ALTOS

IV Terminal

User's Guide

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Overview

Your new Altos IV terminal is a compact, powerful tool with many built-in features to make your work faster and easier. A full set of editing functions has been programmed into the numeric keypad. There are 57 programmable keys/key combinations and a set of special graphics characters for creating line drawings and diagrams. By following the steps described in this guide to install your new Altos IV terminal, you'll soon be able to take advantage of these features. Table 3-4 lists frequently used terminal features and their accompanying keystrokes.

Table of Contents

1 Installing the Terminal

In this chapter you'll learn how to connect the terminal to a computer (or modem) and to a serial printer.

Getting Ready

Unpack and inspect your terminal and report anything that's missing or visibly damaged to your local salesperson. You should have a terminal, a keyboard with coiled cable, and a power cord.

You'll need a 25-pin male RS-232C cable to connect the terminal to your computer or modem, and another cable if you plan to connect a printer directly to your terminal. If the connector cables supplied with your devices do not match the pin assignments in Appendix B (or if you don't have cables), see your local salesperson.

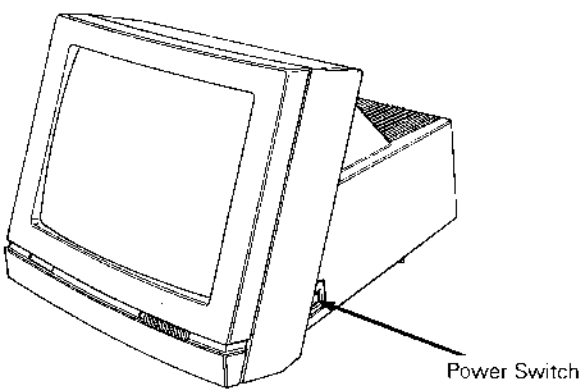
You'll need to plug the terminal into a grounded power outlet. Make sure your building's voltage (115 in the U.S.) matches the voltage shown on the back of your terminal. If it doesn't, contact your local salesperson.

Allow three inches around the terminal for ventilation.

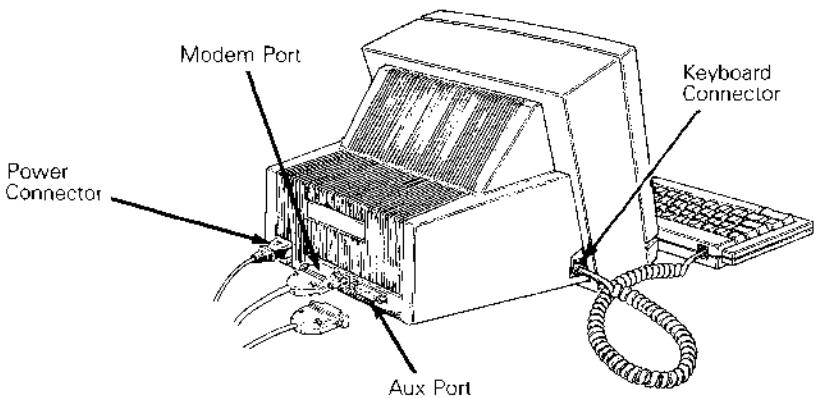
Making Connections

Follow these steps to connect the terminal to your computer and printer:

1. Press the front half of the power switch on the right side of the terminal to turn the terminal off.



2. Plug the keyboard cable into the terminal's keyboard socket on the left side and into the keyboard.
3. Connect your computer interface cable to the terminal MODEM port and to the computer RS-232C port. If you're connecting a modem, follow the modem manual instructions to connect it to your telephone.



4. If you have a serial printer, connect the printer interface cable to the terminal AUX port and to the printer RS-232C port.
5. Tighten the screws on both sides of each connector with a ⅛-inch flat-blade screwdriver to secure the connection.
6. Plug the slotted (female) end of the power cord into the three-pronged connector on the back of the terminal. Plug the pronged end into a grounded power outlet (three-slot in the U.S.). If there's no grounded outlet nearby, you can use an adapter if you ground the outlet by attaching the adapter pigtail to the outlet faceplate screw.

Turning on the Terminal

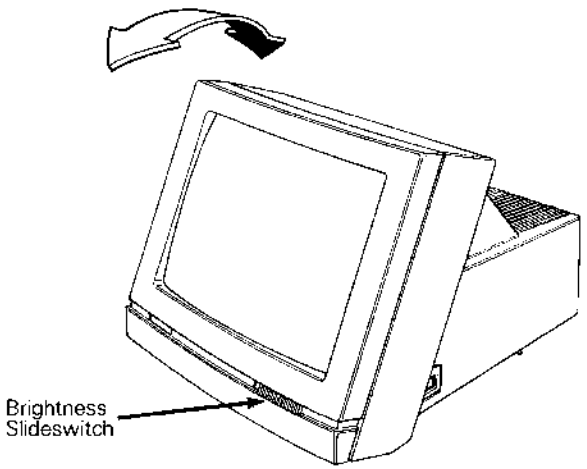
After the terminal is properly installed, turn it on by pressing the back half of the power switch on the right side of the terminal. Listen for a beep indicating that the terminal has received power.

When you turn the terminal on, it tests itself for a few seconds. If it's been on recently, the screen flashes several display patterns as the test runs. If testing uncovers a problem, a beep sounds, an error code—**A**, **C**, **K**, **P**, **X**, **Y**, **0**, or **9**—appears in the bottom right corner of the screen, and you can't operate the terminal. See Chapter 4, "Troubleshooting."

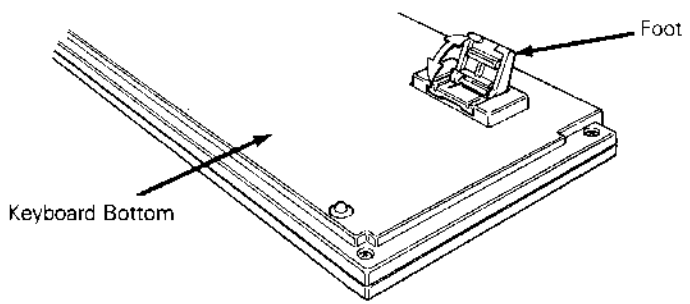
When you see the cursor in the upper left corner of the screen, the terminal has passed all of its tests and is ready for operation. Generally, the next thing to appear on the screen is the status line. This line is a bold rule at the top of the screen with the letters **FDX**, **BLK**, or **HDX** on the upper left side.

Making Comfort Adjustments

Adjust the terminal so the center of the screen is slightly below your eye level. Tilt it to find the most comfortable angle. Adjust the screen's brightness with the slideswitch at the lower right corner. The slide switch markings are for your convenience. Brightness levels may vary from terminal to terminal.



To slant the keyboard, turn it over and pull out the hinged feet. The keyboard should be at or below elbow height.



2 Setting Up the Terminal

In this chapter, you'll learn how to enter **setup** mode (a nonoperating mode) to adapt your terminal to your computer, peripherals, and application programs. The terminal cannot communicate with a computer or printer unless they communicate in a common language.

Setup Mode Levels

In the first six levels of setup mode, you choose parameters such as baud rate and compatibility, as required by your computer, peripherals, and application programs. You choose other parameters, like cursor style and carriage return, to suit your particular needs.

In the seventh level of setup mode, you can program the terminal control keys, as well as the accounting keys and function keys. Thus, you can enter frequently repeated key combinations, or even long character strings, with a single keystroke.

Default values for each parameter are set at the factory and you can always return to them. Values you **save** in memory when you leave setup mode remain in memory until you change them. Values you don't save remain in effect only until you turn off the terminal.

Several other terminal features can be turned on from the keyboard (see Chapter 3).

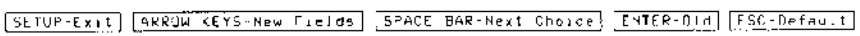
Getting Ready

The terminal's default values may not match the requirements of your computer, modem, or printer. Look in their manuals and note the requirements in the inside back cover of this manual for future reference.

Entering Setup Mode

▼ **Caution**—Don't enter setup mode while data is being transmitted between the terminal and the computer. The terminal cannot receive data during setup mode.

To enter setup mode, press the SHIFT and SETUP keys simultaneously. Any information on the screen remains frozen until you exit setup mode, and a line of boxes, called **fields**, appears at the top of the screen. These fields prompt you in setting up your terminal.



Changing Active Fields and Setup Levels

Another line of fields at the bottom of the screen (the setup line) shows parameters you can change. The **active** field is highlighted. Change the active field with the ◁ and ▷ keys. You can rotate through the seven setup levels with the △ and ▽ keys.

Changing the Setup Parameters

Press the < or ▷ key to choose the parameter you wish to change; press the spacebar to cycle through your choices. Leave your selection displayed and go on to the next parameter you want to change.

Restoring Parameters

To restore values previously saved in memory, press the ENTER key. To return all parameters to their default values, press the ESC key. To save changes you've made, press the SHIFT and SETUP keys simultaneously, then press the Y key. The changes will be saved even after you turn off the power.

The following sections describe the setup levels, their parameters, and possible settings. Default settings are listed first.

First Setup Level

[HANDSHAKE:NONE] [SCREEN:DARK] [CURSOR:BLOCK] [BLINK:ON] [MODE:FDX]

Table 2-1 First Setup Level

Parameter	Settings	Explanation
HANDSHAKE	NONE	The MODEM port has no handshaking protocol. Don't select this if you also select smooth scroll, transparent or auxiliary (copy print) print mode, or 19200 or 38400 baud.
	XON/XOFF	The MODEM port handshaking protocol is X-on/X-off.
	DTR	The MODEM port handshaking protocol is DTR.
	BOTH	The MODEM port handshaking protocol is X-on/X-off and DTR.
SCREEN	DARK	The screen has a dark background.
	LIGHT	The screen has a light background.
CURSOR	BLOCK	The cursor is a rectangle.
	LINE	The cursor is an underline.
BLINK	ON	The cursor blinks.
	OFF	The cursor is steady.

Table 2-1 Continued

Parameter	Settings	Explanation
MODE*	FDX	The communication mode is full-duplex.
	HDX	The communication mode is half-duplex.
	BLOCK	The communication mode is block.
	H-BLK	The communication mode is half-duplex block.

*See Chapter 3 for a discussion of modes.

Second Setup Level

DATA BITS:8 STOP BITS:1 PARITY:NONE

Table 2-2 Second Setup Level

Parameter	Settings	Explanation
DATA BITS	8	The MODEM and AUX ports send and receive only 8-bit characters.
	7	The MODEM and AUX ports send and receive only 7-bit characters.
STOP BITS	1	After the terminal sends a character to the computer, it sends one stop bit.
	2	After the terminal sends a character to the computer, it sends two stop bits.
PARITY	NONE	The terminal doesn't add or check for a parity bit.
	ODD	The terminal sends data with odd parity, ignoring any incoming parity bits.
	EVEN	The terminal sends data with even parity, ignoring any incoming parity bits.
	MARK	The terminal sends data with mark parity ignoring any incoming parity bits.

Third Setup Level

[BAUD RATE:9600]

Table 2-3 Third Setup Level

Parameter	Settings	Explanation
BAUD RATE	9600 19200 38400 50 75 110 134.5 150 300 600 1200 1800 2000 2400 4800	Sets baud rate (speed, expressed as bps—bits per second) at which the terminal sends and receives data through the MODEM port and sends data out the AUX port. This sets both the MODEM and AUX port baud rates.

Fourth Setup Level

[BLK END:US/CR] [AUTO NL:ON] [CR:CR] [AUTO SCRL:ON] [LOCK:CAPS] [REPEAT:ON]

Table 2-4 Fourth Setup Level

Parameter	Settings	Explanation
BLK END	US/CR	When you send a block of data, the terminal sends a unit separator (US) character at the end of each line and a carriage return (CR) character at the end of the block.
	CRLF/ETX	When you send a block of data, the terminal sends carriage return and line feed (CR LF) characters at the end of each line, and an end of text (ETX) character at the end of the block.

Table 2-4 Continued

Parameter	Settings	Explanation
AUTO NL	ON	When a character is entered at the end of a line, the cursor goes to the beginning of the next line.
	OFF	When a character is entered at the end of a line, the cursor stops.
CR	CR	The terminal interprets a received CR character as a carriage return. The RETURN and ENTER keys send a CR character.
	CRLF	The terminal interprets a received CR character as a carriage return and a line feed. The RETURN and ENTER keys send a CR character.
AUTOSCRL	ON	When you enter a character at the end of the last line, the top line of data scrolls up off the screen and is lost.
	OFF	When you enter a character at the end of the last line, the cursor goes to the top left corner of the screen.
LOCK	CAPS	The CAPS LOCK key shifts the alphabetic keys to uppercase.
	REV	Reverses the action of the SHIFT key when CAPS LOCK is on. All shifted alphabetic keys are lowercase; unshifted alphabetic keys are uppercase.
REPEAT	ON	The keys repeat if pressed for more than one-half second.
	OFF	Disables key repeat.

Fifth Setup Level

CRT SAVER:OFF | PROTECT:DIM | ATTRIBUTE:PAGE

Table 2-5 Fifth Setup Level

Parameter	Settings	Explanation
CRT SAVER	OFF	Disables screen (CRT) saver feature; data is always displayed.
	ON	If the terminal is inactive for 18 minutes, the screen blanks but data is not lost. Press the SHIFT key to restore the screen.
PROTECT	DIM	Protected characters are dim.
	NORMAL	Protected characters appear in normal video.
ATTRIBUTE	PAGE	Display attributes are active to the end of the screen or the next display attribute, whichever occurs first.
	LINE	Display attributes are active to the end of the line or the next display attribute, whichever occurs first.

Sixth Setup Level

COMPATIBLE MODE:WY50 | ENHANCE:OFF | KEYPAD:NUMERIC | FKEYS:REMOTE | TEST:OFF

Table 2-6 Sixth Setup Level

Parameter	Settings	Explanation
COMPATIBLE MODE	Altos IV	The terminal can run programs written for WY 50, WY-100, and Lear Siegler ADM-31 terminals.
	TVI910 +	The terminal can run programs written for TeleVideo 910 + terminals.
	TVI925	The terminal can run programs written for TeleVideo 925 terminals.
	ADDSVP	The terminal can run programs written for ADDS Viewpoint A2 terminals.
ENHANCE	OFF	The terminal ignores the enhanced set of commands.
	ON	The terminal recognizes an additional group of commands normally recognized by the terminal selected in Compatible mode.
KEYPAD	NUMERIC	The keypad keys function as normal numeric keys.
	APPLIC	The keypad sends application sequences.
FKEYS	REMOTE	Reprogrammed function keys send code sequences to the computer.
	LOCAL	Reprogrammed function keys send code sequences only to the terminal.
TEST	OFF	The terminal is ready for normal operation.
	ON	Enables a manufacturing test. Do not select this value.

Seventh Setup Level

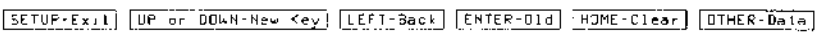
The seventh setup level allows you to program 57 keys:

- The terminal control keys (ESC, TAB, BACK SPACE, DEL, RETURN, LINE FEED, △, ▽, ◁, ▷, and HOME)
- The accounting keys on the numeric keypad (comma, minus sign, period, ENTER, and 0 through 9)
- The function keys on the top row of the keyboard

These keys can hold a total of 1024 characters (64 per key up to 1024). The first 121 characters you program are saved in memory; the rest are effective only until you turn off the terminal's power.

The terminal assigns memory space in the same order as keys are displayed in setup mode. When you reprogram a key, it may use up some of the 121 character spaces previously saved for another key. To check that a key's program is saved, press that key to see if it displays a highlighted field. You can continue reprogramming the keys until you leave the setup mode.

As soon as you enter the seventh setup level, the top line of the screen displays fields that prompt you in programming the keys



The bottom line displays the name of a key that you can program.

Each of the 57 programmable keys is displayed, one at a time beginning with the terminal control keys. The area (or field) following the key's name is highlighted. As you enter characters, they appear in the highlighted field.

■ **Note**—If you try to enter more than 64 characters for that key, the terminal beeps and the rest of the characters are ignored.

The next section describes the steps you would follow to program any of these keys.

Programming Terminal Control Keys

In this section you'll learn how to program the **terminal control** keys [ESC, TAB, BACK SPACE (BS), DEL, RETURN (RTN), LINE FEED (LF), UP (^), DOWN (v), LEFT (<), RIGHT (>), and HOME].

1. Display the key you want to program by pressing the ▽ (or △) key.
2. Type the characters you want this key to send. To enter an escape sequence, press the ESC key and the other key(s). To enter a control code, press CTRL at the same time you press the other key. If you want to add a CR character, press the RETURN key. Escape sequences, control codes, and CR characters each count as one character.

   ■ **Note**—Remember, you can enter up to 64 characters per key. The first 121 characters you enter can be saved in memory when you turn off the terminal. After you enter more than 121 characters, the characters are displayed in a dim field. These dim characters are saved only until you turn off the terminal's power.

   If you make an error, press the ◁ key to delete the previous character, or press HOME to clear the field and start again.
3. Select the next key you want to program by pressing the ▽ (or △) key.

Press the HOME key to clear any old data (previously programmed) from the key.

■ **Note**—If you clear a key and don't reprogram it, the terminal will send the key's default values.

If you've previously programmed the keys and during a subsequent programming session want to restore their previous contents which were saved in memory, press the ENTER key.

Programming Accounting Keys

The accounting keys [comma (KPD ,), minus sign (KPD −), period (KPD .), ENTER, and 0 through 9 (KPD 0 through KPD 9)] have default editing functions (see Chapter 3). While you're in the seventh setup level, the bottom line on your screen displays the field for the first accounting key, the keypad comma, shown as

KPD ,:

You can program these keys by following Steps 1 through 3 in the section "Programming Terminal Control Keys."

Programming Function Keys

The function keys on the top row of the numeric keypad (described in Chapter 3) can also be programmed. You effectively have 32 programmable function keys (8 shiftable to 16). The unshifted function keys are displayed as F1 through F16; the shifted keys are displayed as sF1 through sF16. Chapter 3 describes function keys in detail. If you do not program them, they send the default codes as listed in Table 3-3.

You can program the function keys by following Steps 1 through 3 in the section "Programming Terminal Control Keys."

Leaving Setup Mode

Press the SHIFT and SETUP keys simultaneously to leave setup mode. The status line displays

`SAVE CHANGES FOR POWER-ON? Y-YES N-NO ENTER-Old ESC-Default`

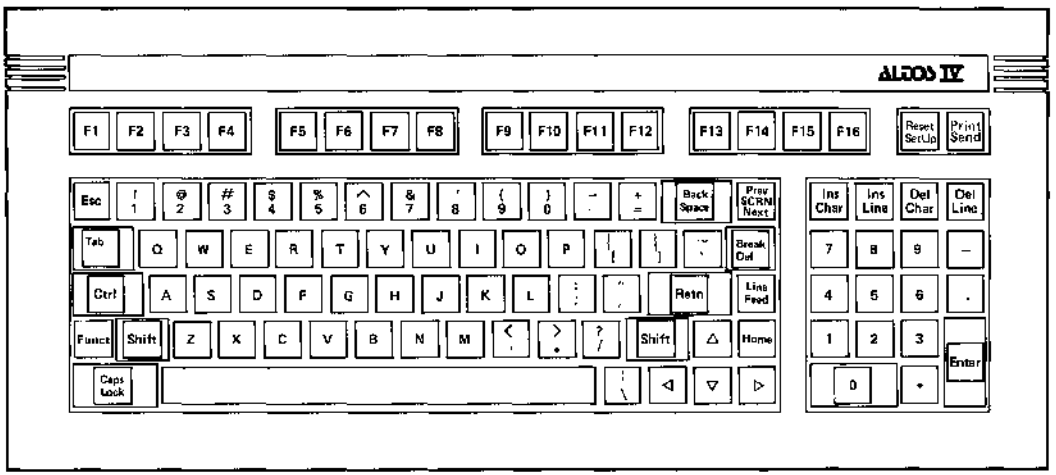
- Press the Y key to save all changes in memory. The changes will be saved even if you turn off the power or reset the terminal.
- Press the N key to leave setup mode without saving the changes. The new parameters are effective only until you turn off the power.
- Press the ENTER key to restore all parameters from memory before leaving setup mode.
- Press the ESC key to restore all parameters to their factory default values. Then press Y to save these values, if desired.

3 Controlling the Terminal

This chapter describes how to control the terminal from the keyboard.

Basic Keyboard Controls

The alphanumeric keys are identical to those on a standard typewriter. Keys that control terminal functions (such as RETURN and TAB) are dark grey.



To reprogram the terminal control keys, see Chapter 2. The following table describes the default functions of the terminal control keys when the terminal's not in setup mode. The **local** keys, CAPS LOCK and RESET SETUP, act directly at the terminal. All the other keys (called **remote** keys) send ASCII codes that your computer's programs may reinterpret. If you are in block mode, the code is sent directly to the terminal and produces the effects described in Table 3-1.

■ **Note**–Keep in mind that pressing them will not produce the described effect unless your program recognizes the codes sent by these keys.

Table 3-1 The Keyboard

Key	Description
ARROW KEYS	Move the cursor in the direction of the arrows. Press the CTRL and △ or ▽ keys to change the smooth scroll speed. △ sends VT; ▽ sends LF; ◁ sends BS; ▷ sends FF.

Table 3-1 Continued

Key	Description
BACK SPACE	Moves the cursor left one position without erasing data. Sends BS.
BREAK	Sends a BREAK signal for a period of 250 milliseconds. The effect of this depends on your computer.
TAB	Moves the cursor to the next tab stop. At the end of the line, the cursor moves to the first tab stop in the next line. Pressed with SHIFT, TAB sends ESC I to the host computer.
DEL CHAR	Has no effect in block mode. In most programs, deletes the character left of the cursor and moves the cursor left one position Sends DEL.
DEL LINE	Deletes the entire line containing the cursor. The lines below the deleted line are moved up one line. The cursor is placed at the beginning of the next lower line. A blank line is inserted as the bottom line.
CAPS LOCK	Turns caps lock mode off and on, and displays **CAPS on** the status line. Capitalizes alphabetic keys only. Press the SHIFT key to enter shifted symbols (e.g., ! and @). If you select REV in setup mode, shifted alphabetic keys display lowercase letters.
CTRL	Pressed with another key, the CTRL key sends a control code. Changes operation of some keys. Hold down CTRL while pressing the other key.
ENTER	If the CR parameter in setup mode is CR, ENTER moves the cursor to the beginning of the same line. If the CR parameter is CRLF, ENTER moves the cursor to the beginning of the next line. Sends CR.
ESC	Introduces an escape sequence. See Appendix C. Sends ESC.
FUNCT	Pressed with another key, FUNCT sends SOH, the other key's code, and CR.

Table 3-1 Continued

Key	Description
HOME	Moves the cursor to the top left corner of the screen (called the home position). Sends RS.
INS CHAR	Places a blank space at the current cursor position, moving all characters to the right one position. This key works on one character at a time; displaced characters do not wrap to the next line. A character at the right margin position is lost.
INS LINE	This key inserts a line of blanks at the line containing the cursor. The original line containing the cursor and all lines below are moved down one line. The cursor is placed at the beginning of the new blank line. The original bottom line is moved off the screen.
LINE FEED	Moves the cursor down one line in the same column. Sends LF.
PREV SCREEN NEXT (shifted)	When you press this key along with the shift key, you can view the previous screen of text.
PREV SCREEN NEXT (unshifted)	By pressing this key alone, you can view the next screen of text.
PRINT/ SEND	When pressed with shift, this key prints the screen contents (from home to the current cursor position) to the AUX port.
RETURN	If the CR parameter in setup mode is CR, RETURN moves the cursor to the beginning of the same line. If the CR parameter is CRLF, RETURN moves the cursor to the beginning of the next line. Sends CR.
RESET SETUP	SETUP puts the terminal into setup mode and displays the first-level setup line and the setup prompts (described in Chapter 2). Pressed with SHIFT, this key resets the terminal, and unlocks the keyboard if locked.

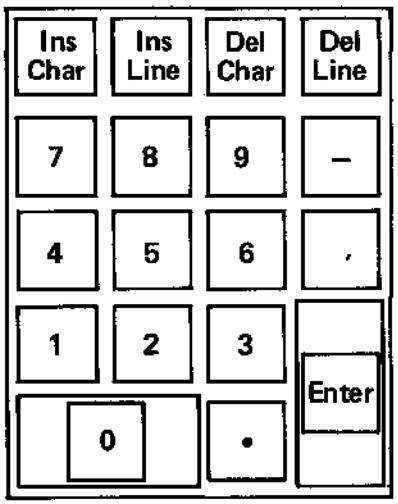
Table 3-1 Continued

Key	Description
SHIFT	Selects the upper character shown on a key, changes operation of some special keys, and capitalizes alphabetic characters. Unless pressed simultaneously with another key, SHIFT has no effect.

■ **Note**–Most keys repeat if you hold them down more than a half-second. You can disable this feature in setup mode.

Numeric Keypad

The numeric keypad shown here consists of two types of keys: accounting keys and editing keys.



Accounting Keys

Unless you've already reprogrammed the accounting keys, they have two operating modes: numeric data entry and editing functions.

If you want the numeric keys to perform the editing functions either change the KEYPAD parameter to APPLIC (application) or press the CTRL key with the appropriate keypad key. For example, if you want to delete a line of text from the screen while the terminal's in NUMERIC keypad mode, press the CTRL and 5 keys at the same time or press the Del Line Key. If you want to clear a line of text for example, press the CTRL key and 9 key while the terminal is in NUMERIC keypad mode.

■ **Note**--If you've reprogrammed the accounting keys (as described in Chapter 2), they send whatever you've programmed into them. If you want them to send the default functions, press the SHIFT or CTRL key with the keypad key.

Table 3-2 Editing Functions of the Numeric Keypad

Function	Predefined Key	Description
INS CHAR 7	Yes	Inserts a space at the cursor position, moving all succeeding characters right one position. Sends ESC Q.
INS LINE 4	Yes	Inserts a line of spaces below the cursor, pushing data below the inserted line down one line. The bottom line of data is lost. Sends ESC E.
SEND 1	Yes	Sends a block of data (all characters from HOME up to and including the cursor position) to the computer. Sends ESC 7.
PRINT 0	Yes	Sends the screen's contents to the printer attached to the AUX port. The data is formatted exactly as shown on the screen. Pressed with the SHIFT key, it sends formatted data to the printer.
DEL CHAR 8	Yes	Deletes the character at the cursor position, moving the character on the right into that position. Sends ESC W.

Table 3-2 Continued

Key	Function	
DEL LINE 5	Yes	Deletes the entire line containing the cursor, moving the lines below it up one line. Sends ESC R.
COPY PRT 2	No	Turns copy print mode on and off. (Sometimes called extension/auxiliary print mode.) Pressed with the SHIFT key, it turns transparent print mode on and off.
CLR LINE 9	No	Replaces all data from the cursor to the end of the line with space characters. Pressed with the SHIFT key, it replaces the data with null characters. Sends ESC T.
CLR PAGE	No	Replaces all data from the cursor to the end of the screen with space characters. Pressed with the SHIFT key, it replaces the data with null characters. Sends ESC Y.
PREV SCRN 3	Yes	Returns the cursor to the position it last occupied in the other screen area (if the program has divided the screen into upper and lower areas). Sends ESC J.
NEXT SCRN .	Yes	Moves the cursor to the position it last occupied in the other screen area if the program has divided the screen into two areas (upper and lower). Sends ESC K.
REPLACE -	No	Typed characters write over existing characters. Sends ESC r.
INSERT ,	No	Characters to the right of the cursor move right as you type. Sends ESC q.

Function Keys

The sixteen function keys, F1 through F16, occupy the top row of the keyboard.

Although 16 function keys are labeled as such, you effectively have 32. All 16 function keys can be shifted giving you a total of 32 function keys.

Function keys send a sequence of codes (which can include characters, control codes, and escape sequences) to the computer. What the computer does when it receives this sequence depends entirely on how the computer and the program it's running at the time interpret these characters. Unless you reprogram the function keys (as described in Chapter 2), they'll send the codes listed in Table 3-3.

Table 3-3 Default Codes for Function Keys

Key	Code Sequence Sent	Key	Code Sequence Sent
F1 unshifted	SOH @ CR	F9 unshifted	SOH H CR
F1 shifted	SOH ` CR	F9 shifted	SOH h CR
F2 unshifted	SOH A CR	F10 unshifted	SOH I CR
F2 shifted	SOH a CR	F10 shifted	SOH i CR
F3 unshifted	SOH B CR	F11 unshifted	SOH J CR
F3 shifted	SOH b CR	F11 shifted	SOH j CR
F4 unshifted	SOH C CR	F12 unshifted	SOH K CR
F4 shifted	SOH c CR	F12 shifted	SOH k CR
F5 unshifted	SOH D CR	F13 unshifted	SOH L CR
F5 shifted	SOH d CR	F13 shifted	SOH l CR
F6 unshifted	SOH E CR	F14 unshifted	SOH M CR
F6 shifted	SOH e CR	F14 shifted	SOH m CR
F7 unshifted	SOH F CR	F15 unshifted	SOH N CR
F7 shifted	SOH f CR	F15 shifted	SOH n CR
F8 unshifted	SOH G CR	F16 unshifted	SOH O CR
F8 shifted	SOH g CR	F16 shifted	SOH o CR

Terminal Features

Table 3-4 lists additional terminal features you can change from the keyboard. To turn the feature on or off, press the listed keys simultaneously.

Table 3-4 Terminal Features

Feature	Key Sequence
Partially reset terminal (unlock keyboard, turn all print modes off)	CTRL SETUP
Unlock keyboard	SHIFT
Clear screen to nulls	CTRL HOME
Increase scrolling rate	CTRL ∧
Decrease scrolling rate	CTRL ∨
Turn keyclick on and off	CTRL ENTER
Turn monitor mode on and off	CTRL <
Turn status line display on and off	CTRL >
Turn block mode on and off	CTRL BACKSPACE
Turn copy print mode on and off	CTRL KPD 2
Turn transparent print mode on and off	CTRL SHIFT KPD 2
Print unformatted screen	CTRL KPD 0
Print formatted screen	CTRL SHIFT KPD 0

Only keyclick and caps lock can be changed while the terminal is in setup mode. The terminal must be in normal operating mode to set the other features listed. To save these changes, follow the two steps below.

1. Press the SHIFT and SETUP keys twice to enter and leave setup mode.
2. Press Y to save the changes.

Communication Modes

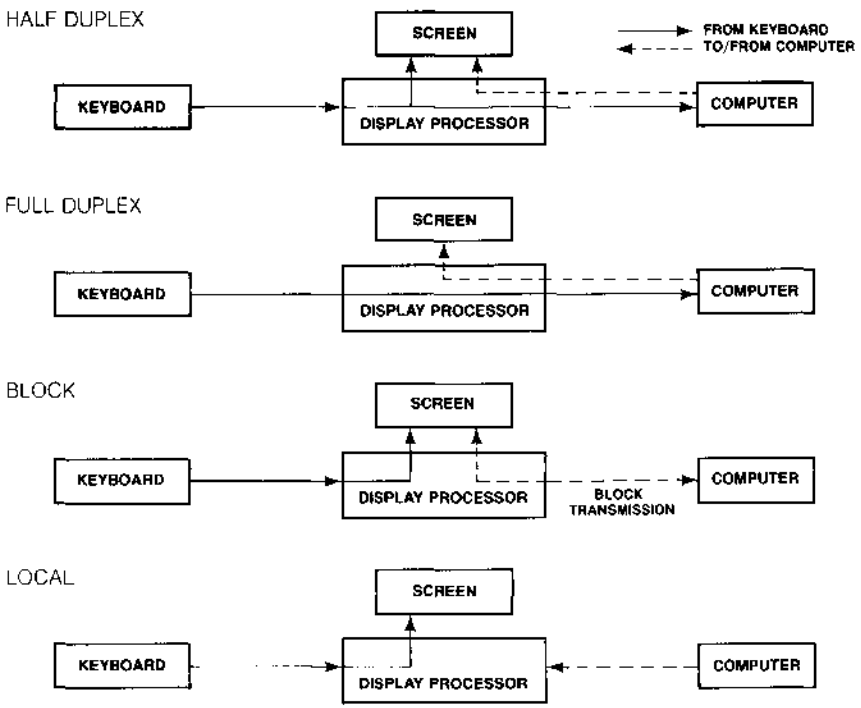
Four modes of communication are possible between the terminal and the computer: full duplex, half duplex, block, and half-duplex block. The following figure shows how the terminal handles data in each mode.

Changing Communication Modes

Select the communication mode in the first setup level.

Full-Duplex Mode

Full duplex is the default mode. In this mode, the terminal sends keyboard entries only to the computer. The computer may send data back to the terminal, where it's displayed on the screen. While the terminal is in full-duplex mode, **FDX** appears on the status line.



Half-Duplex Mode

In half-duplex mode, data goes to the computer and the terminal at the same time. While the terminal is in half-duplex mode, **HDX** appears on the status line.

Block Mode

In block mode, keyboard entries go only to the terminal's screen. When a block of text is ready, you can send it to the computer with the SEND key. Data from the computer is also displayed on the screen. While the terminal is in block mode, **BLK** appears on the status line.

Half-Duplex Block Mode

Half duplex block mode is the same as block mode except the terminal follows Request-To-Send (RTS) and Clear-To Send (CTS) handshaking protocol. While the terminal is in half-duplex block mode, **BLK** appears on the status line.

Monitor Mode

In monitor mode, the terminal displays all characters, including control characters, but does not act on them. This is useful for debugging programs.

4 Troubleshooting

Often a suspected terminal malfunction is something you can easily fix. Read this chapter before placing a service call. The symptoms are shown in bold type, followed by suggested solutions.

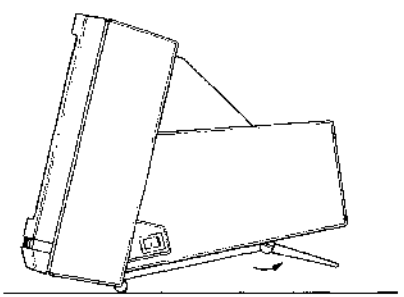
- **Warning**—We are NOT suggesting that you try to fix internal terminal problems. DO NOT open the terminal case unless you are a qualified service technician. While the case is open, dangerous voltages are exposed (even after the power has been turned off).

Symptoms and Solutions

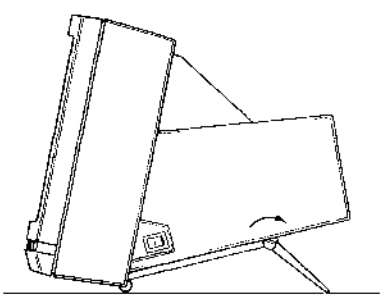
Terminal doesn't maintain its tilt angle with all cables attached.

- **Warning**—Do not disassemble the terminal's foot mechanism because it's spring-loaded under extremely high tension.

Adjust the foot spring with a flat-blade screwdriver, not more than one-quarter turn at a time.



If the foot does not extend when the terminal is tilted forward, turn the screw counterclockwise to loosen it.



If the foot stays extended so the terminal is too upright, turn the screw clockwise to tighten it.

Power switch is on, but display is blank.

Turn the power switch off and on. Did the terminal beep? If not, make sure the power cord is connected both at the terminal and at the electrical outlet.

Terminal beeps but you can't see cursor.

Adjust the brightness slideswitch, sliding it to the far right.

Screen goes blank while the terminal is on.

This is a normal condition if the screen saver parameter (CRT SAVER) is on, and the terminal is inactive for 18 minutes. Press the SHIFT key to bring back the display without changing the data.

Display doesn't respond when you press a key.

If **LOCK** appears in the status line, the keyboard is locked. Press the SETUP key.

Press the CAPS LOCK key several times. If **CAPS** does not appear, make sure the keyboard is properly attached and functioning. If **CAPS** appears, the keyboard is working, but not communicating with the computer. Go into setup mode and make sure the setup parameters match your computer. (See the next condition.)

The computer doesn't respond when you type on the keyboard.

Make sure the computer and keyboard cable connections are correct. See Chapter 1.

Check your setup parameters. Select FDX mode and make sure the handshake, baud rate, data bit, stop bit, and parity bit parameter values match your computer's requirements.

When the terminal is turned on, error codes A, C, K, X, or Y appear at the lower right side of the screen.

Press the SHIFT and SETUP keys simultaneously to stop the manufacturing self-test. If the error code continues, simultaneously press SHIFT and SETUP twice more, and press Y to restore the factory default values.

When the terminal is turned on, error codes 0, 9, or P appear at the lower right side of the screen.

Simultaneously press the SHIFT and SETUP keys, and then press the Y key. If the error code continues, the terminal needs to be serviced by a qualified technician.

Nonsense characters (garbage) appear on the screen.

Match the terminal's baud rate, parity bit, stop bit, and data bit parameters with the computer (as explained in Chapter 2). Also, the pin connections listed in Appendix B must match your computer's requirements.

Every character appears twice.

Select FDX (full duplex) for the MODE setup parameter.

The computer responds to commands but data typed does not appear on the screen.

Select HDX (half-duplex) for the MODE setup parameter.

A Specifications

Screen	14-inch (diagonal), flat-screen, P-31 green phosphor cathode-ray tube
Display Format	26 lines (1 status line, 24 data display lines, 1 setup line), 80 columns; horizontally-split screen
Character Formation	7 × 10 matrix in a 10 × 12 cell; lowercase descenders with two descending dots
Character Set	US ASCII
Displayed Characters	128 characters (96 displayable ASCII characters, 16 control code symbols, and 16 special graphics characters)
Cursor Control	Home, up, down, left, right, tab, return, enter, and linefeed
Cursor Attributes	Block/line; blinking/steady; off
Communications Interfaces	2 EIA RS-232C ports, AUX and MODEM
Communications Modes	Block, half-duplex, full-duplex, and half-duplex block
Word Structure	7 or 8 data bits; 1 or 2 stop bits
Parity	Odd, even, mark, or none
Handshake Protocol	X-on/X-off, DTR, both, or none (terminal does not recognize X-on/X-off handshake sent from a computer)
Baud Rates	MODEM and AUX ports (not independent): 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600, 19.2K, and 38.4K
Nonhidden Video Attributes	Dim, blink, blank, underline, and reverse (combinable)
Protect Video Attributes	Dim and normal

Keyboard	Low-profile detached with 6-foot (1.83m) coiled cable; two-position tilt (low position meets DIN specification) 101 keys arranged in typewriter, numeric pad, and function key sections. 16 user programmable function keys providing 32 separate codes. N-key rollover
Fields	Protected and unprotected
Power Requirements	115 VAC, 60 Hz (U.S.); 230 VAC, 50 Hz (international)
Net Weight	19 pounds (8.6 kg)

Dimensions	Height		Width		Depth	
	in	cm	in	cm	in	cm
Terminal	11.5	25.4	12.5	29.2	13	33.0
Keyboard	2.25	5.7	16.37	41.6	5.5	14.0

B Connector Pin Assignments

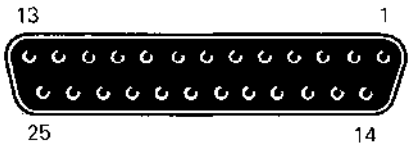


Table B-1 MODEM Port Connector Pin Assignments (DTE)

Pin	Signal	EIA	Direction	Comments
1	Frame Ground	AA		
2	Transmit Data	BA	Out	
3	Receive Data	BB	In	
4	Request to Send	CA	Out	Not required
5	Clear to Send	CB	In	Not required
7	Ground	CF		
8	Data Carrier Detect	CD	In	Not required
20	Data Terminal Ready		Out	Must be connected if you select DTR handshake.

Table B-2 AUX Port Configuration (DCE)

Pin	Signal	EIA	Direction	Comments
1	Frame Ground	AA		
2	Not used			
3	Receive Data	BB	Out	
4	Not used			
5	Clear to Send	CB	Out	Always high
6	Data Set Ready	CC	Out	Always high
7	Ground	AB		
8	Data Carrier Detect	CF	Out	Always high
11	Data Terminal Ready	CD	In	*
20	Data Terminal Ready	CD	In	*

*The terminal recognizes the printer as busy when pin 11 (or 20) is low. Do not connect both pin 11 and pin 20; connect only one of these pins.

Table B-3 Typical Modem Pin Assignments

Terminal (DTE)		Hayes Smartmodem 1200 (DCE)
1	———	1
2	———	2
3	———	3
7	———	7
20	———	20

We recommend that pins 6 and 8 be disconnected. They are modem protocols that may lock up the terminal.

■ **Note**—Front panel switch settings for the Hayes Smartmodem 1200 are DUDUDDUD (D = down, U = up).

Table B-4 Sample Serial Printer Connections

Terminal	Epson FX80 Printer	Terminal	Okidata Printer
1	1	1	1
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
20	20	11	11

For all printer connections, you must use the printer's serial port. The terminal will not operate properly with a parallel interface.

C Quick Reference Guide

Table C-1 contains the command sequences for your terminal. Variables within an escape sequence are shown in italics. For example, the command to set display attributes is shown as

ESC A *n attr*

where *n* represents the screen area and *attr* represents the display attribute. Table C-2 provides a list of the variables for the display attributes. Table C-3 lists segment, line, and column codes for addressing the cursor. Table C-4 contains graphics character codes.

The following table describes command sequences performed by the Altos IV in Altos IV compatible mode with enhanced mode off.

Table C-1 Command Sequences

Command	Sequence
Transmit acknowledge	CTRL E
Sound bell	CTRL G
Move cursor left one column	CTRL H
Tabulate cursor	CTRL I or ESC i
Move cursor down one line in current column, scroll up if at bottom line	CTRL J
Move cursor up in same column, if at top line wrap to bottom	CTRL K
Move cursor right one column	CTRL L
Move cursor to column one	CTRL M
Unlock keyboard	CTRL N or ESC "
Lock keyboard	CTRL O or ESC #
Copy print mode on	CTRL R
All print modes off	CTRL T
Move cursor down one line, no scroll or wrap	CTRL V
Transparent print mode on (enhance mode must be on)	CTRL X
Home cursor, clear unprotected characters to spaces	CTRL Z or ESC ;

Table C-1 Continued

Command	Sequence
Initiate escape sequence	CTRL [
Home cursor	CTRL ^
	or ESC {
Move cursor to column one of next line with scroll	CTRL _
Send terminal identifier Response: 30 CR	ESC SPACE
Clear unprotected characters to display attribute	ESC ! *attr*
Unlock keyboard	ESC "
	or CTRL N
Lock keyboard	ESC #
	or CTRL O
Turn protect mode on	ESC &
Turn protect mode off	ESC '
Turn write-protect mode off	ESC (
Turn write-protect mode on	ESC)
Home cursor, clear screen to nulls, turn off protect and write-protect modes	ESC *
Home cursor, clear screen to space characters, turn off protect and write-protect modes	ESC +
Home cursor, clear screen to protected spaces, turn off protect and write-protect modes	ESC ,
Move cursor to segment and address	ESC - *seg line col*
Clear unprotected data to a specified character (write-protected if write-protect on)	ESC . *char*
Read active segment number and cursor address Response: *seg line col*	ESC /
Clear all tab stops, turn off tab mode	ESC 0
Set a tab stop at cursor column, turn on tab mode	ESC 1
Clear tab stop at cursor	ESC 2

Table C-1 Continued

Command	Sequence
Send unprotected line	ESC 4
Send unprotected page	ESC 5
Send entire line	ESC 6
Send page	ESC 7
Place Start-of-Text (STX) character at cursor	ESC 8
Place End-of-Text (ETX) character at cursor	ESC 9
Home cursor, clear unprotected characters to nulls	ESC :
Home cursor, clear unprotected characters to spaces (protected if write-protect mode is on)	ESC ; or CTRL Z
Address cursor to *line column*	ESC = *line col*
Read cursor address	ESC ?
Response: *line col* CR	or ESC b
Response: *ll* R *cc* C	
Print formatted unprotected page	ESC @
Set display field attributes	ESC A *n attr*
n Screen area	
0 Data area	
1 Label line (bottom line)	
2 Terminal message field (on top line)	
3 Computer message field (on top line)	
Turn block mode on	ESC B
Turn block mode off	ESC C
Turn full-duplex mode on	ESC D F
Turn half-duplex mode on	ESC D H
Insert line of space characters	ESC E
Program and display computer message on status line	ESC F *message* CR
Set character display attribute	ESC G *attr*
Display single special graphics character	ESC H *x*
Turn special graphics mode on	ESC H CTRL B
Turn special graphics mode off	ESC H CTRL C
Backtab	ESC I
Activate other data segment	ESC J or ESC K

Table C-1 Continued

Command	Sequence
Print unformatted page	ESC L
	or ESC p
Send character at cursor position	ESC M
Turn autoscrolling mode off	ESC N
Turn autoscrolling mode on	ESC O
Print formatted page	ESC P
Insert one space character	ESC Q
Delete a line	ESC R
Send block of unprotected characters	ESC S
Clear from cursor to end of line with spaces	ESC T
Turn monitor mode on	ESC U
Protect cursor column	ESC V
Delete cursor character	ESC W
Turn monitor mode off	ESC X
	or ESC u
Clear from cursor to end of segment with spaces	ESC Y
Address cursor to *line*	ESC [*line*
Activate upper data segment	ESC]
	or ESC c
Set display attributes	ESC ^ *n*

n	Attribute
0	True reverse screen off
1	True reverse screen on
2	Attribute active to end of page
3	Attribute active to end of line

Set scrolling speed and type		ESC ` *c*
c	Scrolling Type	Speed (lps)
@	Jump scroll (default)	
<	Smooth scroll	1
–	Smooth scroll	2
G	Smooth scroll	3
>	Smooth scroll	4
?	Smooth scroll	8
H	Smooth scroll	15
I	Smooth scroll	20

Table C-1 Continued

Command	Sequence
Set protected character attribute	ESC ' *c*
c Attribute	
7 Dim (default)	
A Normal	
Screen display off	ESC ' 8
Screen display on (default)	ESC ' 9
Set cursor display features	ESC ' *n*
n Cursor display	
0 Off	
1 On	
2 Steady block cursor	
5 Blinking block cursor	
4 Steady line cursor	
3 Blinking line cursor	
Address cursor to *line column*	ESC a *ll* R *cc* C
Read cursor address (active segment)	ESC b
Response: *ll* R *cc* C	
Tabulate cursor	ESC i
	or CTRL I
Move cursor up in same column, scroll down if at top line (reverse linefeed)	ESC j
Turn local edit mode on	ESC k
Turn remote edit mode on	ESC l
Print unformatted page	ESC p
	or ESC L
Turn insert mode on	ESC q
Turn insert mode off	ESC r
Send block of data	ESC s
Clear the line to nulls	ESC t
Turn monitor mode off	ESC u
	or ESC X
Split screen horizontally	ESC x 1 *line*
Redefine screen as one segment	ESC x 0
Clear data segment to nulls	ESC y

Table C-1 Continued

Command	Sequence
Program/display a function key label	ESC z *field label* CR
Clear a function key label	ESC z *field* CR

field

key	unshifted	shifted	key	unshifted	shifted
F1	0	P	F9	8	X
F2	1	Q	F10	9	Y
F3	2	R	F11	:	Z
F4	3	S	F12	;	[
F5	4	T	F13	<	\
F6	5	U	F14	=	]
F7	6	V	F15	>	^
F8	7	W	F16	?	-

Program a programmable key — ESC z *key sequence* DEL

Clear a programmable key — ESC z *key* DEL

key	unshifted	shifted	key	unshifted
F1	@	`	RIGHT	.
F2	A	a	HOME	/
F3	B	b	KPD ,	p
F4	C	c	KPD -	q
F5	D	d	KPD .	r
F6	E	e	ENTER	s
F7	F	f	KPD 0	t
F8	G	g	KPD 1	u
F9	H	h	KPD 2	v
F10	I	i	KPD 3	w
F11	J	j	KPD 4	x
F12	K	k	KPD 5	y
F13	L	l	KPD 6	z
F14	M	m	KPD 7	{
F15	N	n	KPD 8	¦
F16	O	o	KPD 9	}
ESC	*space*			
TAB	!			
BACKSPACE	"			
BREAK/DEL	#			
RETURN	$			
LINEFEED	%			
UP	+			
DOWN	,			
LEFT	-			

Program/display unshifted label line — ESC z (*label* CR

Table C-1 Continued

Command	Sequence
Program shifted label line	ESC z) *label* CR
Display shifted label line	ESC z P CR
Turn off shifted label line	ESC z DEL
Clear entire unshifted label line	ESC z (CR
Clear entire shifted label line	ESC z) CR
Home cursor	ESC { or CTRL ^
Activate lower data segment	ESC }
Set compatibility and enhance modes	ESC ~ *n*
n mode	
" Altos IV	
# TeleVideo 910+	
$ TeleVideo 925	
% ADDSVP	
Space Enhance mode off	
! Enhance mode on	

Table C-2 lists variables for command sequences requiring display attributes

Table C-2 Display Attributes

Variable	Attribute
(space)	Space code
0	Normal
1	Blank (no display)
2	Blink
3	Blank
4	Reverse
5	Reverse and blank
6	Reverse and blink
7	Reverse, blink, and blank
8	Underscore
9	Underscore and blank
:	Underscore and blink
;	Underscore, blink, and blank
<	Underscore and reverse
=	Underscore, reverse, and blank
>	Underscore, reverse, and blink
?	Underscore, reverse, blink, and blank
p	Dim

Table C-2 Continued

Variable	Attribute
q	Dim and blank
r	Dim and blink
s	Dim, blink, and blank
t	Dim and reverse
u	Dim, reverse, and blank
v	Dim, reverse, and blink
w	Dim, reverse, blink, and blank
x	Dim and underscore
y	Dim, underscore, and blank
z	Dim, underscore, and blink
{	Dim, underscore, blink, and blank
	Dim, underscore, and reverse
}	Dim, underscore, reverse, and blank
~	Dim, underscore, reverse, and blink
DEL	Dim, underscore, reverse, blink, and blank

Table C-3 shows line and column codes for *line col* parameters. When line and column are shown as *ll ccc,* enter the decimal line or column number relative to home. For segment codes shown as *seg,* choose 0 for upper or 1 for lower.

The ADDS-VP line and column codes are listed here for easy reference only.

Table C-3 Line and Column Codes

Line	Altos IV **TVI910+/925 Line Code *line***	Altos IV **TVI910+/925 Column Code *col***	**ADDS-VP Line Code *line***	**ADDS-VP Column Code *col***
1	(space)	(space)	CTRL @	CTRL @
2	!	!	CTRL A	CTRL A
3	"	"	CTRL B	CTRL B
4	#	#	CTRL C	CTRL C
5	$	$	CTRL D	CTRL D
6	%	%	CTRL E	CTRL E
7	&	&	CTRL F	CTRL F

Table C-3 Continued

Line	Altos IV TVI910+/925 Line Code *line*	Altos IV TVI910+/925 Column Code *col*	ADDS-VP Line Code *line*	ADDS-VP Column Code *col*
8	'	'	CTRL G	CTRL G
9	(	(	CTRL H	CTRL H
10	)	)	CTRL I	CTRL I
11	*	*	CTRL J	CTRL P
12	+	+	CTRL K	CTRL Q
13	,	,	CTRL L	CTRL R
14	-	-	CTRL M	CTRL S
15	.	.	CTRL N	CTRL T
16	/	/	CTRL O	CTRL U
17	0	0	CTRL P	CTRL V
18	1	1	CTRL Q	CTRL W
19	2	2	CTRL R	CTRL X
20	3	3	CTRL S	CTRL Y
21	4	4	CTRL T	(space)
22	5	5	CTRL U	!
23	6	6	CTRL V	"
24	7	7	CTRL W	#
25		8		$
26		9		%
27		:		&
28		;		'
29		<		(
30		=		)
31		>		0
32		?		1
33		@		2
34		A		3
35		B		4
36		C		5
37		D		6
38		E		7
39		F		8
40		G		9
41		H		@
42		I		A

Table C-3 Continued

Line	Altos IV **TVI910+/925 Line Code *line***	Altos IV **TVI910+/925 Column Code *col***	**ADDS-VP Line Code *line***	**ADDS-VP Column Code *col***
43		J		B
44		K		C
45		L		D
46		M		E
47		N		F
48		O		G
49		P		H
50		Q		I
51		R		P
52		S		Q
53		T		R
54		U		S
55		V		T
56		W		U
57		X		V
58		Y		W
59		Z		X
60		[		Y
61		\		\
62		]		a
63		^		b
64		_		c
65		`		d
66		a		e
67		b		f
68		c		g
69		d		h
70		e		i
71		f		p
72		g		q
73		h		r
74		i		s

Table C-3 Continued

Line	Altos IV TVI910+/925 Line Code *line*	Altos IV TVI910+/925 Column Code *col*	ADDS-VP Line Code *line*	ADDS-VP Column Code *col*
75		j		t
76		k		u
77		l		v
78		m		w
79		n		x
80		o		y

The command ESC H *x* lets you make graphs, charts, and other line-drawn figures with a set of 16 special graphics characters.

Table C-4 Special Graphics Character Codes

Graphic Character	*x*	Graphic Character	*x*
┬	0	┼	8
└	1	┤	9
┌	2	─	:
┐	3	▒	;
├	4	═	<
┘	5	┴	=
│	6	‖	>
▉	7	▓	?

D Control Codes

Press CTRL with the associated alphanumeric key (control key) to enter the control code.

Table D-1 Control Codes

Control Code	ASCII Hex Code	Display Symbol	Control Key
NULL	00	(blank)	@ or `
SOH	01	S_H	A or a
STX	02	S_X	B or b
ETX	03	E_X	C or c
EOT	04	E-	D or d
ENQ	05	E_Q	E or e
ACK	06	A_K	F or f
BEL	07	B_I	G or g
BS	08	B_S	H or h
HT	09	H_T	I or i
LF	0A	L_F	J or j
VT	0B	V_T	K or k
FF	0C	F_F	L or l
CR	0D	C_R	M or m
SO	0E	S_O	N or n
SI	0F	S_I	O or o

Table D-1 Continued

Control Code	ASCII Hex Code	Display Symbol	Control Key
DLE	10	⊤	P or p
DC1 (XON)	11	⌊	Q or q
DC2	12	⌈	R or r
DC3 (XOFF)	13	⌉	S or s
DC4	14	⊦	T or t
NAK	15	⌋	U or u
SYN	16	⎸	V or v
ETB	17	▮	W or w
CAN	18	┼	X or x
EM	19	┤	Y or y
SUB	1A	─	Z or z
ESC	1B	▒	{ or [
FS	1C	═	¦ or \
GS	1D	⊥	} or]
RS	1E	‖	^ or ~
US	1F	▓	_ or DEL

Index

READER COMMENT FORM

ALTOS IV TERMINAL USER'S GUIDE

Altos Computer Systems
2641 Orchard Park Way
San Jose, CA 95134

This document has been prepared for use with your Altos Computer System. Should you find any errors or problems in the manual, or have any suggestions for improvement, please return this form to the ALTOS PUBLICATIONS DEPARTMENT. Do include page numbers or section numbers, where applicable.

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System Model Number_____

Serial Number_____

Document Title_____

Revision Number 690-17832-001 Date_____

Name_____

Company Name_____

Address_____

_____

DEVICE REQUIREMENTS

	Computer	Printer	Modem	Other
Handshaking protocol				
Data bits				
Stop bits				
Parity bit type				
Baud rate				
End-of-line terminator				
Carriage return code				

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2641 Orchard Park Way, San Jose, California 95134
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2641 Orchard Park Way, San Jose, California 95134
408/946-6700, Telex 184815 Altos UT

November 1985

IMPORTANT

To use your Altos IV terminal, you should edit the first line of the entry for the Wyse WY50 terminal in the file "/etc/termcap" so it looks something like this:

```
w5|wyse5|wyse50|altos4|altos 4|Altos4|Altos 4|alt4|Altos IV|Wyse wy-50:\
```

This will enable you to use your terminal with all Altos-supported software with the exception of High Tech Business Graphics releases 1.7s0 or earlier. If you have one of these releases and you want to use your terrminal with this program, you must set your TERM environment variable to "wy50" and edit the file "/usr/lib/hightech/termcapG". Delete the characters "CO:" from the 11th line of the entry for the WY50 terminal. The line should look like this before you edit it:

```
:go=\EH^B:gf=\EH^C:CO:gb:\
```

And like this after you edit it:

```
:go=\EH^B:gf=\EH^C:gb:\
```

Note that if you have any Wyse WY50 terminals, High Tech Business Graphics will no longer use their 132 column mode after you make this change.