard's keyclick, warning bell, and margin bell only.

For the ANSI keyboards, the **typewriter/data processing** feature lets you select the standard typewriter layout or data processing layout on the keyboard. This setting affects keys that have characters on the right half on their keycaps. If you select Typewriter Keys, you can type all the legends on the left half of the keycaps. If you select Data Processing Keys, you can type all the legends on the right half of the keycaps.

Table 7–7 describes the Keyboard Set-Up features, including settings for top-row function keys on the ANSI keyboards.

If you have a PC keyboard, the Keyboard Set-Up screen displays a different set of features for top-row function keys, based on whether you are using VT mode (Table 7–8) or PC TERM mode (Table 7–9).

Keyboard Set-Up Screen—VT Mode, ANSI Keyboards

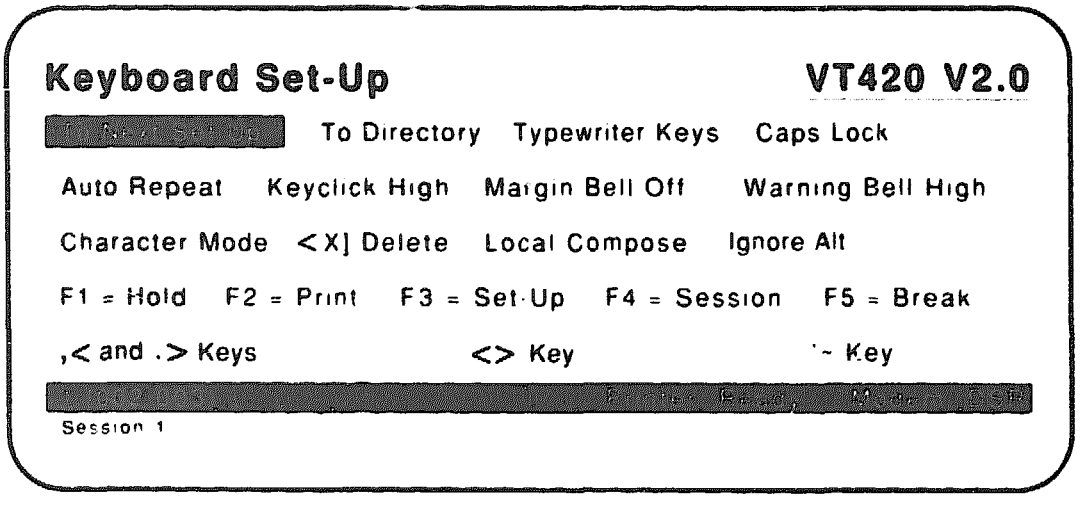

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Table 7–7 Keyboard Set-Up Features

Feature and Settings	Description
Typewriter/data processing ●	Selects which characters are sent by data processing keys.
Typewriter Keys	Selects characters on the left half of the keycaps.
Data Processing Keys	Selects characters on the right half of the keycaps. If **character set mode** is set to 7-bit Characters on the General Set-Up screen, the terminal uses the U.S. ASCII character set.
Caps/shift lock ●	Selects the function of the lock key in the down position.
Caps Lock	When the lock key is down, the alphabetic keys send their uppercase character. Other keys still send the bottom character on their keycap.
Shift Lock	When the lock key is down, all keys send the shifted or 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. The following keys never repeat: **ANSI Keyboards** F1, F2, F3, F4, F5, Alt Function, Return, Compose Character, Ctrl, Shift, and lock. **PC Keyboards** Alt, Caps Lock, Ctrl, Enter, Num Lock, Pause, Print Screen, Scroll Lock, and Shift.
Keyclick **Keyclick High** Keyclick Low Keyclick Off	Selects whether or not keys click when you press them. You can select a high or low volume.

● ANSI keyboards only. ● VT mode only.
Default settings are in **bold** type.

Table 7–7 (Cont.) Keyboard Set-Up Features

Feature and Settings	Description
Margin bell **Margin Bell Off** Margin Bell High Margin Bell Low	Selects whether or not the terminal's bell sounds when the text cursor approaches the right margin. You can select a high or low volume.
Warning bell **Warning Bell High** Warning Bell Low Warning Bell Off	Selects whether or not the terminal's bell rings when (1) operating errors occur, or (2) the terminal receives Ctrl G. You can select a high or low volume.
Character mode ●	Selects whether the keys send their normal characters or report their key position.

NOTE
In PC TERM mode, the PC keyboard sends a scan code to the host to indicate what key was pressed. Therefore, the character mode feature does not apply in PC TERM mode.

Character Mode	Selects ANSI/ISO character encoding for the keyboard.
Position Mode	The keyboard sends control strings that indicate the position of the key pressed.
⌫ key ●	Selects the function of the ⌫ key.
⌫ Delete	⌫ sends the DEL (delete) character.
⌫ Backspace	⌫ sends the BS (backspace) character.
Compose key ●	Selects the function of the Compose Character keys (or Group Shift key on the German keyboard).
Local Compose	Compose Character starts a compose sequence (Chapter 8).
Report Compose	Compose Character sends a control string to the host to report each down or up key transition.
Ignore Compose	Compose Character keys are ignored.
Alt Function key ●	Selects the function of the Alt Function keys.
Ignore Alt	Alt Function keys are ignored.

● ANSI keyboards only. ● VT mode only.
Default settings are in **bold** type.

Table 7–7 (Cont.) Keyboard Set-Up Features

Feature and Settings	Description
Report Alt	Alt Function sends a control string to the host to report each up or down key transition.
Top-Row Function Keys (ANSI Keyboards)	
F1 =	Selects the function of the F1 key.
Hold	F1 stops the scrolling of text for the active session (Chapter 4).
Fkey	F1 (unshifted) sends a function key sequence to the host.
Ignore	F1 is ignored. This setting does not disable F1 for a copy and paste operation.
F2 =	Selects the function of the F2 key.
Print	F2 performs the local print functions described in Chapter 10.
Fkey	F2 (unshifted) sends a function key sequence to the host.
Ignore	F2 is ignored.
F3 =	Selects the function of the F3 key.
Set-Up	F3 is used to enter or leave set-up.
Fkey	F3 (unshifted) sends a function key sequence to the host. To enter set-up after you disable this key: log out, turn off the terminal, wait 10 seconds, then turn on the terminal and make F3 the first key you press.
Ignore	F3 is ignored.
F4 =	Selects the function of the F4 key.
Session	Pressing F4 switches the active session when you use two sessions (Chapter 9).
Fkey	F4 (unshifted) sends a function key sequence to the host.

● ANSI keyboards only. ● VT mode only.
Default settings are in **bold** type.

Table 7–7 (Cont.) Keyboard Set-Up Features

Feature and Settings	Description
Top-Row Function Keys (ANSI Keyboards)	
Ignore	F4 is ignored.
F5 =	Selects the function of the F5 key.
Break	F5 (unshifted) sends a break signal.
No Break	• F5 (unshifted) is ignored. • F5 (shifted) performs a disconnect.
Fkey	F5 (unshifted) sends a function key sequence to the host.
Ignore	F5 is ignored.
,, and .. keys*	Selects the function of the shifted comma and period keys.
, < and .> Keys	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.
, < and .> Keys Send ,, and ..	The shifted comma key sends a comma. The shifted period key sends a period.
<> key*	Selects the function of the <> angle bracket key.
<> Key	<> sends a < when unshifted and a > when shifted.
<> Key Sends `~	<> sends a ` when unshifted and a ~ when shifted.
`~ key*	Selects the function of the `~ key.
`~ Key	`~ sends a ` when unshifted and a ~ when shifted.
`~ Key Sends ESC	`~ sends an escape (ESC) character.

*This feature applies only to the North American/United Kingdom keyboard.

● ANSI keyboards only. ● VT mode only.
Default settings are in **bold** type.

Top-Row Function and Backarrow Keys (VT Mode, PC Keyboard)

Table 7–8 describes the settings for the ← Backspace key and top-row function keys in VT mode.

Keyboard Set-Up Screen—VT Mode, PC Keyboard

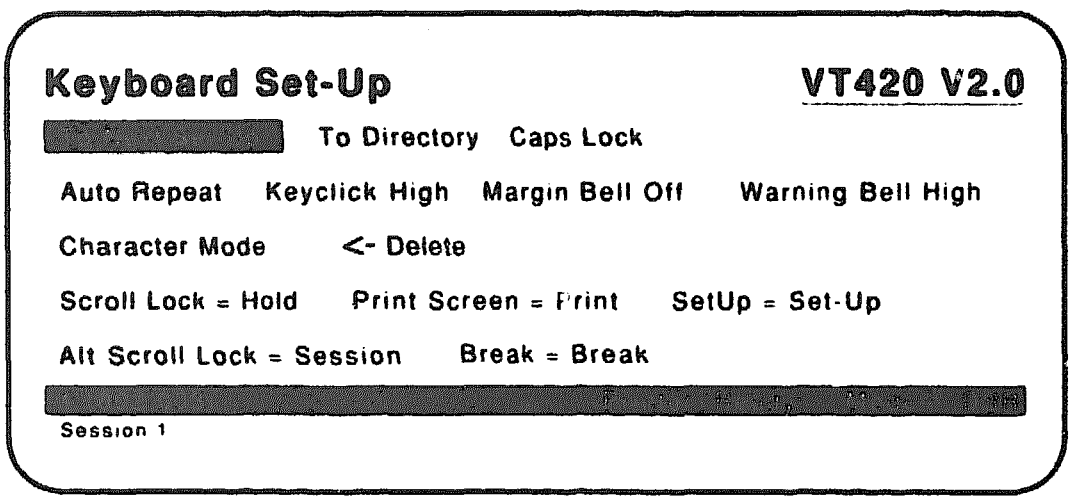

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Table 7–8 Top-Row Function and Backarrow Keys (VT Mode, PC Keyboard)

Feature and Settings	Description
← Backspace key	Selects the function of the ← Backspace key.
← Delete	← Backspace sends the delete character.
← Backspace	← Backspace sends the backspace character.
Scroll Lock =	Selects the function of the Scroll Lock key.
Hold	Scroll Lock stops the scrolling of text for the active session (Chapter 4).

Default settings are in **bold** type.

Table 7–8 (Cont.) Top-Row Function and Backarrow Keys (VT Mode, PC Keyboard)

Feature and Settings	Description
Fkey	Scroll Lock (unshifted) sends a function key sequence to the host.
Ignore	Scroll Lock is ignored. This setting does not disable Scroll Lock for a copy and paste operation.
Print Screen =	Selects the function of the Print Screen key.
Print	Print Screen performs the local print functions described in Chapter 10.
Fkey	Print Screen (unshifted) sends a function key sequence to the host.
Ignore	Print Screen is ignored.
SetUp =	Selects the function of the Alt SetUp key sequence.
Set-Up	Alt SetUp is used to enter or leave set-up.
Fkey	Alt SetUp (unshifted) sends a function key sequence to the host. To enter set-up after you disable this key: log out, turn off the terminal, wait 10 seconds, then turn on the terminal and make Alt SetUp the first key you press.
Ignore	Alt SetUp is ignored.
Alt Scroll Lock =	Selects the function of the Alt Scroll Lock key sequence.
Session	Pressing Alt Scroll Lock switches the active session when you use two sessions (Chapter 9).
Fkey	Alt Scroll Lock (unshifted) sends a function key sequence to the host.
Ignore	Alt Scroll Lock is ignored.
Break =	Selects the function of the Alt Break key sequence.

Default settings are in **bold** type.

Table 7–8 (Cont.) Top-Row Function and Backarrow Keys (VT Mode, PC Keyboard)

Feature and Settings	Description
Break	Alt Break (unshifted) sends a break signal.
No Break	• Alt Break (unshifted) is ignored. • Alt Break (shifted) performs a disconnect.
Fkey	Alt Break (unshifted) sends a function key sequence to the host.
Ignore	Alt Break is ignored.

Default settings are in **bold** type.

Top-Row Function Keys (PC TERM Mode, PC Keyboard)

Table 7–9 describes the settings for top-row function keys in PC TERM mode.

Keyboard Set-Up Screen—PC TERM Mode, PC Keyboard

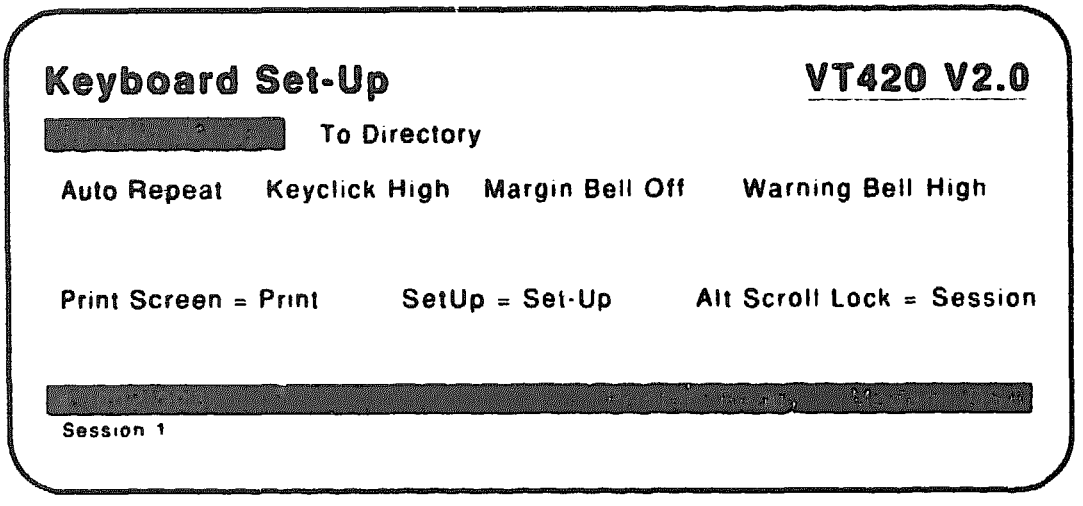

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Table 7–9 Top-Row Function Keys (PC TERM Mode, PC Keyboard)

Feature and Settings	Description
Print Screen =	Selects the function that the software on the host assigns to the Shift Print Screen key sequence.
Print	Shift Print Screen performs a local hard copy. (Does not send a scan code to the host.)
Fkey	Shift Print Screen sends a scan code to the host. When the host's software recognizes the scan code, the host directs the terminal to perform a function key sequence.
SetUp =	Selects the function that the software on the host assigns to the Alt SetUp key sequence.

Default settings are in **bold** type.

Table 7–9 (Cont.) Top-Row Function Keys (PC TERM Mode, PC Keyboard)

Feature and Settings	Description
Set-Up	Alt SetUp directs the terminal to enter or leave set-up. (Does not send a scan code to the host.)
Fkey	SetUp (unshifted) sends a scan code to the host. When the host's software recognizes the scan code, the host directs the terminal to perform a function key sequence. To enter set-up after you disable this key: log out, turn off the terminal, wait 10 seconds, then turn on the terminal and make Alt SetUp the first keys you press.
Alt Scroll Lock =	Selects the function that the software on the host assigns to the Alt Scroll Lock keys.
NOTE **While the Alt Scroll Lock keys enable you to change sessions in PC TERM mode, they may conflict with your software application.**	
Session	Alt Scroll Lock locally directs the terminal to switch the active session if you are using two sessions (Chapter 9). (Does not send a scan code to the host.)
Fkey	Alt Scroll Lock (unshifted) sends scan codes to the host. When the host's software recognizes the scan codes, the host directs the terminal to perform a function a key sequence.

Default settings are in **bold** type.

Tab Set-Up Screen

This screen lets you set the number of tab stops on a line. Tab stops on the screen are similar to tab stops on a typewriter. When you press the Tab key outside of set-up, the cursor advances to the next tab stop. Table 7–10 describes the Tab Set-Up features.

There is one tab stop field for each column on the screen. In PC TERM mode, you can use a screen display of 80 columns. In VT mode, you can use 80 or 132 columns. See the **80/132 column mode** feature in the Display Set-Up screen.

You can use the arrow keys or the Tab key to move the 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. The following figure shows the default tab stop settings.

NOTE
You cannot put a tab in column 1.

Tab Set-Up Screen—VT Mode and PC TERM Mode

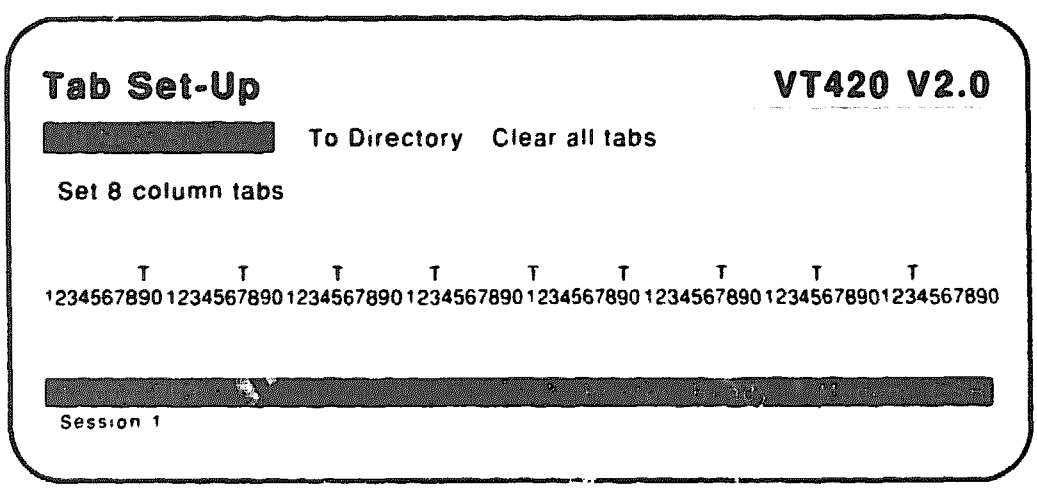

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Table 7–10 Tab Set-Up Features

Feature	Description
Clear all tabs	Removes all current tab settings shown on the Tab Set-Up screen.
Set 8 column tabs	Automatically sets one tab every eight columns, starting at column 9.

8

Typing Additional Characters

The terminal lets you type more characters than appear on your ANSI or PC keyboard. This chapter lists the available characters you can type while the terminal is in VT mode and shows you how to select them. If your terminal is in PC TERM mode, the application software on your host system determines what characters you type from your PC keyboard. Refer to your software documentation for this information.

To enter an additional character in VT mode, you type a sequence of keys. Three basic factors determine the key sequences you can use.

- The type of keyboard you are using (ANSI, Short ANSI, or PC)
- The **keyboard dialect** setting, which should match your keyboard model (Chapter 3)
- The character set the terminal is currently using (Chapter 7)

ANSI Keyboards

For ANSI keyboards, most sequences begin with one of the [Compose Character] keys. On the short ANSI keyboard, the keys are labeled [Compose].

If you use the German ANSI keyboard, most sequences begin with the [Group Shift] key instead of [Compose Character].

This chapter describes

- Three-stroke [Compose Character] sequences (all ANSI keyboard models)
- [Group Shift] sequences (German ANSI keyboard)
- Two-stroke key sequences (ANSI keyboards that have nonspacing diacritical keys)
- Hexadecimal key sequences (for programmers) with ANSI keyboards only

PC Keyboards

For PC keyboards, most sequences begin with one of the [Alt] keys.

This chapter describes

- Three-stroke [Alt] sequences (all PC keyboards)
- Two-stroke key sequences (PC keyboards that have nonspacing diacritical keys)

What Characters Can I Type?

You can type any of the characters in the character set the terminal is currently using. You can select from two multinational sets (the DEC Multinational character set or ISO Latin Alphabet No. 1) or many national replacement character sets (NRCs). If you connect a PC keyboard to the terminal, you can select five additional PC character sets. Chapter 11 shows the character sets.

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.

Key Sequences with Nonspacing Diacritical Keys

ANSI Keyboards

Table 8–1 lists the ANSI keyboards that have keys with *diacritical marks*. Table 8–3 lists all the additional characters for all character sets in the terminal when you connect an ANSI keyboard. Many of these characters include a diacritical mark. For example, Á includes an acute accent.

To enter a character that has a diacritical mark:

Press the diacritical key followed by the character. If your keyboard does not have the diacritical key, you must press the Compose Character key followed by the correct key sequence listed in Table 8–3.

To use diacritical keys, you must be using an 8-bit multinational character set.

Table 8–1 ANSI Keyboards with Diacritical Marks

Keyboard	Grave Accent	Acute Accent	Circumflex Accent	Tilde Mark	Umlaut
Finnish	yes	no	yes	yes	no
Flemish	yes	no	yes	yes	yes
French/Belgian	yes	no	yes	yes	yes
Canadian (French)	yes	no	yes	yes	no
German	yes	yes	yes	yes	yes
Portuguese	no	no	no	yes	no
Spanish	yes	yes	yes	yes	yes
Swedish	yes	no	yes	yes	no
Swiss (French)	yes	no	yes	yes	yes
Swiss (German)	yes	no	yes	yes	yes

PC Keyboards

Table 8–2 lists the PC keyboards that have keys with *diacritical marks*. Many of these characters include a diacritical mark. For example, Á includes an acute accent.

To enter a character that has a diacritical mark:

Press the diacritical key followed by the character. If your keyboard does not have the diacritical key, you must press the Alt key followed by a three-digit code on the numeric keypad. See the PC character sets in Chapter 11 for a list of codes.

To use diacritical keys, you must be using an 8-bit multinational character set or a PC character set.

Table 8–2 PC Keyboards with Diacritical Marks

PC Keyboard	Grave Accent	Acute Accent	Circumflex Accent	Tilde Mark	Umlaut
Belgian	yes	yes	yes	yes	yes
Danish	yes	yes	yes	no	yes
Finnish/Swedish	yes	yes	yes	yes	yes
French	no	no	yes	no	yes
German	yes	yes	no	no	no
Norwegian	yes	yes	yes	no	yes
Portuguese	yes	yes	yes	yes	yes
Spanish (International)	yes	yes	yes	no	yes
Spanish (National)	yes	yes	no	no	yes
Swiss (French)	yes	yes	yes	yes	yes
Swiss (German)	yes	yes	yes	yes	yes

How to Type a Character Using the Compose Character Key (ANSI Keyboards)

To enter a [Compose Character] key sequence:

1. Find the character you want to type in Table 8–3.
2. Press the [Compose Character] key. Compose appears on the keyboard indicator line, indicating the terminal is in the compose mode.

   NOTE
   If the [Compose Character] key does not work, check the setting of the compose key feature in the Keyboard Set-Up screen (Chapter 7).

3. Type the sequence in Table 8–3 for the character you want.

Example

To type an é:

1. Find the é character in Table 8–3.
2. Press [Compose Character].
3. Type [e] and ['] (apostrophe).

NOTE
If you try to enter a character that is not available in the current character set, a warning bell sounds. See "Invalid Sequences (ANSI Keyboards)" in this chapter.

How to Type a Character Using the Group Shift Key (ANSI German Keyboard)

If you select the German Keyboard dialect in the Set-Up Directory screen, the [Group Shift] key replaces the [Compose Character] key.

Many keys on the German keyboard have a second group of legends on the right half of their keycap. These legends are called Group-2.

To enter a single character from Group-2:

1. Press and release the [Group Shift] key. Group Shift appears on the keyboard indicator line at the bottom of the screen. This indicates that you have selected the Group-2 keys.

2. Type the key that has the desired character on the right half of the keycap. The character appears on the screen, and the Group Shift indicator turns off.

Example

To type an ø:

1. Press [Group Shift].
2. Type the key that has the ø character on the right half of the keycap: [O ø].

To enter a series of characters from Group-2:

1. Hold down the [Group Shift] key. Group Shift appears on the keyboard indicator line at the bottom of the screen. This indicates that you have selected the Group-2 keys.
2. Type the series of keys that have the desired characters on the right half of their keycaps. The characters appear on the screen.
3. When you are done typing characters from Group-2, release the [Group Shift] key. The Group Shift indicator turns off.

Invalid Sequences (ANSI Keyboards)

When you complete a valid compose or group-shift sequence, the character appears on the screen and the Compose or Group Shift indicator at the bottom of the screen turns off. If you use an invalid sequence, the terminal cancels the sequence and sounds the warning bell.

Some compose characters require that you type the key sequence in the order listed in Table 8–3. If you do not follow the order, the sequence is invalid and the warning bell sounds. If the terminal does not display the character, repeat the sequence exactly as shown in Table 8–3.

NOTE
Pressing a function key cancels a compose or group-shift sequence without sounding the bell.

You can turn the warning bell on or off in the Keyboard Set-Up screen (Chapter 7).

Canceling or Restarting a Key Sequence (ANSI Keyboards)

If you accidentally start a key sequence by pressing Compose Character, Group Shift, or a nonspacing diacritical key, press the ⌫ key. This immediately cancels the 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 key sequence, they cancel the sequence and perform their usual function:

- Tab
- Enter
- Any top-row key
- Any Ctrl other key combination

How to Type a Character Using the Alt Key (PC Keyboards)

To enter an Alt key sequence:

1. Look at the PC character sets in Chapter 11 and find the character you want to type. Note the decimal value next to the character.
2. Select the PC character set in set-up, if you are not already using that character set.
   a. Enter set-up and display the General Set-Up screen (Chapter 7).
   b. Move the cursor to the **UPSS** feature and change the setting to the PC character set you want to use.
   c. Leave set-up.
3. Check that the Num Lock indicator on the keyboard is on. This indicates that you can enter numbers on the numeric keypad. If the indicator is off, press the Num Lock key.
4. Press and hold the Alt key while typing the decimal value for the PC character on the numeric keypad.
5. Release the Alt key. The character should appear on the screen.
6. If you changed the character set (step 2), you can select your previous character set by using the General Set-Up screen again.

   If you pressed Num Lock so the numeric keypad could generate numbers (step 3), you can press Num Lock again to turn this function off.

Hexadecimal Key Sequences (ANSI Keyboards)

This feature is primarily for programmers who are familiar with character coding and hexadecimal representation.

The terminal uses coded character sets to exchange data with a host computer. The code for a character can be represented by a pair of hexadecimal digits. You can enter any 8-bit code by pressing [Compose Character] or [Group Shift] followed by two hexadecimal digits typed on the numeric keypad.

When you press [Compose Character] or [Group Shift], the terminal assigns hexadecimal values to the numeric keypad keys (Figure 8–1). The character set tables in Chapter 11 show you the hexadecimal values for each character in the standard character sets.

NOTE

The UPSS feature in the General Set-Up screen does not affect hexadecimal compose sequences.

Examples

- You can use a hexadecimal compose sequence to send the US (unit separator) control character. The hexadecimal value for US is 1F. Figure 8–1 shows the numeric keypad.

  1. Press [Compose Character] or [Group Shift].
  2. Press [1] on the numeric keypad.
  3. Press [.] on the numeric keypad.

- You can use a hexadecimal compose sequence to send the DCS (device control string) character. The hexadecimal value for DCS is 90. Figure 8–1 shows the numeric keypad.

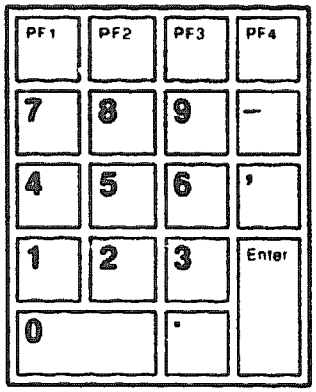
  1. Press [Compose Character] or [Group Shift].
  2. Press [9] on the numeric keypad.
  3. Press [0] on the numeric keypad.

NOTE

If the terminal mode feature in the General Set-Up screen is set to VT420 Mode, 7 Bit Controls, **the 7-bit representation of DCS (ESC P) will be sent.**

Invalid Hexadecimal Sequences

If you enter an invalid sequence, the terminal cancels the sequence and sounds the warning bell. You can turn the warning bell on or off in the Keyboard Set-Up screen (Chapter 7).



Key Name	Hexadecimal Digit
PF1	A
PF2	B
PF3	C
PF4	D
Minus (-)	E
Comma (,)	F

Figure 8–1 Hexadecimal Compose Keys

Table 8–3 Key Sequences for Additional Characters

Character		Sequence
"	quotation mark	¨ (sp)
#	number sign	++
'	apostrophe	´ (sp)
@	commercial at	A A
[	opening bracket	((
\	backslash	/ / or / <
]	closing bracket	))
^	circumflex accent	^ (sp)
`	grave accent	` (sp)
{	opening brace	(-
|	vertical line	/ ^
}	closing brace	) -
~	tilde	~ (sp)
¡	inverted !	!!
¢	cent sign	C / or C |
£	pound sign	L- or L=
¥	yen sign	Y- or Y=
§	section sign	SO or S! or S0
¤	currency sign	XO or X0
©	copyright sign	CO or C0
ª	feminine ordinal	A_
«	open angle brackets	< <
°	degree sign	0 ^
±	plus or minus sign	+ -
²	superscript 2	2 ^
³	superscript 3	3 ^

Character		Sequence
µ	micro sign	/ U
¶	paragraph sign	P!
·	middle dot	. ^
¹	superscript 1	1 ^
º	masculine ordinal	O_
»	closed angle brackets	>>
¼	fraction one-quarter	1 4
½	fraction one-half	1 2
¿	inverted ?	??
À	A grave	`A
Á	A acute	'A
Â	A circumflex	^A
Ã	A tilde	~A
Ä	A umlaut	¨A or "A
Å	A ring	°A or A* (degree sign)
Æ	A E diphthong	AE
Ç	C cedilla	C,
È	E grave	`E
É	E acute	'E
Ê	E circumflex	^E
Ë	E umlaut	¨E or E"
Ì	I grave	`I
Í	I acute	'I
Î	I circumflex	^I

Table 8–3 (Cont.) Key Sequences for Additional Characters

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

*This character is only available when you use the DEC Multinational character set. See the UPSS feature in the General Set-Up screen (Chapter 7).

Table 8–3 (Cont.) Key Sequences for Additional Characters

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

†These characters are only available when you use the ISO Latin Alphabet No. 1 character set. See the UPSS feature in the General Set-Up screen (Chapter 7).

9 Using Two Sessions, Windows, And the Copy and Paste Feature

This chapter describes how to

- Run two computer sessions on your terminal at the same time.
- Select and use windows.
- Copy and paste text between sessions.

With two sessions, your VT420 becomes two terminals in one. You can also use the VT420 as a conventional one-session terminal.

Running two sessions offers many advantages. For example, you can easily display and compare data from two different jobs at the same time. To display data from two sessions, you divide the screen into two *windows*. You can also copy and paste text from one session to another.

What Are Sessions?

A video terminal lets you exchange information with a computer system. In order to communicate with the host system, you must open a session from your terminal. A *session* is an active connection between the terminal and a host system. On many systems, you open a session by logging in to the system.

Two Sessions

The terminal lets you run two sessions at the same time. You can run two sessions in VT mode, two sessions in PC TERM mode, or one session in each mode. Opening two sessions is easy. After you set up the terminal for two sessions, you can use the F4 key (Alt Scroll Lock) to move back and forth between two sessions. The session you are using is called the *active session*. The next section describes how to open two sessions.

NOTE
While the Alt Scroll Lock keys enable you to change sessions in PC TERM mode, they may conflict with your PC software application.

You can connect the terminal to a host computer, a *terminal server*, or a *modem*. This means you can run two sessions on the same host system or on two different systems.

Opening Two Sessions

The terminal uses a communication cable to exchange information with a computer.

If you use PC TERM mode, you need a separate communication cable for each session.

If you use VT mode, you can use one or two communication cables for two sessions. To use one cable, your system must have Digital's SSU software or a terminal server that supports multiple sessions.

Chapters 2 and 3 describe how to install communication cables and set up the terminal for two sessions. This section describes how to use two sessions after you set up the terminal correctly.

The way you open two sessions depends on how many communication cables you use. The following sections describe how to open two sessions if you use

- Two cables
- One cable and SSU software (VT mode only)
- One cable and a terminal server that supports multiple sessions (VT mode only)

If You Use Two Cables

This section describes how to open two sessions if you use two communication cables.

IMPORTANT
Make sure your terminal is set up correctly before you try to open two sessions. Chapter 3 describes how to set up the terminal for two sessions using two cables.

Session 1

You open session 1 the way you normally do on your host system. The terminal always connects you to the system assigned to session 1. This assignment is based on the cable connections at the rear of the terminal. To assign a system to a session, you use the **terminal comm ports** feature in the Global Set-Up screen.

Session 2

After you open session 1, you press the F4 key (Alt Scroll Lock) and open session 2 the same way you opened session 1. When you press F4 (Alt Scroll Lock), the terminal maintains session 1. The session can still receive information from the host system. No information is lost.

If the terminal does not respond correctly when you press F4 (Alt Scroll Lock), repeat the set-up procedure for two sessions in Chapter 3.

Example

To open session 1:

1. Turn on the terminal and wait for the screen to display VT420 OK.
2. Press the Return key (Enter) to tell the system you want to log in. You may have to press the key several times.
3. Then the system prompts you for your user name and password.

To open session 2: Press the F4 key (Alt Scroll Lock) and repeat the login sequence.

If You Use One Cable and SSU Software (VT Mode Only)

If your system has Digital's SSU software or a terminal server that supports multiple sessions, you can run two sessions over one communication cable. Your system manager can tell you if your system has either one.

If Your System has SSU Software

If your system has SSU software, use the following procedure to run two sessions over one communication cable:

IMPORTANT
Make sure your terminal is set up correctly before you try to open two sessions. Chapter 3 describes how to set up the terminal for two sessions, using one cable and SSU software.

Session 1

To open SSU session 1:

1. Log in to your host system the way you normally do.
2. Enter the commands to enable SSU with two sessions on your terminal line.

   For example, on a VMS system you would enter the following command at the $ prompt:

   ```
   $ SSU ENABLE Return
   ```

   The terminal should display the following response on the status line at the bottom of the screen:

   ```
   Done
   ```

   The first session is now open.

   NOTE
   If you type information before the `Done` **message appears on the status line, the terminal displays the** `Service name =` **prompt.**

Session 2

To open a second session:

1. Press the F4 key (Alt Scroll Lock).

   NOTE
   If you did not enable SSU in step 2 above, the host system will not respond when the terminal tries to open the second session. After 10 seconds, the warning bell rings twice and a message appears on the status line, indicating that the host did not respond.

2. The system prompts you for the service name.
3. Press Return (Enter). The system responds with

   ```
   Session Open Request Pending
   ```

   immediately followed by

   ```
   Session Opened
   ```

   Session 2 is now open. The system is ready for the login procedure.

4. Type your login procedure before the terminal sends a timeout message. If you get a timeout message, go to the previous step and repeat the procedure.

If Your Terminal Server Supports Multiple Sessions

The DECserver 200 and later DECserver terminal servers support multiple sessions. If your system has one of these terminal servers, you can use the following procedures to run two sessions over one communication cable. First, you must define your terminal server port for multiple-session use.

Defining Your Terminal Server Port for Multiple Sessions

1. Turn on the VT420 and wait for the screen to display VT420 OK.
2. Press the Return key twice and log in to your terminal server the way you normally do. The Local> prompt appears.
3. At the Local> prompt, enter the following command:

   ```
   Local> DEFINE PORT MULTISESSIONS ENABLED Return
   ```

4. Log out of your terminal server, then log back in so your DEFINE command will take effect.

   The terminal displays the following response on the status line at the bottom of the screen:

   ```
   Done
   ```

The terminal server port is now defined for multiple sessions. This setting remains in effect after you log out. You do not have to repeat this command each time you log in to the terminal server.

Now, you can open two sessions.

Session 1 from the Terminal Server

To open session 1:

1. Press the F4 (Alt Scroll Lock) key. The terminal server prompts you for the service name at the bottom of the screen.
2. At the service name prompt, enter the node name. Your system manager can tell you the node name.

   ```
   Service name = (Node name) Return
   ```

   The following response appears on the status line at the bottom of the screen:

   ```
   Session Opened
   ```

   Session 1 is now open on the terminal server. Now, you should log in to your system.

3. Type your login procedure before the terminal server sends a timeout message. If you get a timeout message from the terminal server, go to

Session 2 from the Terminal Server

To open session 2, repeat the three steps used to open session 1.

Disabling Multiple Sessions on the Terminal Server Port

1. Log out from one session the way you normally do.

   The terminal displays a response indicating that you logged out.

   Then the terminal server displays a response that indicates which session (1 or 2) you closed:

   ```
   Local -nnn- Session n disconnected from (Node name))

   Local -nnn- 1 other session(s) active
   ```

2. Press the F4 (Alt Scroll Lock) key.
3. Repeat step 1 for the second session.
4. At the `Local>` prompt, enter the following command:

   ```
   Local> DEFINE PORT MULTISESSIONS DISABLED Return
   ```

5. Log out of your terminal server, then log back in so your DEFINE command will take effect.

   The terminal displays the following response on the status line at the bottom of the screen:

   ```
   Done
   ```

   The following response appears after the logout response:

   ```
   Local -XXX- Session Management terminated
   ```

   Multiple sessions are now disabled from your terminal's port on the terminal server.

Restoring an Interrupted SSU Session

You can restore sessions that are interrupted by one of the following events:

- Turning the terminal off when it is still connected to the terminal server
- A power failure or similar problem

When a session is interrupted, the terminal or the host system may lose the context of the current session. After the terminal and system regain communication, you can restore the context of the interrupted session without canceling the session and starting over again.

To restore a session: Press the F4 key (Alt Scroll Lock).

SSU Screen and Error Messages

The terminal displays SSU screen and error messages on the line at the bottom of your screen. The messages disappear when you press any keyboard key.

The following paragraphs describe each SSU message. If the message is an error message, the keyboard's warning bell rings twice before the message appears.

- `Sessions not enabled - Unable to run with host Session Management version`

  The terminal's version of SSU firmware does not match the system's version. Check with your system manager.

- `Sessions not enabled - No Session Management response from host`

  The system's SSU software is not working or is not installed. Also, you may have lost your connection with the system. Check with your system manager.

- `Sessions enabled - Restoring previous sessions`

  The host system is servicing an SSU request. Wait briefly for the message to disappear.

- `Session open request pending`

  The host system is servicing an SSU request. Wait briefly for the message to disappear. If the message is followed by `No response from the host for SSU Session Management`**, check your connection to the host. If your terminal has been disconnected from the host, you must log in and start your SSU sessions over again.**

- `Insufficient host resources to open session`

  There is an error at the host system's end of the SSU session. Contact your system manager for help.

- `Data overrun occurred on Session (1 or 2)`

  A communication error has occurred between the terminal and the host system. If this message disappears and does not reappear, the host has corrected the error on its own. If the message continues to appear, contact your system manager for help.

- `Session (number) terminated abnormally`

  The host system has ended the session. Try opening the session again. If you cannot reopen the session, there is a problem with the host system. Check with your system manager.

Which Session is Active?

You can display information from two sessions at the same time, by using windows. However, you can only enter information in one session at a time. There are two ways you can tell which session is active.

- Look at the keyboard indicator line. The active session number appears in the first field at the left of the line.
- Look at the cursors. The active session usually has a blinking cursor. The inactive session has a steady cursor.

  NOTE
  The cursor blink feature in the Display Set-Up screen lets you select a blinking or steady cursor for the current session.

- Type a keyboard character. The software application will display the character in the active session.

Number of Lines/Screen

You can display 24, 36, or 48 lines of information at one time on the screen. By default, 24 lines are visible at one time (excluding the status line at the bottom of the screen). If you display 36 or 48 lines on the screen, the size of the characters will be smaller. The **lines/screen** feature in the Display Set-Up screen controls how many lines you can see on the screen at one time.

VT Mode The number of lines on the screen also depends on the number of lines on a page in page memory. For example, if you select 48 lines /screen but the page size is 24 lines, then you will only see 24 lines of information from that session. This is the case even if there is room for more lines on the screen. If you are running two sessions, you can select 48 lines/screen to display 24 lines in each session.

PC TERM Mode If you divide the screen into two windows, the terminal automatically changes the PC TERM session to the 48 lines/screen setting. This setting allows the session to display 25 lines.

How to Change the Number of Lines/Screen

The number of lines on the screen is a user preference feature. You may have terminal management software that automatically selects the appropriate number of lines on the screen. However, if you want to change the setting manually, use the following procedure:

NOTE
If you are running two sessions and you want to change the number of lines/screen setting for each session, you must make the change for each session individually.

The Display Set-Up screen contains the **lines/screen** feature.

1. Press F3 (Alt SetUp). The terminal displays the Set-Up Directory.
2. Use the arrow key to move to the `Display` Set-Up field.
3. Press Enter. The terminal displays the Display Set-Up screen.
4. Use the arrow keys to move to the `24 Lines/Screen` field.
5. Press Enter to change the setting to 36 or 48 lines/screen.
6. Press F3 (Alt SetUp) to leave set-up.

Windows

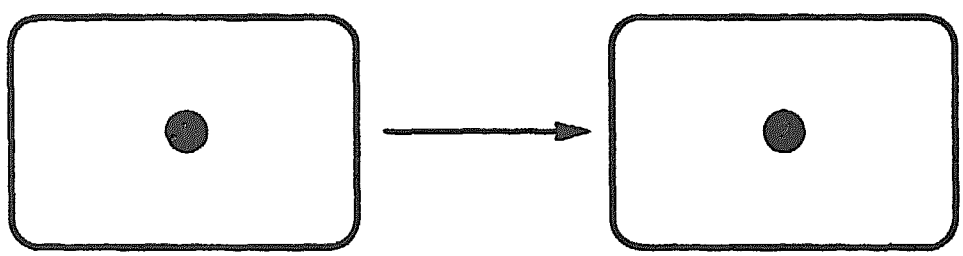
A *window* is an area of the screen that displays information from one session. You can divide the terminal's screen into two windows by opening two sessions.

The amount of information you can display is determined by:

- The number of windows you are using (1 or 2)
- The page size you are using. Pages in page memory may be larger than the number of lines available on the screen.
- The number of lines/screen you choose in the Display Set-Up screen.

One Window

Normally, the terminal uses a full-screen window. In this window, you can only display one session at a time. A full-screen window lets you display 24, 36, or 48 lines of text in 80 columns. In VT mode, you can also use 132 columns. If you use two sessions, you can switch between sessions with the F4 key (Alt Scroll Lock).



LJ-00217-TI0

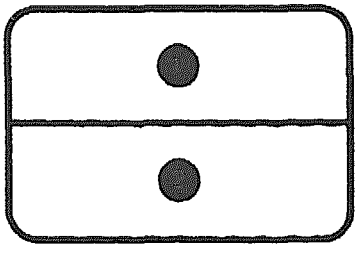
Press F4 (Alt Scroll Lock).

● Session 1
24/36/48 Display Lines

● Session 2
24/36/48 Display Lines

Two Windows

The terminal lets you divide the screen into two windows. When you divide the screen into windows, each window can display 12, 18, or 24 lines of text in 80 columns. In VT mode, you can also use 132 columns. The default number of lines for each window is one-half the number of the lines/screen setting you selected.



LJ-00219-TI0

48 Lines/Screen

- Session 1
  24 Display Lines
- Session 2
  24 Display Lines

How to Select One or Two Windows

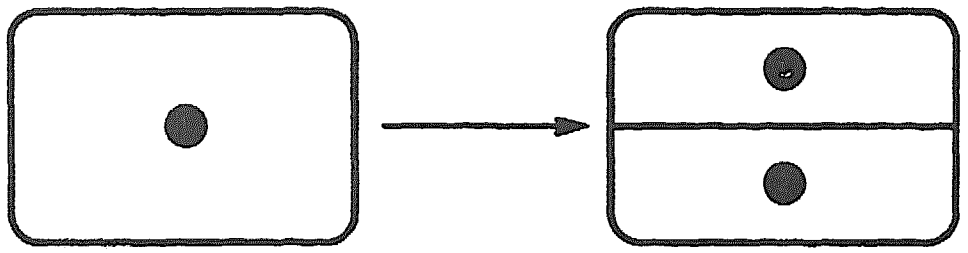
Before you use two windows, make sure the **terminal comm ports** feature in the Global Set-Up screen is set correctly. See the Global Set-Up screen in Chapter 7.

To select a new window style, press Ctrl F4 (Ctrl Alt Scroll Lock). Each time you press Ctrl F4 (Ctrl Alt Scroll Lock), the style of the window on the screen changes.

Pressing Ctrl F4 (Ctrl Alt Scroll Lock)	Gives You ...
One time	Two windows
Again	A full-screen window again

IMPORTANT
Before you use windows, read the next section on keeping the cursor visible.

To select two windows:

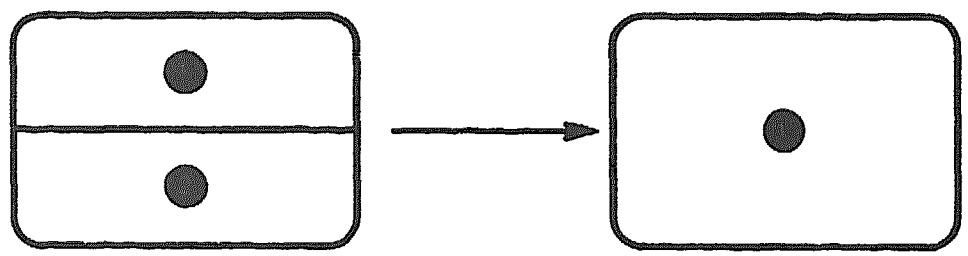


LJ-00220-TI0

Press Ctrl F4 (Ctrl Alt Scroll Lock) once ....

- Session 1
- Session 1
- Session 2

To select one full-screen window again:



LJ-00221-TI0

Press Ctrl F4 (Ctrl Alt Scroll Lock) again.

- Session 1
- Session 2
- Active Session (1 or 2)

Keeping the Cursor Visible

When you divide the screen into windows, half of the area for the active session may disappear. If the cursor for the active session is in the area that disappears, the cursor may also disappear.

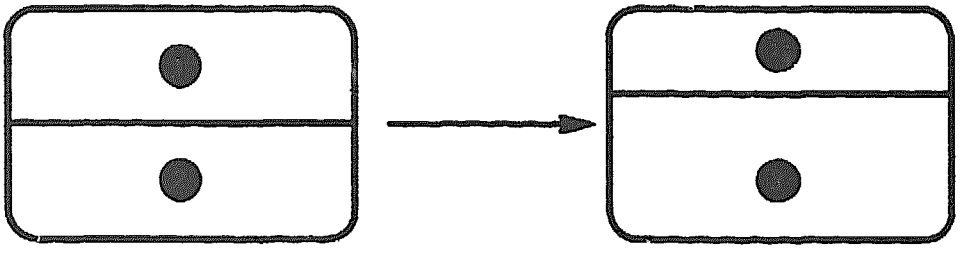
For example, if the screen has 24 lines and you divide the screen horizontally, the top window displays only the top 12 lines of that session. If the cursor is between lines 13 and 24, you cannot see the cursor.

To make sure the cursor stays visible, you can use the coupling features in the Display Set-Up screen (Chapter 7).

If you use one or two windows	Make sure the **vertical coupling** feature is set to `Vertical Coupling`.
If your application uses multiple pages and you move from page to page in page memory	Make sure the **page coupling** feature is set to `Page Coupling`.

How to Change Window Sizes

When you use two windows, you can change the relative size of the windows. The terminal displays a border between the two windows. You can move the border up or down:



LJ-00222-TI0

Session 1
Session 2

Session 1
Session 2

To move the border ...	Press ...
Up	Shift Ctrl ↑
Down	Shift Ctrl ↓

Tips on Using Windows

If the **vertical coupling** feature is enabled, data on the screen may appear to skip up and down when you move the cursor beyond the top and bottom border of a window. The skipping occurs because the terminal must update the screen to keep the cursor visible.

This problem occurs most often with applications that involve frequent cursor action (for example, word processors). Here are a few suggested solutions:

- Disable the **vertical coupling** feature in the Display Set-Up screen. This step will stop the skipping motion on the screen. However, the cursor will disappear if it moves to an area of the terminal's memory that is not on the screen.

  For example, if you split the screen so that each session displays 12 lines of text, the cursor will disappear if it moves to line 13 in either session.

- Set the application to use only the number of lines actually displayed. When you split the screen horizontally, the terminal displays 12 lines in each session by default. Many applications have commands to limit the number of lines available for editing.

  The following two examples apply to the VMS operating system:

  — The EDT editor has a SET LINES command that lets you specify the number of lines available for editing. If your set the number of lines to match the **lines/screen** feature in the Display Set-Up screen when you use two windows, the skipping motion stops.

  — The VMS operating system has a SET TERMINAL/PAGE=*nn* command. This command lets you specify the number of lines used on the screen. Several VMS utilities and applications use this information to limit the number of lines used. If you set the PAGE to one less than the number of displayed lines, applications such as HELP, NOTES, MAIL, and the TPU editor (EVE and EDT sections) perform well when you use two windows.

Panning (VT Mode Only)

You can pan the window for the active session, to view more data in page memory. *Panning* a window is similar to panning a camera. When you pan a camera over a subject, you can see different parts of the subject while standing in the same position. When you pan a window, you can see another part of page memory without moving the window on the screen.

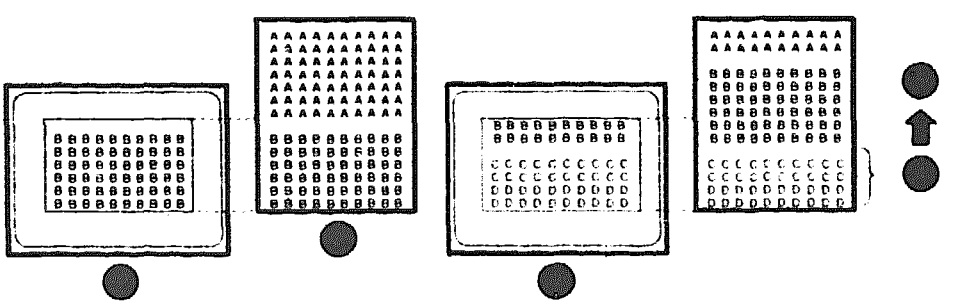
How to Pan

You can pan a window up or down. You can also pan to another page in page memory. To pan a window, you use the following keystrokes:

To pan...	Press...
Up	Ctrl ↑
Down	Ctrl ↓
Back one page	Ctrl Prev (Ctrl Page up)
Forward one page	Ctrl Next (Ctrl Page down)

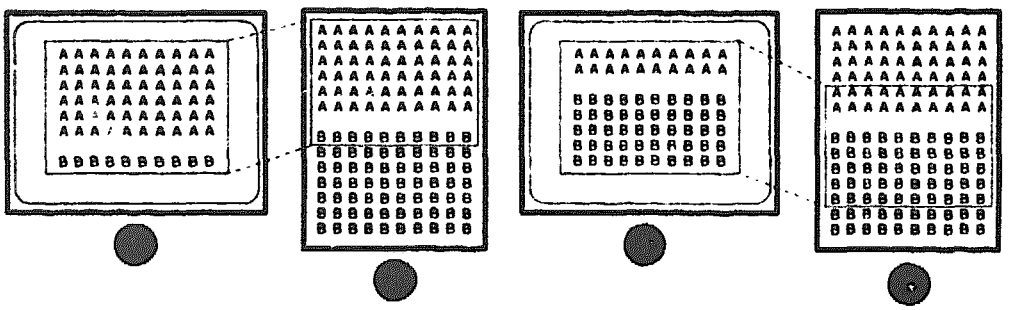
The Difference Between Scrolling and Panning

Panning directions are the opposite of scrolling directions. For example, when you pan up, data appears to scroll down on the screen. The following figures show the difference between scrolling and panning.



LJ 00767 TI0

Before Scrolling		After Scrolling	
Screen	Page	Screen	Page: Data is added. Page: Data that scrolled past the top margin is lost from page memory.



LJ-00768-TI0

Before Panning		After Panning Down	
● Screen	● Page/User Window: The page must be larger than 24 lines.	● Screen	● Page/User Window: Data is not lost from page memory, because data does not move on the page. The page must be larger than 24 lines.

Notes About Panning

- You can only move to another page if memory is divided into more than one page.
- In order to pan on a page, the page size must be larger than the window. The **page arrangement** feature in the Display Set-Up screen (Chapter 7) determines the page size.
- Your cursor may disappear from the screen when you use panning functions. There are two ways you can bring the cursor back on the screen.
  - —Look at the status line. It shows you the cursor location. Then use the Ctrl and arrow keys to pan the cursor back onto the screen.
  - —Make sure the two cursor-coupling features—**vertical coupling** and **page coupling**—are enabled in the Display Set-Up screen.

Copying and Pasting Text (VT Mode Only)

NOTE
The terminal cannot copy and paste text in PC TERM mode.

The terminal provides a simple procedure for copying and pasting data within an active session or between two active sessions. The terminal stores the copied data in a buffer before sending the data to the host. The paste buffer can hold one 24-line page of text data.

Copying Text into the Paste Buffer

To copy text into the paste buffer:

1. Press and hold the F1 key (Scroll Lock) down for the rest of the copy operation. If the cursor was not visible, it appears when you press F1 (Scroll Lock).

   NOTE
   Releasing F1 (Scroll Lock) before completing the copy operation cancels the operation.

2. Use the arrow keys to position the cursor at the beginning of the text you want to copy.
3. With the cursor at the beginning of the text you want to copy, press the Select key (Home).
4. Use the arrow keys to position the cursor one character beyond the end of the text you want to copy. As you move the cursor, the terminal underlines the text you are copying.
5. Press the Remove key (End) , then release F1 (Scroll Lock).

After you complete the copy operation, the terminal places the copied text in the paste buffer and erases the underline from the text on the screen.

Pasting Text

After you copy text to the terminal's paste buffer, you can paste the text into an active session. When you paste the text, it appears on the screen as if it were typed from the keyboard. You can paste text into a file. To paste text:

1. If you are editing a file, use the arrow keys to position the cursor where you want to paste the text.

   If you are at the command level, text will appear on the command line when you paste it.

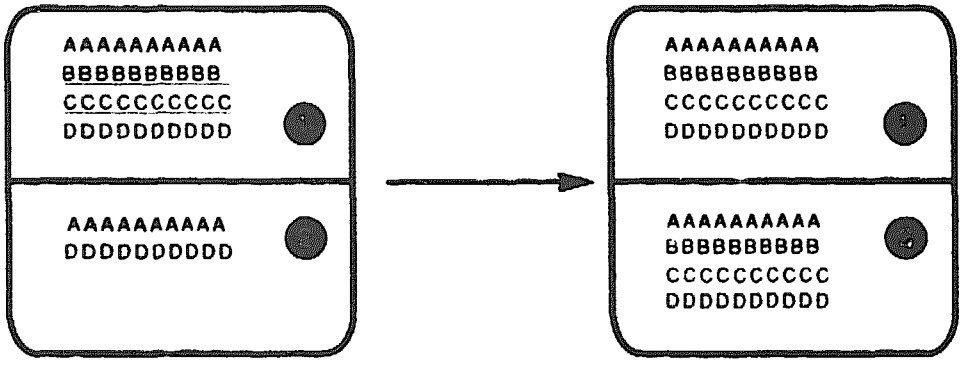
2. Press and hold the F1 key (Scroll Lock) down while you press the Insert key.

3. Release F1 (Scroll Lock).

The terminal sends a copy of the text in the paste buffer to the active session. The text also remains in the paste buffer until you:

- Copy additional text, or
- Turn the terminal off.

The following figure shows an example of copying and pasting text from one active session to another:



LJ-00223 TIO

Session 1
Session 2

Session 1
Session 2

Notes About Copying and Pasting Text

- You can copy up to 24 lines of 132 characters at one time.
- If you try to copy non-ASCII characters, such as graphics information, the terminal sends blank spaces in place of those characters.
- You cannot copy the visual character attributes of text, such as bolding, underlining, and blinking.
- If you release the F1 key (Scroll Lock) before completing the copy or paste operation, the terminal cancels the operation.
- If you set the transmit baud rate to Transmit=19200 or higher in the Communications Set-Up screen, a copy and paste operation may send data to the host computer faster than the host can receive the data. When you are using the VMS operating system, type the SET TERM /HOSTSYNC command to control data flow and prevent the loss of data.

10 Printers and Modems

You can connect a printer directly to your terminal. This chapter describes the Printer Set-Up screen and the types of printers you can use. The chapter also describes how to use a modem with the terminal.

Printers

The VT420 has a built-in serial printer interface that supports many draft, letter-quality, and laser printers, as well as plotters. Here are some of the Digital printers and plotters you can use with your terminal in VT mode:

LA Series		Letter-Quality	Laser	Plotter
LA12	LA50	LQP02	LN01	LJ250 †
LA34	LA75	LQP03	LN03*	LJ251†
LA35	LA100 /LA210	DEClaser 1100†		
LA36	LA324	DEClaser 2100†		
LA38		DEClaser 2200†		

*With an H8751-A adapter.

†With an H8751-E adapter.

Connecting a Printer

The terminal has a built-in serial printer interface that supports many draft, letter-quality, and laser printers, as well as plotters. The terminal uses the Comm2 port to connect a printer.

1. Connect a DEC-423 cable from the printer to the 6-pin Comm2 connector
2. Make sure the installation is correct. Check the appropriate cabling section in Chapter 2.

   One session (one cable) and a printer
   Two sessions with SSU software (one cable) and a printer

NOTE
You cannot connect a printer to the Comm2 port if the terminal is set up for two sessions using two cables.

Selecting a Print Mode (VT Mode)

The terminal lets you select from three different print modes, using the **print mode** feature in the Printer Set-Up screen (Chapter 7):

- Normal mode **(default)**
- Auto print mode
- Controller mode

The status line (Chapter 4) displays the current print mode setting.

Normal Mode: Printing Pages of Text

This mode lets you print displayed text by using the F2 key (Print Screen). *Page* refers to the current page in the terminal's page memory. This page may be larger than the screen. The size of the page depends on two other set-up features.

Feature	Set-Up Screen	Function
Page arrangement	Display Set-Up	Selects the page size. In VT mode, the page size default is 24 lines, which matches the default screen size.
Printer extent	Printer Set-Up	Lets you print a page or the *scrolling region*. The scrolling region is the area within the scrolling margins.

Auto Print Mode: Printing Text from the Host System

In this mode, the terminal 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 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 F2 key (**Print Screen**) in auto print mode.

You can also turn auto print mode on and off by pressing Ctrl F2 (**Ctrl** **Print Screen**). When you leave auto print mode, you return to normal print mode.

Printer Controller Mode: Letting the Host Control Printing

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` appears on the status line.

You cannot use the F2 key (**Print Screen**) 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 local controller mode, you must set two different set-up features (Chapter 7).

1. Set the **on-line/local** feature in the Global Set-Up screen to `Local`.
2. Set the **print mode** feature in the Printer Set-Up screen to `Controller Mode`.

Selecting a Print Mode (PC TERM Mode)

When you set the terminal to PC TERM mode with a PC keyboard connected, the **print mode** feature does not appear on the Printer Set-Up screen. In PC TERM mode, the terminal always uses the normal print mode setting, which means you can print on the local printer connected to the terminal. You can enable or disable the normal print mode by using the **Print Screen =** feature in the Keyboard Set-Up screen (Table 7–9).

Assigning a Printer in Two Sessions

The terminal lets you assign a printer exclusively to one session or share the printer with both sessions. To assign the printer, you use the **printer assignment** feature in the Global Set-Up screen. There are three possible settings:

Printer shared (**default**)
Printer session 1
Printer session 2

NOTE
The printer assignment feature is not enabled if the printer port is assigned as a normal communication port for one of the sessions (in the Global Set-Up screen).

Printer Set-Up Screen

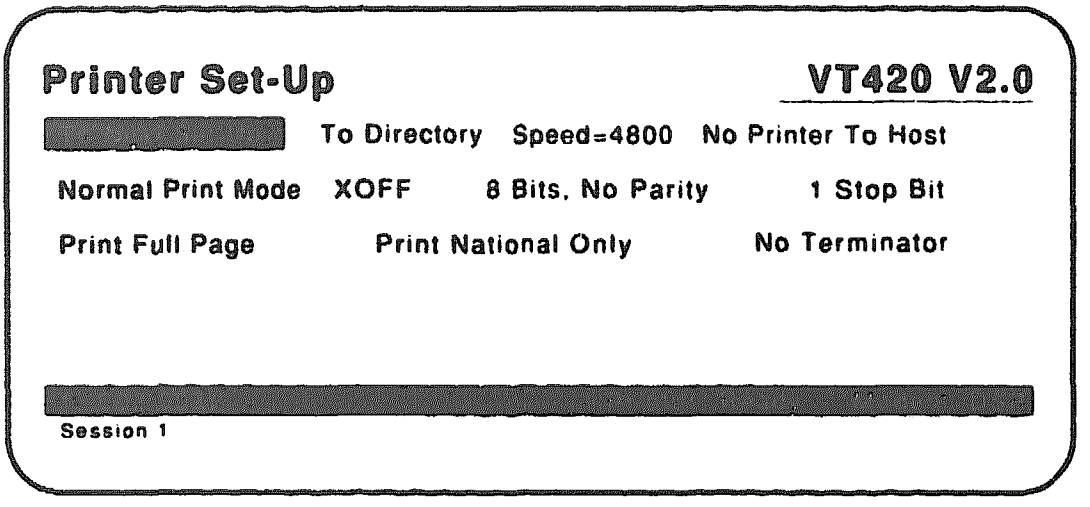
This screen lets you select features to match those of your printer. Table 10–1 describes the features on the Printer Set-Up screen.

Notes About Printing

- If you enter set-up while printing, the terminal temporarily suspends print operations. When you leave set-up, the printer resumes print operations.
- For two sessions: the terminal can save only one version of printer communication set-up features (**printer to host comm**, **print speed**, **flow control**, **character format**, and **stop bits**), because both sessions share one printer line.
- Make sure the **printer assignment** feature on the Global Set-Up screen (Chapter 7) is set to `Printer Shared` or to the session number you want to print from (1 or 2).

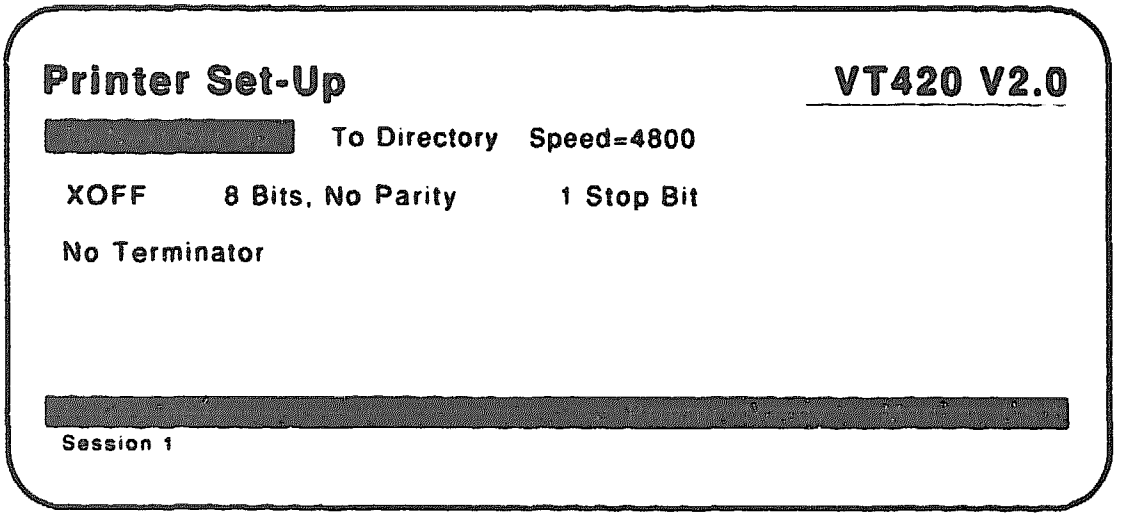
NOTE
The Printer Set-Up screen only appears if the terminal comm ports feature on the Global Set-Up screen is set to `Sessions on Comm1` **or** `S1=Comm1`.

Printer Set-Up Screen—VT Mode



LJ-00758-TI0

Printer Set-Up Screen—PC TERM Mode



LJ-00759-TI0

Table 10–1 Printer Set-Up Features

Feature and Settings	Description
Transmit speed/ receive speed	Selects the baud rate the terminal uses to send data to a printer. The baud rates range from 300 to 38,400 bits/second.
Speed=4800	
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.
Print mode ●	Determines when and how printing takes place.
Normal Print Mode	Lets you start print functions from the keyboard.
Auto Print Mode	Prints the current line of text when the terminal receives a line feed, form feed, or vertical tab from the host.
Controller Mode	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.
XOFF	
No XOFF	

NOTE

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

Data bits/parity	Selects a character format to match the printer's. You can select 7 bits (no, even, odd, mark, or space parity) or 8 bits (no, even, or odd parity).
8 Bits, No Parity	
Stop bits	Selects the number of stop bits (one or two) used by the printer port UART
1 Stop Bit	
2 Stop Bits	
Print Extent ●	Selects how much of the screen to print when you press the F2 key (Print Screen).
Print Full Page	
Print Scroll Region	

● VT mode only.
Default settings are in bold type.

Table 10–1 (Cont.) Printer Set-Up Features

Feature and Settings	Description
Printed data type ●	Lets you restrict the character sets used for printing, so they match the capabilities of the attached printer.
Print 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.
Multinational Only	Control characters and line drawing sets are not sent to the printer.
Print Terminator **No Terminator** Terminator = FF	Selects whether or not the terminal sends a form feed (FF) at the end of a print operation.

● VT mode only.
Default settings are in bold type.

Modems

You need a modem if you want to connect your terminal to a computer system through a telephone line. The modem converts the serial characters sent between the terminal and computer into signals that can travel over telephone lines.

The terminal can operate with full-duplex, asynchronous modems that meet the following national and international standards. The modem you use with your terminal must be compatible with the modem used by the host system.

EIA 232-D
CCITT V.24
CCITT V.28
CCITT V.10
ISO 2110.2

Connecting to a Modem

You can use Digital's DF124, DF212, DF224, and DF242 modems with the terminal. You can also use compatible modems and acoustic couplers, such as the AT&T 103, 113, and 212 types.

NOTE
In PC TERM mode, the modem must be compatible with the XON /XOFF points set by the terminal. See "XON/XOFF Flow Control" in Appendix C.

If a modem meets the required standards, you can connect it to the terminal as follows:

1. Connect the modem cable to the 25-pin RS-232 connector on the rear of the terminal, or use a cable and adapter.
2. Go to the Communications Set-Up screen (Chapter 7).
3. Set the **modem control** feature to the appropriate setting:

Modem Control	If you plan to use modem features that require additional signals beyond data leads only. Examples: call origination and dialing from the keyboard, automatic speed select, and disconnect on loss of carrier or when Shift F5 (Shift Break) is pressed.
Data Leads Only	If you do not plan to use modem control features or your modem (or modem cable) is not configured for modem control.

4. While in the Communications Set-Up screen, set the **transmit speed** and **receive speed** features to match your modem's settings.

11 Programming Summary

This chapter is a summary of the VT420 control functions and commands. Programmers can use this chapter as a quick-reference tool.

NOTE
The application of the control functions and commands on the terminal affects each session independently.

The chapter is divided into the following sections:

Character Encoding

DEC Multinational Character Set

Left Half—U.S. ASCII Character Set

Row	b4 b3 b2 b1	Column 0	1	2	3	4	5	6	7
0	0 0 0 0	NUL	DLE	SP	0	@	P	`	p
1	0 0 0 1	SOH	DC1 (XON)	!	1	A	Q	a	q
2	0 0 1 0	STX	DC2	"	2	B	R	b	r
3	0 0 1 1	ETX	DC3 (XOFF)	#	3	C	S	c	s
4	0 1 0 0	EOT	DC4	$	4	D	T	d	t
5	0 1 0 1	ENQ	NAK	%	5	E	U	e	u
6	0 1 1 0	ACK	SYN	&	6	F	V	f	v
7	0 1 1 1	BEL	ETB	'	7	G	W	g	w
8	1 0 0 0	BS	CAN	(	8	H	X	h	x
9	1 0 0 1	HT	EM	)	9	I	Y	i	y
10	1 0 1 0	LF	SUB	*	:	J	Z	j	z
11	1 0 1 1	VT	ESC	+	;	K	[	k	{
12	1 1 0 0	FF	FS	,	<	L	\	l	|
13	1 1 0 1	CR	GS	-	=	M	]	m	}
14	1 1 1 0	SO	RS	.	>	N	^	n	~
15	1 1 1 1	SI	US	/	?	O	_	o	DEL

← C0 Codes → ← GL Codes (ASCII Graphic) →

LEGEND

Character: ESC

33 Octal
27 Decimal
1B Hex

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Right Half—DEC Supplemental Character Set

8	9	10	11	12	13	14	15	Column (b8 Bits b7 b6 b5 b4 b3 b2 b1)	Row
200 128 80	DCS 220 144 90	240 160 A0		260 176 B0	A 300 192 C0	320 208 D0	a 340 224 E0	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
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	0 1 0 0	4
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	0 1 0 1	5
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	0 1 1 0	6
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	0 1 1 1	7
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	1 0 0 0	8
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	1 0 0 1	9
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	1 0 1 0	10
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	1 0 1 1	11
PLU 214 140 8C	ST 234 156 9C	254 172 AC	1/4 274 188 BC	Ì 314 204 CC	Ü 334 220 DC	ì 354 236 EC	ü 374 252 FC	1 1 0 0	12
RI 215 141 8D	OSC 235 157 9D	255 173 AD	1/2 275 189 BD	Í 315 205 CD	Ý 335 221 DD	í 355 237 ED	ý 375 253 FD	1 1 0 1	13
SS2 216 142 8E	PM 236 158 9E	256 174 AE	276 190 BE	Î 316 206 CE	336 222 DE	î 356 238 EE	376 254 FE	1 1 1 0	14
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	1 1 1 1	15

◄ C1 Codes ►◄ GR Codes (DEC Supplemental Graphic) ►

LJ 00255-TI0

ISO Latin-1 Supplemental Character Set

8	9	10	11	12	13	14	15	Column / Bits b8 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
	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	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	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	3
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	4
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	5
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	6
ESA	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	7
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	8
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	9
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	10
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	11
PLU	214 140 8C ST	234 156 9C ¬	254 172 AC 1/4	274 188 BC Ì	314 204 CC Ü	334 220 DC ì	354 236 EC ü	374 252 FC	12
RI	215 141 8D OSC	235 157 9D —	255 173 AD 1/2	275 189 BD Í	315 205 CD Ý	335 221 DD í	355 237 ED ý	375 253 FD	13
SS2	216 142 8E PM	236 158 9E ®	256 174 AE 3/4	276 190 BE Î	316 206 CE Þ	336 222 DE î	356 238 EE þ	376 254 FE	14
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 ÿ	377 255 FF	15

← C1 Codes ← → GR Codes (ISO Latin-1 Supplemental Graphic) →

LJ 00256-TI0

DEC Special Graphics Character Set

Row	Bits b4 b3 b2 b1	Column 0		Column 1		Column 2		Column 3		Column 4		Column 5		Column 6		Column 7	
	Bits b7 b6 b5	0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	◆	140 96 60	— SCAN 3	160 112 70
1	0 0 0 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	— SCAN 5	161 113 71
2	0 0 1 0	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	— SCAN 7	162 114 72
3	0 0 1 1	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	— SCAN 9	163 115 73
4	0 1 0 0	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	0 1 0 1	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	0 1 1 0	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	0 1 1 1	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	1 0 0 0	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	1 0 0 1	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	1 0 1 0	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	1 0 1 1	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	1 1 0 0	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	1 1 0 1	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	1 1 1 0	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	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	(BLANK)	137 95 5F	— SCAN 1	157 111 6F	DEL	177 127 7F

← C0 Codes → ← GL Codes (DEC Special Graphic) →

LEGEND

Character | ESC | 33 Octal / 27 Decimal / 1B Hex

LJ-00257-TI0

National Replacement Character Sets (NRCs)

Keyboard	NRC Set
United Kingdom	United Kingdom
Danish	Norwegian/Danish
Finnish	Finnish
Flemish	French
French/Belgian	French
Canadian (French)	Canadian (French)
German	German
Italian	Italian
Norwegian	Norwegian/Danish
Portuguese	Portuguese
Spanish	Spanish
Swedish	Swedish
Swiss (French)	Swiss
Swiss (German)	Swiss

Comparing NRCs to the U.S. ASCII Set

Character Set	2/3	4/0	5/11	5/12	5/13	5/14
ASCII	#	@	[	\	]	^
United Kingdom	£	@	[	\	]	^
Finnish	#	@	Ä	Ö	Å	Ü
French	£	à	°	ç	§	^
Canadian (French)	#	à	â	ç	ê	î
German	#	§	Ä	Ö	Ü	^
Italian	£	§	°	ç	é	^
Norwegian / Danish	#	@	Æ	Ø	Å	^
Portuguese	#	@	Ã	Ç	Õ	^
Spanish	£	§	¡	Ñ	¿	^
Swedish	#	É	Ä	Ö	Å	Ü
Swiss	ù	à	é	ç	ê	î

Character Set	5/15	6/0	7/11	7/12	7/13	7/14
ASCII	_	`	{	|	}	~
United Kingdom	_	`	{	|	}	~
Finnish	_	é	ä	ö	å	ü
French	_	`	é	ù	è	¨
Canadian (French)	_	ô	é	ù	è	û
German	_	`	ä	ö	ü	ß
Italian	_	ù	à	ò	è	ì
Norwegian / Danish	_	`	æ	ø	å	~
Portuguese	_	`	ã	ç	õ	~
Spanish	_	`	°	ñ	ç	~
Swedish	_	é	ä	ö	å	ü
Swiss	è	ô	ä	ö	ü	û

DEC Technical Character Set

b4 b3 b2 b1 (b8 b7 b6 b5 →)	Row	0 0 1 0	GL 2	GR 10	0 0 1 1	GL 3	GR 11	0 1 0 0	GL 4	GR 12	0 1 0 1	GL 5	GR 13	0 1 1 0	GL 6	GR 14	0 1 1 1	GL 7	GR 15
0 0 0 0	0				⎬	60 / 48 / 30	260 / 176 / B0	∴	100 / 64 / 40	300 / 192 / C0	Π	120 / 80 / 50	320 / 208 / D0	¬	140 / 96 / 60	340 / 224 / E0	π	160 / 112 / 70	360 / 240 / F0
0 0 0 1	1	⎷	41 / 33 / 21	241 / 161 / A1	⎲	61 / 49 / 31	261 / 177 / B1	∝	101 / 65 / 41	301 / 193 / C1	Ψ	121 / 81 / 51	321 / 209 / D1	α	141 / 97 / 61	341 / 225 / E1	ψ	161 / 113 / 71	361 / 241 / F1
0 0 1 0	2	┌	42 / 34 / 22	242 / 162 / A2	⎳	62 / 50 / 32	262 / 178 / B2	∞	102 / 66 / 42	302 / 194 / C2		122 / 82 / 52	322 / 210 / D2	β	142 / 98 / 62	342 / 226 / E2	ρ	162 / 114 / 72	362 / 242 / F2
0 0 1 1	3	─	43 / 35 / 23	243 / 163 / A3	╲	63 / 51 / 33	263 / 179 / B3	÷	103 / 67 / 43	303 / 195 / C3	Σ	123 / 83 / 53	323 / 211 / D3	χ	143 / 99 / 63	343 / 227 / E3	σ	163 / 115 / 73	363 / 243 / F3
0 1 0 0	4	⌠	44 / 36 / 24	244 / 164 / A4	╱	64 / 52 / 34	264 / 180 / B4	Δ	104 / 68 / 44	304 / 196 / C4		124 / 84 / 54	324 / 212 / D4	δ	144 / 100 / 64	344 / 228 / E4	τ	164 / 116 / 74	364 / 244 / F4
0 1 0 1	5	⌡	45 / 37 / 25	245 / 165 / A5	┐	65 / 53 / 35	265 / 181 / B5	∇	105 / 69 / 45	305 / 197 / C5		125 / 85 / 55	325 / 213 / D5	ε	145 / 101 / 65	345 / 229 / E5	ƒ	165 / 117 / 75	365 / 245 / F5
0 1 1 0	6	│	46 / 38 / 26	246 / 166 / A6	┘	66 / 54 / 36	266 / 182 / B6	Φ	106 / 70 / 46	306 / 198 / C6	√	126 / 86 / 56	326 / 214 / D6	φ	146 / 102 / 66	346 / 230 / E6	ς	166 / 118 / 76	366 / 246 / F6
0 1 1 1	7	⎡	47 / 39 / 27	247 / 167 / A7	〉	67 / 55 / 37	267 / 183 / B7	Γ	107 / 71 / 47	307 / 199 / C7	Ω	127 / 87 / 57	327 / 215 / D7	γ	147 / 103 / 67	347 / 231 / E7	ω	167 / 119 / 77	367 / 247 / F7
1 0 0 0	8	⎣	50 / 40 / 28	250 / 168 / A8	ʕ	70 / 56 / 38	270 / 184 / B8	∼	110 / 72 / 48	310 / 200 / C8	Ξ	130 / 88 / 58	330 / 216 / D8	η	150 / 104 / 68	350 / 232 / E8	ξ	170 / 120 / 78	370 / 248 / F8
1 0 0 1	9	⎤	51 / 41 / 29	251 / 169 / A9		71 / 57 / 39	271 / 185 / B9	≃	111 / 73 / 49	311 / 201 / C9	ϒ	131 / 89 / 59	331 / 217 / D9	ι	151 / 105 / 69	351 / 233 / E9	υ	171 / 121 / 79	371 / 249 / F9
1 0 1 0	10	⎦	52 / 42 / 2A	252 / 170 / AA		72 / 58 / 3A	272 / 186 / BA	Θ	112 / 74 / 4A	312 / 202 / CA	⊂	132 / 90 / 5A	332 / 218 / DA	θ	152 / 106 / 6A	352 / 234 / EA	ζ	172 / 122 / 7A	372 / 250 / FA
1 0 1 1	11	⎛	53 / 43 / 2B	253 / 171 / AB		73 / 59 / 3B	273 / 187 / BB	×	113 / 75 / 4B	313 / 203 / CB	⊃	133 / 91 / 5B	333 / 219 / DB	κ	153 / 107 / 6B	353 / 235 / EB	←	173 / 123 / 7B	373 / 251 / FB
1 1 0 0	12	⎝	54 / 44 / 2C	254 / 172 / AC	≤	74 / 60 / 3C	274 / 188 / BC	Λ	114 / 76 / 4C	314 / 204 / CC	∩	134 / 92 / 5C	334 / 220 / DC	λ	154 / 108 / 6C	354 / 236 / EC	→	174 / 124 / 7C	374 / 252 / FC
1 1 0 1	13	⎞	55 / 45 / 2D	255 / 173 / AD	≠	75 / 61 / 3D	275 / 189 / BD	⇔	115 / 77 / 4D	315 / 205 / CD	∪	135 / 93 / 5D	335 / 221 / DD		155 / 109 / 6D	355 / 237 / ED	↑	175 / 125 / 7D	375 / 253 / FD
1 1 1 0	14	⎠	56 / 46 / 2E	256 / 174 / AE	≥	76 / 62 / 3E	276 / 190 / BE	⇒	116 / 78 / 4E	316 / 206 / CE	∧	136 / 94 / 5E	336 / 222 / DE	ν	156 / 110 / 6E	356 / 238 / EE	↓	176 / 126 / 7E	376 / 254 / FE
1 1 1 1	15	⎨	57 / 47 / 2F	257 / 175 / AF	∫	77 / 63 / 3F	277 / 191 / BF	≡	117 / 79 / 4F	317 / 207 / CF	∨	137 / 95 / 5F	337 / 223 / DF	∂	157 / 111 / 6F	357 / 239 / EF			

LEGEND

Character	Codes (GL)	Codes (GR)	
α	101	301*	Octal
	65	193	Decimal
	41	C1	Hex

* Note
When Set is Mapped Into GR
Bit B8 is 1

LJ-00258-TI0

PC International and PC Multilingual Character Sets (CO and GL)

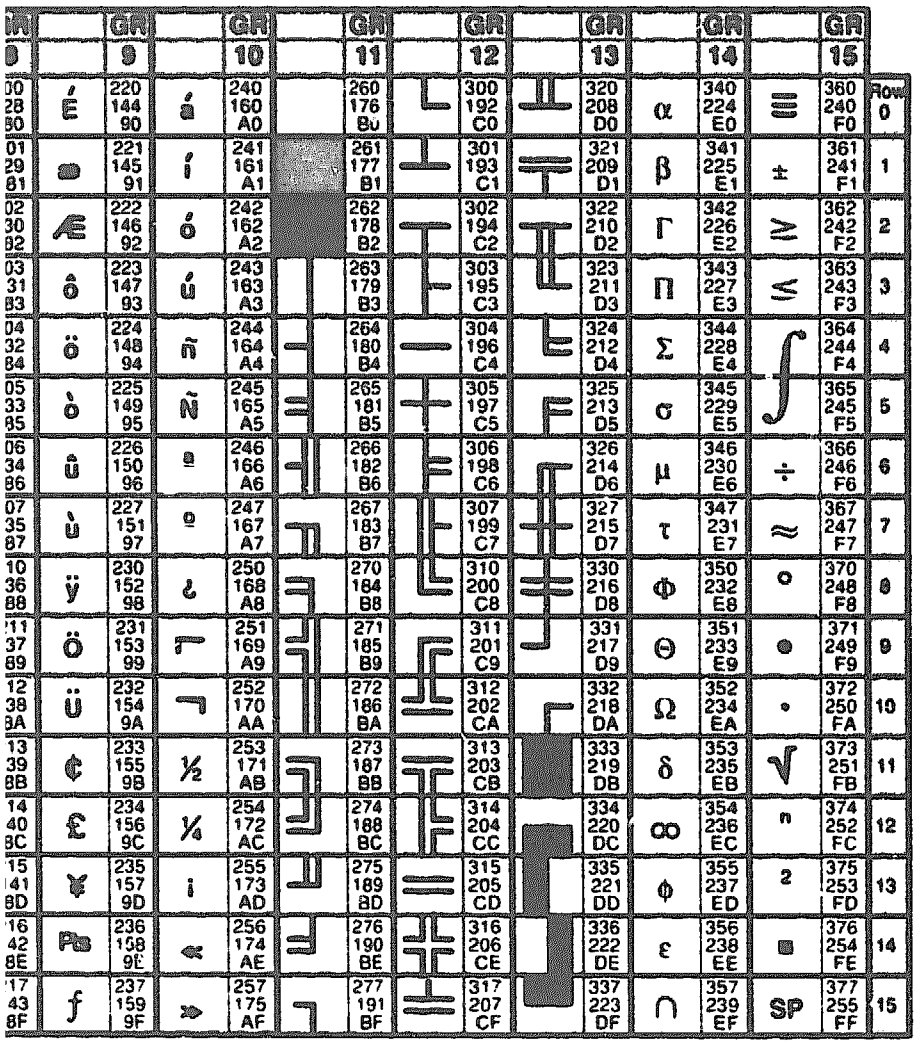
	GL		GL		GL		GL		GL		GL		GL		GL	
Column	0		1		2		3		4		5		6		7	
Row 0	0 0 0	▶	20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70	Row 0
1	1 1 1	◀	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71	1
2	2 2 2	↕	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72	2
3	3 3 3	!!	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	3
4	4 4 4	¶	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	4
5	5 5 5	§	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	5
6	6 6 6	▬	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	6
7	7 7 7	↨	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	7
8	10 8 8	↑	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	8
9	11 9 9	↓	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	9
10	12 10 A	→	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	10
11	13 11 B	←	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	[	133 91 5B	k	153 107 6B	{	173 123 7B	11
12	14 12 C	∟	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	\	134 92 5C	l	154 108 6C	|	174 124 7C	12
13	15 13 D	↔	35 29 1D	-	55 45 2D	=	61 3D	M	115 77 4D	]	135 93 5D	m	155 109 6D	}	175 125 7D	13
14	16 14 E	▲	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	~	176 126 7E	14
15	17 15 F	▼	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	⌂	177 127 7F	15

LEGEND

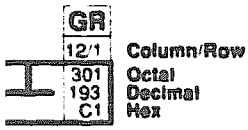
GL	
4/1	Column/Row
A 101	Octal
A 65	Decimal
A 41	Hex

LJ-00261-TI0

ter Set (C1 and GR)



	GR 9		GR 10		GR 11		GR 12		GR 13		GR 14		GR 15	Row
00 28 80	É 220 144 90	á	240 160 A0		260 176 B0		300 192 C0		320 208 D0	α	340 224 E0	≡	360 240 F0	0
01 29 81	▬ 221 145 91	í	241 161 A1		261 177 B1		301 193 C1		321 209 D1	β	341 225 E1	±	361 241 F1	1
02 30 82	Æ 222 146 92	ó	242 162 A2		262 178 B2		302 194 C2		322 210 D2	Γ	342 226 E2	≥	362 242 F2	2
03 31 83	ô 223 147 93	ú	243 163 A3		263 179 B3		303 195 C3		323 211 D3	Π	343 227 E3	≤	363 243 F3	3
04 32 84	ö 224 148 94	ñ	244 164 A4		264 180 B4		304 196 C4		324 212 D4	Σ	344 228 E4	⌠	364 244 F4	4
05 33 85	ò 225 149 95	Ñ	245 165 A5		265 181 B5		305 197 C5		325 213 D5	σ	345 229 E5	⌡	365 245 F5	5
06 34 86	û 226 150 96	ª	246 166 A6		266 182 B6		306 198 C6		326 214 D6	μ	346 230 E6	÷	366 246 F6	6
07 35 87	ù 227 151 97	º	247 167 A7		267 183 B7		307 199 C7		327 215 D7	τ	347 231 E7	≈	367 247 F7	7
10 36 88	ÿ 230 152 98	¿	250 168 A8		270 184 B8		310 200 C8		330 216 D8	Φ	350 232 E8	°	370 248 F8	8
11 37 89	Ö 231 153 99	⌐	251 169 A9		271 185 B9		311 201 C9		331 217 D9	Θ	351 233 E9	●	371 249 F9	9
12 38 8A	Ü 232 154 9A	¬	252 170 AA		272 186 BA		312 202 CA		332 218 DA	Ω	352 234 EA	•	372 250 FA	10
13 39 8B	¢ 233 155 9B	½	253 171 AB		273 187 BB		313 203 CB		333 219 DB	δ	353 235 EB	√	373 251 FB	11
14 40 8C	£ 234 156 9C	¼	254 172 AC		274 188 BC		314 204 CC		334 220 DC	∞	354 236 EC	n	374 252 FC	12
15 41 8D	¥ 235 157 9D	¡	255 173 AD		275 189 BD		315 205 CD		335 221 DD	ϕ	355 237 ED	2	375 253 FD	13
16 42 8E	Pts 236 158 9E	«	256 174 AE		276 190 BE		316 206 CE		336 222 DE	ε	356 238 EE	■	376 254 FE	14
17 43 8F	ƒ 237 159 9F	»	257 175 AF		277 191 BF		317 207 CF		337 223 DF	∩	357 239 EF	SP	377 255 FF	15

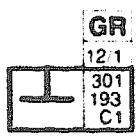


LJ-00262-TI0

PC Multilingual Character Set (C1 and GR)

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

LEGEND



Column/Row
Octal
Decimal
Hex

LJ-00319 TI0

National PC Character Sets

The National PC character sets are the same as the PC International character set, except as indicated in the following table:

PC Character Set	Hexidecimal Value					
	86	89	8B	8C	8E	8F
PC International	å	ë	ï	î	Ä	Å
PC Danish/ Norwegian						
PC Spanish	À					È
PC Portuguese	Á	Ê	Í	Ô	Ã	Â

	91	92	93	94	96	98	99
PC International	æ	Æ	ô	ö	û	ÿ	Ö
PC Danish/ Norwegian							
PC Spanish	Í	Ó				Á	
PC Portuguese	À	È	ô	õ	Ú	Ì	Õ

	9B	9D	9F	A9	AA	AF
PC International		¥	ƒ	⌐	¬	»
PC Danish/ Norwegian	ø	Ø				¤
PC Spanish	Ò	Ú	Ï	⌐	¬	
PC Portuguese		Ù	Ó	Ò		

Control Characters

C0 (7-Bit) Control Characters Recognized

Name	Mnemonic Column /Row	Function
Null*	NUL 0/0	NUL has no function (ignored by the terminal).
Enquiry	ENQ 0/5	Sends the answerback message. (Communications Set-Up)
Bell	BEL 0/7	Sounds the bell tone if the bell is enabled in the Keyboard Set-Up.
BS	BS 0/8	Moves the cursor one character position to the left. If the cursor is at the left margin, no action occurs.
Horizontal tab	HT 0/9	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 0/10	Causes a line feed or a new line operation, depending on the setting of line feed/new line mode.
Vertical tab	VT 0/11	Treated as LF.
Form feed	FF 0/12	Treated as LF.

Name	Mnemonic Column /Row	Function
Carriage return	CR 0/13	Moves the cursor to the left margin on the current line.
Shift out (Locking shift 1)*	SO (LS1) 0/14	Maps the G1 character set into GL. You designate G1 by using a select character set (SCS) sequence.
Shift in (Locking shift 0)*	SI (LS0) 0/15	Maps the G0 character set into GL. You designate G0 by using a select character set (SCS) sequence.
Device control 1 (XON)	DC1 1/1	Also known as XON. If XON/XOFF flow control is enabled in the Communications Set-Up, DC1 clears DC3 (XOFF). This action causes the terminal to continue sending characters.
Device control 3 (XOFF)	DC3 1/3	Also known as XOFF. If XON/XOFF flow control is enabled in the Communications Set-Up, DC3 causes the terminal to stop sending characters. The terminal cannot resume sending characters until it receives a DC1 control character.
Device control 4*	DC4 1/4	Introduces an SSU session management command. The terminal and host use this control to separate SSU commands from ANSI text and control functions.
Cancel*	CAN 1/8	Immediately cancels an escape sequence, control sequence, or device control string in progress. The terminal does not display any error characters.
Substitute*	SUB 1/10	Immediately cancels an escape sequence, control sequence, or device control string in progress. The terminal displays a reverse question mark for an error character.
Escape	ESC 1/11	Introduces an escape sequence. ESC also cancels any escape sequence, control sequence, or device control string in progress.
Delete*	DEL 7/15	Ignored when received, unless a 96-character set is mapped into GL. DEL is not used as a fill character. Using DEL as a fill character is not recommended. Use NUL instead.

*When you connect a PC keyboard to the terminal and select a PC character set, the terminal displays the control character instead of executing it.

C1 (8-Bit) Control Characters Recognized

NOTE

On PC keyboards, to display any 8-bit control character instead of executing it, set the character set mode to 7-bit PC Characters in the General Set-Up screen (Chapter 7).

Name	Mnemonic Column /Row	Function
Index	IND 8/4	Moves the cursor down one line in the same column. If the cursor is at the bottom margin, the page scrolls up.
Next line	NEL 8/5	Moves the cursor to the first position on the next line. If the cursor is at the bottom margin, the page scrolls up.
Horizontal tab set	HTS 8/8	Sets a horizontal tab stop at the column where the cursor is.
Reverse index	RI 8/13	Moves the cursor up one line in the same column. If the cursor is at the top margin, the page scrolls down.
Single shift 2	SS2 8/14	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.
Single shift 3	SS3 8/15	Temporarily maps the G3 character set into GL, for the next graphic character. You designate the G3 set by using a select character set (SCS) sequence.
Device control string	DCS 9/0	Introduces a device control string. Used for loading function keys or a soft character set.
Start of string	SOS 9/8	Ignored.
DEC private identification	DECID 9/10	Makes the terminal send its device attributes response to the host (same as an ANSI device attributes (DA) sequence). Programs should use the ANSI DA sequence instead.

NOTE

If the printer is in controller mode, the terminal sends the sequence to the printer.

Control sequence introducer	CSI 9/11	Introduces a control sequence.
String terminator	ST 9/12	Ends a device control string. You use ST in combination with DCS.
Operating system command	OSC 9/13	Introduces an operating system command.*
Privacy message	PM 9/14	Introduces a privacy message string.*
Application program command	APC 9/15	Introduces an application program command.*

*The terminal ignores all following characters until it receives a SUB, ST, or any other C1 control character.

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
Start of string	SOS	ESC X
DEC private identification	DECID	ESC Z
Control sequence introducer	CSI	ESC [
String terminator	ST	ESC \
Operating system command	OSC	ESC]
Privacy message	PM	ESC ^
Application program	APC	ESC _

Using Macros

The terminal lets you define and invoke macros to suit the needs of your application. A *macro* is a string of ANSI text and commands downloaded into the terminal. By invoking the macro, you can execute a group of control functions with one operation.

Name	Mnemonic	Sequence
Define macro	DECDMAC	DCS *Pid* ; *Pdt* ; *Pen* ! z *D...D* ST
	Pid =	macro ID number (0–63).
	Pdt =	macros to delete first.
	0 =	delete all current macros.
	1 =	delete all current macros.
	Other =	terminal ignores the macro.
	Pen =	encoding format for macro text.
	0 =	standard ASCII characters.
	1 =	hex pairs for each ASCII character.
	Other =	terminal ignores the macro.
	D...D =	control string data.
	! =	repeat sequence introducer.
Invoke macro	DECINVM	CSI *Pid* * z
	Pid =	macro ID number.

Display Controls Mode

Display Controls Font (Left Half)

Row	Column 0	1	2	3	4	5	6	7
0	NUL	DLO	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
10	LF	?	*	:	J	Z	j	z
11	VT	ESC	+	;	K	[	k	{
12	FF	FS	,	<	L	\	l	|
13	CR	GS	-	=	M	]	m	}
14	SO	RS	.	>	N	^	n	~
15	SI	US	/	?	O	_	o	DT

Row	b4	b3	b2	b1
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

Column	0	1	2	3	4	5	6	7
b8	0	0	0	0	0	0	0	0
b7	0	0	0	0	1	1	1	1
b6	0	0	1	1	0	0	1	1
b5	0	1	0	1	0	1	0	1

C0 Codes — GL Codes (ASCII Graphic)

LEGEND

Character ESC — Octal 33, Decimal 27, Hex 1B

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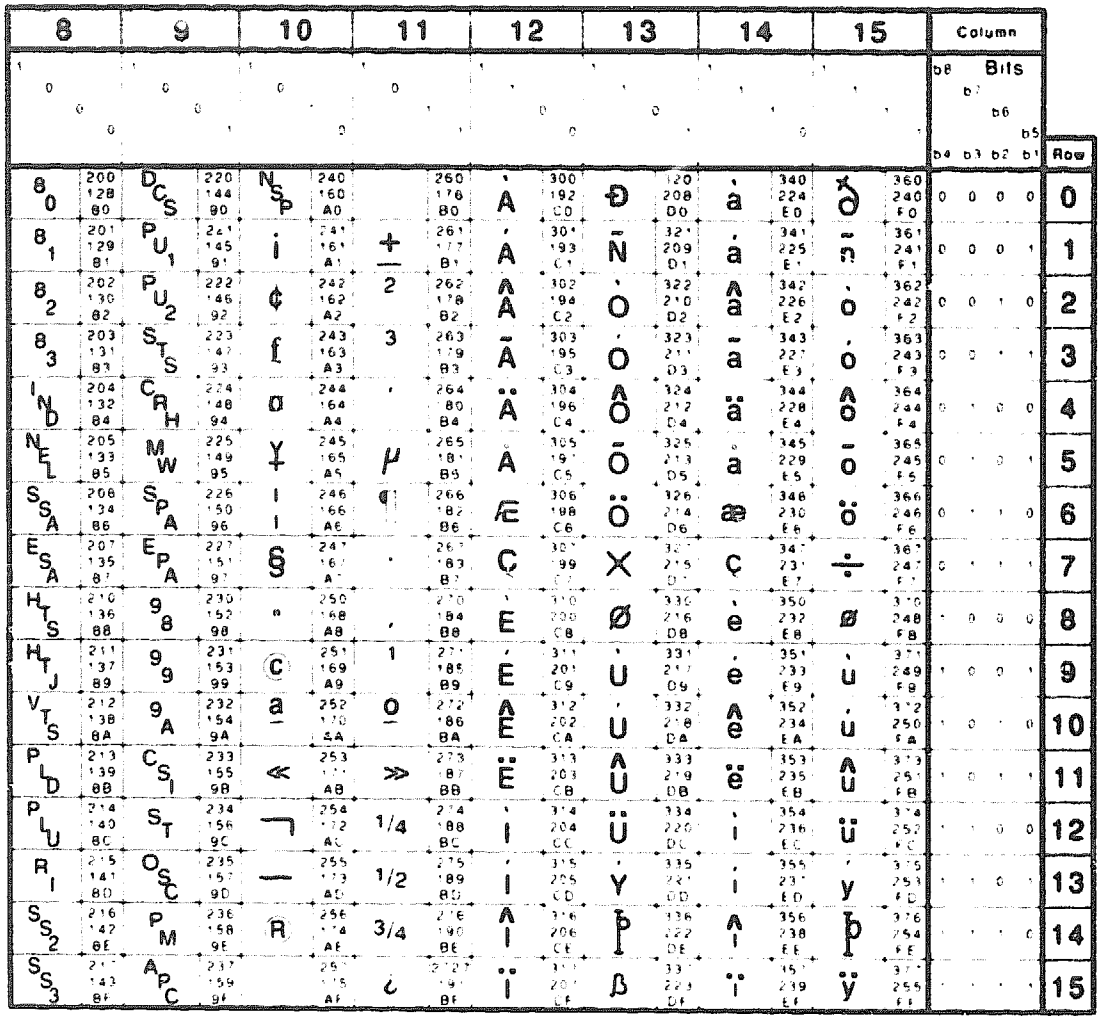
Display Controls Font (Right Half)



LJ 00259-TI0

Codes Sent by Editing Keypad Keys

Key	Code Sent in VT Mode	
	VT400	VT100, VT52
Find	CSI 1 ~	The editing keys do not send codes in these two modes.
Insert Here	CSI 2 ~	
Remove	CSI 3 ~	
Select	CSI 4 ~	
Prev	CSI 5 ~	
Next	CSI 6 ~	

Codes Sent by Arrow Keys

	Cursor Key Mode Setting (DECCKM)		
	ANSI Mode*		VT52 Mode*
Key	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

*ANSI mode applies to VT420 and VT100 modes. VT52 mode is not compatible with ANSI mode.

	Numeric Keypad Mode Setting (DECNKM)			
	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 VT400 and VT100 modes. VT52 mode is not compatible with ANSI standards.
†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 Top-Row Function Keys

Key	Code Sent in VT Mode	
	VT400	VT100, VT52
F1 (Hold)	CSI 1 1 ~	—
F2 (Print)	CSI 1 2 ~	—
F3 (Set-Up)	CSI 1 3 ~	—
F4 (Session)	CSI 1 4 ~	—
F5 (Break)	CSI 1 5 ~	—
F6	CSI 1 7 ~	—
F7	CSI 1 8 ~	—
F8	CSI 1 9 ~	—
F9	CSI 2 0 ~	—
F10	CSI 2 1 ~	—
F11 (ESC)	CSI 2 3 ~	ESC
F12 (BS)	CSI 2 4 ~	BS
F13 (LF)	CSI 2 5 ~	LF
F14	CSI 2 6 ~	—
F15 (Help)	CSI 2 8 ~	—
F16 (Do)	CSI 2 9 ~	—
F17	CSI 3 1 ~	—
F18	CSI 3 2 ~	—
F19	CSI 3 3 ~	—
F20	CSI 3 4 ~	—

Key	Code Sent in VT Mode	
	VT400	VT100, VT52
Shift F1	CSI 1 1 ; 2 ~	—
Shift F2	CSI 1 2 ; 2 ~	—
Shift F3	CSI 1 3 ; 2 ~	—
Shift F4	CSI 1 4 ; 2 ~	—
Shift F5	CSI 1 5 ; 2 ~	—
Shift F6	CSI 1 7 ; 2 ~	—
Shift F7	CSI 1 8 ; 2 ~	—
Shift F8	CSI 1 9 ; 2 ~	—
Shift F9	CSI 2 0 ; 2 ~	—
Shift F10	CSI 2 1 ; 2 ~	—
Shift F11	CSI 2 3 ; 2 ~	—
Shift F12	CSI 2 4 ; 2 ~	—
Shift F13	CSI 2 5 ; 2 ~	—
Shift F14	CSI 2 6 ; 2 ~	—
Shift F15	CSI 2 8 ; 2 ~	—
Shift F16	CSI 2 9 ; 2 ~	—
Shift F17	CSI 3 1 ; 2 ~	—
Shift F18	CSI 3 2 ; 2 ~	—
Shift F19	CSI 3 3 ; 2 ~	—
Shift F20	CSI 3 4 ; 2 ~	—

Keys Used to Send 7-Bit Control Characters

Control Character Mnemonic	Code Table Position	Key Pressed With Ctrl (All Modes)	Dedicated Function Key
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†	—
DC2	1/02	R	—
DC3	1/03	S†	—
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 characters sent in VT100 or VT52 modes only.

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

PC Keyboard Codes (101/102 Keys and VT Mode Only)

Codes Sent by Editing Keypad Keys in PC Layout and ANSI Layout

	Layout	
Key*	PC	ANSI
Insert	CSI 2 ~	CSI 2 ~
Home	CSI H ~	CSI 1 ~
Page Up	CSI 5 ~	CSI 5 ~
Delete	DEL	CSI 3 ~
End	CSI 4 ~	CSI 4 ~
Page Down	CSI 6 ~	CSI 6 ~

*Code sent in VT400 and VT100 modes.

Codes Sent by Arrow Keys in Cursor Key Mode (DECCKM)

	Code Sent in VT400 and VT100 Modes	
Key	Cursor	Application
↑	CSI A	SS3 x
↓	CSI B	SS3 r
→	CSI C	SS3 v
←	CSI D	SS3 t

Codes Sent by Local Function Keys in PC Layout

The following codes match the key when you define the key as an F-key in the Keyboard Set-Up screen. The default code for **Alt Print Screen** displays the set-up screen. The default code for **Alt Scroll Lock** is to switch the session.

The local function keys do not send a code when the PC keyboard is in ANSI keyboard mode.

	Code Sent in VT400 Mode
Key	PC Layout
Scroll Lock	CSI 1 1 ~
Print Screen	CSI 1 2 ~
Alt Print Screen	CSI 1 3 ~
Alt Scroll Lock	CSI 1 4 ~
Alt Pause	CSI 1 5 ~

Codes Sent by Numeric Keypad Keys in PC Layout

Key†	Numeric Keypad Mode Setting (DECNKM) Numeric		Application
	Num Lock On	Num Lock Off	
Num Lock	—	—	SS3 P
-	-		
/	/		SS3 Q
*	*		SS3 R
-	-		SS3 m
+	+		SS3 l
Enter	CR or CR LF		SS3 M
. Del	.	Del	SS3 n
0 Ins	0	CSI 2 ~	SS3 p
1 End	1	CSI 4 ~	SS3 q
2 ↓	2	CSI B	SS3 r
3 PgDn	3	CSI 6 ~	SS3 s
4 ←	4	CSI D	SS3 t
5	5	—	SS3 u
6 →	6	CSI C	SS3 v
7 Home	7	CSI H	SS3 w
8 ↑	8	CSI A	SS3 x
9 PgUp	9	CSI 5 ~	SS3 y

†When the terminal is in VT400 mode or VT100 mode.

Codes Sent by Numeric Keypad Keys in ANSI Layout

Key†	Numeric Keypad Mode Setting (DECNKM) Numeric	Application
Num Lock (PF1)	SS3 P	SS3 P
/ (PF2)	SS3 Q	SS3 Q
* (PF3)	SS3 R	SS3 R
- (PF4)	SS3 S	SS3 S
Alt -		SS3 m
+	+	SS3 l
Enter	CR or CR LF	SS3 M
Del	.	SS3 n
0 Ins	0	SS3 p
1 End	1	SS3 q
2 ↓	2	SS3 r
3 PgDn	3	SS3 s
4 ←	4	SS3 t
5	5	SS3 u
6 →	6	SS3 v
7 Home	7	SS3 w
8 ↑	8	SS3 x
9 PgUp	9	SS3 y

†When the terminal is in VT400 mode or VT100 mode.

Codes Sent by Top-Row Function Keys in PC Layout

Key	Code Sent
F1	CSI 1 1 ~
F2	CSI 1 2 ~
F3	CSI 1 3 ~
F4	CSI 1 4 ~
F5	CSI 1 5 ~
F6	CSI 1 7 ~
F7	CSI 1 8 ~
F8	CSI 1 9 ~
F9	CSI 2 0 ~
F10	CSI 2 1 ~
F11	CSI 2 3 ~
F12	CSI 2 4 ~
Alt F1	CSI 2 3 ~
Alt F2	CSI 2 4 ~
Alt F3	CSI 2 5 ~
Alt F4	CSI 2 6 ~
Alt F5	CSI 2 8 ~
Alt F6	CSI 2 9 ~
Alt F7	CSI 3 1 ~
Alt F8	CSI 3 2 ~
Alt F9	CSI 3 3 ~
Alt F10	CSI 3 4 ~
Alt F11	CSI 3 5 ~
Alt F12	CSI 3 6 ~

Key	Code Sent
Shift F1	CSI 1 1 ; 2 ~
Shift F2	CSI 1 2 ; 2 ~
Shift F3	CSI 1 3 ; 2 ~
Shift F4	CSI 1 4 ; 2 ~
Shift F5	CSI 1 5 ; 2 ~
Shift F6	CSI 1 7 ; 2 ~
Shift F7	CSI 1 8 ; 2 ~
Shift F8	CSI 1 9 ; 2 ~
Shift F9	CSI 2 0 ; 2 ~
Shift F10	CSI 2 1 ; 2 ~
Shift F11	CSI 2 3 ; 2 ~
Shift F12	CSI 2 4 ; 2 ~
Alt Shift F1	CSI 2 3 ; 2 ~
Alt Shift F2	CSI 2 4 ; 2 ~
Alt Shift F3	CSI 2 5 ; 2 ~
Alt Shift F4	CSI 2 6 ; 2 ~
Alt Shift F5	CSI 2 8 ; 2 ~
Alt Shift F6	CSI 2 9 ; 2 ~
Alt Shift F7	CSI 3 1 ; 2 ~
Alt Shift F8	CSI 3 2 ; 2 ~
Alt Shift F9	CSI 3 3 ; 2 ~
Alt Shift F10	CSI 3 4 ; 2 ~
Alt Shift F11	CSI 3 5 ; 2 ~
Alt Shift F12	CSI 3 6 ; 2 ~

Customizing Top-Row Function Keys (ANSI and PC Keyboards)

Keyboard		
ANSI	**PC (PC Layout)**	**Default Code**
F1	F1	CSI 1 1 ~
F2	F2	CSI 1 2 ~
F3	F3	CSI 1 3 ~
F4	F4	CSI 1 4 ~
F5	F5	CSI 1 5 ~
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	F11 or	CSI 2 3 ~
	Alt F1	
F12	F12 or	CSI 2 4 ~
	Alt F2	
F13	Alt F3	CSI 2 5 ~
F14	Alt F4	CSI 2 6 ~
Help (F15)	Alt F5	CSI 2 8 ~
Do (F16)	Alt F6	CSI 2 9 ~
F17	Alt F7	CSI 3 1 ~
F18	Alt F8	CSI 3 2 ~
F19	Alt F9	CSI 3 3 ~
F20	Alt F10	CSI 3 4 ~
	Alt F11	CSI 3 5 ~
	Alt F12	CSI 3 6 ~

Keyboard Key		
ANSI	**PC**	**Default Code**
Shift F1	Shift F1	CSI 1 1 ; 2 ~
Shift F2	Shift F2	CSI 1 2 ; 2 ~
Shift F3	Shift F3	CSI 1 3 ; 2 ~
Shift F4	Shift F4	CSI 1 4 ; 2 ~
Shift F5	Shift F5	CSI 1 5 ; 2 ~
Shift F6	Shift F6	CSI 1 7 ; 2 ~
Shift F7	Shift F7	CSI 1 8 ; 2 ~
Shift F8	Shift F8	CSI 1 9 ; 2 ~
Shift F9	Shift F9	CSI 2 0 ; 2 ~
Shift F10	Shift F10	CSI 2 1 ; 2 ~
Shift F11	Shift F11 or	CSI 2 3 ; 2 ~
	Alt Shift F1	
Shift F12	Shift F12 or	CSI 2 4 ; 2 ~
	Alt Shift F2	
Shift F13	Alt Shift F3	CSI 2 5 ; 2 ~
Shift F14	Alt Shift F4	CSI 2 6 ; 2 ~
Shift F15	Alt Shift F5	CSI 2 8 ; 2 ~
Shift F16	Alt Shift F6	CSI 2 9 ; 2 ~
Shift F17	Alt Shift F7	CSI 3 1 ; 2 ~
Shift F18	Alt Shift F8	CSI 3 2 ; 2 ~
Shift F19	Alt Shift F9	CSI 3 3 ; 2 ~
Shift F20	Alt Shift F10	CSI 3 4 ; 2 ~
	Alt Shift F11	CSI 3 5 ; 2 ~
	Alt Shift F12	CSI 3 6 ; 2 ~

PC Keyboard Scan Codes (101/102 Keys and PC TERM Mode Only)

Scan Codes Sent by Alphanumeric Keys

The key numbers in the following table correspond to the key numbers on the keyboard drawings at the end of this section.

Key	Make Code	Break Code
1	29	A9
2	02	82
3	03	83
4	04	84
5	05	85
6	06	86
7	07	87
8	08	88
9	09	89
10	0A	8A
11	0B	8B
12	0C	8C
13	0D	8D
15	0E	8E
16	0F	8F
17	10	90
18	11	91
19	12	92
20	13	93
21	14	94
22	15	95
23	16	96
24	17	97
25	18	98
26	19	99
27	1A	9A
28	1B	9B
29*	2B	AB
30	3A	BA
31	1E	9E
32	1F	9F
33	20	A0
34	21	A1
35	22	A2
36	23	A3
37	24	A4
38	25	A5
39	26	A6
40	27	A7
41	28	A8
42†	2B	AB
43	1C	9C
44	2A	AA
45†	56	D6
46	2C	AC
47	2D	AD
48	2E	AE
49	2F	AF
50	30	B0
51	31	B1
52	32	B2
53	33	B3
54	34	B4
55	35	B5
57	36	B6
58	1D	9D
60	38	B8
61	39	B9
62	E0 38	E0 B8
64	E0 1D	E0 9D

*This key is on the PC keyboard with 101 keys only (EPC).
†This key is on the PC keyboard with 102 keys only (IEPC).

Scan Codes Sent by Editing and Arrow Keypad Keys

Key	Make Code	Break Code
Unshift Case or Shift + Num Lock		
75	E0 52	E0 D2
76	E0 53	E0 D3
79	E0 4B	E0 CB
80	E0 47	E0 C7
81	E0 4F	E0 CF
83	E0 48	E0 C8
84	E0 50	E0 D0
85	E0 49	E0 C9
86	E0 51	E0 D1
89	E0 4D	E0 CD
	Shift Case*	
75	E0 AA E0 52	E0 D2 E0 2A
76	E0 AA E0 53	E0 D3 E0 2A
79	E0 AA E0 4B	E0 CB E0 2A
80	E0 AA E0 47	E0 C7 E0 2A
81	E0 AA E0 4F	E0 CF E0 2A
83	E0 AA E0 48	E0 C8 E0 2A
84	E0 AA E0 50	E0 D0 E0 2A
85	E0 AA E0 49	E0 C9 E0 2A
86	E0 AA E0 51	E0 D1 E0 2A
89	E0 AA E0 4D	E0 CD E0 2A
Num Lock On		
75	E0 2A E0 53	E0 D2 E0 AA
76	E0 2A E0 54	E0 D3 E0 AA
79	E0 2A E0 4B	E0 CB E0 AA
80	E0 2A E0 47	E0 C7 E0 AA
81	E0 2A E0 4F	E0 CF E0 AA
83	E0 2A E0 48	E0 C8 E0 AA
84	E0 2A E0 50	E0 D0 E0 AA
85	E0 2A E0 49	E0 C9 E0 AA
86	E0 2A E0 51	E0 D1 E0 AA
89	E0 2A E0 4D	E0 CD E0 AA

*When the right Shift key is pressed, the Shift make/break action sends the scan code B6/36 instead of AA/2A. When the right and left Shift keys are pressed, both scan codes are sent.

Scan Codes Sent by Numeric Keypad Keys

Key	Make Code	Break Code
90	45	C5
91	47	C7
92	4B	CB
93	4F	CF
95	E0 35	E0 B5
	Shift Case*	**Shift Case***
	E0 AA E0 35	E0 B5 E0 2A
96	48	C8
97	4C	CC
98	50	D0
99	52	D2
100	37	B7
101	49	C9
102	4D	CD

Key	Make Code	Break Code
103	51	D1
104	53	D3
105	4A	CA
106	4E	CE
108	E0 1C	E0 9C

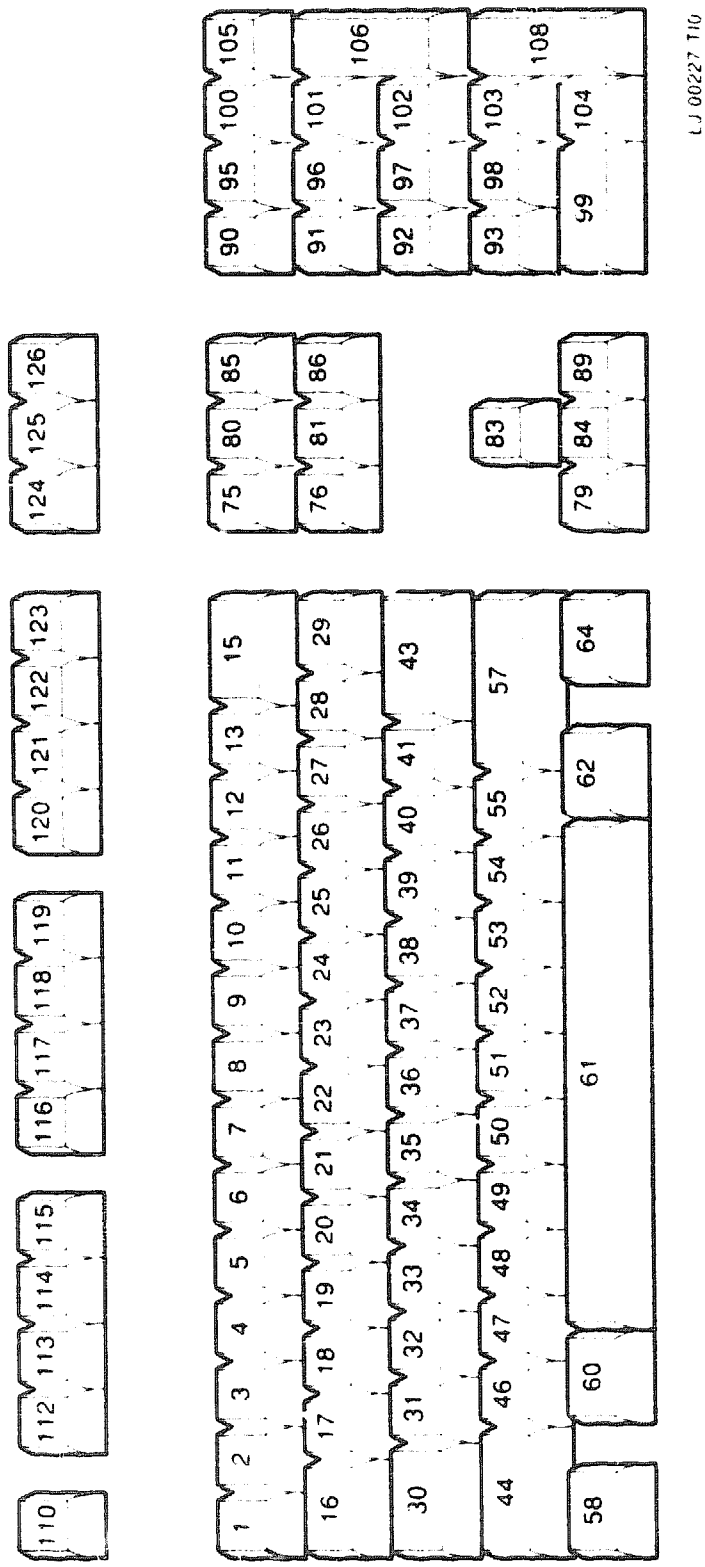
*When the right Shift key is pressed, the Shift make /break action sends the scan code B6/36 instead of AA/2A. When the right and left Shift keys are pressed, both scan codes are sent.

Scan Codes Sent by Function Keys

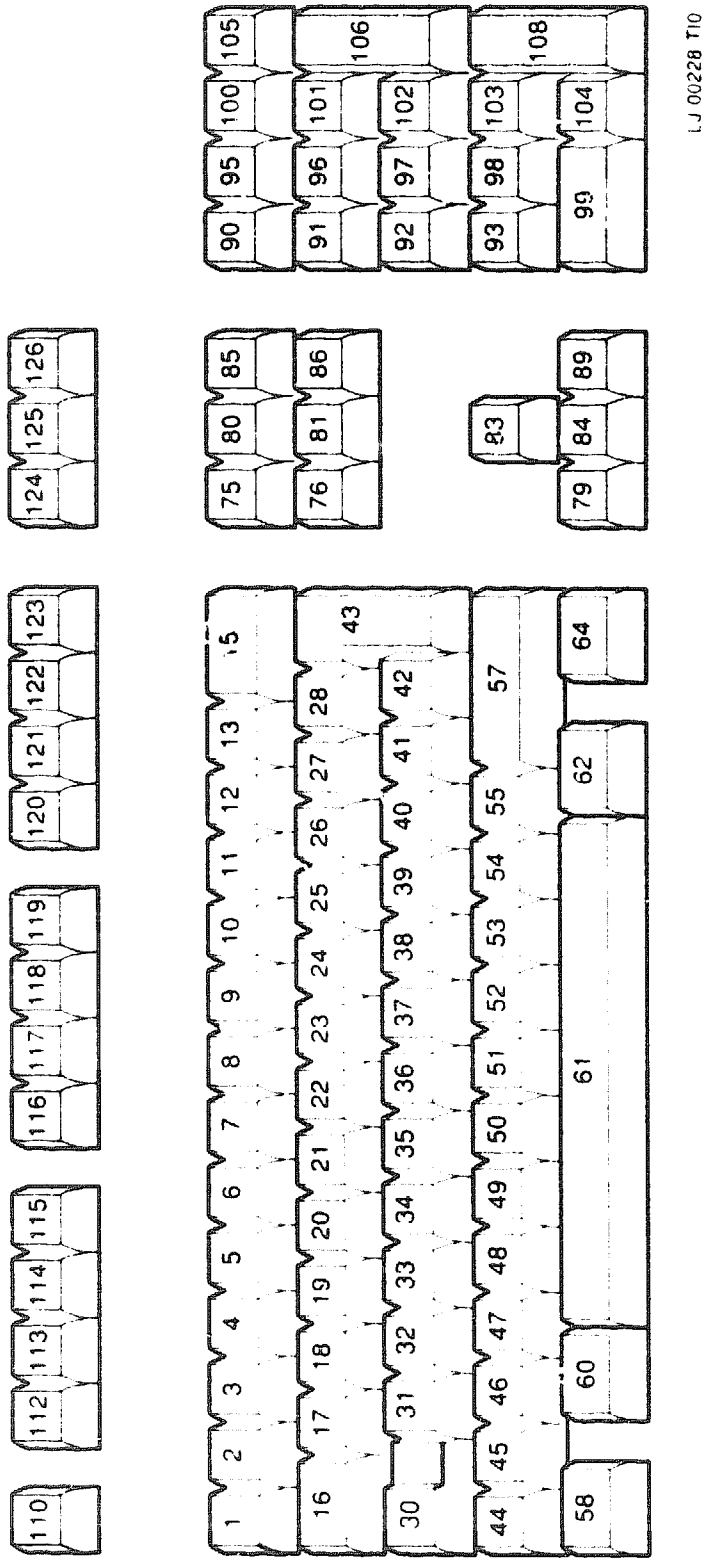
Key	Make Code	Break Code
110	01	81
112	3B	BB
113	3C	BC
114	3D	BD
115	3E	BE
116	3F	BF
117	40	C0
118	41	C1
119	42	C2
120	43	C3
121	44	C4
122	57	D7
123	58	D8
124	E0 2A E0 37	E0 B7 E0 AA
	Ctrl Case, Shift Case	**Ctrl Case, Shift Case**
	E0 37	E0 B7
	Alt Case	**Alt Case**
	54	D4
125	46	C6
		Press Ctrl Key
126*	E1 1D 45 E1 9D C5	E0 46 E0 C6

*This key is not typematic. All associated scan codes occur on the make of the key

PC Keyboard with 101 Keys (EPC)



PC Keyboard with 102 Keys (IEPC)



Operating as VT Series Terminals

Selecting an Operating Level (DECSCL)

Sequence	Level Selected
	Level 1
CSI 6 1 " p	VT100 mode
	*Level 4**
CSI 6 *n* **" p**	VT400 mode, 8-bit controls
CSI 6 *n* **; 0 " p**	VT400 mode, 8-bit controls
CSI 6 *n* **; 1 " p**	VT400 mode, 7-bit controls (D)
CSI 6 *n* **; 2 " p**	VT400 mode, 8-bit controls

*Level 4 includes levels 2 and 3. In these sequences, *n* can be 2 or 3, or 4
(D) = default

Sending C1 Controls to the Host

Sequence	Mode Before	Mode After
7-Bit Controls (S7C1T)		
ESC sp F	VT400 mode, 8-bit controls	VT400 mode, 7-bit controls
	VT400 mode, 7-bit controls	Same. Terminal ignores sequence
	VT100 or VT52 mode	Same. Terminal ignores sequence.
8-Bit Controls (S8C1T)		
ESC sp G	VT400 mode, 8-bit controls	Same. Terminal ignores sequence.
	VT400 mode, 7-bit controls	VT400 mode, 8 bit controls
	VT100 or VT52 mode	Same. Terminal ignores sequence.

Character Set Mode (DECNRCM)

Default: Multinational

Mode	Sequence	Function
Set	**CSI ? 4 2 h**	National: The terminal uses 7-bit characters from an NRC set.
Reset	**CSI ? 4 2 l***	Multinational: The terminal uses 7-bit and 8-bit characters from the DEC Multinational or ISO Latin-1 set.

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

Using Character Sets

Selecting Graphic Character Sets

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)

You designate a hard character set as G0 through G3 by using a select character set (SCS) escape sequence. You cannot designate a 96-character set as G0.

Format:

ESC I_1 I_2 ... I_n **F**

I_1, *intermediate character*
Designates the character set as G0, G1, G2, or G3.

I_1 Character		Code	Set Selection
94-Character Sets			
(	left parenthesis	2/8	G0 (initial setting for GL)
)	right parenthesis	2/9	G1
*	asterisk	2/10	G2 (initial setting for GR)
+	plus sign	2/11	G3
96-Character Sets*			
	hyphen	2/13	G1
	period	2/14	G2
	slash	2/15	G3

*You cannot designate a 96-character set into G0.

I_2...I_n F, intermediate and final characters
Selects one of the standard character sets.

Character Set	I_2...I_n F Characters	Code
94-Character Sets		
ASCII (initial G1 and G0 setting)	**B**	**4/2**

Character Set	$I_2...I_n$ F Characters	Code
Supplemental Graphic (initial G2 and G3 setting)	%5	2/5, 3/5

Character Set	$I_2...I_n$ F Characters	Code
DEC Special Graphics	0	3/0
DEC Technical	>	3/14
User-preferred supplemental	<	3/12
NRC Sets*		
ISO United Kingdom	A	4/1
Dutch	4	3/4
Finnish	5	3/5
ISO French	R	5/2
Canadian (French)	9	3/9
ISO German	K	4/11
ISO Italian	Y	5/9
Norwegian/Danish	6	3/6
ISO Norwegian/Danish	`	6/0
Portuguese	%6	2/5, 3/6
ISO Spanish	Z	5/10
Swedish	7	3/7
Swiss	=	3/13
96-Character Sets		
ISO Latin-1 Supplemental	A	4/1

*Only one NRC set is available at a time. You must select national mode to use NRC sets. See "Character Set Mode (DECNRCM)" at the end of "Operating as VT Series Terminals" in this summary.

Mapping Character Sets

After you designate a character set as G0, G1, G2, or G3, you must map the set into the in-use table as GL or GR. To map a set, you use *locking shift* or *single shift* control functions.

To use a national replacement character set, you must select national replacement character set mode. When you reset this mode, the terminal uses 7-bit and 8-bit characters from one of the multinational character sets (DEC Multinational or ISO Latin-1). When you set this mode, the terminal uses 7-bit characters from an NRC set.

See "Character Set Mode (DECNRCM)" at the end of "Operating as VT Series Terminals" in this summary.

Locking Shifts (LS)

When you use a locking shift, the character set remains in GL or GR until you use another locking shift.

Name	Mnemonic	Code	Maps...
Locking shift G0	LS0	**SI**	**Maps G0 into GL. (default)**
Locking shift G1	LS1	**SO**	G1 into GL.
The following locking shift functions are available only in VT420 mode.			
Locking shift G1 right	LS1R	**ESC ~**	G1 into GR.
Locking shift G2	LS2	**ESC n**	G2 into GL.
Locking shift G2 right	LS2R	**ESC }**	G2 into GR.
Locking shift G3	LS3	**ESC o**	G3 into GL.
Locking shift G3 right	LS3R	**ESC |**	G3 into GR.

Single Shifts (SS)

You use a single shift when you want to display the next character from a different character set. A single shift maps the G2 or G3 set into GL. The character set is active for only one character. Then the terminal returns to the previous character set in GL.

Name	8-Bit Code	7-Bit Code	Function
Single shift 2	SS2	ESC N	Maps G2 into GL for the next character.
Single shift 3	SS3	ESC O	Maps G3 into GL for the next character.

Assigning User-Preferred Supplemental Sets (DECAUPSS)

Default: Supplemental Graphic

Sequence	Set Selected
DCS 0 ! u % 5 ST	Supplemental Graphic
DCS 1 ! u A ST	ISO Latin-1 supplemental

ANSI Conformance Levels

ESC sp *Final*

Final	ANSI Conformance Level
L	Level 1
M	Level 2
N	Level 3

Soft Character Sets

You can only load soft character sets in VT400 mode.

Character Cell Sizes

Cell Size	80 Columns	132 Columns
24 lines/screen		
Width	10 pixels	6 pixels
Height	16	16
36 lines/screen		
Width	10	6
Height	10	10
48 lines/screen		
Width	10	6
Height	8	8

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

Binary Value	Hex Value	Hex Value + 3F Offset	Character Equivalent
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
110010	32	71	q
110011	33	72	r
100100	34	73	s
110101	35	74	t
110110	36	75	u

Binary Value	Hex Value	Hex Value + 3F Offset	Character Equivalent
110111	37	76	v
111000	38	77	w
111001	39	78	x
111010	3A	79	y
111011	3B	7A	z
111100	3C	7B	{
111101	3D	7C	|
111110	3E	7D	}
111111	3F	7E	~

Downloading Soft Characters

Use the following sequence format:

DCS *Pfn ; Pcn; Pe; Pcmw; Pss; Pt; Pcmh; Pcss { Dscs Sxbp1 ; Sxbp2 ;...; Sxbpn* **ST**

DECDLD Parameter Characters

Parameter	Name	Description
Pfn	Font number	Selects the DRCS font buffer to load. Each session has only one font buffer. Pfn has two valid values, 0 and 1. Both values refer to DRCS buffer 1 for each session
Pcn	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. For example, a Pcn value of 0 means that the first soft character is loaded into position 2/0 of the character table. A Pcn value of 1 means position 2/1 in the table, and so on up to Pcn = 95 (position 7/15) Pcn is affected by the character set size. See Pcss below.
Pe	Erase control	Selects which characters to erase from the DRCS buffer before loading the new font.

Parameter	Name	Description
		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).

NOTE

Erased characters are undefined (not blank). The terminal displays these characters as the error character (reverse question mark).

Pcmw	Character matrix width	Selects the maximum character cell width. *VT400 mode* **0 = 10 pixels wide for 80 columns, 6 pixels wide for 132 columns. (default)** 1 = illegal. 2 = 5 × 10 pixel cell (VT220 compatible). 3 = 6 × 10 pixel cell (VT220 compatible). 4 = 7 × 10 pixel cell (VT220 compatible). 5 = 5 pixels wide. 6 = 6 pixels wide. . . . 10 = 10 pixels wide.

Parameter	Name	Description
Pss	Font set size	Defines the screen width and screen height for this font. **0,1 = 80 columns, 24 lines. (default)** 2 = 132 columns, 24 lines 11 = 80 columns, 36 lines 12 = 132 columns, 36 lines 21 = 80 columns, 48 lines 22 = 132 columns, 48 lines If the number of columns or lines per screen changes, the terminal uses the appropriate variation of the soft set. If you try to display a DRCS character when there is no soft set defined for the current number of lines and columns, the terminal displays the error character (reverse question mark).
Pt	Text or full cell	Defines the font as a text font or *full-cell font*. **0 = text. (default)** 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.

Parameter	Name	Description
Pcmh	Character matrix height	Selects the maximum character cell height. **0 or omitted = 16 pixels high. (default)** 1 = 1 pixel high. 2 = 2 pixels high. 3 = 3 pixels high. . . 16 = 16 pixels high. Pcmh values over 16 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. (default)** 1 = 96-character set. The value of Pcss changes the meaning of the Pcn (starting character) parameter above.

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

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

I F

I is 0, 1 or 2 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

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

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

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

ST
is the *string terminator*. ST is an 8-bit C1 character. You can use the equivalent 7-bit sequence ESC \ (1/11, 5/12) when coding for a 7-bit environment.

Valid DECDLD Parameter Combinations

Pt	Pcmw	Pcmh	Pss*
80-column, 24 lines			
0 or 1	0 to 8	0 to 16	0 or 1
2	0 to 10	0 to 16	0, 1

Pt	Pcmw	Pcmh	Pss*
132-column, 24 lines			
0 or 1	0 to 5	0 to 16	2
2	0 to 6	1 to 16	2
80-column, 36 lines			
0 or 1	0 to 8	0 to 10	11
2	0 to 10	0 to 10	11
132-column, 36 lines			
0 or 1	0 to 5	0 to 10	12
2	0 to 6	0 to 10	12
80-column, 48 lines			
0 or 1	0 to 8	0 to 8	21
2	0 to 10	0 to 8	21
132-column, 48 lines			
0 or 1	0 to 5	0 to 8	22
2	0 to 6	0 to 8	22

*The default values are the maximum legal values in each case.

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 set:

- Performing the power-up self-test.
- Selecting `Recall` or `Defaul` in the Set-Up Directory.
- Using a reset to initial state (RIS) sequence.

Page Memory

Setting the Page Format

Name	Mnemonic	Sequence
Set columns per page	DECSCPP	**CSI** *Pn* **$ |** Pn columns (80 or 132).
Column mode	DECCOLM	Set: **CSI ? 3 h** 132 columns. Reset: **CSI ? 3 l** 80 columns. (D)
Set lines per page	DECSLPP	**CSI** *Pn* **t** Pn lines per page. The number of pages depend on how many sessions you use.

Pn	Dual Sessions	Single Session
24	3 pages	6 pages
25	2	5
36	2	4
48	1	3
72	1	2
144	—	1

Set left and right margins	DECSLRM	**CSI** *Pl* ; *Pr* **s** Pl = left column. Pr = right column.
Set top and bottom margins	DECSTBM	**CSI** *Pt* ; *Pb* **r** Pt = top line. Pb = bottom line.

Name	Mnemonic	Sequence
Origin mode	DECOM	Set: **CSI ? 6 h** Move within margins. Reset: **CSI ? 6 l** Move outside margins. (D)
Vertical split screen mode	DECVSSM	Set: **CSI ? 69 h** Left and right margins can be changed. Reset: **CSI ? 6 9 l** Left and right margins cannot be changed. (D)

(D) = default.

Moving Through Page Memory

Name	Mnemonic	Sequence*
Next page	NP	**CSI** *Pn* **U** Move Pn pages forward. C = home.
Preceding page	PP	**CSI** *Pn* **V** Move Pn pages backward. C = home.
Page position absolute	PPA	**CSI** *Pn* **sp P** Move to page Pn. C = same as old page.
Page position backward	PPB	**CSI** *Pn* **sp R** Move Pn pages backward. C = same as old page.
Page position relative	PPR	**CSI** *Pn* **sp Q** Move Pn pages forward. C = same as old page.

*C= new cursor position.

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 the 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
VT400 or VT100 Mode	
0	All attributes off
1	Bold
4	Underline
5	Blinking
7	Reverse video
VT400 Mode Only	
22	Bold off
24	Underline off
25	Blinking off
27	Reverse video off

Editing Sequences

Name	Mnemonic	Sequence
Insert /replace mode	IRM	Set: **CSI 4 h** Insert characters. Reset: **CSI 4 l** Replace characters.
Delete column	DECDC	**CSI** *Pn* ' ~ Pn columns.
Insert column	DECIC	**CSI** *Pn* ' } Pn columns.
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.
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.
Select character protection attribute*	DECSCA	**CSI** *Ps* **" q**
	Ps =	0, DECSED and DECSEL can erase. (D)
	Ps =	1, DECSED and DECSEL cannot erase.
	Ps =	2, DECSED and DECSEL can erase.
Selective erase in display*	DECSED	**CSI ?** *Ps* **J**
	Ps =	0, cursor to end. (D)
	Ps =	1, beginning to cursor.
	Ps =	2, complete display.
Selective erase in line*	DECSEL	**CSI ?** *Ps* **K**
	Ps =	0, cursor to end. (D)
	Ps =	1, beginning to cursor.
	Ps =	2, complete line.

*Available in VT400 mode only.
(D) = default.

Rectangular Area Operations

Rectangular Area Control Functions

Name	Mnemonic	Sequence*
Copy rectangular area	DECCRA	**CSI** *Pts; Pl; Pbs; Prs; Pps; Ptd; Pld; Ppd* **$ v**
	Pts =	top-line border.
	Pl =	left-column border.
	Pbs =	bottom-line border.
	Prs =	right-column border.
	Pps =	source page number.
	Ptd =	destination top-line border.
	Pld =	destination left-column border.
	Ppd =	destination page number.
Erase rectangular area	DECERA	**CSI** *Pt; Pl; Pb; Pr* **$ z**
	Pt =	top-line border.
	Pl =	left-column border.
	Pb =	bottom-line border.
	Pr =	right-column border.
Fill rectangular area	DECFRA	**CSI** *Pch; Pt; Pl; Pb; Pr* **$ x**
	Pch =	decimal code of fill character.
	Pt =	top-line border.
	Pl =	left-column border.
	Pb =	bottom-line border.
	Pr =	right-column border.
Selective erase rectangular area	DECSERA	**CSI** *Pt; Pl; Pb; Pr* **$ {**
	Pt =	top-line border.
	Pl =	left-column border.
	Pb =	bottom-line border.
	Pr =	right-column border.
Select attribute change extent	DECSACE	**CSI** *Ps* *** x**
	Ps =	character positions affected.
	0 or 1 =	stream of character positions.
	2 =	rectangular area of character positions.
Change attributes in rectangular area	DECCARA	**CSI** *Pt; Pl; Pb; Pr; Ps1..Psn* **$ r**
	Pt =	top-line border.
	Pl =	left-column border.
	Pb =	bottom-line border.
	Pr =	right-column border.
	Psn =	visual character attributes.
Reverse attributes in rectangular area	DECRARA	**CSI** *Pt; Pl; Pb; Pr; Ps1..Psn* **$ t**
	Pt =	top-line border.
	Pl =	left-column border.
	Pb =	bottom-line border.
	Pr =	right-column border.
	Psn =	visual character attributes.

*These sequences work in VT400 mode only.

Cursor Movement and Panning

Cursor Movement and Panning Sequences

Name	Mnemonic	Sequence
Enabling the Cursor		
Text cursor enable mode	DECTCEM	Set: **CSI ? 25 h** Visible cursor. (D) Reset: **CSI ? 25 l** Invisible cursor.
Moving the Cursor*		
Back index†	DECBI	**ESC 6**
Forward index†	DECFI	**ESC 9**
Cursor position	CUP	**CSI** *Pl* ; *Pc* **H** Line Pl, column Pc.
Horizontal and vertical position	HVP	**CSI** *Pl* ; *Pc* **f** Line Pl, column Pc. (CUP is recommended instead of HVP.)
Cursor forward	CUF	**CSI** *Pn* **C** Pn columns right.
Cursor backward	CUB	**CSI** *Pn* **D** Pn columns left.
Cursor up	CUU or CPL	**CSI** *Pn* **A** or **CSI** *Pn* **F** Pn lines up.
Cursor down	CUD or CNL	**CSI** *Pn* **B** or **CSI** *Pn* **E** Pn lines down.
Cursor to column	CHA	**CSI** *Pc* **G** Pc columns (same line).
Cursor to line	VPA	**CSI** *Pl* **d** Pl lines (same column).
Moving the Cursor*		
Back n tab stops	CBT	**CSI** *Pn* **Z** Pn number of back tab stops.
Forward n tab stops	CHT	**CSI** *Pn* **I** Pn number of tab stops.
Set tab every 8 columns	CTC	**CSI ? 5 W**
Panning*		
Pan down	SU	**CSI** *Pn* **S** Pn lines down.
Pan up	SD	**CSI** *Pn* **T** Pn lines up.
Vertical cursor coupling mode	DECVCCM	Set:**CSI ? 61 h** Coupled. (D) Reset: **CSI ? 61 l** Uncoupled.
Page cursor coupling mode	DECPCCM	Set: **CSI ? 64 h** Coupled. (D) Reset: **CSI ? 64 l** Uncoupled.

*In these sequences, the default value for Pn, Pl, and Pc is 1.
†Available in VT400 mode only.
(D) = default.

Keyboard, Printing, and Display Commands

Keyboard Control Sequences

Mode	Mnemonic	Sequence Set	Sequence Reset
Keyboard action	AM	**CSI 2 h** Locked.	**CSI 2 l** Unlocked. (D)
Backarrow key	DECBKM	**CSI ? 67 h** Backspace.	**CSI ? 67 l** Delete. (D)
Line feed/ new line	LNM	**CSI 20 h** New Line.	**CSI 20 l** Line feed. (D)
Autorepeat	DECARM	**CSI ? 8 h** Repeat. (D)	**CSI ? 8 l** No repeat.
Autowrap	DECAWM	**CSI ? 7 h** Autowrap.	**CSI ? 7 l** No autowrap. (D)
Cursor keys	DECCKM	**CSI ? 1 h** Application.	**CSI ? 1 l** Cursor. (D)
Keypad application / numeric	DECKPAM	**ESC =** Application.	**ESC >** Numeric. (D)
Numeric keypad mode	DECNKM	**CSI ? 66 h** Application.	**CSI ? 66 l** Numeric. (D)
Keyboard usage mode*	DECKBUM	**CSI ? 68 h** Data processing.	**CSI ? 68 l** Typewriter. (D)
Key position*	DECKPM	**CSI 81 h** Position reports.	**CSI 81 l** Character codes. (D)

Mode	Mnemonic	Sequence Set	Sequence Reset
Enable local functions	DECELF	**CSI** *Pf1; Pc1; ... Pfn; Pcn* **+ q**	
	Pfn =	function number.	
	0 =	all local functions.	
	1 =	local copy and paste.	
	2 =	local panning.	
	3 =	local window resize.	
	Pcn =	control performed.	
	0 =	factory default.	
		In VT mode = enabled.	
		In PC TERM mode = disabled.	
	1 =	enable local function.	
	2 =	disable local function.	

Mode	Mnemonic	Sequence Set	Reset
Local function key control	DECLFKC	**CSI** *Pk1; Pf1; ... Pkn; Pfn* * }	

Pkn = function key number.
0 = all local function keys.
1 = F1 Hold (Scroll Lock).
2 = F2 Print (Print).
3 = F3 Set-Up (Alt SetUp).
4 = F4 Session (Alt Scroll Lock).

Pfn = function performed.
In VT mode = local print.
In PC TERM mode = scan code.
1 = local function.
In VT mode = print.
In PC TERM mode = local print.
2 = send key sequence.
In VT mode = F key.
In PC TERM mode = scan code.
3 = disable key.
In VT mode = disabled.
In PC TERM mode = does not exist.

Mode	Mnemonic	Sequence Set	Reset
Select modifier key reporting	DECSMKR	**CSI** *Pm1; Pf1; ... Pmn; Pfn* + r	

Pmn = key number.
0 = all keys.
1 = left Shift.
2 = right Shift.
3 = lock key.
4 = Ctrl.
5 = left Alt Function.
6 = right Alt Function.
7* = left Compose Character.
8* = right Compose Character.

Pfn = control performed.
0 = factory default.
1 = modifier function.
2 = extended keyboard report.
3 = key disabled.

Mode	Mnemonic	Sequence Set	Reset
Extended keyboard report	DECEKBD	**APC** : *ppp mm*	**ST**
	ppp =	key position number.	
	mm =	modifier key state.	
	0 =	not pressed.	
	1 =	pressed.	

*Not valid with PC keyboard.
(D) = default.

Programming UDKs

Definable Keys

ANSI Keyboard
F1 to F20
Shift F1 to Shift F20

Short ANSI Keyboard
F1 to F10
Extend F1 to Extend F10
Shift F1 to Shift F10
Shift Extend F1 to Shift Extend F10

PC Keyboard
F1 to F12
Shift F1 to Shift F12
Alt F1 to Alt F12
Alt Shift F1 to Alt Shift F12

DECUDK Device Control String Format

DCS *Pc* ; *Pl* ; *Pm* | *Ky1/St1;...Kyn/Stn* ST
Pc is the *clear parameter.*

0 or none	=	clear all keys before loading new values (default).
1	=	clear one key at a time, before loading a new value.

Pl is the *lock parameter.*

0 or none	=	lock the keys.
1	=	do not lock the keys.

Pm is the *modifier parameter.*

0, 2, or none	=	define the shifted function key.
1	=	define the unshifted function key.
3	=	define the alternate unshifted function key.
4	=	define the alternate shifted function key.

DECUDK Device Control String Format

Ky1/St1;...Kyn/Stn are the *key definition strings*.

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

ANSI and Short ANSI Keyboards

	Pm = 1		**Pm = none, 0, or 2**	
Kyn	**ANSI**	**Short**	**ANSI**	**Short**
11	F1	F1	Sh F1	Sh F1
12	F2	F2	Sh F2	Sh F2
13	F3	F3	Sh F3	Sh F3
14	F4	F4	Sh F4	Sh F4
15	F5	F5	Sh F5	Sh F5
17	F6	F6	Sh F6	Sh F6
18	F7	F7	Sh F7	Sh F7
19	F8	F8	Sh F8	Sh F8
20	F9	F9	Sh F9	Sh F9
21	F10	F10	Sh F10	Sh Ext F10
23	F11	Ext F1	Sh F11	Sh Ext F1
24	F12	Ext F2	Sh F12	Sh Ext F2
25	F13	Ext F3	Sh F13	Sh Ext F3
26	F14	Ext F4	Sh F14	Sh Ext F4
28	F15	Ext F5	Sh F15	Sh Ext F5
29	F16	Ext F6	Sh F16	Sh Ext F6
31	F17	Ext F7	Sh F17	Sh Ext F7
32	F18	Ext F8	Sh F18	Sh Ext F8
33	F19	Ext F9	Sh F19	Sh Ext F9
34	F20	Ext F10	Sh F20	Sh Ext F10

NOTE

Pm values of 3 and 4 are specific to the PC keyboard. They are ignored when you use an ANSI or short ANSI keyboard.

DECUDK Device Control String Format

PC Keyboard

	Pm Value			
Kyn	**1**	**None, 0, or 2**	**3**	**4**
11	F1	Sh F1	Alt F1	Alt Sh F1
12	F2	Sh F2	Alt F2	Alt Sh F2
13	F3	Sh F3	Alt F3	Alt Sh F3
14	F4	Sh F4	Alt F4	Alt Sh F4
15	F5	Sh F5	Alt F5	Alt Sh F5
17	F6	Sh F6	Alt F6	Alt Sh F6
18	F7	Sh F7	Alt F7	Alt Sh F7
19	F8	Sh F8	Alt F8	Alt Sh F8
20	F9	Sh F9	Alt F9	Alt Sh F9
21	F10	Sh F10	Alt F10	Alt Sh F10
23	F11	Sh F11	Alt F11	Alt Sh F11
24	F12	Sh F12	Alt F12	Alt Sh F12
25	Alt F3	Alt Sh F3	–	–
26	Alt F4	Alt Sh F4	–	–
28	Alt F5	Alt Sh F5	–	–
29	Alt F6	Alt Sh F6	–	–
31	Alt F7	Alt Sh F7	–	–

DECUDK Device Control String Format

PC Keyboard

	Pm Value			
Kyn	**1**	**None, 0, or 2**	**3**	**4**
32	Alt F8	Alt Sh F8	–	–
33	Alt F9	Alt Sh F9	–	–
34	Alt F10	Alt Sh F10	–	–
35	Alt F11	Alt Sh F11	–	–
36	Alt F12	Alt Sh F12	–	–

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** Page. (D) Reset: **CSI ? 19 l** Scrolling region.
Print form feed mode	DECPFF	Set: **CSI ? 18 h** Form feed. Reset: **CSI ? 18 l** No form feed. (D)

Name	Mnemonic	Sequence
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 page	MC	**CSI i** or **CSI 0 i**
Print composed main display	MC	**CSI ? 10 i**
Print all pages	MC	**CSI ? 11 i**
Print cursor line	MC	**CSI ? 1 i**
Start printer-to-host session	MC	**CSI ? 9 i**
Stop printer-to-host session	MC	**CSI ? 8 i**
Assign printer to active session	MC	**CSI ? 18 i**
Release printer	MC	**CSI ? 19 i**
Printer receive mode	MC	On: **CSI 6 i** Off: **CSI 7 i**
Send line attributes	–	
Single-width		**ESC # 5**
Double-width		**ESC # 6**
Double-width/double-height		
Top half		**ESC # 3**
Bottom half		**ESC # 4**
Send visual character attributes	–	
Clear all attributes		**ESC [0 m**
Set attributes		**ESC [0;** *Ps; Ps;* ... *Ps* **m** Ps = attribute. See text.

(D) = default.

Screen Display Control Sequences

Name	Mnemonic	Sequence
Send /receive mode	SRM	Set: **CSI 12 h** Local echo off. (D) Reset: **CSI 12 l** Local echo on.
Screen mode	DECSCNM	Set: **CSI ? 5 h** Light background. Reset: **CSI ? 5 l** Dark background. (D)
Scrolling mode	DECSCLM	Set: **CSI ? 4 h** Smooth scroll. (D) Reset: **CSI ? 4 l** Jump scroll.
Select number of lines per screen	DECSNLS	**CSI** *Pn* * | Pn = number of lines.
Select active status display*	DECSASD	**CSI Ps $ }** Ps = 0, main display. Ps = 1, status line.
Select status line type*	DECSSDT	**CSI** *Ps* **$ ~** Ps = 0, none. Ps = 1, indicator. (D) Ps = 2, host-writable.

*Available in VT400 mode only.
(D) = default.

Reports

Sequences for Reports

Name	Mnemonic	Sequence
Primary Device Attributes		
Primary DA request (host to terminal)	DA	**CSI c** or **CSI 0 c**
Primary DA response (terminal to host)	DA	**CSI ?** *Psc; Ps1; ... Psn* **c**
	Psc =	operating level.
	61 =	level 1 (VT100 family).
	62,63,64 =	level 4 (VT420 family).
	Ps1...Psn =	extensions.
	1 =	132 columns.
	2 =	printer port.
	6 =	selective erase.
	7 =	soft character set.
	8 =	user-defined keys.
	9 =	NRC sets.
	15 =	DEC Technical set.
	18 =	user windows.
	19 =	two sessions.
	21 =	horizontal scrolling.

See Table 11–1 for alias responses.

Name	Mnemonic	Sequence
Secondary Device Attributes		
Secondary DA request (host to terminal)	DA	**CSI > c** or **CSI > 0 c**
Secondary DA response (terminal to host)	DA	**CSI > 41;** *Pv* **;** *Po* **c**
	Pv =	firmware version.
	Po =	keyboard options.
	0 =	no options.
	1 =	LK443 (101 keys) or LK444 (102 keys) (PC) keyboard with LK401 interface.
Tertiary Device Attributes (VT400 Mode Only)		
Tertiary DA request (host to terminal)	DA	**CSI = c** or **CSI = 0 c**
DECRPTUI response (terminal to host)	DA	**DCS ! |** *D...D* **ST** D...D = unit ID.

Name	Mnemonic	Sequence
Device Status Reports		
Terminal Operating Status		
Request (host to terminal)	DSR	**CSI 5 n**
Report (terminal to host)	DSR	**CSI 0 n** No malfunction.
		CSI 3 n Malfunction.
Cursor Position Report		
Request (host to terminal)	DSR	**CSI 6 n**
Report (terminal to host)	CPR	**CSI** *Pl, Pc* **R**
	Pl =	line number.
	Pc =	column number.
Extended Cursor Position Report		
Request (host to terminal)	DSR	**CSI ? 6 n**
Report (terminal to host)	DECXCPR	**CSI ?** *Pl, Pc; Pp* **R**
	Pl =	line number.
	Pc =	column number.
	Pp =	page number.

Name	Mnemonic	Sequence
Device Status Reports		
Printer Status		
Request (host to terminal)	DSR	**CSI ? 15 n**
Report (terminal to host)	DSR	**CSI ? 13 n** No printer. **CSI ? 10 n** Printer ready. **CSI ? 11 n** Printer not ready. **CSI ? 18 n** Printer busy. **CSI ? 19 n** Printer assigned to other session.
UDK Status (VT400 Mode Only)		
Request (host to terminal)	DSR	**CSI ? 25 n**
Report (terminal to host)	DSR	**CSI ? 20 n** UDKs unlocked. **CSI ? 21 n** UDKs locked.
Macro Space		
Request (host to terminal)	DSR	**CSI ? 62 n**
Report (terminal to host)	DECMSR	CSI *Pn* * { Pn = number of bytes/16.
Keyboard Status		
Request (host to terminal)	DSR	**CSI ? 26 n**
Report (terminal to host)	DSR	**CSI ? 27**; *Pn*; *Pst*; *Ptyp* **n**

Name	Mnemonic	Sequence
Device Status Reports		

	Keyboard Dialect	
Pn	ANSI	PC
0	Unknown*	Unknown*
1	North American	North American
2	British	British
3	Flemish	Belgian
4	Canadian (French)	—
5	Danish	Danish
6	Finnish	Finnish
7	German	German
8	Dutch	—
9	Italian	Italian
10	Swiss (French)	Swiss (French)
11	Swiss (German)	Swiss (German)
12	Swedish	Swedish
13	Norwegian	Norwegian
14	French/Belgian	French
15	Spanish Int.	Spanish Int.
16	Portuguese	Portuguese
28	Canadian (English)	—
32	—	Spanish, National

Pst	=	keyboard status.
0	=	keyboard ready
3	=	no keyboard.
8	=	keyboard busy.
Ptyp	=	keyboard type.
0	=	LK201/LK301.
1	=	LK401.
2	=	LK443/LK444.
3	=	LK421.

*The terminal does not transmit Unknown. Unknown is for devices that cannot determine the keyboard type.

Device Status Reports

Memory Checksum

Request (host to terminal)	DSR	**CSI ? 63;** *Pid* **n** Pid = request label.
Report (terminal to host)	DECCKSR	**DCS** *Pid* **!** ~ *D...D* **ST** Pid = request label. D...D = checksum.

Data Integrity

Request (host to terminal)	DSR	**CSI ? 75 n**
Report (terminal to host)	DSR	**CSI ? 70 n** No communication errors. **CSI ? 71 n** Communication errors. **CSI ? 73 n** Not reported since last power-up or RIS.

Multiple Session Status

Request (host to terminal)	DSR	**CSI ? 85 n**
Report (terminal to host)	DSR	**CSI ? 80;** *Ps2* **n** SSU sessions enabled. Ps2 = maximum number of sessions. **CSI ? 81;** *Ps2* **n** SSU sessions available but pending. Ps2 = maximum number of sessions. **CSI ? 83 n** SSU sessions not ready. **CSI ? 87 n** Sessions on separate lines.

Name	Mnemonic	Sequence
Device Status Reports		
Requesting Checksum of Rectangular Area (VT400 Mode Only)		
Request (host to terminal)	DECRQCRA	**CSI** *Pid; Pp; Pt; Pl; Pb; Pr* *** y** Pid = request label. Pp = page number. Pt = top-line border. Pl = left-column border. Pb = bottom-line border. Pr = right-column border.
Checksum report (terminal to host)	DECCKSR	**DCS** *Pid* **!** ~ *D...D* **ST** Pid = request label. D...D = checksum.
Terminal State Reports (VT400 Mode Only)		
Request (host to terminal)	DECRQTSR	**CSI** *Ps* **$ u** Ps = report requested. 0 = ignored. 1 = terminal state report.
Terminal state report (terminal to host)	DECTSR	**DCS 1 $ s** *D...D* **ST** D...D = report data.
Restore	DECRSTS	**DCS Ps $ p** *D...D* **ST** Ps = data string format. 0 = error. 1 = terminal state report. D...D = restored data.

Name	Mnemonic	Sequence
Presentation State Reports (VT400 Mode Only)		
Request (host to terminal)	DECRQPSR	**CSI** *Ps* **$ w**
	Ps =	report requested.
	0 =	error.
	1 =	cursor information report.
	2 =	tab stop report.
Cursor information report (terminal to host)	DECCIR	**DCS 1 $ u** *D...D* **ST**
		D...D = data string.
Tab stop report (terminal to host)	DECTABSR	**DCS 2 $ u** *D...D* **ST**
		D...D = tab stops.
Restore	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.
Mode Settings (VT400 Mode Only)		
Request mode (host to terminal)	DECRQM	**CSI** *Pa* **$ p**
	Pa =	ANSI mode (Table 11-2).
		CSI ? *Pd* **$ p**
	Pd =	DEC private mode (Table 11-3).
Report mode (terminal to host)	DECRPM	**CSI** *Pa*; *Ps* **$ y**

Name	Mnemonic	Sequence
Mode Settings (VT400 Mode Only)		
	Pa =	ANSI mode (Table 11-2).
	Ps =	mode state.
	0 =	unknown mode.
	1 =	set.
	2 =	reset.
	3 =	permanently set.
	4 =	permanently reset.
Set mode	SM	**CSI** *Pa*; ... *Pa* **h**
	Pa =	ANSI mode(s) (Table 11-2).
		CSI ? *Pd*; ... *Pd* **h**
	Pd =	DEC private mode(s) (Table 11-3).
Reset mode	RM	**CSI** *Pa*; ... *Pa* **l**
	Pa =	ANSI mode(s) (Table 11-2).
		CSI ? *Pd*; ... *Pd* **l**
	Pd =	DEC private mode(s) (Table 11-3).
Control Function Settings (VT400 Mode Only)		
Request (host to terminal)	DECRQSS	**DCS $ q** *D...D* **ST**
	D...D =	intermediate and/or final characters of function (Table 11-4).
Report (terminal 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 11-4).

Name	Mnemonic	Sequence
Saving and Restoring the Cursor State		
Save cursor state	DECSC	**ESC 7**
Restore cursor state	DECRC	**ESC 8**
Window Report (VT400 Mode Only)		
Request (host to terminal)	DECRQDE	**CSI " v**
Report (terminal to host)	DECRPDE	**CSI** *Ph; Pw; Pml; Pmt; Pmp* **" w** Ph = number of lines. Pw = number of columns. Pml = first column at left. Pmt = top line. Pmp = page number.

Name	Mnemonic	Sequence
User-Preferred Supplemental Set (VT400 Mode)		
Request (host to terminal)	DECRQ-UPSS	**CSI & u**
Report (terminal to host)	DECA-UPSS	**DCS 0 ! u % 5 ST** DEC Supplemental Graphic **DCS 1 ! u A ST** ISO Latin-1 supplemental

Table 11–1 Alias Primary DA Responses from the Terminal

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	**CSI ? 62; 1; 2; 6; 7; 8; 9 c**	VT220 terminal
VT320 DA	**CSI ? 63; 1; 2; 6; 7; 8; 9 c**	VT320 terminal
VT420 DA	**CSI ? 64; 1; 2; 6; 7; 8; 9; 15; 18; 19; 21 c**	VT421 terminal

NOTE

To change an alias response, you must use the General Set-Up screen. See Chapter 7, "Using Set-Up".

Table 11–2 ANSI Modes for DECRQM, DECRPM, SM, and RM

Mode	Mnemonic	Sequence
Guarded area transfer	GATM*	1
Keyboard action	AM	2
Control representation	CRM†	3
Insert/replace	IRM	4
Status reporting transfer	SRTM*	5
Vertical editing	VEM*	7
Horizontal editing	HEM*	10
Positioning unit	PUM*	11
Send/receive	SRM	12
Format effector action	FEAM*	13
Format effector transfer	FETM*	14
Multiple area transfer	MATM*	15
Transfer termination	TTM*	16
Selected area transfer	SATM*	17
Tabulation stop	TSM*	18
Editing boundary	EBM*	19
Line feed/new line	LNM	20

*This control function is permanently reset.
†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.

Table 11–3 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
Horizontal cursor coupling	DECHCCM*	60
Vertical cursor coupling	DECVCCM	61
Page cursor coupling	DECPCCM	64
Numeric keypad	DECNKM	66
Backarrow key	DECBKM	67
Keyboard usage	DECKBUM	68
Vertical split screen	DECVSSM	69
Transmit rate limiting	DECXRLM	73
Keyboard position	DECKPM	81

*This control function is permanently reset.

Table 11–4 Control Functions for DECRQSS Requests

Control Function	Mnemonic	Intermediate and Final Characters(s)
Select active status display	DECSASD	$ }
Select attribute change extent	DECSACE	* x
Set character attribute	DECSCA	" q
Set conformance level	DECSCL	" p
Set columns per page	DECSCPP	$ |
Set lines per page	DECSLPP	t
Set number of lines per screen	DECSNLS	* |
Set status line type	DECSSDT	$ ~
Set left and right margins	DECSLRM	s
Set top and bottom margins	DECSTBM	r
Select graphic rendition	SGR	m
Enable local functions	DECELF	+ q
Local function key control	DECLFKC	* }
Select modifier key reporting	DECSMKR	+ r

Resetting and Testing the Terminal

Resetting and Testing Sequences

Name	Mnemonic	Sequence
Resetting the Terminal		
Soft terminal reset*	DECSTR	**CSI ! p**
Hard terminal reset	RIS	**ESC c** Not recommended.
Secure reset	DECSR	**ESC [** *Pr* **+ p** Pr can be any number from 0 to 16383.
Secure reset confirmation	DECSRC	**ESC [Pr * q** Pr can be any number from 0 to 16383.
Tabulation clear	TBC	**CSI 0 g** Clear tab at cursor position. **CSI 3 g** Clear all tabs.
Testing the Terminal		
Screen alignment display	DECALN	**ESC 8**
Invoke confidence test	DECTST	**CSI 4;** *Ps1*...*Psn* **y**

Name	Mnemonic	Sequence
Testing the Terminal		
	Ps	= test to run
	0	= all tests
	1	= power-up self-test
	2	= RS-232 port data loopback
	3	= printer port loopback
	6	= RS-232 modem control line loopback
	7	= DEC-423 port loopback
	9	= repeat tests

*Available in VT400 mode only.

Soft Terminal Reset (DECSTR) States

Mode	Mnemonic	State After DECSTR
Text cursor enable	DECTCEM	Cursor enabled
Insert/replace	IRM	Replace
Origin	DECOM	Absolute (cursor origin at upper-left of screen)
Autowrap	DECAWM	No autowrap
National replacement character set	DECNRCM	Multinational set
Keyboard action	AM	Unlocked
Numeric keypad	DECNKM	Numeric characters
Cursor keys	DECCKM	Normal (arrow keys)
Other Control Functions		
Set top and bottom margins	DECSTBM	Top margin = 1. Bottom margin = page length.
All character sets	G0, G1, G2, G3, GL, GR	Default settings. (DECSTR works only in VT400 mode.)
Select graphic rendition	SGR	Normal rendition.
Select character attribute	DECSCA	Normal (erasable by DECSEL and DECSED).
Save cursor state	DECSC	Home position with terminal defaults.
Assign user-preferred supplemental set	DECAUPSS	Set selected in set-up.
Select active status display	DECSASD	Main display (first 24 lines).
Keyboard position mode	DECKPM	Character codes.

Session Management

Enable Session Command

CSI & x

PC TERM Management

Mode	Mnemonic	Sequence
Enable /disable	PCTERM	**CSI ?***Ps;Pc* **r**
PC TERM environment	Ps = 0	VT mode (default)
	= 1	PC TERM mode
	Pc = 0	Leave (default)
	= 1	PC Multilingual
	= 2	PC International
	= 3	PC Danish/Norwegian
	= 4	PC Spanish
	= 5	PC Portuguese

VT52 Mode Control Codes

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	Move the cursor to the home position.
ESC I	Reverse line feed.
ESC J	Erase from the cursor to the end of the screen.
ESC K	Erase from the cursor to the end of the line.
ESC Y *Pn*	Move the 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 the screen.
ESC V	Print the line with the cursor.

12 Solving Problems

This chapter describes what to do if you have a problem with the terminal. The chapter also describes the terminal's power-up self-test and screen error messages.

Operating Problems

Table 12–1 lists some possible operating problems and their suggested solutions. Check this list before calling for service. If you need service, see the "Digital Service" section in this chapter.

Power-Up Self-Test

Every time you turn the terminal on, it automatically runs a power-up self-test. This test checks the operating status of many of the terminal's internal parts.

Successful test: If the test is successful, a VT420 OK message appears on the screen. The keyboard bell should ring once.

Error: If the keyboard bell does not ring or it rings similar to a telegraph sound, this indicates a self-test error. The keyclick and bell sound patterns are codes that provide service personnel with information about the terminal's operating condition.

Error Messages

If the terminal fails the power-up self-test, the terminal may display one of the error messages in Table 12–2. Only qualified service personnel should try to correct these problems. If possible, note the error message that appears, then call for service.

Table 12–1 Common Operating Problems

Problem	Suggested Solution
The terminal does not turn on when you set the power switch to 1 (on).	Make sure the terminal's power cord is plugged into the wall outlet. Check the power at the wall outlet by plugging in a lamp.
The screen is blank, except for a blinking cursor at the lower-right corner of the screen.	The **CRT saver** feature in the Global Set-Up screen (Chapter 7) may be on. Press any key to reactivate the screen display. Make sure the brightness and contrast controls (Chapter 2) are adjusted correctly.
The screen's text is not balanced on the left and right or top and bottom.	Align the text by using the **screen align** feature in the Set-Up Directory screen (Chapter 7).
Data on the screen does not scroll. The `Hold` indicator is on.	Press the F1 key (Scroll Lock) to resume scrolling.
Data on the screen does not correspond with the characters that were typed at the keyboard.	The **terminal mode** is incorrect. See the **terminal mode** feature in the General Set-Up screen (Chapter 7).
The keyboard seems to be locked (the `Wait` indicator may be on), and the terminal cannot receive data from the host.	Clear the terminal by using the `Clear Comm` field in the Set-Up Directory screen (Chapter 7).
The bell tone does not ring when you turn the terminal on. The keyboard indicator lights do not flash.	Make sure the keyboard is connected to the terminal.
The host system's software does not recognize the terminal type.	Change the setting of the **terminal ID** feature in the General Set-Up screen (Chapter 3).

Table 12–1 (Cont.) Common Operating Problems

Problem	Suggested Solution
Power to the terminal is lost, and you cannot log in to your host system.	**VT Mode** When power is restored to the terminal, make the F4 (Alt SetUp) key the first key you press. See Chapter 9 for the procedure to restore an interrupted session. **PC TERM Mode** When power is restored to the terminal, the terminal starts in VT mode. To change the terminal from VT mode to PC TERM mode, 1. Press Alt SetUp to enter set-up. The Set-Up Directory appears. The field cursor is on the Global field. 2. Use the arrow keys to move to the General field. 3. Press Enter. The General Set-Up screen appears. 4. Use the arrow keys to move to the VT420 Mode, 7-Bit Controls field. Press Enter until the PC TERM Mode setting appears. 5. To save the setting, refer to Chapter 7.
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 **printer assignment** feature in Global Set-Up is set to the active session (Chapter 7). If the setting is correct, Printer: Ready should appear on the status line at the bottom of the screen. Make sure all communication settings on the terminal and printer (such as transmit rate, receive rate, and parity) match.

Table 12–2 Screen Error Messages

Error Message	Problem and Solution
VT420 NVR Error - 1	Nonvolatile memory (set-up storage) is not operating. Turn the terminal off and on. When you turn the terminal on, the set-up features will return to the default state. If the problem continues, call Digital Services.
VT420 RS-232 Port Data Error - 2	The problem is inside the terminal. Call Digital Services.
VT420 RS-232 Port Controls Error - 3	The problem is inside the terminal. Call Digital Services.
VT420 Keyboard Error - 4	1. Make sure your keyboard is plugged in. If it is, 2. Turn the terminal 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, the problem is inside the terminal. Call Digital Services.
VT420 DEC-423 Port Error - 5	The problem is inside the terminal. Call Digital Services.
VT420 Printer Port Error - 6	The problem is inside the terminal. Call Digital Services.
The keyboard's keyclick and margin bell make sound patterns similar to a telegraph.	The problem is inside the terminal. Call Digital Services.

Digital Service

As a full-service vendor, Digital provides hardware, software, network, and operations support to a diverse, worldwide customer base. Digital offers one of the most comprehensive portfolios of service in the industry, designed to support customers throughout the computing life cycle–planning, design, implementation and ongoing management.

Customers tailor the type and level of support to meet their individual business needs. Regardless of the service solution, customers benefit from Digital's single-source support strategy.

Digital's commitment to be the Best in Class service provider means that there is a force of 40,000 service professionals operating from 450 locations in over 80 countries dedicated to support our customers.

Digital believes in backing its products with meaningful warranties. This product may be covered by the Standard Product Warranty, which is entitlement to one year of hardware Basic Service with priority response time Monday through Friday, 8 A.M. to 5 P.M. Where applicable, entitlement to the Product Foundation Warranty for the kernel software is provided. This Standard Warranty is further proof of Digital's commitment to the customer.

Digital provides on-site and off-site remedial services.

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

On-Site Hardware Services

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 can choose the hours of coverage, up to 24 hours a day, 7 days a week. Digital was the first in the industry to offer guaranteed response times.

Basic

Basic offers priority response during regular business hours, Monday through Friday, 8 A.M. to 5 P.M.

Add-On Installation

Many Digital products have been designed to be installed by you. You may, however, decided to have a fully trained Digital Service Specialist install these units, by selecting the Add-On installation offering.

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 Hardware Services

Digital also offers several choices for off-site service.

Carry-in SERVIcenter

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.

Software Services

DECsupport

This offering provides telephone and on-site remedial support (if required), with personalized account focus and scheduled preventive maintenance. Software updates, new releases, and access to Digital's Software Information Network (DSIN) are included where available.

Basic

Basic service includes telephone support, software updates, new releases, and access to DSIN where available.

Self-Maintenance Service

This service provides software updates and new releases.

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 Services Office.

A Specifications

This appendix lists the specifications for the terminal.

Site Planning

Terminal	Approximate Size	
Height	282 mm	(11.1 in)
Width	320 mm	(12.6 in)
Depth	331 mm	(13.1 in)
Weight	8 kg	(17.5 lb)
Tilt-swivel	60 degrees	
Adjustable tilt	+5 to –20 degrees	

ANSI Keyboard	Approximate Size	
Height	45 mm	(1.75 in)
Width	478 mm	(18.8 in)
Depth	191 mm	(7.5 in)
Weight	1.4 kg	(3.1 lb)

Short ANSI Keyboard	Approximate Size	
Height	51 mm	(2.0 in)
Width	335 mm	(13.5 in)
Depth	165 mm	(6.5 in)
Weight	1.0 kg	(2.2 lb)

PC Keyboard	Approximate Size	
Height	50 mm	(2.0 in)
Width	450 mm	(18.25 in)
Depth	180 mm	(7.25 in)
Weight	1.4 kg	(3.1 lb)

Operating Environment

Temperature	10° to 40° C (50° to 104° F)
Relative humidity	10% to 90% relative humidity with a maximum wet bulb of 280° C and a minimum dew point of 2° C
Altitude	2400 m (8000 ft) maximum

Electrical

AC input	No selection required. 100 V to 240 V nominal, single-phase, 2-wire plus safety earth ground, 88 Vrmsto 264 Vrms preset voltage
Line frequency	50 Hz to 60 Hz nominal
Input power	67 watts
Power cord	North American: Rated 125 V, listed, type SJT/SVT, 18 AWG-3 wire All others: Rated 250 V, "HAR" cordage, 0.75 mm^2

Display

Active video area	approximate size
Horizontal	232 mm (9.04 in)
Vertical	168 mm (6.55 in)
Format	24, 36, or 48 lines of 80 or 132 characters
Built-in character sets (dependent on the operating mode)	DEC Multinational character set U.S. ASCII Supplemental ISO Latin Alphabet No. 1 ISO Latin-1 Supplemental DEC Special Graphics DEC Technical 11 National replacement character sets PC International PC Multilingual PC Danish/Norwegian PC Portuguese PC Spanish
Video attributes	Normal, bold, underline, blinking, and negative image (reverse video)—selected individually or in combination
Text cursor	Blinking or steady block or underline
Frame rate	70 Hz (60 Hz optimal)
Antiglare	Integral with CRT

ANSI Keyboard

General	
General	108 sculptured keys with matte finish Available in 15 language dialects, including English
Cord	1.8 m (6 ft) coiled cord with a 4-pin telephone-type modular connector
Indicator lights	2 keyboard indicators:  Hold  Lock

Keys	Approximate Size or Number
Home row	30 mm (1.18 in) above desktop
Key size (top)	13 mm (0.50 in) square
Key spacing	19 mm (0.75 in) center to center (for single-width keys)
Numeric keypad	18 keys
Function keys	5 predefined keys, 15 user-definable keys

Audible Indicators	
Keyclick	Sounds after each keystroke.
Margin bell	Rings once when cursor approaches right margin.
Warning bell	Rings once for compose errors. Rings twice for errors in set-up. Rings once upon receipt of Ctrl G.

Short ANSI Keyboard

General	
General	74 sculptured keys with matte finish Available in North American/UK version only
Cord	1.8 m (6 ft) coiled cord with a 4-pin telephone-type modular connector

Keys	Approximate Size or Number
Home row	30 mm (1.18 in) above desktop
Key size (top)	13 mm (0.50 in) square
Key spacing	19 mm (0.75 in) center to center (for single-width keys)
Function keys	5 predefined keys, 15 user-definable keys (including 10 Extend key sequences, to emulate the full set of ANSI keyboard keys)

Audible Indicators	
Keyclick	Sounds after each keystroke.
Margin bell	Rings once when cursor approaches right margin.
Warning bell	Rings once for compose errors. Rings twice for errors in set-up. Rings once upon receipt of Ctrl G.

PC Keyboard

General	
General	101 or 102 sculptured keys with matte finish Available in 13 language dialects, including English
Cord	1.8 m (6 ft) coiled cord with a 4-pin telephone-type modular connector
Indicator lights	3 keyboard indicators: Num Lock, Caps Lock, Scroll Lock

Keys	Approximate Size
Home row	30 mm (1.18 in) above desktop
Key size (top)	13 mm (0.50 in) square
Key spacing	19 mm (0.75 in) center to center (for single-width keys)
Numeric keypad	17 keys
Function keys	3 predefined key, 16 user-definable keys

Audible Indicators	
Keyclick	Sounds after each keystroke.
Margin bell	Rings once when cursor approaches right margin.
Warning bell	Rings twice for errors in set-up.

B Options and Documentation

This appendix lists modems, cables, and manuals available from Digital for the VT420 terminal.

Modems

Part Number	Description
DF242 Scholar Plus	300, 1200, and 2400 baud, full-duplex asynchronous
DF224	300, 1200, and 2400 baud, full-duplex, asynchronous
DF124	300, 1200, and 1200 baud, full-duplex, asynchronous

Cables

Part Number	Length	Connector
Printer Cables and Adapter (VT420 to printer)		
BC16E-10 BC16E-25	10 ft (3 m) 25 ft (7.6 m)	6-pin M DEC-423 to 6-pin M DEC-423
H8571-A adapter	–	6-pin F DEC-423 to 25-pin F RS-232
Modem Cables		
BC22E-10 BC22E-25	10 ft (3 m) 25 ft (7.6 m)	25-pin F RS-232 to 25-pin M RS-232
Null Modem Cables		
BC22D-*xx*	–	25-pin F RS-232 to 25-pin F RS-232
Communication Cables and Adapters		
BC16E-10 BC16E-25	10 ft (3 m) 25 ft (7.6 m)	6-pin M DEC-423 to 6-pin M DEC-423
H8571-C adapter H8571-F adapter	–	25-pin F RS-232 to 6-pin M DEC-423
AC Power Cables	**Country**	
BN20V-2E	Australia, New Zealand	
BN20S-2E	Austria, Belgium, Finland, France, Germany, Netherlands, Norway, Portugal, Spain, Sweden	
BN20P-2E	Canada	
BN20U-2E	Denmark	
BN20R-2E	Ireland, United Kingdom	
BN19U-2E	Israel	
BN20W-2E	Italy	
BN20T-2E	Switzerland	

M = male. F = female.

xx = length in feet (10, 25, 50, 100, 200, 250)

Related Documentation

You can order the following VT420 documents from Digital:

VT420 Programmer Reference Manual **EK-VT420-RM**

This manual provide information on character processing, character codes, and control functions that programmers can use for VT420 applications.

VT420 Service Guide **EK-VT420-PS**

This guide provides service personnel with the information needed to test, troubleshoot, and repair the VT420 monochrome video terminal.

Installing and Using the Session Support Utility **AA-JB84B-TE**

This guide provides system managers with instructions for installing SSU software to support two sessions over a single communication line. The guide is part of an SSU software kit. The kit is available on different media.

C
Communication

This appendix provides information on how the terminal 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 (Chapter 7). To match your printer's speed, use the Printer Set-Up screen (Chapter 10).

Cables

You can connect the terminal 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 10.

Figure C–1 shows the DEC-423 and RS-232 cables you can use to connect the terminal to a host system or printer. To order cables, see Appendix B.

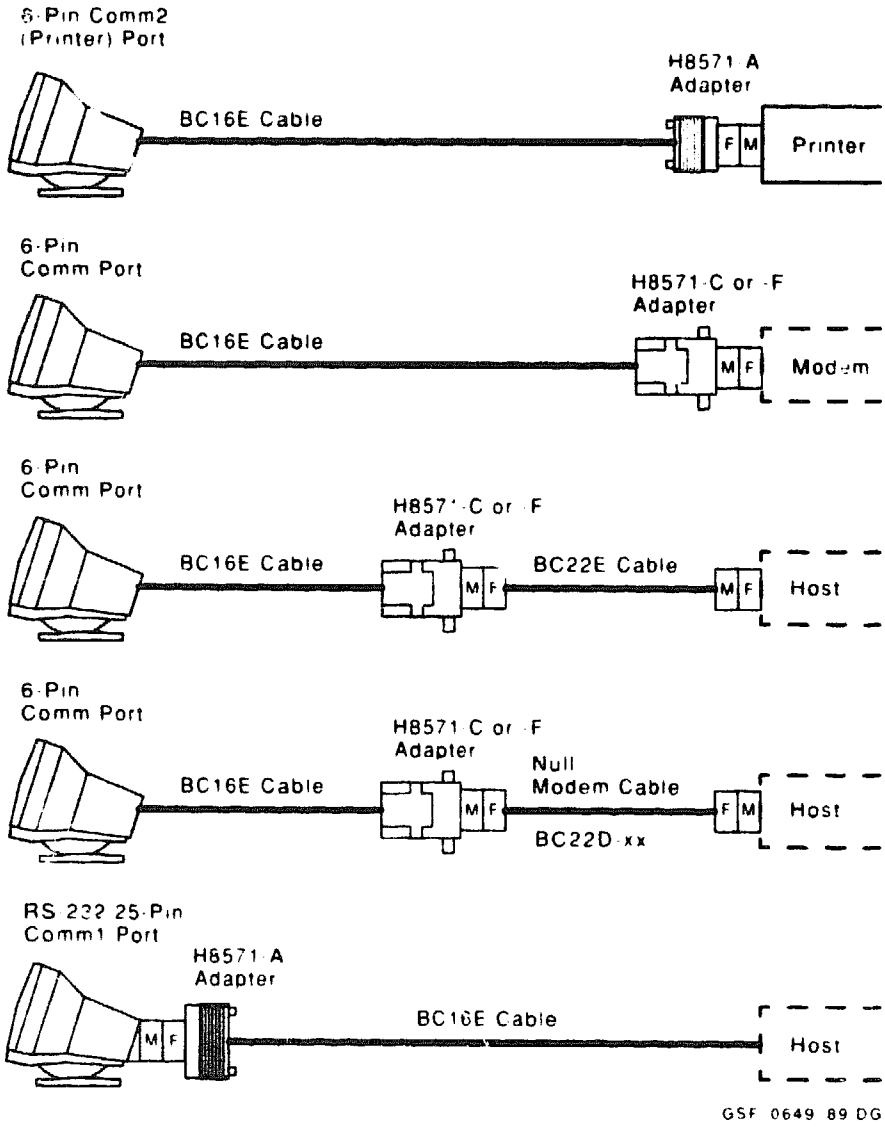


Figure C–1 Cables

XON/XOFF Flow Control

Normally, the terminal processes and displays characters as fast as it receives them. If the host system sends data faster than the terminal can display it, the terminal can use XON/XOFF flow control to tell the host to wait until the terminal has caught up.

The terminal stores incoming characters in a 254-character input buffer. When the buffer fills to a predetermined level (XOFF point), the terminal sends an XOFF character to stop the host system from sending more characters. When the buffer empties to an appropriate level (XON point), the terminal sends an XON character to tell the host system to resume sending characters.

If the terminal is set up to run one session, you can select a first XOFF point of 64 or 128 characters (Communications Set-Up screen). The XON point is 32 characters. If the host system fails to respond to the first XOFF character, the terminal sends another XOFF character when the buffer fills to 220, and when the buffer is completely full.

NOTE
In PC TERM mode, the XON point is 65_{16} characters, and the XOFF point is 67_{16} characters.

If you use SSU software to run two sessions, you can select a first XOFF point of 64, 256, or 1792. SSU provides its own credit-based flow control, so XOFF is not needed.

For normal interactive use, you should use the default XOFF point of 64 characters. This setting prevents the host system from getting too far ahead of what is displayed on the screen. In some cases, using an XOFF point greater than 64 characters may improve the average speed for processing characters, since the host does not have to wait as often.

Hold Screen Function (VT Mode Only)

If XON/XOFF flow control is enabled:

Ctrl S (XOFF)	Puts the screen display on hold.
Ctrl Q (XON)	Releases the screen display.

If XON/XOFF flow control is disabled, you cannot use Ctrl S and Ctrl Q to hold and release the screen. Instead, the keys will send their corresponding codes to the host system.

Notes on Using the Terminal Without XON/XOFF Flow Control

- If you disable XON/XOFF flow control, the terminal's receive input buffer can overflow if the host system sends data faster than the terminal can process and display it.
- The terminal can process text (without ESC sequences) at approximately 2000 characters/second. This rate allows the terminal to communicate at 19,200 baud. Some editing functions, such as inserting or deleting characters in lines, require additional time to process. The 254-character input buffer allows for short bursts.

  For extensive editing, the host system should be programmed to insert fill characters (NULs) after editing sequences. If the host system is not programmed, you should reduce the terminal baud rate to 9600 baud or less. See the Communications Set-Up screen in Chapter 7.
- Selecting one of the smooth scroll settings in the Display Set-Up screen slows the screen display for easy reading. For the smooth scroll setting to work properly at high speeds, you must have XON /XOFF data flow enabled.

Modem Connections and Disconnections

When the terminal makes a connection to the host system through 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 transmission in progress.
- Clears the keyboard buffer and all message buffers.
- Clears the input buffer.
- Clears XOFF sent and XOFF received flags.

NOTE
In PC TERM mode, the terminal resets the XON setting to 65_{16} and the XOFF setting to 67_{16}.

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

- You type Shift F5 (Shift Break).
- You use the Recall or Default fields in the Set-Up Directory.

- You change the host port you are using from the RS-232 port to the DEC-423 port, or from the DEC-423 port to the RS-232 port. See the **comm port selection** feature in the Communications Set-Up screen (Chapter 7).
- 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 F5 (Shift Break).

Break Function (VT Mode Only)

A break condition is the occurrence of a continuous space on a communication line for greater than one character time. Some systems and communication equipment recognize break as a special attention signal.

You can generate a break signal (275 ms space) by pressing F5 (Alt Break), unless you have changed the function of the F5 key (Alt Break) (Keyboard Set-Up screen).

Changing the **terminal comm ports** feature setting from S1-Comm1 to one of the two-session configurations also generates a break signal. This action alerts the host that the session configuration has been altered.

The F5 key (Alt Break) has three functions when used as a break key.

F5 (Alt Break)	Sends a break signal to the host.
Shift F5 (Shift Break)	Disconnects communications when you use a modem.
Ctrl F5 (Ctrl Break)	Sends the answerback message (Communications Set-Up screen) to the host.

Connector Signals

The terminal has two 6-pin connectors (Comm 1 and Comm 2 ports) and one 25-pin connector, which can be used instead of the 6-pin Comm 1 port connector. 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. Figure C–2 shows the pin numbers for the 6-pin connectors.

Table C–1 25-Pin RS-232 Connector Interface Signals (Comm1)

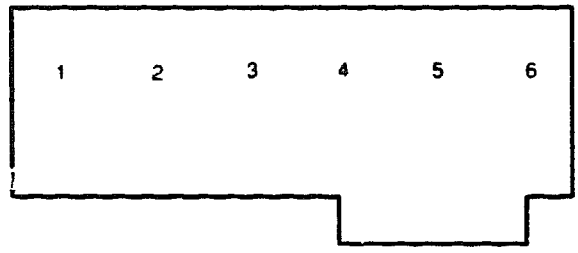
Pin	Signal	Mnemonic	EIA/CCITT /DIN	Description
2	Trans-mitted data	TXD	BA/103/D1	*From Terminal* Sends serial characters. Held in mark state when characters are not being sent. In modem control modes, sends data only when RTS, CTS, DSR, and DTR signals are on.
3	Received data	RXD	BA/104/D2	*To Terminal* Receives serial characters. In modem control modes, ignores characters if RLSD signal is off.
4	Request to send	RTS	CA/105/S2	*From Terminal* When on, places the modem in transmit mode.
5	Clear to send	CTS	CB/106/M2	*To Terminal* When on, tells the terminal that the modem is ready to receive characters.

Table C–1 (Cont.) 25-Pin RS-232 Connector Interface Signals (Comm1)

Pin	Signal	Mnemonic	EIA/CCITT /DIN	Description
6	Data set ready	DSR	CC/107/M1	*To Terminal* When on, tells the terminal 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.
8	Receive line signal detect (carrier detect)	RLSD	CF/109/M5	*To Terminal* When on, tells the terminal 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	*To Terminal* When on (with modem control enabled), selects the `Modem High Speed =` setting in the Communications Set-Up screen. When off, selects the `Modem Low Speed=` setting.
20	Data terminal ready	DTR	CD/108.2/S1.2	*From Terminal* When on, tells the modem that the terminal is ready to send or receive.

Table C–1 (Cont.) 25-Pin RS-232 Connector Interface Signals (Comm1)

Pin	Signal	Mnemonic	EIA/CCITT /DIN	Description
23	Speed select	SPDS	CH/111/S4	*From Terminal* When on, tells the modem that the receive speed selected in set-up is greater than 600 bits /second.



GSF 1387 89 DG

Figure C–2 6-Pin Connector Pinouts

Table C–2 6-Pin DEC-423 Connector Interface Signals (Comm 1 or Comm 2)

Pin	Signal	Mnemonic	Description
1	Data terminal ready	DTR	*From Terminal* When on, tells the modem or printer that the terminal is ready to send or receive.
2	Transmitted data	TXD+	*From Terminal* 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.

Table C–2 (Cont.) 6-Pin DEC-423 Connector Interface Signals (Comm 1 or Comm 2)

Pin	Signal	Mnemonic	Description
3	Transmit signal ground	TXD–	Provides the common ground reference potential for transmitted signals TXD+ and DTR.
4	Receive signal ground	RXD-	Provides the common ground reference potential for received signals RXD+ and DSR.
5	Received data	RXD+	*From Terminal* Receives serial characters.
6	Data set ready	DSR	*To Terminal* **From the modem:** When on, tells the terminal that it has a call connected. **From the printer:** When on, tells the terminal that the printer is ready to print. The terminal checks for DTR from the printer before each print operation.

Standards

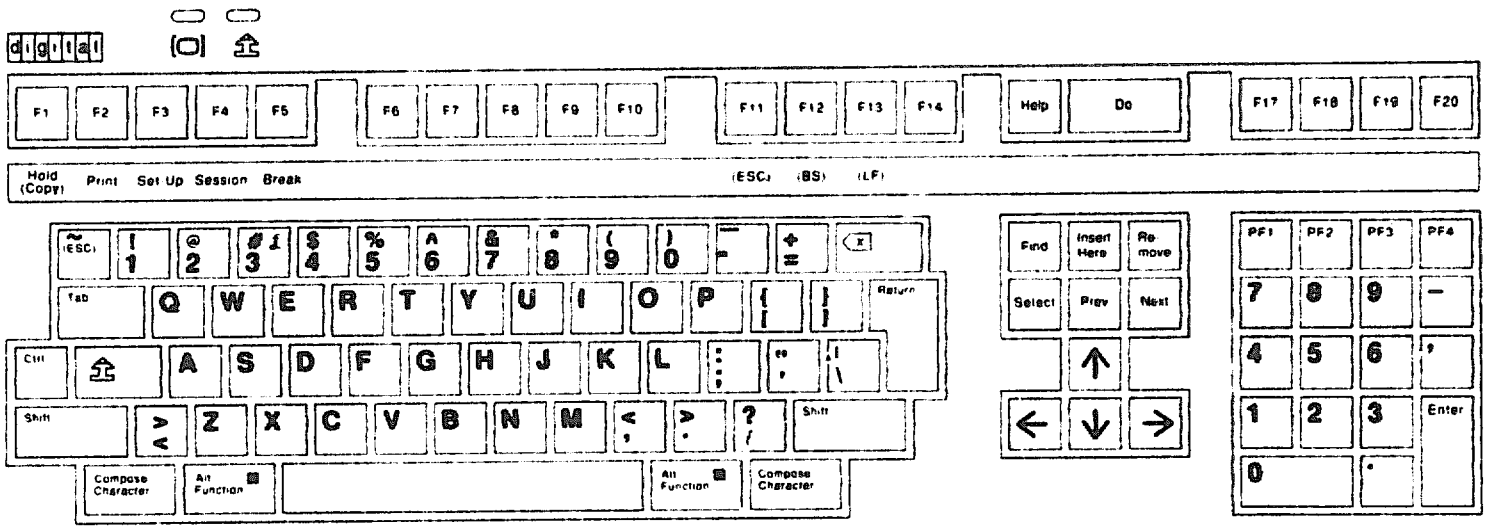
The terminal operates in accordance with the following national and international communication standards:

EIA 232-D
CCITT V.24
CCITT V.28
CCITT V.10
ISO 2110.2

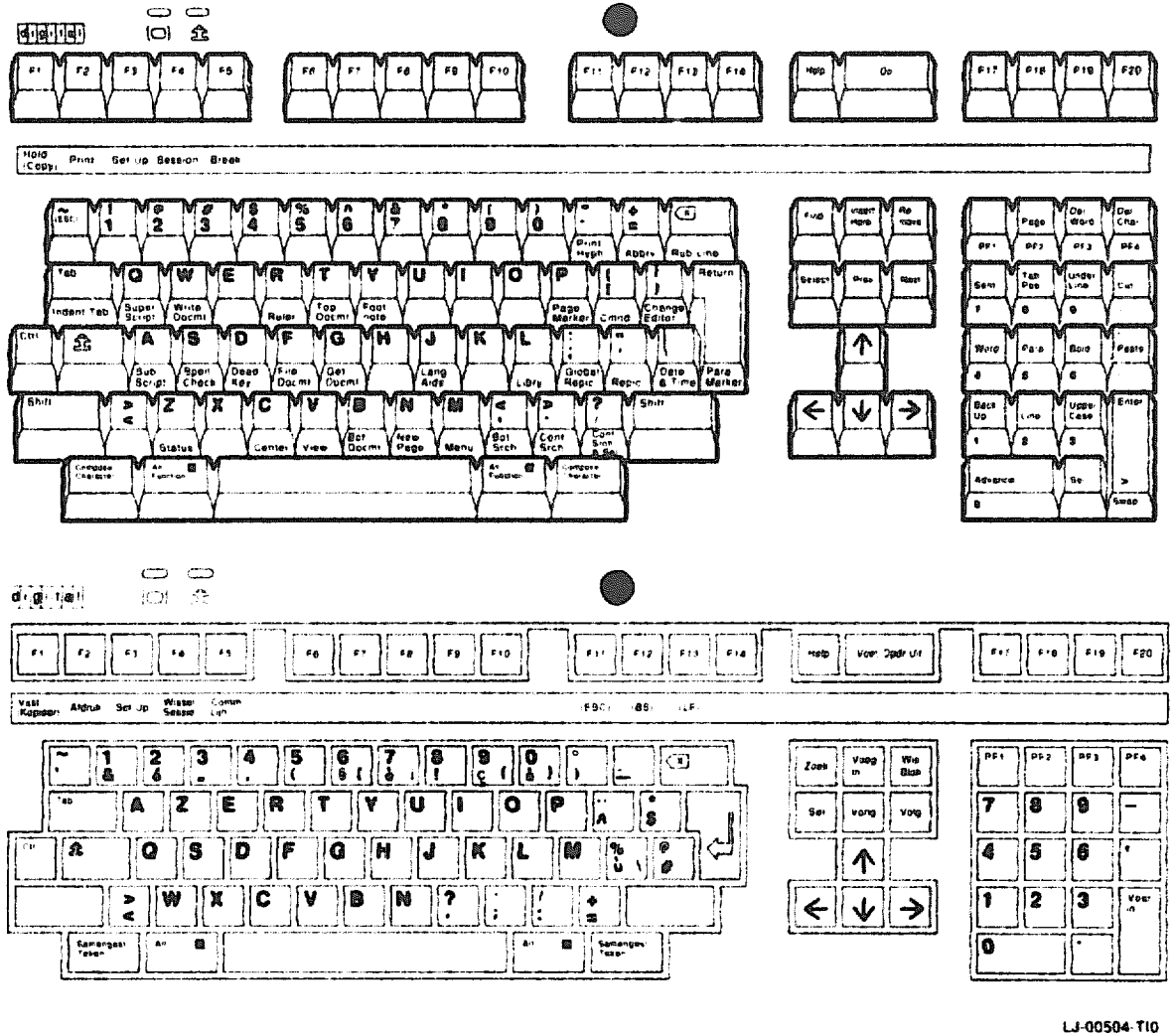
D
Keyboards

This appendix shows each standard model of the ANSI keyboard and the PC keyboard. To find a particular keyboard model, find its number in the following table:

	ANSI Keyboards		PC Keyboards
●	North American/United Kingdom	●	North American
●	North American/United Kindom WPS	●	United Kingdom
●	Belgium (Flemish)	●	Belgium (Flemish)
●	Canada (English)		—
●	Canada (French)		—
●	Denmark	●	Denmark
●	Finland	●	Finland/Sweden
●	France/Belgium	●	France
●	Germany/Austria	●	Germany
●	Netherlands (Dutch)		—
●	Italy	●	Italy
●	Norway	●	Norway
●	Portugal	●	Portugal
●	Spain	●	Spain, International
	—	●	Spain, National
●	Sweden	●	Sweden/Finland
●	Switzerland (French)	●	Switzerland
●	Switzerland (German)		—

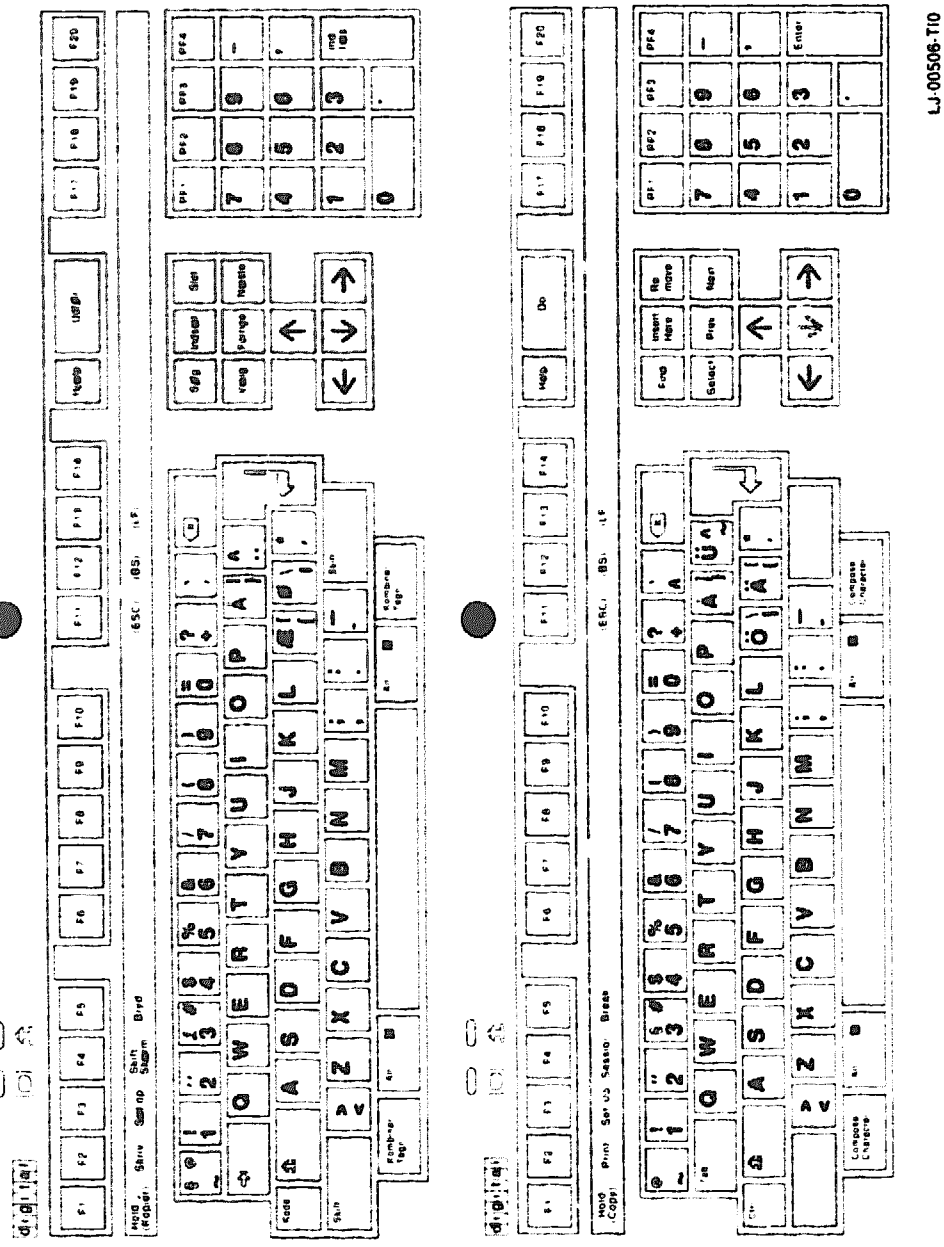

digital
F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 F13 F14 Help Do F17 F18 F19 F20
Hold (Copy) Print Set Up Session Break (ESC) (BS) (LF)
Tab Return Ctrl Shift Shift
Compose Character
Alt Function
Alt Function
Compose Character
Find Insert Here Remove
Select Prev Next
PF1 PF2 PF3 PF4
7 8 9 -
4 5 6 ,
1 2 3 Enter
0 .

LJ-00503-TI0



LJ-00504-TI0

LJ-00505-TI0



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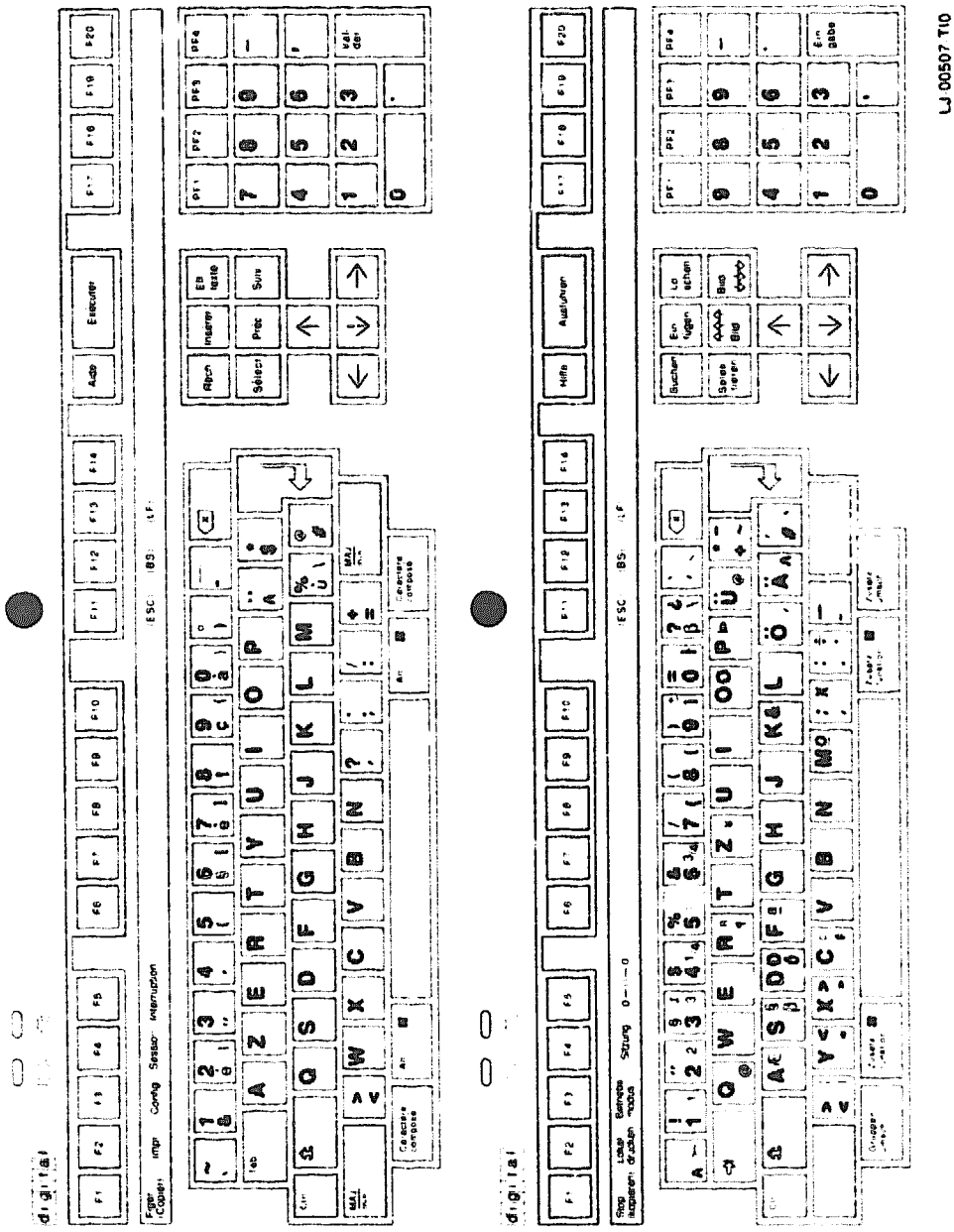
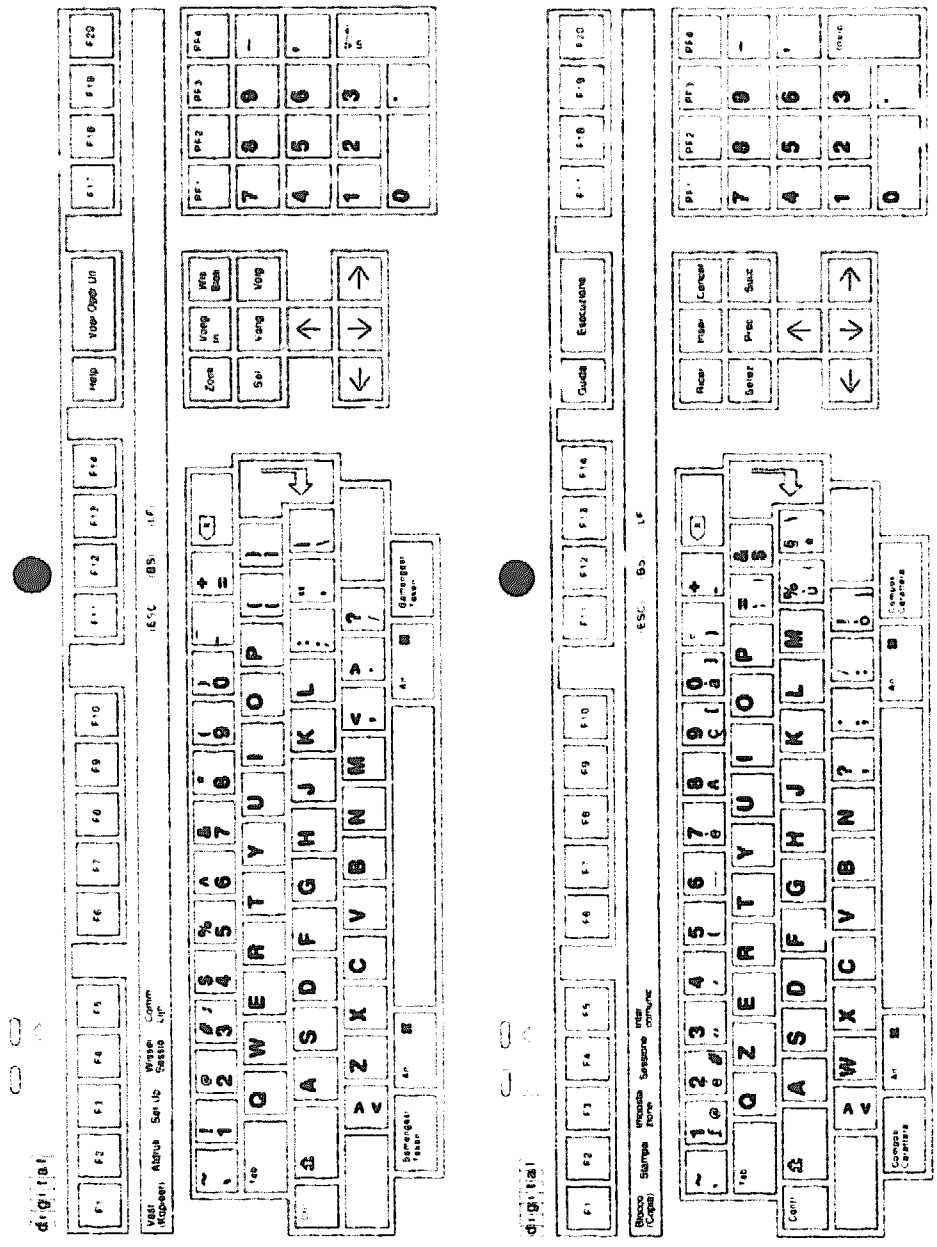
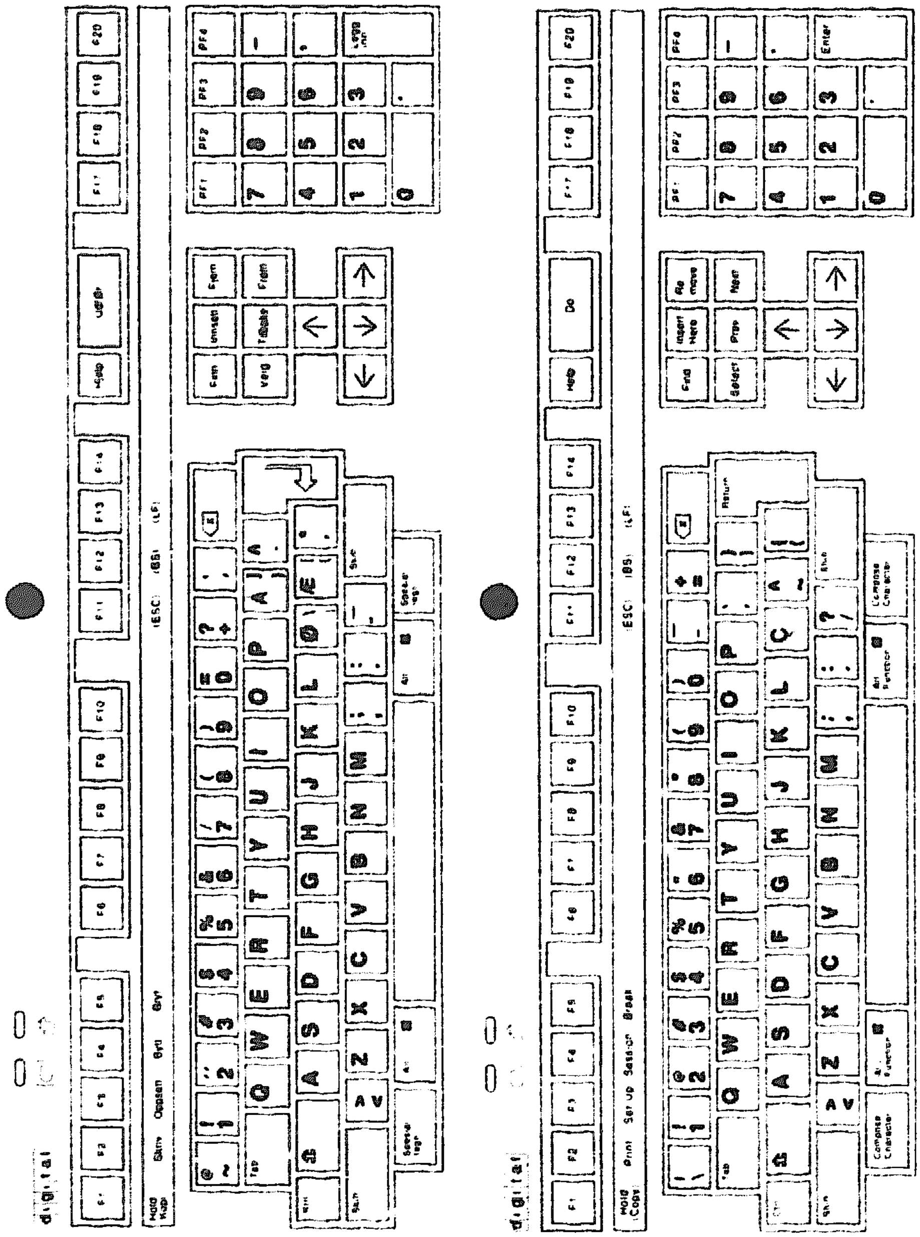


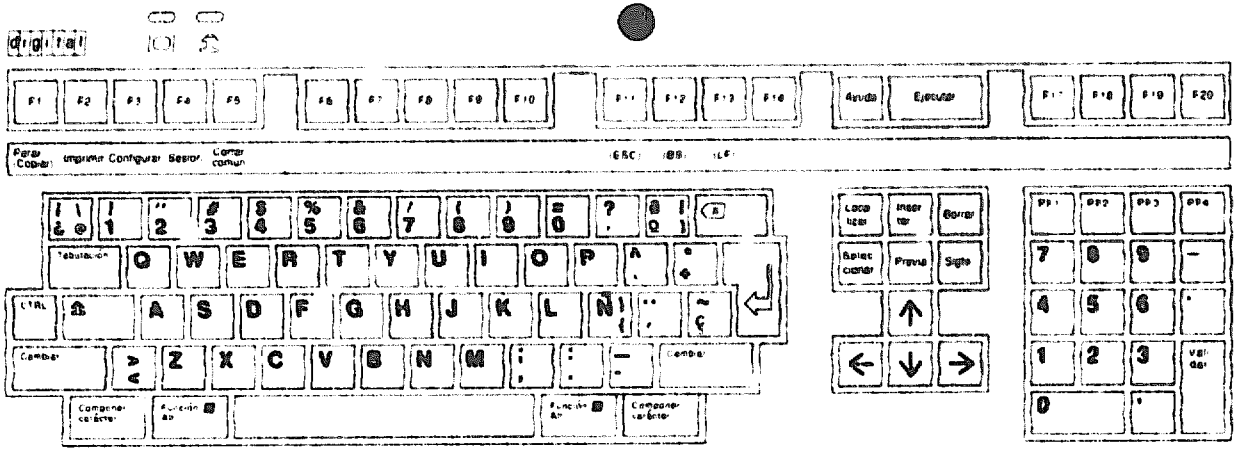
LJ 00507 T10

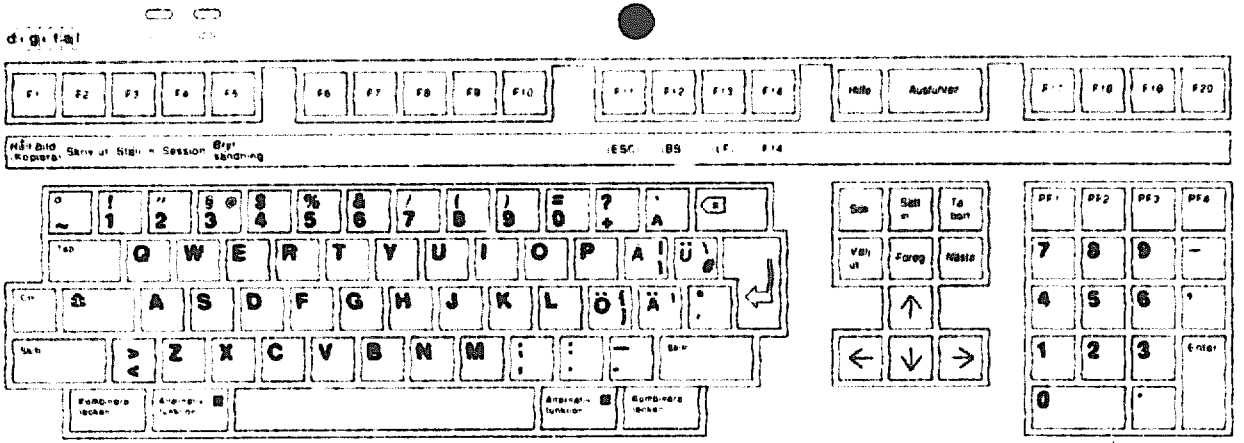


LJ-00508 TIO

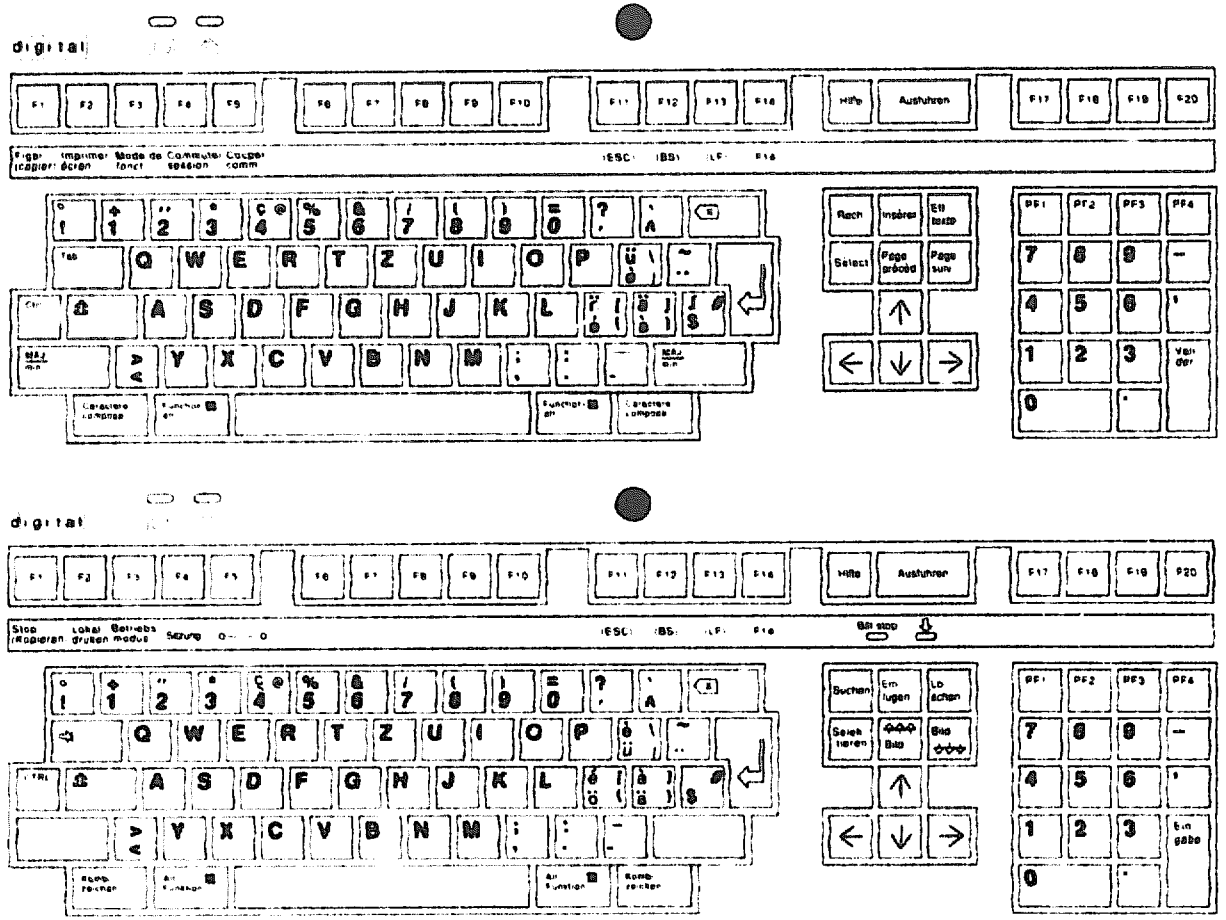

digital
Hold Copy
Print
Set Up
Break
Help
Do
Find
Select
Return
Enter
Compose Character

LJ-00509-TI0





LJ-00510-TI0


digital
F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 F13 F14 Hilfe Ausführen F17 F18 F19 F20
Drucken Bildschirm kopieren Modus Sperre Sitzung
ESC BS LF F16
Hilfe
Ausführen
Einfügen
Löschen
Suchen
Select
Page précéd
Page suiv
PF1 PF2 PF3 PF4
Entrée
digital
Stop
Lokal
Betriebs
Sitzung
Bit stop

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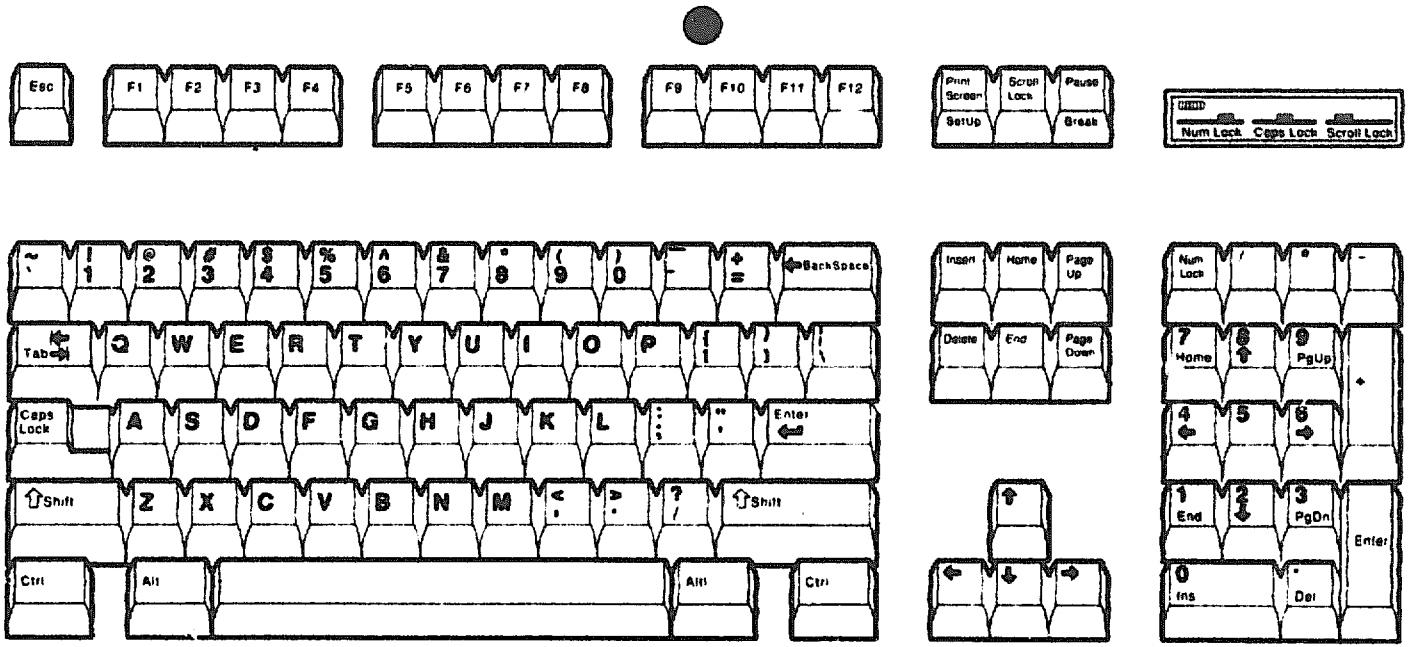
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F1 F2 F3 F4
F5 F6 F7 F8
F9 F10 F11 F12
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Scroll Lock
Pause
SetUp
Break
Num Lock
Caps Lock
Scroll Lock
BackSpace
Tab
Caps Lock
Enter
Shift
Shift
Ctrl
Alt
Alt
Ctrl
Insert
Home
Page Up
Delete
End
Page Down
Num Lock
7 Home
8
9 PgUp
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1 End
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3 PgDn
Enter
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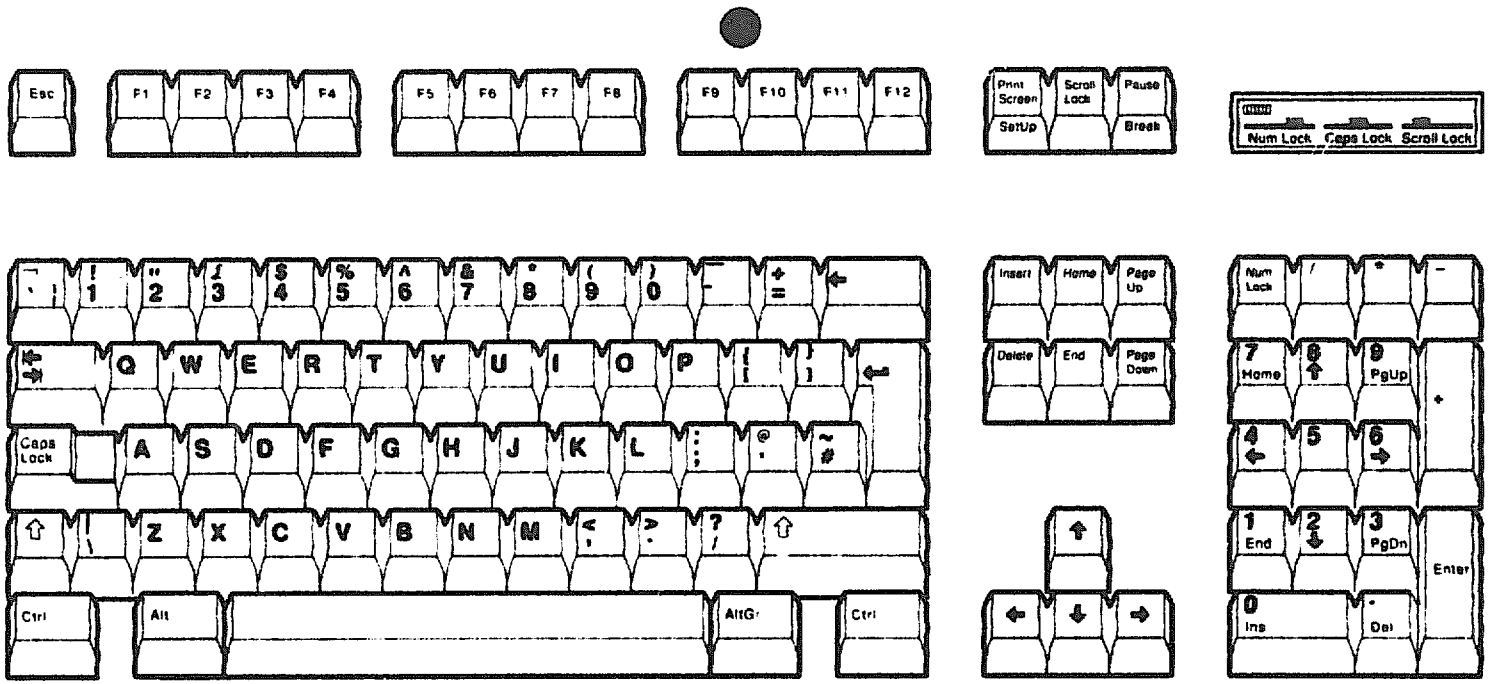
Esc
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F2
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F12
Print Screen
Scroll Lock
Pause
SetUp
Break
Num Lock
Caps Lock
Scroll Lock
Insert
Home
Page Up
Delete
End
Page Down
Num Lock
PgUp
PgDn
Enter
Caps Lock
Ctrl
Alt
AltGr
Ctrl

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Esc
F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
F12
Print Screen
SelUp
Scroll Lock
Pause
Break
Num Lock
Caps Lock
Scroll Lock
Insert
Home
Page Up
Delete
End
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Num Lock
7 Home
8
9 PgUp
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1 End
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3 PgDn
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. Del
Shift Lock
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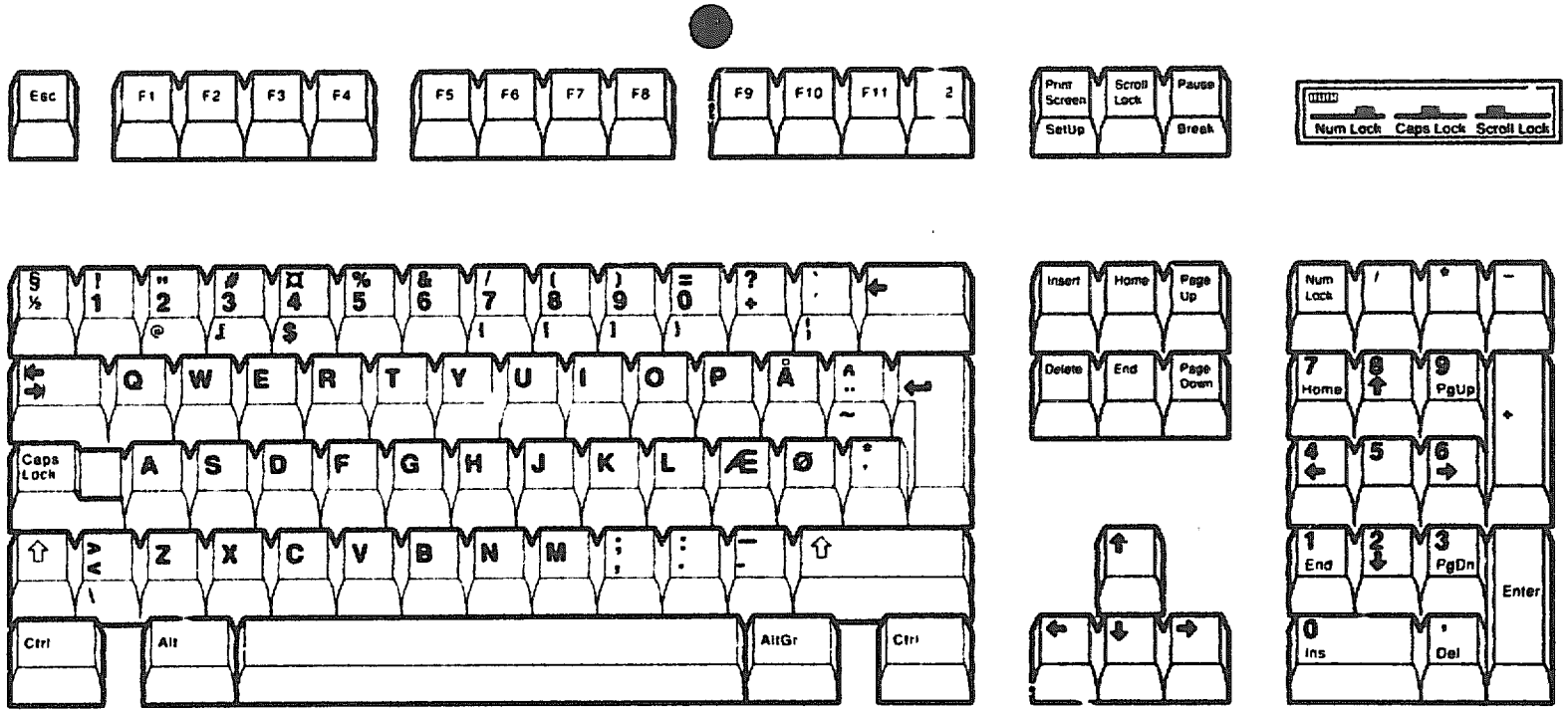
LJ-00236-TI0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F9
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F11
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Num Lock
Caps Lock
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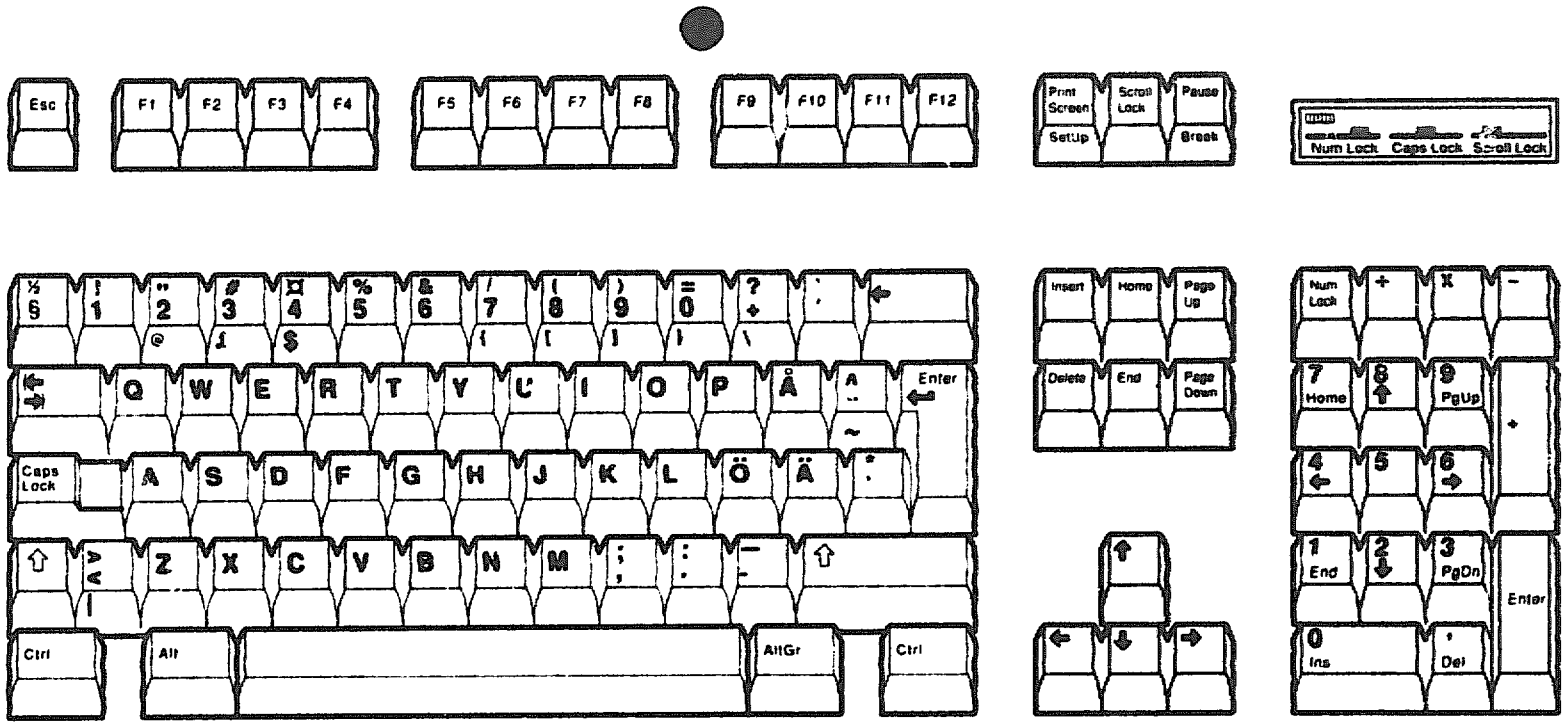
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F1 F2 F3 F4
F5 F6 F7 F8
F9 F10 F11 F12
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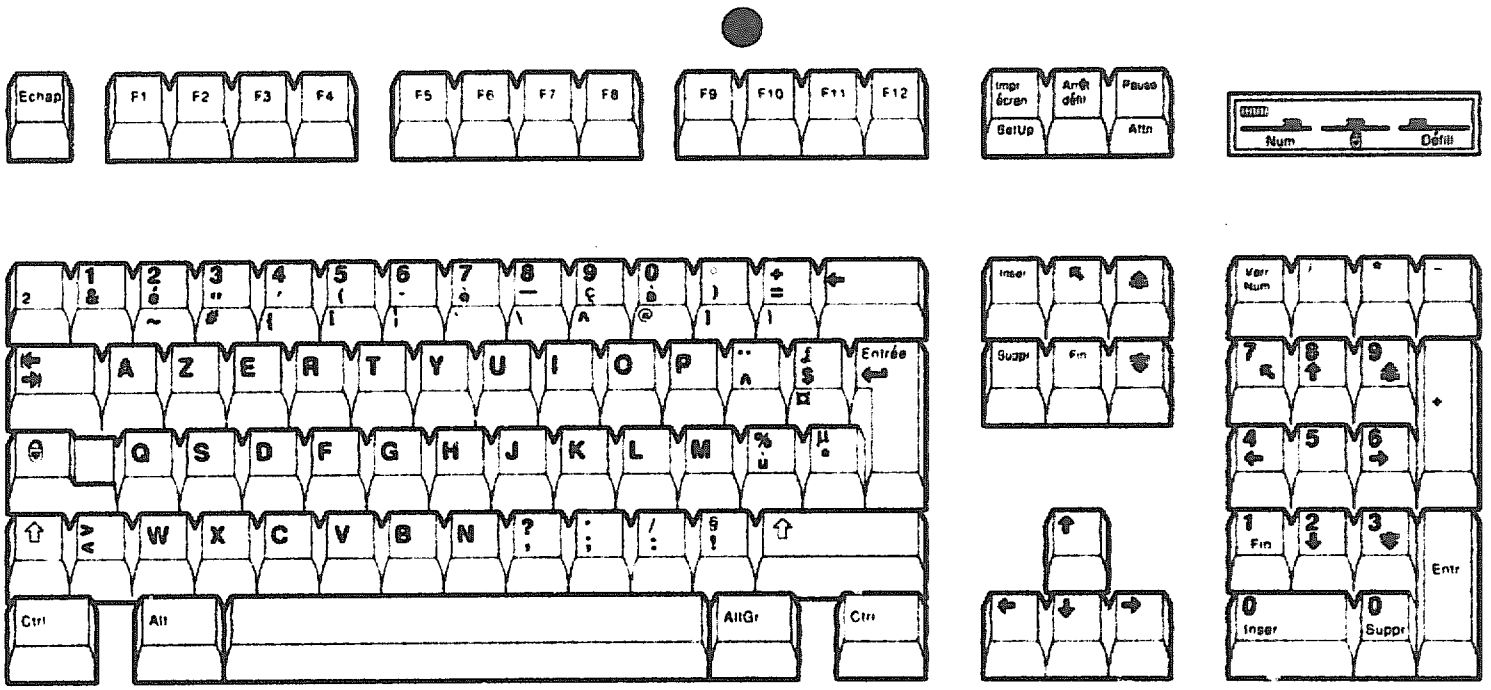
Echap
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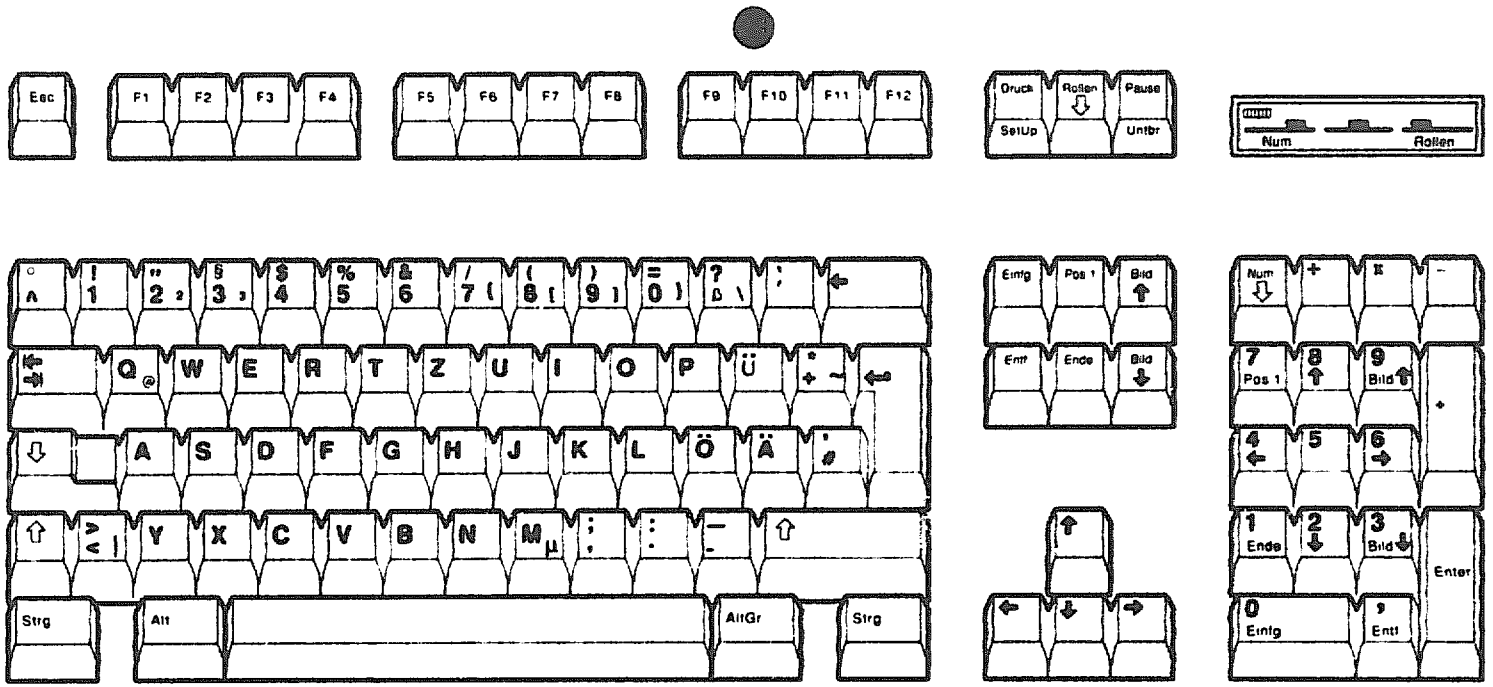
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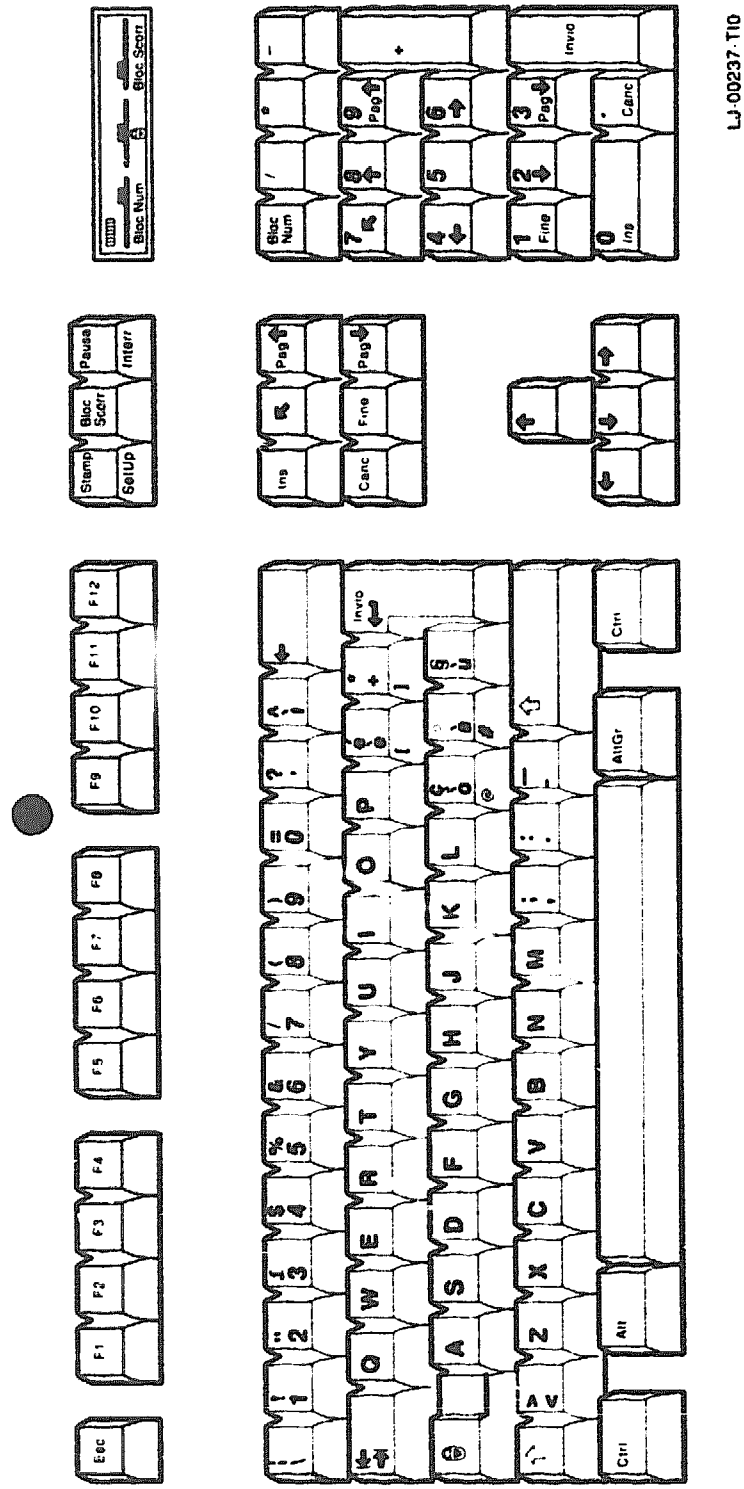
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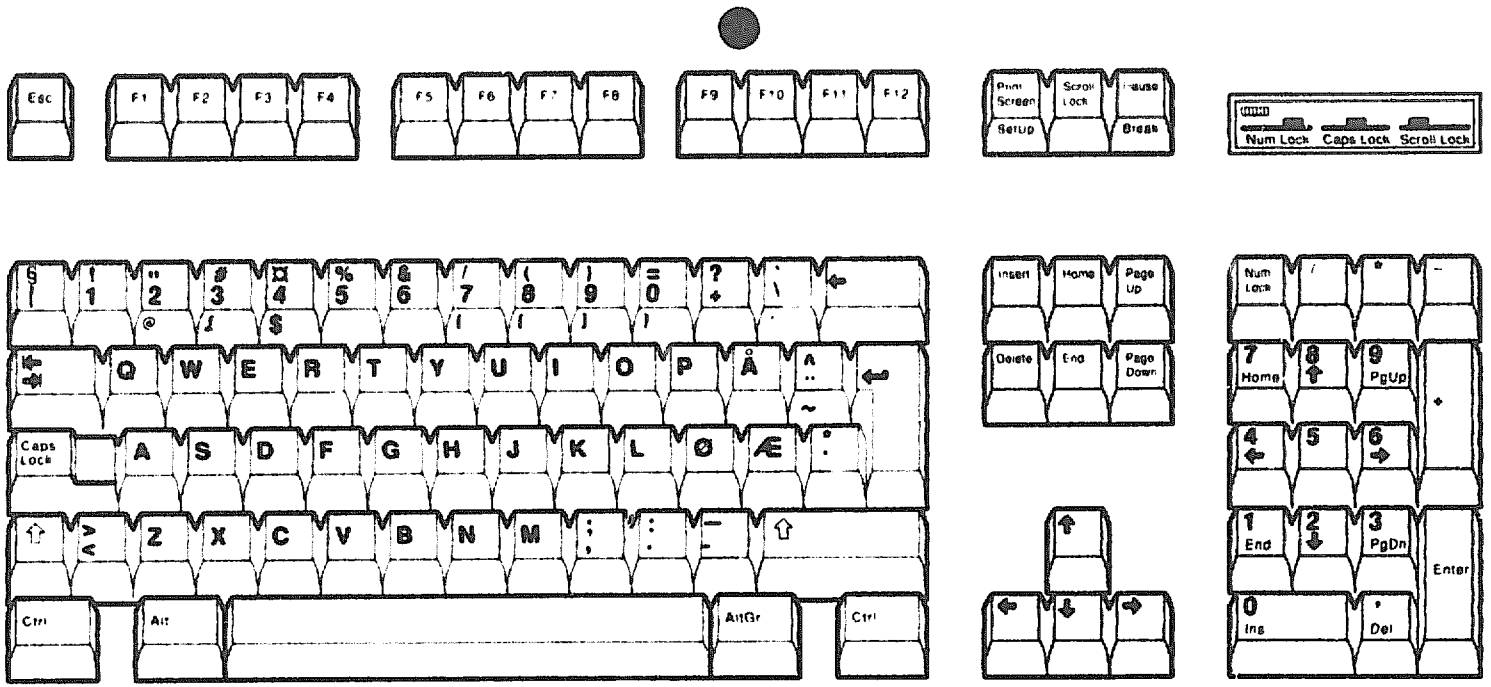
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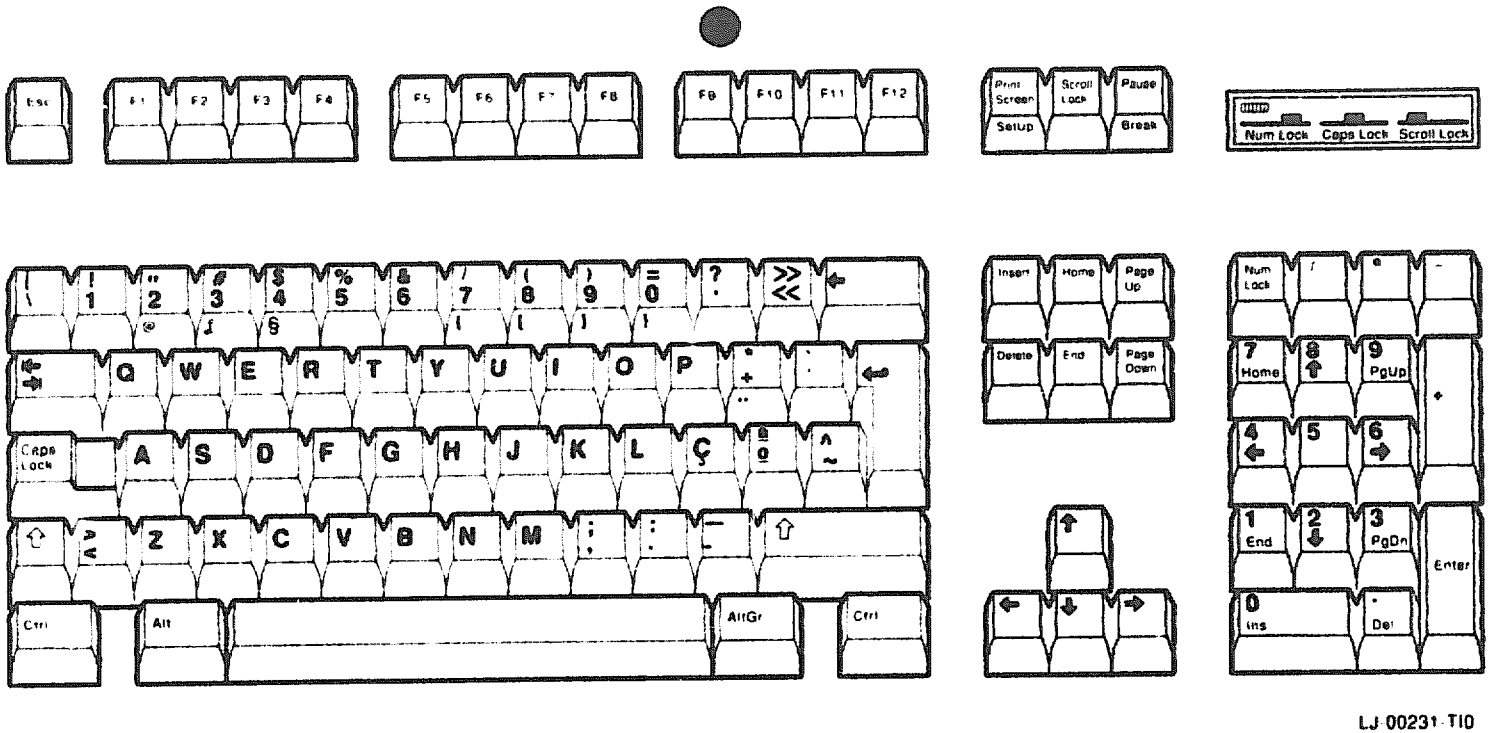
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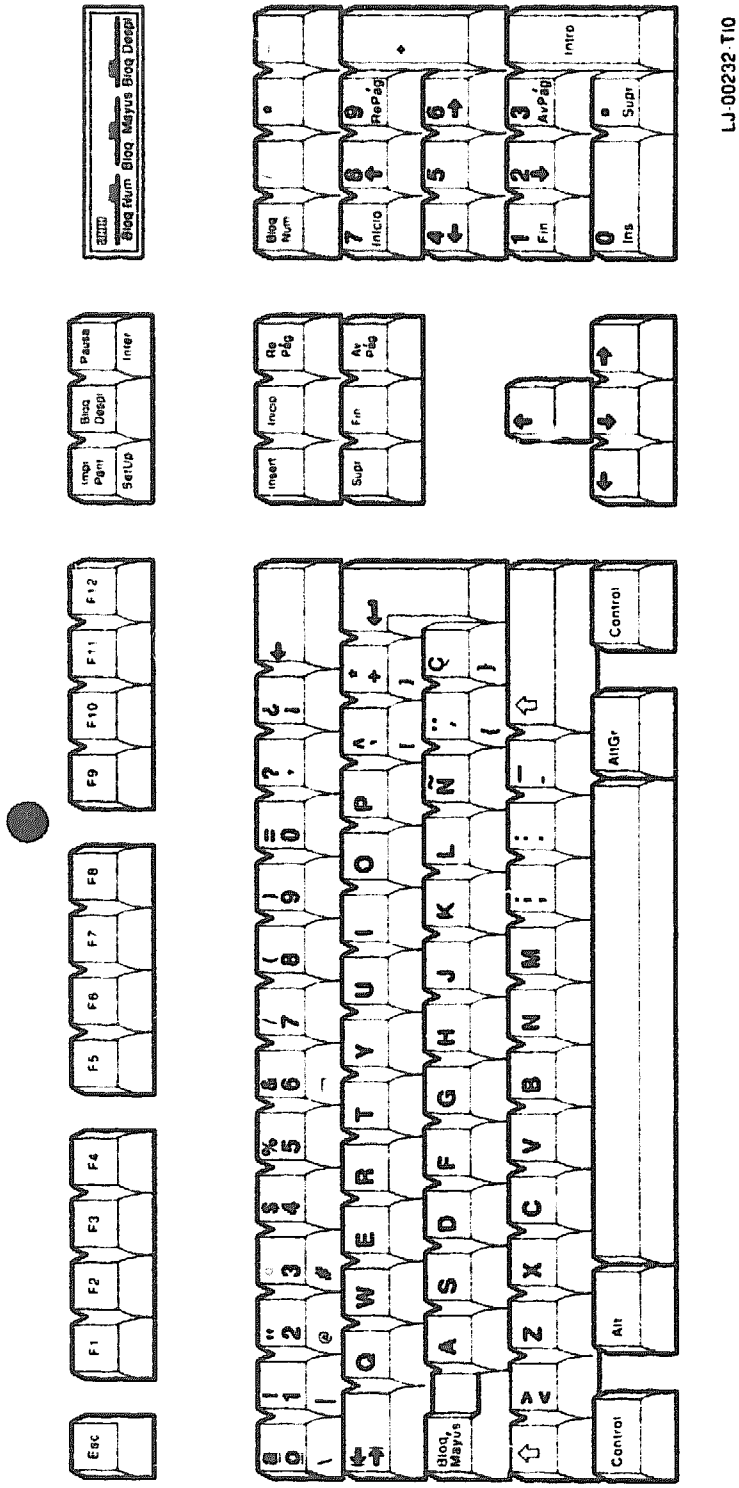
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F12
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Pausa
Inter
Bloq Núm
Bloq Mayus
Bloq Despl
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Fin
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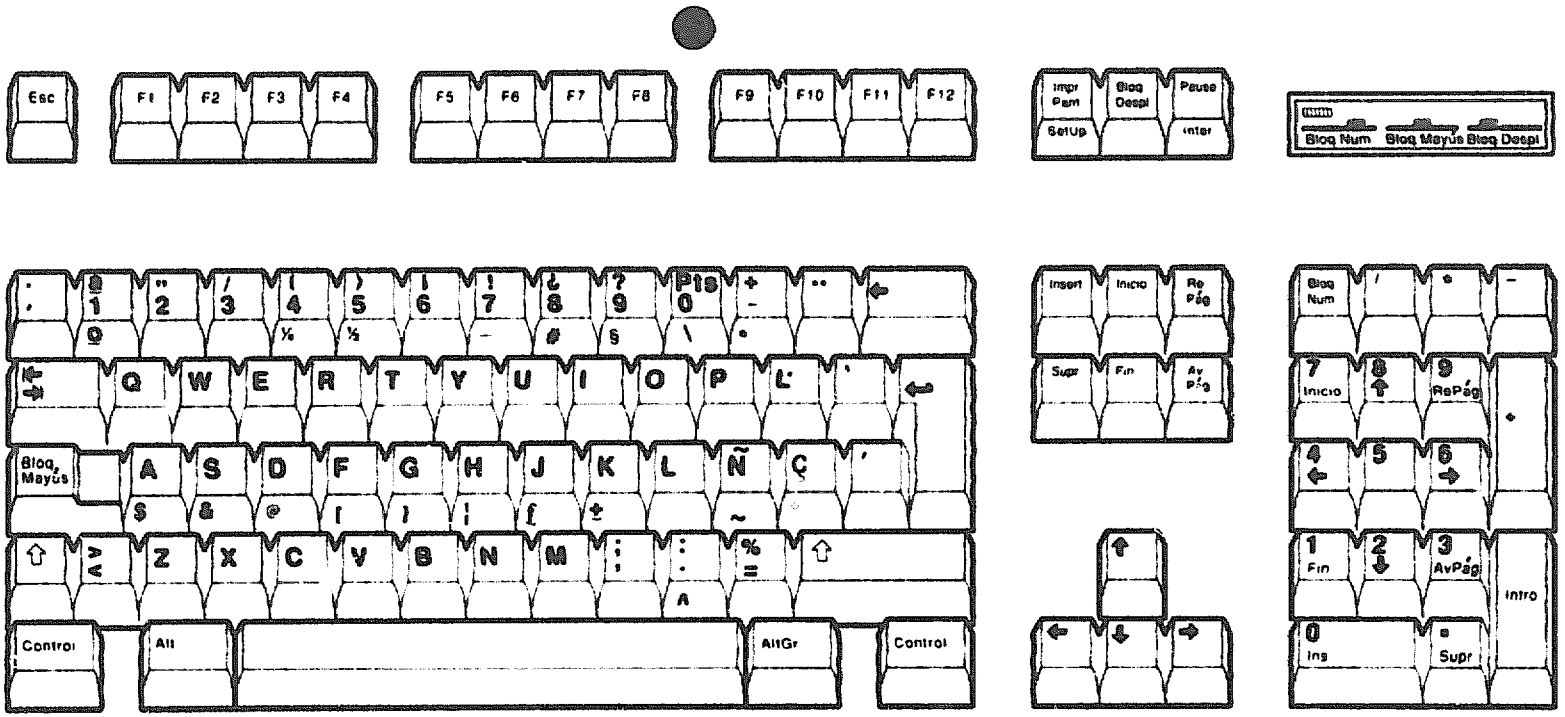
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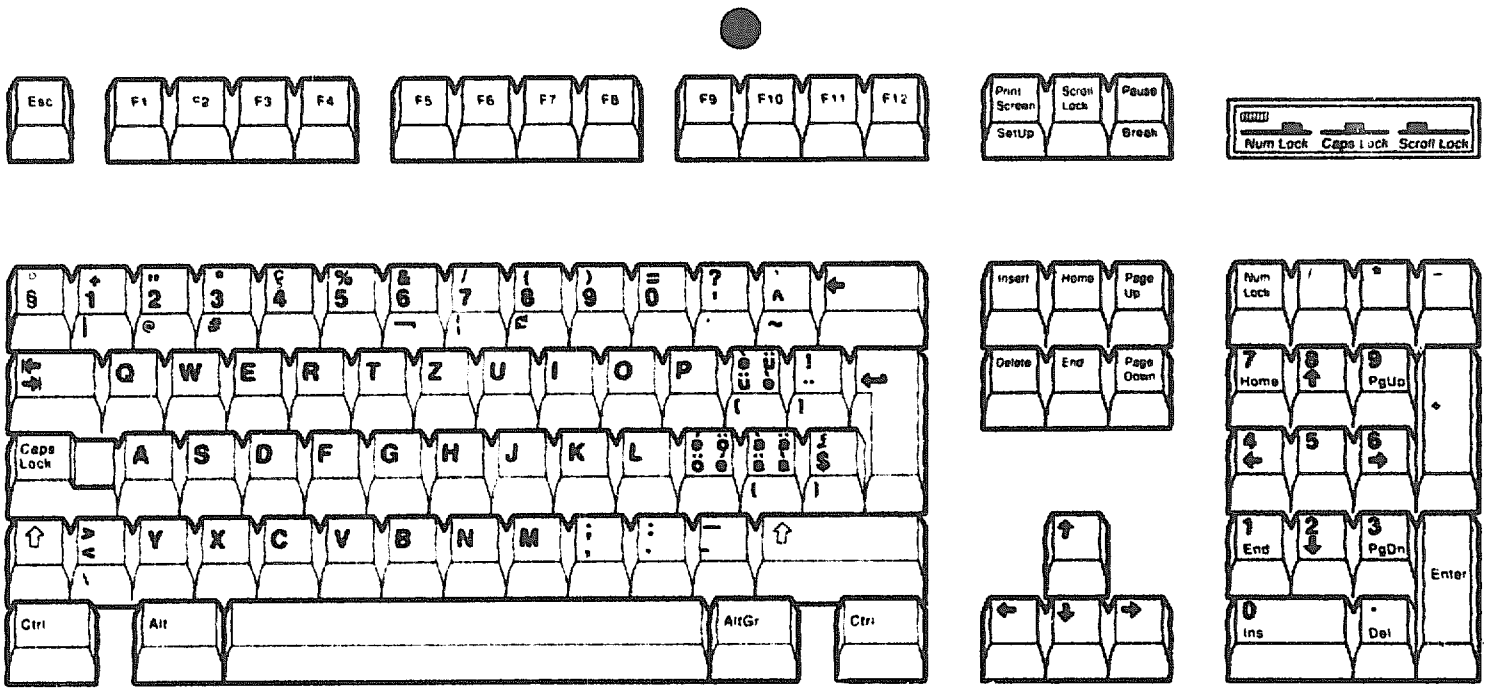
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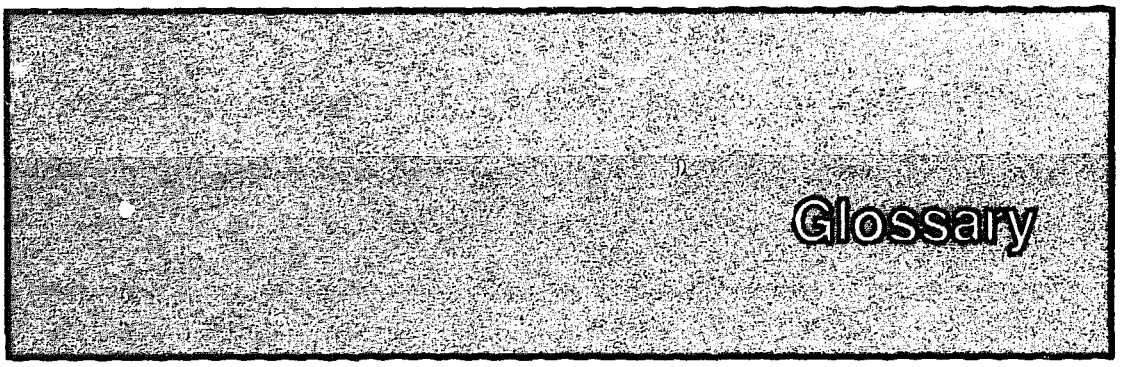

Action field
Terminal features in *set-up* that make the terminal perform an immediate action.

Active session
The *session* that you are currently using on the terminal. You use the F4 key (Alt Scroll Lock) to change the active session.

ANSI
American National Standards Institute.

ASCII
American Standard Code for Information Interchange. A set of 7- or 8-bit binary numbers representing the alphabet, punctuation, numerals, and other special symbols used in text representation and communications protocol.

Application software
A program that performs a specific function for a particular class of computer users. Examples: spreadsheet applications, word processing applications, text-editing applications.

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

Bottom margin
The last line of the *scrolling region*.

CCITT
Comitè Consultatif International de Télégraphique et Téléphonique (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.

Current page
The *page* in *page memory* that the cursor is on.

Cursor
An indicator that highlights the active position on the screen. The terminal uses different cursor characters for text and set-up.

Data processing keys
Keys that have characters on the left half and right half of their keycap. The characters on the right half of the keycap are data processing characters. You must select a special set-up feature to use these characters.

Diacritical marks
Marks or symbols that indicate a change in the standard pronunciation of a letter. Examples of diacritics are the acute accent (´), grave accent (`), and tilde (~).

You can use diacritical marks (if available on your keyboard) to start two- or three-stroke key sequences. When you press a key with a nonspacing diacritical mark, the cursor does not advance until you press the next key.

Display
The information that appears on the screen.

Factory default
A standard setting for a feature. The terminal uses factory-default settings, unless you select a new setting. Many set-up features have default settings.

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

Host system
The computer system(s) you connect to the terminal. If you connect the terminal to two systems, one is the primary host and one is the secondary host.

Inactive session
A *session* that you are not currently using. You can run two sessions at the same time on the terminal, but you can only interact with one session at a time.

ISO
International Organization for Standardization. The ISO 8859 Latin-1 character set is one of the two 8-bit multinational character sets built into the terminal.

Keyboard indicator line
A status line with fields that provide information about the keyboard's status. The keyboard indicator line appears at the bottom of the screen, in the smaller, 132-column font. See also *status line*.

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

Modifier key
A key pressed in combination with another key, to modify the code sent by that key. Ctrl is a modifier key.

National replacement character sets
Seven-bit character sets for many European languages. Each character set with 94 characters. NRC sets are similar to the ASCII set, except for a few characters.

Nonspacing diacritical keys
See Diacritical marks.

Nonvolatile memory
Nonvolatile RAM (random access memory). The terminal uses this memory to store the *saved settings* of set-up features. The settings are not lost when you turn the terminal off.

Page
A section of the terminal's *page memory*. Each page has left, right, top and bottom margins. You can define the size and layout of a page by using the *page arrangement* feature.

Page arrangement
A set-up feature that divides *page memory* into one of four standard page sizes. The default setting of the **page arrangement** feature is 3 pages of 24 lines each (for two sessions) or 6 pages of 24 lines each (for a single session).

Page memory
Memory in the terminal that can store the information you enter from the keyboard. The total size of page memory is 144 lines. Page memory is divided into pages. You can select from several standard page sizes. The amount of memory available depends on the page size selected and the number of *sessions* used (one or two).

Panning
Pointing a *window* to display different parts of *page memory*. Panning a window is similar to panning a camera. The window does not move on the screen; you point the window at another location in page memory.

PC TERM Mode
An operating mode of the VT420 that lets the terminal support a personal computer (PC) keyboard and run PC software applications. You can select PC TERM mode or VT mode from the General Set-Up screen.

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

Port
The logical route for data in or out of the controller board on the terminal. Also, another term for connector. One port can support one or more connectors. All the connectors are on the rear of the terminal.

Prefix key
A key that you press and release before pressing another key, to change the function of one or more keystrokes. [Compose Character] is a prefix key.

Resynchronize
To restore communication with an interrupted *session*.

Saved settings
The settings of set-up features that the terminal uses when you turn the terminal on. You can change these settings or use the *factory-default* settings.

Scan code
The code that is generated by a key when pressed or released. In PC TERM mode, the terminal sends the scan code directly to the host computer. In VT mode, the terminal converts the scan code to a character code or control sequence before passing it to the host.

Scrolling
Moving data between the margins of the page currently displayed. Data scrolled past the margins is lost from *page memory*, but usually not from the *host system*.

Scrolling region
The area on the current *page* that is between the top, bottom, left, and right page margins. The default scrolling region is the complete page. Only a programmer can change the page margins.

Session
An active connection between the terminal and a *host system*. When you log in to a computer from the terminal, you open a session.

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

SSU
Digital's software that lets you run two sessions over one of the terminal's communication lines, in VT mode.

Status line
A display line that provides information about the session's current operating state. The status line appears at the bottom of the screen or at the bottom of the session (if you are running two sessions). The terminal's **status display** feature has three settings—indicator, none, and host-writable. The terminal always displays the status line for the current *session* in set-up.

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

User-defined keys (UDKs)
Any of the top-row keys, F6 to F20 on the VT keyboard or F1 to F12 on the PC keyboard, for which a user has defined special functions. You can use UDKs to store frequently used text and commands.

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

VT Mode
An operating mode of the VT420 that lets the terminal run VT software applications written for specific VT models. You can select VT mode or PC TERM mode from the General Set-Up screen.

Window
A specified area of the screen used to display information from *page memory*. You can divide the screen horizontally into two windows, to display information from two *sessions* at the same time.

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VT420 Common Keyboard Functions

Key = PC keyboard.

Set-Up Keys (Chapter 7)

F3 (Alt SetUp)	Used to enter or leave set-up.
↑, ↓, ←, →	Move the set-up cursor to different features in a set-up screen.
Enter or Return	Performs an action or changes the setting of the feature that the set-up cursor is on.
Ctrl Set-Up (Ctrl Alt Del)	Resets most set-up features for both sessions to their saved setting. The Ctrl Set-Up sequence only works in set-up.

Printing (Chapter 10)

F2 (Print Screen)	Prints the page of text that the cursor is on.
Ctrl F2 (Ctrl Print Screen)	Turns auto print mode on or off. Prints each line of text as it is received from the host system.

Two Sessions (Chapters 3 and 9)

F4 (Alt Scroll Lock)	Changes the active session.
F1 (Scroll Lock)	Holds the screen display of the active session. Press again to release.
Ctrl F1 (Ctrl Scroll Lock)	Holds the screen display of the inactive session. Press again to release.

Windows (Chapter 9)

Ctrl F4 (Ctrl Alt Scroll Lock)	Selects one or two windows on the screen. Press One time: two horizontal windows Two times: one full-screen window
Shift Ctrl ↑ or ↓	Changes the relative size of two windows.

Panning (VT Mode, Chapter 9)

Ctrl ↑ or ↓	Pans up and down.
Ctrl Prev (Ctrl Page Up)	Pans to the previous page.
Ctrl Next (Ctrl Page Down)	Pans to the next page.

Copying and Pasting Text (VT Mode, Chapter 9)

Press and hold the F1 (Scroll Lock) key. While holding the F1 (Scroll Lock) key, use the following keys to cut and paste text:

↑, ↓, ←, →	Move the cursor to beginning or end of text to be copied.
Select (Home)	Selects the starting point of text to be copied.
Remove (End)	Removes the selected text and put it in the paste buffer.
Insert	Pastes the copied text into the active session.

Typing Additional Characters (Chapter 8)

Compose Character	ANSI keyboards only. Lets you enter additional characters (Table 8–3) that do not appear on the keycaps.
Alt	PC keyboards only. Lets you enter additional PC characters (Chapter 11) that do not appear on the keycaps.
Group Shift	German ANSI keyboard only. Lets you enter the characters that appear on the right half of keycaps.

ANSI Keyboard Function Keys (Chapter 4)

F6 to F20, Shift F6 to Shift F20	Perform application-defined functions or user-defined functions. To define keys, see Chapter 11.

Short ANSI Function Keys and Extend Key (Chapter 5)

Extend *front*	Lets you perform the same functions as the keypad and F11 to F20 keys on the longer ANSI keyboard. Functions are printed on the front of short ANSI keys.
F6 to F10, Extend F1 to Extend F10, Shift F6 to Shift F10, Shift Extend F6 to Shift Extend F10	Perform application-defined functions or user-defined functions. To define keys, see Chapter 11.

PC Keyboard Function Keys and Num Lock Key (Chapter 6)

F1 to F12, Shift F1 to Shift F12, Alt F1 to Alt F12, Alt Shift F1 to Alt Shift F12	Perform application-defined functions or user-defined functions. To define keys, see Chapter 11.
Num Lock	On/off switch that lets you use the numeric keypad to send numbers and arithmetic operators. When enabled, the Num Lock keyboard indicator is on.
Alt Num Lock	On/off switch that lets you select Digital's ANSI keyboard layout for the PC keyboard. When you select this layout, the word DEC is displayed on the keyboard indicator line.

Communication (Chapters 4, 6, 7, 10, and Appendix C)

F5 (Alt Break)	Usually ends communication with a session.
Shift F5 (Shift Break)	Ends communication with a modem.
Ctrl F5 (Ctrl Break)	Sends the answerback message to the active session.

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