

**WANG**

6108

## **VS-5/6 Computer System**

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**Customer Engineering  
Product Maintenance Manual**

**741-1705**

### **COMPANY CONFIDENTIAL**

## PREFACE

This document is the Product Maintenance Manual (PMM) for the Wang VS-5/6 Computer System. The manual is organized in accordance with Customer Engineering Technical Documentation's approved PMM outline. The scope of this manual reflects the type of maintenance philosophy selected for this product.

The purpose of this manual is to provide the Wang-trained Customer Engineer (CE) with sufficient instructions to operate, troubleshoot, and repair the VS-5/6 Computer System. The manual will be updated on a regular schedule or as necessary. Such updates will be published either as Publication Update Bulletins (PUBs) or as full revisions.

### First Edition (April, 1986)

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# PUBLICATION UPDATE BULLETIN

TITLE: VS-5E/6E Computer System

DATE: 10/09/87

This PUB affects: 741-1705  
742-1705

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Previous Notice(s): 741-1705, 741-1705-1

## REASON FOR CHANGE:

This PUB. provides updated information to the appropriate sections of the VS-5/6 Computer System Product Maintenance Manual.

## INSTRUCTIONS:

Remove and insert attached pages and/or microfiche as follows:

	REMOVE PAGES	INSERT PAGES
1.	vii/viii	vii/viii
2.	ix/x	ix/x
3.	xi/xii	xi/xii
4.	4-9/10	4-9/10
5.	Sect. 9 T of C	Sect. 9 T of C
6.	9-23/24-9-27/28	9-23
7.		Appendix A
8.		Appendix B
9.		
10.		

	REMOVE FICHE	INSERT FICHE
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# PUBLICATION UPDATE BULLETIN

TITLE: VS-5/6 Computer

DATE: 09/23/86

This PUB affects: 741-1705  
742-1705

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Previous Notice(s): None

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**REASON FOR CHANGE:**

This PUB contains updated part numbers, specifications, cabling, and Illustrated Parts breakdown information for the VS-5/6 Computer.

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**INSTRUCTIONS:**

Remove and insert attached pages and/or microfiche as follows:

	REMOVE PAGES	INSERT PAGES
1.	Nothing	3-17/Blank
2.	4-9/10	4-9/10
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1.	Fiche 1 - 4	Fiche 1 - 4
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### WARNING

DO NOT OPEN THE SWITCHING POWER SUPPLY UNDER ANY CIRCUMSTANCE. EXTREMELY DANGEROUS VOLTAGE AND CURRENT LEVELS, IN EXCESS OF 300 VOLTS DC AND UNLIMITED CURRENT, ARE PRESENT WITHIN THE POWER SUPPLY.

DO NOT ATTEMPT TO REPAIR THE POWER SUPPLY; IT IS FIELD REPLACEABLE ONLY.

AFTER POWERING THE UNIT DOWN AND DISCONNECTING THE AC POWER PLUG FROM THE WALL OUTLET, ALLOW ONE MINUTE BEFORE REMOVING THE POWER SUPPLY TO PROVIDE ADEQUATE TIME FOR ANY RESIDUAL VOLTAGE TO DRAIN THROUGH THE BLEEDER RESISTORS.

### WARNING

THE VS-5/6 COMPUTER DOES NOT HAVE AN AC POWER ON/OFF SWITCH. BEFORE PERFORMING ANY SERVICE ON THE VS-5/6 COMPUTER, REMOVE THE AC POWER PLUG FROM THE WALL OUTLET.

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**SECTION**

**1**

**INTRODUCTION**

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INTRODUCTION

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# SECTION 1

## INTRODUCTION

### 1.1 SCOPE AND PURPOSE

This manual contains installation, operation, troubleshooting, and repair information for the VS-5/6 Computer System. This manual also contains an illustrated breakdown of replaceable parts.

The purpose of the manual is to provide Customer Engineering personnel with the information necessary to install, troubleshoot, and repair any model of the VS-5/6 in the field. Familiarity with small VS systems is recommended for the effective use of this manual.

### 1.2 ORGANIZATION AND LAYOUT

This manual is divided into 12 sections numbered 1 through 12. Each section describes a separate maintenance subject and is arranged to minimize references to other sections. Referencing to other frames is made by means of the section number(s) contained in parenthesis ( ).

All or most information pertaining to a specific task is located on a single and/or double frame. Each frame contains illustrations, numbered steps, and/or text describing the individual steps required to accomplish each task. Each section is preceded by the section number and a section table of contents. The sections, and corresponding frames, are arranged in numerical sequence from left-to-right and from top-to-bottom on the individual fiche cards.

### 1.3 ABBREVIATIONS AND SYMBOLS USED IN THIS MANUAL

<u>ABBREVIATION/SYMBOL</u>	<u>DEFINITION</u>
AC	Alternating current
ANSI	American National Standards Institute
APA	Active Port Assembly
ASSY	Assembly
BIT	Built In Test
BPI	Bits Per Inch
CBL	Cable
CC	Cable Concentrator
CM	Control Mode
CMD	Cartridge Module Drive
CP	Central Processor
CPU	Central Processing Unit

# INTRODUCTION

## ABBREVIATION/SYMBOL

## DEFINITION

DA	Device Adapter
DC	Direct current
DIP	Dual In-line Package
DOS	Disk Operating System
DRAM	Data Random Access Memory
DVM	Digital voltmeter
EAPA	Electrically Active Port Assembly
ECC	Error Correction Code
EIA	Electronic Industries Association
FCC	Federal Communications Commission
FMD	Fixed Module Drive
FRU	Field-replaceable unit
HEX	Hexidecimal Notation (H)
I/O	Input/Output
IOC	Input/Output Controller
IOP	Input/Output Processor
IPB	Illustrated Parts Breakdown
IPL	Initial Program Load
KG	Kilogram
LED	Light-Emitting Diode
M	Mega, (Million)
MBPS	Megabits Per Second
MM	Main Memory
MODEM	Modulator/Demodulator
NEMA	National Electrical Manufacturers Association
OS	Operating System
PARA	Paragraph
P-BAND	Peripheral Band
P/N	Part number
PCA	Printed circuit assembly
PDA	Physical Device Address
PF	Program Function
PM	Preventive maintenance
RAM	Random Access Memory
RF	Radio Frequency
RSD	Removable Storage Drive
SCL	Serial Communications Link
SCSI	Small Computer System Interface
SIOC	Serial Input/Output Controller
SMD	Storage Module Drive
SPS	Switching Power Supply
SOC	Socket
SW	Switch
SYSGEN	System Generation
TAC	Technical Assistance Center
TC	Telecommunications
TP	Test Point
V	Volts
VS	Virtual Storage
VTOC	Volume Table of Contents
WS	Workstation
WLI P/N	Wang Laboratories, Inc. Part Number

**SECTION**

**2**

**IDENTIFICATION**

# SECTION 2 CONTENTS

## SECTION 2 IDENTIFICATION

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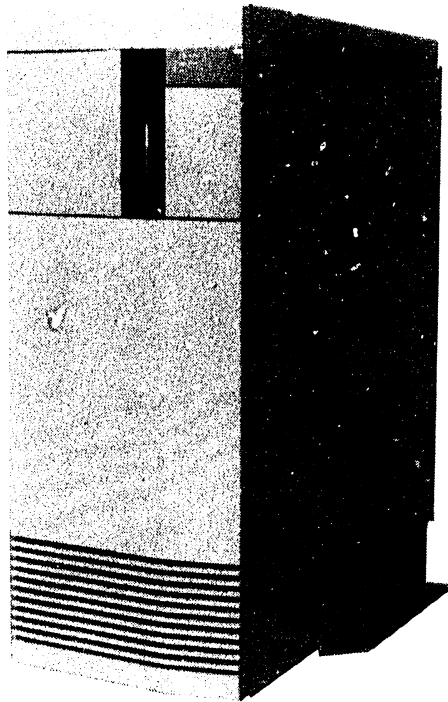
**SECTION 2**  
**IDENTIFICATION**

**2.1 MAJOR ASSEMBLIES**

This section contains system components and major assemblies of the VS-5 and VS-6 computer.

**2.1.1 SYSTEM COMPONENTS**

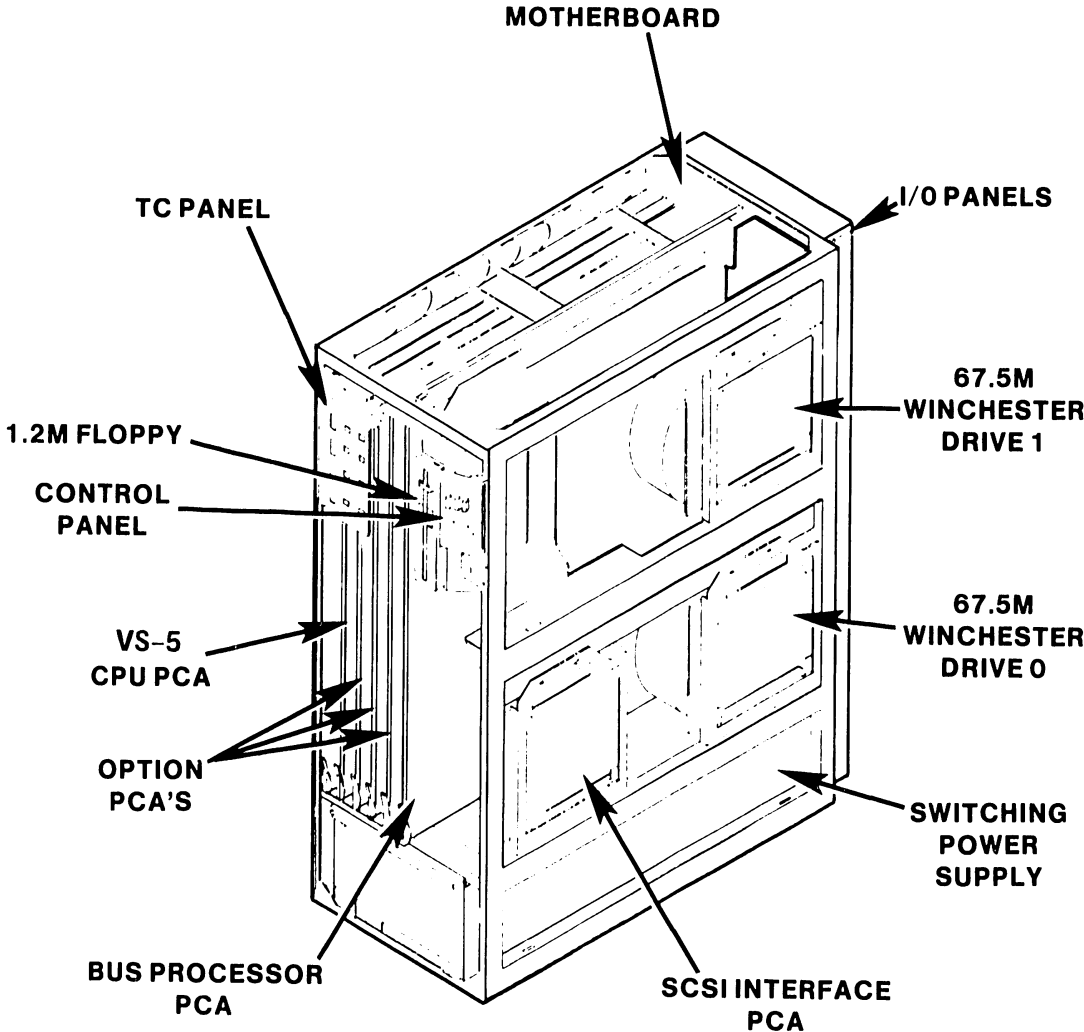
**VS-5/6  
MAINFRAME**



B-03110-FY86-3

**Figure 2-1. VS-5/6 Major Components**

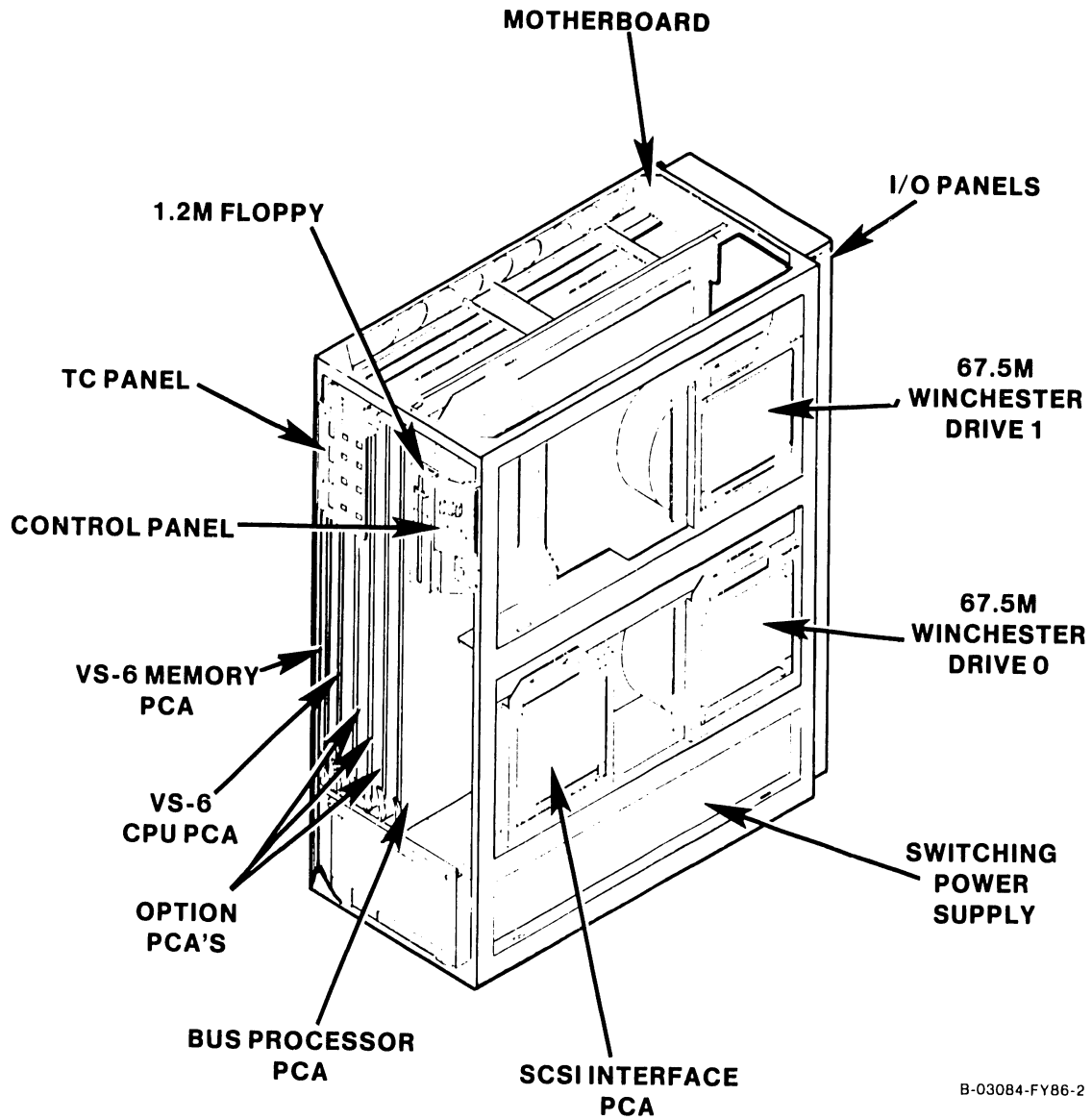
2.2 VS-5 MAJOR PARTS



B-03084-FY86-1

Figure 2-2. VS-5 Computer Major Components

2.3 VS-6 MAJOR PARTS



B-03084-FY86-2

Figure 2-3. VS-6 Computer Major Components

**SECTION**

**3**

**CONTROLS AND  
INDICATORS**



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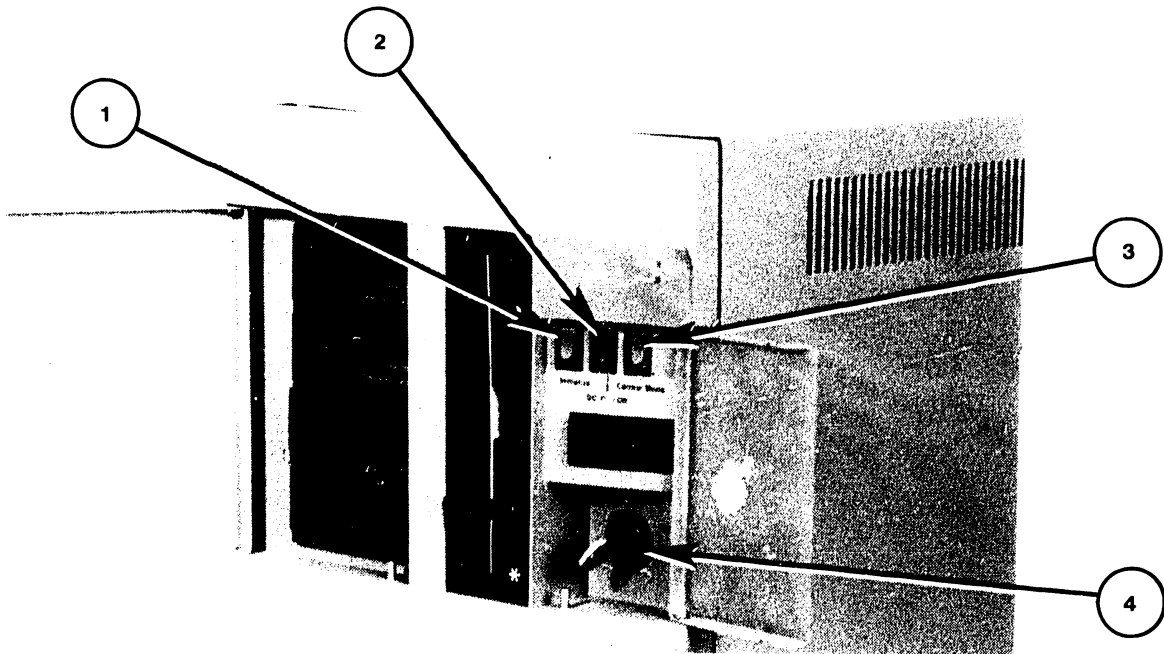
## SECTION 3

### CONTROLS AND INDICATORS

#### 3.1 OPERATOR CONTROLS

##### 3.1.1 VS-5/6 FRONT PANEL CONTROLS

The front panel controls are located inside the control panel door. Open door to the left to access control panel.



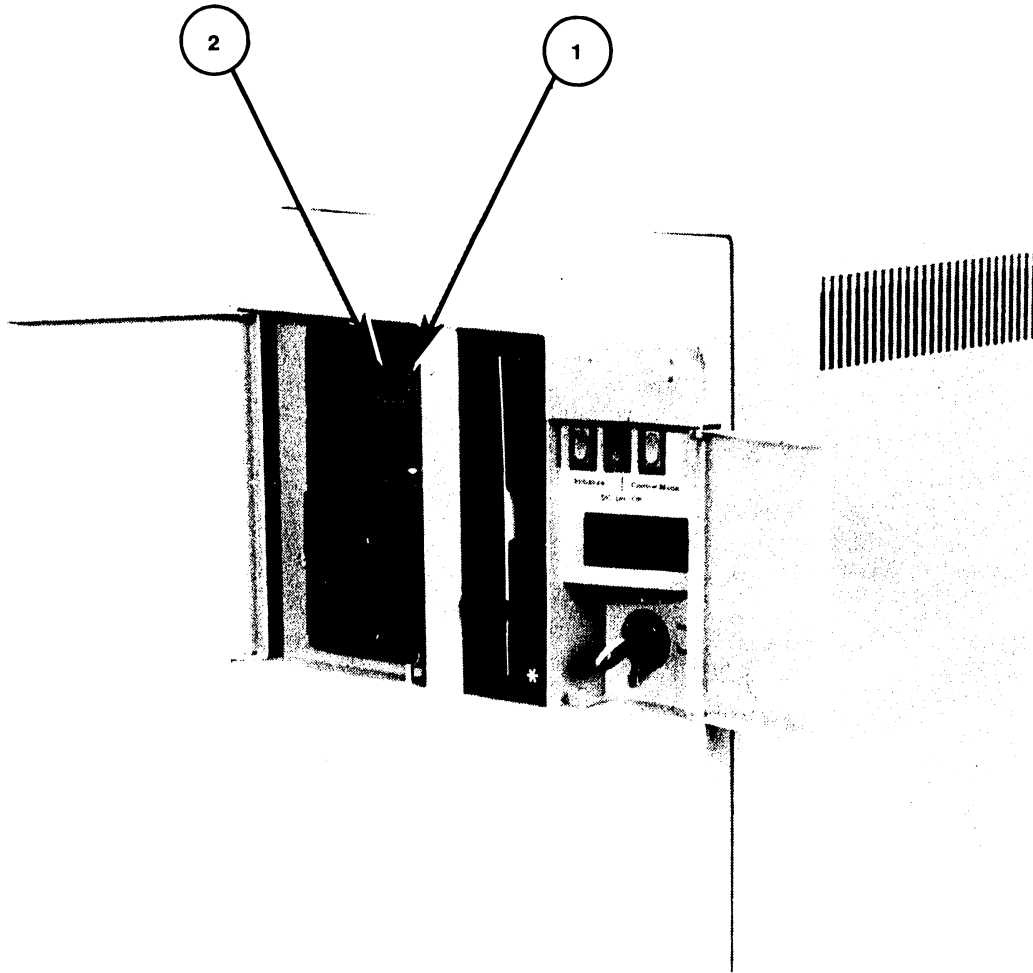
B-03006-FY86-6

Item	Name	Type and Function
1	Initialize Switch	Pushbutton switch; Red, pressing switch IPLs system and resets system clock.
2	DC Power-On Switch	Pushbutton switch; Black, depressing switch applies DC power to system. Pressing switch again removes DC power from system.
3	Control Mode Switch	Pushbutton switch; Green, depressing switch during power-on allows verification of HEX display by looping on decrement mode. Depressing switch any other time forces CP into control mode if control mode microcode is loaded.
4	Local/Remote Switch	Two position key switch; when in local mode allows normal operation. When in Remote mode, allows connection for remote maintenance.

# CONTROLS AND INDICATORS

## 3.1.2 VS-5/6 TC PANEL CONTROLS

The TC Panel Controls are located inside the TC panel door (if TC option is selected). Open the door to the right to access TC control panel.

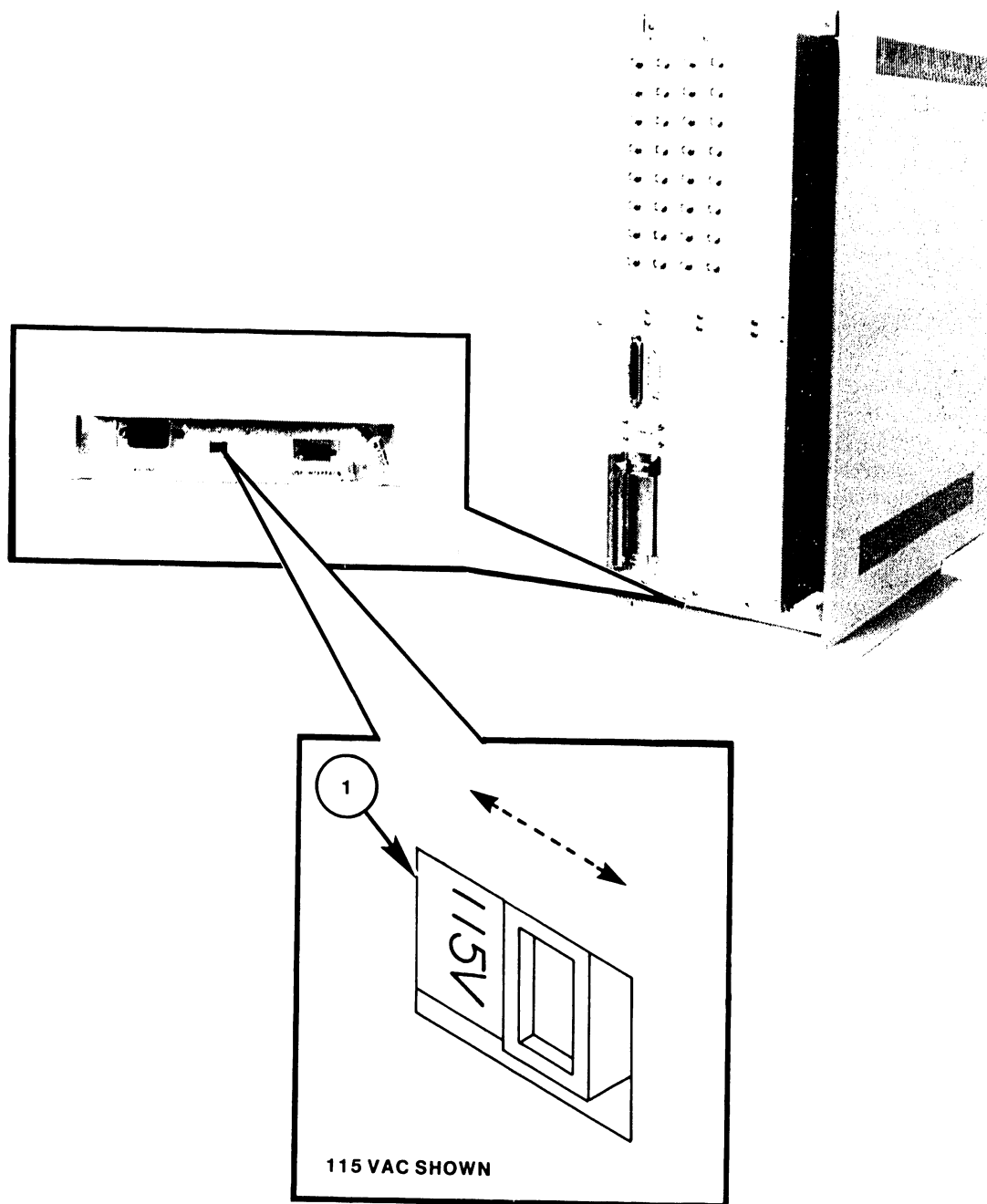


B-03006-FY86-7

Item	Name	Type and Function
1	TC Disconnect Switch	Recessed Pushbutton Switch; When pressed clears TC DA Data Terminal Ready signal.
2	Clear Switch	Recessed Pushbutton Switch; When pressed generates a TC DA power-up reset state.

# CONTROLS AND INDICATORS

## 3.1.3 VS-5/6 REAR PANEL CONTROLS



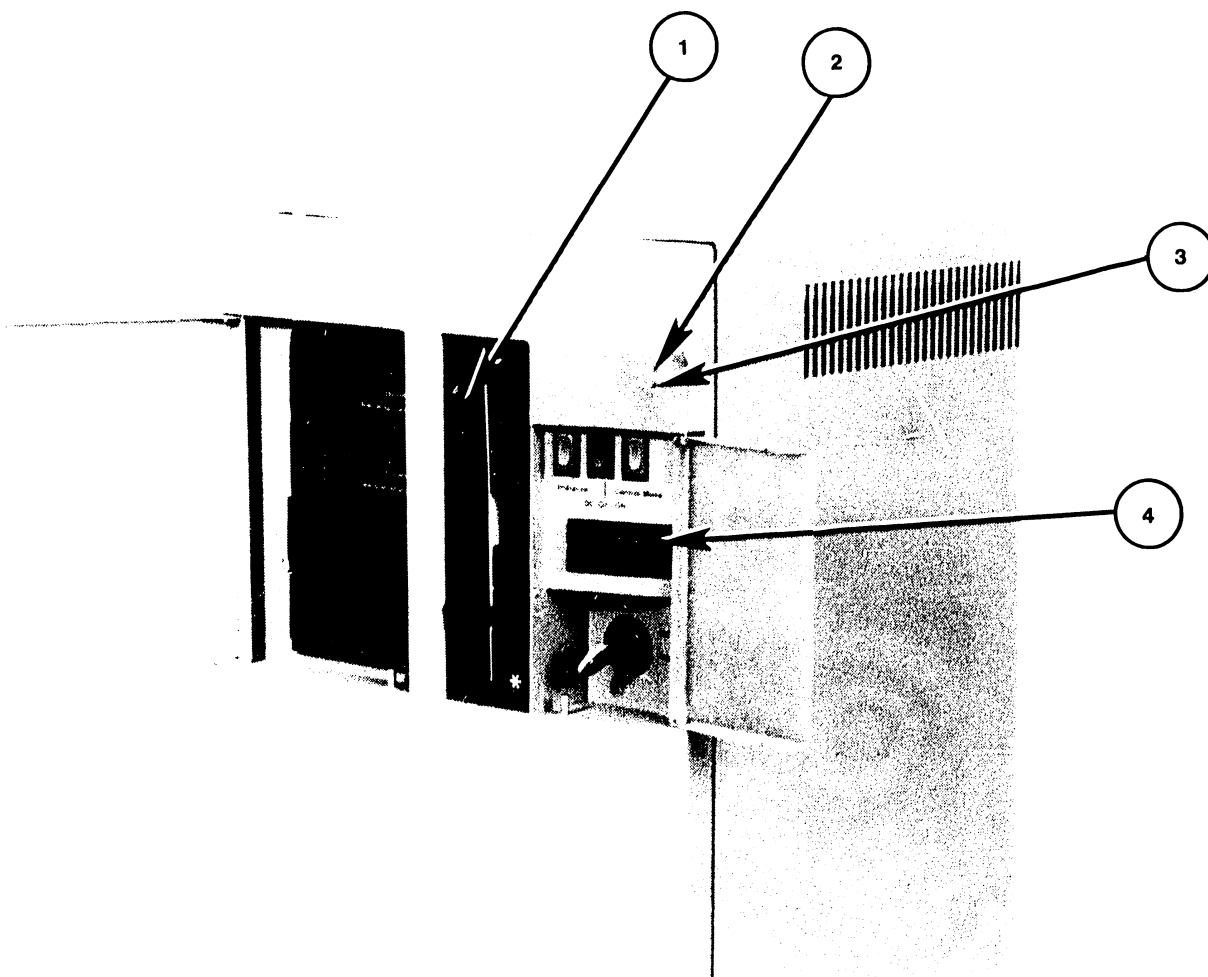
B-03006-FY86-11

Item	Name	Type and Function
1	Voltage Select Switch	Slide-type switch; selects ac operating voltage of 115V or 230V, determined by available line voltage (switch shown in 115V position).

# CONTROLS AND INDICATORS

## 3.2 VS-5/6 OPERATOR INDICATORS

### 3.2.1 FRONT PANEL INDICATORS

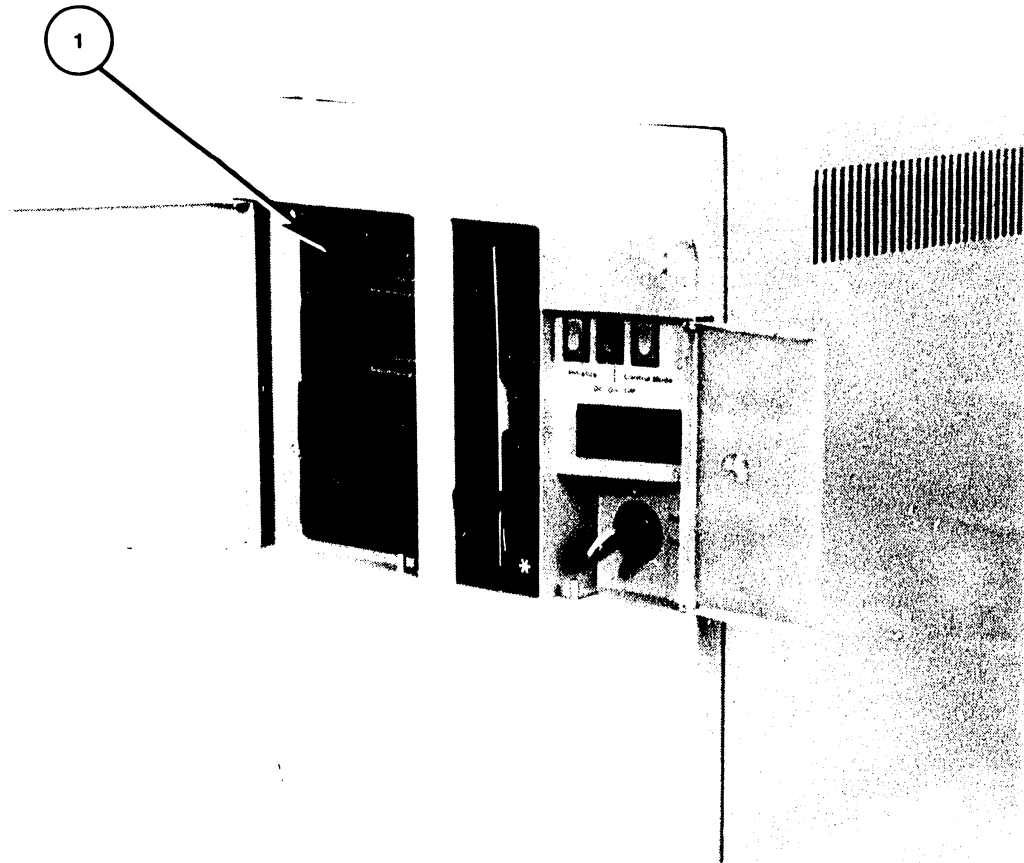


B-03006-FY86-8

Item	Name	Type and Function
1	Diskette Drive Activity LED	LED; Green LED denotes 1.2M drive, Red LED denotes 360K drive, illuminates to indicate activity on diskette drive.
2	DC Power LED	LED; Green, illuminates to indicate DC power on.
3	Not Ready LED	LED; Red, illuminates during power-up diagnostics mode, off during normal operation.
4	Diagnostics LEDs	HEX LEDs; Displays BIT power-up diagnostics being executed and self-test monitor error codes. If an error occurs, the error code will be continuously displayed.

# CONTROLS AND INDICATORS

## 3.2.2 TC PANEL INDICATORS

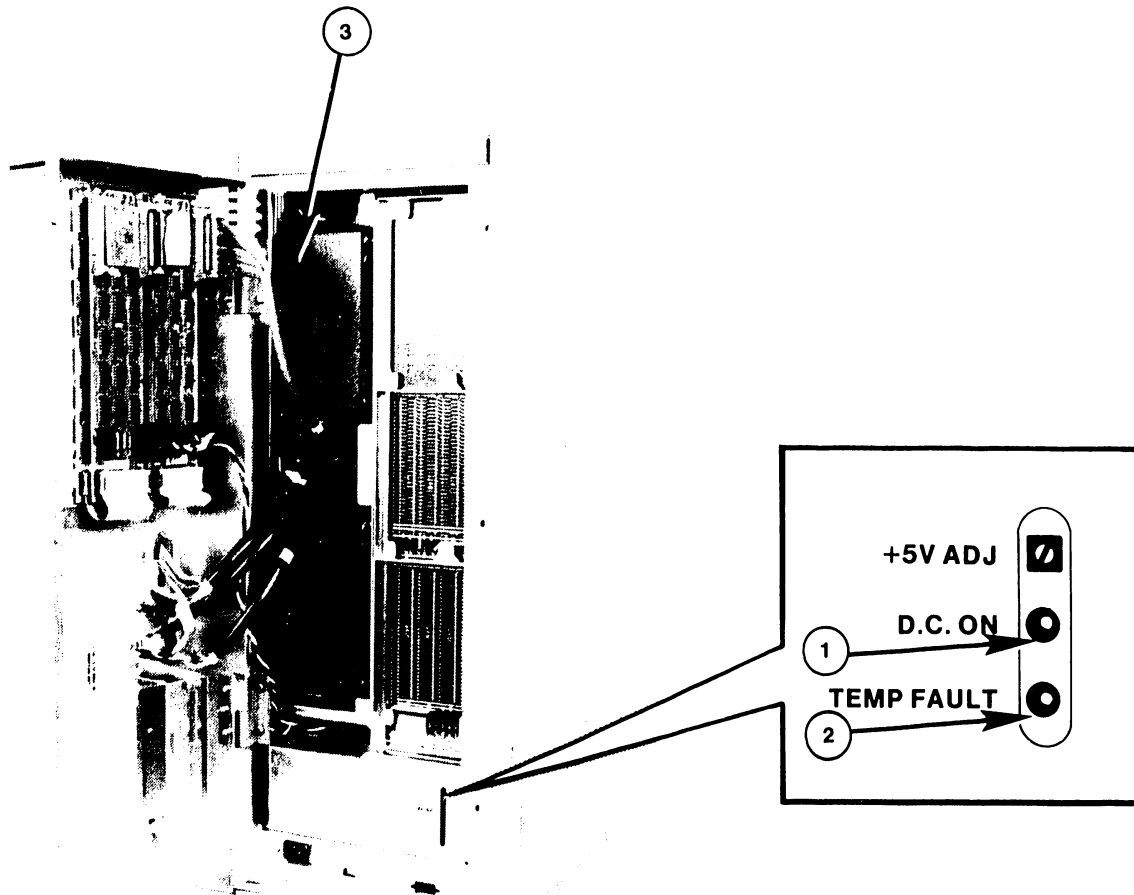


B-03006-FY86-9

Item	Name	Type and Function
1	TC Activity LEDs	Eight LEDs, Red, The LEDs defined below are valid only during running of TC protocols.
	LED 1	Illuminates to indicate Receive Data (RXD).
	LED 2	Illuminates to indicate Transmit Data (TXD).
	LED 3	Illuminates to indicate Clear-to-Send (CTS).
	LED 4	Illuminates to indicate Request-to-Send (RTS).
	LED 5	Illuminates to indicate Carrier Detect (CXR).
	LED 6	Illuminates to indicate Data Terminal Ready (DTR).
	LED 7	Illuminates to indicate Data Set Ready (DSR).
	LED 8	Illuminates to indicate power is on.

# CONTROLS AND INDICATORS

## 3.2.3 POWER SUPPLY/WINCHESTER DRIVE INDICATORS (Inside Bulkhead)



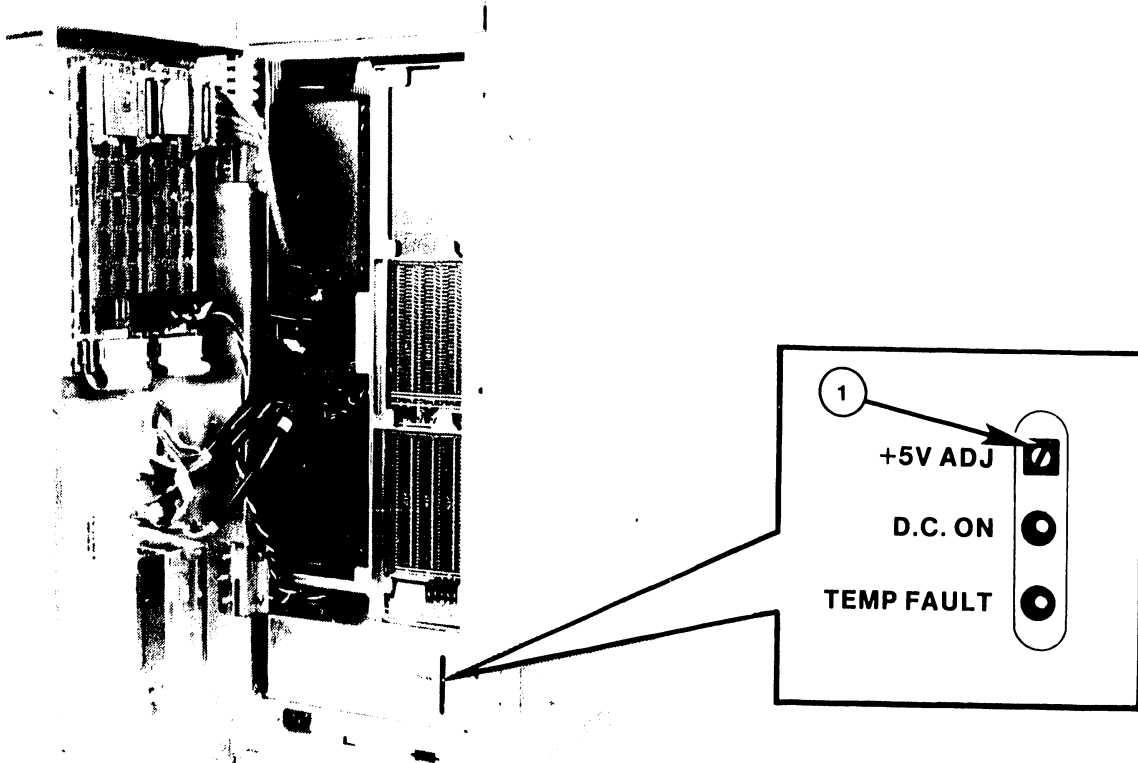
B-03006-FY86-2

Item	Name	Type and Function
1	D.C. ON	LED; Green, illuminates to indicate DC Power On.
2	TEMP. FAULT	LED; Red, illuminates to indicate power supply has internal temperatures above specification limit. Service is required.
3	Activity LED	LED; Red, illuminates to indicate activity on winchester drive.

# CONTROLS AND INDICATORS

## 3.3 VS-5/6 SERVICE CONTROLS

### 3.3.1 POWER SUPPLY CONTROLS

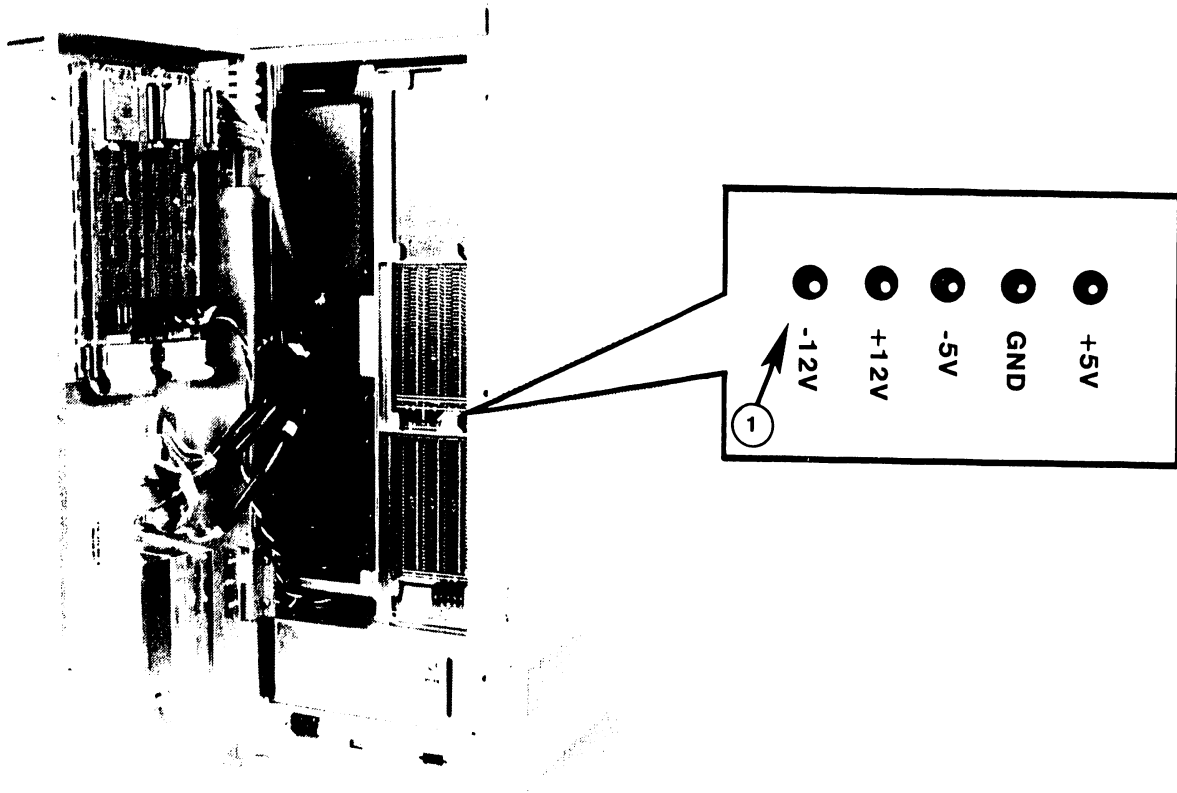


B-03006-FY86-3

Item	Name	Type and Function
1	+5V ADJ	Potentiometer; adjusts +5 Vdc.



3.3.2 MOTHERBOARD TEST POINTS

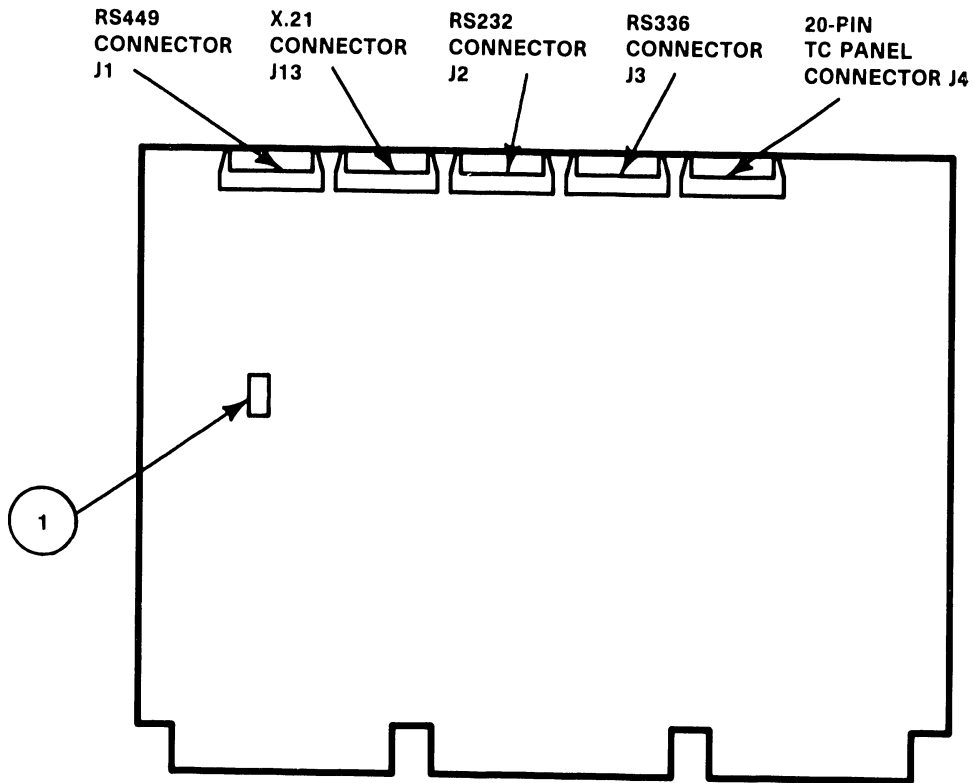


B-03006-FY86-4

Item	Name	Type and Function
1	Voltage Test Points	Terminals; voltage test points for checking main-frame dc voltages. Refer to paragraph 8.2.

# CONTROLS AND INDICATORS

## 3.3.3 1-PORT TC DA CONTROLS

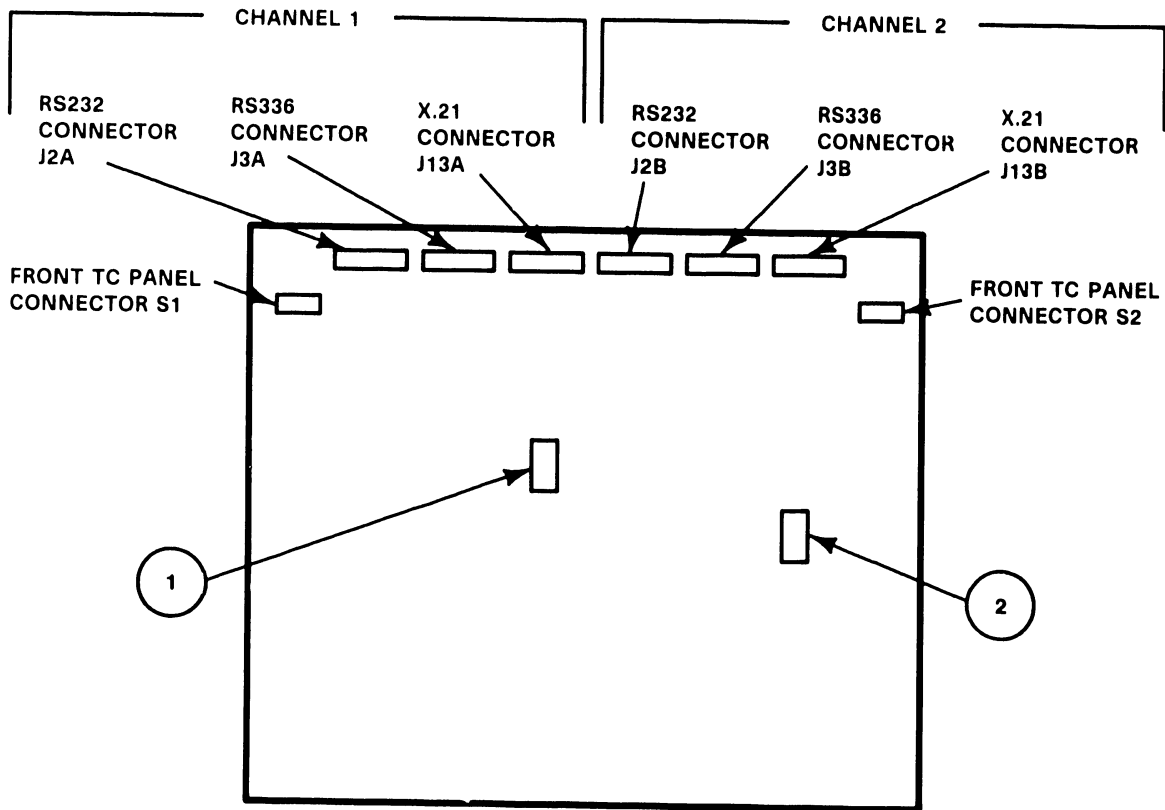


B-03006-FY86-16

Item	Name	Type and Function
1	Telecommunications Mode Select Switch SW1	Rocker-type 8-bit switch bank; selects different diagnostic tests and X.21 support. Refer to paragraph 7.3.7

# CONTROLS AND INDICATORS

## 3.3.4 2-PORT TC DA CONTROLS

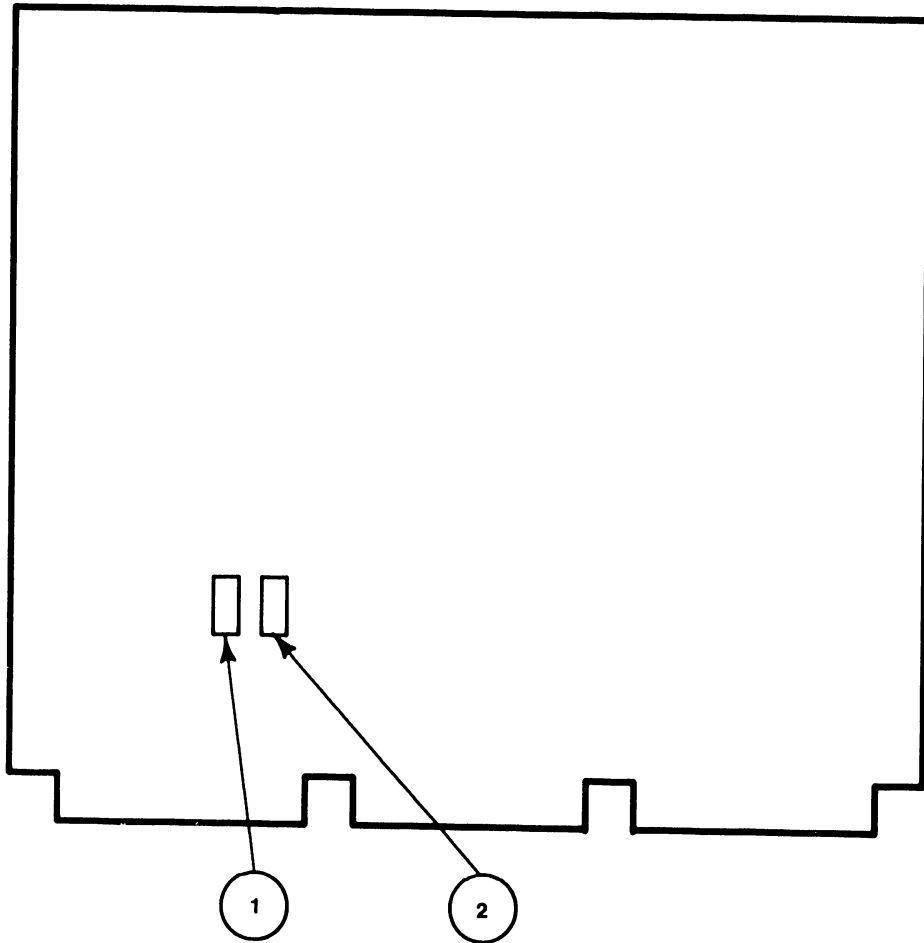


B-03006-FY86-17

Item	Name	Type and Function
1	Telecommunications Mode Select Switch SW1	Rocker-type 8-bit switch bank; selects different diagnostic tests and X.21 support for channel 1. Refer to paragraph 7.3.8.
2	Telecommunications Mode Select Switch SW2	Rocker-type 8-bit switch bank; selects different diagnostic tests and X.21 support for channel 2. Refer to paragraph 7.3.8.

# CONTROLS AND INDICATORS

## 3.3.5 BUS PROCESSOR (BP) CONTROLS

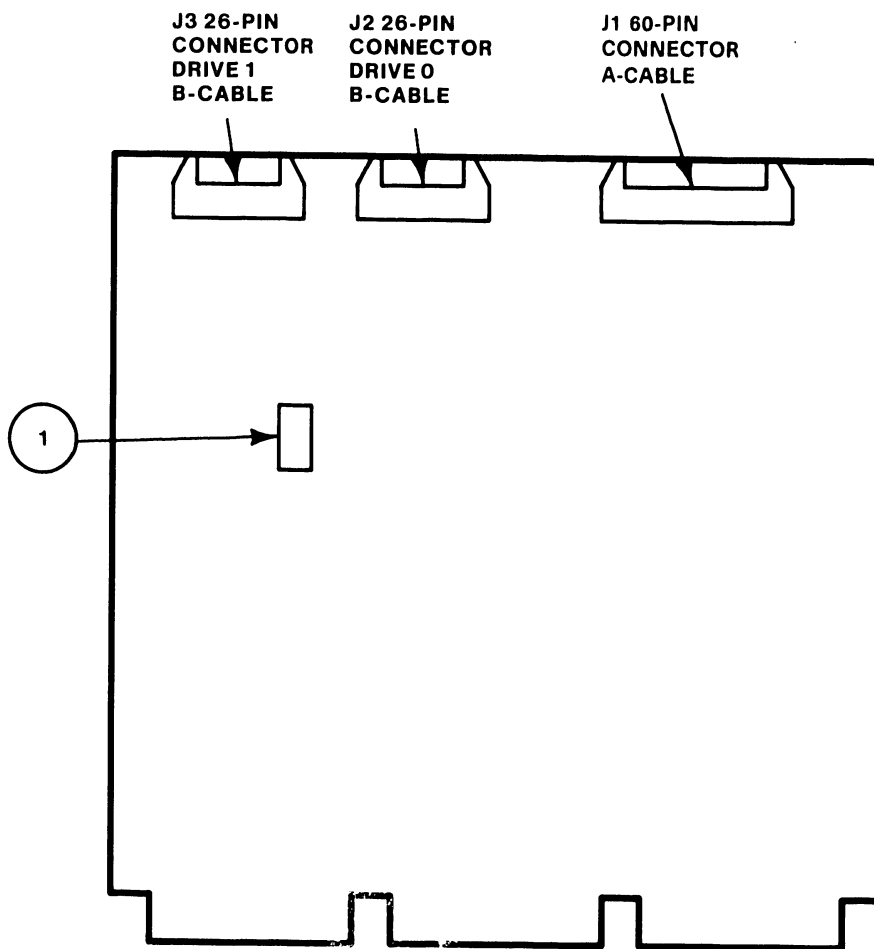


B-03006-FY86-18

Item	Name	Type and Function
1	WS0 Location/Control Mode Select Switch SW1	Rocker-type 8-bit switch bank; selects different IPL Control and BIT test. Refer to para. 7.3.2.
2	Drive-Type/SCSI Device ID Select Switch SW2	Rocker-type 8-bit switch bank; selects diskette drive-type and SCSI Device ID. Refer to paragraph 7.3.2.

# CONTROLS AND INDICATORS

## 3.3.6 SMD 2-PORT BOARD CONTROLS

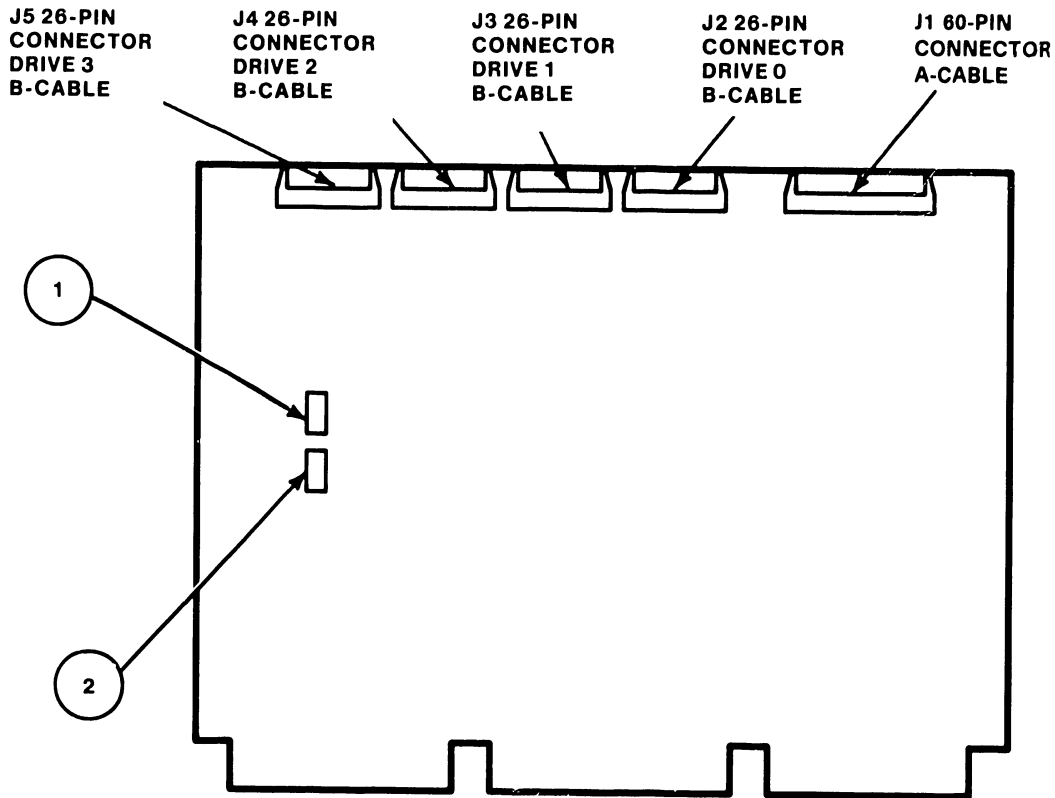


B-03006-FY86-19

Item	Name	Type and Function
1	Drive-Type/Port Select Switch SW1	Rocker-type 8-bit switch bank; selects external drive-type for one of two ports. Switches Sw1-Sw4 select Drive 1 (port 1), Switches Sw5 -Sw8 select Drive 2 (port 2). Refer to paragraph 7.3.5.

# CONTROLS AND INDICATORS

## 3.3.6 SMD 4-PORT BOARD CONTROLS

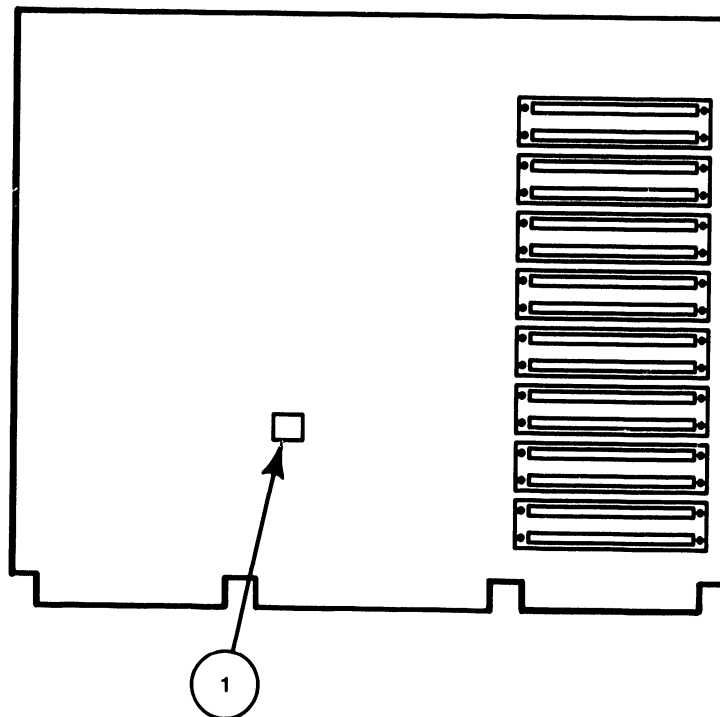


B-03006-FY86-20

Item	Name	Type and Function
1	Drive-Type/Port Select Switch SW1	Rocker-type 8-bit switch bank; selects external drive-type for one of two ports. Switches Sw1-Sw4 select Drive 1 (port 1), Switches Sw5 -Sw8 select Drive 2 (port 2). Refer to paragraph 7.3.6.
2	Drive-Type/Port Select Switch SW2	Rocker-type 8-bit switch bank; selects external drive-type for one of two ports. Switches Sw1-Sw4 select Drive 3 (port 3), Switches Sw5 -Sw8 select Drive 4 (port 4). Refer to paragraph 7.3.6.

# CONTROLS AND INDICATORS

## 3.3.8 VS-5 CPU/MEMORY BOARD CONTROLS

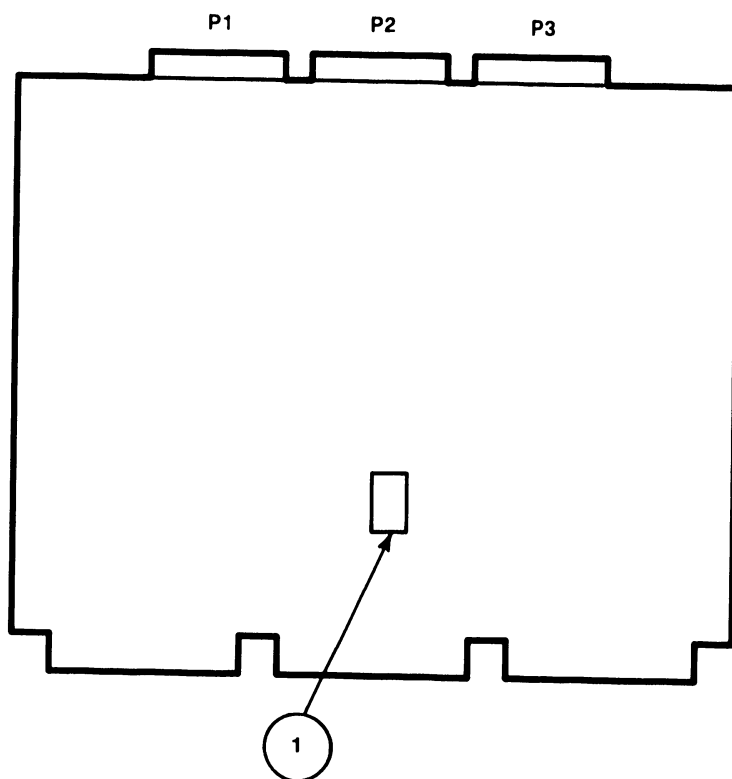


B-03006-FY86-15

Item	Name	Type and Function
1	Memory Size Select Switch SW1	Rocker-type 4-bit switch bank; selects on-board memory size. Refer to paragraph 7.3.1.

# CONTROLS AND INDICATORS

## 3.3.9 VS-6 CACHE MEMORY BOARD CONTROLS



B-03006-FY86-14

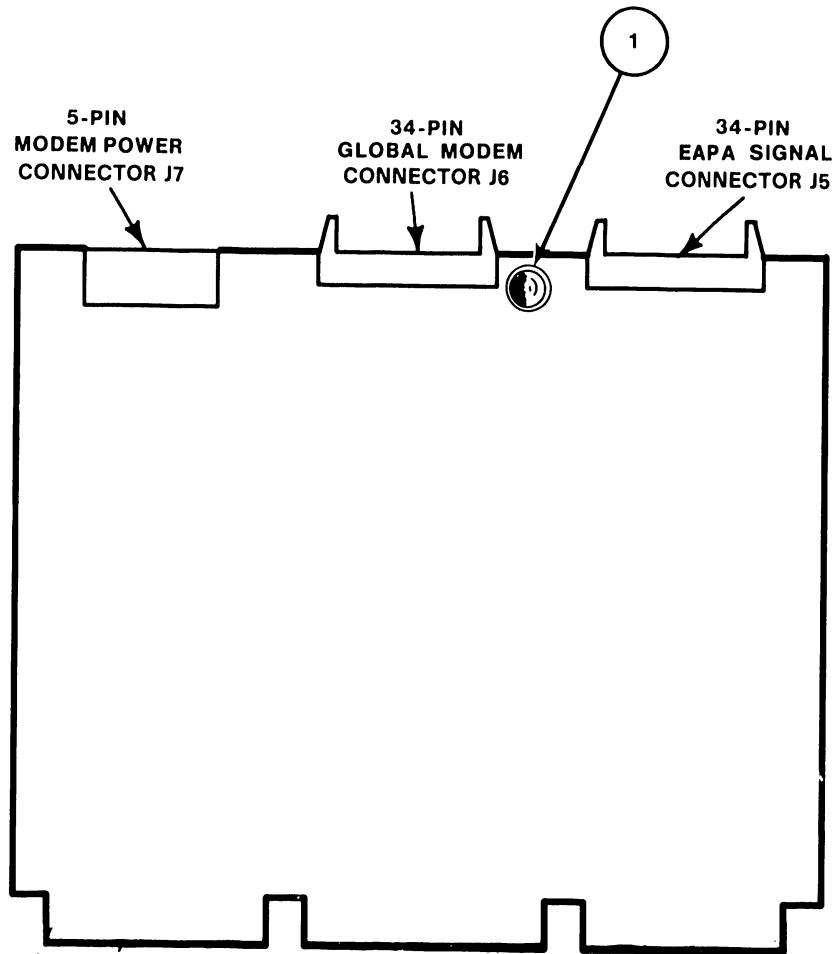
Item	Name	Type and Function
1	Memory Size Select Switch SW1	Rocker-type 4-bit switch bank; selects on-board memory size. Refer to paragraph 7.3.3.



# CONTROLS AND INDICATORS

## 3.4 SERVICE INDICATORS

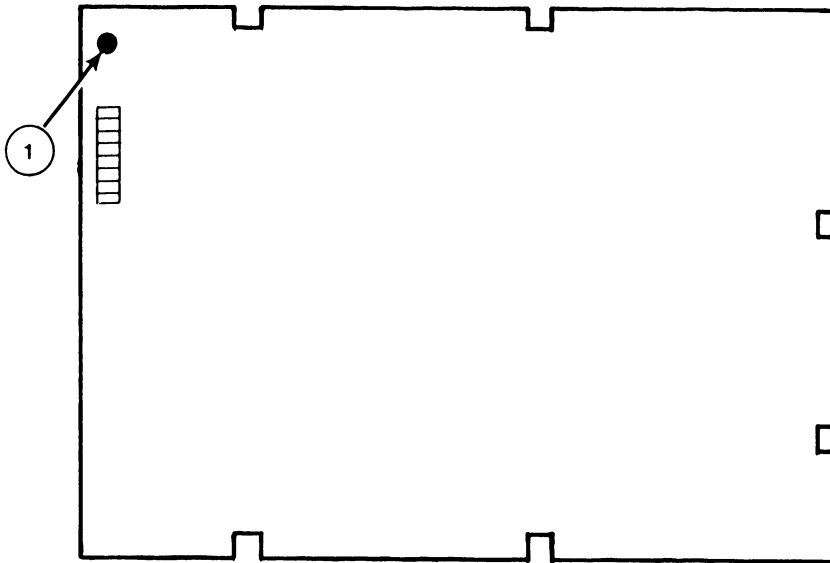
### 3.4.1 UISIO BOARD INDICATOR



B-03006-FY86-13

Item	Name	Type and Function
1	Diagnostic LED	LED; Red, Illuminates during UISIO PCA power-up BIT test is run. If LED remains lit, UISIO PCA failure has occurred.

3.4.2 SCSI INTERFACE PCA REV X0 INDICATOR



B 03316 FY86-5

Item Name	Type and Function
1 Power-On LED	LED; Red, Illuminates when +5 Volt power is supplied to PCA.

**SECTION**

**4**

**OPERATION**

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### SECTION 4 OPERATION

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## SECTION 4

### OPERATION

#### 4.1 SCOPE

Section 4 Operation provides information for system power-up (IPL), running the Stand Alone Utilities (SAU), power-up diagnostics, and system power-down.

#### CAUTION

Never switch VS-5/6 mainframe DC Power On or Off when a floppy is mounted in the drive. Never mount or remove a diskette while floppy activity LED is On.

#### 4.2 SYSTEM POWER-UP

The following procedure contains the steps required to Power-Up (IPL) the VS-5/6 mainframe. Be sure to perform the steps in the sequence given.

- 1) Power-On Workstation 0 (operator console). Workstation 0 raster should be displayed in a few seconds. Power-on any other workstations or printers on the system.

**If Workstation 0 is a Professional Computer with RSAF Software installed, Workstation Emulation must be entered before IPLing the mainframe. If not, error code 42EA will be displayed.**

- 2) Position the Local/Remote Key Switch in the Local position.
- 3) Press the DC Power On switch (Black), the power-on indicator and Drive Not Ready indicator will illuminate. It takes approximately 1 minute for the internal disk to reach operating speed.

If the system is to be loaded from an external disk drive, insert a diskette that contains the IPL files into the floppy diskette drive. If no diskette is inserted in the disk drive, the system will look for the IPL bootstrap file on the internal fixed disk. Once the file is found, the IPL process starts.

- 4) If the system has external drives attached, power on the drives.
- 5) The diagnostic Hex display begins a countdown from FFFF while the power-up diagnostics are being run. This will be completed in approximately 45 seconds. In the event the diagnostic code countdown stops and an error code is displayed, refer to Chapter 6 Troubleshooting for error code information.

## OPERATION

If error code 402A, 403A, or 404A is displayed, these error codes denote that the system disk does not contain the pointer to the bootstrap file (@MCBOOT@). This pointer must be regenerated. Perform the following:

- a) Load the Stand Alone Utility (SAU). Refer to paragraph 4.2.1.
  - b) Using SAU Copy function, copy files @MCBOOT@ and @MICPL@ from the SAU diskette to the system disk. Copying the bootstrap file, the SAU automatically regenerates the pointer. Once regenerated, the IPL procedure can be continued.
- 6) Upon successful completion of BIT diagnostics, the Self Test Monitor Screen appears. Once Self Test diagnostics are successfully run, the IPL Drive Selection screen is displayed (figure 4-1). Position the cursor next to the drive from which the operating system is to be loaded from and press ENTER. If an external drive contains the operating system, position the cursor next to that drive number and press ENTER.

---

Small System VS Self Test Package Version R2xxx  
IPL Drive Selection  
Bootstrap Volume = SYSTEM

Device	Capacity	Type	Volume	Status
2270V7	1.2 Mb	Dsket		
■ 2269V1	67 Mb	Dsket	SYSTEM	
2269V1	67 Mb	Dsket	DATA	

Position Cursor to Indicated Device and Select:

(ENTER) Test & IPL      (PF1) IPL Only      (PF8) Standalone Diagnostic Monitor

---

Figure 4-1. Self Test Monitor and IPL Drive Select Screen

---

Small System VS Self Test Monitor Package Version R2620  
System hardware Status  
System Volume = SYSTEM

Status	Diagnostic
Passed	(SIO) Serial Data Link test
Passed	(BP) BP UART Loopback Verification Test
Running	(CPU) CPU CP Control & CP/BP Test
	(CPU) CPU Random Operand Test
	(CPU) CPU CP Integrity Test
	(MM) Main Memory Integrity Test
	(MM) Main Memory Integrity test

---

Figure 4-2. System Hardware Self-Test Screen

- 7) This screen indicates that the VS-5/6 is testing system components. The results of each test is displayed with the message sequence: 'Loading', 'Running', 'Passed', 'Non-Fatal Error', 'Fatal Error'. If the status is 'Passed' the system is ready to begin initialization.

A Non-Fatal Error message and Fatal Error Message will display an error code of the failure. Refer to Section 6 Troubleshooting for error code definition.

- 8) Press 'ENTER' to continue the IPL sequence. The prompt "Loading System Microcode" is displayed and system initialization begins. In about 10 seconds, the message 'Diagnostics Complete, Beginning System Initialization' appears on WS0 and the Not Ready LED turns off.
- 9) The SYSGEN screen appears. The SYSGEN screen displays the name of the configuration file last used (SYSFILE Field). NOTE: During Initial IPL, the SYSGEN configuration screen does not display a default value for the name of the communications configuration file. The default system configuration file name @CONFIG@ in @SYSTEM@ should be entered.

\*\*\* MESSAGE M001 BY SYSGEN

INFORMATION REQUIRED

Specify the name of the system configuration file and press (ENTER)

- or -

Press (1) to use one workstation and one disk.

SYSFILE = @CONFIG@

SYSLIB = @SYSTEM@

Specify the communications configuration file to be used, if any

COMMFIL = ██████████

COMMLIB = @SYSTEM@

Inhibit Logons at all workstations?

LOGONS = NO

**Figure 4-3. SYSGEN Screen**

- 10) Enter another valid configuration file name in the field 'SYSFILE' and press 'ENTER' or press 'ENTER' to select the configuration file displayed.
- 11) If the system is using communications, specify the communications configuration file name and library.
- 12) Press PF1 to use one workstation (workstation 0) and one disk.



# OPERATION

- 13) Respond to the prompt 'Inhibit Logons at all workstations? Logons = NO'  
If YES is selected, only WSO can be logged on to the system after the IPL is complete. NO is the default value.
- 14) Press 'ENTER'. The Date and Time Screen will be displayed.

---

\*\*\* MESSAGE WN3 BY IPL

## INFORMATION REQUIRED

### SET DATE AND TIME

Year = YY                      Month = MM                      DAY = DD  
HOUR = HH                      MINUTE = MM                      SECOND = SS

---

Figure 4-4. Date and Time Screen

- 15) Enter date and time in the format provided (use the 24 hour clock time for hours) and press ENTER. In about 5 seconds, the IPL screen will appear.

---

```
* * * * *
*
* WWWW      WWWW      AAA      NNN      NNN      GGGGGG
* WW        WW        AA AA    NNN      NN      GG      GG
* WW        WW        AA  AA    NN  N    NN      GG      GG
* WW  WW    WW        AA  AA    NN  N    NN      GG      GG
* WW  WW    WW        AAAAAAAAAA NN      N NN    GG      GGGG
* WW  WWWW  WW        AA  AA    NN      N NN    GG      GG
* WWWW  WWWW  AA      AA      NN      NNN    GG      GG
* WW    WW    AAAA    AAAA    NNN      NNN    GGGGGG
*
* * * * *
```

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Initial Program Load  
VS Operating System  
Nucleus Version 06.66.02  
02048K physical memory available

01:01:01	System Generation	complete
01:02:01	I/O System Initialization	in progress
01:03:01	System Task Initialization	pending

---

Figure 4-5. Initial Program Load (IPL) Screen

## OPERATION

- 16) The IPL screen shows the version of the VS Operating System being used in the IPL process, the physical memory size of the system, and the status of the three phase of IPL. These phases are; complete, in progress, and pending. Refer to the 'VS-5/6 Processor Handbook' for a detail description of the IPL process.

If during the IPL sequence the system detects any critical operating system components are obsolete or incompatible, the Version Warning Screen will be displayed. In the event this occurs refer to paragraph 4.2.

- 17) When the system initialization is completed successfully (approximately 2 minutes), the Operator's console screen is displayed.

---

\*\*\* Wang VS Operator's Console \*\*\*  
2:12 PM                      Tuesday                      March 22, 1986

Position to (\*) and Press (ENTER) to Provide Immediate Operator Service:

Mount Volume FLOPPY on Disk 11, . . . . . 12:40  
\*Assistance Required for Printer 3 . . . . . 13:32  
\*I/O Error Log Queued for Printing . . . . . 13:55

Press (1) to Return to User Mode  
- or -

Use the Function Keys to Manage:

2) PRINT Queue	9) PRINTERS
3) PROCEDURE Queue	10) DISKS
4) TRANSMIT Queue	11) TAPES
5) RETRIEVE Queue	12) TELECOMMUNICATIONS
	13) WORKSTATIONS
6) INTERACTIVE Tasks	
7) NON-INTERACTIVE Tasks	14) SYSTEM Options

Press (HELP) at Any Time to Return to the Operator Console Menu

---

**Figure 4-6. Operator Console Screen**

- 18) When the message 'Queue Verification Routine Complete' appears (approx. 20 to 30 seconds), press PF1 to enter user mode. Workstation 0 is now in user mode and any VS function can now be performed. The VS Logon Screen will be displayed.

---

```

*** Wang VS Logon ***

Workstation 0                2:12 PM                Tuesday March 22, 1986

Hello new user
Welcome to □□□□

Please identify yourself by supplying the following information

Your userid   = █████
Your password =

and press (ENTER) to Logon

or press (PF11) to enter operator mode immediately

```

---

Figure 4-7. VS Logon Screen

19) Enter the default three-letter user ID, CSG. No password is required. Press ENTER. The command processor screen will be displayed.

---

```

*** WANG VS COMMAND PROCESSOR ***

Workstation 0 Ready          11:32 PM                Monday March 22, 1985

Hello
Welcome to the Wang VS

Press (HELP) at any time to interrupt your program or to stop processing
of the current command.

Use function keys to select a command:

(1) RUN Program or Procedure
(2) Set USAGE Constraints
(3) Show PROGRAM Completion Report
(4) Manage QUEUEUS
(5) Manage FILES/Libraries
(6) Manage DEVICES
(11) Enter OPERATOR Mode
(12) Submit PROCEDURE
(13) Send MESSAGE to Operator
(15) PRINT Command Screen
(16) LOGOFF

```

---

Figure 4-8. Command Processor Menu

- 20) When the command processor screen appears the system is in user mode. From this screen, utilities 'GENEDIT', SECURITY, BACKUP, and others will be run.

**NOTE**

Note this manual only contains 'GENEDIT' information that differs from other VS mainframes. 'BACKUP' and utilities are not discussed in this manual.

For information pertaining to programs and features, refer to the 'VS-5/6 Processor Handbook'.

- 21) Run 'GENEDIT' Utility and verify all peripherals have been correctly declared (figure 4-9). If all peripherals are not declared, generate a new @CONFIG@ file and re-IPL the system.

GENEDIT			VS□ Device Adapters		
@CONF05P in @SYSTEM@ on SCSI0			Model VS□		
Jumper Address	PDA	1st Dev	DA Type	DA Description	
000	2800	0	28V01	BP/SIO Device Adapt	
000	2000	32	28V02	BP/Floppy DA	
000	2010				
000	2020	35	28V04	BP/Floppy DA	
300	2C00				
500	3000				
100	3400	40	25V50	Disk Device Adapter	
600	3800				
400	3C00				

TAB to Device Type and PRESS:  
 (ENTER) to edit the devices on the Device Adapter  
 (9) to show valid Device Adapters for the slot

or PRESS: (13) to modify the Device Adapter types;  
 (14) to modify the starting device numbers;  
 (16) to return to main menu

**Figure 4-9. Sample 'Devices Adapters' GENEDIT Screen**

- 22) Tab to 28V01 BP/SIO Device Adapter and press ENTER to display the Devices on IOP screen as shown in figure 4-10.

---

GENEDIT		Devices on IOP		
@CONF05P in @SYSTEM@ on SCSI0		Model VS□		
28V01 BP/SIO Device Adapter		IOP#2		
Dev#	Port#	Type	Description	WP?
0	0	2256C	Combined WS (64K)	
1	1	2529V	6400bpi Cartridge Tp	
2	2	4230	Monochrome Combined	
3	3	2256C	Combined WS (64K)	
4	4	2256C	Combined WS (64K)	
5	5	2256C	Combined WS (64K)	
6	6	2256C	Combined WS (64K)	
7	7	2256C	Combined WS (64K)	
8	8	2509V	9-Track, 1600 bpi Tape	
9	9	5574	600 lpm Band Ptr	Y
10	10	4230	Monochrome Combined	
11	11	4230	Monochrome Combined	
12				
13				
14				
15	15	2276C	Archiver C WS (64K)	

TAB to Device Type and PRESS:	or PRESS:	(5) Next
(ENTER) Reserve cluster devices	(9) Valid Devices	(16) Return
(12) Shift	(13) Modify	(11) Main men

---

Figure 4-10. Sample 'Devices on IOP' GENEDIT Screen

**NOTE**

If a Professional Computer is installed as WS0 and is used for Remote Maintenance, it MUST BE declared as a 2256C Combined WS (64K).

## OPERATION

- 21) Press PF16 to return to the VS Device Adapters Screen. Select 28V04 BP/SCSI DA and press 'ENTER'. The Disks on DA screen will be displayed as shown in figure 4-11.

GENEDIT					Disks on DA	
@CONF05P in @SYSTEM@ on SCSI0			28V01 BP/SCSI DA		Model VS <input type="checkbox"/>	
			IOP#3			
Dev#	Port#	Type	Description		Attach?	
35	6	2269V1	67Mb 5-1/4 in Fix Dk			
36	6	2269V1	67Mb 5-1/4 in Fix Dk			
37						
38						
39						
TAB to Device Type and PRESS:			or PRESS:			
(12) Shift devices up/down			(9) Valid Devices	(16) Return		
			(13) Modify	(↑1) Main men		

Figure 4-11. Sample 'Disks on DA' GENEDIT Screen

### NOTE

If two internal 67.5 MB disk drives are installed, the Device #'s will be sequential (i.e. 35 for drive 0, 36 for drive 1) and the Port number will always be Port #6, the SCSI-to-ST506 interface device address.

- 22) Run BACKUP Utility and copy all files to the back-up disk. If the message 'Work file cannot be placed on output volume, please respeciy' appears, press PF1 to continue. When all files have been copied, the procedure is completed.
- 23) Press PF11 to enter OPERATOR mode.

### 4.2.1 STAND ALONE UTILITY (SAU)

The Stand-Alone Utility (SAU) is a VS utility that runs independently of the VS operating system. The SAU is a self-contained, stand-alone program that does not use the normal operating system, nor can the operating system use the SAU program. The SAU is used to initially load the VS operating system on the system disk. The SAU utility is contained on one floppy diskette labeled SAUDK1. The primary purpose of the SAU is to format the system disk, and copy the operating system software to it during system installation. This utility can also be used for system disk maintenance such as initializing, reformatting and preparing a new system disk.

### NOTE

This SAU is for use with Operating Systems below 7.13. If the Operating System in use is 7.13, → Appendix A of the VS-5E/6E PUB. to this VS-5/6 Computer System Product Maintenance Manual.

### 4.2.1.1 COPY UTILITY

The SAU allows user to copy data from an input diskette, removable disk, or tape into the current system volume. Three levels of the copy utility are supported and are defined as follows:

- **Initialize**      Formats a new system volume, analyzes the disk surface for reliable data storage, constructs the Volume Table Of Contents (VTOC), creates a volume label and copies data. This option overwrites the system disk.
- **Reformat**        Constructs the Volume Table Of Contents, creates a volume label, and copies the data. This option overwrites the system disk.
- **Copy Only**        Copies the files needed to update the system volume without initializing or reformatting the system volume.

When running the SAU, select the copy function required depending on the situation of the mainframe. The following should be considered:

- For a new system, the disk must be initialized for system volume, use the Initialize option.
- If the system volume has already been initialized, use the Reformat option. Reformat clears and rewrites the VTOC.
- To load new system files without rebuilding the entire system, use the Copy option. The Copy option checks for duplicate file names, flags them, and allows the user the option to skip the input file or to rename either the old file or the new file to make copying possible.

### 4.2.1.2 Loading SAU

This section describes steps required to load the SAU program. After the bootstrap SAUDK1 diskette has loaded the system microcode into main memory, load the operating system software onto the system disk from either diskettes or tapes. When the procedure is completed, IPL from the newly formatted system volume. Perform the following:

- 1) Ensure the system has been powered up as described in paragraph 4.2, and that workstation 0 is in workstation emulation.
- 2) Position the front panel keyswitch in 'Local' position.
- 3) Insert 'SAUDK1' diskette into the floppy drive and latch the door closed.
- 4) Press the 'Control Mode' switch (Blue), then press the 'Initialize' switch (Orange).

The diagnostics test automatically run after the Initialize switch is pressed. The Hex display counts down from FFFF to 0000. The Hex display then counts up through a series of diagnostic routines and finally blanks.

- 5) The following message appears on the display:

**Loading System Microcode**

**Loading Complete, Beginning System Initialization**

- 6) The system microcode and the Stand Alone Utility are now loaded into main memory.

**4.2.1.3 Running SAU**

Once the SAU has finished loading, the SAU Function Screen appears.

- 1) Press PF4 to initiate installation. Define input device screen appears.

---

Standalone Utility - Version x.xx.x Select Function  
(c) Copyright 1985, Wang Laboratories, Inc

---

SAU is designed as a means of installing the initial  
software required for operation with this CPU

Press PF4 to initiate the installation  
Press PF5 to create the installation media

---

---

**Figure 4-12. SAU Select Function Screen**



Standalone Utility - Version x.xx.x Define Input Device  
 (c) Copyright 1985, Wang Laboratories, Inc

Please enter the device type and address of the input device.

Device Type - ██████████  
 Physical Device Address (PDA) - ██████

Device Type	PDA	Description	Volume	Status
2270V7	2000	1.2Mb 5-1/4" Floppy	SAUDK1	Standard Label
2529V	2801	6400bpi Cartridge Tp		
2509V	2801	9-track, 1600bpi tape		

Press (ENTER) to continue

Figure 4-13. Define Input Device Screen

- This screen prompts the user to specify the device type and PDA (physical device address) for the input device used to load SAU. It also shows the input devices allowed for this procedure. Enter the device type and the PDA number of device used and press (ENTER). The define system device screen appears.

Standalone Utility - Version x.xx.x Define System Device  
 (c) Copyright 1985, Wang Laboratories, Inc

Please enter the device type and address of the input device.

Device Type - ██████████  
 Physical Device Address (PDA) - ██████

Device Type	PDA	Description	Volume	Status
2269V1	2020	67Mb 5-1/4" fix disk	SCSI0	Standard Label
2269V1	2021	67Mb 5-1/4" fix disk	SCSI1	Standard Label

Press (ENTER) to continue

Figure 4-14. Define System Device Screen

- 3) This screen prompts the user to specify the system device type and PDA for the fixed disk that will be used as the system disk. It also contains the devices for the system that can be designated as system disks. Enter the system device type and PDA and press (ENTER). The Specify Label Handling screen appears.

---

Standalone Utility - Version x.xx.x Specify Label Handling  
(c) Copyright 1985, Wang Laboratories, Inc

---

Press (PF2) to INITIALIZE the system disk  
Press (PF3) to REFORMAT the system disk  
Press (PF4) to COPY only

---

Or Press (PF1) to return to the function selection screen

---

**Figure 4-15. Specify Label Handling Screen**

- 4) Press the PF key that corresponds to the operation to be perform. Refer to table 4-1 for SAU operating description.

**Table 4-1. SAU Operations**

---

Utility	Description
Initialize	Formats and verifies system disk, constructs Volume Table of Contents (VTOC), creates a volume label, and copies the data. This option overwrites the system disk. All data on the disk is lost.
Reformat	Constructs the VTOC, creates a volume label and copies the data. This option overwrites the system disk. All data on the disk is lost.
Copy	Copies files to the system volume output without initializing or reformatting it.

---

## OPERATION

- 5) Pressing PF4 COPY, the SAU 'Request to Mount' screen appears with the message 'Please mount first diskette'. This message appears whether the input medium is a removable disk or diskette. If COPY is selected, go to step 12.
- 6) Pressing PF2 INITIALIZE or PF3 REFORMAT, the Specify Volume Label Screen appears.

---

Standalone Utility - Version x.xx.x  
(c) Copyright 1985, Wang Laboratories, Inc

Specify Volume Label

---

### System Disk

The following information is required for volume formatting:

Volume Name	-	SYSTEM	
Volume Owner	-	████████████████████	
Date (MM/DD/YY)	-	██ / ██ / ██	
VTOC Size (in blocks)	-	0252	
Fault tolerance	-	<u>NONE</u>	(NONE - No fault tolerance) (CRASH - Tolerate system halt) (Media - Tolerate bad media also)
Extent limit at file creation	-	003	(3-255)
Total allowable extends	-	013	(13-255)

---

Please supply the required parameters and press (ENTER) to continue,  
or press (PF1) to return to the Function Selection screen.

---

**Figure 4-16. Specify Volume Label Screen**

- 7) This screen prompts the user to specify information that is used by the SAU to create the system disk volume label. These parameters are discussed in table 4-2.
- 8) Enter the information on the SAU Volume Label Specification screen and press (ENTER). The Formatting Screen appears and displays the message:

### Disk formatting in progress

The SAU can initialize one 2269V1 67MB disk in approximately 2 hours. Once completed, the SAU Allocate Dump or Page Filing screen is displayed.

Table 4-2. Volume Label Parameters

<u>Parameter</u>	<u>Entry</u>
Volume Name	Enter a unique name for the system volume.
Volume Owner	Enter the name of the owner of the volume. For a disk, the volume owner can be from 1 to 14 characters long. For a tape, the volume owner can be from 1 to 3 characters long.
Date	Enter the current date using the MM/DD/YY format.
VTOC Size	Enter the number of blocks that you want to allocate as default for VTOC. For the VS-5/6 you can enter 0222. The default varies with disk size. This default can be overridden if expected to make an unusually large number of entries into VTOC. For example, you should enlarge the size of VTOC if many small files are to be created on the volume. Refer to 'VS System Utilities Reference Addendum' for information on VTOC size.
Fault Tolerance	<p>Enter the type of tolerance you want. Select from NONE, CRASH, and MEDIA. Your selection in the fault tolerance category affects the amount of disk space that remains.</p> <p>Choosing NONE allocated the most memory with the least protection. MEDIA allocated the least memory the most protection. Refer to 'VS System Utilities Reference Addendum' for information on VTOC size.</p>
Extended Limit at file creation	Enter the number of blocks for the extent limit at file creation (3 - 255). The default value is 3 extents. Before setting higher limits, consider the volume's media condition. Refer to the appropriate VS Software Bulletins for additional information.
Total Allowable Extends	Enter the number of blocks for the total number of extends allowed. The default limit is 13. Before setting higher limits, consider the volume's media condition. (The default of 13 extends is recommended for initial system installation.) Refer to the appropriate VS Software Bulletin for additional information.

---

Standalone Utility - Version x.xx.x                      Allocate Dump or Paging Files  
(c) Copyright 1985, Wang Laboratories, Inc

---

Please specify the size of pre-allocated control mode dump file. The size of the file should correspond to the size of main memory for any CPU you intend to use this disk on. Enter a size of zero (0) if you do not want to allocate a dump file at this time.

Size of pre-allocated dump file                      = 00000 K

Please specify the size and location of the user paging pool. The size of the pool should be based on the number of tasks and their segment 2 sizes which may use this disk for paging. Enter a zero (0) if you do not want to allocate a paging pool at this time.

Size of paging pool    = 00000 K

Pool location (relative to VTOC) = 0

0 = nearest VTOC

9 = farthest from VTOC

---

Press (ENTER) to continue.

---

**Figure 4-17. Allocate Dump or Paging File Screen**

- 9) This screen prompts you to specify appropriate VTOC information for the system disk volume label. Enter the information or select the default values and press (ENTER).
- 10) The 'SAU Request to Mount' screen is displayed. The following message is displayed:

**Please mount the first diskette**

- 11) Remove the SAUDK1 diskette from the floppy drive.
- 12) Copy the input files onto the system disk. This can be accomplished either by diskettes or tape. Perform the following which applies:

Diskette:

For a diskette input medium, insert the diskette labeled 'SYST01' or an updated diskette into the diskette drive and latch the door closed. The system will begin copying the files.

Tape Input:

For a tape input medium, power up the tape drive. Insert or mount the system files tape after the message 'Mount the first tape' appears. Press the ON-LINE button.

After several seconds, if the load is successful, the TAPE LOADED indicator will illuminate. The system rewinds the tape and displays the message 'Copy in progress'.

- 13) If a Copy-Only operation is being performed using either diskette or tape media, and the SAU encounters a duplicate file, copying stops and the Duplicate File Name screen appears.

---

Standalone Utility - Version x.xx.x	Duplicate File Name
(c) Copyright 1985, Wang Laboratories, Inc	

---

A file with the name @SYS000@ already exists in @SYSTEM@.

---

Press	PF1 to skip copying file, or PF2 to copy the renamed input file, or PF3 to rename old file/copy new file
-------	--

---

**Figure 4-18. Duplicate File Name Screen**

- 14) To rename a file, place the cursor under the highlighted file name. Re-enter the modifiable file name. Press the appropriate PF key to indicate the Duplicate File Name option selected. 'Copy in Progress' prompt will be displayed.
- 15) If the system files are contained on more than one diskette or tape, the following prompts will be displayed:

Diskette:

The message 'Please Mount the next diskette: SYST02' is displayed. Remove the diskette from the floppy drive and insert the second diskette. Follow the screen prompts until all diskettes are copied.

Tape:

The message 'Please Mount the next tape: -----' is displayed. The system rewinds the tape automatically. Remove the tape from the tape drive and insert the second tape. Follow the screen prompts until all tapes are copied.

- 16) When all tapes and diskettes are copied, the message 'Copy Completed. IPL when ready' is displayed. Remove the diskette or tape. Re-IPL the system as described in paragraph 4.2.

**4.3 POWER-UP DIAGNOSTICS**

Every time the VS-5/6 mainframe is powered-on, the power-up diagnostics are run. The Hex display will decrement from FFFF to 0000. In the event of power-up diagnostics error, the error code will be displayed. Refer to Section 6, Troubleshooting, for error code interpretation.

**4.4 NORMAL SYSTEM POWER-DOWN PROCEDURE**

**CAUTION**

Powering down the system and/or any external disk drive improperly may result in damage to the Volume Table Of Contents (VTOC).

- 1) Verify that all operators have logged off the system. Press key PF13 (Workstations) on an operators console to check that all users are logged off the system.
- 2) Press key PF7 (Non-interactive Tasks) on an operators console to check the background tasks on the system. Look under the USER column to identify any user running a background task and advise the user to suspend or terminate the task.
- 3) Press the Control Mode (Green) pushbutton. This prevents any disk I/O command in process from being halted prior to completion.
- 4) Power down all peripheral devices according to the procedures in their applicable maintenance manual.
- 5) Press the mainframe DC Power (Black) pushbutton to disconnect dc power to the system.

**4.5 EMERGENCY SYSTEM POWER-DOWN PROCEDURES**

In the event of an emergency situation where the normal system power down procedure can not be used, perform the following:

- 1) Press the Control Mode (Green) pushbutton. This prevents any disk I/O command in process from being halted prior to completion and prevents possible damage to any disk VTOC.
- 2) If time permits, unload any external disk drive.
- 3) Press the mainframe DC Power (Black) pushbutton to disconnect dc power to the system.
- 4) Disconnect the mainframe ac power cord from the power source receptacle.



**SECTION**

**5**

**PREVENTIVE  
MAINTENANCE**

SECTION 5 CONTENTS

SECTION 5  
PREVENTIVE MAINTENANCE

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**SECTION 5**  
**PREVENTIVE MAINTENANCE**

**5.1 MATERIALS REQUIRED**

The CE tool kit is required for maintenance (PM) on VS-5/6 Computer System.

**5.2 PM SCHEDULES**

The VS-5/6 Computer System does not require any Preventive Maintenance. However, the service technician should perform the following while at the site during service calls.

<b>Action</b>	<b>Section</b>
Operational Check (IPL)	4.1
Clean Exterior	5.4
Clean Interior	5.4
Inspect	5.5
Adjust	5.6
Diagnostic Check	6.2
Apply ECN's	

**5.3 OPERATIONAL CHECK**

An equipment operational check is recommended after every service call. This test consists of running power-on diagnostics and checking the status diagnostics LEDs for possible error codes. This test takes approximately 45 seconds to complete and is activated when the system is initially powered-on.

**5.4 CLEANING**

A general cleaning should be performed as follows:

**Exterior:**

- 1) Remove dust from exterior with cloth and vacuum.
- 2) Wipe case clean with soft cloth.

## PREVENTIVE MAINTENANCE

### Interior:

- 1) Remove VS-5/6 top, front, and side panels (Para. 7.2.1, 7.2.2, 7.2.3) and vacuum interior.
- 2) Clean power supply fans.

### **5.5 INSPECTION**

An inspection of the equipment should be performed as follows:

- 1) Check for loose or damaged parts.
- 2) Check fan operation.

### **5.6 ADJUSTMENTS**

The following mechanical and electrical adjustments/checks should be performed:

#### **Mechanical:**

- 1) None required.

#### **Electrical:**

- 1) VS-5/6 Power Supply Adjustment. (Para 8.3)
- 2) VS-5/6 +5VFOREVER Check. (Para 8.4)

**SECTION**

**6**

**TROUBLE-  
SHOOTING**

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**CHAPTER 6**  
**TROUBLESHOOTING**

**6.1 SCOPE**

The troubleshooting section of the VS-5/6 maintenance manual contains listings of the BP PROM Error Codes, BP Microcode Error Codes, VS-5/6 Monitor Error Codes, and system troubleshooting flowcharts.

**6.2 BP PROM ERROR CODES**

The BP PROM tests executed have different execution times. If a error code remains on the display for longer than 30 seconds, it should be considered an error. Notations BL, BH, CX, BP, SI, DI, CS, DS and ES refer to 80186 internal registers and are not displayed. These are only visible using an in-circuit emulator attached to the Bus Processor. Notation 'H' following an alphanumeric string indicates hexadecimal notation.

---

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**

---

**00 PROM POWER ON AND INITIALIZATION**

0000 80186 hung on jump to diagnostic start or during chip select programming  
0001 80186 hung during processor register initialization

**04 PROM CHECKSUM VERIFICATION**

0402 Checksum error

**06 2861 DUART COMMUNICATIONS CHECK & REMOTE CHANNEL INITIALIZATION**

0600 80186 hung, See program documentation for possible cause

**08 I/O COMMUNICATION CHECK**

0802 Data write/verify failure on Data RAM DMA MAR

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**

**0A PROGRAMMABLE INTERRUPT CONTROLLER INITIALIZATION & TEST (CON'T)**

0A00 80186 hung, See program documentation for possible cause  
 0A10 Mask register write/verify failure on master 8259A  
 Low byte S1 = expected data, low byte D1 = received data  
 0A11 Mask register write/verify failure on slave 8259A #1  
 Low byte S1 = expected data, low byte D1 = received data  
 0A12 Mask register write/verify failure on slave 8259A #2  
 Low byte S1 = expected data, low byte D1 = received data  
 0A13 Mask register write/verify failure on slave 8259A #3  
 Low byte S1 = expected data, low byte D1 = received data  
 0A14 Mask register write/verify failure on slave 8259A #4  
 Low byte S1 = expected data, low byte D1 = received data

**0C 80186 PROGRAMMABLE INTERNAL TIMER TEST**

0C00 80186 hung, see program documentation for possible cause  
 0C10 Timer Channel 0 count incorrect, CX = received count  
 0C12 Timer Channel 1 count incorrect, CX = received count  
 0C14 Timer Channel 2 count incorrect, CX = received count  
 0C20 No interrupt from channel 0  
 0C22 Interrupt received not channel 0  
 0C24 No max count status from channel 0  
 0C20 No interrupt from channel 1  
 0C22 Interrupt received not channel 1  
 0C24 No max count status from channel 1  
 0C20 No interrupt from channel 2  
 0C22 Interrupt received not channel 2  
 0C24 No max count status from channel 2

**0E FRONT PANEL INTERFACE CHECK**

No explicit codes reported during this test. See program documentation for test details

**10 CODE RAM DATA LINE TEST**

1000 80186 hung, see program documentation for possible cause  
 1002 Data write/verify miscompare  
 BP = expected data, DS:BX = address of miscompare  
 1004 Unexpected parity error  
 DS:BX = test address



---

**TEST ERROR CODE TEST TITLE AND ERROR CODE DESCRIPTION**


---

**12 DATA RAM DATA LINE TEST**

1200 80186 hung, see program documentation for possible cause  
 1202 Data write/verify miscompare  
 BP = expected data, DS:BX = address of miscompare  
 1204 Unexpected Code RAM parity error  
 DS:BX = test address

**14 CODE RAM PARITY GENERATOR/CHECKER TEST**

1400 80186 hung, see program documentation for possible cause  
 1402 Low byte data write/verify miscompare with normal parity  
 BL = expected data, DS:BP = address of miscompare  
 1404 Low byte unexpected parity error  
 DS:BP = test address  
 1406 Low byte data write/verify miscompare with forced parity  
 BL = expected data, DS:BP = address of miscompare  
 1408 Low byte forced parity error not detected  
 DS:BP = test address  
 1412 High byte data write/verify miscompare with normal parity  
 BH = expected data, DS:BP = address of miscompare  
 1414 High byte unexpected parity error  
 DS:BP = test address  
 1416 High byte data write/verify miscompare with forced parity  
 BH = expected data, DS:BP = address of miscompare  
 1418 High byte forced parity error not detected  
 DS:BP = test address

**16 CODE RAM BYTE BANK DECODE ADDRESS LINE TEST**

1600 80186 hung, see program documentation for possible cause  
 1602 Data write/verify miscompare current bank address  
 BH = expected data, DS:BP = address of miscompare  
 1604 Unexpected parity error current bank address  
 DS:BP = bank address  
 1606 Data write/verify miscompare test bank address  
 BH = expected data, DS:BP = address of miscompare  
 1608 Unexpected parity error test bank address  
 DS:BP = test address

**18 DATA RAM BYTE DECODE TEST**

1800 80186 hung, see program documentation for possible cause  
 1802 Data write/verify miscompare current bank address  
 BH = expected data, DS:BP = address of miscompare  
 1804 Unexpected Code RAM parity error current bank address  
 DS:BP = bank address

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE**

**18 DATA RAM BYTE DECODE TEST (CON'T)**

- 1806 Data write/verify miscompare test bank address  
BH = expected data, DS:BP = address of miscompare
- 1808 Unexpected Code RAM parity error test bank address  
DS:BP = test address

**1A CODE RAM ADDRESS LINE TEST**

- 1A00 80186 hung, see program documentation for possible cause
- 1A02 Data write/verify miscompare current offset address  
BP = expected data, DS:BX = address of miscompare
- 1A04 Unexpected parity error  
DS:BX = current address
- 1A06 Data write/verify miscompare test offset address  
BP = expected data, DS:BX = address of miscompare
- 1A08 Unexpected parity error  
DS:BX = test address
- 1A10 Data write/verify miscompare current segment address  
DS = expected data, DS:BX = address of miscompare
- 1A12 Unexpected parity error  
DS:BX = current address
- 1A14 Data write/verify miscompare test segment address  
DS = expected data, DS:BX = address of miscompare
- 1A16 Unexpected parity error  
DS:BX = test address

**1A DATA RAM ADDRESS LINE TEST**

- 1A00 80186 hung, see program documentation for possible cause
- 1A02 Data write/verify miscompare current address  
BP = expected data, DS:BX = address of miscompare
- 1A04 Unexpected parity error  
DS:BX = current address
- 1A06 Data write/verify miscompare test address  
BP = expected data, DS:BX = address of miscompare
- 1A08 Unexpected parity error  
DS:BX = test address

**1E CODE RAM DATA INTEGRITY TEST**

- 1E00 80186 hung, see program documentation for possible cause
- 1E02 Data exchange miscompare pattern #1  
BX = expected data, CX = received data  
DS:SI = address of miscompare

---

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**


---

**1E CODE RAM DATA INTEGRITY TEST (CON'T)**

1E04 Unexpected parity error pattern #1  
DS:SI = test address

1E06 Data exchange miscompare pattern #2  
BX = expected data, CX = received data  
DS:SI = address of miscompare

1E08 Data verify miscompare pattern #3  
BX = expected data, CX = received data  
DS:SI = address of miscompare

1E0A Unexpected parity error pattern #3  
DS:SI = test address

## Data patterns used:

#1 AA55H (even parity)  
#2 55AAH (even parity)  
#3 2A54H (odd parity)

**20 DATA RAM DATA INTEGRITY TEST**

2000 80186 hung, see program documentation for possible cause

2002 Data exchange miscompare patterns #1-5  
CS:BX = expected data, CX = received data  
DS:SI = address of miscompare

2004 Data verify miscompare pattern #6  
CS:BX = expected data, CX = received data  
DS:SI = address of miscompare

## Data patterns used:

#1 0FF0H  
#2 F00FH  
#3 33CCH  
#4 CC33H  
#5 55AAH  
#6 AA55H

**22 CODE RAM REFRESH TEST**

2200 80186 hung, see program documentation for possible cause

2202 Data verify miscompare  
Code RAM integrity pattern #3 = expected data  
CX = received data, DS:SI = address of miscompare

2204 Unexpected parity error  
DS:SI = test address

---

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**


---

**24 CODE RAM ODD WORD/BYTE MOVE TEST**

2400 80186 hung, see program documentation for possible cause  
 2402 Odd address word data write/verify miscompare pattern #1  
 Pattern #1 = expected data, DS:SI = address of miscompare  
 2404 Odd address word string move/verify miscompare pattern #1  
 Pattern #1 = expected data, ES:DI = address of miscompare  
 2406 Odd address byte data write/verify miscompare pattern #2  
 Pattern #2 = expected data, DS:SI = address of miscompare  
 2408 Odd address byte string move/verify miscompare pattern #2  
 Pattern #2 = expected data, ES:SI = address of miscompare  
 240A Even address byte data write/verify miscompare pattern #3  
 Pattern #3 = expected data, DS:SI = address of miscompare  
 240C Even address byte string move/verify miscompare pattern #3  
 Pattern #3 = expected data, ES:DI = address of miscompare

## Data Patterns Used:

#1 AA55H  
 #2 AAH  
 #3 55H

**26 DATA RAM ODD WORD/BYTE MOVE TEST**

2600 80186 hung, see program documentation for possible cause  
 2602 Odd address word data write/verify miscompare pattern #1  
 Pattern #1 = expected data, DS:SI = address of miscompare  
 2604 Odd address word string move/verify miscompare pattern #1  
 Pattern #1 = expected data, ES:DI = address of miscompare  
 2606 Odd address byte data write/verify miscompare pattern #2  
 Pattern #2 = expected data, DS:SI = address of miscompare  
 2608 Odd address byte string move/verify miscompare pattern #2  
 Pattern #2 = expected data, ES:SI = address of miscompare  
 260A Even address byte data write/verify miscompare pattern #3  
 Pattern #3 = expected data, DS:SI = address of miscompare  
 260C Even address byte string move/verify miscompare pattern #3  
 Pattern #3 = expected data, ES:DI = address of miscompare

## Data Patterns Used:

#1 AA55H  
 #2 AAH  
 #3 55H

**28 CODE RAM PARITY ERROR INTERRUPT TEST**

2800 80186 hung, see program documentation for possible cause  
 2802 No forced parity error status detected by polling interrupt  
 controller  
 2804 No forced parity error interrupt detected

**TEST ERROR CODE TEST TITLE AND ERROR CODE DESCRIPTION**

**2A MEMORY TO MEMORY 80186 DMA TEST**

2A00	80186 hung, see program documentation for possible cause
2A10	No channel 0 terminal count status detected
2A12	No channel 0 interrupt status detected
2A14	Data verify miscompare after data RAM to code RAM transfer
2A20	No channel 1 terminal count status detected
2A22	No channel 1 interrupt status detected
2A24	Data verify miscompare after data RAM to code RAM transfer

**38 FLOPPY DISK SELF-TEST**

3800	80186 hung, see program documentation for possible cause
39xx	Device reset function error
3Axx	Device identify function error
3Bxx	Multi-block read function error

Where xx = Specific Operation Status

02	Floppy Disk Controller (FDC) status error after drive select
04	Device not ready
06	FDC Command phase sequence error
08	No completion interrupt detected
0A	No result phase
0C	FDC result phase sequence error
82	No device present
84	FDC chip operational failure after reset
86	Invalid unit number requested
88	Device/parameter calculations error

**3E EXPECTED INTERRUPT HANDLER**

3Exx	Unexpected interrupt, xx = Intel interrupt type service
3EFF	Unexpected interrupt, type unknown

**TEST ERROR CODE TEST TITLE AND ERROR CODE DESCRIPTION**

**40 BOOTSTRAP FILE LOADER**

4000	80186 hung, see program documentation for possible cause
40x0	Non-VS labeled volume
40x1	Bootstrap device media error (ID, CRC, ECC)
40x2	Bootstrap device hardware error (controller or drive)
40x4	Bootstrap device not ready
40x8	Parameter error/BP failure
40xA	Invalid pointer in volume label (non-bootstrap volume)
40xC	Bootstrap file checksum error
40xE	Bootstrap device address computation error

Where x = device/operation  
 2 Volume label read from floppy  
 3 Bootstrap file read from floppy  
 A Volume label read from SCSI  
 B Bootstrap file read from SCSI

**50 SCSI DISK SELF TEST**

5000	80186 hung, see program documentation for possible cause
51xx	Device reset function error
52xx	Device identify function error
53xx	Multi-block read function error

Where xx = Specific Operation Status  
 01 - 6F Vendor defined, See vendor SCSI controller specifications  
 72 Device not ready  
 73 Media error (ID, ECC)  
 74 Hardware error (controller or drive)  
 75 Illegal request or parameter  
 76 Unit attention (controller reset or disk changed)  
 7B Command aborted by controller  
 80 Request device not present  
 82 SCSI Protocol Controller (SPC) self-diagnostic error  
 84 Parameter/calculation error  
 C2 Operation completion timeout  
 C4 Device select timeout  
 C6 Unexpected controller disconnect during transfer  
 C8 Invalid interrupt type during SCSI bus transaction  
 D0 SCSI bus data out phase error  
 D2 SCSI bus data in phase error  
 D4 SCSI bus command phase error  
 D6 SCSI bus status phase error  
 D8 SCSI bus message out phase error  
 DA SCSI bus message in phase error  
 DC Request sense operation failure (unable to retrieve status)  
 F0 Unknown/undecipherable SCSI error occurred

**6.3 BP MICROCODE ERROR CODES AND DESCRIPTION**

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
<b>BP OS GENERATED ERROR CODES</b>	
0002	Divide exception
0003	Invalid task reference
0004	Invalid semaphore use
0005	Invalid priority
0006	No more memory
0007	Unexpected error
0008	Invalid sender
0009	Wild branch
<b>SCSI ERROR CODES</b>	
0030	Invalid Command The CMD type is not a SIO, CIO or HIO The CMD byte in the Iocw is not valid Iosw = 2080 0000 *RCnt 0100
0031	Invalid Count The byte count in the Iocw is not 2K alined (SIO CMDs) The byte count in the Iocw is not 400H (CIO, LDDRT CMD) Iosw = 2080 0400 *RCnt: 0200
0032	Invalid Address The MM address in the Iocw or IAL is not 2K alined Iosw = 20A0 0000 *RCnt 0300
0033	Invalid Device Address The device (disk) adr in the Iocw is not 2K alined Iosw = 2080 0800 *RCnt 0400
0034**	Data Compare Error During a write verify operation, the data read back did not equal the data written Iosw = 2018 0010 *RCnt 0600
0035	Parity Error A parity error occurred during a MM/DRAM DMA Iosw = 2058 0000 *RCnt 0800

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
------------	---------------------------------------

**SCSI ERROR CODES (CON'T)**

0036	<p>Addressing Error                      A addressing error occurred during a MM/DRAM DMA                      Iosw = 2038 0000 *RCnt 0900</p>
0037	<p>DMA Timeout                      A timeout occurred during a MM/DRAM DMA                      Iosw = 2018 0000 *RCnt 0A00</p>
0038	<p>Hardware Error                      The 5386 SPC failed it's powerup self test                      The switches on the BP indicate the type of target @ ID #6, ID #5, or ID #4 are set incorrectly                      Iosw = 2010 0000 *RCnt 0000</p>
0039	<p>Invalid State Error                      An invalid/unexpected state occurred during task execution                      Iosw = 2010 0000 *RCnt 0500</p>
003A**	<p>Check Error                      The CMD issued to the target was completed by the target with a check condition. ReqSenBuf contains information describing reason for check condition. 1st byte of ReqSenBuf (error code) is returned in the Iosw                      Iosw = 2018 0004 *RCnt 07xx                          xx = error code returned by target                      See either WD1003 or Adaptec 5500 user manuals for definitions of returned error codes and possible causes</p>
003B	<p>Disconnect Error                      The target disconnected from the SCSI bus without the first sending a CMD complete or disconnect MSG                      Iosw = 2018 0000 *RCnt 0B00</p>
003C	<p>Select Timeout                      The initiator (BP) was unable to select the target after 4 attempts.                      Iosw = 2010 0200 *RCnt 0C00</p>
003D	<p>Reselect Timeout                      The target did not reselect the initiator (BP) within 10 seconds to continue the I/O that was previously started                      Iosw = 2018 0020 *RCnt 0D00</p>
003E	<p>Not Used</p>



**ERROR CODE            TEST TITLE AND ERROR CODE DESCRIPTION**

**SCSI ERROR CODES (CON'T)**

003F            ISR Error  
 An invalid/unexpected state occurred during the execution of the ISR which handles phase management for the 5385 SPC. No explicit Iosw is generated in response to this error. The occurrence of this error indicates a problem exists communicating over the SCSI bus or the target controller is defective

\*    RCNT = Resident data count which is always set equal to the data count in the Iocw for all errors except data compare errors. For these error codes, the count reflects the number of bad bytes remaining to be transferred when the error occurred.

\*\* These error codes sre not displayed on the front panel LEDs because they occur during normal system operation, and do not indicate a major failure within the system.

**25V36 (DE) GENERATED ERROR CODES**

ERROR CODE	ERROR NAME	ROUTINES ERROR CAN BE GENERATED FROM	ERROR CODE DESCRIPTION
0040			Undefined Error
0041	DaProto	MainProc DpCmd, PlWrite, PIosw2	The DA has made a request of the BP that is not valid under the current context
0042	DaNotRun	PrSIO, PRCIO, AcquireDeCom AcquireDeDMA	The DA is not considered to be running by the BP and therefore the receive Iocw can not be processed
0043	DlpReqTO		The transfer of the request from the DA to the BP failed to complete
0044	DlpCmdTO	InitLdCode, RstCmd, PerBPDa, WaitBpMsgReg	The transfer of the Iocw from the BP to the DA failed to complete

## 25V36 (DE) GENERATED ERROR CODES (CON'T)

ERROR CODE	ERROR NAME	ROUTINES ERROR CAN BE GENERATED FROM	ERROR CODE DESCRIPTION
0045	DlpRespTO	RecCmd, RstCmd, PerMmDa WaitIplCmd AquireDeDMA	There was no response (request) from DA to begin processing the outstanding Iocw
0046	InvDlpAA	Val	The DA has specified a invalid address in the requested transfer
0047	Wrap	Val	The DA has requested a transfer which exceeds the top of its memory
0048	ReqOvr	Val	The DA has requested the transfer of more data than specified in the Iocw
0049	Reset TO	ResetDa PerBpDa	The DA has not gone ready after being reset within the given amount of time
004A	BPPAR	PerBpDa	A parity error has occurred on a BP/DA interface
004B	Mmadr	GetIal, MmToBp, VsIal, PerMnDa	An addressing error has occurred on a transfer involving main memory
004C	MmPar	GetIal, MmToBp, PerMnDafer	An parity error has occurred on a trans- involving main memory
004D	InvCmd	MainProc, PrSIO, GetIal, LdCode, RdCC RstCmd	The Iocw received is invalid
004E	InvDrt	LdDrt	The Drt received is invalid
004F	DaPar	PerMmDa	A parity error has occurred on the DA during a transfer between MM and the DA

TROUBLESHOOTING

25V76-1 AND 27V76-2 (TC) GENERATED ERROR CODES

ERROR CODE	ERROR NAME	ROUTINES ERROR CAN BE GENERATED FROM	ERROR CODE DESCRIPTION
0060	NoDct	PrSIO, LoadCode	No DCT has been loaded prior to receiving a SIO or LoadCode. A load DCT CIO must be the 1st Iocw sent to the DA after powerup
0061	NotRun	PrSIO, PrCio	A Iocw was received that requires the DA to be running to process it, but the DA is not running
0062	InvMM Addr	PrSIO, GetIal, LoadCode, ReadCode VsDaIal	The MM address to be used in the next MM-DA is not 32-bit (VS word) aligned, or entries in the IAL are not 2K aligned
0063	MemPar Err	GetIal, GetDct	The hardware has detected a parity error on the last DMA
0064	MemAddr Err	GetIal, GetDct	The hardware has detected an addressing error on the last DMA
0065	IncCmd	PrCio, ReadCode	The Iocw received is not supported, or is not valid in the current program
0066	Quit	PUDaMsg, PrHio, PrIocw, Plosw2	A Quit request has been received from the DA indicating the DA is no longer running and must be reloaded/restarted
0067	SendCmd	PrHio, PrIocw, Restart, SendGrant	The DMA of the CMD from the BP to the DA failed. (DMA timeout, hardware detected parity or addressing error)
0068	InvReq	PUDaMsg, PrIocw, Plosw2, Restart	The DA request is not valid in the current program text.
0069	WrtNot Allowed	ValReq	The Iocw specified a DMA transfer out of main memory while the DA requested a transfer into main memory
006A	InvDa RamAddr	ValReq	The DA RAM address in the DA request is invalid
006B	Wrap Around	ValReq	The DA RAM address plus the data count exceeds the top of the DA's RAM
006C	ReqOver	ValReq	The DA is requesting the transfer of more data than specified in the Iocw

25V76-1 AND 27V76-2 (TC) GENERATED ERROR CODES

ERROR CODE	ERROR NAME	ROUTINES ERROR CAN BE GENERATED FROM	ERROR CODE DESCRIPTION
006D	SendData	LoadCode, ReadCode, PerMmDa	The DMA of data between the DA and main memory failed. (DMA timeout, hardware detecting parity or address error)
006E	ReqTOut	PrIocw, Plosw2, Restart, PrHio	The DA has not made a request to execute the previously issued CMD within a reasonable amount of time
006F	IsrError	TCDAReqIsr, TCDADMAComIsr	The DA has indicated via its status register that a hardware failure has occurred on the DA

25V37, 25V67 (ISIO, UISIO) GENERATED ERROR CODES (CONTROL MODE)

ERROR CODE	ERROR CODE DESCRIPTION
0070	Undefined Error
0071	BP Parity Error
0072	Unknown Command received from device
0073	WS Code failed to be loaded
0074	DA Code failed to be loaded
0075	DA Response Command time out
0076	Protocol Error
0077	Main Memory ECC Error
0078	Main Memory Address Error

TROUBLESHOOTING

25V37, 25V67 (ISIO, UISIO) LED ERROR CODES (NON-CONTROL MODE)

ERROR CODE	ERROR NAME	ERROR LOC.	ROUTINES CAN BE GENERATED FROM	ERROR CODE DESCRIPTION
0080	Undefined			Undefined Error
0081	InReq	0401 0621 0B21 0E11 1111 1711	PUDaMSG PrHio PrIocw PWrite PIosw2 RstCmd	A request was received from the DA which is invalid under the current program
0082	NotRun	0501 0711 1811	PrSIO PrCio LdDrt	An Iocw was received that requires DA to be running to complete processing but the DA is not running
0082	Quit	0401 0611 0B11 1101	PUDaMsg PrHio PrIocw PrIosw2	A Quit request was received by the task from the DA. Outstanding I/O is error completed and ITMsgs are sent to all other tasks on the same DA notifying them to error complete any outstanding I/O they may have
0082	CleanUp	0641 0B31 1131	PrHio PrIocw PIosw2	Notifies task it's DA is not running and to error complete outstanding I/O
0083	BPDaDMA	0601 0B01 1301 1511 1701 1A01	PrHio PrIocw PWaddr LdCode RstCmd SendDaGr	The DMA of CMD/data from the BP to the DA timed out or a parity error was detected during the transfer
0084	MmDaDMA	1E01 1E11	PerMmDa PerMmDa	The DMA of data between Main memory and the DA timed out, or a parity error occurred during the transfer
0085	ReqTOut	0631 1121 1721	PrHio PIosw2 RstCmd	A CMD was issued to the DA and DA did not respond with the appropriate request within the given amount of time
0086	Not Used			
0087	Not Used			

## TROUBLESHOOTING

### 25V37, 25V67 (ISIO, UISIO) LED ERROR CODES (CON'T)

ERROR CODE	ERROR NAME	ERROR LOC.	ROUTINES CAN BE GENERATED FROM	ERROR CODE DESCRIPTION
0088	ReqOver	0E11	PWrite	The length of the transfer requested by the DA extended past the starting Main Memory Address plus the count specified in the Iocw
0089	ResetOut	1601	ResetDa	After the DA hardware was reset via an out issued by the BP, the hardware ready status bit was not set by hardware within the given amount of time.
008A	Not Used			
008B	MmAddr Err	0821 1B11 1D01	GetIal MmBpDMA VsDaIal	The Source/destination address alignment for the requested DMA transfer is invalid, or an IAL entry is invalid
008C	MmPar Err	0811 1B01	GetIal MmBpDMA	A parity error was detected on the the DMA transfer to/from Main Memory
008D	InvCmd	0701 1501	PrCio Ld Code	The CMD specified in the Iocw is not supported, or a parameter within the Iocw is out of range
008E	InvDrt	1801	LdDrt	The Drt length specified in the Iocw is not 1024

### 25V27 (DSIO) GENERATED ERROR CODES

0091                      More than 2 tape devices attached on a DSIO (only the last 2 will operate in extended MSEM mode)

### CRASH TASK GENERATED ERROR CODES

0093                      A BP task has crashed

### FLOPPY TASK GENERATED ERROR CODES

0095                      The floppy disk controller chip could not be reset

BP SYSTEM ERROR CODES

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**ERROR CODE DESCRIPTION**  
**CODE**

---

00E0	Unable to load code to workstation 0. (Power the workstation off and on to attempt to clear the condition)
00E1	Main Memory parity error occurred during a CODE RAM DAM.
00E2	Main Memory DMA attempted to access a non-existent address.
00E3	BP DATA RAM parity error has occurred.
00E4	PDA of IPL disk (passed from diagnostics) not found in PDA table.
00E5	A Pascal exception of unknown origin has occurred.
00E6	An invalid device adapter type value has been detected.
00E7	DMA operation between DATA RAM and Main Memory timed out.
00E8	The CP set an illegal command out area code.
00E9	Repeated DMA attempts for the command out area failed. BP initiates entry into control mode.
00EA	Repeated DMA attempts for the processor interrupt area failed. BP initiates entry into control mode.
00EB	A SIO/CIO raced with an EC or NC Iosw (possible OS failure). BP initiates entry into control mode.
00EC	An IRQ/DAR raced with an EC or NC Iosw (possible OS failure). BP initiates entry into control mode.
00ED	Main Memory error correction count exceeds its limit (i.e. 1). BP initiates entry into control mode.
00EE	File not found (Control Mode).
00EF	Library not found (Control Mode).
00F0	Device not found (Control Mode).
00F1	File not open (Control Mode).
00F2	VTOC Error (Control Mode).
00F3	End of file (Control Mode).

## BP SYSTEM ERROR CODES (CON'T)

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**ERROR CODE DESCRIPTION**  
**CODE**

---

00F4	IPL device returned damage status (Control Mode).
00F5	IPL device was not-ready - intervention required (Control Mode).
00F6	BP memory or disk address error while accessing IPL device (Control Mode).
00F7	File error in getting control mode pointers.



**6.4 VS-5/6 MONITOR ERROR CODES**

The following error codes are generated by the Diagnostic Monitor files '@MCBOOT@' and '@MCIPL@' in '@SYSTEM@; '@NORMAL@' and '@MONISIO@' in '@DIAST@', and '@MONITOR', '@MONISIO', and '@MONWSO@' in '@DIAGMN@'.

---

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**

---

**41 BOOTSTRAP LOADER (@MCBOOT@)**

4110	Unlabeled Volume (VOL1 Missing)	
4111	Media Error	Volume Label
4112	Controller Hardware Error	Volume Label
4114	Drive Not Ready	Volume Label
4116	Program Error (Divide)	Volume Label
4118	Program Error (Data)	Volume Label
4119	Media Error	Bit Map
411A	Controller Hardware Error	Bit Map
411C	Drive Not Ready	Bit Map
411E	Program Error (Divide)	Bit Map
4120	Program Error (Data)	Bit Map
4121	Media Error	VTOC
4122	Controller Hardware Error	VTOC
4124	Drive Not Ready	VTOC
4126	Program Error (Divide)	VTOC
4128	Program Error (Data)	VTOC
412A	FDX1 ID Does Not Match	VTOC
412B	FDX2 ID Does Not Match	VTOC
412C	FDR1 ID Does Not Match	VTOC

**SELF TEST MONITOR = @NORMAL@ in @DIAGST@**

4131	Media Error	Self Test Monitor
4132	Controller Hardware Error	Self Test Monitor
4133	Checksum Does Not Match	Self Test Monitor
4134	Drive Not Ready	Self Test Monitor
4136	Program Error (Divide)	Self Test Monitor
4138	Program Error (Data)	Self Test Monitor
413A	Library Not Found	Self Test Monitor
413B	File Not Found	Self Test Monitor
413C	FDR1 Not Found	Self Test Monitor
413E	Extends Greater Than 3	Self Test Monitor

**DIAGNOSTIC MONITOR = @MONITOR in @DIAGMN@**

4141	Media Error	Diagnostic Monitor
4142	Controller Hardware Error	Diagnostic Monitor
4143	Checksum Does Not Match	Diagnostic Monitor
4144	Drive Not Ready	Diagnostic Monitor
4146	Program Error (Divide)	Diagnostic Monitor

**TEST ERROR CODE TEST TITLE AND ERROR CODE DESCRIPTION**

**DIAGNOSTIC MONITOR = @MONITOR IN @DIAGMN@ (CON'T)**

4148	Program Error (Data)	Diagnostic Monitor
414A	Library Not Found	Diagnostic Monitor
414B	File Not Found	Diagnostic Monitor
414C	FDR1 Not Found	Diagnostic Monitor
414E	Extends Greater Than 3	Diagnostic Monitor

**SYSTEM LOADER = @MCIPL@ IN @SYSTEM@**

4151	Media Error	System Loader
4152	Controller Hardware Error	System Loader
4153	Checksum Does Not Match	System Loader
4154	Drive Not Ready	System Loader
4156	Program Error (Divide)	System Loader
4158	Program Error (Data)	System Loader
415A	Library Not Found	System Loader
415B	File Not Found	System Loader
415C	FDR1 Not Found	System Loader
413E	Extends Greater Than 3	System Loader

41F3	Invalid Hardware Configuration
41F4	Floppy Status Error
41FD	BP RAM Parity Error
41FE	BP RAM Parity Error
41FF	Unknown Interrupt on BP

**42 SELF TEST MONITOR (@NORMAL@ IN @DIAGST@)**

420F	Incompatible Version of Self-Test Code	
4210	Unlabeled Volume (VOL1 Missing)	
4211	Media Error	Volume Label
4212	Controller Hardware Error	Volume label
4214	Drive Not Ready	Volume label
4216	Program Error (Divide)	Volume label
4218	Program Error (Data)	Volume label
4219	Media Error	Bit Map
421A	Controller Hardware Error	Bit Map
421C	Drive Not Ready	Bit Map
421E	Program Error (Divide)	Bit Map
4220	Program Error (Data)	Bit Map
4221	Media Error	VTOC
4222	Controller Hardware Error	VTOC
4224	Drive Not Ready	VTOC
4226	Program Error (Divide)	VTOC
4228	Program Error (Data)	VTOC
422A	FDX1 ID Does Not Match	VTOC
422B	FDX2 ID Does Not Match	VTOC
422C	FDR1 ID Does Not Match	VTOC

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**

**WORKSTATION FILE = @MONISIO IN @DIAGST@ (SIO)**

4231	Media Error	Workstation File
4232	Controller Hardware Error	Workstation File
4233	Checksum Does Not Match	Workstation File
4234	Drive Not Ready	Workstation File
4236	Program Error (Divide)	Workstation File
4238	Program Error (Data)	Workstation File
423A	Library Not Found	Workstation File
423B	File Not Found	Workstation File
423C	FDR1 Not Found	Workstation File
423E	Extends Greater Than 3	Workstation File

**WORKSTATION FILE = @MONISIO IN @DIAGST@ ([U]SIO)**

4241	Media Error	Workstation File
4242	Controller Hardware Error	Workstation File
4243	Checksum Does Not Match	Workstation File
4244	Drive Not Ready	Workstation File
4246	Program Error (Divide)	Workstation File
4248	Program Error (Data)	Workstation File
424A	Library Not Found	Workstation File
424B	File Not Found	Workstation File
424C	FDR1 Not Found	Workstation File
424E	Extends Greater Than 3	Workstation File

**42 SELF TEST DIAGNOSTIC TEST 2 = @BT0500@ IN @DIAGST@**

4261	Media Error	Diagnostic Test 2
4262	Controller Hardware Error	Diagnostic Test 2
4263	Checksum Does Not Match	Diagnostic Test 2
4264	Drive Not Ready	Diagnostic Test 2
4266	Program Error (Divide)	Diagnostic Test 2
4268	Program Error (Data)	Diagnostic Test 2
426A	Library Not Found	Diagnostic Test 2
426B	File Not Found	Diagnostic Test 2
426C	FDR1 Not Found	Diagnostic Test 2
426E	Extends Greater Than 3	Diagnostic Test 2

**SELF TEST DIAGNOSTIC TEST 3 = @CT0500@ / @CT0100@ IN @DIAGST@**

4271	Media Error	Diagnostic Test 3
4272	Controller Hardware Error	Diagnostic Test 3
4273	Checksum Does Not Match	Diagnostic Test 3
4274	Drive Not Ready	Diagnostic Test 3
4276	Program Error (Divide)	Diagnostic Test 3
4278	Program Error (Data)	Diagnostic Test 3
427A	Library Not Found	Diagnostic Test 3
427B	File Not Found	Diagnostic Test 3
427C	FDR1 Not Found	Diagnostic Test 3
427E	Extends Greater Than 3	Diagnostic Test 3

**TEST ERROR CODE TEST TITLE AND ERROR CODE DESCRIPTION**

**SELF TEST DIAGNOSTIC TEST 4 = @CT0800@ / @CT0200@ IN @DIAGST@**

4281	Media Error	Diagnostic Test 4
4282	Controller Hardware Error	Diagnostic Test 4
4283	Checksum Does Not Match	Diagnostic Test 4
4284	Drive Not Ready	Diagnostic Test 4
4286	Program Error (Divide)	Diagnostic Test 4
4288	Program Error (Data)	Diagnostic Test 4
428A	Library Not Found	Diagnostic Test 4
428B	File Not Found	Diagnostic Test 4
428C	FDR1 Not Found	Diagnostic Test 4
428E	Extends Greater Than 3	Diagnostic Test 4

**SELF TEST DIAGNOSTIC TEST 5 = @CT0B00@ / @CT0300@ IN @DIAGST@**

4291	Media Error	Diagnostic Test 5
4292	Controller Hardware Error	Diagnostic Test 5
4293	Checksum Does Not Match	Diagnostic Test 5
4294	Drive Not Ready	Diagnostic Test 5
4296	Program Error (Divide)	Diagnostic Test 5
4298	Program Error (Data)	Diagnostic Test 5
429A	Library Not Found	Diagnostic Test 5
429B	File Not Found	Diagnostic Test 5
429C	FDR1 Not Found	Diagnostic Test 5
429E	Extends Greater Than 3	Diagnostic Test 5

**SELF TEST DIAGNOSTIC TEST 6 = @MT0500@ / @MT0100@ IN @DIAGST@**

42A1	Media Error	Diagnostic Test 6
42A2	Controller Hardware Error	Diagnostic Test 6
42A3	Checksum Does Not Match	Diagnostic Test 6
42A4	Drive Not Ready	Diagnostic Test 6
42A6	Program Error (Divide)	Diagnostic Test 6
42A8	Program Error (Data)	Diagnostic Test 6
42AA	Library Not Found	Diagnostic Test 6
42AB	File Not Found	Diagnostic Test 6
42AC	FDR1 Not Found	Diagnostic Test 6
42AE	Extends Greater Than 3	Diagnostic Test 6

**SELF TEST DIAGNOSTIC TEST 7 = @MT0800@ / @MT0900@ IN @DIAGST@**

42B1	Media Error	Diagnostic Test 7
42B2	Controller Hardware Error	Diagnostic Test 7
42B3	Checksum Does Not Match	Diagnostic Test 7
42B4	Drive Not Ready	Diagnostic Test 7
42B6	Program Error (Divide)	Diagnostic Test 7
42B8	Program Error (Data)	Diagnostic Test 7
42BA	Library Not Found	Diagnostic Test 7
42BB	File Not Found	Diagnostic Test 7
42BC	FDR1 Not Found	Diagnostic Test 7
42BE	Extends Greater Than 3	Diagnostic Test 7

**TEST ERROR CODE TEST TITLE AND ERROR CODE DESCRIPTION**

**SELF TEST DIAGNOSTIC TEST 8 = @MT0200@ IN @DIAGST@**

42C1	Media Error	Diagnostic Test 8
42C2	Controller Hardware Error	Diagnostic Test 8
42C3	Checksum Does Not Match	Diagnostic Test 8
42C4	Drive Not Ready	Diagnostic Test 8
42C6	Program Error (Divide)	Diagnostic Test 8
42C8	Program Error (Data)	Diagnostic Test 8
42CA	Library Not Found	Diagnostic Test 8
42CB	File Not Found	Diagnostic Test 8
42CC	FDR1 Not Found	Diagnostic Test 8
42CE	Extends Greater Than 3	Diagnostic Test 8
42E0	SIO Time Out	
42E1	SIO Overrun	
42E2	SIO Data RAM Parity Error	
42E3	SIO Serial Parity Error	
42E4	(U)ISIO Time Out	
42E5	(U)ISIO Memory Parity	
42E6	(U)ISIO Data RAM Parity Error	
42E7	(U)ISIO Power Up Failed	
42E8	(U)ISIO Data Link Time Out	
42E9	(U)ISIO FIFO Parity	
42EA	Workstation Powered Off	
42EB	Workstation Coaxial Parity Error	
42EC	Workstation Memory parity Error	
42ED	Workstation Has No Code	
42EE	Workstation Status Invalid	
42F2	CPU Failure	
42F3	Invalid Hardware Configuration	
42F4	Floppy Status Error	
42F5	No Terminal ID Byte Found	

**43 SELF TEST DIAGNOSTIC TEST 1.1 = @ST0500@ IN @DIAGST@**

4351	Media Error	Diagnostic Test 1.1 (SIO)
4352	Controller Hardware Error	Diagnostic Test 1.1 (SIO)
4353	Checksum Does Not Match	Diagnostic Test 1.1 (SIO)
4354	Drive Not Ready	Diagnostic Test 1.1 (SIO)
4356	Program Error (Divide)	Diagnostic Test 1.1 (SIO)
4358	Program Error (Data)	Diagnostic Test 1.1 (SIO)
435A	Library Not Found	Diagnostic Test 1.1 (SIO)
435B	File Not Found	Diagnostic Test 1.1 (SIO)
435C	FDR1 Not Found	Diagnostic Test 1.1 (SIO)
435E	Extends Greater Than 3	Diagnostic Test 1.1 (SIO)

**TEST ERROR CODE TEST TITLE AND ERROR CODE DESCRIPTION**

**43 SELF TEST DIAGNOSTIC TEST 1.2 = @ST0800@ IN @DIAGST@**

4361	Media Error	Diagnostic Test 1.2 (ISIO)
4362	Controller Hardware Error	Diagnostic Test 1.2 (ISIO)
4363	Checksum Does Not Match	Diagnostic Test 1.2 (ISIO)
4364	Drive Not Ready	Diagnostic Test 1.2 (ISIO)
4366	Program Error (Divide)	Diagnostic Test 1.2 (ISIO)
4368	Program Error (Data)	Diagnostic Test 1.2 (ISIO)
436A	Library Not Found	Diagnostic Test 1.2 (ISIO)
436B	File Not Found	Diagnostic Test 1.2 (ISIO)
436C	FDR1 Not Found	Diagnostic Test 1.2 (ISIO)
436E	Extends Greater Than 3	Diagnostic Test 1.2 (ISIO)

**SELF TEST OVERLAY 4 = @CM0800@ / @CM0200@ IN @DIAGST@**

4381	Media Error	Overlay 4
4382	Controller Hardware Error	Overlay 4
4383	Checksum Does Not Match	Overlay 4
4384	Drive Not Ready	Overlay 4
4386	Program Error (Divide)	Overlay 4
4388	Program Error (Data)	Overlay 4
438A	Library Not Found	Overlay 4
438B	File Not Found	Overlay 4
438C	FDR1 Not Found	Overlay 4
438E	Extends Greater Than 3	Overlay 4

**SELF TEST OVERLAY 5 = @CM0B00@ / @CM0300@ IN @DIAGST@**

4391	Media Error	Overlay 5
4392	Controller Hardware Error	Overlay 5
4393	Checksum Does Not Match	Overlay 5
4394	Drive Not Ready	Overlay 5
4396	Program Error (Divide)	Overlay 5
4398	Program Error (Data)	Overlay 5
439A	Library Not Found	Overlay 5
439B	File Not Found	Overlay 5
439C	FDR1 Not Found	Overlay 5
439E	Extends Greater Than 3	Overlay 5

**SELF TEST OVERLAY 6 = @MM0500@ / @MM0100@ IN @DIAGST@**

43A1	Media Error	Overlay 6
43A2	Controller Hardware Error	Overlay 6
43A3	Checksum Does Not Match	Overlay 6
43A4	Drive Not Ready	Overlay 6
43A6	Program Error (Divide)	Overlay 6
43A8	Program Error (Data)	Overlay 6
43AA	Library Not Found	Overlay 6
43AB	File Not Found	Overlay 6
43AC	FDR1 Not Found	Overlay 6
43AE	Extends Greater Than 3	Overlay 6

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**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**


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**44 IPL SYSTEM LOADER (@MCIPL@ IN @SYSTEM@)**

440F	Incompatible Version of Self-Test Code	
4410	Unlabeled Volume (VOL1 Missing)	
4411	Media Error	Volume Label
4412	Controller Hardware Error	Volume label
4414	Drive Not Ready	Volume label
4416	Program Error (Divide)	Volume label
4418	Program Error (Data)	Volume label
4419	Media Error	Bit Map
441A	Controller Hardware Error	Bit Map
441C	Drive Not Ready	Bit Map
441E	Program Error (Divide)	Bit Map
4420	Program Error (Data)	Bit Map
4421	Media Error	VTOC
4422	Controller Hardware Error	VTOC
4424	Drive Not Ready	VTOC
4426	Program Error (Divide)	VTOC
4428	Program Error (Data)	VTOC
442A	FDX1 ID Does Not Match	VTOC
442B	FDX2 ID Does Not Match	VTOC
442C	FDR1 ID Does Not Match	VTOC
4431	Media Error	Workstation File
4432	Controller Hardware Error	Workstation File
4433	Checksum Does Not Match	Workstation File
4434	Drive Not Ready	Workstation File
4436	Program Error (Divide)	Workstation File
4438	Program Error (Data)	Workstation File
443A	Library Not Found	Workstation File
443B	File Not Found	Workstation File
443C	FDR1 Not Found	Workstation File
443E	Extends Greater Than 3	Workstation File

**SYSTEM FILE = @MCCP5@ / @MCCP7@ IN @SYSTEM@**

4461	Media Error	CP Microcode File
4462	Controller Hardware Error	CP Microcode File
4463	Checksum Does Not Match	CP Microcode File
4464	Drive Not Ready	CP Microcode File
4466	Program Error (Divide)	CP Microcode File
4468	Program Error (Data)	CP Microcode File
446A	Library Not Found	CP Microcode File
446B	File Not Found	CP Microcode File
446C	FDR1 Not Found	CP Microcode File
446E	Extends Greater Than 3	CP Microcode File

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**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**


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**SYSTEM FILE = @MCBP2@ IN @SYSTEM@**

44C1	Media Error	@MCBP2@ File
44C2	Controller Hardware Error	@MCBP2@ File
44C3	Checksum Does Not Match	@MCBP2@ File
44C4	Drive Not Ready	@MCBP2@ File
44C6	Program Error (Divide)	@MCBP2@ File
44C8	Program Error (Data)	@MCBP2@ File
44CA	Library Not Found	@MCBP2@ File
44CB	File Not Found	@MCBP2@ File
44CC	FDR1 Not Found	@MCBP2@ File
44CE	Extends Greater Than 3	@MCBP2@ File
44E0	SIO Time Out	
44E1	SIO Overrun	
44E2	SIO Data RAM Parity Error	
44E3	SIO Serial Parity Error	
44E4	(U)ISIO Time Out	
44E5	(U)ISIO Memory Parity	
44E6	(U)ISIO Data RAM Parity Error	
44E7	(U)ISIO Power Up Failed	
44E8	(U)ISIO Data Link Time Out	
44E9	(U)ISIO FIFO Parity	
44EA	Workstation Powered Off	
44EB	Workstation Coaxial Parity Error	
44EC	Workstation Memory parity Error	
44ED	Workstation Has No Code	
44EE	Workstation Status Invalid	
44F0	DMA Time Out	
44F1	DMA Failure	
44F2	CPU Failure	
44F3	Invalid Hardware Configuration	
44F4	Floppy Status Error	



**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE**

**45 DIAGNOSTIC MONITOR = @MONITOR IN @DIAGMN@**

4505	Monitor Message Buffer Overflow	
450F	Incompatible Version Of Diagnostic Code	
4510	Unlabeled Volume (VOL1 Missing)	
4511	Media Error	Volume Label
4512	Controller Hardware Error	Volume Label
4514	Drive Not Ready	Volume Label
4516	Program Error (Divide)	Volume Label
4518	Program Error (Data)	Volume Label
4519	Media Error	Bit Map
451A	Controller Hardware Error	Bit Map
451C	Drive Not Ready	Bit Map
451E	Program Error (Divide)	Bit Map
4520	Program Error (Data)	Bit Map
4521	Media Error	VTOC
4522	Controller Hardware Error	VTOC
4524	Drive Not Ready	VTOC
4526	Program Error (Divide)	VTOC
4528	Program Error (Data)	VTOC
452A	FDX1 ID Does Not Match	VTOC
452B	FDX2 ID Does Not Match	VTOC
452C	FDR1 ID Does Not Match	VTOC

**TEST TABLE FILE = @MONTBL@ in @DIAGMN@**

4531	Media Error	Test Table File
4532	Controller Hardware Error	Test Table File
4533	Checksum Does Not Match	Test Table File
4534	Drive Not Ready	Test Table File
4536	Program Error (Divide)	Test Table File
4538	Program Error (Data)	Test Table File
453A	Library Not Found	Test Table File
453B	File Not Found	Test Table File
453C	FDR1 Not Found	Test Table File
453E	Extends Greater Than 3	Test Table File

**WORKSTATION FILE = @MONWSO@ IN @DIAGMN@**

4541	Media Error	Workstation File
4542	Controller Hardware Error	Workstation File
4543	Checksum Does Not Match	Workstation File
4544	Drive Not Ready	Workstation File
4546	Program Error (Divide)	Workstation File
4548	Program Error (Data)	Workstation File
454A	Library Not Found	Workstation File
454B	File Not Found	Workstation File
454C	FDR1 Not Found	Workstation File
454E	Extends Greater Than 3	Workstation File

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**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**


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**ISIO FILE = @MONISIO@ IN @DIAGMN@**

4551	Media Error	ISIO File
4552	Controller Hardware Error	ISIO File
4553	Checksum Does Not Match	ISIO File
4554	Drive Not Ready	ISIO File
4556	Program Error (Divide)	ISIO File
4558	Program Error (Data)	ISIO File
455A	Library Not Found	ISIO File
455B	File Not Found	ISIO File
455C	FDR1 Not Found	ISIO File
455E	Extends Greater Than 3	ISIO File
45E0	SIO Time Out	
45E1	SIO Overrun	
45E2	SIO Data RAM Parity Error	
45E3	SIO Serial Parity Error	
45E4	(U)ISIO Time Out	
45E5	(U)ISIO Memory Parity	
45E6	(U)ISIO Data RAM Parity Error	
45E7	(U)ISIO Power Up Failed	
45E8	(U)ISIO Data Link Time Out	
45E9	(U)ISIO FIFO Parity	
45EA	Workstation Powered Off	
45EB	Workstation Coaxial Parity Error	
45EC	Workstation Memory parity Error	
45ED	Workstation Has No Code	
45EE	Workstation Status Invalid	
45F0	DMA Time Out	
45F1	DMA Failure	
45F2	CPU Failure	
45F3	Invalid Hardware Configuration	
45F4	Floppy Status Error	
45F5	No Terminal ID Byte Found	
45FA	Lost Data Set ready	
45FB	Transmit Data Error	
45FC	Receive Data Error	

**46 DIAGNOSTIC MONITOR TEST FILES**

46X1	Media Error	Test File X
46X2	Controller Hardware Error	Test File X
46X3	Checksum Does Not Match	Test File X
46X4	Drive Not Ready	Test File X
46X6	Program Error (Divide)	Test File X
46X8	Program Error (Data)	Test File X
46XA	Library Not Found	Test File X
46XB	File Not Found	Test File X
46XC	FDR1 Not Found	Test File X
46XE	Extends Greater Than 3	Test File X

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**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**

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**47 DIAGNOSTIC MONITOR TEST FILES**

47X1	Media Error	Test File X + 15
47X2	Controller Hardware Error	Test File X + 15
47X3	Checksum Does Not Match	Test File X + 15
47X4	Drive Not Ready	Test File X + 15
47X6	Program Error (Divide)	Test File X + 15
47X8	Program Error (Data)	Test File X + 15
47XA	Library Not Found	Test File X + 15
47XB	File Not Found	Test File X + 15
47XC	FDR1 Not Found	Test File X + 15
47XE	Extends Greater Than 3	Test File X + 15

**48 DIAGNOSTIC MONITOR OVERLAY FILES**

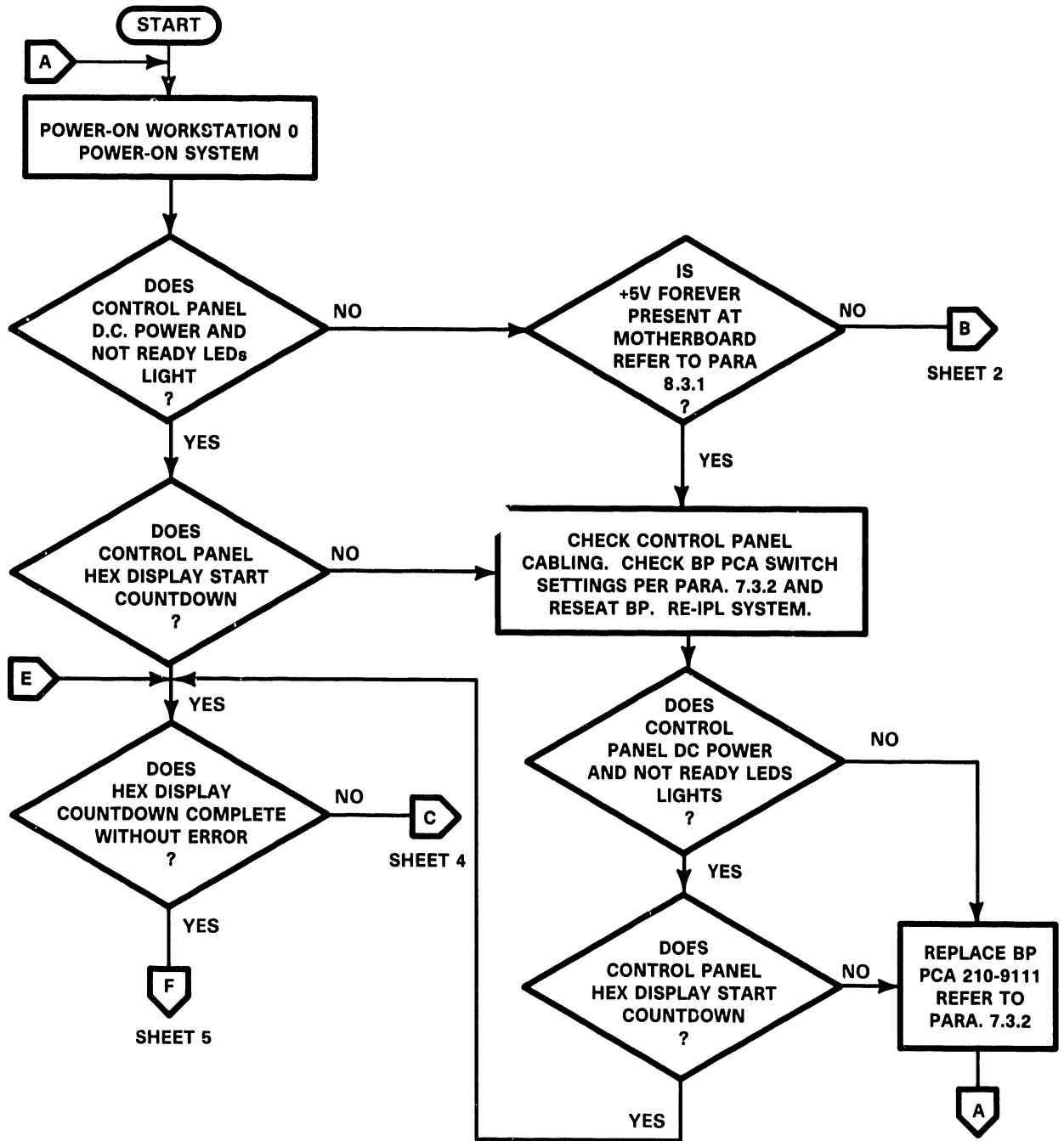
48X1	Media Error	Test File X
48X2	Controller Hardware Error	Test File X
48X3	Checksum Does Not Match	Test File X
48X4	Drive Not Ready	Test File X
48X6	Program Error (Divide)	Test File X
48X8	Program Error (Data)	Test File X
48XA	Library Not Found	Test File X
48XB	File Not Found	Test File X
48XC	FDR1 Not Found	Test File X
48XE	Extends Greater Than 3	Test File X

**49 DIAGNOSTIC MONITOR OVERLAY FILES**

49X1	Media Error	Test File X + 15
49X2	Controller Hardware Error	Test File X + 15
49X3	Checksum Does Not Match	Test File X + 15
49X4	Drive Not Ready	Test File X + 15
49X6	Program Error (Divide)	Test File X + 15
49X8	Program Error (Data)	Test File X + 15
49XA	Library Not Found	Test File X + 15
49XB	File Not Found	Test File X + 15
49XC	FDR1 Not Found	Test File X + 15
49XE	Extends Greater Than 3	Test File X + 15

6.5 VS-5/6 TROUBLESHOOTING FLOWCHARTS

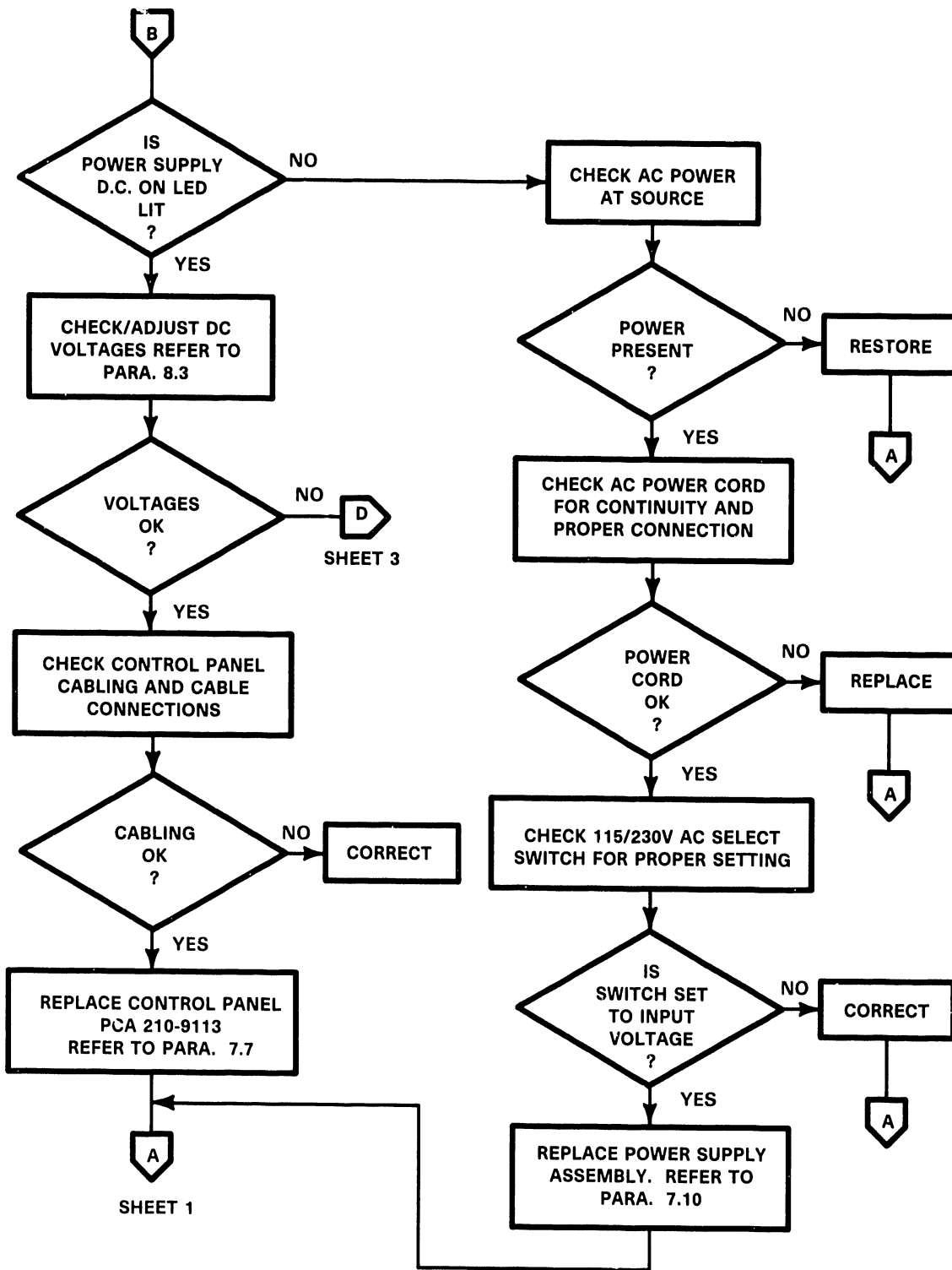
The VS-5/6 troubleshooting flowcharts are designed to aid in the systematic investigation, diagnosis, and repair of failures of the VS-5/6 mainframe. No procedure can list every potential problem or combination of problems that may occur. The flowcharts in this section are detailed to the Field Replaceable Unit (FRU) with references made to text sections to aid in subassembly corrective maintenance and repair.



B-03047-FY86-3

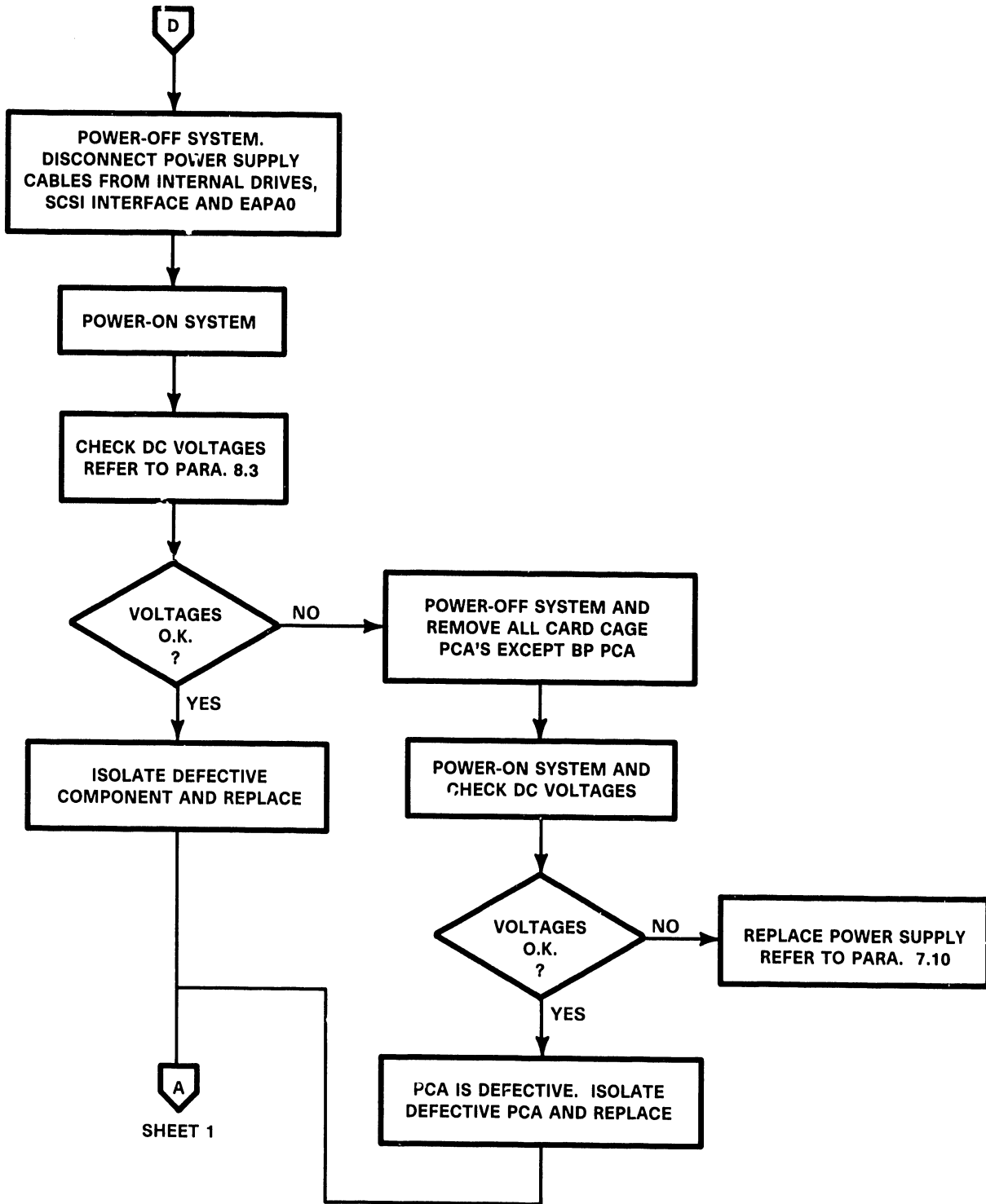
Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 1 of 6)

TROUBLESHOOTING



B-03047-FY86-6

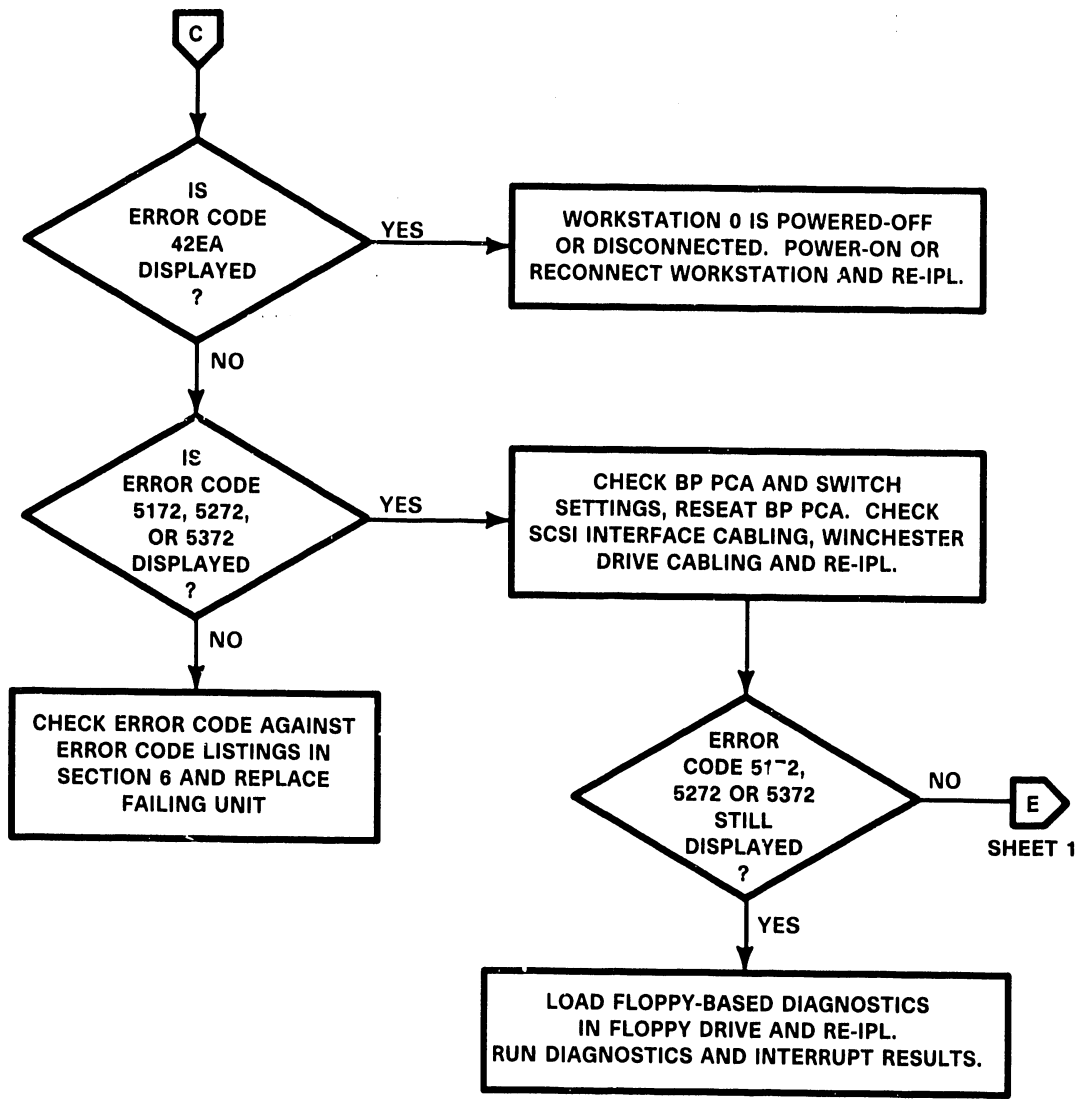
Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 2 of 6)



B-03047-FY86-4

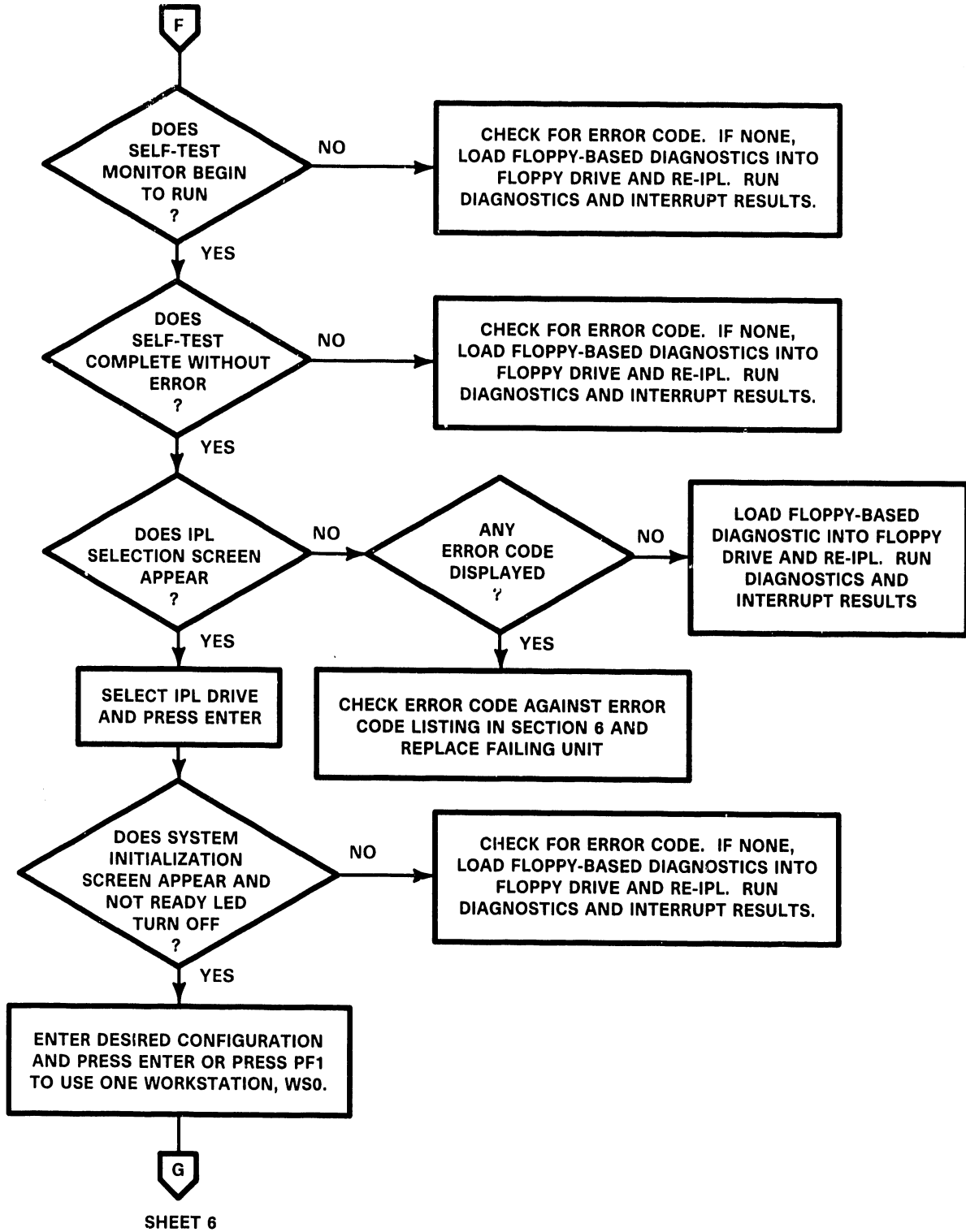
Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 3 of 6)

TROUBLESHOOTING



B-03047-FY86-1

Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 4 of 6)

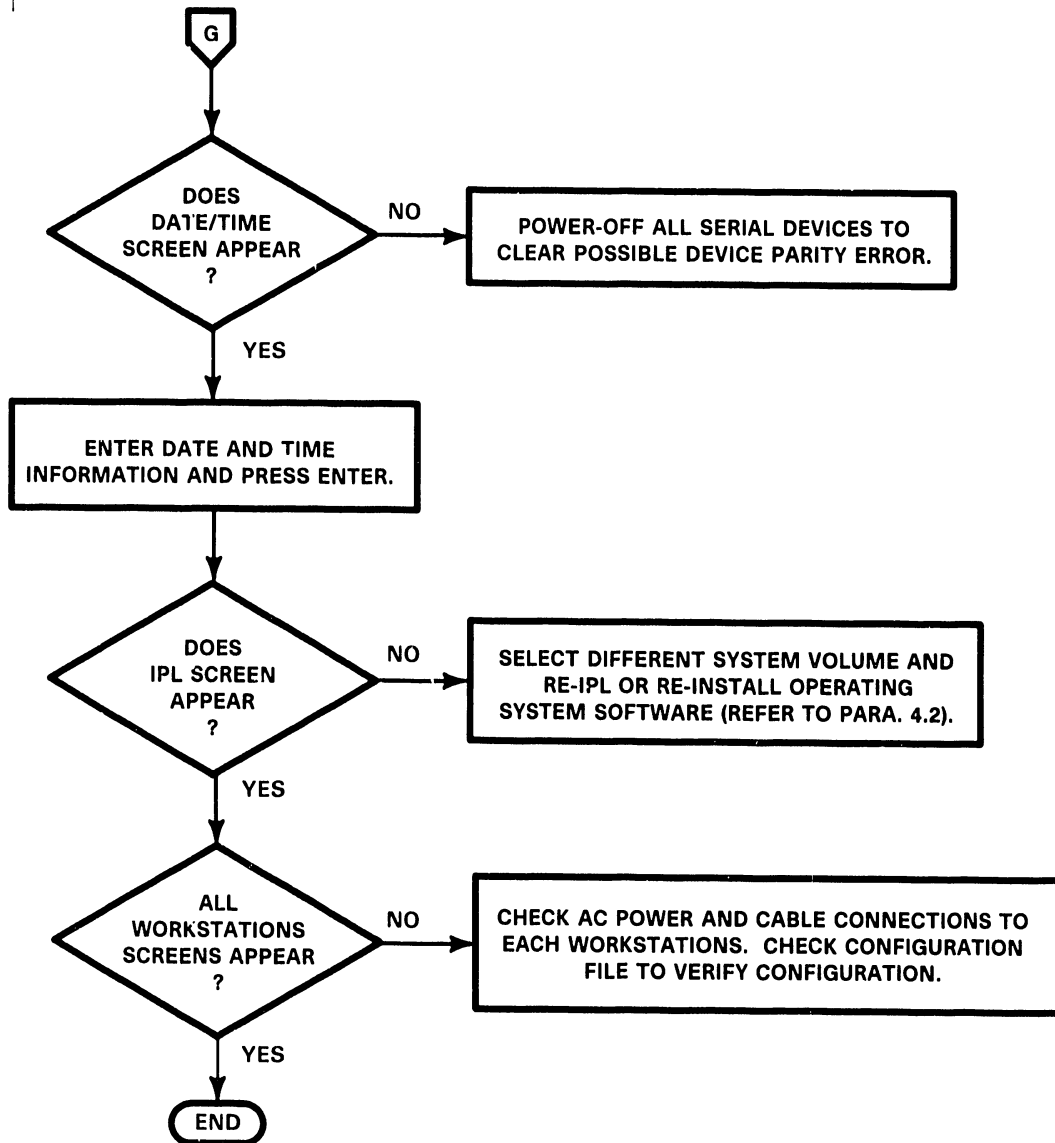


SHEET 6

B-03047-FY86-5

Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 5 of 6)





B-03047-FY86-2

Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 6 of 6)

## 6.6 VS-5/6 DIAGNOSTIC MONITOR

The VS-5/6 Diagnostic Monitor Control Package (WLI part number 195-4968-21) is designed for testing VS-5 and VS-6 hardware configurations. This package contains three diskettes and documentation required to run the diagnostics. The following diskettes are included in this package:

732-6000	DIAGA	5-1/4" Diskette CP5
732-6001	DIAGB	5-1/4" Diskette CP5/7
732-6002	DIAGA	5-1/4" Diskette CP7

### MINIMUM HARDWARE REQUIRED

The minimum hardware required consists of a VS-5 or VS-6 mainframe with one floppy drive. A workstation (16K memory or greater) is required to act as the Test Display Console (TDC). Operator interface occurs at the Test Display Console and the front panel LEDs.

#### 6.6.1 VS-5 TEST CONFIGURATIONS

VS-5 test configurations are as follows:

##### Test Configurations for any SMD/CMD/FMD or SCSI Disk

<u>No.</u>	<u>Test No.</u>	<u>Test Name</u>	<u>Burn-In</u>
1	CT1000	CP Control Memory Test	Yes
2	CT2000	BP/CP Communications Test	Yes
3	CT3000	BU Branch OpCode Test	Yes
4	CT4000	Status, Conditional Branch	Yes
5	CT5000	Subroutine Stack Data	Yes
6	CT6000	Subroutine Stack Addressing	Yes
7	CT7000	Register, Immediate Opcodes	Yes
8	CT8000	CPU Stack Diagnostic Test	Yes
9	CT9000	Logical and Shift Opcodes	Yes
10	CTA000	8-Bit and 16-Bit ALU Test	Yes
11	CTB000	MAR, TRAM, and RTC Test	Yes
12	CTC000	BD, IAD, CC and DSET Test	Yes
13	CTD000	BI Branch Opcode Test	Yes
14	MT1000	Main Memory Test	Yes
15	BT2000	BP/MM DMA Diag (CP5)	Yes
16	CX1000	CPU Tester (CP5)	No
17	BT3000	BP Floppy Disk Diag	No
18	RT2000	BP SCSI Subsystem Diag	No
19	ST1000	BP 928 Data Link Diag	No
20	BT1000	BP Async Port/RIPL Diag	No
21	DT1000	SMD Disk DA Diag	No
22	UT1000	Universal ISIO DA Diag	No
23	TT1000	TC DA Single Port Diag	No
24	TT2000	TC DA Two Port Diag	No
25	ST3000	8 Port RS232 DA Diag	No
26	BX0000	BP I/O engr Utility	No
27	BX2000	BP/MM DMA Engr Utility	No

Test Configuration for 5.25" Double Sided High Density Floppy Disks

'DIAGA'

<u>No.</u>	<u>Test No.</u>	<u>Test Name</u>	<u>Burn-In</u>
1	CT1000	CP Control Memory Test	Yes
2	CT2000	BP/CP Communications Test	Yes
3	CT3000	BU Branch Opcode Test	Yes
4	CT4000	Status, Conditional Branch	Yes
5	CT5000	Subroutine Stack Data	Yes
6	CT6000	Subroutine Stack Addressing	Yes
7	CT7000	Register, Immediate Opcodes	Yes
8	CT8000	CPU Stack Diagnostic Test	Yes
9	CT9000	Logical and Shift Opcodes	Yes
10	CTA000	8-Bit and 16-Bit ALU Test	Yes
11	CTB000	MAR, TRAM, and RTC Test	Yes
12	CTC000	BD, IAD, CC and DSET Test	Yes
13	CTD000	BI Branch Opcode Test	Yes
14	MT1000	Main Memory Test	Yes
15	BT2000	BP/MM DMA Diag (CP5)	Yes
16	CX10C0	CPU Tester (CP5)	No

'DIAGB'

<u>No.</u>	<u>Test No.</u>	<u>Test Name</u>	<u>Burn-In</u>
1	BT3000	BP Floppy Disk Diag	No
2	RT2000	BP SCSI Subsystem Diag	No
3	ST1000	BP 928 Data Link Diag	No
4	BT1000	BP Async Port/RIPL Diag	No
5	DT1000	SMD Disk DA Diag	No
6	UT1000	Universal ISIO DA Diag	No
7	TT1000	TC DA Single Port Diag	No
8	TT2000	TC DA Two Fort Diag	No
9	ST3000	8 Port RS232 DA Diag	No
10	BX0000	BP I/O engr Utility	No
11	BX2000	BP/MM DMA Engr Utility	No

## 6.6.2 VS-6 TEST CONFIGURATIONS

VS-6 test configurations are as follows:

Test Configurations for any SMD/CMD/FMD or SCSI Disk

<u>No.</u>	<u>Test No.</u>	<u>Test Name</u>	<u>Burn-In</u>
1	CT1100	CP Control Memory Test	Yes
2	CT2100	BP/CP Communications Test	Yes
3	CT3100	Unconditional Branch Test	Yes
4	CT4100	Conditional Branch, Subroutine	Yes
5	CT5100	MDR, IREQ, PMR, Stack Test	Yes
6	CT6100	Arithmetic, Multiplier, CC Test	Yes
7	CT7100	BNM Operations, BR Tests	Yes
8	MT1100	MAR Operations, TRAM Test	Yes
9	MT2100	Main Memory, Cache Test	Yes
10	MT3100	OF/ON/BNM Operations Test	Yes
11	BT2100	BP/MM DMA Diag (CP7)	Yes
12	MT4100	CP/BP MM Data Bus Test	Yes
13	MT5100	CP/BP MM Contention/Cache Test	Yes
14	CX1100	CPU Tester (CP7)	No
15	BT3000	BP Floppy Disk Diag	No
16	RT2000	BP SCSI Subsystem Diag	No
17	ST1000	BP 928 Data Link Diag	No
18	BT1000	BP Async Port/RIPL Diag	No
19	DT1000	SMD Disk DA Diag	No
20	UT1000	Universal ISIO DA Diag	No
21	TT1000	TC DA Single Port Diag	No
22	TT2000	TC DA Two Port Diag	No
23	ST3000	8 Port RS232 DA Diag	No
24	BX0000	BP I/O engr Utility	No
25	BX2000	BP/MM DMA Engr Utility	No

# TROUBLESHOOTING

## Test Configuration for 5.25" Double Sided High Density Floppy Disks

### 'DIAGA'

<u>No.</u>	<u>Test No.</u>	<u>Test Name</u>	<u>Burn-In</u>
1	CT1100	CP Control Memory Test	Yes
2	CT2100	BP/CP Communications Test	Yes
3	CT3100	Unconditional Branch	Yes
4	CT4100	Conditional Branch, Subroutine	Yes
5	CT5100	MDR, IREG, PMR, Stack	Yes
6	CT6100	Arithmetic, Multiplier, CC Test	Yes
7	CT7100	BNM Operations, BR Test	Yes
8	MT1100	MAR Operations, TRAM	Yes
9	MT2100	Main Memory, Cache Test	Yes
10	MT3100	DF/DN/BNM Operations	Yes
11	BT2100	BP.MM DMA Diag (CP7)	Yes
12	MT4100	CP/BP MM Data Bus Test	Yes
13	MT5100	CP/BP MM Contention/Cache	Yes
14	CX1100	CPU Tester (CP7)	No

### 'DIAGB'

<u>No.</u>	<u>Test No.</u>	<u>Test Name</u>	<u>Burn-In</u>
1	BT3000	BP Floppy Disk Diag	No
2	RT2000	BP SCSI Subsystem Diag	No
3	ST1000	BP 928 Data Link Diag	No
4	BT1000	BP Async Port/RIPL Diag	No
5	DT1000	SMD Disk DA Diag	No
6	UT1000	Universal ISIO DA Diag	No
7	TT1000	TC DA Single Port Diag	No
8	TT2000	TC DA Two Port Diag	No
9	ST3000	8 Port RS232 DA Diag	No
10	BX0000	BP I/O engr Utility	No
11	BX2000	BP/MM DMA Engr Utility	No

6.6.3 VS-5/6 DIAGNOSTIC MONITOR PROCEDURE

The VS-5/6 Diagnostics should be used when:

- The System is a new installation.
- A fatal error occurs while running Self-Test Diagnostics.
- A non-fatal error occurs and the error code indicated is unclear.

Accessing the VS-5/6 Diagnostic monitor can be accomplished by:

- During normal power-on procedures by pressing the PF8 key.
- By IPLing directly from one of the three diagnostics diskettes.

6.6.3.1 Diagnostic Monitor Program Selection Menus

When the diagnostic package is IPL'ed, it goes through an automatic initialization phase before it allows the operator to interface with the system. Following the initialization, the operator has the following selections:

- Run the Self Test Quick Verification package by pressing ENTER
- Proceed directly to IPL by pressing PF1
- Select Diagnostic Monitor by pressing PF8

Pressing PF8 displays the Program Selection menu. VS-5 DIAGA Program Selection Menu shown in figure 6-2, VS-6 DIAGA Program Selection Menu shown in figure 6-3 and VS-5/6 DIAGB Program Selection Menu is shown in figure 6-4.

---

VS-5/6 Diagnostic Package Version R2631  
Test Selection Option

To Select Tests, Position Cursor and Press any NON-BLANK key. Press SPACE or DELETE to Deselect a Test. Press PF8 to Start An Automatic Sequence. Press ENTER to Begin Testing. Press PF16 to Terminate.

Test Name	Test Name
■ 1 CP Control Memory Test	■ 16 CPU Tester (CP5)
■ 2 BP/CP Communications Test	
■ 3 BU Branch OpCode Test	
■ 4 Status, Conditional Branch	
■ 5 Subroutine Stack Data	
■ 6 Subroutine Stack Addressing	
■ 7 Register, Immediate Opcodes	
■ 8 CPU Stack Diagnostic Test	
■ 9 Logical and Shift Opcodes	
■ 10 8-Bit and 16-Bit ALU Test	
■ 11 MAR, TRAM, and RTC Test	
■ 12 BD, IAD, CC and DSET Test	
■ 13 BI Branch Opcode Test	
■ 14 Main Memory Test	
■ 15 BP/MM DMA Diag (CP5)	

---

Figure 6-2. VS-5 DIAGA Diagnostic Monitor Program Selection Menu

---

VS-5/6 Diagnostic Package Version R2631  
Test Selection Option

To Select Tests, Position Cursor and Press any NON-BLANK key. Press SPACE or DELETE to Deselect a Test. Press PF8 to Start An Automatic Sequence. Press ENTER to Begin Testing. Press PF16 to Terminate.

Test Name	Test Name
■ 1 CP Control Memory Test	
■ 2 BP/CP Communications Test	
■ 3 Unconditional Branch Test	
■ 4 Conditional Branch, Subroutine	
■ 5 MDR, IREQ, PMR, Stack Test	
■ 6 Arithmetic, Multiplier, CC Test	
■ 7 BNM Operations, BR Tests	
■ 8 MAR Operations, TRAM Test	
■ 9 Main Memory, Cache Test	
■ 10 OF/ON/BNM Operations Test	
■ 11 BP/MM DMA Diag (CP7)	
■ 12 CP/BP MM Data Bus Test	
■ 13 CP/BP MM Contention/Cache Test	
■ 14 CPU Tester (CP7)	

---

Figure 6-3. VS-6 DIAGA Diagnostic Monitor Program Selection Menu

---

VS-5/6 Diagnostic Package Version R2631  
Test Selection Option

To Select Tests, Position Cursor and Press any NON-BLANK key. Press SPACE or DELETE to Deselect a Test. Press PF8 to Start An Automatic Sequence. Press ENTER to Begin Testing. Press PF16 to Terminate.

Test Name	Test Name
■ 1 BP Floppy Disk Diag	
■ 2 BP SCSI Subsystem Diag	
■ 3 BP 928 Data Link Diag	
■ 4 BP Async Port/RIPL Diag	
■ 5 SMD Disk DA Diag	
■ 6 Universal ISIO DA Diag	
■ 7 1 Port TC DA Diag	
■ 8 2 Port TC DA Diag	
■ 9 8 Port RS 232 DA Diag	
■ 10 BP I/O Engr Utility	
■ 11 BP/MM DMA Engr Utility	

---

Figure 6-4. VS-5/6 DIAGB Diagnostic Monitor Program Selection Menu

**6.6.3.2 Running Selected Diagnostics**

Select the diagnostics to be run by positioning the cursor next to the test desired and press any Non-Blank character key. This can be accomplished by using either the Up/Down arrow keys or the TAB key.

Deselect tests by positioning the cursor next to the test to be deselected and press the SPACE Bar.

Once the test are selected, press ENTER to display the Run-Time menu and to start the diagnostic tests in the order selected. If testing is not altered by the operator or by hardware failure, the monitor automatically cycles on the set of selected diagnostic programs.

**6.6.4 RUN-TIME MENU SCREEN COMMANDS AND DESCRIPTORS**

The Run-Time Screen (figure 6-5) contains nine commands and eight descriptors. The operator uses the Run-Time screen to monitor test results and the PF function key commands and alternate action commands to control test performance. Selecting the commands initiates the functioning of the command and highlights the command on the screen. The next time a command is selected, it becomes an alternate action command and will cause the original command to be deselected. A description of the commands are as follows:

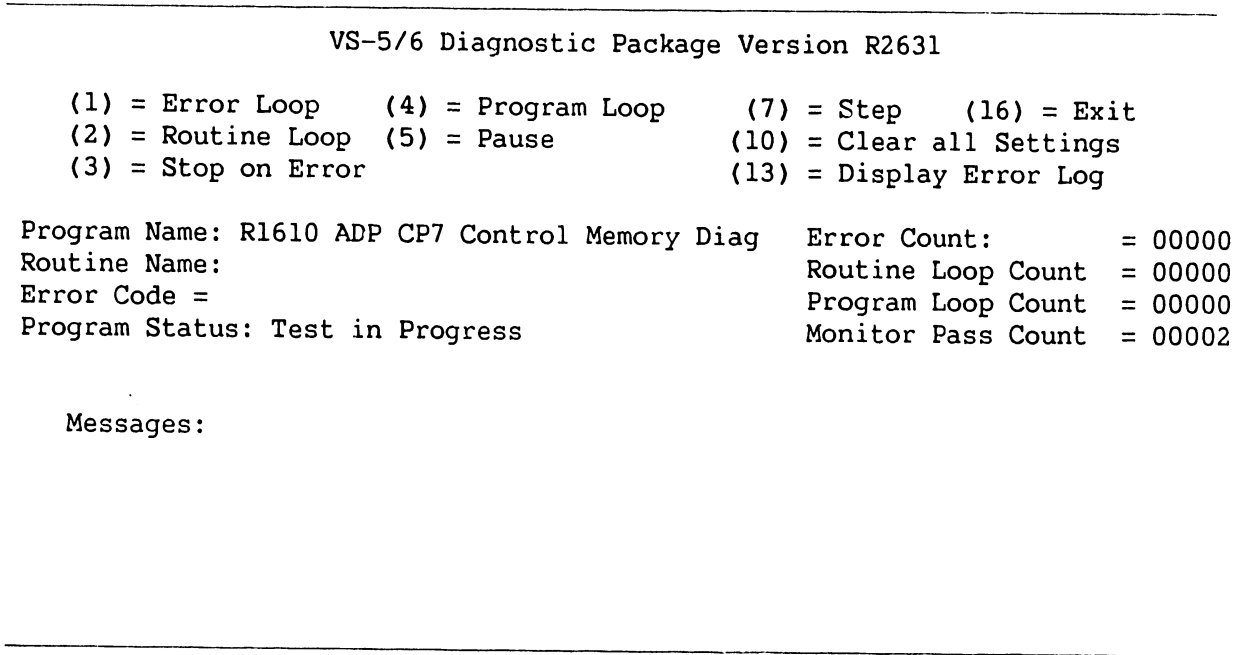


Figure 6-5. Sample VS-5/6 Run-Time Menu Selection Screen



6.6.4.1 Run-Time Selection Screen Commands and Function Keys

<u>Key</u>	<u>Command</u>	<u>Description</u>
PF1	ERROR LOOP	Loop on routine in which the next failure occurs.
PF2	ROUTINE LOOP	Loop on current test routine.
PF3	STOP ON ERROR	Stop the Program when the next failure is detected.
PF4	LOOP ON PROGRAM	Loop on current diagnostic program.
PF5	PAUSE	Halt program prior to the next test routine.
PF6	SCOPE LOOP	Loop on next test routine in which hardware failure occurs. Identical to ERROR LOOP except that error reporting is omitted after after the first error.
PF7	STEP	Used to step passed a selected option (PF1-PF5). That is STEP through PAUSE, Program or Routine Loop, or STOP-ON-ERROR without deselecting the command.
PF8	CLEAR ALL SETTINGS	Resets all other test control commands. (i.e. Stop Looping if looping, or resume testing if halted).
PF13	DISPLAY ERROR LOG	Displays the 23 most recent errors in error buffer. Pressing ENTER returns the user to the Run-Time Menu with no effect on the error log buffer.
PF16	EXIT	Terminates the Diagnostic Monitor program and the Test selection screen is re-entered.

**6.6.4.2 Run-Time Selection Screen Descriptors**

<u>Descriptor</u>	<u>Description</u>
PROGRAM NAME	The name of the Program currently being executed. A program name consists of one or more test routines.
ROUTINE NAME	The name of the test routine currently being executed.
ERROR CODE	The code of the most recently detected error.
PROGRAM STATUS	The status of the diagnostic currently being performed. (e.g. TEST-IN-PROGRESS, STOP ON ERROR, PROGRAM PAUSE, STEP, etc.).
ERROR COUNT	A decimal count of the number of errors which have been detected. The count is cumulative and is reset only by re-IPLing or returning to Program Selection menu (PF16).
ROUTINE LOOP COUNT	A decimal count of the number of loops which have been made through the diagnostic routine currently being performed. This value is only displayed when LOOP-ON-ROUTINE is in effect. It is cleared when the LOOP-ON-ROUTINE option is deselected.
PROGRAM LOOP COUNT	Identical to Routine Loop Count with the exception that this count applies to diagnostic programs rather than to routines.
MONITOR PASS COUNT	A decimal count of the number of loops which have been made through a set of diagnostic programs. Cleared by re-IPLing or returning to Program Selection menu (PF16).

**6.6.4.3 Run-Time Selection Screen Error Messages and Prompts**

The current diagnostic program writes error messages and prompts in the lower half of the screen. If more than one error occurs, only the last error message will be displayed, although the error count and the Diagnostic Monitor Error Log are updated for each error.

6.6.5 RUNNING THE DIAGNOSTIC MONITOR PROGRAM (FROM FLOPPY DRIVE)

- 1) Make sure the Local/Remote Keyswitch is in the local position. Insert the diagnostic diskette (depending on mainframe type used) into the floppy drive and closed the latch.
- 2) Press the Red Initialize button on the front panel. The Hex display will begin count down from Hex FFFF. In about 45 seconds, the screen in figure 6-6 will be displayed on WS0.

---

VS Diagnostic Monitor Package

- - - - - N O T I C E - - - - -

This Diagnostic package is the property of Wang Laboratories, Inc., and is provided for the use by authorized personnel only. Improper use may cause loss or damage to programs and/or data. This package and related materials may not be disclosed or otherwise made available to third parties without the prior permission of Wang.

In no event shall Wang Laboratories, Inc., or its subsidiaries be liable for incidental or consequential damages in connection with or arising from the use of the diagnostic package, the accompanying manual, or any related materials.

- - - - -

Enter YES to Acknowledge, PF16 to Exit

---

Figure 6-6. VS Diagnostic Monitor Disclaimer Screen

- 3) Enter YES to acknowledge. The VS-5/6 Self Test Package Screen will be displayed.

---

VS 5/6 Self Test Package      Version R2631  
IPL Drive Selection  
Bootstrap Volume = DIAGA

Device	Capacity	Type	Volume	Status
■ 2270V7	1.2 Mb	Dsket	DIAGA	
2269V1	67 Mb	Dsket	SYSTEM	Crash Tolerant
2269V1	67 Mb	Dsket	DATA	Crash Tolerant

Position Cursor to Indicated Device and Select:

(ENTER) Test & IPL      (PF1) IPL Only      (PF8) Standalone Diagnostic Monitor

---

Figure 6-7. VS 5/6 Self Test Package Screen

## TROUBLESHOOTING

- 4) Press PF8 to display the VS-5/6 Test Selection Option Screen. (Refer to figure 6-2 VS-5 DIAGA, figure 6-3 VS-6 DIAGA, or figure 6-4 VS-5/6 DIAGB.) Select the tests to be run and press ENTER to begin testing or press PF8 to begin the automatic sequence. Run the diagnostics for one complete, error free pass.
- 5) If no error occurs, insert DIAGB diskette into the floppy drive and press Initialize. Enter YES to acknowledge the disclaimer screen (figure 6-5).

### CAUTION

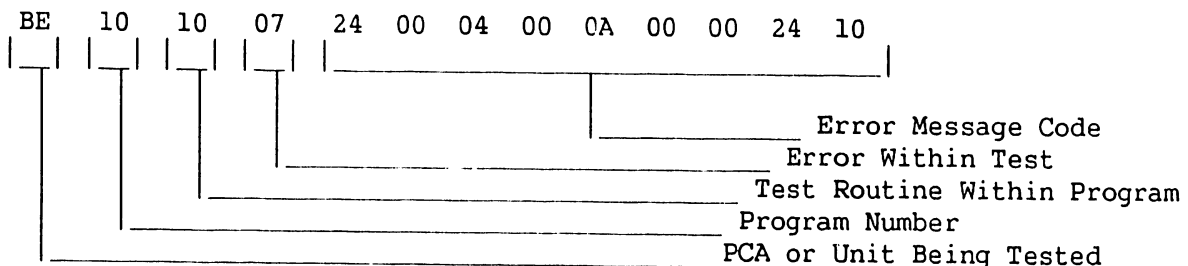
EXERCISE EXTREME CAUTION WHEN ATTEMPTING TO USE DIAGB DISKETTE. THE ABILITY TO WRITE TO ANY DISK ATTACHED TO THE SYSTEM IS MADE AVAILABLE. VALUABLE CUSTOMER DATA MAY BE DAMAGED.

- 6) Select the tests to be run and press ENTER to begin testing or press PF8 to begin the automatic sequence. Run the diagnostics for one complete, error free pass.
- 7) If an error occurs, display the Diagnostic Monitor Error Log at the end of one complete pass. This is accomplished by pressing the PF13 key.
- 8) If no error is detected, press the PF16 key to return to the Diagnostic Monitor Program Selection screen. Press PF16 again to terminate and return to the IPL Drive Selection screen.
- 9) Select the desired disk drive and press ENTER to IPL the system.

#### 6.6.5.1 Interpreting the Diagnostic Monitor Error Log

Display the Diagnostic Error Log by pressing the PF13 key. This screen contains up to 23 of the most recent errors. These errors are listed as 8-character codes followed by up to 18 Hex characters all on a single line.

The first two characters of the 8-character code identify the PCA (or unit) being tested and the program, routine, or error notation. The second two characters (hex notation) identify the program number, the third two characters (hex notation) identify the test routine within the program, the fourth two characters (hex notation) identify the error within the test routine, and the remaining 18 characters (hex notation) contain the error message code. See example below:



## TROUBLESHOOTING

To decipher the failing unit, observe the first error code character contained in the last entry of the error log. For the example, the error code is BE101007 24 00 04 00 0A 00 00 24 10. Using table 6-1, compare the first error code character (in this example 'B', Bus Processor) to the table to find the failing unit. Replace the failing unit.

**Table 6-1. Diagnostic Monitor Failing Unit Error Code Character**

<b>FIRST ERROR CHARACTER CODE</b>	<b>FAILING UNIT</b>
B	Bus Processor DA
C	Central Processor Device Adapter PCA
D	Internal Fixed or External Disk Drive and/or DA
M	Main Memory and Cache Memory Device Adapter PCA
S	Serial I/O (SIO/ISIO/UISIO [928]) PCA or WS0
T	Telecommunications Device Adapter PCA

A complete listing of Error Code displayable on the Diagnostic Monitor Run-Time Menu is contained in section 6.4 VS-5/6 Monitor Error Codes.

**SECTION**

**7**

**REPAIR**

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## SECTION 7

### REPAIR

#### 7.1 SCOPE

This section contains removal and replacement procedures for the field replaceable components of the VS-5/6 mainframe.

##### 7.1.1 TOOLS AND TEST EQUIPMENT

No special tools or test equipment are required to repair the VS-5/6 mainframe.

#### 7.2 REMOVAL PROCEDURES

##### 7.2.1 TOP COVER REMOVAL

- 1) Power-off the VS-5/6 and remove ac power.
- 2) Remove two screws from rear of top cover. Slide top cover towards the rear of the unit and remove.

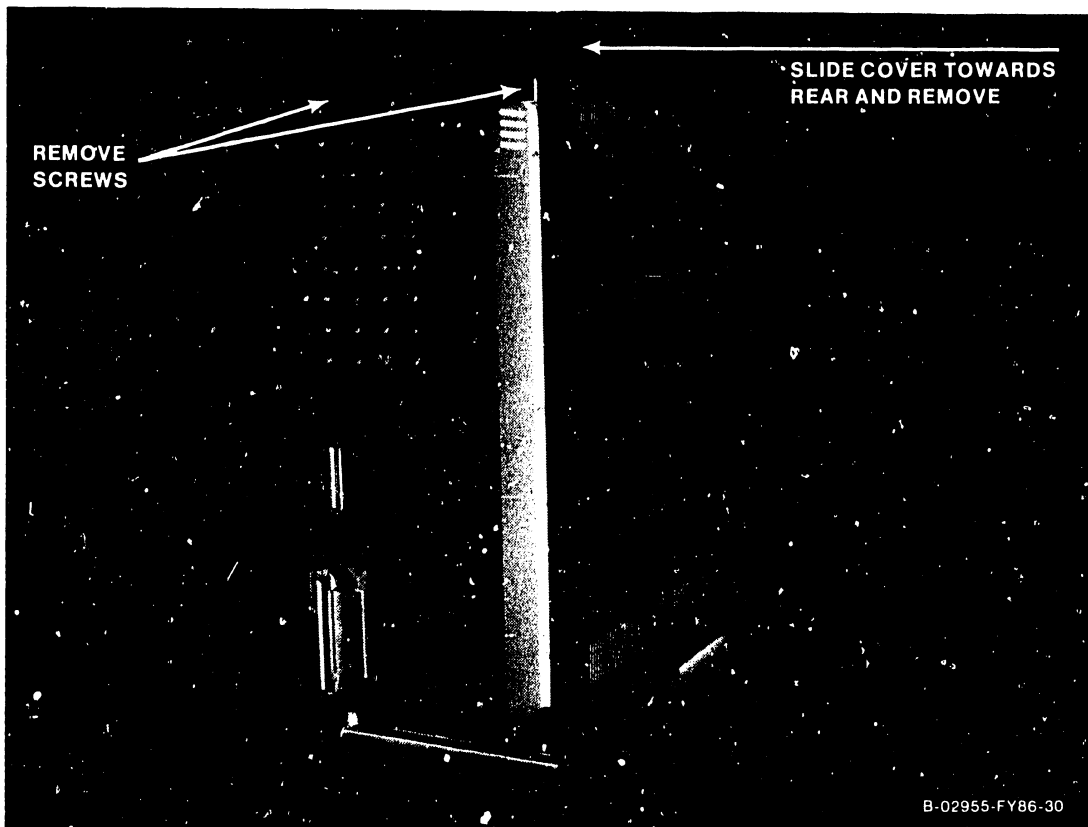


Figure 7-1. Top Cover Removal

### 7.2.2 FRONT COVER REMOVAL

- 1) Loosen two screws via access holes provided in the top of front cover.
- 2) Remove screws located inside TC panel door and control panel door. Tilt cover and lift off of system.

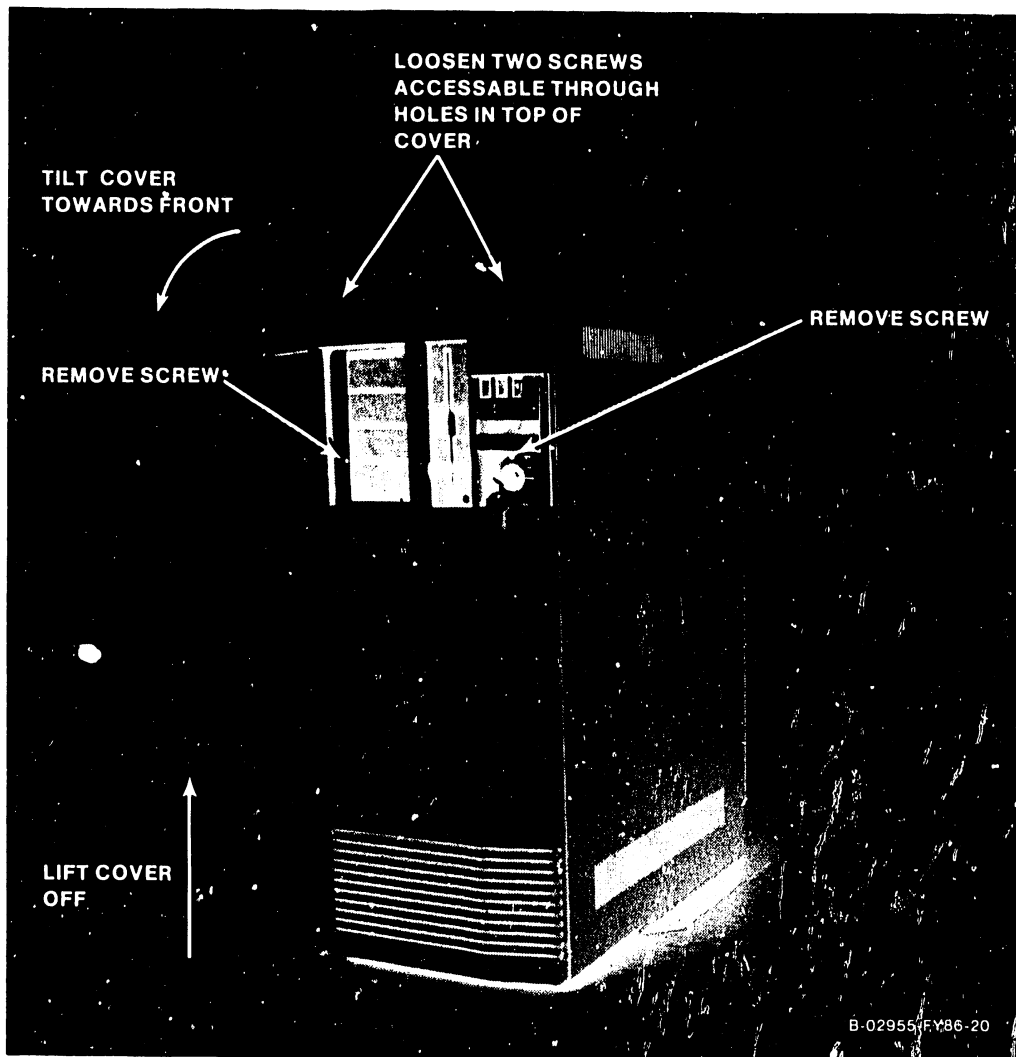


Figure 7-2. Front Cover Removal

### 7.2.3 SIDE COVER REMOVAL

- 1) Lift side covers straight up and off of system.

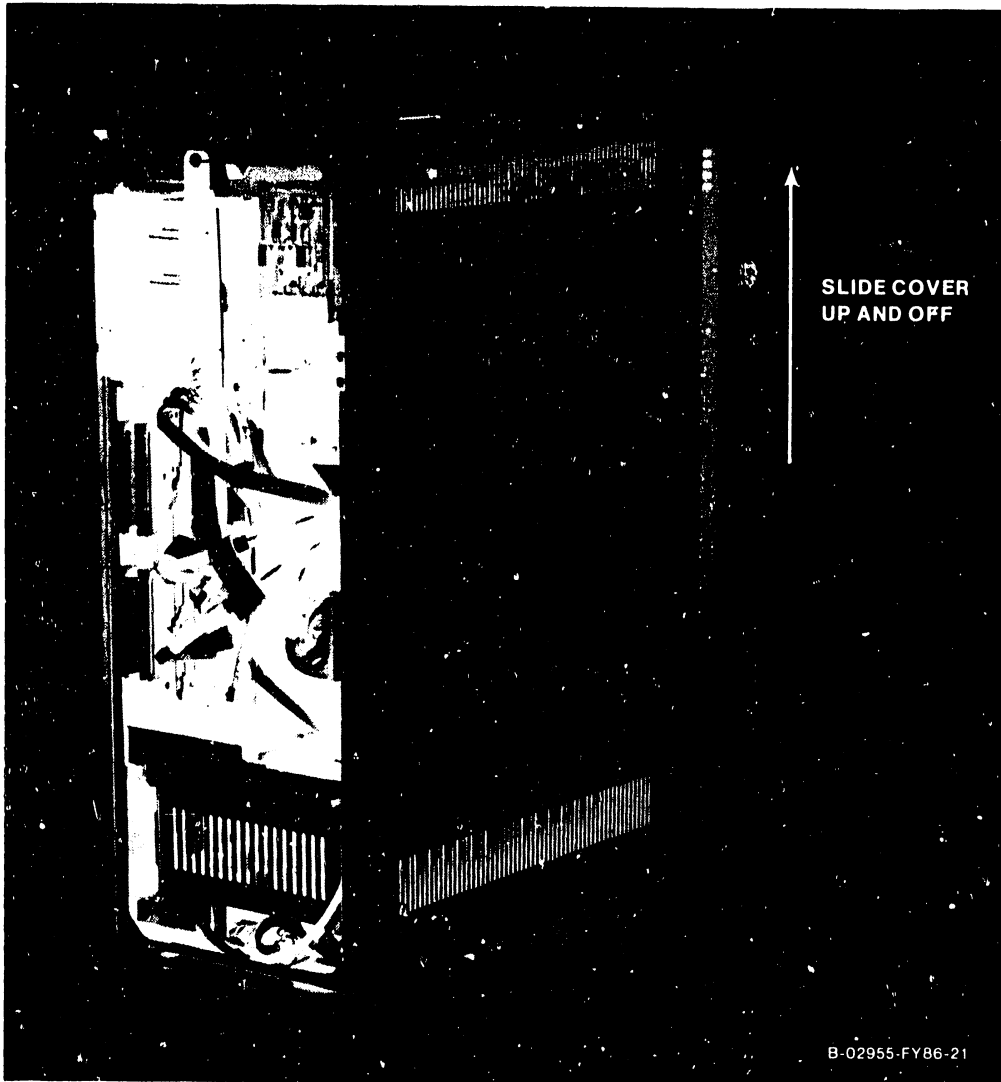


Figure 7-3. Side Cover Removal

### 7.3 GENERAL VS-5/6 PCA REMOVAL/REPLACEMENT

VS-5/6 PCA General Removal describes generic PCA removal procedures. Removal procedures pertaining to specific PCAs are noted in the ensuing pages.

- 1) Remove PCA board hold down.
- 2) Turn the TC Control Panel twist-lock screw 1/2 turn counterclockwise and swing panel to the left.
- 3) Disconnect all (if any) cables from PCA connectors and note cable location and routing.
- 4) Position top and bottom PCA lever clamps to open position by pulling clamp away from board.
- 5) Once the board is free of the motherboard connector, ease the board out of card cage by sliding on guide rails.

#### REPLACEMENT

- 6) Prior to replacing the PCA, ensure all address jumpers and switch positions are correct (refer to the appropriate paragraph for details) and reverse steps 1-5.

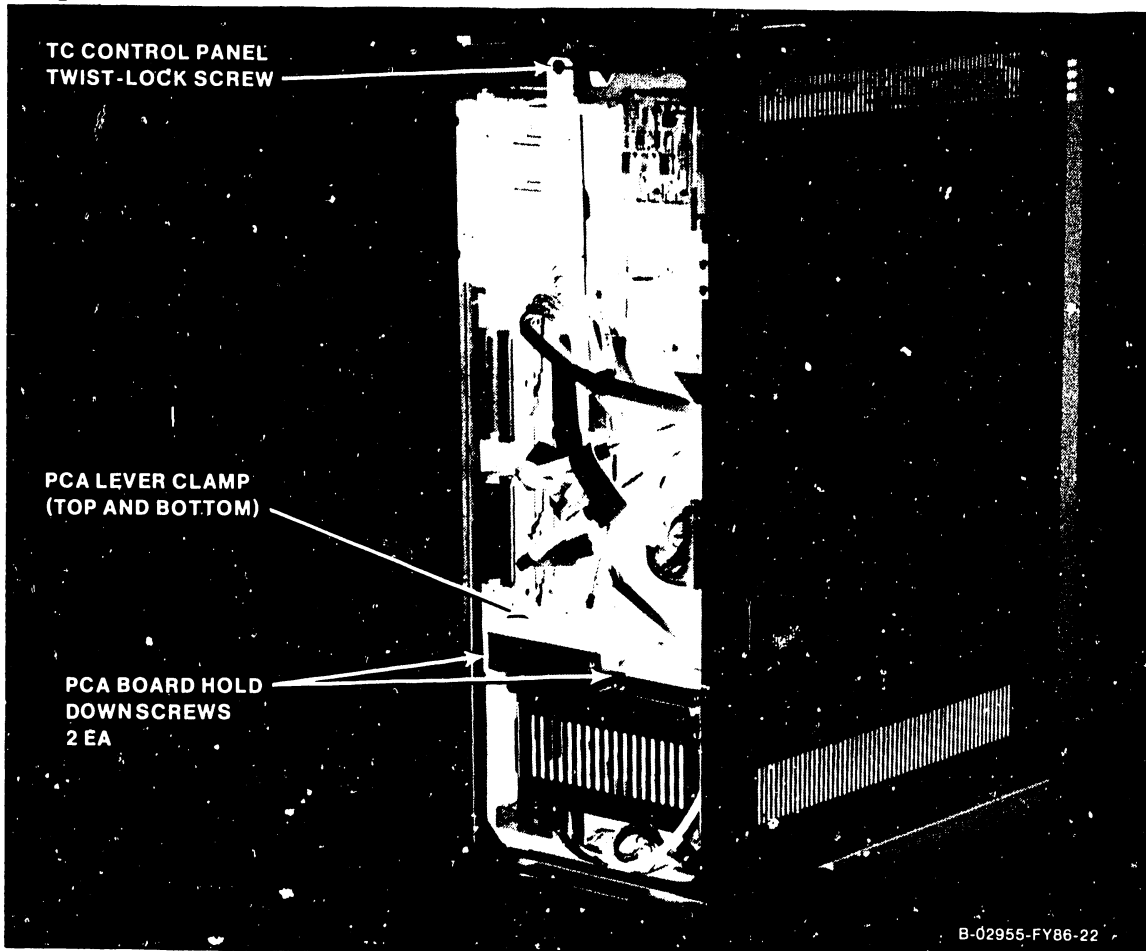
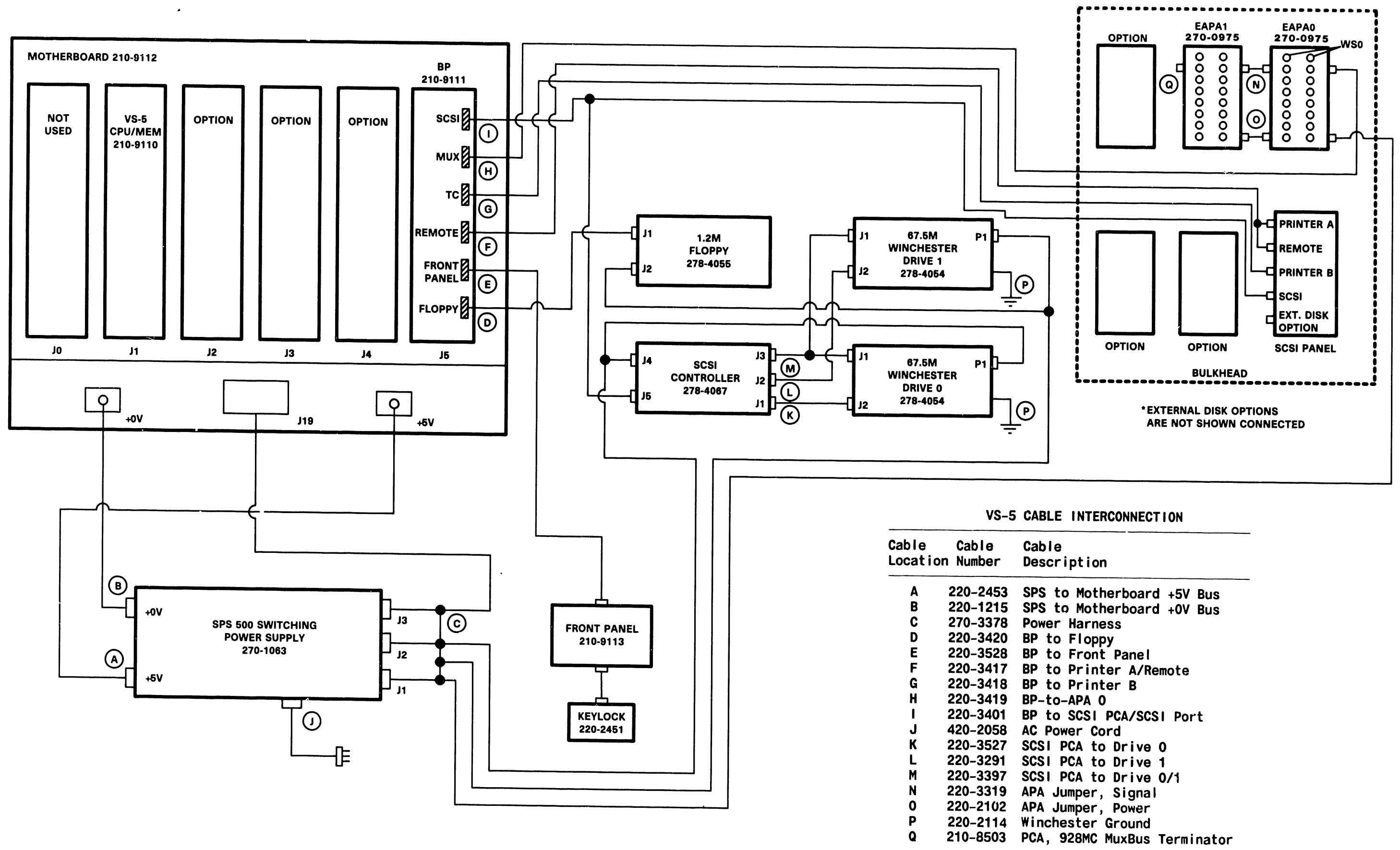


Figure 7-4. General VS-5/6 PCA Removal/Replacement

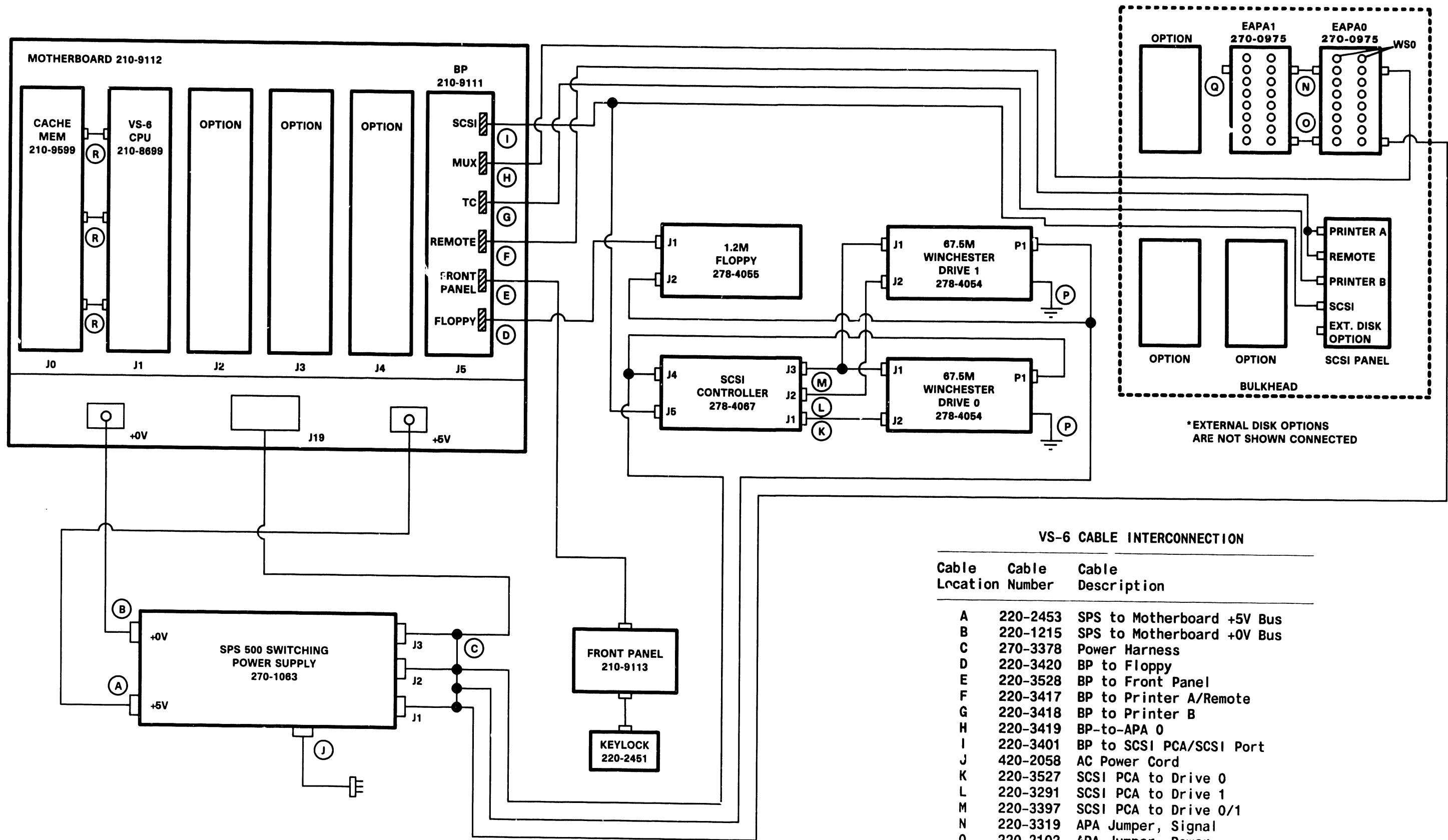


**VS-5 CABLE INTERCONNECTION**

Cable Location	Cable Number	Cable Description
A	220-2453	SPS to Motherboard +5V Bus
B	220-1215	SPS to Motherboard +0V Bus
C	270-3378	Power Harness
D	220-3420	BP to Floppy
E	220-3528	BP to Front Panel
F	220-3417	BP to Printer A/Remote
G	220-3418	BP to Printer B
H	220-3419	BP-to-APA 0
I	220-3401	BP to SCSI PCA/SCSI Port
J	420-2058	AC Power Cord
K	220-3527	SCSI PCA to Drive 0
L	220-3291	SCSI PCA to Drive 1
M	220-3397	SCSI PCA to Drive 0/1
N	220-3319	APA Jumper, Signal
O	220-2102	APA Jumper, Power
P	220-2114	Winchester Ground
Q	210-8503	PCA, 928MC MuxBus Terminator

Figure 7-4A. VS-5 Interconnection Diagram

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**VS-6 CABLE INTERCONNECTION**

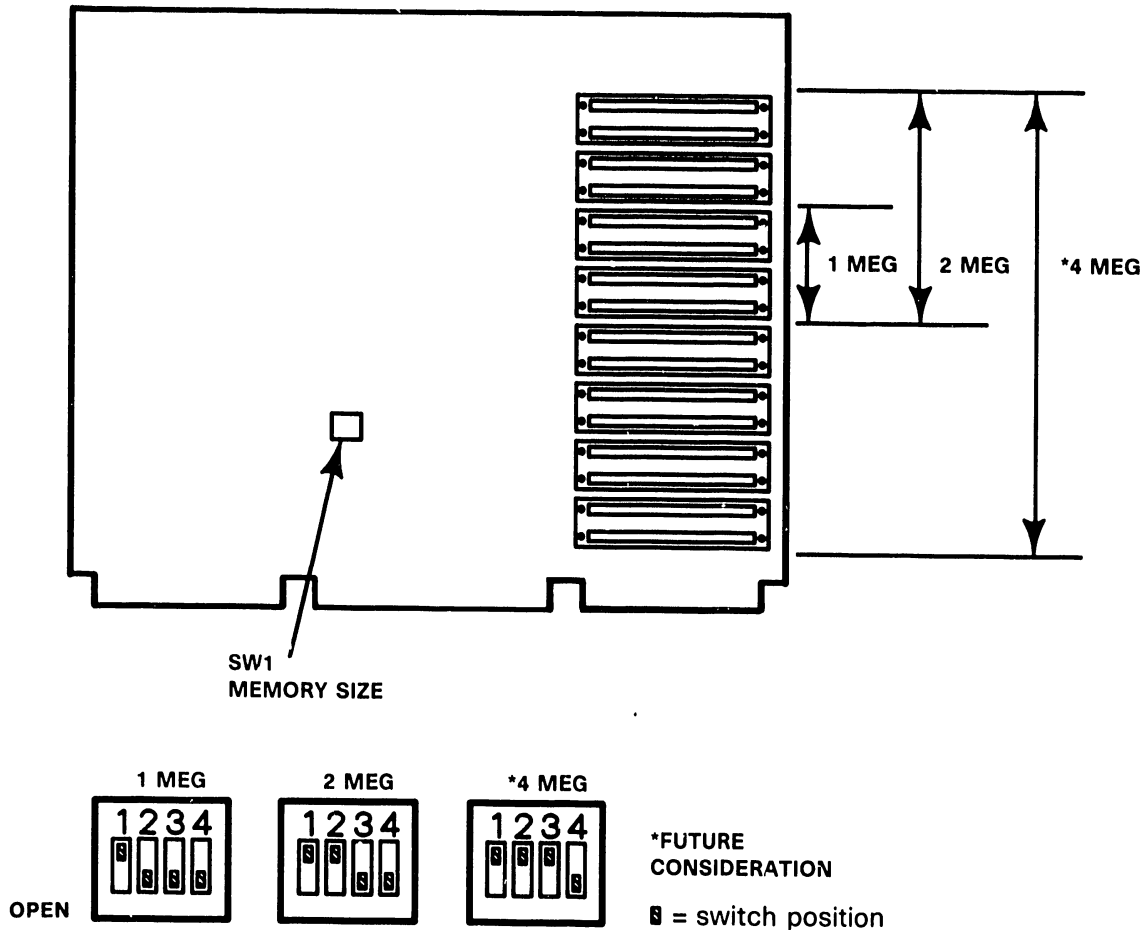
Cable Location	Cable Number	Cable Description
A	220-2453	SPS to Motherboard +5V Bus
B	220-1215	SPS to Motherboard +0V Bus
C	270-3378	Power Harness
D	220-3420	BP to Floppy
E	220-3528	BP to Front Panel
F	220-3417	BP to Printer A/Remote
G	220-3418	BP to Printer B
H	220-3419	BP-to-APA 0
I	220-3401	BP to SCSI PCA/SCSI Port
J	420-2058	AC Power Cord
K	220-3527	SCSI PCA to Drive 0
L	220-3291	SCSI PCA to Drive 1
M	220-3397	SCSI PCA to Drive 0/1
N	220-3319	APA Jumper, Signal
O	220-2102	APA Jumper, Power
P	220-2114	Winchester Ground
Q	210-8503	PCA, 928MC MuxBus Terminator
R	220-3435	CPU to Cache Memory

Figure 7-4B. VS-6 Interconnection Diagram

B-02927-FY86-2

7.3.1 VS-5 CPU REMOVAL

- 1) Remove the VS-5 CPU (210-9110) from backplane slot J1 in the manner described in paragraph 7.3.
- 2) After checking the size of memory installed and memory switch settings, install the new CPU.



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Figure 7-5. VS-5 CPU/Memory Board Memory Size Switch Settings



### 7.3.1.1 VS-5 CPU/MEMORY BOARD MEMORY EXPANSION

The VS-5 CPU/memory board memory can be expanded from 1 Meg up to 2 Meg by installing additional SIMM devices (part number 376-6032). Each SIMM device is 256K by 8, therefore a total of 4 SIMM devices must be installed to upgrade memory from 1 Meg to 2 Meg. To upgrade memory perform the following:

- 1) SIMM memory is located on the right hand side of the VS-5 CPU/Memory board (figure 7-6). To increase memory size from 1 Meg to 2 Meg, 4 SIMM devices must be installed in the next 4 SIMM connectors location L178, L187, L197, and L283.
- 2) Position the SIMM device to be installed at a 30° angle (component side up) above the SIMM connector (figure 9-13). Align the holes located in the corners of the SIMM device with the two post located on either side of the connector. Slide the SIMM device into the connector and snap it down over the connector posts.
- 3) Perform step 2 for each additional SIMM device to be installed.
- 4) Refer to paragraph 7.3 for VS-5 CPU/Memory board memory size switch settings and set switch SW1 accordingly.

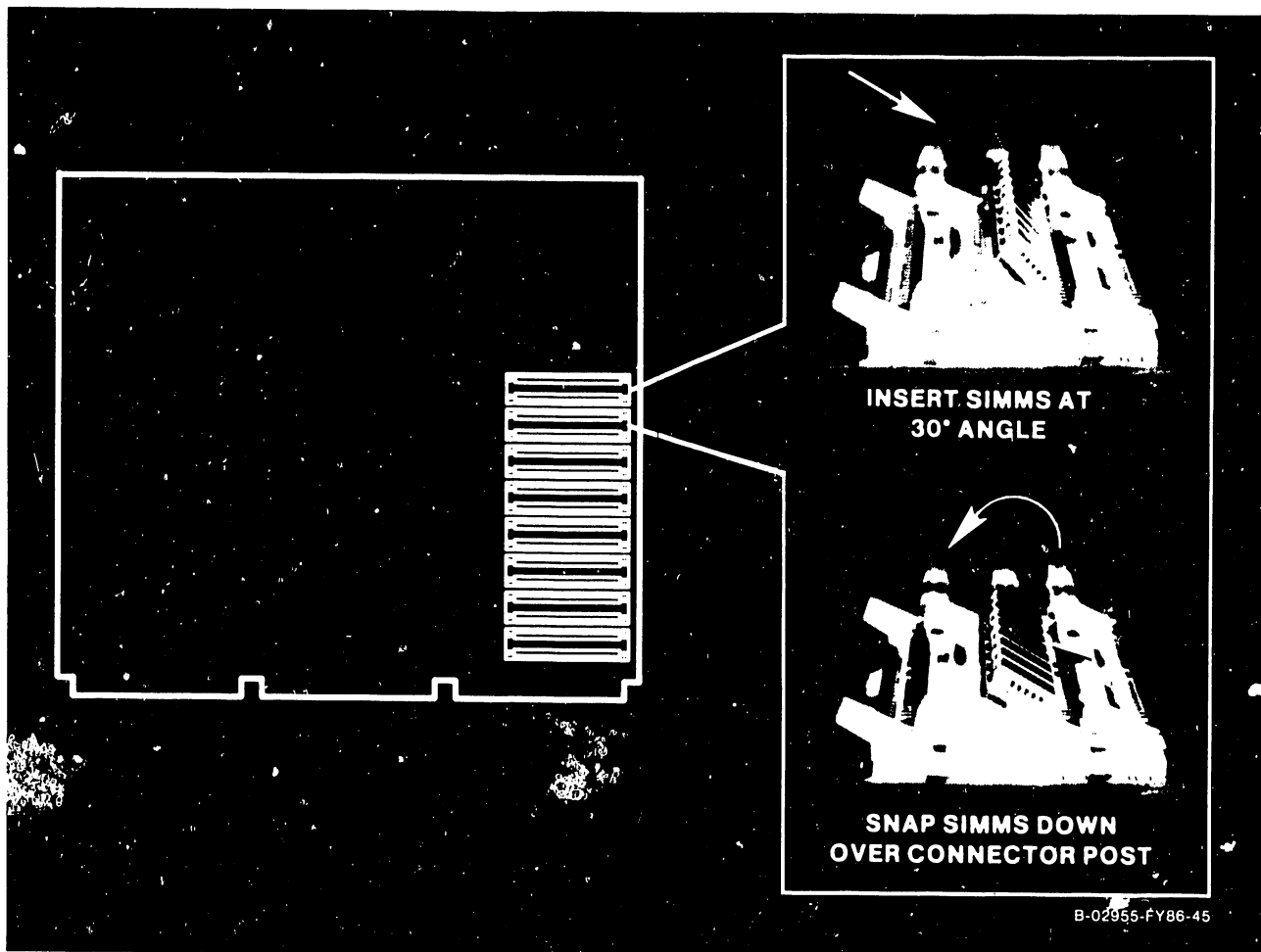
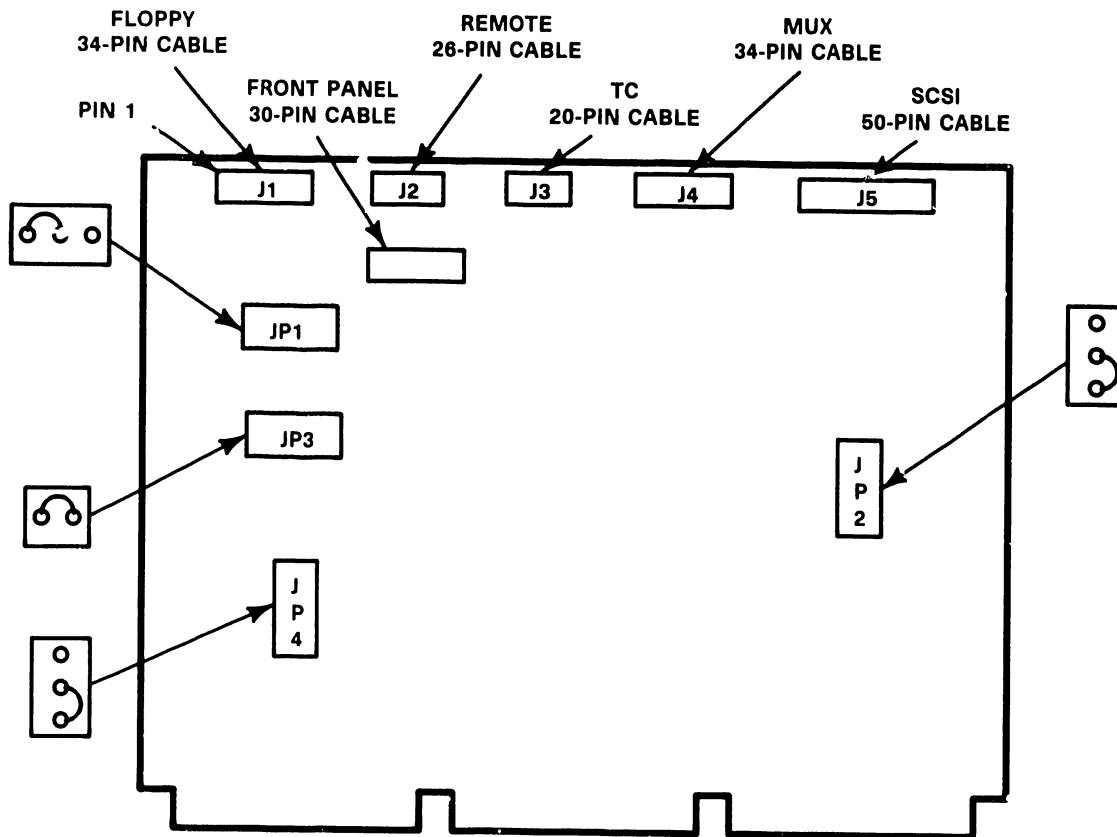


Figure 7-5A. VS-5 CPU/Memory Board Memory Upgrade

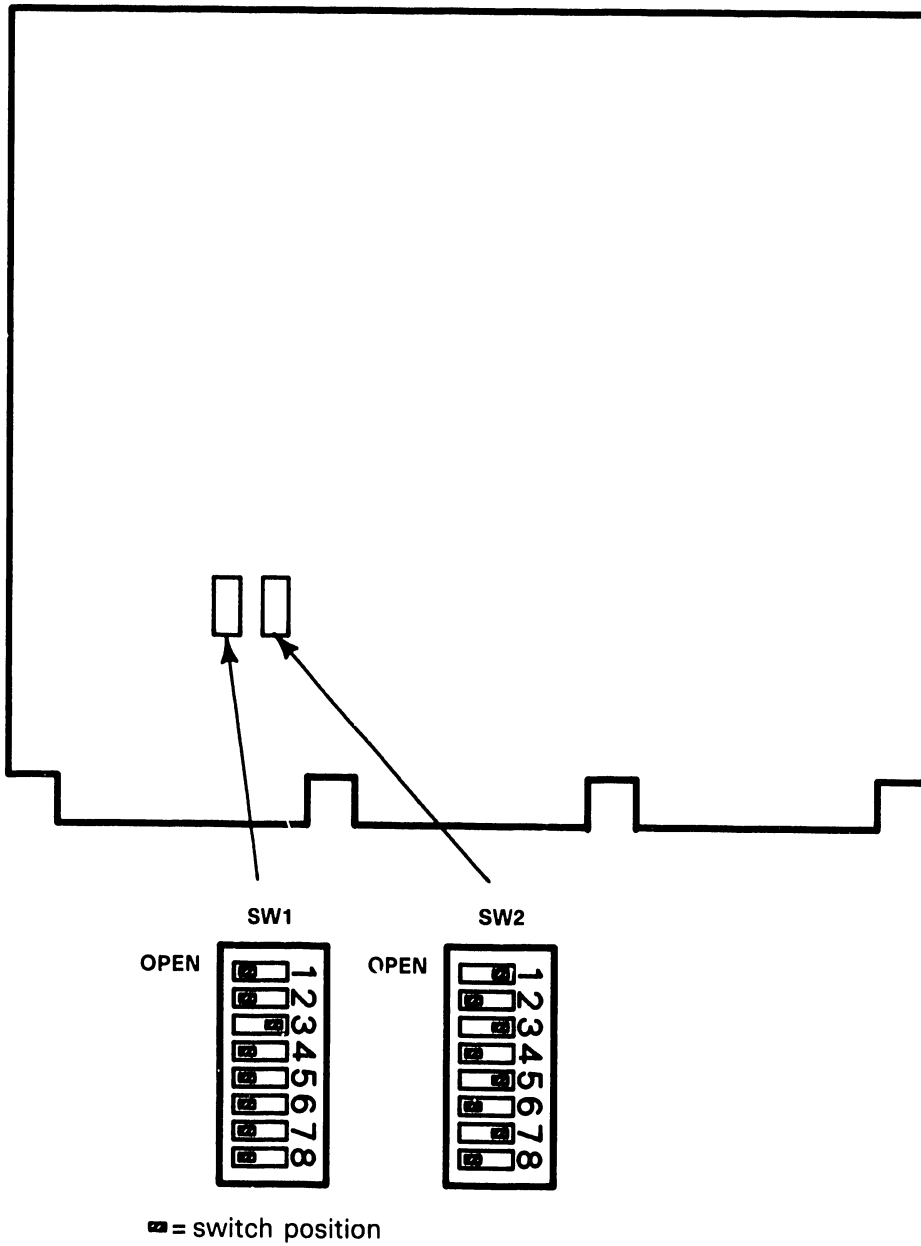
### 7.3.2 VS-5/6 BUS PROCESSOR (BP) REMOVAL

- 1) Before removing the VS-5/6 BP from backplane slot J5, disconnect the following cables:
  - a) 34-pin cable from the Floppy connector
  - b) 26-pin cable from the Remote connector
  - c) 20-pin cable from the TC connector
  - d) 34-pin cable from the MUX connector
  - e) 50-pin cable from the SCSI connector.
- 2) Remove the BP in the manner described in paragraph 7.3 steps 3-4. Ease the BP out of the card cage about three inches and remove the 30-pin cable from the Front Panel connector.
- 3) After checking jumper positions (figure 7-6) and switch setting (figure 7-7), install the new BP board half way into the card cage and reconnect the cable to the Front Panel connector.
- 4) Install the BP completely into the motherboard and reconnect all cables as detailed in step 1a - 1e above.



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Figure 7-6. VS-5/6 BP (210-9111) Board Jumper Location/Positions



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Figure 7-7. VS-5/6 Bus Processor Board Switch Settings

Table 7-1. VS-5/6 Bus Processor Switch Bank SW1 Settings

SW8	SW7	SW6	SW5	SW4	SW3	SW2	SW1	WS0 Location
								Closed Closed - Reserved
								Closed Open - BP RS232 Port
								Open Closed - Device Adapter at Address 400
								Open Open - BP 928 Datalink
								<u>80186 Clock</u>
								Closed - 8 MHz
								Open - 10 MHz
								<u>BIT Error Control</u>
								Closed - Loop on Error
								Open - Halt on Error
								<u>BIT Loop Control</u>
								Closed - Loop on BIT
								Open - Boot on BIT Completion
								<u>IPL Control</u>
								Closed Closed - Bypass BIT, Load Diagnostic Monitor
								Closed Open - Bypass BIT, Load Diagnostic Monitor
								Open Closed - Bypass BIT and Selftest
								Open Open - Normal System IPL
								<u>IPL Control Enable</u>
								Closed - Enables Bits 5 and 6 (SW6 and SW7)
								Open - Forces Normal IPL

NOTE

SWITCH SW1 SWITCH POSITIONS ARE NOT USED BY BP MICROCODE.

Table 7-2. VS-5/6 Bus Processor Switch Bank SW2 Settings

SW8	SW7	SW6	SW5	SW4	SW3	SW2	SW1	Floppy Drive Type
						Closed	Closed	- Reserved
						Closed	Open	- 720K, (NOTE 1)
						Open	Closed	- 1.2M, (NOTE 2)
						Open	Open	- 360K, 5-1/4 in
								<u>SCSI Device ID = 6 Type</u>
						Closed	Closed	- Reserved
						Closed	Open	- ACB-5500
						Open	Closed	- WD-1003A (NOTE 3)
						Open	Open	- Self Identifying
								<u>SCSI Device ID = 5 Type</u>
						Closed	Closed	- Reserved
						Closed	Open	- ACB-5500
						Open	Closed	- WD-1003A
						Open	Open	- Self Identifying
								<u>SCSI Device ID = 4 Type</u>
						Closed	Closed	- Reserved
						Closed	Open	- ACB-5500
						Open	Closed	- WD-1003A
						Open	Open	- Self Identifying

NOTES

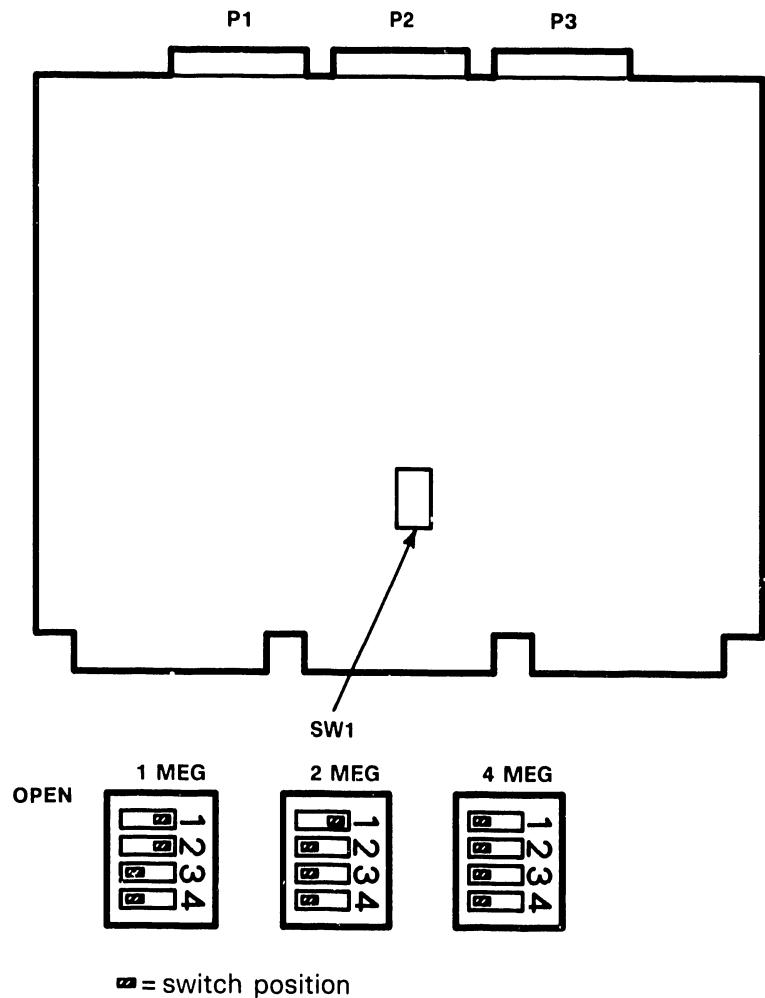
- 1) 720K 3-1/2 inch floppy drive is not supported by BP Microcode.
- 2) 1.2M 5-1/4 inch and 3-1/2 inch Floppy Drive is supported by BP Microcode.
- 3) WD-1003A is the SCSI-to-ST506 winchester interface (part number 278-4076) presently used in the VS-5/6.

7.3.3 VS-6 CACHE MEMORY REMOVAL

- 1) Disconnect the 3 bus jumper cables from VS-6 Cache Memory connectors P1-P3.
- 2) Remove the VS-6 Cache Memory (210-9599) from backplane slot J0 in the manner described in paragraph 7.3.
- 3) After checking memory size, memory switch settings (figure 7-8), and jumper positions (figure 7-9), install the new/upgraded memory board.
- 4) Reconnect the three bus jumper cables.

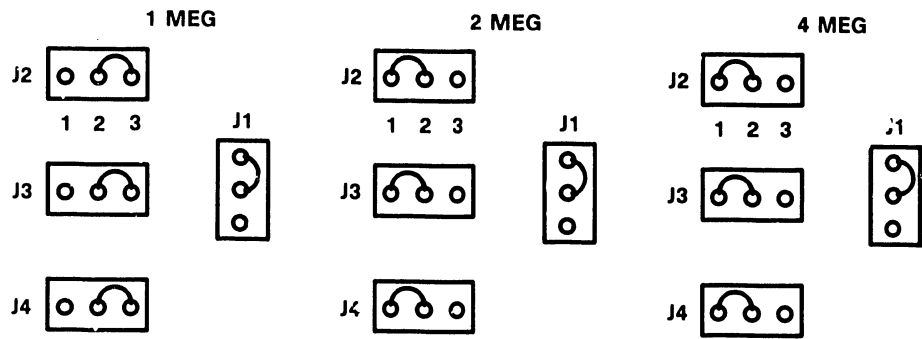
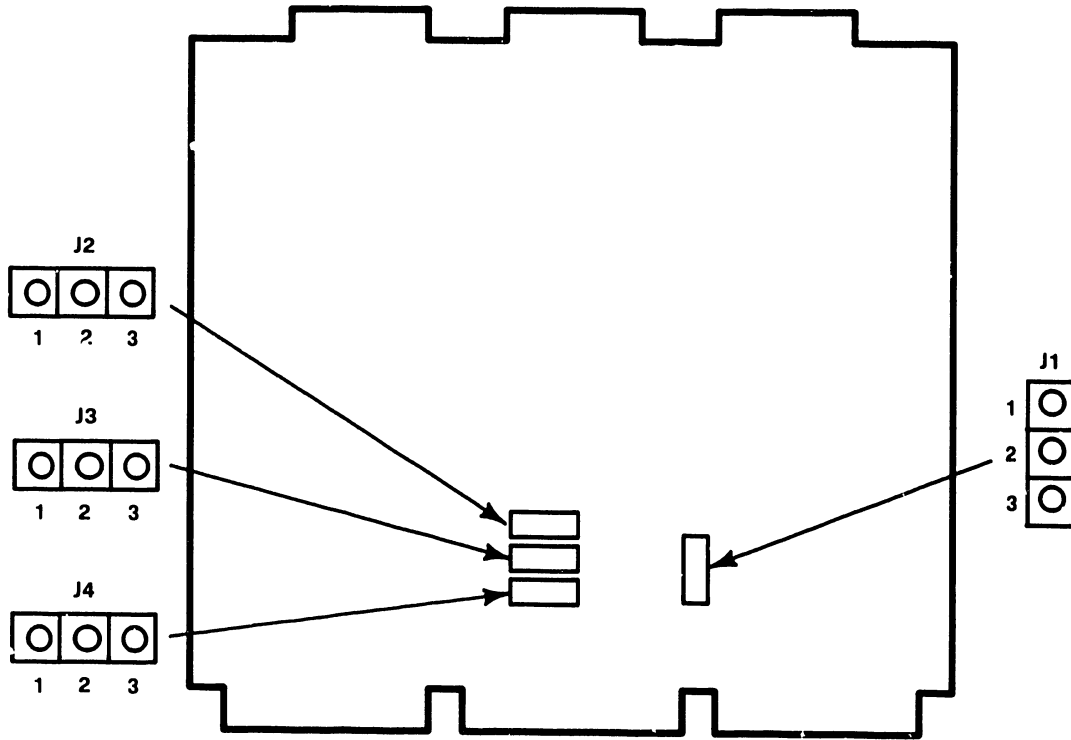
Table 7-3. VS-6 Memory Configuration

Part Number	Memory Configuration	RAM TYPE
210-9599-A	1 Meg (1024K)	64K DRAM
210-9599-1A	2 Meg (2048K)	256K DRAM
210-9599-2A	4 Meg (4096K)	256K DRAM



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Figure 7-8. VS-6 Cache Memory Board (210-9599) Memory Size Switch Settings

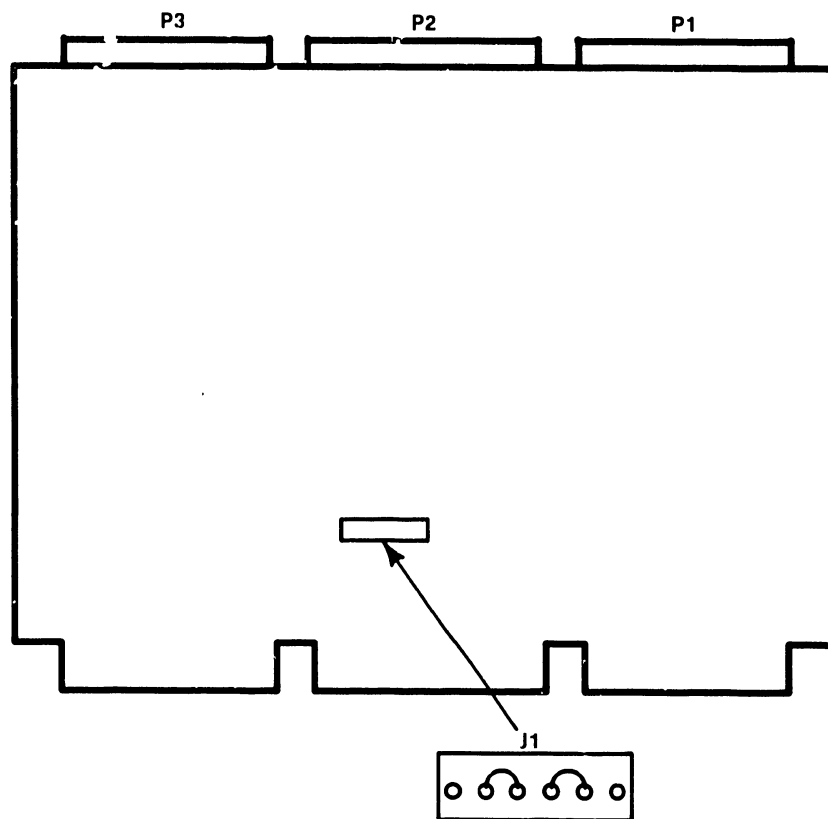


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Figure 7-9. VS-6 Memory Board Jumper Locations/Definitions

### 7.3.4 VS-6 CPU BOARD (210-8699) REMOVAL

- 1) Disconnect the 3 bus jumper cables from VS-6 CPU Board connectors P1-P3.
- 2) Remove the VS-6 CPU (210-8699) from backplane slot J1 in the manner described in paragraph 7.3.
- 3) After checking jumper positions (figure 7-10), install the new/upgraded CPU board.
- 4) Reconnect the three bus jumper cables.



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Figure 7-10. VS-6 CPU Board (210-8699) Jumper Locations/Positions

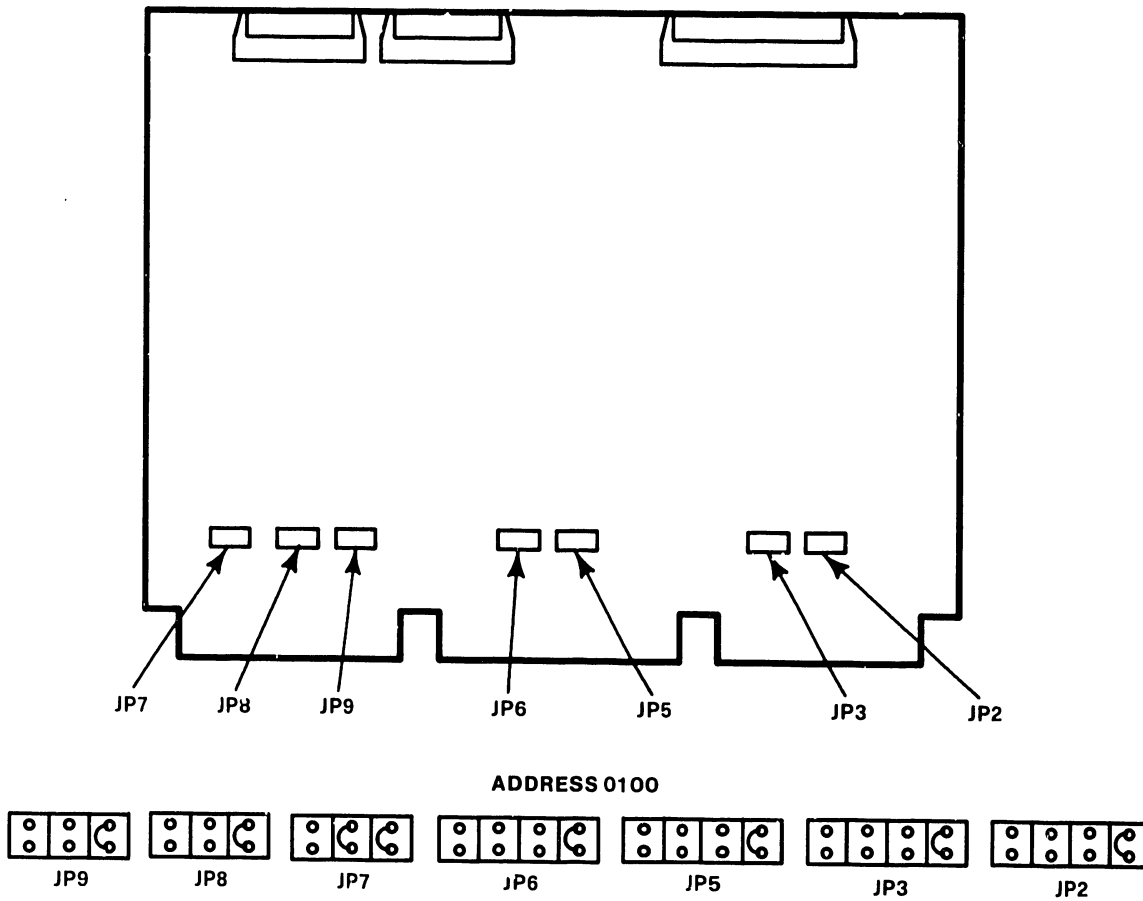


7.3.5 SMD 2-PORT BOARD (210-9313) REMOVAL

- 1) Disconnect the cables from SMD 2-Port Board connectors J1 - J3.
- 2) Remove the SMD 2-Port Board (210-9313) from backplane option slot in the manner described in paragraph 7.3.
- 3) After checking jumper locations/positions (figure 7-11) and switch settings (table 7-4, figure 7-12) install the new SMD 2-Port board.
- 4) Reconnect the three cables.

NOTES

- 1) Address 0100 is reserved for External 2-Port and 4-Port SMD DA.
- 2) Address 0200 is reserved for the SCSI Controller Internal Disk Drives.

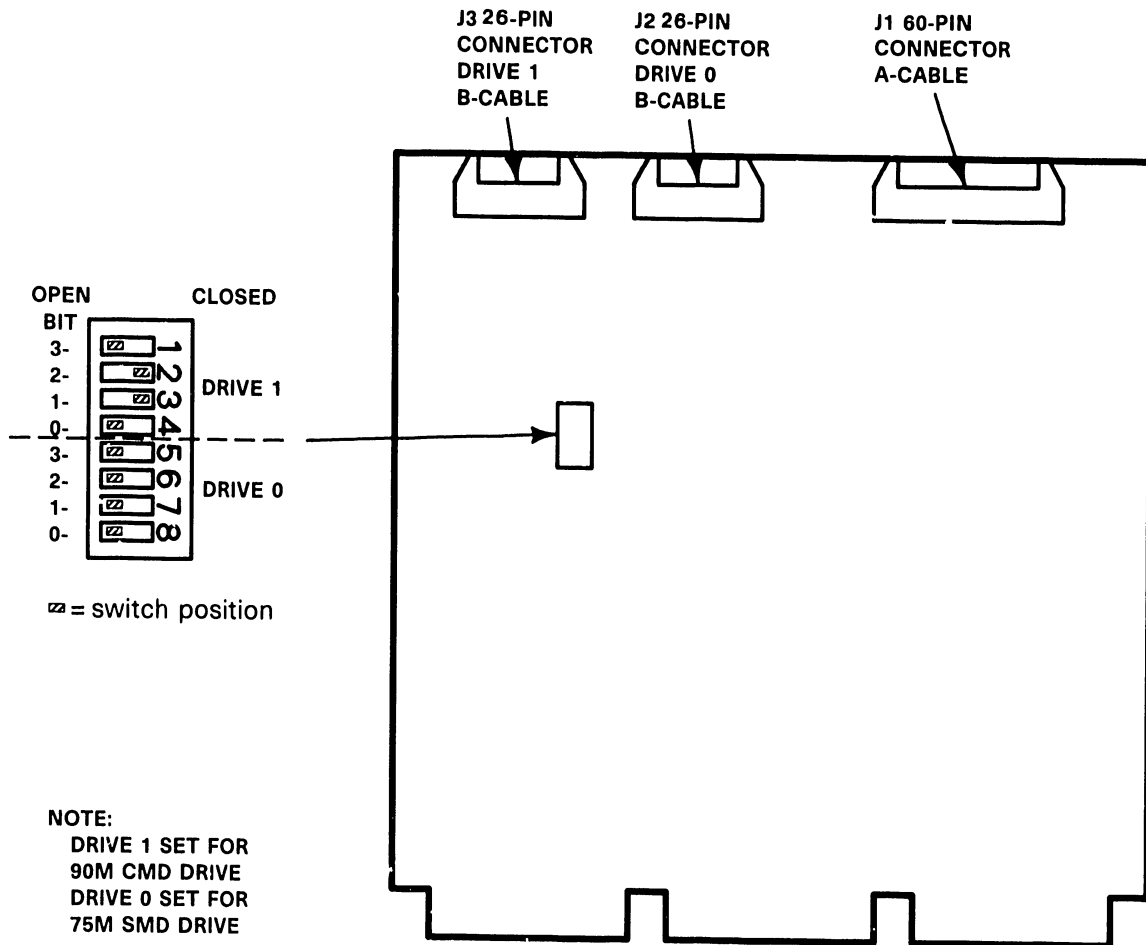


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Figure 7-11. SMD 2-Port Board Jumper Locations/Positions

Table 7-4. External Disk Drive-Type Switch Settings

DRIVE TYPE	SWITCH SETTINGS			
	Bit 3	Bit 2	Bit 1	Bit 0
No Drive	Closed	Closed	Closed	Closed
75M SMD	Open	Open	Open	Open
288M SMD	Open	Open	Open	Closed
30M CMD	Open	Closed	Open	Open
60M CMD	Open	Closed	Open	Closed
90M CMD	Open	Closed	Closed	Open
76M NEC	Closed	Open	Open	Closed
147M NEC	Closed	Open	Closed	Open
620M FMD	Closed	Open	Closed	Closed
76M RSD	Open	Open	Open	Open
314M FSD	Open	Open	Closed	Open



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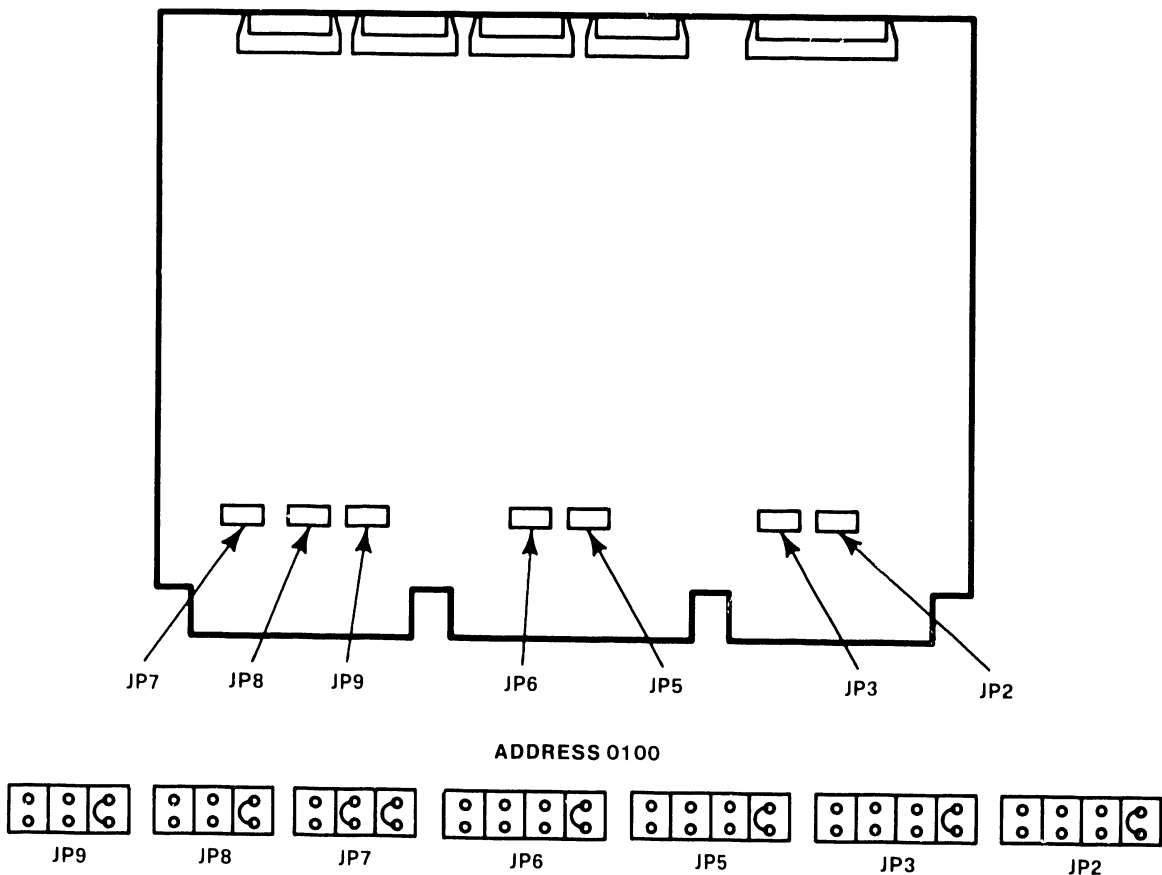
Figure 7-12. 2-Port SMD Switch Location/Drive-type Settings

### 7.3.6 SMD 4-PORT BOARD (210-9315) REMOVAL

- 1) Disconnect the cables from SMD 4-Port Board connectors J1 - J5.
- 2) Remove the SMD 4-Port Board (210-9315) from backplane option slot in the manner described in paragraph 7.3.
- 3) After checking jumper locations/positions (figure 7-13) and switch settings (table 7-5, figure 7-14) install the new SMD 4-Port board.
- 4) Reconnect the cables.

#### NOTES

- 1) Address 0100 is reserved for External 2-Port and 4-Port SMD DA.
- 2) Address 0200 is reserved for the SCSI Controller Internal Disk Drives.

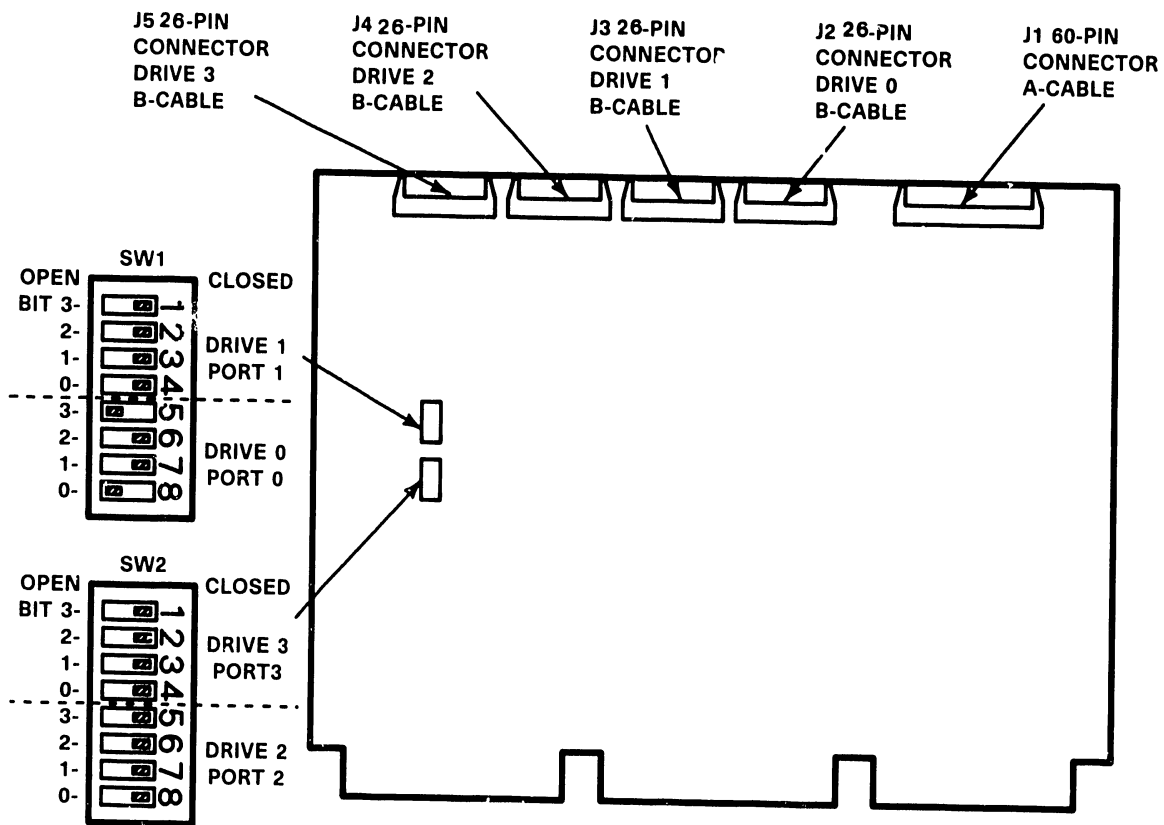


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Figure 7-13. SMD 4-Port Board Jumper Locations/Positions

Table 7-5. External Disk Drive-Type/Switch Settings

DRIVE-TYPE	SWITCH SETTINGS			
	Bit 3	Bit 2	Bit 1	Bit 0
No Drive	Closed	Closed	Closed	Closed
75M SMD	Open	Open	Open	Open
288M SMD	Open	Open	Open	Closed
30M CMD	Open	Closed	Open	Open
60M CMD	Open	Closed	Open	Closed
90M CMD	Open	Closed	Closed	Open
76M NEC	Closed	Open	Open	Closed
147M NEC	Closed	Open	Closed	Open
620M FMD	Closed	Open	Closed	Closed
75M RSD	Open	Open	Open	Open
314M FSD	Open	Open	Closed	Open



☐ = switch position

NOTE:  
 DRIVE 0 SET FOR 90 CMD DRIVE.  
 DRIVE 1-3 SET FOR NO DRIVE.

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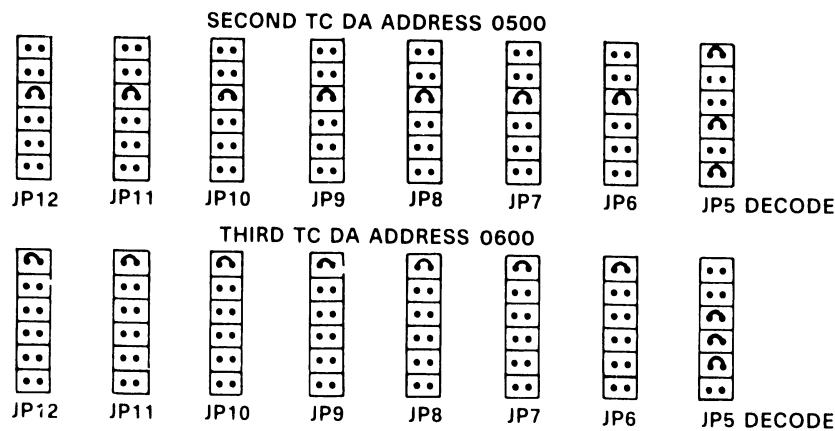
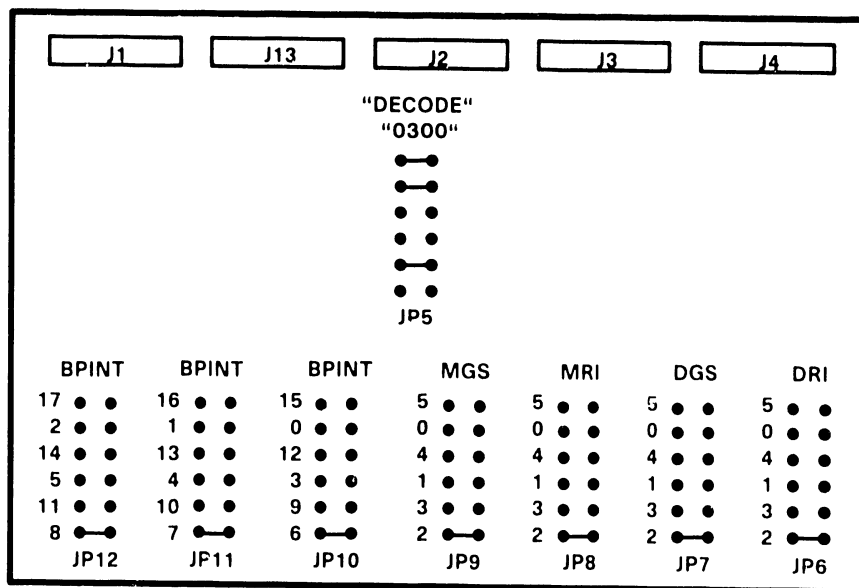
Figure 7-14. SMD 4-Port Board (210-9315) Switch Locations/Settings

### 7.3.7 TC DA 1-PORT BOARD (210-9337) REMOVAL

- 1) Disconnect the cables from TC DA 1-Port Board connectors J1, J2, J3, J13.
- 2) Remove the TC DA 1-Port Board (210-9337) from backplane option slot in the manner described in paragraph 7.3.
- 3) After checking jumper locations/positions (figure 7-15) and switch settings (table 7-6, figure 7-16) install the new TC DA 1-Port board.
- 4) Reconnect the cables.

#### NOTE

The preferred TC DA addresses are 0300 and 0500. If a third TC DA is installed the preferred address is 0600.



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Figure 7-15. TC DA 1-Port Board (210-9337) Jumper Locations/Positions

The TC DA 1-Port switch SW1 is the mode select switch. Normal operation requires all switches to be in the Off (open) position unless the X.21 Interface Option is installed. Refer to table 7-6 for switch definitions and figure 7-16 for switch location.

Table 7-6. TC DA 1-Port Switch Definition

Switch	Switch Name	Purpose	Normal Position
1	Loop on Bit	Repeat TC DA Test Sequence	Open (Off)
2	External Loopback	Supports external RS232 loopback connector	Open (Off)
3	Loop On Error	Repeat any test in error	Open (Off)
4	Stop On Error	Holds error code in TC DA Display. Needs SW3 On	Open (Off)
5	Bypass Power-Up	Bypass power-up test	Open (Off)
6	Loop on Test	Repeats current TC DA Test	Open (Off)
7	X.21 Option	Supports X.21 Interface	Open (Off)
8	128K Option	Supports 128K Byte TC Device adapter memory	Open (Off)

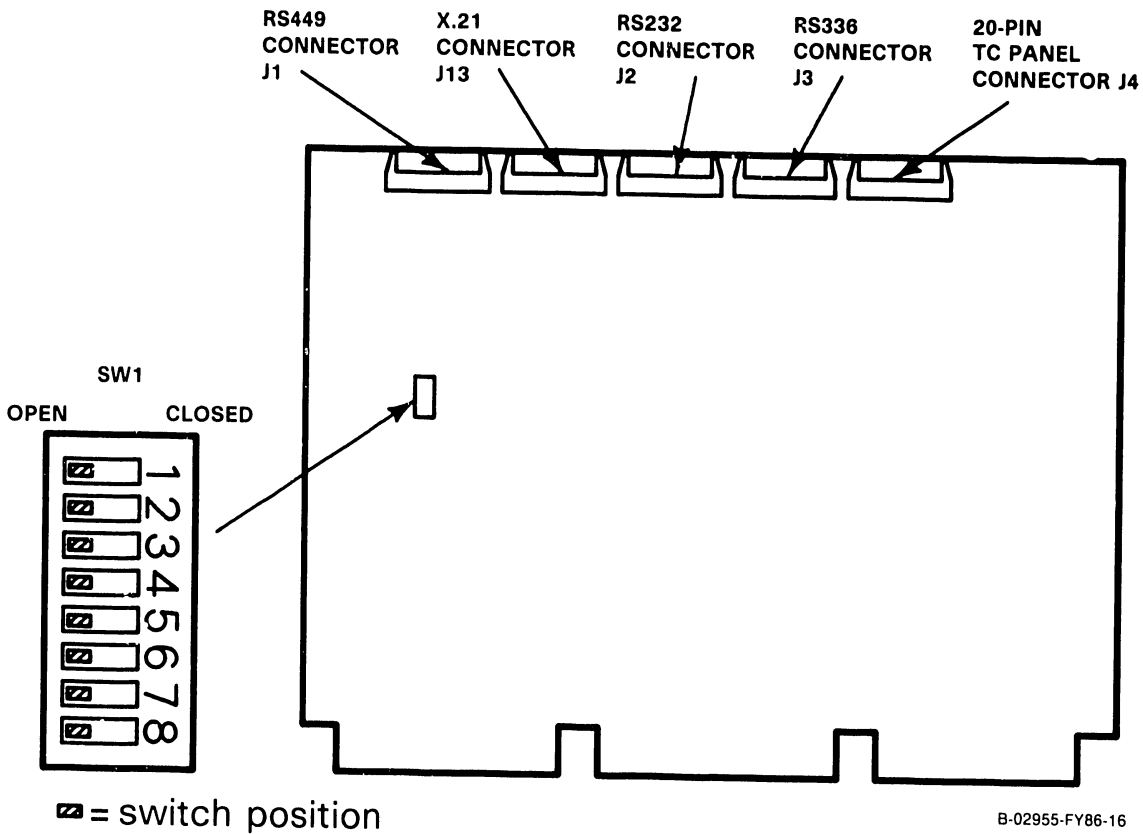


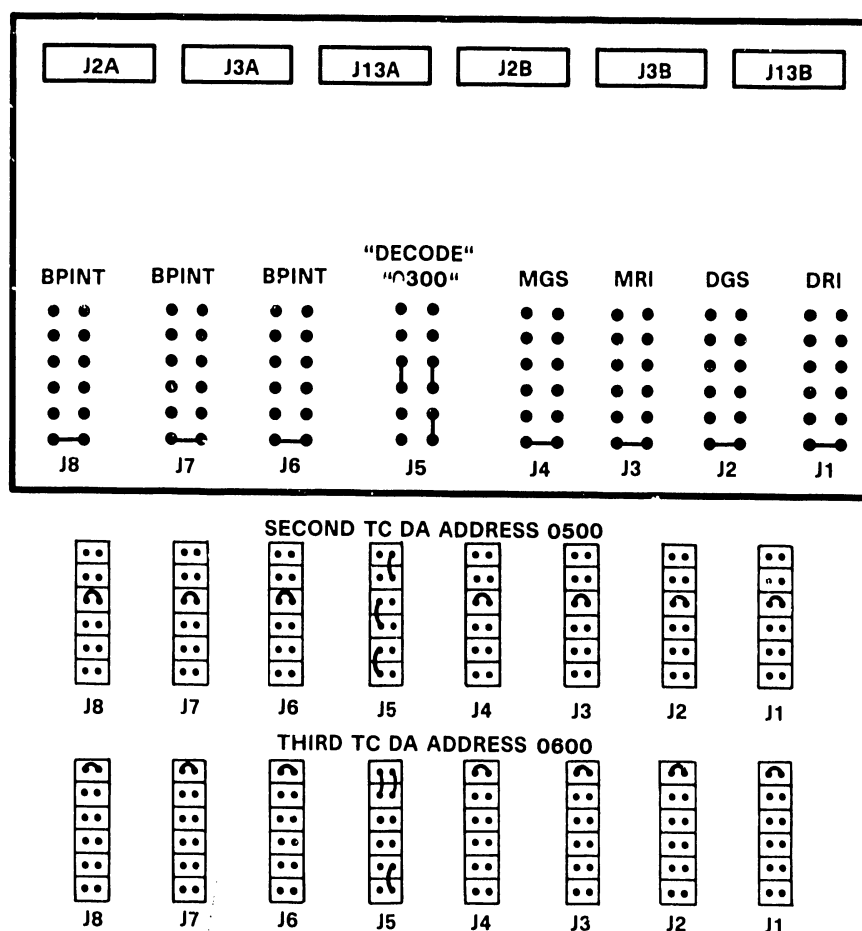
Figure 7-16. TC DA 1-Port Board (210-9337) Switch Settings/Location

### 7.3.8 TC DA 2-PORT BOARD (210-9637) REMOVAL

- 1) Before removing the TC DA 2-Port from the backplane option slot, disconnect all cables from the top of the board.
- 2) Remove the TC DC in the manner described in paragraph 7.3 steps 3-4. Ease the TC DA out of the card cage about three inches and remove the TC front panel cables.
- 3) After checking jumper locations/positions (figure 7-17) and switch settings (table 7-7, figure 7-18), install the new TC DA 2-Port board half-way into the card cage and reconnect the TC front panel cables.
- 4) Install the TC DA completely into the motherboard and reconnect all cables.

#### NOTE

The preferred TC DA addresses are 0300 and 0500. If a third TC DA is installed the preferred address is 0600.



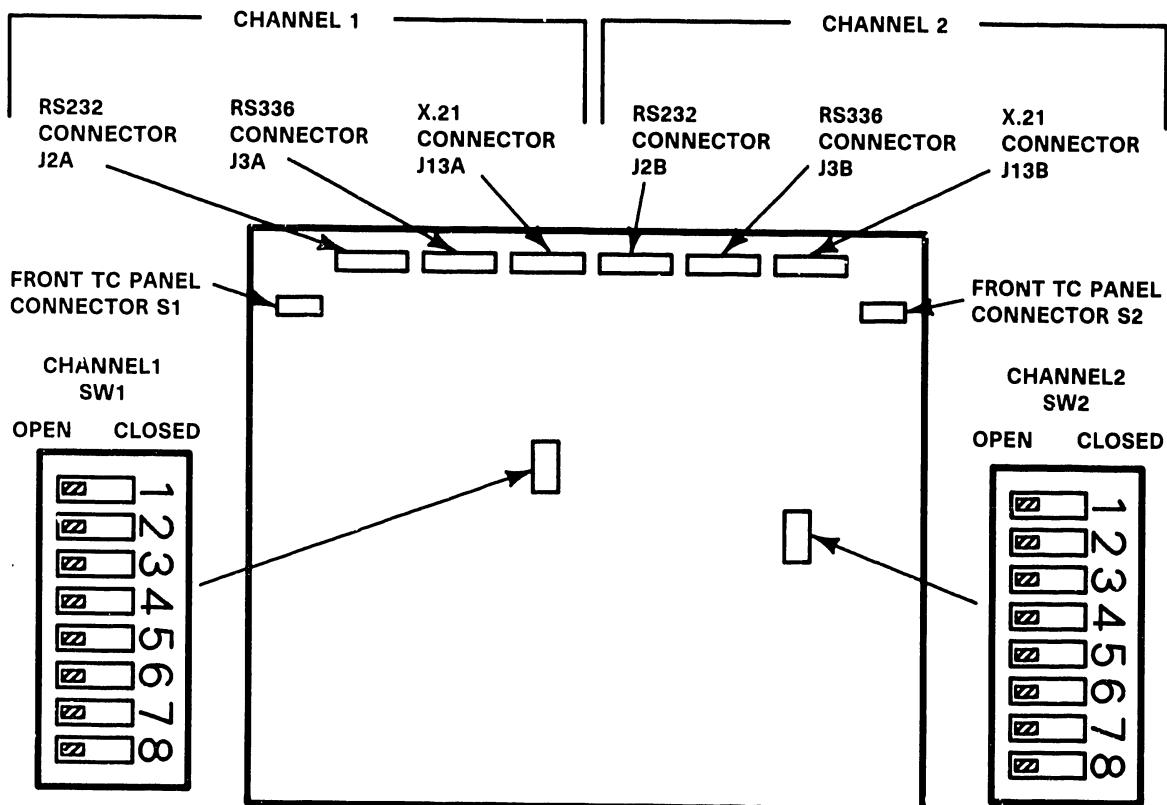
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Figure 7-17. TC DA 2-Port Board (210-9637) Jumper Locations/Positions

The TC DA 2-Port board contains two switches denoted SW1 and SW2. Switch SW1 is the mode select switch for channel 1 and Switch SW2 is the mode select switch for channel 2. Normal operation requires all switches to be in the Off (open) position unless the X.21 Interface Option is installed. Refer to table 7-7 for switch definitions and figure 7-18 for switch locations.

Table 7-7. TC DA 2-Port Switch Definition

Switch	Switch Name	Purpose	Normal Position
1	Loop on Bit	Repeat TC DA Test Sequence	Open (Off)
2	External Loopback	Supports external RS232 loopback connector	Open (Off)
3	Loop On Error	Repeat any test in error	Open (Off)
4	Stop On Error	Holds error code in TC DA Display. Needs SW3 On	Open (Off)
5	Bypass Power-Up	Bypass power-up test	Open (Off)
6	Loop on Test	Repeats current TC DA Test	Open (Off)
7	X.21 Option	Supports X.21 Interface	Open (Off)
8	128K Option	Supports 128K Byte TC Device adapter memory	Open (Off)



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Figure 7-18. TC DA 2-Port Board (210-9637) Switch Settings/Location

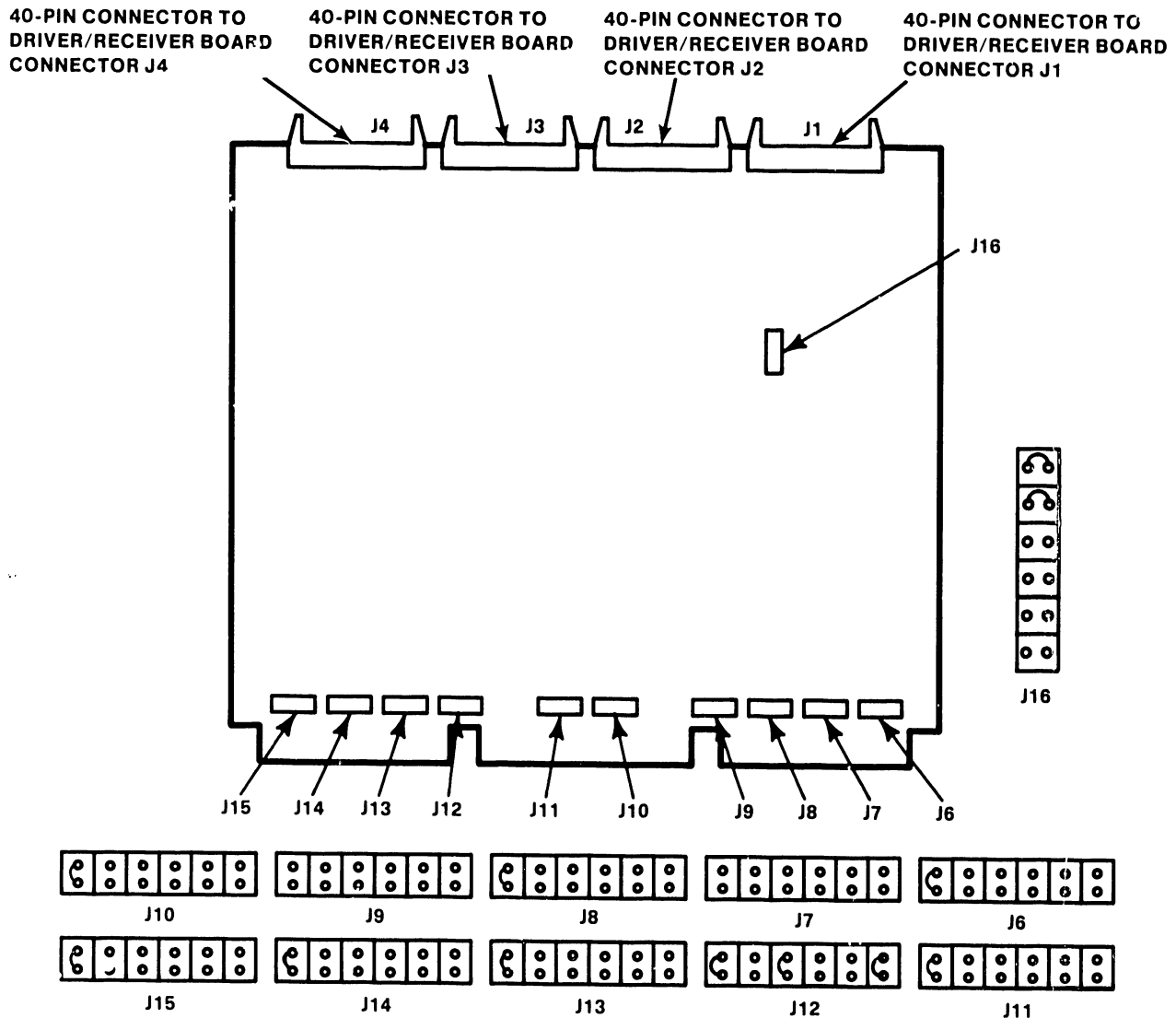


### 7.3.9 ASYNC DEVICE CONTROLLER (210-9355) REMOVAL

- 1) Before removing the Async Device Controller from the backplane option slot, disconnect all cables from the top of the board.
- 2) Remove the Async Controller in the manner described in paragraph 7.3.
- 3) After checking jumper locations/positions (figure 7-19), install the new Async Device Controller into the card cage.
- 4) Reconnect all cables.

#### NOTE

Async Controller should be jumpered for address 0600.  
 Jumper headers J7 and J9 have all jumpers removed.



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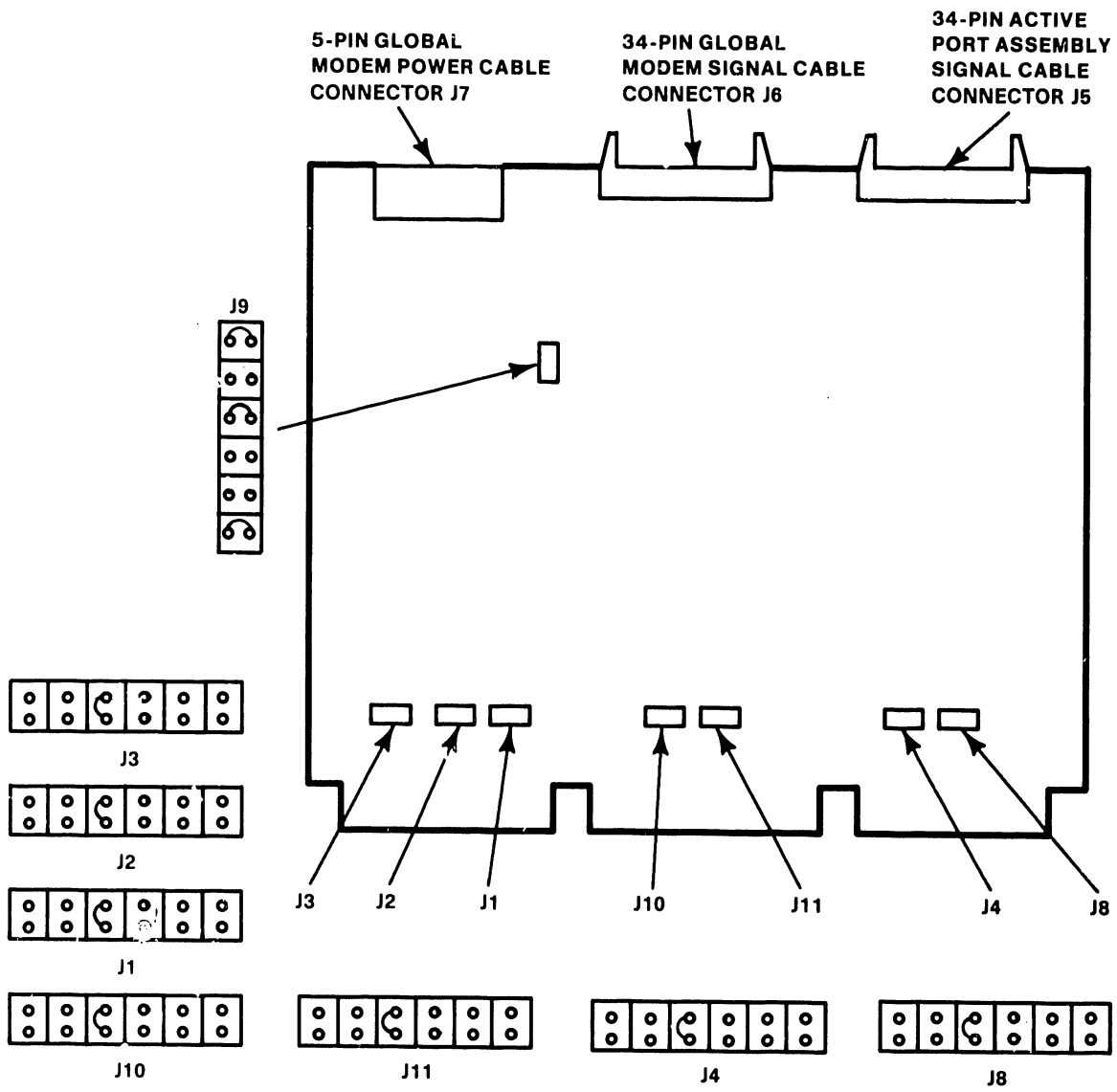
Figure 7-19. Async Device Controller (210-9355) Jumper Locations/Positions

7.3.10 UISIO BOARD (210-8489) REMOVAL

- 1) Before removing the UISIO Board from the backplane option slot, disconnect all cables from the top of the board.
- 2) Remove the UISIO Board in the manner described in paragraph 7.3.
- 3) After checking jumper locations/positions (figure 7-20), install the new UISIO Board into the card cage.
- 4) Reconnect all cables.

NOTE

UISIO Board preferred jumper address is 0400.



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Figure 7-20. UISIO Board (210-8489) Jumper Locations/Positions

#### 7.4. 1.2M FLOPPY DRIVE REMOVAL

- 1) Remove floppy drive data cable and power cable.
- 2) Loosen the two screws securing the drive mounting plate to the chassis 1-1/2 turns counterclockwise.
- 3) Slide drive and mounting plate towards rear of unit until screw heads align with screw slot opening.
- 4) Tilt top of drive and mounting plate towards you such that the screw heads clear the slot and lift drive and mounting plate out of unit.

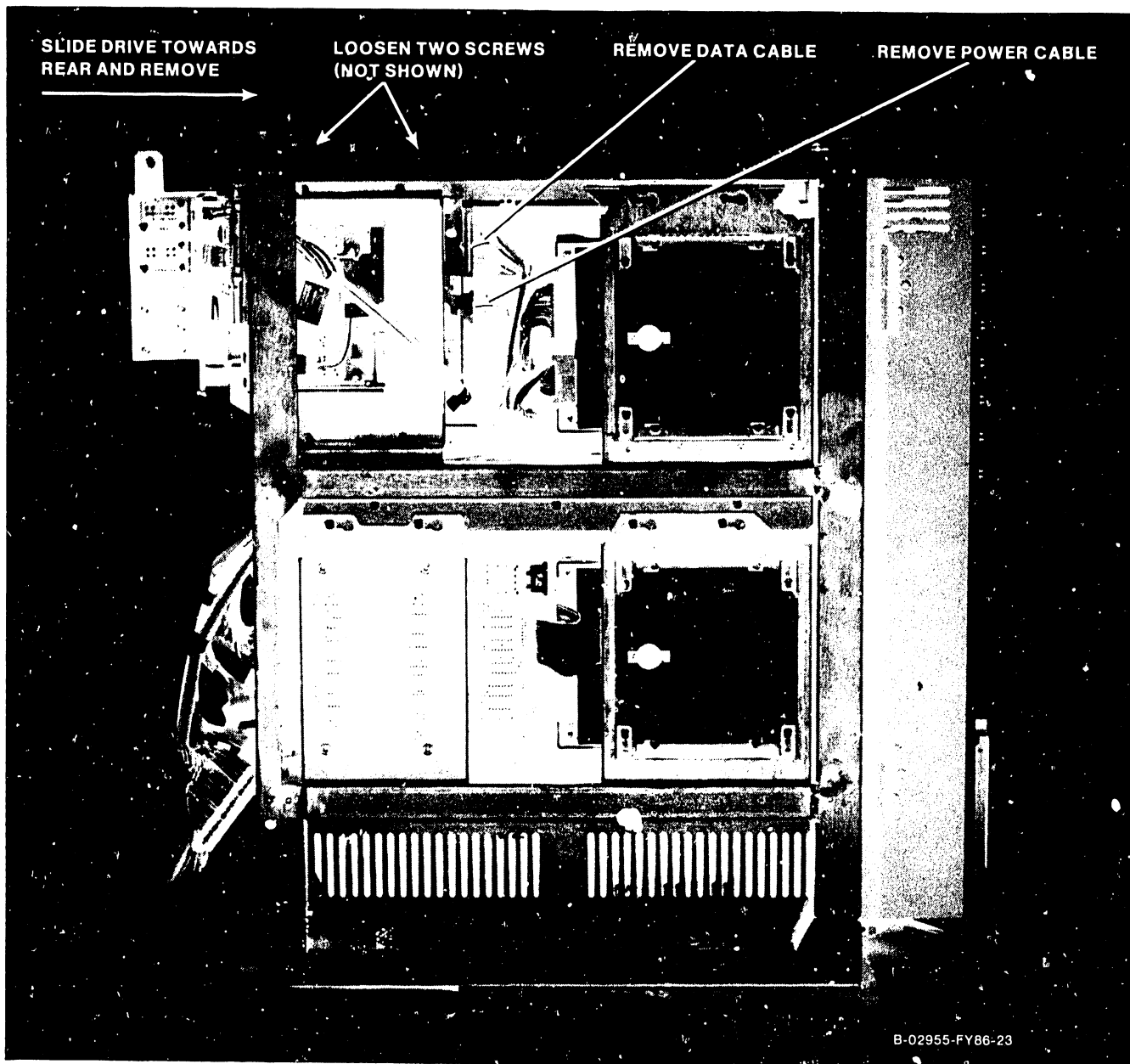


Figure 7-21. Floppy Drive Removal From Mainframe

### 7.4.1 FLOPPY DRIVE MOUNTING BRACKET REMOVAL

- 1) Remove drive from the drive mounting bracket by removing four mounting screws (2 per side). Refer to figure 7-22.

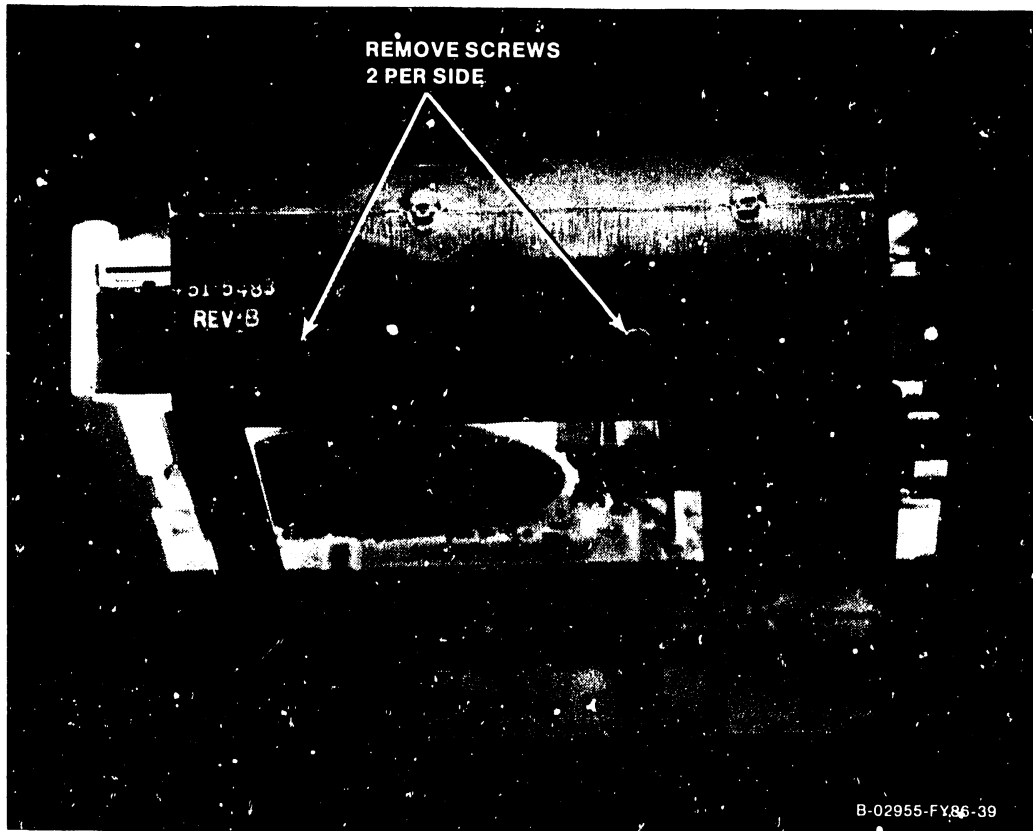
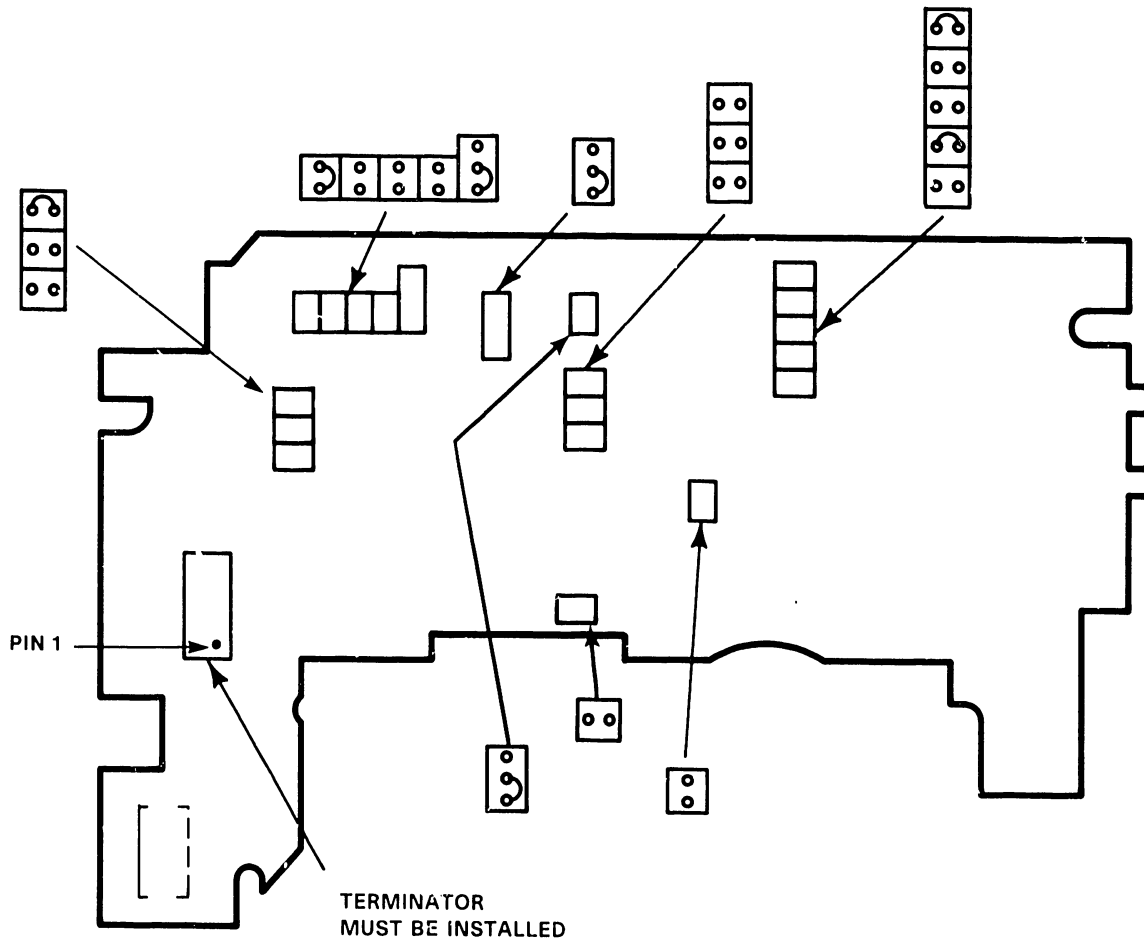


Figure 7-22. Floppy Drive Mounting Bracket Removal

### 7.4.3 FLOPPY DRIVE TERMINATOR CHIP/JUMPER LOCATIONS

- 1) Prior to drive replacement, check the floppy drive (278-4055) for a terminator chip installed at PCA location RPl and jumpers configured as illustrated in figure 7-23.
- 2) Install drive to the drive mounting bracket with the four mounting screws (2 per side) remove in paragraph 7.4.2.
- 3) Position drive and mounting bracket for replacement on the unit and slide drive towards the front of the unit as far as screw slots allow. Tighten mounting screws.
- 4) Replace drive data and power cable.



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Figure 7-23. 1.2M Floppy Drive Terminator/Jumper Locations

### 7.5 67.5MB WINCHESTER DRIVE REMOVAL

- 1) Remove winchester drive data cable, control cable, and power cable.
- 2) Loosen the two screws securing the drive mounting plate to the chassis 1-1/2 turns counterclockwise.
- 3) Slide drive and mounting plate towards rear of unit until screw heads align with screw slot openings.
- 4) Tilt top of drive and mounting plate towards you to clear screw heads from the screw slots and lift drive and mounting plate out of unit.

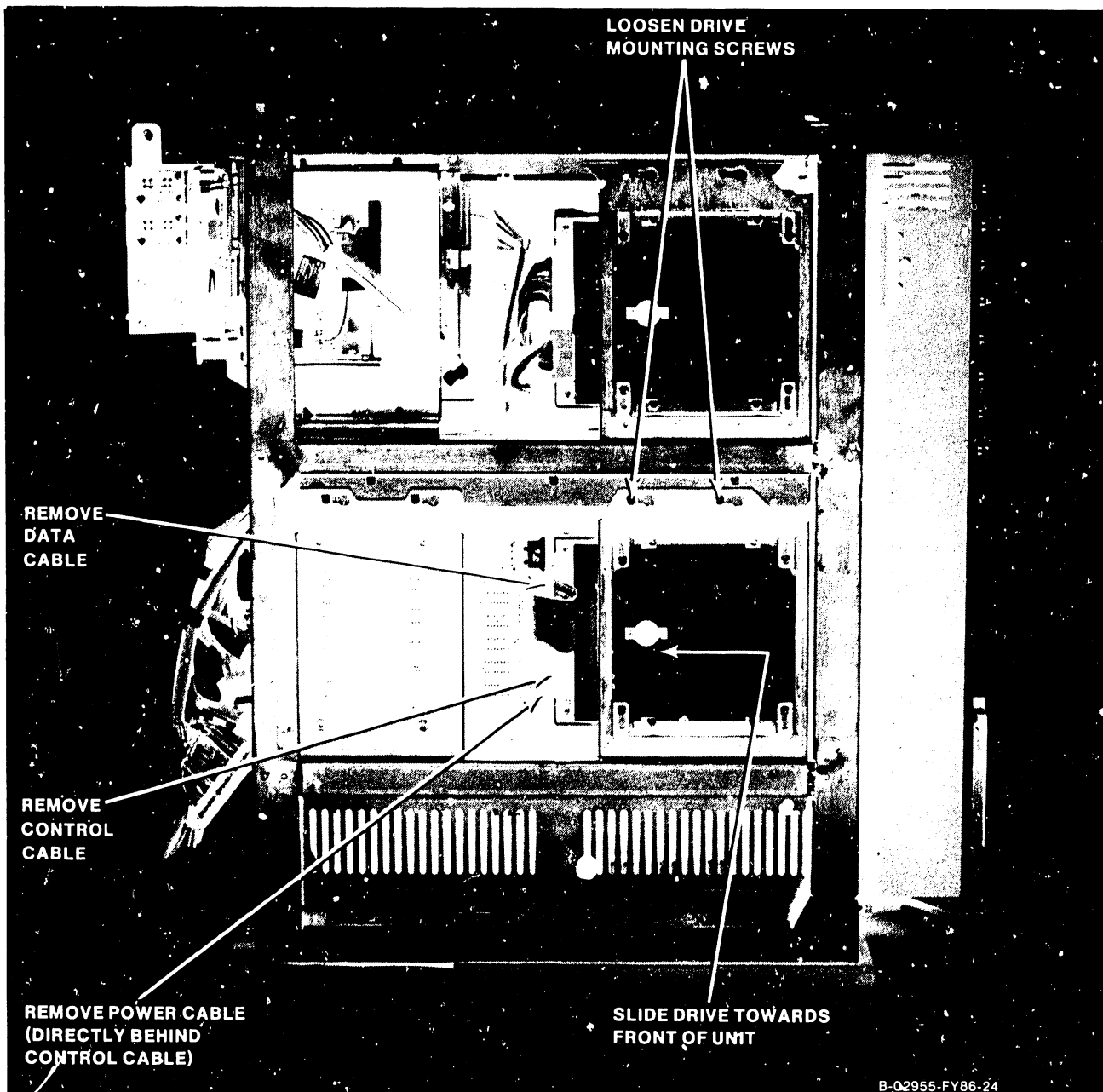


Figure 7-24. 67.5MB Winchester Drive Removal From Mainframe

### 7.5.1 WINCHESTER DRIVE MOUNTING BRACKET REMOVAL

- 1) Remove the drive from the drive mounting bracket by removing four mounting screws (2 per side). Refer to figure 7-25.
- 2) Remove ground spade lug cable from the winchester drive.

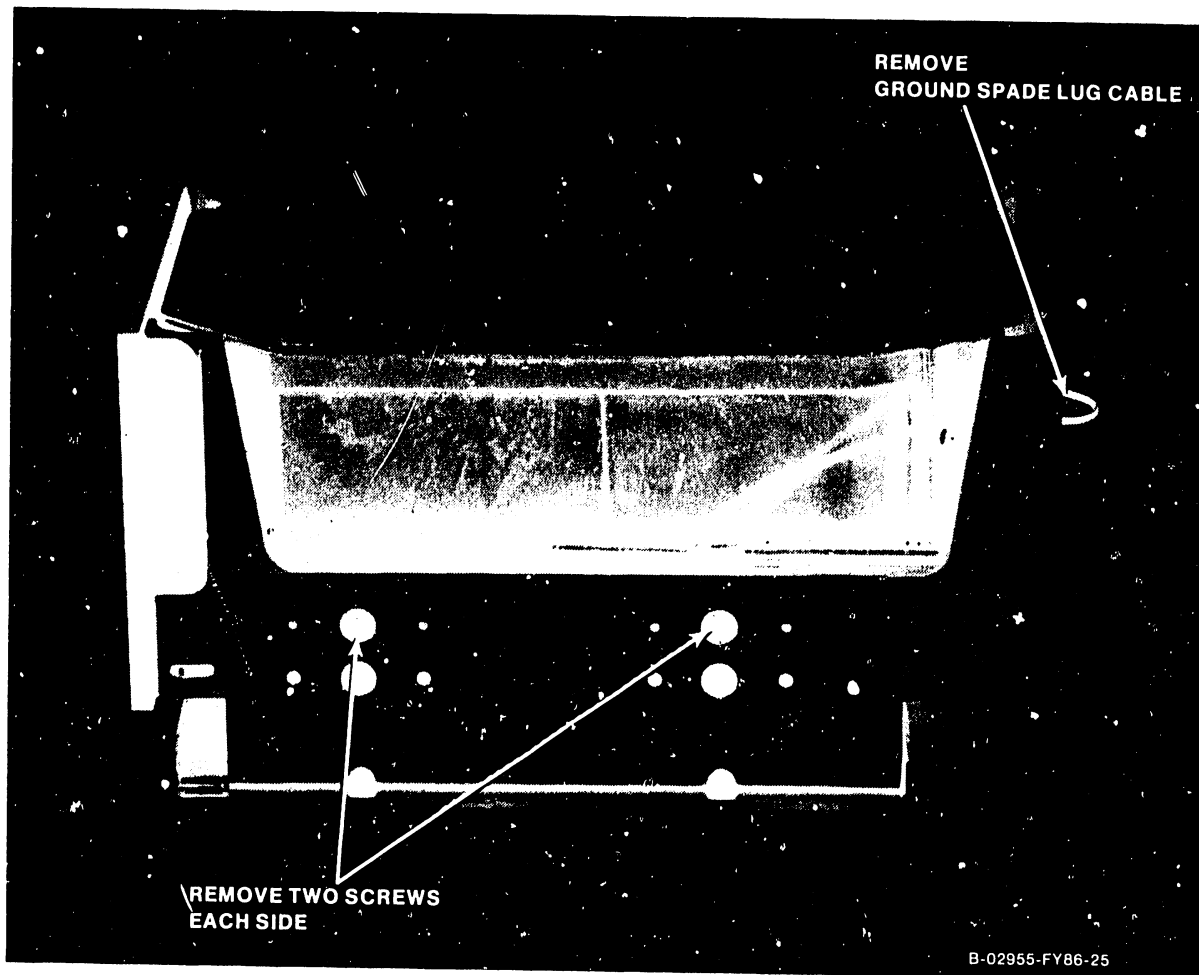


Figure 7-25. Winchester Drive Mounting Bracket Removal

### 7.5.2 67.5MB WINCHESTER DRIVE TERMINATOR/JUMPER ACCESS

Two winchester drive configurations are available, a single drive (drive 0) and a two drive system (drive 0 and drive 1). The single drive system (Drive 0) must have the terminator chip installed at PCA Location RN1 with Drive Select (DS) jumpers as illustrated in figure 7-27. The two drive system requires the terminator be installed in drive 1 and removed from drive 0 with Drive Select jumpers configured as illustrated in figure 7-27.

- 1) Position the drive with drive PCA facing up. Remove the two screws that secure the drive PCA to the drive. Carefully lift the drive PCA upward on its hinge to allow access to terminator/jumpers.

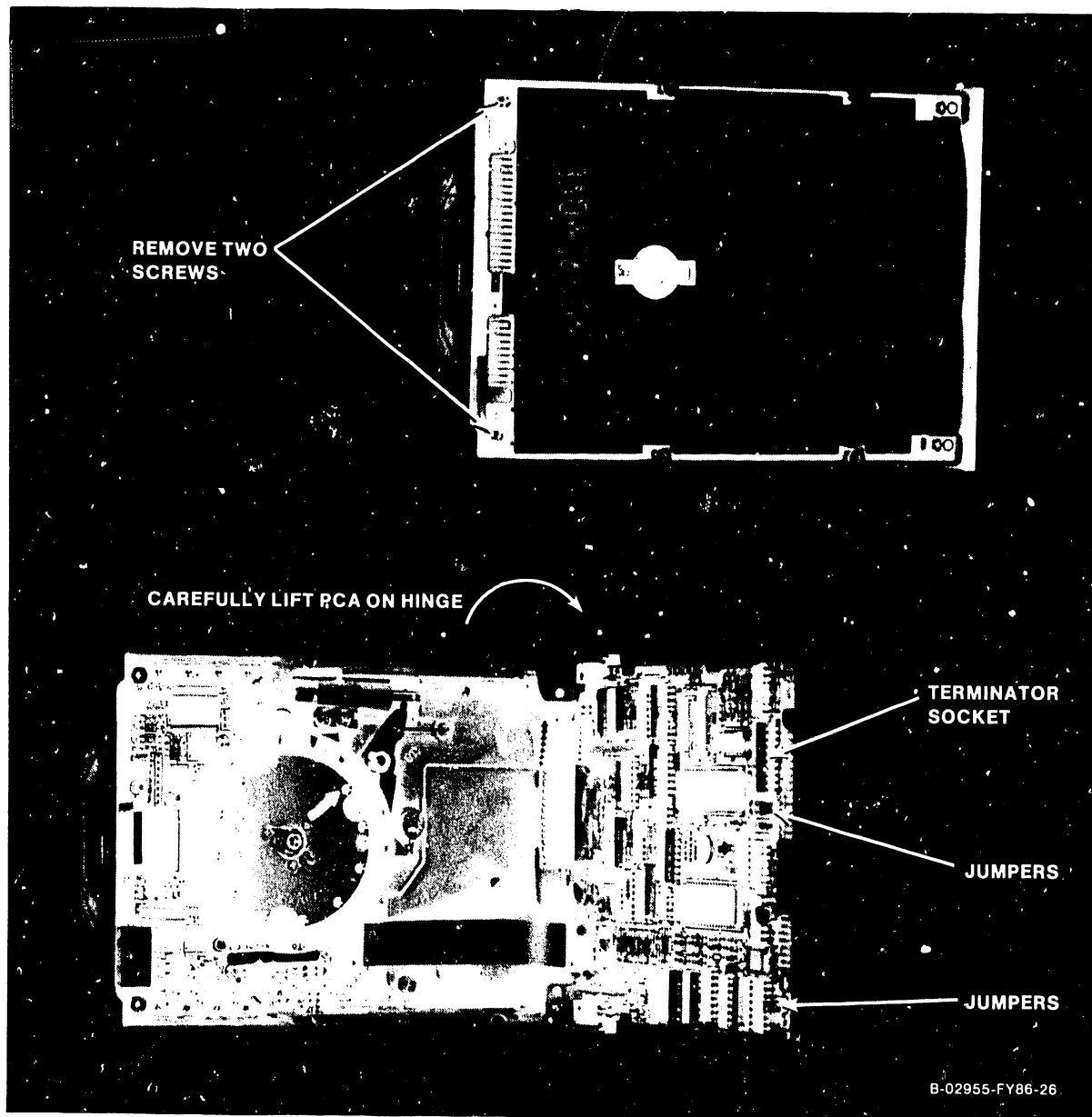
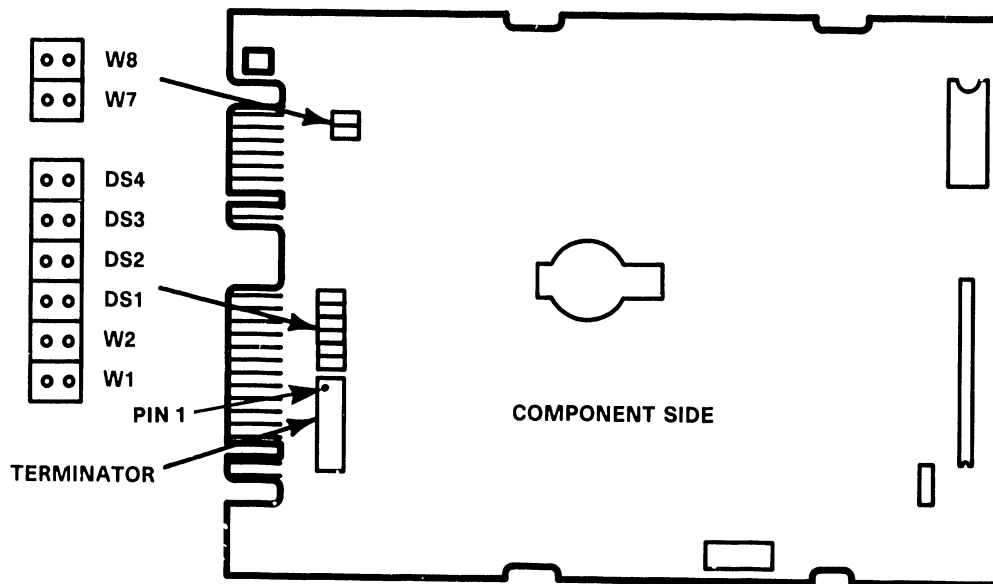


Figure 7-26. 67.5MB Winchester Drive Terminator/Jumper Access



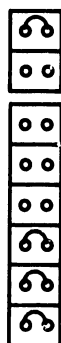
# REPAIR

- 1) Prior to drive replacement, check winchester drive (278-4054) for proper terminator chip/jumper positions.
- 2) Install drive to the drive mounting bracket with the four mounting screws (2 per side) remove in paragraph 7.5.2.
- 3) Connect ground spade lug to winchester drive.
- 4) Position drive and mounting bracket for replacement on the unit and slide drive towards the front of the unit as far as screw slots allow. Tighten mounting screws.
- 5) Replace drive data, control, and power cables.



## SINGLE DRIVE

### DRIVE 0



TERMINATOR  
INSTALLED

## DUAL DRIVE

### DRIVE 0



TERMINATOR  
REMOVED

### DRIVE 1



TERMINATOR  
INSTALLED

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Figure 7-27. 67.5M Winchester Drive Terminator/Jumper Locations

## 7.6. SCSI INTERFACE BOARD REMOVAL

- 1) Note cable location and orientation and remove the following cables from the SCSI Interface Board.
  - a. 50-pin SCSI Interface Cable from connector J4.
  - b. 3-pin Power Cable from connector J5.
  - c. Winchester data cable form connector J3.
  - d. Winchester Drive 1 (if used) control cable from connector J2.
  - e. Winchester Drive 0 control cable from connector J1.
- 2) Loosen the two screws securing the SCSI Interface mounting plate to the chassis 1-1/2 turns counterclockwise.
- 3) Slide SCSI Interface and mounting plate towards the front of unit until screw heads align with screw slot openings.
- 4) Tilt top of SCSI Interface and mounting plate towards you to clear screw heads from the screw slots and lift out of unit.

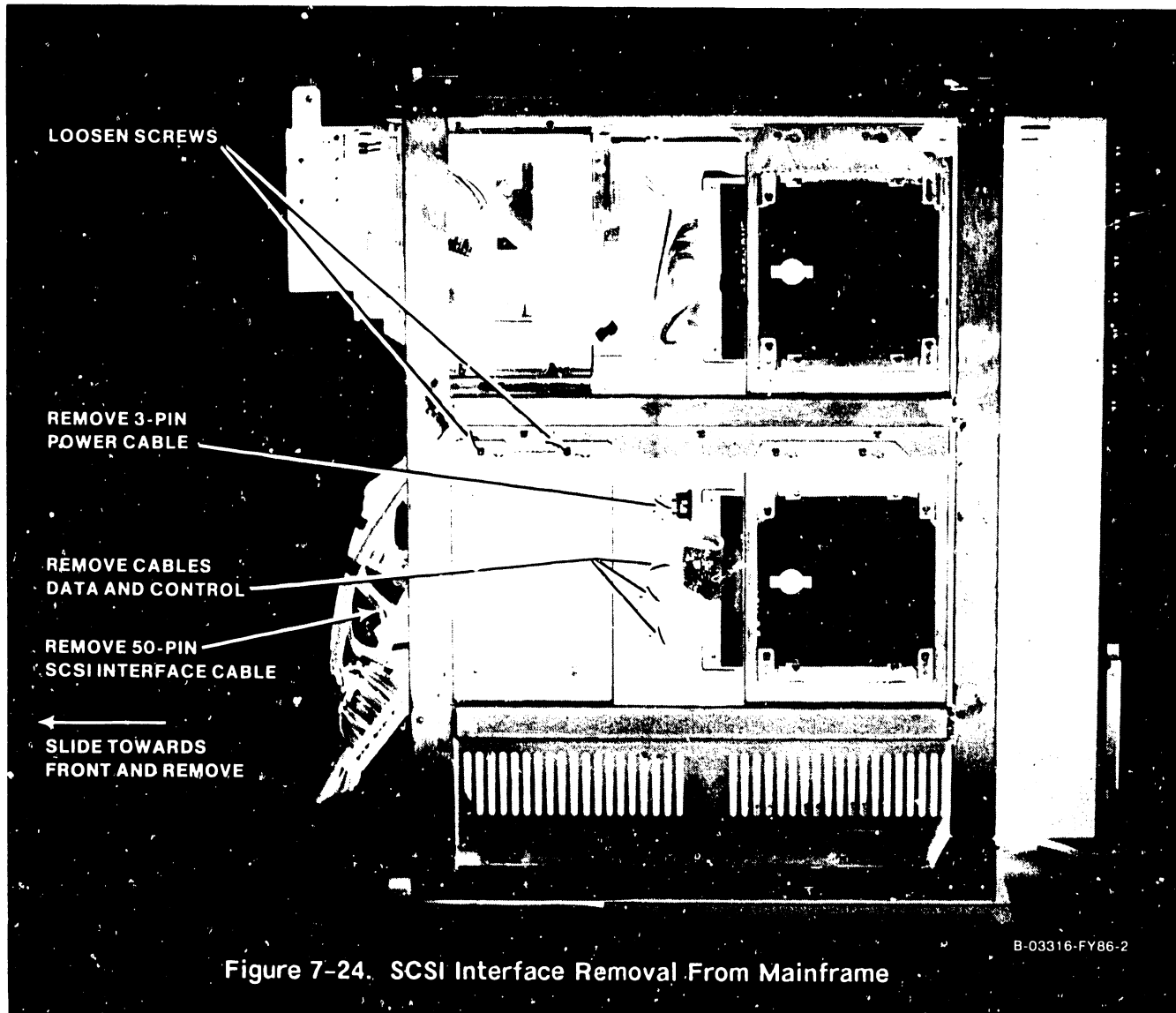
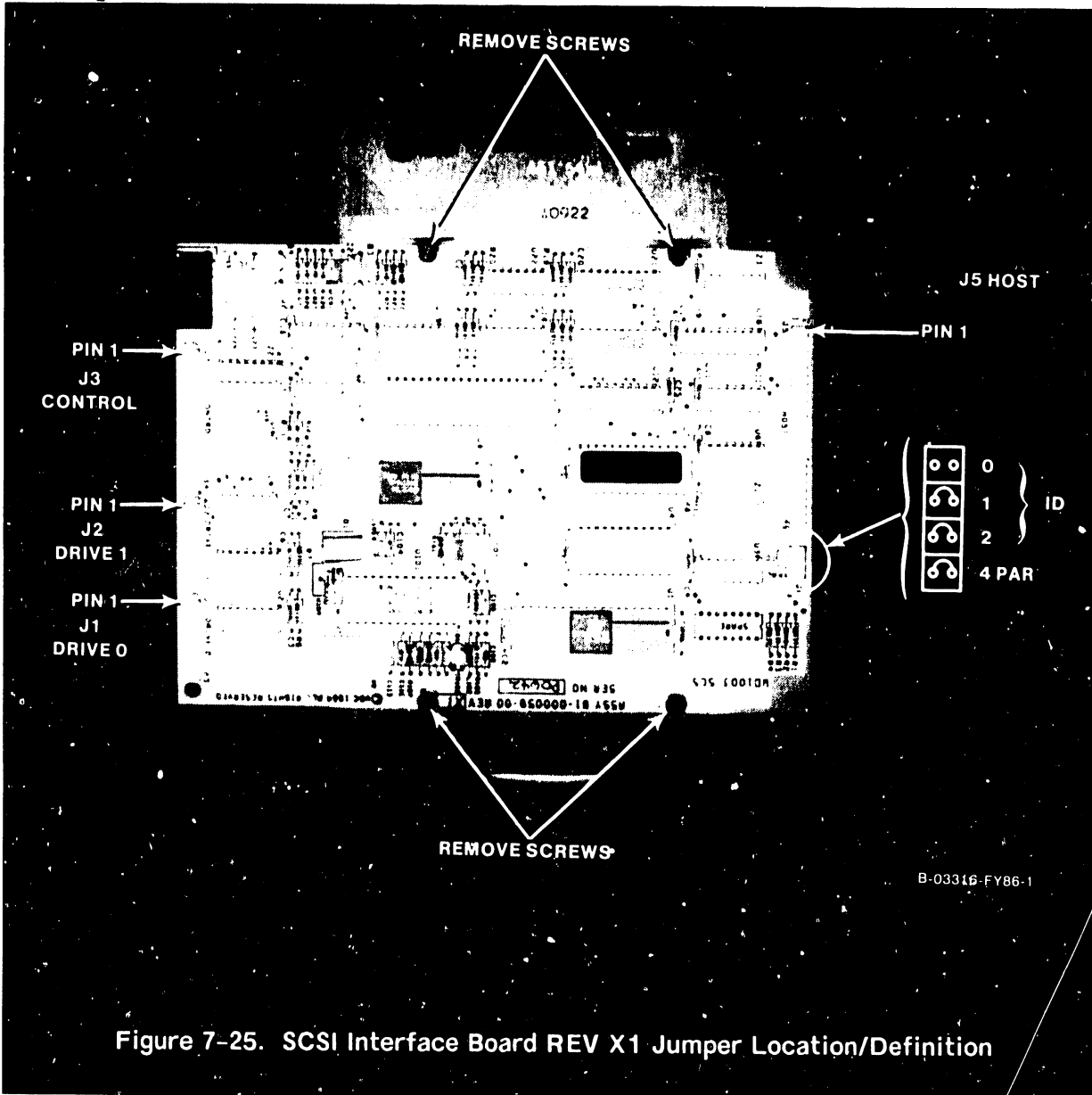


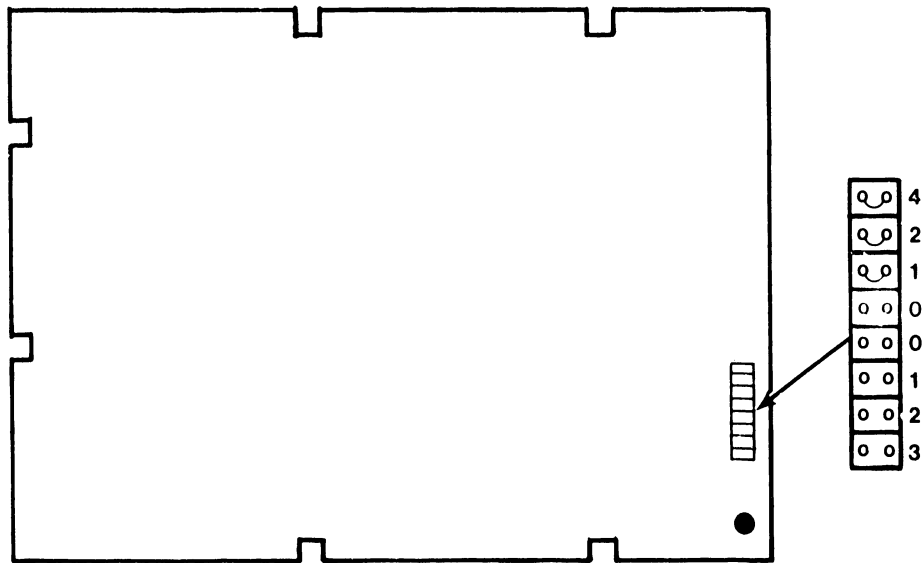
Figure 7-24. SCSI Interface Removal From Mainframe

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7.6.1 SCSI INTERFACE MOUNTING BRACKET REMOVAL/REPLACEMENT

- 1) Remove four screws securing the SCSI Interface to the mounting bracket.
- 2) Prior to SCSI Interface replacement check interface for proper jumper positions (figure 7-25 SCSI Interface Rev X1 or figure 7-25A SCSI Interface Rev X0).
- 3) Install SCSI Interface to the mounting bracket with the four mounting screws remove in step 1 above.
- 4) Position SCSI Interface and mounting bracket for replacement on the unit and slide drive towards the rear of the unit as far as screw slots allow. Tighten mounting screws.
- 5) Replace all cables.





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Figure 7-25A. SCSI Interface Board Rev X0 Jumper Location/Definition

### 7.7 FRONT PANEL PCA (210-9113) REMOVAL/REPLACEMENT

- 1) From the etch side of the PCA, remove the 3-pin keyswitch cable from connector J1 and the 30-pin cable from connector J2.
- 2) Remove the screws that secure the front panel to the bracket assembly.
- 3) Reverse the procedures in step 1 and 2 for replacement.

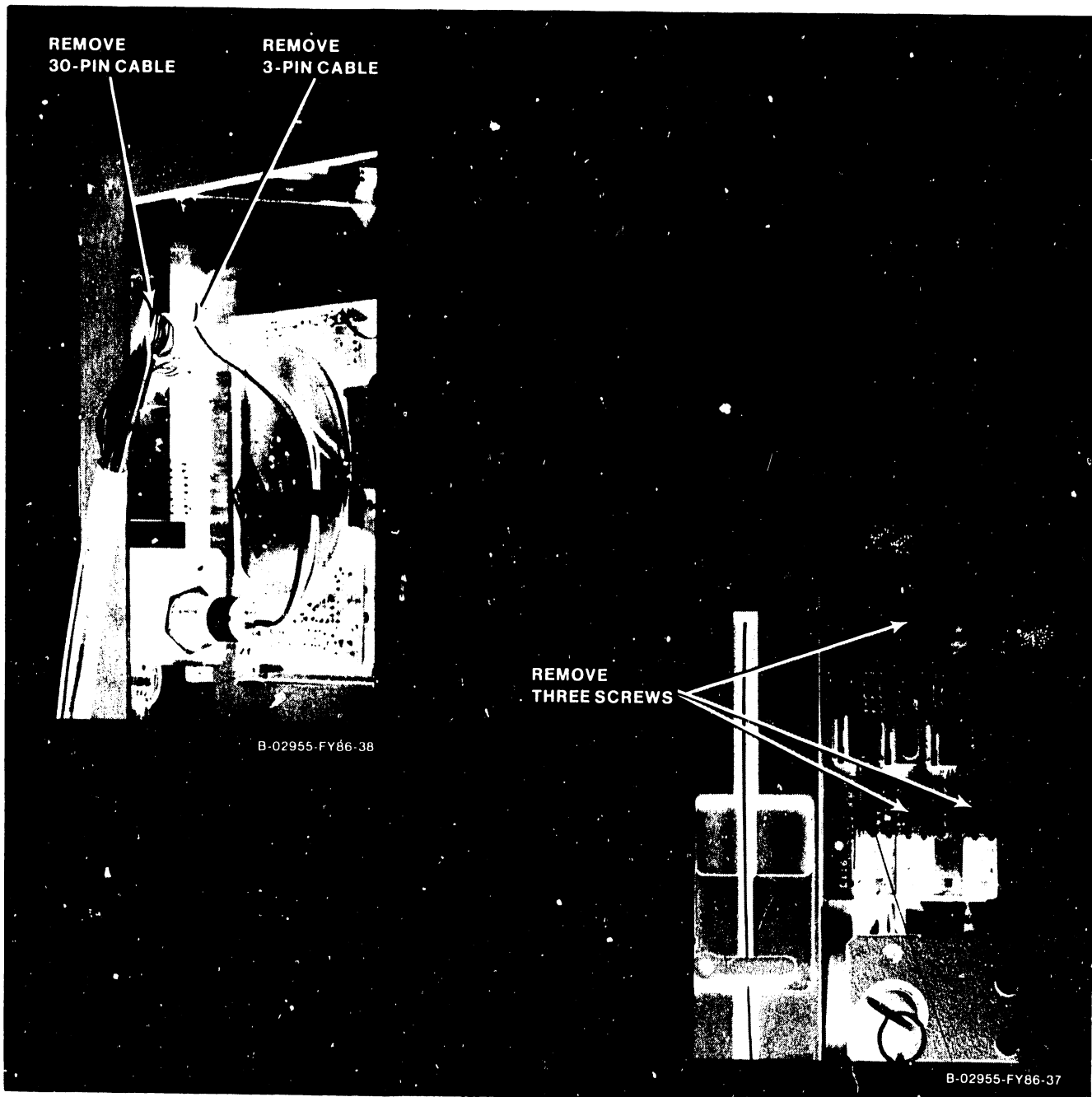


Figure 7-26. Front Panel (210-9113) Removal

### 7.8 TC LIGHT PANEL PCA (210-7785) REMOVAL/REPLACEMENT

A TC Light Panel PCA (210-7785) must be installed for each TC DA port used (i.e. if a 2-port TC DA is installed, two light panels (one per port) must be installed, etc.). The TC Light Panel PCAs mount from the rear of the TC Control panel. Perform the following removal/replacement procedures:

- 1) Turn the fastener 1/2 turn counterclockwise and open the TC Panel to the left on its hinge (paragraph 7.3).
- 2) Remove the 16-pin cable from the connector.
- 3) Remove the three screws that secure the TC Light Panel PCA to the TC Panel.
- 3) Reverse the procedures above for TC Light Panel PCA replacement.

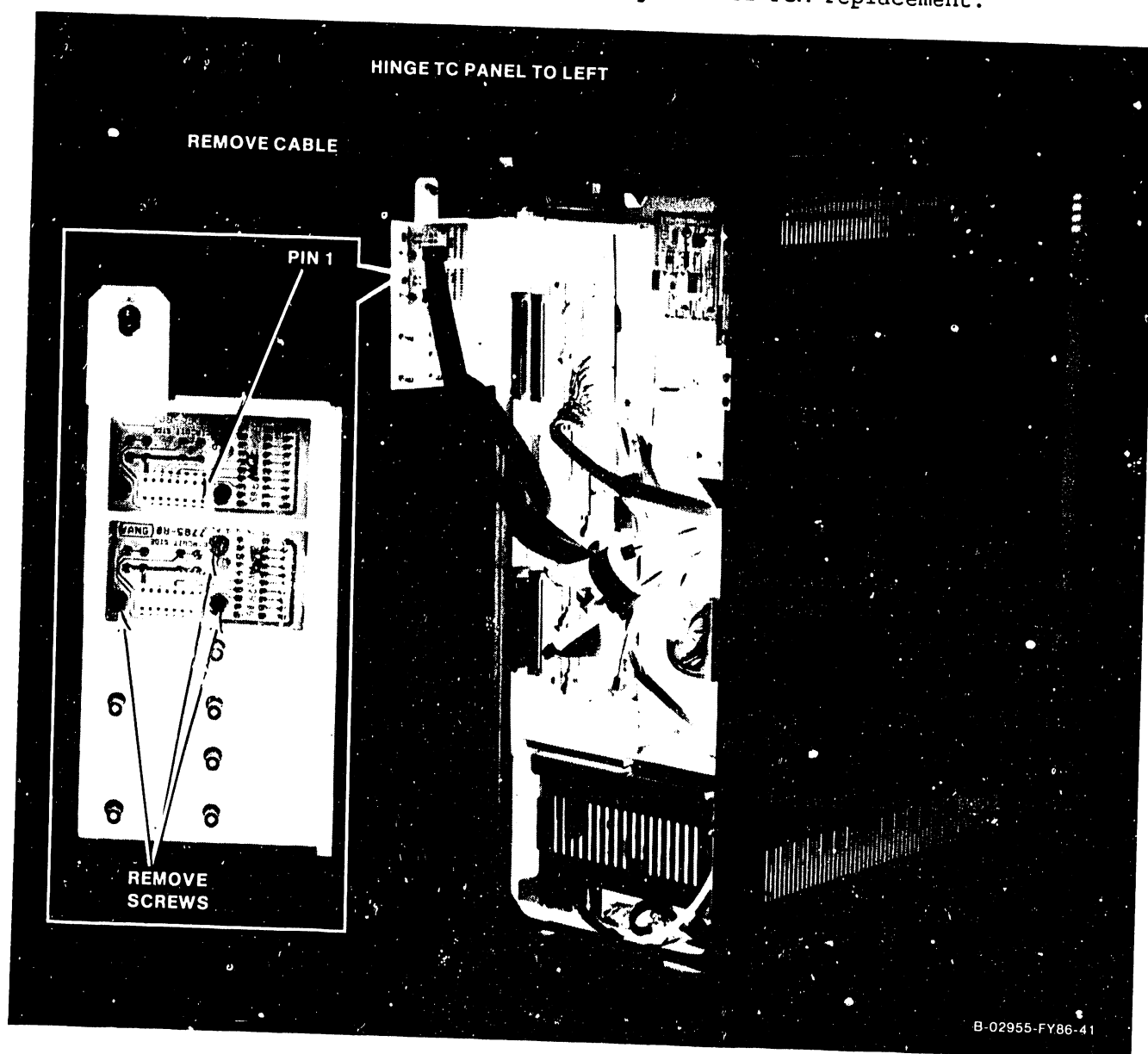


Figure 7-27. TC Light Panel (210-7785) Removal

**7.9 KEYSWITCH ASSEMBLY (220-2451) REMOVAL/REPLACEMENT**

- 1) Remove three-cable connector from the Front Panel connector J1.
- 2) Remove the locknut securing the keyswitch to the keyswitch bracket.
- 3) Slide keyswitch and cable assembly through keyswitch bracket.
- 4) To replace the keyswitch assembly, reverse the procedures above.



Figure 7-28. Keyswitch Assembly Removal

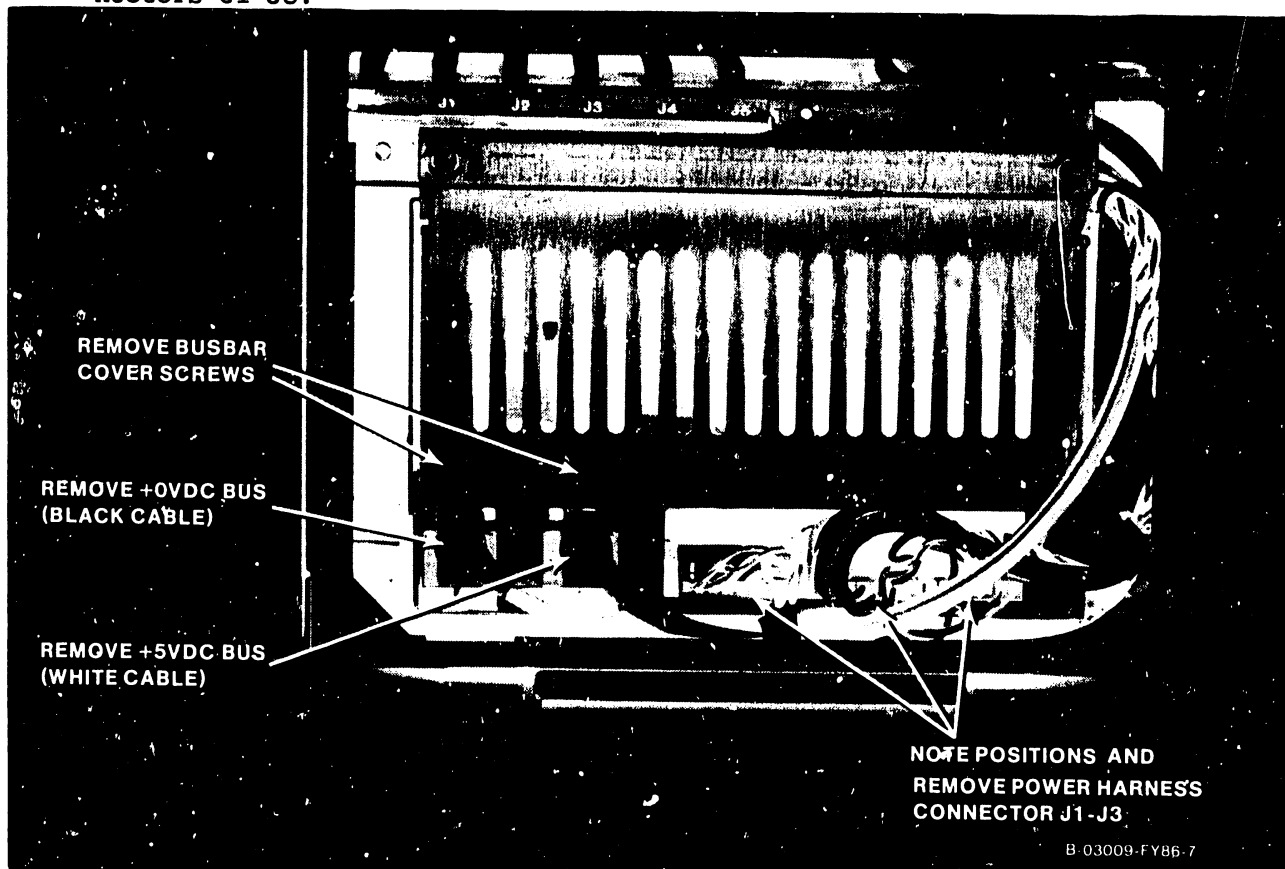
**7.10 SPS500 POWER SUPPLY REMOVAL****WARNING**

DO NOT OPEN THE SWITCHING POWER SUPPLY UNDER ANY CIRCUMSTANCE. EXTREMELY DANGEROUS VOLTAGE AND CURRENT LEVELS. IN EXCESS OF 300 VOLTS DC AND UNLIMITED CURRENT, ARE PRESENT WITHIN THE POWER SUPPLY.

DO NOT ATTEMPT TO REPAIR THE POWER SUPPLY; IT IS FIELD REPLACEABLE ONLY.

AFTER POWERING THE UNIT DOWN AND DISCONNECTING THE AC POWER PLUG FROM THE WALL OUTLET, ALLOW ONE MINUTE BEFORE REMOVING THE POWER SUPPLY TO PROVIDE ADEQUATE TIME FOR ANY RESIDUAL VOLTAGE TO DRAIN THROUGH THE BLEEDER RESISTORS.

- 1) Remove the two screws that secure the Busbar cover.
- 2) Using a 7/16 in. wrench, remove the nuts securing the +5 Vdc and +0 Vdc cables.
- 3) Note connector locations and remove power harness from power supply connectors J1-J3.



**Figure 7-29. Power Supply Cable Removal**



- 4) Remove two screws that secure power supply to mainframe.
- 5) Slide power supply out of the mainframe.

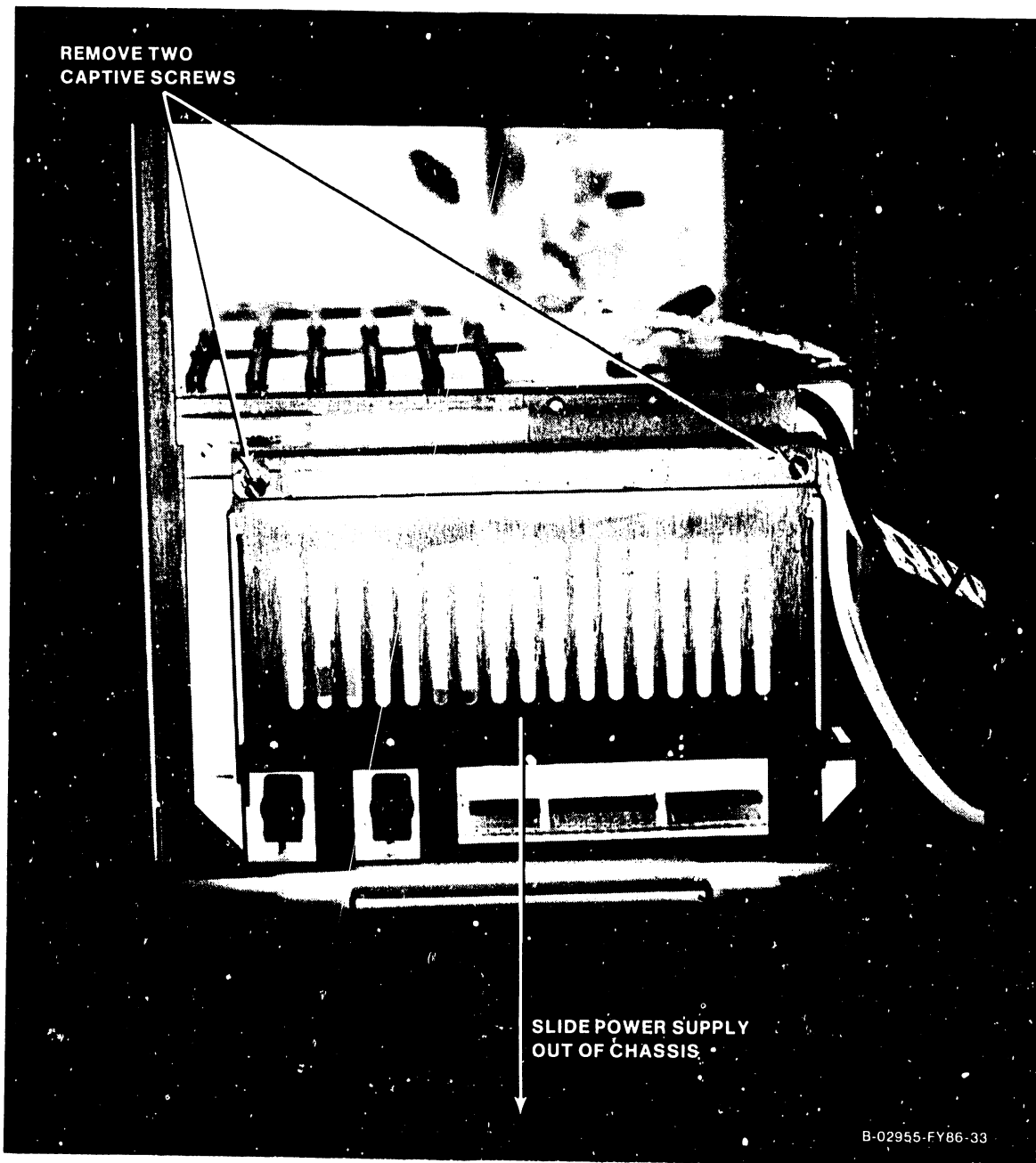


Figure 7-30. Power Supply Removal

## 7.11 MOTHERBOARD REMOVAL/REPLACEMENT

Removal of the motherboard (210-9112) should only be performed if it is determined conclusively that the motherboard is defective. The backplane assembly must be removed in order to replace the motherboard. Perform the following procedures:

- 1) Power down the mainframe and remove the ac cord from the AC receptacle.
- 2) Remove the top, front and side covers (paragraphs 7.2.1, 7.2.2, and 7.2.3).
- 3) Remove all PCAs installed in the card cage (see applicable paragraphs in 7.3).
- 4) Remove power harness from motherboard connector J19.
- 5) Using a 7/16 in. wrench, remove the nuts securing the +5 Vdc and +0 Vdc cables from the motherboard.

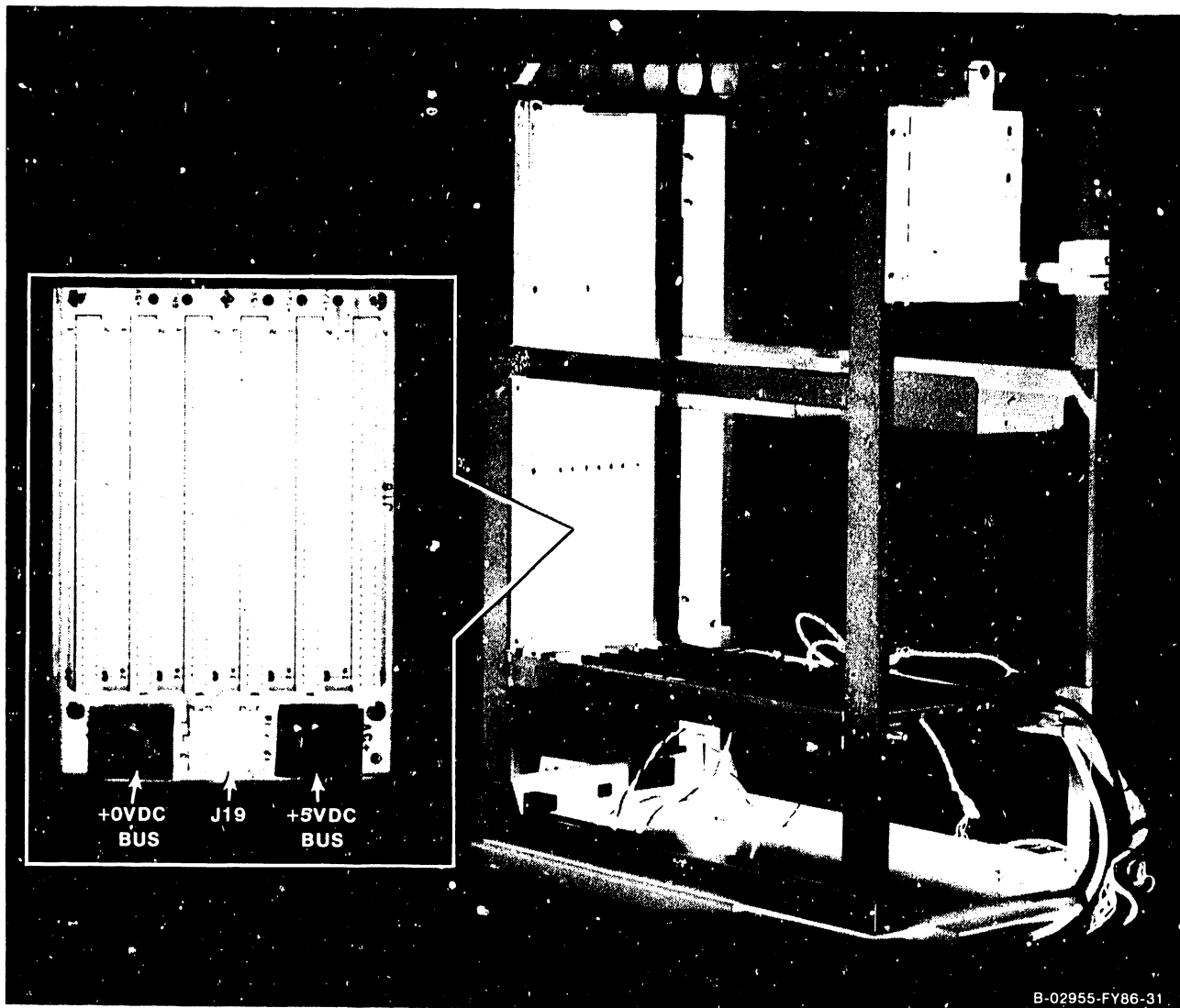


Figure 7-31. Motherboard Cables Removal

## REPAIR

- 6) Open the Bulkhead Door (paragraph 7.12) to access backplane mounting screws.
- 7) Remove the six screws (3 per side) that secure the backplane to the chassis.

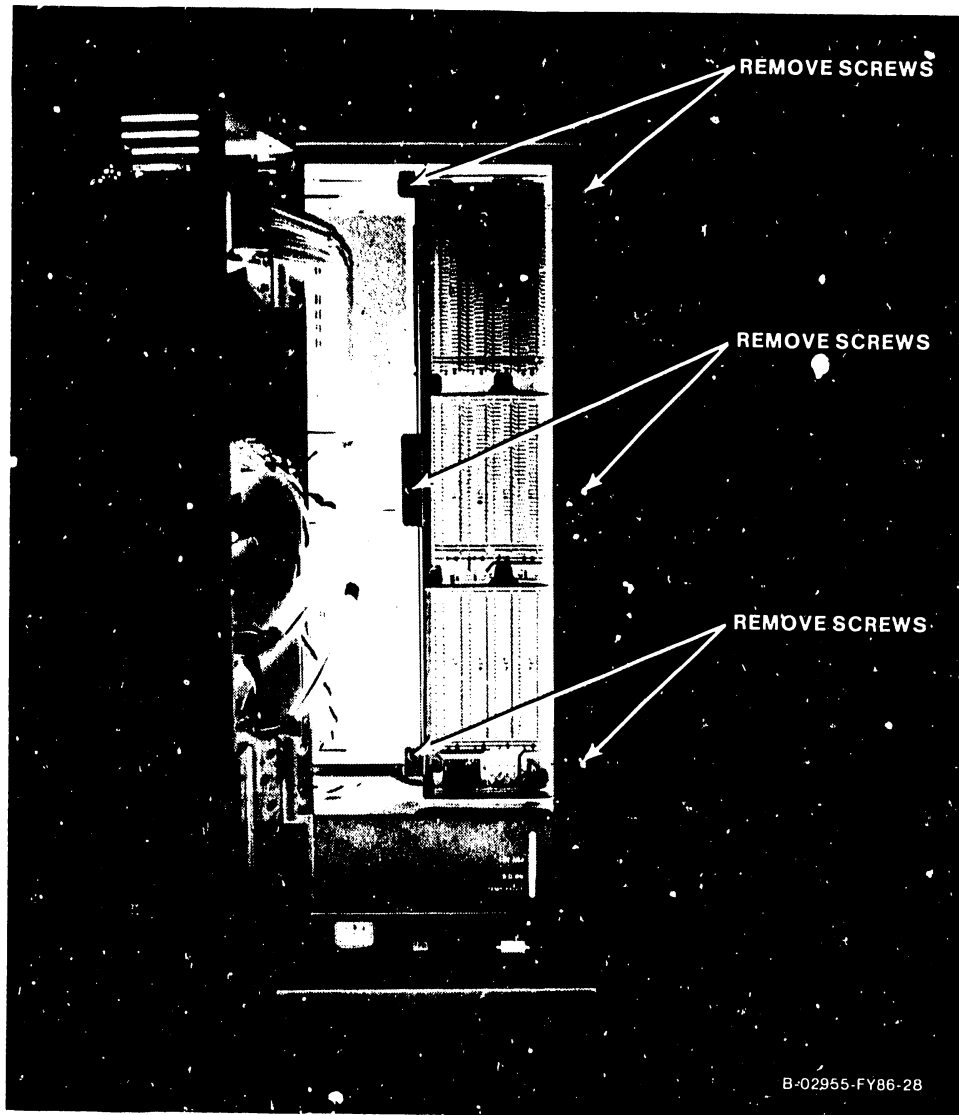


Figure 7-32. Backplane Mounting Screws Locations

- 8) Angle the backplane assembly towards the left (as viewed head-on) and slide the assembly out the bulkhead door opening.

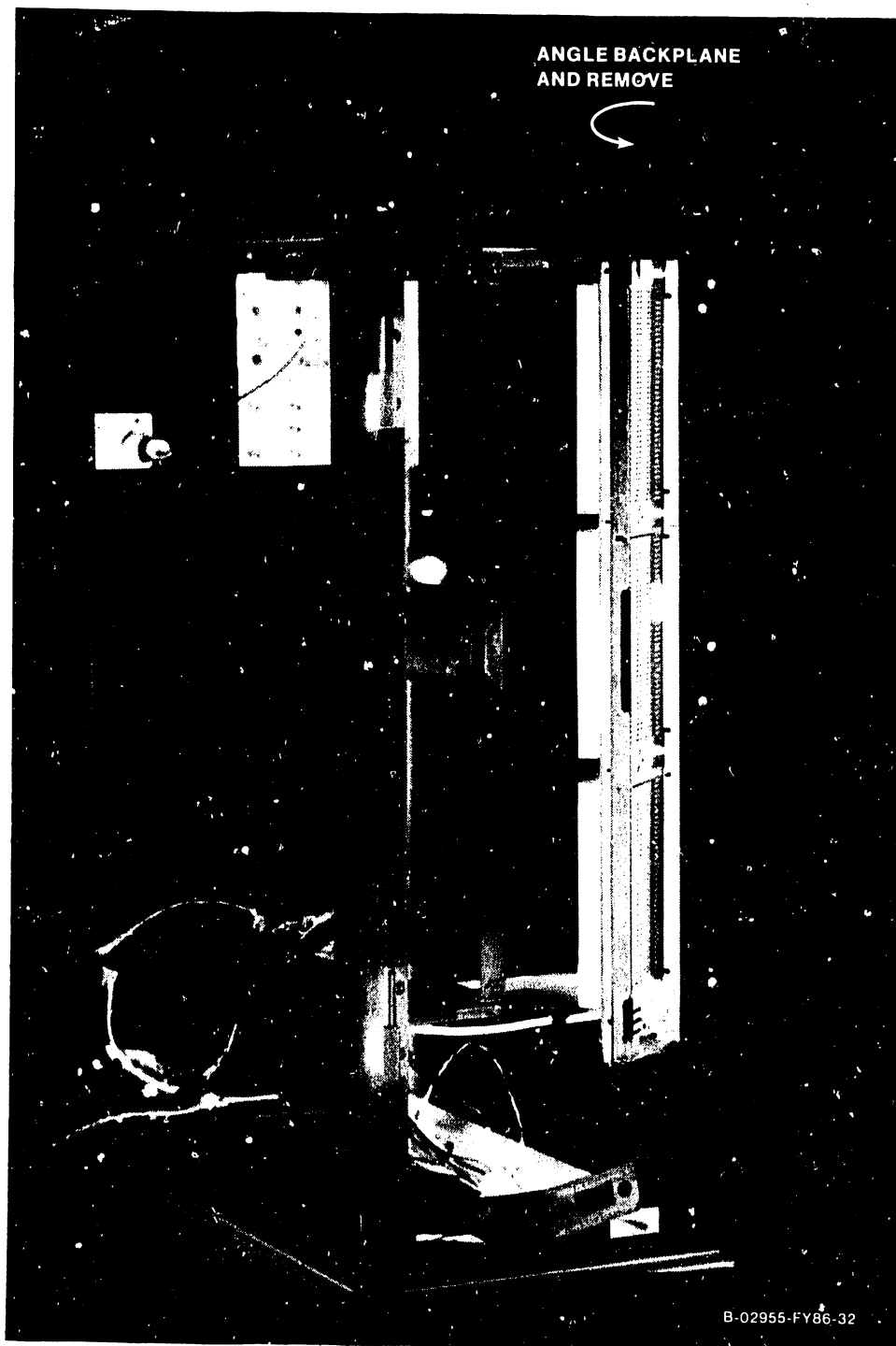


Figure 7-33. Backplane Removal

## REPAIR

- 8) The motherboard is secured to the backplane by 11 screws located on the connector side. Remove these screws to remove the motherboard from the backplane.
- 9) To replace the motherboard, reverse the above procedures taking care to:
  - a) Ensure all screws and nuts are properly re-installed and all cabling are installed correctly.
  - b) Reinstall all circuit boards in correct slot locations and ensure all board cabling is installed properly.

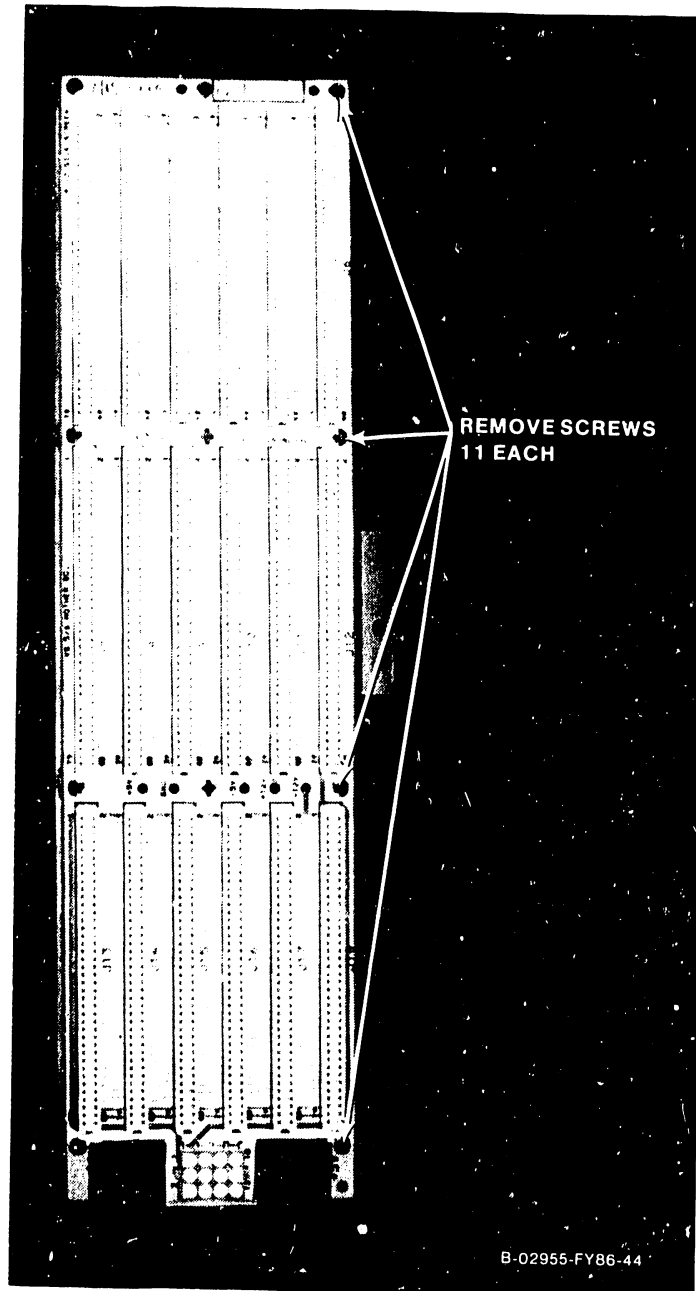


Figure 7-34. Motherboard Removal

## 7.12 BULKHEAD DOOR REMOVAL

The Bulkhead door contains the I/O panels (EAPAs, SCSI, Option panels, etc.) for connections to peripherals. The Bulkhead door can be hinged open or can be removed from its hinges to allow easy access to I/O Panel and panel cabling. Perform the following:

- 1) Turn the three twist-lock screws 1/2 turn counterclockwise.
- 2) Open the bulkhead door to the left, be careful not to open the bulkhead door so far as to put tension on the cables.
- 3) Lift the bulkhead door off its hinges.

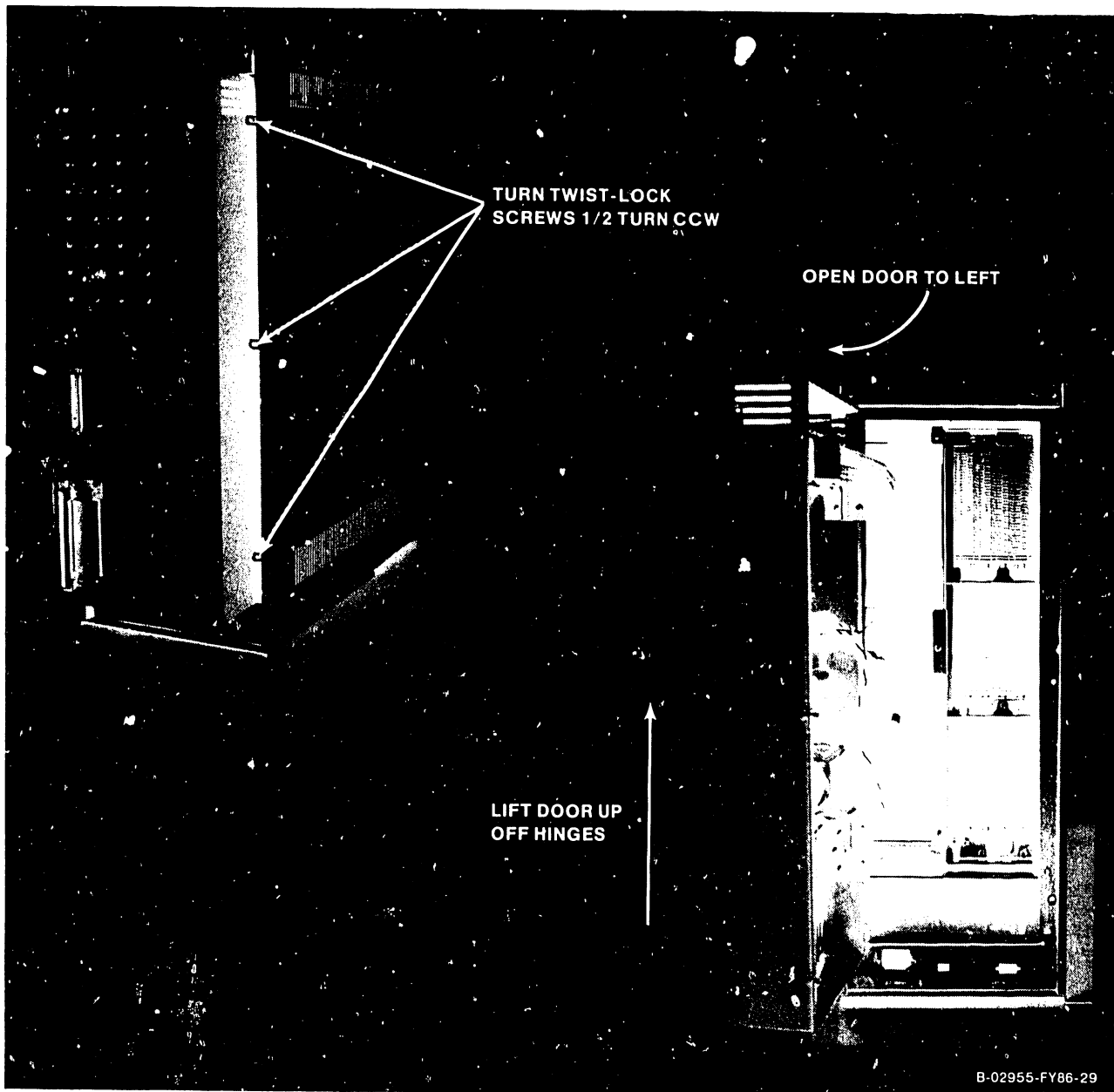


Figure 7-35. Bulkhead Door Removal

### 7.12.1 I/O PANEL REMOVAL/REPLACEMENT

The following contains general information for I/O panel removal sequence. Specific I/O panel removal information is contained in the following sections.

- 1) The I/O panels are designed with interlocking mounting panels. Depending on the location of the I/O panel being removed, the adjacent panels must first be removed. I/O panel removal sequence is from right-to-left as viewed from rear. Perform the following:
  - a) Remove the I/O panel mounting screws from panel to be removed and adjacent panels.
  - b) First remove the right-most I/O panel.
  - c) Remove the center panel then, if require, remove the remaining panel.
- 2) To replace the I/O panels, reverse the above procedures ensuring proper interlocking of mounting plates.

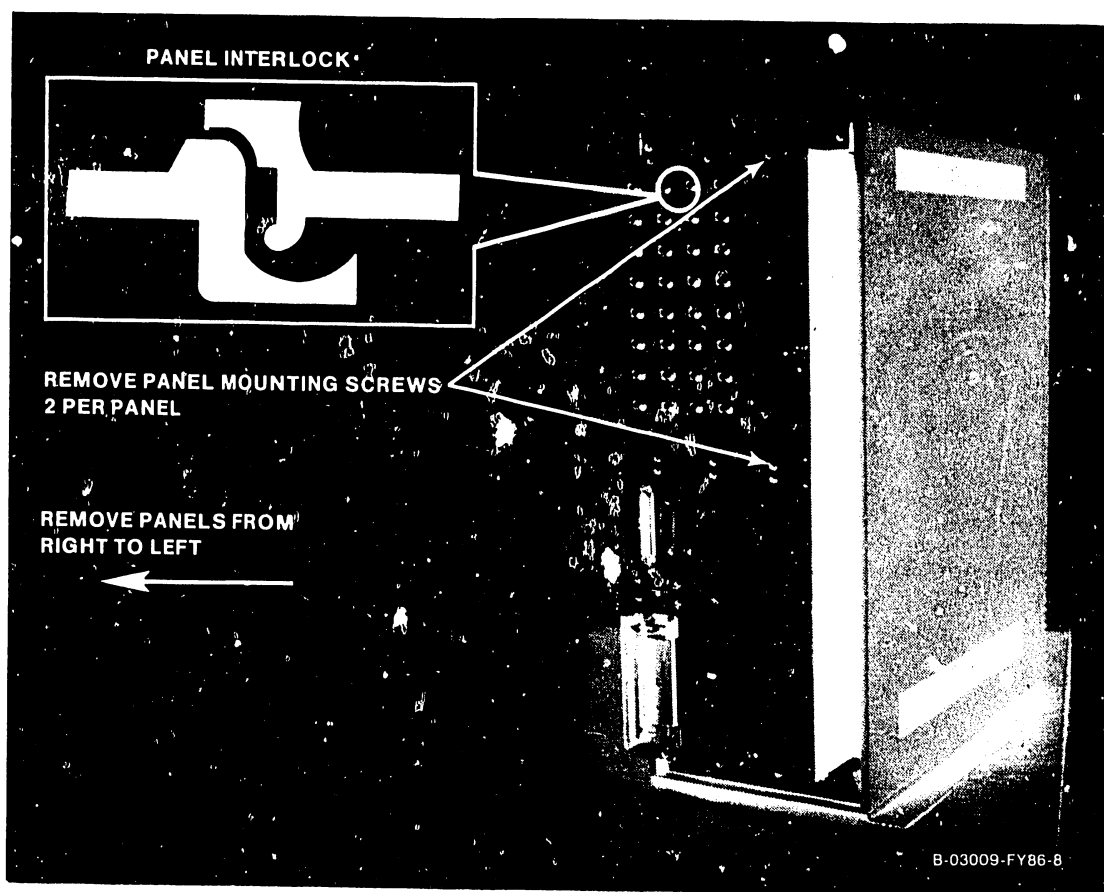


Figure 7-36. General I/O Panel Removal

## 7.12.2 EAPA PANEL REMOVAL/REPLACEMENT

- 1) Remove bulkhead door as described in paragraph 7.12.
- 2) Remove all cables from EAPAs.
  - a) 34-pin cable from EAPA 0 connector J1 (BP MUX Connector to EAPA 0.)
  - b) 34-pin jumper cable from EAPA 0 connector J2 to EAPA 1 connector J1.
  - c) 3-pin dc power cable from EAPA 0 connector J3.
  - d) 3-pin dc jumper cable from EAPA 0 connector J4 to EAPA 1 connector J3.
- 3) Remove the 928MC Muxbus Terminator from EAPA 1 connector J2.
- 4) Remove and replace EAPA panels as described in paragraph 7.11.1.
- 5) Reconnect all cables remove in steps 2a - 2d.
- 6) Install the 928MC Muxbus terminator on the last EAPA connector J2.

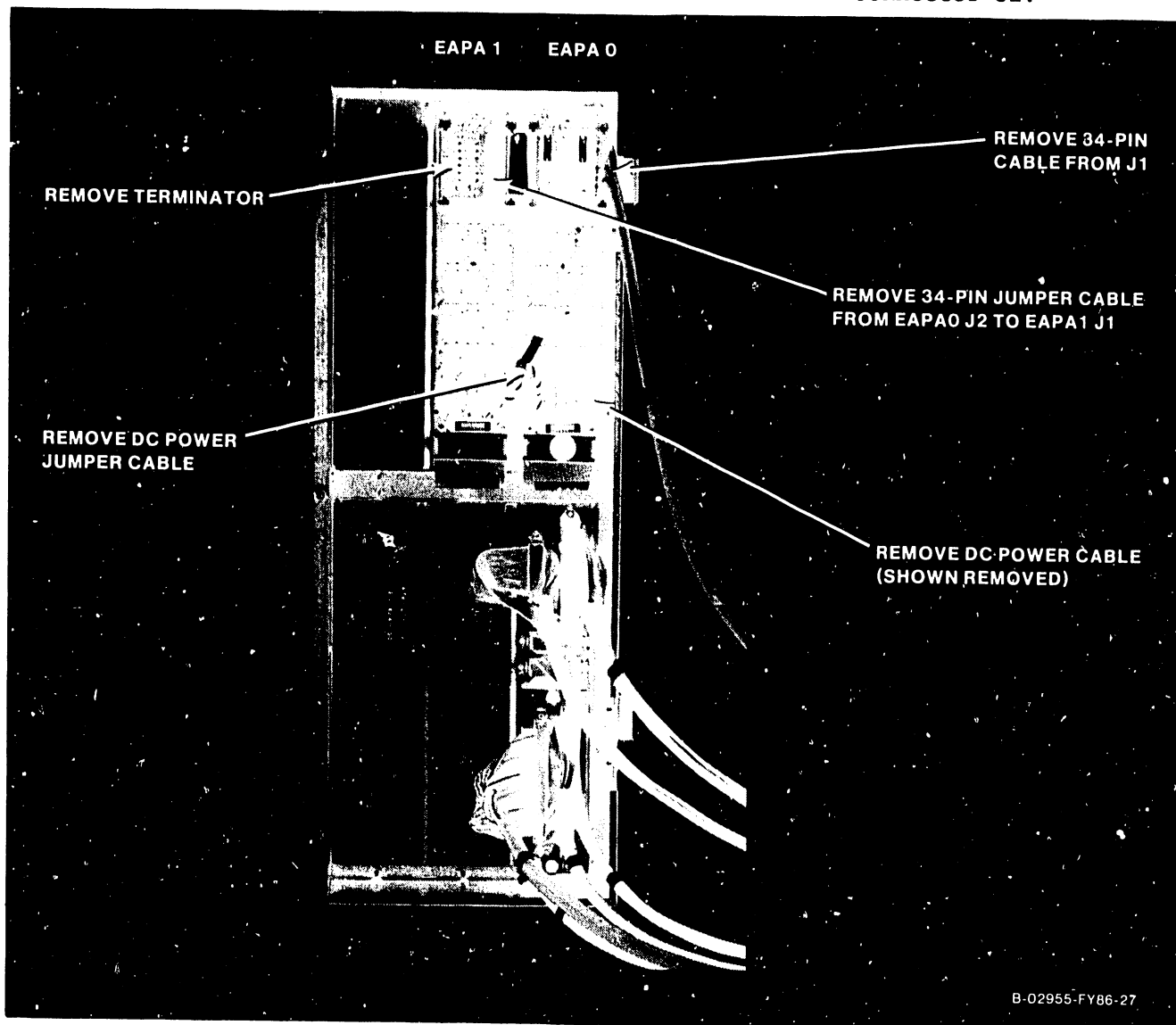


Figure 7-37. EAPA Panel Removal/Replacement



### 7.12.3 SCSI PANEL CABLE REMOVAL/REPLACEMENT

- 1) Remove bulkhead door as described in paragraph 7.12.
- 2) Remove top cover (paragraph 7.2.1).
- 3) Remove front cover (paragraph 7.2.2).
- 4) Remove cable from source connector (table 7-8.).
- 5) Remove cable connector from SCSI panel as illustrated in figure 7-38.
- 6) To replace cable, reverse the procedures listed above.

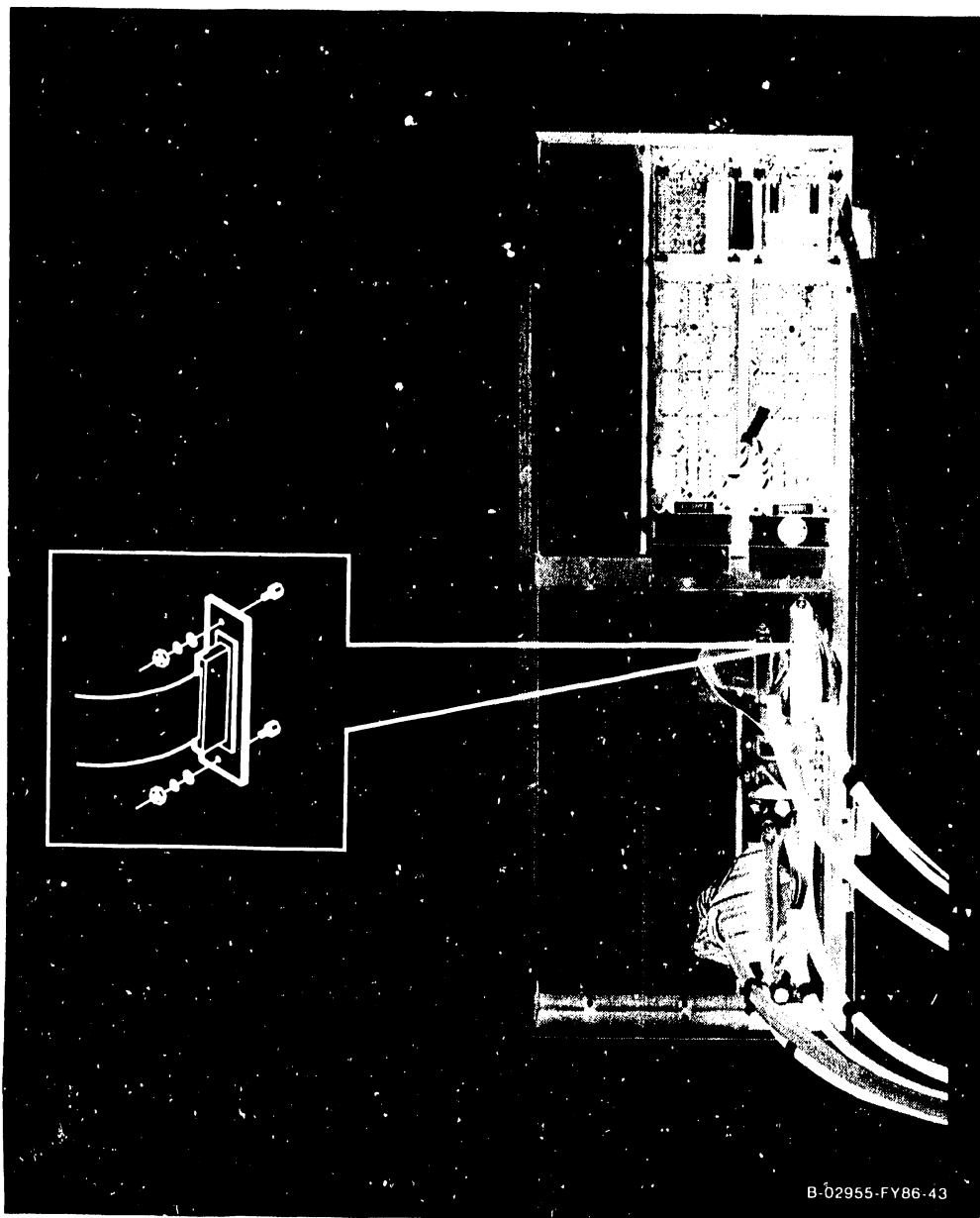


Figure 7-38. SCSI Panel Cable Replacement

Table 7-8. SCSI Panel Cable Listing

<u>Cable P/N</u>	<u>Source</u>	<u>Destination</u>
220-3418	BP TC Connector	Printer B Port
220-3401	BP SCSI Connector	SCSI Interface/SCSI Port
220-3418	BP Remote Connector	Remote Port/Printer A
220-3546	SMD Connector J1	External Drive Data 'A' Cable
220-3544	SMD Connector J2	External Drive 0 'B' Cable
220-3544	SMD Connector J3	External Drive 1 'B' Cable
220-3545	SMD Connector J4	External Drive 2 'B' Cable
220-3545	SMD Connector J5	External Drive 3 'B' Cable

**SECTION**

**8**

**ADJUST-**

**MENTS**

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## SECTION 8

### ADJUSTMENTS

#### 8.1 TOOLS AND EQUIPMENT

No special tools are required to perform alignments and adjustments on the VS-5/6 mainframe. All adjustments and alignments can be accomplished using a standard tool kit which includes:

- Small flat blade plastic screwdriver
- Digital multimeter

#### 8.2 MECHANICAL ADJUSTMENTS

No mechanical adjustments are required.

#### 8.3 ELECTRICAL ADJUSTMENTS

VS-5/6 electrical adjustments consist of adjusting the SPS500 Power Supply voltage levels.

- 1) Open the bulkhead door (paragraph 7.11).
- 2) Power-up mainframe.

#### WARNING

DO NOT OPEN THE SWITCHING POWER SUPPLY UNDER ANY CIRCUMSTANCE. EXTREMELY DANGEROUS VOLTAGE AND CURRENT LEVELS, IN EXCESS OF 300 VOLTS DC AND UNLIMITED CURRENT, ARE PRESENT WITHIN THE POWER SUPPLY.

DO NOT ATTEMPT TO REPAIR THE POWER SUPPLY; IT IS FIELD REPLACEABLE ONLY.

AFTER POWERING THE UNIT DOWN AND DISCONNECTING THE AC POWER PLUG FROM THE WALL OUTLET, ALLOW ONE MINUTE BEFORE REMOVING THE POWER SUPPLY TO PROVIDE ADEQUATE TIME FOR ANY RESIDUAL VOLTAGE TO DRAIN THROUGH THE BLEEDER RESISTORS.

## ADJUSTMENTS

- 3) Measure voltage between motherboard +5V test point and GND test point.
- 4) Adjust +5V ADJ pot to acceptable voltage levels.

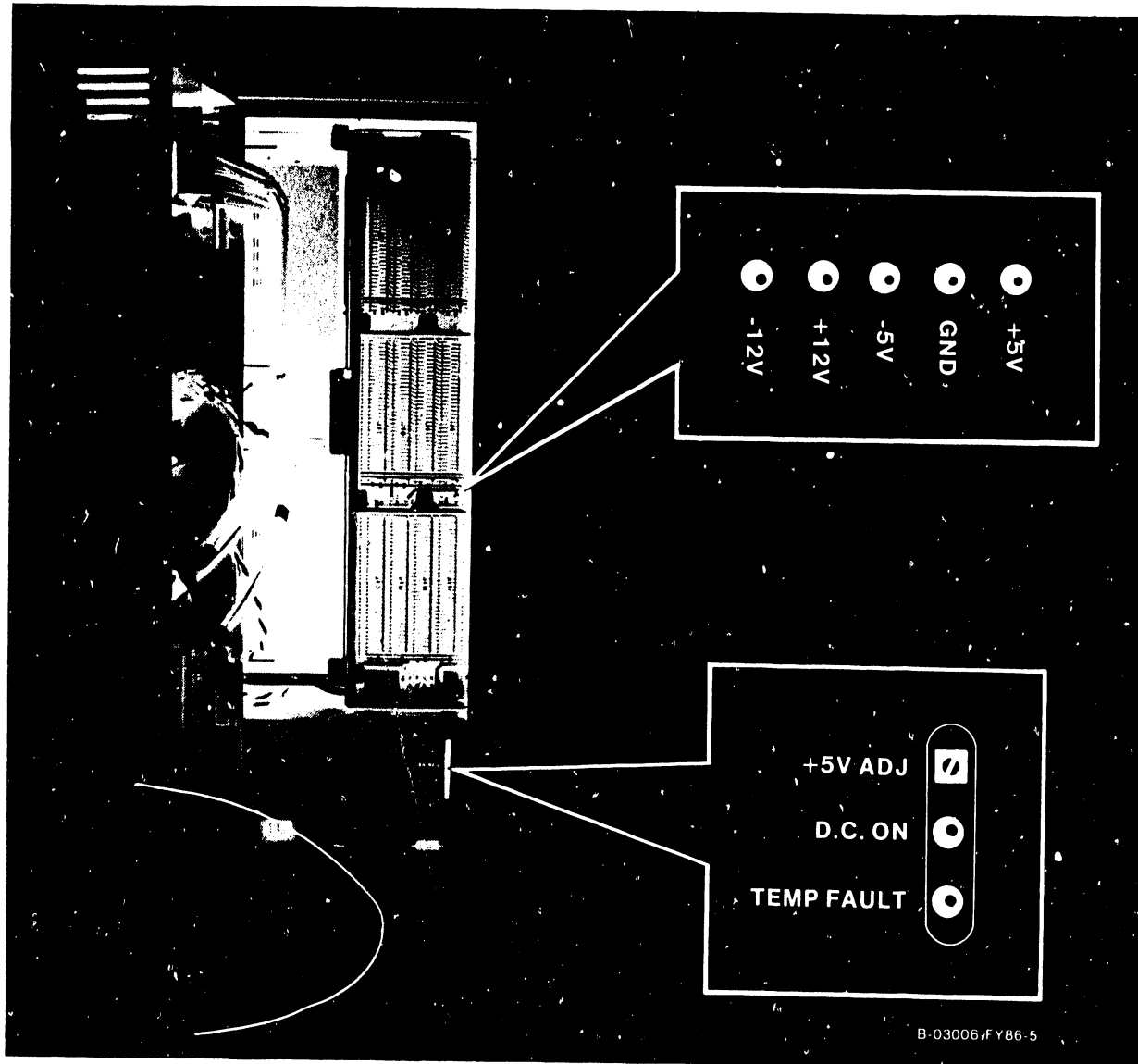


Figure 8-1. SPS500 Power Supply Voltage Adjustment

## ADJUSTMENTS

- 5) Measure and record voltage reading for +12V, -12V, and -5V. Compare voltage readings to readings listed in table 8-1.

### NOTE

The voltage checks listed were performed using a digital voltmeter (DVM). If an analog meter is used, ensure to observe proper polarity.

Table 8-1: VS-5/6 Computer DC Voltage Checks

VOLTAGE	TEST POINT		VOLTAGE LIMITS	ADJUSTABLE
	Positive	Negative		
+5 Vdc	+5V	Gnd	+4.75 to +5.25	Yes (para. 8.3)
+12 Vdc	+12V	Gnd	+11.4 to +12.6	No (Note 1)
-5 Vdc	-5V	Gnd	-4.75 to -5.25	No (Note 1)
-12 Vdc	-12V	Gnd	-11.4 to -12.6	No (Note 1)

Note 1 The +5 Vdc adjustment sets up the other voltage levels.

- 6) If any voltage is out of tolerance or missing, perform the following:
- a) Remove top cover (paragraph 7.2.1), front cover (paragraph 7.2.2) and side covers (paragraph 7.2.3).
  - b) Remove all PCA's from the cardcage except the BP PCA (paragraph 7.3)
  - c) Remove dc power harness from winchester drive(s), floppy drive, SCSI Interface and EAPA 0.
  - d) Power-On mainframe and perform electrical adjustment (paragraph 8.3). If voltages are still missing or out of tolerance, replacement of the power supply is required (refer to paragraph 7.10).
    - 1) If all voltages are now within tolerance, power-down the mainframe and reconnect one dc power harness connector. Power-up mainframe and recheck voltages levels. Perform this procedure until the defective device is found or the last device is reconnected and all voltages are within tolerance.
    - 2) Power-down the mainframe and install one PCA. Power-up mainframe and recheck voltages levels. Perform this procedure until the defective PCA is found.

## ADJUSTMENTS

### 8.3.1 +5 VOLTS FOREVER (+5VF) CHECK

Whenever ac power is applied to the VS-5/6 mainframe (i.e. ac power cord connected), +5VF is generated by the power supply and applied to motherboard connector J19 pin 10 and consequently to motherboard slots 0 - 6 connector P3 pin 19. The +5VF is used by the Bus Processor board On/Off circuitry, which provides the On/Off signal via the Front Panel DC Power-On switch to the power supply. When the DC Power-On Switch is pressed, the On/Off signal circuit is completed, powering on the power supply.

Perform the following procedure to check for +5VF.

- 1) Power down the mainframe. Refer to paragraph 4.4
- 2) Ensure ac power is applied to power supply and check the following:
  - a) Measure the voltage between motherboard ground test point GND and connector J19 pin 10 +5VF (or motherboard connector P3 pin 19), it should read +5 Volts  $\pm$  5%.
  - b) If +5VF voltage is not present, check ac power at source and ac power cord for continuity. Remeasure +5VF.
  - c) If the +5VF is missing, remove the BP PCA from the card cage and perform the procedure contained in step a. If +5VF is now present, the BP PCA is defective. If +5VF is still missing, replacement of the switching power supply is required.

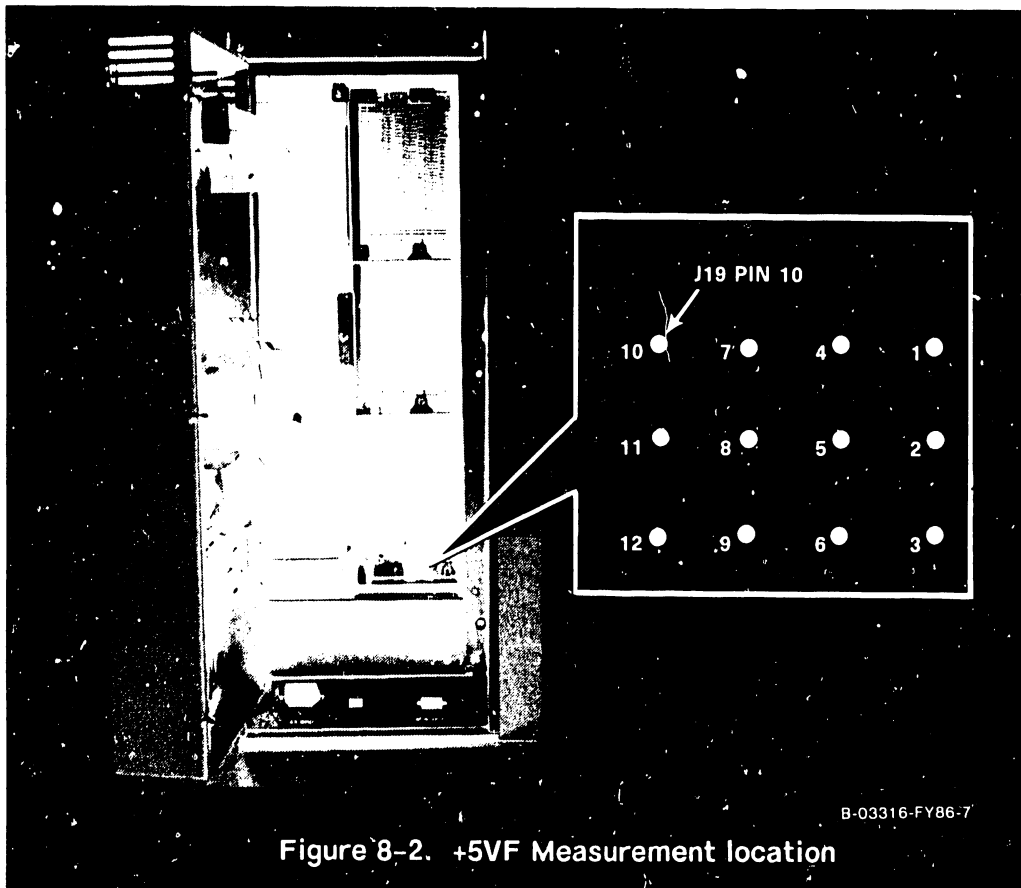


Figure 8-2. +5VF Measurement location



**SECTION**

**9**

**UNPACKING**

**AND**

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## SECTION 9

### UNPACKING AND SETUP

#### 9.1 GENERAL

This section describes the procedures for unpacking, inspection, and installing the VS-5/6 mainframe. Included in this section are instructions for system interconnect and initial power-up. Refer to Section 4, Operation; Section 5, Preventive Maintenance; Section 6, Troubleshooting; and Section 7, Repair; of this manual for more information needed to complete installation. Actual installation should not begin until the site requirements have been met. Refer to the following two sources for publications concerning site requirements.

Publication Title	WLI P/N
Customer Site Planning Guide	700-5978
Technical Documentation Catalog/Index	741-0000
Wang Customer Resource Catalog	700-7647

#### 9.2 INSTALLATION SITE CHECK

The basic configurations of the VS-5/6 mainframe are customer installable. If the customer orders a configuration other than the seven basic configurations listed in table 9-1, or external disk drives, a installation site check is required and the following conditions must have been met:

1. All site plans should have been approved by both the customer and a Customer Service Representative.
2. All building alterations must have been completed and inspected.
3. All electrical wiring, air conditioning, and telecommunications (TC) modifications must have been installed and tested. (The following TC equipment should have been ordered for remote maintenance support, if option is elected:)
  - a. Telephone line. (A dedicated line is not required.)
  - b. Telephone.
  - c. Either of the following modular connecting blocks for the telephone:
    1. RJ11C jack for desk top telephones
    2. RF11W for flush mount wall telephones

## UNPACKING AND SETUP

### NOTE

RF11W flush mount wall phone jack can be used with the "T" connector and a desk top phone, but a wall mounted phone cannot be used.

4. The pre-installation inspection is to be performed two weeks prior to delivery. At this time, the service representative will check the site for compliance with VS site specifications. The service representative will bring any unsatisfactory conditions noted to the attention of the customer for correction.

### NOTE

Before installation of a VS-5/6 can take place, the minimum specifications as described in publications listed in the Customer Site Planning Guide (700-5978), the Technical Documentation Catalog/Index (741-0000), and the Customer Resource Catalog (700-7647) should be met. Failure to meet these requirements can be cause for the service representative to deem a site as unsuitable for the proper functioning of a VS-5/6 system.

### 9.3 TOOLS AND EQUIPMENT

No special tools or equipment are required.

### 9.4 UNPACKING PROCEDURES

Before unpacking the VS-5/6, check all packing slips to make sure the proper equipment has been delivered. Refer to the model number information contained in table 9-1. After checking packing slips, inspect all shipping containers for damage (crushed corners, punctures, etc.).

#### 9.4.1 CLAIMS INFORMATION

If damage is discovered during inspection, the customer should file an appropriate claim promptly with the carrier involved, and notify your service manager.

Table 9-1. VS-5/6 Models

Model Number	WLI/P/N	Description
VS5-1AM	157/177-7411	VS-5, 1MB Main memory, One 67.5 MB Disk
VS5-1BM	157/177-7415	VS-5, 1MB Main memory, Two 67.5 MB Disk
VS5-2BM	157/177-7416	VS-5, 2MB Main memory, Two 67.5 MB Disk
VS6-1AM	157/177-7412	VS-6, 1MB Main memory, One 67.5 MB Disk
VS6-1BM	157/177-7417	VS-6, 1MB Main memory, Two 67.5 MB Disk
VS6-2BM	157/177-7418	VS-6, 2MB Main memory, Two 67.5 MB Disk
VS6-4BM	157/177-7419	VS-6, 4MB Main memory, Two 67.5 MB Disk

## NOTES

Part number prefix 157 = 50Hz ac line frequency mainframes.

Part number prefix 177 = 60Hz ac line frequency mainframes.

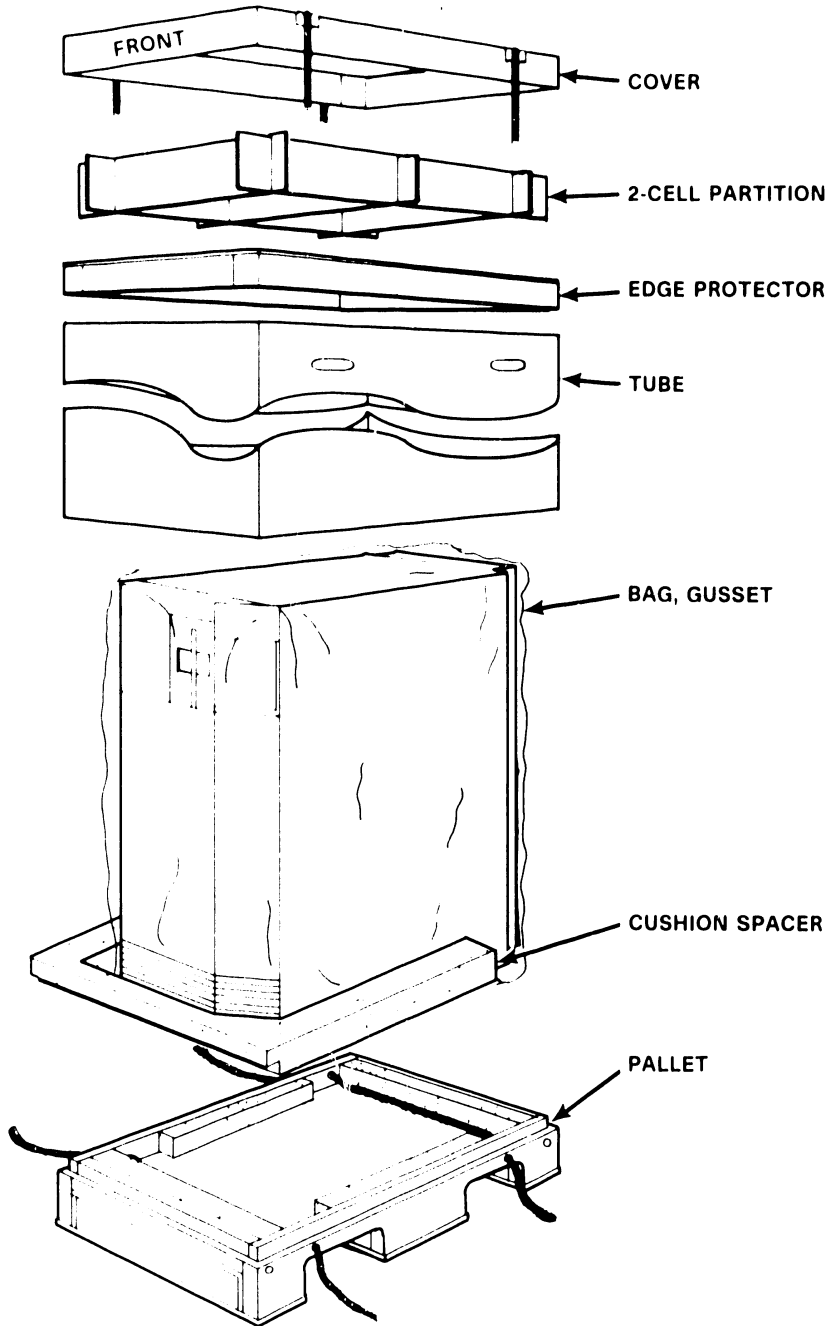
Table 9-1A. VS-5/6 Option PCA Models

Model Number	PCA P/N	Description
25V36B	210-9355-A	Asynchronous Device Adapter
25V67	210-8489-A	Universal Intelligent Serial Input/Output DA
25V50-2B	210-9313-A	Two-Port Disk Controller
25V50-4B	210-9315-A	Four-Port Disk Controller
25V76-1B	210-9337-A	Single-Port Telecommunications Controller
25V76-2B	210-9637-A	Two-Port Telecommunications Controller

# UNPACKING AND SETUP

Perform the following unpacking procedures:

- 1) Remove VS-5/6 from shipping carton.
- 2) Visually inspect the unit for external damage.



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Figure 9-1. VS-5/6 Computer Unpacking

## UNPACKING AND SETUP

- 3) Move the cabinet to its permanent location.
- 4) Once the cabinet is in place, check the service clearances as listed below.

Service Clearance	Inches	Centimeters
Front	13	33.02
Rear	13	33.02
Left	14	35.56
Right	14	35.56

### 9.4.2 UNPACKING PERIPHERALS

Before proceeding, carefully unpack all peripherals according to the procedures outlined in the applicable maintenance manuals. As each unit is unpacked, check it for any obvious shipping damage. Refer to paragraph 9.4.1 if any damage is seen.

#### CAUTION

THIS COMPUTER EQUIPMENT HAS BEEN VERIFIED AS FCC CLASS A.

IN ORDER TO MAINTAIN COMPLIANCE WITH FCC CLASS A VERIFICATION, THE FOLLOWING CONDITIONS MUST BE ADHERED TO DURING NORMAL OPERATION OF EQUIPMENT.

- ALL COVERS MUST BE ON THE SYSTEM AND SECURED IN THE PROPER MANNER.
- ALL INTERNAL CABLES MUST BE ROUTED IN THE ORIGINAL MANNER WITHIN THE CABLE CLAMPS PROVIDED FOR THAT PURPOSE.
- ALL EXTERNAL CABLES MUST BE SECURED AND THE PROPER CABLE USED TO ENSURE THAT CABLE SHIELDING IS PROPERLY GROUNDED TO THE CABLE CLAMPS PROVIDED.
- ALL HARDWARE IS PROPERLY SECURED.



## 9.5 VS-5/6 MAINFRAME INSPECTION

### NOTE

Quality assurance procedures and tests have shown that VS mainframes arriving on customer's premises require only visual inspection, voltage checks, software loading, and cabling. Therefore, the following inspection and installation procedures for all VS mainframe products are in effect.

### DO NOT REMOVE PRINTED CIRCUIT BOARD FOR INSPECTION

### DO NOT CLEAN PRINTED CIRCUIT BOARD CONTACTS WITH AN ERASER

### INSPECT CPU MAINFRAME VISUALLY

### REPORT INSTALLATION PROBLEMS ON THE INSTALLATION REPORT AND STATE SPECIFIC CAUSES OF FAILURE

- 1) Remove top cover. (para. 7.2.1)
- 2) Remove front cover (para. 7.2.2) and side covers (para. 7.2.3).
- 3) Remove the shipping protector from the floppy diskette drive.
- 4) Inspect the interior of the mainframe for packing material and shipping damage such as broken connectors and loose fastening hardware.
- 5) Refer to the shipping list to make sure that the correct circuit boards have been shipped.
- 6) Make sure all circuit boards are properly seated in the backplane.
- 7) Inspect the power supply for damage and loose connections. At this time make sure all power supply connections are tight.
- 8) If necessary, vacuum clean the unit.
- 9) Do not reassemble the mainframe at this time.
- 10) If damage is discovered at any time during the inspection, follow the reporting procedure in paragraph 9.4.1.

### 9.5.1 PERIPHERAL INSPECTION

After inspecting the mainframe, carefully inspect each peripheral according to procedures outlined in the applicable maintenance manuals. If damage is discovered at any time during the peripheral inspection, follow the reporting procedure in paragraph 9.4.1.

**9.6 SOFTWARE/DIAGNOSTIC REQUIREMENTS**

The following paragraphs contain the minimum software requirements and diagnostics required for the VS-5 and VS-6 mainframes.

**9.6.1 SOFTWARE REQUIREMENTS****Table 9-2. VS-5 Minimum Software Requirements**

<u>Software</u>	<u>Version</u>	<u>Comments</u>	<u>WLI P/N</u>
Operating System	6.42.00	Domestic	195-2456-21
Operating System	6.42.00	International	195-2492-21

**Table 9-3. VS-6 Minimum Software Requirements**

<u>Software</u>	<u>Version</u>	<u>Comments</u>	<u>WLI P/N</u>
Operating System	6.42.00	Domestic	195-2456-21
Operating System	6.42.00	International	195-2492-21

**NOTES**

- 1) Complete 195 package part numbers include diskette and documentation
- 2) Diskette only part numbers are shown if no package part numbers are available.

## 9.6.2 DIAGNOSTICS

Table 9-4. VS-5 Built-in Test (BIT) Programs

<u>Diagnostic Name</u>	<u>PROM Rev.</u>	<u>Package P/N</u>
Bus Processor PROM (See Note 1)	5630	195-4995-D

Table 9-5. VS-5 Other Diagnostics

<u>Diagnostic Name</u>	<u>Version</u>	<u>Package P/N</u>
VS-5/6 Diagnostic Monitor (See Note 2)	R2631	195-4968-21

Table 9-6. VS-6 Built-in Test (BIT) Programs

<u>Diagnostic Name</u>	<u>PROM Rev.</u>	<u>Package P/N</u>
Bus Processor PROM (See Note 1)	5630	195-4995-D

Table 9-7. VS-6 Other Diagnostics

<u>Diagnostic Name</u>	<u>Version</u>	<u>Package P/N</u>
VS-5/6 Diagnostic Monitor (See Note 2)	R2631	195-4968-21

## NOTES

- 1) Bus Processor PROM Diagnostics consists of two PROMS, L183 WLI #379-2905 and L184 WLI #379-2906.
- 2) VS-5/6 Diagnostic Monitor consists of 3 diskettes, VS-5 DIAGA WLI #732-6000 (CP5), VS-6 DIAGA WLI #732-6000 (CP7), and VS-5/6 DIAGB WLI #732-6002.

Complete 195 package part numbers include diskette(s) and documentation.

9.7 VS-5/6 POWER SERVICE REQUIREMENTS (DOMESTIC)

The VS-5/6 Computer installation requires that the ac receptacle be easily accessible. If raised flooring is used, ensure the ac receptacle is located above the flooring. This receptacle must be within six feet of the VS-5/6 computer.

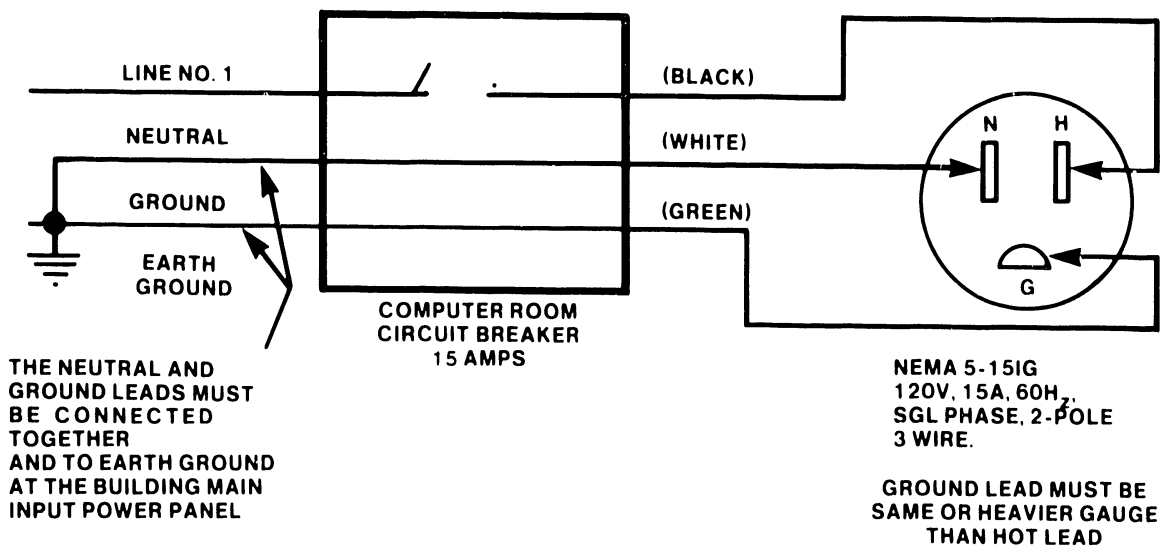
The inspection and electrical checks are required to make sure the power source and receptacle meet all specified requirements before proceeding with the mainframe and peripheral installation.

NOTE

The procedures in the ensuing text are for domestic 115 Vac, 60 Hz installations. Installations outside the continental USA, requiring other configurations and voltages, must be dealt with on a site by site basis.

CAUTION

Failure to verify the input power service can result in serious damage to the mainframe circuits and to connected peripherals.



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Figure 9-2. USA Power Service Requirements (NEMA) for VS-5/6 Installation

## UNPACKING AND SETUP

Using a digital voltmeter or equivalent, perform the ac receptacle input voltage checks as outlined in table 9-8.

**Table 9-8. NEMA Receptacle Voltage Measurements**

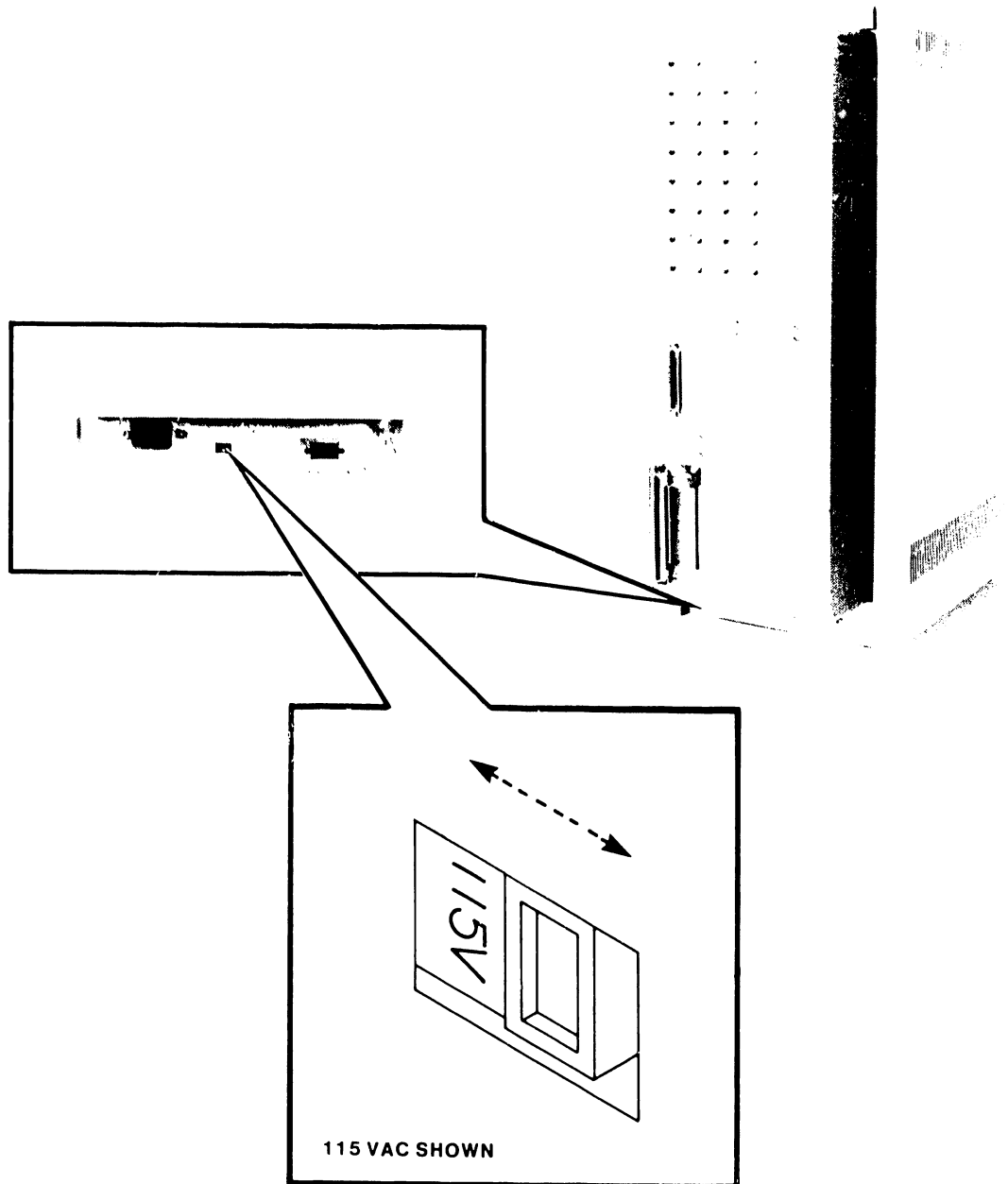
Test Points	Voltage Measurements
H to N	102 to 132 Vac
H to G	102 to 132 Vac
G to N	-0.5 to +0.5 Vac (See Note)

### NOTE

If a difference in potential of more than 0.5 Vac exists between ground and neutral, notify the responsible electrician that the power source is NOT ACCEPTABLE.

9.8 VS-5/6 LINE VOLTAGE SELECT SWITCH

Located below the bulkhead is the ac voltage select switch (figure 9-3). Set the Voltage Select switch to correct line voltage setting (115/230 Vac).



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Figure 9-3. Ac Voltage Select Switch

**9.9 CONNECTIONS**

The following contains information for power supply voltage check and connection to Workstation 0 (WS0).

**9.9.1 VS-5/6 VOLTAGE CHECK**

- 1) Connect the ac power cord to the VS-5/6 power supply receptacle. Secure the power cord captive screws to the power supply stand-offs.

**WARNING**

The VS-5/6 Computer does not have an ac power On/Off Switch. Ac voltage is present inside the power supply whenever the ac power cord is plugged into the ac receptacle. Be sure to remove the ac power cord from the ac receptacle whenever service is to be performed.

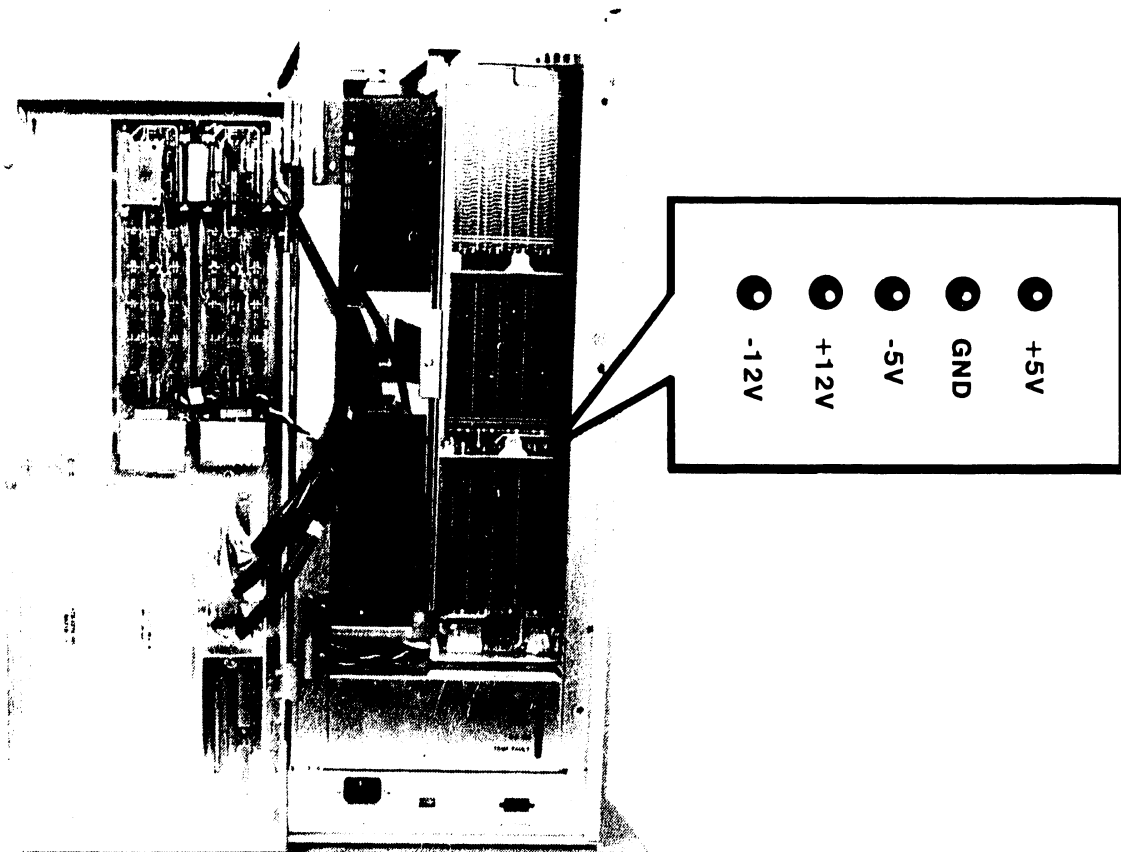
- 2) Open the bulkhead door (paragraph 7.11). The motherboard non-component side contains the voltage test points (figure 9-4).
- 3) Press DC power-On pushbutton located on the front panel and perform the voltage checks as per table 9-9. Note: The voltage checks below were accomplished using a digital voltmeter. If an analog meter is used, be sure to observe proper polarity.

**Table 9-9: VS-5/6 Computer DC Voltage Checks**

VOLTAGE	TEST POINT		VOLTAGE LIMITS	ADJUSTABLE
	Positive	Negative		
+5 Vdc	+5	Gnd	+4.75 to +5.25	Yes (para 8.3)
+12 Vdc	+12	Gnd	+11.4 to +12.6	No (Note 1)
-5 Vdc	-5	Gnd	-4.75 to -5.25	No (Note 1)
-12 Vdc	-12	Gnd	-11.4 to -12.6	No (Note 1)

Note 1 The +5 Vdc adjustment sets up the other voltage levels. Perform the +5 Vdc check/adjustment first, then perform remaining voltage checks.

# UNPACKING AND SETUP



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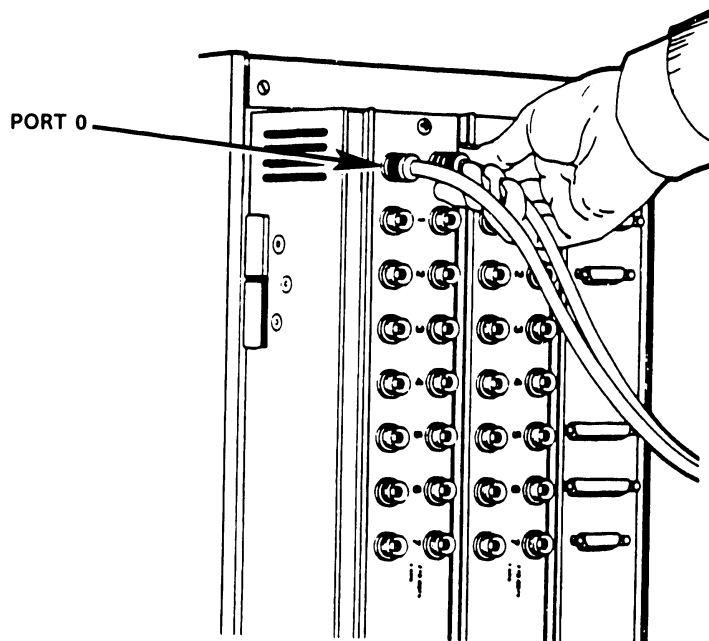
Figure 9-4. DC Voltage Test Points



9.9.2 WORKSTATION 0 CONNECTION

Connect Workstation 0 to the EAPA0 port 0 BNC/TNC ports (located on the bulkhead). It is recommended that workstation 0 be a Professional Computer (Model PC-S1-2) with options required for Remote Maintenance support (refer to paragraph 9.11), otherwise, Workstation 0 can be any of the following serial workstations: Table 9-10 contains a listing of all VS-5/6 support workstations.

Model Number	Description
All Models	Wang Professional Computer
4205	32K WP Workstation
4210MW	32K WP/DP/Graphics Workstation
4220	64K Remote Workstation
4230	64K DP/WP Workstation
4245	Color Workstation
4250	PC Archiving Workstation
4250GH	High Resolution Monitor (for Wang PC)
4250GM	Medium Resolution Monitor (for Wang PC)



B-03110-FY86-11

Figure 9-5. Connecting Workstation 0

Table 9-10. VS-5/6 Supported Workstations

Model Number	Description
PC-S1-2	Five Slot Chassis, 256KB memory, one 360K Diskette Drive, Keyboard. (Requires Workstation Emulation)
2110	Asynchronous DP
2246C	Combined Workstation for DP/WP
2246S	Serial Workstation for DP Only
2256LC	64K Combined Workstation
2266C	Archiving Workstation for DP/WP
2266S	Archiving Workstation for DP
2270V1	Hard Sector Diskette
2270V2	Soft Sector Diskette
2270V3	Hard/Soft Sector Diskette
2276C-1	64K Combined Archiving Workstation
2276C-3	Combined Archiving Workstation
4205	32K Workstation for WP
4210MW	32K Workstation for DP/WP/Graphics
4220	64K Remote Workstation
4230	64K Workstation for DP/WP
4245	Color Workstation
4250	PC Archiving Workstation
4250GH	High Resolution Monitor for PC Archiving Workstation
4250GM	Medium Resolution Monitor for PC Archiving Workstation
6300GM-21	Combined Workstation With Graphics
6300GM	Graphic Monochrome WP Workstation

**9.10 FIRST-TIME IPL PROCEDURE**

The following procedure contains the steps required to IPL the VS-5/6 mainframe. Be sure to perform the steps in the sequence given.

- 1) Power-On Workstation 0 (operator console). Workstation 0 raster should be displayed in a few seconds. Power-on any other workstations or printers on the system.

**If Workstation 0 is a Professional Computer with RSAF software installed, Workstation Emulation must be entered before IPLing the mainframe.**

- 2) Position the Local/Remote Key Switch in the Local position.
- 3) Press the DC Power On switch (Black), the power-on indicator and Drive Not Ready indicator will illuminate. It takes approximately 1 minute for the internal disk to reach operating speed. If no diskette is inserted in the disk drive, the system will look for the IPL bootstrap file on the internal fixed disk. Once the file is found, the IPL process starts.
- 4) If the system has external drives attached, power on the drives.
- 5) The diagnostic Hex display begins a countdown from FFFF while the power-up diagnostics are being run. This will be completed in approximately 45 seconds. In the event the diagnostic code countdown stops and an error code is displayed, refer to Chapter 6 Troubleshooting for error code information.

If error code 402A, 403A, or 404A is displayed, these error codes denote that the system disk does not contain the pointer to the bootstrap file (@MCBOOT@). This pointer must be regenerated. Perform the following:

- a) Load the Stand Alone Utility (SAU) (refer to paragraph 4.3).
  - b) Using SAU Copy function, copy files @MCBOOT@ and @MICPL@ from the SAU diskette to the system disk. Copying the bootstrap file, the SAU automatically regenerates the pointer.
  - c) Once regenerated, the IPL procedure can be continued.
- 6) Upon successful completion of the BIT diagnostics, the Self Test Monitor Screen appears. Once the Self Test diagnostics are successfully run, the IPL Drive Selection screen is displayed (figure 9-6). Position the cursor next to drive from which the operating system is to be loaded from and press ENTER (or RETURN) to run self-test.

If an external disk drive is used to load the operating system, refer to Section 4.2 for operating procedures.

Small System VS Self Test Package Version R2xxx  
 IPL Drive Selection  
 Bootstrap Volume = SYSTEM

Device	Capacity	Type	Volume	Status
2270V7	1.2 Mb	Dsket		
■ 2269V1	67 Mb	Dsket	SYSTEM	
2269V1	67 Mb	Dsket	DATA	

Position Cursor to Indicated Device and Select:

(ENTER) Test & IPL (PF1) IPL Only (PF8) Stand Alone Diagnostic Monitor

Figure 9-6. Self Test Monitor and IPL Drive Select Screen

Small System VS Self Test Monitor Package Version R2620  
 System hardware Status  
 System Volume = SYSTEM

Status	Diagnostic
Passed	(SIO) Serial Data Link test
Passed	(BP) BP UART Loopback Verification Test
Running	(CPU) CPU CP Control & CP/BP Test
	(CPU) CPU Random Operand Test
	(CPU) CPU CP Integrity Test
	(MM) Main Memory Integrity Test
	(MM) Main Memory Integrity test

Figure 9-7. System Hardware Self-Test Screen

- 7) This screen indicates that the VS-5/6 is testing system components. The results of each test is displayed with the message sequence: 'Loading', 'Running', 'Passed', 'Non-Fatal Error', 'Fatal Error'. If the status is 'Passed' the system is ready to begin initialization.

A Non-Fatal Error message and Fatal Error Message will display an error code of the failure. Refer to Section 6 Troubleshooting for error code definition.

## UNPACKING AND SETUP

- 8) Press 'ENTER' to continue the IPL sequence. The prompt "Loading System Microcode" is displayed and system initialization begins. In about 10 seconds, the message 'Diagnostics Complete, Beginning System Initialization' appears on WSO and the Not Ready LED turns off.
- 9) The SYSGEN screen appears. The SYSGEN screen displays the name of the configuration file last used (SYSFILE Field). NOTE: During Initial IPL, the SYSGEN configuration screen does not display a default value for the name of the communications configuration file. The default system configuration file name @CONFIG@ in @SYSTEM@ should be entered.

---

\*\*\* MESSAGE M001 BY SYSGEN

### INFORMATION REQUIRED

Specify the name of the system configuration file and press (ENTER)

- or -

Press (1) to use one workstation and one disk.

SYSFILE = @CONFIG@

SYSLIB = @SYSTEM@

Specify the communications configuration file to be used, if any

COMMFIL = ██████████

COMMLIB = @SYSTEM@

Inhibit logons at all workstations?

LOGONS = NO

---

### Figure 9-8. SYSGEN Screen

- 10) Enter another valid configuration file name in the field 'SYSFILE' and press 'ENTER' or press 'ENTER' to select the configuration file displayed.
- 11) If the system is using communications, specify the communications configuration file name and library.
- 12) Press PF1 to use one workstation (workstation 0) and one disk.
- 13) Respond to the prompt 'Inhibit Logons at all workstations? Logons = NO' If YES is selected, only WSO can be logged on to the system after the IPL is complete. NO is the default value.
- 14) Press 'ENTER'. The Date and Time Screen will be displayed.

\*\*\* MESSAGE WN3 BY IPL

INFORMATION REQUIRED

SET DATE AND TIME

Year = YY                      Month = MM                      DAY = DD  
 HOUR = HH                      MINUTE = MM                      SECOND = SS

Figure 9-9. Date and Time Screen

15) Enter date and time in the format provided (use the 24 hour clock time for hours) and press ENTER. In about 5 seconds, the IPL screen will appear.

```

* * * * *
*
* WWWW      WWWW      AAA      NNN      NNN      GGGGGG      *
* WW        WW        AA AA    NNN      NN      GG      GG      *
* WW        WW        AA  AA    NN  N    NN      GG      GG      *
* WW  WW    WW        AA  AA    NN  N    NN      GG      *
* WW  WW    WW        AAAAAAAAAA NN      N NN    GG      GGGG      *
* WW  WWWW  WW        AA  AA    NN      N NN    GG      GG      *
* WWWW  WWWW        AA  AA    NN      NNN    GG      GG      *
* WW    WW        AAAA  AAAA  NNN      NNN      GGGGGG      *
*
* * * * *
    
```

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Initial Program Load  
 VS Operating System  
 Nucleus Version 06.66.02  
 02048K physical memory available

01:01:01	System Generation	complete
01:02:01	I/O System Initialization	in progress
01:03:01	System Task Initialization	pending

Figure 9-10. Initial Program Load (IPL) Screen

## UNPACKING AND SETUP

- 16) The IPL screen shows the version of the VS Operating System being used in the IPL process, the physical memory size of the system, and the status of the three phases of IPL. These phases are; complete, in progress, and pending. Refer to the 'VS-5/6 Processor Handbook' for a detail description of the IPL process.

If during the IPL sequence the system detects any critical operating system components are obsolete or incompatible, the Version Warning Screen will be displayed. In the event this occurs refer to paragraph 4.2.

- 17) When the system initialization is completed successfully (approximately 2 minutes), the Operator's console screen is displayed.

---

\*\*\* Wang VS Operator's Console \*\*\*  
2:12 PM                      Tuesday                      March 22, 1986

Position to (\*) and Press (ENTER) to Provide Immediate Operator Service:

Mount Volume FLOPPY on Disk 11, . . . . . 12:40  
\*Assistance Required for Printer 3 . . . . . 13:32  
\*I/O Error Log Queued for Printing . . . . . 13:55

Press (1) to Return to User Mode  
- or -

Use the Function Keys to Manage:

2) PRINT Queue	9) PRINTERS
3) PROCEDURE Queue	10) DISKS
4) TRANSMIT Queue	11) TAPES
5) RETRIEVE Queue	12) TELECOMMUNICATIONS
	13) WORKSTATIONS
6) INTERACTIVE Tasks	
7) NON-INTERACTIVE Tasks	14) SYSTEM Options

Press (HELP) at Any Time to Return to the Operator Console Menu

---

Figure 9-11. Operator Console Screen

- 18) When the message 'Queue Verification Routine Complete' appears (approx. 20 to 30 seconds), press PF1 to enter user mode. Workstation 0 is now in Operator mode and any VS function can now be performed. The VS Logon Screen will be displayed.

# UNPACKING AND SETUP

---

\*\*\* Wang VS Logon \*\*\*

Workstation 0                      2:12 PM                      Tuesday March 22, 1986

   Hello new user  
   Welcome to VSS5

Please identify yourself by supplying the following information

   Your userid = █  
   Your password =

   and press (ENTER) to logon

   or press (PF11) to enter operator mode immediately

---

**Figure 9-12. VS Logon Screen**

19) Enter the default three-letter user ID, CSG. No password is required. Press ENTER. The command processor screen will be displayed.

---

\*\*\* WANG VS COMMAND PROCESSOR \*\*\*

Workstation 0 Ready                      11:32 PM                      Monday March 22, 1985

   Hello  
   Welcome to the Wang VS

Press (HELP) at any time to interrupt your program or to stop processing of current command.

   Use function keys to select a command:

(1) RUN Program or Procedure	
(2) Set USAGE Constraints	(11) Enter OPERATOR Mode
(3) Show PROGRAM Completion Report	(12) Submit PROCEDURE
(4) Manage QUEUE	(13) Send MESSAGE to Operator
(5) Manage FILES/Libraries	(15) PRINT Command Screen
(6) Manage DEVICES	(16) LOGOFF

---

**Figure 9-13. Command Processor Menu**



## UNPACKING AND SETUP

- 20) When the command processor screen appears, the system is in user mode. From this screen, program 'GENEDIT' and 'BACKUP' will be run.
- 21) Run GENEDIT Utility given in the VSOS Software Bulletin (Wang part number 715-0017) and verify all peripherals have been correctly declared. If all peripherals are not declared, generate a new @CONFIG@ file and re-IPL the system. **Note if a Professional Computer is installed as WS0 and is being used for Remote Maintenance, it must be declared as a 2256C Combined WS (64K). Refer to section 4.2.**
- 22) Run BACKUP Utility and copy all files to the back-up disk. If the message 'Work file cannot be placed on output volume, please respecify' appears, press PF1 to continue. When all files have been copied, the procedure is completed.
- 23) Press PF11 to enter OPERATOR mode.

### 9.10.1 VS-5/6 JUMPER ADDRESSES

Listed below are the preferred VS-5/6 Jumper addresses.

JUMPER ADD	PDA	DA TYPE	DA DESCRIPTION
0000	2800	28V01	BP/SIO
0000	2000	28V02	BP/Floppy
0000	2010	28V03	SCSI Printers (See Note)
0000	2020	28V04	BP SCSI
0300	2C00	25V76	TC, 1-Port
0500	3000	25V762	TC, 2-Port
0100	3400	25V50	External SMD
0600	3800	25V36	DE DA 2110 W/S (ADC)
0400	3C00	25V67	UISIO

#### NOTE

The 28V03 supports the following Async printers:

PM015	40CPS Daisy Printer
PM019	MF Color Matrix Printer

## UNPACKING AND SETUP

### 9.11 REMOTE MAINTENANCE

Remote Maintenance (RSAF) is an option that allows the customer to contact and run a Remote Maintenance session, via the telephone line, with the Remote Maintenance Center to isolate possible system problems. Refer to the VS Remote System Administrator Facility (RSAF), manual part number 741-1657-A, and RSAF 2 PC Host User Guide, manual part number 741-1734, 741-1734-1 for information on hardware installation and system interconnection.

#### NOTE

Pages 9-24 thru 9-28 are intentionally removed.

## 9.12 VS-5/6 OPTION BOARD UPGRADE INSTALLATION

This section contains information on VS-5/6 option PCAs installation and cabling requirements. Each option installation includes a list of items the option contains and an interconnection diagram (schematic representation) for option cabling. Items and procedures unique to any given option are addressed.

The following option (upgrade) installations are included:

- 9.12.1 Async Device Controller Option (289-0572)
- 9.12.2 1-Port TC DA Option (289-0568)
- 9.12.3 2-Port TC DA Option (289-0569)
- 9.12.4 2-Port Disk Controller (SMD) Option (289-0570)
- 9.12.5 4-Port Disk Controller (SMD) Option (289-0578)
- 9.12.6 VS-5/6 32 Port UISIO Option (289-0571)

### 9.12.1 VS-5/6 ASYNC OPTION (289-0572) INSTALLATION

The VS-5/6 Async Option provides the user with 8 RS232 Serial ports for peripheral connections. Included with this option are:

- 210-9355 Async Device Controller PCA
- 272-0048 Async Back Panel
- 220-3542 40 Pos Soc-Soc Cable (2 each)
- 220-3543 40 Pos Soc-Soc Cable (2 each)

#### PCA Installation

- 1) Power down mainframe and remove mainframe covers. (Refer to paragraphs 7.2.1, 7.2.2, and 7.2.3.)
- 2) Remove the PCA holddown device and hinge the TC Control panel to the left (refer to paragraph 7.3).
- 3) Set the Async Device Controller address to 0600 (refer to paragraph 7.3.9).
- 4) Install the Async Device controller in any available option slot (slot J2, J3, or J4).

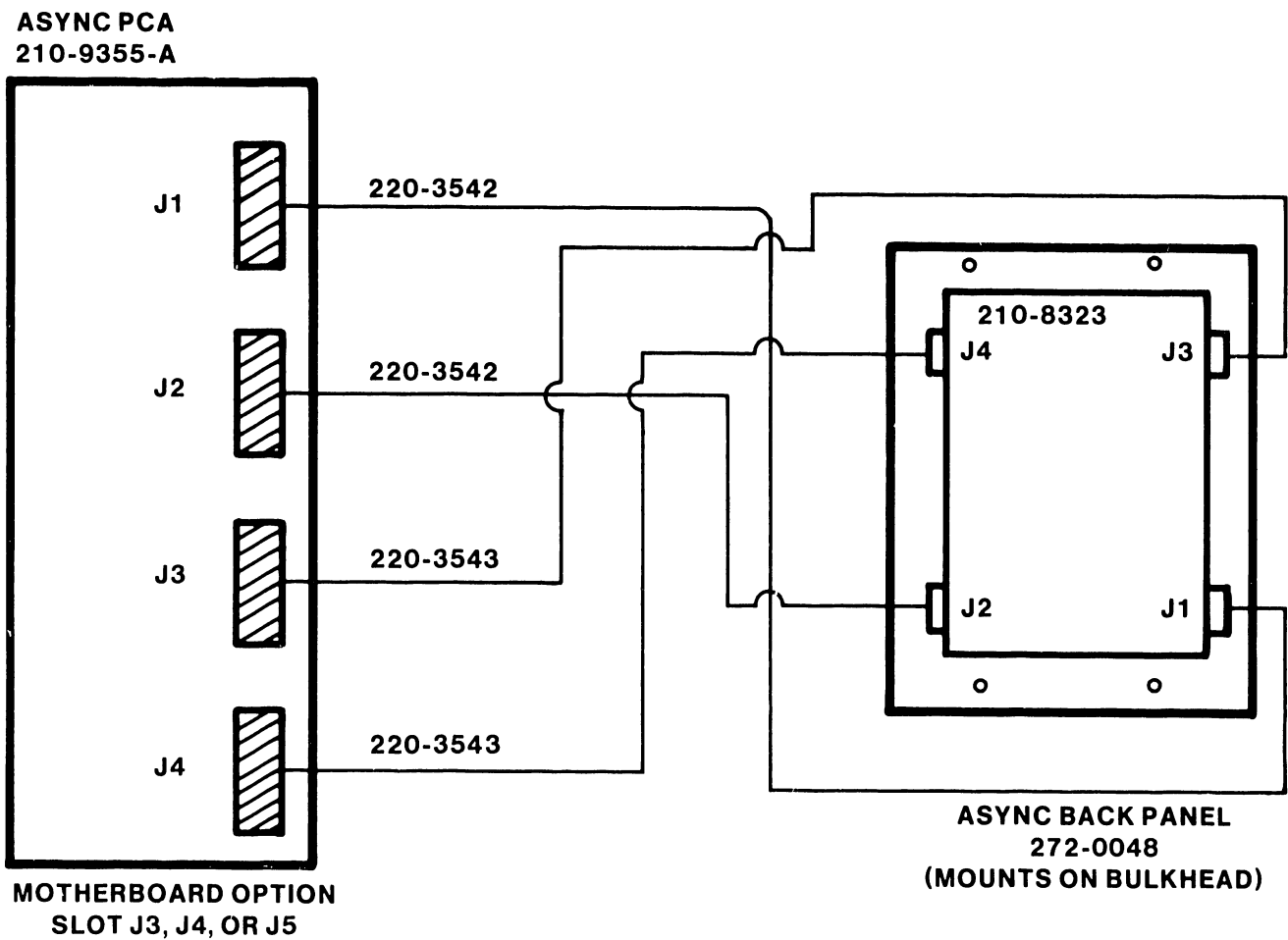
#### Async Back Panel Installation

- 1) Remove two adjacent blank I/O panels from the bulkhead door (refer to paragraph 7.12.1)
- 2) Install Async Back panel in space vacated by blank I/O panels.

# UNPACKING AND SETUP

## ASync Controller Cabling

- 1) Install the RS232 Cables through the mainframe via the cable trough and connect the cables to the Async Device Controller PCA and Async Back Panel as shown in figure 9-20.
- 2) Upon completion of cabling, replace PCA holddown device and secure the TC Panel door. Replace mainframe covers.



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Figure 9-20. Async Device Controller Option Cabling

**9.12.2 1-PORT TC DA UPGRADE OPTION (289-0568) INSTALLATION**

The 1-Port TC DA Option provides the user with serial communications ports (X.21, RS232, RS336, and RS449) for peripheral connections. Included with this option are:

- 210-9337-A 1-Port TC DA PCA
- 272-0051 Single Port TC Panel
- 210-7785-A PCA Light Board
- 210-3556 Cable, 1-Port TC J4 to Light Board PCA J1
- 220-3539 Cable, RS232/RS336 (2 each)
- 220-3541 Cable, X.21 (1 each)
- 615-3023 Label, Telecommunications (1 each)

**PCA Installation**

- 1) Power down mainframe and remove mainframe covers. (Refer to paragraphs 7.2.1, 7.2.2, and 7.2.3.)
- 2) Remove the PCA holddown device and hinge the TC Control panel to the left (refer to paragraph 7.3).
- 3) Set the 1-Port TC DA address to 0300 for the first TC DA, 0500 for the second TC DA, and 0600 for the third TC DA installed (refer to paragraph 7.3.7).
- 4) Install the 1-Port TC DA in any available option slot (slot J2, J3, or J4).

**Single Port TC Panel Installation**

- 1) Remove one blank I/O panel from the bulkhead door (refer to paragraph 7.12.1) for each 1-Port TC DA installed.
- 2) Install the Single Port TC Panel in the space vacated by blank I/O panel.

**TC Light Panel Installation**

- 1) Remove the blank label from the location the light panel is to be located.
- 2) Install the TC Light Panel (210-7785-A) onto the TC Control panel with three screws (refer to paragraph 7.8).
- 3) Install the telecommunications label (615-3023) over the light panel such that the cut-outs align with the recessed switches.

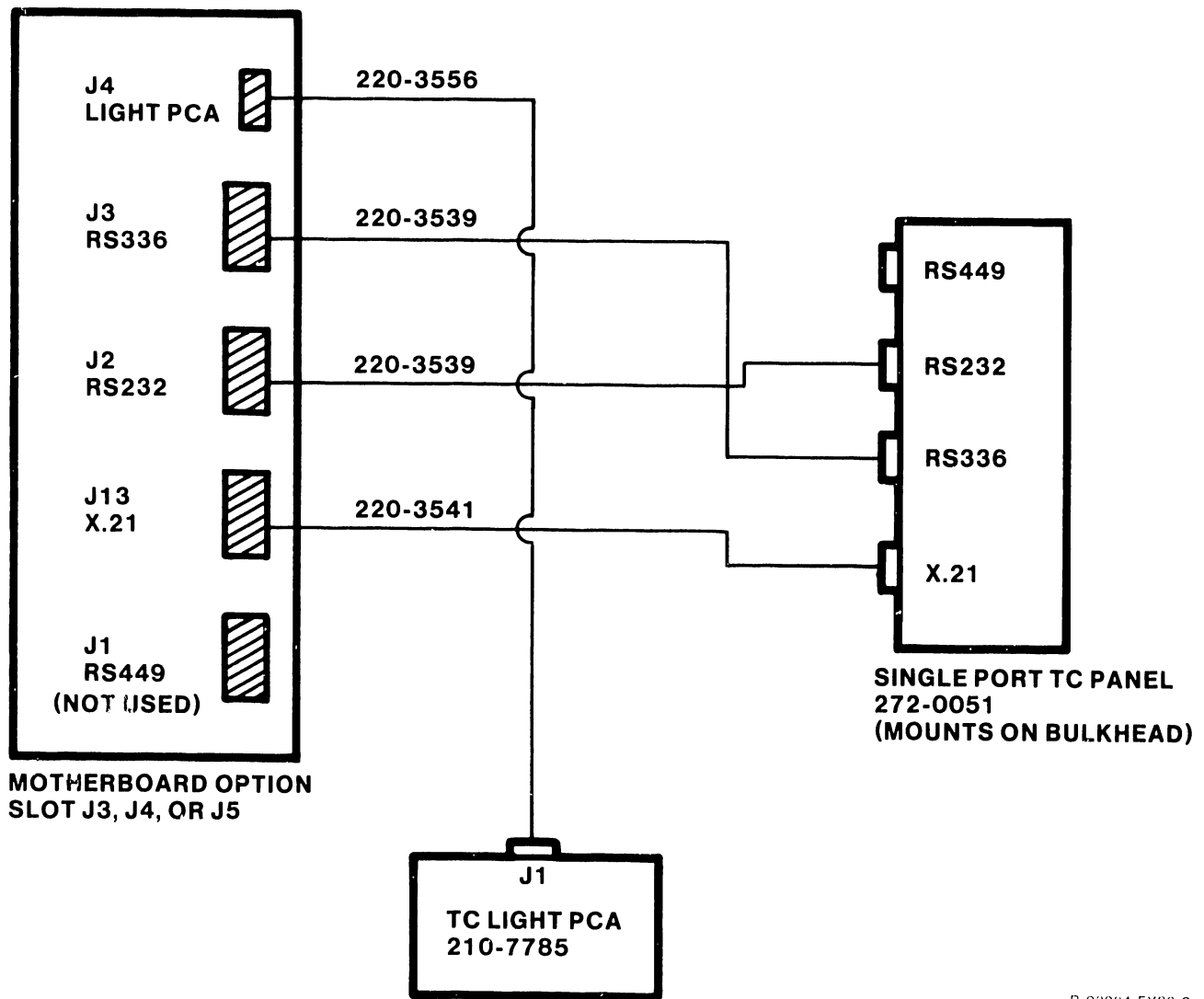
**1-Port TC DA Cabling**

- 1) Install the RS232, RS336, and X.21 cables through the mainframe via the cable trough and connect the cables between the 1-Port TC DA and the 1-Port TC Back Panel as shown in figure 9-21.

# UNPACKING AND SETUP

- 2) Note cable orientation (para. 7.8) and install the Light Board Interface Cable from 1-Port TC connector J4 to the Light Board PCA connector (refer to cabling diagram figure 9-21).
- 3) Upon completion of cabling, replace PCA holddown device and secure the TC Panel door. Replace mainframe covers.

1-PORT TC DA  
210-9337-A



B-03084-FY86-9

Figure 9-21. 1-Port TC DA Option Cabling

**9.12.3 2-PORT TC DA UPGRADE OPTION (289-0569) INSTALLATION**

The 2-Port TC DA Option provides the user with serial communications ports (X.21, RS232, and RS336) for peripheral connections. Included with this option are:

- 210-9637-A 2-Port TC DA PCA
- 272-0052 Dual Port TC Panel
- 210-7785-A PCA Light Board (2 each)
- 220-3539 Cable, Channel 1 RS232/RS366 (2 each)
- 220-3540 Cable, Channel 2 RS232/RS366 (2 each)
- 220-3541 Cable, Channel 1/2 X.21 (2 each)
- 220-3001 Cable, PCA S2 Connector to CH2 Light Board PCA
- 220-3302 Cable, PCA S1 Connector to CH1 Light Board PCA
- 615-3023 Label, Telecommunications (2 each)

**PCA Installation**

- 1) Power down mainframe and remove mainframe covers. (Refer to paragraphs 7.2.1, 7.2.2, and 7.2.3.)
- 2) Remove the PCA holddown device and hinge the TC Control panel to the left (refer to paragraph 7.3).
- 3) Set 2-Port TC DA address to 0300 for the first TC DA, 0500 for the second TC DA, and 0600 for the third TC DA installed (refer to paragraph 7.3.8).
- 4) Install the 2-Port TC DA in any available option slot (slot J2, J3, or J4).

**Dual Port TC Panel Installation**

- 1) Remove one blank I/O panel from the bulkhead door (refer to paragraph 7.12.1) for each 2-Port TC DA installed.
- 2) Install the Dual Port TC Panel in the space vacated by blank I/O panel.

**TC Light Panel Installation**

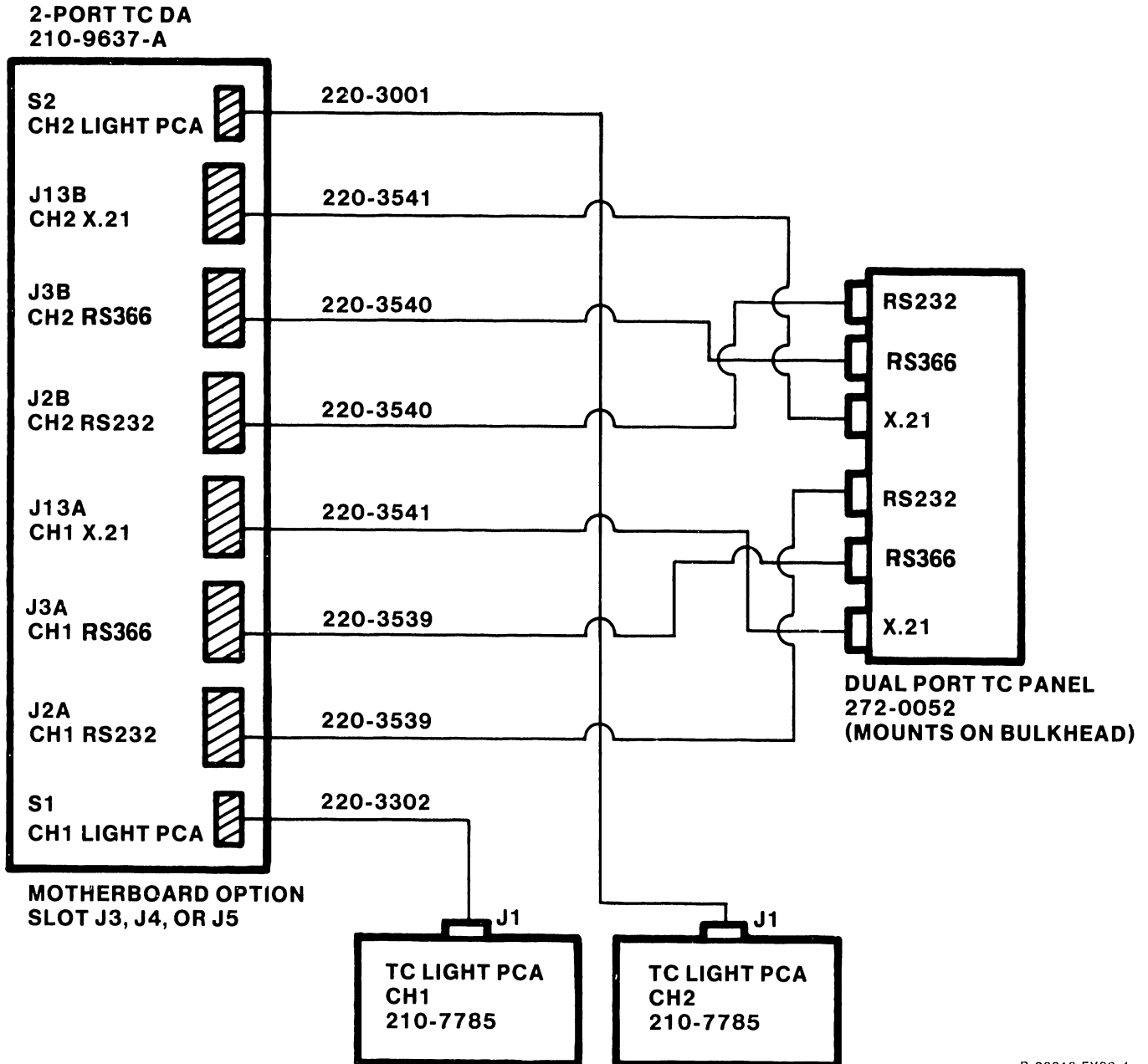
- 1) Remove the blank label from the location where the light panels are to be located.
- 2) Install the TC Light Panels (210-7785-A) onto the TC Control panel with three screws (refer to paragraph 7.8).
- 3) Install the telecommunications label (615-3023) over the light panels such that the cut-outs align with the recessed switches.

**2-Port TC DA Cabling**

- 1) Install the RS232, RS366, and X.21 cables through the mainframe via the cable trough and connect the cables to the 2-Port TC DA and the Dual Port TC Panel as shown in figure 9-22.

# UNPACKING AND SETUP

- 2) Note cable orientation (para. 7.8) and install the Light Board Interface Cables from 2-Port TC connector S1 to the first Light Board PCA connector and 2-Port TC connector S2 to the second Light Board PCA connector. Refer to the cabling diagram in figure 9-22.
- 3) Upon completion of cabling, replace PCA holddown device and secure the TC Panel door. Replace mainframe covers.



B-03316-FY86-4

Figure 9-22. 2-Port TC DA Option Cabling



**9.12.4 2-PORT SMD OPTION UPGRADE (289-0570) INSTALLATION**

The 2-Port SMD Option provides the user with two external drive ports. Refer to paragraph 7.3.5 for drive-types supported. Included with this option are:

- 210-9313-A      2-Port SMD PCA
- 272-0053      2-Port SMD Panel (Mounts on SCSI Panel)
- 220-3544      Cable 'B', External Drive 0/1 (2 each)
- 220-3546      Cable, 'A', External Drive Data

**PCA Installation**

- 1) Power down mainframe and remove mainframe covers. (Refer to paragraphs 7.2.1, 7.2.2, and 7.2.3.)
- 2) Remove the PCA holddown device and hinge the TC Control panel to the left (refer to paragraph 7.3).
- 3) Set the 2-Port SMD address to 0100. Set the External Drive-type switches for drive type installed (refer to paragraph 7.3.5).
- 4) Install the 2-Port SMD in any available option slot (slot J2, J3, or J4).

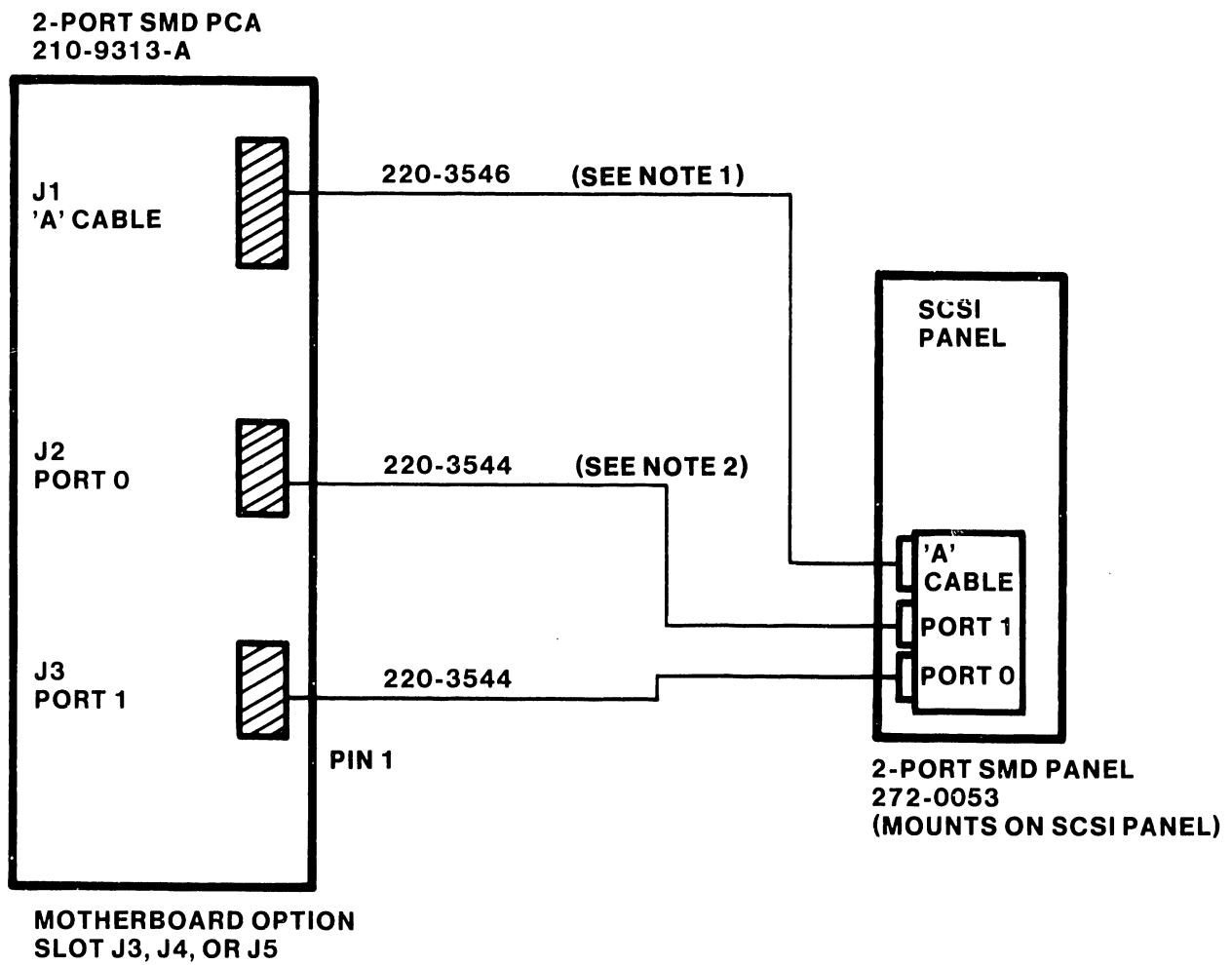
**2-Port SMD Panel Installation**

- 1) Mount the 2-Port SMD panel on the SCSI panel located on the bulkhead door (refer to paragraph 7.12.1).

**2-Port SMD Cabling**

- 1) Install the 'A' Cable and 'B' cables through the mainframe via the cable trough and connect the cables between the 2-Port SMD and the 2-Port SMD Panel as shown in figure 9-23.
- 3) Upon completion of cabling, replace PCA holddown device and secure the TC Panel door. Replace mainframe covers.

# UNPACKING AND SETUP



## NOTES

1. "A" CABLE PIN 1 IS BROWN/TAN.
2. "B" CABLES PIN 1 IS RED.

Figure 9-23. 2-Port SMD Cabling

### 9.12.5 4-PORT SMD OPTION UPGRADE (289-0578) INSTALLATION

The 4-Port SMD Option provides the user with four external drive ports. Refer to paragraph 7.3.6 for drive-types supported. Included with this option are:

- 210-9315-A      4-Port SMD PCA
- 272-0054      4-Port SMD Panel
- 220-3544      Cable 'B', External Drive 0/1 (2 each)
- 220-3545      Cable 'B', External Drive 2/3 (2 each)
- 220-3546      Cable, 'A', External Drive Data

#### PCA Installation

- 1) Power down mainframe and remove mainframe covers. (Refer to paragraphs 7.2.1, 7.2.2, and 7.2.3.)
- 2) Remove the PCA holddown device and hinge the TC Control panel to the left (refer to paragraph 7.3).
- 3) Set the 4-Port SMD address to 0100. Set the External Drive-type switches for drive type installed (refer to paragraph 7.3.6).
- 4) Install the 4-Port SMD in any available option slot (slot J2, J3, or J4).

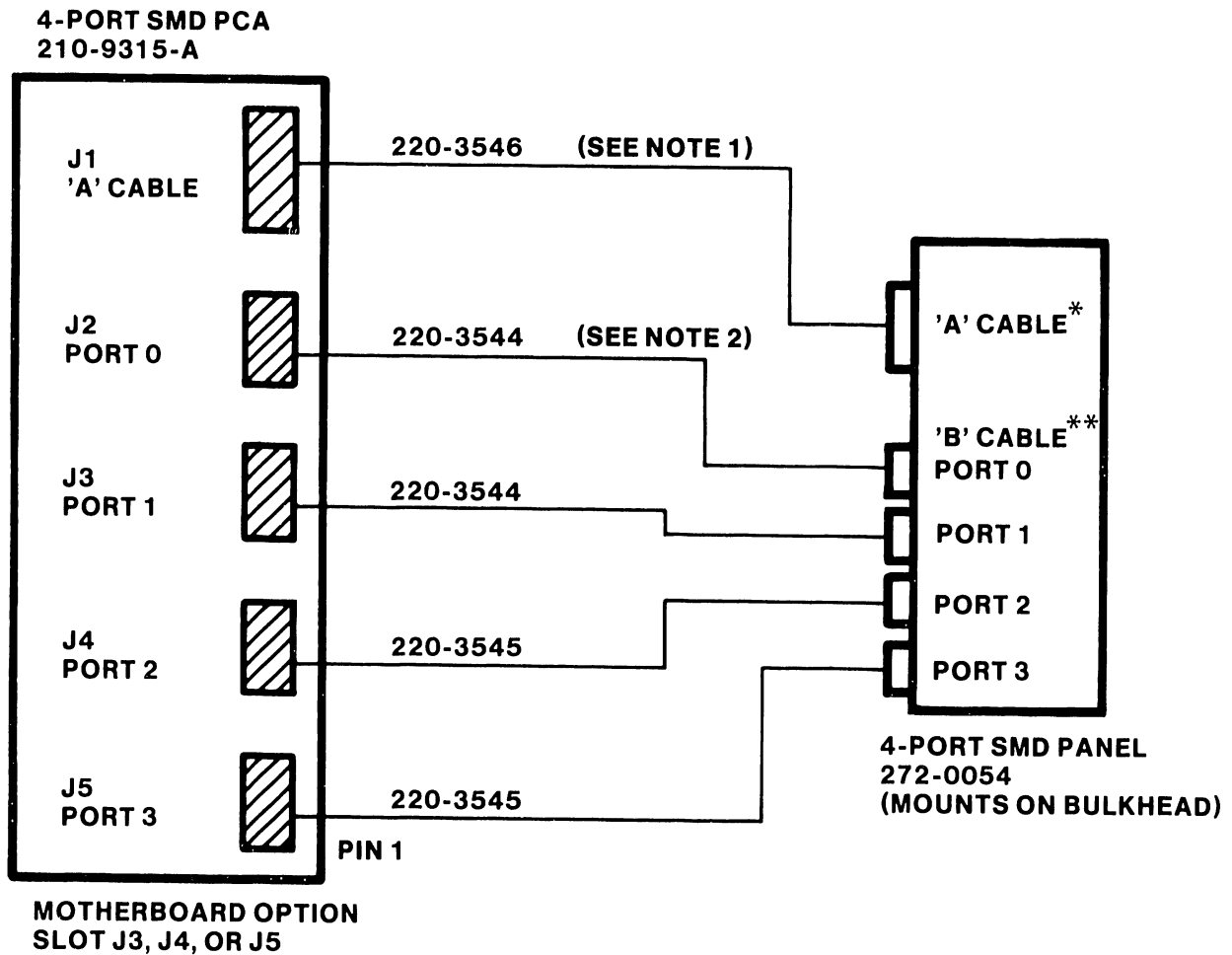
#### 4-Port SMD Panel Installation

- 1) Remove one blank I/O panel from the bulkhead door (refer to paragraph 7.12.1).
- 2) Install the 4-Port SMD Panel in the space vacated by blank I/O panel.

#### 4-Port SMD Cabling

- 1) Install the 'A' Cable and 'B' cables through the mainframe via the cable trough and connect the cables between the 4-Port SMD and the 4-Port SMD Panel as shown in figure 9-24.
- 3) Upon completion of cabling, replace PCA holddown device and secure the TC Panel door. Replace mainframe covers.

UNPACKING AND SETUP



B-03110-FY86-2

Figure 9-24. 4-Port SMD Cabling

### 9.12.6 UISIO OPTION (289-0571) INSTALLATION

The UISIO Option provides the user the versatility to expand bulkhead panel space via the use of the Small Cable Concentrator cabinet. This option also allows the user the flexibility to use a Global Modem which, must be located in the Small Cable Concentrator cabinet due to bulkhead restrictions. Included with this option are:

- 210-8489-A PCA, VS-25/45/65 U W/CNT

#### PCA Installation

- 1) Power down mainframe and remove mainframe covers. (Refer to paragraphs 7.2.1, 7.2.2, and 7.2.3.)
- 2) Remove the PCA holddown device and hinge the TC Control panel to the left (refer to paragraph 7.3).
- 3) Verify UISIO PCA address (refer to paragraph 7.3.10).
- 4) Install the UISIO PCA in any available option slot (slot J2, J3, or J4).

#### Panel Installation

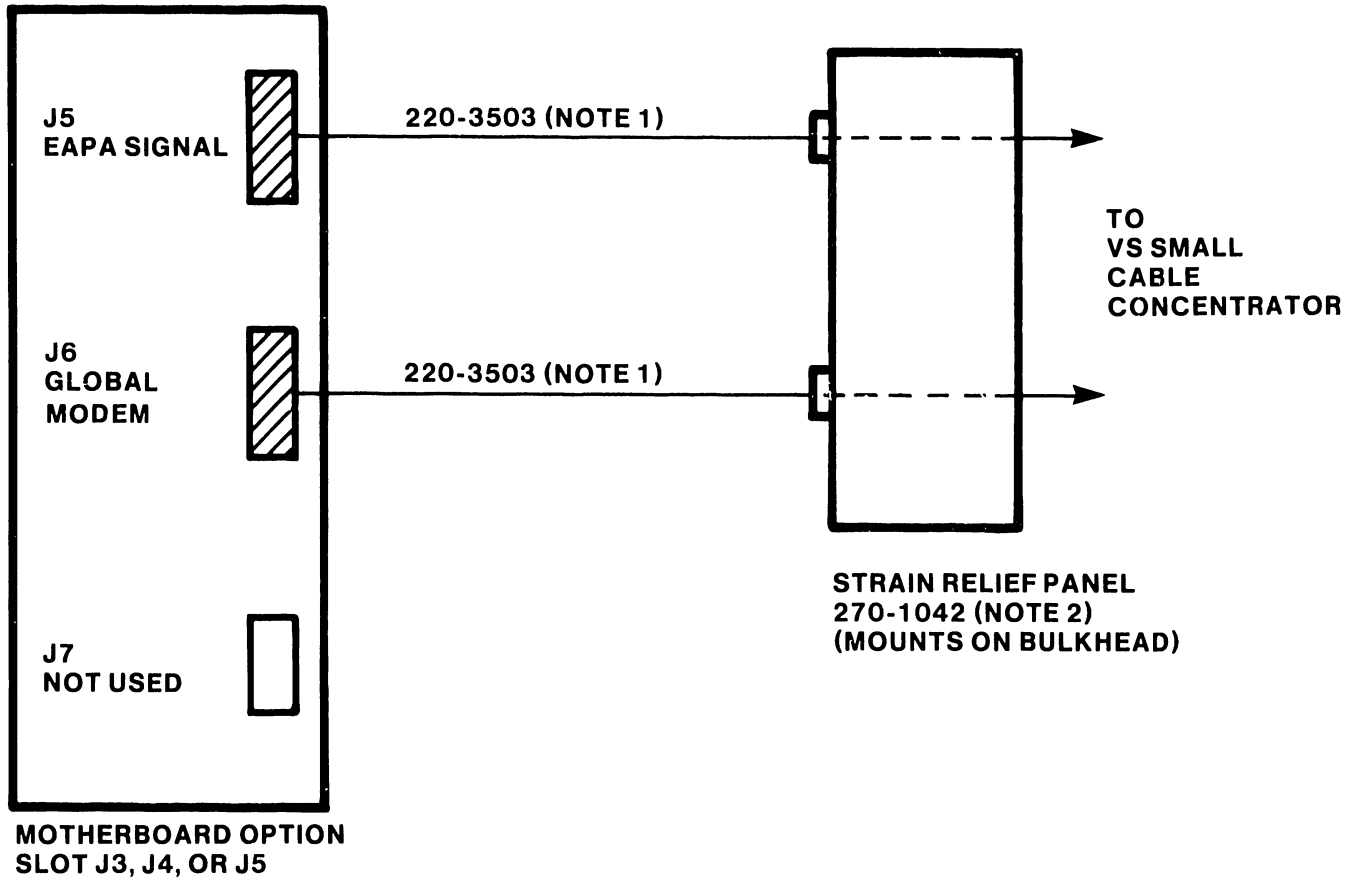
- 1) If additional strain relief panel is required for the UISIO to VS Small Cable Concentrator, perform the following:  
Remove one blank I/O panel from the bulkhead door (refer to paragraph 7.12.1).
- 2) Install the Strain Relief Panel (shipped with the concentrator) in the space vacated by blank I/O panel.

#### UISIO PCA Cabling

- 1) Install the interconnect cables through the mainframe via the cable trough and connect the cables to the UISIO PCA as shown in figure 9-25. Note the Global modem power connector is not used in configurations using the cable concentrator.
- 2) Refer to the VS Small Cable Concentrator maintenance manual (Class Code 6100) for option panel installation and cabling.
- 3) Upon completion of cabling, replace PCA holddown device and secure the TC Panel door. Replace mainframe covers.

# UNPACKING AND SETUP

UISIO PCA  
210-8489-A



## NOTES

- 1) CABLES 220-3503 ARE INCLUDED IN VS SMALL CABLE CONCENTRATOR CABLE KITS
- 2) STRAIN RELIEF PANEL 270-1042 IS INCLUDED WITH CABLE CONCENTRATOR

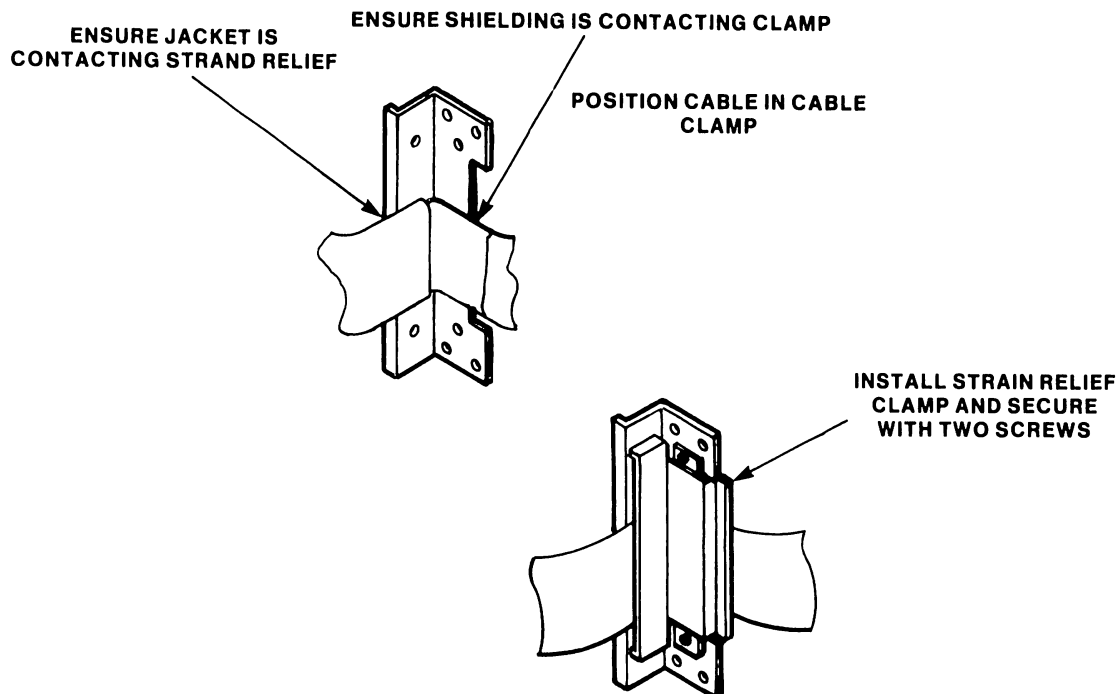
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Figure 9-25. UISIO PCA Cabling

## 9.12.7 EXTERNAL DRIVE CABLING

Both SMD Panels (2-Port and 4-Port) require special attention to cable installation. Two types of disk cable connectors are located on the SMD panels (part numbers 2-Port SMD panel 272-0053 and 4-Port SMD panel 272-0054). The 26-pin sockets are for 'B' cable connections and the 60-pin socket is for the 'A' cable connection. It may be necessary to prepare the external disk cable prior to connecting them to the SMD panel. Verify proper cable installation or perform the following before connecting an external disk cable. Refer to figure 9-26 and figure 9-27.

- 1) Remove the cover plate from the SMD Panel assembly.
- 2) Remove 4 inches of plastic sheathing from one end of the cable.
- 3) Disassemble the cable clamps (strain relief) from the SMD panel by removing the screws on either side of the clamp.
- 4) Lay the shielded section of the external 'A' cable against the face of the clamp at the left side of the plate. Leave 1/4 inch of foil exposed.
- 5) Lay the shielded section of the external 'B' cables (up to four cables) against the face of the clamp at the right side of the plate. Leave 1/4 inch of foil exposed.
- 6) Reassemble the cable clamps by installing the screws removed in step 3. Make sure that pin 1 of the cables are oriented properly and tighten the clamp screws until solid contact with the shield is made. DO NOT over tighten the screws as damage to the cables could result.

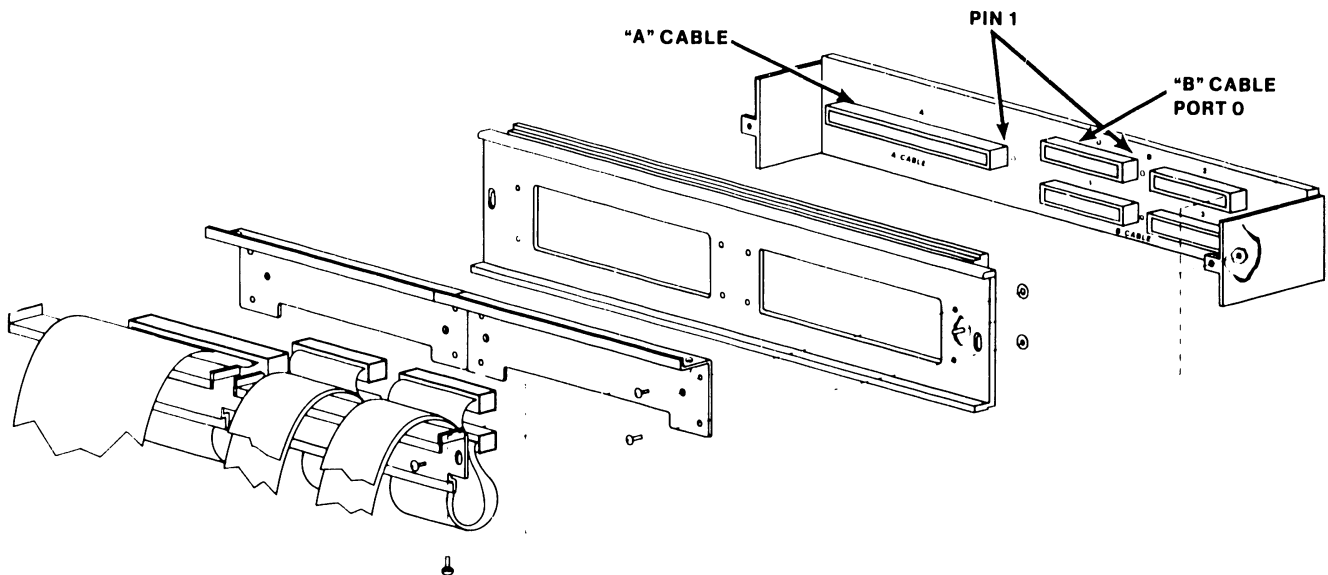


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Figure 9-26. Installing Disk Cable Into Cable Clamp

## UNPACKING AND SETUP

- 7) Plug the 'A' and 'B' cables into the cable connectors on the SMD panel. The 'A' cable is the 60-pin connector and the 'B' cables are arranged with Port 0 at the top left with Port 1 directly below it. Port 2 is to the right of Port 0 and Port 3 is directly below.
- 8) Reinstall the SMD Panel cover plate.



B-02442-FY85-7

Figure 9-27. SMD Panel External Cabling



**9.13 VS-5/6 UPGRADES**

Depending on the mainframe installed, various upgrade kits are available to enhance the mainframe capabilities. The following upgrade kits are presently available:

- 9.13.1 VS-5 2MB Memory Upgrade (289-0573)
- 9.13.2 VS-6 2MB Memory Upgrade (289-0574)
- 9.13.3 VS-6 4MB Memory Upgrade (289-0575)
- 9.13.4 VS-5/6 67.5MB Disk Drive Upgrade (289-0576)
- 9.13.5 VS-5 to VS-6 Upgrade (289-0577)
- 9.13.6 360KB Floppy Disk Drive Option (2270V-5)

**9.13.1 VS-5 2MB MEMORY UPGRADE (289-0573)**

The VS-5 2MB Memory Upgrade Kit (289-0573) allows the VS-5 CPU/Memory PCA memory size to be upgraded from 1MB to 2MB. This upgrade contains four 256K SIMMs modules that are installed in the VS-5 CPU/memory PCA. Refer to paragraph 7.3.1.1 for memory upgrade procedures.

**9.13.2 VS-6 2MB MEMORY UPGRADE (289-0574)**

The VS-6 2MB Memory Upgrade kit (289-0574) consists of one VS-6 2MB CACHE Memory PCA (210-9599-1A). This PCA replaces/upgrades the 1MB CACHE Memory PCA (210-9599) used in the 1MB VS-6 mainframe. Refer to paragraph 7.3.3 VS-6 CACHE memory removal for removal/replacement procedures and Jumper/Switch settings.

**9.13.3 VS-6 4MB MEMORY UPGRADE (289-0575)**

The VS-6 2MB Memory Upgrade kit (289-0575) consists of one VS-6 4MB CACHE Memory PCA (210-9599-2A). This PCA replaces/upgrades the 1MB CACHE Memory PCA (210-9599) or the 2MB CACHE Memory PCA (210-9599-1A) presently used in the 1MB and 2MB VS-6 mainframe. Refer to paragraph 7.3.3 VS-6 CACHE memory removal for removal/replacement procedures and Jumper/Switch settings.

**9.13.4 VS-5/6 67.5MB DISK DRIVE UPGRADE (289-0576)**

The VS-5/6 67.5MB Disk Drive Upgrade (289-0576) entails the addition of a second 67.5 winchester drive to VS-5/6 system presently using one drive.

Installation of the second winchester drive requires that the terminator chip presently installed in drive 0 of a one drive system must be removed and installed in drive 1. Refer to paragraph 7.5 for winchester drive removal/replacements and paragraph 7.5.2 for drive terminator and jumper access and locations.

## 9.13.5 VS-5 to VS-6 UPGRADE (289-0577)

The VS-5 to VS-6 Upgrade kit provides the following components:

- VS-6 CPU PCA (210-8699-A)
- VS-6 CACHE Memory PCA 1MB (210-9566-A)
- 60 Pos Soc-Soc Cable Assy (3 each)
- VS-6 Interconnection Label (615-3212)

### UPGRADE PROCEDURE

Remove the VS-5 CPU PCA presently used (refer to paragraph 7.3.1) and install the VS-6 CPU PCA into slot J1 (paragraph 7.3.4). Verify switch settings and jumper locations (paragraph 7.3.3) and install the VS-6 CACHE Memory PCA into slot J0. Connect the three 60-pos Soc-Soc cable assemblies between the CPU and Cache memory.

Remove the VS-6 Interconnect Label backing and paste-up the label over the VS-5 Interconnection label mounted inside the front cover.

## 9.13.6 360KB FLOPPY DISK DRIVE OPTION (2270V-5)

The 360KB Floppy Disk Drive option contains one 5-1/4 inch half-height floppy disk drive (WLI P/N 278-4033) that can be installed in place of the 1.2MB floppy diskette drive. This floppy drive is supported on VSOS 6.42 and higher.

## 9.14 VS SMALL CABLE CONCENTRATOR

The VS Small Cable Concentrator (Model VS-SM-CC) can be used to provide additional bulkhead panel space for TC panels, Disk Controller panels, and Async Device controller panels. Additionally, if a Global Modem option is to be installed, the modem must be installed in the cable concentrator cabinet. Refer to the 'Small VS Cable Concentrator Maintenance Manual' (Class Code 6100) for system requirements and installation procedures.

The cable concentrator can house the following modular I/O Systems:

- Electrical Active Port Assemblies (EAPA)
- WangNet 'P' Band Panel
- FiberWay Panels (FWAPA)

**9.15 LATEST PCA REVISIONS**

The Latest PCA Revisions levels are listed below.

PCA	NOMENCLATURE	ELECTRICAL REV.	MECHANICAL REV.
210-8563	Power Supply Control	Rev 3	Rev 1
210-8565	Power Supply PCA	Rev 2	Rev 1
210-8699	VS-65 CPU	Rev 2	Rev 2
210-9110	VS-5 CPU/Memory	Rev 2	Rev 0
210-9111	VS-5/6 Bus Processor	Rev 2	Rev 0
210-9112	VS-5/6 Motherboard	Rev 0	Rev 0
210-9313	SMD 2-Port DA	Rev 0	Rev 1
210-9315	SMD 4-Port DA	Rev 0	Rev 0
210-9337	TC DA 1-Port	Rev 3	Rev 0
210-9355	Async Device Controller	Rev 1	Rev 0
210-9637	TC DA 2-Port	Rev 2	Rev 0
210-9599	Cache Memory (VS-65)	Rev 0	Rev 0

**9.16 SCSI BUS TERMINATOR**

Presently the SCSI Bus is terminated on the SCSI Interface PCA (278-4063) via two terminator chips. In the future, a new terminator (part number 725-3334) will be used which attaches to the rear panel SCSI connector. The internal terminator chips will be removed and the external terminator will be installed. External SCSI devices can be added to the SCSI bus without the need to open the unit.

**SECTION**

**10**

**FUNCTIONAL  
DESCRIPTION**

SECTION 10 CONTENTS

SECTION 10  
FUNCTIONAL DESCRIPTION

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**SECTION 10**  
**FUNCTIONAL DESCRIPTION**

**10.1 INTRODUCTION**

Functional Description is not included in the first edition of the VS-5/6 Computer System manual. This information will be provided in subsequent editions.

**SECTION**

**11**

**SPECIFICATIONS**

# SECTION 11 CONTENTS

## SECTION 11 SPECIFICATIONS

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**SECTION 11**  
**SPECIFICATIONS**

**11.1 HARDWARE SPECIFICATIONS**

The hardware specifications section contains specifications for the VS-5/6 computer and component specifications for the 67.5M winchester drive, 1.2M floppy diskette drive, and the SPS500 switching power supply.

**11.1.1 VS-5/6 COMPUTER SYSTEM SPECIFICATIONS**

**VS-5/6 Computer System Dimensions:**

Depth: 20.50 inches (52.07 cm)  
Width: 9.90 inches (25.15 cm)  
Height: 25.50 inches (64.77 cm)

**VS-5/6 Computer System Weight:**

VS-5/6 130 pounds (59.1 Kg) Minimum Configuration

**VS-5/6 Computer System Installation Requirements:**

Front Clearance: 13 inches (33.02 cm)  
Rear Clearance: 13 inches (33.02 cm)  
Side Clearance: 14 inches (35.56 cm)  
Position: Upright Only

**VS-5/6 Power Requirements:**

Dedicated circuit  
90 - 132 Vac (115 Vac nominal), 60 Hz  $\pm$  0.5 (60 Hz nominal)  
180 - 264 Vac (230 Vac nominal), 50 Hz  $\pm$  0.5 (50 Hz nominal)  
6.7 Amps (770.5 volt-amps peak power-up)  
6.0 Amps Operating  
NEMA Receptacle 5-15IG  
NEMA Plug 5-15IP

**Environmental Requirements:**

Relative Humidity:  
20% - 80% non-condensing  
Ambient Temperature:  
60° - 90°F (15.5° - 32° C)

Environmental Requirements (Cont'd):

Max Temp Gradient:  
12°F/Hr (4°C/Hr)  
Max Wet Bulb Temp:  
75°F (24°C)  
Max Altitude:  
10,000 Ft (3.048 Km)  
Heat Dissipation:  
770 Watts (2618 BTU/Hr)

Memory Cycle Time:

VS-5 - 400 nSeconds  
VS-6 - 200 nSeconds

Memory Size:

VS-5 - 1 or 2 MB  
VS-6 - 1, 2, or 4 MB

Number of Users:

VS-5 - 8  
VS-6 - 16

Maximum Serial Devices:

VS-5 - 12  
VS-6 - 16, expandable to 24

**11.1.2 67.5MB WINCHESTER DRIVE SPECIFICATIONS**

Drive Dimensions:

Depth: 8.00 inches (203 mm)  
Width: 5.75 inches (146 mm)  
Height: 3.25 inches (82.6 mm)

Bezel Dimensions:

Depth: 0.185 inches (4.7 mm)  
Width: 5.88 inches (149 mm)  
Height: 3.375 inches (85.7 mm)

Drive Performance:

Capacity:  
67.5MB Formatted  
Transfer Rate:  
5MB bits/second

# SPECIFICATIONS

## Drive Performance (Cont'd):

### Seek Time:

Track-to-Track 6 msec  
Average 28 msec  
Maximum 62 msec

### Rotational Latency:

Average 8.33 msec  
Nominal 16.76 msec

### Start Time:

25 Seconds Maximum to Drive ready

### Stop Time:

15 Seconds Nominal

## Power Requirements:

+5 Vdc  $\pm 5\%$  @ 0.9 Amp Idle, 0.9 Amp Peak  
+12 Vdc  $\pm 5\%$  @ 2.1 Amps Idle, 3.9 Amps Peak

## Power Dissipation:

Standby: 26 Watts, 89 BTU/Hr  
Positioning: 32 Watts, 109 BTU/Hr

## 11.1.3 SPS 500 SWITCHING POWER SUPPLY SPECIFICATIONS

### Dimensions

Depth: 17.66 inches (44.86 cm)  
Width: 6.28 inches (15.95 cm)  
Height (front): 4.60 inches (11.68 cm)  
Height (rear): 5.40 inches (13.71 cm)

### Output Voltages:

+5 Vdc:  
 $\pm 5\%$  @ 30 Amps Typical, 65 Amps Peak, 50 mv Ripple P-P at full Load

+12 Vdc:  
 $\pm 10\%$  @ 5.0 Amps Typical, 16 Amps Peak, 50 mv Ripple P-P at full Load

-5 Vdc:  
5% @ 1.0 Amps Typical, 1.5 Amps Peak, 50 mv Ripple P-P at full Load

-12 Vdc:  
 $\pm 10\%$  @ 1.5 Amps Typical, 3.0 Amps Peak, 50 mv Ripple P-P at full Load

### Power Dissipation:

Steady State:  
490 Watts, 1666 BTU/Hr

11.1.4 1.2MB FLOPPY DRIVE SPECIFICATIONS

Drive Dimensions:

Depth: 8.46 inches (214.9 mm)  
Width: 5.75 inches (146 mm)  
Height: 1.62 inches (41.8 mm)

Drive Performance:

Capacity:  
1.2MB Formatted  
Transfer Rate:  
250K bits/second  
Access Time:  
Track-to-Track 3 msec  
Average 94 msec  
Setting 15 msec  
Average Latency:  
100 msec

Power Requirements:

+5 Vdc  $\pm 5\%$  @0.7 Amp Typical, 0.9 Amp Peak  
+12 Vdc  $\pm 10\%$  @0.75 Amp Typical, 1.2 Amps Peak

Power Dissipation:

Standby: 3.6 Watts, 12.3 BTU/Hr  
Continuous: 12.5 Watts, 42.7 BTU/Hr

# SPECIFICATIONS

## 11.2 SOFTWARE SPECIFICATIONS

This section contains software specifications for the VS-5/6 Computer. Refer to the appropriate section for system used.

### 11.2.1 VS-5 MINIMUM SOFTWARE REQUIREMENTS

---

<u>Software</u>	<u>Version</u>	<u>Comments</u>	<u>WLI P/N</u>
Operating System	6.42.00	Domestic	195-2456-21
Operating System	6.42.00	International	195-2492-21

---

### 11.2.2 VS-6 MINIMUM SOFTWARE REQUIREMENTS

---

<u>Software</u>	<u>Version</u>	<u>Comments</u>	<u>WLI P/N</u>
Operating System	6.42.00	Domestic	195-2456-21
Operating System	6.42.00	International	195-2492-21

---

# SPECIFICATIONS

## 11.3 DIAGNOSTICS SPECIFICATIONS

The section contains diagnostics packages (Built-in Test and Disk-Based) available for the VS-5/6 Computer.

### 11.3.1 VS-5/6 BUILT-IN-TEST (BIT)

---

<u>Diagnostic Name</u>	<u>PROM Rev.</u>	<u>Location</u>	<u>Package P/N</u>
Bus Processor PROM	5630	L183 L184	379-2905 379-2906

---

### 11.3.2 VS-5/6 DIAGNOSTICS

---

<u>Diagnostic Name</u>	<u>Release</u>	<u>Package P/N</u>
VS-5/6 Diagnostic Control	2631	195-4968-21

---

### NOTES

Complete 195 package part numbers include diskette(s) and documentation.

**SECTION 12**  
**ILLUSTRATED**  
**PARTS**

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SECTION 12  
ILLUSTRATED PARTS

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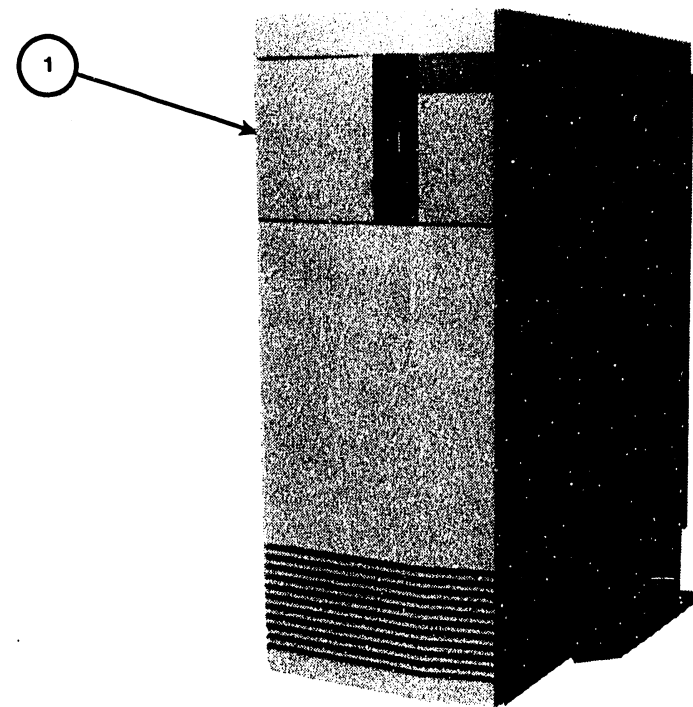
SECTION 12  
ILLUSTRATED PARTS

12.1 INTRODUCTION

The Illustrated Parts section contains illustrations of major assemblies and subassembly for the VS-5/6 Computer System. Field Replaceable Units (FRU) are identified by an asterisk (\*).

12.1.1 MAJOR ASSEMBLIES

Item	Part Number	Description
1	187-7411	VS-5 Computer System
	187-7412	VS-6 Computer System

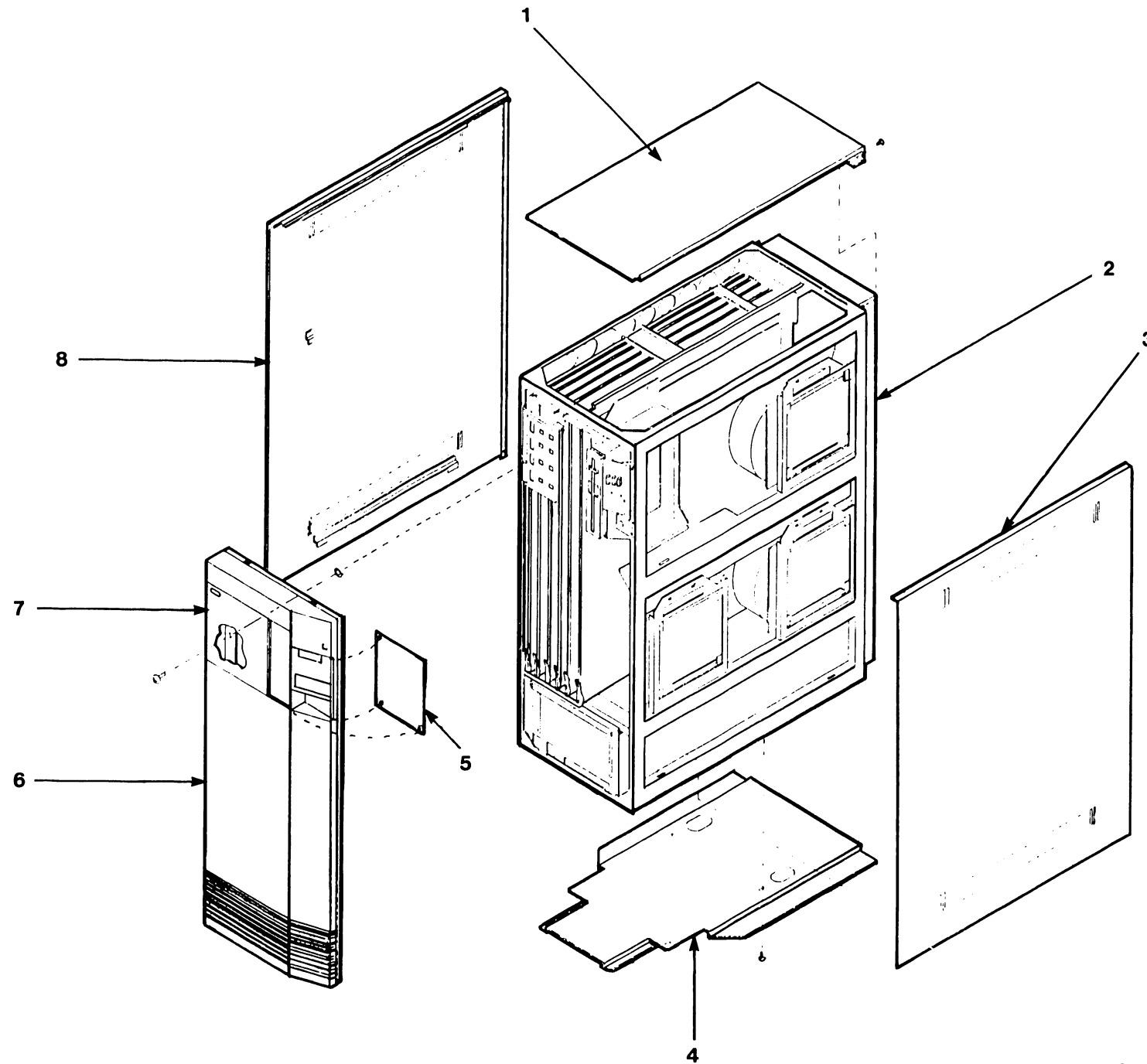


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12.2 SUBASSEMBLIES

12.2.1 VS-5/6 Computer System Covers

Item	Part Number	Description
1	458-3688	Cover, Top
2	452-4793	Frame, Weldment
3	458-3690	Cover, Right Side
4	452-0413	Stand, Anti-Tip
5	449-1165	Door, Small
6	449-1168	Bezel, Front
7	449-1166	Door, Large
8	458-3691	Cover, Left Side

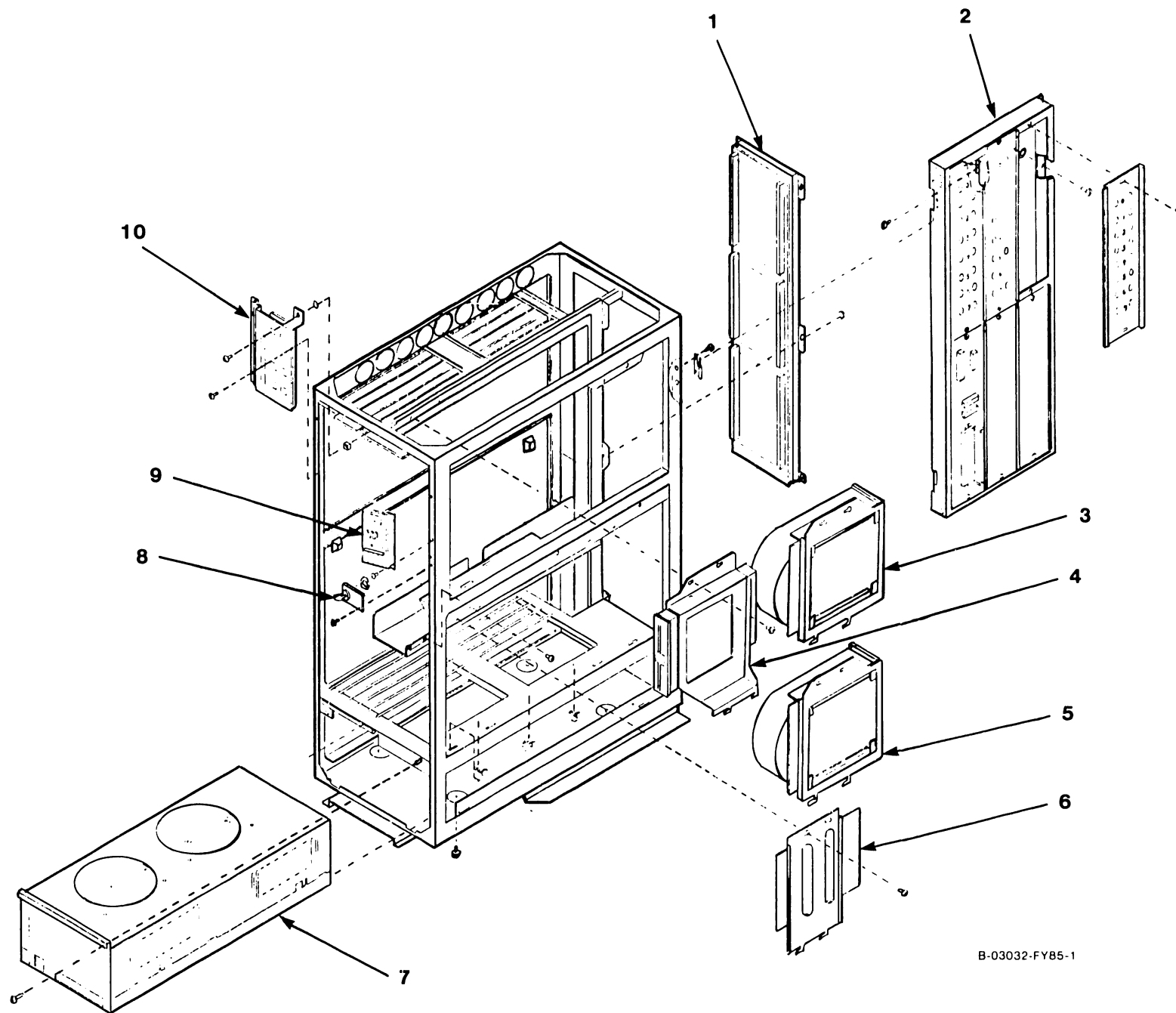


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12.2.2 VS-5/6 Computer System Chassis

Item	Part Number	Description
1	270-0477	Backplane Assembly
2	451-3761	Door, Bulkhead
3	279-0716	Option, Winchester Disk Assembly, VS-5/6
4	279-0717	1.2M HH Floppy, VS-5/6
5	279-0716	Winchester Disk Assembly, VS-5/6
6	270-0715	SCSI I/O Panel Assembly
7*	270-1063	Power Supply, SPS500
8*	325-2327	Key Switch
9*	210-9113	Front Panel, VS-5/6
10		TC Control Panel Assembly, VS-5/6 (Refer to Para 12.3.6)

\* Recommended Spare Part



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### 12.2.3 VS-5 Computer System Card Cage

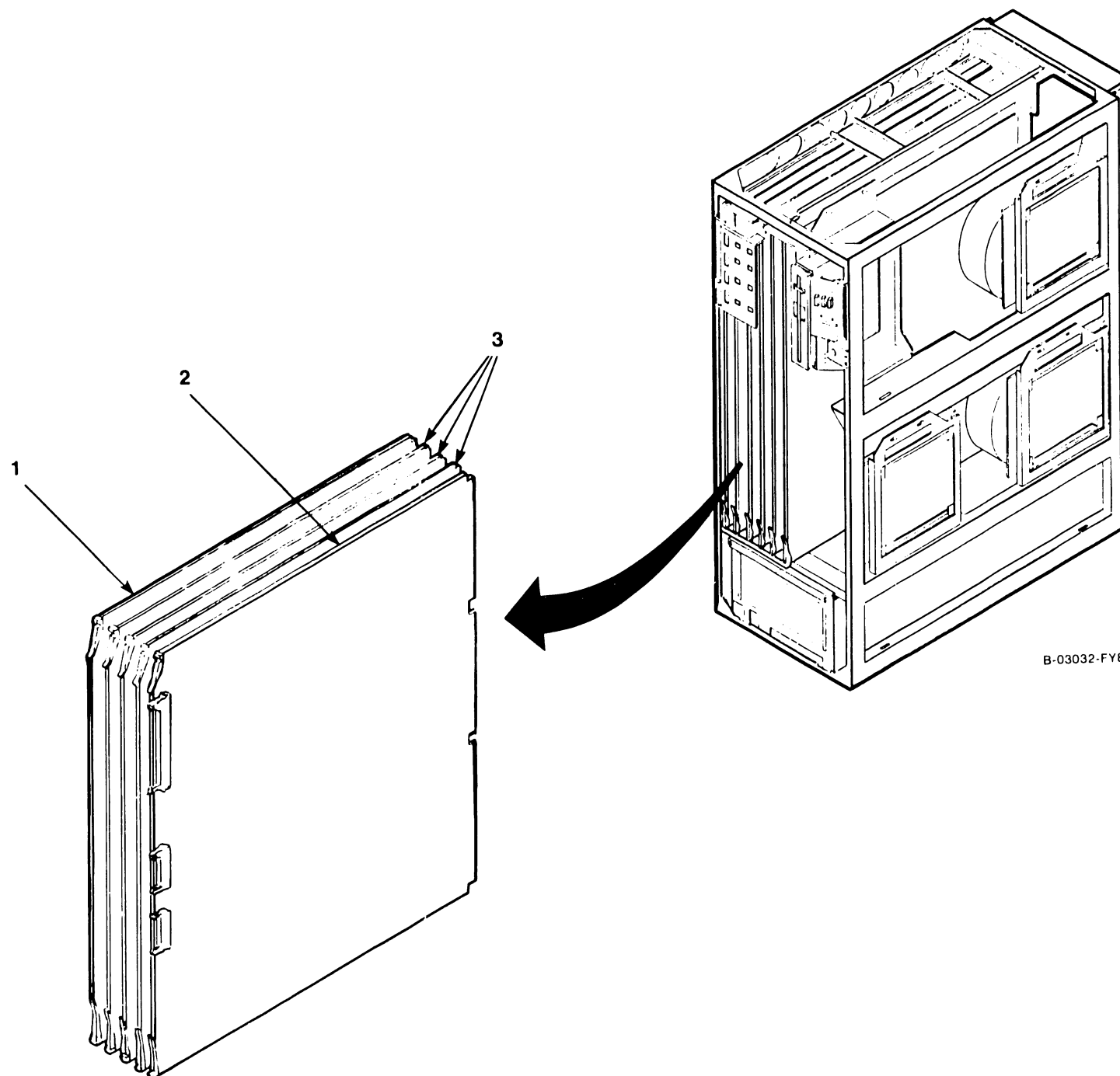
Item	Part Number	Description
------	-------------	-------------

- |    |             |                            |
|----|-------------|----------------------------|
| 1* | 210-9110-A  | PCA, VS-5 CPU, 1 Meg       |
|    | 210-9110-1A | PCA, VS-5 CPU, 2 Meg       |
| 2* | 210-9111    | PCA, Bus Processor, VS-5/6 |

#### OPTION BOARDS

- |    |            |                               |
|----|------------|-------------------------------|
| 3* | 210-9637-A | PCA, VS-25/45/65 2-Port TC DA |
|    | 210-9337-A | PCA, VS-25/45/65 1-Port TC DA |
|    | 210-9313-A | PCA, VS-65 Interface SMD      |
|    | 210-9315-A | PCA, VS-65 Interface SMD      |
|    | 210-9355-A | PCA, Async Device Controller  |
|    | 210-8489-A | PCA, VS-25/45/65 U W/CNT      |

\* Recommended Spare Part



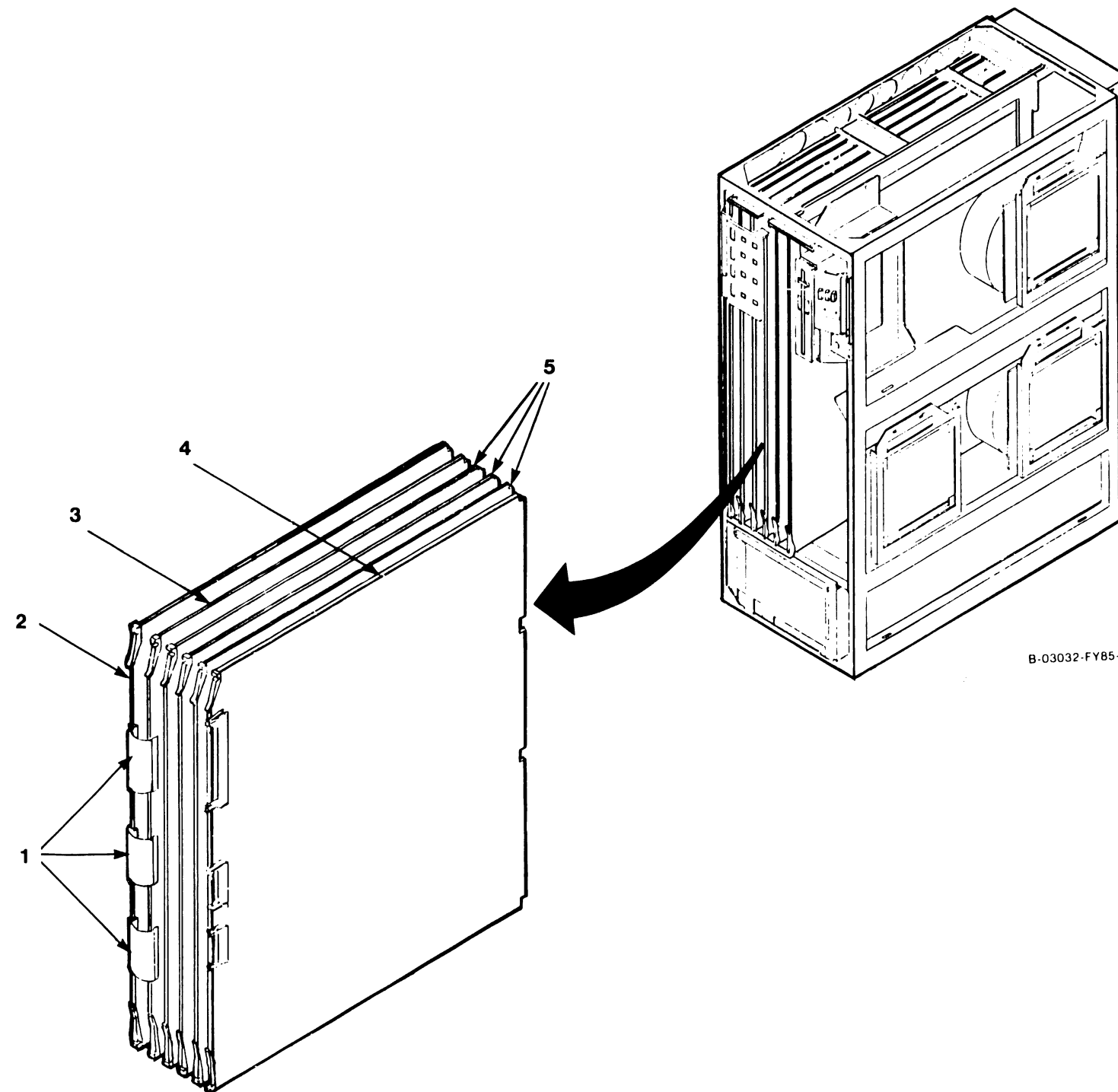
12.2.4 VS-6 Computer System Card Cage

Item	Part Number	Description
1*	220-3435	Cable Assembly, 60 Pos Soc-Soc (Mem Bd. to CPU Bd.)
2*	210-9599-A	PCA, VS-65 Cache Memory, 1 Meg
	210-9599-1A	PCA, VS-65 Cache Memory, 2 Meg
	210-9599-2A	PCA, VS-65 Cache Memory, 4 Meg
3*	210-8699-A	PCA, VS-65 CPU
4*	210-9111	PCA, Bus Processor VS-5/6

**OPTION BOARDS**

5*	210-9637-A	PCA, VS-25/45/65 2-Port TC DA
	210-9337-A	PCA, VS-25/45/65 1-Port TC DA
	210-9313-A	PCA, VS-65 Interface SMD
	210-9315-A	PCA, VS-65 Interface SMD
	210-9355-A	PCA, Async Device Controller
	210-8489-A	PCA, VS-25/45/65 U W/CNT

\* Recommended Spare Part



B-03032-FY85-3

## 12.3 Components

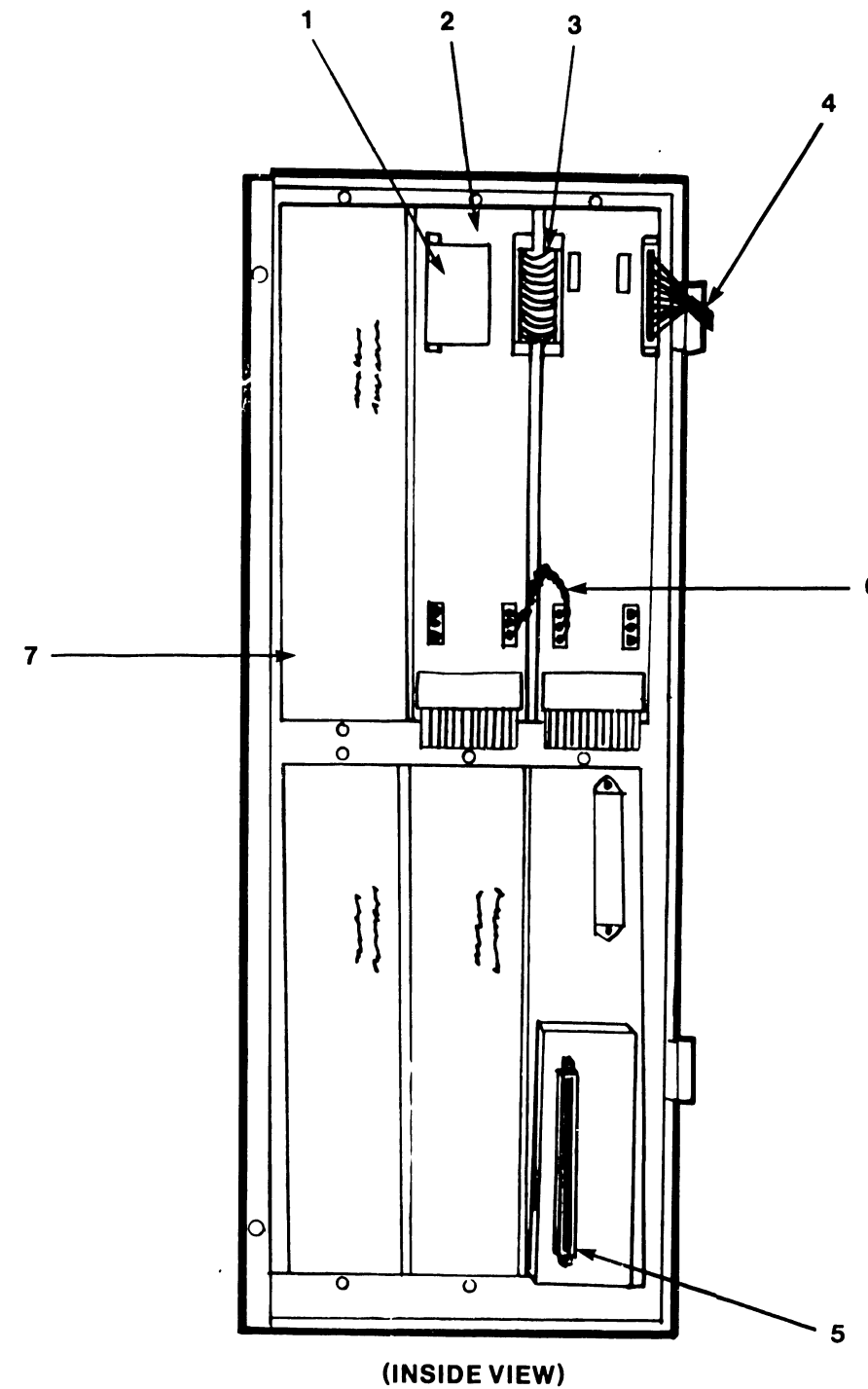
### 12.3.1 Bulkhead Door Assembly

Item	Part Number	Description
1*	210-8503	PCA, 928MC Mux Bus Terminator
2*	270-0975	Panel, 8 Port APA
3*	220-3319	Cable Assembly, 34 pin Soc-Soc, APA to APA
4*	220-3419	Cable Assembly, 34 pin Soc-Soc, BP to APA 0
5*	272-0050	Panel, SCSI Interface
6*	220-2102	Cable, Power Jumper, APA to APA
7	478-1275	Panel, I/O Blank Or

#### OPTIONS

272-0048	Panel, Async
272-0051	Panel, TC Single Port
272-0052	Panel, TC Dual Port
272-0053	Panel, 2-Port SMD
272-0054	Panel, 4-Port SMD

\* Recommended Spare Part

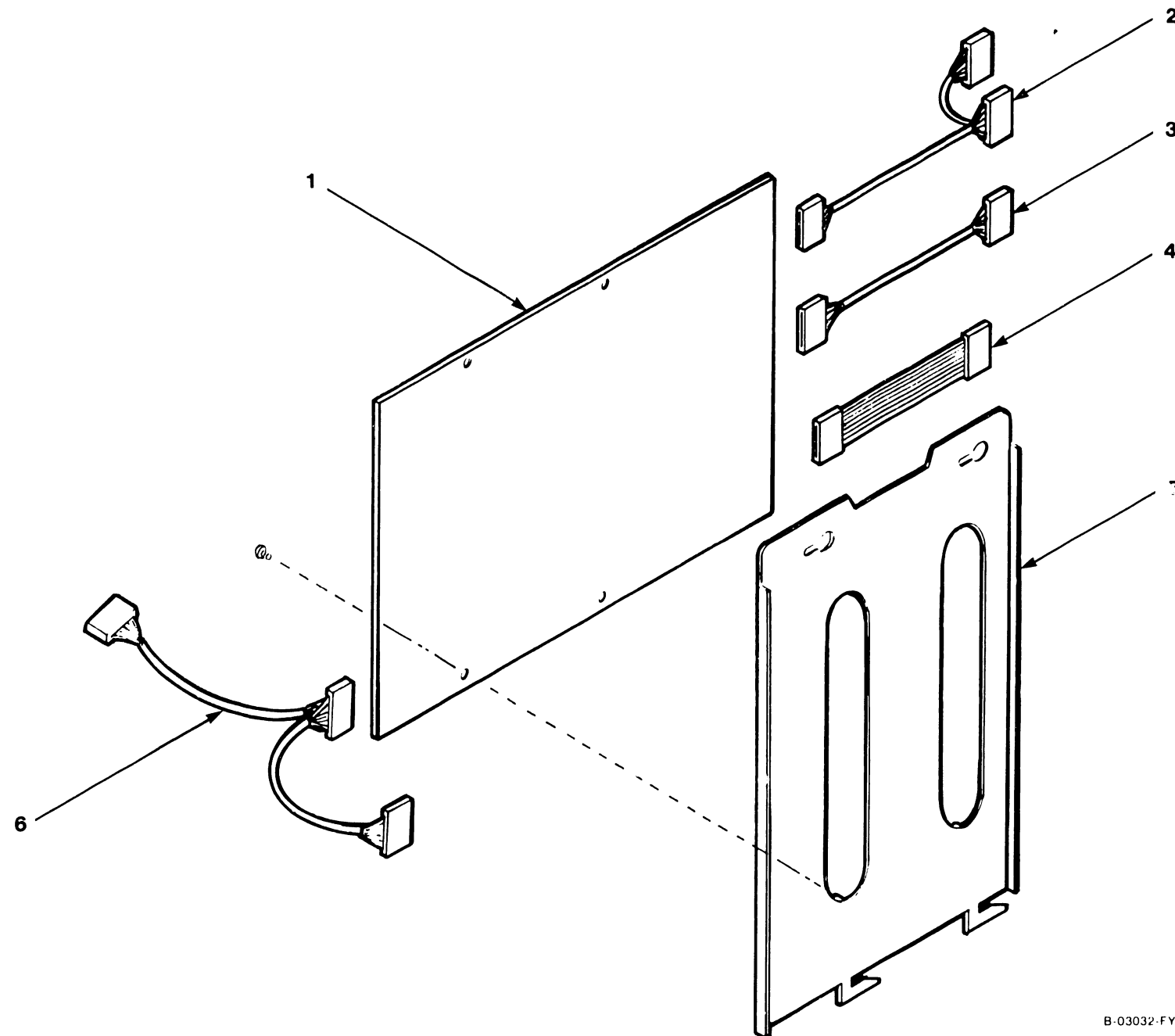


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### 12.3.2 SCSI Controller Assembly

Item	Part Number	Description
1*	278-4067	PCA, SCSI Controller
2*	220-3397	Cable, Data, SCSI to Winchester 0/1
3*	220-3291	Cable, Control, SCSI to Winchester 1
4*	220-3527	Cable, Control, SCSI to Winchester 0
5	451-5491	Bracket, Controller Board
6*	220-3401	Cable, BP to SCSI PCA/SCSI Port

\* Recommended Spare Part

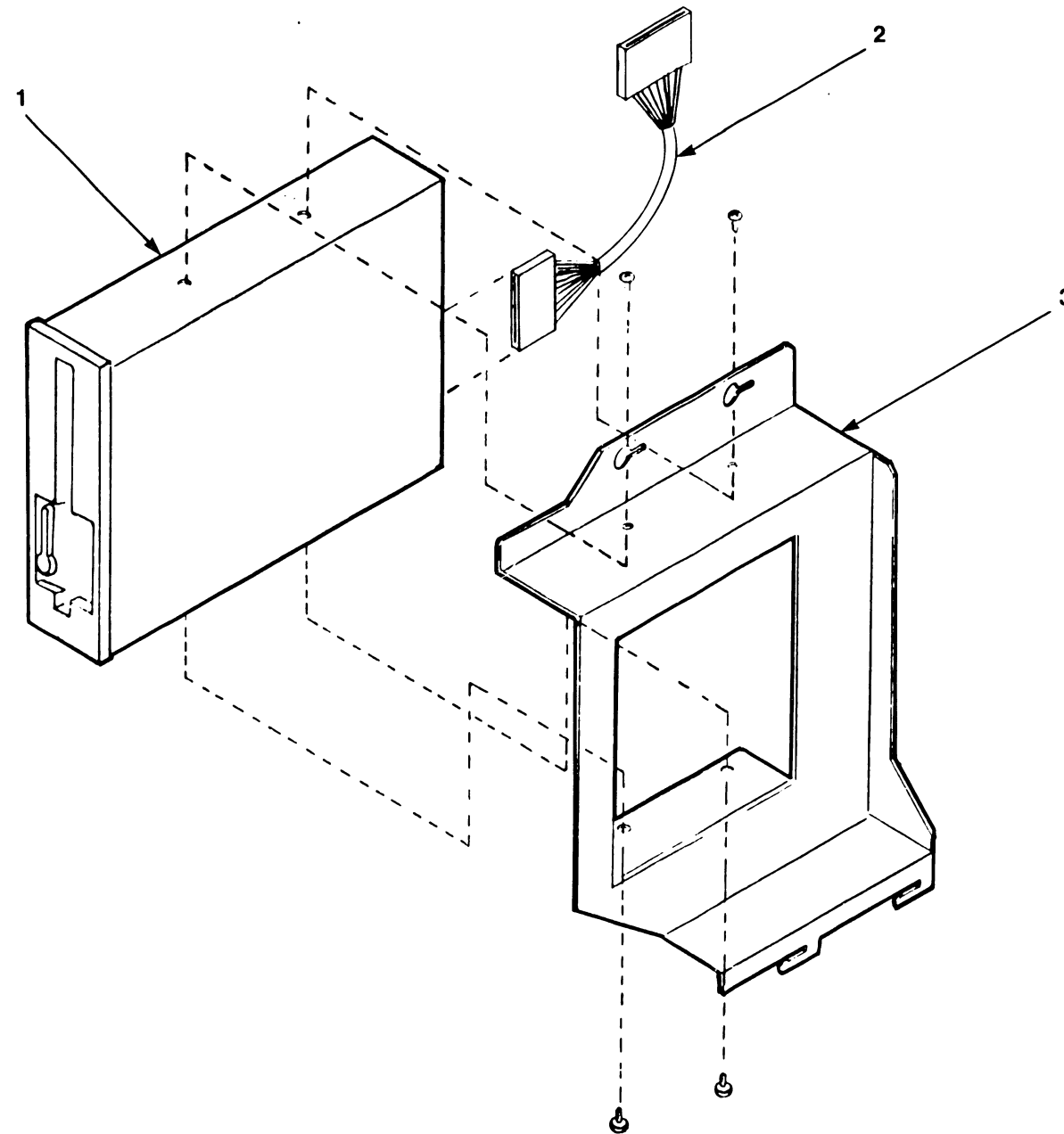


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### 12.3.3 Half-Height Floppy Drive Assembly

Item	Part Number	Description
1*	278-4055	1.2 MB, HH Floppy (Use Media 725-0233-1)
	278-4033	360K, HH Floppy (Use Media 177-0080-1)
2*	220-3420	Floppy I/O Cable, Floppy to BP PCA
3	451-5483	Bracket, 5-1/4 inch Floppy

\* Recommended Spare Part

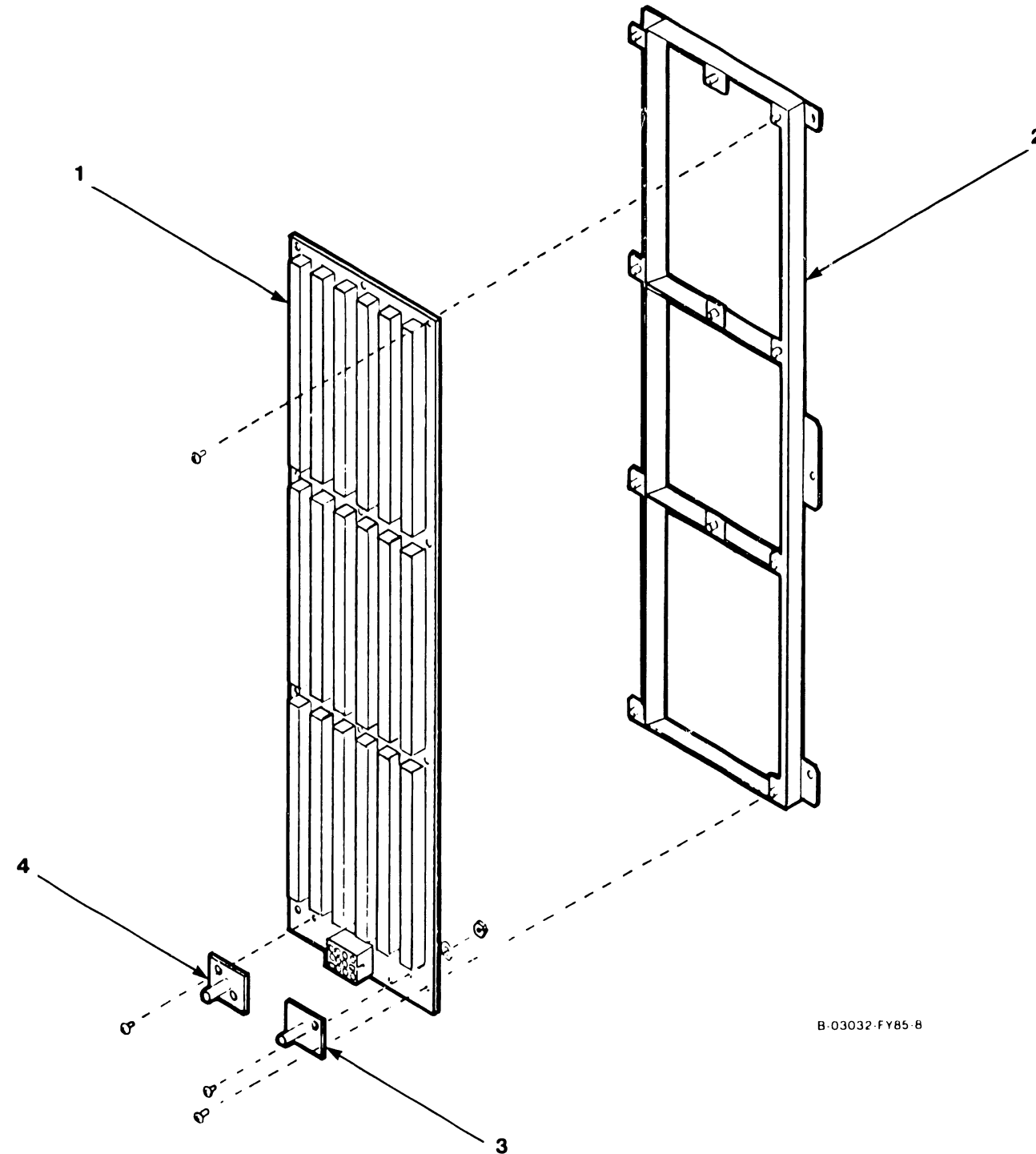


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12.3.4 VS-5/6 BackPanel Assembly

Item	Part Number	Description
1*	210-9112	PCA, Motherboard VS-5/6
2	452-4791	Frame, Motherboard
3	458-1750	Bus Bar, Motherboard LH
4	458-1746	Bus Bar, Motherboard RH
* Recommended Spare Part		

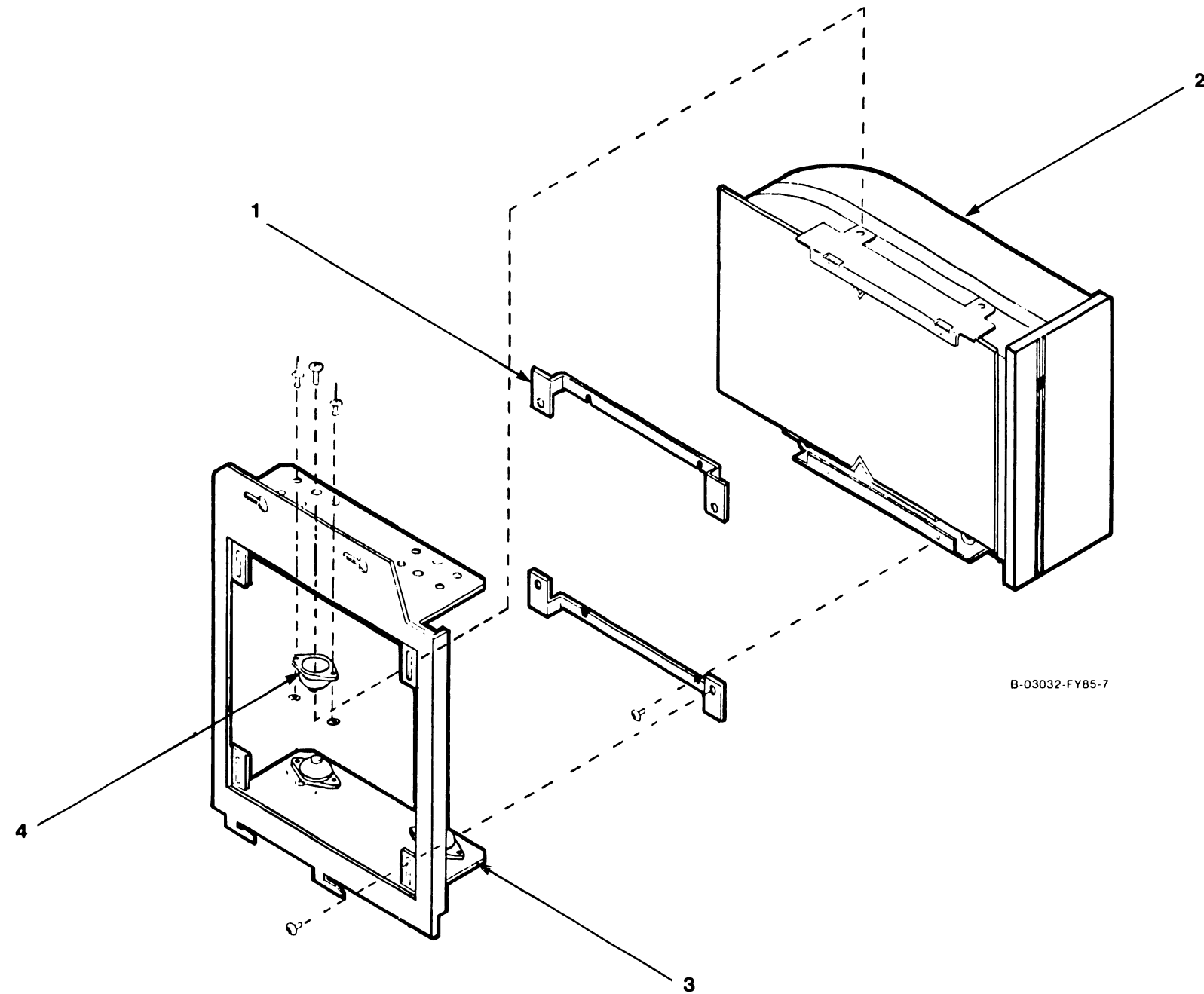


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### 12.3.5 Winchester Disk Assembly

Item	Part Number	Description
1	451-5480	Bracket, Disk (Shipping)
2*	278-4054	Winchester Drive, 67.5 MB 5 1/4 inch
3	458-3689	Bracket, Disk #3
4	655-0330	Shock Mount

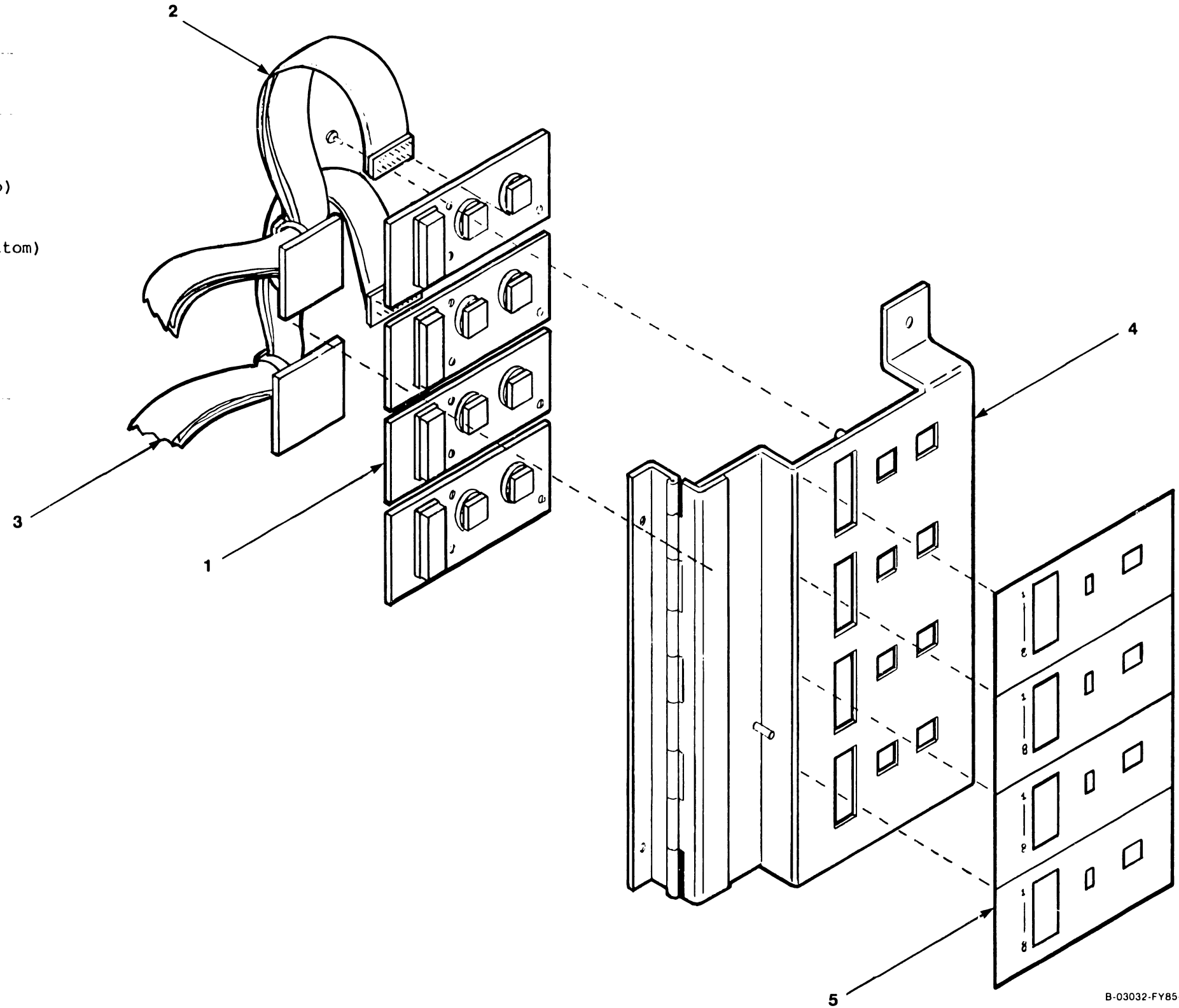
\* Recommended Spare Part



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12.3.6 VS-5/6 TC Control Panel Assembly

Item	Part Number	Description
1*	210-7785-A	PCA, Light Board
2*	220-3001	Cable, 2-Port TC DA to Light Board (Top)
	220-3556	Cable, 1-Port TC DA to Light Board
3*	220-3302	Cable, 2-Port TC DA to Light Board (Bottom)
4	458-3328	Bracket, TC Panel
5	615-3023	Label, TC
* Recommended Spare Part		

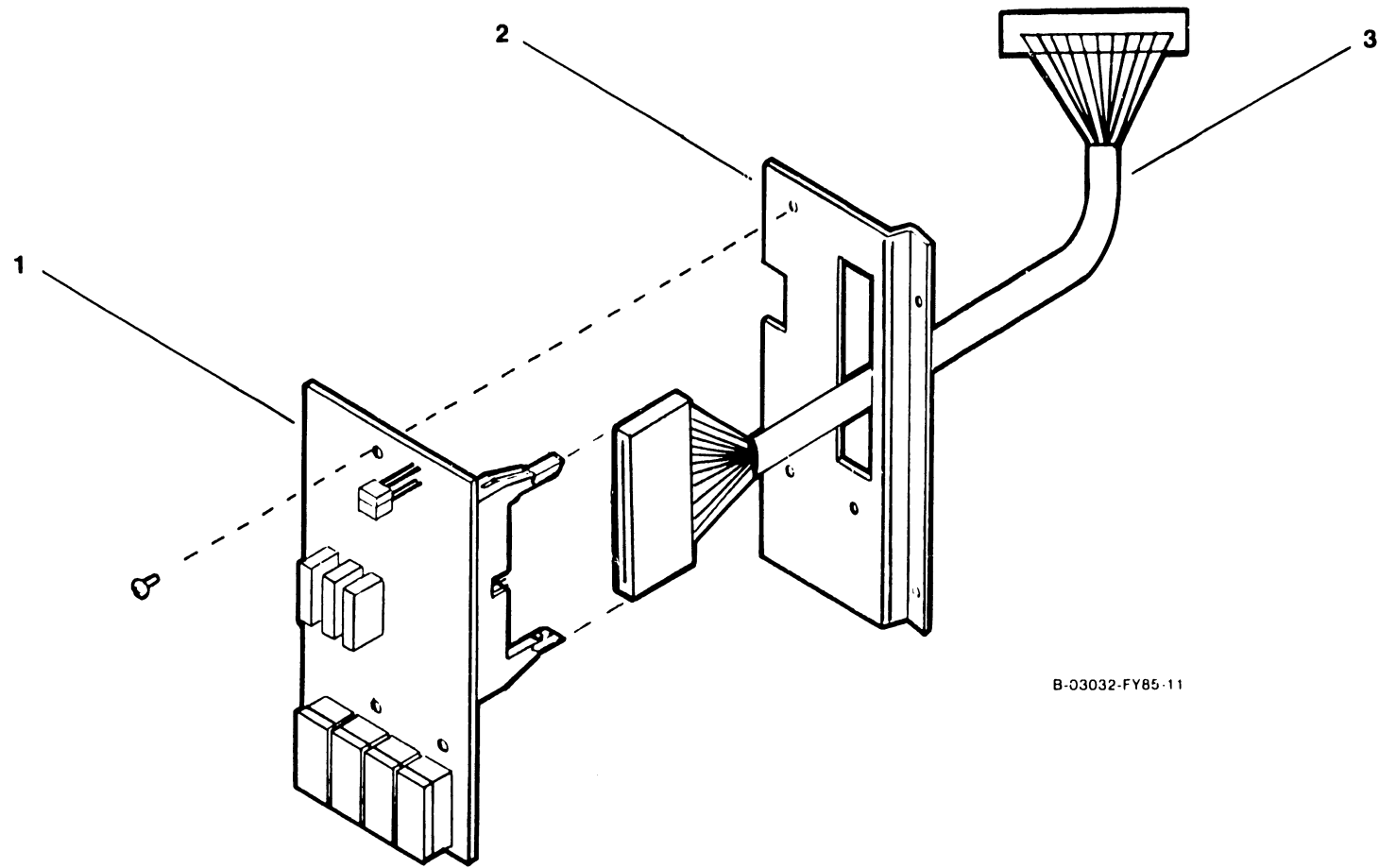


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12.3.7 VS-5/6 Control Panel Assembly

Item	Part Number	Description
1*	210-9113	PCA, Control Panel
2	451-5468	Bracket, Control Panel Mount
3*	220-3528	Cable, BP to Control Panel

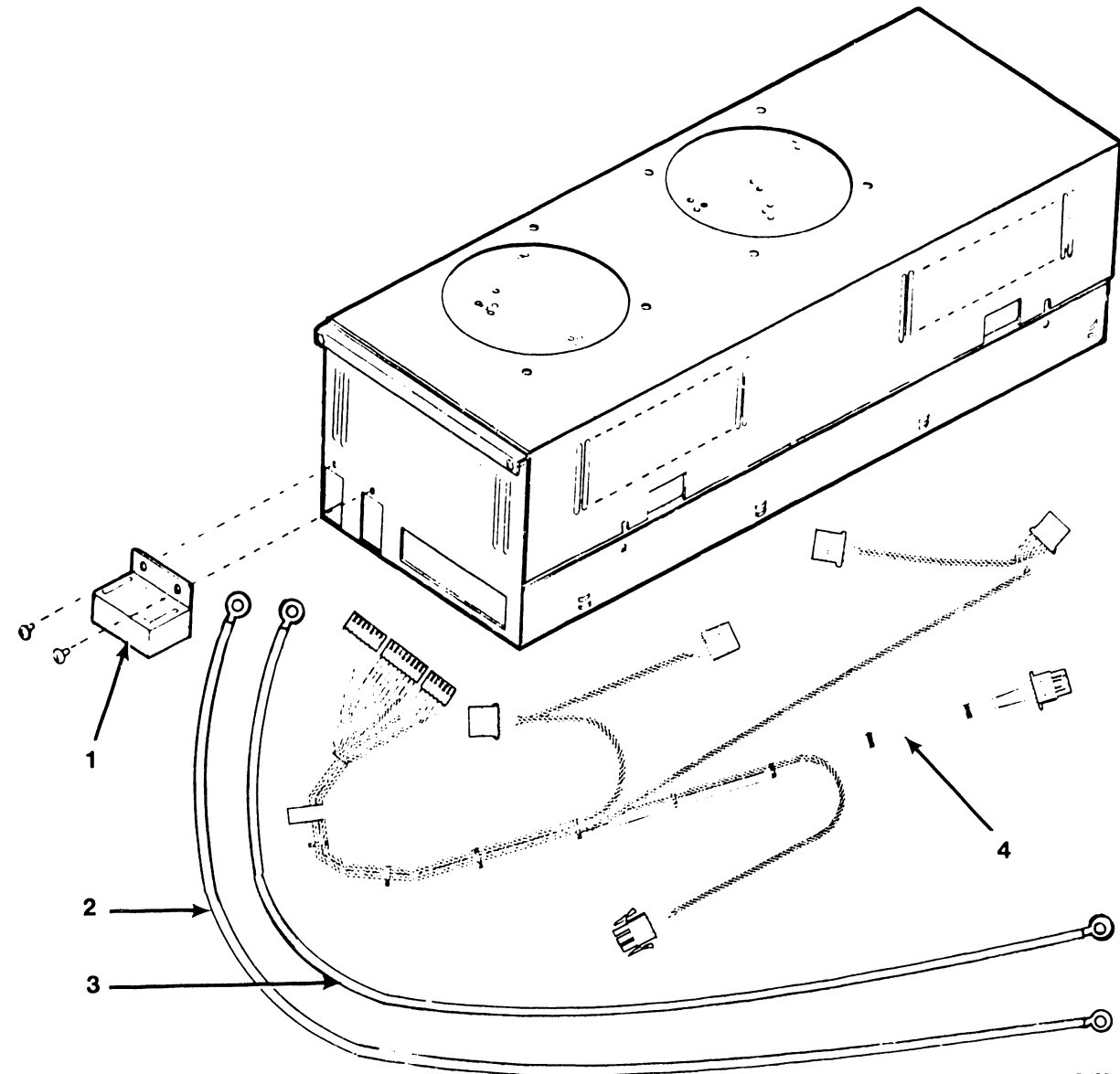
\* Recommended Spare Part



12.3.8 VS-5/6 Power Supply Assembly

Item	Part Number	Description
1	451-2554	Cover, Bus Bar
2*	220-1215	Cable, +0Vdc Bus (Black)
3*	220-2453	Cable, +5Vdc Bus (White)
4*	270-3378	Power Harness

\* Recommended Spare Part



B-03032-FY85-5

## 12.4 CABLE ASSEMBLIES

Cable P/N	Source	Destination
420-2058	AC Power Receptacle	SPS Power Supply AC Connector
220-2453	Power Supply +5V Bus	Motherboard +5V Bus
220-1215	Power Supply +0V Bus	Motherboard +0V Bus
270-3378	Power Supply J1, J2, J3	Floppy Drive (J2), Winchester Drive 0 (P1), Winchester Drive 1 (P1), SCSI Interface (J4), Motherboard (J19), EAPA 0 (J3)
220-3420	BP Floppy Connector	Floppy Drive (J2)
220-3528	BP Front Panel Connector	Front Panel (J2)
220-3417	BP Remote Connector	SCSI Panel Printer A/Remote Port
220-3418	BP TC Connector	SCSI Panel Printer B Port
220-3419	BP MUX Connector	EAPA 0 (J1)
220-3401	BP SCSI Connector	SCSI PCA (J5), SCSI Panel SCSI Port
220-3435	8699 CPU (P1, P2, P3)	9599 Memory Board (P1, P2, P3)
220-3527	SCSI PCA (J1)	Internal Drive 0 (J2) Control
220-3291	SCSI PCA (J2)	Internal Drive 1 (J2) Control
220-3397	SCSI PCA (J3)	Internal Drive 0/1 (J1)
220-3319	EAPA 0 (J2)	EAPA 1 (J1)
220-2102	EAPA 0 (J4)	EAPA 1 (J3)
220-2114	Winchester Ground Lug	Winchester Mounting Plate
220-3546	SMD Connector J1	External Drive Data 'A' Cable
220-3544	SMD Connector J2	External Drive 0 'B' Cable
220-3544	SMD Connector J3	External Drive 1 'B' Cable
220-3545	SMD Connector J4	External Drive 2 'B' Cable
220-3545	SMD Connector J5	External Drive 3 'B' Cable
220-3001	2-Port TC DA (S2)	Light Board PCA (J1)
220-3302	2-Port TC DA (S1)	Light Board PCA (J1)
220-3539	2-Port TC DA (J2B, J3B)	RS232 Connector, RS366 Connector
220-3540	2-Port TC DA (J2A, J3A)	RS232 Connector, RS366 Connector
220-3541	2-Port TC DA (J13A, J13B)	X.21 Connector
220-3556	1-Port TC DA (J4)	Light Board PCA (J1)
220-3539	1-Port TC DA (J2, J3)	RS232 Connector, RS366 Connector
220-3541	1-Port TC DA (J13)	X.21 Connector
220-3542	Async Controller (J3, J4)	Async Panel Connectors (J3, J4)
220-3543	Async Controller (J1, J2)	Async Panel Connectors (J1, J2)

# **APPENDIX**

## **A**

## APPENDIX A

### VS-5E/6E COMPUTER SYSTEM

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### VS-5E/6E COMPUTER SYSTEM

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# **INTRODUCTION**

**APPENDIX A**  
**VS-5E/6E COMPUTER SYSTEM**

**A.1 INTRODUCTION**

**A.1.1 SCOPE AND PURPOSE**

This Appendix contains new information on Operation, Repair, Troubleshooting, Unpacking and Set-Up, and I.P.B. for the VS-5E/6E Computer System.

The purpose of this Appendix is to provide the Customer Engineer with the information necessary to install, maintain, and repair the VS-5E/6E Computer System in the field.

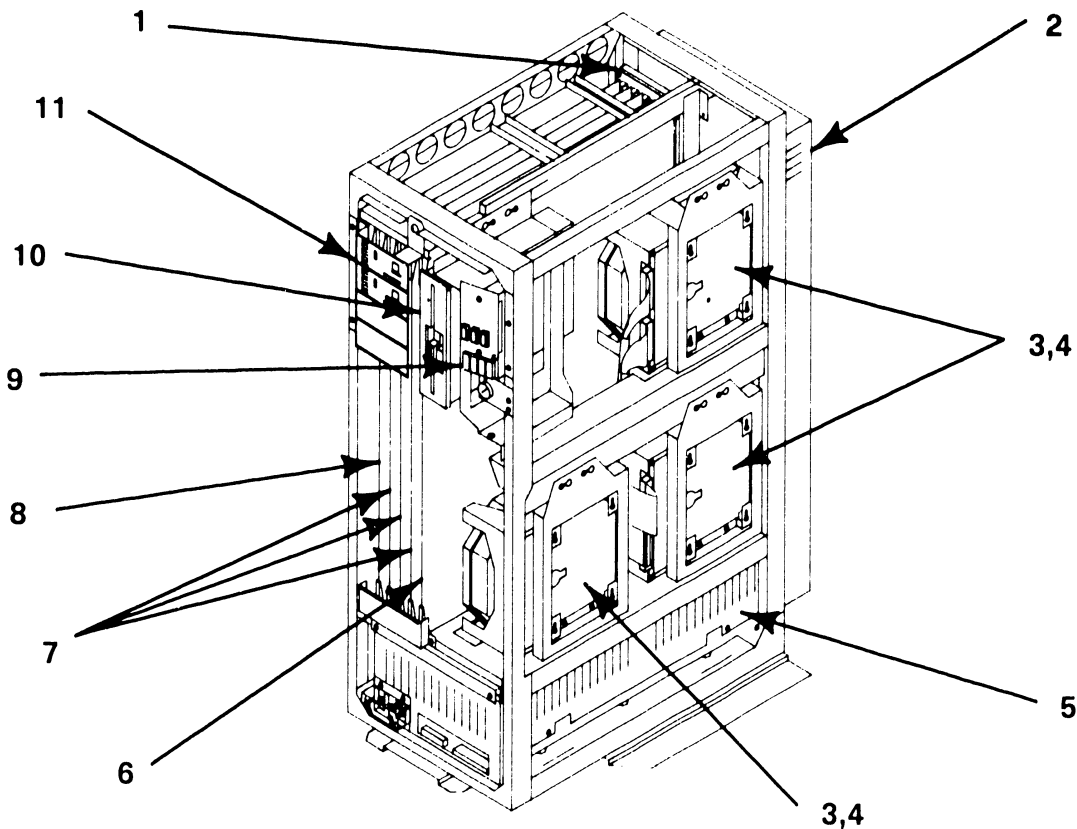
# **MAJOR ASSEMBLIES**

**A.2 MAJOR ASSEMBLIES**

**A.2.1 VS-5E MAJOR PARTS**

The Major Assemblies section of the VS-5E/6E Computer System is similar to the Major Assemblies section of the VS-5/6 Computer System, → 2.2. The VS-5E differences are asterisked (\*) below.

- 1) Motherboard
- 2) I/O Panels
- \* 3) 72MB Winchester Drive
- \* 4) 145MB Winchester Drive
- 5) Switching Power Supply
- \* 6) Bus Processor PCB
- 7) Option PCB's
- 8) VS-5E CPU PCB
- 9) Control Panel
- 10) 1.2MB Floppy Drive
- 11) TC Panel



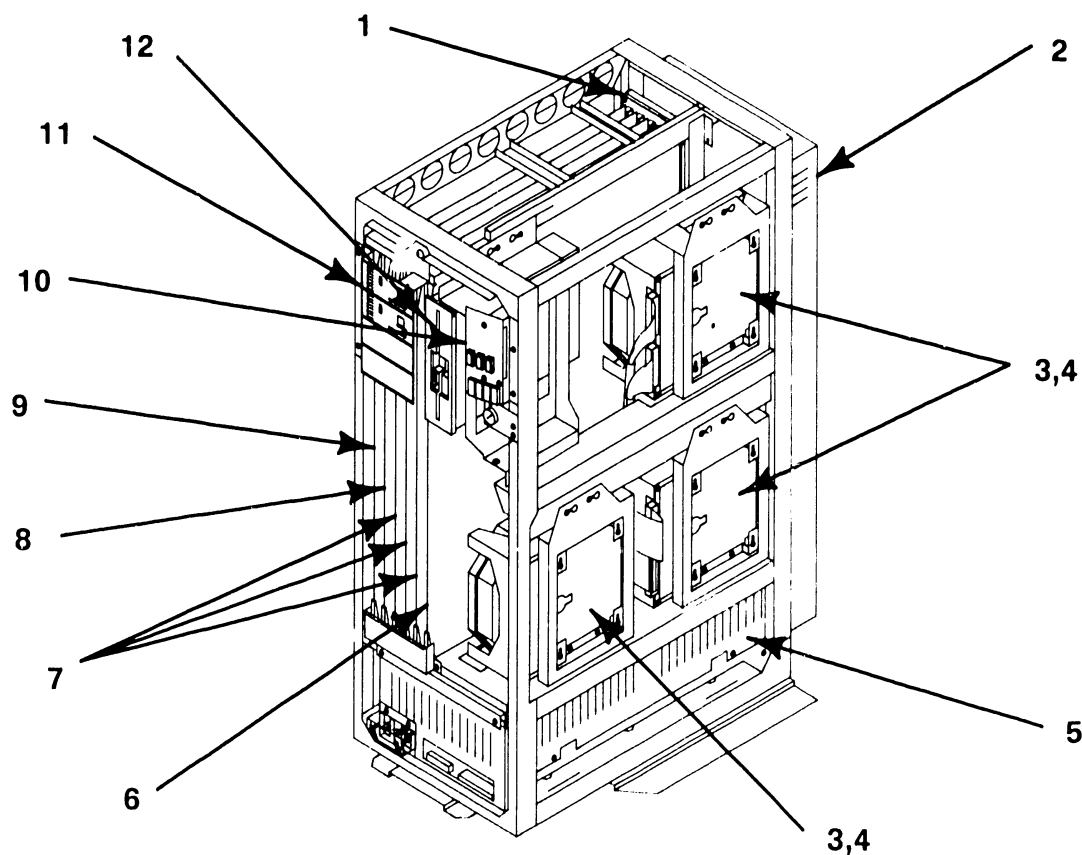
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**A.2 MAJOR ASSEMBLIES**

**A.2.2 VS-6E MAJOR PARTS**

The Major Assemblies section of the VS-5E/6E Computer System is similar to the Major Assemblies section of the VS-5/6 Computer System, → 2.3. The VS-6E differences are explained (\*) below.

- 1) Motherboard
- 2) I/O Panels
- \* 3) 72MB Winchester Drive
- \* 4) 145MB Winchester Drive
- 5) Switching Power Supply
- \* 6) Bus Processor PCB
- 7) Option PCB's
- 8) VS-6E CPU PCB
- \* 9) VS-6E Memory PCB
- 10) Control Panel
- 11) TC Panel
- 12) 1.2MB Floppy Drive



B 0 0846 1 087 2

# OPERATION

### A.3 OPERATION

#### A.3.1.1 STAND-ALONE UTILITIES (SAU)

The Stand Alone Utility (SAU) is a VS utility that runs independently of the VS operating system. The SAU is a self-contained, stand alone program that does not use the normal operating system nor can the operating system use the SAU program.

The SAU is used to initially load the VS operating system onto the system disk. The SAU utility is contained on one 1.2MB floppy diskette labeled SAUDK1.

The primary purpose of the SAU is to format the system disk and copy the operating system software to it during system installation. This utility can also be used for system disk maintenance such as initializing, reformatting and preparing a new system disk.

#### NOTE

This SAU is for use with Operating System 7.13.  
Refer to VS Operating System Release 7.13,  
Customer Software Release Notice P/N 715-1228.



### A.3 OPERATION

#### A.3.1.2 COPY UTILITY

The SAU allows the user to copy data from an input diskette or tape into the current system volume. Three levels of the copy utility are supported and are defined as follows:

- Initialize Formats a new system volume, analyzes the disk surface for reliable data storage, constructs the Volume Table Of Contents (VTOC), creates a volume label and copies data. This option overwrites the system disk.
- Reformat Constructs the Volume Table Of Contents, creates a volume label and copies the data. This option overwrites the system disk.
- Copy Only Copies the files needed to update the system volume without initializing or reformatting the system volume.

When running the SAU, select the copy function required depending on the situation of the mainframe. The following should be considered:

For a new system, the disk must be initialized for system volume, using the Initialize option.

If the system volume has already been initialized, use the Reformat option. Reformat clears and rewrites the VTOC.

To load new system files without rebuilding the entire system, use the Copy option. Copy option checks for duplicate file names, flags them, and allows the user the option to skip the input file or to rename either the old file or the new file to make copying possible.

**A.3 OPERATION**

**A.3.1.3 LOADING SAU**

This section describes the steps required to load the SAU program. After the bootstrap SAUDK1 diskette has loaded the system microcode into main memory, load the operating system software onto the system disk from either diskettes or tapes. When the procedure is completed, IPL from the newly formatted system volume. Perform the following:

- 1) Ensure the system has been powered up as described, → 4.1.
- 2) Position the front panel keyswitch in the 'Local' position, → 4.1.
- 3) Insert SAUDK1 diskette into the floppy drive and latch the door closed, → 4.1.
- 4) Press the Control Mode switch, then press the Initialize switch, → 4.1.

The diagnostics test automatically run after the Initialize switch is pressed. The Hex display counts down from FFFF to 0000. The Hex display then counts up through a series of diagnostic routines and finally blanks.

- 5) The following message appears on the display:

**Loading System Microcode**

**Loading Complete, Beginning System Initialization**

- 6) System microcode and the Stand-Alone Utility are now loaded into memory.

**A.3 OPERATION**

**A.3.1.4 RUNNING SAU (1 of 8)**

Once the SAU has finished loading, the SAU Function Screen appears.

Stand-Alone Utility - Version x.xx.x Select Function  
 (c) Copyright 1987, Wang Laboratories, Inc

SAU is designed as a means of installing the initial software required for operation with this CPU

Press PF4 to initiate the installation  
 Press PF5 to create the installation media  
 Press PF6 to relabel the system volume

- 1) Press PF4 to initiate the installation. The Define Input Device Screen is displayed.

Stand-Alone Utility - Version x.xx.x Define Input Device  
 (c) Copyright 1987, Wang Laboratories, Inc

Please enter the device type and address of the input device.

Device Type - ██████████  
 Physical Device Address (PDA) - ██████

Device Type	PDA	Description	Volume	Status
2270V7	2000	1.2MB 5-1/4" Floppy	SAUDK1	Standard Label
2238V1	2801	Streamer Cart Tape		
2529V	2802	6400bpi Cartridge Tp		

Press (ENTER) to continue

**A.3 OPERATION**

**A.3.1.4 RUNNING SAU (2 of 8)**

- 2) This screen prompts the user to specify the device type and PDA (physical device address) for the input device used to load SAU. It also shows the input devices allowed for this procedure. Enter the device type and the PDA number of device used and press (ENTER). The Define System Device screen appears.

Stand-Alone Utility - Version x.xx.x Define System Device  
(c) Copyright 1987, Wang Laboratories, Inc

Please enter the device type and address of the output device.

Device Type - ██████████  
Physical Device Address (PDA) - ████████

Device Type	PDA	Description	Volume	Status
2269V3	2020	72MB 5-1/4" fix disk	SCSIO	Standard Label
2269V4	2021	145MB 5-1/4" fix disk	SCSI1	Standard Label

Press (ENTER) to continue

- 3) This screen prompts the user to specify the system device type and PDA for the disk that will be used as the system disk. It also contains the devices for the system that can be designated as system disks. Enter the system device type and PDA and press (ENTER). The Specify Label Handling screen appears.

Stand-Alone Utility - Version x.xx.x Specify Label Handling  
(c) Copyright 1987, Wang Laboratories, Inc

Press (PF2) to INITIALIZE the system disk  
Press (PF3) to REFORMAT the system disk  
Press (PF4) to COPY only

Or Press (PF1) to return.

**A.3 OPERATION****A.3.1.4 RUNNING SAU (3 of 8)**

- 4) Press the PF key that corresponds to the operation to be performed. The SAU operation is described as follows:

Utility	Description
Initialize	Formats and verifies system disk, constructs Volume Table of Contents (VTOC), creates a volume label, and copies the data. This option overwrites the system disk. All data on the disk is lost.
Reformat	Constructs the VTOC, creates a volume label and copies the data. This option overwrites the system disk. All data on the disk is lost.
Copy	Copies files to the system volume output without initializing or reformatting it.

- 5) Pressing PF4 COPY, the SAU 'Request to Mount' screen appears with the message, 'Please mount first diskette'. This message appears whether the input medium is a removable disk or diskette. If COPY is selected, → A.3.1.4, step 12.

**A.3 OPERATION**

**A.3.1.4 RUNNING SAU (4 of 8)**

- 6) Pressing PF2 INITIALIZE or PF3 REFORMAT, the Specify Volume Label Screen appears, → A.3.1.4 for Volume Label Parameters.

Stand-Alone Utility - Version x.xx.x Specify Volume Label  
 (c) Copyright 1987, Wang Laboratories, Inc

System Disk

The following information is required for volume formatting:

Volume Name	-	SYSTEM
Volume Owner	-	████████████████████
Date (MM/DD/YY)	-	██ / ██ / ██
VTOC Size (in blocks)	-	0252
Fault tolerance	-	NONE (NONE - No fault tolerance) (CRASH - Tolerate system halt) (Media - Tolerate bad media also)
Extent limit at file creation	-	003 (3-255)
Total allowable extends	-	013 (13-255)

Please supply the required parameters and press (ENTER) to continue, or press (PF1) to return.

- 7) This screen prompts the user to specify information that is used by the SAU to create the system disk volume label, → A.3.1.4 Volume Label Parameters.
- 8) Enter the information on the SAU Volume Label Specification screen and press (ENTER). The Formatting Screen appears and displays the message:

**Disk formatting in progress**

The SAU can initialize one 2269V3 72MB disk in approximately 2 hours. Once completed, the SAU Allocate Dump or Page Filing screen is displayed.

**A.3 OPERATION****A.3.1.4 RUNNING SAU (5 of 8)**


---

<u>Volume Label Parameter</u>	<u>Entry</u>
Volume Name	Enter a unique name for the system volume.
Volume Owner	Enter the name of the owner of the volume. For a disk, the volume owner can be from 1 to 14 characters long. For a tape, the volume owner can be from 1 to 3 characters long.
Date	Enter the current date using the MM/DD/YY format.
VTOC Size	Enter the number of blocks that you want to allocate as default for VTOC. For the VS-5/6 you can enter 0222. The default varies with disk size. This default can be overridden if expected to make an unusually large number of entries into VTOC. For example, you should enlarge the size of VTOC if many small files are to be created on the volume. Refer to 'VS System Utilities Reference Addendum' for information on VTOC size.
Fault Tolerance	Enter the type of tolerance you want. Select from NONE, CRASH, and MEDIA. Your selection in the fault tolerance category affects the amount of disk space that remains.  Choosing NONE allocates the most memory with the least protection. MEDIA allocates the least memory the most protection. Refer to 'VS System Utilities Reference Addendum' for information on VTOC size.
Extended Limit	Enter the number of blocks for the extent limit at file creation (3 - 255). The default value is 3 extents. Before setting higher limits, consider the volume's media condition. Refer to the appropriate VS Software Bulletins for additional information.
Total Allowable Extends	Enter the number of blocks for the total number of extends allowed. The default limit is 13. Before setting higher limits, consider the volume's media condition. (The default of 13 extends is recommended for initial system installation.) Refer to the appropriate VS Software Bulletin for additional information.

---

**A.3 OPERATION****A.3.1.4 RUNNING SAU (6 of 8)**


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Stand-Alone Utility - Version x.xx.x                      Allocate Dump or Paging Files  
(c) Copyright 1987, Wang Laboratories, Inc

---

Please specify the size of pre-allocated control mode dump file. The size of the file should correspond to the size of main memory for any CPU you intend to use this disk on. Enter a size of zero (0) if you do not want to allocate a dump file at this time.

Size of pre-allocated dump file                      = 00000 K

Please specify the size and location of the user paging pool. The size of the pool should be based on the number of tasks and their segment 2 sizes which may use this disk for paging. Enter a zero (0) if you do not want to allocate a paging pool at this time.

Size of paging pool    = 00000 K

Pool location (relative to VTOC) = 0

0 = nearest VTOC

9 = farthest from VTOC

---

Press (ENTER) to continue.

---

9) The Allocate Dump or Paging File screen prompts you to specify appropriate VTOC information for the system disk volume label. Enter the information or select the default values and press (ENTER).

10) The 'SAU Request to Mount' screen is displayed with the following message:

**Please mount the first diskette**

11) Remove the SAUDK1 diskette from the floppy drive, → 4.2.1.3.

12) Copy the input files onto the system disk. This can be accomplished either by diskettes or tape. Perform the following which applies:

**Diskette:**

For a diskette input medium, insert the diskette labeled 'SYST01' or an updated diskette into the diskette drive and latch the door closed, → 4.2.1.3. The system will begin copying the files.



**A.3 OPERATION****A.3.1.4 RUNNING SAU (7 of 8)****Tape Input:**

For a tape input medium, power up the tape drive. Insert or mount the system files tape after the message 'Mount the first tape' appears. Press the ON-LINE button.

After several seconds, if the load is successful, the TAPE LOADED indicator will illuminate. The system rewinds the tape and displays the message 'Copy in progress'.

- 13) If a Copy-Only operation is being performed using either diskette or tape media, and the SAU encounters a duplicate file, copying stops and the Duplicate File Name screen appears.

---

Stand-Alone Utility - Version x.xx.x  
(c) Copyright 1987, Wang Laboratories, Inc

Duplicate File Name

---

A file with the name @SYS000@ already exists in @SYSTEM@.

---

Press

PF1 to skip copying file, or  
PF2 to copy the renamed input file, or  
PF3 to rename old file/copy new file

---

- 14) To rename a file, place the cursor under the highlighted file name. Re-enter the modifiable file name. Press the appropriate PF key to indicate the Duplicate File Name option selected. 'Copy in Progress' prompt is displayed.
- 15) If the system files are contained on more than one diskette or tape, the following prompts is displayed:

**Diskette:**

The message 'Please Mount the next diskette: xxxxxx' is displayed, where 'xxxxxx' is the name of the next input diskette. Remove the diskette from the floppy drive and insert the second diskette. Follow the screen prompts until all diskettes are copied.

**A.3 OPERATION**

**A.3.1.4 RUNNING SAU (8 of 8)**

**Tape:**

The message 'Please Mount the next tape: xxxxxx' is displayed, where 'xxxxxx' is the name of the next input tape. The system rewinds the tape automatically. Remove the tape from the tape drive and insert the second tape. Follow the screen prompts until all tapes are copied.

- 16) When all tapes and diskettes are copied, the message 'Installation Completed. IPL when ready' is displayed, → 4.1. Remove the diskette or tape.

**NOTE**

After copying operating system files to a new system volume, SAU Relabel function must be performed before IPLing from the new system volume.

**A.3 OPERATION**

**A.3.1.5 SAU RELABEL PROCEDURES (1 of 2)**

1) Press PF1 to return to the SAU Select Screen.

Stand-Alone Utility - Version x.xx.x Select Function  
 (c) Copyright 1987, Wang Laboratories, Inc

SAU is designed as a means of installing the initial software required for operation with this CPU

Press PF4 to initiate the installation  
 Press PF5 to create the installation media  
 Press PF6 to relabel the system volume

2) Press PF6 to select the Relabel System Volume. The SAU Select Relabel Volume screen is displayed. This screen prompts you to enter the label and PDA of the volume to be relabeled and displays a list of volumes in the installation.

Stand-Alone Utility - Version x.xx.x Select Relabel Volume  
 (c) Copyright 1987, Wang Laboratories, Inc

Please enter the volume label and address of the device

Volume Label - XXXXXXXXXX  
 Physical Device Address (PDA) - XXXX

Device Type	PDA	Description	Volume	Status
2270V7	2000	1.2MB 5-1/4" Floppy	SAUDK1	Standard Label
2269V3	2020	72MB SCSI Fixed Dk	SYSTEM	Standard Label
2269V4	2020	145MB SCSI Fixed Dk	DATA	Standard Label

Press (ENTER) to continue or (PF1) to return.

**A.3 OPERATION**

**A.3.1.5 SAU RELABEL PROCEDURES (2 of 2)**

- 3) Enter the volume label and PDA, and press ENTER. The SAU Rename Volume screen appears with the current volume name selected.

---

Stand-Alone Utility - Version x.xx.x  
(c) Copyright 1987, Wang Laboratories, Inc

---

Please Rename the Volume

Volume: SCSI02

---

Press (ENTER) to continue or (PF1) to return.

---

- 4) Enter the new volume name by overstriking the current name and press ENTER. The SAU Display Message screen is displayed. Note if the System volume was renamed, the message '@MCBOOT pointer in VOL1 was also updated)' is also displayed.

---

Stand-Alone Utility - Version x.xx.x  
(c) Copyright 1987, Wang Laboratories, Inc

---

Relabel process successfully completed

With new LABEL: SCSI1

At PDA: 2021

@MCBOOT pointer in VOL1 was also updated)

---

- 5) Re-IPL the system from the new system volume just created, → 4.1.

# **PREVENTIVE MAINTENANCE**

**A.4 PREVENTIVE MAINTENANCE**

The Preventive Maintenance section of the VS-5E/6E Computer System is the same as the Preventive Maintenance section of the VS-5/6 Computer System, → 5.1.

# **TROUBLESHOOTING**

## A.5 TROUBLESHOOTING

### A.5.1 GENERAL

This chapter describes the various diagnostic test programs available on the VS-5E/6E, and gives guidelines for their use. It also provides guidelines for isolating fault locations of field replaceable units.

The diagnostic programs perform a number of comprehensive tests of the system hardware functionality in a building block manner. They provide multi-level error isolation options so that the user can pursue error situations through the Printed Circuit Assembly (PCA). The packaging of the programs on the VS-5E/6E floppy diskettes provides for easy access and usage. A description of the diagnostics available, along with a discussion of their usage follows.



**A.5 TROUBLESHOOTING**

**A.5.2 DIAGNOSTIC FACILITIES**

The VS-5E/6E system uses the same diagnostic and error reporting concept as the other Small VS Systems with some differences in functionality and packaging. Two types of diagnostic facilities are available to the VS-5E/6E: Off-line or stand-alone diagnostics (inner-level diagnostics), and on-line peripheral diagnostics (outer-level diagnostics). The on-line diagnostics are operating system dependent and are under the control of the VS Operating System.

During installation and after repair, all available off-line diagnostics must be run to check the CPU.

**A.5 TROUBLESHOOTING****A.5.3 OFF-LINE DIAGNOSTICS**

The VS-5E/6E system architecture (CPU) and external disk drives can be thoroughly tested using an integrated set of off-line (stand-alone) hardware diagnostics running on the 80286 microprocessor controlled Bus Processor (BP). These off-line diagnostic programs provide a sophisticated, user-friendly interface with the CPU. The VS-5E/6E uses three types of off-line core diagnostics.

**PROM-Based**

Power-up diagnostics do rudimentary testing and verification of the most basic aspects of a given PCA. Currently, four PCAs have PROM-based core diagnostics; the Bus Processor, the Telecommunication Device Adapter (TC DA), the Universal Intelligent Serial Input/Output Device Adapter (UISIO DA), and the 4-Port Disk Controller (SMD).

All the device adapters run power-up diagnostics concurrent with the Bus Processor when the system is IPL'ed. When an error occurs, the DA reports the error to the Front Panel display via the Bus Processor. → A.5.11 to determine which PCA failed and Appendix A for a detailed listing of the error.

**CRAM-Based: Self-Test Diagnostic (STD) software**

Self-test Diagnostics are implemented automatically by the Bus Processor upon successful completion of the PROM-based diagnostics. All PROM-based diagnostics have been completed when the HEX display changes from '4000' to '4100'. The Self-Test Diagnostic software package can be resident on the system drive or available on stand-alone diskettes.

**CRAM-Based: Small VS BP2 Class Diagnostic Monitor**

Small VS BP2 Class Diagnostic Monitor when implemented on the Bus Processor, provides additional and more sophisticated tests to isolate specific faults detected by the Self-Test Diagnostic software. The Small System VS Diagnostic Monitor software package can be accessed only from the IPL drive (drive at address 6) or the stand-alone diskettes.

**A.5 TROUBLESHOOTING**

**A.5.3.1 POWER-UP CORE DIAGNOSTICS (PROM-BASED)**

When the VS-5E/6E is turned on (or re-IPL), the CPU goes through an automatic initialization phase before it allows the operator to interface with the system. CPU PROM-level diagnostic programs are automatically accessed during the normal power-up procedure. CROM-level diagnostics are bypassed (on the CPU PCAs) if the appropriate Bus Processor diagnostic switches (switch bank SW1) are not set to the correct positions, → 7.3.2 of VS-5/6 Computer System Product Maintenance Manual.

## A.5 TROUBLESHOOTING

### A.5.3.2 BUS PROCESSOR DIAGNOSTICS

The PROM-based core diagnostics allow the Bus Processor to verify its internal operation and its interface to the selected bootstrap device prior to loading the first CRAM-based intelligence. Circuitry which requires signals that are not internal to the BP or used to bootstrap the system are not verified. This includes circuitry such as the Main Memory DMA and the Real Time Clock (RTC).

Beginning with the decrementing of the Front Panel's four-character Hex display, the Bus Processor initiates the loading and/or testing of a number of basic core functions (e.g. verifies its PROM (checksum), loads and verifies the Programmable Interrupt Controllers and Interrupt Timers, etc.).

The BP then tests the Code RAM (CRAM) and Data RAM (DRAM) integrity and function, communication with data and addressing lines, and parity error detection. The bootstrap device is tested and its diagnostic space (cylinder) is verified.

The Bus Processor, after successfully completing its PROM-based diagnostics and loading the VTOC handler (@MCBOOT@), reads its diagnostic switches to determine its next operation. If all switches are in the standard operational position, the BP will find and load the STD software, and continue with its diagnostic testing until the IPL Drive Selection screen appears. If an error occurs during the BP's power-up diagnostics, → 5.11 for a reference of BP PROM-Based diagnostics. Appendix A contains a complete list of Diagnostic Error Codes and descriptions. BP PROM-based error codes will be displayed as '00xx' through '53xx'.

An additional verification of the functionality of the BP's DRAM and CRAM, is the reading in of the VTOC handler and then the STD software. Each are read as data into the DRAM and then moved by the BP to the CRAM. The BP also verifies the Workstation Zero (WS-0) channel (go/no-go). If no errors are detected (BP and PROM-Based DAs), the BP then loads and runs the primary serial I/O controller. WS-0 code is loaded, and the IPL Drive Selection screen is then displayed. The IPL Drive Selection screen allows the selection of the IPL device and/or the loading of the Diagnostic Monitor software.

## A.5 TROUBLESHOOTING

### A.5.3.3 2-PORT TC DA DIAGNOSTICS

The 2-Port TC DA has PROM-based power-up diagnostics which will run each time the system is powered-up or IPL'ed. The diagnostics will run at the same time as the BP power-up diagnostics and will complete successfully in about 10 seconds.

LEDs on the TC Indicator Panel only show that a failure occurred. These LEDs do not define the type of error. When a TC DA power-up error occurs, the Front Panel HEX Display will indicate the general error. TC DA PROM-based failures will be indicated by error codes '0060' through '006F'.

If an error was indicated during the power-up diagnostics, press the CLEAR pushbutton to reset the TC power-up sequence and attempt to clear the error. If the error cannot be cleared, run the applicable Diagnostic Monitor program to verify the error. Ignore the TC indicator panel LED display when running the Diagnostic Monitor programs. All errors will be displayed on WS-0. If the error is verified, replace the 2-Port TC DA.

## A.5 TROUBLESHOOTING

### A.5.3.4 UISIO DA DIAGNOSTICS

The Universal Intelligent Serial Input/Output Controller (UISIO) uses the same diagnostic facilities available to other intelligent PCAs on the VS-5E/6E Computer System. PROM encoded power-up core diagnostics are used to test the internal operation of the UISIO DAC. The status of the UISIO DAC is indicated by a LED located at the upper center of the PCA. The LED lights during power-up diagnostics and then extinguishes when the diagnostics are successfully completed. If the LED remains on, the diagnostics have failed and the PCA may be defective.

The UISIO reports any errors detected to the Front Panel display via the Bus Processor. UISIO PROM-based failures are indicated by error codes '0070' through '0078'.

**A.5 TROUBLESHOOTING**

**A.5.3.5 4-PORT SMD DISK CONTROLLER DIAGNOSTICS**

The 4-Port SMD Disk Controller PROM-Based diagnostics run concurrently with the BP PROM-Based diagnostics and verifies the 4-Port SMD controller's integrity. If an error condition occurs, error code (40xx, 41xx or B0xx series) is reported to the front panel LED display via the Bus Processor.

## A.5 TROUBLESHOOTING

### A.5.3.6 FRONT PANEL HEXIDECIMAL DIAGNOSTIC ERROR CODE DISPLAY (1 of 3)

The Front Panel Hexadecimal Display indicates system status error codes in hexadecimal (HEX) format. At initial power-up, the HEX display is decremented as a visual check of its functioning. Under operator control it will loop on decrement and loop on displaying the Bus Processor Diagnostic Switch settings. The decrementing of the Front Panel HEX display is ONLY a visual indication of its operation. There is no indication of a HEX display failure.

#### NOTE

A HEX display failure will NOT stop the power-up sequence or normal STD/IPL functions.

The HEX display is used by the CE to troubleshoot the VS-5E/6E CPU. The four-character HEX display is arranged in a single row. The panel provides information concerning BP, CP, and MM status as well as the error condition of I/O devices in the IPL path. (For example, WS-0 and the IPL disk.)

When a fault is detected by the power-up core diagnostics (either PROM-based or CRAM-based), the results are displayed as a HEX code which indicates which PCA or unit failed. Most errors detected by the STD are also displayed on the WS-0 screen.



## A.5 TROUBLESHOOTING

## A.5.3.6 FRONT PANEL HEXIDECIMAL DIAGNOSTIC ERROR CODE DISPLAY (2 of 3)

GENERAL	SPECIFIC	ERROR NAME	FAILING UNIT/COMMENTS
00xx	00 - 09	Bus Processor and BP Operational Code	BP, FP, PS
02xx	00	PROM Power-On & Initialize	BP
04xx	02	PROM Checksum	BP
06xx	00	DUART Check	BP
08xx	02	I/O Comm. Check	BP
0Axx	00 - 14	Programmable Interrupt Test	BP
0Cxx	00 - 44	80186 Internal Timer Test	BP, CP, MM
0Dxx	02 - 06	Wait State Generator	BP
0Exx	xx	Front Panel Interface Check	BP, FP, No explicit codes
10xx	00 - 04	CODE RAM Data Line Test	BP
12xx	01 - 04	Data RAM Data Line Test	BP, DA
14xx	00 - 18	CODE RAM Parity Test	BP
16xx	00 - 08	CODE RAM Byte Bank Decode	BP
18xx	00 - 08	Data RAM Byte Decode	BP
1Axx	00 - 18	CODE RAM Address Line Test	BP
1Cxx	00 - 08	Data RAM Address Line	BP
1Exx	00 - 0A	CODE RAM Data Integrity	BP
20xx	00 - 04	Data RAM Data Integrity	BP
22xx	00 - 04	CODE RAM Refresh	BP
24xx	00 - 0C	CODE RAM Odd Word/Byte Move	BP
26xx	00 - 0C	Data RAM Odd Word/Byte Move	BP
28xx	00 - 04	CODE RAM Parity Error Int.	BP
2Axx	00 - 24	Memory To Memory DMA Test	BP
38xx	00	Floppy Drive Self-Test	BP
39xx	xx	Device Reset Function error	BP, xx = Specific Oper.
3Axx	xx	Device Identify Error	BP, Floppy, Floppy Media xx = Specific Operation
3Bxx	xx	Multi-Block Read Error	BP, Floppy, Floppy Media xx = Specific Operation
3Exx	xx - FF	Unexpected Interrupt	BP, DA, xx = Interrupt
40xx	00 - xE	Bootstrap File Loader	BP, Bootstrap media/Dev. x = Device/Operation
50xx	00	SCSI Disk Self-Test	BP
51xx	xx	Device Reset Error	BP, SCSI Controller xx = Specific Operation
52xx	xx	Device Identify Error	BP, SCSI Controller/Media xx = Specific Operation
53xx	xx	Multi-Block Read Error	BP, SCSI Controller/Media xx = Specific Operation

## Legend:

BP = Bus Processor      FP = Front Panel  
 PS = Power Supply      CP = Central Processor Unit  
 MM = Main Memory      DA = Device Adapter

**A.5 TROUBLESHOOTING**

**A.5.3.6 FRONT PANEL HEXIDECIMAL DIAGNOSTIC ERROR CODE DISPLAY (3 of 3)**

ERROR CODE(s)	ERROR CODE SOURCE/DESCRIPTION
0002 - 0009	BP OS Generated
0030 - 003F	SCSI Error Codes
0040 - 004F	25V36 (DE) Generated
0060 - 006F	25V76-1/25V76-2 (TC) Generated
0070 - 0078	25V67 (UISIO) Generated (Control Mode)
0080 - 008E	25V67 (UISIO) Generated (Non-Control Mode)
0091	25V27 (DSIO) Generated
0093	Crash Task BP Generated
0095	Floppy Task BP Generated
00E0 - 00F7	BP System Error Codes

GENERAL	SPECIFIC	TEST NAME	FILE	LIBRARY
41xx	4110-412C	Bootstrap Loader	@MCBOOT@	in @SYSTEM@
	4131-413E	Self-Test Monitor	@NORMAL@	in @DIAGST@
	4141-414E	Diagnostic Monitor	@MONITOR@	in @DIAGMNE@
	4151-41FF	System Loader	@MCIPL@	in @SYSTEM@
42xx	420F-422C	Self-Test Monitor	@NORMAL@	in @DIAGST@
	4231-423E	Workstation File	@MONISIO	in @DIAGST@
	4241-424E	Workstation File	@MONISIO	in @DIAGST@
	4261-426E	Self-Test Diagnostic Test 2	@BT0500@	in @DIAGST@
	4271-427E	Self-Test Diagnostic Test 3	@CT0500@	in @DIAGST@
	4281-428E	Self-Test Diagnostic Test 4	@CT0800@	in @DIAGST@
	4291-429E	Self-Test Diagnostic Test 5	@CT0B00@	in @DIAGST@
	42A1-42AE	Self-Test Diagnostic Test 6	@MT0500@	in @DIAGST@
	42B1-42BE	Self-Test Diagnostic Test 7	@MT0800@	in @DIAGST@
	42C1-42F5	Self-Test Diagnostic Test 8	@MT0200@	in @DIAGST@
	43xx	4351-435E	Self-Test Diag. Test 1.1	@ST0500@
4361-436E		Self-Test Diag. Test 1.2	@ST0800@	in @DIAGST@
4381-438E		Self-Test Overlay 4	@CM0800@	in @DIAGST@
4391-439E		Self-Test Overlay 5	@CM0B00@	in @DIAGST@
43A1-43AE		Self-Test Overlay 6	@MM0500@	in @DIAGST@
44xx	440F-443E	IPL System Loader	@MCIPL@	in @SYSTEM@
	4461-446E	System File	@MCCP5@	in @SYSTEM@
			@MCCP7@	in @SYSTEM@
	44C1-44F4	System File	@MCCP2@	in @SYSTEM@
45xx	4505-452C	Diagnostic Monitor	@MONITOR@	in @DIAGMNE@
	4531-453E	Test Table File	@MONTBL@	in @DIAGMNE@
	4541-454E	Workstation File	@MONWSO@	in @DIAGMNE@
	4551-45FC	ISIO File	@MONISIO	in @DIAGMNE@
46xx	46x1-46xE	Diag. Monitor Test File	Test File X	
47xx	47x1-47xE	Diag. Monitor Test File	Test File X + 15	
48xx	48x1-48xE	Diag. Monitor Overlay File	Test File X	
49xx	49x1-49xE	Diag. Monitor Overlay File	Test File X + 15	

**A.5 TROUBLESHOOTING**

**A.5.3.7 POWER-UP CORE DIAGNOSTICS (CRAM-BASED)**

An essential diagnostic tool for testing the VS-5E/6E is a series of microcode diagnostic programs executed on the BP. These programs provide diagnostic services for the BP, CP, Main Memory, all VS-5E/6E device adapters, the Remote Diagnostic Telecommunication link, and the ability to communicate with all disk drives. These diagnostics allow the testing of all primary system functions, and when used in conjunction with system supplied on-line diagnostics, ensure rapid resolution of error conditions.

Loaded from disk or diskette, the CRAM-based core diagnostic programs use the Workstation Zero (WS-0) screen to allow the operator to select either the Self-Test Diagnostic or the Small System VS Diagnostic Monitor. In order to run the CRAM-based Core Diagnostics, the system must first pass all of the PROM-based Core Diagnostics.

**A.5 TROUBLESHOOTING****A.5.3.7.1 SELF-TEST DIAGNOSTIC SOFTWARE (Disk Resident Library @DIAGST@)**

The disk-resident Self-Test Diagnostic (STD) software is always loaded from the selected IPL volume. The STD software is loaded into the BP's Code RAM (CRAM) from library @DIAGST@. It verifies all remaining logic necessary to IPL the system, CP Control Memory; data path to BP, instructions, status bits CP/Cache/Main Memory communication, Dual Processor functionality, and the BP's ability to communicate with WS-0 are tested.

→ A.5.3.6 listing of the Error Codes displayed on the Front Panel HEX display and on WS-0 screen of any failed Self-Test Diagnostic. When no error is detected, the STD completes its testing in about one minute per megabyte of memory, and then will begin system IPL. The system must pass the Self-Test Diagnostic programs for IPL to begin.

The STD software is run from the BP2 Class Self Test Package - IPL Drive Selection Screen by pressing the 'ENTER' key. The STD is maintained in library @DIAGST@ on the system default disk drive (if loaded) and on the stand-alone Self-Test Diagnostic diskette. Self-Test Diagnostic Test Programs available are listed below.

TEST NUMBER	FILE NAME	PROGRAM NAME
1.1	@ST0500@	Serial Input/Output Device Adapter Diagnostic
1.2	@ST0800@	Universal Intelligent SIO DA (928/928W) Diag.
2	@BT0500@	USART/Modem/Loop-Back Verification Diagnostic
3	@CT0100@	BP/CP Communications and Control Memory Diag.
4	@CT0200@	Central Processor Operational Diagnostic
5	@CT0300@	Central Processor Integrity Diagnostic
6	@MT0100@	CP/Main Memory & Cache/MM Integrity Diagnostic
7	@BT0900@	BP/Main Memory DMA Diagnostic
8	@MT0200@	Dual Processor/MM Communications Diagnostic

**A.5 TROUBLESHOOTING**

**A.5.3.7.2 INTELLIGENT PCA SELF-TEST REPORTING**

All intelligent PCAs in the system report their self-test status via the Small VS BP2 Class Self-Test Package Option Board Status screen. This screen is displayed once the Self-Test has tested system components and found them operational.

---

Small VS BP2 Class Self-Test Package		Version Rxxxx
System hardware Status		
System Volume = SYSTEM		
<u>Status</u>	<u>Option Board</u>	
Passed	25V76-1	

---

**A.5 TROUBLESHOOTING**

**A.5.4 ON-LINE DIAGNOSTICS (@SYSTST@)**

All on-line diagnostics are stored on disk or diskette in library @SYSTST@. They may be executed under operator control in the standard VS Operating System environment while the customer is in operation. The majority of on-line diagnostic programs are designed for use with serial peripheral devices. They download diagnostic microcode to the serial devices to be tested and usually require a dedicated workstation as the test monitor.

The software packages include coverage for all serial workstations, serial printers, archiving workstations, twin-sheet feeders, envelope feeders, type-setters, special telecommunication devices (TCB/1 & 3), and laser printers.

**A.5 TROUBLESHOOTING**

**A.5.5 SMALL VS BP2 CLASS SYSTEM DIAGNOSTIC PACKAGE**

The Small VS BP2 Class System Diagnostic Package (part number 195-5084-0) is designed to for testing the Small VS BP2 Class Hardware configurations. This package contains five 1.2 MB diskettes (for mainframes using the 1.2 MB floppy drive), fifteen 360 KB diskettes (for mainframes using the 360 KB floppy drive), and the documentation required to run the diagnostics and to interpret the results. The following 1.2 MB diskettes are required for diagnostic testing of the VS-5E/6E Computer system:

732-6000A	CP5DA	1.2 MB 5-1/4" Diskette - CP5 Diagnostics
732-6001A	CP7DA	1.2 MB 5-1/4" Diskette - CP7 Diagnostics
732-6007A	BP2IOB	1.2 MB 5-1/4" Diskette - I/O Diagnostics
732-6008A	BP2ST	1.2 MB 5-1/4" Diskette - Self-Test Diagnostics

**MINIMUM HARDWARE REQUIRED**

The minimum hardware required consists of a VS-5E or VS-6E mainframe with one floppy drive. A workstation (16K memory or greater) is required to act as the Test Display Console (TDC). Operator interface occurs at the Test Display Console and the front panel LEDs.

**360KB FLOPPY DRIVE**

Use the following diskettes when performing diagnostic testing using the 360KB Floppy Drive (Field Version 195-5285-9):

Documentation Release: 9762  
 Documentation Part Number: 760-0043B  
 Software Releases: 2762

5 1/4 inch 360KB Diskette CP5 P/N:	732-8075ACP5D1 - CP Basic
5 1/4 inch 360KB Diskette CP5 P/N:	732-8076ACP5D2 - CP Advanced
5 1/4 inch 360KB Diskette CP5 P/N:	732-8077ACP5MEM - MM/BP DMA
5 1/4 inch 360KB Diskette CP7/7E P/N:	732-8078ACP7D1 - CP Basic
5 1/4 inch 360KB Diskette CP7/7E P/N:	732-8079ACP7D2 - CP Advanced
5 1/4 inch 360KB Diskette CP7 P/N:	732-8080ACP7M1 - CP/MM
5 1/4 inch 360KB Diskette CP7 P/N:	732-8081ACP7M2 - CP/BP/MM
5 1/4 inch 360KB Diskette CP5/7/7E P/N:	732-8xxx BP2IO1 - IO System
5 1/4 inch 360KB Diskette CP5/7/7E P/N:	732-8xxx BP2IO2 - IO System
5 1/4 inch 360KB Diskette CP5/7/7E P/N:	732-8xxx BP2IO3 - IO System
5 1/4 inch 360KB Diskette CP5/7/7E P/N:	732-8xxx MONST - S/T Monitor
5 1/4 inch 360KB Diskette CP5 P/N:	732-8xxx CP5ST - S/T for CP5
5 1/4 inch 360KB Diskette CP7 P/N:	732-8xxx CP7ST - S/T for CP7

**A.5 TROUBLESHOOTING****A.5.5.1 VS-5E TEST CONFIGURATIONS (1 of 2)**

VS-5E test configurations are as follows:

**Test Configuration for 5.25" Double Sided High Density Floppy Disks**

'CP5DA'			
No.	Test No.	Test Name	Burn-In
1	CT1000	CP Control Memory Test	Yes
2	CT2000	BP/CP Communications Test	Yes
3	CT3000	BU Branch Opcode Test	Yes
4	CT4000	Status, Conditional Branch	Yes
5	CT5000	Subroutine Stack Data	Yes
6	CT6000	Subroutine Stack Addressing	Yes
7	CT7000	Register, Immediate Opcodes	Yes
8	CT8000	CPU Stack Diagnostic Test	Yes
9	CT9000	Logical and Shift Opcodes	Yes
10	CTA000	8-Bit and 16-Bit ALU Test	Yes
11	CTB000	MAR, TRAM, and RTC Test	Yes
12	CTC000	BD, IAD, CC and DSET Test	Yes
13	CTD000	BI Branch Opcode Test	Yes
14	MT1000	Main Memory Test	Yes
15	BT2000	BP/MM DMA Diag (CP5)	Yes
16	CX1000	CPU Tester (CP5)	No
17	BX2000	BP/MM DMA Engr Utility	No

**Test Configuration for 5.25" Double Sided High Density Floppy Disks**

'BP2IOB'			
No.	Test No.	Test Name	Burn-In
1	BT3000	BP Floppy Disk Diag	No
2	RT2000	BP SCSI Subsystem Diag	No
3	ST1000	BP 928 Data Link Diag	No
4	BT1000	BP Async Port/RIPL Diag	No
5	DT1000	SMD Disk DA Diag	No
6	HT1000	RSF DA Diagnostics	No
7	UT1000	Universal ISIO DA Diag	No
8	TT1000	TC DA Single Port Diag	No
9	TT2000	TC DA Two Port Diag	No
10	TT3000	Multi-Line TC DA Diag	No
11	ST3000	8 Port RS-232 DA Diag	No
12	ST3000	8 Port EADC DA Diag	No
13	BX0000	BP I/O Engr Utility	No
14	BX2000	BP/MM DMA Engr Utility	No



**A.5 TROUBLESHOOTING****A.5.5.1 VS-5E TEST CONFIGURATIONS (2 of 2)**

VS-5E test configurations for any SMD/CMD/FMD or SCSI Disk are as follows:

<u>No.</u>	<u>Test No.</u>	<u>Test Name</u>	<u>Burn-In</u>
1	CT1000	CP Control Memory Test	Yes
2	CT2000	BP/CP Communications Test	Yes
3	CT3000	BU Branch OpCode Test	Yes
4	CT4000	Status, Conditional Branch	Yes
5	CT5000	Subroutine Stack Data	Yes
6	CT6000	Subroutine Stack Addressing	Yes
7	CT7000	Register, Immediate Opcodes	Yes
8	CT8000	CPU Stack Diagnostic Test	Yes
9	CT9000	Logical and Shift Opcodes	Yes
10	CTA000	8-Bit and 16-Bit ALU Test	Yes
11	CTB000	MAR, TRAM, and RTC Test	Yes
12	CTC000	BD, IAD, CC and DSET Test	Yes
13	CTD000	BI Branch Opcode Test	Yes
14	MT1000	Main Memory Test	Yes
15	BT2000	BP/MM DMA Diag (CP5)	Yes
16	CX1000	CPU Tester (CP5)	No
17	BT3000	BP Floppy Disk Diag	No
18	RT2000	BP SCSI Subsystem Diag	No
19	ST1000	BP 928 Data Link Diag	No
20	BT1000	BP Async Port/RIPL Diag	No
21	DT1000	SMD Disk DA Diag	No
22	HT1000	RSF DA Diagnostic	No
23	UT1000	Universal ISIO DA Diag	No
24	TT1000	1 Port TC DA Diag	No
25	TT2000	2 Port TC DA Diag	No
26	TT3000	Multi-Line TC DA Diag	No
27	ST3000	8 Port RS-232 DA Diag	No
28	ST3000	8 Port EADC DA Diag	No
29	BX0000	BP I/O Engr Utility	No
30	BX2000	BP/MM DMA Engr Utility	No

**A.5 TROUBLESHOOTING****A.5.5.2 VS-6E TEST CONFIGURATIONS (1 of 2)**

VS-6E test configurations for any SMD/CMD/FMD or SCSI Disk are as follows:

<u>No.</u>	<u>Test No.</u>	<u>Test Name</u>	<u>Burn-In</u>
1	CT1100	CP Control Memory Test	Yes
2	CT2100	BP/CP Communications Test	Yes
3	CT3100	Unconditional Branch Test	Yes
4	CT4100	Conditional Branch, Subroutine	Yes
5	CT5100	MDR, IREQ, PMR, Stack Test	Yes
6	CT6100	Arithmetic, Multiplier, CC Test	Yes
7	CT7100	BNM Operations, BR Tests	Yes
8	MT1100	MAR Operations, TRAM Test	Yes
9	MT2100	Main Memory, Cache Test	Yes
10	MT3100	OF/ON/BNM Operations Test	Yes
11	BT2100	BP/MM DMA Diag (CP7)	Yes
12	MT4100	CP/BP MM Data Bus Test	Yes
13	MT5100	CP/BP MM Contention/Cache Test	Yes
14	CX1100	CPU Tester (CP7)	No
15	BT3000	BP Floppy Disk Diag	No
16	RT2000	BP SCSI Subsystem Diag	No
17	ST1000	BP 928 Data Link Diag	No
18	BT1000	BP Async Port/RIPL Diag	No
19	DT1000	SMD Disk DA Diag	No
20	HT1000	RSF DA Diagnostic	No
21	UT1000	Universal ISIO DA Diag	No
22	TT1000	1 Port TC DA Diag	No
23	TT2000	2 Port TC DA Diag	No
24	TT3000	Multi-Line TC DA Diag	No
25	ST3000	8 Port RS-232 DA Diag	No
26	ST3000	8 Port EADC DA Diag	No
27	BX0000	BP I/O Engr Utility	No
28	BX2000	BP/MM DMA Engr Utility	No

A.5 TROUBLESHOOTING

## A.5.5.2 VS-6E TEST CONFIGURATIONS (2 of 2)

Test Configuration for 5.25" Double Sided High Density Floppy Disks

'CP7DA'

No.	Test No.	Test Name	Burn-In
1	CT1100	CP Control Memory Test	Yes
2	CT2100	BP/CP Communications Test	Yes
3	CT3100	Unconditional Branch	Yes
4	CT4100	Conditional Branch, Subroutine	Yes
5	CT5100	MDR, IREG, PMR, Stack	Yes
6	CT6100	Arithmetic, Multiplier, CC Test	Yes
7	CT7100	BNM Operations, BR Test	Yes
8	MT1100	MAR Operations, TRAM	Yes
9	MT2100	Main Memory, Cache Test	Yes
10	MT3100	DF/DN/BNM Operations	Yes
11	BT2100	BP/MM DMA Diag (CP7)	Yes
12	MT4100	CP/BP MM Data Bus Test	Yes
13	MT5100	CP/BP MM Contention/Cache	Yes
14	CX1100	CPU Tester (CP7)	No
15	BX2000	BP/MM DMA Engr Utility	No

Test Configuration for 5.25" Double Sided High Density Floppy Disks

'BP2IOB'

No.	Test No.	Test Name	Burn-In
1	BT3000	BP Floppy Disk Diag	No
2	RT2000	BP SCSI Subsystem Diag	No
3	ST1000	BP 928 Data Link Diag	No
4	BT1000	BP Async Port/RIPL Diag	No
5	DT1000	SMD Disk DA Diag	No
6	HT1000	RSF DA Diagnostic	No
7	UT1000	Universal ISIO DA Diag	No
8	TT1000	TC DA Single Port Diag	No
9	TT2000	TC DA Two Port Diag	No
10	TT3000	Multi-Line TC DA Diag	No
11	ST3000	8 Port RS-232 DA Diag	No
12	ST3000	8 Port EADC DA Diag	No
13	BX0000	BP I/O Engr Utility	No
14	BX2000	BP/MM DMA Engr Utility	No

**A.5 TROUBLESHOOTING****A.5.5.3 LOADING DIAGNOSTIC MONITOR AND SELF-TEST ON IPL DRIVE**

To install the Diagnostic Monitor files and Self-Test files onto the internal drive (SCSI Disk drive set for address 6), perform the following:

**NOTE**

For single drive systems, DISKINIT 'RELABEL' function must be performed using Stand-Alone Utilities, → A.3.1.1.

- 1) BACKUP Library @DIAGMN@, @DIAGST@, and @SYSTEM@ from the appropriate 1.2 MB diskettes listed below to the target drive (SCSI disk drive set for address ID 6).

**VS-5E:**

732-6000A	CP5DA	1.2 MB 5-1/4" Diskette - CP5 Diagnostics
732-6007A	BP2IOB	1.2 MB 5-1/4" Diskette - I/O Diagnostics
732-6008A	BP2ST	1.2 MB 5-1/4" Diskette - Self-Test Diagnostics

**VS-6E:**

732-6001A	CP7DA	1.2 MB 5-1/4" Diskette - CP7 Diagnostics
732-6007A	BP2IOB	1.2 MB 5-1/4" Diskette - I/O Diagnostics
732-6008A	BP2ST	1.2 MB 5-1/4" Diskette - Self-Test Diagnostics

Specify 'CLEAR = NO' when the Backup utility requests the Output Volume. Specify 'UPDATE' When the Backup utility queries as to how to handle duplicate files.

- 2) After backing up library @DIAGMN@, @DIAGST@, and @SYSTEM@ from all the appropriate diskettes, scratch file @MONTBL@ in library @DIAGMN@ on the target disk.
- 3) Rename File @MONTBLM in Library @DIAGMN@ on the target disk to @MONTBL@.
- 4) Run DISKINIT and perform the RELABEL function on the target disk (the disk may be renamed the same volume name).
- 5) The installation is complete.

**A.5 TROUBLESHOOTING**

**A.5.5.4 VS-5E/6E DIAGNOSTIC MONITOR OPERATION PROCEDURE**

The VS-5E/6E Diagnostics should be used when:

- The system is a new installation.
- A fatal error occurs while running Self-Test Diagnostics.
- A non-fatal error occurs and the error code indicated is unclear.

Accessing the VS-5E/6E Diagnostic Monitor can be accomplished by:

- During normal power-on procedures by pressing the PF8 key (if loaded on IPL drive, → 4.1).
- By IPLing directly from one of the three diagnostics diskettes.

**A.5 TROUBLESHOOTING****A.5.5.4.1 Diagnostic Monitor Program Selection Menus (1 of 3)**

When the diagnostic package is IPL'ed, it goes through an automatic initialization phase before it allows the operator to interface with the system. Following the initialization, the operator has the following selections:

- Run the Self-Test Quick Verification package by pressing ENTER
- Proceed directly to IPL by pressing PF1
- Select Diagnostic Monitor by pressing PF8

Pressing PF8 displays the Program Selection menu. VS5E CP5DA Program Selection Menu is shown below, → A.5.5.4.1.

Small VS BP2 Class Monitor Package Version R2xxx  
Test Selection Option

To Select Tests, Position Cursor and Press any NON-BLANK key. Press SPACE or DELETE to Deselect a Test. Press PF8 to Start An Automatic Sequence. Press ENTER to Begin Testing. Press PF16 to Terminate.

- | Test Name                       | Test Name                   |
|---------------------------------|-----------------------------|
| ■ 1 CP Control Memory Test      | ■ 16 CPU Tester (CP5)       |
| ■ 2 BP/CP Communications Test   | ■ 17 BP/MM DMA Engr Utility |
| ■ 3 BU Branch OpCode Test       |                             |
| ■ 4 Status, Conditional Branch  |                             |
| ■ 5 Subroutine Stack Data       |                             |
| ■ 6 Subroutine Stack Addressing |                             |
| ■ 7 Register, Immediate Opcodes |                             |
| ■ 8 CPU Stack Diagnostic Test   |                             |
| ■ 9 Logical and Shift Opcodes   |                             |
| ■ 10 8-Bit and 16-Bit ALU Test  |                             |
| ■ 11 MAR, TRAM, and RTC Test    |                             |
| ■ 12 BD, IAD, CC and DSET Test  |                             |
| ■ 13 BI Branch Opcode Test      |                             |
| ■ 14 Main Memory Test           |                             |
| ■ 15 BP/MM DMA Diag (CP5)       |                             |

**A.5 TROUBLESHOOTING****A.5.5.4.1 Diagnostic Monitor Program Selection Menus (2 of 3)**

VS-6E CP7DA Program Selection Menu is shown below, → A.5.5.4.1.

---

Small VS BP2 Class Monitor Package Version R2xxx  
Test Selection Option

To Select Tests, Position Cursor and Press any NON-BLANK key. Press SPACE or DELETE to Deselect a Test. Press PF8 to Start An Automatic Sequence. Press ENTER to Begin Testing. Press PF16 to Terminate.

Test Name

- 1 CP Control Memory Test
  - 2 BP/CP Communications Test
  - 3 Unconditional Branch Test
  - 4 Conditional Branch, Subroutine
  - 5 MDR, IREQ, PMR, Stack Test
  - 6 Arithmetic, Multiplier, CC Test
  - 7 BNM Operations, BR Tests
  - 8 MAR Operations, TRAM Test
  - 9 Main Memory, Cache Test
  - 10 OF/ON/BNM Operations Test
  - 11 BP/MM DMA Diag (CP7)
  - 12 CP/BP MM Data Bus Test
  - 13 CP/BP MM Contention/Cache Test
  - 14 CPU Tester (CP7)
  - 15 BP/MM DMA Engr Utility
-

**A.5 TROUBLESHOOTING****A.5.5.4.1 Diagnostic Monitor Program Selection Menus (3 of 3)**

VS-5E/6E BP2IO Program Selection Menu shown, → A.5.5.4.1.

---

Small VS BP2 Class Monitor Package Version R2xxx  
Test Selection Option

To Select Tests, Position Cursor and Press any NON-BLANK key. Press SPACE or DELETE to Deselect a Test. Press PF8 to Start An Automatic Sequence. Press ENTER to Begin Testing. Press PF16 to Terminate.

Test Name

- 1 BP Floppy Disk Diag
  - 2 BP SCSI Subsystem Diag
  - 3 BP 928 Data Link Diag
  - 4 BP Async Port/RIPL Diag
  - 5 SMD Disk DA Diag
  - 6 RSF DA Diag
  - 7 Universal ISIO DA Diag
  - 8 1 Port TC DA Diag
  - 9 2 Port TC DA Diag
  - 10 Multi-Line TC DA Diag
  - 11 8 Port RS 232 DA Diag
  - 12 8 Port EADC DA Diag
  - 13 BP I/O Engr Utility
  - 14 BP/MM DMA Engr Utility
-



## A.5 TROUBLESHOOTING

### A.5.5.4.2 Running Selected Diagnostics

Select the diagnostics to be run by positioning the cursor next to the test desired and press any Non-Blank character key. This can be accomplished by using either the Up/Down arrow keys or the TAB key.

Deselect tests by positioning the cursor next to the test to be deselected and press the SPACE Bar.

Once the test are selected, press ENTER to display the Run-Time menu and to start the diagnostic tests in the order selected. If testing is not altered by the operator or by hardware failure, the monitor automatically cycles on the set of selected diagnostic programs.

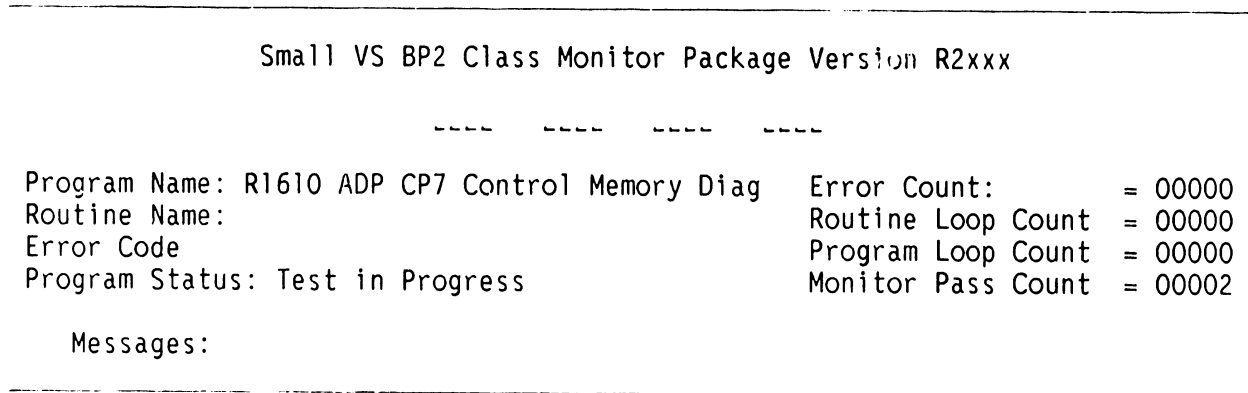
**A.5 TROUBLESHOOTING**

**A.5.5.5 RUN-TIME MENU SCREEN COMMANDS AND DESCRIPTORS**

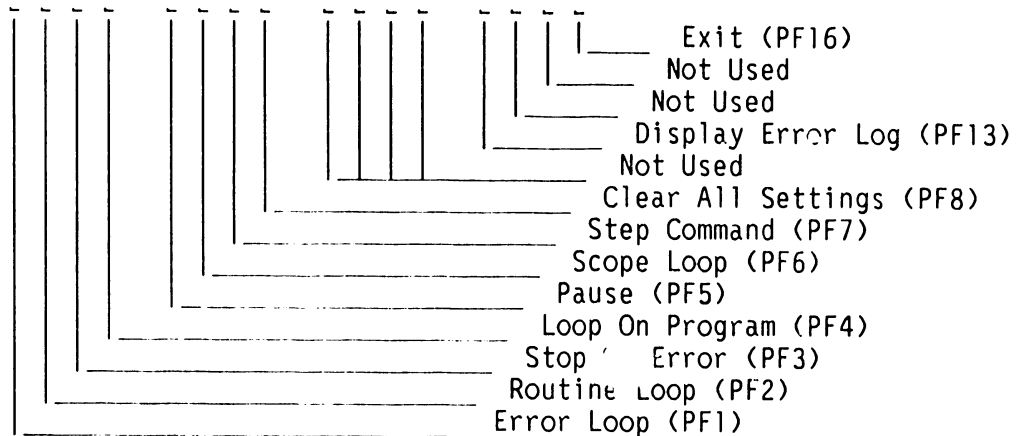
The Run-Time Screen shown, → A.5.5.5.1, contains nine commands and eight descriptors. The operator uses the Run-Time screen to monitor test results and the PF function key commands (for command description, → A.5.5.5.1) and alternate action commands to control test performance. Selecting the commands initiates the functioning of the command and places an asterisk (\*) in the appropriate pseudo space on the screen. The next time a command is selected, it becomes an alternate action command and will cause the original command to be deselected.

**NOTE**

Fields 'Error Code, Error Count, Routine Loop Count, and Program Loop Count' are displayed only when an error occurs or Loop count routine is selected.



The pseudo spaces are defined as follows:



**A.5 TROUBLESHOOTING****A.5.5.5.1 Run-Time Selection Screen Commands and Function Keys**


---

<b>Key Command</b>	<b>Description</b>
PF1 ERROR LOOP	Loop on routine in which the next failure occurs.
PF2 ROUTINE LOOP	Loop on current test routine.
PF3 STOP ON ERROR	Stop the program when the next failure is detected.
PF4 LOOP ON PROGRAM	Loop on current diagnostic program.
PF5 PAUSE	Halt program prior to the next test routine.
PF6 SCOPE LOOP	Loop on next test routine in which hardware failure occurs. Identical to ERROR LOOP except that error reporting is omitted after the first error.
PF7 STEP	Used to increment around a selected option (PF1-PF5). That is STEP through PAUSE, Program or Routine Loop, or STOP-ON-ERROR without deselecting the command.
PF8 CLEAR ALL SETTINGS	Resets all other test control commands. (i.e. stop looping if looping, or resume testing if halted).
PF13 DISPLAY ERROR LOG	Displays the 23 most recent errors in error buffer. Pressing ENTER returns the user to the Run-Time Menu with no effect on the error log buffer.
PF16 EXIT	Terminates the Diagnostic Monitor program and the Test selection screen is re-entered.

---

**A.5 TROUBLESHOOTING****A.5.5.2 Run-Time Selection Screen Descriptors**


---

<b>Descriptor</b>	<b>Description</b>
PROGRAM NAME	The name of the program currently being executed. A program name consists of one or more test routines.
ROUTINE NAME	The name of the test routine currently being executed.
ERROR CODE	The code of the most recently detected error.
PROGRAM STATUS	The status of the diagnostic currently being performed. (e.g. TEST-IN-PROGRESS, STOP ON ERROR, PROGRAM PAUSE, STEP, etc.).
ERROR COUNT	A decimal count of the number of errors which have been detected. The count is cumulative and is reset only by re-IPLing or returning to Program Selection menu (PF16).
ROUTINE LOOP COUNT	A decimal count of the number of loops which have been made through the diagnostic routine currently being performed. This value is only displayed when LOOP-ON-ROUTINE is in effect. It is cleared when the LOOP-ON-ROUTINE option is deselected.
PROGRAM LOOP COUNT	Identical to Routine Loop Count with the exception that this count applies to diagnostic programs rather than to routines.
MONITOR PASS COUNT	A decimal count of the number of loops which have been made through a set of diagnostic programs. Cleared by re-IPLing or returning to Program Selection menu (PF16).

---

**A.5 TROUBLESHOOTING**

**A.5.5.5.3 Run-Time Selection Screen Error Messages and Prompts**

The current diagnostic program writes error messages and prompts in the lower half of the screen. If more than one error occurs, only the last error message will be displayed, although the error count and the Diagnostic Monitor Error Log are updated for each error.

**A.5 TROUBLESHOOTING**

**A.5.5.6 RUNNING THE DIAGNOSTIC MONITOR PROGRAM (FROM FLOPPY DRIVE) (1 of 3)**

- 1) Make sure the Local/Remote Keyswitch is in the local position, → 4.1.
- 2) Insert the diagnostic diskette (depending on mainframe type used) into the floppy drive and closed the latch, → 4.2.
- 3) Press the Red Initialize button on the front panel, → 4.2. The Hex display will begin count down from Hex FFFF. In about 45 seconds, the IPL Drive Selection Screen will be displayed on WS0.

---

Device	Capacity	Type	Volume	Status
Small VS BP2 Class Self-Test Package      Version R2xxx				
IPL Drive Selection				
Bootstrap Volume = CP5DA				
■ 2270V7	1.2 Mb	Dsket	CP5DA	
2269V3	71 Mb	Dsket	SYSTEM	Crash Tolerant
2269V4	142 Mb	Dsket	DATA	Crash Tolerant

Position Cursor to Indicated Device and Select:

(ENTER) Test & IPL      (PF1) IPL Only      (PF8) Stand-Alone Diagnostic Monitor

---

- 4) The cursor will be positioned next to the bootstrap volume (2270V7 when booted from the floppy). Press PF8 to select the Stand-Alone Diagnostic Monitor from the floppy. → A.5.5.4.1 for CP5DA, → A.5.5.4.1 for CP7DA, or → A.5.5.4.1 for BP2IO screens. The VS Diagnostic Monitor Disclaimer screen is displayed, → A.5.5.6.

The Disclaimer Screen informs the user that the VS-5/6 Advanced Diagnostic package was selected and that running this package is at their own risk. At this time, the user has the option of running the diagnostic monitor tests or returning to the Self-Test Package Screen by pressing PF16.

**A.5 TROUBLESHOOTING**

**A.5.5.6 RUNNING THE DIAGNOSTIC MONITOR PROGRAM (FROM FLOPPY DRIVE) (2 of 3)**

---

VS Diagnostic Monitor Package

- - - - - N O T I C E - - - - -

This Diagnostic package is the property of Wang Laboratories, Inc., and is provided for the use by authorized personnel only. Improper use may cause loss or damage to programs and/or data. This package and related materials may not be disclosed or otherwise made available to third parties without the prior permission of Wang.

In no event shall Wang Laboratories, Inc., or its subsidiaries be liable for incidental or consequential damages in connection with or arising from the use of the diagnostic package, the accompanying manual, or any related materials.

- - - - -

Enter YES to Acknowledge, PF16 to Exit

■ ■ ■

- 
- 5) The Diagnostic Monitor has two modes of operation; Customer Runnable Mode and Customer Engineer Mode.

**Customer Runnable Mode**

Customer Runnable Mode is selected by entering YES (either upper or lower case) in the fill-in field and pressing RETURN. This mode contains a limited number of non-destructive tests the customer can run. The PF keys descriptors are disabled with the exception of PF16, which returns the user to the Self-Test Package screen.

**Customer Engineer Mode**

Customer Engineer Mode is selected by entering CSG (upper case dependent) in the fill-in field and pressing RETURN. This mode contains all the diagnostic tests as previously described for the diskette loaded. The PF keys descriptors are enabled.

- 6) Select the tests to be run and press ENTER to begin testing or press PF8 to begin the automatic sequence. Run the diagnostics for one complete, error free pass.

**A.5 TROUBLESHOOTING**

**A.5.5.6 RUNNING THE DIAGNOSTIC MONITOR PROGRAM (FROM FLOPPY DRIVE) (3 of 3)**

- 7) If no error occurs, insert BP2IO diskette into the floppy drive and press Initialize. When the Small VS BP2 Class Self-Test Package screen appears on WSO, press PF8 to select the Diagnostic Monitor. Enter CSG to acknowledge the disclaimer screen, → A.5.5.6.

**CAUTION**

EXERCISE EXTREME CAUTION WHEN ATTEMPTING TO USE BP2IO DISKETTE. THE ABILITY TO WRITE TO ANY DISK ATTACHED TO THE SYSTEM IS MADE AVAILABLE. VALUABLE CUSTOMER DATA MAY BE DAMAGED.

- 8) Select the tests to be run and press ENTER to begin testing or press PF8 to begin the automatic sequence. Run the diagnostics for one complete, error free pass.
- 9) If an error occurs, display the Diagnostic Monitor Error Log at the end of one complete pass. This is accomplished by pressing the PF13 key.
- 10) If no error is detected, press the PF16 key to return to the Diagnostic Monitor Program Selection screen. Press PF16 again to terminate and return to the IPL Drive Selection screen.
- 11) Select the desired disk drive and press ENTER to IPL and Self-Test or PF1 to IPL only and complete the system IPL sequence.

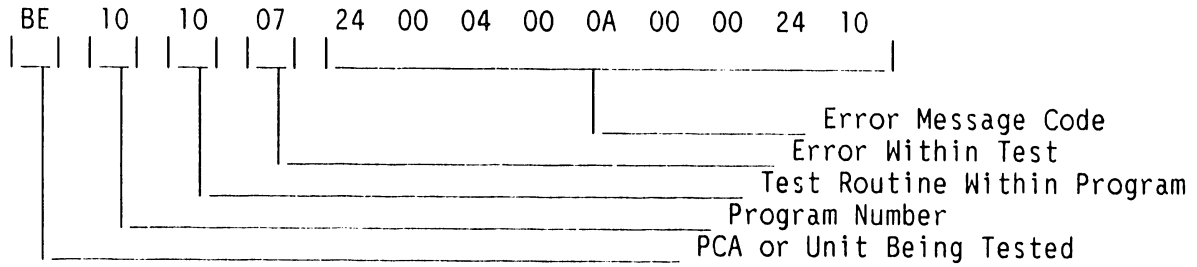


**A.5 TROUBLESHOOTING**

**A.5.5.6.1 INTERPRETING THE DIAGNOSTIC MONITOR ERROR LOG**

Display the Diagnostic Error Log by pressing the PF13 key. This screen contains up to 23 of the most recent errors. These errors are listed as 8-character codes followed by up to 18 Hex characters all on a single line.

The first two characters of the 8-character code identify the PCA (or unit) being tested and the program, routine, or error notation. The second two characters (hex notation) identify the program number, the third two characters (hex notation) identify the test routine within the program, the fourth two characters (hex notation) identify the error within the test routine, and the remaining 18 characters (hex notation) contain the error message code. See example below:



To decipher the failing unit, observe the first error code character contained in the last entry of the error log. For the example, the error code is BE101007 24 00 04 00 0A 00 00 24 10. Use list below to compare the first error code character (in this example 'B', Bus Processor) and compare to find the failing unit. Replace the failing unit.

Diagnostic Monitor Failing Unit Error Code Character List

FIRST ERROR CHARACTER CODE	FAILING UNIT
B	Bus Processor DA
C	Central Processor Device Adapter PCA
D	Internal Fixed or External Disk Drive and/or DA
M	Main Memory and Cache Memory Device Adapter PCA
S	Serial I/O (SIO/ISIO/UISIO [928]) PCA or WSO
T	Telecommunications Device Adapter PCA

A complete listing of Error Code displayable on the Diagnostic Monitor Run-Time Menu is contained in Appendix A.

**A.5 TROUBLESHOOTING**

**A.5.6 POWER-UP CORE DIAGNOSTICS (PROM-BASED)**

When the VS-5E/6E is turned on (or during re-IPL), the CPU goes through an automatic initialization phase before it allows the operator to interface with the system. CPU PROM-level diagnostic programs are automatically accessed during the normal power-up procedure. CROM-level diagnostics are bypassed if the appropriate Bus Processor diagnostic switches (switch bank SW1) are not set to the correct positions, → 7.3.2 of VS-5/6 Computer System Product Maintenance Manual.

**A.5 TROUBLESHOOTING**

**A.5.7 ON-LINE DIAGNOSTIC PROCEDURES**

With on-line diagnostics, located in library @SYSTST@, the CE logs on to the system through any workstation and executes a specific test routine, which runs under control of the VS Operating System (while the customer's system is in operation). For a detailed explanation and discussion of On-Line Diagnostic Procedures, → Customer Engineering Diagnostic Handbook.

## A.5 TROUBLESHOOTING

### A.5.8 CONTROL MODE

CONTROL MODE is a CP state where normal programming activities (under the control of the VS Operating System) are suspended and certain other facilities (mainly diagnostic and initialization) are made available to the system operator. These facilities are divided into two groups of commands as follows:

#### LOAD Group:

Contains commands for initializing the Operating System, loading a stand-alone program, loading a diagnostic program, or restarting a program from an initialized state.

#### DEBUG Group:

Contains commands for displaying and/or modifying Main Memory, general registers, control registers, or the Program Control Word (PCW). Also included in this group are commands for single-step program execution, a hard copy dump of Main Memory and registers, and virtual address translation.

Control Mode uses Workstation Zero (WS-0) for communications between the operator and the system, therefore WS-0 must be powered-on. Control Mode uses only the top line of the CRT display (line one). The contents of this line are saved on entry into Control Mode and are restored upon Control Mode exit. This makes Control Mode transparent to any program that may be using WS-0. For a detailed discussion of Control Mode and Control Mode commands, → VS Principles of Operation manual.

**A.5 TROUBLESHOOTING**

**A.5.9 REMOTE DIAGNOSTICS**

Remote Diagnostics are offered on the VS5E/6E Computer System. The Remote Diagnostics (Remote Maintenance) section of the VS-5E/6E Computer System is the same as the Remote Diagnostics (Remote Maintenance) section of the VS-5/6 Computer System, → 9.11 of VS-5/6 Computer System Product Maintenance Manual.

**A.5 TROUBLESHOOTING**

**A.5.10 GENERAL**

The VS-5E and VS-6E use a BP2 Class Bus Processor. This appendix provides a listing of Small VS Systems BP2 Class Power-Up and Self-Test Diagnostic Error Codes. These four-character codes (listed in Hexadecimal notation) provide diagnostic information to a much greater depth than the two-character codes. While the two-digit codes give sufficient information to allow rapid repair at the 'board-swap' level, many hardware and software problems are not so easily diagnosed. A numerical listing by Error Code and its description and/or related test are listed in the ensuing pages.

**A.5 TROUBLESHOOTING****A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (1 of 10)**

Unless otherwise noted, the following Diagnostic Error Codes are BP2 Class PROM-Based power-up error codes.

---

<b>TEST ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>00</b>	<b>PROM POWER ON AND INITIALIZATION</b>
0000	80186 hung on jump to diagnostic start or during chip select programming
0001	80186 hung during processor register initialization
<b>02</b>	<b>PROM POWER ON AND INITIALIZATION</b>
0200	80186 hung during processor register initialization
<b>04</b>	<b>PROM CHECKSUM VERIFICATION</b>
0402	Checksum error
<b>06</b>	<b>2861 DUART COMMUNICATIONS CHECK &amp; REMOTE CHANNEL INITIALIZATION</b>
0600	80186 hung, See program documentation for possible cause

**A.5 TROUBLESHOOTING****A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (2 of 10)**


---

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**


---

**08 I/O COMMUNICATION CHECK**

0802 Data write/verify failure on Data RAM DMA MAR

**0A PROGRAMMABLE INTERRUPT CONTROLLER INITIALIZATION & TEST**

0A00 80186 hung, See program documentation for possible cause  
 0A10 Mask register write/verify failure on master 8259A  
 Low byte S1 = expected data, low byte D1 = received data  
 0A11 Mask register write/verify failure on slave 8259A #1  
 Low byte S1 = expected data, low byte D1 = received data  
 0A12 Mask register write/verify failure on slave 8259A #2  
 Low byte S1 = expected data, low byte D1 = received data  
 0A13 Mask register write/verify failure on slave 8259A #3  
 Low byte S1 = expected data, low byte D1 = received data  
 0A14 Mask register write/verify failure on slave 8259A #4  
 Low byte S1 = expected data, low byte D1 = received data

**0C 80186 PROGRAMMABLE INTERNAL TIMER TEST**

0C00 80186 hung, see program documentation for possible cause  
 0C10 Timer Channel 0 count incorrect, CX = received count  
 0C12 Timer Channel 1 count incorrect, CX = received count  
 0C14 Timer Channel 2 count incorrect, CX = received count  
 0C20 No interrupt from channel 0  
 0C22 Interrupt received not channel 0  
 0C24 No max count status from channel 0  
 0C20 No interrupt from channel 1  
 0C22 Interrupt received not channel 1  
 0C24 No max count status from channel 1  
 0C20 No interrupt from channel 2  
 0C22 Interrupt received not channel 2  
 0C24 No max count status from channel 2

**0D WAIT STATE GENERATOR**

0D02 Wait State Generator Failed Enable/Disable Switch  
 0D04 Wait State Generator Failed Max/Min Test  
 0D06 Wait State Generator Failed Timing Test



**A.5 TROUBLESHOOTING****A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (3 of 10)**


---

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**


---

**0E FRONT PANEL INTERFACE CHECK**

No explicit codes reported during this test. See program documentation for test details

**10 CODE RAM DATA LINE TEST**

1000 80186 hung, see program documentation for possible cause  
 1002 Data write/verify miscompare  
 BP = expected data, DS:BX = address of miscompare  
 1004 Unexpected parity error  
 DS:BX = test address

**12 DATA RAM DATA LINE TEST**

1200 80186 hung, see program documentation for possible cause  
 1202 Data write/verify miscompare  
 BP = expected data, DS:BX = address of miscompare  
 1204 Unexpected Code RAM parity error  
 DS:BX = test address

**14 CODE RAM PARITY GENERATOR/CHECKER TEST**

1400 80186 hung, see program documentation for possible cause  
 1402 Low byte data write/verify miscompare with normal parity  
 BL = expected data, DS:BP = address of miscompare  
 1404 Low byte unexpected parity error  
 DS:BP = test address  
 1406 Low byte data write/verify miscompare with forced parity  
 BL = expected data, DS:BP = address of miscompare  
 1408 Low byte forced parity error not detected  
 DS:BP = test address  
 1412 High byte data write/verify miscompare with normal parity  
 BH = expected data, DS:BP = address of miscompare  
 1414 High byte unexpected parity error  
 DS:BP = test address  
 1416 High byte data write/verify miscompare with forced parity  
 BH = expected data, DS:BP = address of miscompare  
 1418 High byte forced parity error not detected  
 DS:BP = test address

**A.5 TROUBLESHOOTING****A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (4 of 10)**


---

**TEST ERROR CODE TEST TITLE AND ERROR CODE DESCRIPTION**


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**16 CODE RAM BYTE BANK DECODE ADDRESS LINE TEST**

1600 80186 hung, see program documentation for possible cause  
 1602 Data write/verify miscompare current bank address  
 BH = expected data, DS:BP = address of miscompare  
 1604 Unexpected parity error current bank address  
 DS:BP = bank address  
 1606 Data write/verify miscompare test bank address  
 BH = expected data, DS:BP = address of miscompare  
 1608 Unexpected parity error test bank address  
 DS:BP = test address

**18 DATA RAM BYTE DECODE TEST**

1800 80186 hung, see program documentation for possible cause  
 1802 Data write/verify miscompare current bank address  
 BH = expected data, DS:BP = address of miscompare  
 1804 Unexpected Code RAM parity error current bank address  
 DS:BP = bank address  
 1806 Data write/verify miscompare test bank address  
 BH = expected data, DS:BP = address of miscompare  
 1808 Unexpected Code RAM parity error test bank address  
 DS:BP = test address

**1A CODE RAM ADDRESS LINE TEST**

1A00 80186 hung, see program documentation for possible cause  
 1A02 Data write/verify miscompare current offset address  
 BP = expected data, DS:BX = address of miscompare  
 1A04 Unexpected parity error  
 DS:BX = current address  
 1A06 Data write/verify miscompare test offset address  
 BP = expected data, DS:BX = address of miscompare  
 1A08 Unexpected parity error  
 DS:BX = test address  
 1A10 Data write/verify miscompare current segment address  
 DS = expected data, DS:BX = address of miscompare  
 1A12 Unexpected parity error  
 DS:BX = current address  
 1A14 Data write/verify miscompare test segment address  
 DS = expected data, DS:BX = address of miscompare  
 1A16 Unexpected parity error  
 DS:BX = test address

**A.5 TROUBLESHOOTING****A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (5 of 10)**


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**TEST ERROR CODE TEST TITLE AND ERROR CODE DESCRIPTION**


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**1C DATA RAM ADDRESS LINE TEST**

1C00 80186 hung, see program documentation for possible cause  
 1C02 Data write/verify miscompare current address  
 BP = expected data, DS:BX = address of miscompare  
 1C04 Unexpected parity error  
 DS:BX = current address  
 1C06 Data write/verify miscompare test address  
 BP = expected data, DS:BX = address of miscompare  
 1C08 Unexpected parity error  
 DS:BX = test address

**1E CODE RAM DATA INTEGRITY TEST**

1E00 80186 hung, see program documentation for possible cause  
 1E02 Data exchange miscompare pattern #1  
 BX = expected data, CX = received data  
 DS:SI = address of miscompare  
 1E04 Unexpected parity error pattern #1  
 DS:SI = test address  
 1E06 Data exchange miscompare pattern #2  
 BX = expected data, CX = received data  
 DS:SI = address of miscompare  
 1E08 Data verify miscompare pattern #3  
 BX = expected data, CX = received data  
 DS:SI = address of miscompare  
 1E0A Unexpected parity error pattern #3  
 DS:SI = test address

## Data patterns used:

#1 AA55H (even parity)  
 #2 55AAH (even parity)  
 #3 2A54H (odd parity)

**A.5 TROUBLESHOOTING****A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (6 of 10)**


---

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**


---

**20 DATA RAM DATA INTEGRITY TEST**

2000 80186 hung, see program documentation for possible cause  
 2002 Data exchange miscompare patterns #1-5  
       CS:BX = expected data, CX = received data  
       DS:SI = address of miscompare  
 2004 Data verify miscompare pattern #6  
       CS:BX = expected data, CX = received data  
       DS:SI = address of miscompare

## Data patterns used:

#1 OFFOH  
 #2 F00FH  
 #3 33CCH  
 #4 CC33H  
 #5 55AAH  
 #6 AA55H

**22 CODE RAM REFRESH TEST**

2200 80186 hung, see program documentation for possible cause  
 2202 Data verify miscompare  
       Code RAM integrity pattern #3 = expected data  
       CX = received data, DS:SI = address of miscompare  
 2204 Unexpected parity error  
       DS:SI = test address

**A.5 TROUBLESHOOTING****A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (7 of 10)**


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**TEST ERROR CODE TEST TITLE AND ERROR CODE DESCRIPTION**


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**24 CODE RAM ODD WORD/BYTE MOVE TEST**

2400 80186 hung, see program documentation for possible cause  
 2402 Odd address word data write/verify miscompare pattern #1  
 Pattern #1 = expected data, DS:SI = address of miscompare  
 2404 Odd address word string move/verify miscompare pattern #1  
 Pattern #1 = expected data, ES:DI = address of miscompare  
 2406 Odd address byte data write/verify miscompare pattern #2  
 Pattern #2 = expected data, DS:SI = address of miscompare  
 2408 Odd address byte string move/verify miscompare pattern #2  
 Pattern #2 = expected data, ES:SI = address of miscompare  
 240A Even address byte data write/verify miscompare pattern #3  
 Pattern #3 = expected data, DS:SI = address of miscompare  
 240C Even address byte string move/verify miscompare pattern #3  
 Pattern #3 = expected data, ES:DI = address of miscompare

## Data Patterns Used:

#1 AA55H  
 #2 AAH  
 #3 55H

**26 DATA RAM ODD WORD/BYTE MOVE TEST**

2600 80186 hung, see program documentation for possible cause  
 2602 Odd address word data write/verify miscompare pattern #1  
 Pattern #1 = expected data, DS:SI = address of miscompare  
 2604 Odd address word string move/verify miscompare pattern #1  
 Pattern #1 = expected data, ES:DI = address of miscompare  
 2606 Odd address byte data write/verify miscompare pattern #2  
 Pattern #2 = expected data, DS:SI = address of miscompare  
 2608 Odd address byte string move/verify miscompare pattern #2  
 Pattern #2 = expected data, ES:SI = address of miscompare  
 260A Even address byte data write/verify miscompare pattern #3  
 Pattern #3 = expected data, DS:SI = address of miscompare  
 260C Even address byte string move/verify miscompare pattern #3  
 Pattern #3 = expected data, ES:DI = address of miscompare

## Data Patterns Used:

#1 AA55H  
 #2 AAH  
 #3 55H

**A.5 TROUBLESHOOTING****A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (8 of 10)**


---

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**


---

**28 CODE RAM PARITY ERROR INTERRUPT TEST**

2800 80186 hung, see program documentation for possible cause  
 2802 No forced parity error status detected by polling interrupt controller  
 2804 No forced parity error interrupt detected

**2A MEMORY TO MEMORY 80186 DMA TEST**

2A00 80186 hung, see program documentation for possible cause  
 2A10 No channel 0 terminal count status detected  
 2A12 No channel 0 interrupt status detected  
 2A14 Data verify miscompare after data RAM to code RAM transfer  
 2A20 No channel 1 terminal count status detected  
 2A22 No channel 1 interrupt status detected  
 2A24 Data verify miscompare after data RAM to code RAM transfer

**38 FLOPPY DISK SELF-TEST**

3800 80186 hung, see program documentation for possible cause  
 39xx Device reset function error  
 3Axx Device identify function error  
 3Bxx Multi-block read function error

Where xx = Specific Operation Status  
 02 Floppy Disk Controller (FDC) status error after drive select  
 04 Device not ready  
 06 FDC Command phase sequence error  
 08 No completion interrupt detected  
 0A No result phase  
 0C FDC result phase sequence error  
 0E Error in operation status  
 82 No device present  
 84 FDC chip operational failure after reset  
 86 Invalid unit number requested  
 88 Device/parameter calculations error

**3E EXPECTED INTERRUPT HANDLER**

3Exx Unexpected interrupt, xx = Intel interrupt type service  
 3EFF Unexpected interrupt, type unknown

**A.5 TROUBLESHOOTING****A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (9 of 10)**


---

TEST ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
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**40 BOOTSTRAP FILE LOADER**

4000	80186 hung, see program documentation for possible cause
40x0	Non-VS labeled volume
40x1	Bootstrap device media error (ID, CRC, ECC)
40x2	Bootstrap device hardware error (controller or drive)
40x4	Bootstrap device not ready
40x8	Parameter error/BP failure
40xA	Invalid pointer in volume label (non-bootstrap volume)
40xC	Bootstrap file checksum error
40xE	Bootstrap device address computation error

Where x =

2	device/operation
2	Volume label read from floppy
3	Bootstrap file read from floppy
A	Volume label read from SCSI
B	Bootstrap file read from SCSI

**50 SCSI DISK SELF TEST**

5000	80186 hung, see program documentation for possible cause
51xx	Device reset function error
52xx	Device identify function error
53xx	Multi-block read function error

**A.5 TROUBLESHOOTING****A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (10 of 10)**


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TEST CODE	ERROR	TEST TITLE AND ERROR CODE DESCRIPTION
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**50 SCSI DISK SELF TEST (Continued)**

Where xx = Specific Operation Status

01 - 6F		Vendor defined, See vendor SCSI controller specifications
72		Device not ready
73		Media error (ID, ECC)
74		Hardware error (controller or drive)
75		Illegal request or parameter
76		Unit attention (controller reset or disk changed)
77		Access to protected block attempt
7B		Command aborted by controller
80		Requested device not present
82		SCSI Protocol Controller (SPC) self-diagnostic error
84		Parameter/calculation error
86		Unit busy or reserved
C2		Operation completion timeout
C4		Device select timeout
C6		Unexpected controller disconnect during transfer
C8		Invalid interrupt type during SCSI bus transaction
D0		SCSI bus data out phase error
D2		SCSI bus data in phase error
D4		SCSI bus command phase error
D6		SCSI bus status phase error
D8		SCSI bus message out phase error
DA		SCSI bus message in phase error
DC		Request sense operation failure (unable to retrieve status)
FO		Unknown/undecipherable SCSI error occurred



**A.5 TROUBLESHOOTING****A.5.12 BP2 CLASS MICROCODE ERROR CODES AND DESCRIPTION (1 of 7)**

<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>BP OS GENERATED ERROR CODES</b>	
0002	Divide exception
0003	Invalid task reference
0004	Invalid semaphore use
0005	Invalid priority
0006	No more memory
0007	Unexpected error
0008	Invalid sender
0009	Wild branch
<b>SCSI ERROR CODES</b>	
0030	Invalid Command The CMD type is not a SIO, CIO or HIO The CMD byte in the Iocw is not valid Iosw = 2080 0000 *RCnt 0100
0031	Invalid Count The byte count in the Iocw is not 2K alined (SIO CMDs) The byte count in the Iocw is not 400H (CIO, LDDRT CMD) Iosw = 2080 0400 *RCnt 0200
0032	Invalid Address The MM address in the Iocw or IAL is not 2K alined Iosw = 20A0 0000 *RCnt 0300
0033	Invalid Device Address The device (disk) adr in the Iocw is not 2K alined Iosw = 2080 0800 *RCnt 0400
0034**	Data Compare Error During a write verify operation, the data read back did not equal the data written Iosw = 2018 0010 *RCnt 0600

**A.5 TROUBLESHOOTING****A.5.12 BP2 CLASS MICROCODE ERROR CODES AND DESCRIPTION (2 of 7)****ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE****SCSI ERROR CODES (CON'T)**

- 0035 Parity Error  
A parity error occurred during a MM/DRAM DMA  
Iosw = 2058 0000 \*RCnt 0800
- 0036 Addressing Error  
A addressing error occurred during a MM/DRAM DMA  
Iosw = 2038 0000 \*RCnt 0900
- 0037 DMA Timeout  
A timeout occurred during a MM/DRAM DMA  
Iosw = 2018 0000 \*RCnt 0A00
- 0038 Hardware Error  
The 5386 SPC failed it's powerup self test  
The switches on the BP indicate the type of target @ ID #6, ID #5, or  
ID #4 are set incorrectly  
Iosw = 2010 0000 \*RCnt 0000
- 0039 Invalid State Error  
An invalid/unexpected state occurred during task execution  
Iosw = 2010 0000 \*RCnt 0500
- 003A\*\* Check Error  
The CMD issued to the target was completed by the target with a check  
condition. ReqSenBuf contains information describing reason for  
check condition. 1st byte of ReqSenBuf (error code) is returned in  
the Iosw  
Iosw = 2018 0004 \*RCnt 07xx  
xx = error code returned by target  
See either WD1003 or Adaptec 5500 user manuals for definitions of  
returned error codes and possible causes
- 003B Disconnect Error  
The target disconnected from the SCSI bus without the first sending a  
CMD complete or disconnect MSG  
Iosw = 2018 0000 \*RCnt 0B00
- 003C Select Timeout  
The initiator (BP) was unable to select the target after 4 attempts.  
Iosw = 2010 0200 \*RCnt 0C00

**A.5 TROUBLESHOOTING****A.5.12 BP2 CLASS MICROCODE ERROR CODES AND DESCRIPTION (3 of 7)**


---

**ERROR TEST TITLE AND ERROR CODE DESCRIPTION**  
**CODE**


---

**SCSI ERROR CODES (CON'T)**

003D	Reselect Timeout The target did not reselect the initiator (BP) within 10 seconds to continue the I/O that was previously started Iosw = 2018 0020 *RCnt 0D00
003E	Not Used
003F	ISR Error An invalid/unexpected state occurred during the execution of the ISR which handles phase management for the 5385 SPC. No explicit Iosw is generated in response to this error. The occurrence of this error indicates a problem exists communicating over the SCSI bus or the target controller is defective

\* RCNT = Resident data count which is always set equal to the data count in the Iocw for all errors except data compare errors. For these error codes, the count reflects the number of bad bytes remaining to be transferred when the error occurred.

\*\* These error codes are not displayed on the front panel LEDs because they occur during normal system operation, and do not indicate a major failure within the system.

**25V36 (DE) GENERATED ERROR CODES**

0040	Undefined Error
0041	The DA has made a request of the BP that is not valid under the current context
0042	The DA is not considered to be running by the BP and therefore the receive Iocw can not be processed
0043	The transfer of the request from the DA to the BP failed to complete
0044	The transfer of the Iocw from the BP to the DA failed to complete
0045	There was no response (request) from DA to begin processing the outstanding Iocw
0046	The DA has specified a invalid address in the requested transfer

**A.5 TROUBLESHOOTING****A.5.12 BP2 CLASS MICROCODE ERROR CODES AND DESCRIPTION (4 of 7)**

<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>25V36 (DE) GENERATED ERROR CODES (CON'T)</b>	
0047	The DA has requested a transfer which exceeds the top of its memory
0048	The DA has requested the transfer of more data than specified in the Iocw
0049	The DA has not gone ready after being reset within the given amount of time
004A	A parity error has occurred on a BP/DA interface
004B	An addressing error has occurred on a transfer involving main memory
004C	An parity error has occurred on a transfer involving main memory
004D	The Iocw received is invalid
004E	The Drt received is invalid
004F	A parity error has occurred on the DA during a transfer between MM and the DA

**25V96 MLTC GENERATED ERROR CODES**

0050	Invalid DTR
0051	DA not running
0052	Memory address used is not 32-bit aligned, or entries in IAL are not 2k aligned
0053	Hardware detected parity error on last DMA
0054	Hardware detected an addressing error on last DMA
0055	IOCW received is not supported or invalid
0056	A quit request has been received from the DA indicating the DA no longer running and must be reloaded/restarted
0057	DMA timeout, hardware detected parity error or addressing error
0058	DA request is invalid
0059	DA could not be reset
005A	DA RAM address in the DA request is invalid
005B	DA RAM address and the data count exceeds top of DA RAM
005C	DA is requesting the transfer of more data than specified
005D	DMA of data between DA and Main Memory Failed
005E	DA has not made request to execute the previously issued command within a reasonable amount of time
005F	DA has indicated via its status register that a hardware failure on the DA has occurred

**A.5 TROUBLESHOOTING****A.5.12 BP2 CLASS MICROCODE ERROR CODES AND DESCRIPTION (5 of 7)**

<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>25V76-1 AND 27V76-2 (TC) GENERATED ERROR CODES</b>	
0060	No DCT has been loaded prior to receiving a SIO or LoadCode. A load DCT CIO must be the 1st Iocw sent to the DA after powerup
0061	A Iocw was received that requires the DA to be running to process it, but the DA is not running
0062	The MM address to be used in the next MM DA is not 32-bit (VS word) aligned, or entries in the IAL are not 2K aligned
0063	The hardware has detected a parity error on the last DMA
0064	The hardware has detected an addressing error on the last DMA
0065	The Iocw received is not supported, or is not valid in the current program
0066	A Quit request has been received from the DA indicating the DA is no longer running and must be reloaded/restarted
0067	The DMA of the CMD from the BP to the DA failed. (DMA timeout, hardware detected parity or addressing error)
0068	The DA request is not valid in the current program text
0069	The Iocw specified a DMA transfer out of main memory while the DA requested a transfer into main memory
006A	The DA RAM address in the DA request is invalid
006B	The DA RAM address plus the data count exceeds the top of the DA's RAM
006C	The DA is requesting the transfer of more data than specified in the Iocw
006D	The DMA of data between the DA and main memory failed. (DMA timeout, hardware detecting parity or address error)
006E	The DA has not made a request to execute the previously issued CMD within a reasonable amount of time
006F	The DA has indicated via its status register that a hardware failure has occurred on the DA

## A.5 TROUBLESHOOTING

## A.5.12 BP2 CLASS MICROCODE ERROR CODES AND DESCRIPTION (6 of 7)

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ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
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**25V37, 25V67 (ISIO, UISIO) GENERATED ERROR CODES (CONTROL MODE)**

0070	Undefined Error
0071	BP Parity Error
0072	Unknown Command received from device
0073	WS Code failed to be loaded
0074	DA Code failed to be loaded
0075	DA Response Command time out
0076	Protocol Error
0077	Main Memory ECC Error
0078	Main Memory Address Error

**25V37, 25V67 (ISIO, UISIO) LED ERROR CODES (NON-CONTROL MODE)**

0080	Undefined Error
0081	A request was received from the DA which is invalid under the current program
0082	An Iocw was received that requires DA to be running to complete processing but the DA is not running
0082	A Quit request was received by the task from the DA. Outstanding I/O is error completed and IT Msgs are sent to all other tasks on the same DA notifying them to error complete any outstanding I/O
0082	Notifies task that DA is not operating and outstanding I/O is error complete
0083	The DMA of CMD/data from the BP to the DA timed out or a parity error was detected during the transfer
0084	The DMA of data between Main memory and the DA timed out, or a parity error occurred during the transfer
0085	A CMD was issued to the DA and DA did not respond with the appropriate request within the given amount of time
0086	Not Used
0087	Not Used
0088	The length of the transfer requested by the DA extended past the starting Main Memory Address plus the count specified in the Iocw

**A.5 TROUBLESHOOTING****A.5.12 BP2 CLASS MICROCODE ERROR CODES AND DESCRIPTION (7 of 7)**


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<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
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**25V37, 25V67 (ISIO, UISIO) LED ERROR CODES (NON-CONTROL MODE) (Cont'd)**

0089	After the DA hardware was reset via an out issued by the BP, the hardware ready status bit was not set by hardware within the given amount of time
008A	BP parity error detected
008B	The Source/destination address alignment for the requested DMA transfer is invalid, or an IAL entry is invalid
008C	A parity error was detected on the the DMA transfer to/from Main Memory
008D	The CMD specified in the Iocw is not supported, or a parameter within the Iocw is out of range
008E	The Drt length specified in the Iocwis not 1024

**25V27 (DSIO) GENERATED ERROR CODES**

0091	More than 2 tape devices attached on a DSIO (only the last 2 will operate in extended MSEM mode)
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**CRASH TASK GENERATED ERROR CODES**

0093	A BP task has crashed
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**FLOPPY TASK GENERATED ERROR CODES**

0095	The floppy disk controller chip could not be reset
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**A.5 TROUBLESHOOTING****A.5.13 BP SYSTEM ERROR CODES (1 of 2)**


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**ERROR CODE DESCRIPTION**


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00E0	Unable to load code to workstation 0. (Power the workstation off and on to attempt to clear the condition)
00E1	Main Memory parity error occurred during a CODE RAM DAM
00E2	Main Memory DMA attempted to access a non-existent address
00E3	BP DATA RAM parity error has occurred
00E4	PDA of IPL disk (passed from diagnostics) not found in PDA table
00E5	A Pascal exception of unknown origin has occurred
00E6	An invalid device adapter type value has been detected
00E7	DMA operation between DATA RAM and Main Memory timed out
00E8	The CP set an illegal command out area code
00E9	Repeated DMA attempts for the command out area failed, BP initiates entry into control mode
00EA	Repeated DMA attempts for the processor interrupt area failed, BP initiates entry into control mode
00EB	A SIO/CIO raced with an EC or NC Iosw (possible OS failure), BP initiates entry into control mode
00EC	An IRQ/DAR raced with an EC or NC Iosw (possible OS failure), BP initiates entry into control mode
00ED	Main Memory error correction count exceeds its limit (i.e. 1), BP initiates entry into control mode
00EE	File not found (Control Mode)
00EF	Library not found (Control Mode)
00F0	Device not found (Control Mode)
00F1	File not open (Control Mode)



**A.5 TROUBLESHOOTING****A.5.13 BP SYSTEM ERROR CODES (2 of 2)**

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**ERROR CODE DESCRIPTION**  
**CODE**

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00F2	VTOC Error (Control Mode)
00F3	End of file (Control Mode)
00F4	IPL device returned damage status (Control Mode)
00F5	IPL device was not-ready - intervention required (Control Mode)
00F6	BP memory or disk address error while accessing IPL device (Control Mode)
00F7	File error in getting control mode pointers

## A.5 TROUBLESHOOTING

## A.5.14 DIAGNOSTIC MONITOR ERROR CODES (1 of 14)

The following error codes are generated by the Diagnostic Monitor files '@MCBOOT@' and '@MCIPL@' in '@SYSTEM@'; '@NORMAL@' and '@MONISIO@' in '@DIAST@', and '@MONITOR', '@MONISIO', and '@MONWSO@' in '@DIAGMNE@'.

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TEST CODE	TEST TITLE AND ERROR CODE DESCRIPTION
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## 41 BOOTSTRAP LOADER (@MCBOOT@)

4110	Unlabeled Volume (VOL1 Missing)	
4111	Media Error	Volume Label
4112	Controller Hardware Error	Volume Label
4114	Drive Not Ready	Volume Label
4116	Program Error (Divide)	Volume Label
4118	Program Error (Data)	Volume Label
4119	Media Error	Bit Map
411A	Controller Hardware Error	Bit Map
411C	Drive Not Ready	Bit Map
411E	Program Error (Divide)	Bit Map
4120	Program Error (Data)	Bit Map
4121	Media Error	VTOC
4122	Controller Hardware Error	VTOC
4124	Drive Not Ready	VTOC
4126	Program Error (Divide)	VTOC
4128	Program Error (Data)	VTOC
412A	FDX1 ID Does Not Match	VTOC
412B	FDX2 ID Does Not Match	VTOC
412C	FDR1 ID Does Not Match	VTOC

## SELF TEST MONITOR = @NORMAL@ in @DIAGST@

4131	Media Error	Self-Test Monitor
4132	Controller Hardware Error	Self-Test Monitor
4133	Checksum Does Not Match	Self-Test Monitor
4134	Drive Not Ready	Self-Test Monitor
4136	Program Error (Divide)	Self-Test Monitor
4138	Program Error (Data)	Self-Test Monitor
413A	Library Not Found	Self-Test Monitor
413B	File Not Found	Self-Test Monitor
413C	FDR1 Not Found	Self-Test Monitor
413E	Extents Greater Than 3	Self-Test Monitor

## A.5 TROUBLESHOOTING

## A.5.14 DIAGNOSTIC MONITOR ERROR CODES (2 of 14) -

TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE

## DIAGNOSTIC MONITOR = @MONITOR in @DIAGMN@

4141	Media Error	Diagnostic Monitor
4142	Controller Hardware Error	Diagnostic Monitor
4143	Checksum Does Not Match	Diagnostic Monitor
4144	Drive Not Ready	Diagnostic Monitor
4146	Program Error (Divide)	Diagnostic Monitor
4148	Program Error (Data)	Diagnostic Monitor
414A	Library Not Found	Diagnostic Monitor
414B	File Not Found	Diagnostic Monitor
414C	FDR1 Not Found	Diagnostic Monitor
414E	Extents Greater Than 3	Diagnostic Monitor

## SYSTEM LOADER = @MCIPL@ IN @SYSTEM@

4151	Media Error	System Loader
4152	Controller Hardware Error	System Loader
4153	Checksum Does Not Match	System Loader
4154	Drive Not Ready	System Loader
4156	Program Error (Divide)	System Loader
4158	Program Error (Data)	System Loader
415A	Library Not Found	System Loader
415B	File Not Found	System Loader
415C	FDR1 Not Found	System Loader
415E	Extents Greater Than 3	System Loader
41F3	Invalid Hardware Configuration	
41F4	Floppy Status Error	
41FD	BP RAM Parity Error	
41FE	BP RAM Parity Error	
41FF	Unknown Interrupt on BP	

## A.5 TROUBLESHOOTING

## A.5.14 DIAGNOSTIC MONITOR ERROR CODES (3 of 14)

TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE

## 42 SELF TEST MONITOR (@NORMAL@ IN @DIAGST@)

420F	Incompatible Version of Self-Test Code	
4210	Unlabeled Volume (VOL1 Missing)	
4211	Media Error	Volume Label
4212	Controller Hardware Error	Volume label
4214	Drive Not Ready	Volume label
4216	Program Error (Divide)	Volume label
4218	Program Error (Data)	Volume label
4219	Media Error	Bit Map
421A	Controller Hardware Error	Bit Map
421C	Drive Not Ready	Bit Map
421E	Program Error (Divide)	Bit Map
4220	Program Error (Data)	Bit Map
4221	Media Error	VTOC
4222	Controller Hardware Error	VTOC
4224	Drive Not Ready	VTOC
4226	Program Error (Divide)	VTOC
4228	Program Error (Data)	VTOC
422A	FDX1 ID Does Not Match	VTOC
422B	FDX2 ID Does Not Match	VTOC
422C	FDR1 ID Does Not Match	VTOC

## WORKSTATION FILE = @MONISIO IN @DIAGST@ (SIO)

4231	Media Error	*Workstation File
4232	Controller Hardware Error	Workstation File
4233	Checksum Does Not Match	Workstation File
4234	Drive Not Ready	Workstation File
4236	Program Error (Divide)	Workstation File
4238	Program Error (Data)	Workstation File
423A	Library Not Found	Workstation File
423B	File Not Found	Workstation File
423C	FDR1 Not Found	Workstation File
423E	Extents Greater Than 3	Workstation File

## A.5 TROUBLESHOOTING

## A.5.14 DIAGNOSTIC MONITOR ERROR CODES (4 of 14)

TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE

## WORKSTATION FILE = @MONISIO IN @DIAGST@ ([U]ISIO)

4241	Media Error	Workstation File
4242	Controller Hardware Error	Workstation File
4243	Checksum Does Not Match	Workstation File
4244	Drive Not Ready	Workstation File
4246	Program Error (Divide)	Workstation File
4248	Program Error (Data)	Workstation File
424A	Library Not Found	Workstation File
424B	File Not Found	Workstation File
424C	FDR1 Not Found	Workstation File
424E	Extents Greater Than 3	Workstation File

## 42 SELF TEST DIAGNOSTIC TEST 2 = @BT0500@ IN @DIAGST@

4261	Media Error	Diagnostic Test 2
4262	Controller Hardware Error	Diagnostic Test 2
4263	Checksum Does Not Match	Diagnostic Test 2
4264	Drive Not Ready	Diagnostic Test 2
4266	Program Error (Divide)	Diagnostic Test 2
4268	Program Error (Data)	Diagnostic Test 2
426A	Library Not Found	Diagnostic Test 2
426B	File Not Found	Diagnostic Test 2
426C	FDR1 Not Found	Diagnostic Test 2
426E	Extents Greater Than 3	Diagnostic Test 2

## SELF TEST DIAGNOSTIC TEST 3 = @CT0500@ / @CT0100@ IN @DIAGST@

4271	Media Error	Diagnostic Test 3
4272	Controller Hardware Error	Diagnostic Test 3
4273	Checksum Does Not Match	Diagnostic Test 3
4274	Drive Not Ready	Diagnostic Test 3
4276	Program Error (Divide)	Diagnostic Test 3
4278	Program Error (Data)	Diagnostic Test 3
427A	Library Not Found	Diagnostic Test 3
427B	File Not Found	Diagnostic Test 3
427C	FDR1 Not Found	Diagnostic Test 3
427E	Extents Greater Than 3	Diagnostic Test 3

## A.5 TROUBLESHOOTING

## A.5.14 DIAGNOSTIC MONITOR ERROR CODES (5 of 14)

TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE

## SELF TEST DIAGNOSTIC TEST 4 = @CT0800@ / @CT0200@ IN @DIAGST@

4281	Media Error	Diagnostic Test 4
4282	Controller Hardware Error	Diagnostic Test 4
4283	Checksum Does Not Match	Diagnostic Test 4
4284	Drive Not Ready	Diagnostic Test 4
4286	Program Error (Divide)	Diagnostic Test 4
4288	Program Error (Data)	Diagnostic Test 4
428A	Library Not Found	Diagnostic Test 4
428B	File Not Found	Diagnostic Test 4
428C	FDR1 Not Found	Diagnostic Test 4
428E	Extents Greater Than 3	Diagnostic Test 4

## SELF TEST DIAGNOSTIC TEST 5 = @CT0800@ / @CT0300@ IN @DIAGST@

4291	Media Error	Diagnostic Test 5
4292	Controller Hardware Error	Diagnostic Test 5
4293	Checksum Does Not Match	Diagnostic Test 5
4294	Drive Not Ready	Diagnostic Test 5
4296	Program Error (Divide)	Diagnostic Test 5
4298	Program Error (Data)	Diagnostic Test 5
429A	Library Not Found	Diagnostic Test 5
429B	File Not Found	Diagnostic Test 5
429C	FDR1 Not Found	Diagnostic Test 5
429E	Extents Greater Than 3	Diagnostic Test 5

## SELF TEST DIAGNOSTIC TEST 6 = @MT0500@ / @MT0100@ IN @DIAGST@

42A1	Media Error	Diagnostic Test 6
42A2	Controller Hardware Error	Diagnostic Test 6
42A3	Checksum Does Not Match	Diagnostic Test 6
42A4	Drive Not Ready	Diagnostic Test 6
42A6	Program Error (Divide)	Diagnostic Test 6
42A8	Program Error (Data)	Diagnostic Test 6
42AA	Library Not Found	Diagnostic Test 6
42AB	File Not Found	Diagnostic Test 6
42AC	FDR1 Not Found	Diagnostic Test 6
42AE	Extents Greater Than 3	Diagnostic Test 6

## A.5 TROUBLESHOOTING

## A.5.14 DIAGNOSTIC MONITOR ERROR CODES (6 of 14)

TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE

## SELF TEST DIAGNOSTIC TEST 7 = @BT0800@ / @BT0900@ IN @DIAGST@

42B1	Media Error	Diagnostic Test 7
42B2	Controller Hardware Error	Diagnostic Test 7
42B3	Checksum Does Not Match	Diagnostic Test 7
42B4	Drive Not Ready	Diagnostic Test 7
42B6	Program Error (Divide)	Diagnostic Test 7
42B8	Program Error (Data)	Diagnostic Test 7
42BA	Library Not Found	Diagnostic Test 7
42BB	File Not Found	Diagnostic Test 7
42BC	FDR1 Not Found	Diagnostic Test 7
42BE	Extents Greater Than 3	Diagnostic Test 7

## SELF TEST DIAGNOSTIC TEST 8 = @MT0200@ IN @DIAGST@

42C1	Media Error	Diagnostic Test 8
42C2	Controller Hardware Error	Diagnostic Test 8
42C3	Checksum Does Not Match	Diagnostic Test 8
42C4	Drive Not Ready	Diagnostic Test 8
42C6	Program Error (Divide)	Diagnostic Test 8
42C8	Program Error (Data)	Diagnostic Test 8
42CA	Library Not Found	Diagnostic Test 8
42CB	File Not Found	Diagnostic Test 8
42CC	FDR1 Not Found	Diagnostic Test 8
42CE	Extents Greater Than 3	Diagnostic Test 8
42E0	SIO Time Out	
42E1	SIO Overrun	
42E2	SIO Data RAM Parity Error	
42E3	SIO Serial Parity Error	
42E4	(U)ISIO Time Out	
42E5	(U)ISIO Memory Parity	
42E6	(U)ISIO Data RAM Parity Error	
42E7	(U)ISIO Power Up Failed	
42E8	(U)ISIO Data Link Time Out	

## A.5 TROUBLESHOOTING

## A.5.14 DIAGNOSTIC MONITOR ERROR CODES (7 of 14)

TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE

## SELF TEST DIAGNOSTIC TEST 8 = @MT0200@ IN @DIAGST@ (CON'T)

42E9 (U)ISIO FIFO Parity  
 42EA Workstation Powered Off  
 42EB Workstation Coaxial Parity Error  
 42EC Workstation Memory parity Error  
 42ED Workstation Has No Code  
 42EE Workstation Status Invalid  
 42F2 CPU Failure  
 42F3 Invalid Hardware Configuration  
 42F4 Floppy Status Error  
 42F5 No Terminal ID Byte Found

## 43 SELF TEST DIAGNOSTIC TEST 1.1 = @ST0500@ IN @DIAGST@

4351	Media Error	Diagnostic Test 1.1 (SIO)
4352	Controller Hardware Error	Diagnostic Test 1.1 (SIO)
4353	Checksum Does Not Match	Diagnostic Test 1.1 (SIO)
4354	Drive Not Ready	Diagnostic Test 1.1 (SIO)
4356	Program Error (Divide)	Diagnostic Test 1.1 (SIO)
4358	Program Error (Data)	Diagnostic Test 1.1 (SIO)
435A	Library Not Found	Diagnostic Test 1.1 (SIO)
435B	File Not Found	Diagnostic Test 1.1 (SIO)
435C	FDR1 Not Found	Diagnostic Test 1.1 (SIO)
435E	Extents Greater Than 3	Diagnostic Test 1.1 (SIO)

## SELF TEST DIAGNOSTIC TEST 1.2 = @ST0800@ IN @DIAGST@

4361	Media Error	Diagnostic Test 1.2 (ISIO)
4362	Controller Hardware Error	Diagnostic Test 1.2 (ISIO)
4363	Checksum Does Not Match	Diagnostic Test 1.2 (ISIO)
4364	Drive Not Ready	Diagnostic Test 1.2 (ISIO)
4366	Program Error (Divide)	Diagnostic Test 1.2 (ISIO)
4368	Program Error (Data)	Diagnostic Test 1.2 (ISIO)
436A	Library Not Found	Diagnostic Test 1.2 (ISIO)
436B	File Not Found	Diagnostic Test 1.2 (ISIO)
436C	FDR1 Not Found	Diagnostic Test 1.2 (ISIO)
436E	Extents Greater Than 3	Diagnostic Test 1.2 (ISIO)



## A.5 TROUBLESHOOTING

## A.5.14 DIAGNOSTIC MONITOR ERROR CODES (8 of 14)

TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE

## SELF TEST OVERLAY 4 = @CM0800@ / @CM0200@ IN @DIAGST@

4381	Media Error	Overlay 4
4382	Controller Hardware Error	Overlay 4
4383	Checksum Does Not Match	Overlay 4
4384	Drive Not Ready	Overlay 4
4386	Program Error (Divide)	Overlay 4

## SELF TEST OVERLAY 4 = @CM0800@ / @CM0200@ IN @DIAGST@ (CON'T)

4388	Program Error (Data)	Overlay 4
438A	Library Not Found	Overlay 4
438B	File Not Found	Overlay 4
438C	FDR1 Not Found	Overlay 4
438E	Extents Greater Than 3	Overlay 4

## SELF TEST OVERLAY 5 = @CM0B00@ / @CM0300@ IN @DIAGST@

4391	Media Error	Overlay 5
4392	Controller Hardware Error	Overlay 5
4393	Checksum Does Not Match	Overlay 5
4394	Drive Not Ready	Overlay 5
4396	Program Error (Divide)	Overlay 5
4398	Program Error (Data)	Overlay 5
439A	Library Not Found	Overlay 5
439B	File Not Found	Overlay 5
439C	FDR1 Not Found	Overlay 5
439E	Extents Greater Than 3	Overlay 5

## SELF TEST OVERLAY 6 = @MM0500@ / @MM0100@ IN @DIAGST@

43A1	Media Error	Overlay 6
43A2	Controller Hardware Error	Overlay 6
43A3	Checksum Does Not Match	Overlay 6
43A4	Drive Not Ready	Overlay 6
43A6	Program Error (Divide)	Overlay 6
43A8	Program Error (Data)	Overlay 6
43AA	Library Not Found	Overlay 6
43AB	File Not Found	Overlay 6
43AC	FDR1 Not Found	Overlay 6
43AE	Extents Greater Than 3	Overlay 6

## A.5 TROUBLESHOOTING

## A.5.14 DIAGNOSTIC MONITOR ERROR CODES (9 of 14)

TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE

## 44 IPL SYSTEM LOADER (@MCIPL@ IN @SYSTEM@)

440F	Incompatible Version of Self-Test Code	
4410	Unlabeled Volume (VOL1 Missing)	
4411	Media Error	Volume Label
4412	Controller Hardware Error	Volume label
4414	Drive Not Ready	Volume label
4416	Program Error (Divide)	Volume label
4418	Program Error (Data)	Volume label
4419	Media Error	Bit Map
441A	Controller Hardware Error	Bit Map
441C	Drive Not Ready	Bit Map
441E	Program Error (Divide)	Bit Map
4420	Program Error (Data)	Bit Map
4421	Media Error	VTOC
4422	Controller Hardware Error	VTOC
4424	Drive Not Ready	VTOC
4426	Program Error (Divide)	VTOC
4428	Program Error (Data)	VTOC
442A	FDX1 ID Does Not Match	VTOC
442B	FDX2 ID Does Not Match	VTOC
442C	FDR1 ID Does Not Match	VTOC
4431	Media Error	Workstation File
4432	Controller Hardware Error	Workstation File
4433	Checksum Does Not Match	Workstation File
4434	Drive Not Ready	Workstation File
4436	Program Error (Divide)	Workstation File
4438	Program Error (Data)	Workstation File
443A	Library Not Found	Workstation File
443B	File Not Found	Workstation File
443C	FDR1 Not Found	Workstation File
443E	Extents Greater Than 3	Workstation File

## A.5 TROUBLESHOOTING

## A.5.14 DIAGNOSTIC MONITOR ERROR CODES (10 of 14)

TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE

## SYSTEM FILE = @MCCP5@ / @MCCP7@ IN @SYSTEM@

4461	Media Error	CP Microcode File
4462	Controller Hardware Error	CP Microcode File
4463	Checksum Does Not Match	CP Microcode File
4464	Drive Not Ready	CP Microcode File
4466	Program Error (Divide)	CP Microcode File
4468	Program Error (Data)	CP Microcode File
446A	Library Not Found	CP Microcode File
446B	File Not Found	CP Microcode File
446C	FDR1 Not Found	CP Microcode File
446E	Extents Greater Than 3	CP Microcode File

## SYSTEM FILE = @MCBP2@ IN @SYSTEM@

44C1	Media Error	@MCBP2@ File
44C2	Controller Hardware Error	@MCBP2@ File
44C3	Checksum Does Not Match	@MCBP2@ File
44C4	Drive Not Ready	@MCBP2@ File
44C6	Program Error (Divide)	@MCBP2@ File
44C8	Program Error (Data)	@MCBP2@ File
44CA	Library Not Found	@MCBP2@ File
44CB	File Not Found	@MCBP2@ File
44CC	FDR1 Not Found	@MCBP2@ File
44CE	Extents Greater Than 3	@MCBP2@ File
44E0	SIO Time Out	
44E1	SIO Overrun	
44E2	SIO Data RAM Parity Error	
44E3	SIO Serial Parity Error	
44E4	(U)ISIO Time Out	
44E5	(U)ISIO Memory Parity	
44E6	(U)ISIO Data RAM Parity Error	
44E7	(U)ISIO Power Up Failed	
44E8	(U)ISIO Data Link Time Out	
44E9	(U)ISIO FIFO Parity	
44EA	Workstation Powered Off	
44EB	Workstation Coaxial Parity Error	
44EC	Workstation Memory parity Error	
44ED	Workstation Has No Code	
44EE	Workstation Status Invalid	
44FO	DMA Time Out	
44F1	DMA Failure	

**A.5 TROUBLESHOOTING**

**A.5.14 DIAGNOSTIC MONITOR ERROR CODES (11 of 14)**

**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE**

**SYSTEM FILE = @MCBP2@ IN @SYSTEM@ (CON'T)**

44F2 CPU Failure  
 44F3 Invalid Hardware Configuration  
 44F4 Floppy Status Error

**45 DIAGNOSTIC MONITOR = @MONITOR IN @DIAGMN@**

4505 Monitor Message Buffer Overflow  
 450F Incompatible Version Of Diagnostic Code  
 4510 Unlabeled Volume (VOL1 Missing)  
 4511 Media Error Volume Label  
 4512 Controller Hardware Error Volume Label  
 4514 Drive Not Ready Volume Label  
 4516 Program Error (Divide) Volume Label  
 4518 Program Error (Data) Volume Label  
 4519 Media Error Bit Map  
 451A Controller Hardware Error Bit Map  
 451C Drive Not Ready Bit Map  
 451E Program Error (Divide) Bit Map  
 4520 Program Error (Data) Bit Map  
 4521 Media Error VTOC  
 4522 Controller Hardware Error VTOC  
 4524 Drive Not Ready VTOC  
 4526 Program Error (Divide) VTOC  
 4528 Program Error (Data) VTOC  
 452A FDX1 ID Does Not Match VTOC  
 452B FDX2 ID Does Not Match VTOC  
 452C FDR1 ID Does Not Match VTOC

**TEST TABLE FILE = @MONTBL@ in @DIAGMN@**

4531 Media Error Test Table File  
 4532 Controller Hardware Error Test Table File  
 4533 Checksum Does Not Match Test Table File  
 4534 Drive Not Ready Test Table File  
 4536 Program Error (Divide) Test Table File  
 4538 Program Error (Data) Test Table File  
 453A Library Not Found Test Table File  
 453B File Not Found Test Table File  
 453C FDR1 Not Found Test Table File  
 453E Extents Greater Than 3 Test Table File

## A.5 TROUBLESHOOTING

## A.5.14 DIAGNOSTIC MONITOR ERROR CODES (12 of 14)

TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE

## WORKSTATION FILE = @MONWSO@ IN @DIAGMN@

4541	Media Error	Workstation File
4542	Controller Hardware Error	Workstation File
4543	Checksum Does Not Match	Workstation File
4544	Drive Not Ready	Workstation File
4546	Program Error (Divide)	Workstation File
4548	Program Error (Data)	Workstation File
454A	Library Not Found	Workstation File
454B	File Not Found	Workstation File
454C	FDR1 Not Found	Workstation File
454E	Extents Greater Than 3	Workstation File

## ISIO FILE = @MONISIO@ IN @DIAGMN@

4551	Media Error	ISIO File
4552	Controller Hardware Error	ISIO File
4553	Checksum Does Not Match	ISIO File
4554	Drive Not Ready	ISIO File
4556	Program Error (Divide)	ISIO File
4558	Program Error (Data)	ISIO File
455A	Library Not Found	ISIO File
455B	File Not Found	ISIO File
455C	FDR1 Not Found	ISIO File
455E	Extents Greater Than 3	ISIO File
45E0	SIO Time Out	
45E1	SIO Overrun	
45E2	SIO Data RAM Parity Error	
45E3	SIO Serial Parity Error	
45E4	(U)ISIO Time Out	
45E5	(U)ISIO Memory Parity	
45E6	(U)ISIO Data RAM Parity Error	
45E7	(U)ISIO Power Up Failed	
45E8	(U)ISIO Data Link Time Out	
45E9	(U)ISIO FIFO Parity	
45EA	Workstation Powered Off	
45EB	Workstation Coaxial Parity Error	
45EC	Workstation Memory parity Error	
45ED	Workstation Has No Code	
45EE	Workstation Status Invalid	
45F0	DMA Time Out	
45F1	DMA Failure	
45F2	CPU Failure	

**A.5 TROUBLESHOOTING****A.5.14 DIAGNOSTIC MONITOR ERROR CODES (13 of 14)****TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE**

ISIO FILE = @MONISIO@ IN @DIAGMN@ (Cont'd)

45F3 Invalid Hardware Configuration  
 45F4 Floppy Status Error  
 45F5 No Terminal ID Byte Found  
 45FA Lost Data Set ready  
 45FB Transmit Data Error  
 45FC Receive Data Error

**46 DIAGNOSTIC MONITOR TEST FILES**

46X1	Media Error	Test File X
46X2	Controller Hardware Error	Test File X
46X3	Checksum Does Not Match	Test File X
46X4	Drive Not Ready	Test File X
46X6	Program Error (Divide)	Test File X
46X8	Program Error (Data)	Test File X
46XA	Library Not Found	Test File X
46XB	File Not Found	Test File X
46XC	FDR1 Not Found	Test File X
46XE	Extents Greater Than 3	Test File X

**47 DIAGNOSTIC MONITOR TEST FILES**

47X1	Media Error	Test File X + 15
47X2	Controller Hardware Error	Test File X + 15
47X3	Checksum Does Not Match	Test File X + 15
47X4	Drive Not Ready	Test File X + 15
47X6	Program Error (Divide)	Test File X + 15
47X8	Program Error (Data)	Test File X + 15
47XA	Library Not Found	Test File X + 15
47XB	File Not Found	Test File X + 15
47XC	FDR1 Not Found	Test File X + 15
47XE	Extents Greater Than 3	Test File X + 15

**48 DIAGNOSTIC MONITOR OVERLAY FILES**

48X1	Media Error	Test File X
48X2	Controller Hardware Error	Test File X
48X3	Checksum Does Not Match	Test File X
48X4	Drive Not Ready	Test File X
48X6	Program Error (Divide)	Test File X

**A.5 TROUBLESHOOTING****A.5.14 DIAGNOSTIC MONITOR ERROR CODES (14 of 14)**


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**TEST ERROR TEST TITLE AND ERROR CODE DESCRIPTION  
CODE**


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**48 DIAGNOSTIC MONITOR OVERLAY FILES (CONT'D)**

48X8	Program Error (Data)	Test File X
48XA	Library Not Found	Test File X
48XB	File Not Found	Test File X
48XC	FDR1 Not Found	Test File X
48XE	Extents Greater Than 3	Test File X

**49 DIAGNOSTIC MONITOR OVERLAY FILES**

49X1	Media Error	Test File X + 15
49X2	Controller Hardware Error	Test File X + 15
49X3	Checksum Does Not Match	Test File X + 15
49X4	Drive Not Ready	Test File X + 15
49X6	Program Error (Divide)	Test File X + 15
49X8	Program Error (Data)	Test File X + 15
49XA	Library Not Found	Test File X + 15
49XB	File Not Found	Test File X + 15
49XC	FDR1 Not Found	Test File X + 15
49XE	Extents Greater Than 3	Test File X + 15

**A.5 TROUBLESHOOTING****A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (1 of 13)**

Unless otherwise noted, the following Diagnostic Error Codes are CRAM-based error codes displayed when a failure occurs during the execution of a Self-Test Diagnostic program.

<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>4B</b>	<b>CP CONTROL MEMORY AND COMMUNICATIONS SELF-TEST DIAGNOSTIC (@CT0100@ from @DIAGST@ Execution)</b>
4B80	Central Processor does not respond to HALT command from Bus Processor or CP, MIC cannot be loaded to zero (0) from BP
4B81	Data miscompare on low halfword of Control Memory
4B82	Central Processor External Bus error
4B83	Unable to Read/Write Control Memory
4B84	Data miscompare on middle halfword of Control Memory
4B85	Data miscompare on high halfword of Control Memory
4B86	Central Processor MIC data miscompare
4B87	Data bit and possible addressing error when accessing low halfword of Control Memory
4B88	Data bit and possible addressing error when accessing middle halfword of Control Memory
4B89	Data bit and possible addressing error when accessing high halfword of Control Memory
4B8A	Error in address line, Control Memory low halfword overwritten
4B8B	Error in address line, Control Memory middle halfword overwritten
4B8C	Error in address line, Control Memory high halfword overwritten
4B8D	Data miscompare in Read/Write sequence for Control Memory low halfword
4B8E	Data miscompare in Read/Write sequence for Control Memory middle halfword
4B8F	Data miscompare in Read/Write sequence for Control Memory high halfword
4B90	Possible memory pattern sensitivity error (noise) on Control Memory low halfword
4B91	Possible memory pattern sensitivity error (noise) on Control Memory middle halfword
4B92	Possible memory pattern sensitivity error (noise) on Control Memory high halfword
4B93	Central Processor hardware status register error: Bit 0 not set after issuing halt
4B94	Central Processor hardware status register error: Bit 1 not reset when comparator disabled



**A.5 TROUBLESHOOTING****A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (2 of 13)**

<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>4B</b>	<b>CP CONTROL MEMORY AND COMMUNICATIONS SELF-TEST DIAGNOSTIC (@CT0100@ from @DIAGST@ Execution) (CONT'D)</b>
4B95	Central Processor hardware status register error: Bit 1 not set when comparator enabled
4B96	Central Processor hardware status register error: Bit 0 not set after execution of NOP instruction which should indicate halt
4B97	Central Processor Halted interrupt not detected after execution of NOP instruction
4B98	CP hardware status register error: Central Processor CIO 7 status bit (bit 3) not set after execution of a NOP instruction
4B99	CP Halted interrupt not detected when a CIO 7 instruction executed
4B9A	CP hardware status register error: Central Processor CIO 7 status bit (bit 3) not reset after execution of a NOP instruction
4B9B	Sync interrupt not detected when comparator was enabled and MIC and comparator address should have been the same
4B9C	Forced parity error not detected
4B9D	Control Memory parity check error, Possible open on data line for low halfword of control memory
4B9E	Control Memory parity check error, Possible open on data line for middle halfword of control memory
4B9F	Control Memory parity check error, Possible open on data line for high halfword of control memory
4BA0	Central Processor MIC value incorrect after step
4BA1	Central Processor IO3 status bit not cleared
4BA2	BP IO3 status bit not reset
4BA3	Central Processor IO4 status bit not cleared
4BA4	BP IO4B status bit not set after clear IO4B executed by CP
4BA5	BP IO4B status bit not cleared by Central Processor
4BA6	BP IO3 status bit not set
4BA7	BP IO4B status bit not set
4BA8	IO4B status bit not set by BP command
4BA9	IO3 status bit not set by BP command
4BAA	IO3 interrupt not detected when IO3 cleared
4BAB	IO4B interrupt not detected when IO4B cleared
4BAC	Central Processor not halted at CIO 7 instruction
4BAD	Sync interrupt not received with comparator disables
4BAE	MIC incorrect after CIO 7 executed
4BAF	Central Processor not halted at Sync address with Sync halt enable

**A.5 TROUBLESHOOTING****A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (3 of 13)**

<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>4B</b>	<b>CP CONTROL MEMORY AND COMMUNICATIONS SELF-TEST DIAGNOSTIC (@CT0100@ from @DIAGST@ Execution) (CONT'D)</b>
4BB0	Sync interrupt not taken with sync halt enable
4BB1	Halt interrupt not taken with sync halt enable
4BB2	Unexpected C-Bus latch contents after ORI instruction
4BB3	Multiple Halt interrupts occurred
4BB4	Multiple IO4B interrupts occurred
4BB5	Multiple IO3 interrupts occurred
4BB6	Multiple Sync interrupts occurred
4BB7	Time-out on Free-Running Test, Halt interrupt should have occurred
<b>4C</b>	<b>CENTRAL PROCESSOR OPERATIONAL SELF-TEST DIAGNOSTIC (@CT0200@ from @DIAGST@ Execution)</b>
4C80	Time-out error; Central Processor did not halt when expected or halt interrupt was not detected, Probable CP or Main Memory failure
4C90	CP detected error in Central Processor or Main Memory
4CFC	Multiple Halt interrupts occurred
4CFD	Multiple IO3 interrupts occurred
4CFE	Multiple IO4B interrupts occurred
4CFF	Multiple Sync interrupts occurred
<b>4D</b>	<b>CENTRAL PROCESSOR INTEGRITY SELF-TEST DIAGNOSTIC (@CT0300@ from @DIAGST@ Execution)</b>
4D80	Time-out error; Central Processor did not halt when expected or halt interrupt was not detected, Probable CP or Main Memory failure
4D90	Central Processor detected error in Central Processor or Main Memory
4DFC	Multiple Halt interrupts occurred
4DFD	Multiple IO3 interrupts occurred
4DFE	Multiple IO4B interrupts occurred
4DFF	Multiple Sync interrupts occurred
<b>4Ex</b>	<b>CENTRAL PROCESSOR/CACHE/MAIN MEMORY (INTEGRITY) SELF-TEST DIAGNOSTIC (@MT0100@ from @DIAGST@ Execution)</b>
4E80	Time-out error; Central Processor did not halt when expected or halt interrupt was not detected, Probable CP or Main Memory failure
4E90	Central Processor detected error in Central Processor or Main Memory PCA

**A.5 TROUBLESHOOTING****A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (4 of 13)**

<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>4Ex</b>	<b>CENTRAL PROCESSOR/CACHE/MAIN MEMORY (INTEGRITY) SELF-TEST DIAGNOSTIC (@MT0100@ from @DIAGST@ Execution) (CONT'D)</b>
4EFC	Multiple Halt interrupts occurred
4EFD	Multiple IO3 interrupts occurred
4EFE	Multiple IO4B interrupts occurred
4EFF	Multiple Sync interrupts occurred
<b>4EA</b>	<b>DUAL PROCESSOR (BP and CP) TO MAIN MEMORY/CACHE SELF-TEST DIAGNOSTIC (@MM0200@ from @DIAGST@ Execution)</b>
4EA0	Central Processor detected error in CP or Main Memory PCA
4EA1	BP detected incomplete DMA during Main Memory WRITE operation
4EA3	BP detected incomplete DMA during Main Memory READ operation
4EA4	BP detected data miscompare in READ/WRITE sequence for Main Memory
4EA5	BP detected data miscompare in READ/WRITE sequence for Main Memory
4EA6	BP detected data miscompare in READ/WRITE sequence for Main Memory
4EA7	BP detected data miscompare in READ/WRITE sequence for Main Memory
4EAA	Time-out error; Central Processor did not HALT when expected or HALT interrupt was not detected, Probable CP or MM failure.
4EAC	Central Processor HALTed at an undefined location
4EAD	Unrecoverable (Fatal) error occurred
4EAE	Central Processor HALTed at an incorrect location
4EAF	Multiple interrupts occurred
<b>4F</b>	<b>BUS PROCESSOR/MAIN MEMORY DMA SELF-TEST DIAGNOSTIC (@BT0900@ from @DIAGST@ Execution)</b>
4F01	Continuous Main Memory error correction count interrupt
4F02	Continuous Bus Processor/Main Memory DMA interrupt
4F03	Continuous Central Processor sync interrupt
4F11	DRAM MAR data compare failure
4F21	DRAM MAR changed after diagnostic ripple with ripple controls equal to 'zero'
4F22	DRAM MAR incorrect value after diagnostic ripple with ripple controls equal to 'one'
4F23	DRAM MAR incorrect value after diagnostic ripple with ripple controls equal to 'two'

**A.5 TROUBLESHOOTING****A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (5 of 13)**

<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>4F</b>	<b>BUS PROCESSOR/MAIN MEMORY DMA SELF-TEST DIAGNOSTIC (@BT0900@ from @DIAGST@ Execution) (CONT'D)</b>
4F31	Main Memory MAR low data compare failure
4F32	Main Memory MAR high data compare failure
4F41	Main Memory MAR low incorrect value after diagnostic ripple
4F42	Main Memory MAR high incorrect value after diagnostic ripple
4F81	No DMA completion interrupt on transfer from DRAM to Main Memory address 'zero'
4F82	No DMA completion interrupt on transfer from Main Memory address 'zero' to DRAM address displayed
4F83	No data transferred on DMA from Main Memory address 'zero' to DRAM address displayed
4F84	DRAM addressing failure: Actual address of transfer displayed not equal to Expected address
4F91	No DMA completion interrupt on transfer from DRAM to Main Memory address 'zero'
4F92	No DMA completion interrupt on transfer from Main Memory to DRAM address 'zero'
4F93	Data bus failure: Received data not equal to expected data
4F94	Bus Processor DMA error status bits set on transfer from DRAM to Main Memory address 'zero', (Bus Processor status displayed)
4F95	Bus Processor DMA error status bits set on transfer from Main Memory to DRAM address 'zero', (Bus Processor status displayed)
4FA1	No DMA completion interrupt on transfer from DRAM to Main Memory address 'zero'
4FA2	Bus Processor DMA error status bits set on transfer from DRAM to Main Memory address 'zero', (Bus Processor status displayed)
4FA3	No DMA completion interrupt on transfer from Main Memory to DRAM address 'zero'
4FA4	BP DMA error status bits set on transfer from DRAM to Main Memory address 'zero'
4FA5	Data received from Main Memory did not match expected data
4FA6	No DMA completion interrupt on transfer from DRAM address 'zero' to Main Memory address displayed
4FA7	BP DMA error status bits set on transfer from DRAM address 'zero' to Main Memory address displayed
4FA8	Main Memory Invalid Memory Address (IMA) status bit set on access to valid Main Memory location
4FA9	DRAM data altered on Main Memory IMA fault

## A.5 TROUBLESHOOTING

## A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (6 of 13)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
4F	<b>BUS PROCESSOR/MAIN MEMORY DMA SELF-TEST DIAGNOSTIC (@BT0900@ from @DIAGST@ Execution) (CONT'D)</b>
4FAA	No DMA completion interrupt on transfer from DRAM address 'zero' to Main Memory scan address displayed
4FAB	Bus Processor DMA error status bits set on transfer from DRAM address 'zero' to Main Memory scan address displayed
4FAC	Main Memory addressing failure: Data received from Main Memory scan location did not match expected data
4FAD	Main Memory addressing failure: Data received from Main Memory test location did not match expected data
4FAE	DRAM data altered by DMA to Main Memory test location
4FAF	Access to Main Memory address greater than Lowest Word Address (LWA) set by Central Processor; sizing did not generate IMA fault
4FD8	No DMA completion interrupt on multiword transfer from DRAM to Main Memory with MAR ripple equal to one
4FD9	DMA register count fault: Received Value did not equal Expected Value
4FE1	Unexpected interrupt from Main Memory ECC logging counter after initial programming
4FE2	No DMA completion interrupt on 2K halfword transfer from DRAM to Main Memory
4FE3	Bus Processor DMA error status bits set on 2K halfword transfer from DRAM to Main Memory
4FE4	Unexpected interrupt from ECC logging counter on 2K halfword transfer from DRAM to Main Memory
4FE5	No DMA completion interrupt on 2K halfword transfer from DRAM to Main Memory while operating in the non-ECC mode
4FE6	Bus Processor DMA error status bits set on 2K halfword transfer from DRAM to Main Memory while operating in the non-ECC mode
4FE7	Unexpected interrupt from ECC logging counter on 2K halfword transfer from DRAM to Main Memory while operating in the non-ECC mode
4FE8	No DMA completion interrupt on 2K halfword transfer to DRAM from MM
4FE9	Bus Processor DMA error status bits set on 2K halfword transfer to DRAM from Main Memory
4FEA	Single-bit Main Memory error not corrected on 2K DMA transfer
4FEB	Incorrect number or error corrections logged on 2K DMA transfer
4FEC	No DMA completion interrupt on 2K halfword transfer from DRAM to Main Memory while operating in the non-ECC mode

**A.5 TROUBLESHOOTING****A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (7 of 13)**

<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>4F</b>	<b>BUS PROCESSOR/MAIN MEMORY DMA SELF-TEST DIAGNOSTIC (@BT0900@ from @DIAGST@ Execution) (CONT'D)</b>
4FED	Bus Processor DMA error status bits set on 2K halfword transfer from DRAM to Main Memory while operating in the non-ECC mode
4FEE	Unexpected interrupt from ECC logging counter on 2K halfword transfer from DRAM to Main Memory while operating in the non-ECC mode
4FEF	No DMA completion interrupt on attempted 2K halfword transfer to DRAM from Main Memory with uncorrectable data
4FF0	BP Main Memory ECC status bit not set after Main Memory read of uncorrectable data
4FF1	Correctable ECC logging interrupt did not occur with limit count equal to transfer length and single-bit error correction attempted
4FF2	DMA operation did not abort on Main Memory uncorrectable ECC error
4FF3	No DMA completion interrupt on attempted transfer from Main Memory address 100000 HEX to DRAM
4FF4	Bus Processor Main Memory Invalid Memory Address (IMA) status bit not set after attempted access to Main Memory location 100000 HEX
4FF5	DMA operation did not abort on Main Memory IMA error
4FF6	No DMA completion interrupt on attempted 2K halfword DRAM to Main Memory transfer with bad DRAM parity
4FF7	Bus Processor Main Memory DSB status bit not set after attempted read of DRAM with bad parity
4FF8	DMA operation did not abort on DRAM parity error
4FF9	No DMA completion interrupt on DRAM to Main Memory transfer after correcting DRAM parity
4FFA	Bus Processor DMA error status bit set on DRAM to Main Memory transfer after correcting DRAM parity
4FFB	Unexpected interrupt from ECC logging counter on DRAM to Main Memory transfer after correcting DRAM parity
4FFC	No DMA completion interrupt on two-halfword transfer to DRAM from Main Memory to start PIT clock
4FFD	No DMA completion interrupt on two-halfword transfer from DRAM to Main Memory rewrite "bad" data
4FFE	Bus Processor DMA error status bits set on two-halfword transfer from DRAM to Main Memory

**A.5 TROUBLESHOOTING****A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (8 of 13)**

<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>70-76</b>	<b>UNIVERSAL ISIO DAC SELF-TEST DIAGNOSTIC (@ST0800@ from @DIAGST@ Execution)</b>
7010	UISIO (928W) PCA identification not found on system
7011	Device adapter ready bit failed to be set, software status register indicates that the internal power-up failed; (Software status register has not been tested at this time)
7012	Device adapter ready bit failed to be set
7013	Device adapter ready bit failed to be reset
7014	Device adapter request bit failed to be set
7016	Device adapter request interrupt failed to be detected
7017	Illegal interrupt detected (DA request interrupt expected)
7018	Device adapter request bit failed to be reset
701A	Device adapter request failed to be set
701C	Device adapter ready interrupt failed to be detected
701D	Illegal interrupt detected (DA ready interrupt was expected)
701E	Software status register failed walking ones pattern
7020	Local DMA Controller Buffer Full, Flip-Flop (F/F) failed to reset
7021	LDCBF, F/F failed to be set
7022	UISIO (or 928W) failed to internally detect a completion interrupt
7023	Local DMA Controller Byte Counter (LDCBC) F/F failed to be reset
7024	UISIO (or 928W) failed to internally detect LDCBC F/F being reset
7025	Static RAM Byte Counter (SRBC) F/F failed to be reset
7026	SRBC F/F failed to be set
7027	Device adapter completion interrupt failed to be detected
7028	Illegal interrupt detected; (Only device adapter completion interrupt was expected)
7029	UISIO (or 928W) failed to internally detect a completion interrupt
702A	SRBC F/F failed to be reset
702B	UISIO (or 928W) failed to detect SRBC F/F being reset
702C	Loading of LDCBC (with control register equal to SR/DR) failed to reset LDCBC F/F

## A.5 TROUBLESHOOTING

## A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (9 of 13)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
<b>70-76</b>	<b>UNIVERSAL ISIO DAC SELF-TEST DIAGNOSTIC (@ST0800@ from @DIAGST@ Execution) (CONT'D)</b>
702D	Loading of SRBC (with control register equal to 0) failed to prevent SRBC F/F from resetting
702E	Loading of SRBC (with control register equal to 0) failed to reset SRBC F/F
702F	UISIO (or 928W) failed to set up for DMA operations
703C	UISIO (or 928W) failed to select Static RAM (SR) Bank 1
7042	Dynamic RAM (DR) to SR Bank 1 (SRB-1) DMA: completion interrupt failed to be detected
7044	DR to SRB-1 DMA: ready interrupt failed to be detected
7046	DR to SRB-1 DMA: request interrupt failed to be detected
7048	DR to SRB-1 DMA: hardware status bits failed
704A	DR to SRB-1 DMA: software status bits failed
7052	Dynamic RAM to Z80 and SRB-1 to Main Memory concurrent DMAs: completion interrupt failed to be detected
7058	DR to Z80 and SRB-1 to Main Memory concurrent DMAs: hardware status bits failed
705A	DR to Z80 and SRB-1 to Main Memory concurrent DMAs: software status bits failed
705E	DR to Z80 and SRB-1 to Main Memory concurrent DMAs: interrupts failed (expected one Completion, two Readys, and two Requests
706C	UISIO (or 928W) failed to select SR Bank 2 (SRB-2)
7072	Z80 to DR and Main Memory to SRB-2 concurrent DMAs: completion interrupt failed to be detected
7078	Z80 to DR and Main Memory to SRB-2 concurrent DMAs: hardware status bits failed
707A	Z80 to DR and Main Memory to SRB-2 concurrent DMAs: software status bits failed
707E	Z80 to DR and Main Memory to SRB-2 concurrent DMAs: interrupts failed (expected one Completion, two Readys, and two Requests
7082	SR Bank 2 to DR DMA: completion interrupt failed to be detected
7084	SRB-2 to DR DMA: ready interrupt failed to be detected
7086	SRB-2 to DR DMA: request interrupt failed to be detected
7088	SRB-2 to DR DMA: hardware status bits failed
708A	SRB-2 to DR DMA: software status bits failed
7090	Data transfer failure
70B0	Failure to enable microcode loading step 1



**A.5 TROUBLESHOOTING****A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (10 of 13)**


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<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>70-76</b>	<b>UNIVERSAL ISIO DAC SELF-TEST DIAGNOSTIC (@ST0800@ from @DIAGST@ Execution) (CONT'D)</b>
70B2	Failure to enable microcode loading step 2
70B4	Failure to enable microcode loading step 3
70B6	Failure to enable microcode loading step 4
70FD	Unexpected trap
70FE	Unexpected SIO interrupt
70FF	Get control of workstation failure
7101	Address latch integrity error
71FE	Unexpected SIO interrupt (See Note)

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**NOTE**

This error code is also given instead of error code '4500' when the Local/Remote Diagnostic/Remote Control switch is in the Remote Diagnostic position because the Diagnostic Monitor is not on the system disk.

7201	Write byte completion interrupt failure
7202	Read byte completion interrupt failure
7203	Read and test data; (Also indicates 'Workstation Zero inoperable')
7204	SIO status error
7205	Static RAM MAR (SMAR) ripple failure
72FF	Get control of workstation failure
7301	Write 256 completion interrupt failure
7302	Read 256 completion interrupt failure
7303	Read and test data
7304	SIO status error
7305	SMAR ripple failure
73FF	Get control of workstation failure

**A.5 TROUBLESHOOTING**

**A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (11 of 13)**

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<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>70-76</b>	<b>UNIVERSAL ISIO DAC SELF-TEST DIAGNOSTIC (@ST0800@ from @DIAGST@ Execution) (CONT'D)</b>
7601	Give status completion interrupt failure
7602	Status unchanged
7603	Valid status
7604	Valid device type
76FF	Get control of workstation failure

**NOTE**

Diagnostic Error Codes 98xx, B0xx and D0xx are PROM-based diagnostics executed during power-up sequence.

<b>90</b>	<b>SERIAL INPUT/OUTPUT DEVICE ADAPTER SELF-TEST DIAGNOSTIC (@ST0500@ from @DIAGST@ Execution)</b>
9011	Workstation powered-off (or disconnected) status
9015	Coaxial parity failure, parity error, or not running status
<b>98</b>	<b>DISKETTE DEVICE SELF-TEST DIAGNOSTIC (PROM-BASED)</b>
9820	Diskette drive not ready; (Also indicates 'No floppy in IPL/Boot Device')
9821	Failure on initial Diskette recalibration
9822	Failure on Diskette seek to maximum track (track 77)
9823	Failure on Diskette seek to track 00
<b>A4</b>	<b>SERIAL INPUT/OUTPUT SELF-TEST DIAGNOSTIC (@ST0100@ from @DIAGST@ Execution)</b>
A400	SIO or WS-0 hung on Self-Test Diagnostic entry
A401	SIO or WS-0 identification not found
A402	SMAR data integrity failure

**A.5 TROUBLESHOOTING****A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (12 of 13)**

<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>A4</b>	<b>SERIAL INPUT/OUTPUT SELF-TEST DIAGNOSTIC (@ST0100@ from @DIAGST@ Execution) (CONT'D)</b>
A4FD	Unexpected trap
A4FE	Unexpected SIO interrupt
A4FF	Get control of workstation failure
<b>B0</b>	<b>INTERNAL/EXTERNAL DISK DRIVE DEVICE ADAPTER SELF-TEST DIAGNOSTIC (PROM-BASED)</b>
B000	Hung on entry to disk drive device adapter Self-Test Diagnostic
B004	Ready status bit failed to set
B012	Disk drive device adapter not found on the system
B014	Disk drive device adapter port specified does not exist
B016	Disk drive device adapter at an illegal address (0400 HEX, 0500 HEX, or 0600 HEX)
B022	Disk drive device adapter could not be properly reset
<b>B0</b>	<b>INTERNAL/EXTERNAL DISK DRIVE DEVICE ADAPTER SELF-TEST DIAGNOSTIC (PROM-BASED)</b>
B032	Disk drive could not be selected
B034	Drive Fault could not be cleared
B042	Seek interrupt not detected after a restore (RTZ - Return to Track Zero) operation
B048	Seek interrupt not detected after a Seek to Track operation
B052	ECC error could not be corrected
B062	Operation complete interrupt not detected after a read operation
B068	Operation complete interrupt not detected after an ECC correction operation
B082	Drive status error after restore (RTZ) operation
B084	Drive status error after seek operation
B086	Drive status error after read operation
B092	Read sector operation failed (HCE - Header Check Error)
B094	Read sector operation failed

**A.5 TROUBLESHOOTING****A.5.15 SELF-TEST DIAGNOSTIC EXECUTION ERROR CODES (13 of 13)**

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<b>ERROR CODE</b>	<b>TEST TITLE AND ERROR CODE DESCRIPTION</b>
<b>D0</b>	<b>HARDWARE RELATED FAILURE (PROM-BASED)</b>
DEAD	Program trap for attempted execution from nonexistent memory space (CRAM address branch leads to address in 80286 PROM)
<b>XX</b>	<b>MISCELLANEOUS ERROR CODES</b>
xxFD	Unexpected trap
xxFE	Unexpected SIO interrupt
xxFF	Get control of Workstation Zero failure

**A.5 TROUBLESHOOTING**

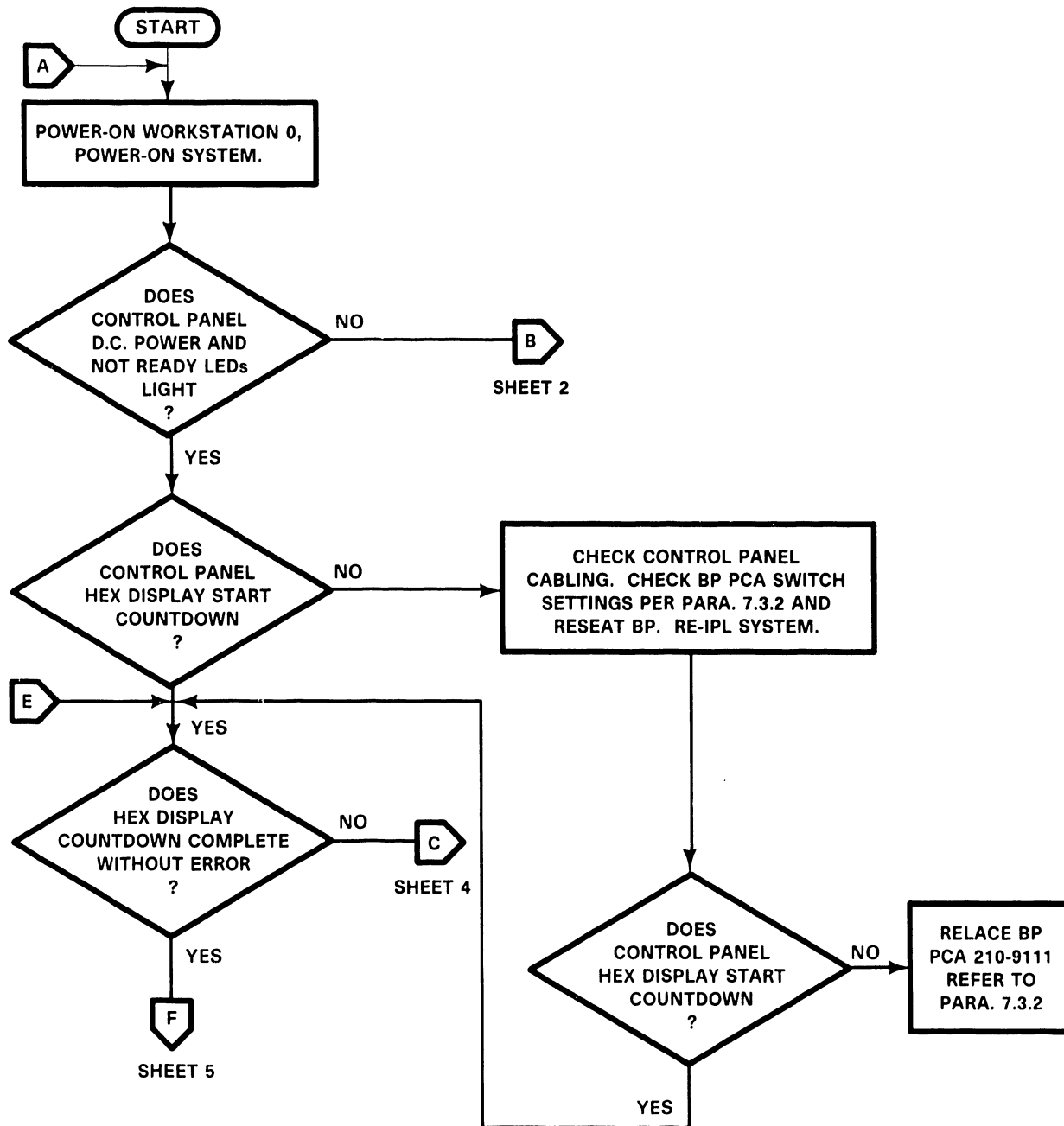
**A.5.16 TROUBLESHOOTING FLOWCHARTS**

The Troubleshooting section of the VS-5E/6E Computer System is the same as the Troubleshooting section of the VS-5/6 Computer System, → 6.2.

The VS-5E/6E Troubleshooting flowcharts are designed to aid in the systematic investigation, diagnosis, and repair of failures of the VS-5E/6E mainframe. No procedure can list every potential problem or combination of problems that can occur. The flowcharts in this section are detailed to the Field Replaceable Unit (FRU) with references made to test sections to aid in subassembly corrective maintenance and repair.

A.5 TROUBLESHOOTING

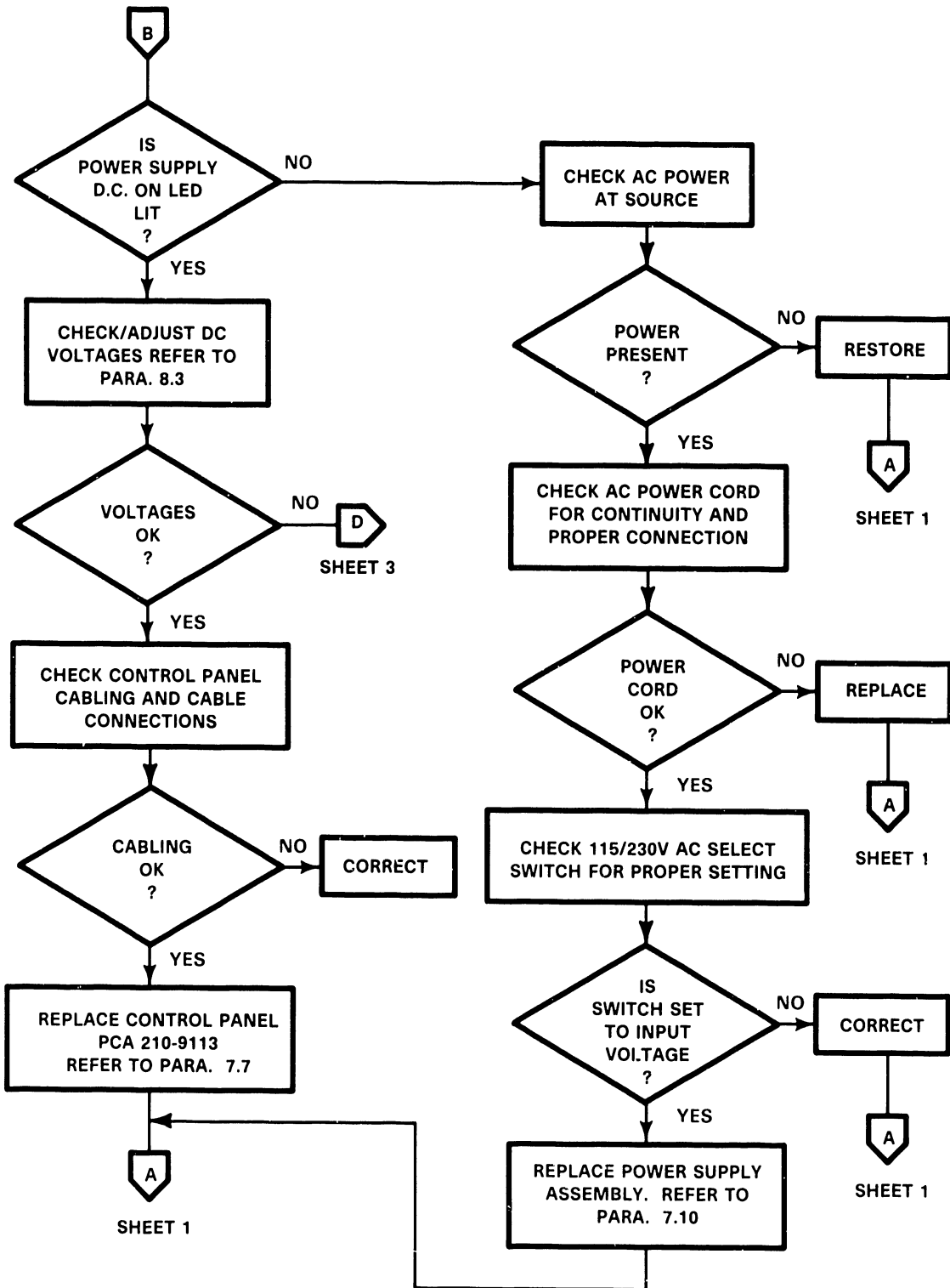
A.5.16 TROUBLESHOOTING FLOWCHARTS (1 of 6)



B-03047-FY86-3

A.5 TROUBLESHOOTING

A.5.16 TROUBLESHOOTING FLOWCHARTS (2 of 6)



B-03047-FY86-6

A.5 TROUBLESHOOTING

A.5.16 TROUBLESHOOTING FLOWCHARTS (3 of 6)

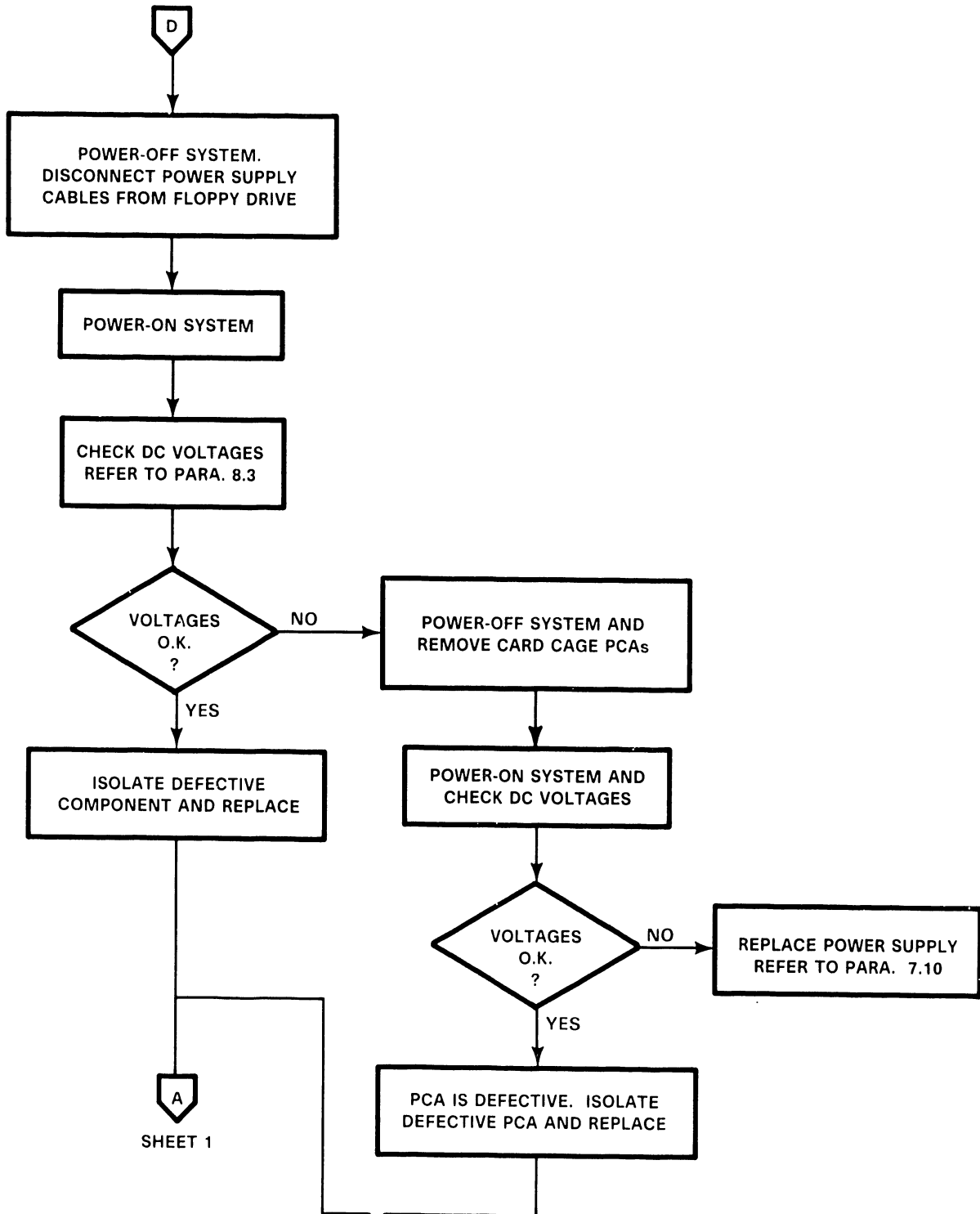
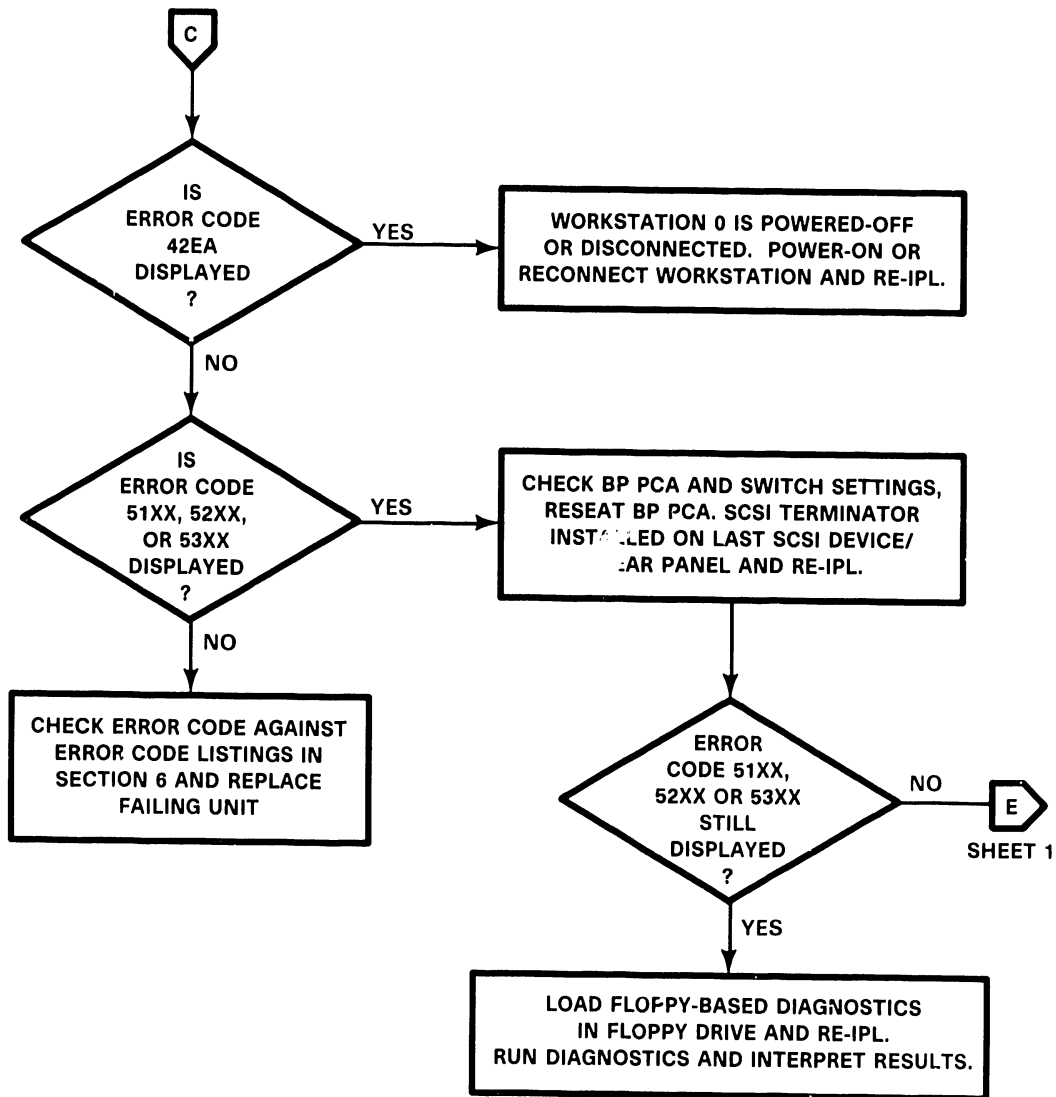


FIGURE 1 Y86.4



A.5 TROUBLESHOOTING

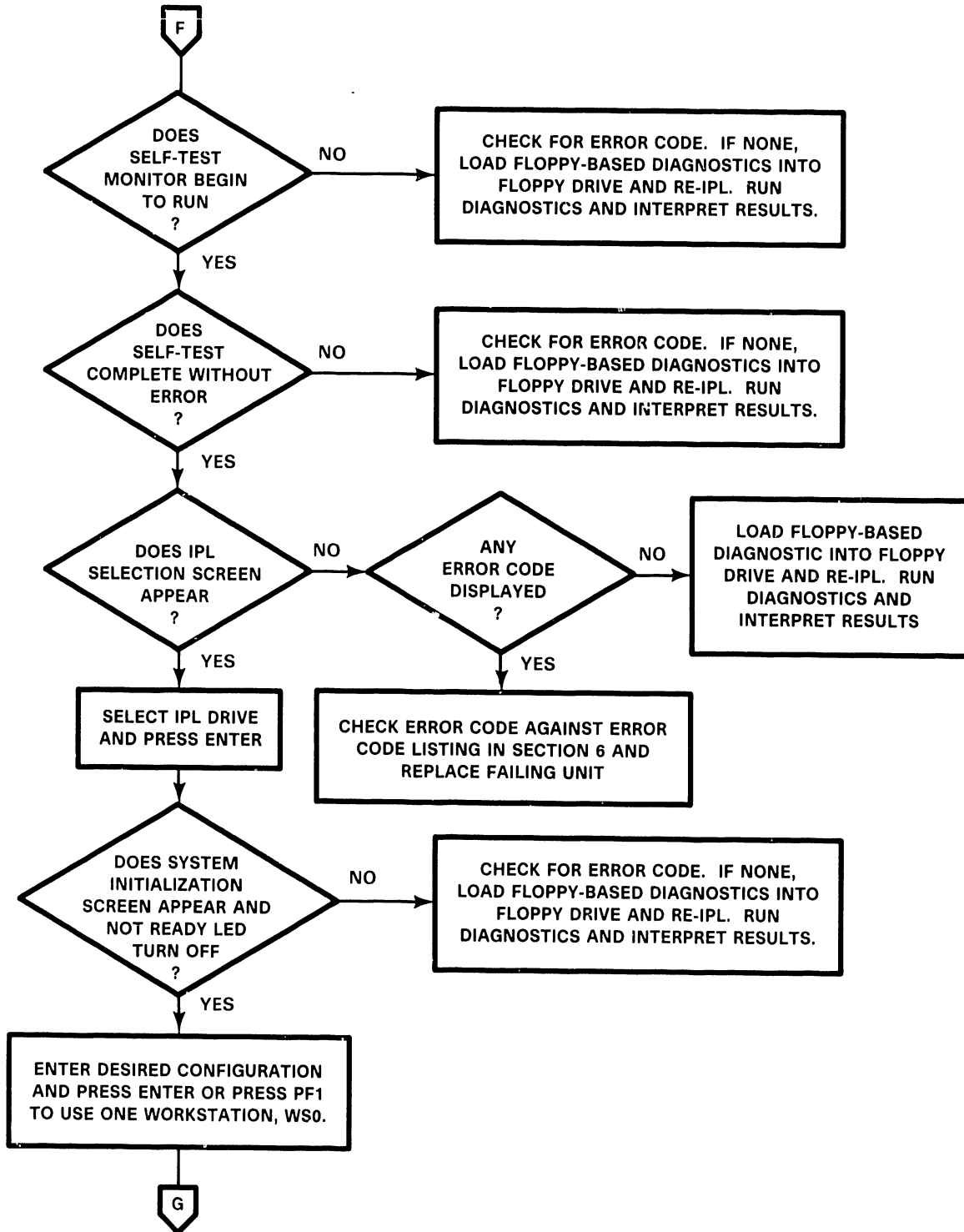
A.5.16 TROUBLESHOOTING FLOWCHARTS (4 of 6)



B-03047-FY86-1

A.5 TROUBLESHOOTING

A.5.16 TROUBLESHOOTING FLOWCHARTS (5 of 6)

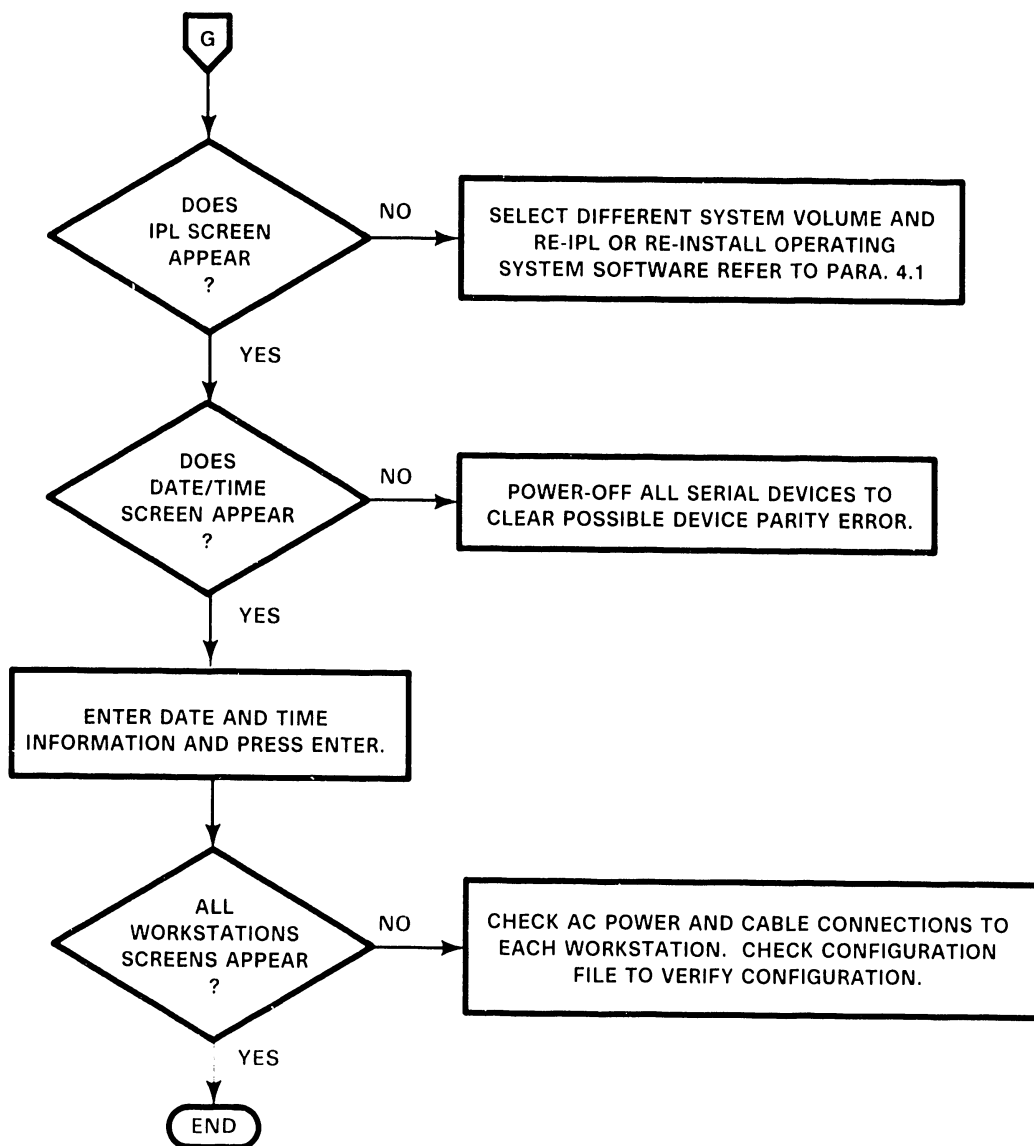


SHEET 6

B-03047 FY86 5

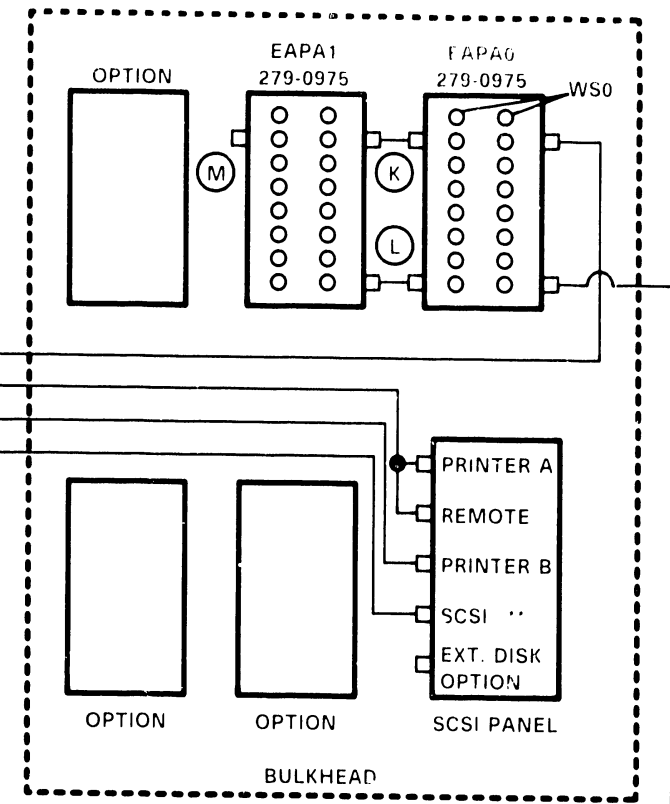
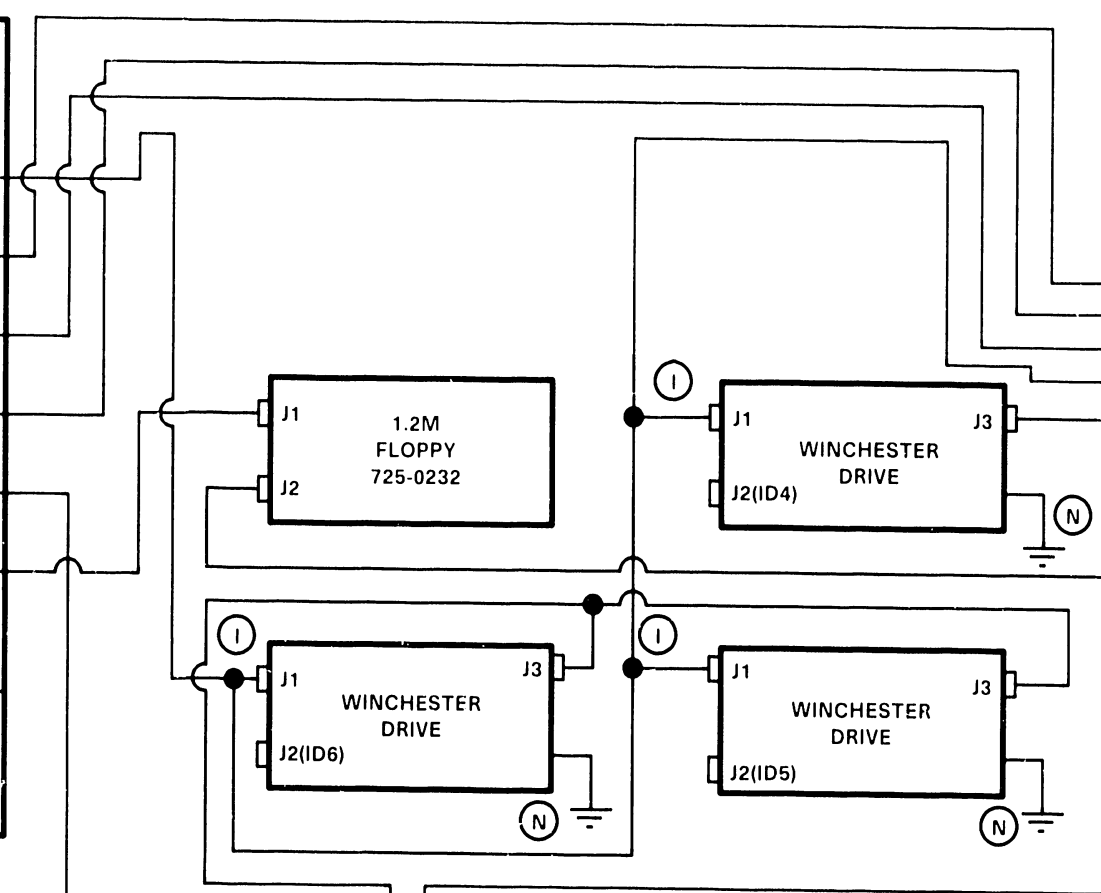
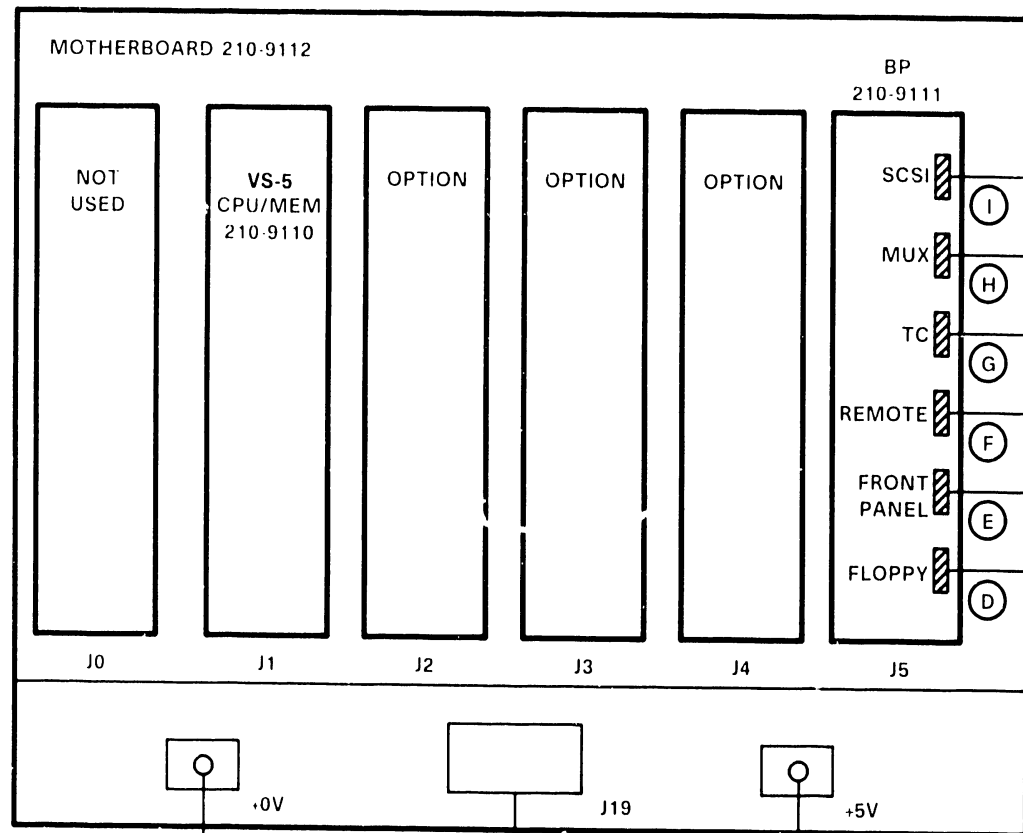
A.5 TROUBLESHOOTING

A.5.16 TROUBLESHOOTING FLOWCHARTS (6 of 6)



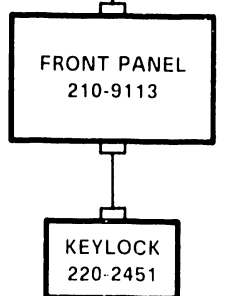
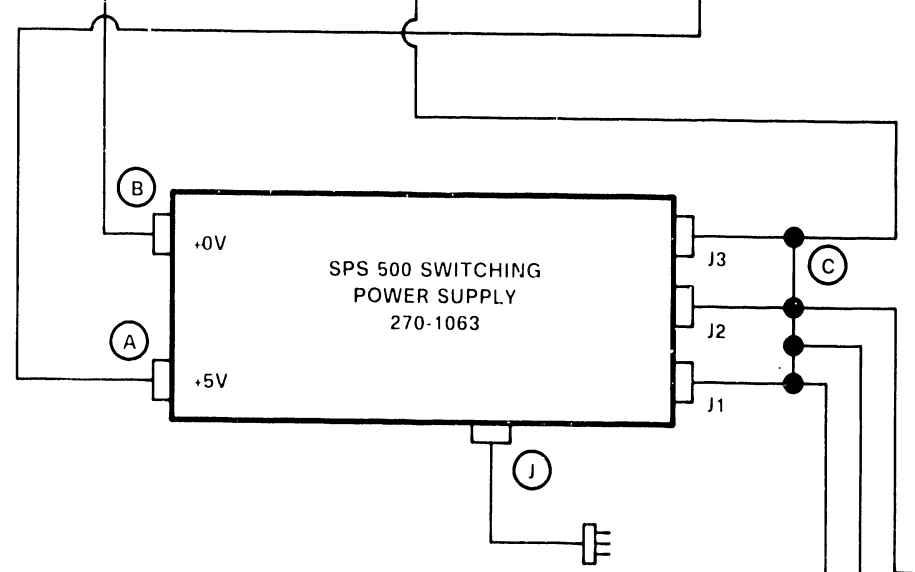
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EXTERNAL DISK OPTIONS ARE NOT SHOWN CONNECTED

\*\* SEE NOTE 1



VS-5E CABLE CONNECTION

Cable Location	Cable Number	Cable Description
A	220-2453	SPS to Motherboard +5V Bus
B	220-1215	SPS to Motherboard +0V Bus
C	270-3378	Power Harness
D	220-3420	BP to Floppy
E	220-3528	BP to Front Panel
F	220-3417	BP to Printer A/Remote
G	220-3418	BP to Printer B
H	220-3419	BP to APA 0
I	220-3624	BP to 145/72MB SCSI
J	420-2058	AC Power Cord
K	220-3319	APA Jumper, Signal
L	220-2102	APA Jumper, Power
M	210-8503	PCA, 928MC MuxBus Terminator
N	220-2114	Winchester Ground

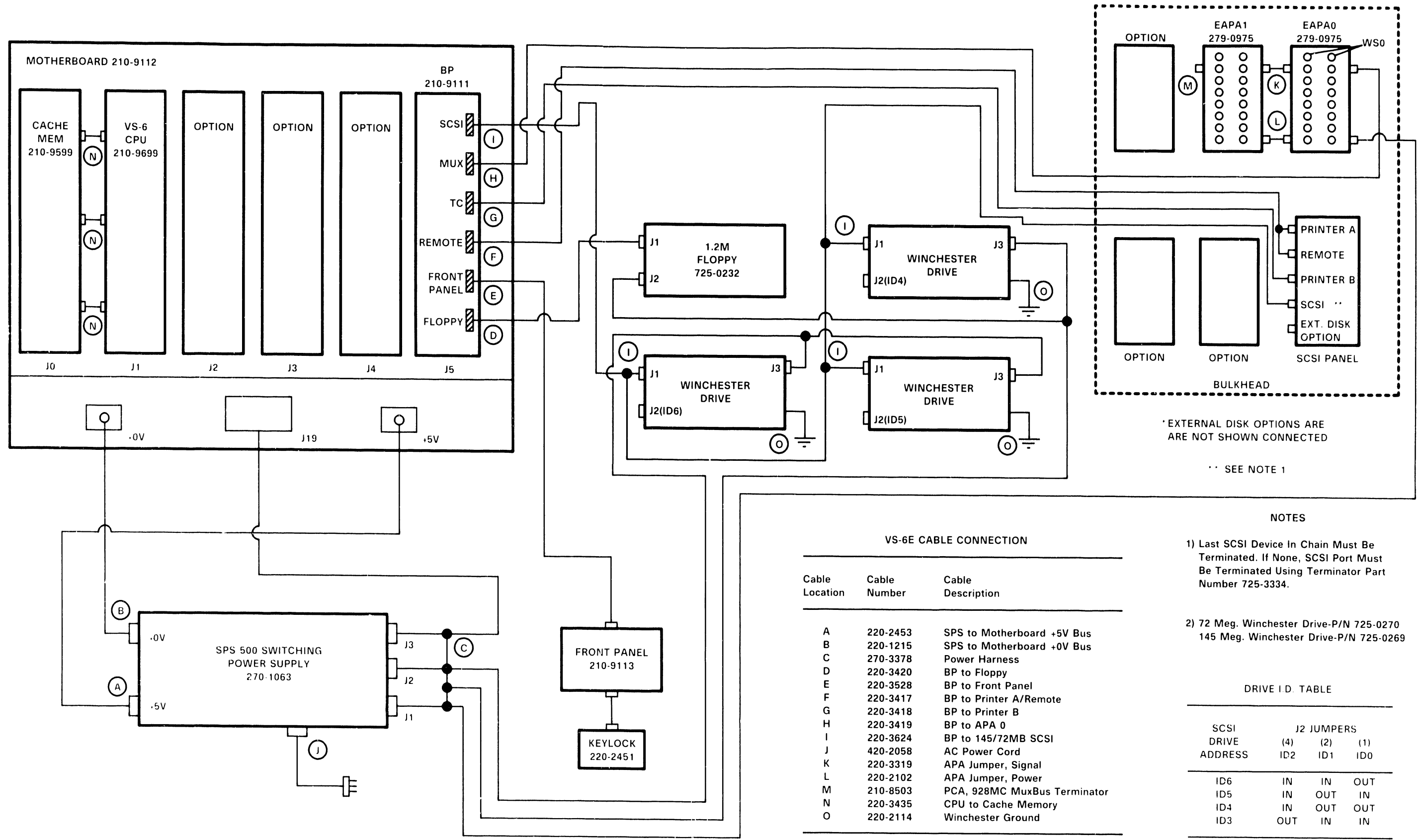
- NOTES
- 1) Last SCSI Device In Chain Must Be Terminated. If None, SCSI Port Must Be Terminated Using Terminator Part Number 725-3334.
  - 2) 72 Meg. Winchester Drive-P/N 725-0270  
145 Meg. Winchester Drive-P/N 725-0269

DRIVE I.D. TABLE

SCSI DRIVE ADDRESS	J2 JUMPERS		
	(4) ID2	(2) ID1	(1) ID0
ID6	IN	IN	OUT
ID5	IN	OUT	IN
ID4	IN	OUT	OUT
ID3	OUT	IN	IN

VS-5E INTERCONNECT DIAGRAM

6-10601-1-85-1



\* EXTERNAL DISK OPTIONS ARE NOT SHOWN CONNECTED

\*\* SEE NOTE 1

**NOTES**

- 1) Last SCSI Device In Chain Must Be Terminated. If None, SCSI Port Must Be Terminated Using Terminator Part Number 725-3334.
- 2) 72 Meg. Winchester Drive-P/N 725-0270  
145 Meg. Winchester Drive-P/N 725-0269

**VS-6E CABLE CONNECTION**

Cable Location	Cable Number	Cable Description
A	220-2453	SPS to Motherboard +5V Bus
B	220-1215	SPS to Motherboard +0V Bus
C	270-3378	Power Harness
D	220-3420	BP to Floppy
E	220-3528	BP to Front Panel
F	220-3417	BP to Printer A/Remote
G	220-3418	BP to Printer B
H	220-3419	BP to APA 0
I	220-3624	BP to 145/72MB SCSI
J	420-2058	AC Power Cord
K	220-3319	APA Jumper, Signal
L	220-2102	APA Jumper, Power
M	210-8503	PCA, 928MC MuxBus Terminator
N	220-3435	CPU to Cache Memory
O	220-2114	Winchester Ground

**DRIVE I.D. TABLE**

SCSI DRIVE ADDRESS	J2 JUMPERS		
	(4) ID2	(2) ID1	(1) ID0
ID6	IN	IN	OUT
ID5	IN	OUT	IN
ID4	IN	OUT	OUT
ID3	OUT	IN	IN

**VS-6E INTERCONNECT DIAGRAM**

Rev. 1.05.77

**REPAIR**

**A.6 REPAIR**

**A.6.2.1 72MB WINCHESTER DRIVE REMOVAL**

The Repair section of the VS-5E/6E Computer System is the same as the Repair section of the VS-5/6 Computer System, → A.6.1.1, A.6.1.2, and 7.5.

VS-5E/6E differences are as follows:

- 67.5MB Winchester Drive replaced by 72MB Winchester Drive, → 11.1.
- Drive I.D.'s changed to ID 3, 4, 5 and 6, → A.6.1.1, A.6.1.2 Interconnect Diagrams.
- Drive cable changed to accomodate up to three Winchester Drives, → 11.1.
- BP Board (P/N 210-9111, 256K) with latest PROM revision:

PROM REVISION: 5754

PROM P/N: A) 379-2095-R2  
B) 379-2096-R2



**A.6 REPAIR**

**A.6.2.2 145MB WINCHESTER DRIVE REMOVAL**

The Repair section of the VS-5E/6E Computer System is the same as the Repair section of the VS-5/6 Computer System, → A.6.1.1, A.6.1.2, and 7.5.

VS-5E/6E differences are as follows:

- New 145MB Winchester Drive added, → 11.1.
- Drive I.D.'s changed to ID 3, 4, 5 and 6, → A.6.1.1, A.6.1.2 Interconnect Diagrams.
- Drive cable changed to accomodate up to three Winchester Drives, → 11.1.
- BP Board (P/N 210-9111, 256K) with latest PROM revision:

PROM REVISION: 5754

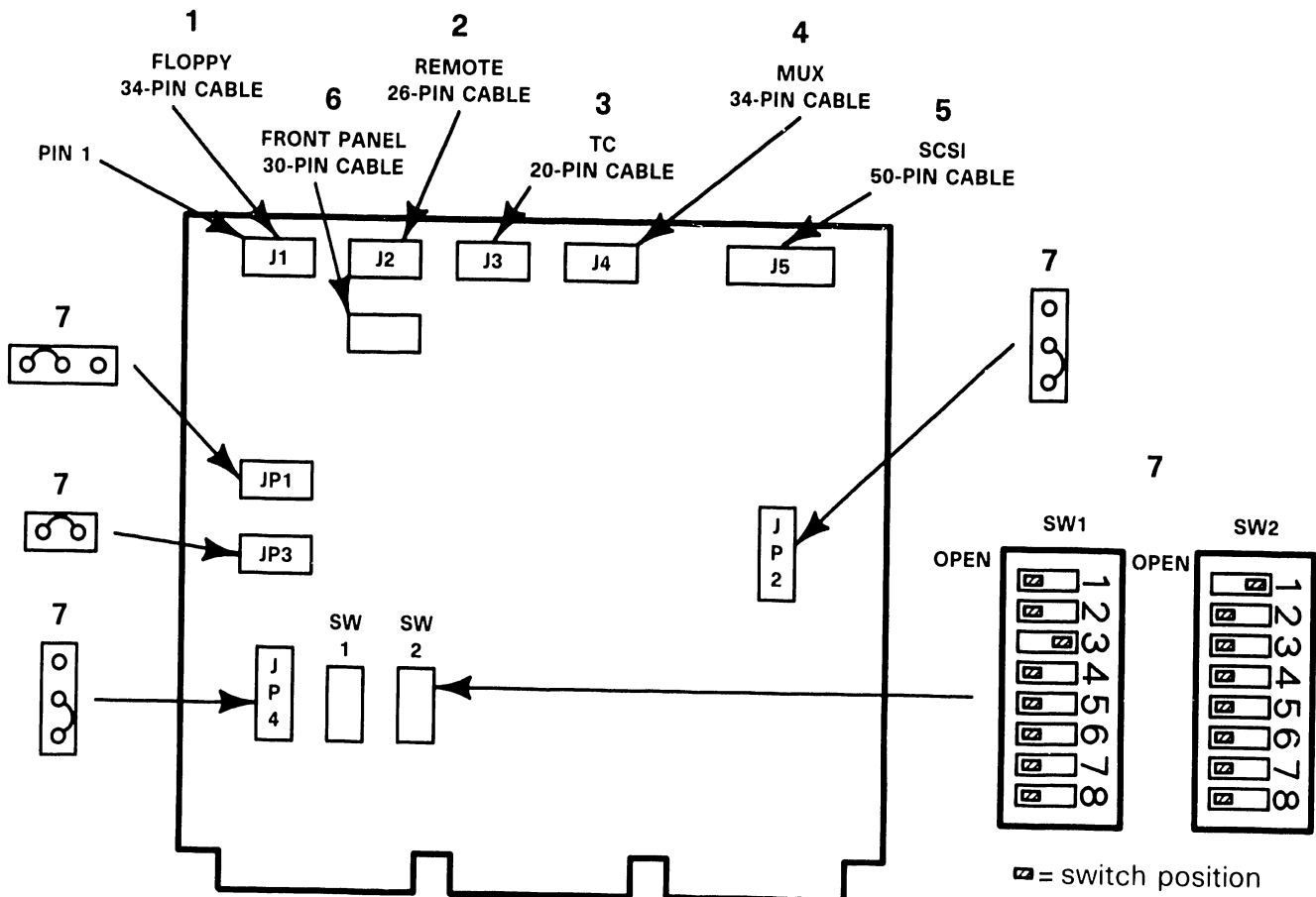
PROM P/N: A) 379-2095-R2  
B) 379-2096-R2

**A.6 REPAIR**

**A.6.3.1 VS-5E/6E BUS PROCESSOR (BP) REMOVAL (1 of 3)**

Before removing VS-5E/6E BP PCB from backplane slot J5, perform following:

- 1) Remove 34-pin cable from Floppy connector, → A.6.3.1.
- 2) Remove 26-pin cable from Remote connector, → A.6.3.1.
- 3) Remove 20-pin cable from TC connector, → A.6.3.1.
- 4) Remove 34-pin cable from MUX connector, → A.6.3.1.
- 5) Remove 50-pin cable from SCSI connector, → A.6.3.1.
- 6) Remove BP Board, (→ 7.3) by easing BP out of card cage three inches, and removing 30-pin cable from Front Panel connector, → A.6.3.1.
- 7) Check jumper positions and switch settings, → A.6.3.1.



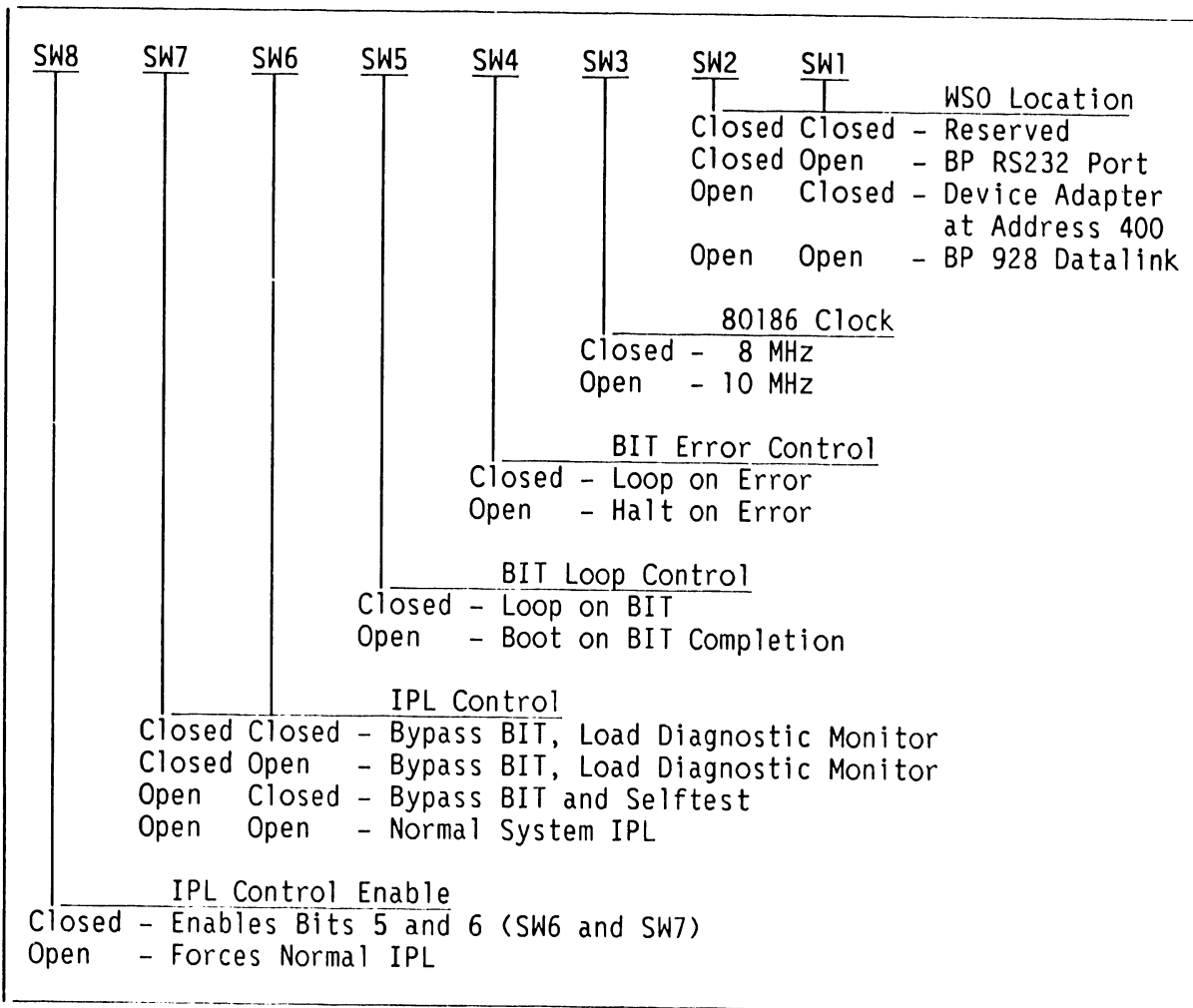
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**A.6 REPAIR**

**A.6.3.1 VS-5E/6E BUS PROCESSOR (BP) REMOVAL (2 of 3)**

- 8) Install new BP board half way into card cage by reversing steps of 7.3.
- 9) Reconnect 30 pin cable to Front Panel connector by reversing steps of A.6.3.1.
- 10) Install BP completely into motherboard and reconnect all cables,  
→ A.6.3.1, steps 1 thru 5.

SWITCH BANK SW1 SETTINGS:



**NOTE**

SWITCH SW1 SWITCH POSITIONS ARE NOT USED BY BP MICROCODE.

**A.6 REPAIR**

**A.6.3.1 VS-5E/6E BUS PROCESSOR (BP) REMOVAL (3 of 3)**

SWITCH BANK SW2 SETTINGS:

SW8	SW7	SW6	SW5	SW4	SW3	SW2	SW1	Floppy Drive Type
						Closed	Closed	- Reserved
						Closed	Open	- 720K, (NOTE 1)
						Open	Closed	- 1.2M, (NOTE 2)
						Open	Open	- 360K, 5-1/4 in
								<u>SCSI Device ID = 6 Type</u>
						Closed	Closed	- Reserved
						Closed	Open	- ACB-5500
						Open	Closed	- WD-1003A (NOTE 3)
						Open	Open	- Self Identifying (NOTE 4)
								<u>SCSI Device ID = 5 Type</u>
						Closed	Closed	- Reserved
						Closed	Open	- ACB-5500
						Open	Closed	- WD-1003A
						Open	Open	- Self Identifying (NOTE 4)
								<u>SCSI Device ID = 4 Type</u>
						Closed	Closed	- Reserved
						Closed	Open	- ACB-5500
						Open	Closed	- WD-1003A
						Open	Open	- Self Identifying (NOTE 4)

**NOTES**

- 1) 720K 3-1/2 inch Floppy Drive is not supported by BP Microcode.
- 2) 1.2M 5-1/4 inch and 3-1/2 inch Floppy Drive is supported by BP Microcode.
- 3) WD-1003A is SCSI-to-ST506 Winchester Interface (part number 278-4076) presently used in VS-5/6.
- 4) VS-5E/6E Winchester Disk Drives use drive mounted Imbedded SCSI PCBS and incorporate self-identifying SW2 switch settings.

# ADJUSTMENTS

**A.7 ADJUSTMENTS**

The Adjustments section of the VS-5E/6E Computer System is the same as the Adjustments section of the VS-5/6 Computer System, → 8.3.

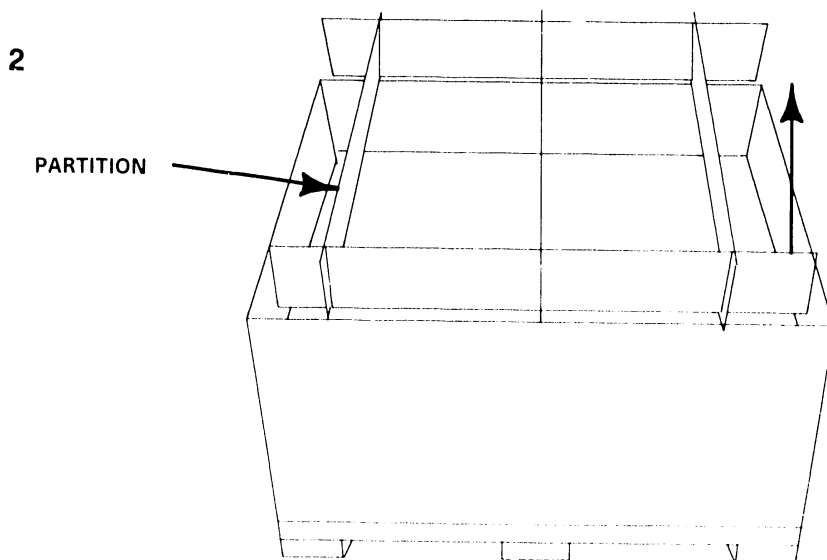
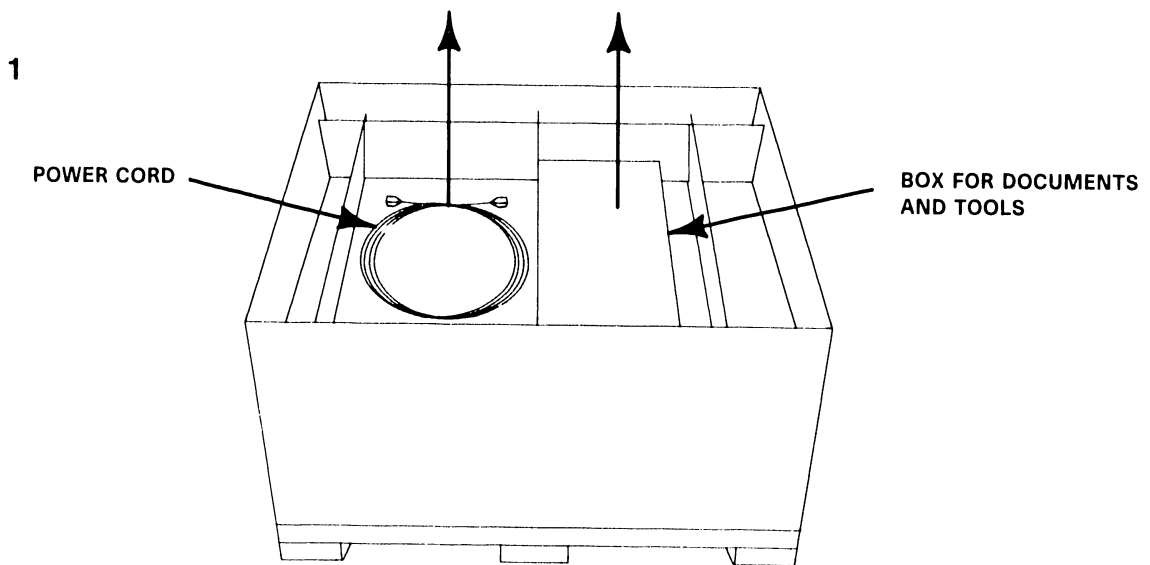
# **UNPACKING AND SETUP**

**A.8 UNPACKING AND SETUP**

**A.8.1 VS-5E/6E UNPACKING (1 of 6)**

The VS-5E/6E Unpacking section of the VS-5E/6E Computer System is similar to the VS-5E/6E Unpacking section of the VS-5/6 Computer System, → 9.4. The VS-5E/6E differences are explained below.

- 1) Remove power cord and small box containing documents and installation tools from top of carton.



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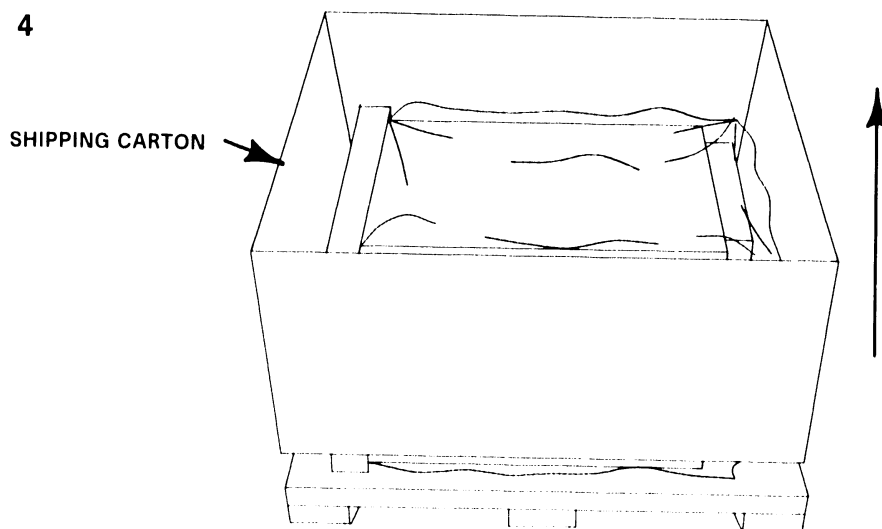
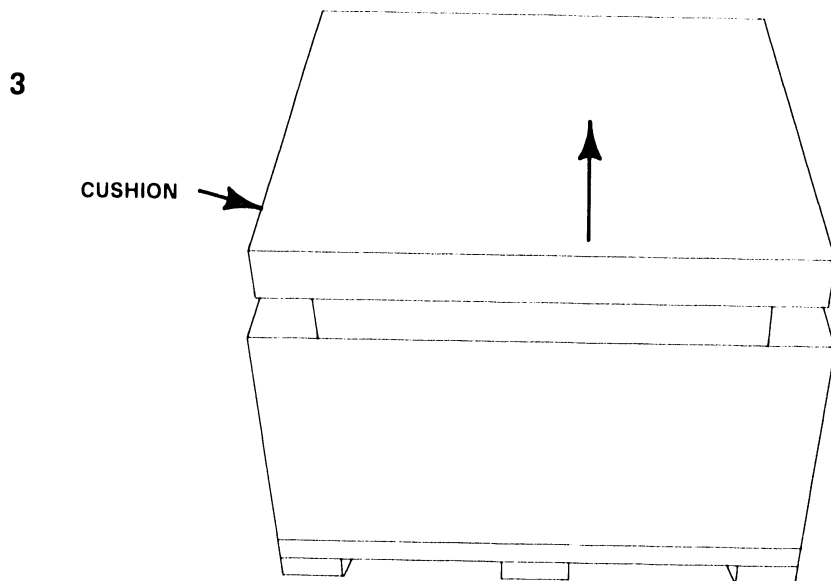
- 2) Remove box partition.



**A.8 UNPACKING AND SETUP**

**A.8.1 VS-5E/6E UNPACKING (2 of 6)**

3) Remove cushion from inside of box.



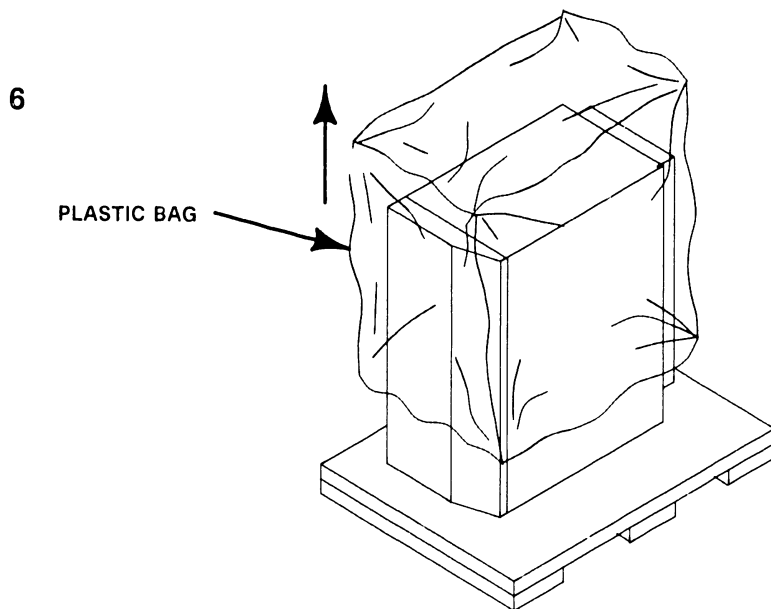
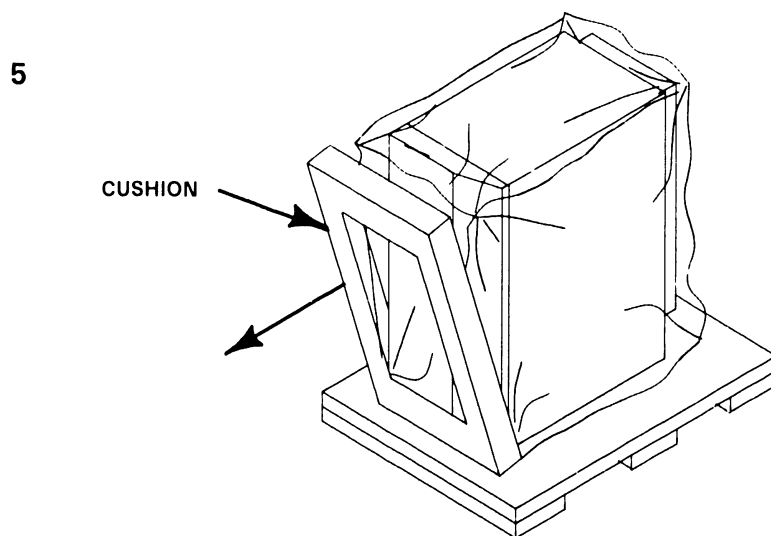
B 03846 1/87/6

4) Remove shipping carton from VS-5E/6E Computer.

**A.8 UNPACKING AND SETUP**

**A.8.1 VS-5E/6E UNPACKING (3 of 6)**

5) Remove cushion surrounding bottom front of VS-5E/6E Computer.



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6) Lift off antistatic plastic bag from VS-5E/6E Computer.

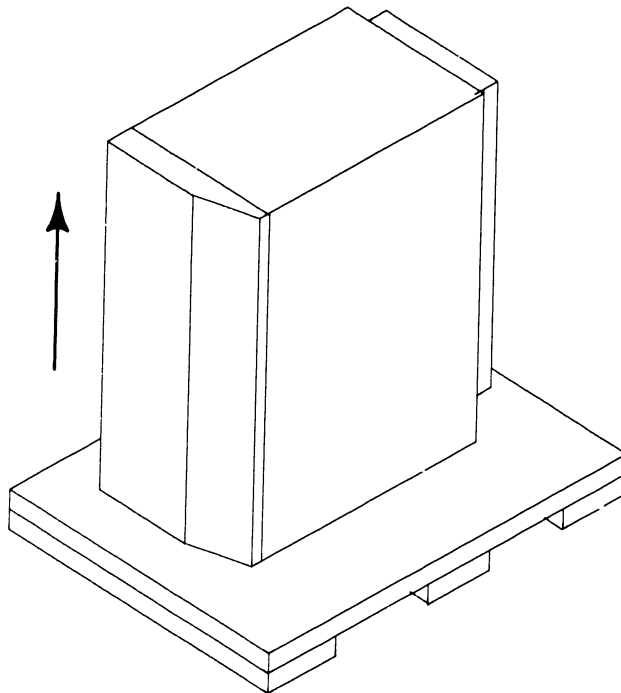
**A.8 UNPACKING AND SETUP**

**A.8.1 VS-5E/6E UNPACKING (4 of 6)**

7) If pallet does not have a non-removable pallet end piece, remove VS-5E/6E Computer in following manner.

A) Lift VS-5E/6E Computer up and off pallet.

7



B-03846 FY87 B

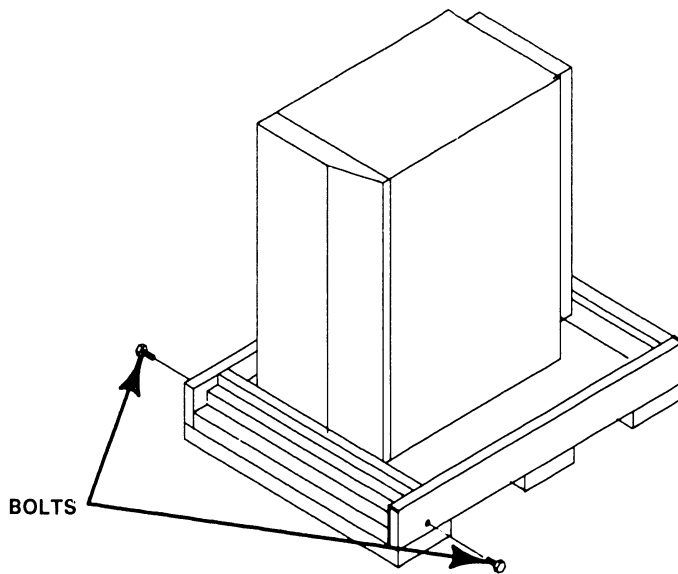
**A.8 UNPACKING AND SETUP**

**A.8.1 VS-5E/6E UNPACKING (5 of 6)**

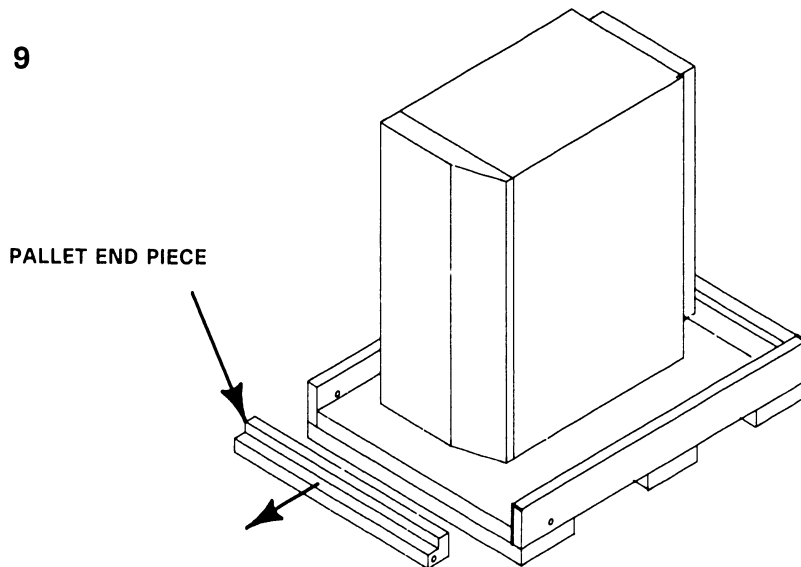
8) If pallet has a removable pallet end piece, remove VS-5E/6E Computer in following manner.

A) Remove two (2) bolts as shown.

8



9



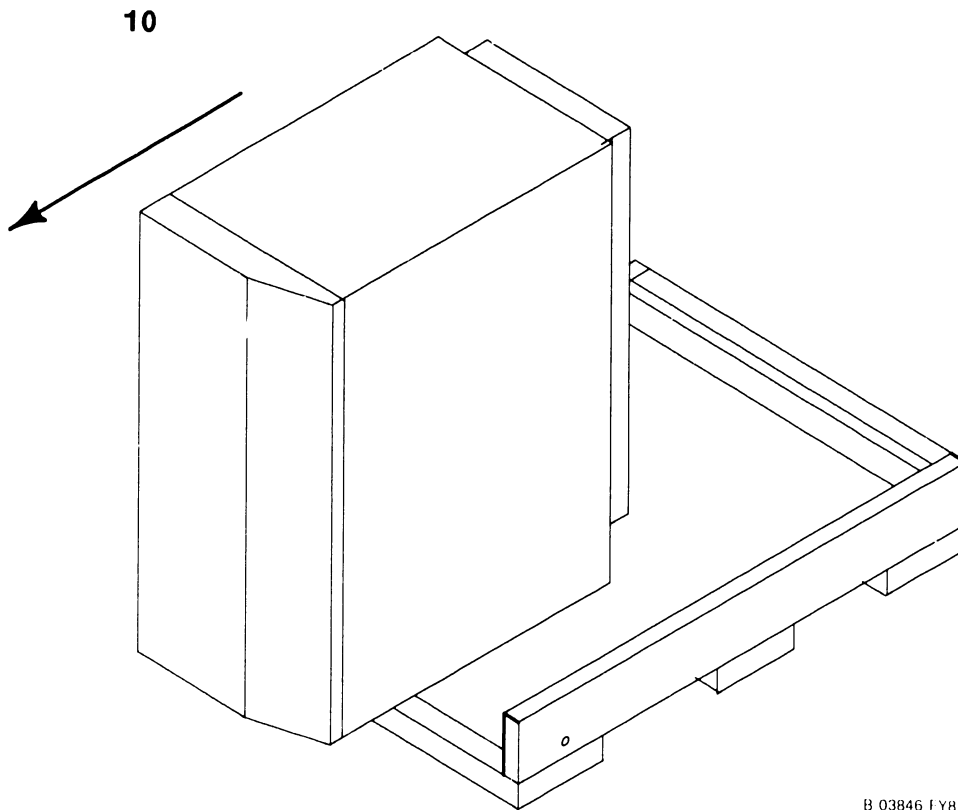
B 03846 1 Y87 9

9) Remove pallet end.

**A.8 UNPACKING AND SETUP**

**A.8.1 VS-5E/6E UNPACKING (6 of 6)**

10) Slide VS-5E/6E Computer off pallet.



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**A.8 UNPACKING AND SETUP****A.8.2.1 FIRST-TIME IPL PROCEDURE (1 of 9)**

The following procedure contains the steps required to IPL the VS-5E/6E mainframe from a disk containing the operating system. If not, perform the Stand-Alone Utilities as described, → A.3.1.1. Be sure to perform the steps in the sequence given.

- 1) Power-On Workstation 0 (operator console), → 4.1. Workstation 0 raster should be displayed in a few seconds. Power-On any other workstations or printers on the system. If the system has external SMD drives attached to the 4-Port SMD Controller, power on the drives.
- 2) Position the Local/Remote Key Switch in the Local position, → 4.1.
- 3) Press the DC Power-On switch to the On (I) position, → 4.1.
- 4) Power-On indicator and Not Ready indicator illuminates, → 4.1.
- 5) Ready external SMD drives (if any). Press the Control Mode pushbutton then the Initialize pushbutton, → 4.2.1.2. The system first looks at the floppy drive for a bootable diskette. If no diskette is inserted in the floppy drive, the system will look for the bootstrap file on the external SCSI drive (address 6). Once the file is found, the following message will be displayed on WS-0.

**IPL MONITOR****Initialization in Progress**

- 6) The IPL process starts. The diagnostic Hex display begins a countdown from FFFF while the power-up diagnostics are being run. This will be completed in approximately 45 seconds. In the event the diagnostic code countdown stops and an error code is displayed, refer to Appendix A for error code information.

If error code 402A or 403A (floppy), or 40AA or 40BA (SCSI) is displayed, these error codes denote that the system disk does not contain the pointer to the bootstrap file (@MCBOOT@). This pointer must be regenerated. Perform the following:

- a) Load the Stand Alone Utility (SAU), → 4.2. Using SAU Copy function, copy files @MCBOOT@ and @MCIPL@ from the SAU diskette to the system disk. Copying the bootstrap file, the SAU automatically regenerates the pointer. Once regenerated, the IPL procedure can be continued.

**A.8 UNPACKING AND SETUP**

**A.8.2.1 FIRST-TIME IPL PROCEDURE (2 of 9)**

7) Upon successful completion of the BIT diagnostics, the Small VS BP2 Class Self-Test Package IPL Drive Selection screen is displayed.

Small VS BP2 Class Self-Test Package Version R2xxx  
 IPL Drive Selection  
 Bootstrap Volume = SYSTEM

Device	Capacity	Type	Volume	Status
2270V7	1.2 MB	Dsket		
■ 2269V3	72 MB	Dsket	SYSTEM	
2269V4	145 MB	Dsket	DATA	

Default Test and IPL in several Seconds

Position Cursor to Indicated Device and Select:

(ENTER) Test & IPL (PF1) IPL Only (PF8) Stand-Alone Diagnostic Monitor

8) Position the cursor next to drive from which the operating system is to be loaded and perform one of the following:

- Press ENTER to IPL and run Self-Test
- Press PF1 to IPL Only
- Press PF8 to run Stand-Alone Diagnostic Monitor

For First-Time IPL, Press ENTER to IPL and Run Self-Test. The VS-5E/6E Self-Test Package Screen will be displayed. The VS-5E System Hardware Self-Test Screen is displayed.

Small VS BP2 Class Self-Test Monitor Package Version Rxxxx  
 System hardware Status  
 System Volume = SYSTEM

Status	Diagnostic
Passed	(SIO) Serial Data Link Test
Passed	(BP) USART Loopback Verification Test
Running	(CP5) CM/Communications Test
	(CP5) Operational Test
	(CP5) Integrity Test
	(MM) Main Memory Integrity Test
	(BP) BP DMA & MARS Test

**A.8 UNPACKING AND SETUP**

**A.8.2.1 FIRST-TIME IPL PROCEDURE (3 of 9)**

The VS-6E System Hardware Self-Test Screen is displayed.

---

Small VS BP2 Class Self-Test Monitor Package	Version Rxxxx
System hardware Status	
System Volume = SYSTEM	
Status	Diagnostic
Passed	(SIO) Serial Data Link test
Passed	(BP) USART Loopback Verification Test
Running	(CP7) CM/Communications Test
	(CP7) Operational Test
	(CP7) Integrity Test
	(MM) CPU/Cache/Main Memory Test
	(BP) BP/Main Memory DMA Test
	(MM) Dual Processor M/M Test

---

- 9) This screen indicates that the VS-5E/6E is testing system components. The results of each test is displayed with the message sequence: 'Loading', 'Running', 'Passed', 'Non-Fatal Error', 'Fatal Error'. If the status is 'Passed', the system is ready to begin initialization. A Non-Fatal Error message and Fatal Error Message will display an error code of the failure. → A.5.1 Troubleshooting and Appendix A Error Codes for error code definition.
  
- 10) Once the diagnostics pass, the prompt "**Loading System Microcode**" is displayed and system initialization begins. In about 60 seconds, the following message appears on WSO and the Not Ready LED turns off.

**Loading Complete, Begin System Initialization**



**A.8 UNPACKING AND SETUP****A.8.2.1 FIRST-TIME IPL PROCEDURE (4 of 9)**

- 11) The SYSGEN screen appears. The SYSGEN screen displays the name of the configuration file last used (SYSFILE Field). NOTE: During Initial IPL, the SYSGEN configuration screen does not display a default value for the name of the system configuration file. Enter a valid configuration file name in the field 'SYSFILE', if known. If the system is using communications, specify the communications configuration file name and library.

**NOTE**

If a configuration file has not been created, the system should be IPL'ed as one workstation and one disk (PF1 key) to allow system configuration file creation using GENEDIT.

---

\*\*\* MESSAGE M001 BY SYSGEN

INFORMATION REQUIRED BY PROGRAM @SYSGEN@

Active Subprogram is @SYSGEN@

Copyright, Wang Laboratories, INC. 1985

Specify the name of the system configuration file and press (ENTER)

- or -

Press (1) to use one workstation and one disk.

SYSFILE = @CONFIG@

SYSLIB = @SYSTEM@

Specify the communications configuration file to be used, if any

COMMFILE = ██████████

COMMLIB = @SYSTEM@

Inhibit logons at all workstations?

LOGONS = NO

Load Microcode to all Devices?

LMCODE = NO

Inhibit Dumping Continuable Halts?

CNDUMP = NO

---

**A.8 UNPACKING AND SETUP****A.8.2.1 FIRST-TIME IPL PROCEDURE (5 of 9)**

12) Respond to the prompts as follows:

'Inhibit Logons at all workstations? Logons = NO'; This prompt offers the option to inhibit logon operations for all workstations. If YES is answered, all workstations except WSO will be inhibited from logon operations. The default value is NO.

'Load Microcode to all Devices? LMCODE = NO'; This prompt allows optional loading of microcode to all devices on the system with loadable microcode, including remote workstations. (Note that most devices load microcode when the device is first powered-on). If YES is selected, the system loads microcode to all microcode loadable devices, thus slowing down the IPL process significantly. The default value is NO.

'Inhibit Dumping Continuable Halts? CNDUMP = NO'. This prompt enables or disables continuable dumps. If YES is selected, the system does not run continuable dumps, the error remains and system operation may be affected. The default value is NO.

13) Press 'ENTER' to select the configuration file displayed or press PF1 to use one workstation (workstation 0) and one disk. The Initial Program Load (IPL) screen will be displayed.



**A.8 UNPACKING AND SETUP**

**A.8.2.1 FIRST-TIME IPL PROCEDURE (7 of 9)**

---

\*\*\* MESSAGE WN3 BY IPL

INFORMATION REQUIRED BY PROGRAM @SYSGEN@

SET DATE AND TIME

YEAR = YY                    MONTH = MM                    DAY = DD  
HOUR = HH                    MINUTE = MM                    SECOND = SS

Memory Size = 02048 K

---

- 15) Enter the date in the YY/MM/DD format. Enter the current time using the 24-hour clock format and press ENTER. The screen will now display the following prompt:

**System Initialization In Progress**

**A.8 UNPACKING AND SETUP**

**A.8.2.1 FIRST-TIME IPL PROCEDURE (8 of 9)**

16) When system initialization is completed successfully (approximately one minute), the Operator's Console screen is displayed.

---

\*\*\* Wang VS Operator's Console \*\*\*  
10:12 AM Tuesday April 01, 1987

Position to (\*) and Press (ENTER) to Provide Immediate Operator Service:

\*MSG from QVR: Queue Verification Routine Complete . . . . . 10:12

Press (1) to Return to User Mode  
- or -

Use the Function Keys to Manage:

- |                          |                        |
|--------------------------|------------------------|
| 2) PRINT Queue           | 9) PRINTERS            |
| 3) PROCEDURE Queue       | 10) DISKS              |
| 4) TRANSMIT Queue        | 11) TAPES              |
| 5) RETRIEVE Queue        | 12) TELECOMMUNICATIONS |
|                          | 13) WORKSTATIONS       |
| 6) INTERACTIVE Tasks     |                        |
| 7) NON-INTERACTIVE Tasks | 14) SYSTEM Options     |

Press (HELP) at Any Time to Return to the Operator Console Menu

---

17) When the message 'Queue Verification Routine Complete' appears (approx. 20 to 30 seconds), acknowledge the message by positioning the cursor next to the message and press RETURN. Press PF1 to enter user mode. The VS Logon Screen is displayed.

---

\*\*\* Wang VS Logon \*\*\*

Workstation 0 10:13 AM Tuesday April 01, 1987

Hello new user  
Welcome to Wang VS

Please identify yourself by supplying the following information

Your userid = ██████  
Your password =

and press (ENTER) to logon

or press (PF11) to enter operator mode immediately

---

**A.8 UNPACKING AND SETUP**

**A.8.2.1 FIRST-TIME IPL PROCEDURE (9 of 9)**

18) Enter the default three-letter user ID, CSG. No password is required. Press ENTER. The Command Processor screen is displayed.

---

\*\*\* WANG VS COMMAND PROCESSOR \*\*\*  
Copyright, Wang Laboratories, INC. 1985  
Workstation 0 Ready 10:15 AM Monday April 01, 1987

Hello  
Welcome to the Wang VS

Press (HELP) at any time to interrupt your program or to stop processing of current command.

Use function keys to select a command:

- |                                    |                               |
|------------------------------------|-------------------------------|
| (1) RUN Program or Procedure       |                               |
| (2) Set USAGE Constraints          | (11) Enter OPERATOR Mode      |
| (3) Show PROGRAM Completion Report | (12) Submit PROCEDURE         |
| (4) Manage QUEUES                  | (13) Send MESSAGE to Operator |
| (5) Manage FILES/Libraries         | (15) PRINT Command Screen     |
| (6) Manage DEVICES                 | (16) LOGOFF                   |
- 

19) When the Command Processor screen appears, the system is in user mode. Run program 'GENEDIT' and configure the system. → 8.2.2 for differences in the GENEDIT procedures. → VS-5E/6E Processor Handbook for complete GENEDIT description and procedures.

20) After saving the new GENEDIT Configuration File, log-off the system and RE-IPL. Perform the IPL procedures, → A.8.2.1, steps 1-11. When the SYSFILE Screen is displayed, enter the name of the configuration file created in GENEDIT and press ENTER. Continue with the IPL procedures until the VS Log-on Screen is displayed.

**A.8 UNPACKING AND SETUP**

**A.8.2.2 GENEDIT PROCEDURES (1 of 7)**

**NOTE**

Note this manual contains only 'GENEDIT' information that differs from other VS mainframes. For information pertaining to programs and features, refer to the 'VS-5E/6E Processor Handbook'.

- 1) From the Command Processor screen, select RUN Program or Procedure (PF1).

```

*** WANG VS COMMAND PROCESSOR ***
Copyright, Wang Laboratories, INC. 1985
Workstation 0 Ready          10:16 AM          Monday April 01, 1987
    
```

Hello  
Welcome to the Wang VS

Press (HELP) at any time to interrupt your program or to stop processing of current command.

Use function keys to select a command:

- |                                    |                               |
|------------------------------------|-------------------------------|
| (1) RUN Program or Procedure       |                               |
| (2) Set USAGE Constraints          | (11) Enter OPERATOR Mode      |
| (3) Show PROGRAM Completion Report | (12) Submit PROCEDURE         |
| (4) Manage QUEUES                  | (13) Send MESSAGE to Operator |
| (5) Manage FILES/Libraries         | (15) PRINT Command Screen     |
| (6) Manage DEVICES                 | (16) LOGOFF                   |

**A.8 UNPACKING AND SETUP****A.8.2.2 GENEDIT PROCEDURES (2 of 7)**

- 2) The RUN Program Screen is displayed. Enter 'GENEDIT' next to the 'PROGRAM' prompt and leave the other fields blank. Press 'ENTER' to accept the entry. The GENEDIT 'Select CONFIG File Screen' is displayed.

GENEDIT x.xx.xx Copyright, Wang Laboratories, Inc. 1985 Select CONFIG File  
This program is used to create or modify a system configuration (CONFIG) file.

To edit an old CONFIG file, enter the file, library and volume:

VOLUME: SCSI1□ LIBRARY: @SYSTEM@ FILE: □□□□□□

- or -

To create a new CONFIG file, enter the VS model number: □□□□

To upgrade the CONFIG File to a higher VS model, enter the CONFIG file name and the higher VS model number.

Press (32) from any screen to exit GENEDIT.

PRESS: (ENTER) to continue (9) to see list of VS Model Numbers  
(16) to exit GENEDIT

- 3) Enter the volume name, library, and file name, of the CONFIG file to modify or enter the model number of VS model (5 for VS-5E, 6 for VS-6E) in the 'To create a new CONFIG file, enter the VS model number: □□□' field to create a new CONFIG file. Press ENTER to continue.
- 4) The GENEDIT Initialization screen is displayed. In about 30 seconds the GENEDIT Main Menu screen is displayed.

GENEDIT

Main Menu  
Model VS□

Select the function you wish to perform by pressing the corresponding PFKey:

- (2) Examine/Modify System Options
- (3) Examine/Modify the DA and Device Configurations
- (4) Display summary and Save/Create/Print the modified CONFIG File

Press: (16) to edit a new CONFIG File  
(32) to Exit GENEDIT



**A.8 UNPACKING AND SETUP****A.8.2.2 GENEDIT PROCEDURES (3 of 7)**

- 5) Press PF3 to Examine/Modify the DA and Device Configurations. The VS□ Device Adapter Screen is displayed.

---

GENEDIT		VS□ Device Adapters Model VS□		
Jumper Address	1st PDA	Dev	DA Type	DA Description
000 2800	0		28V01	BP/SIO Device Adapt
000 2000	32		28V02	BP/Floppy DA
000 2010	33		28V03	BP/RS-232 Async DA
000 2020	35		28V04	BP/SCSI DA
300 2C00				
500 3000				
100 3400	40		25V50	Disk Device Adapter
600 3800				
400 3C00				

TAB to Device Type and PRESS:  
 (ENTER) to edit the devices on the Device Adapter  
 (9) to show valid Device Adapters for the slot

or PRESS: (13) to modify the Device Adapter types;  
 (14) to modify the starting device numbers;  
 (16) to return to main menu

---

- 6) The Bus Processor (jumper address 0000) has four Physical Device Addresses (PDA) assigned to it. PDA 2800 contains the BP/SIO Device adapter, PDA 2000 contains the BP/Floppy DA, PDA 2010 contains the RS-232 Async DA, and PDA 2020 contains the SCSI DA. Each of these DAs are described in the following text with the exception of the RS-232 Async DA.

**A.8 UNPACKING AND SETUP**

**A.8.2.2 GENEDIT PROCEDURES (4 of 7)**

- 7) Tab to 28V01 BP/SIO Device Adapter and press ENTER to display the Devices on IOP screen. **The first device (device 0, Port 0) must be a serial workstation, enter the appropriate workstation model number.**

**NOTE**

If a device other than a serial workstation is entered, the message 'Device 0 must be a workstation' is displayed.

---

GENEDIT Devices on IOP

Model VS□

28V01 BP/SIO Device Adapter IOP#2

Dev#	Port#	Type	Description	WP?
0	0	2256C	Combined WS (64K)	
1	1			
2	2			
3	3			
4	4			
5	5			
6	6			
7	7			
8	8			
9	9			
10	10			
11	11			
12	12			
13	13			
14	14			
15	15			

TAB to Device Type and PRESS:	or PRESS:	(5) Next
(ENTER) Reserve cluster devices	(9) Valid Devices	(16) Return
(12) Shift	(13) Modify	(↑1) Main men

---

**A.8 UNPACKING AND SETUP**

**A.8.2.2 GENEDIT PROCEDURES (5 of 7)**

- 8) Press PF16 to return to the VS Device Adapters Screen. Select 28V02 BP/Floppy DA and press ENTER. The Disks on DA screen is displayed.

The 1.2 MB Floppy is provided on the VS-5E and VS-6E Computer System. Enter the the drive type (2270V7) and press ENTER. Press PF16 to return to the VS Device Adapters Screen.

GENEDIT

Disks on DA  
Model V□

28V02                      BP/Floppy DA                      IOP#2

Dev#	Port#	Type	Description	Attach?
33	0	2270V7	1.2MB 5-1/4" Floppy	

TAB to Device Type and PRESS:

or PRESS:

(12) Shift Devices Up/Down

(9) Valid Disk

(13) Modify

(16) Return

(↑) Main men

- 9) Select 28V04 BP/SCSI DA and press ENTER. The Disks on DA screen is displayed.

**A.8 UNPACKING AND SETUP**

**A.8.2.2 GENEDIT PROCEDURES (6 of 7)**

A sample 'Disks on DA" GENEDIT Screen is shown below:

GENEDIT		Disks on DA			
		Model VS□			
28V04	BP/SCSI DA			IOP#3	
Dev#	Port#	Type	Description	Attach?	
<b>35</b>	<b>6</b>	<b>2269V4</b>	<b>145MB SCSI Fixed Dk</b>		
36	6				
37	6				
38	6				
<b>39</b>	<b>5</b>	<b>2269V3</b>	<b>72MB SCSI Fixed Dk</b>		
40	5				
41	5				
42	5				
<b>43</b>	<b>4</b>	<b>2269V3</b>	<b>72MB SCSI Fixed Dk</b>		
44	4				
45	4				
46	4				
<b>47</b>	<b>3</b>	<b>2269V4</b>	<b>145MB SCSI Fixed Dk</b>		
48	3				
49	3				
50	3				

TAB to a device and PRESS:	or PRESS:	
(12) Shift devices up/down	(9) Valid Disk	(16) Return
	(13) Modify	(↑) Main men

**A.8 UNPACKING AND SETUP**

**A.8.2.2 GENEDIT PROCEDURES (7 of 7)**

- 10) The SCSI drive that contains the IPL Bootfiles must be assigned to port 6. Additional SCSI drives must be assigned to either port 5, 4, or 3, → A.8.2.2 'Disks on DA' GENEDIT Screen.

**NOTES**

- 1) The SCSI drive that contains the boot files (IPL Text) must be assigned to port 6.
  - 2) Only one SCSI disk drive device type can be assigned per port. If a second SCSI disk drive is assigned, the prompt 'The device specified is not a cluster device, it requires a unique part number' is displayed.
- 
- 11) Configure the SCSI disk drives and press ENTER, → A.8.2.2 'Disks on DA' GENEDIT Screen. Press PF16 to return to the VS Device Adapters Screen and complete the configuration.

**A.8 UNPACKING AND SETUP**

**A.8.3 VS-5E/6E UPGRADES**

The VS-5E/6E Upgrades section of the VS-5E/6E Computer System is similar to the VS-5/6 Upgrades section of the VS-5/6 Computer System, → 9.13. The VS-5E/6E differences are explained below.

<u>Model</u>	<u>WLI/P/N</u>	<u>Description</u>
UJ-3436	205/206-3436	VS5E 1MB to 2MB Main Memory Upgrade
UJ-3437	205/206-3437	VS6E 1MB to 2MB Main Memory Upgrade
UJ-3438	205/206-3438	VS6E 1MB to 4MB Main Memory Upgrade
UJ-3439	205/206-3439	VS6E 2MB to 4MB Main Memory Upgrade
UJ-3498	205/206-3498	VS5E to VS6E 1CM/DM 1MB Mem.Upgrade
UJ-3499	205/206-3499	VS5E to VS6E 1CM/DM 2MB Mem.Upgrade

VS-5E 1MB to 2MB Main Memory Upgrade

- 1) This VS-5E 2MB Memory Upgrade Kit allows VS-5E CPU/Memory PCB memory size to be upgraded from 1MB to 2MB. This upgrade contains four 256K SIMMS Modules that are installed in VS-5 CPU/Memory PCB. → 8.3.1 Upgrade Procedures.

VS-6E 1MB to 2MB Main Memory Upgrade

- 2) This VS-6E 2MB Memory Upgrade Kit allows VS-6E Cache Memory size to be upgraded from 1MB to 2MB. → 8.3.1 Upgrade Procedures.

VS-5E 1MB to 4MB Main Memory Upgrade

- 3) This VS-5E 4MB Memory Upgrade Kit allows VS-5E CPU/Memory size to be upgraded from 1MB to 4MB. → 8.3.1 Upgrade Procedures.

VS-5E 2MB to 4MB Main Memory Upgrade

- 4) This VS-5E 4MB Memory Upgrade Kit allows VS-5E CPU/Memory size to be upgraded from 2MB to 4MB. → 8.3.1 Upgrade Procedures.

VS-5E to VS-6E 1CM/DM 1MB Upgrade

- 5) This VS-5E to VS-6E Upgrade Kit allows the VS-5E to be upgraded to a VS-6E. → 8.3.1 Upgrade Procedures.

VS-5E to VS-6E 1CM/DM 2MB Upgrade

- 6) This VS-5E to VS-6E Upgrade Kit allows the VS-5E to be upgraded to a VS-6E. → 8.3.1 Upgrade Procedures.

**A.8 UNPACKING AND SETUP**

**A.8.3.1 VS-5E/6E UPGRADE PROCEDURES (1 of 3)**

SOFTWARE REQUIREMENTS:

<u>CP TYPE</u>	<u>VS SYSTEM CONFIGURATION</u>	<u>REQUIREMENTS</u>
CP5	VS--5/5E	CPU Microcode Version 5.70.20 or later (included with 7.13 OS release).
CP7	VS-6/6E	CPU Microcode Version 7.70.22 or later (included with 7.13 OS release).

SAU HARDWARE PREREQUISITES:

CP5: None  
 CP7: None

SAU SOFTWARE PREREQUISITES:

CP5: VS-5 BP Boot PROM Revision 5630 or later  
 CP7: VS--6 BP Boot PROM Revision 5630 or later

GENEDIT PREREQUISITES:

GENEDIT Version 7.13.90

HARDWARE REQUIREMENTS:

VS-5/5E/6/6E with either a 360KB or 1.2MB Floppy Diskette Drive. Need one (1) Workstation (16K or greater) to act as Workstation Zero (0) System Console.

**A.8 UNPACKING AND SETUP**

**A.8.3.1 VS-5E/6E UPGRADE PROCEDURES (2 of 3)**

UPGRADE PURPOSE: Add a new second drive to VS-5/6.

UPGRADE INSTRUCTIONS:

- 1) Remove all cables connected to TC Device Adapter (DA) Board, → 7.3.
- 2) Remove all cables connected to BP Board, → 7.3.
- 3) Remove BP Board, → 7.3.2.
- 4) Remove both BP Board PROMS at locations L183 and L184.
- 5) Install new BP Board PROM's at locations L183 and L184 as follows:
  - A) VS-5/6 (256K BP Board - P/N 210-9111)  
PROM Part Numbers: (PROM REV. 5694)
    - 1) 379-2095R1
    - 2) 379-2096R1

**NOTE**

BP PCB switches SW1 and SW2 must be set for new self identifying disk drives as indicated, → 6.3.1.

- 6) Install updated BP Board, → reverse steps of 7.3.2.
- 7) Remove Data Cable connections from Winchester Disk Drive, → 7.5.
- 8) Remove Winchester Disk Drive power cable, → 7.5.
- 9) Remove Winchester Disk Drive, → 7.5.
- 10) Remove cable from terminator connection on VS-5/6 Rear Panel, → 7.12.3.
- 11) Set jumpers on new second Winchester Disk Drive to I.D.6 (depends on jumper setting of first Winchester Disk Drive).



**A.8 UNPACKING AND SETUP**

**A.8.3.1 VS-5E/6E UPGRADE PROCEDURES (3 of 3)**

UPGRADE INSTRUCTIONS, (CONT'D):

- 12) Install new power cable and power cable extension (P/N 220-2307) on Winchester Disk Drive, → reverse steps of 7.5.
- 13) Connect Data cable to new second Winchester Disk Drive, → 7.5.
- 14) Install new replacement Winchester Disk Drive, → reverse steps of 7.5.
- 15) Install new upgrade (5E/6E) cable through rear panel toward front of VS-5/6 through the cable channel, → 7.5.
- 16) Connect new upgrade cable terminator to rear panel using old hardware, → 7.12.3.
- 17) Connect other end of new cable to Data connection of new second Winchester Disk Drive, → 7.5.
- 18) Connect other end of upgrade cable to SCSI connector on BP Board, → reverse steps of 7.3 and 7.3.2.
- 19) Re-IPL System, → 4.2.
- 20) Reinitialize new second Winchester Disk Drive, → 4.2 and 4.2.1.
- 21) Run GENEDIT and install new Winchester Disk Drive Model # and the new Drive I.D. # on GENEDIT Utility, → 4.2.

**A.8 UNPACKING AND SETUP**

**A.8.3.2 VS-5E FIELD REPLACEABLE UNITS**

MODEL NUMBERS: VS-5E-1CM, -2CM, -2DM:

PART NUMBER :	DESCRIPTION
210-9110-A	: CPU/MM PCB
210-9111	: BP PCB
725-0232	: FLOPPY DRIVE 1.2MB
725-0270	: WINCHESTER DRIVE 72MB
725-0269	: WINCHESTER DRIVE 145MB
278-0975	: EAPA
270-1063	: SWITCHING POWER SUPPLY
210-9113	: FRONT PANEL
220-2451	: KEYLOCK ASSEMBLY
210-9112	: MOTHERBOARD
220-2453	: SPS to MB +5V BUS
220-1215	: SPS to MB +0V BUS
270-3378	: POWER HARNESS
220-3420	: BP to FLOPPY
220-3528	: BP to FRONT PANEL
220-3417	: BP to PTR A/REMOTE
220-3418	: BP to PTR B
220-3419	: BP to APA O
420-2058	: AC POWER CORD
220-3624	: BP to 147/72MB SCSI
220-3319	: APA SIGNAL JUMPER
220-2102	: APA POWER JUMPER
725-3334	: SCSI TERMINATOR (external)
210-8503	: 928 TERMINATOR

CP5 CPU PCB USAGE:

PART NUMBER :	DESCRIPTION :	CURRENT E-REV
210-9110-A	: CPU/MM PCB	: 2
210-9111	: BP PCB	: 7
270-1063	: SPS	:
210-8565	: SPS PCB	: 7
210-8563	: SPS PCB	: 6
210-9112	: MB	: 0

**A.8 UNPACKING AND SETUP****A.8.3.3 VS-6E FIELD REPLACEABLE UNITS**

MODEL NUMBERS: VS-6E-1CM, -2CM, -2DM, -4CM, -4DM:

PART NUMBER :	DESCRIPTION
210-9699-A	: CPU PCB
210-9111	: BP PCB
725-0232	: FLOPPY DRIVE 1.2MB
725-0270	: WINCHESTER DRIVE 72MB
725-0269	: WINCHESTER DRIVE 145MB
278-0975	: EAPA
270-1063	: SWITCHING POWER SUPPLY
210-9113	: FRONT PANEL
220-2451	: KEYLOCK ASSEMBLY
210-9112	: MOTHERBOARD
220-2453	: SPS to MB +5V BUS
220-1215	: SPS to MB +0V BUS
270-3378	: POWER HARNESS
220-3420	: BP to FLOPPY
220-3528	: BP to FRONT PANEL
220-3417	: BP to PTR A/REMOTE
220-3418	: BP to PTR B
220-3419	: BP to APA 0
210-9599-1	: CACHE/MM -1A, 2MB
420-2058	: AC POWER CORD
220-3624	: BP to 147/72MB SCSI
210-9599-A	: CACHE/MM (1MB)
220-3435	: CABLE (3 required)
210-9599-2	: CACHE/MM -2A, 4MB
220-2102	: APA POWER JUMPER
725-3334	: SCSI TERMINATOR (external)
210-8503	: 928 TERMINATOR
220-3319	: APA SIGNAL JUMPER

CP7 CPU PCB USAGE:

PART NUMBER :	DESCRIPTION	CURRENT	E-REV
210-9699-A	: CPU PCB	:	0
210-9111	: CPU PCB	:	7
210-9599	: MM PCB -A 1MB	:	1
210-9599	: MM PCB -1A 2MB	:	1
210-9599	: MM PCB -2A 4MB	:	1
270-1063	: SPS	:	
210-8565	: SPS PCB	:	7
210-8563	: SPS PCB	:	6
210-9112	: MB	:	0

**A.8 UNPACKING AND SETUP****A.8.3.4 VS-5E/6E MODELS**

<u>Model</u>	<u>MEI #</u>	<u>CEI #</u>	<u>Description</u>
VS5E-1CM	157/177-7485	167/187-7485	VS5E 1MB M.M. 72MB Winch. Drive
VS5E-1DM	157/177-7533	167/187-7506	VS5E 1MB M.M. 145MB Winch. Drive
VS5E-2CM	157/177-7486	167/187-7485	VS5E 2MB M.M. 72MB Winch. Drive
VS5E-2DM	157/177-7506	167/187-7506	VS5E 2MB M.M. 145MB Winch. Drive
VS6E-1CM	157/177-7487	167/187-7487	VS6E 1MB M.M. 72MB Winch. Drive
VS6E-2CM	157/177-7488	167/187-7487	VS6E 2MB M.M. 72MB Winch. Drive
VS6E-1DM	157/177-7534	167/187-7490	VS6E 1MB M.M. 145MB Winch. Drive
VS6E-2DM	157/177-7490	167/187-7490	VS6E 2MB M.M. 145MB Winch. Drive
VS6E-4CM	157/177-7489	167/187-7487	VS6E 4MB M.M. 72MB Winch. Drive
VS6E-4DM	157/177-7491	167/187-7490	VS6E 4MB M.M. 145MB Winch. Drive

**NOTES**

Part number prefix 157 = 50Hz ac line frequency mainframes.

Part number prefix 177 = 60Hz ac line frequency mainframes.

**VS-5/5E/6/6E DIFFERENCES:**

<u>VS-5/6</u>	<u>VS-5E/6E</u>
1) Uses Western Digital PCB	1) Western Digital PCB not used
2) Limit of two drives	2) Can add third drive
3) Uses SCSI Interface cable with Terminator, BP connector and Drive connector	3) Uses latest SCSI Interface cable with connectors for three imbedded SCSI drives, and BP connector
4) Uses only 67.5MB Winchester Drive	4) Uses either 72MB or 145MB Winchester Drives

A.8 UNPACKING AND SETUP

## A.8.3.5 WINCHESTER DISK DRIVE OPTIONS/UPGRADES

<u>Model</u>	<u>MEI #</u>	<u>CEI #</u>	<u>Description</u>
2269V-3B	289-0911	157/177-7503	72MB 5 1/4" Winch. Dr. Option Kit
2269V-4B	289-0912	257/177-7505	145MB 5 1/4" Winch. Dr. Option Kit
2269VR-3B	289-0951	157/177-7543	72MB 5 1/4" Winch. Dr. Upgrade Kit
2269VR-4B	289-0952	257/177-7544	145MB 5 1/4" Winch. Dr. Upgrade Kit

**A.8 UNPACKING AND SETUP****A.8.3.6 CPU INSTALLABLE OPTIONS**

<u>Model</u>	<u>MEI #</u>	<u>CEI #</u>	<u>Description</u>
25V36-B	289-0572	157/177-7430	8 Port Asynchronous I/O Controller
25V50-2B	289-0570	157/177-7426	2 Port SMD I/O Controller
25V50-4B	289-0578	157/177-7427	4 Port SMD I/O Controller
22V98-4A	289-0785	157/177-7501	4 Port SMD I/O Controller
25V76-1B	289-0568	157/177-7428	1 Port TC I/O Controller
25V76-2B	289-0569	157/177-7429	2 Port TC I/O Controller
VS-PA-8C	289-0621	157/177-7431	8 Port Serial APA
2270V5	289-0622	157/177-7440	VS-5/6 360K Floppy Kit

**A.8 UNPACKING AND SETUP**

**A.8.4 REMOTE MAINTENANCE**

The VS-5E/6E Remote Maintenance section of the VS-5E/6E Computer System is the same as the VS-5/6 Remote Maintenance section of the VS-5/6 Computer System, → 9.11 of the VS-5/6 Computer System Product Maintenance Manual.

# **FUNCTIONAL DESCRIPTION**



**A.9 FUNCTIONAL DESCRIPTION**

The VS-5E/6E Functional Description section of the VS-5E/6E Computer System is similar to the VS-5/6 Functional Description section of the VS-5/6 Computer System, → 10.1. No VS-5E/6E differences exist.

# **SPECIFICATIONS**

**A.10 SPECIFICATIONS**

**A.10.1 WINCHESTER DISK DRIVES**

The Hardware Specifications section of the VS-5E/6E Computer System is similar to the Hardware Specifications section of the VS-5/6 Computer System, → 11.1.1. The VS-5E/6E differences are listed below.

72MB WINCHESTER DRIVE:

Drive Performance:

Capacity: 72MB Formatted

Transfer Rate: 10MB/Second

Seek Time:

Track-to-Track:	5 Milliseconds
Average:	23 Milliseconds
Maximum:	50 Milliseconds

145MB WINCHESTER DRIVE:

Drive Performance:

Capacity: 145MB Formatted

Transfer Rate: 10MB/Second

Seek Time:

Track-to-Track:	5 Milliseconds
Average:	23 Milliseconds
Maximum:	50 Milliseconds

**A.10 SPECIFICATIONS****A.10.2.1 VS-5E MINIMUM SOFTWARE REQUIREMENTS**

The VS-5E Software Specifications section of the VS-5E/6E Computer System is similar to the VS-5 Software Specifications section of the VS-5/6 Computer System, → 11.1.2. The VS-5E/6E differences are listed below.

<u>Software</u>	<u>Version</u>	<u>Comments</u>	<u>WLI P/N</u>
System Software*	7.13	See explanations below	195-5560-C**, 195-5560-E**, 195-5560-G**

\* = Includes Operating System 7.13

\*\* = -C = Cartridge Tape  
 -E = 1.2MB 5 1/4 inch Diskette  
 -G = Streamer Tape

## A.10 SPECIFICATIONS

## A.10.2.2 VS-6E MINIMUM SOFTWARE REQUIREMENTS

The VS-6E Software Specifications section of the VS-5E/6E Computer System is similar to the VS-5 Software Specifications section of the VS-5/6 Computer System, → 11.1.2. The VS-5E/6E differences are listed below.

<u>Software</u>	<u>Version</u>	<u>Comments</u>	<u>WLI P/N</u>
System Software*	7.13	See explanations below	195-5561-C**, 195-5561-E**, 195-5561-G**

\* = Includes Operating System 7.13

\*\* = -C = Cartridge Tape  
 -E = 1.2MB 5 1/4 inch Diskette  
 -G = Streamer Tape

**A.10 SPECIFICATIONS**

**A.10.3.1 VS-5E/6E BUILT-IN TEST (BIT)**

The Diagnostics Specifications section of the VS-5E/6E Computer System is similar to the Diagnostics Specifications section of the VS-5/6 Computer System, → 11.3. The VS-5E/6E differences are listed below.

<u>Diagnostic Name</u>	<u>PROM Version</u>	<u>Location/PROM P/N</u>	<u>Package P/N</u>
VS-5/5E/6/6E Bus Processor Power-Up (BP-2)	5754	High - 379-2095-R2 Low - 379-2096-R2	195-4995-D*

\* = Includes hardcopy documentation only

**A.10 SPECIFICATIONS****A.10.4.1 VS-5E/6E DIAGNOSTICS**

The Diagnostics Specifications section of the VS-5E/6E Computer System is similar to the Diagnostics Specifications section of the VS-5/6 Computer System, → 11.3. The VS-5E/6E differences are listed below.

<u>Diagnostic Name</u>	<u>Revision</u>	<u>Package P/N</u>
Small VS BP-2 System Diagnostic Package	2763	195-5084-0*

**NOTE**

Complete 195 package part numbers include Diagnostic Monitor diskette(s) and documentation.

# **ILLUSTRATED PARTS**

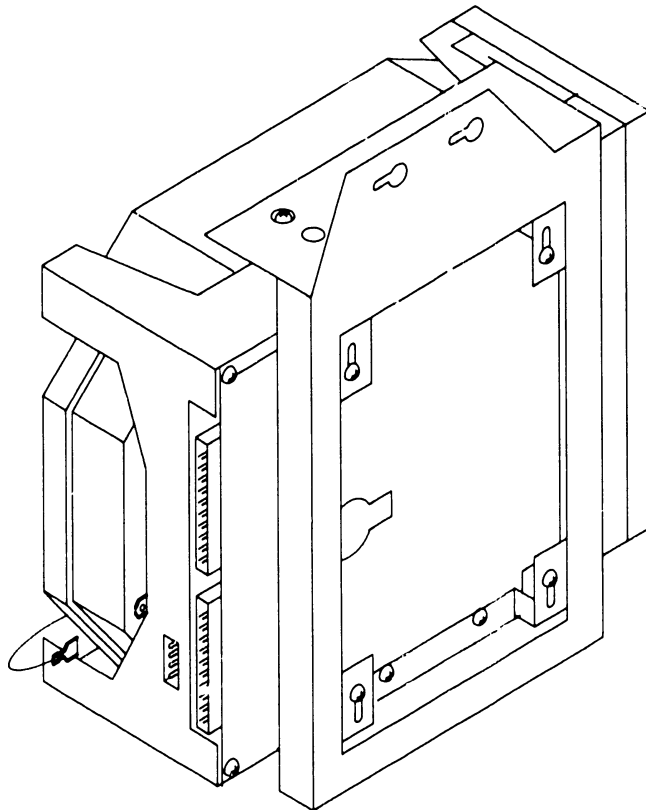


**A.11 ILLUSTRATED PARTS**

**A.11.1 COMPONENTS (1 of 2)**

The I.P.B. Components section of the VS-5E/6E Computer System is similar to the I.P.B. Components section of the VS-5/6 Computer System, → 12.3. The VS-5E/6E differences are shown below.

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1	725-0270	Winchester Disk Drive, 72MB, 5 1/4 inch
2	725-0269	Winchester Disk Drive, 145MB, 5 1/4 inch



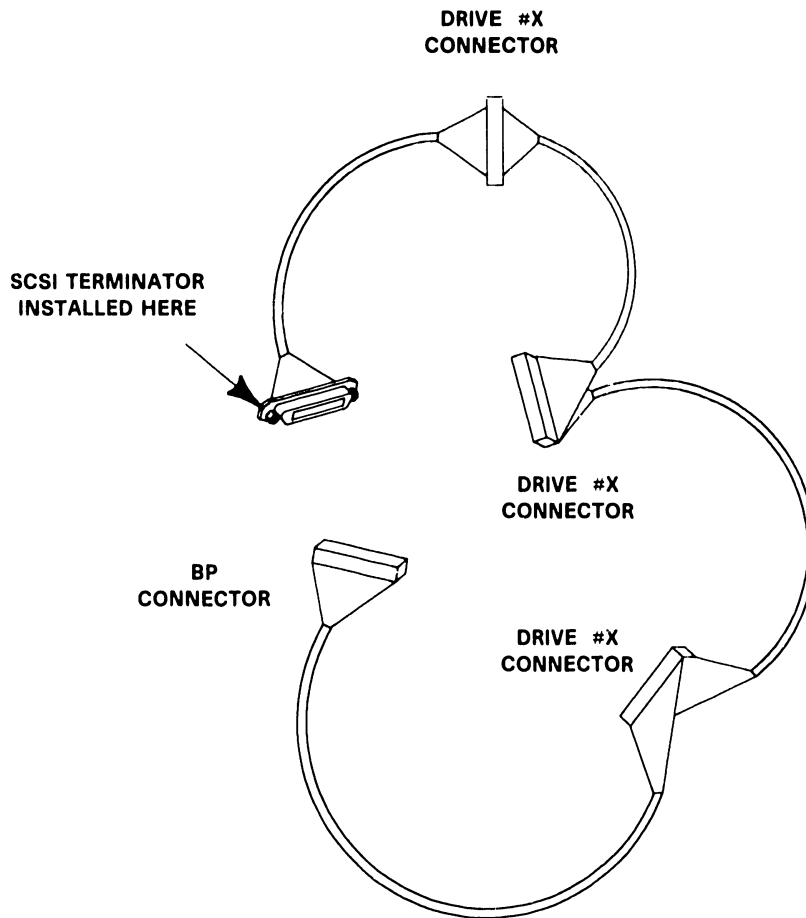
B 03846 FY87 16

**A.11 ILLUSTRATED PARTS**

**A.11.1 COMPONENTS (2 of 2)**

The I.P.B. Components section of the VS-5E/6E Computer System is similar to the I.P.B. Components section of the VS-5/6 Computer System, → 12.3. The VS-5E/6E differences are shown below.

<u>Item</u>	<u>Part Number</u>	<u>Description</u>
1	220-3624	SCSI Interface Cable, Winch. Drive, 72MB
2	220-3624	SCSI Interface Cable, Winch. Drive, 145MB



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# **APPENDIX**

## **B**

## APPENDIX B

### ENHANCED ASYNCHRONOUS DEVICE CONTROLLER BOARD

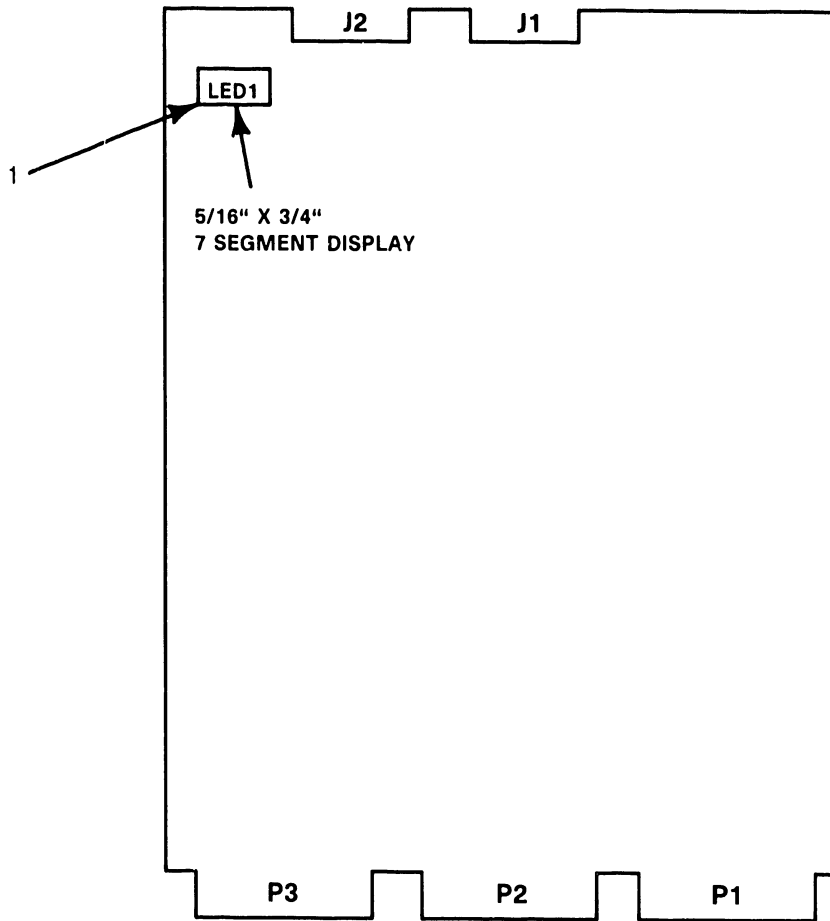
<u>Section</u>	<u>Title</u>	<u>Page</u>
B.1	CONTROLS AND INDICATORS .....	B-1
B.1.1	Enhanced Asynchronous Device Controller (EADC) .....	B-1
B.2	TROUBLESHOOTING .....	B-2
B.2.1	Enhanced Asynchronous Device Controller B.I.T. Failure .....	B-2
B.3	REPAIR .....	B-3
B.3.1	Enhanced Asynchronous Device Controller Removal .....	B-3
B.4	UNPACKING AND SETUP .....	B-5
B.4.1	Enhanced Asynchronous Device Controller Installation ..	B-5
B.4.2	VS-5E/6E Options .....	B-7
B.4.3	Rear Connector Panel Assembly Removal/Replacement .....	B-8
B.5	ILLUSTRATED PARTS .....	B-9
B.5.1	Components .....	B-9

**CONTROLS  
AND  
INDICATORS**

**B.1 CONTROLS AND INDICATORS**

**B.1.1 ENHANCED ASYNCHRONOUS DEVICE CONTROLLER (EADC)**

The Service Indicators section of the VS-5E/6E Computer System is similar to the Service Indicators section of the VS-5/6 Computer System, → 3.2 of the VS-5/6 Computer System Product Maintenance Manual. The VS-5E/6E differences are explained below.



\*NOTE: J11, J13, J15, AND J19 SHOULD NOT HAVE JUMPERS.

B-03846-FY87-3

Item	Name	Type and Function
1	Diagnostic LED1	LED; Red, Indicates GO/NO-GO status on 7 segment HEX Display (LED1). Displays a value of zero (0) when BIT Test passes, or a value higher than zero (0) when BIT Test failure occurs during power-up.

# **TROUBLESHOOTING**

**B.2 TROUBLESHOOTING**

**B.2.1 ENHANCED ASYNCHRONOUS DEVICE CONTROLLER B.I.T. FAILURE**

The Enhanced Asynchronous Device Controller (EADC) Power-Up B.I.T. diagnostics run concurrently with other VS-5E/6E system Power-Up diagnostics. The B.I.T. provides a go/no-go evaluation of the EADC board. The B.I.T. does not check each 'T' module nor the drive circuitry for each channel going to the back panel. If the EADC Power-Up diagnostics fail, the EADC LED1 displays something other than "0".



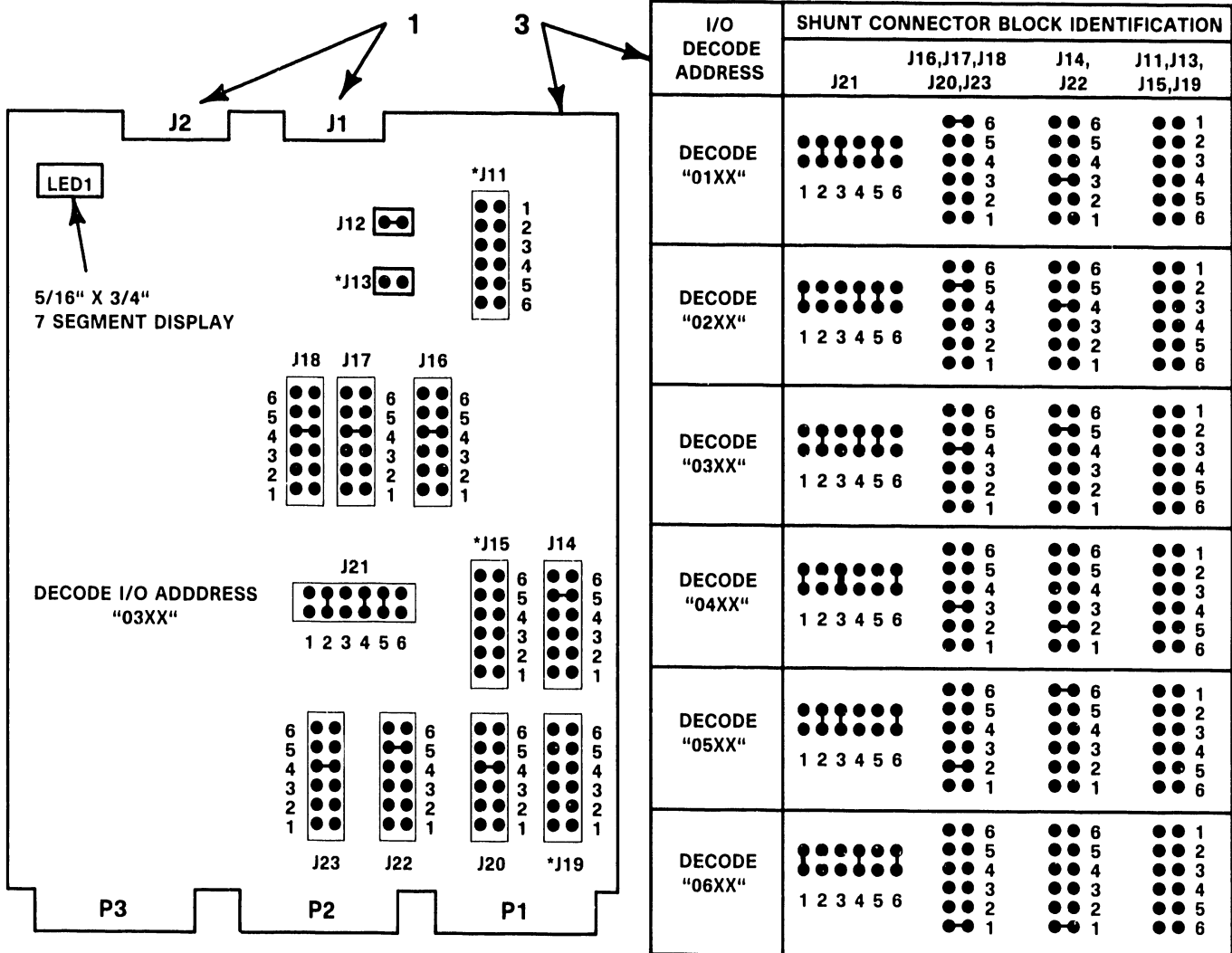
**REPAIR**

**B.3 REPAIR**

**B.3.1 ENHANCED ASYNCHRONOUS DEVICE CONTROLLER REMOVAL (1 of 2)**

The Repair section of the VS-5E/6E Computer System is similar to the Repair section of the VS-5/6 Computer System, → 7.3 of the VS-5/6 Computer System Product Maintenance Manual. The VS-5E/6E differences are explained below.

- 1) Before removing EADC Board (212-3114) from backplane option slot, disconnect J1 and J2 (50-pin Rear Panel Connector) cables from top of board.



\*NOTE: J11, J13, J15, AND J19 SHOULD NOT HAVE JUMPERS.

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**B.3 REPAIR**

**B.3.1 ENHANCED ASYNCHRONOUS DEVICE CONTROLLER REMOVAL (2 of 2)**

- 2) Remove EADC Board, → 7.3.
- 3) Check jumper locations/positions, → B.3.1.
- 4) Install new EADC Board into card cage by reversing steps of 7.3.
- 5) Reconnect all cables by reversing step 1 of B.3.1.

**NOTE**

No preferred jumper address exists for EADC Board.  
Configure jumper address for EADC Board use, → B.3.1.

# **UNPACKING AND SETUP**

**B.4 UNPACKING AND SETUP**

**B.4.1 ENHANCED ASYNCHRONOUS DEVICE CONTROLLER INSTALLATION (1 of 2)**

The VS-5E/6E Options section of the VS-5E/6E Computer System is similar to the VS-5/6 Options section of the VS-5/6 Computer System, → 9.12 of the VS-5/6 Computer System Product Maintenance Manual. No VS-5E/6E differences exist.

The Enhanced Asynchronous Device Controller (25V36AE) is a modular communications subsystem designed for use in existing VS CP5 and CP7 family computers. This allows use of non-intelligent asynchronous terminals such as the Wang 2110 and DEC VT100 to communicate with a VS Host over RS-232C lines.

**PCB INSTALLATION**

- 1) Power-down mainframe, → 4.4.
- 2) Remove mainframe covers, → 7.2.1, 7.2.2, and 7.2.3.
- 3) Remove PCB holddown device and turn TC Control panel to left, → 7.3.
- 4) Inspect PCB for damage, → 9.4.
- 5) Set Enhanced Asynchronous Device Controller address for EADC PCB use, → B.3.1.
- 6) Install Enhanced Asynchronous Device Controller in any available option slot (slot J2, J3, or J4), → 7.3.

**NOTE**

J1 on Rear Connector Panel Assembly  
connects to J1 on EADC PCB Assembly.

J2 on Rear Connector Panel Assembly  
connects to J2 on EADC PCB Assembly.

**B.4 UNPACKING AND SETUP**

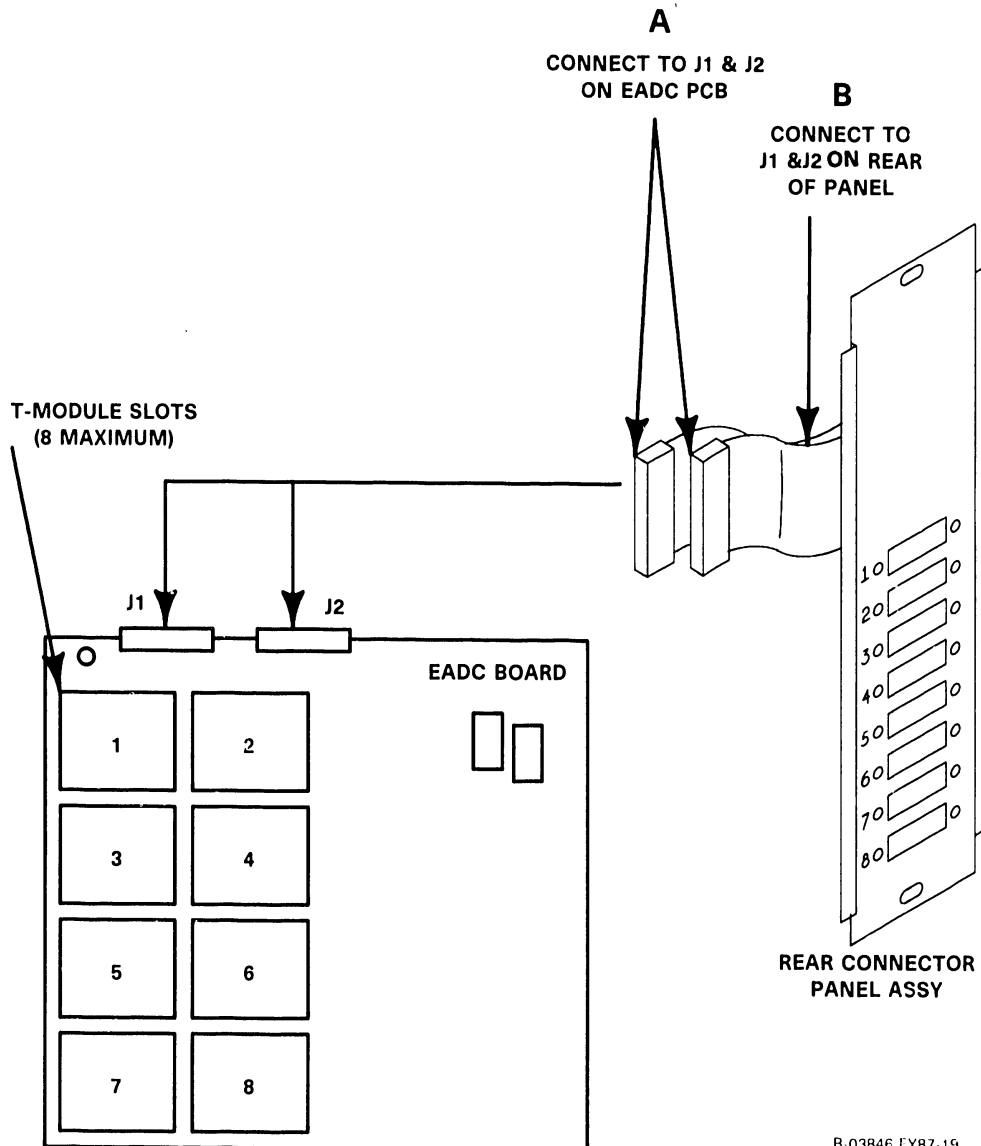
**B.4.1 ENHANCED ASYNCHRONOUS DEVICE CONTROLLER INSTALLATION (2 of 2)**

7) Connect Enhanced Asynchronous Device Controller to the Rear Connector Panel Assembly (WLI P/N 272-0056) as follows:

- A) Connect J1 on EADC PCB to J1 on Rear Connector Panel.
- B) Connect J2 on EADC PCB to J2 on Rear Connector Panel.

**NOTE**

EADC PCB is labeled with J1 and J2 visible.



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**B.4 UNPACKING AND SETUP**

**B.4.2 VS-5E/6E OPTIONS**

The VS-5E/6E Options section of the VS-5E/6E Computer System is similar to the VS-5/6 Options section of the VS-5/6 Computer System, → 9.12 of the VS-5/6 Computer System Product Maintenance Manual. No VS-5E/6E differences exist.

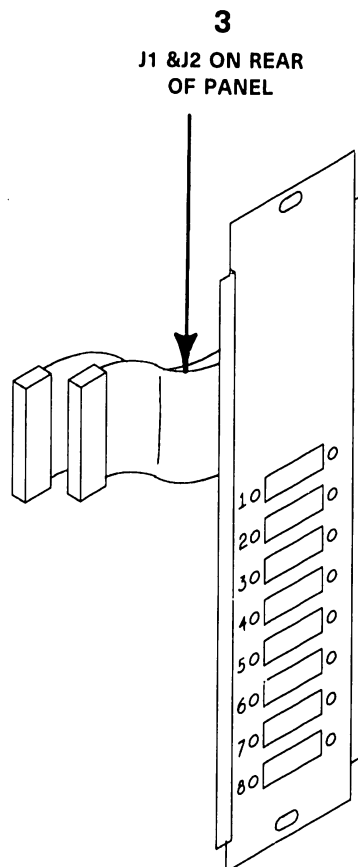
**VS-5E/6E OPTION PCB MODEL**

<u>MODEL NUMBER</u>	<u>WLI/P/N</u>	<u>DESCRIPTION</u>
25V36AE	212-3114	Enhanced Asynchronous Device Controller

**B.4 UNPACKING AND SETUP****B.4.3 REAR CONNECTOR PANEL ASSEMBLY REMOVAL/REPLACEMENT**

The VS-5E/6E Options section of the VS-5E/6E Computer System is similar to the VS-5/6 Options section of the VS-5/6 Computer System, → 9.12 of the VS-5/6 Computer System Product Maintenance Manual. The VS-5E/6E differences are explained below.

- 1) Power-down mainframe, → 4.4.
- 2) Remove top cover of mainframe, → 7.2.1, 7.2.2, 7.2.3.
- 3) Remove cables from Rear Connector Panel Assembly connectors J1 and J2.
- 4) Remove and save hardware used to secure Rear Connector Panel Assembly to mainframe.
- 5) To replace Rear Connector Panel Assembly, reverse removal procedure, steps 1 thru 4 of 9.5.



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# **ILLUSTRATED PARTS**

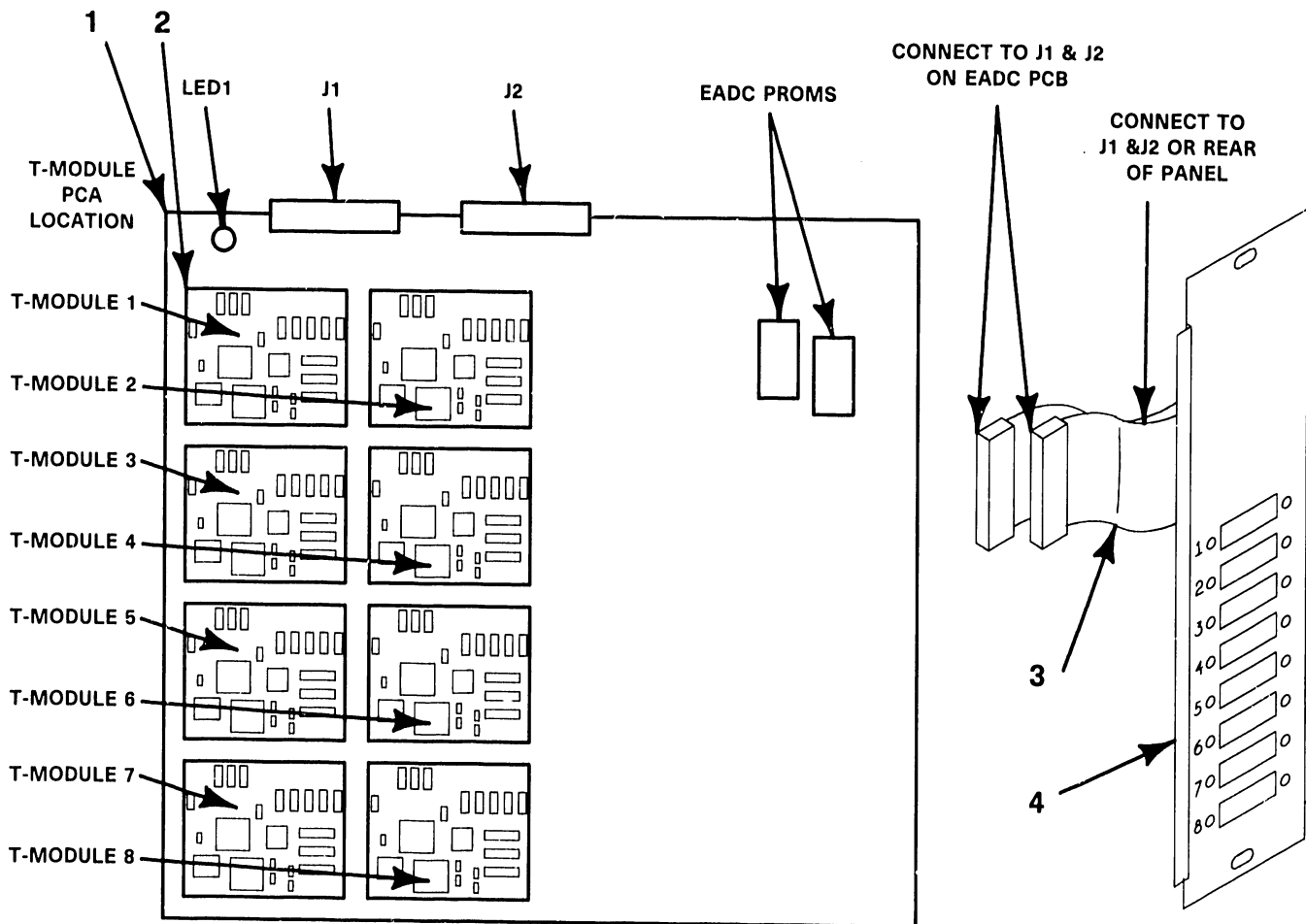
**B.5 ILLUSTRATED PARTS**

**B.5.1 COMPONENTS**

The VS-5E/6E Illustrated Parts section of the VS-5E/6E Computer System is similar to the VS-5/6 Illustrated Parts section of the VS-5/6 Computer System, → 12.3 of the VS-5/6 Computer System Product Maintenance Manual. The VS-5E/6E differences are explained below.

ITEM	PART NUMBER	DESCRIPTION	FRU
1	212-3114	EADC Motherboard with 8 T-Modules	ASSY
2	210-8618*	PCB VS-5E/6E EADC Module (T-Module)	PCB
3	220-3064-1	50-Pin Ribbon Cables (2 each)	CBL
4	272-0056	EADC Back Panel Assembly	ASSY

\* 210-8918 is also a valid part number for T-Module



B 03846 FY87-18

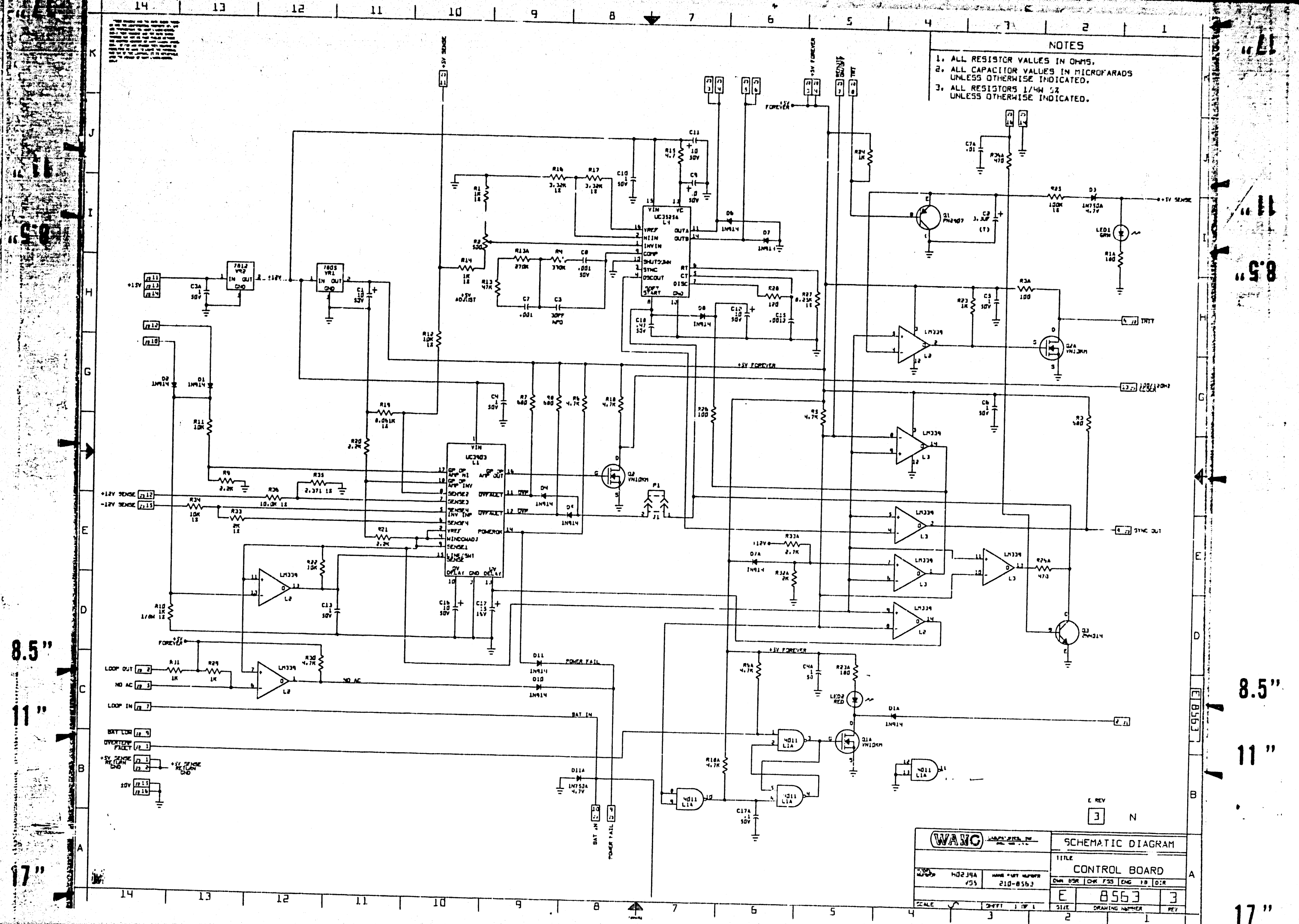
# **SCHEMATICS**

## SCHEMATICS

	<u>P/N</u>	<u>E-REV.</u>	<u>BOARD NAME</u>
1)	210-8563	3	Control Board
2)	210-9699	1	CPU Board
3)	210-9110	2	CPU Board (Multi-layer)
4)	210-9111	7	Bus Processor Board (Multi-layer)
5)	210-9112	0	Motherboard (Multi-layer)
6)	210-9113	0	Front Panel Board (Multi-layer)
7)	210-9313	0	Disk Drive Interface SMD 2 Port Board (Multi-layer)
8)	210-9315	0	Disk Drive Interface SMD 4 Port Board (Multi-layer)
9)	210-9337	4	Single Port TC Board (Multi-layer)
10)	210-9355	3	Asynchronous Control Device Board
11)	210-9599-1	1	Cache Memory Board 2MB (Multi-layer)
12)	210-9599-2	1	Cache Memory Board 4MB (Multi-layer)
13)	210-9637	2	2 Port TC Board (Multi-layer)
14)	210-7785	2	TC Light Panel Board
15)	210-8489	5	UISIO Board

### **NOTE**

The Schematics included in this manual are the latest revisions available at the time of printing.



- NOTES**
1. ALL RESISTOR VALUES IN OHMS.
  2. ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE INDICATED.
  3. ALL RESISTORS 1/4W 5% UNLESS OTHERWISE INDICATED.

<b>WANG</b>		<b>SCHEMATIC DIAGRAM</b>	
TITLE			
<b>CONTROL BOARD</b>			
DATE	NAME	CHK	ENG
03/29/84	WGT	WGT	WGT
VS5	210-8563		
SCALE	3/4" = 1"	SIZE	DRAWING NUMBER
		E	8563
		3	REV

8.5"  
11"  
17"

8.5"  
11"  
17"

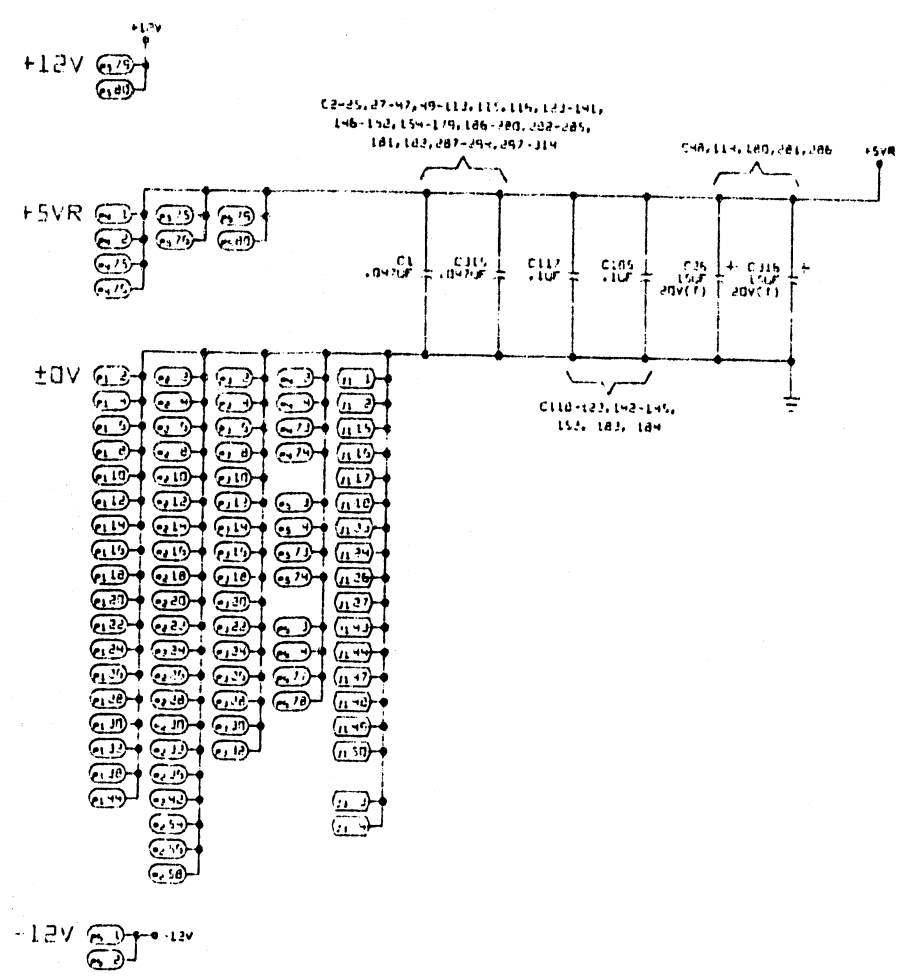
14 13 12 11 10 9 8 7 6 5 4 3 2 1

17"  
11"  
8.5"  
8.5"  
11"  
17"

NOTES  
 1. ALL RESISTOR VALUES IN OHMS.  
 2. ALL CAPACITOR VALUES IN MICROFARADS  
 UNLESS OTHERWISE INDICATED.  
 3. ALL RESISTORS 1/4" W  
 UNLESS OTHERWISE INDICATED.

PNEMONICS	COORD.
BATT 25	L1A9
SM	L4K1
SPAW	B4L1
SPAL	L2114
SPAZ	L2114
SPAL-SPALD	L2114
SPALL	L2114
SPMD-SPMD7	L2E14
SPMD-SPMD14	L2D14
CD-C13	L8K1
CR	G14
CR21-CR48	Z11
CR21	Z11
CR22	L1110
CR23	L1110
CR24	L1110
CR25	L1110
CR26	L1110
CR27	L1110
CR28	L1110
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CR296	L1110
CR297	L1110
CR298	L1110
CR299	L1110
CR300	L1110

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	L109	2
	L108	1
	L101	2
	L200	2
	L203	2
	L205	1
	L207	1
74LS00	L54	1
	L67	1
74F02	L105	2
	L174	2
	L201	2
	L204	2
	L204	2
74F24	L12	1
	L175	1
	L180	4
	L240	4
	L217	2
	L256	1
74F04	L176	5
	L75	1
74F70	L177	2
	L183	2
	L224	1
	L240	1
	L245	2
74F10	L157	1
	L209	1
	L246	2
74F12	L22	1
	L128	1
	L5	2
	L77	1
	L98	2
	L155	2
	L256	1
	L275	1
	L318	1
	L347	2
74F74	L235	1
	L258	1
	L285	1
74F85	L207	2
	L200	2
	L27	1
74F240	L52	1
	L107	1
	L191	1



WANG		SCHEMATIC DIAGRAM	
TITLE		V3-65 CPU	
DATE	DATE PART NUMBER	CHK	LOC
75-65	310-9599	ENG	DIR
SCALE	QUANTITY	DRAWING NUMBER	REV
	1 OF 14	9699	1

17"

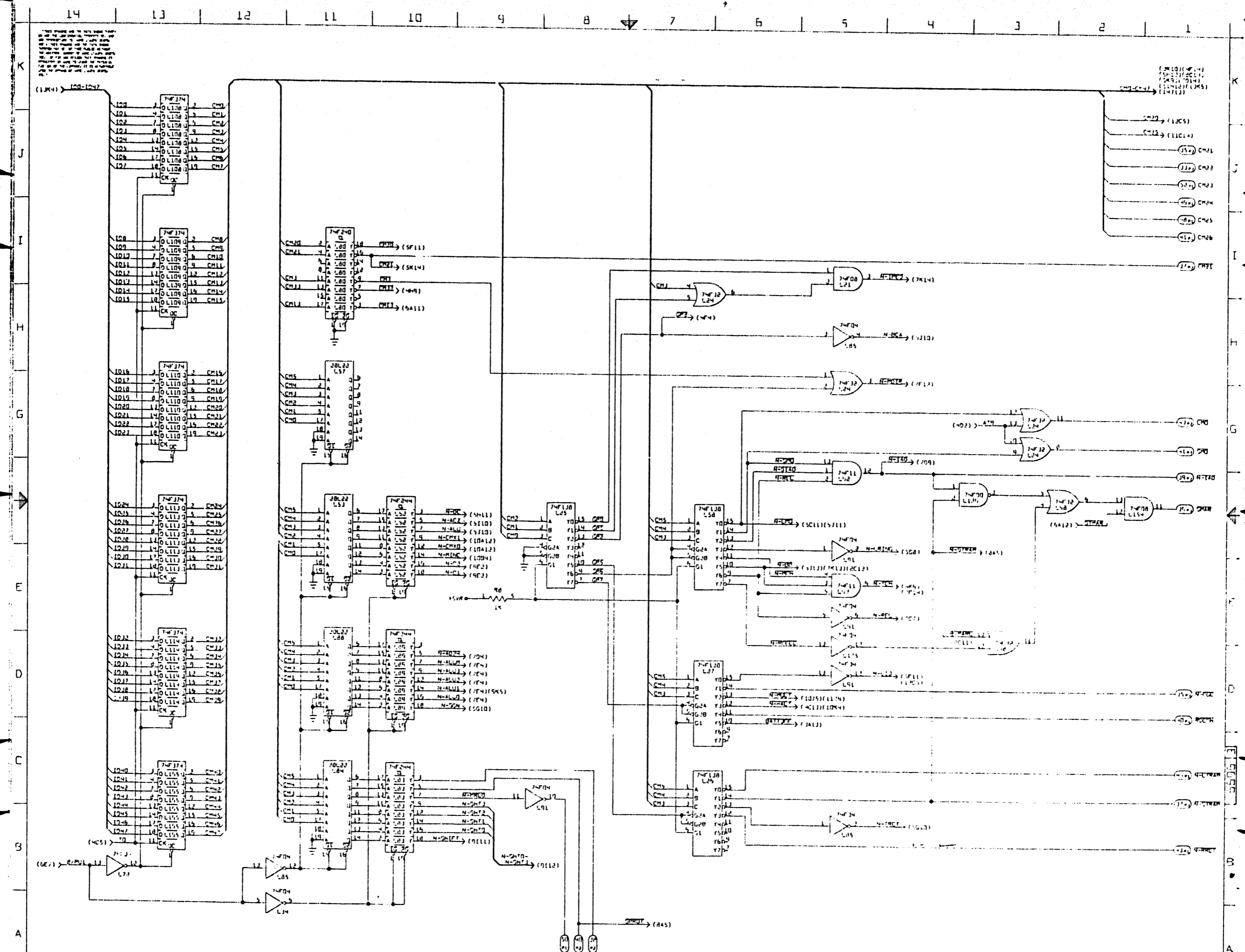
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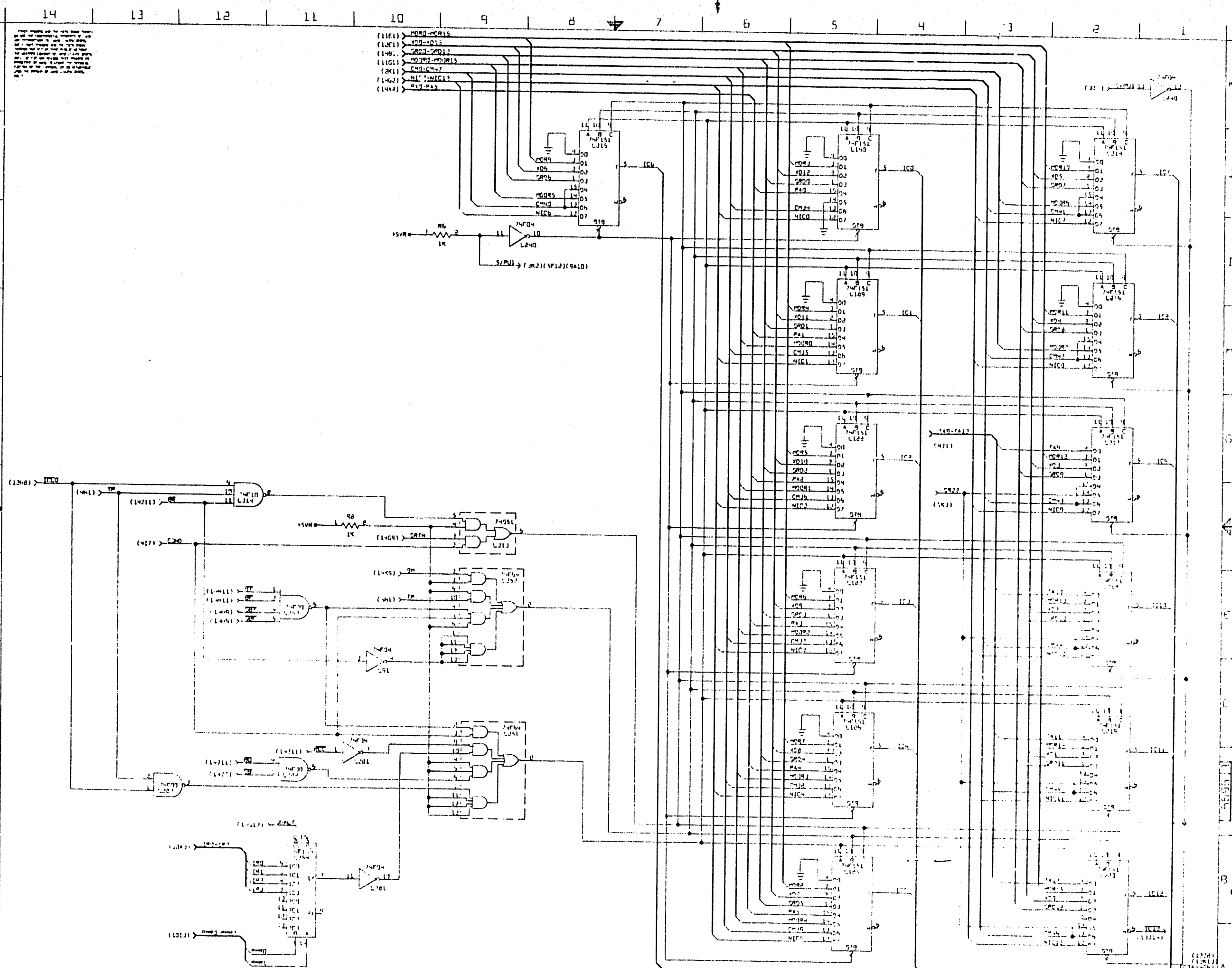
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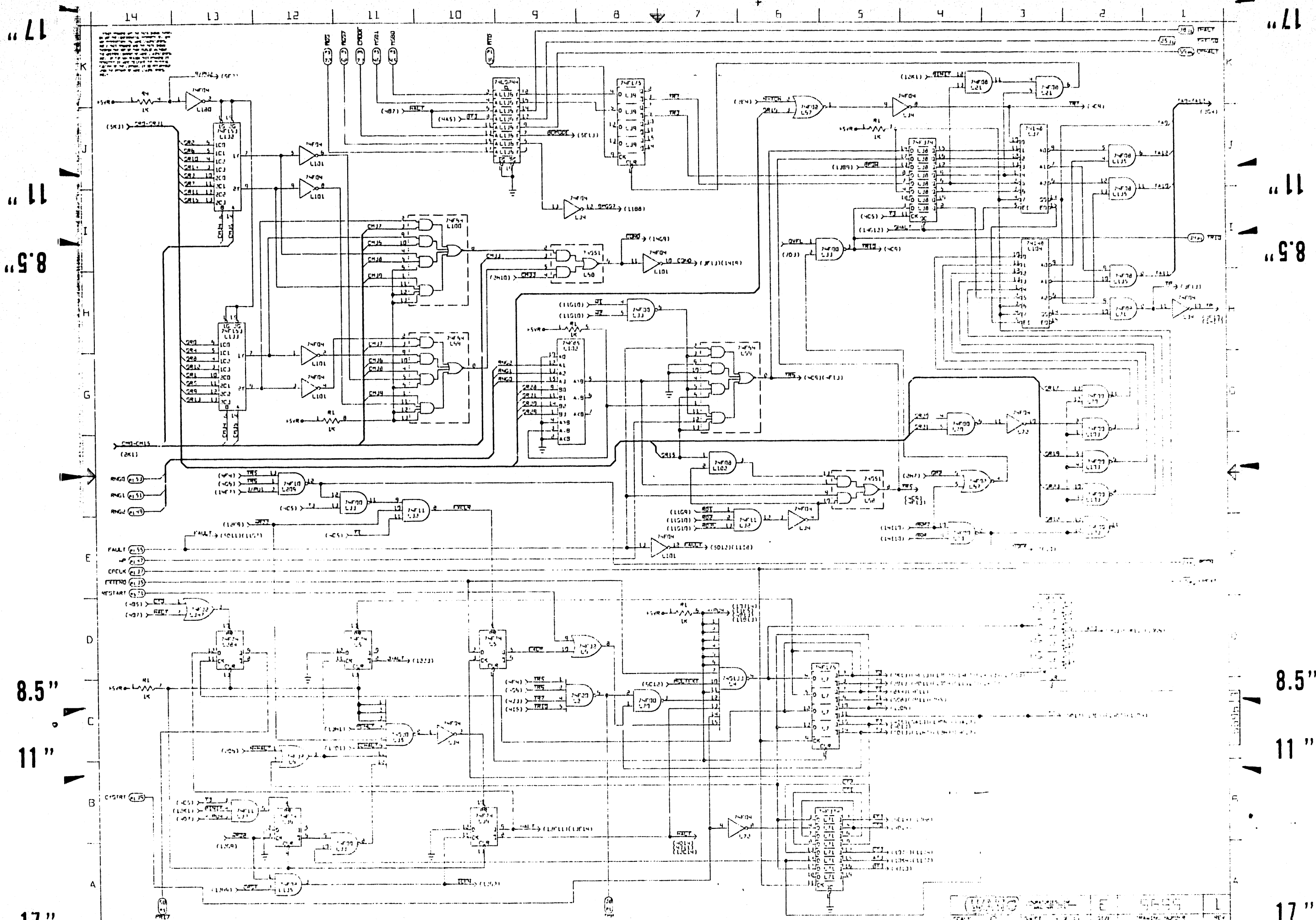
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17" 11" 8.5" 8.5" 11" 17"



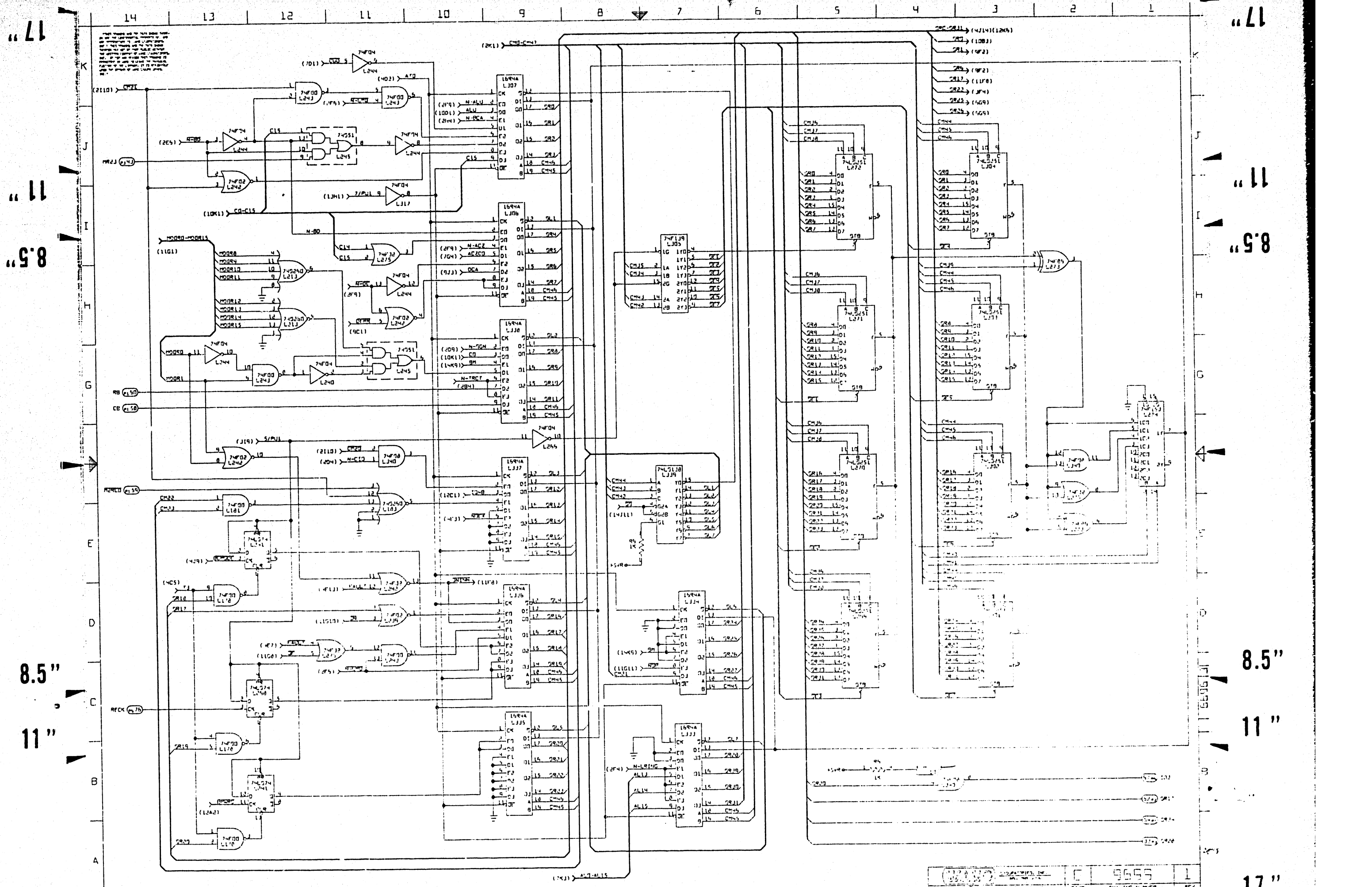




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WANG ELECTRONICS

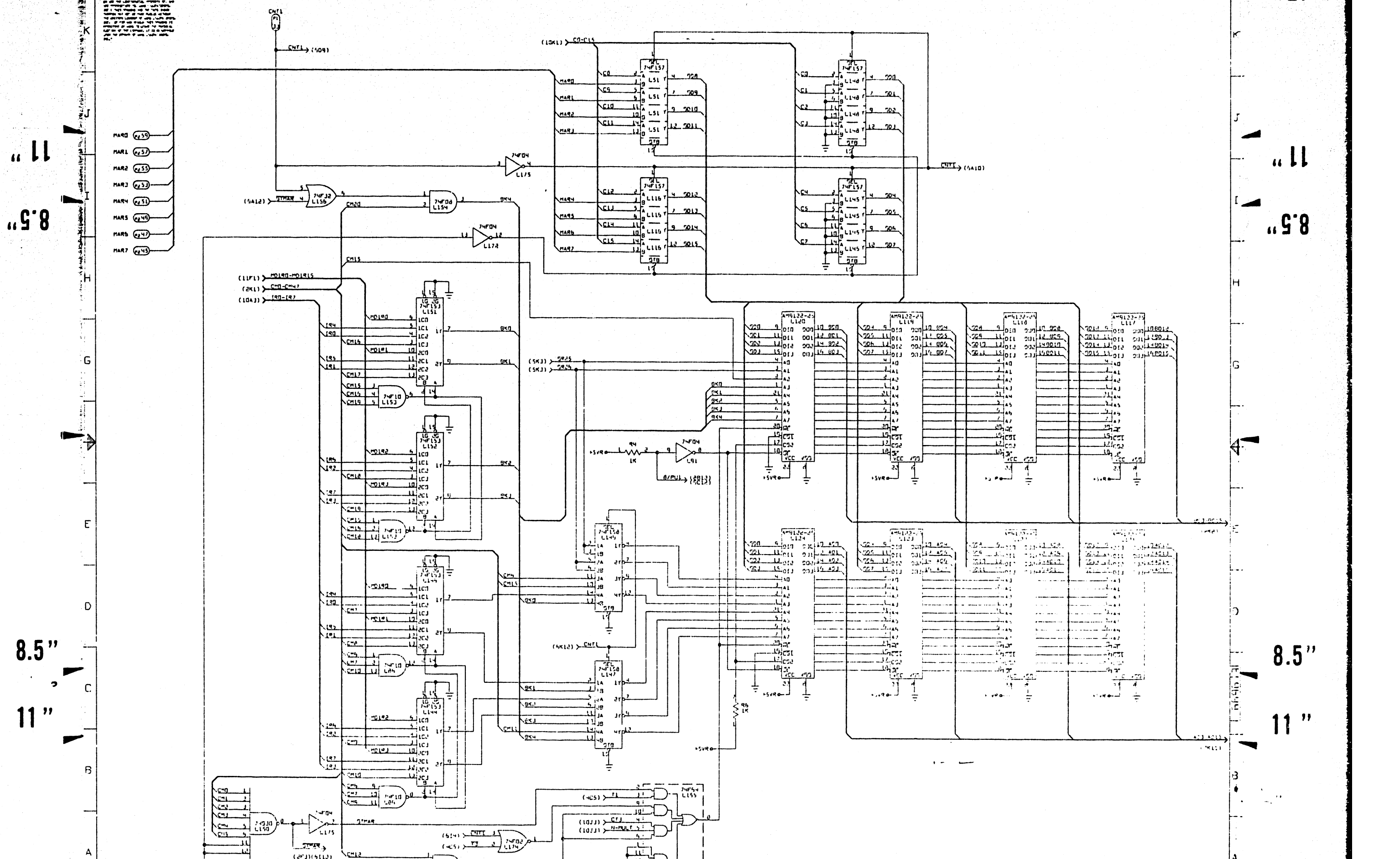


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SCALE DATE DRAWING NUMBER REV

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17" 11" 8.5" 8.5" 11" 8.5" 11" 17"

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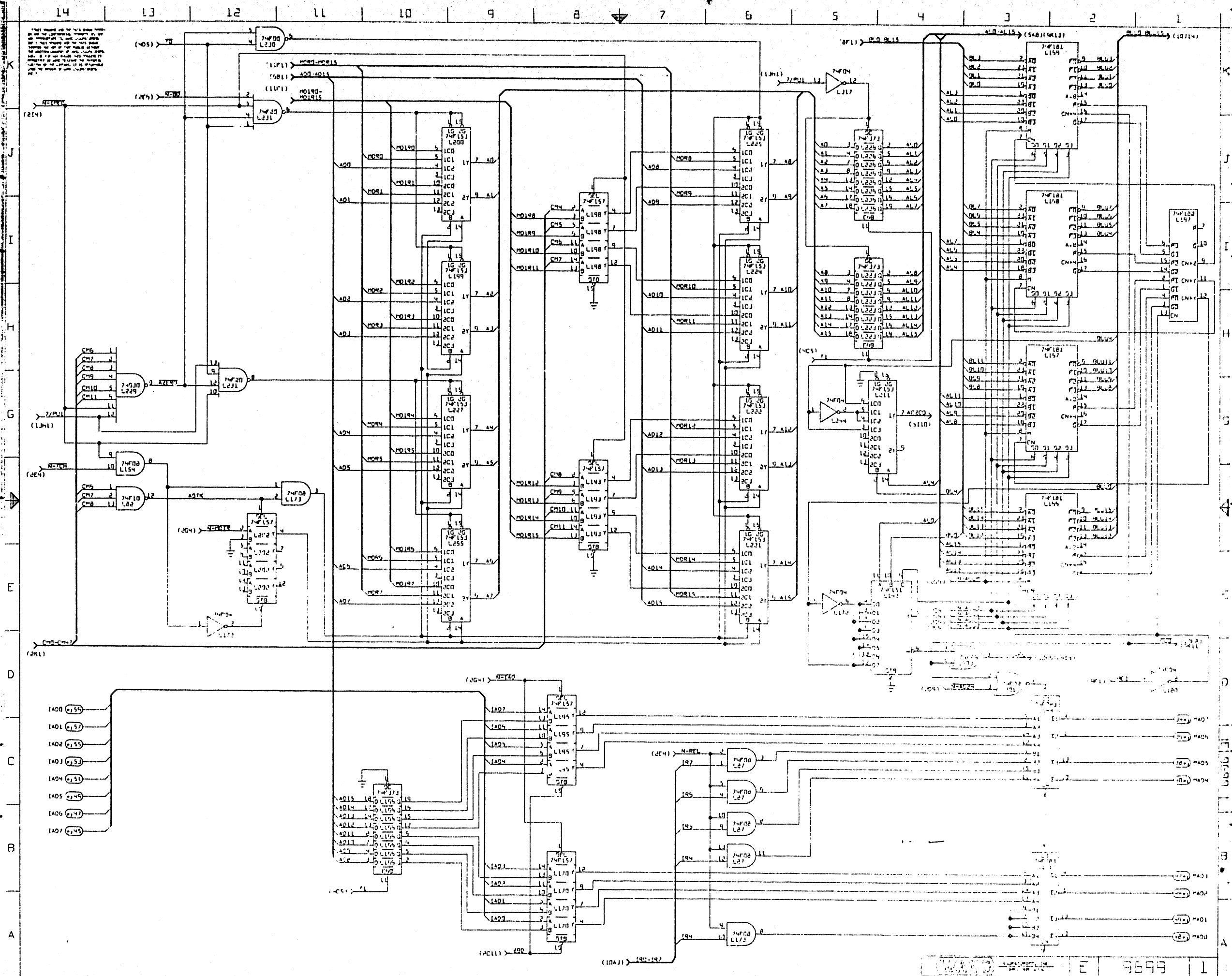
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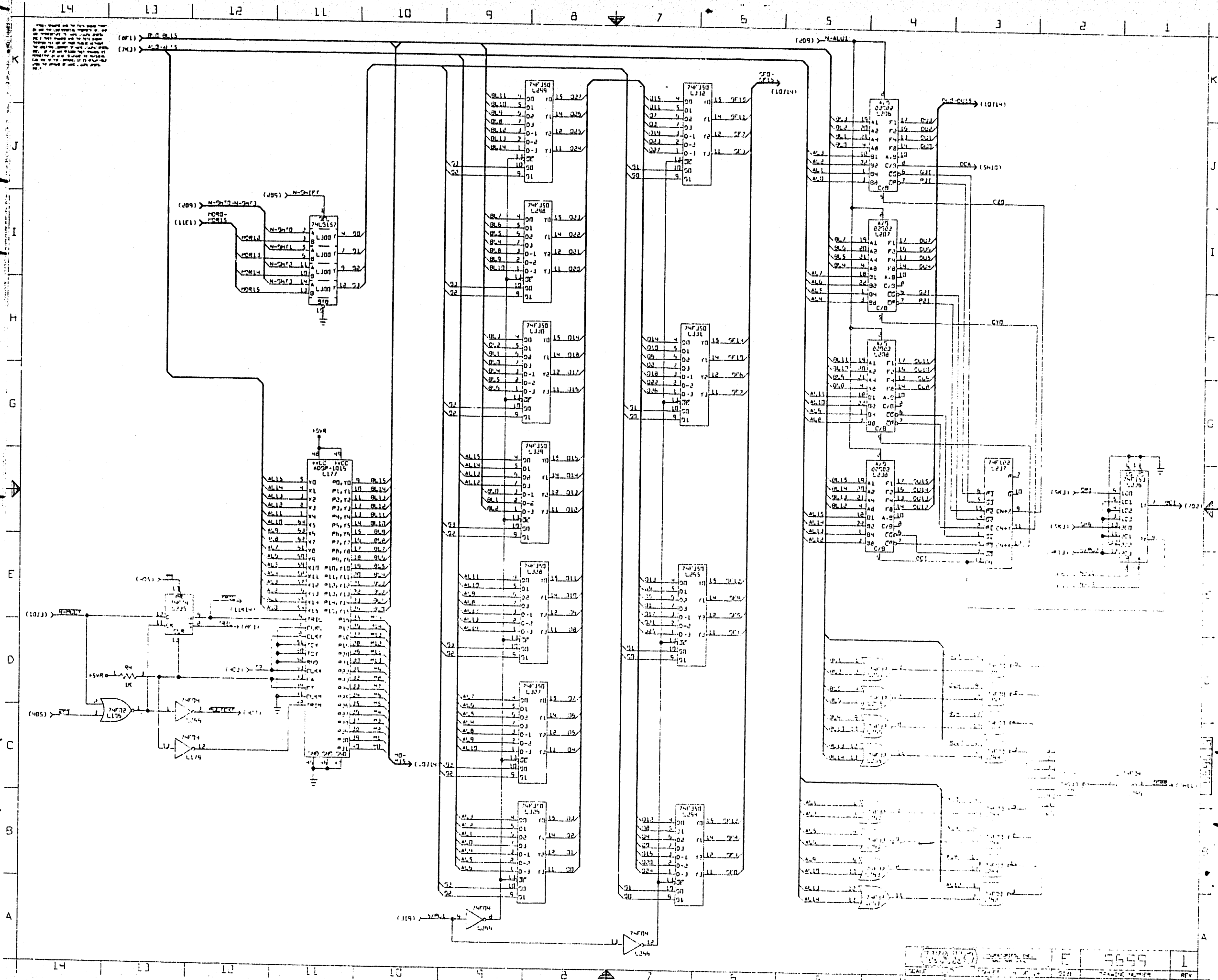
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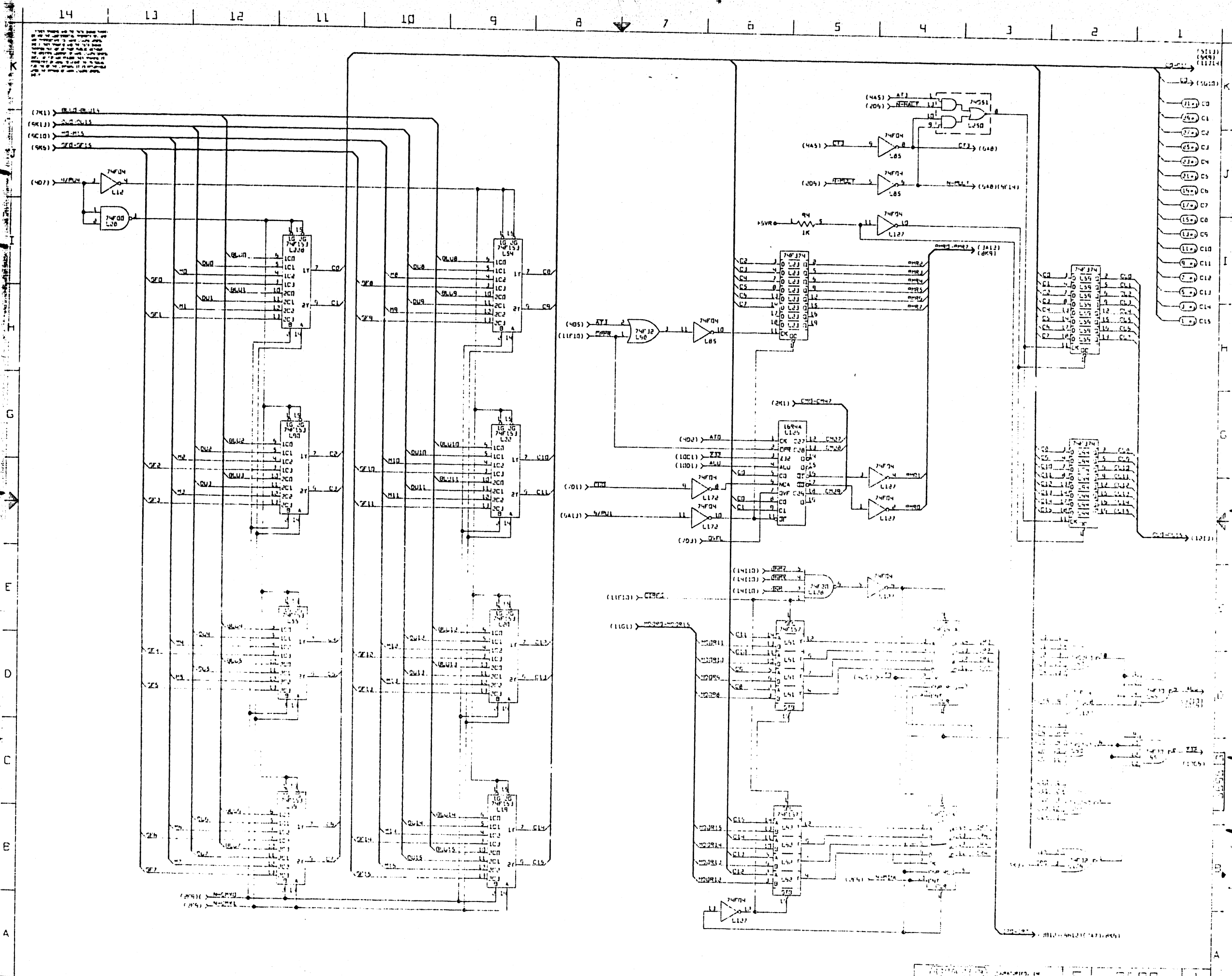


17" 11" 8.5" 8.5" 11" 17"



17" 11" 8.5" 8.5" 11" 17"

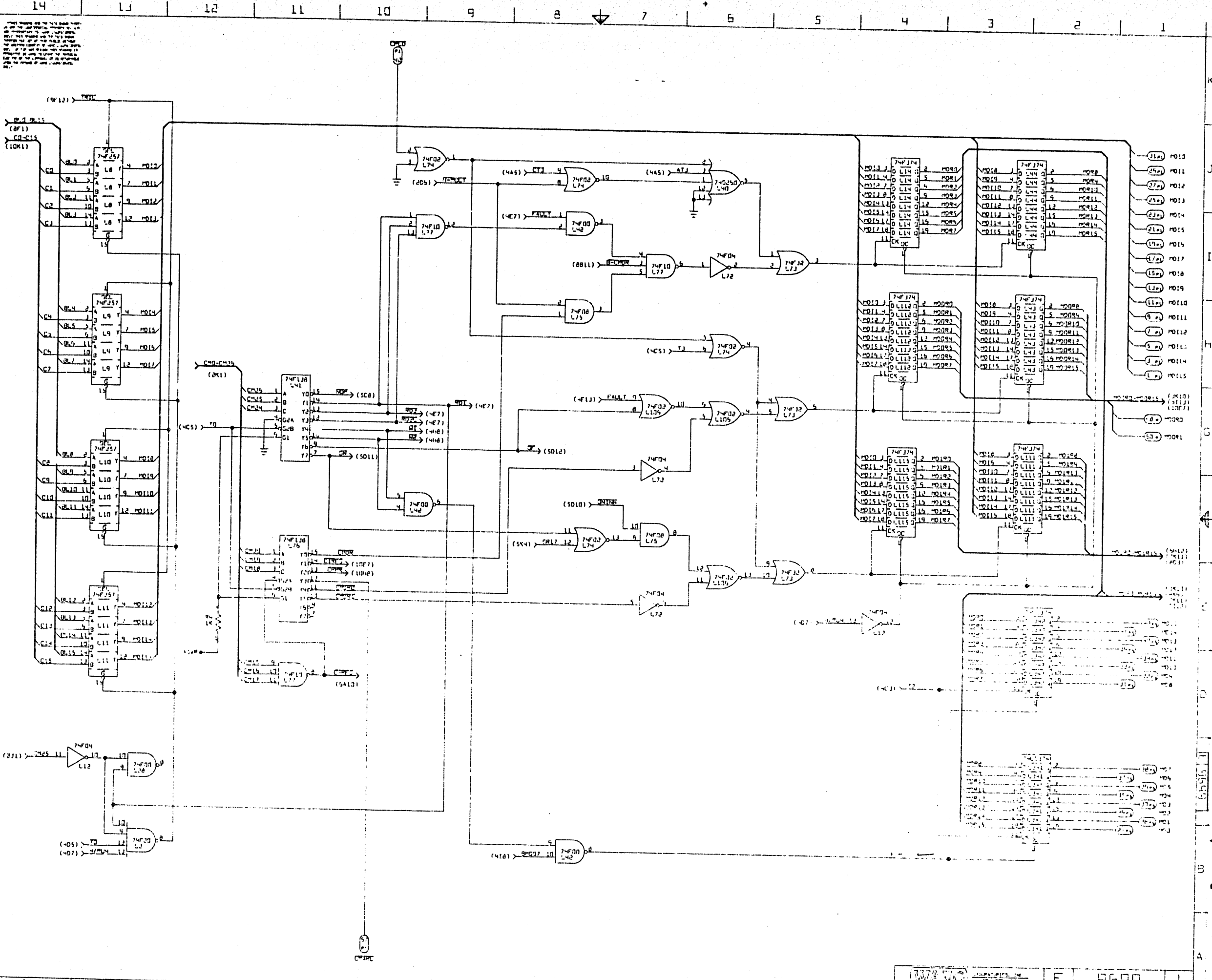
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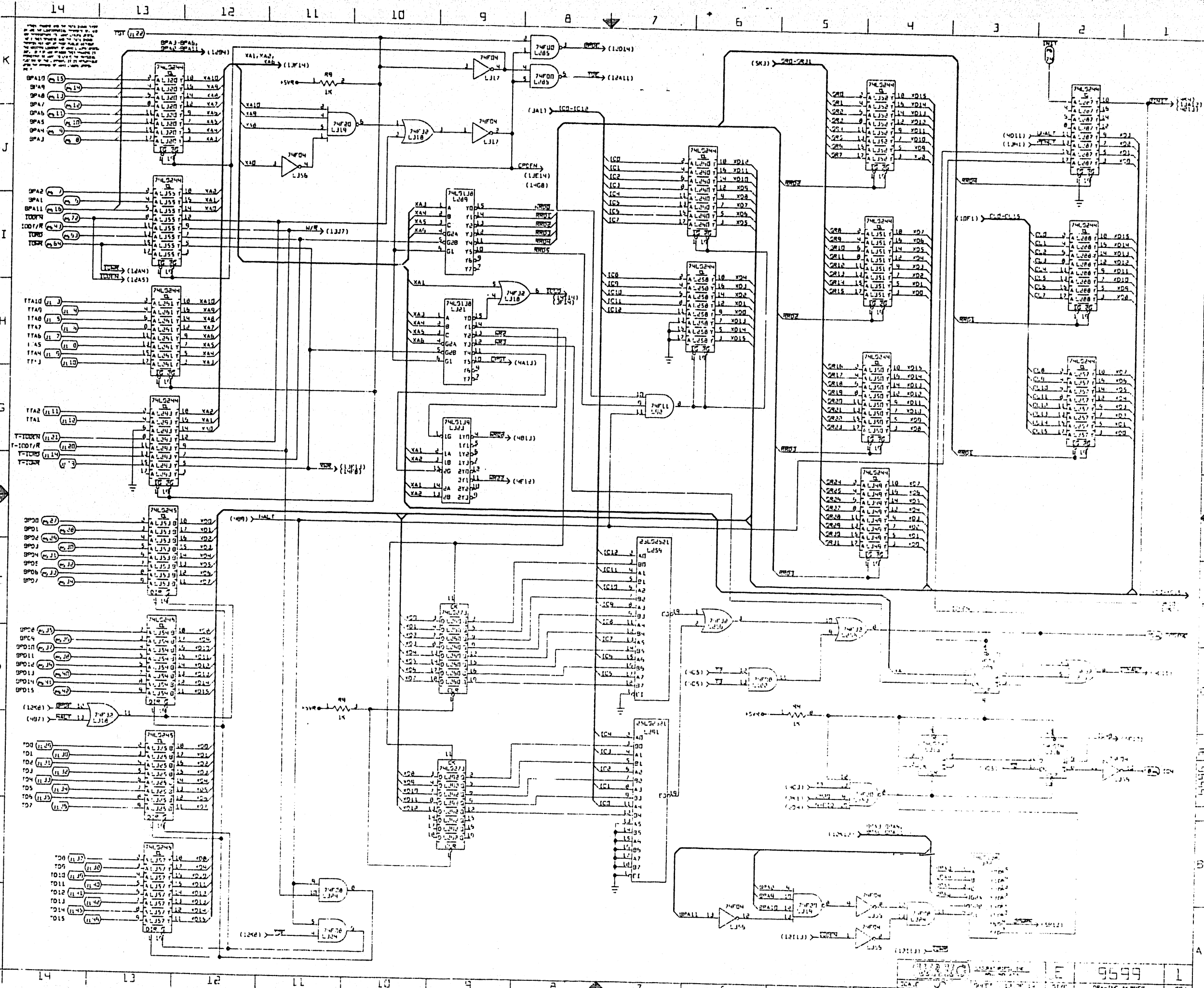
17" 11" 8.5" 11" 8.5" 17"

17" 11" 8.5" 11" 8.5" 17"



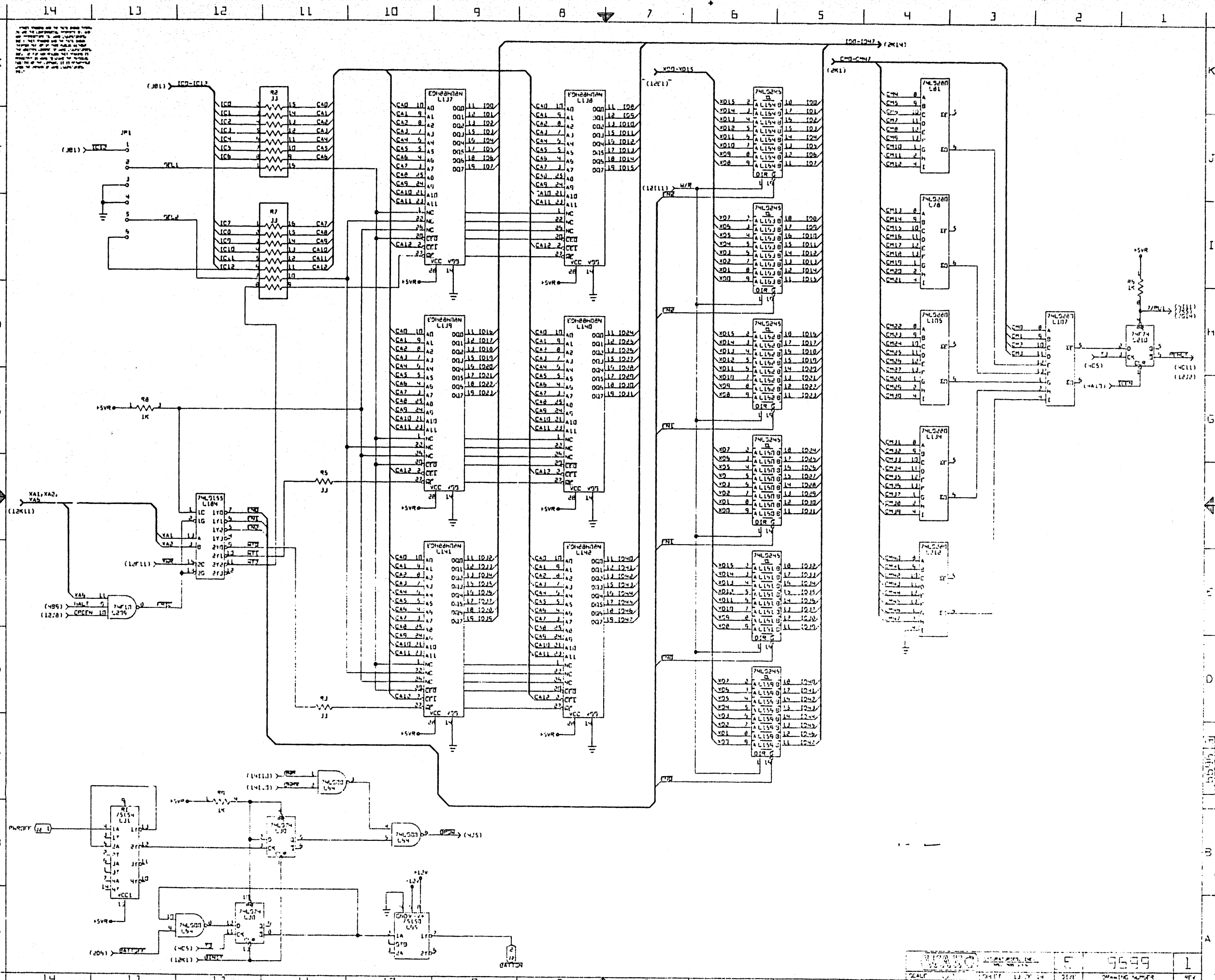


17  
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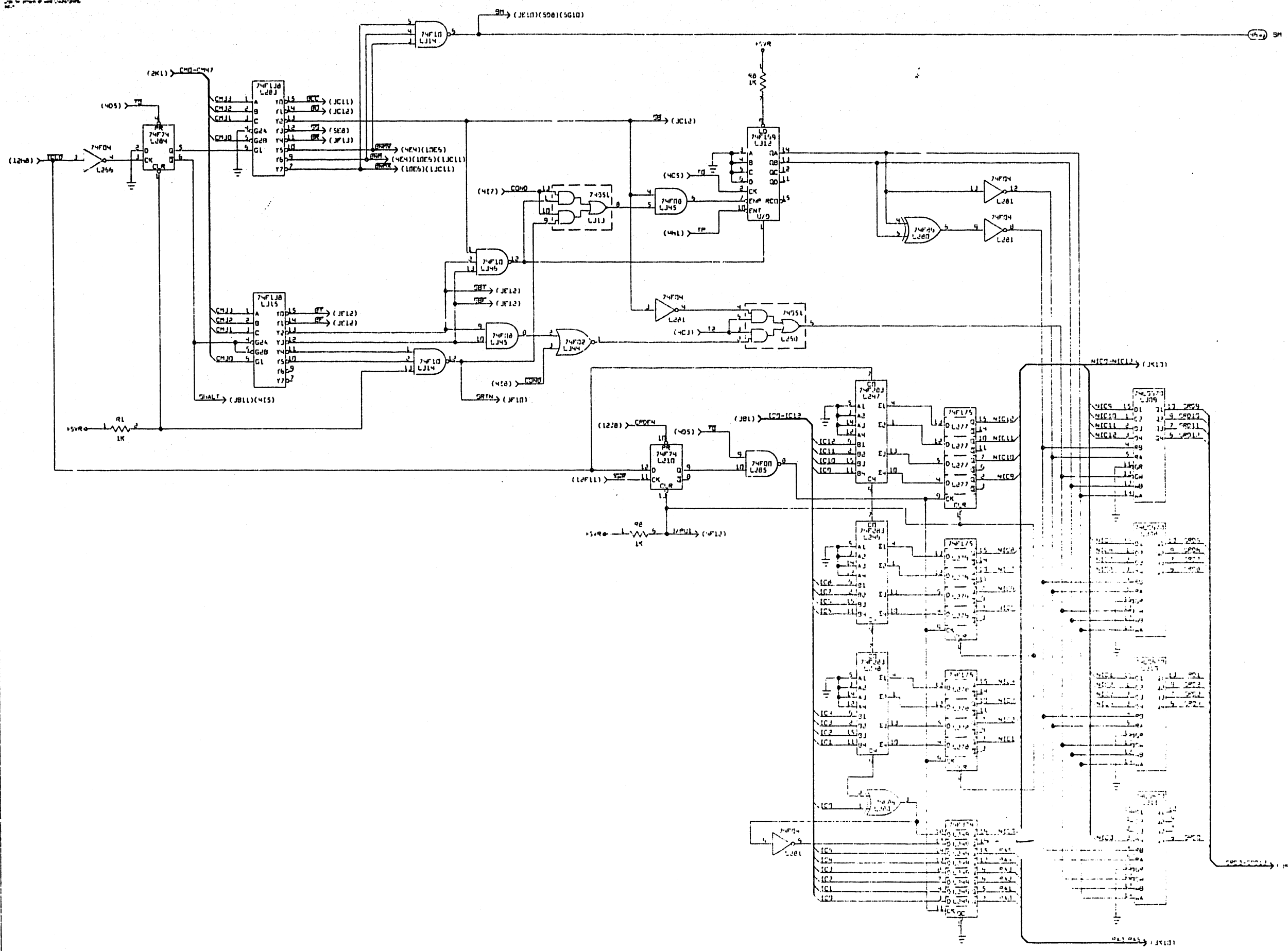
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17

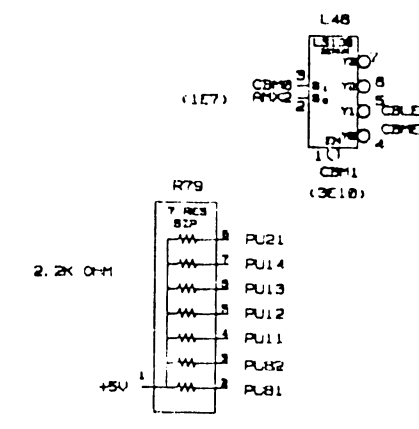
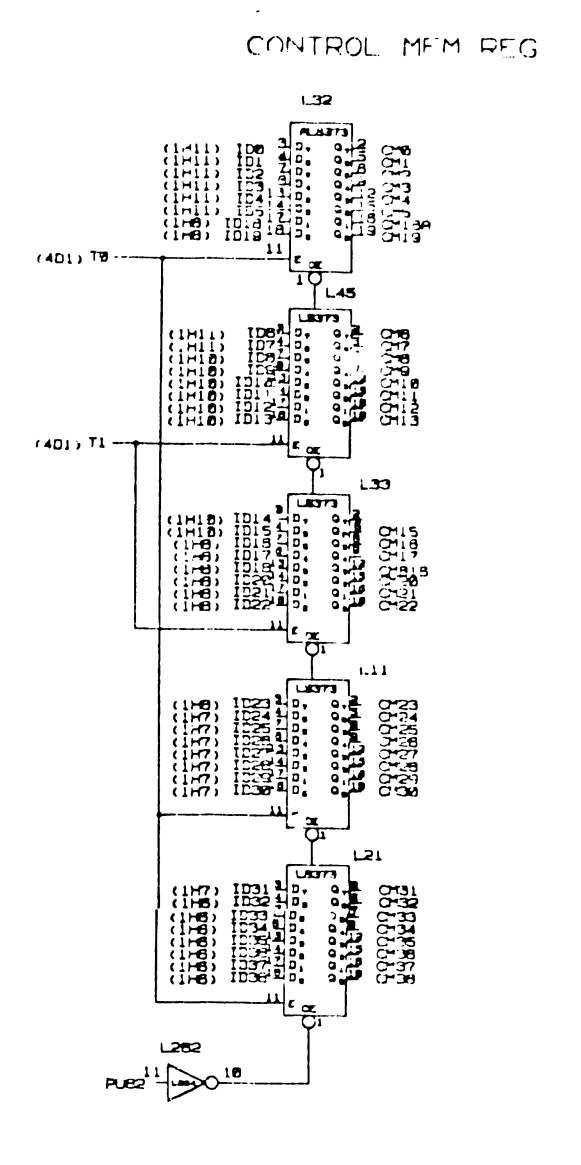
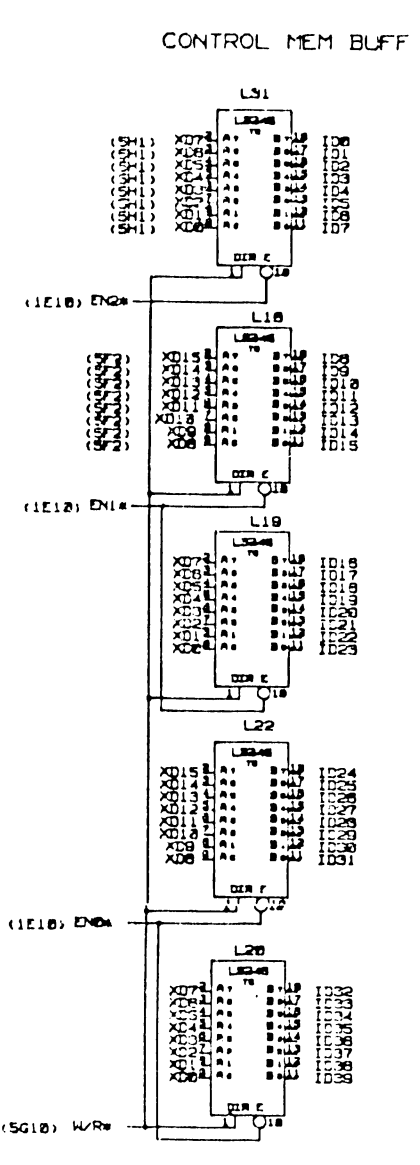
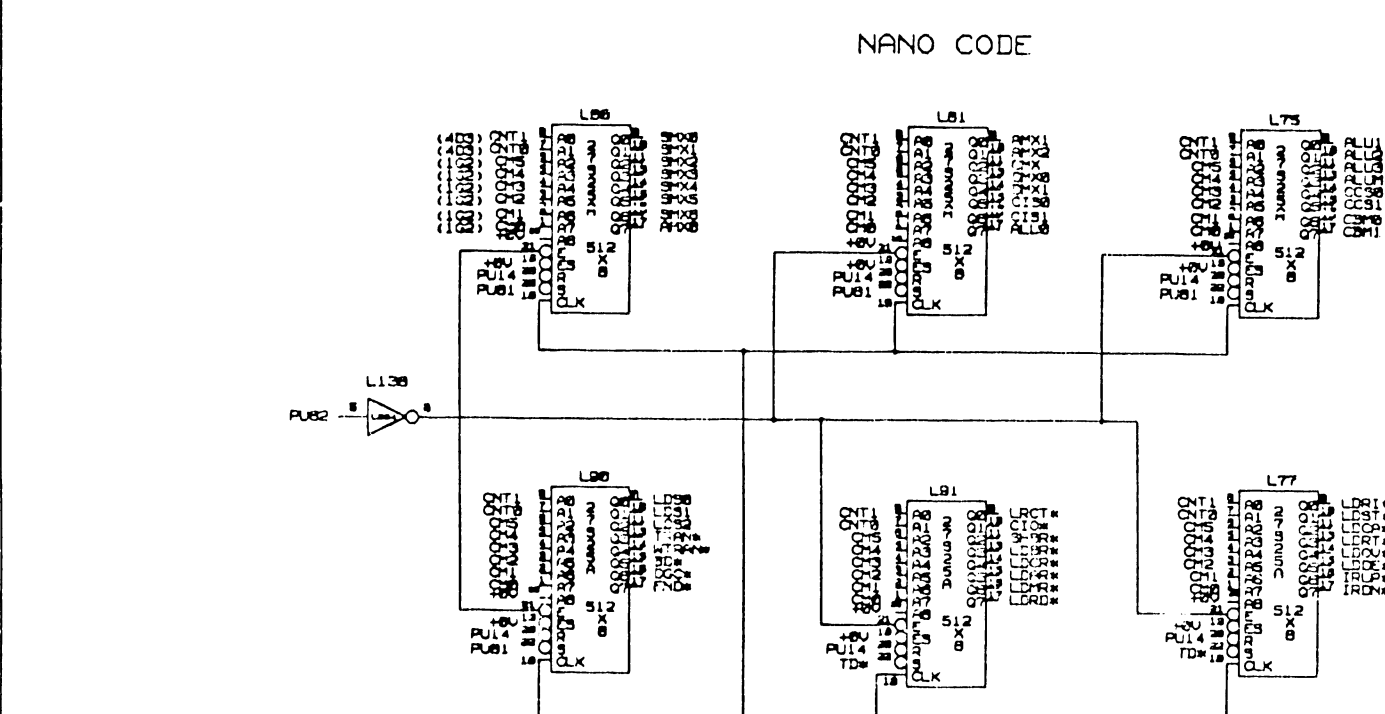
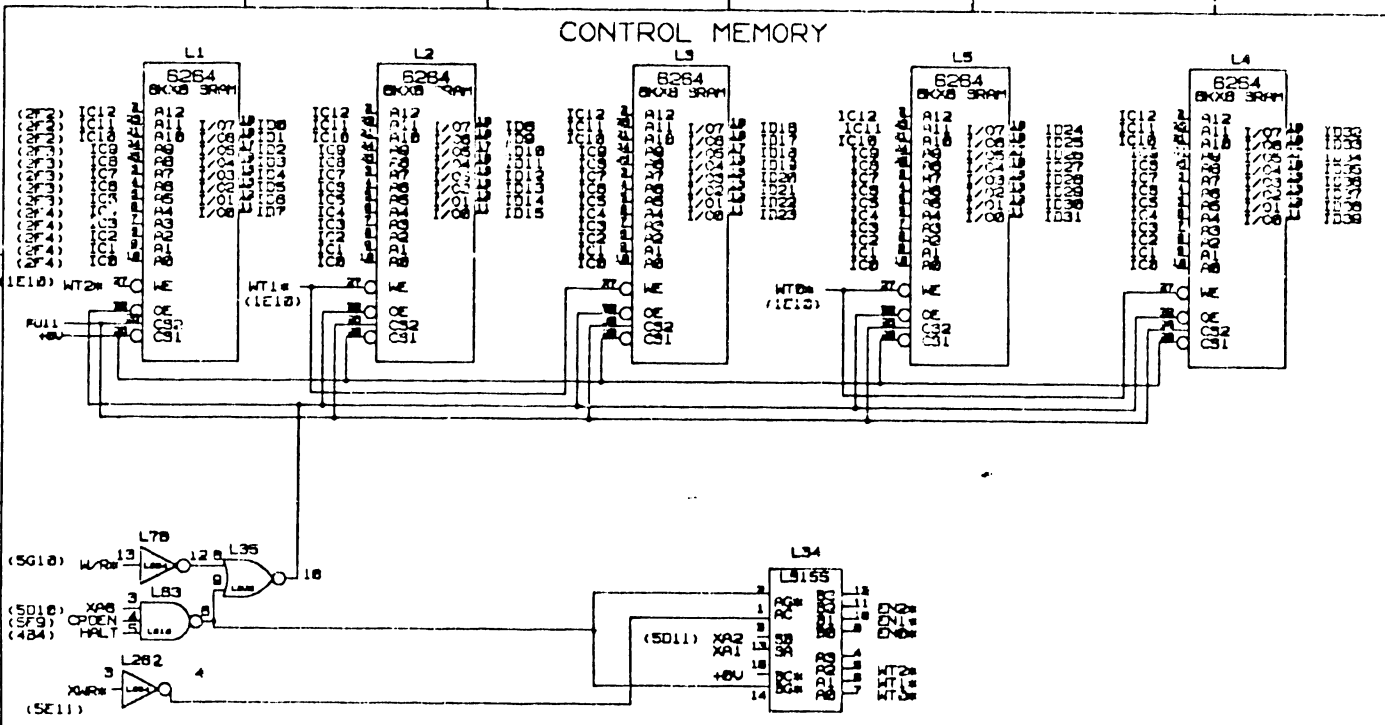
1. This circuit is designed to interface a 7400-series logic device with a microcomputer system. It provides a means for external control signals to be processed by the logic and then used to manage the microcomputer's operation.

2. The circuit uses a 7400-series logic device (74F10) to process control signals from external sources (JC11, JC12, etc.).

3. The output of the logic device is used to control the microcomputer's operation (MIC1 through MIC12).

4. The circuit is powered by a 5V supply (5VVR) and includes a 1K resistor (R1) for current limiting.



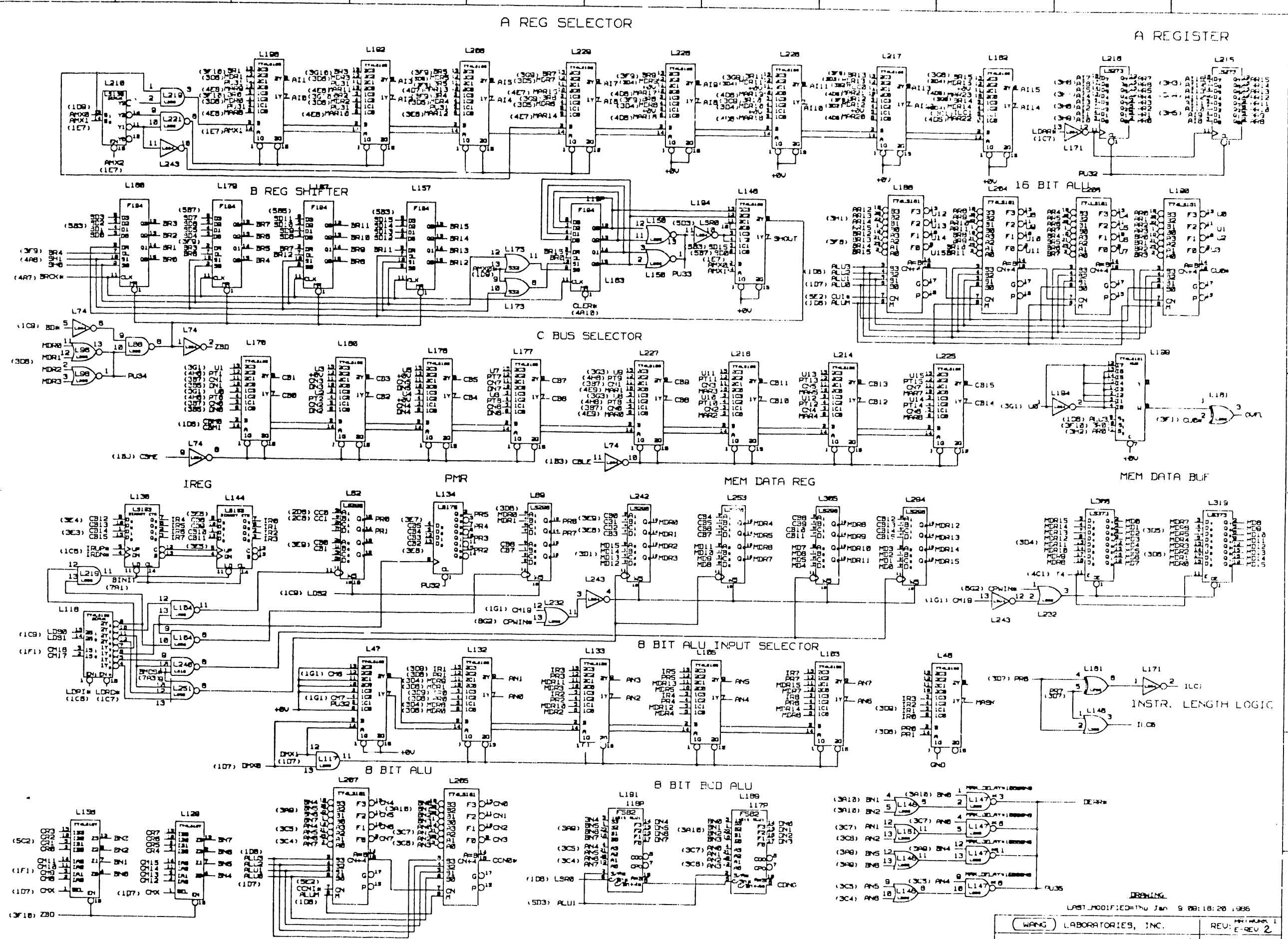


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 LAST MODIFIED Wed Jan 15 14:38:41 1986

WANG LABORATORIES, INC	REV: ART-WORK 1
TITLE: VSS CPU - 4	DATE: 01-00-86
ENGINEER: ROBERT RYAN	PAGE: 1 OF 8







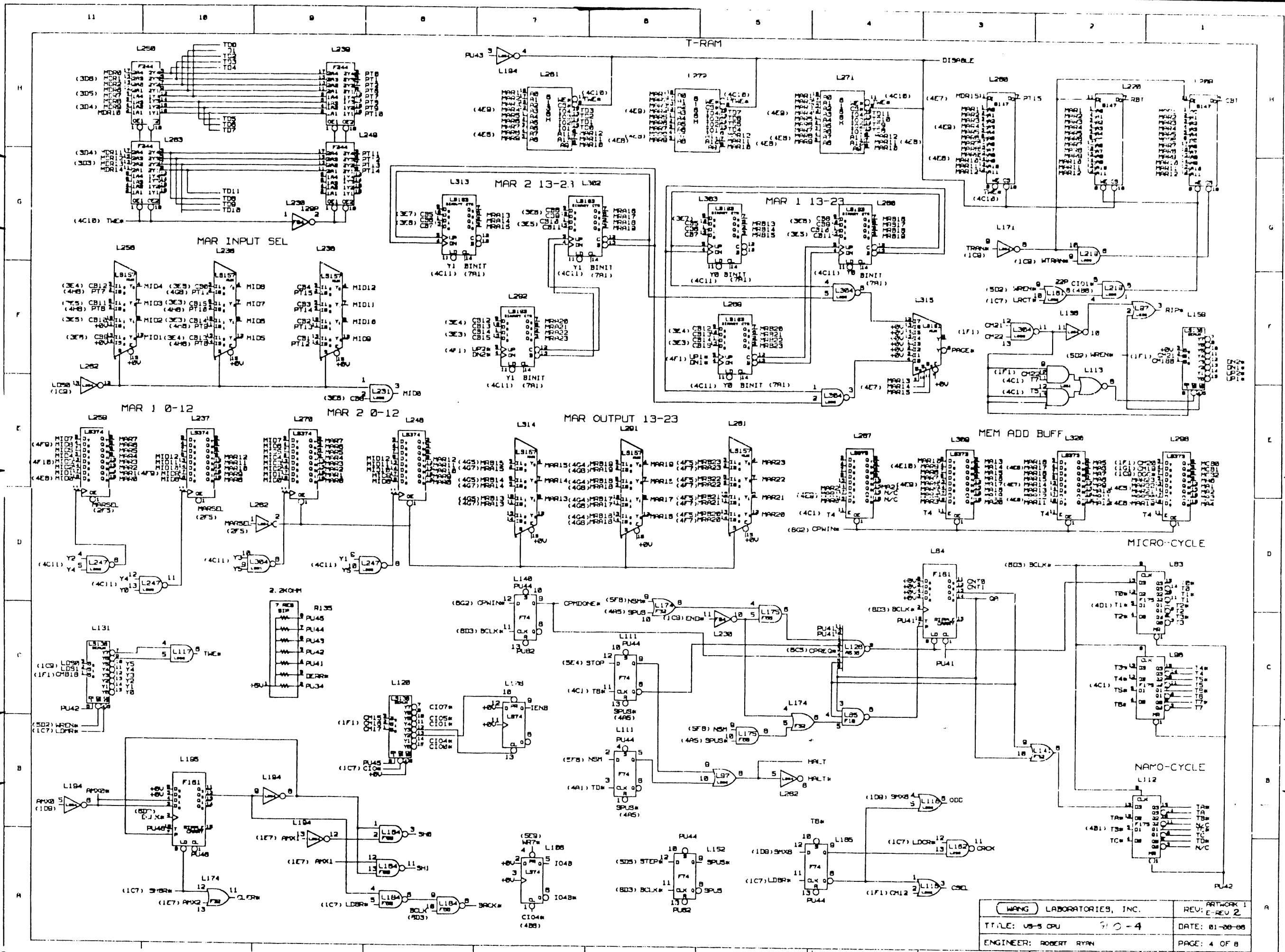
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LAST MODIFIED: 10 Jun 9 09:18:20 1986

WANG	LABORATORIES, INC.	REV: E-REV 2
TITLE:	US-5 CPU 3 )-4	DATE: 01-28-86
ENGINEER:	ROBERT RYAN	PAGE: 3 OF 8

11  
11  
5.8  
8.5  
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17

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8.5  
11  
17



11  
8.5"

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11"

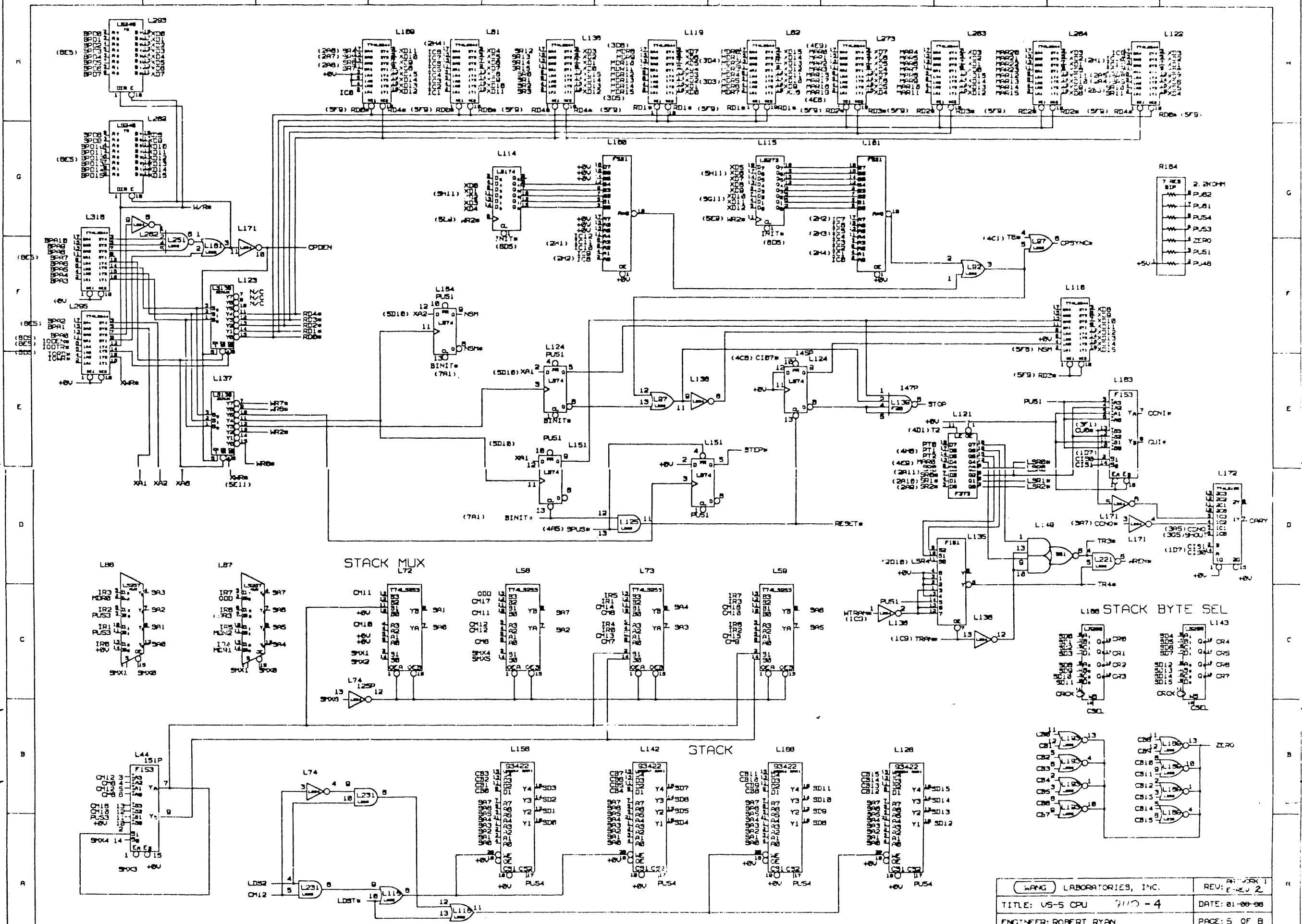
17"

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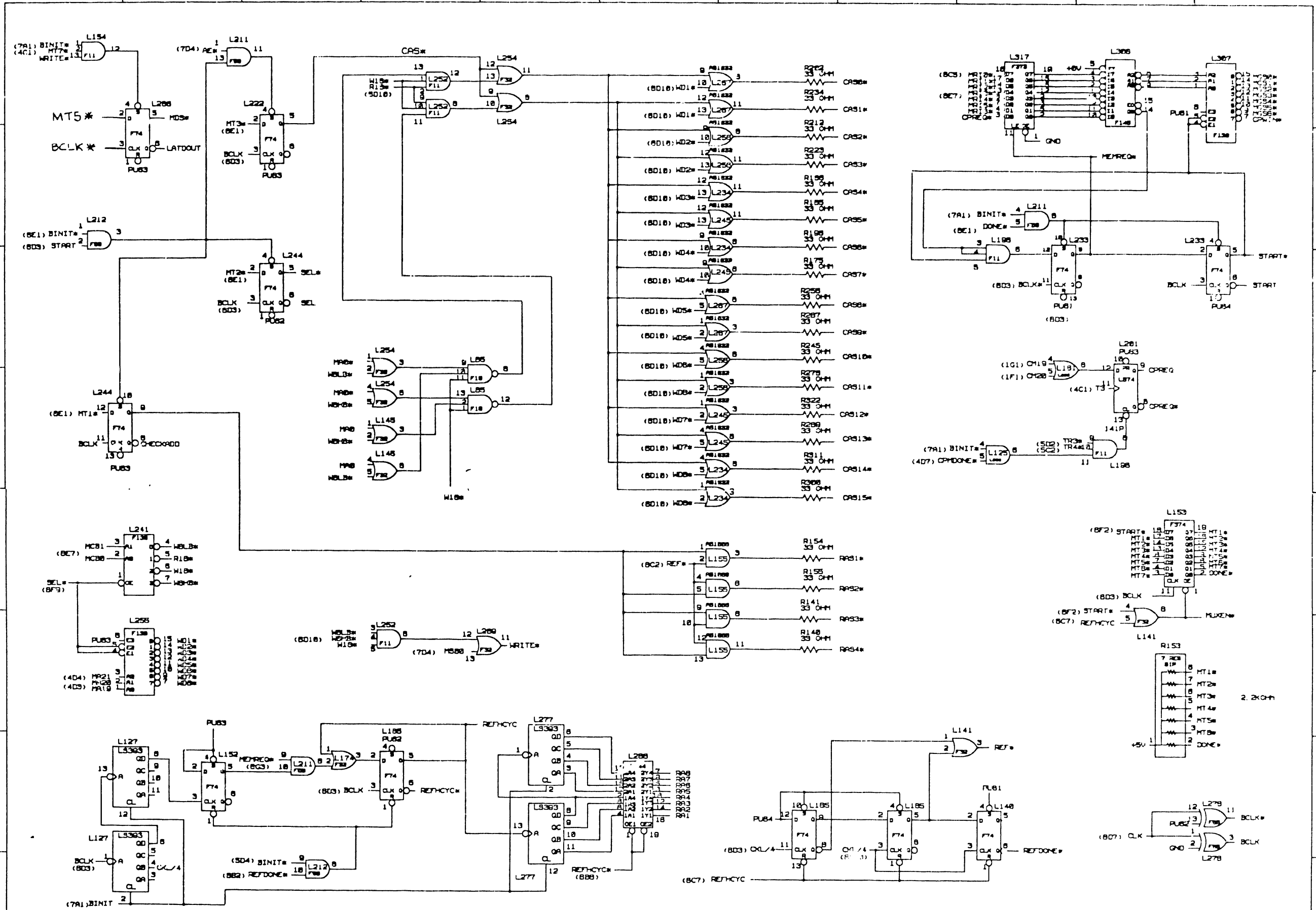
11"

17"



WANG LABORATORIES, INC.		REV: REV 2
TITLE: US-5 CPU 2110-4		DATE: 01-00-68
ENGINEER: ROBERT RYAN		PAGE: 5 OF 8





DRAWING  
 LAST MODIFIED: Thu Jan 9 10:46:57 1988

WANG LABORATORIES, INC.	ART-WORK 1 REV: E-REV 2
TITLE: US-5 CPU 710-4	DATE: 01-00-88
ENGINEER: ROBERT RYAN	PAGE: 6 OF 8

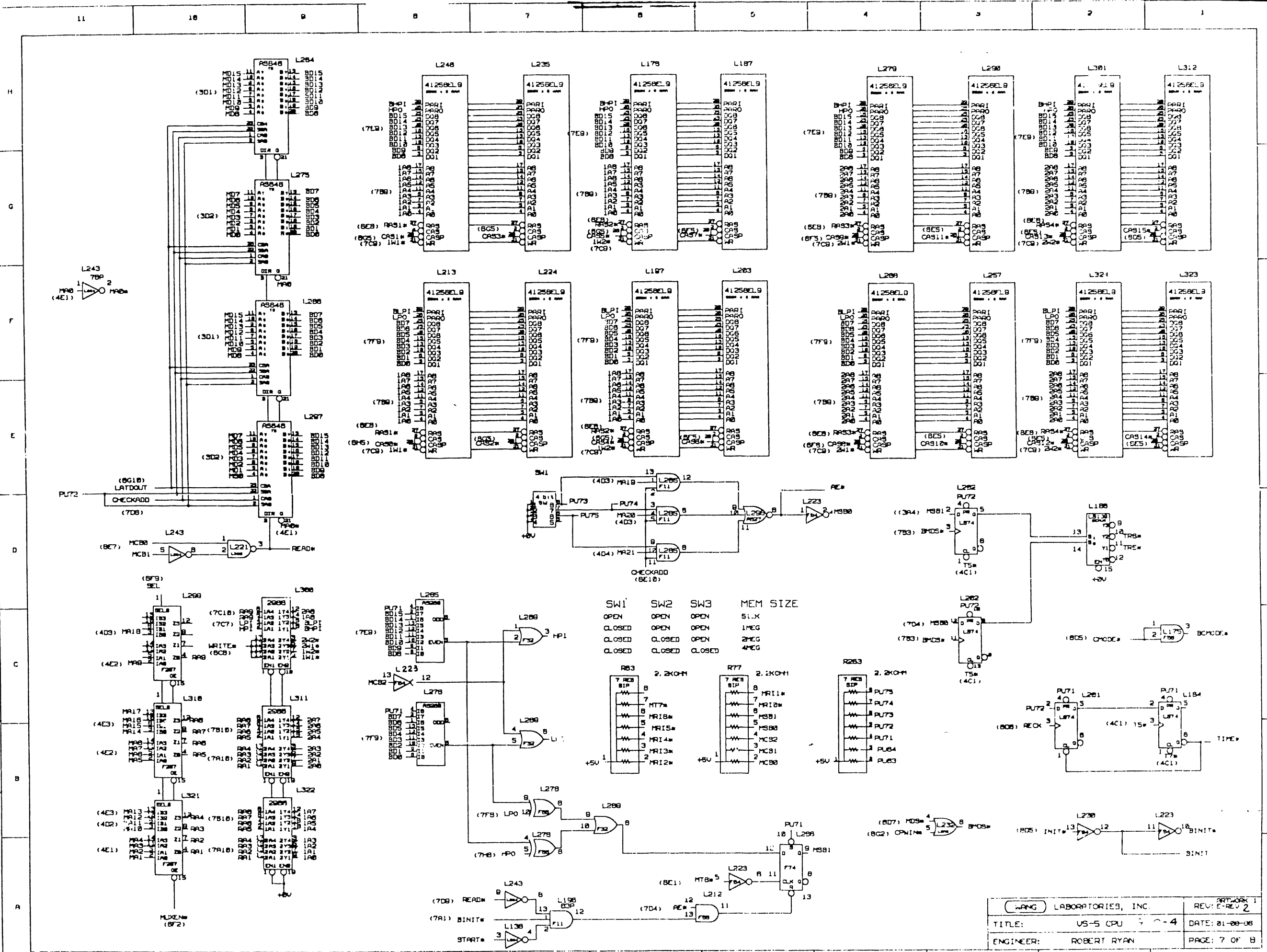
11  
 11  
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17"

8.5"

11"

17"



SW1	SW2	SW3	MEM SIZE
OPEN	OPEN	OPEN	51K
CLOSED	OPEN	OPEN	1MEG
CLOSED	CLOSED	OPEN	2MEG
CLOSED	CLOSED	CLOSED	4MEG

17"

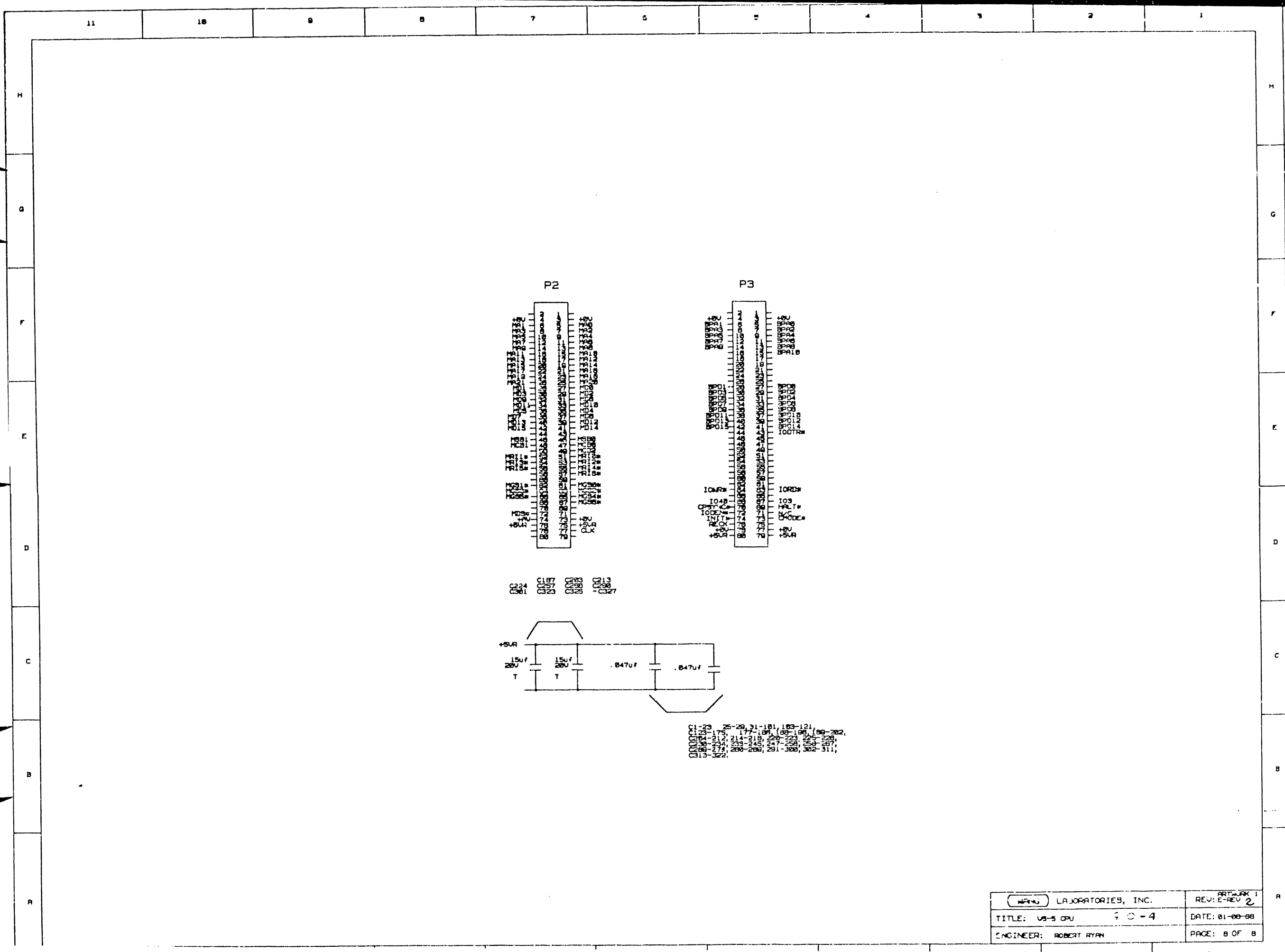
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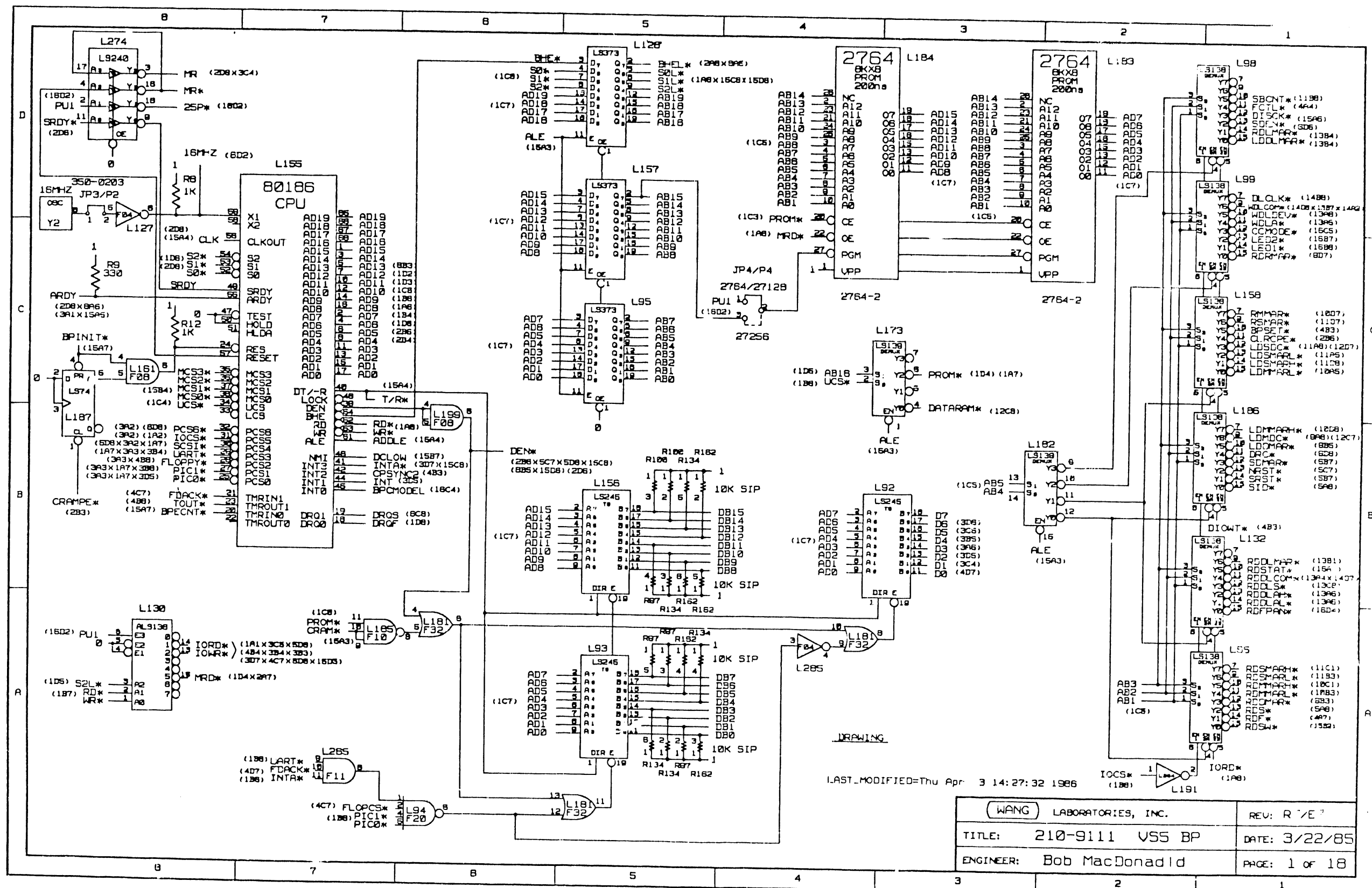
8.5"

8.5"

11"

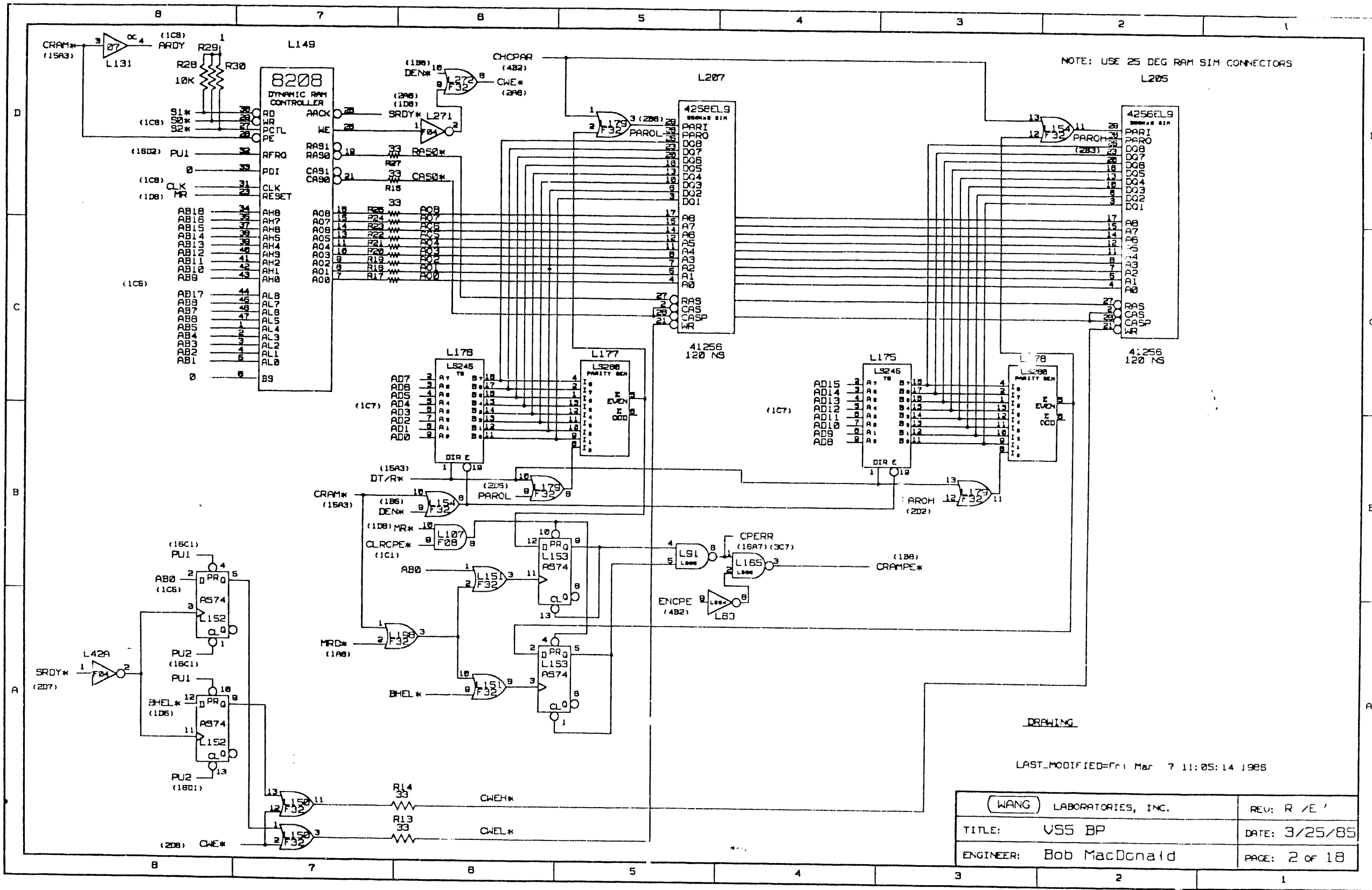
17"





LAST\_MODIFIED=Thu Apr 3 14:27:32 1986

WANG LABORATORIES, INC.		REV: R 7/E 7
TITLE: 210-9111 VSS BP		DATE: 3/22/85
ENGINEER: Bob MacDonalid		PAGE: 1 of 18



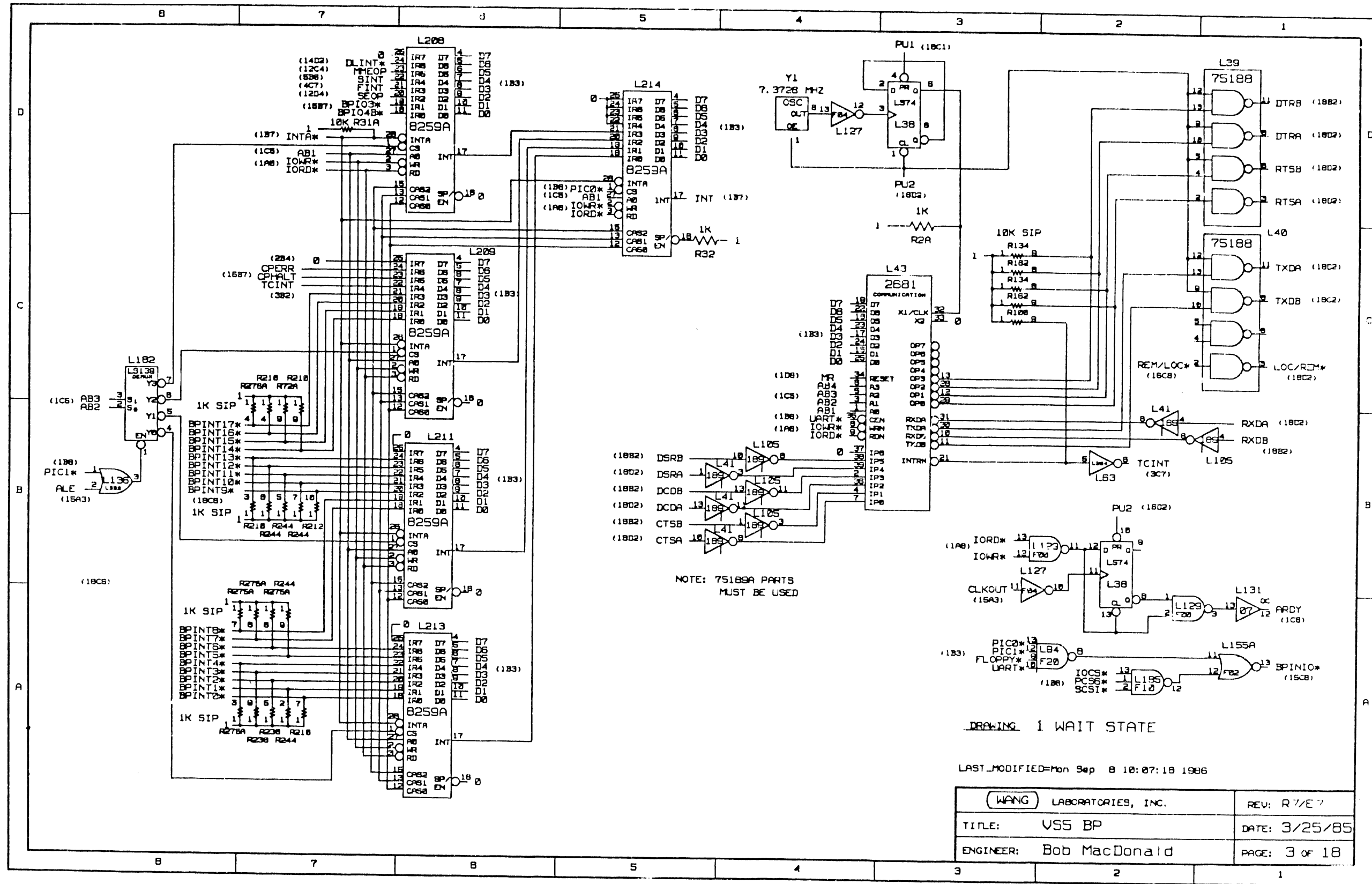
NOTE: USE 25 DEG RAM SIM CONNECTORS

DRAWING

LAST\_MODIFIED=Fri Mar 7 11:05:14 1985

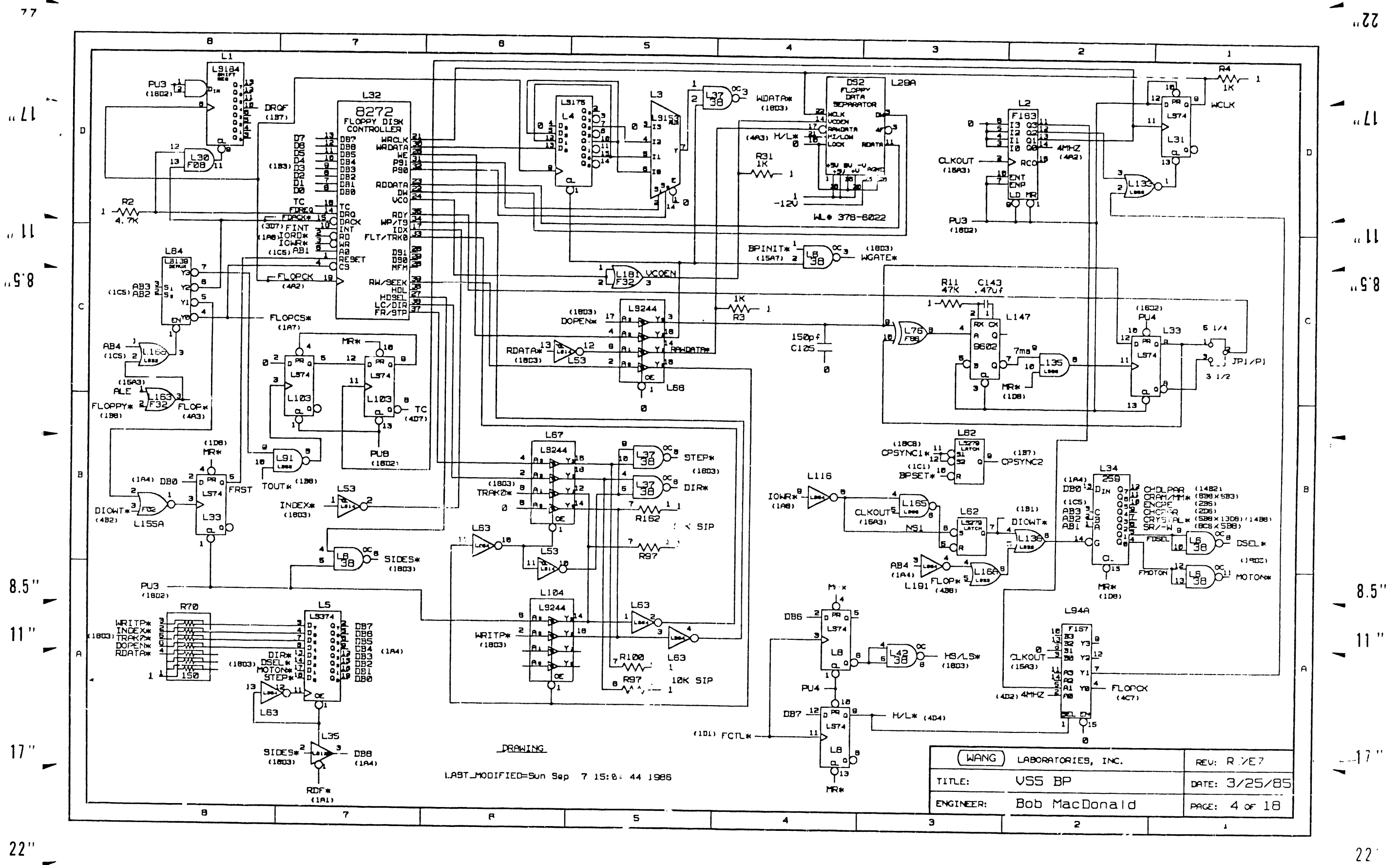
(WANG) LABORATORIES, INC.	REV: R / E'
TITLE: VSS BP	DATE: 3/25/85
ENGINEER: Bob MacDonald	PAGE: 2 of 18

77  
 22"  
 17"  
 11"  
 8.5"  
 11"  
 8.5"  
 22"



77  
 11  
 11  
 8.5  
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 22

22  
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 17  
 22



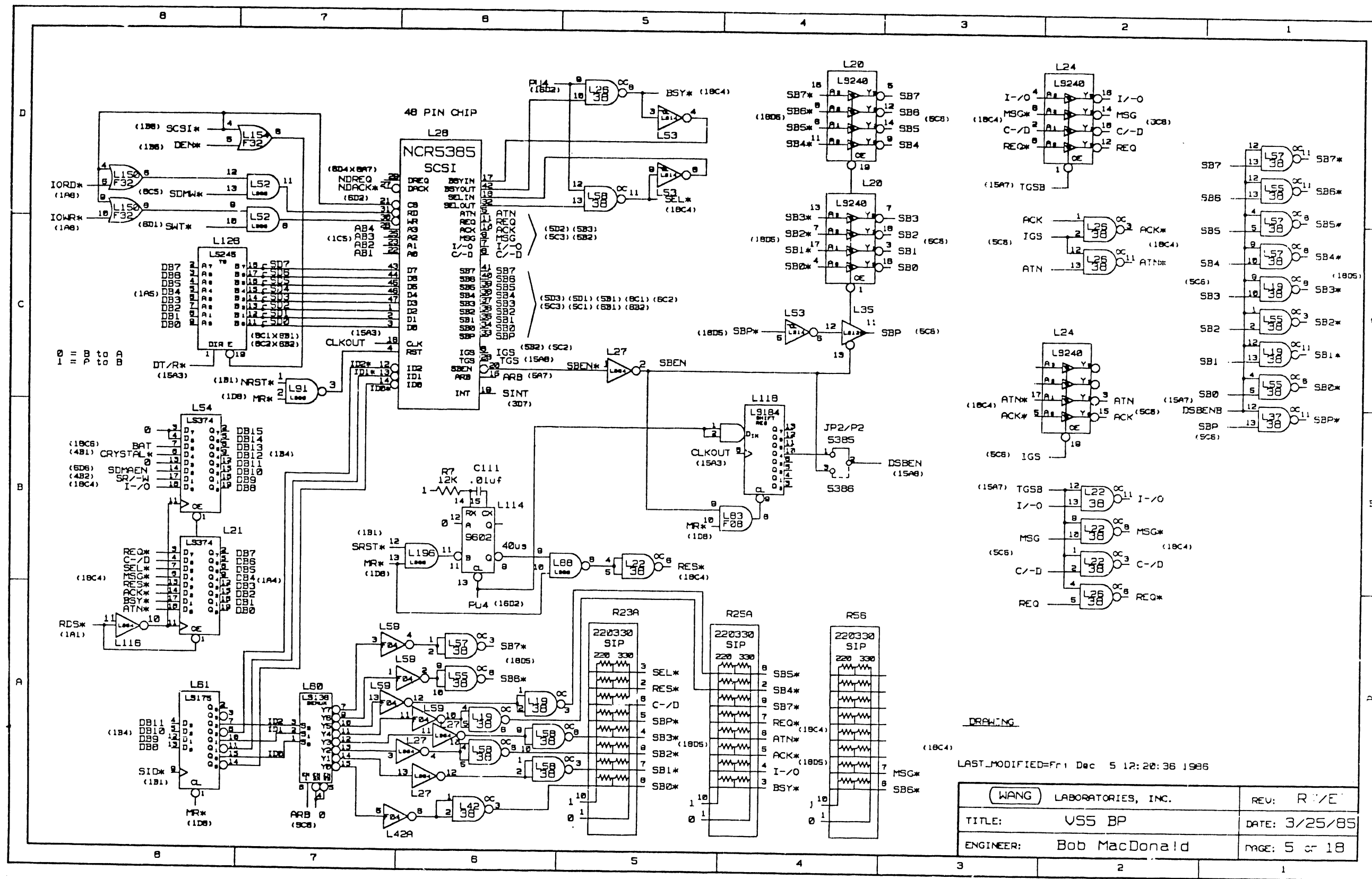
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LAST\_MODIFIED=Sun Sep 7 15:04:44 1986

WANG LABORATORIES, INC.	REV: R.VE7
TITLE: VSS BP	DATE: 3/25/85
ENGINEER: Bob MacDonald	PAGE: 4 of 18



77  
 "L1  
 "L1  
 "5.8  
 "C  
 "B  
 8.5"  
 11"  
 17"  
 22"

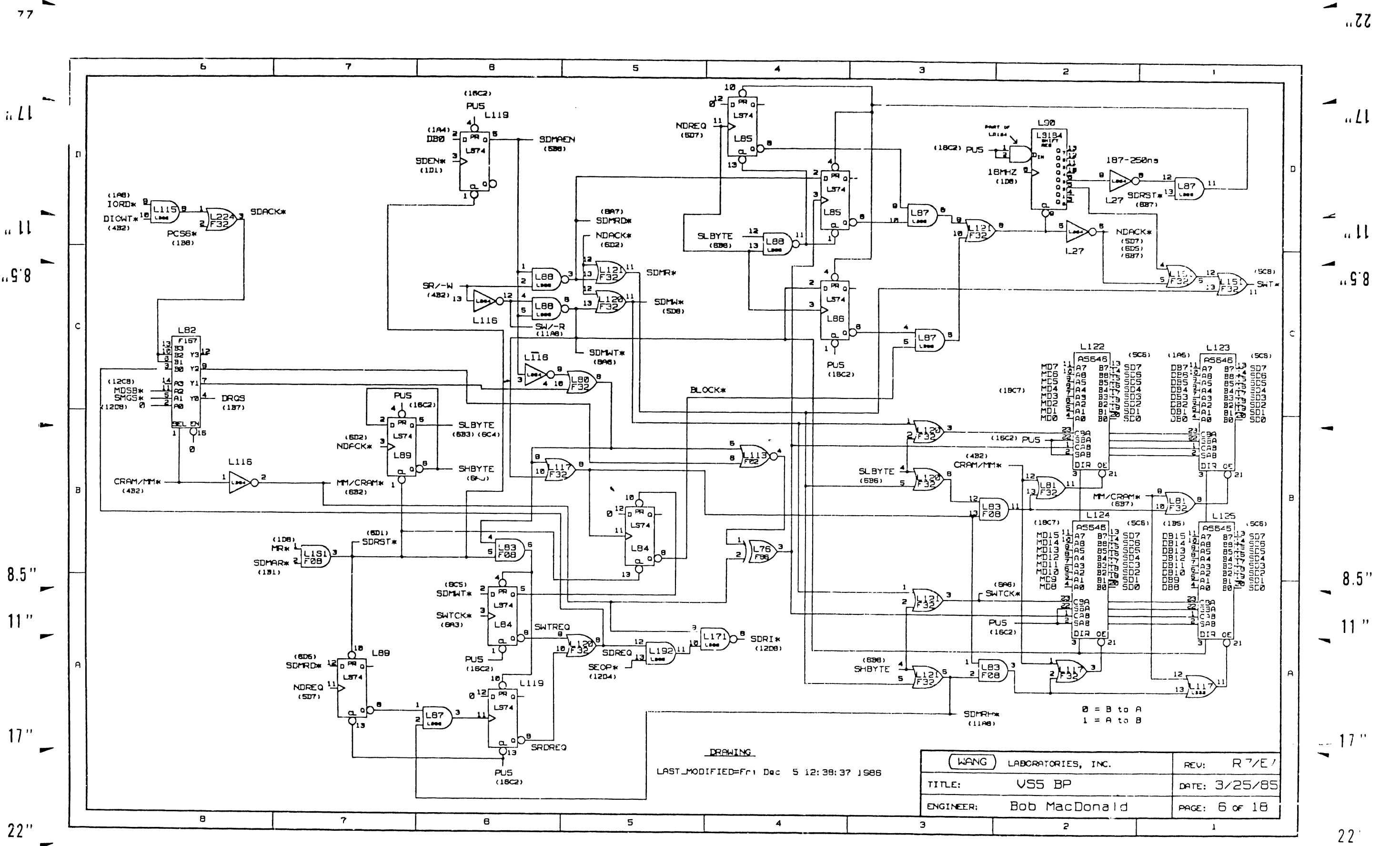
"22  
 "L1  
 "L1  
 "5.8  
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DRAWING  
 LAST\_MODIFIED=Fri Dec 5 12:20:36 1986  

(WANG) LABORATORIES, INC.	REV: R/E
TITLE: VSS BP	DATE: 3/25/85
ENGINEER: Bob MacDonald	PAGE: 5 of 18

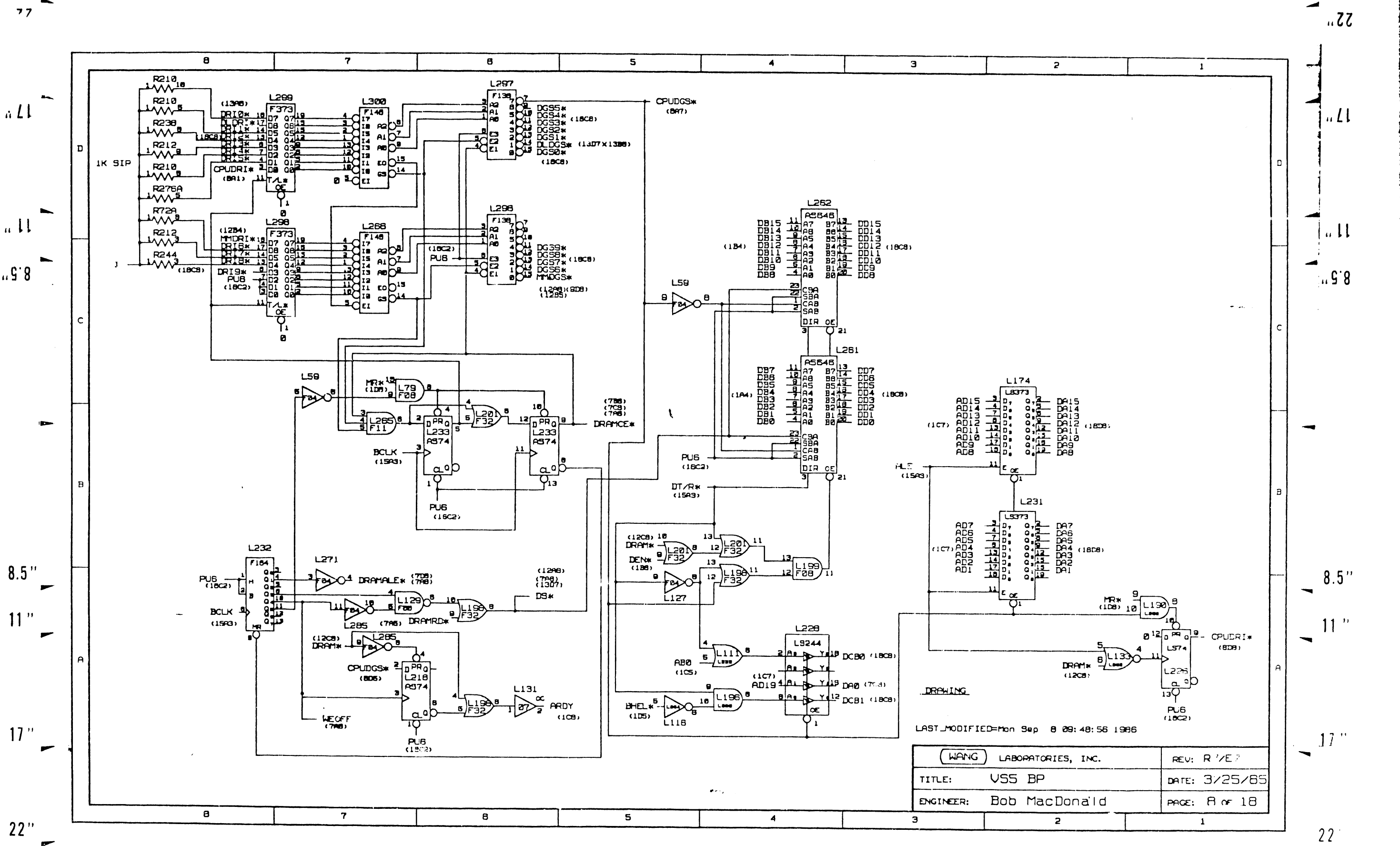




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WANG LABORATORIES, INC.		REV: R7/E1
TITLE: VSS BP		DATE: 3/25/85
ENGINEER: Bob MacDonald		PAGE: 6 of 18

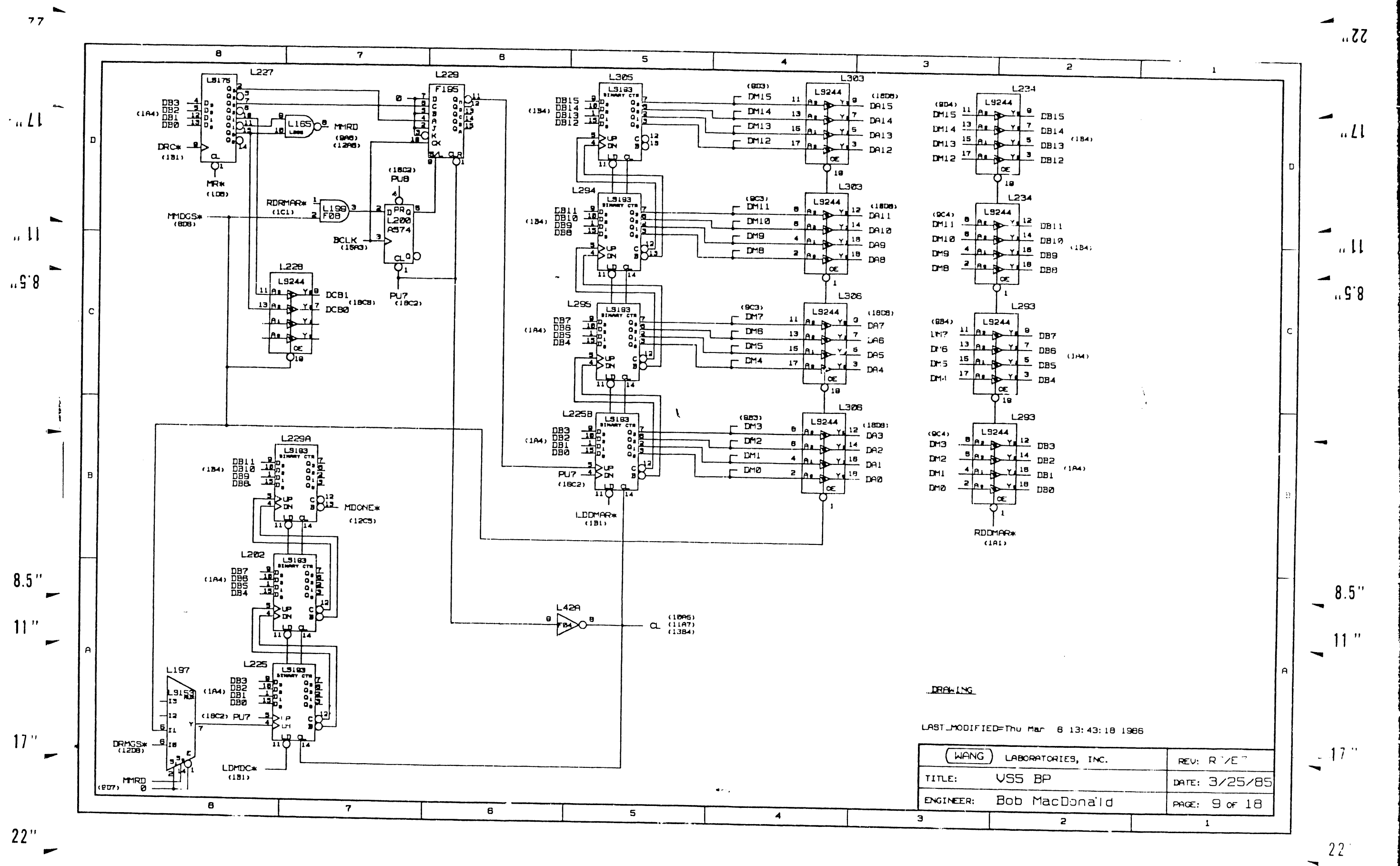




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LAST\_MODIFIED=Mon Sep 8 09:48:56 1986

(WANG) LABORATORIES, INC.	REV: R 1/E 2
TITLE: VSS BP	DATE: 3/25/85
ENGINEER: Bob MacDonald	PAGE: R of 18



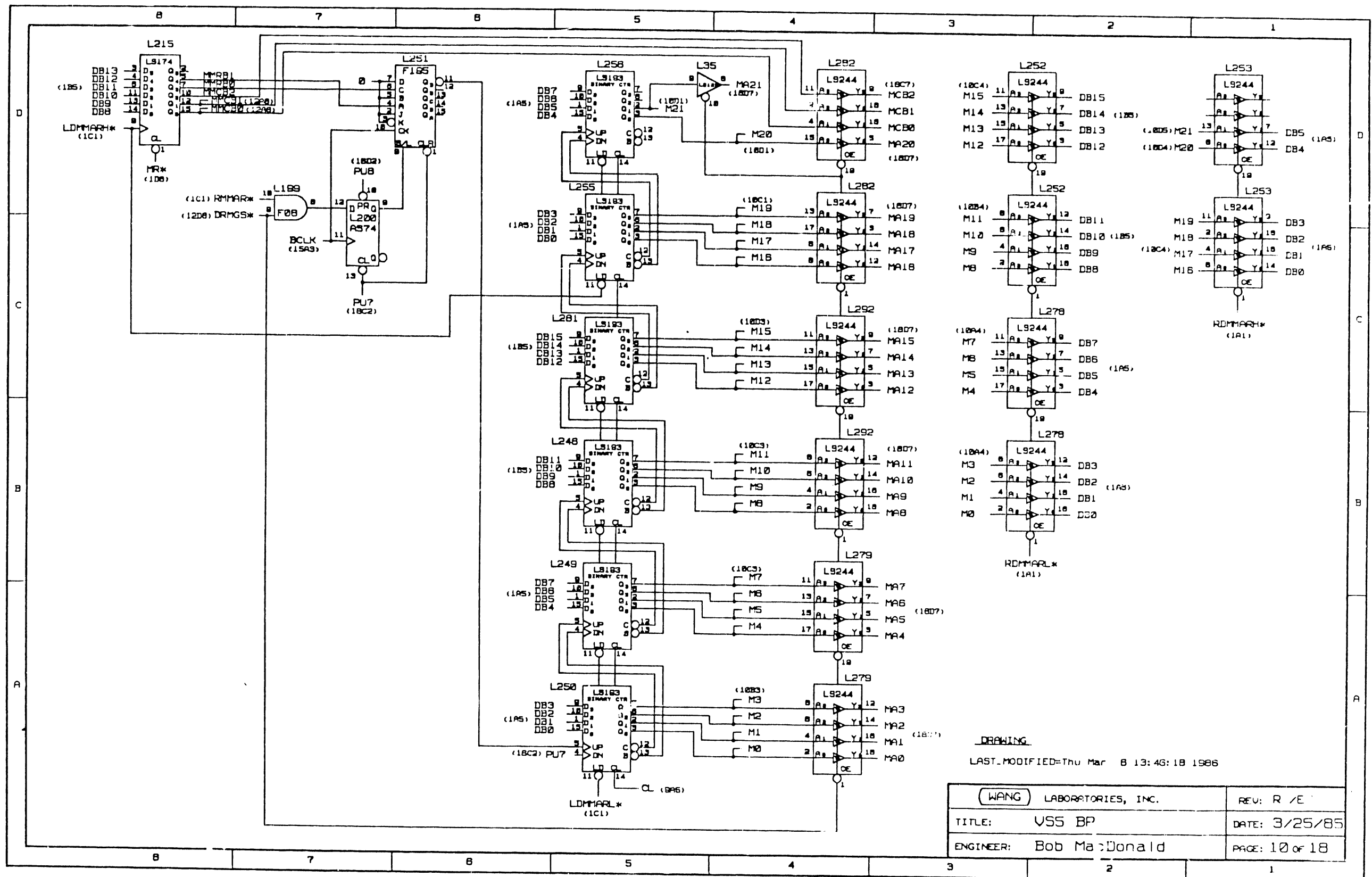
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LAST\_MODIFIED=Thu Mar 8 13:43:18 1986

(WANG) LABORATORIES, INC.	REV: R/E T
TITLE: VSS BP	DATE: 3/25/85
ENGINEER: Bob MacDonald	PAGE: 9 of 18

77  
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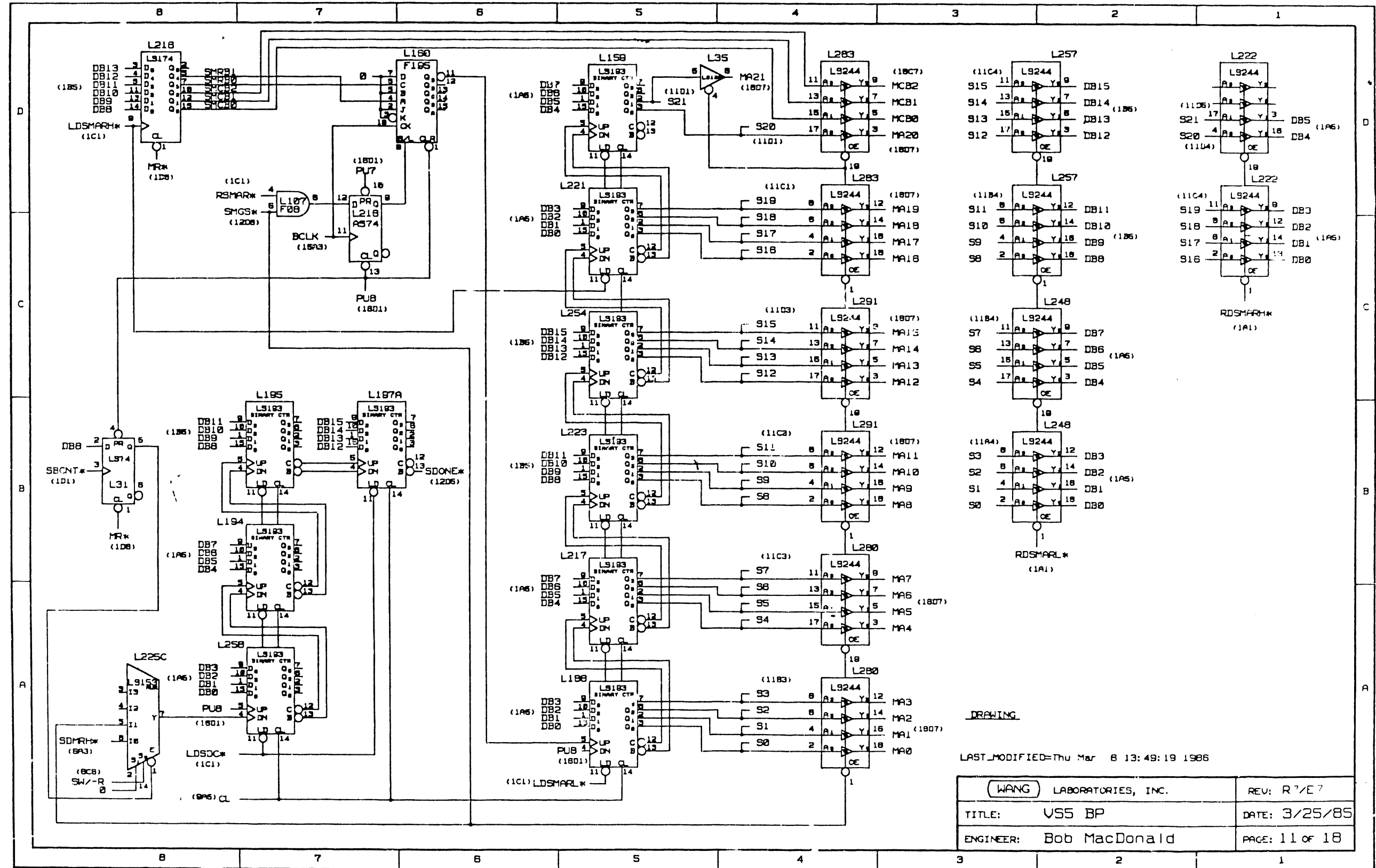


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 LAST MODIFIED=Thu Mar 8 13:46:18 1986

(WANG) LABORATORIES, INC.	REV: R/E
TITLE: VSS BP	DATE: 3/25/85
ENGINEER: Bob MacDonald	PAGE: 10 of 18

77  
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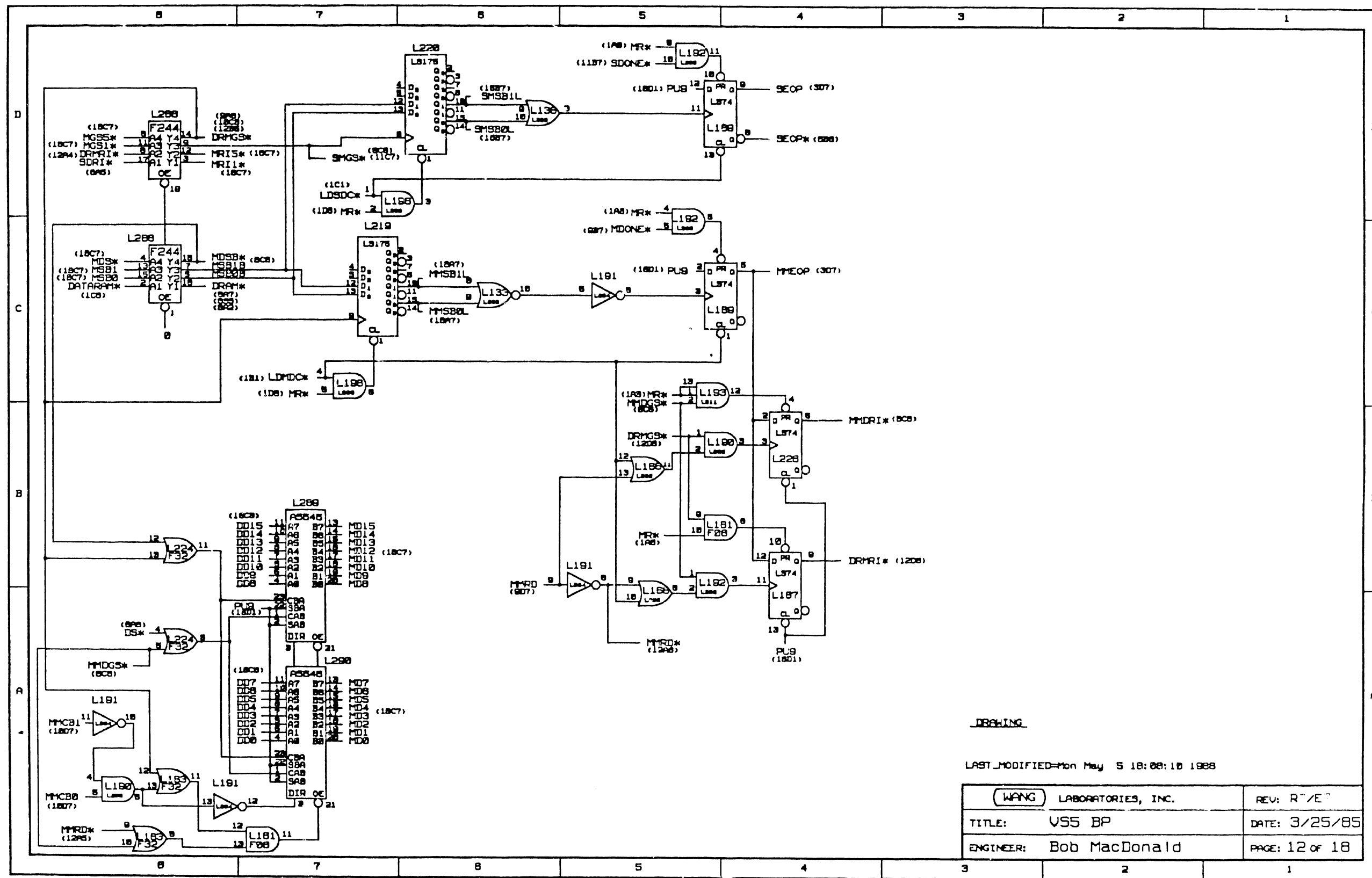


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(WANG) LABORATORIES, INC.	REV: R7/E7
TITLE: V55 BP	DATE: 3/25/85
ENGINEER: Bob MacDonald	PAGE: 11 of 18

77  
 " 11  
 " 9.8  
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 " 9.5  
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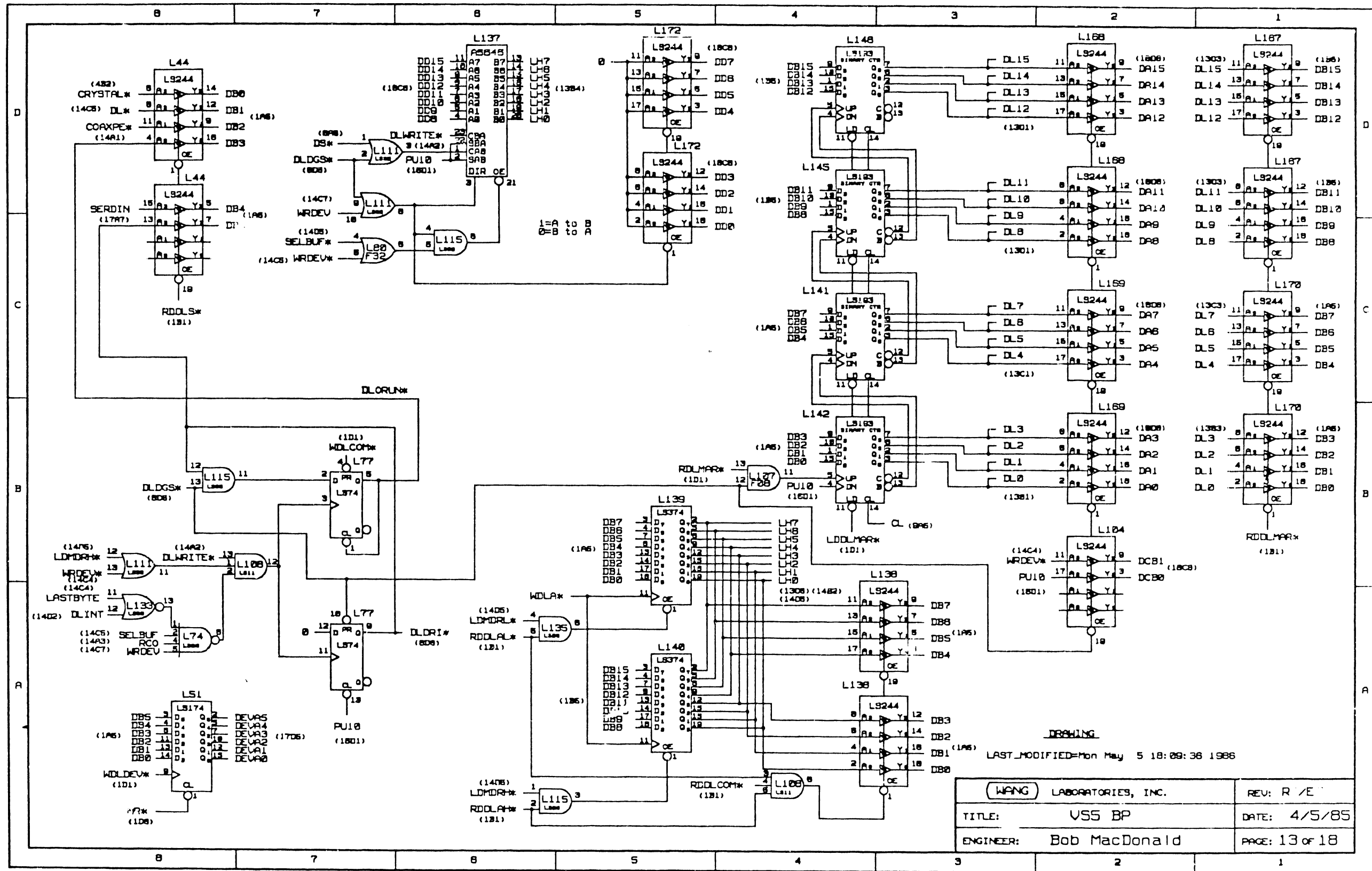


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LAST\_MODIFIED=Mon May 5 18:08:10 1988

(WANG) LABORATORIES, INC.	REV: R7/E7
TITLE: V55 BP	DATE: 3/25/85
ENGINEER: Bob MacDonald	PAGE: 12 of 18

77  
 "L1  
 "L1  
 "5'8  
 C  
 B  
 8.5"  
 11"  
 A  
 17"  
 22"



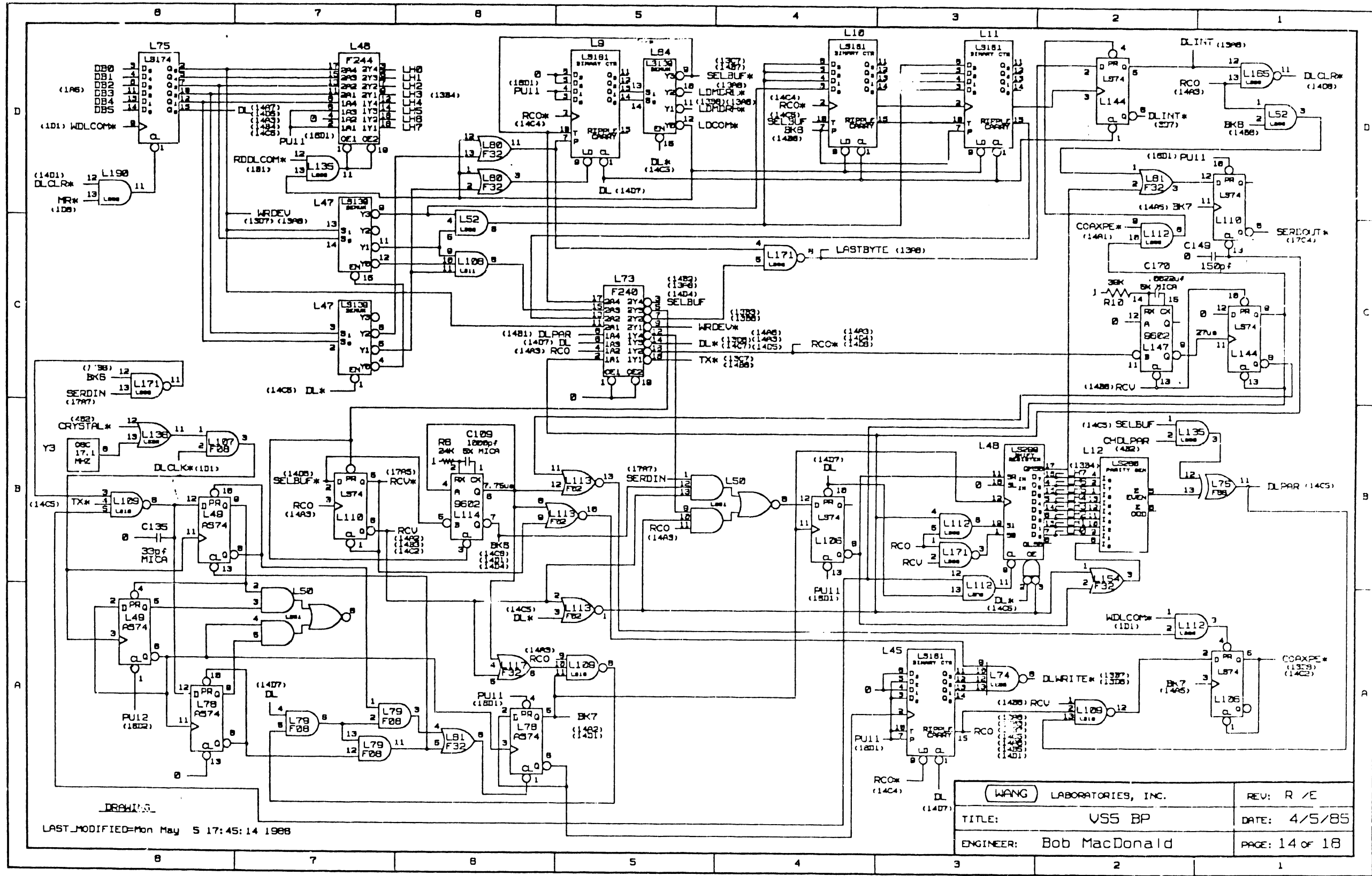
"22  
 "L1  
 "L1  
 "5'8  
 C  
 B  
 8.5"  
 11"  
 A  
 17"  
 22"

WANG LABORATORIES, INC.		REV: R/E
TITLE: VSS BP		DATE: 4/5/85
ENGINEER: Bob MacDonald		PAGE: 13 of 18



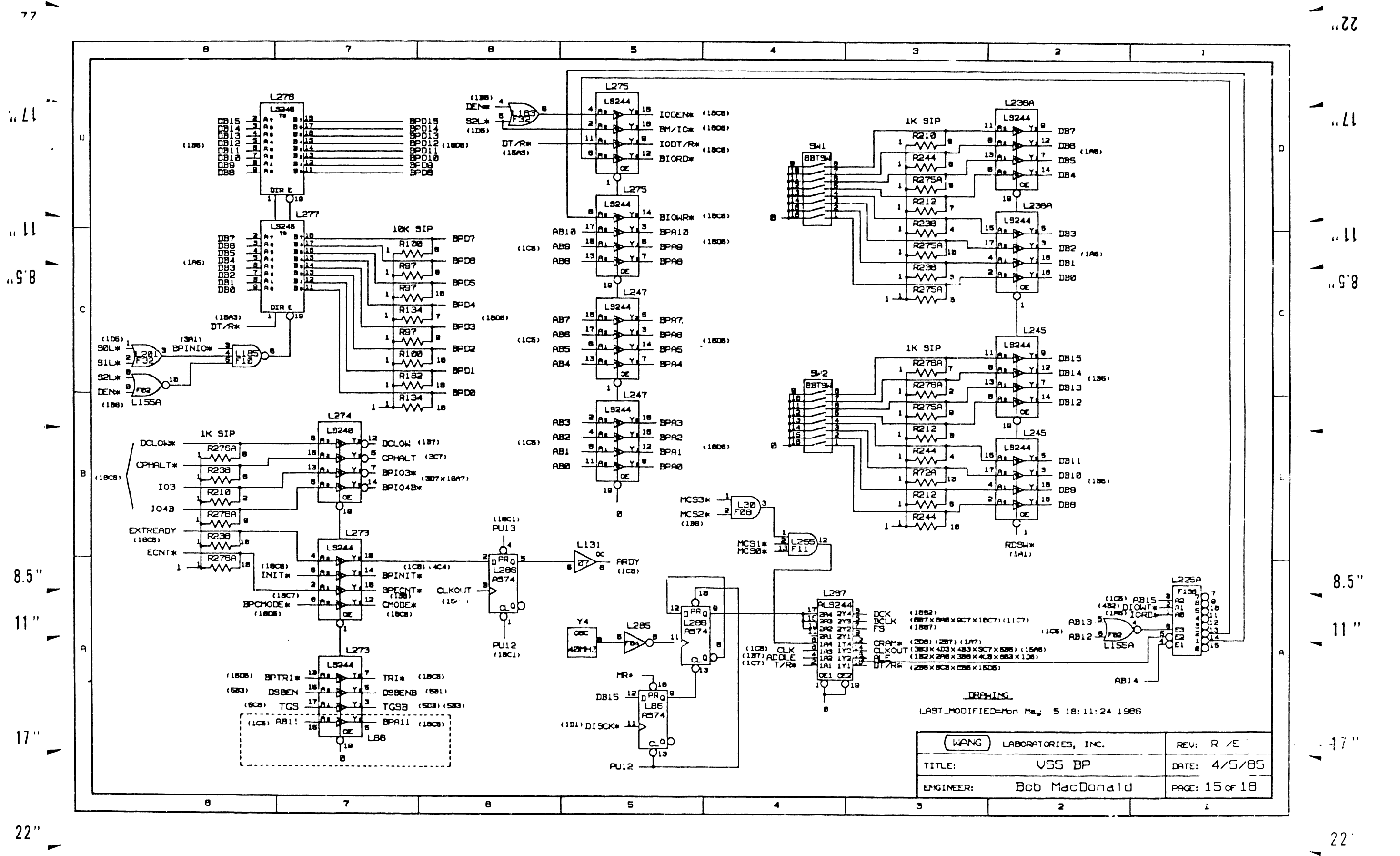
77  
"L1  
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"9.8  
"C  
"B  
8.5"  
11"  
17"  
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"L1  
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"9.8  
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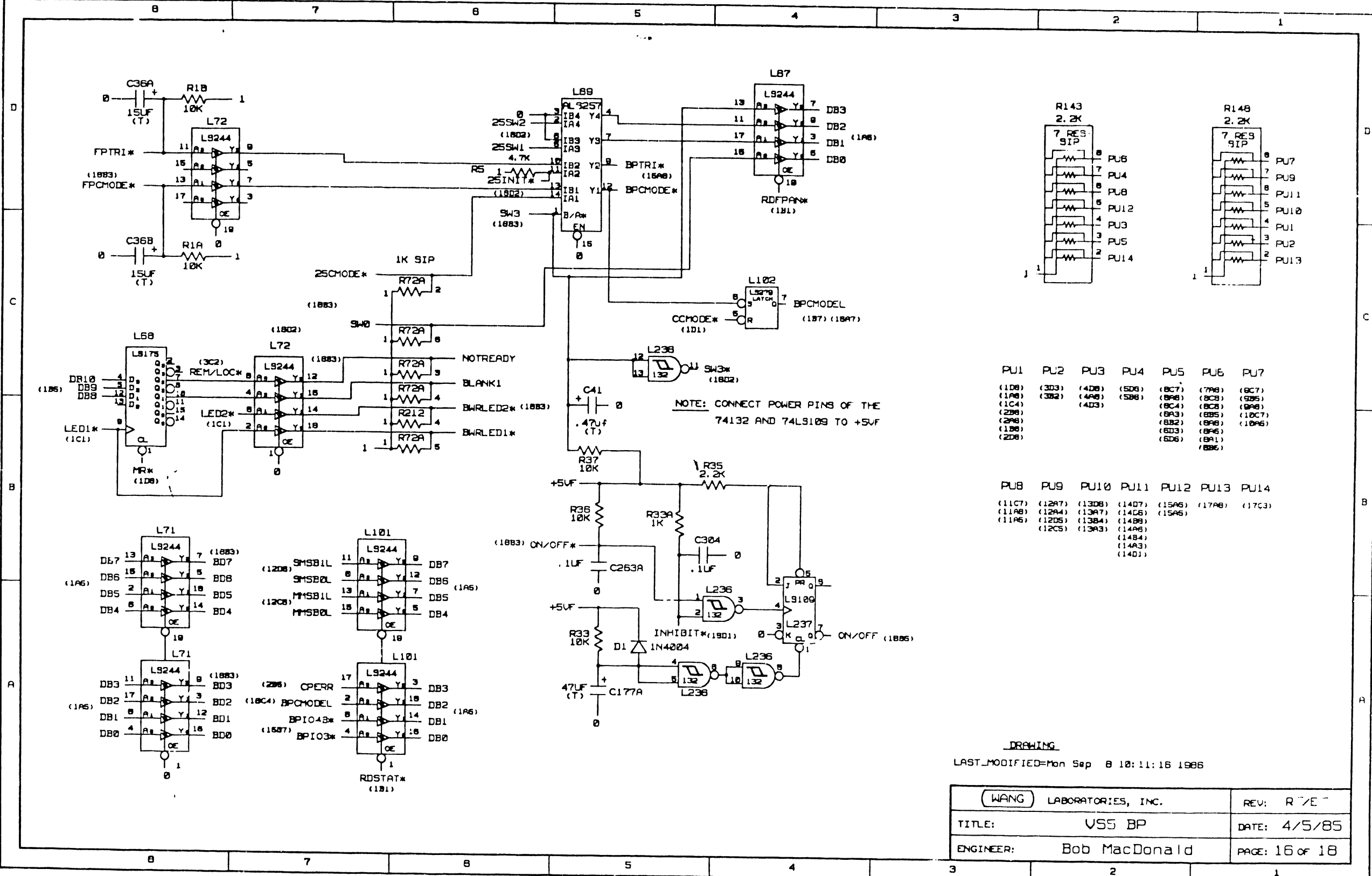
WANG LABORATORIES, INC.		REV: R/E
TITLE: VSS BP		DATE: 4/5/85
ENGINEER: Bob MacDonald		PAGE: 14 of 18



DRAWING

LAST\_MODIFIED=Mon May 5 18:11:24 1986

(WANG) LABORATORIES, INC.	REV: R/E
TITLE: VSS BP	DATE: 4/5/85
ENGINEER: Bob MacDonald	PAGE: 15 of 18

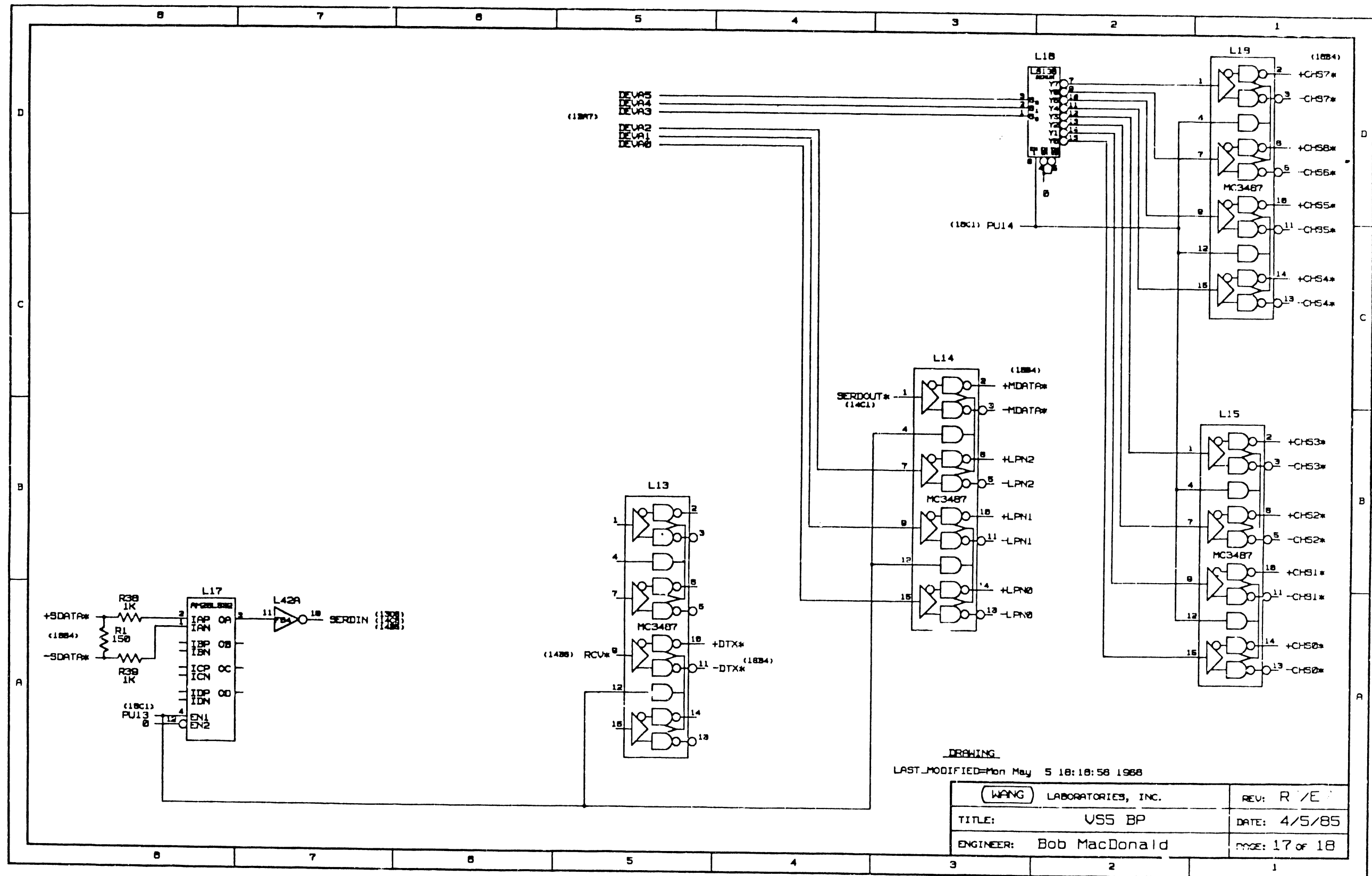


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(WANG) LABORATORIES, INC.	REV: R7/E
TITLE: VSS BP	DATE: 4/5/85
ENGINEER: Bob MacDonald	PAGE: 16 OF 18

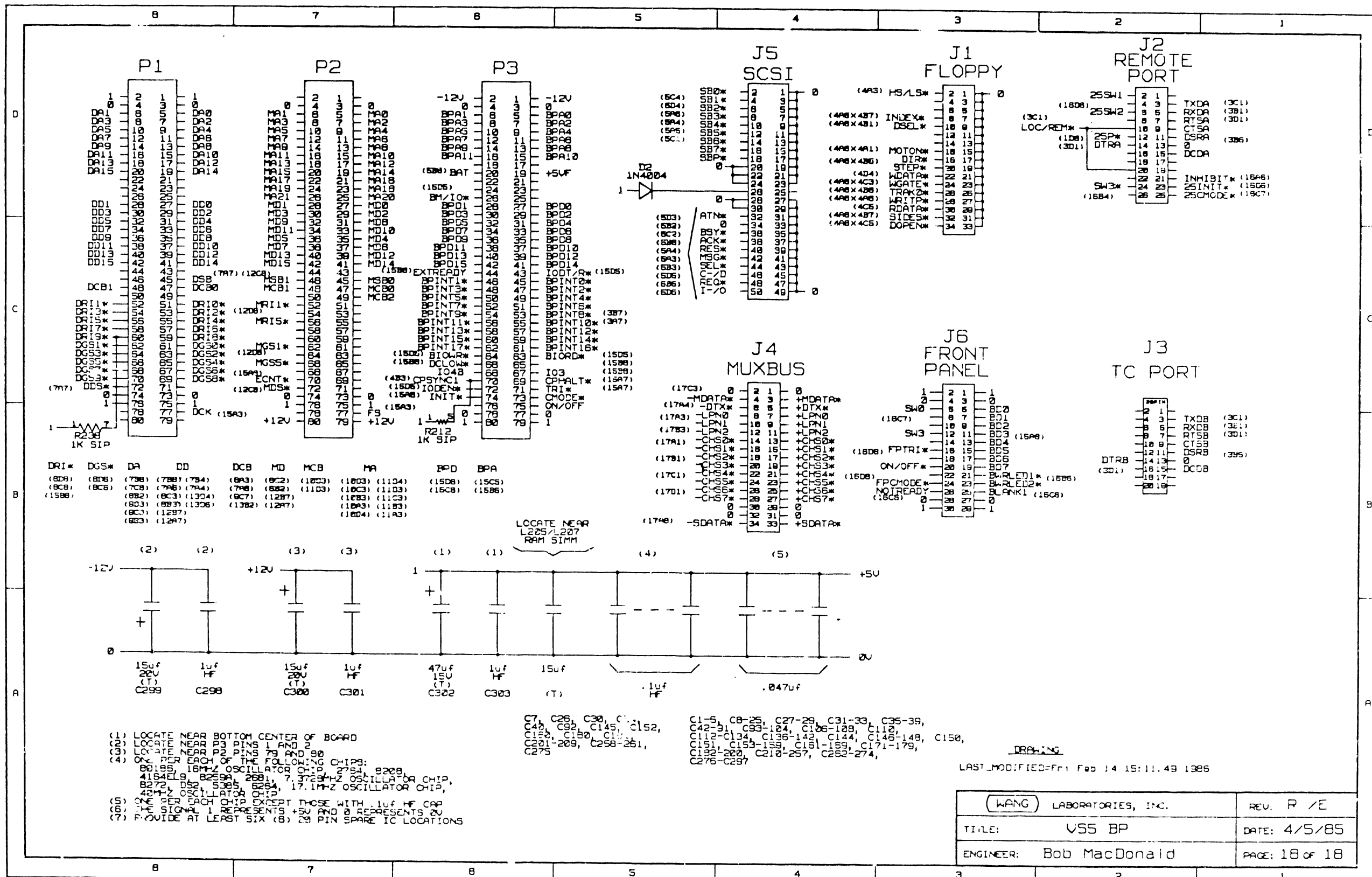
77  
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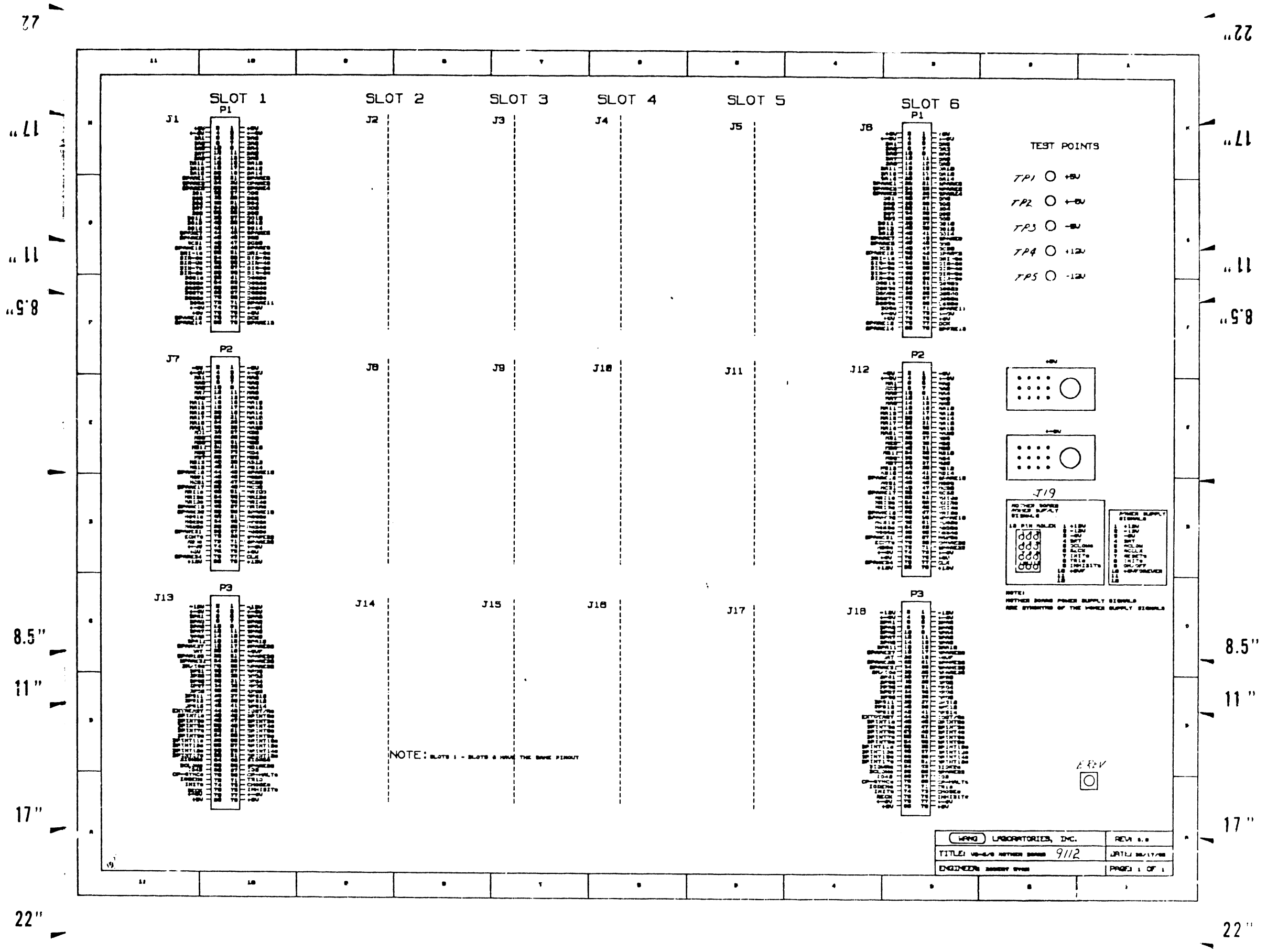
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LAST\_MODIFIED=Mon May 5 18:18:58 1988

(WANG) LABORATORIES, INC.	REV: R / E
TITLE: VSS BP	DATE: 4/5/85
ENGINEER: Bob MacDonald	PAGE: 17 of 18



DR1*	DGS*	DA	DD	DCB	MD	MCB	MA	RPD	BPA
(809)	(806)	(798)	(786)	(843)	(872)	(1033)	(1003)	(1508)	(1505)
(1586)	(805)	(795)	(784)	(842)	(871)	(1032)	(1002)	(1507)	(1504)
		(892)	(883)	(877)	(1287)	(1183)	(1001)	(1506)	(1503)
		(893)	(884)	(878)	(1288)	(1184)	(1004)	(1509)	(1506)
		(894)	(885)	(879)	(1289)	(1185)	(1005)	(1510)	(1507)
		(895)	(886)	(880)	(1290)	(1186)	(1006)	(1511)	(1508)
		(896)	(887)	(881)	(1291)	(1187)	(1007)	(1512)	(1509)
		(897)	(888)	(882)	(1292)	(1188)	(1008)	(1513)	(1510)
		(898)	(889)	(883)	(1293)	(1189)	(1009)	(1514)	(1511)
		(899)	(890)	(884)	(1294)	(1190)	(1010)	(1515)	(1512)
		(900)	(891)	(885)	(1295)	(1191)	(1011)	(1516)	(1513)
		(901)	(892)	(886)	(1296)	(1192)	(1012)	(1517)	(1514)
		(902)	(893)	(887)	(1297)	(1193)	(1013)	(1518)	(1515)
		(903)	(894)	(888)	(1298)	(1194)	(1014)	(1519)	(1516)
		(904)	(895)	(889)	(1299)	(1195)	(1015)	(1520)	(1517)
		(905)	(896)	(890)	(1300)	(1196)	(1016)	(1521)	(1518)
		(906)	(897)	(891)	(1301)	(1197)	(1017)	(1522)	(1519)
		(907)	(898)	(892)	(1302)	(1198)	(1018)	(1523)	(1520)
		(908)	(899)	(893)	(1303)	(1199)	(1019)	(1524)	(1521)
		(909)	(900)	(894)	(1304)	(1200)	(1020)	(1525)	(1522)
		(910)	(901)	(895)	(1305)	(1201)	(1021)	(1526)	(1523)
		(911)	(902)	(896)	(1306)	(1202)	(1022)	(1527)	(1524)
		(912)	(903)	(897)	(1307)	(1203)	(1023)	(1528)	(1525)
		(913)	(904)	(898)	(1308)	(1204)	(1024)	(1529)	(1526)
		(914)	(905)	(899)	(1309)	(1205)	(1025)	(1530)	(1527)
		(915)	(906)	(900)	(1310)	(1206)	(1026)	(1531)	(1528)
		(916)	(907)	(901)	(1311)	(1207)	(1027)	(1532)	(1529)
		(917)	(908)	(902)	(1312)	(1208)	(1028)	(1533)	(1530)
		(918)	(909)	(903)	(1313)	(1209)	(1029)	(1534)	(1531)
		(919)	(910)	(904)	(1314)	(1210)	(1030)	(1535)	(1532)
		(920)	(911)	(905)	(1315)	(1211)	(1031)	(1536)	(1533)
		(921)	(912)	(906)	(1316)	(1212)	(1032)	(1537)	(1534)
		(922)	(913)	(907)	(1317)	(1213)	(1033)	(1538)	(1535)
		(923)	(914)	(908)	(1318)	(1214)	(1034)	(1539)	(1536)
		(924)	(915)	(909)	(1319)	(1215)	(1035)	(1540)	(1537)
		(925)	(916)	(910)	(1320)	(1216)	(1036)	(1541)	(1538)
		(926)	(917)	(911)	(1321)	(1217)	(1037)	(1542)	(1539)
		(927)	(918)	(912)	(1322)	(1218)	(1038)	(1543)	(1540)
		(928)	(919)	(913)	(1323)	(1219)	(1039)	(1544)	(1541)
		(929)	(920)	(914)	(1324)	(1220)	(1040)	(1545)	(1542)
		(930)	(921)	(915)	(1325)	(1221)	(1041)	(1546)	(1543)
		(931)	(922)	(916)	(1326)	(1222)	(1042)	(1547)	(1544)
		(932)	(923)	(917)	(1327)	(1223)	(1043)	(1548)	(1545)
		(933)	(924)	(918)	(1328)	(1224)	(1044)	(1549)	(1546)
		(934)	(925)	(919)	(1329)	(1225)	(1045)	(1550)	(1547)
		(935)	(926)	(920)	(1330)	(1226)	(1046)	(1551)	(1548)
		(936)	(927)	(921)	(1331)	(1227)	(1047)	(1552)	(1549)
		(937)	(928)	(922)	(1332)	(1228)	(1048)	(1553)	(1550)
		(938)	(929)	(923)	(1333)	(1229)	(1049)	(1554)	(1551)
		(939)	(930)	(924)	(1334)	(1230)	(1050)	(1555)	(1552)
		(940)	(931)	(925)	(1335)	(1231)	(1051)	(1556)	(1553)
		(941)	(932)	(926)	(1336)	(1232)	(1052)	(1557)	(1554)
		(942)	(933)	(927)	(1337)	(1233)	(1053)	(1558)	(1555)
		(943)	(934)	(928)	(1338)	(1234)	(1054)	(1559)	(1556)
		(944)	(935)	(929)	(1339)	(1235)	(1055)	(1560)	(1557)
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		(948)	(939)	(933)	(1343)	(1239)	(1059)	(1564)	(1561)
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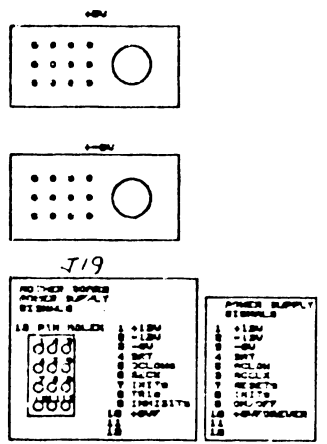
- (1) LOCATE NEAR BOTTOM CENTER OF BOARD
- (2) LOCATE NEAR PINS 1 AND 2
- (3) LOCATE NEAR PINS 79 AND 80
- (4) LOCATE NEAR PINS 104 AND 105
- (5) LOCATE NEAR PINS 106 AND 107
- (6) LOCATE NEAR PINS 108 AND 109
- (7) LOCATE NEAR PINS 110 AND 111
- (8) LOCATE NEAR PINS 112 AND 113
- (9) LOCATE NEAR PINS 114 AND 115
- (10) LOCATE NEAR PINS 116 AND 117
- (11) LOCATE NEAR PINS 118 AND 119
- (12) LOCATE NEAR PINS 120 AND 121
- (13) LOCATE NEAR PINS 122 AND 123
- (14) LOCATE NEAR PINS 124 AND 125
- (15) LOCATE NEAR PINS 126 AND 127
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- (18) LOCATE NEAR PINS 132 AND 133
- (19) LOCATE NEAR PINS 134 AND 135
- (20) LOCATE NEAR PINS 136 AND 137
- (21) LOCATE NEAR PINS 138 AND 139
- (22) LOCATE NEAR PINS 140 AND 141
- (23) LOCATE NEAR PINS 142 AND 143
- (24) LOCATE NEAR PINS 144 AND 145
- (25) LOCATE NEAR PINS 146 AND 147
- (26) LOCATE NEAR PINS 148 AND 149
- (27) LOCATE NEAR PINS 150 AND 151
- (28) LOCATE NEAR PINS 152 AND 153
- (29) LOCATE NEAR PINS 154 AND 155
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- (66) LOCATE NEAR PINS 228 AND 229
- (67) LOCATE NEAR PINS 230 AND 231
- (68) LOCATE NEAR PINS 232 AND 233
- (69) LOCATE NEAR PINS



NOTE: SLOTS 1 - SLOTS 6 HAVE THE SAME PITCH

TEST POINTS

- TP1 ○ +5V
- TP2 ○ +5V
- TP3 ○ -5V
- TP4 ○ +12V
- TP5 ○ -12V



NOTE:  
 EITHER BOARD POWER SUPPLY SIGNALS  
 OR SIGNALS OF THE POWER SUPPLY SIGNALS

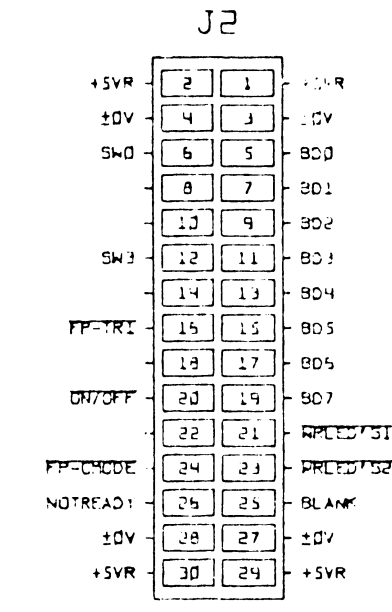
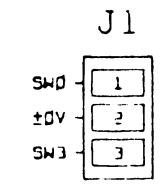
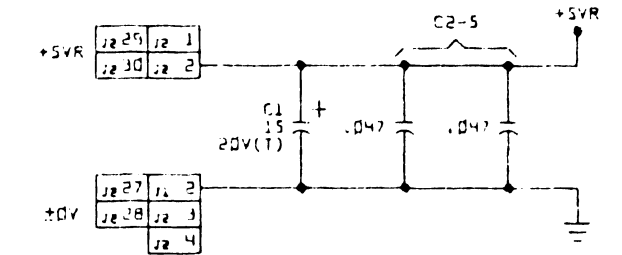
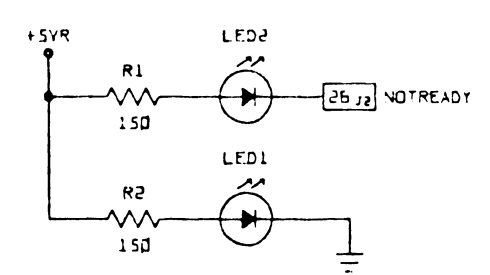
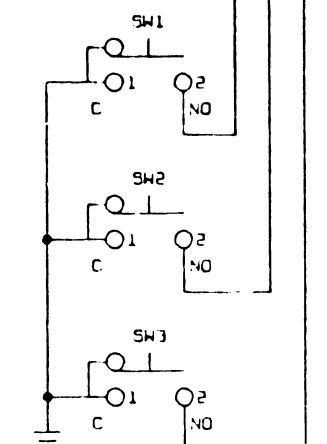
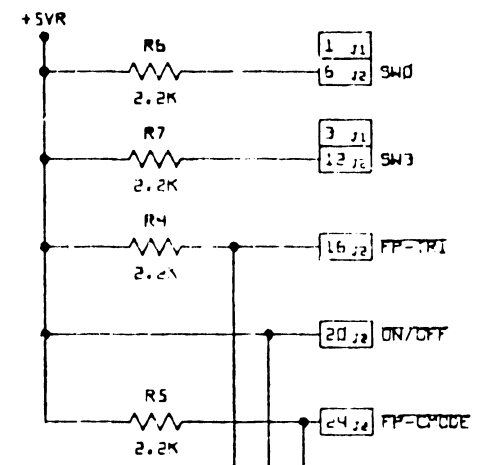
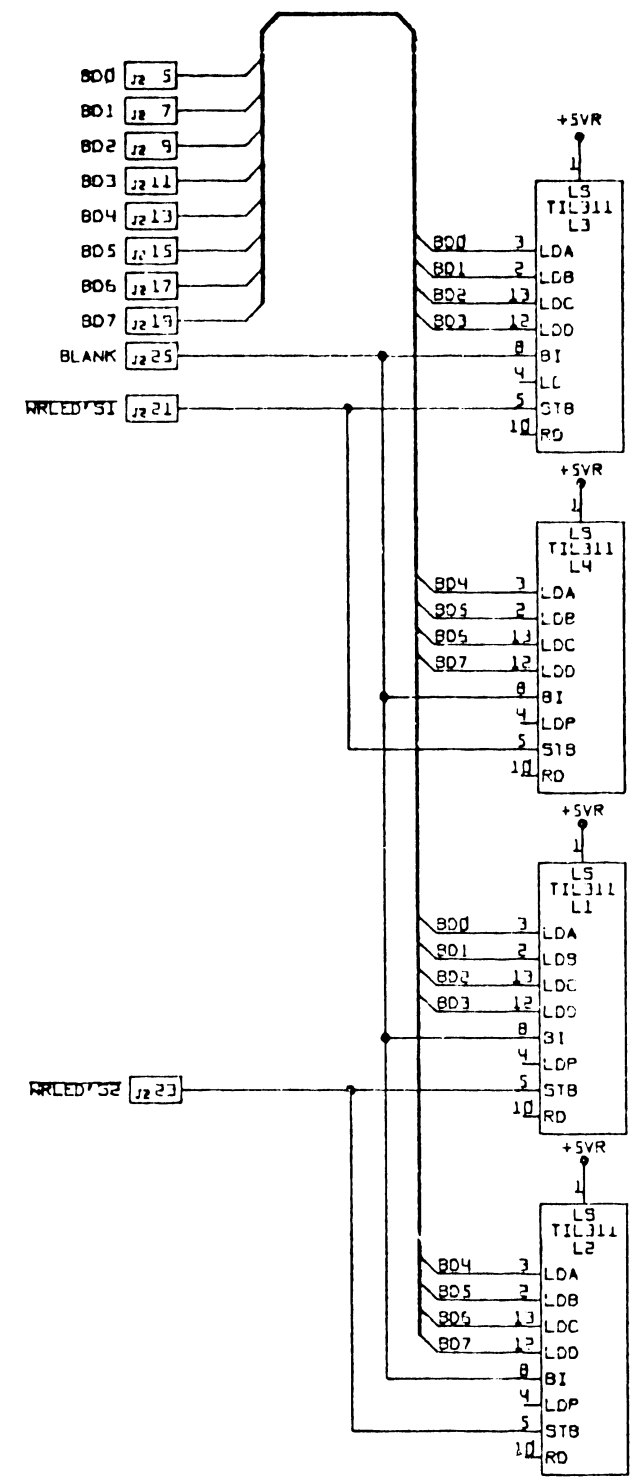
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WANG LABORATORIES, INC.	REV. 1.0
TITLE: VLSI BOARD 9112	DATE: 05/17/88
ENGINEER: BARRY EVAN	PAGE: 1 OF 1

THIS DRAWING AND THE DATA THEREON ARE THE CONFIDENTIAL PROPERTY OF WANG AND ARE LOANED TO YOU UNDER LICENSE. IT IS 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, WITHOUT THE WRITTEN CONSENT OF WANG LABORATORIES, INC. IF YOU ARE AWARE THIS DRAWING IS PROPERTY OF WANG TO MAINTAIN THE PROPRIETARY CHARACTER OF THE DRAWING, IT IS RETURNABLE TO THE OFFICE OF WANG LABORATORIES, INC.

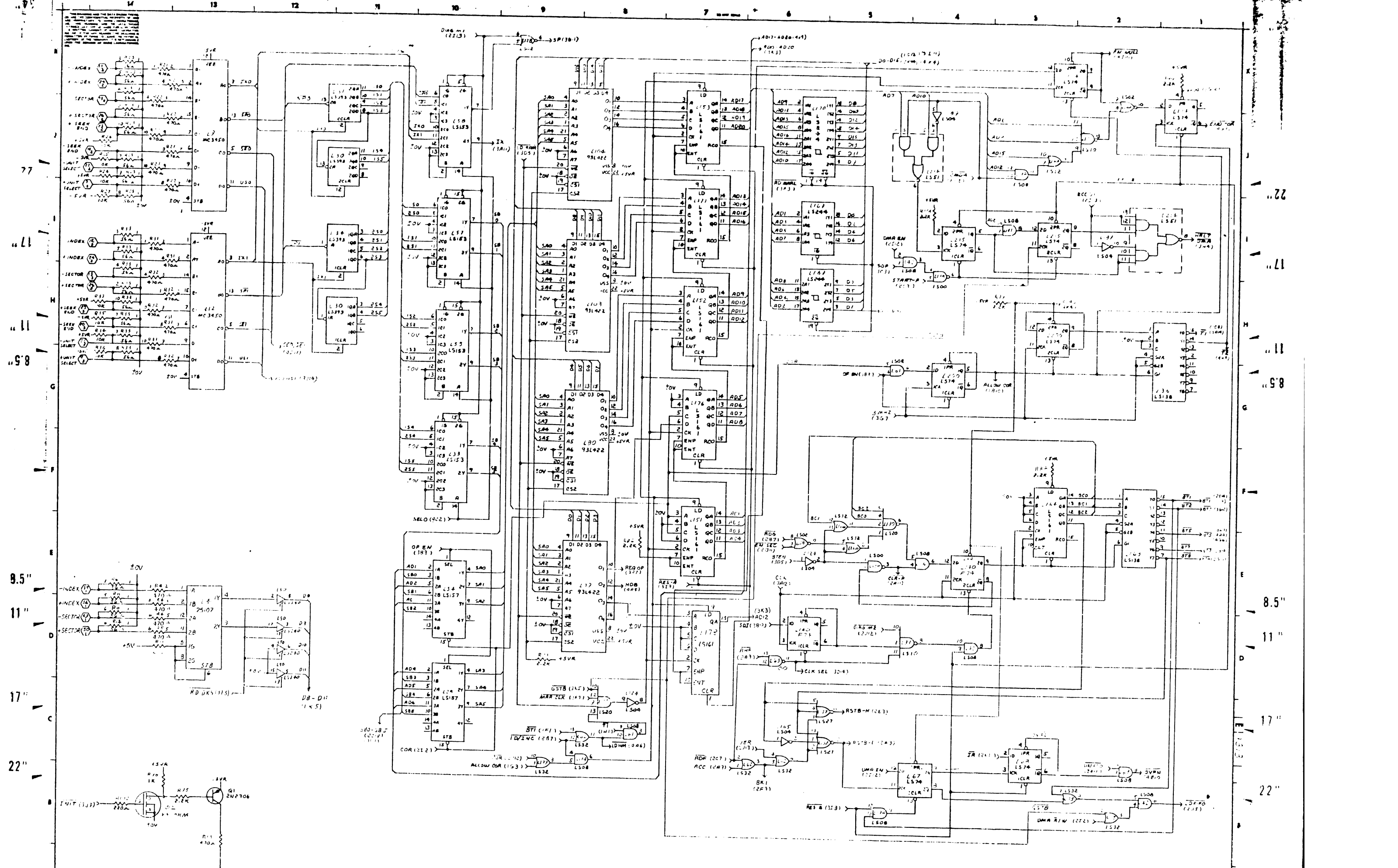
NOTES

1. ALL RESISTOR VALUES IN OHMS.
2. ALL CAPACITOR VALUES IN MICROFARADS.
3. ALL RESISTORS 1/4W 5% UNLESS OTHERWISE INDICATED.



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<b>WANG</b> LABORATORIES, INC.		SCHEMATIC DIAGRAM		
TITLE VS 5/6		FRONT PANEL		
MODEL NUMBER VS 5/6	WANG PART NUMBER 210-9113	DWG BSR	CHK	ENG BR/DJR
SCALE		SHEET 1 OF 1	DATE	DRAWING NUMBER
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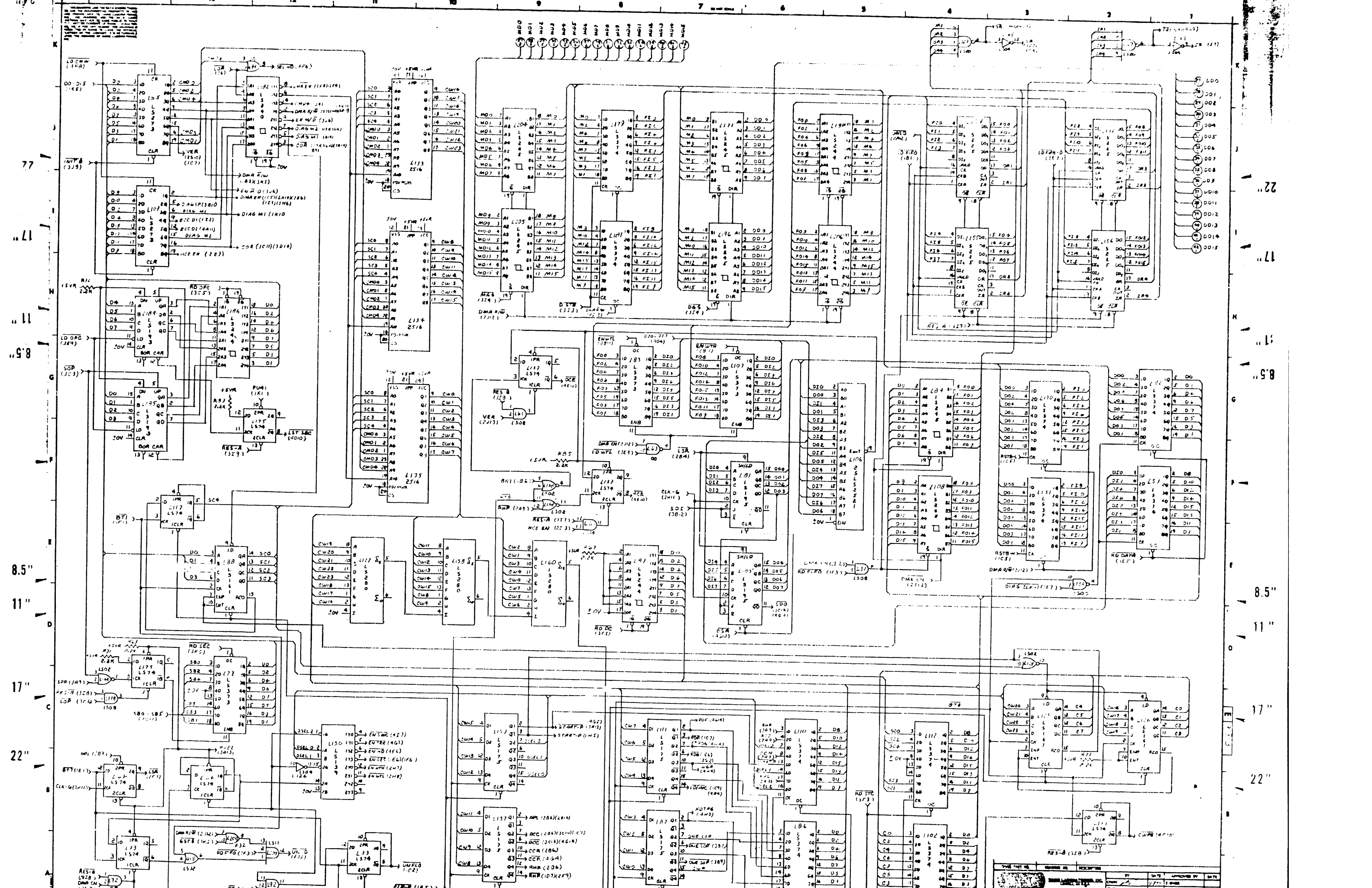
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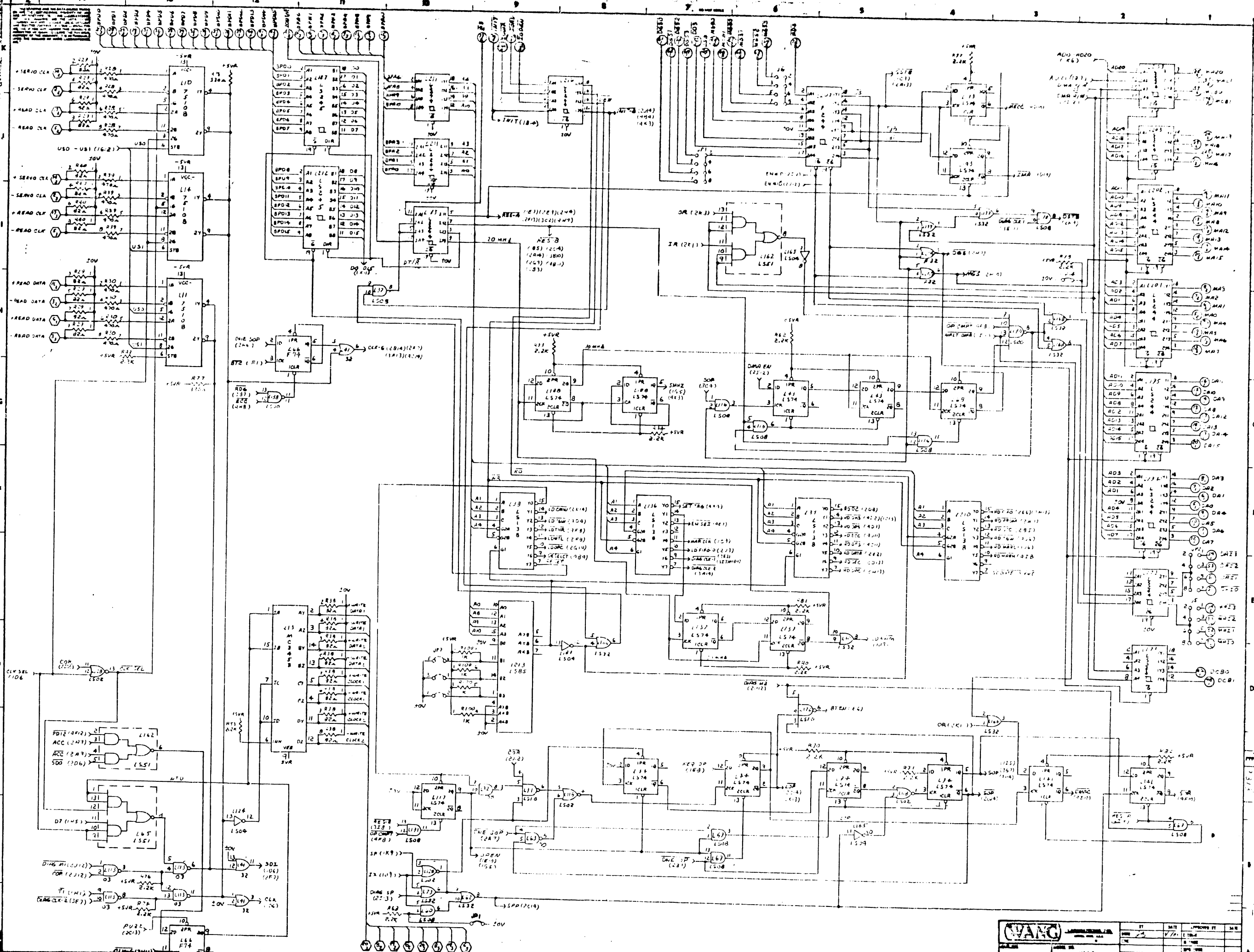
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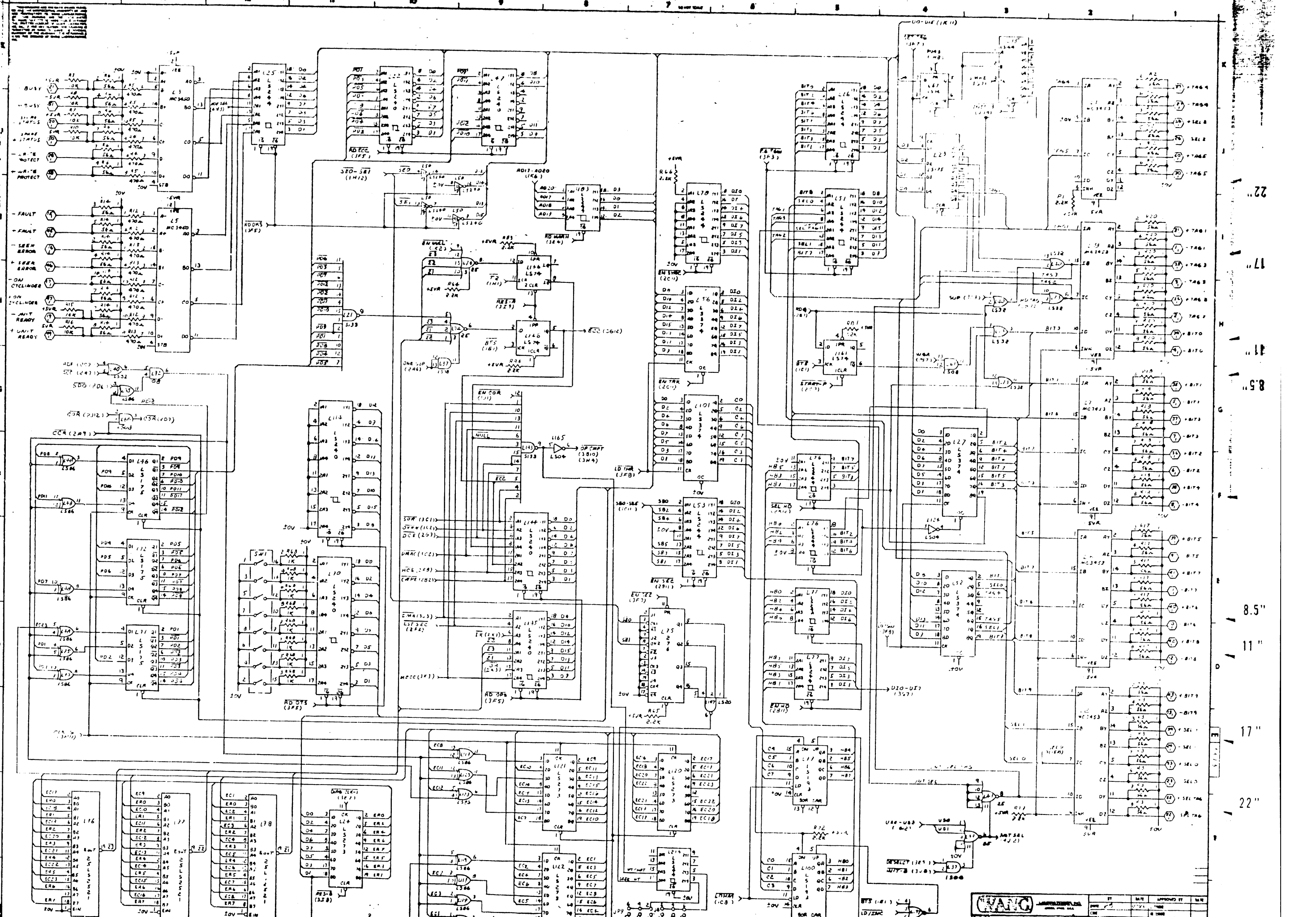
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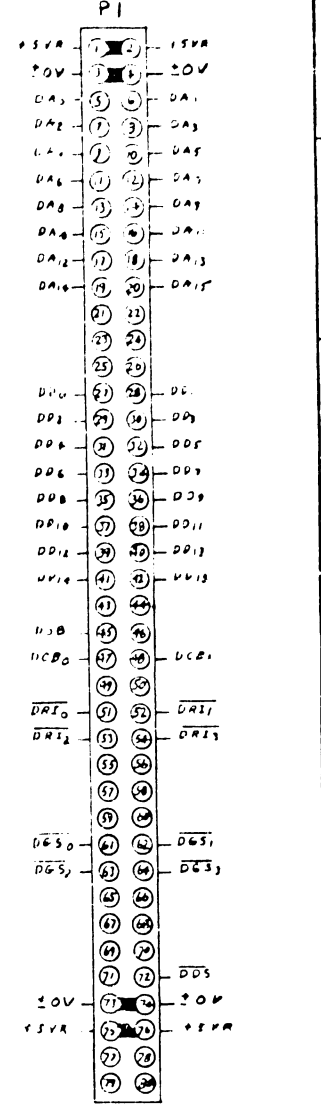
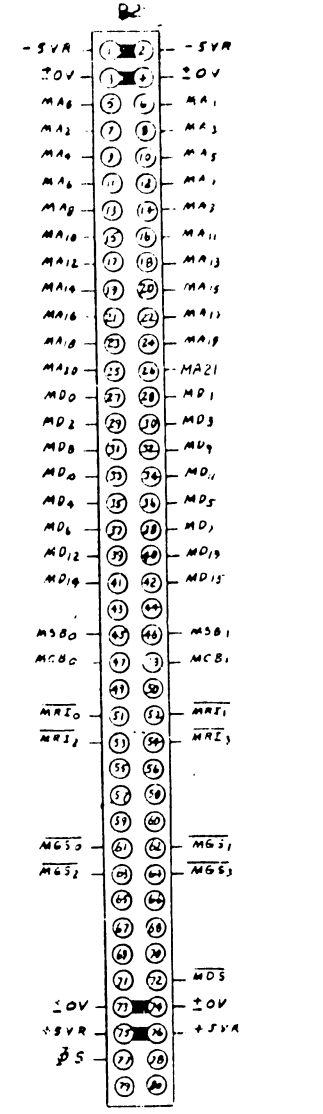
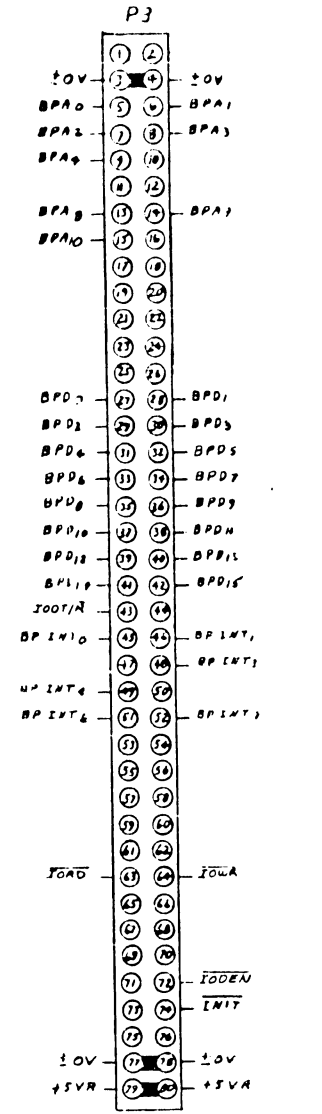
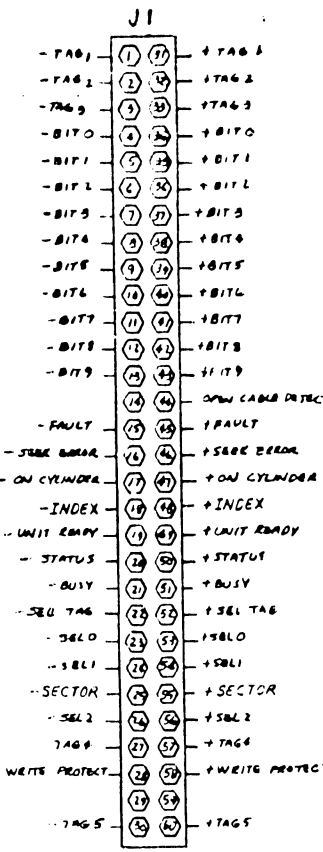
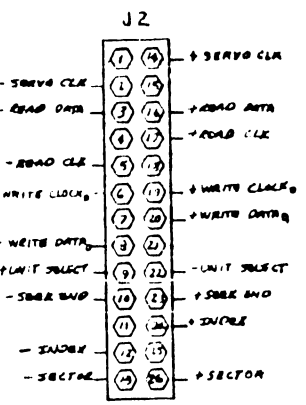
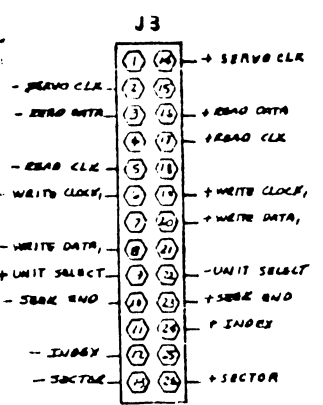


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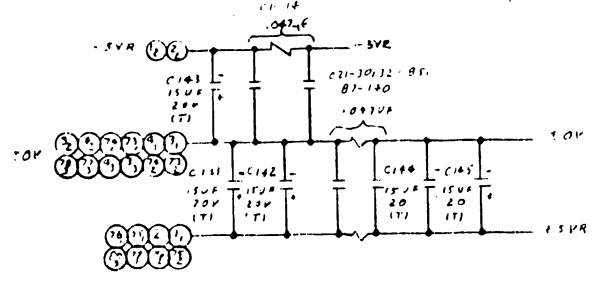
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ABBREVIATIONS	CONNECTION	ABBREVIATIONS	CONNECTION
+BIT 0 - BIT 9	1A1	+SECTOR	1A10
-BIT 0 - BIT 9	1A1	-SECTOR	1A10
BPA 0 - BPA 9	3K11	+SEEK BEHOLD	4A19
BPA 0 - BPA 9	3K11	-SEEK BEHOLD	4A19
BPD 0 - BPD 15	3K13	+SEEK END	1A10
BPD 0 - BPD 15	3K13	-SEEK END	1A10
BP INT 0 - BP INT 5	4A7	+SEL TAG	1A10
+BUSY	4A10	-SEL TAG	1A10
-BUSY	4A10	+SECTOR	1A10
		-SECTOR	1A10
DA 0 - DA 15	3F1	+SEL 0	4C1
DCB 0	3D1	-SEL 0	4C1
DCB 1	3D1	+SEL 1	4C1
		-SEL 1	4C1
DD 0 - DD 15	4J1	+SEL 2	4J1
DD 3	3K7	-SEL 2	4J1
DG 0 - DG 3	3K7	+SEL TAG	4B1
DR 0 - DR 1	3E1	-SEL TAG	4B1
DSB	3K7	+SERVO CLR	3K14
		-SERVO CLR	3K14
+FAULT	4Z10	+STATUS	4U10
-FAULT	4Z10	-STATUS	4U10
		+TAG 1	4Z1
+INDEX	1E10	-TAG 1	4Z1
-INDEX	1E10	+TAG 2	4M1
INT	3K9	-TAG 2	4M1
IOWEN	3K9	+TAG 3	4Z1
IOW T/R	3K12	-TAG 3	4Z1
IOWB	3K9	+TAG 4	4K1
IOWA	3K9	-TAG 4	4K1
		+TAG 5	4J1
MA 0 - MA 15	3E1	-TAG 5	4J1
MCB 0 - MCB 15	3K1	+UNIT READY	4H10
MD 0 - MD 15	2K4	-UNIT READY	4H10
MS 0	3K6	+UNIT SELECT	1E10
MS 0 - MS 15	3K6	-UNIT SELECT	1E10
MST 0 - MST 3	3E1	+WRITE PROTECT	4U10
MSB 0	3K7	-WRITE PROTECT	4U10
MSB 1	3K7		
		ES	3K9
ON CYLINDER	4H4	+WRITE DATA	3A11
-ON CYLINDER	4H4	-WRITE DATA	3A11
OPEN CABLE DEFECT	1A13	+WRITE DATA	3A10
		+WRITE CLOCK	3A10
+READ CLR	3J10	+WRITE CLOCK	3A10
-READ CLR	3J10	-WRITE CLOCK	3A10
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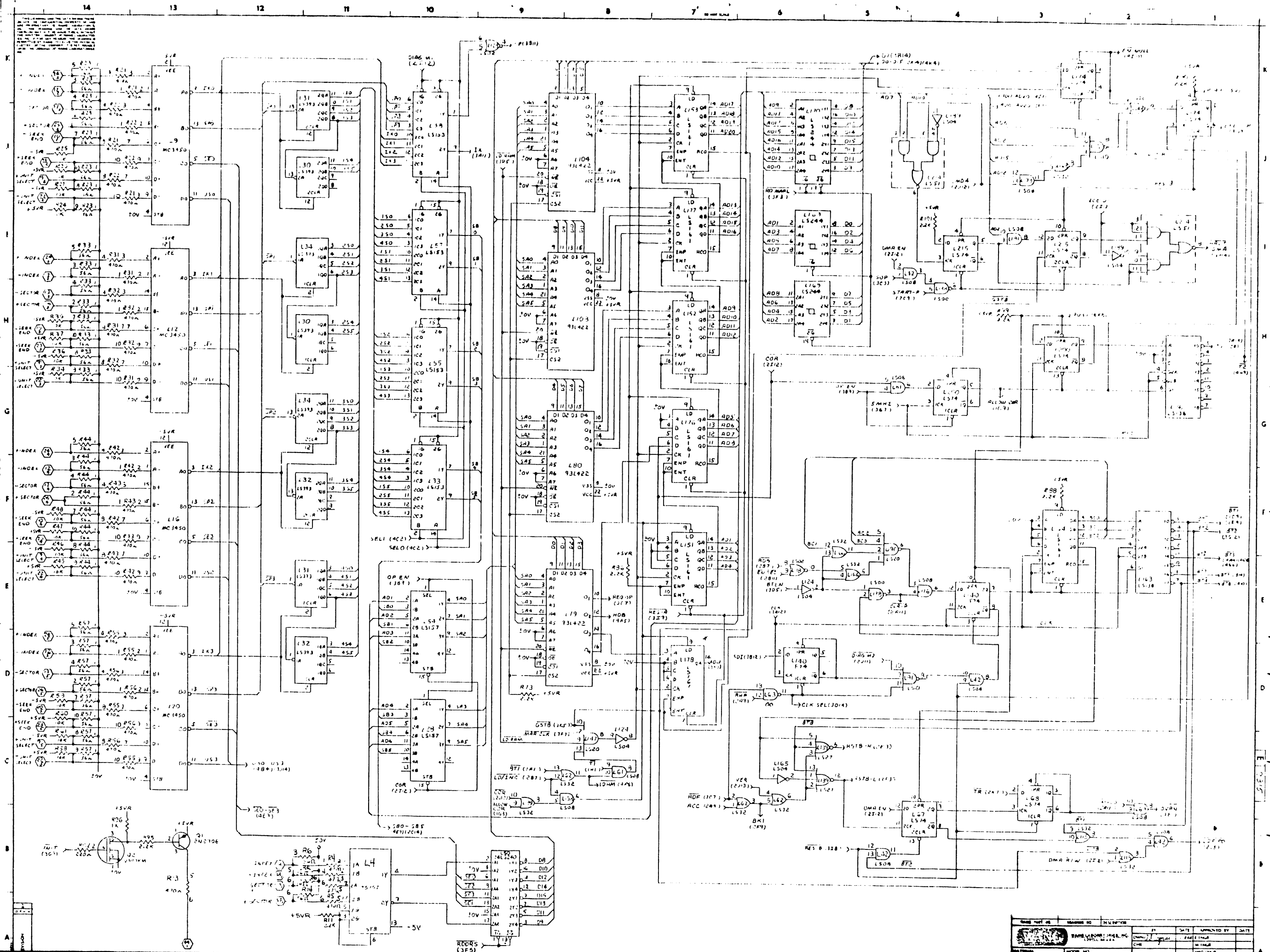


NOTE:  
1) ALL RESISTORS ARE 1/4W 5% UNLESS OTHERWISE SPECIFIED

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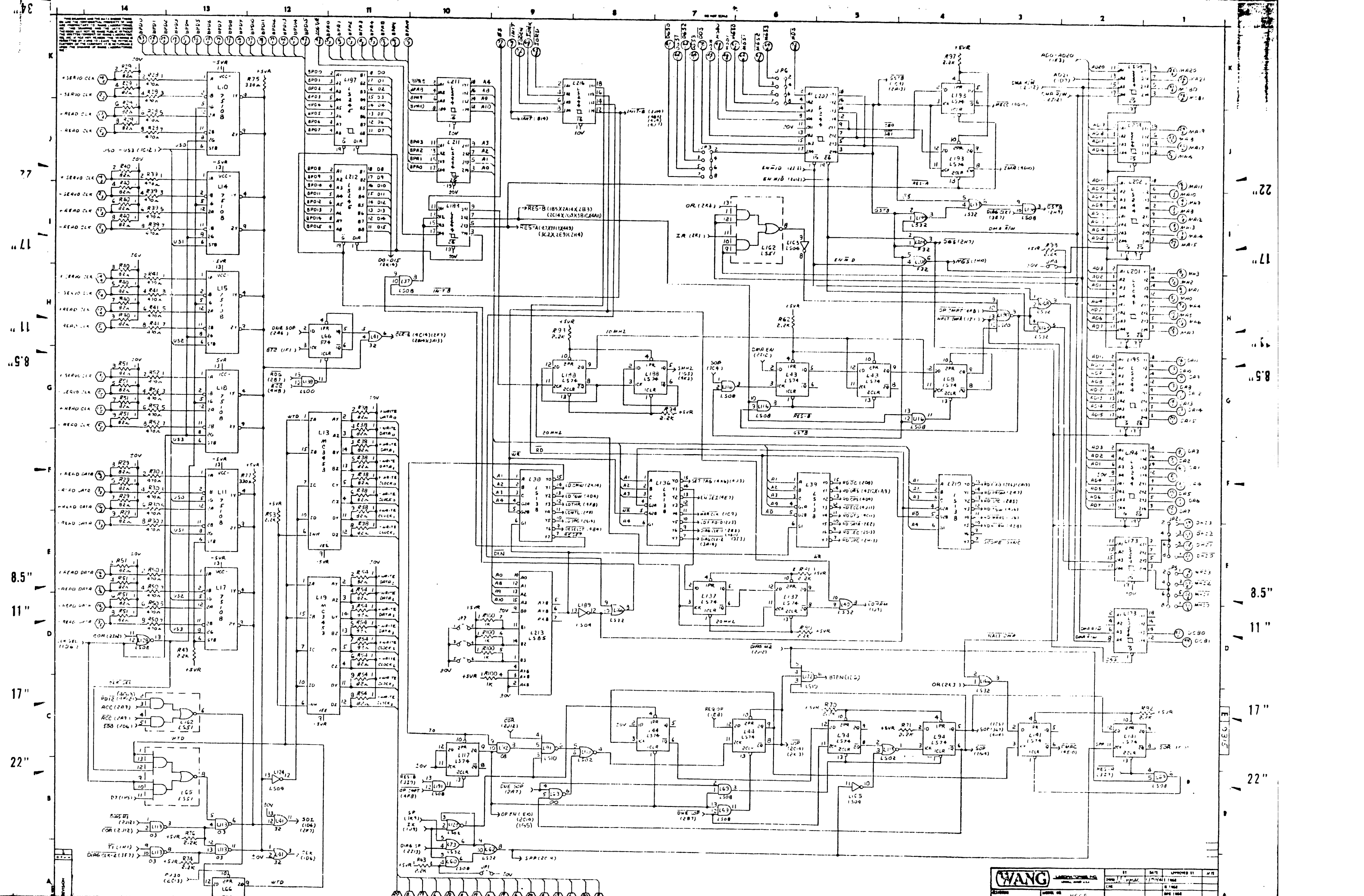
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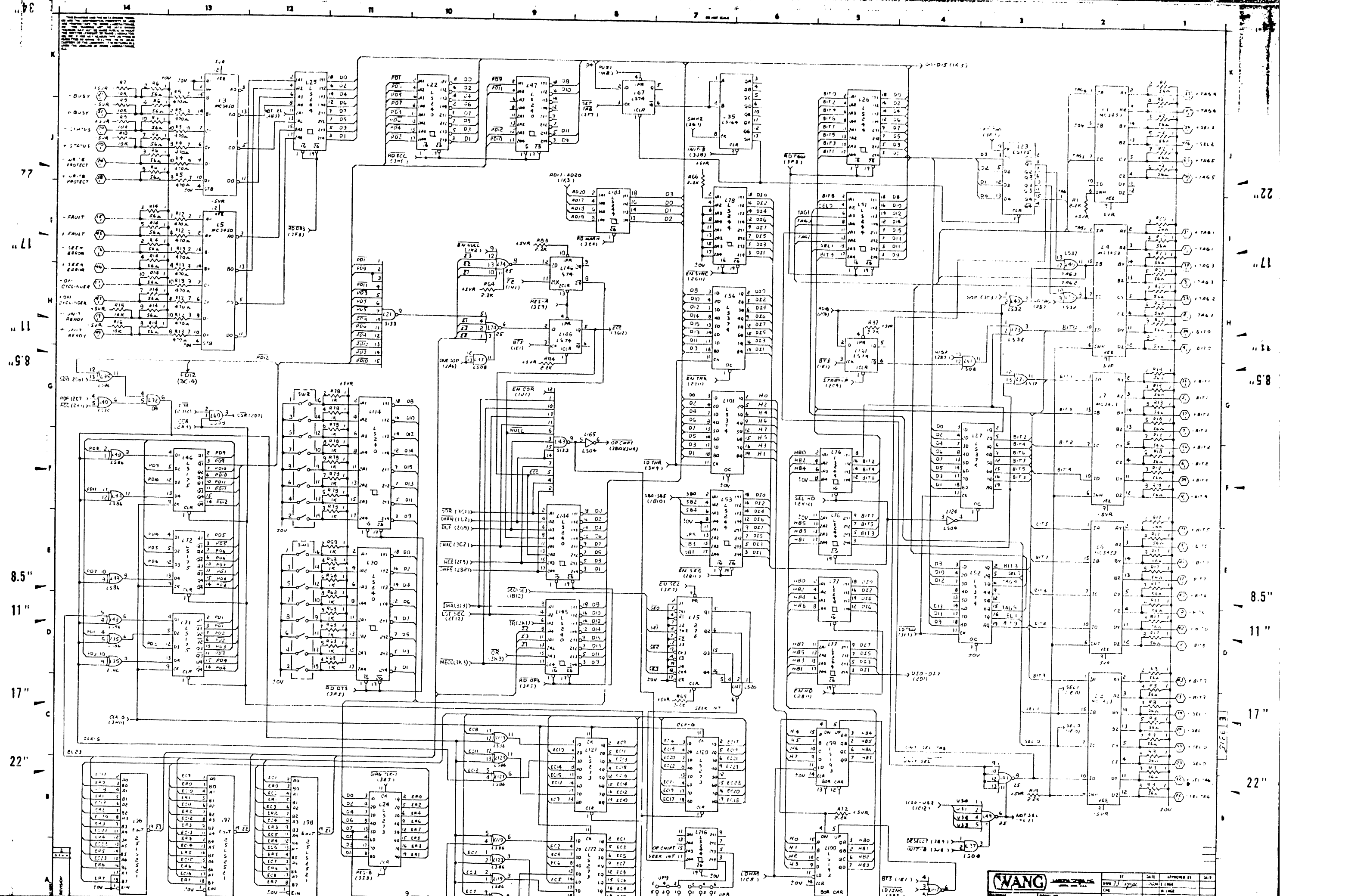
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WANG

NO.	DATE	APPROVED BY	WFE
1	1/14/61		
2	1/14/61		
3	1/14/61		
4	1/14/61		
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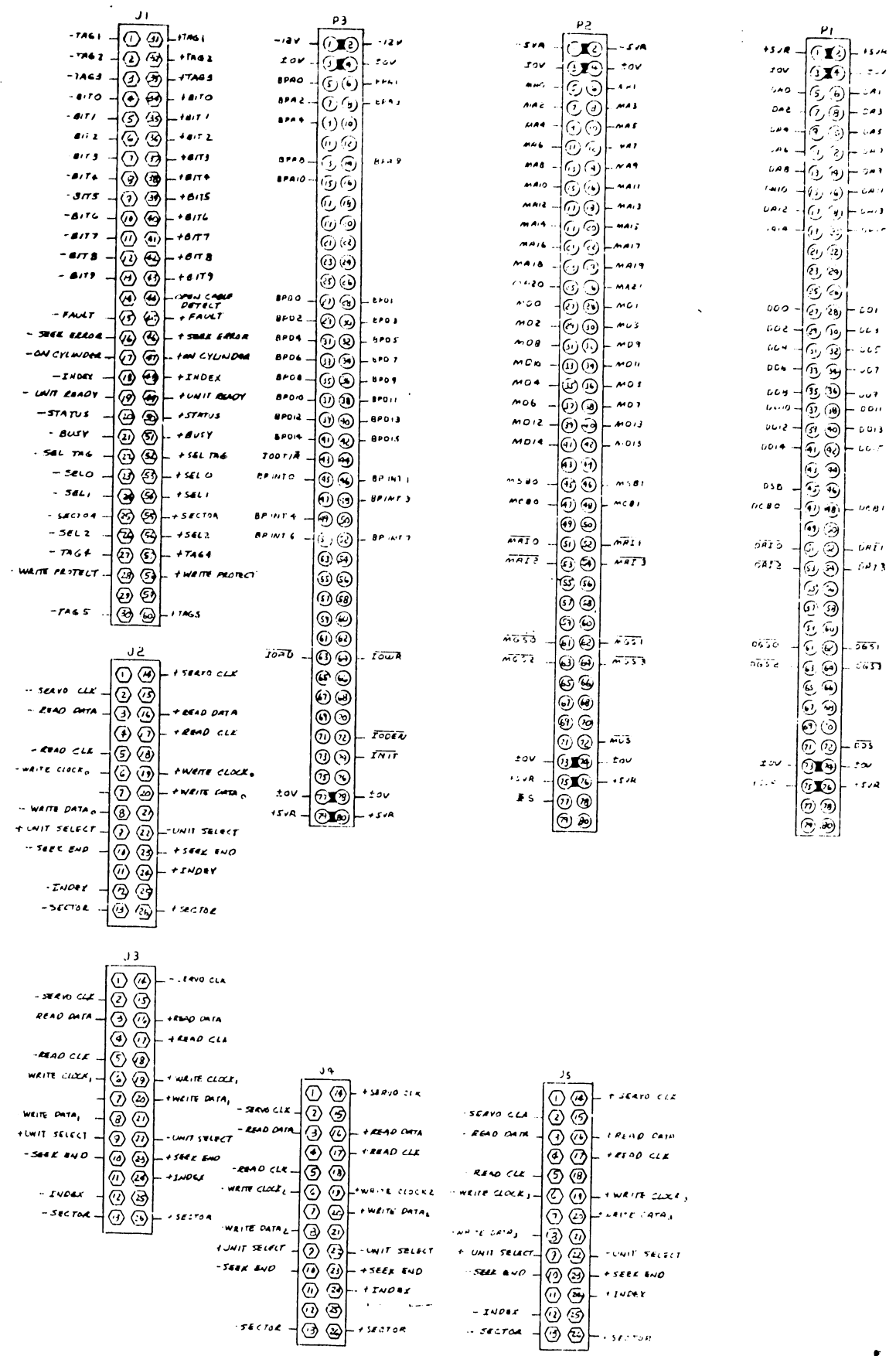
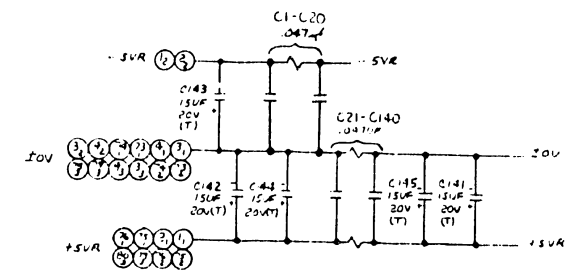
77  
11  
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8.5"  
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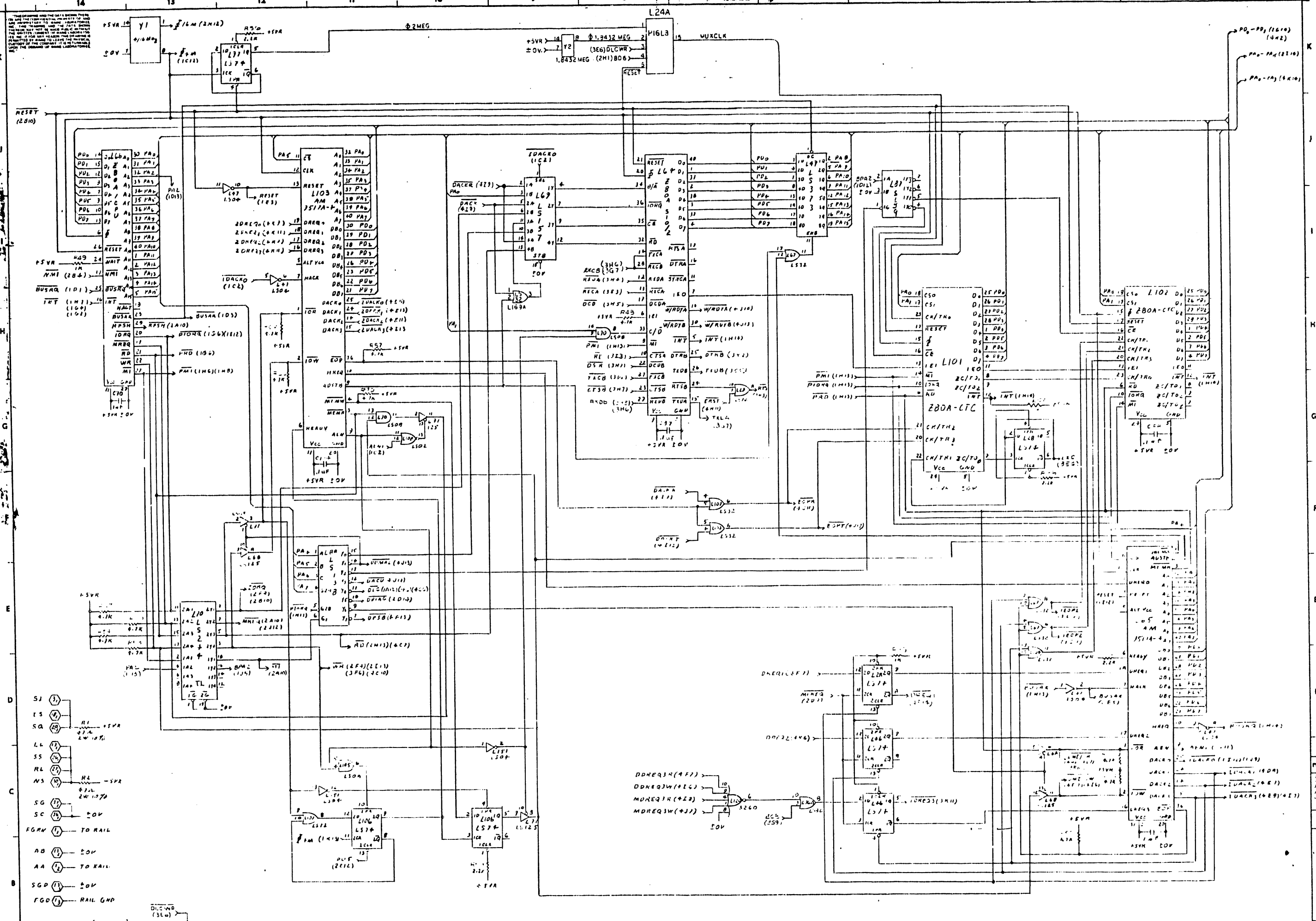


IC TYPE	LOCATION	PAGES
7400	L63	1
74LS02	L118	1
74LS04	L124	1
	L189	3
74LS08	L42	1
	L191	1
74LS11	L209	2
74LS21	L139	1
	L197	1
	L115	1
74LS32	L168	1
	L199	1
	L216	3
74F32	L208	2
74LS51	L25	1
74LS74	L23	1
	L122	1
74LS96	L95	1
	L123	1

PARAMETER	COND.	PARAMETER	COND.	PARAMETER	COND.
-BIT0 -BIT9	4F1	-SEL0	4C1	-WRITE DATA	3A7
BP00 - BP09	3K13	+SEL1	3C1	+WRITE CLOCK	3A9
BP10 - BP19	3K11	+SEL2	4C1	+WRITE DATA	3A8
BP20 - BP29	3K11	+SERVO CLK	3K4		
BP30 - BP39	3K11				
BP40 - BP49	3K11				
BP50 - BP59	3K11				
BP60 - BP69	3K11				
BP70 - BP79	3K11				
BP80 - BP89	3K11				
BP90 - BP99	3K11				
BP00	3D1				
BP01	3D1				
BP02	3D1				
BP03	3D1				
BP04	3D1				
BP05	3D1				
BP06	3D1				
BP07	3D1				
BP08	3D1				
BP09	3D1				
BP10	3D1				
BP11	3D1				
BP12	3D1				
BP13	3D1				
BP14	3D1				
BP15	3D1				
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BP17	3D1				
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BP96	3D1				
BP97	3D1				
BP98	3D1				
BP99	3D1				



NOTE: ALL RES ARE 1/4W 5% UNLESS OTHERWISE SPECIFIED.



14  
 13  
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+5V  
 +12V  
 +24V

RESRT (2810)  
 BUSA (101)  
 INT (111)  
 WAIT (284)  
 NMI (284)  
 BUSA (101)  
 INT (111)  
 WAIT (284)  
 NMI (284)  
 BUSA (101)  
 INT (111)

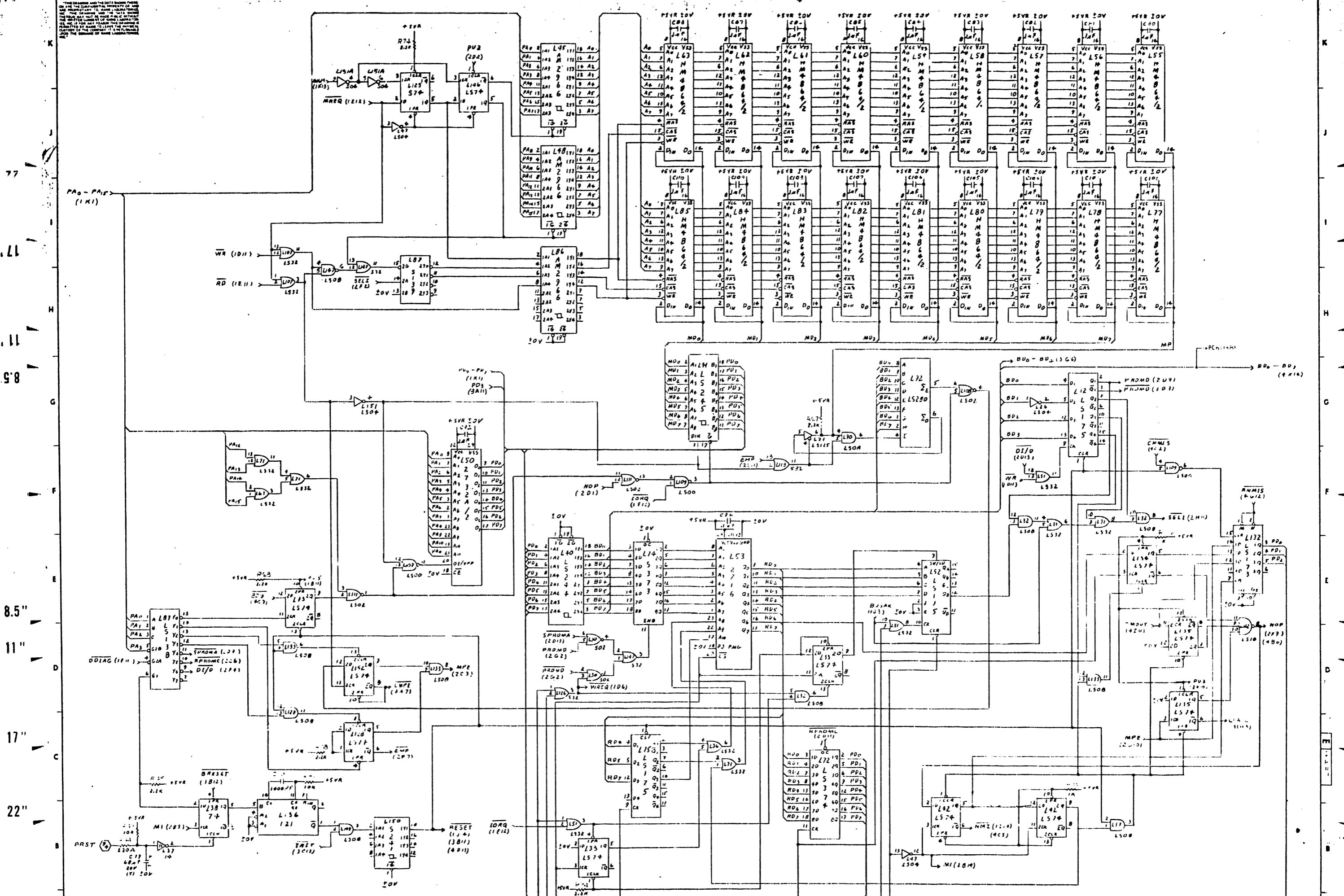
2A  
 2B  
 2C  
 2D  
 2E  
 2F  
 2G  
 2H  
 2I  
 2J  
 2K  
 2L  
 2M  
 2N  
 2O  
 2P  
 2Q  
 2R  
 2S  
 2T  
 2U  
 2V  
 2W  
 2X  
 2Y  
 2Z

+5V  
 +12V  
 +24V

RESRT (2810)  
 BUSA (101)  
 INT (111)  
 WAIT (284)  
 NMI (284)  
 BUSA (101)  
 INT (111)

8.5"  
 11"  
 17"  
 22"

NAME	NO.	REVISION	DATE	APPROVED BY	DATE
WANG					
MODEL NO.					
TITLE	CPU TC DATA				

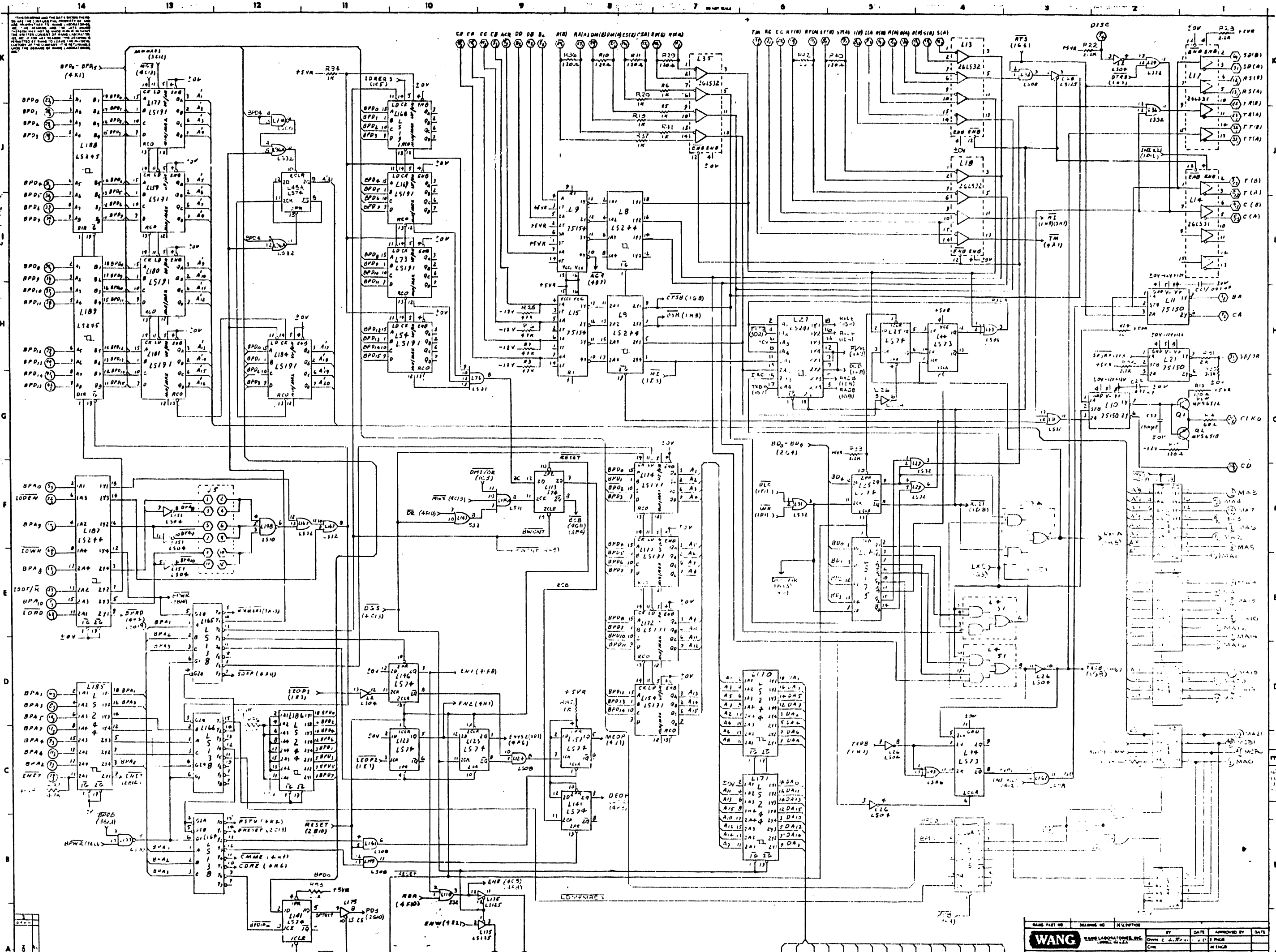


77  
71  
11  
98  
8.5"  
11"  
17"  
22"

The following are the data sheet notes on the 74LS00 NAND gate, 74LS10 decoder, 74LS163 counter, and 74LS164 shift register. The manufacturer's name is not shown on the parts. The manufacturer's name is not shown on the parts. The manufacturer's name is not shown on the parts. The manufacturer's name is not shown on the parts.

DESIGN NO.	REVISION NO.	DESCRIPTION	BY	DATE	APPROVED BY	DATE
720 CPU TO DATA						

**WANG** LABORATORIES, INC. MODEL NO. 720 CPU TO DATA



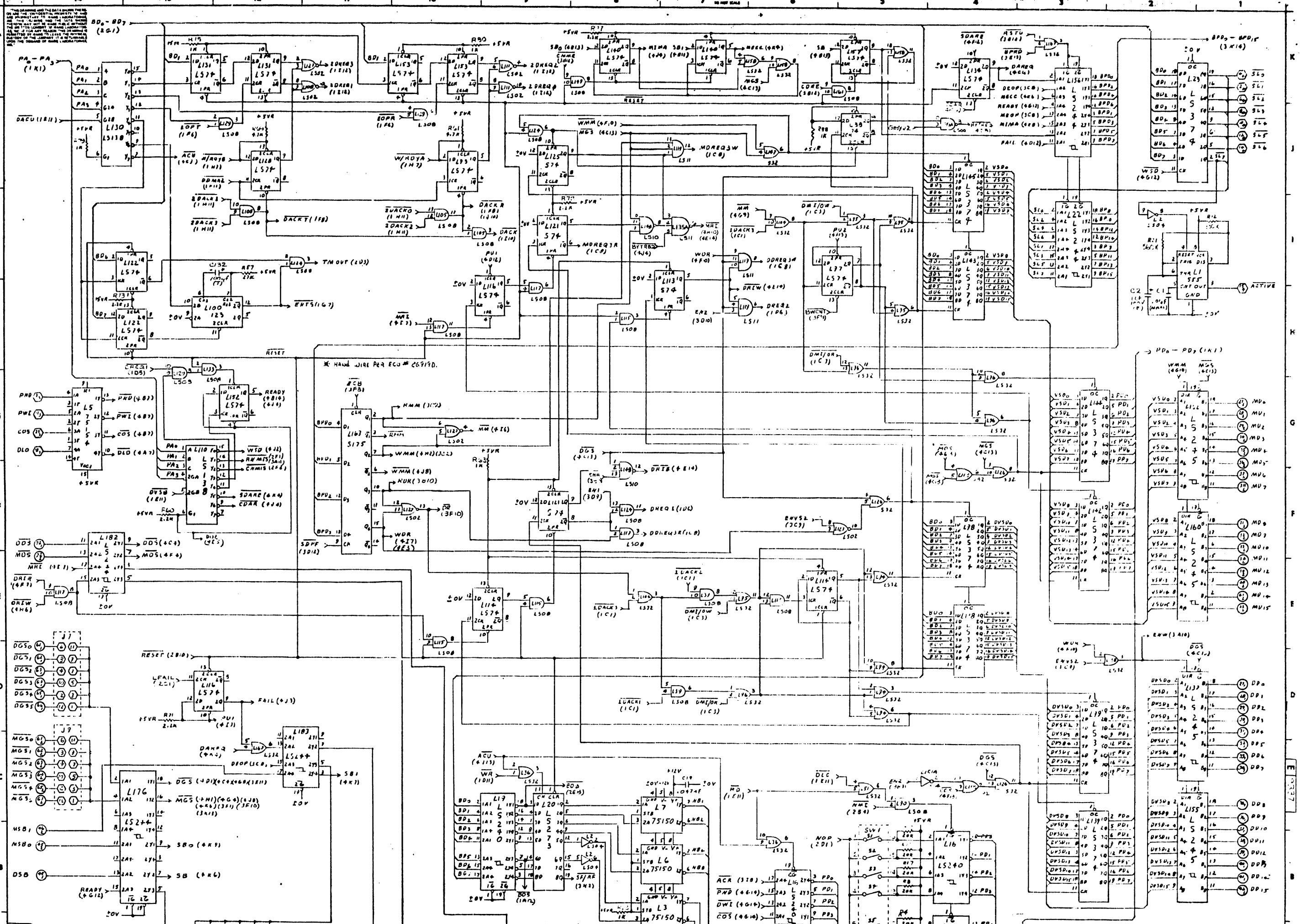
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8.5"  
11"  
17"  
22"

BASE PART NO	REVISION NO	REVISION	BY	DATE	APPROVED BY	DATE
WANG			DATE	APPROVED BY	DATE	
TAPPE LABORATORIES, INC.			DATE	APPROVED BY	DATE	
MODEL NO. 2200			DATE	APPROVED BY	DATE	
TITLE: 2200 TC DATA (MILITARY)			DATE	APPROVED BY	DATE	



DATE	BY	DATE	APPROVED BY	DATE

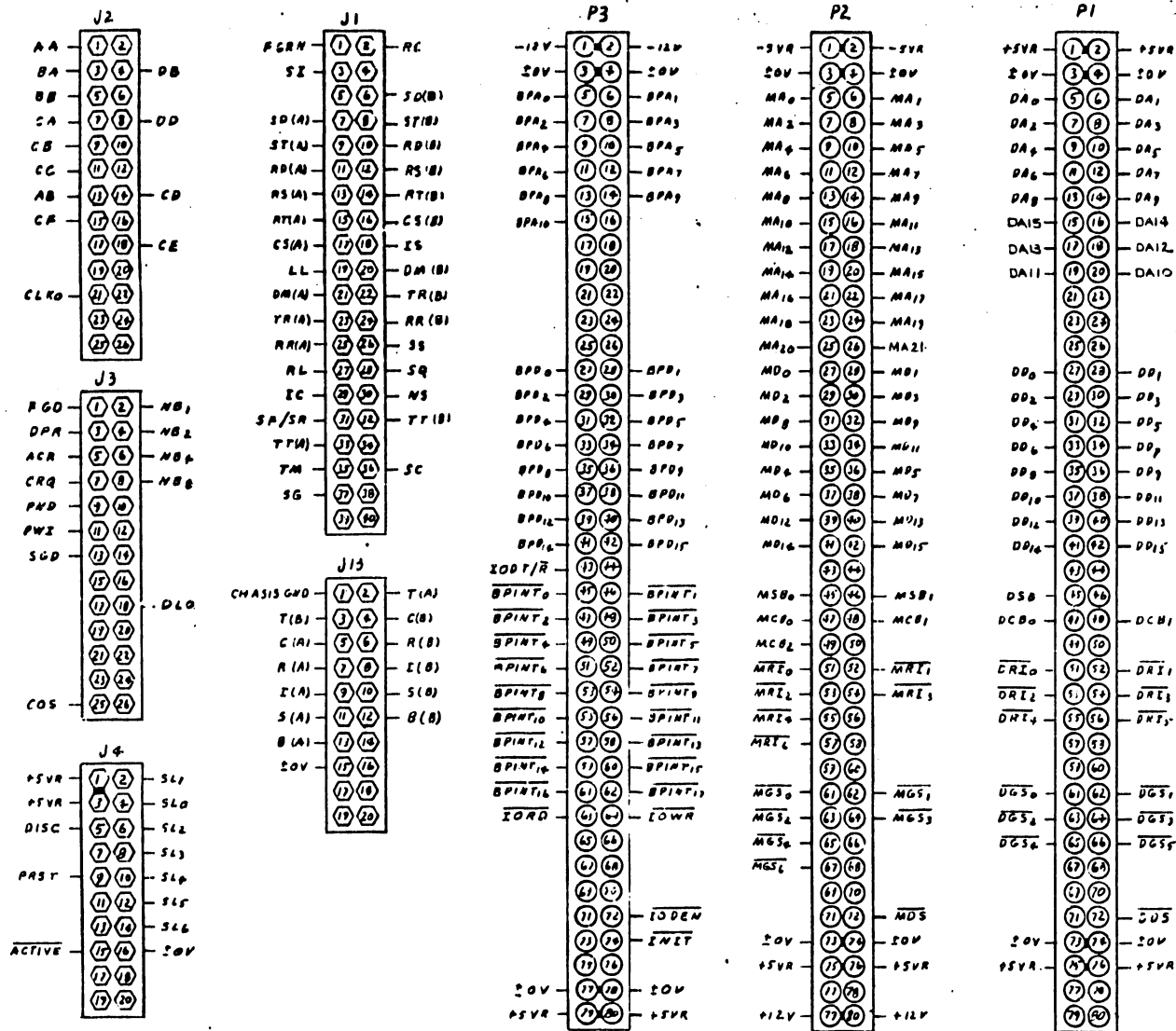
**WANG** LABORATORY

MODEL NO. 725-01

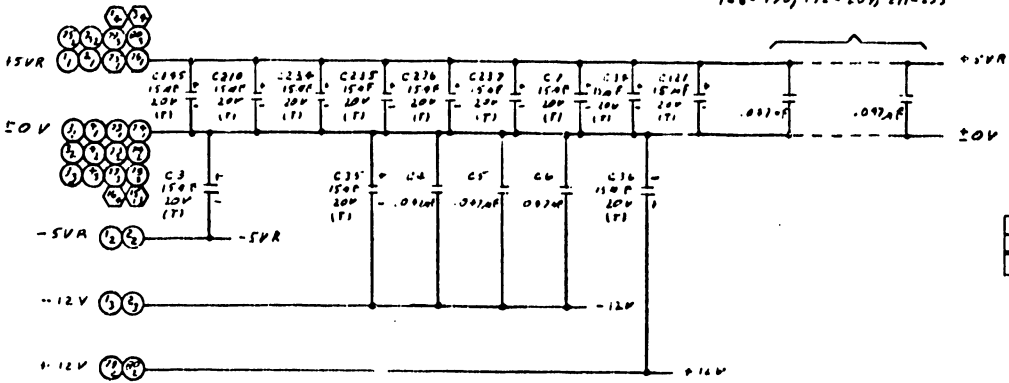
TITLE CPU TO DATA



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CB-33, 37-38, 60-75, 76, 78-79, 83-101, 110-112, 122-133, 133-144, 146-170, 174-209, 211-233



210	227	210 = 209 + 377 OR 378	LG4	LG5, 103	LG6	LG1, 102
0337-A	B337	378-3012-RL, 378-5137	377-0377	377-0471	377-036B	377-0371

MEMORICS	COORD
R(A)	3 K5
R(B)	3 K5
RC	3 K6
RD(A)	3 K7
RD(B)	3 K7
RL	1 C10
RA(A)	3 K8
RA(B)	3 K8
RA(A)	3 K1
RA(B)	3 K1
RA(A)	3 K6
RA(B)	3 K6
3(A)	3 K9
3(B)	3 K9
3C	1 C10
SD(A)	3 K1
SD(B)	3 K1
SD/3R	3 K1
SG	1 C10
SGD	1 B16
SI	1 D14
SLD-SL2	3 J1
SS	1 C10
ST(A)	3 K5
ST(B)	3 K5
SQ	1 D14
T(A)	3 J1
T(B)	3 J1
TM	3 K6
TR(A)	3 J1
TR(B)	3 J1
TT(A)	3 J1
TT(B)	3 J1

MEMORICS	COORD
AA	1 B10
AB	1 B10
ACR	3 K7
ACT/2E	0 K1
B(A)	3 K5
B(B)	3 K5
BA	3 K7
BB	3 K7
BPA0	3 K4
BPA1-BPA7	3 D10
BPA8	3 E10
BPA9	3 E10
BPD0-BPD5	3 E10
BPIA0-BPIA12	3 A12
C(A)	3 J1
C(B)	3 J1
CA	3 H1
CB	3 K7
CC	3 K7
CD	3 A1
CE	3 K10
CF	3 K10
CLK0	3 G1
COS	4 G16
CRQ	4 A8
CS(A)	3 K8
CS(B)	3 K8
DA0-DA15	3 A15
DB	3 K9
DC00-DC01	3 A7
DD	3 K7
DD0-DD15	4 C1
DS	4 F16
DS0-DS15	4 G16
DISC	3 K2
DLO	4 G16
DM(A)	3 A7
DM(B)	3 K9
DNR	4 A8
DR0-DNR5	4 A10
DSB	4 B14
FGD	1 B16
FGAN	1 C14
E(A)	3 K5
E(B)	3 K5
EC	3 K6
ENET	3 E10
ENETP	3 E10
ENETN	3 E10
ES	1 D14
LL	1 C10
MA0-MA20	3 D1
MA0-MC0	3 B1
MD0-MD15	4 B1
MS	4 E16
MS0-MS5	4 C1
MRE0-MRE15	4 A7
MSB0-MSB1	4 B1
MB0	4 A7
MB1	4 A7
MB2	4 A7
MB3	4 A7
N)	1 C10
P0	4 G16
PMT	3 B14
PVE	4 G16

P.C. TYPE	LOC	SPARES
74LS02	L100	1
74LS02	L130	2
74LS00	L177	1
74LS10	L172	2
74LS1	L177	5
74LS21	L170	1
74LS11	L15A	1
74LS04	L143	2
74LS123	L100	1
74LS125	L175	1
74LS241	L150	1
74LS260	L120	1
74LS04	L15A	5
74LS04	L2	1
74LS04	L16	1

NOTE: ALL RESISTORS ARE 1/4W UNLESS SPECIFIED OTHERWISE

E-REV  
4

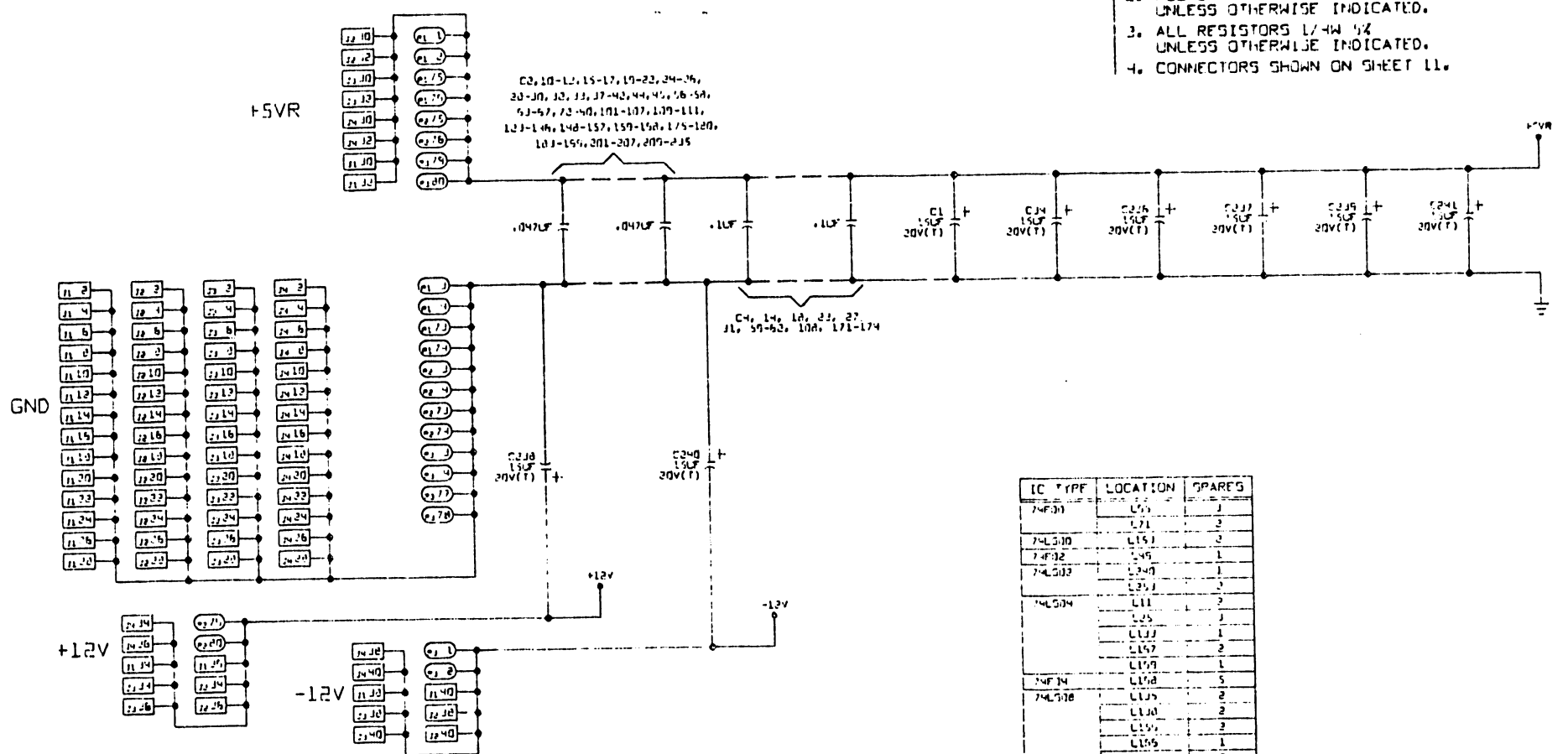
DATE	BY	DATE	APPROVED BY	DATE
15-57-1	WANG			

NOTES

1. ALL RESISTOR VALUES IN OHMS.
2. ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE INDICATED.
3. ALL RESISTORS 1/4W 1/2 UNLESS OTHERWISE INDICATED.
4. CONNECTORS SHOWN ON SHEET 11.

REF-ONICS	COORD.
RY	5F7
RYA1	5G14
RYA2	5F14
RYA3	5G14
RYA4	5G14
RYA5	5G14
RYA6	5G14
RYA7	5G14
RYA8	5G14
RYA9	5G14
RYA10	5G14
RYA11	5G14
RYA12	5G14
RYA13	5G14
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RYA31	5G14
RYA32	5G14
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RYA34	5G14
RYA35	5G14
RYA36	5G14
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RYA92	5G14
RYA93	5G14
RYA94	5G14
RYA95	5G14
RYA96	5G14
RYA97	5G14
RYA98	5G14
RYA99	5G14
RYA100	5G14

REF-ONICS	COORD.
RYA101	5G14
RYA102	5G14
RYA103	5G14
RYA104	5G14
RYA105	5G14
RYA106	5G14
RYA107	5G14
RYA108	5G14
RYA109	5G14
RYA110	5G14
RYA111	5G14
RYA112	5G14
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RYA141	5G14
RYA142	5G14
RYA143	5G14
RYA144	5G14
RYA145	5G14
RYA146	5G14
RYA147	5G14
RYA148	5G14
RYA149	5G14
RYA150	5G14



IC TYPE	LOCATION	SPARES
74F01	U5	1
74F01	U6	1
74F01	U7	1
74F01	U8	1
74F01	U9	1
74F01	U10	1
74F01	U11	1
74F01	U12	1
74F01	U13	1
74F01	U14	1
74F01	U15	1
74F01	U16	1
74F01	U17	1
74F01	U18	1
74F01	U19	1
74F01	U20	1
74F01	U21	1
74F01	U22	1
74F01	U23	1
74F01	U24	1
74F01	U25	1
74F01	U26	1
74F01	U27	1
74F01	U28	1
74F01	U29	1
74F01	U30	1
74F01	U31	1
74F01	U32	1
74F01	U33	1
74F01	U34	1
74F01	U35	1
74F01	U36	1
74F01	U37	1
74F01	U38	1
74F01	U39	1
74F01	U40	1

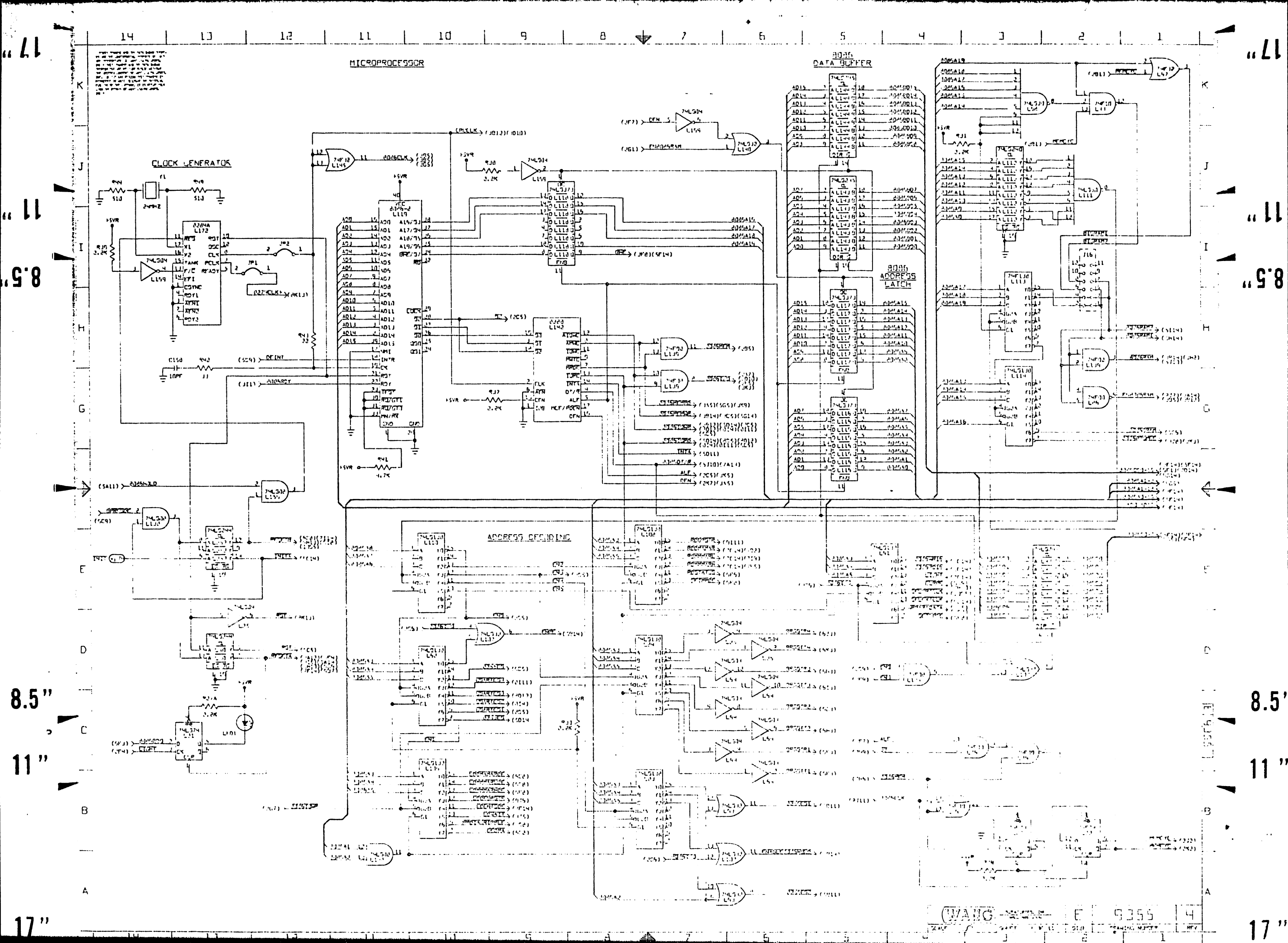
(WANG) SCHEMATIC DIAGRAM

VS-15 ASYNC DEVICE CNTRL.

REV: 100-4155

DATE: 9355

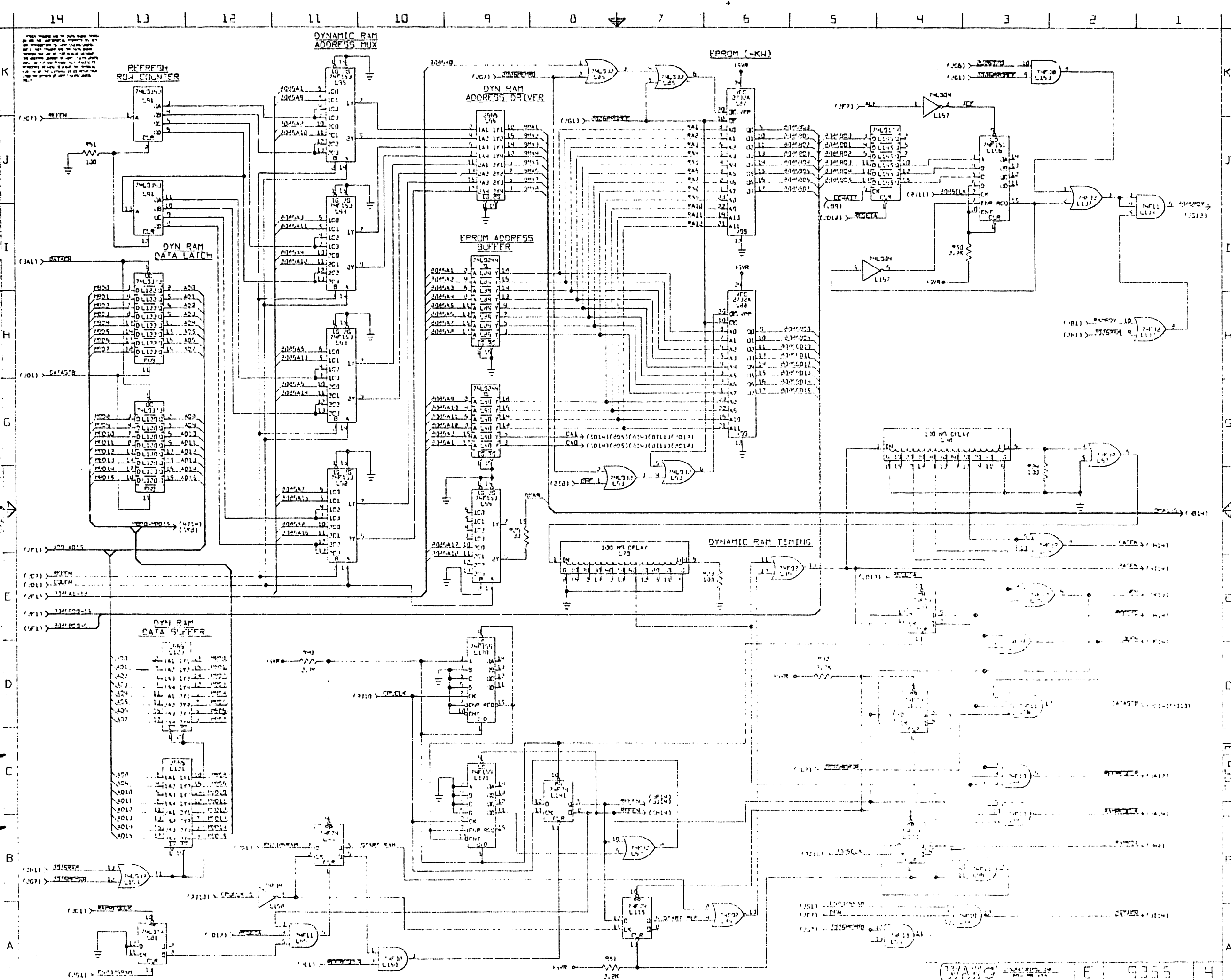
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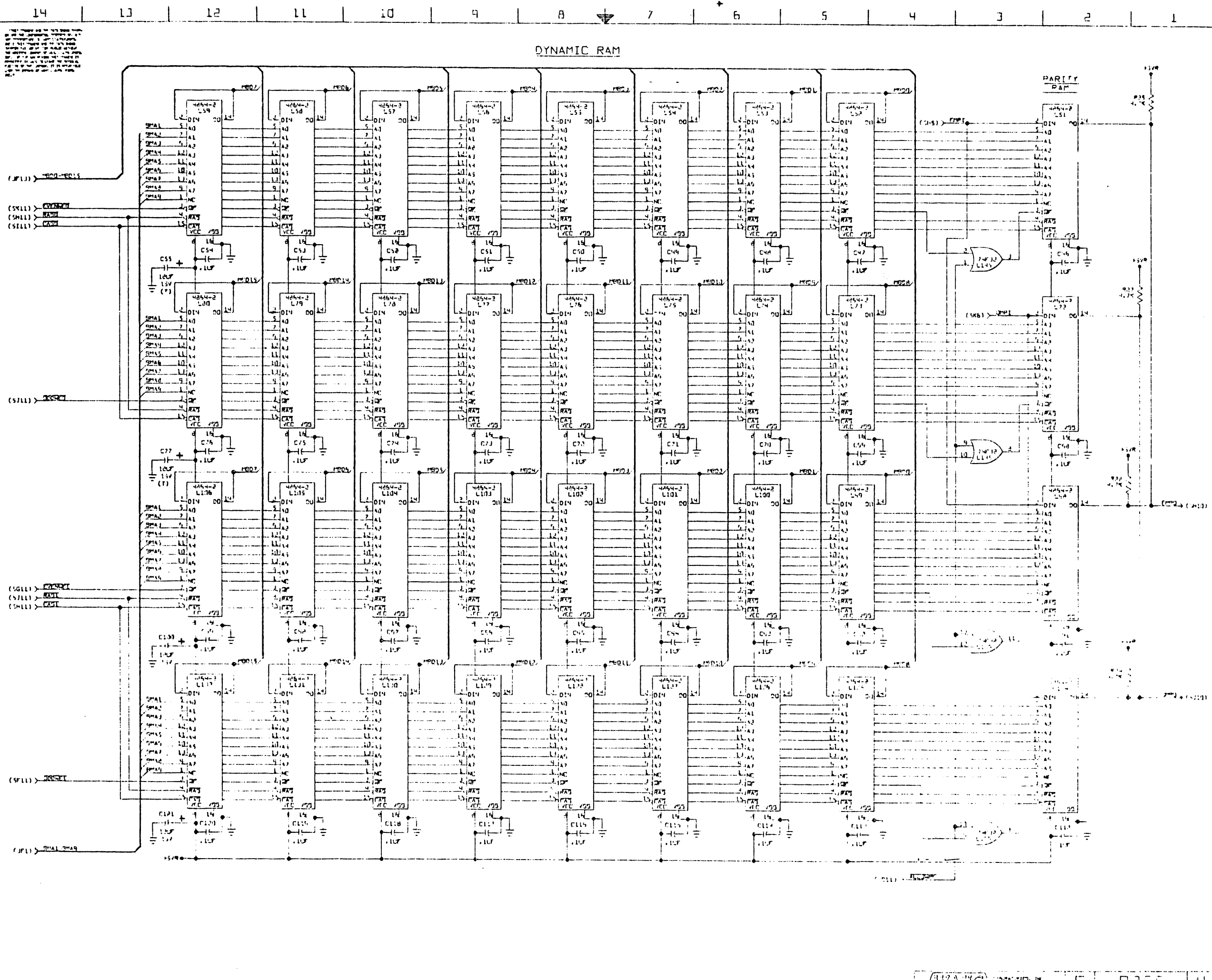


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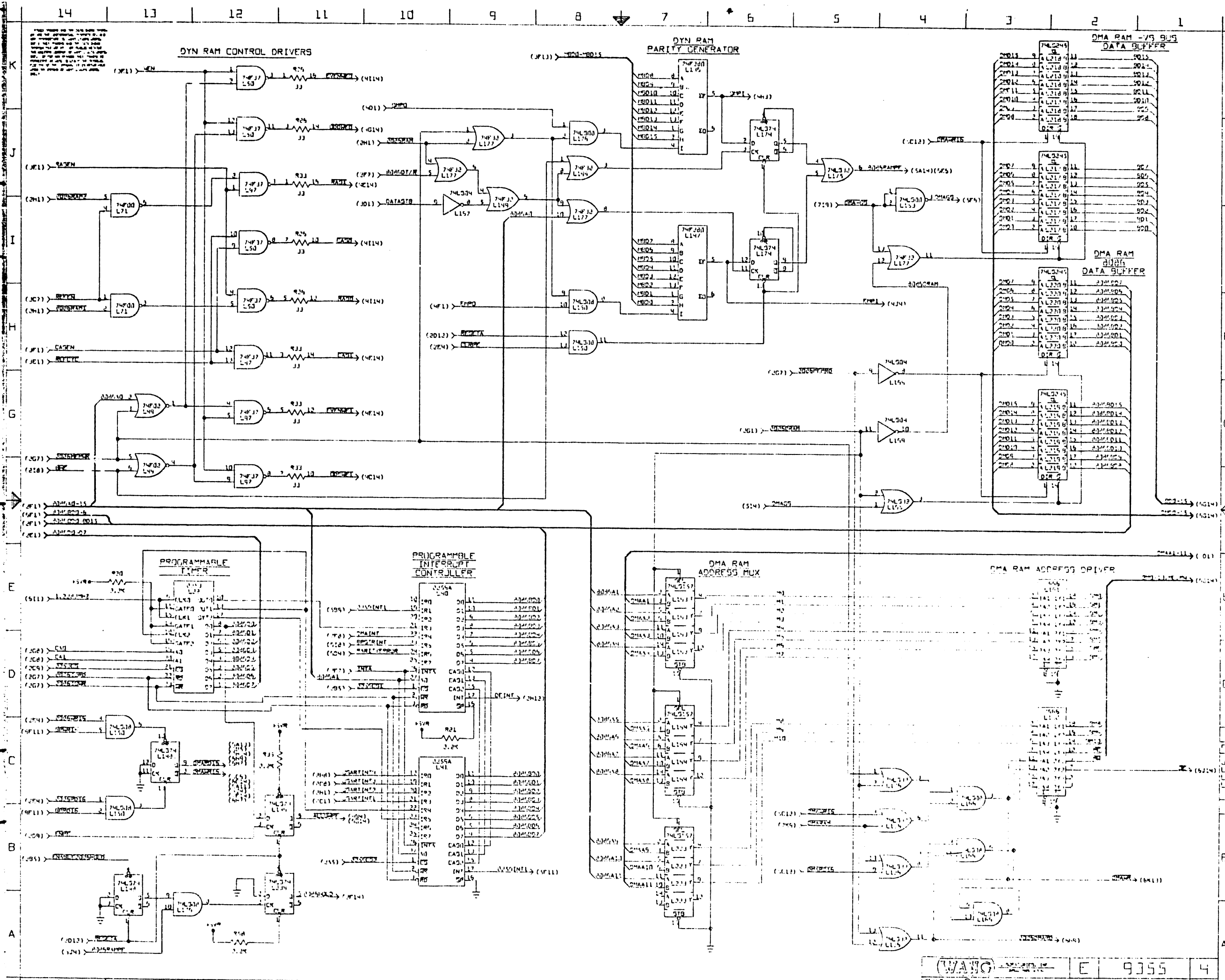


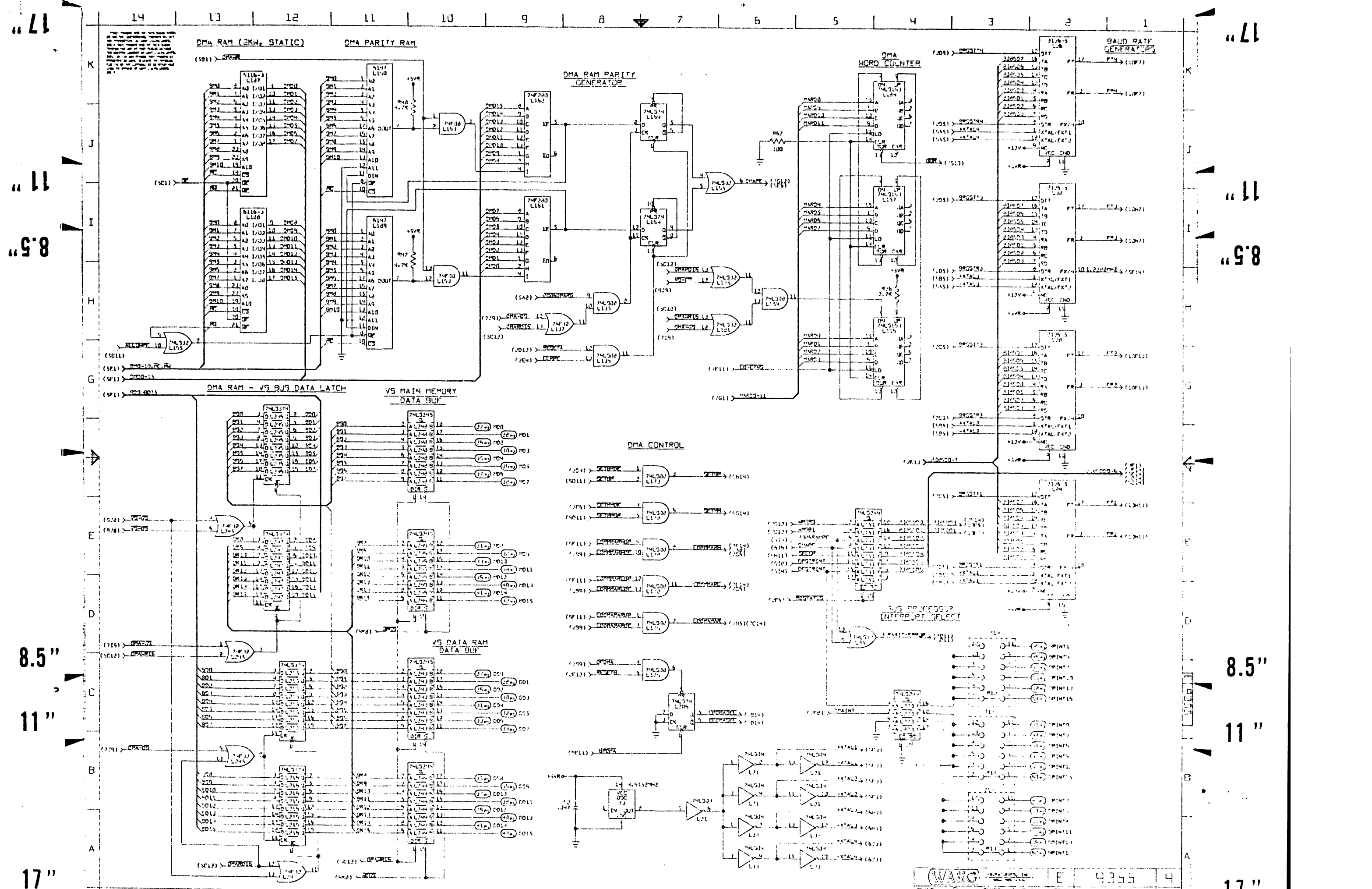
DYNAMIC RAM



17" 11" 8.5" 11" 8.5" 17"

17" 11" 8.5" 11" 8.5" 17"



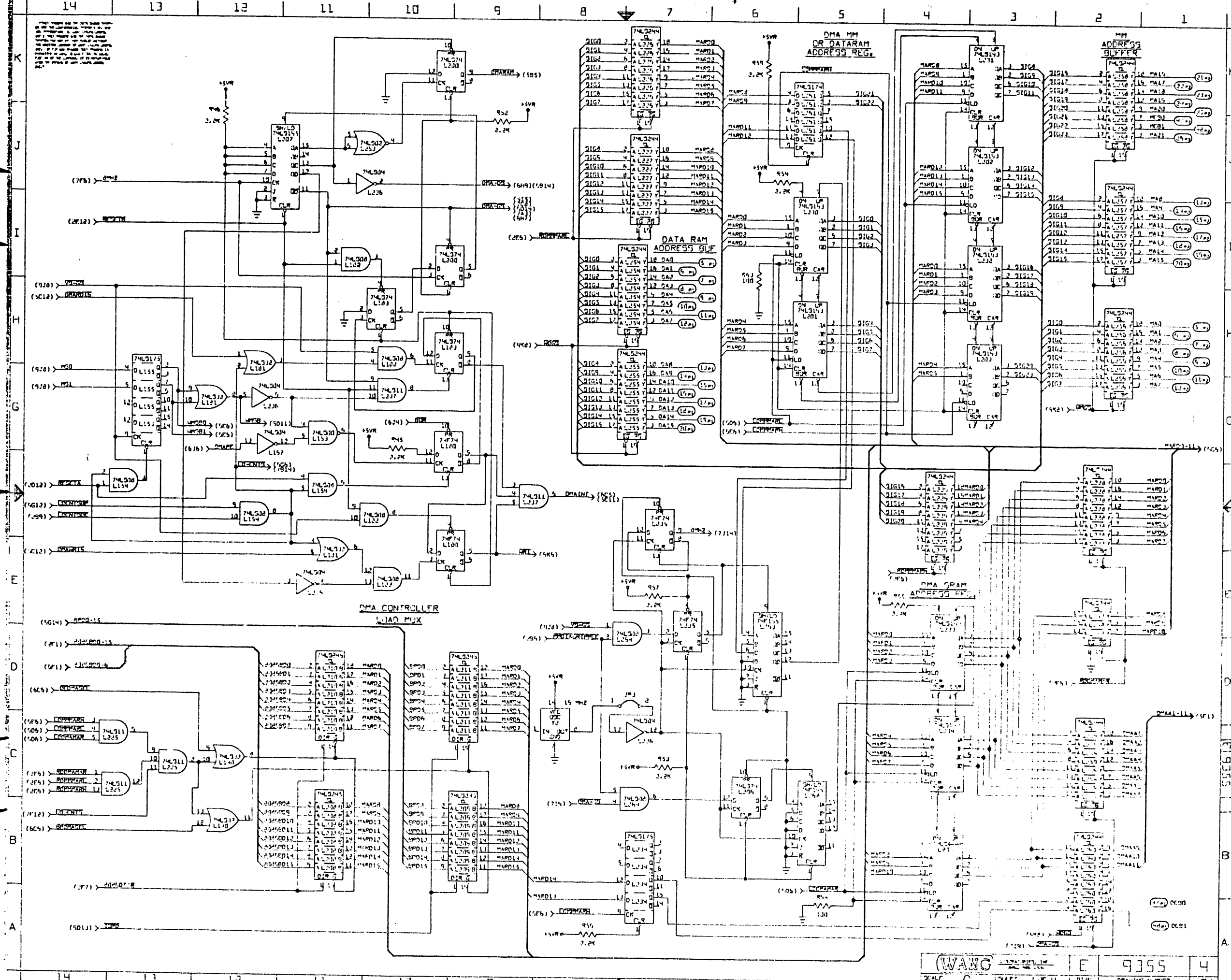


17" 8.5" 11" 8.5" 11" 17"

17" 8.5" 11" 8.5" 11" 17"

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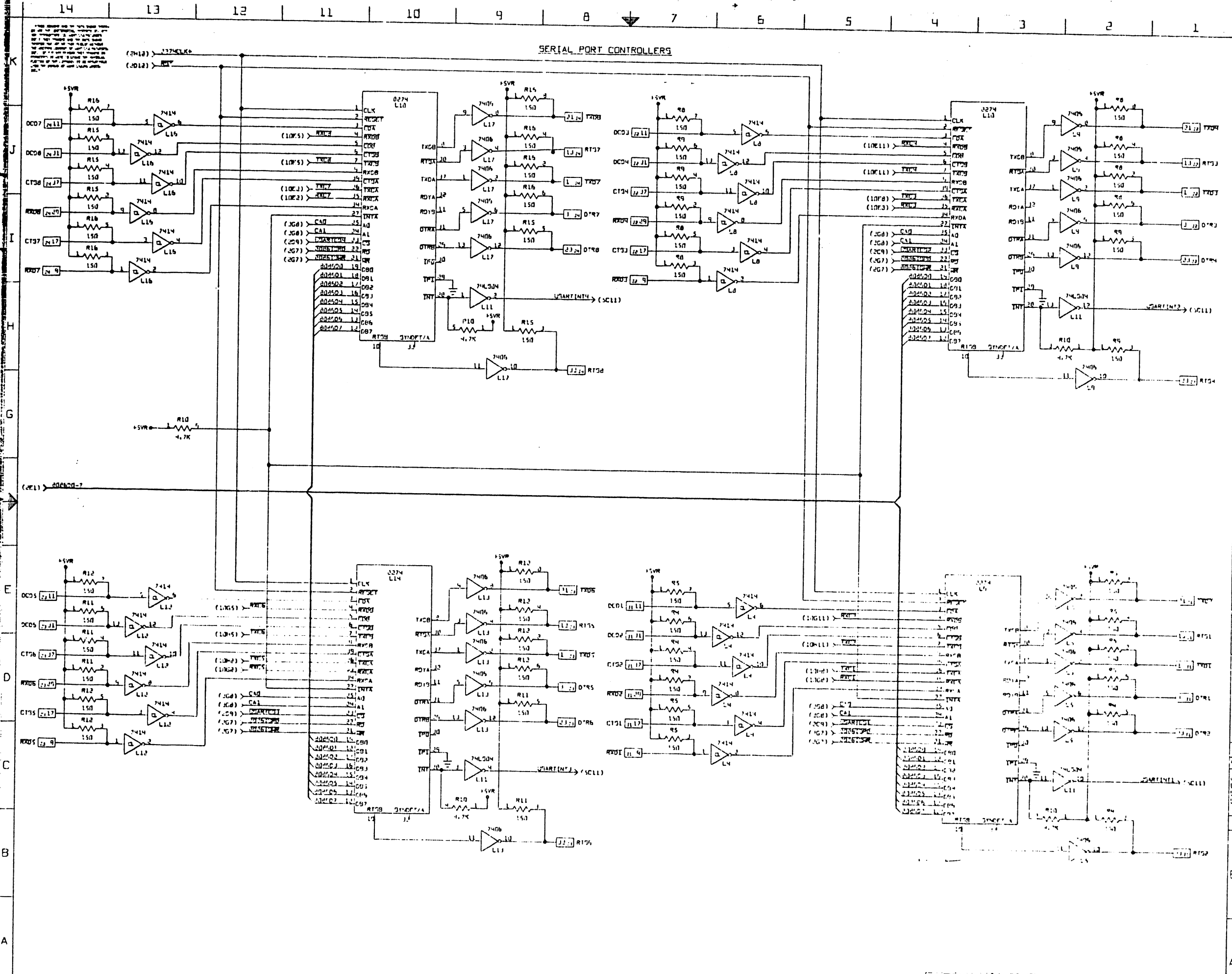
8.5"  
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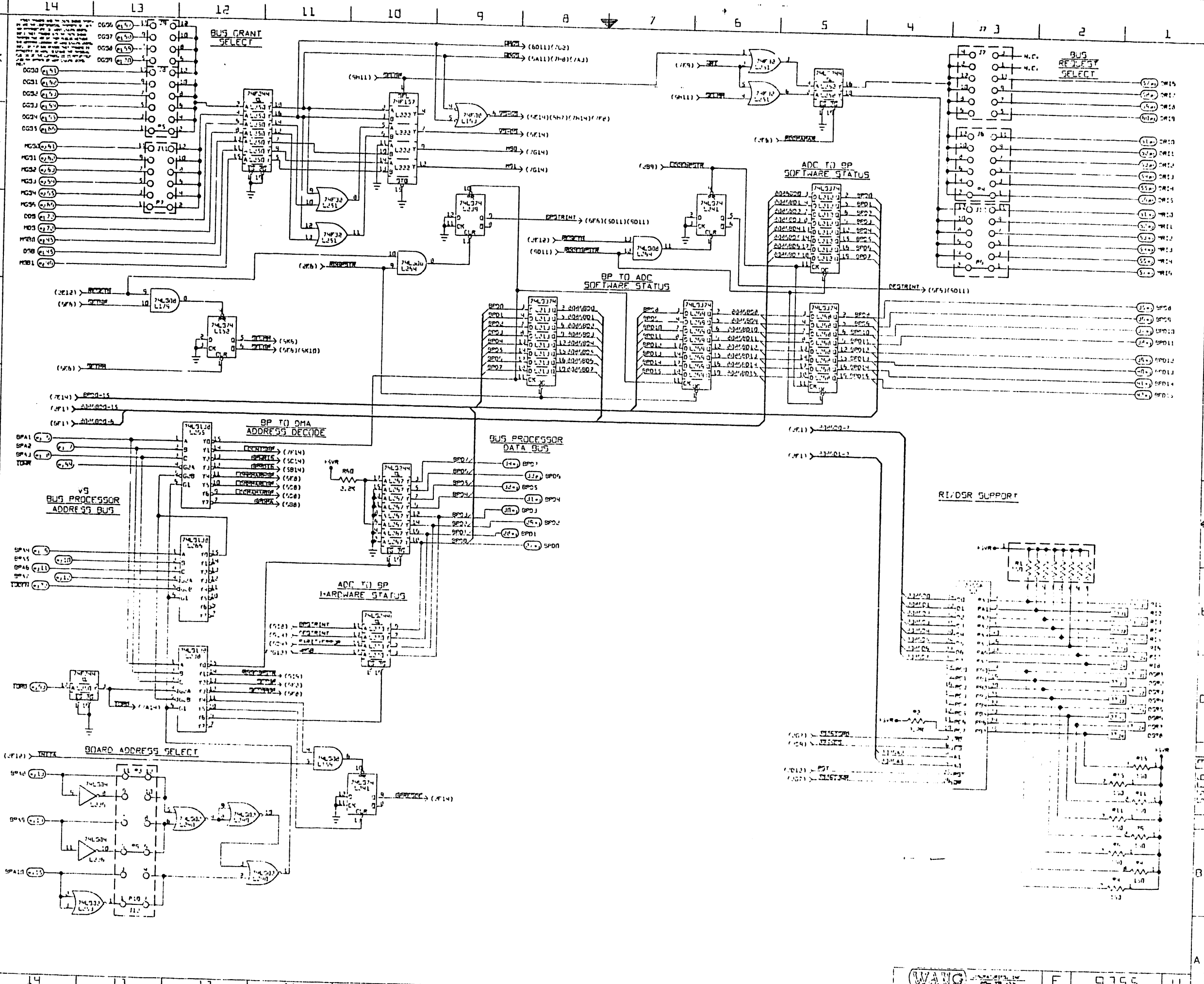
17"

17"

### SERIAL PORT CONTROLLERS

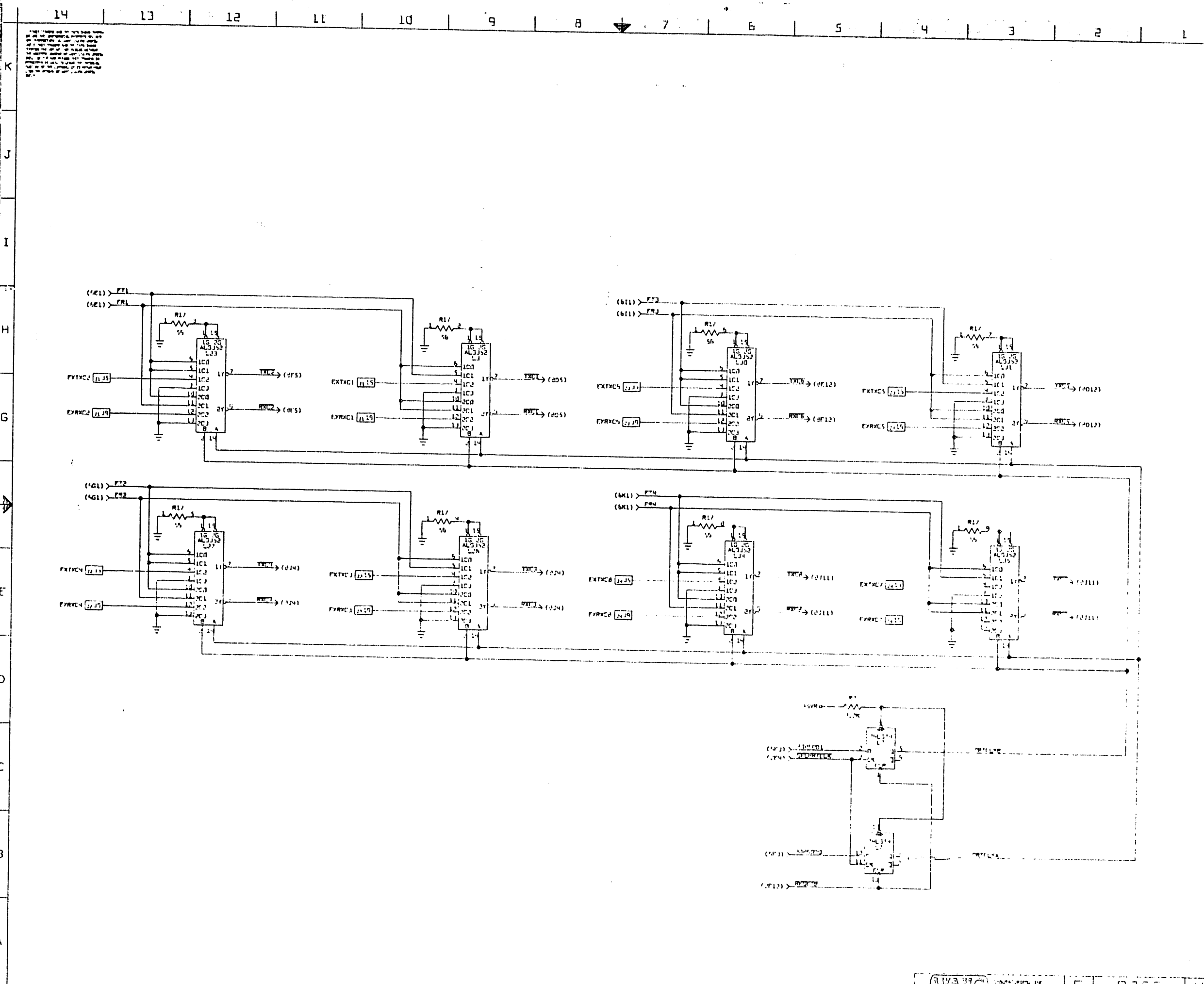


17  
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8.5  
8.5  
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17" 11" 8.5" 8.5" 11" 17"



17" 11" 8.5" 8.5" 11" 17"



17"

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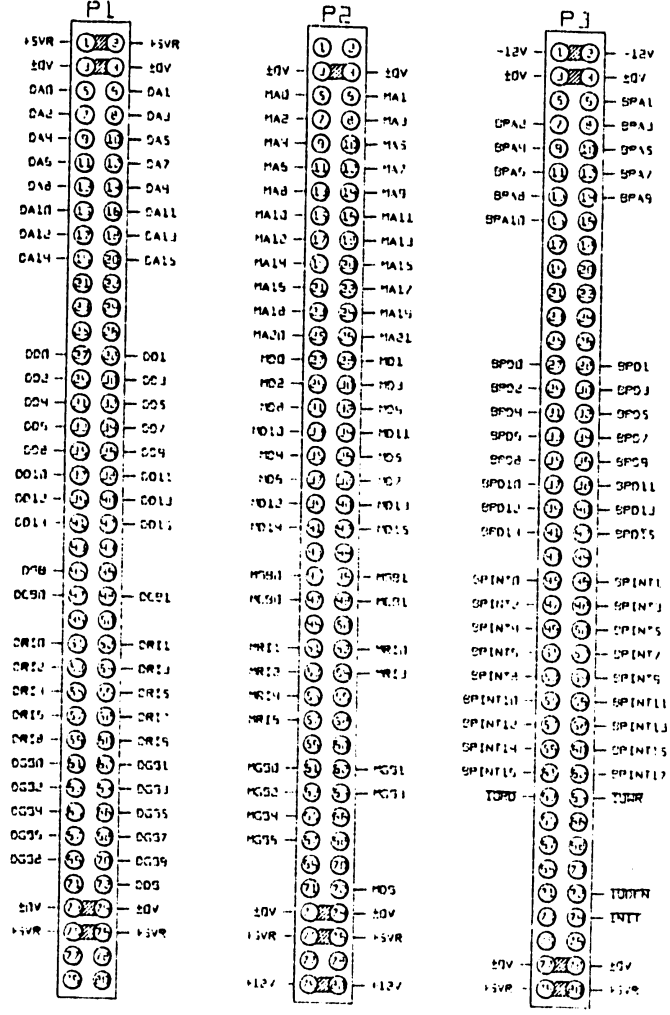
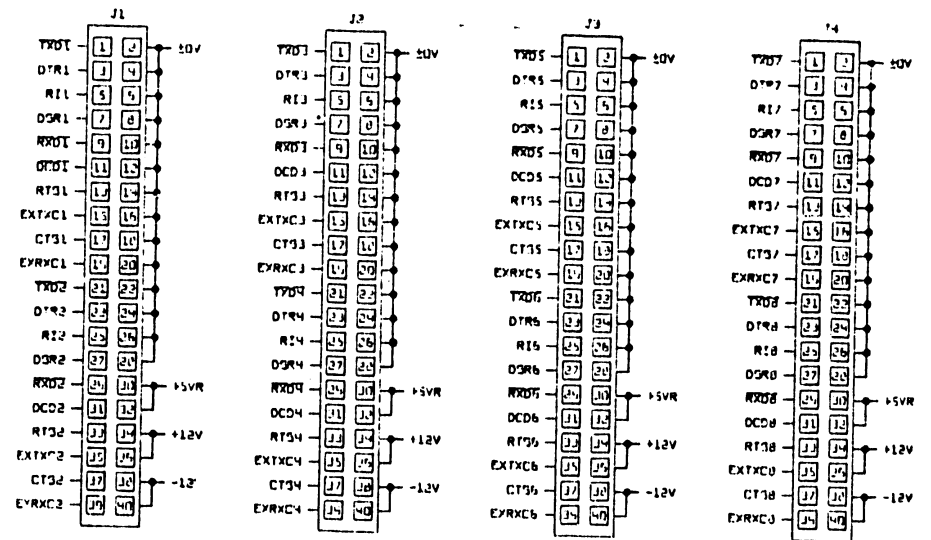
8.5"

8.5"

11"

14 13 12 11 10 9 8 7 6 5 4 3 2 1

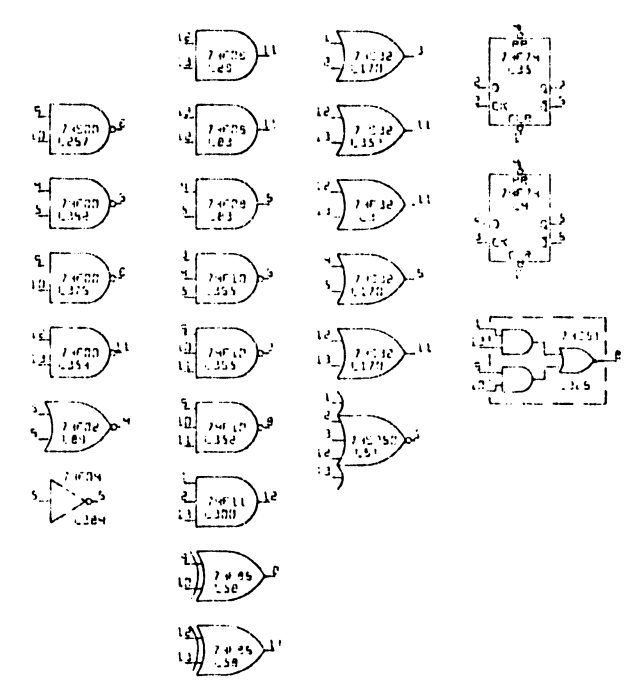
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.  
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DIMENSIONS TO FACE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO EDGE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO HOLE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF HOLE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF PIN UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF SOCKET UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF BALL UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF RING UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF DISC UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF TUBE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF ROD UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF WIRE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF CABLE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF FIBER UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF OPTIC UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF LASER UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF DIODE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF LED UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF PHOTO UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF CAMERA UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF TELESCOPE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF MICROSCOPE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF SPECTROSCOPE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF X-RAY UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF PARTICLE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF NUCLEAR UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF BIOLOGICAL UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF CHEMICAL UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF PHYSICAL UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF ASTRONOMICAL UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF COSMOLOGICAL UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF QUANTUM UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF RELATIVISTIC UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF CLASSICAL UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF MODERN UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF TRADITIONAL UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF ANCIENT UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF MEDIEVAL UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF RENAISSANCE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF BAROQUE UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF 18TH CENTURY UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF 19TH CENTURY UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF 20TH CENTURY UNLESS OTHERWISE SPECIFIED.  
DIMENSIONS TO CENTER OF 21ST CENTURY UNLESS OTHERWISE SPECIFIED.



NOTES

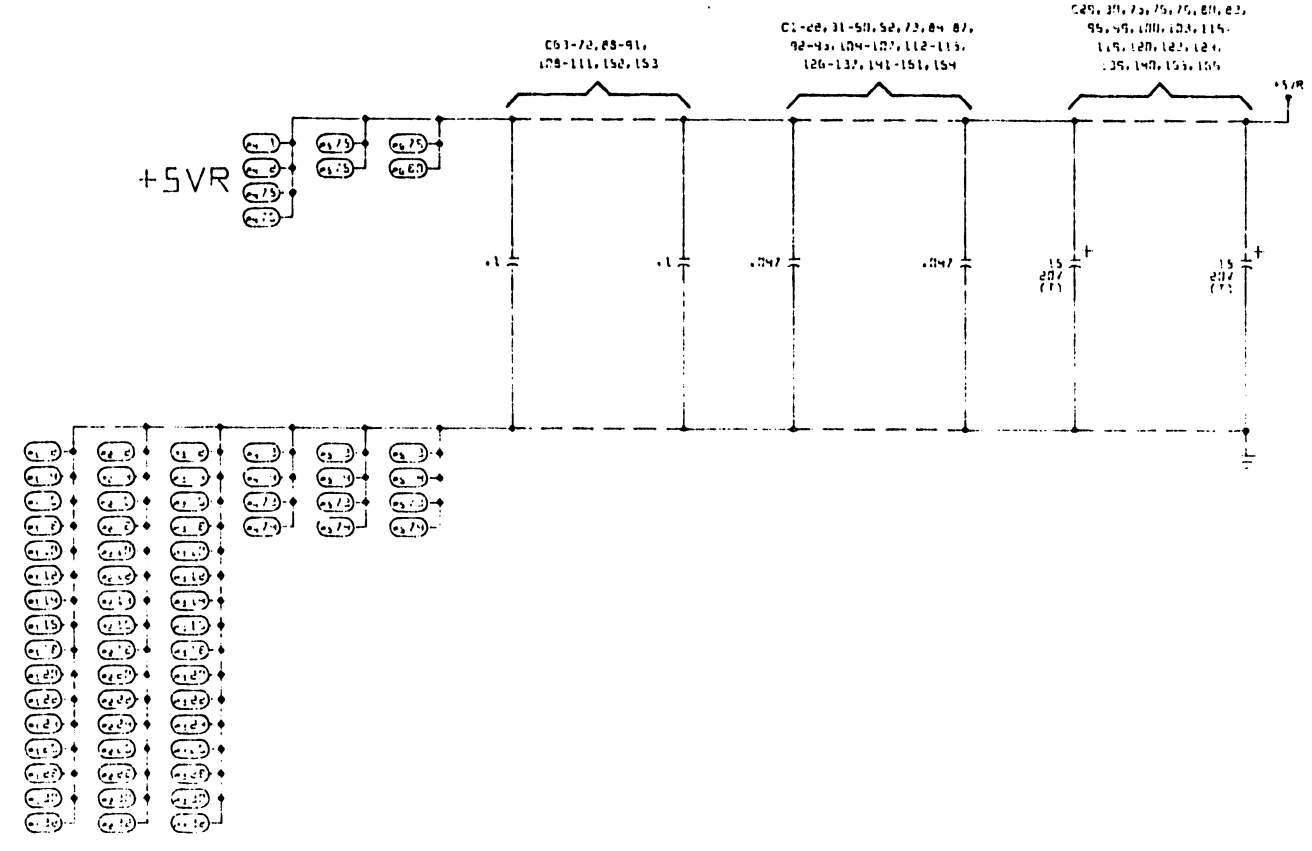
- 1. ALL RESISTOR VALUES IN OHMS.
- 2. ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE INDICATED.
- 3. ALL RESISTORS 1/4W 5% UNLESS OTHERWISE INDICATED.

SPARES



FUNCTIONS	COORD
SM	14B14
CRARC	14F14
CRAT	14G14
CRZ1-CRZ5	14H14
CRF1	201
CRCS	2F
CRV1	2F14
CRVS	12B14
CRSTR1	201
CR-C15	14J14
CRK3	12C1
CR21	2D14
CRNT	2A11
CRVCRD	12B1
FAULT	15A12
CRD	14C14
CRD1-CR07	14G14
CR0	14C14
CRD1-CR07	14G14
CR0	2F14
CR1	10C1
CR2-CR17	13F14
CR18-CR20	2F14
CRD1-CR02	12A11
CR05	2A10
CRD1-CR015	15E1
CRD1-CR015	11J14
CRDTP	12B14
CRD1-CR027	2F1
CRD1-CR0	14C14
CRD1-CR01	14D14
CRD1-CR02	14F1
CRD1-CR07	2114
CRD1	14C1
CRD1	2A11
CRD1	2A11
CRD1	2F1
CRD1-CR015	13E1
CRD1-CR0	14C1

FUNCTIONS	COORD
VOOC	12E14
N-CRAM	15E14
N-PRD	14F14
NRAPT	12K1
RC1, RC2	12G1
RC-RC7	12K1
RCSTART	12H1
RNGH-RNG2	15A12
CRAM	13114
CR0	14B14
CR17	14D14
CR24	15F14
CR26	15H14
STRSR	13114
TRD	14B14
HP	15A12



SCHEMATIC DIAGRAM

9555, 766 CACHÉ MEMORY

DATE: 10/24/64

DESIGNER: [ ]

CHECKED: [ ]

APPROVED: [ ]

WVA

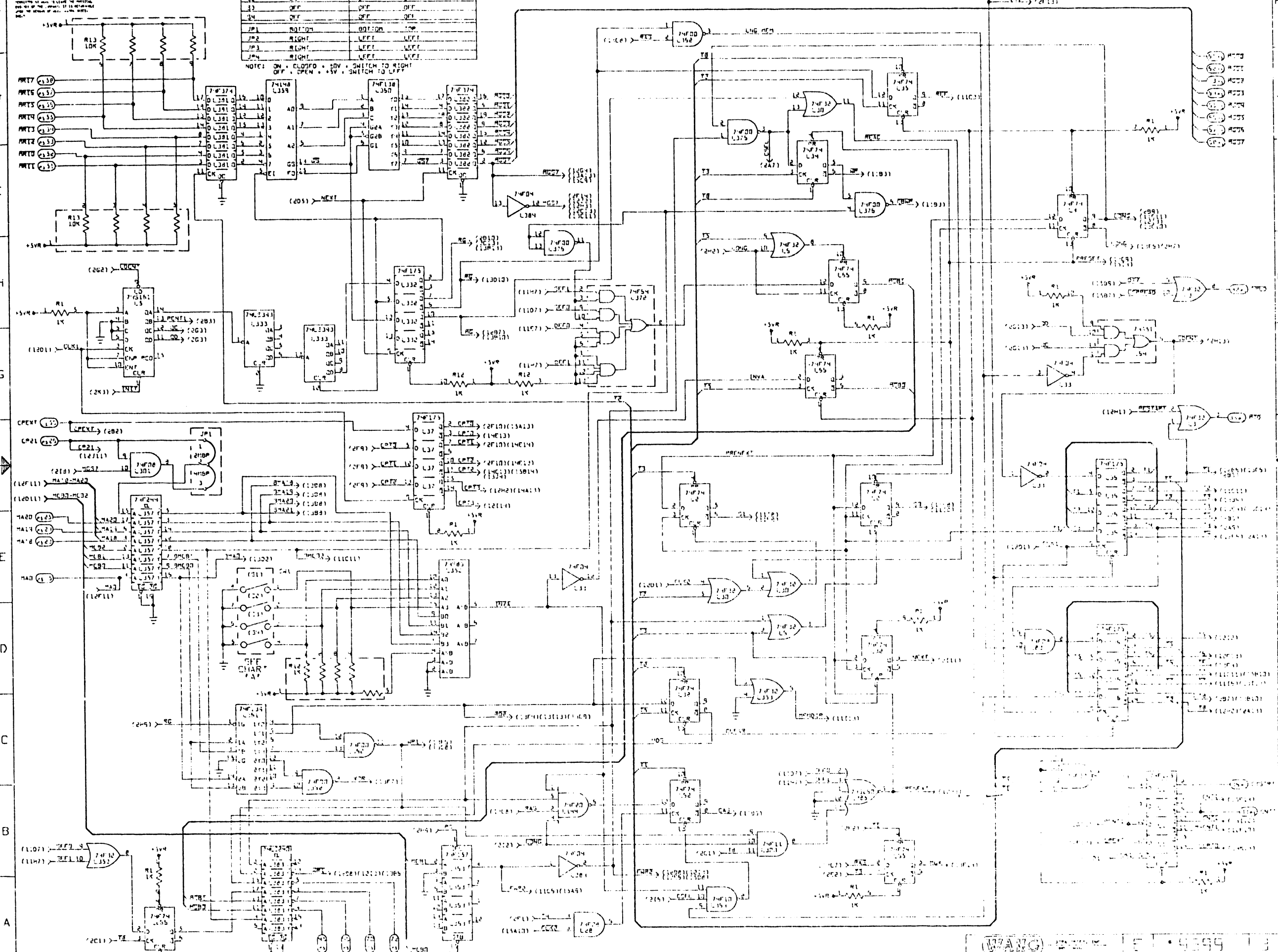
17  
11  
8.5  
8.5  
11  
17

17  
11  
8.5  
8.5  
11  
17

CHART A

10 (345 8413)	24	41 (2335 34713)
11 24	24	OFF
12 24	OFF	OFF
13 24	OFF	OFF
14 24	OFF	OFF
J11 BOTTOM	OFF	OFF
J12 RIGHT	LEFT	LEFT
J13 RIGHT	LEFT	LEFT
J14 RIGHT	LEFT	LEFT

NOTE: ON - CLOSED - 20V SWITCH TO RIGHT  
OFF - OPEN - 5V SWITCH TO LEFT

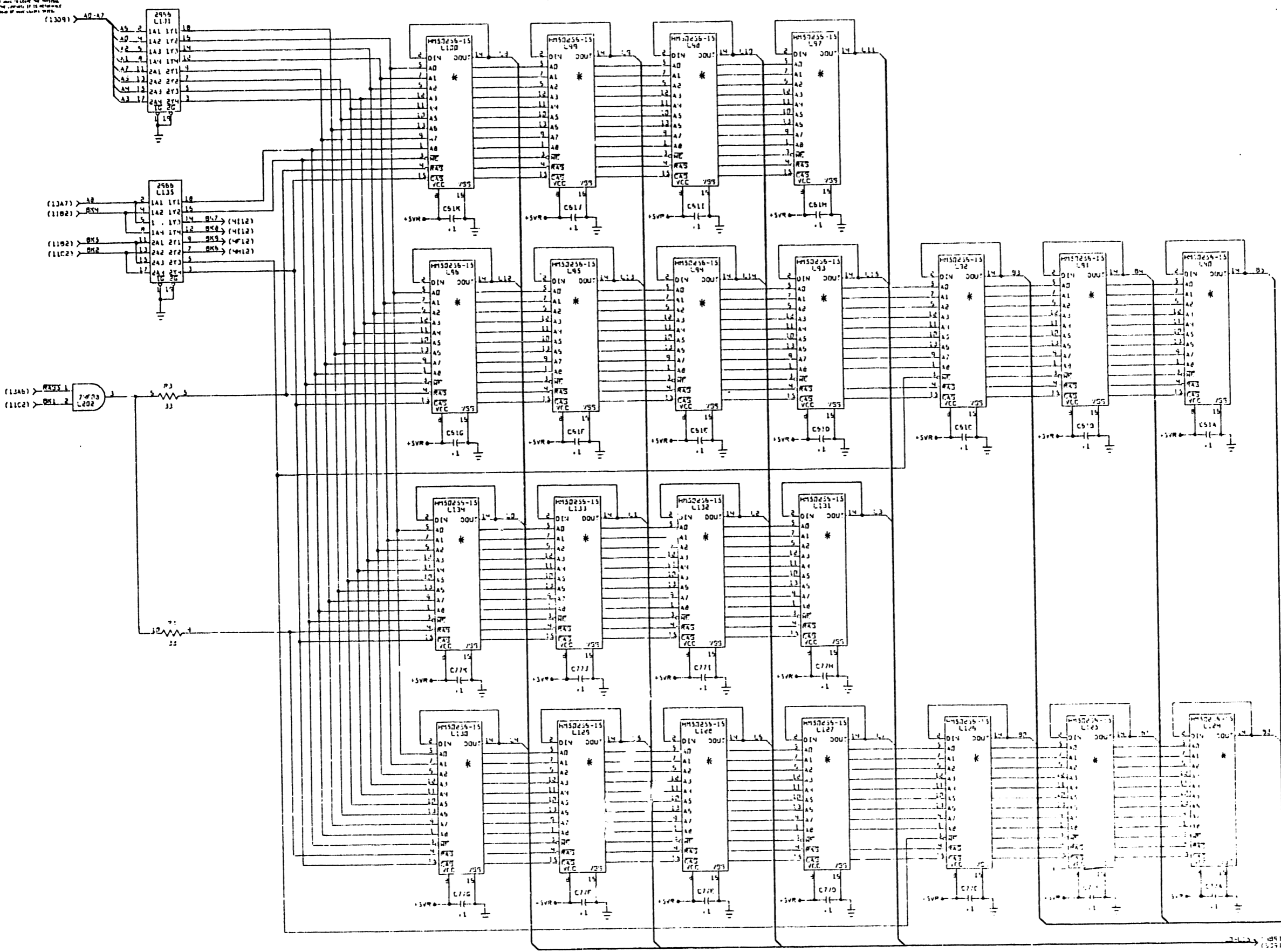


WANG  
E 9599

14 13 12 11 10 9 8 7 6 5 4 3 2 1

17

THIS CIRCUIT IS THE PROPERTY OF THE U.S. GOVERNMENT AND IS LOANED TO YOU. IT AND ITS CONTENTS ARE NOT TO BE DISTRIBUTED OUTSIDE YOUR AGENCY. IF YOU ARE NOT AN AGENT OF THE U.S. GOVERNMENT, IT IS TO BE RETURNED TO THE SOURCE FROM WHICH YOU OBTAINED IT. IF YOU ARE AN AGENT OF THE U.S. GOVERNMENT, IT IS TO BE RETURNED TO THE SOURCE FROM WHICH YOU OBTAINED IT, UNLESS OTHERWISE DIRECTED.



11  
8.5"

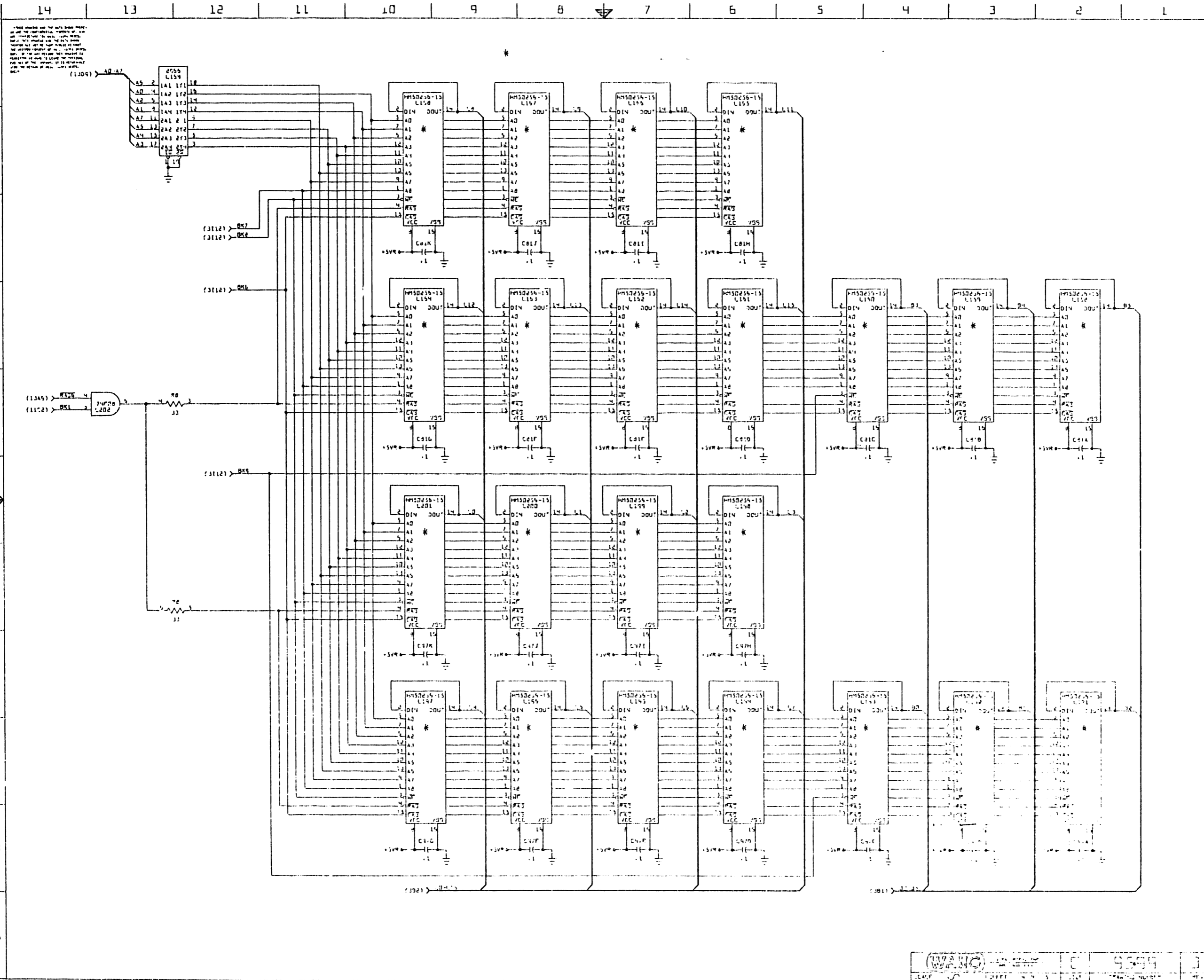
8.5"  
11"

5"

"

"

17"



PLEASE consult the data sheet (MM5225-15) for pin connections, electrical characteristics, and test procedures. The data sheet is available from the manufacturer. The data sheet is available from the manufacturer. The data sheet is available from the manufacturer.

17

11

8.5

8.5

11

17

DATE	9-20-69
DESIGNED BY	W. A. M. C.
CHECKED BY	
APPROVED BY	
REVISIONS	

14 13 12 11 10 9 8 7 6 5 4 3 2 1

17"

11"

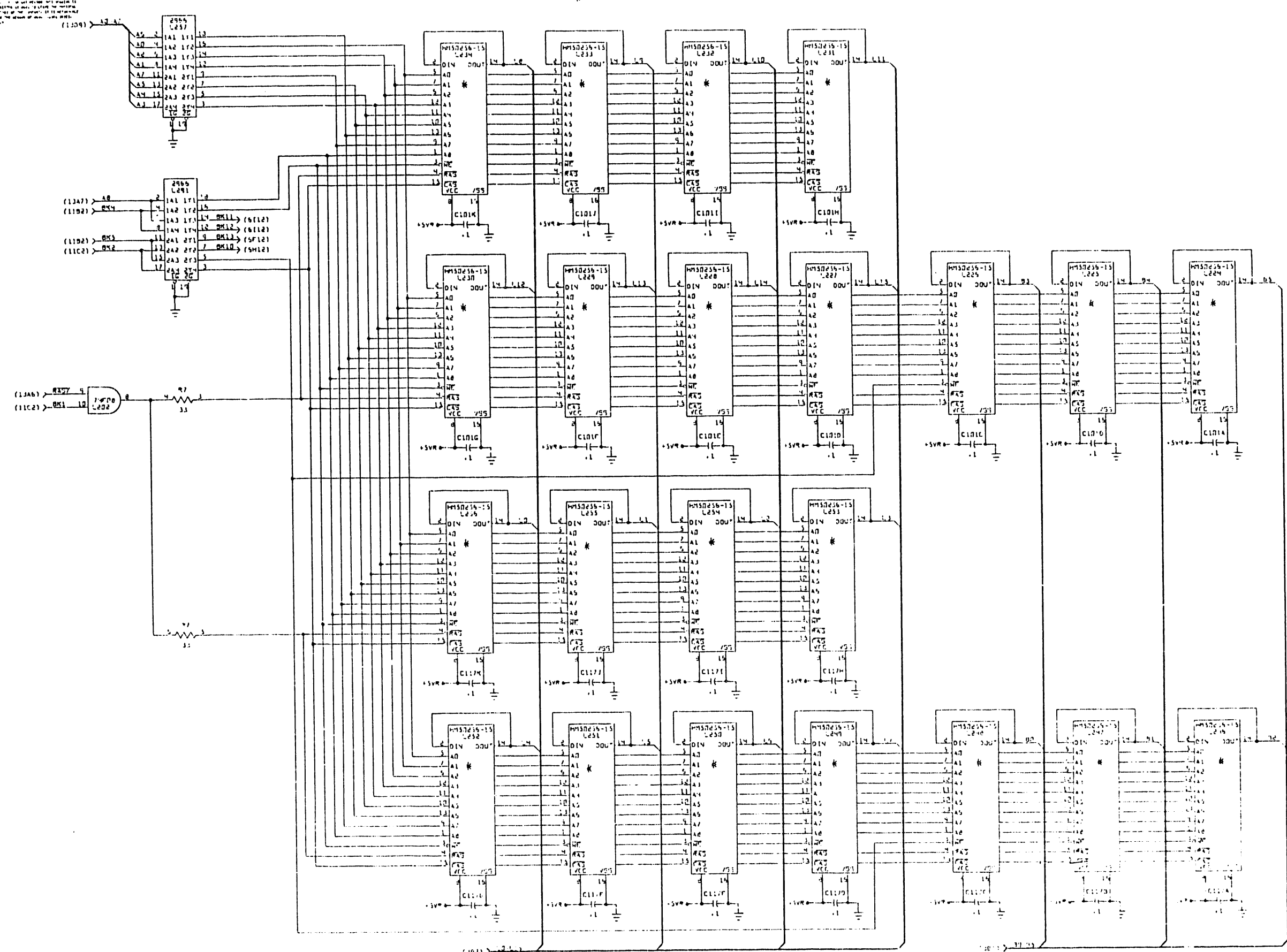
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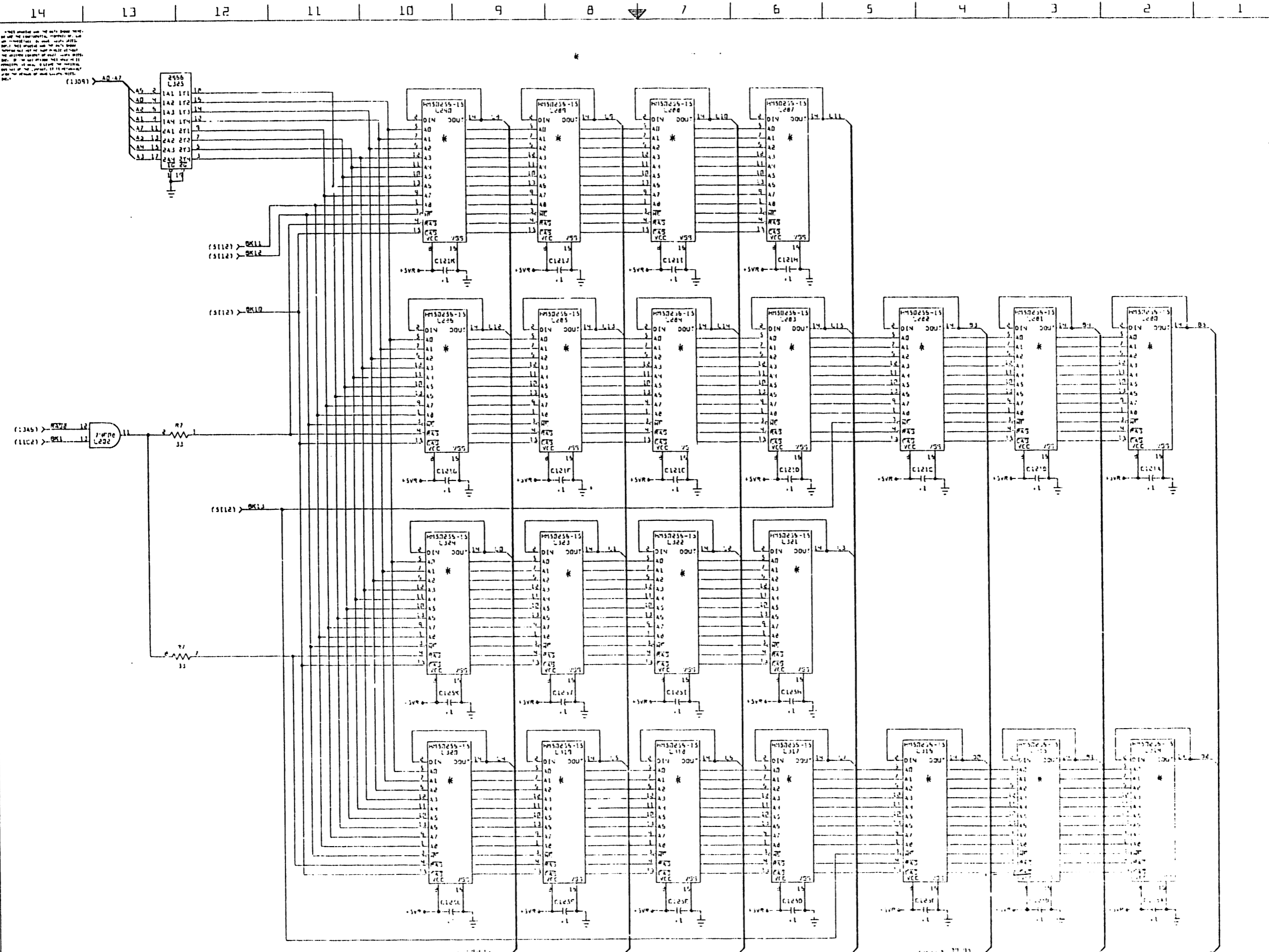
8.5"

11"

17"

Notes:  
1. All components are to be used as specified.  
2. All components are to be used as specified.  
3. All components are to be used as specified.



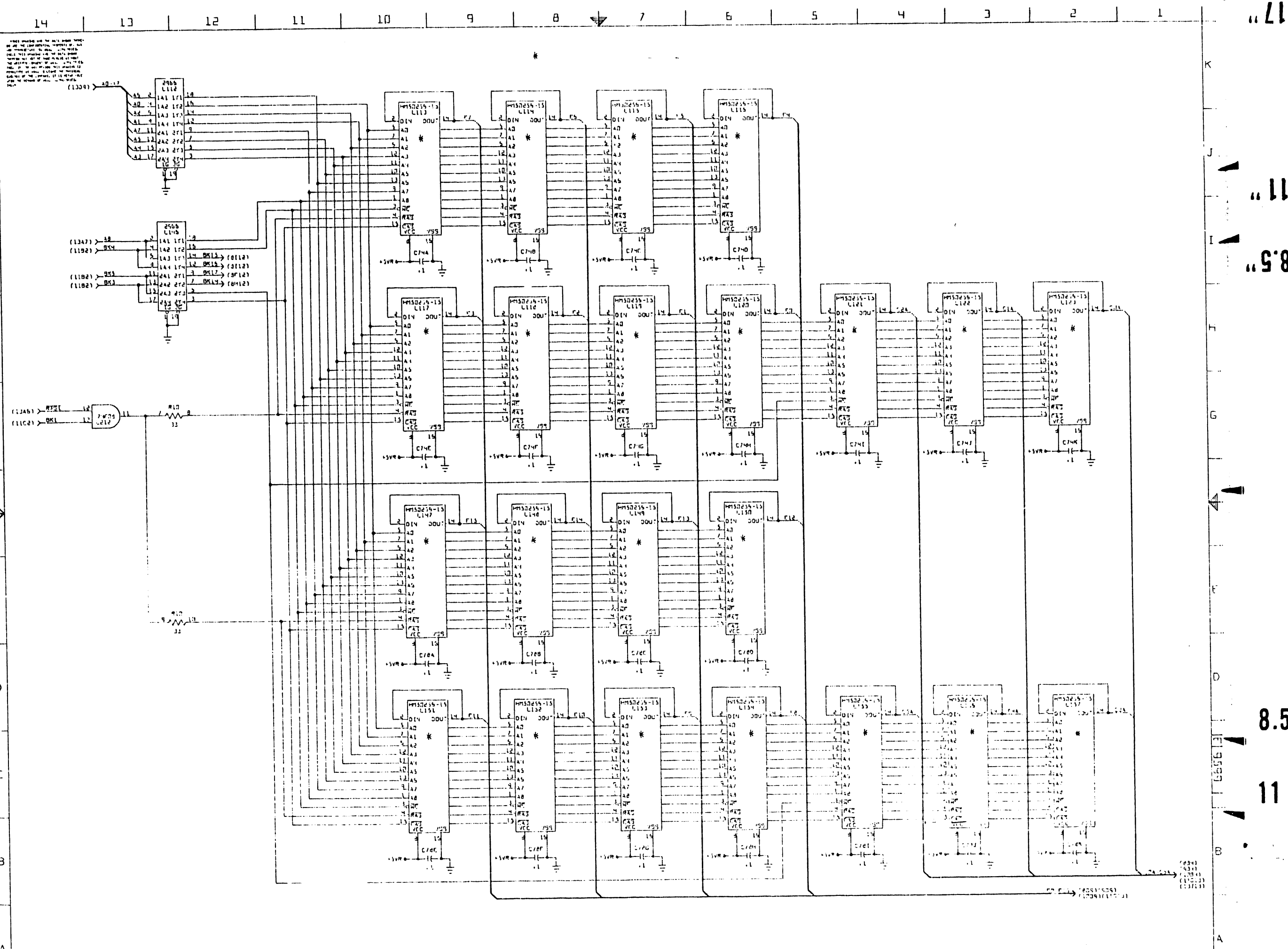


1. This circuit is not to be used as a substitute for the original circuit. It is a simplified version of the original circuit. It is not intended to be used as a substitute for the original circuit. It is not intended to be used as a substitute for the original circuit.

17"  
 11"  
 8.5"  
 3.5"  
 11"  
 17"

17"  
 11"  
 8.5"  
 8.5"  
 11"  
 17"





2565 L112  
 2565 L113



17"

11"

8.5"

8.5"

11"

17"

17"

11"

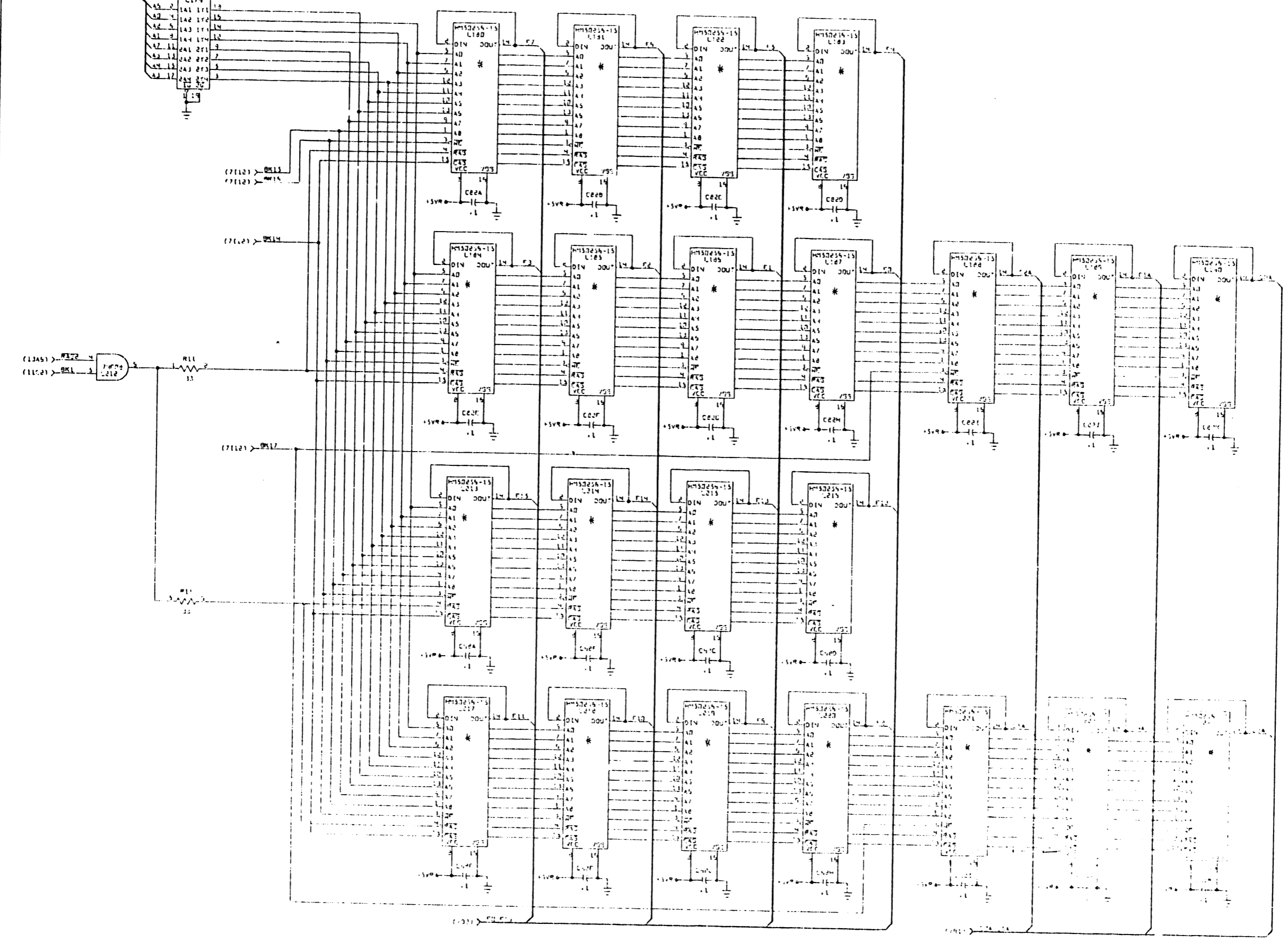
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8.5"

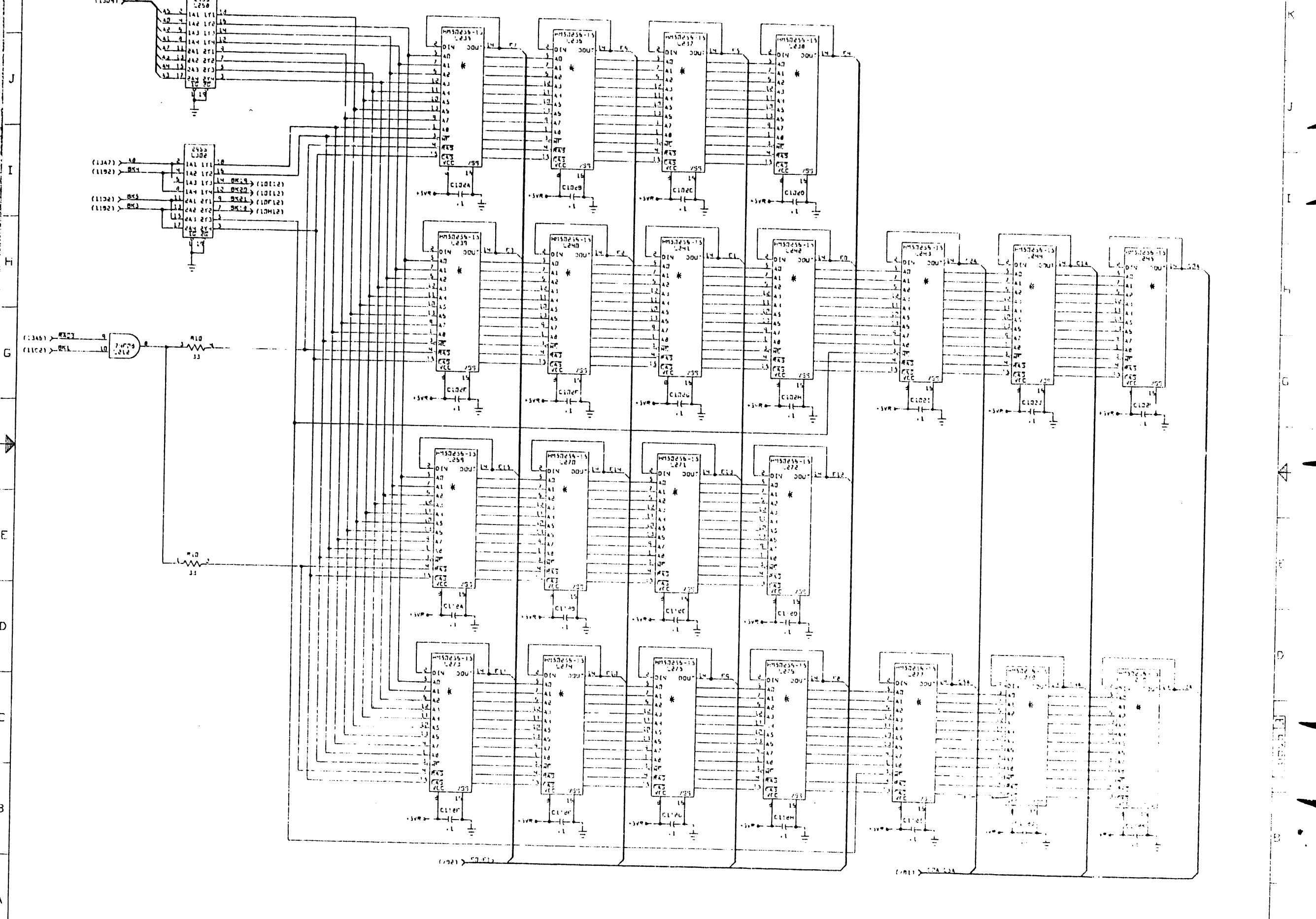
11"

17"

14 13 12 11 10 9 8 7 6 5 4 3 2 1

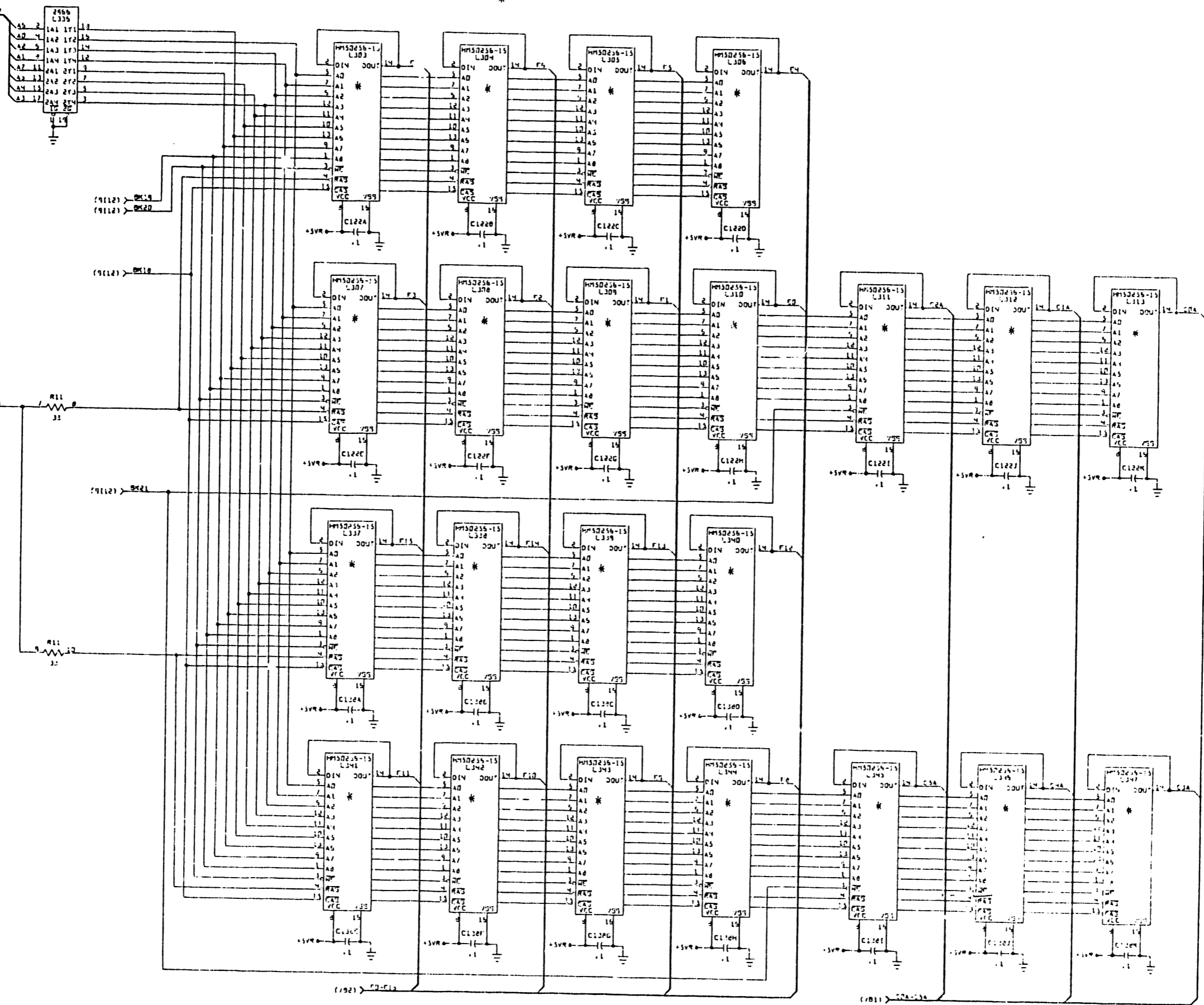


PLEASE CHECK THE DATA SHEET FOR THE PARTS LISTED IN THIS SCHEMATIC. THE PARTS LISTED IN THIS SCHEMATIC ARE SUBJECT TO CHANGE WITHOUT NOTICE. THE PARTS LISTED IN THIS SCHEMATIC ARE SUBJECT TO CHANGE WITHOUT NOTICE.



14 13 12 11 10 9 8 7 6 5 4 3 2 1

1. This circuit is for a 16-bit parallel adder. It uses four 4-bit full adders (74181) to perform the addition. The carry propagation is handled by a carry look-ahead logic (74182). The circuit is designed to be implemented on a single board.



17" 11" 8.5" 8.5" 11" 7"

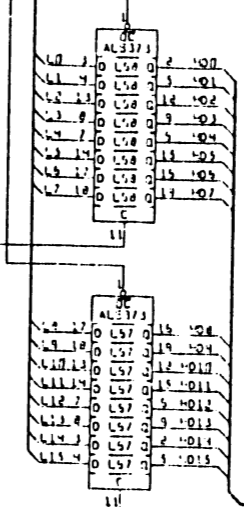
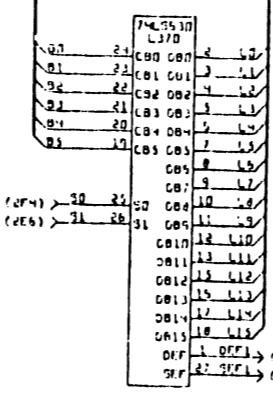
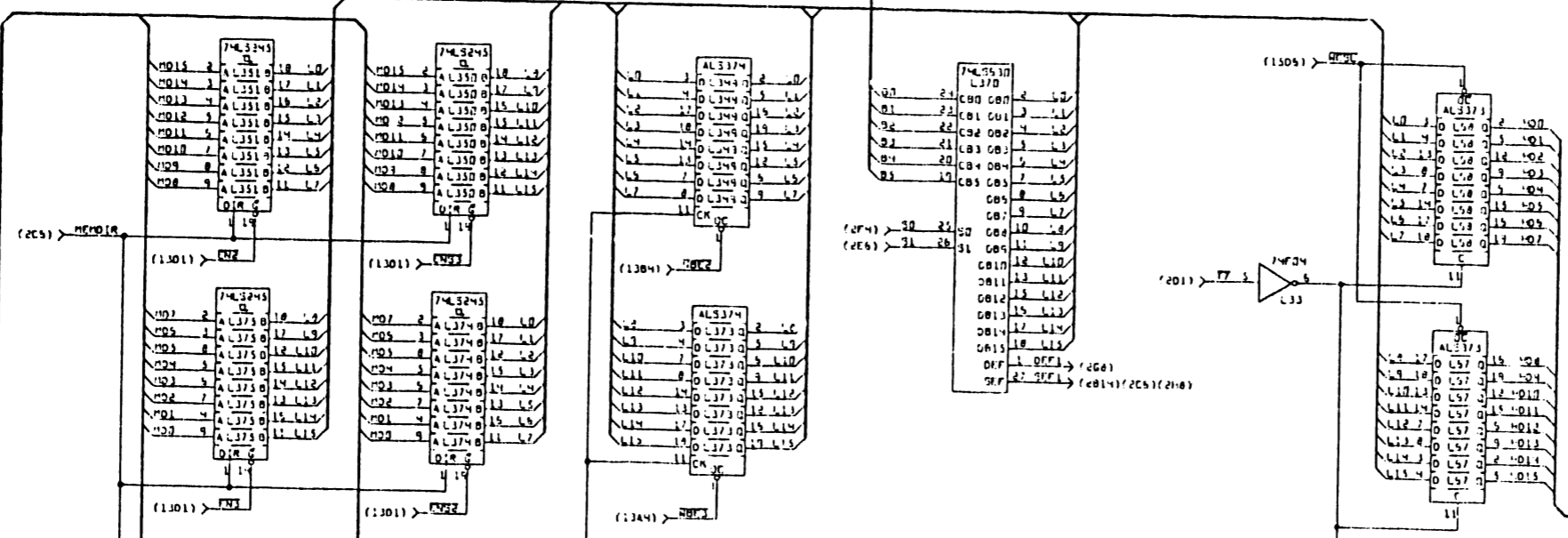
17" 11" 8.5" 8.5" 11" 17"

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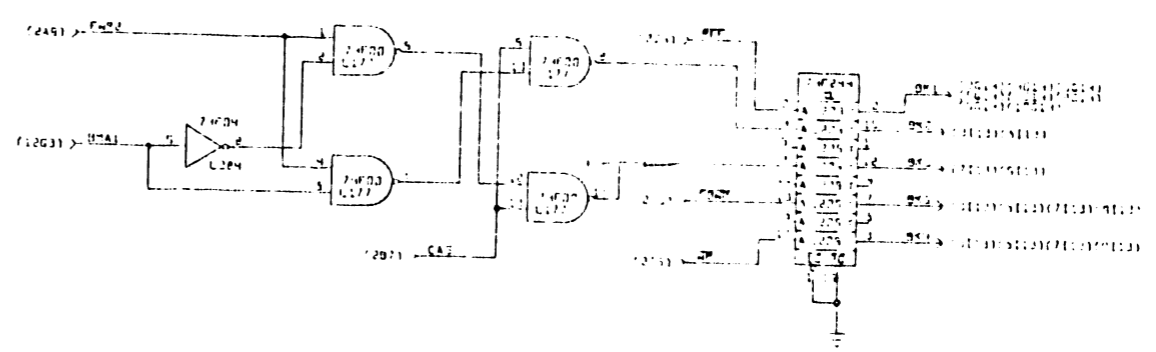
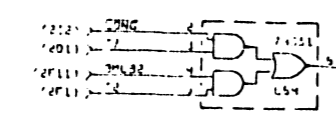
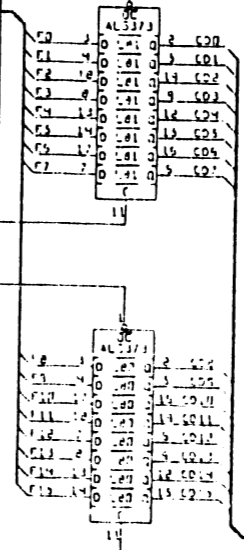
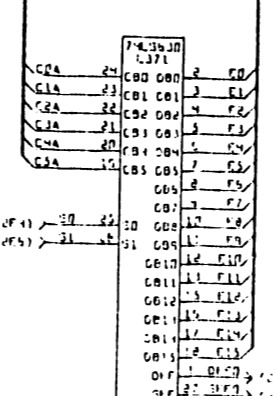
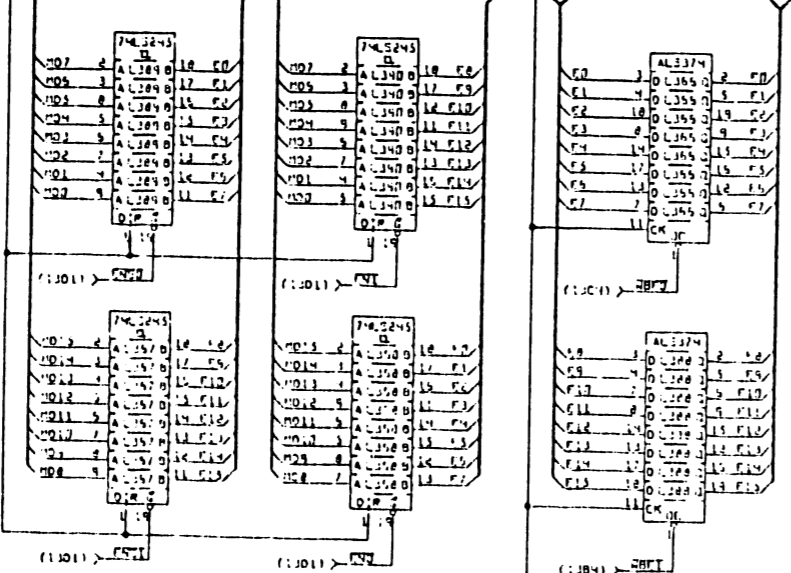
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(101) 20-21  
(102) 22-23

(101) 20-21  
(102) 22-23  
(103) 24-25  
(104) 26-27  
(105) 28-29  
(106) 30-31  
(107) 32-33  
(108) 34-35  
(109) 36-37  
(110) 38-39  
(111) 40-41  
(112) 42-43  
(113) 44-45  
(114) 46-47  
(115) 48-49  
(116) 50-51  
(117) 52-53  
(118) 54-55  
(119) 56-57  
(120) 58-59

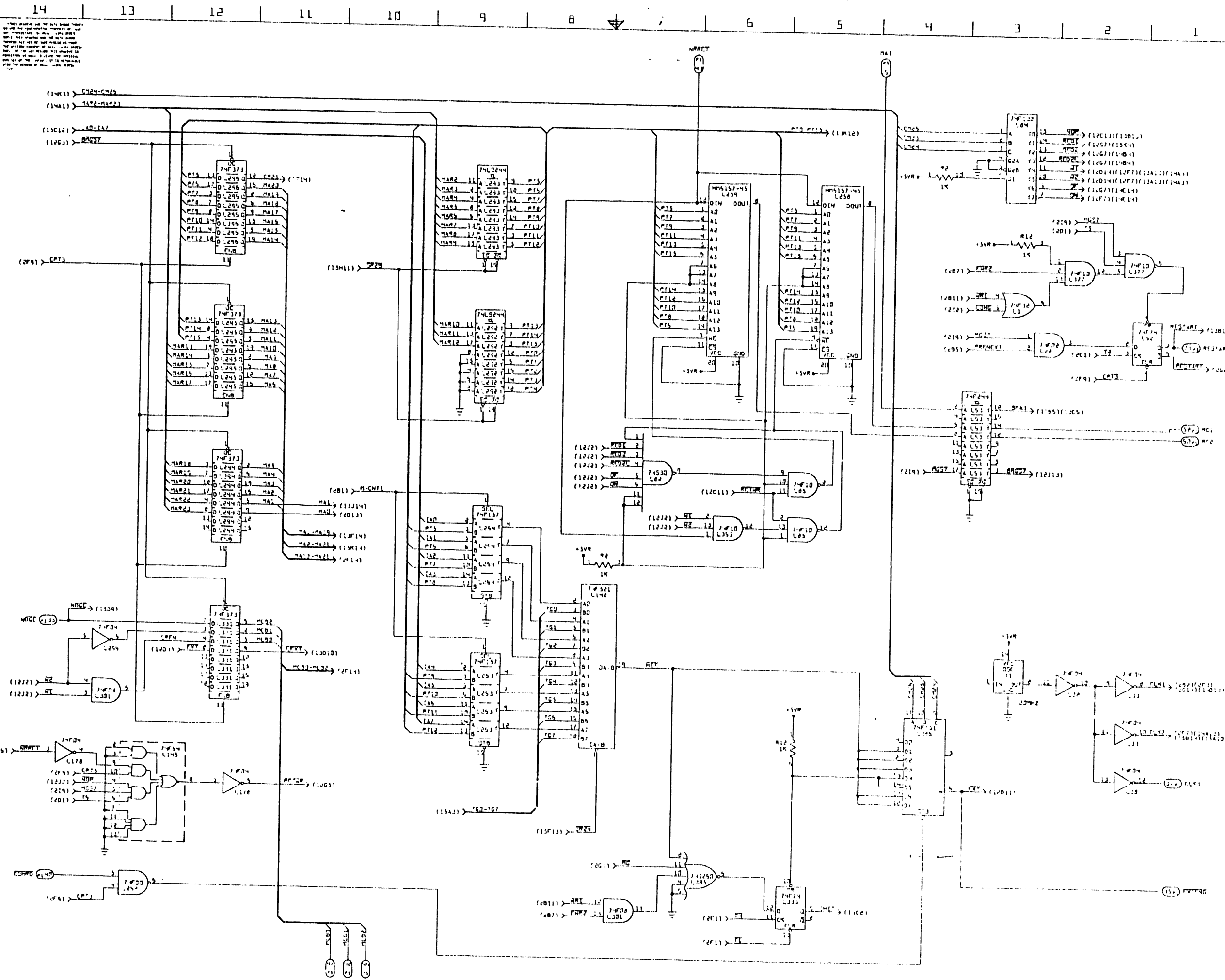


(181) 60A-63A  
(182) 64-67

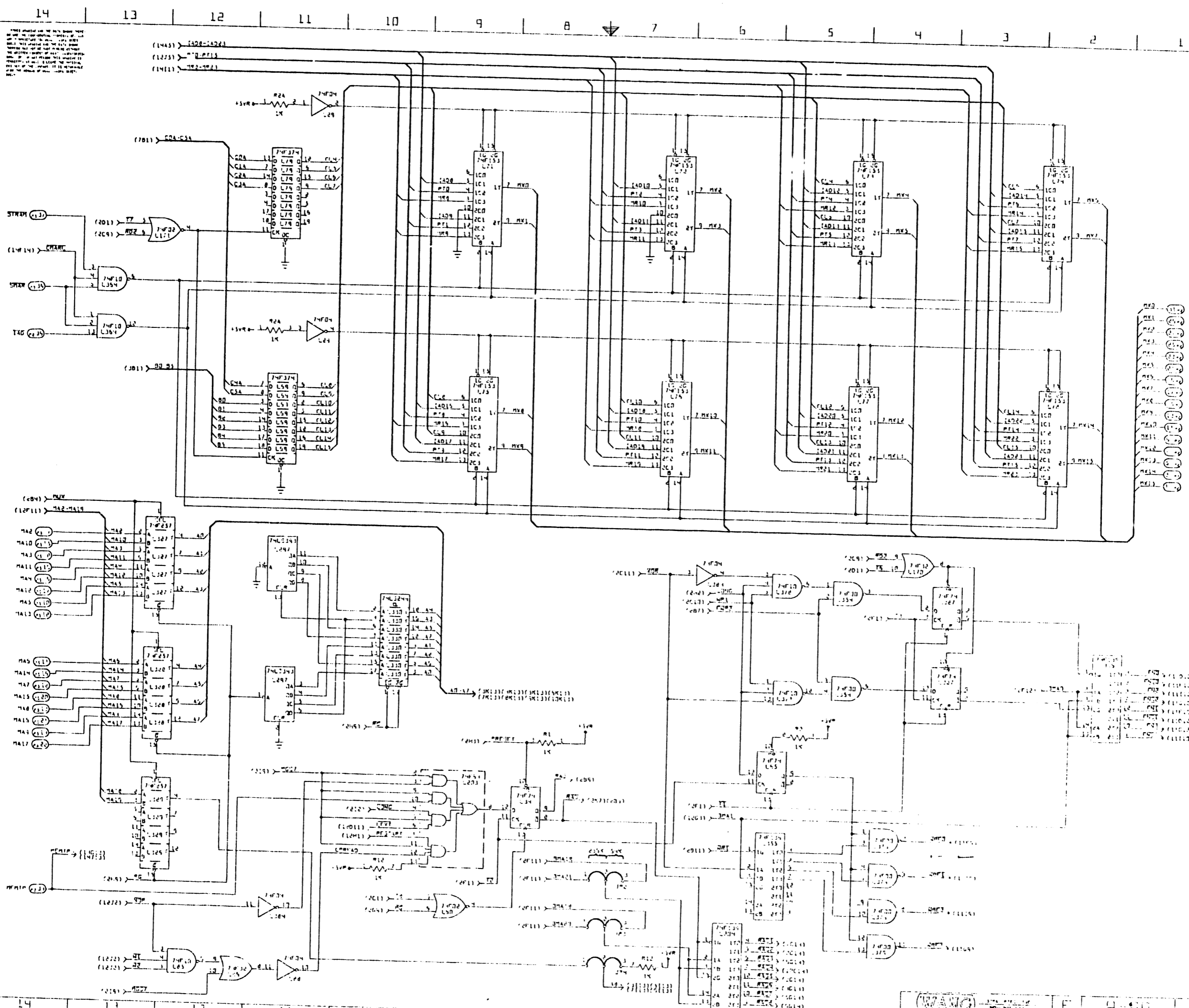


14 13 12 11 10 9 8 7 6 5 4 3 2 1

17"  
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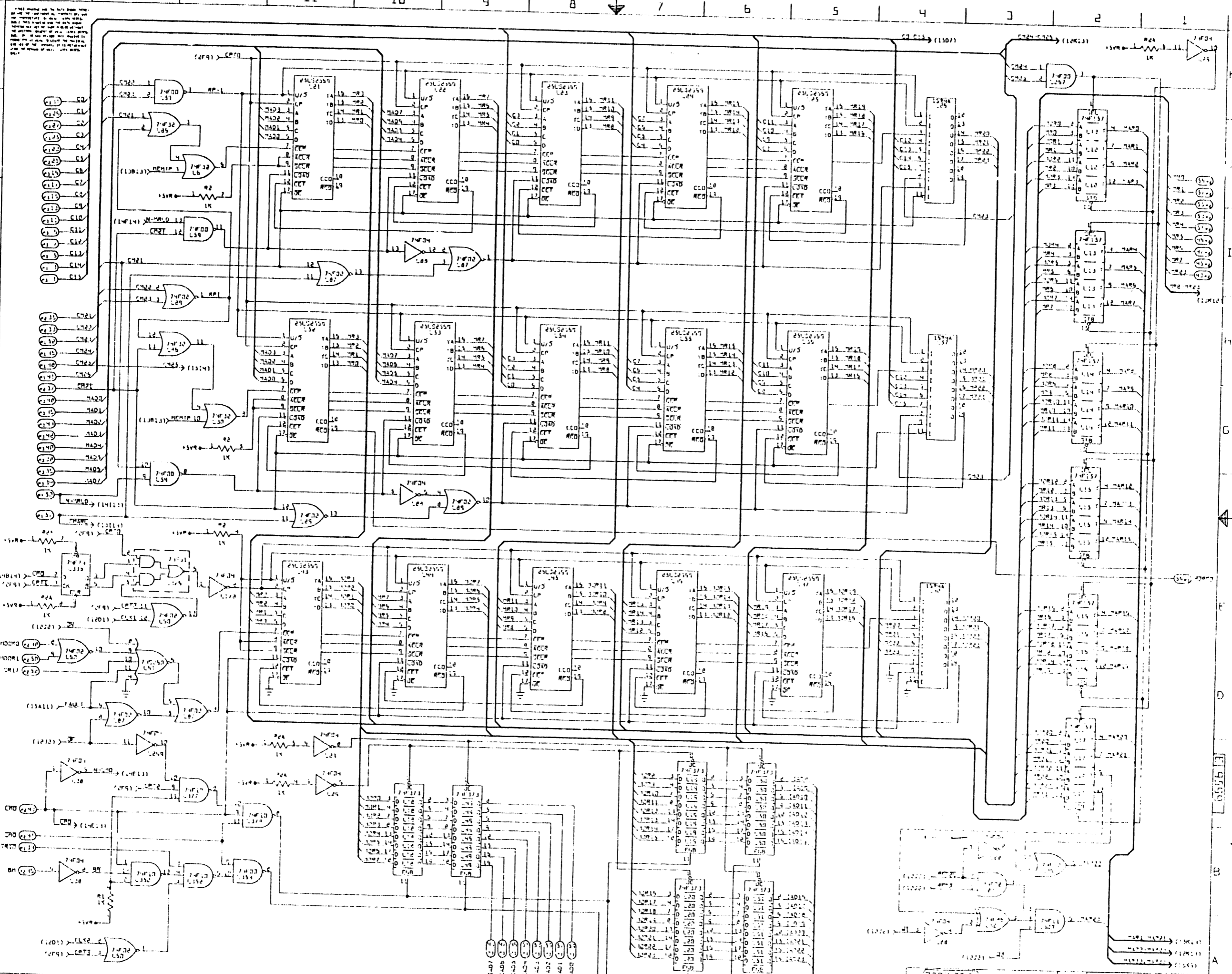
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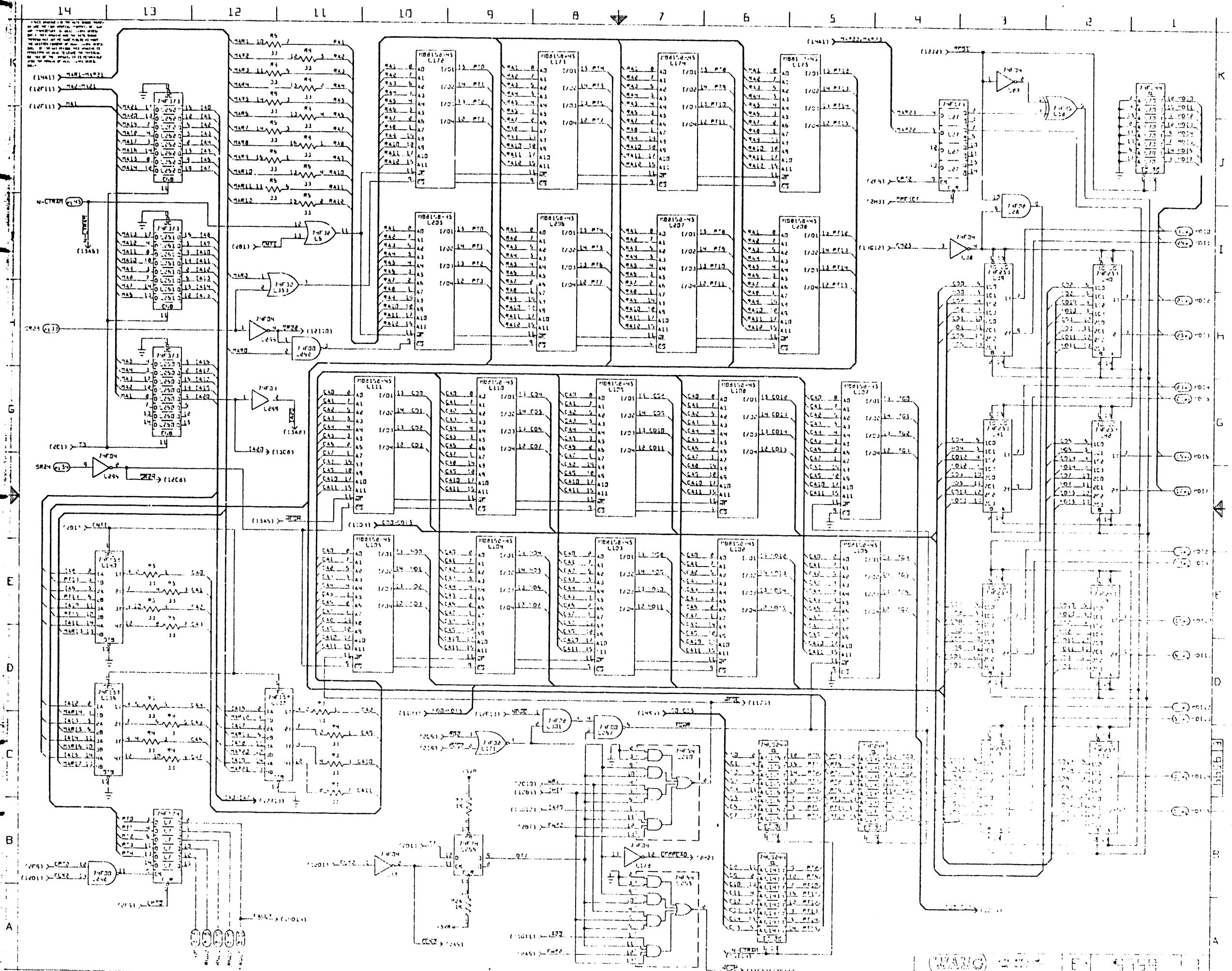
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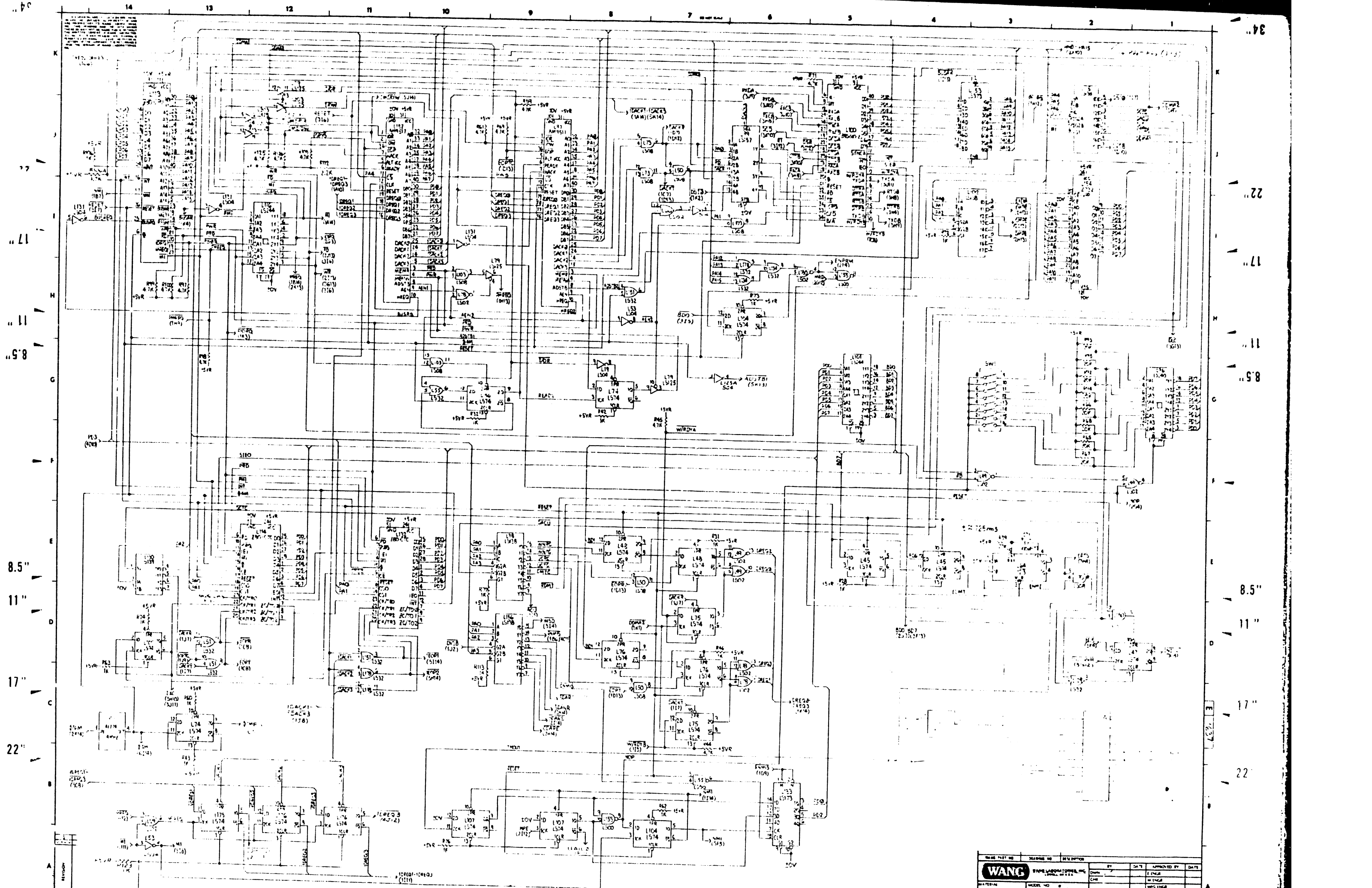
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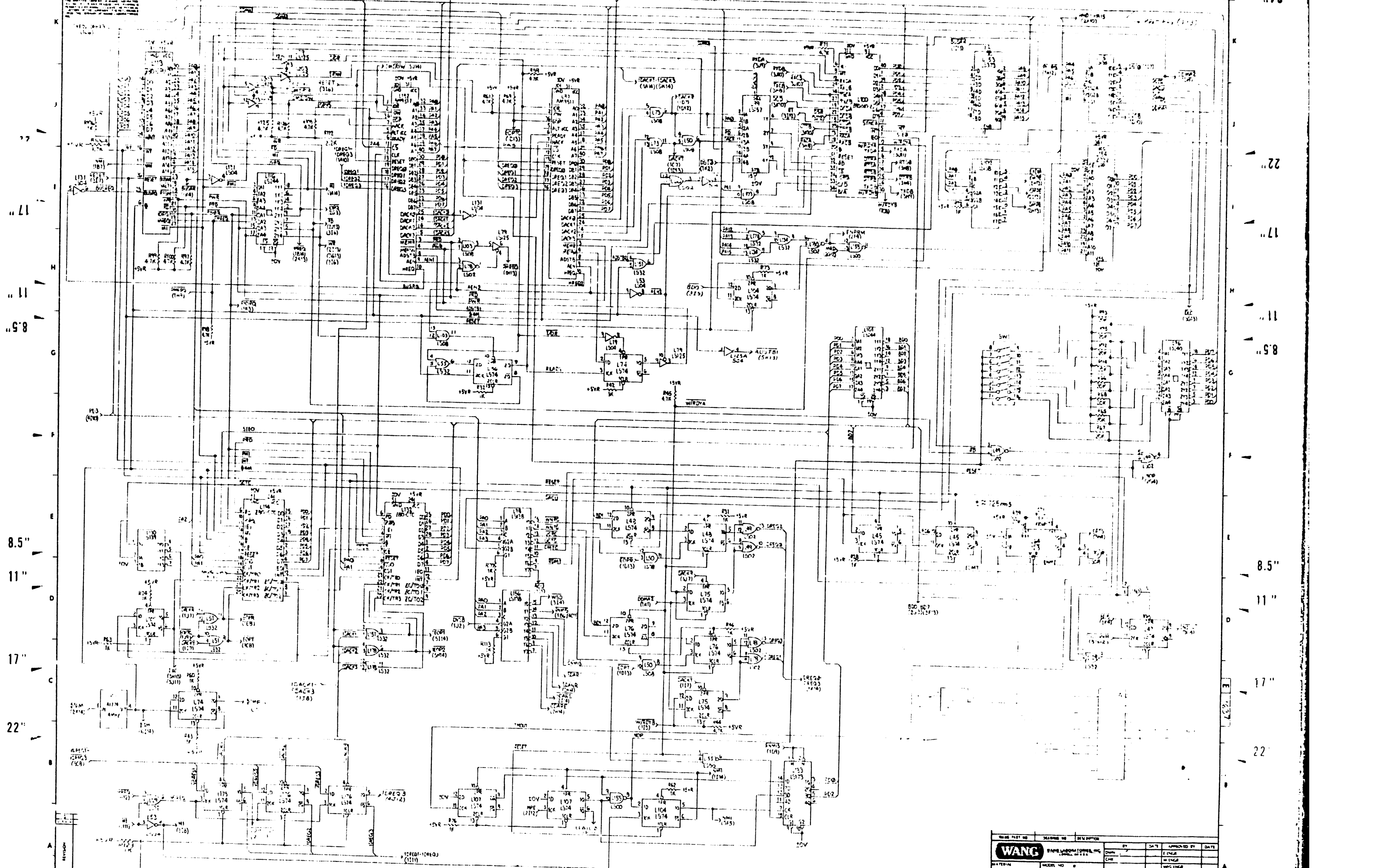


(WALC) 2-7-54 E 9754





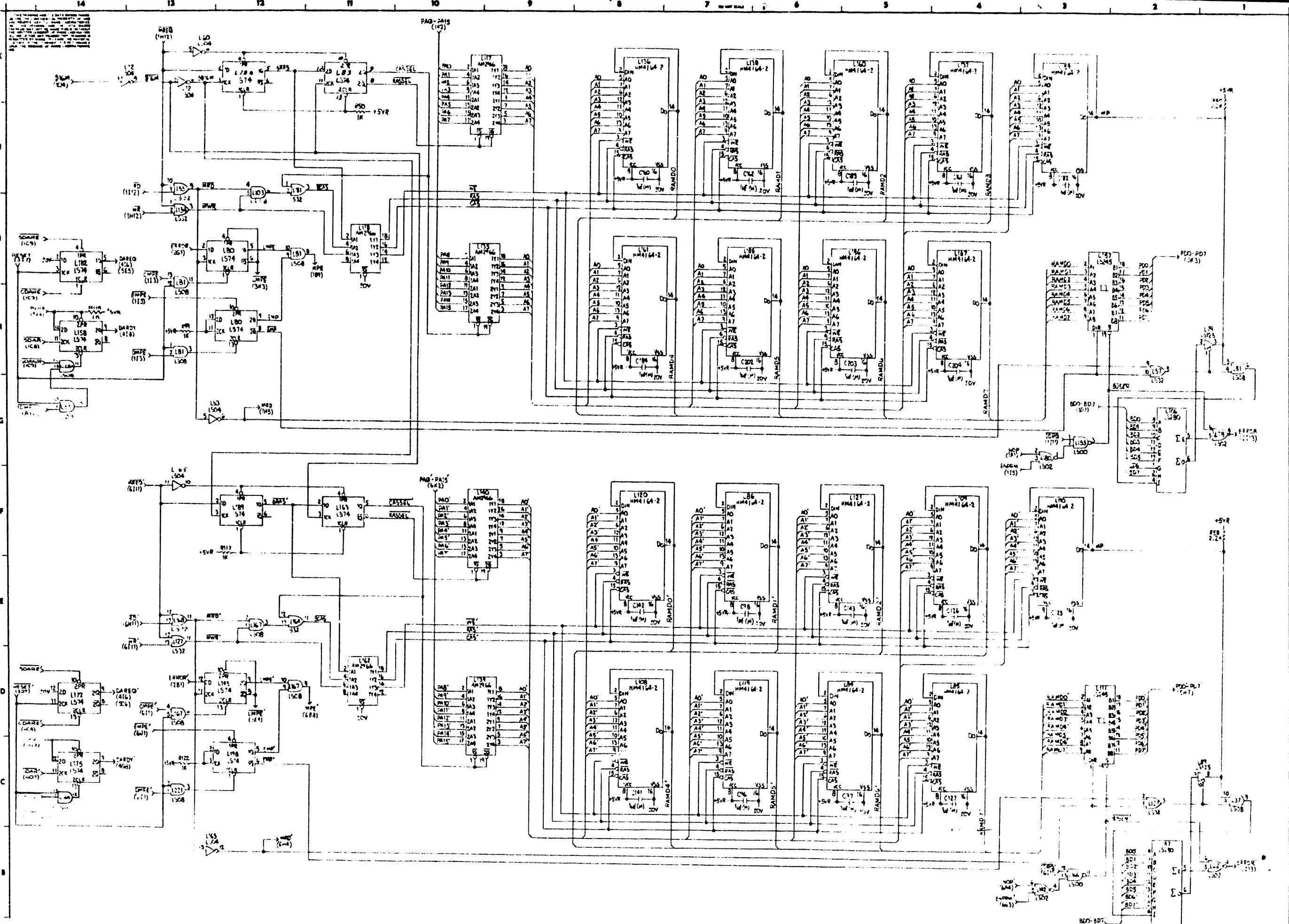
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A B C D E F G H I J K

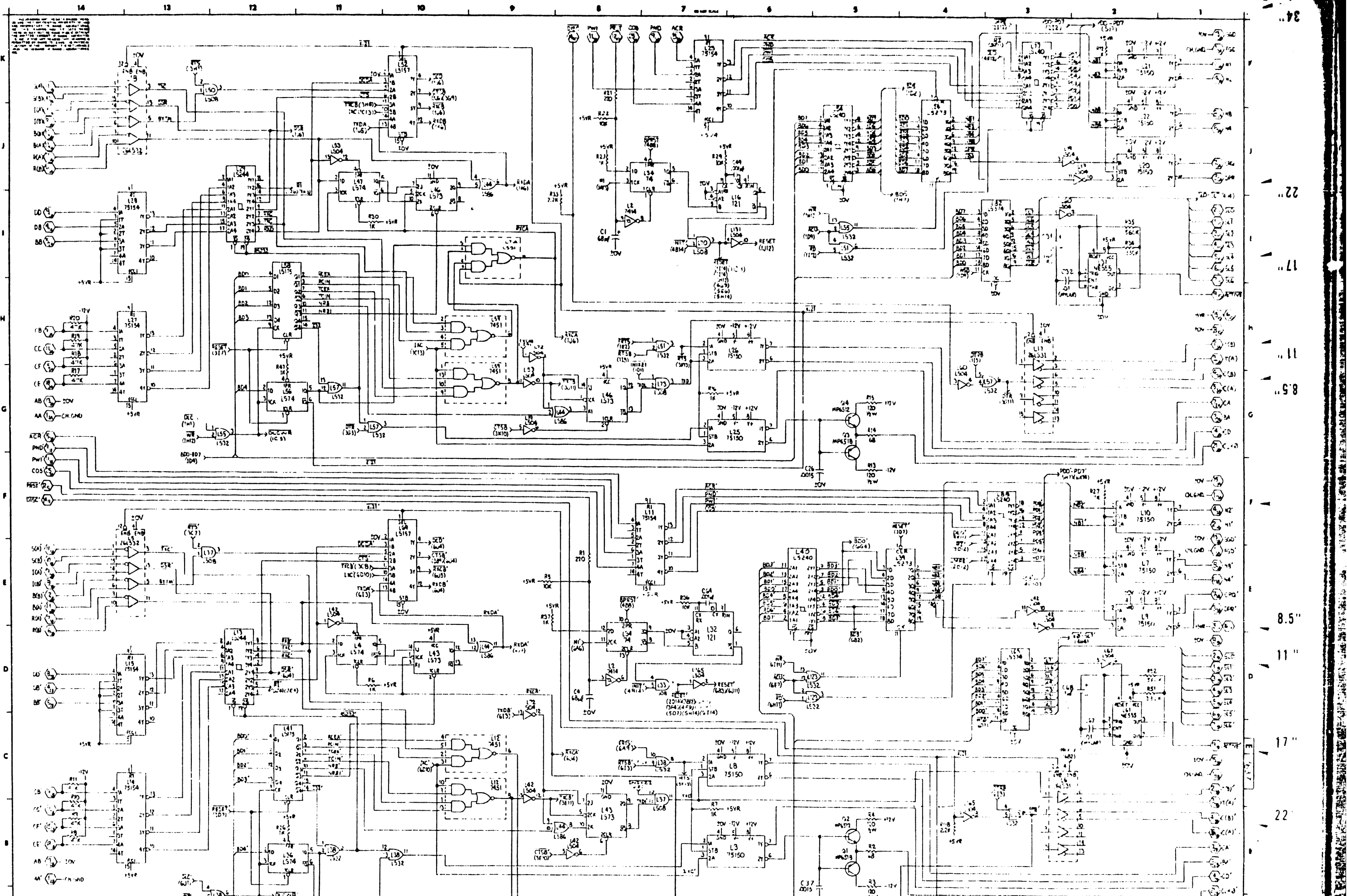
REV	DATE	BY	APPROVED BY
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**WANG** MODEL 720



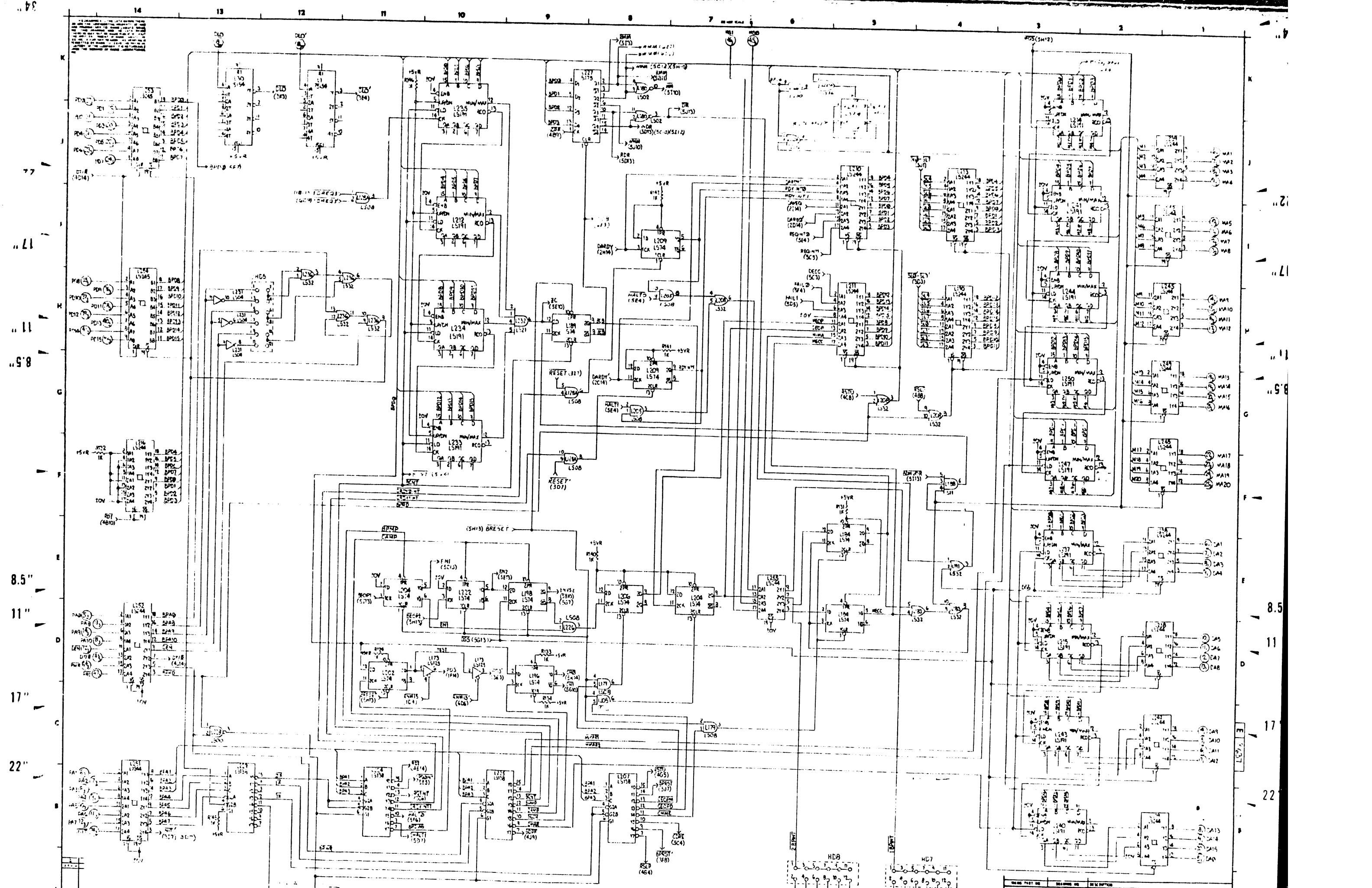
DATE	BY	DATE	APPROVED BY	DATE
11/17/57	WANG	11/17/57	WANG	11/17/57

WANG  
 MODEL NO. 7637  
 TITLE



DATE	BY	DATE	APPROVED BY	DATE

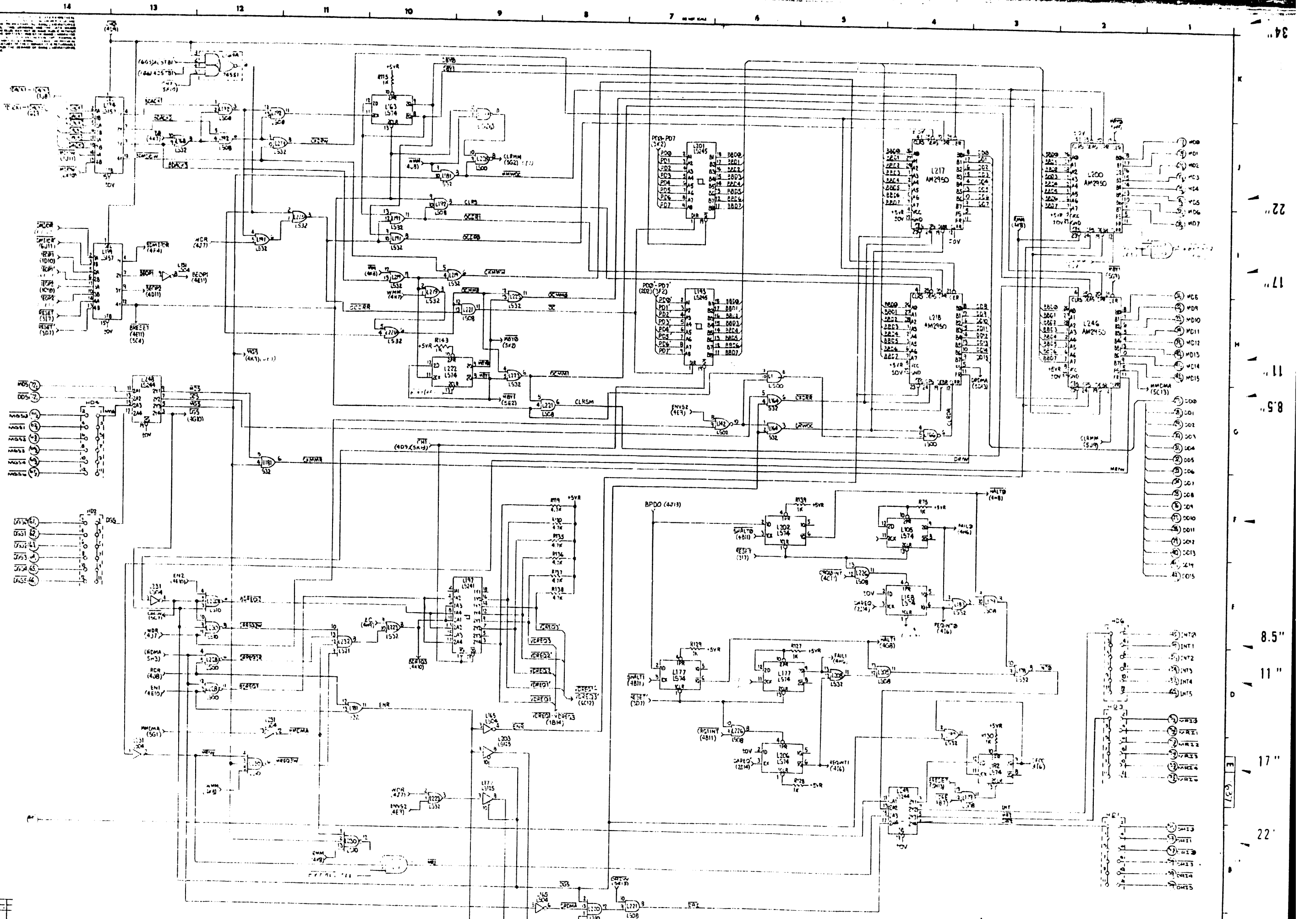
**WANG** WANG LABORATORIES, INC.  
 100 W. 42nd St., New York, N.Y. 10018  
 TEL: (212) 512-2000  
 FAX: (212) 512-2001



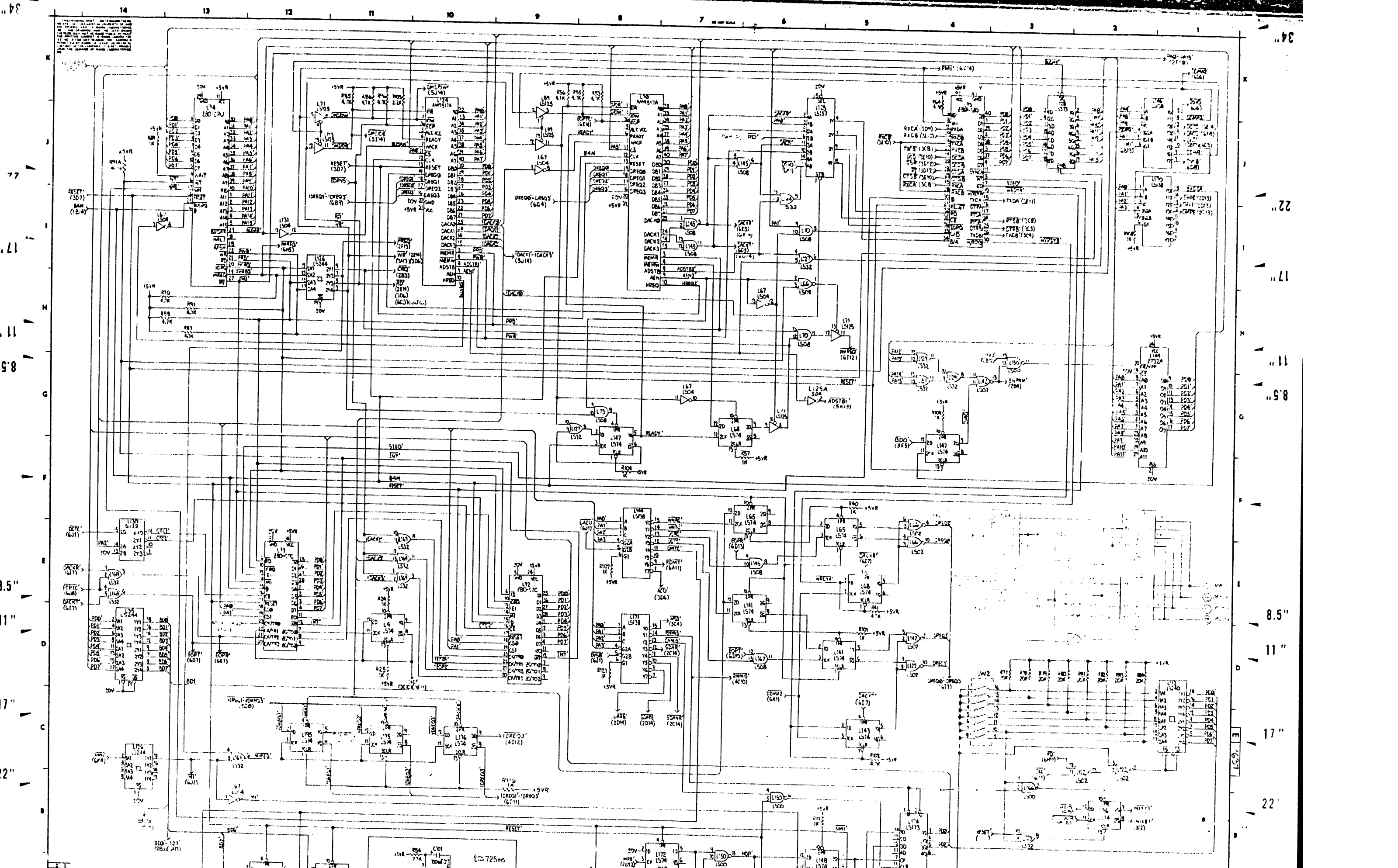
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NAME	REV	DATE	APPROVED BY	DATE
WANG				

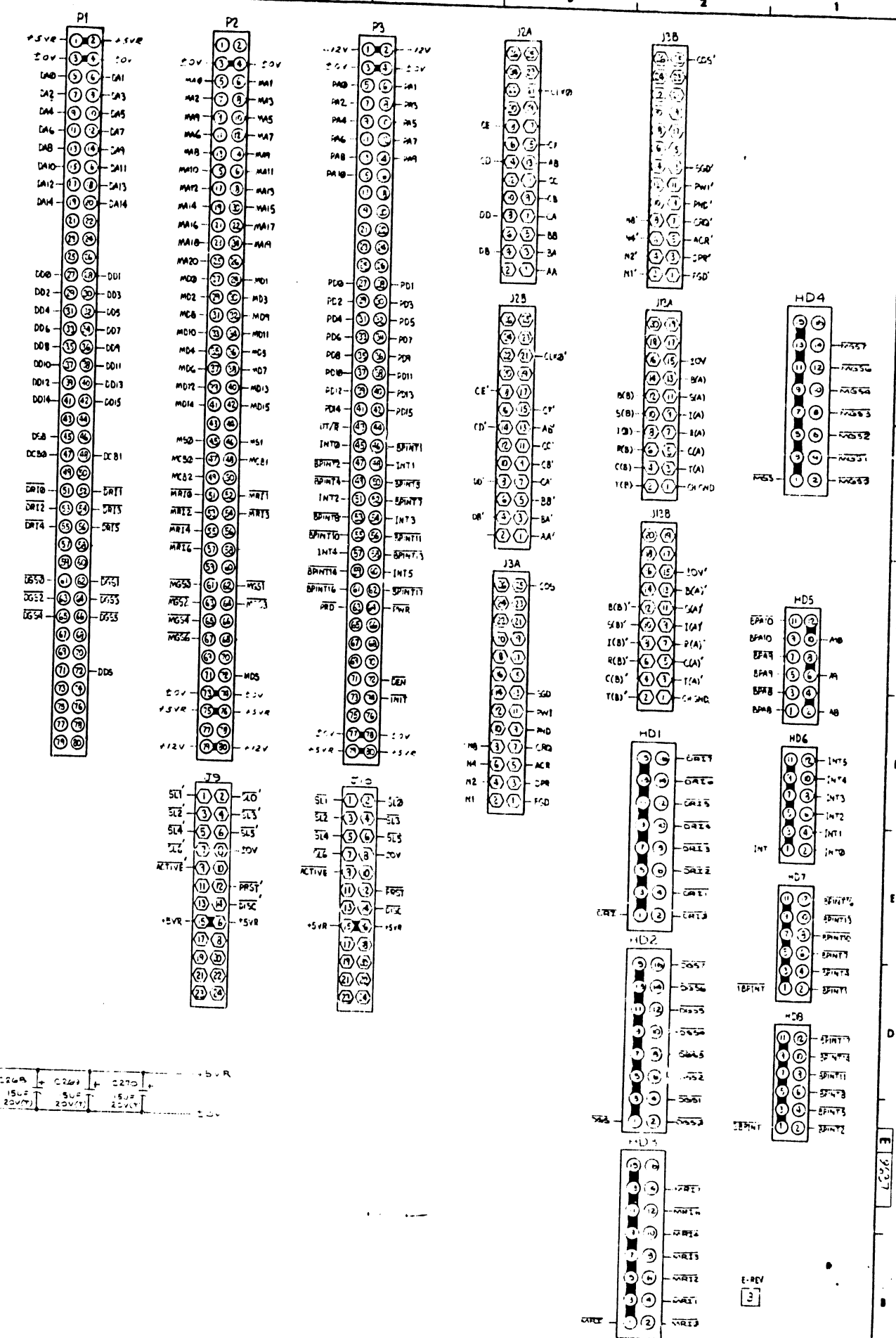


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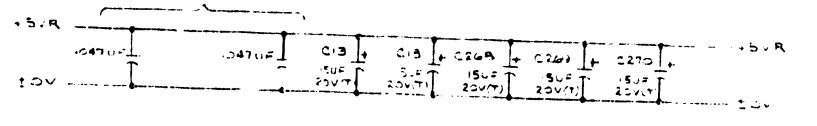
34  
22  
17  
8.5  
8.5  
11  
17  
22

MEMORICS	COORD
AA	3G14
AA'	3B14
AB	3G14
AB'	3B14
AC	3A7
ALR'	3G14
ACTIVE	3H1
ACTIVE	3C1
BA	3G1
BA'	3B1
BA(A)	3J14
BA(Y)	3E14
BB	3I14
BB'	3J14
BB(B)	3J14
BB(A)	3E14
BPINT1	4A5
BPINT2	4A6
BPINT4	4A5
BPINT5	4A6
BPINT7	4A4
BPINT8	4A6
BPINT9	4A4
BPINT11	4A5
BPINT13	4A4
BPINT14	4A5
BPINT16	4A4
BPINT17	4A5
CA	3G1
CA'	3B1
CA(A)	3G1
CA(Y)	3B1
CB	3H4
CB'	3C14
CB(B)	3G1
CB(A)	3B1
CC	3H4
CC'	3B14
CD	3G1
CD'	3B1
CE	3G14
CE'	3B14
CF	3G14
CF'	3B14
CLAD	3G1
CLAD'	3B1
CO5	3A8
CO5'	3A14
CR9	3J1
CR9'	3E1
DA0-DA15	4E1
DA	3I14
DA'	3D14
DCBD	5A9
DD	3I14
DD'	3D14
DD0-DD15	5G1
DEN	4D4
DESD-DESS	5E14
DI2	3A8
DI2'	3A14
DLO'	4A12
DLS'	4A12
DPR	3J1
DPR'	3E1
DPR0-DPR15	5B1
DSB	3D14
DTR	4D14
FSD	3H1
FSD'	3F1
I(A)	3J14
I(A')	3E14
I(B)	3J14
I(B')	3E14
INT0-INT5	5D1

MEMORICS	COORD
MA1-MA20	4J1
MCB2	4A1
MOD-MDIS	5J1
MOS	5G14
MROU-MRSO	5F14
MRT0-MRT5	5C1
MED-MS1	4A7
MED-MS2	4A7
MED-MS3	4A7
MCB1,MCB2	4A1
NI-NB	3H1
NI-NB'	3F1
PAB-PAB0	4C14
PC0-PC15	4J14
PND	3A7
PNO'	3G14
PR0	4D4
PREST	3A8
PREST'	3A14
PWI	3A8
PWI'	3F14
PWR	3D14
R(A)	3J14
R(A')	3E14
R(B)	3J14
R(B')	3E14
S(A)	3H14
S(A')	3E14
S(B)	3H4
S(B')	3E14
SGD	3A1
SGD'	3F1
SL0-SL6	3J1
SL0-SL6	3D1
T(A)	3H1
T(A')	3C1
T(B)	3H1
T(B')	3C1



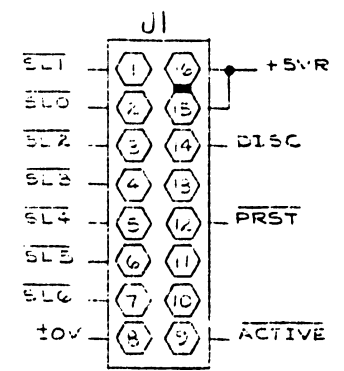
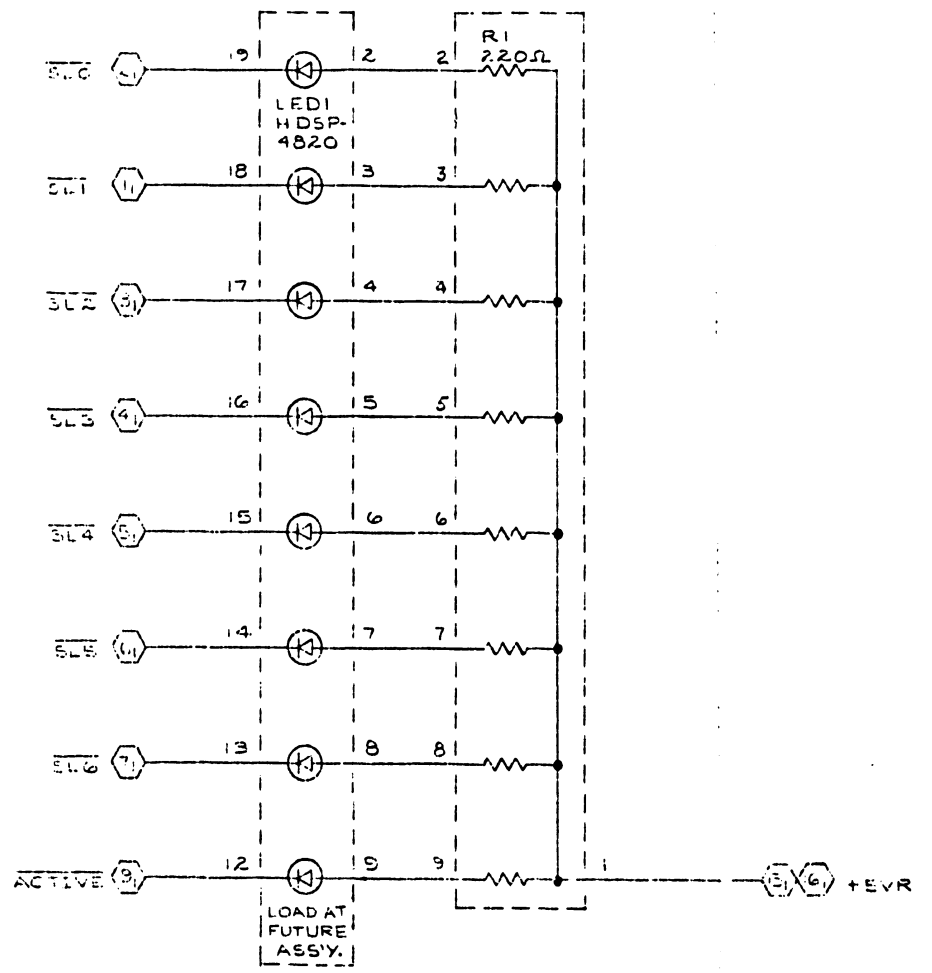
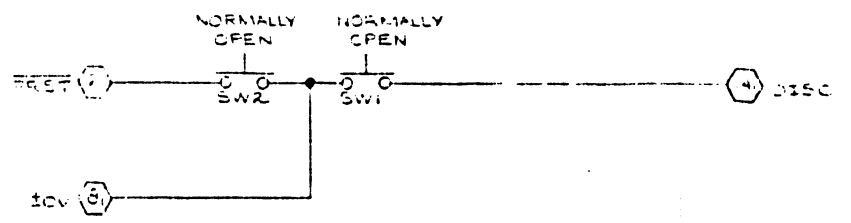
32-3, 5-12, 14-17, 19-25, 27-30,  
 33-34, 38-43, 50-53, 55-56,  
 59-60, 71-72, 88-99, 100, 102-  
 14, 128-140, 144-154, 158-  
 81, 83-101, 208-210



8.5"  
11"  
17"  
22"

8.5"  
11"  
17"  
22"

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COMPONENT	TYPE	M.L. PART NO.
R1	220Ω DIP	333-CB11
LED1	20 PIN SOC	376-7020
J1	8 PIN SOC.	376-9005
SW1,2	06-01-	525-2251

210-203-570		
210	203	570
7755-0	7755	370-1009

E-REV

REV	DESCRIPTION	DATE	BY	CHKD
1	REVISED PER 1/11/66	1/11/66	WJ	WJ
2	REVISED PER 1/11/66	1/11/66	WJ	WJ

WANG LABORATORIES, INC. 1000 WASHINGTON ST. CAMBRIDGE, MASS. 02142		BY	DATE	APPROVED BY	DATE
MATERIAL		OWN	1/11/66	ENGR	1/11/66
MODEL NO.		LIGHT BOARD			
FINISH		D			
REV		2			



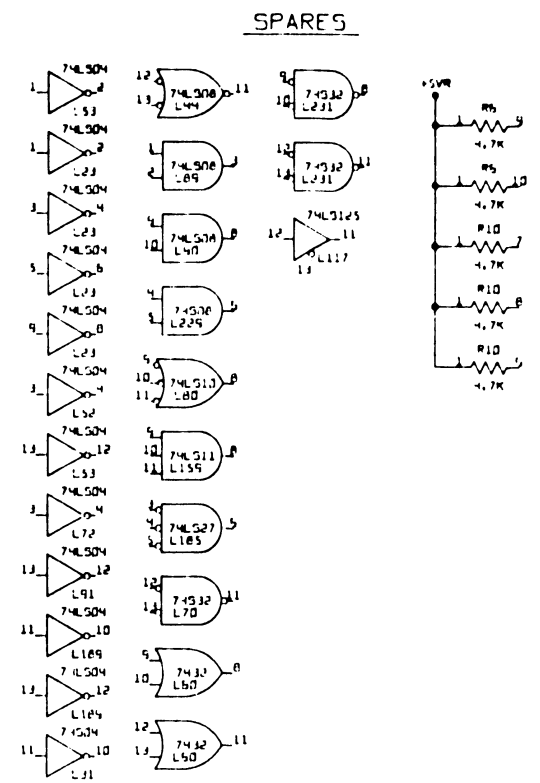
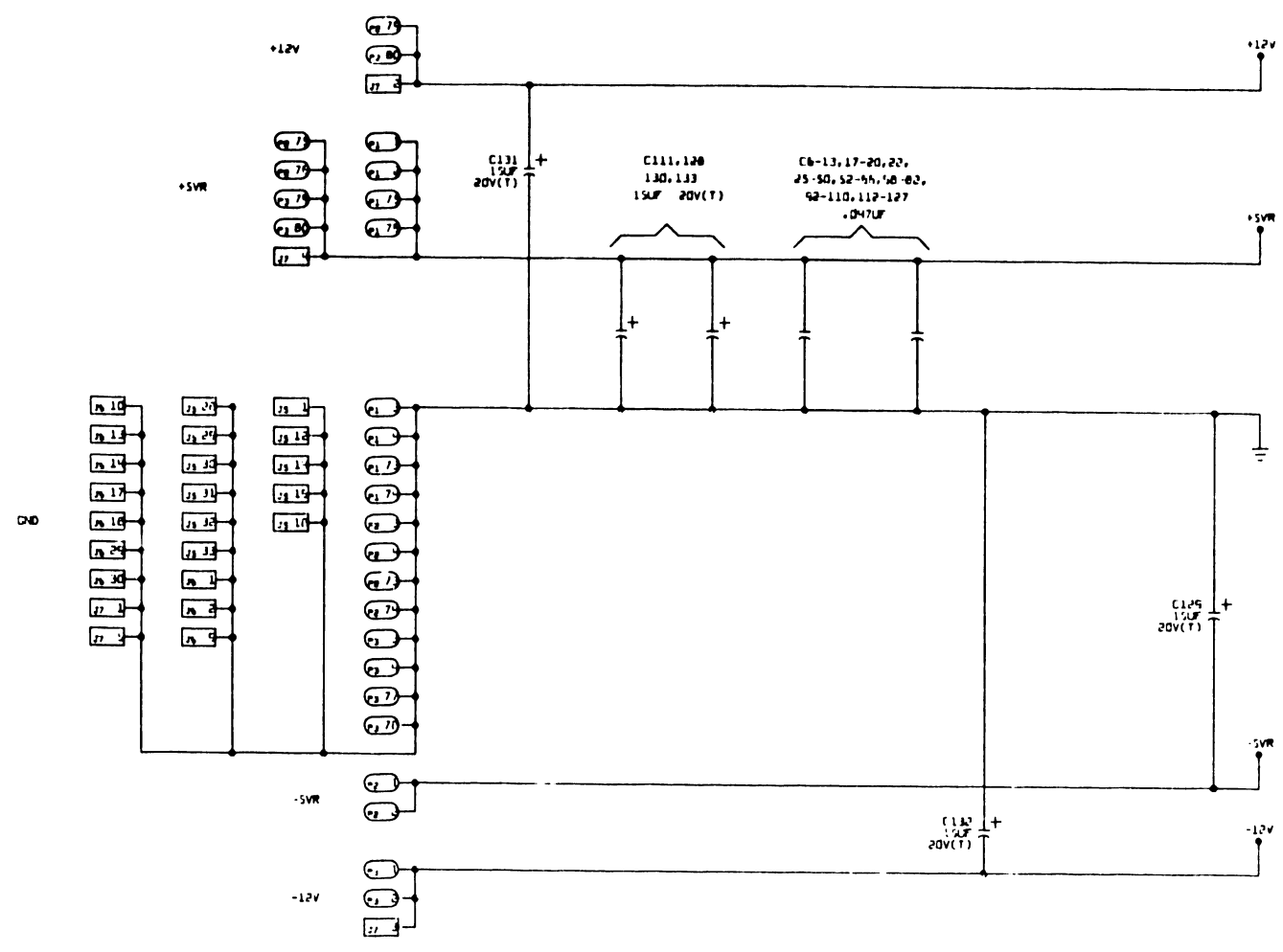
14 13 12 11 10 9 8 7 6 5 4 3 2 1

UNIVERSAL ISIO-W CONTROLLER M/L

NOTES

1. ALL RESISTOR VALUES IN OHMS.
2. ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE INDICATED.
3. ALL RESISTORS 1/4W 5% UNLESS OTHERWISE INDICATED.

FUNCTIONS	COORD.
REAL SPAIN	10J14
REDD SPAIN	9J14
SPINTO-SPINTY7	10G1
CH0	8K1
CH1	8K1
CH2	8J1
CH3	8J1
CH4	8J1
CH5	8K1
CH6	8K1
CH7	8K1
CH8	8K1
CH9	8K1
CH10	8K1
CH11	8K1
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CH98	8K1
CH99	8K1
CH100	8K1



17" 11" 8.5" 8.5" 11" 17"

17" 11" 8.5" 8.5" 11" 17"

REV 4 N

GWA NC		SCHEMATIC DIAGRAM	
UNVRSL ISIO-W		CONTROLLER M/L	
REV	DATE	REV	DATE
4		5	
DRAWING NUMBER		REV	
E 8489		5	

17"

11"

8.5"

8.5"

11"

17"

17"

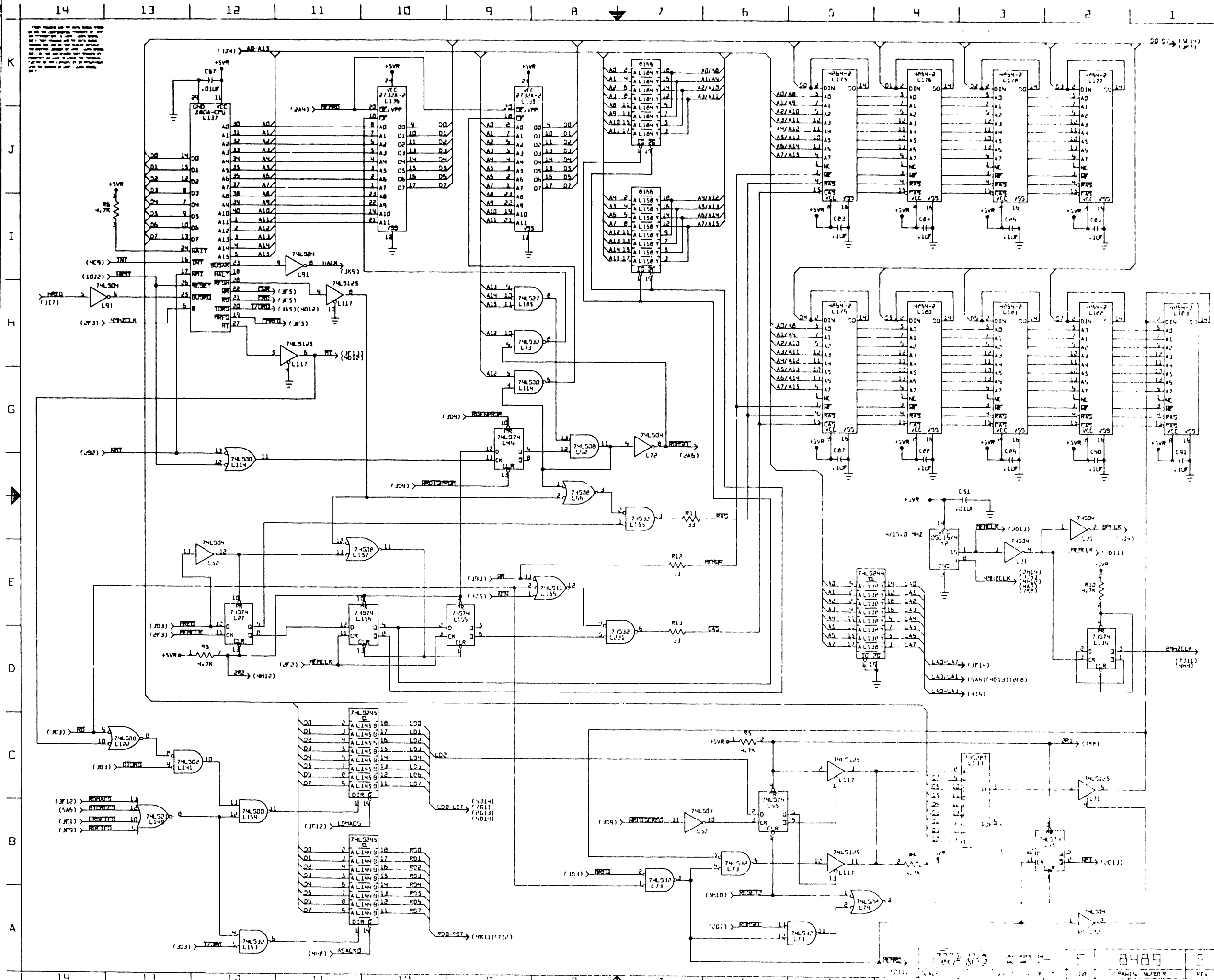
11"

8.5"

8.5"

11"

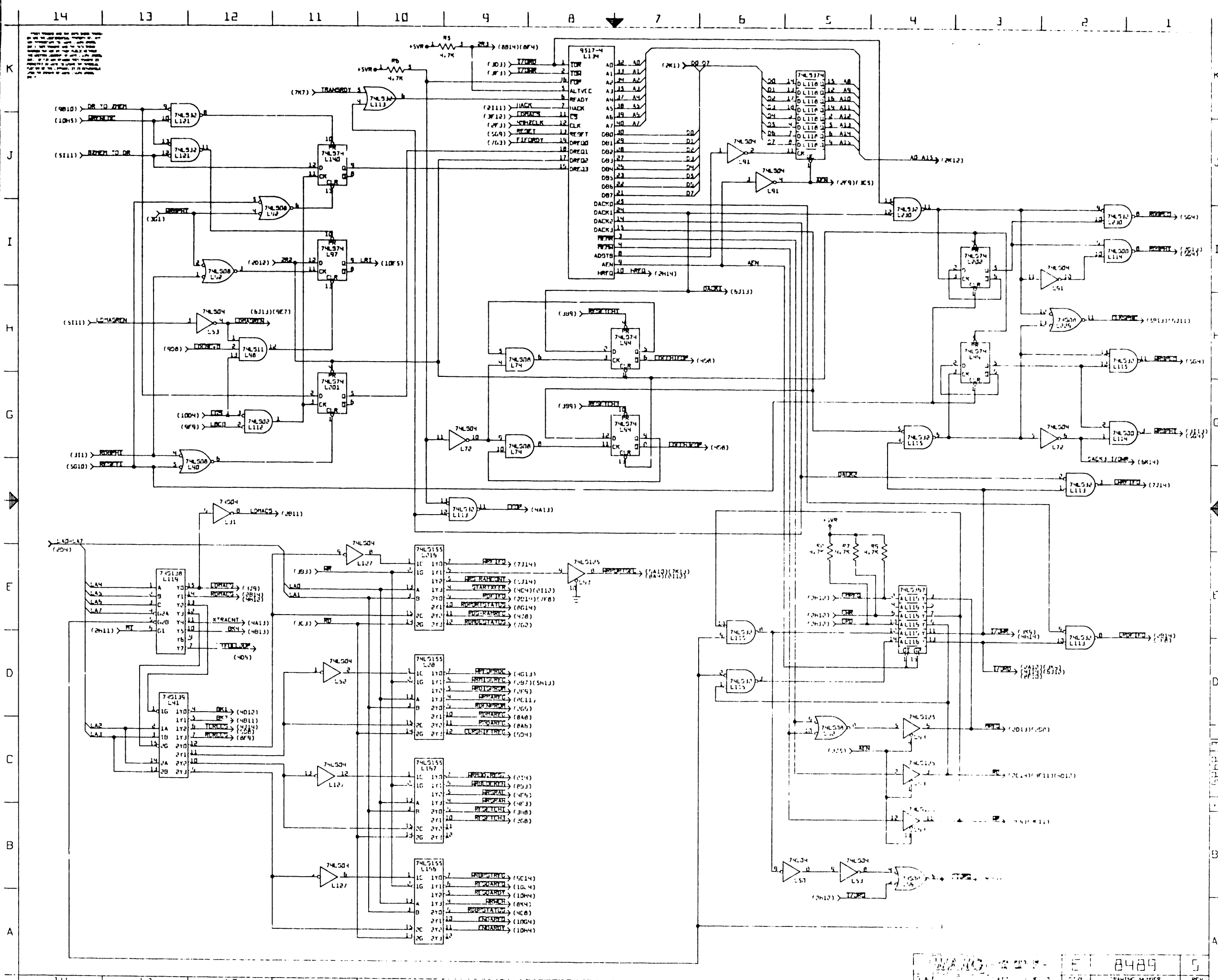
17"



8489

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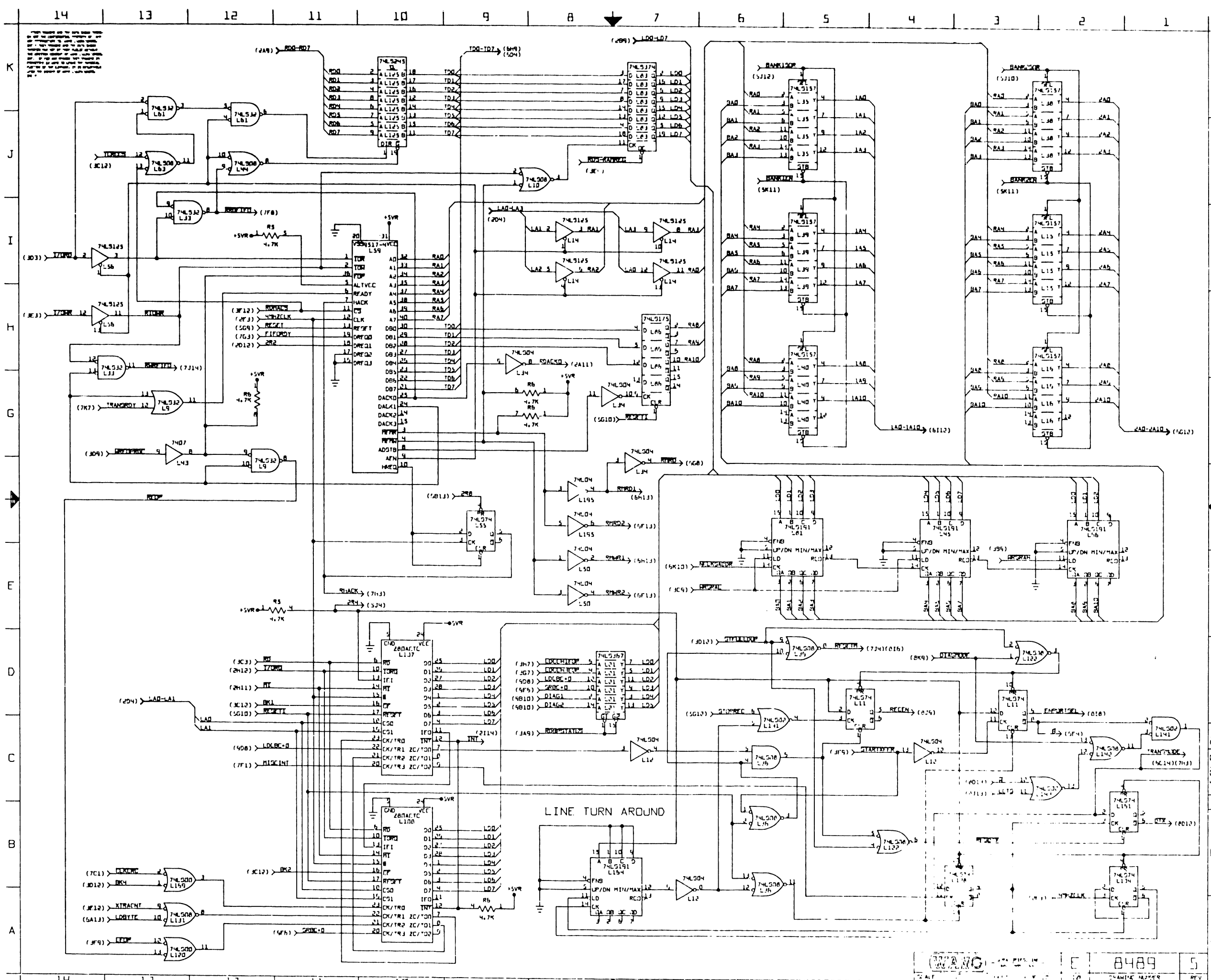
17" 11" 8.5" 8.5" 11" 17"



17" 11" 8.5" 8.5" 11" 17"

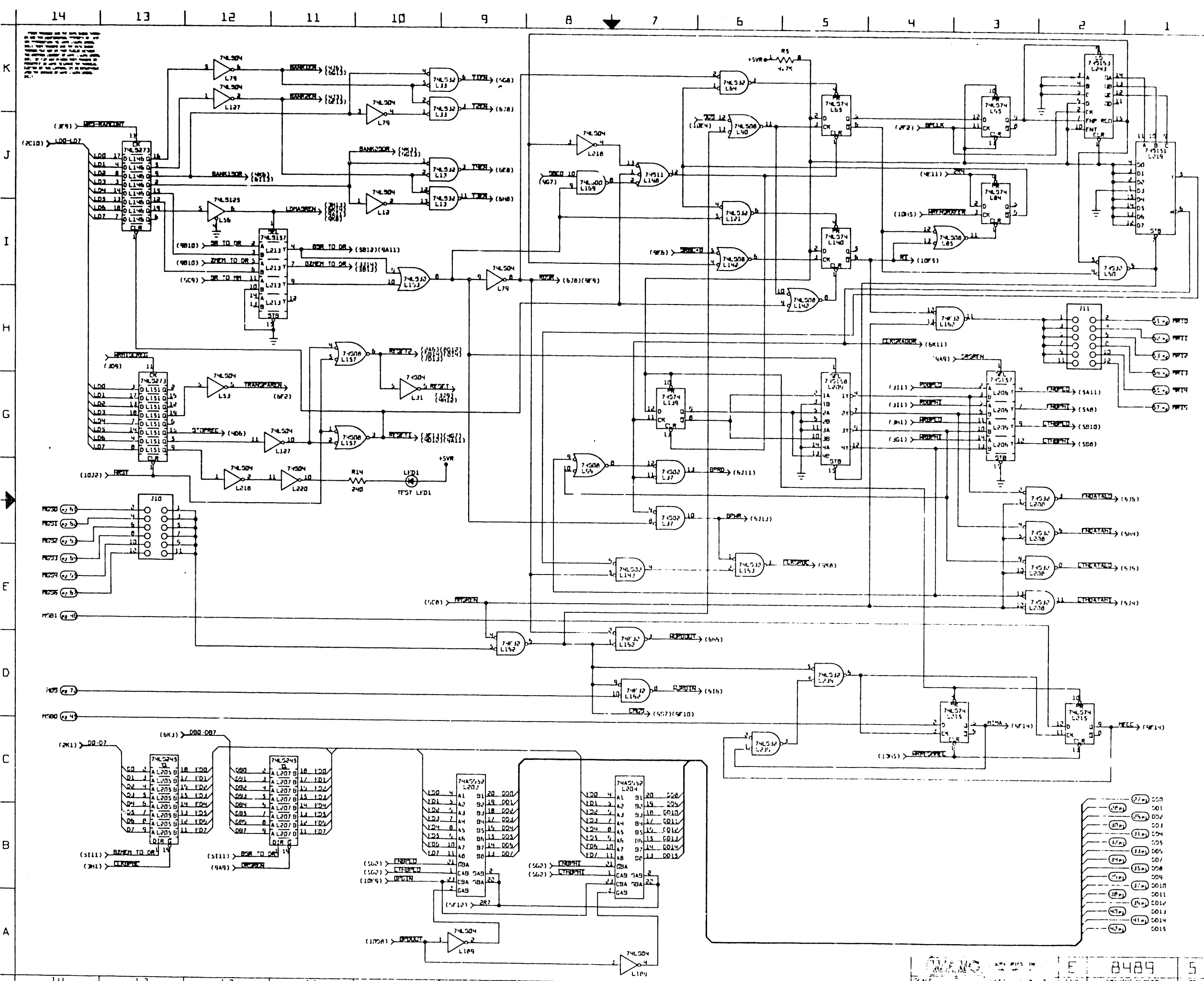
17" 11" 8.5" 11" 8.5" 17"

17" 11" 8.5" 11" 8.5" 17"



17" 11" 8.5" 8.5" 11" 17"

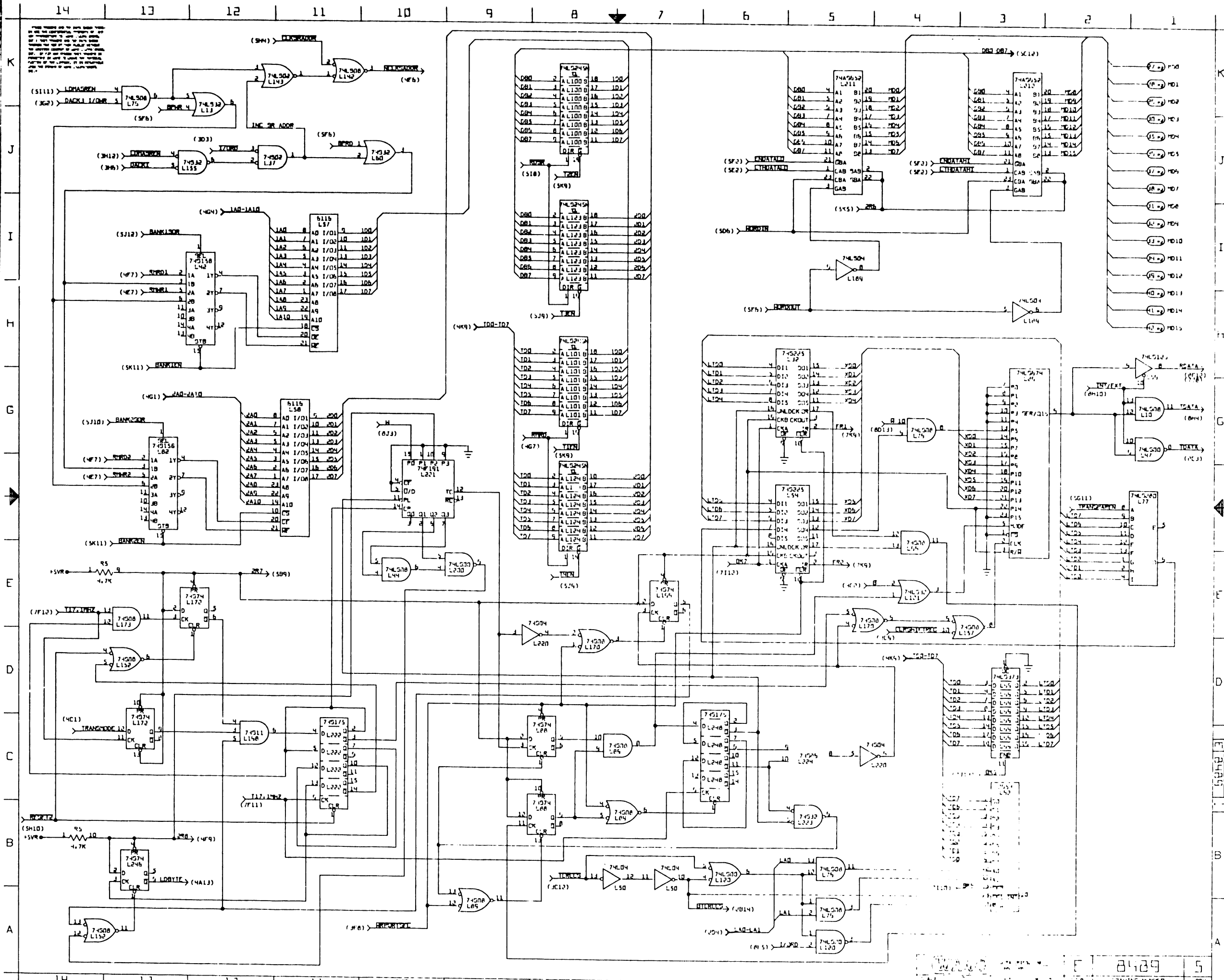
17" 11" 8.5" 8.5" 11" 17"



E 8489 5  
 REV. 5  
 DATE: 11/11/88  
 DRAWN: J. J. J.  
 CHECKED: J. J. J.  
 APPROVED: J. J. J.

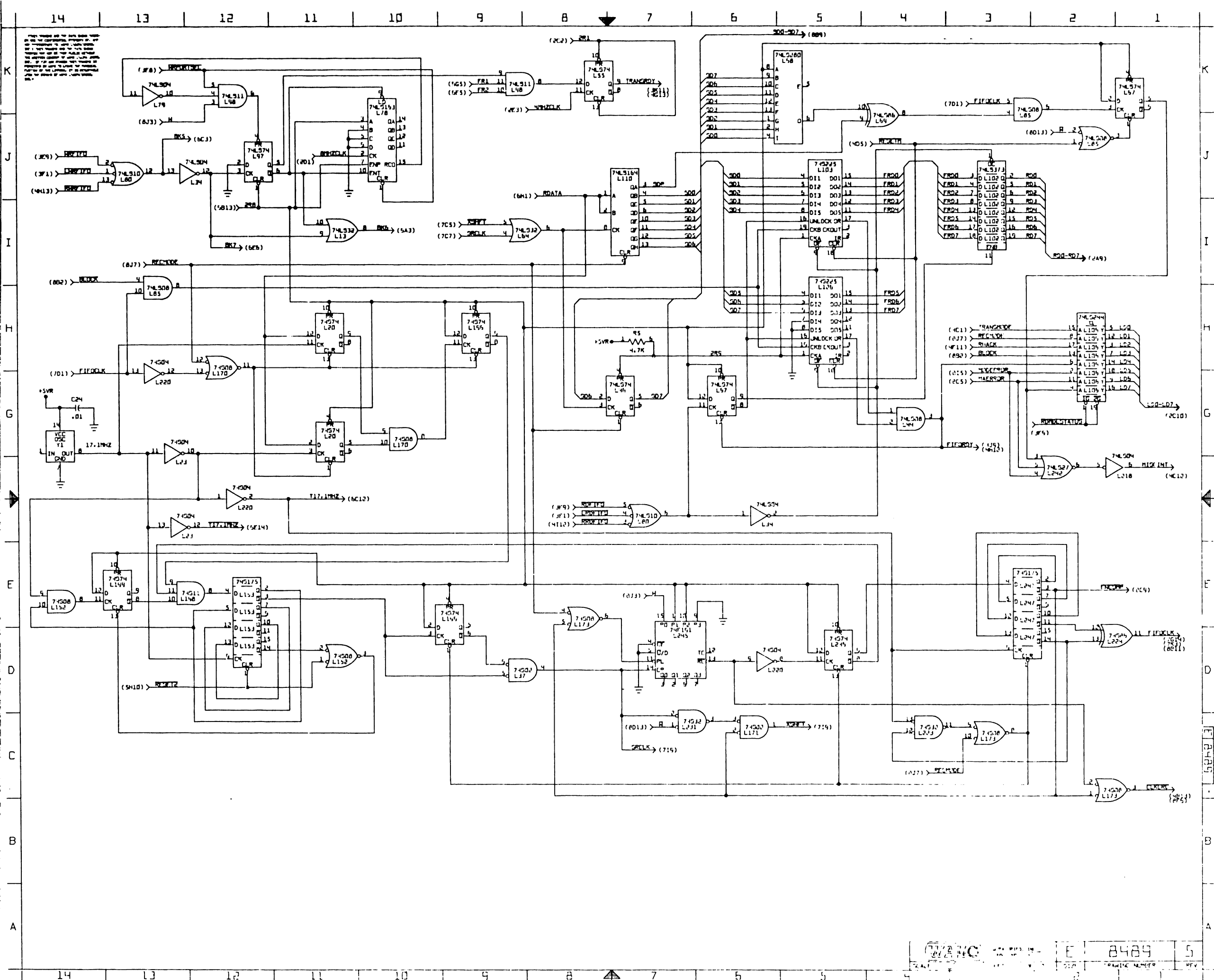
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17" 11" 8.5" 8.5" 11" 17"

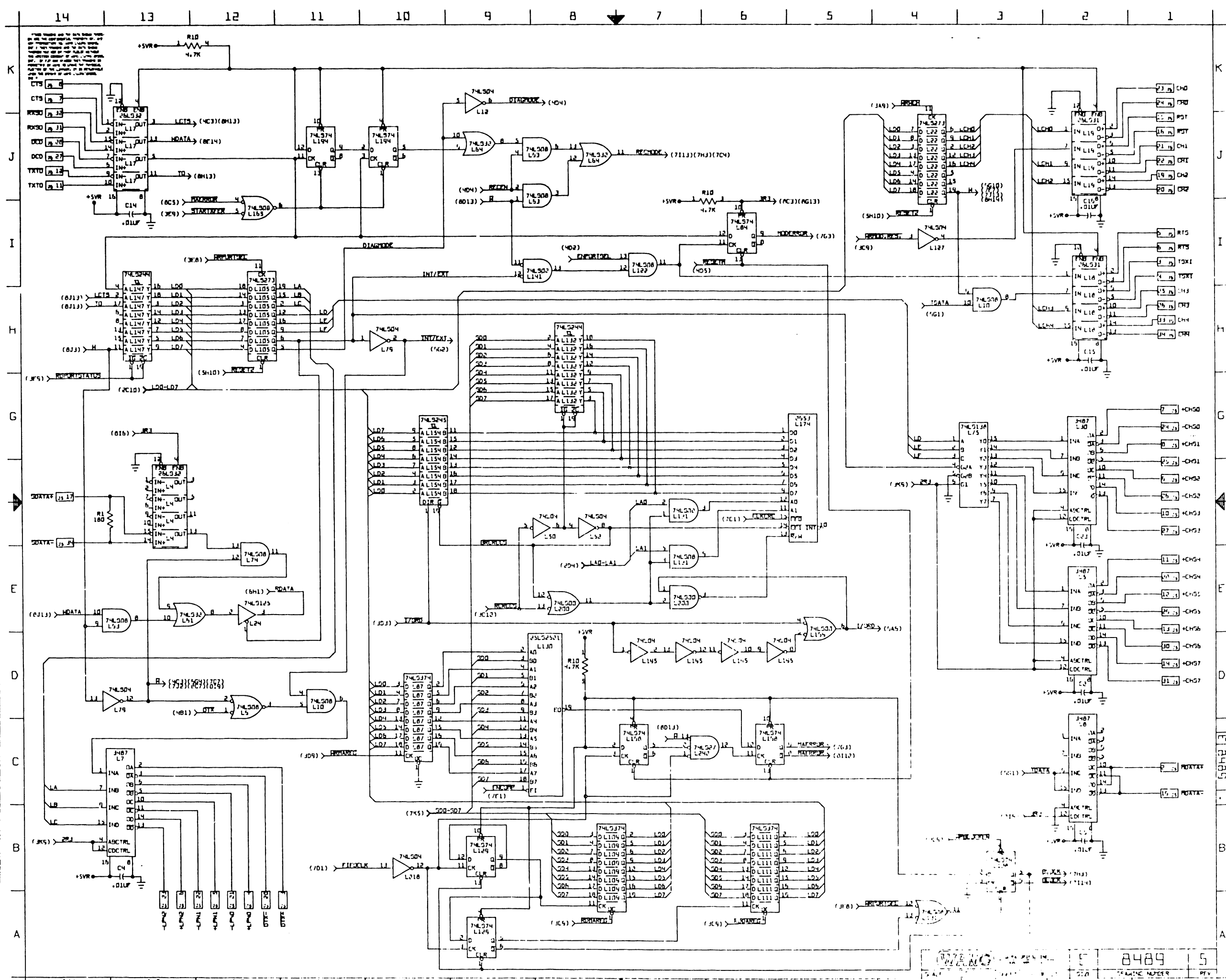


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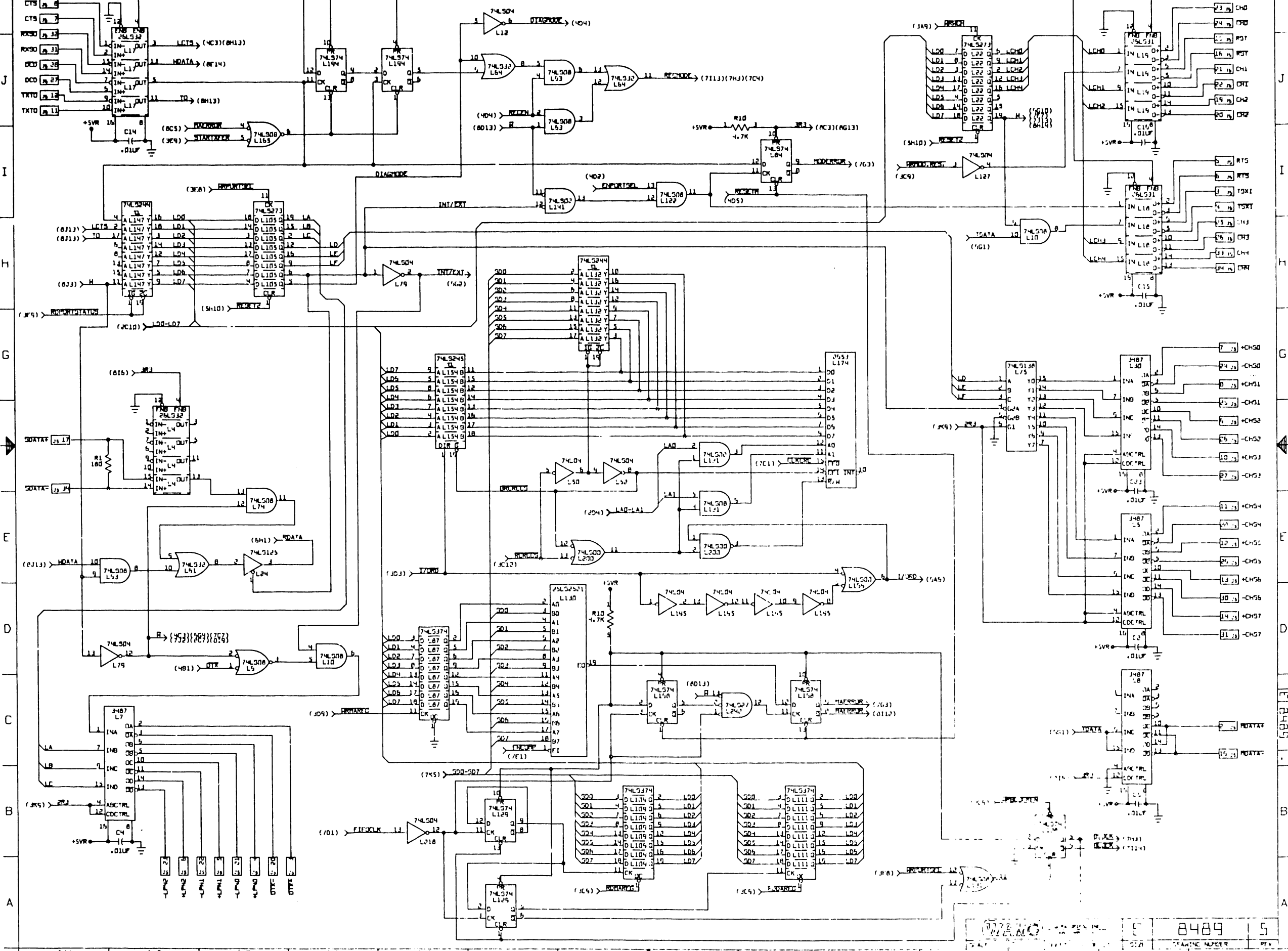
17" 11" 8.5" 11" 8.5" 17"







14 13 12 11 10 9 8 7 6 5 4 3 2 1



14 13 12 11 10 9 8 7 6 5 4 3 2 1

17"

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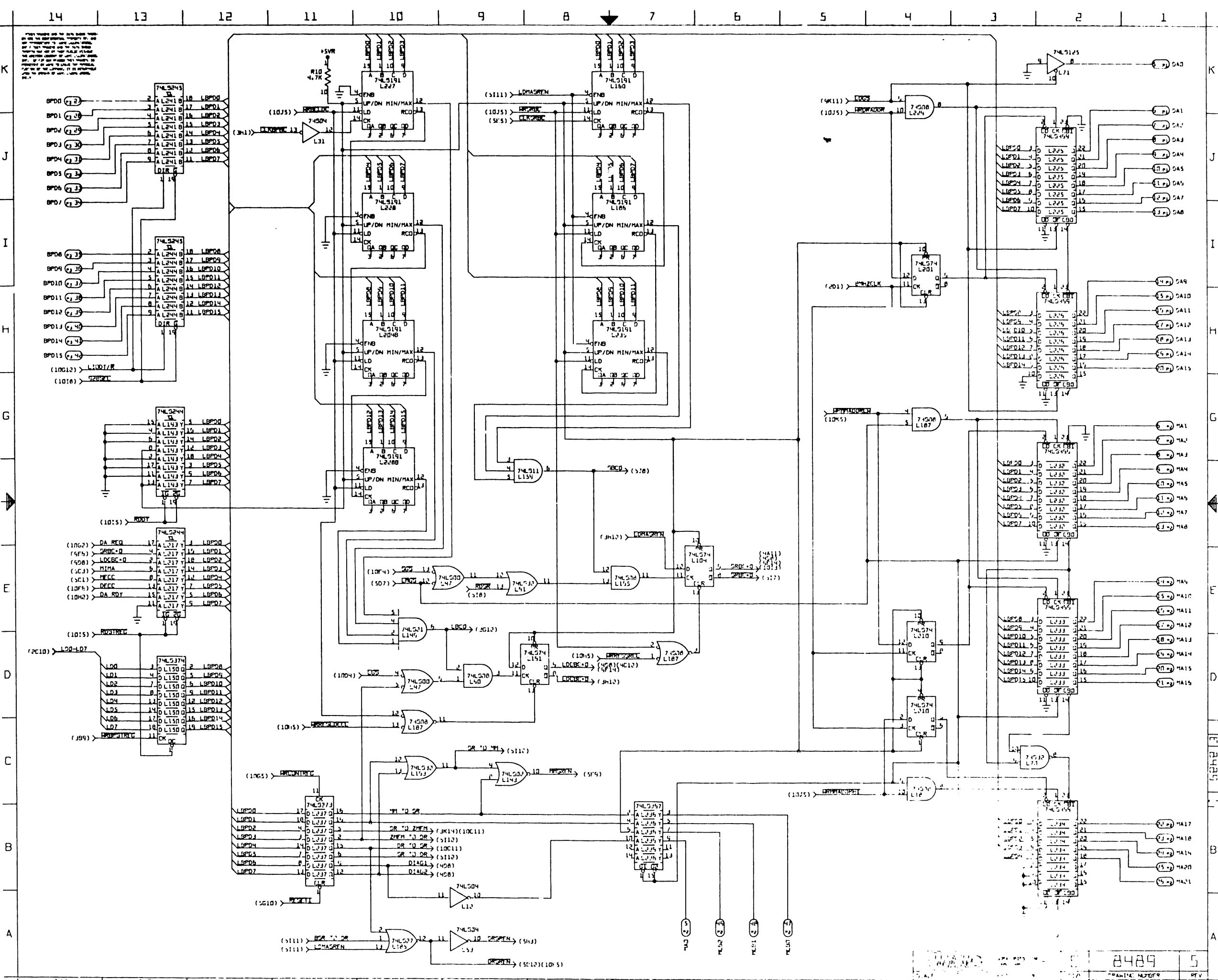
15

WANG

REV

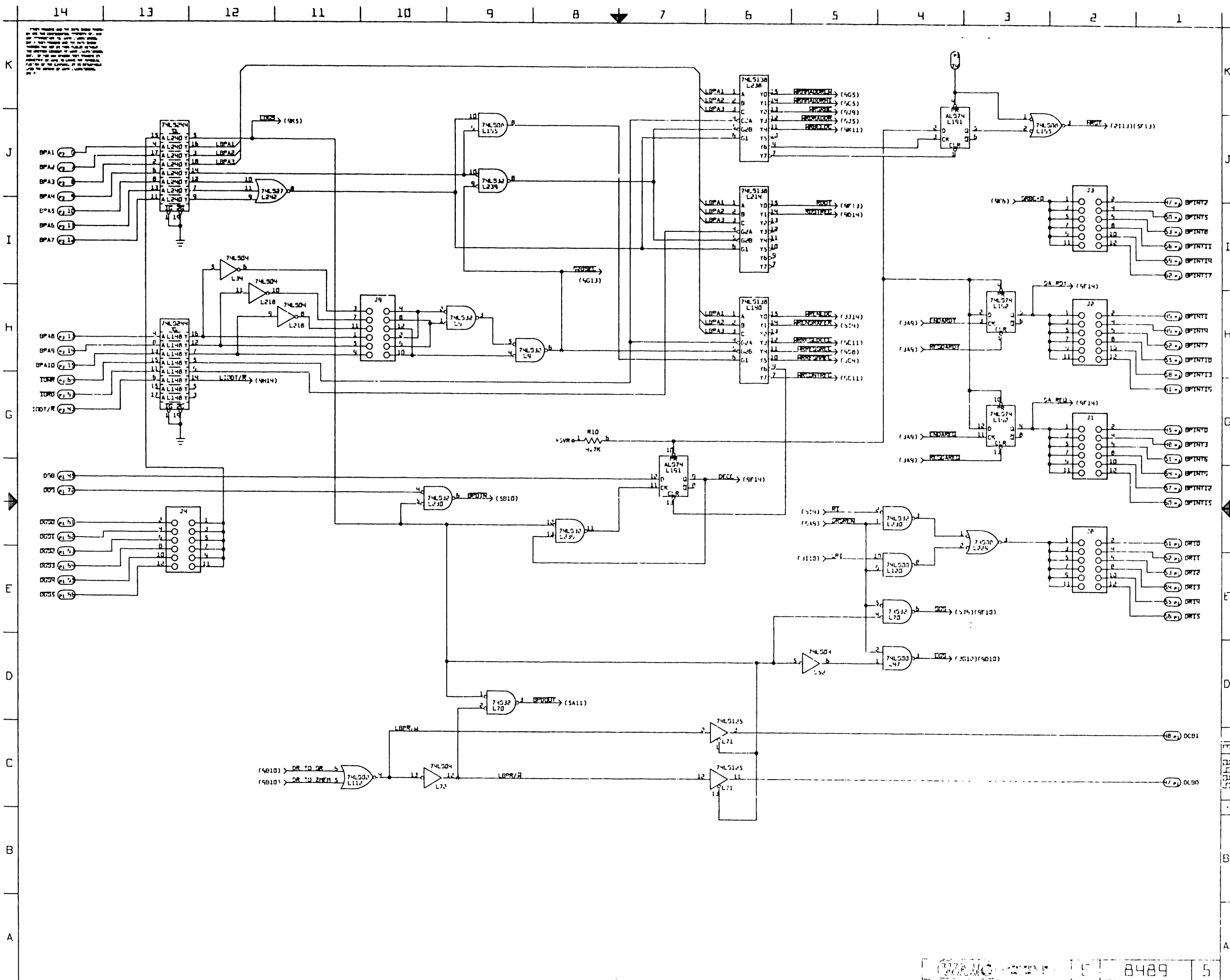


17" 11" 8.5" 8.5" 11" 17"



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17" 11" 8.5" 11" 8.5" 17"

**WANG**

LABORATORIES, INC

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ONE INDUSTRIAL AVENUE, LOWELL, MASSACHUSETTS 01851. TEL (617) 459-5000. TWX 710 343-6769. TELEX 94-7421

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