WANG

6108

VS-5/6 Computer System

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)

Use of the material in this document is authorized only for the purpose stated in the Preface, above.

CUSTOMER ENGINEERING

PUBLICATION UPDATE BULLETIN

TITLE: VS-5E/6E Computer System **DATE:** 10/09/87

This PUB affects: 741-1705
742-1705

Color: Blue

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
1.	1	1
2.	4	4
3.	5	5
4.	6	6
5.	7	7
6.		8
7.		9
8.		10

This page constitutes a permanent record of revisions; place it directly following title page.

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ONE INDUSTRIAL AVENUE LOWELL MASSACHUSETTS 01851 TEL 617 459 5000 TWX 710 343 6769 TELEX 94 7421

CUSTOMER ENGINEERING

PUBLICATION UPDATE BULLETIN

TITLE: VS-5/6 Computer

DATE: 09/23/86

This PUB affects: 741-1705
742-1705

CLASS CODE: 6108

Previous Notice(s): None

REASON FOR CHANGE:

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

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
3.	5-1/2	5-1/2
4.	6-29/30 - 6-35/36	6-29/30 - 6-35/36
5.	6-47/Blank	6-47/Blank
6.	7-15/16 - 7-17/18	7-15/16 - 7-17/18
7.	7-31/32	7-31/32
8.	Nothing	7-32A
9.	8-3/Blank	8-3/4
10.	9-3/4	9-3/4
11.	9-7/8	9-7/8
12.	9-11/12	9-11/12
13.	9-23/24	9-23/24
14.	9-33/34	9-33/34
15.	9-43/44 - 9-45/Blank	9-43/44 - 9-45/Blank
16.	11-5/6	11-5/6
17.	12-5/6 - 12-7/8	12-5/6 - 12-7/8
18.	12-11/12 - 12-13/14	12-11/12 - 12-13/14

	REMOVE FICHE	INSERT FICHE
1.	Fiche 1 - 4	Fiche 1 - 4
2.		

This page constitutes a permanent record of revisions; place it directly following title page.

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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.

SECTION 1 INTRODUCTION

SECTION 2 IDENTIFICATION

SECTION 3 CONTROLS AND INDICATORS

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SECTION 1

INTRODUCTION

SECTION 1

INTRODUCTION

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

ABBREVIATION/SYMBOL	DEFINITION
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

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

IDENTIFICATION

LIST OF ILLUSTRATIONS

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

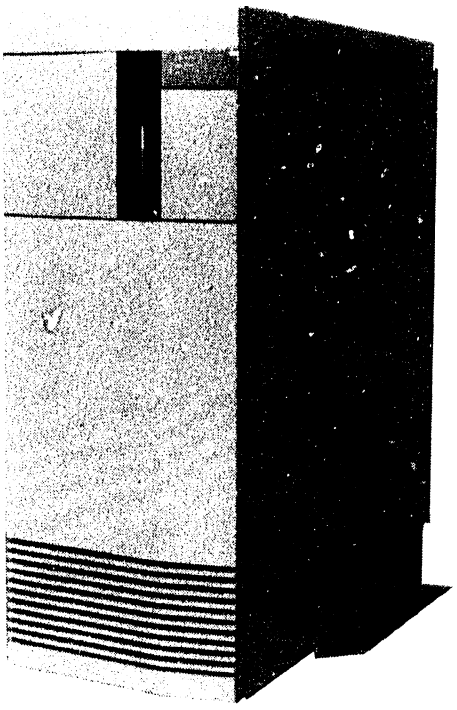

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Figure 2-1. VS-5/6 Major Components

2.2 VS-5 MAJOR PARTS

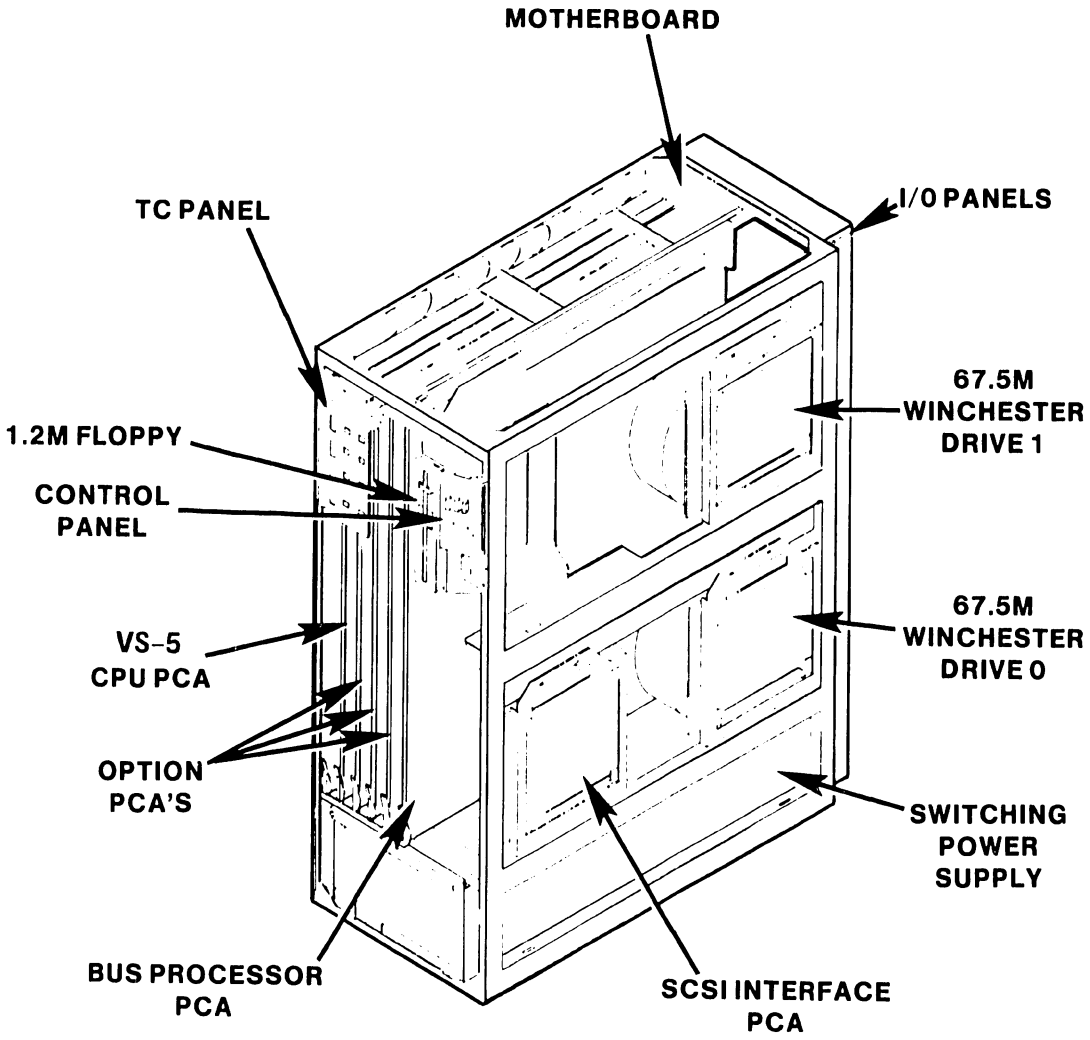


Figure 2-2. VS-5 Computer Major Components

2.3 VS-6 MAJOR PARTS

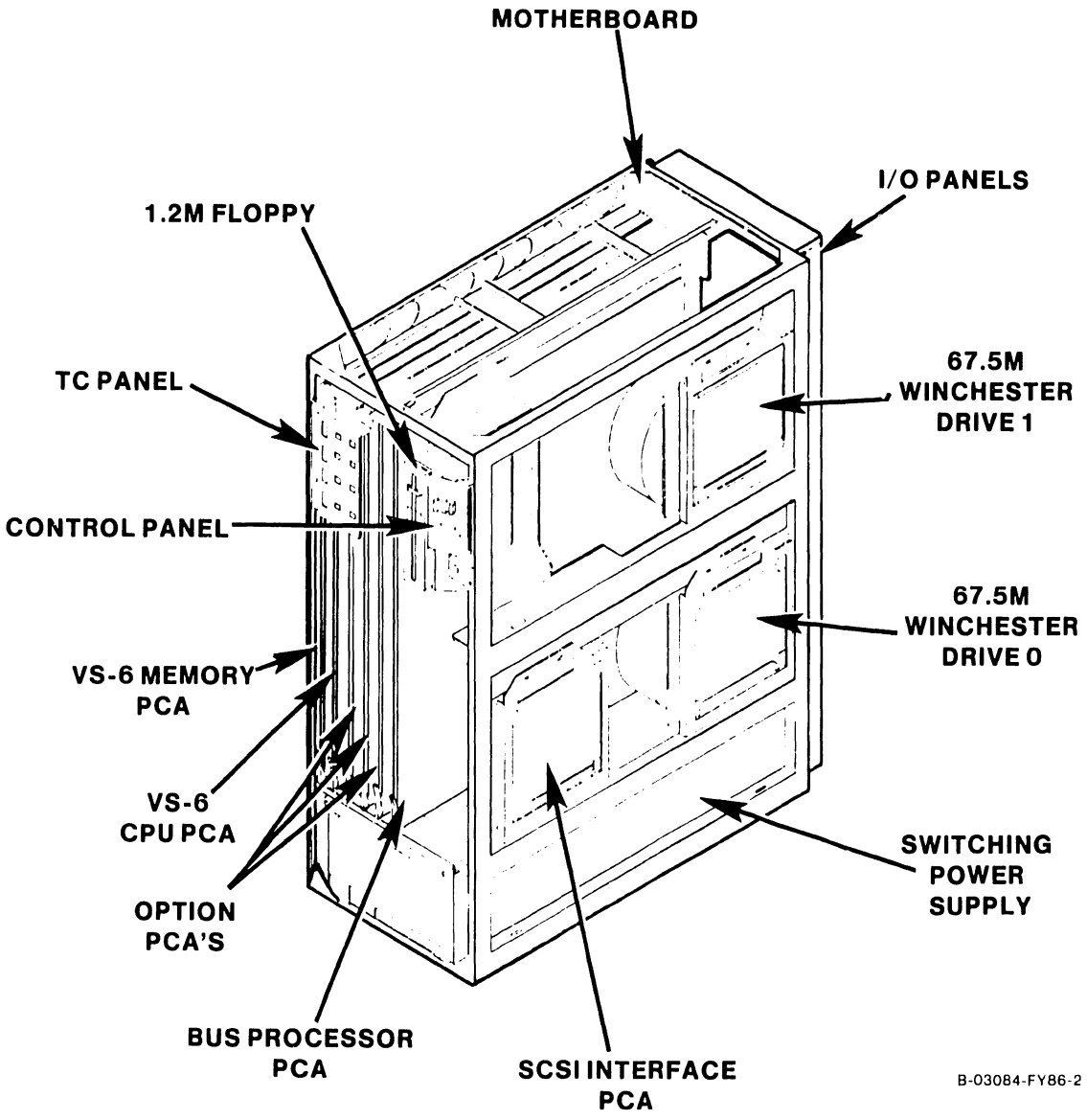


Figure 2-3. VS-6 Computer Major Components

SECTION 3

CONTROLS AND INDICATORS

SECTION 3

CONTROLS AND INDICATORS

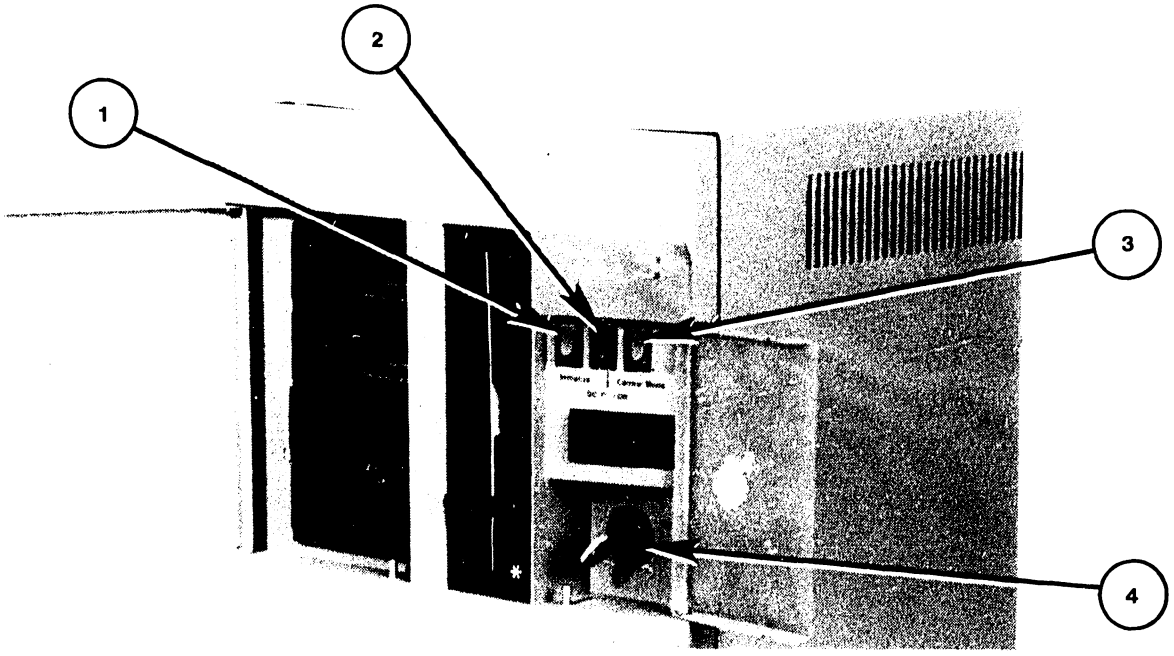
SECTION 3

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.



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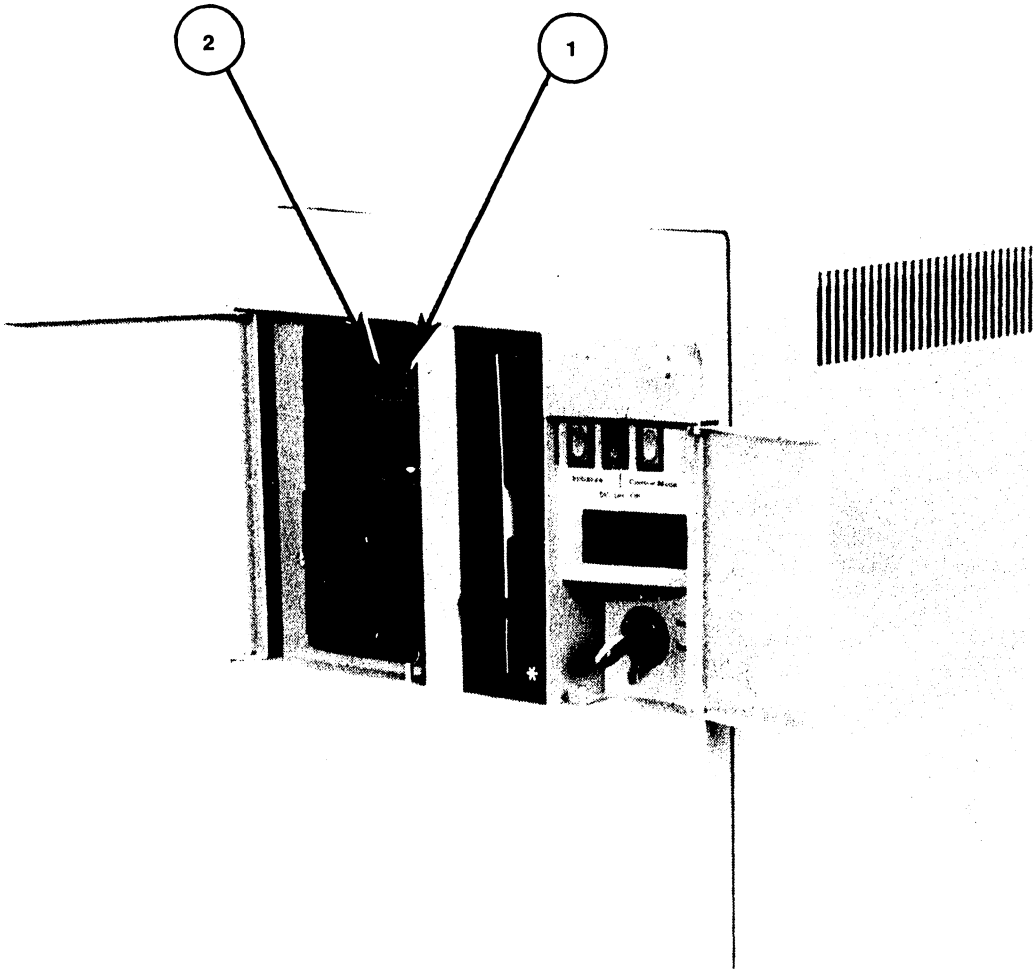
Item	Name	Type and Function
1	Initialize Switch	Pushbutton switch; Red, pressing switch IPLs system and resets system clock.
2	DC Power-On Switch	Pushbutton switch; Black, depressing switch applies DC power to system. Pressing switch again removes DC power from system.
3	Control Mode Switch	Pushbutton 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.

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.



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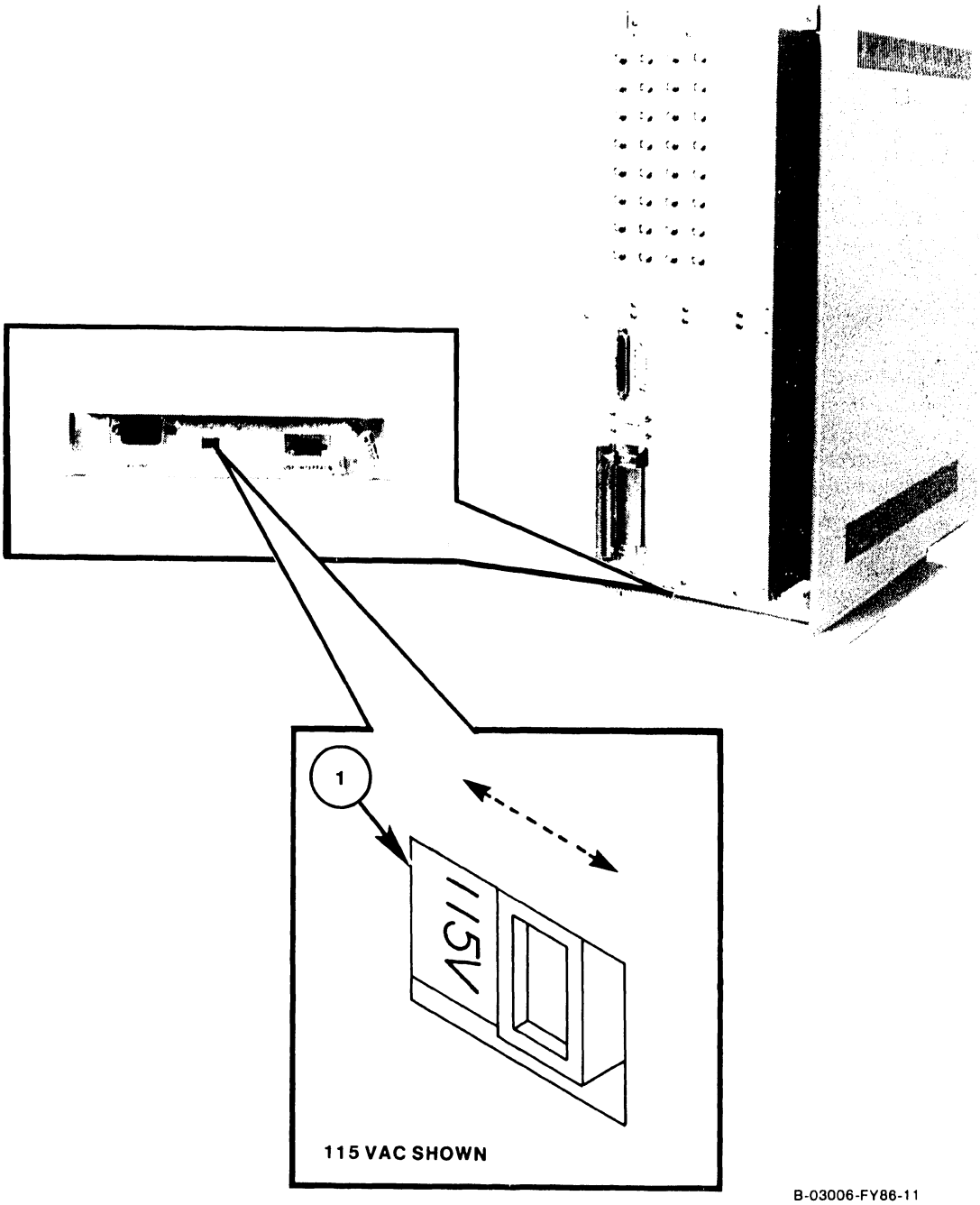
Item	Name	Type and Function
1	TC Disconnect Switch	Recessed Pushbutton Switch; When pressed clears TC DA Data Terminal Ready signal.
2	Clear Switch	Recessed Pushbutton Switch; When pressed generates a TC DA power-up reset state.

3.1.3 VS-5/6 REAR PANEL CONTROLS



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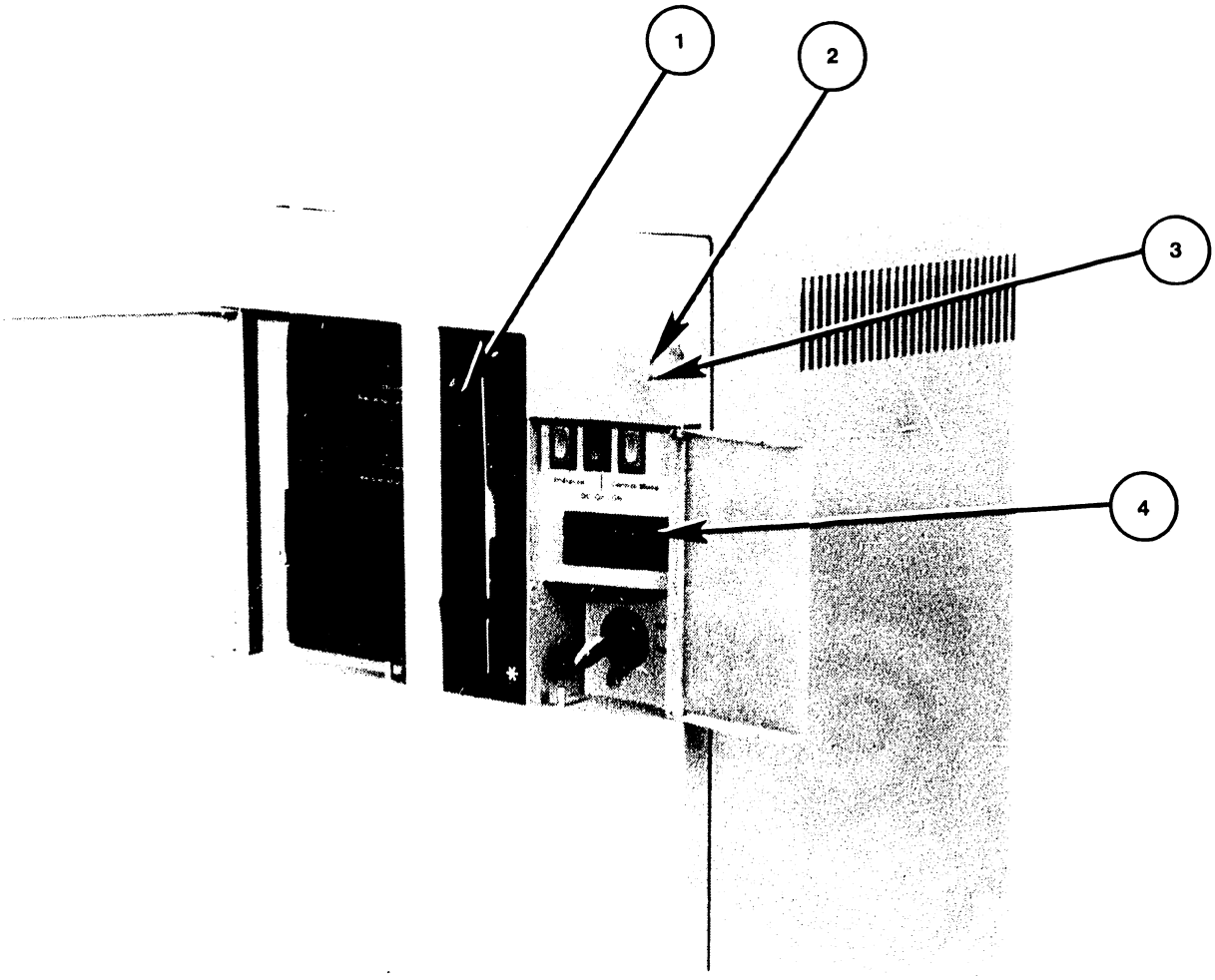
Item	Name	Type and Function
1	Voltage Select Switch	Slide-type switch; selects ac operating voltage of 115V or 230V, determined by available line voltage (switch shown in 115V position).

3.2 VS-5/6 OPERATOR INDICATORS

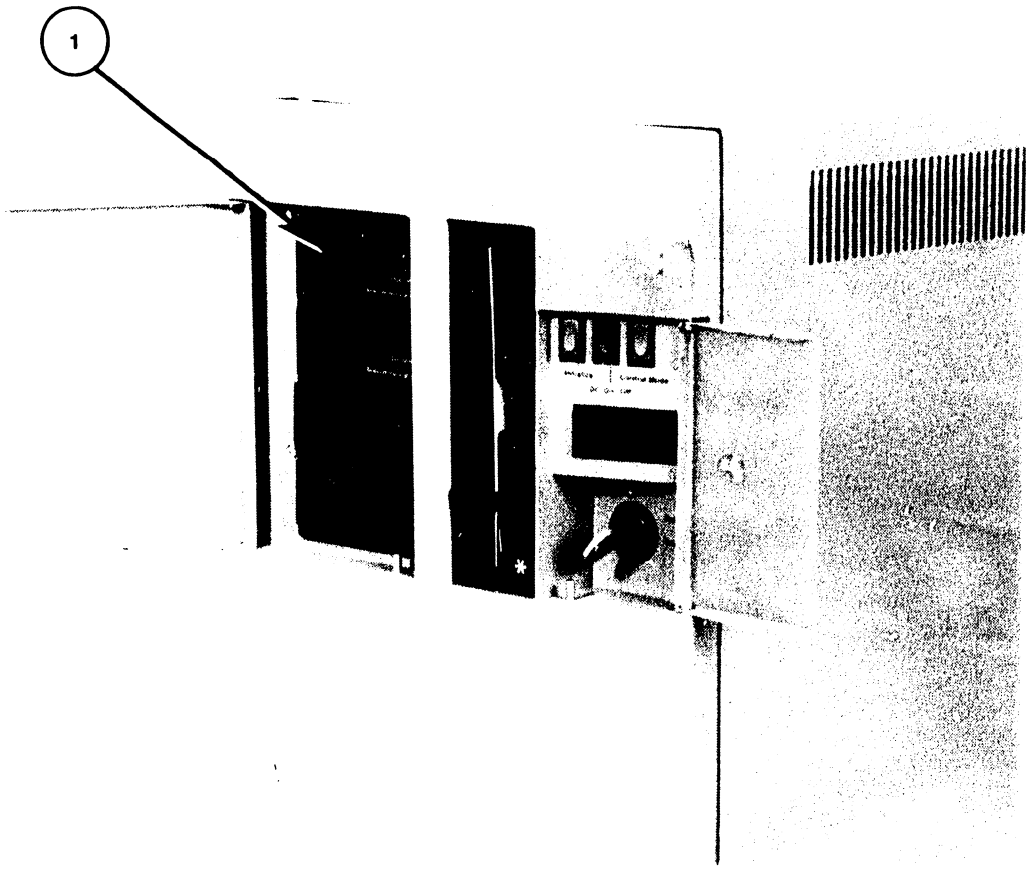
3.2.1 FRONT PANEL INDICATORS



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.

3.2.2 TC PANEL INDICATCRS



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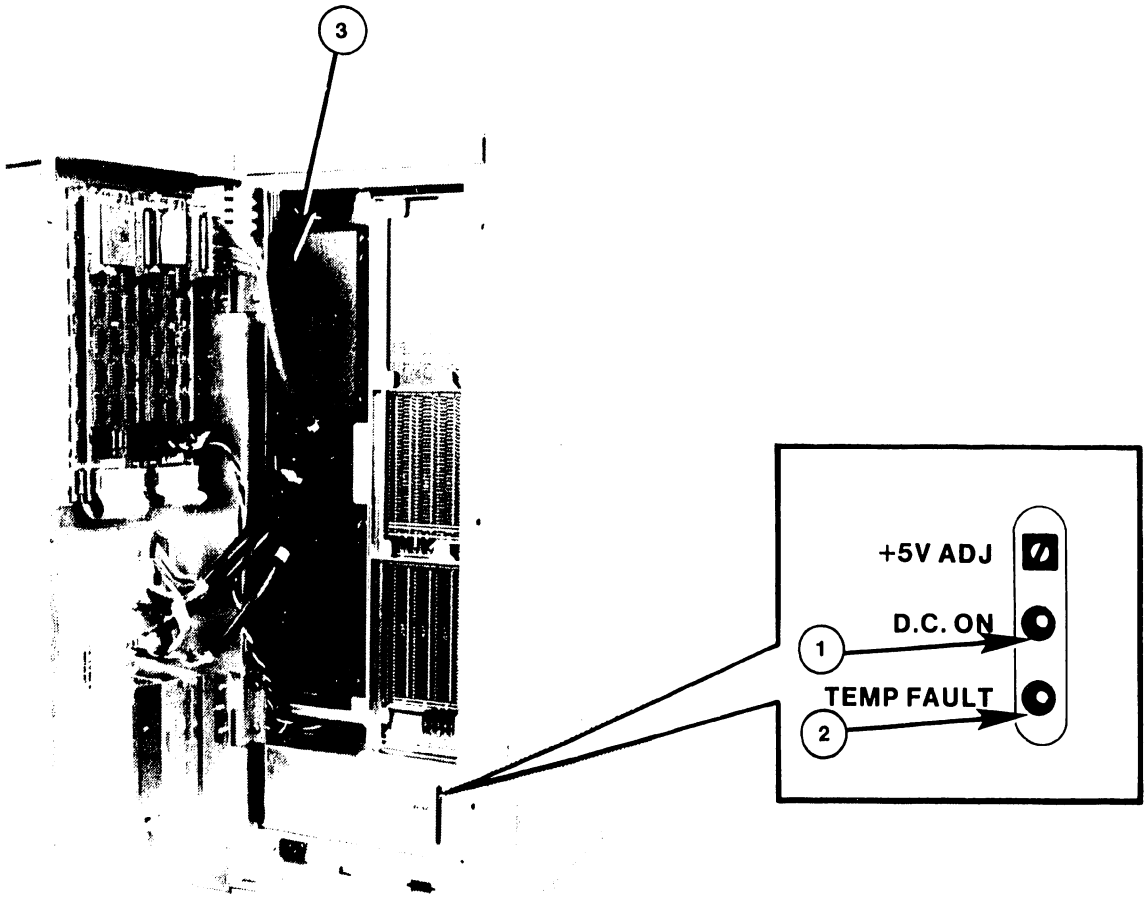
Item	Name	Type and Function
1	TC Activity LEDs	Eight LEDs, Red, The LEDs defined below are valid only during running of TC protocols.
	LED 1	Illuminates to indicate Receive Data (RXD).
	LED 2	Illuminates to indicate Transmit Data (TXD).
	LED 3	Illuminates to indicate Clear-to-Send (CTS).
	LED 4	Illuminates 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.

3.2.3 POWER SUPPLY/WINCHESTER DRIVE INDICATORS (Inside Bulkhead)

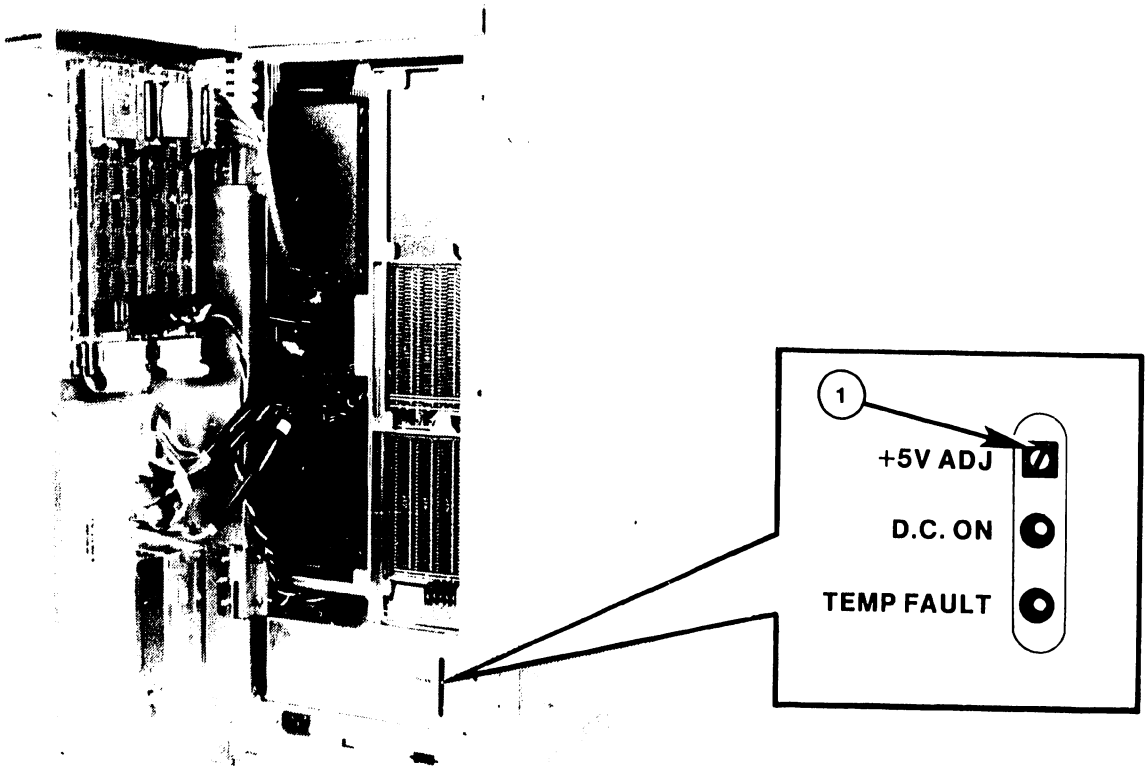


B-03006-FY86-2

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.

3.3 VS-5/6 SERVICE CONTROLS

3.3.1 POWER SUPPLY CONTROLS



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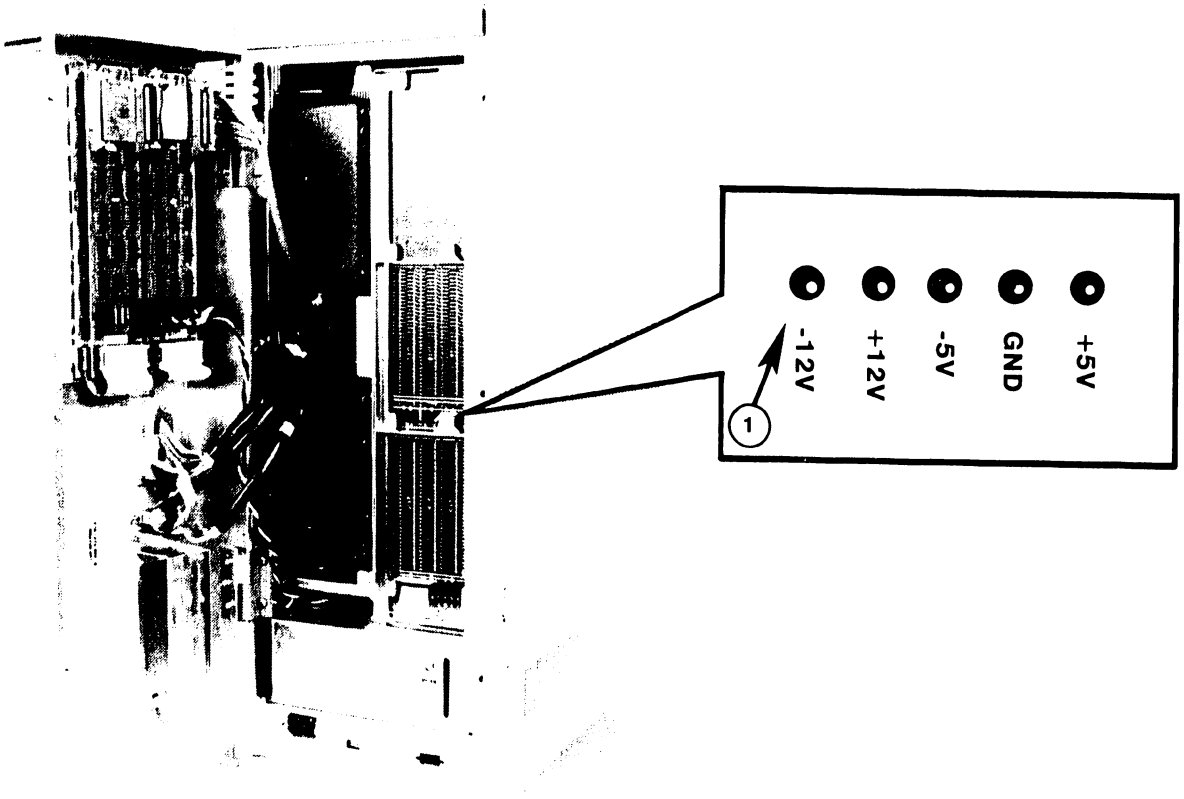
Item	Name	Type and Function
1	+5V ADJ	Potentiometer; adjusts +5 Vdc.

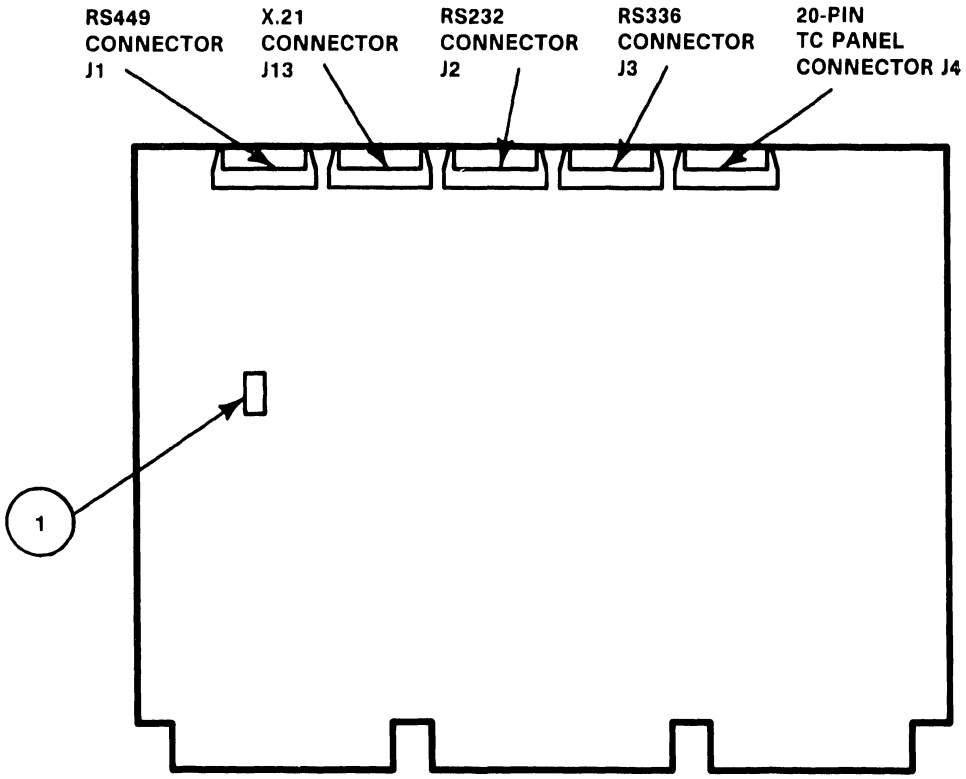
3.3.2 MOTHERBOARD TEST POINTS



B-03006-FY86-4

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

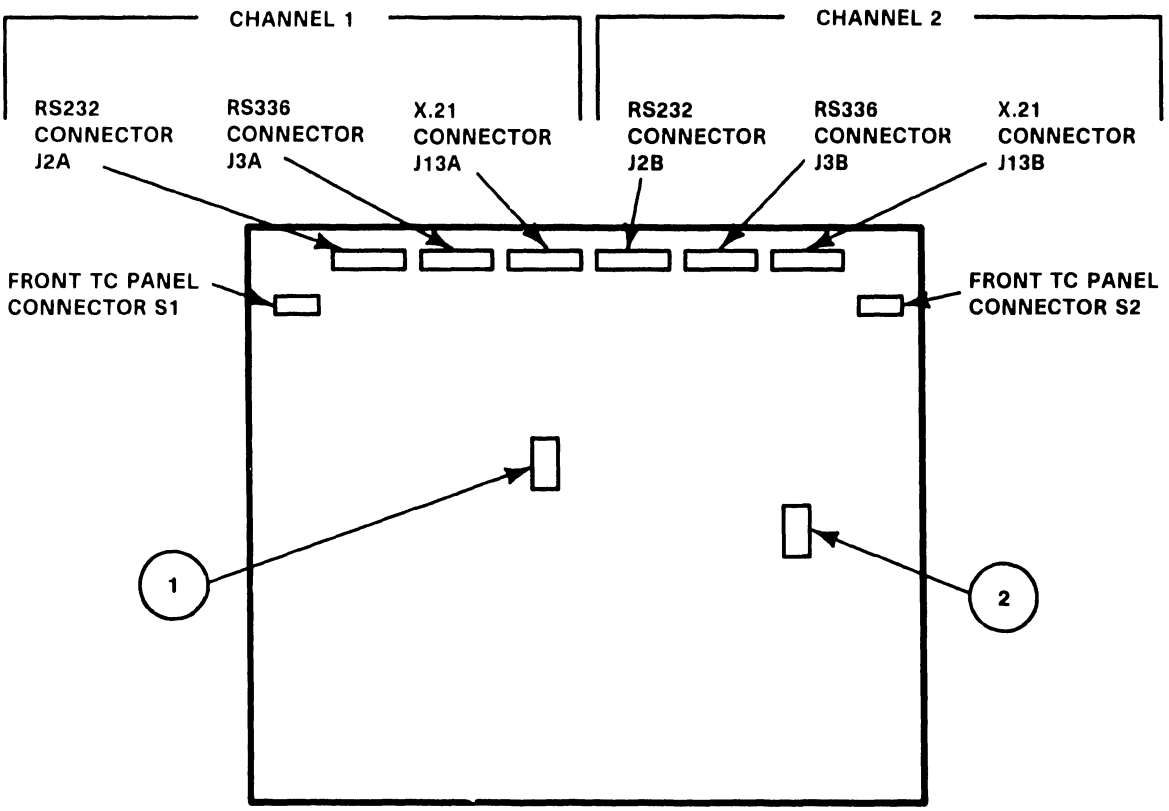
3.3.3 1-PORT TC DA CONTROLS



B-03006-FY86-16

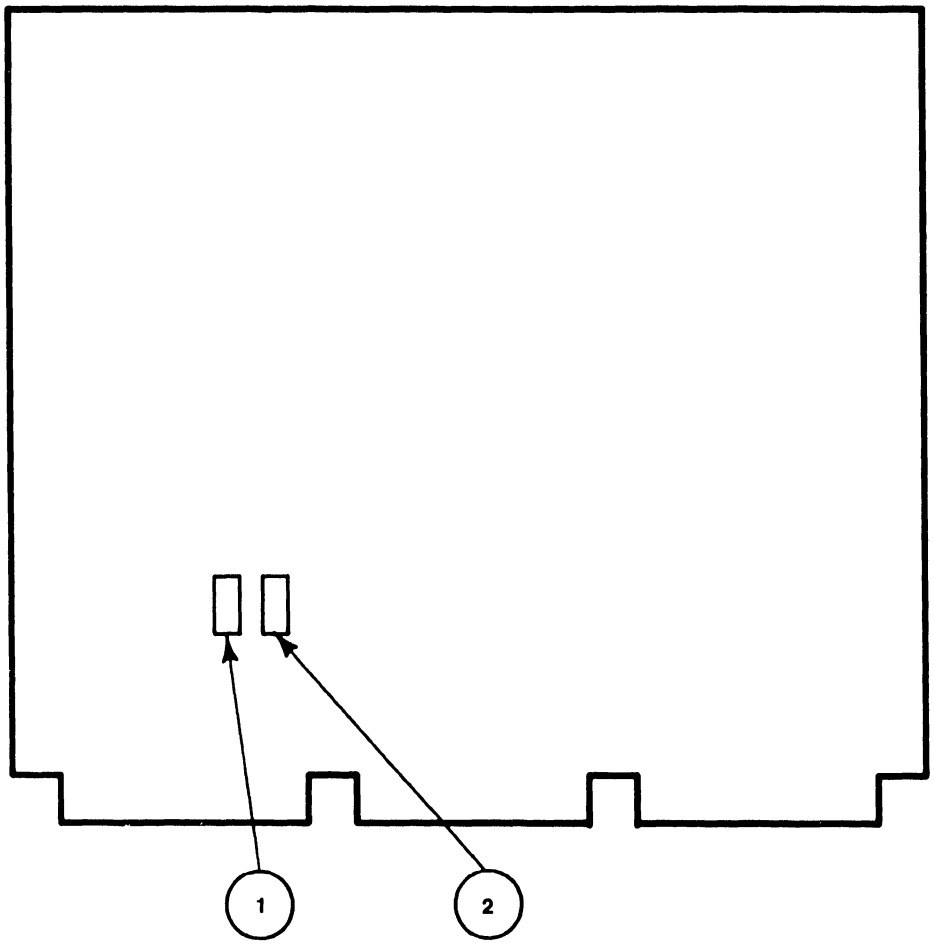
Item	Name	Type and Function
1	Telecommunications Mode Select Switch SW1	Rocker-type 8-bit switch bank; selects different diagnostic tests and X.21 support. Refer to paragraph 7.3.7

3.3.4 2-PORT TC DA CONTROLS



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.

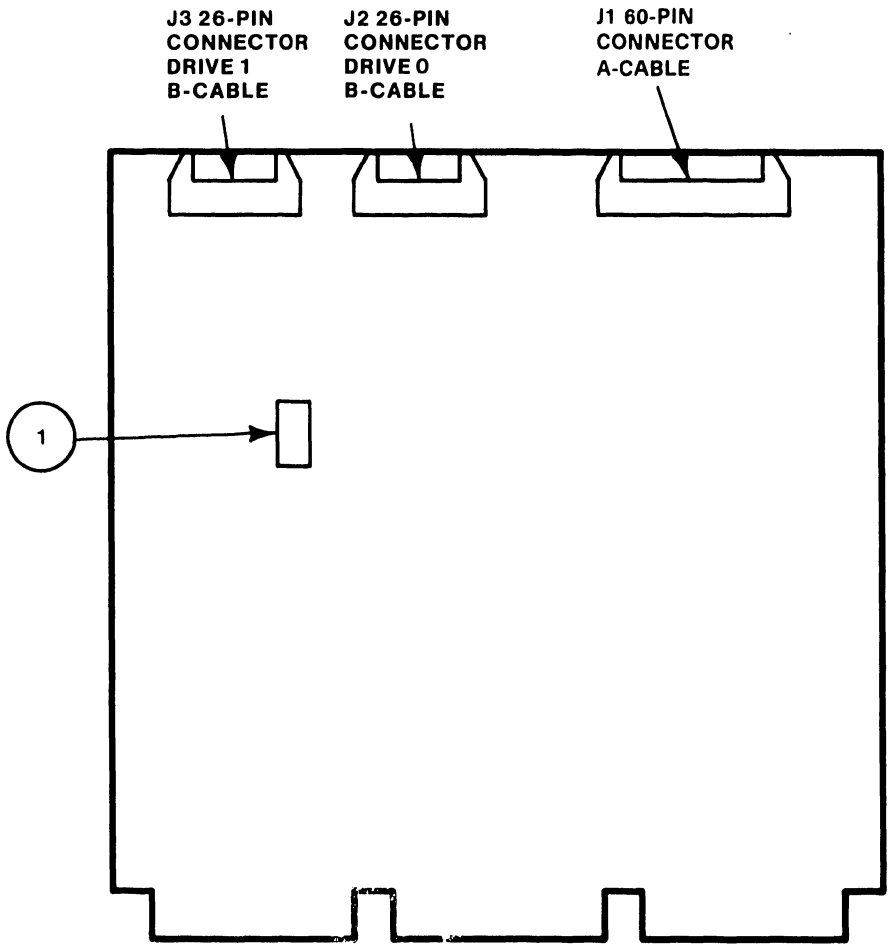
3.3.5 BUS PROCESSOR (BP) CONTROLS



B-03006-FY86-18

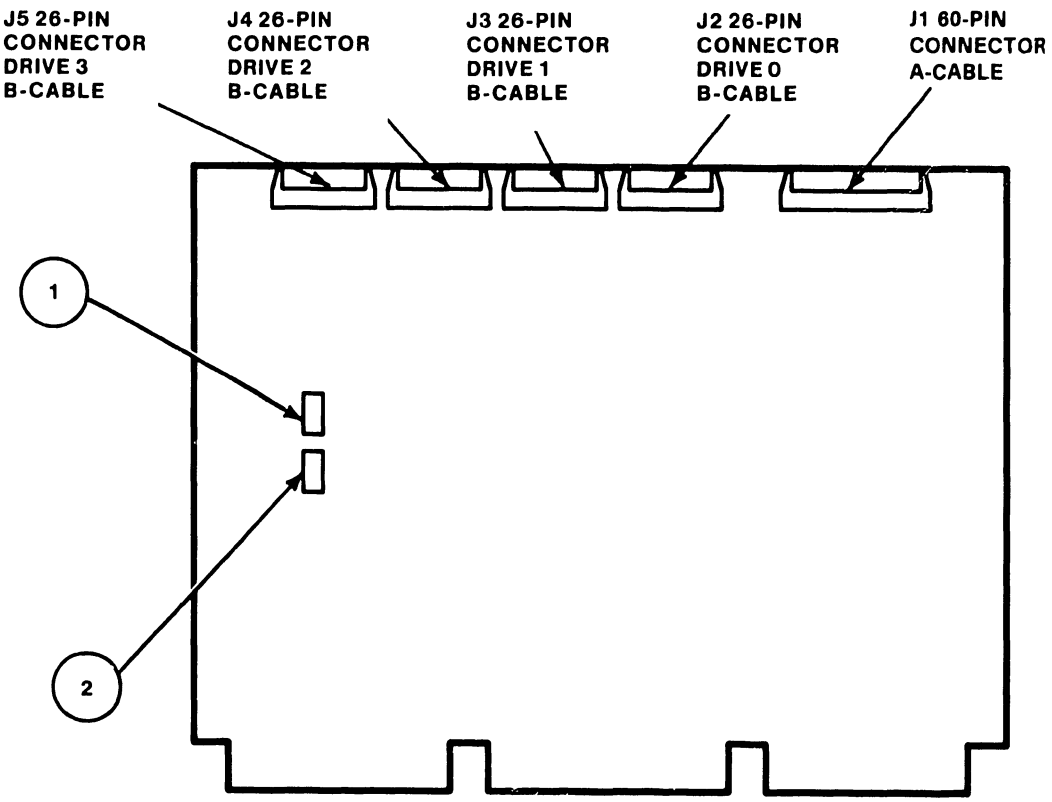
Item	Name	Type and Function
1	WS0 Location/Control Mode Select Switch SW1	Rocker-type 8-bit switch bank; selects different IPL Control and BIT test. Refer to para. 7.3.2.
2	Drive-Type/SCSI Device ID Select Switch SW2	Rocker-type 8-bit switch bank; selects diskette drive-type and SCSI Device ID. Refer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

3.3.6 SMD 2-PORT BOARD CONTROLS



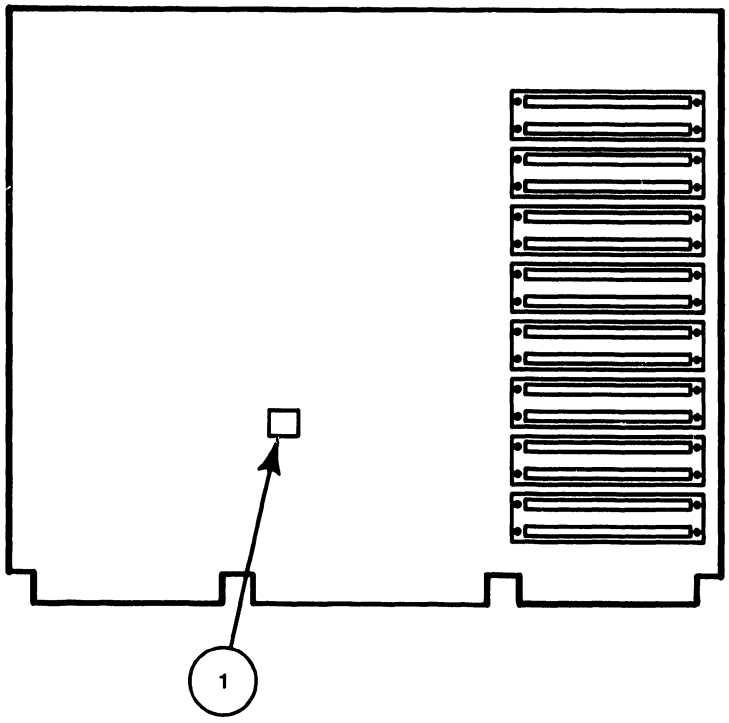
Item	Name	Type and Function
1	Drive-Type/Port Select Switch SW1	Rocker-type 8-bit switch bank; selects external drive-type for one of two ports. Switches Sw1-Sw4 select Drive 1 (port 1), Switches Sw5 -Sw8 select Drive 2 (port 2). Refer to paragraph 7.3.5.

3.3.6 SMD 4-PORT BOARD CONTROLS



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.

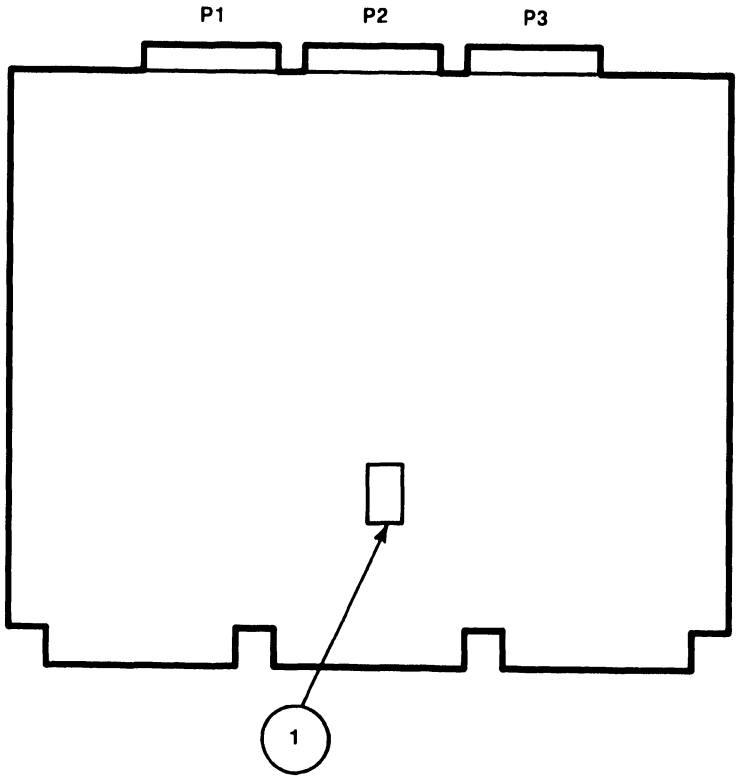
3.3.8 VS-5 CPU/MEMORY BOARD CONTROLS



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.

3.3.9 VS-6 CACHE MEMORY BOARD CONTROLS

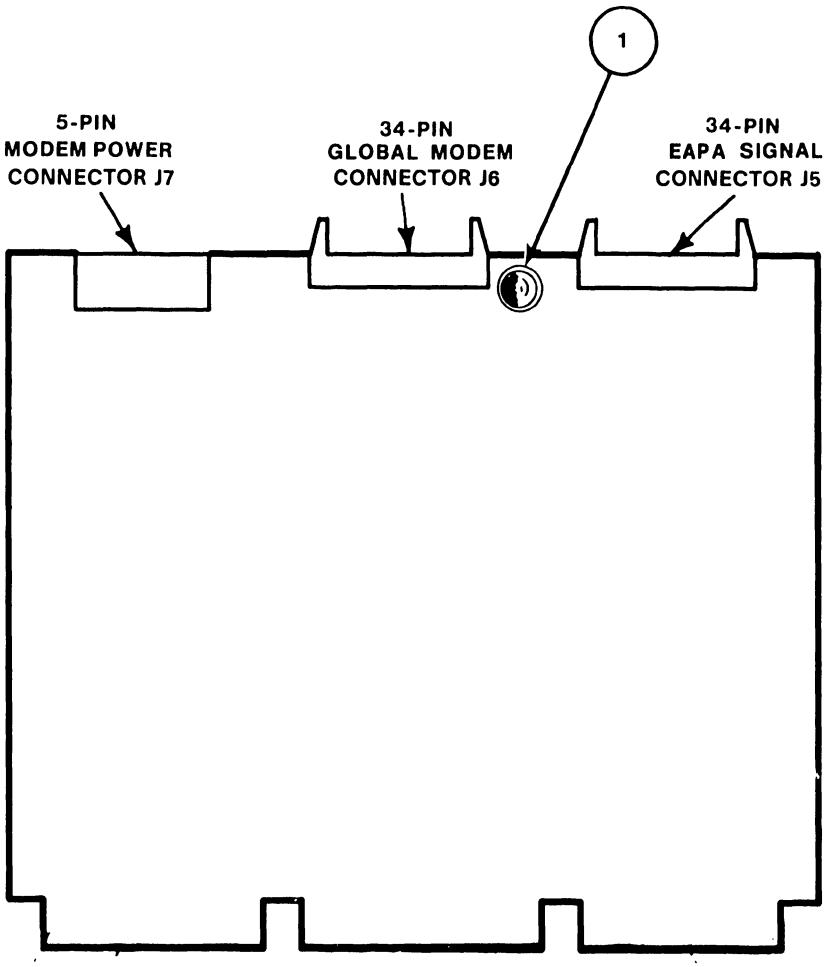


B-03006-FY86-14

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.

3.4 SERVICE INDICATORS

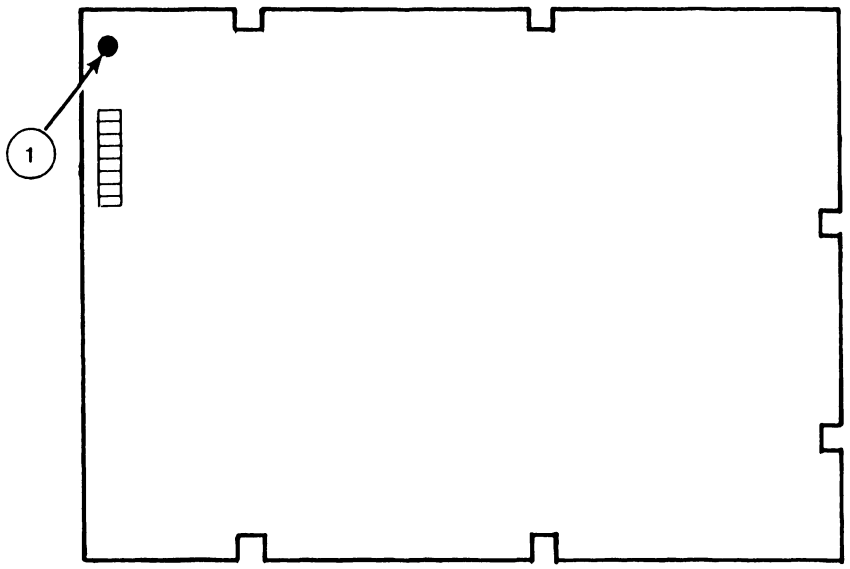
3.4.1 UISIO BOARD INDICATOR



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



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

SECTION 4 OPERATION

SECTION 4

OPERATION

LIST OF ILLUSTRATIONS

SECTION 4

OPERATION (Cont'd)

LIST OF TABLES

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.

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. Coping 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

                    COMMFILE = ■■■■■■■■
                    COMMLIB  = @SYSTEM@

Inhibit Logons at all workstations?              LOGONS = NO
```

Figure 4-3. SYSGEN Screen

10) Enter another valid configuration file name in the filed '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 WS0 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              *
*     WW    WW     WW       AAAAAAAAA     NN   N  N   NN    GG    GGGG      *
*      WW  WWWW  WW         AA     AA     NN    N 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

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                  (11)  Enter OPERATOR Mode
   (3)  Show PROGRAM Completion Report         (12)  Submit PROCEDURE

   (4)  Manage QUEUS                           (13)  Send MESSAGE to Operator
   (5)  Manage FILES/Libraries                 (15)  PRINT Command Screen
   (6)  Manage DEVICES                         (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            1st
     Address   PDA     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).

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                              Model VS□
          28V01   BP/SCSI DA          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:
                                    (9) Valid Devices   (16) Return
(12) Shift devices up/down          (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                    - [redacted]
                    Physical Device Address (PDA)  - [redacted]

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

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.

```
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                    - [redacted]
Physical Device Address (PDA)  - [redacted]

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.

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                    Specify Volume Label
(c) Copyright 1985, 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 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

Parameter	Entry
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 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.
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 coping 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

PREVENTIVE MAINTENANCE

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.

Action	Section
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.

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

SECTION 6

TROUBLESHOOTING

LIST OF ILLUSTRATIONS

LIST OF TABLES

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

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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION

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
	BP OS GENERATED ERROR CODES
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
	SCSI ERROR CODES
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 is 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	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
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

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

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, PIosw2	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, PIosw2, 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, PIosw2, 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

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

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

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

ERROR CODE	ERROR NAME	ERROR LOC.	ROUTINES ERROR 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

ERROR CODE	ERROR CODE DESCRIPTION
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)

ERROR CODE	ERROR CODE DESCRIPTION
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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
		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]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	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	Medi 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

TEST	ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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

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

TEST	ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
	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

TEST	ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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.

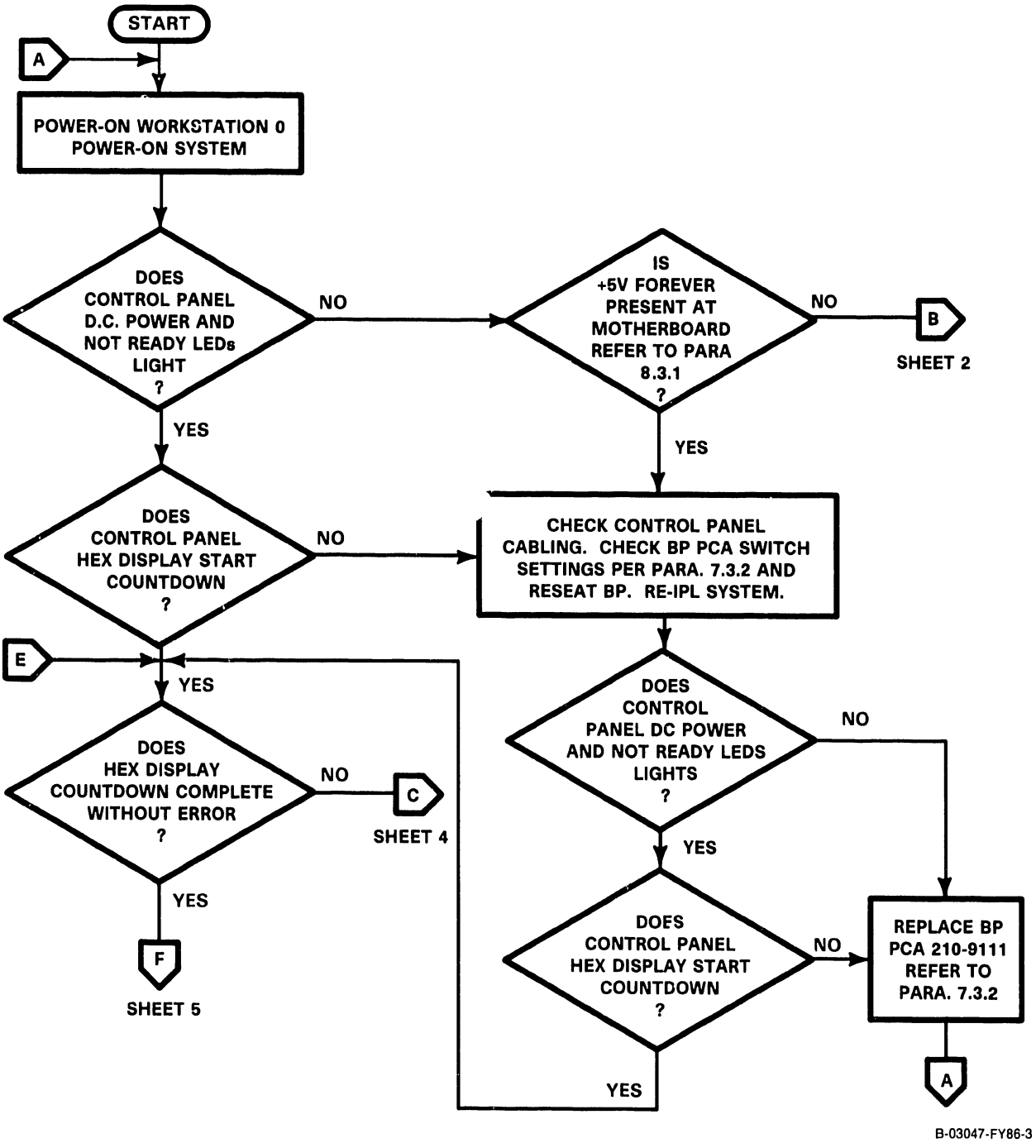


Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 1 of 6)

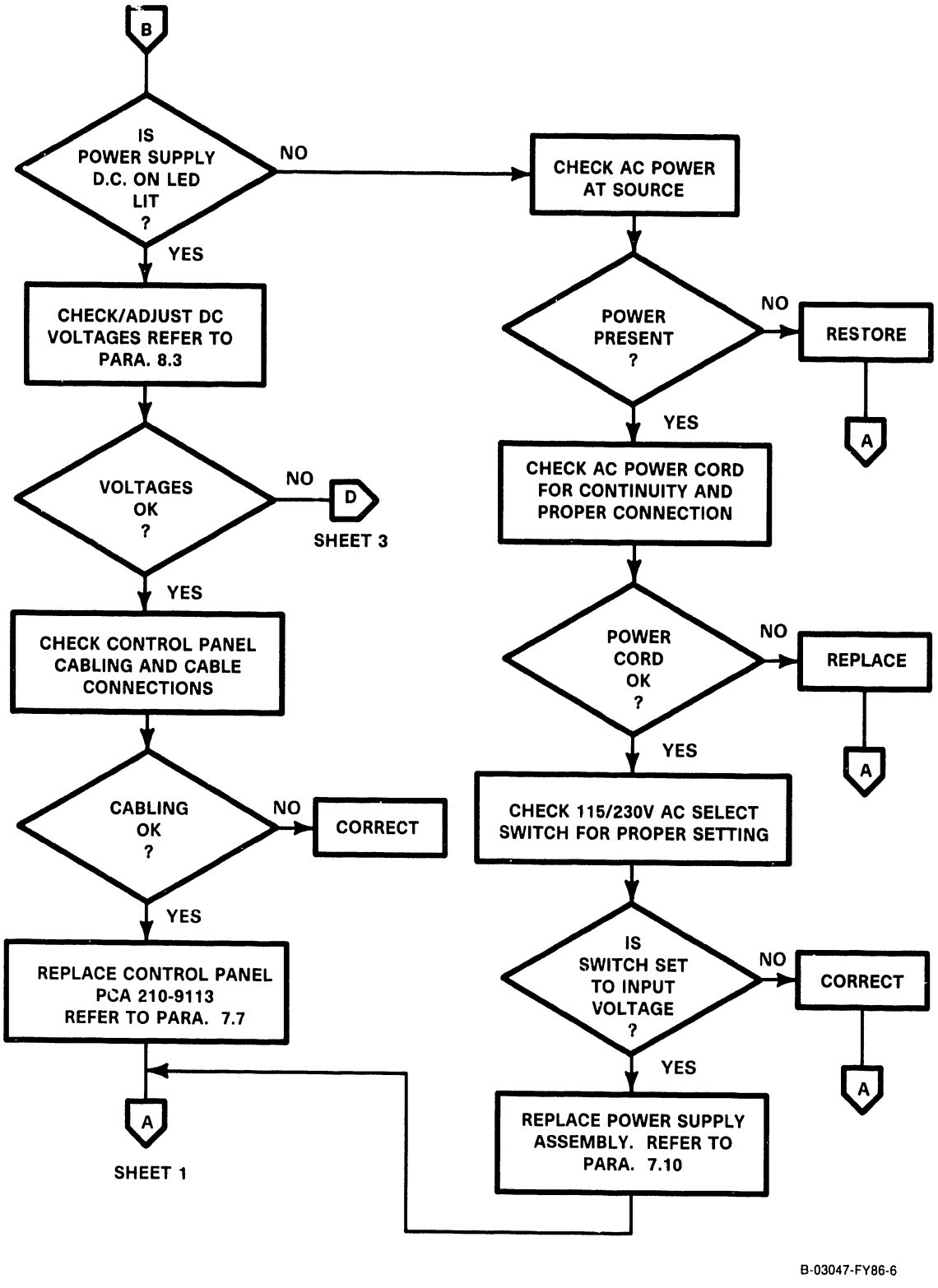


Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 2 of 6)

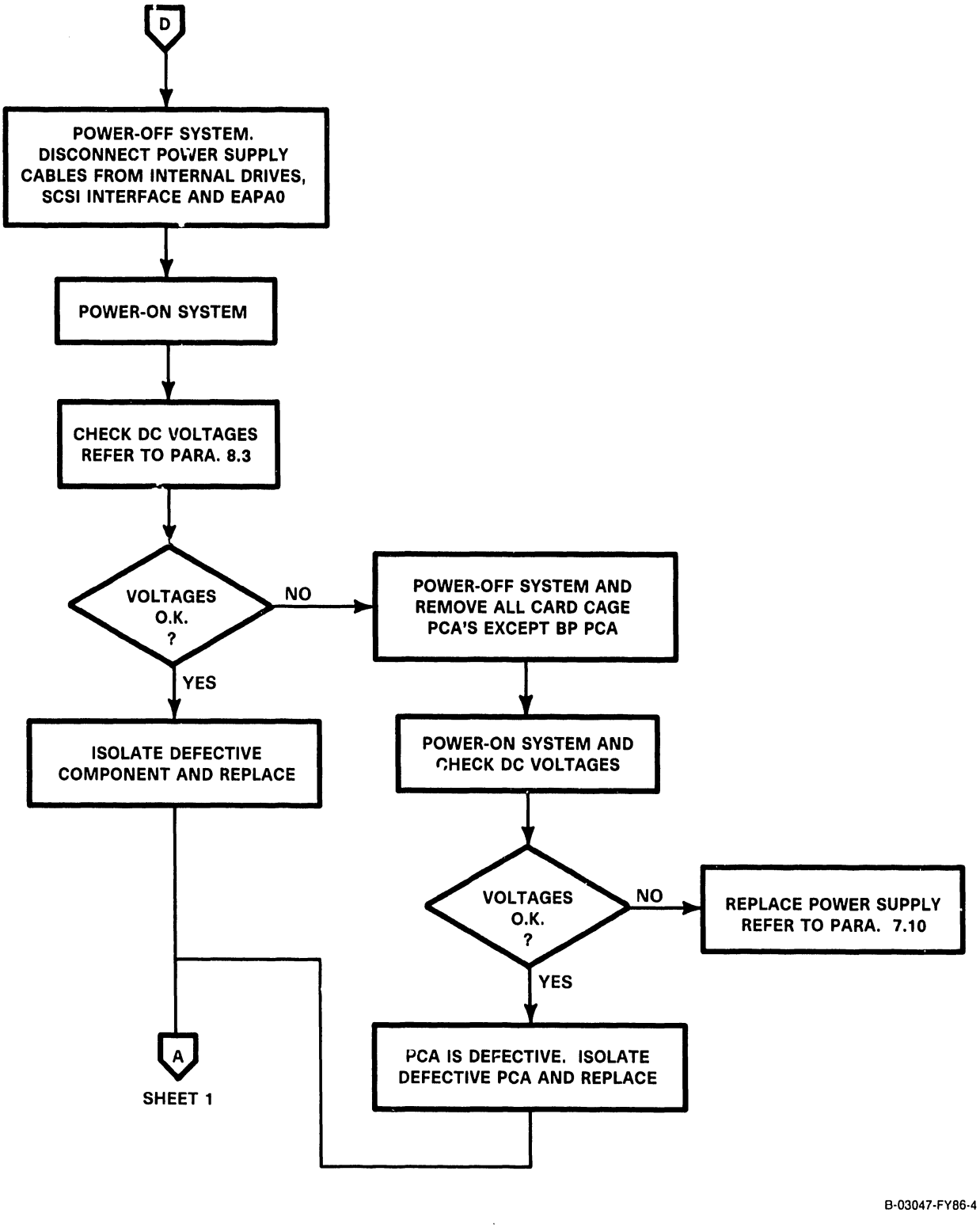


Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 3 of 6)

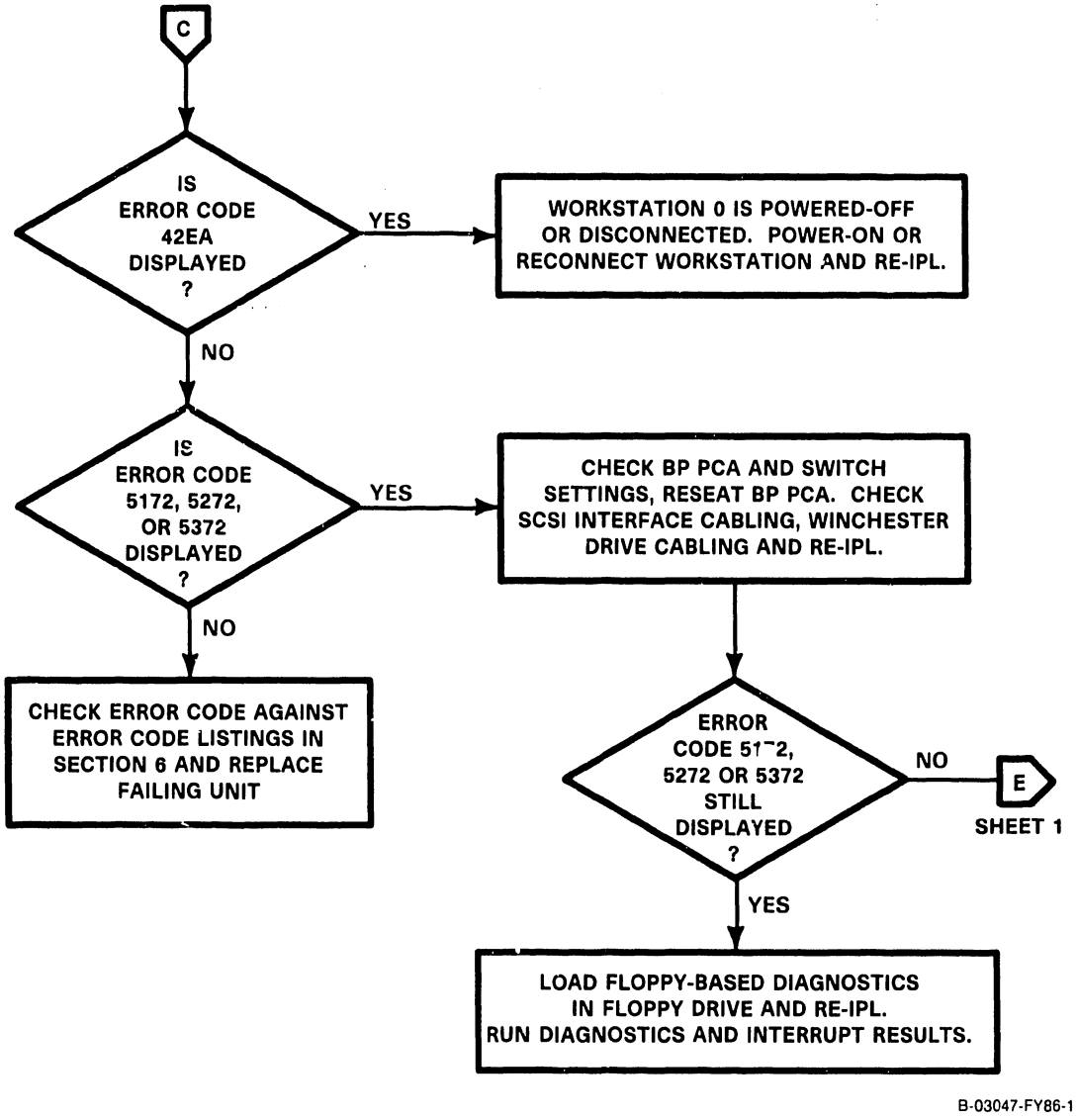


Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 4 of 6)

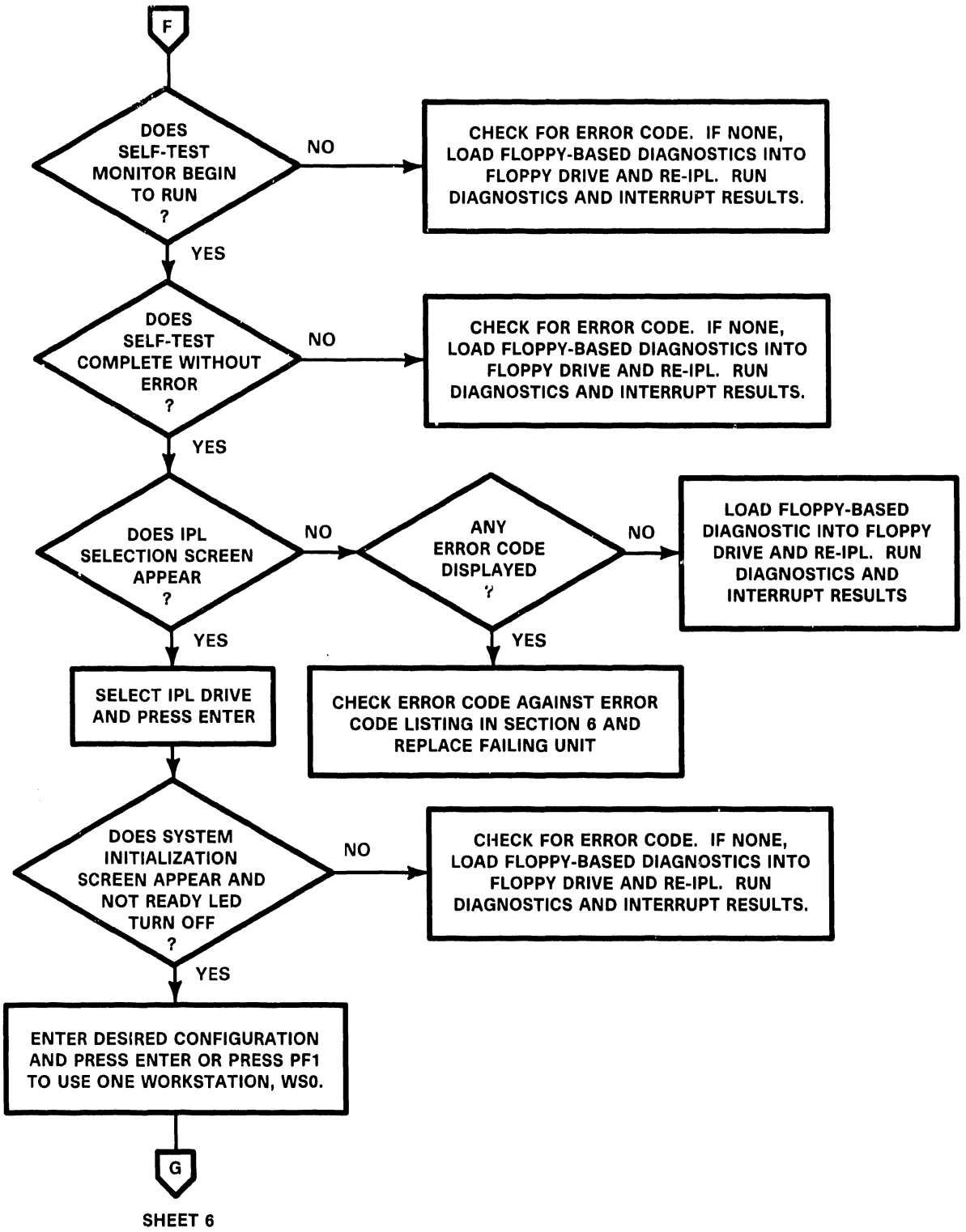


Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 5 of 6)

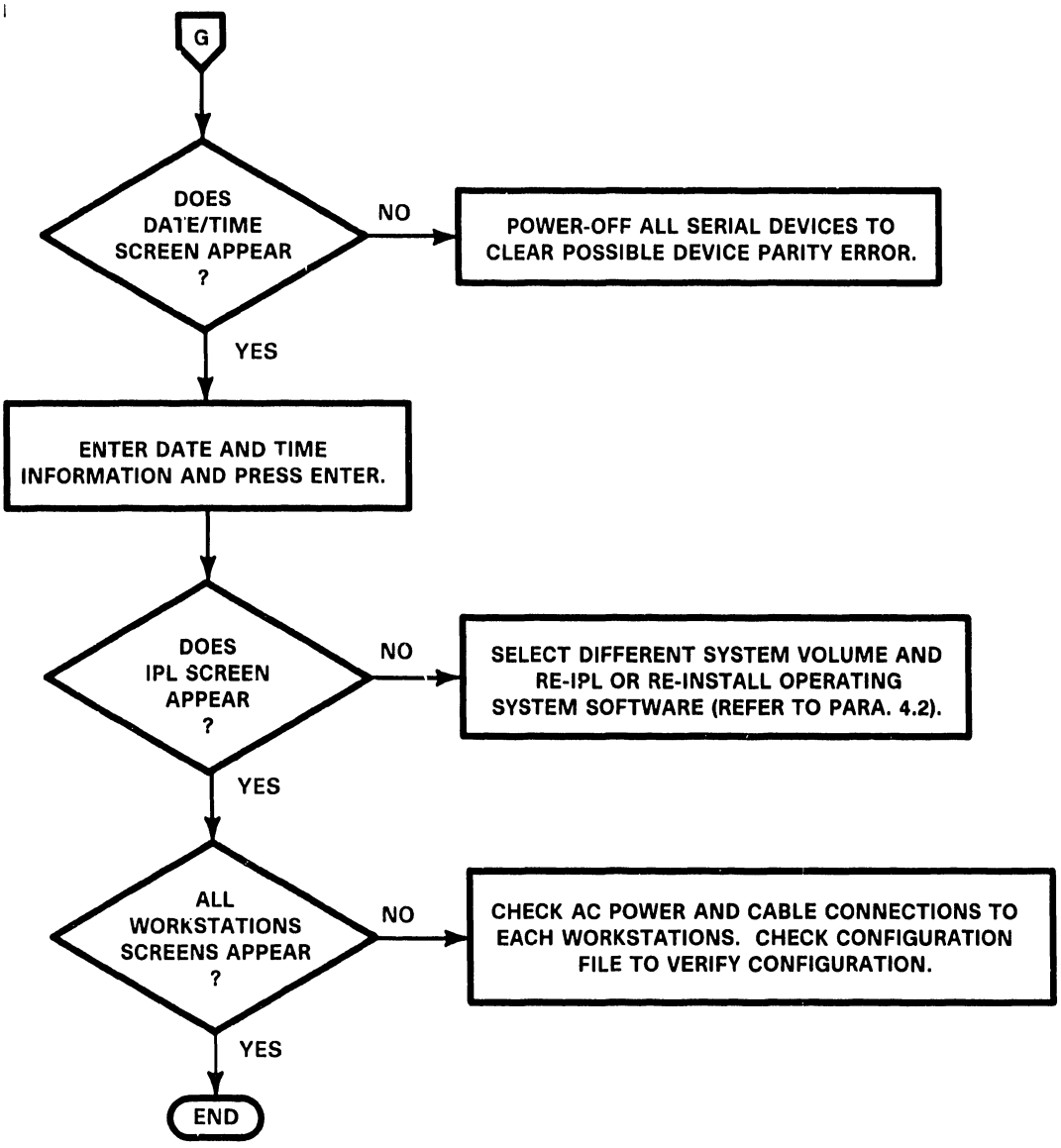


Figure 6-1. VS-5/6 Troubleshooting Flowchart (Sheet 6 of 6)

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 of 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

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	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'

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	CX10C0	CPU Tester (CP5)	No

'DIAGB'

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	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

6.6.2 VS-6 TEST CONFIGURATIONS

VS-6 test configurations are as follows:

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

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 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

Test Configuration for 5.25" Double Sided High Density Floppy Disks

'DIAGA'

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

'DIAGB'

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	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:

```
                    VS-5/6 Diagnostic Package Version R2631

  (1) = Error Loop     (4) = Program Loop      (7) = Step    (16) = Exit
  (2) = Routine Loop   (5) = Pause            (10) = Clear all Settings
  (3) = Stop on Error                         (13) = Display Error Log

Program Name: R1610 ADP CP7 Control Memory Diag   Error Count:          = 00000
Routine Name:                                     Routine Loop Count    = 00000
Error Code =                                      Program Loop Count    = 00000
Program Status: Test in Progress                  Monitor Pass Count    = 00002


  Messages:
```

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

6.6.4.1 Run-Time Selection Screen Commands and Function Keys

Key	Command	Description
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

Descriptor	Description
PROGRAM NAME	The name of the Program currently being executed. A program name consists of one or more test routines.
ROUTINE NAME	The name ot 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

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.

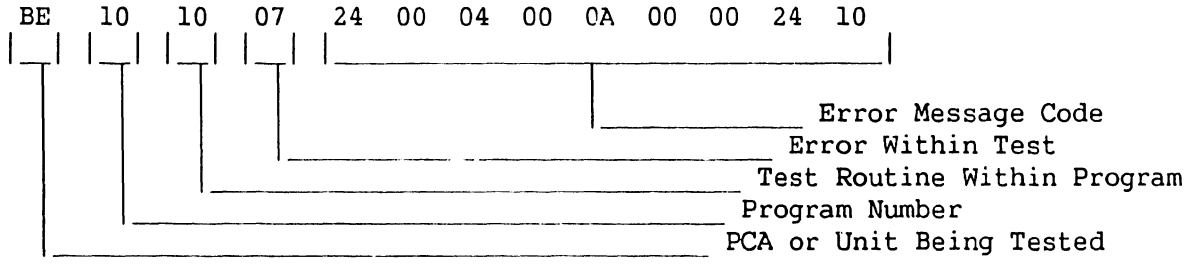
8) If no error is detected, press the PF16 key to return to the Diagnostic Monitor Program Selection screen. Press PF16 again to terminate and return to the IPL Drive Selection screen.

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:



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

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 section 6.4 VS-5/6 Monitor Error Codes.

SECTION 7 REPAIR

SECTION 7

REPAIR

SECTION 7 (CON'T)

REPAIR

LIST OF ILLUSTRATIONS

SECTION 7 (CON'T)

REPAIR

LIST OF ILLUSTRATIONS (CON'T)

LIST OF TABLES

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.

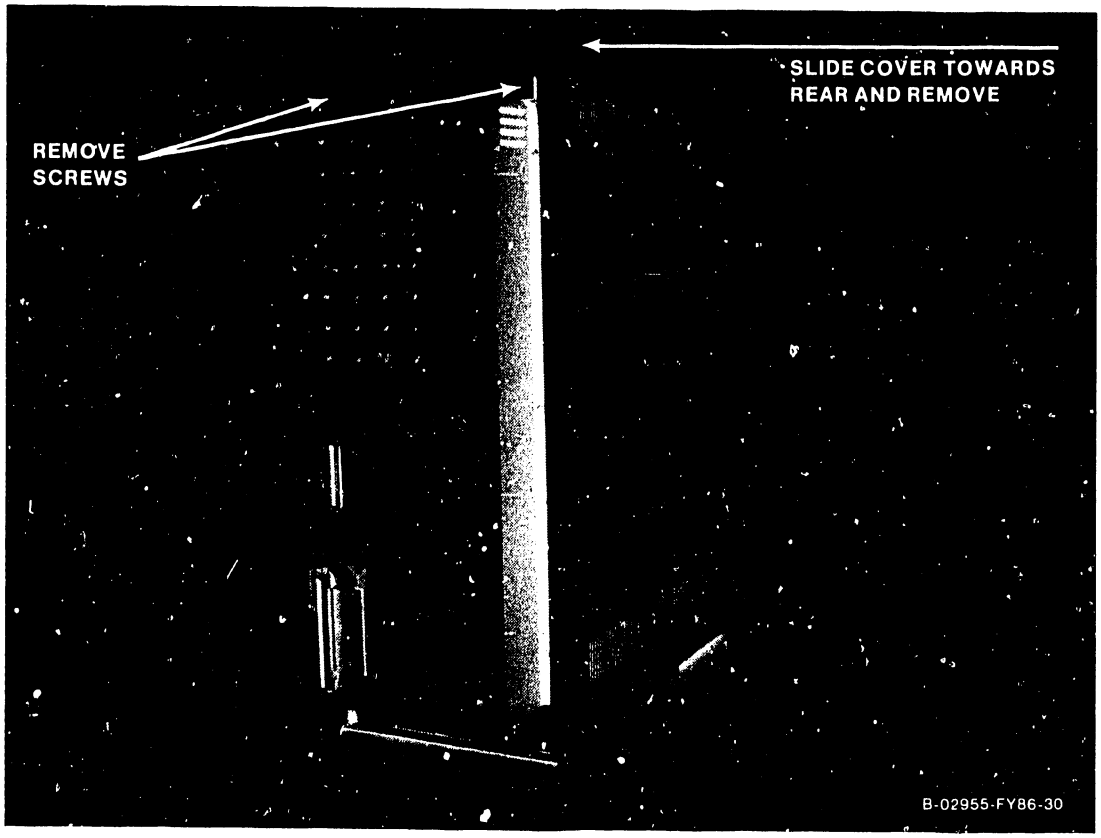


Figure 7-1. Top Cover Removal

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.

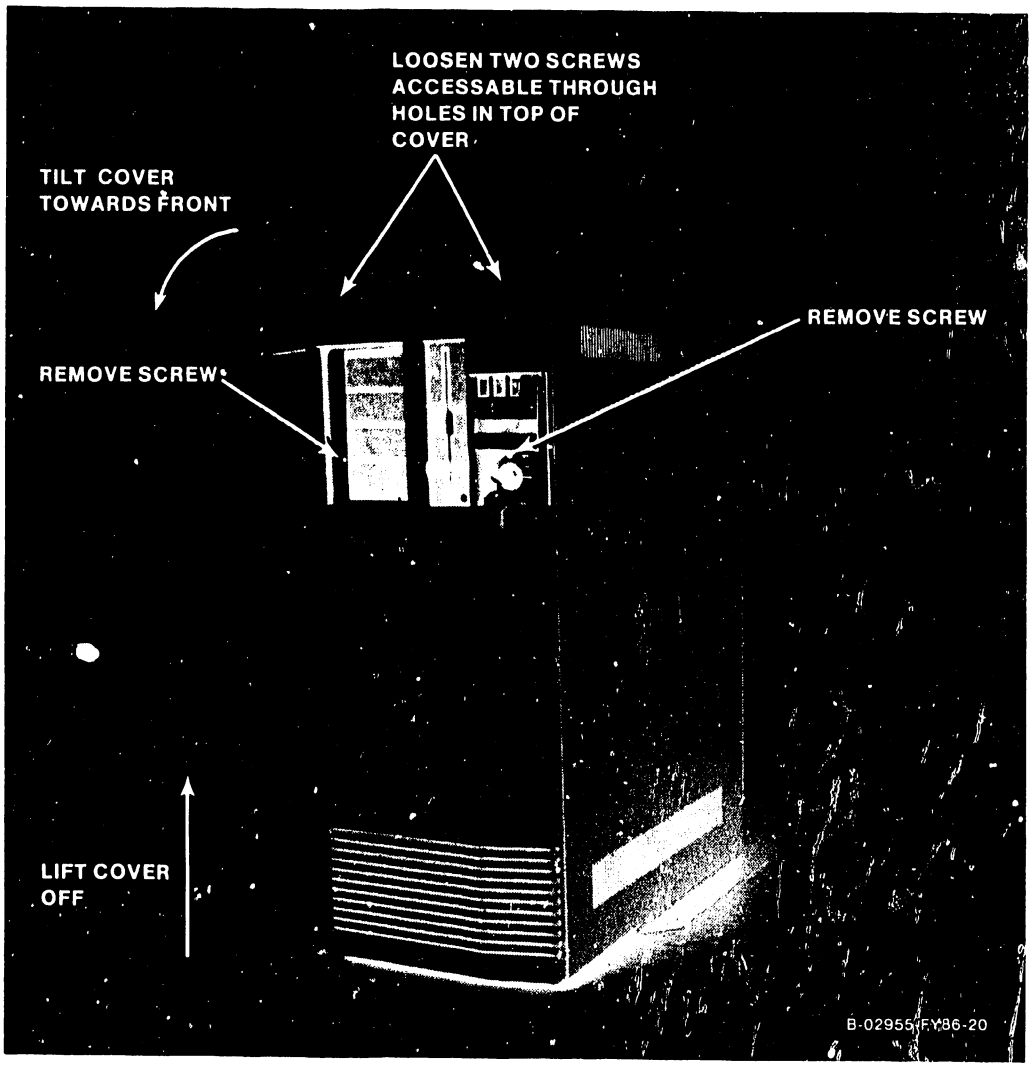


Figure 7-2. Front Cover Removal

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.

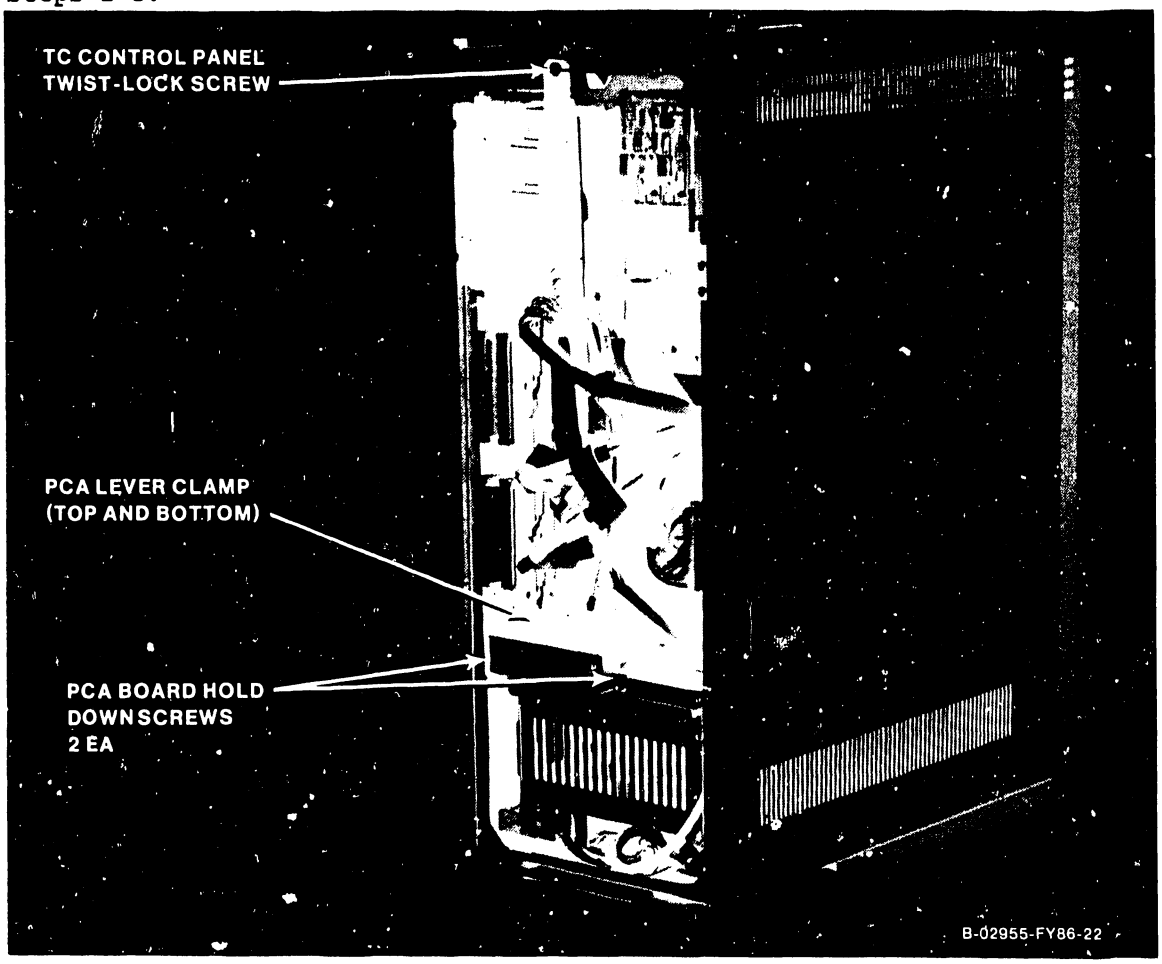
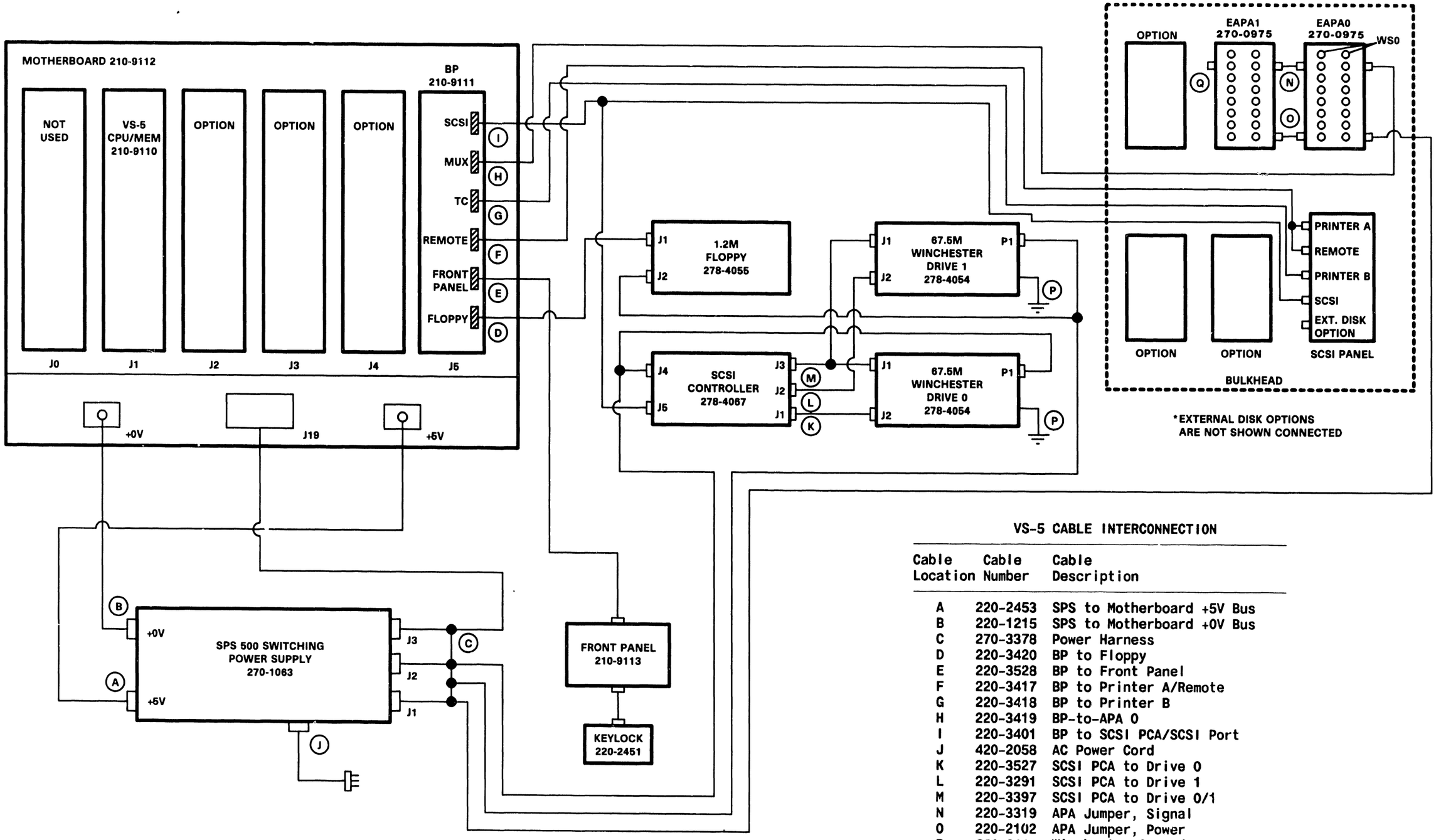


Figure 7-4. General VS-5/6 PCA Removal/Replacement

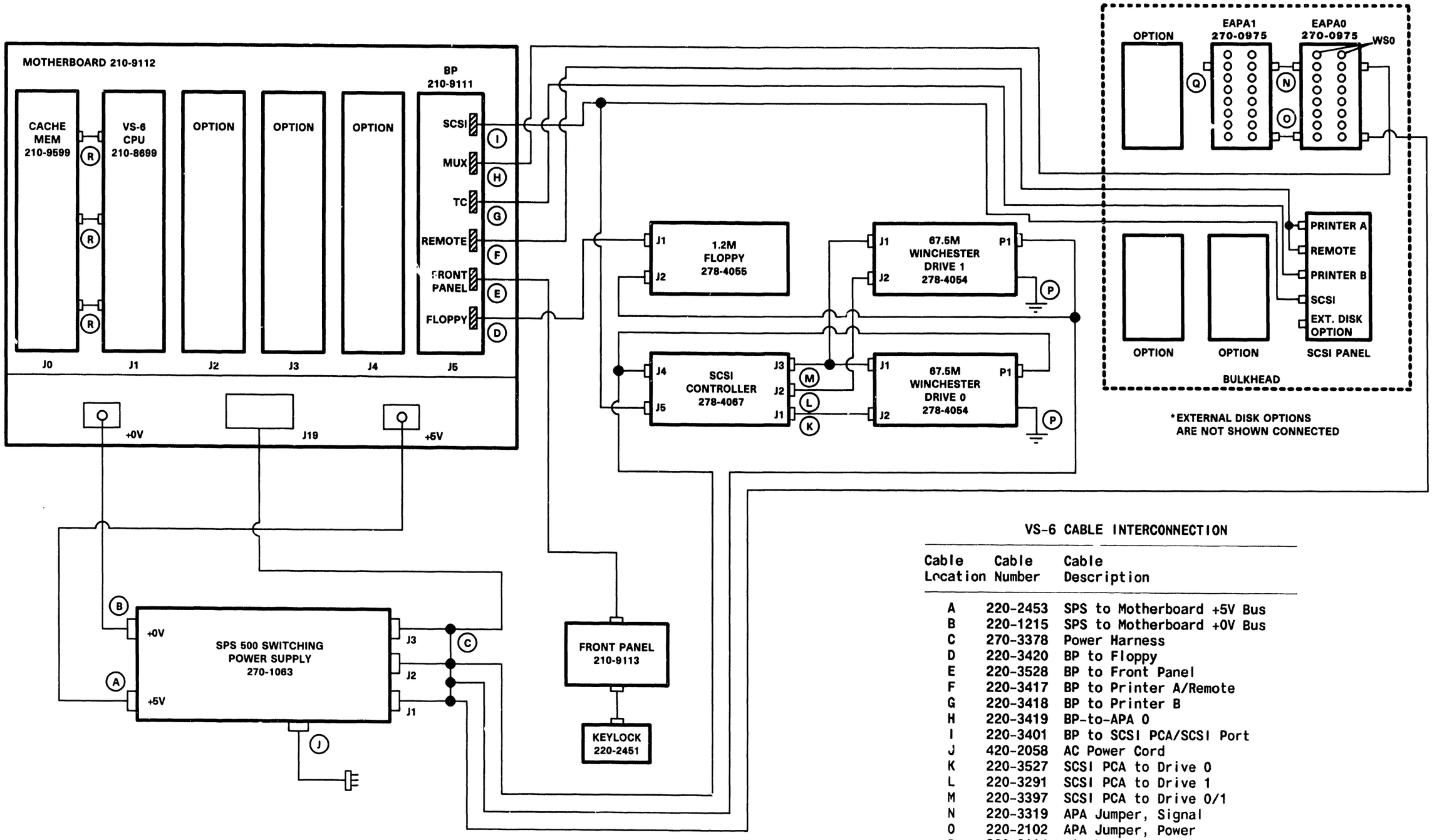


VS-5 CABLE INTERCONNECTION

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

B-02927-FY86-1



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.

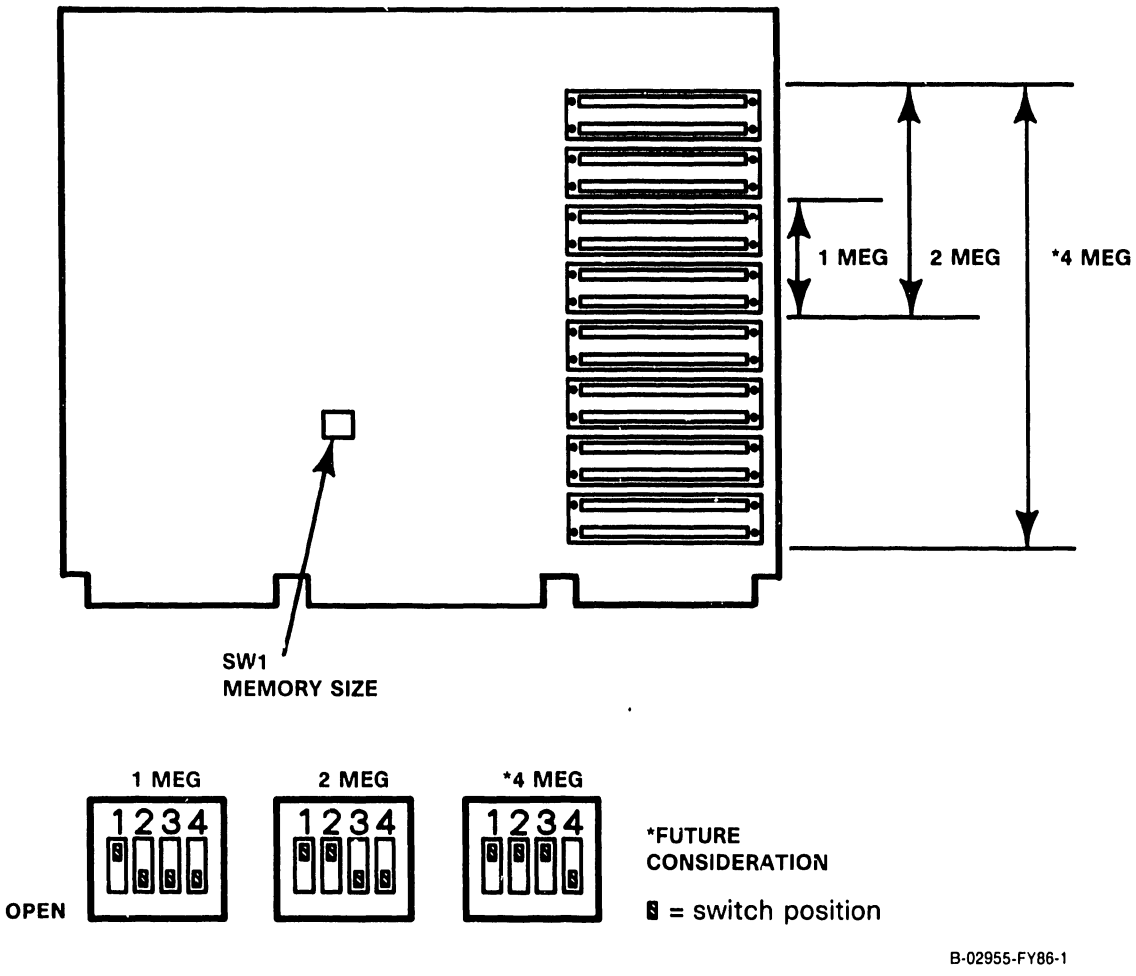


Figure 7-5. VS-5 CPU/Memory Board Memory Size Switch Settings

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.

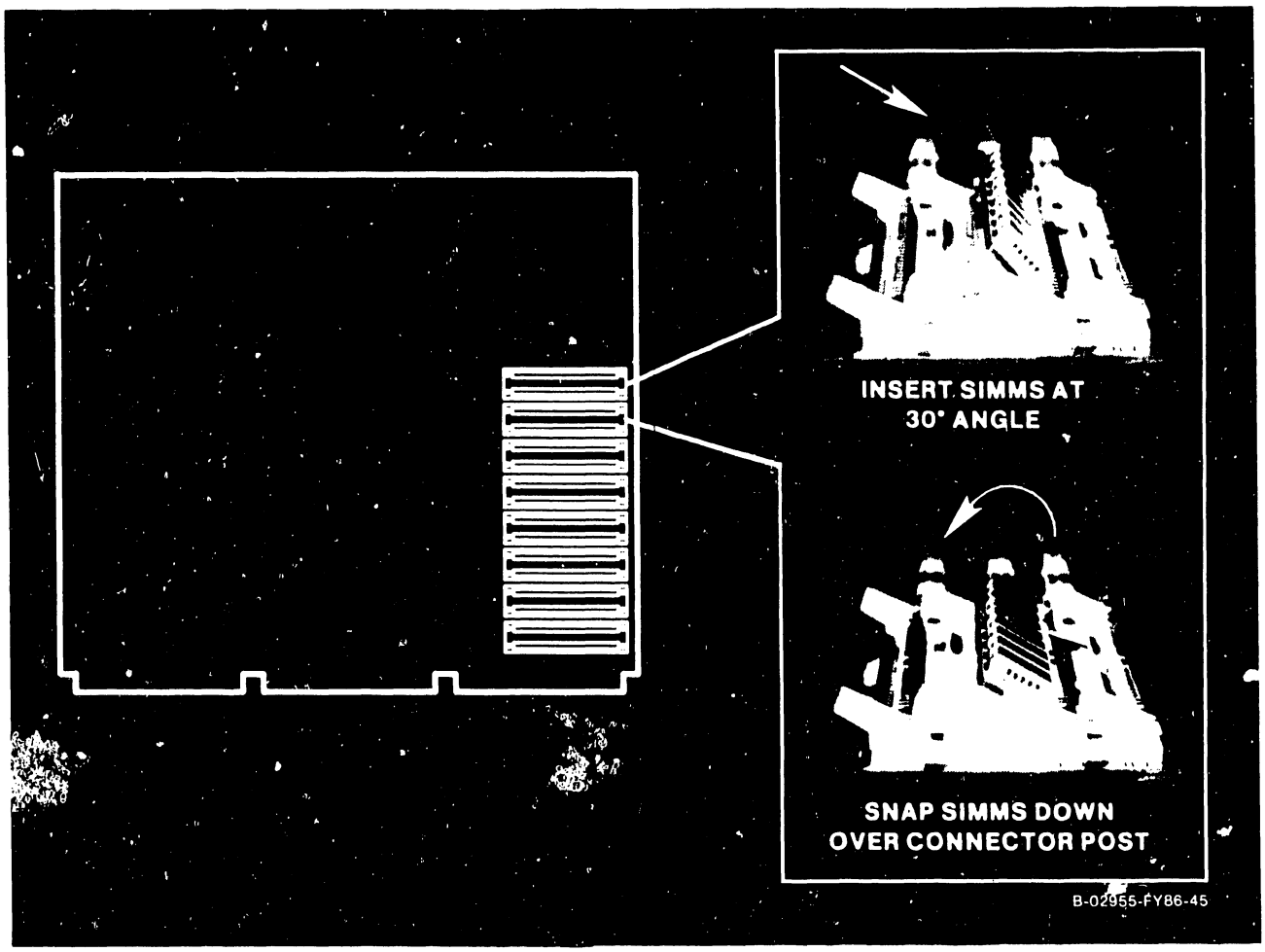


Figure 7-5A. VS-5 CPU/Memory Board Memory Upgrade

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.

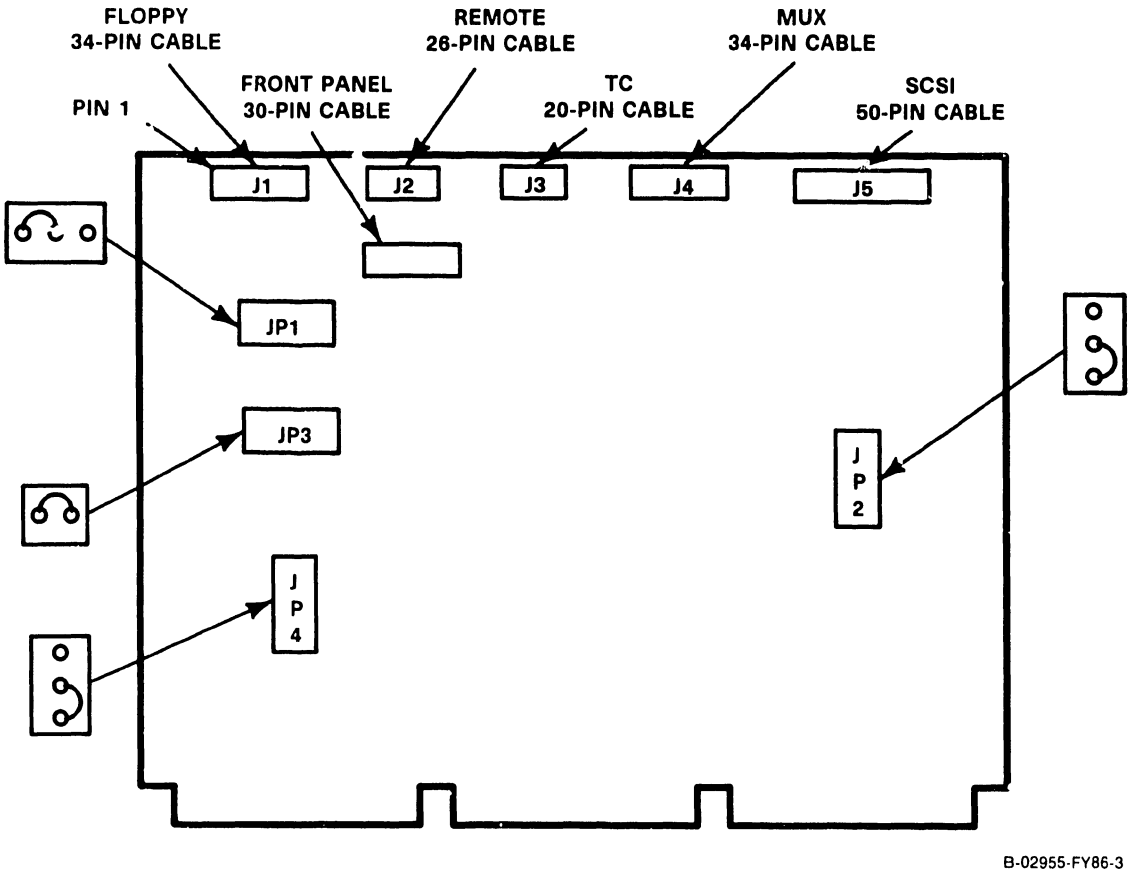


Figure 7-6. VS-5/6 BP (210-9111) Board Jumper Location/Positions

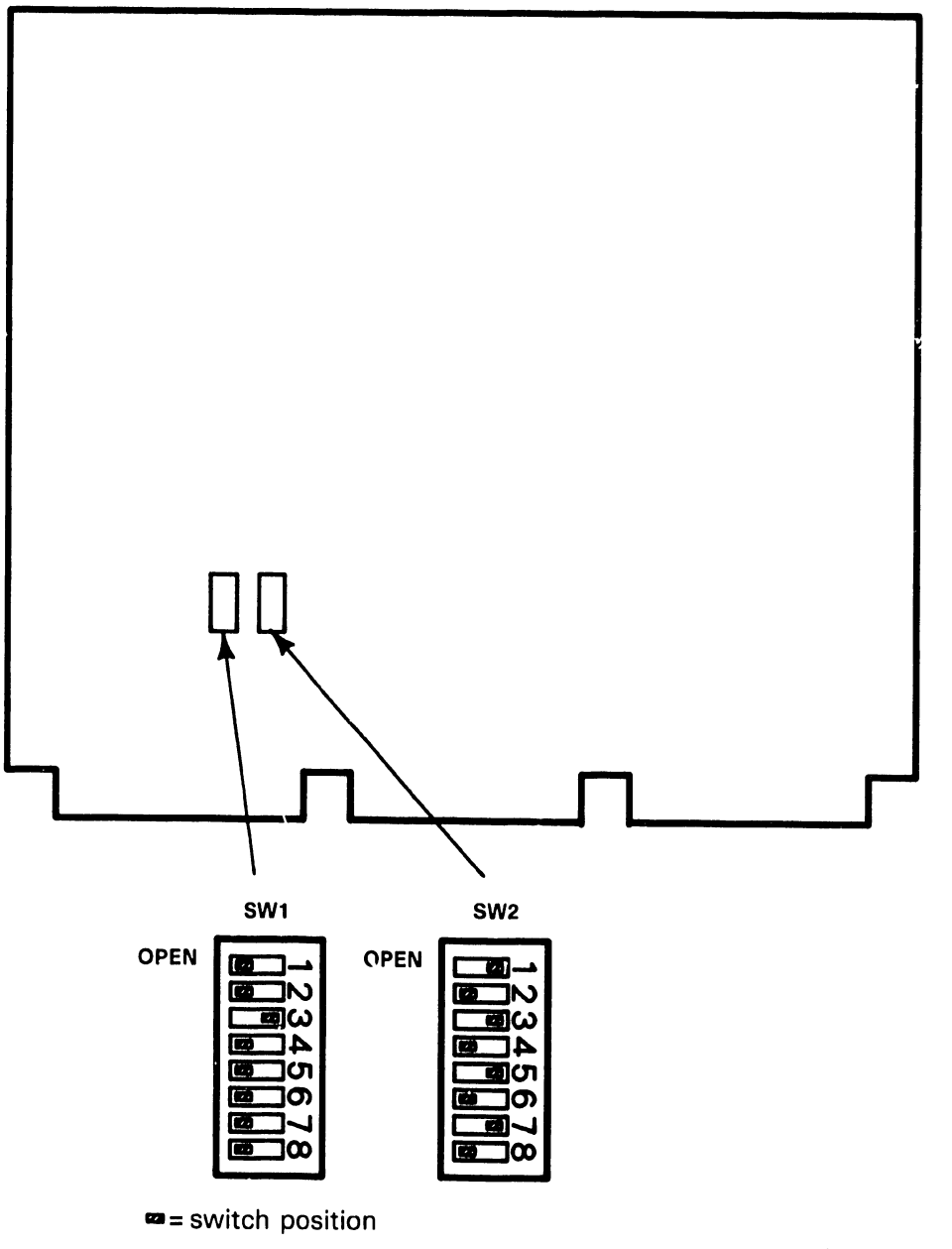
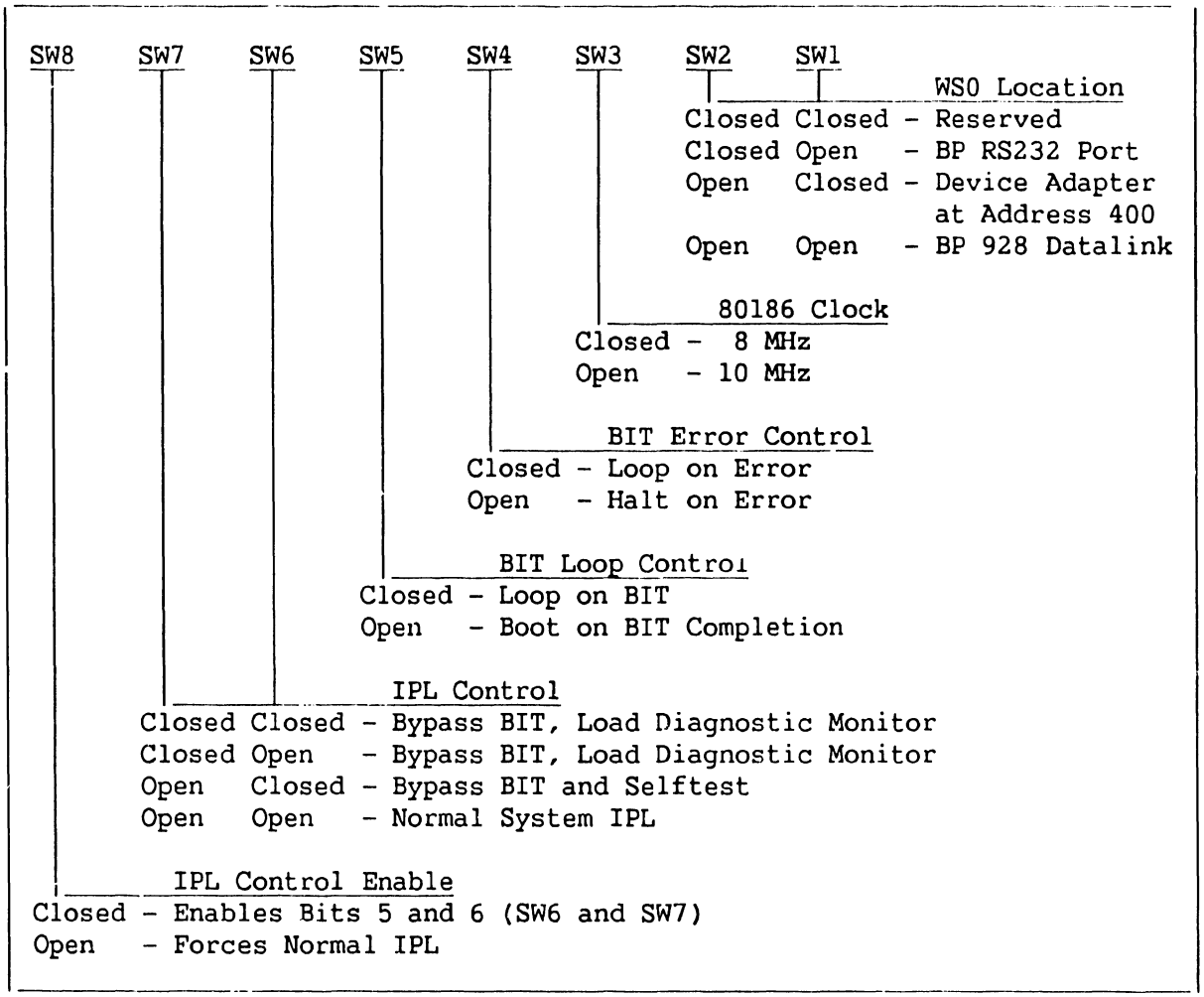


Figure 7-7. VS-5/6 Bus Processor Board Switch Settings

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



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
								SCSI Device ID = 6 Type
						Closed	Closed	- Reserved
						Closed	Open	- ACB-5500
						Open	Closed	- WD-1003A (NOTE 3)
						Open	Open	- Self Identifying
								SCSI Device ID = 5 Type
						Closed	Closed	- Reserved
						Closed	Open	- ACB-5500
						Open	Closed	- WD-1003A
						Open	Open	- Self Identifying
								SCSI Device ID = 4 Type
						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

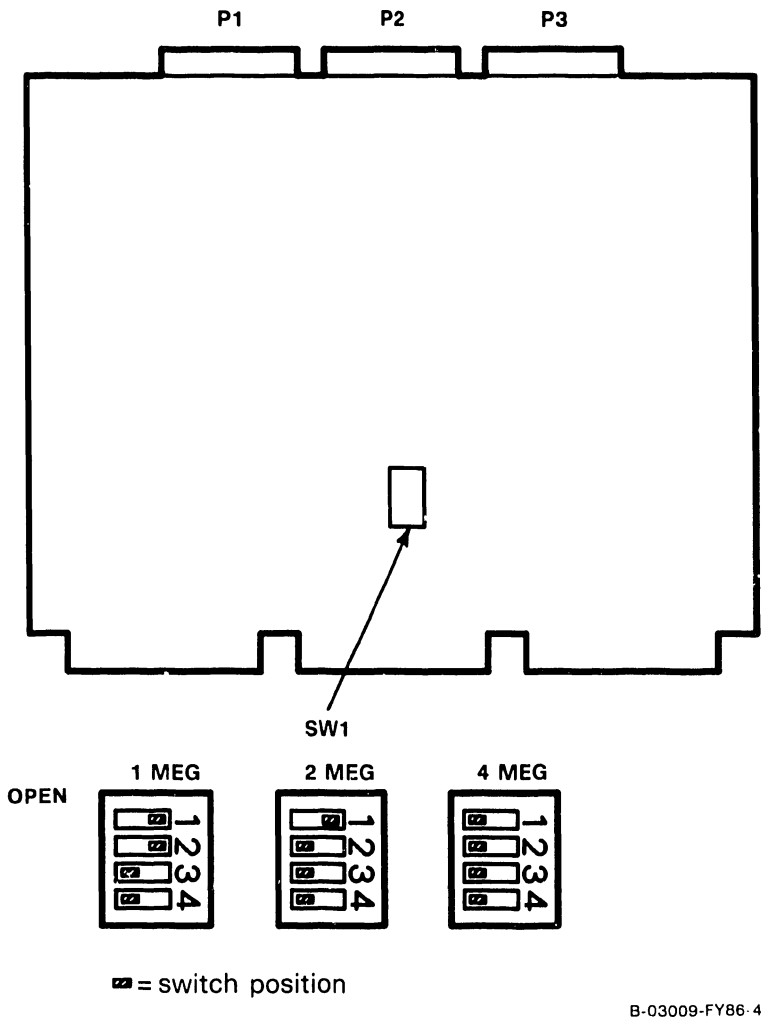


Figure 7-8. VS-6 Cache Memory Board (210-9599) Memory Size Switch Settings

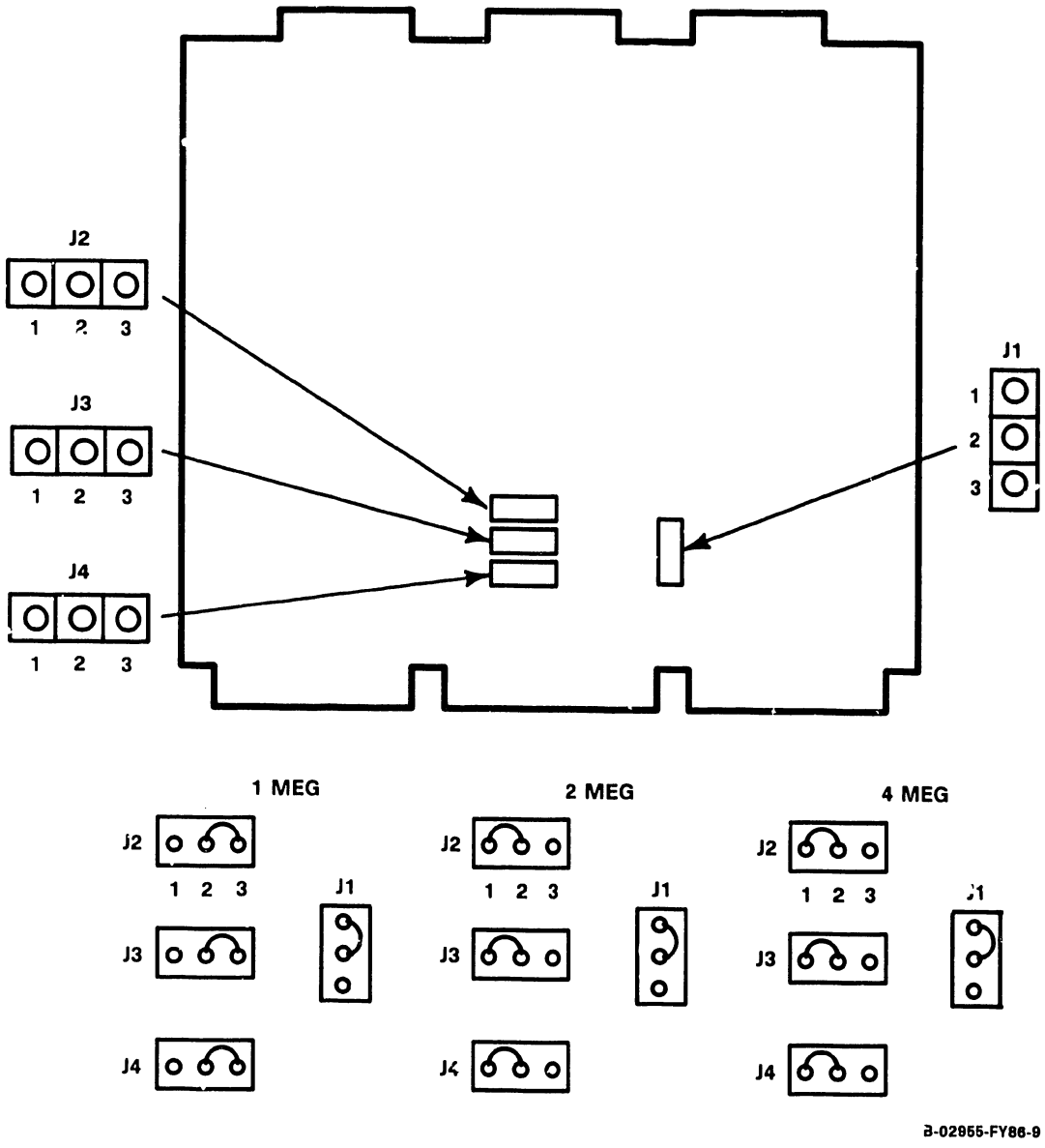


Figure 7-9. VS-6 Memory Board Jumper Locations/Definitions

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.

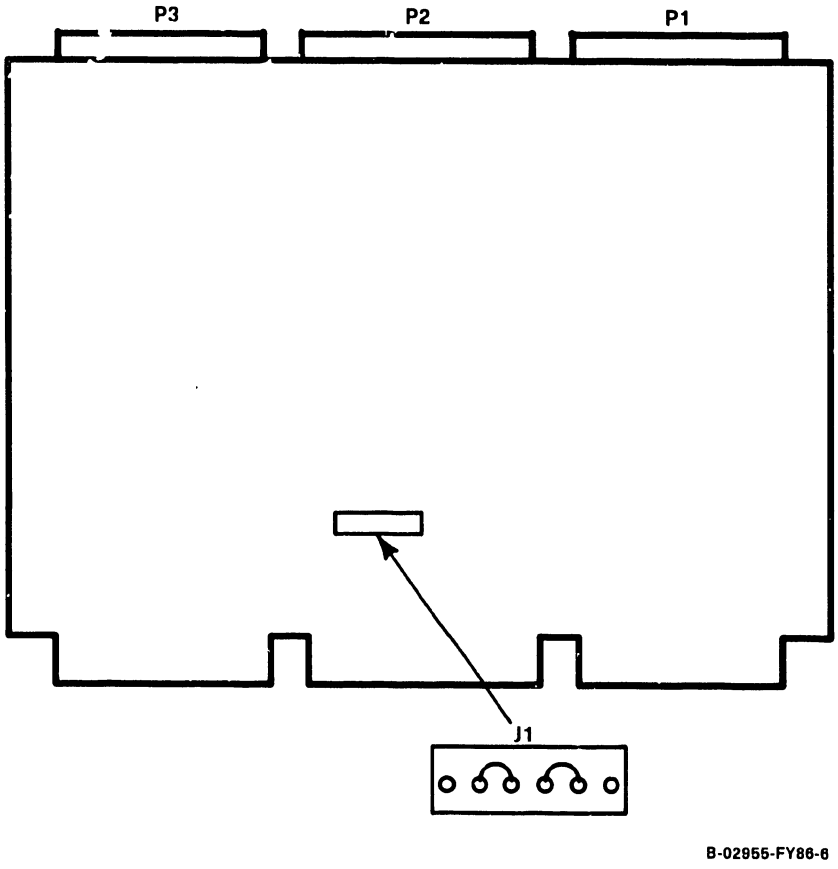


Figure 7-10. VS-6 CPU Board (210-8699) Jumper Locations/Positions

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.

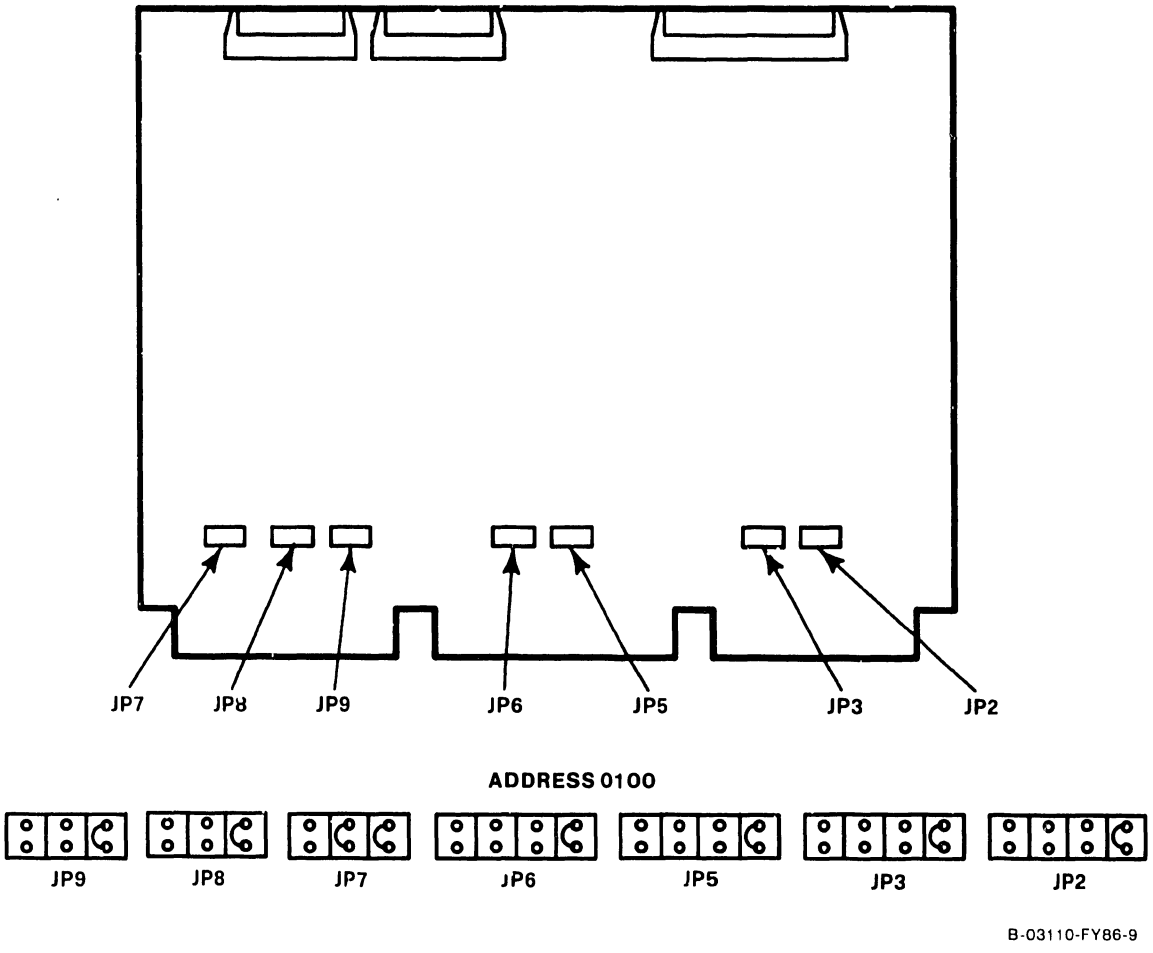


Figure 7-11. SMD 2-Port Board Jumper Locations/Positions

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

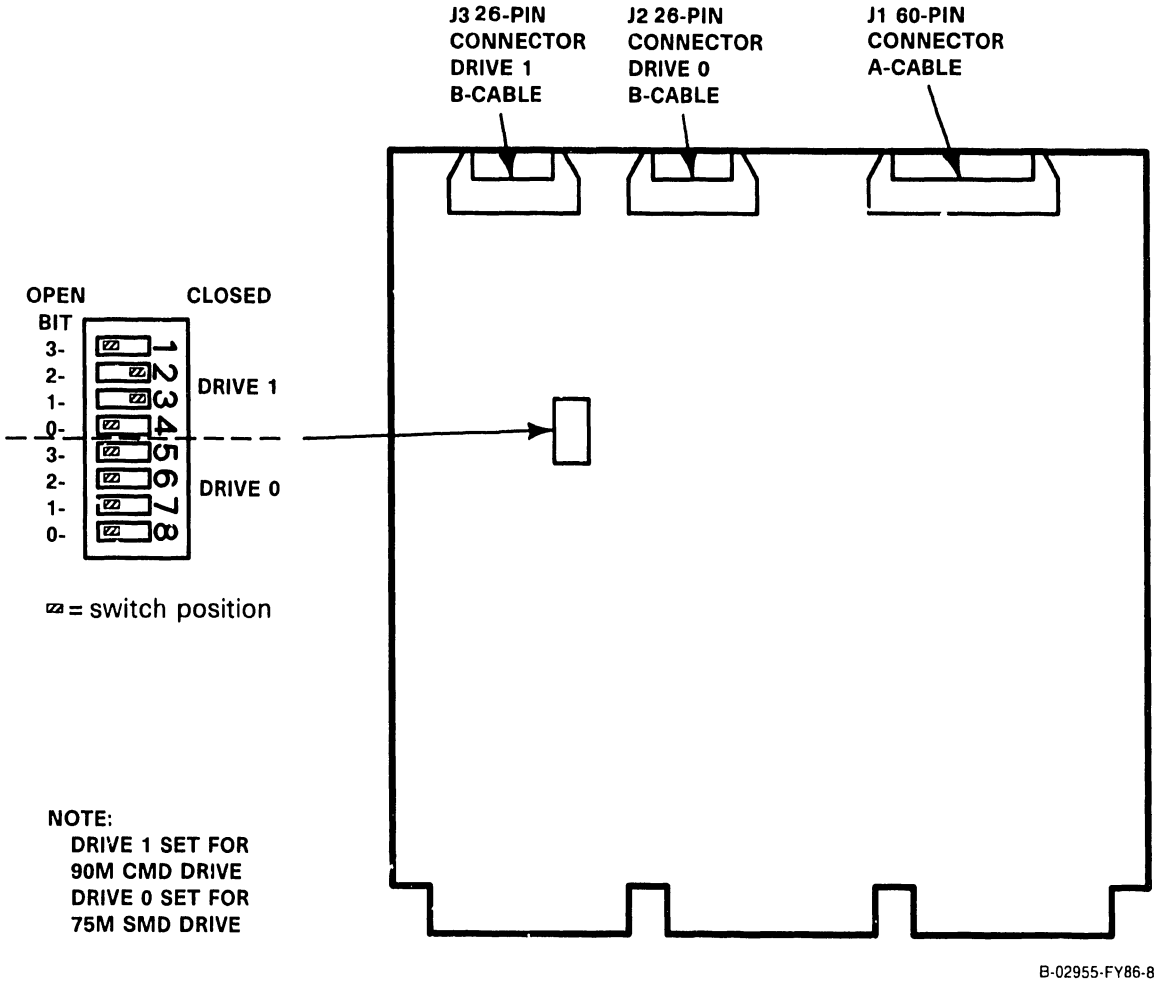


Figure 7-12. 2-Port SMD Switch Location/Drive-type Settings

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.

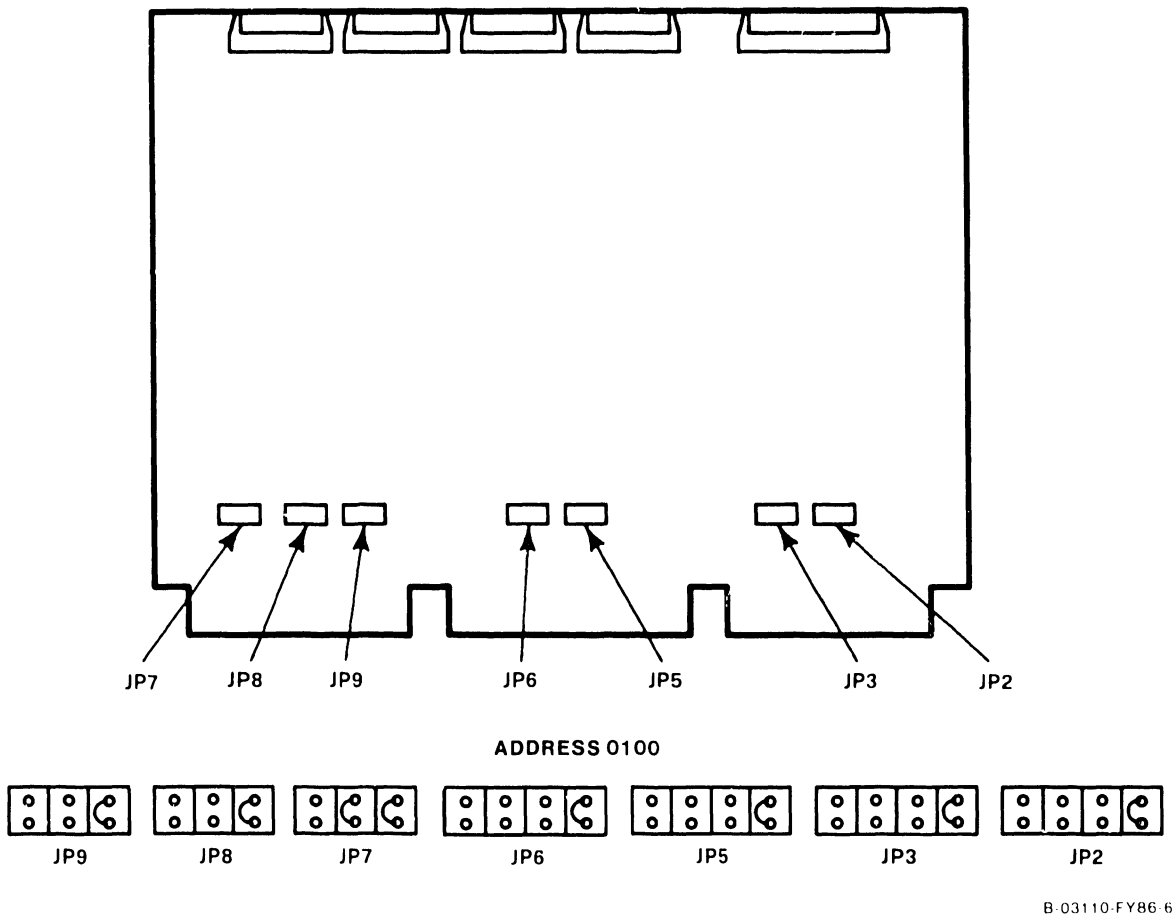
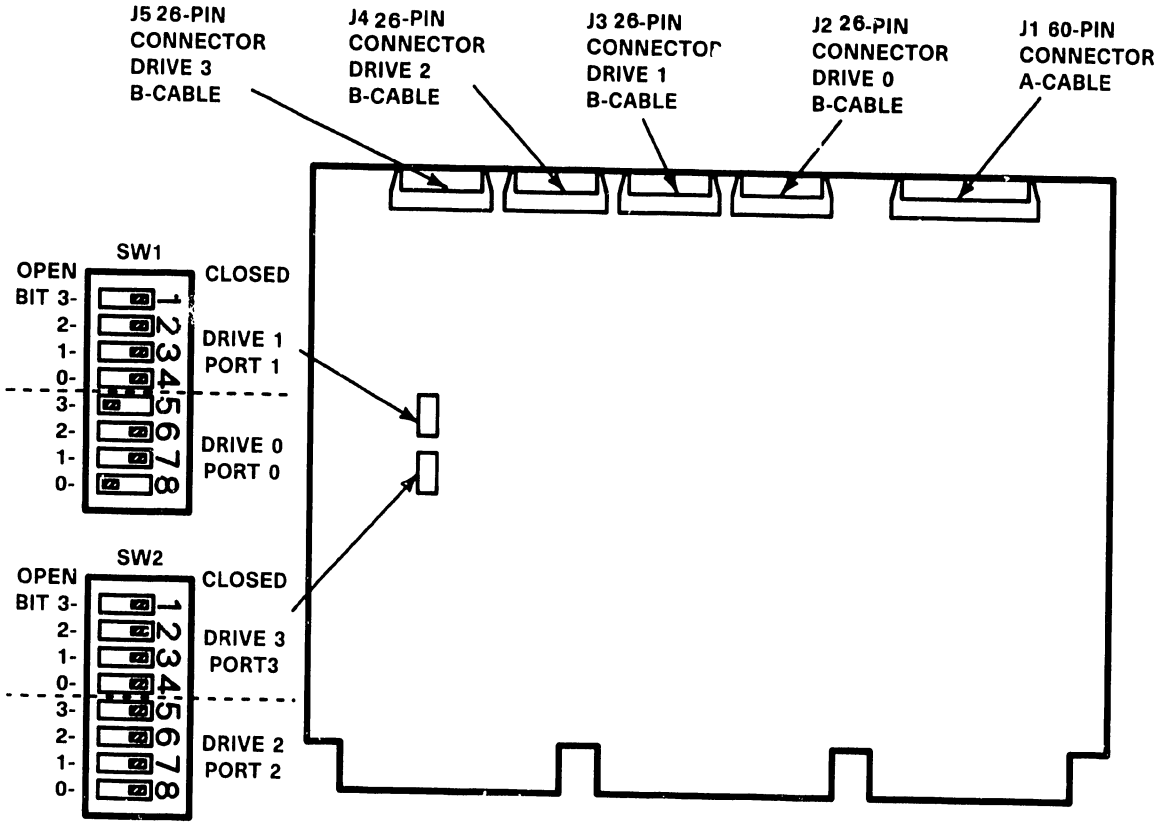


Figure 7-13. SMD 4-Port Board Jumper Locations/Positions

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
7[illegible]M 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.

B-02955-FY86-15

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.

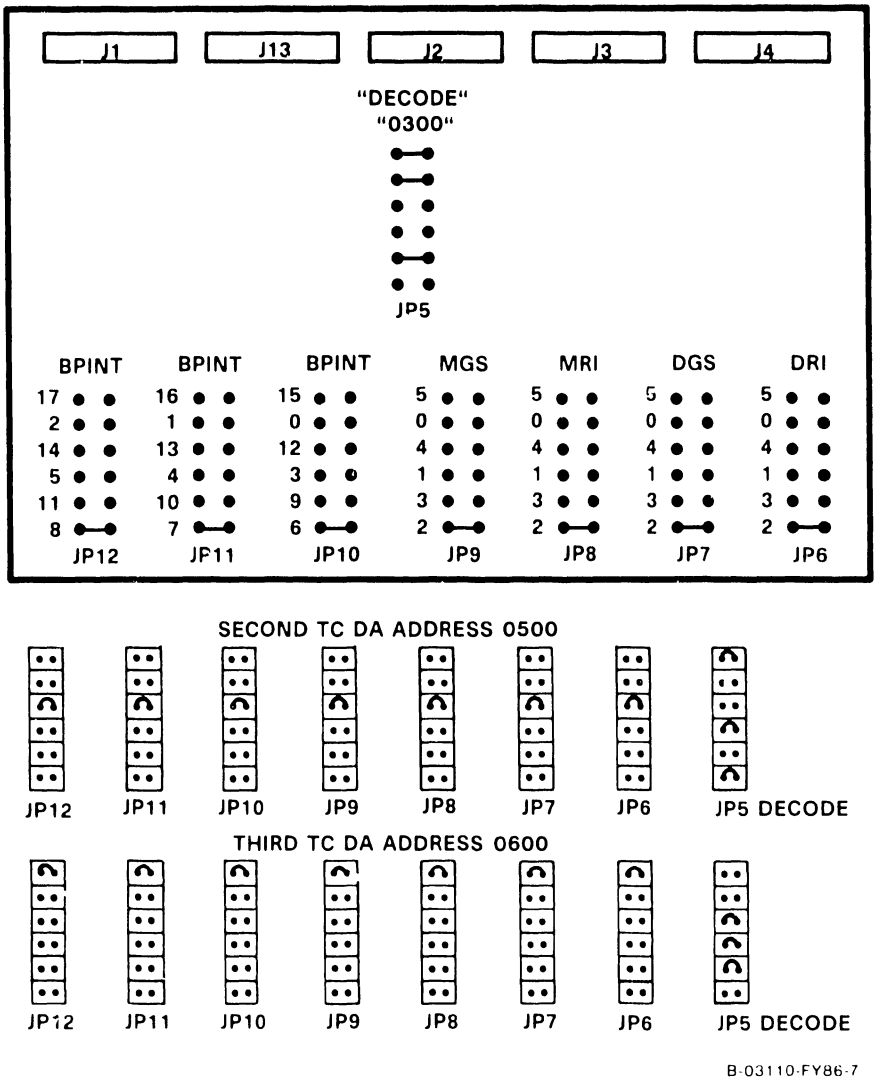


Figure 7-15. TC DA 1-Port Board (210-9337) Jumper Locations/Positions

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)

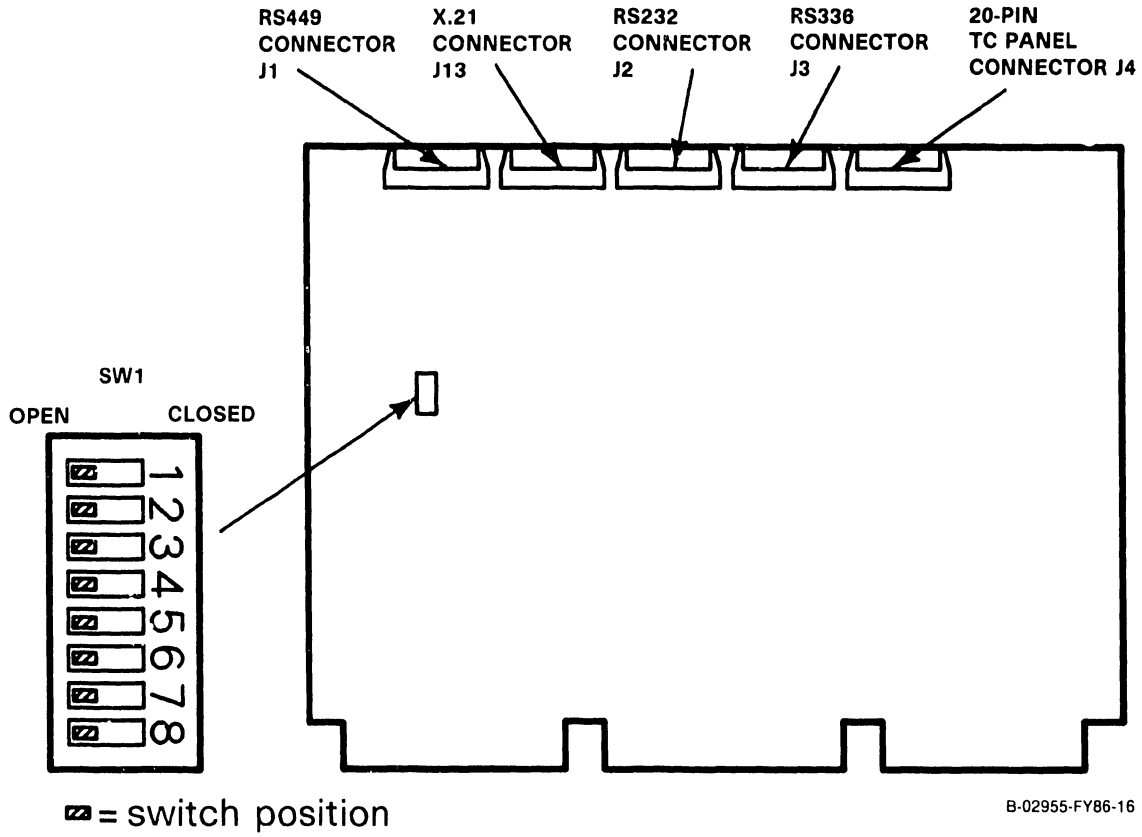


Figure 7-16. TC DA 1-Port Board (210-9337) Switch Settings/Location

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.

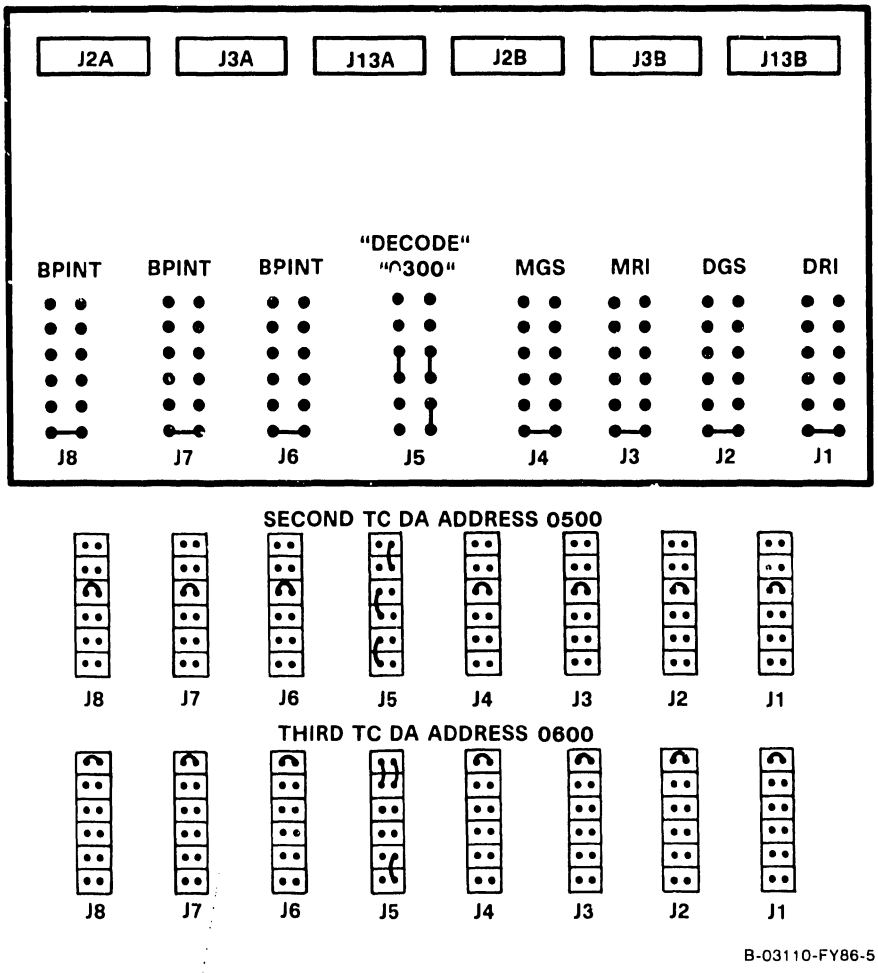


Figure 7-17. TC DA 2-Port Board (210-9637) Jumper Locations/Positions

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)

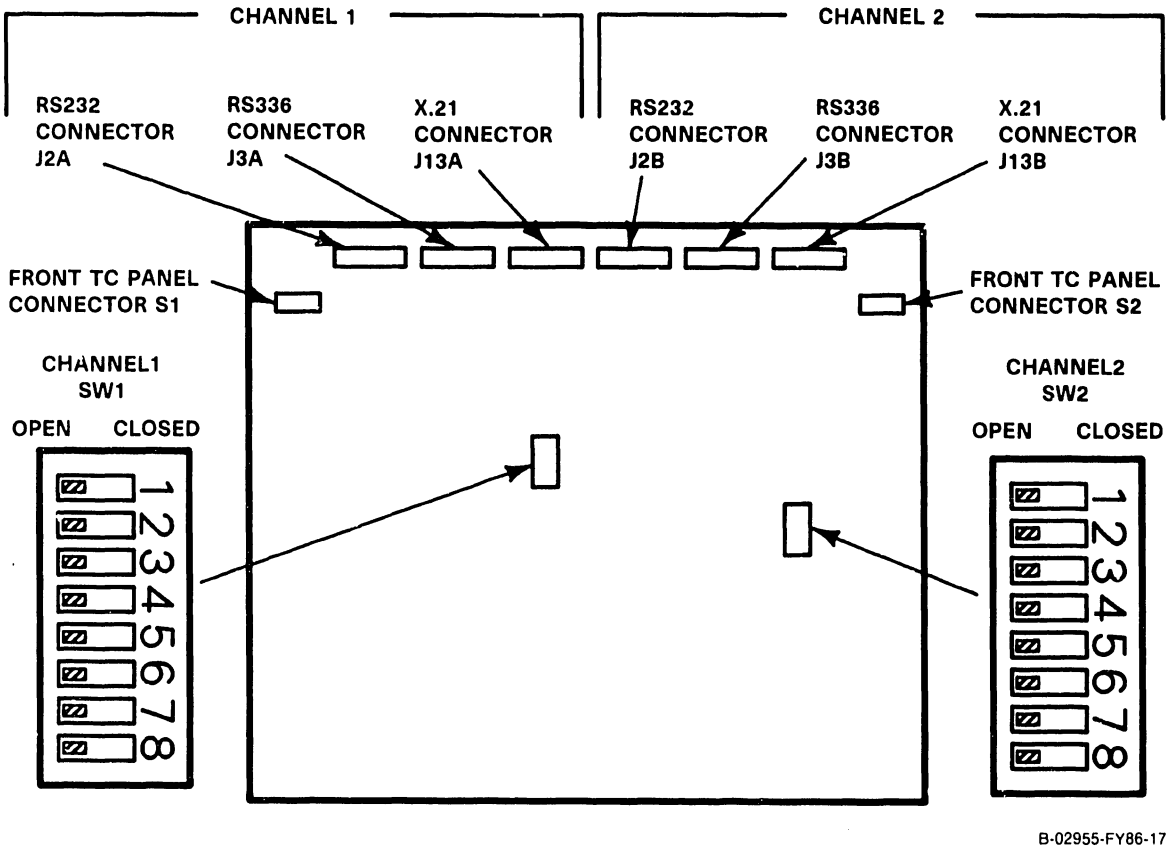


Figure 7-18. TC DA 2-Port Board (210-9637) Switch Settings/Location

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.

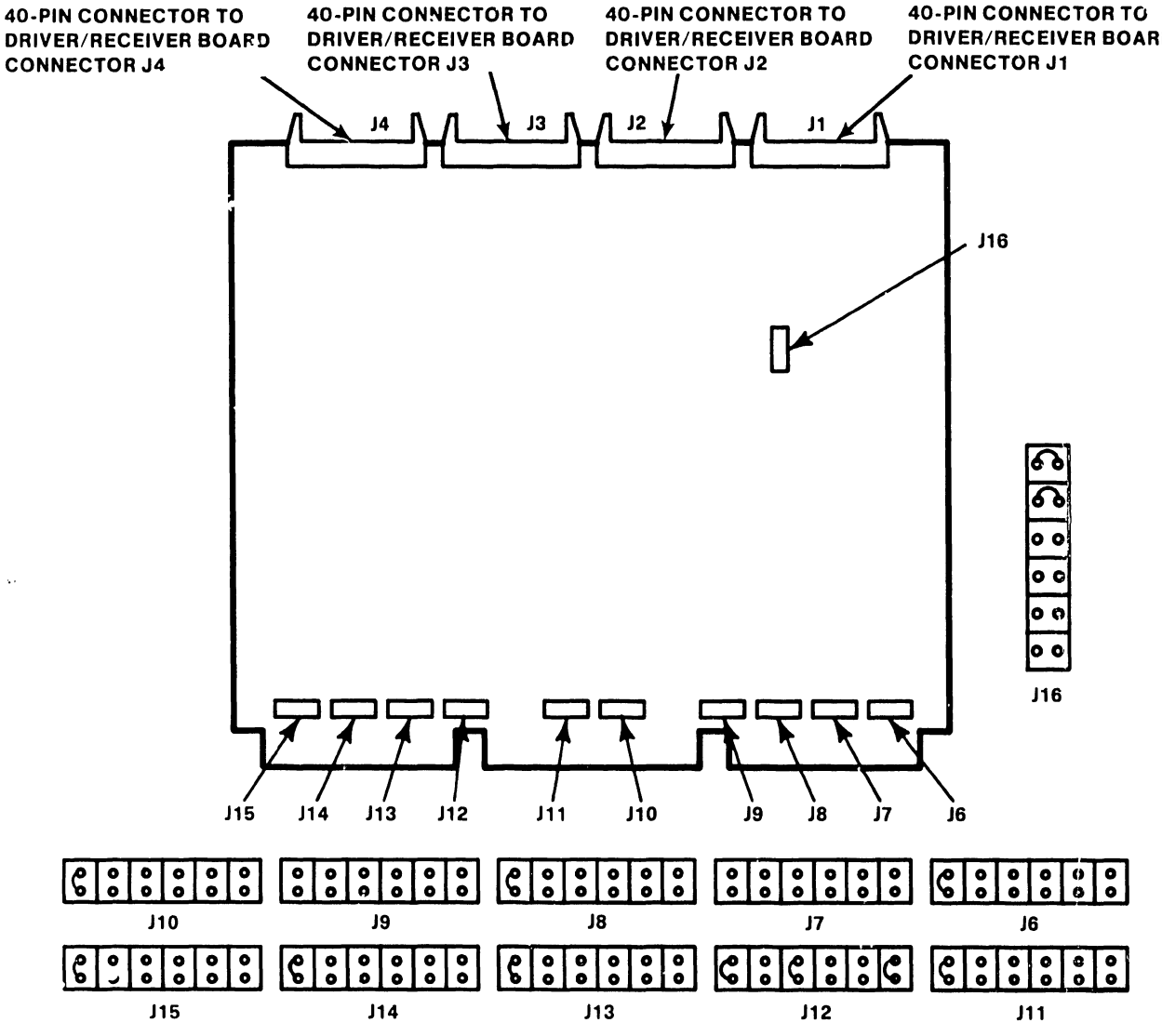


Figure 7-19. Async Device Controller (210-9355) Jumper Locations/Positions

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.

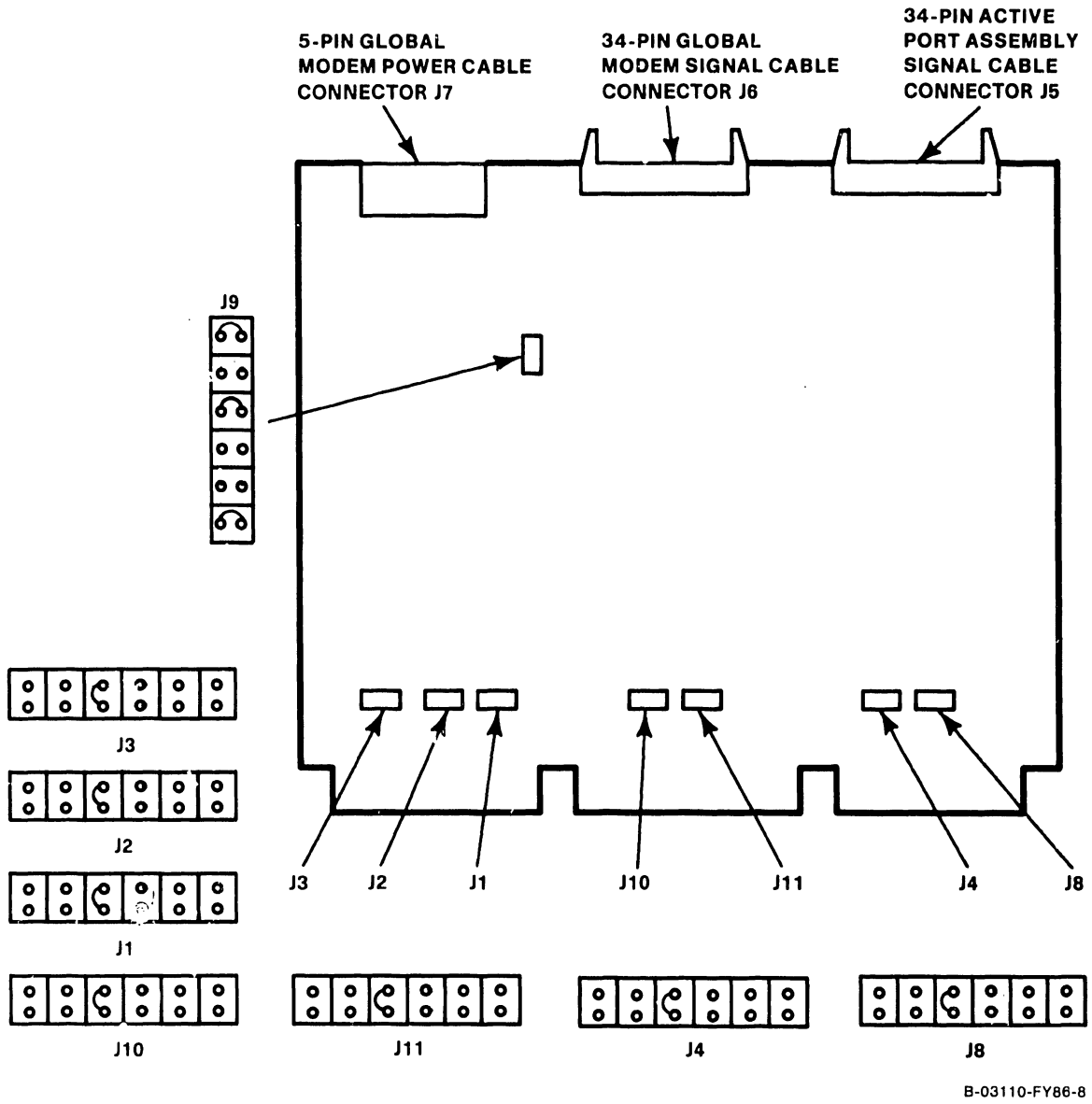


Figure 7-20. UISIO Board (210-8489) Jumper Locations/Positions

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.

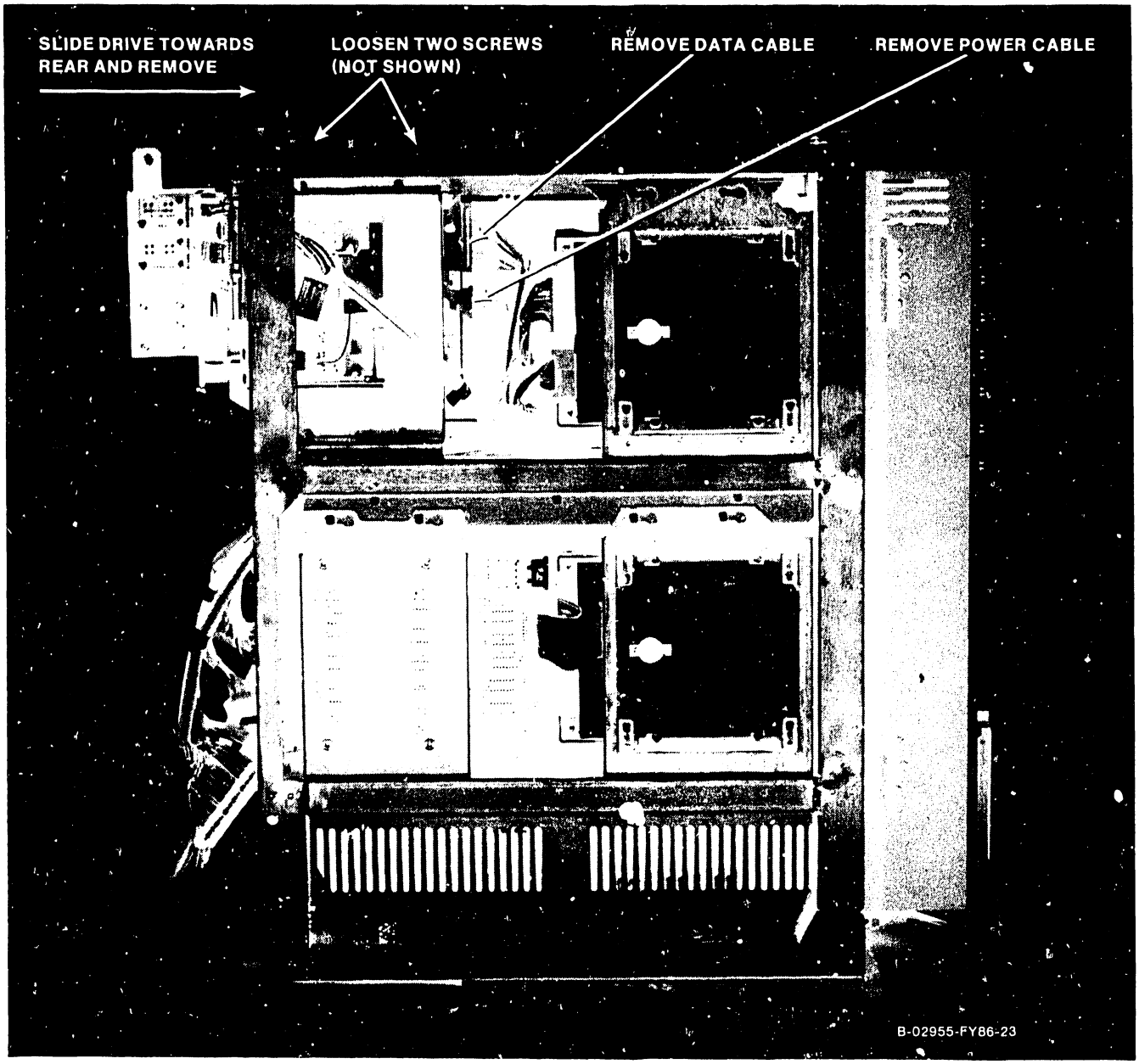


Figure 7-21. Floppy Drive Removal From Mainframe

7.4.1 FIOPPY 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.

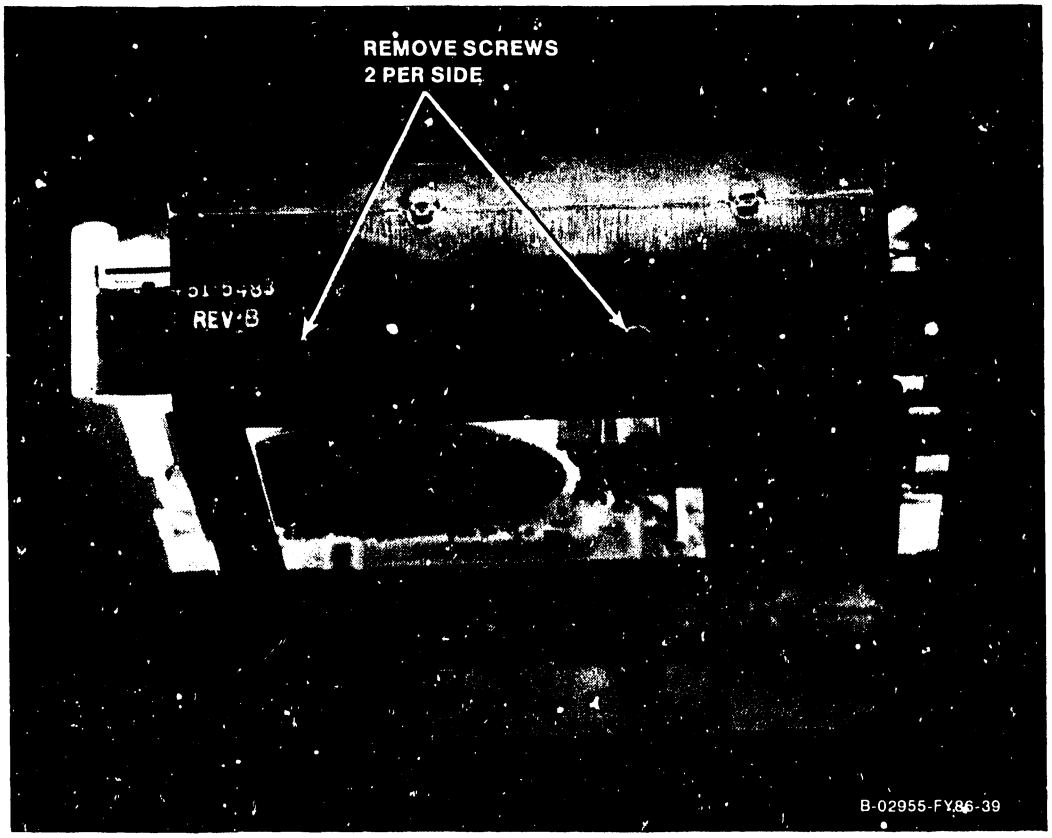


Figure 7-22. Floppy Drive Mounting Bracket Removal

7.4.3 FIOPPY DRIVE TERMINATOR CHIP/JUMPER LOCATIONS

1) Prior to drive replacement, check the floppy drive (278-4055) for a terminator chip installed at PCA location RP1 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.

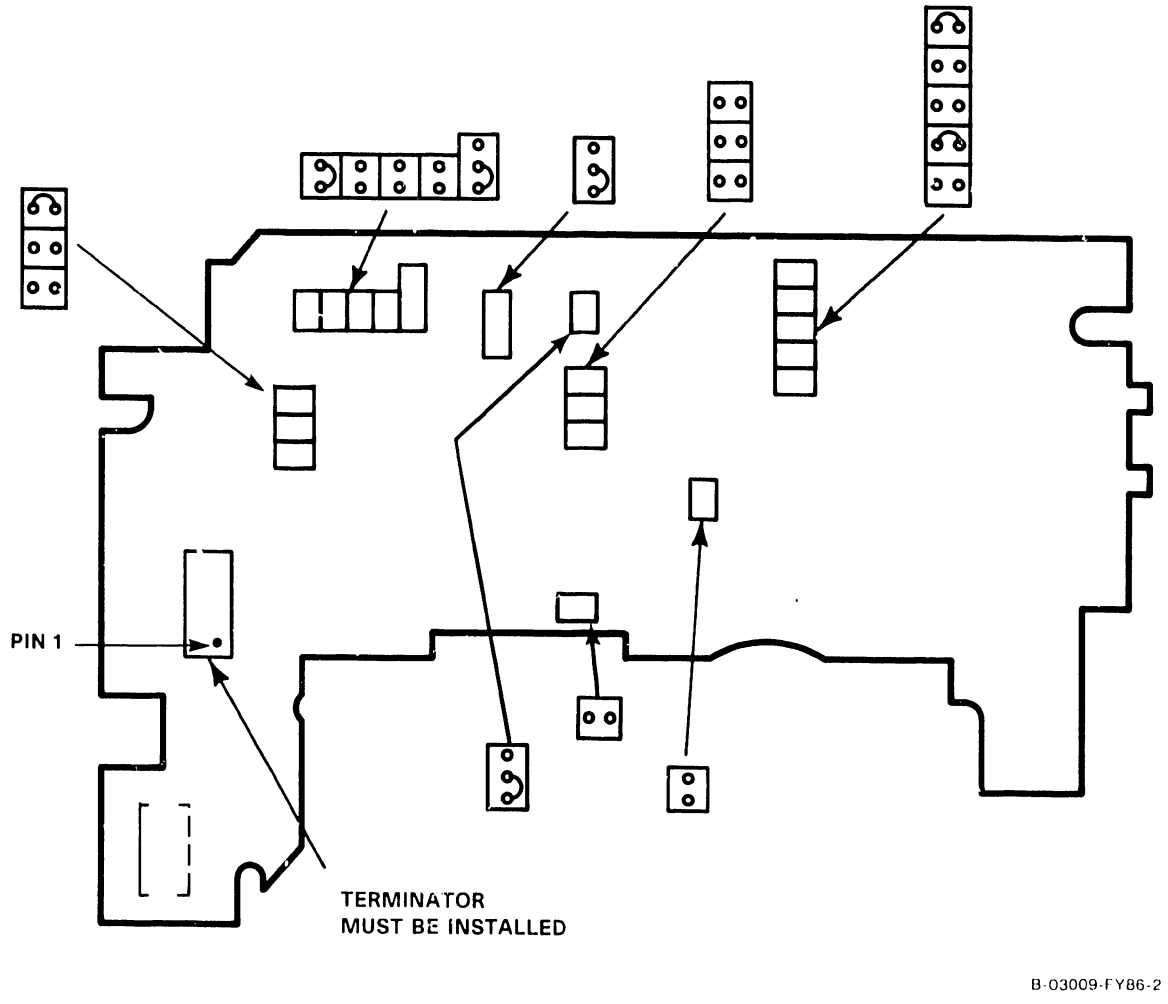


Figure 7-23. 1.2M Floppy Drive Terminator/Jumper Locations

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.

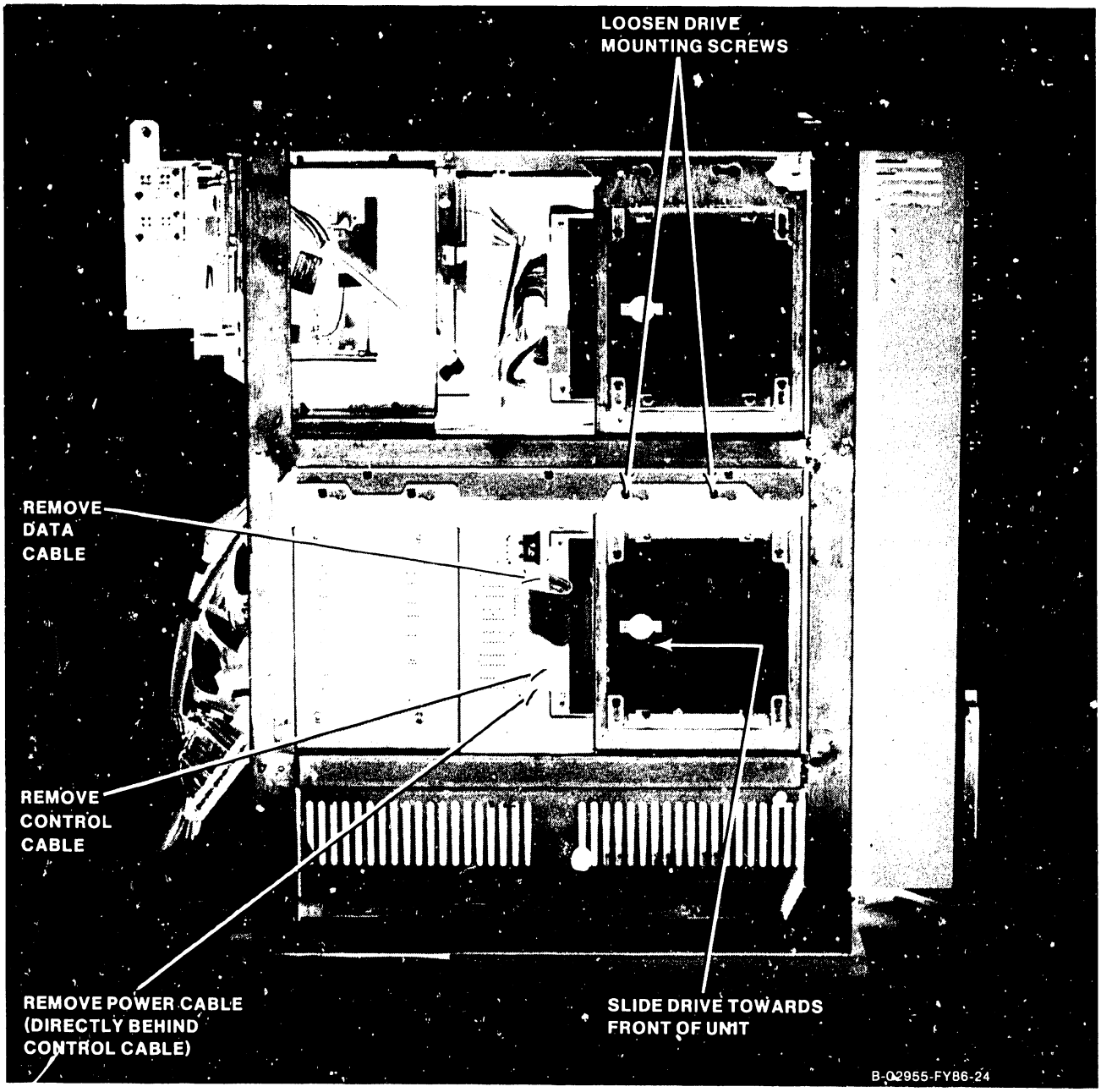


Figure 7-24. 67.5MB Winchester Drive Removal From Mainframe

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.

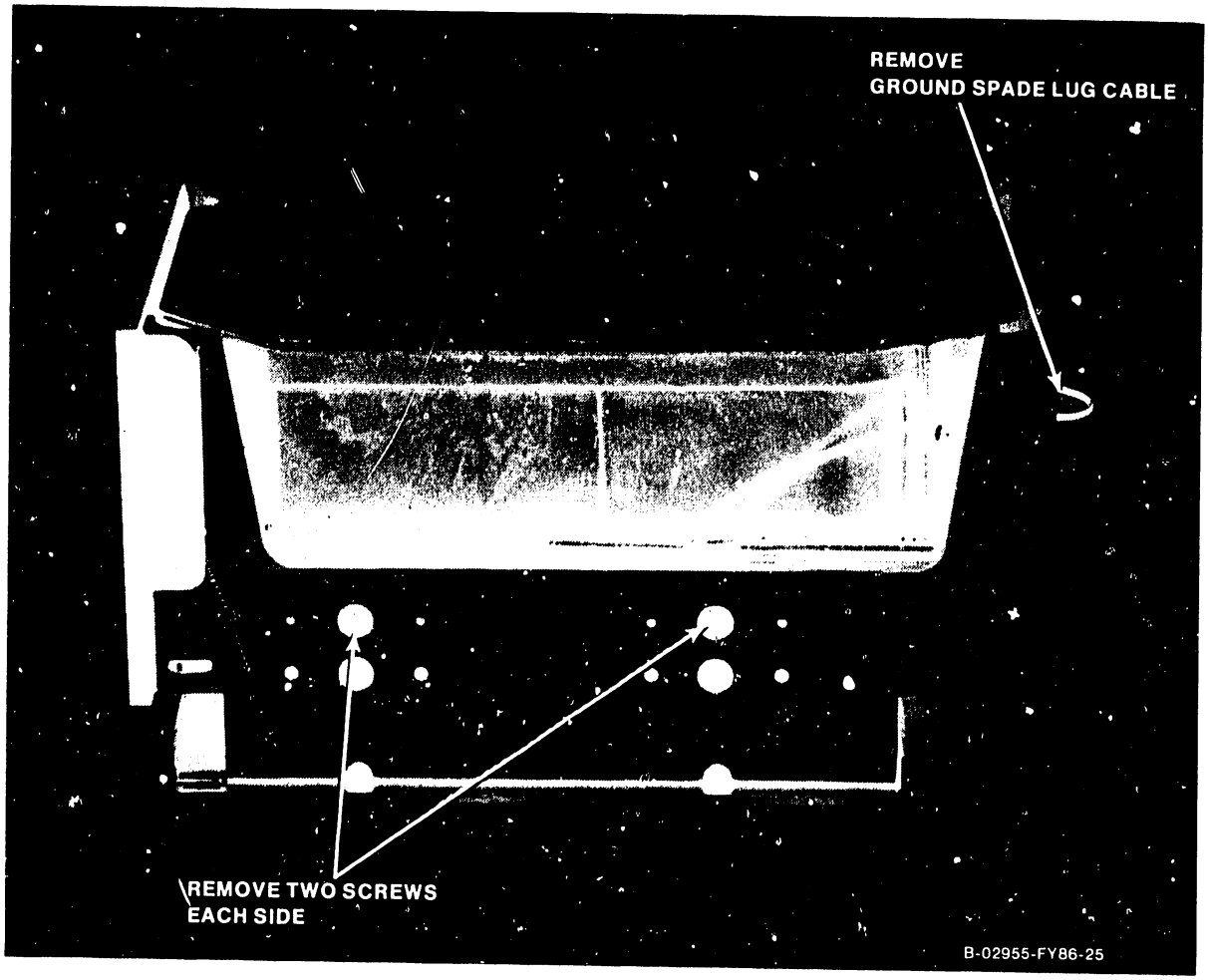


Figure 7-25. Winchester Drive Mounting Bracket Removal

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.

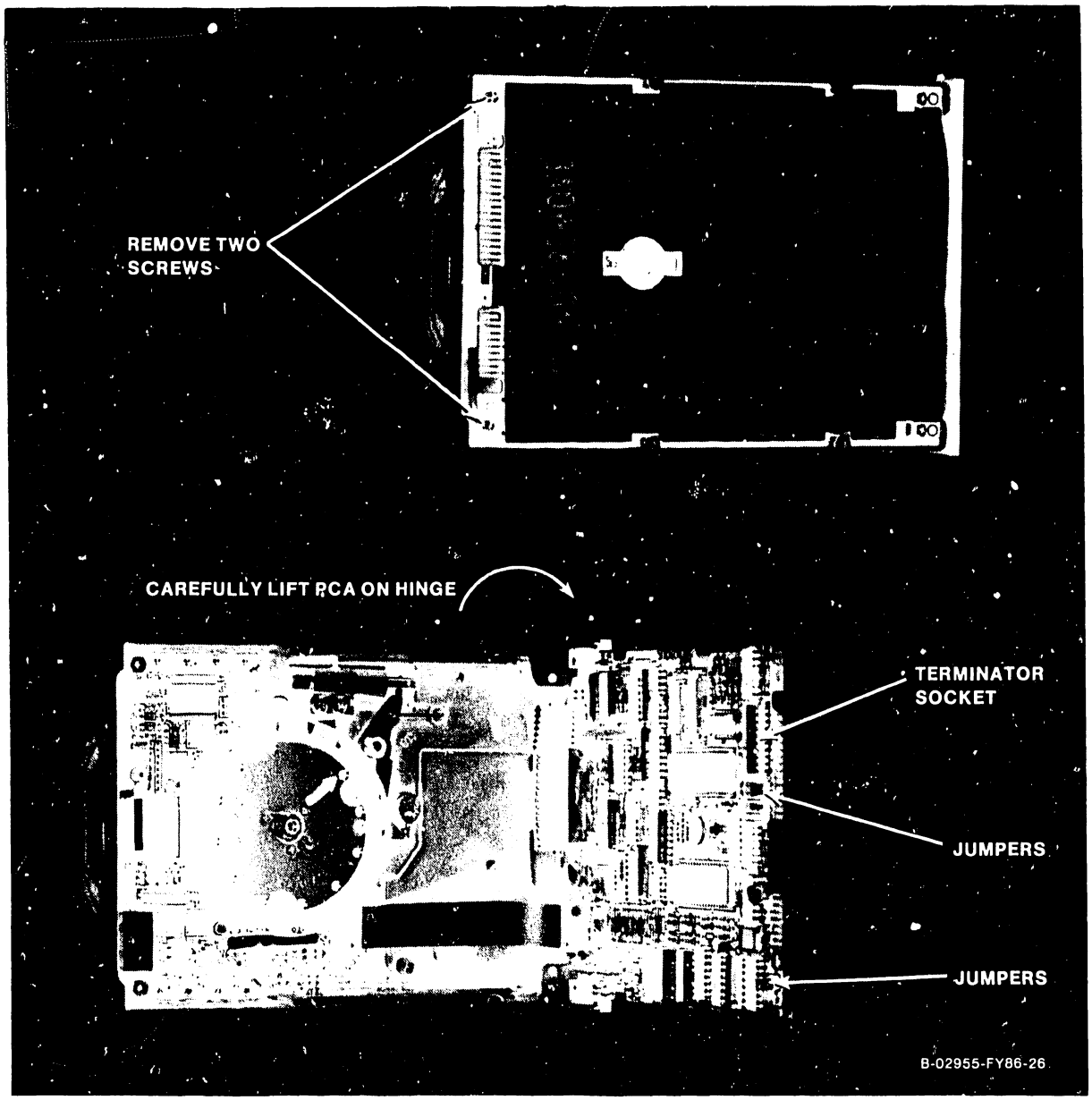


Figure 7-26. 67.5MB Winchester Drive Terminator/Jumper Access

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.

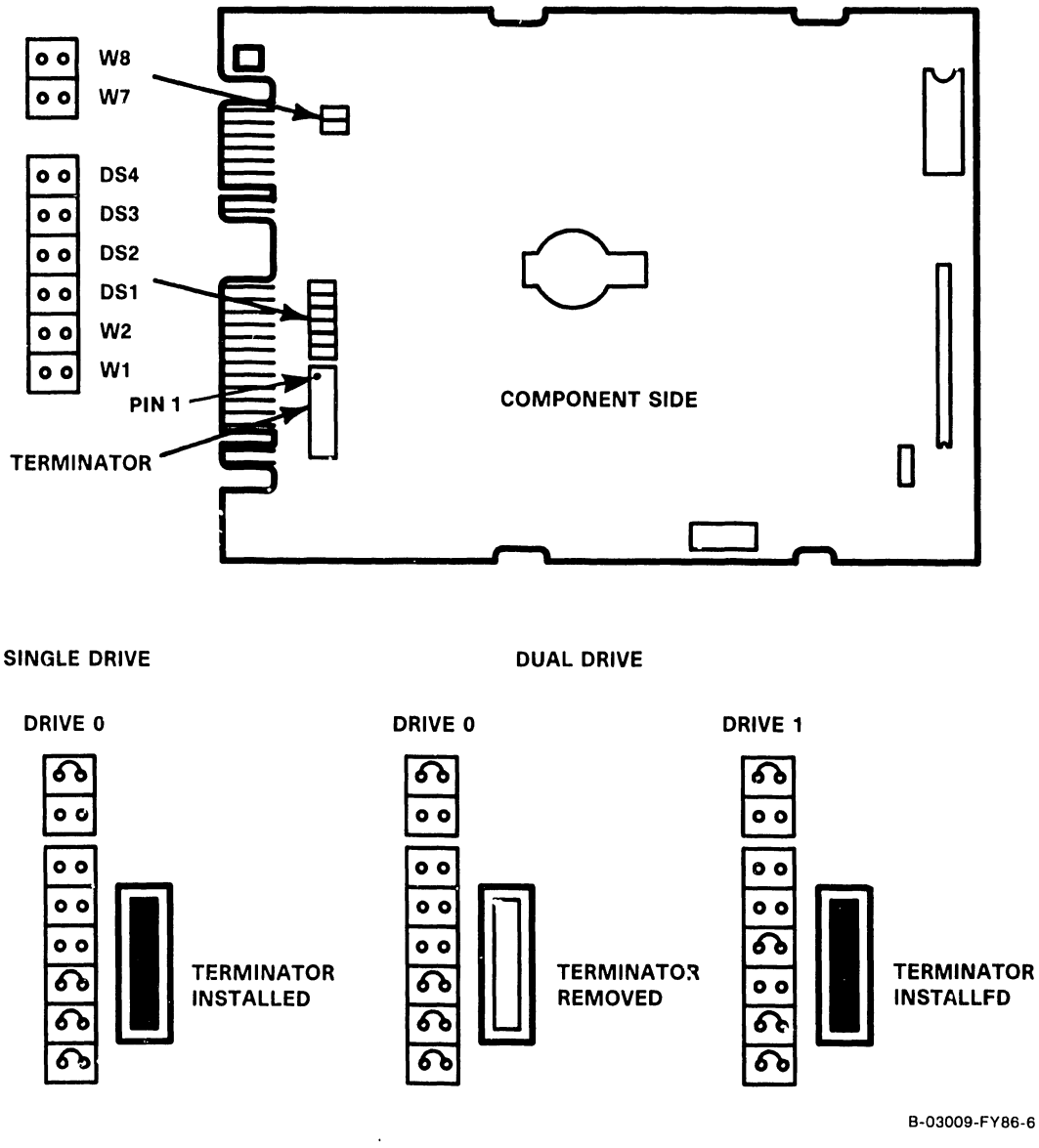


Figure 7-27. 67.5M Winchester Drive Terminator/Jumper Locations

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.

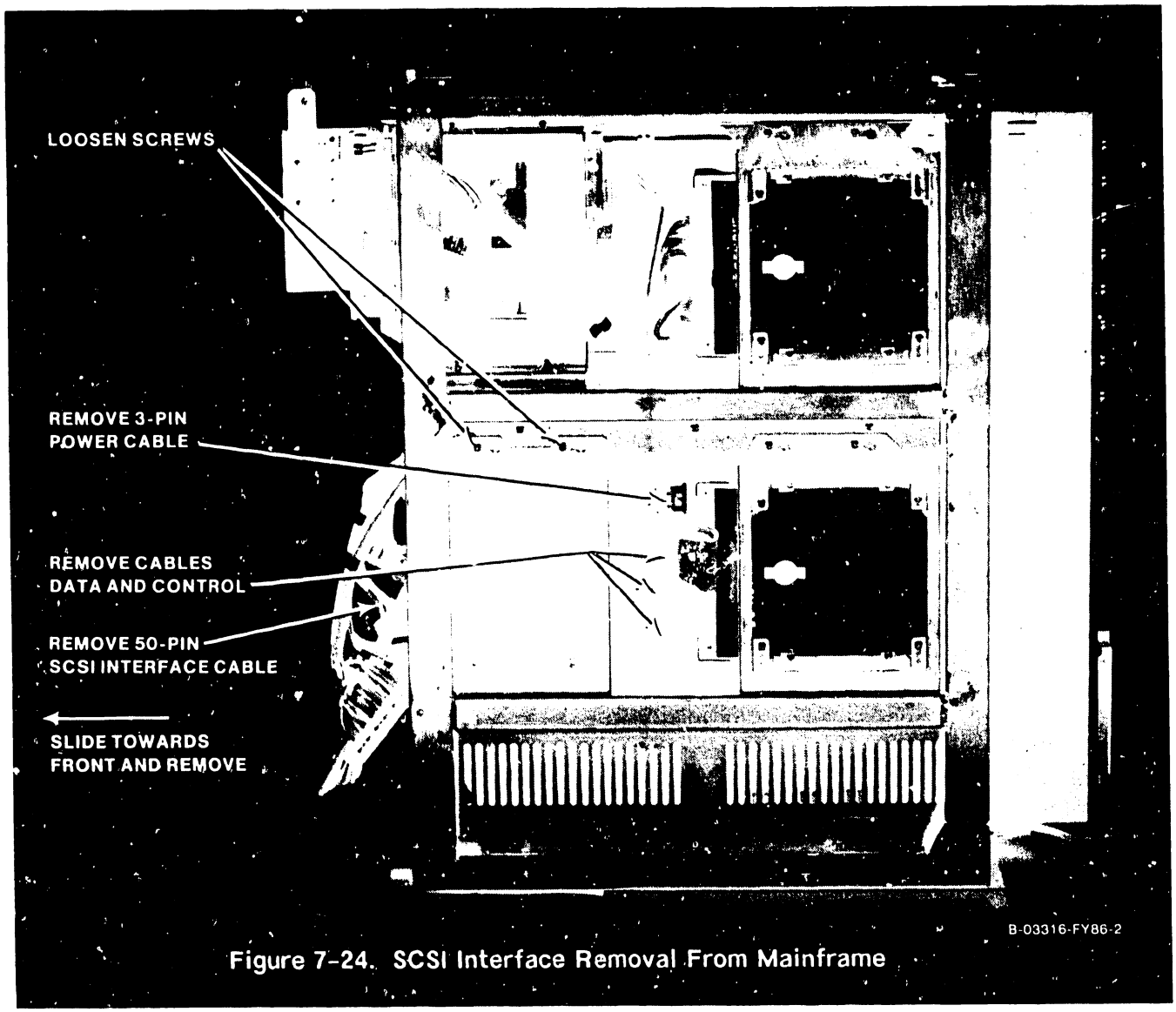


Figure 7-24. SCSI Interface Removal From Mainframe

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.

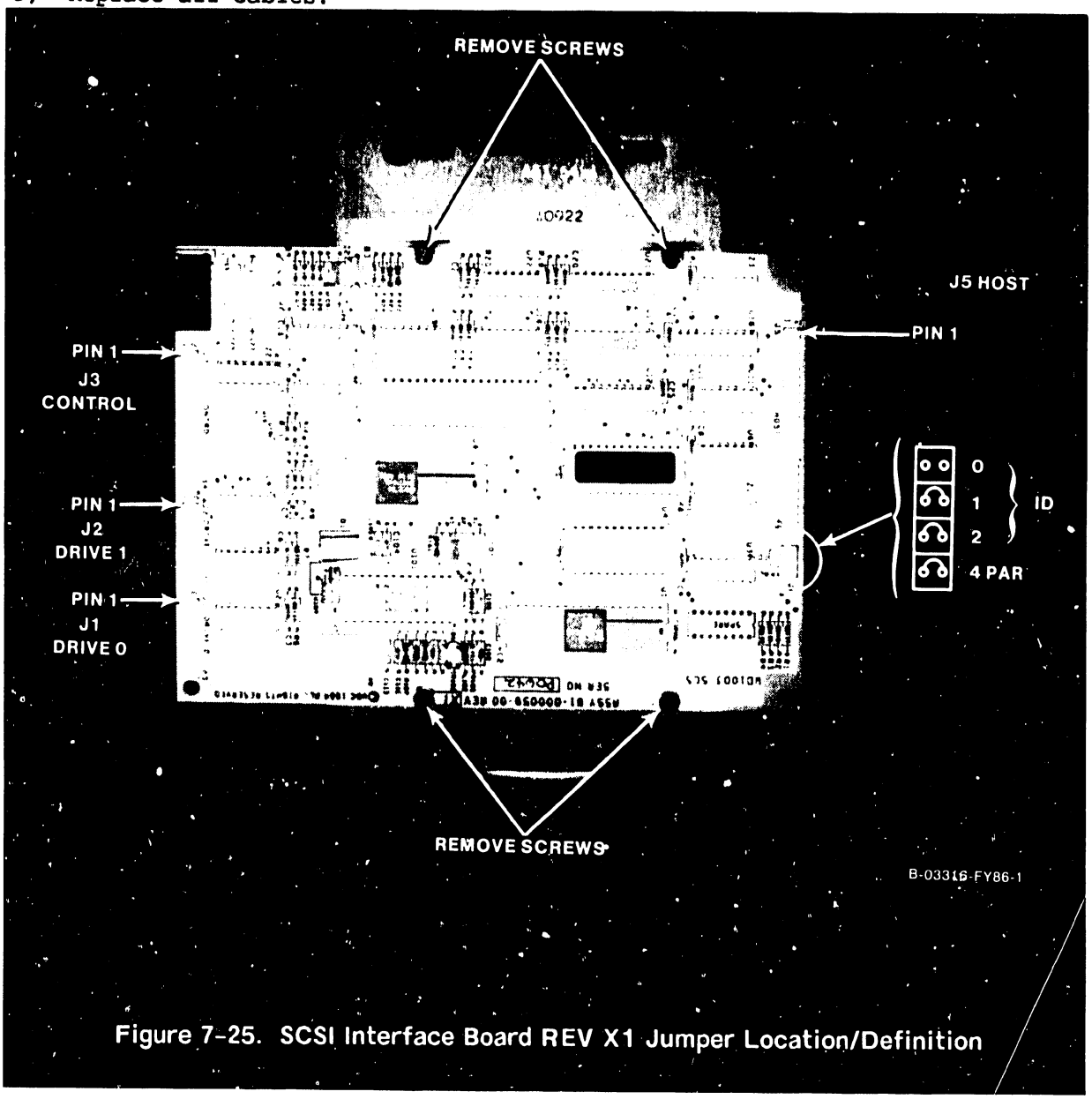


Figure 7-25. SCSI Interface Board REV X1 Jumper Location/Definition

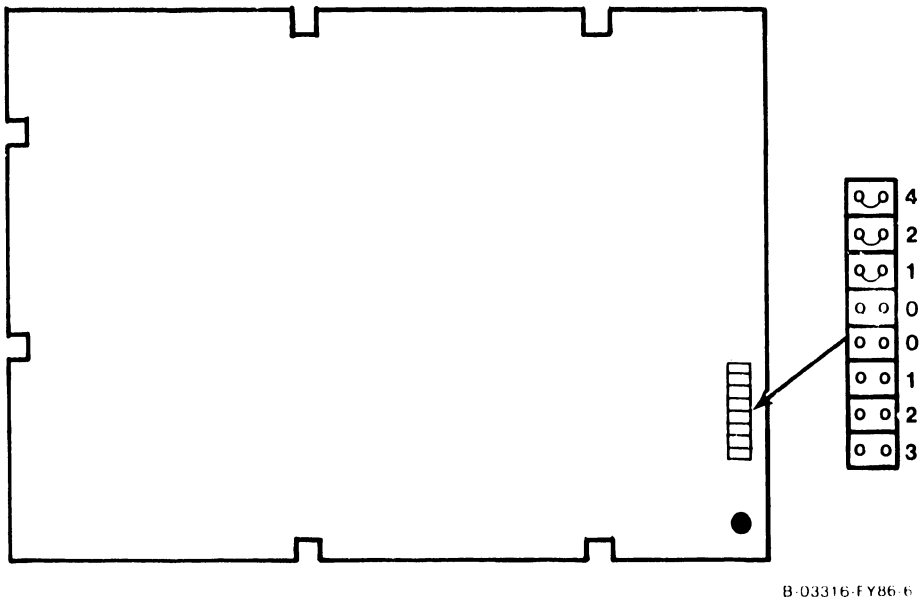


Figure 7-25A. SCSI Interface Board Rev X0 Jumper Location/Definition

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.

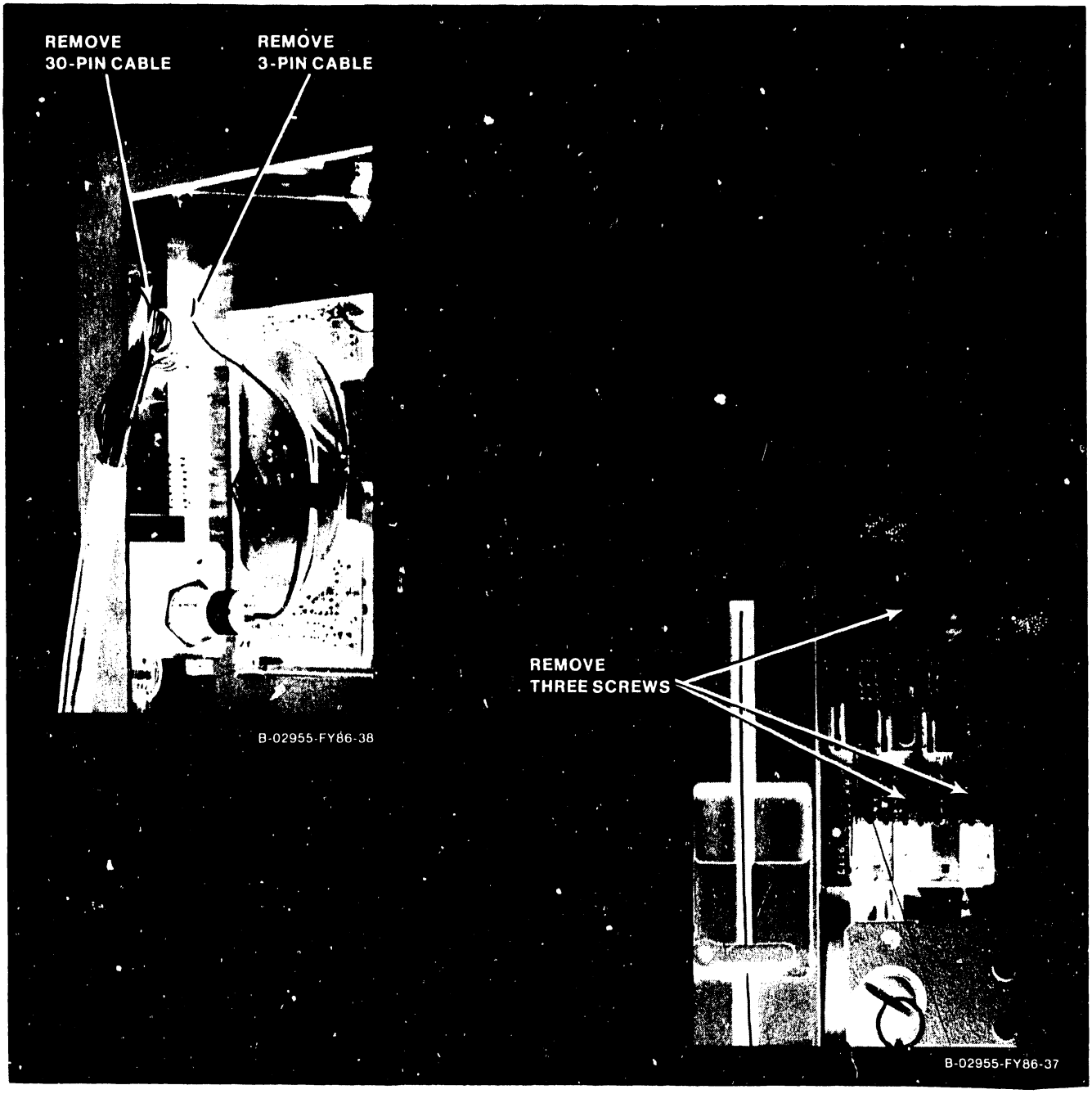


Figure 7-26. Front Panel (210-9113) Removal

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.

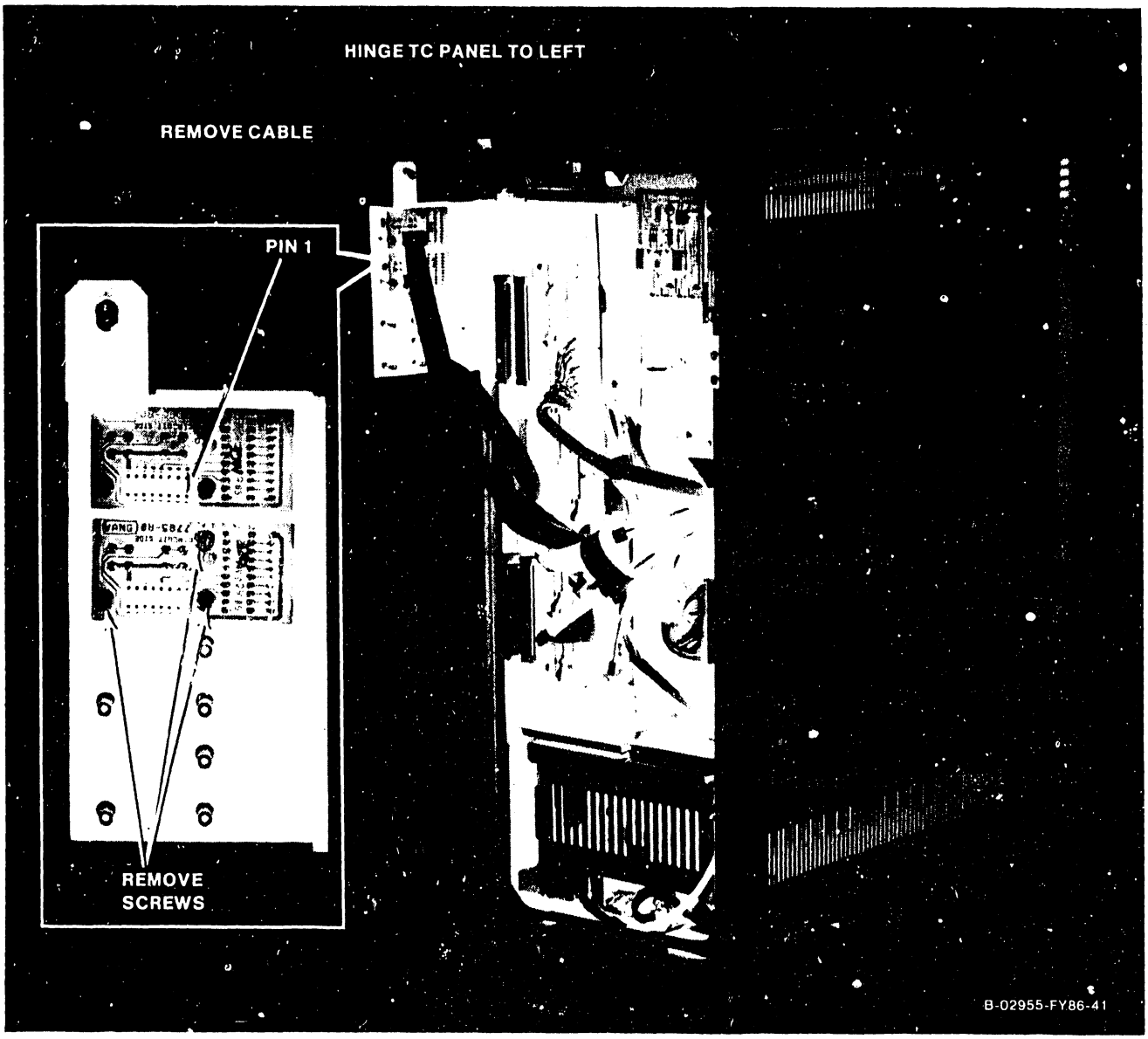


Figure 7-27. TC Light Panel (210-7785) Removal

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.

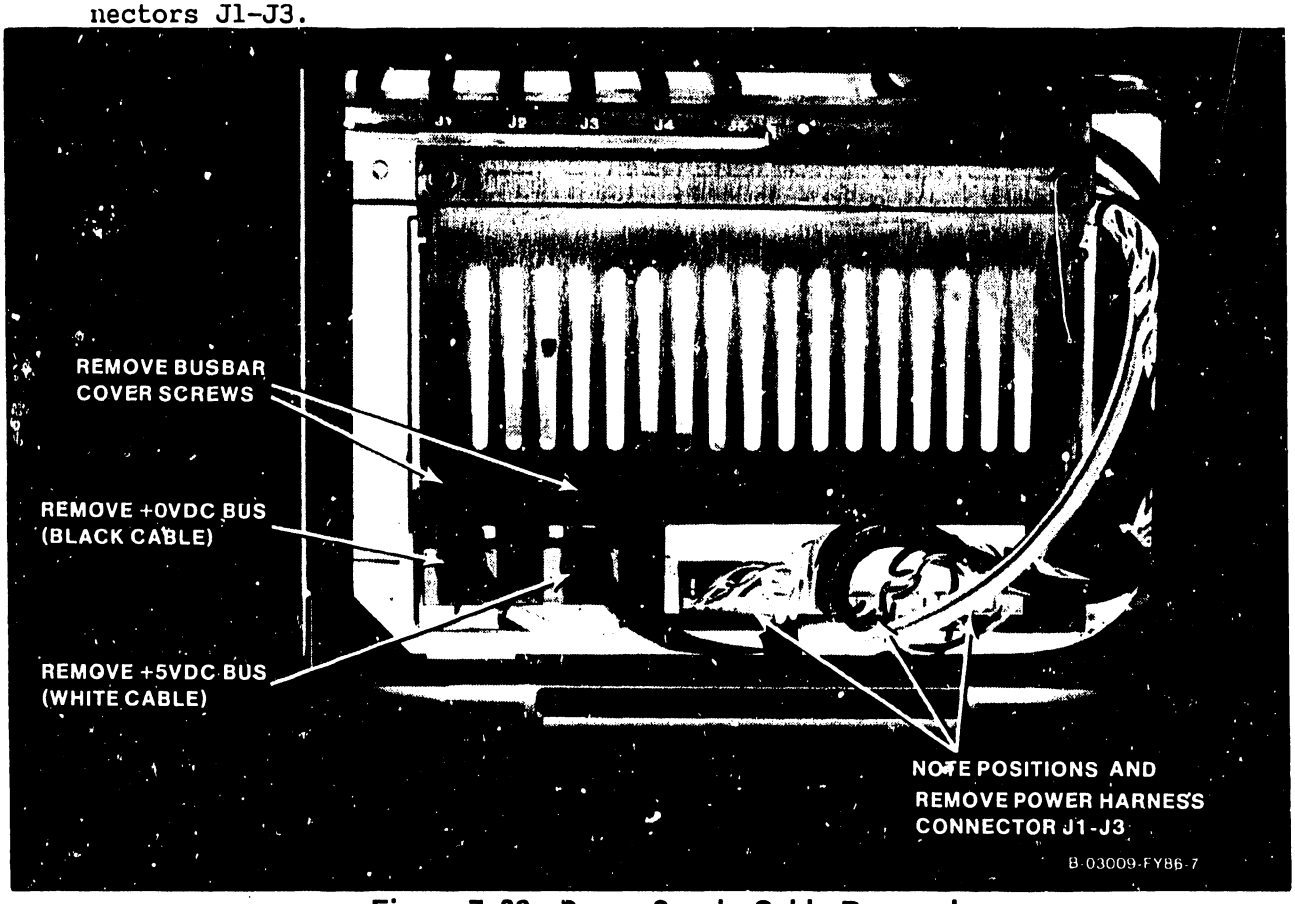


Figure 7-29. Power Supply Cable Removal

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.

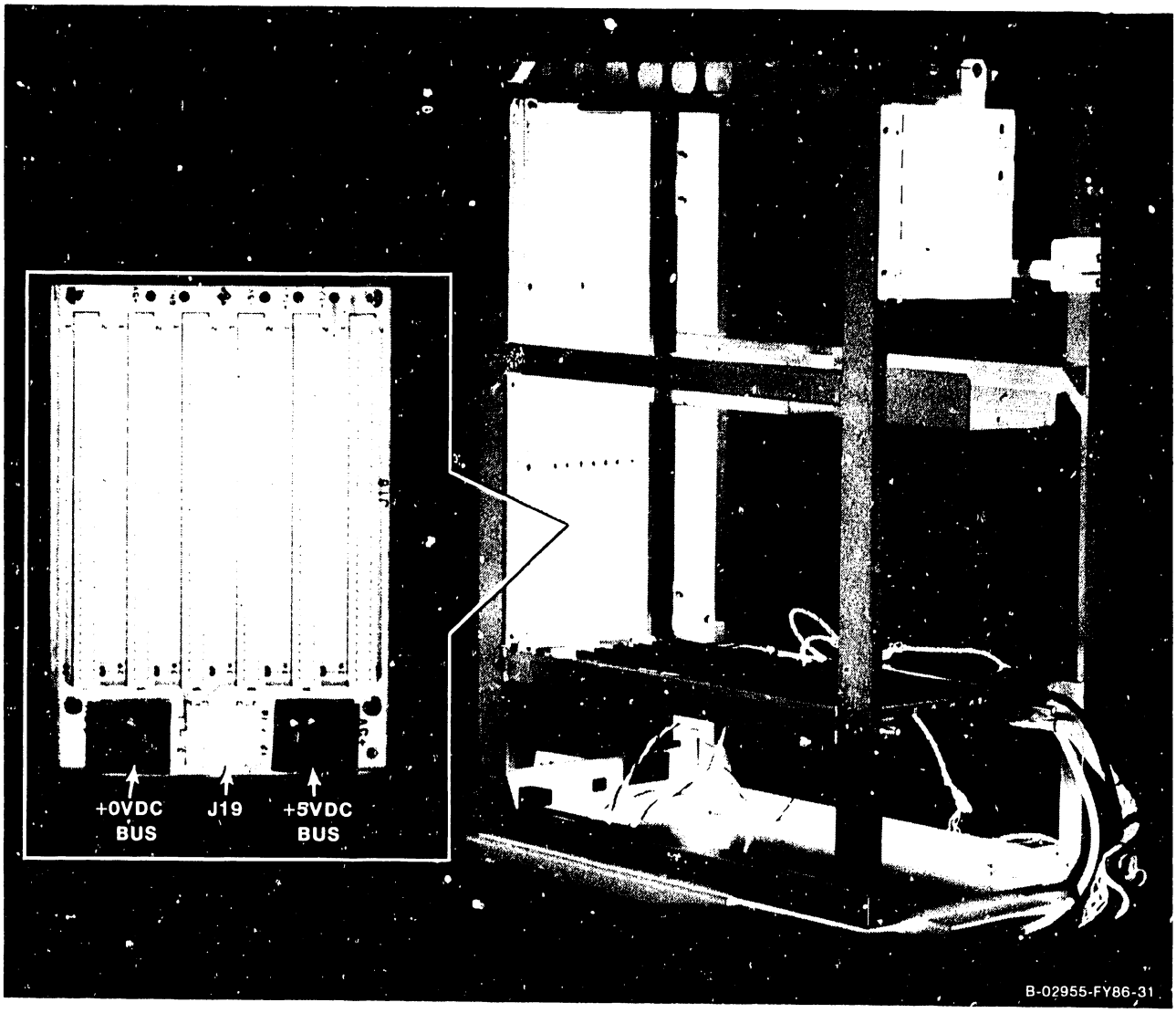


Figure 7-31. Motherboard Cables Removal

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.

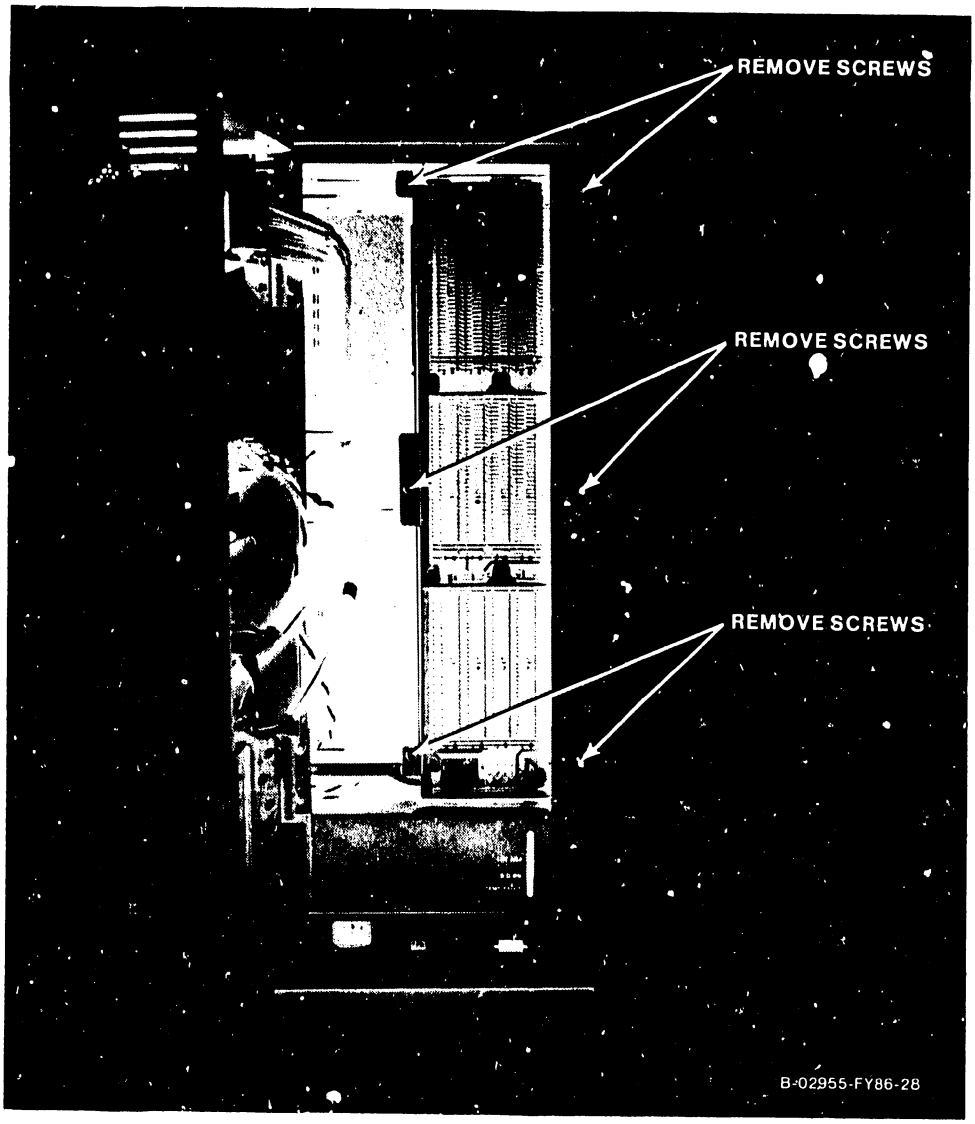


Figure 7-32. Backplane Mounting Screws Locations

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

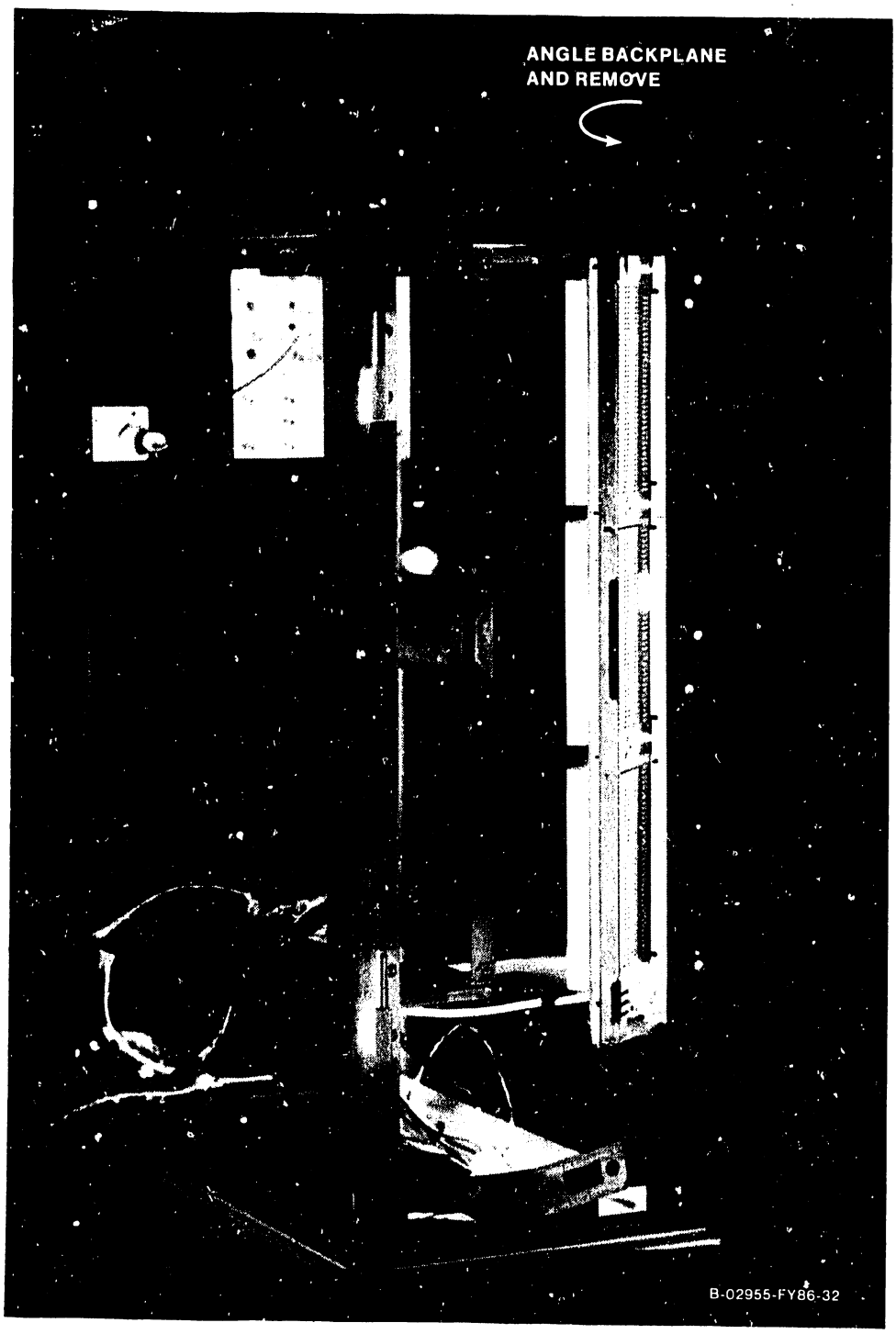


Figure 7-33. Backplane Removal

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.

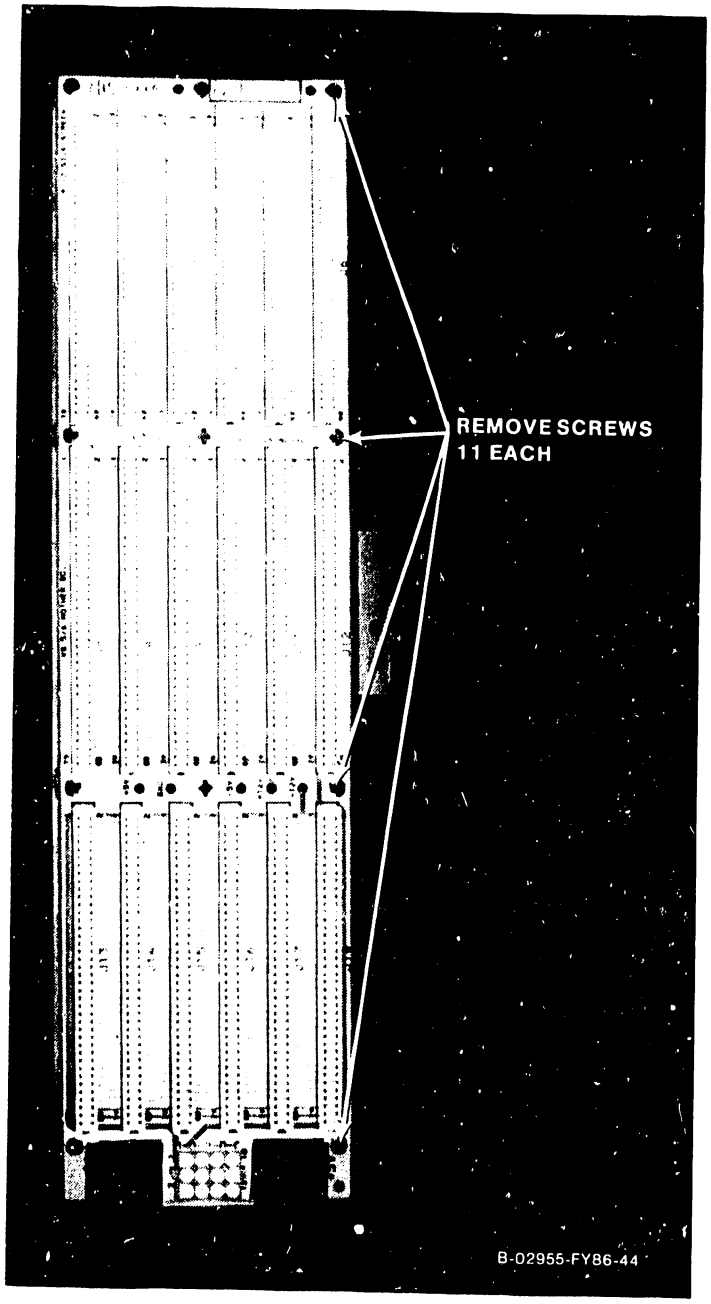


Figure 7-34. Motherboard Removal

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.

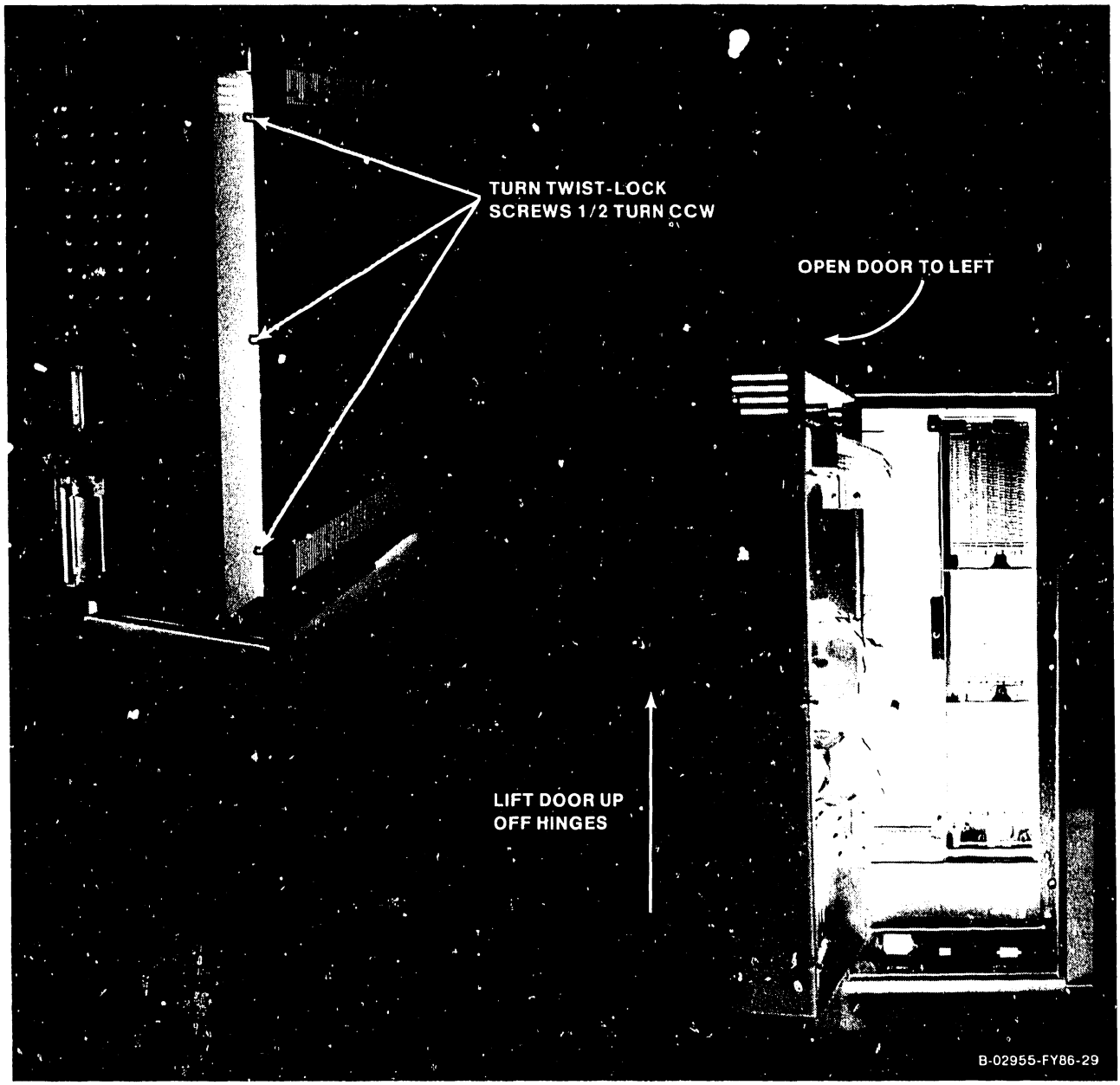


Figure 7-35. Bulkhead Door Removal

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.

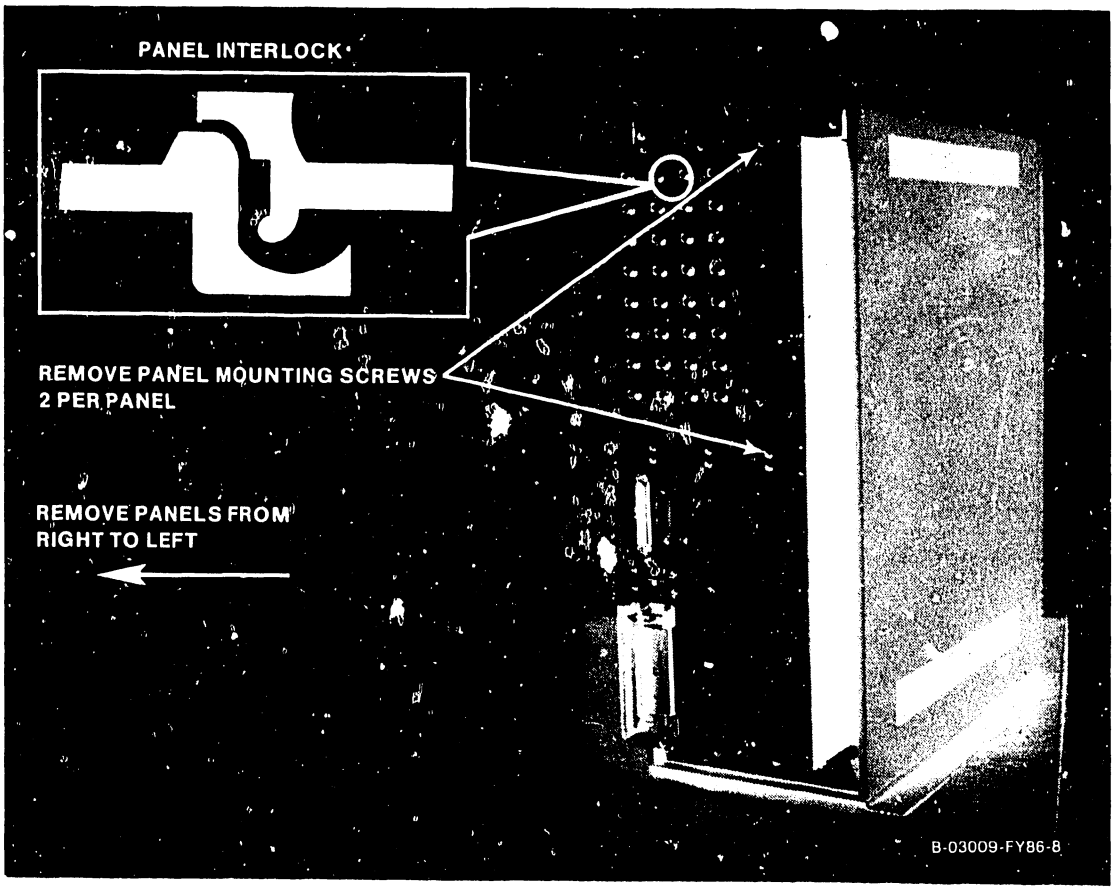


Figure 7-36. General I/O Panel Removal

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.

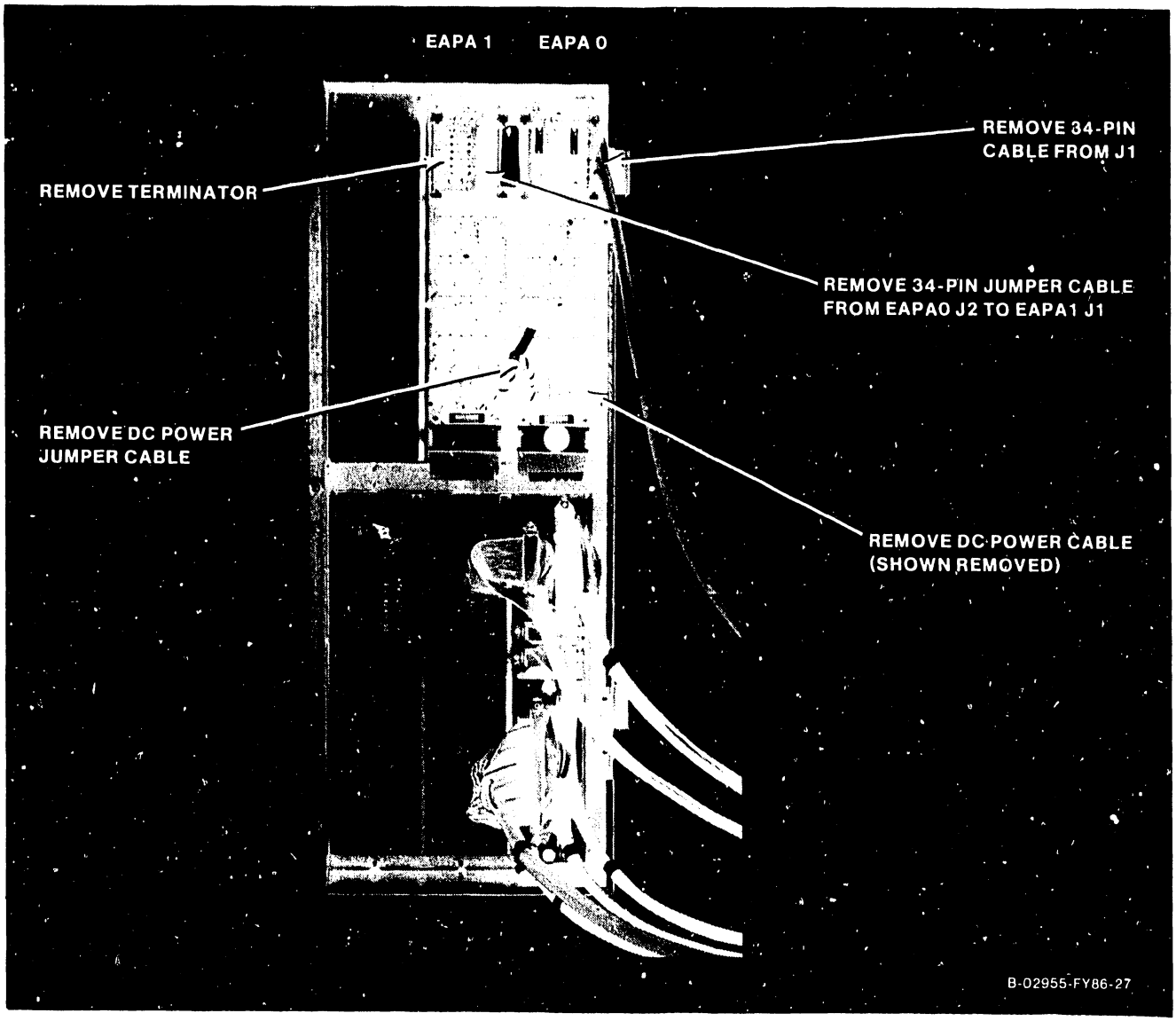


Figure 7-37. EAPA Panel Removal/Replacement

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.

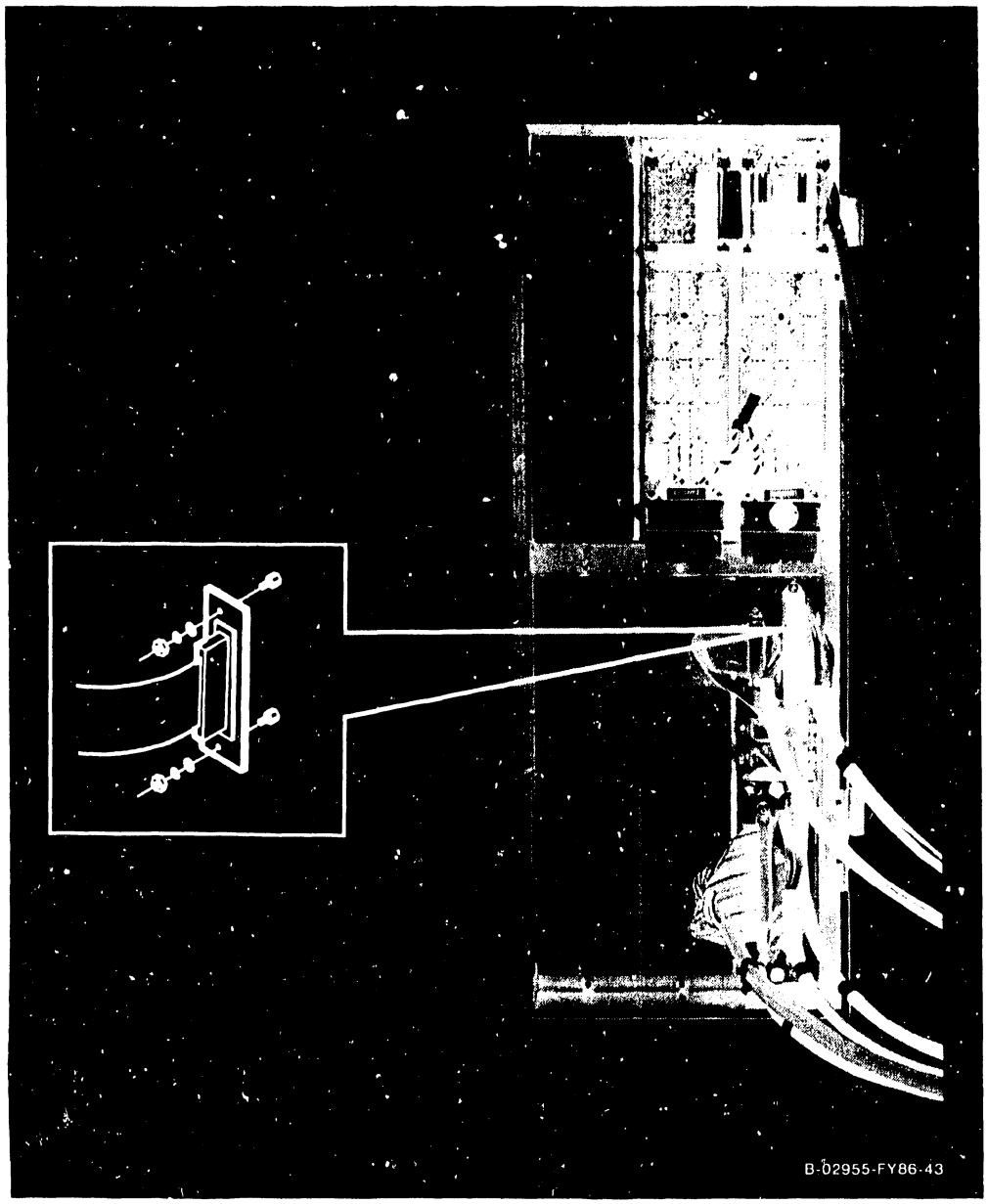


Figure 7-38. SCSI Panel Cable Replacement

Table 7-8. SCSI Panel Cable Listing

Cable P/N	Source	Destination
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

SECTION 8

ADJUSTMENTS

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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.

3) Measure voltage between motherboard +5V test point and GND test point.

4) Adjust +5V ADJ pot to acceptable voltage levels.

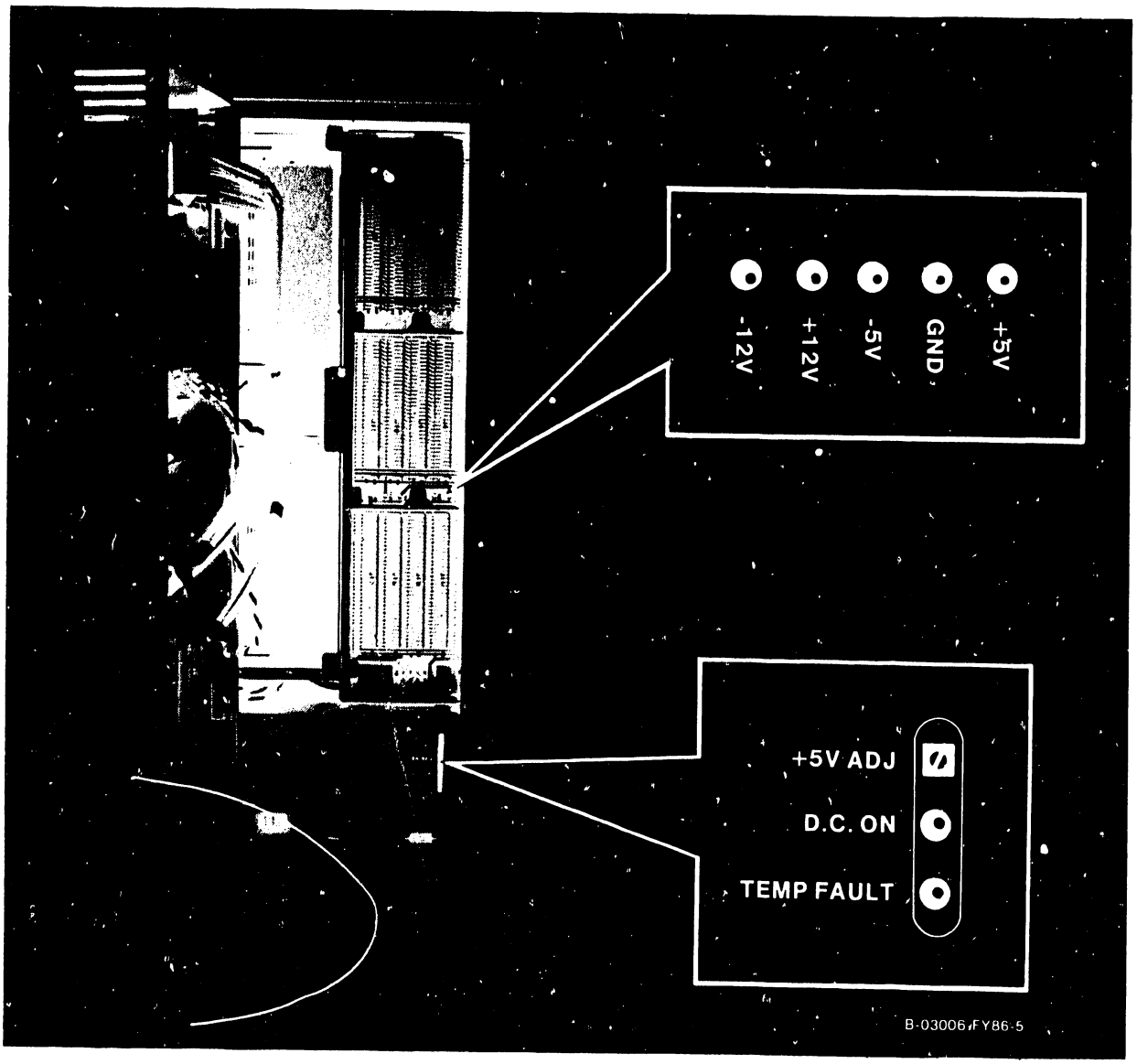

Figure 8-1. SPS500 Power Supply Voltage Adjustment

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.

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 ± 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.

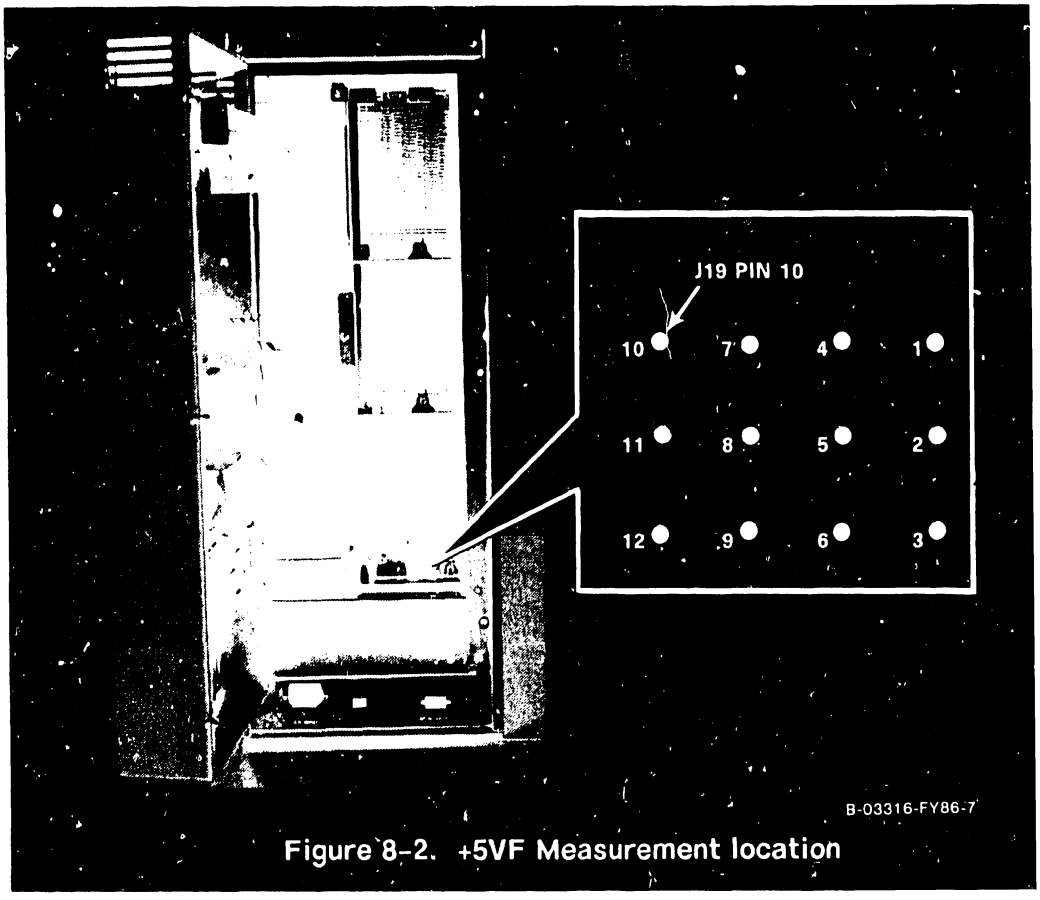

Figure 8-2. +5VF Measurement location

SECTION 9

UNPACKING AND SETUP

SECTION 9

UNPACKING AND SETUP

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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 meet. 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

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

Perform the following unpacking procedures:

1) Remove VS-5/6 from shipping carton.

2) Visually inspect the unit for external damage.

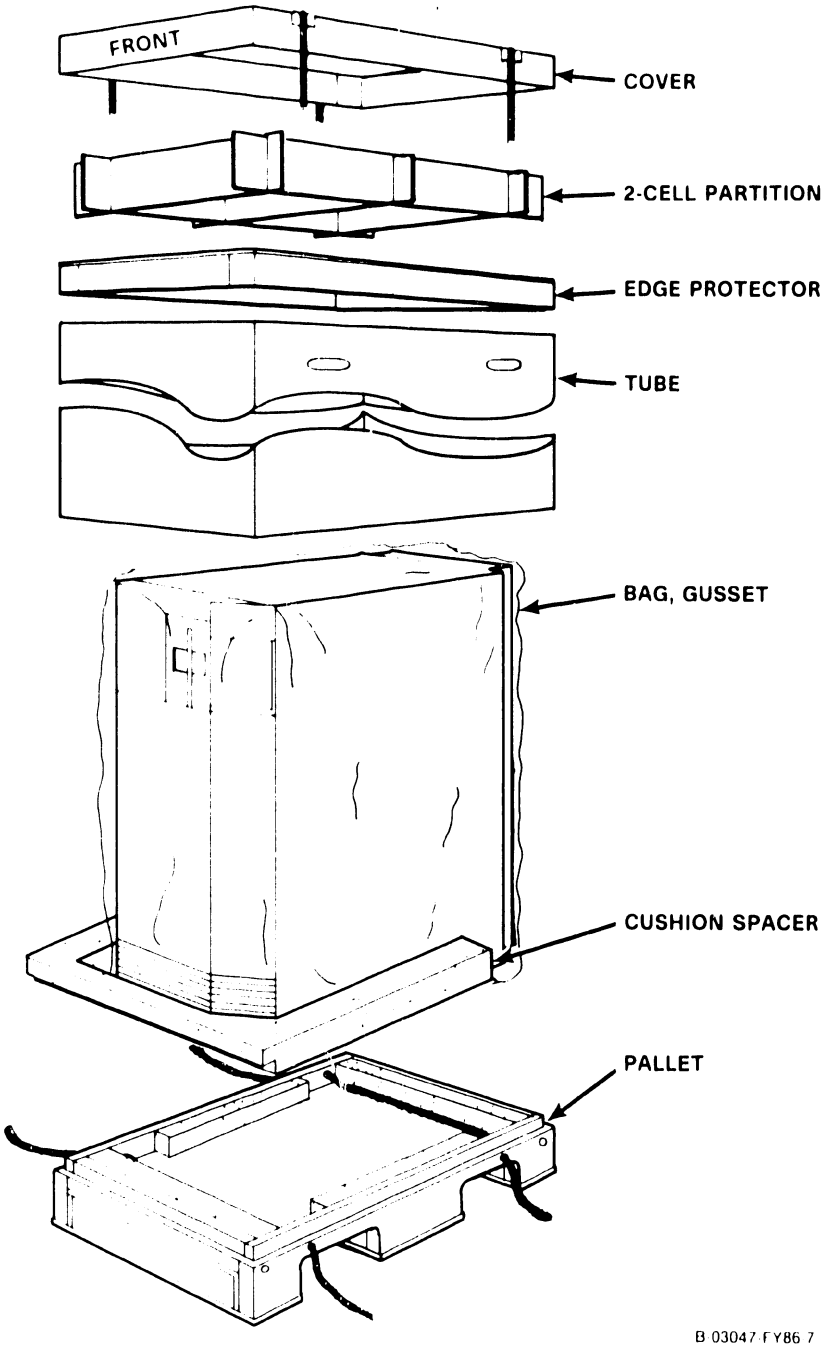

Figure 9-1. VS-5/6 Computer Unpacking

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

Software	Version	Comments	WLI P/N
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

Software	Version	Comments	WLI P/N
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

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

Table 9-5. VS-5 Other Diagnostics

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

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

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

Table 9-7. VS-6 Other Diagnostics

Diagnostic Name	Version	Package P/N
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.

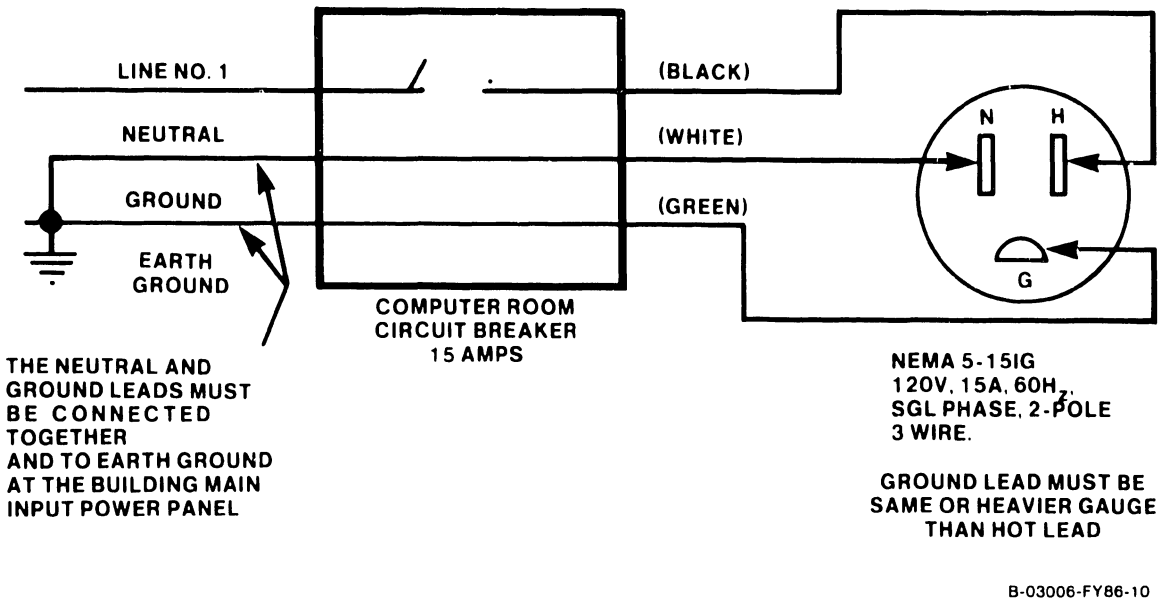

Figure 9-2. USA Power Service Requirements (NEMA) for VS-5/6 Installation

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).

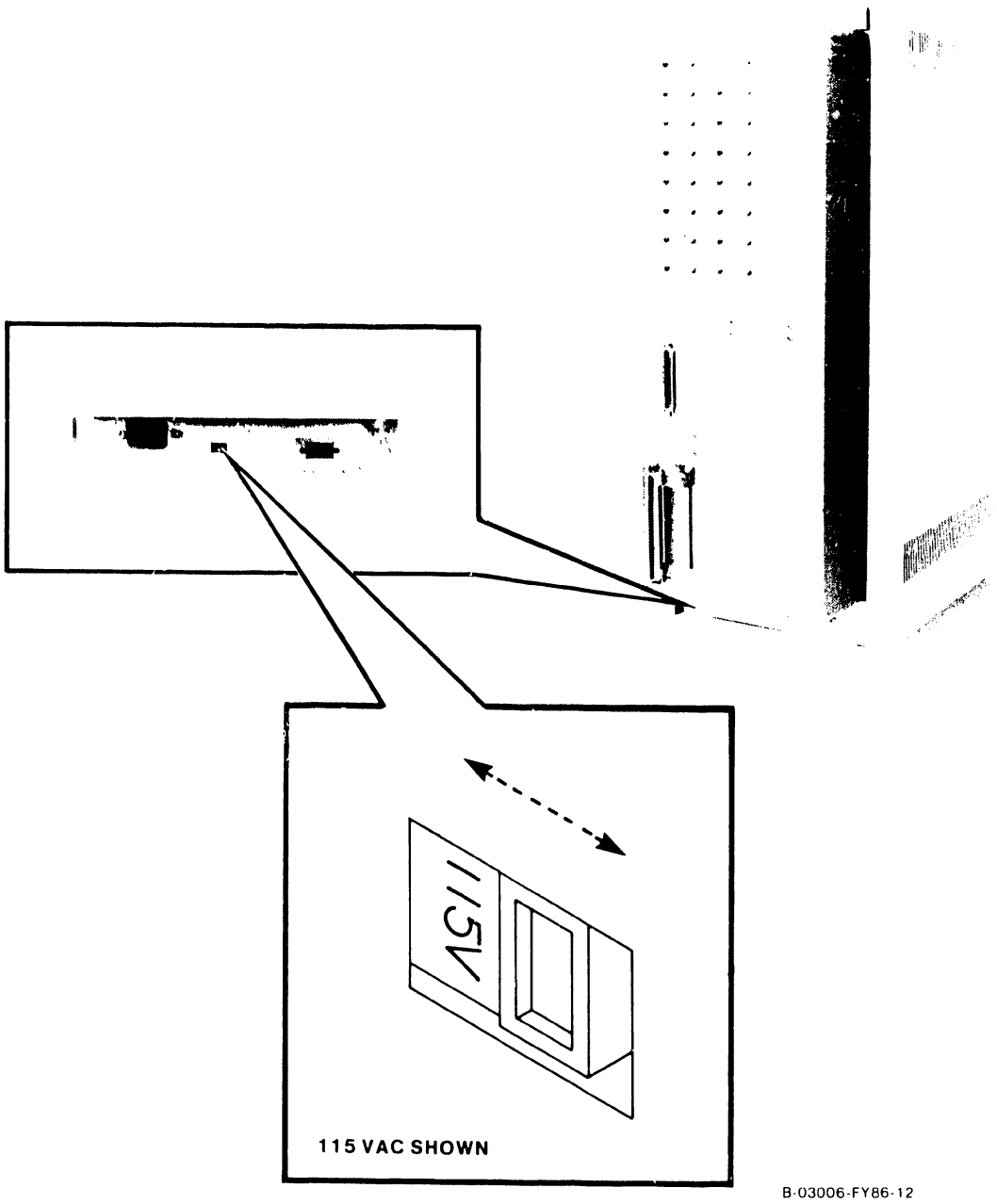

Figure 9-3. Ac Voltage Select Switch

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.

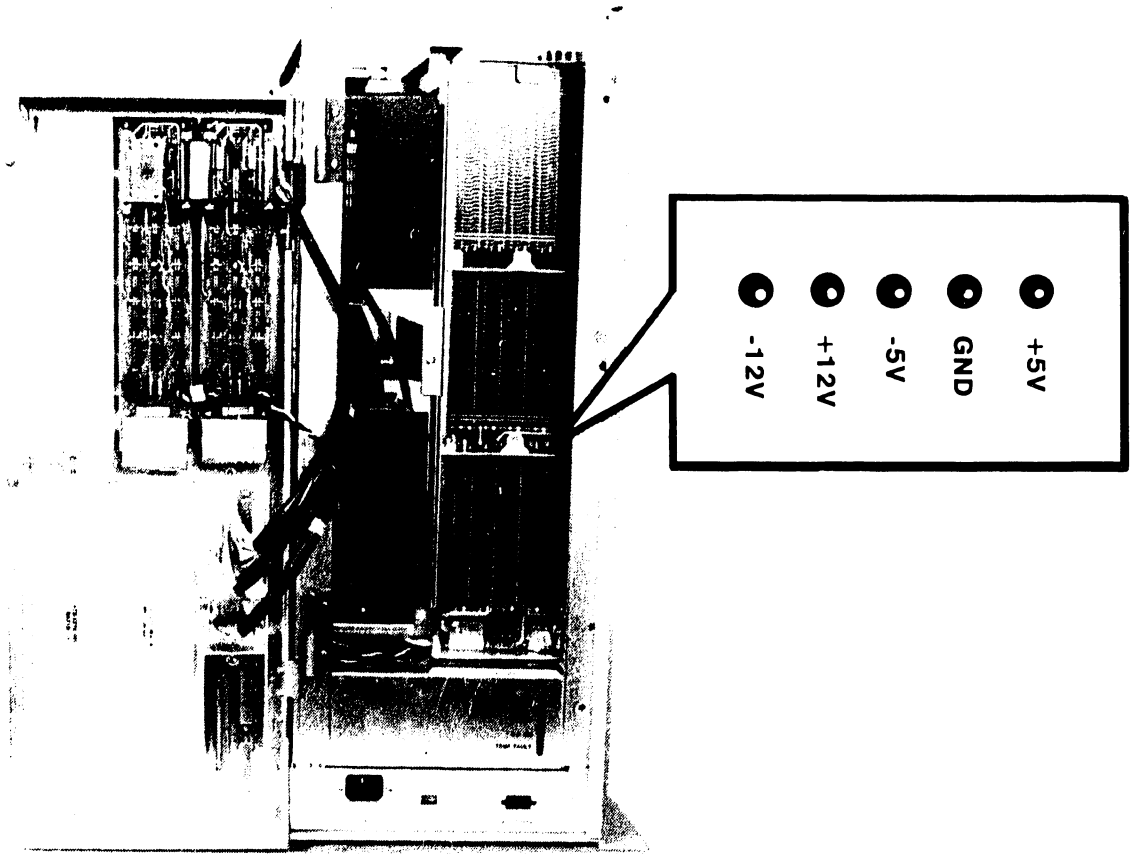

Figure 9-4. DC Voltage Test Points

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)

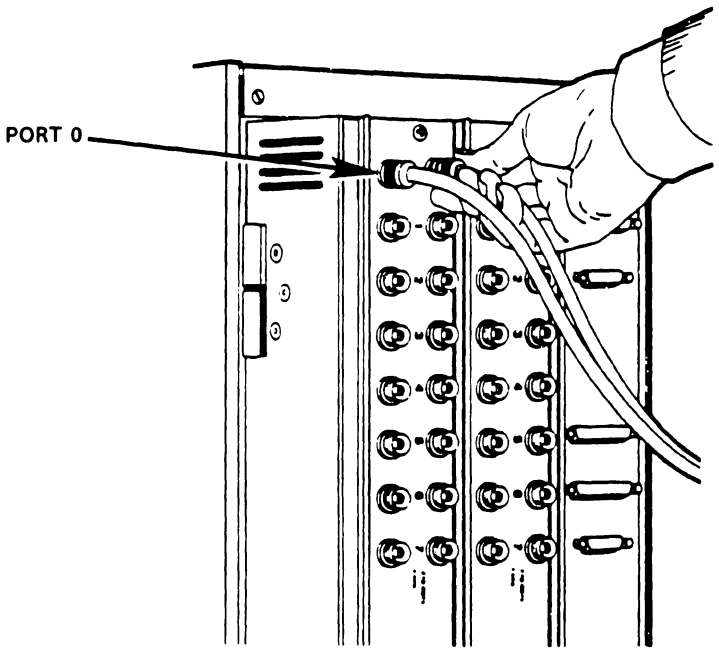

Figure 9-5. Connecting Workstation 0

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. Coping 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.

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

                    COMMFILE =
                    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 WS0 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

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.

```
                    *** 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 QUEUS                           (13)  Send MESSAGE to Operator
    (5)  Manage FILES/Libraries                 (15)  PRINT Command Screen
    (6)  Manage DEVICES                         (16)  LOGOFF
```

Figure 9-13. Command Processor Menu

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

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 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.

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.

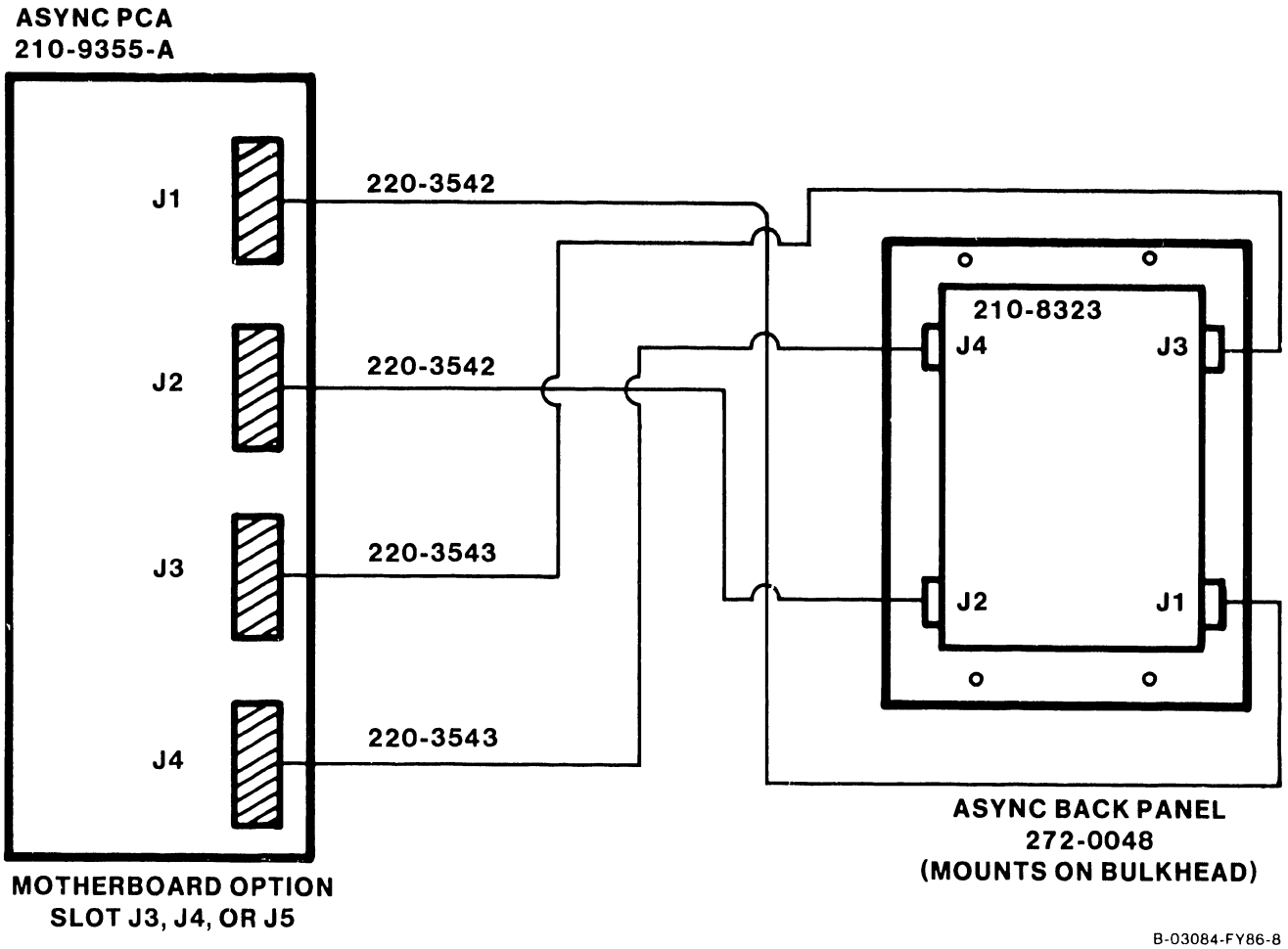


Figure 9-20. Async Device Controller Option Cabling

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.

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.

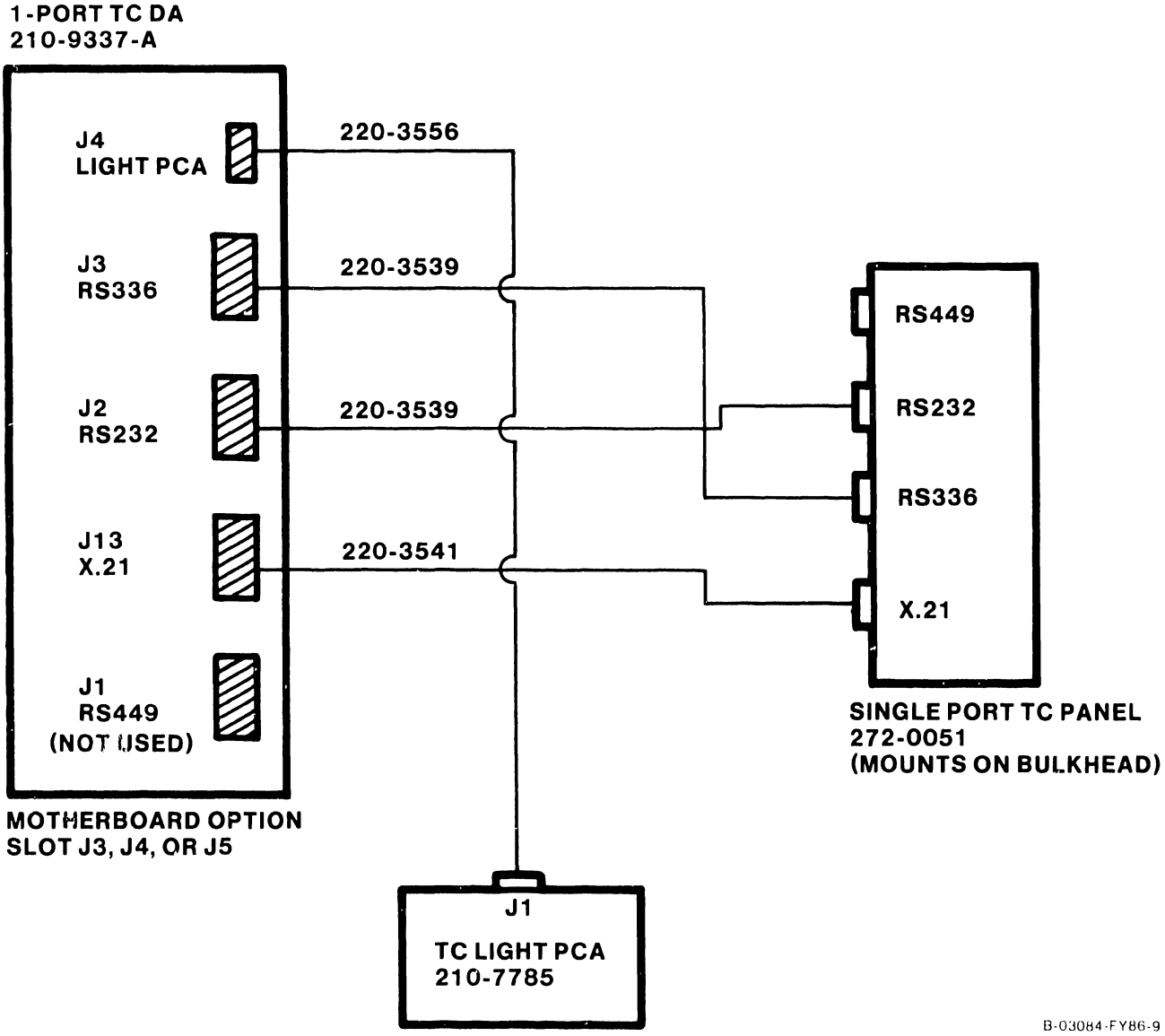


Figure 9-21. 1-Port TC DA Option Cabling

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.

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.

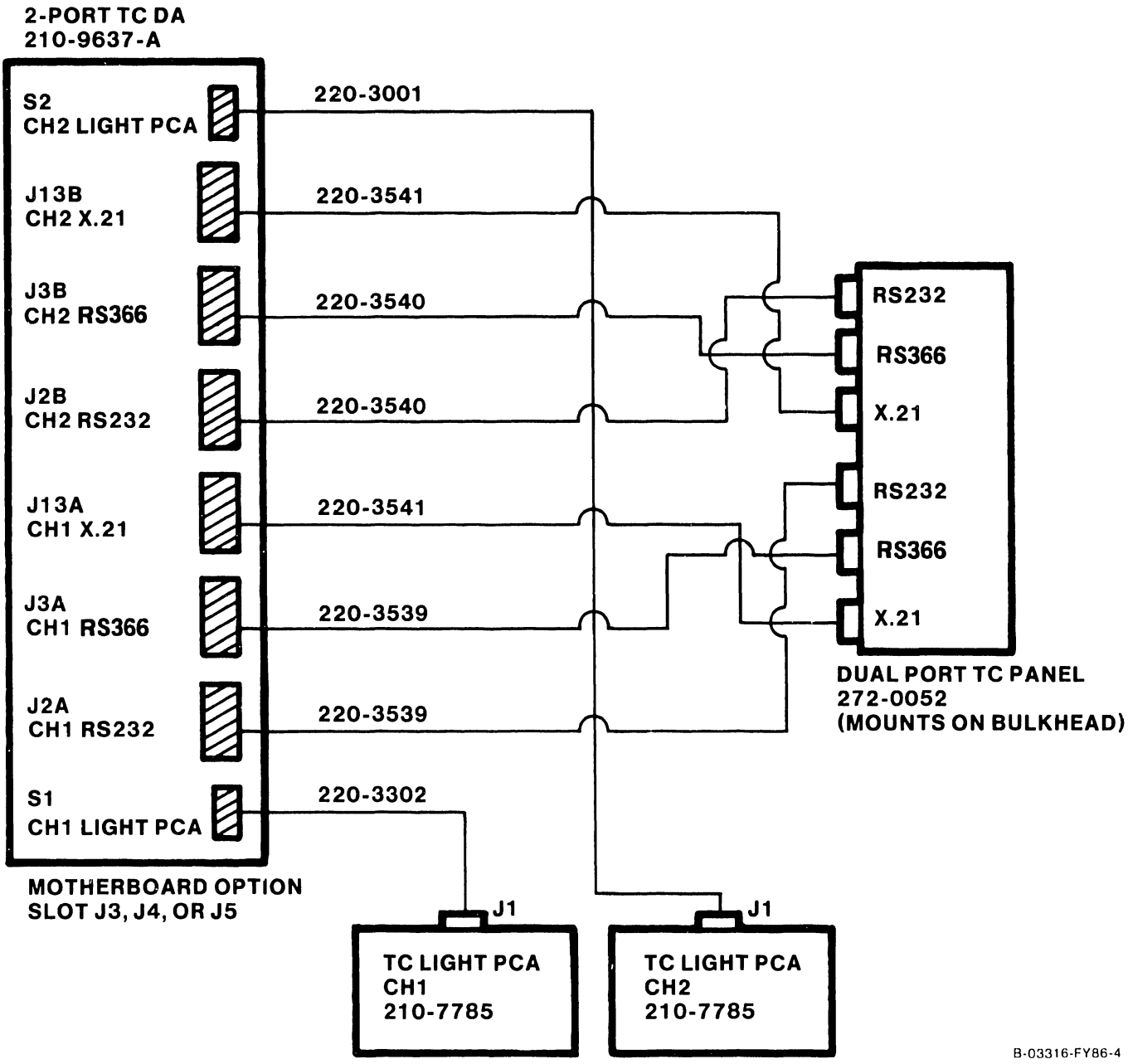


Figure 9-22. 2-Port TC DA Option Cabling

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).

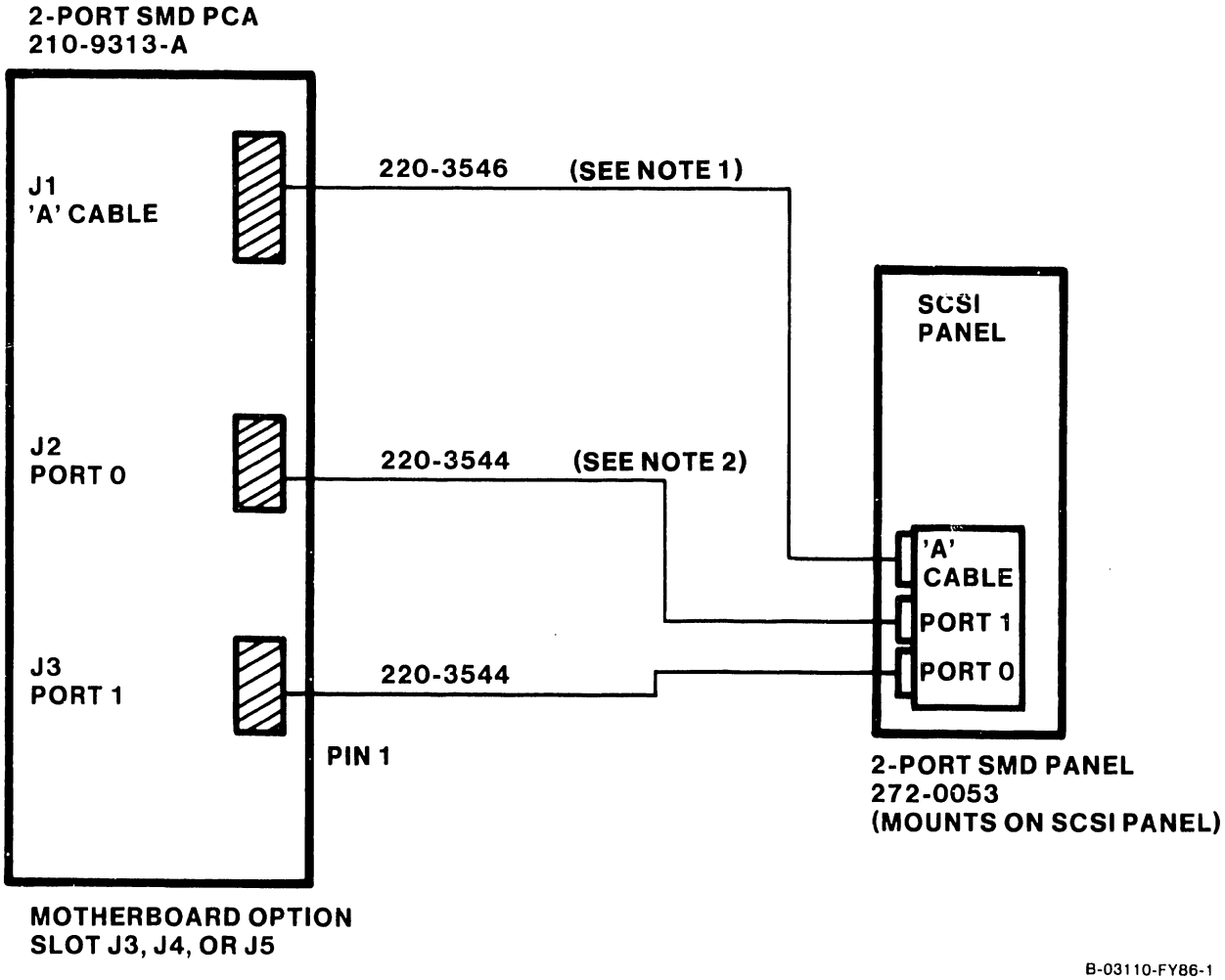
2-Port SMD Panel Installation

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.



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

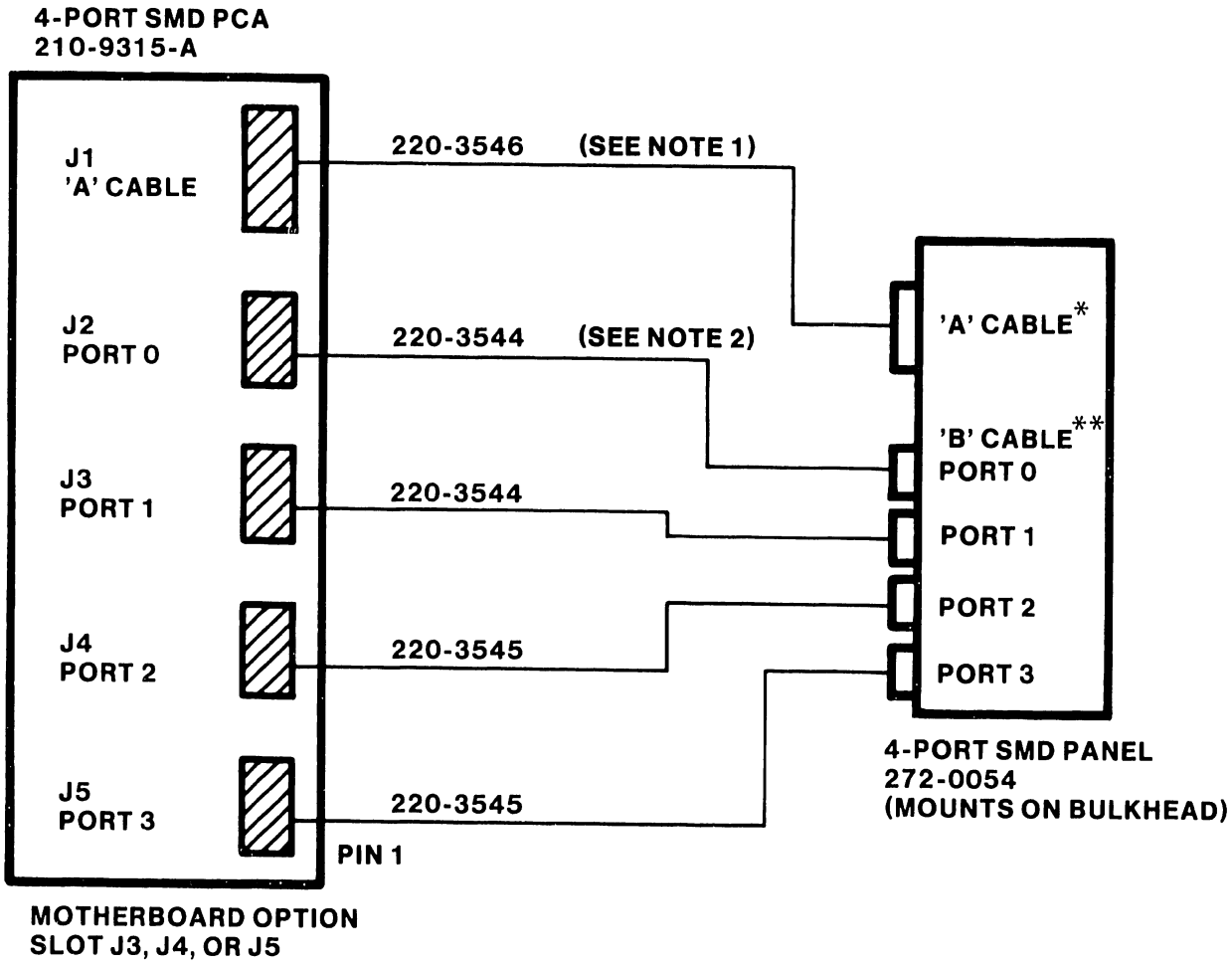
1) Remove one blank I/O panel from the bulkhead door (refer to paragraph 7.12.1).

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.



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

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).

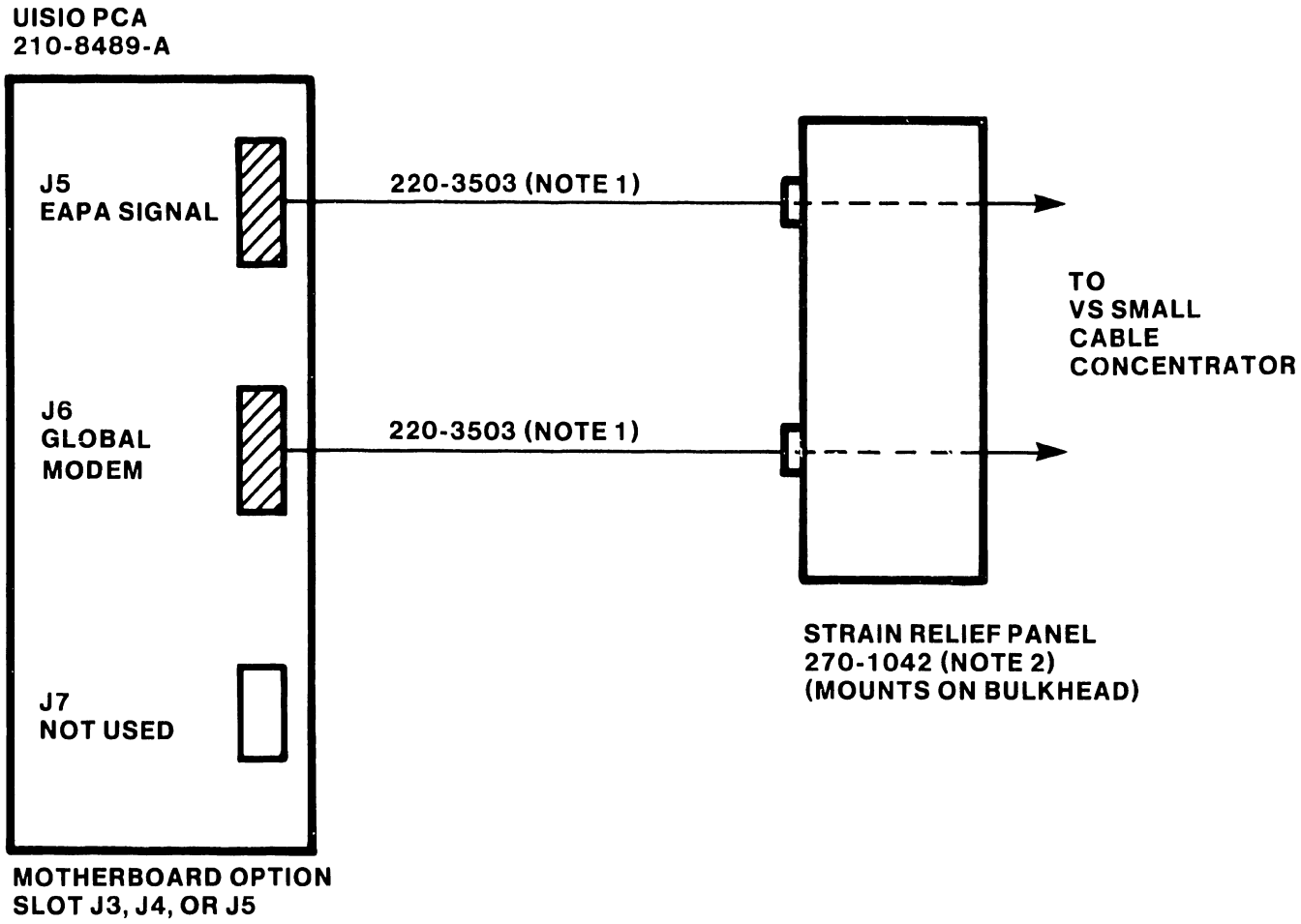
2) Install the Strain Relief Panel (shipped with the concentrator) in the space vacated by blank I/O panel.

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.



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

B-03084-FY86-13

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 if 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.

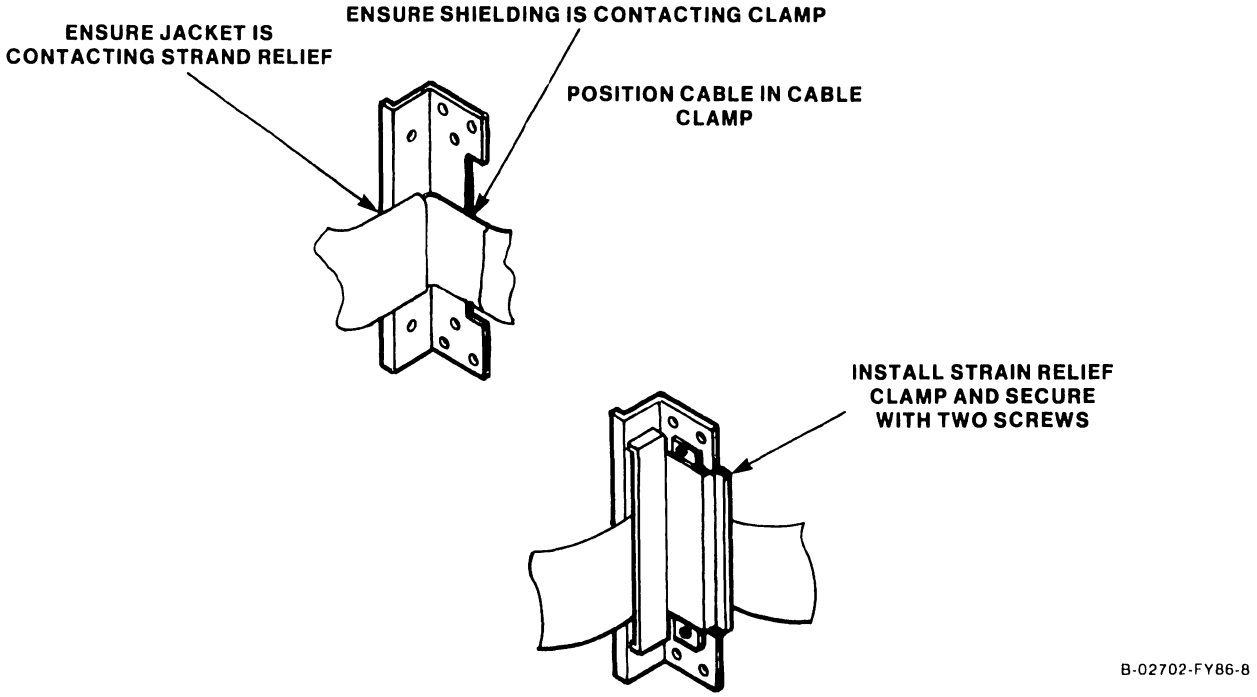


Figure 9-26. Installing Disk Cable Into Cable Clamp

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.

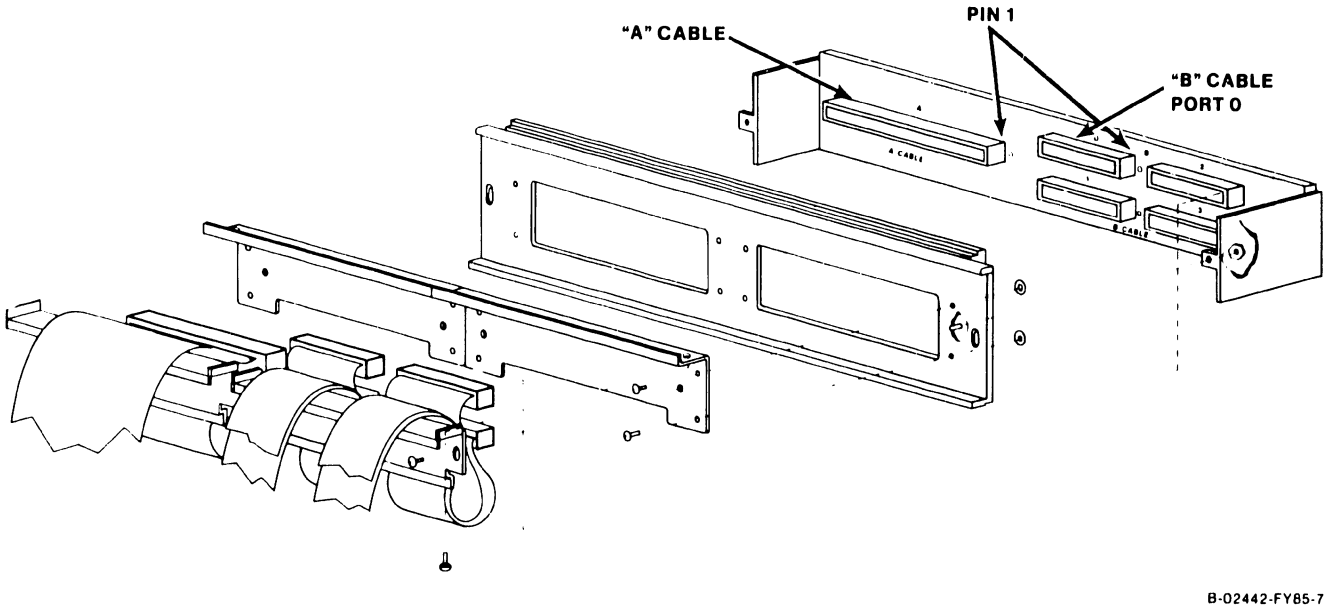


Figure 9-27. SMD Panel External Cabling

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

FUNCTIONAL DESCRIPTION

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

SPECIFICATIONS

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 ± 0.5 (60 Hz nominal)
180 - 264 Vac (230 Vac nominal), 50 Hz ± 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

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 ±5% @0.9 Amp Idle, 0.9 Amp Peak
+12 Vdc ±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:
    ±5% @ 30 Amps Typical, 65 Amps Peak, 50 mv Ripple P-P at full Load

+12 Vdc:
    ±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:
    ±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 ±5% @0.7 Amp Typical, 0.9 Amp Peak
+12 Vdc ±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

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

Software	Version	Comments	WLI P/N
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

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

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)

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

11.3.2 VS-5/6 DIAGNOSTICS

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

NOTES

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

SECTION 12
ILLUSTRATED
PARTS

SECTION 12

ILLUSTRATED PARTS

SECTION 12

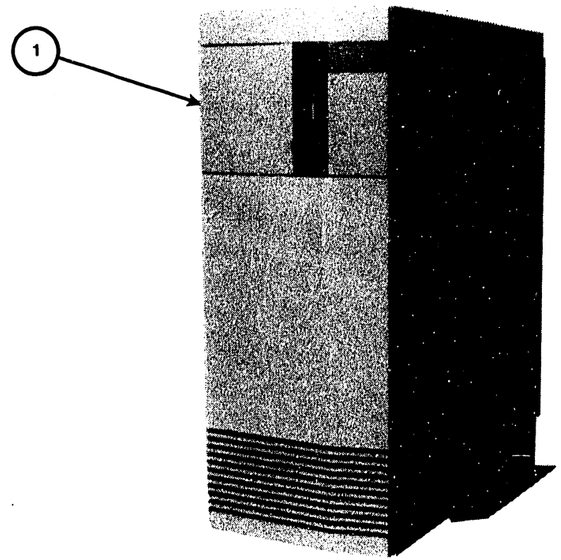
ILLUSTRATED PARTS

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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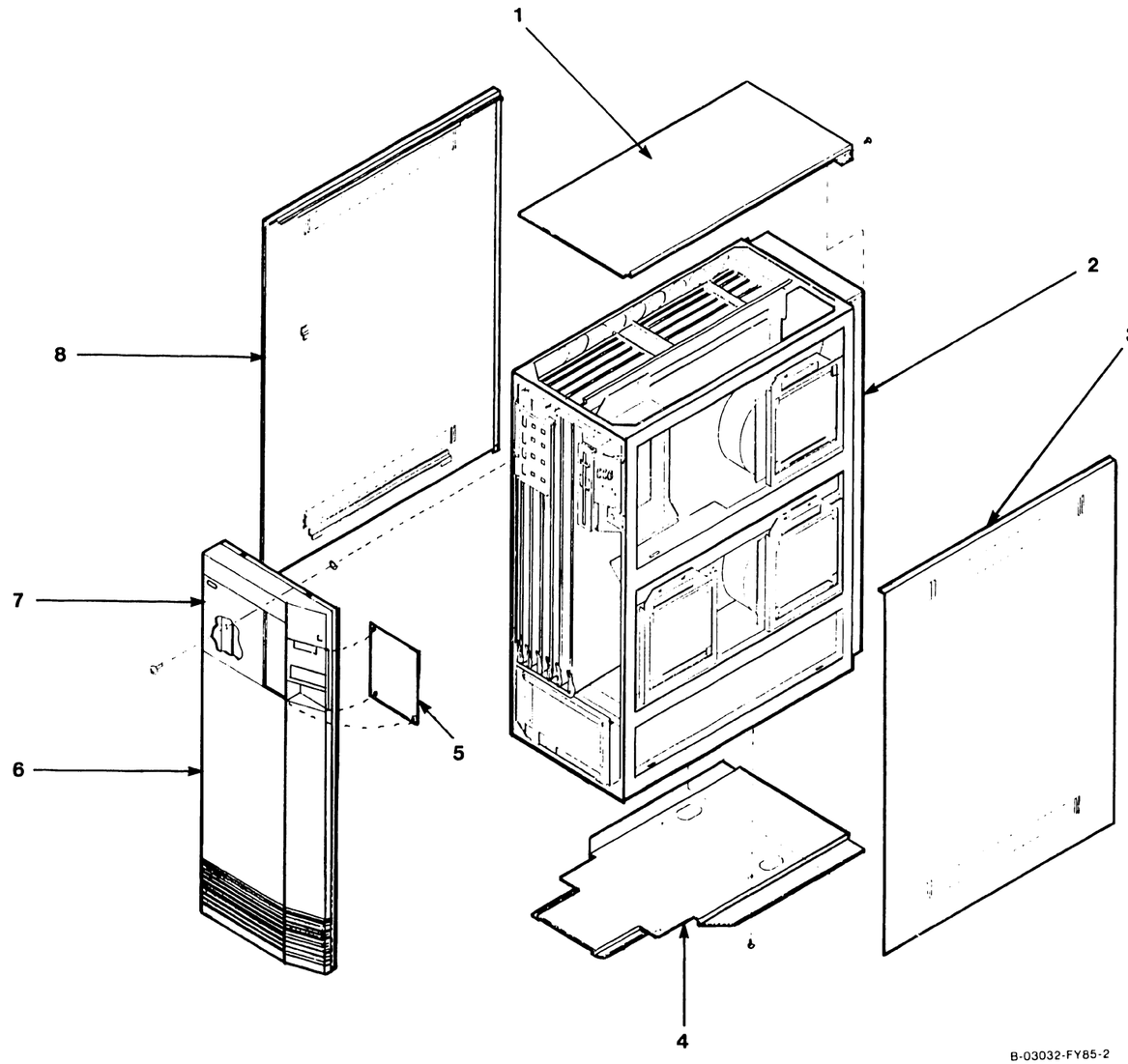
12.2 SUBASSEMBLIES

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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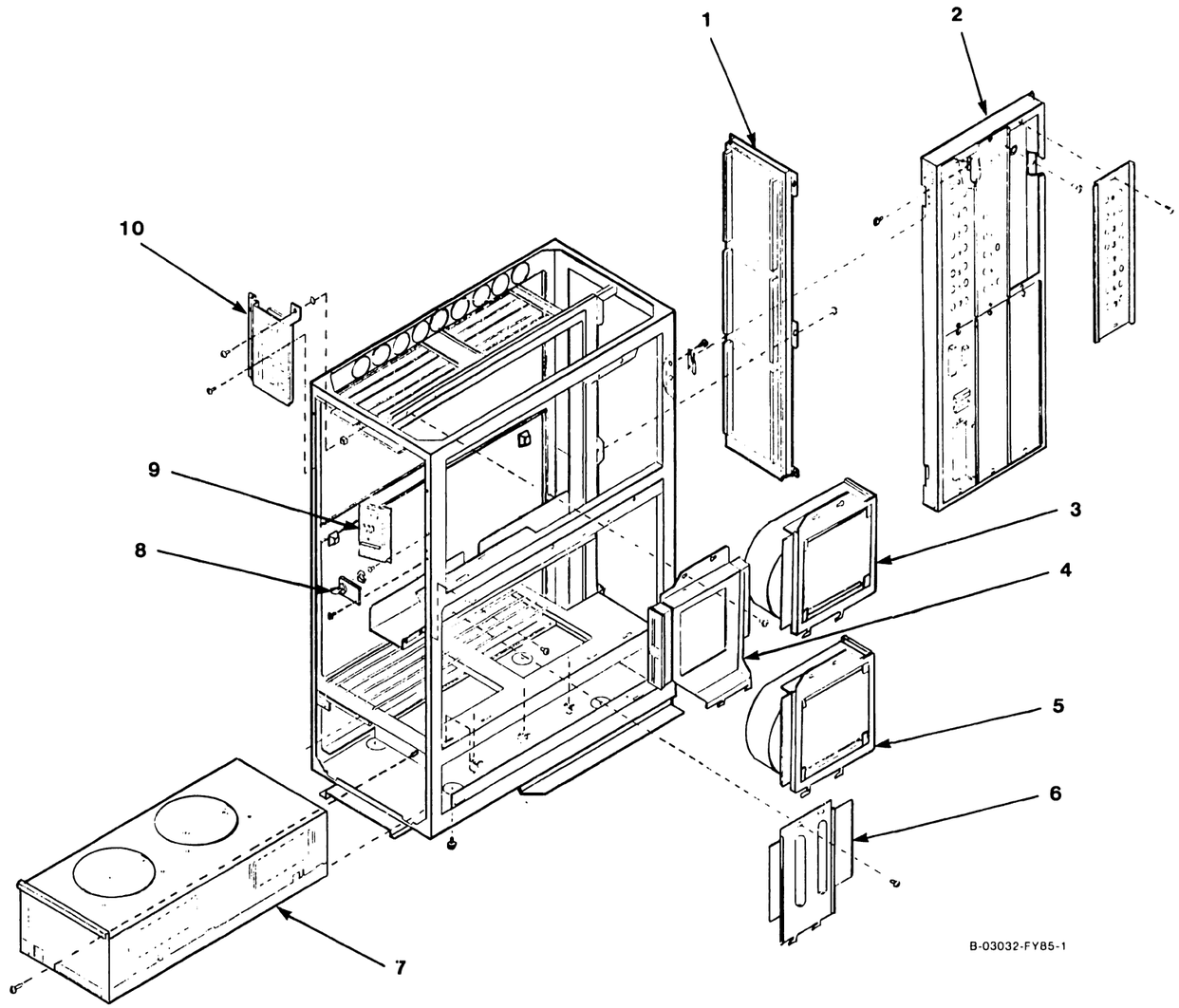
12.2.2 VS-5/6 Computer System Chassis

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)

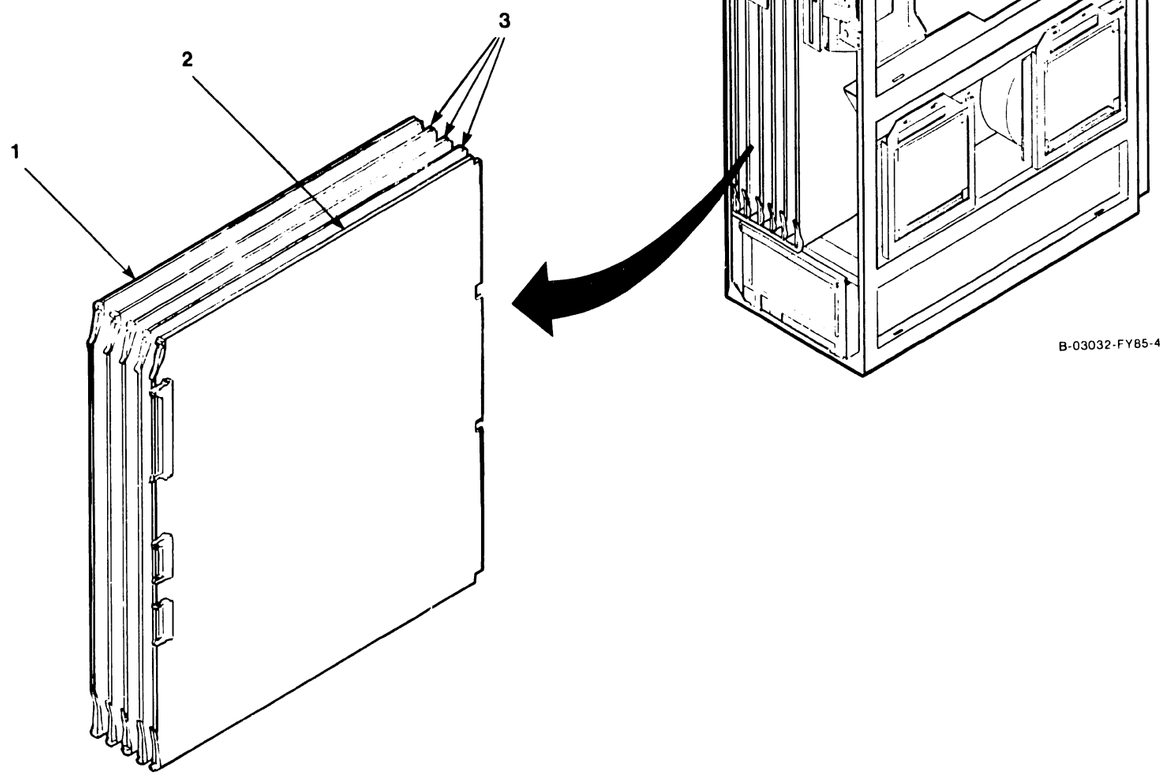
* Recommended Spare Part



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

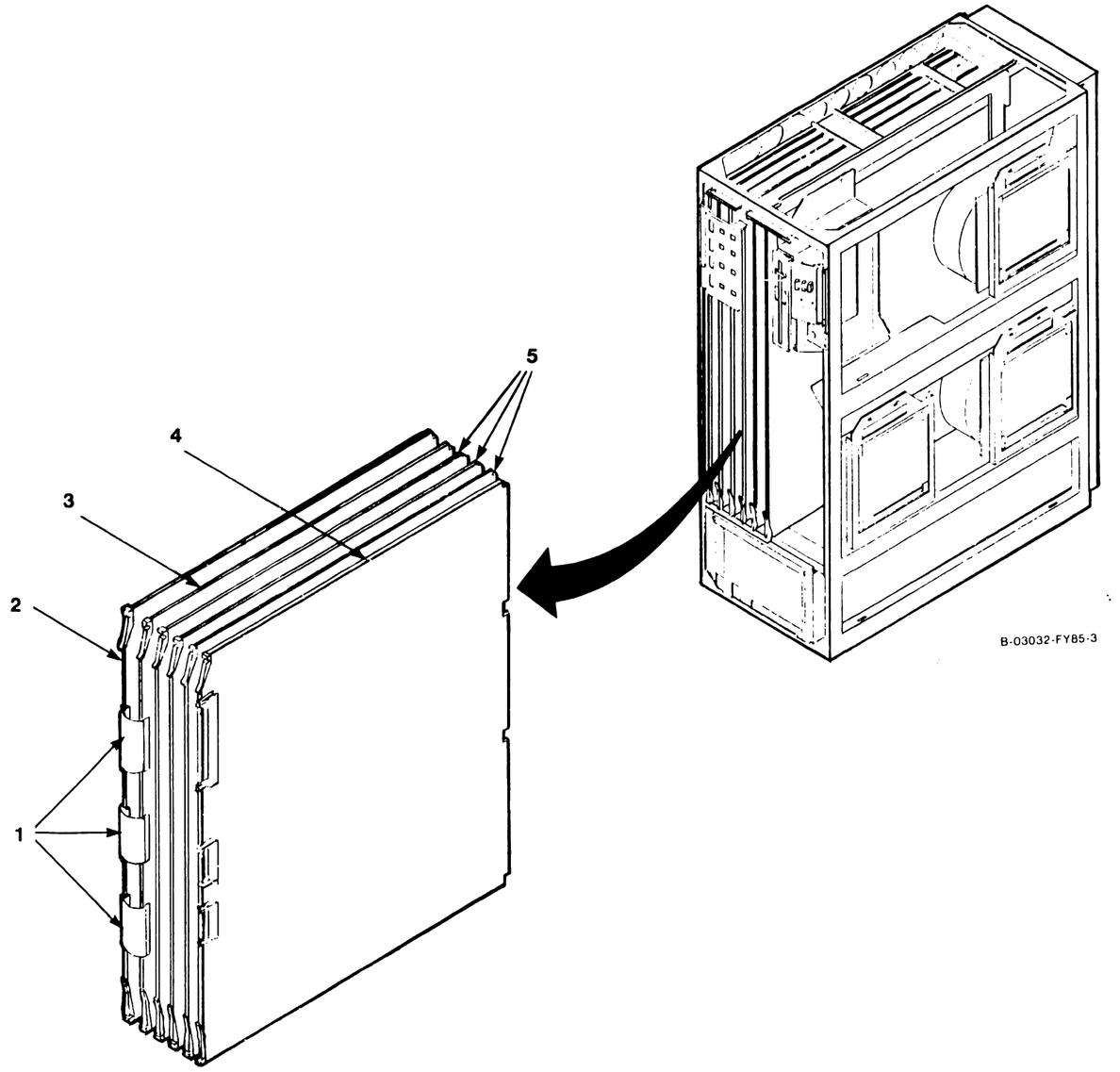
* Recommended Spare Part



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

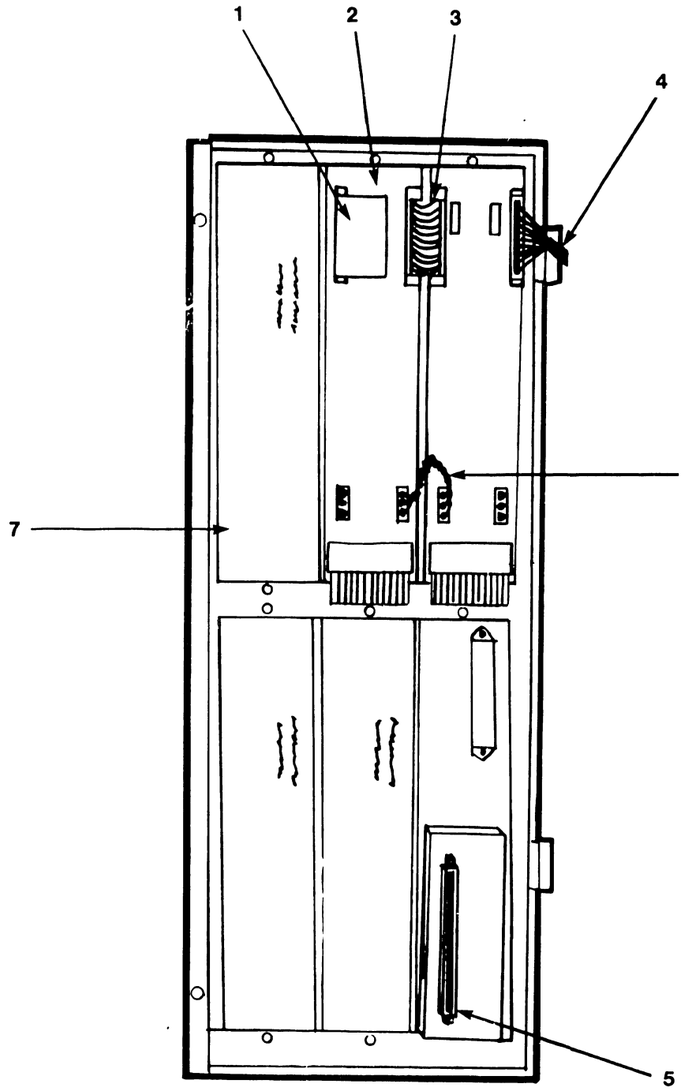


12.3 Components

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



(INSIDE VIEW)

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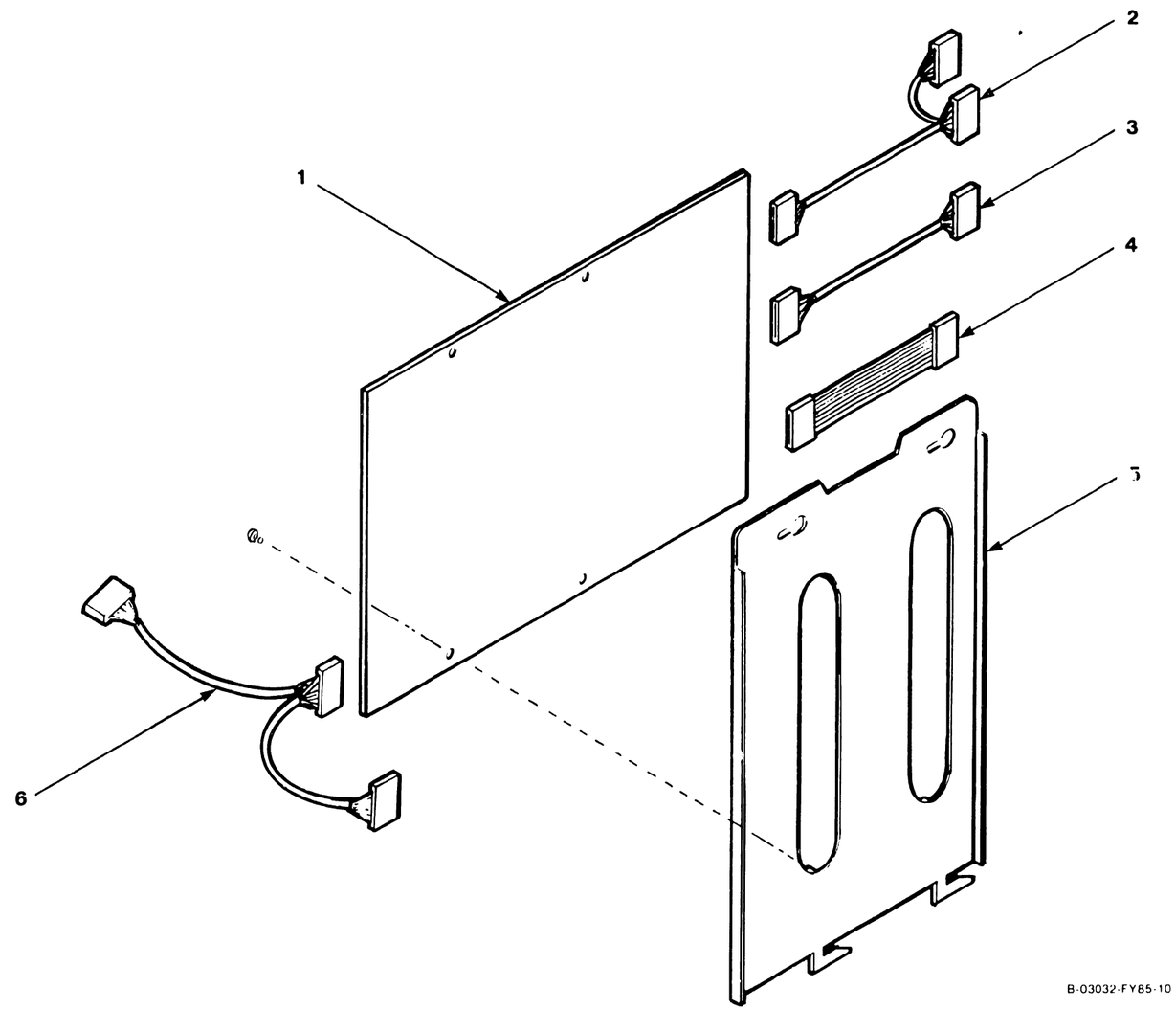
12.3.2 SCSI Controller Assembly

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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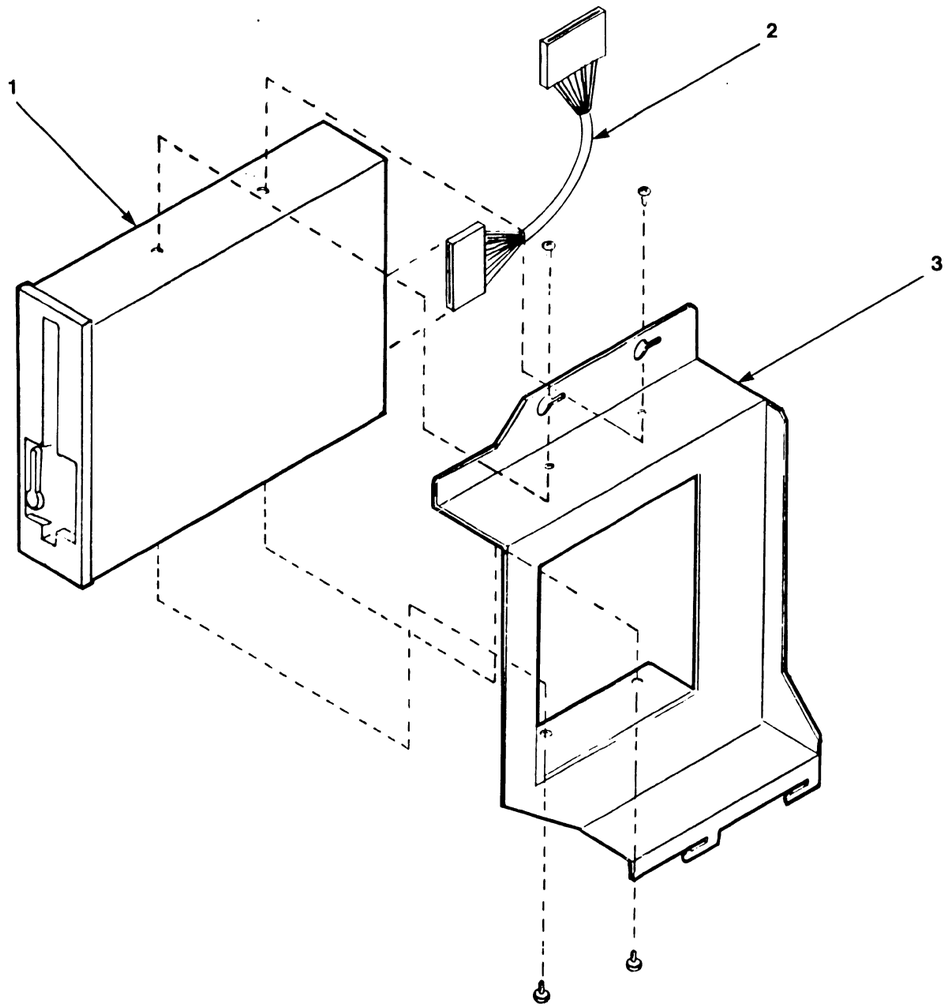
12.3.3 Half-Height Floppy Drive Assembly

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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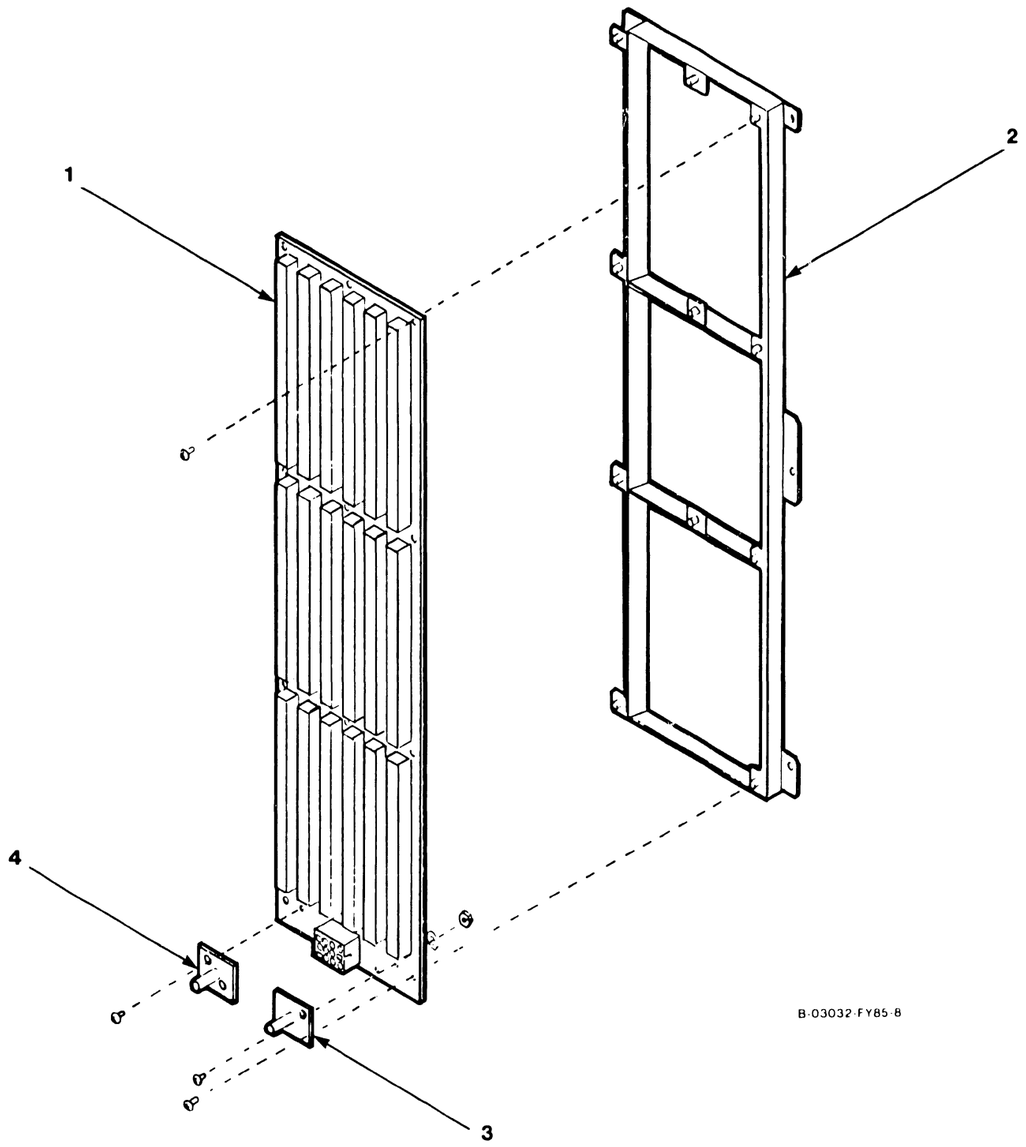
12.3.4 VS-5/6 BackPanel Assembly

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

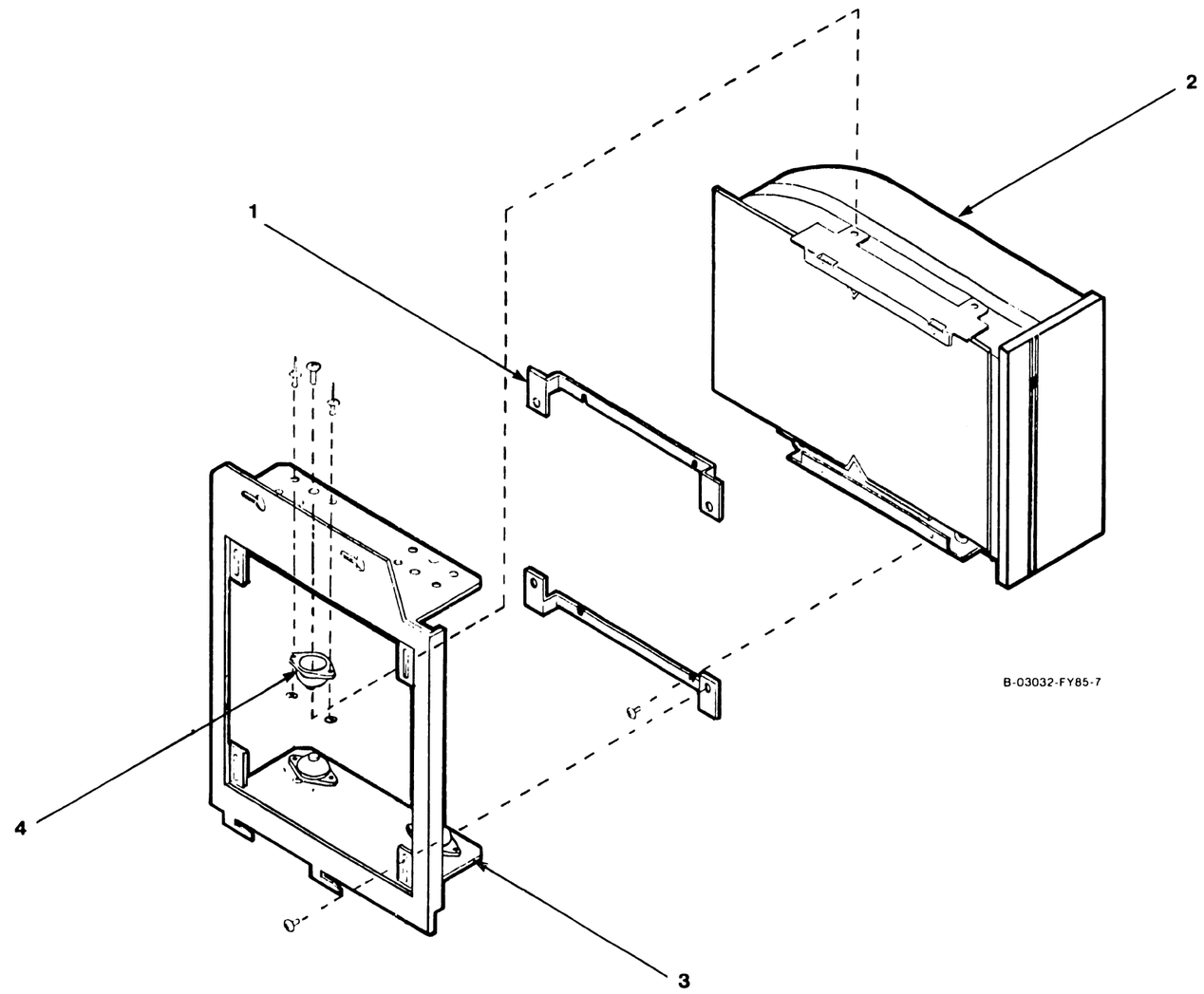
* Recommended Spare Part



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

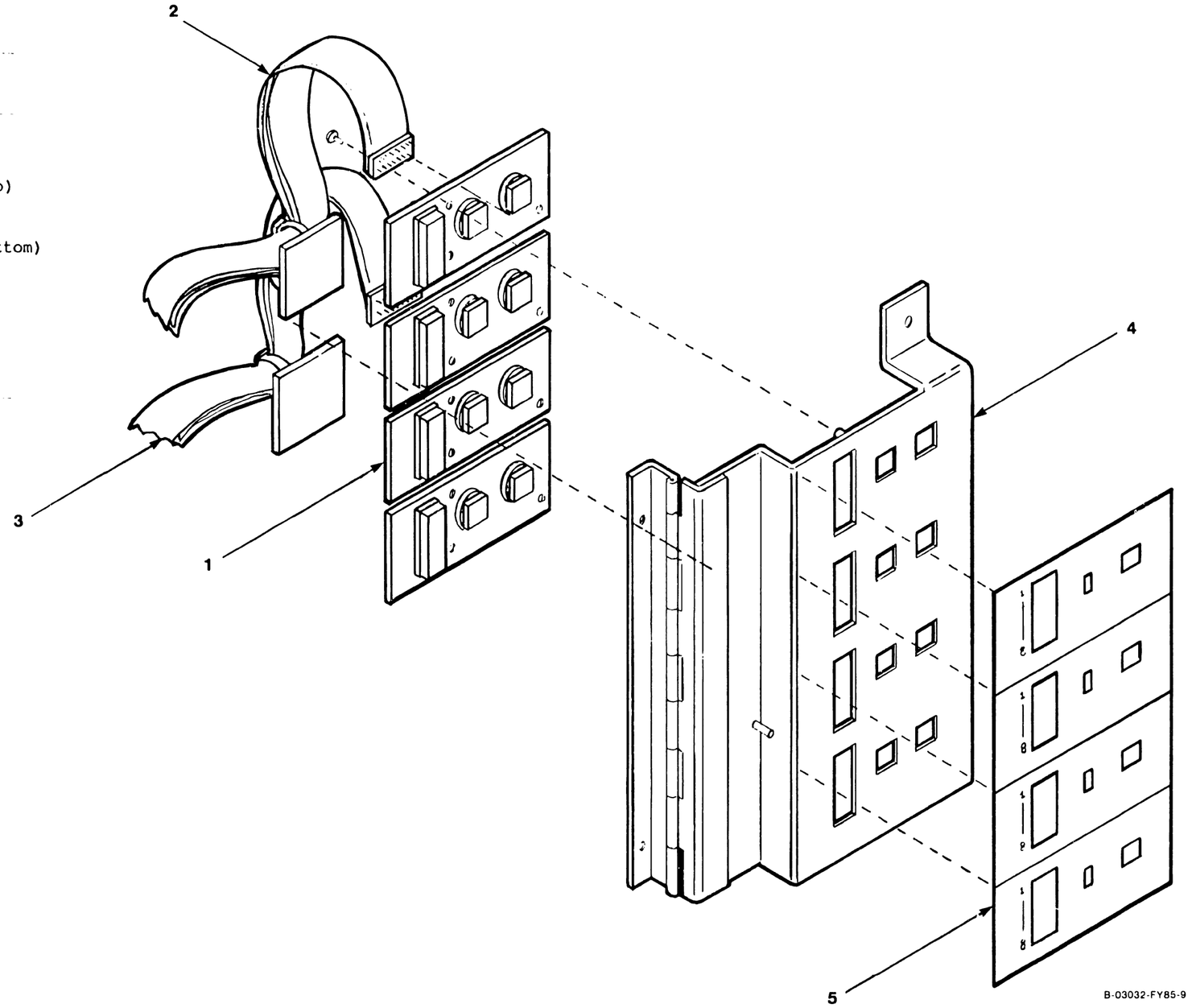
* Recommended Spare Part



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

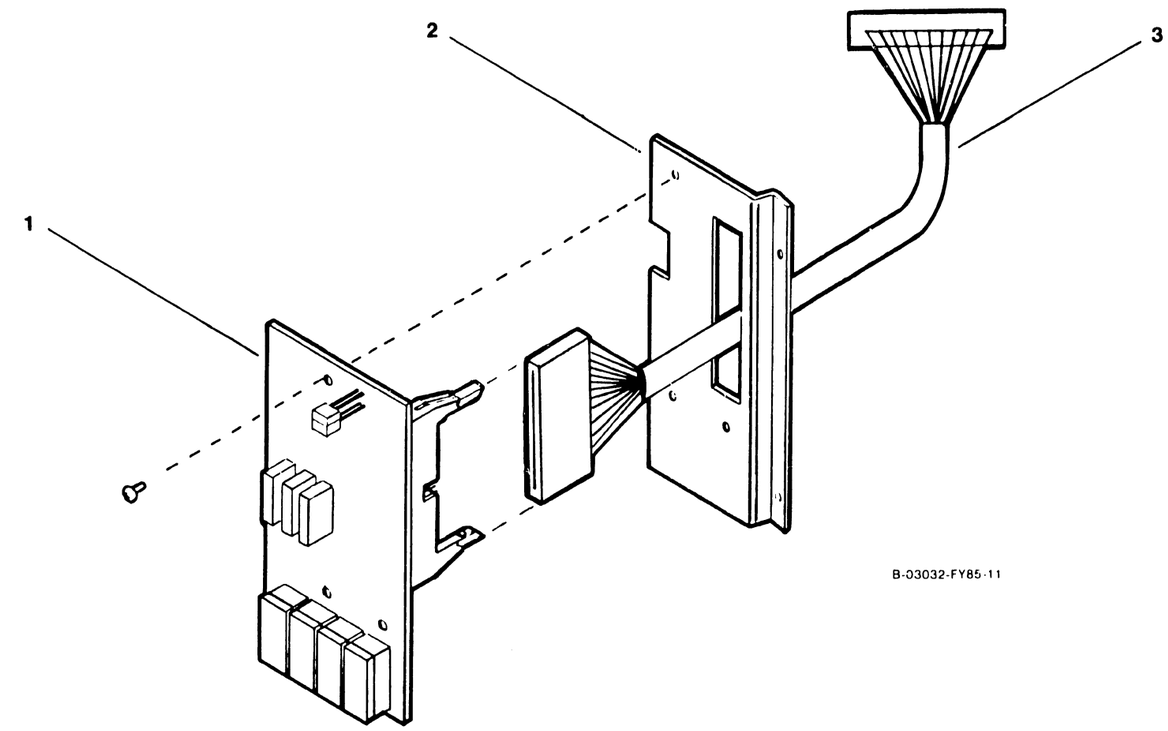
* Recommended Spare Part



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



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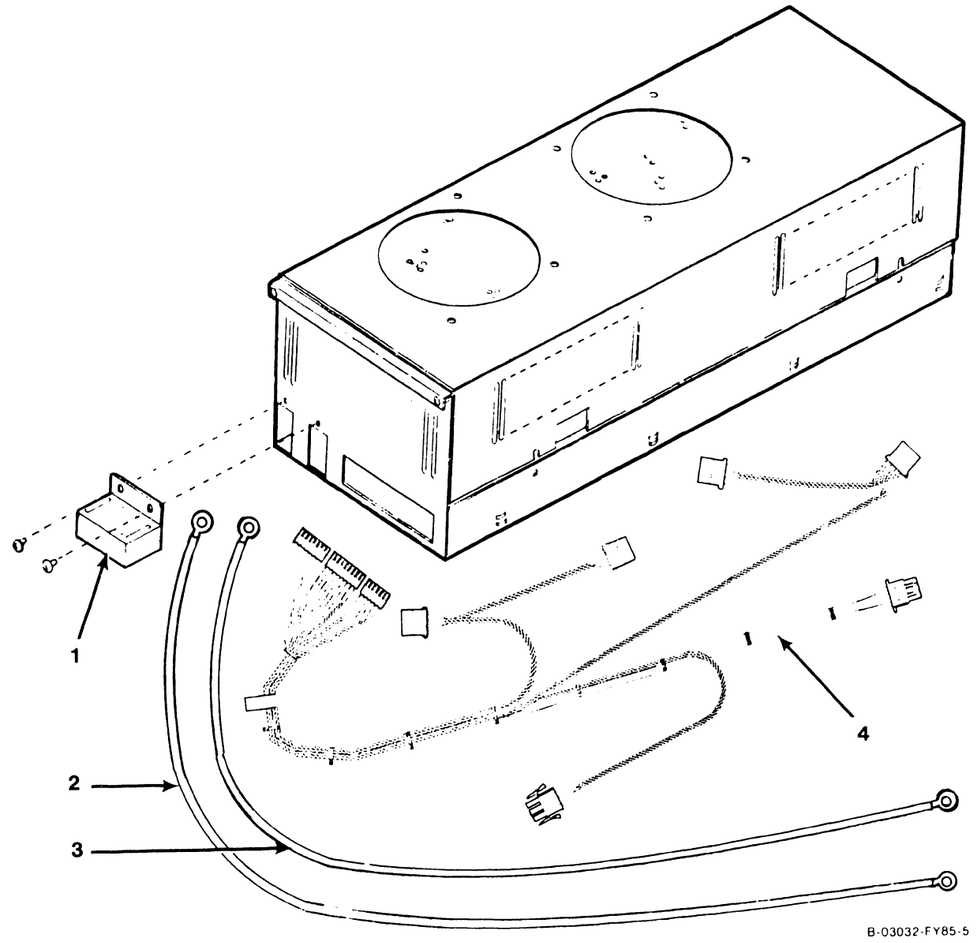
12.3.8 VS-5/6 Power Supply Assembly

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



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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APPENDIX A

VS-5E/6E COMPUTER SYSTEM

TABLE OF CONTENTS (CONT'D)

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.

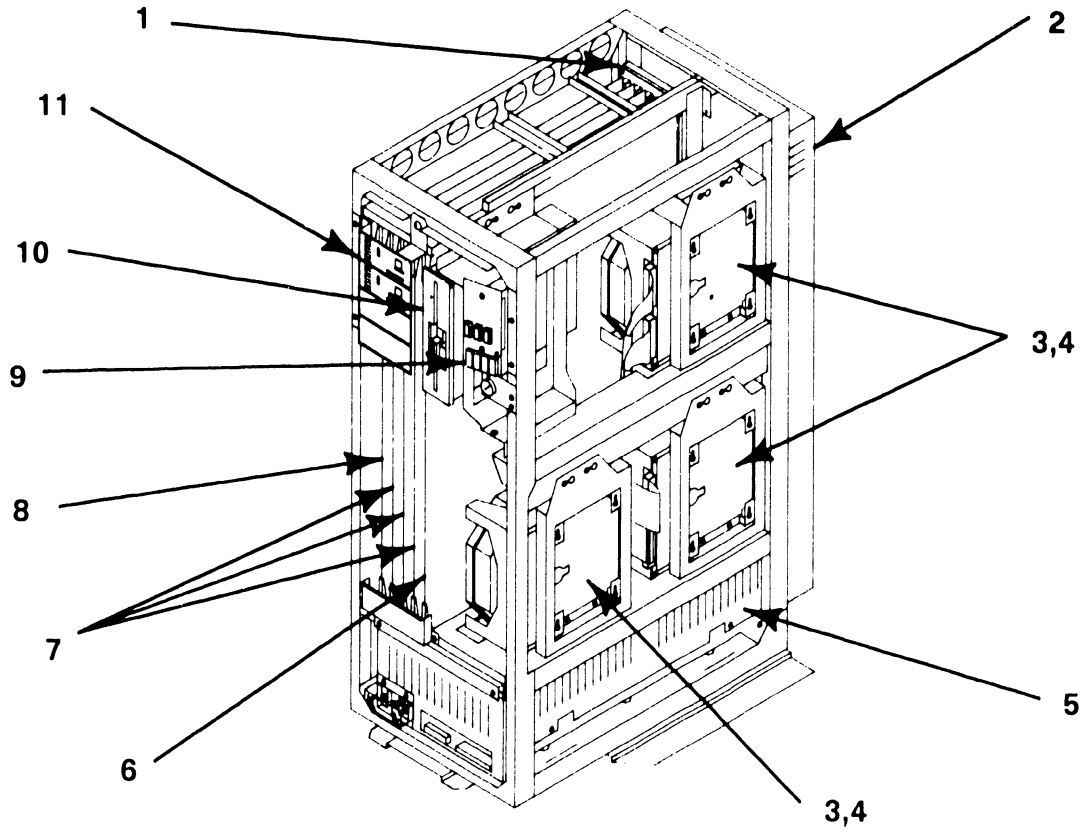
MAJOR ASSEMBLIES

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 d.fferences 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

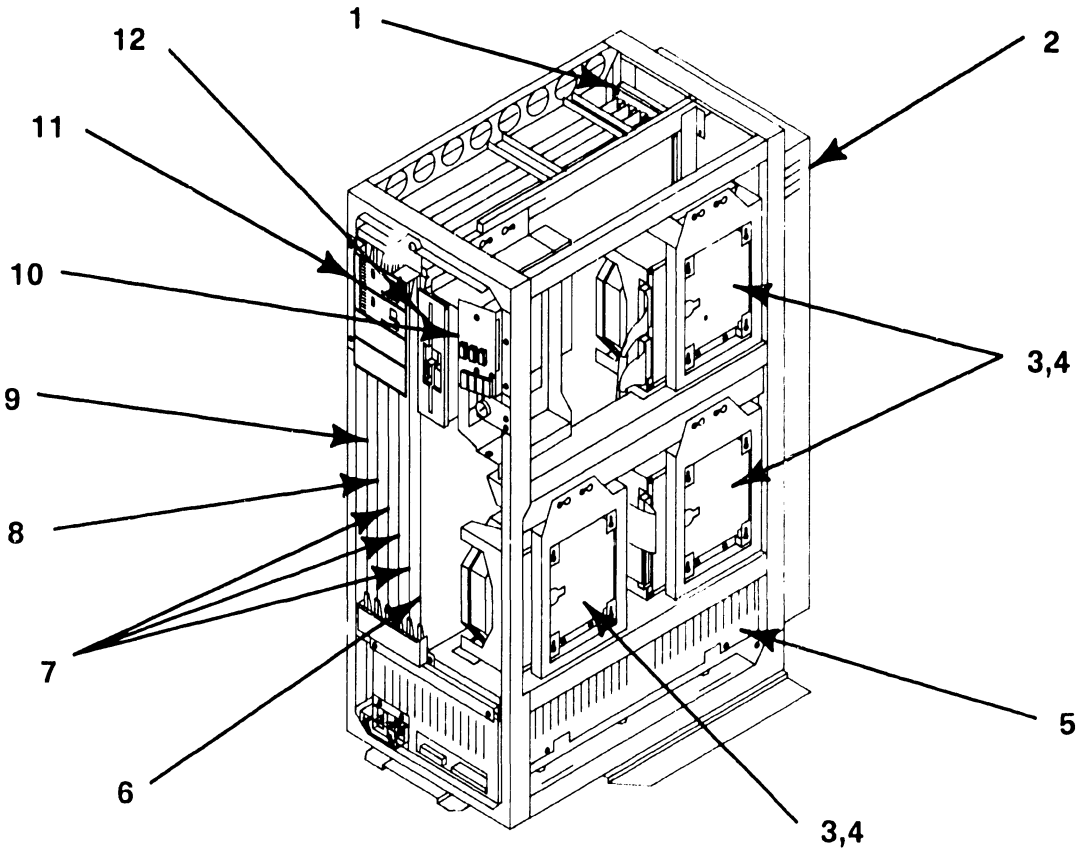


A.2 MAJOR ASSEMBLIES

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



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                    - [redacted]
          Physical Device Address (PDA)  - [redacted]

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 - [redacted]
Physical Device Address (PDA) - [redacted]

Device Type	PDA	Description	Volume	Status
2269V3	2020	72MB 5-1/4" fix disk	SCSI0	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	-	[redacted]
Date (MM/DD/YY)	-	[redacted] / [redacted] / [redacted]
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)

Volume Label Parameter	Entry
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)

```
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 Duplicate File Name
(c) Copyright 1987, 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

---

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                    - [redacted]
                Physical Device Address (PDA)   - [redacted]

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. CRAM-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 @DIAGMN@
	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@ in @DIAGST@
	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	@MCBP2@ in @SYSTEM@
45xx	4505-452C	Diagnostic Monitor	@MONITOR in @DIAGMN@
	4531-453E	Test Table File	@MONTBL@ in @DIAGMN@
	4541-454E	Workstation File	@MONWS0@ in @DIAGMN@
	4551-45FC	ISIO File	@MONISIO in @DIAGMN@
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

Status	Option Board
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 down-load 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, typesetters, 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:

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	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:

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 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
■ 1	CP Control Memory Test
■ 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)
■ 16	CPU Tester (CP5)
■ 17	BP/MM DMA Engr Utility

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

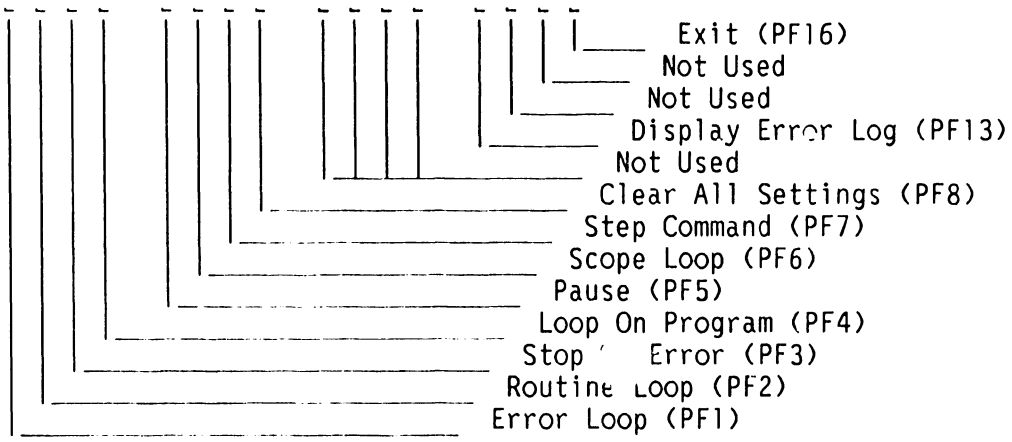
Fields 'Error Code, Error Count, Routine Loop Count, and Program Loop Count' are displayed only when an error occurs or Loop count routine is selected.

Small VS BP2 Class Monitor Package Version R2xxx

Program Name: R1610 ADP CP7 Control Memory Diag	Error Count: = 00000
Routine Name:	Routine Loop Count = 00000
Error Code	Program Loop Count = 00000
Program Status: Test in Progress	Monitor Pass Count = 00002

Messages:

The pseudo spaces are defined as follows:



A.5 TROUBLESHOOTING

A.5.5.5.1 Run-Time Selection Screen Commands and Function Keys

Key	Command	Description
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.5.5.5.2 Run-Time Selection Screen Descriptors

Descriptor	Description
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.

Small VS BP2 Class Self-Test Package Version R2xxx
IPL Drive Selection
Bootstrap Volume = CP5DA

Device	Capacity	Type	Volume	Status
■ 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 WS0, 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.

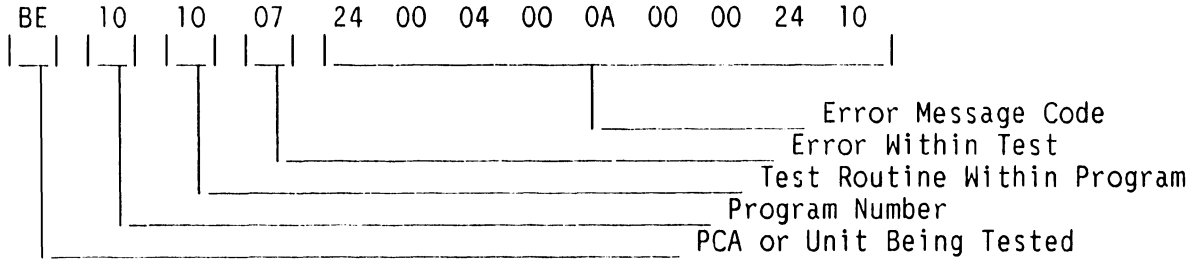
11) Select the desired disk drive and press ENTER to IPL and Self-Test or PF1 to IPL only and complete the system IPL sequence.

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. CRAM-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.

TEST	ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
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
02		**PROM POWER ON AND INITIALIZATION**
	0200	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

A.5 TROUBLESHOOTING

A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (2 of 10)

TEST	ERROR CODE	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 CODE	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
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)

TEST	ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION
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 OFF0H #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)

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

A.5 TROUBLESHOOTING

A.5.11 BP2 CLASS PROM-BASED POWER-UP DIAGNOSTIC ERROR CODES (10 of 10)

TEST	ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
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)
	F0	Unknown/undecipherable SCSI error occurred

A.5 TROUBLESHOOTING

A.5.12 BP2 CLASS MICROCODE ERROR CODES AND DESCRIPTION (1 of 7)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
	BP OS GENERATED ERROR CODES
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
	SCSI ERROR CODES
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 is 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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION

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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION

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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
	25V36 (DE) GENERATED ERROR CODES (CON'T)
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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
	25V76-1 AND 27V76-2 (TC) GENERATED ERROR CODES
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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
	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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
	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)
	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 resel

A.5 TROUBLESHOOTING

A.5.13 BP SYSTEM ERROR CODES (1 of 2)

ERROR CODE	ERROR CODE DESCRIPTION
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)

ERROR CODE	ERROR CODE DESCRIPTION
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 '@DIAGMN@'.

TEST	ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
		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 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	Extents 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	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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
		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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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 CODE	ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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	
44F0	DMA Time Out	
44F1	DMA Failure	

A.5 TROUBLESHOOTING

A.5.14 DIAGNOSTIC MONITOR ERROR CODES (11 of 14)

TEST ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
	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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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 CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
	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)

TEST	ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION	
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.

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
4B	**CP CONTROL MEMORY AND COMMUNICATIONS SELF-TEST DIAGNOSTIC (@CT0100@ from @DIAGST@ Execution)**
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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
4B	**CP CONTROL MEMORY AND COMMUNICATIONS SELF-TEST DIAGNOSTIC (@CT0100@ from @DIAGST@ Execution) (CONT'D)**
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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
4B	**CP CONTROL MEMORY AND COMMUNICATIONS SELF-TEST DIAGNOSTIC (@CT0100@ from @DIAGST@ Execution) (CONT'D)**
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
4C	**CENTRAL PROCESSOR OPERATIONAL SELF-TEST DIAGNOSTIC (@CT0200@ from @DIAGST@ Execution)**
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
4D	**CENTRAL PROCESSOR INTEGRITY SELF-TEST DIAGNOSTIC (@CT0300@ from @DIAGST@ Execution)**
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
4Ex	**CENTRAL PROCESSOR/CACHE/MAIN MEMORY (INTEGRITY) SELF-TEST DIAGNOSTIC (@MT0100@ from @DIAGST@ Execution)**
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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
4Ex	**CENTRAL PROCESSOR/CACHE/MAIN MEMORY (INTEGRITY) SELF-TEST DIAGNOSTIC (@MT0100@ from @DIAGST@ Execution) (CONT'D)**
4EFC	Multiple Halt interrupts occurred
4EFD	Multiple IO3 interrupts occurred
4EFE	Multiple IO4B interrupts occurred
4EFF	Multiple Sync interrupts occurred
4EA	**DUAL PROCESSOR (BP and CP) TO MAIN MEMORY/CACHE SELF-TEST DIAGNOSTIC (@MM0200@ from @DIAGST@ Execution)**
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
4F	**BUS PROCESSOR/MAIN MEMORY DMA SELF-TEST DIAGNOSTIC (@BT0900@ from @DIAGST@ Execution)**
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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
4F	**BUS PROCESSOR/MAIN MEMORY DMA SELF-TEST DIAGNOSTIC (@BT0900@ from @DIAGST@ Execution) (CONT'D)**
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	**BUS PROCESSOR/MAIN MEMORY DMA SELF-TEST DIAGNOSTIC (@BT0900@ from @DIAGST@ Execution) (CONT'D)**
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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
4F	**BUS PROCESSOR/MAIN MEMORY DMA SELF-TEST DIAGNOSTIC (@BT0900@ from @DIAGST@ Execution) (CONT'D)**
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 form 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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
70-76	**UNIVERSAL ISIO DAC SELF-TEST DIAGNOSTIC (@ST0800@ from @DIAGST@ Execution)**
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
70-76	**UNIVERSAL ISIO DAC SELF-TEST DIAGNOSTIC (@ST0800@ from @DIAGST@ Execution) (CONT'D)**
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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
70-76	**UNIVERSAL ISIO DAC SELF-TEST DIAGNOSTIC (@ST0800@ from @DIAGST@ Execution) (CONT'D)**
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)

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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
70-76	**UNIVERSAL ISIO DAC SELF-TEST DIAGNOSTIC (@ST0800@ from @DIAGST@ Execution) (CONT'D)**
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.

90	**SERIAL INPUT/OUTPUT DEVICE ADAPTER SELF-TEST DIAGNOSTIC (@ST0500@ from @DIAGST@ Execution)**
9011	Workstation powered-off (or disconnected) status
9015	Coaxial parity failure, parity error, or not running status
98	**DISKETTE DEVICE SELF-TEST DIAGNOSTIC (PROM-BASED)**
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
A4	**SERIAL INPUT/OUTPUT SELF-TEST DIAGNOSTIC (@ST0100@ from @DIAGST@ Execution)**
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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
A4	**SERIAL INPUT/OUTPUT SELF-TEST DIAGNOSTIC (@ST0100@ from @DIAGST@ Execution) (CONT'D)**
A4FD	Unexpected trap
A4FE	Unexpected SIO interrupt
A4FF	Get control of workstation failure
B0	**INTERNAL/EXTERNAL DISK DRIVE DEVICE ADAPTER SELF-TEST DIAGNOSTIC (PROM-BASED)**
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
B0	**INTERNAL/EXTERNAL DISK DRIVE DEVICE ADAPTER SELF-TEST DIAGNOSTIC (PROM-BASED)**
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)

ERROR CODE	TEST TITLE AND ERROR CODE DESCRIPTION
D0	**HARDWARE RELATED FAILURE (PROM-BASED)**
DEAD	Program trap for attempted execution from nonexistent memory space (CRAM address branch leads to address in 80286 PROM)
XX	**MISCELLANEOUS ERROR CODES**
xxFD	Unexpected trap
xxFE	Unexpected SIO interrupt
xxFF	Get control of Workstation Zero failure

A.5 TROUBLESHOOTING

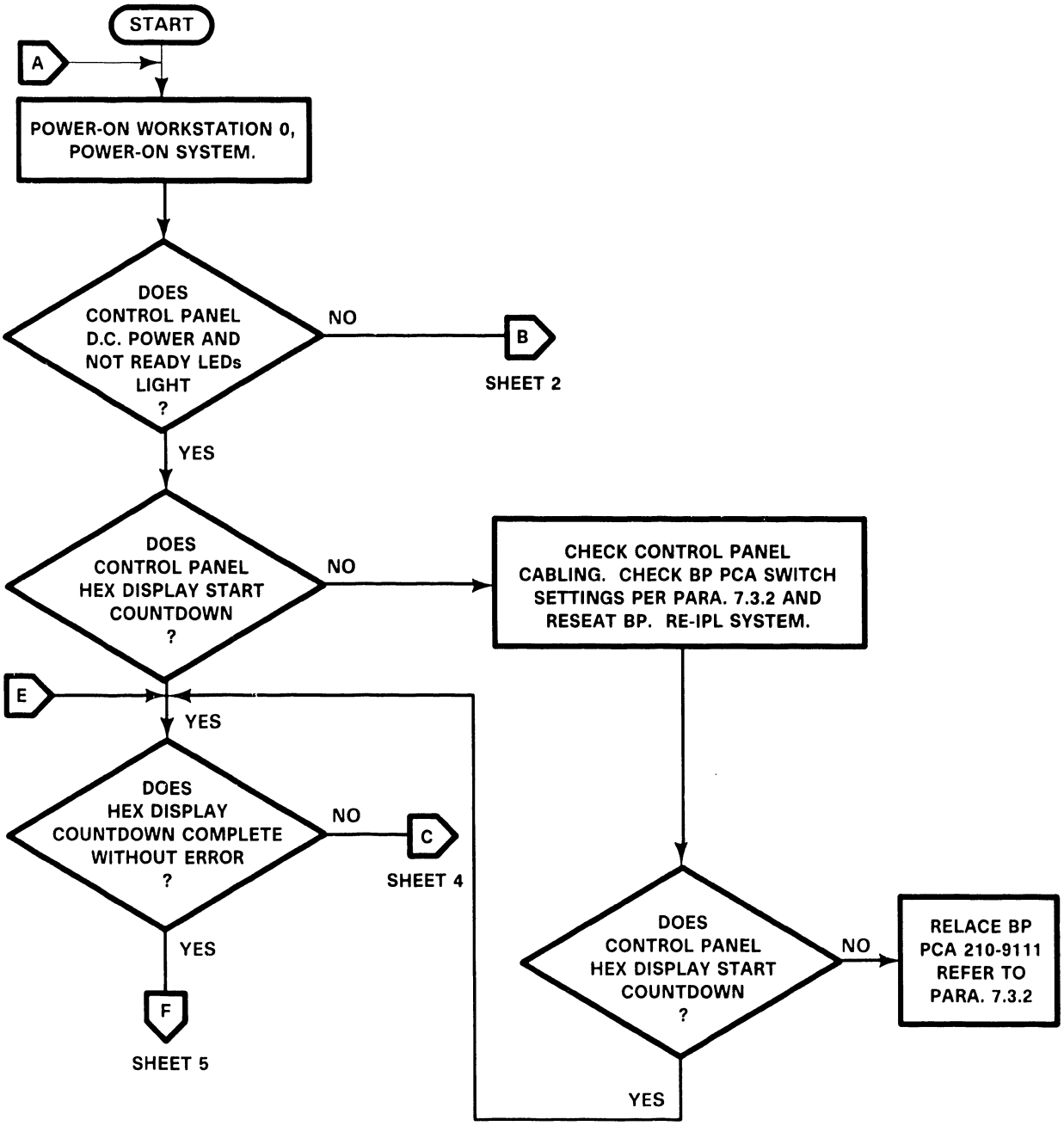
A.5.16 TROUBLESHOOTING FLOWCHARTS

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.

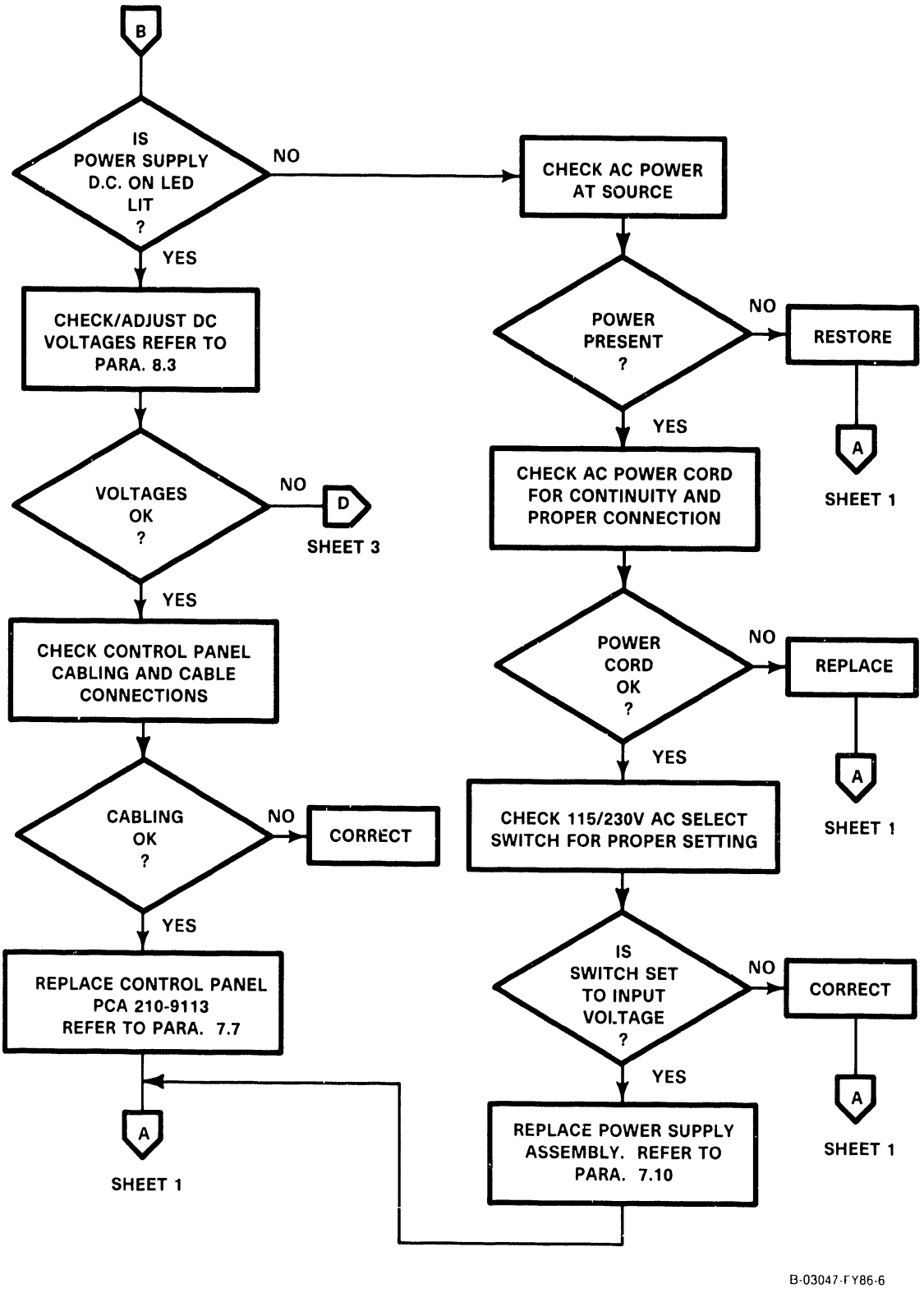
A.5 TROUBLESHOOTING

A.5.16 TROUBLESHOOTING FLOWCHARTS (1 of 6)



A.5 TROUBLESHOOTING

A.5.16 TROUBLESHOOTING FLOWCHARTS (2 of 6)



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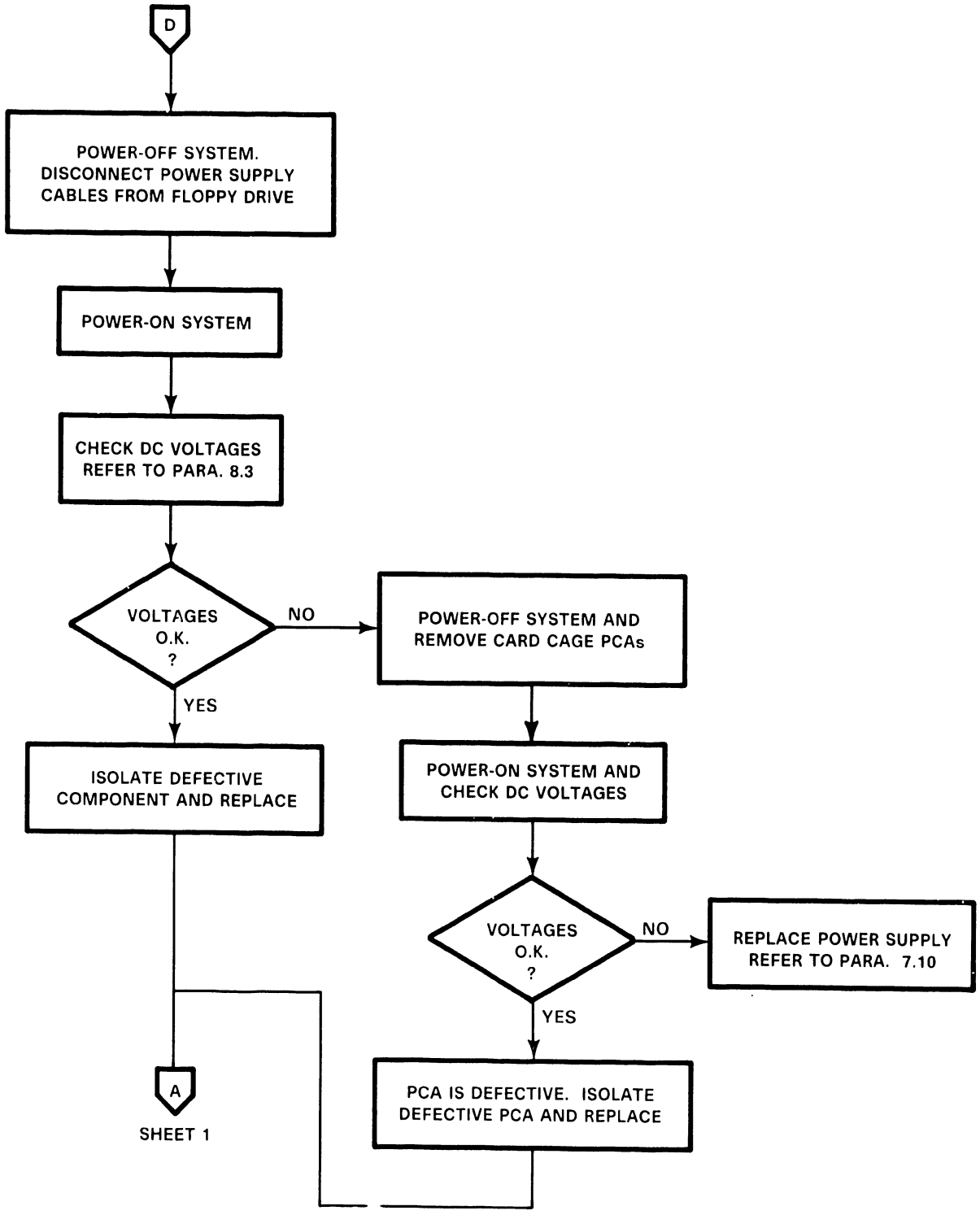
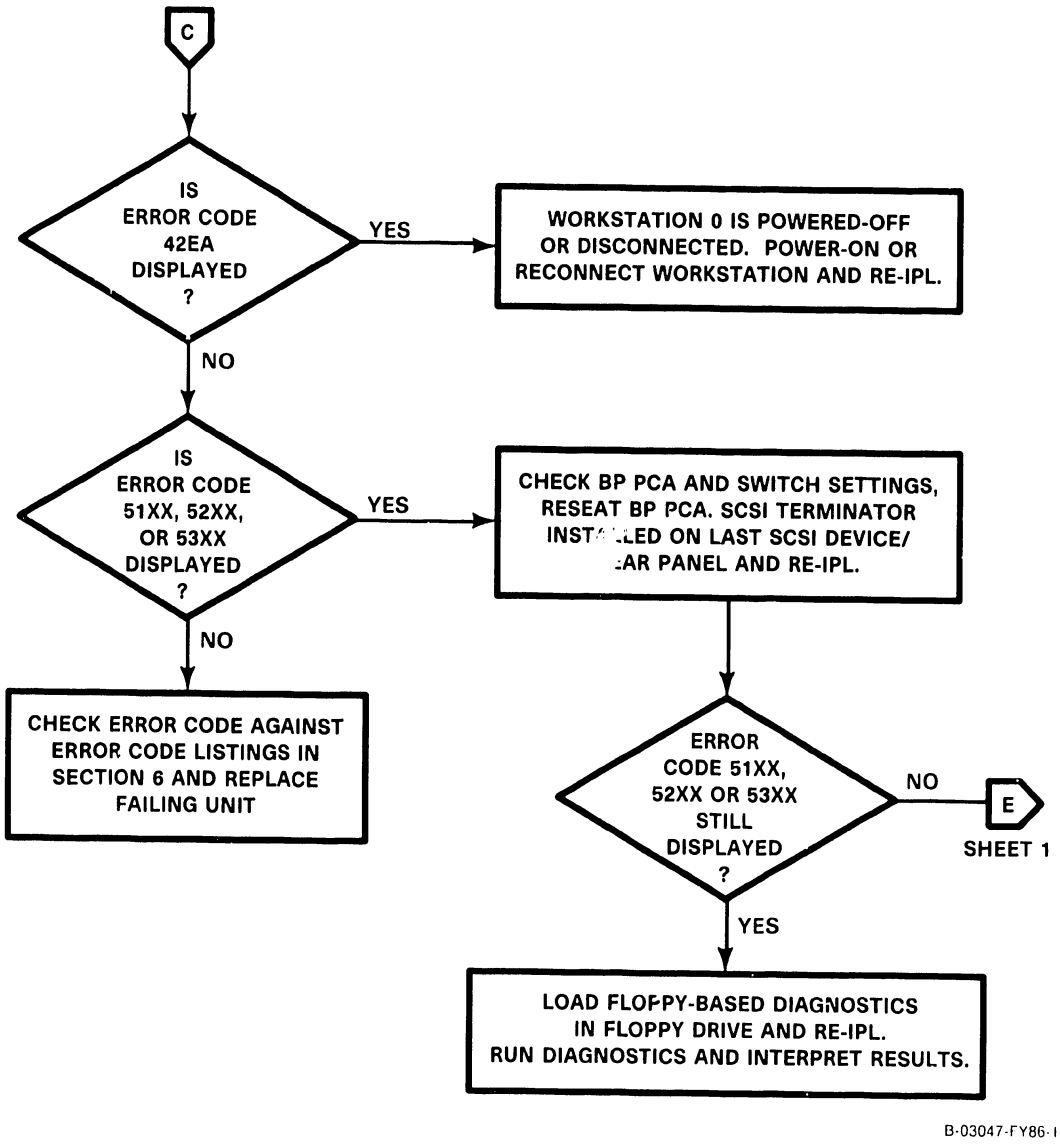
A.5 TROUBLESHOOTING

A.5.16 TROUBLESHOOTING FLOWCHARTS (3 of 6)



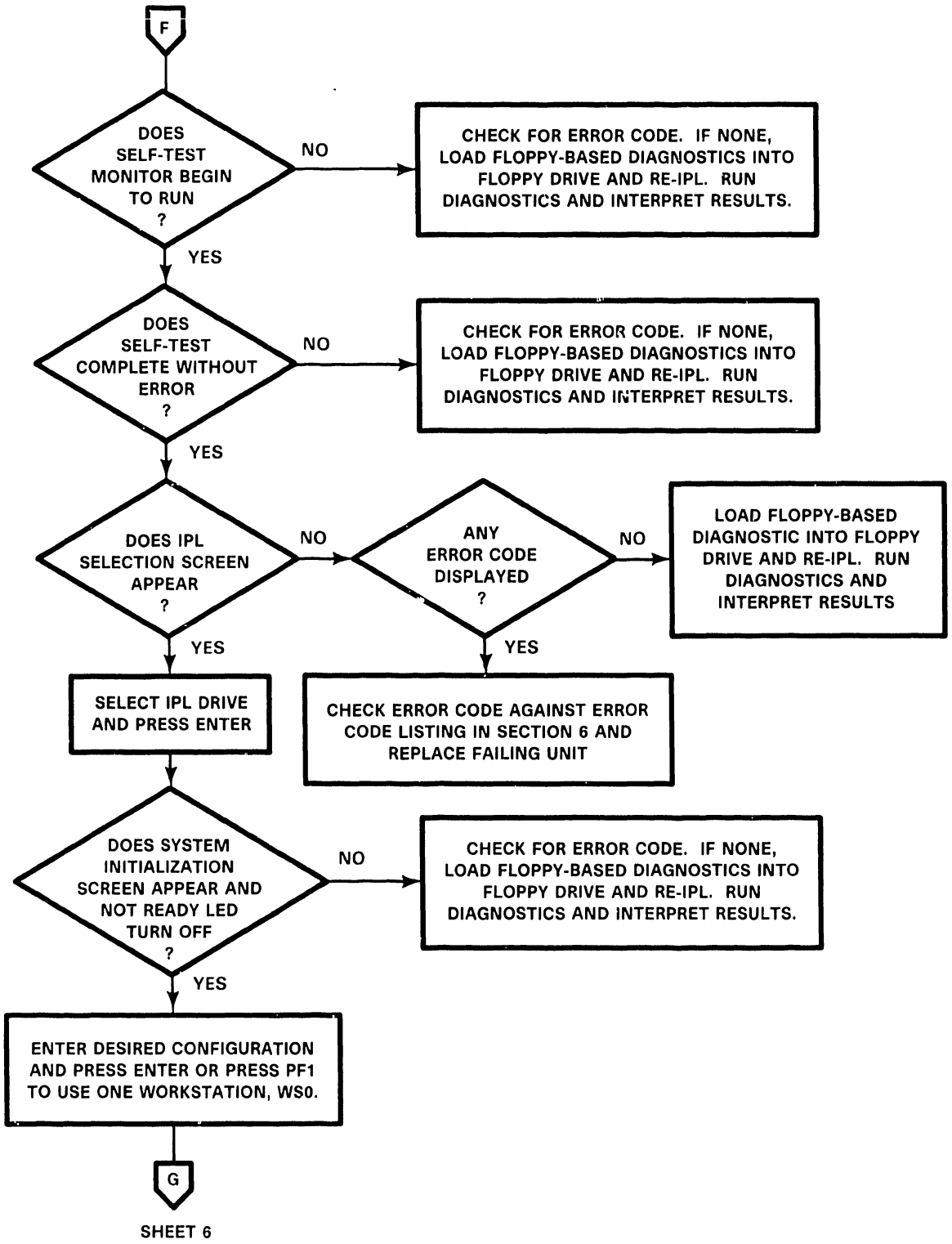
A.5 TROUBLESHOOTING

A.5.16 TROUBLESHOOTING FLOWCHARTS (4 of 6)



A.5 TROUBLESHOOTING

A.5.16 TROUBLESHOOTING FLOWCHARTS (5 of 6)



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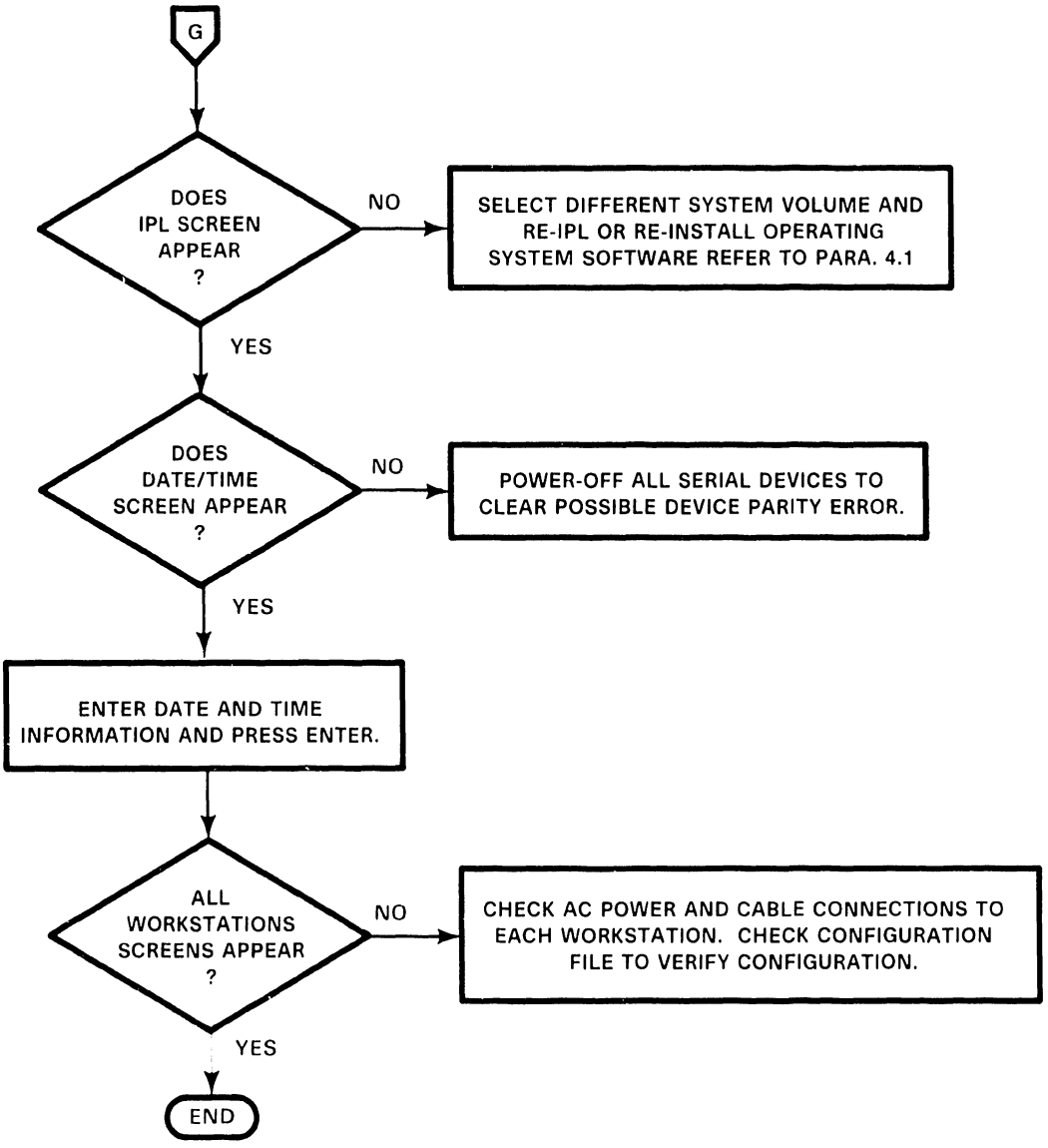
A.5 TROUBLESHOOTING

A.5.16 TROUBLESHOOTING FLOWCHARTS (6 of 6)



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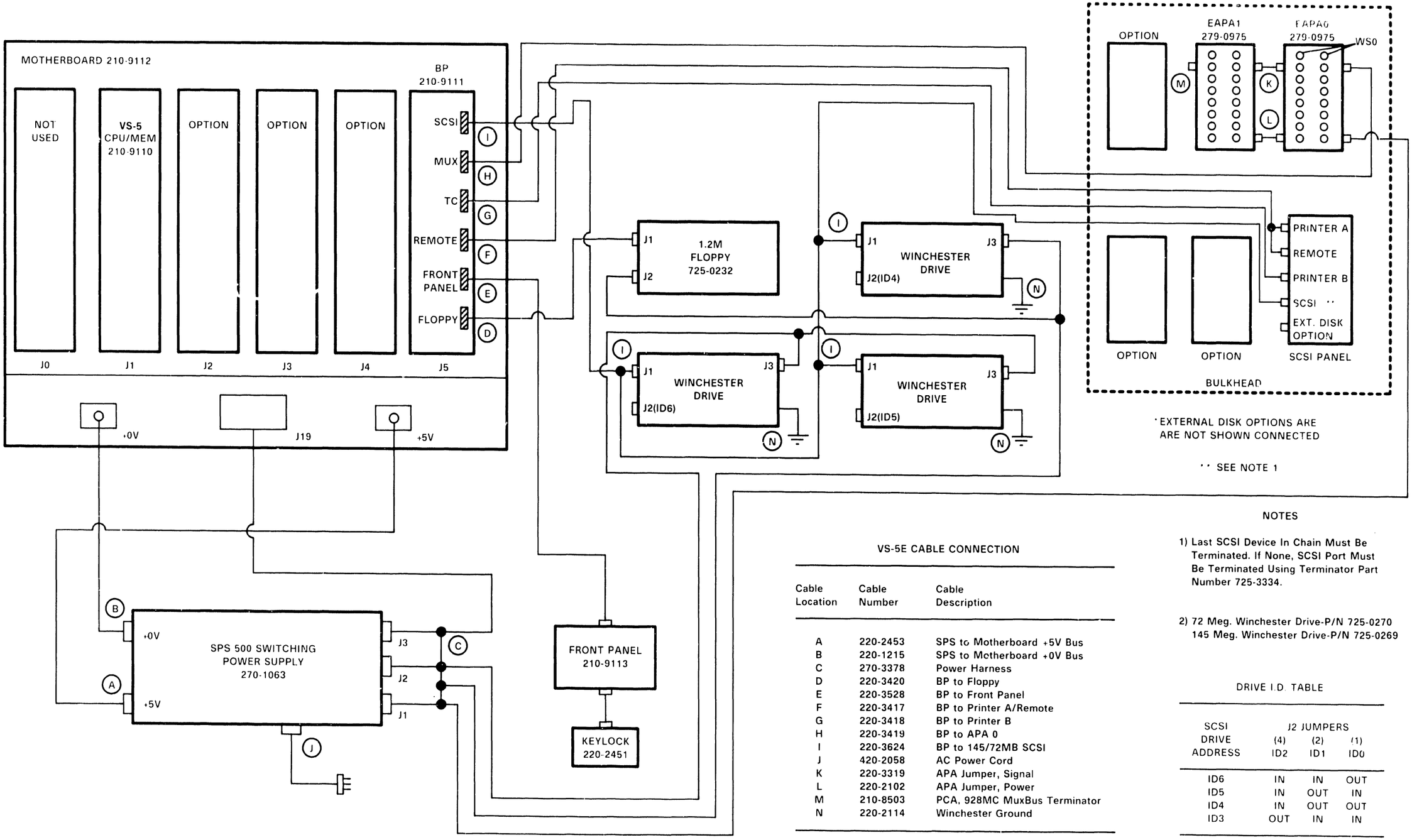


*EXTERNAL DISK OPTIONS ARE ARE NOT SHOWN CONNECTED

** 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

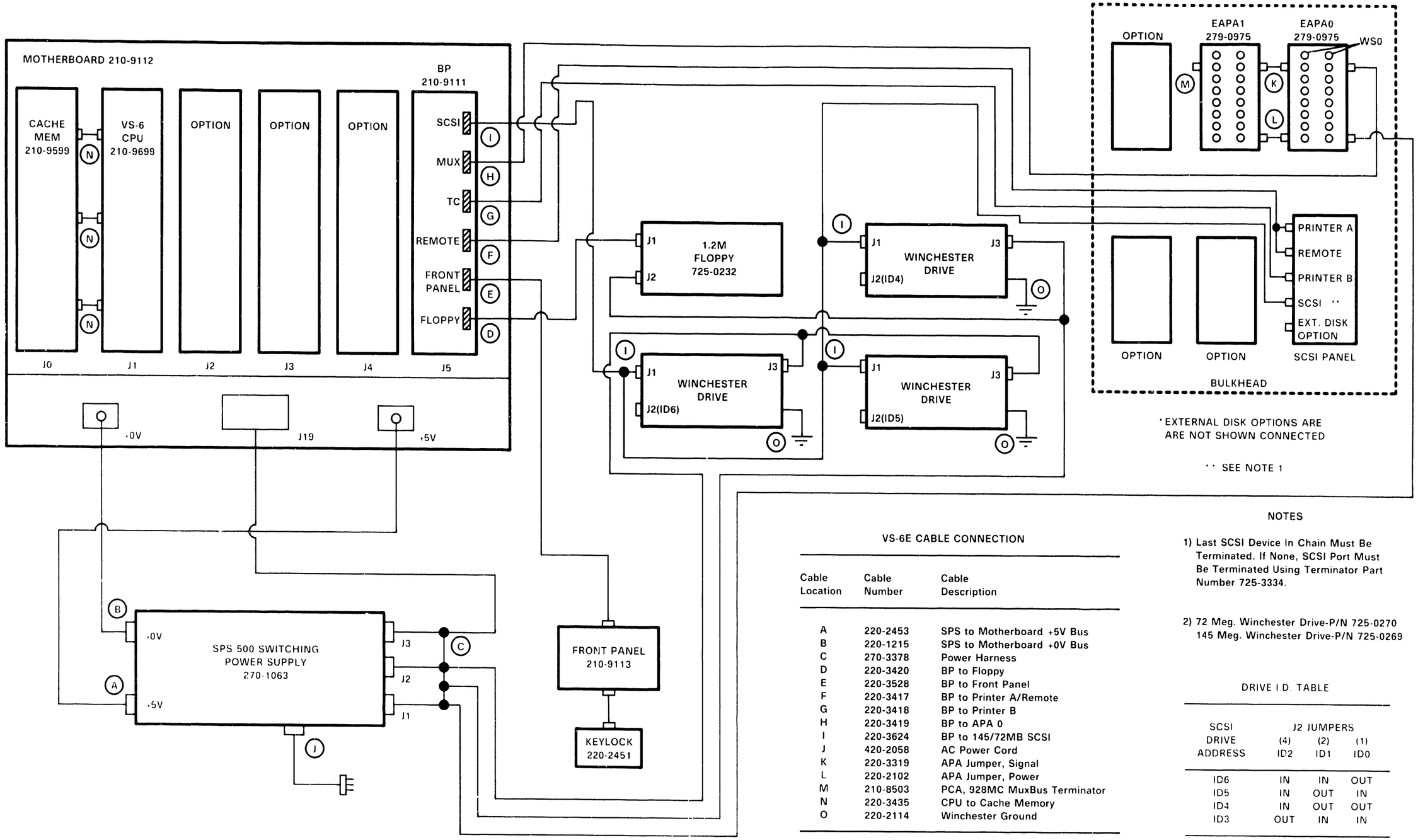
1) Last SCSI Device In Chain Must Be Terminated. If None, SCSI Port Must Be Terminated Using Terminator Part Number 725-3334.

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



*EXTERNAL DISK OPTIONS ARE ARE NOT SHOWN CONNECTED

** SEE NOTE 1

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

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-6E INTERCONNECT DIAGRAM

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.

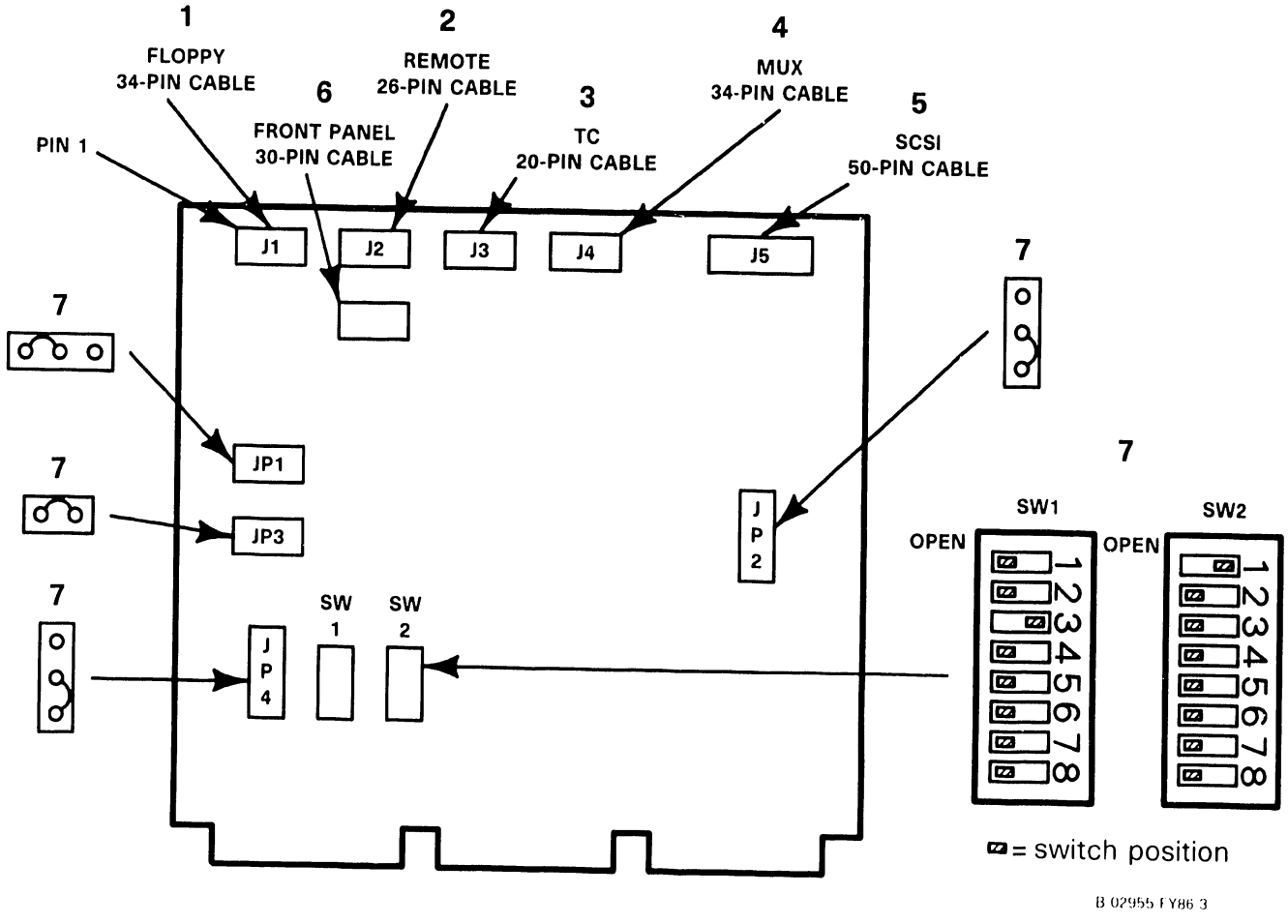
3) Remove 20-pin cable from TC connector, → A.6.3.1.

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.



A.6 REPAIR

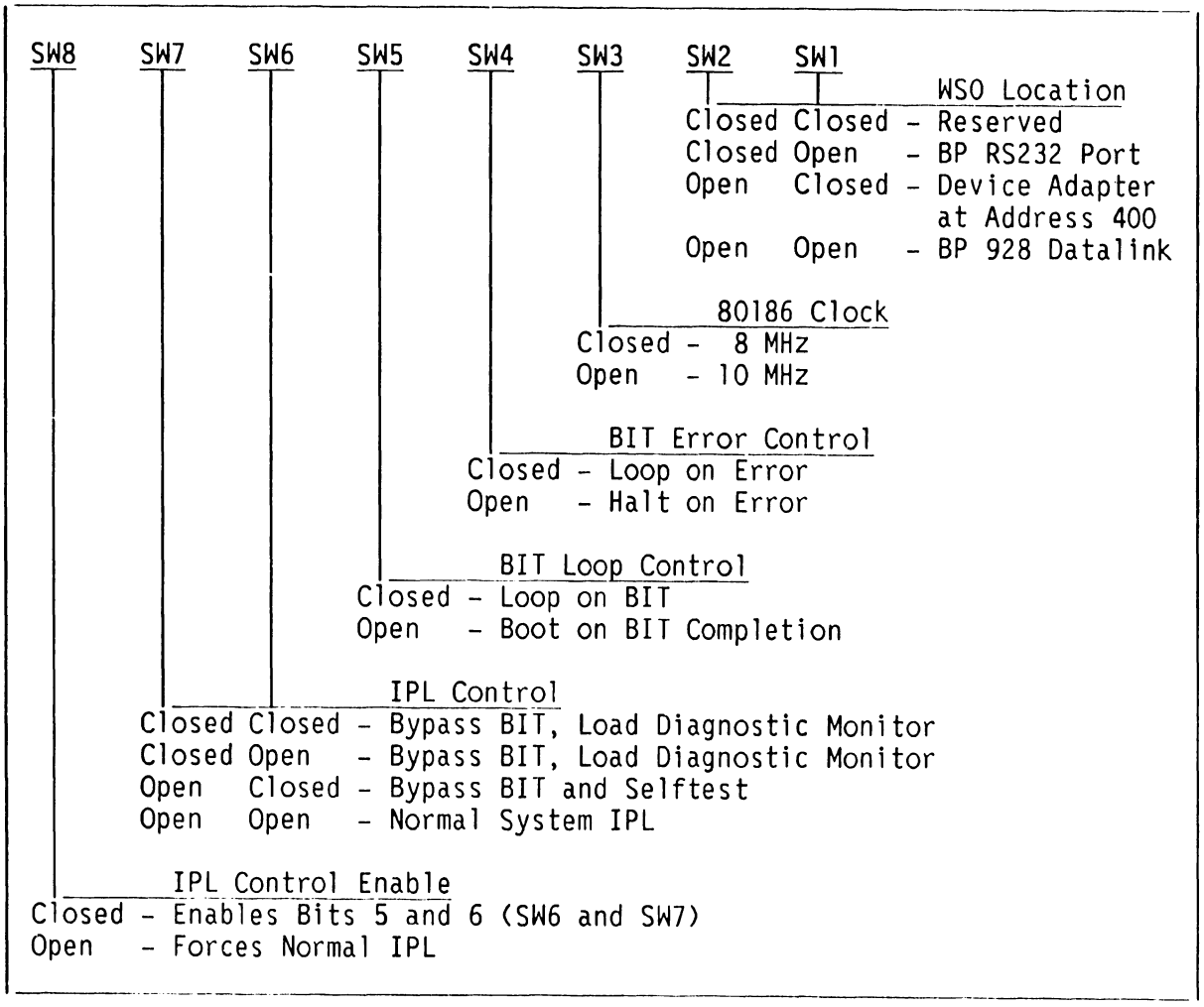
A.6.3.1 VS-5E/6E BUS PROCESSOR (BP) REMOVAL (2 of 3)

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
				SCSI Device ID = 6 Type				
				Closed	Closed	- Reserved		
				Closed	Open	- ACB-5500		
				Open	Closed	- WD-1003A (NOTE 3)		
				Open	Open	- Self Identifying (NOTE 4)		
		SCSI Device ID = 5 Type						
		Closed	Closed	- Reserved				
		Closed	Open	- ACB-5500				
		Open	Closed	- WD-1003A				
		Open	Open	- Self Identifying (NOTE 4)				
SCSI Device ID = 4 Type								
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.

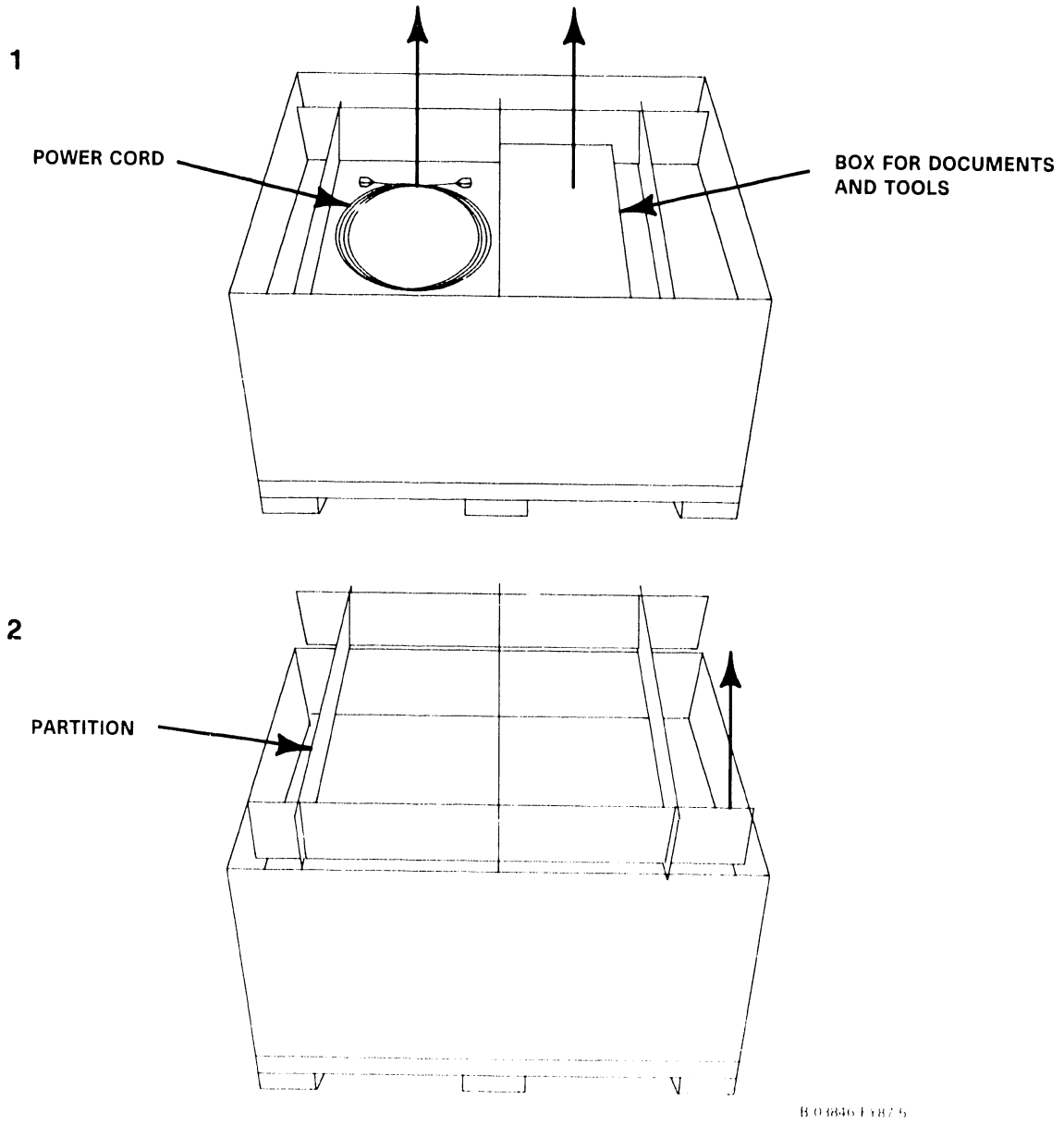
UNPACKING AND SETUP

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.

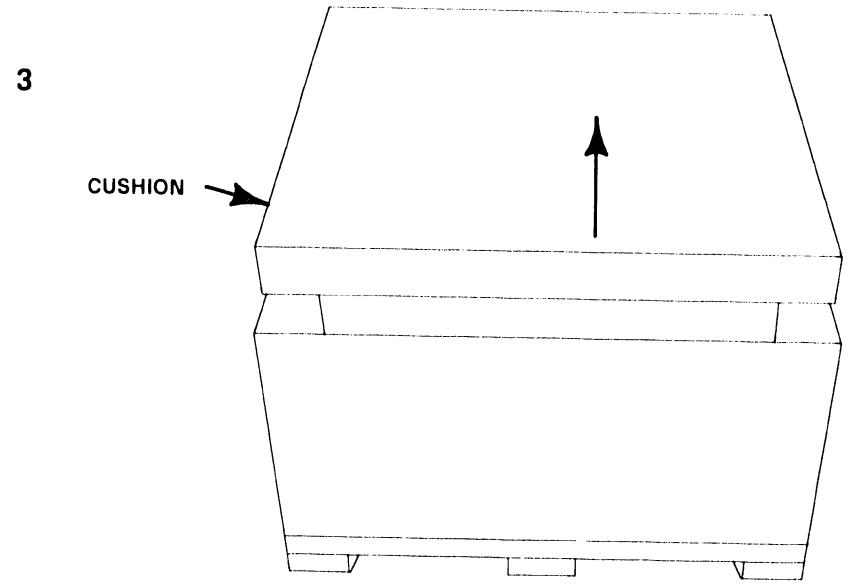


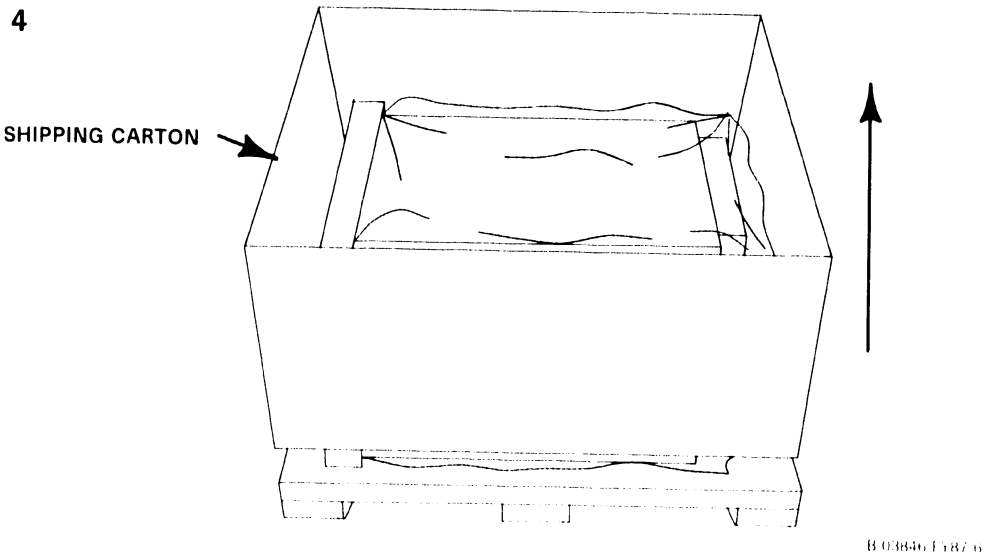
2) Remove box partition.

A.8 UNPACKING AND SETUP

A.8.1 VS-5E/6E UNPACKING (2 of 6)

3) Remove cushion from inside of box.



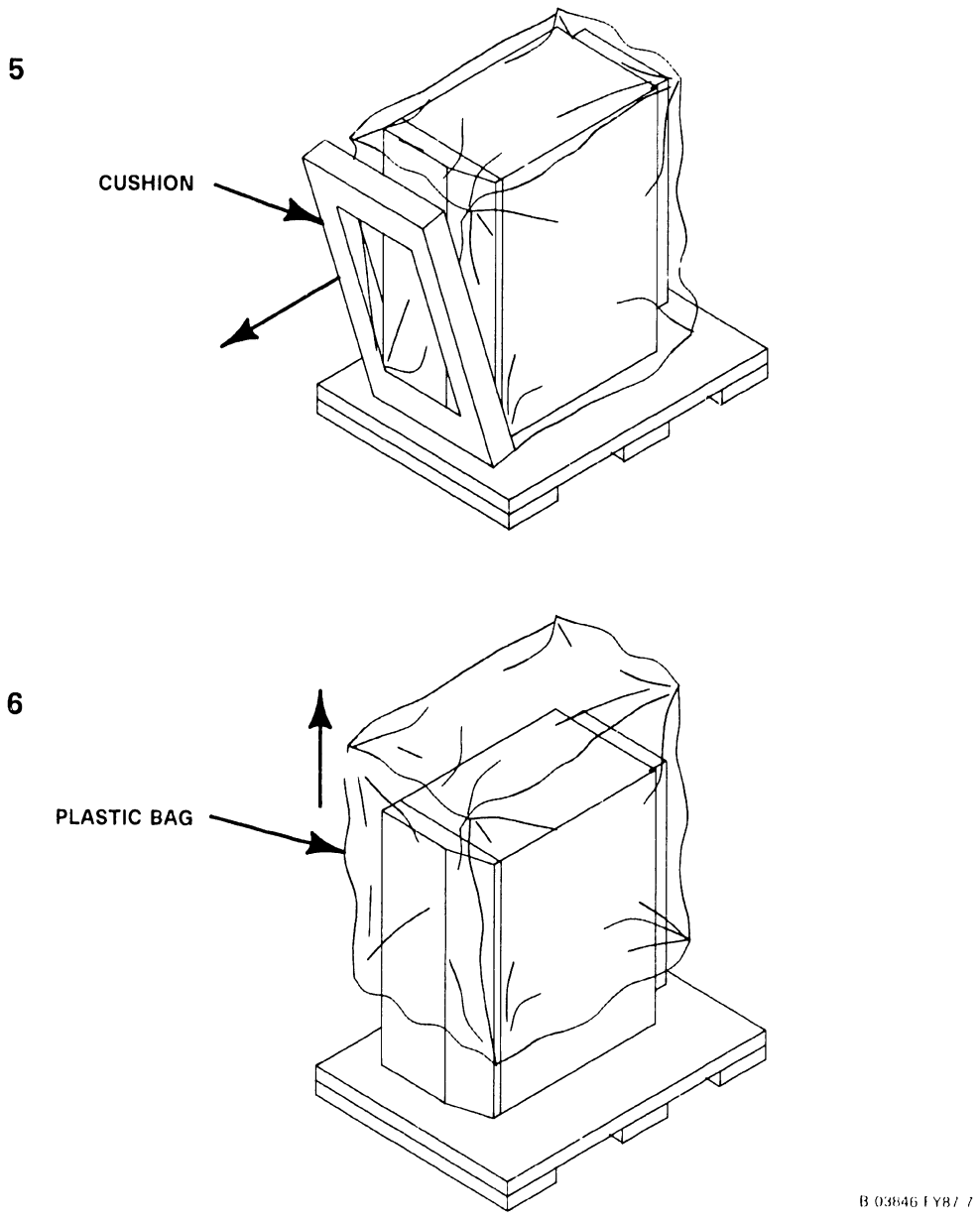


4) Remove shipping carton from VS-5E/6E Computer.

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.



6) Lift off antistatic plastic bag from VS-5E/6E Computer.

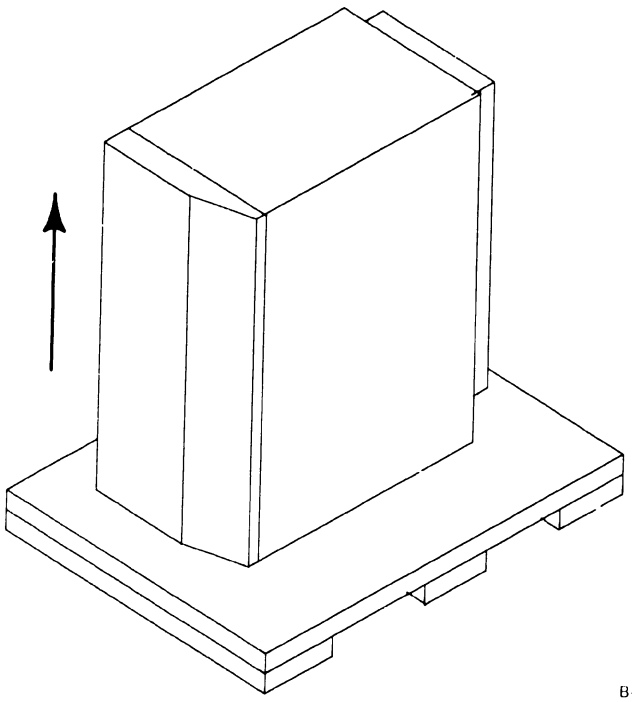
A.8 UNPACKING AND SETUP

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



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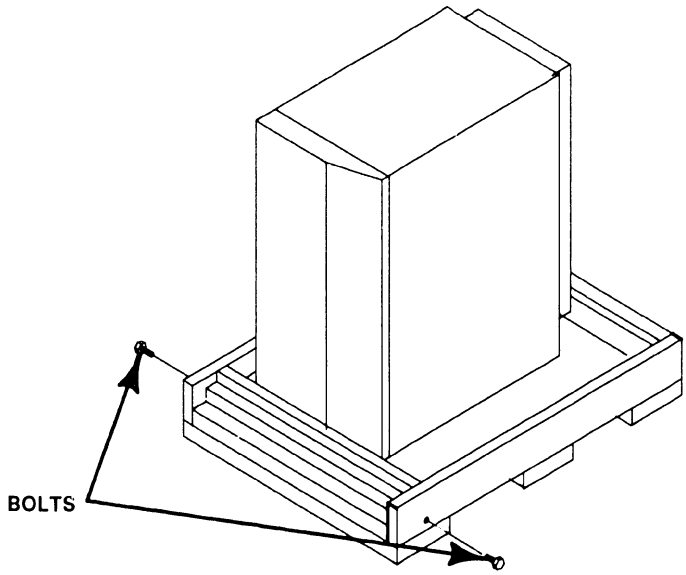
A.8 UNPACKING AND SETUP

A.8.1 VS-5E/6E UNPACKING (5 of 6)

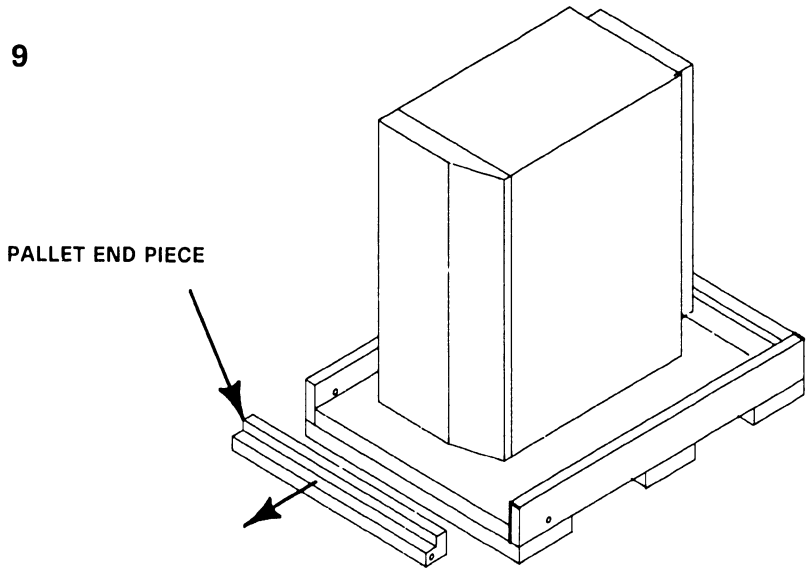
8) If pallet has a removable pallet end piece, remove VS-5E/6E Computer in following manner.

A) Remove two (2) bolts as shown.

8



9



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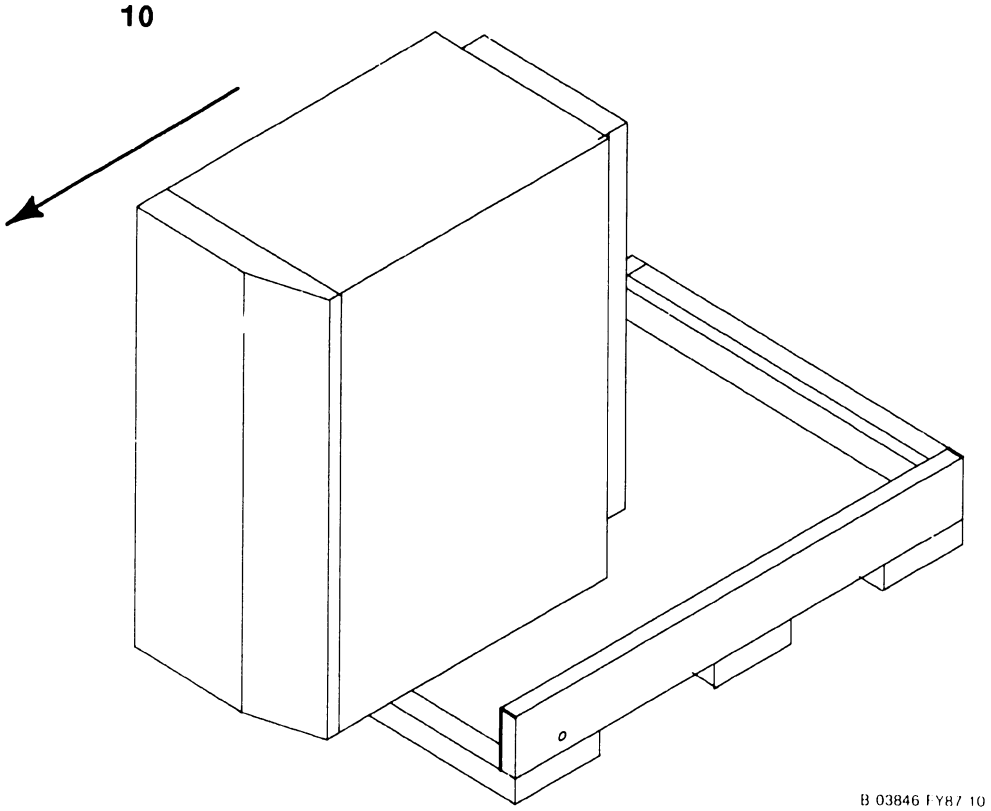
9) Remove pallet end.

A.8 UNPACKING AND SETUP

A.8.1 VS-5E/6E UNPACKING (6 of 6)

10) Slide VS-5E/6E Computer off pallet.



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 (1) 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 WS0 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 = [redacted]
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 WS0 will be inhibited from logon operations. The default value is NO.

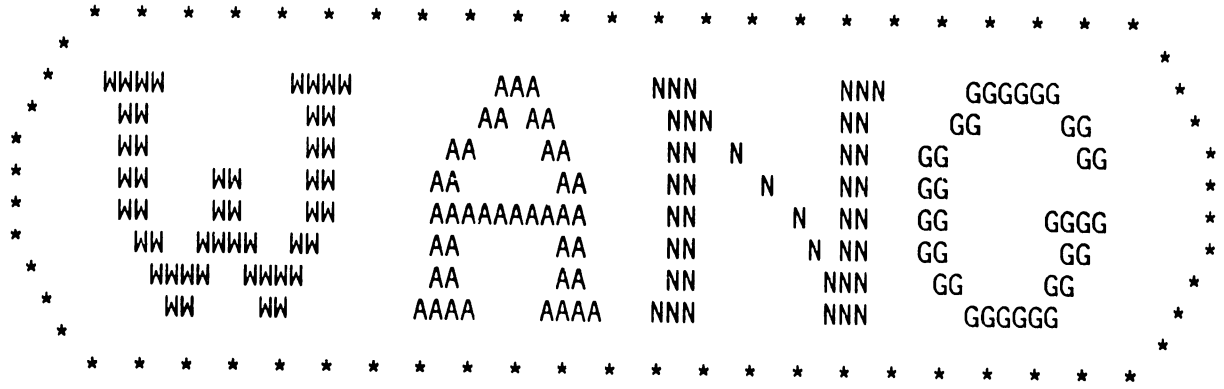
'Load Microcode to all Devices? LMCODE = NO□'; This prompt allows optional loading of microcode to all devices on the system with loadable microcode, including remote workstations. (Note that most devices load microcode when the device is first powered-on). If YES is selected, the system loads microcode 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.

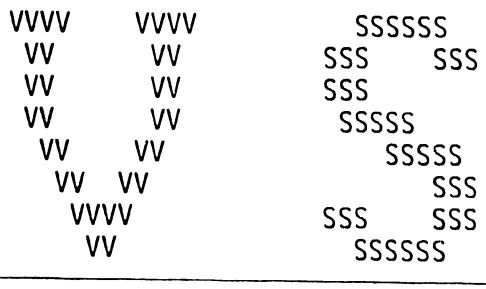
13) Press 'ENTER' to select the configuration file displayed or press PF1 to use one workstation (workstation 0) and one disk. The Initial Program Load (IPL) screen will be displayed.

A.8 UNPACKING AND SETUP

A.8.2.1 FIRST-TIME IPL PROCEDURE (6 of 9)



O.S. xx.xx.xx **System Generation In Progress** CP: xx.xx.xx



14) The prompt 'System Generation In Progress' is displayed in the center of the screen. In about one minute, the Time and Date Screen is 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 VS□

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:
(9) Valid Disk (16) Return
(12) Shift Devices Up/Down (13) Modify (↑1) 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 Dev#	Port#	BP/SCSI DA Type	IOP#3 Description	Attach?
35	**6**	**2269V4**	**145MB SCSI Fixed Dk**	
36	6			
37	6			
38	6			
39	**5**	**2269V3**	**72MB SCSI Fixed Dk**	
40	5			
41	5			
42	5			
43	**4**	**2269V3**	**72MB SCSI Fixed Dk**	
44	4			
45	4			
46	4			
47	**3**	**2269V4**	**145MB SCSI Fixed Dk**	
48	3			
49	3			
50	3			

TAB to a device and PRESS:

(12) Shift devices up/down

or PRESS:

(9) Valid Disk (16) Return
(13) Modify (↑1) 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.

Model	WLI/P/N	Description
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:

CP TYPE	VS SYSTEM CONFIGURATION	REQUIREMENTS
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 0
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

Model	MEI #	CEI #	Description
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:

VS-5/6	VS-5E/6E
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

Model	MEI #	CEI #	Description
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

Model	MEI #	CEI #	Description
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.

Software	Version	Comments	WLI P/N
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.

Software	Version	Comments	WLI P/N
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.

Diagnostic Name	PROM Version	Location/PROM P/N	Package P/N
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.

Diagnostic Name	Revision	Package P/N
Small VS BP-2 System Diagnostic Package	2763	195-5084-0*

NOTE

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

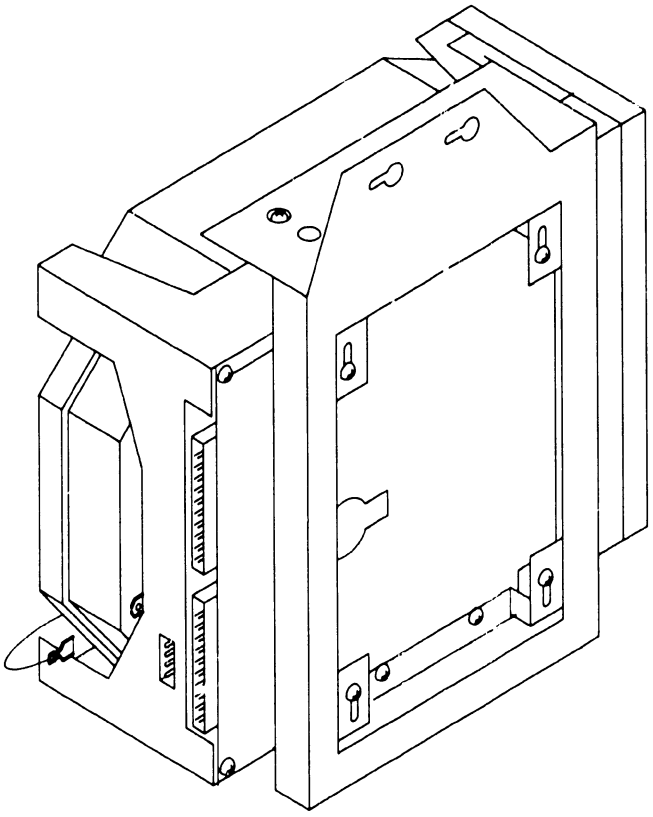
ILLUSTRATED PARTS

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.

Item	Part Number	Description
1	725-0270	Winchester Disk Drive, 72MB, 5 1/4 inch
2	725-0269	Winchester Disk Drive, 145MB, 5 1/4 inch



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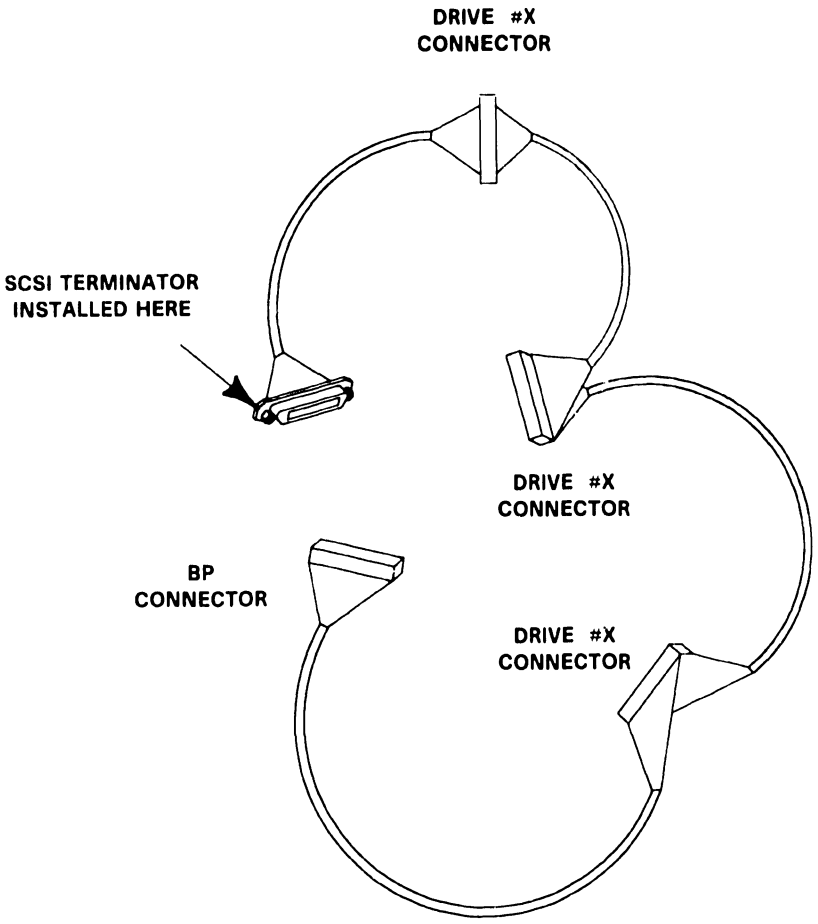
A.11 ILLUSTRATED PARTS

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.

Item	Part Number	Description
1	220-3624	SCSI Interface Cable, Winch. Drive, 72MB
2	220-3624	SCSI Interface Cable, Winch. Drive, 145MB



APPENDIX B

APPENDIX B

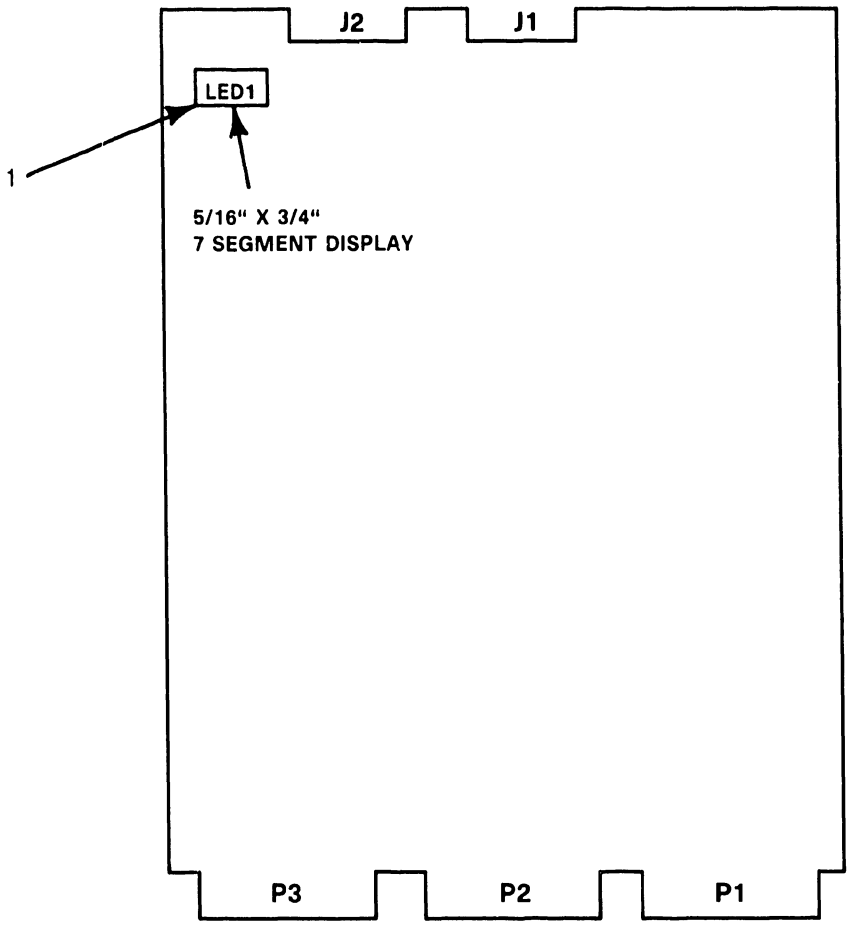
ENHANCED ASYNCHRONOUS DEVICE CONTROLLER BOARD

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".

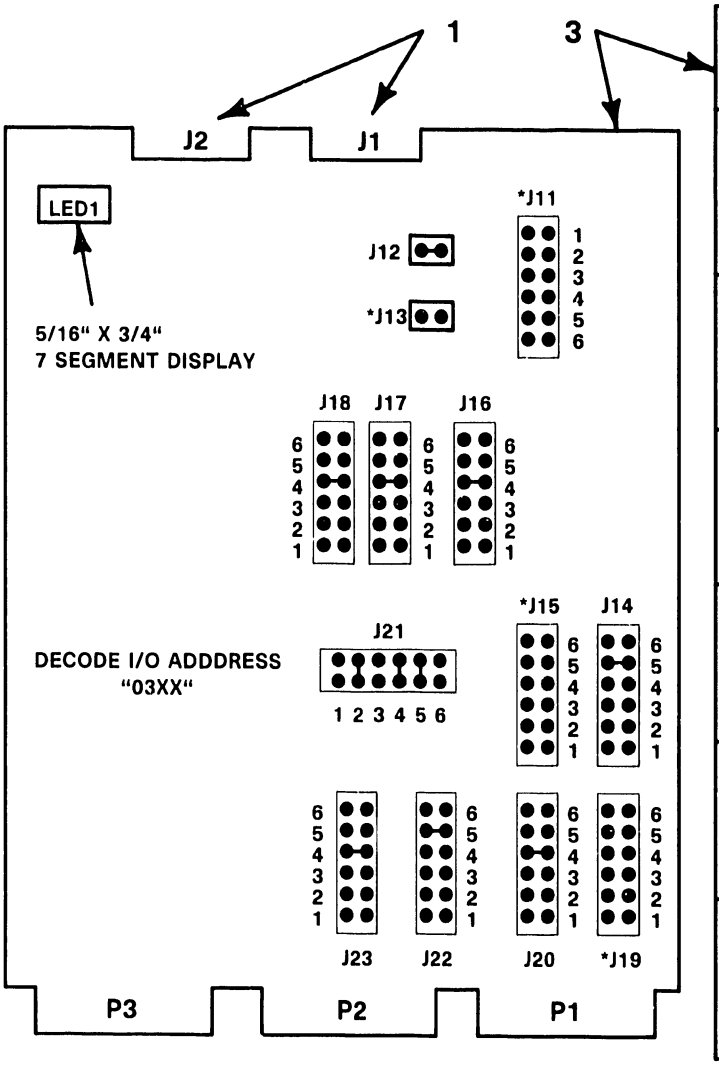
REPAIR

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.



I/O DECODE ADDRESS	SHUNT CONNECTOR BLOCK IDENTIFICATION			
	J21	J16,J17,J18 J20,J23	J14, J22	J11,J13, J15,J19
DECODE "01XX"	1 2 3 4 5 6	6 5 4 3 2 1	6 5 4 3 2 1	1 2 3 4 5 6
DECODE "02XX"	1 2 3 4 5 6	6 5 4 3 2 1	6 5 4 3 2 1	1 2 3 4 5 6
DECODE "03XX"	1 2 3 4 5 6	6 5 4 3 2 1	6 5 4 3 2 1	1 2 3 4 5 6
DECODE "04XX"	1 2 3 4 5 6	6 5 4 3 2 1	6 5 4 3 2 1	1 2 3 4 5 6
DECODE "05XX"	1 2 3 4 5 6	6 5 4 3 2 1	6 5 4 3 2 1	1 2 3 4 5 6
DECODE "06XX"	1 2 3 4 5 6	6 5 4 3 2 1	6 5 4 3 2 1	1 2 3 4 5 6

*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)

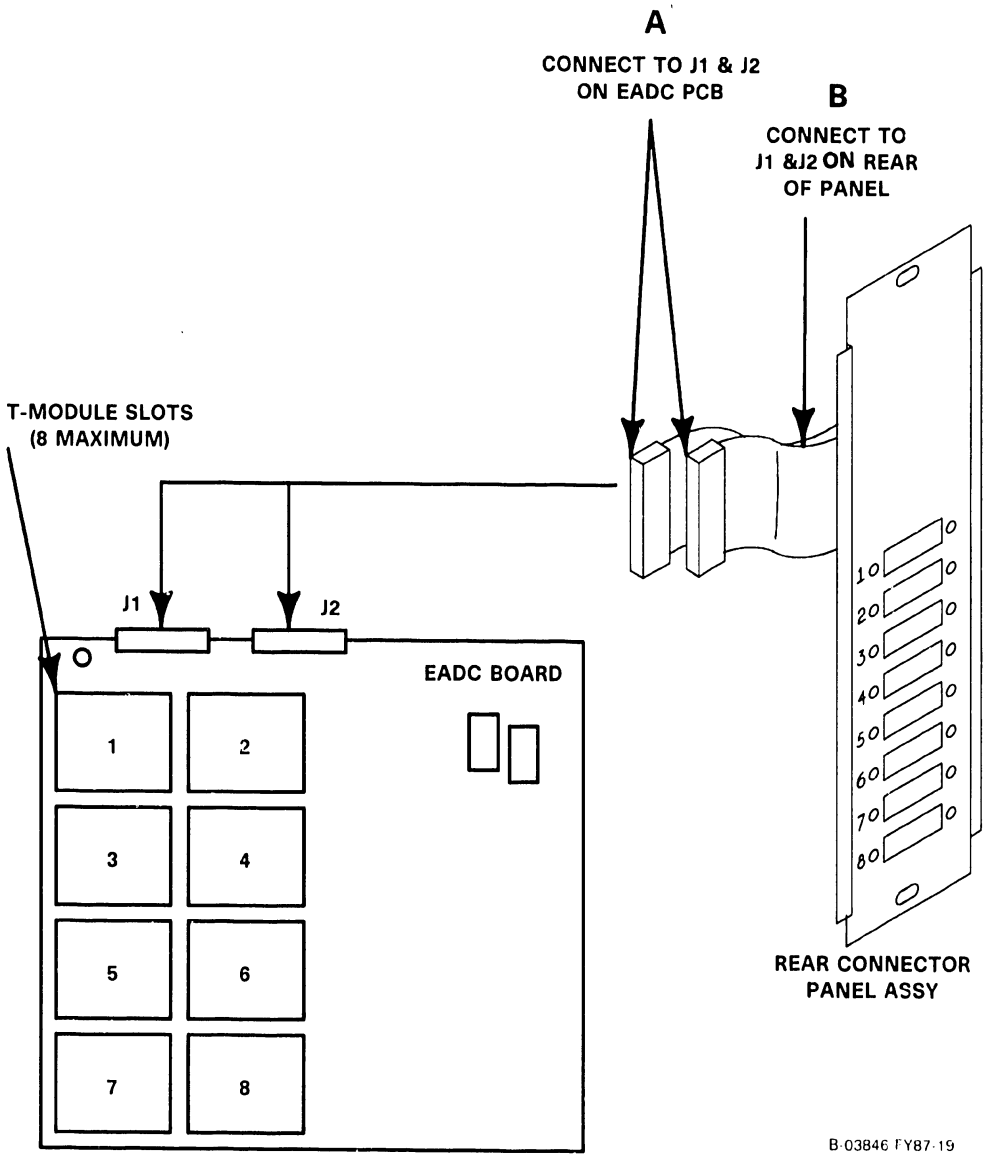
7) Connect Enhanced Asynchronous Device Controller to the Rear Connector Panel Assembly (WLI P/N 272-0056) as follows:

   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.



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

MODEL NUMBER	WLI/P/N	DESCRIPTION
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.

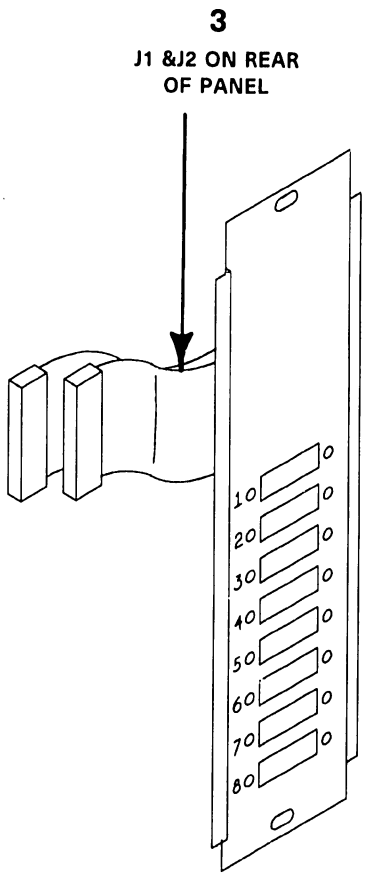
1) Power-down mainframe, → 4.4.

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

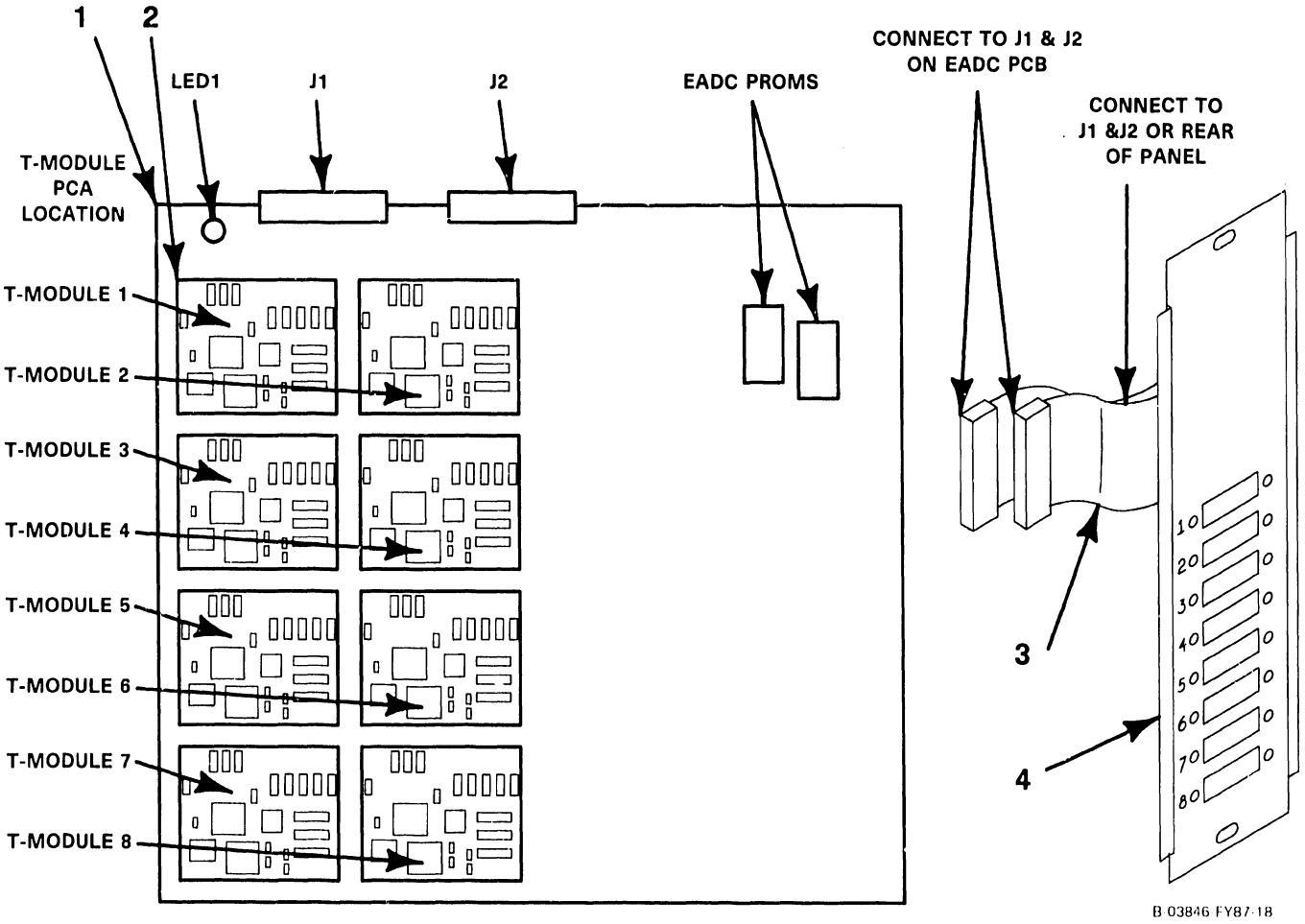
B.5 ILLUSTRATED PARTS

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



SCHEMATICS

SCHEMATICS

	P/N	E-REV.	BOARD NAME
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.

+5V SENSE
+5V FOREVER
RESET
TRIT
+12V
+15V
-12V
7812 VR2
7805 VR1
C3A .1 50V
C1 10 25V
+5V ADJUST
R1 1K 1%
R2 500
R14 1K 1%
R13A 270K
R4 370K
C8 .001 50V
R13 47K
C7 .001
C3 .001 NPO
U1 UC3525A L1
VIN VC VREF OUTA NIIN OUTB INVIN COMP SHUTDOWN SYNC OSCOUT SOFT START RT CT DISC GND
R15 4.7
C11 10 50V
C9 .1 50V
R16 3.32K 1%
R17 3.32K 1%
C10 .1 50V
D6 1N914
D7 1N914
R28 120
R27 8.25K 1%
C12 10 50V
C15 .0015
D8 1N914
C16 .47 50V
R12 10K 1%
R19 6.06K 1%
R20 2.2K
C4 .1 50V
R7 680
R8 680
R6 4.7K
R18 4.7K
R26 100
R5 4.7K
U2 UC3903 L1
VIN GP OP AMP IN1 GP OP AMP OUT GP OP AMP INV SENSE2 OVP ADJ SENSE3 SENSE4 INV INP OVP ADJ SENSE4 VREF POWEROK MINCOMADJ SENSE1 LINE/BAT SENSE GND DELAY
Q2 VN10KM
P1
J1
D4 1N914
D5 1N914
R9 2.2K
R35 2.371 1%
R36 10.0K 1%
R34 10K 1%
R33 2K 1%
R21 2.2K
+12V SENSE
-12V SENSE
R24A 470
C7A .01
Q1 PN2907
C2 3.3uF (T)
R25 120K 1%
D3 1N750A 4.7V
LED1 GRN
R1A 180
R3A 100
R23 1K
C5 .1 50V
Q2A VN10KM
LM339 L2
LM339 L3
C6 .1 50V
R3 680
SYNC OUT
R33A 2.7K
D9A 1N914
R34A 2K
R25A 470
Q3 2N3414
R22 10K
C13 .1 50V
R10 1K 1/8W 1%
C16 10 50V
C17 15 16V
D11 1N914
POWER FAIL
D10 1N914
R30 4.7K
R31 1K
R29 1K
LOOP OUT
NO AC
LOOP IN
BAT LOW
OVERTEMP FAULT
+5V SENSE RETURN GND
+5V SENSE RETURN GND
±10V
BAT IN
D11A 1N750A 4.7V
R5A 4.7K
C4A .1 50
R23A 180
LED2 RED
D1A 1N914
Q1A VN10KM
R16A 4.7K
C17A .1 50V
4011 L1A
E REV 3 N

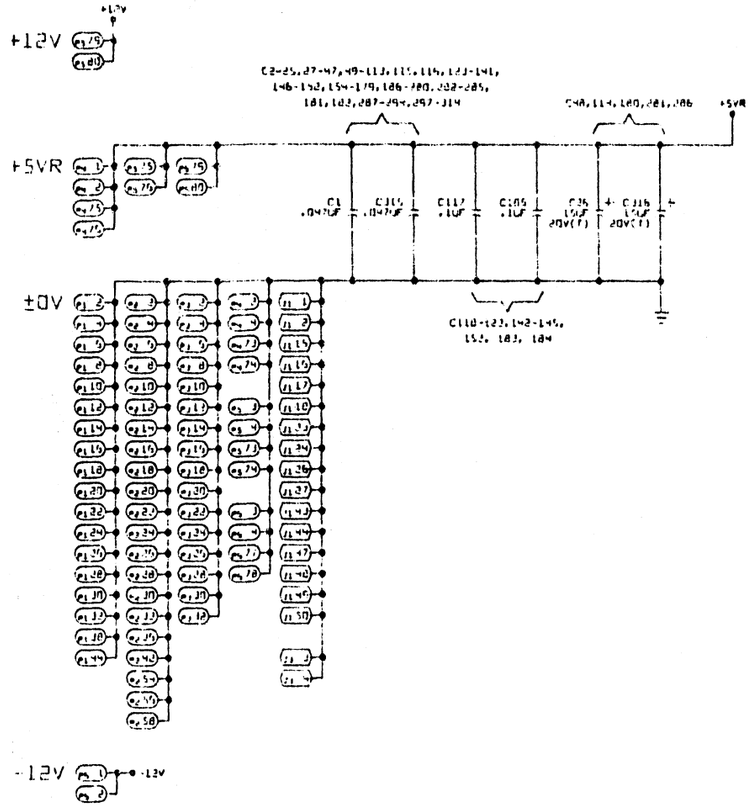
WANG		SCHEMATIC DIAGRAM	
		TITLE CONTROL BOARD	
700 NUMBER 405	HW NUMBER 210-8563	DWN BSR CHK FSS ENG EB DIR	
SCALE	SHEET 1 OF 1	SIZE E	DRAWING NUMBER 8563 REV 3

MNEMONICS	COORD.
BATT-ON	L14J
BH	L4K1
B-MAIN	8A11
BPA1	12114
BPA2	12114
BPA1-BPA10	12114
BPA11	12114
BPA8-BPA7	12E14
BPA8-BPD15	12D14
CD-C15	10K1
CB	7G14
CH01-CH16	231
CH2T	211
CHANC	11A10
CHF1	5K13
CHSTP	4K11
CPCLK	4E14
CPEXT	4E1
CPHALT	4K1
CPCS	11K10
CPSTRC	12F1
CYSTRT	4B14
DBTRIG	4E14
FAIL*	4F14
IA00-IA07	7C14
INIT	1252
IOJ	581
IOH	13C1
IOCCN	13114
IOOT/R	13114
IOMR	12114
IOWR	12114
IPO	2G1
IPROT	2C9
MA00-MA03	7B1
MA04-MA07	7C1
MA10-MA17	8114
MD0-MD7	11C1
MD0-MD15	11D1
MDOPB	11G1
MDOPE	11G1
MD10-MD15	11J1
MDS	4A12
MDST	4K11
MRET	4A14
MRTJ	5114
MSMCT	5F14
MSR0	4K11
MSR1	4K11
MTP	4K13
MWT-MD15	8J14
NCOMP	2D1
NDT00	3F1
NDTRGM	7C1
N-MPLO	4A2
NDMPCT	9J
NDTPRM	7C1
PWR.RF	L3B14
RB	7G14
RPCT	4F1
RPCSR	7D1
RPSY	5G14
RPSTART	4F14
RPSJ-RPSZ	4F14
SM3	9G1
SM3R	4F1
SMRST	7C9
SM17	10B1
SM24	5A1
SM28	7A1
TM3-TD7	13C14
TM8-TD15	13B14
TMALT	4K1
TMSTRT	L3G14
TST.DTAR	L3E14
TST.SM3	L3F14
TST.SM	L3F14
TWD	4A14
TWE3	4E1
TWT	13K13
TYAL-13	L3G14
TXT.SM3	4K1
UP	4F14

IC TYPE	LOCATION	SPARES
74F00	L13	1
	L38	2
	L139	3
	L178	1
	L181	3
	L230	3
	L262	3
	L303	2
	L395	1
	L397	1
74LS00	L64	1
74F02	L67	1
	L135	3
	L174	3
	L201	3
	L334	3
	L344	3
74F04	L12	1
	L175	4
	L180	4
	L240	4
	L317	2
	L356	1
74S04	L179	5
74F08	L79	1
	L173	2
	L183	3
	L324	1
	L340	1
	L345	3
74F10	L153	1
	L209	1
	L349	2
[illegible]	L33	1
	L138	1
74F32	L6	2
	L73	1
	L90	2
	L155	3
	L256	1
	L375	1
	L398	1
	L347	3
74F74	L335	1
	L258	1
	L385	1
74F85	L203	3
	L373	3
	L380	2
74S260	L47	1
	L93	1
	L183	1
	L191	1

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.



REV	DESCRIPTION
L	N

WANG LABORATORIES, INC.

SCHEMATIC DIAGRAM

TITLE: VS-65 CPU

SYSTEM	WANG PART NUMBER	DWN	DES	CHK	DOC	ENG	DIR
VS-65	219-9659						

SCALE: NONE | SIZE: E | DRAWING NUMBER: 9659 | REV: L

14 13 12 11 10 9 8 7 6 5 4 3 2 1

K J I H G E D C B A

74F374 L110 L109 L139 L114 L115 L116 L117 L118 L119 L120 L121 L122 L123 L124 L125 L126 L127

74F240 L57

74F244 L53 L52 L55 L54 L56 L51 L50 L49

74F138 L25 L58 L27 L59

74F08 L21 L54

74F32 L24 L34

74F04 L85 L91 L73 L34

74F11 L42

74F30 L136

74F74 L15

74F00 L22

(13K4) I00-I047

(MCS) (6E7) R/PWR

N-ACE (5H11) N-ACD (5J10) N-ALU0 (5J10) N-CMX1 (10A12) N-CMX0 (10A12) N-MIRC (13B4) N-C2 (6F3) N-C1 (6F3)

N-SH0 (/D4) N-ALU3 (/F4) N-ALU2 (/F4) N-ALU1 (/F4)(5K5) N-ALU0 (/F4) N-SGN (5G10)

N-SH3 (D11) N-SH2 (D11) N-SH1 (D11) N-SH0 (D11) N-SH3-N-SH0 (D12)

SMRQT (B45)

SLOW-CLK SMRQT DMRQT

CM0-CM47 (14J13)

CM20 (12C5) CM15 (11C14) CM21 CM22 CM23 CM24 CM25 CM26 CM31

N-IMCY (7K14) N-IMCA (7J10) N-MSTR (7F13)

CM0 CM40 A=T40 SMAR

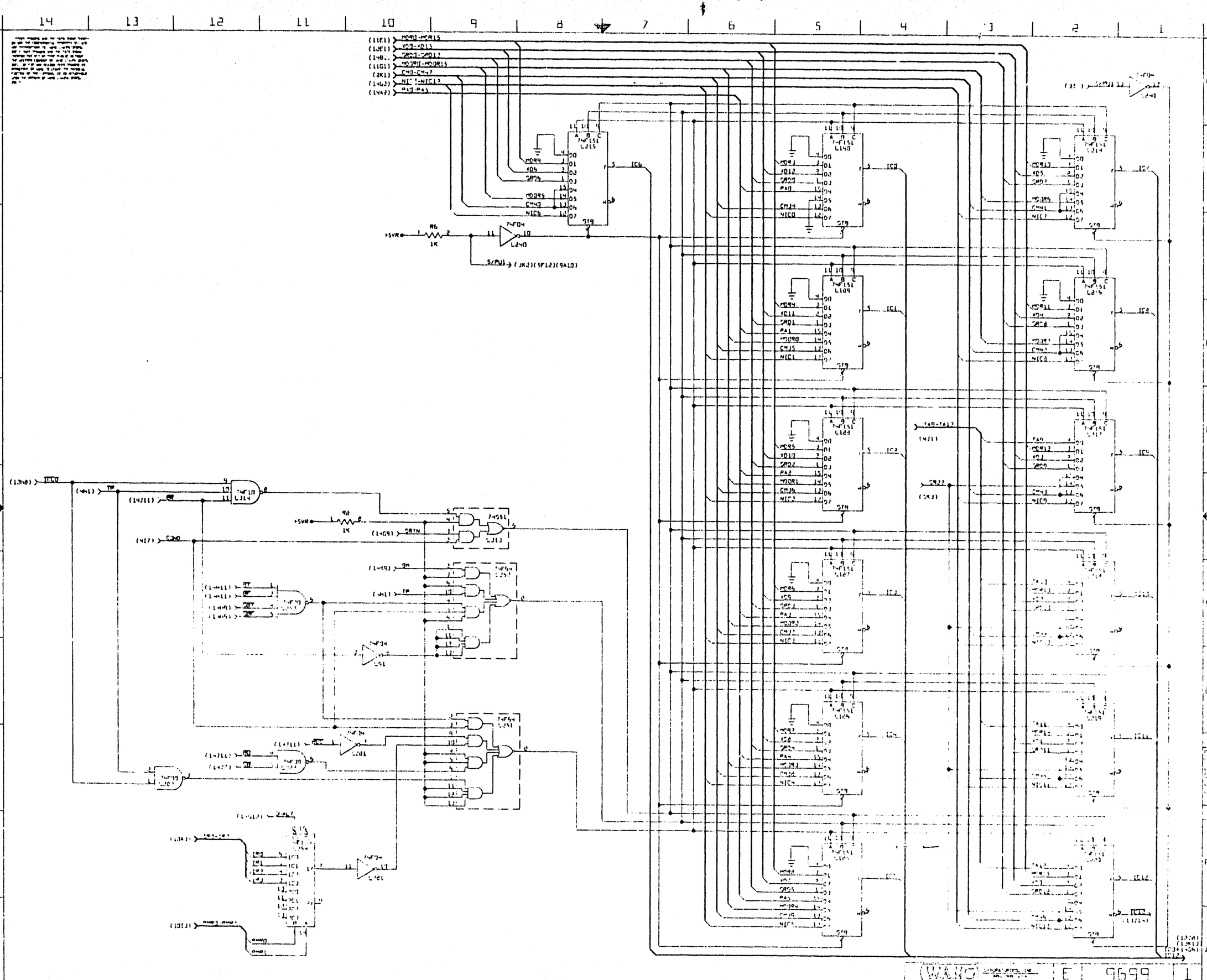
A=CM0 A=T40 A=MRLC (/D9) (5C11)(5J11) N-STRAM (8A1) N-MRMC (5G8) (5J12)(7K13)(8C12) N-MRS (/F5) (/F24) N-RC (10C7) N-MRCC (/F11) (10C7) N-RCC N-RCMA N-STRAM N-MRCT

17" 11" 8.5"

17" 11" 8.5"

WANG E 9699 1 REV

SCALE DRAWING NUMBER SIZE

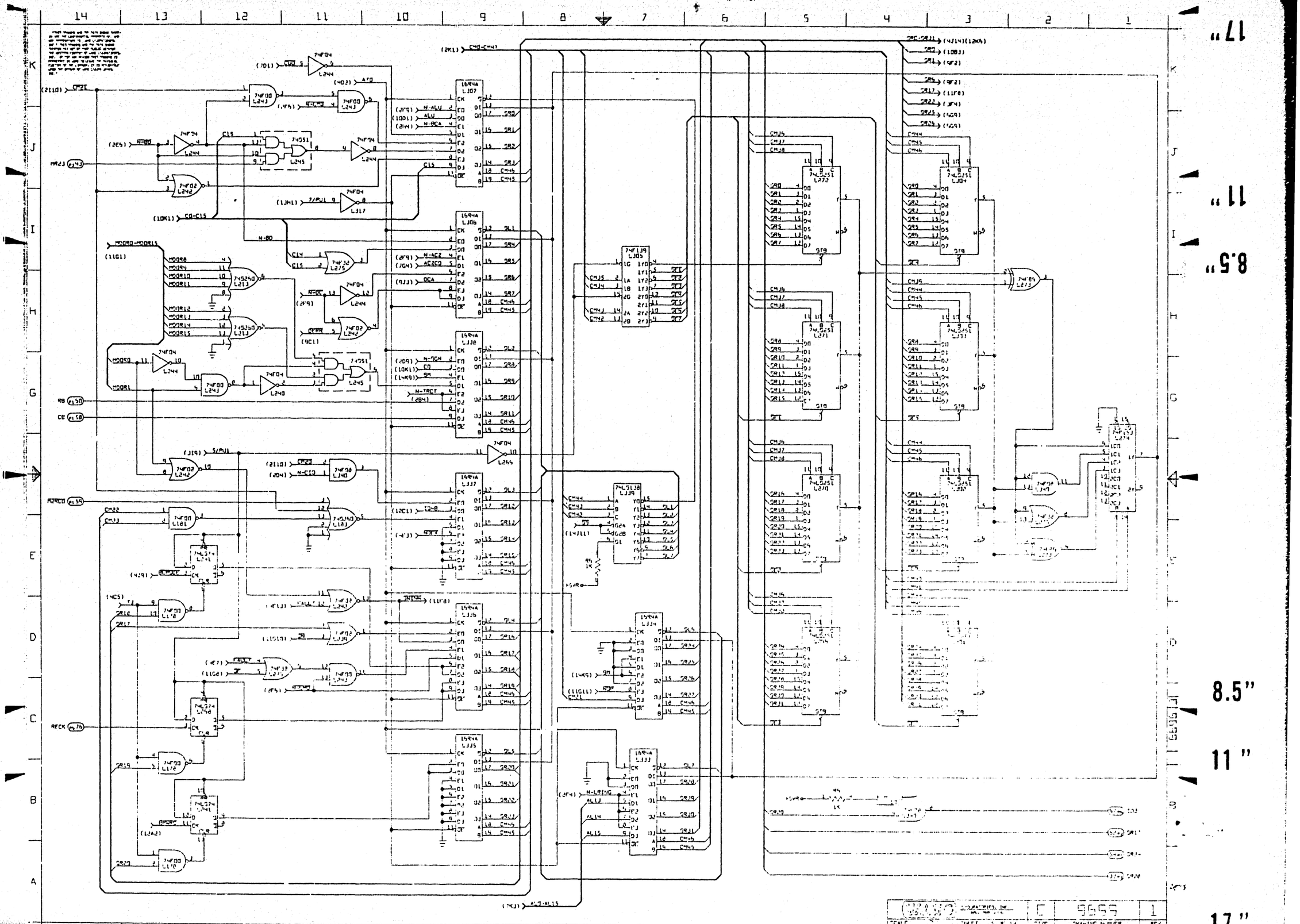


WANG	E	9699	1
SCALE	SHEET	SIZE	• DRAWING NUMBER / REV

14 13 12 11 10 9 8 7 6 5 4 3 2 1

K J I H G E D C B A

8.5" 11" 17"

 74F04
74F00
74F02
74S51
74F32
74S260
74S240
74S74
74F86
74F139
74LS138
74LS251
74LS153
169A
L307
L306
L308
L307
L305
L309
L304
L272
L271
L270
L274
CM0-CM47
C0-C15
MODR0-MODR15
N-ALU
ALU
N-BCA
S/PU1
RB
CB
RECK
AL0-AL15
N-LRING
+5VR
WANG LABORATORIES, INC.
SCALE
SHEET 5 OF 14
SIZE
C
DRAWING NUMBER
9659
REV
1

SCALE	SIZE	DRAWING NUMBER	REV
NONE	E	9699	1

14 13 12 11 10 9 8 7 6 5 4 3 2 1

K J I H G E D C B A

17" 11" 8.5"

8.5" 11" 17"

E 9699 1

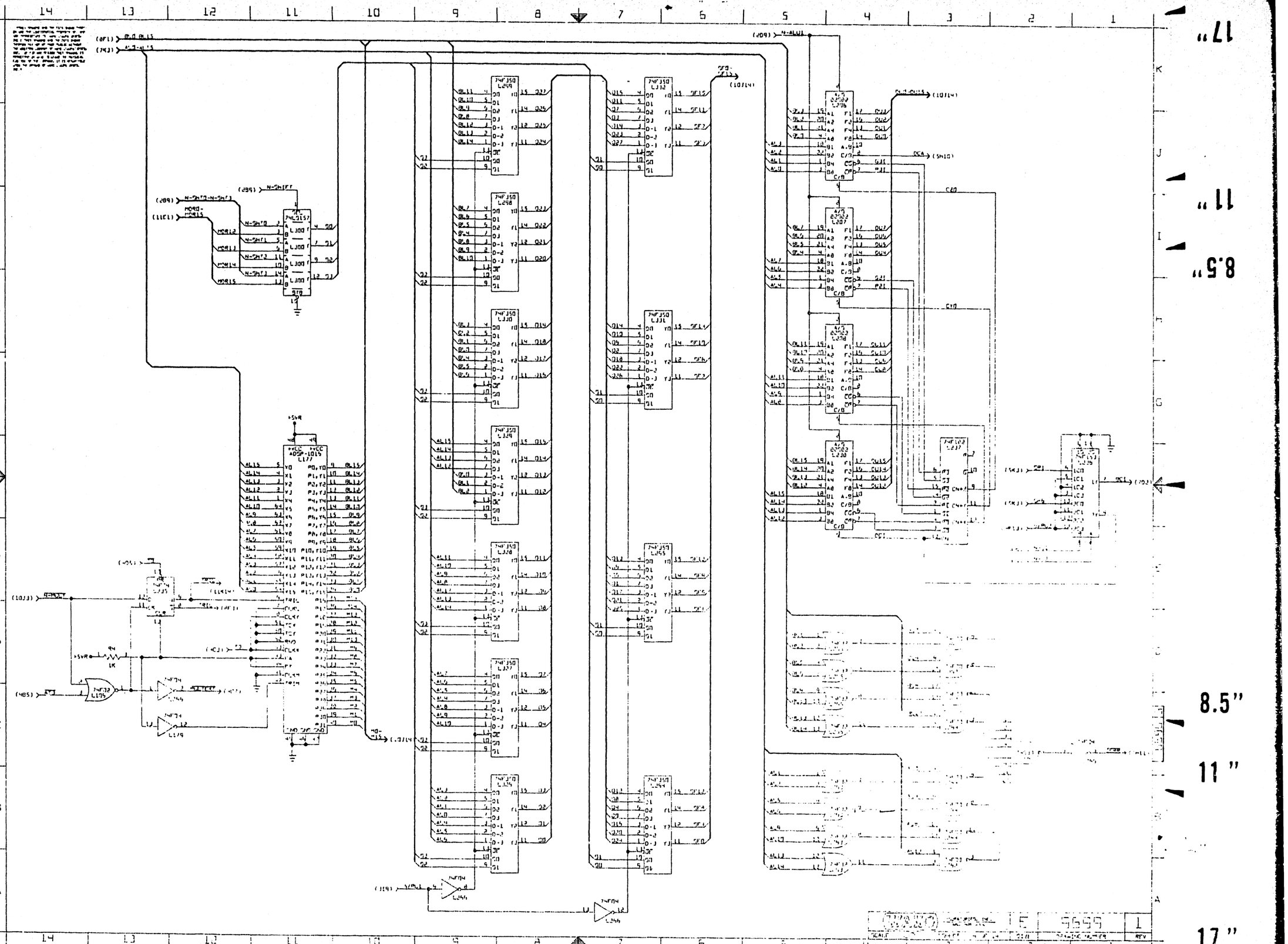
14 13 12 11 10 9 8 7 6 5 4 3 2 1

K J I H G E D C B A

17" 11" 8.5"

8.5" 11" 17"

E 5699 1


74F350
74F157
74F32
74F04
ADSP-1015
74F283
74F153
74F102
74F163
74F139
74F08
74F86
74F74
74F00
74F244
74F373
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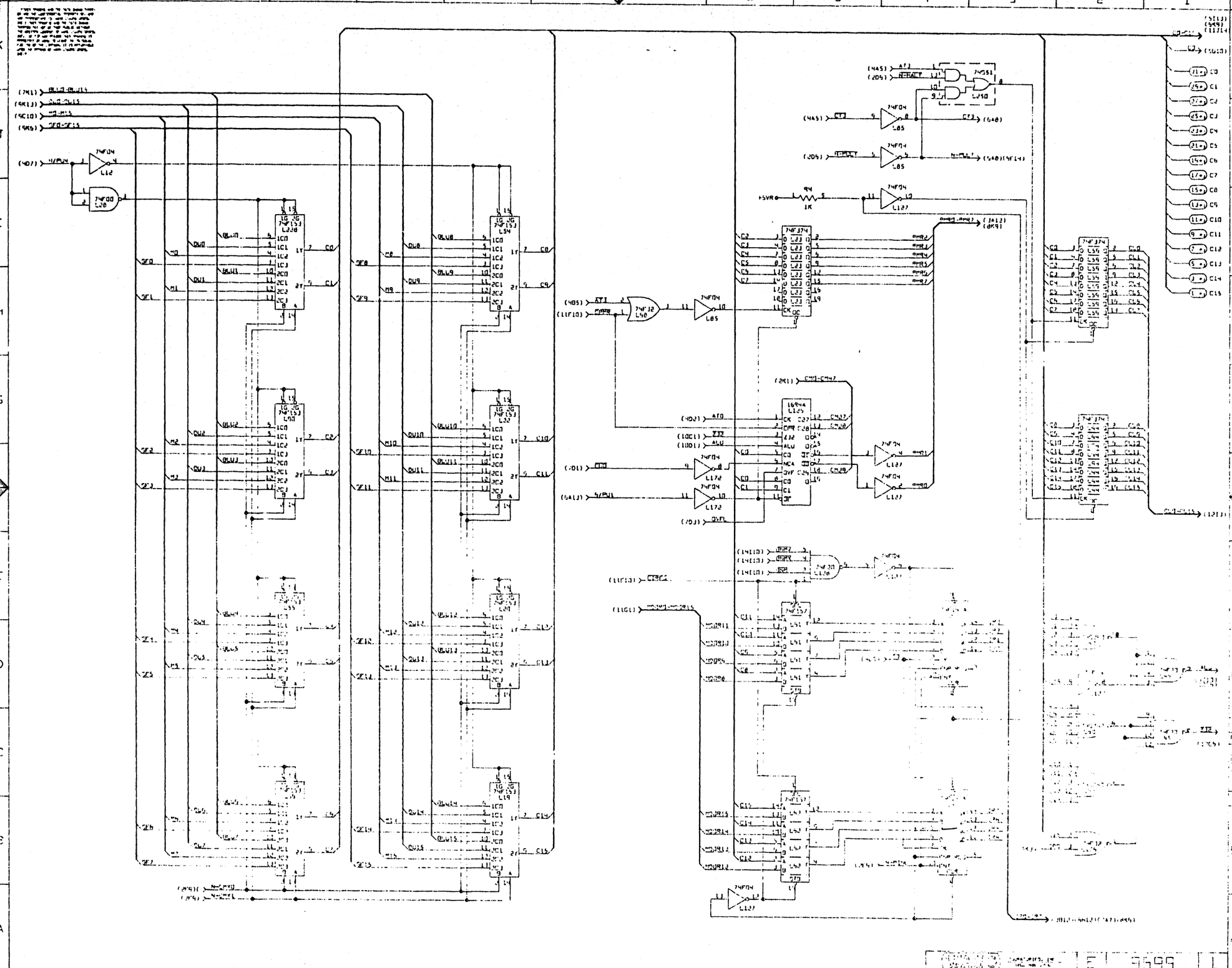
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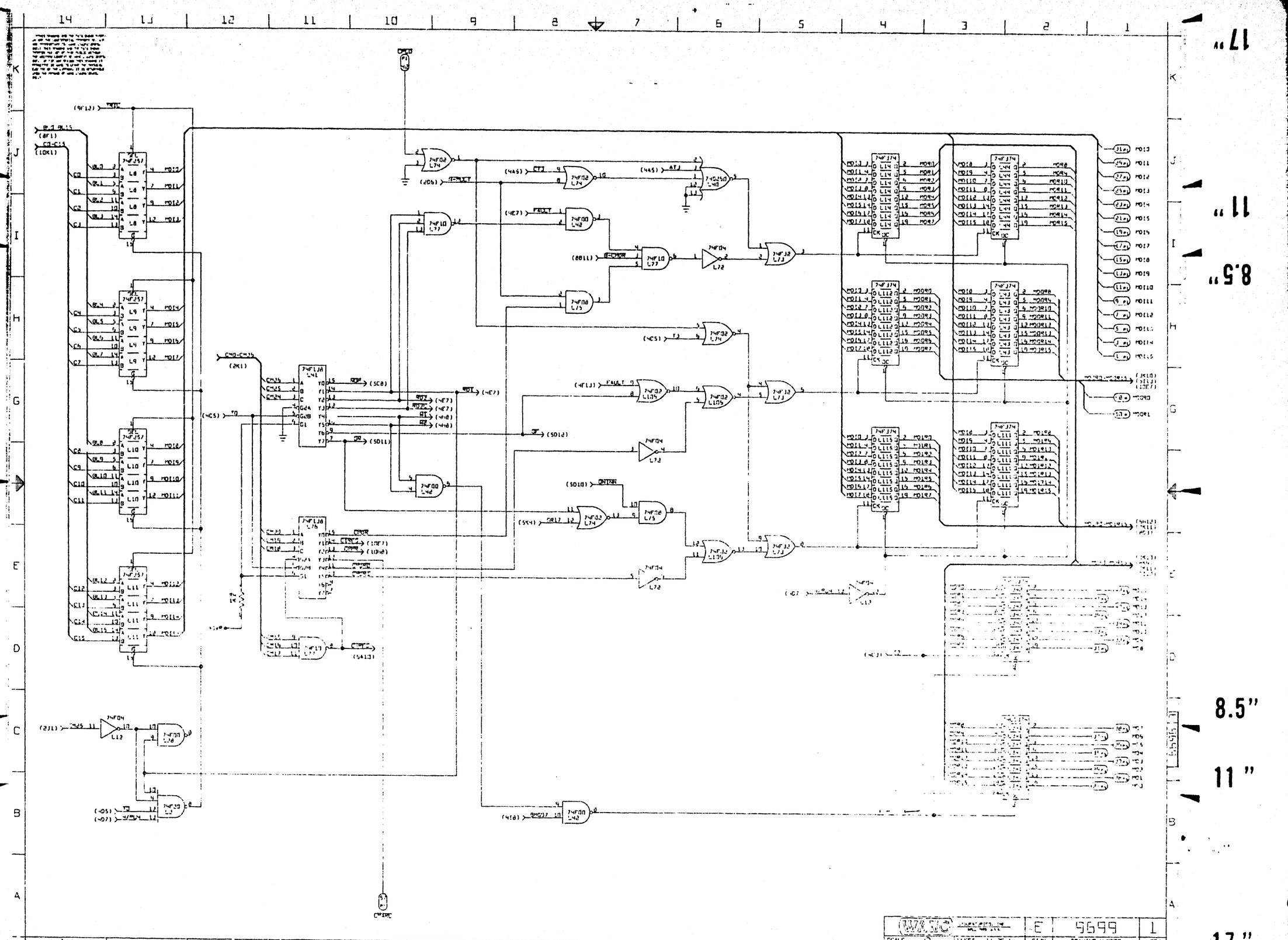
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74F04 L72
74F08 L75
74F10 L77
74F32 L73
74F33 L74
74F374 L114
74F374 L115
74F374 L116
74F374 L117
74F374 L118
74F374 L119
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74F374 L121
74F374 L122
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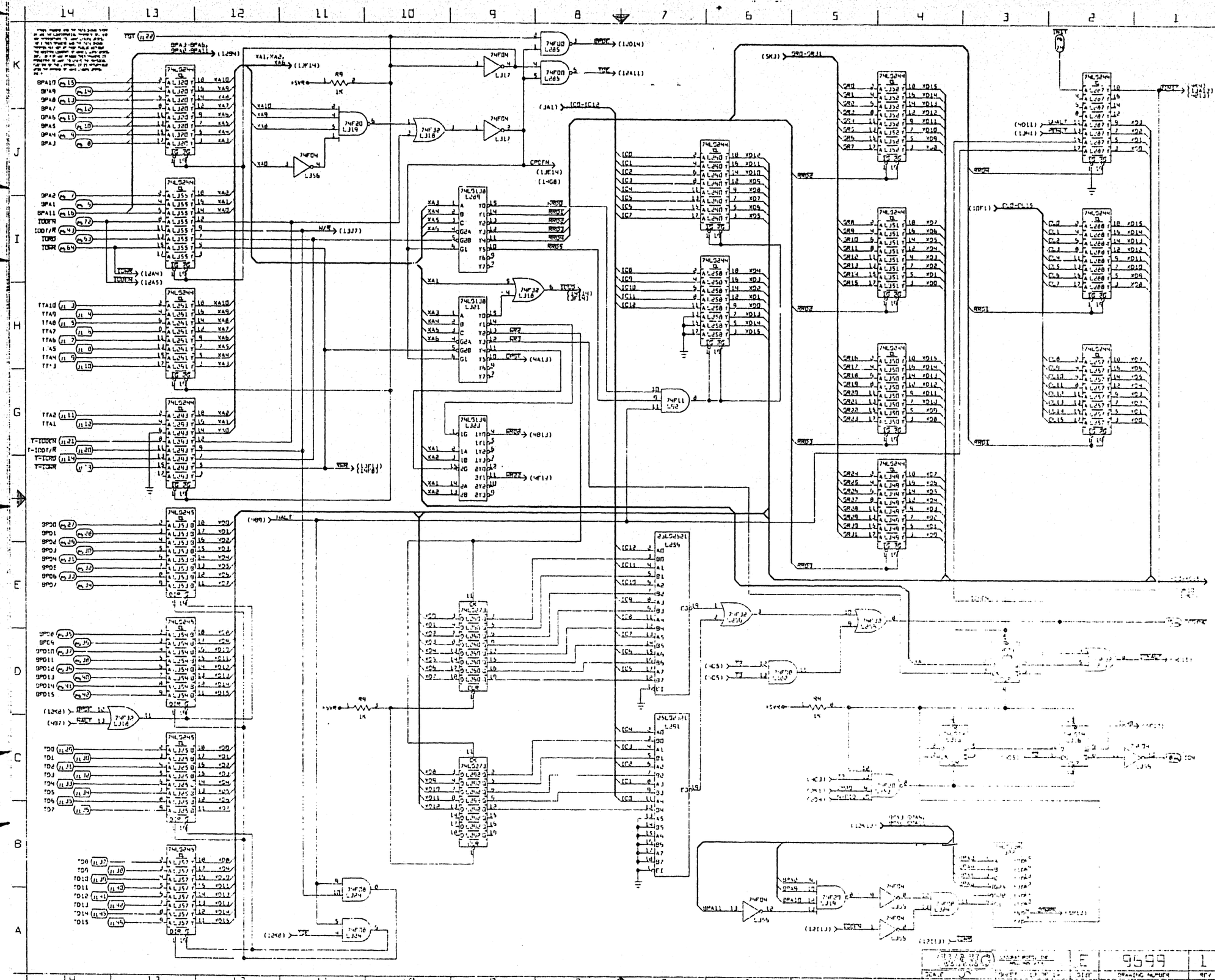
74F374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74LS138
74LS373
74LS521
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74F04
74F08
74F10
74F11
74F20
74F32
74F64
74F74
9599

8.5" 11" 17"

14 13 12 11 10 9 8 7 6 5 4 3 2 1

K J I H G F E D C B A

(JB1) IC0-IC12

JP1

(JB1) IC12

JCL1

JCL2

R2 33

R7 33

R8 1K

R5 33

R9 33

+5VR

XA1, XA2, XA5

(12K11)

74LS155 L104

74LS32 L216

(48S) HALT

(12J8) CPUEN

74LS08 L54

74LS74 L30

74LS153 L49

PWROFF J2 1

(4H5) BATTOFF

(12K1) BATTON

BATTON

NEU4864C3 L137 L138 L139 L140 L141 L142

CA0-CA12 IC0-IC12 VCC VSS

74LS245 DL L150 L151 L152 L153 L154 L155

XD0-XD15 (12E1)

(12J11) W/R

CN1 CN2 CN3 CN4

IC0-IC47 (2K14)

CM0-CM47 (2K1)

74LS280 L81 L78 L105 L134 L112

CM0-CM47

74LS283 L107

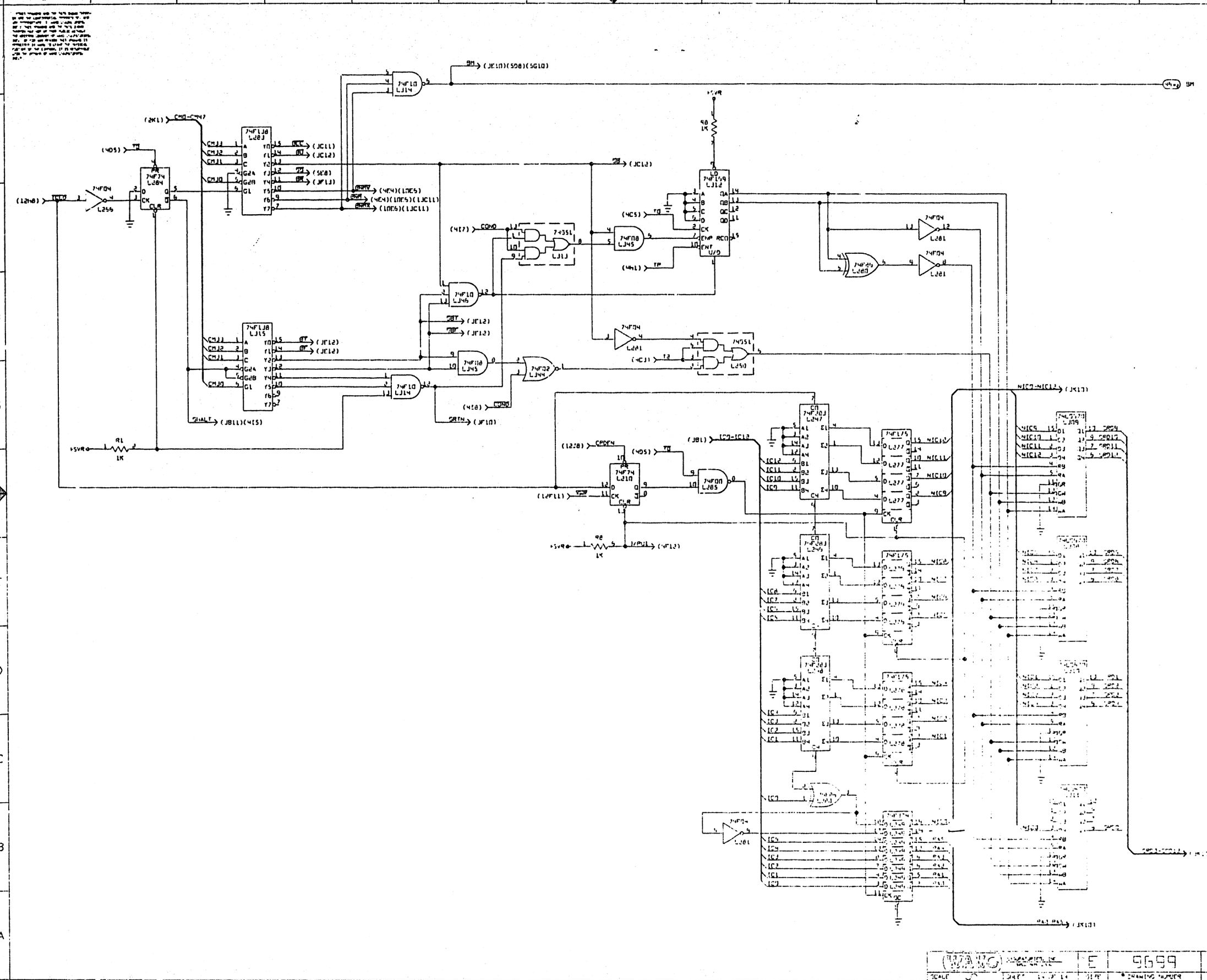
74LS74 L210

+5VR R4 1K

J/PCL1 (7J11) (7J24) (7J41)

(4C5) (4A17)

(4CL1) (12J22)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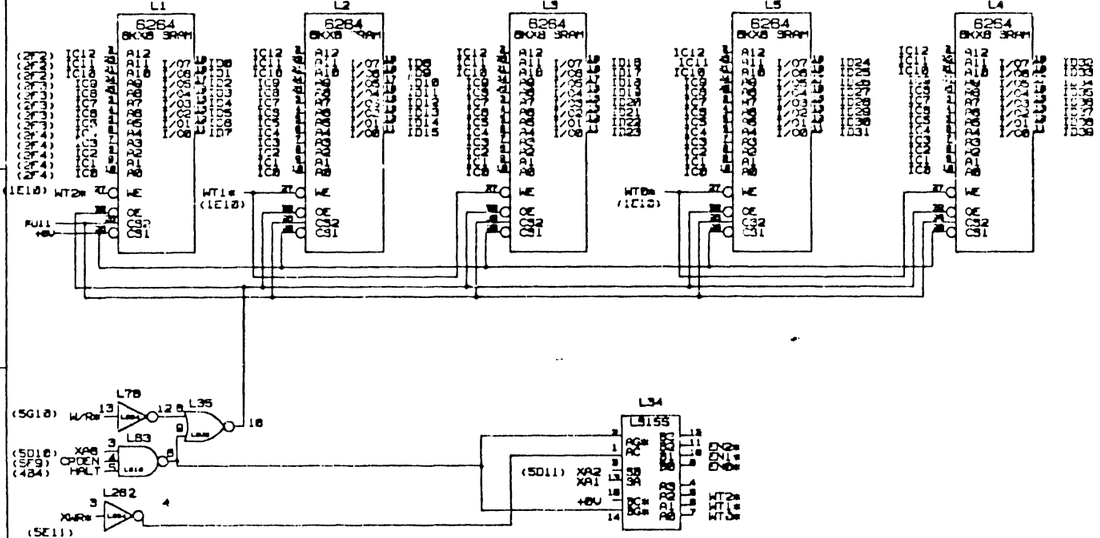
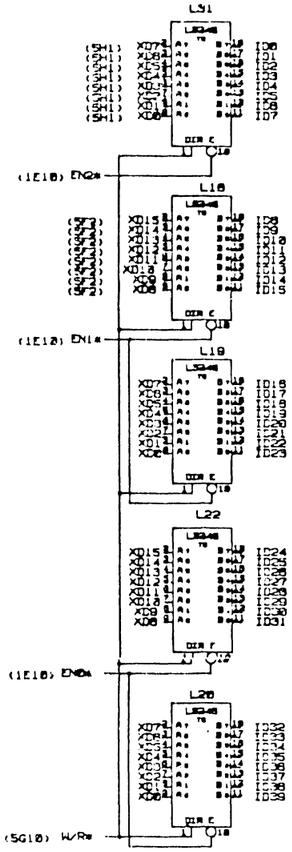
2
1
K
J
I
H
G
E
D
C
B
A
(2K1) CM0-CM47
(4D5) T3
74F74
L284
PR
D
CK
Q
CLR
(12H8) TCLD
74F04
L256
74F138
L283
CMJ3
CMJ2
CMJ1
CMJ0
A
B
C
G2A
G2B
G1
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
BCC (JC11)
BU (JC12)
SS (5C8)
BR (JF13)
ANAV (4E4)(10E5)
ANA (4E4)(10E5)(13C11)
ANAX (10E6)(13C11)
74F10
L314
SM (JE10)(5D8)(5G10)
SM
SB (JC12)
+5VR
R8
1K
LD
74F169
L312
A
B
C
D
CK
ENP
ENT
U/D
QA
QB
QC
QD
RCO
(4C5) T0
(4I7) CONO
74S51
L313
74F08
L345
(4H1) TP
74F04
L281
74F86
L280
74F10
L346
SBT (JE12)
SBF (JF12)
74F138
L315
BT (JE12)
BF (JE12)
74F08
L345
74F02
L344
74F10
L314
(4I8) CONO
SRTN (JF10)
SHALT (JB11)(4I5)
74F04
L281
(4C3) T2
74S51
L250
+5VR
R1
1K
(12J8) CPDEN
(4D5) T0
74F74
L210
D
CK
Q
CLR
(12F11) TCR
74F00
L285
+5VR
R8
1K
1/PU1 (4F12)
(JB1) IC0-IC12
C0
74F283
L247
A1
A2
A3
A4
B1
B2
B3
B4
Σ1
Σ2
Σ3
Σ4
C4
IC12
IC11
IC10
IC9
74F175
L277
CK
CLR
NIC12
NIC11
NIC10
NIC9
NIC0-NIC12 (JK13)
74LS378
L309
NIC9
NIC10
NIC11
NIC12
CRD9
CRD10
CRD11
CRD12
C0
74F283
L249
IC8
IC7
IC6
IC5
74F175
74F283
L248
IC4
IC3
IC2
IC1
74F175
74F86
IC0
74F04
L281
74F175
IC5
IC4
IC3
IC2
IC1
IC0
CRD0-CRD12 (JK13)
PA1-PA5 (JK13)
WANG
E
9699
1
SCALE
SHEET 14 OF 14
SIZE
DRAWING NUMBER
REV

8.5"
11"
17"

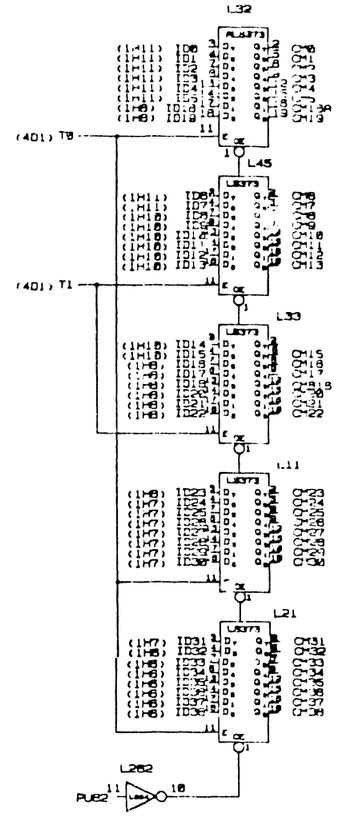
CONTROL MEMORY



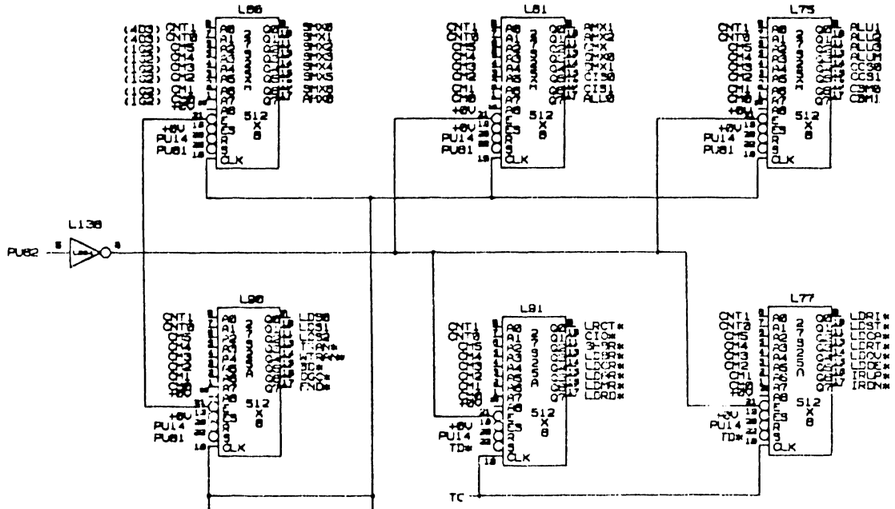
CONTROL MEM BUFF

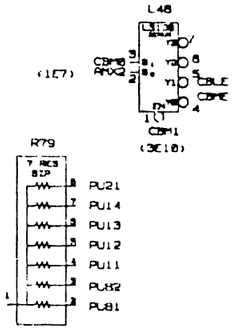


CONTROL MEM REG



NANO CODE





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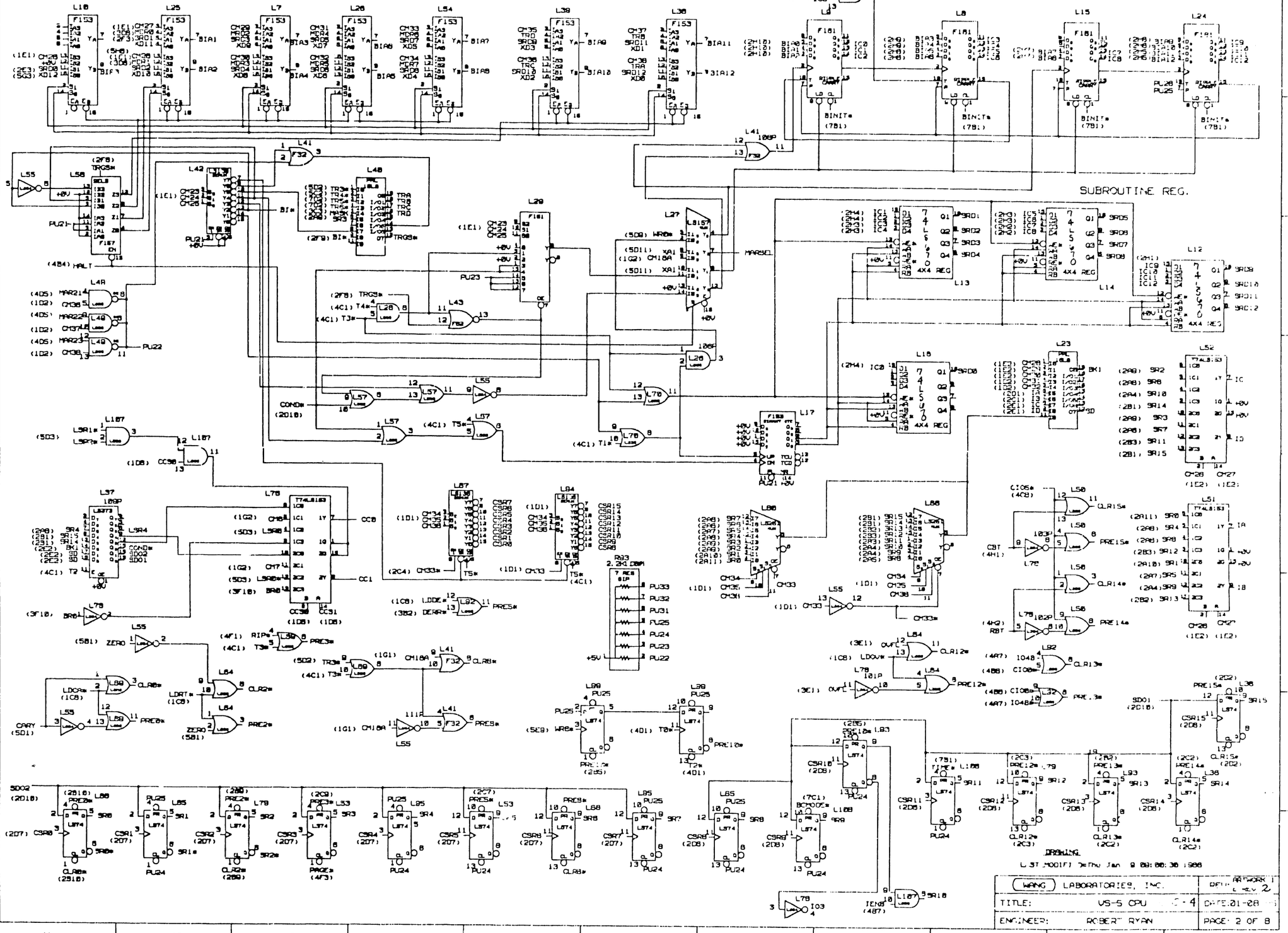
LAST MODIFIED=Wed Jan 15 14:38:41 1986

WANG LABORATORIES, INC.	REV: ARTWORK 1 F-DEV 2
TITLE: VSS CPU 2-4	DATE: 01-08-86
ENGINEER: ROBERT RYAN	PAGE: 1 OF 8

IC INPUT MUX

MIC REG.

SUBROUTINE REG.



DRAWING

L.ST MODIFI Thu Jan 9 08:00:30 1986

WANG LABORATORIES, INC.		ARTWORK REV 2
TITLE: VS-5 CPU		DATE: 01-28
ENGINEER: ROBERT RYAN		PAGE: 2 OF 8

A REG SELECTOR

A REGISTER

B REG SHIFTER

16 BIT ALU

C BUS SELECTOR

IREG

PMR

MEM DATA REG

MEM DATA BUF

8 BIT ALU INPUT SELECTOR

INSTR. LENGTH LOGIC

8 BIT ALU

8 BIT BCD ALU

DRAWING

LAST_MODIFIED=Thu Jan 9 09:18:20 1986

WANG LABORATORIES, INC.		REV: E-REV 2
TITLE:	V5-5 CPU 9 0 -4	DATE: 01-08-86
ENGINEER:	ROBERT RYAN	PAGE: 3 OF 8

T-RAM

MAR INPUT SEL

MAR 2 13-23

MAR 1 13-23

MAR 1 0-12

MAR 2 0-12

MAR OUTPUT 13-23

MEM ADD BUFF

MICRO-CYCLE

NAMO-CYCLE

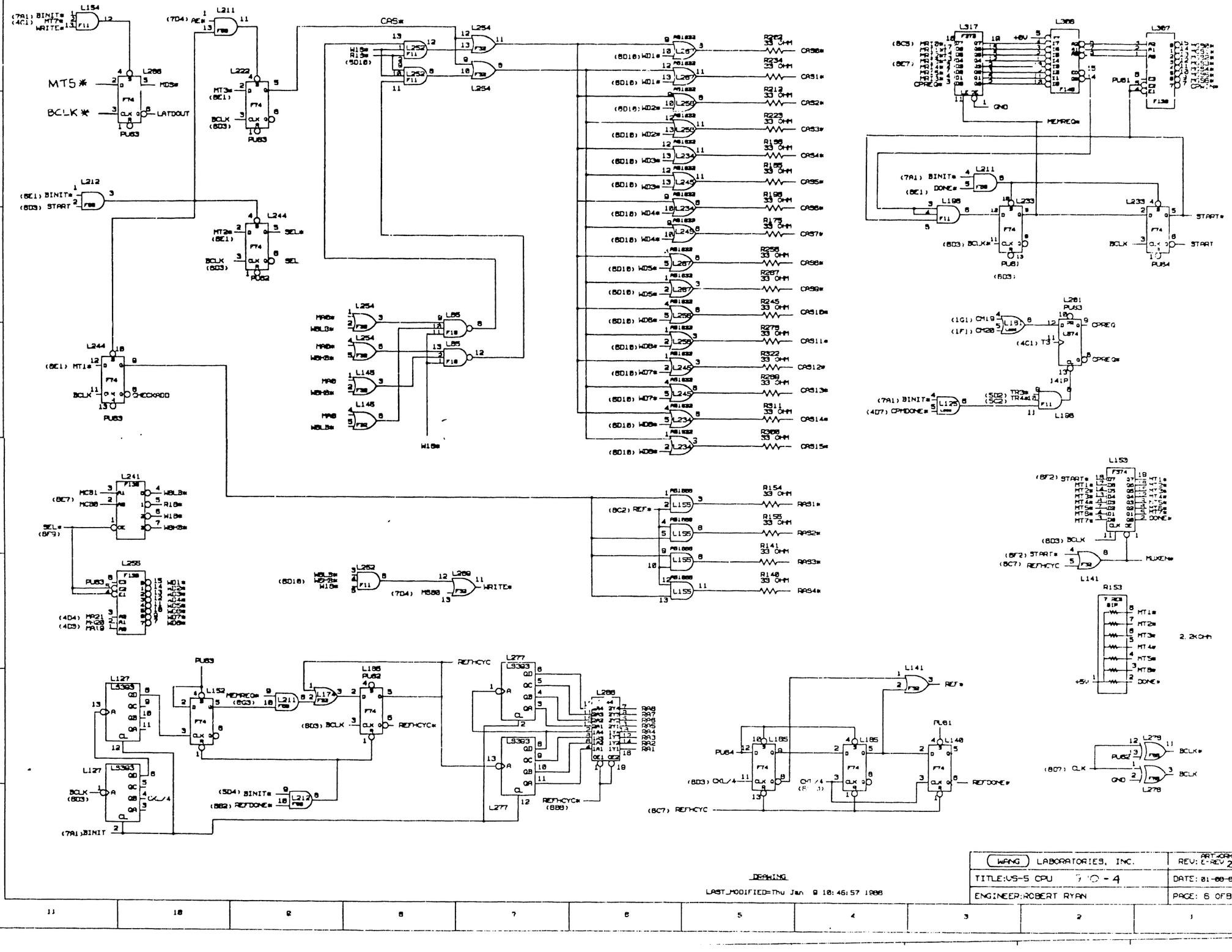
WANG LABORATORIES, INC.	REV: ARTWORK 1 E-REV 2
TITLE: VS-5 CPU 310-4	DATE: 01-08-86
ENGINEER: ROBERT RYAN	PAGE: 4 OF 8

STACK MUX

STACK

L188 STACK BYTE SEL

WANG LABORATORIES, INC.	REV: ORIG 1 REV 2
TITLE: VS-5 CPU 9110-4	DATE: 01-00-00
ENGINEER: ROBERT RYAN	PAGE: 5 OF 8



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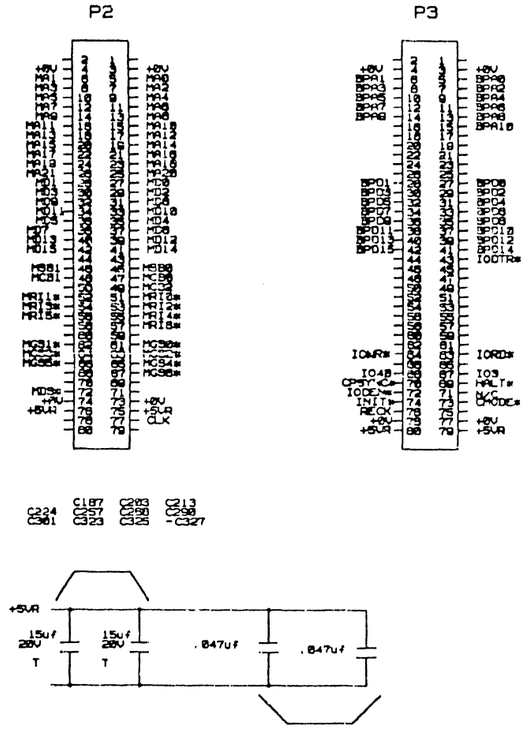
LAST_MODIFIED=Thu Jan 8 10:46:57 1986

WANG LABORATORIES, INC.	REV: ART-WORK 1 E-REV 2
TITLE:VS-5 CPU 7 0 - 4	DATE: 81-08-08
ENGINEER:ROBERT RYAN	PAGE: 6 OF 8

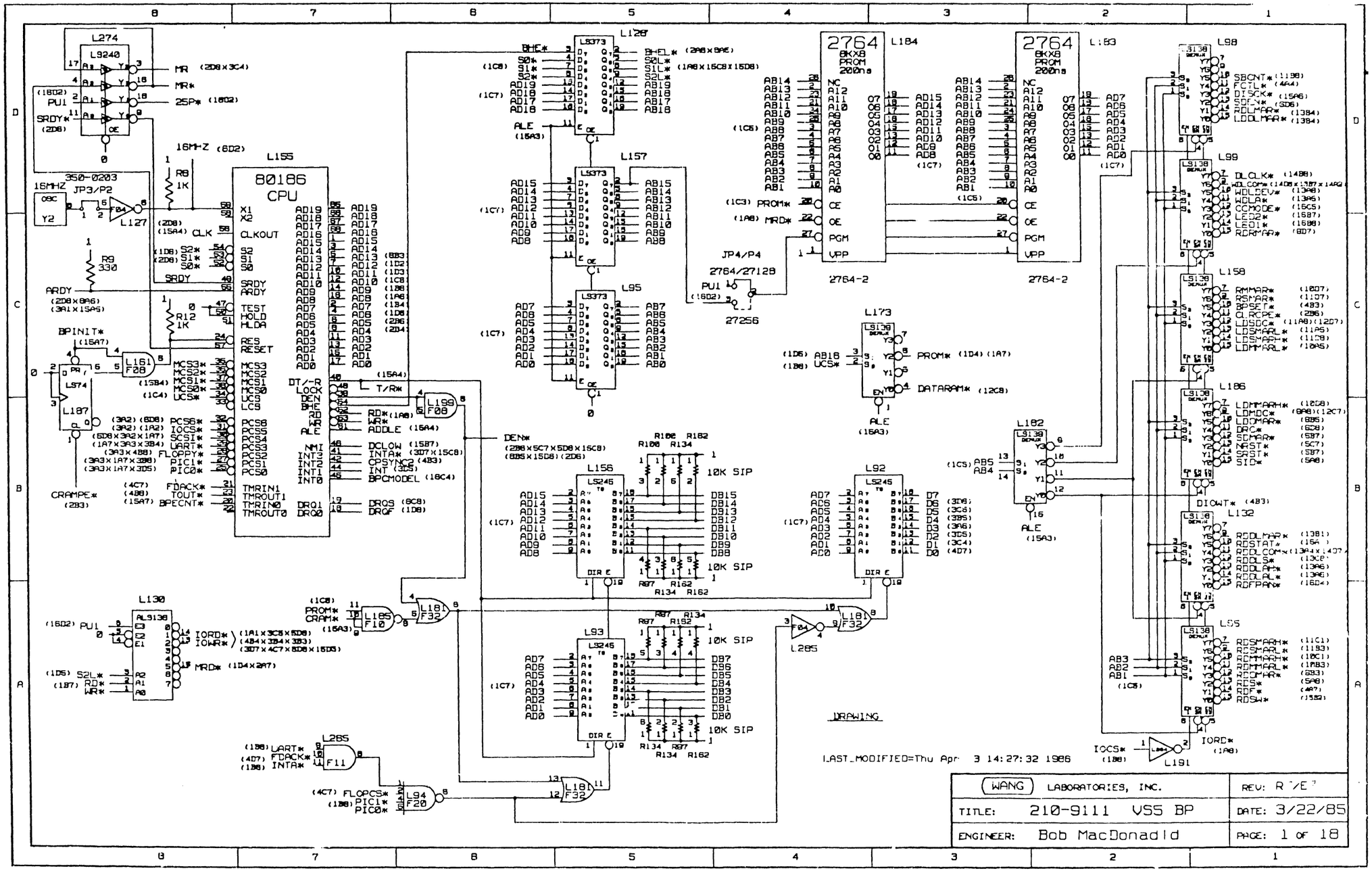
WANG LABORATORIES, INC.	REV: ARTWORK 1 E-REV 2
TITLE: VS-5 CPU	DATE: 81-08-06
ENGINEER: ROBERT RYAN	PAGE: 7 OF 8

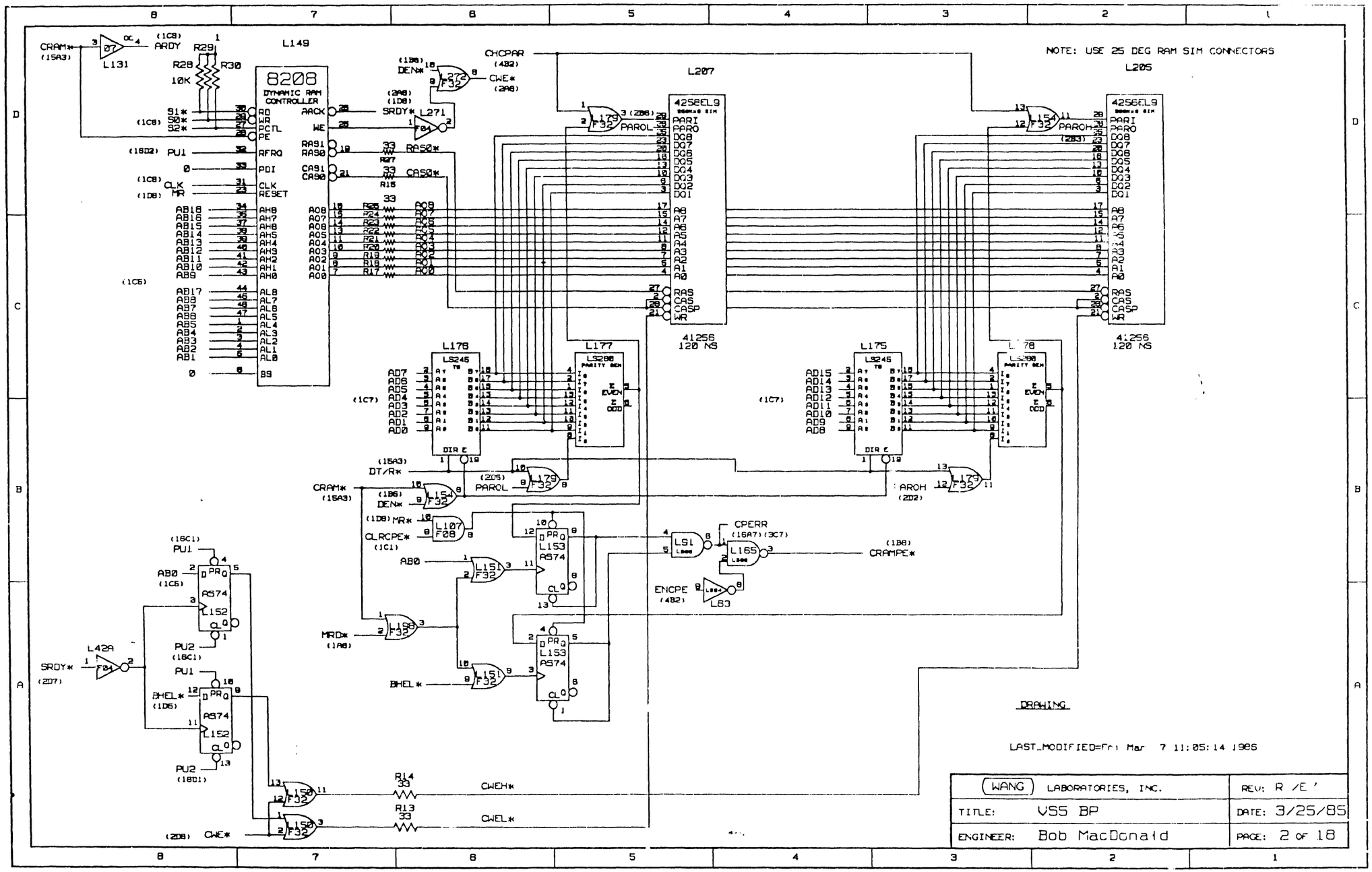
SW1	SW2	SW3	MEM SIZE
OPEN	OPEN	OPEN	512K
CLOSED	OPEN	OPEN	1MEG
CLOSED	CLOSED	OPEN	2MEG
CLOSED	CLOSED	CLOSED	4MEG

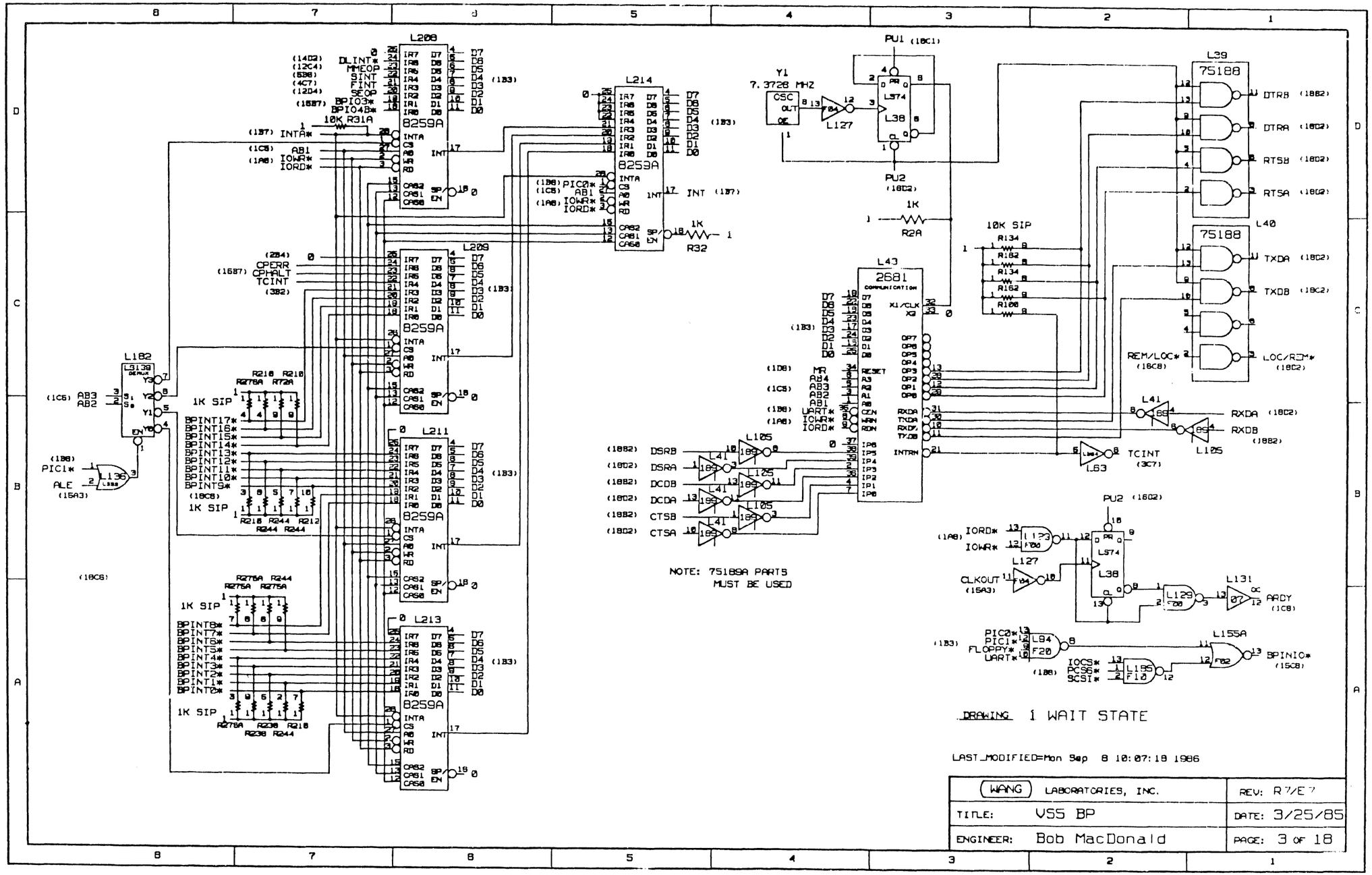


C1-23, 25-28, 31-101, 103-121, C123-175, 177-184, 188-196, 198-202, C204-212, 214-218, 220-223, 225-229, C230-232, 234-245, 247-258, 260-267, 269-278, 280-288, 291-300, 302-311, C313-322.

WANG LABORATORIES, INC.		REV: ART-WORK 1 E-REV 2
TITLE: VS-5 CPU	7 0 - 4	DATE: 01-08-88
ENGINEER: ROBERT RYAN		PAGE: 8 OF 8


L274
L9240
MR (2D8x3C4)
MR*
25P* (1B02)
PU1
SRDY*
16MHZ (6D2)
350-0203
16MHZ
JP3/P2
Y2
L127
R8 1K
R9 330
R12 1K
CLK
CLKOUT
S2*
S1*
S0*
SRDY
ARDY
TEST
HOLD
HLDA
RES
RESET
BPINIT*
L161 F08
L174
L187
MCS3*
MCS2*
MCS1*
MCS0*
UCS*
LCS
PCS6*
IOCS*
SCSI*
UART*
FLOPPY*
PIC1*
PIC2*
FDACK*
TOUT*
BPECNT*
CRAMPE*
TMRIN1
TMROUT1
TMRIN0
TMROUT0
DRQ1
DRQ0
PCS8
PCS5
PCS4
PCS3
PCS2
PCS1
PCS0
L155
80186
CPU
X1
X2
AD19
AD18
AD17
AD16
AD15
AD14
AD13
AD12
AD11
AD10
AD9
AD8
AD7
AD6
AD5
AD4
AD3
AD2
AD1
AD0
DT/-R
DEN
LOCK
BHE
RD
WR
ALE
NMI
INT3
INT2
INT1
INT0
T/R*
RD*
WR*
ADDLE (15A4)
DCLOW (15B7)
INTA* (3D7)(15C8)
CPSYNC* (4B3)
INT (3D5)
BPCMODEL (18C4)
DRQS (8C8)
DRQF (1D8)
L128
L157
L95
L156
L93
L92
L184
L183
2764
8KX8
PROM
200ns
2764-2
PROM*
MRD*
JP4/P4
2764/27128
27256
L173
L9138
PROM* (1D4)(1A7)
DATARAM* (12C8)
L182
L98
L99
L158
L186
L132
L55
L130
AL9138
IORD* (1A1x3C8x5D8)
IOWR* (4B4x3B4x3D3)
(3D7x4C7x5D8x15D5)
MRD* (1B4x2A7)
L285
L181 F32
L185 F10
L94 F20
L191
DEN* (2B8x5C7x5D8x15C8)
(8B5x15D8)(2D6)
R100 R134
R97 R162
10K SIP
DB15
DB14
DB13
DB12
DB11
DB10
DB9
DB8
DB7
DB6
DB5
DB4
DB3
DB2
DB1
DB0
DRAWING
LAST_MODIFIED=Thu Apr 3 14:27:32 1986
WANG LABORATORIES, INC.
REV: R
TITLE: 210-9111 VSS BP
DATE: 3/22/85
ENGINEER: Bob MacDonadld
PAGE: 1 OF 18


8208
DYNAMIC RAM CONTROLLER
L149
L131
L207
L205
4256EL9
41256
120 NS
L178
LS245
L177
LS280
L175
L176
L179
L154
L107
L153
L151
L150
L42A
L91
L165
L83
NOTE: USE 25 DEG RAM SIM CONNECTORS
CRAM*
(15A3)
R29
R28
R30
10K
S1*
S2*
S0*
RFRQ
PDI
CLK
RESET
PE
RD
WR
PCTL
AACK
WE
SRDY*
RAS1
RAS0
CAS1
CAS0
RAS0*
CAS0*
R27
R15
33
PU1
PU2
MR
AB18
AB17
AB16
AB15
AB14
AB13
AB12
AB11
AB10
AB9
AB8
AB7
AB6
AB5
AB4
AB3
AB2
AB1
AB0
AH8
AH7
AH6
AH5
AH4
AH3
AH2
AH1
AH0
AL8
AL7
AL6
AL5
AL4
AL3
AL2
AL1
AL0
BS
A08
A07
A06
A05
A04
A03
A02
A01
A00
R24
R23
R22
R21
R20
R19
R18
R17
R16
DEN*
CHCPAR
(432)
CWE*
(2A8)
(2D8)
(1D8)
PAROL
PARI
PARO
DQ8
DQ7
DQ6
DQ5
DQ4
DQ3
DQ2
DQ1
RAS
CAS
CASP
WR
AD7
AD6
AD5
AD4
AD3
AD2
AD1
AD0
AD15
AD14
AD13
AD12
AD11
AD10
AD9
AD8
EVEN
ODD
DIR
DT/R*
(15A3)
(2D5)
CRAM*
(15A3)
DEN*
(1B6)
MR*
(1D8)
CLRCPE*
(1C1)
AB0
(1C5)
MRD*
(1A8)
BHEL*
(1D6)
SRDY*
(2D7)
CWEH*
CWEL*
R14
R13
33
CPERR
(16A7)(3C7)
CRAMPE*
(1B8)
ENCPE
(4B2)
PAROH
(2B3)
AROH
(2D2)
DRAWING
LAST_MODIFIED=Fri Mar 7 11:05:14 1986
WANG LABORATORIES, INC.
REV: R /E '
TITLE: VSS BP
DATE: 3/25/85
ENGINEER: Bob MacDonald
PAGE: 2 OF 18


L208
8259A
L214
8259A
L209
8259A
L211
8259A
L213
8259A
L182
L9138
L136
L105
PU1 (18C1)
Y1
7.3728 MHZ
CSC
L127
L38
L74
PU2
(18D2)
1K
R2A
L39
75188
L40
75188
10K SIP
R134
R182
R162
R100
L43
2681
DTRB (18B2)
DTRA (18D2)
RTSB (18D2)
RTSA (18D2)
TXDA (18D2)
TXDB (18C2)
REM/LOC* (18C8)
LOC/REM* (18D2)
L41
RXDA (18D2)
RXDB (18B2)
L105
L63
TCINT (3C7)
DSRB (18B2)
DSRA (18D2)
DCDB (18B2)
DCDA (18D2)
CTSB (18B2)
CTSA (18D2)
NOTE: 75189A PARTS MUST BE USED
PU2 (18D2)
L173
L74
L38
L129
L131
RDY (1C8)
L127
CLKOUT (15A3)
L84
F20
L155A
F02
L155
F10
BPINIO* (15C8)
1K SIP
R278A R218 R210 R220
BPINT17*
BPINT16*
BPINT15*
BPINT14*
BPINT13*
BPINT12*
BPINT11*
BPINT10*
BPINT9*
R218 R244 R212 R244
BPINT8*
BPINT7*
BPINT6*
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BPINT2*
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BPINT0*
R278A R244 R238 R218
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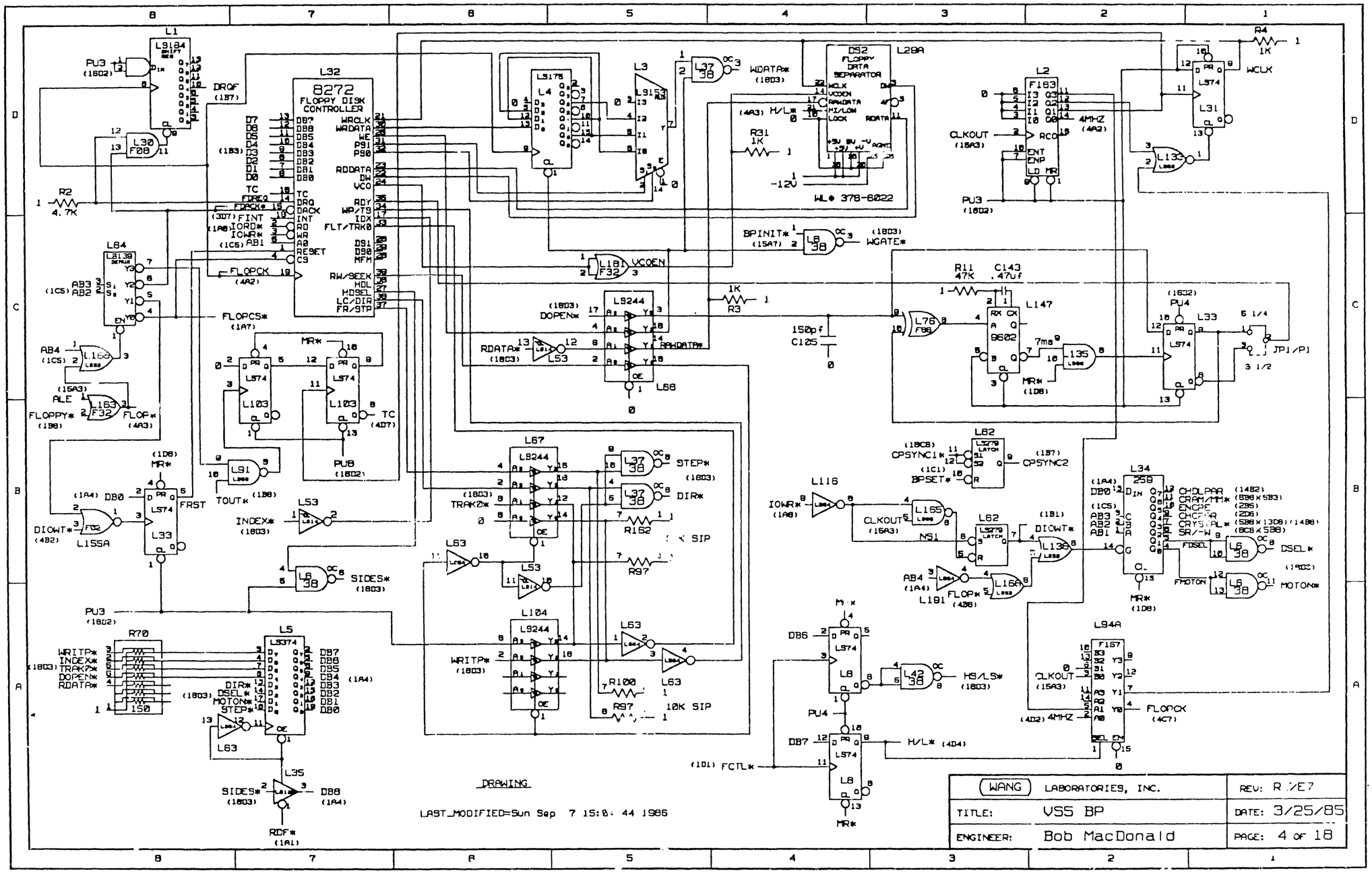
WANG LABORATORIES, INC.
REV: R7/E7
TITLE: VSS BP
DATE: 3/25/85
ENGINEER: Bob MacDonald
PAGE: 3 OF 18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8272 FLOPPY DISK CONTROLLER
FLOPPY DATA SEPARATOR
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F163
9602
LS374
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LS175
LS139
LS138
LS279 LATCH
LS259
LS374
LS157
LS170 LATCH
L9184
DRQF (1B7)
WRCLK
WRDATA
WE
PS1
PS0
RDDATA
DW
VCO
RDY
WP/TS
IDX
FLT/TRK0
DS1
DS0
MFM
RW/SEEK
HDL
HDSEL
LC/DIR
FR/STP
TC
DRQ
DACK
INT
RD
WR
A0
RESET
CS
FDRCK
FLOPCK (4A2)
FINT (3D7)
IORD* (1A8)
IOWR* (1A8)
AB1 (1C5)
FLOPCS* (1A7)
WCLK
4MHZ (4A2)
CLKOUT (15A3)
WDATA* (1803)
WGATE* (1803)
BPINIT* (15A7)
H/L* (4A3)
R31 1K
-12V
R2 4.7K
R3 1K
R4 1K
R11 47K
C143 .47uf
150pf C105
DOPEN* (1803)
RDATA* (1803)
RAWDATA*
VCOEN
MR* (1D8)
7ms
JP1/PJ
3 1/2
AB3 (1C5)
AB2
AB4 (1C5)
ALE (15A3)
FLOPPY* (1B8)
FLOP* (4A3)
DB0 (1A4)
FRST
DIOWT* (4B2)
L155A
TOUT* (1B8)
INDEX* (1803)
SIDES* (1803)
TRAK0* (1803)
STEP* (1803)
DIR* (1803)
DSEL* (1803)
MOTON* (1803)
WRITP* (1803)
RDATA* (1803)
R70 150
R162 SIP
R97
R100
R97 10K SIP
TC (4D7)
RDF* (1A1)
CPSYNC1* (1B8)
CPSYNC2 (1B7)
BPSET* (1C1)
CLKOUT (15A3)
NSI
DIOWT* (1B1)
L155A
L191
FLOP* (4B8)
H/L* (4D4)
FCTL* (1D1)
HS/LS* (1803)
CHDLPRA (1482)
CRAM/MM* (5B8 x 583)
CHCPE (2B5)
CHCPRA (2D6)
SRAM/PL* (5B8 x 13D8) (1488)
SR/-W (8C8 x 5B8)
FDSEL
PHOTON
MOTON* (1803)
DSEL* (1803)
4MHZ (4D2)
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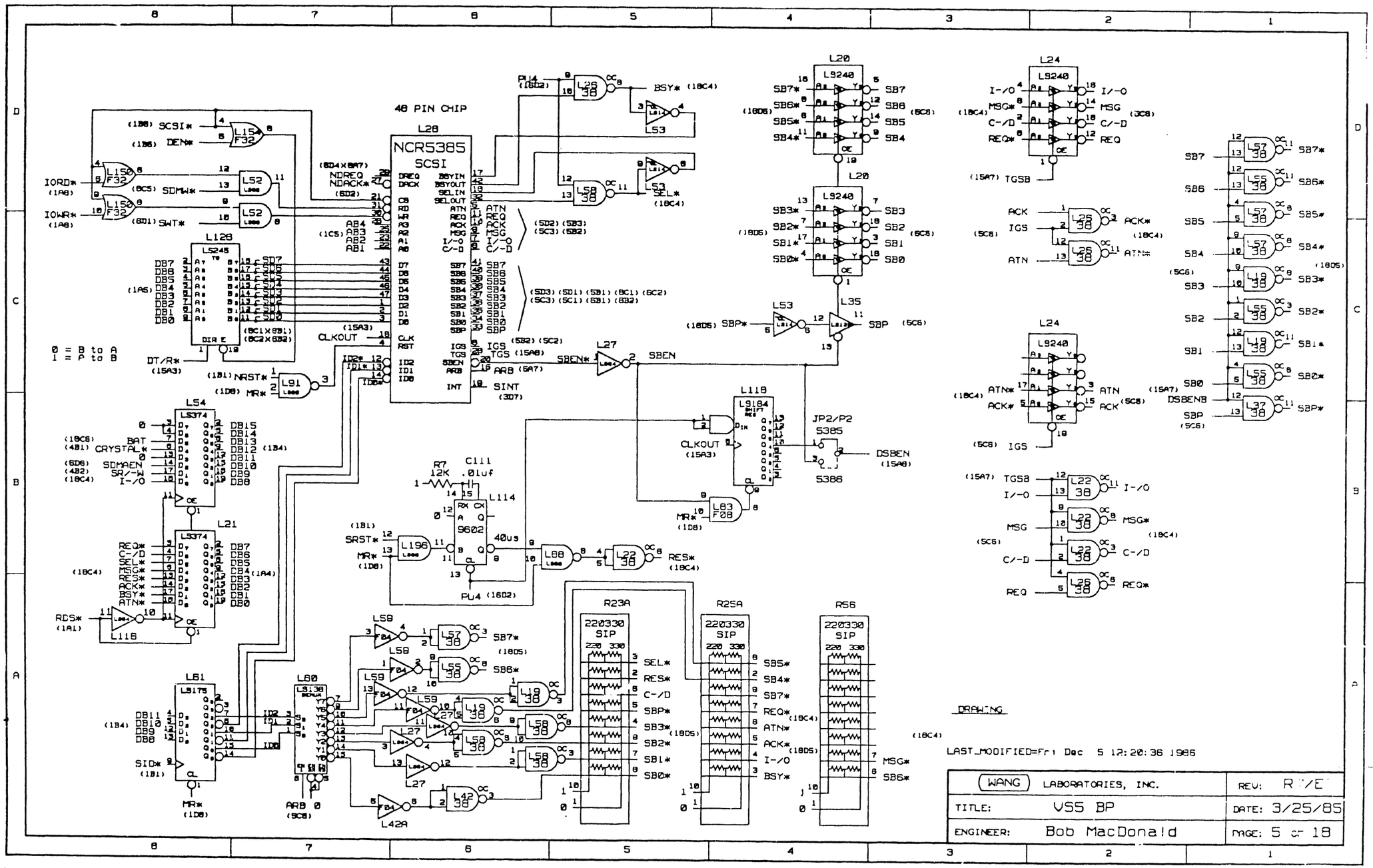
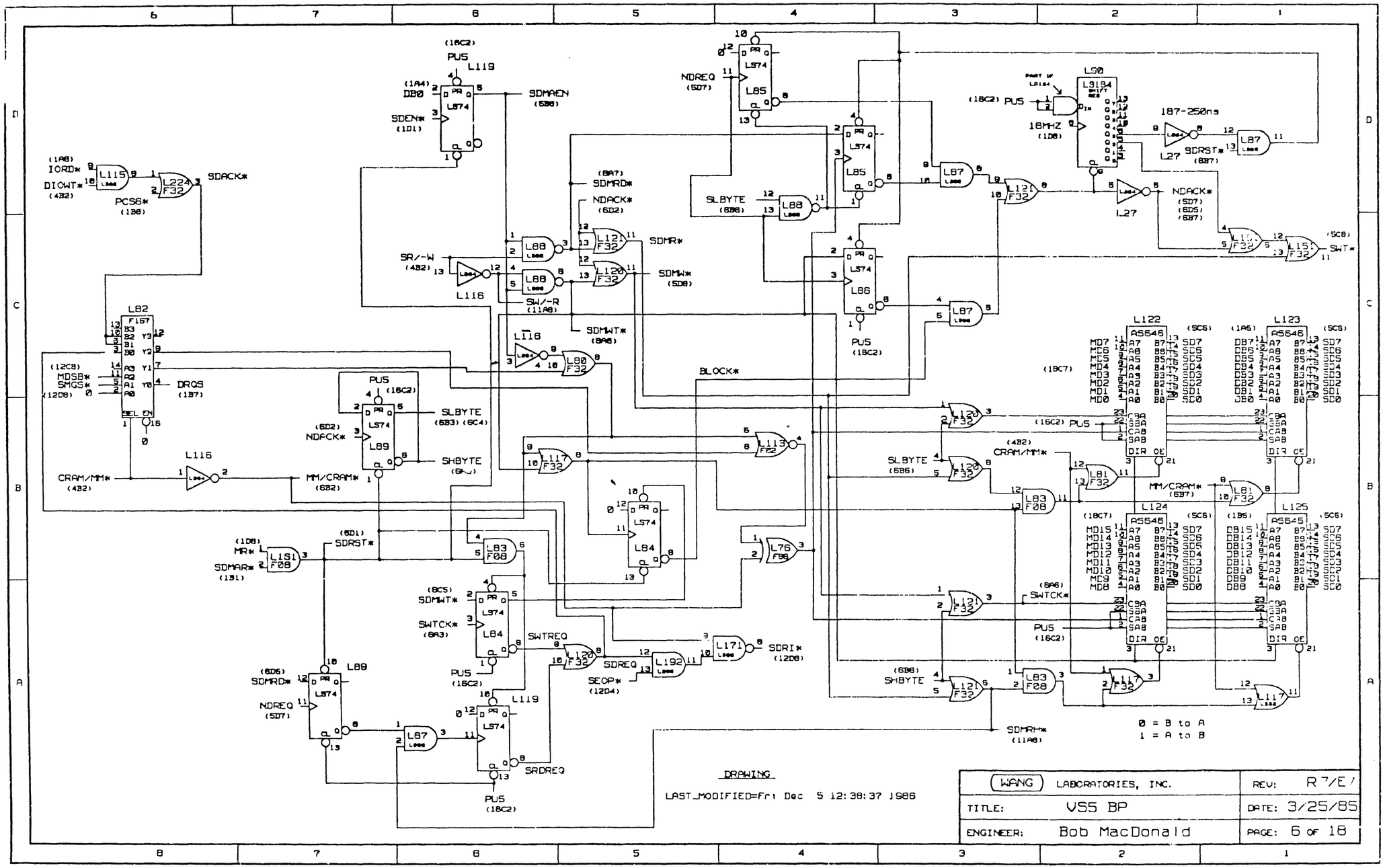
WANG LABORATORIES, INC.
REV: R/E7
TITLE: VSS BP
DATE: 3/25/85
ENGINEER: Bob MacDonald
PAGE: 4 OF 18



WANG LABORATORIES, INC.		REV: R /E
TITLE:	VS5 BP	DATE: 3/25/85
ENGINEER:	Bob MacDonald	PAGE: 5 of 18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(1D1)
SDMAEN
(5B8)
NDREQ
(5D7)
L85
L74
L90
L9184
18MHZ
(1D8)
187-250ns
L27
SDRST*
(6B7)
NDACK*
(5D7) (6D5) (6B7)
SLBYTE
(6B8)
L88
L87
L121
F32
L86
(5C8)
SWT*
IORD*
(1A8)
DIOWT*
(4B2)
PCS6*
(1B8)
SDACK*
L115
L224
F32
L82
F157
(12C8) MDSB*
SMGS*
(12D8)
DRQS
(1B7)
SR/-W
(4B2)
L116
SDMRD*
(8A7)
SDMR*
SDMWT*
(8A6)
SW/-R
(11A8)
L118
L80
F32
BLOCK*
L122
L123
AS646
(5C6)
(1A6)
(5C8)
MD7
MD6
MD5
MD4
MD3
MD2
MD1
MD0
SD7
SD6
SD5
SD4
SD3
SD2
SD1
SD0
DB7
DB6
DB5
DB4
DB3
DB2
DB1
DB0
(18C7)
(16C2) PUS
(4B2)
CRAM/MM*
SLBYTE
(5B6)
L120
L81
L83
F08
L124
L125
MM/CRAM*
(6B7)
(6A6)
SWTCK*
(6B8)
SHBYTE
L121
L117
SDMR*
(11A8)
Ø = B to A
1 = A to B
PUS
(16C2)
SLBYTE
(6B3) (6C4)
(6D2)
NDACK*
L89
SHBYTE
(6A3)
CRAM/MM*
(4B2)
MM/CRAM*
(6B2)
L113
F02
L76
F86
(1D8)
MR*
SDMAR*
(11B1)
L131
(6D1)
SDRST*
L83
F08
L84
(8C5)
SDMWT*
SWTCK*
(6A3)
SWTREQ
L120
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SDREQ
L192
L171
SDRI*
(12D8)
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(5D7)
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L119
SRDREQ
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REV: R7/E1
TITLE: VS5 BP
DATE: 3/25/85
ENGINEER: Bob MacDonald
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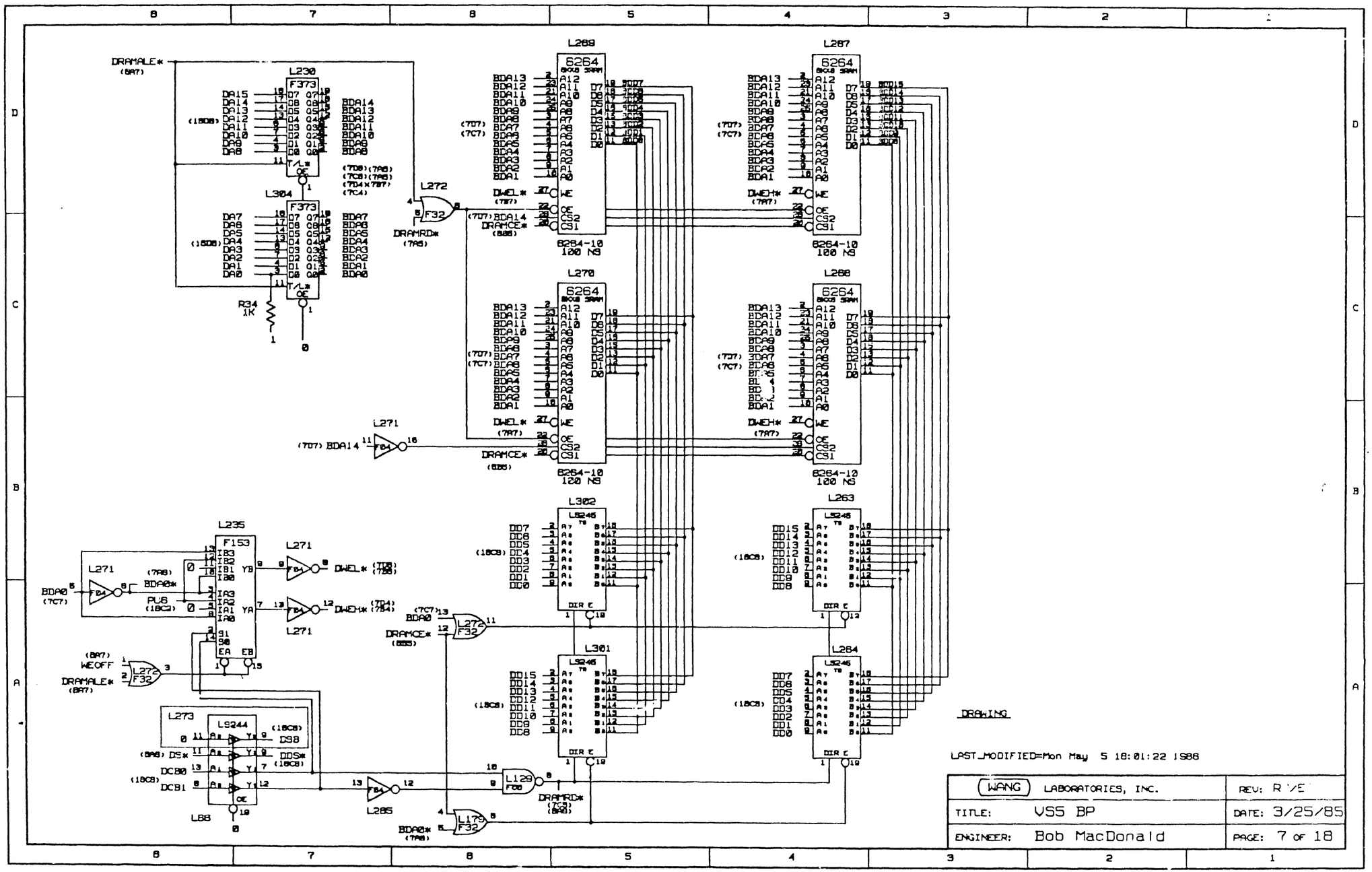
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L271
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L273
L88
L285
L302
L301
L263
L264
L129
L179
DRAMALE*
DRAMRD*
DRAMCE*
DWEL*
DWEH*
WEOFF
R34 1K
6264
6264-10 100 NS
F373
F153
F32
LS244
LS245
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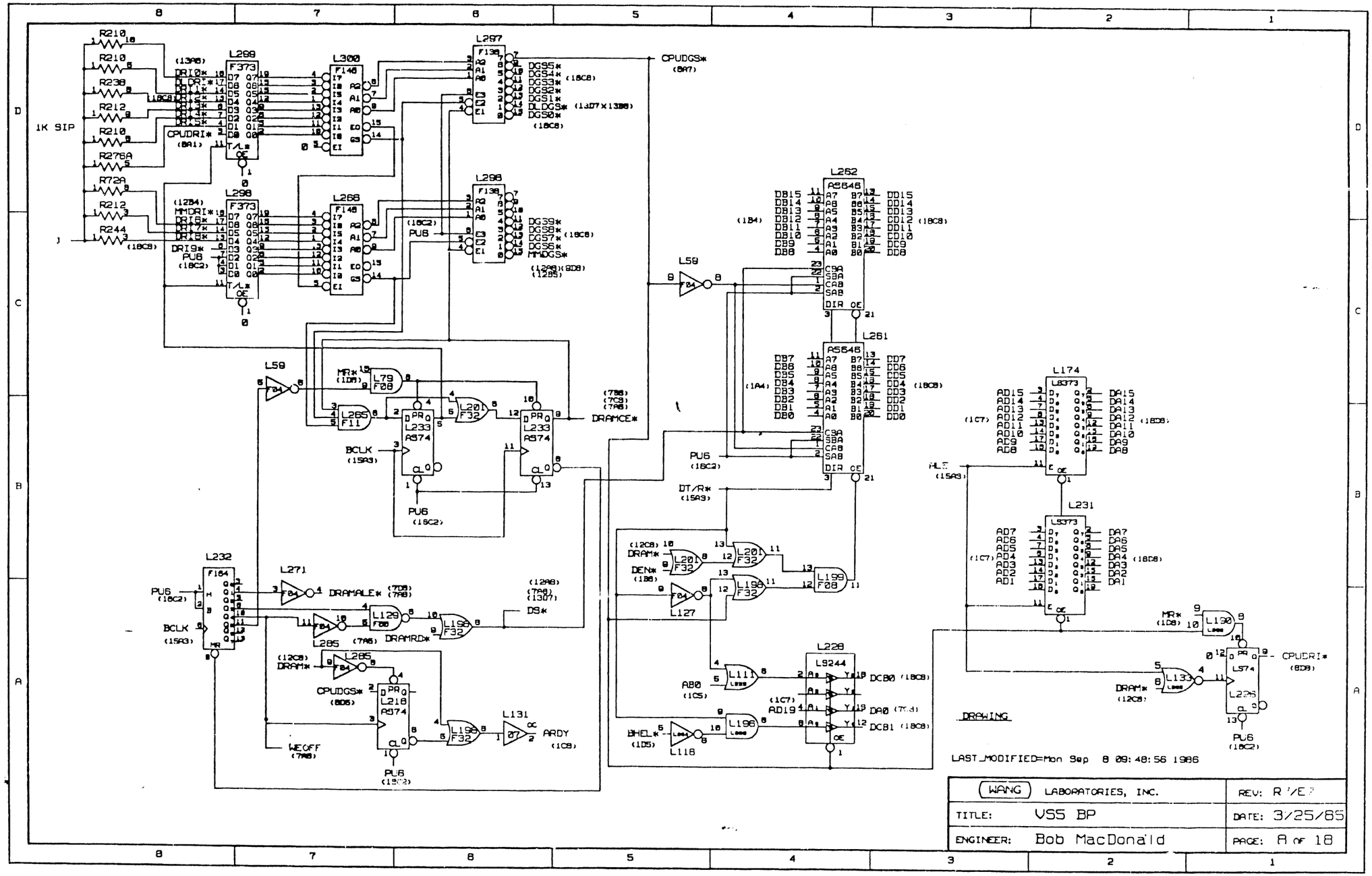
WANG LABORATORIES, INC.
REV: R/E
TITLE: VSS BP
DATE: 3/25/85
ENGINEER: Bob MacDonald
PAGE: 7 OF 18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R238
R212
R210
R276A
R72A
R212
R244
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F373
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L297
F138
L298
F373
L268
F148
L298
F138
CPUDRI*
MMDRI*
DRI0*
DRI9*
PU6
T/L*
OE
DGS5*
DGS4*
DGS3*
DGS2*
DGS1*
DPUDGS*
DGS0*
DG39*
DG58*
DG57*
DG56*
MMDGS*
CPUDGS*
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F04
L79
F08
L265
F11
L201
F32
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BCLK
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L232
F164
L271
DRAMALE*
L129
F00
L198
DS*
L285
DRAMRD*
L286
CPUDGS*
L218
A874
L195
L131
F07
ARDY
WEOFF
L262
AS646
L261
DIR
OE
DT/R*
L127
L199
F08
L228
LS244
L111
L196
L118
AB0
AD19
BHEL*
DCB0
DCB1
DA0
L174
LS373
AD15
AD14
AD13
AD12
AD11
AD10
AD9
AD8
DA15
DA14
DA13
DA12
DA11
DA10
DA9
DA8
L231
AD7
AD6
AD5
AD4
AD3
AD2
AD1
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DA6
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DA2
DA1
MR*
L190
L133
L226
CPUDRI*
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LAST_MODIFIED=Mon Sep 8 09:48:56 1986
WANG LABORATORIES, INC.
REV: R
TITLE: VSS BP
DATE: 3/25/85
ENGINEER: Bob MacDonald
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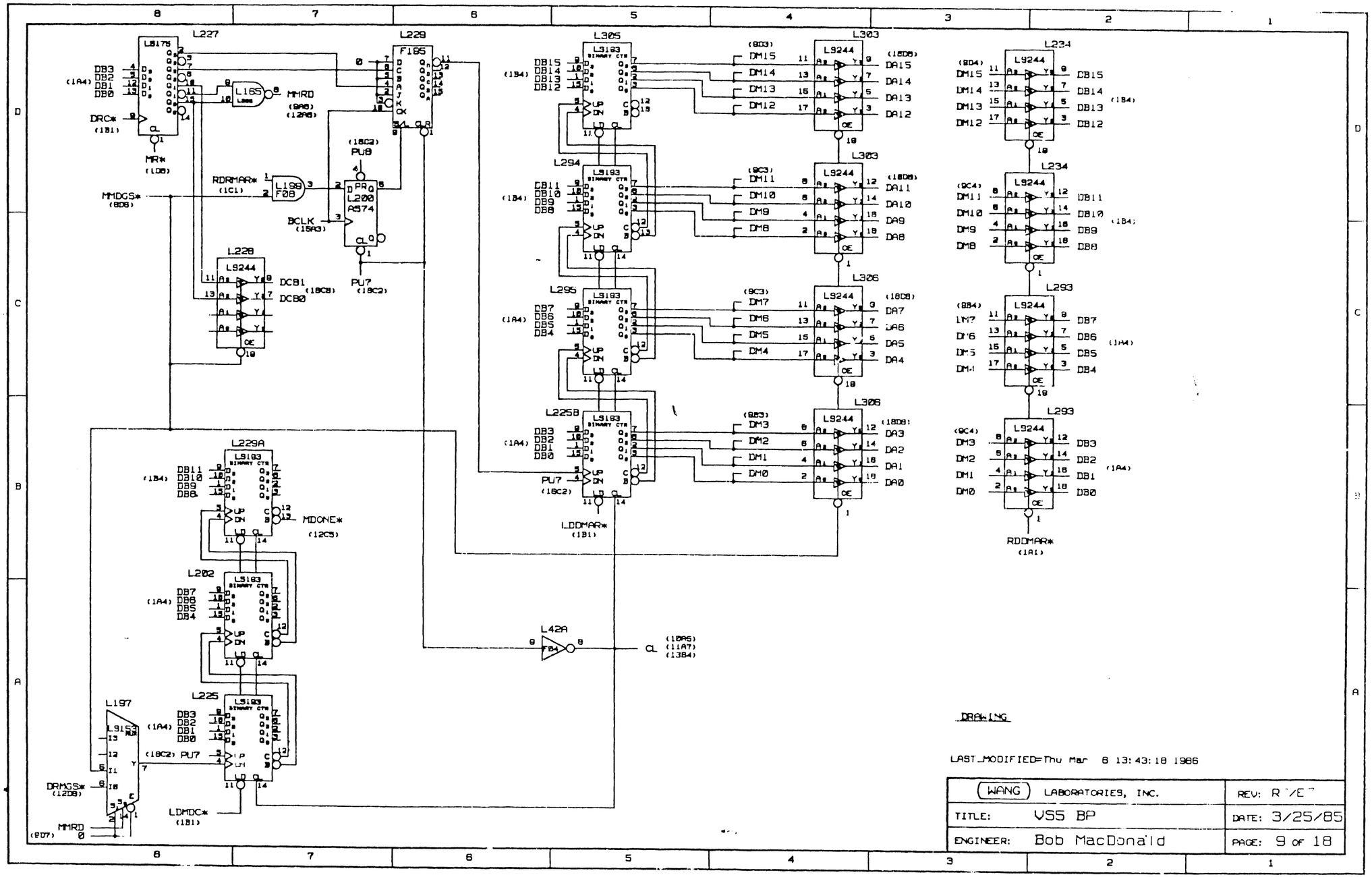
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(9A6)
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L229
F186
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PU8
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L198
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(8D6)
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(18C2)
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DCB0
(18C8)
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L9193
DB15
DB14
DB13
DB12
(1B4)
L294
DB11
DB10
DB9
DB8
L295
DB7
DB6
DB5
DB4
L2258
DB3
DB2
DB1
DB0
PU7
(18C2)
LDDMAR*
(1B1)
L303
(8D3)
DM15
DM14
DM13
DM12
(18D8)
DA15
DA14
DA13
DA12
(9C3)
DM11
DM10
DM9
DM8
DA11
DA10
DA9
DA8
L306
(9C3)
DM7
DM6
DM5
DM4
DA7
DA6
DA5
DA4
(8B3)
DM3
DM2
DM1
DM0
DA3
DA2
DA1
DA0
L234
(8D4)
(9C4)
(8B4)
L293
L229A
DB11
DB10
DB9
DB8
MDONE*
(12C5)
L202
DB7
DB6
DB5
DB4
L225
DB3
DB2
DB1
DB0
PU7
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(12D8)
MMRD
(8D7)
LDMDC*
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(13B4)
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(1A1)
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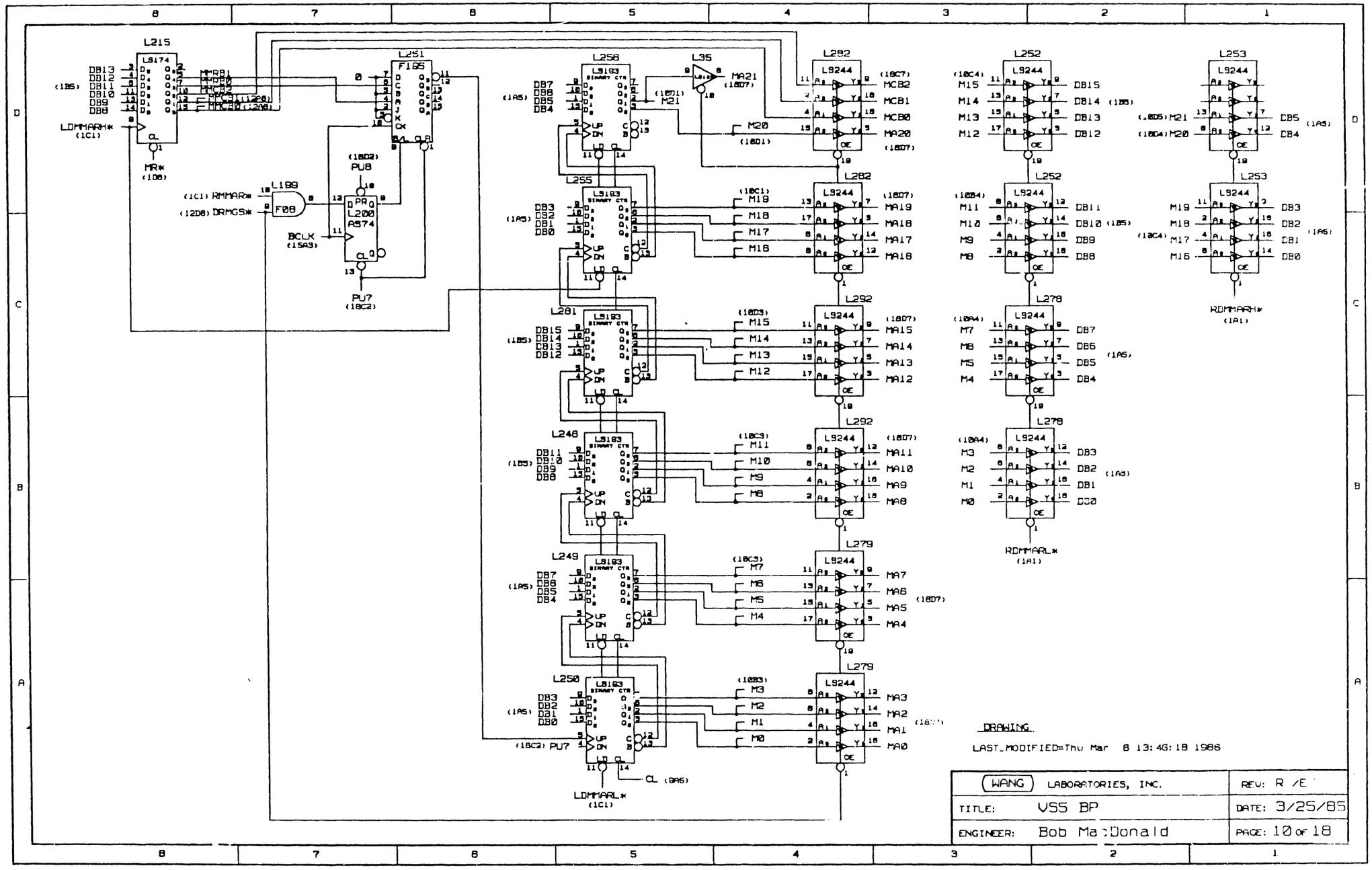
LAST_MODIFIED=Thu Mar 8 13:43:18 1986
WANG LABORATORIES, INC.
REV: R
TITLE: VS5 BP
DATE: 3/25/85
ENGINEER: Bob MacDonald
PAGE: 9 OF 18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MMCB0
MMCB2
MMCB3 (1208)
MMCB0 (1208)
L251
F165
0
(1B02)
PU8
L189
F08
(1C1) RMMAR*
(12D8) DRMGS*
BCLK
(15A9)
L200
A574
PU7
(18C2)
L258
L8193
BINARY CTR
DB7
DB6
DB5
DB4
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M21
(1801)
MA21
(1807)
M20
(1801)
L255
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DB2
DB1
DB0
(1A5)
L281
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DB13
DB12
(1B5)
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DB9
DB8
(1B5)
L249
DB7
DB6
DB5
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(1A5)
L250
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DB2
DB1
DB0
(1A5)
(18C2) PU7
CL (8A6)
LDMMARL*
(1C1)
L282
L9244
(18C7)
MCB2
MCB1
MCB0
MA20
(1807)
(18C1)
M19
M18
M17
M18
MA19
MA18
MA17
MA18
L292
(1803)
M15
M14
M13
M12
MA15
MA14
MA13
MA12
(18C3)
M11
M10
M9
M8
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MA9
MA8
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(18C3)
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M8
M5
M4
MA7
MA6
MA5
MA4
(1807)
M3
M2
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M0
MA3
MA2
MA1
MA0
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M1
M0
DB3
DB2
DB1
DB0
(1A5)
RDMMARL*
(1A1)
L253
(18D5) M21
(18D4) M20
DB5
DB4
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WANG LABORATORIES, INC.
REV: R /E
TITLE: VSS BP
DATE: 3/25/85
ENGINEER: Bob MacDonald
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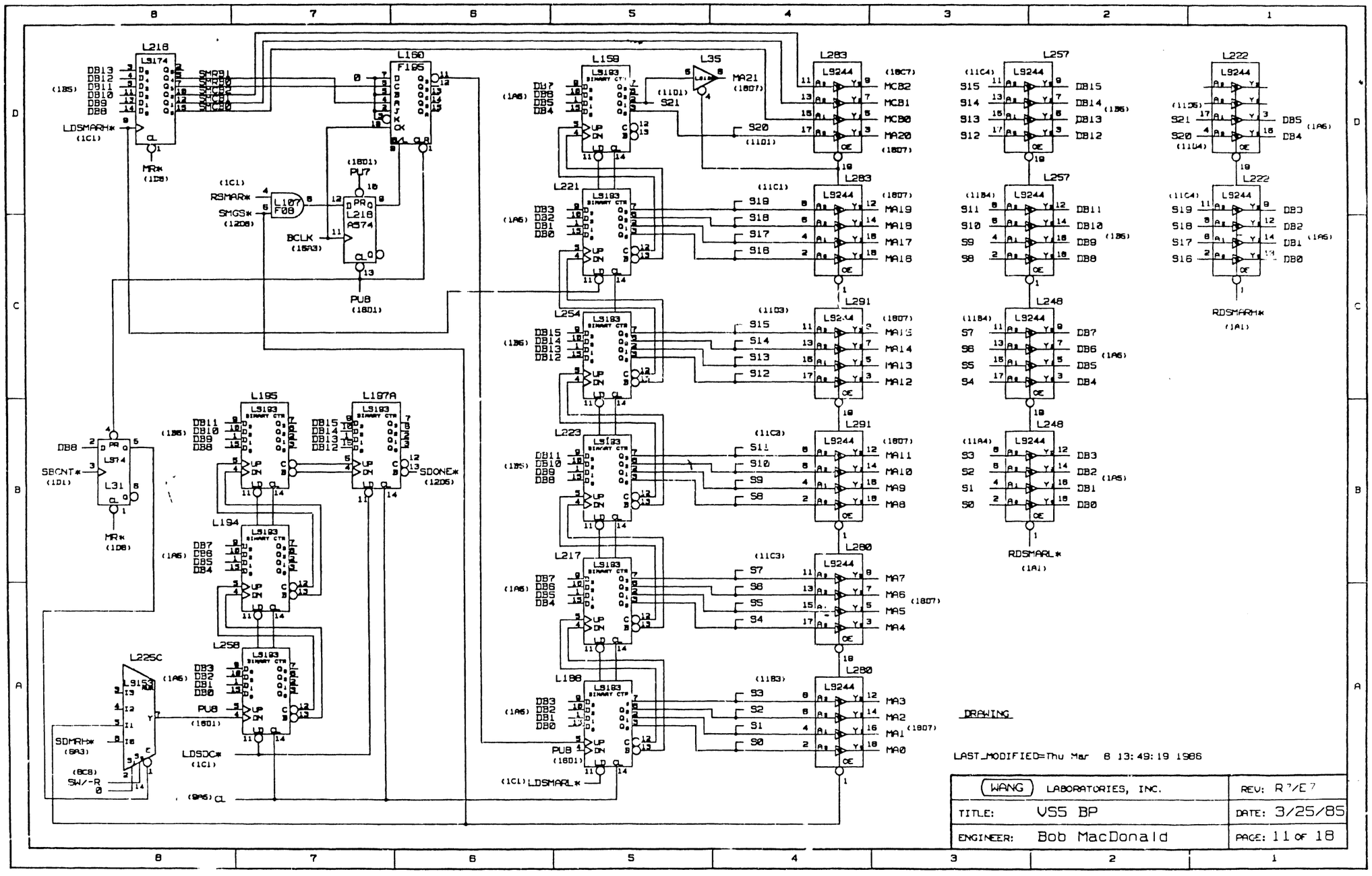
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(1C1)
MR*
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L160
F195
0
MCB2
MCB1
MCB0
MA20
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(18D1)
PU7
(1C1)
RSMAR*
SMGS*
(12D8)
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F08
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AS74
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(18D1)
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DB6
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DB4
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S21
(11D1)
MA21
(18D7)
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S20
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S19
S18
S17
S16
MA19
MA18
MA17
MA16
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DB13
DB12
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S14
S13
S12
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MA14
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MA8
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(11C3)
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S8
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S4
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MA6
MA5
MA4
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MA2
MA1
MA0
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PU8
(18D1)
(1C1) LDSMARL*
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LS244
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DB4
(1A5)
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DB2
DB1
DB0
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S18
S17
S16
(11C4)
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(1A1)
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LS193
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DB10
DB9
DB8
(18S)
L187A
DB15
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DB13
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(12D5)
L194
DB7
DB6
DB5
DB4
(1A6)
L258
DB3
DB2
DB1
DB0
(1A6)
PU8
(18D1)
L225C
L91S3
SDMAH*
(8A3)
(8C8)
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MR*
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(9A5) CL
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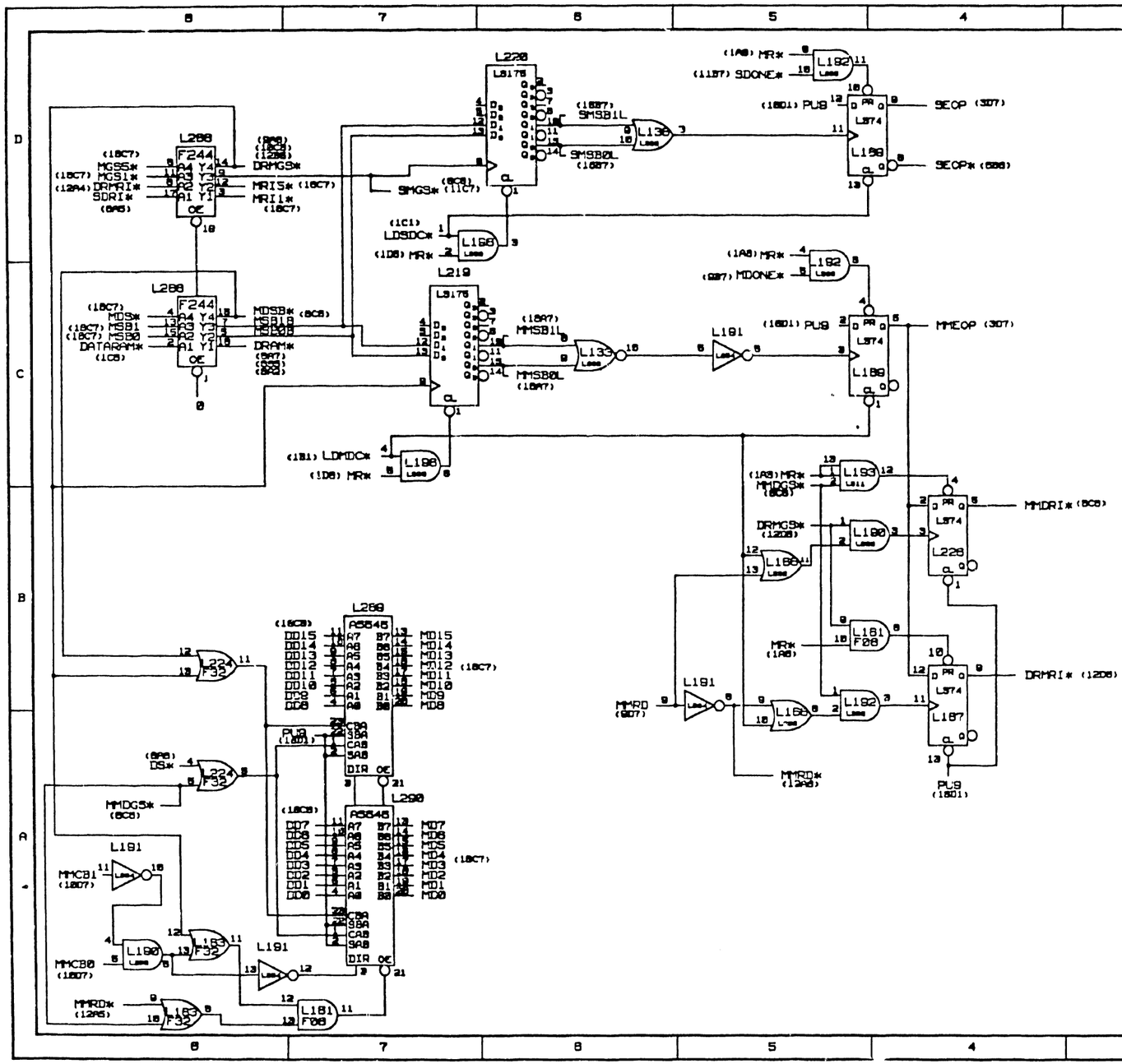
WANG LABORATORIES, INC.
REV: R7/E7
TITLE: VSS BP
DATE: 3/25/85
ENGINEER: Bob MacDonald
PAGE: 11 OF 18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L180
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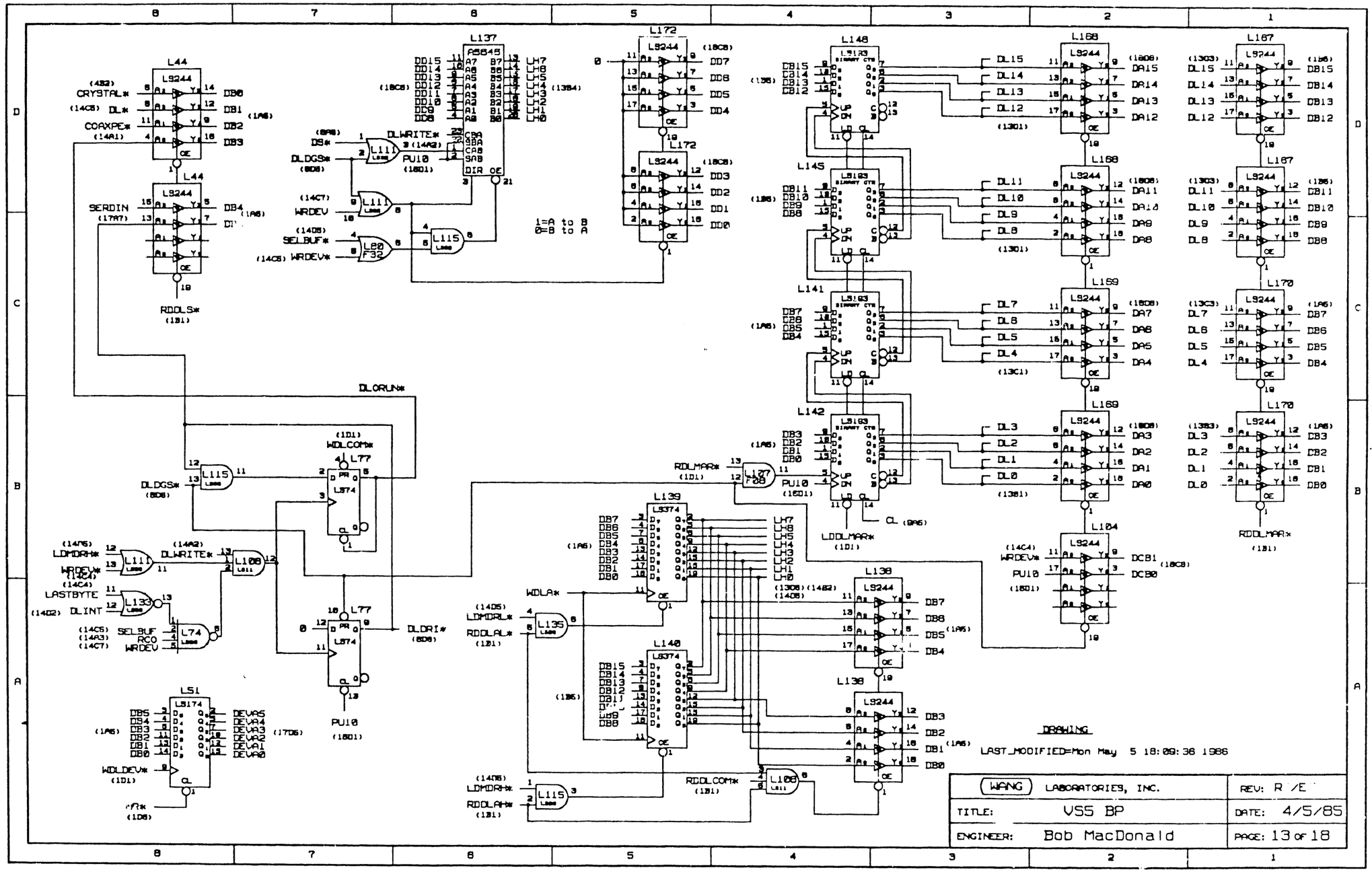
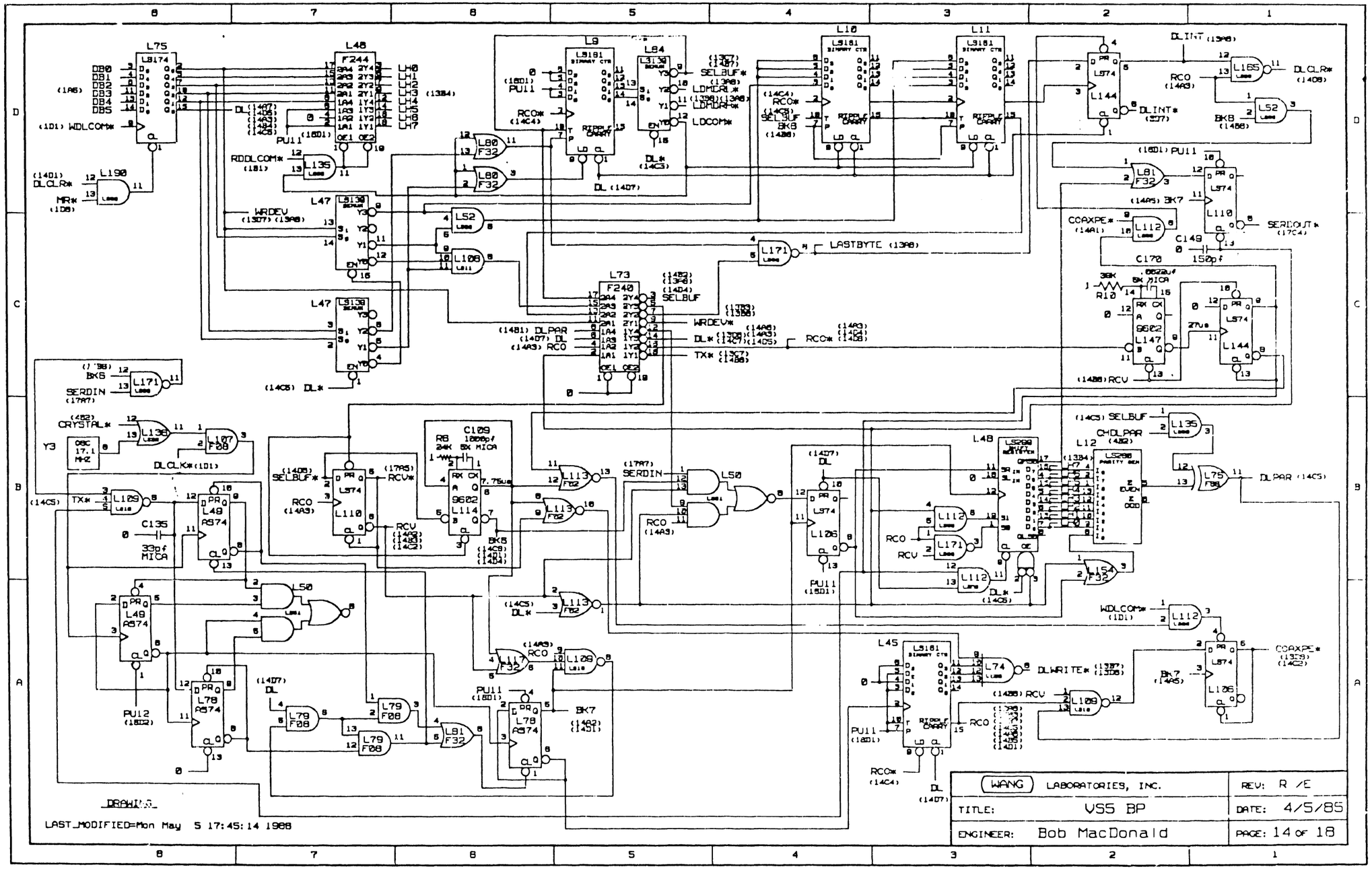
WANG LABORATORIES, INC.
REV: R"/E"
TITLE: VS5 BP
DATE: 3/25/85
ENGINEER: Bob MacDonald
PAGE: 12 OF 18


L44
LS244
(452) CRYSTAL*
(14C8) DL*
COAXPE*
(14A1)
DB0
DB1
DB2
DB3
(1A6)
SERDIN
(17A7)
DB4
RDDLS*
(1B1)
L137
AS645
DD15
DD14
DD13
DD12
DD11
DD10
DD9
DD8
(18C8)
(1384)
DLWRITE*
(14A2)
PU10
(1801)
DS*
(8F8)
DLDGS*
(8D8)
WRDEV
(14C7)
SELBUF*
(14D8)
WRDEV*
(14C8)
L111
L115
L80
F32
L172
LS244
DD7
DD8
DD5
DD4
DD3
DD2
DD1
DD0
1=A to B
0=B to A
L148
LS193
L145
L141
L142
DB15
DB14
DB13
DB12
DB11
DB10
DB9
DB8
DB7
DB6
DB5
DB4
DB3
DB2
DB1
DB0
(1A6)
(1B6)
(13B5)
L168
L167
L169
L170
L104
DL15
DL14
DL13
DL12
DL11
DL10
DL9
DL8
DL7
DL6
DL5
DL4
DL3
DL2
DL1
DL0
(1301)
(13C1)
(1381)
(1303)
(13C3)
(1383)
DA15
DA14
DA13
DA12
DA11
DA10
DA9
DA8
DA7
DA6
DA5
DA4
DA3
DA2
DA1
DA0
(1808)
(186)
(1A6)
RDDLMAR*
(1B1)
(14C4)
WRDEV*
PU10
(1801)
DCB1
DCB0
(18C8)
DLORUN*
(1D1)
WDLCOM*
L77
L115
L108
L111
L133
L74
LASTBYTE
(1402)
DLINT
(14C5)
SELBUF
(14A3)
RCO
(14C7)
WRDEV
(14A2)
DLWRITE*
(14C4)
LDMDRH*
DLDRI*
(8D8)
L51
LS174
DEVA5
DEVA4
DEVA3
DEVA2
DEVA1
DEVA0
(17D5)
WDLDEV*
(1D1)
rfr*
(1D8)
L139
L140
L135
L138
WDLA*
(1405)
LDMDRL*
RDDLAL*
(1B1)
(1406)
LDMDRH*
RDDLAH*
(1408)
RDDLCOM*
LDDLMAR*
CL (9A6)
DRAWING
LAST_MODIFIED=Mon May 5 18:09:36 1986
WANG LABORATORIES, INC.
REV: R /E
TITLE: VSS BP
DATE: 4/5/85
ENGINEER: Bob MacDonald
PAGE: 13 OF 18


L75 L8174
DB0 DB1 DB2 DB3 DB4 DB5
(1A6)
(1D1) WDLCOM*
L48 F244
(1384)
DL (1407)
PU11 (16D1)
RDDLCOM* (1B1)
L135
L190
(14D1) DLCLR*
MR* (1D8)
L9 L9181
L84 L3158
PU11 (16D1)
RCO* (14C4)
DL* (14C5)
DL (1407)
SELBUF* (1398)
LDMDRL* (1398)
LDMDRH* (1398)
LDCOM*
L10 L9181
L11 L9181
(14C4) RCO*
(14C8) SELBUF
BK8 (1428)
L80 F32
L80 F32
L47 L3138
WRDEV (1507) (1398)
L52
L106
L47 L3138
(14C8) DL*
L171
LASTBYTE (1398)
L73 F240
(1481) DLPAR
(1407) DL
(14A3) RCO
(1483) (1398) (14D4) SELBUF
WRDEV* (1398) (14A6)
DL* (1398) (14A3) (1407) (14D5)
TX* (1367) (1486)
RCO* (14A3) (1402) (1458)
DLINT (1398)
L174 L144
RCO (14A3)
DLINT* (1377)
L185
L52
DLCLR* (1408)
BK8 (1458)
(16D1) PU11
L81 F32
L174
(14A5) BK7
L110
SERDOUT* (17C4)
COAXPE* (14A1)
L112
C149 0 150pf
C170 .0022uf
R10 36K 5% MICA
RX CX 9602 L147
27V8
L174 L144
(1488) RCV
(14C5) SELBUF
L135
CHOLPAR (482)
L75 F86
DLPAR (14C5)
L48 LS299
L12 LS280
RCO
RCV
L171
L112
L154 F32
DL* (14C8)
WDLCOM* (1D1)
L112
COAXPE* (1379) (14C2)
L45 L5181
L74
DLWRITE* (1387) (1506)
(14A8) RCV
L109
BK7 (1485)
L174 L126
PU11 (16D1)
RCO
RCO* (14C4)
DL (1407)
(482) CRYSTAL*
L136
L107 F08
Y3 OSC 17.1 MHZ
DLCLK* (1D1)
L129
TX* (14C5)
C135 0 33pf MICA
L49 AS74
L50
L78 AS74
PU12 (1B02)
(1407) DL
L79 F08
L79 F08
L79 F08
L81 F32
(14A5) RCO
L117 F32
L109
PU11 (16D1)
L78 AS74
BK7 (1462) (1451)
(14C5) DL*
L113 F02
L113 F02
L113 F02
(17A7) SERDIN
L50
RCO (14A3)
(1405) SELBUF*
RCO (14A3)
L174
(17A5) RCV*
L110
C109 R8 24K 5% MICA 1000pf 7.75uS
L114 9602
RCV (1462) (1463)
BK8 (1406) (1421) (1484)
(17A7) SERDIN
(14C5) TX*
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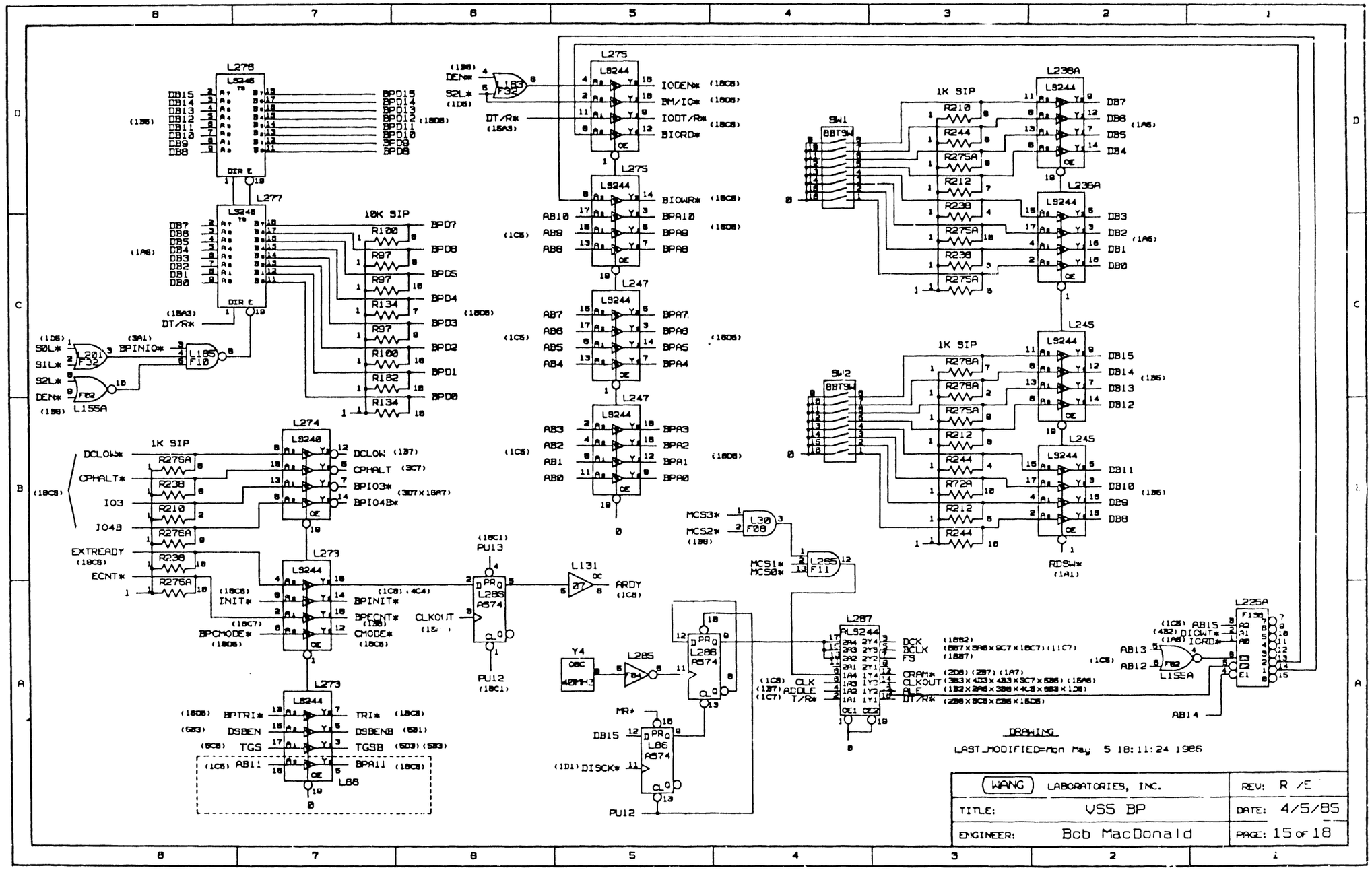
WANG LABORATORIES, INC.
REV: R /E
TITLE: VS5 BP
DATE: 4/5/85
ENGINEER: Bob MacDonald
PAGE: 14 OF 18


L278
L9246
DB15 DB14 DB13 DB12 DB11 DB10 DB9 DB8
BPD15 BPD14 BPD13 BPD12 BPD11 BPD10 BPD9 BPD8
DIR E
L277
10K SIP
R100 R97 R97 R134 R97 R100 R182 R134
BPD7 BPD6 BPD5 BPD4 BPD3 BPD2 BPD1 BPD0
DT/R*
S0L* S1L* S2L* DEN*
L201 F32
L185 F10
F02
BPINIO*
L155A
L274
L9248
1K SIP
R276A R238 R210 R276A R238 R276A
DCLOW* CPHALT* IO3 IO4B EXTREADY ECNT*
DCLOW CPHALT BPIO3* BPIO4B*
L273
L9244
INIT* BPCMODE*
BPINIT* BPCENT* CMODE*
CLKOUT
L273
BPTRI* DSBEN TGS
TRI* DSBENB TGSB
BPA11
L88
AB11
L183 F32
DEN* S2L* DT/R*
L275
IODEN* BM/IC* IODT/R* BIORD*
BIOWR*
AB10 AB9 AB8
BPA10 BPA9 BPA8
L247
AB7 AB6 AB5 AB4
BPA7 BPA6 BPA5 BPA4
AB3 AB2 AB1 AB0
BPA3 BPA2 BPA1 BPA0
L236A
SW1
8BTSW
1K SIP
R210 R244 R275A R212 R238 R275A R238 R275A
DB7 DB8 DB5 DB4 DB3 DB2 DB1 DB0
L245
SW2
R278A R278A R275A R212 R244 R72A R212 R244
DB15 DB14 DB13 DB12 DB11 DB10 DB9 DB8
RDSW*
MCS3* MCS2*
L30 F08
MCS1* MCS0*
L285 F11
L131
ARDY
PU13
PU12
L286
A574
Y4
40MHZ
L285
F04
MR*
DB15
DISCK*
L86
A574
L287
ALS244
DCK DCLK FS
CRAM* CLKOUT ALE DT/R*
CLK ADDLE T/R*
L225A
F138
DIOWT* IORD*
AB15 AB14 AB13 AB12
L15SEA
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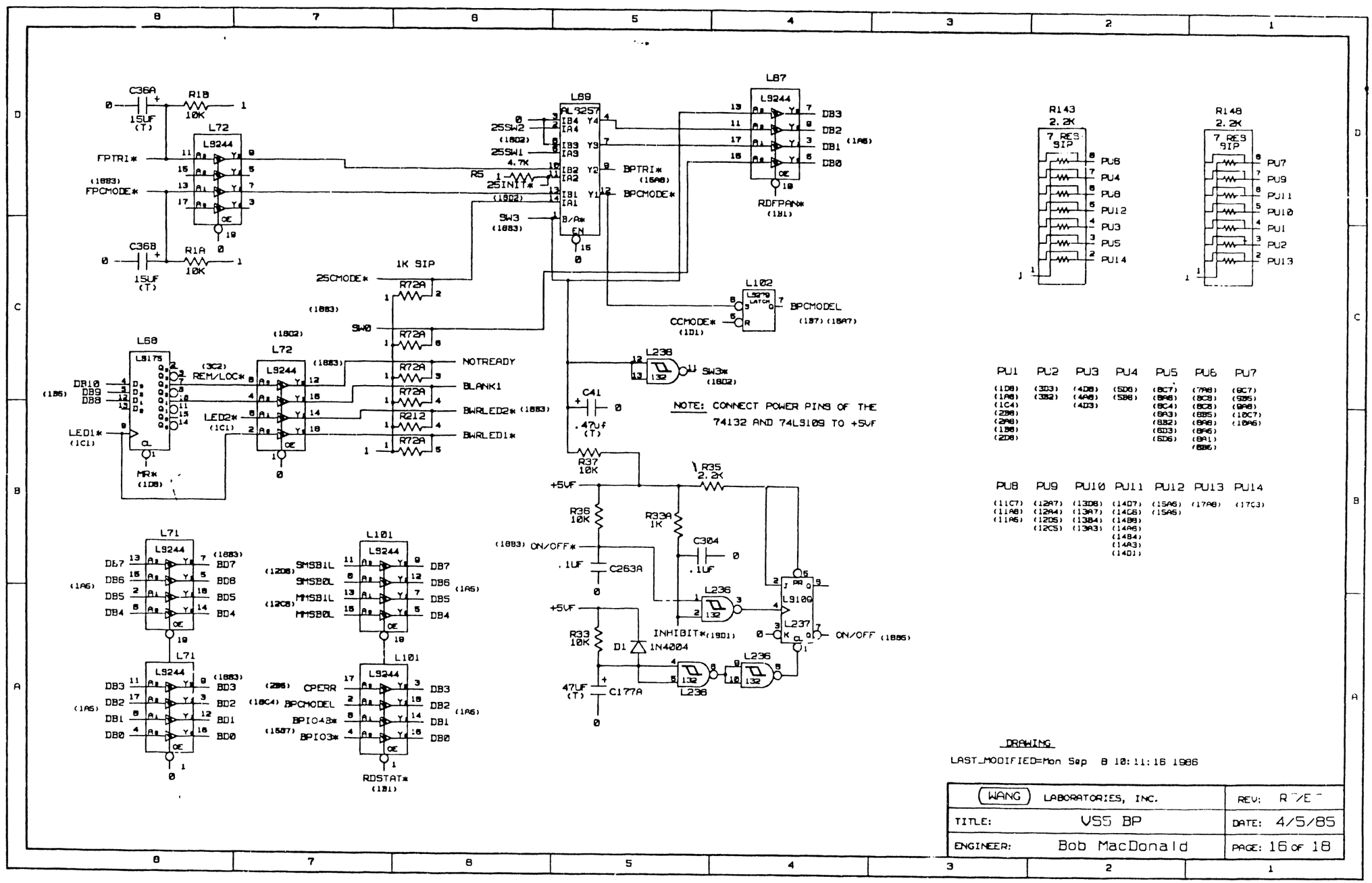
LAST_MODIFIED=Mon May 5 18:11:24 1986
WANG LABORATORIES, INC.
REV: R /E
TITLE: VSS BP
DATE: 4/5/85
ENGINEER: Bob MacDonald
PAGE: 15 OF 18



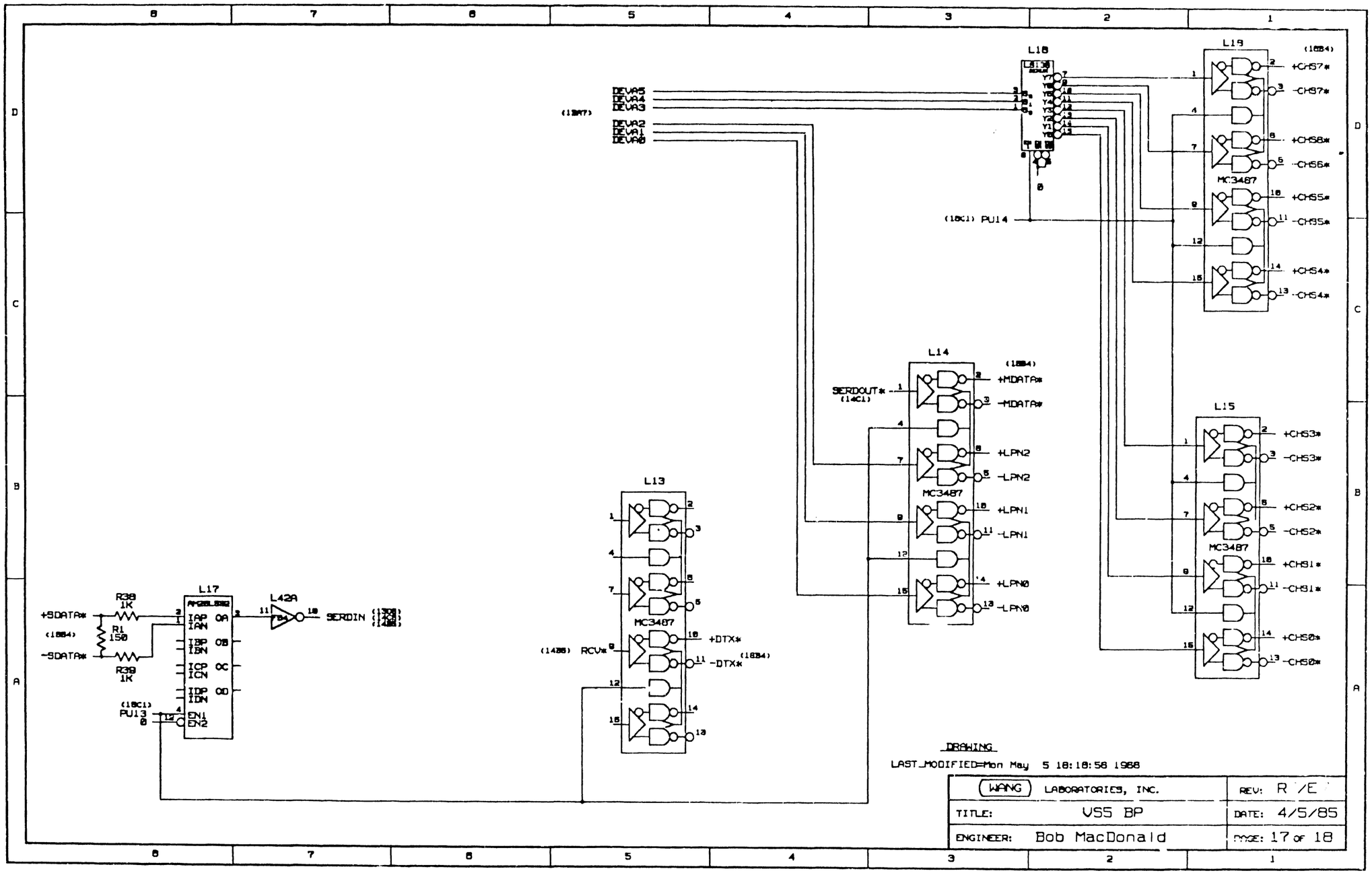
PU1	PU2	PU3	PU4	PU5	PU6	PU7
(1D8)	(3D3)	(4D8)	(5D8)	(8C7)	(7A8)	(8C7)
(1A8)	(3B2)	(4A8)	(5B8)	(8A8)	(8C8)	(9B5)
(1C4)		(4D3)		(8C4)	(8C8)	(9A8)
(2B8)				(8A3)	(8B5)	(18C7)
(2A8)				(8B2)	(8A8)	(18A6)
(1B8)				(6D3)	(8A6)	
(2D8)				(6D6)	(8A1) (6B6)	

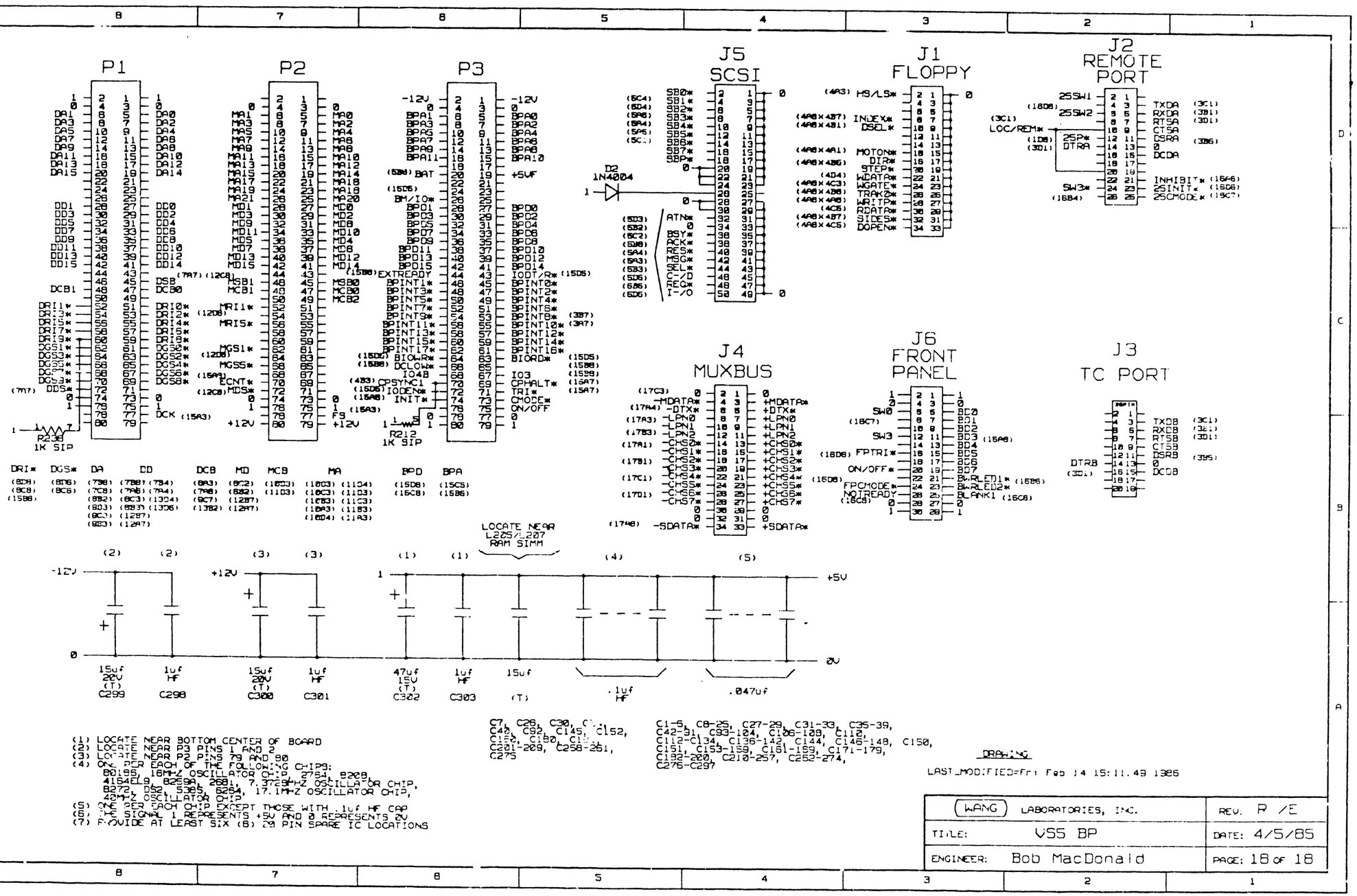
PU8	PU9	PU10	PU11	PU12	PU13	PU14
(11C7)	(12A7)	(13D8)	(14D7)	(15A6)	(17A8)	(17C3)
(11A8)	(12A4)	(13A7)	(14C6)	(15A6)		
(11A6)	(12D5)	(1384)	(14B8)			
	(12C5)	(13A3)	(14A6)			
			(14B4)			
			(14A3)			
			(14D1)			

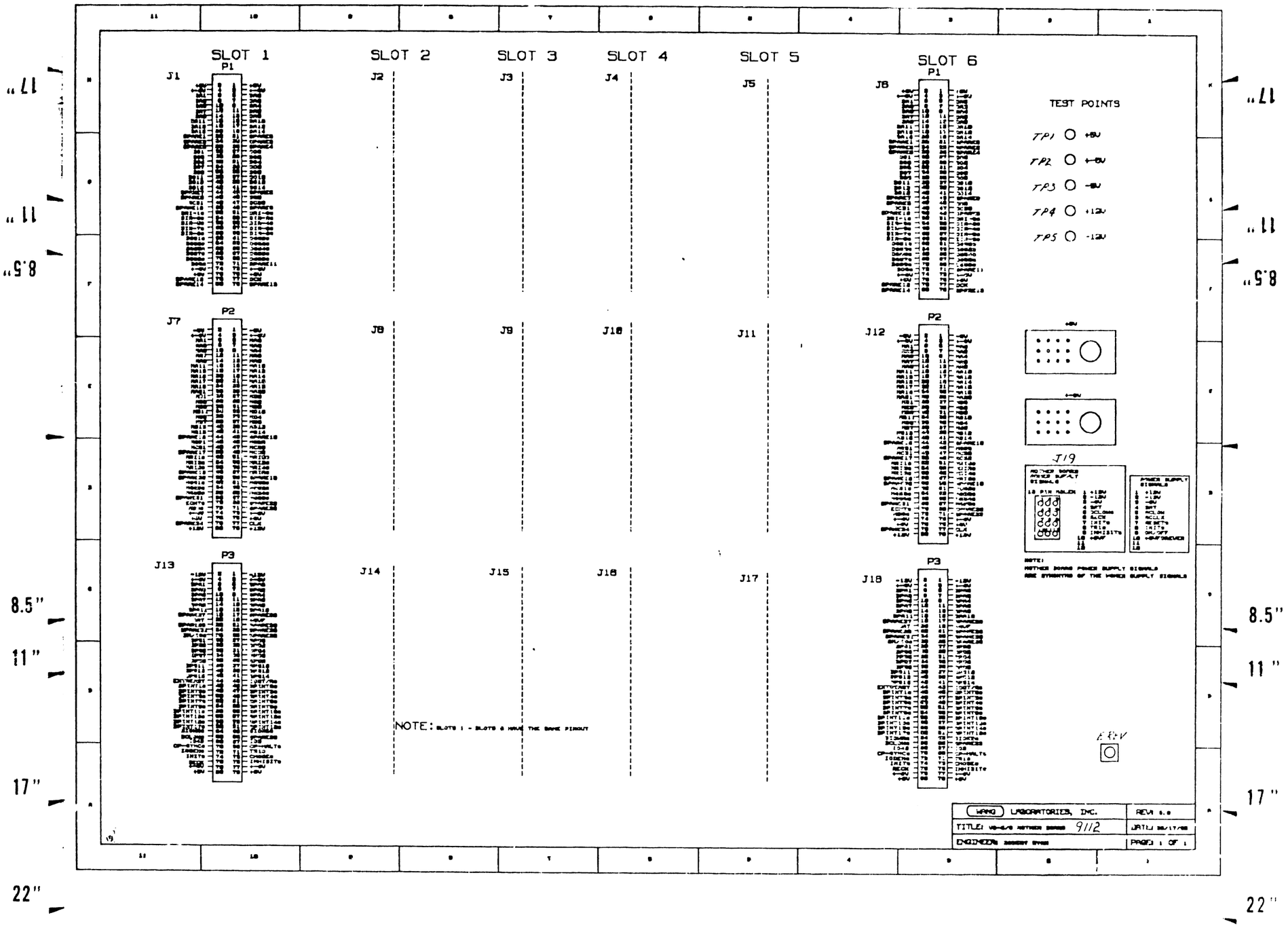
DRAWING

LAST_MODIFIED=Mon Sep 8 10:11:18 1986

WANG LABORATORIES, INC.		REV: R/E
TITLE:	VSS BP	DATE: 4/5/85
ENGINEER:	Bob MacDonald	PAGE: 16 OF 18

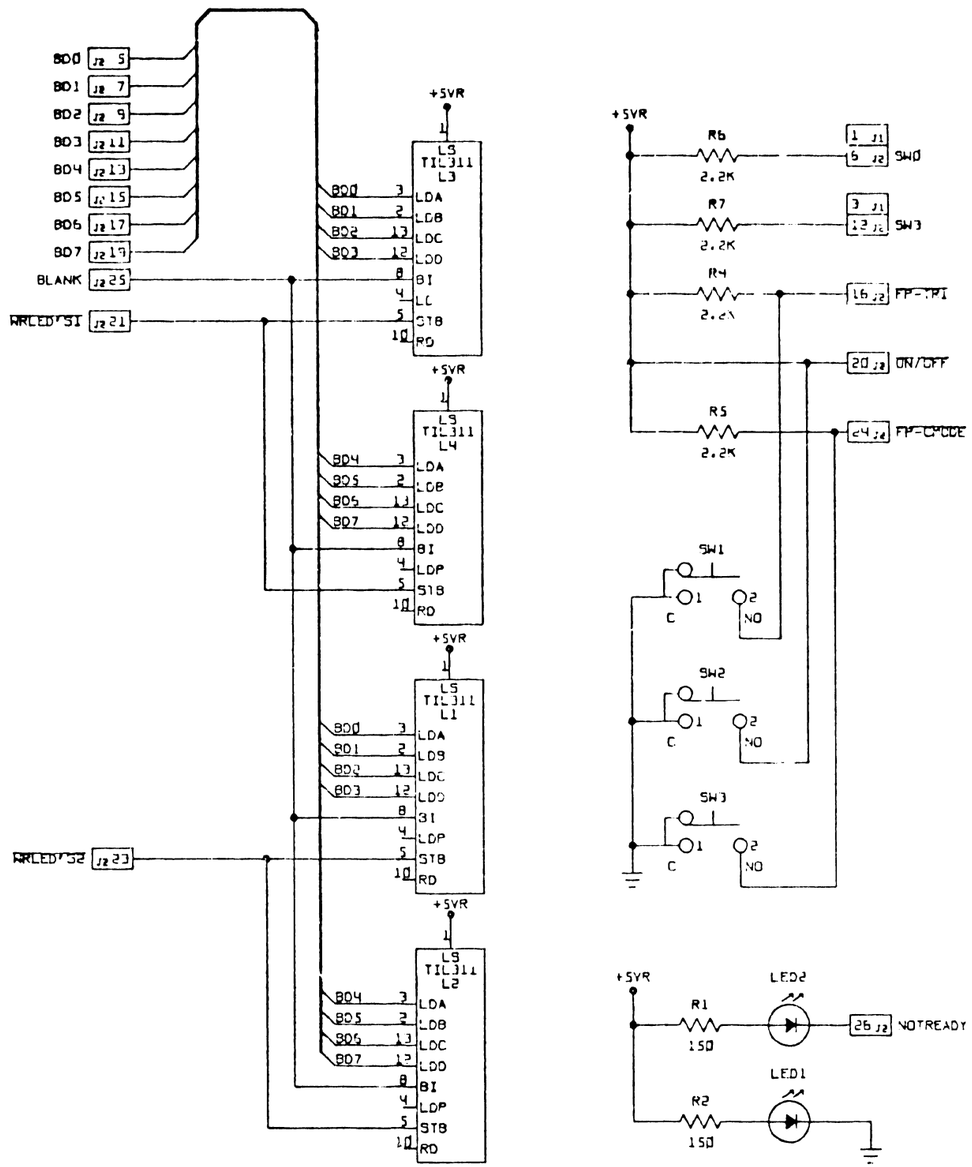

DEVA5
DEVA4
DEVA3
DEVA2
DEVA1
DEVA0
(1887)
L18
L19
(1884)
+CH57*
-CH57*
+CH58*
-CH56*
MC3487
+CH55*
-CH55*
+CH54*
-CH54*
(1881) PU14
L14
(1884)
SERDOUT*
(14C1)
+MDATA*
-MDATA*
+LPN2
-LPN2
+LPN1
-LPN1
+LPN0
-LPN0
L15
+CH53*
-CH53*
+CH52*
-CH52*
+CH51*
-CH51*
+CH50*
-CH50*
L13
(1486) RCV*
+DTX*
-DTX*
(1884)
+SDATA*
-SDATA*
(1884)
R38
1K
R1
150
R39
1K
L17
IAP
IAN
IBP
IBN
ICP
ICN
IDP
IDN
OA
OB
OC
OD
EN1
EN2
(18C1)
PU13
0
L42A
SERDIN
DRAWING
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

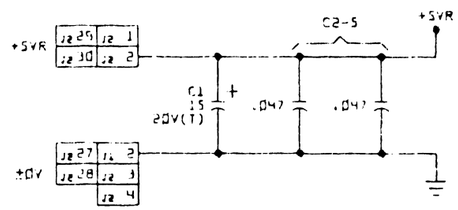

P1
P2
P3
J5
SCSI
J1
FLOPPY
J2
REMOTE
PORT
J4
MUXBUS
J6
FRONT
PANEL
J3
TC PORT
R238
1K SIP
R212
1K SIP
D2
1N4004
LOCATE NEAR
L225/L227
RAM SIMM
-12V
+12V
+5V
0
15uf
20V
(T)
C299
1uf
HF
C298
15uf
20V
(T)
C300
1uf
HF
C301
47uf
15V
(T)
C302
1uf
HF
C303
15uf
(T)
.1uf
HF
.047uf
(1) LOCATE NEAR BOTTOM CENTER OF BOARD
(2) LOCATE NEAR P3 PINS 1 AND 2
(3) LOCATE NEAR P2 PINS 79 AND 80
(4) ONE PER EACH OF THE FOLLOWING CHIPS:
80188, 16MHZ OSCILLATOR CHIP, 2761, 8208,
4164EL9, 8259A, 2681, 7.3728MHZ OSCILLATOR CHIP,
8272, D82 S385, 8284, 17.1MHZ OSCILLATOR CHIP,
40MHZ OSCILLATOR CHIP
(5) ONE PER EACH CHIP EXCEPT THOSE WITH .1uf HF CAP
(6) THE SIGNAL 1 REPRESENTS +5V AND 0 REPRESENTS 2V
(7) PROVIDE AT LEAST SIX (6) 28 PIN SPARE IC LOCATIONS
C7, C26, C30, C...
C42, C92, C145, C152,
C155, C180, C1...
C201-209, C258-261,
C275
C1-5, C8-25, C27-29, C31-38, C95-39,
C42-91, C93-124, C126-129, C132,
C112-C134, C136-142, C144, C146-148, C150,
C151, C153-159, C161-169, C171-179,
C182-200, C210-257, C262-274,
C276-C297
DRAWING
LAST_MODIFIED=Fri Feb 14 15:11:43 1986
WANG LABORATORIES, INC.
REV. R /E
TITLE: VSS BP
DATE: 4/5/85
ENGINEER: Bob MacDonald
PAGE: 18 OF 18

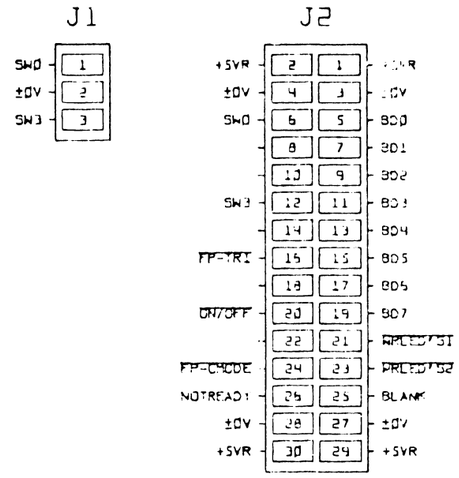

SLOT 1
SLOT 2
SLOT 3
SLOT 4
SLOT 5
SLOT 6
J1
P1
J2
J3
J4
J5
J6
P1
TEST POINTS
TP1 +5V
TP2 +-5V
TP3 -5V
TP4 +12V
TP5 -12V
J7
P2
J8
J9
J10
J11
J12
P2
J19
J13
P3
J14
J15
J16
J17
J18
P3
NOTE: SLOTS 1 - SLOTS 6 HAVE THE SAME PINOUT
REV
WANG LABORATORIES, INC.
REV: 6.0
TITLE: VS-6/8 MOTHER BOARD 9112
ENGINEER:
PAGE: 1 OF 1

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.

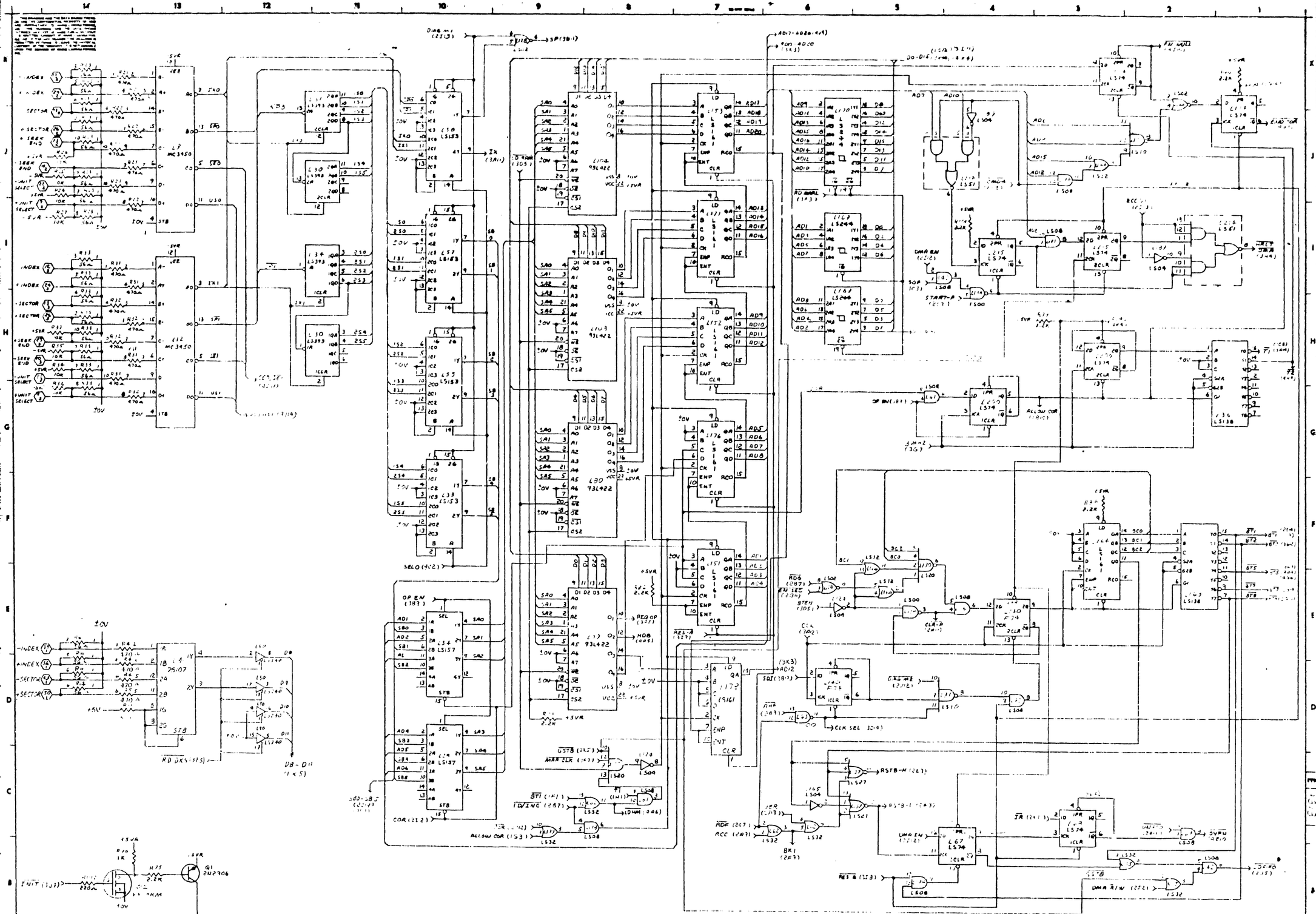


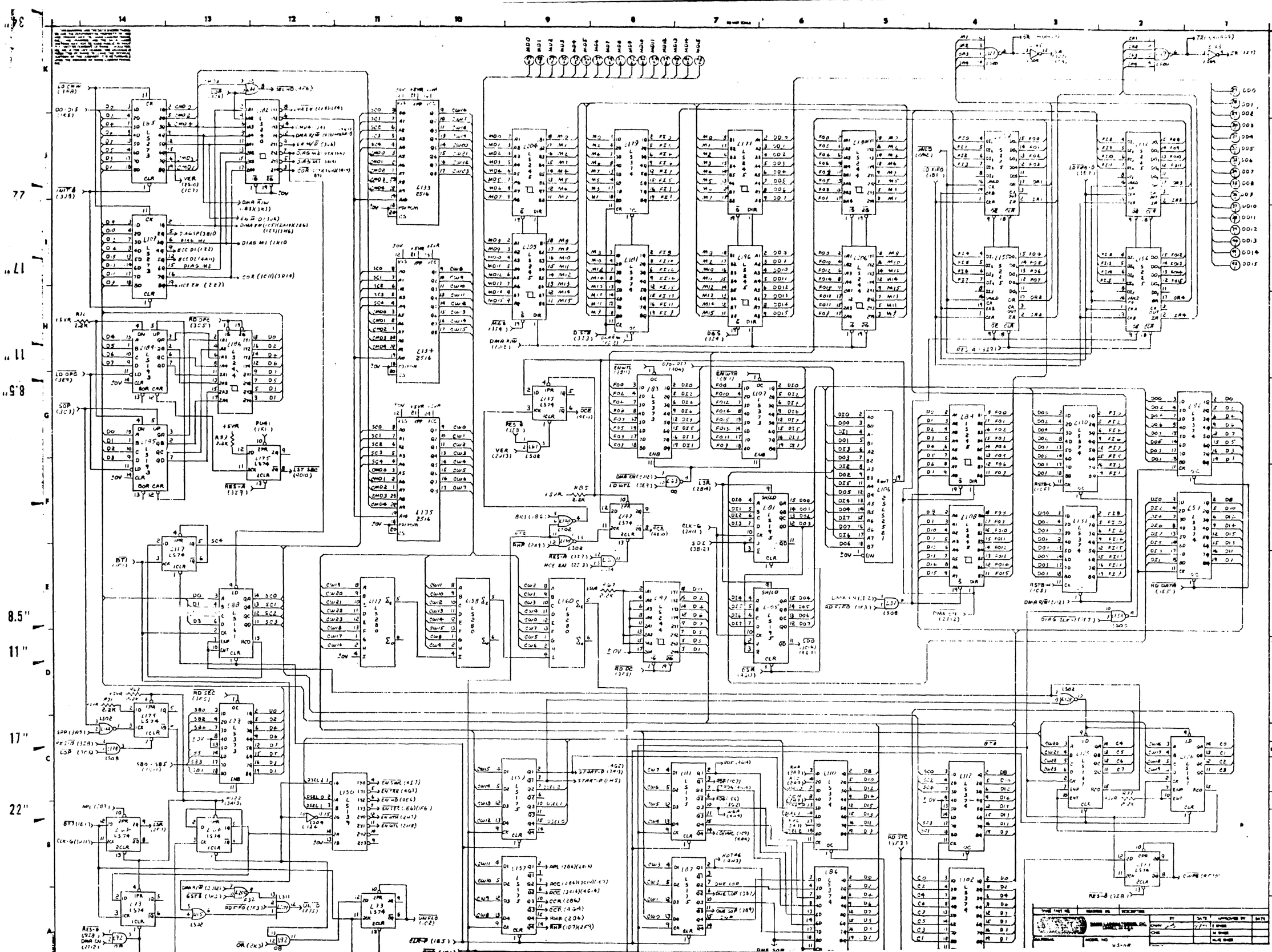




E REV: 0 N

WANG LABORATORIES, INC.	SCHEMATIC DIAGRAM
MODEL NUMBER: VS 5/6	WANG PART NUMBER: 210-9113
TITLE: VS 5/6 FRONT PANEL	
DWN BSR / CHK / ENG BR / DIR	
SCALE	SHEET 1 OF 1
SIZE: D	DRAWING NUMBER: 9113
REV: 2	


L7 MC3450
L12 MC3450
L37 LS393
L30 LS393
L34 LS393
L10 LS393
L18 LS153
L57 LS153
L55 LS153
L33 LS153
L54 LS157
L28 LS157
L104 93L422
L103 93L422
L90 93L422
L77 93L422
L173 LS161
L172 LS161
L176 LS161
L151 LS161
L170 LS244
L169 LS244
L149 LS244
L172 LS161
L215 LS74
L174 LS74
L22 LS74
L56 LS74
L38 LS138
L164 LS161
L143 LS138
L140 LS74
L145 LS74
L67 LS74
L43 LS74
L4 26S07
G1 2N2706
DIAG M1
INIT
OP EN
SELO
COR
ALLOW COR
RSTB-H
RSTB-L
CLK SEL
DMA EN
DMA R/W
START-P
REQ OP
HOB
DB-D11
RD DKS
+5VR
+5V
±0V
WANG LABORATORIES, INC.
LOWELL, MASS.


MDO MD1 MD2 MD3 MD4 MD5 MD6 MD7 MD8 MD9 MD10 MD11 MD12 MD13 MD14 MD15
LO CMW (1EA)
DO-D15 (1C6)
CR
LS74
CLR
CMD 2
CMD 4
VER (2516) (1C7)
SEL MD 4,5,6
DMA R/W (1B3)(1K1)
DMA EN (1C5)(1A4)(1K8)(1E1)(1H6)
DIAG M1 (1K10)
ECC DI (1E2)
ECC DI (4A11)
DIAG M2
COR (1C11)(3D10)
INCR EN (2E7)
SWITCH (3J9)
RAC
+5VR
2.2K
RD OPC (3C5)
LD OPC (3E9)
SOP (3C3)
L189
BOR CAR
L175
L174
PUP1 (1K1)
RES-A (3E9)
L135
2516
SCO
SC1
SC2
SC3
SC4
CMD0
CMD1
CMD2
CMD3
CMD4
CWD0
CWD1
CWD2
CWD3
CWD4
CWD5
CWD6
CWD7
CWD8
CWD9
CWD10
CWD11
L137
L138
L139
L160
L161
L162
L163
L164
L165
L166
L167
L168
L169
L170
L171
L172
L173
L174
L175
L176
L177
L178
L179
L180
L181
L182
L183
L184
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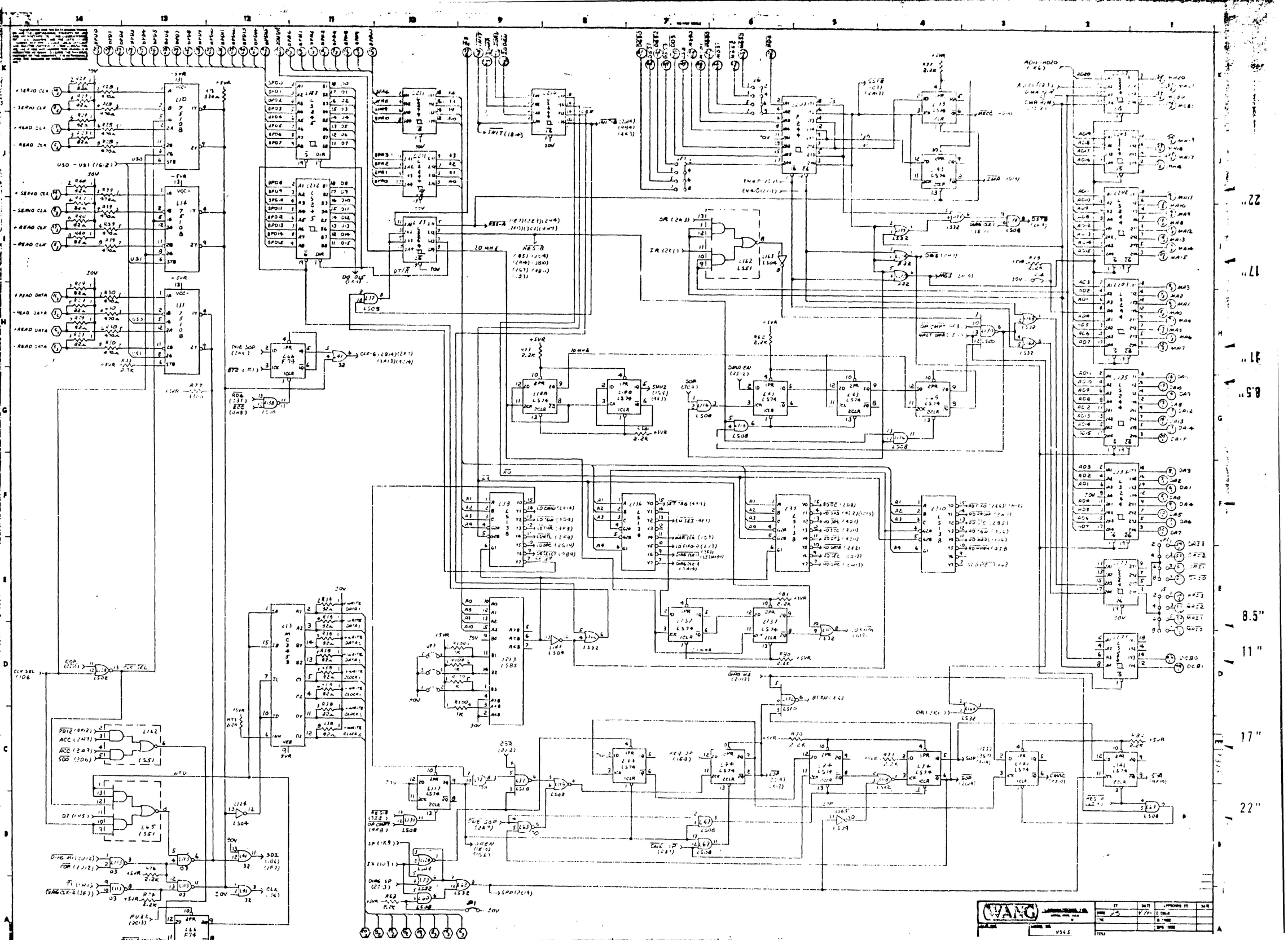
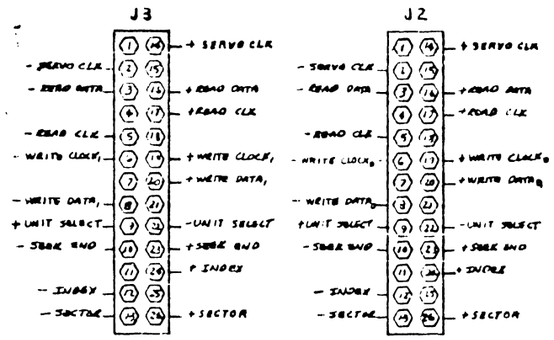
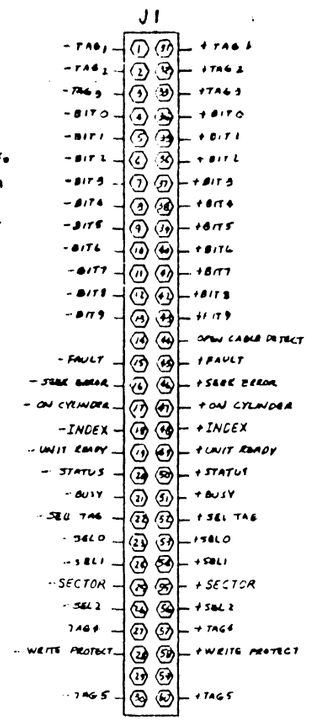
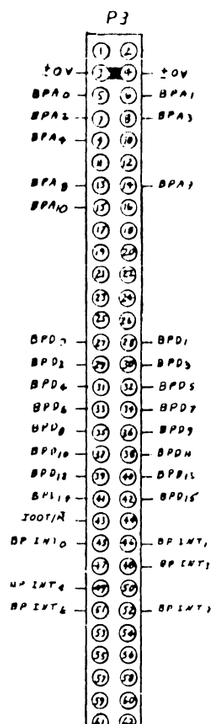
L197
L198
L199

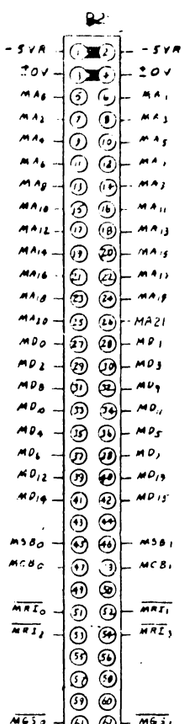

+SERIO CLK
-SERIO CLK
+READ CLK
-READ CLK
+SERVO CLK
-SERVO CLK
+READ DATA
-READ DATA
U50 - U51 (16:2)
U50
U51
U52
U53
U54
U55
U56
U57
U58
U59
U60
U61
U62
U63
U64
U65
U66
U67
U68
U69
U70
U71
U72
U73
U74
U75
U76
U77
U78
U79
U80
U81
U82
U83
U84
U85
U86
U87
U88
U89

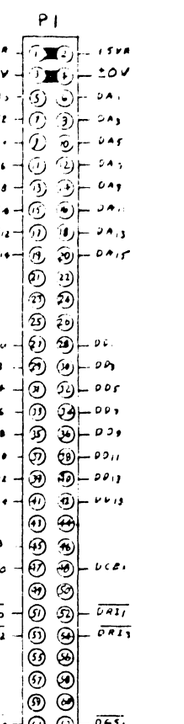
DISK DRIVE INTERFACE





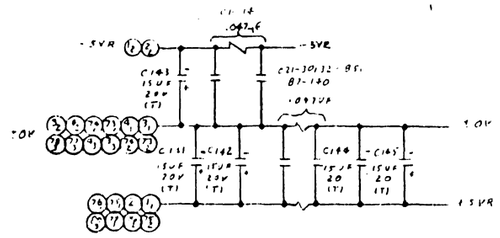






MNEMONICS	CORE B
+ BIT0 - + BIT9	+ F1
- BIT0 - - BIT9	+ A1
BPA0 - BPA8	3 K11
BPA8 - BPA10	3 K11
BPD0 - BPD15	3 K13
BPINT0 - BPINT7	+ A7
+ BUSY	+ J1
- BUSY	+ J1
DA0 - DA15	3 E1
DCB0	3 D1
DCB1	3 D1
DD0 - DD15	2 J1
DD3	3 K7
DGS0 - DGS3	3 K7
DRI0 - DRI3	3 E1
DSB	3 K7
+ FAULT	+ E1
- FAULT	+ E1
+ INDEX	1 K1 + 1 E1
- INDEX	1 K1 + 1 E1
INIT	3 K9
IODEN	3 K9
IOD T/R	3 K12
IOAD	3 K9
IOWA	3 K9
MA0 - MA10	3 E1
MCB0 - MCB3	3 K1
MD0 - MD15	2 K1
MDS	3 K6
MGS0 - MGS3	3 K6
MRI0 - MRI3	3 B1
MSB0	3 K7
MSB1	3 K7
+ ON CYCLINDER	+ H +
- ON CYCLINDER	+ H +
OPEN CABLE DEFECT	1 A13
+ READ CLR	3 J1 + 3 E1
- READ CLR	3 J1 + 3 E1
+ READ DATA	3 H1 +
- READ DATA	3 H1 +

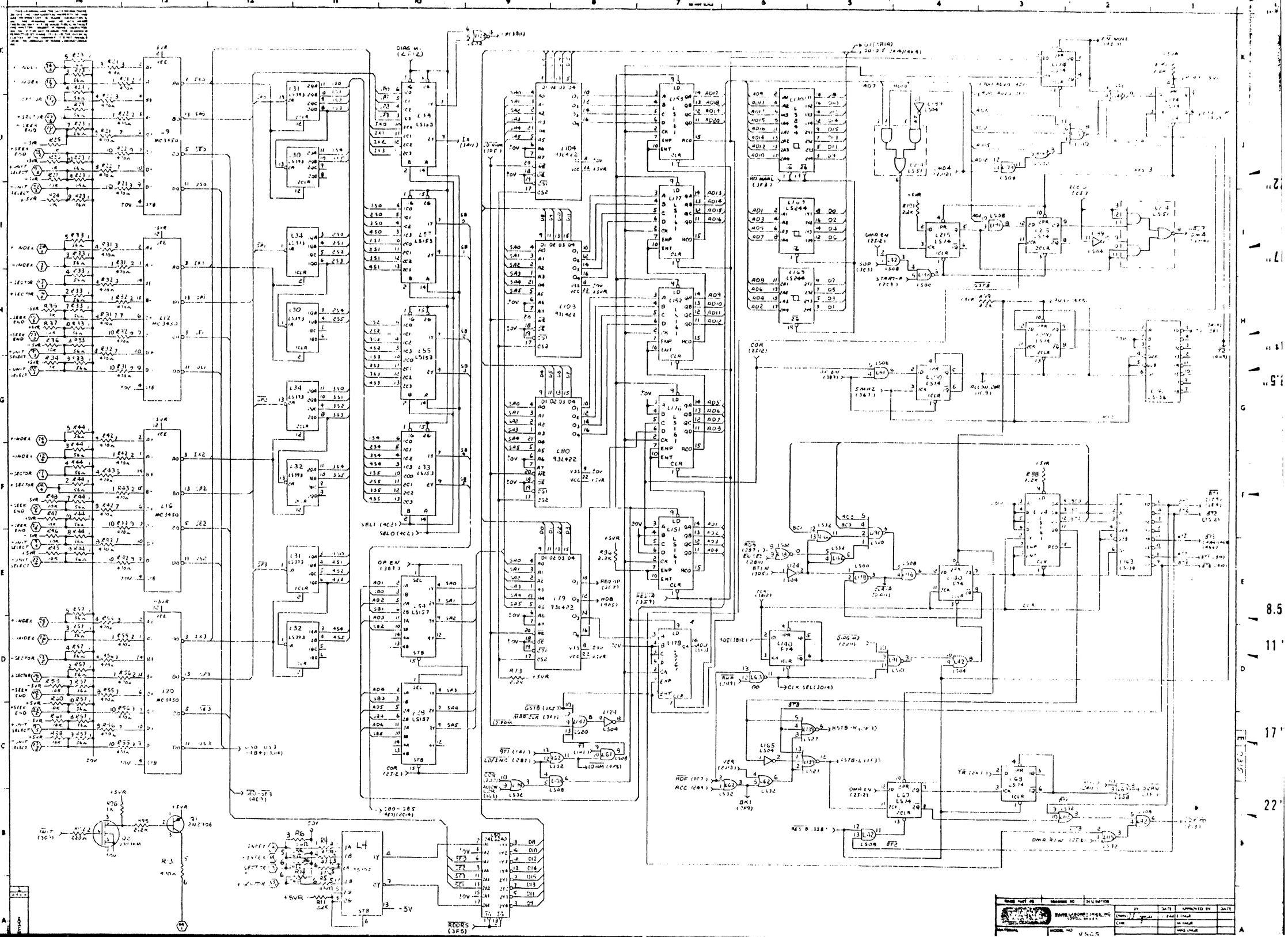
MNEMONICS	CORE B
+ SECTOR	1 J1 + 1 H1 +
- SECTOR	1 J1 + 1 H1 +
+ SEEK ERROR	+ H1 +
- SEEK ERROR	+ H1 +
+ SEEK END	1 J1 + 1 H1 +
- SEEK END	1 J1 + 1 H1 +
+ SEL 0	+ C1
- SEL 0	+ C1
+ SEL 1	+ C1
- SEL 1	+ C1
+ SEL 2	+ J1
- SEL 2	+ J1
+ SEL TAG	+ B1
- SEL TAG	+ B1
+ SERVO CLR	3 K1 + 3 J1 +
- SERVO CLR	3 K1 + 3 E1 +
+ STATUS	+ J1 +
- STATUS	+ J1 +
+ TAG 1	+ E1
- TAG 1	+ E1
+ TAG 2	+ H1
- TAG 2	+ H1
+ TAG 3	+ E1
- TAG 3	+ E1
+ TAG 4	+ K1
- TAG 4	+ K1
+ TAG 5	+ J1
- TAG 5	+ J1
+ UNIT READY	+ H1 +
- UNIT READY	+ H1 +
+ UNIT SELECT	1 E1 +
- UNIT SELECT	1 J1 +
+ WRITE PROTECT	+ J1 +
- WRITE PROTECT	+ J1 +
PS	3 K9
+ WRITE DATA 0	3 A11
- WRITE DATA 0	3 A10
- WRITE CLOCK 0	3 A10
+ WRITE CLOCK 0	3 A10
+ WRITE CLOCK 1	3 A10
- WRITE CLOCK 1	3 A10
- WRITE DATA 1	3 A10
- WRITE DATA 1	3 A10
- UNIT SELECT	1 G14
+ UNIT SELECT	1 G14

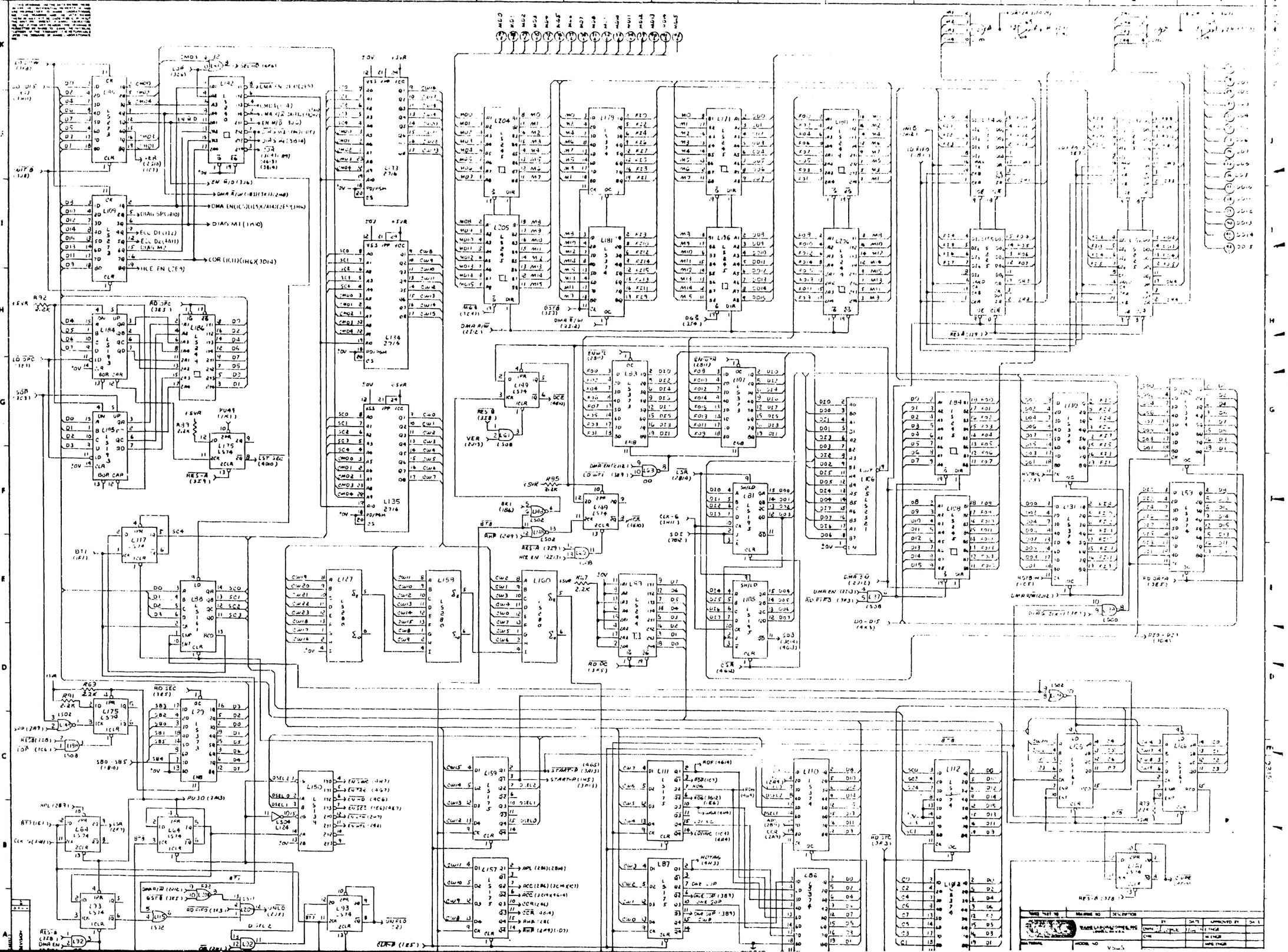


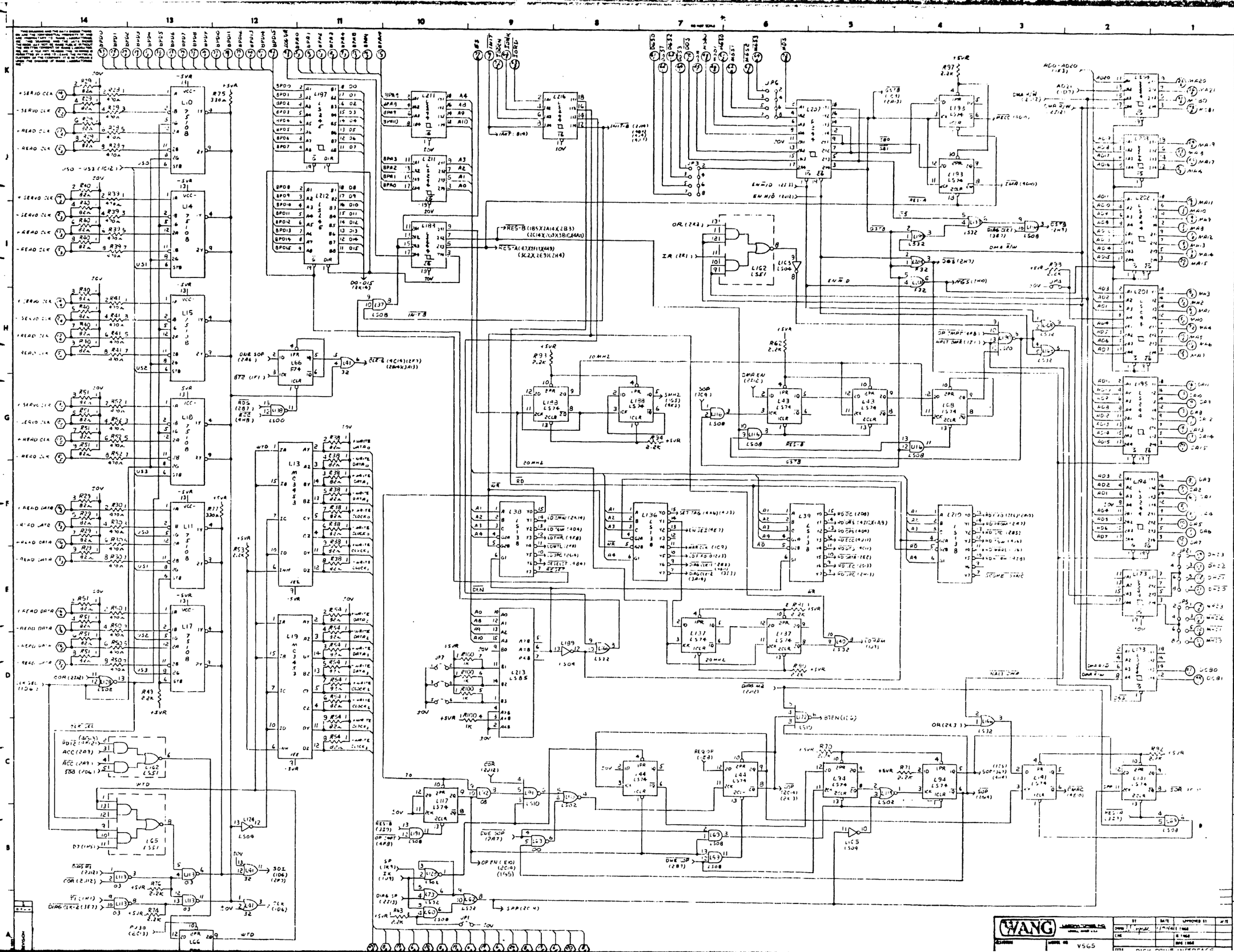
NOTE:
1) ALL RESISTORS ARE 1/8W ± 5% UNLESS OTHERWISE SPECIFIED

E-REV
D

WANG	BY	DATE	APPROVED BY	DATE
	DRN			
	CHK			


MC3450
MC3453
MC3451
MC3452
LS153
LS393
LS139
LS157
LS244
LS374
LS540
LS32
LS08
LS04
LS20
LS00
LS10
LS27
LS51
LS74
LS38
LS86
LS123
LS175
LS273
LS240
93L422
F74
2N3906
+5VR
+5V
-5V
INDEX
SECTOR
SEEK END
UNIT SELECT
WRITE
STEP
DIR
HEAD SEL
WRITE GATE
ERASE
READ DATA
WRITE DATA
SEEK COMPLETE
TRACK 00
INDEX
WRITE PROTECT
DRIVE SELECTED
DRIVE READY
DIAG MD
OPEN
COR
INIT
DMA R/W
DMA EN
RESET
STROBE
BUSY
ACC
VER
RDF
WRF
RDDRS
WRDRS
SMME
ALLOW USR
CLK SEL
DMA ENABLE
TRACK ADDR
SECTOR ADDR
DATA BUS
8.5"
11"
17"
22"




WANG
VS65
DISK DRIVE INTERFACE
WTD
DMA R/W
DMA E/W
MAIN DATA
SOP
SOP (13C9)
DMA EN (2E1C)
DMA ADR (2E1E)
REQ OP (1C8)
SP
SP (1K9)
DIAG SP (2213)
OP EN (1E0) (2C10) (1165)
DUE SOP (2A7)
DUE SP (2B7)
OR (2A2)
IR (2B1)
EN D
EN M/D
RES-B (1B5X2A14X2B3) (2C14X/C9X3R1C&4A11)
RES-A (4E7XH11X4H9) (3C2X,2E9)(2H4)
DD-D15 (2K14)
INIT FB
INIT (B14)
SSTB (2H3)
SSTB (2H7)
DBS (2H7)
MBS (2H10)
DMA R/W
DMA E/W
BTEN (1C6)
SOP (1H4)
SP (1K4)
SSA (1F10)
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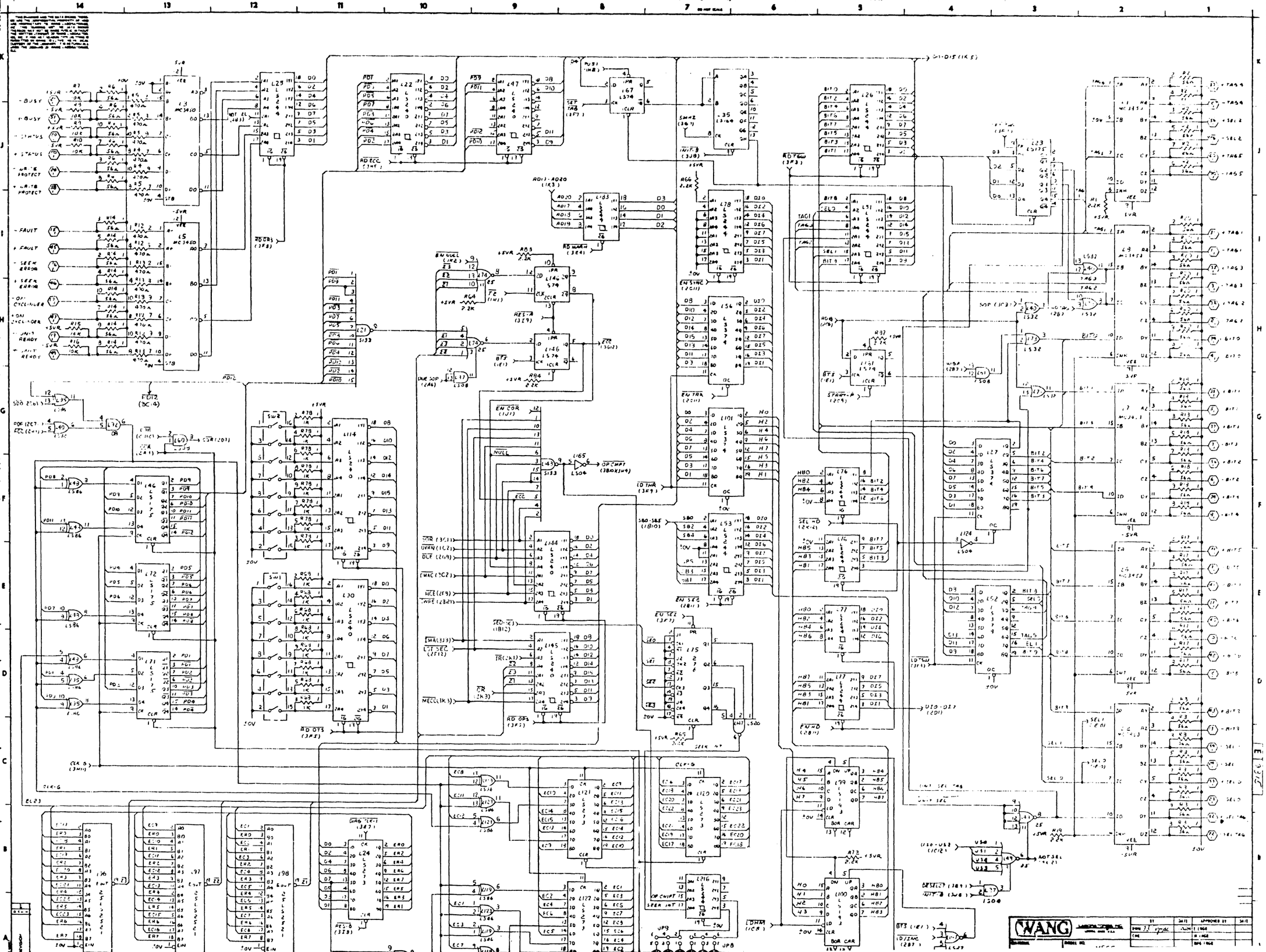
WANG
- BUSY
- STATUS
+ STATUS
- WRITE PROTECT
+ WRITE PROTECT
- FAULT
+ FAULT
- SEEK ERROR
+ SEEK ERROR
- ON CYLINDER
+ ON CYLINDER
- UNIT READY
+ UNIT READY
+5VR
-5VR
+5V
-5V
L3 MC3430
L5 MC3450
L25
L22
L97
L67 S74
L35 S109
L26
L78
L51
L27
L52
L53
L54
L101
L100
L76
L77
L79
L23 S175
L32 S32
L32 S157
L32 S158
L32 S08
L24
L46 S86
L72
L71
L121 S133
L146 S74
L147 S74
L74
L75
L114
L144
L145
L30
L83
L20 S133
L19 S86
L17 S30
L36
L37
L39
L40
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L44
L45
L49
L50
L60
L61
L63
L64
L65 S04
L124 S04
L125 S08
L126 S20
L127 S20
L128 S20
L129 S20
L216 S51
L219 S86
L220 S86
L221 S86
L222 S86
L223 S86
L224 S86
L225 S86
L226 S86
L227 S86
L228 S86
L229 S86
L230 S86
L231 S86
L232 S86
L233 S86
L234 S86
L235 S86
L236 S86
L237 S86
L238 S86

MNEMONICS	CORD
+BIT3 - +BIT9	4F1
-BIT0 - -BIT9	4F1
BPD0 - BPD15	3K13
BPA0 - BPA9	3K11
BPA9 - BPA15	3K11
BPINT 0 - BPINT 7	4A7
+ BUSY	4J14
- BUSY	4J14
DCB0	3D1
DCB1	3D1
DA0 - DA15	3F1
DD0 - DD15	2J1
$\overline{DSS}$	3K7
$\overline{DISO}$ - $\overline{DG35}$	3K7
$\overline{DA13}$ - $\overline{DA15}$	3E1
DSB	
FAULT +	4E4
FAULT -	4E4
INDEX +	1K4 1J14 1G14 1D14
INDEX -	1K4 1J4 1G14 1D14
$\overline{INIT}$	3K1
INIT	8H
$\overline{IS}$	3K9
$\overline{ECODE}$	3K9
$\overline{IOD\ TA}$	3K2
$\overline{IFAB}$	3A9
$\overline{ISUB}$	3K9
MA0 - MA20	3E1
MCB0 MCB2	3K1
MD0 - MD15	2K8
MD3	3K6
$\overline{MG50}$ - $\overline{MG51}$	3A6
$\overline{MA13}$ - $\overline{MA13}$	3B1
$\overline{MSB0}$	3K7
$\overline{MSB1}$	3K7
ON CYLINDER+	4H16
ON CYLINDER-	4H16
OPEN CABLE DETECT	1A13
+READ CLK	3J16 3D16 3G16
-READ CLK	3J16 3D16 3G16
+READ DATA	3F16 3E16 3D16
-READ DATA	3F16 3E16 3D16

MNEMONICS	CORD
+ SEL 1	4C1
- SEL 3	4C1
+ SEL 1	8C1
- SEL 2	4C1
+ SEL 2	4J1
- SEL 2	4J1
+SERVO CLK	1K4 1E14 2H16 1G14
-SERVO CLK	1K4 1E14 2H16 1G14
+ SEEK END	1J14 1H14 1F14 1C14
- SEEK END	1J14 1H14 1F14 1D14
+ SEEK ERROR	4H14
-SEEK ERROR	4H16
+ SECTOR	1J14 1H14 1F14 1D14
- SECTOR	1J14 1H14 1F4 1D14
- SEL TAG	4B1
- SEL TAG	4B1
+ SPARE	4J14
- SPARE	4J14
+ TAG 1	4J1
- TAG 1	4J1
+ TAG 2	4H1
- TAG 2	4H1
+ TAG 3	4J1
- TAG 3	4J1
+ TAG 4	4K1
- TAG 4	4K1
+ TAG 5	4J1
- TAG 5	4J1
+ UNIT SELECT	1J14 1H14 1E14 1C14
- UNIT SELECT	1J14 1H14 1E14 1C14

MNEMONICS	CORD
+ WRITE DATA	3A9
- WRITE DATA	3A9
+ WRITE CLOCK	3A8
- WRITE CLOCK	3A8
+ WRITE DATA	1A8
- WRITE DATA	1A8

IC TYPE	LOCATION	SPARES
7400	L63	1
74LS02	L118	1
	L124	1
74LS04	L183	3
	L42	1
74LS08	L41	2
	L191	
74LS11	L209	2
74LS21	L139	1
	L197	1
74LS32	L115	1
	L168	1
	L199	1
	L216	3
74F32	L208	2
74LS51	L65	1
74LS74	L63	1
	L122	1
74LS86	L85	1
	L123	1

NOTE.
ALL RES ARE 1/4W ±5% UNLESS OTHERWISE SPECIFIED

REV
D

WANG LABORATORIES, INC.	BY	DATE	APPROVED BY	DATE
	DRWN	7/1/76	E 1966	
	CHK	7/5/76	E 1966	
			DPS 1966	

SIZE E
DRAWING NO. 1365

DO NOT SCALE

Y1 +/-16MHz → Φ/16M (2N12)

Φ2MEG

L24A P16L3 — MUXCLK

Y2 Φ1.8432 MEG (3E6) DLCWR (2H1) BD6 — 1.8432 MEG

RESET (2B10)

PA0 – PA15 (4K10)

PD0 – PD7 (1G10) (4N2)

L103 AM 9517A-4 — DMA CONTROLLER

L104 8237A-4 — DMA CONTROLLER

L69 L74 L75 L76 L77 L78 — 8T97 BUS TRANSCEIVERS

L137 — 8T97 BUS TRANSCEIVER

L133A — 8T97 BUS TRANSCEIVER

L101 ZBOA-CTC

L102 ZBOA-CTC

L89 8237A-4 — DMA CONTROLLER

L105 L106 — 74LS74 DUAL D FLIP-FLOP

L10 L11 — 74LS157 QUAD 2-LINE TO 1-LINE DATA SELECTOR

L108 — 74LS85 4-BIT MAGNITUDE COMPARATOR

L110 — 74LS260 DUAL 5-INPUT NOR GATE

L112 — 74LS125 QUAD BUS BUFFER GATE

L113 — 74LS32 QUAD 2-INPUT OR GATE

L114 — 74LS08 QUAD 2-INPUT AND GATE

L115 — 74LS04 HEX INVERTER

L116 — 74LS30 8-INPUT NAND GATE

L117 — 74LS00 QUAD 2-INPUT NAND GATE

L118 — 74LS10 TRIPLE 3-INPUT NAND GATE

L119 — 74LS20 DUAL 4-INPUT NAND GATE

L120 — 74LS38 QUAD 2-INPUT NAND BUFFER

L121 — 74LS08 QUAD 2-INPUT AND GATE

L122 — 74LS00 QUAD 2-INPUT NAND GATE

L123 — 74LS125 QUAD BUS BUFFER GATE

L124 — 74LS08 QUAD 2-INPUT AND GATE

L125 — 74LS04 HEX INVERTER

L126 — 74LS74 DUAL D FLIP-FLOP

L127 — 74LS04 HEX INVERTER

L128 — 74LS74 DUAL D FLIP-FLOP

L129 — 74LS74 DUAL D FLIP-FLOP

L130 — 74LS08 QUAD 2-INPUT AND GATE

L131 — 74LS04 HEX INVERTER

L132 — 74LS32 QUAD 2-INPUT OR GATE

L133 — 74LS74 DUAL D FLIP-FLOP

L134 — 74LS74 DUAL D FLIP-FLOP

L135 — 74LS74 DUAL D FLIP-FLOP

L136 — 74LS74 DUAL D FLIP-FLOP

L137 — 74LS74 DUAL D FLIP-FLOP

L138 — 74LS74 DUAL D FLIP-FLOP

L139 — 74LS74 DUAL D FLIP-FLOP

L140 — 74LS74 DUAL D FLIP-FLOP

L141 — 74LS04 HEX INVERTER

L142 — 74LS74 DUAL D FLIP-FLOP

L143 — 74LS74 DUAL D FLIP-FLOP

L144 — 74LS74 DUAL D FLIP-FLOP

L145 — 74LS74 DUAL D FLIP-FLOP

L146 — 74LS74 DUAL D FLIP-FLOP

L147 — 74LS74 DUAL D FLIP-FLOP

+5VR
R74 330
PU2 (2D2)
LS14A
LS14B
LS125 S74
LS126 S74
MWR (1K13)
MREQ (1E12)
L97 LS04
PA0 - PA15* (1K1)
L95 LS244
L98 LS244
L86 LS244
WR (1D11)
RD (1E11)
L88 LS32
L89 LS08
L87 LS257
SELZ (2F5)
+5V
L85 LS244
L84 LS244
L83 LS244
L82 LS244
L81 LS244
L80 LS244
L79 LS244
L78 LS244
L77 LS244
L76 LS244
MP
MD0
MD1
MD2
MD3
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MD5
MD6
MD7
PU0 - PU7 (1K1)
PD3 (3A11)
L151 LS04
L150 LS240
L71 LS32
L72 LS280
L90 LS04
L91 LS32
EMP (2C11)
NOP (2D1)
L111 LS02
L109 LS00
CONQ (1F12)
L40 LS240
L41 LS244
L53 LS273
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L54 LS273
L55 LS273
L56 LS273
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L61 LS273
L62 LS273
L63 LS273
BUSAK (1D3)
L92 LS04
L93 LS00
L94 LS04
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L168 LS74
L169 LS74
L170 LS74
L171 LS74

BPD0 - BPD15 (4K1)
MMMARS (3E1K)
IDREQ 3 (1C5)
+5VR
R34 1K
CB CR CC CB ACR DD DB BA
R(B) RA(A) DM(B) DM(A) CS(B) CS(A) RM(B) RM(A)
TM RC EC HT(B) RT(A) ST(B) ST(A) I(B) I(A) R(B) R(A) B(A) B(B) S(B) S(A)
R36 120Δ
R10 120Δ
R11 120Δ
R29 120Δ
R6 1K
R20 1K
R5 1K
R13 1K
R31 1K
R37 1K
L35 26LS32
L13 26LS32
L18 26LS32
L14 26LS31
L11 26LS31
L10 26LS31
L9 75154
L8 LS244
L15 75154
L5 75154
L9 LS244
R25 47K
R2 47K
R3 47K
-12V
+5V
L27 LS241
L46 LS73
L57 LS74
L26 LS125
L21 75150
L11 75150
L10 75150
L23 LS74
L24 LS74
L73 LS191
L54 LS191
L84 LS191
L80 LS191
L81 LS191
L77 LS191
L59 LS191
L88 LS245
L89 LS245
L87 LS244
L85 LS138
L86 LS138
L83 LS138
L74 LS74
L76 LS21
L72 LS111
L71 LS111
L70 LS241
L69 LS241
L68 LS241
L64 LS74
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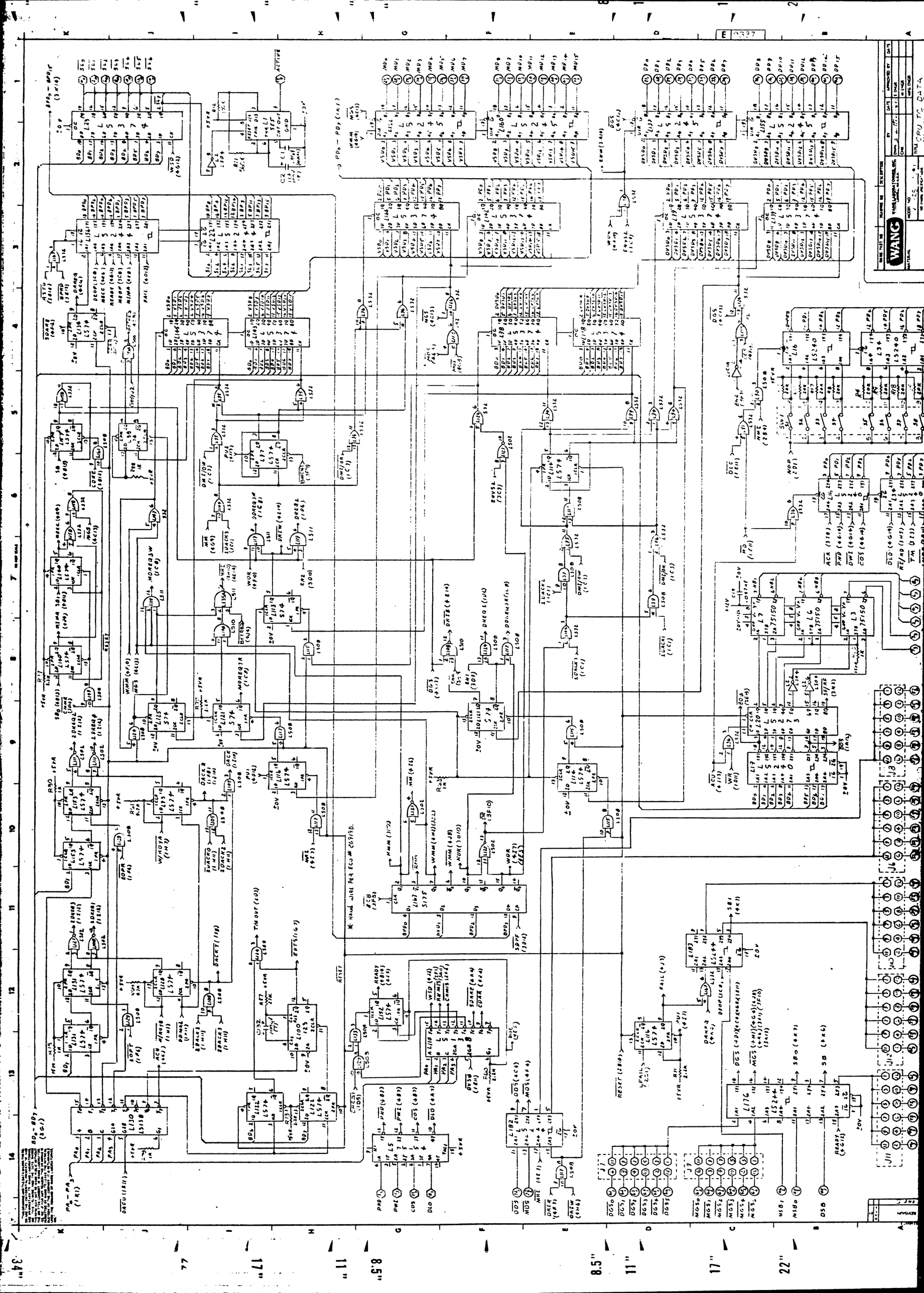
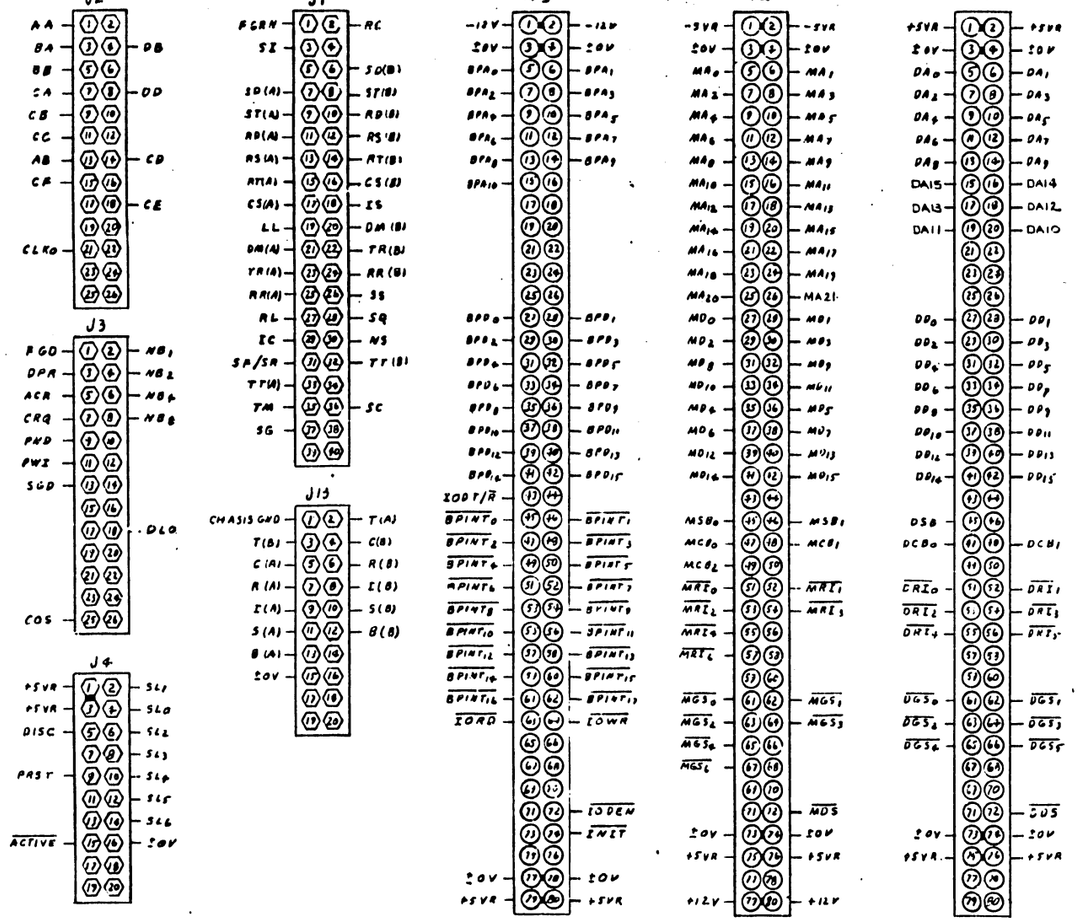
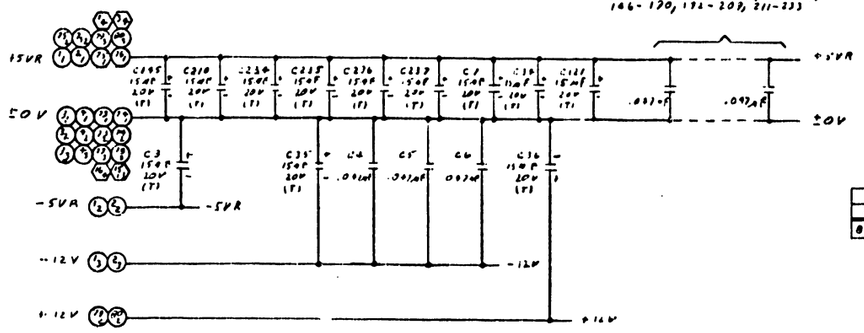
L79 LS74





CB = 32, 33-38, 64-72, 74, 76-78, 81-109, 119-140, 184-193, 195-199, 146-170, 192-203, 211-233



210 = 209 + 377 OR 378								
210	209	L50	L53		L64	L65, 103	L66	L101, 102
8337-A	8337	378-8012-R2	378-5137		377-0373	377-0411	377-0368	377-0371

MNEMONICS	COOR'D
R(A)	3K8
R(B)	3K5
AC	3K6
AD (A)	3K7
AD (B)	3K7
AL	1C14
RR(A)	3K8
RR(B)	3K8
RS(A)	3K1
RS(B)	3K1
RT(A)	3K6
RT(B)	3K6
S(A)	3K4
S(B)	3K4
SC	1C14
SD(A)	3K1
SD(B)	3K1
SF/SR	3H1
SG	1C14
SGD	1B14
SI	1D14
SL0 - SL6	9J1
SS	1C14
ST(A)	3K5
ST(B)	3K5
SQ	1D14
T(A)	3J1
T(B)	3J1
TM	3K6
TR(A)	3J1
TR(B)	3J1
TT(A)	3J1
TT(B)	3J1

MNEMONICS	COOR'D
AA	1B14
AB	1B14
ACR	3K9
ACTIVE	4H1
B(A)	3K5
B(B)	3K5
BA	3H1
BB	3K9
BPA0	3F14
BPA1 - BPA7	3D14
BPA8	3E14
BPA9	3F14
BPA10	3B14
BPD0 - BPD15	3E14
PPINT0 - BPINT15	4A12
C(A)	3J1
C(B)	3J1
CA	3H1
CB	3K9
CC	3K9
CD	3A1
CE	3K10
CF	3K10
CLKO	3G1
COS	4G16
CRQ	4A8
CS(A)	3K8
CS(B)	3K8
DA0 - DA15	3A15
DB	3K9
DCB0, DCB1	3A7
DD	3K9
DD0 - DD15	4C1
CDS	4F14
DGS0 - DGS5	4G14
DISC	3K2
DLO	4G14
DM(A)	3A2
DM(B)	3K8
DMA	4A8
DRI0 - DRI5	4A10
DSB	4B14
FGO	1B14
FGRN	1C14
E(A)	3K5
E(B)	3K5
EC	3K6
ENET	3E14
EODEN	3E14
EODT/R	3C14
EORD	3E14
EOWR	3G14
ES	1D14
LL	1C14
MA0 - MA20	3D1
MLHG - MSBL	3B1
MD0 - MD15	4B1
MDS	4E14
MGS0 - MGS5	4C14
MRI0 - MRI5	4A3
MSB0, MSB1	4B14
NB1	4A7
NB2	4A7
NB4	4A7
NB8	4A7
NS	1C14
PWO	4G14
PWST	2B14
PWI	4G4

I.C. TYPE	LOC	SPARES
74LS02	L15B	1
7402	L30	2
74LS08	L33	1
	L41	1
74LS10	L112	2
7404	L37	5
74LS21	L20	1
74LS11	L115A	
		1
		1
74LS86	L43	2
74123	L100	1
74LS125	L75	1
74S241	L150	1
74S260	L120	1
7406	L15A	3
74LS04	L2	1
74LS04	L26	1

NOTE:
ALL RESISTORS ARE ¼W ±5% UNLESS SPECIFIED OTHERWISE

E-REV
4

REVISION	DESCRIPTION	DATE	APPROVED
A	ECO 8337	1-3-75	

WANG WANG LABORATORIES (TYNGSBORO), INC. LOWELL, MASS. U.S.A.

BY	DATE	APPROVED BY	DATE
DWN P. L. [illegible]	1-3-75	ENGR	
CHK		ENGR	
		MFG ENGR	

MATERIAL
MODEL NO. 15-215 TJ-1
TITLE CPU IC DATA
SIZE E
DRAWING NO. 8337
SHEET NO. 1
REV. 4

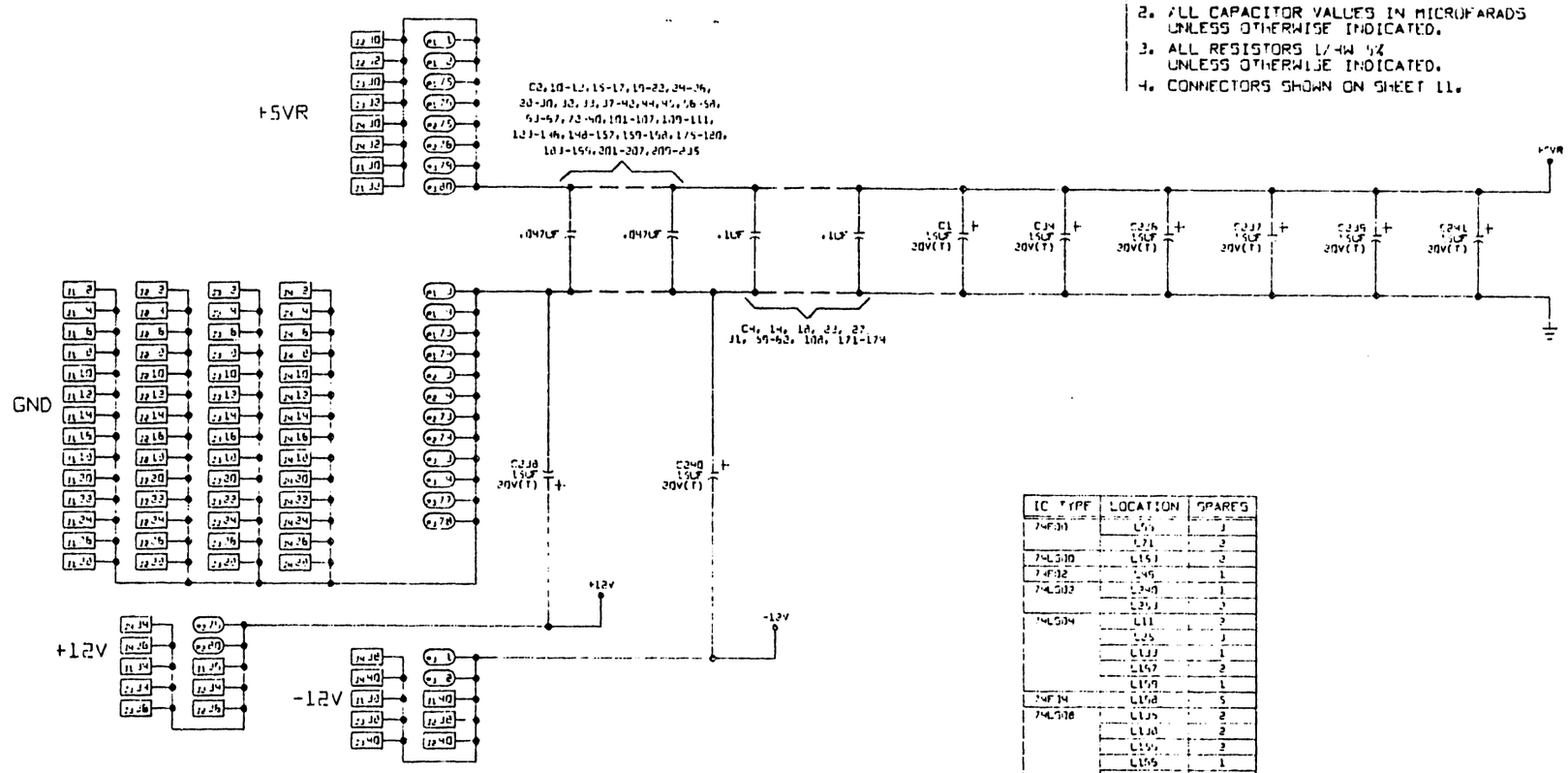
8337

MNEMONICS	COORD.
ACK	5C3
BPA1-BPA7	1G14
BPA8-BPA7	9E14
BPA8-BPA10	9C14
BPD0-BPD7	5G8
BPD8-BPD15	5H4
BPINT1-BPINT7	5D3
BUSY	9A5
CT31,CT32	8C8
CT33	8J8
CT34	8J8
CT35,CT36	8D14
CT37	8J14
CT38	8J14
DCD1,DCD2	8F7
DCD3,DCD4	8J7
DCD5,DCD6	8F14
DCD7,DCD8	8J14
DATA1-DATA8	5B3
DAV	5C6
DI10-DI15	7H7
DCB0-DCB1	7B1
DD3	9J14
DD0-DD15	5C4
DGS0-DGS4	5K14
DR10-DR14	5K3
DTB	9J14
DTTE IN	5B1
DTTE OUT	9A1
DTR1,DTR2	8D1
DTR3,DTR4	8J1
DTR5,DTR6	8D8
DTR7,DTR8	8J8
EXTXC1	1K10
EXTXC2	1K14
EXTXC3	10E17
EXTXC4	10E14
EXTXC5	1K4
EXTXC6	1K7
EXTXC7	10E4
EXTXC8	10E7
EXRXC1	1K14
EXRXC2	1K14
EXRXC3	10E10
EXRXC4	10E14
EXRXC5	1K4
EXRXC6	1K7
EXRXC7	10E4
EXRXC8	10E7
FAULT	9E7
INTT	7E14
TOSYN	9F14
TORQ	5D14
TOSY	9E14
MA0-MA21	2K1
MC80-MC82	7J1
MD3	9J14
MD0-MD15	9K4
MS30-MS33	9J14
MR10-MR15	5J3
MS80-MS81	9J14
PF	5G7
POWER OK	5F7
RESET	5E1
RT0L	8F1
RT02	8J1
RT03	9J1
RT04	9B1
RT05	8F2
RT06	8J2
RT07	9J2
RT08	8F2

MNEMONICS	COORD.
RXD1	9C3
RXD2	8C8
RXD3/RXD9	8J3
RXD5	9C14
RXC5	8D14
RXD7/RXD8	8J14
SCART	5F7
SLCT	5F7
TXD1	8D1
TXD2	8F1
TXD3/TXD9	8J1
TXD5	8F8
TXD6	8C8
TXD7/TXD8	8J8
U30-U31	5H1

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.
4. CONNECTORS SHOWN ON SHEET 11.



IC TYPE	LOCATION	SPARES
74F30	L70	1
	L71	2
74LS00	L151	2
74F02	L95	1
74LS03	L140	1
	L141	2
74LS04	L11	2
	L25	1
	L133	1
	L142	2
	L170	1
74F14	L168	5
74LS08	L135	2
	L136	2
	L139	2
	L165	1
	L176	2
	L179	1
74F20	L150	1
74F10	L47	2
74F11	L124	2
74LS11	L27	1
74F3	L29	1
	L57	1
	L127	1
	L131	1
74LS32	L35	1
	L137	1
	L143	1
74F74	L41	1
	L121	1
74LS74	L148	1
	L152	1

N

WANG	SCHEMATIC DIAGRAM
	TITLE VS-LS ASYNC DEVICE CNTRL
ASSY NUMBER VS-LS	WANG PART NUMBER 110-9155
DWN SDL CHK JS ENG TP DTP	
SCALE	SHEET OF 11
E 9355	4
SIZE	DRAWING NUMBER REV

MICROPROCESSOR

CLOCK GENERATOR

8086 DATA BUFFER

8086 ADDRESS LATCH

ADDRESS DECODING

DYNAMIC RAM ADDRESS MUX

REFRESH ROW COUNTER

DYN RAM ADDRESS DRIVER

EPROM (4KW)

DYN RAM DATA LATCH

EPROM ADDRESS BUFFER

DYNAMIC RAM TIMING

DYN RAM DATA BUFFER

WANG

E 9355 4

DYNAMIC RAM

PARITY RAM

(WANG) | E | 9355 | 4

DYN RAM CONTROL DRIVERS

DYN RAM PARITY GENERATOR

DMA RAM -/O BUS DATA BUFFER

DMA RAM ADDR DATA BUFFER

PROGRAMMABLE TIMER

PROGRAMMABLE INTERRUPT CONTROLLER

DMA RAM ADDRESS MUX

DMA RAM ADDRESS DRIVER

WANG	E	9355	4
SCALE	SHEET 5 OF 11	SIZE	DRAWING NUMBER

DMA RAM (2KW, STATIC)

DMA PARITY RAM

DMA RAM PARITY GENERATOR

DMA WORD COUNTER

BAUD RATE GENERATORS

DMA RAM - VS BUS DATA LATCH

VS MAIN MEMORY DATA BUF

VS DATA RAM DATA BUF

DMA CONTROL

VS PROCESSOR INTERRUPT REJECT

DMA MM
OR DATARAM
ADDRESS REG.

MM
ADDRESS
BUFFER

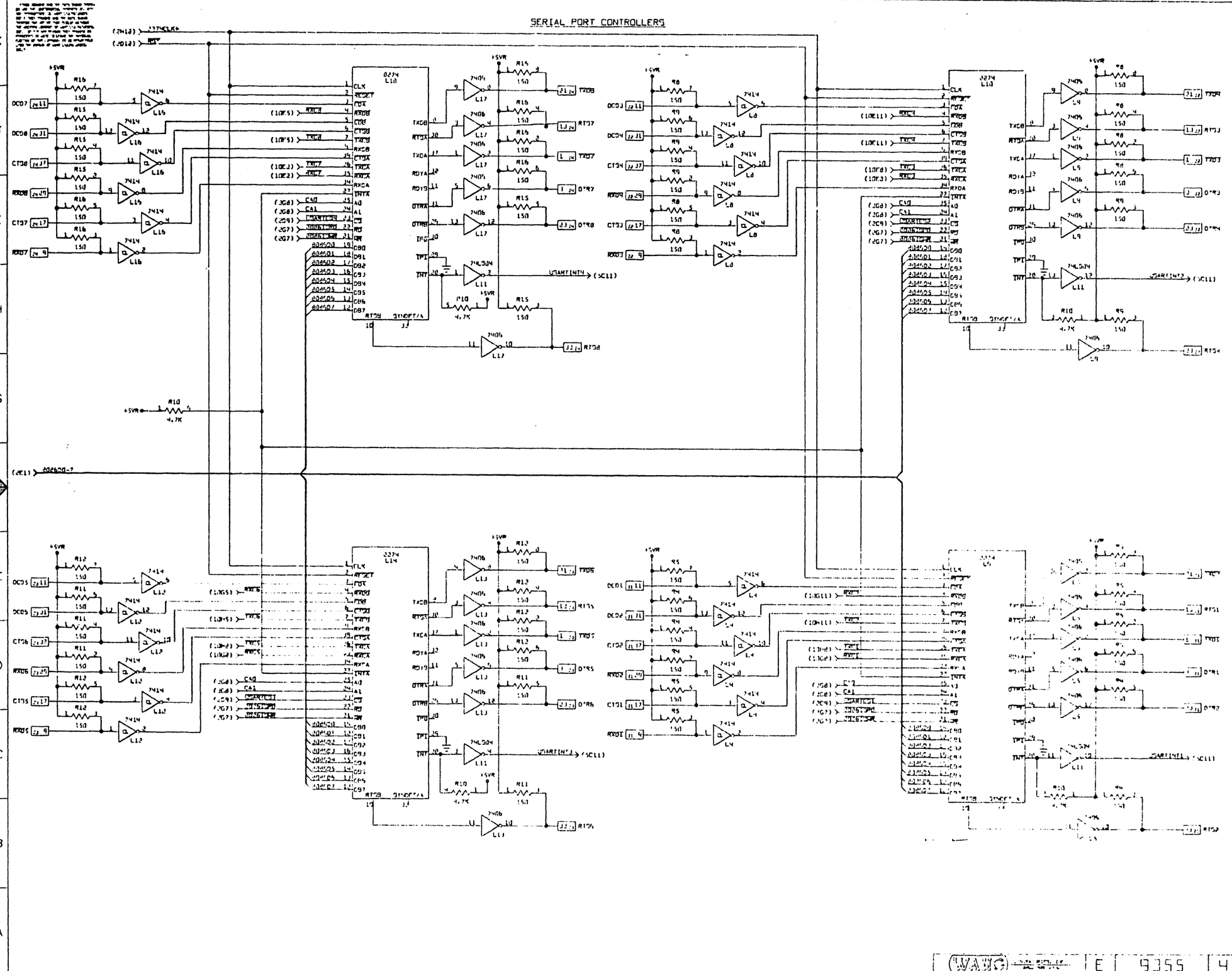
DATA RAM
ADDRESS BUF

DMA CONTROLLER
LOAD MUX

DMA DRAM
ADDRESS REG.

WANG	E	9355	4
SCALE	SHEET 7 OF 11	SIZE	DRAWING NUMBER	REV.

SERIAL PORT CONTROLLERS



BUS GRANT SELECT

BUS REQUEST SELECT

ADC TO BP SOFTWARE STATUS

BP TO ADC SOFTWARE STATUS

BP TO DMA ADDRESS DECODE

BUS PROCESSOR DATA BUS

V9 BUS PROCESSOR ADDRESS BUS

ADC TO BP HARDWARE STATUS

BOARD ADDRESS SELECT

RI/DSR SUPPORT

WANG	E	9355	4
SCALE	SHEET	SIZE	DRAWING NUMBER

14 13 12 11 10 9 8 7 6 5 4 3 2 1

K J I H G E D C B A

17" 11" 8.5" 17"

WANG	E	9355	4

17" 11" 8.5" 17"

WANG	E	9355	4

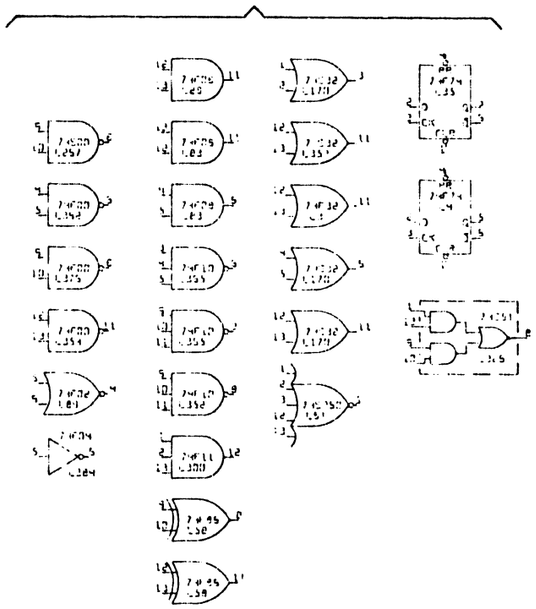
MNEMONICS	COORD
BM	14B14
CARRC	14F14
CART	14G14
CM21-CM25	14H14
CNTC	2B1
CPCS	2F.
CPCYT	2F14
CSCRS	12B14
CSTRT	2B1
CS-CLS	14J14
CLK3	12C1
CP21	2D14
CCRT	2A11
CYTCYC	12B1
FAULT	15A12
FSS	13H14
FADR-FAD7	1442
FNTF	2E4
GMD	14C14
MADR-MAD7	14G14
MAR	2C14
MAL	12E1
MA2-MA17	12F14
MA18-MA20	2F14
MCBR-MCB2	12A11
MDS	2A10
MDR0-MDR15	15E1
MDR-MDR15	11J14
MEMTP	13B14
MDSR-MDS7	2J1
MDDAR	14C14
MSDRL	14D14
MDR-MR7	14J1
MACR-MRS7	2E14
MRS1	14E1
MDR	2A11
MDL	2A11
MTS	2C1
MXR-MX15	13E1
MSMCR	14C1

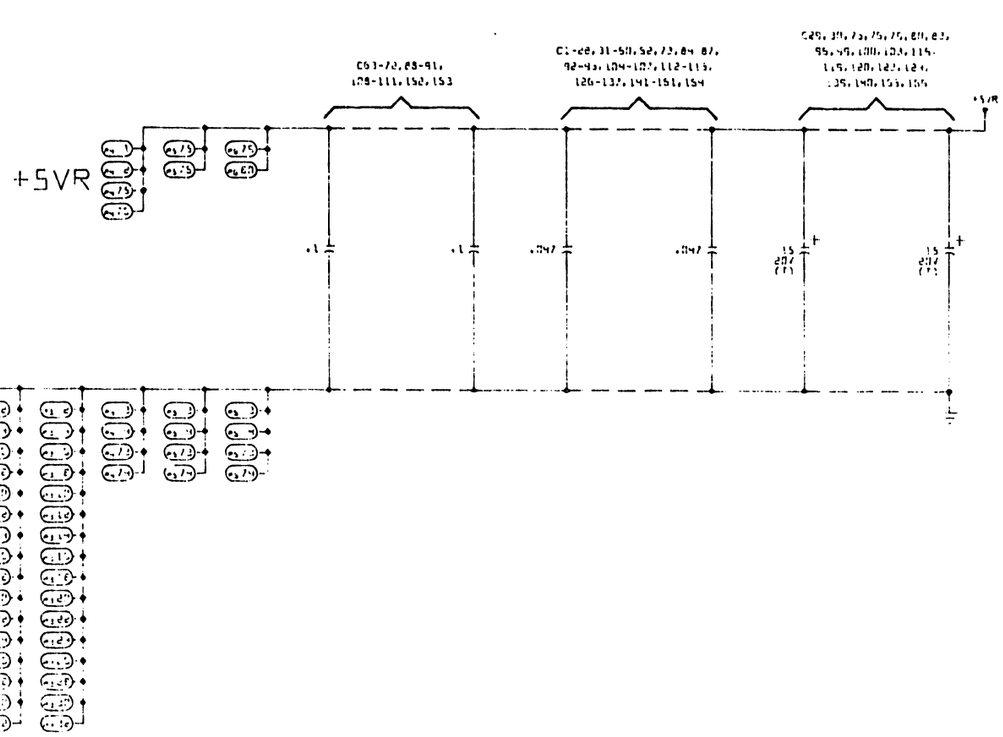
MNEMONICS	COORD
NDSC	12C14
N-CTRRM	15C14
N-MRLD	14F14
NRRCT	12B7
RC1, RC2	12G1
RCTCM	12D1
RCSTART	12H1
RNG0-RNG3	15A12
SRIR	13E14
SR0	14B14
SR17	14D14
SR24	15F14
SR26	15H14
SRRM	13E14
TRIG	14B14
WP	15A12

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



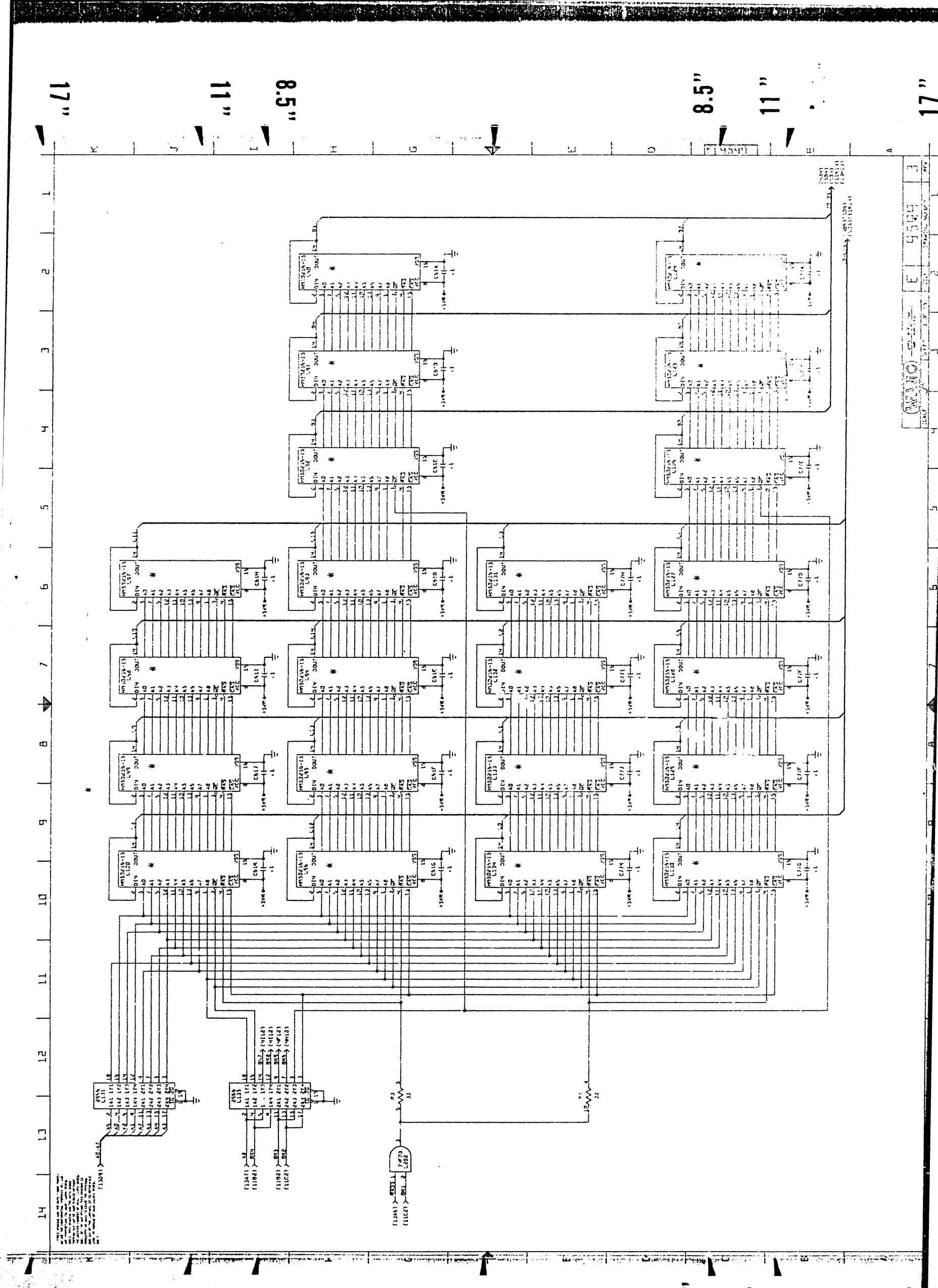


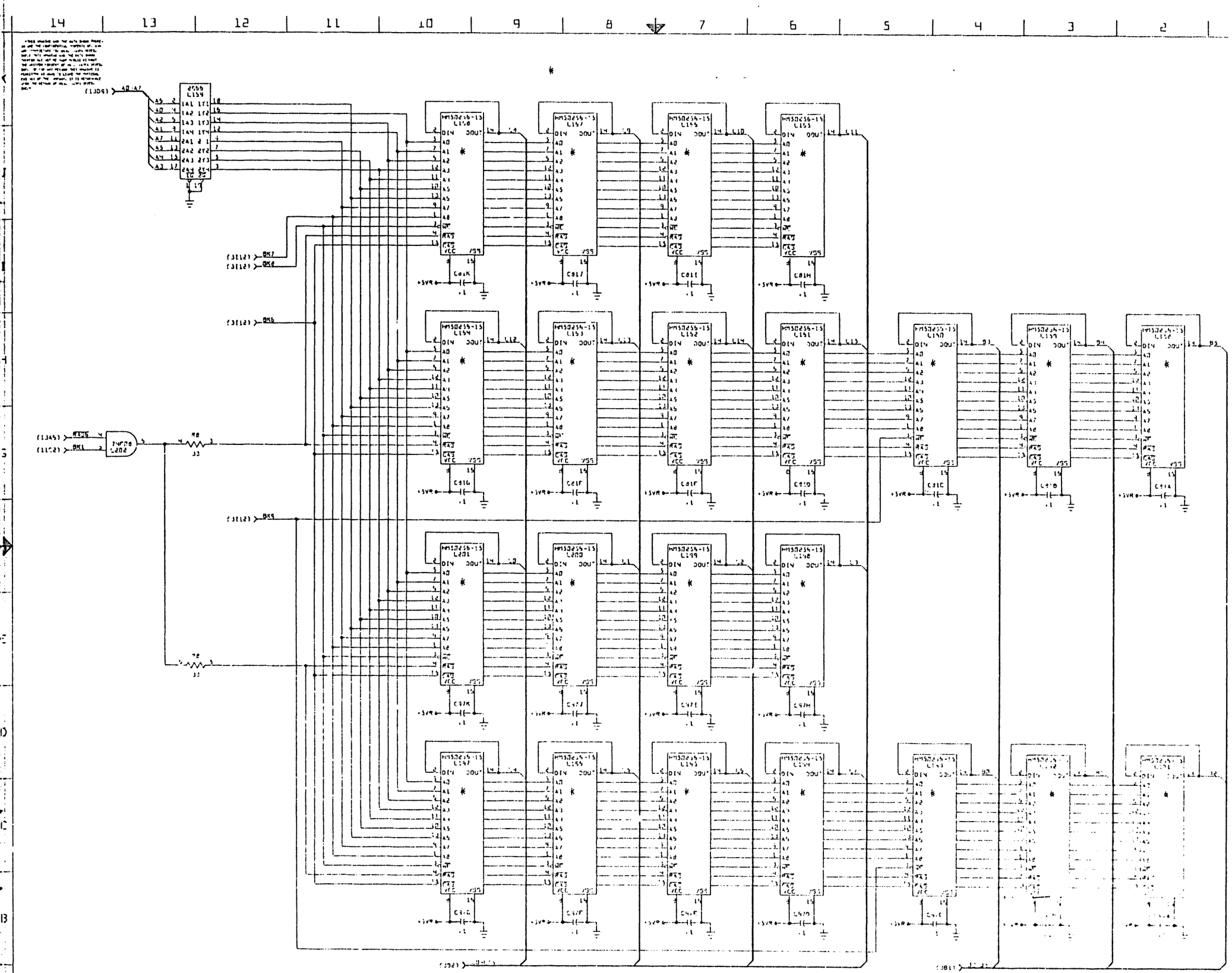
	SCHEMATIC DIAGRAM	
	V355, 735 CACHE MEMORY	
	SIZE E	9599

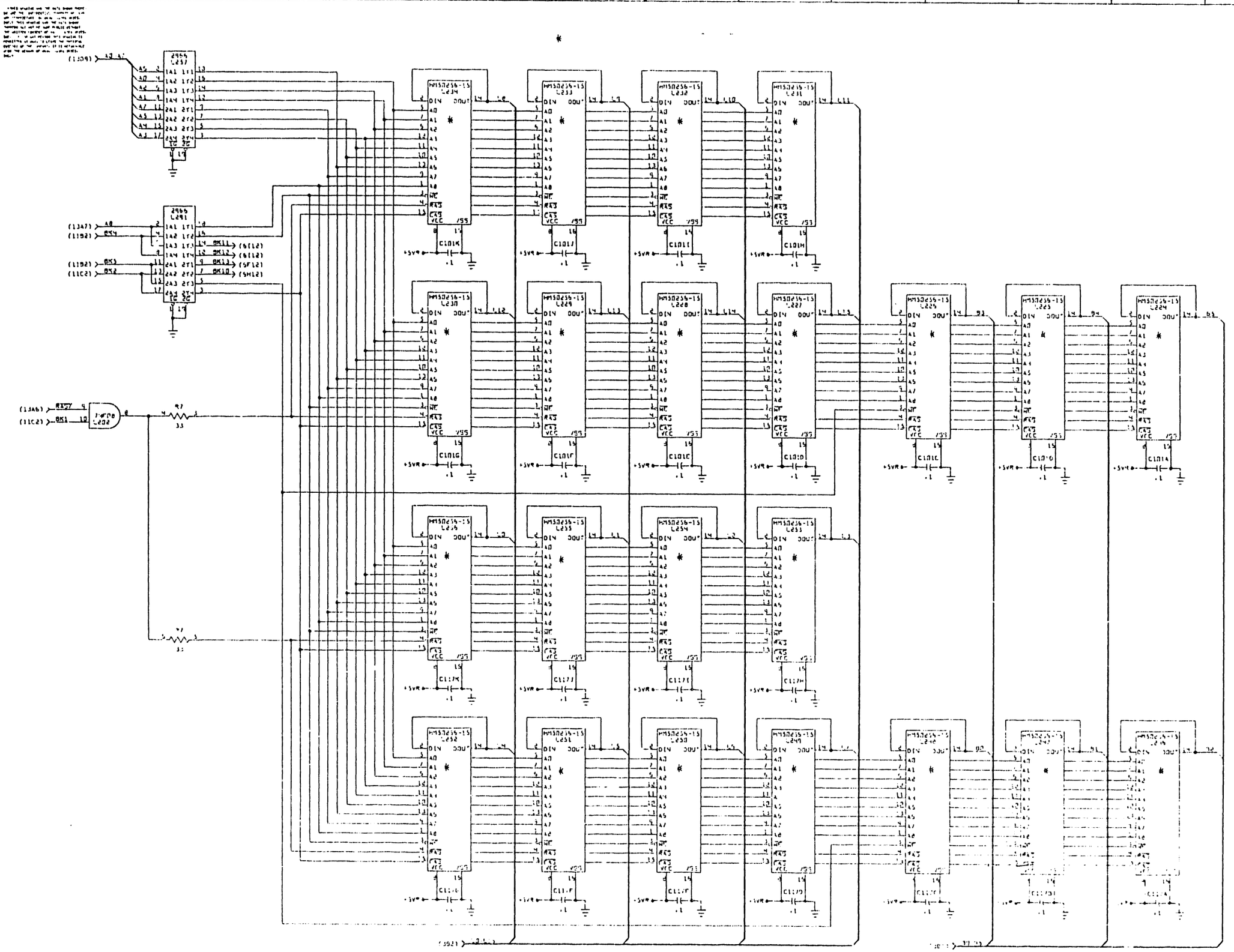
CHART A			
	1M (64K RAM'S)	2M	4M (256K RAM'S)
S1	ON	ON	OFF
S2	ON	OFF	OFF
S3	OFF	OFF	OFF
S4	OFF	OFF	OFF
JP1	BOTTOM	BOTTOM	TOP
JP2	RIGHT	LEFT	LEFT
JP3	RIGHT	LEFT	LEFT
JP4	RIGHT	LEFT	LEFT

NOTES: ON = CLOSED = 0V = SWITCH TO RIGHT
OFF = OPEN = +5V = SWITCH TO LEFT

SEE CHART "A"




A0-A7
RAS
CAS
WE
DIN
DOUT
VCC
VSS
+5VR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K
J
I
H
G
F
E
D
C
B
A
2966
L237
2966
L241
74F08
L242
R7
33
HM50256-15
L234
L233
L232
L231
L230
L229
L228
L227
L226
L225
L224
L246
L245
L244
L243
L252
L251
L250
L249
C1017K
C1017J
C1017I
C1017H
C1017G
C1017F
C1017E
C1017D
C1017C
C1017B
C1017A
C1017
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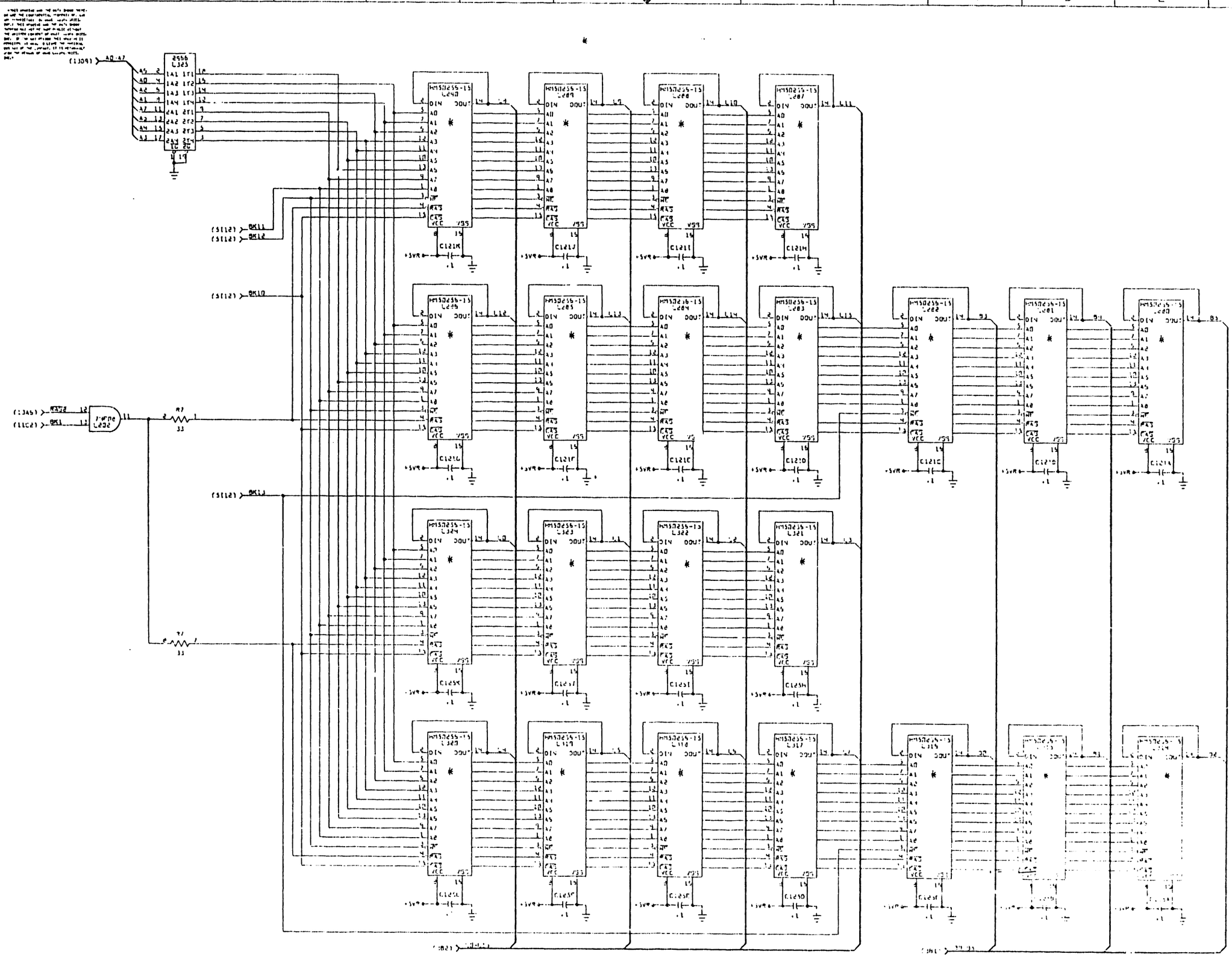
C1017
C1017
C1017
C1017
+5VR
.1


14
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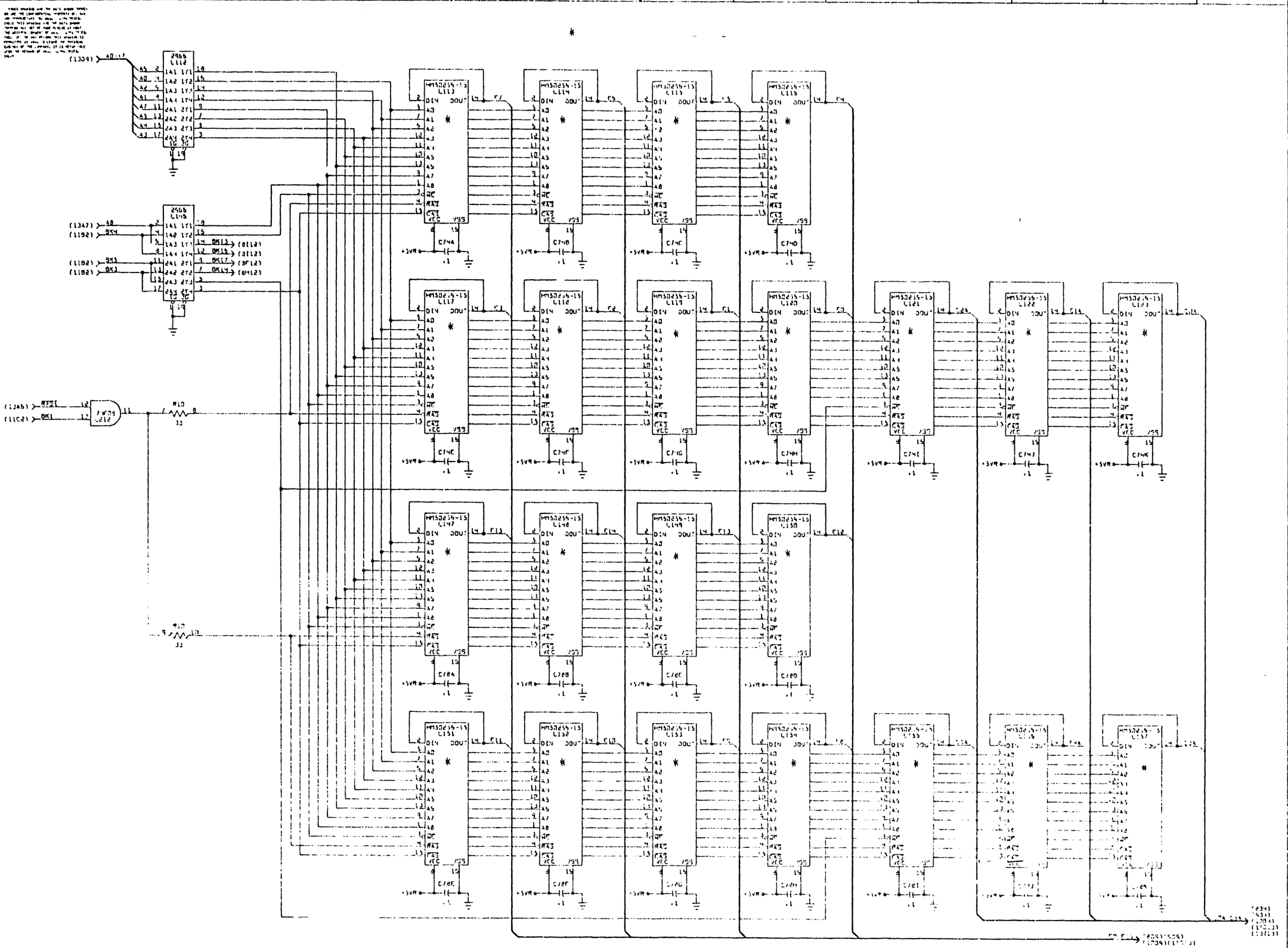
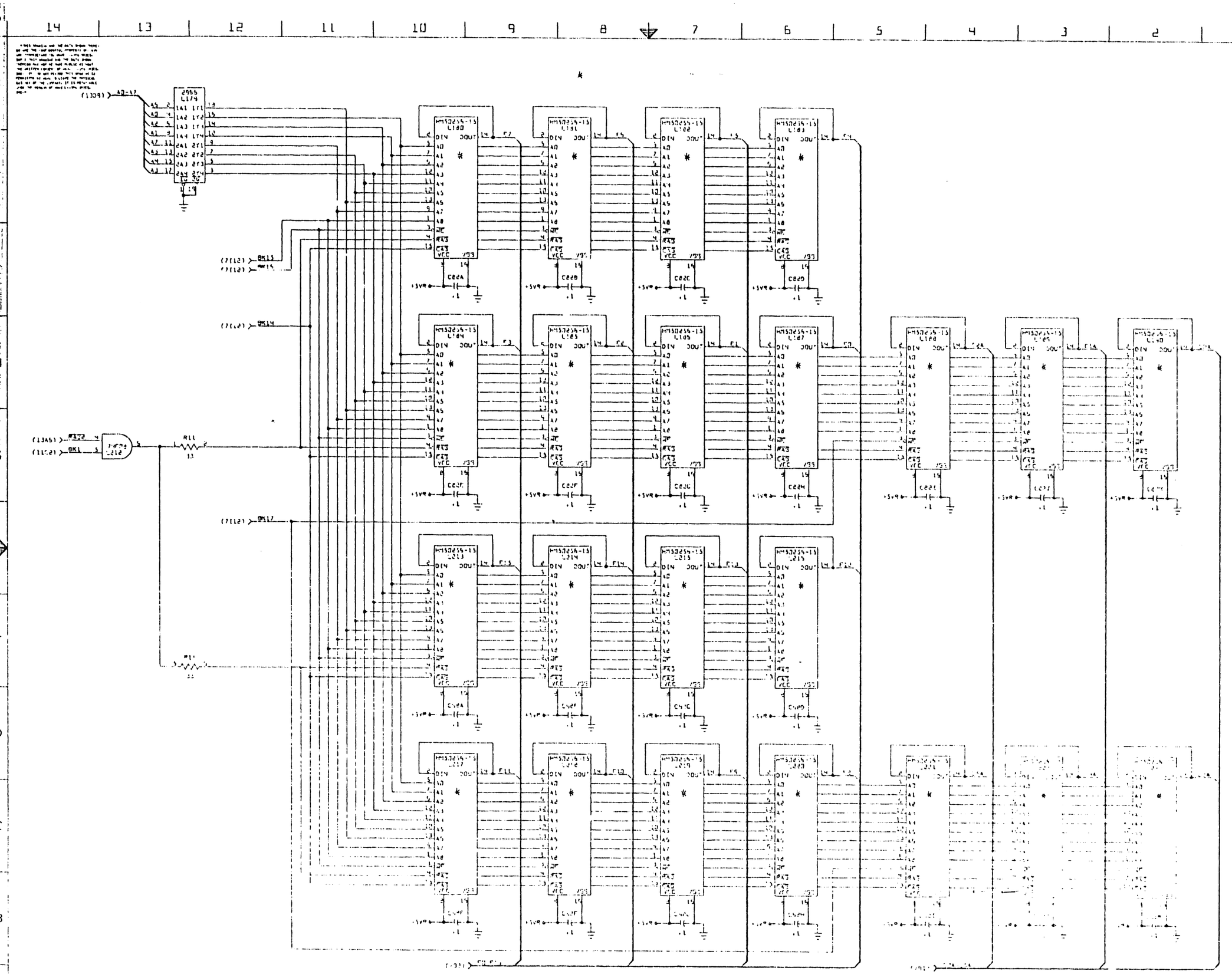
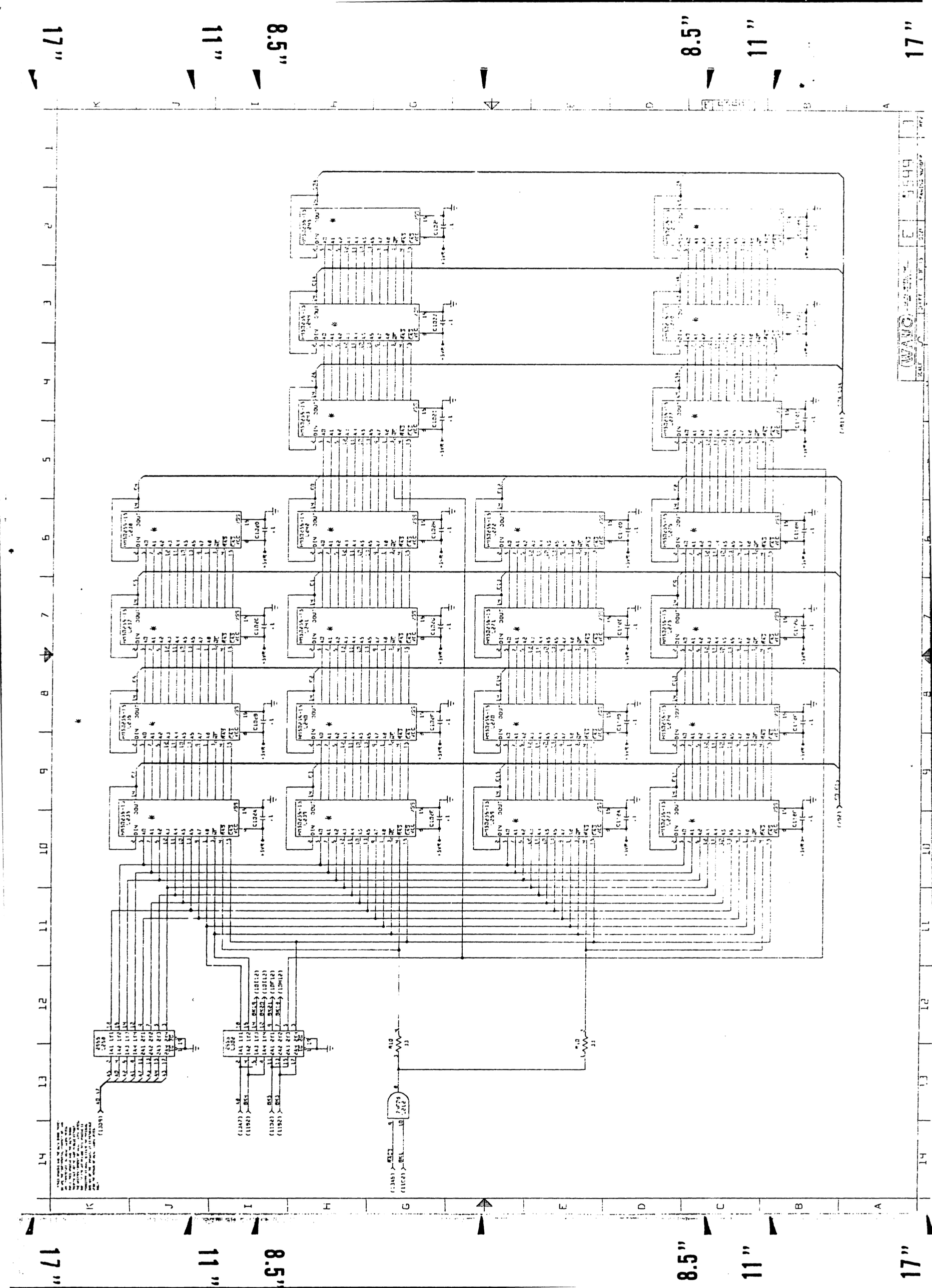
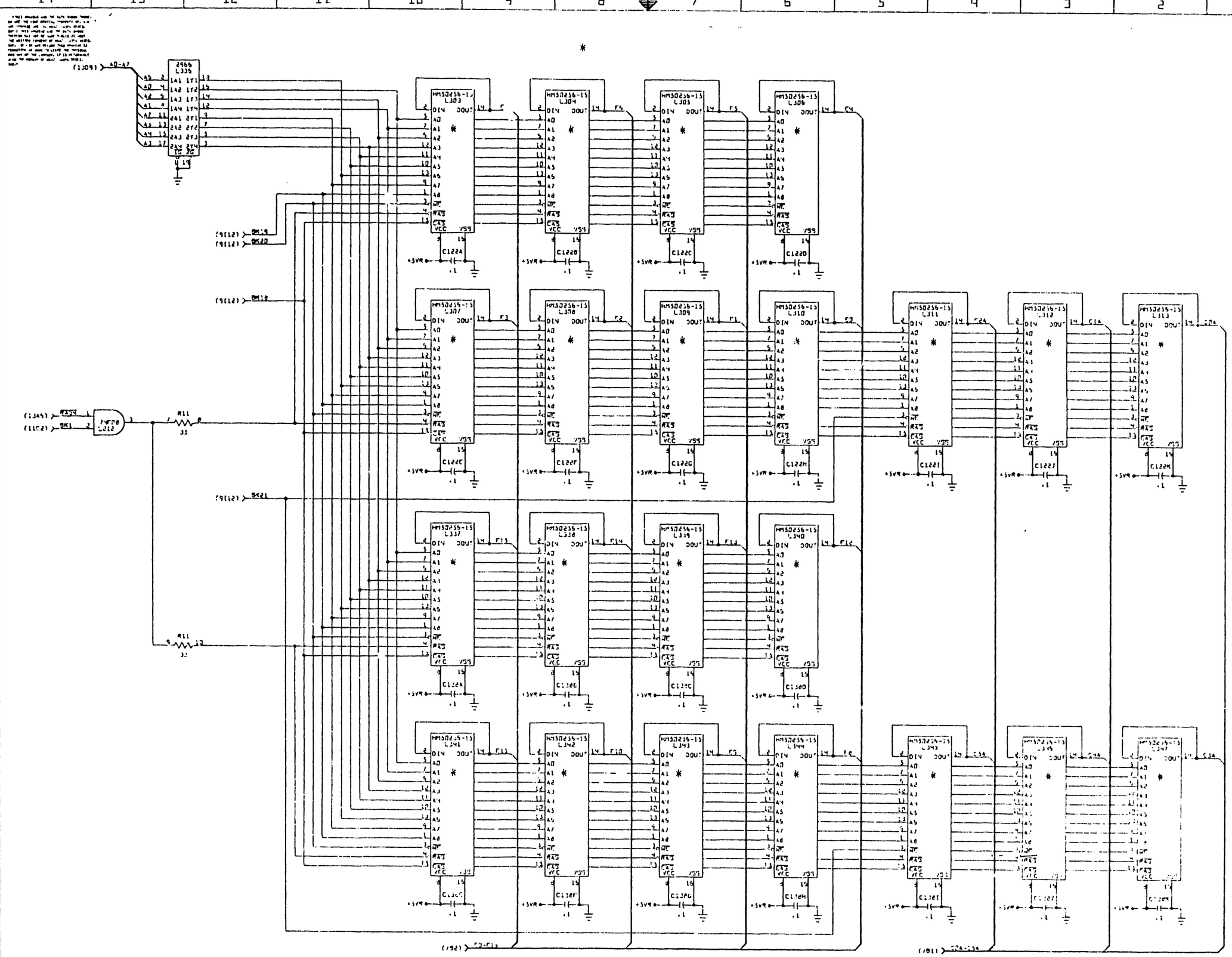
K
J
H
G
F
D
C
B
A
A0-A7
RAS
CAS
WE
DIN
DOUT
VCC
VSS
+5V
.1
33
HM50256-15



WANG	E	9599	E
SCALE	DATE 7 OF 23	SIZE	DRAWING NUMBER	REV






14
13
12
11
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9
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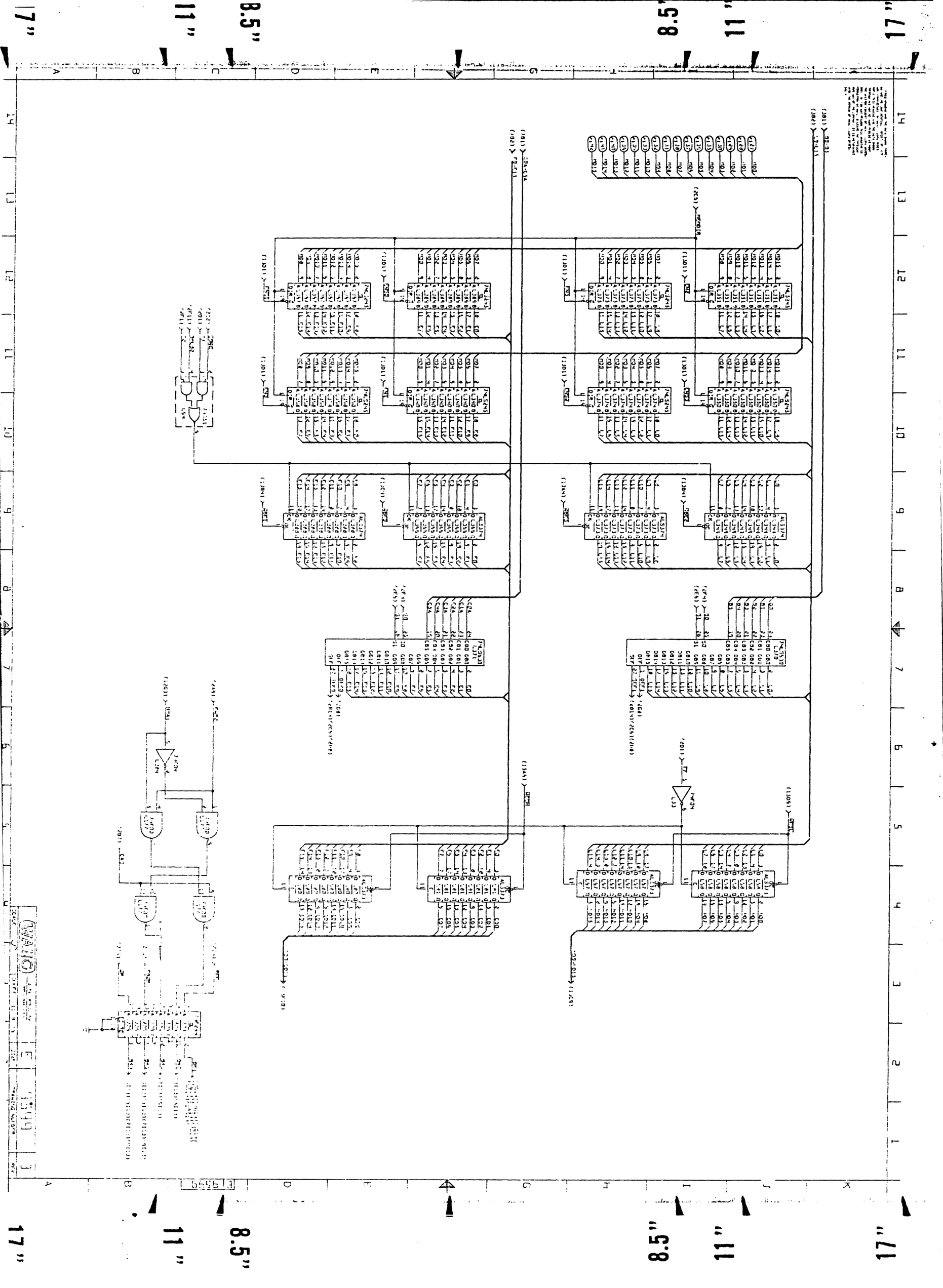
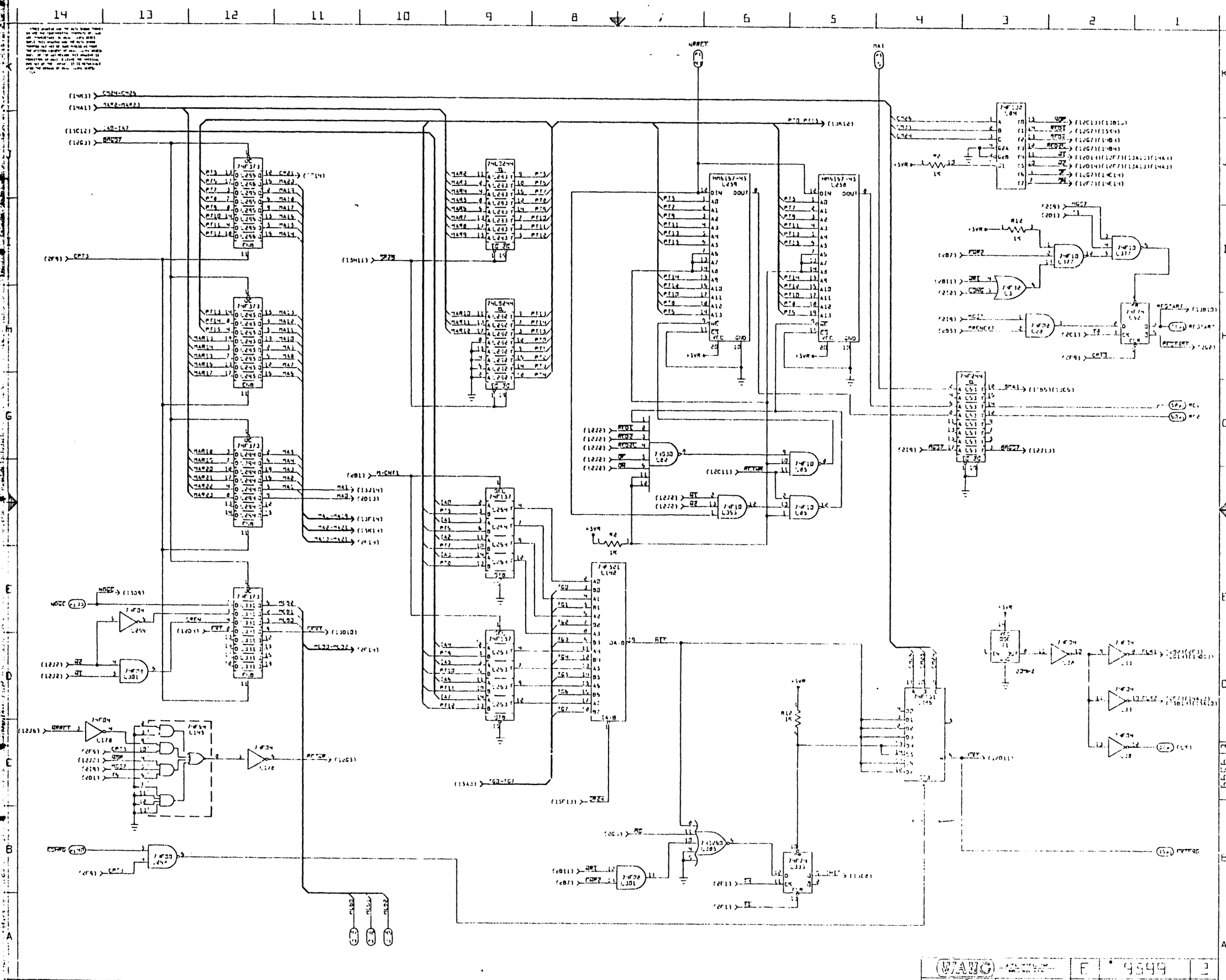
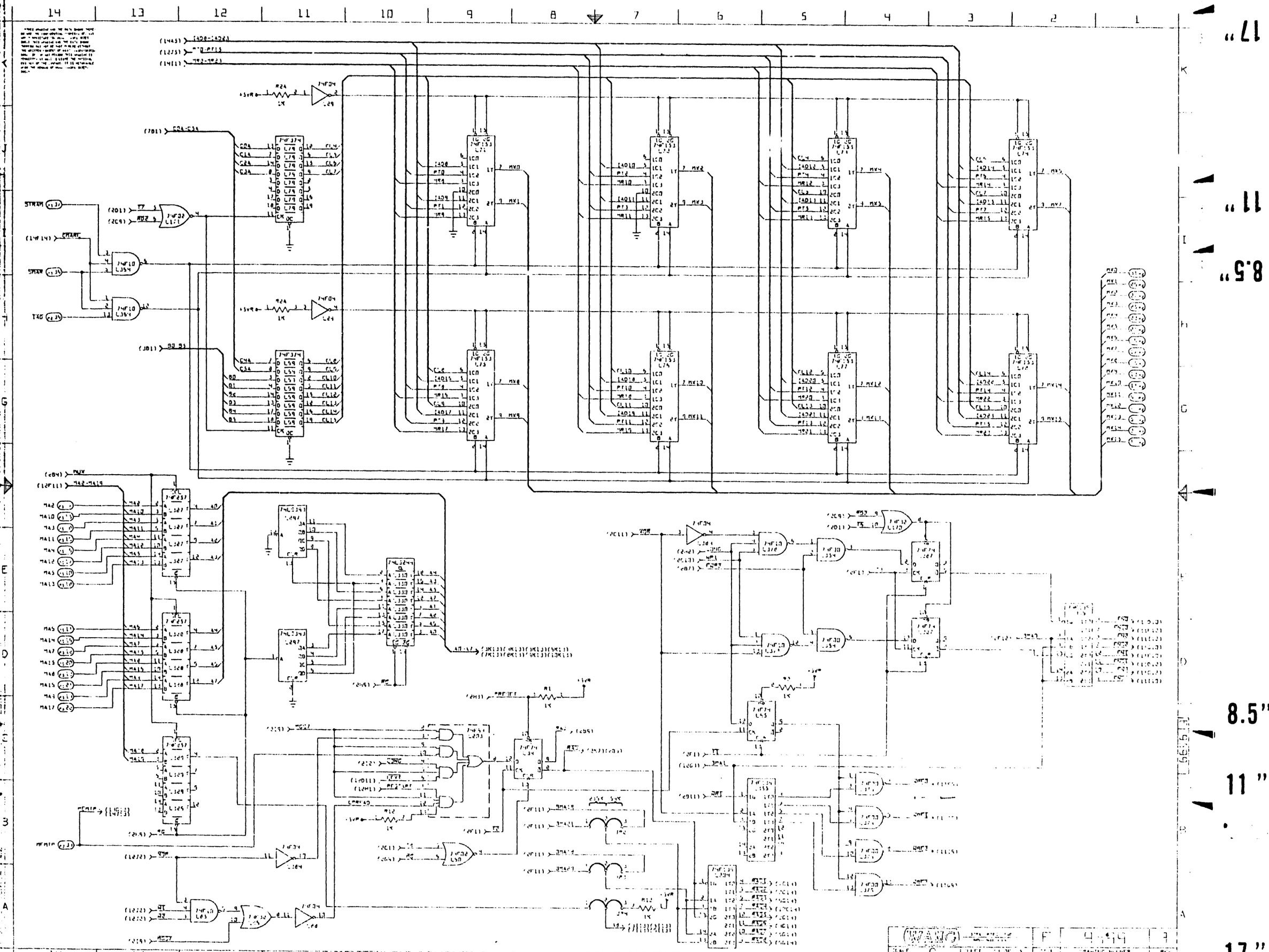
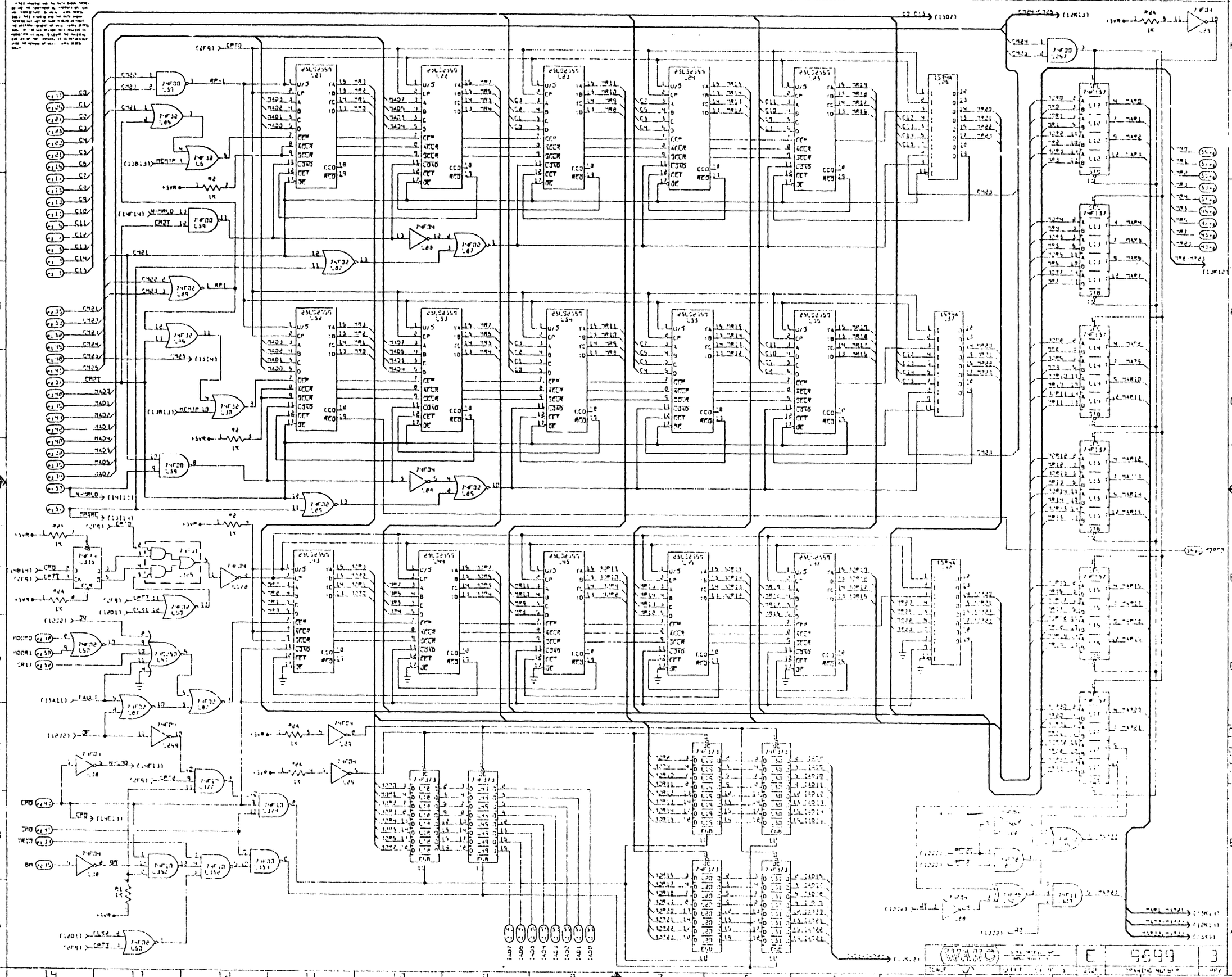
7
6
5
4
3
2
1
K
J
I
H
G
F
E
D
C
B
A
A0-A7
RAS0
RAS1
RAS2
RAS3
CAS0
CAS1
CAS2
CAS3
R11
33
+5VR
.1
C0-C15
C16-C31




WANG
F
9549
3
SHEET 12 OF 33
DRAWING NUMBER




WANG
E
5699
3

17"

11"

8.5"

14 13 12 11 10 9 8 7 6 5 4 3 2 1

K J I H G F E D C B A

8.5"

11"

17"

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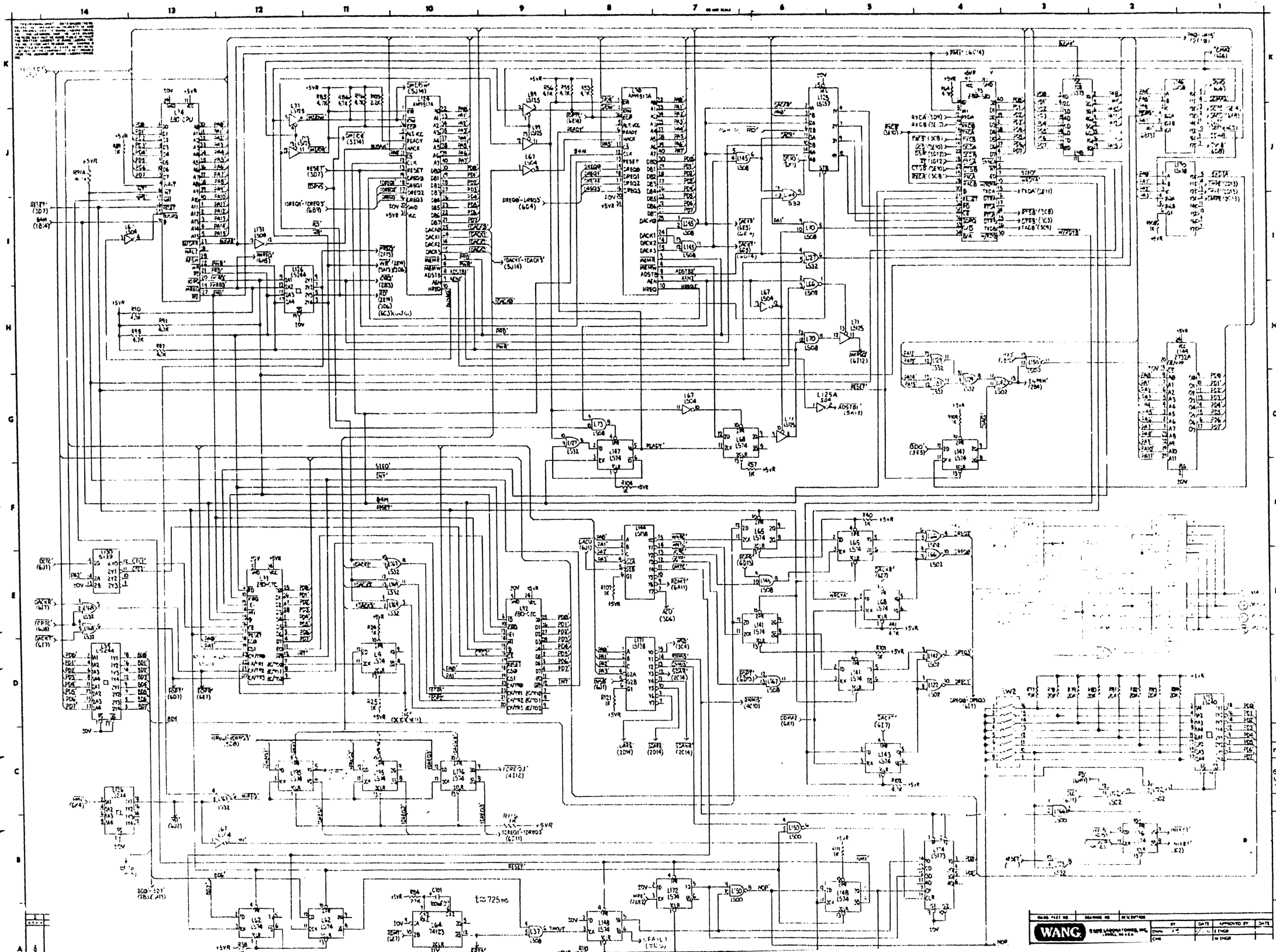
WANG LABORATORIES, INC.


L74 280-CPU
L126 AM9517A
L68 AM9517A
L72 280-PIO
L71 LS138
L125 LS157
L148 Z132A
L149 Z132A
WANG

MNEMONICS	COORD
AA	3G14
AA'	3B14
AB	3G14
AB'	3B14
AC#	3A7
ALR'	3G14
ACTIVE	3H1
ACTIVE'	3C1
BA	3G1
BA'	3B1
B(A)	3J14
B(A)'	3E14
BB	3J14
BB'	3G14
B(B)	3J14
B(B)'	3E14
BPINT1	4A5
BPINT2	4A6
BPINT4	4A5
BPINT5	4A6
BPINT7	4A6
BPINT8	4A5
BPINT9	4A6
BPINT10	4A5
BPINT11	4A5
BPINT13	4A6
BPINT14	4A5
BPINT15	4A6
BPINT16	4A5
BPINT17	4A6
CA	3G1
CA'	3B1
C(A)	3G1
C(A)'	3B1
CB	3H14
CB'	3C14
C(B)	3G1
C(B)'	3B1
CC	3H14
CC'	3B14
CD	3G1
CD'	3B1
CE	3G14
CE'	3B14
CF	3G14
CF'	3B14
CLK#0	3G1
CLK#0'	3B1
COS	3H8
COS'	3E14
CRQ	3J1
CRQ'	3E1
DA#0-DA15	4E1
DB	3E14
DB'	3D14
DCB#	5A9
DD	3J14
DD'	3D14
DD#0-DD15	5G1
DEN	4D14
DGS#0-DGS5	5E14
DIR'	3H8
DISC	3F14
DLO'	6K12
DTS'	4K12
DWR	3J1
DWR'	3E1
D#0-D#15	5B1
DSB	5B14
DWR	4D14
ESD	3K1
ESD'	3F1
F(A)	3J14
F(A)'	3E14
F(B)	3J14
F(B)'	3E14
INT0-INT5	5D1

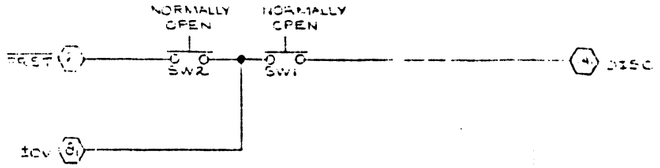
MNEMONICS	COORD
MA1-MA28	4J1
MCB2	4K1
MDD-MD15	5J1
MD5	5G14
MRA0-MRA5	5F14
MRT0-MRT5	5C1
MS0-MS1	4A3
MT#1, MT#2, MT#3, MT#4	4A7
N1-N8	3A1
N1-N8'	3F1
PA0-PA18	4C14
PD0-PD15	4J14
PND	3A7
PND'	3G14
PRD	4D14
PRST	3A8
PRST'	3F14
PWI	3A8
PWI'	3F14
PWR	3D14
R(A)	3J14
R(A)'	3E14
R(B)	3J14
R(B)'	3D14
S(A)	3E14
S(A)'	3E14
S(B)	3E14
S(B)'	3E14
SGD	3A1
SGD'	3F1
SLO - SL6	3J1
SLO - SL6	3D1
T(A)	3H1
T(A)'	3C1
T(B)	3H1
T(B)'	3C1

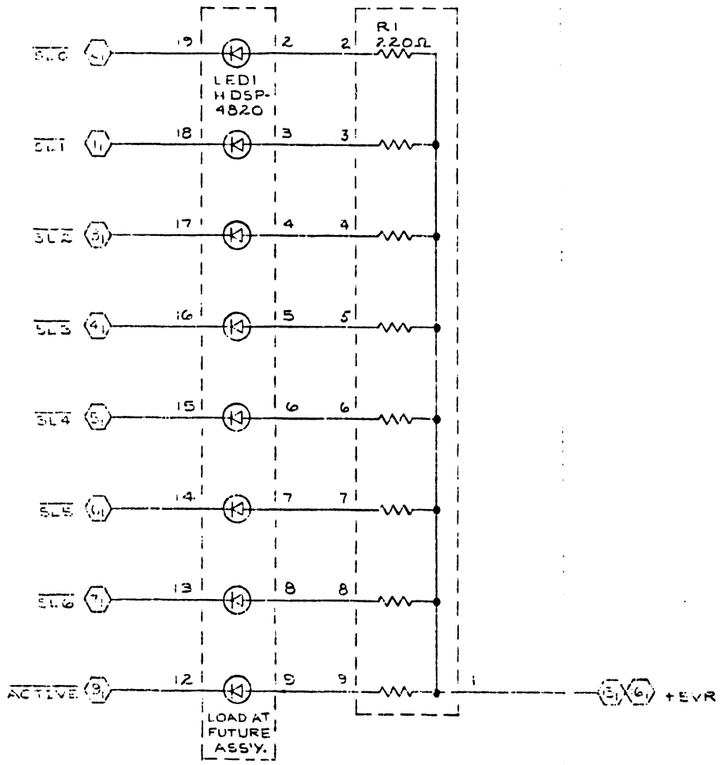
ALL 1/4W RESISTORS MUST BE 5%.

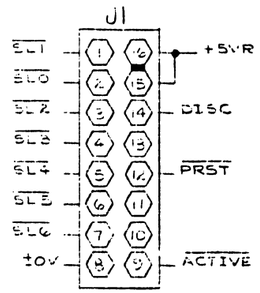
WANG LABORATORIES, INC.

BY	DATE	APPROVED BY	DATE
DWB		[illegible]	

DO NOT SCALE







COMPONENT	TYPE	W.L. PART NO
R1	220Ω SIP	335-0811
LED1	20 PIN SOC	376-2020
J1	4 PIN SOC.	376-2005
SW1,2	DIP-01-	325-2251

2.0+2.0+.370		
.218	.218	LED:
7758-0	7755	370-1069

E-REV
Ø

REVISION	BY	DATE	APPROVED
ORIGINATED PER ENG. ORD. 2/19/73		2/19/73	
CHANGED PER ECO#320450		11/6/80	
REVISED PER ECO#320450		11/6/80	

WANG LABORATORIES, INC. LOWELL, MASS. U.S.A.

BY	DATE	APPROVED BY	DATE
DWN		ENGR	
CHK		M ENGR	
		MFG ENGR	

MATERIAL

MODEL NO. SEE ENGR. SPECIFICATIONS

FINISH

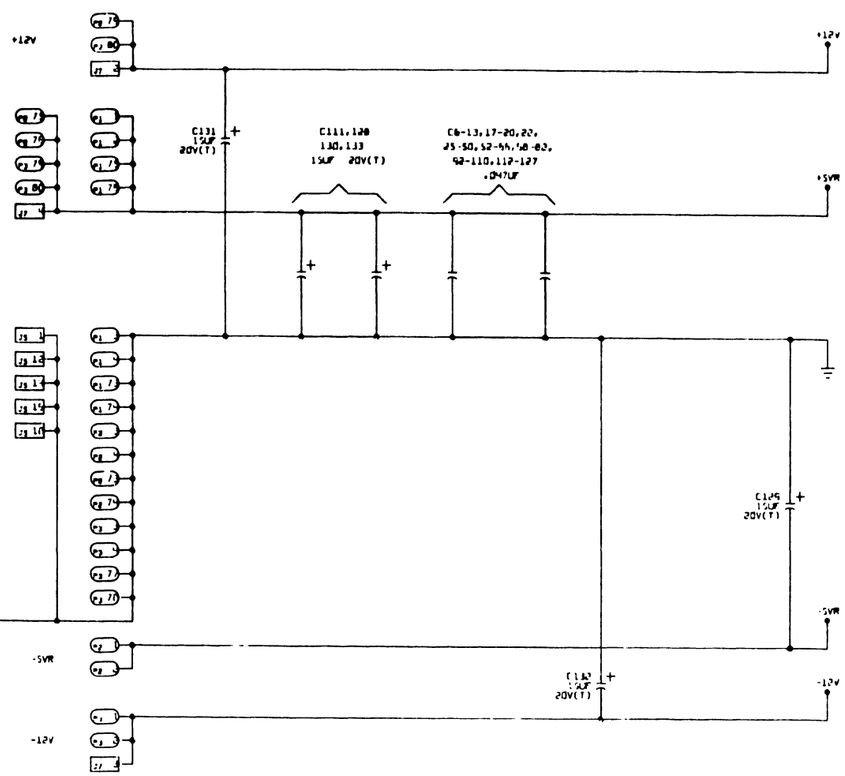
TITLE LIGHT BOARD

SIZE D

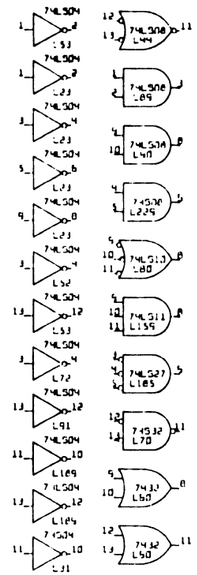
DRAWING NUMBER 7387

SHEET 2

MNEMONICS	COORD.
BCAL 6PA10	10J14
BPD0 6PD15	9J14
BPINT0-BPINT17	10G1
CH0	8K1
CH0E	8K1
CH1	8J1
CH1E	8J1
CH2	8J1
CH2E	8J1
CH3	8H1
CH3E	8H1
CH4	8H1
CH4E	8H1
+CHS0	8G1
-CHS0	8G1
+CHS1	8G1
-CHS1	8G1
+CHS2	8F1
-CHS2	8F1
+CHS3	8F1
-CHS3	8F1
+CHS4	8E1
-CHS4	8E1
+CHS5	8E1
-CHS5	8E1
+CHS6	8D1
-CHS6	8D1
+CHS7	9D1
-CHS7	8D1
CTS	8K14
CTS	8K14
DAD-DAL5	9K1
DCB0	10C1
DCB1	10C1
DCD	8J14
DCD	8J14
DDD-DD15	5C1
DDT	10F14
DDSN-DDS5	10F14
DNIN-DNIS	10C1
DSR	10F14
DTX+	8A12
DTX-	8A12
IDRW	10G14
IDRW	10G14
IODT/ R	10G14
+LPN0	8A12
+LPN0	8A12
-LPN1	8A12
+LPN1	8A12
-LPN2	8A13
+LPN2	8A13
MA0	6A7
MA1-MA21	9C1
MCB0	9A5
MCB1	9A5
MCB2	9A5
MD5	5D14
MDATA+	0C1
MDATA-	0C1
MDD-MD15	6K1
MDSN-MDS9	5F14
MDS5	5E14
MDIN-MN19	5H1
MNT5	1G1
MDB0	5D14
MDB1	5E14
MRT	0J1
RWT	0J1
RTS	0I1
RTS	0I1
RXSD	0J14
RXSN	8K14
SDATA+	0F14
SDATA-	0F14
TSXI	0I1
TSXI	0I1
TXTD	0J14
TXTD	0J14



SPARES



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.

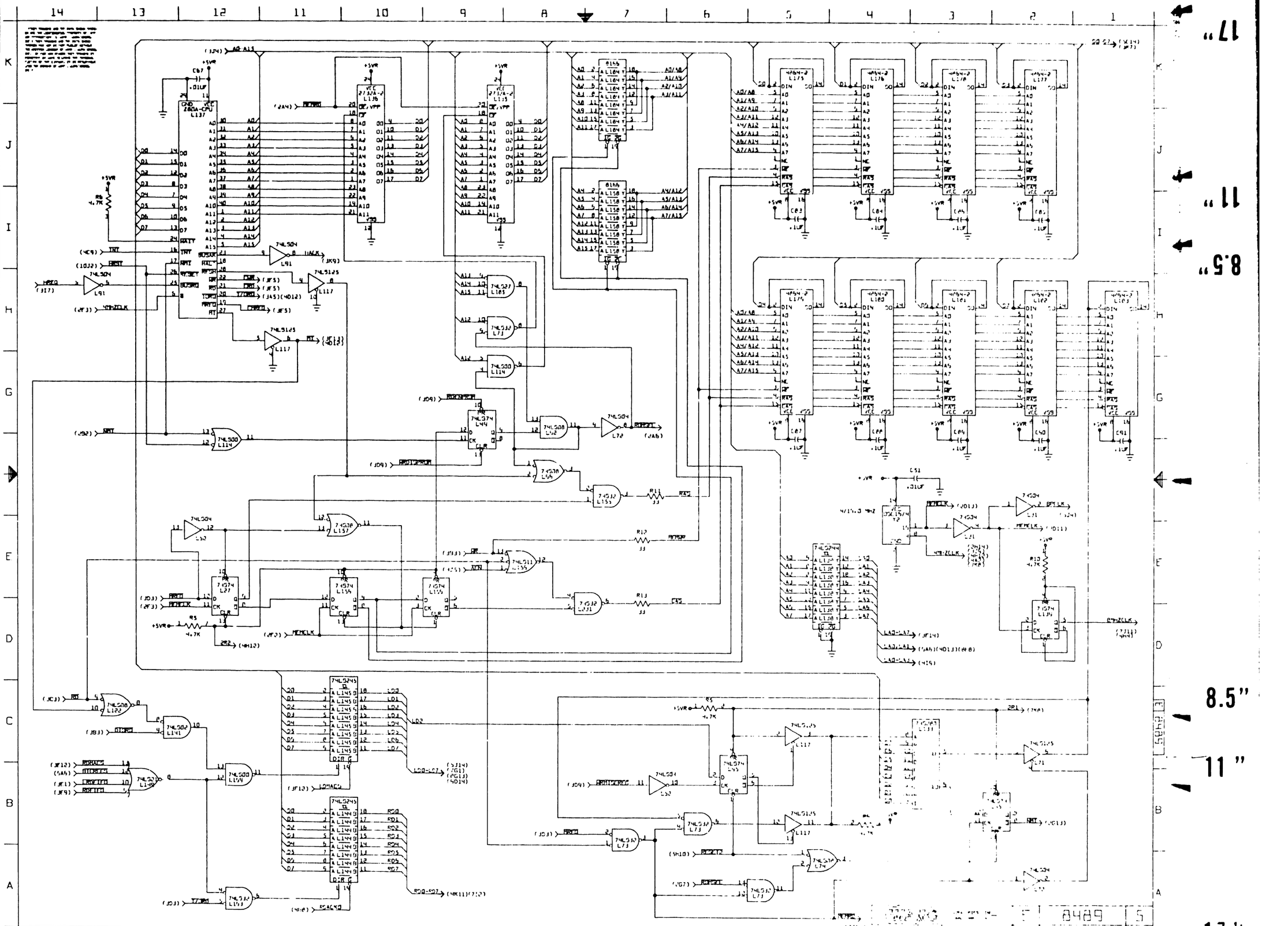
F REV 4 N

SCHEMATIC DIAGRAM

TITLE UNVRSL ISIO-W CONTROLLER M/L

E 8489 5

SCALE SCHEMATIC NUMBER REV


Z80A-CPU L137
27128A-2 L138
27128A-2 L139
74LS04 L91
74LS125 L117
74LS00 L114
74LS08 L42
74LS74 L44
74LS30 L49
74LS32 L155
74LS11 L155
74LS74 L27
74LS74 L156
74LS74 L155
74LS245 L144
74LS245 L133
74LS157 L135
74LS244 L120
74LS374 L55
74LS175 L175
74LS175 L176
74LS175 L177
74LS175 L178
74LS175 L179
74LS175 L180
74LS175 L181
74LS175 L182
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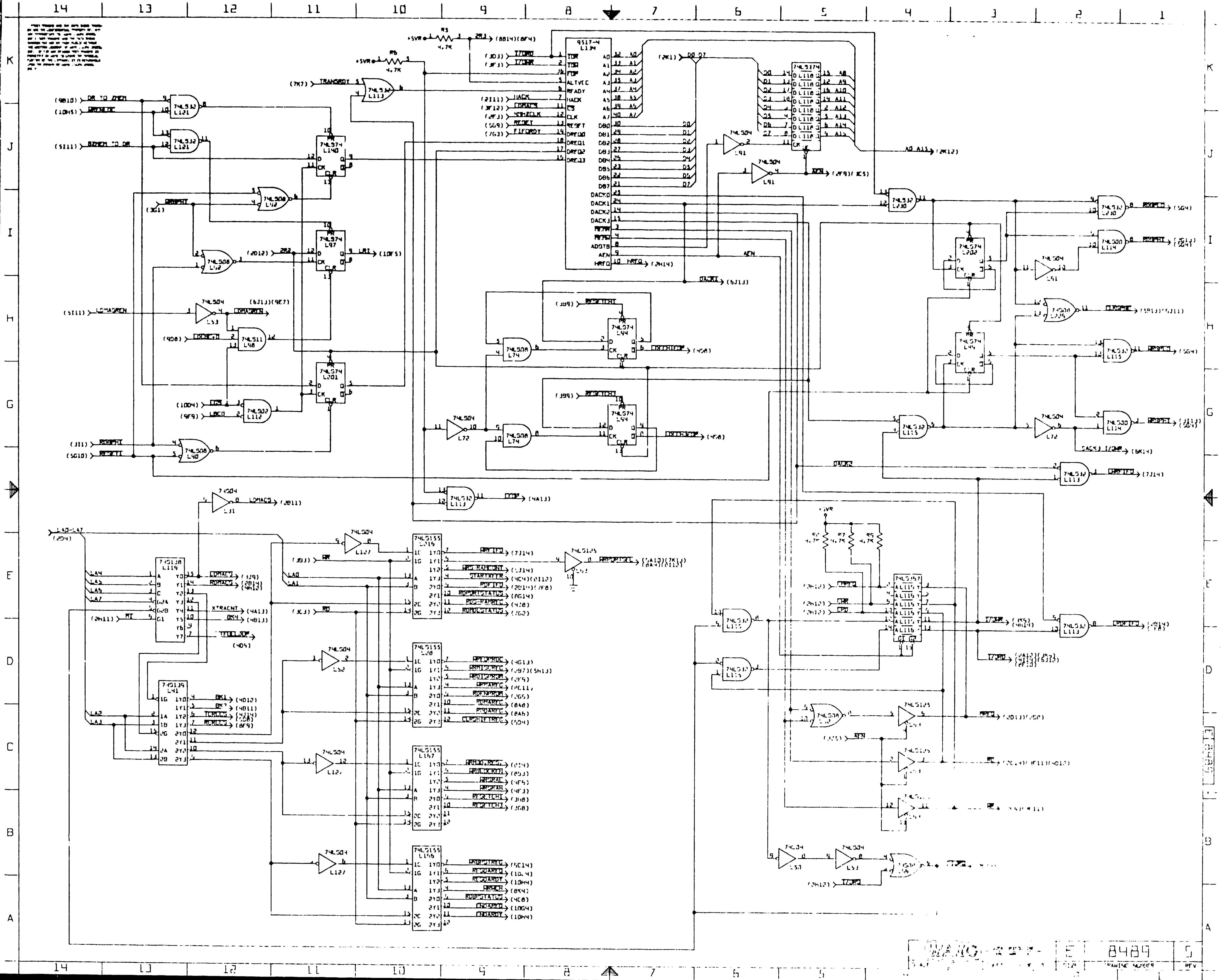
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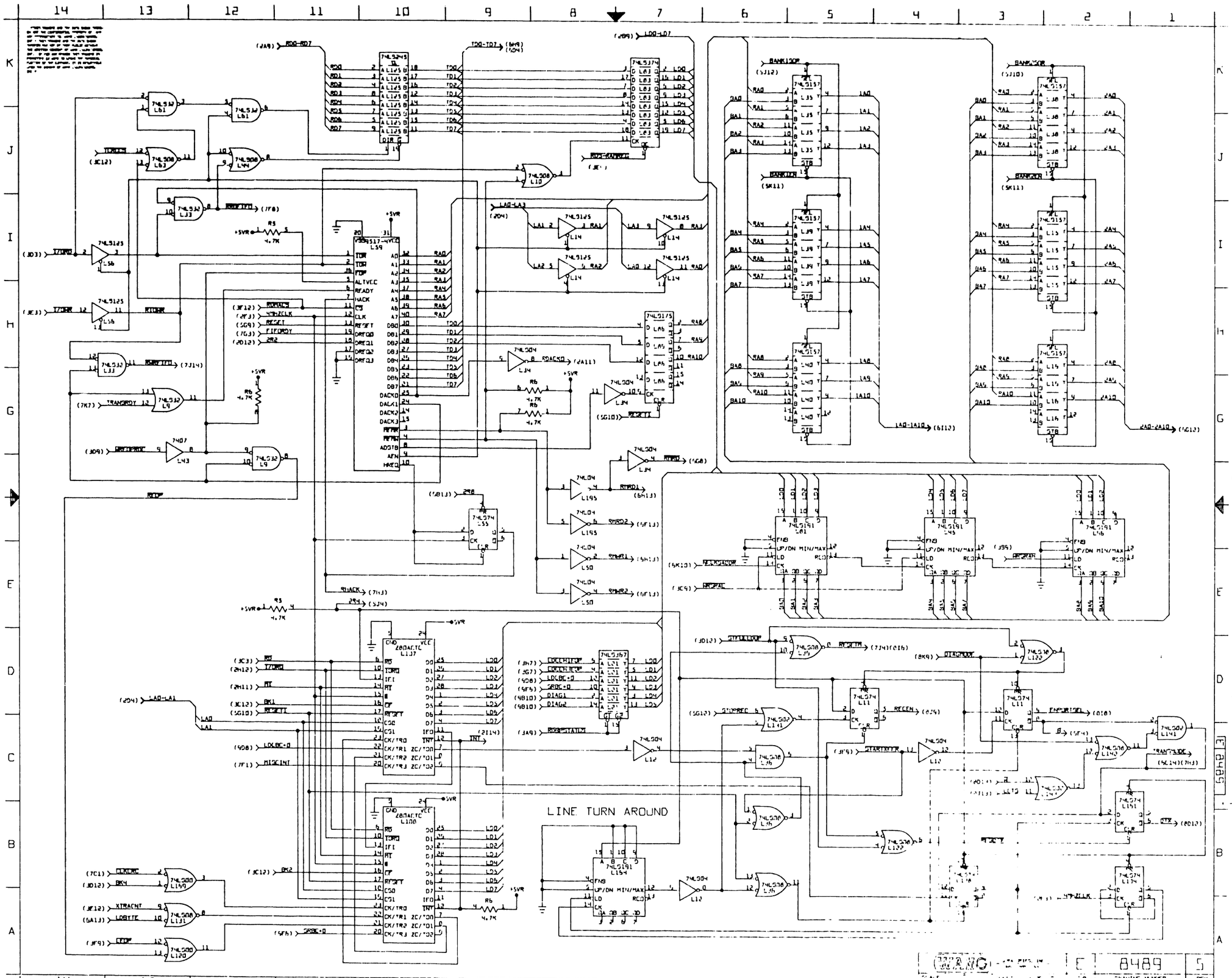
K
J
I
H
G
F
E
D
C
B
A
9517-4
L134
TOR
TOR
FOP
ALTVCC
READY
HACK
CS
CLK
RESET
DREQ0
DREQ1
DREQ2
DREQ3
A0
A1
A2
A3
A4
A5
A6
A7
DB0
DB1
DB2
DB3
DB4
DB5
DB6
DB7
DACK0
DACK1
DACK2
DACK3
AEN
ADSTB
HRFQ
74LS374
L118
A0-A15 (2K12)
D0-D7 (2K1)
AEN (2F9)(3C5)
+5VR
R5 4.7K
R6 4.7K
TRANSRDY (7K7)
74LS32
L113
L121
74LS74
L140
L97
L201
L202
L44
L94
L45
74LS08
L42
L74
L40
74LS11
L48
74LS02
L112
74LS04
L91
L53
L72
L31
L52
L127
74LS32
L230
L115
74LS00
L114
L225
74LS138
L119
74LS139
L41
74LS155
L215
L28
L157
L155
74LS157
L116
74LS125
L63
DR TO 2MEM (9B10)
2MEM TO DR (5I11)
LDMAGREN (5I11)
LOMACS (2B11)
LA0-LA7 (2D4)
LA0
LA1
LA2
LA3
LA4
LA5
LA6
LA7
XTRACNT (4A13)
BK4 (4B13)
BK1 (4D12)
BK2 (4B11)
ROMACS (2B13)(4N12)
DACK1 (5J13)
DACK2
LRI (10F5)
E
8489
5
SIZE
DRAWING NUMBER
REV
WANG

8.5"

11"

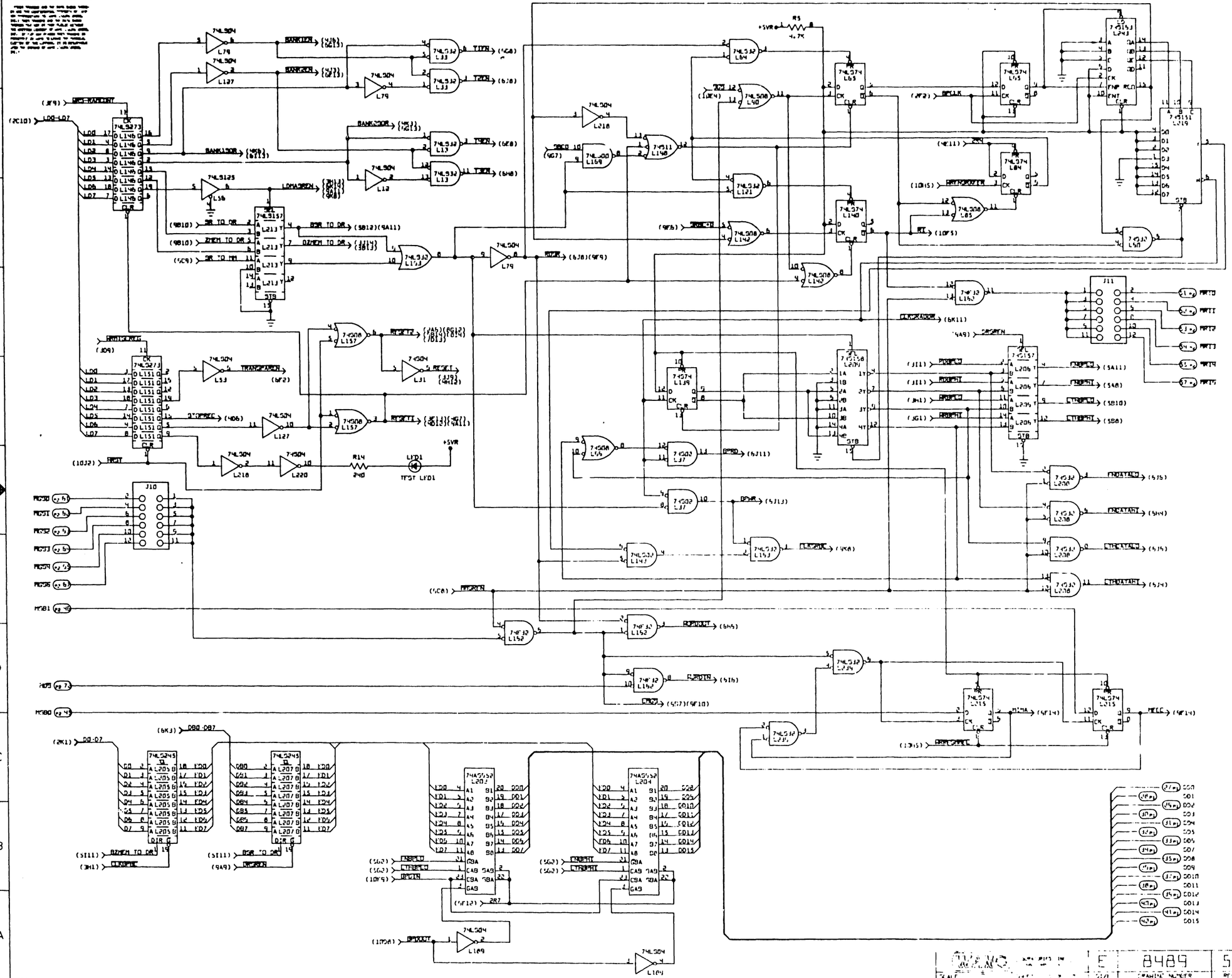
17"


LINE TURN AROUND

17"

11"

8.5"



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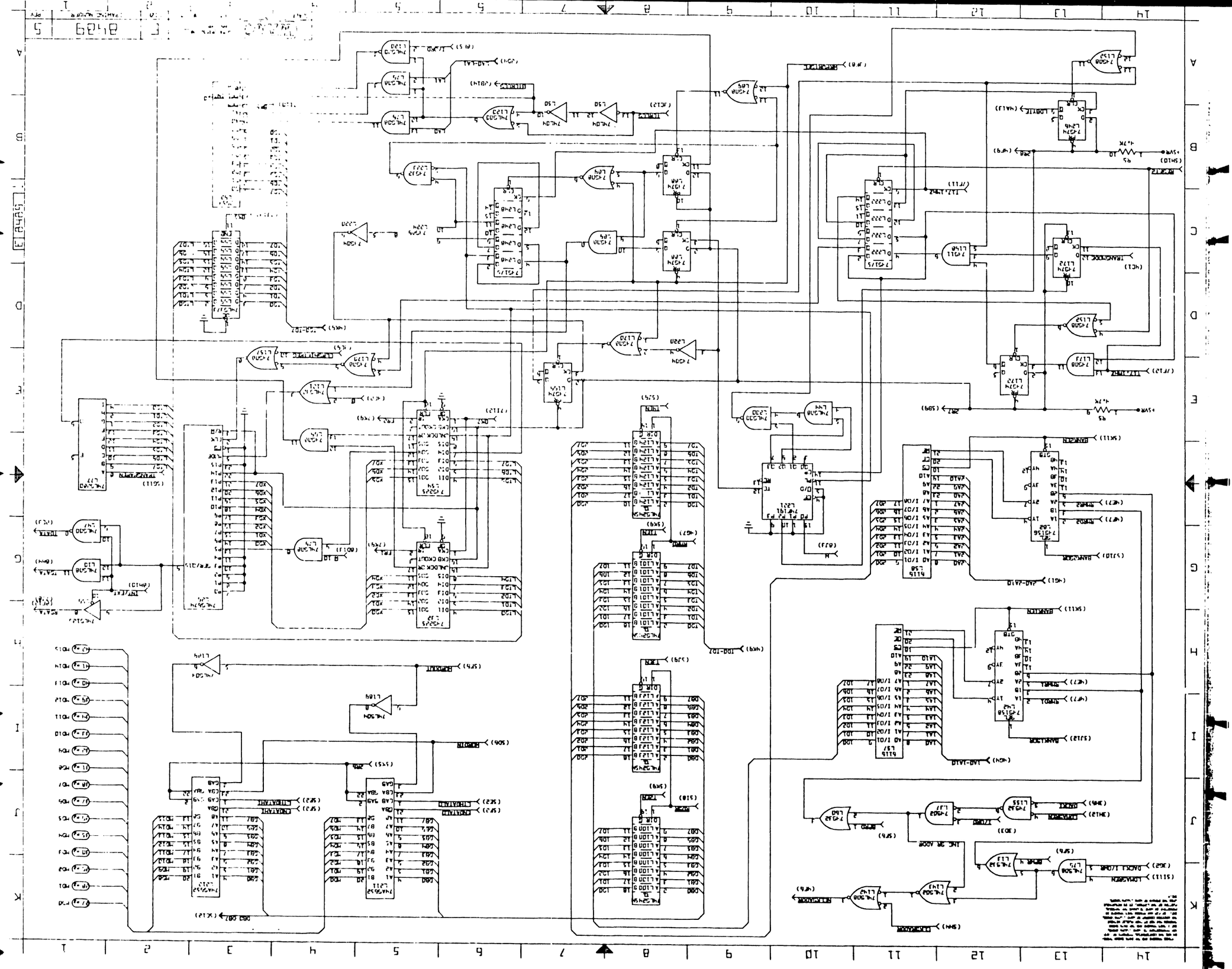

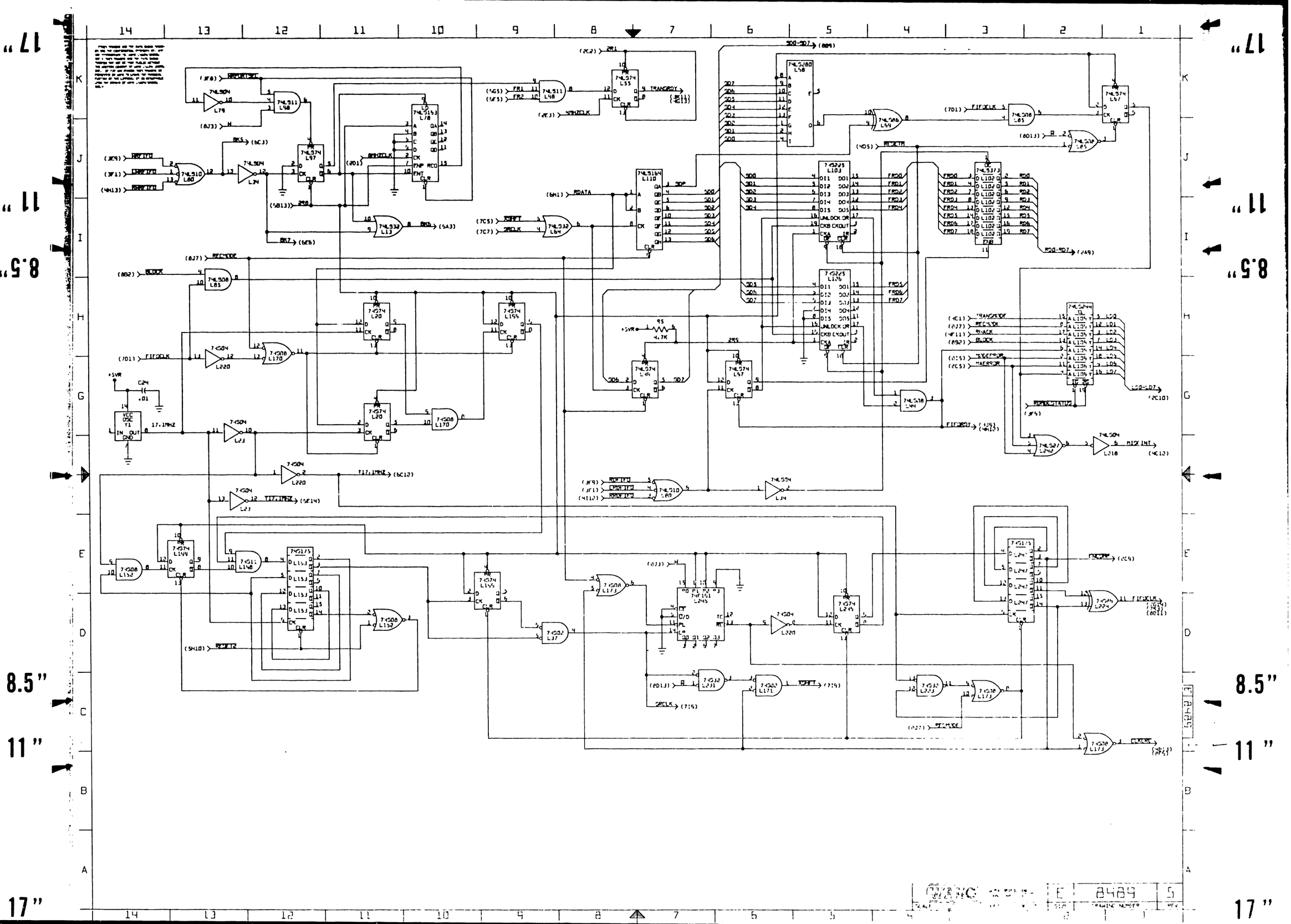
74LS260 L58
74LS374 L35
74LS153 L78
74LS164 L110
74S225 L103
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74LS374 L20
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74LS374 L57
74LS374 L49
74LS374 L96
74LS374 L245
74LS175 L153
74LS175 L247
74LS244 L134
74LS373 L102
74F161 L245
74LS91 L37
74LS32 L64
74LS32 L131
74LS32 L203
74LS27 L242
74LS11 L48
74LS11 L158
74LS10 L80
74LS04 L34
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74LS04 L23
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74LS32 L151
74LS32

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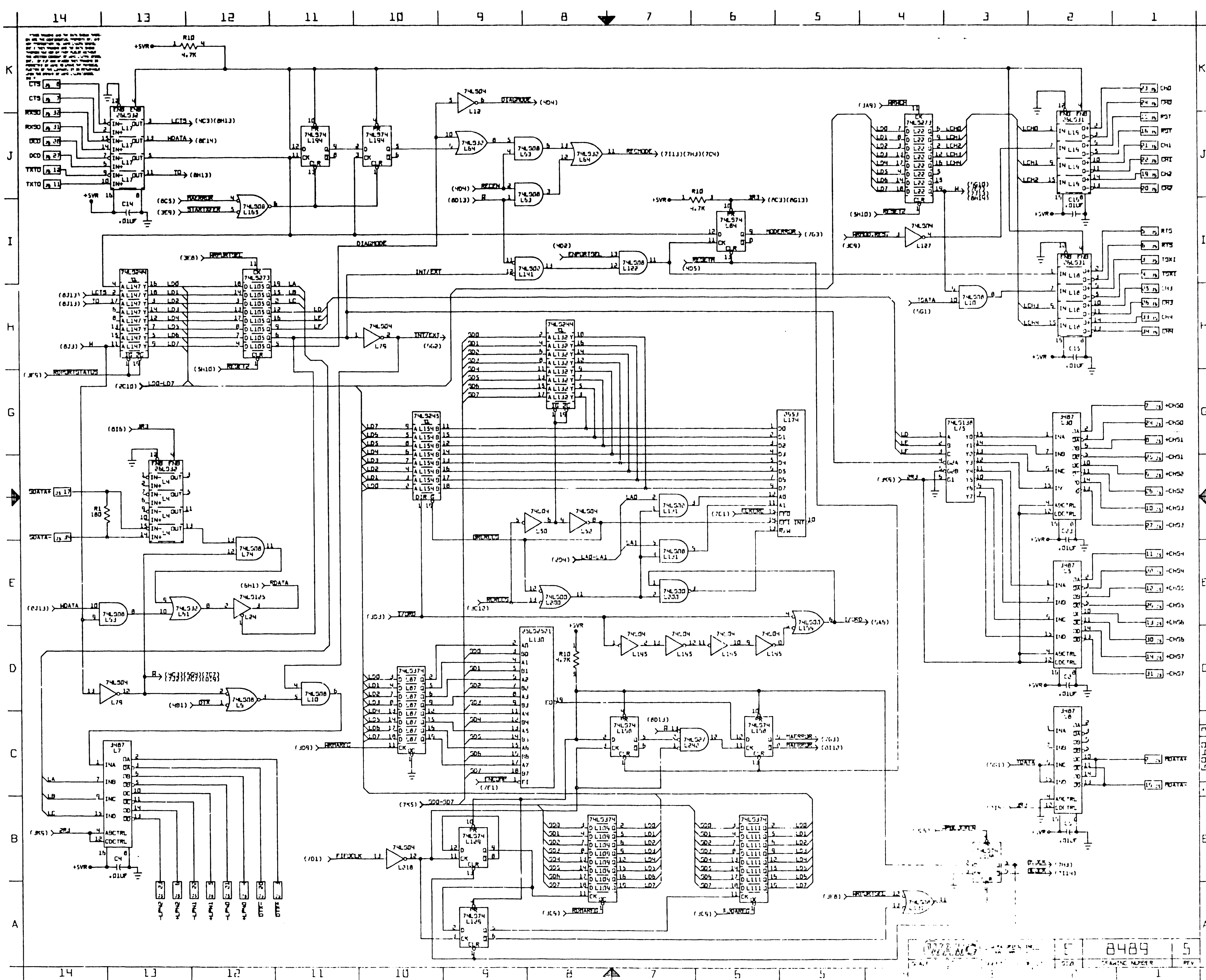

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WANG LABORATORIES, INC

ONE INDUSTRIAL AVENUE, LOWELL, MASSACHUSETTS 01851, TEL (617) 459-5000, TWX 710 343-6769, TELEX 94-7421

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END