



Tenth Anniversary Edition

# ADM 3A Dumb Terminal® Video Display Terminal Users Reference Manual

**LEAR SIEGLER, INC.**  
**DATA PRODUCTS DIVISION**  
901 EAST BALL ROAD, ANAHEIM, CALIFORNIA 92805

**Tenth Anniversary  
ADM 3A  
Dumb Terminal®  
Video Display Terminal**



LEAR SIEGLER, INC.

**USERS REFERENCE  
MANUAL**

## TABLE OF CONTENTS

SECTION	PAGE
I GENERAL DESCRIPTION .....	1-1
1.1 INTRODUCTION .....	1-1
1.2 PURPOSE AND USE .....	1-1
1.3 OPERATIONAL DESCRIPTION .....	1-2
1.3.1 Keyboard .....	1-3
1.3.2 Input/Output (I/O) Port .....	1-3
1.3.3 ADM 3A Control Logic .....	1-3
1.3.4 Set-Up Mode .....	1-3
1.3.5 Send/Receive Modes .....	1-3
1.3.6 Display Memory .....	1-3
1.3.7 CRT Display Monitor .....	1-3
1.4 PHYSICAL DESCRIPTION .....	1-3
1.5 SPECIFICATIONS .....	1-4
1.6 CHARACTER FORMAT .....	1-4
1.7 WORD STRUCTURE .....	1-4
1.8 ANSWERBACK PROGRAMMING .....	1-4
1.9 DATA ENTRY AND OVERFLOW .....	1-4
1.10 KEYBOARD LAYOUT OPTIONS .....	1-4
1.11 OPTIONAL FEATURES .....	1-4
1.11.1 20mA Current Loop On Extension Port .....	1-4
1.11.2 20mA Current Loop On Modem Port .....	1-4
1.11.3 RS-422 Interface Option .....	1-4
1.11.4 230 VAC .....	1-4
1.11.5 Green Phosphor Display .....	1-4
1.11.6 Answerback Storage (NVM) .....	1-4

## TABLE OF CONTENTS (cont'd)

SECTION	PAGE
II	INSTALLATION ..... 2-1
2.1	GENERAL ..... 2-1
2.2	SPECIAL SAFETY REQUIREMENTS ..... 2-1
2.3	UNPACKING AND INITIAL INSPECTION ..... 2-1
2.4	SITE REQUIREMENTS ..... 2-1
2.5	INITIAL PREPARATION ..... 2-2
2.5.1	Line Voltage Selection ..... 2-2
2.5.2	Set-Up Mode Preparation ..... 2-2
2.6	INTERFACE INFORMATION ..... 2-2
2.6.1	RS-232C Modem Port Interface ..... 2-2
2.6.2	RS 232C Extension Port Interface ..... 2-2
2.7	INSTALLING THE ADM 3A ..... 2-2
2.8	POWER TURN-ON ..... 2-8
2.9	POWER TURN-OFF ..... 2-10
2.10	CLEANING ..... 2-10
2.11	INSPECTION ..... 2-10
III	OPERATION ..... 3-1
3.0	PRELIMINARY NOTE ..... 3-1
3.1	GENERAL ..... 3-1
3.2	KEYBOARD OPERATIONS ..... 3-1
3.3	SET-UP MODE OPERATIONS ..... 3-1
3.3.1	Enter Set-Up Mode ..... 3-1
3.3.2	Set Terminal Configuration Parameters ..... 3-5
3.3.3	Exiting Set-Up Mode ..... 3-5
3.3.4	Save Current Terminal Configuration Values ..... 3-5
3.3.5	Enter Personality Mode ..... 3-10
3.3.6	Enter Answerback Programming Mode ..... 3-10
3.3.7	Program Mode ..... 3-11
3.3.8	Cancel Current Mode ..... 3-11
3.3.9	Restore Active Set-Up ..... 3-11
3.3.10	Default Active Set-Up ..... 3-11
3.3.11	Reset The ADM 3A ..... 3-11

## TABLE OF CONTENTS (cont'd)

SECTION	PAGE
3.4 GRAPHICS .....	3-11
3.5 INTERFACE CONTROL OPERATIONS .....	3-11
3.5.1 Data Communication Ports .....	3-11
3.5.2 Request To Send Operation .....	3-11
3.5.3 Code Turnaround Operation .....	3-11
3.6 PROGRAMMING CONSIDERATIONS .....	3-13
3.6.1 Remote CTRL Operation .....	3-13
3.6.2 Remote Load-Cursor Operation .....	3-13
3.6.3 Escape Sequences .....	3-13
3.7 GATED EXTENSION PORT OPERATION .....	3-13

## LIST OF FIGURES

FIGURE		PAGE
1-1	ADM 3A Video Display Terminal .....	1-0
1-2	ADM 3A Data Flow Block Diagram .....	1-2
1-3	ADM 3A Graphic Character Set and CTRL Codes .....	1-7
2-1	ADM 3A Assembly .....	2-3
2-2	ADM 3A Connector Locations .....	2-4
2-3	Typical ADM 3A Application .....	2-5
2-4	Modem and RS-232C Extension Interface Logic .....	2-6
2-5	Optional Current Loop and RS-422 Interface Logic .....	2-7
2-6	ADM 3A Rear Panel Controls .....	2-8
2-7	ADM 3A Front Panel Controls .....	2-9
3-1	ADM 3A Standard Keyboard Operational Characteristics .....	3-2

## LIST OF TABLES

TABLE		PAGE
1-1	ADM 3A Specifications .....	1-5
3-1	Keystroke Explanations .....	3-1
3-2	Set-Up Mode Functions and Control Codes .....	3-4
3-3	Set-Up Mode - Terminal Configuration Parameters .....	3-6
3-4	Personality Mode Functions .....	3-10
3-5	ADM 3A Escape Sequences .....	3-12

## APPENDIX A

ASCII CONTROL CODE CHART .....	A-1
CONTROL AND OPERATORS CODES CHART .....	A-2
ABSOLUTE CURSOR POSITIONS CHART .....	A-3
ADM 3A ATTRIBUTE CODES .....	A-4
ADM 3A GRAPHICS/ATTRIBUTES CODES .....	A-5
LIMITED GRAPHICS CHARACTER SET .....	A-6

## PREFACE

*This Users Reference Manual describes the function and operation of the ADM 3A Video Display Terminal. The instructions and information are presented to aid operational personnel in the installation, operation, and care of the ADM 3A. All operator controls are described in detail, and remote programming considerations are presented in sufficient detail to enable an experienced operator to use the equipment efficiently when confronted with nonstandard applications.*

### WARNING

*This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference. Only shielded cables with the shield terminated to the metal hood of the connector can be used.*



Figure 1-1. ADM 3A Video Display Terminal (10th Anniversary Edition)



## SECTION I GENERAL DESCRIPTION

### 1.1 INTRODUCTION

This section of the manual describes the primary function of the Lear Siegler ADM 3A video display terminal shown in Figure 1-1, page 1-0. Other information in this section includes specifications, operating features and ranges, physical dimensions, and a list of available options.

### 1.2 PURPOSE AND USE

There are numerous applications of the ADM 3A, all involving the transfer of asynchronous data. In some applications, data transfer may be exclusively unidirectional; either from the ADM 3A to a host computer, or from the computer to the ADM 3A. However, a more frequent application of the ADM 3A is one in which an operator communicates with the computer, and the computer reacts in accordance with its stored program.

The ADM 3A features the following general capabilities:

- Full 128 ASCII character set with 24 lines x 80 characters, non-glare display (24th line is used in set-up mode to select terminal parameters)
- Eleven communication rates in full-duplex and half-duplex send/receive modes
- Scrolling
- Absolute cursor positioning
- Variable 9-, 10-, or 11-bit word structures
- Upper and lower case characters standard
- Program mode
- Selectable auto new line operation
- Standard RS-232C or optional 20mA current loop interface, with RS-232C extension interface for auxiliary devices. (Selectable keyboard lock or gated extension port). Optional current loop interface on extension port.
- DTR or X-On/X-Off handshake mode
- Special control character sequences
- Selectable refresh rate: 50 Hz or 60 Hz
- Non-volatile set-up mode for terminal configuration
- Personality mode to designate unique characters for:
  - Fill character
  - Turnaround code
  - X-On/X-Off characters
  - Answerback (with NVM optional)
- Six non-embedded visual attributes:
  - Blank
  - Blink
  - Reverse video
  - Underline
  - Reduced intensity
  - Character graphics
- CRT screen saver
- Full screen reverse video
- Selectable key click
- Business graphics

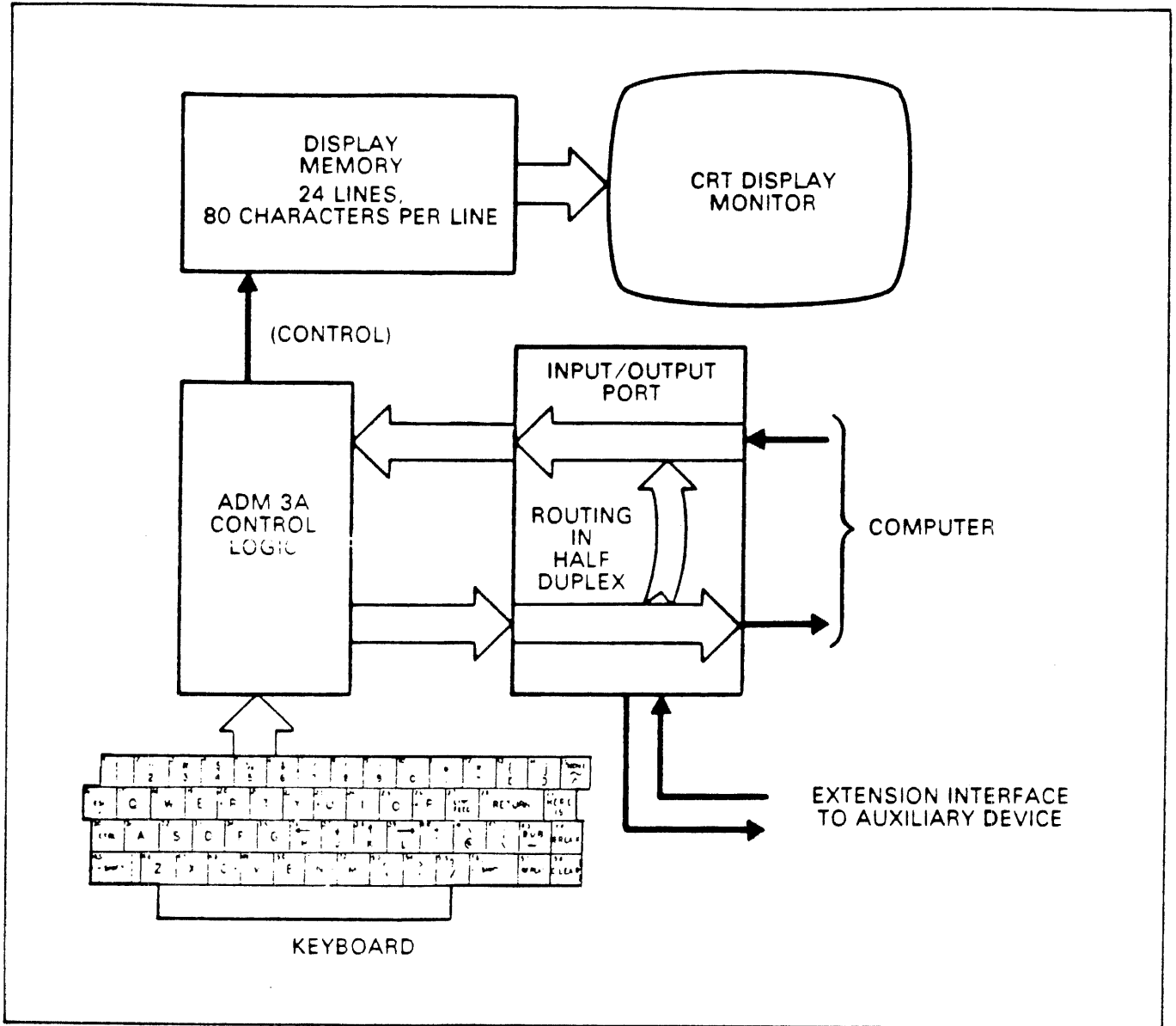


Figure 1-2. ADM 3A Data Flow Block Diagram

- Four keyboard layouts:
  - USASCII-QWERTY
  - UKASCII-QWERTY
  - German-QWERTZ
  - French-AZERTY

### 1.3 OPERATIONAL DESCRIPTION

The ADM 3A is an interactive device which is

used to enter, display, and send information to a host computer, and to receive and display information from the computer. Using a keyboard similar to that of a standard typewriter, the operator may enter information which is immediately transmitted to the computer, and may be simultaneously displayed on a cathode ray tube (CRT). Data from the computer is received and displayed at baud rates as high as 19,200 (the maximum baud rate when using the current loop option is 9600).

### 1.3.1 Keyboard

The keyboard contains 59 keys from which data entry and control functions are initiated. Each keystroke is encoded into a corresponding ASCII character which is immediately transmitted to the host computer. The character is also routed back to the CRT display: directly in half-duplex operation, or echoed from the host computer via the input/output (I/O) interface in full-duplex operation.

### 1.3.2 Input/Output (I/O) Port

The modem I/O port is the link, or interface, that handles the flow of data in both directions between the ADM 3A and the computer. It may be configured for either RS-232C or optional 20mA current loop operation.

With the modem DTR or X-On/X-Off handshake feature, all data transmitted from the host, even at speeds up to 19,200 baud, will be received by the ADM 3A without data loss (9600 for current loop.)

### 1.3.3 ADM 3A Control Logic

The ADM 3A control logic interprets the control codes that originate either at the keyboard or host computer, and directs the activities of the ADM 3A accordingly. These activities include data handling and formatting.

### 1.3.4 Set-Up Mode

The ADM 3A features a non-volatile set-up mode which allows the terminal parameters to be selected through commands from the keyboard. These parameters, including baud rates, word structures, cursor type, communications control, and operating modes, can then be "saved" in memory and retained when power is shut off.

### 1.3.5 Send/Receive Modes

Two selectable send/receive modes are available in the ADM 3A through the set-up mode: half-duplex and full-duplex. In the half-duplex mode, each character is transmitted to the computer as it is entered on the keyboard and is simultaneously displayed on the CRT monitor.

In full-duplex operation, the ADM 3A can transmit and receive information in both directions simultaneously. Characters are transmitted as they are entered at the keyboard,

but are displayed only upon reception. In order to display transmitted characters, they must be echoed back from the host computer or data set.

### 1.3.6 Display Memory

The display memory contains a random access memory (RAM), video logic and character generation circuits appropriate for controlling the CRT display. The memory is capable of holding 1,920 characters, which are stored in sequentially scanned locations. The scanned data is then sent to the CRT for displaying. Input to the display memory consists of the data character codes from the I/O port or keyboard, under the control of signals from the control logic circuits.

### 1.3.7 CRT Display Monitor

The CRT display monitor is a rectangular screen measuring 12 inches diagonally. Data characters are displayed on 24 equally spaced rows, each consisting of 80 characters. The 80-character lines are displayed clearly at a refresh rate of either 50 or 60 Hz, corresponding to the AC line frequency.

## 1.4 PHYSICAL DESCRIPTION

The ADM 3A is a self-contained unit consisting of four major assemblies: (1) base and cover assembly, (2) main logic board, (3) keyboard and (4) the CRT monitor. The power transformer and intercomponent cabling are located on the base portion of the terminal.

The cover portion of the terminal contains the CRT monitor and its associated subassemblies. The cover is hinged to the base at the rear, and when swung open, all components of the ADM 3A are exposed.

The main logic board contains all other operating elements of the ADM 3A that are not contained in the CRT monitor, keyboard and the base assembly. The logic board is connected to a metal plate which anchors to the base supports of the unit. Two connectors on the logic board provide the RS-232C current loop interface and the RS-232C extension interface.

The keyboard assembly is made up of integrated key rows (or modules). It is connected to the main logic board by an eight pin connector.

The CRT monitor consists of three subassemblies: (1) the CRT itself, (2) a printed circuit board that

contains most of the video circuitry, and (3) the flyback assembly. The monitor display screen measures 12 inches diagonally.

## 1.5 SPECIFICATIONS

The ADM 3A specifications are listed in Table 1-1, page 1-5.

## 1.6 CHARACTER FORMAT (Figure 1-3)

The standard ADM 3A character set contains 96 ASCII characters. Control characters are not displayed when they are generated. The displayable 96 ASCII characters consist of upper and lower case letters, numerics, and punctuation.

## 1.7 WORD STRUCTURE

The ADM 3A transmits and receives serial asynchronous data in a 9-bit, 10-bit, or 11-bit format in the following sequence:

- One start bit
- Seven or eight data bits
- One or no parity bit
- One or two stop bits

Parity selection (odd, even, or no parity) is permitted with both the 7-bit or 8-bit data word. If an 8-bit data word is selected, then bit number eight can be designated to be either "1" or "0." Parity selection and the value of bit number eight are selected in the set-up mode. Refer to Section III.

## 1.8 ANSWERBACK PROGRAMMING

The ADM 3A provides a 32-byte, user-programmable, answerback message stored in volatile memory. Answerback with NVM is optional. The message is transmitted in response to an ENQ code from the host computer or by pressing the **HERE IS** key for display on the terminal if it is in half-duplex mode. The answerback is programmable through the **CTRL A** in the set-up mode. Refer to Section III.

## 1.9 DATA ENTRY AND OVERFLOW

New data enters on progressive lines, from top to bottom. When the cursor is on the bottom line, line feed causes upward scrolling of the entire display

page. When overflow occurs, the entire display page is scrolled upward one line as new data enters at the beginning of the new bottom line. If auto newline is not enabled in set-up mode, a CR/LF must be sent.

## 1.10 KEYBOARD LAYOUT OPTIONS

Four character formats, which are selectable via the set-up mode, are available with the ADM 3A for the following language sets: USASCII-QWERTY, UKASCII-QWERTY, German-QWERTZ, and French-AZERTY.

## 1.11 OPTIONAL FEATURES

The standard ADM 3A can be further equipped with several options.

### 1.11.1 20mA Current Loop On Extension Port

This option permits the extension port to be used in a current loop application.

### 1.11.2 20mA Current Loop On Modem Port

This option permits the modem port to be used in a current loop application.

### 1.11.3 RS-422 Interface Option

This option permits the modem port to be used in an RS-422 application.

### 1.11.4 230 VAC

For this option, a 230-volt transformer and appropriate power cord are provided to make the ADM 3A suitable for 230-volt operation.

### 1.11.5 Green Phosphor Display

A green display screen is available with the ADM 3A. This option has a longer life than the standard white screen.

### 1.11.6 Answerback Storage (NVM)

The ADM 3A incorporates facilities to add answerback NVM as an option. This provides the capabilities to store up to a 32-character message in non-volatile memory. Answerback NVM may be ordered with the terminal or as an add-on, plug-in component.

Table 1-1. ADM 3A Specifications

SPECIFICATION	DESCRIPTION										
Display Format	24 lines x 80 characters										
CRT Screen	30.5cm (12-inch) diagonal, P4 phosphor with non-glare surface.										
Refresh Rate	50 Hz or 60 Hz, depending on line frequency (selectable in set-up)										
Horizontal Sweep Rate	16.2 kHz										
Display Area	14.7cm (5.8 inches) high x 21cm (8.3 inches) wide										
Character Set, Generated	128 ASCII characters (with 32 control characters)										
Character Set, Displayed	96 ASCII characters plus special foreign characters.										
Character Matrix	5 x 7 dot matrix 1.88mm (0.074 inch) wide x 4.77 mm (0.188 inch) high										
Character Field	7 x 10 dot matrix 2.62 cm (0.103 inch) wide x 614mm (0.241 inch) high										
Business Graphics	Block graphics and line drawing characters.										
Cursor	CUR CTRL ON: 7 x 10 dot matrix. Reverse image rectangle cursor. Homes to upper left of screen.  CUR CTRL OFF: Double underline, 5 dots wide. Homes to first position of bottom line.										
Cursor Controls	Two-key cursor controls; Backspace <table border="1" data-bbox="1096 1102 1226 1134"><tr><td>CTRL</td><td>H</td></tr></table> , Forespace <table border="1" data-bbox="682 1123 812 1155"><tr><td>CTRL</td><td>L</td></tr></table> , Up <table border="1" data-bbox="876 1123 1006 1155"><tr><td>CTRL</td><td>K</td></tr></table> , Down <table border="1" data-bbox="1096 1123 1226 1155"><tr><td>CTRL</td><td>J</td></tr></table> , Home <table border="1" data-bbox="1315 1123 1445 1155"><tr><td>CTRL</td><td>^</td></tr></table>	CTRL	H	CTRL	L	CTRL	K	CTRL	J	CTRL	^
CTRL	H										
CTRL	L										
CTRL	K										
CTRL	J										
CTRL	^										
Keyboard	59 keys, 26-letter alphabet with upper and lower case, numerics 0 through 9, punctuation, and control. Keys are auto-repeating (15 characters per second), if auto repeating is enabled in set-up mode.										
Functional Control Keys	Escape, Rubout (delete), Break, Return, Shift, Clear, Repeat, Line Feed, Control, Here Is.										
Transmission Modes	Full duplex, half duplex										
Computer Interfaces (modem)	RS-232C point-to-point or optional 20mA current loop.										
Data Rates	75, 110, 150, 300, 600, 1200, 1800, 2400, 4800, 9600, and 19,200 baud (9600 baud maximum for 20mA current loop)										
Parity	Even, odd, or none										
Word Structure	Total word length: 9, 10, or 11 bits  Start: 1 bit  Data: 7 or 8 bits (8th bit 0 or 1)  Stop: 1 or 2 bits										
Extension Interfaces	RS-232C extension port for interfacing serial asynchronous ASCII hard copy printer, magnetic tape recorder, or other serial asynchronous devices using selectable keyboard lock or gated extension port.										

Table 1-1. ADM 3A Specifications (continued)

SPECIFICATION	DESCRIPTION
Non-volatile Set-Up Mode Selections	<p>No dip switches -- terminal functions are selectable from the keyboard. Selectable features include:</p> <ul style="list-style-type: none"> <li>Half or full-duplex</li> <li>All available baud rates</li> <li>Seven or eight data bits</li> <li>Parity enable/disable</li> <li>Odd or even parity</li> <li>One or two stop bits</li> <li>Bit 8 = 0 or 1</li> <li>EIA RS-232C Mode: 103 modem, 202 modem, or local</li> <li>Handshake mode</li> <li>Upper/lower case</li> <li>Caps lock</li> <li>Auto New Line</li> <li>Return key CR or CRLF</li> <li>Keyboard layouts: US, UK, German or French</li> <li>Refresh rate: 50 or 60 Hz</li> <li>Key click</li> <li>Auto repeat</li> <li>Margin bell</li> <li>Keyboard lock</li> <li>SO/SI: lock or gate</li> <li>Clear screen</li> <li>Attributes enabled/disabled</li> <li>Full screen reverse</li> <li>Screen saver</li> <li>Scrolling</li> <li>Cursor Control</li> <li>Program mode</li> <li>Here Is Key</li> <li>Displayed space or advance</li> </ul>
Operating Environment	
Temperature:	41°F to 122°F (5°C to 50°C)
Humidity:	5% to 95%, noncondensing
Altitude:	3.048km (10,000 feet) maximum
Power Requirements	
Standard:	115 VAC ±10%, 60 ±3 Hz, 60 watts nominal
Optional:	230 VAC ±10%, 50/60 ±3 Hz, 60 watts nominal
Heat Dissipation:	205 BTU per hour
Dimensions and Weight	
Width:	39.6cm (15.5 inches)
Depth:	51.3cm (19.85 inches)
Height:	34.3cm (13.51 inches)
Weight:	14.5kg (32 pounds)
Options	20mA current loop on modem or extension port, green phosphor screen, answerback NVM, RS-422, international keycap sets.

HEX		CONTROL		GRAPHIC CHARACTER SET					
		0	1	2	3	4	5	6	7
BITS 4 3 2 1 ↓	BITS 7 6 5 →	000	001	010	011	100	101	110	111
		0	0000	NUL	DLE	SP	0	@	P
1	0001	SOH	DC1	!	1	A	Q	a	q
2	0010	STX	DC2	"	2	B	R	b	r
3	0011	ETX	DC3	#	3	C	S	c	s
4	0100	EOT	DC4	\$	4	D	T	d	t
5	0101	ENQ	NAK	%	5	E	U	e	u
6	0110	ACK	SYN	&	6	F	V	f	v
7	0111	BEEP	ETB	'	7	G	W	g	w
8	1000	BS (←)	CAN	(	8	H	X	h	x
9	1001	HT (TAB)	EM	)	9	I	Y	i	y
A	1010	LF (↓)	SUB	*	:	J	Z	j	z
B	1011	VT (↑)	ESC	+	;	K	[	k	{
C	1100	FF (→)	FS	,	<	L	\	l	!
D	1101	CR	GS	-	=	M	]	m	}
E	1110	SO	RS (HOME)	.	>	N	^	n	~
F	1111	SI	US (NEW LINE)	/	?	O	-	o	*DEL (RUB)

CONTROL  
CODES

(GENERATED BY HOLDING  
CTRL KEY WHILE TYPING  
THE CORRESPONDING  
KEY SHOWN IN COLUMNS  
4 AND 5.) DISPLAYABLE IN  
PROGRAM MODE.

UPPER/LOWER CASE  
DISPLAYABLE IN  
STANDARD ADM 3A

Figure 1-3. ADM 3A Graphic Character Set and CTRL Codes





## SECTION II INSTALLATION

### 2.1 GENERAL

Installation procedures involving unpacking, site requirements, initial set-up, and operation checkout of the ADM 3A are contained in this section of the manual.

### 2.2 SPECIAL SAFETY REQUIREMENTS

No special safety requirements are imposed; observe normal safety procedures when installing the ADM 3A.

### 2.3 UNPACKING AND INITIAL INSPECTION

Each ADM 3A is thoroughly inspected and carefully packaged prior to shipment. Every precaution is taken to ensure that each unit is complete and ready for installation at the customer's site. However, it is recommended that each unit be inspected upon receipt for transit damage. Start by examining the exterior of the package for evidence of rough or careless handling. Then perform a thorough visual inspection of the internal components and subassemblies. As a rule, most transportation companies will not honor claims for damage unless they are filled promptly; therefore, the following steps should be taken:

1. Verify that each item shown on the sales order packing slip has been included in the shipment. Contact LSI or your distributor immediately in the event of packing shortage.
2. Check to verify that the serial number of the unit corresponds to that shown on the invoice.
3. Check the hardware to determine whether any assemblies or screws were loosened during shipment. Tighten as required.

4. Inspect for dust or foreign material which may impair electrical contact when cable connections are made. Vacuum to remove any loose dirt.
5. Install and test operation of the ADM 3A as soon as possible after delivery. (This is very important since internal damage to the equipment cannot be determined by visual inspection alone.)
6. If, in your opinion, the equipment has been damaged (either internally or externally), notify the agent of the transportation company immediately and request an inspection. If assistance is needed to describe the extent of the damage or the repairs that will be necessary, contact your local sales and service office.

### 2.4 SITE REQUIREMENTS

The ADM 3A may be used conveniently in a normal office environment because special mounting provisions are not required. However, it is recommended that a weather-protected environment with an ambient temperature range of 41°F to 122°F (5°C to 50°C) and relative humidity of less than 95 percent be maintained for equipment use.

#### CAUTION

*To prevent condensation from developing, allow the ADM 3A to temperature stabilize when changing locations. Condensation could develop in the unit and adversely affect the operation of the device.*

Whenever the ADM 3A is physically moved to a warmer environment than its former location, be sure to allow sufficient time for the equipment to equalize with the warmer location before activating the terminal. Condensation developed by the temperature differential may possibly impair ADM 3A operation.

Figure 2-1, page 2-3 shows the ADM 3A dimensions. Refer to Section I of this manual for installation power and environmental requirements. Installation of the ADM 3A requires:

- Table or desk mounting
- Standard three-pronged, 115-volt or 230-volt power outlet
- Cable connection to the computer, modem, serial printer, or other auxiliary device. If connection to a remote computer is desired, a modem or data set may be required.

## 2.5 INITIAL PREPARATION

Initial preparation includes making sure that the ADM 3A will not be plugged into an AC line power output that will damage the equipment; and checking and/or resetting the terminal configuration parameters through the set-up mode as necessary.

### 2.5.1 Line Voltage Selection

The ADM 3A is shipped properly connected for either 115-volt or 230-volt AC line power, as specified in the purchase order. Any change for operation with a different line voltage requires changing components in the ADM 3A, which should be accomplished only by authorized LSI Maintenance Personnel. (Unauthorized circuit or component changes invalidate the equipment warranty.)

### 2.5.2 Set-Up Mode Preparation

The terminal operating configurations of the ADM 3A are controlled by firmware "switches" and have been pre-set at the factory to the default conditions as indicated in Table 3-3 (page 3-6) of Section III. By entering the set-up mode, the operating configurations are displayed on the status line (line 24) and can be changed.

## 2.6 INTERFACE INFORMATION

The ADM 3A may be connected directly to a local computer, or connected via telephone data lines to a remote computer. Remote computer connections usually require the use of a modem or data set. Figure 2-2, page 2-4 shows the connector/pin assignments for the modem and extension ports. Figure 2-3, page 2-5 shows a typical ADM 3A application. The ADM 3A's modem and extension port connectors are shown in Figure 2-6, page 2-8.

### 2.6.1 RS-232C Modem Port Interface

The modem port interface is used to connect the terminal directly to a computer, modem, or data set in RS-232C or current loop application. See Figure 2-4, page 2-6 and Figure 2-5, page 2-7.

### 2.6.2 RS-232C Extension Port Interface

The extension port interface extends the standard RS-232C capabilities of the ADM 3A by allowing the connection of a serial RS-232C peripheral.

The gated extension port mode, when selected in the set-up mode, allows selective transmission of data from the keyboard, in half-duplex mode, or the communication line through the extension port.

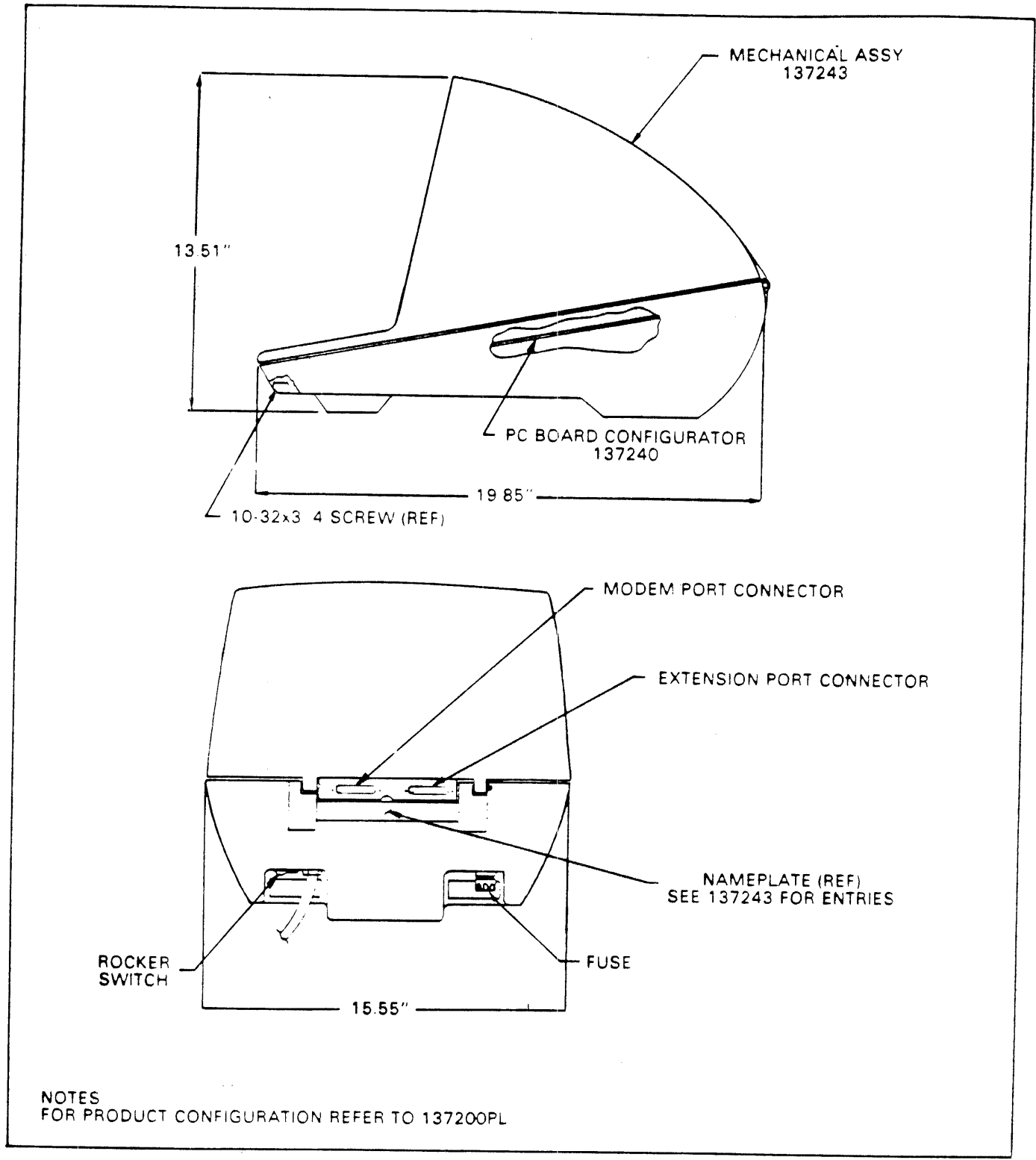
### Note

*The peripheral device that is attached to the extension port must operate at the same baud rate as the communication line.*

## 2.7 INSTALLING THE ADM 3A

To install the ADM 3A, proceed as follows:

1. Check the power ON/OFF switch on the back of the terminal to be sure it is off (Figure 2-6, page 2-8).
2. Connect the data interface cable(s) using the appropriate interface information in Figure 2-2, page 2-4, Figure 2-3, page 2-5 and Subsection 2.6.
3. Plug the power cord to a grounded AC outlet of the correct voltage.



NOTES  
FOR PRODUCT CONFIGURATION REFER TO 137200PL

Figure 2-1. ADM 3A Assembly

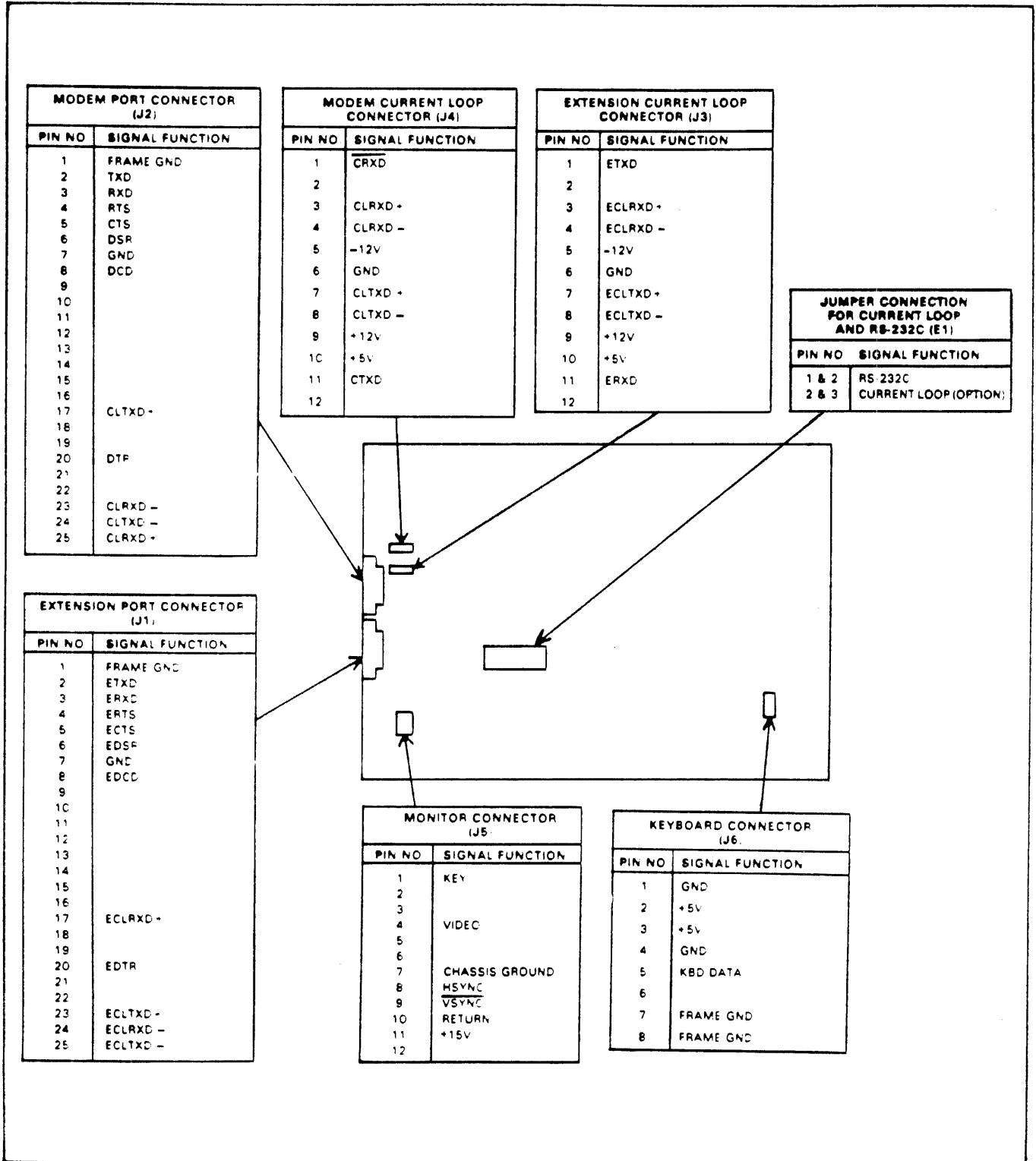


Figure 2-2. ADM 3A Connector Locations

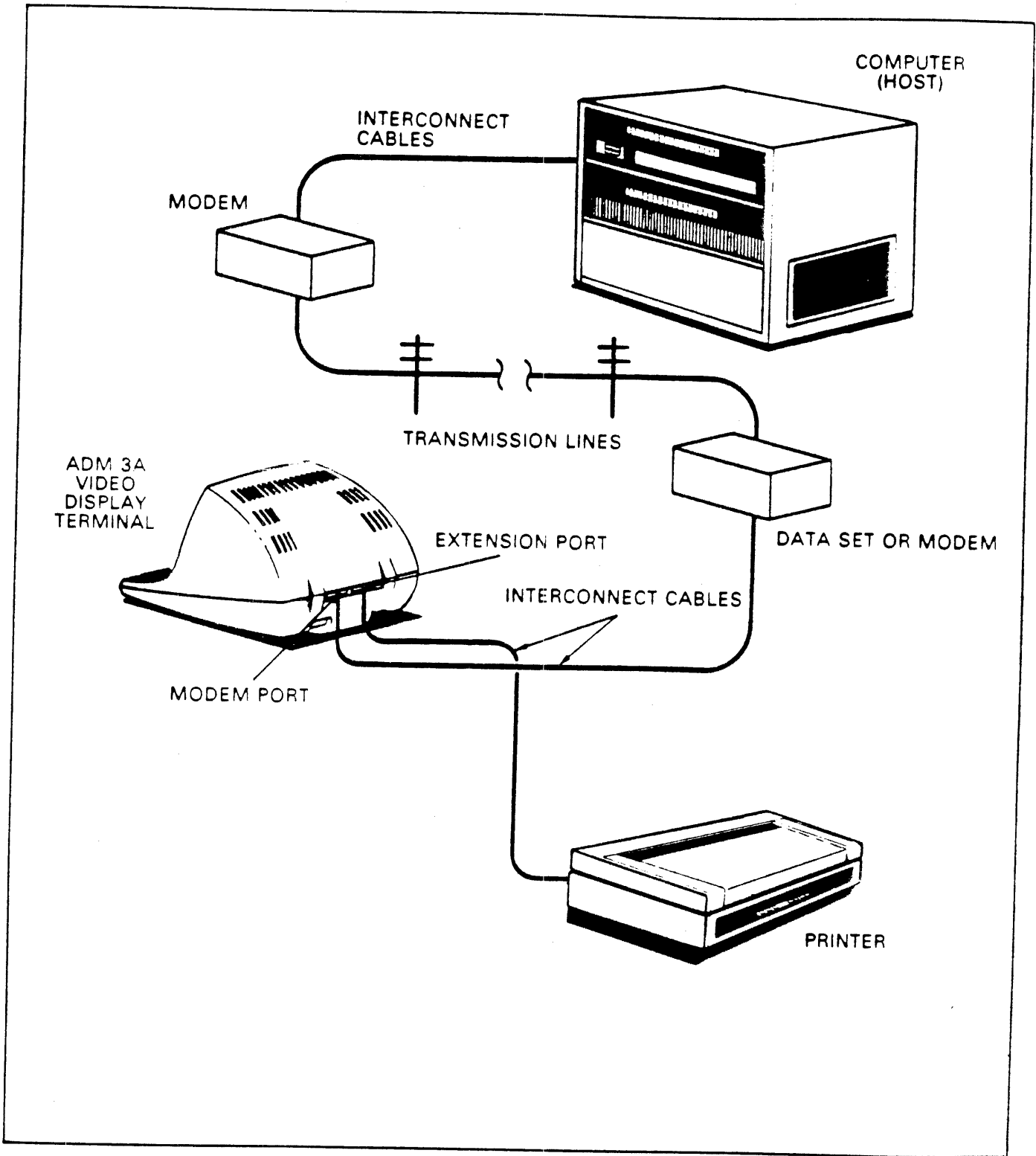


Figure 2-3. Typical ADM 3A Application

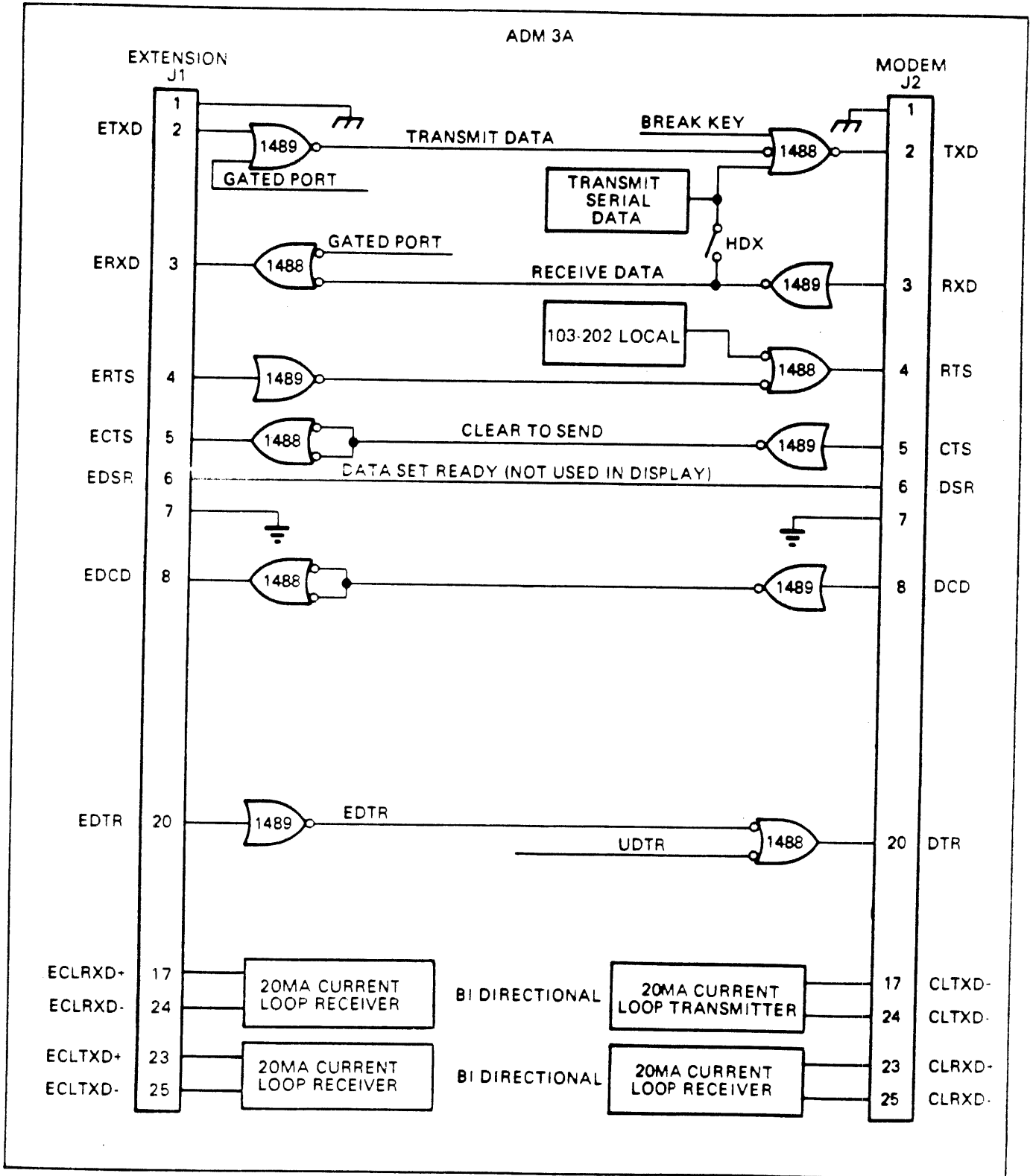


Figure 2-4. Modem and RS-232C Extension Interface Logic

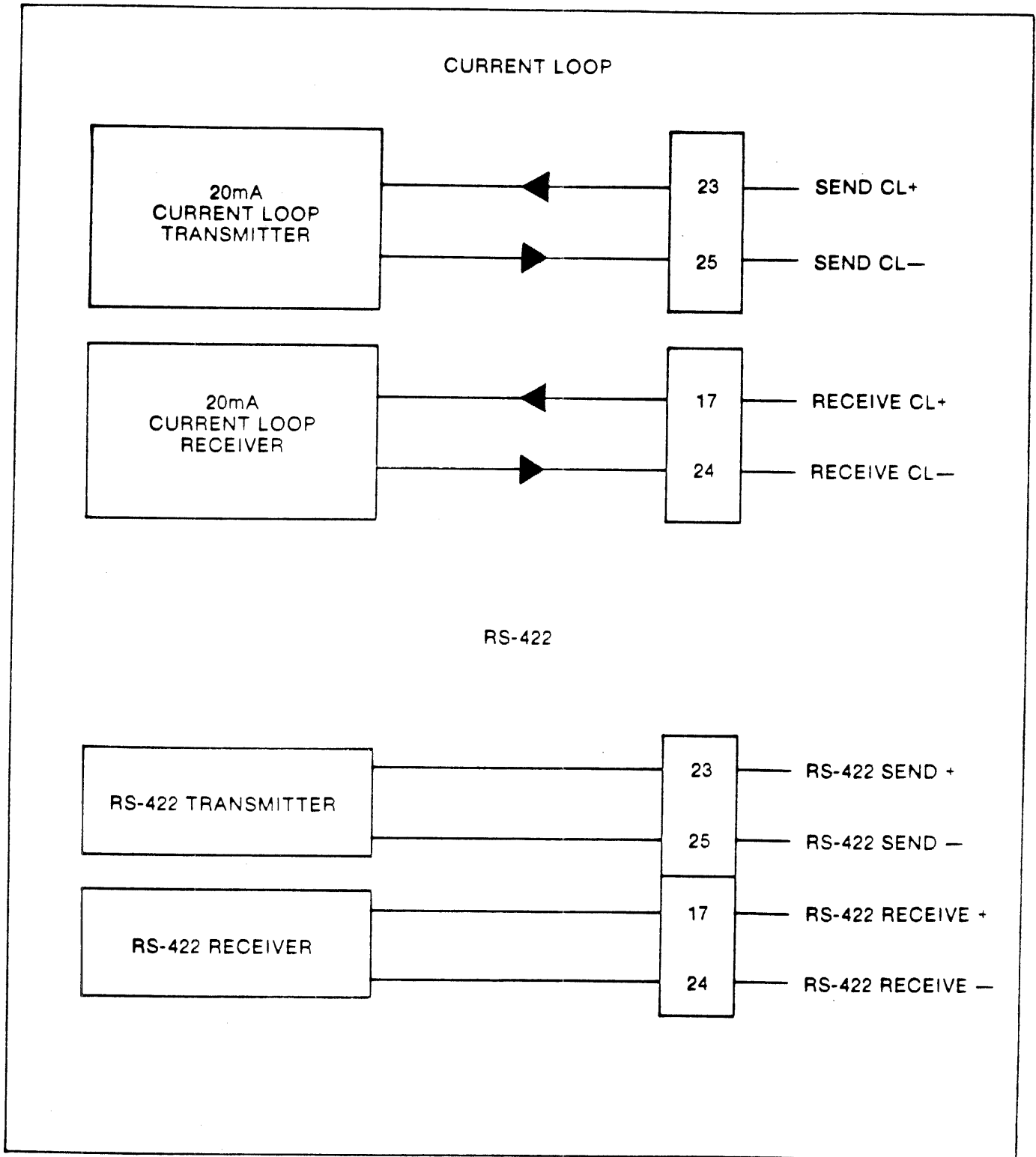


Figure 2-5. Optional Current Loop and RS-422 Interface Logic

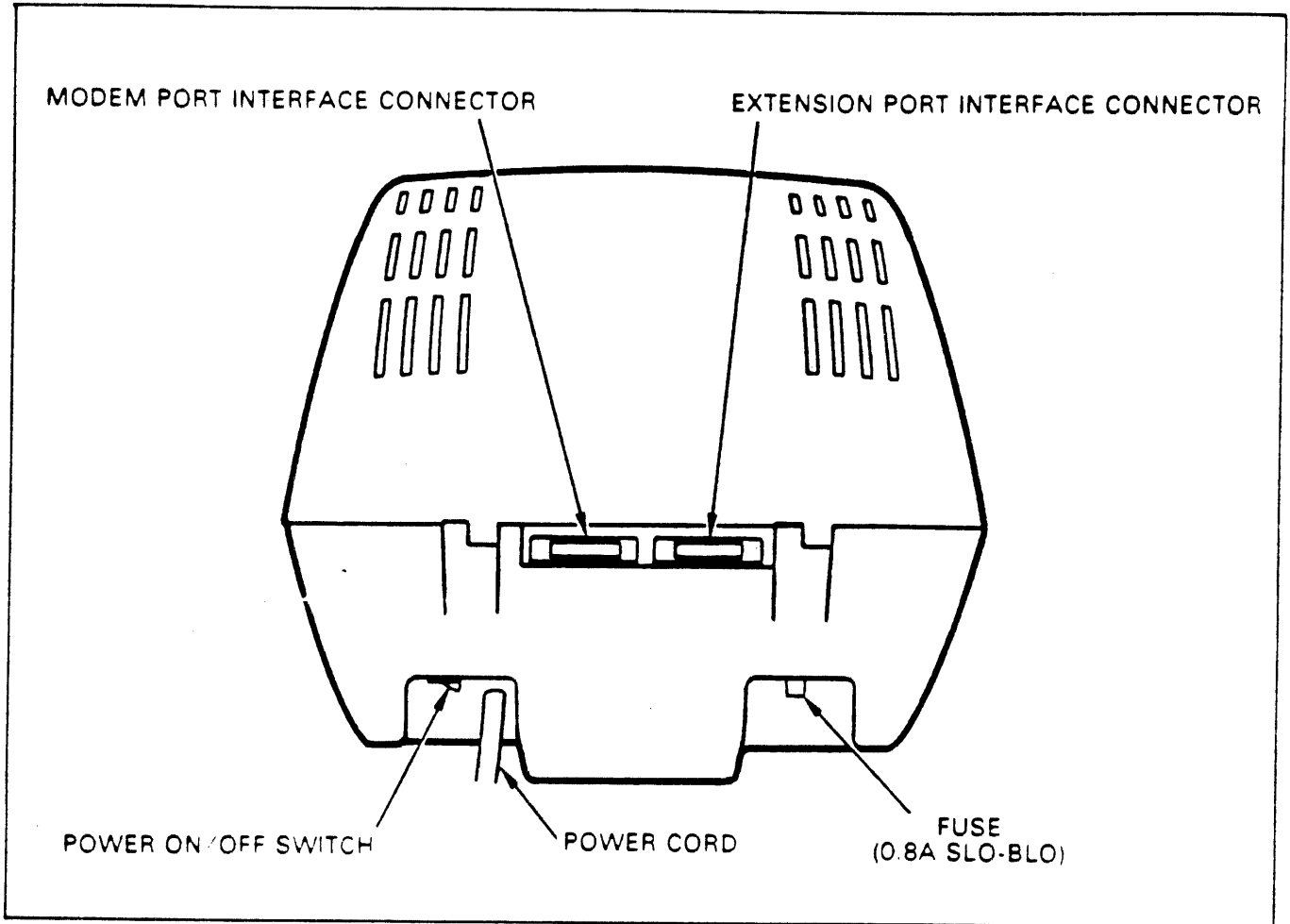


Figure 2-6. ADM 3A Rear Panel Controls

## 2.8 POWER TURN-ON

Proceed as follows:

1. Set the power ON/OFF switch (Figure 2-6, above) to the ON position.
2. Wait approximately 20 seconds for the unit to warm up.
3. The cursor should appear in the home position (i.e., row 1, column 1) on the upper-left hand corner of the screen.
4. Immediately following the warm-up period, the cursor will appear on the screen in the upper-left corner, indicating the terminal has self-tested and passed diagnostics.
5. Adjust the contrast control (Figure 2-7, page 2-9) on the front panel for the desired brightness. The cursor should be present.

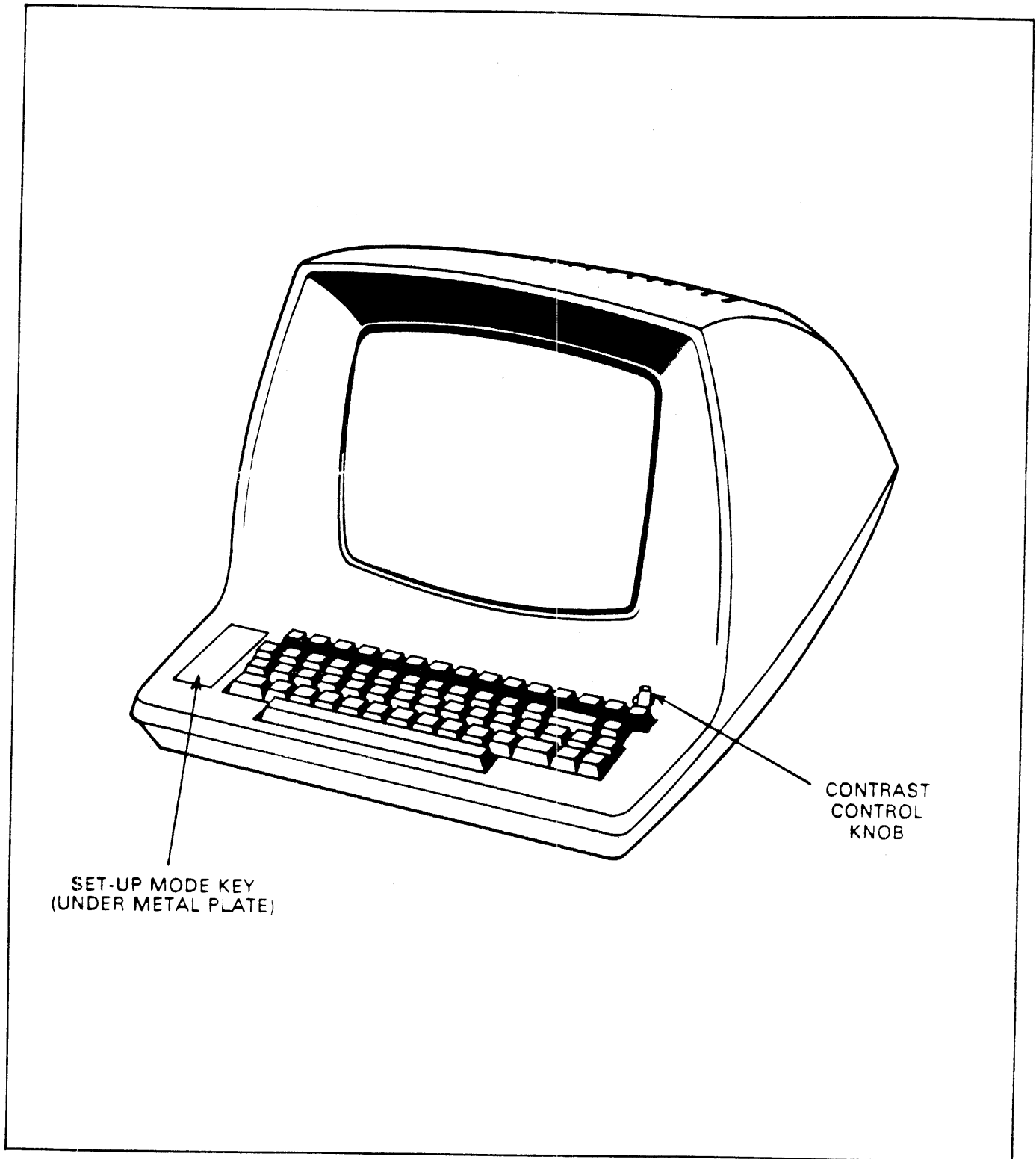
### CAUTION

If power is recycled ON and OFF using the power ON/OFF switch, wait 10 seconds between the OFF and ON operations to ensure complete reset of the ADM 3A electronics.

### CAUTION

To avoid damage to the CRT screen when the terminal is to remain ON but unchanged for extended time periods, reduce the screen brightness using the contrast control knob on the front of the unit or select the screen saver feature in the set-up mode.





*Figure 2-7. ADM 3A Front Panel Controls*

## **2.9 POWER TURN-OFF**

If the unit is displaying information which must be retained, be sure to transmit this information to the host immediately. This is necessary because the display is cleared when power is removed from the unit. An alternative is to send the information to a printer prior to turning the unit off.

## **2.10 CLEANING**

At periodic intervals, clean the exterior housing and lightly dust the unit using a soft brush or damp lint-free cloth. However, paper towels may be substituted if desired. Remove smudges from the CRT exterior housing with conventional spray

cleaners or alcohol. Do not use petroleum base cleaners, such as lighter fluid, as this could be harmful to the painted surface. Use only a lint-free soft cloth to clean the CRT screen. Be careful not to scratch the CRT screen, and do not use freon cleaners, alcohol, or ammonia.

## **2.11 INSPECTION**

Periodically inspect keyboard assembly for freedom of movement. Determine whether the intensity of character trace on the CRT screen has not diminished. Any required mechanical or electrical adjustment should be performed only by an authorized Lear Siegler Service representative to ensure warranty.

## SECTION III OPERATION

### 3.0 PRELIMINARY NOTE

Refer to **Table 3-1**, below for an explanation of the keystroke execution used throughout this manual.

### 3.1 GENERAL

The **ADM 3A** is used to enter, display, and send information to a host computer. It performs a similar function by accepting information from the host and displaying the information on the CRT screen.

In this section of the manual, the various keys and specific control codes recognized by the **ADM 3A** are described. Procedures are provided on how to enter the set-up mode to select or change terminal parameters through keyboard commands. This section also includes procedures on personality mode and answerback programming mode operations while in set-up mode and interface control capabilities.

### 3.2 KEYBOARD OPERATIONS

The operator uses a keyboard very similar to the keyboard of a standard typewriter to enter data. Information typed by the operator may be displayed on the CRT screen immediately (if in half-duplex mode) or as an echo from the remote computer (if in full-duplex mode).

**Figure 3-1**, **page 3-2** shows the layout of a standard **ADM 3A** keyboard. Functionally, the keyboard consists of displayable character keys and special function keys. Some of the special function keys can also be used in conjunction with certain displayable character keys to command specific control operations requiring simultaneous depression of two keys.

In the standard **ADM 3A**, 96 characters are displayed. These characters include upper and lower-case letters, numbers, punctuation marks, and most symbols.

#### Note

*In order for characters to be displayed and for control codes to affect the **ADM 3A** in **FDX** mode, the characters must be echoed back from the host computer. All display actions described below assume that the generated codes are properly echoed.*

### 3.3 SET-UP MODE OPERATIONS

#### 3.3.1 Enter Set-Up Mode

Included in the **ADM 3A** is a set-up mode that is initially used to set up the terminal configuration

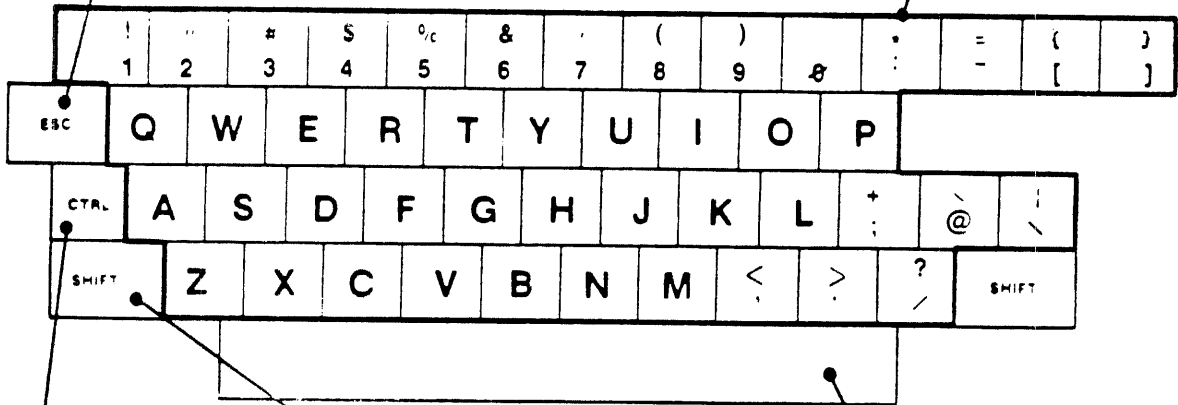
**Table 3-1. Keystroke Explanations**

*This chart describes the keystroke execution used in this manual.*

Keystrokes	Descriptions
ESC A 2	Independent keystrokes, typed one after the other.
CTRL Z	Simultaneous keystrokes. In this example, the CTRL key is held down while the "Z" key is typed.

**ESC** is used in conjunction with displayable characters to produce an ESC sequence. (See Table 3-4, page 3-12, ADM 3A Escape Sequences.)

Alphanumeric, punctuation, and special character keys produce 96 displayable characters. Typing any of these keys with **SHIFT** depressed produces an upper case alpha character or the symbol imprinted on the upper portion of the key.



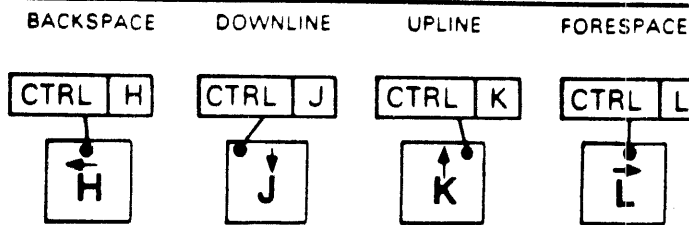
**CONTROL** is held down while typing an otherwise displayable character key to generate one of the 32 control codes. Only 12 control codes are applicable to ADM 3A operation. Refer to control and operators codes chart in Appendix A.

**SHIFT** must be held down while affected key is typed. Enables upper case alpha characters and symbols, as well as a shift in certain special operations.

**SPACE** bar advances cursor one space to the right each time bar is typed. Any character under cursor is replaced by a space. Holding bar down produces a continuous string of spaces until released if auto-repeating is enabled in set-up mode.

Figure 3-1. ADM 3A Standard Keyboard Operational Characteristics

Two key operation moves the cursor one space in the specified direction or incrementally in the specified direction, as long as keys are depressed, if auto repeat is enabled in set-up mode. Character under cursor, or character passed over by cursor are not erased



**HOME** typing **CTRL HOME** moves cursor to first character position (upper left corner) when cursor control is enabled from the set-up mode

**LINE FEED** moves cursor to same column position of next lower line when cursor control is enabled from the set-up mode. If cursor on bottom line, entire display scrolls upward one line and cursor remains stationary. When cursor control is disabled from the set-up mode, all data entry is on bottom line, entire display scrolls upward one line and cursor remains stationary.

**RUB** transmits DEL (RUBOUT) character to the host computer. Cursor does not advance after typing **RUB**. May be used by host as a character erase code.

**RETURN** moves cursor to the first character position in the line containing cursor or the next line if newline is enabled in set-up mode. If Displayed Space is set to Advance and Return key is set to CR in set-up mode, space key is nondestructive between return and subsequent line feed. Cursor can be advanced, space codes do not override characters until line feed is executed.

**REPEAT** allows characters or control functions to be repeated at 15 per second if pressed simultaneously with the repeat key. If auto repeat is enabled in set-up, all keys become auto-repeating and the repeat key does not have to be used. The repeat rate is reduced to the transmission rate if the ADM 3A is operating at a baud rate less than 300 baud.

**HERE IS** key is operational only if there is an answerback message programmed through set-up. When typed, key transmits an identification message. The message is displayed in half-duplex.

**BREAK** causes the transmit data line to go positive (spacing state) for 350 ms. **SHIFT BREAK** generates a spacing state as long as the keys are depressed.

**CLEAR** is operational only when **SHIFT** key is held down. **SHIFT CLEAR** causes data to be erased from screen and from display memory. All 80 x 24 character positions are filled with the currently selected "fill" code. Performs hard reset.

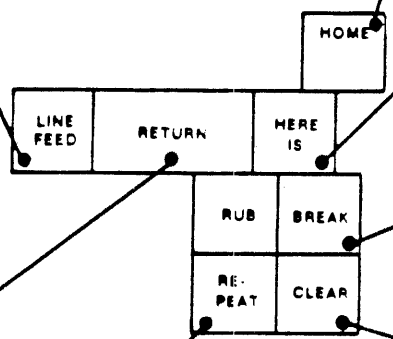


Figure 3-1. ADM 3A Standard Keyboard Operational Characteristics (continued)

Table 3-2. ADM 3A Set-Up Mode Functions and Control Codes

FUNCTION	CONTROL KEYS	DESCRIPTION
Enter Set-Up Mode to Configure Terminal Parameters	Hold down <b>SHIFT</b> key, and press <b>SETUP</b> key.	Used to select or change the following terminal configuration parameters: Half- or full duplex Baud rate: 11 settings Data bits: 7/8 Parity enabled: N/Y Parity: odd/even Stop bits: 1/2 Bit 8: 0/1 EIA mode: 103/local/102 Handshake mode: none/DTR XON/XOFF Lowercase displayed: N/Y Caps lock enabled: N/Y Auto new line enabled: N/Y RETURN key: CR/CRLF Keyboard: US/UK/German/French Refresh rate: 60/50 Hz Keyclick enabled: N/Y Auto repeat enabled: N/Y Margin bell enabled: N/Y Keyboard lock enabled: N/Y SO/SI: Lock/Gate Clear screen enabled: N/Y Attributes enabled: N/Y Full screen reverse enabled: N/Y Screensaver enabled: N/Y Scroll enabled: N/Y Cursor control enabled: N/Y Program mode enabled: N/Y HERE-IS enabled: N/Y Displayed space: Space/Advance
Enter Personality Mode	<b>CTRL P</b>	Personality entries may be programmed by entering hex equivalent of the desired character.
Enter Answerback Programming Mode	<b>CTRL A</b>	Answerback message may be programmed on line 24 of the screen.
Cancel Current Mode	<b>SHIFT RETURN</b>	Cancels current set-up mode function and returns to first entry of set-up mode.
Save Active Set-Up	<b>CTRL S</b>	Saves active set-up mode feature parameters into NVM (EEROM).
Default Active Set-Up	<b>CTRL D</b>	Defaults the active set-up feature parameters.
Restore Active Set-Up	<b>CTRL R</b>	Restores active set-up from NVM (EEROM).
Change Set-Up Selection to option left of cursor	<b>CTRL H</b>	Moves cursor left to change value of function.

Table 3-2. ADM 3A Set-Up Mode Functions and Control Codes (continued)

FUNCTION	CONTROL KEYS	DESCRIPTION
Change Set-Up Selection to option right of cursor.	<b>CTRL L</b>	Moves cursor right to change value of function.
Move Up To Next Previous Set-Up Mode Entry	<b>CTRL K</b>	Goes back to previous set-up parameter.
Move Down To Next Set-Up Entry	<b>CTRL J</b>	Continues to next set-up mode parameter.

features, and to set or change terminal parameters when required through keyboard commands. The set-up features, which reside in non-volatile EEROM, are displayed on line 24 (status line). The set-up mode is accessible only from the keyboard by holding down **SHIFT** key and pressing the **SETUP** key. The setup key is located in the recessed area under the metal plate to the left of the keyboard (Figure 2-7, page 2-9). Table 3-2, page 3-4 provides a list of set-up mode keyboard commands that control set-up mode operations. The set-up functions may be changed in any sequence.

### 3.3.2 Set Terminal Configuration Parameters

To set configuration parameters after receiving the ADM 3A unit:

1. Power on the ADM 3A terminal by setting the ON/OFF switch to ON position.
2. Upon power-up, a reverse block cursor should appear in the left-most column on line 1 when the terminal has passed its diagnostics.
3. Unscrew the metal plate (located in the recessed area to the left of keyboard) to access **SETUP** key.
4. Enter **SHIFT SETUP** (hold down **SHIFT** key, then press **SETUP** key).
5. The first set-up mode entry, "HDX FDX" is displayed on line 24. You can now set or change terminal parameters. As each function is called up, the cursor is positioned over one of the available selections. (i.e. YES or NO).

To change the value for any function, press **CTRL L** or **CTRL H** until the cursor is positioned over the desired value.

6. To display the next function on the list of set-up mode functions, press **CTRL J**. For example, the first function displayed is "HDX FDX." Pressing **CTRL J** will remove "HDX FDX" from the screen and display the next function "BAUD RATE." (See Table 3-3, page 3-6 for a complete list of configuration parameters available with the ADM 3A.)

To back up and display the previous function, press **CTRL K**. After all parameters have been viewed, the terminal returns to the first set-up mode entry, "HDX FDX."

7. The set-up functions may be changed in any sequence; they do not need to be selected in order of display. All the selected functions will remain in effect until the terminal is turned off. Anytime power is first turned on, the cursor is positioned over the individual configurations which were set the last time the set-up mode was saved. (See Paragraph 3.3.4, below).

### 3.3.3 Exiting Set-Up Mode

To exit set-up mode, press **SHIFT SETUP** which is the method used to enter set-up mode.

### 3.3.4 Save Current Terminal Configuration Values

To save current terminal configuration values after setting the desired parameters, enter

**Table 3-3. Set-Up Mode - Terminal Configuration Parameters**  
\*Indicates default configuration settings.

PARAMETERS (DISPLAYED AS)	SELECTABLE SETTINGS	DESCRIPTION
HDX FDX (Half- or full-duplex)	HDX*	Half-duplex mode is enabled. Typed characters are transmitted to the host computer and displayed on the screen.
	FDX	Full-duplex mode is enabled. Typed characters are transmitted to the host computer. Characters must be echoed from the host computer to be displayed.
BAUD RATE	75	Sets the baud rate to be used in communication with the host computer.  NOTE: Current loop to 9600 baud only.
	110	
	150	
	300	
	600	
	1200	
	1800	
	2400	
	4800	
	9600*	
DATA BITS	7*	Sets the data length to seven bits.
	8	Sets the data length to eight bits.
PARITY ENABLED	NO	Parity bit is disabled.
	YES*	Parity bit is enabled. This setting is valid if a 7-bit data word is selected.  NOTE: If parity enabled is set to NO and data bits feature is set to 7, then BIT 8 must be set to either a 0 or 1.
PARITY	ODD	Odd parity is enabled. Sets the communication word structure parity to odd.
	EVEN*	Even parity is enabled. Sets the communication word structure parity to even.
STOP BITS	1*	Serial data word to terminate by 1 stop bit.
	2	Serial data word to terminate by 2 stop bits.
BIT 8	0*	Sets the eighth bit to a 0.
	1	Sets the eighth bit to a 1.  NOTE: These settings are valid only if a 7-bit word structure and a "no parity enabled" are selected.
EIA MODE	103	RTS is always on.
	LOCAL*	RTS is set high and then low with the transmission of each character.



Table 3-3. Set-Up Mode - Terminal Configuration Parameters (continued)  
\*Indicates default configuration settings.

PARAMETERS (DISPLAYED AS)	SELECTABLE SETTINGS	DESCRIPTION
EIA MODE (cont'd)	202	Coded line turnaround method is selected in which RTS is toggled approximately 250 msec after the selected turnaround character is transmitted, and toggled when the coded turnaround character is received. RTS is set to low on power-up and after <b>SHIFT CLEAR</b> .
HANDSHAKE MODE	NONE*	Handshaking protocol between the terminal and the host computer does not take place. DTR signal remains on at all times.
	DTR	Handshaking protocol is enabled using the data terminal ready (DTR) signal. When the terminal input data buffer reaches a fullness upper threshold, the DTR signal turns off. When the buffer content reaches a lower fullness threshold, the DTR signal turns on again.
	XON:XOFF	DTR signal remains on at all times. An XOFF character is transmitted to the host computer when an upper fullness threshold is reached. When a lower fullness threshold is reached, the XON character is transmitted.
LOWERCASE DISPLAYED	NO*	Only upper-case characters are displayed. If a lower-case alphabetic character is received for display, its upper-case counterpart will be displayed instead.
	YES	The terminal displays both upper- and lower-case alphanumeric characters as they are received.
CAPS LOCK ENABLED	NO*	Caps Lock state is disabled. The SHIFT and ESCAPE keys generate an escape code, and upper-case alphanumerics depend on the SHIFT key.
	YES	Caps Lock state is enabled. Pressing the SHIFT with ESCAPE key causes the caps lock state to be toggled ON or OFF. When caps lock is ON, all alpha keys generate upper case characters even if SHIFT is not pressed.
AUTO NEWLINE ENABLED	NO	Auto new line is disabled. The cursor will not advance beyond column 80.
	YES*	Auto new line is enabled. The cursor automatically advances to the first column of the next line below after displaying a character in column 80. If the cursor is on line 24, then the screen scrolls up one line, leaving the cursor in the first column of line 24.
RETURN KEY	CR*	Pressing the RETURN key at the terminal transmits a single carriage return (CR).
	CRLF	Pressing the RETURN key transmits a carriage return (CR) followed by a line feed (LF).

**Table 3-3. Set-Up Mode - Terminal Configuration Parameters (continued)**  
\*Indicates default configuration settings.

PARAMETERS (DISPLAYED AS)	SELECTABLE SETTINGS	DESCRIPTION
KEYBOARD	US*	Sets USASCII-QWERTY keyboard.
	UK	Sets UKASCII-QWERTY keyboard.
	GERMAN	Sets German-QWERTZ keyboard.
	FRENCH	Sets French-AZERTY keyboard.
REFRESH RATE	60 Hz*	Sets vertical refresh rate to 60 Hz.
	50 Hz	Sets vertical refresh rate to 50 Hz.
KEYCLICK ENABLED	NO*	Keyclick is disabled. No keyclick sound is generated when a key is pressed.
	YES	Keyclick is enabled. A keyclick sound is generated when a key is pressed.
AUTO REPEAT ENABLED	NO*	Auto repeat is disabled. A keyboard key is repeated only if the REPEAT key is simultaneously pressed with the key.
	YES	Auto repeat is enabled. Pressing a key down for approximately 1 second causes the character to be repeated.
MARGIN BELL ENABLED	NO	Margin bell is disabled. No audible tone is generated when a character is entered on column 72.
	YES*	Margin bell is enabled. An audible tone is generated when a character is entered on column 72.
KEYBOARD LOCK ENABLED	NO	Keyboard lock is disabled. The keyboard can never be locked by a user command.
	YES*	Keyboard lock is enabled. The keyboard is locked when the appropriate control sequence (LOCK/GATE) is received using the set-up mode SO/SI feature.
SO/SI	LOCK*	Unlocks and locks the keyboard. Upon powerup, the keyboard is unlocked.
	GATE	Enables and disables the gated extension port. Upon powerup, the gated extension port is gated ON.
CLEAR SCREEN ENABLED	NO	Clear screen is disabled. The screen cannot be cleared from the host computer.
	YES*	Clear screen is enabled. A <b>CTRL Z</b> (SUB from host) received from the host clears the screen to the fill character (which is set from the personality mode function while in set-up mode).
ATTRIBUTES ENABLED	NO*	Disables the user attributes, including blank (non-display), blink, reversed video, underlined, reduced intensity (half-intensity) and character graphics.

**Table 3-3. Set-Up Mode - Terminal Configuration Parameters (continued)**  
\*Indicates default configuration settings.

PARAMETERS (DISPLAYED AS)	SELECTABLE SETTINGS	DESCRIPTION
ATTRIBUTES ENABLED (cont'd)	YES	Enables the user attributes, including blank (non-display), blink, reversed video, underline, reduced intensity (half-intensity) and character graphics.
FULL SCREEN REVERSE ENABLED	NO*	Full screen reverse is disabled. All characters are displayed as light characters on a dark background.
	YES	Full screen reverse is enabled. All characters on the screen are displayed as dark characters on a light background.
SCREENSAVER ENABLED	NO*	Disables CRT screen saver feature.
	YES	Enables CRT screen saver feature. If no characters are received from the host or from the keyboard for 15 minutes, the video display turns OFF to avoid phosphor etching. The video display comes ON again upon receiving any host or keyboard activity. Data displayed on the screen will not be lost.
SCROLL ENABLED	NO	Disables automatic scrolling.
	YES*	Enables automatic scrolling when line 24 is filled.
CURSOR CONTROL ENABLED	NO	Disables cursor control. The cursor position is restricted to the bottom or last line on the screen. HOME is to the left-most column of the last line on the screen.
	YES*	Enables cursor control. The cursor may be positioned anywhere on the screen. HOME is the left-most column of the first line on the screen.
PROGRAM MODE ENABLED	NO*	Disables program mode. Control codes are processed normally.
	YES	Enables program mode. Control codes are displayed as reverse characters.
HERE IS ENABLED	NO	Disables HERE IS key.
	YES*	Enables HERE IS key.
DISPLAYED SPACE	SPACE*	RETURN key moves cursor to the first character position in the line containing the cursor. If displayed space is set to space, SPACE key is destructive between RETURN and subsequent LINE FEED.
	ADVANCE	RETURN key moves cursor to the first character position in the line containing the cursor. If displayed space is set to advance, SPACE key is nondestructive between RETURN and subsequent LINE FEED. Cursor can be advanced; space codes do not override characters between RETURN and subsequent LINE FEED.

**Table 3-4. Personality Mode Functions**  
\*Can be any hex character 00-FF.

PARAMETERS (DISPLAYED AS)	DEFAULT SETTINGS	DESCRIPTION
FILL	20*	The fill character is the character that the display is filled with on a clear screen from the keyboard or host.
TURNAROUND	00*	The turnaround character is the character which modulates the RTS during coded turnaround protocol in half duplex. A null (00 hex) does nothing, i.e., RTS is never dropped.
XON	11*	The XON character is sent to the host as a handshake protocol to inform the host that the terminal is able to receive more data. If the XON is set to 00 hex (null), then it is disabled.
XOFF	13*	The XOFF character is sent to the host as a handshake protocol to inform the host that the terminal input buffer is nearly full and may soon overrun. If the XOFF character is set to 00 hex (null), then it is disabled.

**CTRL S** (press **CTRL** and enter **S** simultaneously) while in set-up mode.

**Note**

*There is no immediate visual display to indicate the save function is performed. To determine whether the values have been saved, enter set-up mode again and check each parameter.*

**3.3.5 Enter Personality Mode**

The set-up mode also allows the terminal's personality entries to be programmed. While the terminal is in the set-up mode, enter the personality mode by entering **CTRL P**. To program the terminal personalities, the hexadecimal equivalent for the characters are listed in Table 3-4, above. Hex characters 0C through FF may be entered as upper- or lower-case letters but will be displayed as upper case.

To display the next personality, press **CTRL J**. To back up and display the previous function, press **CTRL K**. After all parameters have been viewed, the terminal returns to the first personality parameter. To exit the personality mode, press **SHIFT SETUP**.

**3.3.6 Enter Answerback Programming Mode**

The answerback programming mode is accessible in the set-up mode by simultaneously pressing **CTRL A** keys. The answerback message may then be programmed on line 24, i.e., the status line. Thirty-two bytes can be programmed into answerback. All characters typed are programmed into the answerback message.

As an option, the answerback message may be saved in NVM. Answerback program mode is terminated by entering **SHIFT RETURN**. The answerback message is programmable through the set-up mode and defaults to null (OFF). Pressing the **HERE IS** key or receiving an ENQ from the host or the command control causes the answerback message to be transmitted to the host and to be displayed if the terminal is in half-duplex mode.

**Note**

*If the answerback memory storage option is not installed, the message is programmed but will be volatile and will default to null upon power-up.*

To display the entire message without destroying it, hold down **SHIFT** key and **SETUP** keys

followed by **CTRL A**. The message will be displayed. To exit without destroying the message depress **SHIFT** and **SETUP**.

To display the entire message and then destroy it, hold down **SHIFT** key and press **SETUP** key followed by **CTRL A**. The message will be displayed. Type any new character and it will destroy the old message and replace it with the new characters or enter a **CTRL @** to destroy the message completely.

To exit the answerback programming mode, hold down the **SHIFT** key and press **RETURN** key, or type a thirty-third character on line 24.

### 3.3.7 Program Mode

The program mode allows the terminal to display all 128 ASCII characters without causing any action to be performed. All control codes are displayed as printable characters in reverse video. This allows you to embed useful information in printed output and can be useful as a diagnostic aid. Program mode is selected in set-up. The screen shall be cleared when program mode is toggled. Wrap and scroll shall be enabled when program mode is enabled.

### 3.3.8 Cancel Current Mode

To cancel current set-up mode function and return to first entry of the set-up mode, "HDX FDX," simultaneously press **SHIFT RETURN** while in set-up mode.

### 3.3.9 Restore Active Set-Up

To restore the function values current in non-volatile memory press **CTRL R** while in set-up mode. There will be no visual display message indicating this function is being performed.

### 3.3.10 Default Active Set-Up

To default active set-up, press **CTRL D** while in set-up mode. There will be no visual display message indicating this function is being performed.

### 3.3.11 Reset The ADM 3A

Resetting the ADM 3A is accomplished by setting the power ON/OFF switch to the OFF position; waiting at least 10 seconds; then turning the switch to ON. All display and other volatile

memory is erased when powering down or by pressing **SHIFT CLEAR**.

## 3.4 GRAPHICS

The graphics capability of the ADM 3A allows you to draw business forms and simple graphics. To set graphics mode, press **ESC G P**. Graphics mode will be set for the remainder of the field in which the cursor is positioned (foreground or background). However, graphics characters should be reserved for use in background fields. The appendix illustrates the limited graphics character set. Escape sequences for the graphics mode are in the appendix, page A-5.

## 3.5 INTERFACE CONTROL OPERATIONS

### 3.5.1 Data Communication Ports

Communication between the ADM 3A and the host computer or modem is accomplished using the modem port. Transmission may be in one direction at a time (half-duplex operation) or in both directions simultaneously (full-duplex operation).

### 3.5.2 Request To Send Operation

The ADM 3A may receive data at any time over the RXD line. Data transmission is controlled by the clear to send (CTS) line.

Request to send (RTS) is set high to inform the host that the ADM 3A wishes to transmit. If CTS (clear to send) is low, transmission is inhibited.

RTS may be controlled in one of three ways, as follows:

1. EIA mode is set to local; RTS rises before transmission of each character and falls when character has been transmitted.
2. EIA mode is set to 103; RTS remains high all the time.
3. EIA mode is set to 202; RTS is controlled through the ADM 3A interface in the code turnaround operation. Transmission may be in only one direction at a time (half-duplex).

### 3.5.3 Code Turnaround Operation

Code turnaround operation is enabled by setting the personality mode "turnaround" parameter to

Table 3-5. ADM 3A Escape Sequences

OPERATION	SEQUENCE	DESCRIPTION
Sets Foreground Mode	ESC (	Sets field to foreground mode, causing all subsequent characters written to the screen to have the current attribute combination selected for the foreground data.
Sets Background Mode	ESC )	Sets field to background mode, causing all subsequent characters written to the screen to have the current attribute combination selected for background data.
Load Cursor Row and Column	ESC = (row) (col)	<p>Directly loads the cursor to a specific address (row and column) on the current screen. The ASCII-encoded variables, row and col, define the row and column at which the cursor is to be positioned as follows:</p> <p>row = The row character is "SPACE" through "7" rows 1 through 24, respectively.</p> <p>col = The column character is "SPACE" through "0" for columns 1 through 80, respectively.</p> <p>If the character(s) received in the row/col positions are not within the specified range, the cursor will be positioned at the margin of the screen most closely associated with the direction of the error. See Appendix, page A-3 for absolute cursor positions chart.</p>
Set Video Attributes	ESC G X	<p>Sets the visual attributes characters written to the screen. The video attributes will affect all characters written to the screen in the mode in which the attribute is selected (foreground or background). The ASCII-encoded variable x ranges from "0" to "DEL" to select the attribute. The chart for the different combinations of attributes is on pages A-4 and A-5.</p> <p>NOTE: Video attributes will be controlled by foreground or background mode.</p>
Send Line All	ESC 6	All data from beginning of the line up to and including the cursor shall be sent to the host. Tagged character fields (background) shall be enclosed by ESC ) and ESC (. The transmission shall be terminated by CR.
Terminal Reset	ESC o !	Terminal shall perform complete reset.
Terminal Default	ESC o S ESC o 9	<p>All active set-up conditions will be set to default values.</p> <p>Terminal shall display current firmware revision, keyboard selection, and hardware configuration, to be displayed and transmitted to the host.</p>

ETX 03 or EOT 04 or CR 0D. RTS line is set high when DCD (carrier detect) line falls, indicating that (character) transmission is complete. Data transmission from the ADM 3A takes place when CTS (clear to send) line from the host is set high.

When RTS (and CTS from the host) are reset to the marking state, the ADM 3A transmission is inhibited. The terminal will not recognize any further commands or codes for approximately 250 milliseconds to allow the host time to propagate its signal.

### 3.6 PROGRAMMING CONSIDERATIONS

#### 3.6.1 Remote CTRL Operation

The host computer has full control over the ADM 3A. All control operations which are possible from the keyboard can also be executed from the computer by transmitting the appropriate CTRL codes. (Refer to the control and operators codes chart in Appendix A.) Displayable characters will be displayed, and valid control codes will be recognized and acted upon in the same manner described for keyboard operations.

#### 3.6.2 Remote Load-Cursor Operation

The computer may command the ADM 3A cursor

to any absolute screen position, as shown in the absolute cursor positions chart in Appendix A.

#### 3.6.3 Escape Sequences

Each escape sequence controls a specific terminal operation. The escape sequences recognized by the ADM 3A is described in Table 3-5, page 3-12.

### 3.7 GATED EXTENSION PORT OPERATION

The RS-232C extension port provides a convenient method for attaching an auxiliary serial asynchronous device to the ADM 3A. The device may be an additional CRT terminal; however, a more common application is for a hard copy device such as a printer. The extension port parallels the RS-232C modem port, such that any data sent to the terminal through the modem port is also passed through the extension port, unless the port is disabled using the gating function.

The gating function allows the host computer to turn the extension port ON and OFF, using control codes. (Refer to the control and operator codes chart in Appendix A.) This function is enabled by entering the set-up mode and setting the SO/SI feature to gate and exiting set-up, pressing **CTRL N**. The **CTRL O** commands disables the port.





**APPENDIX A**  
**OPERATORS QUICK**  
**REFERENCE CHARTS**

### ASCII CONTROL CODE CHART

BITS B7 B6 B5 B4 B3 B2 B1	0 0 0 0		0 1 0 1		1 0 0 1		1 1 0 1	
	CONTROL		NUMBERS SYMBOLS		UPPER CASE		LOWER CASE	
0 0 0 0	NUL	DLE	SP	0	@	P	'	p
0 0 0 1	SOH	DC1	!	1	A	Q	a	q
0 0 1 0	STX	DC2	"	2	B	R	b	r
0 0 1 1	ETX	DC3	#	3	C	S	c	s
0 1 0 0	EOT	DC4	\$	4	D	T	d	t
0 1 0 1	ENQ	NAK	%	5	E	U	e	u
0 1 1 0	ACK	SYN	&	6	F	V	f	v
0 1 1 1	BEL	ETB	'	7	G	W	g	w
1 0 0 0	BS	CAN	(	8	H	X	h	x
1 0 0 1	HT	EM	)	9	I	Y	i	y
1 0 1 0	LF	SUB	*	:	J	Z	j	z
1 0 1 1	VT	ESC	+	;	K	[	k	{
1 1 0 0	FF	FS	,	<	L	\	l	
1 1 0 1	CR	GS	-	=	M	]	m	}
1 1 1 0	SO	RS	.	>	N	^	n	~
1 1 1 1	SI	US	/	?	O	_	o	RUBOUT (DEL)

#### LEGEND

BS ← U.S. CURSOR CONTROL CODE  
 ASCII CHARACTER

## CONTROL AND OPERATORS CODES CHART

CONTROL CODE		HEX CODE	OPERATION
FROM HOST	FROM KEYBOARD		
ENQ	CTRL E	05	Causes current active answerback message to be transmitted to the host and displayed if terminal is in half-duplex mode.
BEL	CTRL G	07	Sounds audible tone in video display terminal.
BS	CTRL H	08	Backspace. Moves cursor one column to the left.
LF	LINE FEED or CTRL J	0A	Line Feed. Moves cursor down one row and remains in the same column.
VT	CTRL K	0B	Upline. Moves cursor up one row and remains in the same column.
FF	CTRL L	0C	Forespace. Moves cursor one column to the right.
CR	RETURN or CTRL M	0D	Carriage Return. Moves cursor to the first column of the current row.
SO	CTRL N	0E	If set-up mode feature SO/SI set to GATE, enables gated extension port and passes CTRL N through the extension port.  If set-up mode feature SO/SI set to LOCK, unlocks key board (from host only).
SI	CTRL O	0F	If set-up mode feature SO/SI set to LOCK and KEYBOARD LOCK is enabled, disables keyboard and passes CTRL O through the extension port.  If set-up mode feature SO/SI set to GATE, disables extension port.
SUB	CTRL Z	1A	Clears screen to fill character selected in the set-up mode, unless clear screen is disabled in set-up mode.
ESC	ESC or CTRL I	1B	Command lead-in.
RS	CTRL HOME	1E	Moves cursor to home position.

## ABSOLUTE CURSOR POSITIONS CHART

Keys Used: ESC = ROW  
ASCII COL  
ASCII

ASCII CODES	POSITION		ASCII CODES	POSITION		ASCII CODES	POSITION	
	ROW	COL		ROW	COL		ROW	COL
<span style="border: 1px solid black; padding: 2px;">ESC</span> <span style="border: 1px solid black; padding: 2px;">=</span> <span style="border: 1px solid black; padding: 2px;">SPACE</span>	1	1	<span style="border: 1px solid black; padding: 2px;">ESC</span> <span style="border: 1px solid black; padding: 2px;">=</span> <span style="border: 1px solid black; padding: 2px;">;</span>		28	<span style="border: 1px solid black; padding: 2px;">ESC</span> <span style="border: 1px solid black; padding: 2px;">=</span> <span style="border: 1px solid black; padding: 2px;">V</span>		55
<span style="border: 1px solid black; padding: 2px;">!</span>	2	2	<span style="border: 1px solid black; padding: 2px;">&lt;</span>		29	<span style="border: 1px solid black; padding: 2px;">W</span>		56
<span style="border: 1px solid black; padding: 2px;">"</span>	3	3	<span style="border: 1px solid black; padding: 2px;">=</span>		30	<span style="border: 1px solid black; padding: 2px;">X</span>		57
<span style="border: 1px solid black; padding: 2px;">#</span>	4	4	<span style="border: 1px solid black; padding: 2px;">&gt;</span>		31	<span style="border: 1px solid black; padding: 2px;">Y</span>		58
<span style="border: 1px solid black; padding: 2px;">\$</span>	5	5	<span style="border: 1px solid black; padding: 2px;">?</span>		32	<span style="border: 1px solid black; padding: 2px;">Z</span>		59
<span style="border: 1px solid black; padding: 2px;">%</span>	6	6	<span style="border: 1px solid black; padding: 2px;">@</span>		33	<span style="border: 1px solid black; padding: 2px;">[</span>		60
<span style="border: 1px solid black; padding: 2px;">&amp;</span>	7	7	<span style="border: 1px solid black; padding: 2px;">A</span>		34	<span style="border: 1px solid black; padding: 2px;">\</span>		61
<span style="border: 1px solid black; padding: 2px;">'</span>	8	8	<span style="border: 1px solid black; padding: 2px;">B</span>		35	<span style="border: 1px solid black; padding: 2px;">]</span>		62
<span style="border: 1px solid black; padding: 2px;">(</span>	9	9	<span style="border: 1px solid black; padding: 2px;">C</span>		36	<span style="border: 1px solid black; padding: 2px;">^</span>		63
<span style="border: 1px solid black; padding: 2px;">)</span>	10	10	<span style="border: 1px solid black; padding: 2px;">D</span>		37	<span style="border: 1px solid black; padding: 2px;">_</span>		64
<span style="border: 1px solid black; padding: 2px;">*</span>	11	11	<span style="border: 1px solid black; padding: 2px;">E</span>		38	<span style="border: 1px solid black; padding: 2px;">`</span>		65
<span style="border: 1px solid black; padding: 2px;">+</span>	12	12	<span style="border: 1px solid black; padding: 2px;">F</span>		39	<span style="border: 1px solid black; padding: 2px;">a</span>		66
<span style="border: 1px solid black; padding: 2px;">,</span>	13	13	<span style="border: 1px solid black; padding: 2px;">G</span>		40	<span style="border: 1px solid black; padding: 2px;">b</span>		67
<span style="border: 1px solid black; padding: 2px;">-</span>	14	14	<span style="border: 1px solid black; padding: 2px;">H</span>		41	<span style="border: 1px solid black; padding: 2px;">c</span>		68
<span style="border: 1px solid black; padding: 2px;">.</span>	15	15	<span style="border: 1px solid black; padding: 2px;">I</span>		42	<span style="border: 1px solid black; padding: 2px;">d</span>		69
<span style="border: 1px solid black; padding: 2px;">/</span>	16	16	<span style="border: 1px solid black; padding: 2px;">J</span>		43	<span style="border: 1px solid black; padding: 2px;">e</span>		70
<span style="border: 1px solid black; padding: 2px;">0</span>	17	17	<span style="border: 1px solid black; padding: 2px;">K</span>		44	<span style="border: 1px solid black; padding: 2px;">f</span>		71
<span style="border: 1px solid black; padding: 2px;">1</span>	18	18	<span style="border: 1px solid black; padding: 2px;">L</span>		45	<span style="border: 1px solid black; padding: 2px;">g</span>		72
<span style="border: 1px solid black; padding: 2px;">2</span>	19	19	<span style="border: 1px solid black; padding: 2px;">M</span>		46	<span style="border: 1px solid black; padding: 2px;">h</span>		73
<span style="border: 1px solid black; padding: 2px;">3</span>	20	20	<span style="border: 1px solid black; padding: 2px;">N</span>		47	<span style="border: 1px solid black; padding: 2px;">i</span>		74
<span style="border: 1px solid black; padding: 2px;">4</span>	21	21	<span style="border: 1px solid black; padding: 2px;">O</span>		48	<span style="border: 1px solid black; padding: 2px;">j</span>		75
<span style="border: 1px solid black; padding: 2px;">5</span>	22	22	<span style="border: 1px solid black; padding: 2px;">P</span>		49	<span style="border: 1px solid black; padding: 2px;">k</span>		76
<span style="border: 1px solid black; padding: 2px;">6</span>	23	23	<span style="border: 1px solid black; padding: 2px;">Q</span>		50	<span style="border: 1px solid black; padding: 2px;">l</span>		77
<span style="border: 1px solid black; padding: 2px;">7</span>	24	24	<span style="border: 1px solid black; padding: 2px;">R</span>		51	<span style="border: 1px solid black; padding: 2px;">m</span>		78
<span style="border: 1px solid black; padding: 2px;">8</span>	25	25	<span style="border: 1px solid black; padding: 2px;">S</span>		52	<span style="border: 1px solid black; padding: 2px;">n</span>		79
<span style="border: 1px solid black; padding: 2px;">9</span>	26	26	<span style="border: 1px solid black; padding: 2px;">T</span>		53	<span style="border: 1px solid black; padding: 2px;">ESC</span> <span style="border: 1px solid black; padding: 2px;">=</span> <span style="border: 1px solid black; padding: 2px;">o</span>		80
<span style="border: 1px solid black; padding: 2px;">:</span>	27	27	<span style="border: 1px solid black; padding: 2px;">ESC</span> <span style="border: 1px solid black; padding: 2px;">=</span> <span style="border: 1px solid black; padding: 2px;">U</span>		54			

### ADM 3A ATTRIBUTE CODES

ATTRIBUTES	CODES
NORMAL VIDEO	ESC G 0
BLANK	ESC G 1
BLINKING	ESC G 2
REVERSE	ESC G 4
REVERSE, BLINKING	ESC G 6
UNDERLINE	ESC G 8
UNDERLINE, BLINKING	ESC G :
UNDERLINE, REVERSE	ESC G <
UNDERLINE, REVERSE, BLINKING	ESC G >
REDUCE	ESC G @
REDUCE, BLINKING	ESC G B
REDUCE, REVERSE	ESC G D
REDUCE, REVERSE, BLINKING	ESC G F
REDUCE, UNDERLINE	ESC G H
REDUCE, UNDERLINE, BLINKING	ESC G J
REDUCE UNDERLINE, REVERSE	ESC G L
REDUCE, UNDERLINE, REVERSE, BLINKING	ESC G N

## ADM 3A GRAPHICS/ATTRIBUTES CODES

GRAPHICS WITH ATTRIBUTES	CODES
GRAPHICS, NORMAL VIDEO	ESC G P
GRAPHICS, BLANK	ESC G Q
GRAPHICS, BLINKING	ESC G R
GRAPHICS, REVERSE	ESC G T
GRAPHICS, BLINKING, REVERSE	ESC G V
GRAPHICS, UNDERLINE	ESC G X
GRAPHICS, UNDERLINE, BLINKING	ESC G Z
GRAPHICS UNDERLINE, REVERSE	ESC G \
GRAPHICS, UNDERLINE, REVERSE, BLINKING	ESC G A
GRAPHICS, REDUCE	ESC G `
GRAPHICS, REDUCE, BLINKING	ESC G b
GRAPHICS, REDUCE, REVERSE	ESC G d
GRAPHICS, REDUCE, REVERSE, BLINKING	ESC G f
GRAPHICS, REDUCE, UNDERLINE	ESC G h
GRAPHICS, REDUCE, UNDERLINE, BLINKING	ESC G j
GRAPHICS, REDUCE, UNDERLINE, REVERSE	ESC G l
GRAPHICS, REDUCE, UNDERLINE, REVERSE, BLINKING	ESC G n

### LIMITED GRAPHICS CHARACTER SET

SPACE	(	0. @	8. H	P. '	X. h	p	x
!	)	1. A	9. I	Q. a	Y. i	q	y
"	*	2. B	. J	R. b	Z. j	r	z
#	+	3. C	. K	S. c	[. k	s	{
\$	.	4. D	< L	T. d	\. l	t	
%	-	5. E	= M	U. e	]. m	u	}
&	.	6. F	. N	V. f	^. n	v	~
'	/	7. G	? O	W. g	_. o	w	RUB

**INDEX**



SUBJECT	PAGE
A-B	
Absolute Cursor Positioning .....	1-1
Absolute Cursor Positions (chart) .....	A-3
Active Set-Up .....	3-10
Answerback Memory .....	1-4
Answerback Programming .....	1-4
Answerback Programming Mode .....	3-5
Answerback Storage (NVM) .....	1-4
Application (diagram) .....	2-5
ASCII Characters .....	1-1,A-1
ASCII Control Code (chart) .....	A-1
Assembly (diagram) .....	2-5
Attribute Codes (chart) .....	A-4
Auto New Line .....	1-1

C

Cancel Current Mode .....	3-11
Character Format .....	1-4,1-7
Cleaning .....	2-10
Clear To Send .....	3-1
Code Turnaround Operation .....	3-11
Connector Location (diagram) .....	2-4
Control and Operator Codes (chart) .....	A-2
Control Codes .....	3-4,A-1
Control Logic .....	1-3
20mA Current Loop On Extension Port .....	1-4
20mA Current Loop On Modem Port .....	1-4
Current Loop Interface Logic (diagram) .....	2-7
Current Mode .....	3-11

D

Data Communications Ports .....	3-11
Data Entry And Overflow .....	1-4
Data Flow Block (diagram) .....	1-2
Default Active Set-Up .....	3-11
Display Memory .....	1-3
Display Monitor .....	1-3
DTR XON/XOFF .....	1-3

E

Enter Answerback Programming Mode .....	3-10
Enter Personality Mode .....	3-10
Enter Set-Up Mode .....	3-1
Escape Sequences .....	3-13
Escape Sequences (table) .....	3-12
Exiting Set-Up Mode .....	3-5

F

Front Panel Controls (diagram) .....	2-9
Full Duplex .....	3-5,3-6,3-10

SUBJECT	PAGE
G	
Gated Extension Port Mode .....	2-2,3-14
General .....	2-1,3-1
Graphic Character Set and CTRL Codes (figure) .....	1-7
Graphics .....	3-11
Graphics/Attributes Codes (chart) .....	A-5
Green Phosphor Display .....	1-4
H	
Half Duplex .....	3-5
I-J	
Initial Inspection .....	2-1
Initial Preparation .....	2-2
Input/Output (I/O) Port .....	1-3
Inspection .....	2-10
Installation .....	2-2
Interface Control Operations .....	3-11
Interfaces:	
RS-232C Extension Port .....	2-2
RS-232C Modem Port .....	2-2
Introduction .....	1-1
K	
Keyboard .....	1-3,3-1
Keyboard Layout Options .....	1-4
Keyboard Operational Characteristics (diagram) .....	3-2,3-3
L	
Limited Graphics Character Set .....	A-6
Line Voltage Selection .....	2-2
M-N	
Modem and RS-232C Extension Interface Logic (diagram) .....	2-6
O	
Operational Description .....	1-2
Optional Current Loop and RS-422 Interface Logic (diagram) .....	2-7
Optional Features .....	1-4
P-Q	
Personality Mode Functions (table) .....	3-10
Physical Description .....	1-3
Power Turn-Off .....	2-10
Power Turn-On .....	2-8
Preliminary Note .....	3-1
Programming Considerations .....	3-13
Program Mode .....	3-11
Purpose and Use .....	1-1

SUBJECT	PAGE
R	
Rear Panel Controls (diagram) .....	2-8
Refresh Rate .....	1-5
Remote Load-Cursor Operation .....	3-13
Remote CTRL Operation .....	3-13
Request To Send .....	3-11
Reset .....	3-11
RS-422 Interface Logic (diagram) .....	2-7
RS-422 Interface Option .....	1-4
Restore Active Set-Up .....	3-11
S	
Save Current Terminal Configuration Values .....	3-5
Safety Requirements .....	2-1
Send/Receive Modes .....	1-3
Set Terminal Configuration Parameters .....	3-5
Set-Up Mode .....	1-3,2-2,3-1,3-10
Set-Up Mode Functions (table) .....	3-4,3-5
Set-Up Mode - Terminal Configuration Parameters (table) .....	3-6 thru 3-9
Site Requirements .....	2-1
Specifications .....	1-5,1-6
Standard Keyboard Operational Characteristics (figure) .....	3-2,3-3
T	
Terminal Configuration Parameters .....	3-5,3-6 thru 3-9
U-V	
Unpacking .....	2-1
230 VAC .....	1-4
Voltage Selection .....	2-2
W-X-Y-Z	
Word Structure .....	1-4

## COMMENTS AND SUGGESTIONS

If you have suggestions for improving this publication, please let us know on the postage-paid reply card to the right.

All comments will be given careful consideration.

PUBLICATION TITLE \_\_\_\_\_  
PUBLICATION NO. \_\_\_\_\_ DATE \_\_\_\_\_  
YOUR NAME \_\_\_\_\_  
TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
SUGGESTIONS \_\_\_\_\_  
\_\_\_\_\_

## IMPORTANT WARRANTY NOTICE

Your new Lear Siegler data terminal is protected against defect in material and workmanship by factory warranty. To establish our date-of-purchase record, please complete the attached postage-paid warranty card, and mail it immediately. This will also allow us to keep you current on product changes and enhancements.

For product service or information on Lear Siegler's maintenance programs, call (714) 778-3500, or toll-free

**800-LEAR DPD  
(800-532-7373)**

## DATA PRODUCT WARRANTY CARD

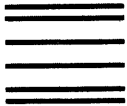
1) Product purchased  ADM 3A  ADM 3E  ADM 11  ADM 11plus  ADM 12  
 ADM 12plus  ADM 22  ADM 24E  ADM 42  ADM 220  ADM 364  
 ADM 1178  VersaPrint™ 500 Series  other \_\_\_\_\_

2) Date product purchased \_\_\_\_\_ 3) Serial no. \_\_\_\_\_

4) Purchased from  LSI  Distributor Name \_\_\_\_\_

Please print or type:

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Telephone ( ) \_\_\_\_\_ Ext. \_\_\_\_\_

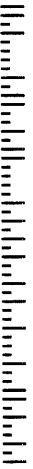
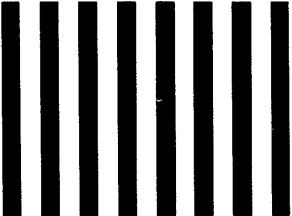


**BUSINESS REPLY MAIL**  
FIRST CLASS MAIL PERMIT NO. 372 ANAHEIM, CALIFORNIA

POSTAGE WILL BE PAID BY ADDRESSEE:

**LEAR SIEGLER, INC.**  
**DATA PRODUCTS DIVISION**  
**DEPT. 66**  
**901 E. BALL ROAD**  
**ANAHEIM, CALIFORNIA 92805-9973**

NO POSTAGE  
STAMP  
NECESSARY  
IF MAILED IN THE  
UNITED STATES

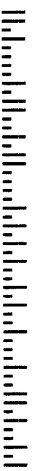
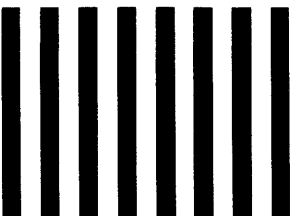


**BUSINESS REPLY MAIL**  
FIRST CLASS MAIL PERMIT NO. 372 ANAHEIM, CALIFORNIA

POSTAGE WILL BE PAID BY ADDRESSEE:

**LEAR SIEGLER, INC.**  
**DATA PRODUCTS DIVISION**  
**DEPT. 66**  
**901 E. BALL ROAD**  
**ANAHEIM, CALIFORNIA 92805-9973**

NO POSTAGE  
STAMP  
NECESSARY  
IF MAILED IN THE  
UNITED STATES





**LEAR SIEGLER, INC.**  
**DATA PRODUCTS DIVISION**

901 EAST BALL ROAD, ANAHEIM, CALIFORNIA 92805

PHONE: (714) 778-3500 TELEX: 65-5444 TWX: 910-591-1157