



AT&T

User's Guide
610 Business
Communications Terminal

User's Guide

610 Business Communications

Terminal

Catalogue Number 999-300-270IS
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Preface

This document provides the user with the information necessary to understand the operation of, and user support for, the 610 Business Communications Terminal (BCT).

A step-by-step installation procedure is part of this guide, as is terminal maintenance and an abbreviated testing and trouble isolation procedure.

Initially, the operator is not expected to have a working knowledge of this terminal or the system in which it is going to operate. The host processor operation is not covered in this guide. It is suggested that each operator have an outline of the system operation and a copy of this User's Guide, as references while using the terminal.

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1. Unpack and Install

Overview

This section provides information for unpacking and installing the 610 Business Communications Terminal (BCT). There is also a brief checkout procedure included in this section.

Unpacking

Observe any and all "Caution" and "Warning" labels on the cartons.

Follow these procedures when unpacking:

- Before unpacking, confirm order with unit codes marked on the carton.
- Read the "Unpacking and Installing" instructions.
- Select an area to unpack the carton so that damage to the components will not occur.
- As a safety precaution, wear approved safety glasses or goggles when unpacking and assembling terminal.
- Unpack each carton carefully. Use a small blade to cut all sealing tape.

Each of the following will be shipped in a separate carton:

- Monitor
- Controller/Base
- Keyboard
- Modem Cable (if present)

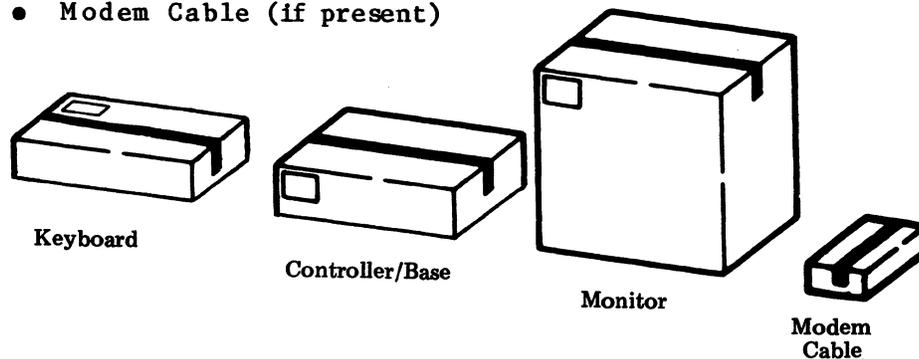


Figure 1-1. Shipping Cartons

Caution: To avoid condensation on the electronic components, the components should be allowed to assume room temperature before unpacking. This is especially important when the boxes are brought into a warm humid room from outside subzero temperature.

1. Open the top of the controller/base (55C710AAAA (PE Code 3344-610)) box by removing or cutting the tape. The User's Guide (999-300-270IS) and the Pocket Reference (999-301-270IS) are in the carton with the controller/base. Remove the controller/base from the carton and place it at the location where the terminal is to be installed.
2. Refer to codes listed below for proper phosphor color of the monitor.
 - 53D210AAA -- White (PE Code 33410-COL10)
 - 53D210YAA -- Amber (PE Code 33410-COL19)
 - 53D210ZAA -- Green (PE Code 33410-COL01)

Position carton in accordance with instructions on the outside of the carton indicating which side should be up. Open the top of the monitor carton by removing or cutting tape. Remove the monitor and assemble to swivel mechanism on the controller/base by following the steps given below.

- a. Remove unpacking and installation instructions from carton. Retain for possible future reference.
- b. Fold flaps of carton back and turn carton upside-down being careful to keep the monitor from sliding out of box while it is being turned over.
- c. Slide carton up and discard.
- d. Lift monitor with styrofoam pack and place next to controller/base. Orient the monitor with the screen downward and the bottom facing towards the installer (see Figure 1-2).
- e. Spread opening of plastic bag (not shown) covering monitor so that four rectangular cutouts are clear.
- f. Pick up controller/base and align tabs on swivel to lower cutouts on bottom of monitor.

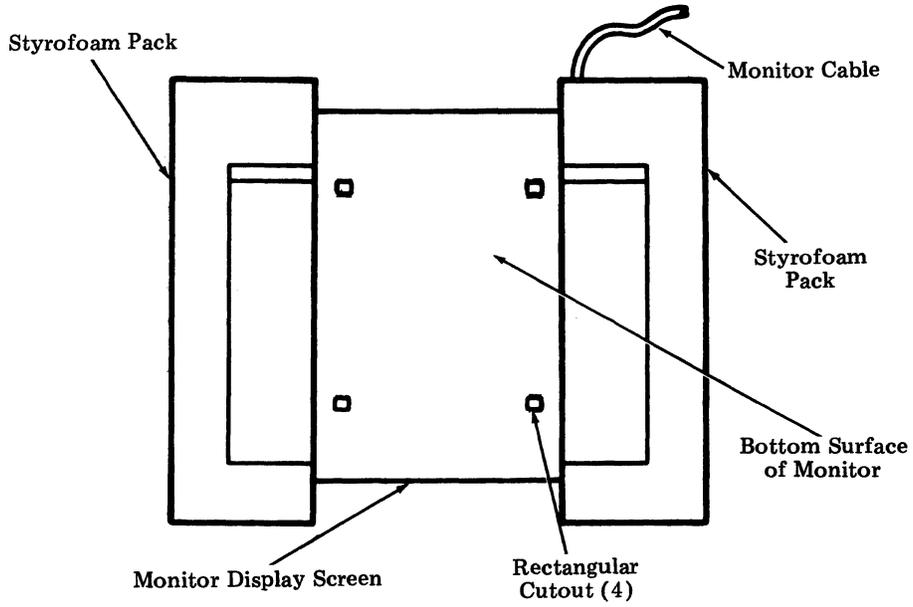


Figure 1-2. Monitor With Styrofoam Pack

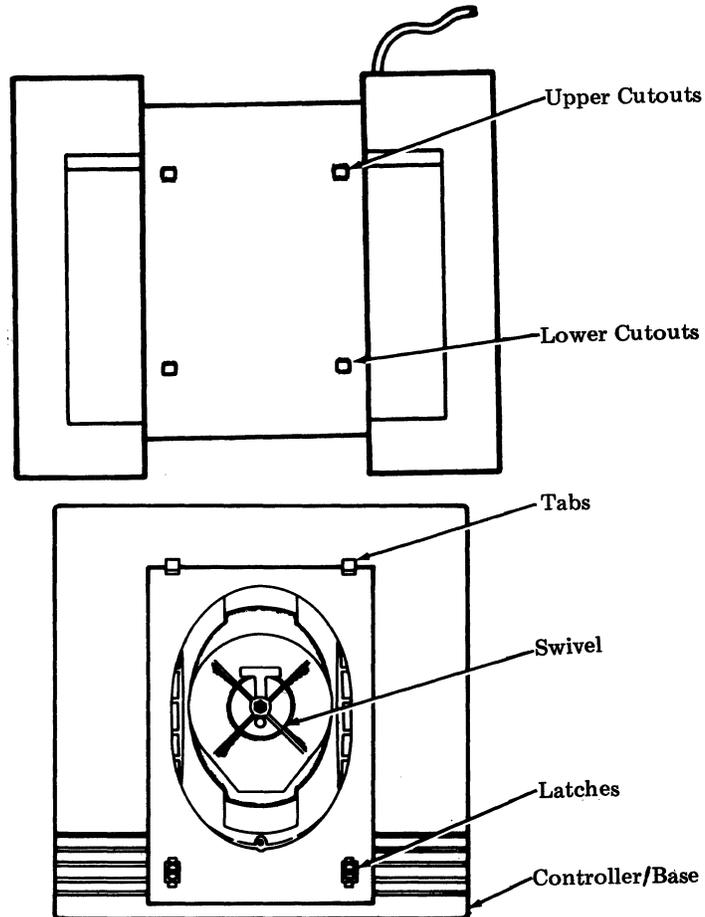


Figure 1-3. Alignment of Controller/Base to Monitor

- g. Insert lower tabs into cutouts and pivot controller/base upward so that latches on swivel engage upper cutouts on monitor. This secures the controller/base to the monitor. The controller/base can be unfastened from the monitor by pinching the release levers of the latches and pivoting the controller/base away from the monitor.

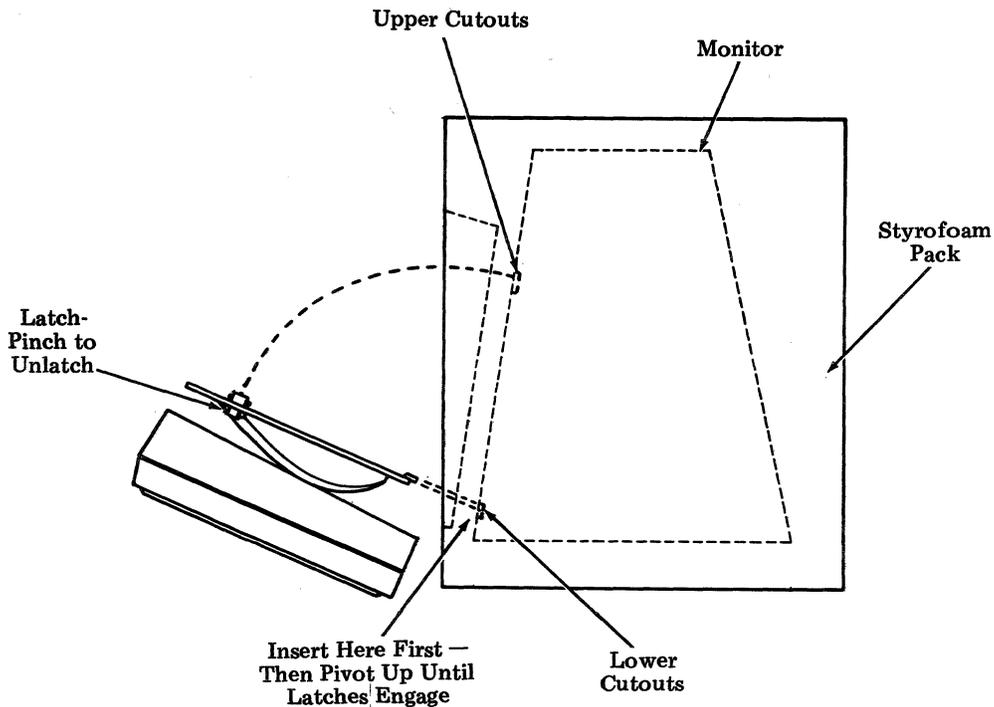


Figure 1-4. Assembly of Controller/Base to Monitor

- h. Tip monitor and controller/base to upright position and remove styrofoam pack and plastic bag.
- i. Connect monitor cable to connector marked "VIDEO" on controller/base. Secure cable to controller/base with two captive screws on connector.
3. Remove the tissue wrapped package from the bottom of the monitor carton. The ac power cord is wrapped in this paper. Unwrap the cord.
4. Connect the female end of the power cord to the ac connector on the back panel of the monitor.

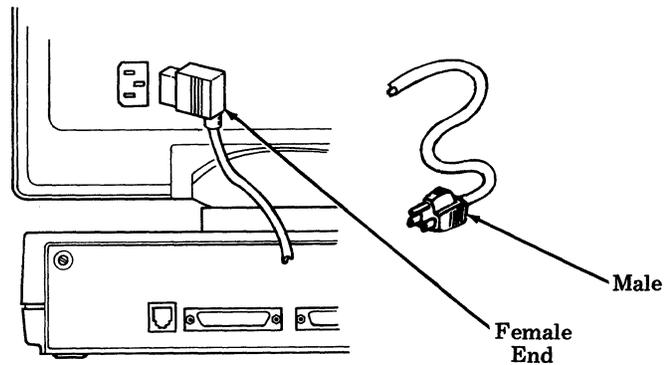


Figure 1-5. AC Connection

5. Check that ac power switch (on front) is off. Insert male end of cord into a 110 Vac outlet (or other power source).
6. Open end of keyboard carton and remove styrofoam pack.
7. Remove tape securing both halves of styrofoam pack, separate the pack, and remove the keyboard.

Note: Plastic bag deleted for clarity.

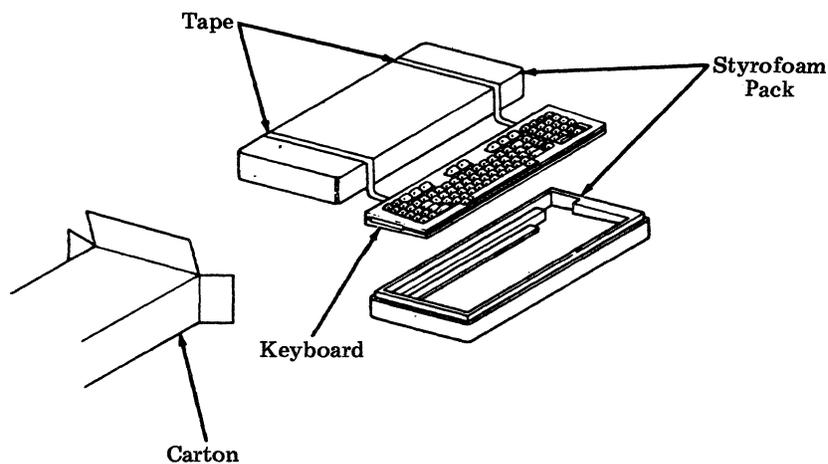


Figure 1-6. Keyboard Packing

8. Identify the keyboard (check Figure 1-9).
9. Place the keyboard near the display.
10. Insert the keyboard connector into the receptacle in the rear of the controller/base.

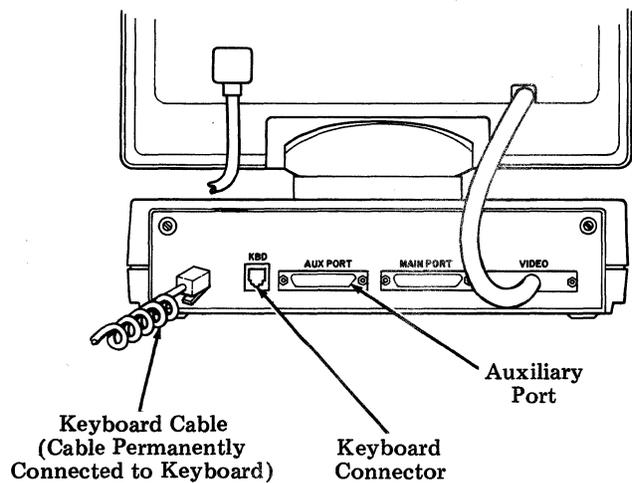


Figure 1-7. Keyboard Cable Installation

11. Adjust the keyboard feet to the desired position.

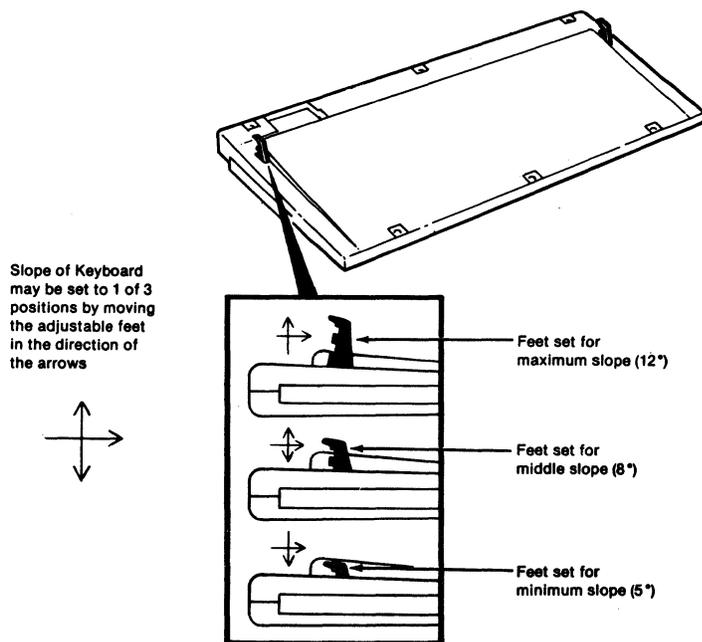
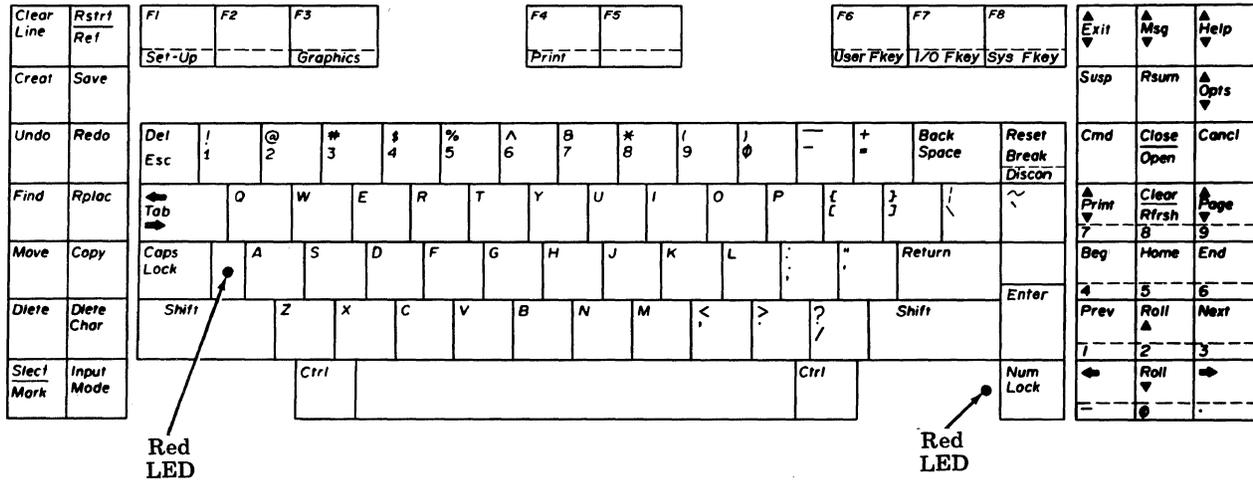
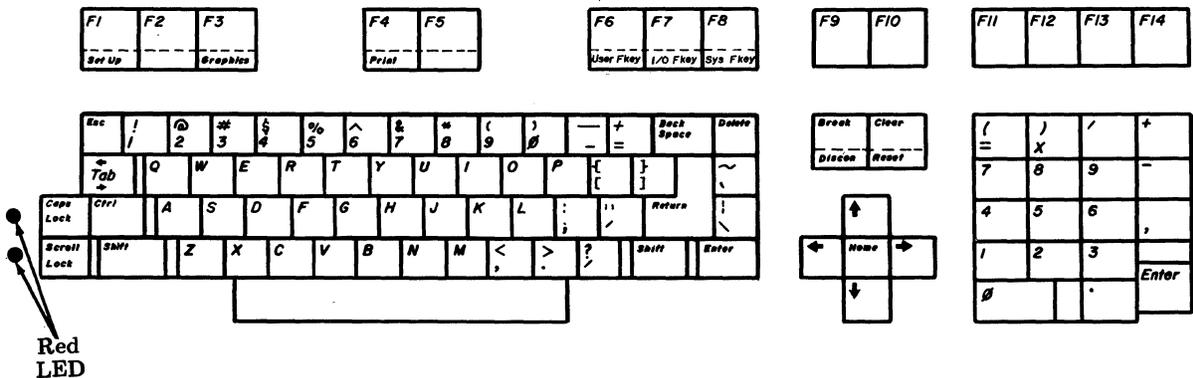


Figure 1-8. Keyboard Foot Adjustment



103-Key Keyboard Layout -- 56K430/ACZ (PE Code 33402)



98-Key Keyboard Layout -- 56K420/ADA (PE Code 33401)

Figure 1-9. Keyboard Layouts

12. If a modem is to be used, unpack the modem cable (ordered separately), and connect the cable to the main port (refer to Figure 1-7) of the terminal and the modem. Secure the ends of the cable with the screws that are part of the connectors. Cables TP416174 (7 ft.), TP416175 (12 ft.), TP416176 (25 ft.), and TP416177 (50 ft.) may be used to connect the terminal to a modem.

Note: PE Codes for the modem cables are:

PE Code	Cable Number
2724-14G	TP416174
2724-14L	TP416175
2724-14S	TP416176
2724-14V	TP416177

13. If a printer is to be used, unpack the printer cable (ordered separately), and connect the cable to the auxiliary port (refer to Figure 1-7) of the terminal and the printer. Secure the ends of the cable with the screws that are part of the connectors. The cable of the 455 Printer is included with the printer. Cables TP416174 (7 ft.), TP416175 (12 ft.), TP416176 (25 ft.), and TP416177 (50 ft.) may be used for the 458 and 475 Printers. The 5310 and 5320 Printers use a TP408065 (7 ft.), TP408066 (12 ft.), TP408067 (25 ft.), or a TP408068 (50 ft.) cable.

Note: PE Codes for the printer cables are:

PE Code	Cable Number
	TP408065
2724-01L	TP408066
2724-01S	TP408067
2724-01V	TP408068

Brief Test

14. Depress ON side of power switch. The terminal displays a "610 OK" message after the controller self-test is passed. If the test fails, a failure message will be displayed.
15. Depress both SHIFT keys and a CTRL key (left control key -- 103 key keyboard (56K430/ACZ)) simultaneously. If the internal tests have passed, the keyboard alarm sounds indicating the keyboard has passed the self-test.
16. Check display:
 - Cursor is at first column of first line. The cursor is an inverse video rectangle or underline (it may be blinking).
 - Eight User Fkey label areas appear at the bottom of the screen if the Labels Option is on (refer to Section 5).

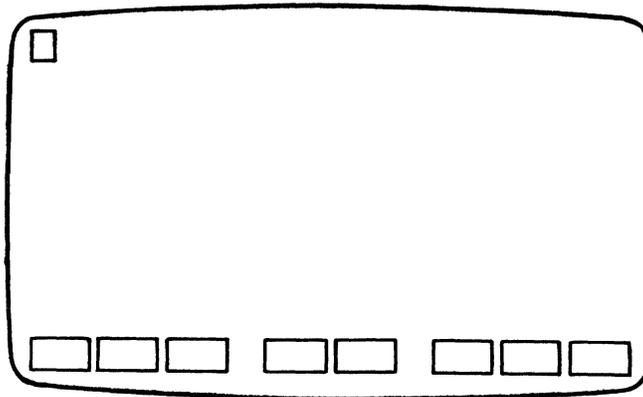


Figure 1-10. Screen Layout

17. Depress the Set-Up root key (with Control (Ctrl) key depressed) and set the terminal options. For a complete description of the options available and procedures for selection, refer to Section 5.

The terminal is now basically functional and ready for use. If trouble is encountered, refer to Section 10.

2. Operating Information

Overview

This section provides a general description of the 610 BCT including controls and physical characteristics. Detailed operating procedures are described in a later section.

Terminal Description

The 610 BCT consists of a monitor, controller, and keyboard. The monitor is available in either white, amber, or green phosphor.

The monitor codes are: 53D210AAA (white), 53D210YAA (amber), and 53D210ZAA (green).

The controller/base code is 55C710AAAA.

The keyboard codes are: 56K420ADA (98 key) and 56K430ACZ (103 key).

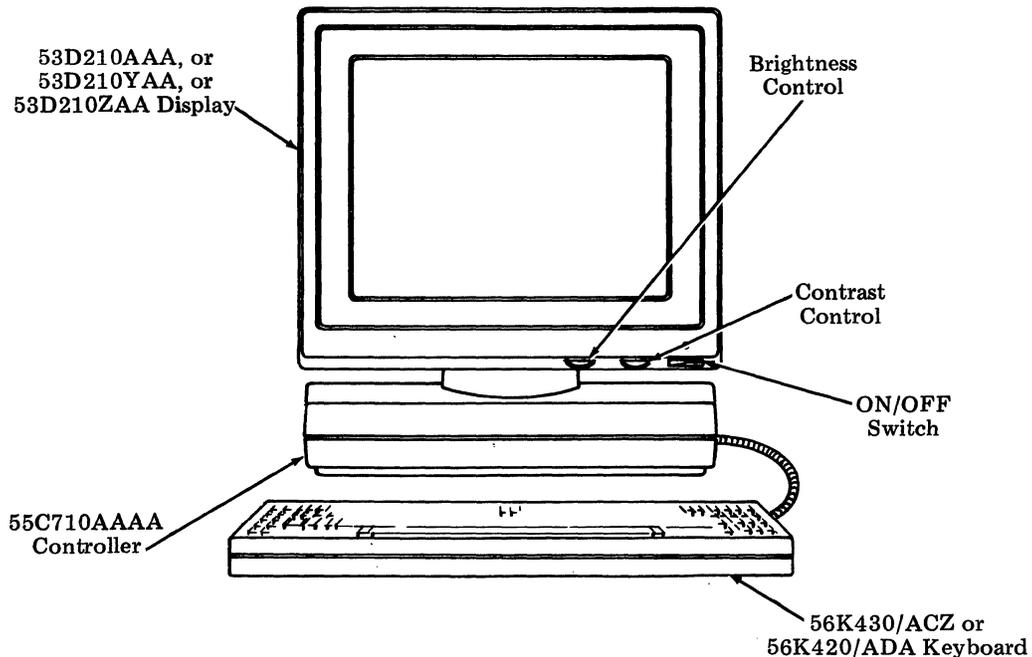


Figure 2-1. Terminal Configuration

The terminal is capable of line speeds from 110 baud through 19200 baud. The terminal receives data through a 500-character receive buffer. At higher line speeds (typically greater than 9600 baud) the receive buffer may fill up. When the buffer is 50 percent full, the terminal will send a DC3 character to alert the host of a possible overrun. As the buffer empties (to 10 percent of capacity) the terminal will generate a DC1 character - buffer available. Loss of data may occur if these signals are ignored.

The terminal operates in full duplex (FDX) on a point-to-point private line or switched network. The terminal requires the use of Electronic Industries Association (EIA) data source.

The monitor is a raster scan, monochrome, short persistence green Cathode Ray Tube (CRT) working with the microprocessor driven controller as a buffered display capable of connecting to point-to-point or switched network lines or in a direct connect arrangement. White (short persistence) and amber (medium persistence) CRTs are also available. The terminal firmware is an integral part of the display.

Two low profile keyboards are available, one with 98 keys and the other with 103 keys. The slope of the keyboard can be adjusted by extending the keyboard feet. With the feet set for minimum profile, the slope is 5 . The slope then goes to 8 and then to 12 for the two other positions of the feet.

The keyboard provides tactile feedback and can be optioned to provide an audible "click" when a key is depressed. The keyboard can alert the operator with single or repeated bell tones.

The keyboard connects to the terminal through a coiled cable providing keyboard mobility for operator convenience.

The terminal provides an EIA RS-232-C interface to connect to an external device. This interface is capable of speeds of 110 to 19200 bits per second (bps).

An auxiliary EIA printer may be connected to the terminal providing for hard copy of data.

Terminal Logic

The controller is microprocessor-driven with Random Access Memory (RAM) and Read Only Memory (ROM) for the firmware. Nonvolatile RAM is provided for preservation of options, function strings, and screen labels when power is removed.

Modem

A modem is needed to connect the terminal to a distant device. The modem must be full duplex and asynchronous. Compatible modems are AT&T types:

103J	2212C
108F	2212D
108G	2224A*
113A	2224B*
212A	

The 610 BCT does not support the speed indicator and speed select leads.

*The modems must be optioned to ignore the SPEED INDICATOR and SPEED SELECT LEADS of the terminal and to use the three-position speed select-switch on the front of the modem.

Expansion

The 610 BCT has an expansion I/O slot which can accept a variety of optional interface circuit cards. These interface cards will be able to communicate internally with the controller via a serial line. With an expansion I/O circuit card, a Set Up option is available to switch between the main EIA port and the expansion circuit card (auxiliary EIA port is still operable).

The RAM is expandable to 32K, 48K, or 64K bytes by use of an optional RAM expansion card.

Expansion can also be accomplished through the use of an optional firmware cartridge, which will enhance the terminal's features or change the terminal's personality. Cartridge activation is option controllable.

Controls

There are three controls that the operator can use to turn the terminal on and adjust brightness and contrast (refer to Figure 2-1). The monitor may also be swiveled left and right and tilted up and down by manually moving the monitor housing.

Power Switch -- Power to the terminal is controlled by a rocker-type switch on the right front of the display. When ON, a green front panel LED will light.

Brightness -- Monitor brightness is controlled by a rotary knob at the right front of the terminal. Rotating the knob left or right varies the screen brightness.

Contrast -- Contrast is controlled by a rotary knob at the front of the terminal. Rotating the knob left or right varies the screen contrast.

Power Up

Upon power up, the terminal performs an initialization process and confidence self-test. Successful completion of the self-test is indicated by a "610 OK" message appearing on the status line. If the terminal powers up with the default options loaded, the function key strings and labels will contain their default values and the message "Default Options Loaded" will appear on the status line with the self-test "610 OK" message. The terminal is ready to receive data when the Data Terminal Ready (DTR) lead is on (+12 V). The User Fkey Labels will appear at the bottom of the display if the Labels Option is on (refer to Section 5). If the keyboard is not connected, the message "ERROR: Kybd" will be displayed on the status line; however, the terminal is capable of receiving if the RAM passes self-test. The terminal will then display a cursor (white rectangle or underline on a black background) in the upper left corner of the screen. The cursor occupies one character cell. The terminal will clear the self-test message when it receives data.



Figure 2-2. Screen Layout

If the cursor and screen Fkey labels (if optioned for On) have not appeared within thirty seconds, check that the brightness control has not been adjusted so low that no video can be seen.

Keyboard-Generated Self-Test

A self-test procedure is initiated when, with the power on and the Shift, and Ctrl (Control) keys depressed, the Esc (Escape) key is depressed. If the keyboard is malfunctioning, the message "ERROR: Kybd" will be displayed on the status line; if there is an error in the internal RAM, the message "ERROR: Base" will be displayed, if there is an error in the external RAM, the message "ERROR: RAM" will be displayed. Other messages ("ERROR: Cartridge" or "ERROR: IO") indicate cartridge and expansion I/O card failures.

If the internal RAM fails the self-test, the screen may not contain any error messages. If more than one failure exists, the message will read (in the worst case) "ERROR: Base Kybd RAM Cartridge IO."

If all of the internal tests are passed, a message indicating the terminal personality and the fact that all the tests were passed is displayed on the status line. For example, if the internal ROM is running, the message will read "610 OK." If running from a cartridge, "610" would be replaced by a different appropriate identification.

All test messages will remain on the screen until a character is received or a keyboard key is depressed.

The keyboard may also be self-tested by simultaneously depressing the Shift, Shift, and Ctrl keys (left Ctrl key on the 56K430/ACZ Keyboard). A successful test is followed by the keyboard bell being sounded.

3. Display

Overview

The display is a 12-inch diagonal CRT with rectangular shaped (3 x 4 ratio) raster area. The dot matrix of the display is character oriented. Either an 80 or 132 character line format can be displayed. The number of columns per line is selected by option or received escape sequence.

The display has a screen saver feature which causes the video to be blanked after one hour of inactivity (no key depressed or data received). The video is returned when a character is received or a key is depressed.

If reactivated by a key depression, that character (one only) will not be sent on-line or appear on the screen.

The cursor is an inverse video rectangle or, optionally, an underline that occupies one character position. It indicates the location of the display activity. When the cursor is located at a position that already has a character, that character will appear as a dark character on a light background (if the cursor is a rectangle). Entering a different character will replace the original character with the entered one. Entering a character may be done from the line or the keyboard (with local or remote echo). One of the terminal options allows the cursor to blink or to remain steady. The cursor moves position by position as characters are received or typed. The cursor can be positioned anywhere on the twenty-four data lines of the display through the use of the cursor positioning keys (with local or remote echo) or by escape sequence commands. Options are described in Section 5 and escape sequences are described in Section 8.

Display Format

1 The display format is 27 lines high. The first 24 lines
2 are for received data. The line numbers shown on the
3 left do not appear on the display. Their use is only for
4 the explanation of this text.
5
6 Line 25 is for status indicators such as "ERROR: Kybd."
7 It is not accessible by the user but the host can write
8 status messages in this line.
9
10 Lines 26 and 27 contain the reverse video pads for the
11 screen labels. These screen labels correspond to the
12 eight "F" keys (F1 through F8) across the top of the
13 keyboard (see "Screen-Labeled Keys" in Section 4,
14 "Keyboard").
15
16 Lines 26 and 27 also contain status indicators for
17 terminal on-line (on) and character insert (ins),
Print On-Line (pol) and Media Copy (mc).
24
25
26

--	--	--	--

 pol

--	--	--

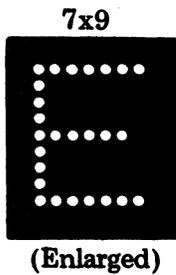
 ins

--	--	--	--

27

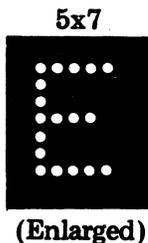
Figure 3-1. Display Format

Character Format



Each character or symbol is made up from a dot pattern.

When optioned for eighty characters per line, each character is displayed in a 9 by 13 dot field. The character uses a 7 by 9 dot grid (plus two descenders) inside the dot field. Underscore attribute uses line 12 of the field. The pattern at the left is a simulation of a display character.



When optioned for 132 characters per line, each character is displayed in a 7 by 13 dot field. The character uses a 5 by 7 dot grid (plus two descenders) inside the dot field.

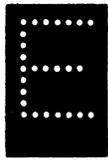
Figure 3-2. Character Format

Character Attributes

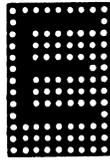
A character may be displayed in one or more of nine major character attributes:

- Normal Video
- Reverse Video
- Bold
- Blank
- Underscore
- Blink
- Single Wide/Single High
- Double Wide/Single High
- Double High/Double Wide

- Normal Video -- Light character displayed on a dark background (shown below).
- Reverse Video -- Dark character displayed on a light background (shown below).
- Bold -- Displayed with increased intensity (not shown below).
- Blank -- Character is placed in display memory but not displayed (not shown below).
- Underscore -- Character displayed with an underscore (shown below). This is a display function and should not be confused with the ASCII underline.
- Blink -- Displayed character alternates between bold intensity and normal intensity (not shown below).
- Single Wide/Single High -- Displayed character size will be one character line high and one character position wide (shown below).
- Double Wide/Single High -- Displayed character size will be one character line high and two character positions wide (shown below).
- Double High/Double Wide -- Display character size will be two character lines high and two character positions wide (shown below).



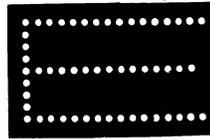
Normal
Video



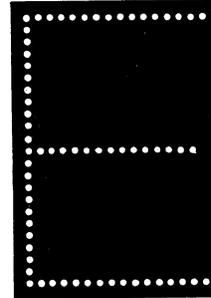
Reverse
Video



Underscored
Video



Double Wide



Double High/Double Wide

Figure 3-3. Display Attributes

4. Keyboard

Overview

Keyboard data is sent to the display (as well as on-line) when the option "LOCAL ECHO" is enabled (on) (refer to Section 5). If "LOCAL ECHO" option is disabled (off), keyboarded data is not sent to the display (sent to line only) unless the receiver (host) echoes the data back to the sender. Refer to Section 7 for a complete list of ASCII (American Standard Code for Information Interchange) characters.

103-Key Keyboard -- 56K430/ACZ

The keyboard is divided into four groups of keys. The main group of the keyboard is a standard typewriter arrangement with some additional keys.

The fourteen keys at the left of the keyboard are system control keys.

The eight keys across the top of the keyboard serve three purposes. They are used as root keys (root identifier on the front of the key), as screen-labeled keys or as function keys. These keys provide the user with access to the modes and features of the terminal. These keys are described in detail in this section.

The twenty-one keys at the right of the keyboard are for cursor positioning, numeric data entry, and system control.

With the exception of keys noted below, all keys on the keyboard repeat at approximately twenty-five characters per second if depressed for more than one-half second: the eight function keys, Break/Reset/Discon, Clear, Num Lock, Caps Lock, the left side cluster, and the right side cluster (the following right side cluster keys will repeat: Roll Up, Roll Down, <-,>, and numbers when Num Lock is on).

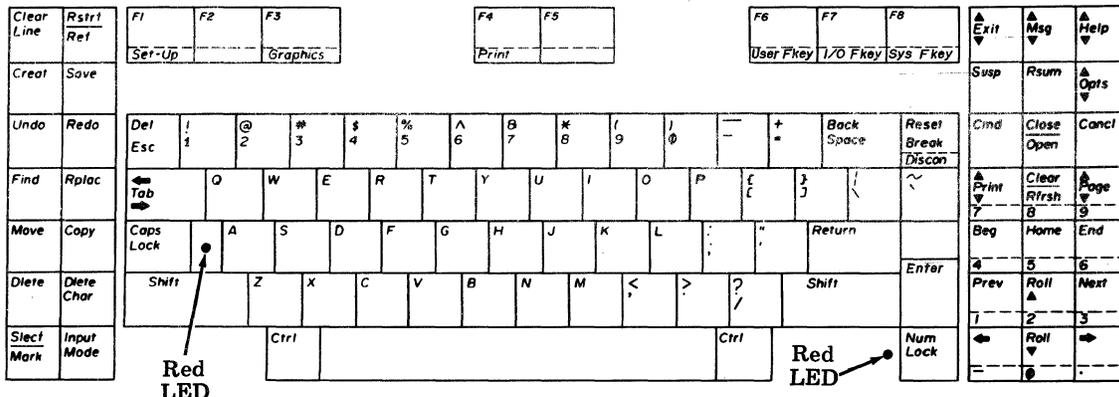


Figure 4-1. Keyboard Layout -- 103-Key Keyboard (56K430/ACZ)

98-Key Keyboard -- 56K420/ADA

The keyboard is divided into four groups of keys. The main group of the keyboard is a standard typewriter arrangement with some additional keys.

The fourteen keys across the top of the keyboard serve three purposes. They are used as root keys (root identifier on the front of the key), as screen-labeled keys, or as function keys. These keys provide the user with access to the modes and features of the terminal. These keys are described in detail in this section. A two-sided writeable template is available for functions keys F9 through F14. The template is blank except for vertical lines above and below the keys on both sides. The template is available in packages of six under modification kit number TP418138.

The seven keys to the right of the standard keys are for cursor positioning and system control.

The eighteen keys at the right of the keyboard are for numeric data entry.

With the exception of the keys noted below, all keys on the keyboard repeat at approximately twenty-five characters per second if they are depressed for more than one half-second: fourteen function keys, Break/Discon, Clear/Reset, Caps Lock, and Scroll Lock.

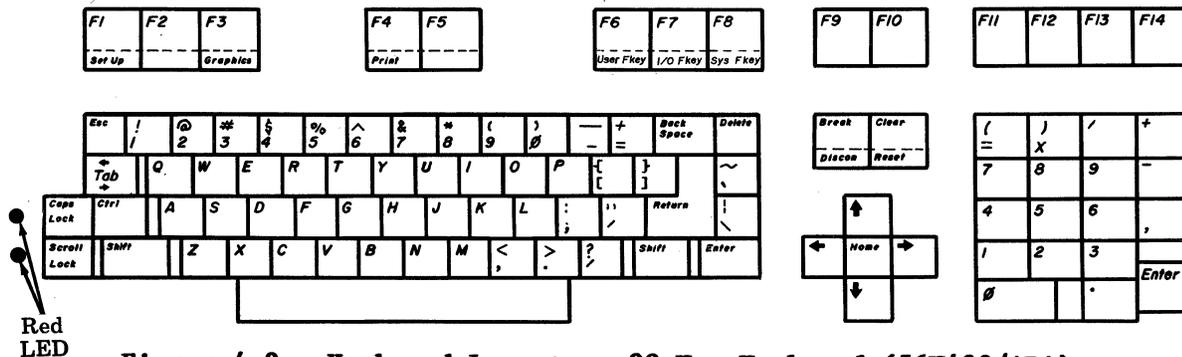


Figure 4-2. Keyboard Layout -- 98-Key Keyboard (56K420/ADA)

Standard Keys

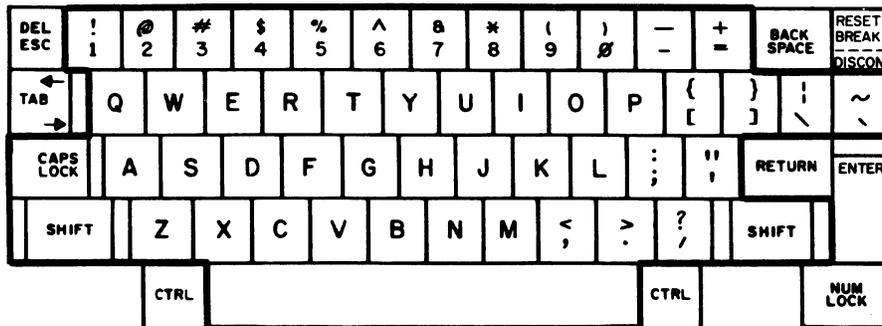


Figure 4-3. Standard Keys — 103-Key Keyboard (56K430/ACZ)

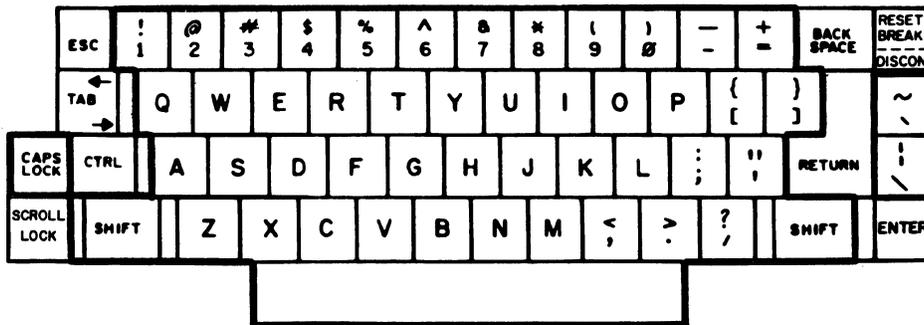


Figure 4-4. Standard Keys — 98-Key Keyboard (56K420/ADA)

The boldly outlined keys in Figure 4-3 and 4-4 identify the standard typewriter keys. They function the same as a typewriter. In the case of keys with double legends ($\frac{\#}{3}$), the lower character (3) is generated.

Shift and Ctrl (Control) modify standard key characters. These keys are described in the following paragraphs.



Depressing a standard key with Shift depressed causes the uppercase alpha characters to be generated. In the case of keys with double legends ($\frac{\#}{3}$), the upper symbol (#) is generated.



Depressing this key turns on the red LED indicator. When this indicator is on, the alpha keys generate uppercase letters. However, keys with double legends are not affected. They continue to generate the lower symbols. Depressing this key a second time turns off the indicator and returns the keyboard to lowercase character generation. The terminal powers up with this key in the same state as it was when the terminal was powered down.

Special Function Keys

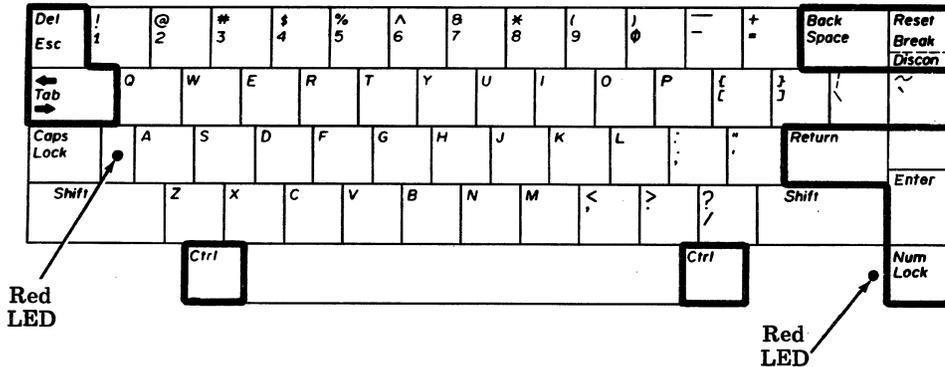


Figure 4-5. Special Function Keys -- 103-Key Keyboard (56K430/ACZ)

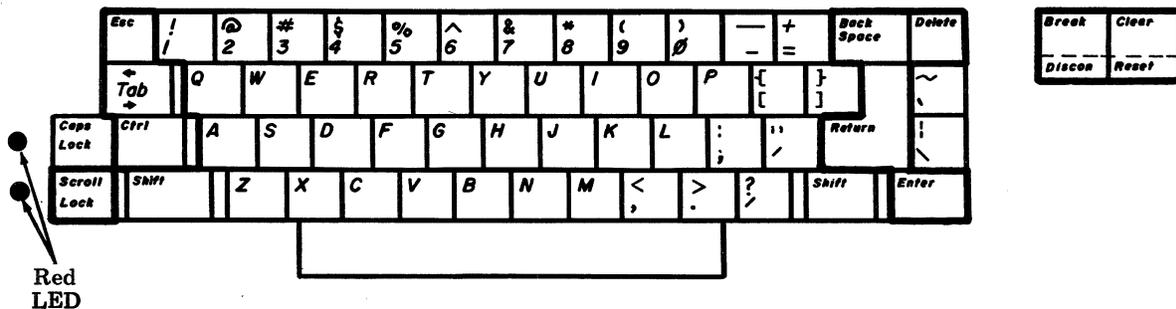


Figure 4-6. Special Function Keys -- 98-Key Keyboard (56K420/ADA)

The boldly outlined keys in Figure 4-5 and 4-6 identify the special function keys. These keys generate frequently used special characters or they enable special features. These key functions are described in the following paragraphs.

Del / **Esc** or **Esc** Depressing this key generates the ASCII control character ESCAPE (Hex 1B). ESCAPE is used to begin control sequences that the terminal and the host use to govern their actions,

Del / **Esc** Depressing this key with Shift depressed generates the ASCII character DELETE (Hex 7F) (103-key keyboard only).

Delete Depressing this key generates the ASCII character DELETE (Hex 7F) (98-key keyboard only).



Depressing this key generates the ASCII character HT (Hex 09). If the "LOCAL ECHO" option (refer to Section 5) is enabled or the remote receiver echoes data back to the display, the cursor will move to the right to the next preset tab stop (Monitor Mode option off -- refer to Section 5) or display the character HT (Monitor Mode on). Depressing this key, with either the Shift key or the Ctrl (Control) key depressed, will generate the ASCII escape sequence ESC[Z (Hex 1B, Hex 5B, Hex 5A). If data is sent to the display (local or remote echo), the cursor will move to the left to the next preset tab stop (Monitor Mode off) or display ESC[Z (Monitor Mode on). Tab stops are set at eight column intervals beginning with column 1 and at the 80th or 132nd. This key does not cause the cursor to change lines.



Depressing various keys while this key is depressed causes ASCII control characters to be generated or special functions to be initiated.



Depressing this key generates the ASCII character BS (Hex 08). If data is sent to the display (local or remote echo), the cursor will move one space to the left (Monitor Mode option off -- refer to Section 5) or display the character (Monitor Mode option on). If the cursor is in the first column, no movement will occur.



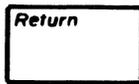
OR



Depressing this key will cause a timed line break (transmit lead high) of approximately 280 ms to be generated. Depressing this key with the Shift key depressed (103-key keyboard only) will generate the ASCII escape sequence ESCc (Hex 1B, Hex 63); if data is sent to the display (local or remote echo), a Reset function is performed (Monitor Mode option off -- refer to Section 5) or ESCc is displayed (Monitor Mode option on). Depressing this key with the Ctrl (Control) key depressed will cause the terminal to turn off the DTR (Data Terminal Ready) lead for two and a half seconds in order to cause the line to drop.



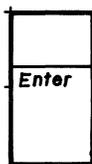
Depressing this key generates the ASCII escape sequence ESC[2J (Hex 1B, Hex 5B, Hex 32, Hex 4A). If data is sent to the display (local or remote echo), the terminal will clear display lines 1 through 24 (with Monitor Mode option off -- refer to Section 5) or display ESC[2J (with Monitor Mode option on). Depressing this key with the Ctrl (Control) key depressed will generate the ASCII escape sequence ESCc (Hex 1B, Hex 63); if data is sent to the display (local or remote echo), a Reset function will be performed (Monitor Mode off) or the sequence ESCc will be displayed (Monitor Mode on). This key is only on the 98 key (56K420/ADA) keyboard.



or



This key is programmable in the Options mode (refer to Section 5). When depressed it will generate either a Carriage Return (CR) (Hex OD), Line Feed (LF) (Hex OA) or a CR and LF (Hex OD, Hex OA). If data is sent to the display (local or remote echo), the cursor will either go to the first column of the present line (CR only), perform a linefeed function (as optioned with NEWLINE on LF) (LF only), go to the first column in the next line (CR and LF), (Monitor Mode option off) or the characters (CR, LF) will be displayed (Monitor Mode option on -- refer to Section 5). With Monitor Mode option on, a displayed CR will only display while a displayed LF will also perform a New Line (NL) function.



or



This key is programmable (up to four characters) in the Options mode (refer to Section 5). Depressing this key will generate the optioned characters. If data is sent to the display (local or remote echo), the characters will appear on the display or local functions will be performed (if control characters) depending on the state of the Monitor Mode option (refer to Section 5).

**Num
Lock**

Depressing this key will toggle the red LED indicator alongside the Num Lock key. When the Num Lock indicator is on, the numeric keys, minus, and period on the right external pad are enabled. When the indicator is off, these keys perform their indicated functions. This key is on the 103-key keyboard only.

**Scroll
Lock**

Depressing this key with the red LED indicator off will light the indicator and generate a DC3 (Hex 13) as a signal to a remote sender to stop sending; depressing this key with the indicator on will turn the indicator off and generate a DC1 (Hex 11) as a signal to a remote sender to resume sending. This key is on the 98-key keyboard only. When Scroll Lock is in effect no characters will be displayed even if the remote end does not stop sending.

Cursor Positioning Keys

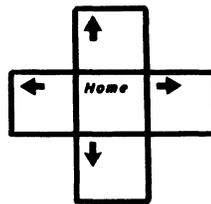


Figure 4-7. Cursor Positioning Keys -- 98-Key Keyboard (56K420/ADA)

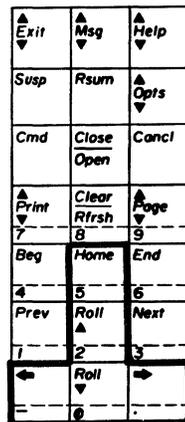
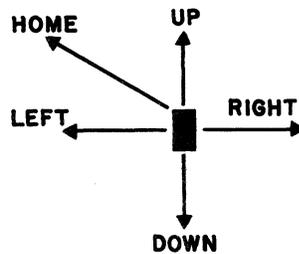


Figure 4-8. Cursor Positioning Keys -- 103-Key Keyboard (56K430/ACZ)

The boldly outlined keys in Figures 4-7 and 4-8 identify the cursor positioning keys. These keys, when depressed, transmit the ANSI (American National Standards Institute) 3.64 code for the cursor positioning functions. If data is sent to the display (local or remote echo), the sequences will appear on the screen (Monitor Mode option on -- refer to Section 5) or the cursor positioning functions will occur (Monitor Mode option off). A single sequence with Monitor Mode off will cause one positioning movement (either a 1-column movement, a 1-line movement, or a home movement) to occur in the direction shown on the keytop.



Cursor Movement

Refer to Tables 4-A and 4-B for the escape (ESC) sequences generated.

Note: The home position is at the first column of the top line (upper left corner of the display area) or the first line of the scrolling region if Origin Mode is in effect.

Table 4-A. 103-Key Keyboard (56K430/ACZ) Cursor Positioning
Key Sequences

Keytop	Num Lock Indicator Off			Num Lock Indicator On		
	Unshift	Shift	Control	Unshift	Shift	Control
	ESC[H See Note	None	None	5 Hex 35	5 Hex 35	5 Hex 35
	ESC[A See Note	ESC[T See Note	ESC[T See Note	2 Hex 32	2 Hex 32	2 Hex 32
	ESC[D See Note	ESC[□@ See Note	ESC[□@ See Note	- (Hyphen) Hex 2D	- (Hyphen) Hex 2D	- (Hyphen) Hex 2D
	ESC[B See Note	ESC[S See Note	ESC[S See Note	0 Hex 30	0 Hex 30	0 Hex 30
	ESC[C See Note	ESC[□A See Note	ESC[□A See Note	. (Period) Hex 2E	. (Period) Hex 2E	. (Period) Hex 2E

Note: Hex codes for:

ESC	1B
[	5B
A	41
B	42
C	43
D	44
H	48
K	4B
N	4E
S	53
T	54
□ (Space)	20
@	40

Table 4-B. 98-Key Keyboard (56K420/ADA) Cursor Positioning Key Sequences

Keytop	Unshift	Shift	Control
	ESC[H See Note	None	None
	ESC[A See Note	ESC[T See Note	ESC[T See Note
	ESC[D See Note	ESC[<input type="checkbox"/> @ See Note	ESC[<input type="checkbox"/> @ See Note
	ESC[B See Note	ESC[S See Note	ESC[S See Note
	ESC[C See Note	ESC[<input type="checkbox"/> A See Note	ESC[<input type="checkbox"/> A See Note

Note: Hex codes for:

ESC	1B
[	5B
A	41
B	42
C	43
D	44
H	48
S	53
T	54
@	40
<input type="checkbox"/> (Space)	20

103-Key Keyboard (56K430/ACZ) Cluster Keys

<i>Clear Line</i>	<i>Rstrl Ref</i>
<i>Creat</i>	<i>Save</i>
<i>Undo</i>	<i>Redo</i>
<i>Find</i>	<i>Rplac</i>
<i>Move</i>	<i>Copy</i>
<i>Diere</i>	<i>Diere Char</i>
<i>Slect Mark</i>	<i>Input Mode</i>

Left-Hand Cluster

<i>▲ Exit ▼</i>	<i>▲ Msg ▼</i>	<i>▲ Help ▼</i>
<i>Susp</i>	<i>Rsum</i>	<i>▲ Opts ▼</i>
<i>Cmd</i>	<i>Close Open</i>	<i>Cancl</i>
<i>▲ Print ▼</i>	<i>Clear Rfrsh</i>	<i>▲ Page ▼</i>
<i>7</i>	<i>8</i>	<i>9</i>
<i>Beg</i>	<i>Home</i>	<i>End</i>
<i>4</i>	<i>5</i>	<i>6</i>
<i>Prev</i>	<i>Roll ▲</i>	<i>Next</i>
<i>1</i>	<i>2</i>	<i>3</i>
<i>←</i>	<i>Roll ▼</i>	<i>→</i>
<i>-</i>	<i>0</i>	<i>.</i>

Right-Hand Cluster

Figure 4-9. Right- and Left-Hand Clusters -- 103-Key Keyboard (56K430/ACZ)

The boldly outlined keys of Figure 4-9 will transmit the sequences shown in Tables 4-C and 4-D, when depressed. The sequences will be displayed if data is sent to the display (local or remote echo) and Monitor Mode option is on (refer to Section 5).

Table 4-C. 103-Key Keyboard (56K430/ACZ) Left-Hand Cluster Sequences

Keypop	Unshift		Shift or Control	
	ASCII Seq.	Hex Code	ASCII Seq.	Hex Code
	ESCOa	1B, 4F, 61	ESCOA	1B, 4F, 41
	ESCOb	1B, 4F, 62	ESCOB	1B, 4F, 42
	ESCON	1B, 4F, 6E	ESCON	1B, 4F, 4E
	ESCOo	1B, 4F, 6F	ESCOO	1B, 4F, 4F
	ESCOs	1B, 4F, 73	ESCOS	1B, 4F, 53
	ESCOT	1B, 4F, 74	ESCOT	1B, 4F, 54
	ESCOx	1B, 4F, 78	ESCOX	1B, 4F, 58
	ESCOy	1B, 4F, 79	ESCOY	1B, 4F, 59
	ESCNC	1B, 4E, 63	ESCNC	1B, 4E, 43
	ESCND	1B, 4E, 64	ESCND	1B, 4E, 44
	ESCNE	1B, 4E, 65	ESCNE	1B, 4E, 45
	ESCnf	1B, 4E, 66	ESCNF	1B, 4E, 46
	ESCNI	1B, 4E, 69	ESCNI	1B, 4E, 49
	ESCnj	1B, 4E, 6A	ESCNI	1B, 4E, 4A

Table 4-D. 103-Key Keyboard (56K430/ACZ) Right-Hand Cluster Sequences

Keypop	With Num Lock Indicator Off				Num Lock Indicator On	
	Unshift		Shift or Control		ASCII Char	Hex Code
	ASCII Seq.	Hex Code	ASCII Seq.	Hex Code		
	ESCok	1B, 4F, 6B	ESCOK	1B, 4F, 4B	N/A	N/A
	ESC0l	1B, 4F, 6C	ESCOL	1B, 4F, 4C	N/A	N/A
	ESC0m	1B, 4F, 6D	ESCOM	1B, 4F, 4D	N/A	N/A
	ESCOp	1B, 4F, 70	ESCOPI	1B, 4F, 50	N/A	N/A
	ESC0q	1B, 4F, 71	ESCOQ	1B, 4F, 51	N/A	N/A
	ESCOr	1B, 4F, 72	ESCOR	1B, 4F, 52	N/A	N/A
	ESC0u	1B, 4F, 75	ESCOU	1B, 4F, 55	N/A	N/A
	ESC0v	1B, 4F, 76	ESCOV	1B, 4F, 56	N/A	N/A
	ESC0w	1B, 4F, 77	ESCOW	1B, 4F, 57	N/A	N/A
	ESC0z	1B, 4F, 7A	ESCOZ	1B, 4F, 5A	7	37
	ESCNa	1B, 4E, 61	ESC[2J	1B, 5B, 32, 4A	8	38
	ESC[U	1B, 5B, 55	ESC[V	1B, 5B, 56	9	39
	ESC9	1B, 39	ESC9B	1B, 4E, 42	4	34

N/A -- Not applicable.

Table 4-D. 103-Key Keyboard (56K430/ACZ) Right-Hand Cluster Sequences (Continuation)

Keytop	With Num Lock Indicator Off				Num Lock Indicator On	
	Unshift		Shift or Control		ASCII/Char	Hex Code
	ASCII Seq..	Hex Code	ASCII Seq.	Hex Code		
	ESCO	1B, 30	ESCNN	1B, 4E, 4E	6	36
	ESCNg	1B, 4E, 67	ESCNG	1B, 4E, 47	1	31
	ESCNh	1B, 4E, 68	ESCNH	1B, 4E, 48	3	33

98-Key Keyboard (56K420/ADA) Cluster Keys

()	/	+
=	*		
7	8	9	-
4	5	6	,
1	2	3	
∅		.	Enter

Figure 4-10. Right-Hand Cluster -- 98-Key Keyboard (56K420/ADA) Only

The keys in the cluster of Figure 4-10, when depressed, will generate the ASCII characters shown on the keytops (except for the Enter key). The ASCII characters) and (will be generated when those keys are depressed with the Shift or Ctrl (Control) keys depressed. The Enter key, when depressed, will generate an ASCII sequence (up to four characters) programmed in the Options mode (refer to Section 5). The characters will be displayed if data is sent to the display (local or remote echo).

Function and Screen-Labeled Keys

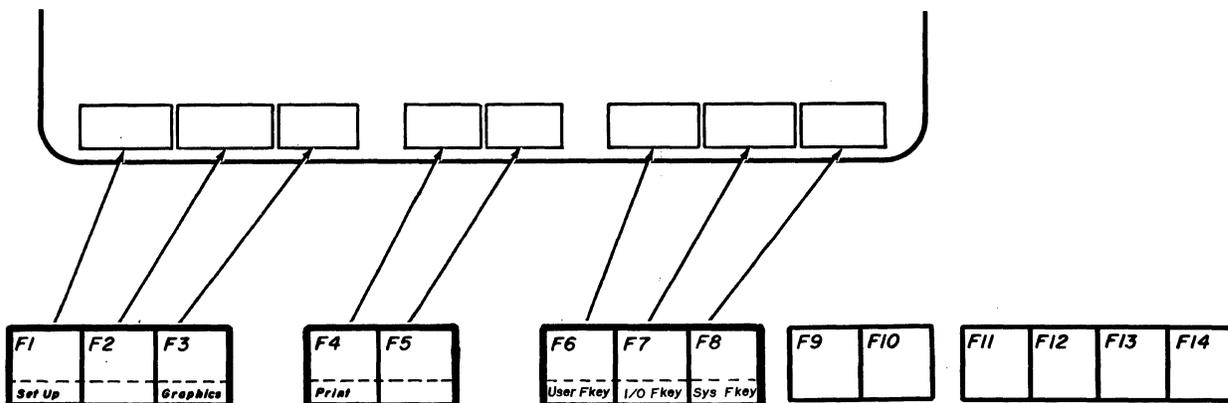


Figure 4-11. Function Keys

The boldly outlined keys in Figure 4-11 identify those function ("F") keys that are also used as screen-labeled keys and their associated screen-label pads. These keys provide the user with access to the modes and features of the terminal.

The screen labels are half-intensity, reverse video pads across the bottom of the screen. These pads contain the current functions for the screen-labeled keys (they will be the User Fkey labels on power up with the Labels option set to "yes").

The screen label structure is based on "root" keys. The "root" keys are the control function of the "F" keys except for the F2 and F5 keys. Depressing a "root" (with the Control key depressed) changes the screen labels and, hence, the screen-labeled key functions. "Root" identifiers are given on the front face of the function keys F1, F3, F4, F6, F7, and F8.

Table 4-E shows the screen labels and the keys that have to be depressed along with the Ctrl (Control) key to access the various sets of screen labels.

Table 4-E. Screen Labels

†	Set Up	→			CHANGE OPTION	DEFAULT VALUES	SAVED VALUES	SAVE	NEXT SET UP	CLEAR TO END
†	Graphics	→	No action occurs.							
†	Print	→	PRINT* ON-LINE	STOP PRINT						
†	User Fkey	→	F1	F2	F3	F4	F5	F6	F7	F8
*†	I/O Fkey	→	No action occurs unless an Expansion I/O card (optional) is present.							
*†	Sys Fkey	→	F1	F2	F3	F4	F5	F6	F7	F8

† Indicates keytop legends ("root" keys). All others are screen labels.

*Fkey labels appear.

An asterisk (*) in the screen label "PRINT ON-LINE" indicates that the Print On-Line mode is enabled.

The following are descriptions of the screen-labeled keys.

Set Up Root

The first depression of the Set-Up root key (with the Ctrl (Control) key depressed) displays the terminal options and screen labels. The second depression of this key (with the Ctrl key depressed) will exit the options SET UP state. Optioning is described in Section 5.

**CHANGE
OPTION**

Depressing this key causes the option that the cursor is in to step through its allowable values. Note that the "Enter" key option requires keyboard entered characters.

**DEFAULT
VALUES**

Depressing this key causes the default values for all of the options to be displayed.

SAVED VALUES Depressing this key restores the options to their previously saved values.

SAVE Depressing this key causes the currently displayed values for the options to be stored in memory.

NEXT SET UP Depressing this key brings up the User Fkey SET UP screen and labels. Each Fkey and its current label will be displayed. The User Fkey screen labels are shown below:



PREVIOUS FIELD These two keys are used to move the cursor backward and forward through the User Fkey label and string fields in the User Fkey SET UP mode.

and
NEXT FIELD

DEFAULT VALUES Depressing this key will cause the default values for the User Fkey labels and strings to be displayed.

NEXT SET UP Depressing this key brings up the optional Expansion I/O card set up screen (if present and using the options screen); otherwise, depressing this key will bring up the Options SET UP screen.

CLEAR TO END Depressing this key in the Options SET UP mode will clear the Enter key string option from the cursor to the end of the string; depressing this key in the User Fkey SET UP mode will clear the field (label or string) from the cursor position to the end of the field. In the Options SET UP mode, this key is operable in the string area only.

Depression of DEFAULT VALUES, SAVED VALUES, or SAVE screen-labeled keys will cause the message "DONE" to be written at the bottom left corner of the Options screen. The USER Fkey SET UP mode is exited and the Fkey strings and labels are stored when the Set-Up key is depressed (with the Ctrl key depressed) or the screen-labeled NEXT SET UP key is depressed. "DONE" will be erased when any key except Shift, Control, Caps Lock, or Num Lock is depressed.

Graphics Root

The graphics feature is not functional on the 610 BCT. Thus, depressing the "Graphics" root key (with Control key depressed) will not cause any action to occur.

Print Root

A depression of the Print root key (with the Control key depressed) displays the Print screen labels. Refer to Section 6 for printer operation information.

PRINT*
ON-LINE

Depressing this key to the on condition (an asterisk (*) present in the screen label) will cause all data from the line to be sent to the printer with the 8th bit spacing. When this key is in the off state (no asterisk present in the screen label), no data will be sent to the printer. When Print On-Line is on a "pol" indicator appears on line 26 between the screen labels for F3 and F4.

STOP
PRINT

Depressing this key while in Media Copy or Print On-Line will cause that function to be terminated.

User Fkey Root

Depression of the User Fkey root key (with the Control key depressed) will display the User Fkey labels.

F1

through

F8

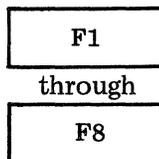
Depressing one of the "F" keys while the User Fkey labels are displayed will cause its User function key string to be transmitted. The User function key strings are programmed in the SET UP state using the User Fkey SET UP screen or downloaded from the line. Each string can contain up to thirty-five characters. The screen labels will be sixteen characters long.

I/O Fkey Root

Depression of the I/O Fkey root key (with the Control key depressed) will display those labels associated with an optional Expansion I/O card (if present). The particular labels will depend on which Expansion I/O card is present; if no card is present, then no action will occur.

Sys Fkey Root

Depression of the Sys Fkey root key (with the Control key depressed) will display the Sys Fkey labels.



Depressing one of the "F" keys while the Sys Fkey labels are displayed will cause its System function key string to be transmitted. These strings and labels can only be downloaded from the line. The System strings may never be viewed on a SET UP screen. They are a maximum of eight characters long.

Function Keys F9 through F14 -- 98-Key Keyboard (56K420/ADA)

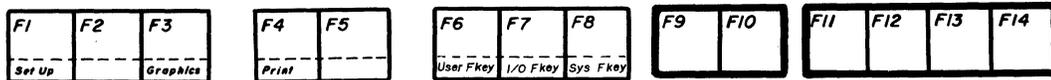


Figure 4-12. Function Keys F9 through F14 -- 98-Key Keyboard (56K420/ADA) Only

The boldly outlined keys of Figure 4-12 when depressed, will transmit the escape sequences shown in Table 4-F. The sequences will be displayed if data is sent to the display (local or remote echo) and the Monitor Mode option is on (refer to Section 5).

Table 4-F. Function Keys F9 Through F14

Keytop	Unshift		Shift	
	ASCII Seq.	Hex Code	ASCII Seq.	Hex Code
	ESCNo	1B, 4E, 6F	ESCNO	1B, 4E, 4F
	ESCnp	1B, 4E, 70	ESCNP	1B, 4E, 50
	ESCnq	1B, 4E, 71	ESCNQ	1B, 4E, 51
	ESCnr	1B, 4E, 72	ESCNR	1B, 4E, 52
	ESCns	1B, 4E, 73	ESCNS	1B, 4E, 53
	ESCnt	1B, 4E, 74	ESCNT	1B, 4E, 54

5. Terminal Setup

Overview

This section contains the procedure for changing options and User Fkey strings along with descriptions of all the options.

The Set-Up root key provides the user with the means of setting terminal options and writing User Fkey labels and strings in easy-to-understand English menus.

The first depression of the Set-Up root key (F1 with the Control key depressed) accesses the terminal options. The options permit changing various terminal actions and are presented in an English menu format that makes changing options as easy as depressing a key. The User Fkey setup is entered by depressing the NEXT SETUP screen-labeled key while the options menu is displayed.

Upon entering SETUP the data on the screen will be cleared (including the status line) and the display will be in 80 columns regardless of the "columns" option selection. On the top line, the title "OPTIONS SETUP" will appear in double width characters. The version number will appear in the bottom right corner, representing the version of firmware resident in the terminal.

The Cursor Control keys are active and are used to move the cursor to the desired location in the OPTIONS SETUP screen.

To move from any of the SETUP screens to the INTERACTIVE screen, depress the Set-Up key with the Control key depressed. Upon exiting the SETUP mode the Fkey labels (i.e. Print, User Fkey, I/O Fkey, or Sys Fkey) will be restored to what they were when entering the SETUP mode. The new options become effective immediately. The screen will be cleared, the cursor homed, and the screen will reflect whatever value of the reverse video option has been chosen. The split screen region, Origin mode on or off, the definitions of GO and G1, the active character set, the character attributes, and the cursor save/cursor restore values (refer to Sections 6 and 8) are defaulted to their power on conditions. Media copy and Print On-Line are off.

Refer to Section 4 for descriptions of the screen-labeled keys associated with the SETUP screens.

Terminal options and User and System Fkey strings and labels can be changed by a host through the use of escape sequences. Section 8 defines all the escape sequences that the terminal responds to.

OPTIONS SETUP			
COMMUNICATIONS		USER PREFERENCES	
I/O Card	idle	Cartridge	used
Speed	1200	Columns	-80-
Send Parity	even	Scrolling	jump
Check Parity	-no-	Reverse Video	-no-
Local Echo	off-	Volume	-4--
Monitor Mode	off-	Key Click	off-
Autowrap	-on-	Cursor Type	blck
Newline on LF	-no-	Cursor Blink	-no-
Return Key	-CR-	Labels	-on-
Enter Key	CR..		

DONE VERSION MO/DA/YR

		CHANGE OPTION	DEFAULT VALUES	SAVED VALUES	SAVE	NEXT SETUP	CLEAR TO END
--	--	------------------	-------------------	-----------------	------	---------------	-----------------

Figure 5-1. Terminal Options

The default values are shown for all options. The option names and values are displayed in normal intensity. The current option name and value will be in reverse video.

Changing Options

To change an option, the following steps should be taken:

1. Move the cursor to the option to be changed with the cursor positioning keys.
2. Depress the CHANGE OPTION screen-labeled key to step the option through its selectable values.

Note: The "ENTER" key option requires keyboard entered characters.

3. Depress the SAVE screen-labeled key to store the currently displayed values for the options in nonvolatile memory.

The DEFAULT VALUES and SAVED VALUES screen-labeled keys are useful when a large number of changes are to be made or errors are to be corrected.

The DEFAULT VALUES screen-labeled key changes all options back to their default values. The SAVED VALUES screen-labeled key changes all the options to the values that are stored in memory from the last SAVE key depression.

Depressing the SAVE screen-labeled key stores the currently displayed option values in nonvolatile memory.

Depressing the NEXT SETUP screen-labeled key will cause the USER Fkey SETUP screen to be displayed.

Depressing the CLEAR TO END screen-labeled key with the cursor in the "ENTER KEY" option field will clear the field of characters from the cursor to the end of the string.

Depression of the screen-labeled keys DEFAULT VALUES, SAVED VALUES, or SAVE will cause the message "DONE" to be displayed at the bottom left corner of the options screen. "DONE" will be erased when any key except Shift, Ctrl, Caps Lock, or Num Lock is depressed.

The option values become effective when the Set Up key is depressed (with the Control key depressed).

The following pages contain descriptions of the options, their selectable values, and their default values. Default values are indicated by an asterisk (*).

Option Descriptions

<u>Option</u>	<u>Selections</u>	<u>Description</u>
I/O Card	Idle* Used	This option is displayed only if an Expansion I/O card is inserted. When optioned "used", the I/O card replaces the main EIA port.
Speed	110 300 1200* 2400 4800 9600 19.2	This option defines the operational speed of the terminal. (110 is 11 unit code, all others are 10 unit code.) When on-line, the speed selection must be identical to the operational speed of the remote receiver. Speeds are in baud rate. 19.2 is 19200 baud. The AUX port also operates at the selected speed.

<u>Option</u>	<u>Selections</u>	<u>Description</u>
Send Parity	even* odd mark spac none	This option determines what state the 8th bit of sent data will be. If even or odd is selected, the 8th bit will be sent to reflect the selected parity. If mark (1) or spac (space) (0) is selected, the 8th bit will be sent as selected. If none is selected, the 8th bit will be sent as space.
Check Parity	yes no*	This option determines whether received data is compared to the Send Parity option. If "yes," errored characters are replaced by SUB characters (SB); if "no," received data parity is ignored. When the terminal is in Monitor mode, received parity will not be checked.
Local Echo	off* on	If "off," keyboarded data is sent to the line only and must be echoed back by the remote receiver to be seen on the terminal. If "on," keyboarded data will be sent to the line and the display at the same time.
Monitor Mode	on off*	If "on," received escape sequences and control characters will be displayed but not acted upon. LF, VT, and FF will be displayed and then acted on as newline (CR/LF). If "on," the terminal will do an autowrap when the cursor is in the last column and data is received. The control characters SI and SO will not be operational to move in and out of GO. When this option is "off," control characters are not viewed.

<u>Option</u>	<u>Selections</u>	<u>Description</u>
Autowrap	on* off	If set to "on," data received at the right margin will be preceded by a locally generated newline. The cursor moves to the next line upon receipt of the 81st or 133rd character on a line. If "off," received data will overprint at the right margin until a newline is received.
Newline on LF	yes no*	This option determines if the cursor moves to the beginning of the next line ("yes") or to the next line in the same column ("no") on receipt of a linefeed character.
Return Key	LF CR* CRLF	This option determines if CR or LF or CR/LF is sent when the Return key is depressed.
Enter Key	(Up to 4 Characters) CR*	This option allows for up to four ASCII characters to be entered that will be sent when the Enter key is depressed.
Cartridge	used* idle	Displayed only if cartridge is plugged in. If "idle" is selected, or if the cartridge is not functioning, the basic software will be running. If "used" is selected, the software in the cartridge is activated.
Columns	132 80*	This option determines whether the terminal powers up in the 80-Column or 132-Column mode. A change in this option clears the screen, homes the cursor, turns off the Insert mode, and resets the scrolling region to lines 1 through 24.
Scrolling	smth jump*	This option is used to indicate to the terminal whether vertical scrolling is "smooth" or "jumps" line-by-line.

<u>Option</u>	<u>Selections</u>	<u>Description</u>
Reverse Video	yes no*	If set to "yes," the entire screen will become light with dark characters when not in the SET UP state; if set to "no," the entire screen will be dark with light characters. The dark screen with light characters is the normal condition.
Volume	1 (quietest) 2 3 4* 5 6 7 (loudest)	This option controls the volume of the keyclick and bell. As this option is changed, the keyboard will generate a keyclick to indicate the new volume selection. With the cursor positioned on this option, Control G will cause the keyboard bell to ring.
Keyclick	on off*	This option determines whether or not the keyboard will generate an audible click when a key is depressed.
Cursor Type	line blck*	If set to "blck," the cursor will appear as a rectangle; if set to "line," the cursor will appear as an underscore.
Cursor Blink	yes no*	If set to "yes," the cursor will alternate between being normal and half intensity (blinking); if set to "no," the cursor will remain in a visible, nonchanging state.
Labels	off on*	If set to "on," the function key screen labels will be displayed when the terminal is in the normal Operational mode; if set to "off," the labels will not be displayed. If the terminal is in SETUP, the function key screen labels are displayed regardless of the option selection. If currently "off" and Fkey keys are downloaded from a remote host, this option will be changed to "on."

Options Record

The following list provides a place to record terminal options so that if the terminal should lose its operating options, the user can reoption the terminal.

	idle*	used					
I/O Card	<input type="checkbox"/>	<input type="checkbox"/>					
	110	300	1200*	2400	4800	9600	19.2
Speed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	even*	odd	mark	spac	none		
Send Parity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	yes	no*					
Check Parity	<input type="checkbox"/>	<input type="checkbox"/>					
	on	off*					
Local Echo	<input type="checkbox"/>	<input type="checkbox"/>					
	on	off*					
Monitor Mode	<input type="checkbox"/>	<input type="checkbox"/>					
	on*	off					
Autowrap	<input type="checkbox"/>	<input type="checkbox"/>					
	yes	no*					
Newline on LF	<input type="checkbox"/>	<input type="checkbox"/>					
	LF	CR*	CRLF				
Return Key	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
	CR*	Up to 4 Characters					
Enter Key	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
	used*	idle					
Cartridge	<input type="checkbox"/>	<input type="checkbox"/>					

	80*	132					
Columns	<input type="checkbox"/>	<input type="checkbox"/>					
	smth	jump*					
Scrolling	<input type="checkbox"/>	<input type="checkbox"/>					
	yes	no*					
Reverse Video	<input type="checkbox"/>	<input type="checkbox"/>					
	1	2	3	4*	5	6	7
Volume	<input type="checkbox"/>						
	on	off*					
Keyclick	<input type="checkbox"/>	<input type="checkbox"/>					
	line	blk*					
Cursor Type	<input type="checkbox"/>	<input type="checkbox"/>					
	yes	no*					
Cursor Blink	<input type="checkbox"/>	<input type="checkbox"/>					
	on*	off					
Labels	<input type="checkbox"/>	<input type="checkbox"/>					

User Fkey Setup

The following figure shows the USER Fkey SETUP menu. The fields and their functions are described following the figure.

USER FKEY SETUP		
	Label	String
F1:	F1	E _C Oc up to 35 characters
F2:	F2	E _C Od up to 35 characters
F3:	F3	E _C Oe up to 35 characters
F4:	F4	E _C Of up to 35 characters
F5:	F5	E _C Og up to 35 characters
F6:	F6	E _C Oh up to 35 characters
F7:	F7	E _C Oi up to 35 characters
F8:	F8	E _C Oj up to 35 characters

PREVIOUS FIELD	NEXT FIELD		DEFAULT VALUES			NEXT SETUP	CLEAR TO END
-------------------	---------------	--	-------------------	--	--	---------------	-----------------

Figure 5-2. User Fkey Setup

The label field provides for sixteen characters to be entered that will be displayed as a screen label for that key when the User Fkey root key is depressed. The label is two lines of eight characters each.

The string can be up to thirty-five characters that can be commands or repetitive data or anything that may be useful to have on a programmed key.

Changing Fkey Labels and Strings

To change a label or string, the following steps should be taken:

1. Move the cursor to the beginning of the label or string to be changed with the cursor positioning keys or the PREVIOUS FIELD or NEXT FIELD screen-labeled keys.
2. Enter the desired characters from the keyboard.

Depressing the DEFAULT VALUES screen-labeled key changes all labels and strings back to their default values (the default values are shown in Figure 5-2).

Depressing the NEXT SETUP screen-labeled key brings up the Expansion I/O Card Setup screen (if the Expansion I/O card is present and uses the options screen). If an Expansion I/O card is not present or present but does not use the options screen, depressing the NEXT SETUP screen-labeled key brings up the Options SETUP screen.

Depressing the CLEAR TO END screen-labeled key will clear the label or string of all characters from the cursor to the end of the label or string.

The labels and strings are stored when the USER Fkey SETUP screen is exited by depressing the NEXT SETUP screen-labeled key or the Set-Up root key (F1) with the Ctrl (Control) key depressed.

6. Operations

Overview

This section describes the mode of transmission and memory access. The terminal has three operational states: an interactive state, a setup state, and a self-test state. It communicates asynchronously character-at-a-time only (from the keyboard) on-line. Keyboarded data can be displayed only if the data is echoed back (local or remote) to the terminal. The 610 BCT utilizes the ANSI (American National Standards Institute) 3.64 line standard where applicable.

The screen consists of twenty-seven lines of 80 or 132 columns, which are to be divided into twenty-four scrollable lines, a host writeable status line, and two screen label lines.

The terminal operates in full duplex on a point-to-point private-line or switched network. The terminal requires the use of a data source with an EIA RS-232-C interface.

Refer to Section 2 for a description of the self-test state and Section 5 for a description of the setup state.

On-Line Interactive

The terminal is always in an on-line state which indicates that characters are transmitted and/or received regardless of the state of DSR from the data source. When DSR is high (+12 Vdc), an "on" indicator with the underline attribute is displayed on line 27 of the display (between F3 and F4 screen-labels).

Receive to Display:

In the on-line interactive state, all received data is directed to the screen. Characters may be displayed as double wide or double high and double wide (refer to Section 8) and may be smooth or jump scrolled vertically. The character set is selectable and text may be displayed with bold, normal, blink, underline, blank, and/or reverse video attributes. A blocked or underscored cursor marks the current location of activity and may be solid, blinking, or invisible.

If the CHECK PARITY option is "yes," parity of a received character is checked according to the SEND PARITY option. The substitute (SB) character is displayed upon reception of a parity error. If the CHECK PARITY option is "no", the send parity option is set to "none", or the terminal has MONITOR MODE option "on," received data is displayed without being checked for parity.

With MONITOR MODE option enabled ("on"), received escape sequences, control characters, and the delete character will be displayed. LF, VT, and FF will be displayed and will be acted on as a newline. In the MONITOR MODE, the terminal will always do an autowrap when the cursor is in the last column and data is received.

If a display of the data being sent to the line is desired, the distant receiver must echo that data back to the terminal or the LOCAL ECHO option must be "on." If the remote receiver echoes data back to the terminal and the LOCAL ECHO option is "on," two characters will appear on the display for each character sent. There is no provision for sending data from the screen in block fashion.

Destructive Scrolling

The display will destructively scroll in the interactive state. With destructive scroll, the display can receive unlimited amounts of data; however, only the last twenty-four lines of data will be displayed. A destructive scrolling routine is used by the terminal to move all the data up or down one line on the screen and place a new blank line at the bottom or top of the screen or split screen region. The status line and the screen label lines do not scroll.

Destructive scrolling takes place when a LF, VT, or FF character or when an index sequence (ESCD) or a newline sequence (ESCE) is received while the cursor is at the bottom of the screen or split screen region. If the cursor is at the last line of the screen or split screen region and characters are received which would overflow the line, an internal newline operation takes place and the destructive scroll routine is used when the AUTOWRAP option (refer to Section 5) is also enabled. If the AUTOWARP option is not enabled, the terminal will continue to receive characters with the most recently received character being displayed in the last character position until a LF, VT, or FF character or an index or newline sequence is received. At that time, a destructive scroll will take place.

Destructive scrolling also takes place when the reverse index sequence (ESC M) is received at the top of the screen or split screen region. As a result, all the data on the screen or in the split screen region will scroll down one line and a blank line will be placed at the top of the scrolling area.

Scrolling Regions

The screen can be divided into two static regions and one scrolling region, one static region and one scrolling region, or one scrolling region by receiving the escape sequence ESC[top row; bottom row r (refer to Section 8) where:

Top row -- defines the first line of the scrolling region.

Bottom row -- defines the last line of the scrolling region.

e.g.: ESC[5;20 r

This sequence will establish a scrolling region from lines 5 through 20. Lines 1 through 4 and 21 through 24 are static regions.

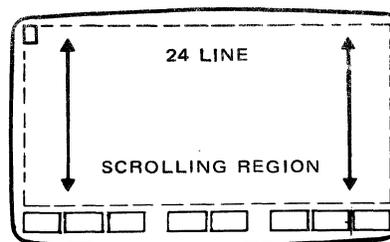
To establish only two regions, either of the following sequences are used:

ESC[top row r or ESC[;bottom row r

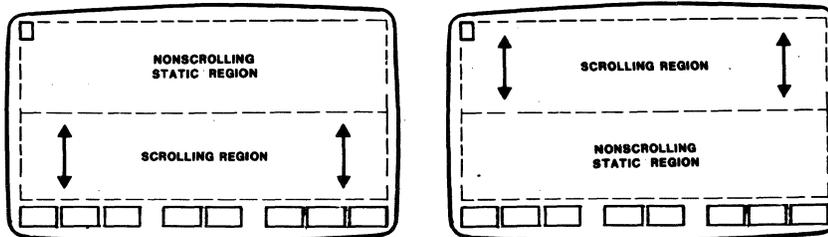
The first sequence will establish the lower region as the scrolling region and the second sequence will establish the upper region as the scrolling region.

Whenever the split screen escape sequence is received, the cursor will be homed. The cursor can be freely moved between screen regions with cursor addressing when not in the Origin mode (refer to Section 8), but destructive scrolling will occur only in the defined region. If in Origin mode (refer to Section 8), the cursor cannot be moved outside the scrolling region except for the status line (by an escape sequence) or a cursor restore sequence. The scrolling region must be at least two lines.

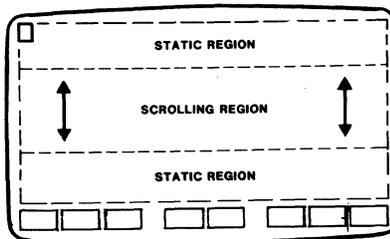
Line insert and line delete (refer to Section 8) operate only in the scrolling region. When autowrap is enabled and the cursor is on the last line of the screen in a nonscrolling region, a newline will position the cursor at the beginning of the same line.



Example: One Scrolling Region



Example: One Static and One Scrolling Region



Example: Two Static Regions and One Scrolling Region

- Note 1:** On power up, the scrolling region is set to line 1 and line 24 (a single twenty-four line scrolling region).
- Note 2:** Line insert and line delete (refer to Section 8) operate only in the scrolling region.
- Note 3:** When autowrap (refer to Section 5) is enabled and the cursor is in the last line of the display in a nonscrolling region, a newline will position the cursor at the beginning of the same line.

Host-Writeable Status Line

A host can write to the status line (line 25) by using cursor positioning (refer to Section 8) to the status line. Autowrap is off while the cursor is in this line. The United States character set (refer to Section 8) is always used on the status line. The following control characters and sequences are not allowed on the status line: linefeed, vertical tab, formfeed, index, reverse index, newline, cursor save, cursor up or down, and clear screen to/from cursor.

Character Sets

Two character sets are active at any given time. They are named G0 and G1. At power up, both are set to the United States character set. G0 is assigned one of the following character sets when the sequence ESC(character refer to Section 6 and 7) is received; G1 is assigned one of the following character sets when the sequence ESC) character (refer to Section 6 and 7) is received:

- United Kingdom Character Set
- United States Character Set
- Special Character and Line Drawing Character Set
- Securities Industry Character Set
- Mosaic Character Set

At power up, character set G0 is active. Upon receipt of the SO (Shift Out) character (Control N), character set G1 becomes active. Receiving SI (Shift In) character (Control O) causes G0 to become the active character set again. Regardless of the active character set, the United States character set is always used on the status line and when in SETUP.

Downloading

Options and Fkeys can be downloaded to the terminal. Each of these downloads is done through the use of escape sequences which are described in the following paragraphs.

Setting Options On-Line

Options may be downloaded to the terminal by using the following escape sequences (ESC is the ESCAPE character):

<u>Option</u>	<u>Sequence</u>
*SPEED SELECTION (Baud)	
110 Baud, 11 Unit Code	ESC[1;5|
300 Baud, 10 Unit Code	ESC[1;6|
1200 Baud, 10 Unit Code	ESC[1;0|
2400 Baud, 10 Unit Code	ESC[1;1|
4800 Baud, 10 Unit Code	ESC[1;2|
9600 Baud, 10 Unit Code	ESC[1;3|
19200 Baud, 10 Unit Code	ESC[1;4|

<u>Option</u>	<u>Sequence</u>
*SEND PARITY	
even	ESC[3;0|
odd	ESC[3;1|
mark	ESC[3;2|
space	ESC[3;3|
none	ESC[3;4|
CHECK PARITY	
yes	ESC[?15h
no	ESC[?15l
LOCAL ECHO	
off	ESC[12h
on	ESC[12l
MONITOR MODE	
on	ESC[13h
off	ESC[13l
AUTOWRAP	
on	ESC[?7h
off	ESC[?7l
NEWLINE ON LINEFEED	
yes	ESC[20h
no	ESC[20l
RETURN KEY	
LF	ESC[8;1|
CR	ESC[8;0|
CR/LF	ESC[8;2|
ENTER KEY	
(String up to 4 characters)	ESC[25;count|String (count = number of characters (1-4) in String)

*If the speed or parity options are downloaded while the terminal is on-line, some received characters may be lost.

<u>Option</u>	<u>Sequence</u>
CARTRIDGE	
used	ESC[?14h
idle	ESC[?14l
COLUMNS	
132	ESC[?3h
80	ESC[?3l
SCROLLING	
smooth	ESC[?4h
jump	ESC[?4l
REVERSE VIDEO	
yes	ESC[?5h
no	ESC[?5l
VOLUME	
1 (quietest)	} Not Selectable On-Line
2	
3	
4	
5	
6	
7 (loudest)	
KEY CLICK	
on	ESC[?16h
off	ESC[?16l
CURSOR TYPE	
line	ESC[?11h
block	ESC[?11l
CURSOR BLINK	
yes	ESC[?12h
no	ESC[?12l
LABELS	
off	ESC[?13h
on	ESC[?13l

Setting Function Keys (F1-F8) On-Line

The User Fkey, I/O Fkey, and Sys Fkey keys can be downloaded by the host using the escape sequence ESC[ps1;pn;ps2;ps3 q label+string where:

ps1 = Fkey key to be downloaded (1 through 8)
pn = number of characters in the string (up to 35 for User Fkey and 8 for Sys Fkey). If pn = 0, only the labels are downloaded without changing the strings.
ps2 = ignored
ps3 = 0 if Sys Fkey, 1 if User Fkey, or 2 if I/O Fkey (if an I/O card is used refer to the I/O card User's Guide for sequence implementation).
label+string = a 16 character label (must be 16) followed immediately by the string of characters as defined by the pn in the escape sequence.

Example: ESC[1;7;0;1qspSCROLLspspREGIONspESC[5;20r

Note: "sp" is space character.

This sequence will write a label of SCROLL REGION for User Fkey key 1 and load a string to make lines 5 through 20 the scrolling region.

The sequence ESC[1q will be interpreted as a download sequence. The next sixteen characters will be the screen label for Sys Fkey 1.

All strings stored in the User Fkey keys and labels will be saved whether they are programmed locally or are downloaded.

Printer Operations

This terminal is capable of supporting an auxiliary printer. The interface leads for the auxiliary port are defined in Section 9. The printer speed must match the line speed.

This terminal is capable of operating with AT&T Printer Models, 455, 458, 475, 5310, and 5320. Limitations to the use of the 458 and 475 Printers are:

458 Printer -- Pins 10, 18, 19, and 21 (current loop leads), pin 11 (reverse channel lead), and pin 14 (secondary transmit data) of the printer are not bridged through to the 610 BCT terminal main port.

475 Printer -- Pin 14 (fault indication) of the printer is not bridged through to the 610 BCT terminal main port.

Pin 4 (Clear To Send) reflects the status of pin 5 (Request To Send) from the printer.

Flow control from the printer (DC1 for X-on, DC3 for X-off) is recognized by the 610 BCT. The 610 BCT will stop sending data to the printer when a DC3 is received. Data will again be transmitted when a DC1 is received. If a DC3 from the printer is not followed by a DC1 within 30 seconds, the "mc" or "pol" indicator becomes reverse video blinking to indicate a possible printer problem. Receiving a DC1 from the printer or dropping Data Terminal Ready (DTR) on the AUX port clears the error condition.

If a received escape sequence is one that the terminal recognizes, the sequence will be acted upon and the data (7 bits with the 8th as space) sent to the printer if the screen-label PRINT ON-LINE is on (an asterisk (*) present in the label). If media copy is being used, the data is sent only to the printer.

Print On-Line

Receiving the escape sequence ESC[?5i will cause the PRINT ON-LINE screen-labeled key to be turned on; receiving the sequence ESC[?4i will turn PRINT ON-LINE off. When the terminal has Local Echo on, keyboarded data is sent to the printer during PRINT ON-LINE. Print On-Line is terminated on entering Set-Up.

Media Copy

The line can send to the printer without sending to the display by using the Media Copy escape sequences. The sequence ESC[5i received on line will put the terminal into the Media Copy mode. Receiving the sequence ESC[4i will cause the terminal to leave the Media Copy mode. When Media Copy is on, all data sent to the terminal is sent directly to the printer and is not displayed.

If the send parity option is set to "none", all 8 bits of data are sent to the printer; otherwise, the 8th bit is sent as space. The keyboard is active during Media Copy. Data echoed to the terminal (local or remote) is sent directly to the printer.

When Media Copy is on, an "mc" indicator appears on line 26 between the screen-labels for F3 and F4. Media Copy overrides Print On-Line.

Media Copy is terminated when the line disconnects or Set-Up is entered.

7. Transmitted Characters

Overview

This section describes the ASCII characters generated by the 103-key keyboard (56K430/ACZ) and 98-key keyboard (56K420/ADA). The following tables show the transmitted ASCII codes, characters, and sequences for key depressions. The characters will be displayed locally and the functions will be performed locally if data is echoed back (local or remote).

Table 7-A. Transmitted Codes -- F1 Through F8 Keys

Key Legend	Local Function	Unshift		Shift		Control	
		Alpha* Numeric	Hex	Alpha Numeric	Hex	Function	Hex
F1 Set-Up	SLK 1	ESC 0 c	1B, 4F, 63	none		none	
F2	SLK 2	ESC 0 d	1B, 4F, 64	none		none	
F3 Graphics	SLK 3	ESC 0 e	1B, 4F, 65	none		none	
F4 Print	SLK 4	ESC 0 f	1B, 4F, 66	none		none	
F5	SLK 5	ESC 0 g	1B, 4F, 67	none		none	
F6 User Fkey	SLK 6	ESC 0 h	1B, 4F, 68	none		none	
F7 I/O Fkey	SLK 7	ESC 0 i	1B, 4F, 69	none		none	
F8 Sys Fkey	SLK 8	ESC 0 j	1B, 4F, 6A	none		none	

*Default values shown.

Table 7-B. Transmitted Codes -- Main Section

Key Legend	Local Function	Unshift		Shift		Control	
		Alpha Numeric	Hex	Alpha Numeric	Hex	Function	Hex
†Del Esc	†DEL/ESC	ESC	1B	DEL	7F	none	
! 1	Spec Char/ Numeral	1	31	!	21	none	
@ 2	Spec Char/ Numeral	2	32	@	40	NUL	00
# 3	Spec Char/ Numeral	3	33	#	23	none	
\$ 4	Spec Char/ Numeral	4	34	\$	24	none	
% 5	Spec Char/ Numeral	5	35	%	25	none	
^ 6	Spec Char/ Numeral	6	36	^	5E	RS	1E
& 7	Spec Char/ Numeral	7	37	&	26	none	
* 8	Spec Char/ Numeral	8	38	*	2A	none	
(9	Spec Char/ Numeral	9	39	(	28	none	
) 0	Spec Char/ Numeral	0	30	)	29	none	
— -	Spec Char/ Numeral	-	2D	—	5F	US	1F
+ =	Spec Char/ Numeral	=	3D	+	2B	none	
Back Space	Back Space	BS	08	BS	08	BS	08

†103-key keyboard (56K430/ACZ) only (98-key keyboard (56K420/ADA) has ESC only).

Table 7-B. Transmitted Codes -- Main Section (Continuation)

Key Legend	Local Function	Unshift		Shift		Control	
		Alpha Numeric	Hex	Alpha Numeric	Hex	Function	Hex
Reset Break Discon	Break/ Discon	Break		ESCc#		disconnect#	
Delete ^s	Delete	DEL	7F	none		none	
Tab	Tab Fwd Back	HT	09	ESC[Z		ESC[Z	
Q	Alpha	q	71	Q	51	DC1	11
W	Alpha	w	77	W	57	ETB	17
E	Alpha	e	65	E	45	ENQ	05
R	Alpha	r	72	R	52	DC2	12
T	Alpha	t	74	T	54	DC4	14
Y	Alpha	y	79	Y	59	EM	19
U	Alpha	u	75	U	55	NAK	15
I	Alpha	i	69	I	49	HT	09
O	Alpha	o	6F	O	4F	SI	0F
P	Alpha	p	70	P	50	DLE	10
{ [	Spec Char	[	5B	{	7B	ESC	1B
}]	Spec Char	]	5D	}	7D	GS	1D
| \	Spec Char	\	5C	|	7C	FS	1C
~ `	Spec Char	`	60	~	7E	none	

#103-key keyboard (56K430/ACZ) only.

#98-key keyboard (56K420/ADA) only.

Table 7-B. Transmitted Codes -- Main Section (Continuation)

Key Legend	Local Function	Unshift		Shift		Control	
		Alpha Numeric	Hex	Alpha Numeric	Hex	Function	Hex
Caps Lock	Caps Lock	none		none		none	
Ctrl	Control	none		none		none	
A	Alpha	a	61	A	41	SOH	01
S	Alpha	s	73	S	53	DC3	13
D	Alpha	d	64	D	44	EOT	04
F	Alpha	f	66	F	46	ACK	06
G	Alpha	g	67	G	47	BEL	07
H	Alpha	h	68	H	48	BS	08
J	Alpha	j	6A	J	4A	LF	0A
K	Alpha	k	6B	K	4B	VT	0B
L	Alpha	l	6C	L	4C	FF	0C
:	Spec Char	;	3B	:	3A	none	
;							
"	Spec Char	'	27	"	22	none	
'							
Return	Return	CR/LF/CRLF		CR/LF/CRLF		CR/LF/CRLF	
Enter	Enter	4 char opt seq		4 char opt seq		4 char opt seq	
Shift	Shift	none		none		none	
Z	Alpha	z	7A	Z	5A	SUB	1A
X	Alpha	x	78	X	58	CAN	18
C	Alpha	c	63	C	43	ETX	03

Table 7-B. Transmitted Codes -- Main Section (Continuation)

Key Legend	Local Function	Unshift		Shift		Control	
		Alpha Numeric	Hex	Alpha Numeric	Hex	Function	Hex
V	Alpha	v	76	V	56	SYN	16
B	Alpha	b	62	B	42	STX	02
N	Alpha	n	6E	N	4E	SO	0E
M	Alpha	m	6D	M	4D	CR	0D
< ,	Spec Char	,	2C	<	3C	none	
> .	Spec Char	.	2E	>	3E	none	
? /	Spec Char	/	2F	?	3F	none	
Shift	Shift	none		none		none	
Ctrl	Control	none		none		none	
	Space	SP	20	SP	20	SP	20
Ctrl	Control	none		none		none	
Num Lock*	Num Lock	none		none		none	
Scroll Lock§	none	DC1 or DC3	11 or 13	DC1 or DC3	11 or 13	DC1 or DC3	11 or 13

#103-key Keyboard (56K430/ACZ) only.
§98-key Keyboard (56K420/ADA) only.

Table 7-C. Transmitted Codes — 103-Key Keyboard (56K430/ACZ)
Left-Hand Cluster

Key Legend	Local Function	Unshift	Shift	Control
		Alpha Numeric	Alpha Numeric	Alpha Numeric
Clear Line	none	ESCOa	ESCOA	ESCOA
Rstrrt Ref	none	ESCOb	ESCOB	ESCOB
Creat	none	ESCON	ESCON	ESCON
Save	none	ESCOo	ESCOO	ESCOO
Undo	none	ESCOs	ESCOS	ESCOS
Redo	none	ESCOT	ESCOT	ESCOT
Find	none	ESCOx	ESCOX	ESCOX
Rplac	none	ESCOy	ESCOY	ESCOY
Move	none	ESCNC	ESCNC	ESCNC
Copy	none	ESCND	ESCND	ESCND
Dlete	none	ESCNE	ESCNE	ESCNE
Dlete Char	none	ESCNF	ESCNF	ESCNF
Slect Mark	none	ESCNI	ESCNI	ESCNI
Input Mode	none	ESCNj	ESCNJ	ESCNJ

Table 7-D. Transmitted Codes — 103-Key Keyboard (56K430/ACZ)
Right-Hand Cluster

Key Legend	Local Function	Unshift		Shift		Control		Num Lock
		Alpha Numeric	HEX	Alpha Numeric	HEX	Alpha Numeric	HEX	
▲ Exit ▼	none	ESCOk		ESCOK		ESCOK		↑ No Affect ↓
▲ Msg ▼	none	ESCOl		ESCOL		ESCOL		
▲ Help ▼	none	ESCOM		ESCOM		ESCOM		
Suspd	none	ESCOp		ESCOp		ESCOp		
Rsume	none	ESCOq		ESCOQ		ESCOQ		
▲ Opts ▼	none	ESCOr		ESCOR		ESCOR		
Cmd	none	ESCOu		ESCOU		ESCOU		
Close Open	none	ESCOv		ESCOV		ESCOV		
Cancl	none	ESCOW		ESCOW		ESCOW		
▲ Print ▼ 7-----	none numeric	ESCOz 7	37	ESCOZ 7	37	ESCOZ 7	37		OFF ON
Clear Rfrsh 8-----	function numeric	ESCNa 8	38	ESC[2J 8	38	ESC[2J 8	38	OFF ON
▲ Page ▼ 9-----	none numeric	ESC[U 9	39	ESC[V 9	39	ESC[V 9	39	OFF ON
Beg 4-----	none numeric	ESC9 4	34	ESCNB 4	34	ESCNB 4	34	OFF ON
Home 5-----	home numeric	ESC[H 5	35	none 5	35	none 5	35	OFF ON
End 6-----	none numeric	ESCO 6	36	ESCNN 6	36	ESCNN 6	36	OFF ON

Table 7-D. Transmitted Codes -- 103-Key Keyboard (56K430/ACZ)
Right-Hand Cluster (Continuation)

Key Legend	Local Function	Unshift		Shift		Control		Num Lock
		Alpha Numeric	Hex	Alpha Numeric	Hex	Alpha Numeric	Hex	
<i>Prev</i> 7-----	none numeric	ESCNg 1	 31	ESCNG 1	 31	ESCNG 1	 31	OFF ON
<i>Roll</i> ▲ 2-----	cursor up numeric	ESC[A 2	 32	ESC[T** 2	 32	ESC[T** 2	 32	OFF ON
<i>Next</i> 3-----	none numeric	ESCNh 3	 33	ESC[NH 3	 33	ESC[NH 3	 33	OFF ON
← -----	cursor left hyphen	ESC[D -	 2D	ESC[@** -	 2D	ESC[@** -	 2D	OFF ON
<i>Roll</i> ▼ 0-----	cursor down numeric	ESC[B 0	 30	ESC[S** 0	 30	ESC[S** 0	 30	OFF ON
→ -----	cursor right period	ESC[C .	 2E	ESC[@ A** .	 2E	ESC[@ A** .	 2E	OFF ON

**No local function.

□ Space

Table 7-E. Transmitted Codes -- 98-Key Keyboard (56K420/ADA)
Center and Right-Hand Cluster

Key Legend	Local Function	Unshift		Shift		Control	
		Alpha Numeric	Hex	Alpha Numeric	Hex	Alpha Numeric	Hex
F9	none	ESCNo		ESCNO		none	
F10	none	ESCNo		EScNP		none	
F11	none	ESCNo		EScNQ		none	
F12	none	ESCNo		EScNR		none	
F13	none	ESCNo		EScNS		none	
F14	none	ESCNo		EScNT		none	
Break/ Discon	Break/ Disconnect	break		none		disconnect	
Clear/ Reset	Clear/ Reset	ESC[2J		none		ESCc	
(=	Spec Chars	=	3D	(	28	(	28
) *	Spec Chars	*	2A	)	29	)	29
/	Spec Char	/	2F	/	2F	/	2F
+	Spec Char	+	2B	+	2B	+	2B
7	numeric	7	37	7	37	7	37
8	numeric	8	38	8	38	8	38
9	numeric	9	39	9	39	9	39
-	hyphen	-	2D	-	2D	-	2D
↑	cursor up	ESC[A		ESC[T**		ESC[T**	

**No local function.

Table 7-E. Transmitted Codes -- 98-Key Keyboard (56K420/ADA)
Center and Right-Hand Cluster (Continuation)

Key Legend	Local Function	Unshift		Shift		Control	
		Alpha Numeric	Hex	Alpha Numeric	Hex	Alpha Numeric	Hex
4	numeric	4	34	4	34	4	34
5	numeric	5	35	5	35	5	35
6	numeric	6	36	6	36	6	36
,	comma	,	2C	,	2C	,	2C
←	cursor left	ESC[D		ESC[□ @**		ESC[□ @**	
HOME	home	ESC[H		none		none	
→	cursor right	ESC[C		ESC[□ A**		ESC[□ A**	
1	numeric	1	31	1	31	1	31
2	numeric	2	32	2	32	2	32
3	numeric	3	33	3	33	3	33
↓	cursor down	ESC[B		ESC[S**		ESC[S**	
0	numeric	0	30	0	30	0	30
.	period	.	2E	.	2E	.	2E
Enter	enter	4 char opt seq		same		same	

**No local function.

□ Space

8. Received Characters

Overview

This section describes the terminal's responses to received characters. Received characters fall into two categories, display characters and control (escape) sequences. This section describes the terminal action to both display characters and escape sequences.

The terminal is an ASCII device with American National Standards Institute (ANSI) standard 3.64 based escape sequences.

The following table shows the ASCII character set that the terminal recognizes. The first two columns (0 and 1) are control characters, some of which cause terminal actions. These are described later in this section.

In interactive with MONITOR MODE on, all characters are displayed. Received escape sequences and control characters will be displayed but not acted on (LF, VT, and FF will be displayed and then acted on as a NEWLINE). With MONITOR MODE off, control characters and escape sequences will be acted on but not displayed.

Table 8-A. ASCII Code

		1st Hexadecimal Character								Column					
Hex		0	1	2	3	4	5	6	7						
2nd Hexadecimal Character	0	NUL	DLE	SP	0	@	P	`	p	0	0				
	1	SOH	DC1	!	1	A	Q	a	q	1	0				
	2	STX	DC2	"	2	B	R	b	r	0	1				
	3	ETX	DC3	#	3	C	S	c	s	1	1				
	4	EOT	DC4	\$	4	D	T	d	t	0	0				0
	5	ENQ	NAK	%	5	E	U	e	u	1	0				
	6	ACK	SYN	&	6	F	V	f	v	0	1				
	7	BEL	ETB	'	7	G	W	g	w	1	1				
	8	BS	CAN	(	8	H	X	h	x	0	0				
	9	HT	EM	)	9	I	Y	i	y	1	0				
	A	NL	SUB	*	:	J	Z	j	z	0	1				0
	B	VT	ESC	+	;	K	[	k	{	1	1				
	C	FF	FS	,	<	L	\	l	|	0	0				1
	D	CR	GS	-	=	M	]	m	}	1	0				
	E	SO	RS	.	>	N	^	n	~	0	1				
	F	SI	US	/	?	O	_	o	DEL%	1	1				
Row										1	2	3	4		
		0	1	0	1	0	1	0	1	5					
		0		1		0		1		6				BITS	
		0				1				7					

- | | | | |
|-------------------------|---------------------|----------------------------|-----------------------|
| NUL • Null | BS • Back Space | DLE • Data Link Escape | CAN • Cancel |
| SOH • Start of Heading | HT • Horizontal Tab | DC1 • Device Control 1 | EM • End of Media |
| STX • Start of Text | NL • New Line | DC2 • Device Control 2 | SUB • Substitute |
| ETX • End of Text | VT • Vertical Tab | DC3 • Device Control 3 | ESC • Escape |
| EOT • End of Transmis'n | FF • Form Feed | DC4 • Device Control 4 | FS • Field Separator |
| ENQ • Enquiry | CR • Carriage Ret | NAK • Negative Acknowledge | GS • Group Separator |
| ACK • Acknowledge | SO • Shift-Out | SYN • Synchronous | RS • Record Separator |
| BEL • Bell | SI • Shift-In | ETB • End of Trans'n Block | US • Unit Separator |
| | SP • Space | DEL • Delete | |

Control Characters

The following table lists the ASCII control characters and describes actions, if any, that the terminal takes in response to the characters.

Table 8-B. ASCII Control Characters

Character	Mnemonic	Displayed Character	Hex Code	Function
Null	NU		00	none
Start of Header	SOH	S _H	01	none
Start of Text	STX	S _X	02	none
End of Text	ETX	E _X	03	none
End of Transmission	EOT	E _T	04	none
Enquiry	ENQ	E _Q	05	none
Acknowledge	ACK	A _K	06	none
Bell	BEL	␣	07	ring bell
Back Space	BS	B _S	08	backspace
Horizontal Tab	HT	→	09	horizontal tab
Line Feed (New Line)	LF	≡	0A	line feed
Vertical Tab	VT	V _T	0B	line feed
Form Feed	FF	F _F	0C	line feed
Carriage Return	CR	←	0D	carriage return
Shift Out	SO	S _O	0E	select G1 font
Shift In	SI	S _I	0F	select G0 font
Data Link Escape	DLE	D _L	10	none
Device Control 1	DC1	D ₁	11	none
Device Control 2	DC2	D ₂	12	turn on print on-line
Device Control 3	DC3	D ₃	13	none
Device Control 4	DC4	D ₄	14	turn off print on-line

Table 8-B. ASCII Control Characters (Continuation)

Character	Mnemonic	Displayed Character	Hex Code	Function
Negative Acknowledge	NAK	N K	15	none
Synchronous	SYN	S Y	16	none
End of Transmission Block	ETB	E B	17	none
Cancel	CAN	C N	18	cancel escape sequence parsing
End of Media	EM	E M	19	none
Substitute	SUB	S B	1A	cancel escape sequence parsing
Escape	ESC	E C	1B	begin escape sequence parsing
Field Separator	FS	F S	1C	none
Group Separator	GS	G S	1D	none
Record Separator	RS	R S	1E	none
Unit Separator	US	U S	1F	none

United States Character Set

ESC(B = G0
ESC)B = G1

Table 8-C. United States ASCII Set

H E X	Ø	1	2	3	4	5	6	7
Ø		D _L	SPACE	Ø	@	P	\	P
1	S _H	D ₁	!	1	A	Q	a	q
2	S _X	D ₂	"	2	B	R	b	r
3	E _X	D ₃	#	3	C	S	c	s
4	E _T	D ₄	\$	4	D	T	d	t
5	E _Q	N _K	%	5	E	U	e	u
6	A _K	S _Y	&	6	F	V	f	v
7	↑	E _B	'	7	G	W	g	w
8	B _S	C _N	(	8	H	X	h	x
9	→	E _M	)	9	I	Y	i	y
A	≡	S _B	*	:	J	Z	j	z
B	V _T	E _C	+	;	K	[	k	{
C	F _F	F _S	,	<	L	\	l	!
D	<	G _S	-	=	M	]	m	}
E	S _O	R _S	.	>	N	^	n	~
F	S _I	U _S	/	?	O	_	o	//

United Kingdom Character Set

ESC(A = G0
ESC)A = G1

Table 8-D. United Kingdom Set

H E X	Ø	1	2	3	4	5	6	7
Ø		D _L	SPACE	Ø	@	P	`	p
1	S _H	D ₁	!	1	A	Q	a	q
2	S _X	D ₂	"	2	B	R	b	r
3	E _X	D ₃	£	3	C	S	c	s
4	E _T	D ₄	\$	4	D	T	d	t
5	E _Q	N _K	%	5	E	U	e	u
6	A _K	S _Y	&	6	F	V	f	v
7	Å	E _B	'	7	G	W	g	w
8	B _S	C _N	(	8	H	X	h	x
9	→	E _M	)	9	I	Y	i	y
A	≡	S _B	*	:	J	Z	j	z
B	V _T	E _C	+	;	K	[	k	{
C	F _F	F _S	,	<	L	\	l	|
D	←	G _S	-	=	M	]	m	}
E	S _O	R _S	.	>	N	^	n	~
F	S _I	U _S	/	?	O	_	o	//

Special Character and Line Drawing Set

ESC(O = G0
ESC)O = G1

Table 8-E. Special Character and Line Drawing Set

H E X	Ø	1	2	3	4	5	6	7
Ø		D _L	SPACE	Ø	@	P	◆	—
1	S _H	D ₁	!	1	A	Q	⋯	—
2	S _X	D ₂	"	2	B	R	H _T	—
3	E _X	D ₃	#	3	C	S	F _F	—
4	E _T	D ₄	\$	4	D	T	C _R	┌
5	E _Q	N _K	%	5	E	U	L _F	└
6	A _K	S _Y	&	6	F	V	°	⊥
7	⏏	E _B	/	7	G	W	±	⊥
8	B _S	C _N	(	8	H	X	N _L	|
9	→	E _M	)	9	I	Y	V _T	≤
A	≡	S _B	*	:	J	Z	┘	≥
B	V _T	E _C	+	;	K	[	└	π
C	F _F	F _S	,	<	L	\	┘	≠
D	←	G _S	-	=	M]	┘	£
E	S _O	R _S	.	>	N	^	+	•
F	S _I	U _S	/	?	O	BLANK	—	//

Securities Industry Character Set

ESC(1 = G0
ESC)1 = G1

Table 8-F. Securities Industry Set

H E X	Ø	1	2	3	4	5	6	7
Ø		D _L	SPACE	Ø	¼	P	\	p
1	S _H	D ₁	⅛	1	A	Q	a	q
2	S _X	D ₂	"	2	B	R	b	r
3	E _X	D ₃	#	3	C	S	c	s
4	E _T	D ₄	\$	4	D	T	d	t
5	E _Q	N _K	%	5	E	U	e	u
6	A _K	S _Y	&	6	F	V	f	v
7	↑	E _B	'	7	G	W	g	w
8	B _S	C _N	(	8	H	X	h	x
9	→	E _M	)	9	I	Y	i	y
A	≡	S _B	½	:	J	Z	j	z
B	V _T	E _C	+	;	K	⅞	k	{
C	F _F	F _S	,	<	L	\	l	!
D	←	G _S	-	=	M	¾	m	}
E	S _O	R _S	.	>	N	⅜	n	~
F	S _I	U _S	/	?	O	⅝	o	//

Mosaic Character Set

ESC{ } = G0
ESC)} = G1

Table 8-G. Mosaic Set

H E X	Ø	1	2	3	4	5	6	7
Ø		D _L						
1	S _H	D ₁						
2	S _X	D ₂						
3	E _X	D ₃						
4	E _T	D ₄						
5	E _Q	N _K						
6	A _K	S _Y						
7	⏏	E _B						
8	B _S	C _N						
9	→	E _M						
A	≡	S _B						
B	V _T	E _C						
C	F _F	F _S						
D	<	G _S						
E	S _O	R _S						
F	S _I	U _S						

Escape Sequences

The terminal is capable of responding to the escape sequences listed below. These sequences provide additional functions not provided by the control characters. When received, an escape sequence is acted upon provided that MONITOR MODE is off. If MONITOR MODE is on, the sequence will be displayed and not acted upon.

The majority of the escape sequences that the terminal responds to are ANSI 3.64 based.

Single Character Escape Sequences

ESC7 Save Cursor Position and Attributes
ESC8 Restore Cursor Position and Attributes

Receiving the sequence ESC7 will cause the current cursor position, attribute, origin mode condition, GO/GI condition, and active character set to be saved. Reception of the sequence ESC8 will cause the cursor to move to the saved position with the saved attribute and the other saved values. The saved values for cursor position, attribute, and Origin mode condition are set to home, normal, and off, respectively, and GO and GI are set to the US character set and GO is active when the terminal is powered up or when the terminal enters or leaves the Options Set Up mode. A cursor recall (ESC8) will move the cursor to the position saved or, if the saved position is cleared, it will move to the home position. On the status line, a cursor save will be ignored but a cursor recall will be recognized.

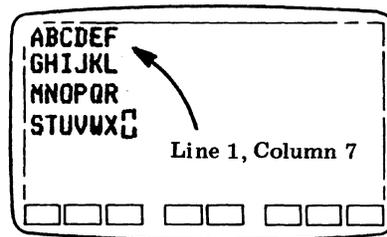


Figure 8-1. Cursor Save

Example shows ESC7 received at line 1, column 7. The received message:

```
      E  
      SN  
was:  ABCDEFCL etc.  
      7
```

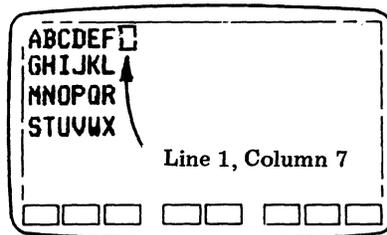


Figure 8-2. Cursor Recall

Example shows an ESC8 received after the "X" and the cursor returning to line 1, column 7.

ESCD Index

Receiving the sequence ESCD causes the cursor to move down one line in the same column until it reaches the last line of the scrolling region or the last line of the screen. If the cursor is in the last line of the scrolling region, a destructive scroll will occur (a blank line will appear at the bottom of the scrolling region). If the cursor is in the last line of the screen, receiving an ESCD sequence will cause no cursor movement and scrolling will not occur (unless the last line of the screen is also the last line of the scrolling region). The cursor will not leave the scrolling region.

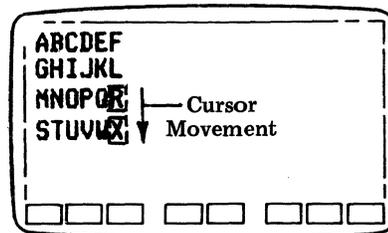


Figure 8-3. Index

ESCE Newline

Receiving the sequence ESCE causes the cursor to move to the first column of the next line until it reaches the last line of the scrolling region or the last line of the screen. If the cursor is in the last line of the scrolling region, a destructive scroll will occur (a blank line will appear at the bottom of the scrolling region). If the cursor is in the last line of the screen, receiving an ESCE sequence will cause the cursor to move to the first column of the last line; scrolling will not take place (unless the last line of the screen is also the last line of the scrolling region). The cursor will not leave the scrolling region.

ESCM Reverse Index

Receiving the sequence ESCM causes the cursor to move up one line in the same column until the first line of the scrolling region or the first line of the screen is reached. If the cursor is in the first line of the scrolling region, a destructive scroll will occur (a blank line will appear at the top of the scrolling region). If the cursor is in the top line of the screen, receiving an ESCM sequence will cause no cursor movement and scrolling will not occur (unless the top line of the screen is also the top line of the scrolling region). The cursor will not leave the scrolling region.

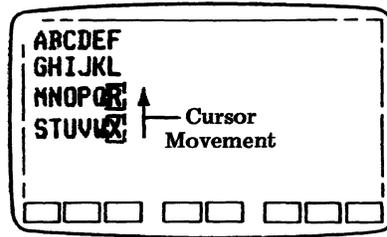


Figure 8-4. Reverse Index

ESCQ Save Options Into Nonvolatile Options
ESCR Restore Into Nonvolatile Options

Receiving the sequence ESCQ causes the current options to be saved into nonvolatile options. Receiving the sequence ESCR causes the nonvolatile options to be restored into the current volatile options. When the nonvolatile options are restored, the screen is blanked of all data, the scrolling region is reset to lines 1 and 24, the insert mode is turned off, and the screen labels are unchanged. All restored options are immediately effective. An ESCR must be followed by a short period of idle line (approximately two msec) to prevent data loss.

ESCc Device Reset

Receiving the sequence ESCc causes the terminal to reset. The terminal will be set to power on conditions using the current volatile options, the screen will be cleared, and the Sys Fkey labels and strings set to their default values.

In the interactive state, no scrolling region is defined, Origin mode is off, characters have normal attributes, G1 and G0 are the US character set, and G0 is active. Also, cursor save is cleared, the cursor is homed, print on-line is off, Insert mode is off, the cursor is visible, and the screen is unblanked. The User Fkey labels are displayed if the labels option is on.

Repetitive Parameter Escape Sequences

The following escape sequences provide for multiple functions based on the pn value. If no pn value or 0 is entered, a single function will be performed; otherwise, the function will be performed pn times (example: ESC[5@ will cause five character inserts to be performed).

ESC[*pn*A Cursor Up

Receiving the sequence ESC[*pn*A will cause the cursor to move up *pn* lines in the same column until the cursor reaches the top line of the scrolling region or line 1 of the screen. The cursor will not move out of the scrolling region.

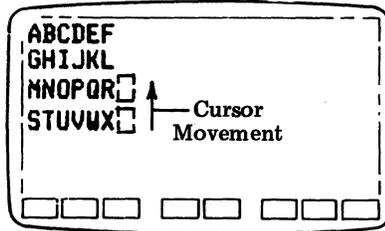


Figure 8-5. Cursor Up

ESC[*pn*B Cursor Down

Receiving the sequence ESC[*pn*B will cause the cursor to move down *pn* lines in the same column until the cursor reaches the last line of the scrolling region or line 24 of the screen. The cursor will not leave the scrolling region.

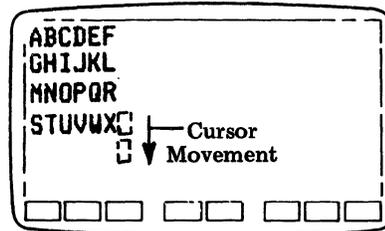


Figure 8-6. Cursor Down

ESC[*pn*C Cursor Right

Receiving the sequence ESC[*pn*C will cause the cursor to move to the right *pn* columns in the same line until the last column is reached. The cursor will not go beyond the right border, regardless of autowrap option selection.

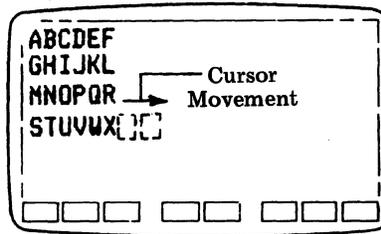


Figure 8-7. Cursor Right

ESC[*pn*D Cursor Left

Receiving the sequence ESC[*pn*D will cause the cursor to move to the left *pn* columns in the same line. The cursor will not move past the first column.

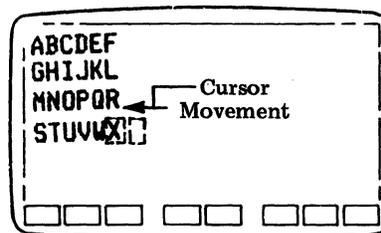


Figure 8-8. Cursor Left

ESC[*pn*L Line Insert

Receiving the sequence ESC[*pn*L will cause *pn* blank lines to be inserted on the screen at the current cursor position if in the scrolling region. The cursor moves to the first column of the same line. Data on the cursor line and all following lines of the scrolling region are scrolled down *pn* lines. All data on the lines scrolled out of the scrolling region will be lost. Line insert is active in the scrolling region only.

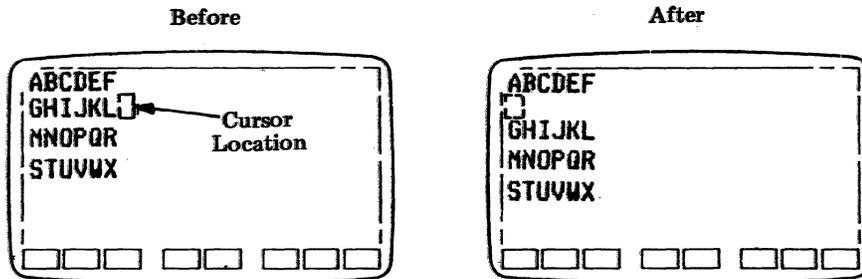


Figure 8-9. Line Insert

ESC[*pn*M Line Delete

Receiving the sequence ESC[*pn*M will cause the cursor line and *pn*-1 lines below the current cursor position to be deleted. The cursor moves to the first column of the same line. All lines below the cursor to the end of the scrolling region are moved up *pn* lines and *pn* blank lines are placed at the bottom of the scrolling region. Line delete is active in the scrolling region only.

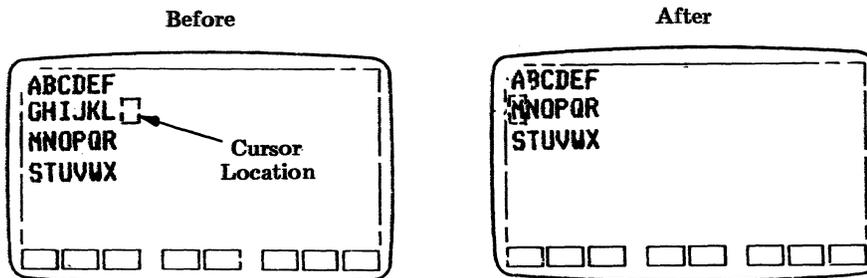


Figure 8-10. Line Delete

ESC[*pn*P Character Delete

Receiving the sequence ESC[*pn*P will cause *pn* characters to be deleted at the cursor position. All characters to the right of the cursor will move *pn* columns to the left.

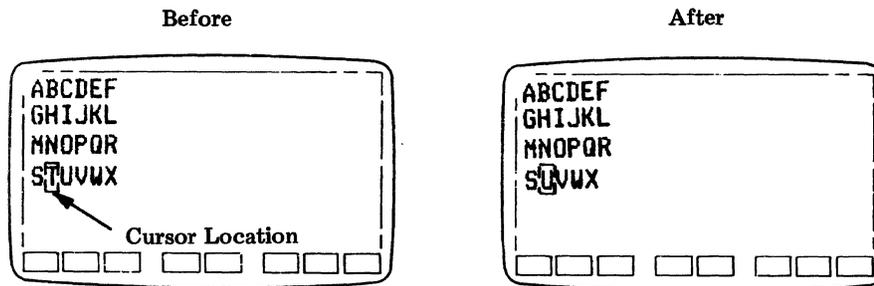


Figure 8-11. Character Delete

ESC[*pn*Z Back Tab

Receiving the sequence ESC[*pn*Z causes *pn* back tabs to occur. The cursor will move to the left on the current line to the previous preset tab stops. If the cursor is in columns 1 through 9, it is moved to column 1.

ESC[*pn*b Repeat Character

Receiving the sequence ESC[*pn*b will cause the last received character (not part of an escape sequence) to be repeated *pn* times. The maximum value for *pn* is 255. This sequence is not ANSI 3.64 compatible.

ESC[*pn*@ Character Insert

Receiving the sequence ESC[*pn*@ will cause the insertion of *pn* spaces (with normal attributes) at the cursor position and extending to the right. All characters to the right of the cursor will be moved *pn* columns to the right. Any characters moved beyond the right margin will be lost.

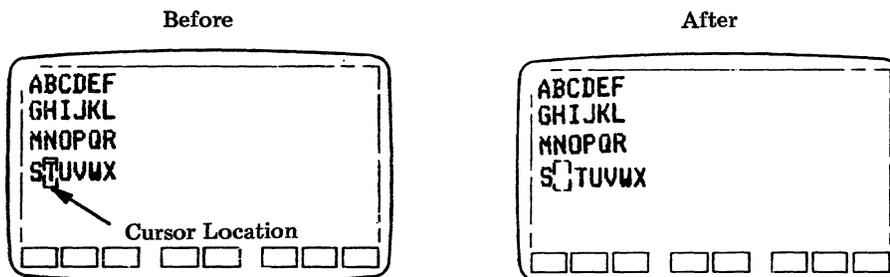


Figure 8-12. Character Insert

Cursor Positioning Escape Sequences

The following escape sequences provide for cursor positioning to a specific row and column. If no parameter numbers are defined, a 1 is assumed and the cursor will go to row or column 1. "Absolute" is in reference to the entire screen.

ESC[6n Cursor Position Report Request

Receiving the sequence ESC[6n causes the terminal to respond with the cursor position sequence ESC[row;column R. The row and column values are the same as those which are used to address the cursor position with Origin mode (refer to escape sequences ESC[?6h/ESC[?6l) off, i.e., cursor position is relative to the first row (line) and first column of the display.

ESC[row;column H Cursor Addressing

Cursor addressing positions the cursor with the address scheme ESC[row;column H or ESC[row;column f. The values for row and column are the values for the line number and column number at which the cursor is to be positioned. The row value ranges from 1 to 24 and the column value ranges between 1 and 80 or 132, depending on the columns option (refer to Section 5). If the values are missing or 0, they default to 1. If the row value is larger than 24, then the value is defaulted to 24; if the columns value is larger than the line length (80 or 132), the value is defaulted to the maximum value.

If in the Origin mode (refer to escape sequences ESC[?6h/ESC[?6l), cursor addressing is relative to the home position of the scrolling region. The cursor cannot be moved outside of the scrolling region with the exception of the status line.

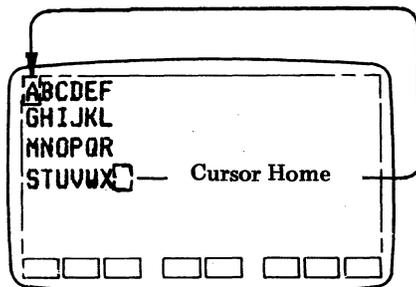


Figure 8-13. Cursor Positioning on ESC[1;1H, ESC[1;1f, ESC[H, or ESC[f Sequences

ESC[row;column R Cursor Position Report

Refer to "Cursor Position Report Request" escape sequence ESC[6n in this section.

ESC[row;column f Cursor Addressing

Refer to Cursor Addressing escape sequence ESC[row;column H in this section.

ESC[row;column x Cursor Positioning to the Status Line

The sequence ESC[row;column x will cause the cursor to move to the status line (line 25 of the screen). The value for "row" is ignored. The value for "column" is a decimal whole number between 1 and 80 or 1 and 132, depending on the columns option (refer to Section 5). The column value defaults to 1 if omitted or 0. If the column value is larger than the line length (80 or 132), the column position is defaulted to the maximum value.

User Defined Scrolling Region

ESC[top row;bottom row r Split Screen

Receiving the escape sequence ESC[top row;bottom row r will cause the screen to be configured into two static regions and one scrolling region, one static region and one scrolling region, or one scrolling region. Whenever the split screen escape sequence is received, the cursor is homed. The cursor can be freely moved between screen regions with cursor addressing when not in the Origin mode (refer to escape sequences ESC[?6h/ESC[?6l of this section) but destructive scrolling will occur only in the scrolling region. If in Origin mode, the cursor cannot be moved outside the scrolling region with the exception of the status line. The scrolling region must have at least two lines. Refer to Section "6. Destructive Scrolling and Scrolling Regions." Missing parameters or 0 will default to 1 for the top row and 24 for the bottom row.

Selective Parameter Escape Sequences

Missing selective parameters default to 0.

ESC[psJ Clear Screen

Receiving the sequence ESC[J or ESC[0J will clear characters and their character attributes from the cursor to the end of the 24th line. Receiving the sequence ESC[1J from the line will clear characters and their character attributes from the beginning of the screen to the cursor. Receiving the sequence ESC[2J will clear lines 1 through 24. The status line and screen labels are not affected by these sequences. When an entire line is cleared, the line attributes of that line are changed to single high/single wide.

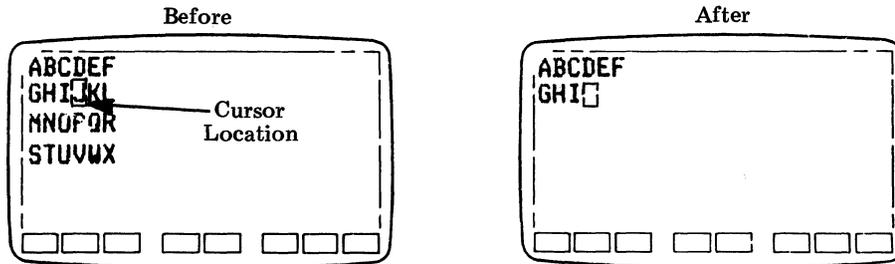


Figure 8-14. ESC[J or ESC[0J Clears All to End of Screen

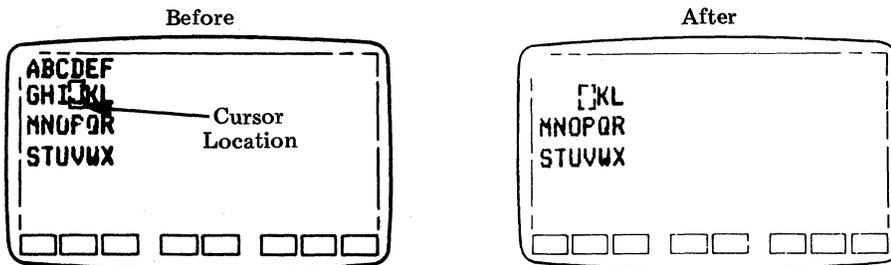


Figure 8-15. ESC[1J Clears All to Cursor

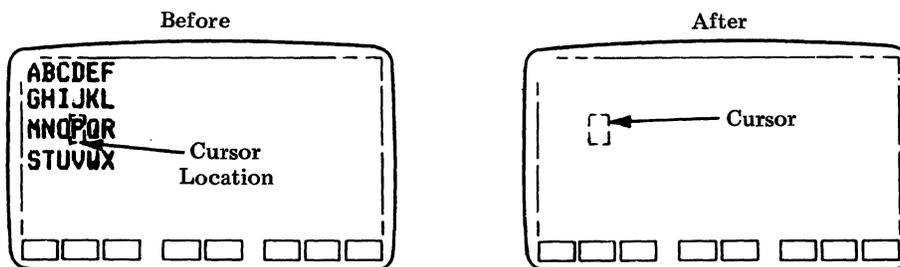


Figure 8-16. ESC[2J Clears All

ESC[psK Clear In Line

Receiving the sequence ESC[2K will cause the current cursor line to be cleared of data and character attributes; receiving the sequence ESC[K or ESC[OK will clear all data and character attributes from the cursor to the end of the current cursor line. Receiving the sequence ESC[1K will clear characters and their attributes from the beginning of the current cursor line to the cursor.

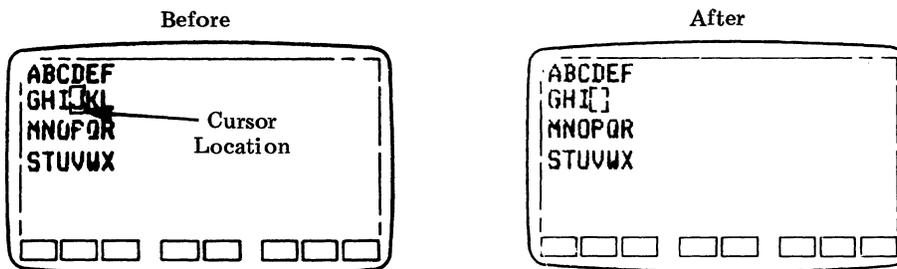


Figure 8-17. ESC[K or ESC[OK Clears From the Cursor to the End of the Line

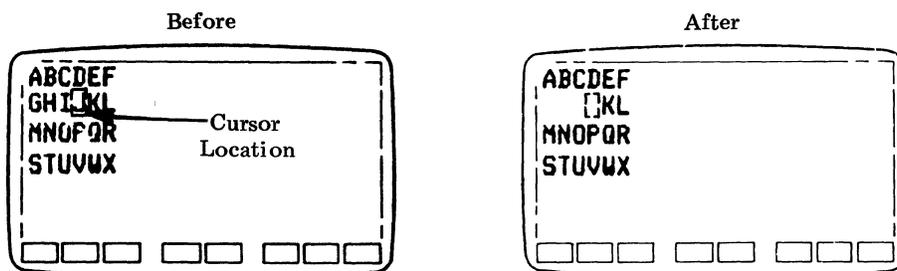


Figure 8-18. ESC[1K Clears From the Beginning of the Line to the Cursor

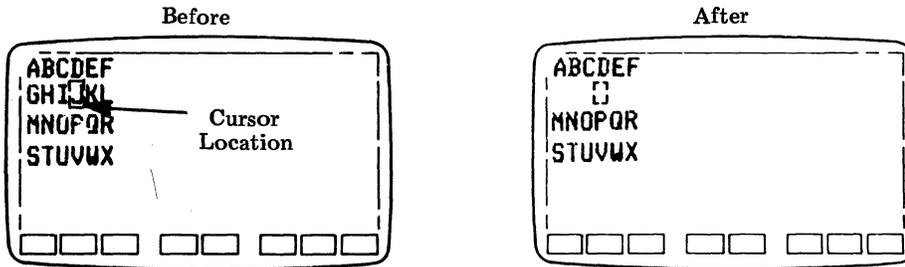


Figure 8-19. ESC[2K Clears Entire Line

ESC[0c Request Software Configuration

ESC[c Request Software Configuration

Receiving the sequence ESC[0c or ESC[c will cause the terminal to respond with the sequence ESC[?ps1;ps2;ps3c where:

ps1 = Windowing Terminal Indicator (7 for nonwindowing
610 BCT)

ps2 = terminal type (4 for 610 BCT)

ps3 = firmware release number

ESC[0>c Request Hardware Configuration

ESC[>c Request Hardware Configuration

Receiving the sequence ESC[0>c or ESC[>c will cause the terminal to respond with the sequence ESC[>ps1;pn1;pn2;ps2c where:

ps1 = keyboard type

0 = no keyboard

1 = 103-key keyboard

2 = 98-key keyboard

pn1 = cartridge installed and type:

0 = no cartridge installed

A nonzero indicates a cartridge identification

pn2 = expansion card installed and type:

0 = no expansion card installed

A nonzero indicates an I/O card identification

ps2 = RAM available and tested:

0 = basic (16K)

1 = 32K

2 = 48K

3 = 64K

ESC[ps;....;psh Setup State Escape Sequences Set Mode
ESC[ps;....;psl Setup State Escape Sequences Reset Mode

Receiving the sequence ESC[4h causes the terminal to enter the Insert mode. In the Insert mode, a character to be displayed causes the character at the cursor position and all characters to the right of the cursor to be moved to the right one position. The entered character is displayed at the cursor position. When the terminal is in the Insert mode, the "ins" indicator appears on line 27 between the labels for F5 and F6. When the sequence ESC[4l is received, the terminal exits the Insert mode.

Refer to Sections 5 and 6 for descriptions of the following escape sequences and functions:

ESC[12h Local Echo Off
ESC[12l Local Echo On
ESC[13h Turn Monitor Mode On
ESC[13l Turn Monitor Mode Off
ESC[20h Turn Newline on LF On
ESC[20l Turn Newline on LF Off

ESC[?ps;....;psh Setup State Sequences Set Private Mode
ESC[?ps;....;psl Setup State Sequences Reset Private Mode

Receiving the sequence ESC[?6h causes the terminal to enter the Origin mode with the cursor positioned in row 1, column 1 of the scrolling region. In this mode, the cursor will not leave the scrolling region except for the status line or a cursor restore function. Cursor addressing in this mode is done relative to the home position in the scrolling region. Receiving the sequence ESC[?6l resets the Origin mode. The cursor is homed (row 1, column 1 of the screen). Cursor addressing is independent of the scrolling region and the cursor may be positioned anywhere on the screen except for the screen label lines.

Receiving the sequence ESC[?25l will cause the cursor, if visible, to become invisible; receiving the sequence ESC[?25h will cause the cursor, if invisible, to become visible.

Receiving the sequence ESC[?10h will cause the screen to be blanked; receiving the sequence ESC[?10l will unblank a blanked screen.

Refer to Sections 5 and 6 for descriptions of the following escape sequences and functions:

```
ESC[?3h Set Screen to 132 Columns
ESC[?3l Set Screen to 80 Columns
ESC[?4h Set to Vertical, Smooth Scroll
ESC[?4l Set to Vertical Jump Scroll
ESC[?5h Set Screen to Reverse Video
ESC[?5l Set Screen to Normal Video
ESC[?7h Turn Autowrap On
ESC[?7l Turn Autowrap Off
ESC[?11h Set Cursor Type to Underscore
ESC[?11l Set Cursor Type to Block
ESC[?12h Set Cursor to Blink
ESC[?12l Set Cursor to Steady
ESC[?13h Turn Labels Off
ESC[?13l Turn Labels On
ESC[?14h Set Cartridge to "Used"
ESC[?14l Set Cartridge to "Idle"
ESC[?15h Set Check Parity Option to "Yes"
ESC[?15l Set Check Parity Option to "No"
ESC[?16h Turn On Key Click
ESC[?16l Turn Off Key Click
```

```
ESC[4i Media Copy Off
ESC[5i Media Copy On
```

Receiving the sequence ESC[5i causes MEDIA COPY to be turned on; receiving the sequence ESC[4i causes MEDIA COPY to be turned off. When MEDIA COPY is on, all data sent to the terminal is sent directly to the printer and is not displayed.

```
ESC[?4i Print On-Line Off
ESC[?5i Print On-Line On
```

Receiving the sequence ESC[5i causes the PRINT ON-LINE function to be turned on; receiving the sequence ESC[4i causes the PRINT ON-LINE function to be turned off (refer to Section 6).

ESC[psm Set Character Attributes

Character attributes are invoked when the escape sequence ESC[psm is received with a single parameter or a combination of parameters. The sequences used are the ANSI 3.64 standard sequences for SELECT GRAPHIC RENDITION (SGR) commands using the selective parameters:

- 0 = normal
- 1 = bold
- 2 = bold
- 4 = underline
- 5 = blink
- 7 = reverse video
- 8 = blank

Example: The sequence ESC[0;4;5m will clear all the attributes currently on and then set underscore and blink on.

Character attributes along with characters can be cleared by using the proper clearing sequences (refer to ESC[psJ and ESC[psK in this section).

Bold, normal intensity, and blank are mutually exclusive. If one of these intensity sequences is received, it overrides the previous intensity state. Blank overrides blink. Blink causes the character to alternate between bold and normal intensity.

Attribute definitions appear below:

- Normal - Characters entered onto the display will be light characters on a dark background.
- Bold - Characters entered onto the display will be in increased intensity.
- Underline - Characters entered onto the display will be underlined.
- Blink - Characters entered onto the display will be blinking between normal and bold.
- Reverse Video - Characters entered onto the display will be dark characters on a light background.
- Blank - Characters entered onto the display will be blanked.

Table 8-H is a list of escape sequences that specify the character attribute. The active attributes, after receiving the sequence, are indicated by an X. The parameters need not be in numerical order; however, a 0 always cancels all previously assigned attributes.

Table 8-H. Character Attribute Escape Sequences

Sequence	0 Norm	1 or 2 Bold	8 Blank	5 Blink	4 Under- Scored	7 Reverse Video
ESC[0m	X					
ESC[0;1m		X				
ESC[0;2m		X				
ESC[0;8m			X			
ESC[0;4m	X				X	
ESC[0;5m				X		
ESC[0;7m	X					X
ESC[0;1;4m		X			X	
ESC[0;2;4m		X			X	
ESC[0;4;5m	X			X	X	
ESC[0;4;7m	X				X	X
ESC[0;4;8m			X		X	
ESC[0;1;5m				X		
ESC[0;2;5m				X		
ESC[0;5;7m				X		X
ESC[0;5;8m			X			
ESC[0;1;4;5m				X	X	
ESC[0;1;4;7m		X			X	X
ESC[0;2;4;5m				X	X	
ESC[0;2;4;7m		X			X	X
ESC[0;4;5;7m				X	X	X
ESC[0;4;5;8m			X		X	
ESC[0;1;5;7m				X		X
ESC[0;2;5;7m				X		X
ESC[0;4;7;8m			X		X	X
ESC[0;5;7;8m			X			X
ESC[0;1;4;5;7m				X	X	X
ESC[0;2;4;5;7m				X	X	X
ESC[0;4;5;7;8m			X		X	X

ESC[psn Terminal/Printer Status Request

Receiving the sequence ESC[5n (terminal status request) will cause the terminal to reply with ESC[0n (test passed) or ESC[3n (test failed).

Receiving the sequence ESC[?15n (printer status request) will cause the terminal to reply with ESC[?11n (printer not ready) or ESC[?10n (printer ready).

ESC[psp Select Screen Labels

Receiving the sequence ESC[0p will cause the Sys Fkey labels to become visible on the screen.

Receiving the sequence ESC[1p will cause the User Fkey labels to appear.

Receiving the sequence ESC[2p will cause the Fkey labels to be blanked.

Receiving the sequence ESC[3p will cause the PRINT Fkey labels to become visible.

Receiving the sequence ESC[4p will cause the I/O Fkey labels to become visible if there is an I/O card and it is being used.

Receiving any one of these sequences may change the LABELS option (refer to Section 5).

ESC[ps1;pn;ps2;ps3q Label String

Refer to Sections 5 and 6 for a description of this sequence.

ESC[s Request Terminal Parameters

Receiving the sequence ESC[s will cause the terminal to transmit the option values. The terminal responds with the sequence ESC[ps1, ps2...ps18 where each ps is an ASCII value representing an option selection. Refer to Appendix D, Terminal Options Upload, for the values of ps1 through ps18.

Display Line Attributes

ESC#3 Top of Double High and Double Wide Line

ESC#4 Bottom of a Double High and Double Wide Line

Receiving the sequence ESC#3 will cause the characters in the line to become the top of double high and double wide characters; receiving the sequence ESC#4 will cause the characters in the line to become the bottom of double high and double wide characters.

To create a full double high and double wide character line, display two adjacent lines with the same characters and use ESC#3 on the top and ESC#4 on the bottom line. Characters to the right of the center of the line with a previous attribute of single high and single wide will be lost.

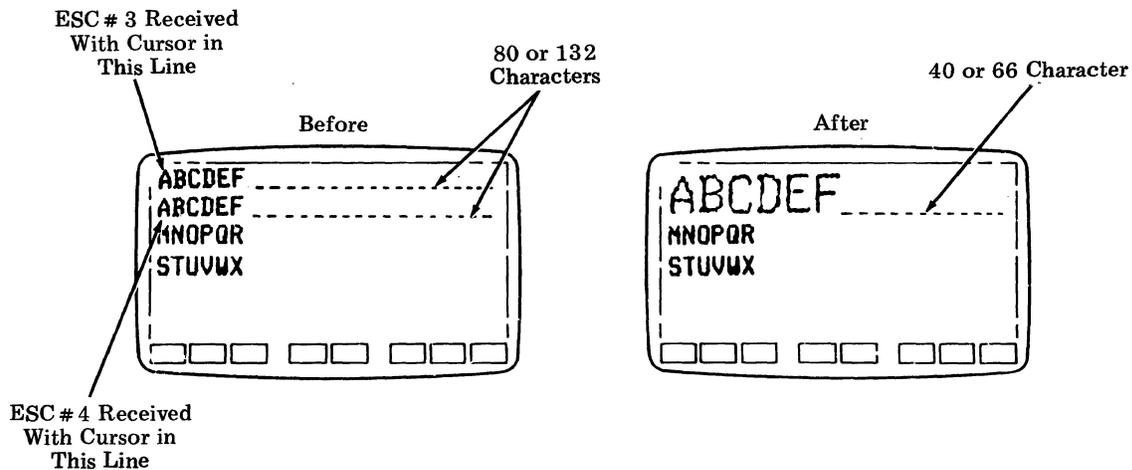


Figure 8-20. Double High, Double Wide Line Attribute

ESC#5 Single High and Single Wide Line

Receiving the sequence ESC#5 causes the cursor line to become single high, single wide. New lines of data will have this attribute.

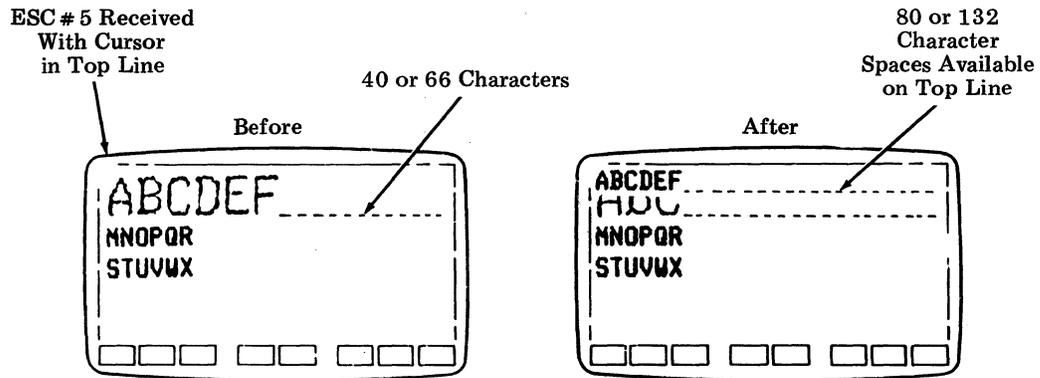


Figure 8-21. Double High, Double Wide to Single Wide, Single High Attribute

ESC#6 Double Wide/ Single High Line

Receiving the sequence ESC#6 will cause the line which contains the cursor to become double wide and single high. If the line previously had an attribute of single wide and the line contained more characters than half of the line, characters originally past the center of the screen will be lost.

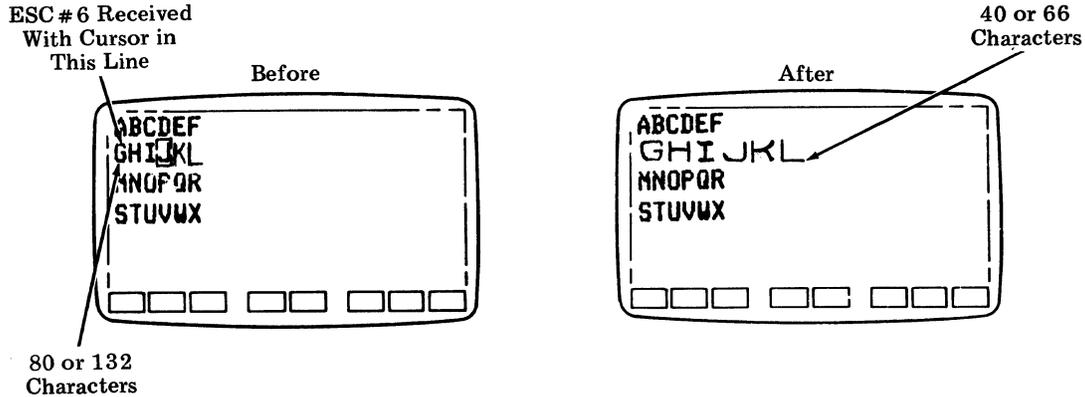


Figure 8-22. Double Wide, Single High Line Attribute

Alignment Test

ESC#8 Alignment Test

Receiving the sequence ESC#8 causes the terminal to display an entire screen of uppercase Es.

Character Sets

- ESC(A) United Kingdom Character Set for G0
- ESC(B) United States Character Set for G0
- ESC(O) Special Character and Line-Drawing Character Set for G0
- ESC(1) Securities Industry Character Set for G0
- ESC(} Mosaic Character Set for G0
- ESC)A United Kingdom Character Set for G1
- ESC)B United States Character Set for G1
- ESC)O Special Character and Line-Drawing Character Set for G1
- ESC)1 Securities Industry Character Set for G1
- ESC)} Mosaic Character Set for G1

Refer to Section 6 for a description of the character set function, refer to Table 8-C through Table 8-G for the hexadecimal equivalents for the various characters contained in the above character sets.

Control Characters

Backspace (BS)

Receiving the backspace character (Hex 08) causes a cursor-left function. Receiving continuous backspace characters will cause continuous cursor-left functions until the cursor is in the first character position of the current line.

Bell (Bel)

Receiving bell characters (Hex 07) causes the keyboard tone generator to sound.

Cancel (Can)

Receiving the cancel character (Hex 18) causes escape sequence parsing to be terminated. The character will also be displayed.

Carriage Return (CR)

Receiving the carriage return character (Hex 0D) causes the cursor to return to the first character position of the current line.

DC2

Receiving the DC2 character (Hex 12) turns on PRINT ON-LINE (refer to Section 6).

DC4

Receiving the DC4 character (Hex 14) turns PRINT ON-LINE off (refer to Section 6).

Escape (ESC)

Receiving the Escape character (Hex 1B) begins a control sequence. The characters that follow the Escape character cause a special function to be performed.

Formfeed (FF)

Receiving the Formfeed character (Hex 0C) will cause destructive scrolling if the cursor is currently located on the last line of the scrolling region.

Horizontal Tab (HT)

Receiving the Horizontal Tab character (Hex 09) causes the cursor to advance to the next preset horizontal tab stop. The tabs in the terminal are preset at every eighth column starting with column 9. The cursor will move to column 80 if it is past column 73 while in 80 Column mode or to column 132 if it is past column 129 while in the 132 Column mode.

Linefeed (LF)

Depressing the Linefeed key (Control J) causes a Linefeed character (Hex 0A) to be sent. Depression of the Linefeed key while optioned for Local Echo on (refer to Section 5) or reception of the Linefeed character will cause destructive scrolling if the cursor is located on the last line of the scrolling region.

Shift In (SI)

Receiving the Shift In character (Hex 0F) causes the character set assigned to G0 to become active (refer to Section 5 and this section).

Shift Out (SO)

Receiving the Shift Out character (Hex 0E) causes the character set assigned to G1 to become active (refer to Section 5 and this section).

Substitute (SUB)

Receiving the Substitute character (Hex 1A) causes escape sequence parsing to be terminated. The character will also be displayed.

Vertical Tab (VT)

Reception of the Vertical Tab character (Hex 0B) causes destructive scrolling if the cursor is currently in the last line of the scrolling region.

9. Communications

Overview

This section describes the various system uses and the modem and printer interfaces. Both interfaces are 25-pin female connectors that are Electronic Industry Association (EIA) RS-232-C.

System Use

The terminal is designed for use in a variety of full duplex systems:

- Switched network
- Dedicated private line
- Multiplexed front end
- Direct connect

Switched Network Systems

For switched network systems the terminal is coupled to a modem by an RS-232-C modem cable. The modem is connected to the central telephone office through dial-up lines. This type of arrangement can be used asynchronously with full duplex modems. This type of system almost always assumes the terminal is a great distance from the remote sender (host).

The system normally allows the host to echoplex data back to the terminal. Parity checking capabilities and substitute character on received error routine are common requirements.

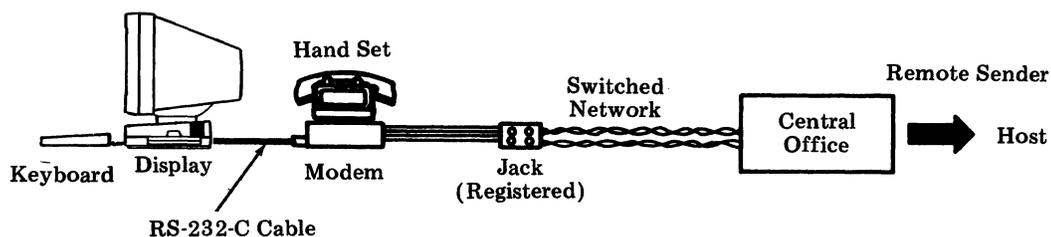


Figure 9-1. Switched Network

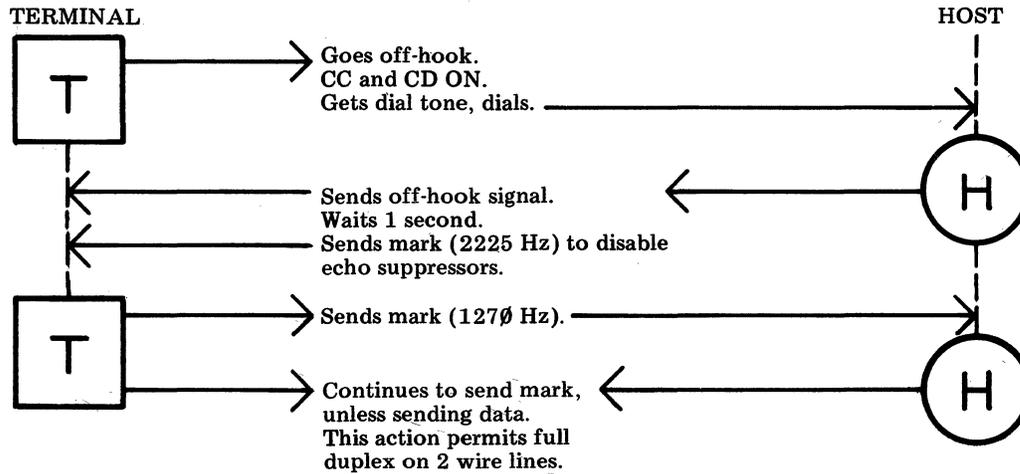


Figure 9-2. On-Line Modem-to-Modem Action

Dedicated Private Line Systems

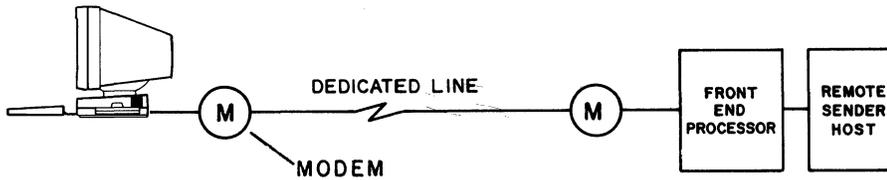


Figure 9-3. Dedicated Line

Private line point-to-point systems using dedicated telephone lines are generally used with full duplex modems at speeds of 2400 bps and above. Conditioned lines are required for higher rate analog or digital modem transmission.

Multiplexed Front End Systems

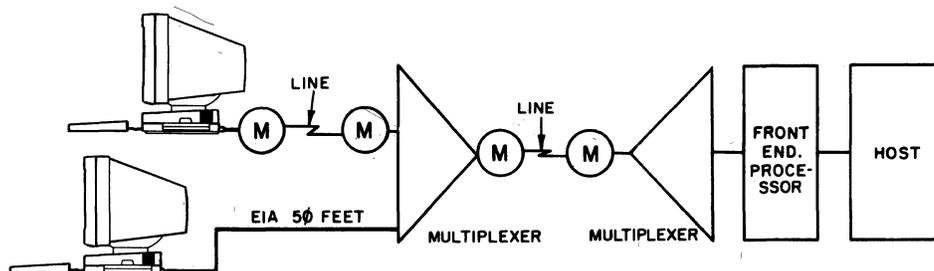


Figure 9-4. Terminals Multiplexed

The terminal is well suited for use with a multiplexed front end processor. The multiplexer (or line concentrator) must be capable of:

- Asynchronous serial data transfer
- 8 bit characters (ASCII)
- Start/stop bit insertion
- Full duplex operation
- Matching modem line rate
- Parity checking and generation
- Character-at-a-time message assembly/disassembly
- Auto-answer

In this type of system, the terminal may be coupled to the multiplexer port by EIA cable connection or by the use of modems.

Direct Connect Systems

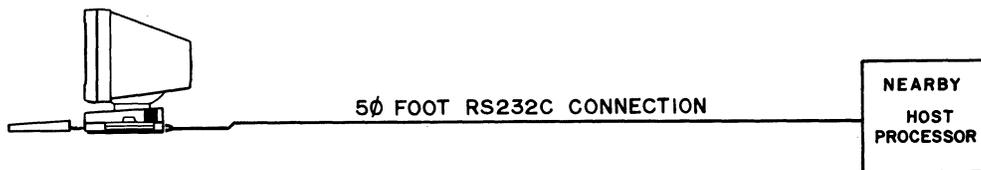


Figure 9-5. Direct Connect

Direct connect allows one of two methods to be used for terminal connection.

When the terminal is located within 50 feet of a host processor, a connection may be made using standard RS-232-C interface cable connections. The cable connection must support the terminal's full duplex capability.

The host may be made to monitor Pin 20 for host to terminal sending.

Sensing of control leads by the terminal is minimal. Sending is controlled by an internal character available signal and receiving is to an input buffer. Received data has a priority to the display. Send data is affected by keyboard inputs.

Interfaces

EIA Ports

The terminal has two EIA RS-232-C ports on the rear of the display. The right port is for the modem interface and the left is for an optional EIA printer.

Both ports have 25-pin female connectors. Signals on these ports are defined as follows:

ON = +5 to +12 volts dc (Space)

OFF = -5 to -12 volts dc (Mark)

with respect to signal ground. These definitions apply to both send and receive data.

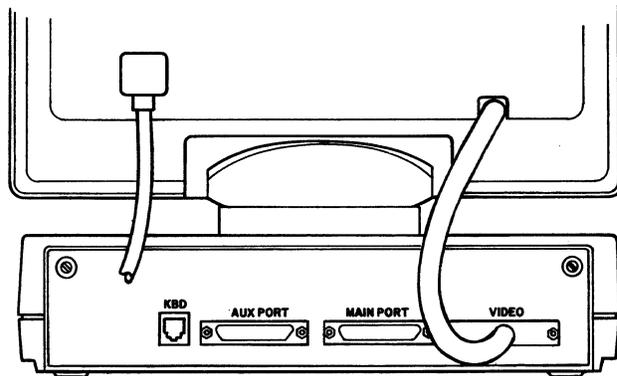


Figure 9-6. EIA Ports

Modem Port

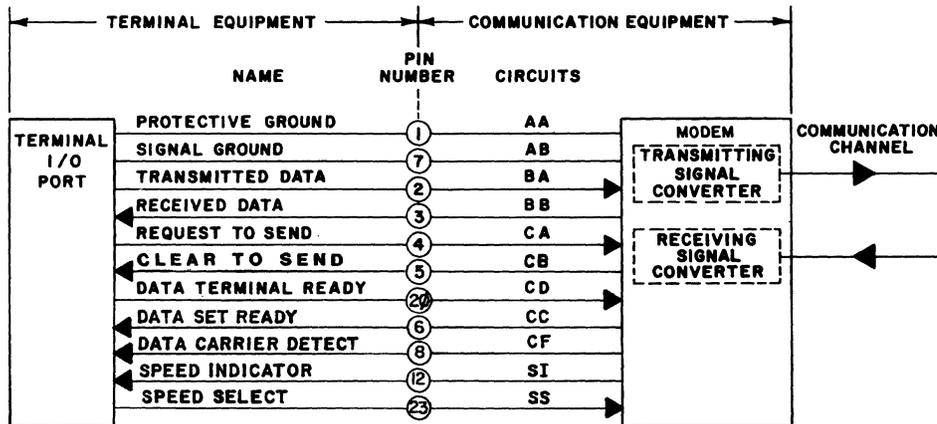


Figure 9-7. Modem Cable Leads

Table 9-A. Modem (I/O) Port Interface Pins

- Pin 1 Protective Ground -- equipment frame and ac power ground
- Pin 2 Transmitted Data (SD) -- data originated by terminal, binary to modem, analog from modem
- Pin 3 Received Data (RD) -- data originated at remote sender, analog to modem, binary to terminal
- Pin 4 Request to Send (RTS) -- signal to modem indicating ready to transmit -- always held high when power is on
- Pin 5 Clear to Send (CTS) -- signal to terminal indicating the modem is ready to transmit data (ignored by terminal)
- Pin 6 Data Set Ready (DSR) -- signal to terminal indicating the modem is ready to receive or transmit data
- Pin 7 Signal Ground -- common ground reference between terminal and modem
- Pin 8 Data Carrier Detect (DCD) -- signal to terminal that carrier has been detected (ignored by terminal)
- Pin 12 Speed Indicator (SI) -- signal from modem (ignored by terminal)
- Pin 20 Data Terminal Ready (DTR) -- signal to modem, always on except during disconnect and/or power off
- Pin 23 Speed Select (SS) -- signal to modem (always off)

A call may be originated at the terminal or at the remote host computer, either can send data or receive data regardless of where the call was originated. The terminal can receive messages any time it is called, provided that the power is on.

Auxiliary Port

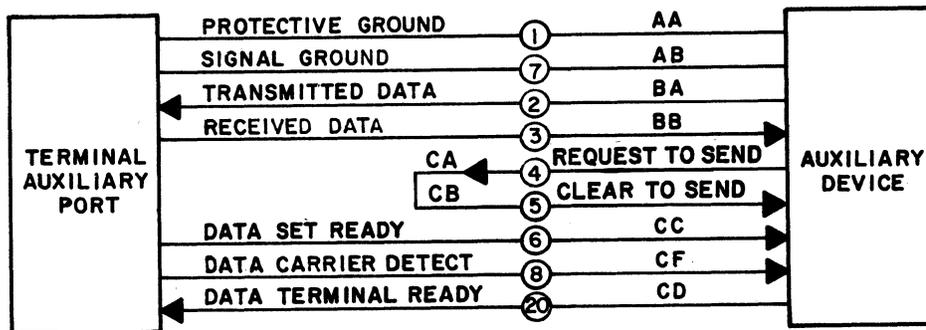


Figure 9-8. Printer Cable Leads

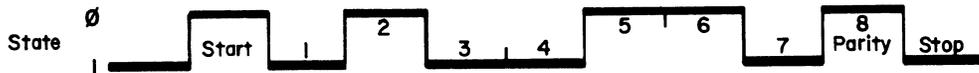
Table 9-B. Auxiliary Port Interface Pins

- Pin 1 Protective Ground -- equipment frame and ac power ground
- Pin 2 Transmitted Data (SD) -- data originated by the auxiliary device
- Pin 3 Received Data (RD) -- data originated at the terminal
- Pin 4 Request to Send (RTS) -- tied to Clear to Send at terminal
- Pin 5 Clear to Send (CTS) -- tied to Request to Send at terminal
- Pin 6 Data Set Ready (DSR) -- signal to auxiliary device from terminal (always on when terminal power is on)
- Pin 7 Signal Ground (AB) -- common ground reference between terminal and auxiliary device
- Pin 8 Data Carrier Detect (DCD) -- signal to auxiliary device from the terminal (always on when terminal power is on)
- Pin 20 Data Terminal Ready (DTR) -- signal from auxiliary device to terminal

On-Line Signaling

In asynchronous signaling, start and stop bits are required in the bit stream to identify the beginning and ending of a character. The start bit is a positive going transition (space) on a marking line. It signals that the following voltage transition will be an ASCII character. Each group of character bits is followed by a stop bit. The stop bit is a negative going transition (mark) of what would be the 9th information bit. This signaling pattern is commonly referred to as "10 bit code" or "10 unit code."

(Perfect waveform for ASCII character M with even parity shown.)



State 1 (mark)/Off = -5 to -25 Vdc
State 0 (space)/On = +5 to +25 Vdc

Figure 9-9. On-Line Signaling

10. Maintenance

If Trouble Occurs

This section provides troubleshooting information to help the user isolate a problem and to aid in the reporting of the trouble. This testing should be done before calling for service.

Before reporting as a trouble, the user should:

- Make sure the ac power cord is plugged in.
- Make sure the power switch is on.
- Check if other terminals are having the same problem.
- Make sure brightness and volume are turned up.
- Turn off power to the terminal and follow the steps in Table 10-A.

Table 10-A. Power On Test

Step	Action	Yes	No
1	Turn on power.		
2	Did the "610 OK" message appear?	Go to Step 5.	Go to Step 3.
3	Depress Esc key with Shift and Ctrl keys depressed. Did trouble message appear?	Report as trouble in: ERROR: Kybd Keyboard ERROR: Base Controller ERROR: RAM External RAM Card ERROR: Cartridge Cartridge ERROR: IO Expansion I/O Card Note: A failure in both the keyboard and in the controller may result in no error message appearing.	Go to Step 4.
4	Depress Shift/Shift/Ctrl (left Ctrl -56K430/ACZ) simultaneously. Did bell ring?	Report as controller trouble.	Go to Step 7.
5	Is cursor present?	Go to Step 8.	Go to Step 6.
6	Turn up brightness. Is raster present?	Report as video trouble.	Report as monitor trouble.
7	Turn up volume (change volume in Options Setup mode). Repeat Step 4 action.	Go to Step 8.	Report as keyboard trouble.
8	Are User Fkey screen labels present?	The terminal is basically operational. If trouble is still present, check terminal options. If options are correct, contact service representative.	Check Labels option. Repeat test procedure. If test results are the same, report as terminal trouble.

Options can cause erratic operations, so it is important to ensure they are set up properly.

When the terminal is installed, the existing values should be checked to ensure the trouble is not option related.

If the trouble still exists after the tests have been run and the options verified, report the trouble to your service representative giving as much information as possible.

Routine Cleaning

Keeping the terminal clean is an easy matter. Use a slightly damp paper towel to wash or clean glass, plastic, and painted surfaces.

When oily substances are present on the terminal, a fair amount of rubbing may be required. This is the recommended method of cleaning rather than using chemical solvents.

Warning 1: Unpainted plastic parts may be damaged by the use of chemicals, cosmetics, and high heat.

Warning 2: Painted parts may be damaged by the use of chemicals, glues, adhesive-backed tapes, and adhesive-backed labels.

Spills

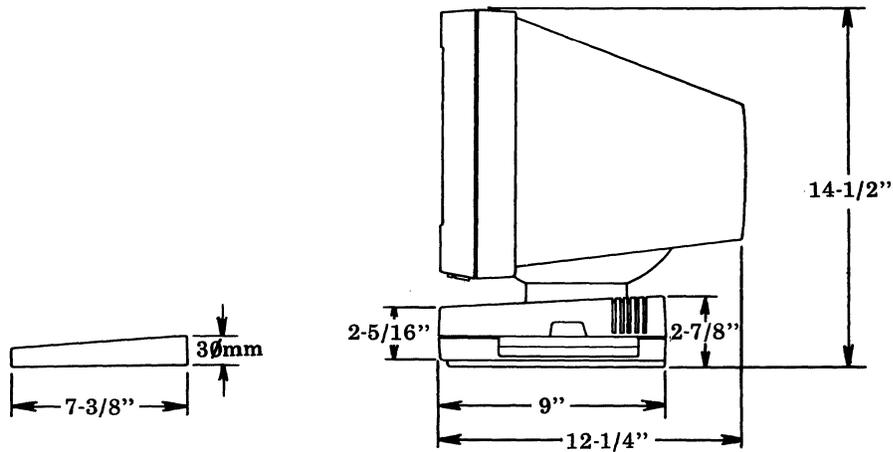
Care should be taken not to spill any liquid into the keyboard. If a spill occurs, it is imperative that the terminal be turned off immediately. The keyboard should then be disconnected and turned upside down and all excess liquids allowed to drain. The keyboard should be left upside down for several hours until completely dry. If the keyboard self-test fails when reconnected, after the drying time, call for service.

Appendices

Appendix A — Specifications

Dimensions and Weight

Display and Controller
Combined Weight 29 lbs.



Keyboard Weight
56K430/ACZ = 4.5 lbs.
56K420/ADA = 4.5 lbs.

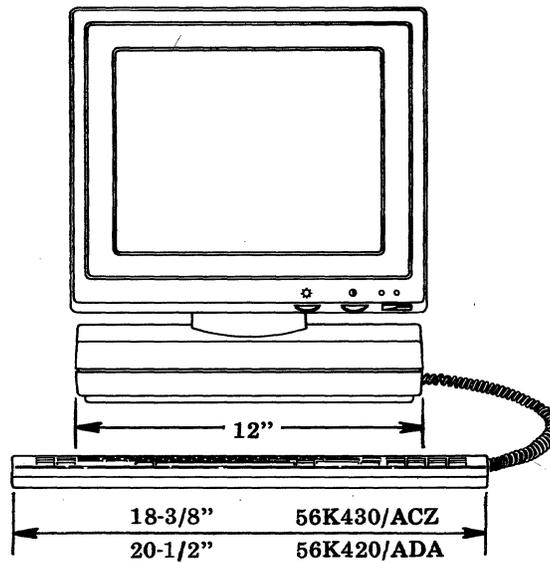


Figure A-1. Dimensions and Weights

Environmental Requirements

Temperature

Storage (boxed) -40°C to +65°C
Operating +4.5°C to +40°C

The terminal may also be operated up to 50 C for a maximum of 72 consecutive hours but not more than 15 days per year provided that the ventilation slots in the display are not obstructed.

Relative Humidity

5% to 80% noncondensing

Altitude

Shipping Sea Level to 50,000 ft. (15,240m)
Storage Sea Level to 50,000 ft. (15,240m)
Operating Sea Level to 10,000 ft. (3048m)

Power

Line Voltage 90 to 132 Vac

Frequency 60 Hz

Power 60 W max.

Surge Current 10 amp max. at 115 Vac

Power Cord 6' 7" detachable
One end has a standard 3-prong, grounded connector (NEMA 5-15 type) for wall receptacle. The other end is a 3-blade receptacle (mates with IEC 320-type connector) which attaches to the display.

Display

CRT 12" diagonal in white, green, or amber phosphor

Character Size 80- 7 x 9 dot matrix plus 2 descenders
132- 5 x 7 dot matrix plus 2 descenders

Display Area 8.25" x 6.25"

Character Set 5 character sets

Keyboard

General	98- or 103-key attachable with coiled cord
Key Layout	60-key typewriter arrangement with 8 function keys, 14 special function keys, and 21 right keypad keys or 59-key typewriter arrangement with 8 function keys, 8 special function keys, 5 cursor positioning keys, and 18 right pad keys
Keyclick	Optional audible feedback for key depression
Bell and Keyclick	Adjustable volume

Line Communications

Type	Full duplex character-at-a-time
Speed	110 (2 stop bits) and 300 to 19200 (1 stop bit) baud asynchronous ASCII Code
Parity	Even, odd, 8th bit mark, 8th bit space, or none
Flow Control	XON and XOFF (DC1/DC3) buffer full signaling

Printer Communications

Type	Full duplex
Speed	The same speed as the main port, up to 19200 baud
Code	ASCII
Parity	8th bit space (or data if in media copy with send parity set to "none").
Flow Control	XON/XOFF (DC1/DC3)

Electromagnetic Interference

Other electrical apparatus (i.e., printers) may cause visual interference, especially if they are powered at a different line frequency than the refresh rate of the 610 BCT. This and other types of interference may be avoided by maintaining a distance of approximately one meter (3.3 feet) between the 610 BCT and the other electrical apparatus.

Appendix B — Screen-Labeled Keys

The following are the screen labels that the 610 BCT will display.

Table B-1. Screen Labels

Set Up	→			CHANGE OPTION	DEFAULT VALUES	SAVED VALUES	SAVE	NEXT SET UP	CLEAR TO END
Graphics	→	No action occurs.							
Print	→	PRINT ON-LINE*	STOP PRINT						
User Fkey	→	F1	F2	F3	F4	F5	F6	F7	F8
I/O Fkey	→	No action occurs unless an Expansion I/O card (optional) is present.							
Sys Fkey	→	F1	F2	F3	F4	F5	F6	F7	F8
† Next Setup	→	PREVIOUS FIELD	NEXT FIELD		DEFAULT VALUES			† NEXT SETUP	CLEAR TO END

† Screen-Labeled Key

* Refer to Section 5 for description of this key.

Appendix C -- Options Summary

Depressing the Set-Up root key (F1) while the Control key (Ctrl) is depressed displays the terminal options (Figure C-1). Depressing the NEXT SETUP screen-labeled key (with the terminal options displayed) displays the USER FKey SETUP (Figure C-2).

TERMINAL OPTIONS

<u>COMMUNICATIONS</u>		<u>USER PREFERENCES</u>	
I/O Card	idle	Cartridge	used
Speed	1200	Columns	-80-
Send Parity	even	Scrolling	jump
Check Parity	-no-	Reverse Video	-no-
Local Echo	off-	Volume	-4--
Monitor Mode	off-	Key Click	off-
Autowrap	-on-	Cursor Type	blk
Newline on LF	-no-	Cursor Blink	-no-
Return Key	-CR-	Labels	-on-
Enter Key	CR..		

DONE

<input type="text"/>	<input type="text"/>	CHANGE OPTION	DEFAULT VALUES	SAVED VALUES	SAVE	NEXT SETUP	CLEAR TO END
----------------------	----------------------	------------------	-------------------	-----------------	------	---------------	-----------------

Figure C-1. Terminal Options

USER FKEY SETUP

	Label	String
F1:	F1	^Oc Up to 35 CHARACTERS
F2:	F2	^Od Up to 35 CHARACTERS
F3:	F3	^Oe Up to 35 CHARACTERS
F4:	F4	^Of Up to 35 CHARACTERS
F5:	F5	^Og Up to 35 CHARACTERS
F6:	F6	^Oh Up to 35 CHARACTERS
F7:	F7	^Oi Up to 35 CHARACTERS
F8:	F8	^Oj Up to 35 CHARACTERS

DONE

PREVIOUS FIELD	NEXT FIELD		DEFAULT VALUES			NEXT SETUP	CLEAR TO END
-------------------	---------------	--	-------------------	--	--	---------------	-----------------

Figure C-2. User Fkey Setup

Appendix D -- Escape Sequences

Single Character Escape Sequences

ESC7	Save Cursor Position and Attributes
ESC8	Restore Cursor Position and Attributes
ESCD	Index (Cursor Down)
ESCE	Newline
ESCM	Reverse Index (Cursor Up)
ESCQ	Save Into Nonvolatile Options
ESCR	Restore Nonvolatile Options
ESCc	Device Reset

Repetitive Parameter Escape Sequences

ESC[pnA	Cursor Up
ESC[pnB	Cursor Down
ESC[pnC	Cursor Right
ESC[pnD	Cursor Left
ESC[pnL	Insert Line
ESC[pnM	Delete Line
ESC[pnP	Delete Character
ESC[pnZ	Cursor Back Tab
ESC[pnb	Repeat Character pn Times (not ANSI 3.64 compatible)
ESC[pn@	Character Insert

Absolute Numeric Parameter Escape Sequences

ESC[row;column H	Cursor Position
ESC[row;column R	Cursor Position Report
ESC[row;column f	Cursor Position
ESC[top row; bottom row r	Set Scrolling Region
ESC[row;column x	Cursor Positioning to Status Line

Selective Parameter Escape Sequences

ESC[psJ	Clear Characters and Attributes From Page Clear to End of Page ps = 0 Clear to Start of Page ps = 1 Clear Entire Page ps = 2
ESC[psK	Clear Characters and Attributes From Line Clear to End of Line ps = 0 Clear to Start of Line ps = 1 Clear Entire Line ps = 2

ESC[5i	Enter Media Copy
ESC[?4i	Turn Off Print On Line
ESC[?5i	Turn On Print On Line
ESC[ps;...;ps1	Setup State Reset Mode Insert Mode Off ps = 4 Local Echo On ps = 12 Monitor Mode Off ps = 13 Newline On Line Feed Off ps = 20
ESC[?ps;...;ps1	Setup State Reset Private Mode 80 Columns ps = 3 Jump Scroll ps = 4 Normal Screen ps = 5 Origin Mode Off ps = 6 Line Autowrap Off ps = 7 Unblank Screen ps = 10 Block Cursor ps = 11 Cursor Steady ps = 12 Labels On ps = 13 Cartridge Idle ps = 14 Parity Check to No ps = 15 Keyclick Off ps = 16 Cursor off ps = 25
ESC[psm	Set Character Attributes (Graphic Rendition) Normal ps = 0 Bold ps = 1 or 2 Underscore ps = 4 Blink ps = 5 Reverse Video ps = 7 Blank ps = 8
ESC[psn	Device Status Request Terminal Status Test Passed ps = 0 Terminal Status Test Failed ps = 3 Request Terminal Status ps = 5 Screen Cursor Position Request ps = 6
ESC[?psn	Printer Status Request Printer Status - Ready ps = 10 Printer Status - Not Ready ps = 11 Request Printer Status ps = 15

ESC[psp

Select Fkey Labels

System ps = 0
User ps = 1
Blank ps = 2
Print ps = 3
I/O ps = 4

ESC[ps1;pn;ps2;ps3q
label + string

Set Fkey String

ps1 = Fkey Number 1 Through 8
ps2 = Ignored by Terminal
ps3 = User/IO/Sys Fkey
0 = Sys Fkey
1 = User Fkey
2 = I/O Fkey
pn = Number of Characters in String
1 Through 8 for System Fkey or
1 Through 35 for User Fkey.
If 0, labels only are downloaded.

ESC[ps1;ps2;

Download of Options

Speed Option ps1 = 1
1200 Baud ps2 = 0
2400 Baud ps2 = 1
4800 Baud ps2 = 2
9600 Baud ps2 = 3
19200 Baud ps2 = 4
110 Baud ps2 = 5
300 Baud ps2 = 6

Send Parity Option ps1 = 3

Even ps2 = 0
Odd ps2 = 1
Mark ps2 = 2
Space ps2 = 3
None ps2 = 4

RETURN Key ps1 = 8

CR ps2 = 0
LF ps2 = 1
CR/LF ps2 = 2

ENTER Key ps1 = 25

ps2 = Number of Characters
Plus Character String
Equal to ps2 Characters

ESC [ps1 ps2 ... psn s

Terminal Options Upload

ps1 = I/O card option

1 = idle

2 = used

ps2 = speed option

1 = 1200 bps

2 = 2400 bps

3 = 4800 bps

4 = 9600 bps

5 = 19200 bps

6 = 110 bps

7 = 300 bps

ps3 = send parity option

1 = even

2 = odd

3 = mark

4 = space

5 = none

ps4 = check parity option

1 = no

2 = yes

ps5 = local echo option

1 = off

2 = on

ps6 = monitor mode option

1 = off

2 = on

ps7 = autowrap option

1 = on

2 = off

ps8 = newline on linefeed option

1 = no

2 = yes

ps9 = return key option

1 = CR

2 = LF

3 = CR and LF

ps10 = cartridge option

1 = idle

2 = used

ps11 = columns option

1 = 80 columns

2 = 132 columns

ps12 = scrolling option

1 = jump

2 = smooth

ps13 = reverse video option

1 = no

2 = yes

ps14 = keyboard volume option
1 = volume level 4
2 = volume level 5
3 = volume level 6
4 = volume level 7 (loudest)
5 = volume level 1 (quietest)
6 = volume level 2
7 = volume level 3
ps15 = key click option
1 = off
2 = on
ps16 = cursor type option
1 = block
2 = line
ps17 = cursor blink option
1 = no
2 = yes
ps18 = labels option
1 = on
2 = off

Font Selection Sequence

ESC(A	Set G0 = United Kingdom Alphabetic
ESC(B	Set G0 = U.S. ASCII
ESC(O	Set G0 = Special Characters and Line Drawing
ESC(l	Set G0 = Securities Industry
ESC(}	Set G0 = Mosaics
ESC)A	Set G1 = United Kingdom Alphabetic
ESC)B	Set G1 = U.S. ASCII
ESC)O	Set G1 = Special Characters and Line Drawing
ESC)l	Set G1 = Securities Industry
ESC))	Set G1 = Mosaics

Display Line Attributes

ESC#3	Top of a Double-High and Double-Wide Line
ESC#4	Bottom of a Double-High and Double-Wide Line
ESC#5	Single-Wide and Single-High Line
ESC#6	Double-Wide and Single-High Line

Special Sequence

ESC#8	Alignment Test
-------	----------------

Appendix E-Character Set Cross Reference

Table E-1 is a cross reference of the keytops of the main section of the keyboard and the various character sets (United States, United Kingdom, Special Characters and Line Drawing, Securities Industry, and Mosaics).

Table E-1. Main Keyboard Section

MOSAIC	CONTROL SHIFT UNSHIFT	Esc	Esc	NUL	Esc	Esc	Esc	RS	Esc	Esc	Esc	Esc	US	Esc	BS	BS	BS	Delete
SECURITIES	CONTROL SHIFT UNSHIFT	Del	Esc	1/8	1/4	##	\$	%	RS 3/8	8	1/2	()	US 5/8	+	BS	BS	BS	Delete
LINE DRAW	CONTROL SHIFT UNSHIFT	Del	Esc	/	@	##	\$	%	RS ^	8	*	()	US -	+	BS	BS	BS	Delete
UNITED KINGDOM	CONTROL SHIFT UNSHIFT	Del	Esc	/	@	£	\$	%	RS ^	8	*	()	US -	+	BS	BS	BS	Delete
UNITED STATES	CONTROL SHIFT UNSHIFT	Del	Esc	/	@	##	\$	%	RS ^	8	*	()	US -	+	BS	BS	BS	Delete
KEYTOPS	Del Esc	Esc	/	@	£	\$	%	A	B	*8	(9)	)	=	+	Back Space	Delete		

Note 1

Note 2

Note 2

MOSAIC	CONTROL SHIFT UNSHIFT	ESC [Z	DCI	ETB	ENQ	DC2	DC4	EM	NAK	HT	SI	DLE	ESC	GS	FS		
SECURITIES	CONTROL SHIFT UNSHIFT	ESC [Z	Q	W	E	R	T	Y	U	I	O	P	ESC [7/8	GS [3/4	FS []	~	
LINE DRAW	CONTROL SHIFT UNSHIFT	ESC [Z	-	W	E	R	T	Y	U	I	O	P	ESC []	GS []	FS []	~	
UNITED KINGDOM	CONTROL SHIFT UNSHIFT	ESC [Z	Q	W	E	R	T	Y	U	I	O	P	ESC []	GS []	FS []	~	
UNITED STATES	CONTROL SHIFT UNSHIFT	ESC [Z	Q	W	E	R	T	Y	U	I	O	P	ESC []	GS []	FS []	~	
KEYTOPS		Tab	Q	W	E	R	T	Y	U	I	O	P	[]	[]	~

Note 1

Note 1: 56K430/ACZ (103 key) keyboard only.

Note 2: 56K420/ADA (98 key) keyboard only.

Table E-1. Main Keyboard Section (Continuation)

MOSAIC	CONTROL				
	SHIFT				
	UNSHIFT				
SECUR	CONTROL			SPACE	
	SHIFT			SPACE	
	UNSHIFT			SPACE	
LINE	CONTROL			SPACE	
	SHIFT			SPACE	
	UNSHIFT			SPACE	
UNITED	CONTROL			SPACE	
	SHIFT			SPACE	
	UNSHIFT			SPACE	
UNITED	CONTROL			SPACE	
	SHIFT			SPACE	
	UNSHIFT			SPACE	
KEYTOPS	Ctrl		(SPACE)	Ctrl	

Note 1

Note 1

Note 1: 56K430/ACZ (103 key) keyboard only.

Appendix F--Terminal Personality Information

The following information is provided for those users that wish to program UNIX* hosts with the 610 BCT personality.

TERM CAP Personality

```
610|610bct|att610bct|ATT610BCT|AT&T 610 bct terminal 80 column mode:\
:am:hs:mi:ms:xn:xo:bs:pt:\
:co#80:li#24:kn#8:\
:AL=\E[%dL:DC=\E[%dP:DL=\E[%dM:DO=\E[%dB:\
:IC=\E[%d@:LE=\E[%dD:RI=\E[%dC:\
:UP=\E[%dA:ae=~O:al=\E[L:as=~N:bt=\E[Z:cd=\E[J:\
:ce=\E[K:cl=\E[H\E[J:cm=\E[%i%d;%dH:cs=\E[%i%d;%dr:\
:dc=\E[P:dl=\E[M:ei=\E[4l:fs=\E8:ho=\E[H:\
:is=\E[Om^O\E[8;O|\E[?3;4;5;13;151\E[13;201\E[?7h\E[12h:\
:im=\E[4h:k1=\EOc:k2=\EOd:k3=\EOe:\
:k4=\EOf:k5=\EOg:k6=\EOh:k7=\EOi:k8=\EOj:kb=\b:\
:kd=\E[B:kh=\E[H:k1=\E[D:kr=\E[C:ku=\E[A:\
:mb=\E[5m:md=\E[1m:mh=\E[2m:nd=\E[C:\
:r2=\Ec\E[?31:rc=\E8:sc=\E7:se=\E[m:so=\E[7m:\
:sr=\EM:ts=\E7\E[25;%i%dx:ue=\E[m:up=\E[A:\
:us=\E[4m:ve=\E[?25h\E[?12l:vi=\E[?25l:\
:vs=\E[?12;25h:ko=bt,nd,up,ho,dc,dl,im,al:
610-w|610bct-w|att610bct-w|ATT610BCT-w|AT&T 610 bct terminal 132 column mode:\
:co#132:is=\E[Om^O\E[8;O|\E[?4;5;13;151\E[13;201\E[?3;7h\E[12h:\
:tc=610:
```

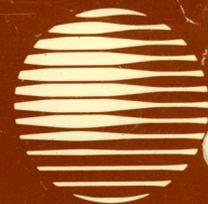
Figure F-1. TERM CAP Personality Information Entry

*Trademark of AT&T Bell Laboratories.

TERM INFO Personality

```
610|610bct|att610bct|ATT610BCT|AT&T 610 bct terminal 80 column mode,
am, hs, mir, msgr, xenl, xon,
cols#80, it#8, lh#2, lines#24, lw#8, nlab#8, wsl#80,
acsc=`\ aaffggjjkllmmnnoppqrrssttuuvvwxxyzz{|}|}~",
bel=~G, blink=\E[5m, bold=\E[1m, cbt=\E[Z,
civis=\E[?25l, clear=\E[H\E[J, cnorm=\E[?25h\E[?12l, cr=\r,
csr=\E[%i%p1%d;%p2%dr, cub=\E[%p1%D, cubl=\b,
cud=\E[%p1%dB, cudl=\n, cuf=\E[%p1%DC, cuf1=\E[C,
cup=\E[%i%p1%d;%p2%dH, cuu=\E[%p1%DA, cuul=\E[A,
cvvis=\E[?12;25h, dch=\E[%p1%DP, dchl=\E[P, dim=\E[2m,
dl=\E[%p1%DM, dll=\E[M, ed=\E[J, el=\E[K, ell=\E[LK,
enacs=\E(B\E)O, flash=\E[?5h$<200>\E[?5l, fsl=\E8,
home=\E[H, ht=\t, ich=\E[%p1%D@, il=\E[%p1%DL, ill=\E[L,
ind=\n, invis=\E[8m,
is1=\E[8;0|\E[?3;4;5;13;15l\E[13;20l\E[?7h\E[12h,
is2=\E[Om^O, kbeq=\E9, kbs=\b, kcbt=\E[Z, kclr=\E[ZJ,
kcubl=\E[D, kcudl=\E[B, kcuf1=\E[C, kcuul=\E[A,
kdchl=\ENf, kdll=\ENe, kel=\EOa, kend=\EO, kent=\r,
kf1=\EOc, kf2=\EOd, kf3=\EOe, kf4=\EOf, kf5=\EOg,
kf6=\EOh, kf7=\EOi, kf8=\EOj, khome=\E[H, kind=\E[S,
knp=\E[U, kpp=\E[V, kprr=\EOz, kri=\E[T, ll=\E[24H,
mc4=\E[?4i, mc5=\E[?5i, nel=\r\n,
pfx=\E[%p1%d;%p2%l%02dq\s\s\sf%p1%ld\s\s\s\s\s\s\s\s\s\s\s\s%p2%s,
pln=\E[%p1%d;0;0;0q%p2%:-16.16s, rc=\E8, rev=\E[7m,
ri=\EM, rmacs=^O, rmir=\E[4l, rmln=\E[2p, rmso=\E[m,
rmul=\E[m, rs2=\Ec\E[?3l, sc=\E7,
sgr=\E[0;?%p6%t;1%;?%p5%t;2%;?%p2%t;4%;?%p4%t;5%;?%p3%p1%|t;7%;?%p7%t;8%;m%?%p9%t^N^e^0%;,
sgrO=\E[m^O, smacs=^N, smir=\E[4h, smln=\E[p,
smso=\E[7m, smul=\E[4m, tsl=\E7\E[25;%i%p1%dx,
610-w|610bct-w|att610bct-w|ATT610BCT-w|AT&T 610 bct terminal 132 column mode,
cols#132, is1=\E[8;0|\E[?4;5;13;15l\E[13;20l\E[?3;7h\E[12h,
wsl#132, use=610
```

Figure F-2. TERM INFO Personality Information Entry



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