

# **ADM 42 Ergonomic Terminal™ Video Display Unit Maintenance Manual**

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

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**ADM-42  
Data  
Display Terminal**



**LEAR SIEGLER, INC.**

**MAINTENANCE  
MANUAL**

## TABLE OF CONTENTS

SECTION	PAGE
<b>I GENERAL DESCRIPTION</b> .....	1-1
1.1 INTRODUCTION .....	1-1
1.2 PURPOSE AND USE .....	1-1
1.3 PHYSICAL DESCRIPTION .....	1-1
1.4 OPERATIONAL DESCRIPTION .....	1-1
1.5 SPECIFICATIONS .....	1-1
1.5.1 Memory Extension Option .....	1-1
1.5.2 Direct Connect Option .....	1-1
1.5.3 Answer Back Memory Option .....	1-3
1.5.4 Alternate Character Generator Set Option .....	1-3
1.5.5 TCU Desk Mount Option .....	1-3
1.6 ADDITIONAL OPTIONS .....	1-3
1.6.1 Standard Option Board Features .....	1-3
1.6.1.1 Serial Printer Option .....	1-3
1.6.1.2 31-Character Function Key Option .....	1-3
1.6.2 Polling and Addressing Option .....	1-4
1.6.3 63-Character Function Key Option .....	1-4
1.7 RELATED DOCUMENTS .....	1-4
<b>II INSTALLATION</b> .....	2-1
2.1 INTRODUCTION .....	2-1
2.2 SAFETY REQUIREMENTS .....	2-1
2.3 SITE REQUIREMENTS .....	2-1
2.4 INITIAL PREPARATION .....	2-1
2.4.1 Line Voltage Selection .....	2-1
2.4.2 Configuration Control Dip Switch Settings .....	2-3
2.4.2.1 Main Board Switches .....	2-3
2.4.2.2 Option Board DIP Switches .....	2-3

TABLE OF CONTENTS (cont'd)

SECTION	PAGE
2.5 INTERFACE INFORMATION .....	2-11
2.5.1 Standard or RS-232C Extension Interface .....	2-11
2.5.2 Current Loop Interface .....	2-11
2.5.3 Direct Connect Interface .....	2-11
2.5.4 Printer Interface .....	2-11
2.6 INSTALLING THE ADM 42 .....	2-11
2.7 POWER TURN-ON .....	2-16
2.8 POWER TURN-OFF .....	2-16
2.9 CARE OF THE ADM 42 .....	2-17
2.9.1 Cleaning .....	2-17
2.9.2 Inspection .....	2-17
III FUNCTIONAL DESCRIPTION .....	3-1
3.1 INTRODUCTION .....	3-1
3.2 OPERATIONAL DESCRIPTION .....	3-2
3.2.1 Keyboard .....	3-2
3.2.2 Control Section (MPU) .....	3-2
3.2.3 Video Logic and Control .....	3-2
3.2.4 Interface Section .....	3-2
3.2.5 System Configuration Switches .....	3-2
3.2.6 Regulated Power Supply .....	3-4
3.3 STANDARD CHARACTER FORMAT .....	3-4
3.4 ADM 42 WORD STRUCTURE .....	3-4
3.5 DATA TRANSMISSION CHARACTERISTICS .....	3-4
3.5.1 Conversation Mode Characteristics .....	3-4
3.5.2 Block Mode Characteristics .....	3-4
3.5.3 ADM 1 Mode Characteristics .....	3-7
3.6 PRINT MODE TRANSMISSION CHARACTERISTICS .....	3-7
3.6.1 Formatted Print Mode .....	3-7
3.6.2 Unformatted Print Mode .....	3-8
3.6.3 Copy Print Mode .....	3-8
3.6.4 Buffered Print Mode .....	3-9
IV OPERATION .....	4-1
4.1 INTRODUCTION .....	4-1

TABLE OF CONTENTS (cont'd)

SECTION	PAGE
4.2 CONTROL CODES AND OPERATING MODES.....	4-1
4.2.1 Standard Control Codes.....	4-1
4.2.2 Escape Sequence.....	4-1
4.2.3 Terminal RESET Operations.....	4-4
4.2.3.1 Power ON RESET.....	4-4
4.2.3.2 RESET Button.....	4-5
4.2.3.3 Firmware RESET.....	4-5
4.2.3.4 Selected Operational RESETS.....	4-5
4.2.4 Multiple Escape Sequences.....	4-5
4.2.5 Keyboard Enable/Disable.....	4-5
4.2.6 Scrolling.....	4-5
4.2.7 Display of Program Version.....	4-6
4.2.8 Status Line Characteristics.....	4-6
4.2.8.1 Status Indicator Control.....	4-6
4.2.8.2 Status Line Message Control.....	4-6
4.3 FUNCTION KEY (FUNKEY) CHARACTERISTICS.....	4-6
4.3.1 Displaying FUNKEY Messages.....	4-6
4.3.2 Storing FUNKEY Messages.....	4-6
4.3.3 Linking FUNKEY Messages.....	4-9
4.3.3.1 Storing Extra-Length FUNKEY Messages.....	4-10
4.3.3.2 Linking Multiple Commands.....	4-11
4.3.4 Erasing FUNKEY Messages.....	4-11
4.3.5 Evoking FUNKEY Messages.....	4-11
4.4 FORMAT CONTROL OPERATIONS.....	4-11
4.4.1 Program Mode.....	4-12
4.4.2 Protected Fields and Modes.....	4-12
4.4.2.1 Write Protect Mode.....	4-12
4.4.2.2 Protect Mode.....	4-12
4.4.2.3 Designated Protected Field.....	4-12
4.4.2.4 Selected Protected Fields.....	4-12
4.4.3 Auto Page Mode.....	4-13
4.4.4 Limited Graphics Mode.....	4-13
4.4.5 Write Character "c" "N" Times.....	4-13
4.5 CURSOR CONTROL OPERATIONS.....	4-13
4.5.1 Non-Addressed Cursor Positioning.....	4-13
4.5.2 Absolute Cursor Addressing.....	4-13
4.5.2.1 Load Cursor Operation.....	4-13
4.5.2.2 Read Cursor Operations.....	4-14
4.5.2.3 Go To Page "N" Operations.....	4-14
4.5.3 Tab Control.....	4-18
4.5.3.1 Protect Mode Tab Operations.....	4-18
4.5.3.2 Typewriter Tab Mode Operations.....	4-18
4.5.3.3 Modulo Tab Mode Operations.....	4-18

## TABLE OF CONTENTS (cont'd)

SECTION	PAGE
4.6 DATA EDITING CONTROL OPERATIONS.....	4-18
4.7 DATA TRANSMISSION CONTROL OPERATIONS.....	4-21
4.7.1 Block Mode Send .....	4-21
4.7.2 Dynamic Baud Rate Control .....	4-21
4.8 PRINT TRANSMISSION CONTROL OPERATIONS .....	4-23
4.9 PERSONALITY CONTROL .....	4-23
4.9.1 Display of Personality Codes.....	4-23
4.9.2 Dynamic Personality Change Codes.....	4-23
4.9.2.1 Modification of Escape Lead-In Character .....	4-23
4.9.2.2 Modification of End Block Character(s).....	4-23
4.9.2.3 Modification of New Line Character(s).....	4-23
4.9.2.4 Modification of Field Separator Character .....	4-25
4.9.2.5 Modification of FUNKEY Lead-In Character .....	4-25
4.9.2.6 Modification of Parity Error Replacement Character ..	4-27
4.9.2.7 Modification of Clear/Erase/Insert/Delete Replacement .....	4-27
4.9.2.8 RTS START Delay Control.....	4-28
4.9.2.9 RTS OFF Delay Control.....	4-28
4.9.2.10 Polling Option Variant Control.....	4-28
4.9.2.11 Polling Transmission Number Limit Control.....	4-28
4.9.2.12 Power-Up Tab Mode Control .....	4-28
4.9.2.13 Special Function Control Byte E.....	4-31
4.9.2.14 Status Line Attribute Control Byte F .....	4-31
4.9.2.15 Special Function Control Byte 10 .....	4-31
4.9.2.16 Special Function Control Byte 11 .....	4-31
4.10 VIDEO ATTRIBUTE CONTROL OPERATIONS .....	4-31
4.10.1 Cursor and Video Control .....	4-31
4.10.2 Displayable Character Video .....	4-35
4.10.3 ADM 42/ADM 2 Attribute Mode Control .....	4-35
V POLLING AND ADDRESSING.....	5-1
5.1 ADM 42 POLLING .....	5-1
5.1.1 Setting ADM 42 Address .....	5-1
5.1.2 Establishing Polling Operations .....	5-1
5.1.2.1 Setting Up Terminal .....	5-1
5.1.2.2 Monitor Mode Operation .....	5-2
5.1.2.3 Enabling Keyboard .....	5-2
5.1.3 Removing Terminal from Polling Status.....	5-2
5.1.4 Initiating Standard Polling Sequence .....	5-2
5.1.5 POLL Responses.....	5-3

## TABLE OF CONTENTS (cont'd)

SECTION	PAGE
5.1.6	SELECT Responses ..... 5-5
5.1.7	SEQUENTIAL SELECT Responses ..... 5-5
5.1.8	FAST SELECT Responses ..... 5-6
5.1.9	BROADCAST SELECT Responses ..... 5-6
5.1.10	SEND Responses ..... 5-6
5.2	SPECIAL POLLING OPERATIONS..... 5-12
5.2.1	GROUP POLL Operation ..... 5-12
5.2.2	GROUP SELECT Operations ..... 5-13
5.2.3	MULTI-POINT CONTENTION Operations ..... 5-13
5.2.4	Addressable Printer Port Operations ..... 5-13
5.2.5	Polling Communications Buffer Operations ..... 5-14
VI	THEORY OF OPERATION ..... 6-1
6.1	GENERAL DESCRIPTION ..... 6-1
6.2	FUNCTIONAL DESCRIPTION ..... 6-2
6.3	DETAILED BLOCK DESCRIPTION ..... 6-5
6.3.1	CPU Section ..... 6-5
6.3.2	External Interface Section ..... 6-11
6.3.3	System Memory Section ..... 6-13
6.3.4	Video Display Section ..... 6-17
6.3.5	Keyboard Section ..... 6-21
6.3.6	System Configuration Switches ..... 6-25
6.3.7	External Bus Buffers ..... 6-26
6.3.8	Option Board ..... 6-26
VII	MAINTENANCE ..... 7-1
7.1	INTRODUCTION ..... 7-1
7.2	PREVENTIVE MAINTENANCE ..... 7-1
7.3	SWITCH SETTINGS ..... 7-1
7.4	CORRECTIVE MAINTENANCE ..... 7-3
7.4.1	Problem Identification ..... 7-3
7.4.2	Removal and Replacement ..... 7-5
VIII	DRAWINGS ..... 8-1

## TABLE OF CONTENTS (cont'd)

### LIST OF FIGURES

FIGURE		PAGE
1-1	ADM 42 Video Display Terminal .....	x
1-2	ADM 42 Character Format (By Ascending ASCII Codes) with HEX Code ..	1-2
2-1	ADM 42 Mounting Requirements .....	2-2
2-2	ADM 42 Front Panel Controls and Indicators .....	2-4
2-3	Connector and DIP Switch Locations on Main Logic Board .....	2-5
2-4	Connector and DIP Switch Locations on Option Logic Board .....	2-6
2-5	Typical ADM 42 Application .....	2-12
2-6	ADM 42 Rear Panel Controls .....	2-13
2-7	MODEM and RS-232C Extension Interface Logic .....	2-14
2-8	Current Loop Interface Logic .....	2-15
2-9	Direct Connect Interface Logic .....	2-18
2-10	Printer Interface Logic .....	2-18
3-1	ADM 42 Data Flow Block Diagram .....	3-3
3-2	Displayable Character Set and Control Codes .....	3-5
3-3	Word Format Codes with DIP Switch Configurations .....	3-6
4-1	Chart of Escape Sequences .....	4-2
4-2	Sample FUNKEY Message Format and Store Codes .....	4-7
4-3	Limited Graphics Mode Symbols .....	4-14
4-4	Chart of ASCII Characters vs. Modulo Numbers .....	4-15
4-5	Absolute Cursor Addressing Operation Codes .....	4-16
4-6	Display of Standard Personality Byte Values .....	4-24
4-7	Chart of Recommended RTS OFF Delay Times .....	4-30
5-1	POLL Function Dialogue, Flow Diagram .....	5-4
5-2	SELECT Function Dialogue, Flow Diagram .....	5-7
5-3	SEQUENTIAL SELECT Function Dialogue, Flow Diagram .....	5-8
5-4	FAST SELECT FUNCTION Dialogue, Flow Diagram .....	5-9
5-5	BROADCAST SELECT Function Dialogue, Flow Diagram .....	5-10
5-6	SEND Function Dialogue, Flow Diagram .....	5-11
6-1	ADM 42 Simplified System Block Diagram .....	6-3
6-2	CPU Section Detailed Block Description .....	6-6
6-3	MPU Block Diagram .....	6-7
6-4	MPU Flow Chart .....	6-9
6-5	System Timing and Two Phase Clock .....	6-10
6-6	External Interface Section Block Diagram .....	6-12
6-7	System Memory Board .....	6-14
6-8	Video Control Section .....	6-16
6-9	Keyboard Section .....	6-23
6-10	PIA Block Diagram .....	6-24
6-11	System Configuration Switches .....	6-25
6-12	Option Board Block Diagram .....	6-27



## TABLE OF CONTENTS (cont'd)

### LIST OF FIGURES (cont'd)

FIGURE		PAGE
7-1	Removing the Plunger .....	7-8
7-2	Insertion Tool Guideway .....	7-9
7-3	Placing the Solid Contact in the Insertion Tool .....	7-10
7-4	Inserting the Spilt Contact in the Insertion Tool .....	7-11
7-5	Placing the Insertion Tool into the Guide .....	7-12
7-6	Replacing the Plunger .....	7-13

### LIST OF TABLES

TABLE		PAGE
1-1	ADM 42 Specifications .....	1-5
2-1	Main Logic Board Configuration Control Switch Settings .....	2-7
2-2	Option Logic Board Configuration Control Switch Settings .....	2-9
4-1	Control Codes Utilized by Standard ADM 42 .....	4-3
4-2	Chart of Assigned Status Line Positions .....	4-8
4-3	Status Code Control Operation Codes .....	4-8
4-4	Status Line Message Control Operations .....	4-9
4-5	Function Key/FUNKEY Characteristics .....	4-10
4-6	Chart of Cursor Control Operations .....	4-17
4-7	Data Editing Control Operations .....	4-19
4-8	Data Transmission Control Operations .....	4-22
4-9	Dynamic Baud Rate Control Operation Codes .....	4-25
4-10	Print Transmission Control Operations .....	4-26
4-11	Polling Option Variant Byte B Operations .....	4-29
4-12	Power-Up Default Modulus Tabs Byte D .....	4-30
4-13	Special Function Control Byte E Operations .....	4-32
4-14	Status Line Visual Attribute Control Byte F Operations .....	4-33
4-15	Special Function Control Byte 10 Operations .....	4-34
4-16	Special Function Control Byte 11 Operations .....	4-35
4-17	Video Attribute Control Operation Codes .....	4-36
4-18	Operation Codes for ADM 42/ADM 2 Attribute Mode Control .....	4-36
7-1	ADM 42 Troubleshooting Guide .....	7-4

**TABLE OF CONTENTS (cont'd)**

**APPENDIX A**

**Operators Quick Reference Guides**

**APPENDIX B**

**TTL Data Display Monitor 120/150**

**APPENDIX C**

**Factory Service and Maintenance Information**

## PREFACE

*This Maintenance Manual provides all the information required to perform routine and corrective maintenance on the ADM 42 Data Display Terminal. The instructions and information may also be used to aid operational personnel in the installation, operation, and care of the ADM 42. 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 non-standard applications.*

*The major topics described in the manual include:*

<i>Section I</i>	<i>General Description</i>
<i>Section II</i>	<i>Installation</i>
<i>Section III</i>	<i>Functional Description</i>
<i>Section IV</i>	<i>Operation</i>
<i>Section V</i>	<i>Polling and Addressing</i>
<i>Section VI</i>	<i>Theory of Operation</i>
<i>Section VII</i>	<i>Maintenance</i>
<i>Section VIII</i>	<i>Drawings</i>
<i>Appendix A</i>	<i>Operator's Quick Reference Guides</i>
<i>Appendix B</i>	<i>TTL Data Display Monitor 120/150</i>
<i>Appendix C</i>	<i>Factory Service and Maintenance Information</i>
	<i>Index</i>

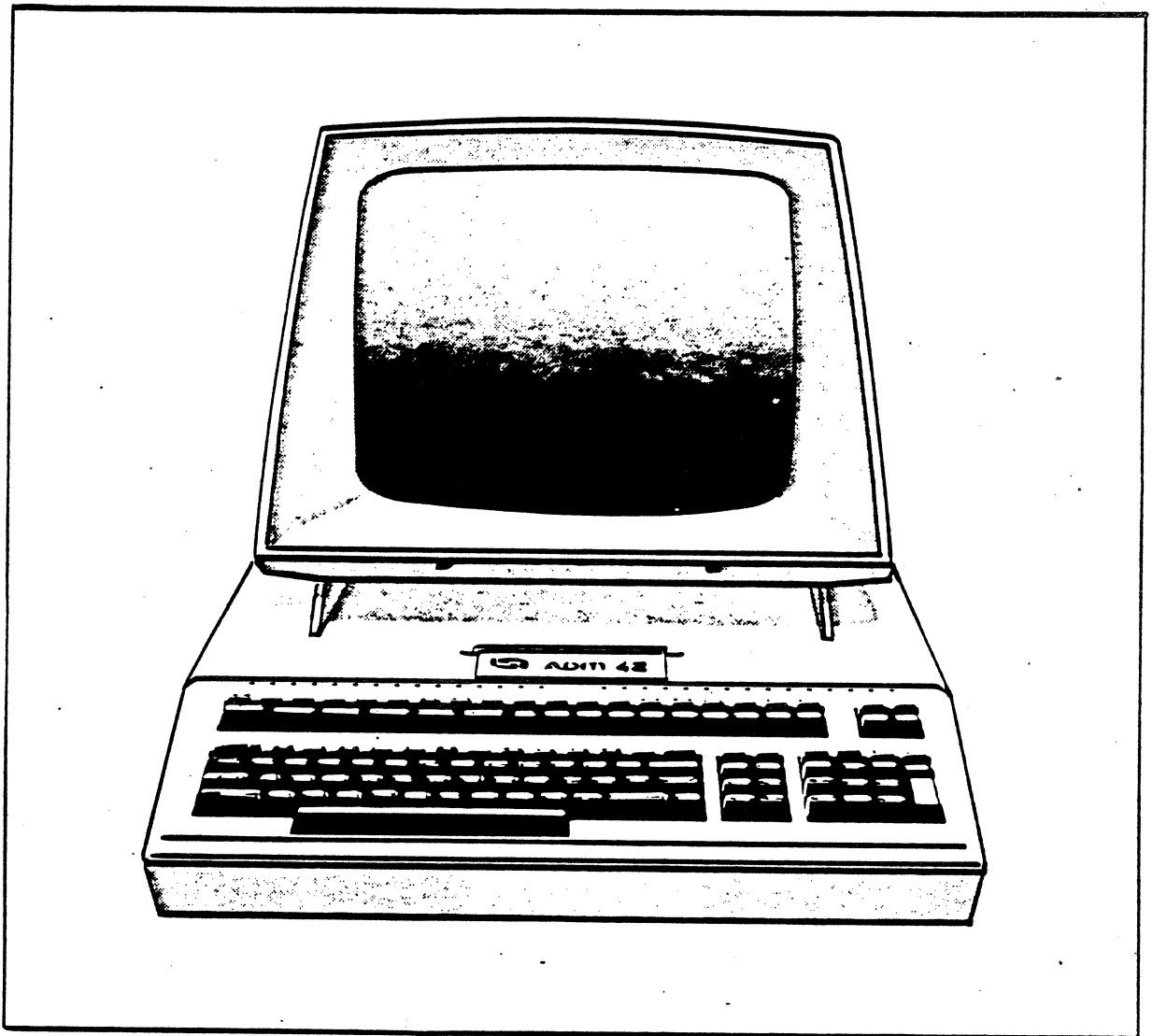


Figure 1-1. ADM-42 Data Display Terminal

## SECTION I GENERAL DESCRIPTION

### 1.1 INTRODUCTION

This section describes and lists the specifications of the Lear Siegler ADM 42 Ergonomic Terminal™ Video Display Unit (see figure 1-1), along with available options.

### 1.2 PURPOSE AND USE

There are numerous applications of the ADM 42 all involving the transfer of data. Data transfer, in some applications, may be almost exclusively unidirectional; either from the ADM 42 to the computer, or from the computer to the ADM 42. A more frequent application of the ADM 42, however, is one in which an operator communicates with a computer, and the computer responds in accordance with its stored program.

### 1.3 DESCRIPTION

The ADM 42 Video Display Unit is a stand-alone terminal, consisting of a Terminal Control Unit (TCU), Keyboard Unit, and Monitor Unit. The TCU contains the logic circuitry, baud rate switches, power supply ON/OFF switch, cabling, and interface connectors. The keyboard and the monitor are self-contained and each may be physically moved several feet away from the TCU without interrupting operations. The monitor display screen is a 15-inch diagonal CRT. The display format consists of 80 characters x 24 lines, plus a 25th status line. Figure 1-2 shows the standard 128-character format for the ADM 42.

### 1.4 SPECIFICATIONS

Table 1-1 lists the specifications of the ADM 42.

### 1.5 OPTIONS

The ADM 42 can be equipped with several optional features, each requiring additions and/or alterations to the standard terminal configuration.

#### 1.5.1 Memory Extension Option

The Memory Extension Option extends the basic RAM memory capability from 4 pages (8K-bytes) to 8 pages by the addition of 8-K bytes of memory.

#### 1.5.2 Direct Connect Option

The Direct Connect circuit contains a line interface used to connect CRT data terminals to computer I/O channels. The interface is operated in the half-duplex polling mode. It may be used with up to nine additional interface circuits of the same type connected on one line. The following specification defines the DC interface.

#### RECEIVER PERFORMANCE

##### Input (DC LINE)

Maximum Receive Rate .....	9600 BAUD
Maximum Line Length .....	1000 FT.
Marking Signal Level .....	-12±1V
Spacing Signal Level .....	0+1/-2V
Receive Threshold .....	6±1V

00 NUL	01 SOH	02 STX	03 ETX	04 EOT	05 ENO	06 ACK	07 BEL	08 BS	09 HT	0A LF	0B VT	0C FF	0D CR	0E SO	0F US	CTRL FUNCTIONS	
10 DLE	11 DC1	12 DC2	13 DC3	14 DC4	15 NAK	16 SYN	17 ETB	18 CAN	19 EM	1A SUB	1B ESC	1C FS	1D GS	1E RS	1F US		
20	21 :	22 "	23 #	24 \$	25 %	26 &	27 '	28 (	29 )	2A *	2B +	2C ,	2D -	2E .	2F /		
30	31 !	32 @	33 A	34 B	35 C	36 D	37 E	38 F	39 G	3A H	3B I	3C <	3D =	3E >	3F ?		
40	41 @	42 Q	43 R	44 D	45 E	46 F	47 G	48 H	49 I	4A J	4B K	4C L	4D M	4E N	4F O		
50	51 P	52 R	53 S	54 T	55 U	56 V	57 W	58 X	59 Y	5A Z	5B [	5C \ ]	5D ^	5E ^	5F _		
60	61 a	62 b	63 c	64 d	65 e	66 f	67 g	68 h	69 i	6A j	6B k	6C l	6D m	6E n	6F o		
70	71 p	72 q	73 r	74 s	75 t	76 u	77 v	78 w	79 x	7A y	7B z	7C {	7D }	7E ~	7F ~		ESC FUNCTION

Figure 1-2. ADM 42 Character Format (By Ascending ASCII Codes) with HEX Code

Output (DCRCV)  
  
TTL Compatible ..... 2 LOADS  
  
Gate Inputs (RTS/ & XRTS/)  
  
TTL Compatible ..... 1 LOAD

### TRANSMITTER PERFORMANCE

Input (DC SEND)  
  
Maximum Transmission Rate ..... 9600 BAUD  
RS232 Voltage Levels ..... +6 To +12V  
  
Output (DC LINE)  
  
Maximum Line Length ..... 1000 FT.  
Marking Signal Level ..... -12+0.5/-0V  
Spacing Signal Level ..... 0+0/-0.5V

### 1.5.3 Answer Back Memory Option

The Answer Back Memory Option allows the ADM 42 to respond to an ENQ input either from the host, or the keyboard. The answer back message is stored in a PROM which is programmed (up to 30 characters in length) in accordance with the user's requirements.

### 1.5.4 Alternate Character Generator Set Option

The Alternate Character Generator Set Option permits the ADM 42 to display data in many different fonts and languages. A ROM determines the font and/or language to be displayed on the monitor. When necessary, this option is supplemented by replacement key caps.

To provide the ADM 42 with a limited graphics capability, a graphics ROM is available for drawing forms and continuous lines.

### 1.5.5 TCU Desk Mount Option

The TCU Desk Mount Option allows the three separate ADM 42 assemblies (TCU, Keyboard Assembly, and Monitor Assembly) to be individually mounted on a desk. This option is supplied in kit form only, for customer installation.

## 1.6 ADDITIONAL OPTIONS

This group of options involve the installation of an option logic board in addition to the main logic board in the ADM 42. Certain standard option board features are included with the installation of the option board. Several other optional capabilities may be selected in addition to these standard features.

### 1.6.1 Standard Option Board Features

Installation of the option board includes a Serial Printer Port Option and a 31-Character Function Key Option.

#### 1.6.1.1 Serial Printer Option

The Serial Printer Option allows the ADM 42 to be connected to an asynchronous serial printer via the PRINTER port. Included in the option is the ability to program the port so that the printer connected to the port may be controlled directly from the host computer without otherwise affecting ADM 42 operation.

#### 1.6.1.2 31-Character Function Key Option

The 31-Character Function Key Option provides the capability of storing in memory 31 characters under each function key F1 thru F16. Using SHIFT in conjunction with any key F1 thru F16 extends the storage capacity to an additional 16 keys, or 32 in all.

## 1.6.2 Polling and Addressing Option

The Polling and Addressing Option allows the ADM 42 to accommodate the following polling modes: Standard Poll, Select, Sequential Select, Fast Select, Broadcast Select, Group Poll/Select and Multipoint Contention. Logic-board mounted DIP switches are provided to permit a user selected terminal address consisting of two ASCII characters. When active in a polling environment, the ADM 42 is prevented from initiating transmission of data except under the control of the network control center. The Polling and Addressing Option may be disabled by setting the appropriate DIP switch to OFF.

With Polling Option installed, it is possible for the host to enable or address the PRINTER port (when installed) and send a message to the terminal's addressable print buffer at the terminal's communication rate. The buffered data may then be read out to the printer at the printer

baud rate. No other ADM 42 operation is affected during this operation.

## 1.6.3 63-Character Function Key Option

The 63-Character Function Key Option provides the capability of storing in memory an additional 32 characters under each function key F1 thru F16, giving a total of 63 characters. Using SHIFT in conjunction with any key, F1 thru F16 extends the storage capacity to an additional 16 keys or 32 in all.

## 1.7 RELATED DOCUMENTS

- a. ADM 42 Operators Quick Reference Manual DP110.
- b. ADM 42 Maintenance Manual DP309.
- c. ADM 42 Illustrated Parts Catalog DP710



Table 1-1. Specifications

**DISPLAY**

*CRT Screen:* 15-inch diagonal, P4 Phosphor with non-glare faceplate

*Refresh Rate:* 50 Hz or 60 Hz, depending on line frequency, non-interlaced

*Horizontal Rate:* 19.2 kHz

*Four Page Display:* 2000 characters per page

*Display Format:* 80 characters/line by 25 lines

*Display Area:* 7.25" (18.4 cm) high x 9.75" (24.8 cm) wide

*Character Set:* 128 ASCII characters

*Character Matrix:* 7 x 9 dot matrix (plus full 2 dot descenders)

*Character Field:* 10 x 12 dot matrix (6 mm high x 3mm wide)

*Cursor:* 10 x 12 dot matrix. Reverse Image block cursor

*Cursor Controls:* Backspace, Forespace, Up, Down, Home, Tab, Return, New Line, Read Cursor, Cursor Addressing, Line Feed, and Back Tab

*Visual Attributes:* Blink, blank, reverse video, underline. Protected fields are displayed in reduced intensity.

**KEYBOARD FUNCTIONS**

*Keyboard:* 26-letter alphabet with upper & lower case, numerics 0 through 9. Punctuation, Break, RUBout (delete), Caps Lock. Most keys are auto repeating (approximately 30 characters per second).

*Numeric Key Pad:* 15 keys, 0 through 9, Return, Tab, Comma, Period, and Minus

*Cursor Control:* Individual cursor control keys

*Edit Keys:* Character insert, character delete, line insert, line delete, line erase, page erase, clear space, clear null, page edit

*Functional Command Keys:* Break, Start of Message, End of Message, ESCape, Conversation/Block Mode, Program Mode, Write Protect Mode, Protect Mode, Reset/Command, RUBout (delete), Control, New Line, Tab/Back Tab, Page Forward, Page Back, Tab set/clear, Send Line, Send Page, Send Message and Print

*Function Keys:* 16 function keys shiftable to 32. Each key transmits SOH an ASCII character & carriage return.

**FORMATTING AIDS**

*Protect Mode:* Screen formatting of protected & unprotected fields displayed in dual intensity

*Program Mode:* Displays all control characters

**EDITING**

*Edit Operations:* Page/line edit, clear entire screen to spaces, clear unprotected positions to spaces, clear entire screen to nulls, clear unprotected positions to nulls, character insert by line or page basis, character delete by line or page basis, line insert, line delete, erase line to spaces, erase line to nulls, page erase to spaces and nulls. All edit operations can be activated remotely by the host using ESCape sequence.

**TERMINAL 25TH STATUS/MESSAGE LINE**

*Terminal Status Line Displays:* Page #, protect mode, write protect mode, keyboard lock, auto page, insert mode, program mode, page edit mode, ADM 1 mode, printing, error messages and user status

**TRANSMISSION MODES**

*Block Transmission:* Send line unprotected, send line all (shift), send page unprotected, send page all (shift), send message unprotected, send message all (shift), send cursor coordinate, send function sequence

Table 1-1. Specifications (cont'd)

**Conversation Mode:** Conversation mode/half duplex, Conversation mode/full duplex, dynamic control of block/conversation and duplex mode from remote or keyboard

**Control Characters:** Control characters may be transmitted to the computer and/or entered on the screen.

**Interfaces:** RS232-C point-to-point or 20mA current loop, RS232-C extension

**Data Rates:** 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600

**Parity:** even, odd or none

#### OPERATING ENVIRONMENT

**5°C to 50°C (41° to 122°F):** 5% to 95% relative humidity, without condensation

**Power Requirements:**

**Standard:** 115V +10%, 60 Hz

**Optional:** 230V +10%, 50 Hz

**Heat Dissipation:** 534 BTU/HR

**Dimensions:**

**Width:** 18.88 inches (48.0 cm)

**Depth:** 25.38 inches (64.51 cm)

**Height:** 18.0 inches (45.72 cm)

**Weight:** 62 pounds (28.12 kg)

#### OPTIONS

Serial printer port (RS-232C)

Parallel internal system bus interface

Direct Connect Interface

Polling and Addressing

Answerback Memory

Alternate Character Generators:

United Kingdom

Limited Graphics: 11 special line drawing characters

Additional memory (4 additional pages)

Programmable function keys (31 or 63 characters)

PC-110 green phosphor

Special Personality

Micro Program Source Code Listing

Output cables

Clear or Blank key caps

Special paint

Key locks

Remote monitor stand

8-foot keyboard cable

6-foot monitor cable

## SECTION II INSTALLATION

### 2.1 INTRODUCTION

Installation procedures involving unpacking, initial set-up, and operational checkout of the ADM42 Video Display Unit are described in this section of the manual.

#### CAUTION

*Allow the unit to adjust to the new environment when changing locations from one room to another, before energizing the unit. Condensation could develop in the unit and adversely affect its operation.*

### 2.2 SAFETY REQUIREMENTS

No special safety precautions are required for ADM 42 installation.

The physical dimensions of the ADM 42 are shown in figure 2-1. The basic requirements for installation are the following:

- Table or desk mounting
- Standard three-pronged 115-volt or special 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 is usually required.

### 2.3 SITE REQUIREMENTS

The ADM 42 may conveniently be used in a normal office environment, as no special mounting provisions are 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), relative humidity not greater than 95% be maintained for equipment use.

### 2.4 INITIAL PREPARATION

Whenever the ADM 42 is physically moved from a cold location to a warmer environment, be sure to allow sufficient time for the equipment temperature to equalize with the warmer location before activating the terminal. Condensation developed by the temperature differential could possibly impair the ADM 42.

#### 2.4.1 Line Voltage Selection

The ADM 42 is shipped connected for either 115-volt or 230-volt operation, as specified in the purchase order. Any change in line voltage requires changes which can be accomplished only by authorized LSI maintenance personnel.

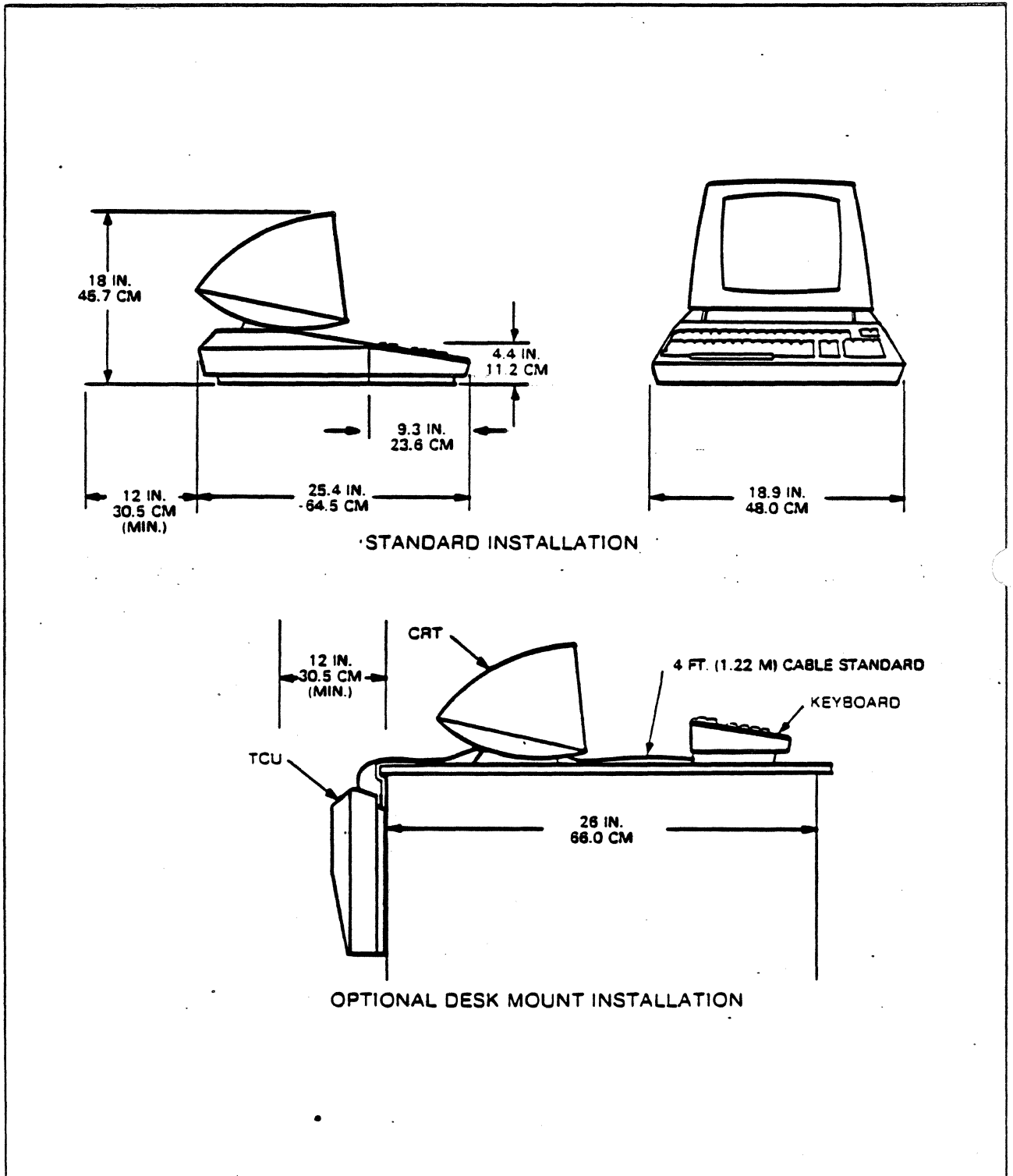


Figure 2-1. ADM 42 Mounting Requirements

## 2.4.2 Configuration Control DIP Switch Settings

### CAUTION

*Set DIP switches ON or OFF using  
DIP Switch Setting Tool 857001.  
DO NOT use a ball point pen or  
pencil; the switches could become  
contaminated with conductive  
debris.*

### 2.4.2.1 Main Board Switches

Figures 2-2 and 2-3 show the locations and factory settings of the configuration control DIP switches and other front panel controls. Commonly used DIP switches are accessible through the ADM 42 access door on the front panel (see figure 2-2). The functions of all DIP switches are summarized in table 2-1. To gain unrestricted access to all DIP switches, proceed as follows:

1. If the unit is ON, set ON/OFF switch to OFF and remove power cord from its receptacle.
2. Remove monitor power cord from TCU receptacle. Remove monitor from the top of the Terminal Control Unit (TCU) and set the monitor safely aside.
3. Remove keyboard assembly by lifting the assembly straight up. Set the assembly safely aside.

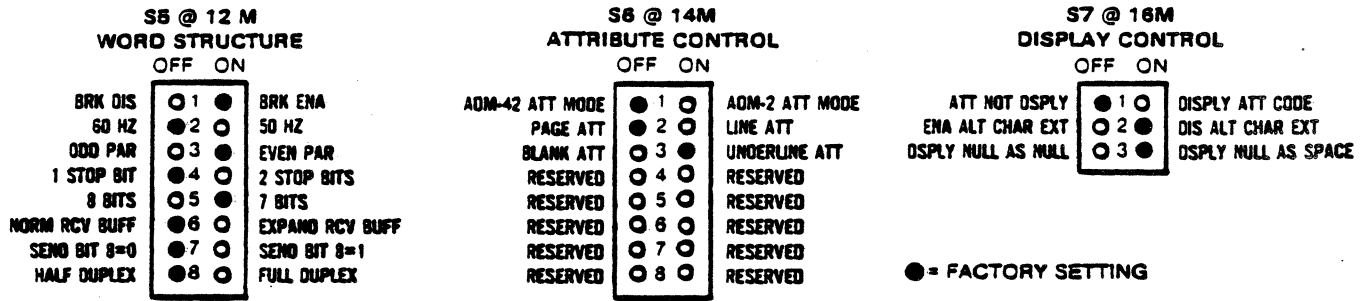
4. Open front panel access cover and release the spring catch while lifting the front of the TCU cover, to expose the main logic board.
5. To return the terminal to service, reverse the above procedure.

### 2.4.2.2 Option Board DIP Switches

Figure 2-4 shows the locations and the factory settings of the Option Board configuration control DIP switches. Refer to table 2-2 for a summary of the functions of these switches. To gain unrestricted access to these switches, proceed as follows:

1. If the unit is operating, set ON/OFF switch to OFF and remove power cord from its receptacle.
2. Remove all cable connections from the rear of the terminal.
3. Remove monitor and keyboard assembly; set each safely aside.
4. Open front panel access cover and release the spring catch while lifting the front of the TCU cover.
5. From the left side, raise the main logic board to its vertical position using the slots provided. The option board is now exposed.
6. To return the terminal to service reverse the above procedure.

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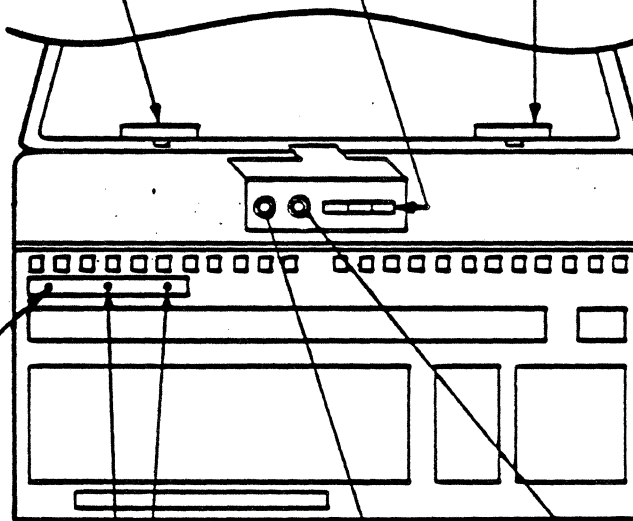
**CONTRAST** slide potentiometer controls the character brightness relative to the background.

**BRIGHTNESS** slide potentiometer controls overall brightness of display.

**ACTIVITY** indicator lights when communication network is active on a polling terminal.

**TRANSMIT** indicator lights when terminal is transmitting data.

**RECEIVE** indicator lights when terminal is receiving data.

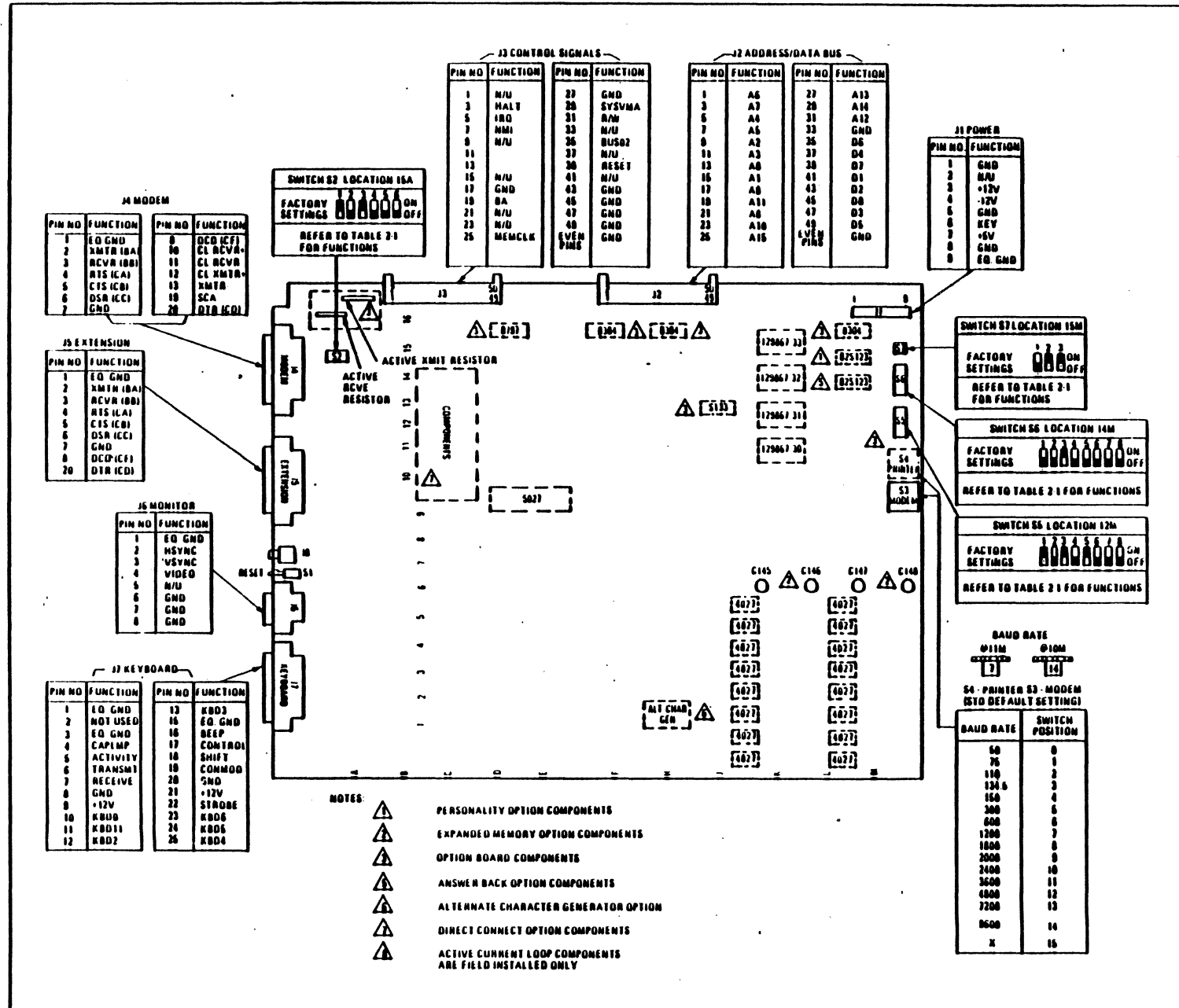


**BAUD RATES**

MODEM		PRINTER
POSITION = BAUD RATE		
0 = 50	5 = 300	10 = 2400
1 = 75	6 = 600	11 = 3600
2 = 110	*7 = 1200	12 = 4800
3 = 134.5	8 = 1800	13 = 7200
4 = 150	9 = 2000	**14 = 9600

\* Printer port factory setting  
\*\* Modem port factory setting

Figure 2-2. ADM 42 Front Panel Controls and Indicators



**J4 MODEM**

PIN NO	FUNCTION	PIN NO	FUNCTION
1	EQ GND	9	DCD (CF)
2	XMTX (BA)	10	CL RCVR
3	RCVR (BB)	11	CL RCVR
4	RIS (CA)	12	CL XMTX
5	CIS (CB)	13	HSTR
6	DSR (CC)	14	SCA
7	GND	15	DTR (CD)

**J5 EXTENSION**

PIN NO	FUNCTION
1	EQ GND
2	XMTX (BA)
3	RCVR (BB)
4	RIS (CA)
5	CIS (CB)
6	DSR (CC)
7	GND
8	DCD (CF)
9	DTR (CD)

**J6 MONITOR**

PIN NO	FUNCTION
1	EQ GND
2	HSYNC
3	VSYNC
4	VIDEO
5	N/U
6	GND
7	GND
8	GND

**J7 KEYBOARD**

PIN NO	FUNCTION	PIN NO	FUNCTION
1	EQ GND	13	KBD3
2	NOT USED	14	EQ GND
3	EQ GND	15	BEEP
4	CAPLMP	16	CONTROL
5	ACTIVITY	17	SHIFT
6	TRANSMIT	18	CONMOD
7	RECEIVE	19	GND
8	GND	20	+12V
9	+12V	21	STROBE
10	KBD0	22	KBD5
11	KBD1	23	KBD6
12	KBD2	24	KBD7
		25	KBD4

**J3 CONTROL SIGNALS**

PIN NO	FUNCTION	PIN NO	FUNCTION
1	N/U	27	GND
3	MALT	28	SYSMA
5	IRQ	31	RAM
7	NMI	33	N/U
9	N/U	35	BUS02
11		37	N/U
13		39	RESET
15	N/U	41	N/U
17	GND	43	GND
19	RA	45	GND
21	N/U	47	GND
23	N/U	49	GND
25	MEMCLK	51	EVEN STROBE

**J2 ADDRESS/DATA BUS**

PIN NO	FUNCTION	PIN NO	FUNCTION
1	A6	27	A13
3	A7	28	A14
5	A4	31	A12
7	A5	33	GND
9	A2	35	D6
11	A3	37	D4
13	A8	39	D7
15	A1	41	D1
17	A8	43	D2
19	A11	45	D8
21	A8	47	D3
23	A10	49	D5
25	A15	51	GND

**J1 POWER**

PIN NO	FUNCTION
1	GND
2	N/U
3	+12V
4	-12V
5	GND
6	KEY
7	+5V
8	GND
9	EQ GND

**SWITCH S7 LOCATION 15M**

FACTORY SETTINGS: [ON] [OFF] [OFF] [OFF]

REFER TO TABLE 2-1 FOR FUNCTIONS

**SWITCH S6 LOCATION 14M**

FACTORY SETTINGS: [ON] [OFF] [OFF] [OFF] [OFF]

REFER TO TABLE 2-1 FOR FUNCTIONS

**SWITCH S5 LOCATION 12M**

FACTORY SETTINGS: [ON] [OFF] [OFF] [OFF] [OFF]

REFER TO TABLE 2-1 FOR FUNCTIONS

**BAND RATE**

011M @10M

[7] [14]

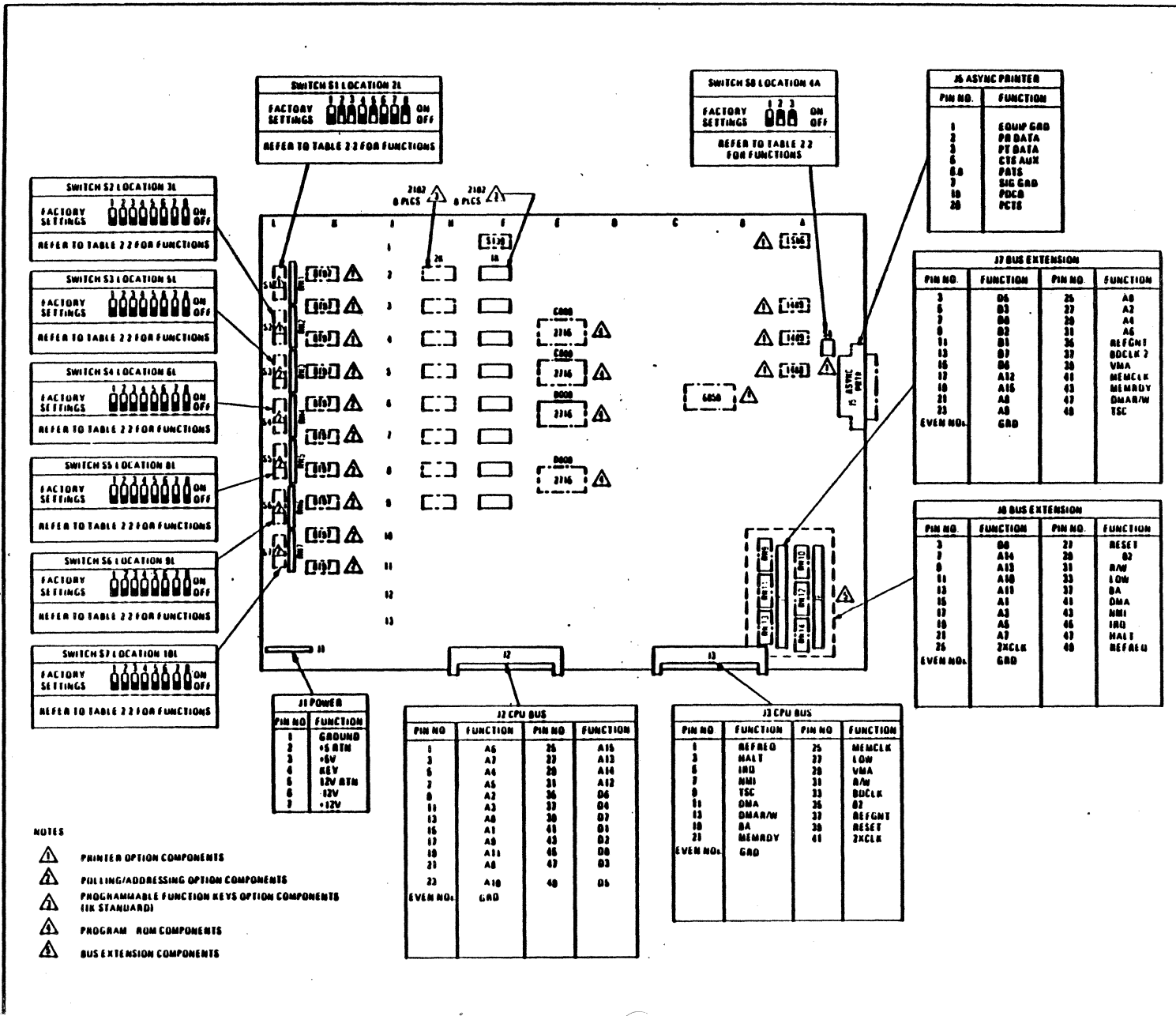
S4 - PRINTER S3 - MODEM  
S5-D DEFAULT SETTING

BAND RATE	SWITCH POSITION
50	0
75	1
110	2
134.5	3
150	4
300	5
600	6
1200	7
1800	8
2000	9
2400	10
3600	11
4800	12
7200	13
9600	14
X	15

- NOTES:
- ▲ PERSONALITY OPTION COMPONENTS
  - ▲ EXPANDED MEMORY OPTION COMPONENTS
  - ▲ OPTION BOARD COMPONENTS
  - ▲ ANSWER BACK OPTION COMPONENTS
  - ▲ ALTERNATE CHARACTER GENERATOR OPTION
  - ▲ DIRECT CONNECT OPTION COMPONENTS
  - ▲ ACTIVE CURRENT LOOP COMPONENTS ARE FIELD INSTALLED ONLY

Figure 2-3. Connector and DIP Switch Locations on Main Logic Board

Figure 2-4. Connector and DIP Switch Locations on Option Logic Board





**Table 2-1. Main Logic Board Configuration Control Switch Settings**

SWITCH BANK S2 @ 15A INTERFACE					OPERATION
<u>SW1</u>	<u>SW2</u>	<u>SW3</u>	<u>SW4</u>	<u>SW5</u>	
ON	OFF	ON	OFF	OFF	*RS-232C enabled; Direct Connect disabled.
OFF	OFF	ON	OFF	ON	Enable Current Loop; Direct Connect disabled.
OFF	ON	OFF	ON	OFF	Enable Direct Connect; Disable RS-232C and Current Loop.
All other SW1, SW2, SW3, SW4, SW5 combinations not allowed					
<u>SW6</u>					*OFF disables secondary channel control (SCF); ON is not defined.
SWITCH BANK S5 @ 12M WORD STRUCTURE			OPERATION		
<u>SW1</u>			*ON enables BREAK key; OFF disables key		
<u>SW2</u>			ON selects 50 Hz monitor refresh rate; *OFF selects 60 Hz monitor refresh rate		
<u>SW5</u>	<u>SW4</u>	<u>SW3</u>	<u>MODEM PORT SELECTION</u>		
ON	ON	ON	Selects 7 DATA bits, even parity, 2 STOP bits		
ON	ON	OFF	Selects 7 DATA bits, odd parity, 2 STOP bits		
ON	OFF	ON	*Selects 7 DATA bits, even parity, 1 STOP bit		
ON	OFF	OFF	Selects 7 DATA bits, odd parity, 1 STOP bit		
OFF	ON	ON	Selects 8 DATA bits, no parity, 2 STOP bits		
OFF	ON	OFF	Selects 8 DATA bits, no parity, 1 STOP bit		
OFF	OFF	ON	Selects 8 DATA bits, even parity, 1 STOP bit		
OFF	OFF	OFF	Selects 8 DATA bits, odd parity, 1 STOP bit		
<u>SW6</u>			ON enables the 2048-byte expanded input buffer; *OFF enables the standard input buffer.		
<u>SW7</u>			ON sends Bit 8 as 1 (mark); *OFF sends Bit 8 as 0 (space), when 8-bit word structure has been selected.		
<u>SW8</u>			ON selects Full Duplex Mode at power-up; *OFF selects Half Duplex Mode. Setting may be modified dynamically from host or keyboard.		

\*Indicates standard factory setting.

NOTE: If the position of any DIP switch is changed, a RESET (with power on) must be executed in order for the change to take effect. Depressed side of the switch is the set position.

**Table 2-1. Main Logic Board Configuration Control Switch Settings (cont'd)**

SWITCH BANK S6 @ 14M ATTRIBUTE CONTROL	OPERATION
SW1	<p>*OFF establishes ADM 42 Video Attribute Control Mode (requiring ESC G entry code).</p> <p>ON establishes ADM 2 Video Attribute Control Mode (requiring appropriate ADM 2 entry code)</p>
SW2	<p>*OFF causes any Video Attribute Control Sequence (ESC G) to be effective for entire page.</p> <p>ON causes sequence to be effective only to the end of current line.</p>
SW3	<p>Establishes whether blanked fields or underlined fields may be selected using the appropriate Video Attribute Control Sequence (ESC G):</p> <p>OFF = Blanked fields</p> <p>*ON = Underlined fields</p>
SW4 thru SW8	Reserved
SWITCH BANK S7 @ 16M DISPLAY CONTROL	OPERATION
SW1	<p>*OFF causes SPACE to be displayed, instead of the code identifying the attribute selected.</p> <p>ON causes the appropriate attribute code to be displayed.</p>
SW2	<p>OFF allows horizontal segments of adjacent Line Drawing Set symbols to be joined.</p> <p>*ON prevents joining of adjacent horizontal segments. (Settings are applicable only when Alternate Character Generator Option is installed and enabled.)</p>
SW3	<p>OFF causes NULLS to be displayed as NULLS;</p> <p>*ON causes NULLS to be displayed as SPACES.</p>

\*Indicates standard factory setting

NOTE: If the position of any DIP switch is changed, a RESET (with power on) must be executed in order for the change to take effect. Depressed side of the switch is the set position.

**Table 2-2. Option Logic Board Configuration Control Switch Settings**

SWITCH BANK S1 @ 2L SERIAL PRINTER WORD FORMAT			OPERATION
SW1			*OFF enables ASYNCHRONOUS PRINTER port  ON enables PARALLEL PRINTER port
SW2			OFF enables communication with the printer via the print buffer (last page of display memory).  *ON disables print buffer
<u>SW5</u>	<u>SW4</u>	<u>SW3</u>	<u>PRINTER PORT SELECTIONS</u>
ON	ON	ON	Selects 7 DATA bits, even parity, 2 STOP bits
ON	ON	OFF	Selects 7 DATA bits, odd parity, 2 STOP bits
ON	OFF	ON	*Selects 7 DATA bits, even parity, 1 STOP bit
ON	OFF	OFF	Selects 7 DATA bits, odd parity, 1 STOP bit
OFF	ON	ON	Selects 8 DATA bits, no parity, 2 STOP bits
OFF	ON	OFF	Selects 8 DATA bits, no parity, 1 STOP bit
OFF	OFF	ON	Selects 8 DATA bits, even parity, 1 STOP bit
OFF	OFF	OFF	Selects 8 DATA bits, odd parity, 1 STOP bit
			} 8th BIT = $\Delta$
SW6, SW7			Reserved
SW8			OFF enables the ASYNCHRONOUS PRINTER port receive (input) line  *ON disables the receive (input) line
SWITCH BANK S2 @3L			OPERATION
SW1 thru SW8			Reserved
SWITCH BANKS S3 @ 5L 1ST POLLING ADDRESS			OPERATION
SW1 thru SW7			Define the ASCII code for the 1st Polling Address Character ( <sup>A</sup> 1)  *OFF = Logic 1; ON = Logic 0
SW8			*OFF disables Polling function  ON enables Polling function
SW1 thru SW7			Define the ASCII code for the 2nd Polling Address character ( <sup>A</sup> 2).  *OFF = Logic 1; ON = Logic 0

\*Indicates standard factory settings

NOTE: If the position of any DIP switch is changed, a RESET (with power on) must be executed in order for the change to take effect. Depressed side of the switch is the set position.

Table 2-2. Option Logic Board Configuration Control Switch Settings (cont'd)

SWITCH BANK S4 @ 6L 2ND POLLING ADDRESS	OPERATION
SW8	*OFF disables Polling communications buffer ON enables buffer (Personality Byte 8 bit X8 must be set)
SWITCH BANK S5 @ 8L 1ST GROUP POLL ADDRESS	OPERATION
SW1 thru SW7	Define the ASCII code for the 1st Group Poll Address character (A <sub>1</sub> ). *OFF = Logic 1; ON = Logic 0
SW8	Reserved
SWITCH BANK S6 @ 9L 2ND GROUP POLL ADDRESS	OPERATION
SW1 thru SW7	Define the ASCII code for the 2nd Group Poll Address character (A <sub>2</sub> ). *OFF = Logic 1; ON = Logic 0
SW8	Reserved
SWITCH BANK S7 @ 11L GROUP POLL ADDRESS	OPERATION
SW1 thru SW7	Define the ASCII code for the Group Select Address character (G <sub>a</sub> ). *OFF = Logic 1; ON = Logic 0
SW8	Reserved
SWITCH BANK S8 @ 4A PRINTER	OPERATION
SW1	*OFF disables reception of the printer Carrier Detect (DCD) signal via connector J5-20 ON enables reception of DCD via connector J5-20
SW2      SW3	PRINTER BUSY SELECTIONS
ON      ON ON      OFF OFF      ON OFF      OFF	*Selects BUSY LOW via connector J5-19 Selects BUSY HIGH via connector J5-19 Not allowed BUSY not active (Unit senses printer as never BUSY)

\*Indicates standard factory settings

NOTE: If the position of any DIP switch is changed, a RESET (with power on) must be executed in order for the change to take effect. Depressed side of the switch is the set position.

## 2.5 INTERFACE INFORMATION

The ADM 42 may be cabled directly to a local computer, serial printer, or other auxiliary device; or it may be connected via telephone data lines to a remote computer located anywhere in the world. Remote computer connections require the use of a modem or data set. Figure 2-5 shows a typical ADM 42 application, while figure 2-6 shows the rear panel locations of the interface connectors.

### 2.5.1 Standard or RS-232C Extension Interface

The Standard RS-232C interface consists of connecting a computer directly to the ADM 42 through the MODEM port. The RS-232C extension interface requires the use of the MODEM port. Through the EXTENSION port several terminals or other devices may be daisy-chained, usually in a polling environment. Figure 2-7 shows the logic associated with these interfaces. Refer to table 2-1 for the settings of DIP switches in switch bank S2 which are required to enable these interfaces.

### 2.5.2 Current Loop Interface

The ADM 42 can be configured for current loop using the MODEM port, without interfering with normal RS-232C signals required for asynchronous operation. The current loop interface increases the maximum permissible distance between the terminal and connected device. Figure 2-8 shows the logic associated with passive and active current loop interfaces. Refer to table 2-1 for the settings of DIP switches in switch bank S2 which are required to enable Current Loop operation.

### 2.5.3 Direct Connect Interface

The Direct Connect interface using the MODEM port, is used with many Burroughs-type computer systems operating in Half-Duplex Mode, in a polling environment. The interface can accommodate up to nine terminals connected to the line pair (AWG #24 twisted pair, or larger) having a maximum length of 1000 feet. Figure 2-9 shows the logic associated with this interface. Refer to table 2-1 for the settings of DIP switches in switch bank S2 which are required to enable Direct Connect.

### 2.5.4 Printer Interface

The PRINTER port is used to connect the ADM 42 directly to an asynchronous serial printer. Figure 2-10 shows the logic associated with this interface. The option logic board must be installed in addition to the main board. Refer to tables 2-1 and 2-2 for the settings of DIP switches on the main board and option board respectively, required to enable the PRINTER interface.

## 2.6 INSTALLING THE ADM 42

To install the ADM 42, proceed as follows:

1. Connect the data interface cable to the terminal using the appropriate interface information (paragraph 2.5).
2. Check the ON/OFF switch (figure 2-6) to ensure that it is set to OFF.
3. Plug the terminal into a grounded AC outlet of the proper voltage.

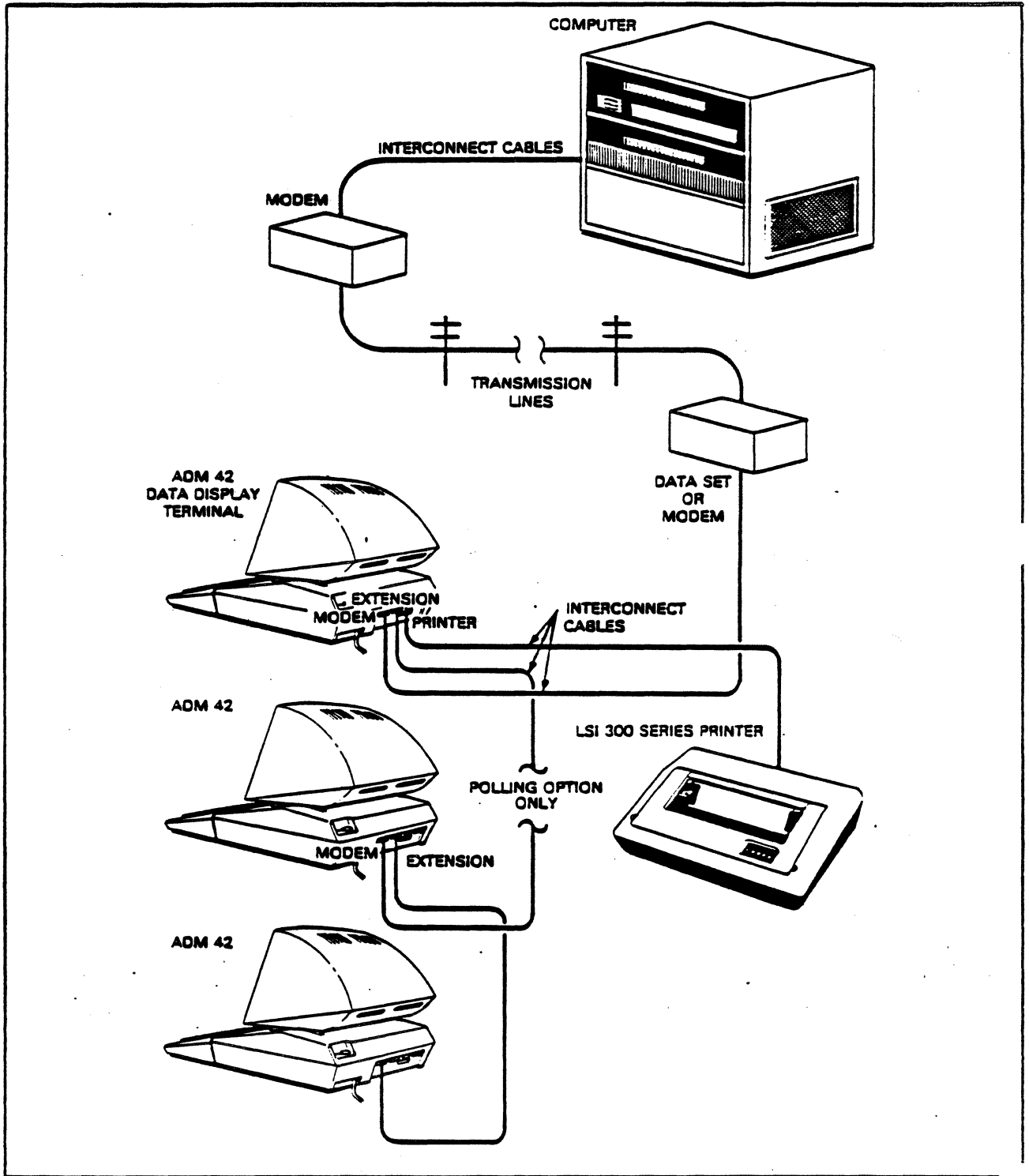


Figure 2-5. Typical ADM 42 Application

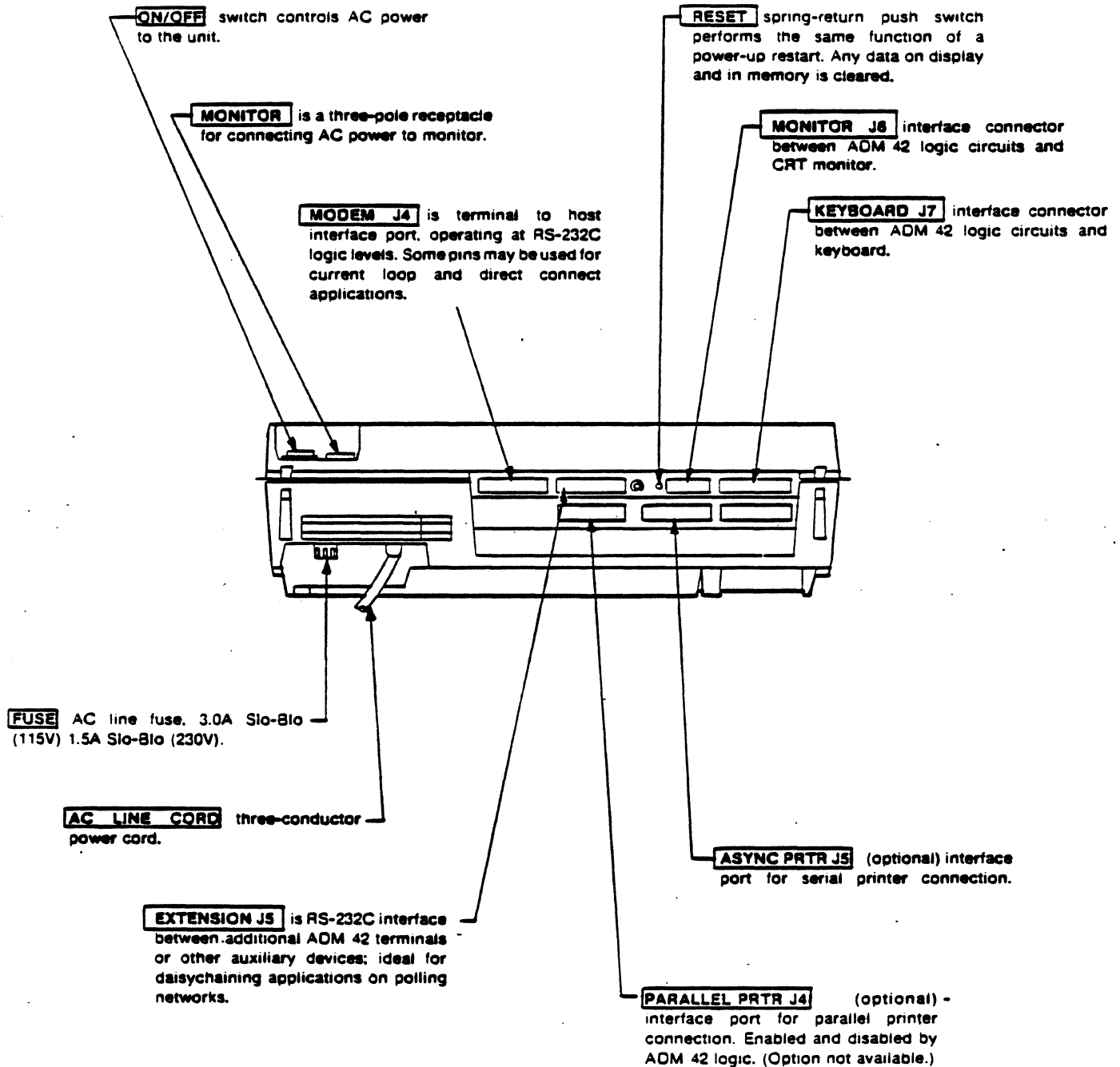


Figure 2-6. ADM 42 Rear Panel Controls

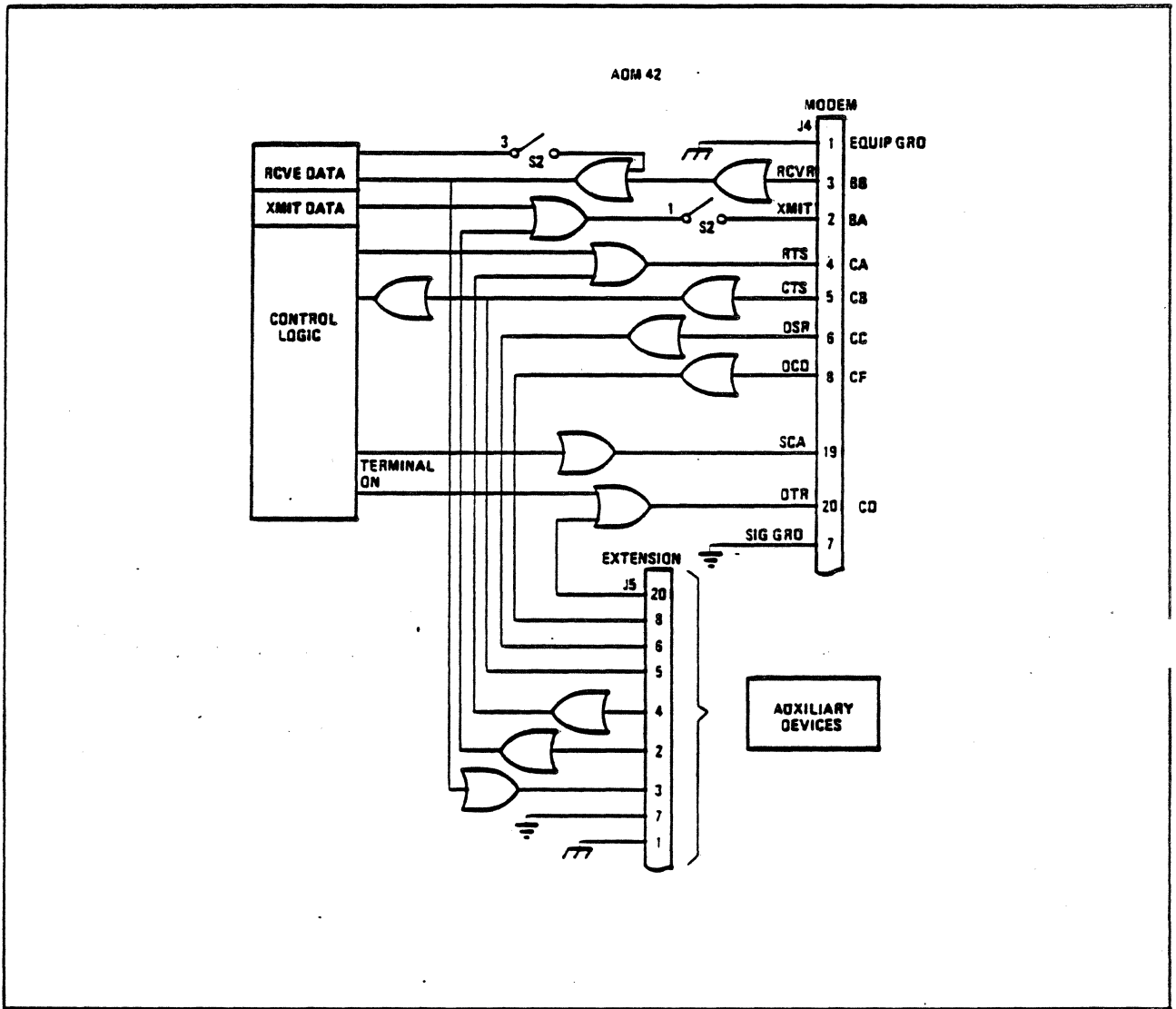


Figure 2-7. MODEM and RS-232C Extension Interface Logic



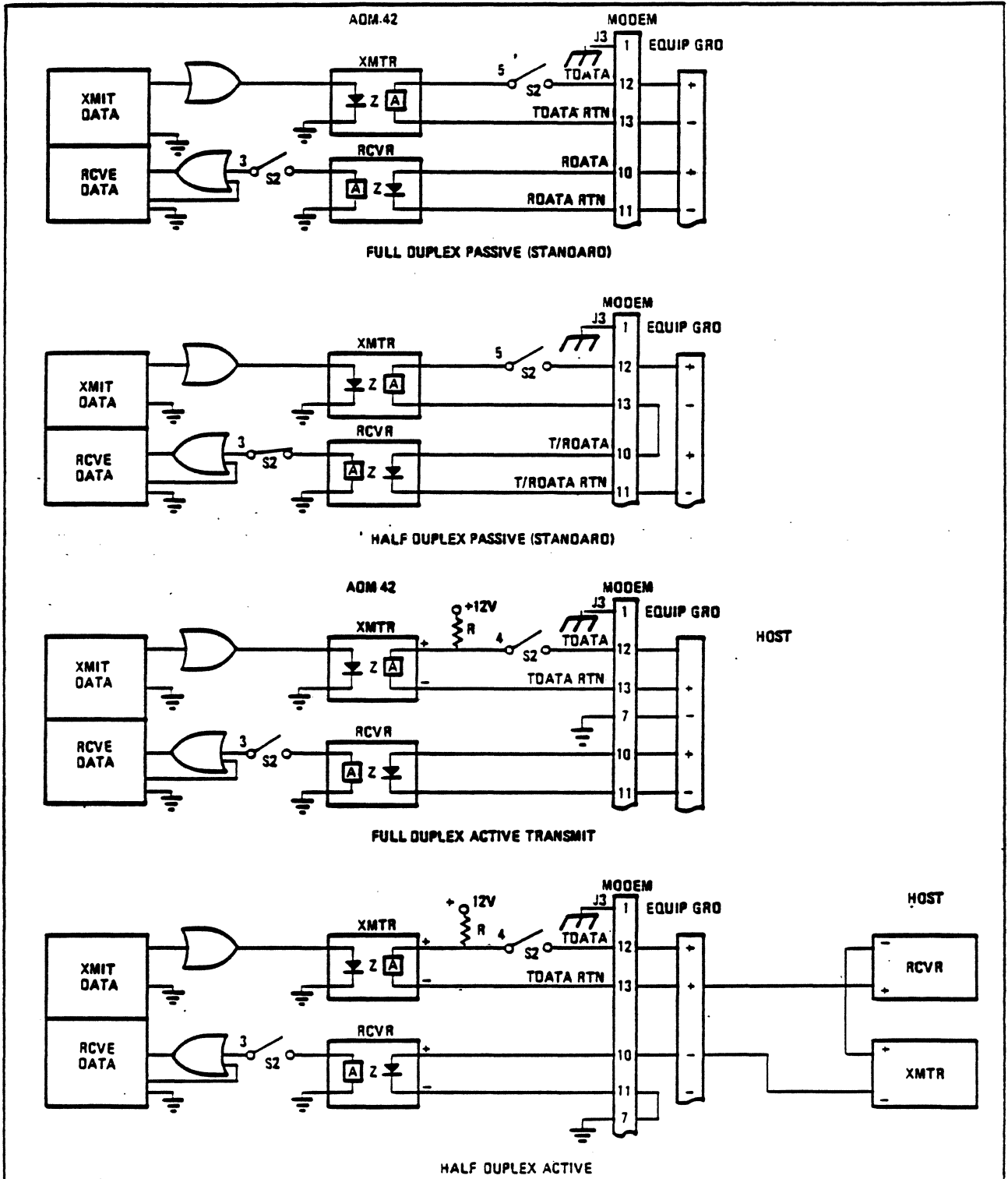


Figure 2-8. Current Loop Interface Logic

4. Set the MODEM and PRINTER (if required) BAUD RATE switches (see figure 2-2) to the desired baud rate.

**Note**

*The BAUD RATE switches are factory set as follows:*

Switch	Position	Baud Rate
MODEM	14	9600
PRINTER	7	1200

5. Set the configuration control DIP switches (refer to tables 2-1 and 2-2) to the appropriate positions for controlling the ADM 42 characteristics.
6. Turn on the terminal.

## 2.7 POWER TURN-ON

1. Set the ON/OFF switch to ON. Blower must be running. (See figure 2-6.)
2. Wait approximately 20 seconds for the unit to warm up and self test. The cursor should appear at the HOME position, and PG=1 should appear in the 25th Status Line.

**CAUTION**

*To avoid damage to the CRT phosphor, it is recommended that the display brightness be reduced when the display remains unchanged for significant periods of time.*

3. Adjust CONTRAST and BRIGHTNESS controls (see figure 2-2) for desired display brightness.

4. If the cursor does not appear, or if an error indication appears, execute from the keyboard **CTRL|SHIFT|RESET/CMD**.

5. If the display still does not appear, troubleshoot the monitor, then the terminal electronics, if necessary.

6. If a memory error is present, the display will indicate the source of error (memory location) and the bit(s) in error. For example, assume indication:

"01 0400      80 0800"

- 01 0400 Signifies that the LSB at memory address 0400 is bad.

- 80 0800 Signifies that the MSB at memory address 0800 is bad.

7. Troubleshoot appropriate terminal electronics according to the memory error indication.

8. Terminal operation may continue without interruption without regard for errors detected; however results involving the indicated memory locations are unpredictable.

## 2.8 POWER TURN-OFF

1. If the terminal contains any information which must be retained, be sure to transmit this information immediately to the host computer. This is necessary, as the display memory is cleared when power is removed from the terminal. As an alternate measure, print the information prior to turning off the terminal.

2. Turn off the ADM 42 by setting ON/OFF switch to OFF.

## 2.9 CARE OF THE ADM 42

Proper care of the ADM 42 Video Display Unit consists of performing the routine cleaning and inspection procedures listed in the following paragraphs.

### 2.9.1 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 monitor 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.

This terminal is equipped with a Sun-flex non-glare filtered screen. Observe the following precautions when cleaning the screen:

1. Remove dust from the glare filter surface by lightly rubbing with the treated cloth which is supplied with each terminal.
2. Occasionally shake out excess dust from the cloth.
3. To remove pencil marks, grease pen marks, etc. from the filter, use a clean lint-free cloth (NOT THE CLOTH PROVIDED WITH THE TERMINAL) and plain rubbing alcohol, wiping the filter surface while the filter is in place.

### 2.9.2 Inspection

Periodically, inspect switches and keyboard assembly for freedom of movement. Determine that the intensity of character trace on the CRT screen has not diminished. Any required mechanical and electrical adjustment shall only be performed by an authorized Lear Siegler Service Representative.

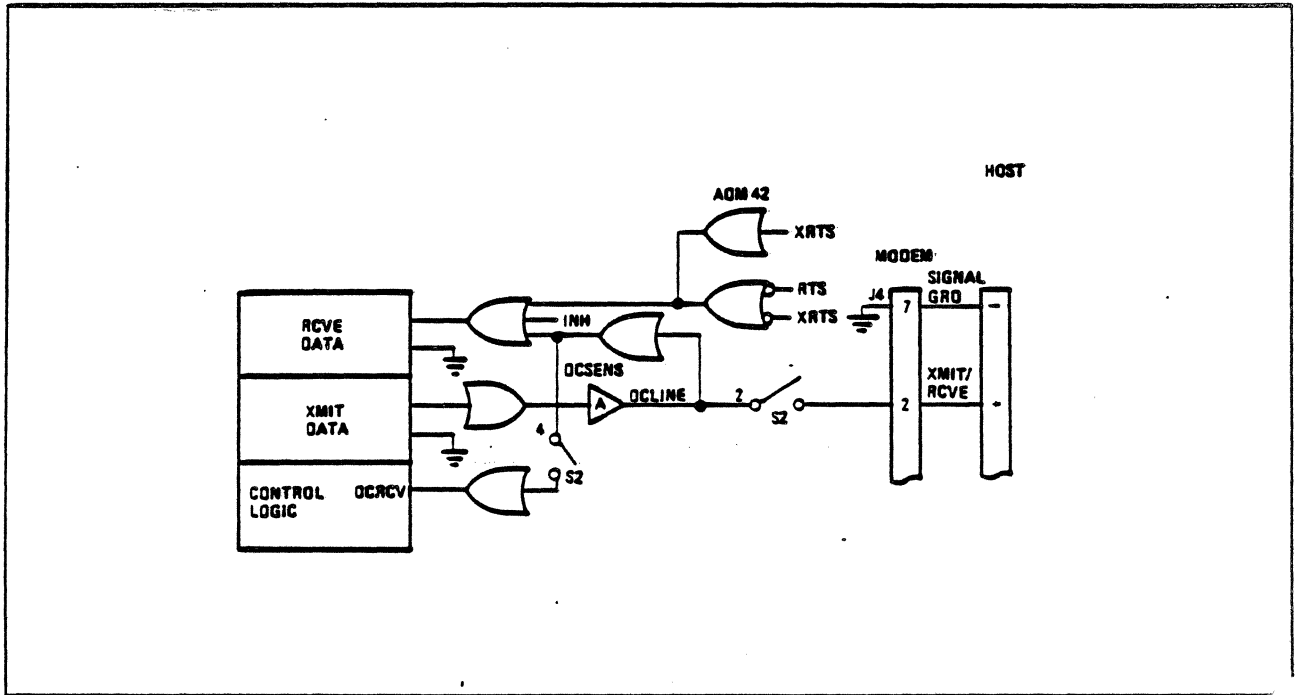


Figure 2-9. Direct Connect Interface Logic

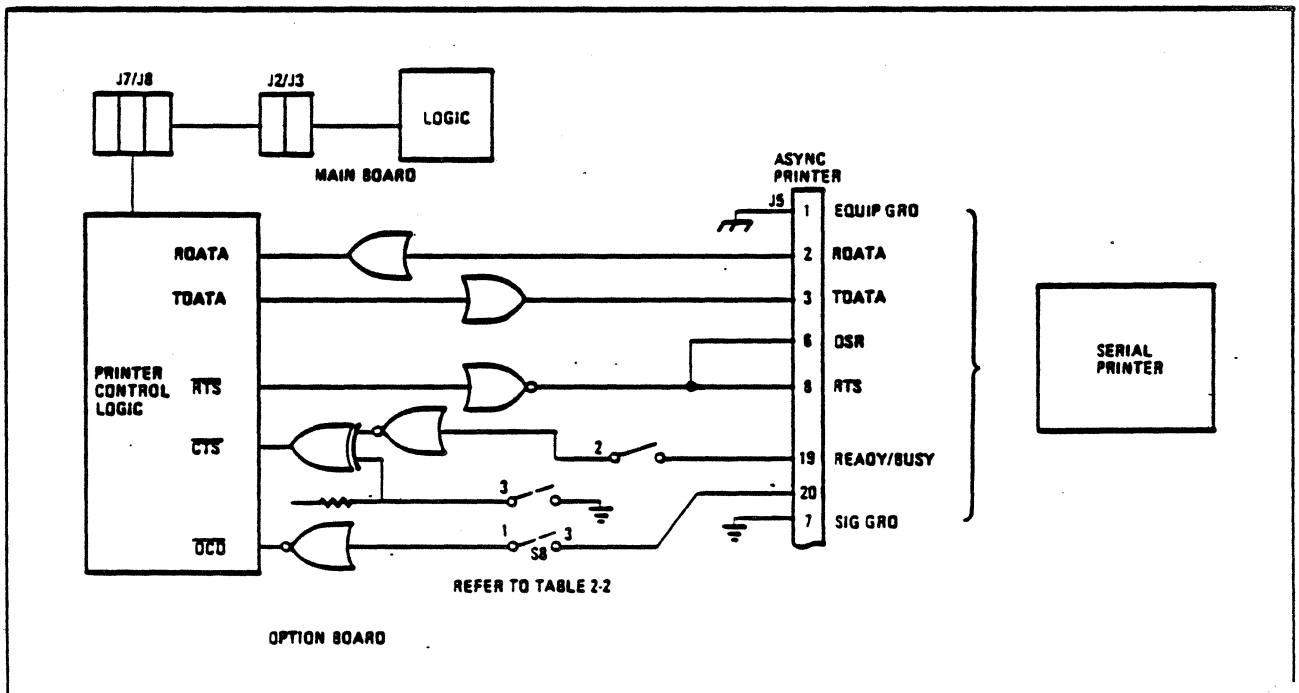


Figure 2-10. Printer Interface Logic

## SECTION III FUNCTIONAL DESCRIPTION

### 3.1 INTRODUCTION

This section describes the functional characteristics of the ADM 42 which contribute to the full operational use of the terminal.

Ordinarily each keystroke typed by the operator is independent of the one preceding or following it.

In fact, the rollover protection feature of the terminal prevents the production of a second character code before the key already typed is released. There are some exceptions, such as when using the **SHIFT** and **CTRL** keys. In this manual, a special convention is used to identify keystrokes and whether successive keystrokes are independent or concurrent, as follows:

KEYSTROKES	DESCRIPTION
<b>ESC</b> <b>Z</b>	Independent keystrokes typed sequentially. This operation code executes a special RESET operation, discussed in Section IV.
<b>SHIFT</b> <b>RESET/CMD</b>	Concurrent keystrokes. The second key must be pressed while holding <b>SHIFT</b> . Refer to Section IV for a discussion of this RESET operation.
<b>CTRL</b> <b>SHIFT</b> <b>RESET/CMD</b>	Three concurrent keystrokes. The sequence in which <b>CTRL</b> and <b>SHIFT</b> are operated is not significant; however, both keys must be held down while typing the third key. Refer to Section IV for a discussion of this RESET operation.

## 3.2 OPERATIONAL DESCRIPTION

The ADM 42 is a microprocessor-based device which provides a means of communicating with a host computer, and which allows the user full control of the content and format of data entered by means of the keyboard. Figure 3-1 illustrates the flow of data through the functional areas of the ADM 42.

The standard ADM 42 consists of a power supply, keyboard, control section (MPU), video logic and control, monitor display, configuration control switches, and interface logic. The interface logic provides the standard and RS-232C extension interfaces and the serial printer interface.

### 3.2.1 Keyboard

Data to be processed by the terminal is either entered from the keyboard or is sent from the host computer. Keyboard entry is made using one of the 118 keys on the keyboard. Each keystroke is encoded into an ASCII character which appears on seven data lines connected to the MPU. Accompanying the 7-bit character is a keystroke which alerts the program that a character has been input from the keyboard.

### 3.2.2 Control Section (MPU)

The Control Section (MPU) contains the microprocessor and various integrated circuits which control all the operations of the ADM 42. These operations include: timing and control, data handling and storage, interpreting and responding to control commands from the keyboard and the computer, video control, I/O interfacing, and status control.

Data entering the terminal is placed on the Data Bus and sent to the MPU section which contains the microprocessor and various other integrated circuits and switches. The MPU, executing a stored read only memory (ROM) program, decodes the input data and reformats it into data and control instructions for the video logic and control section.

### 3.2.3 Video Logic and Control

The Video Logic and Control section contains the display logic needed to drive the monitor, 8K of random access memory (RAM), and character generation circuits, as well as the video logic and 15-inch monitor. The monitor screen can display 24 lines of data containing as many as 80 characters per line, plus a 25th Status Line. Data from the MPU is written into the video RAM; control instructions from the MPU cause the contents of the RAM to be periodically displayed on the monitor screen.

### 3.2.4 Interface Section

Data and control information from a remote computer is routed through the MODEM port to the interface section, and then to the MPU. The MPU causes data to be displayed on the monitor in the same manner as the keyboard data. The interface contains the logic circuitry appropriate for interfacing with RS-232C point-to-point signals or 20-ma current loop signals, and modem logic. Optional circuits for an RS-232C serial printer and direct connect interfaces are available. The interface section also contains the baud rate clock and baud rate switches which permit the ADM 42 to receive or transmit data at selected baud rates from 50 to 9600 baud.

The ADM 42 transmits data by retrieving data from the video RAM and placing it on the Data Bus for routing to the MPU. The MPU reformats the data and routes data and control information to the interface section over the Data Bus. Interface logic is used to prepare the data and control information for transmission to the appropriate device connected.

### 3.2.5 System Configuration Switches

Several banks of system configuration switches are provided to control various attributes and characteristics of the ADM 42. The switches are mounted on the main and option logic boards. The characteristics thus controlled include: mode of transmission/reception, parity, word structure refresh rate, cursor/display attributes, and the polling address (optional).

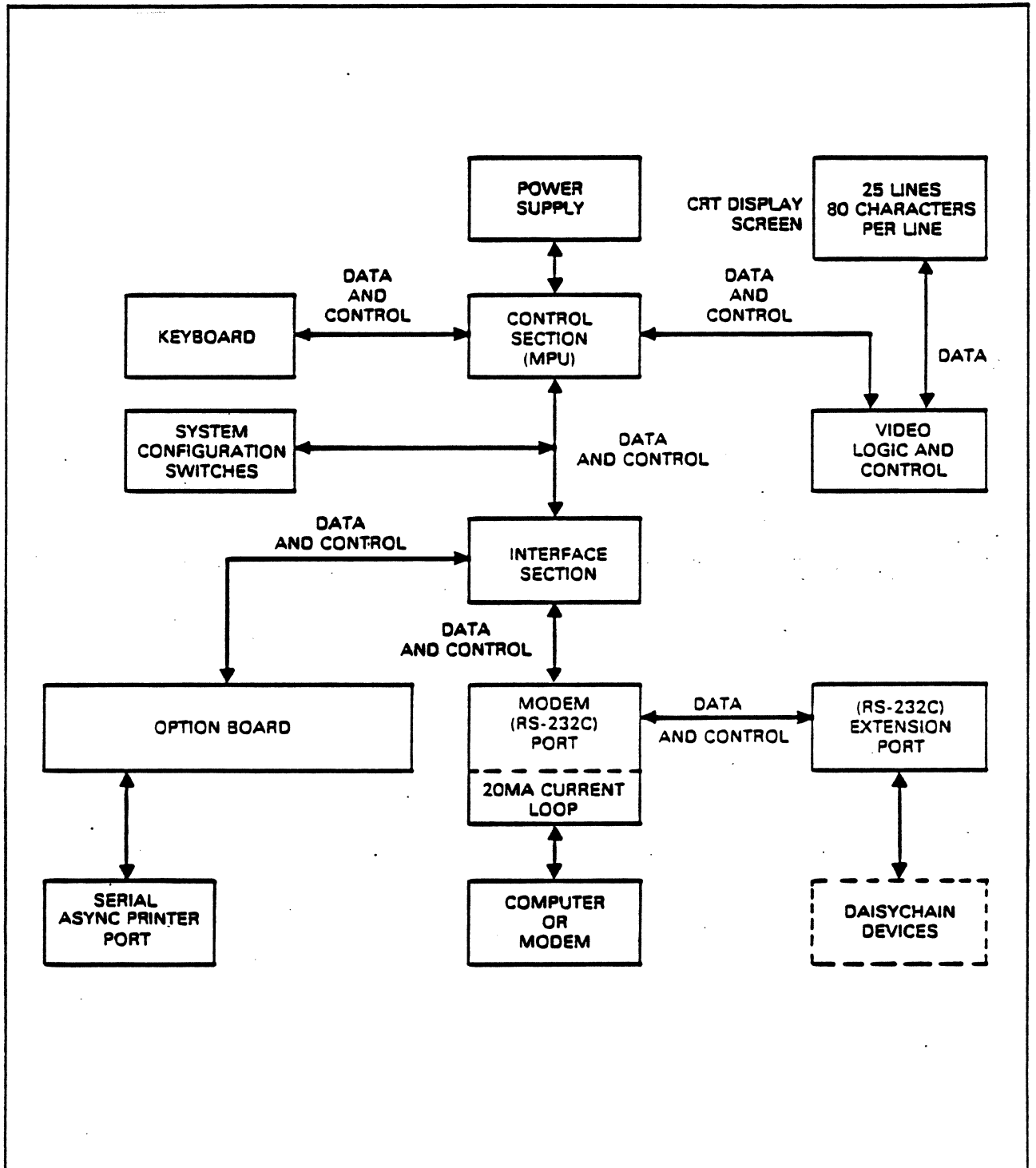


Figure 3-1. ADM 42 Data Flow Block Diagram

### 3.2.6 Regulated Power Supply

The ADM 42 power supply is a regulated power supply located adjacent to the main printed circuit board assembly. Three regulated dc voltages are provided: +5 volts, and +12 volts. The power supply can accept line voltage inputs of 115 Vac or 230 Vac (with 230-volt power supply option).

### 3.3 STANDARD CHARACTER FORMAT

The standard ADM 42 character set contains 128 ASCII characters, 32 of which are control characters. (See figure 3-2.) The entire character set may be displayed on the monitor by placing the terminal in Program Mode or by preceding control characters with an ESC code.

### 3.4 ADM 42 WORD STRUCTURE

The ADM 42 can transmit and receive data characters in any one of the asynchronous character formats shown in figure 3-3. The appropriate word format for the user's application (including the use of a serial printer) is selected by means of the indicated DIP switches.

### 3.5 DATA TRANSMISSION CHARACTERISTICS

Data which has been written in memory and displayed on the monitor may be transmitted to the host computer either character-by-character as during Conversation Mode operation, or in message blocks, as during Block Mode operation. Transmission is asynchronous, using one of the word formats specified in figure 3-3, and at a transmission rate determined by the application. Using the MODEM BAUD RATE or optional PRINTER BAUD RATE switch on the front panel (see figure 2-2), it is possible to select a data transmission rate of 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, or 9600 baud. The standard ADM 42 MODEM port is set for 9600 baud at the factory. The factory

setting for the optional ASYNC PRINTER port is 1200 baud.

### 3.5.1 Conversation Mode Characteristics

Conversation Mode communication between the ADM 42 and the host computer is character-by-character only. Transmission may be in one direction at a time, as in Half-Duplex operation; or in both directions simultaneously, as in Full-Duplex operation. At power-up, the standard ADM 42 is initialized in Block Mode. Refer to Section IV for the modifications possible using personality.

The ADM 42 may receive data over the RCVE line (BB) with Carrier Detect (DCD) over line CF. Data for transmission is controlled by Request to Send (RTS) over line CA, and Clear to Send (CTS) over line CB.

Request to Send (RTS) is set (high) to inform the host that the ADM 42 wishes to transmit. Clear to Send (CTS) from the host or modem should be set (high) to initiate ADM 42 transmission. In Full Duplex Mode, RTS is set high and remains high. In Half-Duplex Mode, RTS is reset to low whenever Return (CR), End of Transmission (EOT) or End of Text (ETX) is sensed by ADM 42 logic.

**SHIFT/CONV** sets ON LINE Mode in which Data Terminal Ready (DTR) is held high. **SHIFT/CONV** also sets OFF LINE Mode in which DTR is held low.

### 3.5.2 Block Mode Characteristics

In Block Mode, information is transmitted and received as complete messages or blocks of data (compared with character-by-character transmission in Conversation Mode). Complete messages, up to four full pages (optionally, eight full pages) in length may be displayed and stored in display memory. These messages may be edited or otherwise modified from the keyboard before being transmitted to the host and/or to an optional auxiliary device such as a printer. At power-up, the standard ADM 42 is initialized in Block Mode.



			CONTROL CHARACTERS		DISPLAYABLE CHARACTERS					
HEX BYTE ↓ 2ND	BITS 4321	1ST	0	1	2	3	4	5	6	7
		BITS 765	0 <sub>00</sub>	0 <sub>01</sub>	0 <sub>10</sub>	0 <sub>11</sub>	1 <sub>00</sub>	1 <sub>01</sub>	1 <sub>10</sub>	1 <sub>11</sub>
0	0000		NSL	DLE		0	@	P	'	p
1	0001		SSM	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		EST	DC4	\$	4	D	T	d	t
5	0101		END	NAK	%	5	E	U	e	u
6	0110		ACK	SYN	&	6	F	V	f	v
7	0111		BELP	ETB	'	7	G	W	g	w
8	1000		BS (←)	CAN	(	8	H	X	h	x
9	1001		(SKIP) RT	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	(HOME) RS	.	>	N	^	n	~
F	1111		SI	(NEW LINE) US	/	?	O	_	o	DEL

**CONTROL CODES**

Utilized by Std ADM 42 with Printer Option

Utilized by Polling ADM42

USE **[CTRL]** KEY WITH DISPLAYABLE CHARACTER KEYS TO PRODUCE CONTROL CODES

Figure 3-2. Displayable Character Set and Control Codes.

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WORD FORMAT	DIP SWITCH CONFIGURATIONS			WORD STRUCTURE										
	SW5	SW4	SW3	BIT	BIT	BIT	BIT	BIT	BIT	BIT	BIT	BIT	BIT	BIT
				8	1	2	3	4	5	6	7	8	9	10
Eleven-Bit Word with Even Parity and 2 STOP Bits	ON	ON	ON	Start	ACTIVE BITS = 1 OR 0							even parity	stop	stop
Eleven-Bit Word with Odd Parity and 2 STOP Bits	ON	ON	OFF	Start	ACTIVE BITS = 1 OR 0							odd parity	stop	stop
* Ten-Bit Word with Even Parity and 1 STOP Bit	ON	OFF	ON	Start	ACTIVE BITS = 1 OR 0							even parity	stop	X
Ten-Bit Word with Odd Parity and 2 STOP Bits	ON	OFF	OFF	Start	ACTIVE BITS = 1 OR 0							odd parity	stop	X
Eleven-Bit Word with No Parity and 2 STOP Bits	OFF	ON	ON	Start	ACTIVE BITS = 1 OR 0							always 0**	stop	stop
Ten-Bit Word with No Parity and 1 STOP Bit	OFF	ON	OFF	Start	ACTIVE BITS = 1 OR 0							always 0**	stop	X
Eleven-Bit Word with Even Parity and 1 STOP Bit	OFF	OFF	ON	Start	ACTIVE BITS = 1 OR 0							always 0**	even parity	stop
Eleven-Bit Word with Odd Parity and 1 STOP BIT	OFF	OFF	OFF	Start	ACTIVE BITS = 1 OR 0							always 0**	odd parity	stop

\*Factory Standard Setting

\*\*Always 0 for PRINTER port; switch selectable for MODEM port, via S5-SW7

Figure 3-3. Word Format Codes with DIP Switch Configurations

### 3.5.3 ADM 1 Mode Characteristics

The ADM 42 may be placed in the ADM 1 Mode by typing ESC % at the keyboard. In this mode, the transmission of text is modified as follows:

1. The FS character indicating the presence of protected fields are not sent.
2. The US characters indicating the end of line are not sent.
3. The cursor goes to the first unprotected position on the screen, when Protect Mode is set.
2. When the terminal is ready to transmit data, the printer Request to Send (RTS) line (pins 6 and 8) is set (high).
3. If the printer is READY, it signals not BUSY over the READY line, which alerts the terminal. Depending upon which printer is used, BUSY may be active when high or low on pin 19 of connector J5.
4. When the PRINT command is executed, the word PRINT is displayed in the 25th Status Line as long as not BUSY is indicated.
5. If the PRINT command is executed by the host, the ADM 42 transmits a CR code to the host upon completion of the transmission to the printer.

## 3.6 PRINT MODE TRANSMISSION CHARACTERISTICS

Print Mode transmission requires an optional Serial Printer Interface installation as described in Section II of this manual. The interface can be used with most RS-232C compatible serial printers, which includes buffered as well as character-by-character printers. With this interface, configuration control DIP switches (refer to table 2-2) are provided to establish: word format, BUSY ON/OFF and polarity characteristics. In addition, the PRINTER BAUD RATE switch on the front panel (see figure 2-2), makes it possible to select a transmission rate of 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, or 9600 baud, independent of the MODEM port baud rate. The factory setting for the ASYNC PRINTER port baud rate is 1200.

The logical conditions required for proper terminal/printer control are as follows:

1. The Printer Interface and the READY BUSY control lines are enabled as appropriate for the application (see figure 2-10 and table 2-2).
2. "PRNT" is displayed in the Status Line.
2. "EM" is written at the cursor position as a STOP code.
3. The cursor moves to the HOME position. If Auto Page is set, the cursor moves to the HOME position on Page 1, and transmission begins.
4. The code sequence CR NULL LF NULL is sent to the printer, followed by the data as formatted on the screen.

### 3.6.1 Formatted Print Mode

Formatted Print Mode (Page Format Mode) transmits data to the printer so that it will be printed exactly as displayed on the CRT screen. A set of operation codes permits ALL displayed data to be sent with no distinction made between protected and unprotected data; or permits only unprotected data, as formatted, to be transmitted to the printer, with protected data sent as spaces. Trailing spaces or nulls are not transmitted and operation codes are transmitted as spaces. When a Formatted Print command is executed (refer to Print Transmission Control Operations in Section IV), the following events take place:

5. NULL characters and trailing spaces on a line are not sent. When the last character on each line is sent, the terminal sends CR NULL LF NULL before moving to the next line.

**Note**

*A STOP (EM) code within the text will cause the printing to stop at that point.*

6. Upon reaching the STOP code, the operation is terminated, a final CR NULL LF NULL is sent, and the STOP code (EM) is overwritten with a space.

### 3.6.2 Unformatted Print Mode

Unformatted Print Mode transmits in a continuous stream, without inserting control characters or internal ADM 42 delays. This mode allows greater flexibility in formatting the printed copy, especially with printers having other than 80-character lines. No distinction is made between protected and unprotected data as displayed. When this PRINT command is executed (refer to Print Transmission Control Operations in Section IV), the following events take place:

1. Control codes for print formatting must be embedded in the text using local coding sequences. Such control codes include: CR, LF, FF, VT, BEL, ESC, BS, FS, GS, RS, and US.
2. A STOP code (EM) may be written at the stopping point designated by the user.
3. The cursor is usually set at the beginning of the data to be transmitted, then the PRINT command is executed.
4. "PRNT" is displayed in the Status Line, and transmission begins.
5. Line control characters (CR, LF, etc.) are not inserted at the end of each ADM 42 line;

transmission continues without delay from line to line, until the EM STOP code, if written, is reached. The STOP code is not overwritten.

6. NULL characters on the screen are sent to the printer, and all trailing spaces are transmitted.

### 3.6.3 Copy Print Mode

In Copy Print Mode, data is sent to the printer via the ADM 42 print buffer, with or without data being displayed. Operating under the software control, the print buffer is formed by taking over the last page of display memory (Page 4 standard; Page 8 with option installed). Data is transmitted from the buffer in Unformatted Print Mode at a transmission rate determined by the PRINTER BAUD RATE switch setting. Dynamic operation codes permit data to be read into the buffer and retransmitted to the printer either: a) without being displayed; or b) after being displayed and/or acted upon by the ADM 42.

When the Copy Print command is executed (refer to Print Transmission Control Operations in Section IV), the following events take place:

1. "PRNT" is not displayed in the Status Line.
2. The last page is not accessible for display.
3. Data is transmitted at the selected printer baud rate, in accordance with the printer BUSY/READY protocol previously discussed.
4. Control code DC4 from the host resets Copy Print Mode; however, printing from the buffer continues until the buffer is empty.
5. ESC A 0 releases the print buffer if and only if the buffer is empty.

### 3.6.4 Buffered Print Mode

In Buffered Print Mode, displayed data is transferred to the buffer then sent to the printer.

Operating under software control, the print buffer is formed by taking over the last page of display memory (Page 4, standard; Page 8, with option installed). Unless modified by a set of dynamic operation codes, data is transmitted from the buffer in Page Format Mode at a transmission rate determined by the PRINTER BAUD RATE switch setting. The dynamic operation codes permit data to be read into the buffer and retransmitted to the printer in various formats. When the Buffered Print command is executed (refer to Print Transmission Control

Operations in Section IV), the following events take place:

1. "PRNT" is displayed in the Status Line.

2. The last page is not accessible for display.
3. Data is transmitted at the selected baud rate, in accordance with the printer BUSY/READY protocol discussed in paragraph 3.6.
4. ESC A 0 releases the last page; however, printing from the buffer must first be completed.

**Note**

*All Buffered Print commands are inoperative in Polling Mode. Polling uses the addressable printer port.*



## SECTION IV OPERATION

### 4.1 INTRODUCTION

This section provides the information necessary for the operator to utilize the ADM 42 to its fullest capabilities. Emphasis is given to the control codes required to initiate and control the various terminal operations, whether they originate at the host or the ADM 42 keyboard. It is assumed that the operator is thoroughly familiar with keyboard operations, which are not discussed herein, except as required to execute a given terminal operation. Refer to the ADM 42 Operators Quick Reference Guide DP110 for detailed keyboard information.

### 4.2 CONTROL CODES AND OPERATING MODES

#### 4.2.1 Standard Control Codes

The operational characteristics of the ADM 42 are controlled in part, by a group of control codes which may originate at the host computer or at the terminal keyboard. Control codes are not displayable unless preceded by an ESC character or Program Mode is set. In either case, the

ADM 42 will display but not act upon the recognized control code. Of the 32 standard control codes available for use, the standard (non-polling) ADM 42 utilizes the control codes listed in table 4-1.

#### 4.2.2 Escape Sequence

An escape sequence is formed by executing the ESC code, followed by one or more otherwise displayable ASCII characters. Each escape sequence controls a specific terminal operation. Some operations are one time only or for a specific number of times; others remain operative for as long as power to the terminal is not interrupted or until terminated by another control code.

Escape sequences are used primarily to control ADM 42 operations, but may also be extended to control a printer or other auxiliary device connected to the ADM 42.

Figure 4-1 shows the escape sequences utilized by the ADM 42, whether from the host or from the keyboard. Escape sequences may be initiated from the keyboard using the **ESC** key during Block Mode or Conversation Mode operations, as follows:

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ESCAPE SEQUENCE									
HEX BYTE 2ND ↓	1ST →	2	3	4	5	6	7	8	9
0			0 CLEAR TABS	@ PRINT PROT AS SP	P PRINT PAGE ALL	' POLLING ADDRESS*	p PRINT UNFORMAT		
1	!	FUNKEY PROG*	1 SET TYPWR TABS	A COPY PRINT	Q INSERT CHAR	a AUX CONTROL*	q SET INS MODE		
2	"	KBD ENA**	2 CLEAR COL OF TABS	B SET BLOCK MO	R DELETE LINE	b STATUS 1 OFF	r CLEAR INS MODE		
3	#	KBD DISA**	3 TYPWR TAB CTRL*	C SET CONV MO	S SEND MSG	c STATUS 1 ON	s SEND MSG ALL		
4	\$	CLEAR ADM1 MO	4 SEND FG LINE	D SET DUPLH OR F	T ERASE LINE (PERS)	d STATUS 2 OFF	t ERASE LINE TO NUL		
5	%	SET ADM 1 MO	5 SEND FG PAGE	E INSERT LINE	U SET PGM MODE	e STATUS 2 ON	u CLEAR PGM MODE		
6	&	SET PROTECT	6 SEND ALL LINE	F MESSAGE TO ROW 25*	V SET COL PROT SP AT CURSOR	f STATUS 3 OFF	v SET AUTO PG		
7	'	CLEAR PROTECT	7 SEND ALL PAGE	G ATTRIB CONTROL*	W DELETE CHAR	g STATUS 3 ON	w CLEAR AUTO PG		
8	(	CLEAR WPROT	8 WRITE SOM (STX)	H	X CLEAR PGM MODE	h	x		
9	)	SET WPROT	9 WRITE EOM (ETX)	I BACK TAB	Y ERASE PAGE (PERS)	i TAB (SKIP)	y ERASE PG TO NULL		
A	*	CLEAR ALL TO NULL	: CLEAR FG TO NULL	J PAGE BACK	Z CLEAR ALL MODES	j	z		
B	+	CLR ALL TO SPACE	: CLR FG SP/PERS	K PAGE FWD	[ BUFFERED PRINT CONTROL*	k	{		
C	`	CLR ALL TO PROT SP	< STATUS 4 ON	L GO TO PAGE N (1-8)**	\ EVOKE FUNKEY*	l	;	BAUD RATE CTRL*	
D	.	LOAD PRC*	= LOAD RC*	M MULT ESC*	]	m WRITE MULT CHAR*	}		
E	.	CHANGE PERS*	> STATUS 4 OFF	N SET PAGE EDIT	^ BLINK CONTROL	n	~	CURSOR VIDEO CTRL*	
F	/	READ PRC**	? READ RC**	O CLEAR PAGE EDIT	- BLANK CONTROL	o DISPLAY PERS*	DEL		

\*Multiple Characters Required

\*\*Remote (from host) Only

Figure 4-1. Chart of Escape Sequences



Table 4-1. Control Codes Utilized by Standard ADM 42





CONTROL CODE		HEX CODE	OPERATION
FROM HOST	FROM KEYBOARD		
CR	CTRL C	03	ETX (End of Text) EOT (End of Transmission), or CR (Carriage Return) are used as line turnaround characters during half-duplex operation.
	CTRL D	04	
	RETURN	0D	
BEL	CTRL G	07	BEEP - Generates audible alarm.
BS		08	Back Space - Moves cursor to the next unprotected position to the left on the line or on the next previous line, moving from right to left.
HT	BACK TAB TAB	09	Horizontal Tab - Skips cursor to next tab set position, when Protect Mode is set. If no such position, cursor moves to HOME (or next unprotected position) on page, or other page if Auto Page is set.
LF		0A	Line Feed - Moves cursor to same column position in next lower line, or to next unprotected position in new line or next line, if necessary.
VT		0B	Up Line - Moves cursor to same column position in next previous line, or to next unprotected position (moving from right to left) in new line or next line, if necessary.
FF		0C	Forespace - Moves cursor to the next unprotected position to the right on the line, or to the first unprotected location on the next lower line, moving from left to right.
CR	RETURN	0D	Return - Moves cursor to first unprotected position in line containing the cursor.
DC4		14	From host only, control code resets Copy Print Mode. Printing from the buffer continues until buffer is empty.
EM	SPECIAL OPERATION	19	Special Print Mode control code used to designate STOP code during Formatted Print Mode operations, and optionally as a STOP code during Unformatted Print Mode operation.

Table 4-1. Control Codes Utilized by Standard ADM 42 (cont'd)

CONTROL CODE		HEX CODE	OPERATION
FROM HOST	FROM KEYBOARD		
ESC	ESC	1B	Escape - Recognized by ADM 42 as code extension character which must be followed by otherwise displayable character(s) to invoke a specific terminal operation. Also used preceding a control code to cause control code to be displayed instead of acted upon
FS	SPECIAL OPERATION	1C	Field Separator - Used to designate protected fields in a block send operation.
RS	HOME	1E	HOME - Moves cursor to first character position on page, even if Auto Page is set. If HOME is protected, cursor moves to first unprotected position on affected page.
US	NEW LINE	1F	New Line - Causes a combined Return (CR) and Line Feed (LF) to be executed. Cursor moves to first unprotected position on next line.

- **Block Mode** - Each escape sequence is immediately acted upon by the terminal, unless the sequence is preceded by an additional ESC character, or Program Mode is set. In either case, the escape sequence will be displayed but not acted upon, and transmitted along with the block of data.

**Note**

*Control codes may also be imbedded in the text (by preceding the control code with ESC) for transmittal along with the block of data.*

- **Conversation Mode, Full Duplex** - ESC is transmitted directly to the host and is utilized by the ADM 42 only when echoed by the host.

**4.2.3 Terminal RESET Operations**

The ADM 42 may be RESET in several ways, depending upon the purpose and extent of RESET desired.

**4.2.3.1 Power ON RESET**



*Power ON RESET should be used only if the following RESET operations do not effect the desired reset. When recycling power using the ON/OFF switch, wait 10 seconds between the OFF and ON operations.*

A Power ON RESET consists of a complete recycling of all ADM 42 functions, including power. This is accomplished by setting the ON/OFF switch to OFF, waiting 10 seconds, then setting the switch to ON. All display and other memory are erased by powering down. Upon power-up, the terminal is subject to the complete Power Turn-ON procedure specified in Section II.

#### 4.2.3.2 RESET Button

The RESET button resets the microprocessor and causes all Power ON RESET functions to be performed, without shutting down power.

#### 4.2.3.3 Firmware RESET

A firmware RESET consists of resetting all display and other memory without powering down. In addition to resetting the memories to their default status, Firmware RESET causes the current position of the configuration control DIP switches and baud rate switches to be read. Each time a DIP switch or baud rate switch position is changed a Firmware RESET should be executed in order for the change to take effect. Execute at the keyboard **CTRL|SHIFT|RESET/CMD**.

#### Note

*Any RESET may be used to read DIP switch positions; however, a Firmware RESET is recommended.*

#### 4.2.3.4 Selected Operational RESETS

Several RESET operations are available, using special keys, for resetting specific operational conditions in the terminal:

- Type **RESET/CMD** to reset a keyboard LOCK condition. **RESET/CMD** also swaps the 25th Status Line display with the Status Line message in memory as described further along in this section.

- Type **SHIFT|RESET/CMD** to clear a parity error from the 25th Status Line, and to abort all Send and Print operations.

### 4.2.4 Multiple Escape Sequences

Any number of escape sequences may be executed one after another without preceding each operation with an ESC character, thus facilitating operations which require more than one escape sequence. This operation is activated as follows:

1. Execute ESC M.
2. Execute only the action character of each desired escape sequence. For example, assume it is desired to set Protect Mode and Send Page Foreground. The sequence would be: ESC M & 5.
3. Terminate the operation by executing CR, LF, HOME, or any other control code.

### 4.2.5 Keyboard Enable/Disable

The ADM 42 keyboard is always active unless disabled by an ESC # sequence. The keyboard on a polling terminal is disabled unless Compose (LOCAL) MODE is set. Once disabled, the keyboard may be enabled by an ESC " sequence from the host only, or by executing **RESET/CMD** at the keyboard.

### 4.2.6 Scrolling

In the ADM 42, data is entered into display memory starting at HOME position on each page (except as modified by certain restrictions when protected fields are involved), and continuing through Position 80 in Line 24. When Position 80 is filled, the display is shifted upwards one line and data entry continues, starting with Position 1 in the new Line 24. The original top line is lost. Scrolling on each page continues indefinitely, unless Auto Page is set; if so, scrolling is inhibited. Also scrolling is inhibited if Protect

Mode is set. Scrolling and automatic New Line, when Position 80 is filled (Auto Line Wrap) may be inhibited by a dynamic personality change sequence (described later in this section).

#### 4.2.7 Display of Program Version

The firmware program installed varies with its level of enhancement and with customer requirements. The program version installed is V2.03; it may be displayed by executing ESC o 9.

#### 4.2.8 Status Line Characteristics

Various kinds of status information are displayed in Status Line 25, shown in table 4-2. Display is in normal video, except status indicators S1, S2, S3, and S4, which are in reverse video. S4 is also blinking.

##### 4.2.8.1 Status Indicator Control

Status Indicators S1, S2, S3, and S4 may be used to alert the ADM 42 operator to the existence of a user-specified condition. This condition could be "message waiting," or "garbled transmission," or any such condition.

The Status Indicators are displayed in designated positions in Status Line 25 (refer to table 4-2) in reverse video, by means of the operation codes listed in table 4-3. Status S4 appears in reverse video, blinking, and usually specifies a special condition of some kind.

##### 4.2.8.2 Status Line Message Control

An override message may be placed in Status Line positions 2 thru 80 at any time by the host. Any data residing in the Status Line will be temporarily replaced by this message and stored in memory. Any host initiated or keyboard entry which affects the status line (refer to table 4-2) will recall the original Status Line data from memory and place the Status Line message in

memory. The Status Line display and Status Line message in memory (if any) may be swapped by typing **RESET/CMD** at the keyboard. Table 4-4 lists the Status Line message control operations.

### 4.3 FUNCTION KEY (FUNKEY) CHARACTERISTICS

Function keys F1 thru F16 are used to store and/or transmit specific messages to the host upon command from the host or the keyboard. These messages may be used for any purpose specified by the user. In the standard ADM 42, the stored message is always a fixed three- or four-character code (refer to table 4-5) which is different for each function key. This code may be transmitted to the host at any time by typing the appropriate key **F1** thru **F16**, with or without **SHIFT**.

The stored message may be increased to 31 or 63 characters, maximum, with the installation of 31 or 63-Character (Programmable) Function Key Option. The information that follows concerns FUNKEY operations on terminals equipped with the programmable function key option.

#### 4.3.1 Displaying FUNKEY Messages

To display all of the FUNKEY messages stored in the terminal execute ESC ! 1 or ESC ! 2 from host or keyboard. Figure 4-2 shows a sample FUNKEY message display format in which each recorded message depicts a significant characteristic of each message. An un-programmed function key displays an "X".

#### 4.3.2 Storing FUNKEY Messages

1. Storing FUNKEY messages may be accomplished from the keyboard or the host.
2. Each message must start in position 1 on a new line to be accepted.

**CAUTION**

*All programmable function keys are erased when Power ON, RESET button, or Firmware RESET is executed.*

—SAMPLE DISPLAY—

K THIS IS A SAMPLE OF A COMPLETE DISPLAY, CALLED UP BY ESC I 1  
 K FOR UNSHIFTED FUNKEY CODES, OR ESC I 2 FOR SHIFTED CODES,  
 K WITH THE 63-CHARACTER PROGRAMMABLE KEY OPTION INSTALLED.  
 K TO ENTER THIS LINE, CLEAR SCREEN THEN TYPE: K (MSG) CTRL F4  
 K EACH MESSAGE MUST START WITH K, H, OR A TO BE ACCEPTED.  
 K "K" AT START OF EACH MESSAGE MEANS: DISPLAY ON TERMINAL CRT.  
 K "K" MESSAGE WILL ALSO BE XMITTED TO HOST IF CONV MODE IS SET.  
 K "H" AT START OF MESSAGE MEANS: XMIT TO HOST; DO NOT DISPLAY.  
 K "A" AT START OF MESSAGE MEANS: XMIT TO PRTR; DO NOT DISPLAY.  
 K TO LINK EXTRA LENGTH MSG TO NEXT ADDR (J), WRITE ESC \ J,  
 K WITHIN 63-CHARACTER LIMIT. AT END OF MESSAGE, TYPE CTRL F11.  
 K TO CALL UP EXTRA LENGTH MESSAGE, TYPE F10 (HOST ESC \ I).  
 K TO ERASE THIS FUNKEY MSG: CLR SCRN; TYPE CTRL F13 (HOST ESC I L).  
 K TO ERASE ALL FUNKEY STORAGE. TYPE SHIFT CTRL RESET (HOST ESC I X).  
 K "X" INDICATES UNPROGRAMMED FUNKEY LOCATION.  
 X

—SAMPLE DISPLAY—

**FUNKEY STORE CODES**

KEYBOARD	HOST	
	UNSHIFTED	SHIFTED
CTRL F1	ESC I @	ESC I `
CTRL F2	ESC I A	ESC I a
CTRL F3	ESC I B	ESC I b
CTRL F4	ESC I C	ESC I c
CTRL F5	ESC I D	ESC I d
CTRL F6	ESC I E	ESC I e
CTRL F7	ESC I F	ESC I f
CTRL F8	ESC I G	ESC I g
CTRL F9	ESC I H	ESC I h
CTRL F10	ESC I I	ESC I i
CTRL F11	ESC I J	ESC I j
CTRL F12	ESC I K	ESC I k
CTRL F13	ESC I L	ESC I l
CTRL F14	ESC I M	ESC I m
CTRL F15	ESC I N	ESC I n
CTRL F16	ESC I O	ESC I o

\*Type **SHIFT CTRL F<sub>n</sub>** to store data in shifted F<sub>n</sub> locations

Figure 4-2. Sample FUNKEY Message Format and Store Codes

Table 4-2. Chart of Assigned Status Line Positions

CHARACTER POSITIONS	DISPLAY	STATUS INFORMATION
1-5	PG=X	Current Page No. X, where "X" may be 1 thru 8.
6-10	APG	Auto Page ON
11-15	EDIT	Edit Mode ON
16-20	PROG	Program Mode ON
21-25	PROT	Protect Mode ON
26-30	WPRT	Write Protect Mode ON
31-35	INSM	Insert Mode ON
36-40	LOCK	Keyboard Locked
41-45	ADM 1	ADM 1 Mode ON
46-50	PRNT or PBSY	"PRNT" denotes Print Mode ON "PBSY" denotes printer busy
51-60	PARITY ERR	Error message
2-80	(User Msg)	Override message from host; replaces current Status Line display which is stored in memory.
66-67 70-71 74-75 78-79	S1 S2 S3 S4	Status Line indicators which are used to specify any user-determined condition. S4 (blinking) points to a special condition.

Table 4-3. Status Code Control Operation Codes

STATUS INDICATOR	S1	S2	S3	S4
ON	ESC c	ESC e	ESC g	ESC <
OFF	ESC b	ESC d	ESC f	ESC >

Table 4-4. Status Line Message Control Operations

OPERATION	SOURCE	OPERATION CODE	ACTIVITY
Initiate Override Message	Host	ESC F Message CR*	Message placed in Status Line positions 2 thru 80, overriding, but not erasing, current display.
Clear Override Message	Host Keyboard	ESC Z, ESC %, etc. <b>RESET/CMD</b>	Message is cleared from display but retained in memory by any operation code which affects Status Line.
Erase Override Message	Host	ESC F CR*	Message is erased from screen and memory; original Status Line display is restored.
Recall Status Line Message	Keyboard	<b>RESET/CMD</b>	Status Line display and Status Line message are swapped each time key is typed.

\*Any control character (CR, LF, HT, etc.) may be used.

3. Each message must start with a "K", "H", or "A" destination code, where:
  - K - Designates a message for CRT display, when evoked. If Conversation Mode is set, the message will also be transmitted to the host.
  - H - Designates a message for transmission to host, with no CRT display, when evoked.
  - A - Designates a message for transmission to a printer, with no CRT display, when evoked.
4. Block Mode should be set to avoid unintentionally transmitting data to the host when storing data at the keyboard.

5. Immediately following the last character of the message, execute the appropriate FUNKEY Store Code (see figure 4-2). The cursor will backspace one space to indicate acceptance of the message.

### 4.3.3 Linking FUNKEY Messages

FUNKEY messages stored under different function keys may be linked together to form a single message, as when a message is too lengthy to be stored under one key. The linking capability can also be used to link two or more operations under one command.

Table 4-5. Function Key/FUNKEY Characteristics

EVOKING OPERATION		UNPROGRAMMED CODE TRANSMITTED	EVOKING OPERATION		UNPROGRAMMED CODE TRANSMITTED
EVOKE CODE	KEYBOARD		EVOKE CODE	KEYBOARD	
ESC \ @	F1	SOH @ CR*	ESC \ \	SHIFT F1	SOH \ CR*
ESC \ A	F2	SOH A CR*	ESC \ a	F2	SOH a CR*
ESC \ B	F3	SOH B CR*	ESC \ b	F3	SOH b CR*
ESC \ C	F4	SOH C CR*	ESC \ c	F4	SOH c CR*
ESC \ D	F5	SOH D CR*	ESC \ d	F5	SOH d CR*
ESC \ E	F6	SOH E CR*	ESC \ e	F6	SOH e CR*
ESC \ F	F7	SOH F CR*	ESC \ f	F7	SOH f CR*
ESC \ G	F8	SOH G CR*	ESC \ g	F8	SOH g CR*
ESC \ H	F9	SOH H CR*	ESC \ h	F9	SOH h CR*
ESC \ I	F10	SOH I CR*	ESC \ i	F10	SOH i CR*
ESC \ J	F11	SOH J CR*	ESC \ j	F11	SOH j CR*
ESC \ K	F12	SOH K CR*	ESC \ k	F12	SOH k CR*
ESC \ L	F13	SOH L CR*	ESC \ l	F13	SOH l CR*
ESC \ M	F14	SOH M CR*	ESC \ m	F14	SOH m CR*
ESC \ N	F15	SOH N CR*	ESC \ n	F15	SOH n CR*
ESC \ O	F16	SOH O CR*	ESC \ o	SHIFT F16	SOH o CR*

\*If established by a Dynamic Personality Change operation, a second transmission terminator (End Block character) is also transmitted. The first End Block character (CR) may also be changed via personality.

#### 4.3.3.1 Storing Extra-Length FUNKEY Messages (See Figure 4-2)

1. An extra-length FUNKEY message is one which is greater than 31 characters if the 31-character option is installed, or greater than 63 characters if the 63-character option is installed.
2. Store the extra-length message in the same manner as for shorter messages, except:

- a. Within the 31- or 63-character limit, display ESC \ (ASCII), where (ASCII) is the location of the next FUNKEY memory.
- b. Immediately following the (ASCII) character, above, execute CTRL F<sub>n</sub>, where F<sub>n</sub> is the function key to be programmed.
- c. Before continuing the message, execute New Line and enter the desired destination code to start the message.
- d. Continue the message to its completion. If necessary, extend the message to any memory location in accordance with a, b, and c, above.



- e. Immediately following the last character of the message, execute the appropriate Store Code (see figure 4-2) of the FUNKEY to be linked. The cursor will backspace one space to indicate acceptance of the message.

#### 4.3.3.2 Linking Multiple Commands

Upon occasion it may be required to execute a terminal operation requiring a specific operation code in conjunction with sending data to the host. For example: assume that it is desired to send only "LIST CR" to the host many times; the CRT screen must be cleared before writing the message. The operation would be as follows:

1. Clear the screen to spaces.
2. Execute: **H** **L** **I** **S** **T** **ESC** **RETURN**  
(Typing **ESC** causes CR to be displayed).
3. Execute: **CTRL** **F1** to store H LIST CR under FUNKEY **F1**.
4. Execute: **NEW LINE**.
5. Execute: **K** **ESC** **ESC** **␣**, to write **K E<sub>C</sub>** on the screen.
6. Execute: **ESC** **ESC** **\** **@**, to write **E<sub>C</sub> \@** on the screen.
7. Execute: **CTRL** **F2** to store **E<sub>C</sub> \*** **E<sub>C</sub> \@** under FUNKEY **F2**.
8. Now, whenever **F2** is called for, the CRT screen will be cleared and LIST CR will be sent to the host.

#### 4.3.4 Erasing FUNKEY Messages

1. To erase a specific FUNKEY message from the keyboard: Clear screen, then type **CTRL** **F<sub>x</sub>**, where **F<sub>x</sub>** is the FUNKEY memory location to be erased.

2. To erase a specific FUNKEY message from the host, execute **ESC !** (ASCII), where the (ASCII) is the address of the FUNKEY memory location to be erased (see figure 4-2).
3. To erase all FUNKEY messages, execute **ESC ! X**.

#### 4.3.5 Evoking FUNKEY Messages

A FUNKEY message is "evoked" when it is recalled from memory and transmitted. Its destination is determined by the "H", "K", or "A" destination code at the beginning of the message. FUNKEY messages may be evoked in one of the following ways:

##### Note

*"K" designated messages will be displayed and transmitted to the host if CONV MODE is set.*

1. Type appropriate key **F1** thru **F16** unshifted or shifted, or
2. Execute appropriate Evoke code (refer to table 4-5).
  - a. To evoke a complete extra-length FUNKEY message, execute the Evoke Code associated with the initial memory address. Example - **ESC \ I** or **F10** would evoke the complete I - J message in figure 4-2.
  - b. To evoke a selected portion of an extra-length FUNKEY message, execute the Evoke Code associated with the 2nd or 3rd, etc. portion of the message. Example - **ESC \ J** or **F11** would evoke only the following message:

"WITHIN 63-CHARACTER LIMIT AT END OF MESSAGE, TYPE **CTRL** **F11**."

#### 4.4 FORMAT CONTROL OPERATIONS

Certain ADM 42 operations are concerned primarily with formatting or controlling the manner in which data is formatted, whether it is input from the host or from the keyboard.

#### 4.4.1 Program Mode

Program Mode is typically used for transparent operation. In Program Mode control characters (CR, LF, FS, etc.) are written and displayed as they are received or keyed but are not acted upon. Program Mode is set by typing **PROG MODE** once (PROG appears in Status Line). Program Mode is terminated by typing **PROG MODE** again.

#### 4.4.2 Protected Fields and Modes

Areas in the ADM 42 display may be designated as protected fields. These fields appear at reduced intensity and have the following characteristics:

- Protected fields cannot be overwritten as long as Protect Mode is set.
- Forms appearing on the display initiated by the computer are usually in protected characters.

##### 4.4.2.1 Write Protect Mode

Write Protect Mode is set by typing **SHIFT WRITE PROT**. (WPRT appears in Status Line). Characters written while Protect Mode is set are immediately protected. Write Protect Mode is terminated by typing **WRITE PROT**.

##### 4.4.2.2 Protect Mode

Protect Mode is set by typing **PROT MODE** (PROT appears in Status Line). Protect Mode is terminated by typing **PROT MODE** again.

##### 4.4.2.3 Designated Protected Field

The operator has complete control over any character typed into display memory. Consequently, the operator may elect to protect or

leave unprotected any character entered from the keyboard. To enter protected characters Write Protect Mode must be set. Usually Protect Mode is also set so that the characters are protected as they are written. The ESC ) and ESC ( codes are used during a Send All operation as delimiters for protected fields in a line, page, or message.

##### 4.4.2.4 Selected Protected Fields

The ( ` ) character may be used to establish a special protected field in which characters which have been written protected will be transmitted along with unprotected characters in a message. While operating in Write Protect Mode a ( ` ) character will establish the field and another ( ` ) character will terminate the field. Any character bracketed by the ( ` ) character will thus be transmitted as though unprotected during a Send Line, Send Page, or Send Message routine. The bracketed field will not be erased by a Clear to Foreground routine. The selected protected field is cleared along with and in the same manner as any other protected field.

The following is an example of this special operation:

1. Assume that the terminal is in Write Protect Mode (with Protect Mode set).
2. The operator enters a combination of protected (P) characters, specially protected (p) characters, and unprotected (U) characters, as follows:

PPP ` ppp UU ppp ` PPP UU

3. If Send Line, Send Page, or Send Message is commanded, the following will be transmitted. (An FS character is sent in the place of each protected field not sent.

FS ppp UU ppp FS UU

### 4.4.3 Auto Page Mode

Auto Page Mode is set by typing **SHIFT PAGE BACK** (APG appears in Status Line), and terminated by typing **SHIFT PAGE FWD**. This mode connects all memory pages (4 or 8) together to form one continuous page, with the current page retaining its page status. When Auto Page is set, several modifications to terminal operations take place:

- **Cursor Position** - The cursor goes to HOME position on the next page in a Page Forward operation or to the last position on the previous page in a Page Back operation.
- **Scrolling** - Scrolling is inhibited. When data is entered in the last position of the current page, data entry continues in the HOME position or the first unprotected position of the next page. When data is entered into the last position of the last page, cursor goes to HOME on first page.

### 4.4.4 Limited Graphics Mode

When an optional Line Drawing Alternate Character Generator is installed in the ADM 42, the terminal is equipped to produce simple line drawings in Limited Graphics Mode. In this mode, the characters on seven terminal keys are modified to produce eleven graphic symbols (see figure 4-3). Transmission of the graphics constructed from these keys is the same ASCII character as the original character. Limited Graphics Mode is established by ESC G 8.

### 4.4.5 Write Character "c" "N" Times

Any displayable character "c" may be written any specified number of times "N", using operation code ESC m N c. The number of times "N" is expressed by a modulo number which is in turn expressed by a single otherwise displayable ASCII character. Figure 4-4 is a chart of the 96 displayable characters and the modulo numbers they represent. Example: To write the character "D" 29 times, execute ESC m = D.

## 4.5 CURSOR CONTROL OPERATIONS

### 4.5.1 Non-Addressed Cursor Positioning

The cursor may be moved to any unprotected position on the screen under the remote or local control of the operator; its position signifies the next character position in the display. When data is being entered, the cursor moves one position to the right on the line or to the first unprotected position in the next line each time a character is written under its present position. The cursor cannot stop in a protected field. The operation codes and keyboard operations required to control the non-addressed and absolute (addressed) cursor positions are listed and described in table 4-6.

### 4.5.2 Absolute Cursor Addressing

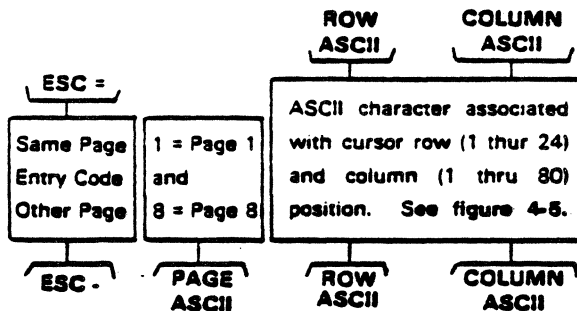
Absolute cursor addressing consists of commanding the cursor to a specific display location or reading out the exact cursor location, using operation codes. Commanding the cursor to a specific location (loading the cursor) may be executed by host or keyboard commands; reading the cursor may be executed only by the host, and the position codes are sent only to the host. The load/read commands are executed by means of multiple character escape sequences in which the exact page, row, and column location of the cursor is expressed in a set of ASCII characters, as shown below. See figure 4-5 for the ASCII characters assigned to each row and column location.

#### 4.5.2.1 Load Cursor Operation

When the Load Cursor operation is initiated, the cursor moves to the commanded position, except that if Protect Mode is set, the cursor will not stop in a protected field; it will perform in the same manner as described for Horizontal Tab in table 4-6. The operation codes required to load the cursor are as follows:

KEY	SYMBOL (UNSHIFTED)	SYMBOL (WITH SHIFT)	KEY	SYMBOL (UNSHIFTED)	SYMBOL (WITH SHIFT)
22 - ø	∅	—	42 { [	┌	└
24 ~ ^	⊥	⊥	43 } ]	┐	┘
25 : /	⊕	∥	75 < ,	,	⊥
			76 > .	.	⊥

Figure 4-3. Limited Graphics Mode Symbols



Example: Operation code ESC - 2 2 M commands the cursor to Page 2, Row 19, Column 46.

#### 4.5.2.2 Read Cursor Operations

The Read Cursor operation consists of the read command from the host only and an immediate response from the terminal defining the cursor position, regardless of whether Conversation Mode or Block Mode is set. If the page in which the cursor rests is known, the host executes ESC ?, and the terminal responds with the appropriate Row ASCII and Column ASCII characters followed by CR. If the page in which the cursor rests is not known, the host executes ESC /, and

the terminal responds with the appropriate Page ASCII, Row ASCII and Column ASCII, followed by CR. Example: To read the position to which the cursor was commanded, above, the operation code sequence is as follows:

	From Host	ADM 42 Response
Page Known	ESC ?	2 M CR
Page Unknown	ESC /	22 M CR

#### 4.5.2.3 Go To Page "N" Operations

Any page may be called up for display at any time by executing ESC L, followed by the desired page number. The appropriate page will be displayed and the cursor will go to the last known position on that page. If Auto Page is set, the cursor will go to the same column position of the top row on the selected page. Example: To call up page 4 for display, execute ESC L 4.

#### Note

If the last known position or HOME is protected, the cursor goes to the first available unprotected position.

ASCII CHARACTER	MODULO NUMBER	ASCII CHARACTER	MODULO NUMBER	ASCII CHARACTER	MODULO NUMBER
SPACE	0	@	32	,	64
	1	A	33	a	65
"	2	B	34	b	66
#	3	C	35	c	67
\$	4	D	36	d	68
%	5	E	37	e	69
&	6	F	38	f	70
'	7	G	39	g	71
(	8	H	40	h	72
)	9	I	41	i	73
*	10	J	42	j	74
+	11	K	43	k	75
,	12	L	44	l	76
-	13	M	45	m	77
.	14	N	46	n	78
/	15	O	47	o	79
0	16	P	48	p	80
1	17	Q	49	q	81
2	18	R	50	r	82
3	19	S	51	s	83
4	20	T	52	t	84
5	21	U	53	u	85
6	22	V	54	v	86
7	23	W	55	w	87
8	24	X	56	x	88
9	25	Y	57	y	89
:	26	Z	58	z	90
;	27	[	59	{	91
<	28	\	60		92
=	29	]	61	~	93
>	30	^	62	DEL	94
?	31	_	63		95

Figure 4-4. Chart of ASCII Characters vs. Modulo Numbers





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

\*N = Selected page 1 thru 4 (standard) or 1 thru 8 (optional)

Figure 4-5. Absolute Cursor Addressing Operation Codes

Table 4-6. Chart of Cursor Control Operations

OPERATION	HOW TO EXECUTE		DESCRIPTION
	FROM HOST	KEYBOARD	
Cursor HOME	RS	<b>HOME</b>	Cursor moves to upper left corner position on page or if protected, to first unprotected position on page.
Downline	LF	 or <b>LINE FEED</b>	Cursor moves one increment in the specified direction. If the new position is protected, cursor moves to first unprotected position in the specified line (for Backspace, the next previous position is selected). Character under cursor or character passed over is not erased.
Upline	VT		
Backspace	BS		
Forespace	FF		
Return	CR	<b>RETURN</b>	Cursor moves to the first unprotected position in the line containing cursor.
New Line	US	<b>PAGE/NEW/LINE</b>	Cursor moves to the first unprotected position in the new line (combined CR and LF).
Horizontal Tab or Skip	HT or ESC i	<b>BACK TAB/TAB</b>	Operational only when Protect Mode or Typewriter Tab Mode is set. Tab moves cursor forward to the next unprotected position on the page. If there is no such position, cursor moves to HOME or the next unprotected position following HOME.
Backtab	ESC I	<b>SHIFT BACKTAB/TAB</b>	Backtab moves cursor backwards to the last previous unprotected position after a protected field on the page. If there is no such position, cursor moves to the end of the page.
Load Cursor: Same Page, Row, Column  Page N, Row, Column	<b>ESC =</b>  <b>ESC -</b>	<b>ROW ASCII</b> <b>COL ASCII</b>  <b>PAGE ASCII</b> <b>ROW ASCII</b> <b>COL ASCII</b>	Refer to paragraph 4.5.2.1 for details.
Rear Cursor: Known Page, Row, Col  Unknown Page, Row, Column	<b>ESC ?</b>  <b>ESC /</b>	Terminal Response <b>ROW ASCII</b> <b>COL ASCII</b> <b>CR</b>  <b>PAGE ASCII</b> <b>ROW ASCII</b> <b>COL ASCII</b> <b>CR</b>	Refer to paragraph 4.5.2.2 for details.

## 4.5.3 Tab Control

### 4.5.3.1 Protect Mode Tab Operations

At the keyboard, **BACK TAB/TAB** is used to tab forward, and **SHIFT BACK TAB/TAB** to tab backwards to preset tab positions, with Protect Mode set. From the host, the HT or ESC i code commands forward tab, and ESC I commands backward tab. Protect Mode tabs are established by setting a vertical column of protected spaces from the cursor position down: execute ESC V or type **SHIFTTAB/SET/CLEAR**. Protect Mode is automatically set. The tab stop is the unprotected position immediately following the protected position. Protect Mode tabs (and Protect Mode) are cleared by any Clear All operation.

### 4.5.3.2 Typewriter Tab Mode Operations

In Typewriter Tab Mode, tab stops may be set, cleared and utilized in much the same way as with an ordinary typewriter. If Protect Mode is set, Typewriter Tab Mode is inhibited; however, setting Protect Mode does not clear any typewriter tabs which have been set. The tab stop is the actual cursor position at the time the tab set command is executed. (For Protect Mode tabs, the tab stop is the next unprotected position.)

ESC 3 p establishes Typewriter Tab Mode, if Protect Mode is not set. If Auto Page is set either before or after Typewriter Tab Mode, is set, the conditions established apply to every page. While Typewriter Tab Mode is set, the following operation codes are active:

- ESC 0 Clears all Typewriter Tabs, but not Modulo Tabs.

- ESC 1 Sets a column of tabs at the cursor position for the entire page.
- ESC 2 Clears column of tabs at cursor position for the entire page.
- ESC 3 SPACE Clears Typewriter Tab Mode (and all modulo tabs).

### 4.5.3.3 Modulo Tab Mode Operations

In Modulo Tab Mode, multiple columns of tabs at regular intervals for the entire page may be established using an ESC 3 (ASCII) sequence. The ASCII character entered defines the number of character positions in each interval. This character expresses a modulo number from 0 to 79, which is the value of the interval. See figure 4-4 for character vs modulo values. Example: To set tab stops every 10 character positions on every line, execute ESC 3 \*.

- ESC 3 (ASCII) sets modulo tabs.
- ESC 3 Space resets Modulo Tab Mode (and Typewriter Tab Mode).

## 4.6 DATA EDITING CONTROL OPERATIONS

The ADM 42 is equipped with extensive data editing capabilities, most of which may be executed from the host and from the keyboard. Table 4-7 lists and describes all the data editing operations available on the terminal, along with the operation codes and/or keyboard operations required to execute them. Clear and Erase commands apply only to the current page, even if Auto Page is set.

### Note

*If DIP switch S7-SW3 at location 15M is set to ON, NULL codes will not be displayed.*



Table 4-7. Data Editing Control Operations

OPERATION	HOW TO EXECUTE		DESCRIPTION
	FROM HOST	KEYBOARD	
Clear ALL to NULL*	ESC *	SHIFT CLEAR NULL	All displayed data, unprotected and protected, is cleared and replaced with null codes. Cursor goes to HOME.
Clear ALL to SPACES (Personality)	ESC +	SHIFT CLEAR SPACE	All displayed data, unprotected and protected, is cleared and replaced with space or personality codes. Cursor goes to HOME.
Clear ALL to Protected SPACES	ESC ,	ESC .	All displayed data is cleared and replaced with protected spaces. If Protect Mode is set at this time, the last space on the screen becomes unprotected, and cursor may rest there.
Clear Foreground to NULL*	ESC :	CLEAR NULL	Unprotected data is cleared and replaced with null codes. Cursor goes to HOME or first unprotected position on page.
Clear Foreground to SPACES (Personality)	ESC ;	CLEAR SPACE	Unprotected data is cleared and replaced with spaces or personality codes. Cursor goes to HOME or first unprotected position on page.
Set/Clear Page Edit Mode	Set: ESC N (EDIT appears in Status Line)  Clear: ESC O (EDIT removed from Status Line)	PAGE EDIT  PAGE EDIT	Modifies movement of data for CHAR INSERT and CHAR DELETE operations.
Set/Clear Auto Page	Set: ESC .v (APG appears in Status Line)  Clear: ESC w (APG removed from Status Line)	SHIFT PAGE BACK  SHIFT PAGE FWD	All memory pages (4 or 8) connected together to form one continuous page; current page retains its page status. For additional information, refer to paragraph 4.4.3.
Set/Clear Insert Mode	Set: ESC q (INSM appears in Status Line)  Clear: ESC r (INSM removed from Status Line)	SHIFT CHAR INSERT  SHIFT CHAR INSERT	In the line containing the cursor, a string of characters may be written under cursor, without first writing a space. All following characters move one space to the right for each insertion. Insertions are inhibited when inserted characters fill the line (previous characters following the cursor are lost), or protected field occupies last space in the line.

\*Nulls are not displayed when switch S7-SW3 at location 15M is set to ON.

Table 4-7. Data Editing Control Operations (cont'd)

OPERATION	HOW TO EXECUTE		DESCRIPTION
	FROM HOST	KEYBOARD	
Line Insert	ESC E	LINE INSERT	Line containing the cursor and all lower lines shift downwards one line. Deleted line is replaced with unprotected spaces and cursor moves to first position in the line. When screen is full, bottom line is lost. If Write Protect Mode is set, Line Insert resets that mode. If Protect Mode is set, Line Insert cannot be performed.
Line Delete	ESC R	LINE DELETE	Line containing cursor is erased, simultaneously, all lower lines shift upwards one line. Cursor moves to the first position of the line that moves upwards, and the bottom line is filled with unprotected spaces. If Protect Mode is set, Line Delete cannot be performed.
Line Erase	ESC T	LINE ERASE	Starting with the cursor position, all characters in the line (or current field, if Protect Mode is set) are erased and replaced with space or personality codes. Write Protect Mode is not reset (Refer to Personality Byte 10).
Line Erase to Null	ESC t	SHIFT LINE ERASE	Starting with the cursor position and continuing to the end of the line, all data, unprotected and protected, is erased and replaced with unprotected null codes. If Write Protect Mode is set it is not reset (Refer to Personality Byte 10).
Page Erase	ESC Y	PAGE ERASE	Starting with the cursor position and continuing to the end of the page, all unprotected characters are erased and replaced with unprotected space or personality codes. If Write Protect Mode is set, it is not reset (Refer to Personality Byte 10).
Page Erase to Nulls*	ESC y	SHIFT PAGE ERASE	Starting with the cursor position and continuing to the end of the page, all data, unprotected and protected is cleared and replaced with unprotected null codes. If Write Protect Mode is set, it is not reset (Refer to Personality Byte 10).

\*Nulls are not displayed when switch S7-SW3 at location 15M is set to QN

Table 4-7. Data Editing Control Operations

OPERATION	HOW TO EXECUTE		DESCRIPTION
	FROM HOST	KEYBOARD	
Page Back Page Forward	ESC J ESC K	PAGE BACK PAGE FWD	Each time a Page Forward or Page Back command is executed, the current page and cursor position are memorized (unless Auto Page is set). Data which is resident on a page is retained when another page is called up. During a Page Forward operation, the shift is to Page 1 when the last page (4 or 8) is reached. There is no shift from Page 1 during a Page Back operation.
Character Insert	ESC Q	CHAR INSERT	Writes a space under the cursor; all following characters move one space to the right. If line is full, last character in the line is lost, unless character is protected or Page Edit is set. If Page Edit is set, last character in each line wraps around to the next line, and so on to the end of the page. Operation terminates when line is filled with inserted spaces or a protected field is encountered.
Character Delete	ESC W	CHAR DELETE	Deletes character under cursor; all characters that follow in the field or line move one space to the left to fill deleted position. A space is written at the end of the field or line (or page if Page Edit is set). When Page Edit is set, the first character in the following line moves up to fill the deleted last position in the previous line; characters that follow move one space to the left, and so on, to the end of the page. Protected positions are not disturbed.

## 4.7 DATA TRANSMISSION CONTROL OPERATIONS

### 4.7.1 Block Mode Send

Data Transmission or Send operations are associated most directly with Block Mode or optional Polling transmissions to the host computer. Table 4-8 lists and describes all the Data Transmission operations available, along with the operation codes and/or keyboard operations required to execute them. For additional Data Transmission information, refer to paragraph 3.5.

### 4.7.2 Dynamic Baud Rate Control

The baud rate at which the MODEM port and ASYNC PRINTER port transmissions occur are independently controlled. The standard or default baud rate for each port is established by the MODEM and PRINTER BAUD RATE rotary switches on the front panel. This default setting can be dynamically modified by executing an appropriate ESC; (ASCII) operation code, where the (ASCII) character corresponds to the desired baud rate listed in table 4-9. The table also shows the equivalent BAUD RATE switch position for each dynamic setting. Any Power ON, RESET button, or Firmware RESET operation terminates all dynamic baud rate settings.

Table 4-8. Data Transmission Control Operations

OPERATION	HOW TO EXECUTE		DESCRIPTION
	FROM HOST	KEYBOARD	
Start of Message		<b>SOM</b>	Imbeds STX code in displayed message; used to designate start of message during Send Message operations (Block Mode only).
End of Message		<b>EOM</b>	Imbeds ETX code in displayed message; used to designate end of message during Send Message operations (Block Mode only).
Send Line Foreground	ESC 4	<b>SEND LINE</b>	Sends line of unprotected data, starting at beginning of line containing cursor and ending at the cursor position.
Send Page Foreground	ESC 5	<b>SEND PAGE</b>	Sends only unprotected data on page, starting with first unprotected character and continuing to cursor position. If Auto Page is set, unprotected data on all pages, up to cursor position, is sent.
Send Line All*	ESC 6	<b>SHIFT SEND LINE</b>	Sends line of unprotected and protected data, starting at the beginning of the line containing the cursor and ending at cursor position. Protected fields are bracketed by ESC ) and ESC (.
Send Page All*	ESC 7	<b>SHIFT SEND PAGE</b>	Sends all data on page, starting with HOME and continuing to cursor position. Protected fields are bracketed by ESC ) and ESC (. If Auto Page is set, all data on all pages, up to cursor position, is sent.
Send Message Foreground	ESC S	<b>SEND MSG</b>	Sends unprotected data in message displayed which is bracketed by STX - ETX ( <b>SOM</b> <b>EOM</b> ) codes. If no STX code is encountered, cursor starts at HOME or first unprotected position following HOME. If no ETX code is encountered transmission stops at end of page (end of last page if Auto Page is set).
Send Message All*	ESC s	<b>SHIFT SEND MSG</b>	Sends all data, unprotected and protected, in message which is bracketed by STX - ETX ( <b>SOM</b> <b>EOM</b> ) codes. If no STX code is encountered, cursor starts at HOME or first unprotected position following HOME. If no ETX code is encountered, transmission stops at end of page (end of last page if Auto Page is set). Protected fields are bracketed by ESC ) and ESC (.

\*Operation is modified by ADM 42/ADM 2 Attribute Control operations.

## 4.8 PRINT TRANSMISSION CONTROL OPERATIONS

Table 4-10 lists and describes all the Print Transmission operations available, along with the operation codes and/or keyboard operations required to execute them. For additional Print Transmission information, refer to paragraph 3.6.

## 4.9 PERSONALITY CONTROL

The ADM 42 personality has the capability of allowing certain terminal characteristics to be altered. These characteristics or traits may be "permanent" or "dynamic" (temporary). Dynamic operation codes may be executed from the host or the keyboard.

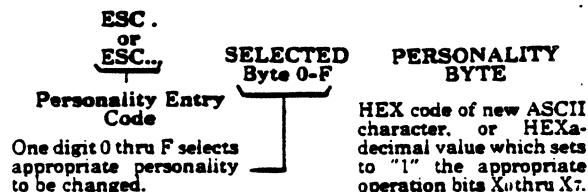
### 4.9.1 Display of Personality Codes

Figure 4-6 shows a coding chart for all the personality codes available in the ADM 42. This chart may be called up to the screen by executing ESC o 0. The displayed codes are HEX codes which have the following significance. The ADM 42 personality has the capability to allow certain terminal characteristics to be altered.

- a. HEX code 00 means NULL or NO-OP.
- b. The HEX codes for Bytes No. 0 thru No. 8 define the actual ASCII characters used in the applicable operation.
- c. The HEX codes for Bytes No. 9 and No. A have special significance for RTS ON Delay and RTS OFF Delay control operations as described in the paragraphs which follow.
- d. The HEX codes for Bytes No. B thru No. F and No. 10 and No. 11 have hexadecimal values which are defined during the following discussion of Dynamic Personality Change Codes.

### 4.9.2 Dynamic Personality Change Codes

Dynamic (temporary) personality modifications may be made by means of personality change operation codes. Dynamic modifications are reset during power-up of the ADM 42. The operation codes are escape sequences having the following structure:



#### 4.9.2.1 Modification of Escape Lead-In Character

As shown in figure 4-6, the standard or default Escape Lead-In Character is ESC (HEX 1B). Personality Byte 0 (ESC . 0) can modify the lead-in sequence to replace the normal ESC code with another ASCII character, which then would be used as an escape sequence lead in. SHIFT ESC then may also be used to execute an escape sequence from the keyboard.

#### 4.9.2.2 Modification of End Block Character(s)

Figure 4-6 shows that the standard 1st End Block (transmission terminator) character is CR (HEX 0D), and the 2nd End Block character is NUL (HEX 00). Personality Byte 1 (ESC . 1) is used to modify the 1st terminator, and Byte 2 (ESC . 2) is used to modify the 2nd terminator. These characters are transmitted at the end of all Block Mode transmissions.

#### 4.9.2.3 Modification of New Line Character(s)

Figure 4-6 shows that the standard 1st New Line character is US (HEX 1F) and the standard 2nd End Block character is NUL (HEX 00). Personality Byte 3 (ESC . 3) is used to modify the 1st New Line character, and Byte 4 (ESC . 4) is used to modify the 2nd New Line character. Example - It is desired to transmit LF and CR instead of the standard US character: execute: ESC . 3 0A, followed by ESC . 4 0D.

Figure 4-6. Display of Standard Personality Byte Values

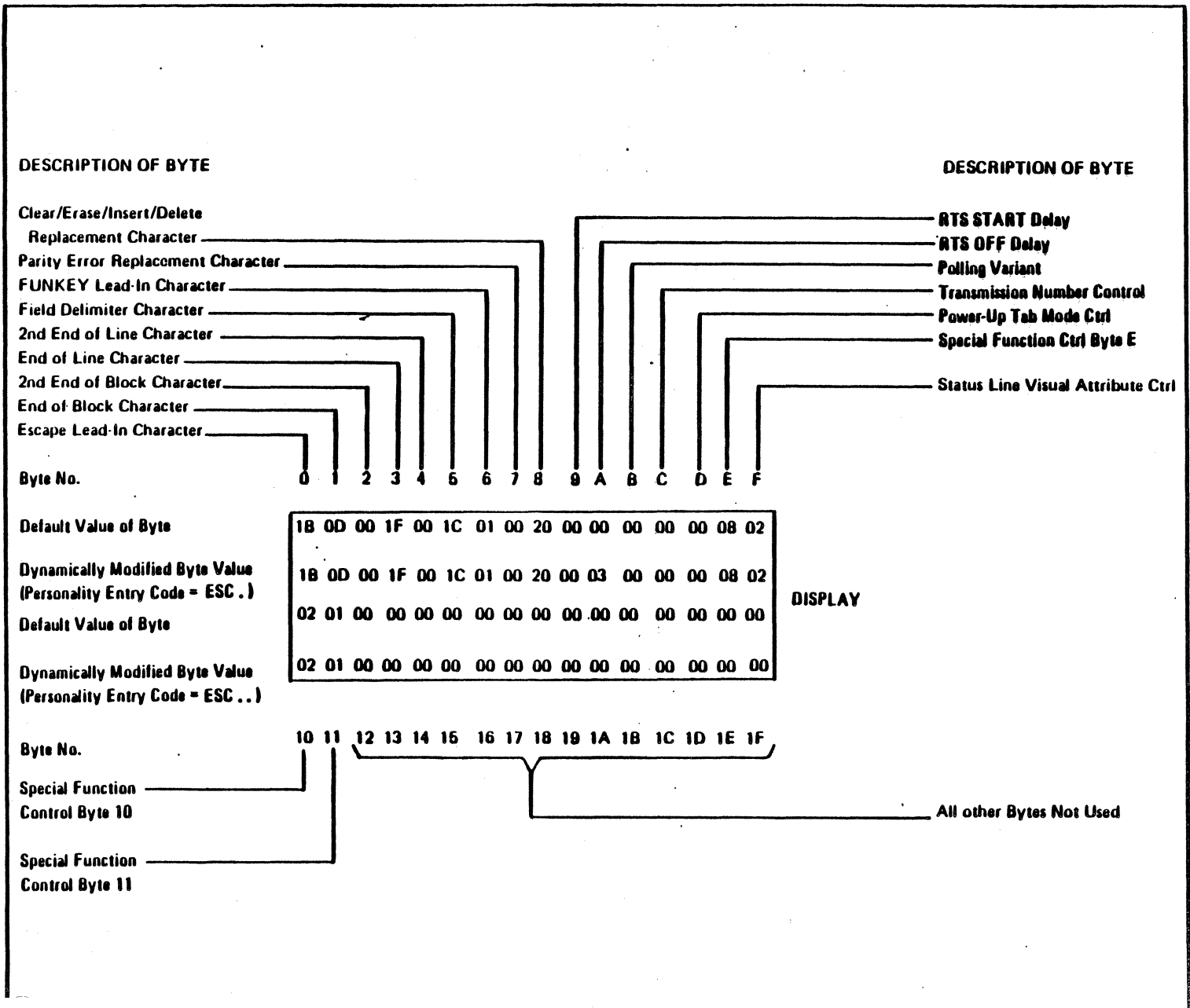


Table 4-9. Dynamic Baud Rate Control Operation Codes

DESIRED BAUD RATE	MODEM PORT	PRINTER PORT	EQUIVALENT BAUD RATE SWITCH POSITION
50	ESC: @	ESC: `	0
75	ESC: A	ESC: a	1
110	ESC: B	ESC: b	2
134.5	ESC: C	ESC: c	3
150	ESC: D	ESC: d	4
300	ESC: E	ESC: e	5
600	ESC: F	ESC: f	6
1200*	ESC: G	ESC: g	7
1800	ESC: H	ESC: h	8
2000	ESC: I	ESC: i	9
2400	ESC: J	ESC: j	10
3600	ESC: K	ESC: k	11
4800	ESC: L	ESC: l	12
7200	ESC: M	ESC: m	13
9600**	ESC: N	ESC: n	14

\* Standard (default) baud rate for PRINTER port

\*\* Standard (default) baud rate for MODEM port

#### 4.9.2.4 Modification of Field Separator Character

Figure 4-6 shows that the standard Field Separator character is FS (HEX 1C). Personality Byte 5 (ESC . 5) is used to modify this character. Field separators are usually employed when Protect Mode is set to delimit protected fields. **Example** - To change the Field Separator character from FS to EM, execute: ESC . 5 19.

#### 4.9.2.5 Modification of FUNKEY Lead-In Character

Figure 4-6 shows that the standard FUNKEY Lead-In character for unprogrammed function keys **F1** thru **F16**, without or with **SHIFT**, is SOH (HEX 01). Personality Byte 6 (ESC . 6) is used to modify this character. **Example** - To change the SOH character to the STX character, execute: ESC . 6 02.

Table 4-10. Print Transmission Control Operations

OPERATION	HOW TO EXECUTE		DESCRIPTION
	FROM HOST	KEYBOARD	
Print Page Formatted	ESC P	<b>PRINT</b>	Sends all data on page, up to cursor position to be transmitted in Page Format Mode (refer to paragraph 3.6). If Auto Page is set, print data on all pages up to cursor position, is sent.
Print Page Unformatted	ESC p	<b>SHIFT PRINT</b>	Sends all data on page, from cursor to EM code or end of page, in Unformatted Page Mode (refer to paragraph 3.6). If Auto Page is set, print data on all pages is sent. Space and null codes are transmitted along with all trailing spaces.
Print Protected Data as Spaces	ESC @	<b>ESC @</b>	Unprotected data is sent, with protected data sent as spaces. Nulls or trailing spaces are not transmitted and attribute codes are transmitted as spaces. If Auto Page is set, print data on all pages, up to cursor position, is sent.
Copy Print Without Display	Set: ESC A 1 Reset: DC4	<b>ESC A 1</b>	Data is read into print buffer (last page) at terminal baud rate and transmitted at printer baud rate in Unformatted Print Mode (refer to paragraph 3.6). Meanwhile, normal ADM 42 operations continue on other pages. Data is lost if buffer overflows.
Copy Print With Display	Set: ESC A 2 Reset: DC4	<b>ESC A 2</b>	Data is read into print buffer (last page) and displayed on current page(s) at terminal baud rate; transmitted at printer baud rate in Unformatted Print Mode (refer to paragraph 3.6). Data is lost if buffer overflows.
Unbuffered Print Page Format	ESC [ 0 P	<b>ESC [ 0 P</b>	All data on page is transmitted to printer, just as displayed on screen.
Unbuffered Print Protected Data as Spaces	ESC [ 0 @	<b>ESC [ 0 @</b>	All unprotected data on page is transmitted to printer, with protected data sent as spaces. Trailing spaces or nulls are not transmitted, and attribute control codes are transmitted as spaces
Buffered Print Page Format	ESC [ 2 P	<b>ESC [ 2 P</b>	Print buffer (last page of display memory) enabled. Data in page format is transferred to print buffer, then from the buffer to printer at printer baud rate.



Table 4-10. Print Transmission Control Operations (cont'd)

OPERATION	HOW TO EXECUTE		DESCRIPTION
	FROM HOST	KEYBOARD	
Buffered Print Protected Data as Spaces	ESC [ 2 @	ESC [ 2 @	Print buffer enabled. All unprotected data on page is transferred to print buffer with protected data sent as spaces. Trailing spaces or nulls are not transferred, and attribute control codes are sent as spaces. Contents of buffer are then transmitted to printer at printer baud rate.
Unbuffered Print Unformatted Data	ESC [ 0 p	ESC [ 0 p	All data on page, from cursor to EM code or end of page is transmitted unformatted, in one continuous stream. Line control codes and internal ADM 42 delay codes are omitted. SPACE and NULL codes are transmitted, along with trailing spaces.
Buffered Print Unformatted Data	ESC [ 2 p	ESC ] 2 p	Print buffer enabled. All data on page, from cursor to EM code or end of page is transferred unformatted, in one continuous stream to print buffer. Line control codes and internal ADM 42 delay codes are omitted. SPACE and NULL codes are transmitted, along with all trailing spaces. Contents of buffer are then transmitted to printer at printer baud rate.
Release Print Buffer	ESC A 0	ESC A 0	Print buffer is released but only after buffer is emptied and mode is reset.

#### 4.9.2.6 Modification of Parity Error Replacement Character

As shown in figure 4-6, the standard parity error replacement character (the character written on the screen when the ADM 42 senses a parity error). Thus, whatever is received in a message is displayed. Personality Byte 7 (ESC . 7) is used to modify this character. Example - To change the replacement character to NAK, execute: ESC . 7 95. Upon receipt of parity error, a NAK is displayed as a replacement character and PARITY is displayed in Status Line 25, if Bit X<sub>7</sub> of Personality Byte 7 is set.

#### 4.9.2.7 Modification of Clear/Erase/Insert/Delete Replacement

As shown in figure 4-6 the standard Clear/Erase/Insert/Delete replacement character is SPACE (HEX 20). Personality Byte 8 (ESC . 8) is used to modify this character. (Operation bits X<sub>6</sub> and X<sub>7</sub> of Personality Byte 10 modify the use of this character.) Example - To change the Clear/Erase/Insert/Delete character to NUL, execute: ESC . 8 00.

#### 4.9.2.8 RTS START Delay Control

The time delay in milliseconds from when Request To Send (RTS) goes high and the actual start of transmission (CTS) during a Block Mode transmission is the RTS START Delay time. Personality Byte 9 (ESC . 9) is used to establish a different time delay than that inherent in the terminal. HEX 00 (see figure 4-6) means no change in the inherent value. Any other HEX code, when converted to a decimal value, would express 1/2 the desired delay time in milliseconds. Example - To establish an RTS START Delay time of 115 milliseconds; execute: ESC .9 3A. (HEX 3A=Decimal 58.)

#### 4.9.2.9 RTS OFF Delay Control

The time delay, in milliseconds, from the end of transmission until RTS is turned OFF (RTS goes low), during Block Mode transmission, is the RTS OFF Delay time. Personality Byte A (ESC.A) is used to establish a different RTS OFF Delay time than that automatically established under firmware control (proportional to baud rate). Any other value desired should be established in accordance with the RTS OFF Delay times recommended by the chart in figure 4-7. Example - To establish an RTS OFF Delay time of 9 milliseconds (approximately 2x the number of interrupts required at 1800 baud,) execute: ESC . A 05.

#### 4.9.2.10 Polling Option Variant Control

Personality Byte B (ESC . B) controls the optional Polling Option variables listed in table 4-11. Each operation is either set to ON or OFF depending upon the logical condition (1 = ON; 0 = OFF) of the operation bit controlling that operation. The HEX code of this byte (ESC . B) is the HEXadecimal value of all the operation bits X<sub>0</sub> thru X<sub>7</sub> which must be set to ON at the same time. (Refer to table 4-11). Example - To establish a Polling operation in which: a) headers are required; b) any key may be used to establish Local Mode; and c) FAST SELECT is conditional, other polling operations are standard. Operation bits X<sub>2</sub>X<sub>1</sub>X<sub>0</sub> must be set; execute ESC . B 0 7.

#### Note

*For detailed information on Polling and Addressing, refer to Section V of this manual.*

#### 4.9.2.11 Polling Transmission Number Limit Control

The transmission number is the number of Polling transmissions that will be counted before recycling the count. This number is imbedded in the Polling header (refer to Section V) when operation bit X<sub>0</sub> of Personality Byte B (table 4-11) is set to ON. Personality Byte C (ESC . C) controls the transmission number limit. The default value (00) of this byte (see figure 4-6) specifies that the transmission number will not be sent. Other transmission number limits may be established as follows:

- ESC . C 01 specifies transmission number alternating between 01 and 00.
- ESC . C 02 thru ESC . C 09 counts transmission number 02 thru 09 before recycling.

#### 4.9.2.12 Power-Up Tab Mode Control (See figure 4-6.)

Power-Up Tab Mode Control Byte D (ESC . D) establishes whether or not Modulo Tab Mode is automatically set at power-up. Operation bits X<sub>0</sub> thru X<sub>6</sub> of this byte are set to ON to express an ASCII character which determines the modulo tabbing interval, in accordance with the ASCII vs. modulo values in figure 2-4. When bits X<sub>0</sub> thru X<sub>6</sub> are all OFF, Modulo Tab Mode is not set at power-up; modulo tabs can be set only by executing ESC 3 (ASCII), as described in paragraph 4.5.3.3. Modulo Tab Mode (and Typewriter Tab Mode) are reset by ESC 3 Space.

Bit X<sub>7</sub> of byte D is used as specified in table 4-11 to control whether Modulo tabs or Protect Mode tabs may be reset by the Clear All (ESC \* and ESC +) commands.

Table 4-11. Polling Option Variant Byte B Operations

OPERATION		ESC . B (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
X <sub>7</sub>	Reserved	80	Reserved	
X <sub>6</sub>	Communications Buffer Control	40	ON= Polling Communications Buffer (last two pages) is reserved (DIP Switch S4-SW8 ON). Incoming data held in buffer until message is completed. If no errors, message goes to screen.  OFF= Polling Communications Buffer disabled; incoming data goes directly to screen.	OFF
X <sub>5</sub>	Addressable Print Buffer Control	20	ON = Addressable Print Buffer (last page display memory) enabled (see Section V).  OFF= Addressable Print Buffer disabled.	OFF
X <sub>4</sub>	Transmit Last Character	10	ON = Transmission of last character (under cursor) is inhibited.  OFF= Last character (under cursor) is transmitted.	OFF
X <sub>3</sub>	Return to Local/ Idle State	08	ON = Terminal automatically returns to Local State upon completion of Polling message.  OFF= Terminal automatically returns to Idle State upon completion of Polling message.	OFF
X <sub>2</sub>	FAST SELECT Control	04	ON = FAST SELECT is conditional; terminal must be in Idle State to receive data.  OFF= FAST SELECT is unconditional; terminal is commanded to Idle State and must respond.	OFF
X <sub>1</sub>	Local Mode Control	02	ON = Any key may be used to establish Local State.  OFF= CONV required to establish Local State (Compose Mode).	OFF
X <sub>0</sub>	Headers Required	01	ON = Headers are required in all communications.  OFF= Headers are not required.	OFF

RECOMMENDED RTS OFF DELAY TIMES

RTS DELAY (MILLISECONDS)	BAUD RATE	OPERATION CODE	RTS DELAY (MILLISECONDS)	BAUD RATE	OPERATION CODE
343	50	ESC . A AC	9	1800	ESC . A 05
229	75	ESC . A 73	9	2000	ESC . A 05
175	110	ESC . A 58	7	2400	ESC . A 04
127	134.5	ESC . A 40	7	3600	ESC . A 04
115	150	ESC . A 3A	5	4800	ESC . A 03
57	300	ESC . A 1D	5	7200	ESC . A 03
29	600	ESC . A 0F	5	9600	ESC . A 03
15	1200	ESC . A 08			

Figure 4-7. Chart of Recommended RTS OFF Delay Times

Table 4-12. Power-Up Default Modulus Tabs Byte D.

OPERATION		ESC . D (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
X <sub>7</sub>	Typewriter Tab Clear	80	ON = Clear all typewriter tabs with Clear All (ESC * and ESC +) commands.  OFF = Only Protect Mode tabs cleared by Clear All command. Typewriter Tabs and Modulo Tabs are cleared in normal manner.	OFF
X <sub>6</sub>	Power-Up Tab Mode	40	Bits ON or OFF as required to define the ASCII character selected which may be used at Power-Up time to initialize Modulo Tab Mode, without executing ESC 3. Nominally, character utilized is the same used when the sequence ESC 3 is used.	ALL OFF
X <sub>5</sub>		20		
X <sub>4</sub>		10		
X <sub>3</sub>		08		
X <sub>2</sub>		04		
X <sub>1</sub>		02		
X <sub>0</sub>		01		

#### 4.9.2.13 Special Function Control Byte E (See Figure 4-6)

Several miscellaneous operations are controlled by Personality Control Byte E, as shown in table 4-13. The HEX value of this byte determines which operations are set to ON. The default value of this byte (08) specifies that video is not automatically turned off after approximately 20 minutes of no change in the display. Example - Execute ESC . E 89 to set operation bits  $X_7X_6X_0$  which specify: a) personality changes from the keyboard are inhibited; b) automatic video off is inhibited; and c) programming of function keys and display of FUNKEY messages are inhibited. Other default operations are not affected.

#### 4.9.2.14 Status Line Attribute Control Byte F

The personality byte (Byte F) controls the visual attribute of the message in Status Line 25, as shown in table 4-14. The HEX value of the byte determines which operation bits are set to ON. Also, operation bit  $X_0$  is further controlled by DIP switch S6-SW3 at location 14M, which defines whether the Status Line field will be underlined (SW3 ON) or blanked (SW3 OFF). The default value of this byte is 02 (see figure 4-6) which specifies that the 25th Line message will be blinking when entered. Example - Execute ESC . F 07 to set operation bits  $X_2X_1X_0$  and specify that the Status Line entry shall be reversed, blinking and underlined (SW3 set to ON position).

#### 4.9.2.15 Special Function Control Byte 10

Several miscellaneous operations are controlled by Personality Byte 10, as shown in table 4-15. The HEX value of the personality byte determines which operations are set to ON. The default value of this byte is 02 (see figure 4-6) which specifies that the Erase Page operation when used, will terminate Write Protect (WPRT). Example - Execute ESC .. 0 62 to set operation bits  $X_6X_5X_1$  which specify: a) for Clear operations, the replacement character is as specified in Personality Control Byte 8. The Erase Line, Scrolling, New Line, and Erase to Spaces operations are normal; b) protected field delimiter, FS, is imbedded after an unprotected field; and c)

Erase Page operation terminates Write Protect.

#### 4.9.2.16 Special Function Control Byte 11

Several power-up conditions are controlled by Personality Bytes 11, as shown in table 4-16. The HEX value of the byte determines which operations are set to ON. The default value of this byte is 01 (see figure 4-6) which specifies that CAP LOCK is set when power-up is complete.

### 4.10 VIDEO ATTRIBUTE CONTROL OPERATIONS

Video attributes highlight or otherwise call attention to selected portions of the display. The underlining or blanking video is selected by means of DIP switch S6-SW3 at location 14M.

#### 4.10.1 Cursor and Video Control

The sequence for modifying the cursor and video is ESC ~ (ASCII), where (ASCII) defines the modification. The modification applies to every display page and remains in effect until the terminal is RESET or is further modified by an ESC ~ operation code. The cursor and video modification operation codes are as follows:

- ESC ~ 0 Video OFF (data entered is retained)
- ESC ~ 1 Video ON; cursor OFF
- ESC ~ 2 Video ON; cursor steady
- ESC ~ 3 Video ON; cursor blinking

#### 4.10.2 Displayable Character Video

The video attributes for displayable characters (including displayed control codes) may be modified by ESC G (0 thru F), where (0 thru F)

Table 4-13. Special Function Control Byte E Operations

OPERATION		ESC . E (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
X <sub>7</sub>	Keyboard Personality Changes	80	ON = Inhibit personality changes from the keyboard.  OFF= Personality changes from keyboard are accepted.	OFF
X <sub>6</sub>	Line Erase With CR	40	ON = CR erases remainder of current line before executing normal CR operation.  OFF= Normal CR operation.	OFF
X <sub>5</sub>	New Line With CR	20	ON = Executing CR also executes New Line.  OFF= Normal CR operation.	OFF
X <sub>4</sub>	Auto Line Wrap	10	ON = Auto Line Wrap is inhibited. Operator must use CR ,NL , etc. to get to next line.  OFF= Auto Line Wrap - New Line automatically executed when position 80 is filled.	OFF
X <sub>3</sub>	Auto Video Shut Off	08	ON = CRT video not shut off after approximately 20 minutes of no display activity.  OFF= CRT video automatically shut off after approximately 20 minutes of no display activity.	ON
X <sub>2</sub>	Pseudo Send	04	ON = <b>PRINT</b> sends SOH P CR <b>SHIFT PRINT</b> sends SOH p CR  <b>SEND LINE</b> sends SOH Q CR <b>SHIFT SEND LINE</b> sends SOH q CR  <b>SEND PAGE</b> sends SOH R CR <b>SHIFT SEND LINE</b> sends SOH r CR  <b>SEND MSG</b> sends SOH S CR <b>SHIFT SEND MSG</b> sends SOH s CR  OFF= Disables mode ; normal SEND or PRINT operations	OFF

**Table 4-13. Special Function Control Byte E Operations (cont'd)**

OPERATION		ESC . E (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
X <sub>1</sub>	Load Cursor Skip	02	ON = Cursor skips out of protected field if position is specified during a Load Cursor operation.  OFF= Cursor remains in protected field if position is specified during a Load Cursor operation.	OFF
X <sub>0</sub>	FUNKEY Programming/ Display	01	ON = Inhibit programming of function keys and display of FUNKEY messages.  OFF= Normal FUNKEY operations.	OFF

**Table 4-14. Status Line Visual Attribute Control Byte F Operations**

OPERATION		ESC . F (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
X <sub>7</sub>	Reserved	80	Reserved	OFF
X <sub>6</sub>	↓	40	↓	↓
X <sub>5</sub>	↓	20	↓	↓
X <sub>4</sub>	↓	10	↓	↓
X <sub>3</sub>	↓	08	↓	↓
X <sub>2</sub>	Reversing Control	04	ON = Status Line message reversed.  OFF= Status Line message in normal or personality video.	OFF
X <sub>1</sub>	Blinking Control	02	ON = Status Line message blinking.  OFF= Status Line message in normal or personality video.	ON
X <sub>0</sub>	Underlining or Blanking Control	01	ON = Status Line message underlined (S6-SW3 @ 14M set to ON) or blanked (S6-SW3 at OFF).  OFF= Status Line message in normal or personality video.	OFF

Table 4-15. Special Function Control Byte 10 Operations

OPERATION		ESC . . 0 (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
X <sub>7</sub>	Erase to Spaces Replacement Character	80	ON = Erase to Spaces operation uses replacement character specified by Personality Byte 8.  OFF = Normal Erase to Spaces operation.	OFF
X <sub>6</sub>	Clear to Spaces Replacement Character	40	ON = Clear to Spaces operation uses replacement character specified by Personality Byte 8.  OFF = Normal Clear to Spaces operation.	OFF
X <sub>5</sub>	FS vs. Protected Field Control	20	ON = Protected field delimiter, FS, is imbedded after unprotected field.  OFF = Protected field delimiter, FS, is imbedded before unprotected field.	OFF
X <sub>4</sub>	Transmit NL Control	10	ON = Inhibit transmission of 1st and 2nd New Line characters (Personality Bytes 3 and 4)  OFF = Normal transmission of 1st and 2nd New Line characters.	OFF
X <sub>3</sub>	Scrolling Control	08	ON = Scrolling of an unprotected page is inhibited.  OFF = Normal Scrolling operation.	OFF
X <sub>2</sub>	Reserved	04	Reserved	OFF
X <sub>1</sub>	Erase Page vs. Write Protect	02	ON = Erase Page operation resets Write Protect Mode.  OFF = Normal Erase Page operation.	ON
X <sub>0</sub>	Erase Line vs. Write Protect	01	ON = Erase Line operation resets Write Protect Mode (WPRT).  OFF = Normal Erase Line operation.	OFF



Table 4-16. Special Function Control Byte 11 Operations

OPERATION		ESC . . 1 (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
X <sub>7</sub>	Reserved	80	Reserved	ALL OFF
X <sub>6</sub>		40		
X <sub>5</sub>		20		
X <sub>4</sub>		10		
X <sub>3</sub>		08		
X <sub>2</sub>	Power-Up Conv Mode Control	04	ON = Conversation Mode is set when power-up is completed.  OFF= Block Mode is set when power-up is completed.	OFF
X <sub>1</sub>	Reserved	02	Reserved	OFF
X <sub>0</sub>	Power-Up CAP LOCK Control	01	ON = CAP LOCK is set when power-up is completed.  OFF= CAP LOCK is not set when power-up is completed.	ON

defines the attribute. (Refer to table 4-17.) The attributes apply to the area bracketed by the operation code, or to the end of the current page (DIP switch S6-SW2 OFF) if a closing operation code is not entered. (DIP switch S6-SW2 ON causes the attribute to be effective only to the end of the current line.) The operation is not changed if Auto Page is set.

**Note**

*When the optional Line Drawing character generator is installed, the Standard Character Generator is also available for use.*

**4.10.3 ADM 42/ADM 2 Attribute Mode Control**

Main logic board DIP switch S6-SW1 provides a means of selecting ADM 42 Attribute Mode (S6-

SW1 OFF) or ADM 2 Attribute Mode (S6-SW1 ON) for special control of the blanking and underlining attributes. Table 4-18 lists the various operation codes required to select the attributes. If any of these special attributes is selected, the Send Line All, Send Page All, and Send Message All operations (table 4-8) are modified as follows:

- ADM 42 Attribute Mode - ESC G (\*) is sent for the attribute code, where (\*) is the appropriate ASCII from table 4-17.
- ADM 2 Attribute Mode - Between the ESC) and ESC ( codes which bracket protected fields, BEL is sent for the BLINK delimiter, and CAN is sent for the BLANK (UNDERLINE) delimiter.

**Note**

*When the ADM 2 Attribute Mode is set, the ADM 42 attributes are inhibited.*

**Table 4-17. Video Attribute Control Operation Codes**

FUNCTION	STD CHAR. GENERATOR	ALT. CHAR. GENERATOR
Reset to Normal Video	ESC G 0	ESC G 0
Limited Graphics Mode Enable		ESC G 8
Blanking (S6-SW3 OFF) or Underlining (S6-SW3 ON) of area	ESC G 1 or ESC -	ESC G 9 or ESC -
Blinking of Area	ESC G 2 or ESC ^	ESC G A or ESC ^
Blanking (S6-SW3 OFF) or Underlining (S6-SW3 ON) and Blinking of Area	ESC G 3	ESC G B
Reversing of Area	ESC G 4	ESC G C
Blanking (S6-SW3 OFF) or Underlining (S6-SW3 ON) and Reversing of Area	ESC G 5	ESC G D
Blinking and Reversing of Area	ESC G 6	ESC G E
Blanking (S6-SW3 OFF) or Underlining (S6-SW3 ON) and Reversing of Area	ESC G 7	ESC G F

NOTE: The above operations apply when ADM 42 Attribute Mode is selected (S6-SW1 OFF). If ADM 2 Attribute Mode is selected (S6-SW1 ON), the above operations are inhibited; the attribute codes will be displayed but not acted upon.

**Table 4-18. Operation Codes for ADM 42/ADM 2 Attribute Mode Control**

FUNCTION	ADM 42 MODE	ADM 2 MODE
Blanking for entire page	ESC G (Space)	ESC G I
Blanking to end of line	ESC G ~	ESC G #
Underlining for entire page	ESC G \$	ESC G %
Underlining to end of line	ESC G &	ESC G '

## SECTION V

# POLLING AND ADDRESSING

### 5.1 ADM 42 POLLING

When the Polling Option is installed in the ADM 42, the terminal may then act as a polling terminal in a multi-point communications network. Group Poll, Group Select, and Multi-Point Contention polling activities are also available. When active in a polling environment, the ADM 42 is prevented from initiating transmission of traffic (data) except under the control of the network control center. All message transmission is between the network control center and the selected terminal or terminals; these messages, as well as control of the entire communications network, are controlled entirely by a polling/addressing dialogue initiated by the control center. Within the dialogue, the control center periodically asks or "polls" each device to see if any messages are waiting; if so, the device is commanded to transmit its message in a prescribed format. The control center may also send messages to a specified terminal or terminals at any time.

#### 5.1.1 Setting ADM 42 Address

The ADM 42 Polling Address is a two-character code (A<sub>1</sub>A<sub>2</sub>) which must be ASCII characters and not control characters. The terminal will recognize and respond to only the specified address. The address is preset by means to two banks of DIP switches (locations 5L and 6L) on the option board (see figure 2-4). Each switch in the bank represents one bit in the 7-bit address: SW1 OFF sets bit 0 (LSB) = 1; SW2 OFF sets bit 1 = 1; etc. SW8 (location 5L only) ON enables the polling option. SW8 ON at location 6L enables the Polling

Communications Buffer, which must be selected by setting bit X<sub>s</sub> of Personality Byte B. The preset switch settings establish the Polling Address for the ADM 42. This address may be displayed by executing ESC 'A from the keyboard.

#### 5.1.2 Establishing Polling Operations

##### 5.1.2.1 Setting Up Terminal

The information to be transmitted when the terminal is polled must be entered on the ADM 42 display prior to being polled. Proceed as follows:

1. Type **CONV MODE** to lighted state, to enable data entry from the keyboard.

#### Note

*This requirement may be modified by setting bit X<sub>i</sub> of Personality Byte B.*

2. Enter the data just as it is to be transmitted. All editing and embedding of control characters must be done at this time.
3. Select and execute the appropriate activity to enable the ADM 42 response to a POLL inquiry, as follows:
  - **SEND LINE** , to cause the ADM 42 to send all unprotected characters from the beginning of the line through the cursor position. To send protected as well as unprotected characters, type **SHIFT SEND LINE** . This operation is the same as the forced Send v or Send x from the computer.

#### Note

*Setting bit X<sub>4</sub> of Personality Byte B will inhibit transmission of the character position under the cursor.*

- **SEND PAGE** , to cause the ADM 42 to send all unprotected characters from the beginning of the page through the cursor position. To send protected, as well as unprotected characters, type **SHIFT SEND PAGE** . This operation is the same as the forced Send w or Send y from the computer.

#### Note

*Setting bit X<sub>4</sub> of Personality Byte B will inhibit transmission of the character position under the cursor.*

- **SEND MSG** , to cause the ADM 42 to send all unprotected characters in the display bracketed by STX and ETX codes. If no STX is encountered, transmission will start at the HOME position; if no ETX is encountered, transmission will stop at the end of the page. To send protected, as well as unprotected characters, type **SHIFT SEND MSG** . This operation is the same as the forced Send z or Send . from the computer.

4. The terminal is now ready to transmit. It waits to be polled. (The CONV MODE light is out).

### 5.1.2.2 Monitor Mode Operation

The ADM 42 may be set up for Monitor Mode operation by executing ESC 'M from the keyboard. This operation causes all data (including line control data) on the RCVE line to be displayed, whether addressed to this terminal or not. This mode is usually employed as a troubleshooting activity. Monitor Mode is reset by executing **SHIFT RESET** from the keyboard or by an unconditional polling sequence from the host computer.

### 5.1.2.3 Enabling Keyboard

To enable the ADM 42 keyboard for data entry, type **CONV MODE** to its lighted state. If this operation does not return the terminal to keyboard operation, type **SHIFT RESET** . The lighted **CONV MODE** key indicates when control has been returned to the keyboard. The computer can override local keyboard operation by executing FAST SELECT, or BROADCAST SELECT.

### 5.1.3 Removing Terminal from Polling Status

To set Non-Polling Mode, execute ESC 'R from the keyboard. The ADM 42 will no longer respond as a polling terminal. To re-establish Polling Mode, execute ESC 'S from the keyboard. Polling Mode may also be disabled by setting option board DIP switch S3-SW8 @ 5L to OFF.

### 5.1.4 Initiating Standard Polling Sequence

All polling operations are initiated by the network control through a standard control sequence. This sequence consists of the following:

1. EOT Character (EOT).
2. Two Address Characters (A<sub>1</sub>A<sub>2</sub>). In order for the terminal to respond, these characters must match the two address characters established by option board DIP switches S3 @ 5L and S4 @ 6L.
3. Function Code. This code is an ASCII character, used to identify the operation to be performed by the terminal. It may be one of the following:
  - p POLL
  - q SELECT

- r SEQUENTIAL SELECT
- s FAST SELECT
- t BROADCAST SELECT
- v SEND LINE FOREGROUND
- w SEND PAGE FOREGROUND
- x SEND LINE ALL
- y SEND PAGE ALL
- z SEND MSG FOREGROUND
- { SEND MSG ALL

4. ENQ Character (ENQ). This character is present only when a POLL (p), SELECT (q), or SEND (v, w, x, y, z, { ) operation is called for.

### 5.1.5 POLL Responses (See Figure 5-1)

The POLL sequence is initiated by the control center to inquiry the ADM 42 whether there is data to be sent. When the ADM 42 is sent the sequence "EOT A<sub>1</sub>A<sub>2</sub>p ENQ" the terminal will respond as follows:

1. If there is no message waiting to be sent (traffic), the terminal sends an EOT character to the control center and then returns to the Idle state.
2. If there is traffic, the terminal sends the message to the control center in accordance with how the message is prepared, the instructions in the Function Code and the personality of the terminal.
  - a. If the poll message is to be taken from the screen or a programmed FUNKEY, the terminal response is as follows:

- \*SOH Character (SOH).
- \*Two Address Characters (A<sub>1</sub>A<sub>2</sub>). These characters are the preset terminal address.
- \*Transmission Number (#). This number may be inhibited by executing ESC . C 00, and thus not appear. If enabled, the maximum number of transmissions counted (re-transmissions are not counted) may be between 1 and 9, depending upon the value selected by Personality Byte C (ESC . C).
- STX Character (STX). This character identifies the beginning of the message to be transmitted.
- Text. This is the message which is written on the screen or stored under a FUNKEY. The message is sent in one of two formats, depending on whether or not Protect Mode is set, as follows:
  1. Protect Mode OFF. All characters except NUL are sent. A US character is inserted in the string as the cursor moves from the end of one line to the beginning of the next.
  2. Protect Mode ON. All foreground characters are sent; each protected field is designated by an FS character. A US character is transmitted as in 1 above.
  3. If the Function Code is a Send code (v, w, x, y, z, or { ) instead of "p" the terminal complies with the instruction as described under Send Responses.
- ETX Character (ETX). This character designates the end of the polled message.
- LRC Character (LRC). This character represents the modulo 2 sum of the text transmitted, plus the ETX character. It is used by the control center to determine whether or not the text was received correctly.
  - b. If the polling message is to be taken from an unprogrammed function key F1 thru F16

\*Headers are not part of the standard ADM 42 polling response. Header characters will be present only, if selected by setting bit X<sub>0</sub> of Personality Byte B.

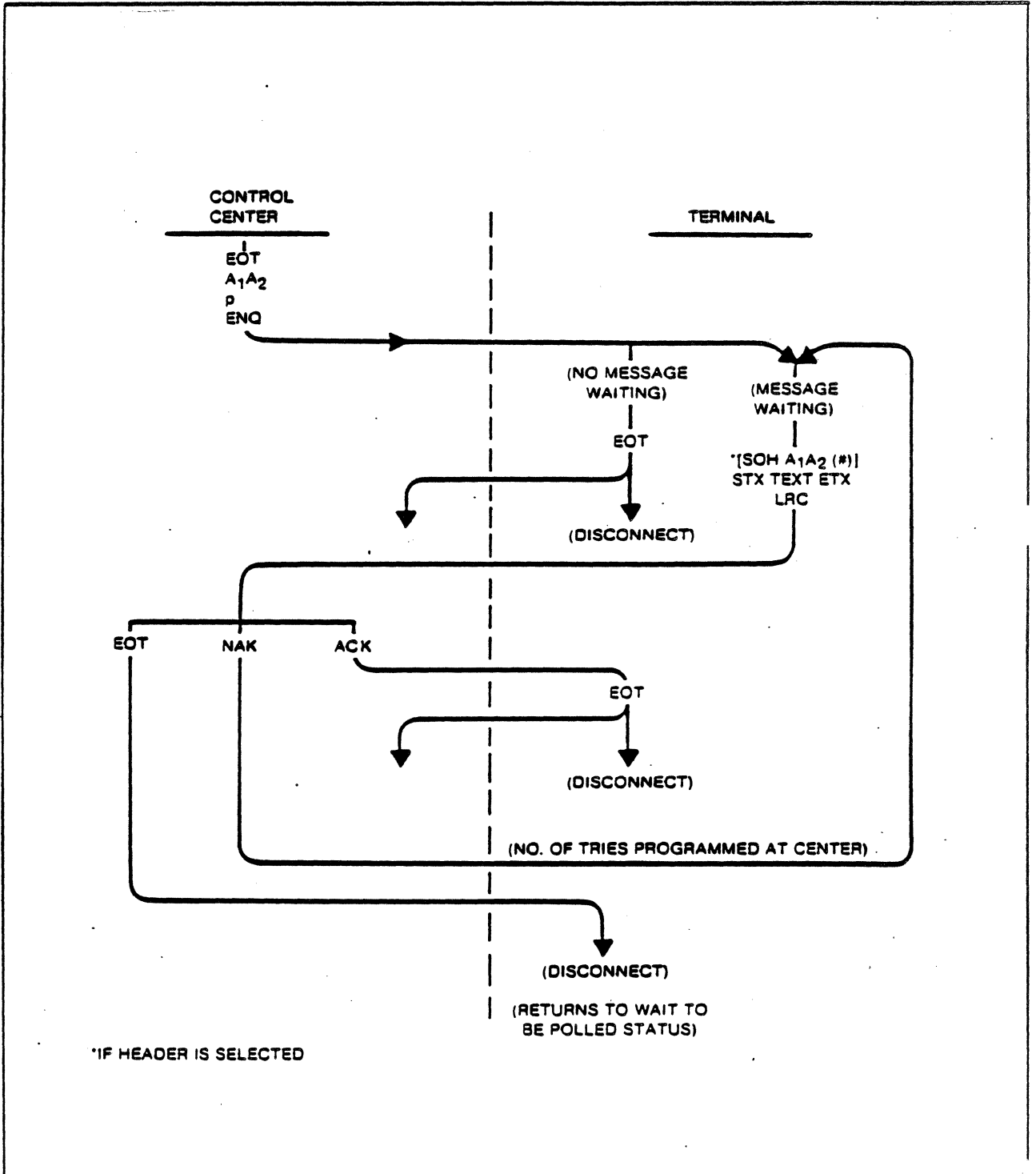


Figure 5-1. POLL Function Dialogue, Flow Diagram

and headers are not selected, the terminal responds: "SOH (character) ETX LRC". Note that "SOH" replaces the normal STX character and the (character) is the assigned F1 thru F16 character.

- c. If the polling message is to be taken from an unprogrammed function key F1 thru F16 and headers are selected, the terminal responds: "SOH A<sub>1</sub>A<sub>2</sub> (#) STX DLE (character) ETX LRC". Note that DLE (or some character other than SOH, STX, EOT, ETX, or LRC) replaces the normal SOH character.
3. After the ADM 42 has sent the LRC character, it positions the cursor at the original location and waits for the control center to acknowledge receipt of the message. The acknowledgement will consist of one of the following:
  - **ACK.** The message was received correctly. The terminal responds by transmitting "EOT" and disconnecting.
  - **NAK.** The message was received with errors. The terminal will respond by retransmitting the message (transmission number is not incremented) and again waiting for control center acknowledgement. The control center will determine how many transmissions will be called for.
  - **EOT.** Retransmission is required. The terminal responds by positioning the cursor at the original location and awaiting polling.

### 5.1.6 SELECT Responses (See Figure 5-2)

The SELECT sequence is used when the control center wishes to send a message to a single addressed terminal. When the ADM 42 is addressed by the sequence "EOT A<sub>1</sub>A<sub>2</sub>q ENQ" the terminal responds as follows:

1. If the terminal is BUSY, it sends a NAK character, beeps to alert the operator that a message is waiting, then disconnects. BUSY is defined as any of the following states:
  - The terminal is waiting to be polled.
  - The operator is entering data.
  - The terminal is sending data to the printer.
2. If the terminal is not BUSY, it sends an ACK to the control center, and waits for the center to send "[SOH A<sub>1</sub>A<sub>2</sub>(#)] STX TEXT ETX LRC". If there is an EOT in the message, the terminal will disconnect to Idle state.
3. After the selected header is received, the following events occur:
  - If there are no errors, the ADM 42 sends an ACK to the control center, then disconnects to the Idle state.
  - If there are errors, the ADM 42 sends a NAK character to the control center and awaits retransmission of the message.
  - The control center may then retransmit the message, starting with the selected header. If the control center decides not to retransmit, it sends an EOT instead of the selected header; the ADM 42 disconnects to the Idle state.

### 5.1.7 SEQUENTIAL SELECT Responses (See Figure 5-3)

The SEQUENTIAL SELECT operation is used to sequentially address a number of terminals with a single extended control message. The header sequence is "EOT A<sub>1</sub>A<sub>2</sub>r B<sub>1</sub>B<sub>2</sub>r...N<sub>1</sub>N<sub>2</sub>s". Note that the FAST SELECT (s) Function Code is sent to the last terminal addressed. This code is always

\*Headers are not part of the standard ADM 42 polling response. Header characters will be present only, if selected by setting bit X<sub>0</sub> of Personality Byte B.

followed by "[SOH N<sub>1</sub>N<sub>2</sub>(#)]STX TEXT ETX LRC." The following events take place:

1. All terminals except the last terminal (N<sub>1</sub>N<sub>2</sub>) test their BUSY status. If BUSY, each terminal will disconnect without responding.
2. Last terminal (N<sub>1</sub>N<sub>2</sub>) connects unconditionally and waits for an STX character. All addressed terminals which are not BUSY connect and wait for an STX character.
3. Following receipt of "...ETX LRC" all addressed terminals except last terminal (N<sub>1</sub>N<sub>2</sub>) disconnect without responding. Terminal N<sub>1</sub>N<sub>2</sub> sends either an ACK or NAK to the control center, then disconnects to Idle or personality state. The control center decides whether or not to retransmit if NAK is returned.

### 5.1.8 FAST SELECT Responses (See Figure 5-4)

The FAST SELECT function is used when the control center requires fast, unconditional (see note) selection of a specific terminal. Upon receiving the header sequence (EOT N<sub>1</sub>N<sub>2</sub> s), the terminal will unconditionally connect and wait for the message block. The terminal will not respond until after it has received the LRC character. The complete message block code is "[SOH N<sub>1</sub>N<sub>2</sub>(#)] STX Text ETX LRC". After receiving LRC, the terminal sends either ACK or NAK to the control center, then disconnects to Idle (or personality) state. The control center decides whether or not to transmit if NAK is returned.

#### Note

*Setting bit X<sub>2</sub> of Personality Byte B will cause FAST SELECT to be conditional only if terminal is in Idle state.*

\*Headers are not part of the standard ADM 42 polling response. Header characters will be present only, if selected by setting bit X<sub>0</sub> of Personality Byte B.

### 5.1.9 BROADCAST SELECT Responses (See Figure 5-5)

The BROADCAST SELECT function is used when the control center requires fast, unconditional selection of a number of terminals. All terminals on the line receive the same message under the header sequence. When each terminal receives the sequence "EOT N<sub>1</sub>N<sub>2</sub>t" followed by "[SOH N<sub>1</sub>N<sub>2</sub>(#)] STX Text ETX LRC" it will connect unconditionally, whether BUSY or not. Following receipt of the sequence, all terminals except the addressed terminal disconnect to the Idle (or personality) state without responding. The addressed terminal will send either ACK or NAK to the control center, then disconnect to the Idle (or personality) state. The control center decides whether or not to retransmit if NAK is returned.

### 5.1.10 SEND Responses (See Figure 5-6)

One of six characters specifies the information that the addressed terminal is to send. The function character (v, w, x, y, z, or t) is transmitted in place of the "q" in the standard header. The six possible Send functions are as follows:

1. **Send Line Foreground (v).** The terminal will send all foreground unprotected data in the line in which the cursor rests from beginning of line to the cursor position. NUL characters are not transmitted. The terminal marks each protected area in the line by sending an FS character.
2. **Send Page Foreground (w).** The terminal will send all foreground data in the page, starting at the HOME location and ending at cursor position. NUL characters are not transmitted. The terminal marks each protected area in the page by sending an FS character. Each end of line is indicated by US character.



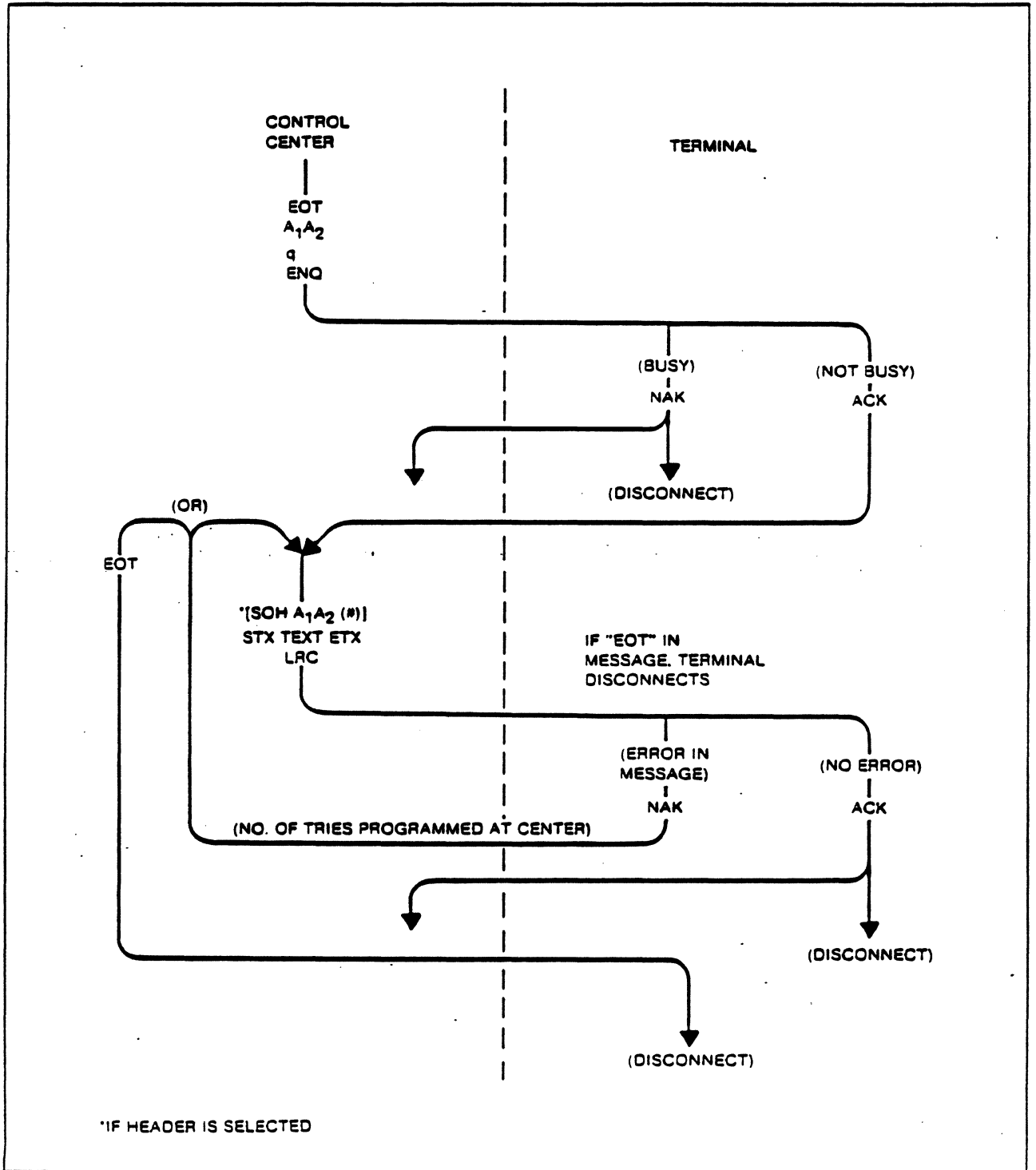


Figure 5-2. SELECT Function Dialogue, Flow Diagram

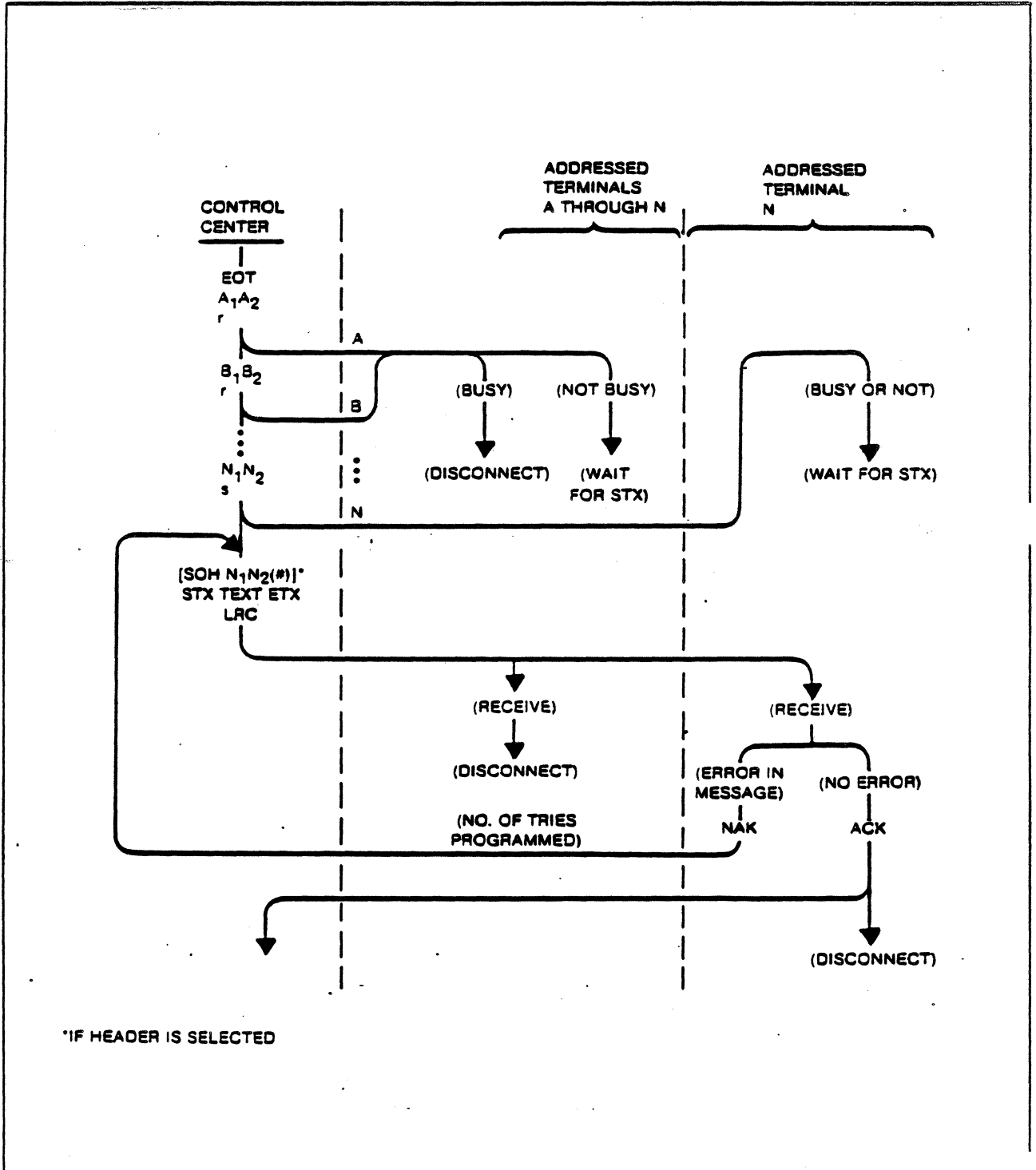


Figure 5-3. SEQUENTIAL SELECT Function Dialogue, Flow Diagram

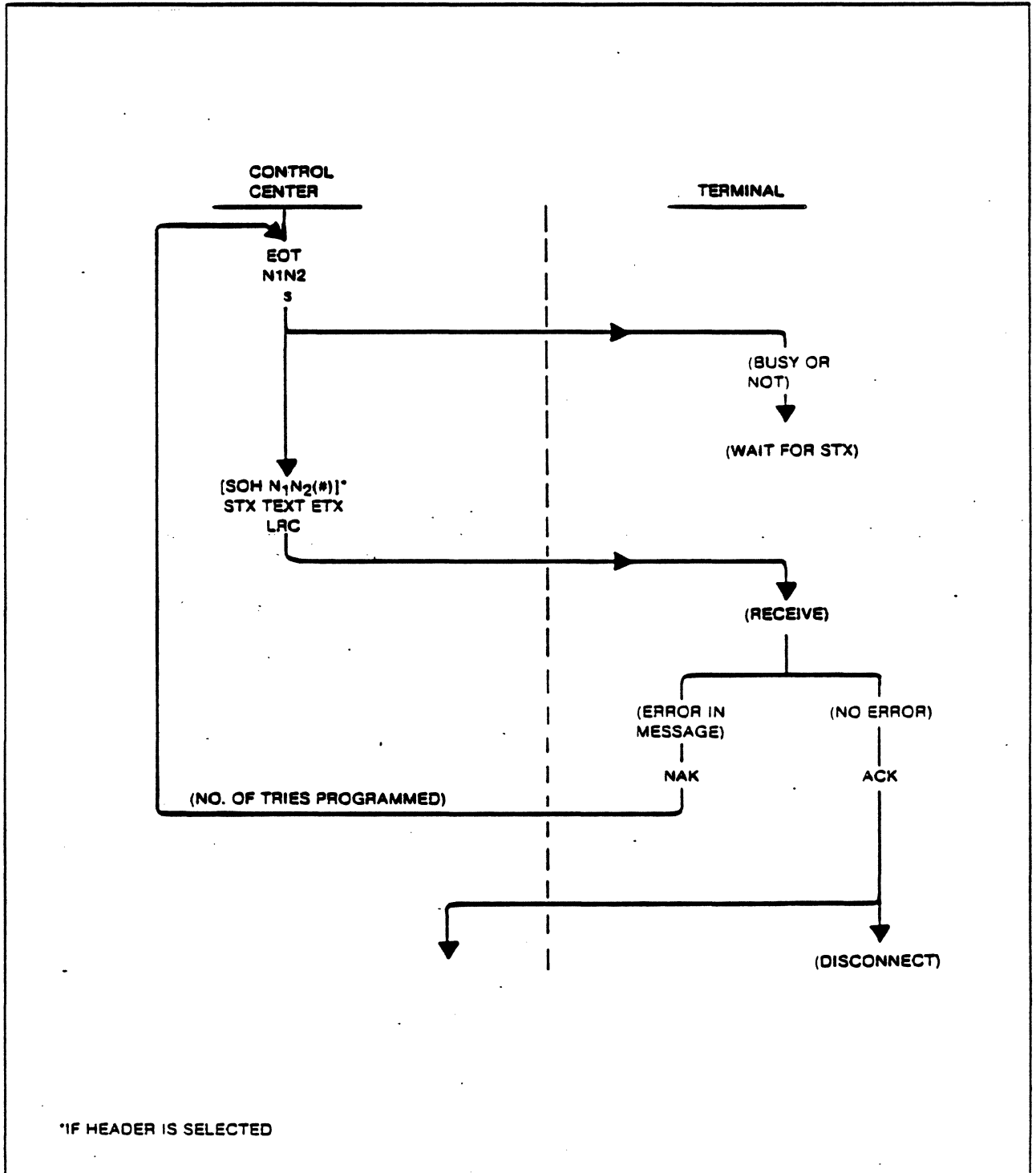


Figure 5-4. FAST SELECT Function Dialogue, Flow Diagram

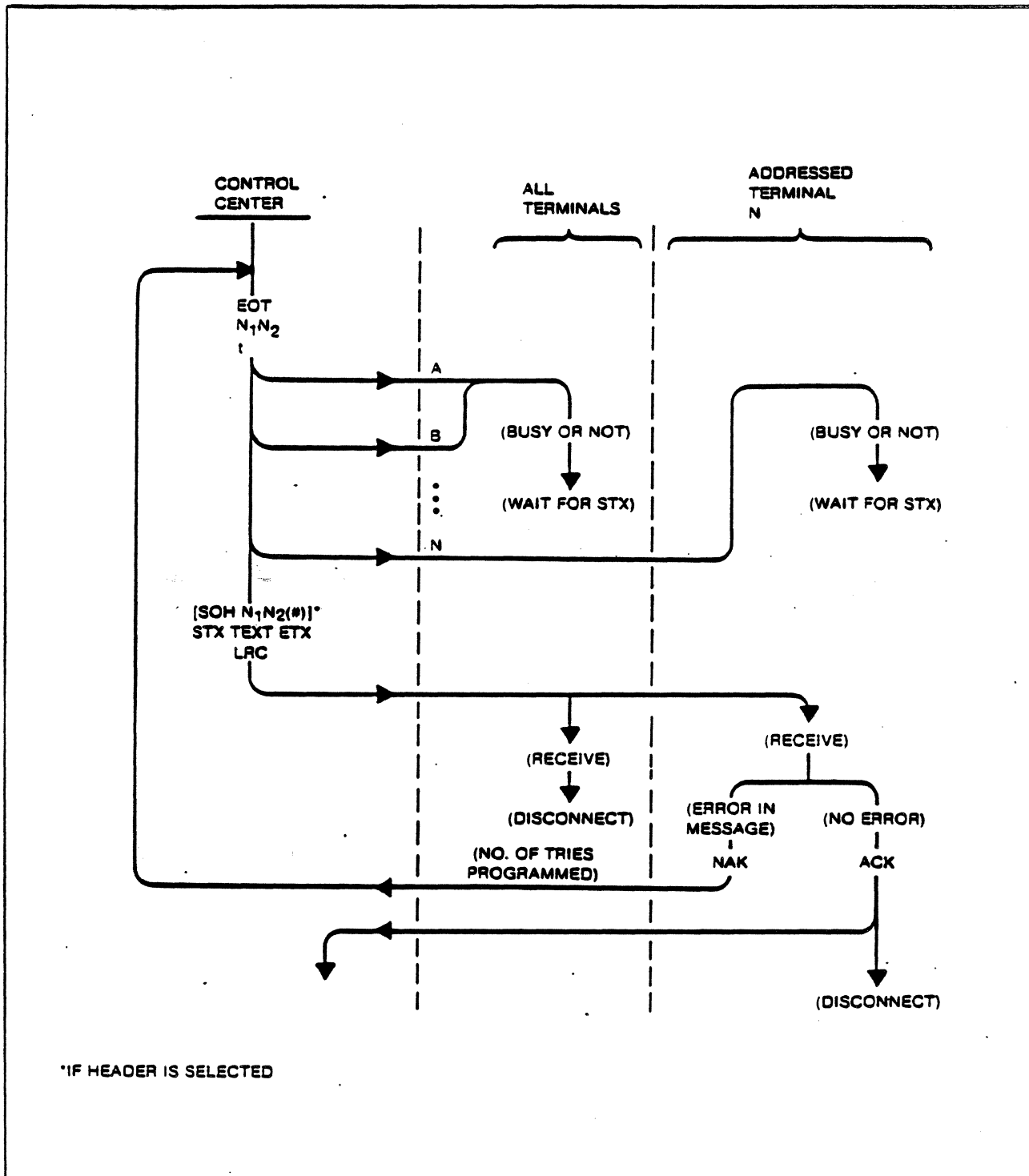


Figure 5-5. BROADCAST SELECT Function Dialogue, Flow Diagram

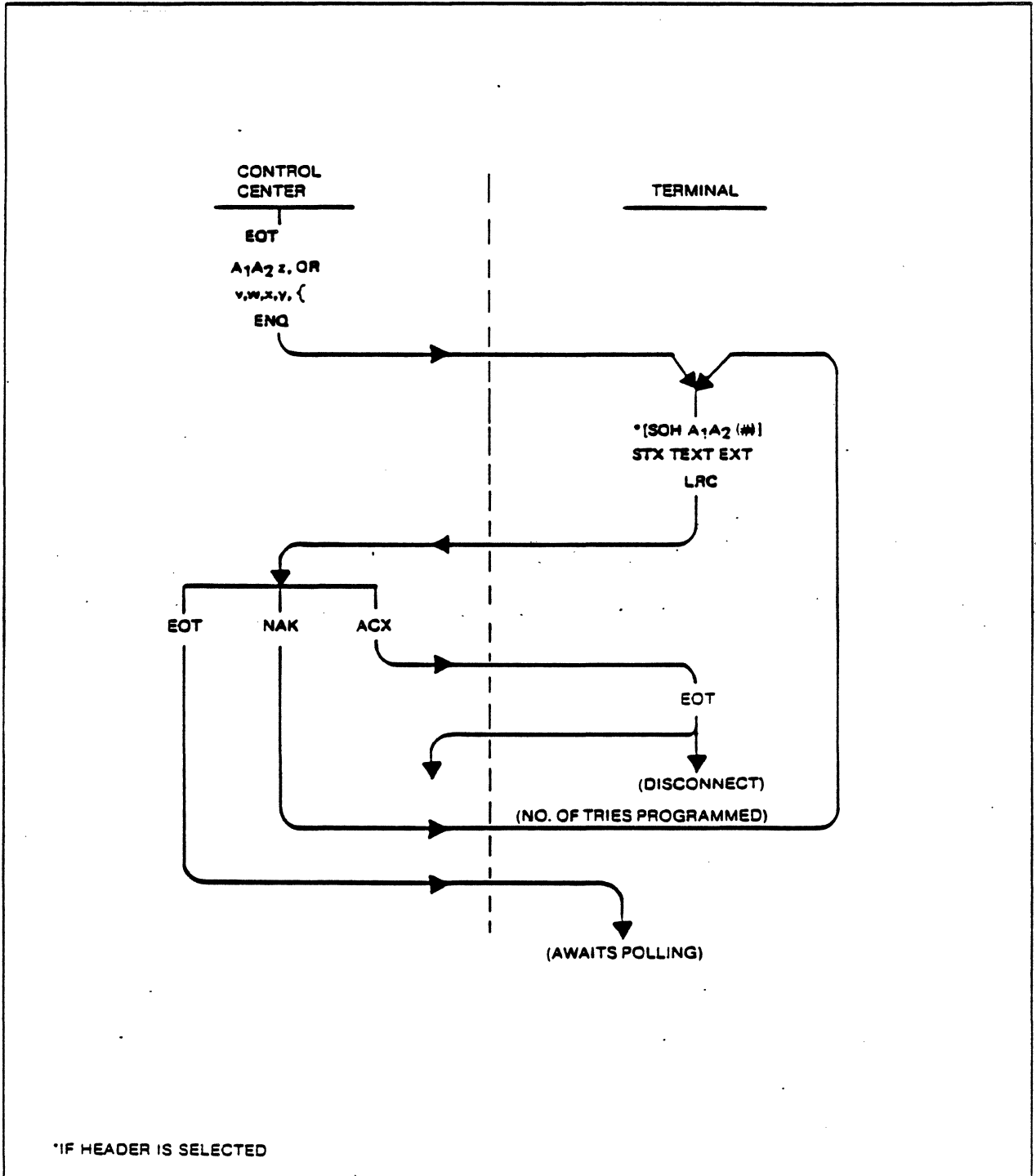


Figure 5-6. SEND Function Dialogue, Flow Diagram

3. **Send Line All (x).** The terminal will send all data, protected and unprotected, in the line in which the cursor rests and stops at cursor. All characters are transmitted, with the operation code ESC ) preceding the first character of a protected field, and the operation code ESC ( following the last character of a protected field.
4. **Send Page All (y).** The terminal will send all data, protected and unprotected, in the page, beginning at the HOME location, stopping at cursor. All characters are transmitted, with the operation code ESC ) preceding the first character of a protected field, and the operation code ESC ( following the last character of a protected field.
5. **Send Message Foreground (z).** The terminal will send all foreground data following an STX code and ending with an ETX code. NUL characters are not transmitted. The terminal marks each protected area within the STX/ETX brackets by sending an FS character. If no STX is on the screen, transmission starts at HOME. If no ETX is on the screen, transmission stops at last position on the screen.
6. **Send Message All (t).** The terminal will send all data, protected and unprotected, between the STX/ETX codes. All characters are transmitted with the operation code ESC) preceding the first character of a protected field, and the operation code ESC ( after the last character of a protected field. If no STX is on the screen, transmission starts at HOME. If no ETX is on the screen, transmission stops at the last position on the screen. (STX is written on the screen by typing **SOM** ; ETX is written by typing **EOM** .)

Control and operation codes may be imbedded in memory by preceding the control code by an ESC; i.e. **ESC RETURN** will cause CR character to be written to the screen rather than being interpreted as a RETURN operation.

## 5.2 SPECIAL POLLING OPERATIONS

The ADM 42, with the Polling Option installed, may perform in several special polling environments. These environments consists of GROUP POLL, GROUP SELECT, MULTI-POINT CONTENTION, and ADDRESSABLE PRINTER operation. The paragraphs which follow describe these operations in terms of their differences from standard polling operations.

### 5.2.1 GROUP POLL Operations

GROUP POLL is essentially the same as standard POLL operations, except that the GROUP POLL address is the same for each terminal. All terminals are daisy chained via their EXTENSION/MODEM ports. Each terminal responds as would an individual terminal under ADM 42 POLL. The GROUP POLL address for each terminal on the line is set up using option board DIP switch banks S5 @ 8L and S6 @ 9L in the same manner as for ADM 42 POLL (using switches S3 @ 5L and S4 @ 6L). Typing ESC ' A from the keyboard will display all polling addresses.

#### Note

*The GROUP POLL address should not be the same as the standard POLL address on any terminal in the group.*

GROUP POLL is functional only when groups of terminals are concatenated (daisy chained). Headers must be used. The following is a typical GROUP POLL operation; with three or more terminals on a line connected to a modem or data set:

1. First terminal receives GROUP POLL command; if it has data to transmit, it sends data to control center and waits for ACK. (If NAK, operations proceed as described for POLL Responses, paragraph 5.1.5.) When ACK is received, first terminal sends CTS to next terminal.

2. If first terminal has no data to send, it checks for DTR (Data Terminal Ready) high on EXTENSION port, which is connected to the MODEM port of the next terminal. Finding DTR high, it sends CTS to second terminal.
3. If second terminal has data, it sends data to the control center and waits for ACK. When ACK is received, it looks for DTR high on its EXTENSION port and sends CTS to the next terminal.
4. If second terminal has no data, it checks for DTR high on EXTENSION port and sends CTS to the next terminal.
5. Process is repeated until last terminal in line fails to find DTR high on its EXTENSION port; terminal sends EOT (End of Transmission) to the control center and disconnects.

**Note**

*If no terminal in the chain has data to send only the last terminal will respond with an "EOT".*

## 5.2.2 GROUP SELECT Operations

GROUP SELECT is essentially the same as BROADCAST SELECT operations, except that the GROUP SELECT address ( $G_n$ ) is inserted in the header in place of the "t". The complete address thus becomes: "EOT  $N_1N_2 G_n$  SOH  $N_1N_2(\#)$  STX TEXT ETX LRC". ( $G_n$  is an upper case alpha character, A to Z.) Also:

1. The GROUP SELECT address resides in option board DIP switch S7 @ 10L.
2. Several groups may be selected by means of different terminal addresses. Every terminal in a group must be on the same line, but the line does not have physical limitations.
3. All terminals on line will connect unconditionally, with the addressed terminal responding as specified for BROADCAST SELECT.

## 5.2.3 MULTI-POINT CONTENTION Operations

MULTI-POINT CONTENTION is a polling mode which is selectable only by the control center, using the following control characters: "EOT NUL NUL BEL". In this mode, the control center CPU notifies all terminals on the line that the CPU will not poll until it has a message to be sent or until a polling terminal signifies that it has a message for the CPU. Terminal sends "EOT  $A_1A_2p$  ENQ" to notify the CPU it has a message to send.

## 5.2.4 Addressable Printer Port Operations

The Addressable Printer Port operations are used to permit the ADM 42 to receive CPU output messages at the selected transmission rate, store the message, and retransmit the message in the prescribed format to a printer. The operation is as follows:

1. Bit  $X_5$  of Personality Byte B must be set.
2. With the ADM 42 set up for standard polling, the control center calls for SELECT, as follows: "EOT  $A_1A_2q$  ENQ". Note that the second terminal address ( $A_2$ ) is incremented to  $A_3$ ; this causes the ADM 42 to enable the print buffer (highest page) for operation. A buffer-not-empty condition will cause a terminal BUSY response.
3. The terminal responds to SELECT in the same manner as described in paragraph 5.1.6. Also, a NAK may be sent upon completion of a message not only because of an incorrect LRC, or terminal BUSY; a printer buffer overflow will also cause the entire message to NAK.
4. Once the terminal responds to the message with an ACK the ADM 42 disconnects, returns to the polling Idle (or personality) state, and begins outputting to the printer. Printing proceeds at the baud rate determined

by the PRINTER BAUD RATE switch on the front panel, and continues until the buffer is empty. The terminal operates in the **Buffered Print Mode** format established by appropriate operation codes (refer to **Print Transmission Control Operations** in **Section IV**).

5. Once printing from the buffer begins, no further messages from the control center may be received by the print buffer until the buffer is empty. (The terminal responds BUSY only to a print message.)

### 5.2.5 Polling Communication Buffer Operations

The Polling Communications Buffer is selected by setting option board DIP switch S4-SW8 to ON and setting bit  $X_6$  of Personality Byte B.

1. With the buffer selected, the last two pages of memory (3 & 4) or (7 & 8) are reserved as the buffer.
2. All RCVE data is stored in the buffer; only if the message is correct will the data be sent to the display.
3. If the message LRC is incorrect, a NAK is sent to the host and nothing is displayed.



SECTION 6  
THEORY OF OPERATION

6.1 GENERAL DESCRIPTION

This section contains theory of operation information concerning the ADM-42 Interactive Data Display Terminal. The section is divided into three subsections: General, Functional, and Detailed descriptions.

The ADM-42 Data Display Terminal is an interactive, micro-program-controlled, video display device designed to communicate either unidirectionally or bidirectionally with a remote computer. The terminal has a detachable keyboard at which the operator enters or edits information, and a cathode-ray-tube (CRT) on which information is displayed.

Physically, the ADM-42 consists of three interconnected modules:

Monitor Module - This module contains the CRT display screen and the analog electronics used to control the display.

Keyboard Module - This module is a detachable, 118-key keyboard containing alphabetic and numeric characters, symbols, and special purpose keys which control the ADM-42 operation.

Electronics Module - This module contains the control, display memory and input/output (I/O) sections, the power supply assembly, and the cooling fan assembly.

Functionally, the ADM-42 is divided into seven sections:

CPU - containing the system clock, M6800 MPU, system timing control, address buffers and decoders.

External Interface - containing the interface logic for an external port, modem port, current-loop port, polling address port, and a separate buffer and interface for the special option board.

Keyboard - containing the keyboard matrix, keyboard interface adaptor, and keyboard timing logic.

Video Display - containing CRT control and character generation logic.

Display Memory - containing 8K-bytes of EPROM, 1K bits of RAM, and up to 16K-bits of RAM Refresh Memory.

Configuration Electronics - containing various switches and associated circuitry used to determine the system configuration.

Option Board - containing a parallel printer port, serial printer port, synchronous communication port, polling address logic; data, address and control buffers; 3K-bits of SRAM, and up to 8K-bytes of additional EPROM, PROM or ROM.

## 6.2 FUNCTIONAL DESCRIPTION (Figure 6-1)

The ADM-42 is an interactive data display device used to communicate with a remote computer. The communication may be unidirectional to or from the computer, or bidirectional to and from the computer.

Information is presented to the display area of the terminal from one of two sources; the keyboard or the remote computer.

If the information is from the keyboard, the data is sent to the CPU directly via the Data Bus. From the CPU, the data is sent to the Video section and written into the Video Data Refresh RAM, to be displayed upon the CRT.

If, however, the information originates at the remote computer, the data is delivered to the ADM-42 in one of two ways., If the host computer is considered to be "local" (50 feet or less in distance from the ADM-42), the data is sent through an RS-232C interconnect cable to the External Interface, via the Data Bus to the CPU, then to the Refresh RAM and to the CRT. If the data transmission is from a truly "remote" station and the data must be transmitted via telephone lines, a modem or dataset (one at each end of the transmission line) must be used. These devices merely condition the data for transmission along standard telephone lines. The data route after it reaches the External Interface is the same as in the local mode of transfer.

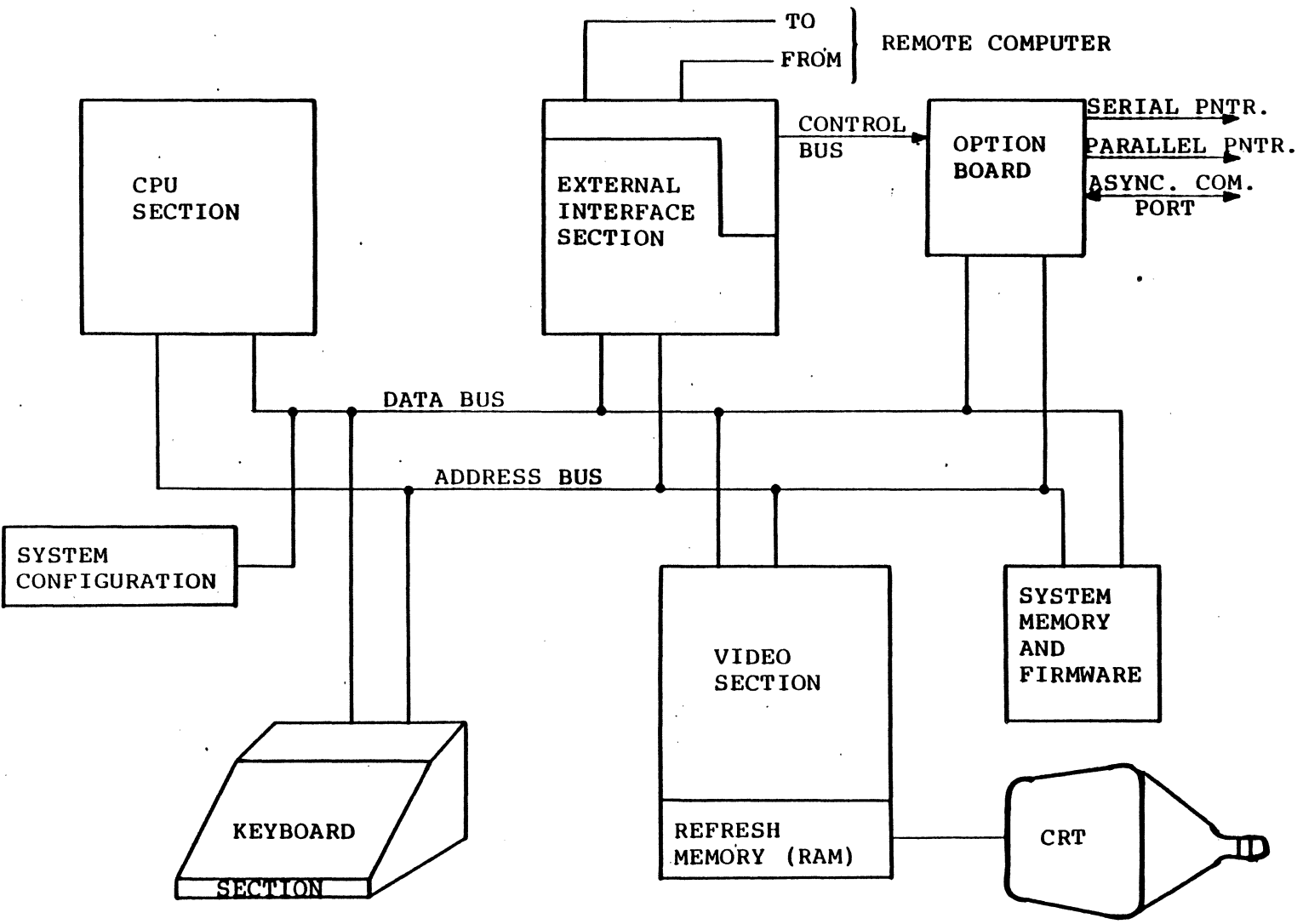


Figure 6-1. ADM-42 Simplified System Block Diagram

The ADM-42 transmits data by "reading" the information from the Refresh RAM and sending it via the Data Bus to the CPU. From the CPU, the data is placed again on the Data Bus and sent to the External Interface, where it is output from one of the ports. From this point, the "local"/"remote" conventions are applicable, depending upon the distance the data must travel to the host computer.

It should be noted that, in the ADM-42, no data transfer is accomplished without the data being routed through the CPU.

#### CPU Section

The CPU section contains the M6800 MPU, associated addressing logic, and the system timing logic. The CPU performs all addressing, data manipulation and arithmetic functions of the ADM-42. Any data to be moved to or from this device will be routed through the CPU section.

#### External Interface Section

The External Interface section provides the capability to interface with RS-232C point-to-point signals, 20 mA current loop signals, and modem interface signals. The interface also contains the Baud Rate clock and switches, allowing the ADM-42 to receive or transmit data at selected baud rates from 50 to 9600 baud.

#### Video Display Section

This section contains the video display logic, including the display memory, two character generators (one standard and one alternate), and the circuitry to condition the data for display on the CRT.

#### System Memory Section

This section contains 8K-bytes of EPROM and 1K-bits of RAM. The 8K-bytes of EPROM comprise the firmware area where the system programs are maintained. The 1K bits of RAM make up the temporary (scratchpad) storage where data manipulation takes place.

#### Configuration Electronics

Contained in this section is the Personality ROM which contains the preset system configuration information, and the configuration switches which allow operator configuration of the system.

## Keyboard

The keyboard provides operator availability to the ADM-42 and to the remote computer. The keyboard consists of a detachable, 118-key keyboard having alphabetic and numeric characters, symbols, and special control keys. The functional components are the keyboard matrix, scan and control logic, timing logic, and associated indicator lamps.

### 6.3 DETAILED BLOCK DESCRIPTION

#### 6.3.1 CPU Section (Figure 6-2, Schematic Sheet 2)

The CPU section is comprised of the Microprocessing Unit (MPU), the System Timing Logic, and the System Address Buffers and Decoders..

#### MPU (Figures 6-3 and 6-4)

The MPU is a Motorola M6800 microprocessor. It is a bidirectional, bus-oriented, 8-bit parallel LSI machine with a 16-bit address capability. Its function is to coordinate the activities of the system and to perform all addressing, data manipulation, and arithmetic functions.

The processor has two 8-bit accumulators which are used to hold operands and results from the Arithmetic Logic Unit (ALU). The 16-bit index register stores 16-bits of memory address for the index mode of memory addressing. The stack pointer is a 2-byte (8 bits per byte) register that contains the address of the next available location in external memory. The program counter is a 16-bit register that contains the program address. A condition code register (flag register) contains 16 bits of condition codes; the condition codes indicate the results of an ALU operation, Negative (N), Zero (Z), Overflow (V), Carry from bit 7 (C), and Half Carry from bit 3 (H). These bits of the condition code register are used as testable conditions for the conditional branch instructions. Bit 4 is a mask bit. The unused bits of the condition code register (bits 6 and 7) are always ones.

The minimum instruction time is 2 us. Processor control lines include RESET, which automatically restarts the processor (see flow chart, Figure 6-4), as well as Interrupt Request (IRQ) and Non-Maskable Interrupt to monitor peripheral status.

There are Tri-State Control (TSC), Data Bus Enable (DBE), and HALT control lines which can be used for Direct Memory Access or multiprocessing.

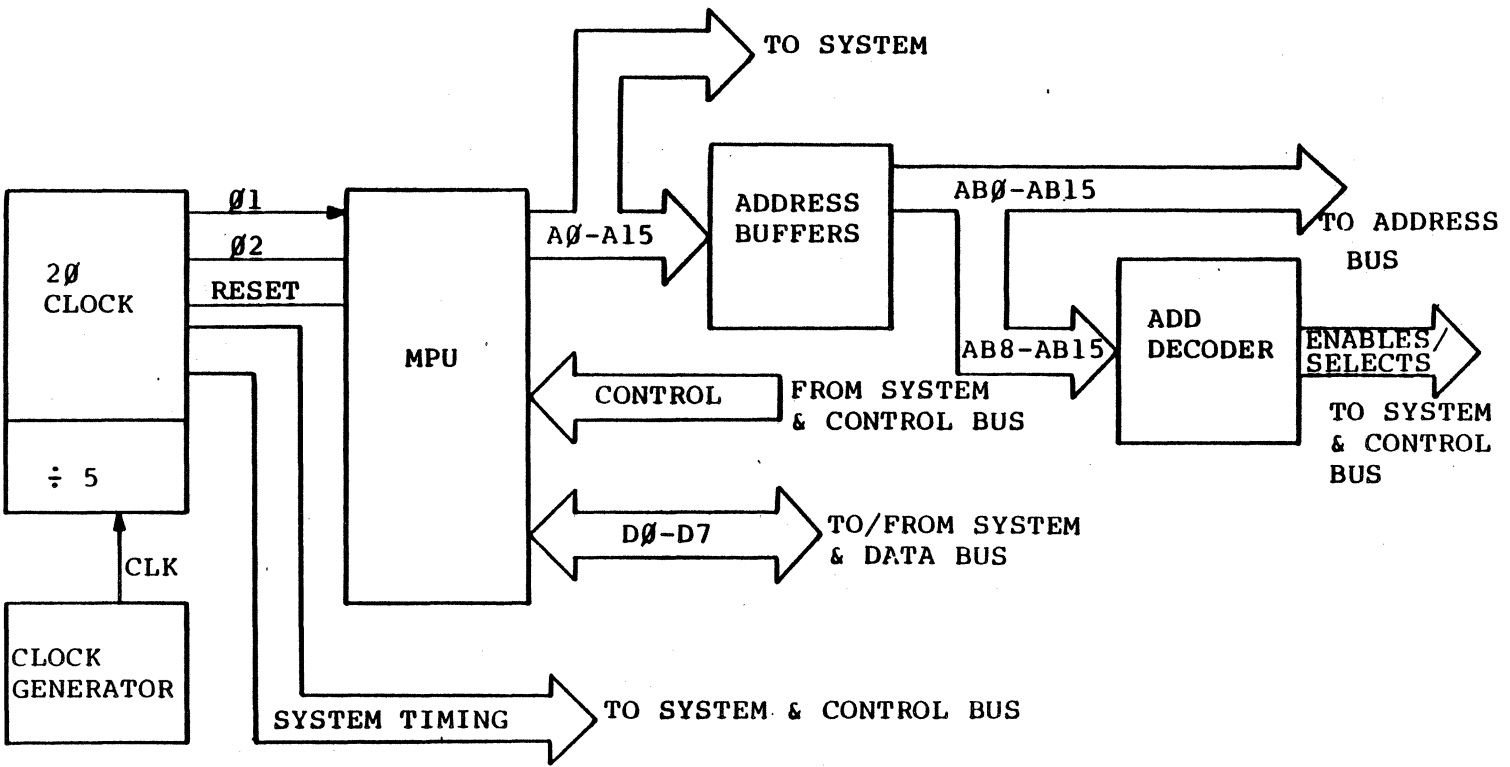


Figure 6-2. CPU Section Detailed Block Description

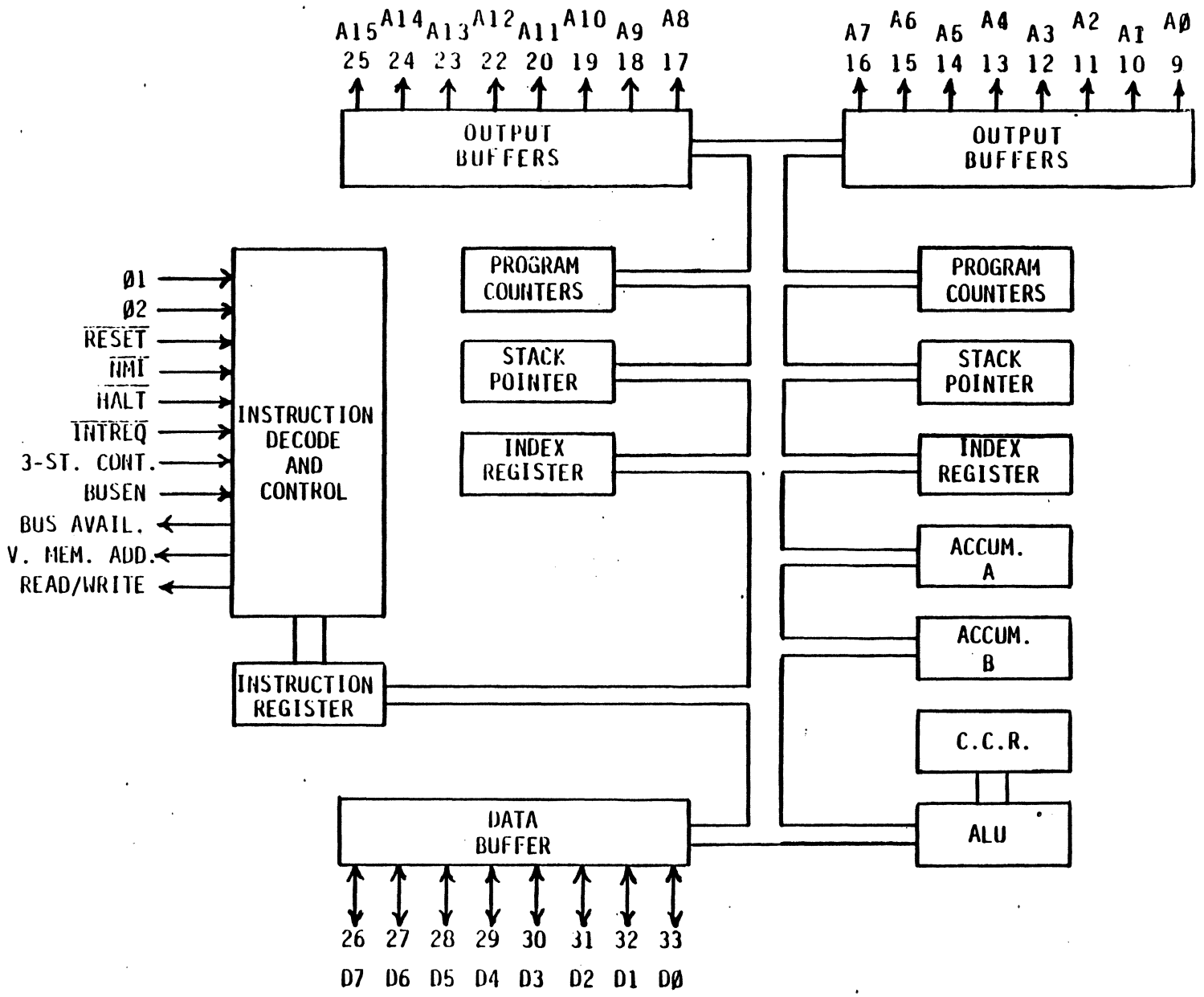


Figure 6-3. MPU Block Diagram

### System Timing and Two-Phase Clock (Figure 6-5)

MPU and system timing is accomplished by the System Timing Control and the Two-Phase ( $2\phi$ ) Clock. The two-phase, non-overlapping clock ( $\phi 1$  and  $\phi 2$ ) is used to control the MPU timing. All data transfers are accomplished when DATA BUS ENABLE is active and on the trailing edge of  $\phi 2$  of the clock. At this time, the bus drivers are enabled. During an MPU read cycle, the data bus drivers are disabled internally.

The master oscillator in the system timing logic generates the master clock term,  $CLK/\overline{CLK}$ .  $CLK$  is divided by 5 to produce  $MPUCLK$ , which, in turn, feeds the two-phase clock, to produce the two non-overlapping clock pulses,  $\phi 1$  and  $\phi 2$ , used for MPU timing. The two-phase clock also produces the rest of the system timing signals, as follows:

- **REFGNT (Refresh Grant):** A synchronous output used to synchronize the refresh operation to the MPU.
- **$\overline{REFREQ}$  (Refresh Request):** A synchronous input used to freeze the MPU clocks in the  $\phi 1$  high,  $\phi 2$  low state for dynamic memory refresh.
- **MCLK (Memory Clock):** A clock signal in phase with  $\phi 2$ , which free-runs during a refresh request cycle.
- **$\phi 2TTL$  (Bus  $\phi 2$ ):** This clock signal, in phase with  $\phi 2$ , is buffered through the Bus Buffers as  $\phi 2B$  onto the CPU Bus and to the Extension Bus.
- **MEMRDY (Memory Ready):** An asynchronous input used to freeze the MPU clocks in the  $\phi 1$  low,  $\phi 2$  high state for slow memory interface.
- **MPUCLK (MPU Clock):** Used to synchronize the MPU with the remote computer.
- **2XCLK (Two-Times Clock):** A free-running clock at two times the MPU clock rate which is sent to the VTAC in the Video section and used to establish the basic character clock rate.

### Address Buffers

The System Address Bus Buffers consist of three tri-state bus drivers driving the 16-line Address Bus (AB0 - AB15). The Address Bus provides the address interconnect between the CPU and the Address Decoders, the External Interface section, the Memory section, the Video section, and the Keyboard section.



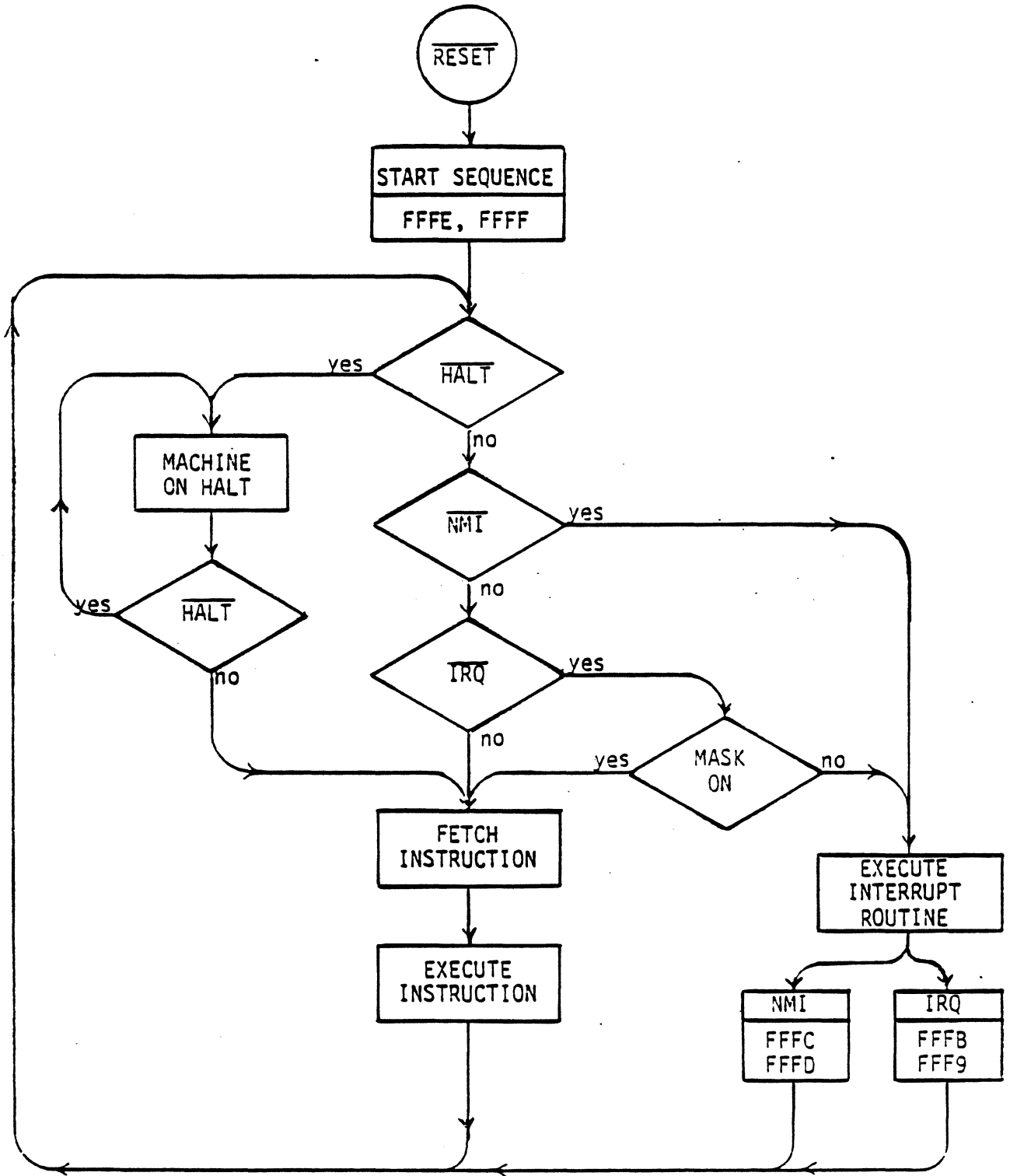
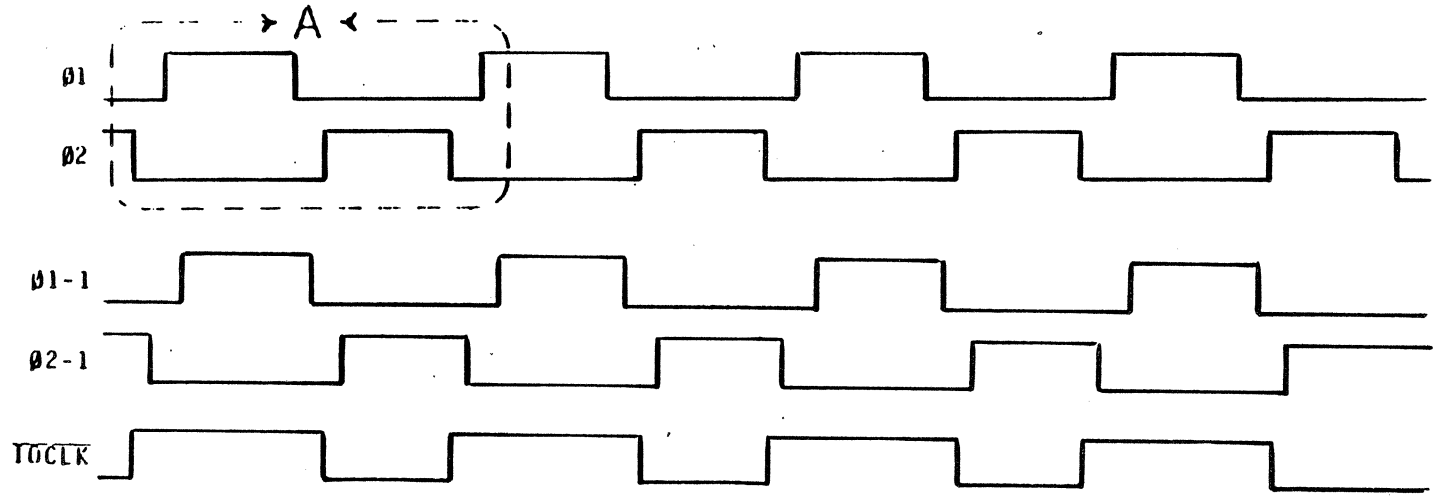
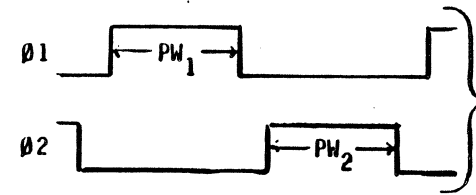


Figure 6-4. MPU Flow Chart

Figure 6-5. System Timing and Two Phase Clock



INSERT "A"



Non-Overlapping clocks

Cycle time = 1.085 usec nominal

PW<sub>1</sub> = 528 nsec nominal  
PW<sub>2</sub> = 528 nsec nominal

### Address Decoders

The Address Decoders decode address lines AB8 through AB15 as chip enable/select terms for the system RAM, ROM, Peripheral Interface adaptors (PIA1, PIA2), Asynchronous Communication Interface adaptor (ACIA1), Personality ROM (PERROM), Configuration Switch bank (SWBNK1), and Baud Rate Control (BRCLD).

#### 6.3.2 External Interface Section (Figure 6-6; Schematic Sheet 9)

The External Interface provides the interconnect between the ADM-42 and any external system or peripheral devices that are working with it.

The ADM-42 provides a standard EIA RS-232C voltage interface, a 20 ma current-loop interface and a modem interconnect. Interface control is accomplished by a Motorola MC6850 Asynchronous Communications Interface Adapter (ACIA). The ACIA provides data formatting and control to interface serial asynchronous data communications information to the bus-organized MPU.

Included in this section is the baud rate-determining logic and a configuration switch bank.

### ACIA

The ACIA provides a special-purpose serial interface for asynchronous communications. It handles all formatting tasks such as insertion and detection of start, stop, and parity bits, and accomplishes the serial-to-parallel/parallel-to-serial conversion. It further provides the modem control signals, such as Clear-to-Send (CTS), Request to Send (RTS), and Data Carrier Detect (DCD).

Serial data from the remote computer is received as RCVR, shifted through the ACIA and presented to the MPU as parallel data, D0 through D7. Conversely, parallel data from the MPU is presented to the ACIA as D0 - D7 and loaded. This data is shifted through the ACIA and is transmitted out serially as XMIT. The term that enables the loading of the parallel data (D0 - D7) to or from the MPU is VMAB, the Valid Memory Address term.

The direction of data flow through the ACIA is established by BR/ $\bar{W}$ , the Read/Write term. If the line is high, the ACIA's output drivers are turned on and a selected internal register is read. If the line is low, the output drivers are turned off and the MPU writes into a selected register.

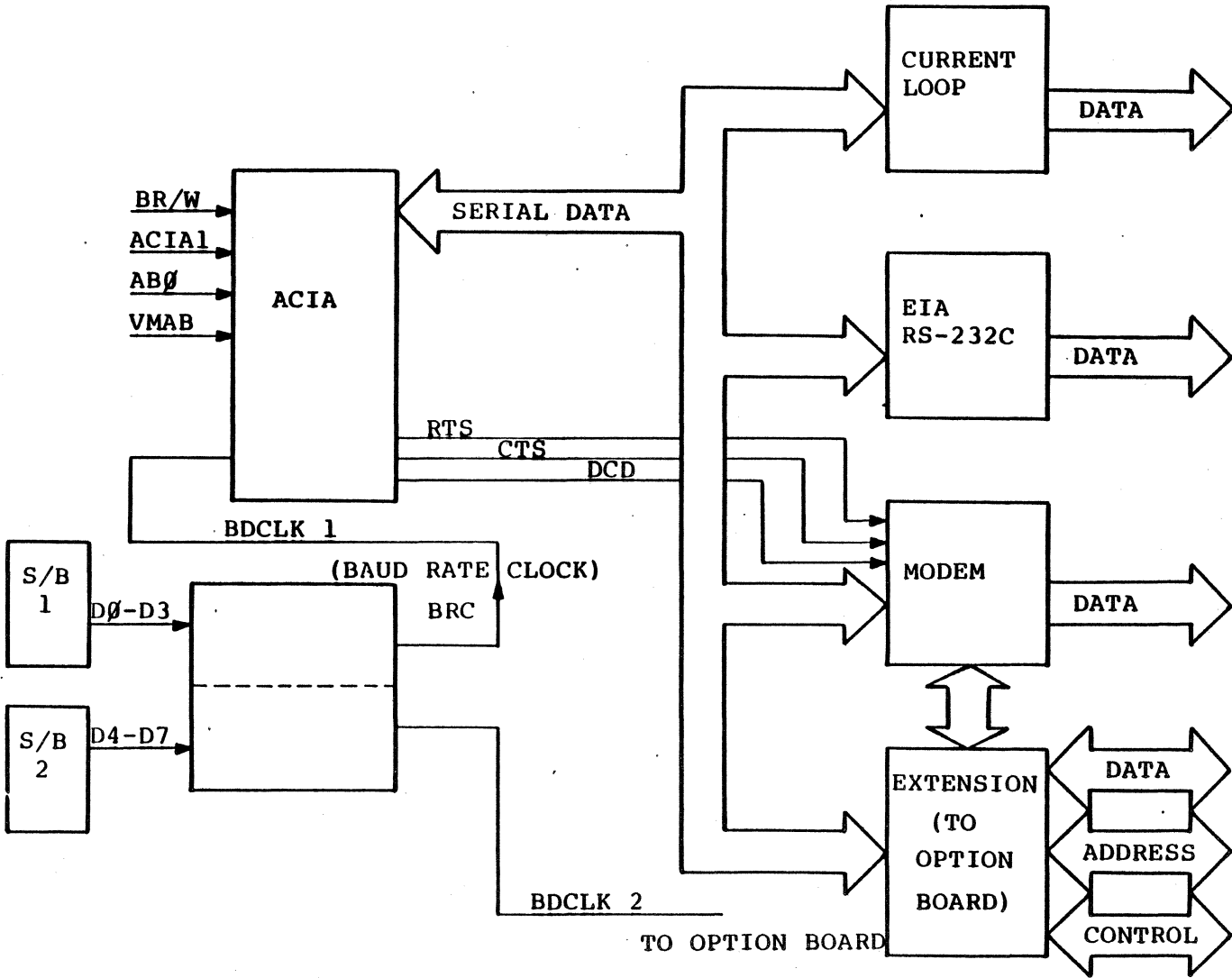


Figure 6-6. External Interface Section Block Diagram

BDCLK1, generated by the Baud Rate Clock, is used to determine the rate of data transfer to and from the selected port. The Interrupt Request ( $\overline{IRQ}$ ) is low when an external device is requesting service from the MPU.

The term ACIA1 is used in conjunction with the pulled-up CS0 and CS1 inputs to the ACIA to select the chip. When ACIA1 goes low, the chip is selected and the control and data inputs become effective.

ABC is the register select term. If the line is high, the Transmit/Receive Data Registers are selected, and if it is low, the Control/Status Registers are selected. This line is used with the Read/Write line to select the read-only or write-only register in each register pair.

#### Baud Rate Select Logic

The Baud Rate Switches and the Baud Rate Clock select both the transmit and receive Transmission rates (baud rates). These rates are established during installation of the ADM-42.

There are two switch banks used in determining baud rates. Each switch bank generates a unique code to the Dual Baud Rate Generator. The first bank of switches generate the code D0 - D3. This four-bit code selects a baud rate frequency from 50 to 9600 baud (BDCLK1), which is then sent to the ACIA where it establishes the transmit/receive baud rate. The second bank of switches generate the code D4 - D7, which also goes to the Dual Baud Rate Generator to produce BDCLK2. This term is sent to the option board to set up the baud rates for the serial printer port ACIA.

#### Configuration Switch Bank

Data transfer parameters are set up by this bank of eight switches. The parameters are suffered and placed on the data bus as D0 - D7.

#### 6.3.3 System Memory Section (Figure 6-7; Schematic Sheet 8)

The System Memory Section consists of 8K-bytes of EPROM firmware, 1K-bits of temporary (scratchpad) RAM, Data Buffers, and the chip enable logic.

#### Firmware EPROMs

The 4 2K-byte EPROMs contain the ADM-42 operating system and related firmware. Each of the four ROM chips is selected by either ROMA, ROMB, ROMC, or ROMD, the four chip enable terms produced by the decoding of ROM1, ROM2 (the chip enable

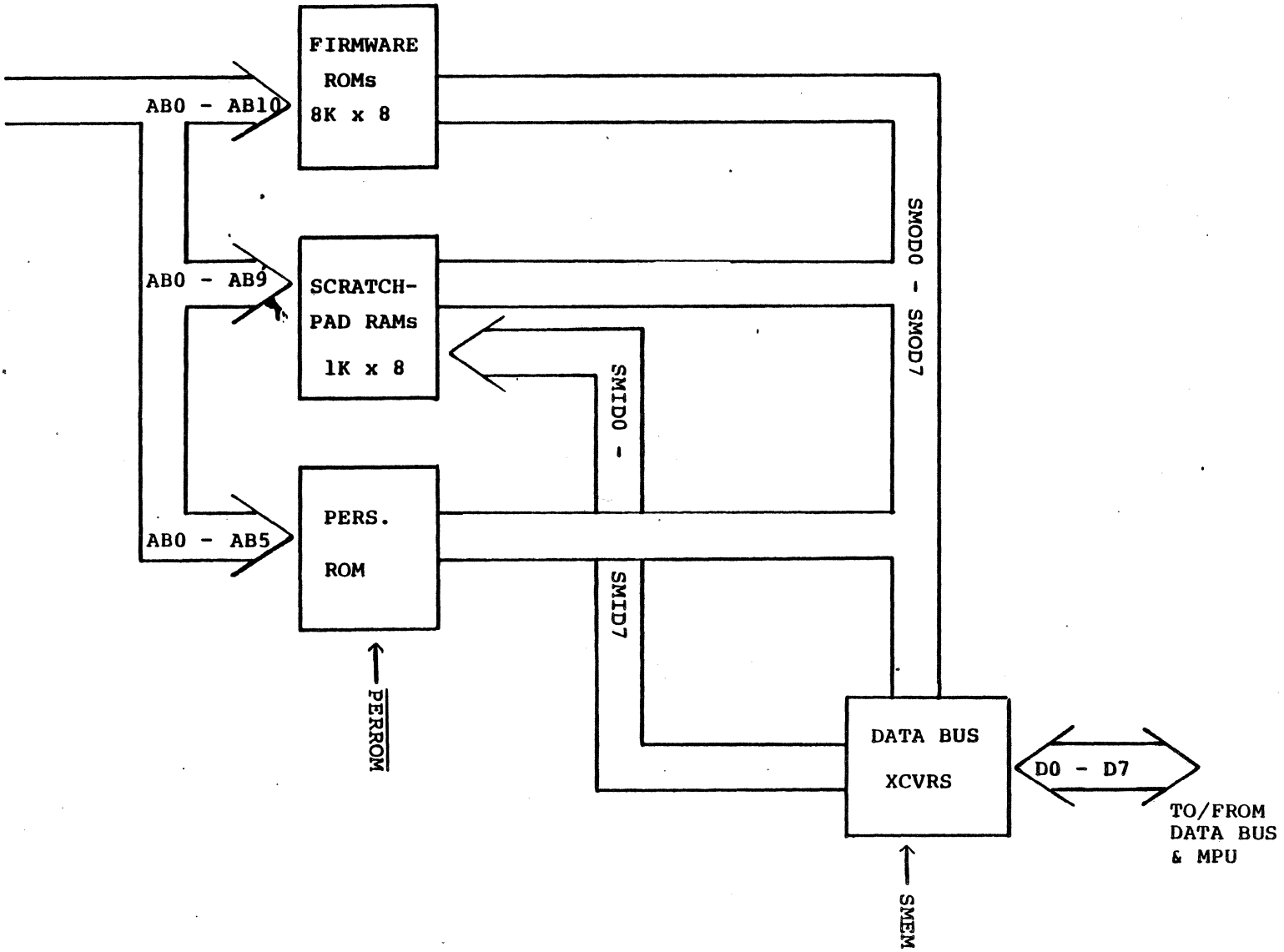


Figure 6-7. System Memory Board

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terms from the Address Decoders in the CPU section) and address bit AB11. When the chip is selected, the data from the location specified by the address bus bits AB0 - AB10 is placed on the memory output lines, SMOD0 - SMOD7. These outputs are routed to Data Bus via the memory bus transceivers as D0 - D7, to be sent to the MPU.

Scratchpad RAMs

These eight 1K-bit RAMs provide temporary storage where the calculations and data manipulations for the ADM-42 are accomplished. They are configured to provide 1K-byte of static, random-access storage.

Chip select is done by the decoding of  $\overline{\text{RAM}}$  (from the chip enable logic in the CPU Section--see above) and the two address bits, AB10 and AB11. When the eight chips are simultaneously enabled by RAM1, and if the R/ $\overline{\text{W}}$  line is low, the data contained in the input data byte, SMID0 - SMID7 is loaded into the location specified by the address lines, AB0 - AB9. This input data byte comes from the memory bus transceivers which received it from the Data Bus as D0 - D7. If the R/ $\overline{\text{W}}$  line is high, a read operation is initiated, and the data in the locations specified by the 10-bit address (AB0 - AB9) is read out and placed on the same output data lines as the firmware outputs. This output data is placed on the Data Bus in the same manner as the firmware data.

Data Bus Transceivers

These bidirectional, tri-state transceivers buffer the input and output memory data to and from the Data Bus.

Depending upon the state of the select term, SMEM, the transceivers are switched either to or from the Data Bus. In the low state, data is taken from the Data Bus and routed to the Scratchpad RAMs. In the high state, data from either the system firmware EPROMs or the scratchpad RAMs is buffered onto the Data Bus.

Personality ROM

The Personality ROM contains system configuration information and is enabled by the term  $\overline{\text{PERROM}}$ . Data from this device is read from the location specified by address lines AB0 - AB5 as SMOD0 - SMOD7. This byte of configuration information is placed on the Data Bus in the same manner as the System Firmware and Scratchpad Memory output information.

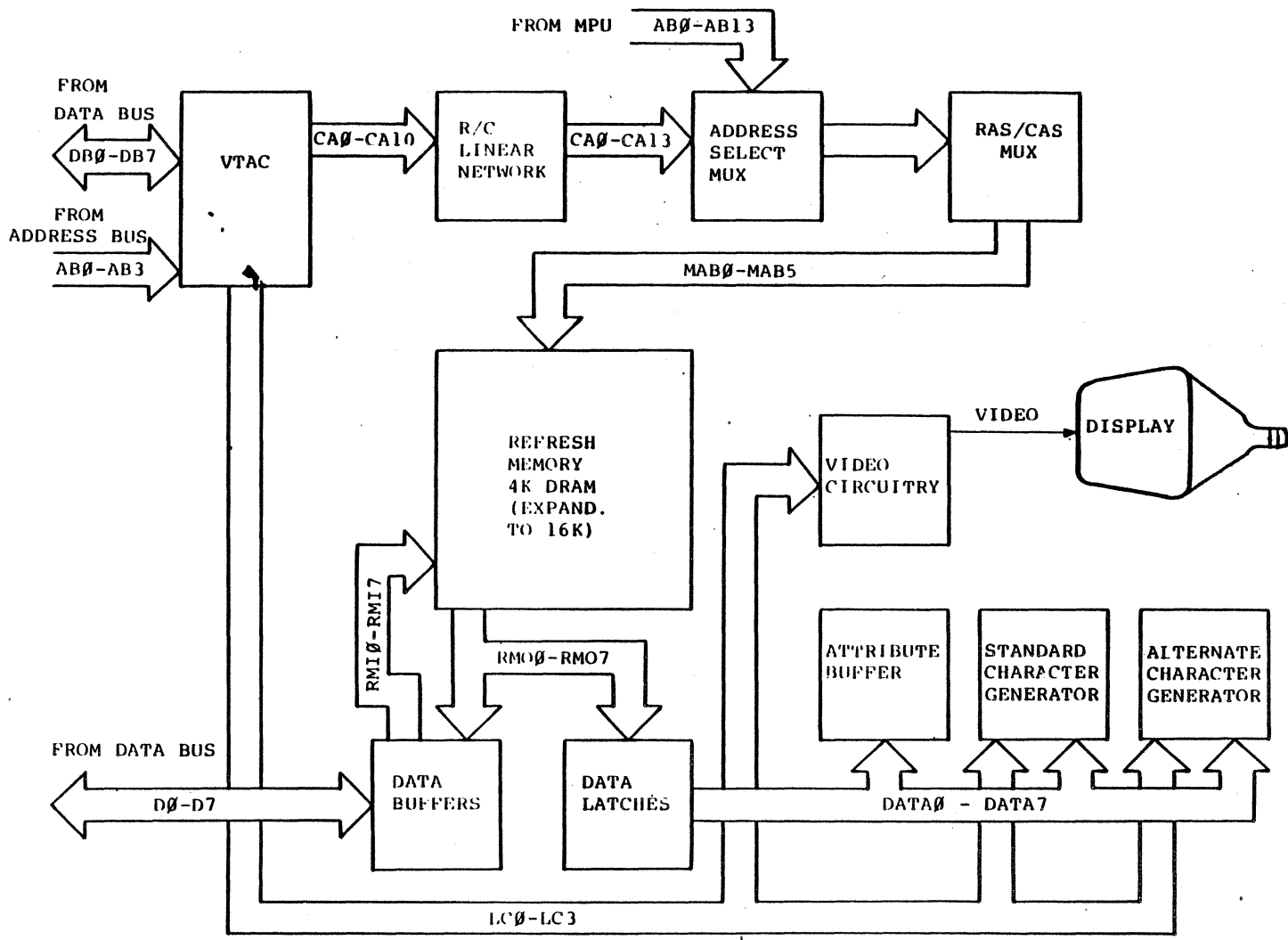


Figure 6-8. Video Control Section.



#### 6.3.4 Video Display Section (Figure 6-8)

The Video Section controls and conditions information to be displayed by the ADM-42 CRT monitor.

This section consists of 4K-bytes (expandable to 16K-bytes) of dynamic RAM Refresh Memory, CRT Video Timer/Controller (VTAC), R/C Linear Address Network, Address Select Multiplexer, Row Address Strobe (RAS)/Column Address Strobe (CAS) Multiplexer, Data Buffer and Latches, Standard (and Alternate) Character Generator, the Video Logic and the CRT Monitor.

##### Data Flow Overview

Data and address information from the Data and Address Buses are presented to the VTAC; here vertical and horizontal formatting is accomplished. Vertical drive (VDRIVE) and horizontal synchronizing (HSYNC) is also generated here.

The row/column address information from the VTAC is converted to linear address information by the R/C Linear Address network. This linear address data is routed to the Address Selection Multiplexer and on to the Row/Column Address Selection Multiplexer.

The resultant address information is used to specify a location in the Refresh RAMs to which or from which data is to be transferred. Data to the RAMs from the Data Bus and from the RAMs to the Data Bus is routed via the Data Buffers, and data to be displayed is routed from the RAMs to the Character Generators via the Data Latches. The Data Buffers are bidirectional drivers to and from the Data Bus and the CPU. The Data Latches are unidirectional to the Character Generators and the Attribute Buffers. The information is then conditioned by the Video Logic to be displayed on the CRT Monitor.

##### Refresh Memory (Schematic Sheet 4)

The Refresh Memory consists of 4K-bytes (expandable to 16K-bytes in 4K-byte increments) of dynamic random-access MOS memory. All data to be displayed by the CRT is stored in Refresh Memory in ASCII coding.

The six linear address lines (MAB0 - MAB5) assert the 12-bit (11 address bits and one protect bit) RAM address to the RAMs. The first six bits are the row address and are loaded by  $\overline{RAS}$ . The next six bits (five address bits and one protect bit) are the column address and are loaded by  $\overline{CAS}$ . This 12-bit row/column address specifies the location in the Refresh Memory that the data is to be read from or written into. The Read/Write function select is accomplished by the term  $\overline{WE}$  from the Address

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Selector.  $\overline{WE}$  determines whether data will be written into or read out of the RAMs; high for read, low for write. The  $\overline{PAGE\ 12}$  term selects the lower 4K-byte bank; the term means pages 1 and 2. If one of the optional upper 4K-byte banks (pages) is to be selected, the term will be  $\overline{PAGE\ 34}$ ,  $\overline{PAGE\ 56}$ , or  $\overline{PAGE\ 78}$ . Input information (RMD10 - RMD17) is routed from the data bus to the RAMs via the bidirectional Data Buffer. Output information (RMD0 - RMD07) is routed from the RAMs to either (or both) the data bus or the Character Generators and the Attribute Buffer (and ultimately, the CRT monitor).

CRT Video Timer-Controller (VTAC; Schematic Sheet 7)

The VTAC is a programmable MOS/LSI device containing the logic functions required to generate all the timing signals for the presentation and formatting of video data on a CRT monitor. All frame formatting, such as horizontal, vertical, and composite sync, characters per data row, data rows per frame, and raster scans per data row and per frame are totally programmable.

The control byte is taken from the data bus as DB0 - DB7. This byte comes from the MPU, system memory or the remote computer. This 8-line data bus (DB0 - DB7), being bidirectional, is also used for cursor addressing as an output.

The lower four bits (AB0 - AB3) of the MPU-generated address are used by the VTAC as register address for selecting one of the seven control registers or either of the cursor address registers.

The term VTAC signals the VTAC chip that is being addressed.

$\overline{VMAB}$ , the Valid Memory Address line from the MPU, acts as the data strobe which strobes the data bus (DB0 - DB7) into the appropriate register in the VTAC. It also may output the cursor character or cursor address onto the data bus.

2XCLK, from the Two-Phase clock, functions as a Dot Counter carry, establishing the basic character clock rate for the VTAC.

The output CUR is the cursor video signal and defines the cursor location in the data field.

The Scan counter outputs (LC0 - LC3) provide row selection for the character generator. The least significant bit (LC00) defines the odd and even fields so as to select the even scan line during the even field and the odd scan line during the odd field.

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The three sync outputs are defined as follows:

**HSYNC** - Horizontal sync: Initiates the horizontal retrace (flyback)

**VDRIVE** - Vertical Drive: Initiates the vertical retrace.

**CSYNC** - Composite sync: Synchronizes the composite video by providing a true RS-170 composite sync waveform.

The Character Counter outputs are used with the Data Row Counter outputs to provide the linear address via the R/C Linear network. This makes the ADM-42 code-independent. That is to say, by the use of the R/C linear network, the ADM-42 can process and display information coded in virtually any of the standard character codes.

Row/Column Linear Address Network (Schematic Sheet 7)

This logic group consists of one 256-bit, bipolar, programmable ROM, and two 4-bit adders. This network simply converts the Data RAM row/column address form produced by the VTAC to the linear form used by the Address Selector and the Row/Column Address Mux logic, thus allowing the ADM-42 to be character code-independent.

Address Select Multiplexer (Schematic Sheet 3)

This logic group consists of four quad, 2 to 1 multiplexers (data selectors). On the inputs of the Address Select Multiplexer are two 14-bit addresses; one (AB0 - AB13) from the MPU via the System Address Bus Buffers, and one (CA0 - CA13) from the VTAC via the R/C Linear network. The select term, CRTRAM, determines whether the address to be strobed through the mux is to be the RAM address that the MPU wants to write into, or the RAM address that the VTAC wants to display on the monitor. It is generated by the CPU section by a valid memory address and either address bit AB14 or AB15. The strobe or enable line is held active, allowing the output (MA0 - MA13) to be always enabled.

Row/Column Address Multiplexer (Schematic Sheet 3)

The R/C Address Mux consists of two quad, 2 to 1 multiplexers (data selectors). On the inputs are the 12 low-order bits (MA0 - MA11) of the 14-bit output of the Address Selector Mux. These 12 bits are enabled through the R/C Address Mux alternately; MA0 - MA5 on the first select and MA6 - MA11 on the second select;

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six bits at a time, by SELRAS. SELRAS is enabled by RAS, the term which strobes the first six bits of RAM address into the RAMs. Stated simply, when SELRAS (RAS) is active, the first six bits are strobed through, and when SELRAS is not active (CAS active), the second six bits are strobed through. This places the 6-bit row address on the RAM address lines when RAS is true, and the 6-bit column address on the RAM address lines when CAS is true.

Page Select (Schematic Sheet 3)

This demultiplexer/decoder decodes the upper two address bits (MA12 and MA13) of the Refresh RAM address from the Address Selector for memory page selection. The coding is as follows:

<u>MA12</u>	<u>MA13</u>	<u>Page</u>
0	0	1,2
0	1	3,4
1	0	5,6
1	1	7,8

Data Buffer And Latches (Schematic Sheet 5)

The Data Buffer consists of two, bidirectional, tri-state bus transceivers and a 2 to 1 multiplexer. Data from the RAMs to be driven to the Data Bus is asserted as RMD00 - RMD07 and, by selecting the drivers, is driven to the bus as D0 - D7. If data from the Data Bus is to be written into the RAMs, the receivers are selected and the bus data (D0 - D7) is routed to the RAMs as RMD10 - RMD17. The term which selects the direction of data through the buffers is BR/W.

The Data Latches consist of two, quad D-type flip-flops. The data from the RAMs to be displayed by the monitor is asserted on the inputs as RMD00 - RMD07. The output data to the Character Generators is DATA0 - DATA6. This 7-bit data block defines a stored character in the Character Generator which is to be displayed on the CRT. Also, output from the latches is the inverse DATA0 - DATA7. This information, along with a portion of the positive-true output (DATA0 - DATA7) is used to establish the display attributes.

Character Generators (Standard And Alternate) (Schematic Sheet 6)

The Character Generators are EPROMs programmed with 128 displayable characters (upper and lower case) in the ASCII code. The character is specified by DATA0 - DATA6 and the actual raster line count is contained in LC0 - LC3. The ASCII character information is contained in the output byte, CG0 - CG7.

The chip select term is ALTNCG, which selects either the Standard or Alternate character generator. The Standard generator is the one normally used. The Alternate is used for foreign language or special character generation.

#### Video Logic (Schematic Sheet 7)

This logic group conditions the binary data containing the character and attributes of the character and the display into a form (COMPOSITE VIDEO) capable of being displayed on the CRT. Also available in this section are the sync signals (HSYNC and VSYNC) needed to synchronize the display with the information to be displayed.

The COMPOSITE VIDEO is applied directly to the CRT. The sync signals are sent to the monitor electronics.

The character generator information (CB0 - CG7) is asserted on the parallel inputs to an 8-bit shift register. They are loaded by SHLOAD and clocked out the serial output as CVID.

The Null Detect circuit gives the user the option of displaying or inhibiting the display of a null character. This circuit decodes DATA0 - DATA6 to make that determination depending upon the state of the DISNUL switch.

DATA7 is used by the Video Logic to produce the PROTECT BIT (PROBIT) signal. If a character is to be displayed in a protected area of the CRT, the seventh bit of the character code is set high. This causes the monitor to display that character at a reduced intensity.

#### 6.3.5 Keyboard Section (Figure 6-9)

The Keyboard provides the operator interface between the ADM-42 and the remote computer. It is a detachable, 118-key keyboard containing alphabetic and numeric characters, symbols, and special keys which control the ADM-42 operations. The 16 special-function keys can be used with the SHIFT key to produce 16 additional functions.

The Keyboard section consists of the keyboard matrix, a Peripheral Interface Adapter (PIA), an 8 to 1 mux, a 4 to 16 decoder, timing logic, and associated indicator lamps.

#### Keyboard Matrix (Schematic Sheet )

The keyboard matrix consists of a 16 x 8 (128 intersections) matrix with 118 of the intersections being occupied by the ADM-42 character (alphabetic and numeric), symbol, and control keys. The MPU generates a binary count cycle (scan) and routes

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it to the PIA as DB0 - DB7. The PIA generates KB0 - KB6 and routes the lower four bits (KBD0 - KBD3) to the 4-to-16 decoder and the upper three bits to the 8-to-1 mux. Using the decoder and the multiplexer the MPU (via the PIA) scans each intersection of the matrix. If a key is pressed, the next scan that polls that intersection senses the key and generates STROBE at that "X" and "Y" coordinate address. STROBE is routed to the PIA, stops the scan, locks the address at STROBE time, and produces DEBTRG (Debounce Trigger). DEBTRG triggers the NE 555 Timer and 10 ms later, DEBDLY (Debounce Delay) is produced. If the key is still sensed by the time DEBDLY comes true, the address of that key is decoded as to the character in the Look-Up table located in the system memory and the appropriate ASCII character code is generated to the Character Generator (the Video Section), to be displayed. If, however, the key is not sensed at DEBDLY time, the look-up is aborted and the scan is restarted.

Peripheral Interface Adapter (PIA) (Figure 6-10)

The PIA is a universal interface device that controls the transfer of data from the keyboard to the CPU and the monitor.

The binary count cycle (scan) is received via the data bus as DB0 - DB7). The PIA generates the actual scan code, KBD0 - KBD3 (X axis) and KBD4 - KBD6 (Y axis) for the keyboard matrix. When a key is sensed (or suspected), STROBE is generated, after having stopped the scan and stored the address present at the time that STROBE came true. After 10 ms, DEBDLY is returned to the PIA, and if STROBE is still true, the stored address is routed to the MPU as DB0 - DB7 and decoded into the appropriate ASCII character code from the Look-Up table in System Memory. It is then routed to the video section where it is displayed on the monitor CRT.

If STROBE is not true when DEBDLY is returned to the PIA, the stored address is released and the keyboard scan is continued.

Four to Sixteen Decoder

This device does a binary decode of the lower four bits (KBD0 - KBD3) of the scan count furnished by the PIA such that one output line is selected each time the 4-bit binary number is incremented, placing a low level on the corresponding vertical matrix line.

Eight-to-One Multiplexer

This device does a binary decode of the three upper bits (KBD4 - KBD6) of the scan count such that one of the eight horizontal matrix lines is addressed each time this 3-bit

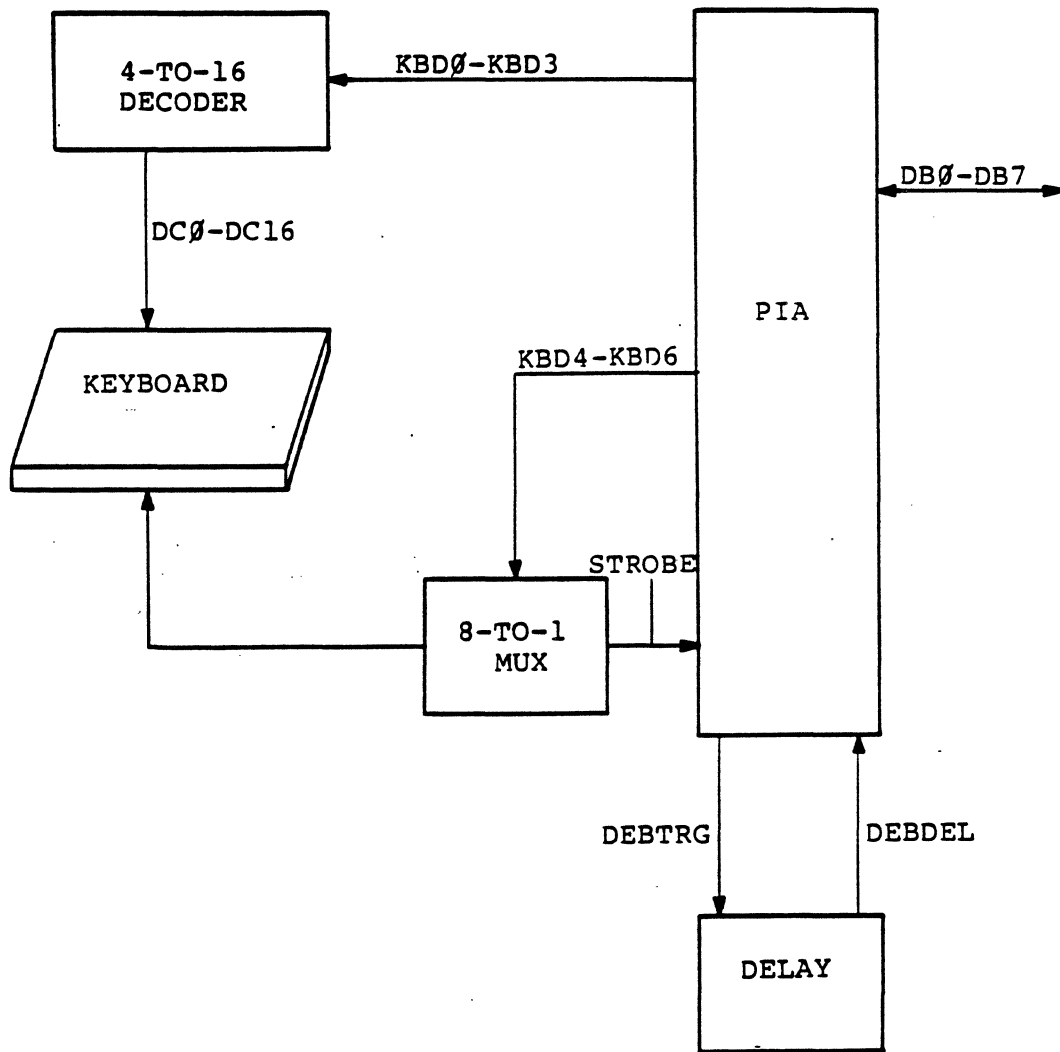


Figure 6-9. Keyboard Section

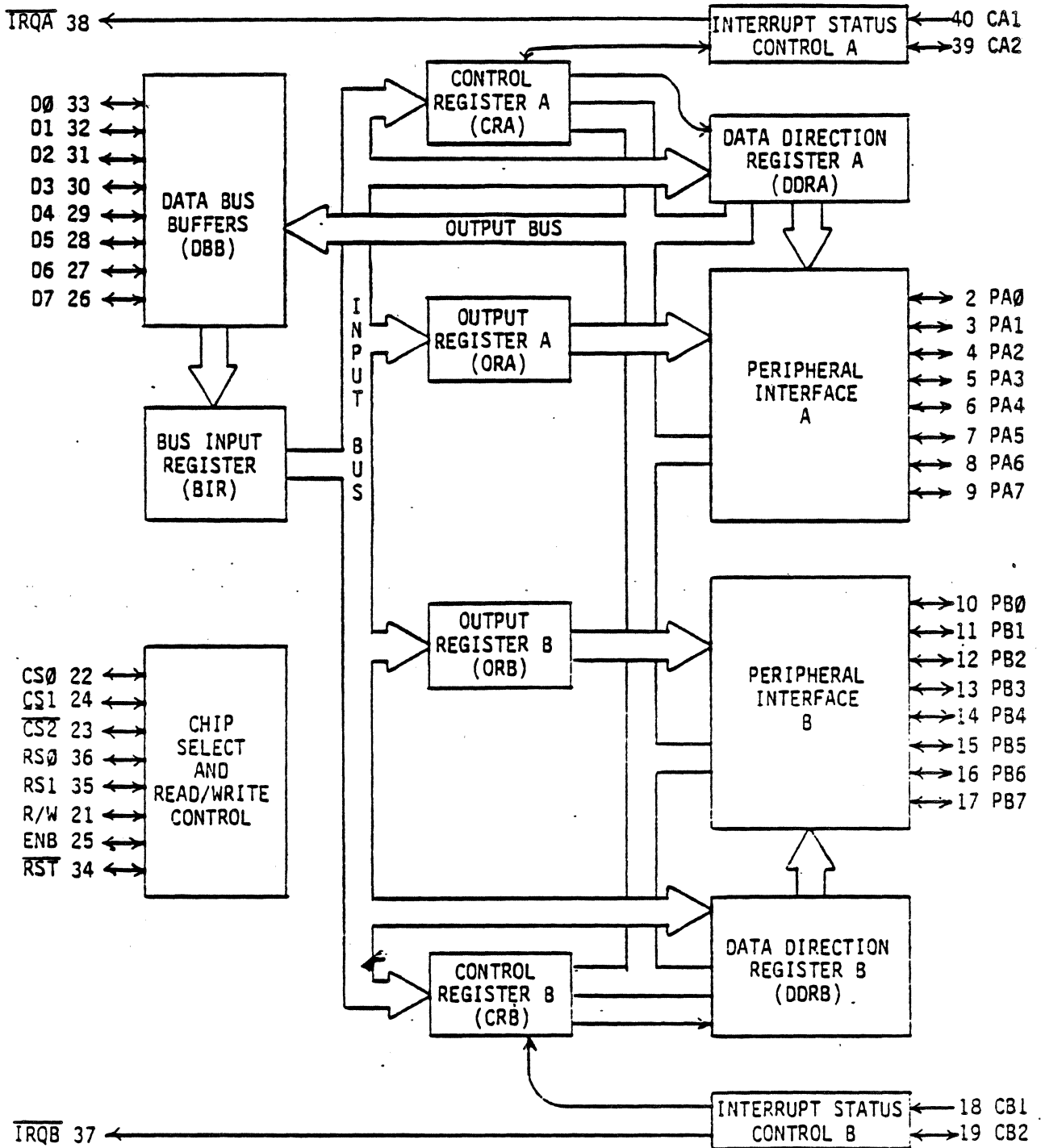


Figure 6-10. PIA Block Diagram



binary number is incremented. If a key is pressed, the low level on the intersecting vertical line is passed down the addressed horizontal line and out to the PIA as STROBE. The key provides a connection between the two intersecting lines.

6.3.6 System Configuration Switches (Figure 6-11;  
Schematic Sheet 9)

The System Configuration Switches consist of eight single-pole, single-throw (On-Off) switches and two 4-bit, tri-state bus drivers feeding the Data Bus.

The switches are used to determine data transmission parameters, such as Break Enable/Disable, even or odd parity, number of stop bits (1 or 2), etc.

The enabling term for the switch buffers is SWBNK1.

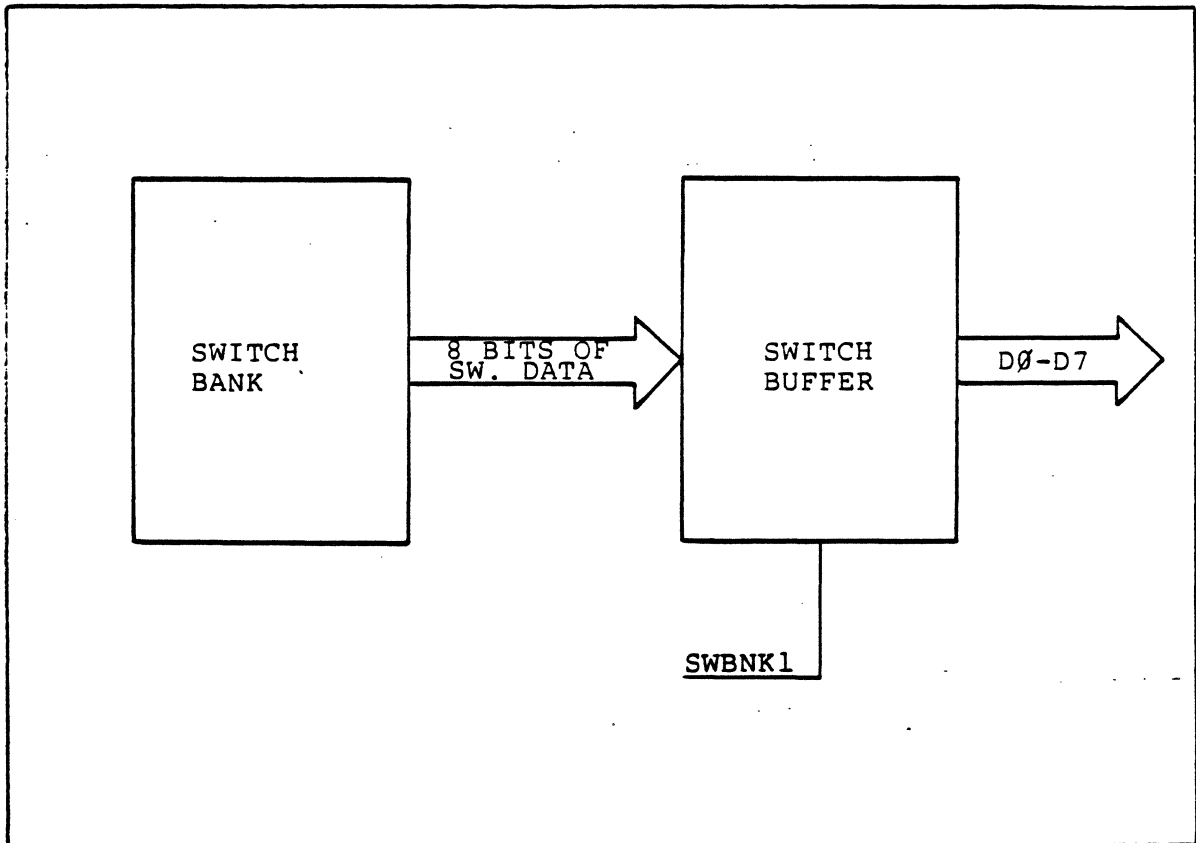


Figure 6-11. System Configuration Switches

### 6.3.7 External Bus Buffers (Schematic Sheet 11)

The Address (A0-A15) and Data (D0 - D7) Busses are buffered on and off the main circuit board by bidirectional tri-state bus transceivers.

The address buffers are normally in a transmit state, that is, off the board. These gates may be enabled to a receive state if Direct Memory Access (DMA) is available and active.

The data buffers are controlled directionally by memory and/or I/O activity. If data is to be transmitted to an external device, the data buffers are enabled to write to the bus, and conversely, if an external device is to write to the MPU, the buffers are enabled to read from the bus.

The Control Bus is maintained in much the same manner, except that it is constantly enabled in the output state, since the tri-state drivers are unidirectional. This bus feeds the Option board.

Certain incoming communication lines are available here, such as REFREQ, HALT, IRQ, etc.

### 6.3.8 Option Board (Figure 6-12; Schematic 2 (Option Board), Sheet 1-8)

The ADM-42 Option Board is a separate printed circuit board containing a parallel printer port, a serial printer port, a synchronous communications port, polling address logic, data/address/control buffers, 3K-bits of static RAM, and up to 8K-bytes of additional ROM.

The Option Board is supplied by three separate busses: an 8-bit data bus, a 16-bit address bus (these two are system busses), and a control bus carrying 18 control terms. Modem communication lines are wired point-to-point.

#### Option Board Interface Buffers (Schematic 2, Sheet 2)

The data buffers consist of two sets of 8-bit, tri-state bus transceivers. The first set, enabled by READ A, buffers D0 - D7 into and out of the option board. The second set, enabled by READ B, converts (switches) incoming data (D0 - D7) into memory data (MDI0 - MDI7) and routes it to the optional memory section. The second set further converts data read from the optional memory (MDO0 - MDO7) to data to be placed on the data bus and routed to the MPU (D0 - D7).

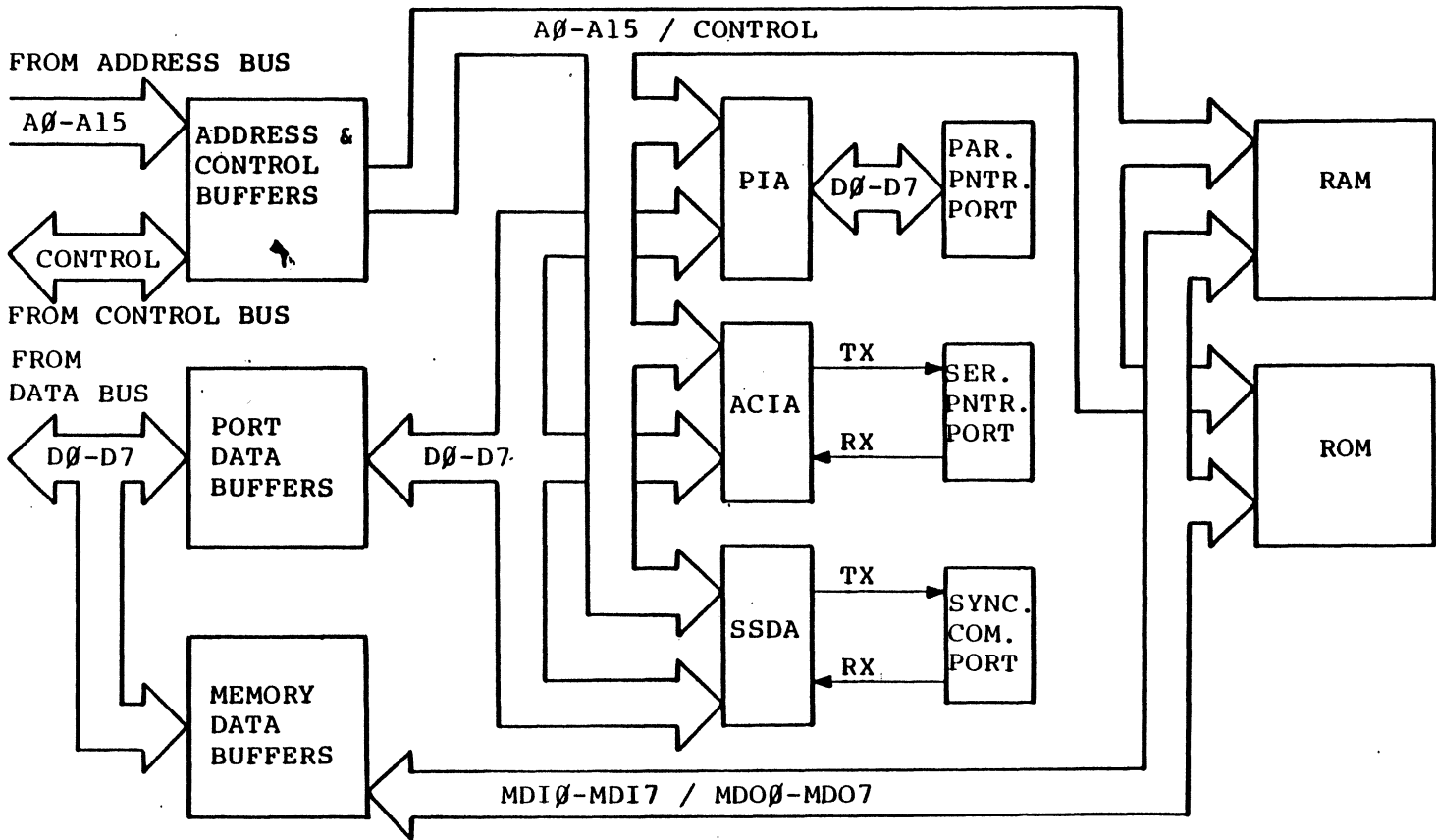


Figure 6-12. Option Board Block Diagram

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The address buffers are uni-directional, 16-bit, tri-state bus drivers receiving the address bus information and passing it to the option board as A0 - A15.

Eight of the 18 control signals are buffered into the option board (VMA, R/W, RESET, MEMCLK, LOW, 02, BDCLK2, and 2xCLK). IRQ is buffered out of the option board. The remaining nine (BA, MEMRDY, REFGNT, REFREQ, HALT, TSC, DMA, DMAR/W, and NMI) are available at the extension bus for use by the customer.

Address Decoders (Schematic 2, Sheet 3)

The address information (A7 - A15) is decoded in this section to generate the select terms for the option board functions. Bits A7 and A8 select the ports with the terms, PNTASY (asynchronous printer port), PNTPAR (parallel printer port), and SYNCOM (synchronous communications port). Bits A7 - A10 enable the polling and port attribute switch banks. Bits A10 and A11 select the optional ROM and RAM chips. Bits A12 - A15 generate the enabling terms for ROM, RAM, and I/O selection.

Asynchronous Printer Port (Schematic 2, Sheet 4)

The asynchronous, or serial printer port consists of an ACIA and a word-configuration switch bank. The incoming printer data (PRDATA) is received onto the option board through pin 3 of the communications line and routed to the ACIA for conditioning (deserializing). The outgoing printer data (PTDATA) is routed from the ACIA to the printer via the communications line, pin 2. The port control terms (PRTS, PCTS, and PDCD) are also routed to the printer and the MPU via the communications lines.

The word configuration information (D0 - D7) is returned to the MPU (as with all data transfer in the ADM-42) for processing and return to the ACIA. The enabling term for the switch bank is SWBNK3.

Parallel Printer Port (Schematic 2, Sheet 5)

The parallel printer port consists of a PIA receiving data from the Data Bus (D0 - D7) and transferring the data in parallel mode to the attached printer as DATA 1 - DATA 2. Certain control signals, such as DATA STROBE, PAPER OUT, BUSY, ON LINE, etc., are handled by the PIA.

Synchronous Communication Port (Schematic 2, Sheet 6)

This port consists of a Synchronous Serial Data Adapter (SSDA) and a word-configuration switch bank.

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The SSDA differs from the ACIA in that a transmitter clock (SYNTCK) and a receiver clock (SYNRCK) are provided to synchronize the transmission and reception rates with the I/O device involved. The serial data lines are SYNCRX (receive) and SYNCTX (transmit).

The modem control terms are buffered into this section via the standard communications lines.

The switch bank functions in the same manner as the one described in the Asynchronous Printer Port discussion, except that the enabling term is SWBNK4.

Polling (Schematic 2, Sheet 7)

The polling option consists of five 8-bit DIP switches feeding tri-state buffers to the Data Bus and the MPU. The polling information is set into the switches and enabled onto the bus by the terms SWBNK5 - SWBNK9.

RAM/ROM (Schematic 2, Sheet 8)

The memory section consists of 2K-bytes of EPROM provided for future system expansion, and 3K-bytes of SRAM; 2K-bytes for optional programmable functions and 1K-byte for future expansion.

Addressing for the EPROMs is accomplished by A0 - A10. The SRAMs are addressed by A0 - A9.

Data into the SRAMs is MDI0 - MDI7, and data out of both the SRAMs and the EPROMs is MDO0 - MDO7.

The chip enables for the EPROMs are  $\overline{ROMA}$ ,  $\overline{ROMB}$ ,  $\overline{ROMC}$ , and  $\overline{ROMD}$ , respectively. The lower 1K of RAM is enabled by  $\overline{RAM2}$ , the next 1K is enabled by  $\overline{RAM3}$ , and the remaining 1K is enabled by  $\overline{RAM4}$ .



**SECTION 7**  
**MAINTENANCE**

**7.1 INTRODUCTION**

This section contains information and instructions for performing routine and corrective maintenance for the ADM-42.

**7.2 PREVENTIVE MAINTENANCE**

The only preventive maintenance required on the ADM-42 is the occasional cleaning of the exterior surfaces, and periodic visual inspections.

The ADM-42 casing should be cleaned using a household cleaner and a paper towel or a soft, lint-free cloth. NEVER use lighter fluid or other petroleum based solvents to clean the casing. Damage to the plastic or painted surfaces could result. In addition, avoid wiping dust into the keyboard and do not let spray cleaner run between the keys.

Periodically, inspect switches and keyboard assembly for freedom of movement. Determine that intensity of character trace on the CRT screen has not diminished. Any required mechanical and electrical adjustment shall only be performed by an authorized Lear Siegler service representative.

**7.3 SWITCH SETTINGS**

The ADM-42 contains four switch banks used to establish certain system configuration characteristics. Two of these switch banks are located on the logic board (CPU switches), and two are located under an access cover on the front of the ADM-42 casing, just below the display screen (word attribute and baud rate switches).

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CPU Switches (Logic Board)

Switches one and two are used for determination of communication mode and are configured per the following:

<u>SWITCH 1</u>	<u>SWITCH 2</u>	<u>FUNCTION</u>
On	Off	Current Loop
Off	ON	Secondary Channel

Switches 3, 4, and 5 are configured as follows:

<u>SWITCH 3</u>	<u>SWITCH 4</u>	<u>SWITCH 5</u>	<u>FUNCTION</u>
on	off	on	These switches must be in this configuration for ADM-42 operation.

Attribute Switches (Logic Board)

These four DIP switches are configured as follows:

<u>SWITCH #</u>	<u>FUNCTION</u>	<u>ON</u>	<u>OFF</u>
1	Underline/Blank	blank	underline
2	Attribute Code	display code	blank code
3	Graphics	disable	enable
4	Null Code	display null	blank null

Word Structure Switches (External Switch Panel)

THE FUNCTIONS OF THIS SWITCH BANK TO BE ASSIGNED UPON COMPLETION OF SOFTWARE.

Baud Rate Switches (External Switch Panel)

These two 16-position rotary switches determine the data transmission rate for the Serial Printer Port and the Asynchronous Communications Port (Modem). The left-most switch controls the Modem baud rate, and the right-most switch controls the Serial Printer port baud rate as follows:

<u>SWITCH POSITION</u>	<u>BAUD RATE</u>
0	50
1	75
2	110
3	134.5
4	150
5	300
6	600
7	1200



<u>SWITCH POSITION</u>	<u>BAUD RATE</u>
8	1800
9	2000
10	2400
11	3600
12	4800
13	7200
14	9600
15	DO NOT USE

#### 7.4 CORRECTIVE MAINTENANCE

This section contains information for performing corrective maintenance on the ADM-42 Display Terminal.

##### 7.4.1 Problem Identification

When it is determined that the ADM-42 is not functioning correctly, the following procedures and the procedures shown in Table 7-1 should be followed:

1. Determine the state of the machine when the fault occurred. Check for operator error, blown fuses, loose connectors; modem or computer failure. Often times failure is caused by one or more of these items.
2. Operate the ADM-42 to determine which functions have failed. For example, does the terminal transmit but not receive? Are characters correctly displayed on the screen? Has a single function such as Backspace or Insert Line failed?
3. Isolate the cause of the failure to a specific module such as the Keyboard assembly, CRT, or Main Circuit Board.
4. Perform the required adjustments or replace the malfunctioning module.

Table 7-1. ADM-42 Troubleshooting Guide

<u>SYMPTOM</u>	<u>CAUSE</u>	<u>ACTION</u>
Terminal will not power up	No AC power to terminal  Fuse Blown	Check power connection to wall  Replace fuse.
Monitor dark or cursor does not appear in upper left corner of screen after 20 second warm-up period.	Video screen not properly adjusted or faulty. Monitor board.  Main logic board.	Press HOME key.  Adjust brightness and contrast controls.  Check cable connections between Monitor and Main Circuit board...  Replace Monitor board.
Character entered from keyboard not displayed on CRT screen.	Faulty keyboard switch.	Check operation of key. If necessary remove and replace  tacts. Replace Monitor board.  Check for foreign material between keys.
Incorrect or random characters displayed on screen.	Incorrect Baud Rate switch settings.  Faulty modem.	Set Baud Rate switches to correct position.  Check operation of modem.
Display not vertically aligned on screen.	Video screen vertical drive improperly adjusted.	Perform vertical adjustments described in this section.

Table 7-1. ADM-42 Troubleshooting Guide (Cont.)

<u>SYMPTOM</u>	<u>CAUSE</u>	<u>ACTION</u>
Display not horizontally aligned on screen.	Improper horizontal adjustment.	Perform horizontal adjustments described in this section.
Display out of focus.	Focus control incorrectly adjusted.	Adjust focus as outlined in this section.
Raster improperly centered.	Ring magnets incorrectly adjusted.	Follow procedures outlined in this section.
Editing functions not working.	Possible CPU or system ROM malfunction.	Replace main circuit board.
Terminal will not transmit or receive data.	Malfunctioning modem.	Check modem operation.  Check operation of remote computer.

#### 7.4.2 Removal and Replacement

##### Keyboard

##### Keyboard Cover Removal

1. Turn off power.
2. Detach keyboard from main electrical housing by lifting up and pulling out on the keyboard assembly.
3. Use a key or screwdriver to depress latch on top cover and lift keyboard cover off.

##### Keyboard Assembly Removal

1. Disconnect connector at rear of board.
2. Lift out board.

3. Reverse procedure to replace.

#### Key Switch Contact Replacement

The tools required to remove the key switch contacts from the keyboard are:

Insertion tool and guide

Soldering iron (low temperature)

Wicking device

Short needle-nose pliers with serrated jaws

The procedure is as follows:

1. Remove the Main Circuit board.
2. Remove the solder from the contact (dewick) with a low-heat soldering iron so as not to damage circuit pads. The contacts will protrude about 1/32 inches beyond the back of the logic board. Make sure that the contacts are completely free of any solder by brushing them with your finger. The contacts should move freely.
3. Turn the board over so that the keyboard is up.
4. Remove the key top whose contacts need to be replaced.
5. With the pliers, firmly grasp the plunger in the corner (see Figure 7-1). Pull straight up firmly.

**CAUTION:**

The plunger is fragile; pulling to the side can break plunger or housing.

6. Remove the spring..
7. With the pliers, grasp the contact and pull vertically; remove both contacts.
8. Place the insertion tool guide in the switch housing making sure that the keyway is toward the front of the keyboard (see Figure 7-2).

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9. Insert the solid contact (P/N 373-30052-2) in the insertion tool with the bend to the outside and the solder end up (see Figure 7-3). Insert the split contact (P/N 373-30053-2) with the split end in first (see Figure 7-4).
10. Place the insertion tool into the guide matching keyway slot and key. Press the tool firmly straight down until the contacts are seated and the tool clicks (see Figure 7-5).
11. Remove the tool and the guide.
12. Replace the spring.
13. Replace the plunger making sure that the bar is parallel with the contact opening. Work the plunger down slowly, separating the contacts with the crossbar of the plunger (see Figure 7-6).
14. Press the plunger firmly down until it is seated. The plunger will click.
15. Replace the key top.
16. Turn the board over and verify that the contacts extend about 1/32 inch past the board.
17. Resolder the contacts in place.

Replacing Keyboard Cover

1. Place plastic tabs on front of keyboard assembly in slots on bottom of keyboard assembly.
2. Rock the cover back and press gently until latch clicks.

Monitor

Removing Monitor Housing from Main Electrical Housing

1. Disconnect monitor power cord from electrical housing.
2. Disconnect video connector from main electrical housing.
3. Pull monitor housing straight up until it is clear of the pins on the electrical housing and remove.

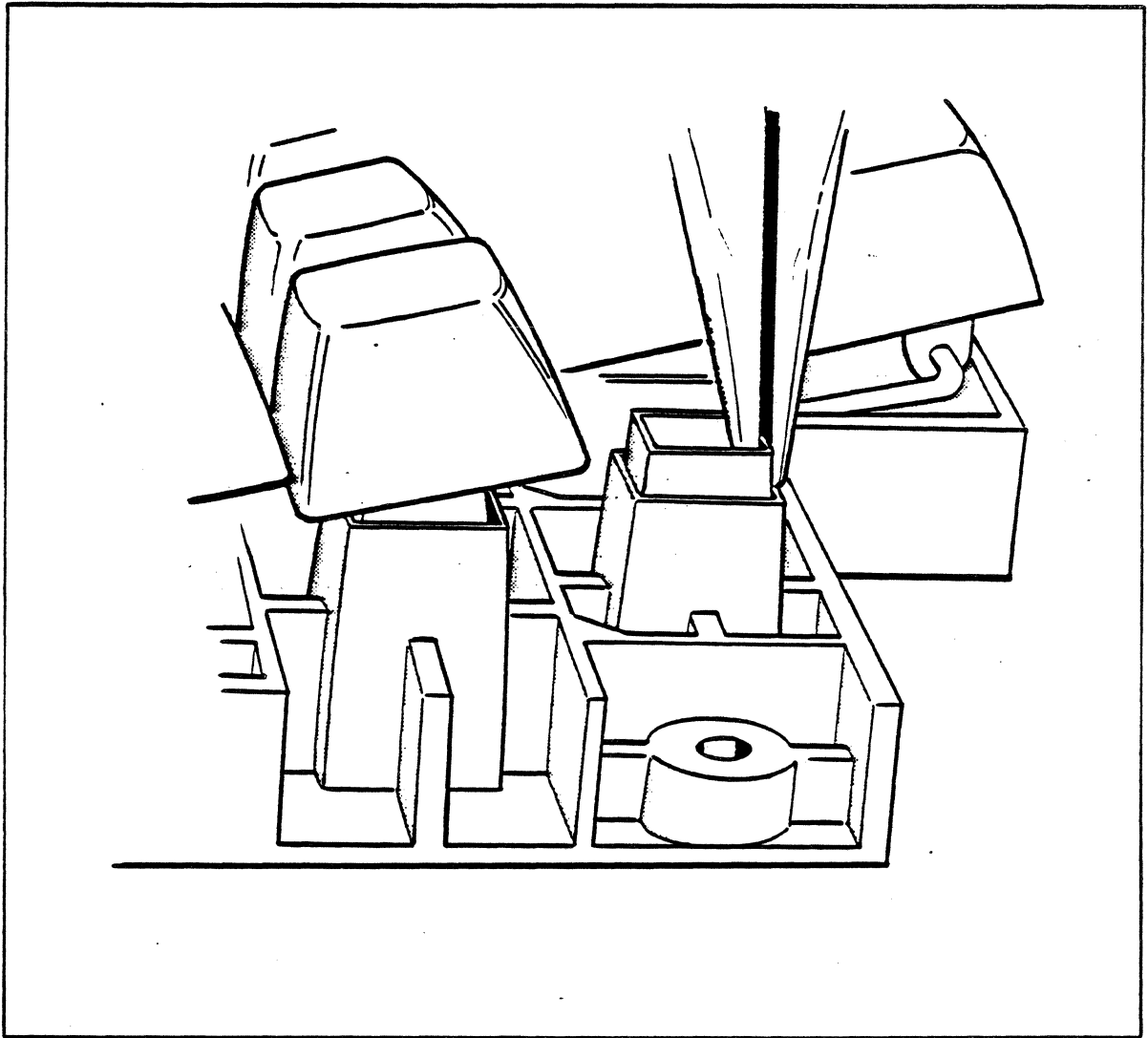


Figure 7-1. Removing the Plunger

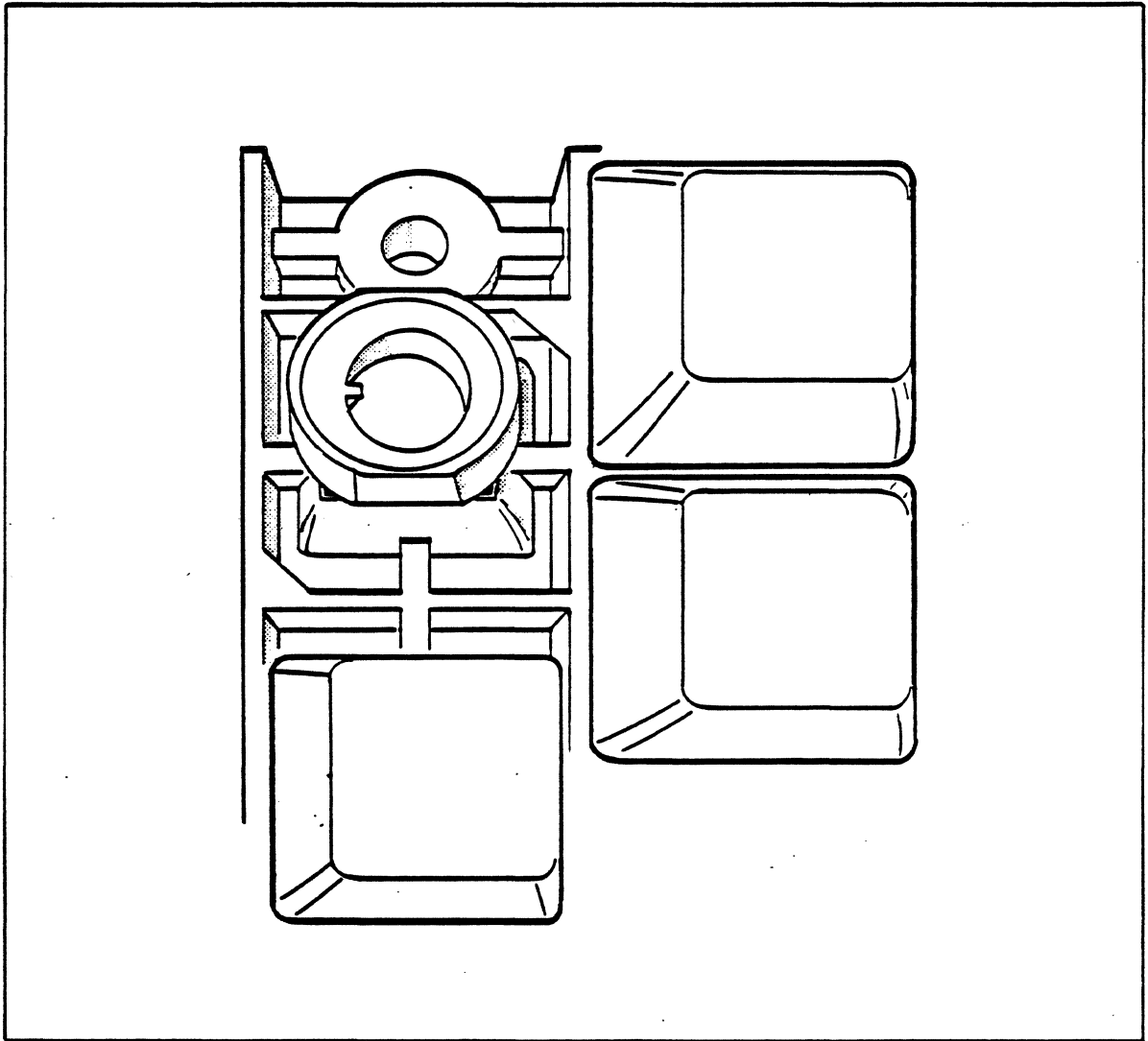


Figure 7-2. Insertion Tool Guideway

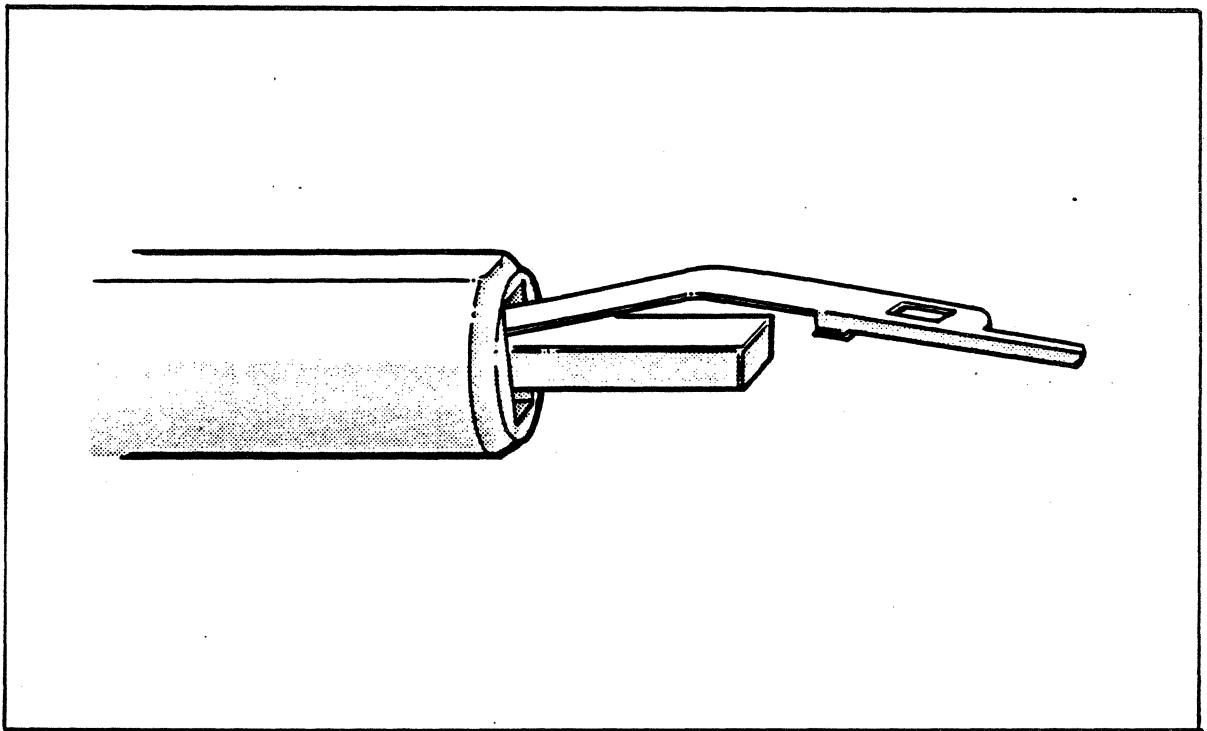


Figure 7-3. Placing the Solid Contact in the Insertion Tool



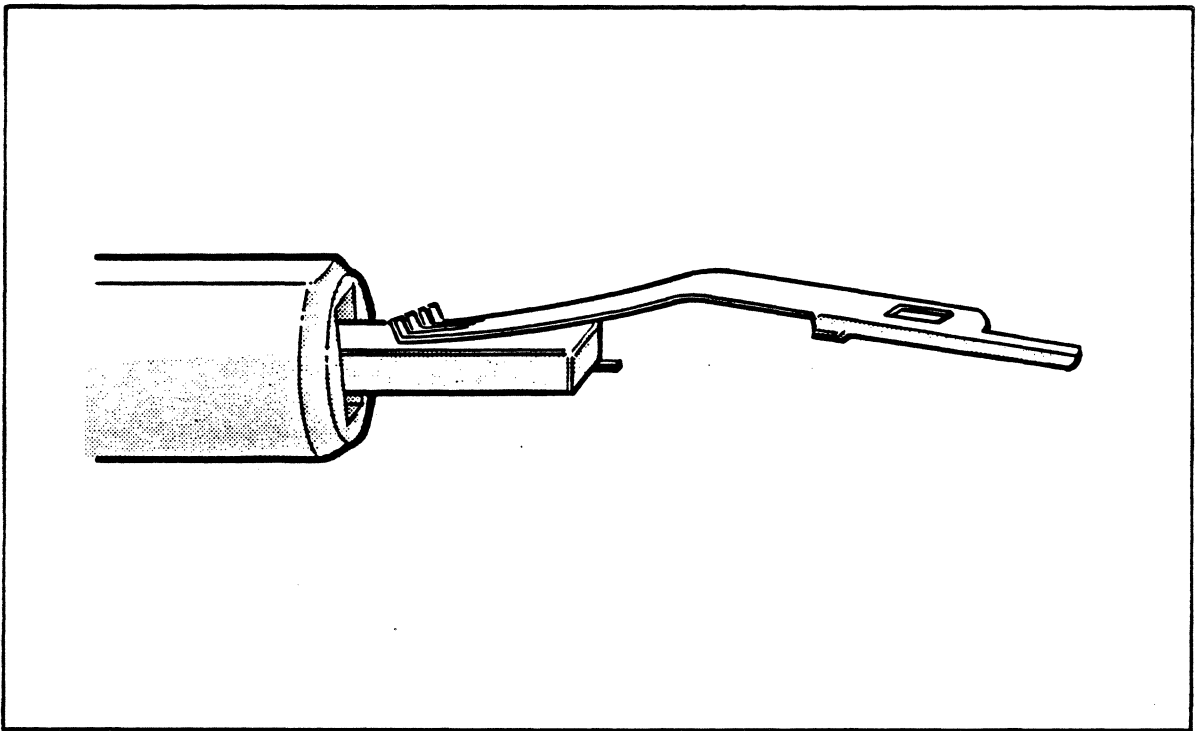


Figure 7-4. Inserting the Split Contact in the Insertion Tool

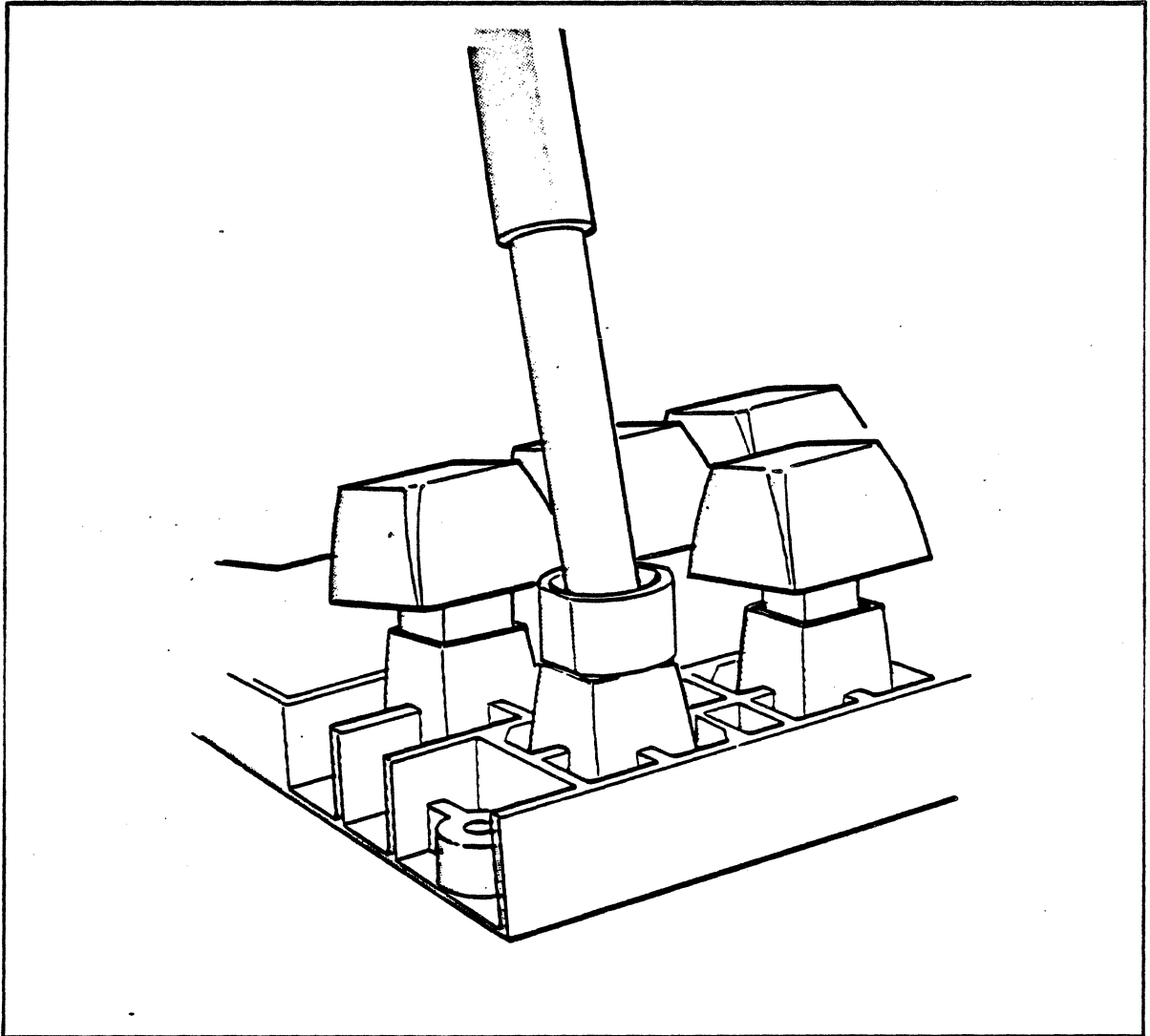


Figure 7-5. Placing the Insertion Tool Into the Guide

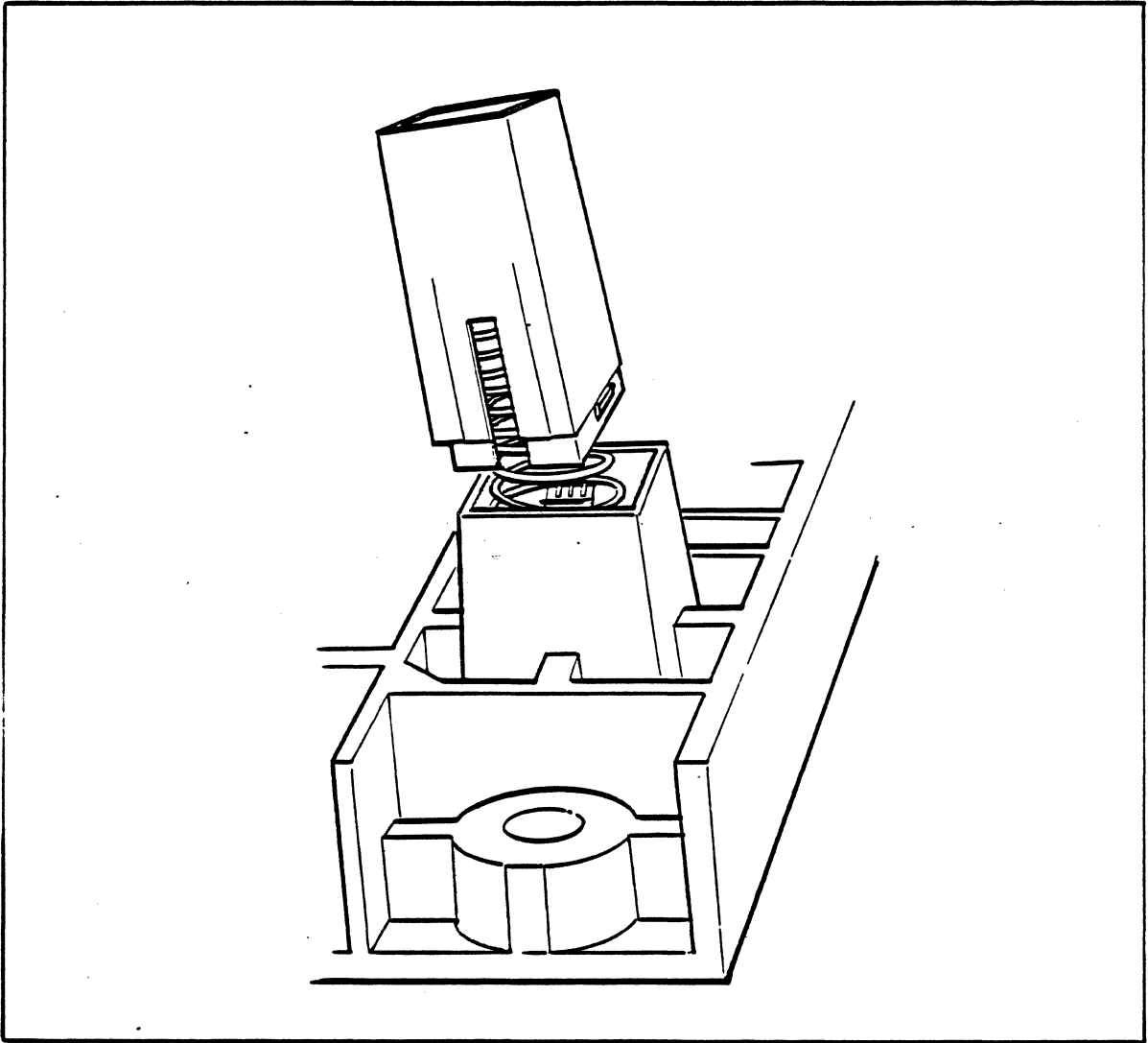


Figure 7-6. Replacing the Plunger

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4. Reverse procedure to replace.

Opening Monitor Cover

1. Push in or pry gently on the center catch of the cover.
2. Rock cover upward and forward to gain access to monitor logic board and CRT.
3. To replace, install catches on front top of cover, lower cover, and push inward above catch unit it clicks into place.

Removal of Main Electrical Housing Cover

1. Open Switch Access Cover to expose latch.
2. Bend the catch toward the front of the monitor and lift the lid upward.

Replacement of Main Electrical Housing Cover

1. Place plastic tabs located at rear of cover into slots on bottom of electrical housing.
2. Lower cover and hook latch.
3. Close Switch Access Cover.

Removal of Power Supply

1. Loosen screw holding down the power supply circuit boards.
2. Disconnect power supply connectors from the boards.
3. Lift up power supply from front until it is clear of the housing.
4. Pull cord through the back of the electrical housing.
5. Reverse procedure to replace.

Removal of Logic Boards

1. Disconnect connector running between keyboard and main electrical housing.

2. Lift up logic boards and place in holders.
3. Remove boards by disconnecting all connectors and lifting the boards straight out.
4. Reverse procedure to replace.

Removal of CRT

WARNING:

Discharge anode voltage to ground before attempting to remove the CRT, flyback assembly or circuit board..

To remove the CRT, proceed as follows:

1. Unhook both ends of the spring that is positioned across the CRT.
2. Remove the connector from the base of the CRT.
3. Remove the anode connector from the lower surface of the CRT.
4. Using a screwdriver or socket wrench, loosen the clamps on both sides of the CRT frame. Turn the clamps to clear the frame.
5. Grasp the CRT securely and lift it upward, then out of the ADM-42 cover.

To install a new CRT, follow the preceding steps in reverse order.

To remove the flyback assembly, proceed as follows:

1. Disconnect the anode connector from the CRT.
2. Disconnect the Molex connector that connects the flyback assembly to the monitor circuit board.
3. Use a screwdriver to loosen the hex-head screw that clamps the flyback assembly to the molded cover.
4. Lift the flyback assembly upward until the screw clears the slot in the mounting plate. Remove assembly from the cover.

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To remove the monitor circuit board, proceed as follows:

1. Remove the flyback assembly.
2. Disconnect all Molex connectors from the monitor circuit board..
3. Slide circuit board from the slots in the molded cover and remove.

To replace monitor circuit board and flyback assembly, perform the preceding steps in the reverse order.

#### 7.4.3 Adjustments

The Monitor assembly is the only ADM-42 component which requires adjustment.

#### Opening the ADM-42 Cover

All adjustments to the ADM-42, except the contrast adjustment, must be performed with the terminal cover opened or removed. To open the terminal cover, proceed as follows:

1. Remove the two slot head screws located under the front corners of the terminal base.
2. Lift the cover upwards and rearwards from the front until it is lowered to rest on the table.
3. To remove the cover, disconnect the cable connecting the main circuit board to the monitor. Slide the cover toward the left until it is free of the hinge pins, then lift the cover from the base.

Note that the cover need not be removed for most of the adjustments required on the ADM-42.

#### Contrast Adjustment

The Contrast Adjustment knob is located on the front of the monitor chassis, just below the screen, to the left of the ON/ OFF switch. The contrast control should be set to the center of its range initially, and then, after the brightness control is set, set the contrast for comfortable viewing.

#### Brightness Adjustment

The brightness control is located on the front of the monitor chassis, just below the screen, to the right of the ON/OFF switch. The brightness control should be initially turned

switch. The brightness control should be initially turned clockwise until the background is barely visible. The cursor should be present. Adjust for comfortable viewing.

**WARNING:**

Brightness must be adjusted with power applied to the ADM-42. To avoid electrical shock, use a non-conducting screwdriver for this and all other adjustments.

Vertical Adjustment

To perform vertical adjustment on the ADM-42, proceed as follows:

1. Apply video and synchronization signals to the monitor.
2. Set the Vertical Frequency control to the center of its rotation.
3. Adjust the Vertical Height control until the desired height of the display is obtained.
4. Adjust the Vertical Linearity control to obtain the best vertical linearity.
5. Remove the vertical drive signal from the CRT or use a jumper lead and short the vertical drive input terminal of the printed circuit card edge connector to ground.
6. Adjust the Vertical Frequency control until the picture rolls up slowly.
7. Restore the vertical drive signal to the monitor.
8. Recheck height and linearity.

Horizontal Adjustment

The raster width is changed by adjusting the width coil and the Horizontal Linearity Sleeve as follows:

1. Apply video and synchronization signals to the monitor. Set the Contrast Control to the point where the raster is visible on the screen.

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2. Insert the Horizontal Linearity Sleeve under the yoke until about 1/3 of the sleeve is exposed. If the monitor was shipped from the factory and the location of the sleeve in the yoke was present, make a mark on the sleeve and reinsert the sleeve to this mark if removal is required.  
  
If the Horizontal Linearity Sleeve is inserted too far into the yoke, the horizontal output circuitry may be stressed.
3. Adjust the Horizontal Width Coil to obtain the correct raster width.
4. To obtain the best linearity, move the Horizontal Linearity Sleeve further under the yoke. This adjustment may affect the raster width but should not be used for raster width adjustments. The Horizontal Linearity Sleeve should be positioned to obtain the best linearity.
5. Readjust the Horizontal Width Coil to obtain the correct raster width.
6. Check horizontal linearity and width. Adjust if necessary.

Focus Adjustment

To obtain the best focus, rotate the Focus Adjustment knob.

Centering the Raster

The raster may be centered by rotating the Ring Magnets.

The Ring Magnets should not be used to move the raster from its center position; this action will lower the display resolution.

If the display is tilted, the entire yoke should be rotated.



SECTION 8  
DRAWINGS

NOTE: Drawings in this Section are physically arranged in numerical sequence.

<u>TITLE</u>	<u>ASSEMBLY 129810-1,-21</u>	<u>ASSEMBLY 129810-31,41</u>
Final Assembly, ADM-42	129810E	129810E
Parts List, Final Assembly, ADM-42	PL129810E	PL129810E
Configuration Switch	CS129830B	CS131370A
Personality PROM, ADM-42 Standard	129753T-8 (Sht. 6)	-
Options, ADM-42	129542F	131371D
Terminal Control Unit, ADM-42	129840D	129840D
Parts List, Terminal Control Unit, ADM-42	PL129840D	PL129840D
Assembly Logic Board	129830D (Shts. 1 & 3)	131370A
Parts List, Assembly, Logic Board	PL129830D	PL131370A
Schematic, Logic Board	129831C	129813A
Assembly, Option Logic Board	129832D (Sht. 1)	129832D (Sht. 1)
Parts List, Assembly, Option Logic Board	PL129832D	PL129832D
Schematic, Option Logic Board	129833A	129833A
Keyboard Assembly, ADM-42	129841B	129841B
Parts List, Keyboard Assembly, ADM-42	PL129841B	PL129841B

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<u>TITLE</u>	<u>ASSEMBLY 129810-1,-21</u>	<u>ASSEMBLY 129810-31,-41</u>
Keyboard PC Board Assembly	129834C (Sht. 1)	-
Parts List, Keyboard PC Board Assembly	PL129834C	-
Schematic Keyboard PC Board Assembly	129835B	-
Cable Assembly, Keyboard	129723	129817A
Monitor Assembly, ADM-42	129842B	129842B
Parts List, Monitor Assembly, ADM-42	PL129842B	PL129842B
Monitor Cable, Video	129839B	129839B
AC Cable Assembly, Monitor	-	129844A
Power Adapter Assembly	129777C	-
Power Supply Assembly	129730A	129730A
Parts List, Power Supply Assembly	PL129730C	PL129730C
Power Supply PCBA	129731A (Sht. 1)	129731A (Sht. 1)
Parts List, Power Supply PCBA	PL129731A	PL129731A
Wire List Power Supply PCBA	129732D	129732D
<u>TITLE</u>	<u>ASSEMBLY 131394</u>	
PC Board Assembly	131394D	
Parts List, PC Board Assembly	PL131394D	

**REVISIONS**

LTR	SHEET	DESCRIPTION	DATE	APPROVED
4		INC ADCN 1-3 REDRAWN SMT 12, 11 (OPT 2 F/N 7 WAS .107) ADDED OPT 5, 6, 11 DELETE OPT 3-6; OPT 9-5 F/N 5 WAS W. Kelly 10-20-78 138748-4102	11-27-78 11-27-78	W. Kelly H. Turner
8		INC ADCN 4-8 SMT 7 F/N 8 QTY WAS 3, F/N 9 WAS 9 SMT 8 F/N 7 QTY WAS 3 W. Kelly 2-21-79	2-21-79 2-21-79	W. Kelly H. Turner

**CONTENTS**

Option		Page
1	PROM configuration	3
2	Data RAM	
	8K	4
	12K	4
	16K	4
	Option board instruction	5
3	Option board general	6
* 3-1	Parallel printer port	7
3-2	Async printer port	8
* 3-3	Synchronous port	9
3-4	Polling address	10
3-5	Programmable function keys	
	3-5-1 32 CHARACTER (1K)	11
	3-5-2 64 CHARACTER (2K)	11
* 3-6	Expanded program (Not available)	
* 3-7	External bus	12
4	Composite video	13
5	Answer back	14
	Alternate character set	
6-1	Graphics	15
10	230V 50/60 Hz Power input	16
	Optional keyboard arrangement	
11-1	Alternate	17
* 11-2	German	17
* 11-3	United Kingdom	17
* 11-4	Scandinavian	17
20	Cable, RS232-current loop	18
21	Cable, Parallel printer	18
22	Cable, Async printer	18
* 23	Cable, External bus	19
* 24	Cable, Composite video	19

\* OPTION NOT AVAILABLE

DASH NO.	NEXT ASSY	USED ON
		DL29500
APPLICATION		

UNLESS OTHERWISE SPECIFIED  
DIM. IN INCHES  
TOLERANCES  
X ± .1  
.XX ± .03  
.XXX ± .010  
ANGLES ± 0.5°  
MACH. FIN.

DR W. KELLY 8-18-78  
CHK  
DSGN  
ENGR DH THOMSON 8-25-78  
PROJ  
REL M. SLUTZKY 8-25-78  
CUSTOMER APPD

 LEAR SIEGLER, INC.  
ELECTRONIC INSTRUMENTATION DIV.  
ANAHEIM, CALIF.

**CONFIGURATION CONTROL**  
**ADM 42**

SIZE	CODE IDENT	REV
<b>A</b>	<b>98438</b>	<b>F</b>

129542

SCALE	SHEET 1 OF 19
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FORM 10 1078

J

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**REVISIONS**

LTR	SHEET	DESCRIPTION	DATE	APPROVED
C		INC ADCN 9-20 DCN 435 & 520. ADD NEW SHT 2 FOR REVISIONS & UPDATE ALL SHEETS	4-7-80 4/7/80 RM - 4-4-80	<i>W. Kelly</i> <i>B. [unclear]</i> <i>W. Kelly</i>
D		INC DCN 603	RM - 4-4-80 4/8/80	<i>W. Kelly</i> <i>B. [unclear]</i>
E		INC DCN 605	RM 4-4-80 4/8/80	<i>W. Kelly</i> <i>B. [unclear]</i>
F		INC DCN 627	RM 4-4-80 4/8/80	<i>W. Kelly</i> <i>B. [unclear]</i>

Form 9 10-1011a

SIZE	CODE IDENT		
<b>A</b>	<b>98438</b>	<b>129542</b>	<b>F</b>
SCALE	-		SHEET 2

↑

CONFIGURATION NO.	FROM DASH NO. ON 129830					FROM DASH NA ON 129832				
	PERSONALITY 129753(825123) LOCATION 14K	PROGRAM 129827(2716) LOCATION 11H E000	PROGRAM 129827(2716) LOCATION 12H E800	PROGRAM 129827(2716) LOCATION 13H F000	PROGRAM 129827(2716) LOCATION 14H F800	PROGRAM 129827(2716) LOCATION 4E C000	PROGRAM 129827(2716) LOCATION 5E C800	PROGRAM 129827(2716) LOCATION 6E D000	PROGRAM 129827(2716) LOCATION 8E D800	
	753-	827-	827-	827-	827-	827-	827-	827-	827-	
1	OPT.	-55	-54	-53	-52	-57				570
2										
3	011000	00411	004012	004013	004014	004004	-	004006	-	5.E
4	NOT RECD	-64	-54	-53	-52	-57				6.E
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Form # 10-1011a

OPTION 1  
 TITLE: FROM CONFIGURATION  
 SHEET: 1 OF 1

SIZE <b>A</b>	CODE IDENT <b>98438</b>	<b>129542</b>	REV <b>F</b>
SCALE	SHEET		<b>3</b>

QTY PRD				PARTS LIST			
NO.	16K	12K	8K	PART NUMBER	DESCRIPTION	LOCATION/REF DES	NOTE
1			✓	8K MEMORY	OPTION		
2		✓		12K MEMORY	OPTION		
3	✓			16K MEMORY	OPTION		
4							
5	2	16	B	129466-4027	RAM		
6	2	16	B	128518-103	CAP, .01UF		
7	2	1		128518-106	CAP, 10UF		
8							
9							
10							
11							
12							
13							

A. PARTS INSTALL ON 129830. SEE DWG FOR LOCATION

Form 9-10-1011a

OPTION 2	SIZE A	CODE IDENT 98438	129542	REV F
TITLE MEMORY - 8K/12K/16K	SCALE	SHEET 4		
SHEET 1 OF 1				

REQUEST FOR ANY OF THE FOLLOWING OPTIONS IN GROUP 3  
 REQUIRE ADDITIONAL P.C. BOARD 129832 & PARTS LISTED  
 ON NEXT SHEET ADDED TO 129830 BD.

ANY OF THE FOLLOWING AFFECT REAR CLOSURE 129746.

OPTION

PARALLEL PTR PORT	•			•		•
ASYNCR PTR PORT		•			•	•
SYNCHRONOUS PORT			•	•	•	•
INSTALL 129746 CLOSURE DASH NO. ON 129832	-191-	-181-	-171-	-161-	-151-	-111-

Form # 10-1011a

OPTION BOARD INSTRUCTIONS

SIZE

A

CODE IDENT

98438

129542

REV

F

SCALE

SHEET

5

QTY REQD		PARTS LIST				
NO.			PART NUMBER	DESCRIPTION	LOCATION/REF DES	NOTE
1						
2						
3						
4		2	8496-1003	CONN, 50 PIN	(3M)	A
5						
6						
7						
8						
9		1	129832-11	P.C. BOARD ASSY		B
10		2	129739-1	INTERCONNECT CABLE 50X2		B
11		1	129746-(NOTE)	CLOSURE		C
12		1	129843-3	SPACER		B
13						

A. PARTS INSTALL ON 129830. SEE DWG FOR LOCATION  
 B PARTS INSTALL ON TOP ASSY 129840.  
 C. CLOSURE DASH NO. IS OPTION DEPENDENT SEE  
 TABULATION ON SHT 4 OR INSTALL BLANK 129746-131

FORM 9-10-10118

OPTION 3  
 TITLE OPTION BOARD  
 SHEET 1 OF 1

SIZE A  
 CODE IDENT 98438  
 SCALE

129542  
 SHEET 6

REV F



QTY REQD		PARTS LIST				
NO.			PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1		1	129824-6821	IC		
2		3	129467-04			
3		1	129467-21			
4		1	129476-102	RES MOD, 1K		
5		5	128518-102	CAP .001 UF		
6		1	128533-302	RES 3K		
7		1	128533-472	RES 4.7K		
8		1	206817-1	CONN		(AMP)
9		2	129473-3	JACK SOCKET		
10		2	R3479 x 1/4	RIVET, SEMI-TUB		(CHICAGO RIVET)
11		1	640379-3	SOCKET, 40 PIN		(AMP)
12		1	129827-00	EPROM 2716		B
13						

A. INSTALL PARTS ON 129832. SEE DWG FOR LOCATION.

B PROGRAM PER PROM TABULATION, SEE SHT 3  
AVAILABLE PROGRAMS:

1. (NONE)
- 2.

OPTION NOT AVAILABLE

Form # 10-1011A

OPTION 3-1	SIZE A	CODE IDENT 98438	129542	REV F
TITLE PARALLEL PTR PORT	SCALE		SHEET 7	
SHEET 1 OF 1				

QTY END		PARTS LIST			
NO.		PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

A. STANDARD PARTS INCLUDED ON 129832-11

B. PROGRAM PER PROM TABULATION. SEE SHT 2.

AVAILABLE PROGRAMS:

1. 129827-004004; ONLY COMPATABLE WITH -11 THRU -14 OR -12, 13, 14 & 17 PROGRAM SET.
2. 129827-57 ONLY COMPATABLE WITH -52 THRU -55 PROGRAM SET.

OPTION 3-2  
 TITLE ASYNC PRINTER PORT  
 SHEET 1 OF 1

SIZE	CODE IDENT	REV
A	98438	F
SCALE	129542	SHEET 8

FORM 9 10-1975

QTY END		PARTS LIST				
NO.			PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1		1	129824-6852	IL		
2		1	128348-1488			
3		2	128348-1489			
4		2	128348-8T97			
5		1	785-1-R4.7K	RES MOD, 47K	(BECKMAN)	
6		1	1-435668-8	SWITCH, 8 POS	(AMP)	
7		2	128518-103	CAP, .01 UF		
8		2	128533-512	RES, 5.1K		
9		1	206584-1	CONN, 25 PIN	(AMP)	
10		2	129473-3	JACKSCREW		
11		2	R3479 x 1/4	RIVET, SEMI-TUBULAR	(CHICAGO RIVET)	
12		1	640361-3	SOCKET, 24 PIN	(AMP)	
13		1	129827-00	EPROM 2716		B

A. PARTS INSTALLED ON 129832. SEE DWG FOR LOCATION.  
 B. PROGRAM PER PROM TABULATION. SEE SHT 3  
 AVAILABLE PROGRAMS:

1. (NONE)
- 2.

OPTION NOT AVAILABLE

OPTION 3-3	SIZE A	CODE IDENT 98438	129542	REV 11
TITLE SYNCHRONOUS PORT	SCALE		SHEET 9	
SHEET 1 OF 1				

FORM 9-10-1011A

QTY REQD		PARTS LIST			
NO.		PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTE
1	7	128348-8T97	IC		
2	5	1-435668-8	SWITCH, 8 POS	(AMP)	
3	5	785-1-R4.7K	RES MOD 4.7K	(BECKMAN)	
4	1	129827-00	EPROM 2716	6E	C
5					
6					
7					
8					
9					
10					
11					
12					
13					

A. PARTS INSTALL ON 129832. SEE DWG FOR LOCATION

B. DECKL INSTALLS ON 129841 KEYBOARD ASSY.

C. PROGRAMS AVAILABLE

1. 129827-004006 (FOR PROM SET REL 12/18)

2. 129827-73 (FOR PROM SET V2.03H)

FORM 9-10-1978

OPTION 3-4	SIZE A	CODE IDENT 98438	129542	REV F
TITLE POLLING ADDRESS	SCALE	SHEET 10		
SHEET 1 OF 1				

QTY REQD		PARTS LIST				
NO.			PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTE
1			3-5-1	32 CHAR. FCN KEYS		B
2		✓	3-5-2	64 CHAR. FCN KEYS		
3						
4						
5		B	128348-2102A	RAM	2H-9H	A
6						
7						
8						
9						
10						
11						
12						
13						

A. PARTS INSTALL ON 129832-11 PCB IN SOCKETS.

B. STANDARD PARTS INCLUDED ON 129832-11

Form 9-10-10118

OPTION **3-5**  
 TITLE PROGRAMMABLE FUNCTION KEYS  
 SHEET 1 OF 1

SIZE **A** CODE IDENT **98438**

**129542**

REV **F**

SCALE

SHEET 11

QTY END		PARTS LIST			
1	2	3	4	5	6
1	2	3	4	5	6
1	2	3496-2003	CONN 50 PIN		(3M)
2	6	761-3-R100-Ω	RES MOD 100 Ω, DIP		(CTS)
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

A. PARTS INSTALL ON 129832. SEE DW4 FOR LOCATION.

OPTION NOT AVAILABLE

Form 9 10-1071a

OPTION 3-7	SIZE A	CODE IDENT 98438	129542	REV F
TITLE EXTERNAL BUS	SCALE		SHEET 12	
SHEET 1 OF 1				

QTY REQD		PARTS LIST				
NO.			PART NUMBER	DESCRIPTION	LOCATION/REF DES	NOTES
1		1	51-153-0000	JACK	(SELECTRO)	
2		2	2N3904	TRANSISTOR		
3		1	128533-100	RES, 10 $\Omega$		
4		1	128533-750	RES, 75 $\Omega$		
5						
6		1	51-107-3059	PLUG, COAX	SELECTRO	B/C
7						
8						
9						
10						
11						
12						
13						

- A. PARTS INSTALL ON 129830. SEE DWG FOR LOCATION.
- B. IF INSTALLED ON RG59/U FOR CUSTOMER BY LSI, PART NO. 51-124-3059 MAY BE SUBSTITUTED.
- C. FURNISH LOOSE WITH EQUIPMENT AS PART OF THIS OPTION.

OPTION ..... 4 .....  
 TITLE COMPOSITE VIDEO  
 SHEET 1 OF 1

SIZE	CODE IDENT	REV
A	98438	F
SCALE	129542	
	SHEET 13	

QTY REQD		PARTS LIST			
No.		PART NUMBER	DESCRIPTION	LOCATION/REF DES	NOT.
1					
2					
3					
4	1	129753-00	PROM, 825123	10K	A
5					
6					
7					
8					
9					
10					
11					
12					
13					

- A. PROGRAM TO CUSTOMER REQUIREMENTS.
- B. INSTALL ON 129830 @ 10K. SEE DWG.
- C. NOT AVAILABLE UNTIL -7 BD

FORM 9 10-10-11

OPTION 5	SIZE A	CODE IDENT 98438	129542	REV F
TITLE ANSWER BACK	SCALE	SHEET 14		
SHEET 1 OF 1				



QTY REQD		PARTS LIST				
NO		6-1	PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1		✓	6-1	GRAPHICS		
2						
3						
4						
5		1	129827-005000	PROM, LINE GRAPHICS	2H	A
6						
7						
8						
9						
10						
11						
12						
13						

A. PROGRAM & INSTALL PROM ON 129830 @ 2H

Form 9 10-10119

OPTION 6	SIZE A	CODE IDENT 98438	129542	REV F
TITLE ALTERNATE CHAR GEN SET	SCALE	SHEET 15		
SHEET 1 OF 1				

QTY REQD		PARTS LIST				
No.			PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1		1	129730-21	POWER SUPPLY ASSY		A
2		1	31301.5	FUSE, S-B, 1 1/2A	(LITTELFUSE)	A
3		1	129717-27	NAME PLATE, TPU		A
4						
5		1	129717-35	NAME PLATE, MON		C
6		1	313.750	FUSE, S-B, 3/4A	(LITTELFUSE)	C
7						
8						
9						
10						
11						
12						
13						

A REPLACES EXISTING POWER SUPPLY ON 129840 TOP ASSY.

B MONITOR MUST BE 230V (SEE VENDOR DATA SHEET)

C REPLACES EXISTING NAME PLATE ON 129842 MON ASSY.

Form 910-1011a

OPTION	10	SIZE	CODE IDENT	129542	REV
TITLE	230 V 50/60 HZ	A	98438		F
SHEET	1 OF 1	SCALE		SHEET	16

QTY REQD					PARTS LIST			
10	11-4	11-3	11-2	11-1	PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1			✓		11-1	ALTERNATE KBD		
2			✓		11-2	GERMAN KBD	NOT AVAILABLE	
3	✓				11-3	UK OPTION		
4	✓				11-4	SCANDINAVIAN	NO. AVAILABLE	
5								
6				1	129841-11	KEYBOARD ASSY		A
7				1	129841-21	" "		A
8	1				129435-43	KEYTOP, ENGRAVED		C
9	1				129841-41	" "		A
10				1	129827 OR 129867	CHAR GEN	1H	B
11	1				129827-2A	CHAR GEN EPROM	1H	B
12	1				129827 OR 129867	CHAR GEN	1H	B
13								

- A. REPLACE 129841-1 KEYBOARD WITH F/N 6, 7, 8, OR 9 AS APPLICABLE.
- B REPLACE STD CHAR GEN ON 129830 @ 1H
- C REPLACE KEYTOP #42 #3 WITH FIN 8 1/3

Form 9 10-10-11a

OPTION 11 TITLE OPTIONAL KEYBOARD ARRANG SHEET 1 OF 1	SIZE <b>A</b>	CODE IDENT <b>98438</b>	<b>129542</b>	REV <b>F</b>
SCALE			SHEET 17	

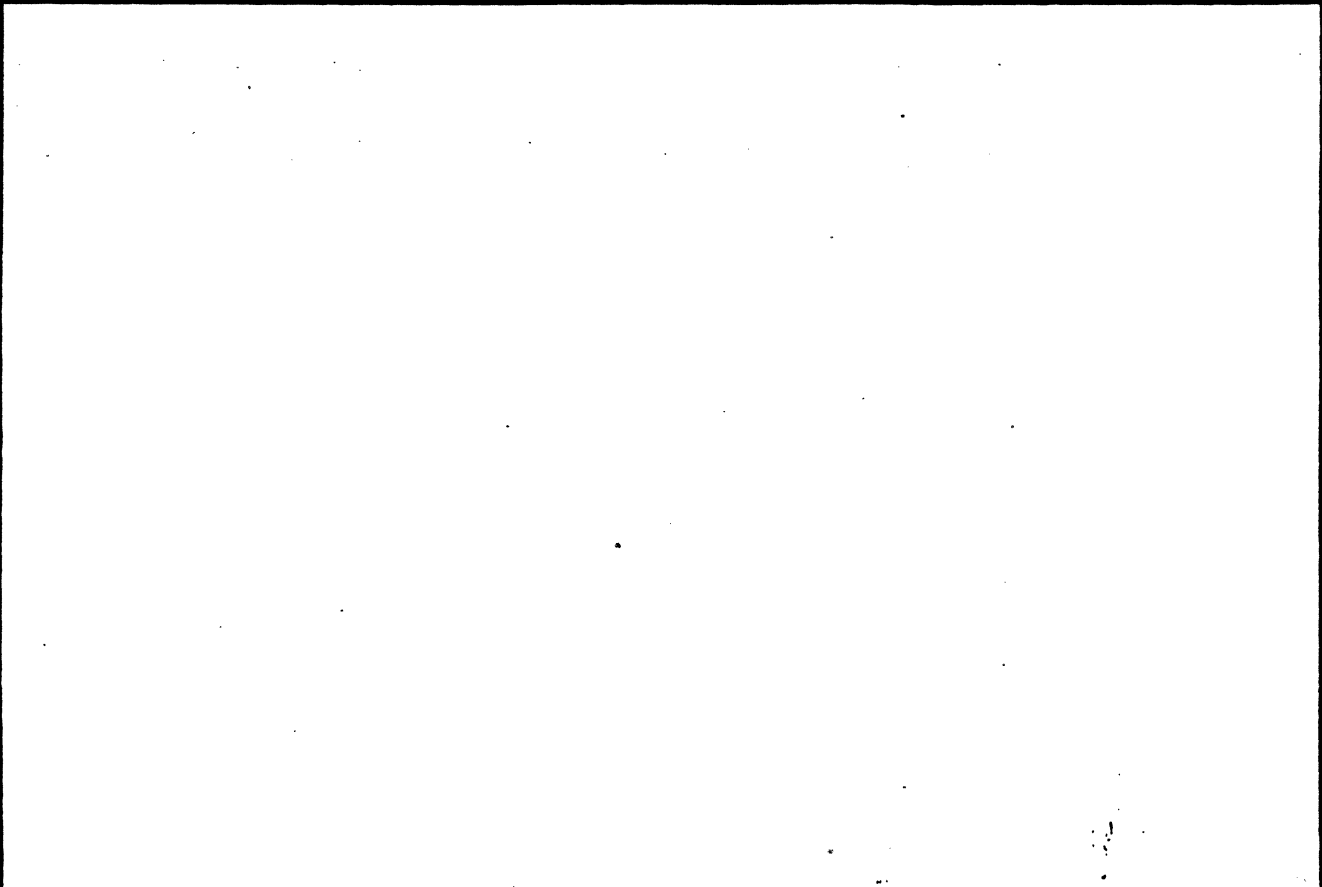
QTY END		PARTS LIST				
NO.			PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOT.
1		✓	OPT 20	CABLE, RS232 -CURRENT LOOP		
2		✓	OPT 21	CABLE, PARALLEL PRINTER		
3	✓		OPT 22	CABLE, ASYNC PRINTER		
4	✓					
5						
6						
7		1	129316-21	CABLE, RS232-CURRENT LOOP		
8		1	129787-1	CABLE, PARALLEL PRINTER		
9	1		129949-1	CABLE, ASYNC PRINTER		
10						
11						
12						
13						

Form 9-10-1011A

OPTION 20-21-22  
 TITLE CABLE, I/O  
 SHEET

SIZE	CODE IDENT	REV
A	98438	F
SCALE	129542	SHEET 18

QTY END		PARTS LIST				
NO.			PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1		✓	OPT 23	EXTERNAL BUS	(NOT AVAIL)	
2		✓	OPT 24	CABLE, COMPOSITE VIDEO	(NOT AVAIL)	
3						
4						
5						
6		2		FLAT		
7		1		CABLE		
8						
9						
10						
11						
12						
13						



FORM 9-10-1911A

OPTION 23-24	SIZE	CODE IDENT	REV
TITLE CABLE	A	98438	F
SHEET	SCALE	SHEET 19	

APPLICATION			SYM	REVISION DESCRIPTION	APPROVAL / DATE
DASH NO.	NEXT ASSY	USED ON			

NOTES:

1. TOOLING FOR F/N 4

PRODUCTION - CHAMPOMATIC 1-253980-4  
 HAND - 229451-4 TOOL KIT  
 EXTRACTUIL - 23023B-1


TOOLING FOR F/N 8

PRODUCTION - AMP-O-MATIC  
 HAND - 90302-1  
 INSET/EXTL - 91067-2

2. STAMP F/N 12 - LSI PART NO & DESCRIPTION

129723-1 KEYBOARD
----------------------

CONTRACT NO.

CONTENTS		DR <i>W. Kelly 3-14-77</i>	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV ANAHEIM, CALIF.			
SECT.	PAGES	CHK				
1		DSGN	CABLE ASSY - KEYBOARD TO ELECTRONICS			
2		ENGR				
3		PROJ <i>W. Thomas 1/11/77</i>				
4		REL <i>J. Turner 8/1/77</i>	SIZE	CODE IDENT	129723	RE
5		CUSTOMER APPD	A	98438		
6			SCALE		SHEET	1 OF 3

7-0001 (7-64)

QTY REQD		LIST OF MATERIALS OR PARTS LIST				
		FIND NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR CODE IDENT	SPECIFICATION
	-1	1	-1	CABLE ASSY - KEYBOARDED TO ELECTRONICS		
	✓	1				
		2				
		3				
	1	4	552313-1	RECEPTACLE	AMP	
	1	5	1-552413-1	CABLE CLAMP	"	
	1	6	205208-1	PLUG	"	
	1	7	206472-1	CABLE CLAMP	"	
	20	8	1-66506-1	CONT, PIN, 24-20	"	FOR AMP-D-MATIC
		9				
	A/R	10	129726-1	CABLE		
		11				
	2	12	FIT-221-3/8, CLEAR	SLEEVING,	ALPHA	CUT 2" LG IDENT PER NOTE 2
		13				
		14				
		15				
		16				
		17				
		18				

SCALE **A** SIZE CODE IDENT **98438** SHEET **2**

129723

RE

LINE NO.	TERMINATION INFORMATION						WIRE INFORMATION					ROUTING	LGTY
	CABLE NO.	WIRE NO. OR COLOR	FROM		TO		FIND NO./NOTES						
			REF DES	PIN	REF DES	PIN	FROM END		TO END		WIRE OR CABLE		
							CONN	TERMINATION	CONN	TERMINATION			
1		-	KEYBD	1	ELECT	2							
2		-		2		3							
3		WH/GR		3		4				8			
4		BLK		4		5							
5		WH/BN		5		6							
6		WH/YI		6		7							
7		WH/YL		7		8							
8		WH/BL		8		9							
9		BK/BR		9		10							
10		WH/OR		10		11							
11		WH/GR		11		12	4		6				
12		WH/RD		12		13	5		7				
13		-		13		14	12				10		4
14		-		14		15	△						
15		BRN		15		16							
16		ORN		16		17							
17		RED		17		18							
18		GRN		18		19							
19		YEL		19		20							
20		WHT		20		21							
21		VIO		21		22							
22		GRY		22		23							
23		BLU		23		24							
24		BK/RD	KEYBD	24	ELECT	25				8			
25		-				1							

CODE NOTES:

△ SLEEVING SHALL EXTEND INTO CABLE CLAM

7-0601d (7-44)

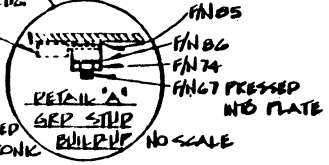
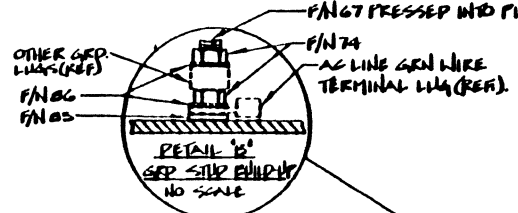
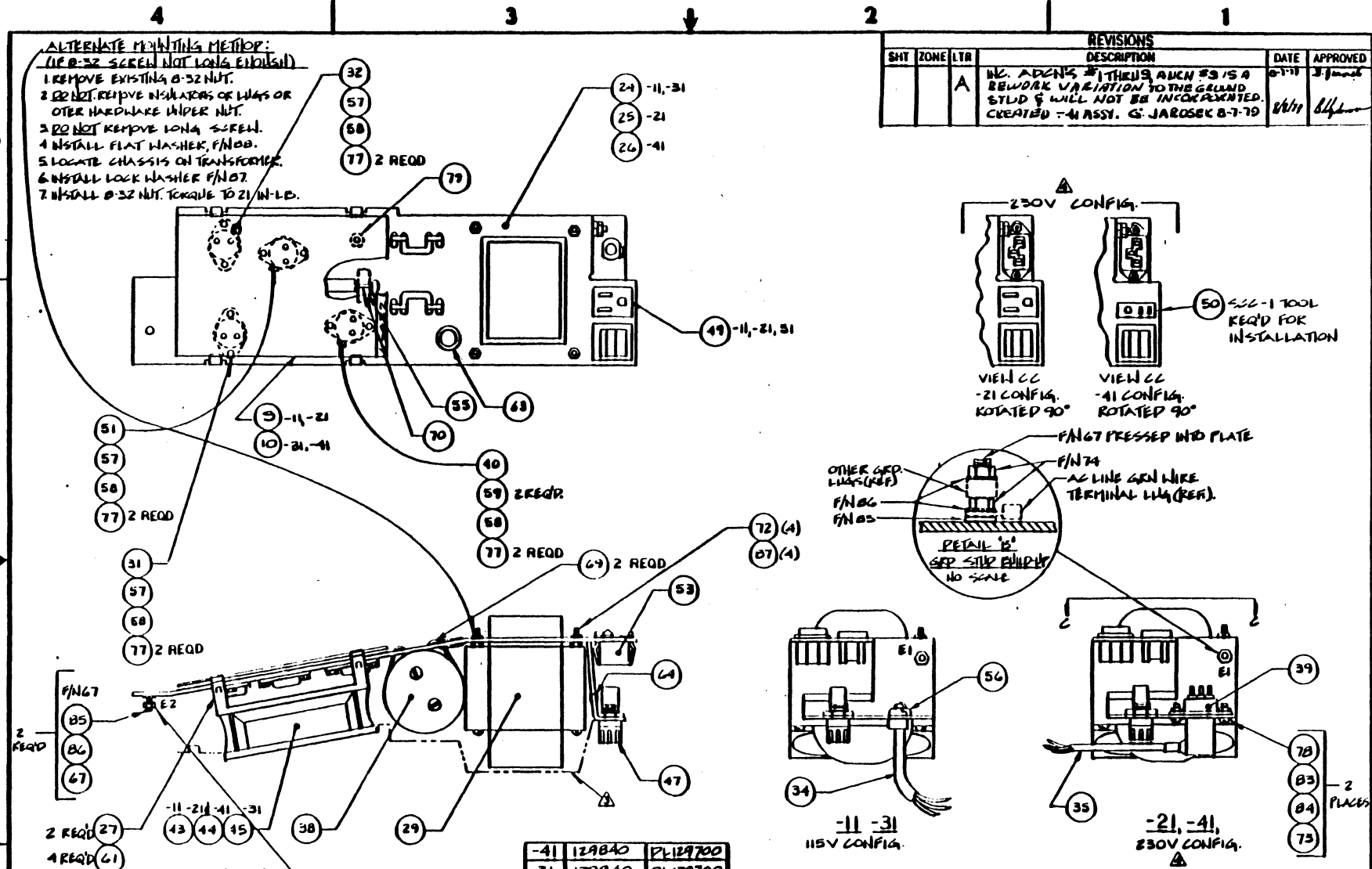
SIZE <b>A</b>	CODE IDENT <b>98438</b>	<b>129723</b>	RI
SCALE		SHEET <b>3</b>	



**ALTERNATE MOUNTING METHOD:**  
(IF Ø.32 SCREW NOT LONG ENOUGH)

1. REMOVE EXISTING Ø.32 NUT.
2. DO NOT REMOVE INSULATORS OR WAGS OR OTHER HARDWARE UNDER NUT.
3. DO NOT REMOVE LONG SCREW.
4. INSTALL FLAT WASHER, F/N 08.
5. LOCATE CHASSIS ON TRANSFORMER.
6. INSTALL LOCK WASHER, F/N 07.
7. INSTALL Ø.32 NUT. TORQUE TO 21 IN-LB.

REVISIONS					
SHT	ZONE	LTR	DESCRIPTION	DATE	APPROVED
		A	INC. ADGNS WITH THIS ASSEMBLY AS A BENDABLE VARIATION TO THE GROUND STUD & WILL NOT BE INCORPORATED. CREATED -4 ASST. G. JAROSK 8-7-79	8/7/79	[Signature]



1. FOR WIRING SEE 129732-11 OR 129732-21 OR -31. (SEE PL FOR APPLICATION).
2. FOR SCHEMATIC SEE SH 2

NOTES: UNLESS OTHERWISE SPECIFIED

DASH NO	NEXT ASSY USED ON	APPLICATION
-41	129840	PL129700
-31	129840	PL129700
-21	129540	
-21	129790	
-21	129840	
-11	129790	
-11	129702	
-1	129702-1	PL129700

UNLESS OTHERWISE SPECIFIED:  
DIM IN INCHES  
TOLERANCES:  
X.01  
.XX.03  
XXX.010  
ANGLES ±0.5°

CONTR NO	
DR	[Signature]
CHK	
DSGN	
ENGR	
PROJ	[Signature]
REL	[Signature]

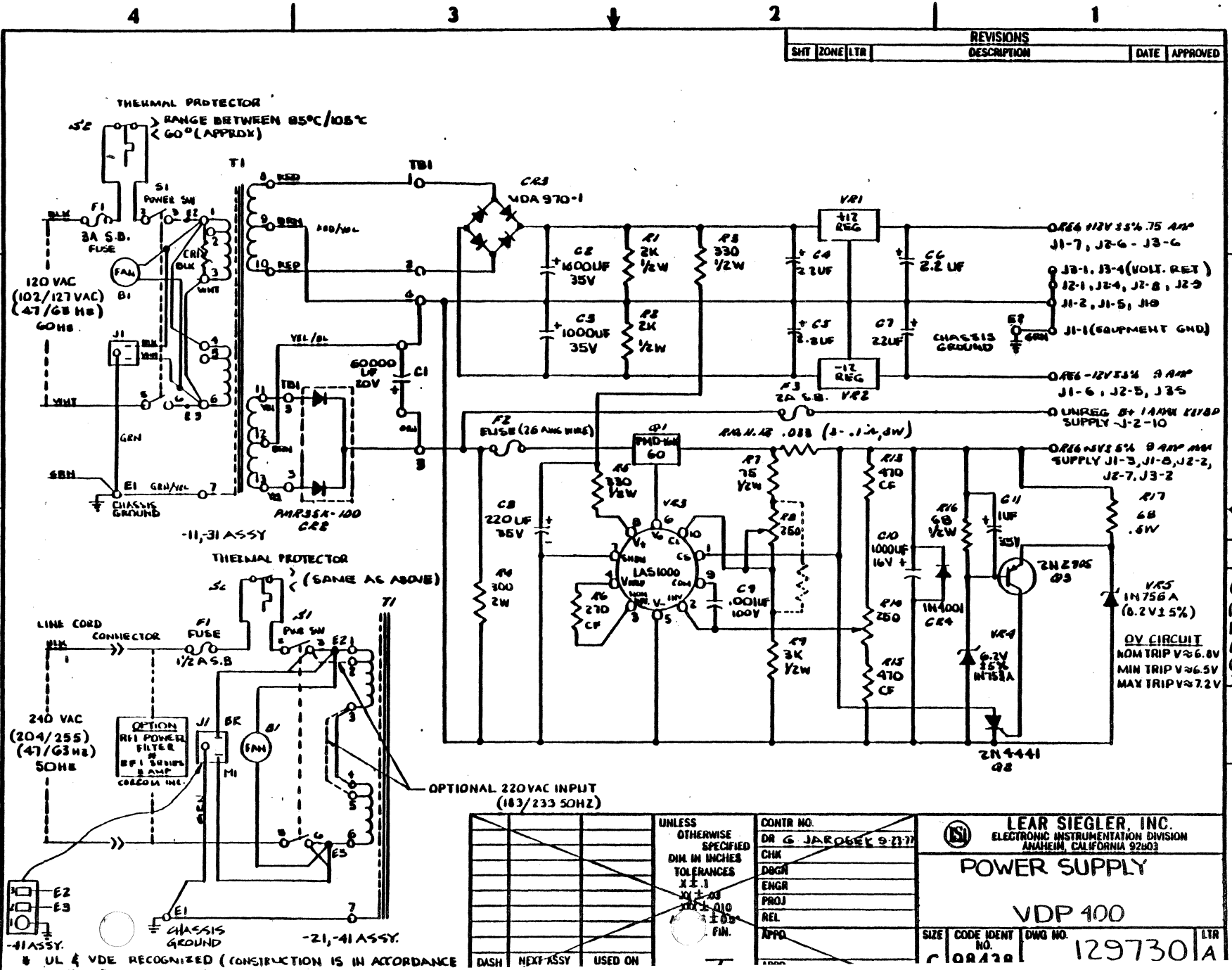
SEE SEPARATE PARTS LIST PL129730

**LEAR SIEGLER, INC.**  
ELECTRONIC INSTRUMENTATION DIVISION  
ANAHEIM, CALIFORNIA 92803

**POWER SUPPLY ASSY**  
VDP 400

SIZE	FSCM NO.	DWG NO.	LTR
C	98438	129730	A
SCALE 1/2		SHEET 1 OF 4	

129730 | A | B | C | D



REVISIONS			
SHT	ZONE	LTR	DESCRIPTION

D  
 C  
 B  
 A  
 129730 A

UNLESS OTHERWISE SPECIFIED DIM IN INCHES TOLERANCES	CONTR. NO. DR G JAROCKY 9-777
X ± .1	CHK
X ± .05	DRGN
X ± .01	ENGR
± .001	PROJ
± .0005	REL
FIM	APPD

LEAR SIEGLER, INC.  
 ELECTRONIC INSTRUMENTATION DIVISION  
 ANAHEIM, CALIFORNIA 92803

**POWER SUPPLY**

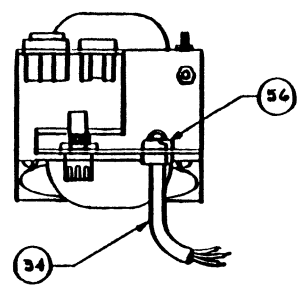
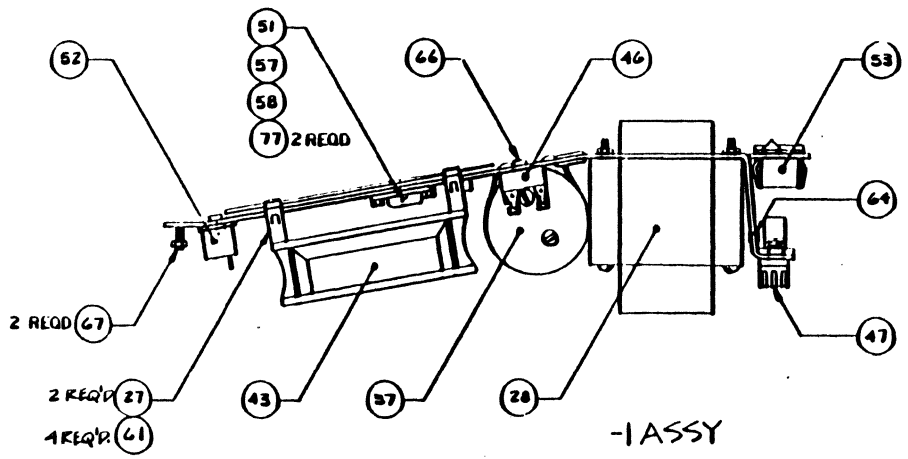
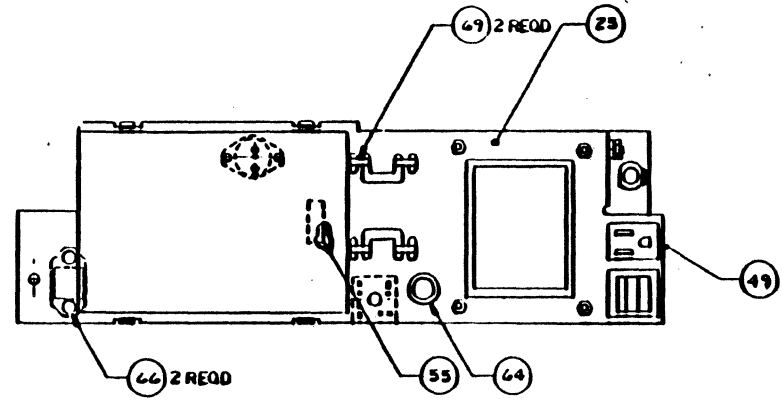
**VDP 400**

SIZE	CODE IDENT NO.	DWG NO.	LTR
C	OR 179	129730 A	A

UL & VDE RECOGNIZED (CONSTRUCTION IS IN ACCORDANCE WITH THEIR STANDARDS)

4 | 3 | 2 | 1

REVISIONS			
SHIT	ZONE	LTR	DESCRIPTION



2. FOR SCHEMATIC SEE SH 4  
 1. FOR WIRING SEE 129732-1.  
 NOTES: UNLESS OTHERWISE SPECIFIED

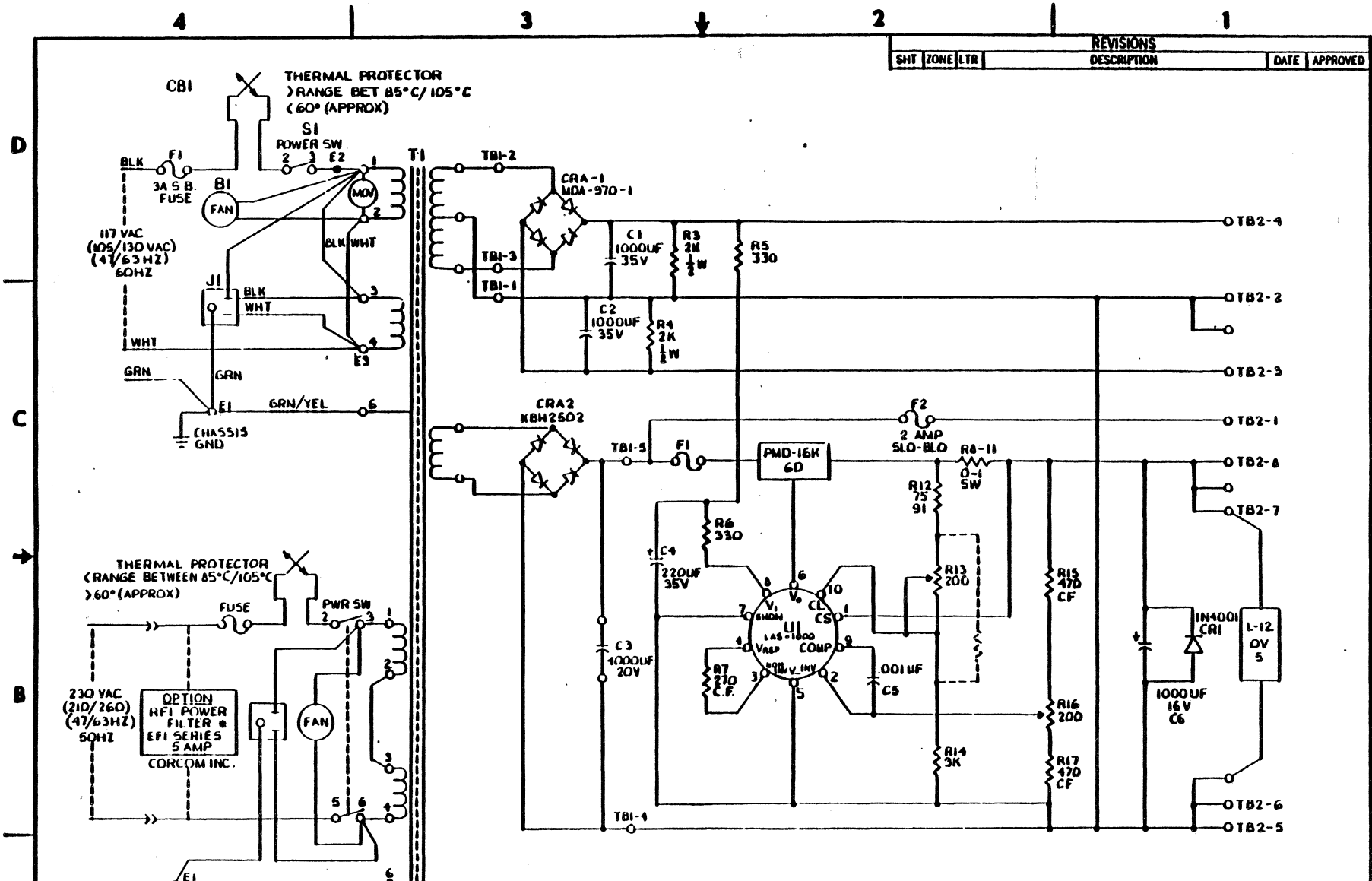
PROPRIETARY LEGEND			
EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF LEAR SIEGLER, INC. AND ISSUED IN STRICT CONFIDENCE AND SHALL NOT BE REPRODUCED, COPIED, OR USED FOR THE MANUFACTURE OR SALE OF	SIZE C	FSCM NO. 98438	DWG NO. 129730
			LTR A

D  
C  
B  
A

129730 | A

1 OF 4


REVISIONS					
SHT	ZONE	LTR	DESCRIPTION	DATE	APPROVED



-1 ASSY

\* UL AND IEC RECOGNIZED (CONSTRUCTION IS IN ACCORDANCE WITH IEC, BSI AND CSA STANDARDS.)

DASH NO			NEXT ASSY			USED ON APPLICATION		
UNLESS OTHERWISE SPECIFIED: DIM IN INCHES TOLERANCES: X0.1 XXX.010 A ± .005"								
CONTR NO			DB <i>Byrd Version 6-7-78</i>			CHK		
DSCN			ENGR			PROJ		
REL			APPD			SIZE		


**LEAR SIEGLER, INC.**  
 ELECTRONIC INSTRUMENTATION DIVISION  
 ANAHEIM, CALIFORNIA 92803

**SCHEM PWR SUPPLY**  
**VDP 400**

FSCM NO. **129730**  
 DWG NO. **129730**  
 LTR **A**

129730 | A

REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
C		REVISED & REDRAWN, INCOMP. AOCN = 16.	7-7-79	<i>J. Garavito</i>
			7ES 7-3-79	<i>B. Hudson</i>

NOTES:

- ⚠ UL RECOGNIZED COMPONENT
- ⚠ MAY BE PURCHASED WITH 12" SELF LEADS.
- ⚠ NATURAL COLOR OPTIONAL.
- ⚠ MODIFY-TRIM CENTER DIVIDER TO 1/8" HIGH MAX.
- ⚠ HEX SCREW 4-40 x 1/2 & EXTERNAL TOOTH LOCK WASHER MAY BE USED IN PLACE OF SEMS HARDWARE.
- ⚠ IF HARDWARE NOT USED RETURN TO STOCKROOM
- ⚠ SCC-1 TOOL REQUIRED FOR INSTALLATION.
- ⚠ INSTALL ON MOUNTING PLATE 129734.
- 9. FOR SCHEMATIC OF -1 THRU -41 SEE SHEET 2 OF 129730.
- FOR SCHEMATIC OF -1 SEE SHEET 4 OF 129730

-41	129840	DL129700
-31	129840	
-21	129540	
-21	129790	
-21	129840	
-11	129790	
-11	129702	
-1	129702-1	DL129700
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED  
 DIM. IN INCHES  
 TOLERANCES  
 X ± .1  
 XX ± .03  
 XXX ± .010  
 ANGLES ± 0.5°  
 MACH. FIN.

DR BALFOUR 3-4-77  
 CHK  
 DSGN  
 ENGR  
 PROJ THOMSON 8/1/77  
 REL W. TURNER 8/1/77  
 CUSTOMER APPD



LEAR SIEGLER, INC.  
 ELECTRONIC INSTRUMENTATION DIV.  
 ANAHEIM, CALIF.

POWER SUPPLY ASSY  
 VDP 400

SIZE A CODE IDENT 98438 PL129730 REV C

SCALE SHEET 1 OF 5



FIND NO.	QTY REQD				STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	31	21	41	-11				
1						-1	PWR. SUPPLY ASSY. 115V	(REPLACED BY -11)
2				✓		-11	" " " "	(VDP 400 & VDP 410)
3	✓					-21	" " " 230V	VDP 400 & ADM 42
4	✓					-31	" " " 115V	ADM 42
5		✓				-41	" " " 230V	REPLACES -21
6								
7								
8						129731-1	PCB ASSY. - PWR SUPPLY	
9		✓		1		129731-11	" " " "	
10	1	✓				129731-21	" " " "	
11								
12						129732-1	WIRING LIST	
13	1		1			" -11	" "	
14		✓				" -21	" "	
15		✓				" -31	" "	
16								
17						129733-1	WIRE ASSY.	
18	1	1	1			" -11	" "	
19		✓		1		" -21	" "	
20	1	1	1			" -31	" "	
21								
22								
23						129734-3	MOUNTING PLATE	
24	1		1			" -5	" "	
25	1	✓				" -7	" "	

SIZE  
A  
FSCM NO.  
98438

SH 2  
PL/129730

REV



FIND NO.	QTY REQD				STOCK NO. # OR NOTES	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-3/	2/	-1/	-1				
26		1				129734-9	MOUNTING PLATE	
27	2	2	2	2		129735-3	BRACKET, FAN	
28				1	T1	129738-3	TRANSFORMER	
29	1	1	1		T1	" -5	"	
30								
31	1	1	1		VR1	128348-1512	VOLTAGE REG (+12V)	LRS 512
32	1	1	1		VR2	" -1812	" " (-12V)	LRS 812
33								
34	1		1	1		129455-03	PWR. CORD	
35		1				" -13	" "	
36								
37				1	C1	129468-403	CAP. 40,000 MF 20 VOLTS	
38	1	1	1		C1	" -603	CAP. 60,000 MF 20 VOLTS	
39		1				EAC-301	CONNECTOR	SWITCH CRAFT
40	1	1	1		CR2	PTR 35K-100	RECTIFIER	
41				1	CR2	KBH 2502	BRIDGE	GI
42								
43			1	1	B1	4600X	FAN	PATTOTER ⚠
44		1			B1	4650X	"	" ⚠
45	1				B1	3-15-2471	"	HOWARD ⚠
46								
47	1	1	1	1	XFI	342838L	FUSEHOLDER	LITTLE FUSE ⚠
48								
49	1	1	1	1	J1	1370-W	RCPT	LEWITON
50		1			J1	SIG-3303-SCL.093THA	SOCKET	BEAU PRODUCTS ⚠

SIZE  
A  
FSCM NO.  
98438

SH 3  
PL129730

REV

FIND NO.	QTY REQD				STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-3/	2/24/	-1/	-1/				
51	1	1	1	1	Q1	PMD16K60	TRANSISTOR, DARLINGTON	LAMBDA
52				1	CR1	L120V5	OVERVOLTAGE PROTECTOR, VARISTOR	"
53	1	1	1	1	S1	TGCO411-TW-B	SWITCH, ROCKER (IMPRINTED ON/OFF)	CARLING $\Delta$
54								
55	1	1	1	1	S2	MODEL F 100°C	THERMAL PROTECTOR	PORTAGE $\Delta$
56	1		1	1		SR-6P3-4	STRAIN RELIEF	HEYCO
57	3	3	3	1		TM-1	INSULATOR	WECKESSER $\Delta$
58	4	4	4	4		60-11-4511-1674	INSULATOR, REINFORCED SILICONE. CHROMIUM	
59	2	2	2			5609-11	SHOULDER WASHER	SEASTROTT
60								
61	4	4	4	4	B24001	RD66RBSLF	POP RIVET	USIT
62								
63	1	1	1	1		NITC557-8C-BLKK	GROMMET, SPLIT	$\Delta$ NYLON HOLDING
64	H/K	R/K	R/R	R/K		P95-2	GROMMET	RICHCO
65								
66				3	B22612	CL-632-2	INSERT	PEIT
67	2	2	2	2	B22102	FH-032-10	STUD	PEIT $\Delta$
68								
69	2	2	2	2	B30017	PLT3I	CABLE TIE	PANDUIT
70	1	1	1		B30003	PLT1M	TIE WRAP	PANDUIT
71								
72	4	4	4	4	B22802	B-32	NUT, HEX, STL, CAD PLATE	
73		2			B22601	#6	NUT	
74	3	3	3	3	B22001	10-32	NUT, N.P. BRASS	
75								

SIZE A  
FSCM NO. 98438

SH 4  
PL/129730

REV U





FIND NO	QTY RECD				STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	31	21	11	-1				
76	4	4	4	3	821418	4-40 x 3/8	SCREW, PAN HD.	
77	8	8	8	2	821409	4-40 x 1/2	SCREW, SETTS HEX HD.	△
78		2			821621	6-32 x 1/2	SCREW	
79	1	1	1			4-40 x 1/4	SCREW SETTS HEX HD.	
80								
81								
82								
83		2			823603	#6	WASHER, FLAT	
84		2			823606	#6	WASHER, INT STAR LOCK	
85	2	2	2	2	823001	#10	WASHER, FLAT	
86	3	3	3	3	823004	#10	WASHER, LOCK EXT. TOOTH	
87	4	4	4			#8	WASHER, LOCK, EXT. TOOTH, STL. CRD.	△
88	4	4	4		823803	#8	WASHER, FLAT, STL. CRD.	△
89								
90								
91								
92								
93								
94								
95								
96								
97								
98								
99								
100								

SIZE A  
FSCM NO. 98438

SH 5  
PL 129730

REV C

4

3

2

1

D

C

B

A

D

C

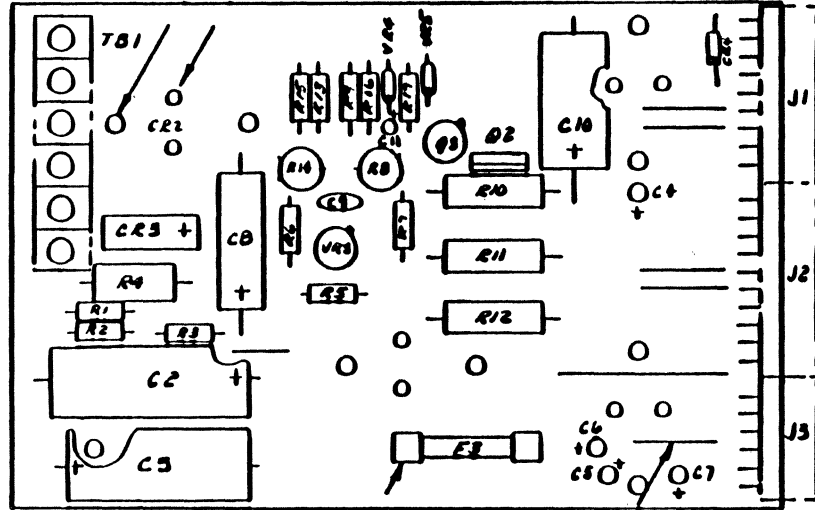
B

A

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	CREATED - 11 ASSY - 9 REVISIONS REDRAWN WAS 'C' SIZE D. BALFOUR	8/22/70 4/20/70	W. Kelly M. Turner

32 9 REED INSTALL FROM FAR SIDE

35 BREED INSTALL FROM FAR SIDE



129731-11 ASSY

30 2 REED

36 TYP

NOTE:  
1. FOR SCHEMATIC SEE DWG 129730, SH2.

SEE SEPARATE PARTS LIST PL 129731

DASH NO.	NEXT ASSY	USED ON
-11	129730-4	DL 129706
-1	129730-1	DL 129700

APPLICATION

UNLESS OTHERWISE SPECIFIED  
DIM IN INCHES  
TOLERANCES  
X ± .1  
XX ± .03  
XXX ± .010  
ANGLES ± 0.5°  
MACH. FIN.

CONTR NO.	DR W. KELLY 6-29-72
CHK	
DSGN	
ENGR	
PROJ D. H. THOMPSON 8-1-77	
REL W. TURNER 8-1-77	
APPD	
APPD	

<b>LEAR SIEGLER, INC.</b> ELECTRONIC INSTRUMENTATION DIVISION ANAHEIM, CALIFORNIA 92803			
P.C. BOARD ASSY - POWER SUPPLY			
SIZE	CODE IDENT NO.	DWG NO.	LTR
B	98438	129731	A
SCALE	SHEET 1 OF 2		

4

3

2

1

4

3

2

1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	CREATED - 11 ASSY - 9 REVISIONS REDRAWN WAS 'C' SIZE	4/25/77	AM/low
		D. BALFOUR	4/25/77	M. Turner

D

C

B

A

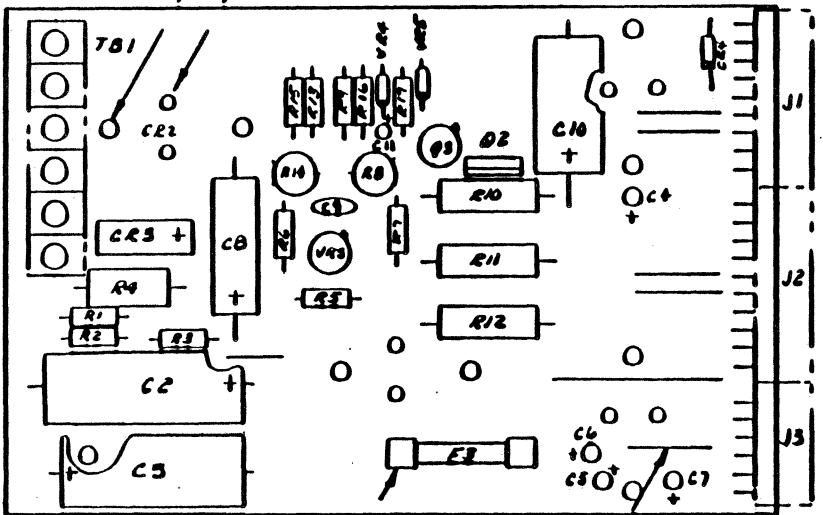
D

C

B

A

32 9 REED INSTALL FROM FAR SIDE  
35 BREED INSTALL FROM FAR SIDE



NOTE:  
1. FOR SCHEMATIC SEE DWG 129730, SH2.

129731-11 ASSY  
30 2 REED

36 TYP

SEE SEPARATE PARTS LIST PL 129731

-11	129730-4	DL129706
-1	129730-1	DL129706
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED  
DIM IN INCHES  
TOLERANCES  
X ± .1  
XX ± .03  
XXX ± .010  
ANGLES ± 0.05°  
MACH. FIN.

CONTR NO.	DR W. KELLY 6-29-77
CHK	
DSGN	
ENGR	
PROJ M THOMSON 8-1-77	
REL W. TURNER 8-1-77	
APPD	
APPD	

LEAR SIEGLER, INC.  
ELECTRONIC INSTRUMENTATION DIVISION  
ANAHEIM, CALIFORNIA 92803

P.C. BOARD ASSY -  
POWER SUPPLY

SIZE	CODE IDENT NO.	DWG NO.	LTR
B	98438	129731	A
SCALE			SHEET 1 OF 2

3

2

<b>PARTS LIST</b>		CONTR NO.	<b>LEAR SIEGLER, INC.</b>		98438	PL 129731	A															
MODEL <i>ADM-4</i>		JOB NO. <i>DL 129700</i>	ELECTRONIC INSTRUMENTATION DIVISION ANAHEIM CALIFORNIA		CODE IDENT	SHEET 1 OF 2 SHEETS	REV															
PLANNING APPLICATION			PREPARED <i>BALFOUR 3-4-77</i>	RELEASED <i>H. Turner</i>	ITEM NOMENCLATURE																	
PLANNER	REQUIRED TOTAL QTY. THIS RELEASE	PROD. ABA SCHEDULE ISSUE DATE SCHEDULED COMP DATE	CHECKED	DATE <i>11/17</i>	<i>PWB ASSY- PWR SUPPLY</i>																	
END ITEM	BUY FULL		APPROVED <i>[Signature]</i>																			
ASSY IDENT	NEXT ASSEMBLY	PLANNING NOTES:	ENGINEERING NOTES:	LTR	REVISION DESCRIPTION	DATE	APPROVED															
-1	129730-1	<p style="font-size: small;">PROPOSE PART LEGEND</p> <p style="font-size: x-small;">EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF LEAR SIEGLER, INC. AND SHALL NOT BE REPRODUCED OR USED FOR THE MANUFACTURE OR SALE OF THE APPARATUS WITHOUT THE WRITTEN PERMISSION.</p>		A	INC ADDN 152, ADDED FNS BALFOUR 2-28-78	3/14/80 3/15/80	<i>[Signature]</i> <i>H. Turner</i>															
RECORD OF REVISION STATUS OF EACH SHEET																						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
FIND NO.	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REF DES	PLANNING																
						P	M	C	TOTAL REQ	STOCK REQS	SHORT QTY	UNIT COST	TOTAL COST	C	G	B	COST BASE					
1			129731-1	PWB ASSY - PWR SUPPLY																		
2			129731-11	PWB ASSY - PWR SUPPLY																		
3			129731-5	PWB - PWR SUPPLY																		
4			129731-7	PWB - PWR SUPPLY																		
5			129469-16B	CAP. ELECT. 1600UF 35V	C2																	
6			129329-10B	CAP. ELECT. 1000UF 35V	C3																	
7			129469-227	CAP. ELECT 820UF 35V	C8																	
8			129469-10B	CAP. ELECT 1000UF 16V	C10																	
9			129758-102	CAP. POLYESTER .001UF 100V	C9																	
10			1N4001 (1 <sup>00</sup> 1N4001)	DIODE	C24																	
11			MDA970-1 (1 <sup>00</sup> MDA970-1)	BRIDGE	C23																	
12			128518-225	CAP. SOLID TAN. 2.2UF 35V	C4,5,6,7																	
13			1U76LFUSE 313002	FUSE, 2A SLO-BLO	F3																	




REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		REVISED & REDRAWN -11 REPLACES -1 W. Kelly 10/28/77	10/28/77	R.E. McAllister W. Kelly 10/28/77
B		INC ADCN 1 SMT 2 & 3 REDRAWN ADDED SMT 4 W. Kelly 11-27-78	11-27-78 11-27-78	W. Kelly H. Turner
C		INC ADCN 2,3 ADDED SMT 5 (-31 ASSY) T.E.S. 7-1-79	7-2-79 8-8-79	J. Turner R. Hyndman
D		INC ADCN 4,5 & DCN 955 CHANGED QTY FOR F/N 7 FROM 4 TO 2 BAB 6-11-80	6-12-80 6/12/80	W. Kelly R. Hyndman

NOTES:

1. CERTIFY AS UL RECOGNIZED COMPONENT.
2. FOR SCHEMATIC SEE DWG. 129730 SH. 2 & 4

-31	129730	DL129700
-21	129730	DL129700
-11	129730	DL129700
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 XX ± .03 XXX ± .010 ANGLES ± 0.5° MACH. FIN. J	DR W. KELLY 3/29/77	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.		
	CHK			
	DSGN			
	ENGR			
	PROJ D.H. THOMSON 8/1/77			
REL W. TURNER 8/1/77	SIZE A	CODE IDENT 98438	129732	REV D
CUSTOMER APPD	SCALE	SHEET 1 OF 5		

FIND NO.	QTY RECD				STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-4/	-3/	-2/	-1/				
1								
2	6	8	6	835008	2-350803-2	TAB, 250, INS 18-22	AMP UL LISTED	
3	3	3	1	835050	3-31889-3	TERM LUG, #10 RING, 18-22	AMP "	
4	3	3	3	835004	52409	TERM LUG, #6 SPADE, 18-22	AMP "	
5	4	3	3	835018	31900	TERM LUG, #10 RING 14-16	AMP "	
6	4	4	4	835019	52420	TERM LUG, #6 SPADE 14-16	AMP "	
7	2	2	2	835033	324067	SPLICE	AMP "	
8	1	1	1		C2055-003-BL	FAN CORD	PACIFIC ELECTRICORD	
9	1/2	1/2	1/2		18 AWG, 16x30, GRN/YEL	WIRE, UL STYLE 1015, PVC	UL LISTED	
10							"	
11	1/2	1/2	1/2		14 AWG, 41x30, YEL		"	
12	↑	↑	↑		14 AWG, 41x30, YEL/BLU		"	
13					14 AWG, 41x30, ORN		"	
14					22 AWG, 7x30, BLK		"	
15					22 AWG, 7x30, WHT		"	
16					22 AWG, 7x30, RED		"	
17	↓	↓	↓		22 AWG, 7x30, RED/YEL		"	
18	1/2	1/2	1/2		18 AWG, 16x30, BLK		"	
19								
20	1/2	1/2	1/2			SLEEVING, CLEAR 5 AWG	UL LISTED	
21	1/2	1/2	1/2			SLEEVING, CLEAR 0 AWG	"	
22								
23								
24								

SIZE A  
 FSCM NO. 98438  
 SH 129732  
 REV D

LINE NO.	TERMINATION INFORMATION				WIRE INFORMATION						
	FROM		TO		IDENTIFICATION	LENGTH	ROUTING	FIND NO. / NOTES			
	REF DES	PIN	REF DES	PIN				WIRE	FROM END	TO END	
1	E4		T1	1	BLK 22	5		14	7	1 <sup>copy</sup>	△ 20
2	E4		S1	3	BLK 22	7½		14		2 <sup>copy</sup>	2
3	E4		J1	BR	BLK 22	5		14		3 <sup>copy</sup>	2
4	E4		FAN CORD		-	17		8		4 <sup>copy</sup>	
5	E3		FAN CORD		-	17		-	7	1 <sup>copy</sup>	
6	E3		T1	6	WHT 22	5		15		2 <sup>copy</sup>	△ 20
7	E3		S1	6	WHT 22	5½		15		3 <sup>copy</sup>	2
8	E3		J1	Ni	WHT 22	5		15		4 <sup>copy</sup>	2
9	S1	2	CBI(S2)		BLK 18	12		SELF LEAD	2		
10	F1	10AD	CBI(S2)		BLK 18	11		SELF LEAD	2		
11	J1 GRN WIRE		E1 CHASSIS GRD		-	-		SELF LEAD			
12	POWER CORD		F1	LINE	BLK						
13	"		S1	5	WHT			-			
14	"		E1 CHASSIS GRD		GRN			-			
15	T1	7	E1 CHASSIS GRD		GRN/YEL 11	6½		9		△ 20	3
16	T1	1	T1	4	BLK 22	3		14		△	△ 20
17	T1	3	T1	6	WHT 22	3		15		△ 20	△
18											
19	T1	8	TB1	1	RED 22	9½		16		△ 20	4
20	T1	9	TB1	6	RED/YEL 22	8½		17		△ 20	4
21	T1	10	TB1	2	RED 22	9		16		△ 20	4
22	T1	11	TB1	3	YEL 14	8		11		△ 21	△ 6
23	T1	12	C1	(-)	YEL/BLU 14	5½		12		△ 21	△ 5
24	T1	13	TB1	5	YEL 14	7½		11		△ 21	6
25	C1	(-)	TB1	6	YEL/BLU 14	4½		12	5		6
26	C1	(+)	TB1	4	ORN 14	6¾		13	5		6
27											
28											
29											
30											

Form 9-10-1011c

△ SOLDER △ STRIP ½ INCH △ STRIP 5/8 INCH STD 115 V INPUT - 11 ASSY	SIZE	CODE IDENT	REV
	<b>A</b>	<b>98438</b>	129732 D
	SCALE	SHEET	3



LINE NO.	TERMINATION INFORMATION				WIRE INFORMATION					
	FROM		TO		IDENTIFICATION	LENGTH	ROUTING	FIND NO. / NOTES		
	REF DES	PIN	REF DES	PIN				WIRE	FROM END	TO END
1	E4		T1	1	BLK 22	5		14	7 1 <sup>or</sup> 4	△ 20
2	E4		S1	3	BLK 22	7 1/2		14	2 <sup>or</sup> 4	2
3	E4		J1	BR	BLK 22	5	△	14	3 <sup>or</sup> 4	2
4	E4		FAN CORD	1	(18)	17		8	4 <sup>or</sup> 4	
5	E3		FAN CORD	2	(18)	17		-	7 1 <sup>or</sup> 4	
6	E3		T1	6	WHT 22	5		15	2 <sup>or</sup> 4	△ 20
7	E3		S1	6	WHT 22	5 1/2		15	3 <sup>or</sup> 4	2
8	E3		J1	N;	WHT 22	5	△	15	4 <sup>or</sup> 4	2
9	S1	2	CBI (S2)		BLK 18	12		SELF LEAD	2	
10	F1	KAD	CBI (S2)		BLK 18	11		SELF LEAD	2	
11	J1	GRN WIRE	E1 CHASSIS GRD			-		SELF LEAD		
12	J2	L	F1	LINE	BLK 22	6 1/2		14	△	2
13	J2	N	S1	5	WHT 22	6 1/2		15	△	2
14	J2	1/2 E	E1 CHASSIS GRD		GRN/YEL 18	4		9	△	3
15	T1	7	E1 CHASSIS GRD		GRN/YEL 18	6 1/2		9	△ 20	3
16	T1	3	T1	4	BLK 22	3		14	△ 20	△ 20
17										
18										
19	T1	8	TB1	1	RED 22	9 1/2		16	△ 20	4
20	T1	9	TB1	6	RED/YEL 22	8 1/2		17	△ 20	4
21	T1	10	TB1	2	RED 22	9		16	△ 20	4
22	T1	11	TB1	3	YEL 14	8		11	△ 21	△ 6
23	T1	12	C1	(-)	YEL/BLU 14	5 1/2		12	△ 21	△ 5
24	T1	13	TB1	5	YEL 14	7 1/2		11	△ 21	6
25	C1	(-)	TB1	6	YEL/BLU 14	4 1/2		12	5	6
26	C1	(+)	TB1	4	ORN 14	6 3/4		13	5	6
27										
28										
29										
30										

FORM 9-10-1950

△ SOLDER △ STRIP 5/8 INCH  
 △ ON 410 DO NOT INSTALL  
 △ STRIP 1/2 INCH  
 230 V INPUT -21 ASSY

SIZE	CODE IDENT	
<b>A</b>	<b>98438</b>	129732
SCALE	SHEET 4	

LINE NO.	TERMINATION INFORMATION				WIRE INFORMATION					
	FROM		TO		IDENTIFICATION	LENGTH INCHES	ROUTING	FIND NO. / NOTES		
	REF DES	PIN	REF DES	PIN				WIRE	FROM END	TO END
1	E4		T1	1	BLK 22	5		14	7 1 OF 4	△ 20
2	E4		S1	3	BLK 22	7 1/4		14	2 OF 4	2
3	E4		* J1	3	BLK 22	5	△	14	3 OF 4	△
4	E4		FAN CORD	1		18		8	4 OF 4	
5	E3		FAN CORD	2		18		-	7 1 OF 4	
6	E3		T1	6	WHT 22	5		15	2 OF 4	△ 20
7	E3		S1	6	WHT 22	5 1/2		15	3 OF 4	2
8	E3		* J1	2	WHT 22	5	△	15	1 OF 4	△
9	S1	2	CBI (S2)		BLK 22	12		SELF LEAD	2	
10	F1	2	CBI (S2)		BLK 22	11		SELF LEAD	2	
11	* J1	1	E1 CHASSIS GRD		GRN/YEL 18	4	△	9	△	3
12	J2	L	F1	LINE	BLK 22	6 1/2		14	△	2
13	J2	N	S1	5	WHT 22	6 1/2		15	△	2
14	J2	E	E1 CHASSIS GRD		GRN/YEL 18	4		9	△	3
15	T1	7	E1 CHASSIS GRD		GRN/YEL 18	6 1/2		9	△ 20	3
16	T1	3	T1	4	BLK 22	3		14	△ 20	△ 20
17										
18										
19	T1	8	TB1	1	RED 22	9 1/2		16	△ 20	4
20	T1	9	TB1	6	RED/YEL 22	8 1/2		17	△ 20	4
21	T1	10	TB1	2	RED 22	9		16	△ 20	4
22	T1	11	TB1	3	YEL 14	8		11	△ 21	6
23	T1	12	C1	(-)	YEL/BLU 14	5 1/4		12	△ 21	5
24	T1	13	TB1	5	YEL 14	8		11	△ 21	6
25	C1	(-)	TB1	6	YEL/BLU 14	4 1/2		12	5	6
26	C1	(+)	TB1	4	ORN 14	6 3/4		13	5	6
27										
28										
29										
30	* IDENTICAL TO -Z1 ASSY EXCEPT FOR WIRES TO & FROM J1.									

Form 9-10-10116

△ SOLDER △ ON 410 DO NOT INSTALL 230V INPUT - 31 ASSY	SIZE	CODE IDENT	129732	REV D
	A	98438		
SCALE		SHEET		5

PERSONALITY PROM PROGRAM

PART NO. 129

Specification Form  
ADM 42

753-008000-1

CUSTOMER STD ADM 42

129753-08

S.O. #

DATE

POS	SYM	PURPOSE	BIT SPECIFICATION								STANDARD
			7	6	5	4	3	2	1	0	
0	\$1B	Escape Lead in Character	0	0	0	1	1	0	1	1	ESC
1	\$0D	End of Block Transmit Character	0	0	0	0	1	1	0	1	CR
2	\$0E	2nd End of Block Transmit Character	0	0	0	0	0	0	0	0	NULL
3	\$1F	New Line Send Character	0	0	0	1	1	1	1	1	US
4	\$00	2nd New Line Send Character	0	0	0	0	0	0	0	0	NULL
5	\$1C	Field Separator	0	0	0	1	1	1	0	0	FS
6	\$01	Function Lead in Xmit	0	0	0	0	0	0	0	1	SCH
7	\$00	Parity Error Replacement Character	0	0	0	0	0	0	0	0	NULL
8	\$20	Clear/Erase Replacement Character	0	0	0	1	0	0	0	0	SPACE
9	\$00	Start Delay	0	0	0	0	0	0	0	0	Ø
10	\$00	Reserved	0	0	0	0	0	0	0	0	Ø
11	\$00	Poll Variants	0	0	0	0	0	0	0	0	Ø
12	\$00	Trans # Limit	0	0	0	0	0	0	0	0	Ø
13	\$00	Default Tab Mode	0	0	0	0	0	0	0	0	Ø
14	\$08	Keyboard Lockouts	0	0	0	0	1	0	0	0	Ø
15	\$02	Message Attribute	0	0	0	0	0	0	1	0	Ø4
16		Reserved									
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30	\$C0	Identification Code	1	1	0	0	0	0	0	0	
31	\$46	Identification Code	0	1	0	0	0	1	1	0	

Form 9 10-10110

SIZE	CODE IDENT	REV
A	98438	129753 T
SCALE	SHEET	6


REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A	2	FN 6 WAS QTY 1, 10-01-103A CONN, 3 CKT. MOLEX; FN 7 QTY WAS 3, FN 8 QTY WAS 3, FN 13 WAS 10-19-1031 WAFER QTY 1, FN 16 PN WAS 10-01-1044 (FN 5, REVISED - 1 & -11 TERMINATIONS (ADD AW)) BALFOUR 2-23-78	3/2/78	<i>[Signature]</i>
B	3,4	ADDED -41 INC ADDN 1 W. Kelly 7-27-79	8-8-79 8-8-79	W. Kelly <i>[Signature]</i>
C	2,3	ADD LSI PN PER DCN 905 W. Kelly 7/2/80	2-5-79 5/1/80	R. <i>[Signature]</i> <i>[Signature]</i>

NOTE:


△ UL RECOGNIZED COMPONENT.

	129701-11	
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 XX ± .03 XXX ± .010 ANGLES ± 0.5° MACH. FIN. ✓	DR	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.		
	CHK			
	DSGN BALFOUR 12-15-77	WIRE LIST -		MONITOR
	ENGR	ASSY - BALL BROS		
	PROJ <i>[Signature]</i>	SIZE	CODE IDENT	REV
	REL <i>[Signature]</i> 12/21/77	A	98438	C
CUSTOMER APPD	SCALE	SHEET 1 OF 4		

91101-1-101118



QTY REQD			LIST OF MATERIALS OR PARTS LIST				
-21	-11	-1	FIND NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR CODE IDENT	SPECIFICATION
		✓	1	129777-1	CONTRAST HARNESS ASSY		
	✓		2	129777-11	BRIGHTNESS HARNESS ASSY		
✓			3	129777-21	COAX CABLE ASSY		
		1	4	801024	RES. VAR 500-N		
	1		5	801026	RES VAR 100K		
			6				
	3	4	7	809120	SOLDER SPRING		
2		4	8	809087	CONTACT		
	1		9	809025	CONN HOUSING		
	1		10	809027	KEY		
	3		11	809062	CONTACT		
AR	AR	AR	12	22AWG 7x30	WIRE, UL STYLE 1015	PVC, COLOR AS	INDICATED 
			13				
AR			14	812028	COAX, RG 59 B/U		
1			15	809118	COAX CONN		
1			16	809218	CONN. 4CKT		
1			17	809121	TERMASHIELD		
1			18	809122	INSULAT, CU		

SCALE

SIZE  
**A**

CODE IDENT  
**98438**

**129777**

SHEET 2

**C**

FORM 10-1011B

QTY REQD			LIST OF MATERIALS OR PARTS LIST				
	-41	-31	FIND NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR CODE IDENT	SPECIFICATION
		✓	19	129777-31	PWR ADPTR ASSY		
	1	1	20	809125	CONN. RCPT		
	5	5	21	809038	CONTACT, SOCKET		
	1	1	22	809115	COUPLER, MALE		⚠
	1	1	23	809116	COUPLER, FEMALE		⚠
	1	1	24	835046	TERM. PIDG, RING NID		
	AR	AR	25	22AWG 7x30	WIRE, UL STYLE 1015	PVC COLOR AS INDICATED	⚠
		AR	26	22AWG 7x30	WIRE, UL STYLE 1061	PVC COLOR AS INDICATED	⚠
	✓		27	129777-41	PWR ADPTR ASSY	230 V	
			28				
			29				
			30				
			31				
			32				
			33				
			34				
			35				
			36				

SCALE  
 SIZE  
**A**  
 CODE IDENT  
**98438**  
**129777**  
 SHEET **3**  
 REV  
**C**

LINE NO.	TERMINATION INFORMATION						WIRE INFORMATION					ROUTING	LGTH	
	CABLE NO.	WIRE NO. OR COLOR	FROM		TO		FIND NO./NOTES							
			REF DES	PIN	REF DES	PIN	FROM END		TO END		WIRE OR CABLE			
							CONN	TERMINATION	CONN	TERMINATION				
1	-1	YEL	R1	1	P201	1	4	7	△ 2	8	12			
2		YEL	R1	2	P103	3		7		8	12			
3		WHT	R1	3	P201	6		7		8	12			
4		WHT	R1	3	P103	1		7		8				
5	-11	RED	R2	1	P101	3	5	7		11	12			
6		BRN	R2	2	P101	4		7	11	12				
7		YEL	R2	3	P101	2		7	11	12				
8														
9	-21	COND	COND		P202	1	15		16	8	14	60	3	
10		WHT	SH		P202	3				17,18	8			12
11														
12	-31	BLK	XF1	END	P.PWR	3	23		20	21	26			
13		BLU	XF1	END	P.PWR	8				21	26			
14		WHT	PWR CD	WHT	P.PWR	1		22			21	25		
15		YEL	PWR CD	WHT	P.PWR	6					21	25		
16		GRN	E4		P.PWR	5		24			21	25		
17														
18	-41	BLK	XF1	END	P.PWR	3	23	20	20	21	25			
19		WHT	P.PWR	8	P.PWR	1		21		21	25			
20		YEL	PWR CD	WHT	P.PWR	6		22		21	25			
21		GRN	E4		P.PWR	5		24		21	25			
22														
23														
24														
25														

CODE NOTES: △ 2 REMOVE EXISTING WHITE & YELLOW WIRES FROM P201, 166 AND P103, 163.

7-03-1d (7-44)

SIZE	CODE IDENT	
A	98438	129777
SCALE		SHEET 4

REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		RELEASE PER DCN 1292	9/17/81	<i>[Signature]</i>
B		INCORP DCN # 1663	12-17-80	<i>[Signature]</i>
C		INCORP DCN # 1900	3/15/81	<i>[Signature]</i>
D		INCORP DCN # 2767	9-3-81	<i>[Signature]</i>

TABLE OF CONTENTS

PARA	DESCRIPTION	SHEET
1.0	SCOPE	2
2.0	APPLICABLE DOCUMENTS	2
3.0	INPUT REQUIREMENTS	2
4.0	DISPLAY CHARACTERISTICS	4
5.0	POWER REQUIREMENTS	6
6.0	MECHANICAL REQUIREMENTS	6
7.0	PROTECTIVE FINISH	6
8.0	U.L. APPROVAL	6
9.0	ENVIRONMENTAL REQUIREMENTS	7
10.0	HUMAN FACTORS REQUIREMENTS	7
11.0	WARRANTY	8
12.0	APPROVED VENDOR	8
13.0	REFERENCE DOCUMENTATION	8
14.0	CHANGES AFTER APPROVAL	8
	FIG. 1 CRT DISPLAY AREA	9
	FIG. 2 TIMING DIAGRAM	10
	FIG. 3 PHYSICAL OUTLINE	11
	FIG. 4 POWER CONNECTOR	12
	FIG. 5 CRT OUTLINE	13

-1	129842	DL129700
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

SPECIFICATION CONTROL DRAWING

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 XX ± .03 XXX ± .010 ANGLES ± 0.5° MACH. FIN.	DR <i>W. Kelly</i> 8-21-80	LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.	MONITOR, 15 INCH		REV D
	CHK		ADM-42		
	DSGN <i>W. Kelly</i> 8-21-80	SIZE	CODE IDENT	129779	SHEET 1 OF 16
	ENGR <i>[Signature]</i> 8-29-80	A	98438		
	PROJ	SCALE			
REL <i>[Signature]</i> 7/9/81					
CUSTOMER APPD					



1.0 DESCRIPTION

THIS 15 INCH MONITOR IS TO BE USED IN THE ADM-42 DATA DISPLAY TERMINAL. THE UNIT IS TO BE OPERATED IN THE DIRECT DRIVE OR SYNC MODE AND ON 115/230 VAC SUPPLIED BY LSI.

2.0 APPLICABLE DOCUMENTS

2.1 LSI DRAWINGS

129708 REV A CRT MOUNTING BRACKET  
129794 MOUNTING PLATE SUBASSEMBLY  
129798 ACCEPTANCE TEST PROCEDURE

3.0 INPUT REQUIREMENTS

3.1 INPUT CONNECTOR FOR DIRECT DRIVE

3.1.1 CONNECTOR PIN OUT

PIN 1 GROUND  
2 BRIGHTNESS POT HIGH  
3 BRIGHTNESS POT-LOW  
4 BRIGHTNESS POT-ARM  
5 UNUSED  
6 HORIZONTAL SYNC  
7 UNUSED  
8 VIDEO SIGNAL  
9 VERTICAL SYNC  
10 GROUND

3.1.2 CONNECTOR IS OF THE PRINTED CIRCUIT EDGE TYPE WITH 0.156 INCH CENTER TO CENTER CONTACT SPACING AND 0.054 TO 0.071 INCH PRINTED CIRCUIT BOARD THICKNESS.

3.1.3 THE MATING CONNECTOR SHALL BE A SINGLE READOUT TYPE WITH 10 CONTACTS AND EQUIVALENT TO AN AMPHERNOL TYPE 225-21031-101.

3.2 VIDEO INPUT CHARACTERISTICS

3.2.1 THE INPUT IMPEDANCE SHALL BE 2.0K OHM MINIMUM SHUNTED BY 60PF MAX. AT A DOT RATE OF 19.584 MHZ.

3.2.2 INPUT VIDEO SIGNAL LEVELS SHALL BE ZERO TO 0.04 VOLTS FOR BLACK. THE LEVEL SHALL BE ADJUSTABLE BUT NOT TO EXCEED 5.0 VOLTS FOR WHITE LEVEL.

SIZE	CODE IDENT		RFV
A	98438	129779	D
SCALE		SHEET	2

3.2.3 VIDEO DOT TIMING

3.2.3.1 THE TIMING FOR A DOT, WHEN DISPLAYING STANDARD VIDEO, SHALL BE A 78.1 NSEC. WIDE POSITIVE PULSE WITH RISE AND FALL TIMES OF LESS THAN 10 NSEC.

STANDARD VIDEO SHALL BE DEFINED AS DISPLAYING WHITE DOTS ON A BLACK BACKGROUND.

3.2.3.2 THE TIMING FOR A DOT, WHEN DISPLAYING REVERSE VIDEO, SHALL BE A 52.1 NSEC. WIDE NEGATIVE PULSE WITH RISE AND FALL TIMES OF LESS THAN 10 NSEC. REVERSE VIDEO SHALL BE DEFINED AS DISPLAYING BLACK DOTS ON A WHITE BACKGROUND.

3.3 VERTICAL SYNC INPUT CHARACTERISTICS.

3.3.1 THE INPUT LOADING SHALL BE COMPATIBLE TO 74 S SERIES TTL LOGIC CIRCUITS.

3.3.2 THE PULSE AMPLITUDE SHALL BE A LOW LEVEL OF 0.0 TO +0.4 VOLTS AND A HIGH LEVEL OF 4.0 $\pm$ 1.5 VOLTS.

3.3.3 THE PULSE RATE SHALL BE EITHER 50 OR 60 PULSES PER SECOND  $\pm$ 1%.

3.3.4 THE PULSE RISE AND FALL TIMES SHALL BE EQUAL TO OR LESS THAN 100 NSEC.

3.3.5 THE VERTICAL CIRCUIT SHALL ACCEPT THE PULSE FORMAT GIVEN IN FIGURE NO. 2.

3.4 HORIZONTAL SYNC INPUT CHARACTERISTICS

3.4.1 THE INPUT LOADING SHALL BE COMPATIBLE TO 74 S SERIES TTL LOGIC CIRCUITS

3.4.2 THE PULSE AMPLITUDE SHALL BE A LOW LEVEL OF 0.0 TO +0.4 VOLTS AND A HIGH LEVEL OF 4.0 $\pm$ 1.5 VOLTS.

3.4.3 THE PULSE RATE SHALL BE 19.2K PER SECOND  $\pm$ 1%.

3.4.4 THE PULSE RISE AND FALL TIME SHALL BE EQUAL TO OR LESS THAN 50 NSEC.

3.4.5 THE HORIZONTAL CIRCUITS SHALL ACCEPT THE PULSE FORMAT GIVEN IN FIGURE NO. 2.

SIZE	CODE IDENT		RFV
A	98438	129779	D
SCALE		SHEET	3

4.0 DISPLAY CHARACTERISTICS

4.1 CATHODE RAY TUBE

4.1.1 THE CATHODE RAY TUBE (CRT) SHALL BE FIFTEEN INCH DIAGONAL MEASUREMENT. SEE FIGURE 5 FOR OUTLINE.

4.1.2 THE CRT SHALL BE SUPPLIED AS STANDARD WITH P-4 PHOSPHOR (129779-1) OR P-31 PHOSPHOR (129779-2).

4.1.3 THE CRT SHALL HAVE A DEFLECTION ANGLE OF 110°.

4.1.4 THE CRT SHALL BE SUPPLIED WITH A "T" BAND TO MEET U.L. IMPLOSION PROTECTION REQUIREMENTS.

4.1.5 THE CRT SHALL HAVE A DISPLAY AREA AS SHOWN IN FIGURE NO. 1.

SIZE	CODE IDENT	129779	REV
A	98438		D
SCALE		SHEET	4

4.2 CONTROLS

4.2.1 THE INTERNAL CONTROLS PROVIDED WITHIN THE UNIT SHALL CONSIST OF THE FOLLOWING:

- HEIGHT
- VERTICAL SYNC
- VERTICAL LINEARITY
- BRIGHTNESS
- HORIZONTAL CENTERING
- WIDTH
- FOCUS
- HORIZONTAL SYNC
- 24 VOLT ADJUST

4.2.2 THE CONTRAST CONTROL WILL BE MOUNTED OFF-UNIT AND SHALL BE A 100 OHM POT. THE VIDEO LEAD FROM CONTRAST CONTROL TO PIN 8 OF MONITOR BOARD EDGE CONNECTOR WILL BE APPROXIMATELY 17 INCHES LONG.

4.3 DISTORTION

4.3.1 CONDITIONS OF MEASUREMENT: UNLESS OTHERWISE STATED, ALL MEASUREMENTS SHALL BE MADE UNDER CONTROLLED LABORATORY CONDITIONS AFTER AN INITIAL WARM-UP PERIOD OF 5 TO 8 MINUTES. APPLIED POWER SHALL BE WITHIN THE LIMITS STATED IN PARAGRAPH 5.0. DATA SHALL BE PROVIDED FOR 25 ROWS OF 80 CHARACTER COLUMNS OF CHARACTERS. THE REMOTE BRIGHTNESS CONTROL SHALL BE ADJUSTED TO THE POINT JUST BEFORE THE RASTER IS VISIBLE. THE LIGHT OUTPUT OF THE MONITOR SHALL BE ADJUSTED TO 3.0 FOOT LAMBERTS  $\pm$  0.5 FT. LAM. (MEASURED ON A WESTON 759 LIGHT METER OR EQUIVALENT) WITH THE CONTRAST CONTROL. AVERAGE LIGHT OUTPUT SHALL BE MEASURED WITH A FULL PAGE OF CHARACTERS WITH 30% DOTS LIT. THE FOCUS CONTROL SHALL BE ADJUSTED FOR BEST OVERALL FOCUS.

4.3.2 MAXIMUM GEOMETRIC DISTORTION ALLOWED SHALL BE:

4.3.2.1 PIN AND BARREL - DEFINED AS THE CURVATURE OF THE VIDEO CHARACTER ON TOP/BOTTOM OR SIDES.

4.3.2.1.1 LIMITS FOR TOP/BOTTOM ARE 1.0% OF THE HORIZONTAL SIZE OR  $T = 0.10$  INCHES MAXIMUM.

4.3.2.1.2 LIMITS FOR SIDE ARE  $S = 0.075$  INCH MAX.

4.3.2.1.3 INCREMENTAL PIN AND BARREL (I) = 0.020 INCH MAX/INCH.

4.3.2.1.4 REFERENCE FIGURE 6A AND 6B.

4.3.2.2 TRAPEZOIDAL DISTORTION - DEFINED AS THE DIFFERENCE IN THE VIDEO HEIGHT OR WIDTH.

4.3.2.2.1 LIMITS ON THE TOP/BOTTOM (HORIZONTAL) ARE H.T.D. =  $W - W_1 = 0.1$  MAX.

SIZE	CODE IDENT	129779	REV
A	98438		D
SCALE		SHEET	5

- 4.3.2.2.2 LIMITS ON SIDES (VERTICAL) ARE  $VTD = V - V_1 = 0.1$  MAX.
- 4.3.2.2.3 REFERENCE FIGURE 7A AND 7.
- 4.3.2.3. PARALLELOGRAM DISTORTION - DEFINED AS THE DIFFERENCE FROM A TRUE 90 DEGREE ANGLE OF THE VIDEO PRESENTATION.
- 4.3.2.3.1 LIMITS ON THE PARALLELOGRAM DISTORTION  $P - P_1 = 0.1$  MAX. (USING GAUGE SHOWN IN FIGURE 7 IN DETAILED INSTRUCTIONS).
- 4.3.2.3.2 REFERENCE FIGURE 8.
- 4.3.2.4 YOKE TILT - DEFINED AS THE DEVIATION OF THE CENTER ROW OF CHARACTERS FROM A MOUNTING PLANE.
- 4.3.2.4.1 LIMITS ON TILT ARE  $T = 0.100$  INCH MAX. (USING GAUGE SHOWN IN FIGURE 4 AND TEST PROCEDURE NO. 2)
- 4.3.2.4.2 REFERENCE FIGURE 9.
- 4.3.2.5 VERTICAL RASTER CENTERING - DEFINED AS AN UNBLANKED RASTER BEING CENTERED TO THE PHOSPHOR EDGE OF THE CRT.
- 4.3.2.5.1 LIMITS FOR VERTICAL RASTER CENTERING ARE  $V.R.C = A - A_1 = 0.250$  INCH MAX.
- 4.3.2.5.2 REFERENCE FIGURE 10
- 4.3.2.6 HORIZONTAL RASTER CENTERING
- 4.3.2.6.1 LIMITS FOR HORIZONTAL RASTER CENTERING ARE  $H.R.C. = B - B_1 = 0.250$  INCH MAX.
- 4.3.2.6.2 REFERENCE FIGURE 11.
- 4.3.2.7 VIDEO SIZE - DEFINED AS ACTIVE VIDEO DISPLAY SIZE AFTER 5 MINUTES OF WARM-UP, AT THE CENTER OF THE VIDEO PRESENTATION.
- 4.3.2.7.1 VERTICAL SIZE -  $V = 7.15$  INCH  $\pm 0.125$  INCH.
- 4.3.2.7.2 HORIZONTAL SIZE -  $W = 9.90$  INCH  $\pm 0.125$  INCH.
- 4.3.2.7.3 REFERENCE FIGURE 1.

NOTE: GEOMETRY MEASUREMENTS MUST BE MADE WITH THE CRT PHOSPHOR FACING EAST AND THE CRT NECK FACING WEST.

SIZE	CODE IDENT	129779	REV
A	98438		D
SCALE		SHEET 6	

5.0 POWER REQUIREMENTS

5.1 THE INPUT VOLTAGE SHALL BE 105 TO 135 VAC 50/60 Hz. OR 215 TO 250 VAC 50 Hz.

5.2 THE INPUT CURRENT SHALL BE .50 AMPERES NOMINAL WITH A MAXIMUM PEAK CURRENT OF .65 AMPERES.

5.3 THE INPUT POWER CONNECTOR SHALL MATE WITH MOLEX PART NO. 03-06-1092 AND FEMALE CONTACTS MOLEX 1787-F SERIES.

5.4 POWER CONNECTOR PIN OUT PER FIGURE 4.

6.0 MECHANICAL REQUIREMENTS

6.1 PHYSICAL SIZE SHALL BE PER FIGURE 3 OF THIS SPECIFICATION.

6.2 THE CRT SHALL BE MOUNTED WITH BRACKETS 129708-5 AND 129708-6 PER LSI DRAWING 129708.

6.3 THE ELECTRONICS SHALL BE MOUNTED WITH MOUNTING PLATE SUB-ASSEMBLY 129794-1 PER LSI DRAWING 129794.

6.4 CRT BRACKETS AND MOUNTING PLATE MAY BE TEMPORARILY FASTENED TOGETHER FOR SHIPMENT AND HANDLING.

7.0 PROTECTIVE FINISH

7.1 PROTECTIVE FINISHES SHALL BE PROVIDED ON ALL MATERIAL AND COMPONENTS WHICH MAY BE ADVERSELY AFFECTED BY THE ENVIRONMENTAL CONDITIONS SPECIFIED HEREIN.

8.0 U.L. APPROVAL

8.1 THE UNIT SHALL BE DESIGNED AND MANUFACTURED TO MEET THE REQUIREMENTS OF U.L. 478, (ELECTRONIC DATA PROCESSING UNITS AND SYSTEMS) UNDERWRITERS LABORATORIES INC. STANDARDS OF SAFETY, WHEN CONTAINED WITHIN A SUITABLE ENCLOSURE.

SIZE	CODE IDENT.	129779	REV
A	98438		D
SCALE		SHEET	7

- 9.0 ENVIRONMENTAL REQUIREMENTS
- 9.1 TEMPERATURE
  - 9.1.1 THE OPERATING TEMPERATURE MINIMUM AND MAXIMUM SHALL BE 0°C. and 50°C. AMBIENT.
  - 9.1.2 THE STORAGE TEMPERATURE MINIMUM AND MAXIMUM SHALL BE -20°C. AND +65°C. AMBIENT.
- 9.2 RELATIVE HUMIDITY
  - 9.2.1 THE OPERATING RELATIVE HUMIDITY SHALL BE 5 TO 90 PERCENT (NON-CONDENSING) WITH A GRADIENT EQUAL TO OR LESS THAN 10% PER HOUR.
- 9.3 ALTITUDE
  - 9.3.1 THE OPERATING ALTITUDE SHALL BE SEA LEVEL TO 10,000 FEET.
  - 9.3.2 THE NON-OPERATING ALTITUDE SHALL BE SEA LEVEL UP TO 30,000 FEET.
- 10.0 HUMAN FACTORS REQUIREMENTS
- 10.1 X-RAY RADIATION
  - 10.1.1 THE UNIT AS SPECIFIED SHALL COMPLY WITH THE "RADIATION CONTROL FOR HEALTH AND SAFETY ACT OF 1968".
- 10.2 RFI RADIATION
  - 10.2.1 THE UNIT SHALL MEET FCC RULES AND REGULATIONS, IN ACCORDANCE WITH FCC COMPUTING DEVICES DOCKET NO. 20780.

SIZE <b>A</b>	CODE IDENT. <b>98438</b>	129779	REV <b>D</b>
SCALE		SHEET <b>8</b>	

11.0 WARRANTY

THE EQUIPMENT SOLD TO LEAR SIEGLER, INC. SHALL BE WARRANTED BY THE VENDOR FOR A PERIOD OF ONE YEAR FROM THE DATE OF THE VENDOR'S SHIPMENT AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USE AND OPERATION.

12.0 APPROVED VENDOR

12.1 THE FOLLOWING VENDOR HAS SUBMITTED UNITS THAT COMPLY WITH THE REQUIREMENTS OF THIS SPECIFICATION. SUBSEQUENT ORDERS SHALL COMPLY WITH THIS SPECIFICATION AND SHALL BE ACCEPTED IN ACCORDANCE WITH ACCEPTANCE TEST PROCEDURE 129798.

<u>LSI PART NO.</u>	<u>DESCRIPTION</u>	<u>VENDOR PART#</u>	<u>VENDOR</u>
129779-1	MONITOR, P4	4803700	MOTOROLA
129779-2	MONITOR, P-31	4803900	MOTOROLA

12.2 VENDOR ADDRESS

MOTOROLA INC.  
DATA PRODUCTS

13.0 REFERENCE DOCUMENTATION

13.1 THE VENDOR SHALL BE REQUIRED TO SUPPLY A COMPLETE DOCUMENTATION PACKAGE FOR THE UNIT SPECIFIED HEREIN. THE DOCUMENTATION MAY BE USED IN LSI MAINTENANCE MANUALS AND FOR U.L. SUBMITTAL.

13.2 DOCUMENTATION PACKAGE SHALL CONSIST OF:

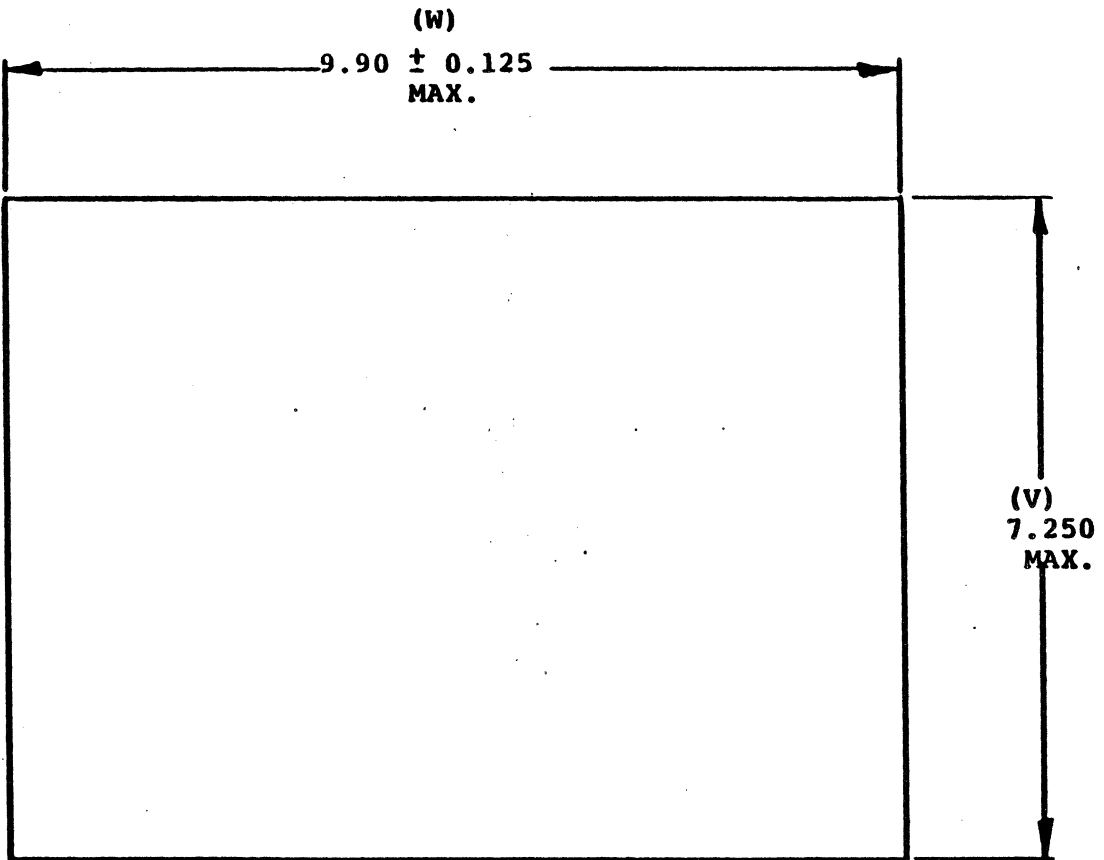
SCHEMATIC DIAGRAMS  
PC BOARD LAYOUT AND ASSEMBLY DRAWINGS  
COMPONENT PARTS LISTS  
COMPONENT SPECIFICATIONS OR REPLACEMENT PARTS INFO.  
TRANSFORMER AND PC BOARD MATERIAL SPECIFICATION  
FOR U.L. SUBMITTAL

14.0 CHANGES AFTER APPROVAL

14.1 CHANGES OF MATERIAL, COMPONENT TYPE, VALUE, OR SOURCE OF SUPPLY SHALL BE SUBMITTED TO LSI 60 DAYS PRIOR TO INTENDED SHIP DATE FOR APPROVAL. WRITTEN ACCEPTANCE FROM LSI PRIOR TO SHIPMENT IS REQUIRED. DOCUMENTATION OF CHANGES MAY BE SUBMITTED CONCURRENT WITH SHIPMENT.

SIZE	CODE IDENT	129779	REV
A	98438		D
SCALE		SHEET	9





(W)

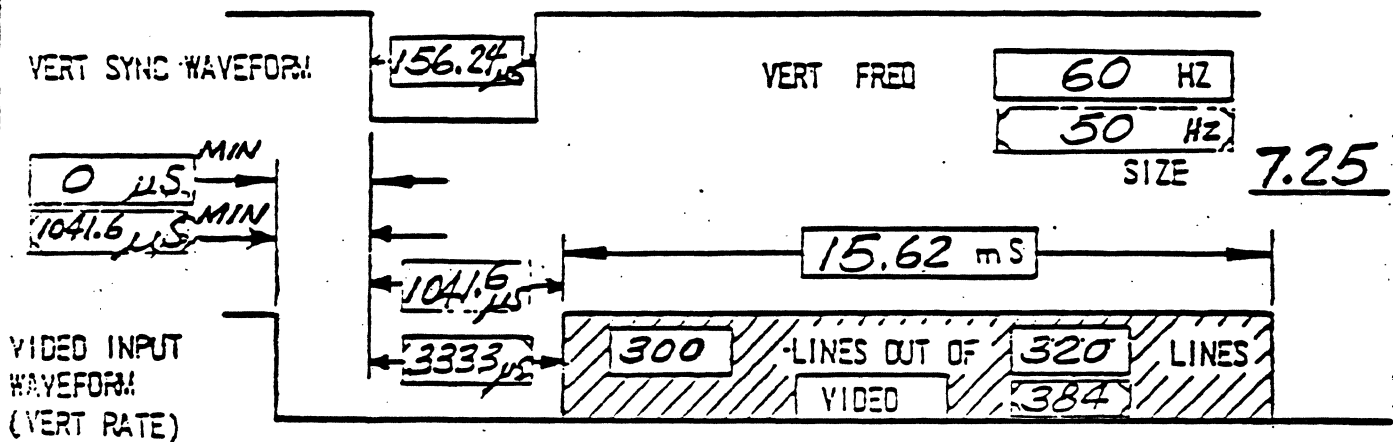
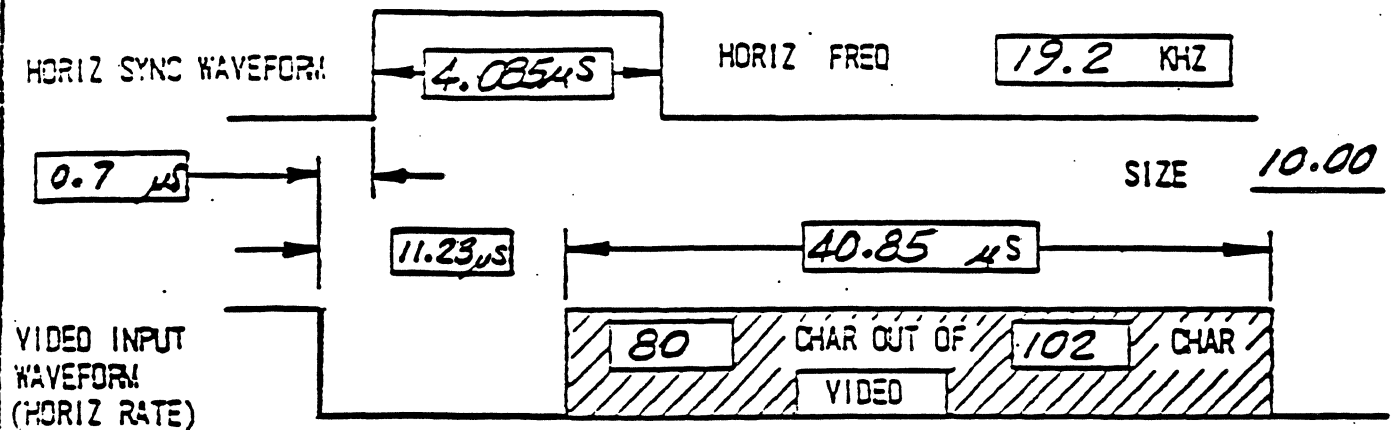
9.90 ± 0.125  
MAX.

(V)  
7.250  
MAX.

15" CRT DISPLAY AREA

FIGURE NO. 1

SCALE	SIZE	CODE IDENT	SHEET	RE
	A	98438	129779	D
			10	



	HORIZ	VERT
CHARACTER BLOCK	10	12
CHARACTER MATRIX	7	9
DOT RATE (MHZ)	19.584 MHZ	

VIDEO INFORMATION	
POLARITY	+ WHITE
IMPEDANCE	STANDARD
PERCENT	50-100
VIDEO INPUT RANGE (V)	STANDARD

FIGURE No. 2

SIZE	CODE IDENT	129779	REV
A	98438		D
SCALE		SHEET	//

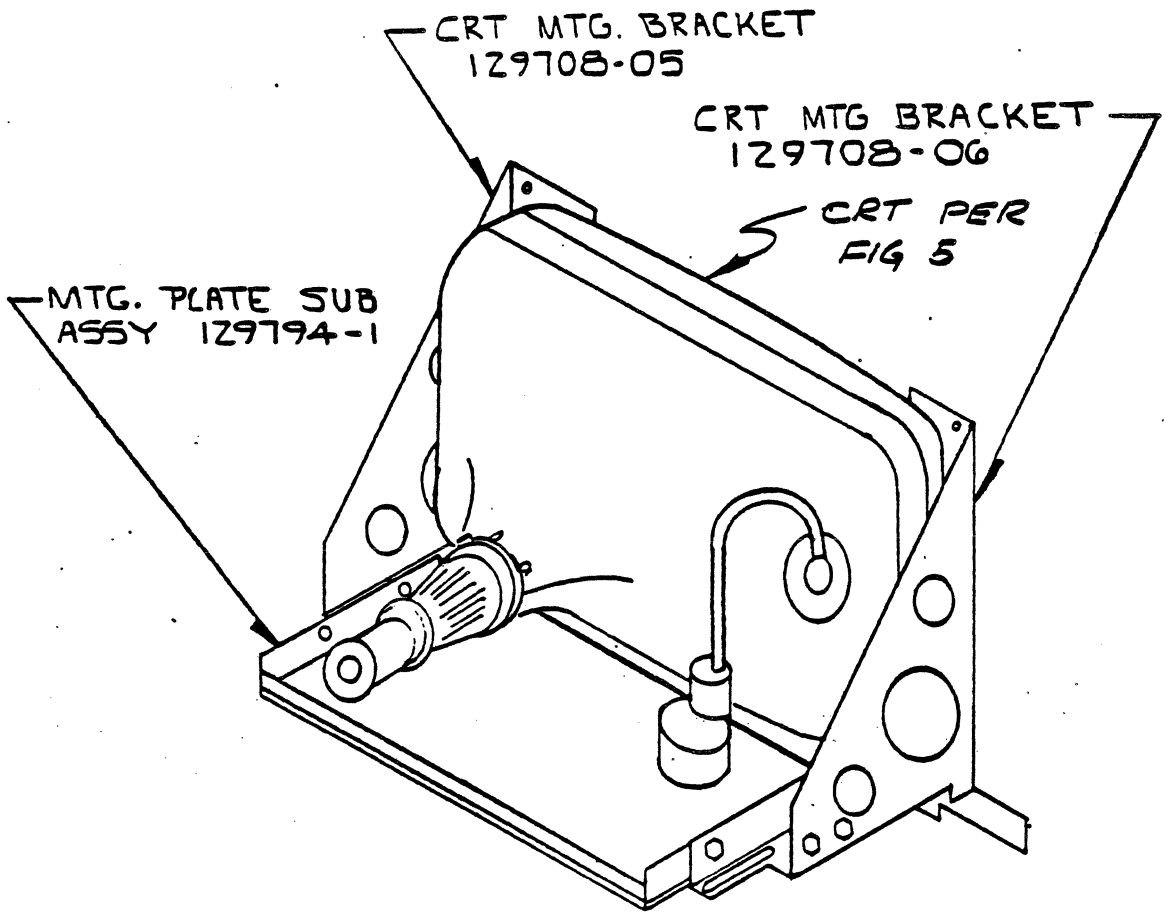
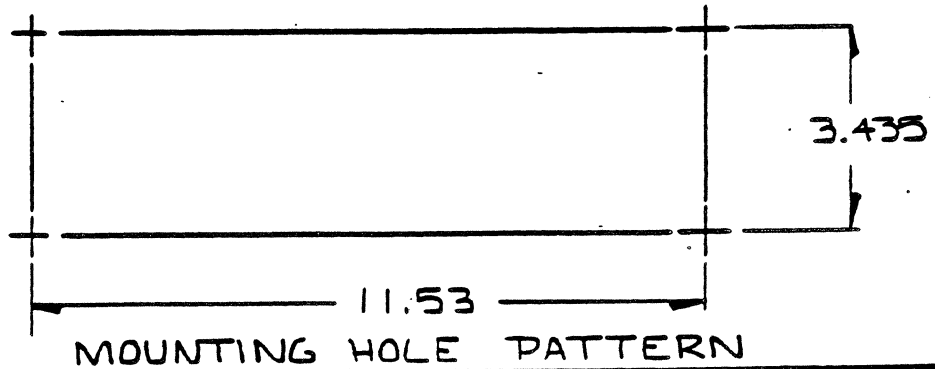


FIGURE NO. 3  
PHYSICAL OUTLINE



SIZE	CODE IDENT	129779	REV
<b>A</b>	<b>98438</b>		<b>D</b>
SCALE	—	SHEET	12

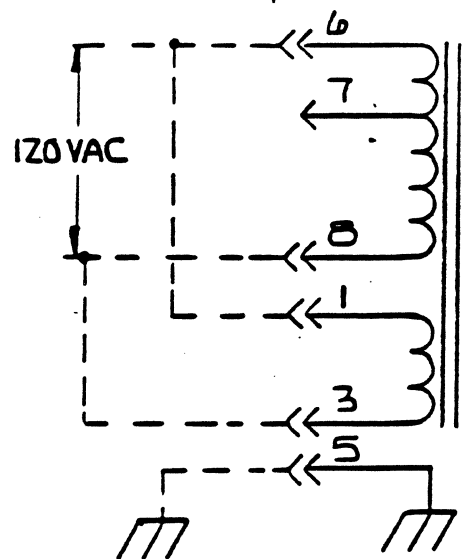
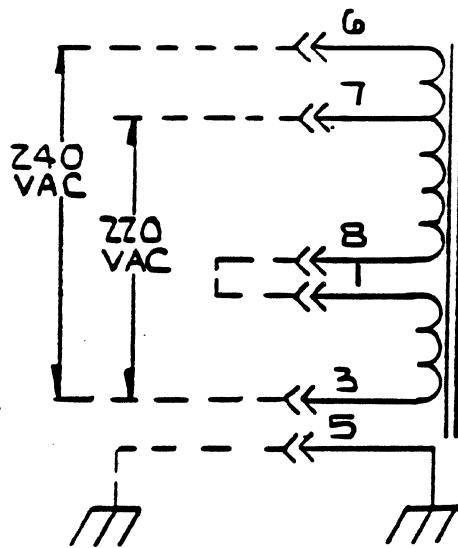
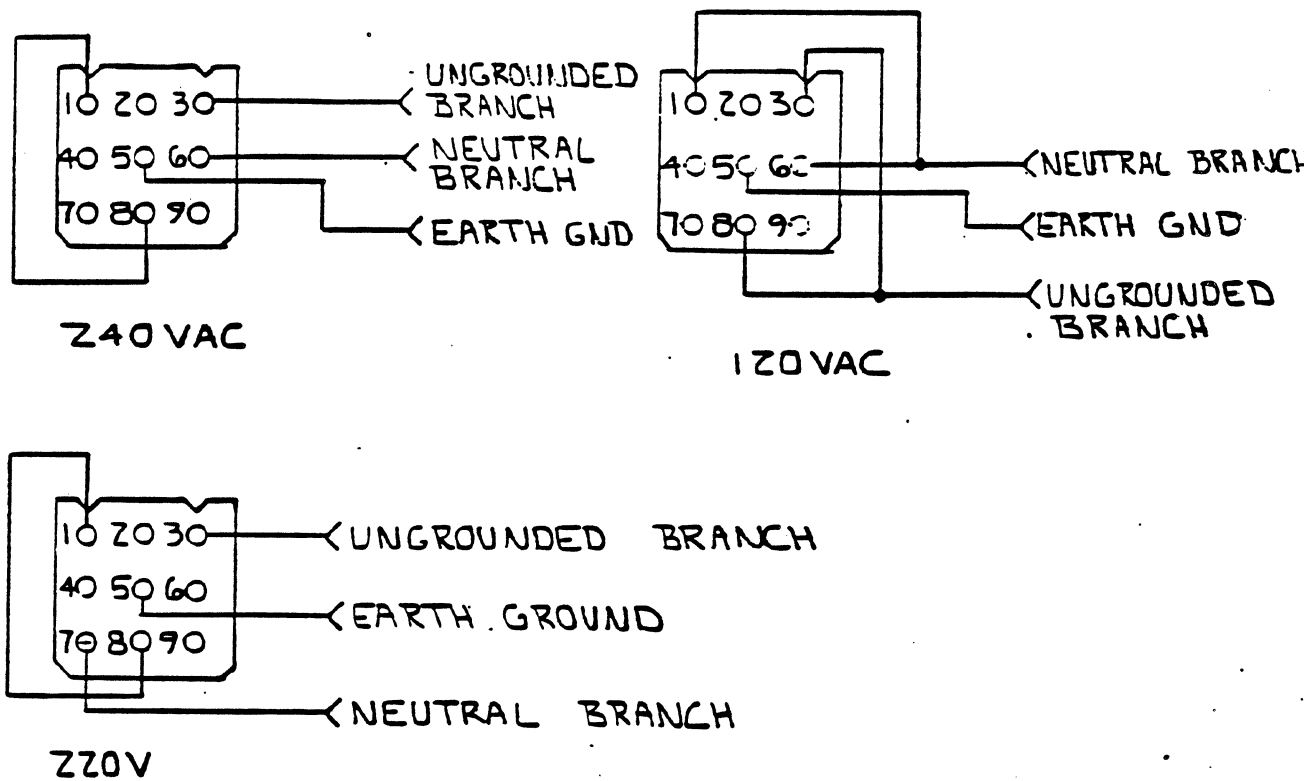
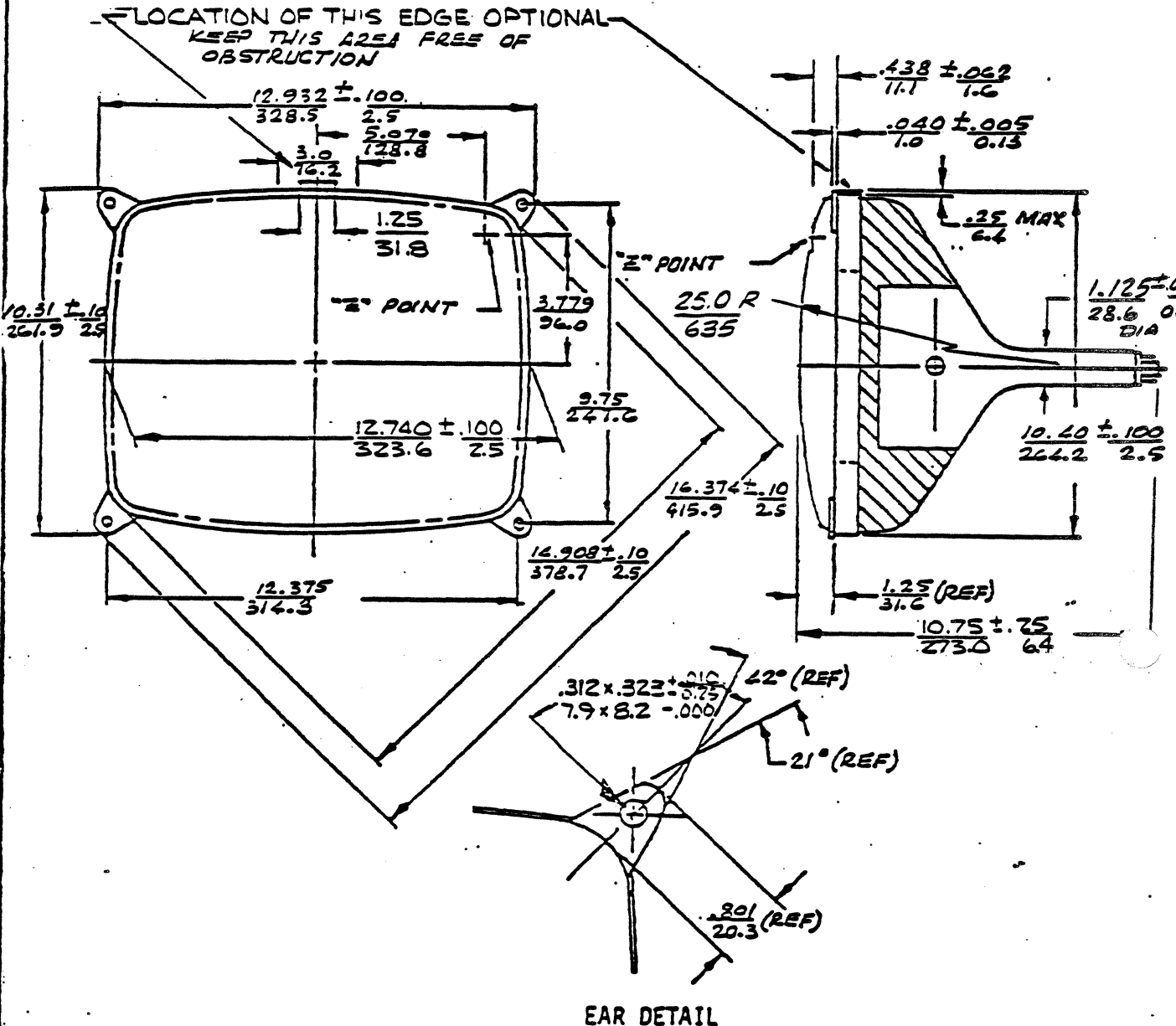


FIGURE NO. 4  
POWER CONNECTION

SIZE <b>A</b>	CODE IDENT <b>98438</b>	<b>129779</b>	REV <b>D</b>
SCALE —	SHEET <b>13</b>		

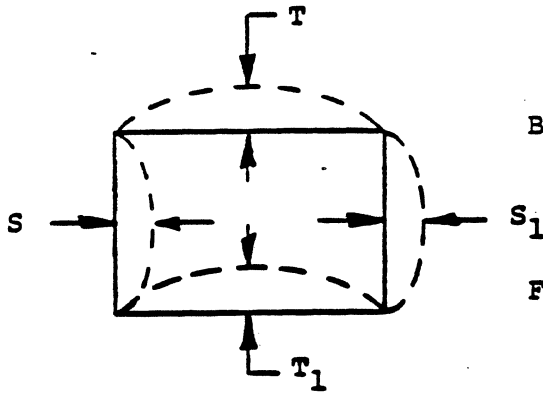


**NOTE:**

THE EARS SHALL FIT OVER (4) .170 ± .002 DIA. PINS LOCATED WITH THEIR CENTERS AT THE CORNERS OF A 12.375 ± .005 BY 9.750 ± .005 RECTANGLE.

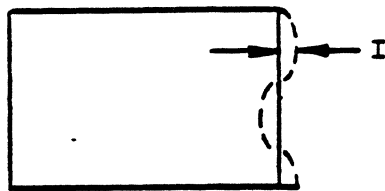
FIGURE 5  
CRT OUTLINE

SIZE <b>A</b>	CODE IDENT <b>98438</b>	129779	REV <b>D</b>
SCALE		SHEET 14	



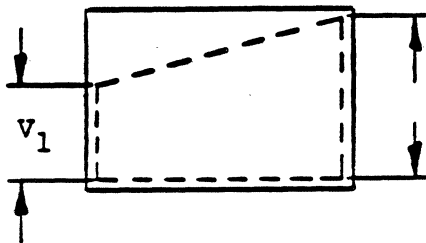
BARREL AND PINCUSHION

FIGURE 6A



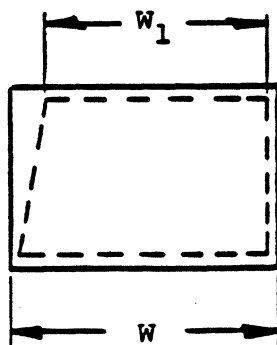
INCREMENTAL PIN AND BARREL

FIGURE 6B



TRAPEZOID DISTORTION (HORIZONTAL)

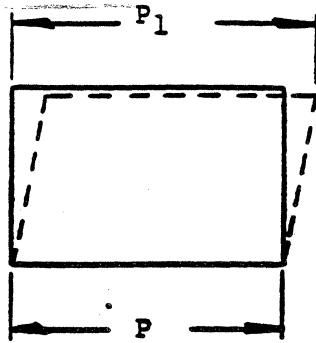
FIGURE 7A



TRAPEZOID DISTORTION (VERTICAL)

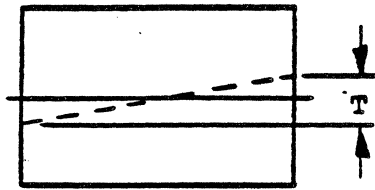
FIGURE 7B

SIZE	CODE IDENT	129779	RE
<b>A</b>	<b>98438</b>		<b>D</b>
SCALE		SHEET	15



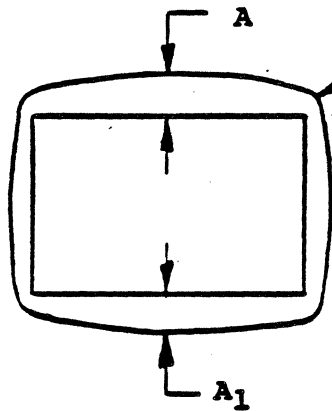
PARALLELOGRAM DISTORTION

FIGURE 8



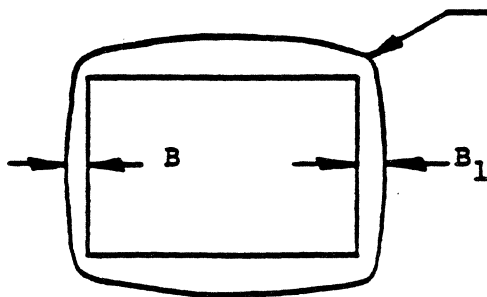
YOKE TILT

FIGURE 9



PHOSPHOR EDGE

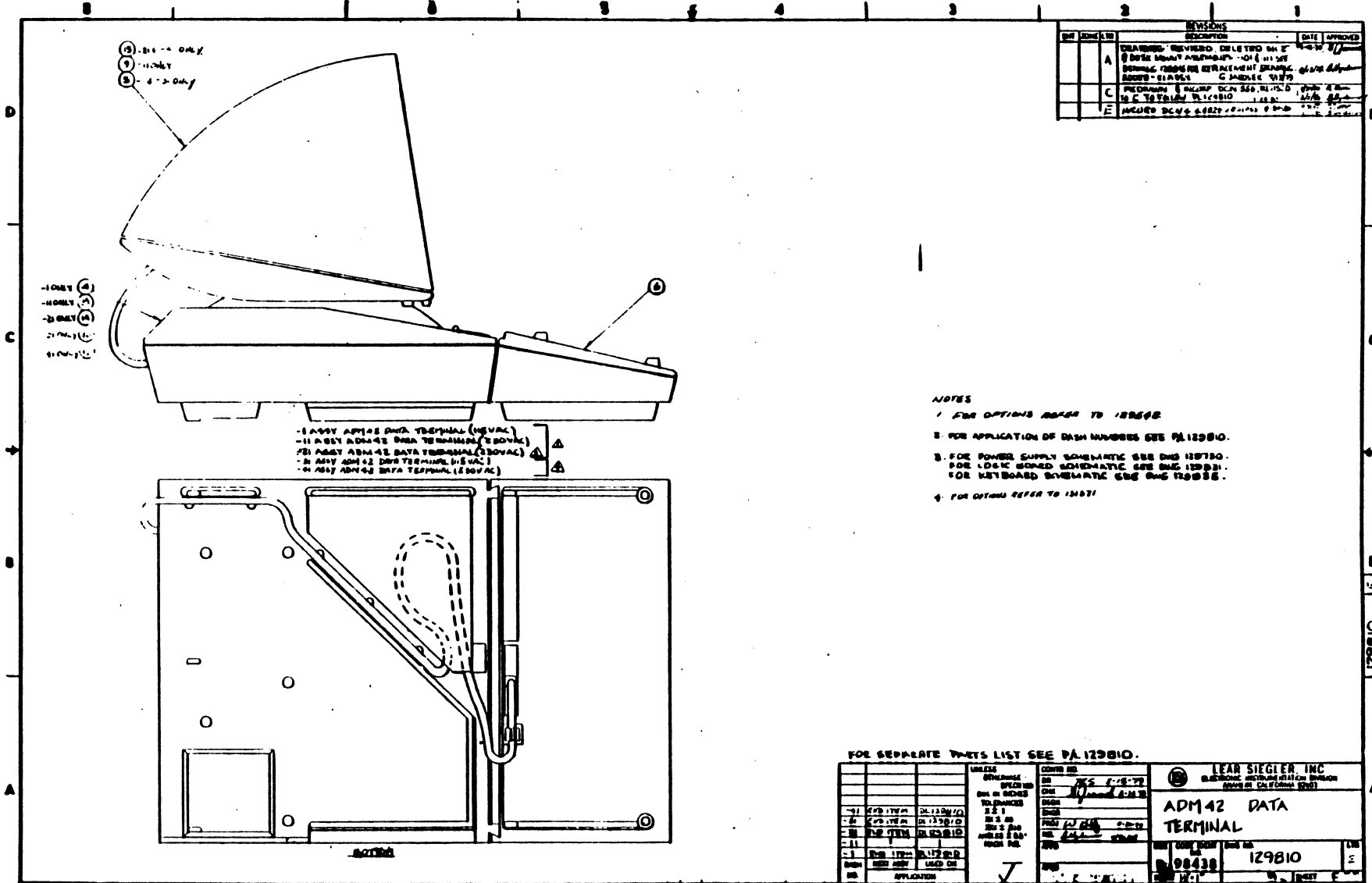
FIGURE 10



PHOSPHOR EDGE

FIGURE 11

SIZE	CODE IDENT		REV
<b>A</b>	<b>98438</b>	129779	<b>D</b>
SCALE		SHEET	16



REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	CHANGED REVISED DELETED ON E DATE MONTH YEAR SOME PARTS IN STRAIGHTENED DRAWING SHEET-1 CLASS C NUMBER 1179	4-1-77	[Signature]
C	PROGRAMMING CHANGE DCAN 640, 641, 642 12 C TOTAL PA 129810	4-1-77	[Signature]
E	INCREASE DCAN 640, 641, 642 FROM 12 TO 15	4-1-77	[Signature]

- NOTES
1. FOR OPTIONS REFER TO 129808
  2. FOR APPLICATION OF DASH NUMBERS SEE PA 129810.
  3. FOR POWER SUPPLY SCHEMATIC SEE DWD 129750.  
FOR LOGIC BOARD SCHEMATIC SEE DWD 129820.  
FOR KEYBOARD SCHEMATIC SEE DWD 129830.
  4. FOR OPTIONS REFER TO 129871

FOR SEPARATE PARTS LIST SEE PA 129810.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS TO BE SHOWN TO DECIMALS IN INCHES.	CONTROL NO.	LEAR SIEGLER INC ELECTRONIC INSTRUMENTATION DIVISION ANN ARBOR, CALIFORNIA 9201
11 100% TEST PA 129810/1 12 100% TEST PA 129810/2 13 100% TEST PA 129810/3	DATE: 4-1-77 TIME: 2:15 PM BY: [Signature] FOR: [Signature]	<b>ADM42 DATA TERMINAL</b>
14 100% TEST PA 129810/4 15 100% TEST PA 129810/5	PART NO. [Signature] REV. NO. 001 DATE: 4-1-77	QTY: 129810 PART NO. 129810 REV. NO. 001
16 100% TEST PA 129810/6 17 100% TEST PA 129810/7	DRAWING NO. 129810 REV. NO. 001	129810
18 100% TEST PA 129810/8 19 100% TEST PA 129810/9	APPLICATION: [Signature]	129810




REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
	A	CREATED -11, -101 & -111 ASSY ADDED F/N'S 2, 8, 9, 12, 13, 10, 11, 16, 18, 19 YES 3-7-79	3/21/79	R. Q. P. Llorens
	B	INCORPORATED ADCH #2 BY DELETING ALL REF TO DASH NO'S -101 & -111. & ADDED -21 ASSY. G. JAROSEK 7/3/79	8-9-79 8/9/79	J. G. Gammell Elly Llorens
	C	INCOOP. DCN 556 JE GLASS 4-8-80	4/3-80 5/1/80	R. D. W. P. Llorens Elly Llorens
	E	INCOOP. DCN 414 & 824 JE GLASS 4-30-80	4/30/80 5/1/80	R. D. W. P. Llorens Elly Llorens

NOTE

- FOR OPTIONS REFER TO 129542
- APPLICATION
  - 1 IS STD ADM 42 115VAC
  - 11 IS STD ADM 42 230VAC SERIAL NO. 1 THRU 3666
  - 21 IS STD ADM 42 23VAC SERIAL NO. 3667 & ON
  - 31 IS STD ADM 42 115VAC
  - 41 IS STD ADM 42 230VAC
- FOR PUR SUPPLY SCHEMATIC SEE 129730.  
FOR LOGIC BD. SCHEMATIC SEE 129831  
FOR KEY BOARD SCHEMATIC SEE DWG 129835.
- FOR OPTIONS REFER TO 131371.

	EWD TRU	DL129810
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 XX ± .03 XXX ± .010 ANGLES ± 0.5° MACH. FIN. J	DR G. JAROSEK 7/5/79	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.	PARTS LIST - ADM 42 DATA TERMINAL	
	CHK			
	DSGN	PROJ. W. Johnson 7/6/79	SIZE	CODE IDENT
	ENGR	REL H. Llorens 7/6/79	A	98438
	CUSTOMER APPD		[ PL129810 ]	
		SCALE		REV E
				SHEET 1 OF 2

FORM 10 1978



FIND NO.	QTY REQD					PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-21	-11	-1	-31	-41			
1			✓			-1	ADM 42 ASSY 115VAC	△
2		✓				-11	" " " 230VAC	△ △
3	✓					-21	ADM 42 ASSY 230VAC	△ △
4			1			129840-1	TERMINAL CONTROL UNIT	
5			1	1		129842-1	MONITOR	
6	1	1	1	1	1	129841-11	KEYBOARD ASSY	
7						129723-1	CABLE ASSY	
8		1				129840-11	TERMINAL CONTROL UNIT 230VAC	
9		1				129842-21	MONITOR 230VAC	
10								
11				✓		129810-31	ADM 42 ASSY 115VAC	△△
12					✓	129810-41	ADM 42 ASSY 230VAC	△△
13								
14	1					129840-61	TERMINAL CONTROL UNIT 230VAC	
15	1				1	129842-31	MONITOR 230VAC	
16				1		129840-71	TERMINAL CONTROL UNIT 115VAC	
17					1	129840-81	TERMINAL CONTROL UNIT 230VAC	
18								
19						REF R <sub>6</sub> CS131370	ADM 42 CONFIGURATION CONTROL SWL SETTINGS	
20								
21								
22								
23								
24								
25								

SIZE A  
 FSCM NO. 98438  
 SH PL129810  
 REV 2

△△

△△

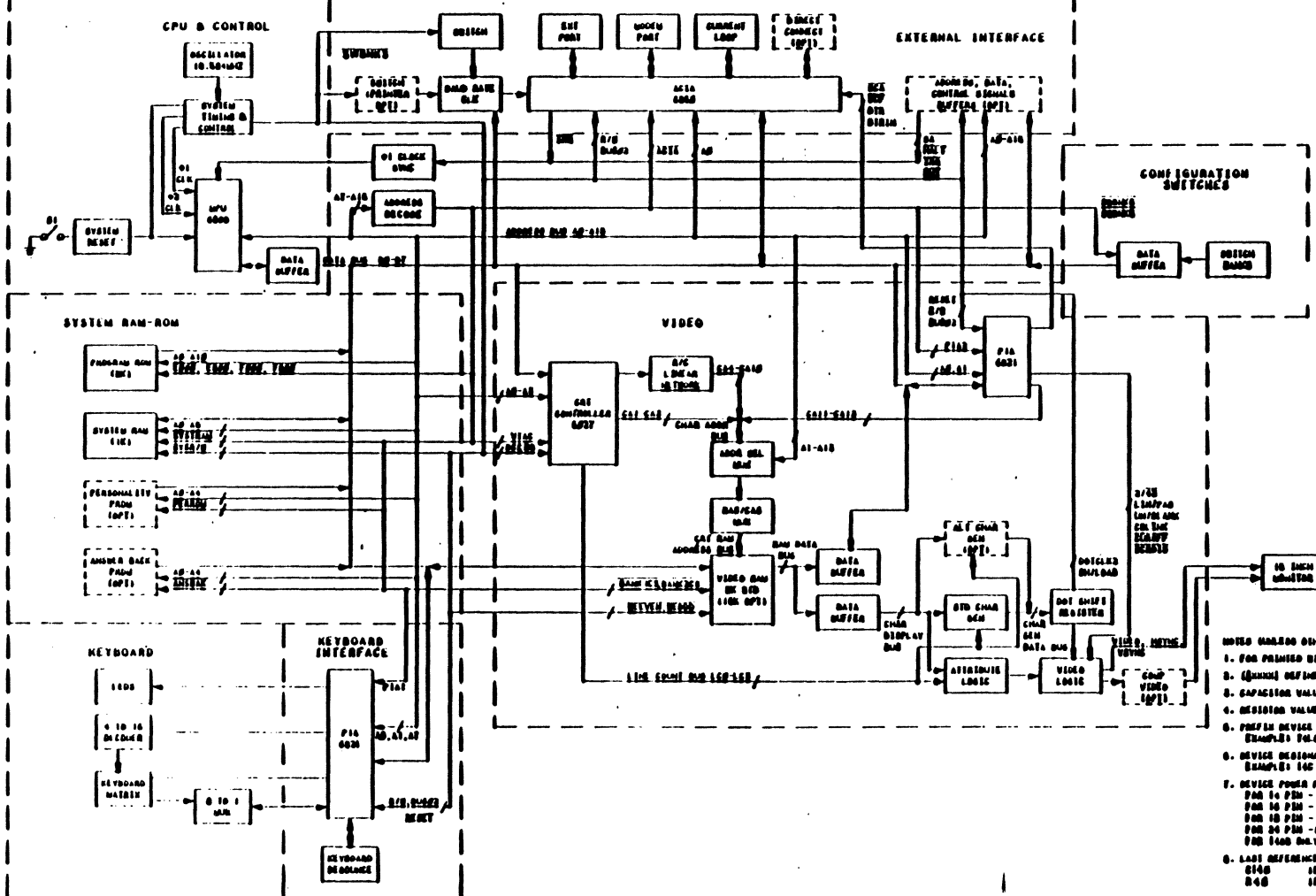
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1

REVISIONS				DATE	APPROVED
SHT	ZONE	LTR	DESCRIPTION		
	A		RELEASE PIR D.N. 5 A(1)	3/21/72	[Signature]



- NOTES (UNLESS OTHERWISE SPECIFIED):
- FOR PRICED BOARD 129812 B, ASSY 121870.
  - (BRACKET) DEFINES HEXAGONAL ADDRESS.
  - CAPACITOR VALUES ARE IN MICROFARADS.
  - RESISTOR VALUES ARE IN OHMS, KS, MS, OR  $10^6$ .
  - POWER DEVICE TYPE WITH FO. (EXAMPLE) 78-0101
  - DEVICE DESIGNATION INDICATES LOCATION. (EXAMPLE) 100
  - DEVICE POWER PING ARE:  
 PWR 10 PSM - 750mD, 101-001  
 PWR 10 PSM - 010mD, 101-001  
 PWR 10 PSM - 010mD, 101-001  
 PWR 20 PSM - 101mD, 201-001  
 PWR 1000 DMLV - 750mD, 11-121, 101-121.
  - LAST REFERENCE DESIGNATION USED:  
 0100 10mD 12B 1010  
 040 107 1001 171

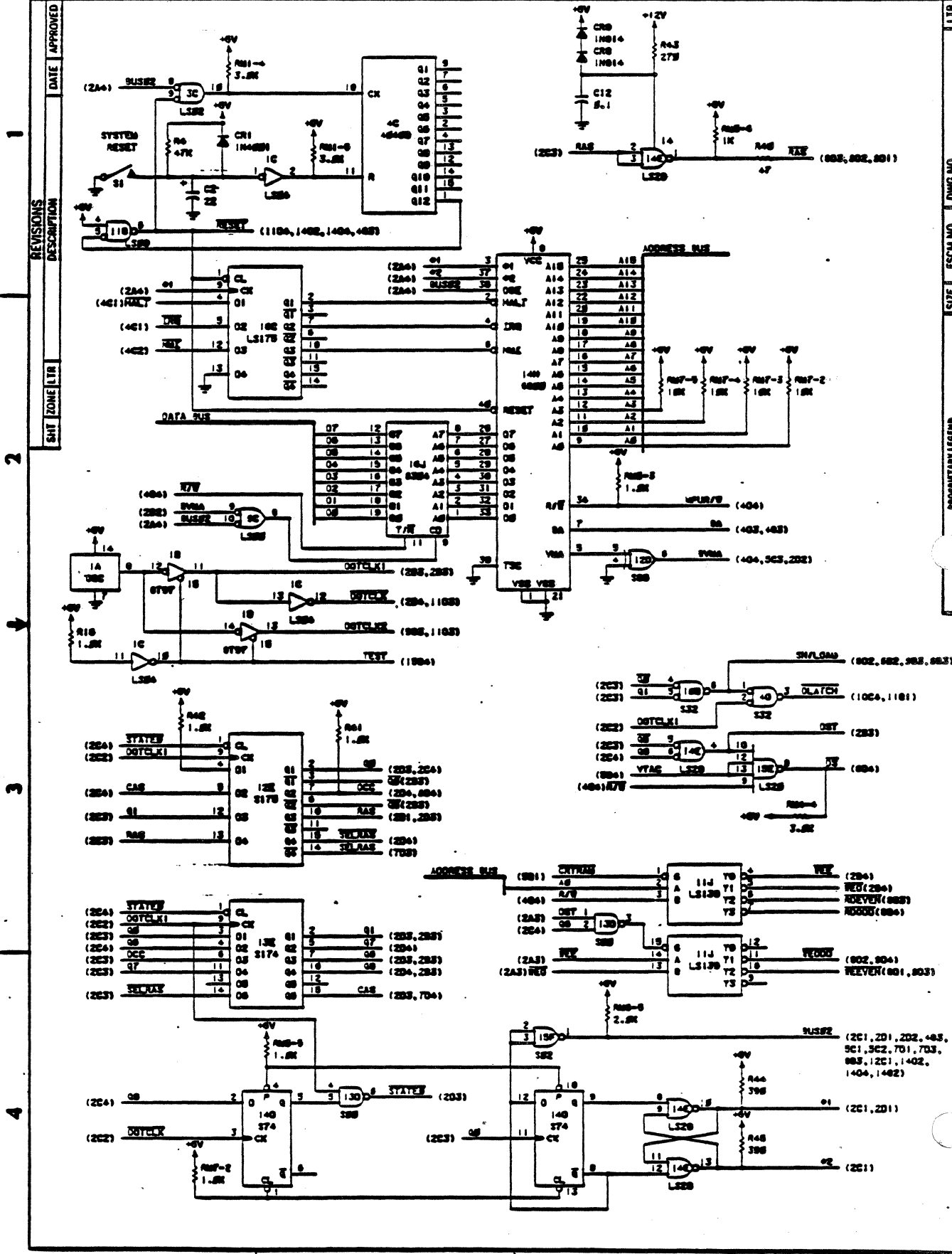
UNLESS OTHERWISE SPECIFIED: DIM IN INCHES TOLERANCES: Xs 1 XXs 03 XXXs 010 ANGLES ±0.5°			CONTR NO DR [Signature] CHK DSGN ENGR [Signature] PRD [Signature] REL [Signature]
DASH NO	131370	NEXT ASSY USED ON	0-129810
APPLICATION			APPD
PROPRIETARY LEGEND EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF LEAR SIEGLER INC. ARE ISSUED IN STRICT CONFIDENCE AND SHALL NOT BE			APPD

**LEAR SIEGLER, INC.**  
DATA PRODUCTS DIVISION  
ANAHEIM CALIFORNIA 92803

**SCHMATIC,  
LOGIC BOARD ADM-42**

SIZE	FSCM NO	DWG NO	LTR
C	98438	129813	A

DATE APPROVED:   
 DESCRIPTION:   
 SHEET ZONE LTR:   
 REVISIONS:   
 SIZE:   
 FSCM NO:   
 DWG NO:   
 129813   
 98438   
 C   
 PROPRIETARY LEGEND:   
 NO OTHERS AUTHORIZED BY CONTRACT HAVE   
 ACCESS TO AND INFORMATION AND INFORMATION   
 HEREIN IS TO BE KEPT IN STRICT CONFIDENCE AND SHALL NOT BE



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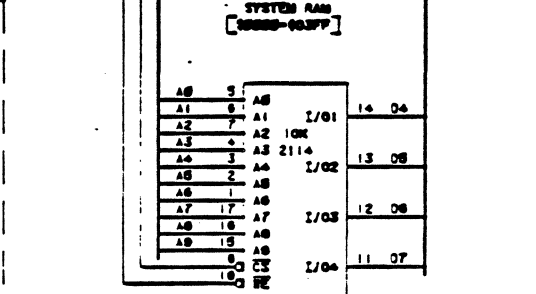
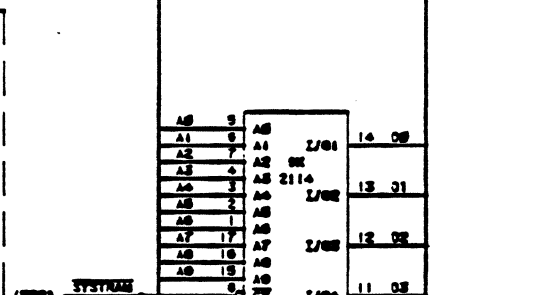
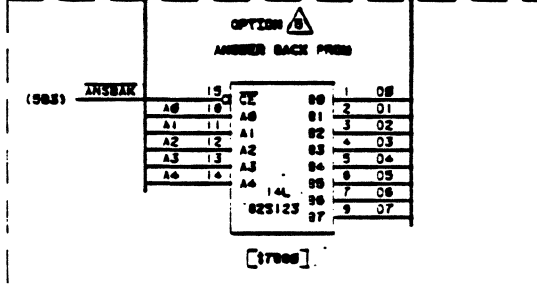
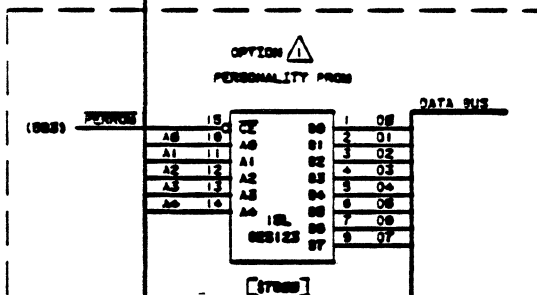
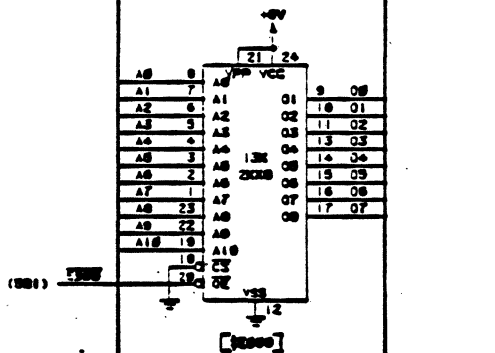
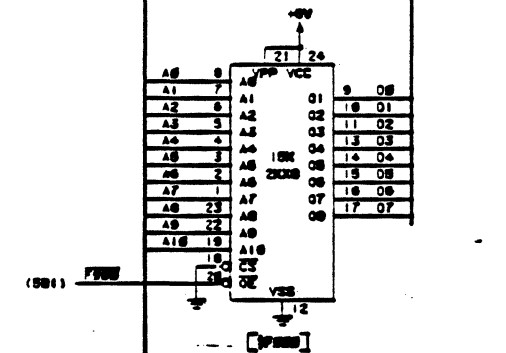
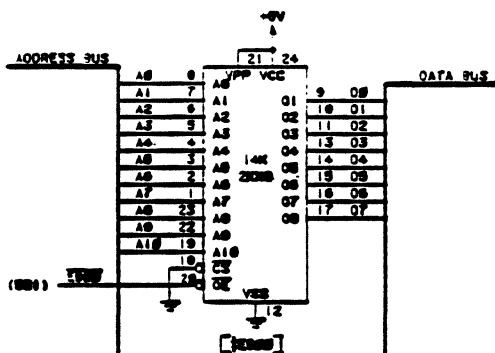
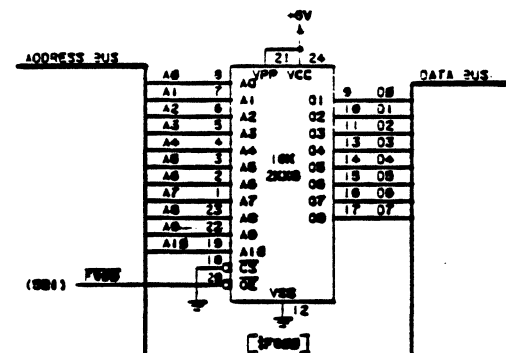
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REVISIONS	DESCRIPTION

SMT	ZONE	LTR

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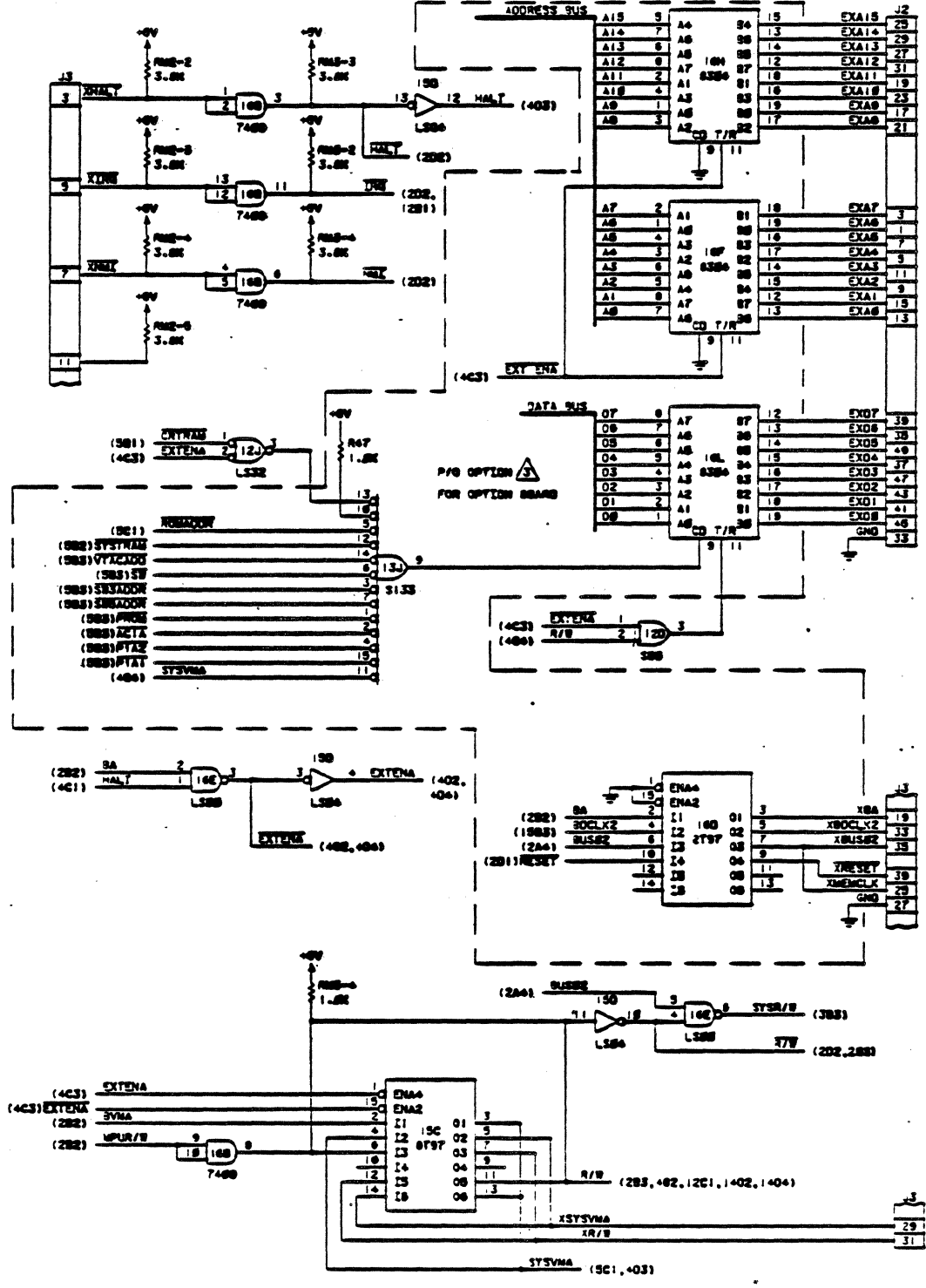
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 AIRBUS AND AIRBUS INDUSTRIES, THIS SHEET IS  
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SIZE: C  
 FSCM NO: 98438  
 DWG NO: 129813  
 LTR: A  
 SHEET 3

17248-2

REVISIONS  
DATE APPROVED

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FORM NO. 129813

SIZE C 9843B

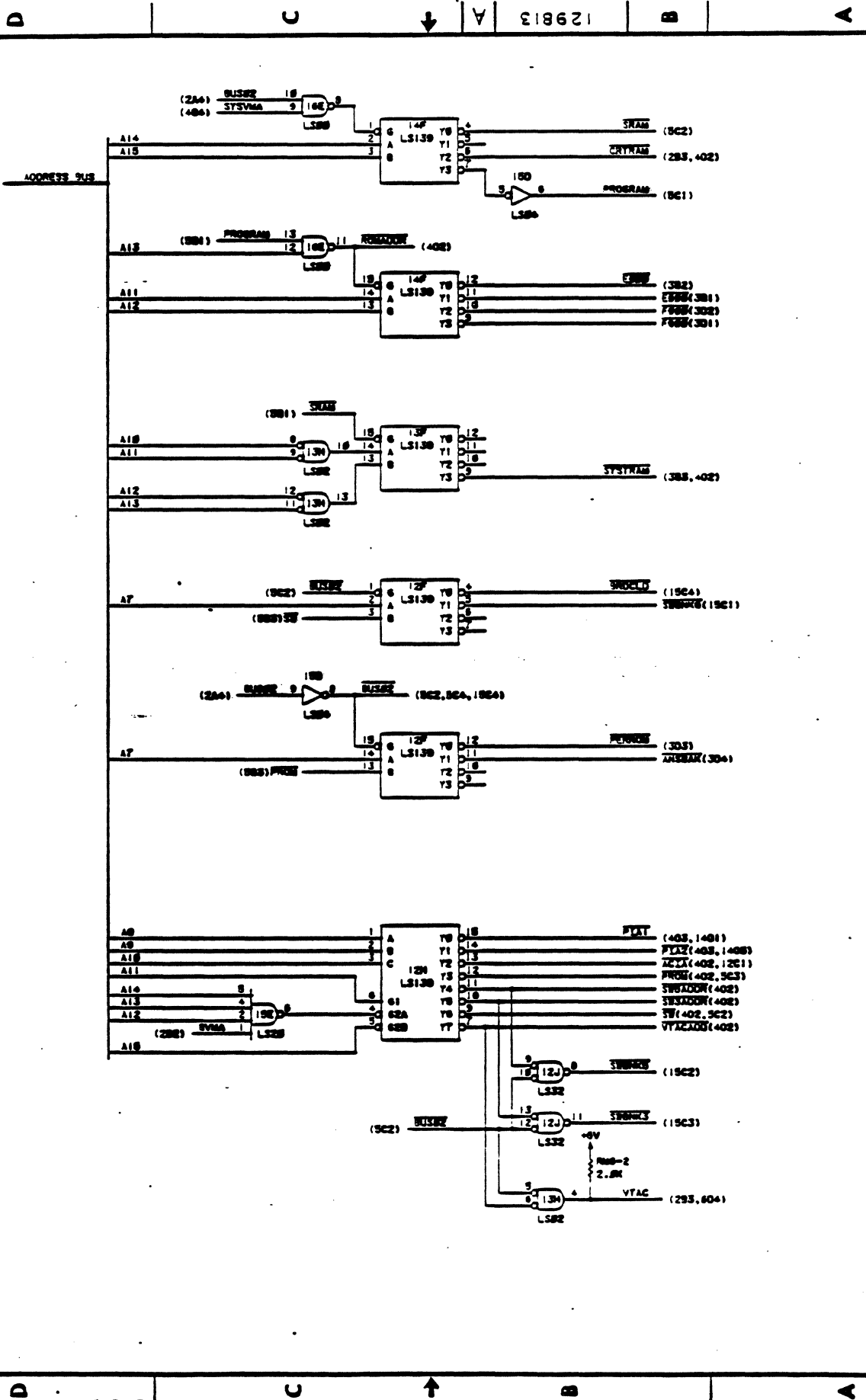
DWG NO. 129813

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DATE	APPROVED
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LTR	A
DWG NO	129813
FSCM NO	98438
SIZE	C

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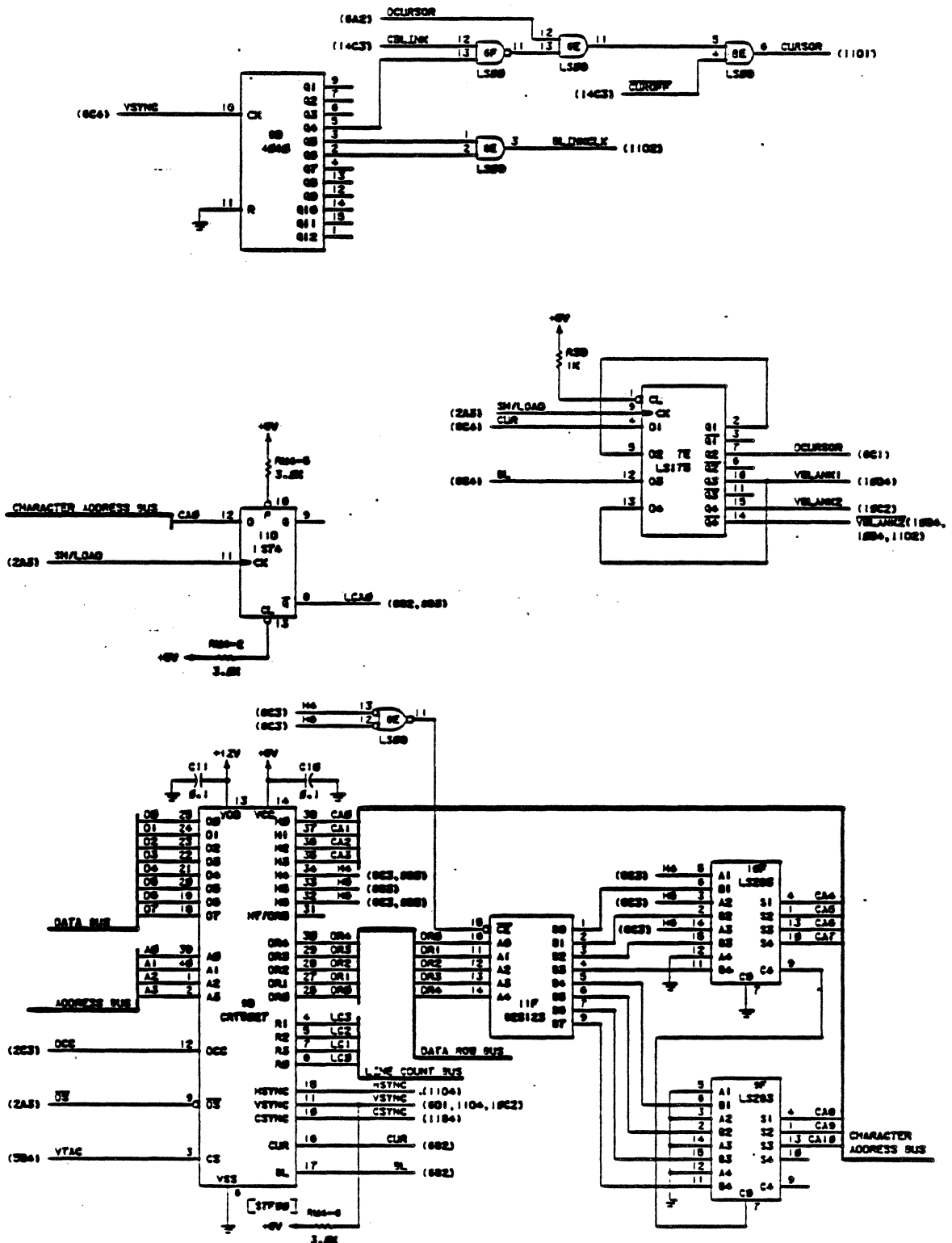
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REVISIONS DESCRIPTION		
SMT ZONE LTR		

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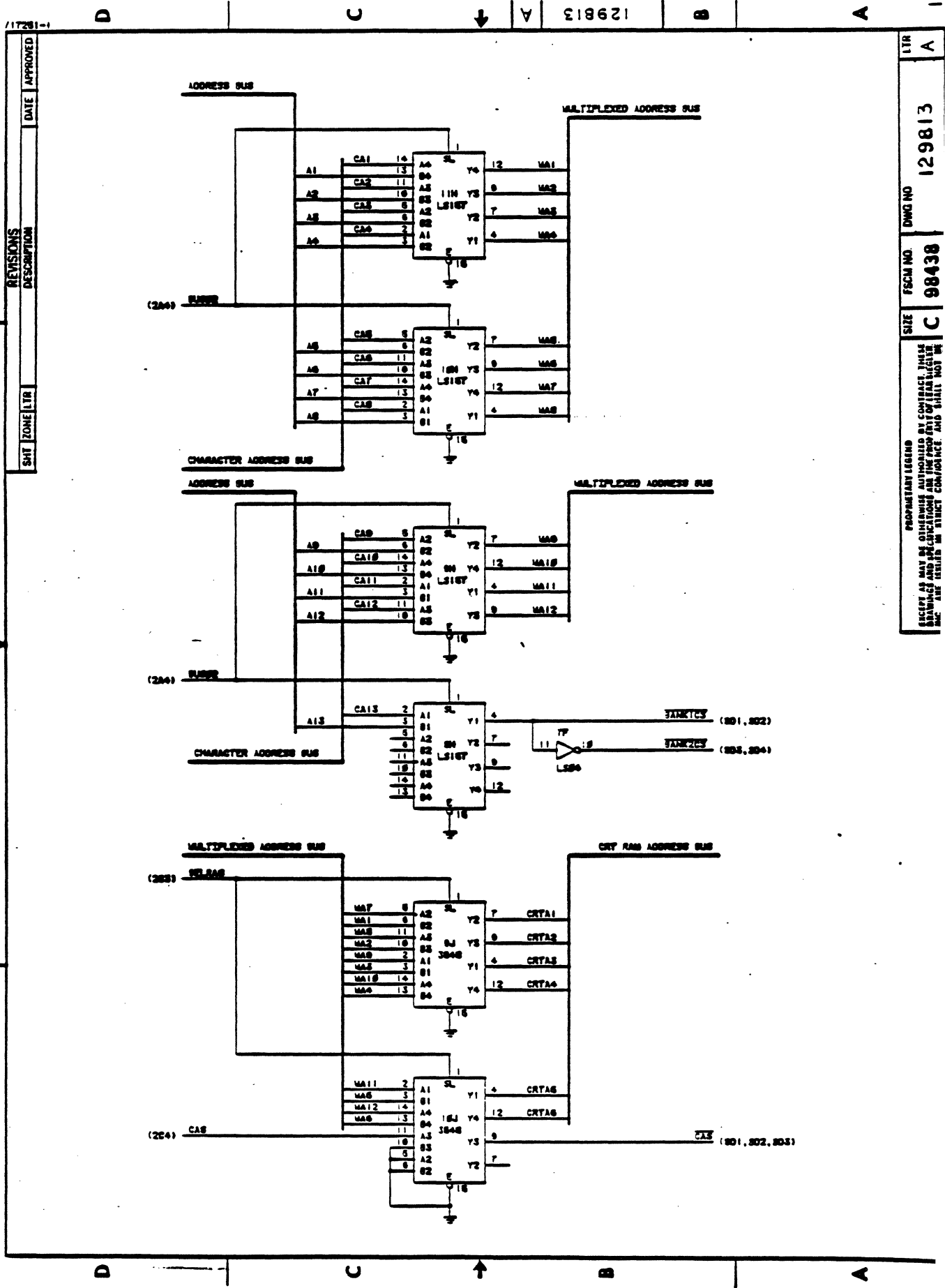
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129813  
 98438  
 129813  
 FSCM NO. DWG NO. SIZE C  
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 THIS DOCUMENT IS UNCLASSIFIED BY CONTRACT DATA  
 REPORT NUMBER AND IS AVAILABLE TO THE PUBLIC  
 WITHOUT LIMITATION IN STRICT CONFIDENCE AND SHALL NOT BE





REV. NO.	DATE	APPROVED
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LTR	DWG NO	FSCM NO	SIZE
A	129813	98438	C

PROPRIETARY LEGEND  
EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT, THESE DRAWINGS ARE UNCLASSIFIED AND SHALL NOT BE RELEASED UNDER E.O. 12958

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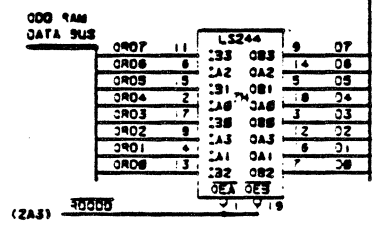
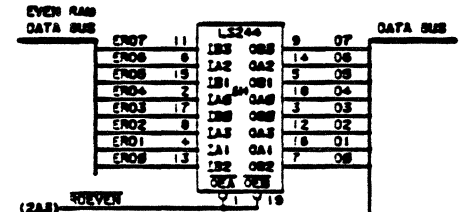
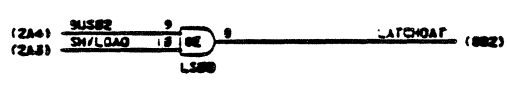
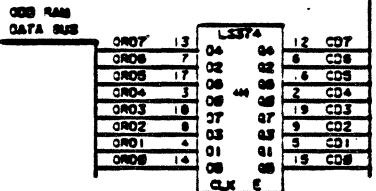
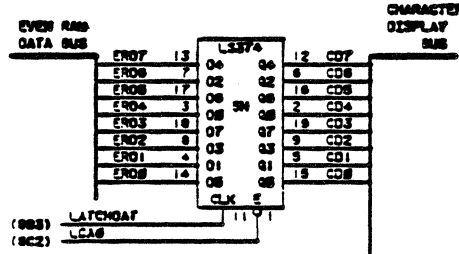
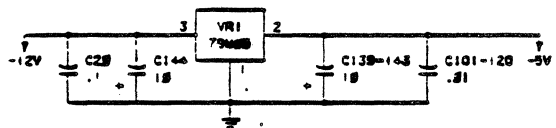
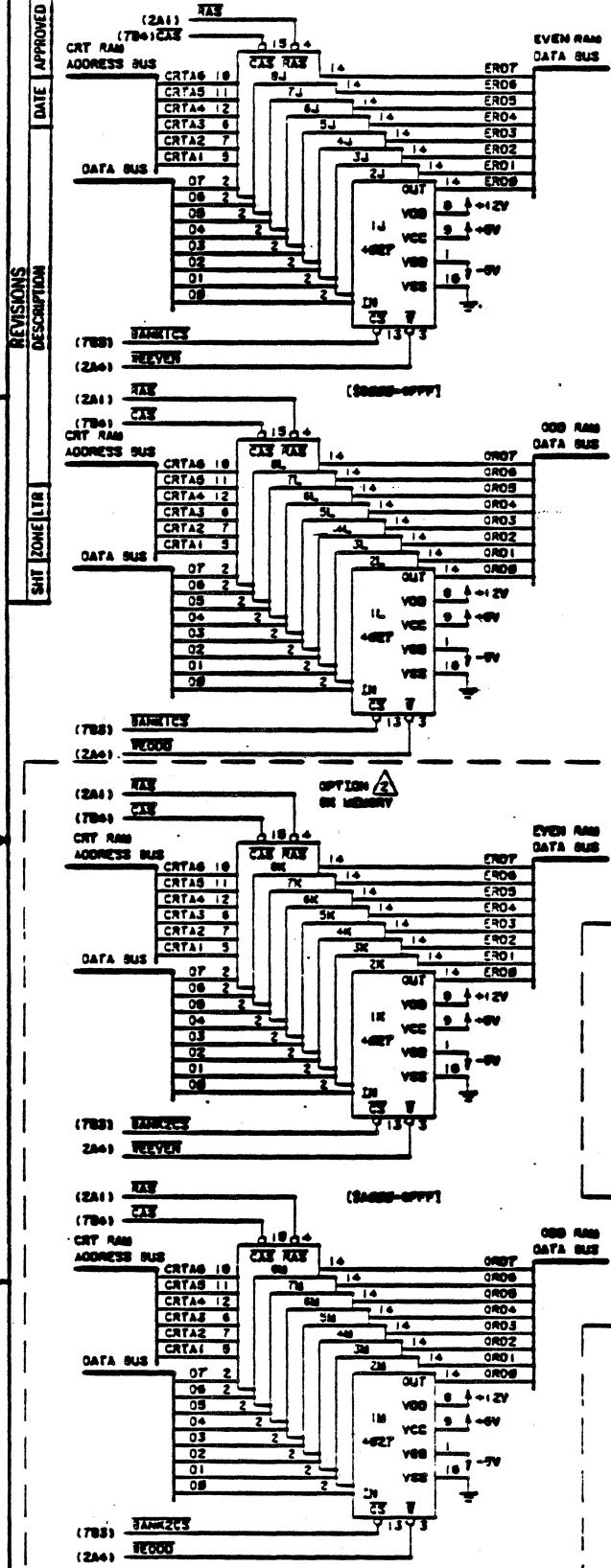
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REVISIONS  
DATE APPROVED  
DESCRIPTION  
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129813

DWG NO. 129813

FSCM NO. 00000

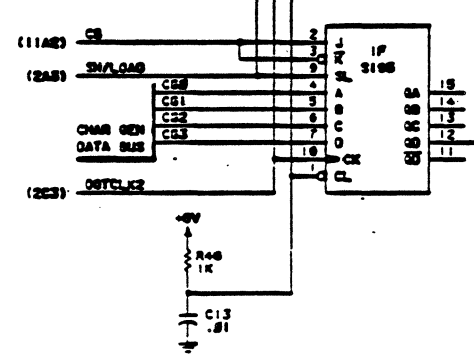
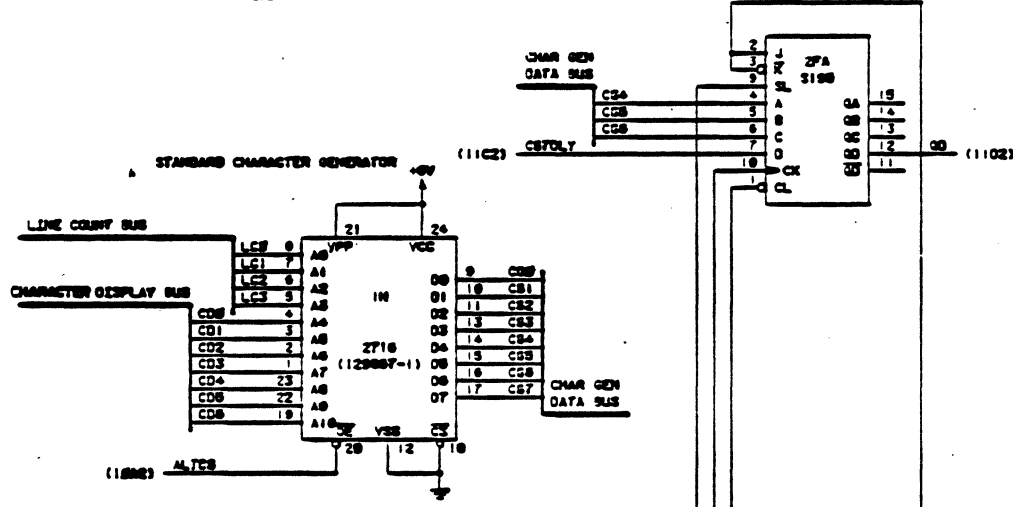
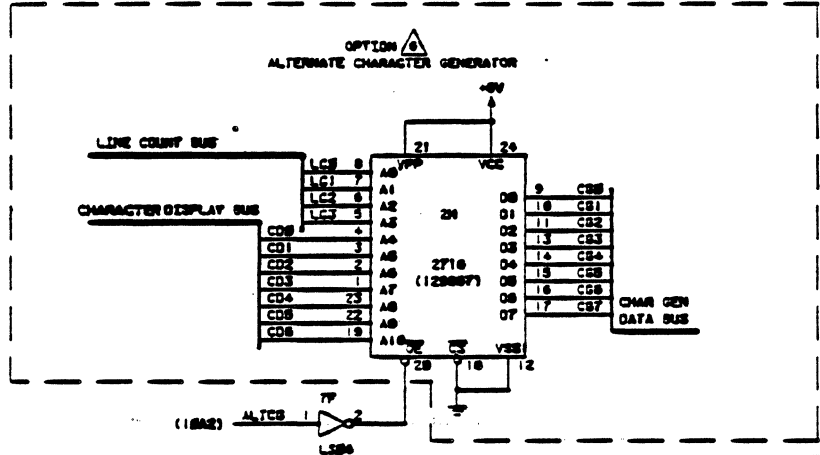
SIZE C

PROPRIETARY LEGEND  
EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT, THESE  
DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF THE COMPANY

LTR A

1723-2	DATE APPROVED
SHT ZONE LTR	DESCRIPTION

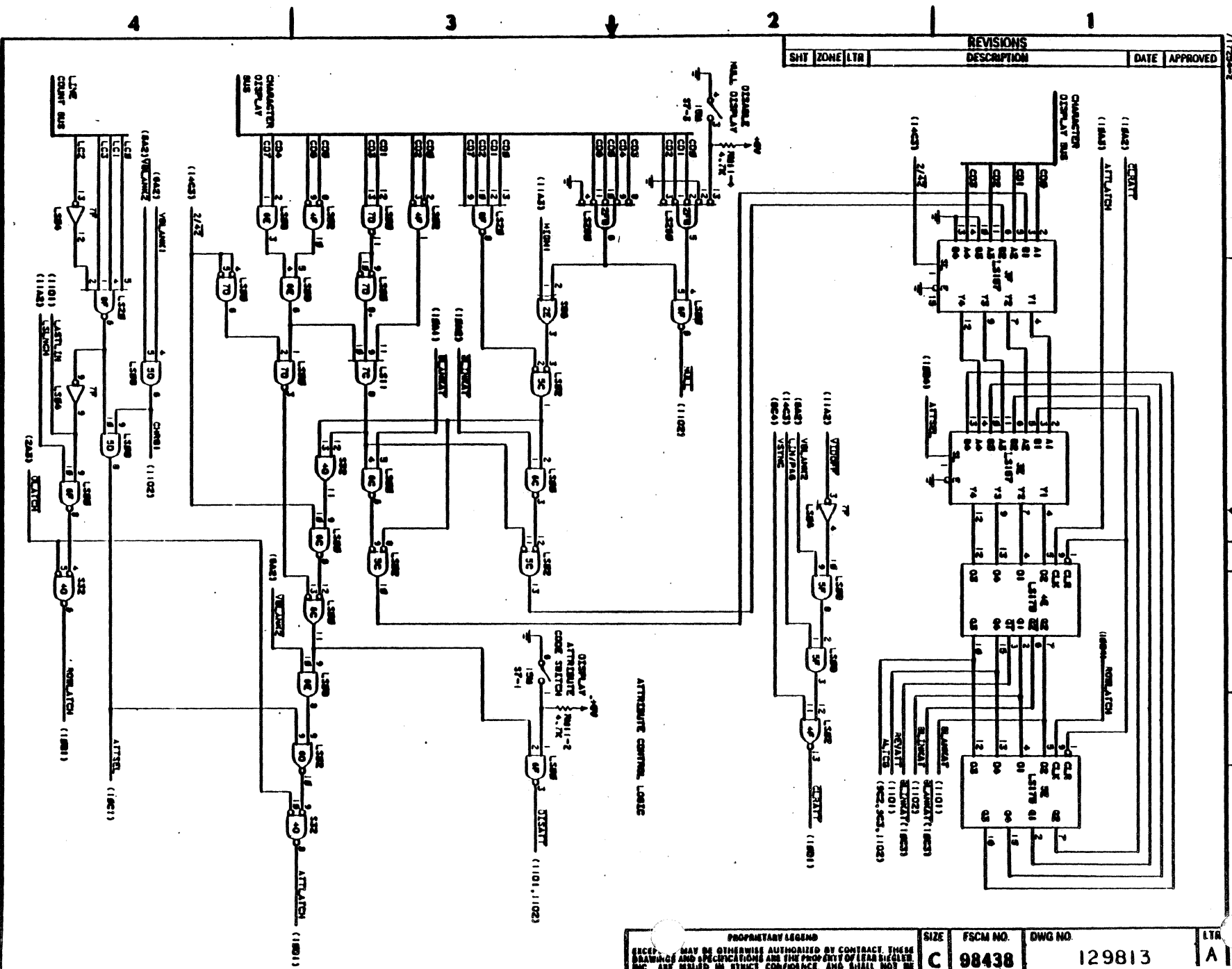
1  
2  
3  
4



LTR	DWG NO.	SIZE	FSCM NO.	LTR
A	129813	C	98438	A

PROPRIETARY LEGEND  
EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT, THESE DRAWINGS SHALL BE STRICTLY CONFIDENTIAL AND SHALL NOT BE

REVISIONS			DATE	APPROVED
SHT	ZONE	LTR	DESCRIPTION	



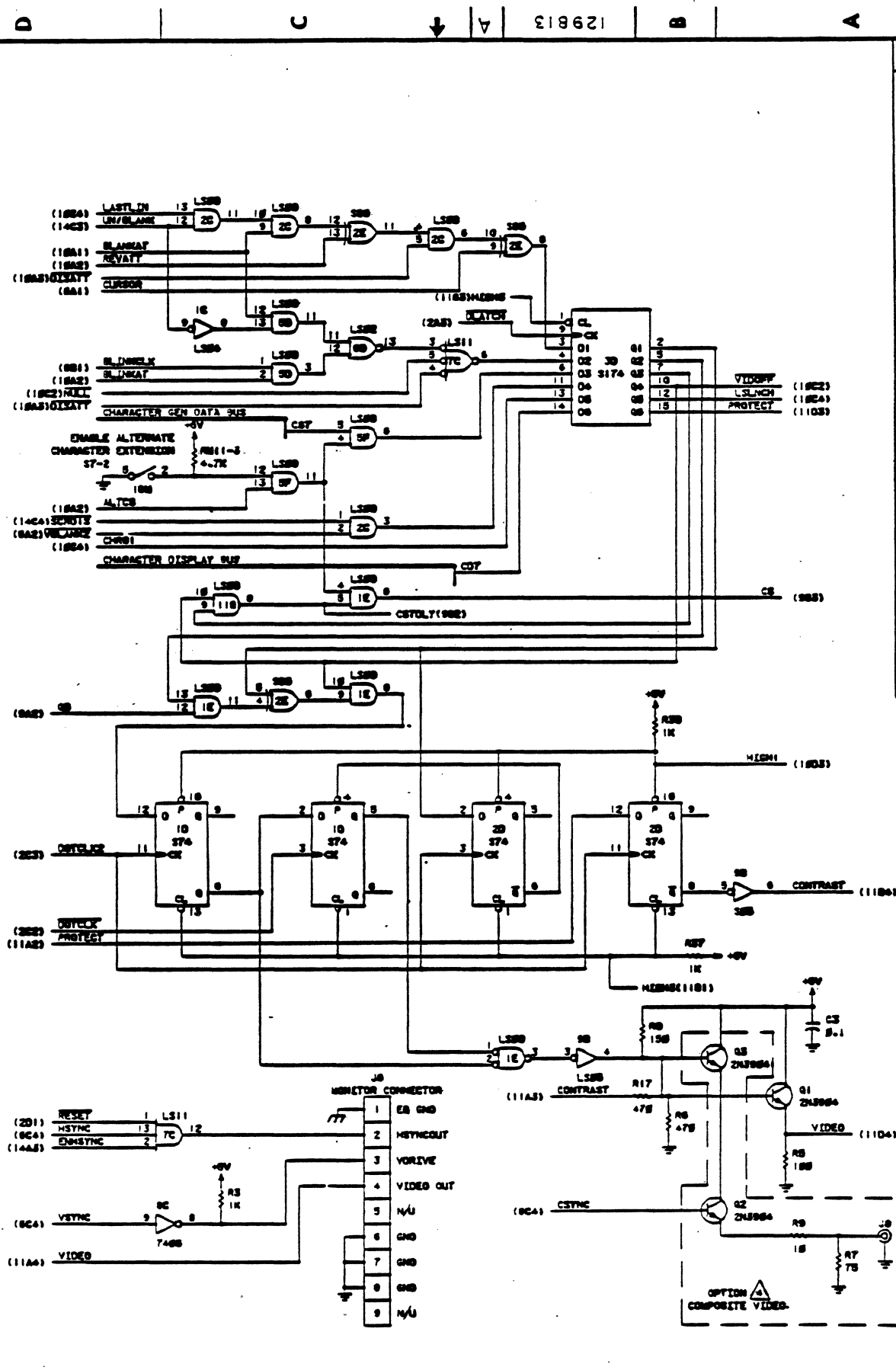
REV. NO.	DESCRIPTION	DATE	APPROVED
1			

SMT	ZONE	LTR

REV. NO.	DESCRIPTION	DATE	APPROVED
2			

REV. NO.	DESCRIPTION	DATE	APPROVED
3			

REV. NO.	DESCRIPTION	DATE	APPROVED
4			



REV. NO.	DESCRIPTION	DATE	APPROVED
1			

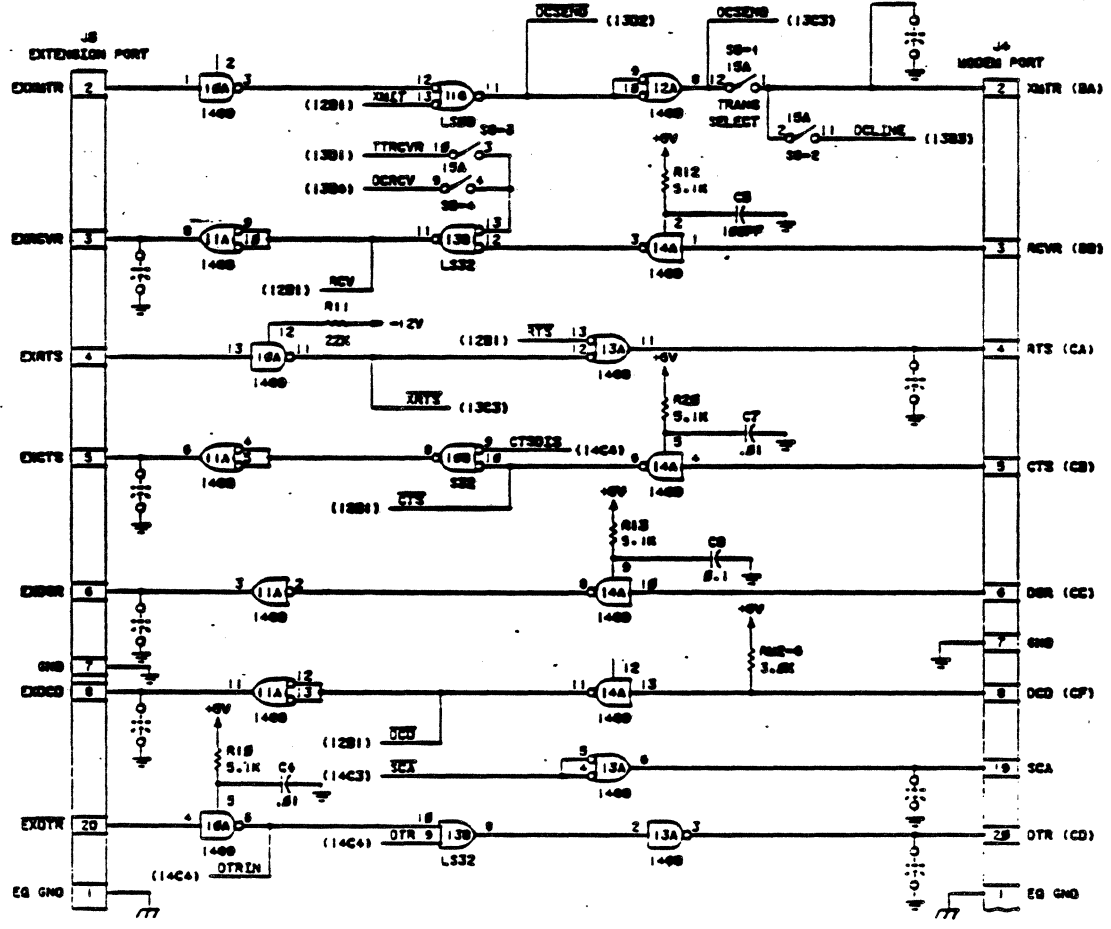
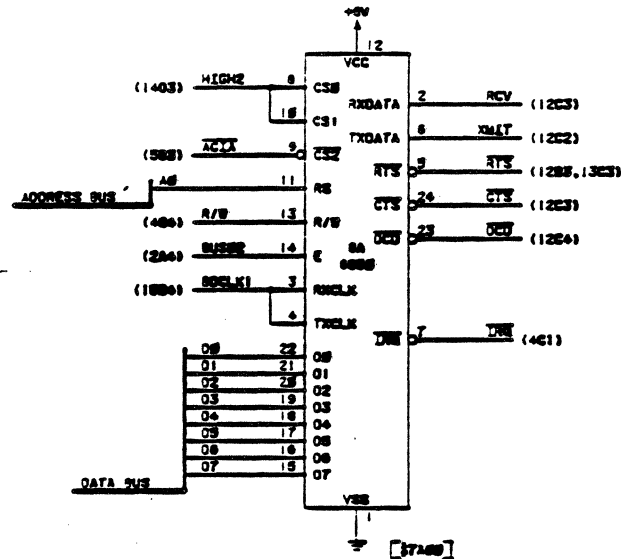
REV. NO.	DESCRIPTION	DATE	APPROVED
2			

PROPRIETARY LEGEND  
 EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT, THESE  
 DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF LITTON  
 INC. AND SHALL BE KEPT IN STRICT CONFIDENCE. THIS DOCUMENT  
 IS UNCLASSIFIED BY DATE 08/20/2013 FOR THE REASON THAT IT IS  
 NOT A TECHNICAL DRAWING.

SIZE C 98438  
 FSCN NO 129813  
 DWG NO 129813  
 LTR 1

REV	DATE	APPROVED
1		
2		
3		
4		

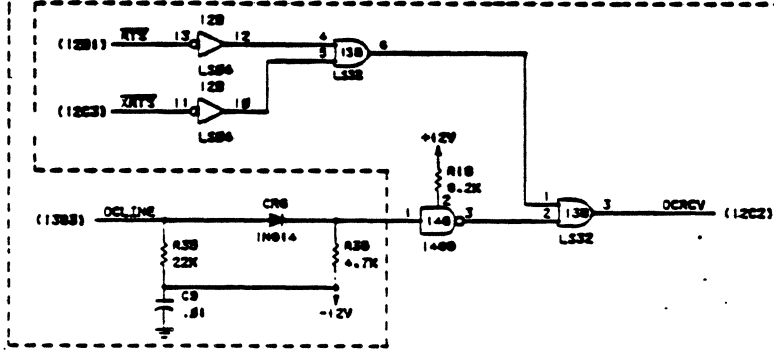
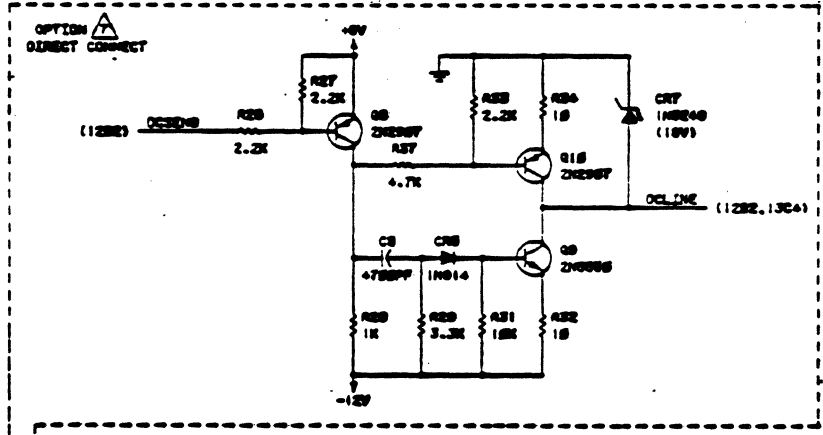
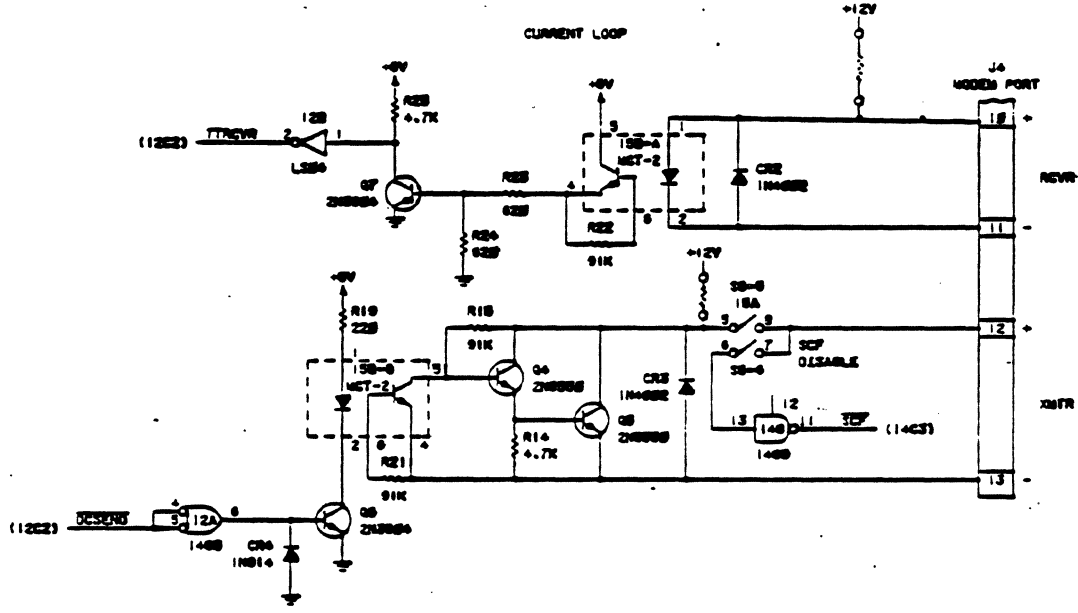
REVISIONS	DESCRIPTION
1	
2	
3	
4	



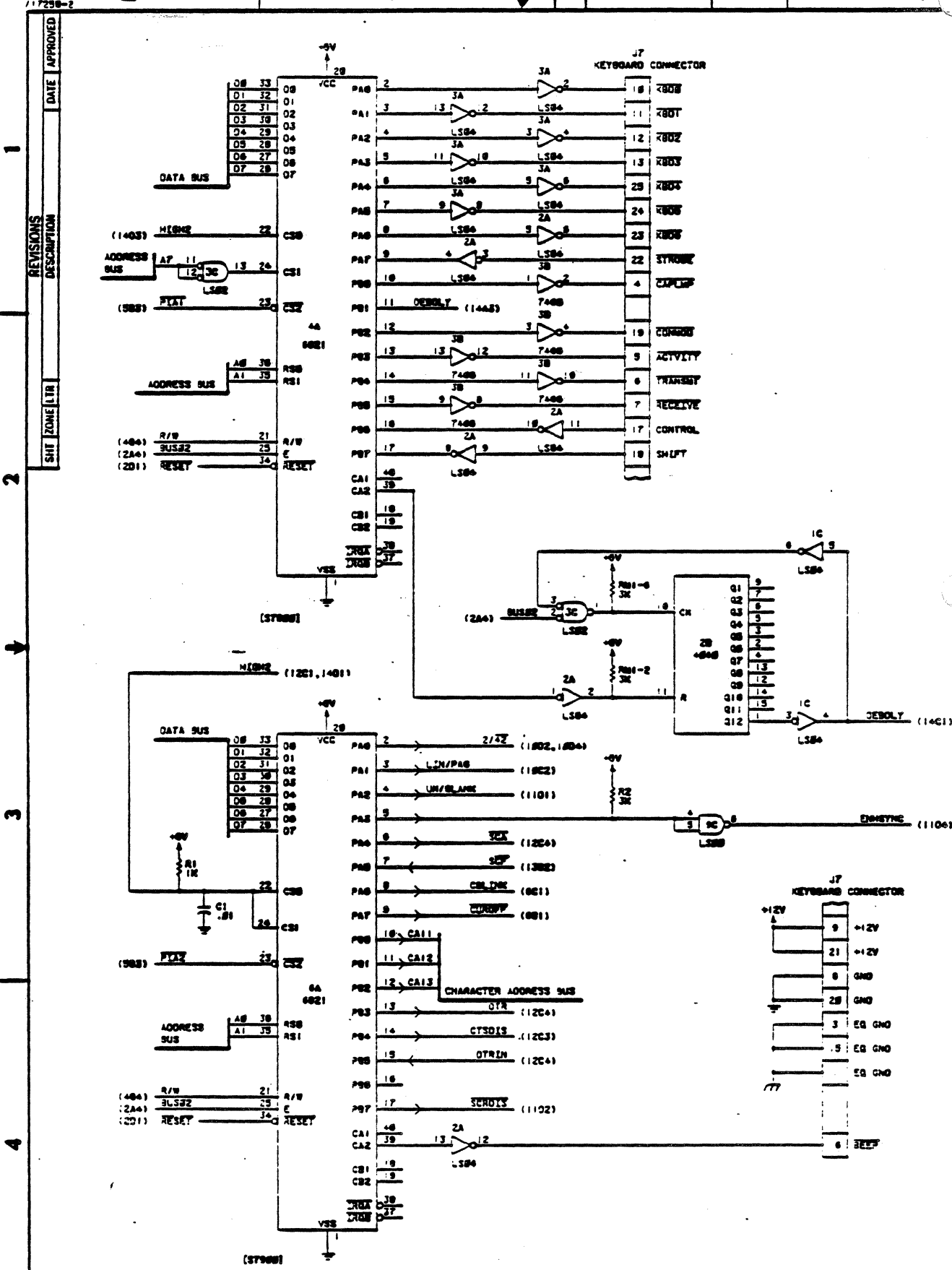
129813  
 DATE APPROVED  
 SAT ZONE LTR  
 REVISIONS DESCRIPTION  
 SIZE FSCM NO. DWG NO. 129813  
 C 98438  
 PROPRIETARY LEGEND  
 THIS DOCUMENT IS UNCLASSIFIED  
 EXCEPT WHERE SHOWN OTHERWISE  
 DATE 10-12-2011 BY 60322 UCBAW/BJS/STP

REVISIONS	DATE	APPROVED
DESCRIPTION		
SHIFT ZONE (LTR)		

1  
2  
3  
4



LTR	A
DWG NO.	219813
FSCM NO.	98438
SIZE	C
PROPRIETARY LEGEND EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF LEAR ELECTRIC CORPORATION AND ARE NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.	



REV	DATE	APPROVED	DESCRIPTION
1			
2			
3			
4			

1  
2  
3  
4

DATE APPROVED  
DESCRIPTION  
SITE ZONE LTR  
REVISIONS

PROPRIETARY LEGEND  
UNLESS OTHERWISE AUTHORIZED BY CONTRACT, ALL RIGHTS RESERVED  
NO PART OF THIS DOCUMENT IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.

SIZE: FSCM NO. 9843B  
DWG. NO. 129813  
LITERATURE 1-A





1  
2  
3  
4

REV. NO.	DESCRIPTION	DATE	APPROVED

**J1 POWER**

PIN NO.	FUNCTION	REF
1	GND	1503
2	N/U	
3	+12V	1504
4	-12V	1504
5	GND	1504
6	KEY	1504
7	+6V	1504
8	GND	1504
9	EQ. GND	1504

**J2 ADDRESS/DATA BUS**

PIN NO.	FUNCTION	REF
1	A6	4A1
3	A7	4A1
5	A4	4A2
7	A8	4A2
9	A2	4A2
11	A3	4A2
13	A6	4A2
15	A1	4A2
17	A9	4A1
19	A11	4A1
21	A8	4A1
23	A16	4A1
25	A16	4A1
27	A13	4A1
29	A14	4A1
31	A12	4A1
33	GND	4A2
35	D6	4A2
37	D4	4A2
39	D7	4A2
41	D1	4A2
43	D2	4A2
45	D8	4A2
47	D3	4A2
49	D5	4A2
EVEN	GND	

**J3 CONTROL SIGNALS**

PIN NO.	FUNCTION	REF
1	N/U	
3	HALT	401
5	IRQ	401
7	MEM	402
9	N/U	
11	↑	
13	↓	
15	N/U	
17	GND	
19	BA	4A3
21	N/U	
23	N/U	
25	MEMCLK	4A3
27	GND	4A3
29	STVMA	4A4
31	R/W	4A4
33	N/U	
35	BUSPZ	4A3
37	N/U	
39	RESET	4A3
41	N/U	
43	GND	
45	GND	
47	GND	
49	GND	
EVEN	GND	

**J4 MODEM**

PIN NO.	FUNCTION	REF
1	EQ GND	12A4
2	XMTR (BA)	12A2
3	RCVR (BB)	12A3
4	RTS (CA)	12A3
5	CTS (CB)	12A3
6	DSR (CC)	12A3
7	GND	12A3
8	DCD (CF)	12A4
9	N/U	
10	CL RCVR+	13A1
11	CL RCVR-	13A1
12	CL XMTR+	13A2
13	CL XMTR-	13A2
14	N/U	
15	↑	
16	↓	
17	N/U	
18	SCA	
19	↓	
20	DTR (CD)	12A4
21	N/U	
22	↑	
23	↓	
24	↓	
25	N/U	

**J5 EXTENSION**

PIN NO.	FUNCTION	REF
1	EQ. GND	1204
2	XMTR (BA)	1202
3	RCVR (BB)	1203
4	RTS (CA)	1203
5	CTS (CB)	1203
6	DSR (CC)	1203
7	GND	1203
8	DCD (CF)	1204
9	N/U	
10	↑	
11	↓	
12	↓	
13	↓	
14	↓	
15	↓	
16	↓	
17	↓	
18	↓	
19	N/U	
20	DTR (CD)	1204
21	N/U	
22	↑	
23	↓	
24	↓	
25	N/U	

**J6 MONITOR**

PIN NO.	FUNCTION	REF
1	EQ. GND	11C4
2	H SYNC	11C4
3	V SYNC	11C4
4	VIDEO	11C4
5	N/U	11C4
6	GND	11C4
7	GND	11C4
8	GND	11C4
9	N/U	11C4

**J7 KEYBOARD**

PIN NO.	FUNCTION	REF
1	EQ. GND	14A4
2	N/U	
3	EQ. GND	14A4
4	CARLMP	14B1
5	ACTIVITY	14B2
6	TRANSMIT	14B2
7	RECEIVE	14B2
8	GND	14A3
9	+12V	14A3
10	KB01	14B1
11	KB01	14B1
12	KB02	14B1
13	KB03	14B1
14	N/U	
15	EQ. GND	14A4
16	BEEP	14A4
17	CONTROL	14B2
18	SHIFT	14B2
19	CONN00	14B2
20	GND	14A4
21	+12V	14A3
22	STROBE	14B1
23	KB06	14B1
24	KB05	14B1
25	KB04	14B1

**J8 COMPOSITE VIDEO (OPT.)**


PIN NO.	FUNCTION	REF
1	VIDEO	11A4

129813  
 DWG NO.  
 FSCM NO. 00030  
 SIZE C  
 PROPRIETARY LEGEND  
 SUBJECT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF IBM CORPORATION

REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		INC. DCN 537, ADD SH. 4. <i>W. Kelly</i> 2-22-80 ADDED LSI PIN'S ON SHEET 2, PARTS LIST	3-4-80 3/6/80	<i>W. Kelly</i> <i>B. Hyman</i>

-11	129542	
-1	129841	DL129810
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 .XX ± .03 .XXX ± .010 ANGLES ± 0.5° MACH. FIN. J	DR <i>W. Kelly</i> 7-2-79	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.	CABLE ASSY - KEYBOARD		
	CHK				
	DSGN				
	ENGR				
	PROJ <i>W. Kelly</i> 8-8-79	SIZE <b>A</b>		CODE IDENT <b>98438</b>	REV <b>A</b>
	REL <i>B. Hyman</i> 9/13/79	<b>129817</b>			
CUSTOMER APPD	SCALE	SHEET 1 OF 4			

FORM 10-1008



FIND NO.	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-11	-1				
1		✓		129817 -1	CABLE ASSY (48)	
2		✓		129817 -11	CABLE ASSY (96)	
3						
4						
5		1 1		809058	PLUG, HOUSING	
6		1 1		809078	CABLE CLAMP	
7		22 22		809079	CONTACT, PIN, 24-28	
8		1 1		809262	HOUSING	
9		22 22		809083	CONTACT, 2759T, 22-30	
10		1 1		809047	KEY, POLARIZING	
11						
12		A/R A/R		129726 -1	CABLE	
13						
14			2	129948-9	MARKER, CABLE	
15		2		129948-19	MARKER, CABLE	
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

SIZE A  
 FSCM NO. 98438  
 SH 129817  
 2  
 REV A



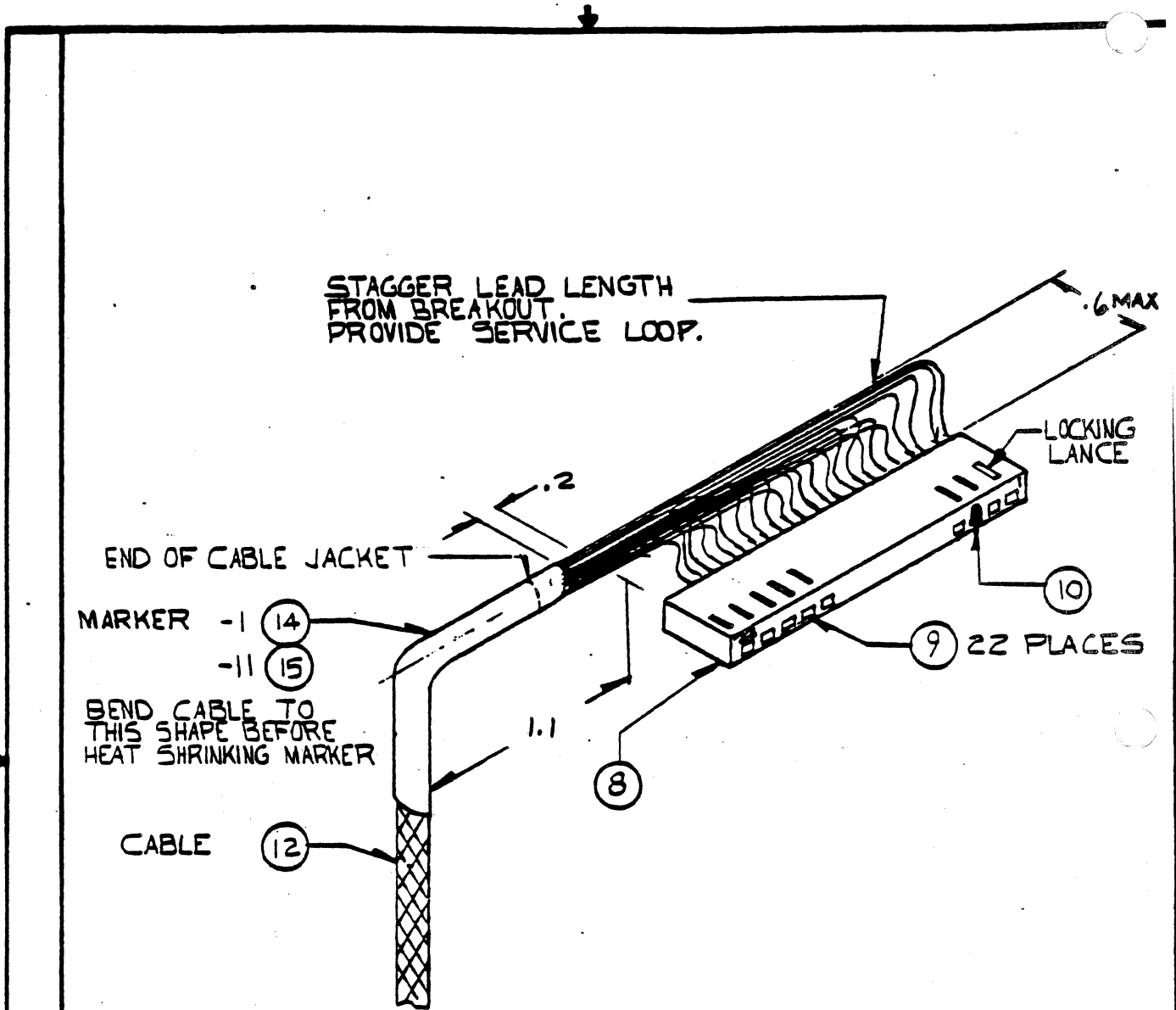
LINE NO.	TERMINATION INFORMATION						WIRE INFORMATION				ROUTING	LGTH	
	CABLE NO. -/ (-11)	WIRE NO. OR COLOR	TCU FROM		KBD TO		FIND NO./NOTES						
			REF DES	PIN	REF DES	PIN	FROM END		TO END				WIRE OR CABLE
							CONN	TERMINATION	CONN	TERMINATION			
1													
2													
3		WH/BK/PA	P7	3	PI	2		7		9			
4		VIO		4		8							
5		WH/BK/RO		5		11							
6		BLU		6		10							
7		WH/BK/BR		7		9							
8		WH/GY		8		12							
9		GRN		9		6							
10		WH/VIO		10		22							
11		WH/BLU		11		21	5,		8,		12		
12		YEL		12		20	6,		14				
13		WH/GRN		13		19	14	7	△	9			
14		—		—		3	△	—	△	10			
15		GRY		15		1	△	7		9			
16		BLK		16		7							
17		WHT		17		15							
18		WH/BLK		18		14							
19		BRN		19		23							
20		WH/BRN		20		4							
21		WH/RD		21		5							
22		RED		22		18							
23		WH/ORG		23		17							
24		ORG		24		16							
25		WH/YEL	P7	25	PI	13		7		9			

CODE NOTES: △ STRIP OUTER JACKET 2 INCH  
 △ STRIP OUTER JACKET 1 INCH.  
 △ FAN PI PER DETAIL 1  
 △ MARKER, F/N 14, SHALL EXTEND INTO CABLE CLAMP, F/N 6.

7-0001d (7-4)

SIZE	CODE IDENT		REV
A	98438	129817	A
SCALE		SHEET	3

48(-1), 96(-11)



DETAIL I

Form 910-1011a

SIZE <b>A</b>	CODE IDENT <b>98438</b>	<b>129817</b>	REV ○
SCALE —		SHEET <b>4</b>	








**REVISIONS**

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		INC. ADCN 1 THRU 7 <i>FIN 71 QTY 3 was 2</i> <i>DELETE LV 129486-3 SPACES ADDED SMT 6 TESTS 10-23-78</i>	<i>11-15-78</i> <i>11-15-78</i>	<i>W. Kelly</i> <i>R. A. Albright</i>
B		INC ADCN 8-21. DCN 434, 458 & 520. <i>RM - 4-11-80</i>	<i>4-11-80</i> <i>4-17-80</i>	<i>W. Kelly</i> <i>B. Hodgson</i>
C		INC DCN 562 <i>RM 4-11-80</i>	<i>4-11-80</i> <i>4-17-80</i>	<i>W. Kelly</i> <i>B. Hodgson</i>
D		INC DCN 454 <i>RM 4-11-80</i>	<i>4-11-80</i> <i>4-17-80</i>	<i>W. Kelly</i> <i>B. Hodgson</i>

-1	129840	DU129810
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 XX ± .03 XXX ± .010 ANGLES ± 0.5° MACH. FIN. J	DR <i>W. Kelly 4/24/78</i>	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.	
	CHK		
	DSGN	P.C. BOARD ASSY - ADM 42	
	ENGR	LOGIC	
	PROJ <i>B. Hodgson - 9/21/78</i>		
REL <i>H. Turner 5/3/78</i>	SIZE <b>A</b>	CODE IDENT <b>98438</b>	REV <b>D</b>
CUSTOMER APPD	SCALE		SHEET 1 OF 6

FORM 10-1038

FIND NO.	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-//	-/				
1		✓		-1	P.C. BOARD ASSY - ADM42 LOGIC	
2		✓		-11	" " " " " "	
3						
4						
5		1		-5	PRINTED WIRING BOARD	
6		1		-7	" " "	
7		1	1	129746-121	CLOSURE	
8		1	1	129762-3	OSC	
9		1	1	811016 800A-5.0688 MHZ	CRYSTAL	STANDARD CRYSTAL
10		8	8	129473-3	JACK SOCKET	
11		3	3	809017 206584-1	CONN, 25 PIN	AMP
12		1	1	804048 8125AV2	SWITCH	C & K
13						
14		1	1	804017 212794	SWITCH	EECO
15						
16		1	1	809106 09-75-1091	CONN	MOLEX
17		1	1	804060 435640-5	SWITCH, 8 POS	AMP
18		1	1	435640-3	SWITCH, 5 POS	AMP
19		1	1	435640-2	SWITCH, 4 POS	AMP
20		2	2	819046 785-1-R4.7K	RESISTOR MODULE 4.7K	BECKMAN
21		1	1	809185 207084-2	CONN, 9 PIN	AMP <sup>205204-1</sup> <sub>17-1370</sub>
22		1	1	129476-472	RESISTOR MODULE, 4.7K	
23		3	3	129476-302	RESISTOR MODULE 3K	
24						
		REF	REF	129831	SCHEMATIC	

SIZE A  
 FSCM NO. 98438  
 SH PL129830  
 2  
 REV D



FIND NO.	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	/	-				
26	1	1		129467-02	LS TYPE	
27	7	7		-04		
28	6	6		-08		
29	2	1		-09		
30	1	1		-10		
31	2	2		-11		
32	1	1		-20		
33						
34	2	2		-30		
35	5	5		-32		
36	3	4		-74	LS74	
37	1	1		-86		
38	2	2		-161		
39	1	1		-174		
40	7	7		-175		
41	2	2		-283		
42	1			129826-00	IC TYPE 74S00	IE
43	1	1		129826-05	S TYPE	
44	1	1		-10		
45	1	1		-11		
46	1	1		-37		
47	2	1		-74	S74	
48	1	1		-130		
49	1	1		-139		
50	6	6		-157		

SIZE **A**  
 FSCM NO. **98438**  
 SH **P129830**  
 REV **D**





FIND NO.	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
		-1 -1				
51		1		128348-00		
52		1		-06		
53		1		-154		
54		1		-166		
55		3		-1488		
56		2		-1489		
57		2		-3648		
58		1		-8116		
59		1		-5027		
60		12		-8T28		
61		8		-8T95		
62		1		-555		
63		1		-21		
64		1		128348-79M05		
65		1		129824-6800		
66		2		-6821		
67		1		-6850		
68		1		-6875		
69		1		129867-1	CH GEN	
70		2		129498-01	OPT ISOLATOR	
71		4		129827-00	2716 PROM	
72						
73		1		129753-05	PROM ADDR TRANS	
74		8		129466-4027	RAM	
75		8		128348-2107A		

SIZE A  
 FSCM NO. 98438  
 SH PL129830  
 REV D





FIND NO.	QTY REQD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	/	-				
76	1	1	808005	1N4002	DIODE	
77	2	2	808042	1N914	DIODE	
78	3	3	810001	2N3904	TRANSISTOR	
79	2	2	810004	2N5550	TRANSISTOR	
80						
81	1	1		129875-104	CAP. .1uF 5%	
82	34	29		129876-103	CAP .01UF	
83	13	13		129876-104	.1UF	
84	2	2		128518-225	2.2UF	
85	20	19		129469-106	10UF	
86	3	2		128518-106	10UF	
87	1	1		129468-4751	4.7UF, 25V	
88	1	1		129885-1822	RES, 18.2K 1%	
89	5	5		128533-150	RES, 15	
90	1	1		-241	240	
91	2	2		-471	470	
92	2	2		-621	620	
93	9	9		-102	1K	
94	6	6		-472	4.7K	
95	4	4		-512	5.1K	
96	1	1		-113	11K	
97	3	3		-913	91K	
98						
99	3	2		-101	100	
100	1	1		-151	150	

SIZE A  
 FSCM NO. 98438  
 SH PL129830  
 REV D





FIND NO.	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	//	-/				
101						
102	1	1		129747-3	SPACER, P.C. BOARD	
103	1	1	839012	7717-5 DAP	INSULATOR	THERMALLOY
104						
105	39	13	802031	640358-3	SOCKET 16 PIN	AMP
106	1	1	802032	640359-3	SOCKET 18 PIN	"
107	2	3	802030	640357-3	SOCKET, 14 PIN	"
108	7	7	802033	640361-3	SOCKET, 24 PIN	"
109	4	4	802034	640379-3	SOCKET, 40 PIN	"
110						
111						
112						
113						
114						
115						
116						
117						
118						
119						
120						
121						
122						
123						
124						
125						

SIZE **A**  
 FSCM NO. **98438**  
 SH **P/129830**  
 REV **D**



REVISIONS

SHT	ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A		RELEASED PER DCN	10/2/80	[Signature]
	B		INC. DCN 685	2-27-81	[Signature]

**STANDARD PWB 129830-7**

**O1C**  
S1 - VIDEO ATTRIBUTES

UNDERLINE  
 DSNLY ATTRIBUTE AS SPACE  
 GRAPHICS ENABLED  
 DSNLY MAIL AS SPACE

BLANK ATTRIBUTE  
 DSNLY ATTRIBUTE CODE  
 GRAPHICS DISABLED  
 DSNLY MAIL AS MAIL

**O14C**  
S6 - CURR LOOP/SECONDARY CHAN

CURR LOOP AND SECONDARY CHAN CTRL  
 EXTERNAL TRISTATE BUS ENA  
 DATA BUS ENABLE CTRL

CURR LOOP AND SECONDARY CHAN CTRL  
 EXTERNAL TRISTATE BUS ENA  
 DATA BUS ENABLE CTRL

S6-1	S6-2	S6-4	S6-5	FUNCTION
ON	OFF			CURR LOOP ENABLED
OFF	ON			SECONDARY CHAN ENABLED
OFF	OFF			CURR LOOP AND SECONDARY CHAN DISABLED
ON	ON			MAY CAUSE DAMAGE TO UNIT
		OFF	ON	INTERNAL DATA BUS ENABLED
		ON	OFF	INTERNAL DATA BUS ENABLED
		OFF	OFF	NOT DEFINED
		ON	ON	MAY CAUSE DAMAGE TO UNIT

**OPTION PWB 129832-5**

**S8-2 S8-3** FUNCTION

ON	ON	PIN 10 BUSY LOW
ON	OFF	PIN 10 BUSY HIGH
OFF	ON	NOT ALLOWED
OFF	OFF	BUSY NOT ACTIVE*

\*UNIT SERVES PRINTER AS NEVER BUSY

**O4A**  
S8 - PRINTER BUSY

PIN 20 CTRL DSA  
 PIN 10 BUSY CTRL

PIN 20 CTRL ENA  
 PIN 10 BUSY CTRL

**S8** SERIAL PRINTER CMD FORMAT  
**S2** SYNC/ASYNC MODE  
**S3** 1ST POLLING ADDRESS  
**S4** 2ND POLLING ADDRESS

PARALLEL WITH ENA  
 DSNLY PRINTER  
 ENA QUALITY  
 1 STOP BIT  
 8 DATA BITS  
 1 STOP BIT  
 8 DATA BITS  
 1 STOP BIT  
 8 DATA BITS  
 1 STOP BIT  
 8 DATA BITS  
 1 STOP BIT  
 8 DATA BITS  
 1 STOP BIT  
 8 DATA BITS

ASYNC ENA  
 SYNC ENA  
 1ST POLLING ENA  
 2ND POLLING ENA  
 ENA POLLING ENA  
 ENA POLLING ENA

**S5** 1ST GROUP POLL ADDR  
**S6** 2ND GROUP POLL ADDR  
**S7** GROUP SELECT ADDR

LOGIC ZERO BITS  
 LOGIC ONE BITS  
 LOGIC ZERO BITS  
 LOGIC ONE BITS  
 LOGIC ZERO BITS  
 LOGIC ONE BITS

**BAUD RATE**

PRINTER	MODEM
11	11
15	15

(STD DEFAULT SETTING)

BAUD RATE	SWITCH POSITION
50	0
75	1
110	2
134.5	3
150	4
300	5
600	6
1200	7
1800	8
2400	9
2400	10
3600	11
4800	12
7200	13
9600	14
I	15

THE LOCATIONS AND FACTORY SETTINGS OF THE CONFIGURATION CONTROL SWITCHES SHOWN APPLY TO:  
 PRINTED WIRING BOARD 129830-7  
 OPTIONAL PRINTED WIRING BOARD 129832-5  
 IF YOU NEED TO MAKE CHANGES, PLEASE REFER TO THE OPERATORS MANUAL.

NOTES:  
 1. Switch Position ON - Closed - Logical 0  
 2. Switch Position OFF - Open - Logical 1  
 3. o - Standard o - Optional o - Reserved

**CAUTION**

IN COLD CLIMATES, CARE SHOULD BE EXERCISED TO ALLOW THE TEMPERATURE OF THE TERMINAL TO EQUALIZE WITH ROOM TEMPERATURE BEFORE REMOVING THE UNIT FROM THE SHIPPING CARTON. THIS WILL PREVENT MOISTURE FROM CONDENSING ON A COLD TERMINAL EXPOSED TO WARM AIR. AVOID OPERATING THE UNIT ON A SURFACE, SUCH AS CARPETING, WHICH WOULD OBSTRUCT THE FLOW OF COOLING AIR UP THROUGH THE BOTTOM OF THE CHASSIS. THIS COULD RESULT IN OVERHEATING AND DAMAGE TO THE UNIT.

UNLESS OTHERWISE SPECIFIED:  
 DIM IN INCHES

TOLERANCES:  
 .05  
 .XX .03  
 .XXX .010  
 ANGLES ±0.5°

DASH NO.	SL129810	ADM-02
NEXT ASSY USED ON	APPLICATION	

PROPRIETARY LEGEND  
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CONTR NO  
 DR [Signature]  
 CHK  
 DSGN  
 ENGR [Signature]  
 PROJ [Signature]  
 REL [Signature]

APPD  
 APPD

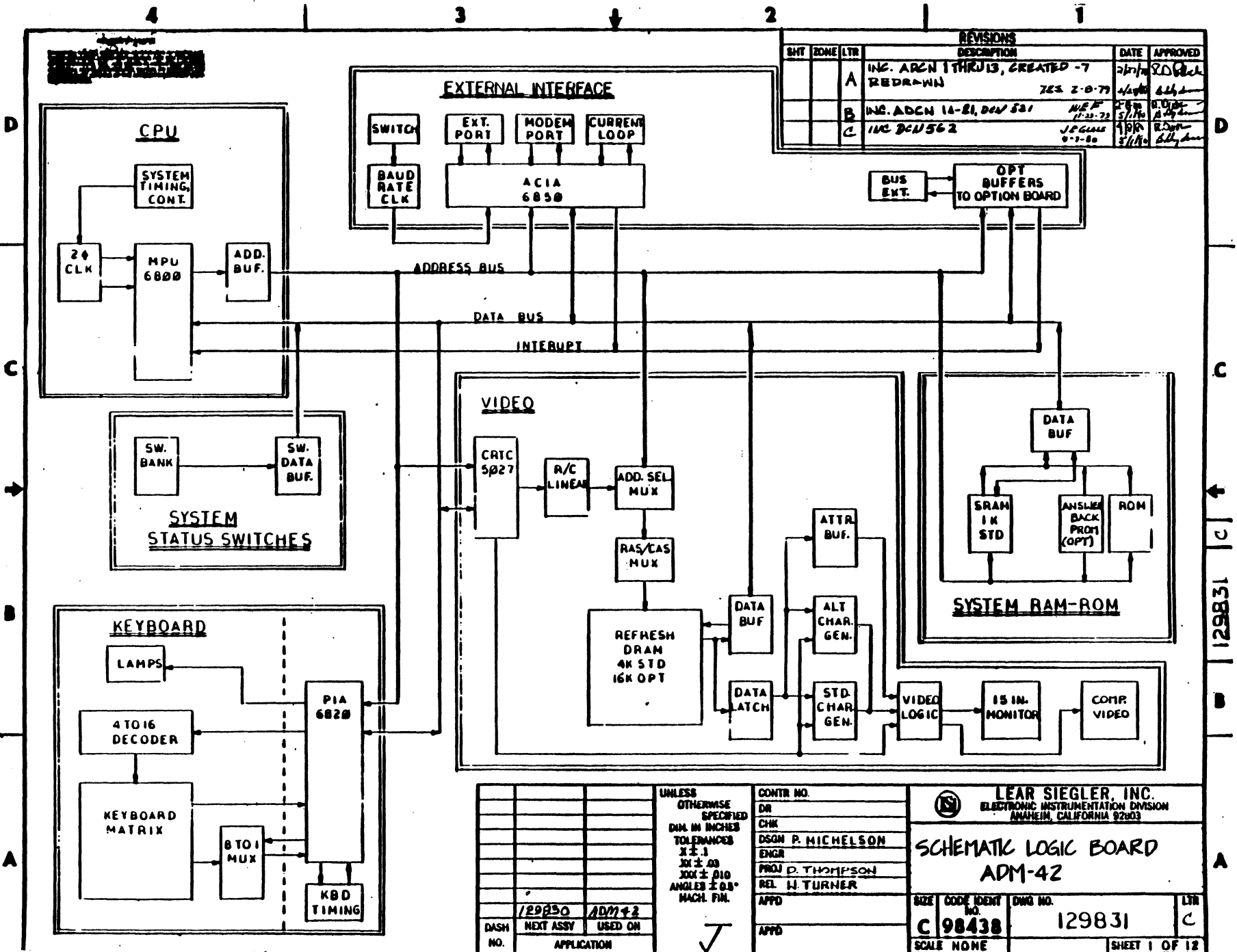
**LEAR SIEGLER, INC.**  
 DATA PRODUCTS DIVISION  
 ANAHEIM, CALIFORNIA 92803

ADM-02 CONFIGURATION CONTROL SWITCH SETTINGS

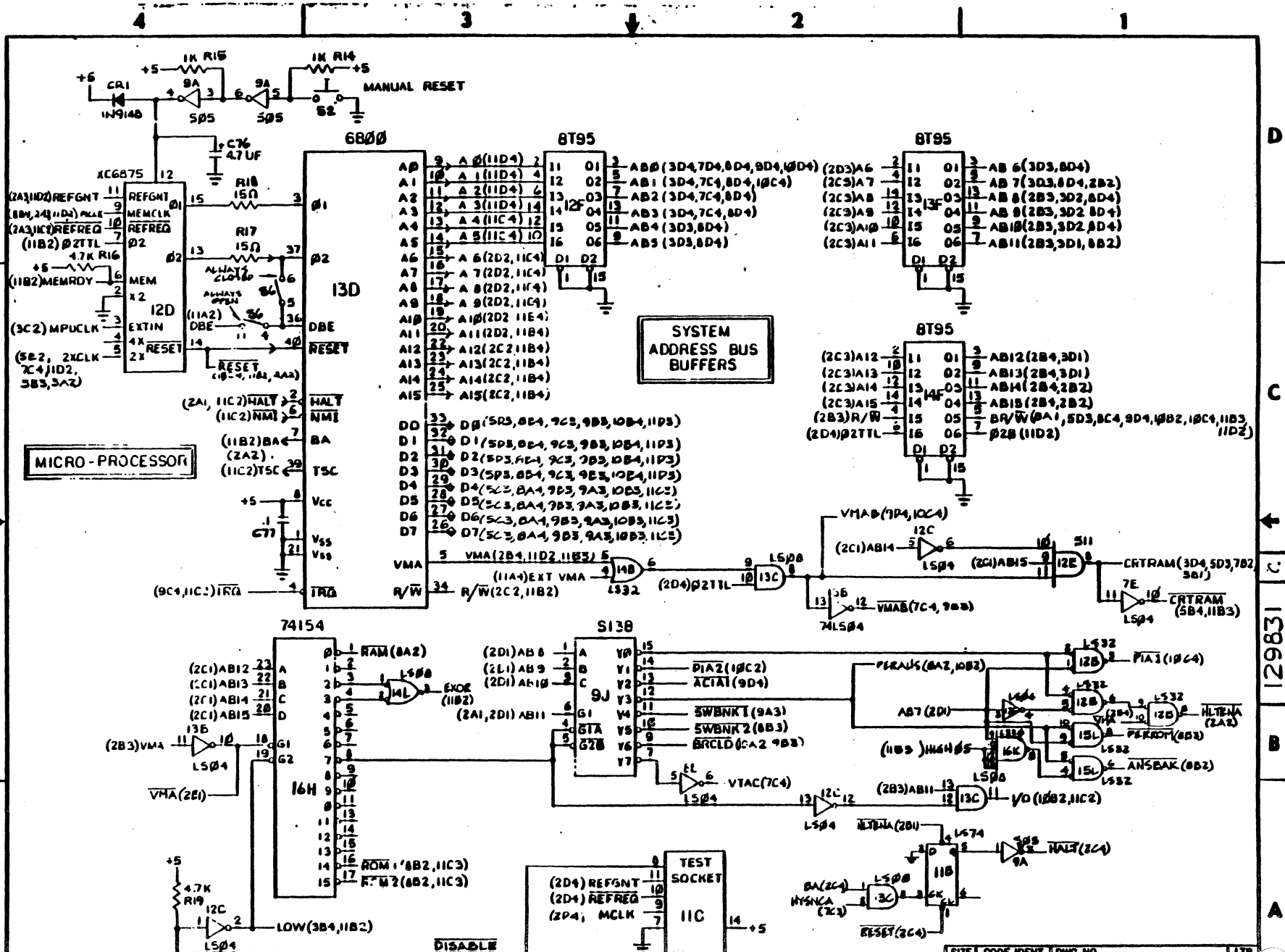
SIZE **C** FSCM NO. **98438** DWG NO. **CS129830-7** LTR **B**

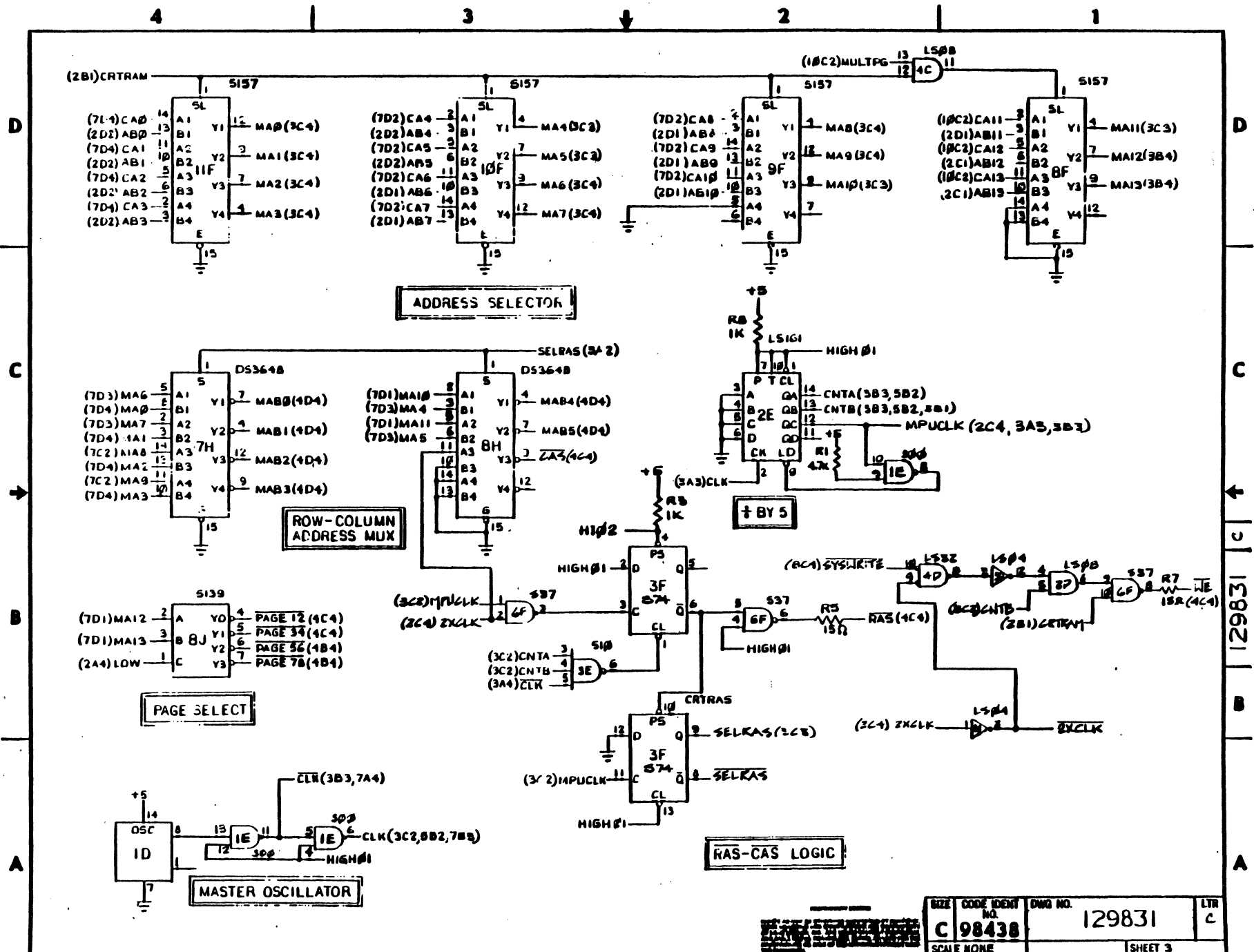
SCALE SHEET OF

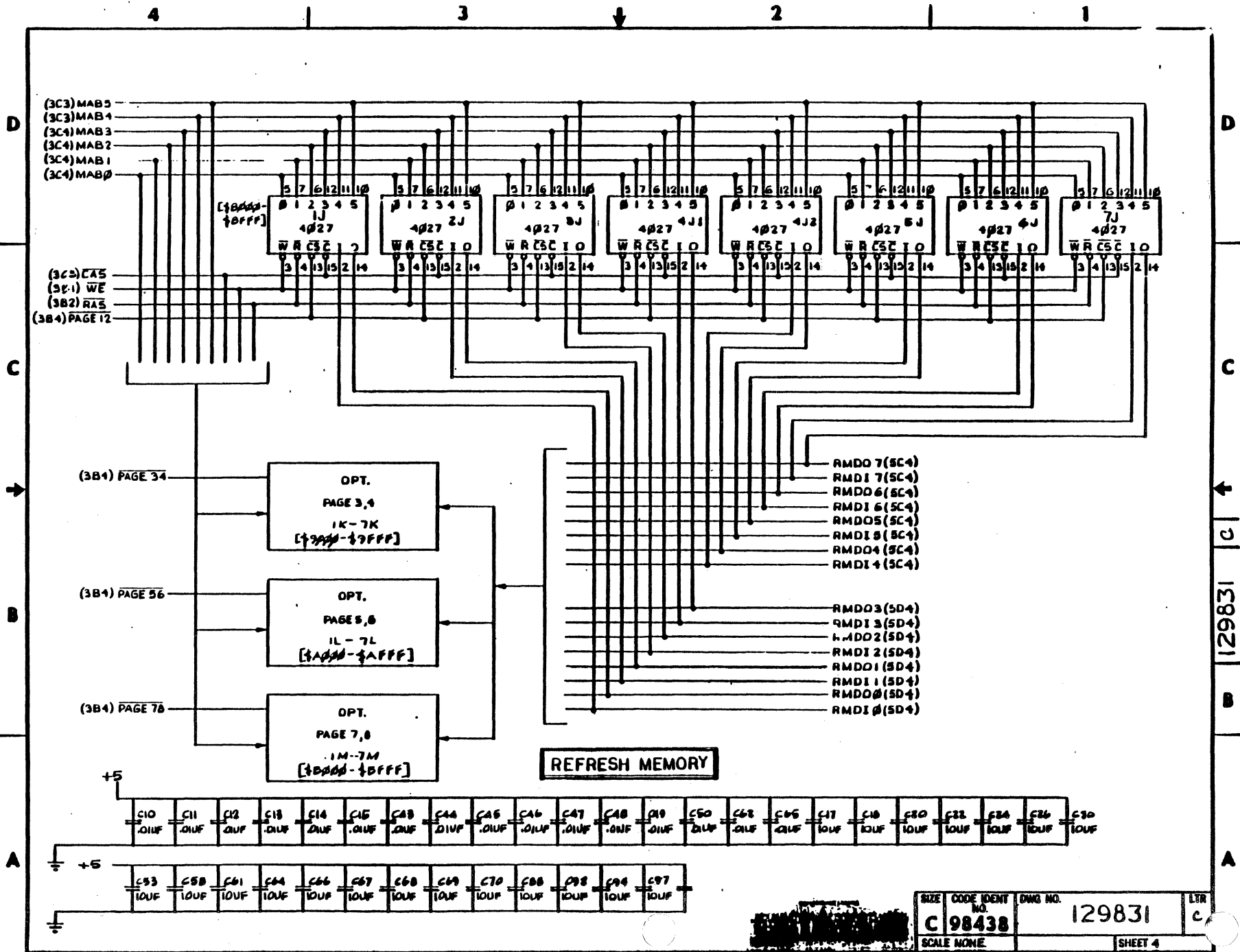
D  
 C  
 B  
 A  
 CS129830-7 B

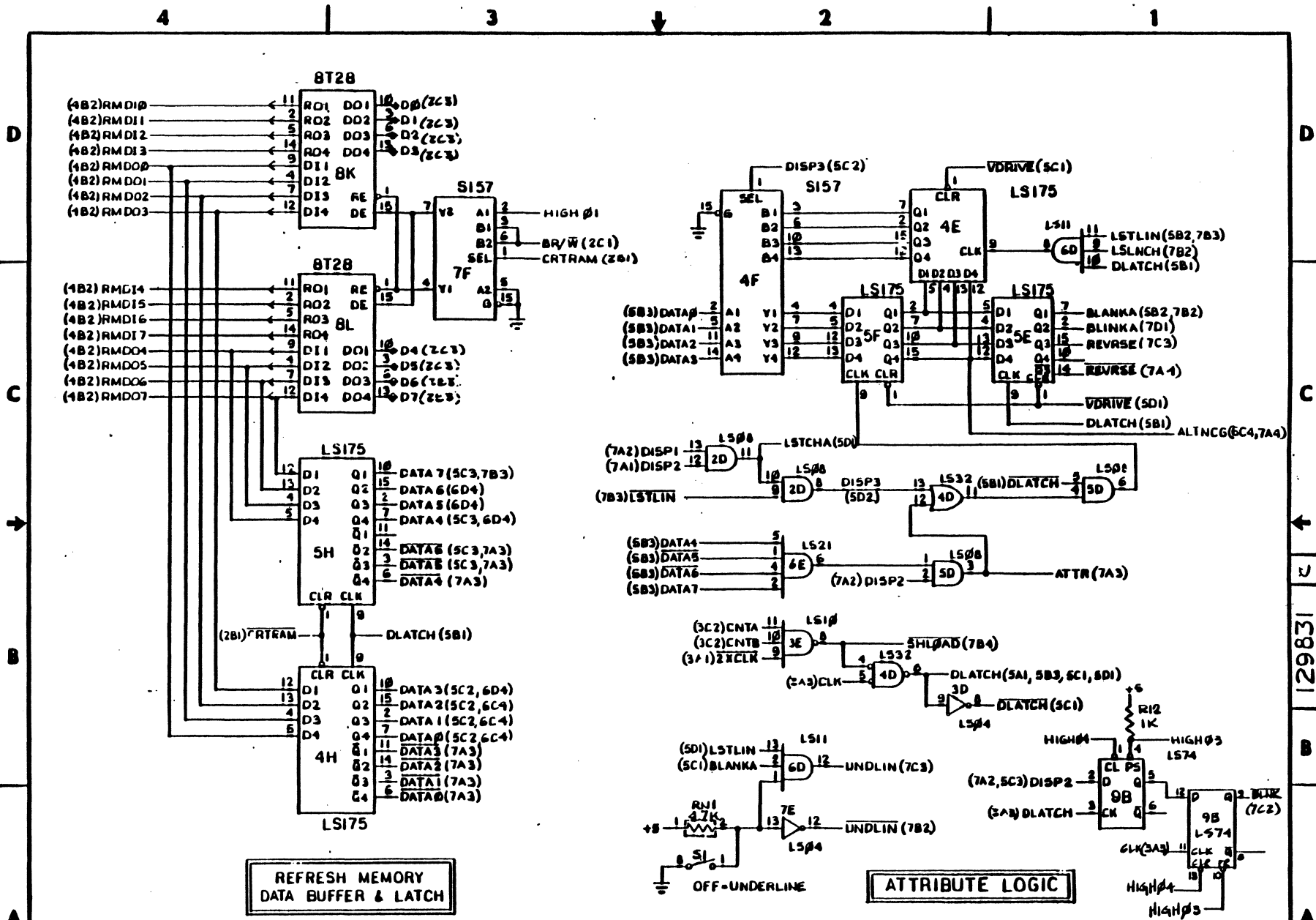












REFRESH MEMORY  
DATA BUFFER & LATCH

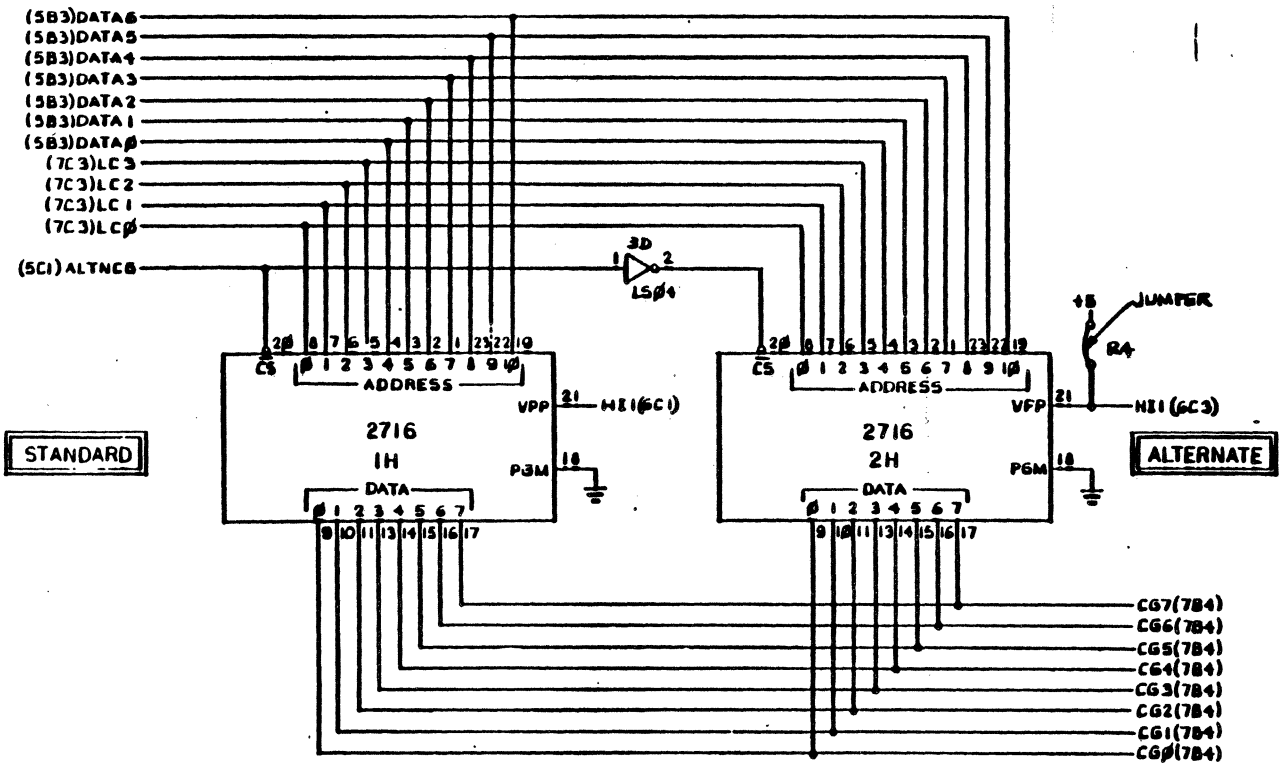
ATTRIBUTE LOGIC

SIZE	CODE IDENT	DWG NO.	LTR
C	98438	129831	C
SCALE NONE	SHEET 5		

4 3 2 1

D  
C  
B  
A

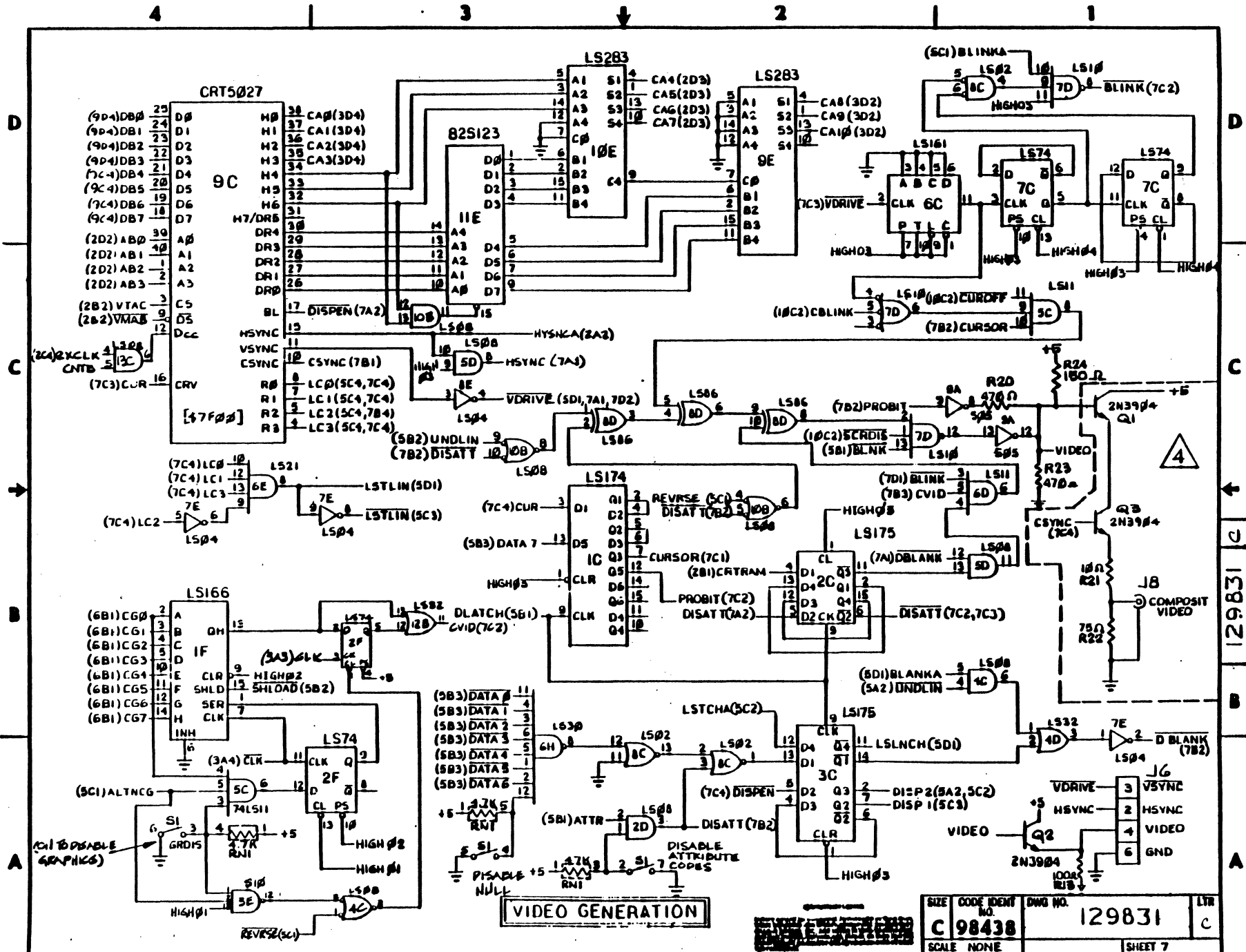
D  
C  
B  
A



CHARACTER GENERATOR

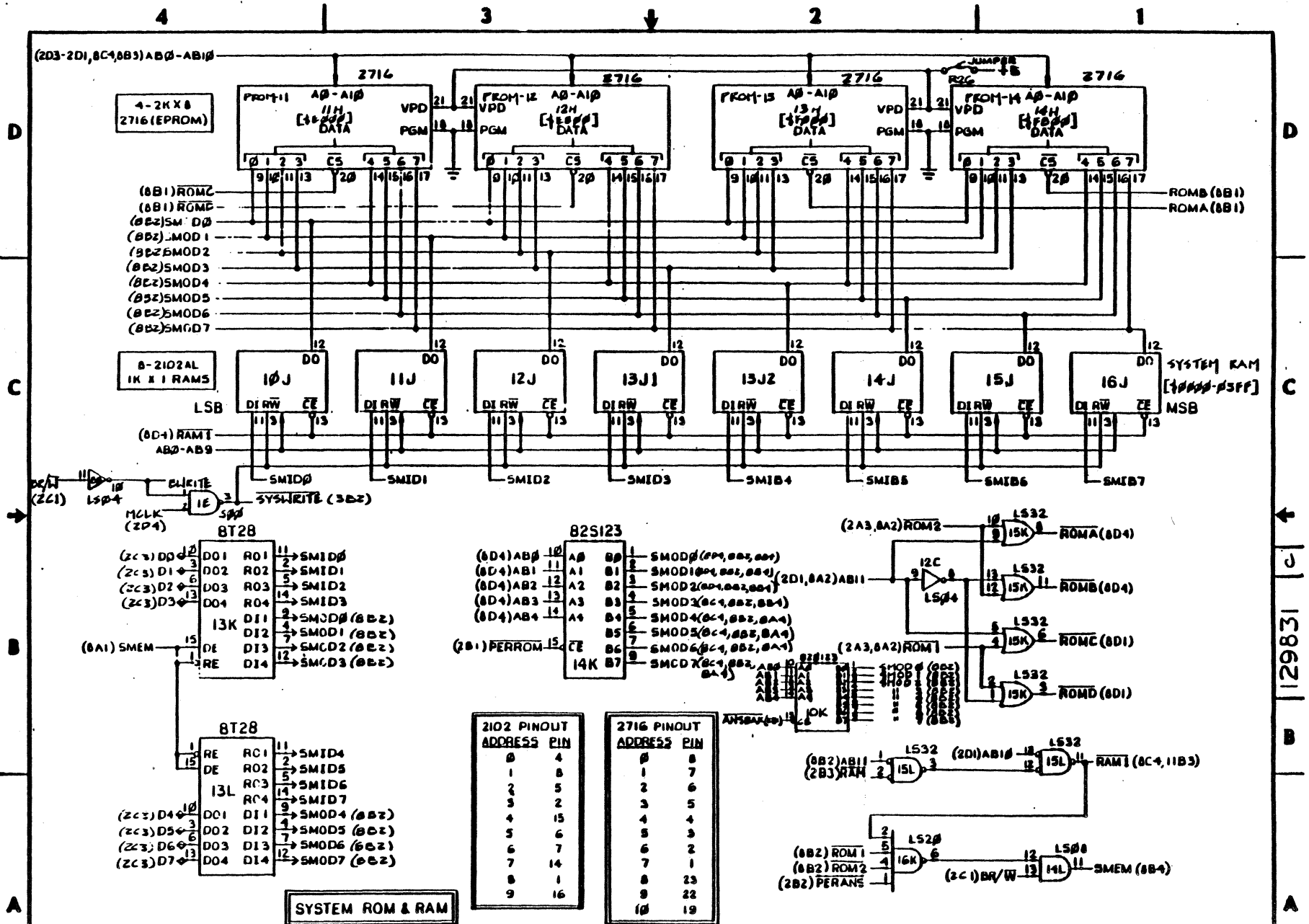
SIZE	CODE IDENT NO.	DWG NO.	LTP
C	98438	129831	c

129831 [c]



**VIDEO GENERATION**

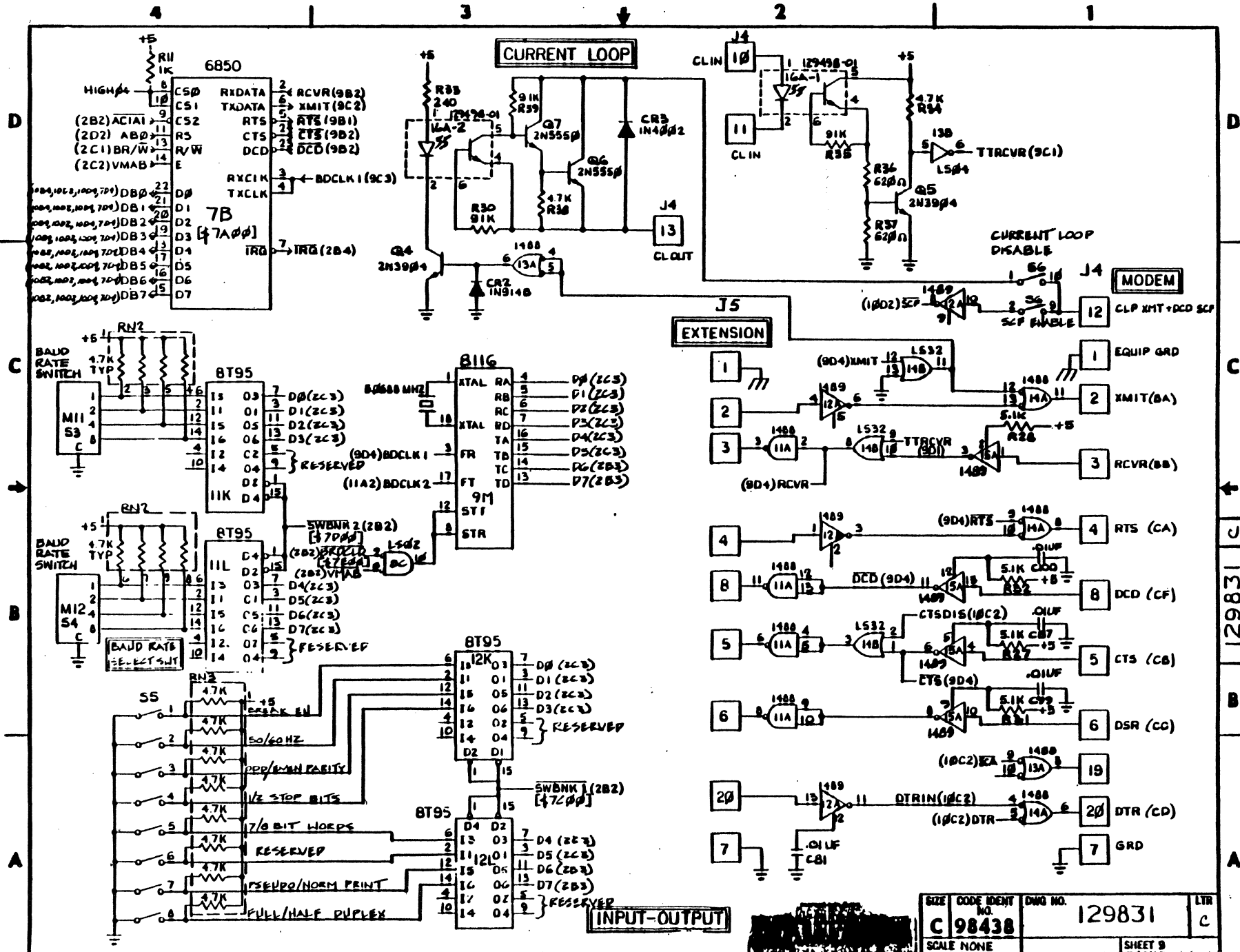
SIZE	CODE	IDENT	DWG NO.	LTR
C	98438		129831	C
SCALE	NONE		SHEET 7	



SYSTEM ROM & RAM

2102 PINOUT		
ADDRESS		PIN
0		4
1		8
2		5
3		2
4		15
5		6
6		7
7		14
8		1
9		16

2716 PINOUT		
ADDRESS		PIN
0		8
1		7
2		6
3		5
4		4
5		3
6		2
7		1
8		23
9		22
10		19

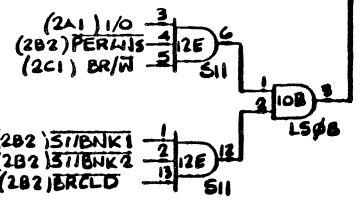
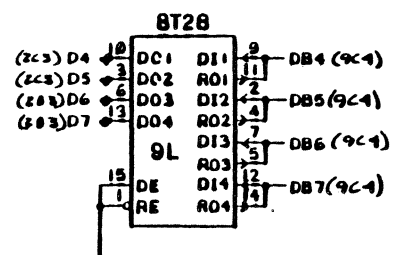
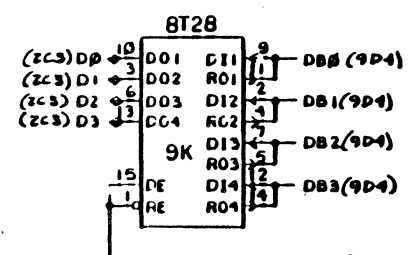
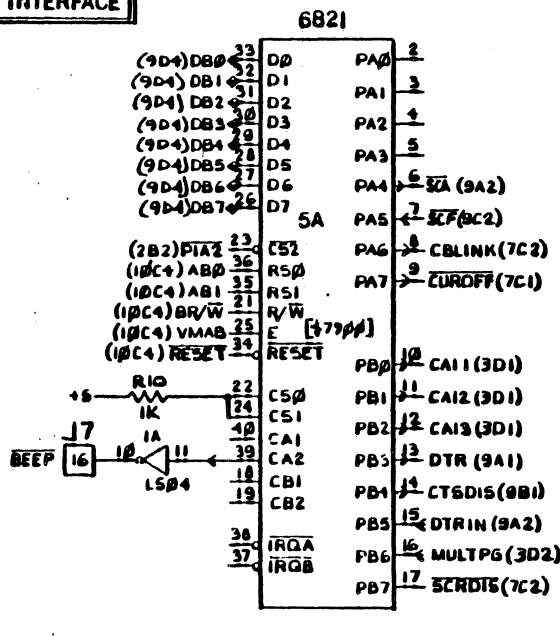
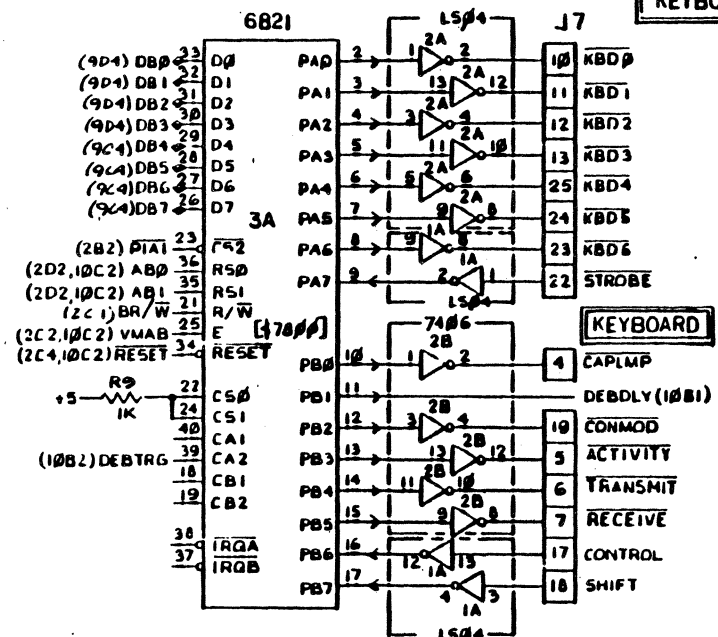


SIZE	CODE IDENT NO.	DWG NO.	LTR
C	98438	129831	C
SCALE NONE	SHEET 9		

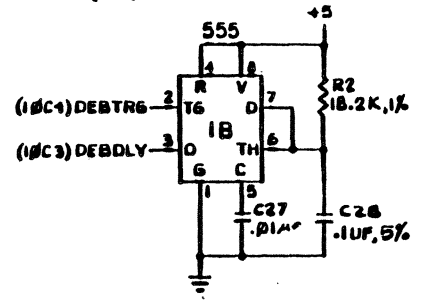


4 3 2 1

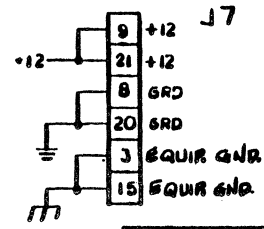
**KEYBOARD INTERFACE**

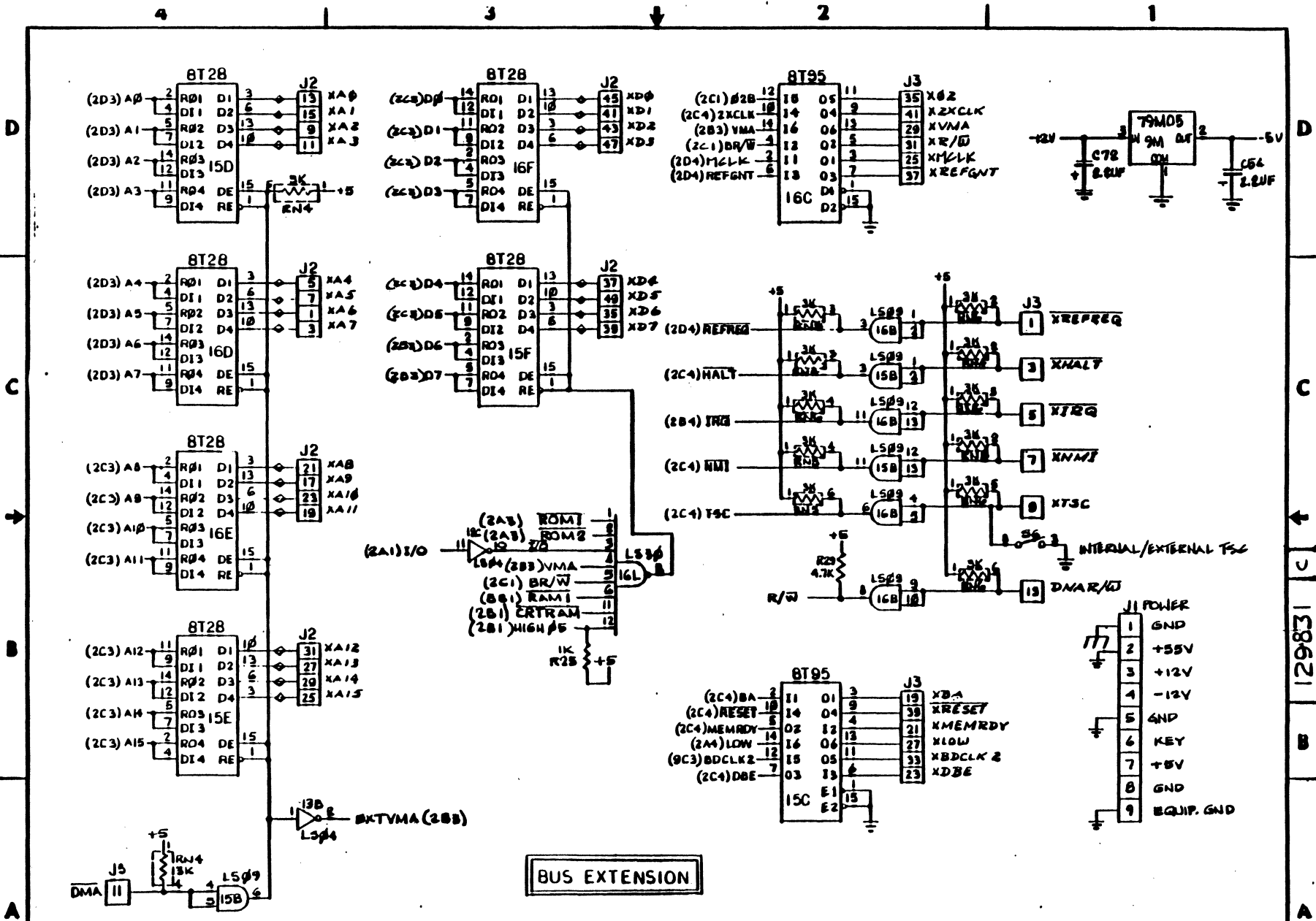


**DATA BUS BUFFER**



**KEYBOARD**





BUS EXTENSION

REV	DATE	APPROVED	DESCRIPTION

J3 CONTROL SIGNALS

PIN NO.	FUNCTION	SHEET
1	REFREQ	11 C
2	GRD	11 C
3	HALT	11 C
4	INT	11 C
5	TRZ	11 C
6	PH/A	11 C
7	PH/A	11 C
8	PH/A	11 C
9	PH/A	11 C
10	PH/A	11 C
11	PH/A	11 C
12	PH/A	11 C
13	PH/A	11 C
14	PH/A	11 C
15	PH/A	11 C
16	PH/A	11 C
17	PH/A	11 C
18	PH/A	11 C
19	PH/A	11 C
20	PH/A	11 C
21	PH/A	11 C
22	PH/A	11 C
23	PH/A	11 C
24	PH/A	11 C
25	PH/A	11 C
26	PH/A	11 C
27	PH/A	11 C
28	PH/A	11 C
29	PH/A	11 C
30	PH/A	11 C
31	PH/A	11 C
32	PH/A	11 C
33	PH/A	11 C
34	PH/A	11 C
35	PH/A	11 C
36	PH/A	11 C
37	PH/A	11 C
38	PH/A	11 C
39	PH/A	11 C
40	PH/A	11 C
41	PH/A	11 C
42	PH/A	11 C
43	PH/A	11 C
44	PH/A	11 C
45	PH/A	11 C
46	PH/A	11 C
47	PH/A	11 C
48	PH/A	11 C
49	PH/A	11 C

J1 POWER

PIN NO.	FUNCTION	SHEET
1	GRD	11 B
2	+5V	11 B
3	+12V	11 B
4	-12V	11 B
5	KEY	11 B
6	GRD	11 B
7	+5V	11 B
8	GRD	11 B
9	EQUIP GRD	11 B

J2 ADDRESS/DATA BUS

PIN NO.	FUNCTION	SHEET
1	GRD	11 C
2	GRD	11 C
3	GRD	11 C
4	GRD	11 C
5	GRD	11 C
6	GRD	11 C
7	GRD	11 C
8	GRD	11 C
9	GRD	11 C
10	GRD	11 C
11	GRD	11 C
12	GRD	11 C
13	GRD	11 C
14	GRD	11 C
15	GRD	11 C
16	GRD	11 C
17	GRD	11 C
18	GRD	11 C
19	GRD	11 C
20	GRD	11 C
21	GRD	11 C
22	GRD	11 C
23	GRD	11 C
24	GRD	11 C
25	GRD	11 C
26	GRD	11 C
27	GRD	11 C
28	GRD	11 C
29	GRD	11 C
30	GRD	11 C
31	GRD	11 C
32	GRD	11 C
33	GRD	11 C
34	GRD	11 C
35	GRD	11 C
36	GRD	11 C
37	GRD	11 C
38	GRD	11 C
39	GRD	11 C
40	GRD	11 C
41	GRD	11 C
42	GRD	11 C
43	GRD	11 C
44	GRD	11 C
45	GRD	11 C
46	GRD	11 C
47	GRD	11 C
48	GRD	11 C
49	GRD	11 C

J4 POWER

PIN NO.	FUNCTION	SHEET
1	EQUIP GRD	9 C
2	XMIT (A)	9 C
3	R CVR (B)	9 C
4	R TS (A)	9 B
5	R TS (B)	9 B
6	D SR (C)	9 B
7	D SR (C)	9 A
8	D SR (C)	9 B
9	NU	9 B
10	CL IN	9 D
11	CL IN	9 D
12	CL OUT	9 C
13	CL OUT	9 D
14	NU	9 D
15	NU	9 D
16	NU	9 D
17	NU	9 D
18	NU	9 D
19	SCA (C)	9 A
20	D TR (C)	9 A
21	NU	9 A
22	NU	9 A
23	NU	9 A
24	NU	9 A
25	NU	9 A

J5 EXTENSION

PIN NO.	FUNCTION	SHEET
1	EQUIP GRD	9 C
2	XMIT (B)	9 C
3	R CVR (A)	9 C
4	R TS (A)	9 D
5	R TS (B)	9 D
6	D SR (C)	9 D
7	D SR (C)	9 A
8	D SR (C)	9 D
9	NU	9 D
10	CL IN	9 D
11	CL IN	9 D
12	CL OUT	9 C
13	CL OUT	9 D
14	NU	9 D
15	NU	9 D
16	NU	9 D
17	NU	9 D
18	NU	9 D
19	D TR (C)	9 A
20	D TR (C)	9 A
21	NU	9 A
22	NU	9 A
23	NU	9 A
24	NU	9 A
25	NU	9 A

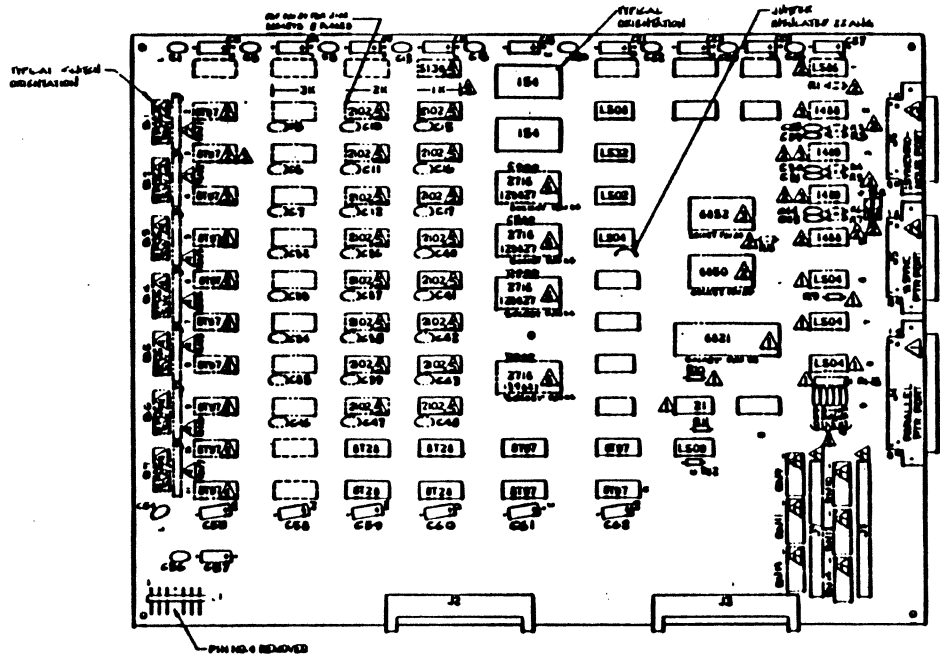
J6 MONITOR

PIN NO.	FUNCTION	SHEET
1	EQUIP GRD	7 C
2	H SYNC	7 A
3	V SYNC	7 A
4	VIDEO	7 A
5	+5V	7 C
6	GRD	7 A
7	GRD	7 C
8	GRD	7 C
9	+5V	7 C

J7 KEYBOARD

PIN NO.	FUNCTION	SHEET
1	NU	10 A
2	EQUIP GRD	10 A
3	EQUIP GRD	10 A
4	ZALTP	10 C
5	ACTIVITY	10 C
6	TRANSMIT	10 C
7	RECEIVE	10 C
8	GRD	10 A
9	+12	10 B
10	RDD3	10 D
11	RDD1	10 D
12	RDD2	10 D
13	RDD3	10 D
14	NU	10 A
15	EQUIP GRD	10 A
16	DEP	10 C
17	CONTROL	10 C
18	SHIFT	10 C
19	CONTROL	10 C
20	GRD	10 A
21	+12	10 A
22	STRONG	10 C
23	RDD6	10 C
24	RDD5	10 D
25	RDD2	10 D

129631



PC BOARD ASSY (1-800)

REV	DESCRIPTION	DATE APPROVED
1	REV A24 1-6	10/23/82
2	REV B24 7-6	10/23/82
3	REV C24 7-6	10/23/82
4	REV D24 7-6	10/23/82

- INDICATIONS TO BSC  
 A: 20K 100K  
 1: 20K 100K 1000 10000 100000 1000000 10000000 100000000 1000000000 (KEEP ADLN#)
- B AND JITTERS (SMALL UNLATERED)  
 01 20-1 TO 20-2  
 02 20-3 TO 20-4  
 03 20-5 TO 20-6  
 04 20-7 TO 20-8  
 05 20-9 TO 20-10  
 06 20-11 TO 20-12  
 07 20-13 TO 20-14  
 08 20-15 TO 20-16  
 09 20-17 TO 20-18  
 10 20-19 TO 20-20  
 11 20-21 TO 20-22  
 12 20-23 TO 20-24
- B: 20K 100K 1000 10000 100000 1000000 10000000 100000000 1000000000  
 C: 20K 100K 1000 10000 100000 1000000 10000000 100000000 1000000000

- 11 FOR OPTIONAL CONFIGURATIONS SEE 129832
  - 12 FOR SCHEMATIC SEE 129832
  - ▲ BUS EXTENSION
  - ▲ PROGRAM PROM (SEE 129842 FROM FABRICATION)
  - ▲ PROGRAM PROM FUNCTION KEYS (18 STD; 2K OPTIONAL)
  - ▲ POLLING ADR
  - ▲ SYNCHRONOUS PORT (NOT AVAILABLE)
  - ▲ ASYNC PIR PORT (STD)
  - ▲ PARALLEL PIR PORT (NOT AVAILABLE)
- NOTES: UNLESS OTHERWISE SPECIFIED

466 SEPARATE PARTS LMT-PL217992

MILC		DATE	LEAR SIEGLER INC ELECTRONIC INSTRUMENTATION DIVISION 5000 S. COLLETT RD MILWAUKEE, WI 53211
REV		REV	
129840		ADM44	PC BOARD ASSY ADM 42 (OPTION)
REV		REV	
129840		ADM44	129832
REV		REV	129832

129832

REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		INC ADCN 1-8, REDRAWN WAS 4 SHEETS DELETE F/N 12 '9496-2003 HDR, SO PIN 3M W Kelly 2-21-79	2-21-79 2-21-79	W. Kelly T. Turner
B		INC DCN 414. REDRAWN WAS 2 SHEETS J E GLASS 4-7-80	4/30/80 5/1/80	R. Owen B. Lyden
C		INC DCN 608 J E GLASS 4-7-80	4/30/80 5/1/80	R. Owen B. Lyden
D		INC DCN 906 J E GLASS 4-7-80	4/30/80 5/1/80	R. Owen B. Lyden

NOTE 1. PROGRAM PROM - SEE 1295+2 PROM TABULATION.

	129840	ADM42
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED  
DIM. IN INCHES  
TOLERANCES  
X ± .1  
XX ± .03  
XXX ± .010  
ANGLES ± 0.5°  
MACH. FIN.

DR W. KELLY 5-2-78  
CHK  
DSGN  
ENGR  
PROJ DH THOMSON 5-2-78  
REL W. TURNER 5-3-78  
CUSTOMER APPD



LEAR SIEGLER, INC.  
ELECTRONIC INSTRUMENTATION DIV.  
ANAHEIM, CALIF.

P.C. BOARD ASSY -  
ADM 42 OPTION

SIZE	CODE IDENT	REV
A	98438	PL129832 D
SCALE	SHEET 1 OF 3	



FIND NO	QTY REQD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REFERENCE DESIGNATORS
		-11-1				
1		✓		129832-1	PCBA, ADM #2, OPTION	
2		✓		-11		
3		1 1		129832-5	PRINTED WIRING BOARD	
4						
5		1 1		129746-131	CLOSURE	
6		1 1		129747-3	STANDOFF	
7		2 2		802026	CONN., 50-PIN	J2, J3
8		1 1		809109	CONN. 11-PIN	J1
9						
10		1 1		129467-02	IC-QUAD 2-IN NOR, LS02	4D
11		1 1		-04	" HEX INVERTER, LS04	5D
12		1 1		-08	" QUAD 2-IN AND, LS08	2D
13		1 1		-09	" QUAD 2-IN AND, OC, LS09	10C
14		1 1		-32	" QUAD 2-IN OR, LS32	3D
15		2 2		129348-154	" 4-16 LINE DEC. 154	1E, 2E
16		4 4		-8T28	" QUAD BUS RCVR, 3-ST, 8T28	10F, 11F, 10H, 11H
17		6 4		-8T97	" HEX BUF, 3-ST, NON INV, 8T97	10D, 11D, 10E, 11E, 2K, 3K
18						
19		11 11		129876-104	CAP .1 MFD, 50V, 10% MONO	C1, 3, 8, 13, 15, 20, 22, 24, 26, 54, 56
20		16 16		129469-106	" 10 MFD, 25V	C2, 4, 9, 14, 19, 21, 23, 25, 27, 33, 57-62
21		2 2		128533-302	RES. 3K	R1, 2
22						
23						
24		6 6		802033	SOCKET, IC 24-PIN	1E-6E, 8E, 4C, 6C
		1 1		802034	" 40-PIN	7C

SIZE: A  
 FSCM NO: 98438  
 SH: PL129832  
 REV: D

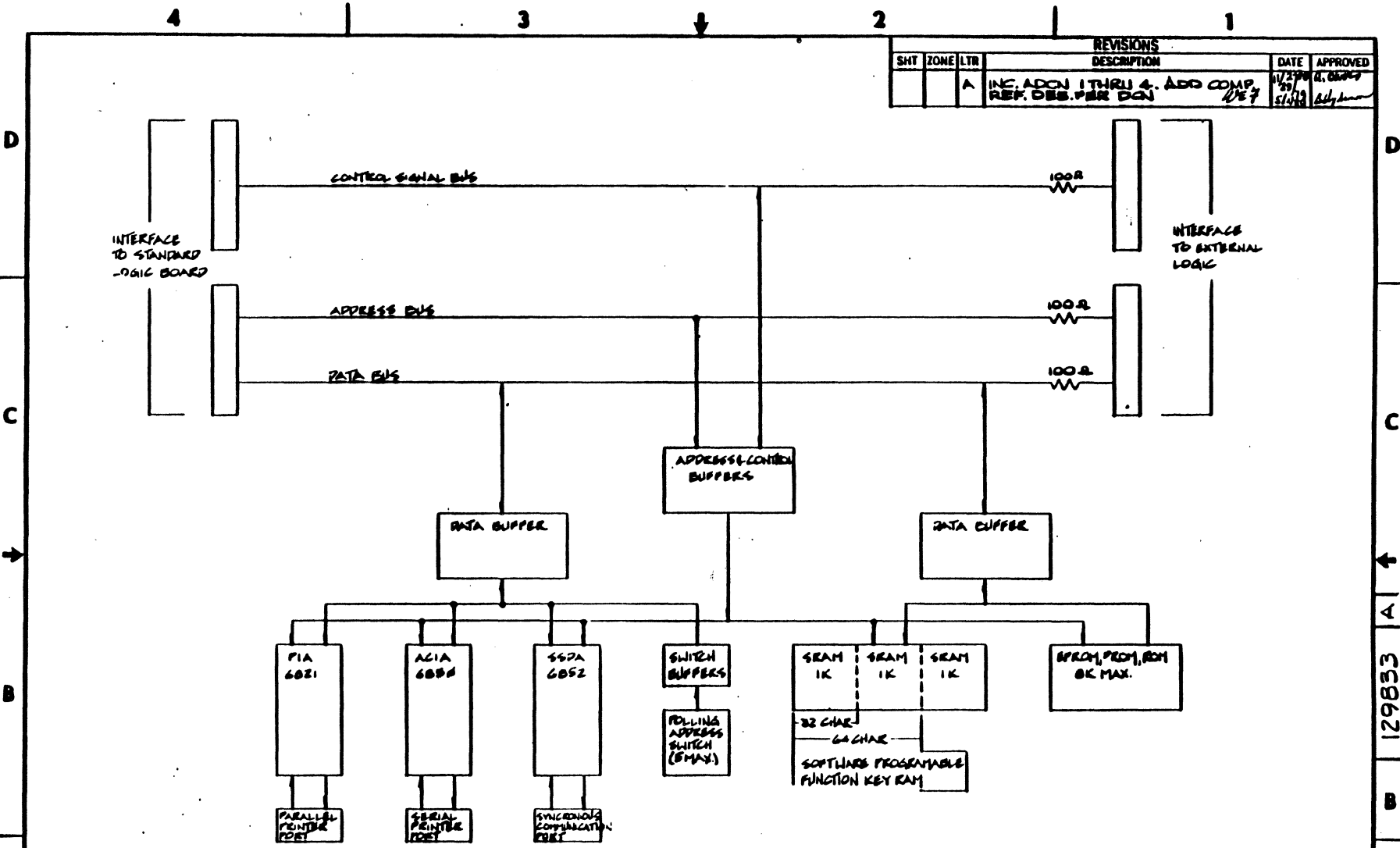




FIND NO.	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REFERENCE DESIGNATORS
		-11-1				
26						
27		1		129824-6850	IC-ASYNC COM INT ADAPTER	6C
28		1		129827-XX	EPROM 2716, C000	4E NOTE 1
29		8		129348-2102A	RAM	2F-2F
30		1		-1488	IC QUAD LINE DR. TYPE 1488	5A
31		2		-1489	IC QUAD LINE REVR. TYPE 1489	3A, 4A
32		1		129467-86	IC QUAD 2-IN EXCL OR, 74LS86	1A
33						
34						
35		1		128533-472	RES. 4.7K	R1
36		1		-512	5.1K	R7
37		1		-102	1K	R8
38						
39		17		129876-103	CAP. .01, 50V, ±10%	C10-12, 15-17, 36-48, 47, 48
40		8		802031	SOCKET, 16-PIN	2H-2H
41		1		804021	SWITCH, 8 POS.	S1
42		1		804028	" 3 POS.	S8
43		1		819046	RES. MOD 4.7K	RN
44		1		131365-11	CONN. ASSY, 25-PIN	J5
45		2		824002	RIVET (R3478X7/32)	
46		1		129746-181	CLOSURE, STD	
47						
48						
49						
50						

SIZE A  
 FSCM NO. 98438  
 SH PL129832  
 REV D





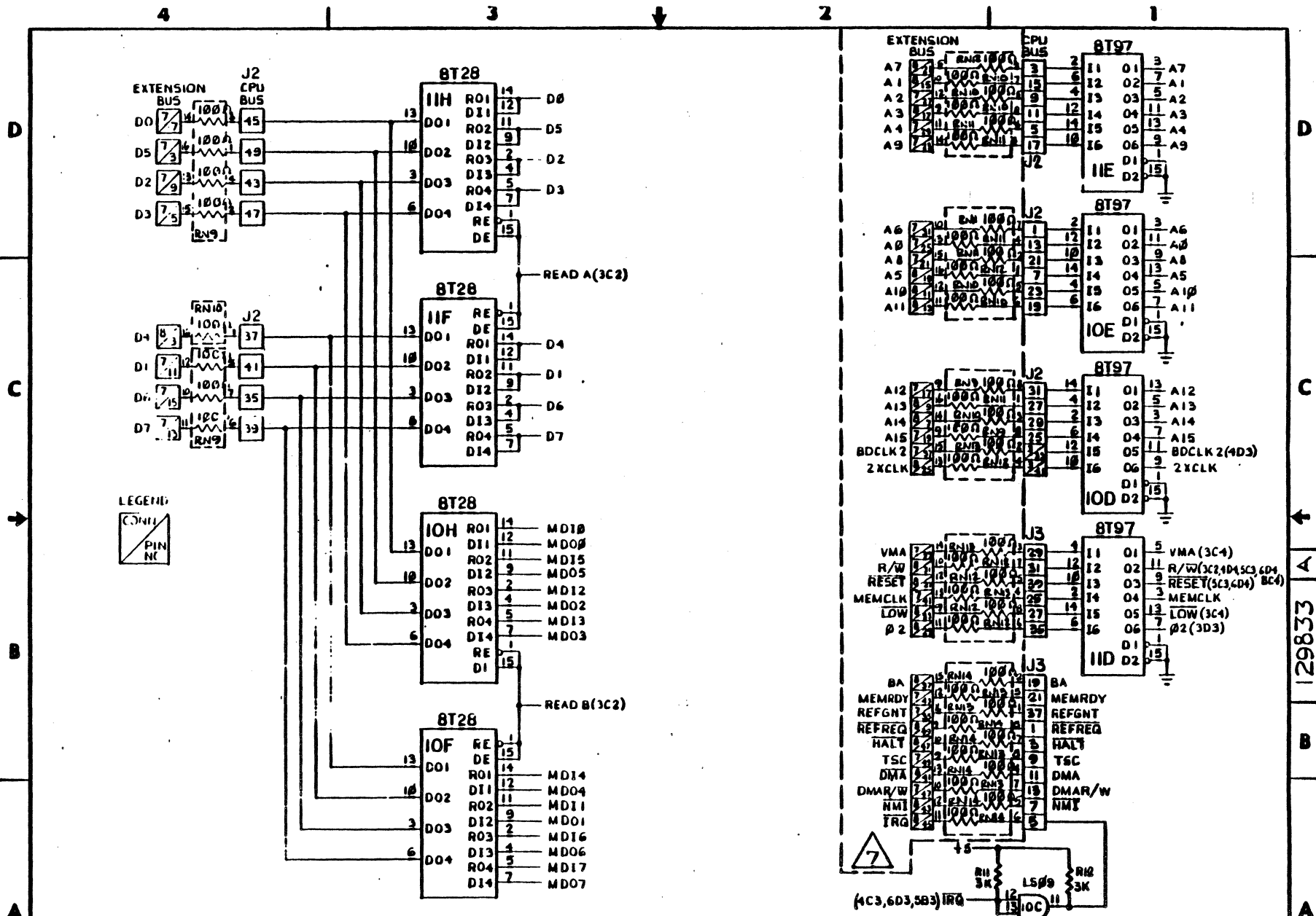
REVISIONS				DATE	APPROVED
SHT	ZONE	LTR	DESCRIPTION		
		A	INC. ADDN 1 THRU 4. ADD COMP REF. DES. PER DGN	11/27/78 12/21/78 5/1/79	H. GREGG D. J. ...

FOR NOTES SEE SHEET 3

UNLESS OTHERWISE SPECIFIED: DIM IN INCHES TOLERANCES: X ± .1 XX ± .03 XXX ± .010 ANGLES ± 0.5°		CONTR NO	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIVISION ANAHEIM, CALIFORNIA 92803
DASH NO	NEXT ASSY USED ON APPLICATION	DR	
		CHK	SCHEMATIC - ADM 42 OPTION BOARD
		DSGN	
		ENGR	
		PROJ	
		REL	
PROPRIETARY LEGEND EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF LEAR SIEGLER, INC. ARE ISSUED IN STRICT CONFIDENCE, AND SHALL NOT BE REPRODUCED, COPIED, OR USED FOR THE MANUFACTURE OR SALE OF THE APPLICABLE INSTRUMENT OR EQUIPMENT.		APPD	SIZE
		APPD	FECM NO
			DWG NO
			129833
			LTR
			A
			SCALE
			SHEET 1 OF 8

129833 | A | ↑

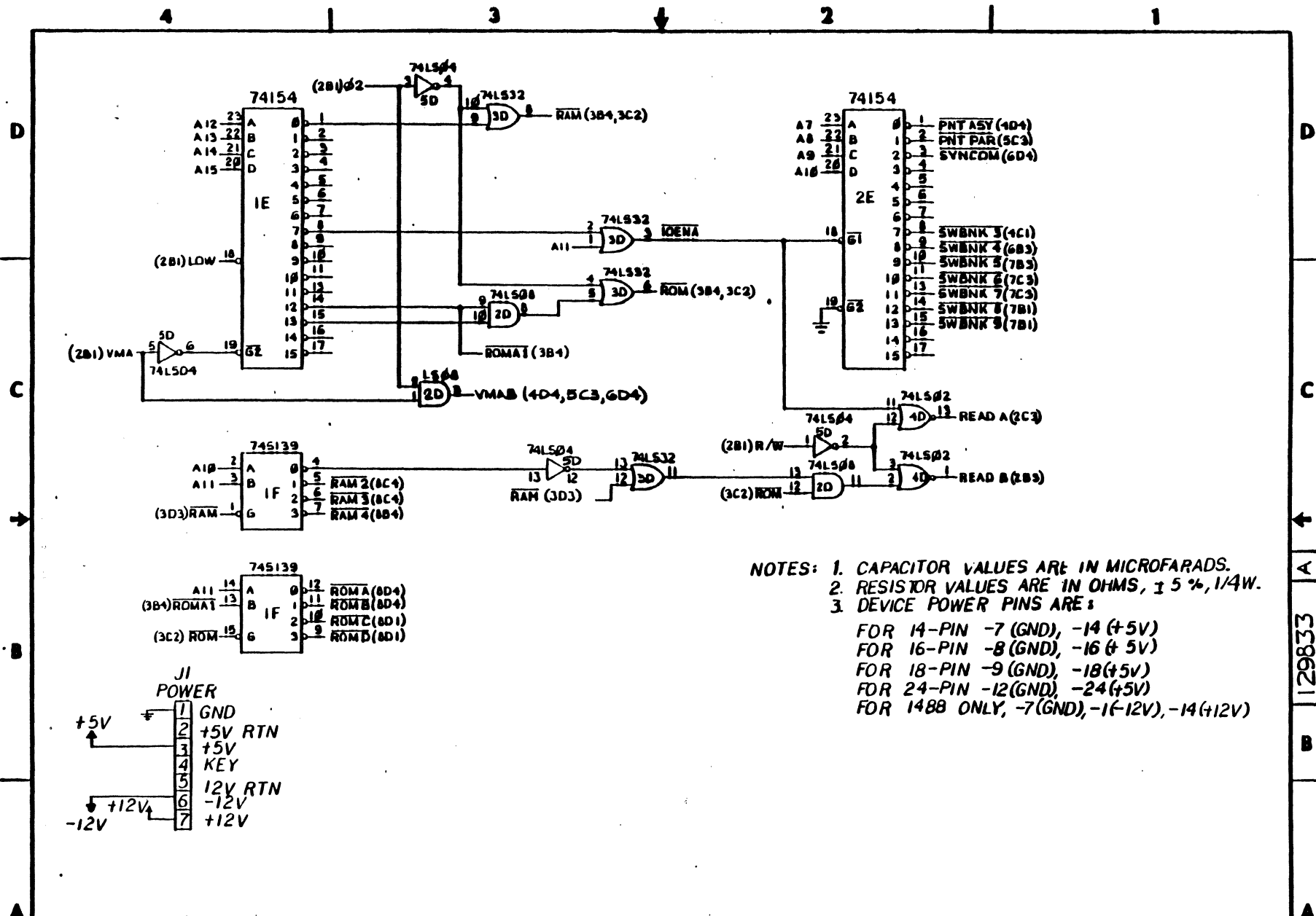




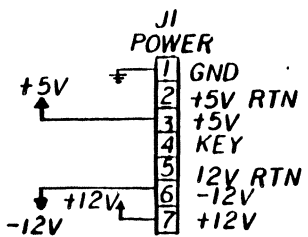
LEGEND:  
  
 CONN  
 PIN  
 NC

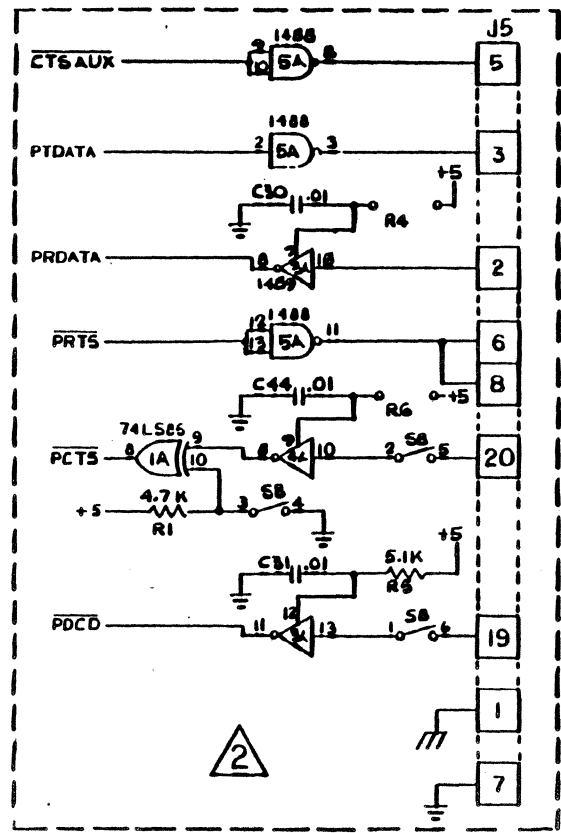
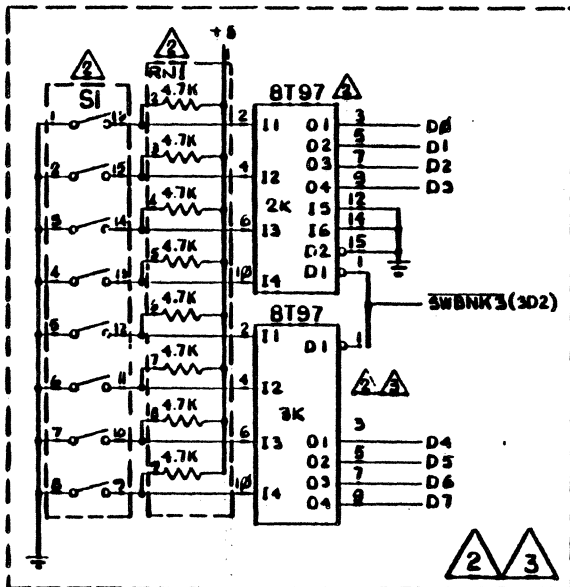
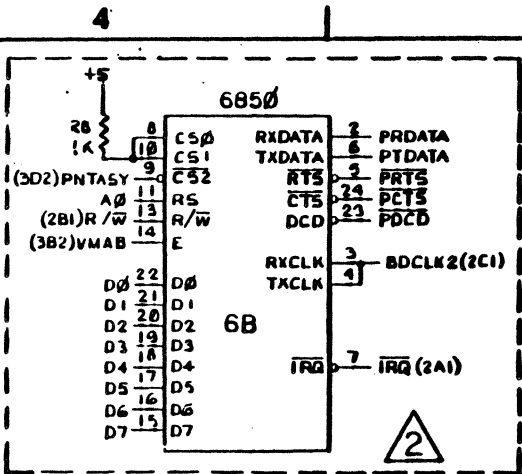
INTERFACE BUFFERS

SIZE	CODE IDENT NO.	DWG NO.	LTR
C	98438	129833	A

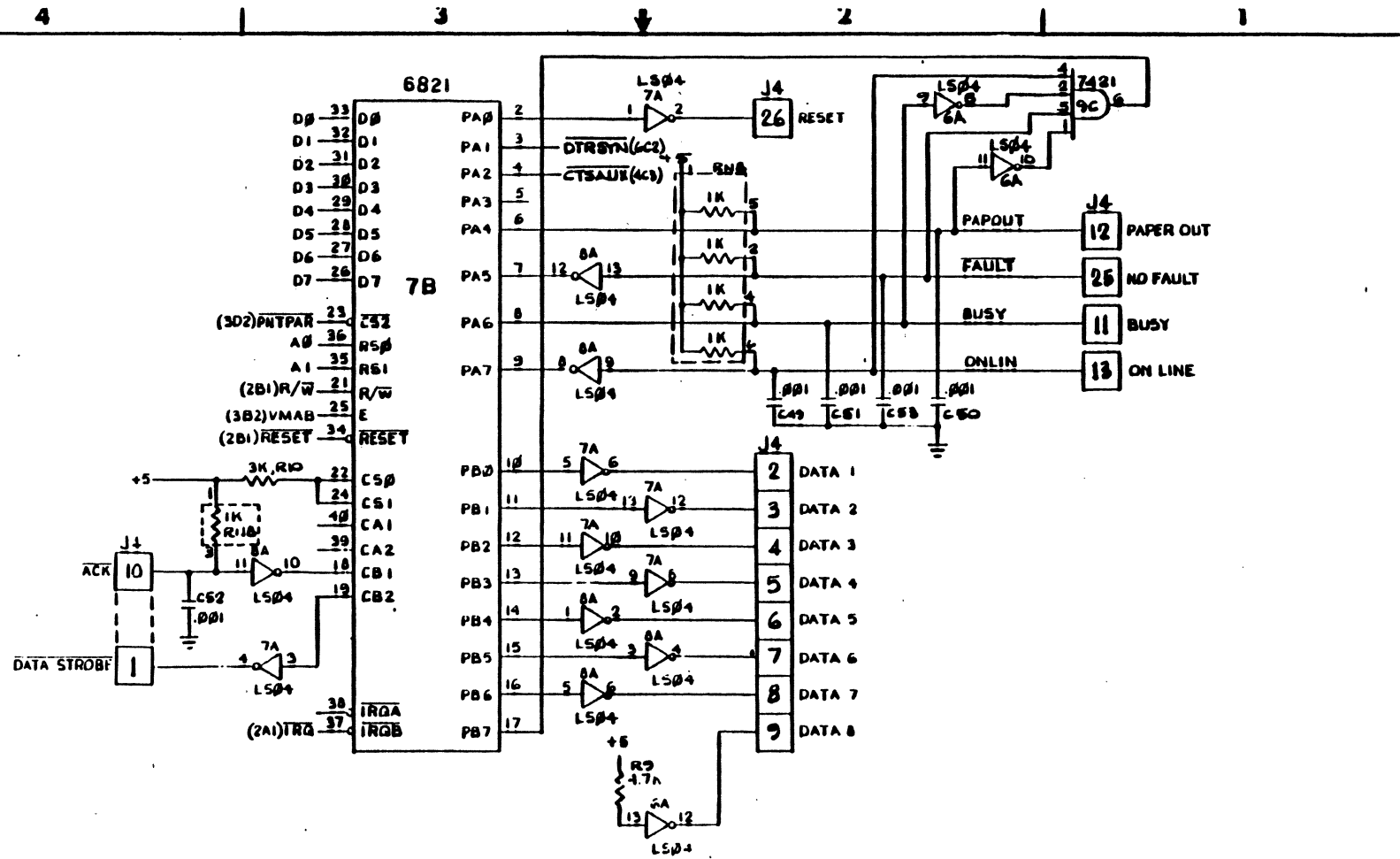


NOTES: 1. CAPACITOR VALUES ARE IN MICROFARADS.  
 2. RESISTOR VALUES ARE IN OHMS,  $\pm 5\%$ , 1/4W.  
 3. DEVICE POWER PINS ARE:  
 FOR 14-PIN -7 (GND), -14 (+5V)  
 FOR 16-PIN -8 (GND), -16 (+5V)  
 FOR 18-PIN -9 (GND), -18 (+5V)  
 FOR 24-PIN -12 (GND), -24 (+5V)  
 FOR 1488 ONLY, -7 (GND), -1 (-12V), -14 (+12V)



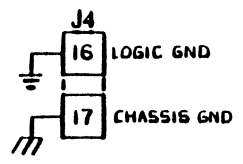


ASYNC. PRINTER PORT



PARALLEL PRINTER PORT

OPTION 1

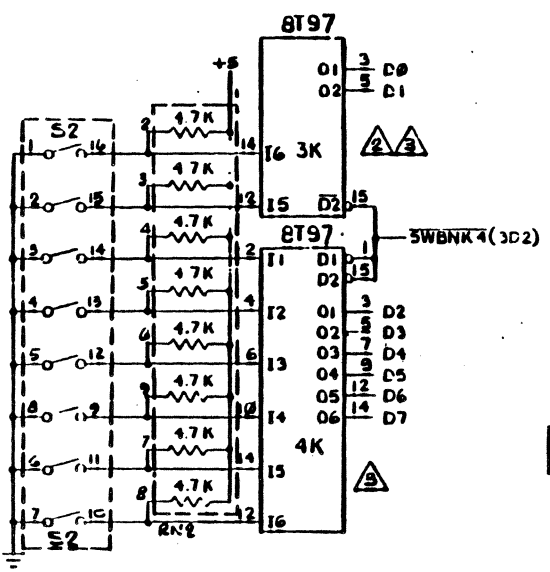
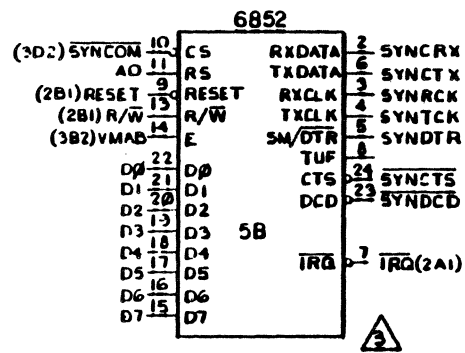


SIZE	CODE IDENT NO.	DWG NO.	LTR
C	98438	129833	A
SCALE NONE		SHEET 5	

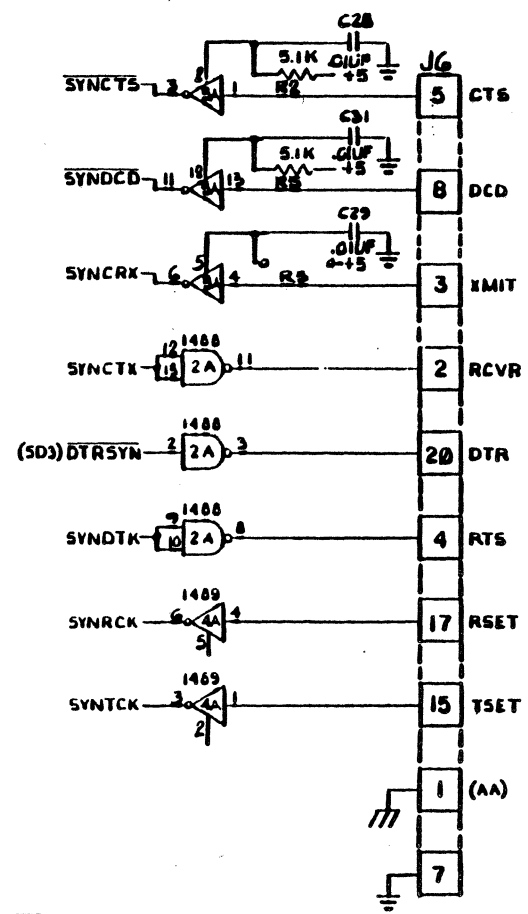
4 | 3 | 2 | 1

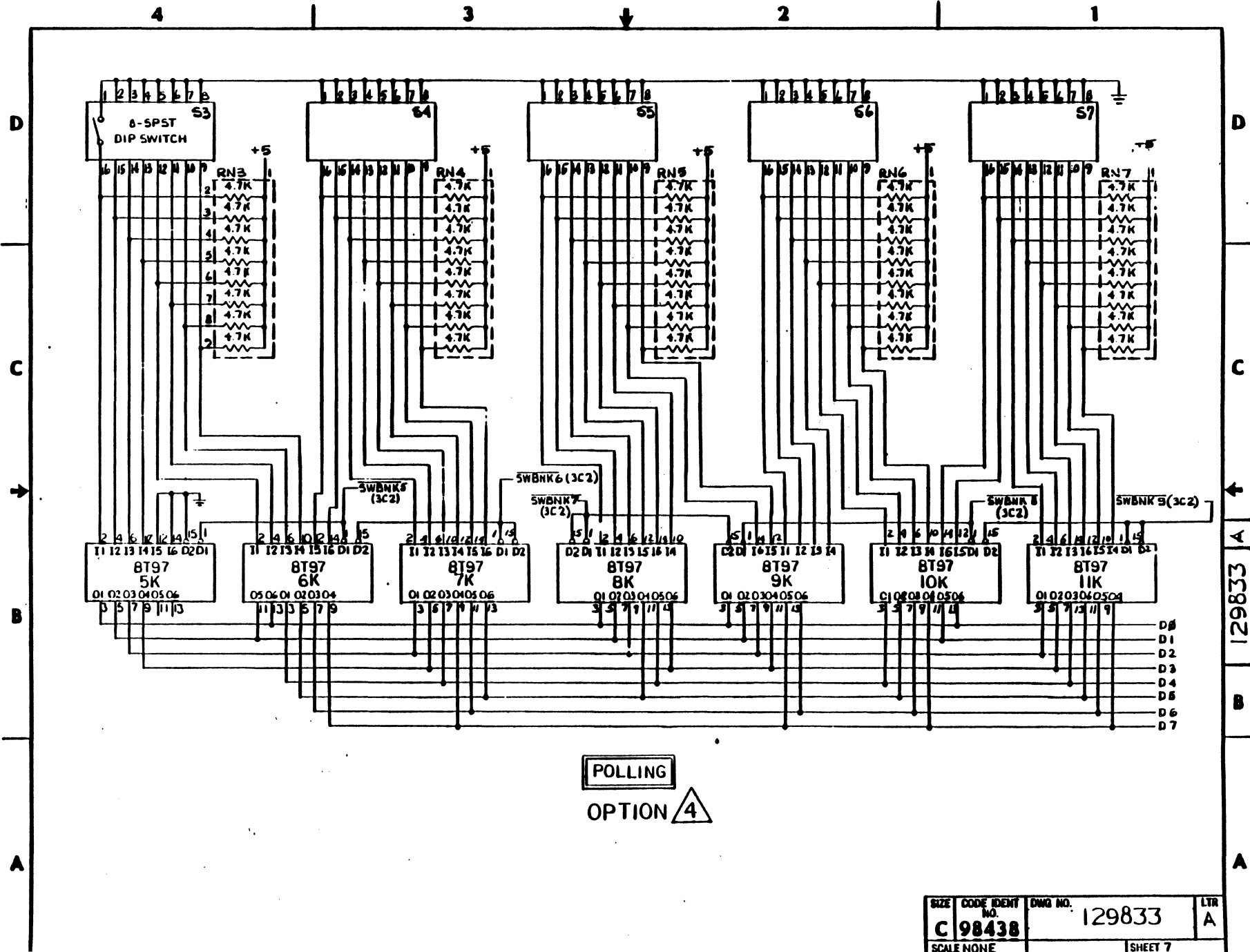
D  
C  
B  
A

D  
C  
B  
A

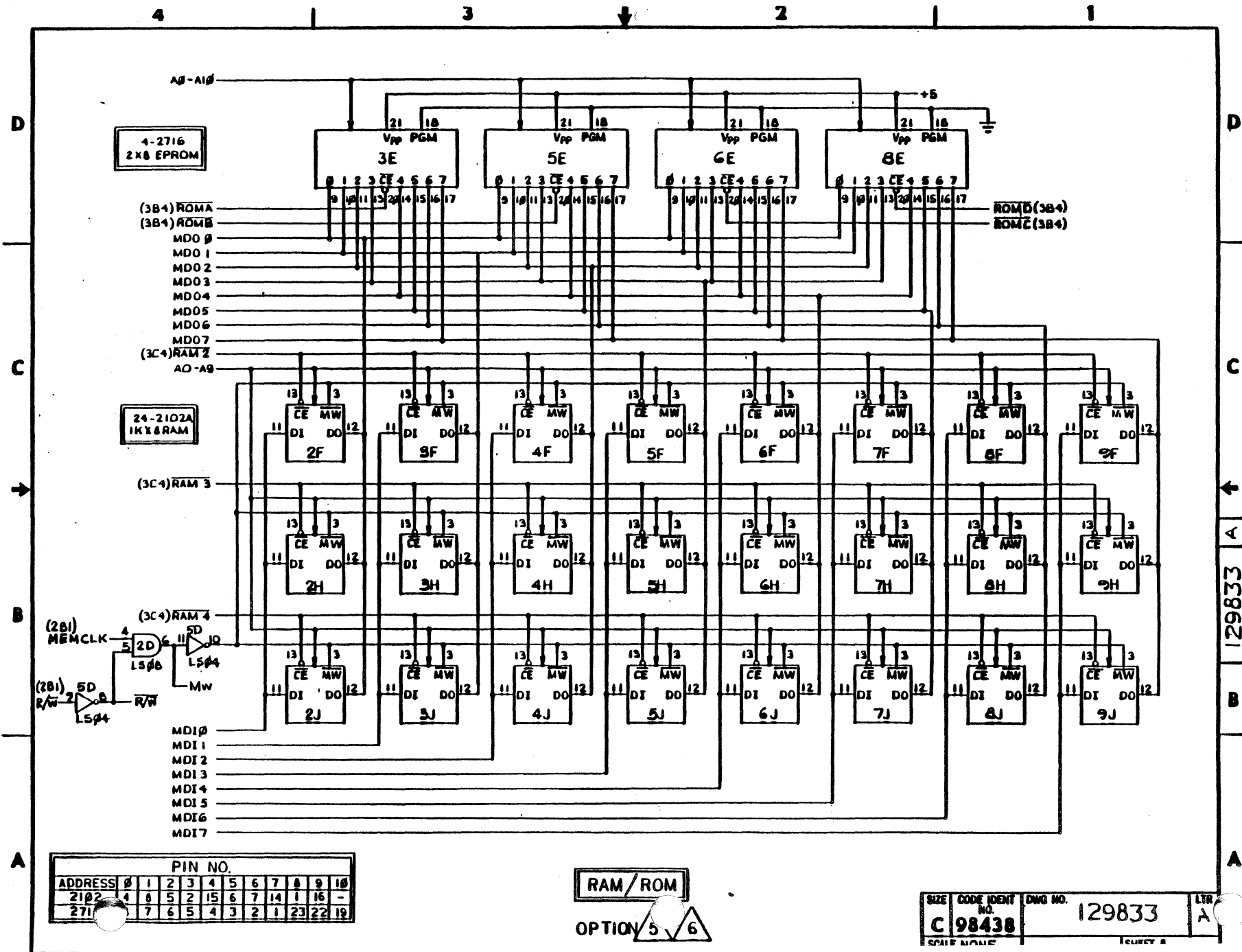


SYNCHRONOUS PORT  
OPTIONS 2 3

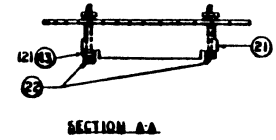
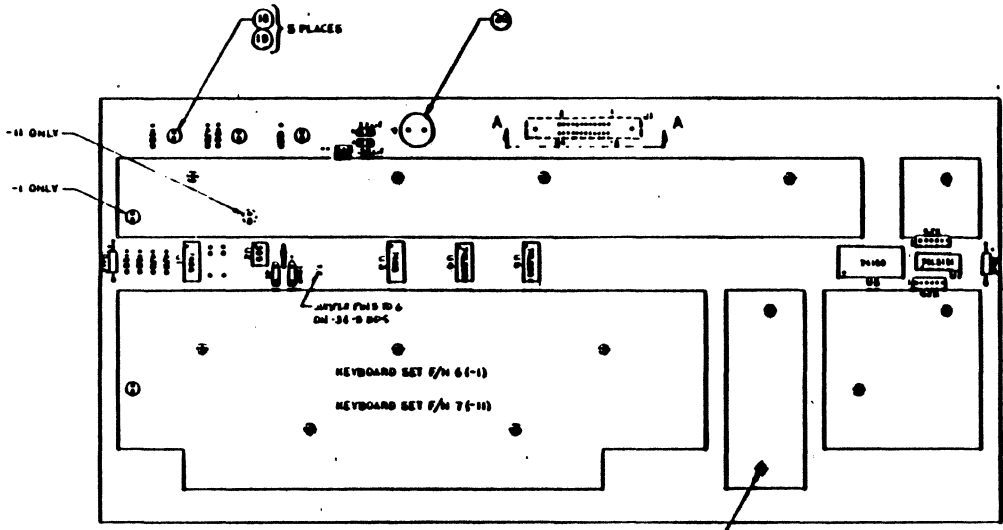




SIZE	CODE IDENT NO.	DWG NO.	LTR
C	98438	129833	A
SCALE NONE		SHEET 7	



REV	DATE	BY	DESCRIPTION	DATE	APPROVED
A			INC ASSEMBLY ADDED JUMPER FOR 3-1-8		
B			INC ASSEMBLY 3-4-8 AND D.N. 478		
C			INC DCN 478		



-1 ASSEMBLY  
-11 ASSEMBLY  
(-T BOARD)

FOR SCHEMATIC SEE 129886

SEE SEPARATE PARTS LIST R/129834

UNLESS OTHERWISE SPECIFIED	CONTR NO.	 LEAR SIEGLER INC. ELECTRONIC INSTRUMENTATION DIVISION IRVINE, CALIFORNIA 92617
ALL IN INCHES	DR 4-116	
BALANCED	DRN	<b>PC BOARD ASSY</b> <b>KEYBOARD ADM-42</b>
U.S.S.	ENGR	
U.S.S. 80	FRY	REV 1
U.S.S. 80	REV 2	REV 2
U.S.S. 80	REV 3	REV 3
U.S.S. 80	REV 4	REV 4
U.S.S. 80	REV 5	REV 5
U.S.S. 80	REV 6	REV 6
U.S.S. 80	REV 7	REV 7
U.S.S. 80	REV 8	REV 8
U.S.S. 80	REV 9	REV 9
U.S.S. 80	REV 10	REV 10
U.S.S. 80	REV 11	REV 11
U.S.S. 80	REV 12	REV 12
U.S.S. 80	REV 13	REV 13
U.S.S. 80	REV 14	REV 14
U.S.S. 80	REV 15	REV 15
U.S.S. 80	REV 16	REV 16
U.S.S. 80	REV 17	REV 17
U.S.S. 80	REV 18	REV 18
U.S.S. 80	REV 19	REV 19
U.S.S. 80	REV 20	REV 20
U.S.S. 80	REV 21	REV 21
U.S.S. 80	REV 22	REV 22
U.S.S. 80	REV 23	REV 23
U.S.S. 80	REV 24	REV 24
U.S.S. 80	REV 25	REV 25
U.S.S. 80	REV 26	REV 26
U.S.S. 80	REV 27	REV 27
U.S.S. 80	REV 28	REV 28
U.S.S. 80	REV 29	REV 29
U.S.S. 80	REV 30	REV 30
U.S.S. 80	REV 31	REV 31
U.S.S. 80	REV 32	REV 32
U.S.S. 80	REV 33	REV 33
U.S.S. 80	REV 34	REV 34
U.S.S. 80	REV 35	REV 35
U.S.S. 80	REV 36	REV 36
U.S.S. 80	REV 37	REV 37
U.S.S. 80	REV 38	REV 38
U.S.S. 80	REV 39	REV 39
U.S.S. 80	REV 40	REV 40
U.S.S. 80	REV 41	REV 41
U.S.S. 80	REV 42	REV 42
U.S.S. 80	REV 43	REV 43
U.S.S. 80	REV 44	REV 44
U.S.S. 80	REV 45	REV 45
U.S.S. 80	REV 46	REV 46
U.S.S. 80	REV 47	REV 47
U.S.S. 80	REV 48	REV 48
U.S.S. 80	REV 49	REV 49
U.S.S. 80	REV 50	REV 50
U.S.S. 80	REV 51	REV 51
U.S.S. 80	REV 52	REV 52
U.S.S. 80	REV 53	REV 53
U.S.S. 80	REV 54	REV 54
U.S.S. 80	REV 55	REV 55
U.S.S. 80	REV 56	REV 56
U.S.S. 80	REV 57	REV 57
U.S.S. 80	REV 58	REV 58
U.S.S. 80	REV 59	REV 59
U.S.S. 80	REV 60	REV 60
U.S.S. 80	REV 61	REV 61
U.S.S. 80	REV 62	REV 62
U.S.S. 80	REV 63	REV 63
U.S.S. 80	REV 64	REV 64
U.S.S. 80	REV 65	REV 65
U.S.S. 80	REV 66	REV 66
U.S.S. 80	REV 67	REV 67
U.S.S. 80	REV 68	REV 68
U.S.S. 80	REV 69	REV 69
U.S.S. 80	REV 70	REV 70
U.S.S. 80	REV 71	REV 71
U.S.S. 80	REV 72	REV 72
U.S.S. 80	REV 73	REV 73
U.S.S. 80	REV 74	REV 74
U.S.S. 80	REV 75	REV 75
U.S.S. 80	REV 76	REV 76
U.S.S. 80	REV 77	REV 77
U.S.S. 80	REV 78	REV 78
U.S.S. 80	REV 79	REV 79
U.S.S. 80	REV 80	REV 80
U.S.S. 80	REV 81	REV 81
U.S.S. 80	REV 82	REV 82
U.S.S. 80	REV 83	REV 83
U.S.S. 80	REV 84	REV 84
U.S.S. 80	REV 85	REV 85
U.S.S. 80	REV 86	REV 86
U.S.S. 80	REV 87	REV 87
U.S.S. 80	REV 88	REV 88
U.S.S. 80	REV 89	REV 89
U.S.S. 80	REV 90	REV 90
U.S.S. 80	REV 91	REV 91
U.S.S. 80	REV 92	REV 92
U.S.S. 80	REV 93	REV 93
U.S.S. 80	REV 94	REV 94
U.S.S. 80	REV 95	REV 95
U.S.S. 80	REV 96	REV 96
U.S.S. 80	REV 97	REV 97
U.S.S. 80	REV 98	REV 98
U.S.S. 80	REV 99	REV 99
U.S.S. 80	REV 100	REV 100

129834 C


PC BOARD ASSY  
KEYBOARD ADM-42  
129834  
C



**REVISIONS**

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		INCORR ADCN 1-6 1-18-80 <i>Revised</i>	1/21/80 1/30/80	R. C. Jones B. Hyden
C		SKIP REV LEVEL B TO CORRESPOND WITH 129834. INCORP DCN 498 1-18-80	1/21/80 1/30/80	R. C. Jones B. Hyden

		129810
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 XX ± .03 XXX ± .010 ANGLES ± 0.5° MACH. FIN. J	DR <i>W. Kelly</i> 4-11-78	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.			
	CHK		P.C. BOARD ASSY - KEYBOARD, ADM-4		
	DSGN	PROJ <i>CH. Johnson</i> 4/15/78	SIZE	CODE IDENT	REV
	ENGR	REL <i>H. Turner</i> 4/15/78	<b>A</b>	<b>98438</b>	<b>PL129834</b>
	CUSTOMER APPD		SCALE		SHEET 1 OF 3

FORM 10-1008



FIND NO.	QTY REQD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-11	-1				
1		✓		-1	P.C. BOARD ASSY - KBD	STO
2		✓		-11	P.C. BOARD ASSY - KBD	G.E.
3						
4						
5		1 1		-7	PRINTED WIRING BOARD	
6				129828-1	KEYBOARD SET	
7		1		129825-1	KEYBOARD SET	
8						
9		1 1		12834B-159	I.C.	
10		1 1		-555		
11		1 1		-7805		
12		1 1		-06		
13						
14		2 2		129467-04		
15						
16		1 1		-151		
17		1 1		128578-04		
18		5 5		5082-4650	LED	HEWLETT-PACKARD
19		3 3		211447	FORMING BLOCK	TEC
20		1 1		AI-254	AUDIO INDICATOR	PROJECTS UNLIMITED
21		1 1		552221-1	CONNECTOR	AMP
22		1 1		552563-1	HARDWARE KIT	AMP
23						
24						
25						

SIZE A  
 FSCM NO. 98438  
 SH PL/29834  
 2  
 REV C






FIND NO.	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-//	-/				
26		2 2		129476-472	RES MODULE 4.7K	
27						
28		5 5		128533-121	RES 120	
29		1 1		-472	4.7K	
30		1 1		-154	150K	
31						
32						
33		1 1		128518-103	CAP .01 UF	
34						
35		2 2		128518-334	.33 UF	
36		1 1		128518-225	2.2 UF	
37		2 2		129469-106	10UF	
38						
39						
40						
41						
42		14 14		4-40 X 3/8 TYPE F	SCREW, SLOT, PAN HD	
43		2 2		823411	WASHER, FL #4, (.2500D X .115 ID X .032)	
44					SMALL PATTERN	
45						
46						
47						
48						
49						
50						

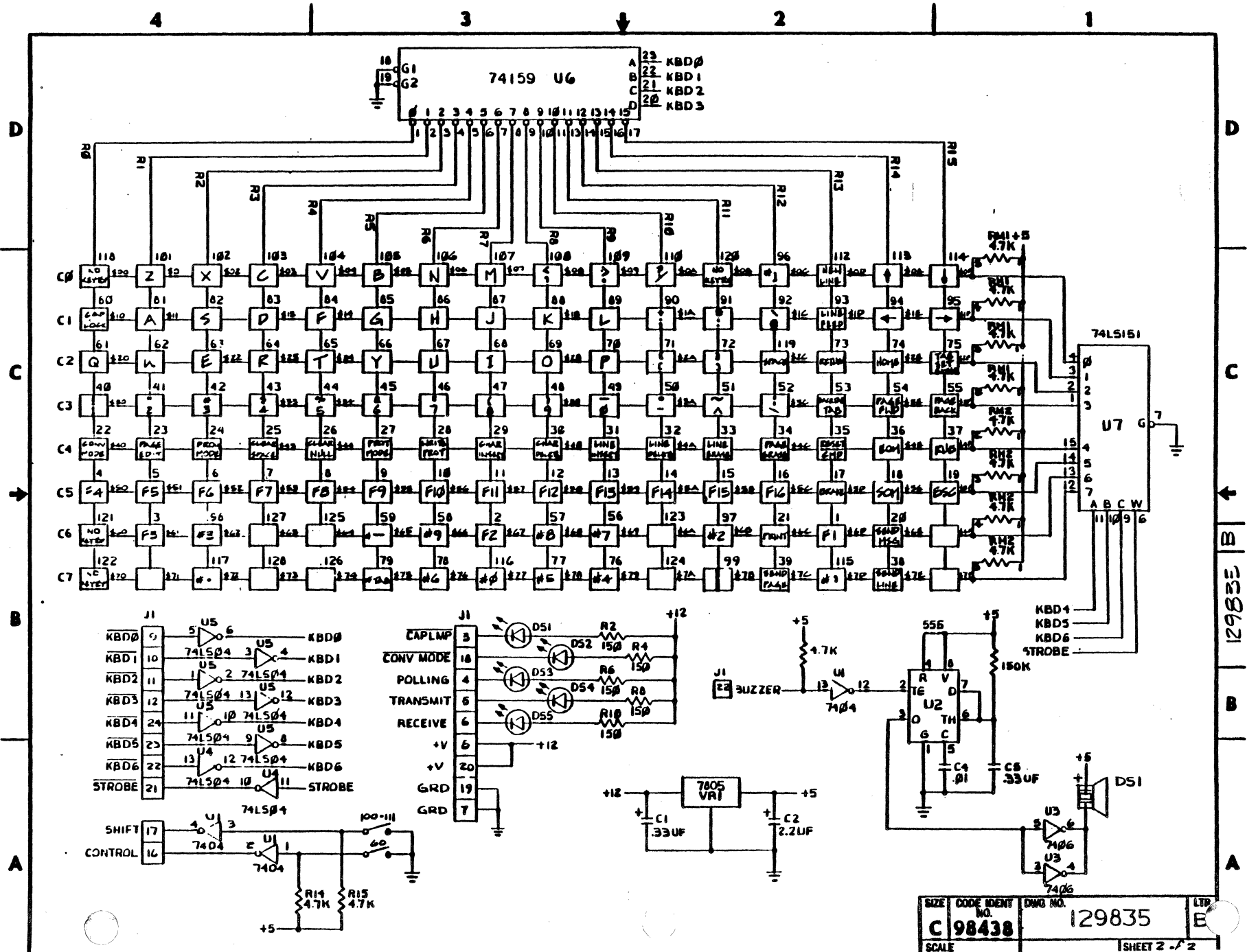
SIZE **A**  
 FSCM NO. **98438**  
 SH **PL/29834**  
 REV **C**



REVISIONS					
SHT	ZONE	LTR	DESCRIPTION	DATE	APPROVED
		A	KEY NOMENCLATURE	5-26-78	[Signature]
		B	INCRP DCN NO. 498	1/17/80	[Signature]

UNLESS OTHERWISE SPECIFIED: DIM. IN INCHES		CONTR NO DR 725 7-5-78		 <b>LEAR SIEGLER, INC.</b> ELECTRONIC INSTRUMENTATION DIVISION ANAHEIM, CALIFORNIA 92803	
TOLERANCES: .X±.1 .XX±.03 .XXX±.010 ANGLES ±0.5°		CHK DSGN [Signature] 2-5-78 ENGR PROJ [Signature] 7/6/78 REL [Signature] 7/6/78		<b>SCHEMATIC-KEYBOARD</b> <b>ADM-42</b>	
DASH NO	NEXT ASSY	USED ON	APPD	SIZE	FSCM NO.
	APPLICATION		APPD	C	98438
PROPRIETARY LEGEND EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF LEAR SIEGLER, INC. ARE ISSUED IN STRICT CONFIDENCE, AND SHALL NOT BE REPRODUCED, COPIED, OR USED FOR THE MANUFACTURE OR SALE OF THE APPARATUS WITHOUT WRITTEN PERMISSION			DWG NO <b>129835</b>		LTR B
			SCALE		SHEET 1 OF 2


129835



REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		INC ADCN 1-4 ADDED -11 SHT 4,5 REDRAWN; ADDED NEW SHT 5 RENUMBER SHT 5 AS SHT 6 W. Kelly 5/27/79	5-10-79 5/27/79	W. Kelly B. Hydeman
B		INC. ADCN 5-7. DCN 469, 574. ADDED SHT 7 & LSI P/N TO PARTS LIST. W. Kelly 2-22-80	3-20-80 3/22/80	W. Kelly B. Hydeman

-11	129542	
-1	129842	DL129810
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 .XX ± .03 .XXX ± .010 ANGLES ± 0.5° MACH. FIN. J	DR <i>W Kelly 6-30-71</i>	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.	WIRE ASSY - MONITOR ADM 42	
	CHK			
	DSGN	SIZE CODE IDENT REV <b>A 98438</b> 129839 B		
	ENGR <i>B. Hydeman 4/30/79</i>			
	PROJ <i>J. Zurner 4/30/79</i>	CUSTOMER APPD	SCALE	SHEET 1 OF 7

FORM 10-1008

NOTES:

1. APPLY PART NO. TO TAG.
2. UL LISTED & CERTIFIED PART OR MATERIAL.
3. BRAID CABLE JACKET WITH 24 CARRIER NEW ENGLAND BUTT BRAIDING MACHINE. BRAID ANGLE 45°, 90% COVERAGE, BRAID IS NYLON, YARN SIZE 840/2, LIGHT GRAY (TO MATCH 129726 CABLE)

Form 9 10-1011a

SIZE	CODE IDENT		
A	98438	129839	8
SCALE	NONE		SHEET 2

FIND NO.	QTY RECD			STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
			-1/11				
1			✓		129839 - 1/-11	WIRE ASSY	
2			A/R		812112	WIRE, TWISTED PAIR, UL 1061, 7x30 STRAND (BLK/WHT)	
3			1		801029	POT, 100Ω (R1-CONTRAST)	
4			1		801026	POT, 100K (R2-BRIGHTNESS)	
5			1		809206	CONNECTOR HOUSING	P6 NOTE 2
6			1		809207	CABLE CLAMP	
7			7		809079	CONTACT, PIN, 24-20AWG	
8			1		835010	TERM LUG, SPADE, #6	
9			1		809025	HOUSING, CONN.	P101 NOTE 2
10			9		809062	CONTACT	
11			6		809038	CONTACT	
12			A/R			BRAID CLEAR	NOTE 3
13			A/R		839040	INSULATION (.106 ID) 20AWG PVC	NOTE 2
14			1		830026	MARKER TIE	NOTE 1
15			8		830003	CABLE TIE	
16			A/R		812019	WIRE, INSL, UL 1061 WHT	NOTE 2
17			↑		812091	BLK	
18			↑		812020	RED	
19			↑		812092	GRN	
20			↑		812021	YEL	
21			↑		812093	BLU	
22			↑		812022	BRN	
23			↑		812023	ORN	
24			↓		812089	GRY	
25			A/R		812090	WIRE, INSL, UL 1061 VIO	

SIZE A  
 FSCM NO. 98438  
 SH 129839  
 3  
 REV B



LINE NO.	TERMINATION INFORMATION						WIRE INFORMATION					ROUTING	LGTH		
	CABLE NO. <small>FUNCTION</small>	WIRE NO. OR COLOR	42 "MONITOR" FROM		CRT TO		FIND NO./NOTES								
			REF DES	PIN	REF DES	PIN	FROM END		TO END		WIRE OR CABLE				
							CONN	TERMINATION	CONN	TERMINATION					
1	EQ GRD	GRN	P6	1	GRD SCREW			7		8	19		54		
2	HDR	BLU		2	P101	6		7		10	21		54		
3	VDR	BLK		3	P101	9		7		10	17		54		
4	VIDEO	BLK		4	R1	3	5, 6	7	9	△ 11	2		5 1/2		
5	GRD	WHT		6	R1	1		7		(SECOND WIRE)					
6	+V	V10		5	P101	7		7				10	25		54
7	GRD	WHT		7	P101	1		7				10	16		54
8		-		8	(NOT USED)										
9		-	P6	9	(NOT USED)										
10	GRD	GRAY	R1	1	P101	10		3		(TWO WIRES) △ 11		10	24		24
11	VIDEO	YEL	R1	2		8		△ 11		10	20		24		
12	+28 BRT	ORN	R2	3		2		△ 11		10	23		23		
13	-100 BRT	BRN	R2	1		3	4	△ 11		10	22		23		
14	BRT	RED	R2	2	P101	4		△ 11		10	18				
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															

CODE NOTES: △ INSULATE TERMINATION WITH F/N 13.

7-60010 (7-4)

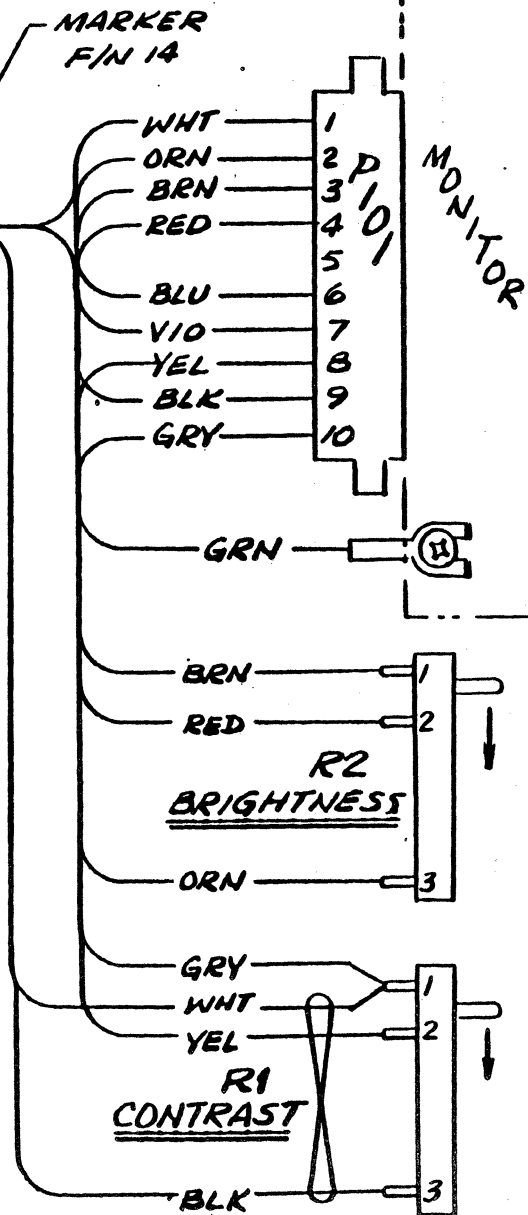
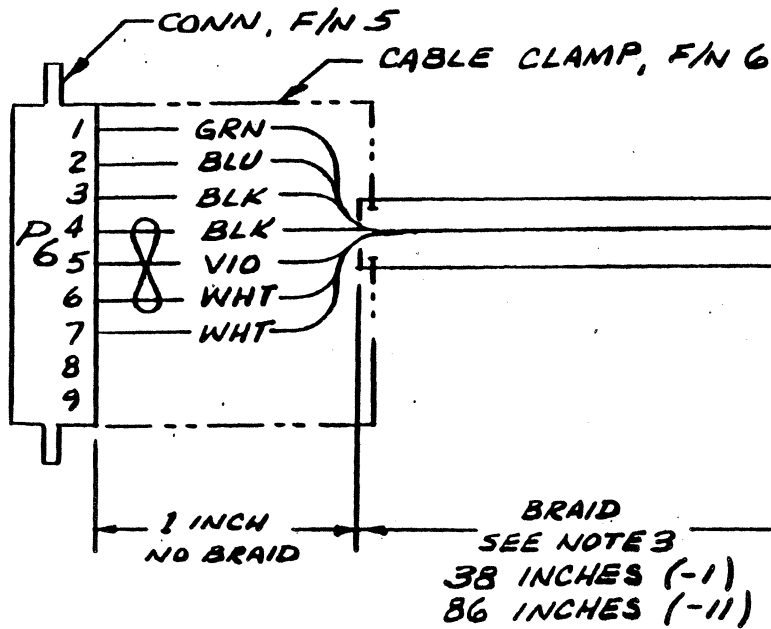
SIZE	CODE IDENT		
A	98438	129839	B
SCALE		SHEET	4

LINE NO.	TERMINATION INFORMATION						WIRE INFORMATION					ROUTING	LGTH
	CABLE NO. <small>FUNCTION</small>	WIRE NO. OR COLOR	42 MONITOR FROM		CRT TO		FIND NO./NOTES						
			REF DES	PIN	REF DES	PIN	FROM END		TO END		WIRE OR CABLE		
							CONN	TERMINATION	CONN	TERMINATION			
1	EQ GRD	GRN	P6	1	GRD SCREW			7		8	19		102
2	HDR	BLU		2	PI01	6		7		10	21		102
3	VDR	BLK		3	PI01	9		7		10	17		102
4	VIDEO	BLK		4	RI	3		7		△ 11	2		10 1/2
5	GRD	WHT		6	RI	1	5,	7	9	(SECOND WIRE)			
6	+V	VIO		5	PI01	7	6	7		10	25		102
7	GRD	WHT		7	PI01	1		7		10	16		102
8		-		8	(NOT USED)								
9		-	P6	9	(NOT USED)								
10	GRD	GRAY	R1	1	PI01	10	3	(TWO WIRES) 11		10	24		24
11	VIDEO	YEL	R1	2		8		△ 11		10	20		24
12	+28 BRT	ORN	R2	3		2		△ 11		10	23		23
13	-100 BRT	BRN	R2	1		3	4	△ 11		10	22		23
14	BRT	RED	R2	2	PI01	4		△ 11		10	18		23
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													

CODE NOTES: △ INSULATE TERMINATION WITH F/N 13

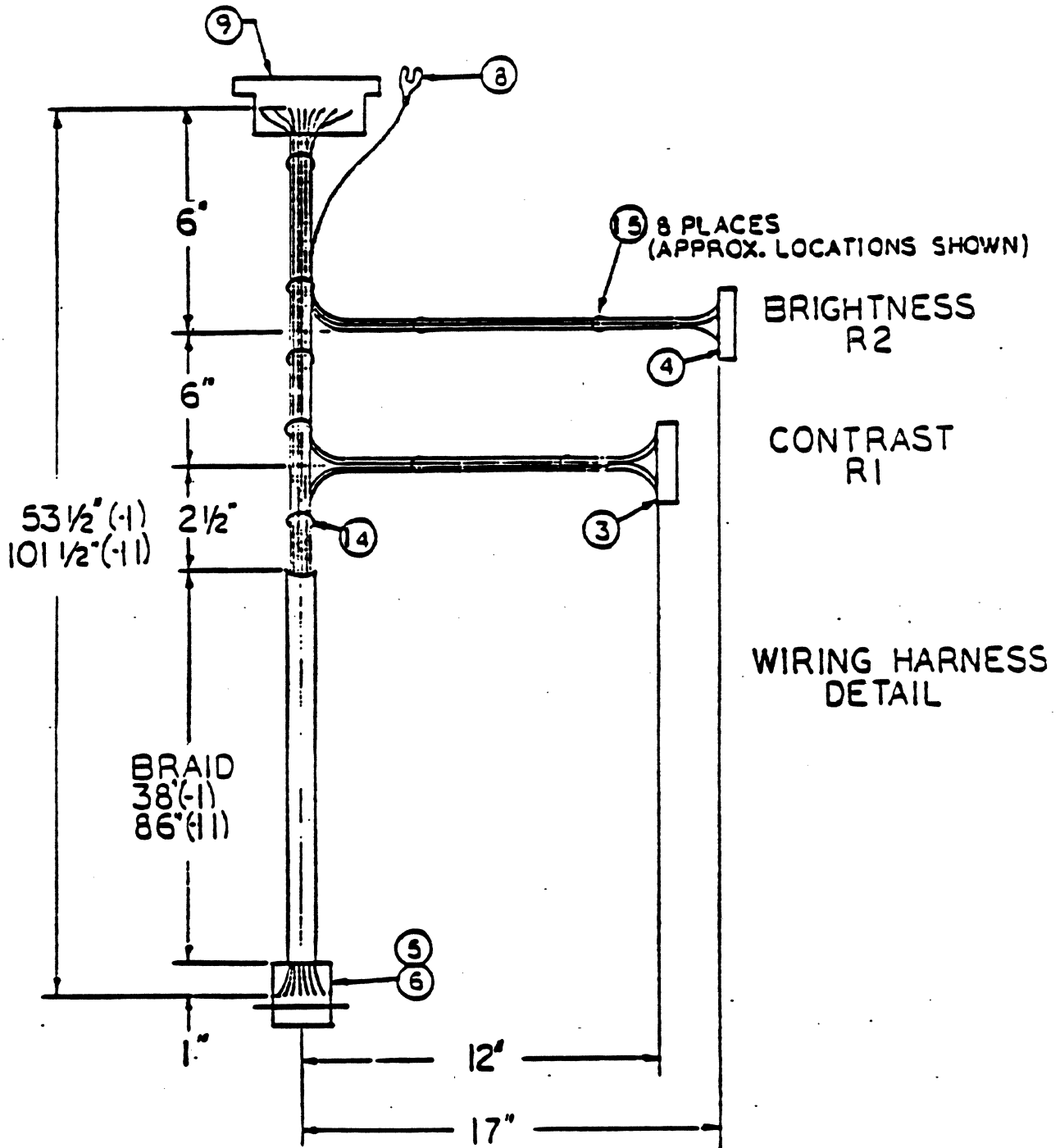
7-0601d (7-64)

SIZE	CODE IDENT	REV
A	98438	B
SCALE	SHEET	5



DIAGRAM

SCALE	SIZE	CODE IDENT	SHEET
A	98438	129839	6



NOTE:  
ALL DIMENSIONS ±1/2"

SIZE <b>A</b>	CODE IDENT <b>98438</b>	<b>129839</b>	REV <b>B</b>
SCALE NONE		SHEET 7	

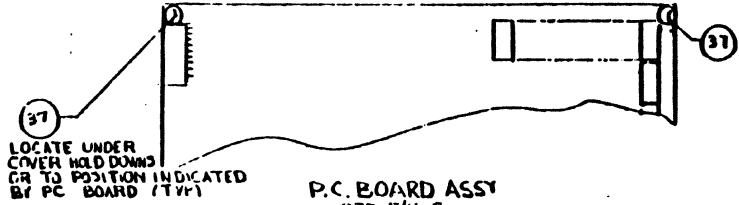
4

3

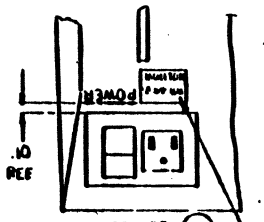
2

1

FRONT

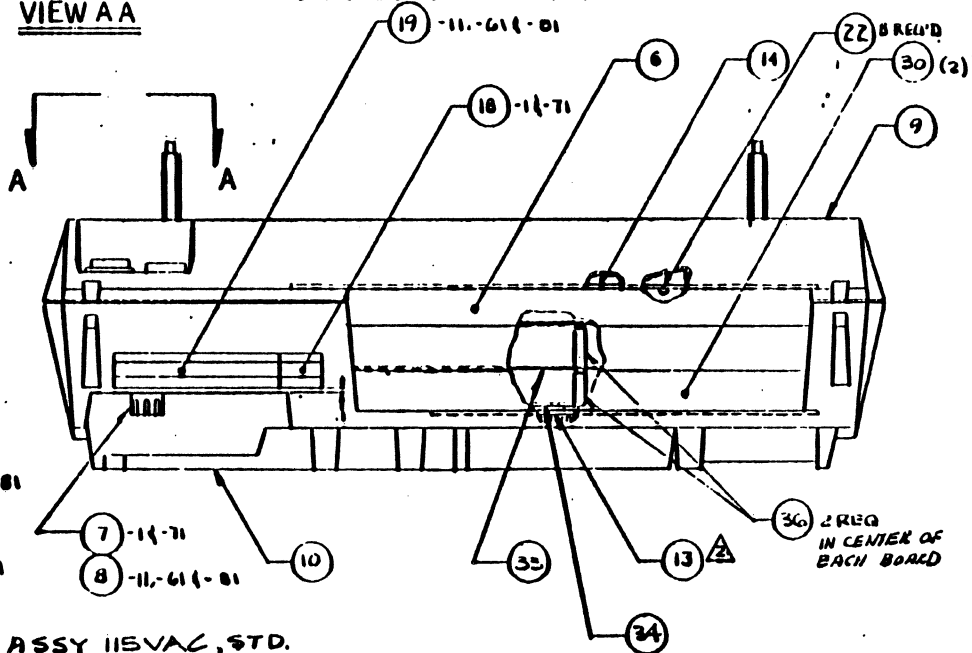
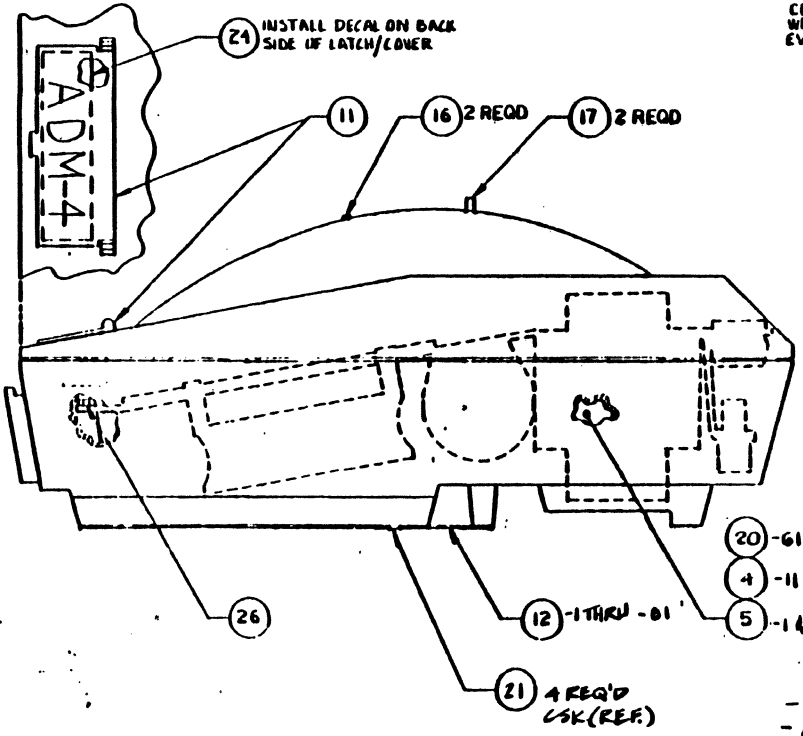


P.C. BOARD ASSY  
REF F/N G



VIEW A A

REVISIONS					
SHT	ZONE	LTR	DESCRIPTION	DATE	APPROVED
		A	REVISED DRAWING TO INCORPORATE FILLER BOARDS. CREATED -11-21 -51, -41 & -61 & ADDED F/N 33, 25, 36 & 37 & 38.	1-20-79 1-20-79	<i>[Signature]</i> <i>[Signature]</i>
		B	REMOVED ALL REF TO ASSEMBLY -21 THRU -51. & ADDED ASSEMBLY -61. INCORPORATED ADCN 2 THRU 4. ADCN 3 IS A REWORK VARIATION AND WILL NOT BE INCORPORATED ON DWG. G. JARUSEK 6/7/78	5/23/78 6/23/78	<i>[Signature]</i> <i>[Signature]</i>
		C	INCORP ADCN 5, DCN 411, 414.	11-6-79 7/6/79	<i>[Signature]</i> <i>[Signature]</i>
		D	INC DCN 915	1-19-80 1/14/80	<i>[Signature]</i> <i>[Signature]</i>



- 1 ASSY 115VAC, STD.
- 11 ASSY 230VAC, STD.
- 61 ASSY 230VAC STD Δ
- 71 ASSY 115 VAC, STD
- 81 ASSY 230 VAC, STD

NOTE:

1. FOR OPTIONS REFER TO 129542.
- Δ BOND IN PLACE WITH HOT MELT.
- Δ -61 ASSY TO REPLACE -11 ASSY. -61 HAS NEW PWR CONN. FOR MONITOR ATTACHMENT & WILL MATE WITH MONITOR 129842-31 ONLY. SEE 129842 FOR INTERCHANGABILITY DATA.

FOR SEPARATE PARTS LIST SEE PL 129840

-81	129810		UNLESS OTHERWISE SPECIFIED: DIM. IN INCHES TOLERANCES: XX.1 XX.03 XXX.010 ANGLES 40.5°	CONTR NO.	
-71	129810			DR. <i>[Signature]</i> 6/17/78	
-61	129810			CHK	
-11	129810			DSGN	
-1	129810	DL129810		ENGR	
DASH NO.	NEXT ASSY	USED ON	APPLICATION	PROJ. <i>[Signature]</i> 7/15/78	REL. <i>[Signature]</i> 4/6/78
PROPRIETARY LEGEND EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF LEAR SIEGLER, INC. AND ARE KEPT IN STRICT CONFIDENCE AND SHALL NOT BE REPRODUCED.				APPD	

**LEAR SIEGLER, INC.**  
ELECTRONIC INSTRUMENTATION DIVISION  
ANAHEIM, CALIFORNIA 92803

**TERMINAL CONTROL UNIT**

**ASSY - ADM 42**

SIZE	FSCM NO.	DWG NO.	LTR
C	98438	129840	D

D

C

D

B

A


129840

**REVISIONS**

LTR	SHEET	DESCRIPTION	DATE	APPROVED
	A	INC. ADCN 1 THRU 8 & CREATED -11, -21 & -31. 7.E.5 3-6-79	4-30-79 4/20/79	W. Kelly Blyden
	B	INC. ADCN # 9 THRU 11. DELETE ALL REF TO ASSEMBLIES - 21 THRU -51 & ADDED - 61 ASSY. G. JAROSEK 7/3/79	8-9-79 9/13/79	B. Darnick Blyden
	C	INC ADCN 12, DCN 461 & 414 RM 3.4.80	4-5-79 3-5-79 3-6-80	W. Kelly Blyden
	D	INC DCN 915 BAB 6-17-80	6-17-80 6/18/80	W. Kelly Blyden

▲ -61 ASSY TO REPLACE -11 ASSY.  
 -61 HAS NEW POWER CONN. FOR  
 MONITOR ATTACHMENT. WILL MATE  
 WITH MONITOR 129842-31 ONLY  
 NOTES. SEE 129842 FOR INTERCHANGABILITY  
 DATA.

-61	129810	DL129810
-11	129810	DL29810
-1	129810	DL29810
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 XX ± .03 XXX ± .010 ANGLES ± 0.5° MACH. FIN. J	DR <i>W. Kelly 4/27/79</i>	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.	TERMINAL CONTROL UNIT ADM-42	SIZE <b>A</b>	CODE IDENT <b>98438</b>	PL129840	REV <b>D</b>
	CHK						
	DSGN						
	ENGR						
	PROJ <i>H. Turner 5/2/79</i>						
REL <i>H. Turner 5/3/79</i>							
CUSTOMER APPD							
				SCALE		SHEET 1 OF 3	



FIND NO.	QTY RECD			STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	<del>1</del>	<del>61</del>	<del>1</del>				
1	/		✓		-1	TERMINAL CONTROL UNIT 115V	
2	/		✓		-11	" " " 230V	
3	/	✓			-61	TERMINAL CONTROL UNIT 230V	△
4	/	1			129730-21	POWER SUPPLY 230V	
5	/		1		129730-31	POWER SUPPLY 115V	
6	/	1	1		129830-11	P.C. BOARD ASSY - LOGIC	
7	/		1		313003	FUSE 3A	LITTLE FUSE
8	/	1			31301.5	FUSE 1.5A	"
9	/	1	1		129705-9	COVER	
10	/	1	1		129705-3	BASE	
11	/	1	1		129718-06	LATCH COVER/LOGO	
12	/	1	1		129748-3	BOTTOM DEFLECTOR	
13	/	1	1		129750-3	INNER CLOSURE	
14	/	1	1		129749-5	TOP CLOSURE	
15	/				129705-7	COVER	
16	2/2	2	2	2	129751-3	PIN, NYLON	
17	2/2	2	2	2	129766-3	PIN, STEEL	
18	/		1		129497-47	NAMEPLATE UL	
19	/	1	1		129717-27	NAMEPLATE 230V	
20	/	1			129730-41	POWER SUPPLY 230VAC	
21	4/4	4	4	4	#4 x 3/8	SCREW OVAL HD. PUSH TITE	ENDURION FINISH
22	8/8	8	8	8	BZ1403	SCREW #4 X .312 PAN HD	
23	/				131370-1	PC BD ASSY	
24	/				131397	DECAL	
25	/		1		129497-55	NAMEPLATE	

SIZE A  
 FSCM NO. 98438  
 SH PL129840  
 REV D



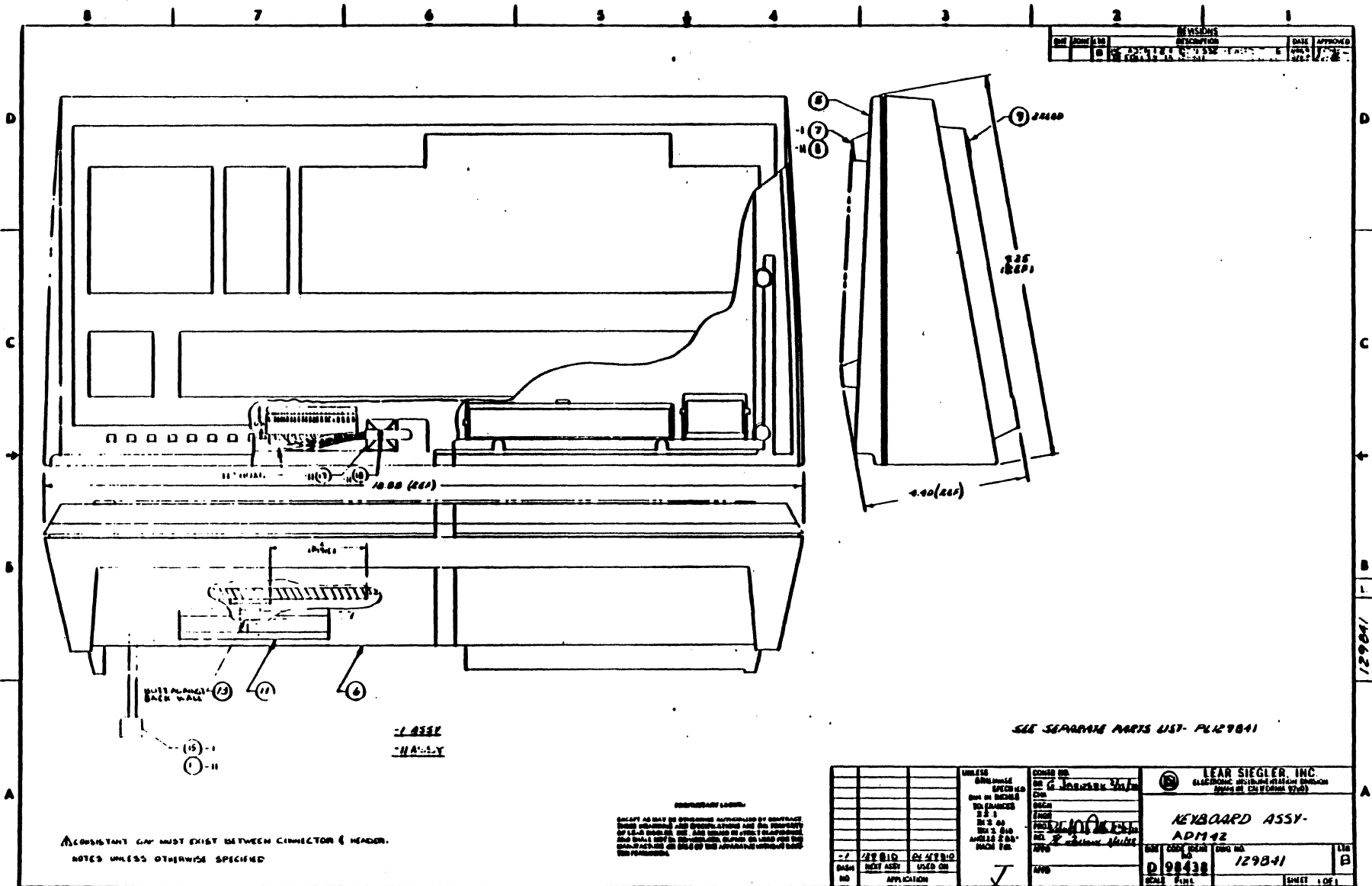


FIND NO.	QTY REQD				STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	8/2	6/1	1/1	-1				
26	1	1	1	1		10-32 x 3/8	SCREW, SEMS, HEX INDENTED	
27	/							
28	/							
29	/							
30	2	2	2	2		129746-131	CLOSURE (BLANK)	
31	/							
32	/							
33	1	1	1	1		129837-05	FILLER PANEL CENTER	
34	1	1	1	1		129837-03	FILLER PANEL BOTTOM	
35	/							
36	2	2	2	2		129747-3	P.C. BOARD SPACER	
37	2	2	2	2		5816 x 3/8 DIA	PAD	DECOFELT
38	/							
39	/							
40	/					129840 - 71	TERM CONTROL UNIT-115V	
41	/					- 81	TERM CONTROL UNIT-230V	
42	/							
43	/							
44	/							
45	/							
46	/							
47	/							
48	/							
49	/							
50	/							

A SIZE  
 98438 FSCM NO.  
 SH PL 129840  
 3  
 REV D







REV		DESCRIPTION	DATE	APPROVED
0	1	INITIAL DESIGN	12/28/81	
1	2	REVISED TO ADD DIMENSIONS	1/15/82	

CONSISTENT GAP MUST EXIST BETWEEN CONNECTOR & HEADER.  
NOTES UNLESS OTHERWISE SPECIFIED

**IMPORTANT LABEL:**  
EXCEPT AS MAY BE OTHERWISE AUTHORIZED BY CONTRACTOR, THESE DIMENSIONS AND SPECIFICATIONS ARE THE PROPERTY OF LEAR SIEGLER, INC. AND SHALL BE KEPT IN CONFIDENTIALITY AND SHALL NOT BE REPRODUCED, COPIED OR LOANED FOR THE MANUFACTURE OR USE OF THE APPLICANT WITHOUT THE WRITTEN PERMISSION.

SEE SEPARATE PARTS LIST - PLK 9841

UNLESS OTHERWISE SPECIFIED DIM IN INCHES TOLERANCES FRACTIONS DECIMALS ANGLES RADIUS DIMENSIONS	CONTR. NO. BY G. JOHNSON DATE 12/28/81 12/28/81 12/28/81 12/28/81 12/28/81	LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIVISION 3000 W. CHRYSLER BLVD. TROY, MI 48068
129841 KEYBOARD ASSY	129841	KEYBOARD ASSY - AD1142
DATE: 12/28/81 BY: G. JOHNSON CHECKED: [Signature] SCALE: 1:1	DATE: 12/28/81 BY: [Signature] CHECKED: [Signature] SCALE: 1:1	DATE: 12/28/81 BY: [Signature] CHECKED: [Signature] SCALE: 1:1

129841

A


B

SHEET 1 OF 1

REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
	A	INC. ADCN'S 1 THRU 6 CREATED -11  7ES 3-26-79	3/26/79 4/2/79	R.P. Polloway B. Hyden
	B	INC ADCN'S 7 & 8, DCN 532 w.h. 1-25-80 RM	1/28/80 2/4/80	R. O. O'Connell B. Hyden

-1	129840	DL129810
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 XX ± .03 XXX ± .010 ANGLES ± 0.5° MACH. FIN. J	DR <i>W. Kelly</i> 4/27/78	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.			
	CHK		KEYBOARD ASSY - ADM-42		
	DSGN	ENGR	PROJ <i>D. H. Johnson</i> 5/2/78	SIZE	CODE IDENT
	REL <i>J. Turner</i> 5/3/78	CUSTOMER APPD	SCALE	A	98438
					PL129841
				REV B	
				SHEET 1 OF 2	

FORM 10-100B

FIND NO.	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-	/				
1		✓		-1	KEYBOARD ASSY, ADM-42	
2		✓		-11	KEYBOARD ASSY, ADM 42	
3						
4						
5		1 1		129706-9	COVER	
6		1 1		129706-3	BASE	
7		1		129834-1	P.C. BOARD ASSY	
8		1		129829-00	KEYBOARD ASSY	
9		2 2		5816 - 3/8 DIA	PAD, 1/16 THK	DELCOBELT CORP
10						
11		1 1		129717-29	NAME PLATE	
12		1 1		129836-3	DECAL	
13		1 1		021-0375	CABLE CLIP	DEK
14						
15		1		129723-1	CABLE ASSY.	
16		1		129817-1	CABLE ASSY	
17		1		B30002	TIE MOUNT, ADHESIVE BACK	
18		1		B30003	CABLE TIE	
19						
20						
21						
22						
23						
24						
25						

SIZE A  
 FSCM NO. 98438  
 SH PL/29841  
 REV B




REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		INC ADCN #1 THRU 5, CREATED - 21 ASSY. 7.25. 2-16-79	3-21-79	<i>G. Jarosek</i> <i>E. Pollock</i>
B		INC ADCN 6,8,9 & DCN 412 & 645 DCN 7. REWORK ONLY. REM-2-21-80	2/26/80 4/18/80	A. Patel <i>[Signature]</i>

2. PANEL FILTER MATERIAL SHALL BE POLYCARBONATE. PANEL SHALL HAVE CLEAR ADHESIVE STRIPS.  
1. UL RECOGNIZED COMPONENT

NOTE:

-1	129810	DL129810
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 .XX ± .03 .XXX ± .010 ANGLES ± 0.5° MACH. FIN. ✓	DR <i>G. JAROSEK</i> 9/30/78	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.	PARTS LIST - MONITOR ASSY ADM 42	
	CHK			
	DSGP	PROJ <i>[Signature]</i> 7/5/78	SIZE	CODE IDENT
	ENGR	REL <i>H. Turner</i> 7/4/78	A	98438
	CUSTOMER APPD		PL129842	REV B
		SCALE	SHEET 1 OF 3	

FORM 10-102B



FIND NO.	QTY RECD				STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-31	-21	-11	-1				
1				✓		-1	MONITOR ASSY 115VAC	
2			✓			-11	MONITOR ASSY WITH OUT POWER SUPPLY	
3	1	1	1	1		129704-03	COVER	
4	1	1	1	1		129704-09	BASE	
5								
6	1	1		1		129778-11	MONITOR, WITHOUT COMPOSITE VIDEO	
7			1			129778-21	MONITOR, WITHOUT COMPOSITE VIDEO & P.S.	
8								
9								
10	1	1	1	1		129712-41	JUMPER ASSY, GRD	
11		✓				-21	MONITOR ASSY 230VAC	
12	✓					-31	MONITOR ASSY 230VAC/SPECIAL CONN.	
13								
14								
15	1	1	1	1		129839-1	MONITOR CABLE, VIDEO	
16	1	1	1	1		129484-9	SCREEN	
17		1		1		129455-9	PWR CORD	
18	1			1		129497-49	NAMEPLATE - UL	
19			1			129717-37	NAMEPLATE	
20	1	1	1	1		128214-7	LABEL WARNING	
21	1	1				129717-35	NAMEPLATE	
22	2	2	2	2		129849-3 (TYP2)	RETAINER PANEL	
23	1					129844-1	PWR CORD	
24		1				129777-41	POWER ADAPTER ASSY	230VAC
25				1		129777-31	POWER ADAPTER ASSY	115 VAC

SIZE A  
 FSCM NO. 98438  
 SH PL129842  
 2  
 REV B





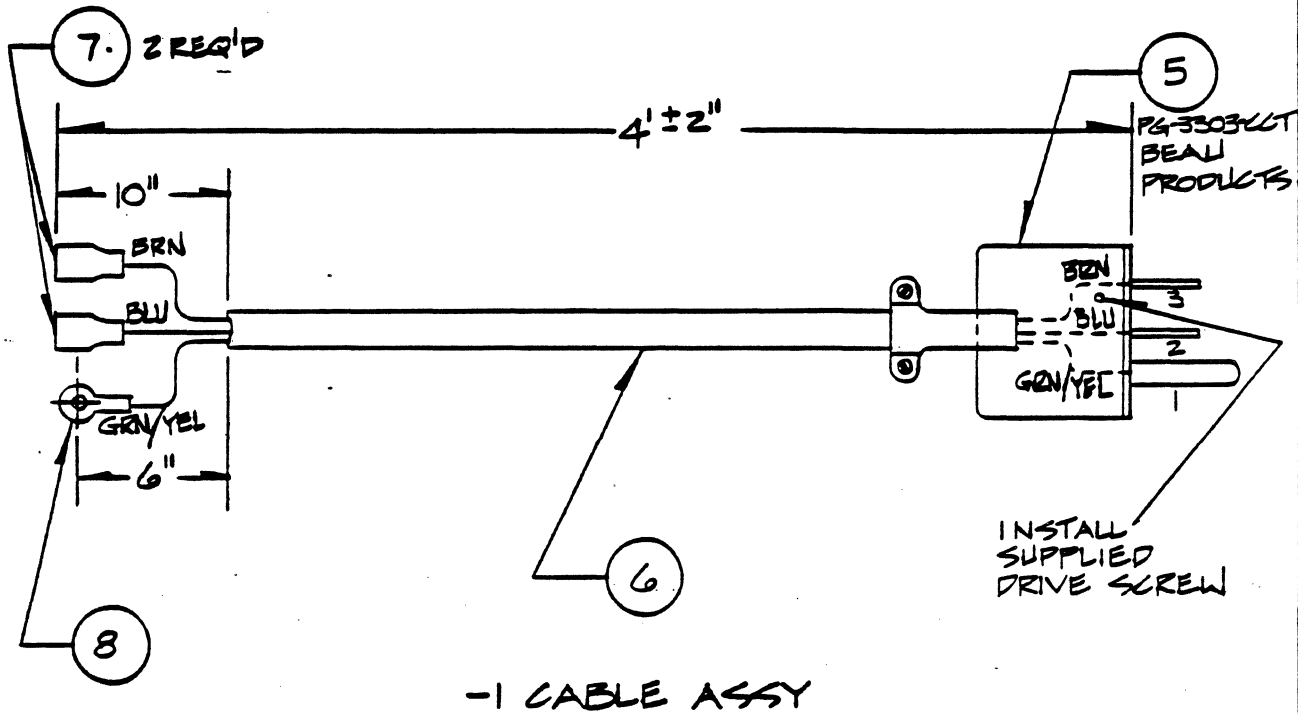
FIND NO.	QTY REQD				STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-31	-21	-11	-1				
26	1	1			B40026	FUSE .75 AMP SLO BLO	LITTELFUSE	
27				1	B40013	FUSE 1.5 AMP SLO BLO	LITTELFUSE	
28	1	1		1	B40005	FUSE HOLDER	LITTELFUSE	
29								
30	1	1	1	1	B19062	FACE PANEL	JUMFLEX CO.	
31	1	1		1	B27001	GROUNDING CLIP	FASTEX	
32	1	1	1	1	B21650	SCREW #6-32 X .312 5EMSHX HD		
33								
34	2	2	2	2	B23001	WASHER NO.10 BRASS, NICKEL PLATED		
35	2	2	2	2	B22001	NUT, SIZE 10-32 BRASS NICKEL PLATED		
36	2	2	2	2	B23007	WSHR #10 EXT TOOTH, <sup>BRONZE</sup> NICKEL PL.	FED.	
37	1	1	1	1	B32014	GROMMET 3.75 LONG	RICHCO	
38								
39								
40	2	2	2	2	B24015	BARB STUD No.10x3/8		
41	1	1	1	1	B23013	GROMMET, SPLIT	NYLON MOLDING	
42								
43								
44	1	1	1	1	B30016	CABLE RETAINER	DEK	
45								
46	1	1	1	1	B34006	CABLE CLAMP 1/4-NA		
47	1	1	1	1	B21648	SCREW #6 X 1/4 TYPE B, X RECESS, PNHD. CAD PL		
48								
49								
50								

A SIZE  
 98438 FSCM NO.  
 SH PL129842  
 3  
 REV B



REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		INCORP. ADCN L. ADD LSI P/N TO P/L <i>W.K. Kelly</i> 3-4-80 <i>R. Hydeman</i> 3-6-80		



-1	129842	DL129810
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED  
DIM. IN INCHES  
TOLERANCES  
X ± .1  
XX ± .03  
XXX ± .010  
ANGLES ± 0.5°  
MACH. FIN.

DR	<i>JES. 7-3-79</i>
CHK	<i>J. Jarnette</i>
DSGN	
ENGR	
PROJ	<i>W. Kelly 3/1/79</i>
REL	<i>R. Hydeman 9/13/79</i>
CUSTOMER APPD	



LEAR SIEGLER, INC.  
ELECTRONIC INSTRUMENTATION DIV.  
ANAHEIM, CALIF.

AC CABLE ASSY  
TCU TO MONITOR (230VAC)

SIZE	CODE IDENT	REV
<b>A</b>	<b>98438</b>	<b>A</b>

129844

SCALE NONE

SHEET 1 OF 2



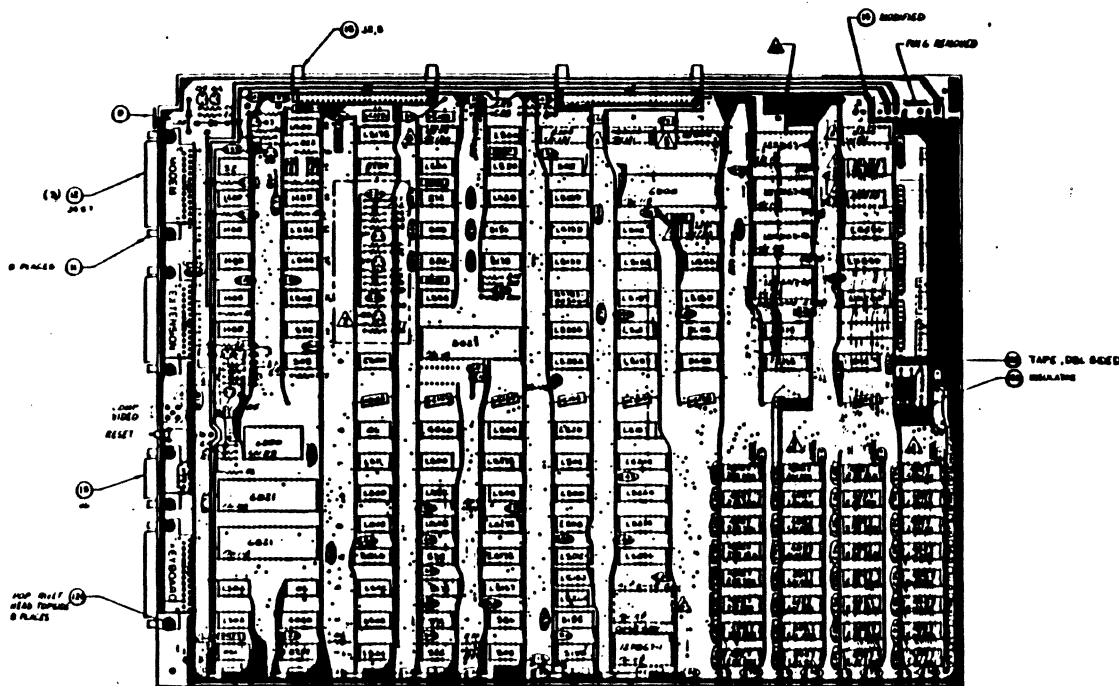


FIND NO.	QTY RECD				STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
				-1				
1				✓		129844 -1	CABLE ASSY	
2								
3								
4								
5				1		802041	PLUG	
6				4'		812120	CABLE, 3 COND.	
7				2		809242	TAB RCPT. .250	
8				1		835050	TERM #10 RING, 18-22AWG	
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								

SIZE **A**  
 FSCM NO. **98438**  
 SH **129844**  
 REV **2**



REVISIONS			DATE APPROVED
NO.	DESCRIPTION	DATE	APPROVED
1	REVISIONS		
2	REVISIONS		
3	REVISIONS		
4	REVISIONS		
5	REVISIONS		
6	REVISIONS		
7	REVISIONS		
8	REVISIONS		
9	REVISIONS		
10	REVISIONS		



-1 ASSY

- NOTES:
- ▲ PERSONALITY OPTION
  - ▲ MEMORY OPTION
  - ▲ OPTION BOARD
  - ▲ COMPOSITE VIDEO OPTION
  - ▲ ANSWER BACK
  - ▲ ALTERNATE CHARACTER SET
  - ▲ DIRECT CONNECT
  - ▲ FOR SCHEMATIC SEE 131370
  - ▲ FOR OPTIONS SEE 131371
  - ▲ ASSY NO 131370-1 MUST BE PLACED ON PC BOARD IN APPROX LOCATION SHOWN.

FOR SEPARATE PARTS LIST SEE P/131370

UNLESS OTHERWISE SPECIFIED DIM IN INCHES		CONTROL NO.		LEAR SIEGLER, INC. DATA PRODUCTS DIVISION ARLINGTON CALIFORNIA 91301	
TOLERANCES		DIMS. CONTROL		PC BOARD ASSEMBLY ADM 42	
FRACTIONS		DIM. CONTROL		DATE	
DECIMALS		DIM. CONTROL		FSC# NO.	
MILS		DIM. CONTROL		DWG NO.	
MILS		DIM. CONTROL		LIB	
MILS		DIM. CONTROL		SCALE	
MILS		DIM. CONTROL		SHEET # OF #	
MILS		DIM. CONTROL		DATE	
MILS		DIM. CONTROL		FSC# NO.	
MILS		DIM. CONTROL		DWG NO.	
MILS		DIM. CONTROL		LIB	
MILS		DIM. CONTROL		SCALE	
MILS		DIM. CONTROL		SHEET # OF #	

REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		RELEASE PER DCN	11-9-79 1/28/80	W. Kelly B. Hildebrand

NOTES:

- ① VENDOR ITEM-SEE DWG BEFORE ORDERING.
- ② 128343-5016 MAY BE USED IN PLACE OF -8116.
- ③ EPROM 129827-015011, -015012, -015013, -015014 (PROGRAM 131407) MAY BE USED IN PLACE OF 129867-30, -31, -32, -33 RESPECTIVELY

-1	129810	DL129810
DASH NO.	NEXT ASSY.	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED  
DIM. IN INCHES  
TOLERANCES  
X ± .1  
.XX ± .03  
.XXX ± .010  
ANGLES ± 0.5°  
MACH. FIN.

DR *W. Kelly* 11/7/79  
CHK *H. Craft* 11/12/79  
DSGN  
ENGR *R. Quora* 11/7/79  
PROJ *A. Poutel* 11/2/79  
REL *B. Hildebrand* 1/28/80  
CUSTOMER APPD  
*W. Kelly* 1/24/80



LEAR SIEGLER, INC.  
ELECTRONIC INSTRUMENTATION DIV.  
ANAHEIM, CALIF.

PC BOARD ASSY  
MPU, ADM 42

SIZE **A** CODE IDENT **98438** PL13137Q REV **A**

SCALE SHEET 1 OF 6



FIND NO.	QTY REQD				STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
				-1				
1				✓		-1	P.C. BOARD ASSY	
2								
3								
4								
5				1		129812-5	PRINTED WIRING BOARD	
6								
7				Ref		129813	SCHEMATIC	
8								
9				1		129746-121	CLOSURE	
10				1		129762-3	OSC	1A
11				1		811016	CRYSTAL, 5.0688MHZ	Y1
12				3		131365-11	CONN ASSY, 25 PIN	J4,5,7
13				1		131365-1	CONN ASSY, 9 PIN	J6
14				1		809106	CONN, 9 PIN (09-75-1091)	J1
15				2		809096	CONN, 50 PIN	J2,3
16				2		804021	SWITCH, DIP, 8 POS	S5,6
17				1		804006	6 POS	S2
18				1		804028	3 POS	S7
19				1		804048	MOM, SPST (8125AV2)	S1
20				1		804047	ROT, BCD (A210031GFY)	S3
21				3		819046	RES MODULE, SIP, 4.7K	RMB-10
22				1		129476-102	1K	RM5
23				1		-202	2K	RM6
24				4		-302	3K	RM1-4
25				1		-472	4.7K	RM11

A

SIZE  
FSCM NO.  
98438SH  
22131370REV  
A



FIND NO.	QTY RECD			STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
			-1				
26			1		129476-103	RES MODULE, SIP, 10K	RM7
27							
28			5		129467-00	IC, TYPE 74LS00	6C, 6F, 7D, 9C, 16E
29			5		-02	74LS02	3C, 5C, 6D, 4F, 13H
30			6		-04	74LS04	1C, 2A, 3A, 7F, 12B, 15D
31			6		-08	74LS08	2C, 5F, 6E, 5D, 8E, 11B
32			1		-09	74LS09	16B
33			1		-11	74LS11	7C
34			2		-20	74LS20	8F, 15E
35			1		-28	74LS28	14E
36			2		-32	74LS32	12J, 13B
37			1		-74	74LS74	11D
38			1		-138	74LS138	12H
39			4		-139	74LS139	11J, 12F, 13F, 14F
40			6		-157	74LS157	3E, 3F, 8H, 9H, 10H, 11H
41			4		-175	74LS175	4E, 5E, 7E, 16C
42			5		-244	74LS244	6H, 7H, 11L, 12L, 13L
43			1		-260	74LS260	2F-B
44			2		-283	74LS283	9F, 10F
45			2		-374	74LS374	4H, 5H
46							
47			2		129466-2114	RAM, TYPE 2114, 1Kx4	9K, 10K
48			16		129466-4027	RAM, TYPE 4027, 4Kx1	1J-BJ, 1L-BL
49							
50							

SIZE A  
 FSCM NO. 98438  
 SH P-131370  
 REV A



FIND NO.	QTY RECD			STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
			-1				
51			1		129753-00500	PROM, TYPE 82S123, 32x8 (TRANSLATION)	11F
52							
53			1		129867-1	ROM, 2Kx8 (CHK GEN)	1H
54			1		-30	(PROGRAM E000)	13K
55			1		-31	(PROGRAM E800)	14K
56			1		-32	(PROGRAM F000)	15K
57			1		-33	(PROGRAM FB00)	16K
58							
59			1		129826-00	IC, TYPE 74500	13D
60			1		-02	74502	15F
61			1		-05	74505	9B
62			1		-08	74508	1E
63			2		-32	74532	4D, 10B
64			3		-74	74574	1D, 2D, 14D
65			2		-86	74586	2E, 12D
66			2		-174	745174	3D, 13E
67			1		-175	745175	12E
68			2		-195	745195	1F, 2F-A
69							
70			1		129824-6800	IC, TYPE 6800	14H
71			2		-6821	6821	4A, 6A
72			1		-6850	6850	8A
73							
74			2		129498-01	IC, TYPE MCT-2 (OPT 1506)	15B-A, 15B-B
75							

SIZE A  
FSCM NO. 98438

SH P/131570

REV A

FIND NO	QTY RECD			STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
			-1				
76			2		128348-06	I.C. TYPE 7406	3B, 8C
77			2		-8T97	8T97	1B, 15C
78			3		-1488	1488	11A, 12A, 13A
79			3		-1489	1489	10A, 11A, 14B
80			2		-3648	3648	9J, 10J
81			3		-4040	4040B	2B, 4C, 8D
82			1		-8304	8304	16J
83			1		-5027	5027	9D
84			1		-8116	8116	9L
85			1		-79M05	VOLT REG, TYPE 79M05 (-5V)	VRI
86							
87			2		808005	DIODE, SIL, TYPE 1N4002	CR2, CR3
88			1		808004	DIODE, SIL, TYPE 1N4001	CR1
89			3		808042	DIODE, SIL, TYPE 1N914	CR4, 8, 9
90			3		810001	TRANS, NPN, TYPE 2N3904	Q1, 6, 7
91			2		810004	TRANS, NPN, TYPE 2N5550	Q4, 5
92							
93			1		128518-1011	CAP, 100 PF 10%, 1KV, CER	C5
94			67		129876-103	.01 UF, 10%, 50V, MAND	C1, 4, 6, 7, 13, 15-20
95			49		129876-104	.1 UF, 10%, 50V, MAND	C3, 10, 11, 12, 14, 15-20
96			18		129469-106	10UF, +100-10% 25V AL ELEC	C121-13B
97			10		128518-106	10UF, 10%, 25V, TANT	C139-14B
98			1		128518-226	22UF, 10%, 15V, TANT	C2
99							
100							

SIZE A  
 FSCM NO. 98438  
 SH P/L 131370  
 REV A

FIND NO.	QTY REQD			STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
			-1				
101			1		128533-470	RES, 47, 5%, 1/4W	R40
102			1		-101	100	R5
103			1		-151	150	R8
104			1		-221	220	R19
105			1		-271	270	R43
106			2		-391	390	R44, 45
107			2		-471	470	R6, 17
108			2		-621	620	R23, 24
109			10		-102	1K	R1, 3, 16, 37, 38, 39, 41, 42, 46, 47
110			2		-302	3K	R2, 4B
111			2		-472	4.7K	R14, 25
112			4		-512	5.1K	R10, 12, 13, 20
113			1		-822	8.2K	R18
114			1		-223	22K	R11
115			1		-473	47K	R4
116			3		-913	91K	R15, 21, 22
117							
118			4		802034	SOCKET, 40 PIN	4A, 6A, 7D, 14H
119			7		802033	24 PIN	5A, 1H, 2H, 13K-16L
120			35		802031	16 PIN	16D, 13J, 15L, 1K-8K, 1M-8M
121			3		129877-20	20 PIN	16F, 16H, 16L
122			1/2			TAPE, DBL SIDED, 1/32	
123			1		839012	INSULATOR, T0-5 (7717-5)	
124			8		824002	RIVET, (R3479 x 2/32)	
125			1		129747-3	SPACER, P.C. BOARD	

SIZE A  
 FSCM NO 98438  
 SH P2131370  
 REV A






REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		PRODUCTION RELEASE PER DCN 414 <i>W. Kelly</i>	2/4/80	<i>R. Lloyd</i>
B		INC DCN 604, ADD NEW SHEET 13 UPDATE OTHERS <i>Rm - 9-9-80</i>	5-23-80 5/23/80	<i>W. Kelly</i> <i>R. Lloyd</i>
C		INC DCN 759 <i>Rm 9-9-80</i>	5-23-80 5/23/80	<i>W. Kelly</i> <i>R. Lloyd</i>
D		INC DCN 867 <i>Rm 5-23-80</i>	5-23-80 5/23/80	<i>W. Kelly</i> <i>R. Lloyd</i>

NOTES

- FOR USE WITH 129B10-31 & -41.  
LOGIC BOARD 131370(REF)

-	END ITEM	DL129500
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIM. IN INCHES TOLERANCES X ± .1 .XX ± .03 .XXX ± .010 ANGLES ± 0.5° MACH. FIN. J	DR <i>W. Kelly 11/9/79</i>	 LEAR SIEGLER, INC. ELECTRONIC INSTRUMENTATION DIV. ANAHEIM, CALIF.	CONFIGURATION CONTROL		
	CHK		ADM 42 (131370 PCB ASSY)		
	DSGN <i>W. Kelly 11/16/79</i>	ENGR <i>R. Owen 1/31/80</i>	PROJ	SIZE	CODE IDENT
	REL <i>R. Lloyd 2/4/80</i>	CUSTOMER APPD	SCALE	A	98438
					131371
				REV	D
				SHEET 1 OF 18	

CONTENTS

<u>OPTION</u>	<u>TITLE</u>	<u>SHEET</u>
1.	PERSONALITY	3
2.	8K MEMORY	4
3.	OPTION BOARD - GEN.	5
3-1	PARALLEL PTR PORT	6 (NOT AVAILABLE)
3-2	ASYNC PTR PORT (STD)	6
3-3	SYNCHRONOUS PORT	6 (NOT AVAILABLE)
3-4	POLLING ADDRESS	7 (AVAILABLE AS OF 3/18/80)
3-5-1 (32) 3-5-2 (64)	32/64 CHARACTER PROGRAMMABLE FUNCTION KEYS	8
3-6	EXPANDED PROGRAM	6 (NOT AVAILABLE)
3-7	EXTERNAL BUS	6 (NOT AVAILABLE)
4.	COMPOSITE VIDEO	9
5.	ANSWER BACK	10
6.	ALTERNATE CHARACTER SET	11
7.	DIRECT CONNECT	12
30/31	TCU DESK MOUNT (113/230)	14
32	MONITOR LONG CABLE	15
33	MONITOR COMPOSITE VIDEO	16 (NOT AVAILABLE)
	ACCESSORIES LIST	17
	STANDARD SWITCH POSITIONS	18

Form 9 10-1011a

SIZE <b>A</b>	CODE IDENT <b>98438</b>	REV <b>D</b>	<b>131371</b>
SCALE		SHEET 2	

QTY END		PARTS LIST				
AS			PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1						
2						
3		1	129753-00	PROM, TYPE 825123, 32x8	15L	1, 2
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

**DESCRIPTION:** THIS OPTION ALLOWS THE USER TO SPECIFY AS PERMANENT CERTAIN TRANSMISSION DELIMITERS, THE COMMAND LEADIN CHARACTER, AND CONTROL OF VARIOUS FEATURES WITHIN THE FIRMWARE.

**NOTES:**

1. ENGINEERING MUST ESTABLISH A PROGRAM PART NUMBER FOR EACH APPLICATION.
2. INSTALL PART ON 131370 P.C.B. ASSY IN SOCKET AT LOCATION INDICATED.

Form 910-1011A

OPTION <b>1</b>	SIZE <b>A</b>	CODE IDENT <b>98438</b>	<b>131371</b>	REV <b>D</b>
TITLE <b>PERSONALITY</b>	SCALE	SHEET <b>3</b>		
SHEET <b>1 OF 1</b>				

QTY END		PARTS LIST				
AS			PART NUMBER	DESCRIPTION	LOCATION/REF DES	Qty
1						
2						
3		16	129466-4027	RAM, TYPE 4027, 4Kx1	1K-BK, 1M-8M	1
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

DESCRIPTION: THIS OPTION ALLOWS ADDITIONAL FOUR PAG  
OF DISPLAY.

NOTES:

1. ADD PARTS TO 131370 PCB ASSY  
INSTALL IN SOCKETS AT LOCATIONS INDICATED

OPTION ..... 2 .....  
TITLE B.K. MEMORY .....  
SHEET 1 OF 1

SIZE	CODE IDENT	REV
A	98438	D
SCALE	131371	
SHEET 4		

QTY REQD		PARTS LIST				
NO.			PART NUMBER	DESCRIPTION	LOCATION/REF DES	NOTE
1						
2		3	128348-8304	I.C. TYPE 8304	16H, 16F, 16L	1
3		1	128348-8T97	I.C. TYPE 8T97	16D	1
4		1	129826-133	I.C. TYPE 743133	13J	1
5		1	804047	SWITCH, ROT, BCD	11M	1
6						
7						
8						
9		1	129832-11	P.C. BOARD ASSY		2
10		2	129739-1	INTERCONNECT CABLE, 50x2		2
11		1	129746-(NOTE 3)	CLOSURE		2,3
12						
13						

DESCRIPTION: ANY OF THE OPTIONS PREFIXED 3 REQUIRE INSTALLATION OF 129832-11 P.C. BOARD, INTERCONNECT CABLES, AND MAY REQUIRE A CLOSURE DIFFERENT FROM THE ONE CALLED OUT ON 129832. ALSO SEVERAL PARTS AS LISTED ABOVE MUST BE INSTALLED ON 131370.

THE FOLLOWING OPTION COMBINATIONS REQUIRE REAR CLOSURE CHANGE AS INDICATED IN TABLE:

PARALLEL PTR PORT (OPT 3-1)	.	.	.	.	.	.
ASYNCR PTR PORT (STANDARD)	.	.	.	.	.	.
SYNCHRONOUS PORT (OPT 3-3)	.	.	.	.	.	.
CLOSURE 129746 DASH NO.	-191	-181	-171	-161	-151	-111

(STD)

NOTES:

- PART INSTALLS ON 131370 - REFER TO DWG FOR LOCATION.
- PART INSTALLS IN 129840 CPU ASSY
- P.C. BOARD 129832 HAS 129746-181 CLOSURE STD. OPTIONS TABULATED ABOVE WILL REQUIRE NEW CLOSURE DEPENDING ON REQUESTED OPTIONS.

Form 9 10-1011a

OPTION 3	SIZE A	CODE IDENT 98438	131371	REV D
TITLE OPTION BOARD-GENERAL	SCALE		SHEET 5	
SHEET 1 OF 1				

OPTION 3-1 PARALLEL PRINTER PORT  
(NOT AVAILABLE)

OPTION 3-2 ASYNC PRINTER PORT  
NOW STANDARD - PARTS INCLUDED  
IN 129832-11

OPTION 3-3 SYNCHRONOUS PORT  
(NOT AVAILABLE)

OPTION 3-7 EXTERNAL BUS  
(NOT AVAILABLE)

OPTION 3-6 EXPANDED PROGRAM  
(NOT AVAILABLE)

OPTION 3-5-1 32 CHARACTER  
NOW STANDARD - PARTS INCLUDED  
IN 129832-11

SIZE	CODE IDENT	REV
A	98438	D
SCALE		SHEET 6

QTY REQD		PARTS LIST			
NO		PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1					
2	7	128348-8T97	I.C. TYPE 8T97		2
3	5	804060	SWITCH, 8 POS		2
4	5	819046	RES MODULE, 47K (785)		2
5	1	129867-80	ROM (PROGRAM D000) 6E		2,3
6					
7					
8					
9					
10					
11					
12					
13					

DESCRIPTION: THIS OPTION ALLOWS USER TO HAVE POLLING COMMUNICATION PROTOCOL FOR MULTIPLE TERMINAL WITH UNIQUE ADDRESS ON THE SAME COMMUNICATIONS LINE.

NOTES:

1. THIS OPTION IS FACTORY INSTALLED ONLY
2. ADD PARTS TO 129832-11 P.C.B ASSY - SEE DWG FOR LOCATIONS.
3. IF ROM 129867-80 NOT AVAILABLE USE FROM 129827-20.

OPTION NOT AVAILABLE

OPTION 3-4	SIZE	CODE IDENT	REV
TITLE POLLING ADDRESS	A	98438	D
SHEET 1 OF 1	SCALE	131371	SHEET 7



QTY REQD		PARTS LIST			
QTY	REQD	PART NUMBER	DESCRIPTION	LOCATION/REF DES	NOTES
1		-3-5-1	32 CHAR PROG KEYS (STD)		2
2	✓	-3-5-2	64 CHAR PROG KEYS		
3					
4	8	128348-2102A	RAM	2H-9H	1
5					
6					
7					
8					
9					
10					
11					
12					
13					

DESCRIPTION: THIS OPTION PROVIDES FUNCTION KEYS WITH CAPABILITY TO CONTAIN A VARIABLE LENGTH CHARACTER STREAM OF UP TO 64 BYTES.

NOTE

1. PARTS INSTALL ON 129832-11 P.C. B IN SOCKETS
2. 32 CHAR. PROG FUNCTION OPTION NOW STANDARD - PARTS INCLUDED ON 129832-11

Form 9-10-1011a

OPTION 3-5	SIZE A	CODE IDENT 98438	131371	D
TITLE 32/64 CHARACTER PROGRAMMABLE FUNCTION KEYS	SCALE		SHEET 8	
SHEET 1 OF 1				

QTY END		PARTS LIST				
NO.			PART NUMBER	DESCRIPTION	LOCATION/REF DES	NOTES
1						
2						
3		2	810001	TRANS, NAN, TYPE 2N8904	G2, 3	1
4		1	128533-100	RES, 10 5%, 1/4 W	E9	1
5		1	128533-750	RES, 75, 5%, 1/4 W	R7	1
6		1	809123	JACK (51-153-0000)	J8	1
7						
8		1	809118	CONN, MALE (51-107-305)	P8	2
9						
10						
11						
12						
13						

DESCRIPTION: THIS OPTION PROVIDES COMPOSITE VIDEO OUTPUT SIGNAL FOR USE WITH A HIGH LINE RATE MONITOR AT SOME REMOTE LOCATION UP TO FEET. REQUIRES THE SPECIAL CONNECTOR (FURNISHED - FIN 8 ABOVE) AND CUSTOMER SUPPLIED RG59 CABLE TO COMPLETE INSTALLATION.

NOTES:

1. INSTALL PARTS ON 131370 P.C.B ASSY - SOLDER IN PLACE.
2. THIS PART SHIPPED SEPARATE FOR INSTALLATION ON CUSTOMER CABLE - TYPE RG59

OPTION 4	SIZE A	CODE IDENT 98438	131371	REV D
TITLE COMPOSITE VIDEO OUTPUT SHEET 1 OF 1	SCALE		SHEET 9	

QTY REQD		PARTS LIST			
NO.		PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1					
2					
3	1	129753-00	PROM, TYPE 825123, 33P	14L	1
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

DESCRIPTION: THIS OPTION ALLOWS USER TO TRANSMIT A CUSTOMER SPECIFIED FIXED MESSAGE WHEN EXTERNALLY PROMPTED

NOTES:

- PROGRAM PROM WITH CUSTOMER MESSAGE.
- INSTALL PART ON 131370 P.C.B ASSY AT LOCATION INDICATED. SOLDER IN PLACE.

FORM 9 10-10110

OPTION <u>5</u>	SIZE <u>A</u>	CODE IDENT <u>98438</u>	<u>131371</u>	REV <u>D</u>
TITLE <u>ANSWER BACK</u>	SCALE	SHEET <u>10</u>		
SHEET <u>1 OF 1</u>				

P. No.		QTY REQD		PARTS LIST			
No.				PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1							
2							
3		1		129867-40	ROM-2Kx8	2H	1,2
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							

DESCRIPTION: THIS ADDITIONAL CHARACTER GENERATOR IS USED TO DISPLAY ELEVEN ASCII CHARACTERS AS VERTICAL AND HORIZONTAL LINE SEGMENTS.

NOTES:

1. INSTALL PART ON 131370 P.C.B ASSY IN SOCKET AT LOCATION INDICATED
2. EPROM 129827-19 MAY BE USED IN PLACE OF 129867-40.

Form 9 10-10116

OPTION <u>6</u>	SIZE <b>A</b>	CODE IDENT <b>98438</b>	<b>131371</b>	REV <b>D</b>
TITLE <u>ALTERNATE CHAR GEN</u>	SCALE	SHEET <u>11</u>		
SHEET <u>1 OF 1</u>				

QTY REQD		PARTS LIST				
NO			PART NUMBER	DESCRIPTION	LOCATION/REF DES	NOTE
1		1	810004	TRANS, NPN, TYPE 2N5550	Q9	1
2		2	810037	TRANS, PNP, TYPE 2N2907	Q8, 10	1
3		1	808044	DIODE, ZENER, 18V (IN5748B)	CR7	1
4		3	808042	DIODE, SIL, TYPE IN914B	CR5, 6, 10	1
5		1	129876-103	CAP. .01, 10%, 50V, MANG	C9	1
6		1	128518-472	CAP, 4700PF, $\pm 20\%$ , 25V, CER	C8	1
7		3	128533-222	RES, 2.2K, 5%, 1/8W	R26, 27, 33	1
8		2	-100	10	R32, 34	1
9		2	-472	4.7K	R30, 36	1
10		1	-102	1K	R28	1
11		1	-332	33K	R29	1
12		1	-103	10K	R31	1
13		1	-223	22K	R35	1

DESCRIPTION: THIS OPTION PROVIDES SERIAL DATA ON J1-3 TO DRIVE DIRECT CONNECT TRANSMISSION, RECEIVE LINE GENERALLY USED WITH BURROUGHS 2-WIRE DIRECT CONNECT INTERFACE

NOTES:

1. INSTALL PARTS ON 131370 P.C.B ASSY- SOLDER IN PLACE.

Form 2-10-10116

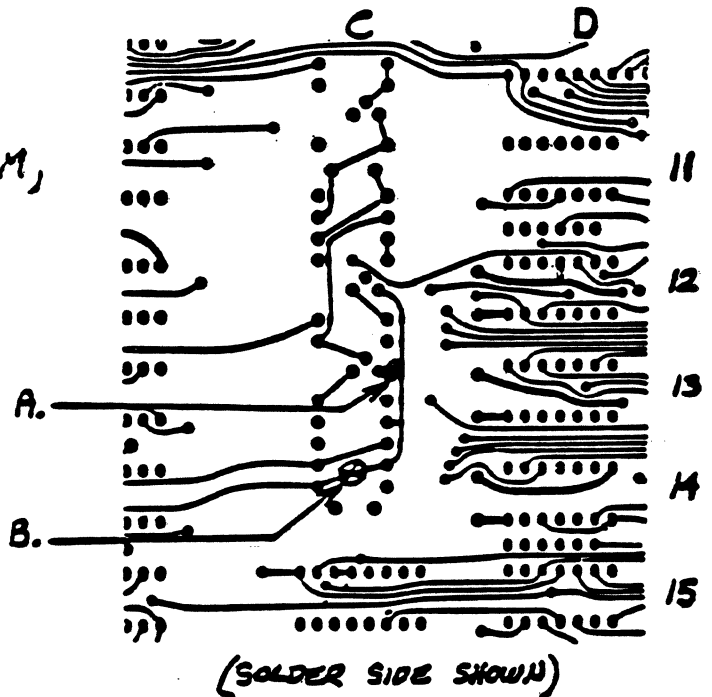
OPTION 7	SIZE A	CODE IDENT 98438	131371	D
TITLE DIRECT CONNECT	SCALE		SHEET 12	
SHEET 1 OF 2				

# REWORK INSTRUCTIONS

MODIFY 129812-5 PWE:

A. CUT PLATING PER DIAGRAM,  
SOLDER SIDE.

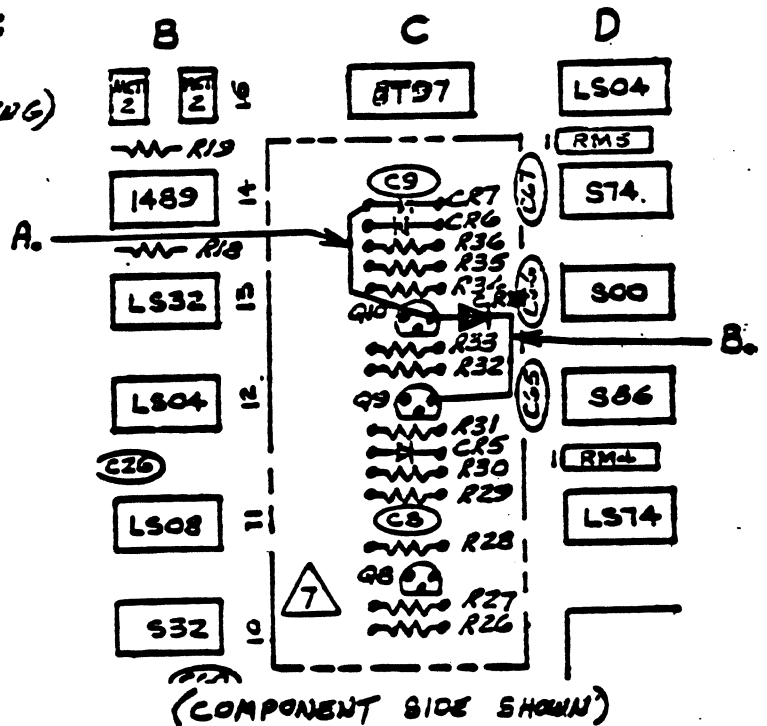
B. CUT PLATING PER DIAGRAM,  
SOLDER SIDE.



MODIFY 131370 PCB ASSY:

A. ADD JUMPER WIRE (30 AWG)  
FROM COLLECTOR OF Q10  
TO ANODE OF CRT,  
COMPONENT SIDE.

B. ADD CR10, IN914 DIODE,  
FROM COLLECTOR OF Q10  
TO COLLECTOR OF Q9,  
COMPONENT SIDE.  
USE SLEEVING AS REQ'D.



Form 910-10110

OPTION 7  
DIRECT CONNECT  
SHEET 2 OF 2

SIZE CODE IDENT

**A** 98438

131371

REV

**D**

SCALE

SHEET 13

QTY REQD		PARTS LIST				
NO.			PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTE
1		✓	-30			
2		✓	-31			
3		1	129845-1	ADM 42 DESK MOUNT	115 VAC	1
4		1	129845-21	ADM 42 DESK MOUNT	230 VAC	1
5						
6						
7						
8						
9						
10						
11						
12						
13						

DESCRIPTION: THIS OPTION MODIFIES ADM 42 TO ALLOW ALTERNATE MOUNTING SUCH AS DESK MOUNTING. THE TCU TOP HOUSING IS EXCHANGED & MONITOR STAND INCLUDED. OPTION MUST BE FACTORY INSTALLED

NOTES

1. MODIFY ADM 42 AS INDICATED ON 129845 SHIP MONITOR STAND & CUSTOMER KIT IN SEPARATE PACKAGE.

OPTION ... 30/31	SIZE	CODE IDENT	131371	V
TITLE DESK MOUNT	A	98438		D
SHEET 1 OF 1	SCALE		SHEET 14	

FORM 9 10-10-1118

QTY REQD		PARTS LIST				
NO			PART NUMBER	DESCRIPTION	LOCATION / REF DES	NOTES
1		✓	-32			
2						
3		1	129839-11	CABLE ASSY-MONITOR		1
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

DESCRIPTION: THIS OPTION PROVIDES ADDITIONAL 4 FEET OF MONITOR CABLE. OPTION MUST BE FACTORY INSTALLED.

NOTE

1. REPLACE 129839-1 CABLE IN MONITOR ASSY 129842

Form 9-10-1011a

OPTION 32	SIZE A	CODE IDENT 98438	131371	REV D
TITLE MONITOR LONG CABLE	SCALE	SHEET 15		



OPTION 33 NOT DEFINED

Form 9-10-1011a

SIZE	CODE IDENT	131371	REV
A	98438		D
SCALE		SHEET	16

ACCESSORIES

- 1. CABLE, RS232/CURRENT LOOP P/N 129316-21
- 2. CABLE, PARALLEL PRINTER P/N 129787-1
- 3. CABLE, ASYNC PRINTER P/N 129949-1
- 4. MONITOR STAND P/N 129770-1  
(ALSO SEE DESK MOUNT OPTION)

Form 9 10-1011a

SIZE	CODE IDENT.		REV
A	98438	131371	D
SCALE		SHEET	17

SWITCH POSITIONS AND FUNCTIONS FOR ADM 42 STANDARD CONFIGURATION:

NOTES:

- SOLID DOT INDICATES INITIAL SWITCH POSITION SETTINGS. CUSTOMER REQUIREMENTS MAY DEFINE OTHER SETTINGS.
- SEE TABLE BELOW FOR SWITCH SETTINGS FOR "BIT-PARITY-STOP" COMBINATIONS AVAILABLE.

**S2**  
@ 15A LOCATION

	OFF	ON	
RS-232 XMIT DIS	<input type="radio"/>	<input checked="" type="radio"/>	RS-232 XMIT ENA
DIR CONN XMIT DIS	<input checked="" type="radio"/>	<input type="radio"/>	DIR CONN XMIT ENA
CURR LOOP RCV DIS	<input checked="" type="radio"/>	<input type="radio"/>	CURR LOOP RCV ENA
DIR CONN RCV DIS	<input checked="" type="radio"/>	<input type="radio"/>	DIR CONN RCV ENA
CURR LOOP XMIT DIS	<input checked="" type="radio"/>	<input type="radio"/>	CURR LOOP XMIT ENA
SCF DIS	<input type="radio"/>	<input checked="" type="radio"/>	SCF ENA

**S7**  
@ 16M LOCATION

	OFF	ON	
ATT NOT DSPLY	<input checked="" type="radio"/>	<input type="radio"/>	DISPLY ATT CODE
ENA ALT CHAR EXT	<input type="radio"/>	<input checked="" type="radio"/>	DIS ALT CHAR EXT
NULL CODES	<input type="radio"/>	<input checked="" type="radio"/>	NULL SPACES

**S5**  
@ 12M LOCATION

	OFF	ON	
BRK DIS	<input type="radio"/>	<input checked="" type="radio"/>	BRK ENA
60 HZ	<input checked="" type="radio"/>	<input type="radio"/>	50 HZ
ODD PAR	<input type="radio"/>	<input checked="" type="radio"/>	EVEN PAR
1 STOP BIT	<input type="radio"/>	<input checked="" type="radio"/>	2 STOP BITS
8 BITS	<input type="radio"/>	<input checked="" type="radio"/>	7 BITS
NORM IN BUFFER	<input checked="" type="radio"/>	<input type="radio"/>	EXPAND IN BUFFER
BIT 8 = 0	<input checked="" type="radio"/>	<input type="radio"/>	BIT 8 = 1
HALF DUPLEX	<input checked="" type="radio"/>	<input type="radio"/>	FULL DUPLEX

SEE NOTE 2

**S3** @ 10 M LOCATION  
**S4** @ 11 M LOCATION (PTR OPTION)

POS	BAUD RATE
0	50
1	75
2	110
3	134.5
4	150
5	300
6	600
7	1200
8	1800
9	2000
10	2400
11	3600
12	4800
13	7200
14	9600
15	-

**S6**  
@ 14M LOCATION

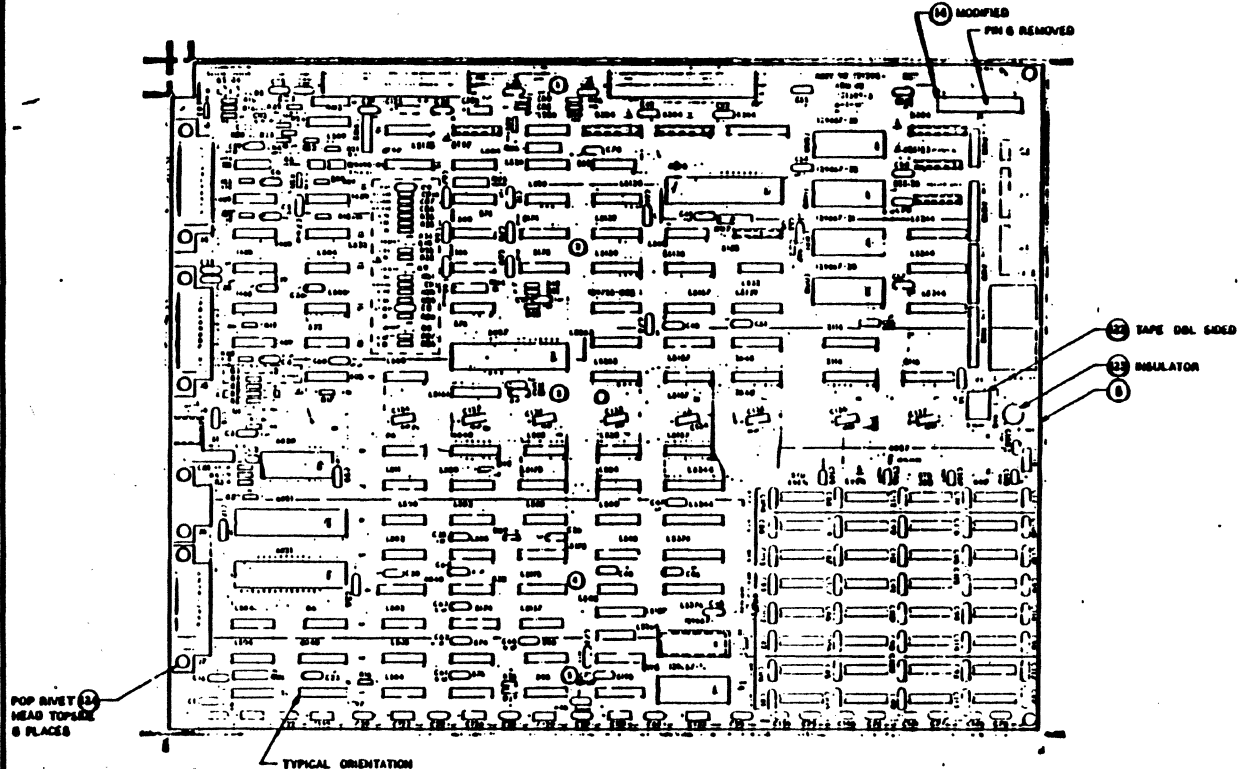
	OFF	ON	
ADM 42 ATT MODE	<input type="radio"/>	<input checked="" type="radio"/>	ADM 2 ATT MODE
PAGE ATT	<input checked="" type="radio"/>	<input type="radio"/>	LINE ATT
BLANK ATT	<input type="radio"/>	<input checked="" type="radio"/>	UNDERLINE ATT
	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	
	<input type="radio"/>	<input type="radio"/>	

S5-3	S5-4	S5-5	PARITY	STOP-BITS	STP
ON	ON	ON	EVEN	2	7
OFF	ON	ON	ODD	2	7
ON	OFF	ON	EVEN	1	7
OFF	OFF	ON	ODD	1	7
ON	ON	OFF	NONE	2	8
OFF	ON	OFF	NONE	1	8
ON	OFF	OFF	EVEN	1	8
OFF	OFF	OFF	ODD	1	8

Form # 10-1011a

SIZE	CODE IDENT	131371	D
<b>A</b>	<b>98438</b>		
SCALE	-	SHEET	18

REV	DATE	BY	APPROVE
A	RELEASE FOR DCN #	S. HARRIS	11/18/71
B	INCORP DCN # 1971	J. A. HARRIS	11/18/71
C	INCORP DCN # 1992	J. A. HARRIS	11/18/71
D	INCORP DCN # 2785	W. G. HARRIS	11/18/71



- NOTES:
- ▲ PERSONALITY OPTION
  - ▲ MEMORY OPTION
  - ▲ OPTION BOARD
  - ▲ COMPOSITE VIDEO OPTION
  - ▲ ANSWER BACK
  - ▲ ALTERNATE CHARACTER SET
  - ▲ DIRECT CONNECT
  - FOR SCHEMATIC SEE 131390
  - FOR OPTIONS SEE 131371
  - (1) DENOTES IC SOCKET

-1 ASSY (W/O ROMS SEE P/L)  
-002 ASSY

FOR PARTS LIST SEE P/L 131394

131390		DL1290HQ	CONTAINS 131390 131391 131392 131393 131394 131395 131396 131397 131398 131399	LEAR SIEGLER, INC 131390-131399 131390-131399
PC BOARD ASSEMBLY ADM 42			DATE 11/18/71	REV D
D 98438		131394	APPD	REV D

REVISIONS

LTR	SHEET	DESCRIPTION	DATE	APPROVED
A		RELEASE PER DCN # 998 S. FIGUEROA	6-5-80 6-6-80	<i>[Signature]</i>
B		INCORP DCN # 1471 DWA	11-17-80 11-21-80	<i>[Signature]</i>
C		INCORP DCN # 1902 EnB	3-20-81 3/31/81	<i>[Signature]</i>
D		INCORP DCN # 2785 EX	10-5-81 10-5-81	<i>[Signature]</i>

- 4. 128348-5027 MAY BE SUBSTITUTED FOR -5037.
- 3. -1 SAME AS -002 EXCEPT WITHOUT PROGRAM ROMS AND CHARACTER GENERATOR..
- 2. 128348-5016 MAY BE USED IN PLACE OF -8116.
- 1. VENDOR ITEM-SEE DWG BEFORE ORDERING.

NOTES:

-002	131390	DL12981
-1	131390	DL129810
DASH NO.	NEXT ASSY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED  
DIM. IN INCHES  
TOLERANCES  
X ± .1  
XX ± .03  
XXX ± .010  
ANGLES ± 0.5°  
MACH. FIN.

DR S. FIGUEROA  
CHK *W. Kelly* 6-4-80  
DSGN  
ENGR *R. [unclear]* 6-4-80  
PROJ  
REL *[unclear]* 6/1/80  
CUSTOMER APPD



LEAR SIEGLER, INC.  
ELECTRONIC INSTRUMENTATION DIV.  
ANAHEIM, CALIF.

PC BOARD ASSY  
MPU, ADM 42

SIZE A CODE IDENT 98438 [ PL 131394 ] RE [ ]  
SCALE SHEET 1 OF 6



FIND NO.	QTY REQD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
	-002	-1				
1		✓		-1	P.C. BOARD ASSY	
2	✓			-002	P.C. BOARD ASSY	
3						
4						
5	1	1		131395-3	PRINTED WIRING BOARD	
6						
7	REF	REF		131396	SCHEMATIC	
8						
9						
10	1	1		129762-3	OSC	1A
11	1	1		811016	CRYSTAL, 5.0688MHZ	Y1
12	3	3		131365-11	CONN ASSY, 25 PIN	J4,5,7
13	1	1		131365-1	CONN ASSY, 9 PIN	J6
14	1	1		809106	CONN, 9 PIN (09-75-1091)	J1
15	2	2		809096	CONN, 50 PIN	J2,3
16	2	2		804021	SWITCH, DIP, 8 POS	S5,6
17	1	1		804006	6 POS	S2
18	1	1		804028	3 POS	S7
19	1	1		804048	MOM, SPST (8125AV2)	S1
20	1	1		804047	ROT, BCD (1A210031GFY)	S3
21	3	3		819046	RES MODULE, SIP, 4.7K	RMB-10
22	1	1		129476-102	1K	RM5
23	1	1		-202	2K	RM6
24	4	4		-302	3K	RM1-4
25	1	1		-472	4.7K	RM11

SIZE A  
 FSCM NO. 98438  
 SH PL 131394  
 REV D



FIND NO.	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
26		1 1		129476-103	RES MODULE, SIP, 10K	RM7
27						
28		5 5		129467-00	IC, TYPE 74LS00	6C, 6F, 7D, 9C, 16E
29		5 5		-02	74LS02	3C, 5C, 6D, 4F, 13H
30		6 6		-04	74LS04	1C, 2A, 3A, 7F, 12B, 15D
31		6 6		-08	74LS08	2C, 5F, 6E, 5D, 8E, 11B
32		1 1		-09	74LS09	16B
33		1 1		-11	74LS11	7C
34		2 2		-20	74LS20	8F, 15E
35		1 1		-28	74LS28	14E
36		2 2		-32	74LS32	12J, 13B
37		1 1		-74	74LS74	11D
38		1 1		-138	74LS138	12H
39		4 4		-139	74LS139	11J, 12F, 13F, 14F
40		6 6		-157	74LS157	3E, 3F, 8H, 9H, 10H, 11H
41		4 4		-175	74LS175	4E, 5E, 7E, 15C
42		5 5		-244	74LS244	6H, 7H, 11L, 12L, 13L
43		1 1		-260	74LS260	2F-B
44		2 2		-283	74LS283	9F, 10F
45		2 2		-374	74LS374	4H, 5H
46		1 1		-161	74LS161	9D-A
47		2 2	129466-21143		RAM, TYPE 1Kx4	9K, 10K
48		16 16	129466-4027		RAM, TYPE 4027, 4Kx1	1J-3J, 1L-8L
49						
50						

SIZE A  
 FSCM NO. 98438  
 SH P/L 13/3 94  
 3  
 REV D



FIND NO.	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
		02-1				
51	1	1		129753-005	PROM, TYPE 82S123, 32x8 (TRANSLATION)	11F
52						
53	1	0		129867-1	ROM 2Kx8 (CHAR GEN)	1H
54	1	0		-30	(PROG E000)	13K
55	1	0		-31	(PROG E800)	14K
56	1	0		-32	(PROG F000)	15K
57	1	0		129867-33	ROM 2Kx8 (PROG F800)	16K
58						
59	1	1		129826-00	IC, TYPE 74S00	13D
60	1	1		-02	74S02	15F
61	1	1		-05	74S05	9B
62	1	1		-08	74S08	1E
63	2	2		-32	74S32	4D, 10B
64	3	3		-74	74S74	1D, 2D, 14D
65	2	2		-86	74S86	2E, 12D
66	2	2		-174	74S174	3D, 13E
67	1	1		-175	74S175	12E
68	2	2		-195	74S195	1F, 2F-A
69						
70	1	1		129824-6800	IC, TYPE 6800	14H
71	2	2		-6821	6821	4A, 6A
72	1	1		-6850	6850	8A
73						
74	2	2		129498-01	TYPE MCT-2 (OPT ISOL)	15B-A, 15B-B
75						

SIZE A  
 FSCM NO. 98438  
 SH PL 13/394  
 REV D



FIND NO	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
76	2	2		128348-06	I.C., TYPE 7406	3B, 8C
77	2	2		-8T97	8T97	1B, 15C
78	3	3		-1488	1488	11A, 12A, 13A
79	3	3		-1489	1489	10A, 14A, 14B
80	2	2		-3648	3648	9J, 10J
81	3	3		-4040	4040B	2B, 4C, 8D
82	1	1		-8304	8304	16J
83	1	1		-5037	5037	9D-B
84	1	1		-8116	8116	9L
85	1	1		-79M05	VOLT REG, TYPE 79M05 (-5V)	VRI
86						
87	2	2		808005	DIODE, SIL, TYPE 1N4002	CR2, CR3
88	1	1		808004	DIODE, SIL, TYPE 1N4001	CR1
89	3	3		808042	DIODE, SIL, TYPE 1N914	CR4, 8, 9
90	3	3		810001	TRANS, NPN, TYPE 2N3904	Q1, 6, 7
91	2	2		810004	TRANS, NPN, TYPE 2N5550	Q4, 5
92						
93	1	1		128518-1011	CAP, 100 PF 10%, 1KV, CER	C5
94	67	67		129876-103	.01 UF, 10%, 50V, MONO	C1, 4, 6, 7, 13, 59-120
95	49	49		129876-104	.1 UF, 10%, 50V, MONO	C3, 10, 11, 12, 14, 15-58
96	18	18		129469-106	10UF, +100-10%, 25V AL ELEC	C121-138
97	10	10		128518-106	10UF, 10%, 25V, TANT	C139-148
98	1	1		128518-226	22UF, 10%, 15V, TANT	C2
99						
100						

SIZE  
A  
FSCM NO.  
98438

SH  
PL 131394  
5

REV  
D

FIND NO.	QTY RECD		STOCK NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	REMARKS
		-1				
b1	1	1		128533-470	RES, 47, 5%, 1/4W	R40
b2	1	1		-101	100	R5
b3	1	1		-151	150	R8
b4	1	1		-221	220	R19
b5	1	1		-271	270	R43
b6	2	2		-391	390	R44,45
b7	3	3		-471	470	R6,17,49
b8	2	2		-621	620	R23,24
b9	10	10		-102	1K	R1,3,16,37,38,39,41,42,44,47
110	2	2		-302	3K	R2,48
111	2	2		-472	47K	R14,25
112	4	4		-512	5.1K	R10,12,13,20
113	1	1		-822	8.2K	R18
114	1	1		-223	22K	R11
115	1	1		-473	47K	R4
116	3	3		-913	91K	R15,21,22
117						
118	4	4		802034	SOCKET, 40 PIN	4A, 6A, 7D, 14H
119	7	7		802033	24 PIN	8A, 1H, 2H, 13K-16E
120	35	35		802031	16 PIN	16D, 13U, 15L, 1N-8U, 1K-8K, 1L-8L, 1M-8M
121	3	3		129877-20	20 PIN	16F, 16H, 16L
122	1/2	1/2			TAPE, DBL SIDED, 1/32	
123	1	1		839012	INSULATOR, TO-5 (7717-5)	FOR VRI
124	8	8		824002	NET (R3479 x 1/32)	
125	1	1		129747-3	SPACER, P.C. BOARD	

SIZE A  
 FSCM NO. 98438  
 SH PL 13/394  
 REV D

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

## ASCII CONTROL CODE CHART

BITS 87 86 85 84 83 82 81	0 0 0 0				0 1 0 1				1 0 1 0				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	RU BOUT (DEL)								



### LEGEND

BS	LS CURSOR CONTROL CODE
	ASCII character
	control

OPERATORS QUICK REFERENCE CHART OF  
ADM 42 UTILIZED CONTROL CODES

HEX BYTE	CONTROL CHARACTERS		DISPLAYABLE CHARACTERS							
	1ST	0	1	2	3	4	5	6	7	
	BITS 7 6 5	0 <sub>0</sub> 0	0 <sub>0</sub> 1	0 <sub>1</sub> 0	0 <sub>1</sub> 1	1 <sub>0</sub> 0	1 <sub>0</sub> 1	1 <sub>1</sub> 0	1 <sub>1</sub> 1	
0	0000	000	000	DLE		0	@	P	'	p
1	0001	001	001	DC1	!	1	A	Q	a	q
2	0010	010	010	DC2	"	2	B	R	b	r
3	0011	011	011	DC3	#	3	C	S	c	s
4	0100	100	100	DC4	\$	4	D	T	d	t
5	0101	101	101	NAK	%	5	E	U	e	u
6	0110	110	110	SYN	&	6	F	V	f	v
7	0111	111	111	ETB	'	7	G	W	g	w
8	1000			CAN	(	8	H	X	h	x
9	1001			EM	)	9	I	Y	i	y
A	1010			SUB	*	:	J	Z	j	z
B	1011			ESC	+	;	K	[	k	{
C	1100			FS	'	<	L	\	l	!
D	1101			GS	-	=	M	]	m	}
E	1110			SO	.	>	N	^	n	~
F	1111			SI	/	?	O	_	o	DEL

**CONTROL CODES**

-  Utilized by Std ADM 42 with Printer Option
-  Utilized by Polling ADM42

USE **[CTRL]** KEY WITH DISPLAYABLE CHARACTER KEYS TO PRODUCE CONTROL CODES

**OPERATORS QUICK REFERENCE CHART OF  
STATUS LINE CONTROL OPERATION CODES**

OPERATION	SOURCE	OPERATION CODE	ACTIVITY
Initiate Override Message	Host	ESC F Message CR*	Message placed in Status Line positions 2 thru 80, overriding, but not erasing, current display.
Clear Override Message	Host Keyboard	ESC Z, ESC %, etc. <b>RESET/CMD</b>	Message is cleared from display but retained in memory by any operation code which affects Status Line.
Erase Override Message	Host	ESC F CR*	Message is erased from screen and memory; original Status Line display is restored.
Recall Status Line Message	Keyboard	<b>RESET/CMD</b>	Status Line display and Status Line message are swapped each time key is typed.

\*Any control character (CR, LF, HT, etc.) may be used.

STATUS INDICATOR	S1	S2	S3	S4
ON	ESC c	ESC e	ESC g	ESC <
OFF	ESC b	ESC d	ESC f	ESC >

OPERATORS QUICK REFERENCE CHART OF  
FUNCTION KEY/FUNKEY CHARACTERISTICS

EVOKING OPERATION		UNPROGRAMMED CODE TRANSMITTED	EVOKING OPERATION		UNPROGRAMMED CODE TRANSMITTED
EVOKE CODE	KEYBOARD		EVOKE CODE	KEYBOARD	
ESC \ @	F1	SOH @ CR*	ESC \ \	SHIFT F1	SOH \ CR*
ESC \ A	F2	SOH A CR*	ESC \ a	F2	SOH a CR*
ESC \ B	F3	SOH B CR*	ESC \ b	F3	SOH b CR*
ESC \ C	F4	SOH C CR*	ESC \ c	F4	SOH c CR*
ESC \ D	F5	SOH D CR*	ESC \ d	F5	SOH d CR*
ESC \ E	F6	SOH E CR*	ESC \ e	F6	SOH e CR*
ESC \ F	F7	SOH F CR*	ESC \ f	F7	SOH f CR*
ESC \ G	F8	SOH G CR*	ESC \ g	F8	SOH g CR*
ESC \ H	F9	SOH H CR*	ESC \ h	F9	SOH h CR*
ESC \ I	F10	SOH I CR*	ESC \ i	F10	SOH i CR*
ESC \ J	F11	SOH J CR*	ESC \ j	F11	SOH j CR*
ESC \ K	F12	SOH K CR*	ESC \ k	F12	SOH k CR*
ESC \ L	F13	SOH L CR*	ESC \ l	F13	SOH l CR*
ESC \ M	F14	SOH M CR*	ESC \ m	F14	SOH m CR*
ESC \ N	F15	SOH N CR*	ESC \ n	F15	SOH n CR*
ESC \ O	F16	SOH O CR*	ESC \ o	SHIFT F16	SOH o CR*

\*If established by a Dynamic Personality Change operation, a second transmission terminator (End Block character) is also transmitted.

OPERATORS QUICK REFERENCE CHART OF  
MODULO NUMBERS VS. ASCII CHARACTERS

ASCII CHARACTER	MODULO NUMBER	ASCII CHARACTER	MODULO NUMBER	ASCII CHARACTER	MODULO NUMBER
SPACE	0	@	32	,	64
	1	A	33	a	65
"	2	B	34	b	66
#	3	C	35	c	67
\$	4	D	36	d	68
%	5	E	37	e	69
&	6	F	38	f	70
'	7	G	39	g	71
(	8	H	40	h	72
)	9	I	41	i	73
*	10	J	42	j	74
+	11	K	43	k	75
,	12	L	44	l	76
-	13	M	45	m	77
.	14	N	46	n	78
/	15	O	47	o	79
0	16	P	48	p	80
1	17	Q	49	q	81
2	18	R	50	r	82
3	19	S	51	s	83
4	20	T	52	t	84
5	21	U	53	u	85
6	22	V	54	v	86
7	23	W	55	w	87
8	24	X	56	x	88
9	25	Y	57	y	89
:	26	Z	58	z	90
;	27	[	59	{	91
<	28	\	60		92
=	29	]	61	~	93
>	30	^	62		94
?	31	_	63	DEL	95



OPERATOR'S QUICK REFERENCE GUIDE TO  
ABSOLUTE CURSOR POSITIONING SEQUENCE  
AND MODULO NUMBERS

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

OPERATORS QUICK REFERENCE CHART OF  
ABSOLUTE CURSOR ADDRESSING OPERATION CODES

OPERATIONAL CODES	POSITION		OPERATIONAL CODES	POSITION		OPERATIONAL CODES	POSITION	
	ROW	COL		ROW	COL		ROW	COL
	SPACE	1	1	:	28	V		55
↑	!	2	2	<	29	W	↑	56
	"	3	3	"	30	X		57
	#"	4	4	>	31	Y		58
	\$	5	5	?	32	Z		59
	%	6	6	@	33	[		60
	&	7	7	A	34	\		61
Same Page Load:	!	8	8	B	35		Same Page Load:	62
ESC =	(	9	9	C	36	^	ESC =	63
Same Page Read:	)	10	10	D	37	_	Same Page Read:	64
ESC ?	.	11	11	E	38	\	ESC ?	65
*Nth Page Load:	+	12	12	F	39	a	*Nth Page Load:	66
ESC - N	.	13	13	G	40	b	ESC - N	67
*Nth Page Read:	.	14	14	H	41	c	*Nth Page Read:	68
ESC / N	.	15	15	I	42	d	ESC / N	69
	/	16	16	J	43	e		70
↓	0	17	17	K	44	f	↓	71
	1	18	18	L	45	g		72
	2	19	19	M	46	h		73
	3	20	20	N	47	i		74
	4	21	21	O	48	j		75
	5	22	22	P	49	k		76
	6	23	23	Q	50	l		77
	7	24	24	R	51	m		78
	8		25	S	52	n		79
	9		26	T	53	o		80
	:		27	U	54			

\*N = Selected page 1 thru 4 (standard) or 1 thru 8 (optional)

OPERATORS QUICK REFERENCE CHART OF  
DYNAMIC BAUD RATE CONTROL OPERATION CODES

DESIRED BAUD RATE	MODEM PORT	PRINTER PORT	EQUIVALENT BAUD RATE SWITCH POSITION
50	ESC: @	ESC: `	0
75	ESC: A	ESC: a	1
110	ESC: B	ESC: b	2
134.5	ESC: C	ESC: c	3
150	ESC: D	ESC: d	4
300	ESC: E	ESC: e	5
600	ESC: F	ESC: f	6
1200*	ESC: G	ESC: g	7
1800	ESC: H	ESC: h	8
2000	ESC: I	ESC: i	9
2400	ESC: J	ESC: j	10
3600	ESC: K	ESC: k	11
4800	ESC: L	ESC: l	12
7200	ESC: M	ESC: m	13
9600**	ESC: N	ESC: n	14

\* Standard (default) baud rate for PRINTER port  
\*\* Standard (default) baud rate for MODEM port

OPERATOR'S QUICK REFERENCE GUIDE TO BAUD RATE CHANGE

Keys Used: ESC:[ASCII Character]

SWITCH POSITION	BAUD RATE	MODEM PORT		ASYNC PRNTR PORT	
		(KEYBOARD) ASCII	(REMOTE) HEX CODE	ASCII	HEX CODE
0	50	@	40	--	--
1	75	A	41	a	61
2	110	B	42	b	62
3	134.5	C	43	c	63
4	150	D	44	d	64
5	300	E	45	e	65
6	600	F	46	f	66
7	1200	G	47	g	67
8	1800	H	48	h	68
9	2000	I	49	i	69
10	2400	J	4A	j	6A
11	3600	K	4B	k	6B
12	4800	L	4C	l	6C
13	7200	M	4D	m	6D
14	9600	N	4E	n	6E

**OPERATORS QUICK REFERENCE CHART OF  
PERSONALITY CHANGE OPERATION CODES**

OPERATION	PERSONALITY BYTE OPERATION	DESCRIPTION	STD DEFAULT
Escape Lead-In Character	ESC . 0	Enter HEX code associated with desired ASCII character. Example: If desired ASCII character is W, enter 5 7 .	ESC
End Block Character	ESC . 1		CR
2nd End Block Character	ESC . 2		NULL
New Line Character	ESC . 3		NULL
2nd New Line Character	ESC . 4		NULL
Field Separator Character	ESC . 5		NULL
Function Lead-In Character	ESC . 6		SOH
Parity Character	ESC . 7		NULL
Replacement Character	ESC . 8		SPACE
RTS-START Delay Time	ESC . 9 .		Enter HEX code whose value is 1/2 the desired delay in milliseconds. Example: If desired delay is 115 milliseconds, enter 3A.
RTS-OFF Delay Time	ESC . A	Calculated automatically by program when byte value is 00. If change is desired, enter HEX code appropriate to the desired delay, in accordance with chart below.	00

**RECOMMENDED RTS OFF DELAY TIMES**

RTS-OFF DELAY (MILLISECONDS)	BAUD RATE	OPERATION CODE	RTS-OFF DELAY (MILLISECONDS)	BAUD RATE	OPERATION CODE
343	50	ESC . A AC	9	1800	ESC . A 05
229	75	↑ 73	9	2000	↑ 05
175	1101	58	7	2400	04
127	134.5	40	7	3600	04
115	150	3A	5	4800	03
57	300	1D	5	7200	03
29	600	0F	5	9600	↓ ESC . A 03
15	1200	ESC . A 08			

## OPERATORS QUICK REFERENCE CHART OF PERSONALITY CHANGE OPERATION CODES (cont'd)

Personality Bytes B thru 11, following, are controlled by a HEXidecimal value which causes specific Operation Bits to be set to ON in accordance with the accompanying chart. Bits X<sub>7</sub> X<sub>8</sub> X<sub>5</sub> X<sub>4</sub> comprise the HI order bits, bits X<sub>3</sub> X<sub>2</sub> X<sub>1</sub> X<sub>0</sub> comprise the LO order bits. All bits to be set must be set simultaneously.

BYTE VALUE	F	E	D	C	B	A	9	8
OPERATION BITS SET TO ON	HI X <sub>7</sub> X <sub>8</sub> X <sub>5</sub> X <sub>4</sub> LO X <sub>3</sub> X <sub>2</sub> X <sub>1</sub> X <sub>0</sub>	X <sub>7</sub> X <sub>8</sub> X <sub>5</sub> • X <sub>3</sub> X <sub>2</sub> X <sub>1</sub> •	X <sub>7</sub> X <sub>8</sub> • X <sub>5</sub> X <sub>3</sub> X <sub>2</sub> • X <sub>1</sub>	X <sub>7</sub> X <sub>8</sub> • • X <sub>3</sub> X <sub>2</sub> • •	X <sub>7</sub> • X <sub>5</sub> X <sub>4</sub> X <sub>3</sub> • X <sub>1</sub> X <sub>0</sub>	X <sub>7</sub> • • X <sub>5</sub> • X <sub>3</sub> • • X <sub>1</sub> •	X <sub>7</sub> • • • X <sub>4</sub> X <sub>3</sub> • • • X <sub>0</sub>	X <sub>7</sub> • • • • X <sub>3</sub> • • • •
BYTE VALUE	7	6	5	4	3	2	1	0
OPERATION BITS SET TO ON	HI • X <sub>8</sub> X <sub>5</sub> X <sub>4</sub> LO • X <sub>2</sub> X <sub>1</sub> X <sub>0</sub>	• X <sub>8</sub> X <sub>5</sub> • • X <sub>2</sub> X <sub>1</sub> •	• X <sub>8</sub> • X <sub>4</sub> • X <sub>2</sub> • X <sub>0</sub>	• X <sub>8</sub> • • • X <sub>2</sub> • •	• • X <sub>5</sub> X <sub>4</sub> • • X <sub>2</sub> X <sub>1</sub>	• • • X <sub>5</sub> • • • • X <sub>2</sub> •	• • • • X <sub>4</sub> • • • • X <sub>0</sub>	• • • • • • • • • •

### Polling Option Variants (ESC. B) Byte B

OPERATION		ESC. B (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
X <sub>7</sub>	Reserved	80	Reserved	
X <sub>8</sub>	Communications Buffer Control	40	ON = Polling Communications Buffer (last two pages) is reserved (DIP Switch S4-SW8 ON). Incoming data held in buffer until message is completed. If no error, message goes to screen.  OFF = Polling Communications Buffer disabled; incoming data goes directly to screen.	OFF
X <sub>5</sub>	Addressable Print Buffer Control	20	ON = Addressable Print Buffer (last page display memory) enabled (see Section VI).  OFF = Addressable Print Buffer disabled.	OFF
X <sub>4</sub>	Transmit Last Character	10	ON = Transmission of last character (under cursor) is inhibited.  OFF = Last character (under cursor) is transmitted.	OFF
X <sub>3</sub>	Return to Local/Idle State	08	ON = Terminal automatically returns to Local State upon completion of Polling message.  OFF = Terminal automatically returns to Idle State upon completion of Polling message.	OFF
X <sub>2</sub>	FAST SELECT Control	04	ON = FAST SELECT is conditional; terminal must be in Idle State to receive data.  OFF = FAST SELECT is unconditional; terminal is commanded to Idle State and must respond.	OFF
X <sub>1</sub>	Local Mode Control	02	ON = Any key may be used to establish Local State.  OFF = CONV required to establish Local State (Compose Mode).	OFF
X <sub>0</sub>	Headers Required	01	ON = Headers are required in all communications.  OFF = Headers are not required.	OFF

**OPERATORS QUICK REFERENCE CHART OF  
PERSONALITY CHANGE OPERATION CODES (cont'd)**

BIT	TITLE	BYTE	DESCRIPTION	STD (DEFAULT) BIT CONDITION
<b>Polling Transmission Number Byte C (ESC . C)</b>				
X <sub>7</sub>	Reserved	80	Reserved	OFF
X <sub>6</sub>		40		
X <sub>5</sub>		20		
X <sub>4</sub>		10		
X <sub>3</sub>	Limit = 8	08	Operation bits set establish number of transmissions counted before recycling the count. 00 = transmission number inhibited, 01 = count recycles between 0 and 1.	00
X <sub>2</sub>	Limit = 4	04		
X <sub>1</sub>	Limit = 2	02		
X <sub>0</sub>	Limit = 1	01		
<b>Power-Up Default Modulus Tabs Byte D (ESC . D)</b>				
X <sub>7</sub>	Typewriter Tab Clear	80	ON = Clear all typewriter tabs with Clear All (ESC * and ESC +) commands.  OFF = Only Protect Mode tabs cleared by Clear All command. Typewriter Tabs and Modulo Tabs are cleared in normal manner.	OFF
X <sub>6</sub>	Power-Up Tab Mode	40	Bits ON or OFF as required to define the ASCII character selected which may be used at Power-Up time to initialize Modulo Tab Mode, without executing ESC 3. Nominally, character utilized is the same used when the sequence ESC 3 is used.	ALL OFF
X <sub>5</sub>		20		
X <sub>4</sub>		10		
X <sub>3</sub>		08		
X <sub>2</sub>		04		
X <sub>1</sub>		02		
X <sub>0</sub>		01		

OPERATORS QUICK REFERENCE CHART OF  
PERSONALITY CHANGE OPERATION CODES (cont'd)

OPERATION		ESC . E (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
<b>Special Function Control Byte E (ESC . E)</b>				
X <sub>7</sub>	Keyboard Personality Changes	80	ON = Inhibit personality changes from the keyboard.  OFF= Personality changes from keyboard are accepted.	OFF
X <sub>6</sub>	Line Erase With CR	40	ON = CR erases remainder of current line before executing normal CR operation.  OFF= Normal CR operation.	OFF
X <sub>5</sub>	New Line With CR	20	ON = Executing CR also executes New Line.  OFF= Normal CR operation.	OFF
X <sub>4</sub>	Auto Line Wrap	10	ON = Auto Line Wrap is inhibited. Operator must use CR ,NL, etc. to get to next line.  OFF= Auto Line Wrap - New Line automatically executed when position 80 is filled.	OFF
X <sub>3</sub>	Auto Video Shut Off	08	ON = CRT video not shut off after approximately 20 minutes of no display activity.  OFF= CRT video automatically shut off after approximately 20 minutes of no display activity.	ON
X <sub>2</sub>	Pseudo Send	04	ON = <b>PRINT</b> sends SOH P CR <b>SHIFT PRINT</b> sends SOH p CR  <b>SEND LINE</b> sends SOH Q CR <b>SHIFT SEND LINE</b> sends SOH q CR  <b>SEND PAGE</b> sends SOH R CR <b>SHIFT SEND LINE</b> sends SOH r CR  <b>SEND MSG</b> sends SOH S CR <b>SHIFT SEND MSG</b> sends SOH s CR  OFF= Disables mode ; normal SEND and PRINT operations	OFF



**OPERATORS QUICK REFERENCE CHART OF  
PERSONALITY CHANGE OPERATION CODES (cont'd)**

OPERATION		ESC . E (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
<b>Special Function Control Byte E (ESC . E) (cont'd)</b>				
X <sub>7</sub>	Load Cursor Skip	02	ON = Cursor skips out of protected field if position is specified during a Load Cursor operation.  OFF= Cursor remains in protected field if position is specified during a Load Cursor operation.	OFF
X <sub>0</sub>	FUNKEY Programming/ Display	01	ON = Inhibit programming of function keys and display of FUNKEY messages.  OFF= Normal FUNKEY operations.	OFF
<b>Status Line Visual Attribute Control Byte F (ESC . F)</b>				
OPERATION		ESC . F (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
X <sub>7</sub>	Reserved	80	Reserved	OFF
X <sub>6</sub>	↓	40	↓	↓
X <sub>5</sub>	↓	20	↓	↓
X <sub>4</sub>	↓	10	↓	↓
X <sub>3</sub>	↓	08	↓	↓
X <sub>2</sub>	Reversing Control	04	ON = Status Line message reversed.  OFF= Status Line message in normal or personality video.	OFF
X <sub>1</sub>	Blinking Control	02	ON = Status Line message blinking.  OFF= Status Line message in normal or personality video.	ON
X <sub>0</sub>	Underlining or Blanking Control	01	ON = Status Line message underlined (S6-SW3 @ 14M set to ON) or blanked (S6-SW3 at OFF).  OFF= Status Line message in normal or personality video.	OFF

**OPERATORS QUICK REFERENCE CHART OF  
PERSONALITY CHANGE OPERATION CODE (cont'd)**

OPERATION		ESC . . 0 (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
<b>Special Function Control Byte 10 (ESC . . 0)</b>				
X <sub>7</sub>	Erase to Spaces Replacement Character	80	ON = Erase to Spaces operation uses replacement character specified by Personality Byte 8.  OFF = Normal Erase to Spaces operation.	OFF
X <sub>6</sub>	Clear to Spaces Replacement Character	40	ON = Clear to Spaces operation uses replacement character specified by Personality Byte 8.  OFF = Normal Clear to Spaces operation.	OFF
X <sub>5</sub>	FS vs. Protected Field Control	20	ON = Protected field delimiter, FS, is imbedded after unprotected field.  OFF = Protected field delimiter, FS, is imbedded before unprotected field.	OFF
X <sub>4</sub>	Transmit NL Control	10	ON = Inhibit transmission of 1st and 2nd New Line characters (Personality Bytes 3 and 4)  OFF = Normal transmission of 1st and 2nd New Line characters.	OFF
X <sub>3</sub>	Scrolling Control	08	ON = Scrolling of an unprotected page is inhibited.  OFF = Normal Scrolling operation.	OFF
X <sub>2</sub>	Reserved	04	Reserved	OFF
X <sub>1</sub>	Erase Page vs. Write Protect	02	ON = Erase Page operation resets Write Protect Mode.  OFF = Normal Erase Page operation.	ON
X <sub>0</sub>	Erase Line vs. Write Protect	01	ON = Erase Line operation resets Write Protect Mode (WPRT).  OFF = Normal Erase Line operation.	OFF

**OPERATORS QUICK REFERENCE CHART OF  
PERSONALITY CHANGE OPERATION CODES (cont'd)**

OPERATION		ESC . . 1 (BYTE)	DESCRIPTION	STD (DEFAULT) BIT CONDITION
BIT	TITLE			
<b>Special Function Control Byte 11 (ESC . . 1)</b>				
X <sub>7</sub>	Reserved	80	Reserved	ALL OFF
X <sub>6</sub>		40		
X <sub>5</sub>		20		
X <sub>4</sub>		10		
X <sub>3</sub>		08		
X <sub>2</sub>	Power-Up Conv Mode Control	04	ON = Conversation Mode is set when power-up is completed.  OFF = Block Mode is set when power-up is completed.	OFF
X <sub>1</sub>	Reserved	02	Reserved	OFF
X <sub>0</sub>	Power-Up CAP LOCK Control	01	ON = CAP LOCK is set when power-up is completed.  OFF = CAP LOCK is not set when power-up is completed.	ON

**OPERATORS QUICK REFERENCE CHART OF  
VIDEO ATTRIBUTE CONTROL OPERATION CODES**

FUNCTION	DESCRIPTION
ESC ~ 0	Video OFF (data is retained)
ESC ~ 1	Video ON; cursor OFF
ESC ~ 2	Video ON; cursor steady
ESC ~ 3	Video ON; cursor blinking

FUNCTION	ADM 42 MODE	ADM 2 MODE
Blanking for entire page	ESC G (Space)	ESC G I
Blanking to end of line	ESC G "	ESC G #
Underlining for entire page	ESC G \$	ESC G %
Underlining to end of line	ESC G &	ESC G '

FUNCTION	STD CHAR.	ALT. CHAR.
Reset to Standard Video	ESC G 0	ESC G 0
Limited Graphics Mode Enable		ESC G 8
Blanking (S6-SW3 OFF) or Underlining (S6-SW3 ON) of area	ESC G 1 or ESC ~	ESC G 9 or ESC ~
Blinking of Area	ESC G 2 or ESC ~	ESC G A or ESC ~
Blanking (S6-SW3 OFF) or Underlining (S6-SW3 ON) and Blinking of Area	ESC G 3	ESC G B
Reversing of Area	ESC G 4	ESC G C
Blanking (S6-SW3 OFF) or Underlining (S6-SW3 ON) and Reversing of Area	ESC G 5	ESC G D
Blinking and Reversing of Area	ESC G 6	ESC G E
Blanking (S6-SW3 OFF) or Underlining (S6-SW3 ON) and Blinking and Reversing of Area	ESC G 7	ESC G F

OPERATORS QUICK REFERENCE CHART  
OF ADM-42 ESCAPE SEQUENCES

		ESCAPE SEQUENCE						
HEX	1ST BYTE →	2	3	4	5	6	7	
	2ND ↓							
0			0 CLEAR TABS	@ PRINT PROT AS SP	P PRINT PAGE ALL	' POLLING ADDRESS*	p PRINT UNFORMAT	
1	!	FUNKEY PROG*	1 SET TYPWR TABS	A COPY PRINT*	Q INSERT CHAR	a AUX CONTROL*	q SET INS MODE	
2	"	KBD ENA**	2 CLEAR COL OF TABS	B SET BLOCK MO	R DELETE LINE	b STATUS 1 OFF	r CLEAR INS MODE	
3	#	KBD OISA**	3 TYPWR TAB CTRL*	C SET CONV MO	S SEND MSG	c STATUS 1 ON	s SEND MSG ALL	
4	\$	CLEAR ADM1 MO	4 SEND FG LINE	D SET DUPLH OR F	T ERASE LINE (PERS)	d STATUS 2 OF F	t ERASE LINE TO NUL	
5	%	SET ADM 1 MO	5 SEND FG PAGE	E INSERT LINE	U SET PGM MODE	e STATUS 2 ON	u CLEAR PGM MOD	
6	&	SET PROTECT	6 SEND ALL LINE	F MESSAGE TO ROW 25*	V SET COL PROT SP AT CURSOR	f STATUS 3 OFF	v SET AUTO PG	
7	'	CLEAR PROTECT	7 SEND ALL PAGE	G ATTRIB CONTROL*	W DELETE CHAR	g STATUS 3 ON	w CLEAR AUTO PG	
8	(	CLEAR WPROT	8 WRITE SOM (STX)	H	X CLEAR PGM MODE	h	x	
9	)	SET WPROT	9 WRITE EOM (ETX)	I BACK TAB	Y ERASE PAGE (PERS)	i TAB (SKIP)	y ERASE PG TO NULL	
A	.	CLEAR ALL TO NULL	: CLEAR FG TO NULL	J PAGE BACK	Z CLEAR ALL MODES	j	z	
B	+	CLR ALL TO SPACE	; CLR FG SP/PERS	K PAGE FWD	[ BUFFERED PRINT CONTROL*	k	{	
C	,	CLR ALL TO PROT SP	< STATUS 4 ON	L GO TO PAGE N (1-8)**	\ EVOKE FUNKEY*	l		
D	-	LOAD PRC*	= LOAD RC*	M MULT ESC*	] WRITE MULT CHAR*	m	~	
E	.	CHANGE PERS*	> STATUS 4 OFF	N SET PAGE EDIT	^ BLINK CONTROL	n	~	
F	/	READ PRC**	? READ RC**	O CLEAR PAGE EDIT	_ BLANK CONTROL	o DISPLAY PERS*	DEL	

\*Multiple Characters Required

\*\*Remote (from host) Only

LEAR SIEGLER, INC.  
DATA PRODUCTS DIVISION

OPERATOR'S QUICK REFERENCE GUIDE  
TO GRAPHIC CHARACTER SET CODES

			FUNCTION		GRAPHIC CHARACTER SET					
HEX			0	1	2	3	4	5	6	7
	LSBs 4321	MSBs 765	000	001	010	011	100	101	110	111
0	0000		NUL	DLE		0	@	P		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		(SKIP) HT	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	(HOME) RS	.	>	N	^	n	~
F	1111		SI	(NEW LINE) US	/	?	O	—	o	DEL

OPERATOR'S QUICK REFERENCE GUIDE TO BUFFERED PRINT MODE

Keys Used: ESC [(ASCII Characters)

FUNCTION	ASCII CHARACTERS
Unbuffered Serial Printing	0P
Unbuffered Parallel Printing	1P
Buffered Serial Printing	2P
Buffered Parallel Printing	3P
Unbuffered Serial Printing Unformatted	0p
Unbuffered Parallel Printing Unformatted	1p
Buffered Serial Printing Unformatted	2p
Buffered Parallel Printing Unformatted	3p

**APPENDIX B**

**TTL DATA DISPLAY MONITOR  
120/150**



# **SERVICE MANUAL**

## **TTL DATA DISPLAY 120/150**

5-017-1024

REV. A

July, 1978



**Electronic  
Display  
Division**



## CONTENTS

	Page
ILLUSTRATIONS AND TABLES	iii
PART I OPERATING DATA	1
Section	
1. GENERAL INFORMATION	
1.1 Monitor Description	1-1
1.2 Customer Input Signal Requirements	1-1
1.2.1 PWA Signal Edge Connector	1-1
1.2.2 Video	1-1
1.2.3 Horizontal Drive	1-4
1.2.4 Vertical Drive	1-4
1.2.5 Skip Scan	1-4
1.3 Input Power Requirement	1-4
1.3.1 AC Input Power Requirement	1-4
1.3.1.1 Input Power Connector	1-4
1.3.1.2 Input Voltage	1-4
1.3.1.3 Input Power	1-4
1.3.1.4 Input Frequency	1-6
1.3.2 DC Input Power Requirements	1-6
1.3.2.1 Input Power Connector	1-6
1.3.2.2 Input Voltage	1-6
1.3.2.3 AC Ripple	1-6
1.3.2.4 Input Current	1-6
1.4 Display Monitor Electrical Characteristics	1-6
1.4.1 Video Amplifier	1-6
1.4.2 Horizontal Electronics	1-8
1.4.3 Vertical Electronics	1-8
1.4.4 Skip Scan Electronics	1-9
1.5 CRT Display Characteristics	1-9
1.5.1 CRT Resolution	1-9
1.5.2 Geometric Distortion	1-9
1.5.3 Linearity	1-9
1.5.4 Jitter	1-9
1.6 Mechanical Specifications	1-10
1.7 Environmental Specifications	1-10
1.8 Reliability	1-10
1.9 X-Ray Radiation	1-10
1.10 User Operating Controls	1-13
1.10.2 Internal Controls	1-13
2. INSTALLATION	2-1
2.1 Mechanical	2-1
2.2 Electrical	2-1
2.2.1 AC Input	2-1
2.2.2 DC Input	2-1
2.3 Location	2-1
2.4 Ground Techniques	2-1
2.5 Video Lead In Considerations	2-1



## CONTENTS (Cont.)

Section		Page
3	OPERATION	3-1
	3.1 General	3-1
	3.2 Brightness Adjust	3-1
	3.3 Contrast Adjust	3-1
PART II	SERVICE DATA	4
4	THEORY OF OPERATION	4-1
	4.1 Video Amplifier	4-1
	4.2 Vertical Electronics	4-1
	4.3 Horizontal Electronics	4-6
	4.3.1 Horizontal Deflection	4-6
	4.3.2 CRT Operating Voltages	4-8
	4.4 X-Ray Protection Electronics	4-8
	4.5 Dynamic Focus Electronics	4-9
	4.6 Low Voltage Regulated Supply	4-9
5	ADJUSTMENT AND MAINTENANCE	5-1
	5.1 General	5-1
	5.2 Initial Turn-On	5-1
	5.3 Power Supply Adjustment	5-1
	5.4 Vertical Electronics	5-1
	5.4.1 Vertical Sync Adjust	5-1
	5.4.2 Vertical Linearity and Height Adjust	5-1
	5.4.3 Skip Scan Adjust	5-1
	5.5 Horizontal Electronics	5-2
	5.5.1 Width Adjustment	5-2
	5.5.2 Horizontal Centering Adjustment	5-2
	5.6 Raster Centering	5-2
	5.7 Focus	5-2
	5.8 Dynamic Focus	5-2
	5.9 Brightness and Contrast	5-3
	5.10 Troubleshooting Guide	5-3
6	SERVICE DATA	6-1
	6.1 General	6-1
	6.2 Ordering Parts	6-1
	6.3 Returning Parts	6-1
	6.4 Waveforms	6-2
	6.5 Board Assembly	6-2
	6.6 Component Replacement Parts Affecting Product Safety	6-2
	6.7 Chassis Mounted Component Parts List	6-2



## CONTENTS (Cont.)

	Page
<b>ILLUSTRATIONS</b>	
1.1 Horizontal/Video Timing	1-2
1.2 Vertical/Video Timing	1-3
1.3 Skip Scan/Horizontal Timing	1-5
1.4 Video Amplifier Input Impedance	1-6
1.5 Video Amplifier Input Transfer Function	1-7
1.6 25V Pulse Response	1-7
1.7 Horizontal Input Impedance	1-8
1.8 Vertical Input Impedance	1-8
1.9 Skip Scan Input Impedance	1-9
1.10 TTL 120, 0° and TTL 150, 5° Tilt	1-12
2.1 PWA Interface Connection and Signal Output	2-2
2.2 Wiring Data For J1 Mating Connector	2-3
4.1 Optional Video Amplifier Schematic	4-2
4.2 TTL 120/150 Block Diagram	4-3
4.3 Yoke Current Waveform	4-4
4.4 Block Diagram of Vertical Amplifier	4-5
4.5 Horizontal Timing Diagram of U102 & U103	4-7
4.6 Power Supply Block Diagram	4-10
5.1 Dynamic Focus Waveform	5-2
6.1 TTL 120 Schematic	6-5
6.2 TTL 120 Main PWA Component Layout and Parts List	6-6
6.3 TTL 150 Schematic	6-7
6.4 TTL 150 Main PWA Component Layout and Parts List	6-8
6.5 TTL 120/150 Waveforms	6-9
6.6 Component Layout Low Voltage Regulator PWA	6-10
6.7 Component Layout for Dynamic Focus PWA	6-11
6.8 Skip Scan Component Layout and Parts List	6-12
<b>TABLES</b>	
1-1 Mechanical Specifications	1-11
2-1 Mounting Data	2-1



IM1024

## PART I

### OPERATING DATA

This section of the Service Manual provides data concerning the specifications, installation and operation of the TTL120/150 Data Monitor.



## SECTION 1

## GENERAL INFORMATION

## 1.1 MONITOR DESCRIPTION

The TTL 120/150 Data Monitor is a solid state raster scan display for data terminal application. The Monitor is designed for high quality display of alphanumeric dot characters.

The Data Monitor is available with either a 12 inch or a 15 inch diagonal screen size CRT and each monitor uses a CRT with 110° deflection angle which results in a very dense package.

The Data Monitor requires three separate TTL compatible input signals for operation, they are 1) vertical drive, 2) horizontal drive and 3) video. These three separate TTL input signals eliminate costly redundancy associated with the mixing and stripping operation required in a composite (single input) monitor.

The unit is available with the following factory installed options. The TTL compatible skip scan option provides for variable spacing between character rows while using only one scan line per space. The dynamic focus PWA option is available to provide an overall focus improvement from the conventional static focus control. The horizontal frequency can be altered from 15.25kHz to 21kHz. The main PWA is available with or without a brightness control, with or without contrast control and the video termination can be changed.

## 1.2 CUSTOMER INPUT SIGNAL REQUIREMENTS

## 1.2.1 PWA Signal Edge Connector (Customer Supplied)

Viking	No. ZVK10S/1-2
Amphenol	No. 225-21031-101
Cinch	No. 250-10-30-170
Ball EDC	No. 1-039-0119

(Refer to Figure 2.1 for wiring detail of this connector)

## 1.2.2 Video

Amplitude: High - 4.0V  $\pm$ 2.0V into an external 500 $\Omega$  or less contrast control.  
2.0V max at J101-8 to prevent video amplifier saturation.

Low - 0.0V  $\pm$ 0.4V

Polarity: White High

Pulse Width: 40ns min

Rise and Fall Time: Less than 12ns (10% to 90%)

Video Blanking: Refer to Figures 1.1 and 1.2

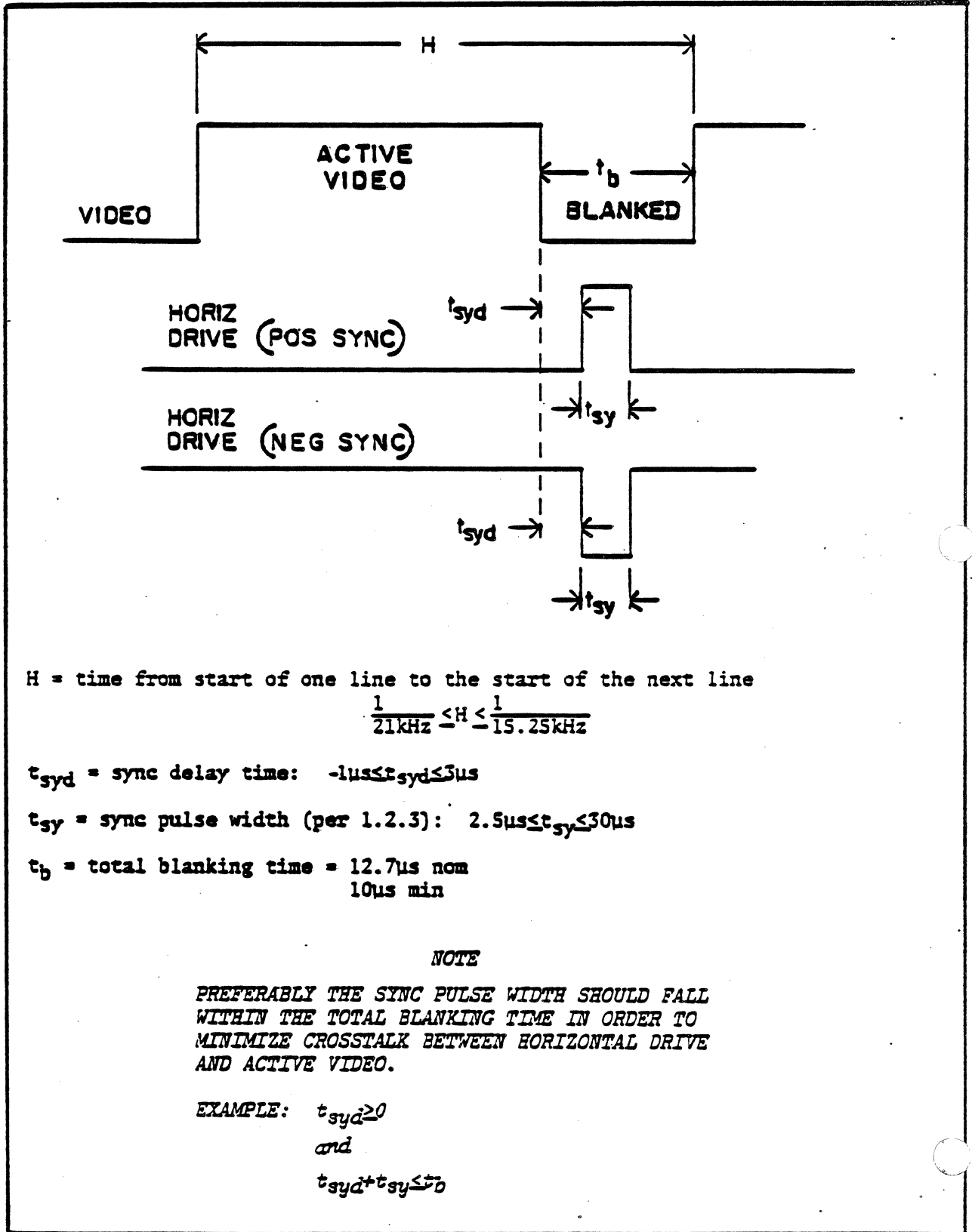


Figure 1.1 Horizontal/Video Timing

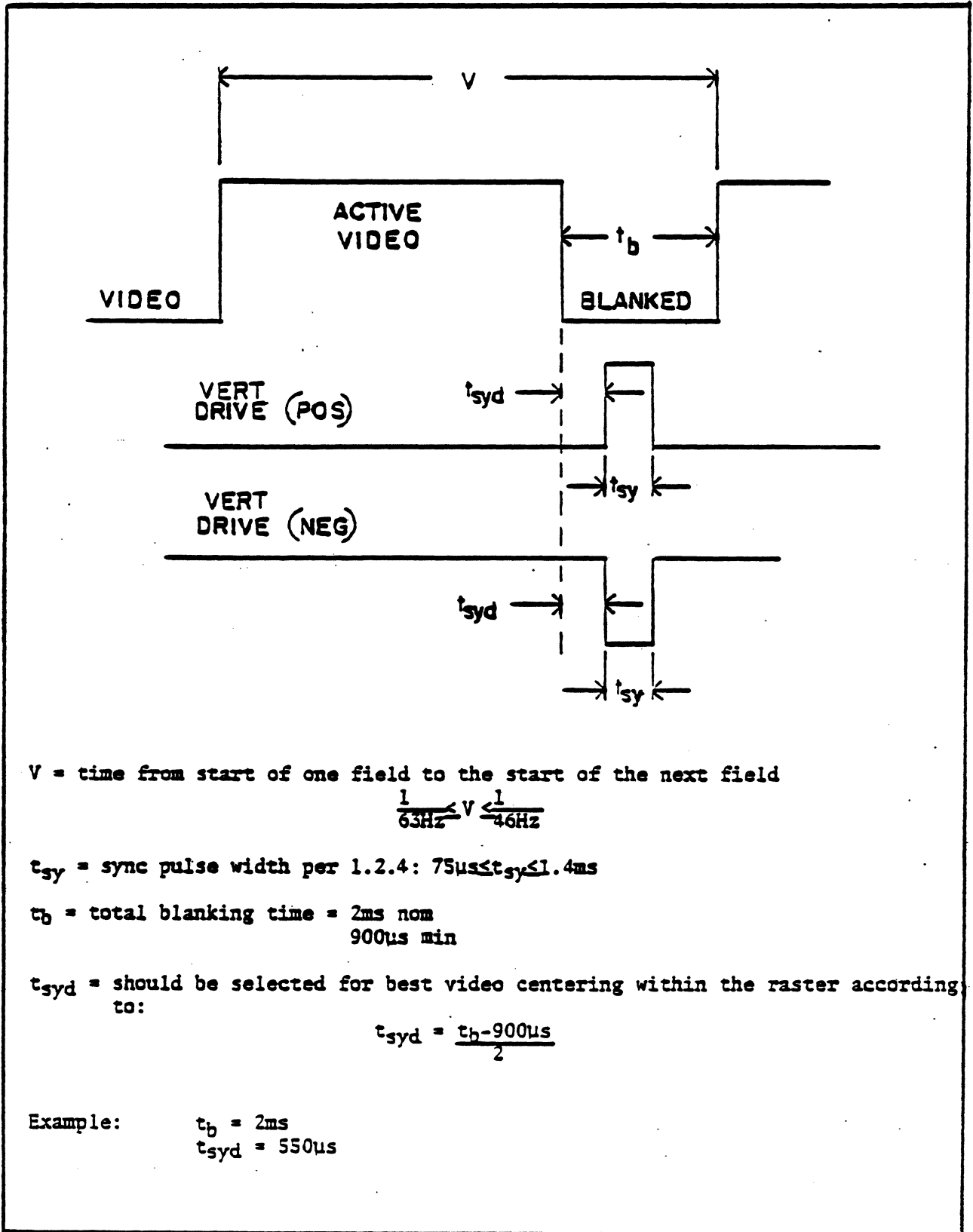


Figure 1.2 Vertical/Video Timing





### 1.2.3 Horizontal Drive

Horizontal Frequency: ( $f_H$ ): 15,250Hz min to 21,000Hz max  
 15,750Hz  $\pm$ 500Hz (Standard)

Amplitude: High - 4.0V  $\pm$ 1.5V  
 Low - 0.0V  $\pm$ 0.4V

Polarity: Standard - Positive edge triggering  
 Optional - Negative edge triggering

Pulse Width ( $t_{sy}$ ): 2.5 $\mu$ s min to 30 $\mu$ s max  
 Rise and Fall Time: Less than 100ns (10% to 90%)  
 Horizontal/Video Timing: Refer to Figure 1.1

### 1.2.4 Vertical Drive

Vertical Frequency ( $f_V$ ): 46Hz min to 63Hz max

Amplitude: High - 4.0V  $\pm$ 1.5V  
 Low - 0.0V  $\pm$ 0.4V

Polarity: Standard - Negative edge triggering  
 Optional - Positive edge triggering

Pulse Width ( $t_{sy}$ ): 75 $\mu$ s min to 1.4ms max  
 Rise and Fall Time: Less than 100ns (10% to 90%)  
 Vertical/Video Time: Refer to Figure 1.2

### 1.2.5 Skip Scan

Amplitude: High - 4.0V  $\pm$ 1.5V  
 Low - 0.0V  $\pm$ 0.4V

Polarity: Skip High

Pulse Width ( $t_{ss}$ ): 3 $\mu$ s min to 10 $\mu$ s max  
 Rise and Fall Time: Less than 100ns (10% to 90%)  
 Skip Scan/Horizontal Timing: Refer to Figure 1.3

## 1.3 INPUT POWER REQUIREMENT

### 1.3.1 AC Input Power Requirement

#### 1.3.1.1 Input Power Connector

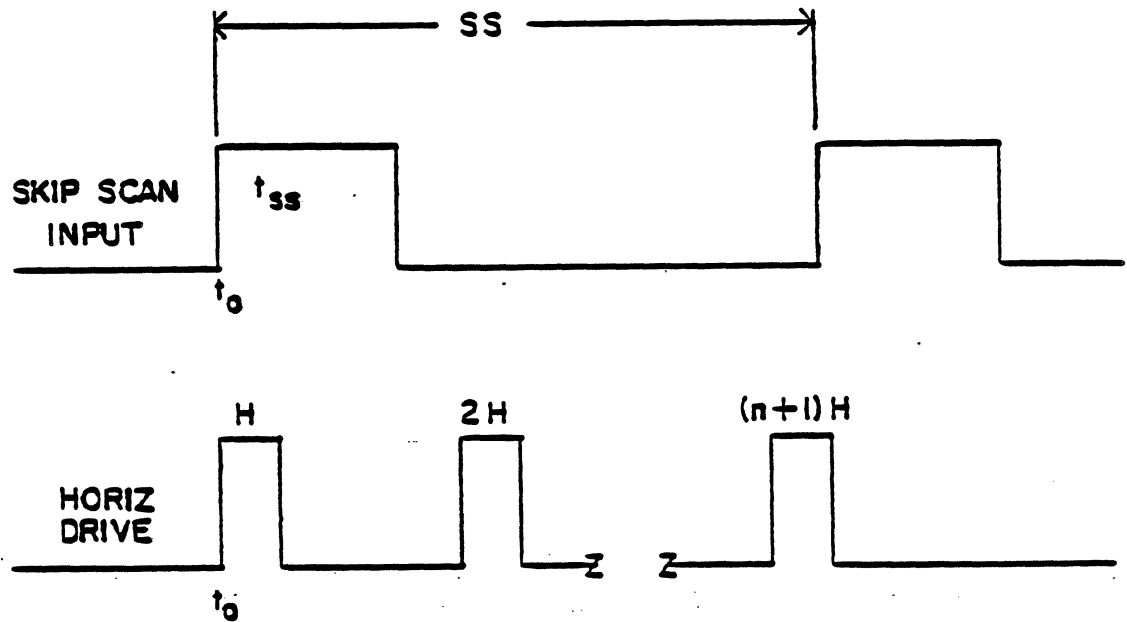
A 9 pin male connector shell (Molex 03-06-1092) with female contacts (Molex 4529) is required to mate with J1 of the AC power supply. Refer to Figure 2.2 for wiring detail of the J1 mating connector.

#### 1.3.1.2 Input Voltage

120V Nominal: 105V RMS min to 130V RMS max  
 220V Nominal: 198V RMS min to 242V RMS max  
 240V Nominal: 210V RMS min to 264V RMS max

#### 1.3.1.3 Input Power

Nominal Wattage: 50 watts @ 120VAC, 220VAC or 240VAC  
 Maximum Wattage: 65 watts @ 120VAC, 220VAC or 240VAC



SS = Time between skip scan pulses  $nH$  which will conform to the number of lines  $(n-1)$  in the character matrix plus one line  $(H)$  for vertical setting

$t_{ss}$  = Skip scan pulse width (per 1.2.5)  $3\mu s \leq t_{ss} \leq 10\mu s$

The leading edges of the skip scan input and horizontal drive should be coincident at time  $t_0$ .

Figure 1.3 Skip Scan/Horizontal Timing



#### 1.3.1.4 Input Frequency

49Hz min to 61Hz max

#### 1.3.2 DC Input Power Requirements (Optional)

##### 1.3.2.1 Input Power Connector

The DC input voltage is applied through pin 7 of J101 on the main PWA.

##### 1.3.2.2 Input Voltage

+55VDC  $\pm 2\%$ , with line, load and temperature.

##### 1.3.2.3 AC Ripple

100mV p-p max for refresh synchronous with power frequency

35mV p-p max for refresh non-synchronous with power frequency

##### 1.3.2.4 Input Current

Average Current Nominal: 0.5A

Average Current Maximum: 0.7A

Maximum Peak Current

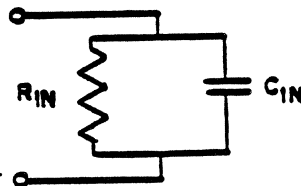
from Horizontal and

Vertical AC Components: 1A

#### 1.4 DISPLAY MONITOR ELECTRICAL CHARACTERISTICS

##### 1.4.1 Video Amplifier

Input Impedance: Refer to Figure 1-4



$R_{IN}$  (Unterminated) = 5k typ; 3K min  
 $C_{IN}$  = 20pF typ; 30pF max

Figure 1.4 Video Amplifier Input Impedance



Input Transfer Function (typ): Refer to Figure 1-5

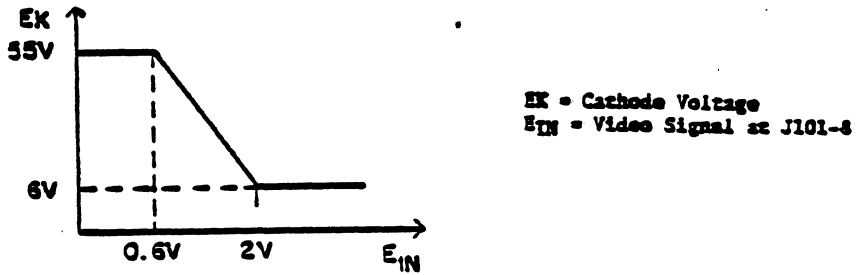


Figure 1.5 Video Amplifier Input Transfer Function

Bandwidth: DC 22MHz @ -3db typ; 20MHz @ -3db min

25V Pulse Response: Refer to Figure 1.6

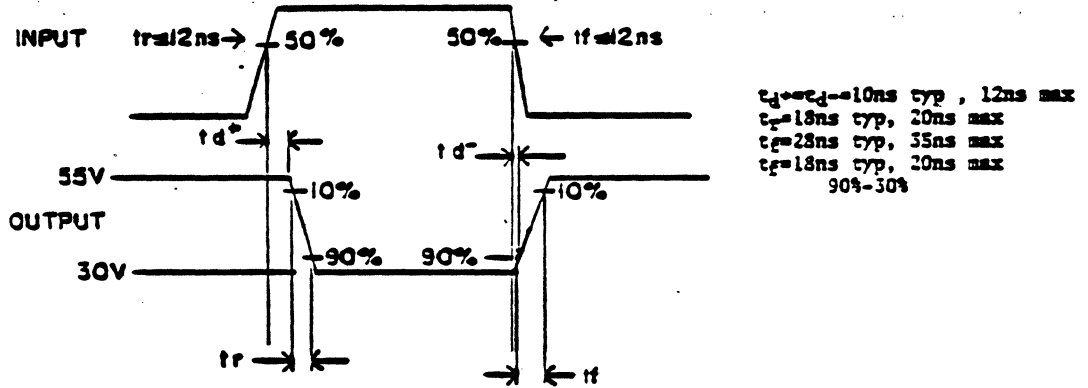


Figure 1.6 25V Pulse Response



1.4.2 Horizontal Electronics

Input Impedance: Refer to Figure 1.7

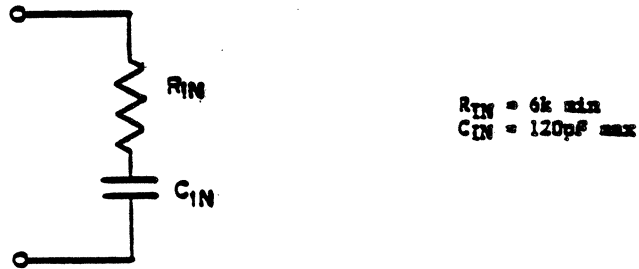


Figure 1.7 Horizontal Input Impedance

Retrace Time: 8.2 $\mu$ s typ; 9.0 $\mu$ s max

Horizontal Centering: Adjustment range is equal to  $*t_{CTR} = 1.1(R_{153} + R_{159})C_{153}$  which translates to 8 $\mu$ s min to 28 $\mu$ s max

\*t = Time      \*CTR = Centering

1.4.3 Vertical Electronics

Vertical Input Impedance: Refer to Figure 1.8

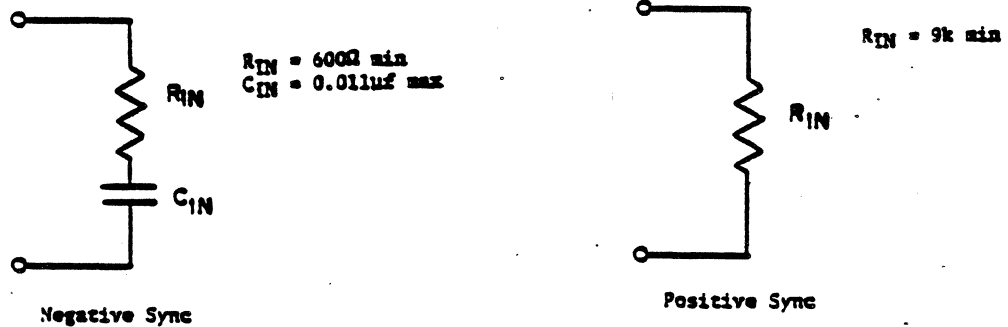


Figure 1.8 Vertical Input Impedance

Retrace Time: 700 $\mu$ s typ; 820 $\mu$ s max



#### 1.4.4 Skip Scan Electronics

Input Impedance: Refer to Figure 1.9

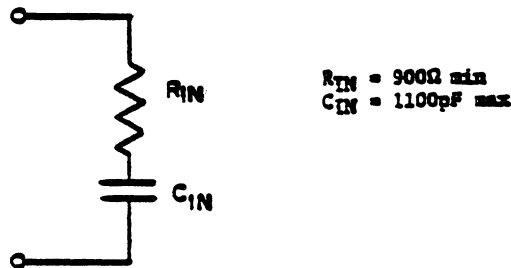


Figure 1.9 Skip Scan Input Impedance

Vertical Amplifier Delay Plus Settling Time: 60 $\mu$ s max to 90% of final value

### 1.5 CRT DISPLAY CHARACTERISTICS

#### 1.5.1 CRT Resolution (without bonded panel)

Phosphor	*Resolution (TV Lines)	
	Center	Corner
P4	1000 @ 30fL	900 @ 30fL
P39	1000 @ 15fL	900 @ 15fL

\*Resolution is measured in accordance with EIA RS-375 except Burst Modulation (or depth of modulation) is adjusted for 100%.

#### 1.5.2 Geometric Distortion

The perimeter of a full field of characters approaches an ideal rectangle of 4 by 3 aspect ratio to within  $\pm 1.5\%$  of rectangle height.

#### 1.5.3 Linearity

Character height or width shall be within 10% of that of any adjacent character and within 20% of that for any character on the screen.

#### 1.5.4 Jitter

Display jitter as a function of magnetic interference from the power transformer is:

60Hz - 0.006 inch p-p max  
 50Hz - 0.008 inch p-p max



## 1.6 MECHANICAL SPECIFICATIONS

Table 1-1 and Figure 1.10 lists the mechanical specifications for the TTL-120/150 Data Monitor. For further information, contact our General Sales Offices. They are:

Addison, Illinois (312) 279-7400  
 Ocean, New Jersey (201) 922-2800  
 Santa Clara, California (408) 244-1474  
 Upland, California (714) 985-7110  
 Lewisville, Texas (214) 436-2383

## 1.7 ENVIRONMENTAL SPECIFICATIONS

	<u>Operating Range</u>	<u>Storage Range</u>
Ambient Temperature	5°C to 55°C	-40°C to 65°C
Humidity (Non-Condensing)	5% to 80%	5% to 90%
Altitude	Up to 10,000Ft. (3048M)	Up to 30,000Ft. (9144M)

## 1.8 RELIABILITY

The calculated MTBF excluding CRT at 55°C is 24,500 hours. The calculations are based on MIL 217A assuming the military K Factors are "ground base equipment."

## 1.9 X-RAY RADIATION

The TTL 120/150 Data Monitor complies with the Federal Regulation for Radiation Control as required by the radiation Control for Health and Safety Act of 1968, and as implemented by Title 21, Subchapter J of the Code of Federal Regulation.

These regulations place certain requirements upon manufacturers of products which can emit x-rays under some conditions of operation or failure. This includes CRT data display monitors.

Certification of compliance with radiation regulations is shown by a label attached to each monitor. The user is responsible for labeling his product in a similar fashion or in making the DHEW label easily visible from the outside of the enclosure. The regulations state that "This (certification) information shall be provided in the form of a tag or label permanently affixed or inscribed on such product so as to be legible and readily accessible to view when the product is fully assembled for use..." Each monitor is supplied with an extra label attached to the CRT. The user will remove this label and use it as stated above.

**DIMENSION (Inches/Millimeters)**

MODEL		TILT (°)	A (in/mm)	B	C	Weight (Lbs/Kg)	OUTLINE DWG
TTL-120B	AC	0	4.51/115	4.72/120	9.03/229	15/6.8	2-030-0394
TTL-120B	AC	7½	4.70/119	4.11/104	8.95/227	15/6.8	3-030-0391
TTL-120A	AC	0	4.58/116	2.97/75	9.09/231	14.5/6.6	2-030-0388
TTL-120A	AC	5	4.72/120	2.57/65	9.06/230	14.5/6.6	2-030-0403
TTL-120A	AC	7½	4.78/121	2.37/60	9.01/229	14.5/6.6	2-030-0406
TTL-120A	AC	10	4.80/122	2.16/55	8.95/227	14.5/6.6	2-030-0390
TTL-120D	AC	0	4.66/118	5.30/135	9.20/234	15.5/7.0	2-030-0393
TTL-120D	AC	10	4.90/124	4.78/121	9.02/229	15.5/7.0	2-030-0392
TTL-150A	AC	0	5.33/135	2.38/60	10.66/271	18.5/8.4	2-030-0395
TTL-150A	AC	5	5.42/138	1.91/48	10.62/270	18.5/8.4	2-030-0389
TTL-150A	AC	7½	5.47/139	1.67/42	10.57/268	18.5/8.4	2-030-0405
TTL-150D	AC	0	5.30/135	5.40/137	10.62/270	19.75/9.0	2-030-0387
TTL-150D	AC	5	5.92/150	4.58/116	11.03/280	19.75/9.0	2-030-0387

**NOTES:**

1. For DC models subtract 4 lbs/1.8kg
2. Dimensions based on standard unit with plain face CRT.



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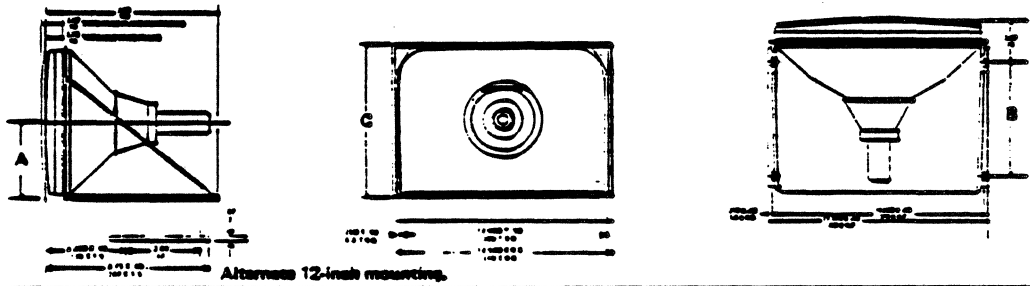
**Table 1-1 Mechanical Specifications**



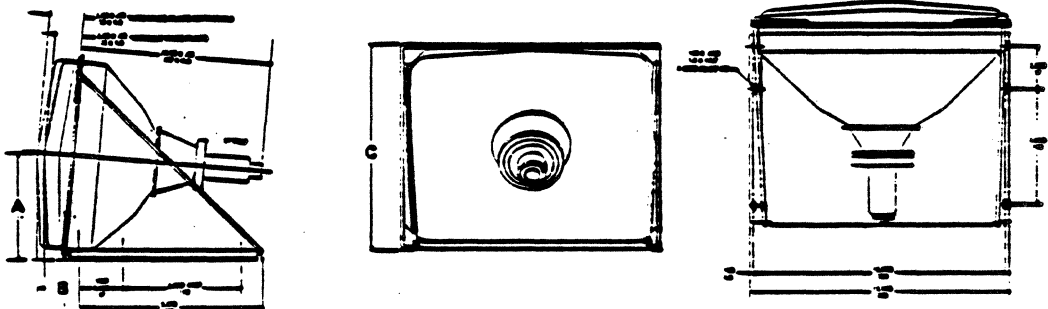


**DIMENSIONS FIGURE 1-12**

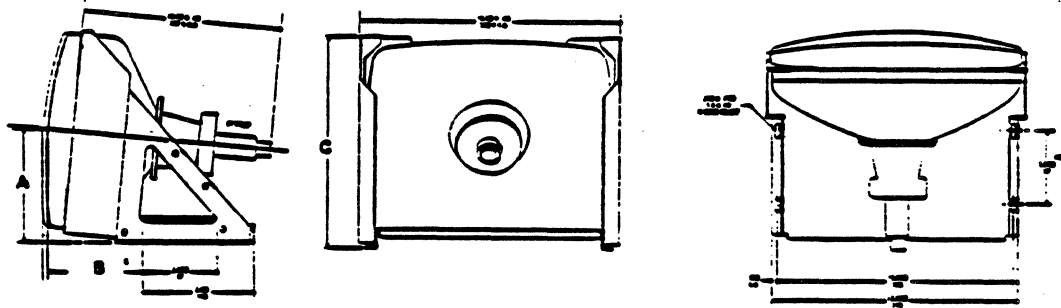
**TTL-120 12-INCH DIAGONAL A**



**TTL-150 15-INCH DIAGONAL A**



**TTL-150 15-INCH DIAGONAL ° D**



\* Alternate 15-inch frame style.

Figure 1.10 TTL 120, 0° and TTL 150 5° Tilt Dimensions



## 1.10 USER OPERATING CONTROLS

### 1.10.1 External Controls

The only external control required for operation of the standard TTL 120/150 display unit is a contrast control. The impedance level of this control shall be no greater than 500Ω to keep frequency response limitations to a minimum.

An option is available where the contrast control can be placed on the PWA.

Another option is available, where the brightness control is removed from the PWA. A remote brightness control supplied by the customer is used and is connected to the PWA via J101.

### 1.10.2 Internal Controls

The following controls are mounted on the main PWA:

Width	Skip Height (Optional)
Horizontal Video Centering	Internal Contrast (Optional)
Vertical Sync	Brightness
Vertical Linearity	Focus
Height	Dynamic Focus (Located on Dynamic Focus PWA)



## Section 2

## INSTALLATION

## 2.1 MECHANICAL

Refer to Table 2-1 for the Display Monitor mounting data and to Section 1.6 for its mechanical specifications.

<u>MODEL</u>	<u>MOUNTING DATA</u>
TTL120B	4 Clinch Nuts
TTL120A	4 .188X.500 radius end slots
TTL120D	4 .218X.750 radius end slots
TTL150A	6 .188X.500 radius end slots

Table 2-1 Mounting Data

## 2.2 ELECTRICAL

## 2.2.1 AC Input

The TTL120/150 Data Monitor with a internal AC power supply operates from either a 120VAC or 220/240VAC source depending on the wiring of the AC mating connector (customer supplied) for J1. Refer to Figure 2.2 for wiring data of J1 mating connector.

## 2.2.2 DC Input

The TTL120/150 Display Monitor without an internal AC power supply is operated from an external +55VDC source. The DC input voltage of +55V is applied to pin 7 of J101.

## 2.3 LOCATION

The Display Monitor shall not be located in an area such that the operating ambient temperature exceeds +55°C.

## 2.4 GROUND TECHNIQUES

The Display Monitor is normally mounted in a system where the frame and chassis plate is an integral part of the system ground. The vertical/video ground and horizontal ground (located on pins 1 and 10 of J101) are tied to the chassis plate through a #6 tapping screw located at one corner of the PWA. Ground connections to the Display Monitor can then be made through the chassis mounting plate or via connections to pins 1 and 10 of J101. Refer to Figure 2.1 for Interface Connections.

## 2.5 VIDEO LEAD IN CONSIDERATIONS

For the best display, the video input line requires special consideration.

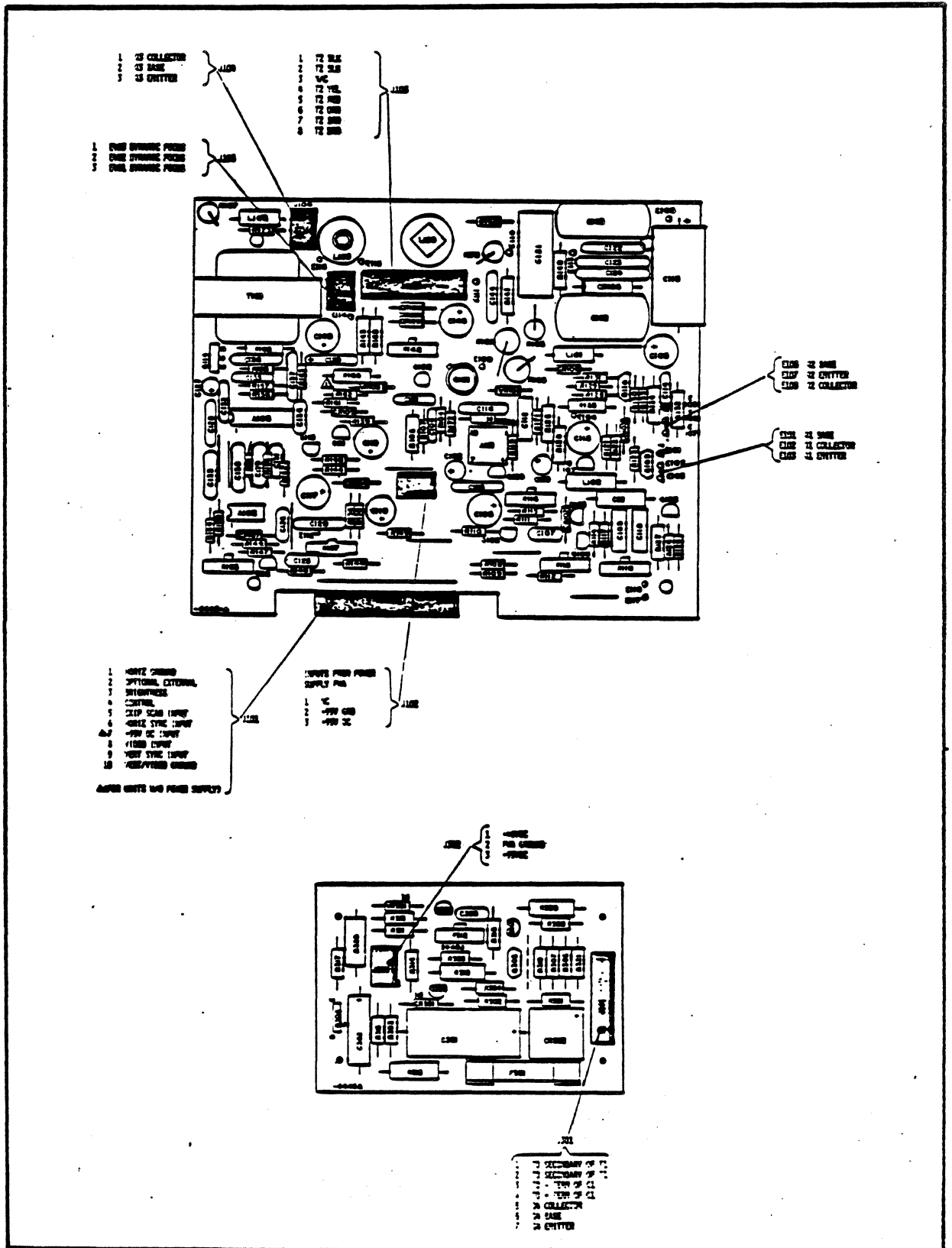


Figure 2.1 PWA Interface Connection and Signal Output

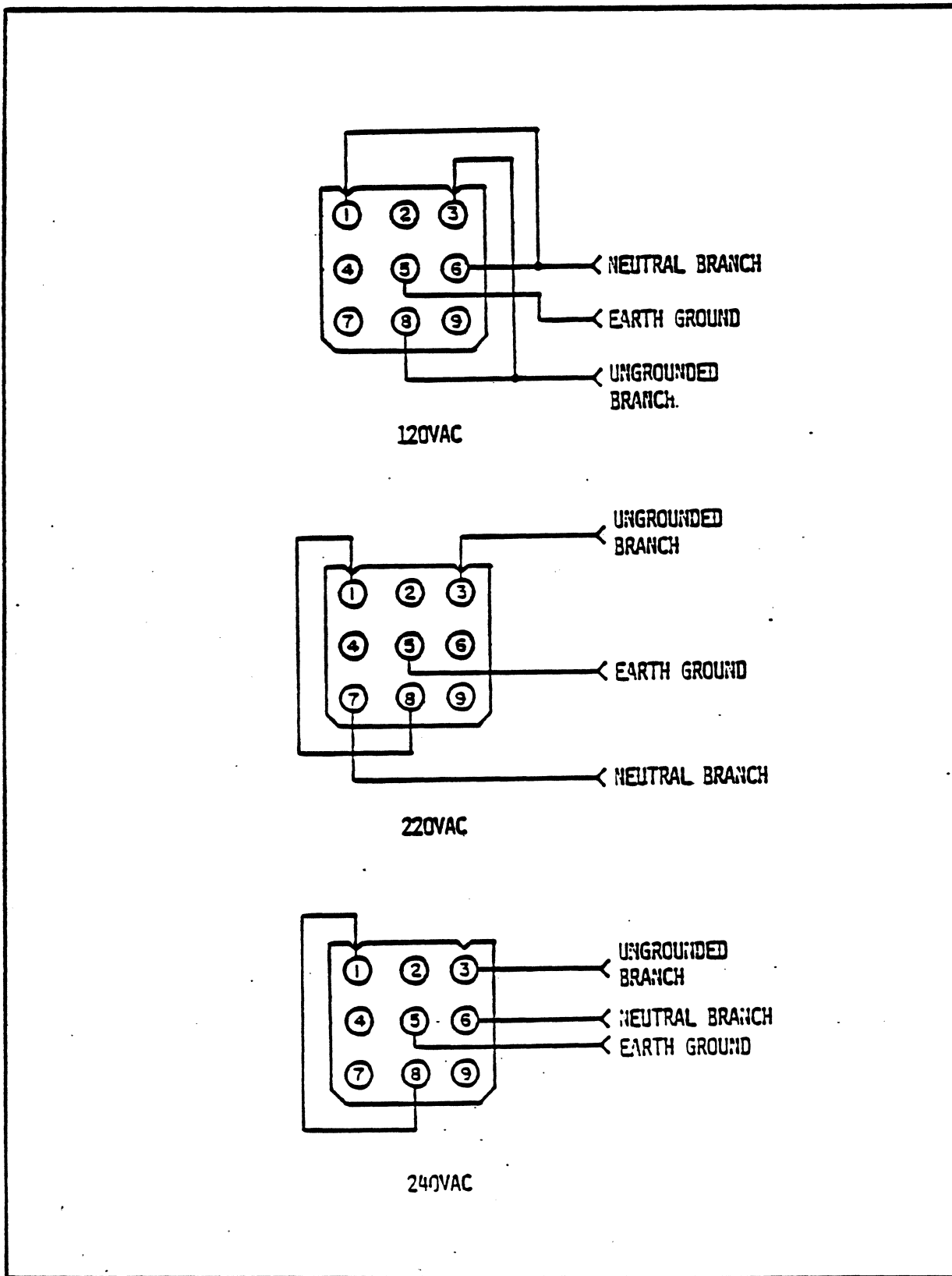


Figure 2.2 Wiring Data for J1 Mating Connector



1. To avoid capacitive coupling from adjacent lines, the video leads should be routed away from all other wiring and the horizontal sync width should not extend into the active video area (Refer to Figure 1.1).

If this is not possible, a shielded or twisted pair video lead may become necessary.

2. The video line should be kept as short as possible in order to minimize line capacitance and the bandwidth limitation this capacitance imposes. Unfortunately low line capacitance is contradictory to a shielded or twisted pair line mentioned in item 1 above. To resolve this contradiction, a terminated system may have to be used, where by the video line is terminated in the characteristic impedance of the shielded (coaxial) or twisted pair line generally  $50 \leq Z_0 \leq 120 \Omega$ . This termination resistor is available on the Main PWA as an optional component.



## Section 3

## OPERATION

## 3.1 GENERAL

After power, video and drive signals have been applied to the Display Monitor, the contrast and brightness controls are adjusted for the best looking display.

## 3.2 BRIGHTNESS ADJUST

The brightness control is used to adjust the raster just beyond visual cutoff; in this manner, maximum contrast ratio is obtained when video is applied.

## 3.3 CONTRAST ADJUST

The contrast control is used to vary the data brightness level as dictated by ambient lighting conditions.



PART II

SERVICE DATA

Section 4 through 6 and the supplement are for qualified service personnel.

The TTL 120/150 has no end user serviceable parts inside. Refer service to qualified service personnel.





## Section 4

## THEORY OF OPERATION

## 4.1 VIDEO AMPLIFIER

Video amplification is provided by Q101 and Q102. Q101 and Q102 are connected in a cascode arrangement; Q102 operates as an emitter follower and Q101 operates in the common base configuration. This minimizes the Miller effect input capacitance and the defining breakdown parameter for Q101 becomes  $B_V C_{BO}$  as opposed to  $B_V C_{EO}$  for the common emitter configuration. This enables selection of a higher speed/lower breakdown transistor to be used in the video amplifier.

The video amplifier is normally off. That is, in the absence of a video input signal or with a signal level of less than 0.6V at J101-8, the CRT cathode voltage at the collector of Q101 will be at +55V. When the input signal exceeds 0.6V, the amplifier begins operation in the linear region and the CRT cathode voltage starts to decrease with a nominal voltage gain of 35 V/V.

The dynamic range capability of the amplifier is 48V which provides more than adequate head room to meet the normal viewing brightness requirement of 18 to 30 volts of modulation. Emitter degeneration resistor R106 stabilizes the gain against hfe variations and  $V_{BE}$  temperature variations. High frequency peaking is provided by C104 and L101 resulting in a nominal bandwidth of 22MHz. CR101 provides arc protection for Q101 by clamping the collector voltage to a maximum value of 55V.

Optional resistors R102, R103 and R174 (Refer to Figure 4.1) are used to tailor the video amplifier characteristics to meet certain performance requirements. R102 is a termination resistor used for those applications where the frequency limiting effects of the input cable capacitance must be minimized. R103 is a contrast control which can be provided as an internal adjustment while R174 is used to convert the video amplifier to a normally on Class A amplifier. R174 eliminates the initial 0.6V dead zone which normally exists and modifies the amplifier transfer characteristic (Refer to Figure 1.5) for compatibility with competitive monitors with Class A video amplifiers.

## 4.2 VERTICAL ELECTRONICS

The vertical electronics circuit consists of a positive sync inverter, a vertical oscillator, an emitter follower, a vertical output amplifier and the vertical deflection coil of the yoke. Refer to figure 4.2.

Q105 is a programmable unijunction transistor and operates as a relaxation sawtooth oscillator. The free running frequency range of 40Hz to 65Hz is governed by R115, C109, C110 and the voltage at the gate of Q105. CR102 provides temperature compensation for the free running frequency. Q105 operates like a switch; in the off condition, a ramp voltage is produced at the anode of Q105 (TP104). This ramp voltage will increase until the anode voltage exceeds the gate voltage and turns Q105 on to rapidly discharge the voltage across C109 and

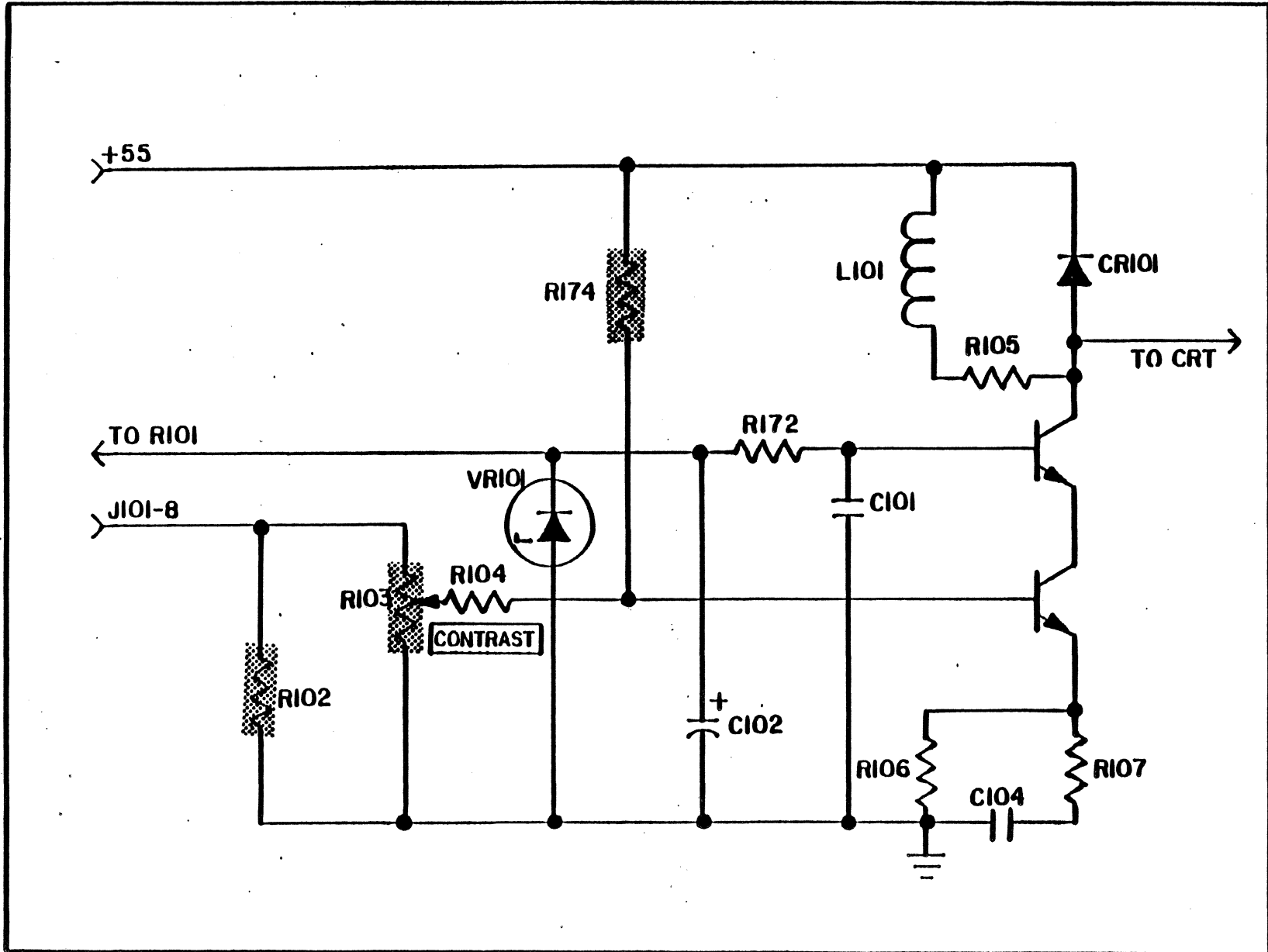
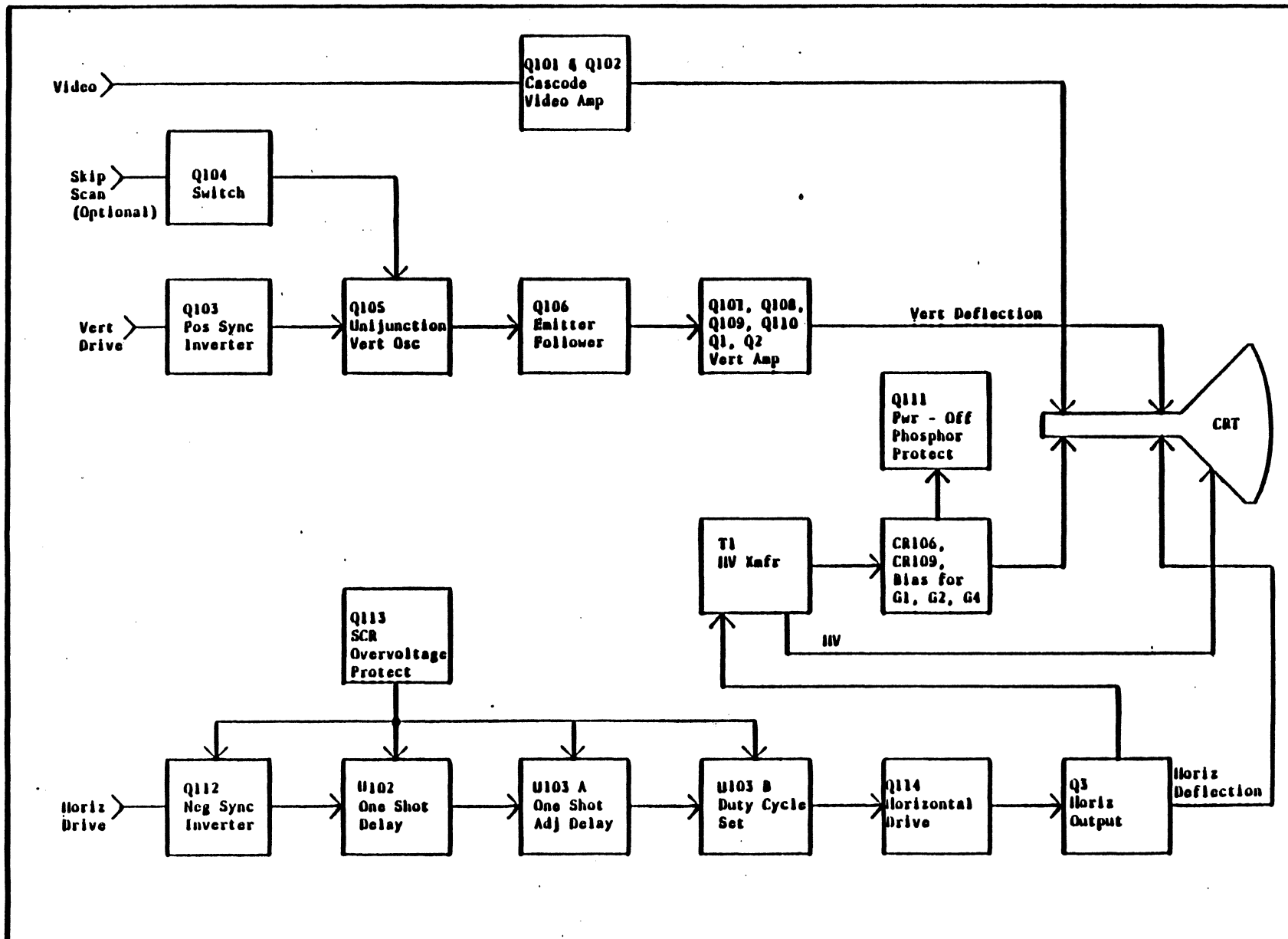


Figure 4.1 Optional Video Amplifier Schematic



IM1024

Figure 4.2 TTL120/150 Block Diagram



C110 through L102. The decay time is governed by the resonant frequency of the tuned circuit consisting of L102, C109 and C110.

The oscillator is synchronized by the application of a negative pulse at the gate of Q105. Negative sync at J101-9 is standard but positive sync can be accommodated with inverter Q103 by removing the negative sync jumper wire between R109 and C107 and adding the positive jumper wire between the collector of Q103 and C107. The negative sync pulse lowers the gate voltage and forces the oscillator to run at the incoming frequency as long as the vertical sync control R113 is adjusted to produce a free running frequency slightly lower than the incoming frequency.

Height control R116 varies the amplitude of the sawtooth voltage and subsequent raster height by controlling the effective B+ voltage applied to R115. The B+ voltage is established through the voltage divider action between R111, R112, R113, R116 and R119.

If a true sawtooth current waveform (linear ramp) is supplied to the yoke, the displayed video would be stretched at the top and bottom of the CRT because of the large difference between the faceplate radius curvature and the yoke center of deflection. As such, the sawtooth waveform must be modified to produce the classic "S" shaped yoke current waveform as shown in Figure 4.3.

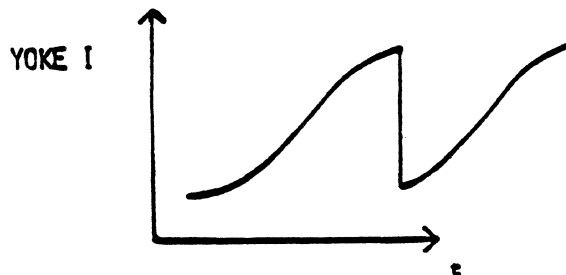
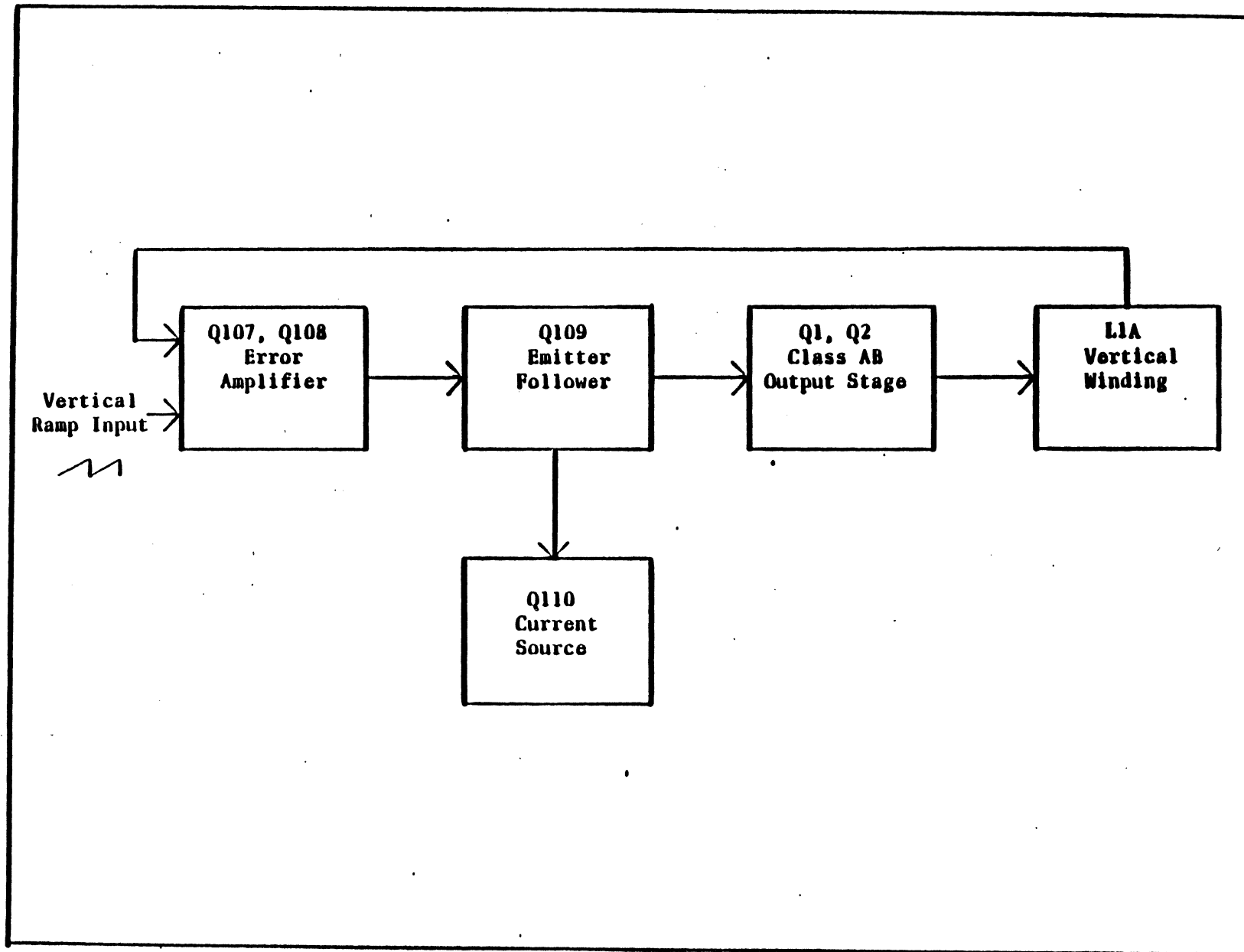


Figure 4.3 Yoke Current Waveform

The required "S" shaping is produced by linearity electronics Q106, R117, R118 and C110 in combination with the low frequency response limitation of the vertical amplifier. The linearity electronics modifies the sawtooth waveform at the emitter of Q106 by integrating this waveform through R117, R118 and C110 and inserting the resultant parabola in series with the ramp. Q106 is a darlington emitter follower which provides excellent isolation between the vertical oscillator and output amplifier.

The output amplifier consists of Q106 through Q110 and chassis mounted transistors Q1 and Q2. As indicated by Figure 4.4, the amplifier is of the closed loop variety which makes the input to output transfer function independent of the transistor parameters. The Class AB push-pull output stage eliminates the requirement for an output transformer or choke which is required for a Class A output amplifier. If one neglects the finite open loop gain, the input to



IM1024

Figure 4.4 Block Diagram of Vertical Amplifier



output transfer function (voltage at the base of Q108 to the yoke current) is defined by:

$$\frac{I_{out}}{E_{IN}} = \frac{R125}{R127} \times \frac{1}{R135}$$

This insures that the output yoke current becomes an exact replica of the input ramp voltage.

A voltage replica of the yoke current is produced across R135. This voltage is fed back through C113 to the base of Q107. Q107 together with Q108 comprises a high gain error amplifier that amplifies the voltage difference between the two bases. The amplified voltage difference produces the necessary base current for emitter follower Q109. The base current requirement is a function of the current gain (hfe) of Q109, Q1, Q2 and the output yoke current. Q1 and Q2 comprise a class AB emitter follower output stage. Q1 supplies current during the first half of vertical scan (CRT screen top to center) with Q2 supplying current during the last half of scan (CRT screen center to bottom). During vertical retrace, the yoke current is quickly reversed when the peak yoke current is transferred from Q2 to Q1. The retrace time is governed by the flyback voltage which is defined by the natural clamping action of the amplifier at +52V (TP112). Q110 is a current source of sufficient magnitude to handle the peak base current requirement of Q2. The class A bias to eliminate crossover distortion is provided by CR103 and R130. R121, R122, R123, R124 and R133 are DC biasing resistors to insure the amplifier operates within the linear region.

Optional skip scan electronics Q104, U101, C105, C108 and VR102 provides the ability to step the vertical amplifier. Q104 operates as a normally off switch. With the application of a positive pulse at J101-5, Q104 turns on and the collector voltage jumps to 22V as defined by zener VR102. The collector voltage and the 7.5K, 100K resistors in U101 combine to charge C109 and C110 for the duration of the input pulse (as defined in section 1.2.5). The resultant voltage step across C109 and C110 (TP104) is processed by the vertical amplifier to produce a corresponding jump in yoke current. For CRT deflection jumps of <0.16", the settling time of the vertical amplifier is <50µs. Capacitor C108 couples the ramp waveform back to Q104 to provide linearity correction to the skip scan waveform.

## 4.3 HORIZONTAL ELECTRONICS

### 4.3.1 Horizontal Deflection

Integrated circuits U102 and U103 are used as one shot delays to perform 2 functions: 1) U102 and one half U103 provide an adjustable one horizontal line sync delay which permits the video to be centered horizontally within the raster and 2) the other half of U103 generates the proper duty cycle for the horizontal output transistor.

The standard main PWA is wired for a positive sync signal applied at J101-6. The input circuit can be modified to accept a negative sync signal at J101-6 removing the positive sync jumper wire between the collector of Q112 and C126 and inserting a jumper wire connecting R145 to C126.



The positive sync pulse is inverted by Q112 and applied to pin U102-2 to produce a positive going pulse at pin U102-3. The time out of this positive pulse is equal to  $1.1(R151 C130)$ . After the pulse times out, the negative going edge applied to pin U103-6 produces another positive pulse at pin U103-5. In this case, the pulse duration is variable according to  $1.1(R153+R154)C133$ . This completes the one line sync delay. The negative going edge of this pulse is coupled to pin U103-8 by C134 to produce another positive pulse at pin U103-9 with a time duration equal to  $1.1(R158 C136)$ . This provides a duty cycle consistent with proper operation of the horizontal output transistor.

The complete timing relationship is shown in Figure 4.5.

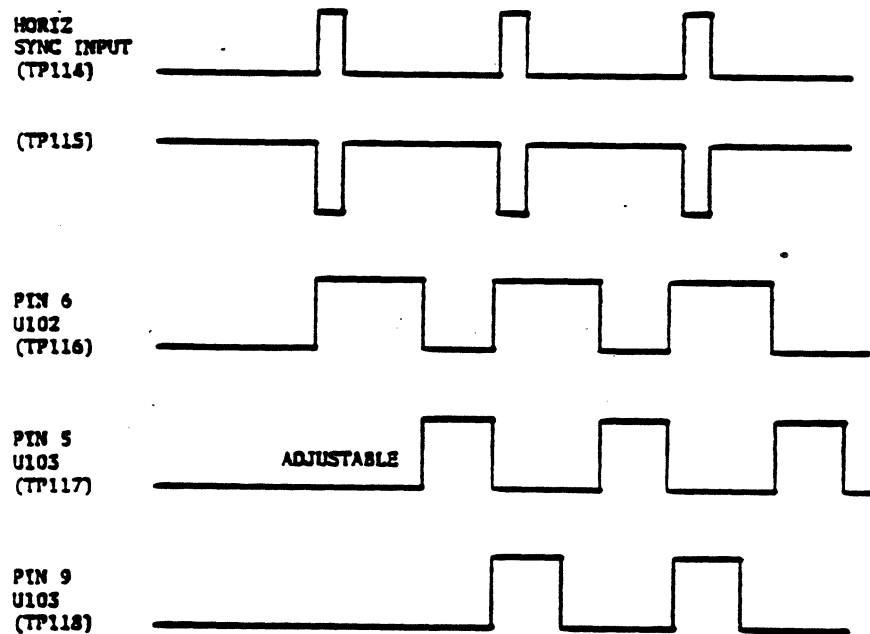


Figure 4.5 Horizontal Timing Diagram of U102 & U103

Horizontal driver Q114 and horizontal output transistor Q3 both operate as switches. The positive pulse at pin U103-9 drives Q114 into saturation. Transformer T101 is phased so that Q3 is turned off during this time. When the primary current of T101 is interrupted by the turn off of Q114, the secondary voltage reverses to turn Q3 on.

The horizontal output stage performs 2 functions: 1) to supply the yoke with the necessary scanning current and 2) develop the CRT anode, G1, G2 and focus voltages. Item 2 will be discussed in section 4.3.2.

Just before horizontal flyback (or when the electron beam moves rapidly from the extreme right side of the CRT screen to the left), maximum yoke current is flowing out of terminal E115 through switch Q3 to ground. Flyback is initiated by the turn off of Q3. With Q3 off, the yoke energy as well as the energy in the flyback primary (T1) is transferred through resonance action to retrace capacitor C142, the yoke distributed capacitance and T1 capacitance. When this



energy transfer is complete, the capacitor voltage (TP120) is maximum (400-600V depending upon line rate), the inductive current is zero and the electron beam has returned to screen center. Now the capacitive energy transfers back to inductive energy to produce a yoke current of the same magnitude but of the opposite direction to that just prior to flyback. This completes beam retrace to the left side of the screen.

The capacitor voltage now swings negative but is clamped near ground by damper diode CR108 which results in the inductive current transferring from the capacitor to CR108. Linear scan now begins as a result of the DC voltage on C143 being impressed across the yoke. C143 is charged to the power supply voltage of +55 VDC and prevents any DC currents from flowing through the yoke.

After the electron beam has moved a distance of about 35% across the screen, Q3 is turned on and the yoke current is transferred from CR108 to Q3. Q3 now carries the yoke current for the remainder of the linear scan time.

As discussed in the vertical section, the desired current waveform for a linear scan on the CRT is an "S" shaped ramp. C143 also provides this "S" shaping by impressing a parabolic voltage across the yoke in addition to a DC voltage.

Additional linearity correction is provided by saturable inductor L104. Without L104, the video would be stretched on the left side of the screen because of the R losses present in the yoke, Q3 etc.

L103 is an adjustable coil placed in series with the horizontal yoke winding to provide width control. The coil inductance controls the voltage magnitude available to the yoke and controls the resultant current magnitude and raster width.

#### 4.3.2 CRT Operating Voltages

The DC operating voltages for the CRT with the exception of the filament voltage are all obtained by rectification and filtering of the horizontal flyback pulse. CR106 and C121 rectify and filter the flyback pulse across Q3 to produce a G2 voltage of 400-600 volts depending upon the horizontal operating frequency. This voltage also feeds the focus grid of the CRT through R141 and focus control R142.

The flyback pulse is transformer coupled by T2, rectified and filtered by CR109 and C119 to produce -90V which is used as the source voltage for G1 to control raster brightness. Q111 aids in eliminating CRT spot burn during power turn off by rapidly discharging the CRT aquadag capacitance.

The CRT anode voltage is developed by T2, rectification diode CR1 and the aquadag filter capacitance. The voltage is typically 17kV for the 15" CRT size and 14kV for the 12" CRT size.

The filament voltage of 6.3V RMS is obtained from a 6 turn winding added to T2.

#### 4.4 X-RAY PROTECTION ELECTRONICS

To comply with the DHEW requirements on X-ray radiation, Q113 and VR103 are





employed to shut down the high voltage in the event the DC supply voltage exceeds 60V DC. If by misadjustment or failure in the regulator electronics, the input voltage should exceed about 60V DC, zener VR108 will start to conduct and turn Q113 on. With Q113 conducting, the supply voltage for U102 and U103 is reduced to zero; this removes the horizontal drive signal and subsequently the high voltage.

#### 4.5 DYNAMIC FOCUS ELECTRONICS

For optimum electron beam focusing over the complete CRT face, the focus voltage should increase as the deflection angle increases. As such, the focus voltage would be at a minimum in the CRT center and at a maximum in the corners. The optional dynamic focus electronics approximates this requirement by varying the focus voltage as a function of horizontal position from tube center.

The horizontal waveform across Q3 is processed by the C403, L401, C402 tank network to produce the parabolic waveform (See Figure 5.1). L401 provides for amplitude adjustment over the range of 200V to 400V p-p. C401 couples the waveform to the focus electrode.

#### 4.6 LOW VOLTAGE REGULATED SUPPLY

The AC line voltage is applied to transformer T1 (Refer to Figure 4.6). The secondary voltage developed is rectified and filtered by CR302 and C1 to produce a DC voltage for the regulator electronics of 76V DC. The 76V DC input is dropped to +55V DC through the series pass transistor Q4. DC regulation of +55 volts is maintained by tapping down the voltage through the divider network of R311, R312 and R313. The resultant 6.3V DC at the wiper arm of R312 is applied to the base of Q302. Also a DC reference voltage from VR301 is applied to the emitter of Q302. This transistor then develops a DC error current that flows through R310 to the base of emitter follower Q305. Current source Q301 supplies current to the base of Q305 and collector of Q302. This bias current from Q301 will tend to shift the base of Q305 in a positive direction where as the current from Q302 will tend to shift the base in the negative direction. This results in an error current from the collector of Q302 that controls emitter follower Q305 and also the series pass transistor Q4. This enables the DC output voltage to be maintained at +55V DC, independent of the input voltage and output load current.

Foldback current limiting of the +55V DC supply is provided by means of transistor Q303 and resistors R306, R307, R308 bias network. When the load current exceeds about 2 amps, the voltage drop across R309 is of sufficient magnitude to turn on Q303. As Q303 turns on, the base current supplied to Q305 decreases to produce a corresponding decrease in output voltage. In the event of a direct short on the +55V DC bus, the short circuit current will be approximately 100ma. Removing the external short circuit will allow the regulator to resume normal operation.

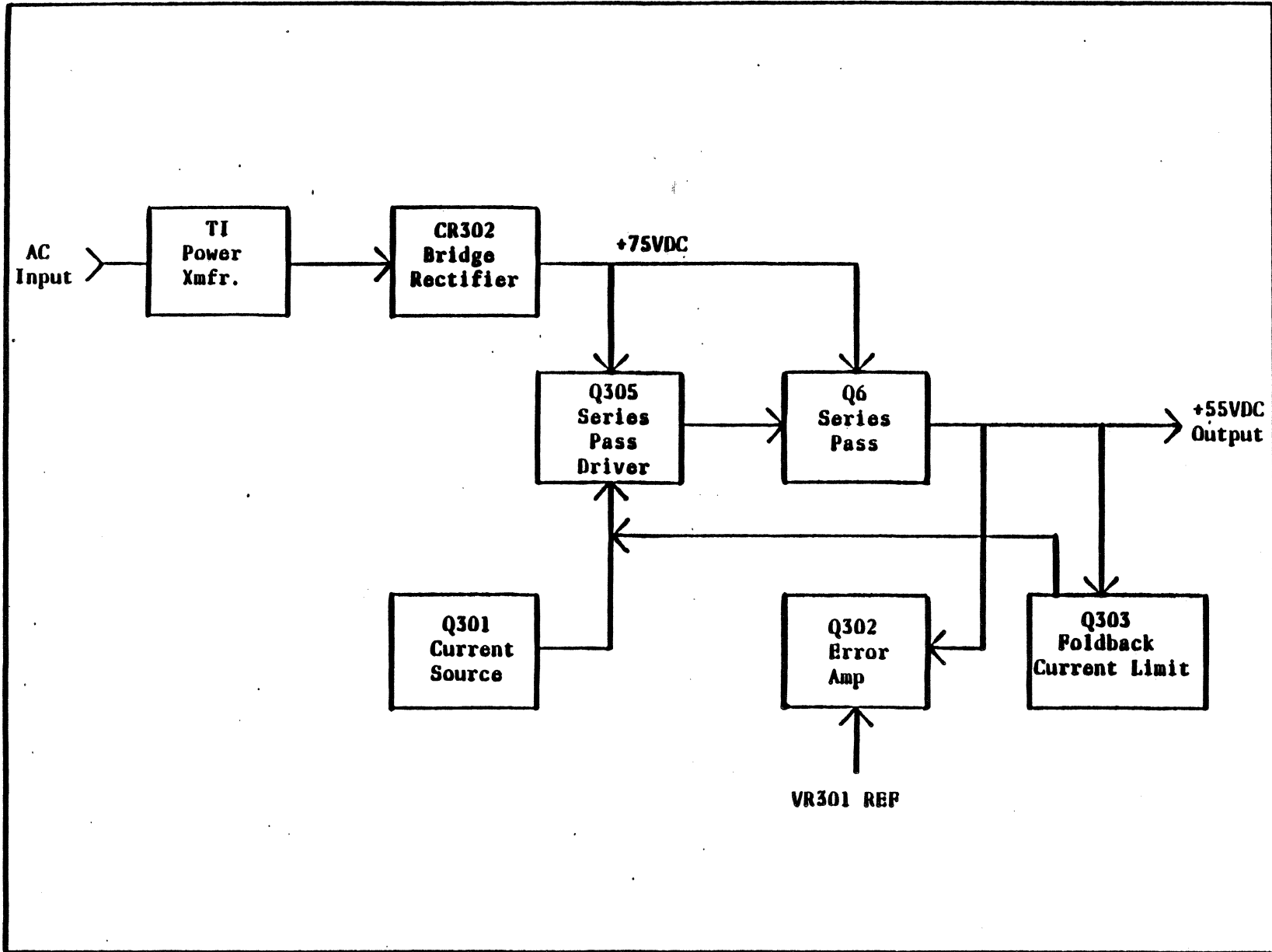


Figure 4.6 Power Supply Block Diagram



## Section 5

## ADJUSTMENT AND MAINTENANCE

## 5.1 GENERAL

This section describes the adjustment procedures to be used for set up of the various circuits during routine maintenance or after component replacement.

## 5.2 INITIAL TURN-ON

Connect the signal input connector to J101 of the main PWA and connect the power input connector to J1 of the power transformer T1. Turn on the Display Monitor and the test equipment; allow 15 minutes for warm-up.

All the horizontal and vertical circuits adjustments can be made using an "E" or "#" character. Adjust the raster brightness to just beyond visual extinction with the brightness control.

## 5.3 POWER SUPPLY ADJUSTMENT

Connect a DC volt meter to the anode of CR104, located near J102-3 on the main PWA. Adjust the B+ adjust control on the LV regulator PWA for a meter reading of  $+55V \pm 0.5V$ .

## 5.4 VERTICAL ELECTRONICS

## 5.4.1 Vertical Sync Adjust

The Vertical Sync Adjust control is located on the main PWA. Adjust this control clockwise (as viewed from the rear of the Display Monitor) until the picture just rolls down. Now back off the control (CCW) until the picture snaps back into sync.

## 5.4.2 Vertical Linearity and Height Adjust

Both of these controls are located on the main PWA. The vertical linearity control R118 is adjusted for the best vertical linearity. The vertical height control R116 is adjusted for the proper vertical height.

## 5.4.3 Skip Scan Adjust

This adjustment procedure will apply only to the Display Monitor that has the skip scan option.

Apply the skip scan signal and adjust control U101 until the proper skip height is obtained. In general, the proper skip height is obtained by removing the skip scan signal and establishing a given video height as described in Section 5.4.2. The skip scan signal is then applied and the height is increased to the final height requirement with control U101. As the increase from initial height



to final height becomes larger there will be interaction between the skip scan control and the vertical sync and linearity controls such that R113 and R118 may have to be readjusted.

## 5.5 HORIZONTAL ELECTRONICS

### 5.5.1 Width Adjustment

Adjust the Width Control L103 for the desired picture width.

### 5.5.2 Horizontal Centering Adjustment

Adjust the Horizontal Centering control R153 to center the video horizontally within the raster.

## 5.6 RASTER CENTERING

The centering magnets located at the back of the yoke are used to center the raster on the CRT. The magnets should never be used to center the video horizontally as this may cause display focus problems as well as the possibility of neck shadow. The rings may have to be used to center the video vertically since the vertical position of the video within the raster is strictly dependent on customer timing and vertical flyback time. Picture tilt is corrected by rotating the yoke.

## 5.7 FOCUS

Adjust focus control R142 for the best overall focus on the CRT.

## 5.8 DYNAMIC FOCUS

Place oscilloscope probe between TP112 and ground. The waveform should look like Figure 5.1.

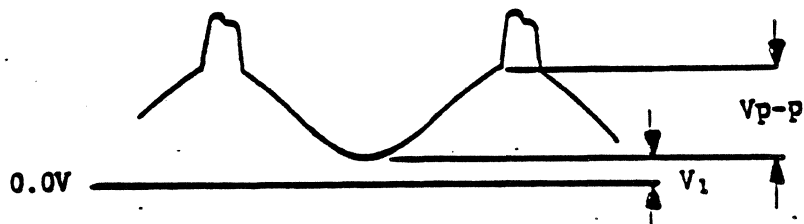


Figure 5.1 Dynamic Focus Waveform

The voltage level at the bottom portion of the waveform ( $V_1$ ) is controlled with the static Focus control R142 while the peak-to-peak amplitude ( $V_{p-p}$ ) is controlled with L401 on the dynamic focus PWA.

$V_1$  corresponds to CRT center focus and is adjusted for  $25V \pm 75V$  to give best center focus while the peak-to-peak amplitude is adjusted for  $300V \pm 100V$ . This



will give the best focus compromise at the edges of the display pattern. The adjustments do interact in that increasing the Vp-p will lower the  $V_1$  voltage and vice versa.

## 5.9 BRIGHTNESS AND CONTRAST

The brightness and contrast controls are adjusted per Section 3 of the manual.

## 5.10 TROUBLESHOOTING GUIDE

### Symptoms/Possible Solutions

1. Screen is dark - Check to see if the +55V is present. A convenient point of measurement is at CR104 on the main PWA. If there is no +55V, disconnect J104 which isolates the horizontal transistor. If the +55V is still not present, disconnect J105 which isolates the remainder of the horizontal output stage. If the +55V now returns to normal, the problem is most likely the damper diode CR108.

If the +55V is still not present after disconnecting J104 and J105, the problem is either with the +55V power supply or the vertical amplifier. This can be determined by disconnecting J102 and measuring the +55V at the power supply itself. Actual isolation of a fault to a specific transistor stage is best accomplished by the use of an oscilloscope and reference to the typical waveforms in Figure 6.7 in Section 6.

2. Loss of Video - Check Q101, Q102 and VR101.
3. Loss of Brightness Control - Check CR109 and CR106.



## Section 6

## SERVICE DATA

## 6.1 GENERAL

This section contains the replaceable electrical parts list, schematic, PWA component layout and waveforms for servicing of the TTL 120/150 Data Monitor.

If a part you have ordered has been replaced with a new part or an improved part, our customer service representative will contact you concerning any change in the part.

Change information concerning the TTL 120/150 units is located at the rear of the manual in the supplement section.

## 6.2 ORDERING PARTS

Most parts contained in the monitor are available commercially from electronic parts outlets. When it is necessary to order spare or replacement parts from Ball Electronic Display Division (Ball E.D.D.), include the part description, part number, model and serial number data of the Data Monitor as listed on the serial number plate and, if applicable, the schematic reference number listed in the parts list. Orders for these parts should be sent to:

Ball Electronic Display Division  
P.O. Box 43376  
St. Paul, Minnesota 55164

For rapid service: Telephone area (612) 786-8900

OR

TXW area (910) 563-3552

## 6.3 RETURNING PARTS

When the monitor requires service or repair in accordance with the enclosed warranty, return the unit or part to:

Ball Electronic Display Division  
4501 Ball Road N.E.  
Circle Pines, Minnesota 55014

ATTN: Customer Service

Telephone area (612) 786-8900  
TXW area (910) 563-3552



Unnecessary delays may be avoided when parts are returned to Ball Electronic Display Division using the following procedures:

- (1) Package the unit or part in accordance with the method of shipment. Enclose a list of the material being returned and the reason for returning it.
- (2) Send the unit or part, transportation prepaid, to the address stipulated for returning parts.

All equipment and parts described in the warranty will be replaced, provided our examination discloses that the defects are within the limits of the warranty. If damages or defects are not within the limits of the warranty, the customer will be notified of the extent of repairs required and the cost. The unit will be repaired and returned upon agreement.

#### 6.4 WAVEFORMS

The waveforms on the component layout were taken with 1.5V peak-to-peak character signal (Refer to Section 5.2) applied to the Data Monitor. These waveforms can be used as a check point to localize problems to a specific circuit area. The waveform photographs indicate the actual peak amplitude for each test point.

#### 6.5 BOARD ASSEMBLY

The board assembly part number has a 6-002-XXXX prefix. The last four digits of the part number is found under the "use on 6-002" column in the parts list. The last four digits of the board assembly part number is stamped on the component side of the board.

#### 6.6 COMPONENT REPLACEMENT PARTS AFFECTING PRODUCT SAFETY

Product safety must be considered when any components is replaced in this monitor. The critical components that affect X-radiation are denoted in the shaded areas on the schematics. Components in the shaded area are to be replaced only with Ball Electronic Display Division approved components.

The use of substitute components which do not have the same characteristics as the original components may create excessive X-radiation.

#### 6.7 CHASSIS MOUNTED COMPONENT PARTS LIST

REF SYM	DESCRIPTION	PART NUMBER
C1	Cap, 1500-100, ER	1-012-2186
CR1	Diode, HV, D0463	1-021-0463
J1	Connector Shell, 9 Pin Female	1-034-0313
L1	Deflection Coil - Refer to part number on yoke; i.e. 1-023-XXXX	



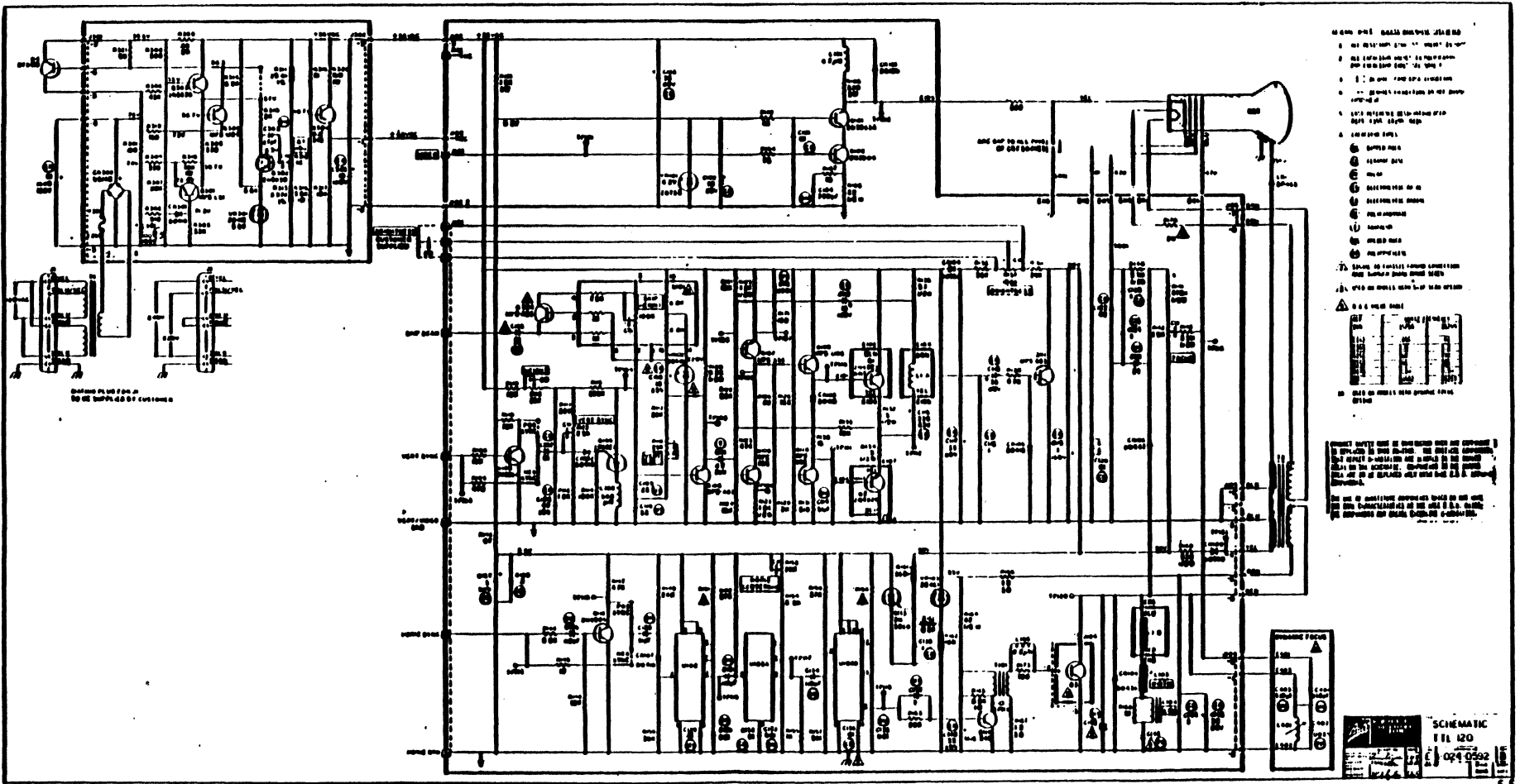
## Transistor

Q1		2N4923	78-85-4923
Q2		2N4920	1-015-1169
Q3		B0402 (15,750)	78-85-0402
	or	B1213 (18,240)	1-015-1213
Q4		DTS410	78-85-0410

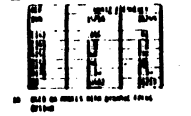
## Transformer

T1	Power
T2	High Voltage Stamp on Coil Form; i.e. 6-003-XXXX - Refer to last four digits of part number.





- NOTE THE FOLLOWING POINTS:
1. ALL RELAYS ARE OF THE 120V TYPE.
  2. ALL RELAYS ARE OF THE 120V TYPE.
  3. ALL RELAYS ARE OF THE 120V TYPE.
  4. ALL RELAYS ARE OF THE 120V TYPE.
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THIS SCHEMATIC IS A REPRESENTATION OF THE SYSTEM AS SHOWN IN THE PHOTOGRAPH. IT IS NOT A GUARANTEE OF THE SYSTEM'S PERFORMANCE. THE SYSTEM'S PERFORMANCE IS SUBJECT TO VARIATIONS IN COMPONENTS AND WIRING. THE SYSTEM'S PERFORMANCE IS SUBJECT TO VARIATIONS IN COMPONENTS AND WIRING.

SCHEMATIC  
IIL 120  
074 0592

FIGURE 6.1 IIL 120 SCHEMATIC

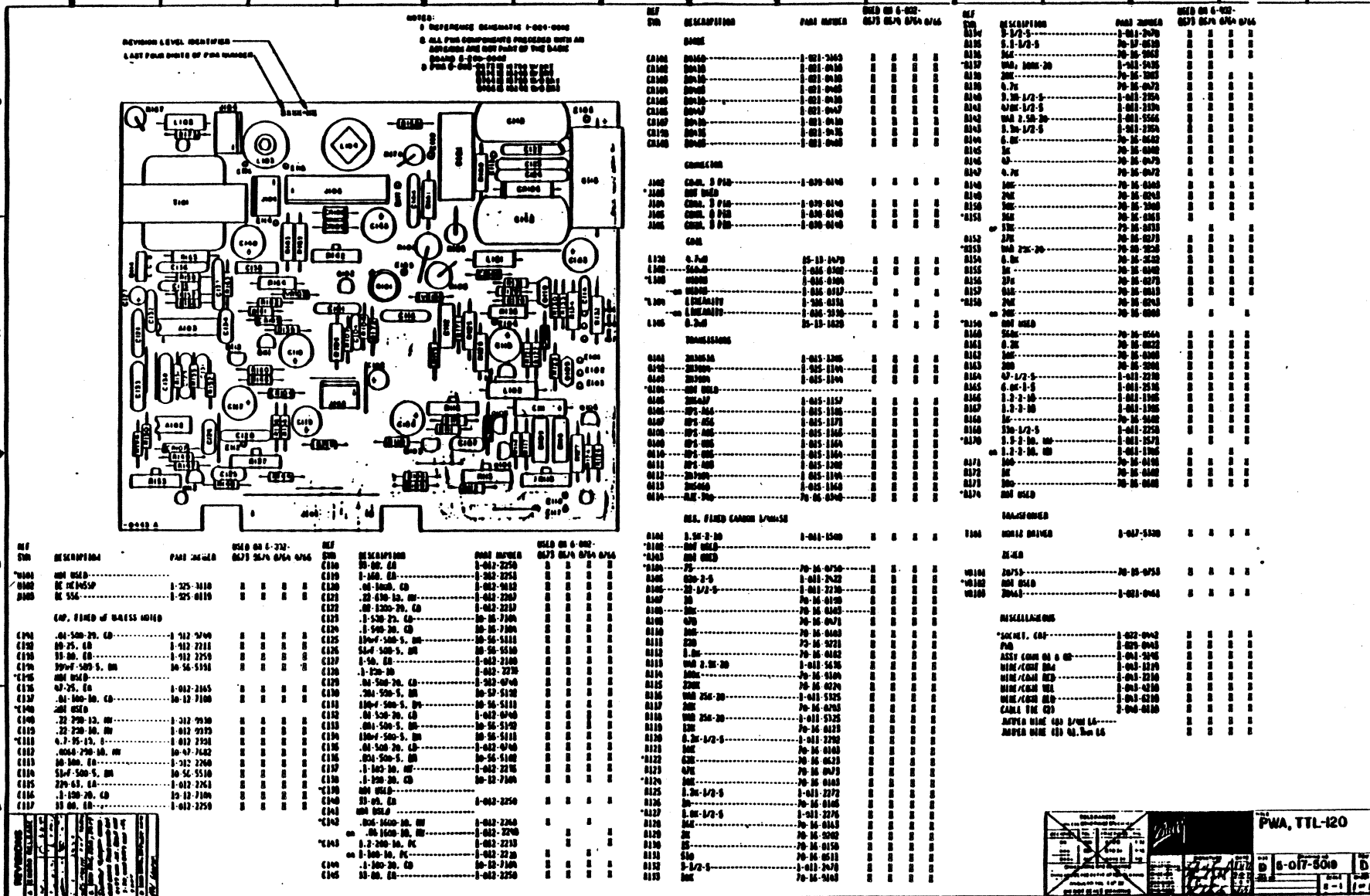


FIGURE 6.2 TTL 120 MAIN PMA COMPONENT LAYOUT AND PARTS LIST

PWA, TTL-120

6-017-8000

6-017-8000

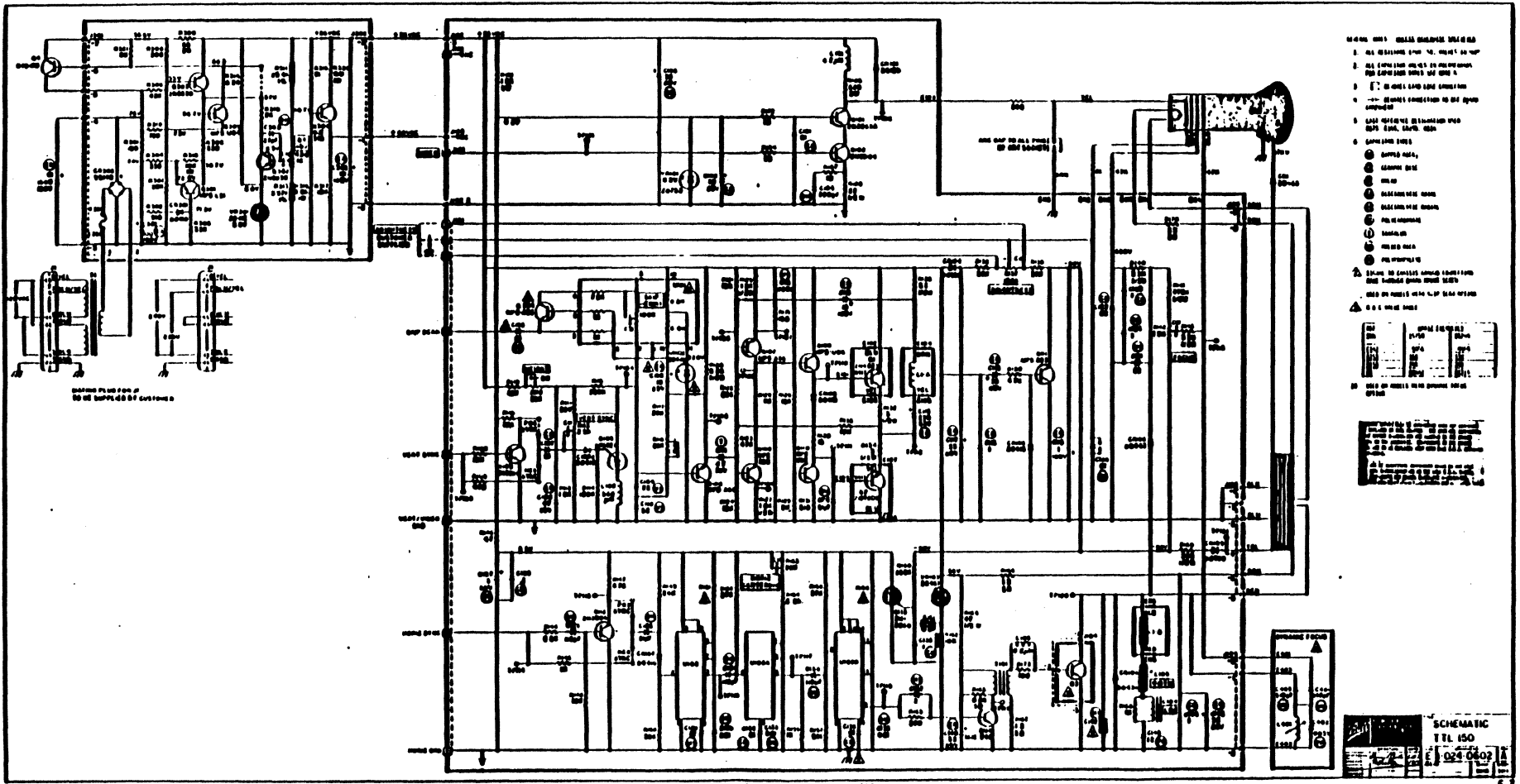
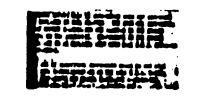
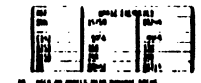


FIGURE 6.3 TIL150 SCHEMATIC

1. ALL DIMENSIONS FROM 10' POINT TO 10' POINT
2. ALL DIMENSIONS MUST BE PRECISE FOR LAP AND SOLDER USE ONLY
3. [Symbol] IS ONLY LAND LANE CONNECTION
4. [Symbol] IS ONLY CONNECTION TO THE BOARD
5. LAND OFFSETS DIMENSIONED FROM 10' 10' 10' 10' 10'
6. LAND LANE SIZE
  - CIRCLE AREA
  - SQUARE AREA
  - RECTANGLE AREA
  - POLYLINE AREA
  - POLYAREA AREA
  - POLYTEXT AREA
7. DIMENSIONS MUST BE PRECISE AND DIMENSIONS MUST BE PRECISE
8. DIMENSIONS MUST BE PRECISE



SCHEMATIC  
TIL 150  
1024 08402



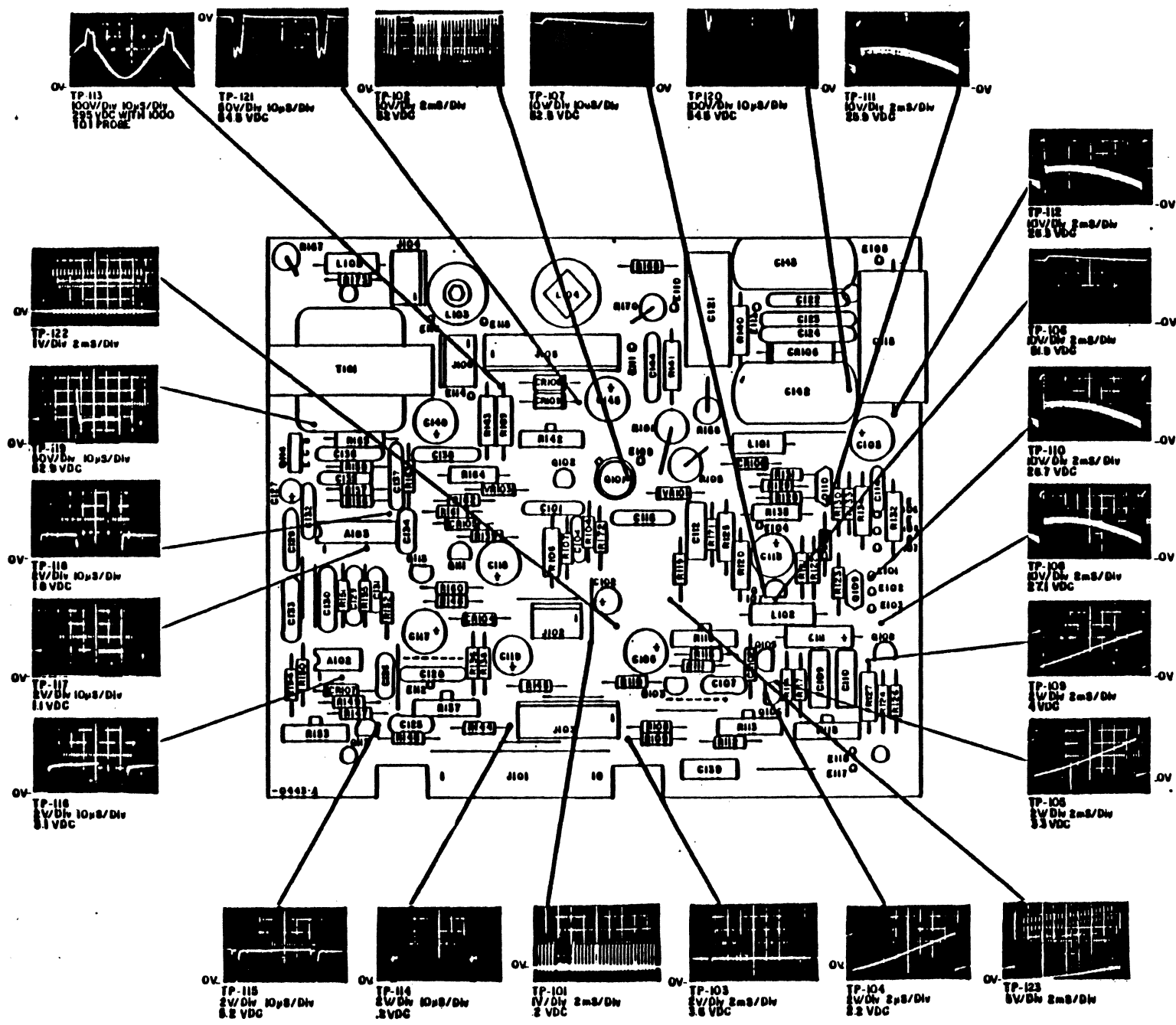
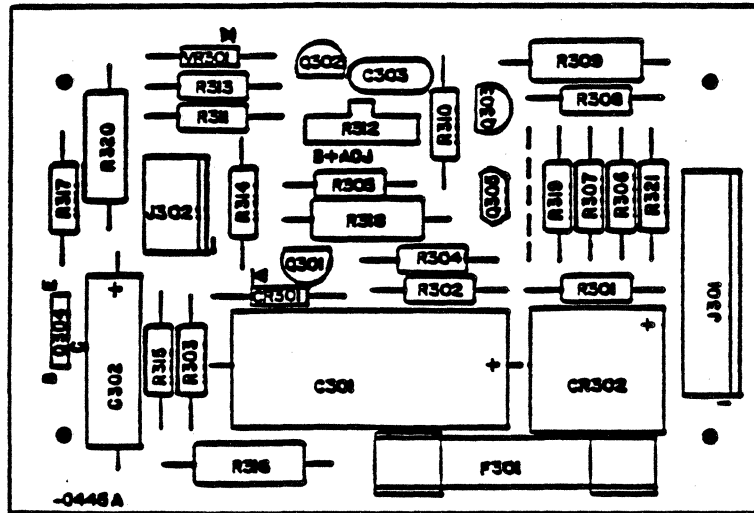


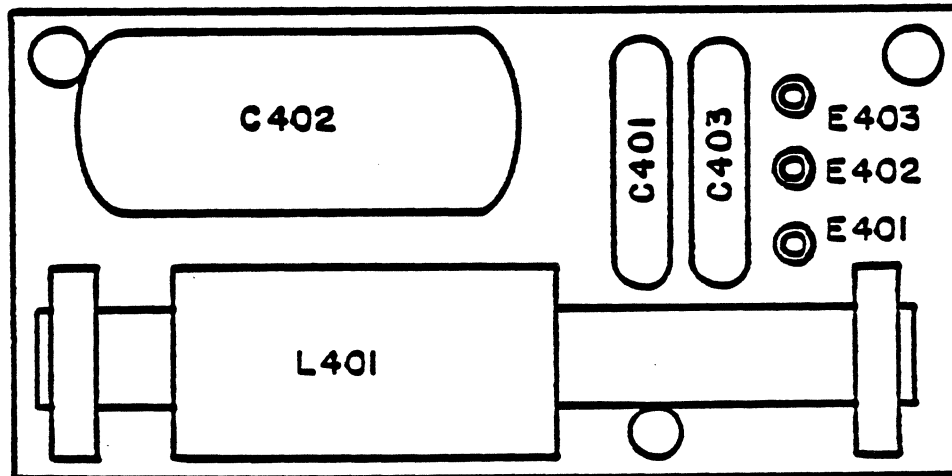
FIGURE 6.5 TTL120/150 WAVEFORMS



REF SYN	DESCRIPTION	PART NUMBER
CAP. FIXED UNLESS NOTED		
C301	100-100, EA	1-012-2127
C302	10-100, EA	1-012-2115
C303	27M-500-5, DR	1-012-2161
CONNECTOR		
J301	CONN 7 PIN MALE	1-039-0145
J302	CONN 3 PIN MALE	1-039-0148
DIODES		
CR301	DO410	1-021-0410
CR302	VS148 2 AMP	1-021-0413
FUSE		
F301	FUSE 1.25A-250V	28-13-0125
RES. FIXED CARBON 1/2W ±5% UNLESS NOTED		
R301	180	1-011-2252
R302	910	1-011-2269
R303	33K	1-011-2306
R304	330	1-011-2259
R305	330	1-011-2258
R306	43K	1-011-2309
R307	30K	1-011-2375
R308	300	1-011-2257
R309	.68-2-10, WM	1-011-2217
R310	2K	1-011-2277
R311	29.4K-1%	1-011-2518

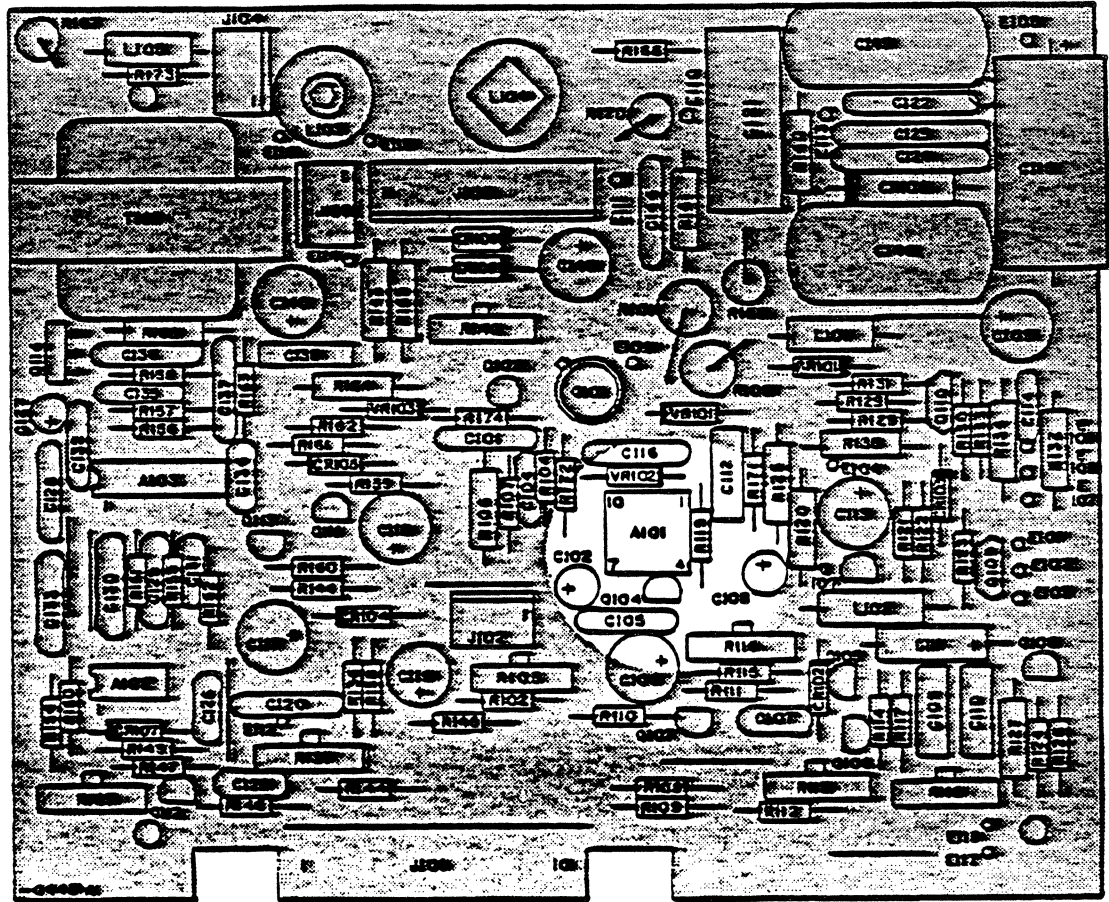
REF SYN	DESCRIPTION	PART NUMBER
R312	VAR 1K-1/4-20%, CD	1-011-5182
R313	3.57K-1%	1-011-2517
R314	8.2K	1-011-2292
R315	1K	1-011-2270
R316	3.6K-1	1-011-2527
R317	10K	1-011-2294
R318	10K-1-10, CD	1-011-2508
R319	150	1-011-2250
R320	150-1-10, CD	1-011-1155
R321	68	1-011-2242
TRANSISTORS		
Q301	NPS-L51	1-015-1175
Q302	2N5837	1-015-1172
Q303	2N5830	1-015-1172
Q304	1N4340	78-86-0340
Q305	NPS-004	1-015-1167
ZENER		
VR301	Z0412	1-021-0412
MISCELLANEOUS		
	FUSE CLIP (2)	13-14-6008
	PWB	1-029-0445

FIGURE 6.6 COMPONENT LAYOUT LOW VOLTAGE REGULATOR PWA



REF SYM	DESCRIPTION	PART NUMBER
	CAP, FIXED $\mu$ F UNLESS NOTED	
C401	910-1000-5, MM	1-012-0523
C402	3900-1600-10, PP	1-012-2262
C403	910-1000-5, MM	1-012-0523
	COIL	
L401	FOCUS	1-016-0249
	MISCELLANEOUS	
	PWB	1-029-0446
	CONN, SHELL, 3 PIN	1-034-0356
E401	WIRE/CONT ORN	1-043-3271
E402	WIRE/CONT BLK	1-043-0270
E403	WIRE/CONT RED	1-043-2271

Figure 6.7 Component Layout for Dynamic Focus PWA



PART NUMBERS FOR PMA'S WITH THE SKIP SCAN OPTION ARE:

6-002-0758	TTL 150, 15,750 W/BRT
6-002-0768	TTL 150, 13,240 W/BRT
6-002-0769	TTL 150, 15,750 W/O BRT
6-002-0770	TTL 150, 13,240 W/O BRT
6-002-0771	TTL 120, 15,750 W/BRT
6-002-0772	TTL 120, 13,240 W/BRT
6-002-0773	TTL 120, 15,750 W/O BRT
6-002-0774	TTL 120, 13,240 W/O BRT

THE BALANCE OF THE COMPONENT PARTS AND PART NUMBERS CAN BE FOUND ON THE APPROPRIATE COMPONENT LAYOUTS WITHOUT THE SKIP SCAN OPTION. FOR EXAMPLE, BALANCE OF THE PARTS USED ON 6-002-0758 TTL150, 15,750, W/BRT CAN BE LOCATED ON FIGURE 6.4.

SKIP SCAN COMPONENT PARTS LIST

REF	DESCRIPTION	PART NUMBER
U101	RES TRIM 100K	1-011-0074
C105	CAP 01uF-50V-20, D	1-012-0740
C108	CAP 10uF-25, ER	1-012-0221
Q104	TRANSISTOR MPS-456	1-015-1171
VR102	ZENER, 20V46	1-021-0446

Figure 6.8 Skip Scan Component Layout and Parts List



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

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**APPENDIX C**

**FACTORY SERVICE AND MAINTENANCE INFORMATION**

APPENDIX C

FACTORY SERVICE AND MAINTENANCE INFORMATION

DEPOT REPAIR

Equipment returned to LSI must be shipped prepaid and must have a Return Goods Authorization (RGA) number on the outside top of the carton or the shipment may be lost, misrouted, or returned to you.

STEP 1

Prepare the following information:

Model type of equipment to be returned  
Serial Number  
Report Symptom (if failure)  
Type of modification or option to be installed (if applicable)

STEP 2

Please call (714) 774-1010 ext. 371 or write to:

Lear Siegler, Inc.  
Data Products Division  
714 N. Brookhurst St.  
Anaheim, CA 92803  
Attn: Customer Service

or teletype:

TELEX 655444  
TWX 910-591-1157

Please state that you would like a Return Goods Authorization number. At this time, we will record the information you prepared, as well as a purchase order number, if applicable.

STEP 3

You will then be provided with an RGA number and the address of the depot where we request that you return the equipment.

**Note**

*All modifications and repairs are FOB Anaheim, California, Chicago, Illinois, or Philadelphia, Pennsylvania, whichever depot is used. All repairs are warranted for a period of 30 days. The freight responsibility for repairs made on out-of-warranty equipment is that of the customers. Return freight on repairs in warranty is paid by LSI/DPD.*

On-site service and maintenance is provided by factory trained service representatives at each of the service cities listed on the following page. Please call your local Lear Siegler Service Representative for more information.

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**SERVICE CITIES**

On-site maintenance for the equipment is available within a 50 mile radius of the below listed cities.

<b>ALABAMA</b> Birmingham	<b>INDIANA</b> Indianapolis	<b>NEW JERSEY</b> Clifton Princeton	<b>SOUTH CAROLINA</b> Columbia
<b>ARIZONA</b> Phoenix	<b>IOWA</b> Des Moines	<b>NEW MEXICO</b> Albuquerque	<b>TENNESSEE</b> Knoxville Memphis
<b>ARKANSAS</b> El Dorado	<b>KENTUCKY</b> Louisville	<b>NEW YORK</b> Albany Buffalo Great Neck, LI New York City Rochester Syracuse	<b>TEXAS</b> Dallas Houston Lubbock San Antonio
<b>CALIFORNIA</b> Los Angeles Palo Alto San Diego San Francisco Santa Ana Stockton Ventura	<b>LOUISIANA</b> New Orleans	<b>MARYLAND</b> Silver Springs	<b>UTAH</b> Salt Lake City
<b>COLORADO</b> Denver	<b>MASSACHUSETTS</b> Boston Chicopee	<b>NORTH CAROLINA</b> Charlotte Greensboro	<b>VIRGINIA</b> Richmond
<b>CONNECTICUT</b> Norwalk	<b>MICHIGAN</b> Detroit Grand Rapids	<b>OHIO</b> Cincinnati Cleveland Columbus	<b>WASHINGTON</b> Seattle
<b>FLORIDA</b> Miami Orlando Tampa	<b>MINNESOTA</b> Minneapolis	<b>OKLAHOMA</b> Oklahoma City	<b>WISCONSIN</b> Appleton Milwaukee
<b>GEORGIA</b> Atlanta	<b>MISSOURI</b> Kansas City St. Louis	<b>OREGON</b> Portland	<b>CANADA</b> Montreal Toronto Vancouver
<b>ILLINOIS</b> Chicago Highland Peoria	<b>NEBRASKA</b> Omaha	<b>PENNSYLVANIA</b> Allentown Harrisburg Philadelphia Pittsburgh	

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## **INDEX**

## INDEX

### A

Absolute Cursor Addressing .....	4-13,4-16
Addressable Printer Port .....	5-13
ADM 1 Mode .....	3-7
ADM 42/ADM 2 Attribute Mode .....	4-35
ADM 42 Polling .....	5-1
Alternate Character .....	1-3
Attributes, Video .....	4-31,4-44,4-36
Auto Page .....	4-13

### B

Baud Rate .....	2-16,4-21,4-25
Block Mode .....	3-4,4-4,4-21
BROADCAST SELECT .....	5-6,5-10
Buffered Print Mode .....	3-9

### C

Character Format, Standard .....	1-2,3-4
Cleaning .....	2-17
Clear/Erase/Insert/Delete Character .....	4-27
Configuration Control DIP Switch Settings, Main Board .....	2-3,2-7
Configuration Control DIP Switch Settings, Option Board .....	2-3,2-9
Control Codes .....	3-5,4-1,4-3
Controls .....	2-3
Control Section (MPU) .....	3-2
Conversation Mode .....	3-4,4-4
Copy Print Mode .....	3-8
CTRL .....	3-1
Current Loop .....	2-15
Cursor and Video Attribute Control .....	4-31
Cursor Addressing .....	4-13,4-14
Cursor Control .....	4-16

## INDEX (cont'd)

### D

Data Transmission Characteristics .....	3-4,4-21
Delay Time, RTS START/OFF .....	4-28
Designated Protected Field .....	4-12
Dimensions, Physical .....	2-1
DIP Switch Settings .....	2-3
Direct Connect .....	1-1,2-11,2-18
Displayable Character Video .....	4-35
Displayable Characters .....	3-5
Displaying FUNKEY Messages .....	4-6

### E

Editing .....	4-18,4-19
End of Block Character .....	4-23
Erasing FUNKEY Messages .....	4-11
Escape Lead-In Character .....	4-23
Escape Sequences .....	4-1,4-2
Evoking FUNKEY Messages .....	4-11
Extra-Length FUNKEY Messages .....	4-9

### F

FAST SELECT Responses .....	5-6,5-9
Field Separator Character .....	4-25
Firmware RESET .....	4-5
Format Control .....	4-11
Formatted Print Mode .....	3-7
Function Key (FUNKEY) .....	4-9
FUNKEY Lead-In Character .....	4-6,4-7

### G-H

Go To Page "N" .....	4-14
GROUP POLL Operations .....	5-12
GROUP SELECT Operations .....	5-13

### I-J

Initiating Polling Sequence .....	5-2
Inspection .....	3-17
Installation .....	2-1,2-11
Interface	
Current Loop .....	2-11,2-15
Direct Connect .....	2-11,2-18
Printer .....	2-11,2-18
Standard or RS-232C Extension .....	2-11,2-14
Interface Section .....	3-2

## INDEX (cont'd)

### K

Keyboard .....	1-1,3-2
Keyboard Enable/Disable .....	4-5,5-2
Keystroke Conventions .....	3-1

### L

Line Voltage Selection .....	2-1
Limited Graphics .....	4-13,4-14
Line Voltage Selection .....	2-1
Linking FUNKEY Messages .....	4-8
Linking Multiple Commands .....	4-11
Load Cursor .....	4-13
LRC Character .....	5-3

### M-N

Main Board DIP Switches .....	2-3
Maintenance Manual .....	1-4
Modifications:	
Clear/Erase/Insert/Delete .....	4-27
Dynamic Personality .....	4-21
End of Block .....	4-23
Escape Lead-In .....	4-23
Field Separator .....	4-25
FUNKEY Lead-In .....	4-25
New Line .....	4-23
Parity Error .....	4-27
Polling Option Variant .....	4-28,4-29
Polling Transmission Number .....	4-28
Power-Up Tab Mode .....	4-28,4-30
RTS START/OFF Delay .....	4-28,4-30
Special Functions .....	4-31,4-32
Status Line Attribute .....	4-31
Multi-Point Contention .....	5-13
New Line .....	4-23
Non-Addressed Cursor Positioning .....	4-13

## INDEX (cont'd)

### O

Operational Description .....	3-2
Format Control .....	3-4
Interface Section .....	3-2
Keyboard Section .....	3-2
MPU Section .....	3-2
Power Supply, Regulated .....	3-4
System Configuration Switches .....	3-2
Video Logic and Control .....	3-2
Operational RESETS .....	4-5
Operators Quick Reference Manual .....	1-4
Option Board DIP Switches .....	2-3
Options:	
Alternate Character Generator Set .....	1-3
Answer Back Memory .....	1-3
31-Character Function Key .....	1-3
63-Character Function Key .....	1-4
Direct Connect .....	1-1,2-11,2-17
Memory Extension .....	1-1
Polling and Addressing .....	1-4
Serial Printer .....	1-3,2-11,2-17
TCU Desk Mount .....	1-3

### P

Parity Error .....	4-27
Personality Control .....	4-23
Personality Display .....	4-23
POLL Responses .....	5-3,5-4
Polling, ADM 42 .....	5-1
Polling Communications Buffer .....	5-14
Polling Control .....	4-28,4-29,5-2
Polling Option .....	1-4
Power ON .....	2-16
Power ON Reset .....	4-4
Power OFF .....	2-16
Power Supply .....	3-4
Print Mode .....	3-7
Print Mode Transmission:	
Characteristics Control Operations .....	3-7,4-22,4-23
Printer Interface .....	2-11,2-18
Printer Option .....	1-3,2-11,2-17
Program Display .....	4-6
Program Mode .....	4-12
Protect Mode .....	4-12
Protect Mode Tabs .....	4-18
Protected Fields .....	4-12



## INDEX (cont'd)

### Q

Quick Reference Manual, Operators .....1-4,4-1

### R

Read Cursor ..... 4-14  
Related Documents ..... 1-4  
Remove from Polling Status ..... 5-2  
RESET Button ..... 4-5  
RESET Operations ..... 4-4  
RS-232 Interface ..... 2-11,2-14  
RTS START Delay ..... 4-28  
RTS OFF Delay ..... 4-28

### S

Safety Requirements ..... 2-1  
Scrolling ..... 4-5  
SELECT Responses ..... 5-5,5-7  
Selected Protected Fields ..... 4-12  
Send Line (v) ..... 5-1,5-12  
Send Line (x) ..... 5-12  
Send Page (w) ..... 5-2  
SEND Responses ..... 5-6,5-11  
SEQUENTIAL SELECT Responses ..... 5-5,5-8  
Setting ADM 42 Address ..... 5-1  
Shift ..... 3-1  
Site Requirements ..... 2-1  
Special Function Control Bytes (Personality) ..... 4-31,4-32,4-33,4-34,4-35  
Specifications ..... 1-5  
Status Code Control ..... 4-7,4-8  
Status Line 25 ..... 4-6,4-7,4-31,4-33  
Storing FUNKEY Messages ..... 4-6  
STX Character ..... 5-3  
System Configuration Switches ..... 3-2

### T

Tab Mode ..... 4-17,4-29,4-32  
Terminal Control Unit (TCU) ..... 1-1  
Terminal RESET ..... 4-4  
Typewriter Tabs ..... 4-18

## INDEX (cont'd)

### U

Unformatted Print Mode ..... 3-8

### V

Video Attribute Control ..... 4-36

Video Logic ..... 3-2

Voltage Selection ..... 2-1

### W-X-Y-Z

Word Structure ..... 3-4

Write Character "N" Times ..... 4-13

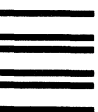
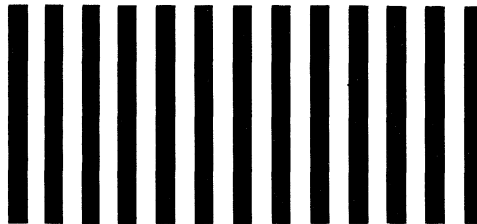
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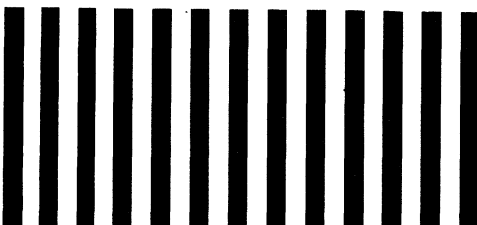
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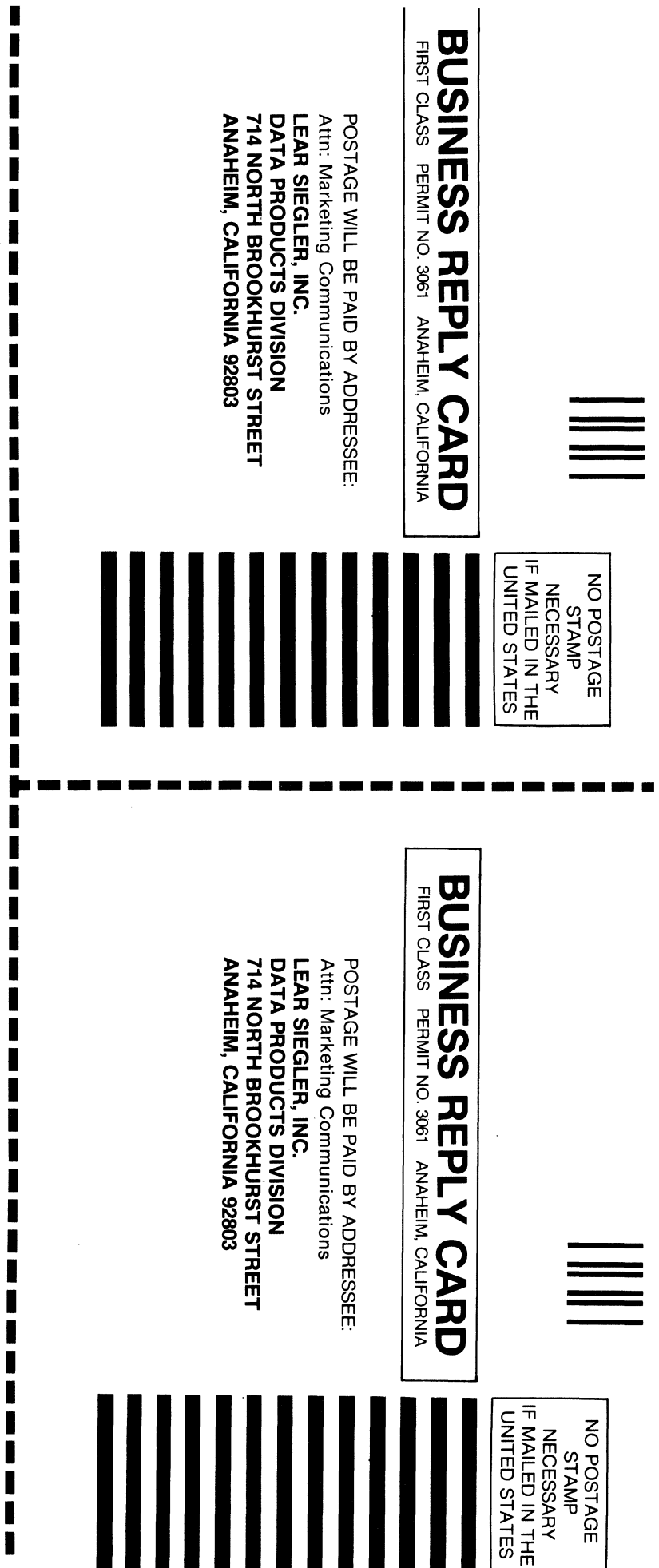
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