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TeleVideo

personal terminal

OWNER'S GUIDE

TeleVideo Systems, Inc.

TeleVideo® Personal Terminal Owner's Guide

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FCC Notice

The Personal Terminal is classified as either a Class A or Class B computing device. Class A devices should be used only in commercial, business, or industrial environments, whereas Class B devices have been approved by the Federal Communications Commission for use in residential areas as well. Check the FCC label on the bottom of your terminal to ensure that you have purchased the version appropriate for your end-use environment.

"Class A Warning: This peripheral equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it may cause interference with radio emissions. This peripheral equipment has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC Rules, which are designed

to provide reasonable protection against radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own risk and expense will be required to correct the interference."

"Class B Warning: This peripheral equipment has been certified to comply with the limits for a **Class B** computing device, pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against interference to radio and TV reception when operated in a residential environment. See instruction if interference with radio emissions is suspected."

Modem Notice

The following information is derived from FCC Regulations, Part 68, and pertains to Personal Terminals that contain an optional 300- or 300/1200-baud modem or telephone.

Do not connect the 300- or 300/1200-baud modem to a party line or a pay telephone. All connections to the telephone company network must be through standard USOC-RJ11C connectors.

Notify the telephone company that you are installing an FCC–registered device. Give them the telephone number(s) to which it will be connected and the FCC registration number and ringer equivalence of the modem and/or telephone (located on the bottom of each).

If the modem/telephone fails to operate properly, disconnect it from the telephone line so you can determine whether the problem is in the terminal/telephone or the telephone company network. If the problem is in the telephone line, call the telephone company. If the problem is in the modem/telephone, do not reconnect the modem/telephone. To maintain a valid FCC registration, the FCC requires that only TeleVideo Systems, Inc. or its authorized service agent repair the modem/telephone.

The telephone company may make changes in its network that affect the modem/telephone, provided they give you enough advance notice to maintain uninterrupted service.

You must notify the telephone company again if you permanently disconnect the modem/telephone from the telephone company network.

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1. Installation

Welcome to a wide world of information, brought to you by TeleVideo's Personal Terminal in one compact, convenient, and economical unit.

The Personal Terminal is designed to give you access to information stored in corporate data bases. To reach this information quickly and easily, you can program the terminal's seven function keys. For example, you can press one key to reach the company data base, another to log on, and a third to retrieve and display the information you want. If you need a printed copy, just press two more keys.

If your terminal contains either of the two optional internal modems, you can also communicate by telephone with computers far from your desk, including the timesharing systems of subscription data bases.

The Personal Terminal is easy to install. This chapter gives you step-by-step instructions, along with illustrations to guide you.

Notifying the Telephone Company

If your terminal contains one of the optional internal modems or the optional handset, notify the telephone company when you install it. You should supply the following information:

- Your name
- Your telephone number
- The FCC registration number from the label on the bottom of the terminal
- The ringer equivalence, also from the label on the bottom

Unpacking the Terminal

Carefully remove your Personal Terminal from its shipping carton. Save the carton and the shipping material in case you want to move or ship the terminal later.

Inspect the keyboard, the cabinet, and the video screen for shipping damage. If the screen is broken, protect yourself by using tongs and gloves to handle the broken fragments. The fragments are sharp and the coating on the inside of the tube is poisonous.

WARNING! *Never touch any exposed components inside the case. The cathode ray tube (CRT) retains high voltages of electricity even when the power is turned off. In case of damage, call a qualified service technician.*

Selecting a Site

Since the Personal Terminal is so compact, it's easy to find a place for it. To take full advantage of its easy-to-read screen, place it away from bright lights and annoying glare.

In selecting a site, remember to give the terminal adequate ventilation. Never place the terminal on a soft surface that could block the vents on the bottom. You should allow at least 4 inches (10.2 cm) of space around the terminal.

Checking the Voltage Setting

When the terminal is shipped, it is set to operate at 110 volts. Terminals being used in Europe need to be set for 220-volt operation. A blocking strip on the back of the terminal (Figure 1-1) holds in position the switch that changes the voltage setting from 110 to 220 volts. Make sure the switch is in the correct position, as shown in Figure 1-2.

Figure 1-1
Rear View of Terminal

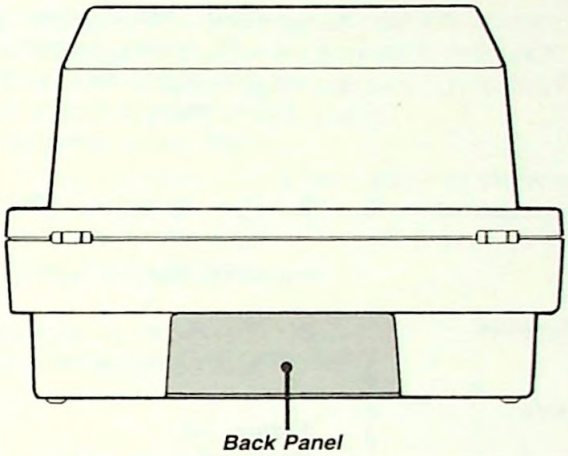
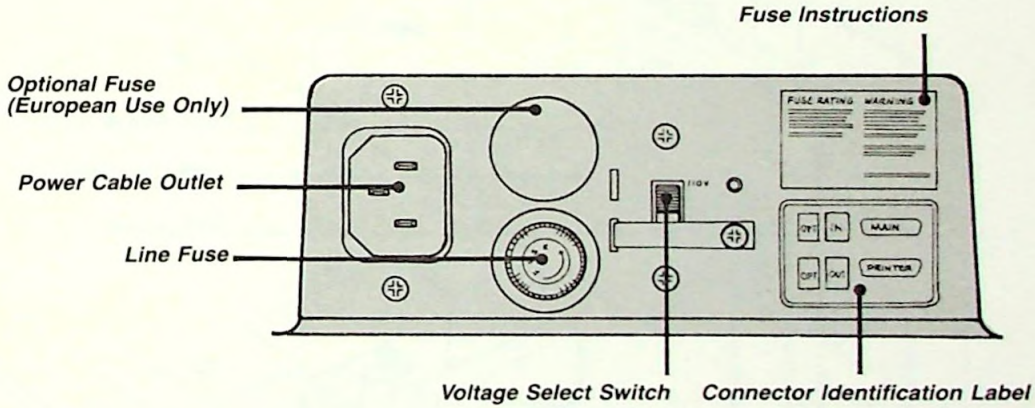


Figure 1-2
Back Panel



Connecting the Computer

If the Personal Terminal is less than 50 feet from the computer, you can connect it directly with an interface cable with a standard RS-232C connector.[1] These cables are available from almost any distributor.

1. For pin connector assignments, see Appendix H.

To connect the terminal to the computer:

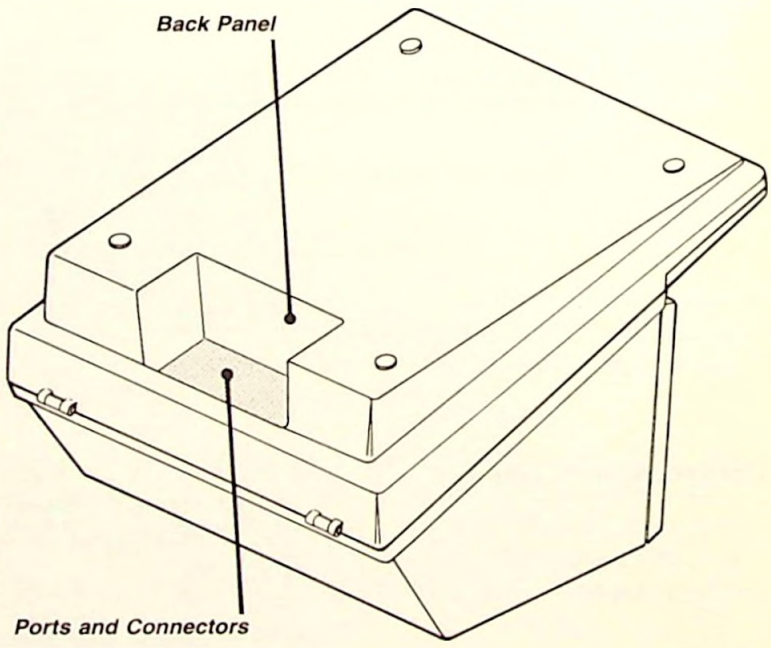
1. Face the screen away from you and turn the terminal upside down. This exposes its bottom surface, as shown in Figure 1-3a, so you can see the two RS-232C ports and the modular jack connectors beneath the curved surface. The labels identifying these ports and connectors are engraved on the back panel, shown in Figure 1-2.

2. Plug the cable's RS-232C connector into the terminal connector that corresponds to the **Main Port** label on the terminal's back panel.

3. To find out where to plug the cable into the computer, consult your computer manual.

Figure 1-3
Connecting the Interface Cables

a. Location of the Main and Printer Ports



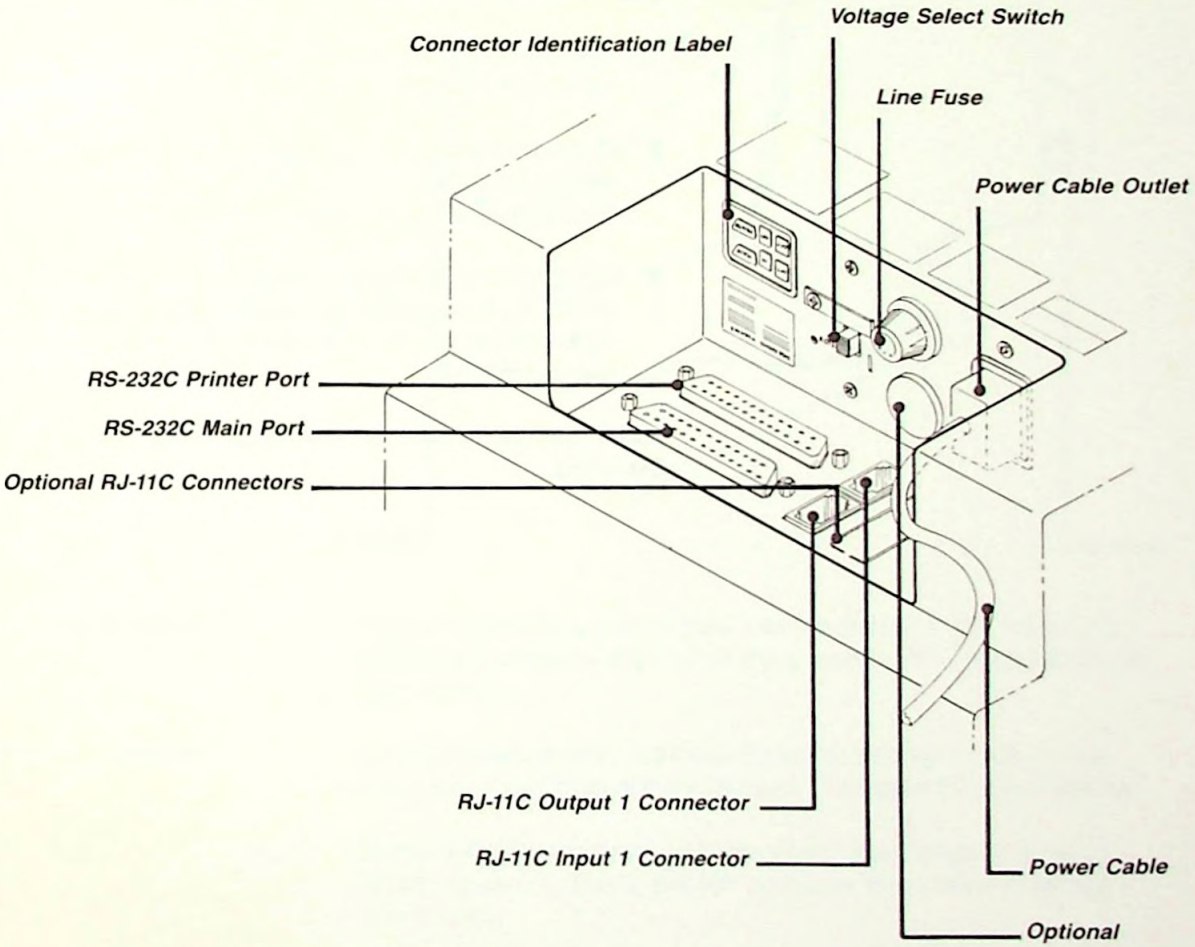
Connecting the Printer

1. Turn the terminal upside down to expose its bottom surface, shown in Figure 1-3a.

2. Plug the RS-232C interface cable's connector into the connector beneath the terminal's main port, shown in Figure 1- 3b.[1] This connector corresponds to the **Printer Port** label on the terminal's back panel.

3. Plug the other end of the cable into the printer's RS-232C serial port, as shown in your printer manual.

b. Connectors and Ports



1. For pin connector assignments, see Appendix B.

NOTE! *The Personal Terminal is wired to receive the* ***printer busy*** *signal on pin 20. Some printers, however, send this signal on pins 11 or 19. If your printer does not work, check the printer's manual to see if the printer uses those pins. In that case, call a qualified service technician to modify the cable. If the printer's connector is wired correctly, call TeleVideo for technical assistance.*

Connecting the Modem

If your Personal Terminal has an optional internal modem, you also have to connect the terminal to your telephone line. To do this, you need two telephone cords, each with a modular RJ-11C connector at one end. The other connector on one of the cords should fit the jack in your telephone, while the second cord needs a connector that fits the wall jack.

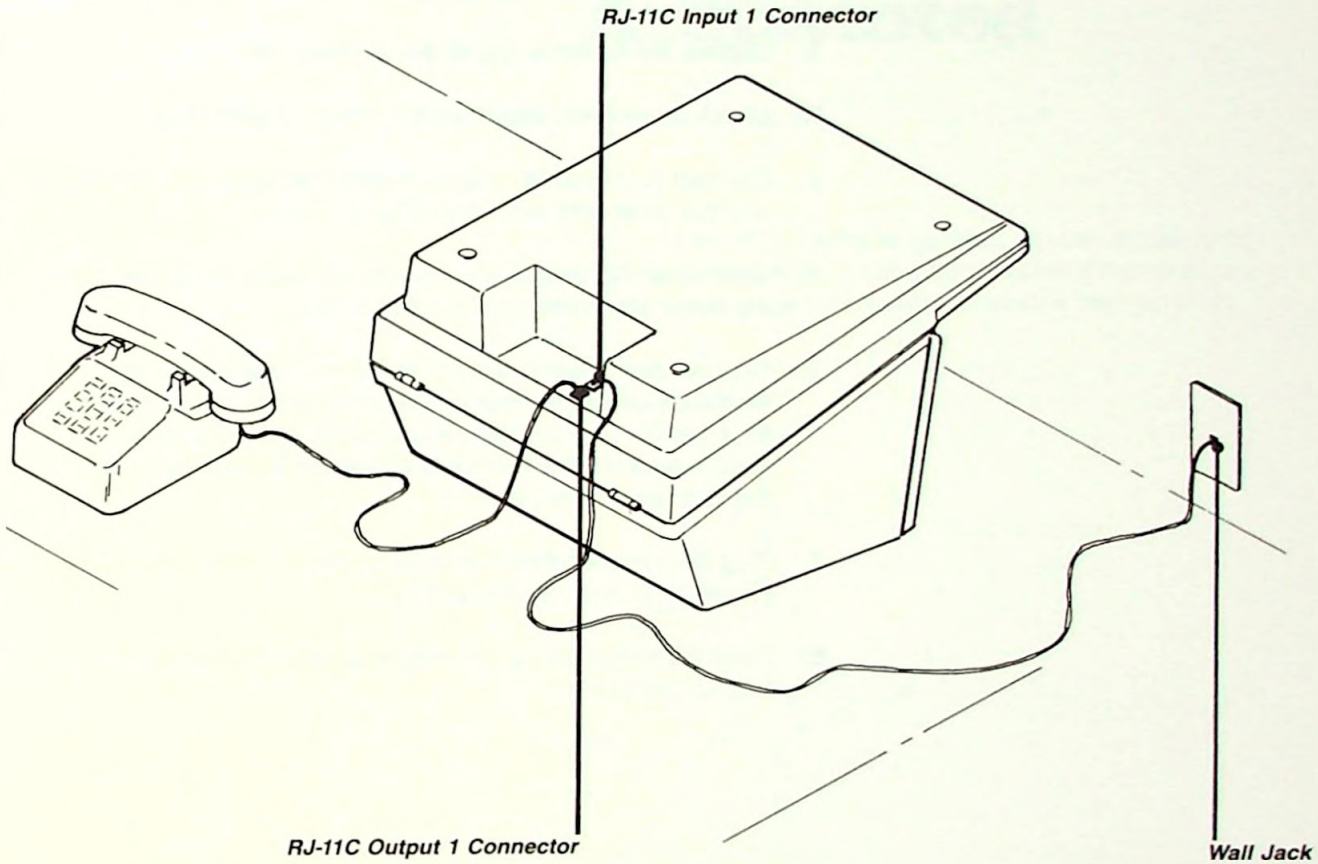
1. Turn the terminal upside down to expose the bottom surface, as shown in Figure 1-3a.

2. Connect one telephone cord to the wall jack and the terminal's connector shown in Figure 1-3b. This connector corresponds to the **In** label on the terminal's back panel.

3. Connect the RJ-11C connector on the second cord to the terminal connector that corresponds to the **Out** label. Plug the other end of this cord to your telephone. The result will look like Figure 1-4.

Your Personal Terminal is now ready to call computers all over the world.

Figure 1-4
Connecting the Modem



Plugging In the Terminal

Plug the terminal's power cord into the outlet on the terminal's back panel, shown in Figure 1-2. Plug the other end into a standard wall socket.

Turning On the Terminal

To turn on the terminal, find the switch marked with a white dot on the upper right corner of the keyboard. Push down on the white dot.

The terminal should beep, and the cursor (a rectangular square) should appear in the upper left corner of the screen in about 15 seconds.

Installation Summary

1. Notify the telephone company.
2. Unpack the terminal and find a suitable site.
3. Check the voltage select switch setting (Figure 1-2).
4. Connect an RS-232C interface cable between the computer and the terminal's main port (Figure 1-3b).
5. Connect an RS-232C interface cable between the printer and the terminal's printer port (Figure 1-3b).
6. Connect one telephone cord to the wall jack and to the terminal's connector that corresponds to the **In** label on the back panel. Connect the second telephone cord to the telephone and to the terminal's connector that corresponds to the **Out** label. See Figure 1-4.
7. Plug the power cord into the outlet on the terminal's back panel (Figure 1-2) and into the wall outlet.
8. Press the switch on the upper right corner of the keyboard to turn on the power.

2. Getting Acquainted

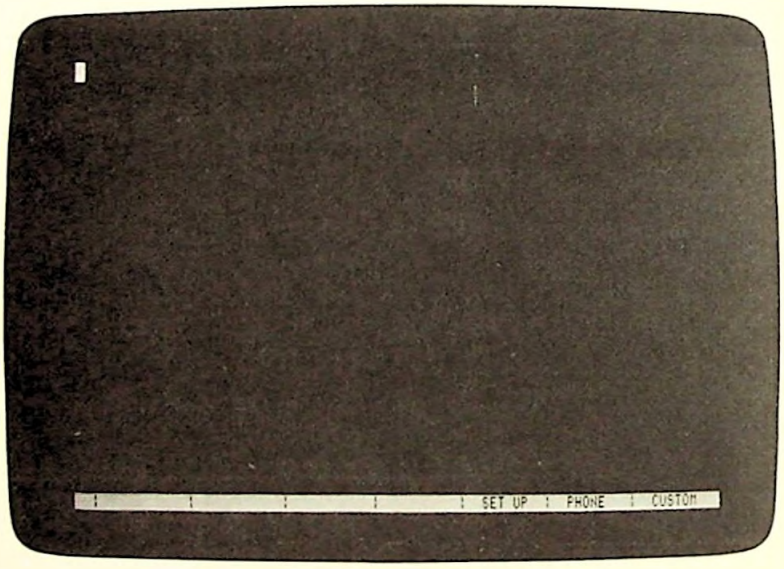
Now that your Personal Terminal is installed, you're almost ready to use it. This chapter gives you a general overview of the terminal's basic components and functions and introduces the terminal's keyboard.

General Overview

When you turned on the terminal, it responded with a beep. After about 15 seconds, it also displayed a contrasting line at the bottom of the screen and a blinking, lighted square in the upper left corner, as shown in Figure 2-1.

The lighted square, called a cursor, shows where the next character you enter will appear. The contrasting line is called the status line. It displays labels and messages that make it easy to control the terminal, as you'll see later.

Figure 2-1
Initial Screen Display



Basic Components of the Personal Terminal

The Personal Terminal has four basic components for receiving, displaying, and sending information:

- A keyboard similar to that of a typewriter, where you can enter letters and numbers. It also has special keys for various functions.
- A screen that displays the data you enter at the keyboard, as well as messages from the terminal or your computer program. The screen has 24 rows for displaying data and an additional, contrasting status line.
- Outlets (called ports) to connect the terminal to computers and printers.

- An optional internal modem that allows the terminal to call other computers across telephone lines.

Ways To Use the Personal Terminal

Like any video display terminal, the Personal Terminal works with computers to run programs for a variety of tasks, such as sales order processing, accounting, and inventory control. When you use these programs, they determine how the keys work and which messages the screen displays.

By installing one of the optional internal modems, you can also retrieve information from corporate computers or subscription data bases via telephone lines.

Operating States

The terminal has five operating states that allow you to control the terminal. In each state, the status line displays a word above each function key so you know what will happen when you press that key. If the status line is blank above a key, that key has no effect in that particular state.

Table 2-1 lists the operating states and summarizes what you can do in each one. Later chapters describe these states in more detail.

Table 2-1
Operating States

State	What It Does
Starting	Gives you access to the set up, phone, and custom states. (You can reach the dial state directly at any time with the (DIAL) key.)
Custom	Lets you send up to 15 characters to the computer and/or the screen by pressing one of the seven function keys. Which characters it sends depend on how you or your computer programmed these keys.
Phone	Allows you to automatically dial voice or data calls from a directory containing up to 28 numbers. This state requires one of the optional modems. (However, even without a modem, you can use the directory as an electronic telephone book.)
Dial	Allows you to manually dial numbers. As in the phone state, the terminal can not dial numbers unless your terminal contains one of the optional modems.

Table 2-1
Continued

State	What It Does
Set up	Lets you select operating characteristics such as the brightness of the screen. This state also lets you determine which numbers and characters will be sent by the function keys in the phone and custom states.

The Keyboard

The terminal's keyboard is similar to a typewriter's. It contains two kinds of keys: alphanumeric character keys and special keys.

Character Keys

The character keys, highlighted in Figure 2-2, include all letters (a through z), numbers (Ø through 9), punctuation marks, and mathematical symbols. These keys repeat when pressed for more than one-half second.

Figure 2-2
Character Keys



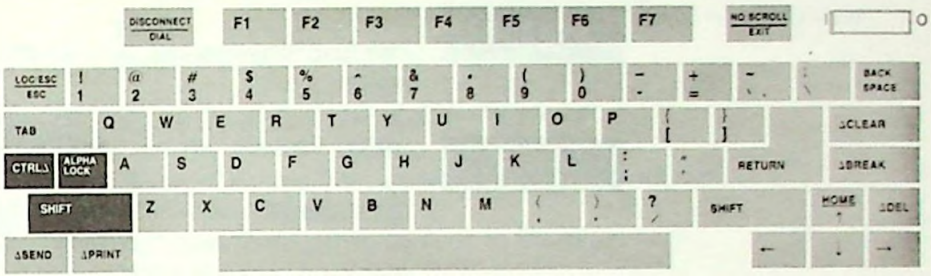
Special Keys

The special keys do not display characters when pressed. Instead, they generate commands to perform special functions, such as transmitting data to the computer, printing, or moving the cursor. Some special keys are used alone; others, together with additional keys.

The figures in this section show the special keys you will use most often, and the descriptions that follow briefly explain their functions. Special keys used mostly by programmers and technicians are discussed in Chapter 7.

Figure 2-3 highlights the keys that select uppercase characters and the CTRL key.

Figure 2-3
(SHIFT), (ALPHA LOCK), (CTRL Δ)



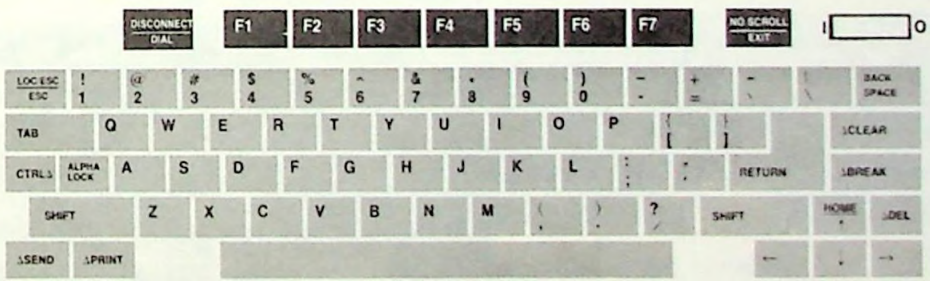
SHIFT When pressed together with another key, capitalizes the letter or selects the upper character or function shown on the key.

ALPHA LOCK Capitalizes all letters until you press it again, but does not select the upper character or function of the other keys. An * appears in the first column of the status line when the alpha lock feature is on.[1]

CTRLΔ Sends, erases, or prints data if you press it together with the (Δ SEND), (Δ CLEAR), or (Δ PRINT) key. (Programmers may also use (Δ DEL) and (Δ BREAK) in this way.) Certain program functions often use this key with character keys.

Figure 2-4 shows the keys you'll probably use most often. They include the function keys, (DIAL), and (EXIT).

Figure 2-4
Function keys, (DIAL), (EXIT)



1. When transparent print mode is on, an X replaces the * in the first column. If you disable (lock) the keyboard, an L will replace both the * and the X.

F1 through F7

The function keys guide you through the operating states. They perform different functions in each operating state, as indicated in the status line above each function key.

The function keys can also be programmed to fit your specific needs.

DISCONNECT DIAL

(DIAL) lets you dial manually, as explained in Chapter 4.

(DISCONNECT) aborts dialing before it begins or interrupts the call when the terminal finishes dialing. The terminal then returns to the starting or custom state.

NO SCROLL EXIT

(EXIT) returns the terminal to the starting state, either directly or via the custom state (depending on the setting chosen in the set up state, explained in Chapter 3).

(NO SCROLL) stops data from coming in (screen updating). A T appears in the second column of the status line. To continue screen updating, press (NO SCROLL) again, causing the T in the status line to disappear.

Figure 2-5 highlights the keys that move the cursor (cursor control keys). What happens when the cursor reaches the borders of the screen depends on how the scroll and autowrap modes are set.[1,2]

If you don't know how the modes are set, try the cursor control keys with some sample data that you don't mind losing.

Figure 2-5
Cursor Control Keys



1. Scroll mode is determined in the set up state.
2. Autowrap mode may be set by a command or in the set up state.

HOME ↑

↑ moves the cursor up one line within the column. When the cursor reaches the top line of the screen, it does not move further.

(HOME) moves the cursor to the upper left corner of the screen (called home).

←

Moves the cursor one position to the left.

BACK SPACE

Like ←, it moves the cursor one position to the left.

→

Moves the cursor one position to the right.

↓

Moves the cursor down one line within the column.

RETURN

Returns the cursor to the beginning of the current or the next line, depending on the return parameter setting in the set up state (see Table 3-1).

TAB

Moves the cursor to the next tab stop (preset at every eighth column position unless the program changes it). When you keep it held down, the cursor moves through all the tab stops until it reaches the last tab stop on the screen.

Figure 2-6 shows the keys with which you can send data displayed on the screen to the computer, erase data on the screen, or print that data. Hold down the (CTRL Δ) key while pressing these keys.

Figure 2-6
(Δ SEND), (Δ PRINT), (Δ CLEAR), (Δ DEL), (Δ BREAK), (ESC)



Δ SEND

Sends all data displayed on the screen to the computer.

Δ PRINT

Prints all data displayed on the screen.

Δ CLEAR

Erases all data on the screen and replaces it with space characters.



A special key used by technicians and programmers.

A special key used by technicians and programmers.

(LOC ESC) (local escape) lets you change the terminal with the commands described in Chapter 7 without sending those changes to the computer.

(ESC) is a special key mostly used by programmers.

The Status Line

The status line occupies the bottom line on the screen. In addition to reflecting the current function of each function key, the extreme right and left sides of the status line sometimes display status indicators. The far left fields show the status of the terminal, computer, or printer, while the far right field indicates the modem's status. Table 2-2 describes the meaning of the characters you may see in these fields. Refer to the section on troubleshooting in Chapter 6 if you see one of these characters while the terminal is not reacting as you expect it to.

Table 2-2
Status Line Characters

Field	Character	Terminal's Status
Left	P	The printer is busy and can not accept any more data from the terminal now.
	S	The terminal is sending data to the computer or the printer.
	T	The terminal is busy and can not accept data from the computer. (See the description of the (NO SCROLL) key.)
	L	The keyboard is locked.
	H	The host (computer) is busy and can not receive any data from the terminal right now.
	X	The terminal has been set so it does not send anything to the screen, but forwards to the printer everything it receives from the computer (i.e., transparent print mode is on).
	*	The (ALPHA LOCK) key is engaged. Press it again to disengage it.

Table 2-2
Continued

Field	Character	Terminal's Status
Right	D	The terminal is dialing a telephone number.
	W	The terminal is waiting for the telephone connection to be made.
	C	The telephone connection has been made.
	A	The terminal is in answer mode.

If any of the conditions described above persist and cause the terminal to lock up, refer to the Troubleshooting section in Chapter 6.

Printing

If you connect a printer to the Personal Terminal, it will print the current page for you when you press CTRL Δ-Δ PRINT. Of course, the computer program can also print by activating one of the terminal's printing modes.

You can print data even if the computer program wasn't written that way. All you have to do is press the keys listed in Table 2-3 before the computer starts sending the data.

NOTE! *Any data the terminal receives from the computer or a modem during a page print will be lost. Before you start you should ensure that you will not receive data during printing. When you see a hyphen between two key names, hold the first key down while you press the second key.*

Table 2-3
Printing Data

Keys	Effect
CTRL Δ-Δ PRINT	Prints everything that is displayed on the current screen.
LOC ESC @	Continuously prints everything as the terminal receives it from the computer. Also displays the data on the screen.
LOC ESC A	Turns off the printing that you started when you pressed LOC ESC @ .

3. Setting Operating Characteristics

Before you can use the Personal Terminal, you have to set its operating characteristics (called parameters). This ensures that the computer and/or printer agree on how to handle data. If they try to communicate at different speeds, for example, they won't communicate at all.

You can also set some of the terminal's operating parameters according to your own preferences. These values include the screen brightness, the appearance of the cursor, and the background of the screen.

When the Personal Terminal is manufactured, a value is assigned to each parameter. When you change these values as explained in this chapter, the new values are saved in the terminal's permanent memory until you change the values again.

Set Up Procedure

To simplify the set up process, fill out the list in Table 3-1.

This list is divided into three groups of parameters: screen, communications, and miscellaneous. As you can see, you have several options for each parameter. The first option listed is the value set at the factory, called the default value.

Go through the list and circle the values you want. For the screen parameters, choose any value – it's strictly a matter of personal preference. However, the miscellaneous and communications parameters are more technical and must be set correctly. If you don't know the correct values for the technical parameters, ask your data processing manager or check the manuals for your computer and/or printer.

Table 3-1
Set Up Values

Screen Parameters	Values
How bright do you want the screen? The default value is a moderate brightness (11). You can increase it to maximum brightness (15), decrease the brightness until the cursor becomes almost invisible (Ø), or choose any value in between.	BRIGHT 15-Ø (Choose one: _____)
Do you want the screen to turn itself off when it's not in use for approximately 10 minutes? (To turn it back on, press any key. We recommend using a key marked with a Δ, since it will not display a character on the screen when pressed. No data is lost.)	TIMOUT No = OFF Yes = ON
Do you want the cursor to appear as an underline, a rectangular block, or not at all?	CURSOR[1] BLOCK LINE NONE
Do you want the cursor to blink? Or do you prefer it to be steady?	CURSOR[1] BLINK STEADY

1. Your applications program may override the settings for these values.

Table 3-1
Continued

Screen Parameters	Values
Would you like the screen to display 80 or 40 columns? (If you choose 40 columns, your characters will be twice as wide as normal characters, but you can only fit half as many on the screen.)	COLUMN[1] 80 40
Do you prefer dark letters on a light background (LIGHT) or light letters on a dark background (DARK)?	BKGRND LIGHT DARK
When you enter a character after the cursor reaches the end of a line, do you want the cursor to stop there (OFF)? Or do you want it to return to the beginning of that line (ON)? (If you have chosen to display 40 columns per line, you'll probably want to turn WRAP on.)	WRAP[1] ON OFF

Communications Parameters	Values
Select a baud rate compatible with your computer for the main (computer) port. (When you use the 300-baud modem, the terminal temporarily changes this rate to 300 baud. If you use the 300/1200-baud modem at a rate other than 300, the terminal temporarily changes the rate to 1200 baud.	M. BAUD 9600 4800 2400 1200 600 300 110 19.2K
Select a baud rate compatible with your printer for the printer port. (This baud rate is used when you print with the page print command. If you print with another print mode, the terminal temporarily changes this baud rate to match the main port's baud rate.)	P. BAUD 9600 4800 2400 1200 600 300 110 19.2K

1. Your applications program may override the settings for these values.

Table 3-1
Continued

Communications Parameters	Values
Select the proper parity for your computer.	PARITY NONE ODD EVEN SPACE MARK
Does your computer require 7 or 8 data bits?	D. BITS 8 7
Does your computer require 1 or 2 stop bits?	S. BITS 2 1
Do you want to operate in block, full duplex, or half duplex communication mode? Block mode lets you make corrections before sending as block of data to the computer (by pressing the Δ SEND key). Full duplex only sends data to the computer, while half duplex sends it to the screen and to the computer. (If you're using a modem, you'll probably need to use FDX.)	MODE[1] FDX[2] HDX BLOCK
Does your computer use DTR control or X-On/X-Off as the handshaking protocol? (Select X-ON if you're using a modem.)	PROTCL[1] X-ON[2] DTR

Miscellaneous Parameters	Values
Do you have a pulse (rotary) or tone (most pushbutton) telephone?	DIAL TONE PULSE[2]
Does your system require a frequency of 60 hertz (U.S.) or 50 hertz (most international)?	HERTZ 60 50
Do you want the codes generated by the cursor control keys to be sent to the computer (DUPLEX), or do you only want to change the screen display (LOCAL)?	EDIT[1] DUPLEX[2] LOCAL

1. Your applications program may override the settings for these values.
2. When in doubt, choose this value.

Table 3-1
Continued

Miscellaneous Parameters	Values
When the terminal receives a carriage return code, should it perform just a carriage return (CR) or a carriage return and a line feed (CRLF)?	RETURN CR CRLF[2]
Do you want the screen to scroll up when the cursor reaches the end of the screen (ON)? Or do you want the cursor to wrap around to the home position (OFF)?	SCROLL ON[2] OFF
Do you want the keys to click when you press them?	KY CLK ON OFF
When you press the (EXIT) key, do you want the terminal to enter the starting or the custom state? (If you use the custom state often, choose CUSTOM to save a step.)	EXIT =[1] START CUSTOM

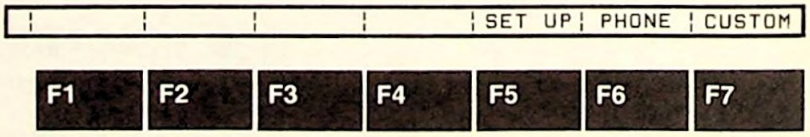
1. When in doubt, choose this value.

Entering the Set Up State

The set up state allows you to change the values for the operating parameters listed in Table 3-1.

When the terminal is manufactured, it is set to enter the starting state (Figure 3-1) when you turn it on. If the terminal is not in the starting state, press (EXIT) until the status line matches Figure 3-1. The areas above function keys (F5), (F6), and (F7) are labeled SET UP, PHONE, and CUSTOM, respectively.

Figure 3-1
Starting State Status Line



Press (F5) (SET UP) to enter the set up state. Now the status line displays SCREEN, COMM, and MISC above (F1), (F2), and (F3), as shown in Figure 3-2. Each key lets you change one of the three groups of parameters in Table 3-1.

Figure 3-2
Set Up State Status Line



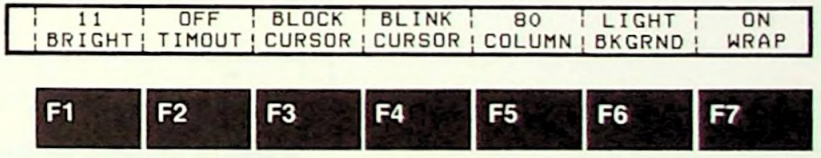
Changing Screen Parameters

1. Press (F1) (SCREEN). The status line will change to look like Figure 3-3. It displays the label for the parameter controlled by each function key, with the default value for that parameter directly above the label. For example, BRIGHT shows the default value 11.

2. Compare the values you circled in Table 3-1 with those appearing on the labels. If a circled value is different from the one displayed above a particular key, press that key. Each time you do, a new value appears. Keep pressing the key until the value displayed matches the one you circled.

3. When all the values match your circled values, press (EXIT) to return to the starting state (you may have to press (EXIT) twice).

Figure 3-3
Screen Parameters



Changing Communications Parameters

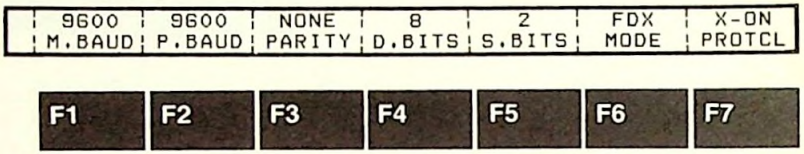
1. Press (F5) (SET UP) while the terminal is in the starting state.

2. Press (F2) (COMM). The status line now looks like Figure 3-4. It displays a label for each communication parameter, with that parameter's default value above the label.

3. Compare the values you circled in Table 3-1 with those above the labels. If a value you circled is different from the one displayed above a particular key, press that key. Each time you do, a new value appears. Keep pressing the key until the value displayed matches the one you circled.

4. When all values match, press (EXIT) to return to the starting state (you may have to press (EXIT) twice).

Figure 3-4
Communications Parameters



Changing Miscellaneous Parameters

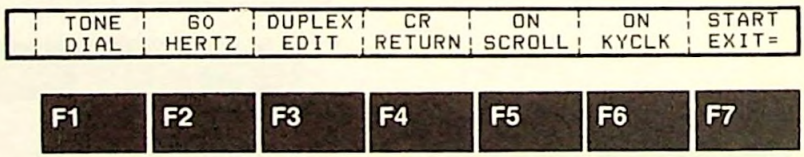
1. Press (F5) (SET UP) while the terminal is in the starting state.

2. Press (F3) (MISC). The status line now displays the label for the miscellaneous parameter controlled by each function key. The default value is displayed directly above each parameter's label, as shown in Figure 3-5.

3. As with the other parameters, compare the values you circled with those that appear above the labels. If any values differ, keep pressing the corresponding key until all circled values match the displayed values.

4. Press (EXIT) to return to the starting or custom state.

Figure 3-5
Miscellaneous Parameters



Set Up Summary

1. In Table 3-1, circle the value you want for each parameter.

2. If necessary, press (EXIT) until the terminal enters the starting state.

3. Press (F5) to enter the set up state.

4. Press (F1) to change the screen parameters
   (F2) to change the communications parameters
   (F3) to change the miscellaneous parameters

5. Press each function key until the value displayed in the top half of the status line matches the value you circled in Table 3- 1.

6. Press (EXIT) to return to the starting or custom state.

4. Phoning

If your terminal contains one of the optional internal modems, you can automatically dial up to 28 telphone numbers stored in the Personal Terminal's memory, including computer data bases around the world. The terminal can receive information at a speed of either 300 or 1200 baud (bits per second), depending on which modem you have. These electronic conversations with computers are called data calls, as opposed to the more familiar voice calls.

The Personal Terminal can automatically dial voice calls for you too. This chapter explains how to make both data and voice calls with the touch of a key.

Of course, you can always manually dial a number that you haven't stored in the Personal Terminal's directory – just press (**DIAL**) and enter the telephone number on the keyboard.

Loading Numbers

Before you can use the phone state for automatic dialing, you must load the telephone numbers into the terminal's directory. You may include numbers for data bases as well as ordinary numbers.

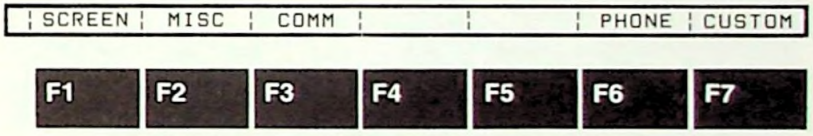
1. Press (EXIT) until the terminal enters the starting state, shown in Figure 4-1.

2. Press (F5) (SET UP) to enter the set up state. The status line changes to look like Figure 4-2.

Figure 4-1
Starting State



Figure 4-2
Set Up State

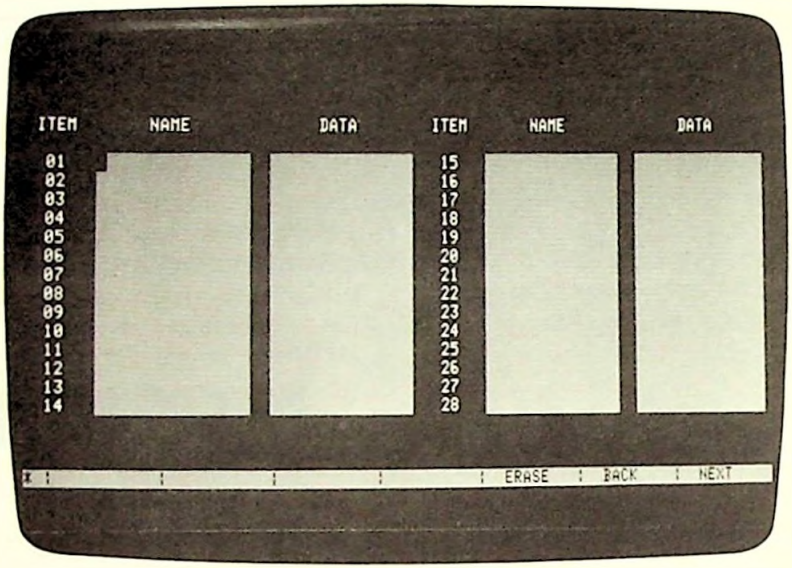


STOP! *The next step will write over data displayed on the screen. However, your applications program should store this data in the computer's memory and allow you to retrieve it. Consult the documentation for your applications program to find out how data can be redisplayed.*

3. Press (F6) (PHONE) to display the screen that lets you load numbers into the directory. In response, the screen shown in Figure 4-3 appears, with the cursor in the block labeled NAME.

   The status line changes to display the words ERASE, BACK, and NEXT over (F5), (F6), and (F7). These keys let you correct entries and move the cursor between fields. (Each field is one line within the NAME or the DATA block.)

Figure 4-3
Directory Screen



4. With the cursor still in the NAME block, enter a name that identifies the number you want to load into item Ø1. Although you can enter up to 15 characters, only the first eight letters will be displayed above (F1) when you enter the phone state. The same is true of items Ø2 through Ø5.

   If you make a mistake, press (F5) (ERASE). This erases all data in the field and returns the cursor to the beginning of that field. (← and → do not work in the phone state.)

5. Press (F7) (NEXT) to move the cursor to the DATA block.

6. Enter the number you want to load into item Ø1. Whenever you press (F1) in the phone state, you will dial this number. You may enter up to 15 characters, including spaces, hyphens, and parentheses for clarity. However, the terminal only acts on numbers when dialing.

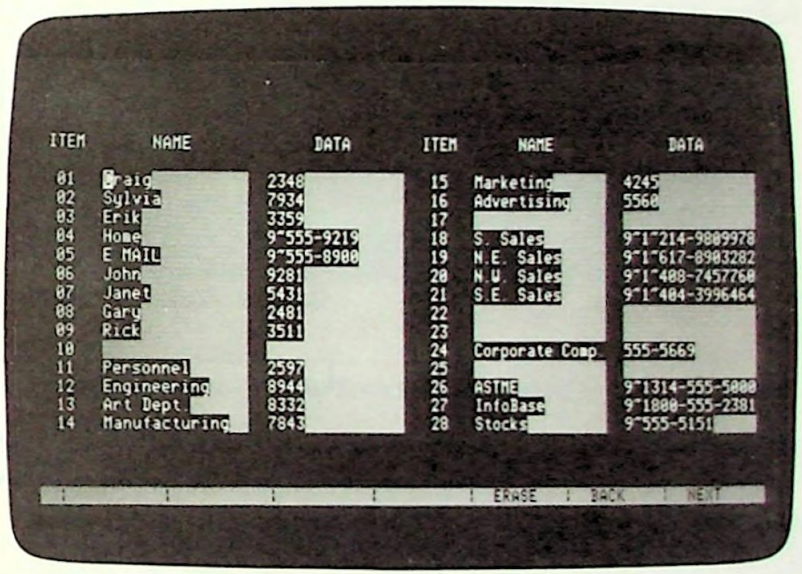
   Many business telephone systems require a prefix and a delay to reach outside numbers. To program a two-second delay, enter = where you want it. (In earlier models of the Personal Terminal, use a ~.)

To correct mistakes, press (F5) (ERASE). The cursor returns to the beginning of the field and you can try again.

7. Press (F7) (NEXT) to move the cursor to the NAME block of item Ø2. Continue entering up to 28 names and numbers. When you finish, the screen might look like Figure 4-4.

8. Press (EXIT) when you are finished.

Figure 4-4
Sample Directory



Changing the Directory

To change the directory after you have loaded it:

1. Press (EXIT) until the terminal enters the starting state.

2. Press (F5) (SET UP) to enter the set up state.

3. Press (F6) (PHONE) to display the directory screen, as shown in Figure 4-4.

4. Press (F6) (NEXT) and (F7) (BACK) to move to the cursor to the fields you want to change.

5. Press (F5) (ERASE) to erase old information.

6. Enter the new name or number.

7. Press (EXIT) to return to the starting or custom state.

Dialing with the 300-Baud Modem

If your terminal has the 300-baud modem, it can exchange data over telephone lines at 300 baud. Whenever you use the modem for dialing, the terminal automatically defaults to the modem's baud rate.

The phone state lets you dial automatically the telephone numbers you loaded into the directory.

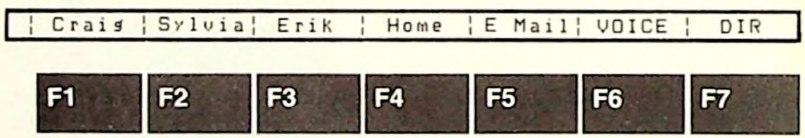
Automatic Data Calls

To dial automatically:

1. Press (EXIT) until the terminal enters the starting state.

2. Press (F6) (PHONE) to enter the phone state. The status line changes to display the names for items Ø1 through Ø5 in the directory, as shown in Figure 4-5.

Figure 4-5
Sample Phone State Display with 300-Baud Modem



3. To dial a telephone number corresponding to a name in the status line, press the function key below that name. For example, to call Erik, you would press (F3).

4. To dial other numbers in the directory, first press (F7) (DIR). The directory will appear on the screen, with the cursor in the status line just behind the ITEM # display (see Figure 4-6).

5. Enter the item number corresponding to the telephone number you want to call. To call Personnel, for example, enter 11.

6. Press (RETURN) to start the dialing process.

As soon as the terminal starts to dial, a D (dialing) appears in the status line's last column, as shown in Figure 4-7. All keys are disabled while the terminal is dialing.

Figure 4-6
Sample Directory with 300-Baud Modem

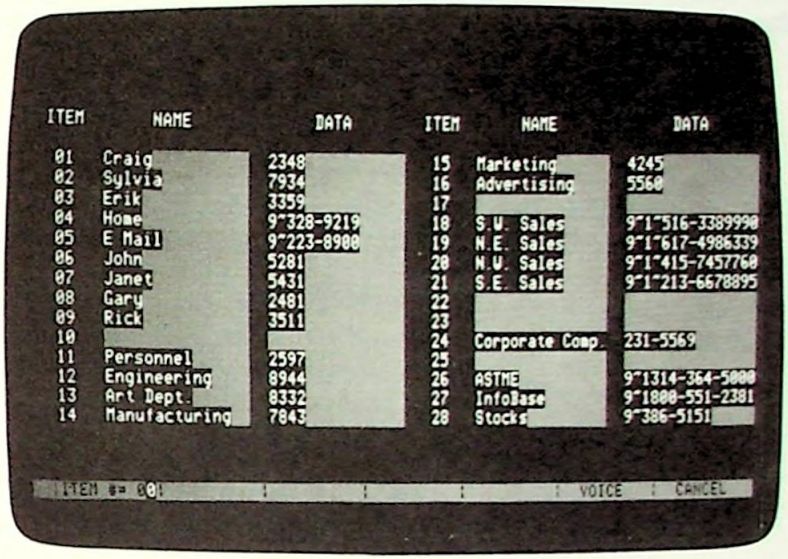
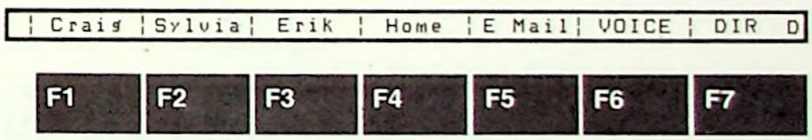


Figure 4-7
Sample Status Line While Terminal Is Dialing in Phone State



The terminal beeps when it has finished dialing, and a W (waiting) replaces the D in the status line. All keys except (EXIT), (DIAL), (SHIFT)-(DIAL) (DISCONNECT), (F6) (VOICE), and (F7) (CANCEL) remain disabled.

When the modem at the other end "answers" with the correct tone, a C (connected) replaces the W in the status line. The terminal then returns to the custom state.

Automatic Voice Calls

Follow steps 1 through 6. When the terminal beeps and the W appears, pick up the telephone receiver and press (F6) (VOICE).

Manual Data Calls

The dial state lets you manually dial telephone numbers not stored in the directory.

1. Press (DIAL). The status line changes to look like Figure 4-8.

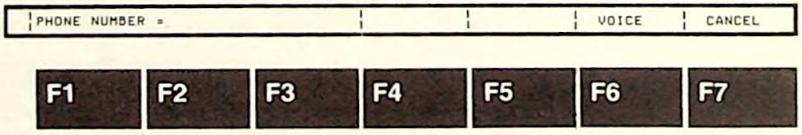
2. Enter the telephone number you want to dial. As you press the keys on the keyboard, the telephone number appears in the status line behind the PHONE NUMBER = display.

   Many business telephone systems require a prefix and a delay to reach outside numbers. To program a two-second delay, enter = where you want it. (In earlier models of the Personal Terminal, use a ~.)

   If you make a mistake, press (F7) (CANCEL). The number in the status line will disappear and you can try again. (You can not use ← and → to make corrections.)

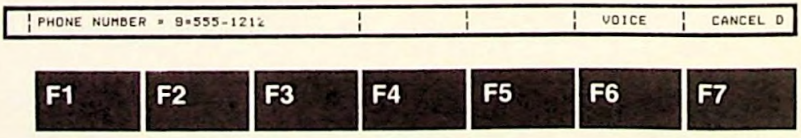
3. Press (RETURN) to start the dialing process.

Figure 4-8
Dial State Display with 300-Baud Modem



When the terminal starts to dial, a D (dialing) appears in the status line's last column, as shown in Figure 4-9. All keys are disabled while the terminal is dialing.

Figure 4-9
Status Line While Terminal Is Dialing in Dial State



The terminal beeps when it has finished dialing, and a W (waiting) replaces the D in the status line. All keys except (EXIT), (DIAL), (SHIFT)-(DIAL) (DISCONNECT), (F6) (VOICE), and (F7) (CANCEL) remain disabled.

When the modem at the other end answers with the correct tone, a C (connected) replaces the W in the status line. The terminal then returns to the custom state.

Manual Voice Calls

Follow steps 1 through 3. When the terminal beeps and the W appears, pick up the telephone receiver and press (F6) (VOICE).

Interrupting an Uncompleted Call

You can not interrupt a call while the D is displayed in the status line. However, as soon as the terminal beeps and displays the W in column 80, you can interrupt the call.

In the phone state, you can interrupt a call in any of three ways:

- Press (F7) (CANCEL) to redisplay the directory. You can now dial another telephone number from the directory.
- Press (DIAL) to enter the dial state. You are ready to manually dial a telephone number from the keyboard.
- Press (SHIFT)-(DIAL) (DISCONNECT) to return to the starting or custom state.

In the dial state, you can interrupt the call with either of two methods:

- Press (F7) (CANCEL) or (DIAL) to return to the beginning of the dial state.
- Press (SHIFT)-(DIAL) (DISCONNECT) to return to the starting or custom state.

Hanging Up

To finish a voice call, simply hang up the telephone receiver.

To finish a data call, press (SHIFT)-(DIAL) (DISCONNECT). The terminal disconnects the modem and returns to the starting or custom state.

If you left an applications program to make the call, most systems will return you to the program where you left it. However, you will have to tell the computer to reenter the data previously displayed on the screen.

Dialing with the 300/1200-Baud Modem

If your Personal Terminal has the 300/1200-baud modem, the terminal can receive data at either 300 or 1200 baud. When you turn on the modem, the terminal's main port baud rate automatically (but only temporarily) changes to 1200 baud (unless you set it for 300 in the set up state). If you want the modem to operate at 300 baud, you must set the terminal's main port baud rate for 300.

In addition to making data calls, the 300/1200-baud modem can answer incoming calls, as explained later in this section.

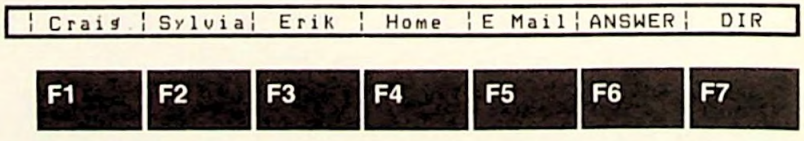
Automatic Data Calls

You can automatically dial telephone numbers from the directory when the terminal is in the phone state.

To dial automatically:

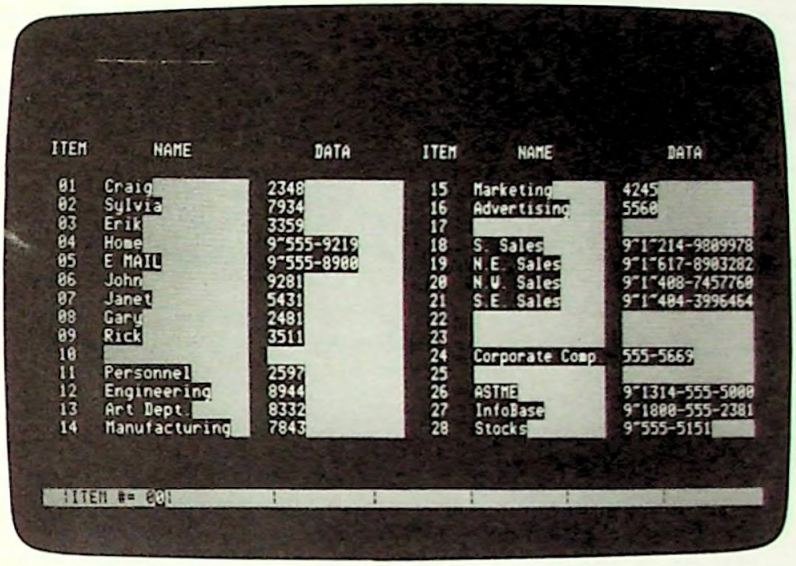
1. Press (EXIT) until the terminal enters the starting state.
2. Press (F6) (PHONE) to enter the phone state. The status line changes to display the names corresponding to items Ø1 through Ø5 in the directory, as shown in Figure 4-10.
3. To dial a telephone number for a name displayed in the status line, press the function key below the name. For example, to call Erik, you would press (F3).
4. To dial other telephone numbers from the directory, press (F7) (DIR). The directory will appear on the screen, with the cursor in the status line just behind the ITEM # display (see Figure 4-11).
5. Enter the item number of the phone number you want to call. To call Personnel, for example, enter 11.
6. Press (RETURN) to start the dialing process.

Figure 4-10
Sample Phone State Display with 300/1200-Baud Modem



As soon as the terminal starts to dial, a D (dialing) appears in the status line's last column, as shown in Figure 4-7.

Figure 4-11
Sample Directory with 300/1200-Baud Modem



The terminal beeps when it has finished dialing, and a W (waiting) replaces the D in the status line.

As soon as the modem at the other end "answers" with the correct tone, a C (connected) replaces the W in the status line and the terminal enters the custom state. If there is no answer within approximately 20 seconds, the terminal automatically disconnects the modem.

Automatic Voice Calls

To make an automatic voice call, follow steps 1 through 6 in the previous section. After the terminal beeps and the W appears in the status line, pick up the telephone receiver and press any key. This automatically disconnects the modem.

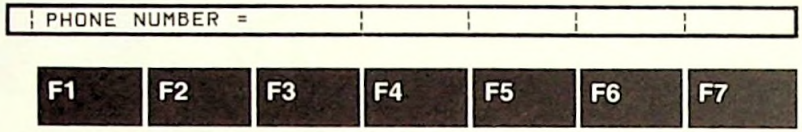
Manual Data Calls

The dial state lets you manually dial numbers not stored in the directory.

To dial manually:

1. Press (DIAL). The status line changes to look like Figure 4-12.

Figure 4-12
Dial State Display with 300/1200-Baud Modem



2. Enter the number you want to dial. As you press the keys on the keyboard, the number appears behind the PHONE NUMBER = display in the status line.

   Many business telephone systems require a prefix and a delay to reach outside numbers. To program a two-second delay, enter = where you want it. (In earlier models of the Personal Terminal, use a ~.)

   If you make a mistake, press (DIAL) again. The number in the status line will disappear and you can try again.

3. Press (RETURN) to start the dialing process.

When the terminal starts to dial, a D (dialing) appears in the last column of the status line.

The terminal beeps when it finishes dialing, and a W (waiting) replaces the D in the status line.

As soon as the modem at the other end answers with the correct tone, a C (connected) replaces the W in the status line. If there is no answer within approximately 20 seconds, the modem automatically disconnects.

Manual Voice Calls

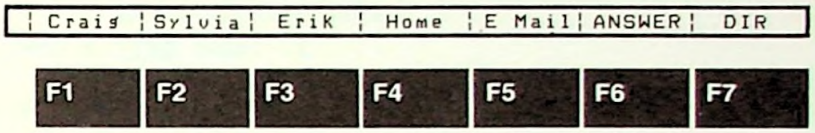
To manually dial a voice call, follow steps 1 through 3 in the previous section. When the terminal beeps and the W appears, pick up the telephone receiver and press any key to disconnect the modem.

Answering Incoming Calls

To set the 300/1200-baud modem to answer incoming calls:

1. Press (F6) (PHONE) from the starting state. This puts the terminal in the phone state and changes the status line so it looks like Figure 4-13.

Figure 4-13
Sample Phone State Display with 300/1200-Baud Modem



2. Press (F6) (ANSWER) to turn on the answer mode. An **A** will appear in column 80 of the status line. The terminal will now answer incoming calls and display any data it receives on the screen.

   The terminal can not communicate with the computer while answer mode is on.

3. Press (F6) (ANSWER) again to turn off the answer mode. The **A** in column 80 disappears.

Interrupting an Uncompleted Call

You can interrupt a call being dialed with the 300/1200-baud modem by pressing any key before the **C** appears in the status line. The terminal remains in the state (either phone or dial state) in which you initiated the dialing.

Hanging Up

When you are finished with a voice call, simply hang up the telephone receiver.

When a data call is finished, press (SHIFT)-(DIAL) (DISCONNECT). The terminal disconnects the modem and returns to the starting or custom state. Whenever the modem is disconnected, the answer mode is turned off.

If you left an applications program to make the call, most systems will return you to the program where you left it. However, you will have to tell the computer to reenter the data previously displayed on the screen.

NOTE! *The 300/1200-baud modem gives you additional control in handling data calls. If your terminal has this modem installed, see the 300/1200-Baud Modem Owner's Guide for more information.*

Phoning Summary

Loading the Directory

1. Press (EXIT) to enter the starting state.
2. Press (F5) (SET UP) to enter the set up state.
3. Press (F6) (PHONE) to display the directory. Remember, displaying the directory overwrites any data on the screen.
4. Enter the desired names and numbers. Use (F5) (ERASE), (F6) (BACK), and (F7) (NEXT) to correct entries and move between fields.

   Enter = where you want a two-second dialing delay.
5. Press (EXIT) to return to the starting or custom state.

Automatic Dialing in the Phone State (300- or 300/1200-Baud Modem)

1. Press (EXIT) until the terminal enters the starting state.
2. Press (F6) (PHONE) to enter the phone state.
3. To dial a telephone number identified by a name in the status line, press the corresponding function key.
4. To dial a telephone number in the directory, press (F7). Enter the item number corresponding to the telephone number you want to dial. Press (RETURN) to start the dialing process.
5. Listen for a beep and watch for a **W** in column 80 of the status line, indicating that the terminal has finished dialing.
6. To make a voice call, pick up the telephone and press (F6) (VOICE) if you are using the 300-baud modem or any key if you have the 300/1200-baud modem.
7. When you are making a data call, watch for a **C** in column 80, indicating that the connection is made. The 300/1200-baud modem automatically disconnects itself if the terminal does not make a connection within approximately 20 seconds.

8. To interrupt a call, press

   - F7 (CANCEL) or SHIFT-DIAL (DISCONNECT) if you have a 300-baud modem
   - Any key if you have a 300/1200-baud modem

9. After you finish a voice call, hang up the receiver.

10. To end a data call, press SHIFT-DIAL (DISCONNECT).

Manual Dialing in the Dial State (300- or 300/1200-Baud Modem)

1. Press DIAL to enter the dial state.

2. Enter the number you want to dial. Enter = where you want to include a two-second delay in the dialing.

3. To correct a mistake, press DIAL again.

4. Press RETURN to start the dialing process.

5. To make a voice call, wait for the beep and the **W** in column 80 of the status line. Then pick up the telephone receiver and press F6 (VOICE) if you are using the 300-baud modem or any key if you have the 300/1200-baud modem.

6. When you are making a data call, watch for the **C** to indicate the connection is made.

7. To interrupt a call before the data connection is made, press:

   - F7 (CANCEL) or SHIFT-DIAL (DISCONNECT) if you have a 300-baud modem
   - Any key if you have a 300/1200-baud modem

8. To finish a voice call, hang up.

9. To finish data calls, press SHIFT-DIAL (DISCONNECT).

Answering Incoming Calls (300/1200-Baud Modem)

1. In the set up state, select the correct baud rate setting.
2. Press (EXIT) to enter the starting state.
3. Press (F6) (PHONE) to enter the phone state.
4. Press (F6) (ANSWER) to turn on answer mode. An **A** will appear in column 80 of the status line.
5. Press (F6) (ANSWER) again when you no longer want the modem to answer incoming calls.

5. Customizing the Personal Terminal

If you frequently enter the same group of characters for any reason, you can program one of the seven function keys to send those characters with a single keystroke.

Each unshifted function key can transmit up to 15 characters, and another 15 when pressed with the (SHIFT) key. Thus you can load the keys with up to 14 different character strings to meet your specific needs.

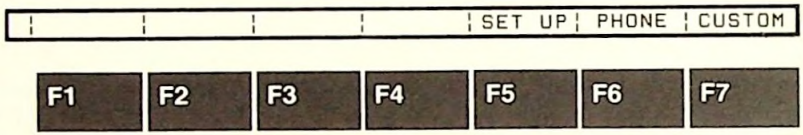
This chapter includes an example that shows how to program the function keys so they access information within a corporate computer.

Loading the Function Keys

Before you can use the function keys in the custom state, you must load them. After you load them, each key sends one string of characters when you press only the function key, and another string when you press it with (SHIFT).

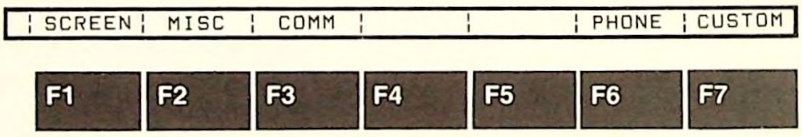
1. Press (EXIT) until the terminal is in the starting state, shown in Figure 5-1.

Figure 5-1
Starting State



2. Press (F5) (SET UP) to enter the set up state. The status line changes to look like Figure 5-2.

Figure 5-2
Set Up State



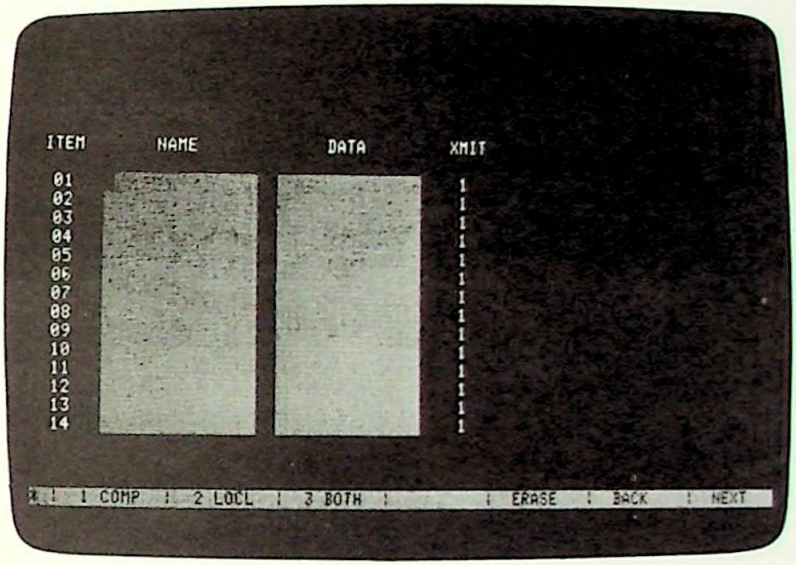
STOP! *The next step causes the terminal to write over the data displayed on the screen. However, this data should still be stored in the computer's memory.*

3. Press (F6) (CUSTOM) to display the screen you will use to load the function keys. The cursor will be in the first block, labeled NAME, as shown in Figure 5-3.

   In the custom state, the lines labeled items Ø1 through Ø7 correspond to keys (F1) through (F7). Items Ø8 through 14 correspond to shifted keys (F1) through (F7).

   At the same time this screen appears, the status line changes to display ERASE, BACK, and NEXT over function keys (F5), (F6), and (F7). Press these keys to correct entries and move the cursor back and forth between fields (one line in either the NAME or the DATA column).

Figure 5-3
Function Key Screen



4. Enter an identifying name for the characters you want to load as item Ø1. Although each name can contain up to 15 letters, only the first eight letters will be displayed above the function key while the terminal is in the custom state.

   If you make a mistake, press (F5) (ERASE). This erases all data in the field, and returns the cursor to the beginning of that field. (You can not use → and ← to erase data.)

5. Press (F7) (NEXT) to move the cursor to the DATA block.

6. Enter up to 15 characters that you want the terminal to send when you press (F1). The sequence can include control characters.

   For example, to include a carriage return character with the character string, you would press (RETURN). Since (RETURN) corresponds to a CTRL M (in ASCII), an M appears in reverse video in the DATA block. All control characters appear in reverse video.

If you want a character string longer than 15 characters, you can load the remaining characters into the item that corresponds to the shifted function key (in this case, item Ø8). Thus, to send the entire string from items Ø1 and Ø8, you would first press (F1) and then (SHIFT)-(F1). You can also combine items Ø2 and Ø9, items Ø3 and 1Ø, etc., in this way.

7. While the cursor is in the first line (item Ø1), decide whether you want that character string to be sent to the computer, or be processed locally, or both. If you want to send it to the computer, you don't need to do anything. The default value is already 1, as indicated by the 1 in the XMIT (transmit) column on the right side of the screen.

   To change the value of a particular line, make sure the cursor is somewhere (anywhere) in the line. Notice that the status line displays the three choices over the first three function keys:

   - 1 COMP, selected by pressing (F1), sends the current character string only to the computer. The XMIT column displays 1 when this is in effect. This is the default value, so unless you change it (by pressing (F2) or (F3) while the cursor is in the line), that line will only be sent to the computer. Use this value when the terminal is operating in full duplex mode.

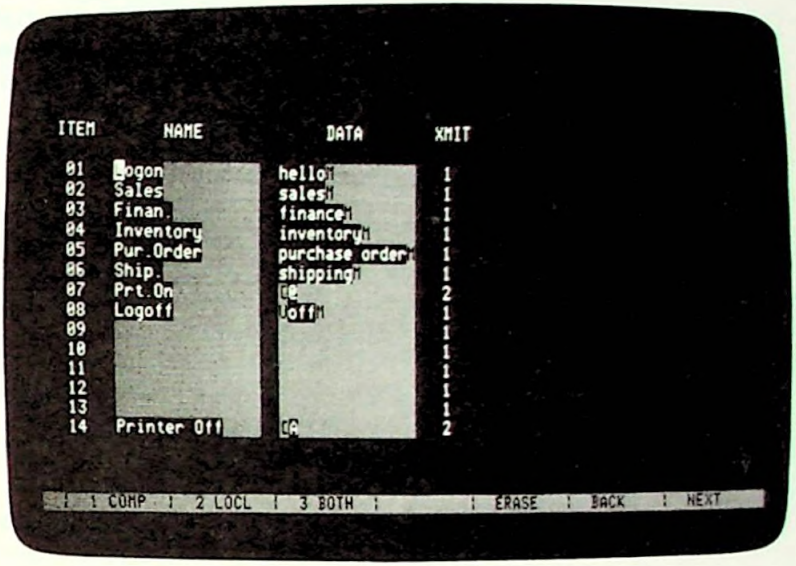
   - 2 LOCL, selected by pressing (F2), only processes the character string locally (within the terminal); nothing is sent to the computer). The XMIT columns displays 2 after you press (F2).

   - 3 BOTH, selected by pressing (F3), processes the character string locally and sends it to the computer. (Use this value when the terminal is operating in half duplex mode.)

8. Press (F7) (NEXT) to move the cursor to the next field in the NAME block. Continue entering names and character strings and selecting the destination for each. When you finish, your screen might look like Figure 5-4.

9. Press (EXIT) when you have entered all the names and character strings. The terminal will save them in its permanent memory so they are available whenever you enter the custom state.

Figure 5-4
Sample Screen of Function Key Character Strings



Changing Function Key Values

To change the character strings loaded into a function key:

1. Press (EXIT) until the terminal enters the starting state.
2. Press (F5) (SET UP) to enter the set up state.
3. Press (F7) (CUSTOM) to display the screen that shows what is currently loaded into the function keys for the custom state. Remember, data previously displayed on the screen will be written over.
4. Press (F6) (BACK) and (F7) (NEXT) to move to the field(s) you want to change.
5. Press (F5) (ERASE) to erase the name or data in that field.
6. Enter the new name or data.
7. To change where the data will be sent, press (F1) (1 COMP), (F2) (2 LOCL), or (F3) (3 BOTH).
8. Press (EXIT) to return to the starting or custom state.

Using the Custom State

Once you load the function keys with character strings, they can send those strings whenever the terminal is in the custom state.

You'll save time by using the function keys whenever you need to enter the same information repeatedly, such as when you are filling out forms or entering log-on codes. You might also program a function key to redisplay a screen that was overwritten.

If you use the custom state often, you can save another step by programming the terminal to enter the custom state whenever you press (EXIT).[1]

The custom state has virtually unlimited applications, and each can be unique. The following example shows how you could gain access to various data bases within the company's central computer with the customized function keys.

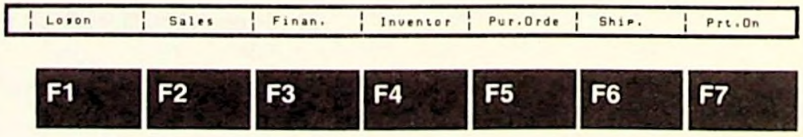
Example

When you loaded the function keys (as described in the previous section), the resulting screen could look like Figure 5-4. You are now ready to use them in the custom state.

1. Press (EXIT) until the terminal enters the custom state. If the terminal enters the starting state, press (F7) (CUSTOM) to enter the custom state. The status line will resemble Figure 5-5.

   To see the labels for the shifted function keys, press (SHIFT)-(F7) (shift CUSTOM) while the terminal is in the starting state. An S will appear at the right side of each label. To send out the character string associated with these labels, you still need to press (SHIFT) with the function key.

Figure 5-5
Sample Status Line in Custom State



1. You can program the (EXIT) key in the set up state or with a command, as explained in Chapter 7.

2. Press (F1) to send the characters that serve as the log-on code for the computer. In this case, those characters are "hello CTRL M."

3. Press (F2) through (F6) to gain access to the various data bases. For example, you would press (F4) (INVENTOR) to reach inventory control.

4. Press (F7) if you want to start printing data retrieved from the data base.

5. Press (SHIFT)-(F7) to stop printing it.

6. Press (SHIFT)-(F1) to log off (leave) the company computer.

Now instead of having to remember and enter correctly the name of each data base, you can program the function keys to do it for you. You'll save dozens of keystrokes.

NOTE! *For security reasons, you may not want to show your log-on code in the status line.*

Customizing Summary

Loading the Function Keys

1. Press (EXIT) to enter the starting state.

2. Press (F5) (SET UP) to enter the set up state.

3. Press (F6) to display the screen in which you can load names and character strings into the function keys.

4. Enter the desired names and characters. Use (F5) (ERASE), (F6) (BACK), and (F7) (NEXT) to correct entries and move between fields. Use (F1) (1 COMP), (F2) (2 LOCL), and (F3) (3 BOTH) to determine where the characters are sent.

5. Press (EXIT) to return to the starting or custom state.

Using the Custom State

1. Press (EXIT) to enter the custom state. If (EXIT) takes you to the starting state, press (F7) (CUSTOM).

2. To send the character strings corresponding to items Ø1 through Ø7, press function keys (F1) through (F7).

3. To send the character strings corresponding to items Ø8 through 14, press function keys (F1) through (F7) together with (SHIFT).

   To see the labels for these strings, press (SHIFT)-(CUSTOM).

4. Press (EXIT) to return to the starting or custom state.

6. Maintenance and Assistance

TeleVideo's Personal Terminal was designed and manufactured with the same high standards that have given TeleVideo products a reputation for superior reliability.

For trouble-free operation, follow the simple care instructions on the next page. This chapter also shows you how to handle problems you might come across and whom to call for assistance.

Caring for the Terminal

Your Personal Terminal requires only minimal care. For trouble-free operation, follow these rules:

- Never place the terminal on a mat that could block air circulation to the ventilation slots on the bottom of the terminal.
- Keep all ventilation slots free of dust and dirt.
- Never spill any liquids on the terminal.
- Don't drop any foreign objects into the terminal.
- Before cleaning the case, disconnect all cables and telephone lines.
- Clean the case with a slightly damp cloth and a mild detergent.
- Clean the keyboard once a year with compressed air.

Troubleshooting

Some of the problems you may encounter are easily correctible. The following list describes some common problems and their solutions.

P	The terminal skips every other line.
S	Enter the set up state and turn off autowrap mode, or set the return parameter to CR, not CR/LF.
P	Editing changes the data on the screen but not in the file.
S	Enter the set up state and select the duplex edit mode.
P	Everything appears double.
S	Enter the set up state and select the full duplex communication mode.
P	The computer does not respond to the function keys when the terminal's main (computer) port is sending data at a high baud rate.
S	Rewrite the program to accept the full string before analyzing it. Put nulls between characters. Select a slower baud rate.

P The terminal doesn't respond to keyboard entries.

S Sometimes the computer program or the terminal temporarily locks the keyboard, such as when you press (CTRL △)-(△ PRINT). Usually after the function is completed, the keyboard is unlocked (e.g., the printing is finished). However, if the keyboard remains locked, look at the status line. If it displays one of the characters described in Table 2-2, refer to the following list:

Displayed Character	Solution(s)
P	If the printer is not printing, make sure the interface cable to the printer is wired correctly.
S	Make sure the interface cable to the printer is wired correctly.
T	Press the (NO SCROLL) key.
L	Press (SHIFT)-(ESC) and (").
H	Make sure the interface cable to the host (computer) is wired correctly.
X	Press (SHIFT)-(ESC) (LOC ESC), then (A).
*	Press (ALPHA LOCK) once.
D	Wait until you see W on the status line and try again.
W	Wait a few moments until the connection has been made or disconnect and dial again.
A	Enter the phone state and press (F6) (ANSWER).

P The computer seems to respond correctly but when you type something, the terminal does not display it on the screen.

S Enter the set up state and select half duplex communication.

P Escape sequences or control codes that you enter on the keyboard don't work correctly.

S If an * appears in column 1 of the status line, the (ALPHA LOCK) key is engaged. Press it again to disengage it.

Try pressing SHIFT-ESC (LOC ESC) instead of ESC when you enter the sequence. Or put the terminal in block mode so the terminal can perform a control code locally. Make sure you leave block mode after the code executes.

NOTE! *Since commands entered with SHIFT-ESC (LOC ESC) or in block mode affect only the data displayed on the screen, the resulting file may be different from what was displayed on the screen.*

Some computer programs are not written to process escape sequences or control codes. In this case, the software must be modified.

P	The terminal doesn't respond to SHIFT-EXIT (NO SCROLL).
S	Enter the set up state and try the other handshaking protocol (either X-Off or DTR).
P	The terminal doesn't respond when you press the power switch.
S	Check the line fuse, as described in the next section. If it is bad, replace it.

Replacing the Line Fuse

If you turn on the power and the terminal does not respond with a beep and a screen display, first check to make sure it is plugged in and that the outlet has power. If that doesn't correct the problem, check the line fuse.

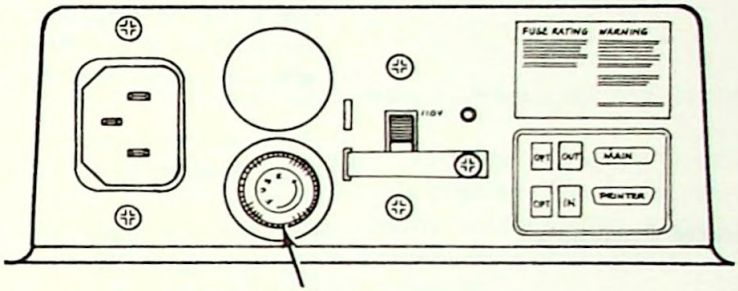
To check the line fuse:

1. Unplug the terminal's power cord.
2. Unscrew the fuse holder (shown in Figure 6-1) counterclockwise.
3. Slip the fuse from the holder and examine it. If the thin wire inside the tube is broken or the tube is black, you must replace the fuse. However, the fuse may be defective even though no damage is visible.
4. Replace the fuse with a 1-ampere, fast blow fuse.

5. Replace the fuse holder and tighten it by turning it clockwise.

6. Plug in the power cord.

Figure 6-1
Location of the Line Fuse



If You Need Assistance

TeleVideo has two service departments to help you.

Before calling, check to make sure the terminal is plugged in, all cables are connected to the correct ports, and all settings determined in the set up state are correct. Try to place the terminal by the phone and have this manual with you.

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

Call Customer Service for help with hardware problems, or if you want to return the terminal for repair.

Technical Assistance

For Technical Assistance, call 408/971-0255(ext 424) between 8:30 a.m. and 5:00 p.m., Pacific time, Monday through Friday (except holidays).

Customer Service

You can reach the Customer Service department by calling 408/971-0255 between 7:00 a.m. and 5:00 p.m., Pacific time, Monday through Friday (except holidays).

If the line is busy, try again or leave a message with the TeleVideo operator. Your call will be returned as soon as possible.

Shipping the Terminal

Should you need to ship the terminal, remove all cables and telephone lines. Use either the original TeleVideo shipping container or other suitable materials to pack the terminal.

7. Programming

This chapter is meant for the person who programs the terminal.

It lists and explains the commands that let you set the terminal's features for the operator. These commands are grouped by function, including screen display, cursor control, editing data, transmitting data, printing, programming keys, and sending terminal status data to the computer.

Most commands generate codes that trigger the terminal to perform certain functions. Others work by putting the terminal in specific modes that determine how it reacts to commands or keyboard entries that follow.

Entering Commands

The commands listed in this chapter are escape sequences and control codes. You can enter these commands at the keyboard or incorporate them into your programs, in any programming language.

Using Commands in Your Programs

By incorporating these commands into a computer program, you can control the terminal remotely.

The syntax of your programming language determines how to include these commands. The terminal will respond to the control code or escape sequence received from the program, regardless of the specific structure of that programming language.

NOTE! *Since there are dozens of programming languages, this manual can not show how to incorporate commands into each language.*

Entering Commands at the Keyboard

Control codes and escape sequences can be entered at the keyboard, as explained below. You may choose to transmit these commands to the computer, or to have them work locally only.

When entering commands at the keyboard, make sure the (ALPHA LOCK) key is not depressed. Also, be careful to distinguish between upper- and lowercase letters, the number 1 and a lowercase L, a Ø and an uppercase O.

Escape Sequences To enter an escape sequence at the keyboard, press the (ESC) key, release it, and **then** press the other key(s) in the sequence. The terminal will transmit the command to the computer immediately in either full or half duplex communication mode (see Data Transmission).

To process commands only locally (without sending them to the computer), press (SHIFT)-(ESC) (LOC ESC) instead of (ESC).

Some escape sequences can also be generated by the keys listed in Table 7-1.

Control Codes To enter a control code at the keyboard, hold down the CTRL Δ key while pressing the other key in the sequence.

Most control codes affect cursor movement and can also be generated by several special keys (editing keys) on the keyboard. These keys are listed in Table 7-1.

Entering Commands with Special Keys

You can enter certain commands by simply pressing a key on the keyboard. The keys that control cursor movement are called editing keys. The other keys trigger certain terminal functions and are marked with a Δ. They must be pressed together with the CTRL Δ key.

The commands triggered by the editing keys are transmitted to the computer unless the terminal is in the local edit mode, as explained in the next section. Commands generated by the other special keys are only processed locally (i.e., they are not sent to the computer).

Table 7-1 lists the keys that generate commands. Their effects are explained in more detail in the sections on cursor movement, data transmission, editing, and printing.

Table 7-1
Special Keys That Generate Commands

Key	Command	Effect
← BACK SPACE	CTRL H	Moves cursor left one position.
→	CTRL L	Moves cursor right one position.
↓	CTRL J	Moves cursor down one position within column.
↑	CTRL K	Moves cursor up one position within column.
RETURN	CTRL M	Returns cursor to beginning of line or beginning of next line (depending on the setting of the return parameter in the set up state).

Table 7-1
Continued

Key	Command	Effect
HOME	CTRL ^	Moves cursor to the upper left corner of the screen [column 1, line (row) 1].
TAB	CTRL I	Moves cursor to the next tab stop.
SHIFT-TAB	LOC ESC I	Moves cursor to previous tab stop.
CTRL Δ-Δ CLEAR[1]	LOC ESC +	Erases all data displayed on the screen and replaces it with space characters.
CTRL Δ-Δ SEND	LOC ESC 7 or LOC ESC s	Sends a certain amount of data displayed on the screen to the computer. You can program the Δ SEND key to send either from the home through the cursor positions (LOC ESC 7) or all data displayed on the screen (LOC ESC s).
CTRL Δ-Δ PRINT	LOC ESC P	Prints all data on the screen from the home through the cursor positions.
CTRL Δ-Δ BREAK[1]	BREAK	Holds the communication line (pin 2 of the main RS-232C connector) in the 1 state for 250 milliseconds. Nothing appears on the terminal's screen.
CTRL Δ-Δ DEL[1]	DELETE	Sends the ASCII delete character to the computer. When the terminal is in full duplex mode, nothing appears on the screen. A delete character sent from the computer will not be displayed on the screen unless the terminal is in monitor mode.

1. For easier use, Δ CLEAR, Δ BREAK, and Δ DEL will operate with SHIFT as well as with CTRL Δ.

Edit Modes

Setting local edit mode causes the commands generated by certain editing keys to affect only the screen display, without sending the commands to the computer.

Set local edit mode (ESC) k

Causes the following editing keys to affect only data displayed on the screen:

(TAB)
↓
↑
(SHIFT)-↑ (HOME)
→

The commands generated by the ←, (BACK SPACE), and (RETURN) keys are sent to the computer even when local edit mode is on.

Set duplex edit mode (ESC) l (lowercase L)

Transmits all commands triggered by the editing keys (except (SHIFT)-(TAB)) to the computer.

Screen Display

The commands in this group let you determine the cursor's appearance, the number of characters per line, and whether the terminal's alternate character set is displayed.

You can also choose up to two character attributes per line. These character attributes define whether ASCII or graphics characters are displayed, as well as the size and visual appearance of the characters.

Set cursor appearance (ESC) . n

Selects the cursor's style and appearance, as defined by the variable n.

Table 7-2 lists the possible values for n.

Table 7-2
Cursor Appearance

n	Appearance
Ø	Invisible
1	Blinking block
2	Steady block
3	Blinking underline
4	Steady underline

Example

For a steady block cursor, enter (ESC) [.] [2]

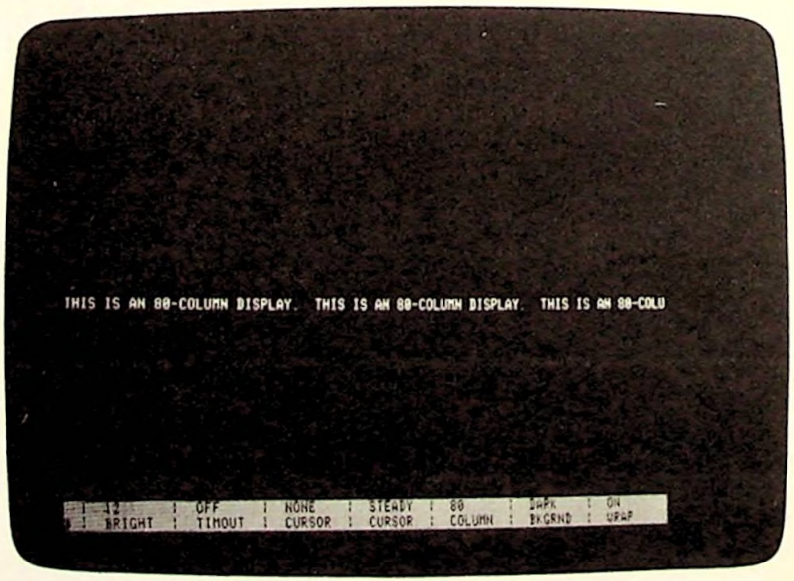
Characters per Line

You can determine whether the screen displays 80 or 40 characters (columns) per line. Since this command changes displayed data in unpredictable ways, we recommend that you clear the screen before redefining the number of columns per line.

Set 80-column display (ESC) [u]

Displays 80 columns per line. At that setting, all characters appear at the normal (single) width, as shown in Figure 7-1.

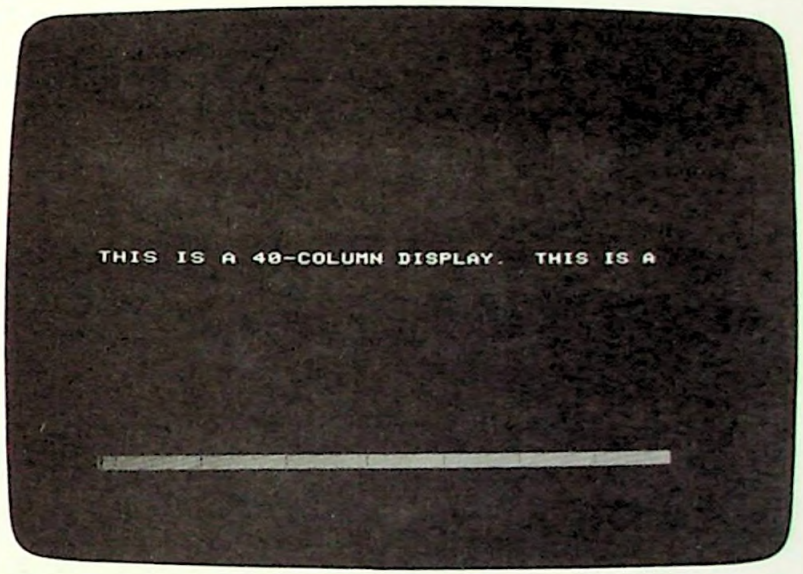
Figure 7-1
80-Column Display



Set 40-column display (ESC) (p)

Displays 40 columns per line. All characters appear at twice their normal width, as shown in Figure 7-2.

Figure 7-2
40-Column Display



Alternate Character Mode

The standard character set consists of 128 ASCII characters, including 96 display characters and 32 control characters. Or you can activate a 32-character alternate character set mode to display the terminal's foreign character set.

Alternate character mode on (ESC) (J)

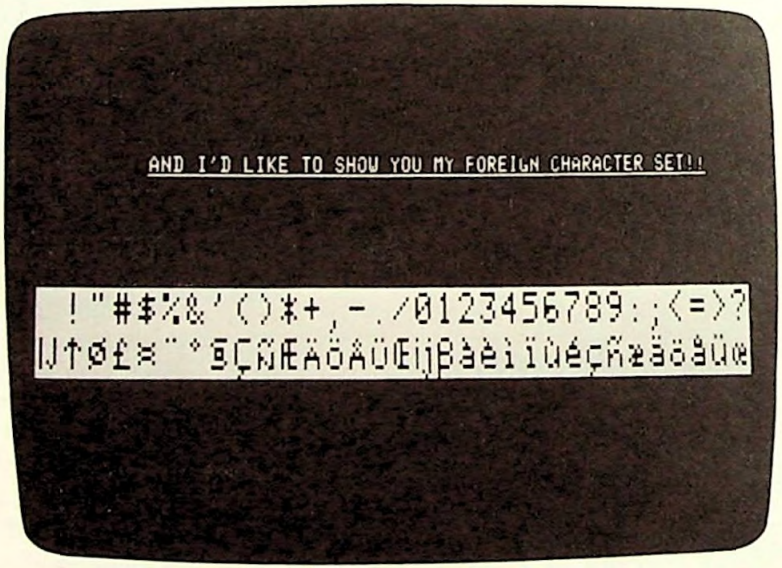
If the alternate character mode is on when the terminal receives certain standard characters from the keyboard or the computer, the terminal displays the alternate characters instead of the standard characters.

The alternate character mode also allows you access to additional graphics characters, as explained in the next section and in the example in Appendix E.

The ASCII values of the standard characters that correspond to the alternate characters are decremented by 20 hex (– 32 decimal offset) before being stored in the terminal's display memory. This allows you to actually store control characters in the display memory and to send them to the computer or printer with the page print or send commands.

The standard ASCII characters and their corresponding foreign characters are shown in Figure 7-3 and listed in Appendix D. All other standard display characters are displayed normally, and the control characters have the same effect when the terminal receives them.[1]

Figure 7-3
Alternate Character Set



Alternate character mode off (ESC) (K)

Turns off alternate character mode. All standard ASCII characters are displayed normally and the graphics characters that correspond to the alternate characters are not available.

1. The delete character will appear on the screen only if you enter it from the keyboard or if the terminal is in monitor mode.

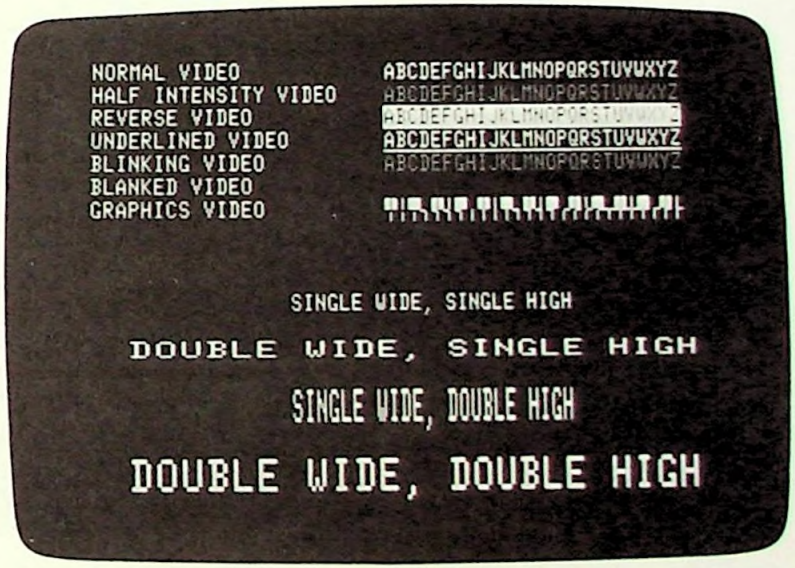
naracter Attributes

The character attributes define three aspects of a character's appearance:

- The character set (ASCII/foreign or graphics characters)
- The character size (single or double width and height)
- The character's visual appearance (including normal video, reverse video, underline, blinking, blank, and half intensity)

All aspects of the character attributes, including the character set, character size, and visual appearance (except blinking, of course), are shown in Figure 7-4.

Figure 7-4
Character Attributes

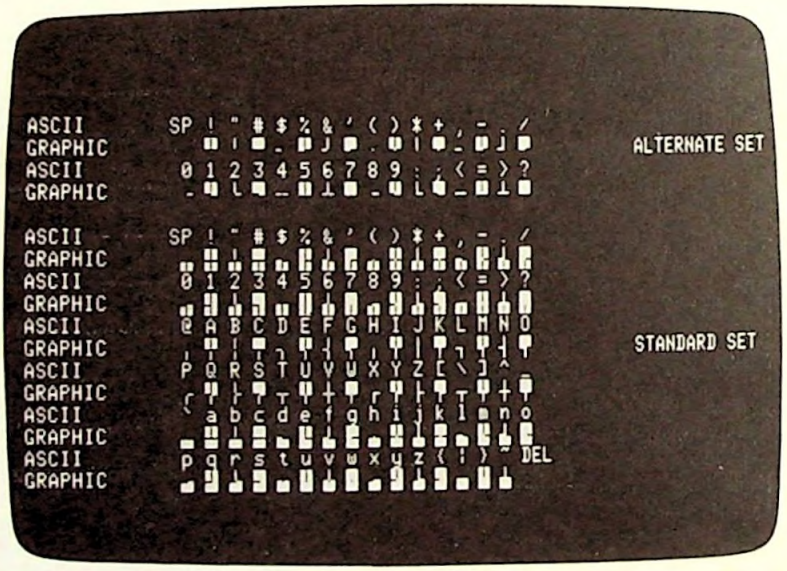


Character Set When selecting the character attributes, you can choose between the ASCII/foreign or graphics character sets.

When you select the graphics character set, each of the 96 ASCII display characters corresponds to a graphics character. When the alternate character mode is on, the 32 alternate characters also correspond to additional graphics characters, giving you a total of 128 special graphics characters.[1] (The 32 ASCII control characters still perform their normal functions.)

Figure 7-5 shows the graphics characters and the corresponding ASCII code for the standard or alternate character mode. Appendix E shows in detail how each graphics character is formed, and gives an example of how to "draw" a rectangle on the screen with the graphics characters.

Figure 7-5
Graphics Characters



Character Size When selecting the character size, you can choose single width and/or height, or double width and/or height.

Selecting double-width characters is not the same as selecting a 40-column line. Although a line of double-width characters looks like a 40-column line on the screen, they may be printed differently, as explained later.

1. The delete character will appear on the screen only if you enter it from the keyboard or if the terminal is in monitor mode.

Visual Appearance In addition to determining the character set and size, you can define how these characters appear on the screen. You have five options:

Reverse video	Reverses the background defined in the set up state.
Half intensity	Changes the intensity to half of normal.
Underline	Creates a solid line below all characters on the line (including the line created by the ⎵ key).
Blink	Causes all characters to blink at a rate of 1 Hz.
Blank	Causes all data entered on the line to be invisible, although it is stored in the display memory. This data can be displayed by redefining this variable.

Defining Attributes

You can define, on a line-by-line basis, up to two attributes per line. Each attribute is a unique combination of the character set, the character size, and the visual appearance. (The attributes themselves do not take up a space on the screen.)

One attribute in any given line is called the Ø attribute; the other is called the 1 attribute. Of the eight bits that define each character in the terminal's display memory, one determines whether the Ø or the 1 attribute applies to that character. If the most significant bit is a Ø, the Ø attribute applies to the character. If it is a 1, the 1 attribute applies.

Loading Attributes The Ø and 1 attributes for each line are loaded with commands. These commands define the variables that make up each attribute. An attribute look-up table in the terminal's display memory stores this information.

When the screen is cleared, the information in the attribute look-up table is erased, and the table is loaded with the default attribute for both the Ø and 1 attributes. In 80-column mode, the default attribute is the ASCII/foreign character set displayed in normal video and single width and height. The default attribute remains in effect until you define the attributes.

You can load the variables into the Ø and 1 attributes with the cursor at any position in the line. Once loaded, you can assign either attribute to any segment of that line, as explained later.

Load Ø attribute (ESC) G Ø m n

Loads the Ø attribute for the current line, regardless of the cursor's position on that line. The m and n values are taken from Table 7-4.

Load 1 attribute (ESC) G 1 m n

Loads the 1 attribute for the current line, regardless of the cursor's position on that line. The m and n values are taken from Table 7-4.

When you load the Ø and 1 attributes, the m value defines character width, underline, character set, and the blank variables. The n value defines reverse video, half intensity, blinking, and the character height.

Table 7-4a contains the variables that make up the m value. Table 7-4b defines the n value. Table 7-3 lists the variables in Table 7-4.

Table 7-3
Variables in Table 7-4

Table	Variable Number	Determines	Options
a	1	Character width	Single/double
	2	Underline	Underline/ no underline
	3	Character set	ASCII/graphics
	4	Blank or half character	Blank/visible or upper/lower half
b	1	Video display	Normal/reverse
	2	Intensity	Half/full
	3	Blink	Blink/steady
	4	Character height	Double/single

In Table 7-4, the four choices for variables 1 and 2 are listed horizontally across the top of each section, while the four choices for variables 3 and 4 appear vertically down the side.

Thus, variables 1 and 2 define a vertical column, variables 3 and 4 a horizontal column. The point of intersection determines the actual m or n value.

Table 7-4
Character Attributes

a. m Values

1 2	Single width No underline	Double width No underline	Single width Underline	Double width Underline
3 ASCII **4** Visible or upper half[1]	@	A	B	C
3 ASCII **4** Blank or lower half[1]	D	E	F	G
3 Graphics **4** Visible or upper half[1]	H	I	J	K
3 Graphics **4** Blank or lower half[1]	L	M	N	O

b. n Values

1 2	Normal video Full intensity	Reverse video Full intensity	Normal video Half intensity	Reverse video Half intensity
3 Steady **4** Single height	@	A	B	C
3 Blink **4** Single height	D	E	F	G
3 Steady **4** Double height[1]	H	I	J	K
3 Blink **4** Double height[1]	L	M	N	O

1. If you select double-height characters (variable 4) in Table 7-4b, you must use variable 4 in Table 7-4a to define the upper half of the character in one line, the lower half in the next. Therefore, double-height characters can not be defined as blank.

Example

Let's say you want some characters in a particular line on the screen to have the following characteristics (listed in the order they appear in Table 7-4): double width, not underlined, ASCII characters, visible, reverse video displayed at normal intensity, steady, single height.

1. Look at Table 7-4a to determine the first four variables.

a. m Values

1 2	Single width No underline	Double width No underline	Single width Underline	Double width Underline
3 ASCII **4** Visible or upper half	@	A	B	C
3 ASCII **4** Blank or lower half	D	E	F	G
3 Graphics **4** Visible or upper half	H	I	J	K
3 Graphics **4** Blank or lower half	L	M	N	O

2. Circle the values you want. (Although two variable sets contain the desired value for one variable, only one set has the desired values for **both** variables.)

3. Draw a vertical line down from the set that combines both desired values for variables 1 and 2.

4. Draw a horizontal line across from the set that combines both desired values for variables 3 and 4.

5. Circle the letter where the lines intersect. This is the m value.

6. Look at Table 7-4b to determine the second four variables.

b. n Values

3 4	1 Normal video Full intensity	2 Reverse video Full intensity	Normal video Half intensity	Reverse video Half intensity
Steady Single height	@	A	B	C
Blink Single height	D	E	F	G
Steady Double height	H	I	J	K
Blink Double height	L	M	N	O

7. Follow steps 2 through 5 to determine the n value.

8. Enter (ESC) G Ø A A to load the Ø attribute.

If you also want to define the 1 attribute, follow the same procedure through step 7. At that point, enter the command that loads the 1 attribute ((ESC) G 1 m n).

Activating the Attributes When you have loaded both attributes, you can assign either attribute to any segment of a given line with the following commands:

Ø attribute mode on (ESC) F

Turns on the Ø attribute for the next character received after the ESC F command. The Ø attribute remains in effect until you turn on the 1 attribute.

1 Attribute mode on (ESC) (H)

Turns on the 1 attribute for the next character received after the ESC H command. The 1 attribute remains in effect until you turn on the Ø attribute.

Keep in Mind

- Whenever you enter the set up state, the screen display changes to show which characters are defined by each of the two attributes. This helps when you're debugging the program. Characters with the Ø attribute will be displayed in normal video, while characters with the 1 attribute will appear in half-intensity reverse video. The screen display returns to normal when the terminal leaves the set up state.

- The screen appearance of double-height and width characters may vary, depending on the setting for characters per line.

  If you define a double-width character for an 80-column line, every other character entered will not appear on the screen. Therefore, you must enter a character twice if you want it displayed. In 40-column mode, however, every character entered appears as a double-width chararacter (i.e., the single-width attribute is ignored).

- In some cases, certain variables may not be available.

  When the main port operates at a baud rate of 19.2K, the terminal ignores all character attributes.

  You can not define graphics characters as double-height or underlined. If you try, the terminal will display single-height graphics characters that are not underlined.

  You can not make double-height characters invisible, since the variable that defines visibility also defines the upper and lower halves of double-height characters.

- When characters displayed on the screen are sent to the computer or printer, they may not be sent the way they appear on the screen. These changes are discussed in more detail in the Data Transmission and Printing sections.

Cursor Control

The cursor movement commands let you move the cursor in all directions. You can do this by entering control codes or by specifying the cursor's location by line (row) and column numbers (called cursor addressing).

Autowrap Mode

By setting the autowrap mode, you can determine what happens when the cursor reaches the first or last position on a line.

Autowrap mode on (ESC) (v)

Wraps the cursor to the first position in the next line when you enter data after the cursor reaches the last position on a line. If you use → or ← to move the cursor past the end or beginning of a line, the cursor wraps to the first or last position of the same line.

Autowrap mode off (ESC) (w)

Keeps the cursor at the end position on a line when you enter data or press → after the cursor reaches this position. Any additional characters or ← entered at the end of the line replace the character already at the last position.

Cursor Movement

When the terminal receives the following commands from the keyboard or the computer program, it moves the cursor. The setting for the autowrap and scroll modes affect how the terminal responds to certain cursor movement commands.[1, 2] (These commands are also listed in Table 7-1, together with the editing keys that can generate them.)

Cursor left (CTRL)-(H)

Moves the cursor one position to the left.

Autowrap mode on: When the cursor reaches the first position on the line, it wraps to the last position on the same line.

Autowrap mode off: When the cursor reaches the first position on the line, the command no longer has any effect.

Cursor right (CTRL)-(L)

Moves the cursor one position to the right.

1. Autowrap mode may be set by command or in the set up state.
2. Scroll mode is determined in the set up state.

Autowrap mode on: When the cursor reaches the last position on the line, it wraps to the first position on the same line.

Autowrap mode off: When the cursor reaches the last position on the line, the command no longer has any effect.

Cursor down (line feed) CTRL △+J

Moves the cursor down one line within the column.

Scroll mode on: When the cursor reaches the last line of the display, the display scrolls up one line. A blank line of space characters (with the default character attribute) appears in the bottom line, while the top line is pushed out of view. This line is lost (although it may remain in the computer's memory). The cursor moves into the new line.

Scroll mode off: When the cursor reaches the last line of the display, the display does not scroll up. The cursor wraps to the first line on the screen while remaining in the same column.

Cursor up CTRL △+K

Moves the cursor up one line within the column until it reaches the first line on the display. Once it does, the cursor does not move further.

Home CTRL △+^

Moves the cursor to the home position, which is the upper left corner of the screen [column 1, line (row) 1].

Carriage return CTRL △+M

Returns the cursor to the beginning of the line or to the beginning of the next line, depending on the setting of the return parameter.

CR set: When the terminal receives the carriage return command from the computer or the keyboard, it returns the cursor to the beginning of the current line.

CR/LF set: When the terminal receives the carriage return command from the computer or the keyboard, it moves the cursor to the beginning of the next line (i.e., it performs a carriage return and a line feed).

New line (CTRL △-_)

Moves the cursor to the beginning of the next line.

Addressing the Cursor

Move cursor to address (ESC) (=) r c

Moves the cursor to a position (address) specified by the r (row) and c (column) variables. Enter both values as ASCII characters, as defined in Appendix C.

NOTE! *When the terminal is set to display 40 columns per line, you can not address the cursor to an odd-numbered column.*

Example

To move the cursor to column 15, line 20:

1. Look at Appendix C to find the values that correspond to column 15 and line (row) 20.

2. Enter (ESC) (=) (.) (3).

Tabulation

When you turn on the power, tab stops are already set at every eighth column, starting with column 8. The following commands let you set tab stops, tabulate (forward and backward) between tab stops, and clear tab stops. When the power is turned off, all tab stops set with commands are cleared and the terminal is reset to the default tab stops.

Set tab (ESC) (1)

Sets a tab stop at the cursor position.

Clear tab (ESC) (2)

Clears the tab stop at the cursor position.

Clear all tabs (ESC) (3)

Clears all tab stops, regardless of the cursor position.

Tabulate (CTRL △-I)

Moves the cursor to the next tab stop. The cursor wraps from line to line until it reaches the last position on the screen. It also stops at the first column of each line and the last position on the screen, even if all tab stops are cleared. Once the cursor reaches the last position on the screen, it no longer responds to *CTRL I* commands.

Tabulate backwards (ESC) I

Moves the cursor to the previous tab stop. The cursor wraps from line to line until it reaches the first position on the screen. The cursor also stops at the last column of each line and on the first position on the screen, even if all tab stops are cleared. Once the cursor reaches the first position on the screen, it no longer responds to *ESC I* commands.

Editing Data

You can change displayed data by deleting existing data or inserting additional data one line at a time.

You can also erase data and replace it with space characters. The data editing commands affect either the current line, the entire screen, or any data displayed after the cursor position.

Deleting and Inserting Data

Delete line (ESC) R

Deletes all data and character attributes in the cursor line. The line below the deleted line scrolls up, including the character attributes in effect for that line. A line of normal video space characters appears in the bottom line.

Insert line (ESC) E

Inserts a blank line (normal video space characters) in the cursor line. The cursor line moves down one line, including the character attributes in effect for that line. The cursor moves to the beginning of the blank line that was inserted. The bottom line is pushed off the screen. This line is lost (although it may remain in the computer's memory).

Erasing Data

The following commands let you erase data within a line, data from the cursor position to the end of the screen, or the entire screen. The erased data is replaced with the default character attributes (ASCII/foreign character set, single-height and width, normal video space characters).

Erase to end of line (ESC) T

Erases data from (and including) the cursor position to the end of the line. The erased area is filled with space characters with either the Ø or 1 character attribute, depending on which attribute mode is in effect when this command is received.

Erase to end of screen (ESC) Y

Erases data from (and including) the cursor position to the end of the screen, including any visual attributes. The erased area is filled with space characters with the default visual attribute. Any data remaining in the cursor line also reverts to the default character attribute. The cursor does not move.

Erase screen (ESC) + or (CTRL Δ)-Z or (Δ CTRL)-\ or (ESC) *

Erases the entire screen and clears the attribute look-up table in the display memory that stores character attributes. As a result, the erased area is filled with spaces with the default character attribute. The cursor moves to the home position.

Data Transmission

Various commands let you determine how data is transmitted between the computer and the terminal. You can choose between communication modes, program the delimiters to be sent with the data, and define a handshaking protocol to regulate the flow of data.

Communication Modes

The communication mode determines whether the terminal can send and receive data at the same time. You can also set the communication mode to let the terminal send data to the computer as a block.

Set half duplex communication mode (ESC) D H

Allows the terminal to either send data to the computer or receive data, but not simultaneously.

When data is entered at the keyboard, the terminal sends that data to the computer. At the same time, it displays the data on the screen. If the data includes commands, the terminal also processes these commands while sending them to the computer.

However, if the commands are entered with (SHIFT)-(ESC) (LOC ESC) the commands will affect only the screen display, without being sent to the computer. This is also true of some commands entered with the editing keys when the terminal is in local edit mode.

When the terminal receives data from the computer, it displays that data on the screen. If the data includes commands, the terminal processes them.

Set full duplex communication mode (ESC) (D) (F)

Allows the terminal to send and receive data at the same time. When you enter data at the keyboard, the terminal sends that data to the computer. However, it does not display the data on the screen, and commands included with this data are not processed by the terminal.

When the computer receives data from the terminal, it should process any commands contained in the data and then send it back (echo) to the terminal. When the terminal receives the data echoed by the computer, it displays it on the screen or processes it.

Set block communication mode (ESC) (B)

Lets you enter data without sending it to the computer immediately. This lets you check and correct the data before sending it to the computer with the (SEND) key.[1]

Programming the Delimiters

Whenever the terminal sends a stream of data, that data includes delimiters that signal the end of the line (line delimiter) and the text (text delimiter). For example, when the terminal is in block communication mode, data is not transmitted until you press (SEND) or the terminal receives a send command. The block of data transmitted in response to these commands includes line and text delimiters to tell the computer where the lines and the text end. These delimiters are also used in printing.

Unless you program these delimiters, the terminal will transmit the default delimiters. The default line delimiter is a carriage return and line feed character (*CTRL M* and *CTRL J*). The default text delimiter is a null and a carriage return character (*CTRL @* and *CTRL M*).

1. You can determine how much data is transmitted by the (SEND) key, as described in the Programming Keys section.

Program line delimiter (ESC) x 1 n m

Programs the line delimiter, where n and m are variables representing any two ASCII characters. This delimiter replaces the default line delimiter in the terminal's permanent memory.

Program text delimiter (ESC) x 2 n m

Programs the text delimiter, where n and m are variables representing any two ASCII characters. This delimiter replaces the default text delimiter in the terminal's permanent memory.

Handshaking Protocols

If the computer sends data faster than the terminal can process it, data might be lost. To avoid possible data loss, the terminal uses handshaking protocols to stop data from coming in when its 256-byte receive buffer is almost full.

The terminal provides two protocols: DTR control and X-On/X-Off. DTR control changes the voltage on the DTR line (pin 20 of the RS-232C connector) to tell the computer to stop or start sending data. X-On and X-Off, on the other hand, are ASCII characters transmitted with the data stream.

The terminal also monitors the DTR line from the printer to allow the printer to initiate the signals to stop or restart the data flow. Whenever the printer lowers the voltage on this line (i.e., sends the printer busy signal), the terminal passes the signal to the computer, using either DTR control or the X-Off signal.

Set DTR control (CTRL △)-N

Enables DTR control to control data flow between the computer and terminal. When the terminal's receive buffer is 32 bytes short of being full, the terminal lowers the voltage on the DTR line (pin 20) to the computer. In response, the computer should stop sending data.

As the terminal processes the data in the buffer, the buffer empties. When the buffer is 16 bytes short of being empty, the terminal raises the voltage on the DTR line to the computer, telling it to resume sending data.

Set X-On/X-Off (CTRL △-O)

Allows the X-On/X-Off signals to control data flow. When the terminal's receive buffer is 32 bytes short of being full, the terminal sends the ASCII character X-Off *(CTRL S)* to the computer. The computer should stop sending data.

As the terminal processes the data in the buffer, the buffer empties. When it is 16 bytes short of being empty, the terminal sends the ASCII character X-On *(CTRL Q)* to tell the computer to resume sending data.

NOTE! *When the terminal is set for X-On/X-Off, both DTR and X-On/X-Off handshaking may occur with the computer if the printer lowers its DTR line when copy or transparent print mode is on. If this causes a problem, you can modify the RS-232C cable to eliminate the DTR signalling. Call TeleVideo if you need assistance.*

Printing

The terminal's print modes let you print data as it is received from the computer. You can determine whether data being printed is also displayed on the screen.

Page print (ESC) P

Sends all data on the screen to the printer at the baud rate selected for the printer port in the set up state. The transmission includes line and text delimiters to tell the printer where to start new lines and when to stop printing.

Keep in Mind:

Some characters can not be printed as they appear on the screen.

- When sending data to the printer, the terminal reads the Ø attribute in each line. If the Ø attribute defines graphics characters, the **entire** line is sent as space characters.

  This gives you some flexibility in determining how graphics characters are printed.

  By loading graphics characters into the 1 attribute, you can print them as the ASCII characters to which they correspond. The other characters in the line will be printed normally.

  If you have a printer that can print graphics characters, loading graphics characters into the 1 attribute may allow you to

actually print graphics characters. Refer to your printer's manual for details.

- If the Ø attribute within a line defines double-width characters (or if the terminal is set for a 40-column display), the terminal sends to the printer only every other character in its display memory for the **entire** line.[1]

  As a result, all double-width characters will be printed as single-width characters. However, if the line also contains single-width characters, only every other character will be printed.

  Therefore, to avoid garbled printing, we recommend that you do not define double- and single-width characters within the same line.

- Double-height characters are printed as two single-height characters, one on top of the other.

- The terminal ignores the variables that define visual appearance (blink, blank, normal, reverse, and underline). As a result, data that is invisible on the screen can be printed. Therefore, do not define confidential data as blank (invisible) if there is a possibility it may be printed.

Copy print mode on (ESC) @

Sends all data received from the computer to the printer. At the same time, the terminal displays the data on the screen. It also processes any commands included in the data stream.

The baud rate for the printer port automatically changes to match the main port's baud rate. If the printer is printing data received by the modem, the printer baud rate changes to match the modem's baud rate.

Copy print mode off (ESC) A

Stops sending data received from the computer to the printer. The printer port baud rate reverts to the setting determined in the set up state.

Transparent print mode on (CTRL)+R or (ESC) `

1. You can actually see the characters in the terminal's display memory by entering the set up state. When the terminal leaves the set up state, the screen returns to normal.

Sends all data received from the computer to the printer without displaying that data on the screen. Commands included in the data stream are not processed.

The baud rate for the printer port changes automatically to match the main port's baud rate. If the printer is printing data received by the modem, the printer baud rate changes to match the modem's baud rate. Column 1 of the status line displays an X.

Transparent print mode off (CTRL △-T) or (ESC) (a)

Stops sending data received from the computer to the printer. The printer port baud rate reverts to the setting determined in the set up state.

Miscellaneous Commands

Power reset (ESC) (~)

Resets the terminal. All displayed data is lost, and all operating parameters revert to the default values. However, the values loaded for the function keys and the phone directory (to be used in the phone and custom states) are not lost.

Disable (lock) keyboard (ESC) (#)

Disables the keyboard. All keys and keyboard commands except (LOC ESC) (") and (CTRL △-△ BREAK) are disabled. Column 1 of the status line displays L.[1]

Enable (unlock) keyboard (ESC) (")

Reenables the keyboard when sent by the computer. To reenable the keyboard from the keyboard, press (LOC ESC) (").

Sound bell (CTRL △-G)

Sounds the terminal's bell.

Self test (ESC) (V)

Displays the screen alignment pattern to allow you to adjust the screen size and linearity. The terminal's firmware level appears in the upper left corner of the screen and is sent to the computer, followed by the text delimiter.

1. The L that appears in column 1 of the status line when you disable the keyboard will replace both the X indicating transparent print mode and the * that appears when the alpha lock feature is on.

Monitor mode on (ESC) (U) or (LOC ESC) (U)

Instead of sending or processing escape sequences and control codes received from the computer, the terminal displays them on the screen. This helps when you're debugging a program since you can actually see what commands are received by the terminal.

Table 7-5 lists the control codes, the ASCII characters they generate, the corresponding hex values, and the characters as they appear on the screen in monitor mode.

Table 7-5
Monitor Mode Control Characters

Code	ASCII Character	Hex Value	Character Displayed
CTRL @	NULL	ØØ	↑ @
CTRL A	SOH	Ø1	↑ A
CTRL B	STX	Ø2	↑ B
CTRL C	ETX	Ø3	↑ C
CTRL D	EOT	Ø4	↑ D
CRTL E	ENQ	Ø5	↑ E
CTRL F	ACK	Ø6	↑ F
CTRL G	BEL	Ø7	↑ G
CTRL H	BS	Ø8	↑ H
CTRL I	HT	Ø9	↑ I
CTRL J	LF	ØA	↑ J
CTRL K	VT	ØB	↑ K
CTRL L	FF	ØC	↑ L
CTRL M	CR	ØD	↑ M
CTRL N	SO	ØE	↑ N
CTRL O	SI	ØF	↑ O
CTRL P	DLE	1Ø	↑ P
CTRL Q	DC1	11	↑ Q
CTRL R	DC2	12	↑ R
CTRL S	DC3	13	↑ S
CTRL T	DC4	14	↑ T
CTRL U	NAK	15	↑ U

Table 7-5
Continued

Code	ASCII Character	Hex Value	Character Displayed
CTRL V	SYN	16	↑V
CTRL W	ETB	17	↑W
CTRL X	CAN	18	↑X
CTRL Y	EM	19	↑Y
CTRL Z	SUB	1A	↑Z
CTRL [	ESC	1B	↑[
CTRL \	FS	1C	↑\
CTRL]	GS	1D	↑]
CTRL ^	RS	1E	↑^
CTRL _	US	1F	↑_
DEL	DEL	7F	▒[1]

Monitor mode off (LOC ESC) (X)

Turns off monitor mode. Commands received by the terminal are again processed or displayed.

Programming Keys

Programming the (Δ SEND) Key

When you press (Δ SEND), a certain amount of the data displayed on the screen is sent to the computer. The commands that follow let you determine how much data is transmitted. The (Δ SEND) key programming is saved in the terminal's permanent memory.

Program (Δ SEND) key for home to cursor (ESC) (ø) (1) (7)

Programs the (Δ SEND) key to send to the computer all data from (and including) the home position to (but not including) the cursor position.

Program (Δ SEND) key for entire screen (ESC) (ø) (1) (s)

Programs the (Δ SEND) key to send to the computer all data displayed on the screen.

1. The delete character will appear on the screen only if you enter it from the keyboard or if the terminal is in monitor mode.

Programming the EXIT Key

When you press the EXIT key, the terminal enters either the starting or the custom state. You can also determine the EXIT key's effect in the set up state.

Program EXIT key for starting state ESC _

Programs the terminal to enter the starting state whenever the EXIT key is pressed.

Program EXIT key for custom state ESC ^

Programs the terminal to enter the custom state whenever EXIT is pressed. If you press EXIT again, the terminal enters the starting state.

Programming Function Keys for Custom State

You can program each of the seven function keys to transmit character strings up to 15 characters long. If you program all keys, the function key memory for the custom state will contain 14 names and 14 character strings, for shifted and unshifted operation of each key.

Program keys for custom state ESC ; n m ⟨name⟩ ^ ⟨data⟩ CTRL-Y

where

n is the ASCII character that corresponds to the function key number shown in Table 7-6.

m is the transmit code.

1 transmits to the computer
2 transmits to the screen only (local)
3 transmits to both computer and screen

name can consist of up to 15 characters. The first six characters entered for keys F1 through F7 will appear in the status line above those keys when the terminal is in the custom state.

data can consist of up to 15 characters, to be transmitted when the corresponding shifted or unshifted key is pressed. This data string can include commands. If the command is a control code, it is displayed in half-intensity reverse video.

Table 7-6
n Values for Function Keys

Key Number	Corresponding ASCII Character
F1	@
F2	A
F3	B
F4	C
F5	D
F6	E
F7	F
SHIFT-F1	G
SHIFT-F2	H
SHIFT-F3	I
SHIFT-F4	J
SHIFT-F5	K
SHIFT-F6	L
SHIFT-F7	M

NOTE! *The commands that define the communication modes (ESC D H, ESC D F, and ESC B) can not be programmed into the function keys unless the computer echoes them.*

Example

To program function key F2 to display FINAN. and transmit FINANCE *CTRL M* to the computer, enter

ESC ! A 1 F I N A N . ^ F I N A N C E
CTRL Δ-M CTRL Δ-Y

NOTE! *The ^ character normally signals the end of the name entry and CTRL Y terminates the entire sequence. If you want to load these characters into the strings of either the name or data entries, you must enter CTRL P before these characters. CTRL P allows any command that follows it (including CTRL P) to be loaded.*

Example

To program F3 to display USERID and transmit 123 *CTRL Y* 456 to the computer and the screen, enter

ESC ; B 3 U S E R I D ^ 1 2 3 CTRL Δ-P CTRL Δ-Y 4 5 6 CTRL Δ-Y

Programming the Directory for the Phone State

You can program the terminal's directory with up to 28 names and numbers to be dialed automatically when the terminal is in the phone state.

The first five function keys will dial the number that corresponds to directory items Ø1 through Ø5 in the phone state. The status line above these keys will display the names that identify these numbers. F7 (DIR) will display the directory, which contains all item names and numbers.

Program directory ESC] n ⟨name⟩ ^ ⟨data⟩ CTRL Δ-Y

where

n is the ASCII character corresponding to the directory's item number, as shown in Table 7-7. Items Ø1 through Ø5 will correspond to keys F1 through F5 when the terminal is in the phone state.

Table 7-7
n Values for Directory Items

Item Number	Corresponding ASCII Character	Item Number	Corresponding ASCII Character
Ø1	@	15	N
Ø2	A	16	O
Ø3	B	17	P
Ø4	C	18	Q
Ø5	D	19	R
Ø6	E	2Ø	S
Ø7	F	21	T
Ø8	G	22	U
Ø9	H	23	V
1Ø	I	24	W

Table 7-7
Continued

Item Number	Corresponding ASCII Character	Item Number	Corresponding ASCII Character
11	J	25	X
12	K	26	Y
13	L	27	Z
14	M	28	]

name consists of up to 15 characters that identify the number.

data can contain up to 15 characters, to be dialed when the terminal is in the phone state. To include a delay while dialing, enter a = in the appropriate position. (In earlier models, enter a ~.) Hyphens, spaces, etc., are not processed during dialing, although you may enter them for clarity.

Example

To program (F1) (item Ø1) to dial Craig's extension, enter

(ESC)] @ C R A I G ^ 2 3 4 8 (CTRL Δ-Y)

NOTE! *The ^ character normally signals the end of the name entry and CTRL Y terminates the entire sequence. If you want to load these characters into the strings of either the name or data entries, you must enter CTRL P before these characters. CTRL P allows any command that follows it (including CTRL P) to be loaded, as shown in the example on the previous page.*

Sending Information to the Computer

The terminal responds to the commands in this section by sending the requested information to the computer.

Keep in Mind:

Some characters can not be printed as they appear on the screen.

- When sending data to the computer, the terminal reads the Ø attribute in each line. If the Ø attribute defines graphics characters, the **entire** line is sent as space characters.

  This allows you some flexibility in determining how graphics characters are transmitted to the computer.

By loading graphics characters into the 1 attribute, you can send them as the ASCII characters to which they correspond. The other characters in the line will be transmitted normally.

- If the Ø attribute within a line defines double-width characters (or if the terminal is set for a 40-column display), the terminal sends to the computer only every other character in its display memory for the **entire** line.[1]

  As a result, all double-width characters will be sent as single-width characters. However, if the line also contains single-width characters, only every other character will be sent.

  Therefore, to avoid sending garbled data, we recommend that you do not define double- and single-width characters within the same line.

- Double-height characters are sent to the computer as two single-height characters, one on top of the other.

- The terminal ignores the variables that define visual appearance (blink, blank, normal, reverse, underline). As a result, data that is invisible on the screen can be transmitted to the computer.

Send screen from home position to cursor (ESC) 7

Asks for the data from (and including) the home position to (but not including) the cursor position. In response, the terminal sends that block of data, including line and text delimiters.

Send entire screen (ESC) s

Asks for all data on the screen. The terminal sends all data on the screen, including line and text delimiters.

Send set up parameters (ESC) Z 1

Asks the terminal for its current operating parameters. The terminal responds by sending nine bytes of code, followed by a text delimiter. Appendix F shows the parameters contained in each byte.

1. You can actually see the characters in the terminal's display memory by entering the set up state. When the terminal leaves the set up state, the screen returns to normal.

Send function key memory (ESC) Z 2

Asks the terminal for the contents of the function keys, as programmed for use in the custom state.

The terminal responds by sending three blocks of code. The first block defines where the contents of the function keys are to be sent. The second and third blocks define the name and data fields for all function keys. Within these blocks, the name or data fields for each key are separated by line delimiters. At the end of the transmission, the terminal sends the text delimiter.

Table 7-8 shows in detail how these blocks are transmitted.

Table 7-8
Data Send Format for Function Key Memory

Byte	Format	Description of Byte(s)
1-14	14 × (1 byte)	Transmit index, where: *CTRL A* sends to computer *CTRL B* sends to screen (local) *CTRL C* sends to both
15	1 byte	Space (20 hex)
16, 17	2 bytes	Line delimiter
18-255	14 × (15 + 2 bytes)	Name fields and line delimiter
256-493	14 × (15 + 2 bytes)	Data fields and line delimiter
494, 495	2 bytes	Text delimiter

Program terminal ID (ESC) m x y

Programs the terminal's ID into the permanent memory, where x and y are any two ASCII characters.

Send terminal ID (ESC) M or (CTRL Δ) E

Asks the terminal to identify itself.

The terminal responds by sending the two characters you programmed with the previous command, followed by the text delimiter.

Limited Warranty

The warranty period that applies to your Personal Terminal is determined by the terminal's serial number. The limited warranty itself is defined by the Statement of Limited Warranty. Therefore, you do not need to complete or send in a separate warranty card.

Statement of Limited Warranty

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

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

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

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

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Appendices

Appendix A	ASCII Code Chart
Appendix B	Terminal Commands
Appendix C	Cursor Coordinate Table
Appendix D	Foreign Character Set
Appendix E	Graphics Character Set
Appendix F	Set Up Parameter Formats
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Appendix H	Pin Connector Assignments

Appendix A
ASCII Code Chart

ASCII Char.	Control Code	Bit	7	6	5	4	3	2	1	0	Octal	Decimal	Hex
		Binary Value	128	64	32	16	8	4	2	1			
NUL	CTRL @		Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	ØØØ	ØØØ	ØØ
SOH	CTRL A		Ø	Ø	Ø	Ø	Ø	Ø	Ø	1	ØØ1	ØØ1	Ø1
STX	CTRL B		Ø	Ø	Ø	Ø	Ø	Ø	1	Ø	ØØ2	ØØ2	Ø2
ETX	CTRL C		Ø	Ø	Ø	Ø	Ø	Ø	1	1	ØØ3	ØØ3	Ø3
EOT	CTRL D		Ø	Ø	Ø	Ø	Ø	1	Ø	Ø	ØØ4	ØØ4	Ø4
ENQ	CTRL E		Ø	Ø	Ø	Ø	Ø	1	Ø	1	ØØ5	ØØ5	Ø5
ACK	CTRL F		Ø	Ø	Ø	Ø	Ø	1	1	Ø	ØØ6	ØØ6	Ø6
BEL	CTRL G		Ø	Ø	Ø	Ø	Ø	1	1	1	ØØ7	ØØ7	Ø7
BS	CTRL H		Ø	Ø	Ø	Ø	1	Ø	Ø	Ø	Ø1Ø	ØØ8	Ø8
HT	CTRL I		Ø	Ø	Ø	Ø	1	Ø	Ø	1	Ø11	ØØ9	Ø9
LF	CTRL J		Ø	Ø	Ø	Ø	1	Ø	1	Ø	Ø12	Ø1Ø	ØA
VT	CTRL K		Ø	Ø	Ø	Ø	1	Ø	1	1	Ø13	Ø11	ØB
FF	CTRL L		Ø	Ø	Ø	Ø	1	1	Ø	Ø	Ø14	Ø12	ØC
CR	CTRL M		Ø	Ø	Ø	Ø	1	1	Ø	1	Ø15	Ø13	ØD
SO	CTRL N		Ø	Ø	Ø	Ø	1	1	1	Ø	Ø16	Ø14	ØE
SI	CTRL O		Ø	Ø	Ø	Ø	1	1	1	1	Ø17	Ø15	ØF
HLE	CTRL P		Ø	Ø	Ø	1	Ø	Ø	Ø	Ø	Ø2Ø	Ø16	1Ø
DC1	CTRL Q		Ø	Ø	Ø	1	Ø	Ø	Ø	1	Ø21	Ø17	11
DC2	CTRL R		Ø	Ø	Ø	1	Ø	Ø	1	Ø	Ø22	Ø18	12
DC3	CTRL S		Ø	Ø	Ø	1	Ø	Ø	1	1	Ø23	Ø19	13
DC4	CTRL T		Ø	Ø	Ø	1	Ø	1	Ø	Ø	Ø24	Ø2Ø	14
NAK	CTRL U		Ø	Ø	Ø	1	Ø	1	Ø	1	Ø25	Ø21	15
SYN	CTRL V		Ø	Ø	Ø	1	Ø	1	1	Ø	Ø26	Ø22	16
ETB	CTRL W		Ø	Ø	Ø	1	Ø	1	1	1	Ø27	Ø23	17
CAN	CTRL X		Ø	Ø	Ø	1	1	Ø	Ø	Ø	Ø3Ø	Ø24	18
EM	CTRL Y		Ø	Ø	Ø	1	1	Ø	Ø	1	Ø31	Ø25	19
SUB	CTRL Z		Ø	Ø	Ø	1	1	Ø	1	Ø	Ø32	Ø26	1A
ESC	CTRL [		Ø	Ø	Ø	1	1	Ø	1	1	Ø33	Ø27	1B
FS	CTRL \		Ø	Ø	Ø	1	1	1	Ø	Ø	Ø34	Ø28	1C
GS	CTRL]		Ø	Ø	Ø	1	1	1	Ø	1	Ø35	Ø29	1D
RS	CTRL ^		Ø	Ø	Ø	1	1	1	1	Ø	Ø36	Ø3Ø	1E
US	CTRL _		Ø	Ø	Ø	1	1	1	1	1	Ø37	Ø31	1F
SP			Ø	Ø	1	Ø	Ø	Ø	Ø	Ø	Ø4Ø	Ø32	2Ø
!			Ø	Ø	1	Ø	Ø	Ø	Ø	1	Ø41	Ø33	21
"			Ø	Ø	1	Ø	Ø	Ø	1	Ø	Ø42	Ø34	22
#			Ø	Ø	1	Ø	Ø	Ø	1	1	Ø43	Ø35	23
$			Ø	Ø	1	Ø	Ø	1	Ø	Ø	Ø44	Ø36	24
%			Ø	Ø	1	Ø	Ø	1	Ø	1	Ø45	Ø37	25
&			Ø	Ø	1	Ø	Ø	1	1	Ø	Ø46	Ø38	26

Appendix A
Continued

ASCII Char.	Control Code	Bit	7	6	5	4	3	2	1	0	Octal	Decimal	Hex
			Binary Value										
			128	64	32	16	8	4	2	1			
'	(apostrophe)		Ø	Ø	1	Ø	Ø	1	1	1	Ø47	Ø39	27
(			Ø	Ø	1	Ø	1	Ø	Ø	Ø	Ø5Ø	Ø4Ø	28
)			Ø	Ø	1	Ø	1	Ø	Ø	1	Ø51	Ø41	29
*			Ø	Ø	1	Ø	1	Ø	1	Ø	Ø52	Ø42	2A
+			Ø	Ø	1	Ø	1	Ø	1	1	Ø53	Ø43	2B
,	(comma)		Ø	Ø	1	Ø	1	1	Ø	Ø	Ø54	Ø44	2C
–	(dash)		Ø	Ø	1	Ø	1	1	Ø	1	Ø55	Ø45	2D
.	(period)		Ø	Ø	1	Ø	1	1	1	Ø	Ø56	Ø46	2E
/			Ø	Ø	1	Ø	1	1	1	1	Ø57	Ø47	2F
Ø			Ø	Ø	1	1	Ø	Ø	Ø	Ø	Ø6Ø	Ø48	3Ø
1			Ø	Ø	1	1	Ø	Ø	Ø	1	Ø61	Ø49	31
2			Ø	Ø	1	1	Ø	Ø	1	Ø	Ø62	Ø5Ø	32
3			Ø	Ø	1	1	Ø	Ø	1	1	Ø63	Ø51	33
4			Ø	Ø	1	1	Ø	1	Ø	Ø	Ø64	Ø52	34
5			Ø	Ø	1	1	Ø	1	Ø	1	Ø65	Ø53	35
6			Ø	Ø	1	1	Ø	1	1	Ø	Ø66	Ø54	36
7			Ø	Ø	1	1	Ø	1	1	1	Ø67	Ø55	37
8			Ø	Ø	1	1	1	Ø	Ø	Ø	Ø7Ø	Ø56	38
9			Ø	Ø	1	1	1	Ø	Ø	1	Ø71	Ø57	39
:			Ø	Ø	1	1	1	Ø	1	Ø	Ø72	Ø58	3A
;			Ø	Ø	1	1	1	Ø	1	1	Ø73	Ø59	3B
<			Ø	Ø	1	1	1	1	Ø	Ø	Ø74	Ø6Ø	3C
=			Ø	Ø	1	1	1	1	Ø	1	Ø75	Ø61	3D
>			Ø	Ø	1	1	1	1	1	Ø	Ø76	Ø62	3E
?			Ø	Ø	1	1	1	1	1	1	Ø77	Ø63	3F
@			Ø	1	Ø	Ø	Ø	Ø	Ø	Ø	1ØØ	Ø64	4Ø
A			Ø	1	Ø	Ø	Ø	Ø	Ø	1	1Ø1	Ø65	41
B			Ø	1	Ø	Ø	Ø	Ø	1	Ø	1Ø2	Ø66	42
C			Ø	1	Ø	Ø	Ø	Ø	1	1	1Ø3	Ø67	43
D			Ø	1	Ø	Ø	Ø	1	Ø	Ø	1Ø4	Ø68	44
E			Ø	1	Ø	Ø	Ø	1	Ø	1	1Ø5	Ø69	45
F			Ø	1	Ø	Ø	Ø	1	1	Ø	1Ø6	Ø7Ø	46
G			Ø	1	Ø	Ø	Ø	1	1	1	1Ø7	Ø71	47
H			Ø	1	Ø	Ø	1	Ø	Ø	Ø	11Ø	Ø72	48
I			Ø	1	Ø	Ø	1	Ø	Ø	1	111	Ø73	49
J			Ø	1	Ø	Ø	1	Ø	1	Ø	112	Ø74	4A
K			Ø	1	Ø	Ø	1	Ø	1	1	113	Ø75	4B
L			Ø	1	Ø	Ø	1	1	Ø	Ø	114	Ø76	4C
M			Ø	1	Ø	Ø	1	1	Ø	1	115	Ø77	4D

Appendix A Continued

ASCII Char.	Control Code	Bit	7	6	5	4	3	2	1	0	Octal	Decimal	Hex
			128	64	32	16	8	4	2	1			
			Binary Value										
N			Ø	1	Ø	Ø	1	1	1	Ø	116	Ø78	4E
O			Ø	1	Ø	Ø	1	1	1	1	117	Ø79	4F
P			Ø	1	Ø	1	Ø	Ø	Ø	Ø	12Ø	Ø8Ø	5Ø
Q			Ø	1	Ø	1	Ø	Ø	Ø	1	121	Ø81	51
R			Ø	1	Ø	1	Ø	Ø	1	Ø	122	Ø82	52
S			Ø	1	Ø	1	Ø	Ø	1	1	123	Ø83	53
T			Ø	1	Ø	1	Ø	1	Ø	Ø	124	Ø84	54
U			Ø	1	Ø	1	Ø	1	Ø	1	125	Ø85	55
V			Ø	1	Ø	1	Ø	1	1	Ø	126	Ø86	56
W			Ø	1	Ø	1	Ø	1	1	1	127	Ø87	57
X			Ø	1	Ø	1	1	Ø	Ø	Ø	13Ø	Ø88	58
Y			Ø	1	Ø	1	1	Ø	Ø	1	131	Ø89	59
Z			Ø	1	Ø	1	1	Ø	1	Ø	132	Ø9Ø	5A
[			Ø	1	Ø	1	1	Ø	1	1	133	Ø91	5B
\			Ø	1	Ø	1	1	1	Ø	Ø	134	Ø92	5C
]			Ø	1	Ø	1	1	1	Ø	1	135	Ø93	5D
^			Ø	1	Ø	1	1	1	1	Ø	136	Ø94	5E
_	(underline)		Ø	1	Ø	1	1	1	1	1	137	Ø95	5F
`	(grave)		Ø	1	1	Ø	Ø	Ø	Ø	Ø	14Ø	Ø96	6Ø
a			Ø	1	1	Ø	Ø	Ø	Ø	1	141	Ø97	61
b			Ø	1	1	Ø	Ø	Ø	1	Ø	142	Ø98	62
c			Ø	1	1	Ø	Ø	Ø	1	1	143	Ø99	63
d			Ø	1	1	Ø	Ø	1	Ø	Ø	144	1ØØ	64
e			Ø	1	1	Ø	Ø	1	Ø	1	145	1Ø1	65
f			Ø	1	1	Ø	Ø	1	1	Ø	146	1Ø2	66
g			Ø	1	1	Ø	Ø	1	1	1	147	1Ø3	67
h			Ø	1	1	Ø	1	Ø	Ø	Ø	15Ø	1Ø4	68
i			Ø	1	1	Ø	1	Ø	Ø	1	151	1Ø5	69
j			Ø	1	1	Ø	1	Ø	1	Ø	152	1Ø6	6A
k			Ø	1	1	Ø	1	Ø	1	1	153	1Ø7	6B
l			Ø	1	1	Ø	1	1	Ø	Ø	154	1Ø8	6C
m			Ø	1	1	Ø	1	1	Ø	1	155	1Ø9	6D
n			Ø	1	1	Ø	1	1	1	Ø	156	11Ø	6E
o			Ø	1	1	Ø	1	1	1	1	157	111	6F
p			Ø	1	1	1	Ø	Ø	Ø	Ø	16Ø	112	7Ø
q			Ø	1	1	1	Ø	Ø	Ø	1	161	113	71
r			Ø	1	1	1	Ø	Ø	1	Ø	162	114	72
s			Ø	1	1	1	Ø	Ø	1	1	163	115	73
t			Ø	1	1	1	Ø	1	Ø	Ø	164	116	74

Appendix A
Continued

ASCII Char.	Control Code	Bit	7	6	5	4	3	2	1	0	Octal	Decimal	Hex
		Binary Value	128	64	32	16	8	4	2	1			
u			Ø	1	1	1	Ø	1	Ø	1	165	117	75
v			Ø	1	1	1	Ø	1	1	Ø	166	118	76
w			Ø	1	1	1	Ø	1	1	1	167	119	77
x			Ø	1	1	1	1	Ø	Ø	Ø	170	120	78
y			Ø	1	1	1	1	Ø	Ø	1	171	121	79
z			Ø	1	1	1	1	Ø	1	Ø	172	122	7A
{			Ø	1	1	1	1	Ø	1	1	173	123	7B
¦			Ø	1	1	1	1	1	Ø	Ø	174	124	7C
}			Ø	1	1	1	1	1	Ø	1	175	125	7D
~			Ø	1	1	1	1	1	1	Ø	176	126	7E
DEL			Ø	1	1	1	1	1	1	1	177	127	7F

Appendix B
Terminal Commands

Table B-1 lists the control codes for the Personal Terminal. Keys in parentheses generate the same command.

Table B-1
Control Codes

Control Character	Hex Code	Effect
NULL	ØØ	No action
CTRL E	Ø5	Send terminal ID
CTRL G	Ø7	Sound bell
CTRL H	Ø8	Cursor left (BACK SPACE , ←)
CTRL I	Ø9	Tabulate (TAB)
CTRL J	ØA	Cursor down (↓)
CTRL K	ØB	Cursor up (↑)
CTRL L	ØC	Cursor right (→)
CTRL M	ØD	Carriage return (RETURN)
CTRL N	ØE	Set DTR control, disable X-ON/OFF
CTRL O	ØF	Set X-ON/OFF, disable DTR control
CTRL R	12	Transparent print mode on
CTRL T	14	Transparent print mode off
CTRL Z	1A	Clear screen to spaces
CTRL \		(CTRL Δ - Δ CLEAR)
CTRL ^	1E	Home (HOME)
CTRL _	1F	New line
CTRL [	1B	Escape sequence initiator

Table B-2 lists the escape sequences for the Personal Terminal. Keys in parentheses generate the same command.

Table B-2
Escape Sequences

Sequence	Effect
ESC "	Enable (unlock) keyboard
ESC #	Disable (lock) keyboard
ESC)	Half-intensity visual attribute on
ESC (	Half-intensity visual attribute off
ESC G Ø *m n*	Load Ø attribute
ESC G 1 *m n*	Load 1 attribute
ESC F	Activate Ø attribute mode
ESC H	Activate 1 attribute mode
ESC . n	Set cursor appearance
ESC 1	Set tab stop at cursor position
ESC 2	Clear tab stop at cursor position
ESC 3	Clear all tab stops
ESC 7	Send screen from home to (but not including) cursor position
ESC s	Send entire screen
ESC Z 1	Send set up parameters
ESC Z 2	Send function key memory
ESC = *r c*	Move cursor to address
ESC I	Tabulate backward
ESC P	Page print (CTRL Δ - Δ PRINT)
ESC @	Copy print mode on
ESC A	Copy print mode off
ESC `	Transparent print mode on
ESC a	Transparent print mode off
ESC B	Set block communication mode
ESC D H	Set half duplex communication mode
ESC D F	Set full duplex communication mode

Table B-2
Continued

Sequence	Effect
ESC E	Insert line at cursor position
ESC R	Delete cursor line
ESC T	Erase to spaces, from (and including) cursor to end of line
ESC Y	Erase to spaces, from (and including) cursor to end of page
ESC +	Clear screen to spaces
ESC *	((CTRL Δ)-(Δ CLEAR))
ESC U	Monitor mode on
LOC ESC U	
LOC ESC X	Monitor mode off
ESC V	Self test
ESC ~	Power reset
ESC k	Set local edit mode
ESC l	Set duplex edit mode
ESC Ø 1 7	Program (Δ SEND) key from home to cursor position
ESC Ø 1 s	Program (Δ SEND) key for entire screen
ESC x 1 *n m*	Program line delimiter
ESC x 2 *n m*	Program text delimiter
ESC m *x y*	Program terminal ID
ESC M	Send terminal ID
ESC ! *n m* *⟨name⟩* ^ *⟨data⟩*CTRL Y	Program function keys, custom state
ESC] *n* *⟨name⟩* ^ *⟨data⟩*CTRL Y	Program directory, phone state
ESC _	Program (EXIT) key, starting state
ESC ^	Program (EXIT) key, custom state
ESC p	Set 40-column display
ESC u	Set 80-column display
ESC v	Autowrap mode on
ESC w	Autowrap mode off
ESC J	Alternate character set on
ESC K	Alternate character set off

Appendix C
Cursor Coordinate Table

Row/ Column	ASCII Code Transmitted	Column	ASCII Code Transmitted	Column	ASCII Code Transmitted
1	Space	28	;	55	V
2	!	29	⟨	56	W
3	"	30	=	57	X
4	#	31	⟩	58	Y
5	$	32	?	59	Z
6	%	33	@	60	[
7	&	34	A	61	\
8	' (apostrophe)	35	B	62	]
9	(	36	C	63	^
10	)	37	D	64	_ (underline)
11	*	38	E	65	` (grave)
12	+	39	F	66	a
13	, (comma)	40	G	67	b
14	– (dash)	41	H	68	c
15	. (period)	42	I	69	d
16	/	43	J	70	e
17	Ø	44	K	71	f
18	1	45	L	72	g
19	2	46	M	73	h
20	3	47	N	74	i
21	4	48	O	75	j
22	5	49	P	76	k
23	6	50	Q	77	l
24	7	51	R	78	m
25	8	52	S	79	n
26	9	53	T	80	o
27	:	54	U		

Appendix D
Foreign Character Set

The foreign character set in Table D-1 is available when the alternate character set is turned on.

Table D-1
Foreign Characters

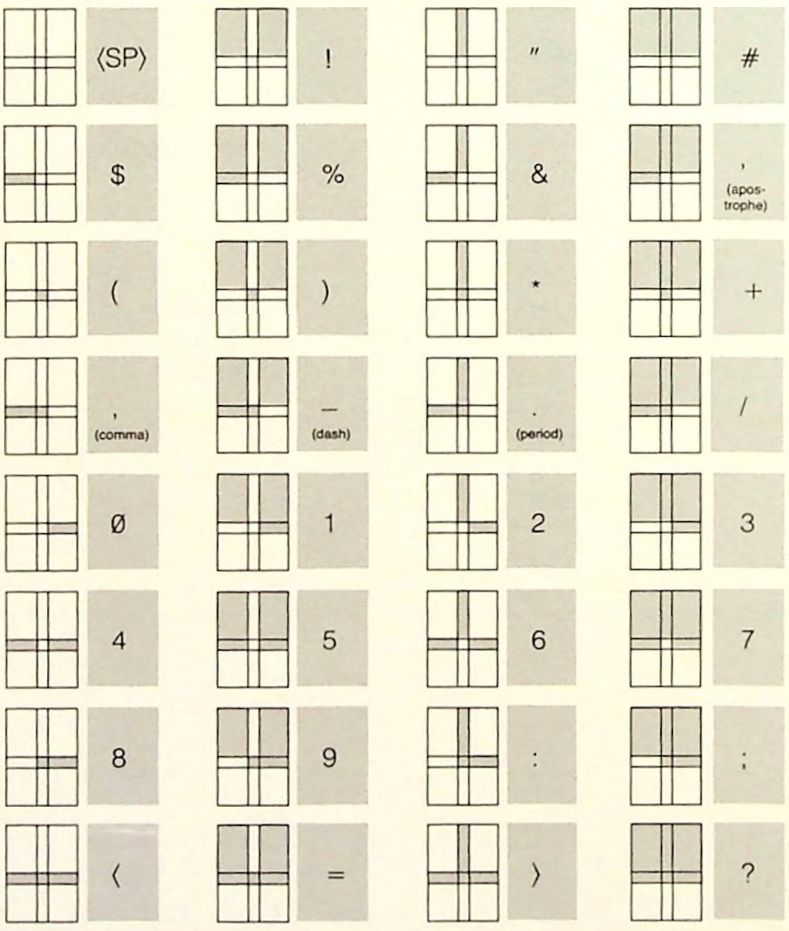
Standard Character	Foreign Character	Hex Code
⟨SP⟩	IJ	20
!	↑	21
"	Ø	22
#	£	23
$	¤	24
%	¨	25
&	°	26
' (apostrophe)	§	27
(	Ç	28
)	Ñ	29
*	Æ	2A
+	Ä	2B
, (comma)	Ö	2C
– (dash)	Å	2D
. (period)	Ü	2E
/	Œ	2F
0	ij	30
1	ß	31
2	à	32
3	è	33
4	ì	34
5	ï	35
6	ù	36
7	é	37
8	ç	38
9	ñ	39
:	æ	3A
;	ä	3B
⟨	ö	3C
=	å	3D
⟩	ü	3E
?	œ	3F

Appendix E
Graphics Character Set

The following graphics characters correspond to the 96 ASCII display characters and the 32 alternate characters shown in Figure 7-5.[1]

The next section shows how each character cell is formed and gives an example of how to draw a rectangle with the graphics characters.

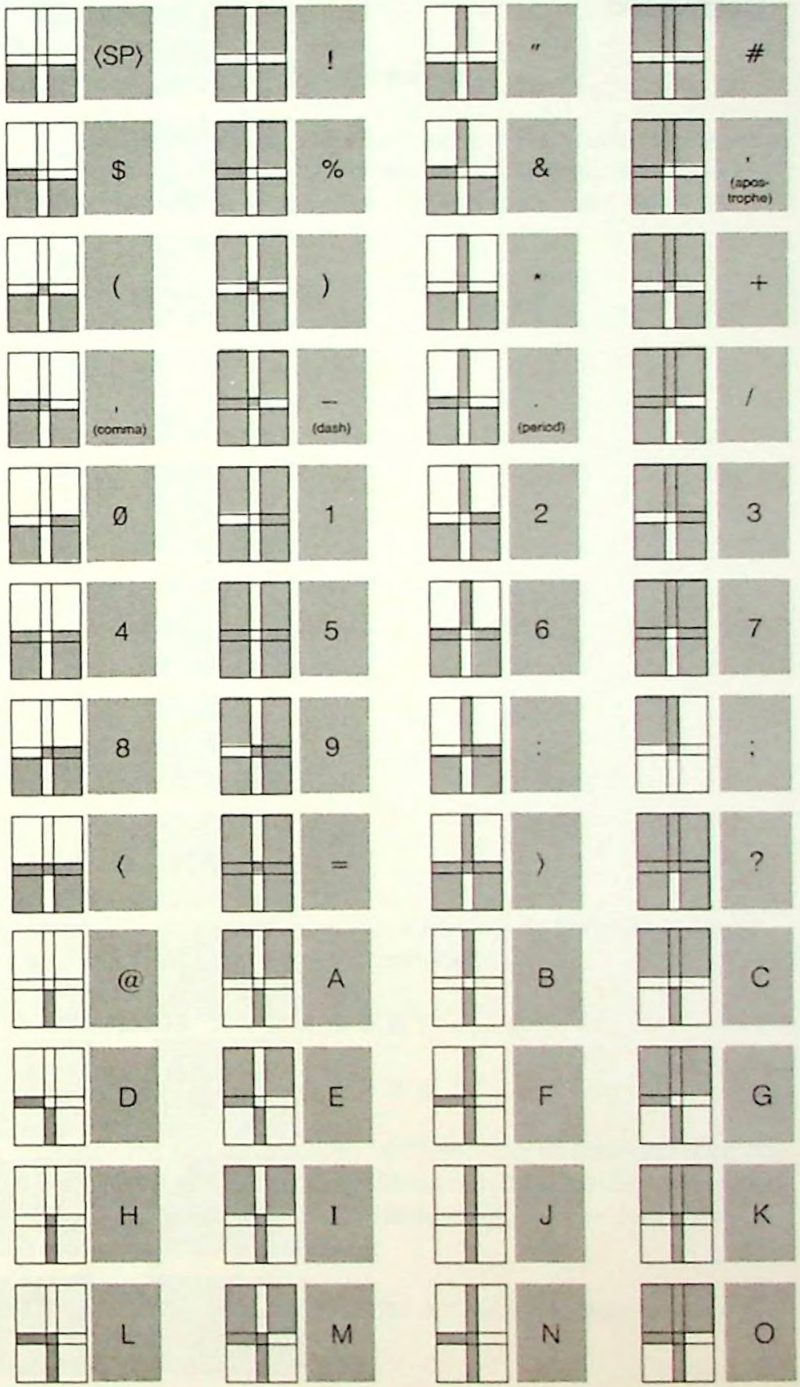
Alternate



1. The delete character will appear on the screen only if you enter it from the keyboard or if the terminal is in monitor mode.

Appendix E Continued

Standard



Appendix E Continued

Standard

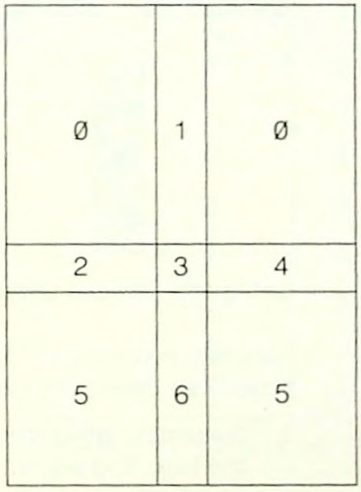


Appendix E
Continued

Graphics Character Cell Formation

Each graphics character cell consists of six areas, as shown in Figure E-1. The bit formation of each ASCII or alternate character determines which areas within the cell are turned on or off.

Figure E-1
Graphics Character Cell



Example

The ASCII character A has the following bit formation, which corresponds to the bits as shown below:

Bit formation **Ø 1 Ø Ø Ø Ø Ø 1**

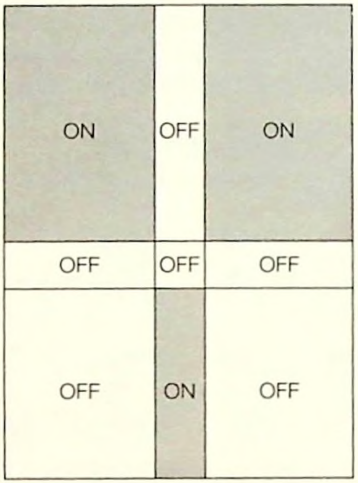
Bit number **7 6 5 4 3 2 1 Ø**

The seventh bit has no effect. All other bits correspond to specific areas, as shown in Figure E-1. Areas with bit values of 1 are turned on, as indicated by the shaded areas in Figure E-2. Areas with bit values of Ø are turned off.

To see how the ASCII character A is actually displayed on the screen, look at Figure 7-5.

Appendix E
Continued

Figure E-2
Graphics Character Cell for ASCII Character A

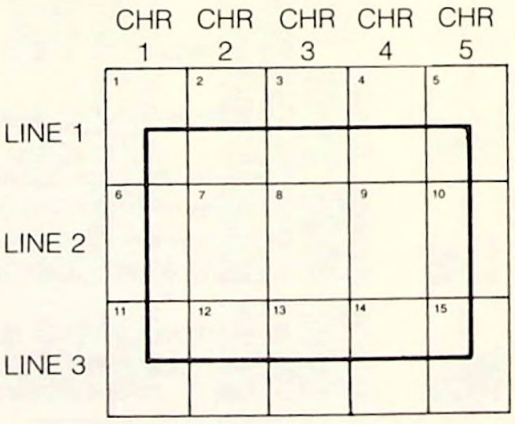


Using the Special Graphics Attribute

Let's say you want to "draw" a rectangle five columns wide and three lines deep with the graphics characters.

1. Determine which graphics characters you need to make up the box. You will need characters to form the four corners, lines for the vertical and horizontal sides, and spaces for the inside of the rectangle, as shown in Figure E-3.

Figure E-3
Drawing a Rectangle with Graphics Characters



Appendix E Continued

2. In the pages of graphics character illustrations, see which characters correspond to the graphics characters you need. Note whether they are ASCII or alternate characters. The characters needed to draw Figure E-3 are listed in Table E-1.

Table E-1
Graphics Characters Needed To Draw a Rectangle

Graphics Character	Line Number	Character Position	Corresponds To
┌	1	1	X (Standard)
─	1	2, 3, 4	((Alternate)
┐	1	5	L (Standard)
│	2	1	J (Standard)
sp	2	2, 3, 4	Space (Alternate)
│	2	5	J (Standard)
└	3	1	: (Alternate)
─	3	2, 3, 4	((Alternate)
┘	3	5	. (Alternate)

3. Move the cursor to the position where you want the upper left corner to be.

4. Enter ESC G 1 H @ to set the graphics attribute for the first line.

5. Press (ESC) (H) to activate the graphics attribute for the first line.

6. Enter the characters for line 1:

   Character 1: Enter ESC K to turn on the standard character set. Press (X) to display the ┌ character.

   Characters 2, 3, 4: Enter ESC J to turn on the alternate character set. Press (() three times to display the ─ character three times.

   Character 5: Enter ESC K to turn on the standard character set. Press (L) to display the ┐ character.

Appendix E Continued

7. Press (RETURN) and [↓] to move the cursor to the beginning of line 2.

8. Enter ESC G 1 H @ to set the graphics attribute for the second line.

9. Enter the characters for line 2:

   Character 1: Press [J] to display the ▌ character.

   Characters 2, 3, 4: Enter ESC J to turn on the alternate character set. Press the space bar three times to display the space character.

   Character 5: Enter ESC K to turn on the standard character set. Press [J] to display the ▌ character.

10. Press (RETURN) and [↓] to move the cursor to the beginning of line 3.

11. Enter ESC G 1 H @ to set the graphics attribute for the third line.

12. Enter the characters for line 3:

    Character 1: Enter ESC J to turn on the alternate character set. Press [:] to display the ▙ character.

    Characters 2, 3, 4: Press [(] three times to display the – character three times.

    Character 5: Press [.] to display the ▟ character.

Appendix F
Set Up Parameter Formats

Byte 1: Check byte (ASCII U)

Byte 2: Defines parity selection, where

CTRL @ = Odd
CTRL A = Even
CTRL B = Space
CTRL C = Mark
CTRL D = None

Byte 3: Determines the communications set up.

Bit No.	Determines	Values 0	1
1[1]	Data bits	7	8
2	Stop bits	1	2
3	Duplex modes	HDX	FDX
4	Handshaking	DTR	X-Off
5	Dialing	Tone	Pulse
6	Communications mode	Block	Duplex
7	Edit mode	Local	Duplex
8[2]	Send mode	All	To cursor

Byte 4: Controls the brightness setting and communications status.

Bit No.	Determines	Values
1[1]-4	Brightness	0-15
5,6	Data direction, where	

	Bit 5	Bit 6	Effect
	Ø	Ø	Normal
	1	Ø	Page Print
	Ø	1	Trans. Print
	1	1	Copy Print
7-8[2]	Ignore		

Byte 5: Determines the cursor setting, where

CTRL @ = None
CTRL A = Blinking block
CTRL B = Blinking underline
CTRL Q = Steady block
CTRL R = Steady underline

Byte 6: Controls miscellaneous functions

Bit No.	Determines	Values 0	1
1[1]	Time out function	Off	On
2	Synch rate	60 Hz	50 Hz
3-8[2]	Ignored		

Byte 7: Contains the screen and keyboard parameters.

Bit No.	Determines	Values 0	1
1[1]	Characters per line	80	40
2	Background	Dark	Light
3	Cursor	Wrap	No wrap
4	Keyboard	Lock	Unlock
5	Carriage return received	CR	CR/LF
6	Scroll mode	No	Yes
7	Keyclick	On	Off
8[2]	Power-up state	Start	Custom

Byte 8: Ignored

1. Least significant bit
2. Most significant bit

Appendix F Continued

Byte 9: Determines the main and printer baud rates

Bit No.	Determines
1[1]-4	Main port baud rate
5-8[2]	Printer port baud rate

Nibble values:

Ø =	19.2K	4 =	1200
1 =	9600	5 =	600
2 =	4800	6 =	300
3 =	2400	7 =	110

1. Least significant bit
2. Most significant bit

Appendix G
Specifications

Screen
9-inch nonglare CRT
Ergonomic yellow-green phosphor
50 or 60 Hz refresh rate
Screensaver feature

Display Format
40 or 80 columns
24 lines
25th status line

Character Formation
Character cell: 7 × 10 pixels
Character matrix: 5 × 7 pixels with descenders

Character Sets
128 displayable ASCII characters
128 graphics characters
32 foreign characters

Cursor Control
Home, up, down, right, left, carriage return, line feed, tab, back tab, addressable cursor

Cursor Attributes
Blinking or steady block
Blinking or steady underline
Invisible

Communications Interface
RS-232C asynchronous serial printer port
RS-232C asynchronous serial main (computer) port
Optional 300- or 300/1200-baud modem

Communications Modes
Full and half duplex
Block

Parity
Odd, even, mark, space, or none

Handshaking Protocols
X-On/X-Off control
DTR control

Baud Rates
8 independent baud rates for each port (110 to 19,200 Kb)

Printing
Page print
Copy print
Transparent print

Visual Attributes
Normal
Reverse
Half intensity
Blinking
Underline
Blank
Double wide
Double high
Graphics
Combinations of the above

Keyboard
Attached keyboard
Matted keycaps
2-key rollover with 3-key lockout
74 keys:
- 7 programmable function keys
- 20 special keys
- 47 alphanumeric keys

Power Requirements
110 or 220 volts ac
50 or 60 Hz

Dimensions
Height: 9⅝ in. (24.45 cm)
Width: 12½ in. (31.75 cm)
Depth: 15⅛ in. (38.42 cm)

Weight
Shipping: 16 lb
Net: 14 lb

Options
Telephone handset with cradle
300-baud modem
300/1200-baud modem
Carrying case

Appendix H
Pin Connector Assignments, Main and Printer Ports

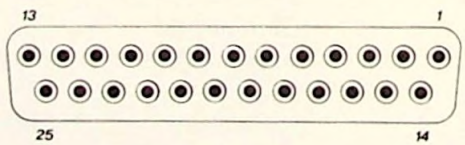
Table H-1
Pin Assignments for Main Port

Pin Number	Signal Definition
1	Protective Ground
2	Transmitted Data (output)
3	Received Data (input)
4	Request to Send (output)
5	Clear to Send (input)
6	Data Set Ready (input)
7	Signal Ground
8	Received Line Signal Detector
20	Data Terminal Ready (output)

Table H-2
Pin Assignments for Printer Port

Pin Number	Signal Definition
1	Protective Ground
3	Received Data (input)
4	Request to Send (output)
5	Clear to Send (input)
6	Data Set Ready (input)
7	Signal Ground
8	Received Line Signal Detector
20	Data Terminal Ready (output)

Figure H-1
Pin Numbers



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Quick Reference Guide

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Set cursor appearance	ESC . n
Set 80-column display	ESC u
Set 40-column display	ESC p
Alternate character set on	ESC J
Alternate character set off	ESC K
Load Ø attribute	ESC G Ø *mn*
Load 1 attribute	ESC G 1 *mn*
Half intensity on	ESC)
Half intensity off	ESC (
Activate Ø attribute mode	ESC F
Activate 1 attribute mode	ESC H
Cursor Control	
Autowrap mode on	ESC v
Autowrap mode off	ESC w
Cursor left	CTRL H
Cursor right	CTRL L
Cursor down (line feed)	CTRL J
Cursor up	CTRL K
Carriage return	CTRL M
New line	CTRL _
Home	CTRL ^
Move cursor to address	ESC = *rc*
Set tab stop	ESC 1
Clear tab stop	ESC 2
Clear all tab stops	ESC 3
Tabulate	CTRL I
Tabulate backwards	ESC I
Editing Data	
Set local edit mode	ESC k
Set duplex edit mode	ESC l
Delete line	ESC R
Insert line	ESC E
Erase to end of line	ESC T
Erase to end of screen	ESC Y
Erase entire screen	ESC + or CTRL Z or CTRL \ or ESC *

Function	Command
Data Transmission	
Set half duplex communication mode	ESC D H
Set full duplex communication mode	ESC D F
Set block communication mode	ESC B
Program line delimiter	ESC x 1 *nm*
Program text delimiter	ESC x 2 *nm*
Set DTR control	CTRL N
Set X-On/X-Off	CTRL O
Printing	
Page print command	ESC P
Copy print mode on	ESC @
Copy print mode off	ESC A
Transparent print mode on	CTRL R or ESC `
Transparent print mode off	CTRL T or ESC a
Miscellaneous Commands	
Power reset	ESC ~
Disable (lock) keyboard	ESC #
Enable (unlock) keyboard	ESC "
Sound bell	CTRL G
Self test	ESC V
Monitor mode on	ESC U or LOC ESC U
Monitor mode off	LOC ESC X
Programming Keys	
Program ⇩ SEND key, home to cursor	ESC Ø 1 7
Program ⇩ SEND key, entire screen	ESC Ø 1 s
Program EXIT key, starting state	ESC _
Program EXIT key, custom state	ESC ^
Program function keys, custom state	ESC ! *nm (name)* ^ *(data)* CTRL Y
Program directory, phone state	ESC] *n (name)* ^ *(data)* CTRL Y
Sending Information to the Computer	
Send page from home to cursor position	ESC 7
Send entire screen	ESC s
Send set up parameters	ESC Z 1
Send function key memory, custom state	ESC Z 2
Program terminal ID	ESC m *xy*
Send terminal ID	ESC M or CTRL E

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