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VIEWPOINT/3A PLUS
USER'S MANUAL

The information contained in normal type font
pertains to the Viewpoint/3A mode.

*All information in dark script font redefines
operation as it pertains to operation in the
Viewpoint/3A plus mode.*

NOTE:

The information contained in this manual is for
reference only. Specifications and features are
subject to change without notice.

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INTRODUCTION

The VIEWPOINT 3/A PLUS contains two modes of
operation. The Viewpoint/3A mode is a 3A
terminal emulation. *The Viewpoint/3A Plus mode
incorporates additional features as follows:*

- *Aux port enable/disable*
- *Cursor suppress*
- *Cursor enable*
- *Erase to end of line*
- *Erase to end of page*
- *Visual highlighting*
- *Transparent print*

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CURSOR CONTROL - Absolute addressing.

SELECTABLE CURSOR STYLE - Blinking or Steady; Block or underline.

DISPLAY DIMENSIONS -
Height - 12 3/4"
Width - 14"
Depth - 14 1/2"
Weight - 20 lbs.

DATA COMMUNICATIONS - Full or half-duplex. 8 selectable baud rates, unidirectional, serial output AUX port, switchable parity.
EIA RS232C

COMMUNICATIONS INTERFACE - 8 switch-selectable baud rates from 110 to 19,200.

ADJUSTABLE VIEWING ANGLE - Press-to-Release tab at rear of cabinet allows viewing angle to be adjusted.

NUMERIC PAD - Adding machine style with 5 embedded cursor control keys.

KEYBOARD DIMENSIONS -
Height - 2 3/8"
Width - 15"
Depth - 7"
Weight - 2 lbs.

SCREEN - (1920 characters) 24 lines, 80 characters per line. 12 inches measured diagonally)

OPERATING REQUIREMENTS

Power	120 volts @ 60 Hz,	60 Watts	0.50 Amp.
	240 volts @ 50 Hz,	60 Watts	0.25 Amp.
	220 volts @ 50 Hz,	60 Watts	0.25 Amp.
Temperature	Operation:10 degrees to 40 degrees C.		
	Storage: 0 degrees to 85 degrees C.		
Humidity	10% to 95% RH, non-condensing.		

VIEWPOINT/3A PLUS SPECIFICATIONS

VERSATILE ERASE FUNCTION -
End of Line
End of Page
Entire Screen

VISUAL ATTRIBUTES - Tagged data may be displayed with the following attributes:
Normal
Underline
Reverse Video
Blinking
Half-Intensity
Suppressed Video
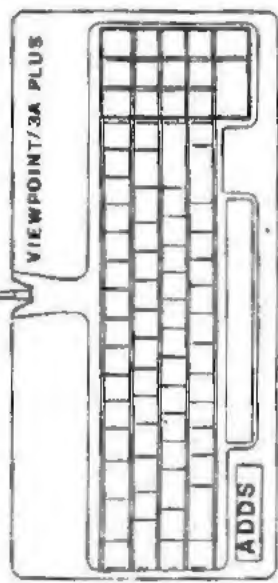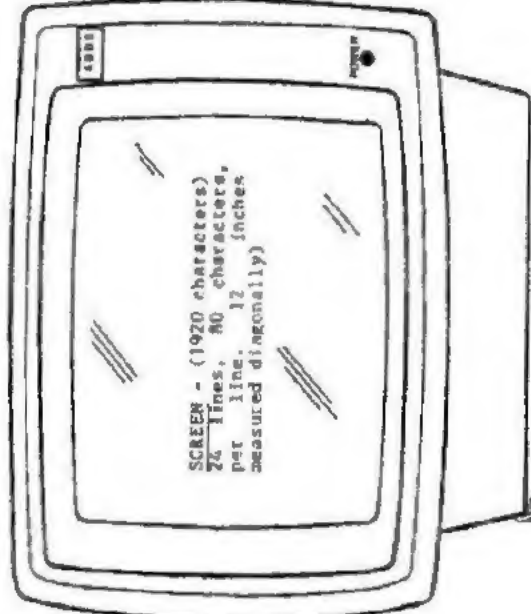or various combinations of the above.

CHARACTER SET - 96 displayable ASCII characters formed on a 5 x 8 dot matrix.

PRINT TRANSPARENT MODE - Data and control codes are passed directly to the AUX port without being displayed or acted upon.

MONITOR MODE - All received data, including control codes are displayed without being acted upon.

KEYBOARD - 5A alphanumeric, symbol and control keys arranged in a standard typewriter style array.

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The ADDS VIEWPOINT/3A PLUS display terminal is designed for operating efficiency, user convenience and ease of maintenance. The main unit can be set in two vertical viewing positions by depressing the 'Press to Release' tab on the rear of the cabinet. The screen (CRT) and the control electronics are in the main cabinet. A detachable serial keyboard can be positioned by the user for convenient data entry.

The terminal's architecture, diagrammed in Figure 1-1, uses state of the art multi-function devices. VIEWPOINT/3A PLUS is controlled by a microcomputer with program memory and communications control as well as processing capability. The keyboard and two serial ports interface with the microcomputer. The programmable CRT controller contains an internal character generator ROM and has access to an external display memory. Option switches allow the user to set terminal operating parameters.
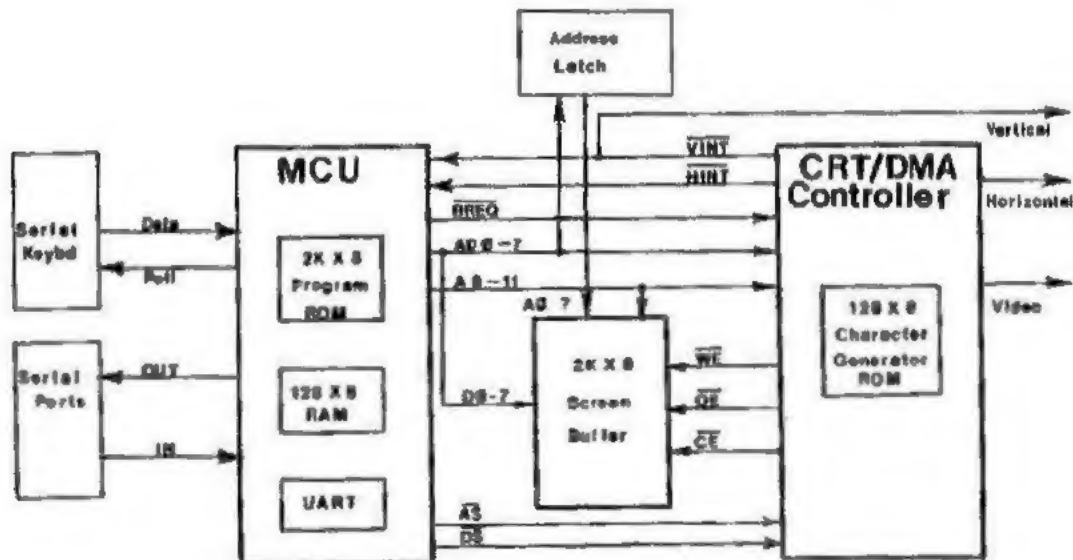
Figure 1-1 VIEWPOINT/3A PLUS Architecture

1.1 CRT

The CRT shown in Figure 1-2, has a 12 inch diagonal screen. The display consists of 24 lines of 80 characters each for a total of 1920 character positions. Data can be displayed as dark characters on a

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light background or as light characters on a dark background. Upper and lower case characters are displayed in a 5 x 8 dot pattern on a 7 x 10 dot matrix which allows for descended lower case. Control codes are also displayed in Monitor mode. (See Section 2.3).
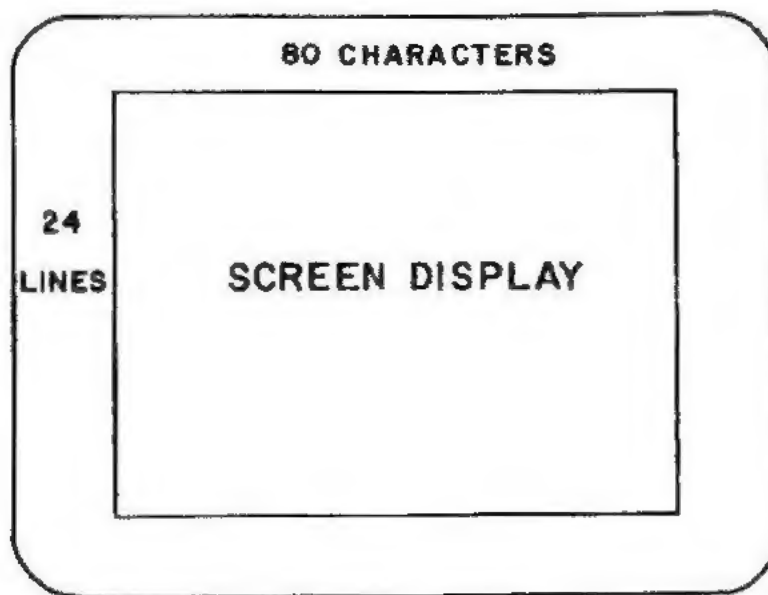
Figure 1-2 CRT Screen
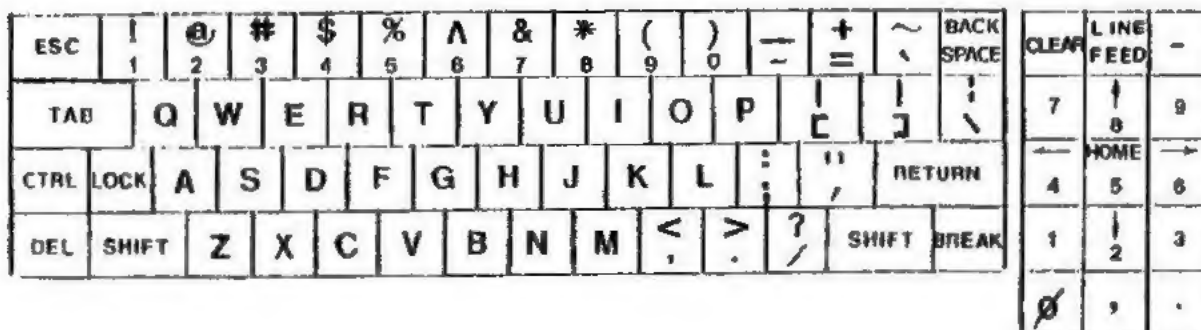
Figure 1-3 VIEWPOINT/3A PLUS Keyboard

1.2 Keyboard

The removable VIEWPOINT/3A PLUS keyboard shown in Figure 1-3 is arranged in a standard typewriter style array plus a separate 14 key cursor control and

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calculator type numeric pad with cursor control keys. The main array is used for the entry of alphanumeric data and control functions (see Section 4). Pressing the alpha keys transmits upper case to the screen and/or communications and auxiliary interfaces. Lower case characters can be entered by use of the SHIFT key. A LOCK key, when set, causes all alpha characters to be shifted. SHIFT is always required to enter the upper legends on numeric and symbol keys.

The pad to the right of the main array contains numeric 0-9, a period, a comma, a clear, a line feed and a minus sign arranged in the standard ten key adding machine array plus five embedded cursor control keys. Cursor controls are described in Section 1.2.1.

All main keys are repeating (typamatic) except BREAK, CLEAR, SHIFT, CTRL, LOCK, ESC, and RETURN. Cursor arrows and Line Feed are typamatic. While held down, typamatic keys automatically repeat at the rate of about 15 times per second (after the key is held down for one full second).

The keyboard can be locked and unlocked by commands from the CPU *or the keyboard*.

All VIEWPOINT/3A PLUS keys are encoded to generate standard ASCII codes. BREAK, CLEAR, CTRL, SHIFT and LOCK are not encodable characters.

1.2.1 Key Functions

> NOTE: Key Depression Notation - When more than one key must be depressed for a particular function, it will be annotated as follows: a dash (-) between key names indicates that both keys are depressed simultaneously (eg. CTRL-K). A comma (,) between key names indicates that each key is depressed and released sequentially (eg. ESC,y).

1. ESC
The ESC key generates the ASCII code ESC (CTRL-[) and is also used as a lead-in code for some VIEWPOINT/3A PLUS special functions (Figure 4-2).

2. TAB
The TAB key generates the ASCII code HT (CTRL-I). No local action is generated from the depression of this key.

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3. CTRL (Control)

The CTRL key is used in conjunction with other keys to perform special functions. When held down while an alphanumeric key (from ASCII code chart column 4-7) is pressed, the code structure of that character is changed by forcing the seventh bit to zero. This allows the control codes assigned to columns 0 and 1 of the ASCII Code Chart to be generated. For example, the "D" key generates an EOT when used in conjunction with the CTRL key (See Section 4). Not all Control codes are used by the VIEWPOINT/3A PLUS. (See Figure 2-3 for a list of unused control codes.)

4. LOCK

When pressed, LOCK sets the keyboard in Alphabetic SHIFTed mode. All unSHIFTed alpha characters are transmitted and displayed in lower case, all SHIFTed alphas in upper case. A second press of LOCK releases it returning the keyboard to upper case, SHIFT to lower.

5. SHIFT

The SHIFT key, which appears on both sides of the main array, is used to change alpha characters from upper to lower or lower to upper case depending on the toggle condition of the LOCK key. SHIFT always selects the upper legend on non-alpha keys.

6. BACK SPACE

Pressing this key moves the cursor back one space. If the cursor is at the beginning of a line, this command is ignored. *If the cursor is at the beginning of a line, it goes to the end of the preceding line. If it is at the beginning of the top line, it goes to the end of the last line on the display.*

7. RETURN

In 3A mode, RETURN places the cursor at the beginning of the same line.
RETURN places the cursor at the beginning of the next line (Auto Line Feed enabled) or at the beginning of the same line (Auto Line Feed disabled).

8. BREAK

BREAK, which must be pressed in conjunction with the CONTROL key, generates a 500 millisecond break ("spacing" condition) on the communications line and a discrete signal on Pin 11 of the communications port.

9. CLEAR

CLEAR, which must be pressed in conjunction with the SHIFT key, is a local function to erase the screen. No code is sent on the communications line.

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10. LINE FEED

LINE FEED causes the cursor to move down one line from its current position. If the cursor is on the last line, and Auto Scroll is disabled, the cursor will "wrap" to the same column position in the top line. If Auto Scroll is enabled, the text scrolls up one line, the cursor remains on the bottom line.

11. CURSOR CONTROLS (require SHIFT)

The Cursor controls are embedded alternate functions for five numeric pad keys. They are enabled when these keys are pressed in conjunction with the SHIFT key.

↓ has the same function as Line Feed.

→ moves the cursor one position forward. If it is at the end of a line, it moves to the beginning of the next line only if Auto Line Feed is enabled. *It moves to the beginning of the next line, regardless of the setting of the Auto Line Feed switch.*

If the cursor is at the end of the last line with Auto Scroll enabled, the text will scroll up and the cursor will move to the beginning of the new blank bottom line. With Auto Scroll disabled, the cursor moves to the beginning of the top line.

↑ moves the cursor directly up one line. If it is on the top line, it moves to the same position on the bottom line.

← has the same function as BACKSPACE.

HOME places the cursor in the upper left corner with Block cursor enabled and is ignored with Underline cursor enabled. *Home is always the upper left corner of the screen.*

1.3 Interfaces (ports)

The VIEWPOINT/3A PLUS has two serial ports for communication with the outside world. The first (EIA port) interfaces with the host computer (CPU) and the second (Aux. port) with a printer or other peripheral. Data is transmitted to the CPU and the Aux. port simultaneously when the Aux. port is connected.

1.3.1 Communications (EIA) port

The terminal communicates with the host CPU in full or half-duplex via a standard serial EIA RS232C interface. Transmission rates of 110, 300, 1200, 1800, 2400, 4800, 9600 and 19,200 baud are switch selectable on the rear panel. (See Section 3)

1.3.2 Auxiliary (Aux.) port

The unidirectional Aux. port allows the connection of the terminal to a serial peripheral such as a printer or cassette. EIA RS232 signal conventions are used at the interface. The baud rate will always be the same as that selected for the Comm. port. The Aux. port is always enabled.   *The Aux. port is disabled/enabled by commands from the keyboard or CPU.*

With the Aux. port enabled, all keyboard entered data will go to the peripheral as well as the CPU. The CPU or the keyboard can also send data directly to the Aux. port in a print transparent mode. (See Section 2.5)

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At power ON, the terminal is configured by the switch
set parameters. These include full or half-duplex,
transmission baud rate, display characteristics, etc.
See Section 3. Contrast is controlled by a knob on
rear of terminal.

2.1 Transmission

The terminal functions in Conversational mode with data
transmitted and received on a character by character
basis. Transmission is standard teletype emulation
with normal rules for full and half-duplex with the ex-
ception that reverse channel is not supported.

If the terminal is operating in half-duplex, and a key
is pressed, the corresponding code is simultaneously
transmitted and displayed on the screen (if it is a
displayable character). Displayable characters are
shown in columns 2-7 of the ASCII code chart, Figure
4-1. The cursor indicates the next display position
and automatically advances one space when a character
is entered. A space is considered a displayable
character, the display being a blank. In half-duplex
RTS is dropped when a CR (Control-M) code is keyed,
ETX (Control-C) or EOT (Control-D) code is keyed.
*In half-duplex RTS is dropped when a CR (Control-M) is
keyed.*

In full-duplex, all encoded keys are transmitted
directly to the CPU only (not to the display) where
they may or may not be echoed back for screen display.
Unencoded keys such as LOCK are processed in the ter-
minal.

2.2 Data Entry

The cursor is displayed, by switch selection, as a
block or an underline, blinking or steady, in the re-
verse of the text display (light or dark characters). A
displayable character is shown at the current cursor
location when received from the keyboard or the CPU,
the cursor moving one space to the right. When the
cursor is positioned on an existing line of data, new
data overwrites the old data showing on the screen,
(old data remains on the screen until overwritten or
erased).

When a character is entered at the end of a line, the
cursor goes to the beginning of the next line unless
Auto Line Feed is disabled. If Auto Scroll is enabled
and a character is entered at the end of the last line,
the screen text scrolls (moves) up one line leaving a
blank line at the bottom of the screen; the cursor
moves to the beginning of the new line. If JP-1 is

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installed, data entered from the keyboard will cause a short bell when the cursor reaches the 73rd character position. This indicates the end of line approaching; similar to typewriter operation.

2.2.1 Tagged Data

The sequence ESC,] sets a "tag" bit on subsequent characters to logic "1" causing them to be displayed with a visual attribute when such a code is entered. The sequence ESC,[resets the "tag" bit to "0" returning subsequent data display to normal.

2.2.2 Visual Attributes

The sequence ESC,0 causes the code immediately following to be interpreted as a visual attribute. Four major attributes (Reverse video, Half intensity, Blinking, and Underline) plus Zero Intensity are available and can be used in any of the 13 modes listed in Figure 2-1.

> NOTE: Half intensity is the default attribute on power up.

The attributes selected affect every tagged character on the screen regardless of whether the character was entered before or after the attribute was activated. Every tagged character on the screen must display the same attribute at the same time.

> Example: The entry ESC,0,B causes all tagged data to blink. The subsequent entry ESC,0,A will cause all tagged data to now display as half-intensity instead of blinking.

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Attribute	ASCII Code	Hex Code
Normal*	@	40
Half Intensity**	A	41
Blinking	B	42
Half Intensity, Blinking	C	43
Reverse Video	P	50
Rev. Video, Half Intensity	Q	51
Rev. Video, Blinking	R	52
Rev. Video, Half Intensity Blinking	S	53
Underlined	`	60
Underlined, Half Intensity	a	61
Underlined, Blinking	b	62
Underlined, Half Intensity Blinking	c	63
Video Suppress	D	44

* Normal (black or white characters) is switch selectable. See Figure 3-4.

** Half intensity is the default attribute on power up.

Figure 2-1   Codes Used for Visual Attributes

Application Notes:

When a full page of data, including visual attributes, is sent from the CPU, it is recommended that ESC,0,@ be transmitted before the data to improve the visual appearance while the screen is being filled. The appropriate attributes should then be set after the data has been received.

The visual attribute selected by an attribute code corresponds to the location of the "1" bits in the code. Any code that contains a "1" in an attribute position will activate that attribute. The bit positions are:

```
underline:        X 1 X X X X X
Reverse video:    X X 1 X X X X
Video Suppress:   X X X X 1 X X
Blink:            X X X X X 1 X
Half Intensity:   X X X X X X 1
```

Where X designates a "don't care" position for example, the sequence ESC,0,A will generate the same visual attribute as the sequence ESC,0,1 (half intensity).

2.3   Monitor Mode

Normally, control codes (column 0 and 1 of the ASCII chart) are not displayed. The command CTRL-1 places

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the terminal in Monitor mode where all characters received, including control codes, are displayed. Figure 2-2 shows the symbols used for each code. While in Monitor mode, the terminal will only display the data stream and will not act on any of the control commands. The command CTRL-2 terminates Monitor mode and returns the terminal to normal operation. Monitor mode can only be enabled from the keyboard.

NOTES: 1. CTRL-1 and CTRL-2 must be entered on the main typing array, not on the numeric pad.
2. Displayed control codes are alpha characters tagged with the underline attribute. *When monitor mode is entered, the attribute for the entire screen is automatically changed to underline when the unit receives the first control code. All tagged data is then displayed as underlined until a new attribute is entered.*
3. Exiting monitor mode does not reset the attribute.

Control Code	Symbol	Control Code	Symbol	Control Code	Symbol
NUL	@	VT	K	SYN	V
SOH	A	FF	L	ETB	W
STX	B	CR	M	CAN	X
ETX	C	SO	N	EM	Y
EOT	D	SI	O	SUB	Z
ENQ	E	DLE	P	ESC	[
ACK	F	DC1	Q	FS	\
BEL	G	DC2	R	GS	]
BS	H	DC3	S	RS	^
HT	I	DC4	T	US	_
LF	J	NAK	U		

Figure 2-2 Symbols Used for Displayed Control Codes

2.4 Auxiliary (Aux.) Port

The unidirectional serial Aux. port allows the connection to the terminal of a serial peripheral such as a printer or cassette. This interface transmits only and therefore does not support X-On/Off operation.

The Aux. port baud rate (and the Comm. port baud rate) is determined by the settings of switches 1, 2 and 3 on the back panel. For higher baud rates (eg. 9600, 19,200) it is recommended that two character times of no transmission be allowed to prevent loss of the initial data to the Aux port.

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2.5 Print Transparent

This mode allows the CPU to communicate directly with the Aux. port, bypassing the CRT screen. The command ESC,3 enables this mode, and the command ESC,4 terminates it. While in Print Transparent mode, the display memory ignores the entire data stream from the CPU. It is recommended that prior to enabling the Print Transparent mode that the keyboard be locked, thus preventing accidental key strokes which may result in garbled output.

2.6   Unused Control Codes – The codes shown in the abbreviated ASCII Chart in Figure 2-3 are generated but not acted upon by the Viewpoint.

b4	b3	b2	b1	COLUMN ROW	0	1
0	0	0	0	0	NUL	DLE
0	0	0	1	1	SOH	DC1
0	0	1	0	2	STX	DC2
0	0	1	1	3		DC3
0	1	0	0	4		DC4
0	1	0	1	5	ENQ	NAK
0	1	1	0	6	ACK	SYN
0	1	1	1	7		
1	0	0	0	8		
1	0	0	1	9	HT	EM
1	0	1	0	A		
1	0	1	1	B		
1	1	0	0	C		FS
1	1	0	1	D		GS
1	1	1	0	E		
1	1	1	1	F		US

3A MODE

b4	b3	b2	b1	COLUMN ROW	0	1
0	0	0	0	0	NUL	DLE
0	0	0	1	1	SOH	DC1
0	0	1	0	2	STX	DC2
0	0	1	1	3	ETX	DC3
0	1	0	0	4	EOT	DC4
0	1	0	1	5	ENQ	NAK
0	1	1	0	6	ACK	SYN
0	1	1	1	7		
1	0	0	0	8		
1	0	0	1	9	HT	EM
1	0	1	0	A		SUB
1	0	1	1	B		
1	1	0	0	C		FS
1	1	0	1	D		GS
1	1	1	0	E	SO	
1	1	1	1	F	SI	US

3A PLUS MODE

Figure 2-3   Unused Control Codes

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Eleven operational parameters can be selected by
setting miniature rocker switches located in two
blocks, S1 on the rear panel and S2 on the P.C. board.

3.1 Switch Settings

The switch blocks, are marked with Ø and 1 settings
and the individual switches are set by pressing each
lever to the desired position.

Rear panel switch settings are shown in Figure 3-2 and
P.C. board settings in Figure 3-4. The rear panel
switch location is shown in Figure 3-1 and the P.C.
board switch location in Figure 3-3.

In addition to switch set parameters, the connection of
Jumper 1 will enable a short bell on reaching the 73rd
column when data is entered from the keyboard only.

CAUTION

Switch settings are read only at power-up. If a
setting is changed, the terminal must be turned OFF
then ON again for the change to take affect.
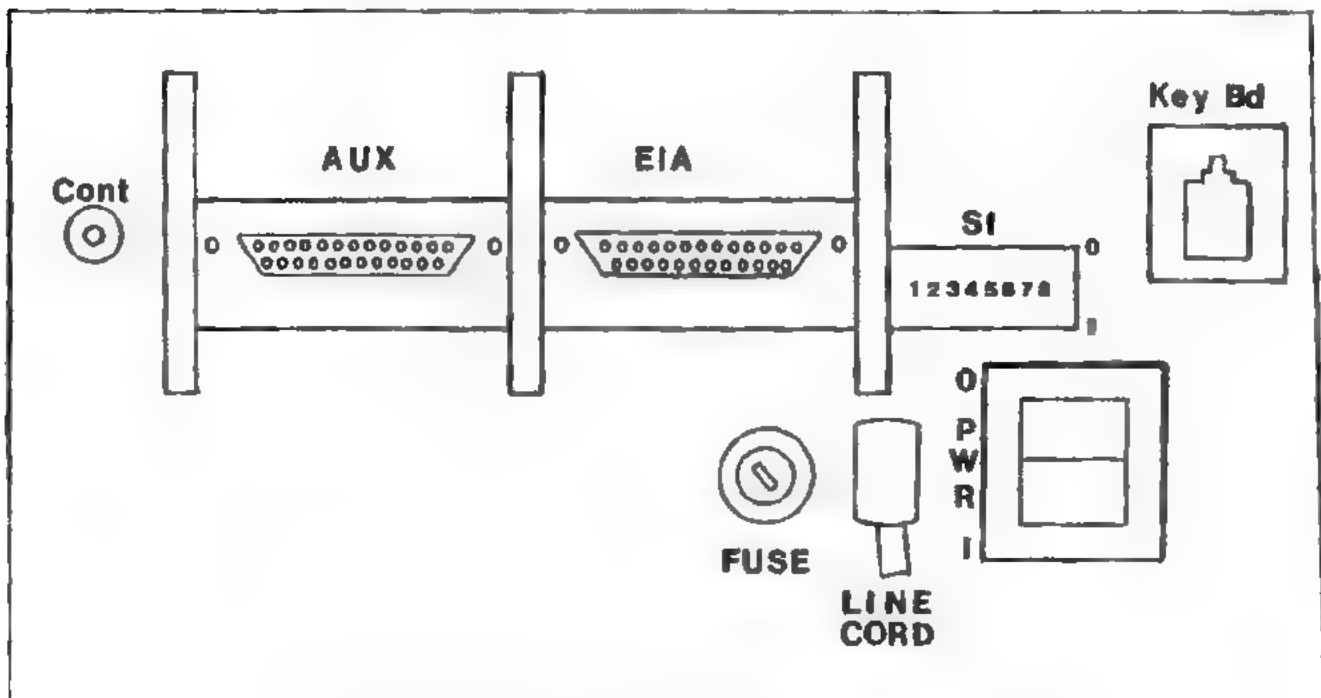
Figure 3-1 Rear Panel Switch Location

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Switch No.	Name	Setting	Function
S1-1,2,3	BAUD RATE	000	110
		001	300
		010	1200
		011	1800
		100	2400
		101	4800
		*110	9600
		111	19,200
S1-4	AUTO SCROLL	0	Disabled
		*1	Enabled
S1-5	AUTO LINE FEED	*0	Disabled
		1	Enabled
S1-6	LINE MODE	*0	Half duplex
		1	Full duplex
S1-7,8	PARITY	*00	Odd
		01	Even
		10	Marking
		11	Spacing

* Factory Setting

Figure 3-2 Rear Panel Switch Settings
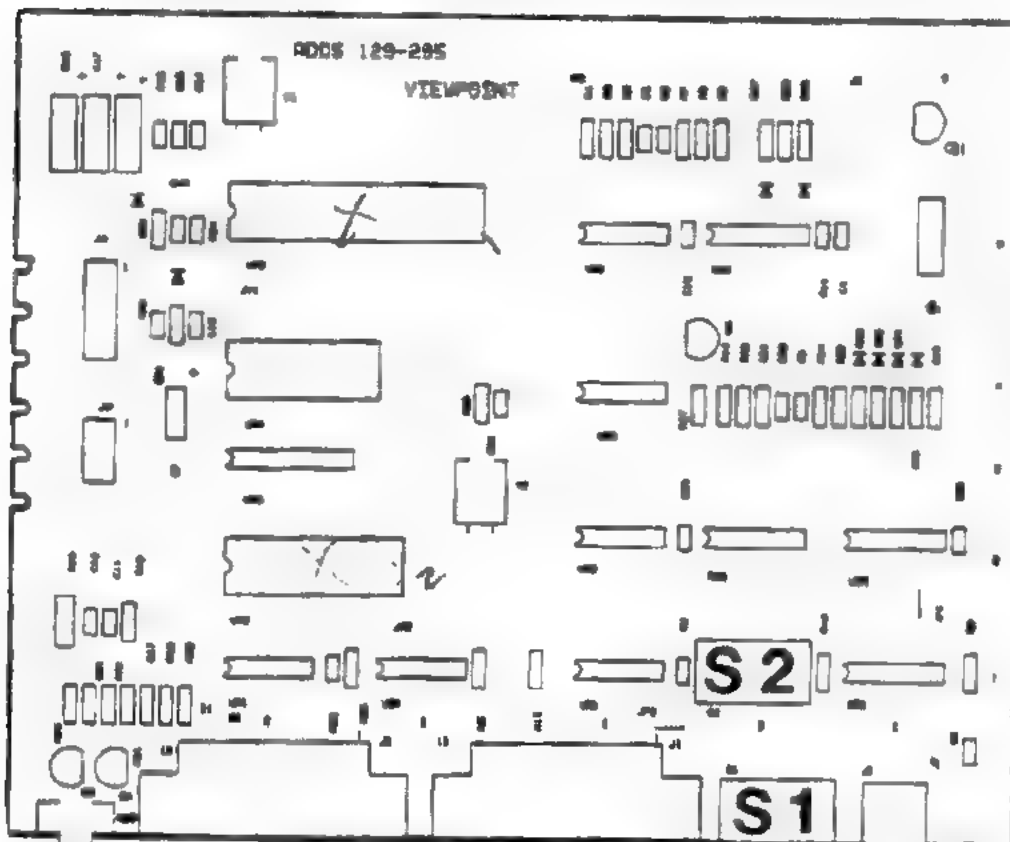
Figure 3-3 P.C. Board Switch Location

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Switch No.	Name	Setting	Function
S2-1	CHARACTER DISPLAY	*0 1	Light characters on dark background Dark characters on light background
S2-2	DISPLAY PARITY ERROR	*0 1	Disabled Enabled
S2-3	SCREEN REFRESH RATE	*0 1	60 HZ 50 HZ
S2-4	Mode of Operation	*0 1	3A Mode 3A Plus Mode
S2-5	Disable CTRL-Z	*0 1	Enabled Disabled
S2-6	Space/ Adv.	*0 1	Disabled Enabled
S2-6			*Switch not used in 3A Plus Mode.*
S2-7	CURSOR DISPLAY	*0 1	Steady Blinking
S2-8	CURSOR FORMAT	*0 1	Block Underline

Short bell on 73rd column is enabled by installing JP-1.
*Factory Setting

Figure 3-4   P.C. Board Switch Settings

3.2 Switch Set Parameter Description

1. Baud Rate (Switches S1-1,2,3)
The baud rate for the Communications port and the Auxiliary port is determined by the setting of these three switches as shown in Figure 3-2.   Two stop bits are inserted at all baud rates.

2. Auto Scroll (Switch S1-4)

   0 = Auto Scroll disabled.

   1 = Auto Scroll enabled.

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When Auto Scroll is enabled, data scrolls if the cursor is on the bottom line and LF (CTRL-J or ↓) is entered. Data will also scroll if Auto Line Feed is enabled and *CR (CTRL-M or RETURN) is entered* or if data is entered past end of line. The displayed data moves upward one line with the previous top line lost from memory. A new blank line appears at the bottom of the screen, simulating teletypewriter Line Feed.

3. Auto Line Feed (Switch S1-5)

0 = Disabled: The cursor will remain at the 80th character position if no valid cursor commands are received and data will be overwritten. When CR is received (RETURN or CTRL-M), the cursor moves to the beginning of the current line. *The cursor will wrap around to the beginning of the next line if data is entered in the 80th position.*

1 = Enabled: When the cursor is at the end of a line it will move to the first position of the next line. CR will cause the cursor to go to the beginning of the current line. *CR (RETURN) will cause the cursor to go to the beginning of the next line.*

4. Line Mode (Switch S1-6)

0 = Half-duplex. Entered data is simultaneously displayed on the screen and transmitted to the communications line.

1 = Full-duplex. Keyboard entered data goes directly to the communications line, there is no internal connection between the keyboard and the display. The host CPU must echo each character back via the communications line if the operator is to see data entered from the keyboard.

5. Parity (Switches S1-7,8)

An eighth (parity) bit can be used to check the accurate transmission of each 7-bit ASCII code.

00 = Odd: the eighth bit is set so that the total count of ON (1) bits for each outgoing code is odd.

01 = Even: the eighth bit is set for an even total count of ON (1) bits.

10 = Marking: the eighth bit is held ON (1).

11 = Spacing: the eighth bit is held OFF (0).

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With parity check enabled (Switch PC-A3/2), incoming data is checked for the above conditions.

6. Video Character display (Switch S2-1)

    0 = light characters displayed on a dark back-
        ground.

    1 = dark characters displayed on a light back-
        ground.

7. Display Parity Error (Switch S2-2)

    0 = Disabled: data is displayed as received
    without checking for parity, parity errors are
    ignored.

    1 = Enabled: input data is checked against the
    parity setting on switches S1-7 and 8. A detected
    error is flagged with an reverse "P" (ᑫ) on the
    CRT.

    NOTE: A break in half-duplex mode or a disconnec-
    tion in the data lines may also cause the reverse
    "P" to be displayed due to a framing or open-line
    error if switch is enabled.

8. Screen Refresh Rate (Switch S2-3)

    0 = 60HZ

    1 = 50HZ

9. 3A Mode or 3A Plus Mode (Switch S2-4)

    Select Terminal Mode

    0 = 3A Mode

    1 = 3A Plus Mode

10. Disable CTRL-Z (Switch S2-5)

    0 = Enable: permits CTRL-Z control code to clear
        screen.

    1 = Disable: prevents clearing of screen except
        by executing successive LINE FEEDS or SHIFT
        CLEAR.

11. Space/Adv. (Switch S2-6)   *not used in 3A Plus*
                                    Mode

    0 = SPACE: selects destructive cursor; that is,
        space code always overwrites the display
        memory location under cursor and advances
        cursor.

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3-5

1 = ADV: selects non-destructive cursor between
RETURN and subsequent LINE FEED. Cursor may
be advanced by a space code and does not
overwrite display memory location; however,
cursor is destructive between LINE FEED and
next RETURN.

12. Cursor Display (Switch S2-7)

0 = Steady presentation.

1 = Cursor blinks at the rate of twice/second.

13. Cursor Format (Switch S2-8)

0 = Cursor displayed as a rectangular block.

1 = Cursor displayed as an underline.

In the 3A mode only, underline cursor
selection will disable the following functions:

       Cursor Home, Up and Forward
       Absolute Addressing

NOTE: Home is lower left of screen on power up.

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The 128 ASCII codes shown in Figure 4-1 can be generated from the keyboard or by the CPU. From the keyboard, the codes for the characters in columns 2 through 7 are generated by pressing the corresponding key (in conjunction with SHIFT as required). The commands in column 0 and 1 are obtained by pressing the CTRL key in conjunction with the character key from column 4 or 5 respectively. Additional commands are generated from code sequences. Not all commands are used by the VIEWPOINT/3A PLUS.

b7 b6 b5 →	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b4 b3 b2 b1 / ROW / COLUMN	0	1	2	3	4	5	6	7
0 0 0 0 0	NUL	DLE	SP	0	@	P	`	p
0 0 0 1 1	SOH	DC1	!	1	A	Q	a	q
0 0 1 0 2	STX	DC2	"	2	B	R	b	r
0 0 1 1 3	ETX	DC3	#	3	C	S	c	s
0 1 0 0 4	EOT	DC4	$	4	D	T	d	t
0 1 0 1 5	ENQ	NAK	%	5	E	U	e	u
0 1 1 0 6	ACK	SYN	&	6	F	V	f	v
0 1 1 1 7	BEL	ETB	'	7	G	W	g	w
1 0 0 0 8	BS	CAN	(	8	H	X	h	x
1 0 0 1 9	HT	EM	)	9	I	Y	i	y
1 0 1 0 10	LF	SUB	*	:	J	Z	j	z
1 0 1 1 11	VT	ESC	+	;	K	[	k	{
1 1 0 0 12	FF	FS	,	<	L	\	l	
1 1 0 1 13	CR	GS	-	=	M	]	m	}
1 1 1 0 14	SO	RS	.	>	N	^	n	~
1 1 1 1 15	SI	US	/	?	O	_	o	DEL

Figure 4-1. ASCII Code Chart

Certain common commands such as ESC or HT (TAB) are assigned to a single key for operator convenience. Special terminal commands can be generated by combining CTRL with alpha keys.

This section describes the codes and commands used by the VIEWPOINT/3A PLUS. Keyboard function in the generation of codes is discussed in Section 1.

4.1 ASCII Codes

The ASCII code chart is divided into control codes in column 0 and 1, and upper and lower case characters and symbols in columns 2 through 7. The seven bit binary pattern transmitted for each code is shown with the three most significant bits (b7 - b5) over each column, and the four least significant bits (b4 - b1) along side each row. The hex and decimal chart location is also given for each column and row. The code equivalent of any character or command is expressed by combining these column and row digits.

Example:	Character	Binary	Chart Location
	A	1000001	4/1
	SHIFT-A	1100001	6/1
	SOH (CTRL-A)	0000001	0/1

4.2 Command Codes

VIEWPOINT/3A PLUS commands are described in this section by function and listed alphabetically in Figure 4-2. Commands are formulated as ASCII escape (ESC) sequences or by combining CTRL and/or SHIFT with other keys. Not all ASCII commands and CTRL combinations are used. Undefined commands are ignored.

A hyphen in the command sequences indicates that the keys must be held down simultaneously.

> Example: "CTRL-T" means hold two keys down at once.

A comma between codes in a sequence indicates that the keys should be pressed sequentially.

> Example: "ESC,3" means press ESC key, release it, then press 3.

Normally, control codes are not displayed on the screen. The command CTRL-1 places the terminal in Monitor mode where control codes are displayed but not acted upon. The special symbols used to display control codes are shown in Figure 2-2.

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Command	ASCII CODE	Generation From Keyboard
***Address, Absolute	ESC,=,r,c*	ESC,=,r,c*
Audible Tone	BEL	CTRL-G
Aux Port Enable	*ESC,@*	*ESC,@*
Aux Port Disable	*ESC,A*	*ESC,A*
Backspace	BS	BACKSPACE or CTRL-H
Cursor Back	BS	CTRL-H or ←
Cursor Down	LF	CTRL-J or ↓
***Cursor Forward	FF	CTRL-L or →
***Cursor Home	RS	CTRL-∧ or Home
***Cursor Up	VT	CTRL-K or ↑
Cursor Suppress	*ETB*	*CTRL-W*
Cursor Enable	*CAN*	*CTRL-X*
Erase to End of Line	*ESC,T*	*ESC,T*
Erase to End of Page	*ESC,Y*	*ESC,Y*
Erase Screen	SUB	SHIFT-CLEAR or CTRL-Z
	ESC,*	ESC,*
Keyboard Lock	SI	----
Keyboard Unlock	SO	----
Keyboard Lock	*ESC,#*	*ESC,#*
Keyboard Unlock	*ESC,"*	*ESC,"*
Monitor Mode Disable	--	CTRL-2**
Monitor Mode Enable	--	CTRL-1**
New Line	CR	CTRL-M or RETURN
Read Current Cursor Pos.	*ESC,?*	*ESC,?*
Set Attribute	*ESC,0,x****	*ESC,0,x****
Tag Bit Reset	*ESC,(*	*ESC,(*
Tag Bit Set	*ESC,)*	*ESC,)*
Transparent Print ON	*ESC,3*	*ESC,3*
Transparent Print OFF	*ESC,4*	*ESC,4*

```
    *   - r,c = Row and column code.  See Absolute
            Cursor Addressing Chart, Appendix A.
   **   = Entered on the main typewriter array only,
            not the numeric pad.
  ***   - Disabled when cursor is underline. (In 3A
            mode only)
 ****   - Attribute.  Default is Half Intensity.
```

Figure 4-2   Terminal Commands

4.2.1 Cursor Control Codes

1. HOME (requires SHIFT)

The RS code (CTRL-A or HOME key) places the cursor in the HOME location: the upper left hand corner of the screen with Block cursor enabled and is disabled with an underline cursor display. *Home key or RS code will place the cursor in the upper left hand corner of the screen.*

2. FORWARD (requires SHIFT)

The FF code (CTRL-L or →key) moves the cursor one position forward. *The FF code (CTRL-L or → key) moves the cursor one position forward and if at the end of a line it moves to the beginning of the next line.* If Auto Line Feed is enabled, the cursor remains at the 80th character position. Data is overwritten unless a valid cursor control command is received.

3. BACK (requires SHIFT)

The BS code (CTRL-H or ←key) moves the cursor back one position. *If it is at the beginning of a line, it goes to the end of the preceding line. If it is at the beginning of the first line, it goes to the end of the last line.* It will not move past the beginning of a line.

4. UP (requires SHIFT)

The VT code (CTRL-K or ↑ key) moves the cursor directly up onto the preceding line. It will not move past the top line. *If it is on the top line, it goes to the same relative position on the bottom line.*

5. DOWN (requires SHIFT)

The LF code (CTRL-J, or ↓ key) moves the cursor directly down one line. If it is on the bottom line, it moves to the same relative position on the top line if Auto Scroll is disabled. With Auto Scroll enabled, the displayed text scrolls up and the cursor moves directly down on the new line.

6. *Cursor Enable*

The command CTRL-X enables the cursor so that it is displayed.

7. *Cursor Suppress*

The command CTRL-W will suppress the cursor so that it will not be displayed.

4.2.2 Erase Codes

1. ERASE SCREEN

The SUB code or CTRL-Z erases the entire screen (screen is filled with "spaces") (if switch S2-4 is enabled) and the cursor moves to the HOME position.

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The code ESC,* erases the entire screen (screen is filled with "spaces") and the cursor moves to the upper left corner. The attribute tag bit is reset on the code sequence ESC,*, but the attribute does not change. CTRL-Z will not reset the attribute tag.

2.   ERASE TO END OF LINE
The code sequence ESC,T erases all data from the cursor to the end of the current line. The cursor does not move.

3.   ERASE TO END OF PAGE
The code sequence ESC,Y erases all data from the cursor position to the end of the page. The cursor does not move.

4.2.3 Other Control Codes

1.   CARRIAGE RETURN
The CR code (CTRL-M or RETURN key) moves the cursor to the beginning of the current line.   With Auto Line Feed on, CR will cause the cursor to go to the beginning of the next line.

2.   KEYBOARD LOCK/UNLOCK
The SI code (or CTRL-O) locks the keyboard and the SO code (or CTRL-N) code sequence unlocks it. Valid codes only are recognized from the CPU.   The code sequence ESC,# locks the keyboard and the code sequence ESC," unlocks it. Valid codes only are recognized from the CPU or the keyboard.

> NOTE: When the keyboard is locked, only
> ESC," is recognized as the proper
> code to unlock the keyboard.

3.   MONITOR MODE
The code sequence CTRL-1 places the terminal in Monitor mode where all control codes are displayed on the screen but are not acted on. The sequence CTRL-2 exits this mode. These commands can come only from the keyboard, not the CPU. Numerics 1 and 2 must be entered on the main typing array.

> NOTE: Entering Monitor Mode sets the underline
> attribute on. Exiting Monitor Mode does not reset
> the attribute.

4.   AUDIBLE TONE
The code BEL (CTRL-G) causes an audible tone to sound consistent with the teletypewriter bell control.

4.2.4   Absolute Cursor Addressing

The screen contains 1920 character locations (24 rows x 80 columns). The cursor can be placed in any particular location by a single four-byte command in addition to incremental movement by cursor control keys.

Refer to Appendix B for the corresponding addressing grid. Each row and column is designated by a sequential ASCII character code.

The command ESC,=,r,c will position the cursor to the row (r) and column (c) location indicated.

> Example: ESC,=,1,# places the cursor in the second row and the fourth column. Refer to Appendix A for further discussion.

4.2.5   *Read Cursor Position*

When the CPU issues the code sequence ESC,?, it will cause the terminal to transmit the cursor position by r,c (row and column code) followed by a CR code. See Absolute Cursor Addressing Chart, Appendix A.

4.3   DEL Code

The ASCII code, DEL, is transmitted whenever the "DEL" key is depressed. It is not displayed unless the terminal is in the Monitor Mode.

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4.4 EIA Data Communications Signals

Figure 4-3 tabulates the EIA port pin designations and pin outs.

Pin No.	Signal	Description
1	GND	Protective Ground
2	EIAOUT	Transmitted Data
3	EIAIN	Received Data
4	RQSND	Request to Send
5	CLSND	Clear to Send
7	GND	Signal Ground
11	SCND BRK	Secondary Break Indicator
20	DTR	Data Terminal Ready

Figure 4-3   EIA Data Communication Signals

4.4.1 Auxiliary Port

All incoming serial data is directly routed to the auxiliary port.

All incoming serial data following the code sequence ESC,@ is directly routed to the auxiliary port. Upon receipt of the sequence ESC,A (which is also sent to the Aux port), the port is disabled (held marking).

4.5   Aux Data Communication Signals - Figure 4-4 tabulates the EIA port pin designation and pin outs.

Pin No.	Signal	Description
1	GND	Protective Ground
3	AUXOUT	Auxiliary Output
7	GND	Signal Ground

Figure 4-4   Aux Data Communication Signals

Absolute Cursor Addressing Chart
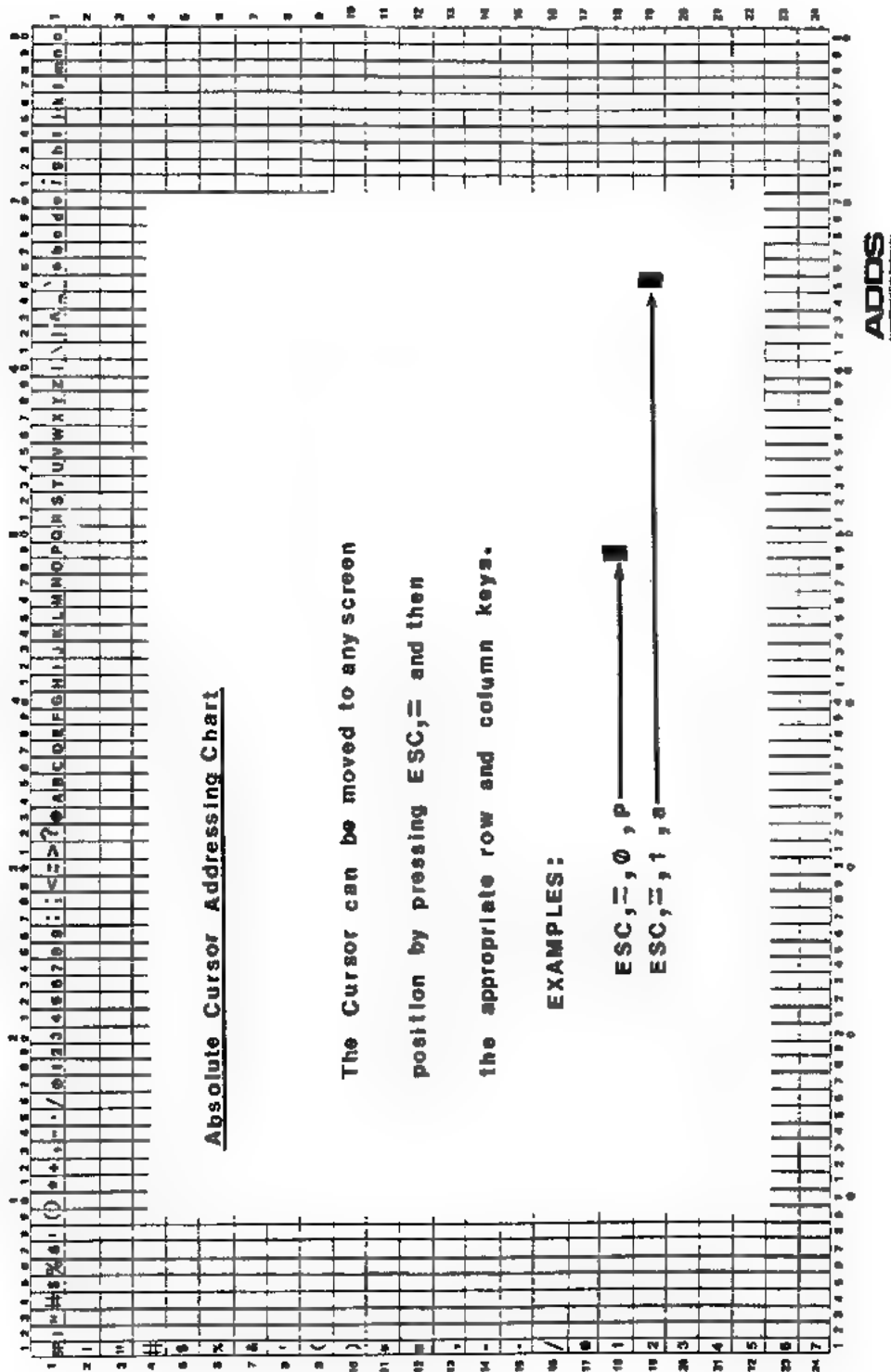
The Cursor can be moved to any screen position by pressing ESC,= and then the appropriate row and column keys.

EXAMPLES:

ESC,=,0,P
ESC,=,1,a

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Schaumburg, Illinois	312-843-7560
Dallas, Texas	214-387-2337
Tustin, California	714-730-6444
Palo Alto, California	415-856-0560
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For those customers wishing to maintain an inventory of replacement parts, to accomplish their own repairs, a list of subassembly prices is provided for convenience. These items may be purchased directly from Applied Digital Data Systems Inc. as noted below.

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Part Number	Description	Price	1-25	26-50	51-75	76-100
129-29500	Logic PCB	$260.00	1	2	4	5
129-28500	PS/Video Assy	$234.00	1	2	4	5
355-10500	Keyboard	$190.00	1	2	4	5
350-03800	Transformer	$50.00			1	1
518-20500	K/B Cable	$4.50	1	1	1	2
345-10200	Yoke Assy	$21.00		1	1	2
345-10300	CRT Assy	$70.00		1	1	2

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Dollars	Discount
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    Method of shipment (UPS, Air Freight, etc.)
    Part Number and quantity of items ordered
    Price and required delivery

If priority handling is required, please note this on your order and include a phone number and contact at your company.

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Applied Digital Data Systems (ADDS) offers an extended warranty contract exclusively for the Viewpoint and the Viewpoint/3A PLUS. ADDS warrants each new communications and terminal product man-ufactured by it to be free of defects in materials and workman-ship under normal use and service for a period of 90 days. This contract, when signed by the purchaser and submitted to ADDS with payment and a document (sales receipt, invoice, etc.) that es-tablishes date of purchase will extend the standard warranty cov-erage to a full two or three years depending on the option selected.

ADDS' sole obligation under this warranty is limited to repairing, at its factory, any failure of the equipment for the period selected, provided that the buyer bears the responsibilty for payment of all shipping and insurance charges connected with the repair.

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