



GRiDCASE 1550sx

Service
Manual

**GRiDCASE 1550sx
Service Manual**

June 1991

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47211 Lakeview Blvd.
Fremont, CA 94538-6599
(415) 656-4700
FAX (415) 683-9888

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Contents

ABOUT THIS BOOK

Manual Organization	ix
Related Publications	ix
Notational Conventions	x

CHAPTER 1: INTRODUCTION

Computer Description	1-1
Specifications	1-2
Physical Characteristics	1-2
Environmental Range	1-2
Power Converter	1-3
Power Sources	1-3
Bridge Battery	1-3
Microprocessors	1-3
Memory	1-3
Display	1-4
Graphics	1-4
Disk Storage	1-4
Internal Modem (optional)	1-4
MNP 2400 Baud	1-4
MNP 2400 Baud (U.K.)	1-4
US MNP/FAX	1-5
Interfaces	1-5
Keyboard	1-5
Pointing Device	1-5
Operating System	1-5
Maintenance Philosophy	1-5
Replaceable Assemblies	1-6

**CHAPTER 2:
OPERATION**

Setting up the Computer	2-1
Controls and Indicators	2-4
Contrast Control (LCD Screen Only)	2-4
Brightness Control	2-4
Isopoint Control Bar	2-4
Indicator Lights	2-5
Processor	2-5
Battery	2-6
Disk	2-6
Num Lock	2-6
Caps Lock	2-7
Scroll Lock	2-7
Keyboard	2-7
Internal Diskette Drive	2-8
Diskette Eject Button	2-8
In-Use Light	2-8
Rear Connector Panel	2-10
Operation	2-12
POST Beep Test	2-13
VGA BIOS Beep Codes	2-15

**CHAPTER 3:
TROUBLESHOOTING/TEST**

Diagnostic Test Descriptions	3-1
Test Equipment Required	3-5
DC Power Check	3-5
External Power Supply Voltage Check	3-5
DC/DC Converter Voltage Check	3-6
Running the Diagnostics	3-8
Setup	3-8
Procedures	3-9
Troubleshooting	3-10

CHAPTER 4: MAINTENANCE

Safety Instructions	4-1
Warnings	4-2
Cautions	4-3
Preventive Maintenance	4-4
Cleaning the GRiDCASE 1550sx Computer	4-4
Cleaning the Computer Display	4-4
Cleaning the Fan	4-4
Cleaning the Isopoint Mechanism	4-5
Cleaning Key Cap Slots	4-8
Bridge Battery	4-8
Miscellaneous Hardware Requirements	4-8
Tools Required	4-10
Disassembly Instructions	4-10
Preparing for Computer Disassembly	4-11
Removing the Top Cover	4-12
Preparing for Display Assembly Removal	4-13
Removing the Keyboard Bezel	4-15
Main Logic Board Locator Diagram	4-16
Removing the Display Assembly	4-18
Removing the Keyboard	4-20
Removing the Isopoint Assembly	4-21
Removing the Modem Card and Battery Case	4-22
Removing the Hard and Floppy Drive Case	4-24
Removing the Drive Case Printed Wiring Assemblies	4-26
Removing the Hard Disk and Diskette Drives	4-26
Removing the Rear Panel Casting	4-30
Removing the Rear Panel Assembly	4-32
Removing the Main Logic Board	4-34
Reassembly Instructions	4-36
Replacing Parts on the Computer Base	4-36
Installing the Main Logic Board	4-36
Installing the Rear Panel Assembly	4-37
Installing the Rear Panel Casting	4-37
Installing the Hard Disk and Diskette Drives	4-37
Installing the Drive Case Assemblies	4-37
Installing the Hard and Floppy Drive Case	4-38
Installing the Battery Case and Modem Card	4-38
Installing the Isopoint Assembly	4-38
Installing the Keyboard	4-39
Preparing to Install the Display Assembly	4-39
Installing the Keyboard Bezel	4-39
Installing the Display Assembly	4-39
Installing the Top Cover	4-40

**CHAPTER 5:
DIAGRAMS**

Schematics 5-1
 Main Logic Board Schematic 5-1
 Rear Connector Panel Schematic 5-2
 Expansion Bus Connector Schematic 5-2
 Wiring Diagrams 5-2
 Assembly Drawings 5-2

List of Figures

Figure 1-1.	Computer Dimensions	1-2
Figure 2-1.	Power Switch Off	2-1
Figure 2-2.	Computer Handle/Leg	2-2
Figure 2-3.	Connecting Power Supply Externally	2-2
Figure 2-4.	Opening Display Screen	2-3
Figure 2-5.	Computer Front View	2-5
Figure 2-6.	GRiDCASE 1550sx Keyboard	2-7
Figure 2-7.	Computer Side View	2-9
Figure 2-8.	Rear Connector Panel	2-11
Figure 2-9.	Power Switch On	2-12
Figure 3-1.	Computer Power Connections	3-6
Figure 3-2.	DC Voltage Test Points	3-7
Figure 3-3.	Diagnostic Test Setup	3-8
Figure 4-1.	Isopoint Assembly Cleaning Areas	4-5
Figure 4-2.	Isopoint Assembly Components	4-7
Figure 4-3.	Top Cover Removal	4-12
Figure 4-4.	Preparation for Display Removal	4-13
Figure 4-5.	Display Cable Access	4-14
Figure 4-6.	Removing the Keyboard Bezel	4-15
Figure 4-7.	Main Logic Board (MLB) Locator Diagram	4-17
Figure 4-8.	Removing the Left Display Assembly Cable	4-18
Figure 4-9.	Removing the Right Display Assembly Cable	4-19
Figure 4-10.	Keyboard and Isopoint Removal	4-21
Figure 4-11.	Battery Case Removal	4-23
Figure 4-12.	Drive Case Removal	4-25
Figure 4-13.	Drive Case Printed Wiring Assemblies	4-27
Figure 4-14.	Floppy Diskette Drive Removal	4-27
Figure 4-15.	Hard Disk Drive Removal	4-28
Figure 4-16.	Drive Harness Removal	4-29
Figure 4-17.	Rear Panel Casting Removal	4-31
Figure 4-18.	Rear Panel Assembly Removal	4-33
Figure 4-19.	Main Logic Board Removal	4-35
Figure 5-1.	Main Logic Board Schematic (Page 1 of 62)	5-4
Figure 5-2.	Rear Connector Panel Schematic (Page 1 of 6)	5-66
Figure 5-3.	RS-232C Loopback Fixture Wiring Diagram	5-72
Figure 5-4.	Printer Loopback Fixture Wiring Diagram	5-73
Figure 5-5.	Expansion Bus Connector Schematic	5-74

List of Tables

Table 1-1. GRiDCASE 1550sx Replaceable Assemblies	1-6
Table 2-1. POST Beep Codes	2-14
Table 3-1. Test Equipment Required for Diagnostic Tests	3-5
Table 3-2. Troubleshooting Tests	3-11
Table 4-1. Hardware Used in the 1550sx Computer	4-8
Table 4-2. Tools Required for Service	4-10
Table 5-1. Computer Assembly Drawings	5-2
Table 5-2. Main Logic Board (MLB) Schematic Coverage	5-3
Table 5-3. Rear Connector Panel Schematic Coverage	5-3

ABOUT THIS BOOK

This manual covers service information for the GRiDCASE[®] 1550sx[™] computer, including diagnostics and the procedures necessary to disassemble and reassemble the computer. Schematic diagrams and specifications for the computer are also included.

Manual Organization

This manual is organized as follows:

Chapter 1 describes the GRiDCASE 1550sx computer. It also provides technical specifications and general maintenance information, including a list of field-replaceable parts.

Chapter 2 describes operating the GRiDCASE 1550sx computer to the extent needed for testing and performing maintenance procedures.

Chapter 3 describes the diagnostics and how to use them to isolate and solve problems.

Chapter 4 describes the disassembly and reassembly of the computer to perform repairs. It also provides important safety and maintenance information.

Chapter 5 includes drawings to assist the service technician.

Related Publications

The following publications contain related information:

GRiDCASE 1550sx User's Guide (Order Number 001550-40), for information on setting up and using the GRiDCASE 1550sx computer.

GRiDCASE 1550sx Technical Reference Manual (Order Number 001550-50), for technical specifications and descriptions of the GRiDCASE 1550sx computer.

Notational Conventions

The following conventions are used to distinguish key elements of text in this manual:

bold	Used for commands, options, switches, and literal portions of syntax that must be entered exactly as shown.
<i>italics</i>	Used for file names, variables, and placeholders that represent the type of text to be entered by the user.
<code>monospace</code>	Used for sample command lines, program code and examples, and sample sessions.
keycaps	Used to identify keys or key sequences on the computer keyboard.

Occasionally, multi-key operations, such as “press **Shift-Tab**,” are described. When you see a hyphen between two keycap names, press the keys in the order in which they appear. Thus, when you read “press **Shift-Tab**,” you should press the **Shift** key and, while holding it down, press and release the **Tab** key. When you see hyphens between three keycap names, press the first two keys and, while holding them down, press and release the last key.

CHAPTER 1: INTRODUCTION

This chapter describes the computer and provides technical specifications and the maintenance philosophy.

Computer Description

The GRiDCASE 1550sx computer is a full function 12 pound (without battery) laptop computer, with an 80386sx microprocessor and optional 80387sx numeric coprocessor. The computer features an Isopoint control bar, a hard disk drive, up to 8 MB of RAM, and 8 I/O ports. The standard display is a high contrast backlit LCD, with an optional VGA gas plasma display available. Keyboard-controlled Standby switching assures maximum battery life.

Specifications

The specifications of the GRiDCASE 1550sx computer are provided in this section.

Physical Characteristics

The size parameters (height, width, and length) of the computer are illustrated in Figure 1-1.

Height (H)	2.5 in. (6.4 cm)
Width (W)	11.5 in. (29.2 cm), less projections
Length (L)	15 in. (38.1 cm)
Weight	12 lbs (5.4 kg), without battery pack
Case	Magnesium alloy

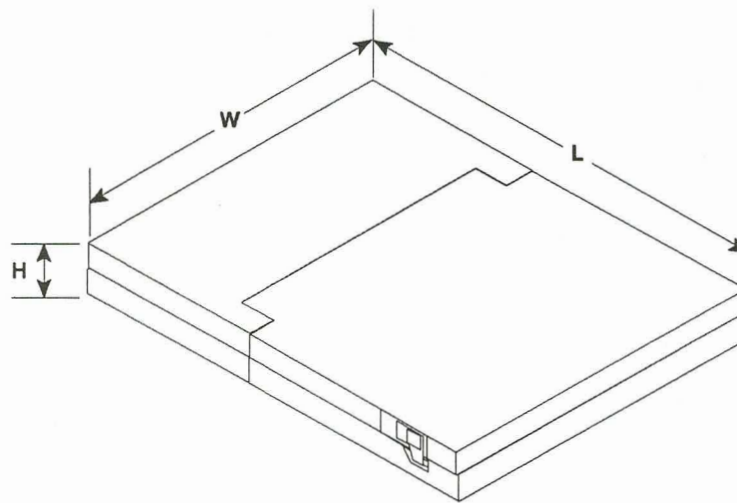


Figure 1-1. Computer Dimensions

Environmental Range

Temperature	
Operating	5° C to 40° C (41° F to 104° F)
Storage	-20° C to 60° C (-4° F to 140° F)
Humidity:	
Operating	20% to 80% relative humidity
Storage	20% to 80% noncondensing

Shock:

Operating	5g
Nonoperating	70g

Vibration

Operating	3-200 Hz @ 0.4g
Nonoperating	3-200 Hz @ 1.5g

Altitude

Operating	10,000 ft (3048m)
Nonoperating	40,000 ft (12192m)

Electrostatic discharge 15 kV maximum
(external case)

Power Converter

Internal dc/dc converter (9-18 Vdc input range)

Power Sources

100-240 Vac, 47-63 Hz, 60W
120 Vac, 400 Hz, 60W
12 Vdc, rechargeable, removable internal NiCad battery (optional)
12 Vdc, rechargeable, attachable lead acid battery (optional)
12 Vdc cigarette lighter adapter (optional)

Bridge Battery

Internal, 7.2-volt NiCad battery provides standby mode power while changing the internal or attachable battery pack

Microprocessors

80386sx CPU, 20/8 MHz
80387sx arithmetic coprocessor (optional)

Memory

2 MB RAM standard
4 MB RAM (optional)
8 MB RAM (optional)

Display

10-inch (25.4 cm) diagonal backlit LCD (standard)
640 x 480 pixel
1:1 aspect ratio
32 gray scales

10-inch (25.4 cm) diagonal, gas plasma screen (optional)
640 x 480 pixel
1.1:1 aspect ratio
7 gray scales

Graphics

PC-compatible VGA
LCD and plasma screens also support EGA, CGA, MGA, and MDA
Analog VGA (external monitor port)

Disk Storage

3.5 in. 1.44 MB high density floppy disk drive (reads, writes and formats both 1.44 MB and 720 kB diskettes)

60 MB hard disk drive

120 MB hard disk drive (optional)

Internal Modem (optional)

MNP 2400 Baud

2400 bit-per-second Hayes Smartmodem 2400 compatible; auto-dial, auto-answer; Microcom Networking Protocol (MNP) level 5 error detection, correction, and data compression support

MNP 2400 Baud (U.K.)

MNP modem for use in the United Kingdom, built to comply with the conditions set out in the General Approval granted to GRiD Computer Systems Limited.

US MNP/FAX

Built-in fax modem with MNP level 5 error detection, correction, and data compression support

Interfaces

RS-232C serial 9-pin, PC-compatible (2 ports)
Centronics 25-pin parallel, PC-compatible
GRiD Peripheral Connector, 25-pin
External video, Analog VGA output, 15-pin
External keyboard, IBM AT-compatible 5-pin DIN connector
RJ-12C 6-pin phone jack for telephone (optional)
RJ-45C 8-pin phone jack for internal modem (optional)
Expansion bus, IBM AT-compatible
External dc power

Keyboard

IBM PC-AT compatible
77 keys (101 key emulation)
12 function keys
Embedded numeric keypad
Standard typewriter size and style

Pointing Device

Built-in Isopoint control bar emulates a Microsoft bus mouse

Operating System

GRiD MS-DOS 4.01 and subsequent versions

Maintenance Philosophy

Diagnostic tests for the GRiDCASE 1550sx computer help determine whether or not problems exist. If problems are found, the manual gives instructions for identifying the applicable replaceable assembly, removing it, and replacing it.

If other parts need replacement or if replacing the parts does not remedy the problem and you are in the United States, contact the GRiD Resource Center (GRC) at 1-800-654-GRID (4743), or write to: GRiD Systems Corporation, GRiD Resource Center, P.O. Box 5003, Fremont, California 94537-5003. Outside the United States, contact your local GRiD Systems representative or distributor.

Replaceable Assemblies

Table 1-1 is a listing of the replaceable assemblies for the GRiDCASE 1550sx computer. Miscellaneous replaceable hardware that may be needed during reassembly is listed in Table 4-1.

Table 1-1. GRiDCASE 1550sx Replaceable Assemblies

Part Number	Description
250237-00	Hard Disk Drive, 60 MB
250202-00	Hard Disk Drive, 120 MB (Optional)
250201-00	3.5-inch Disk Drive
106769-00	Display Assembly, LCD
106904-00	Display Assembly, Plasma (Optional)
105687-00	Top Cover Assembly
105605-00	Keyboard Frame (Bezel)
105620-00	Rear Panel printed wiring assembly PWA
106960-00	Main Logic Board, LCD
106960-01	Main Logic Board, Plasma (Optional)
105609-00	Power Supply (Converter), dc/dc
106790-00	Power Supply, LCD Display Backlight
105571-00	Keyboard
105608-00	Isopoint Assembly
106289-00	Battery Case Assembly (w/o backplane)
104170-00	Battery Case Backplane
540140-00	Bridge Battery
107204-00	D/C Input Switch Assembly & Harness
107124-00	Locking Cable, dc/dc
100712-00	Power Cord, US
105572-00	External Power Supply, ac/dc
107373-00	Internal Modem, US MNP 2400 Baud (Optional)
107422-00	Internal Modem, US MNP/FAX (Optional)
105542-00	Internal Modem, UK MNP 2400 Baud (Optional)
250042-00	Power Cord, UK
280861-00	Isopoint Bezel
Model 32153	Internal Battery
Model 32162	External Attachable Battery

CHAPTER 2: OPERATION

This chapter describes the operation of the GRiDCASE 1550sx computer to the extent needed for testing and performing maintenance procedures. Refer to the *GRiDCASE 1550sx User's Guide* for additional information on operating the computer.

Setting up the Computer

The 1550sx computer has four power options. These are the internal/external power supply (Model 34173), the internal battery pack (Model 32153), the external attachable battery pack (Model 32162), and the cigarette lighter adapter cable (Model 32134). The internal/external power supply will be used when servicing the computer. If any of the other power sources are used, refer to the *GRiDCASE 1550sx User's Guide* for connection information.

To connect the internal/external computer power supply and prepare the computer for use, perform these steps:

1. **Check that the computer power switch is off.** The power switch is on the back of the computer (see Figure 2-1). Press the bottom of this switch to set it to the off position.

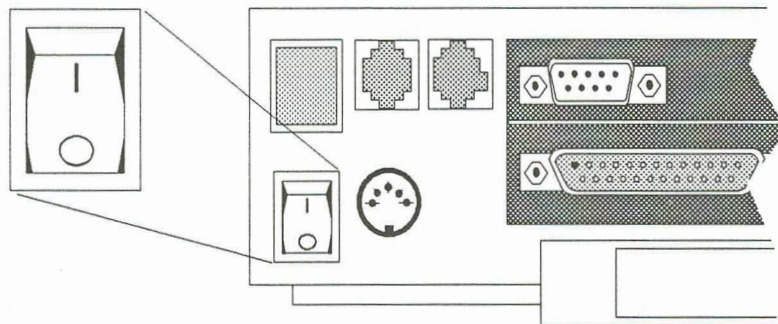


Figure 2-1. Power Switch Off

2. **Unfold the handle/leg on the computer (optional).** When the leg is in the down position (see Figure 2-2), the viewing angle and the typing position are improved. Pivot the handle down 90° to act as a leg. Make certain the handle extension is compressed into the legs.

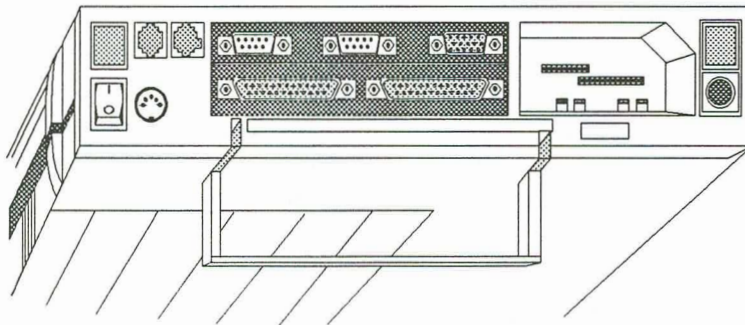


Figure 2-2. Computer Handle/Leg

3. **Connect the internal/external power supply to the computer and plug it in.** The internal/external power supply has a standard power cord and a computer power cable (see Figure 2-3). Plug one end of the computer power cable into the power connector on the back of the computer; plug the other end into the power supply. Plug one end of the power cord into the power cord socket on the power supply. Plug the other end into a wall outlet that provides the specified power and accepts a three-prong grounded plug. If a plug adapter is used, make sure it is properly grounded.

NOTE: The locking connectors on the computer power cable prevent the cable from becoming detached accidentally. To remove the cable, gently pull the cable connector until the cable is released.

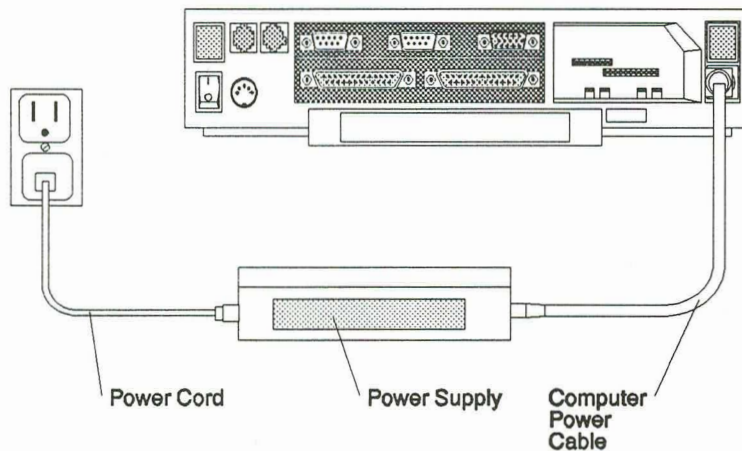


Figure 2-3. Connecting Power Supply Externally

For connecting this power supply as an internal power source, refer to *Connecting the Internal/External Power Supply Internally* in the *GRIDCASE 1550sx User's Guide*.

4. **Open the display screen.** The screen is locked to the frame by one latch on each side. Pull these latches toward you and lift the screen from the front of the computer (see Figure 2-4).

CAUTION

Handle the screen with care. Never use abrasive substances on the screen. For complete information on cleaning the screen, refer to Chapter 4 of this manual.

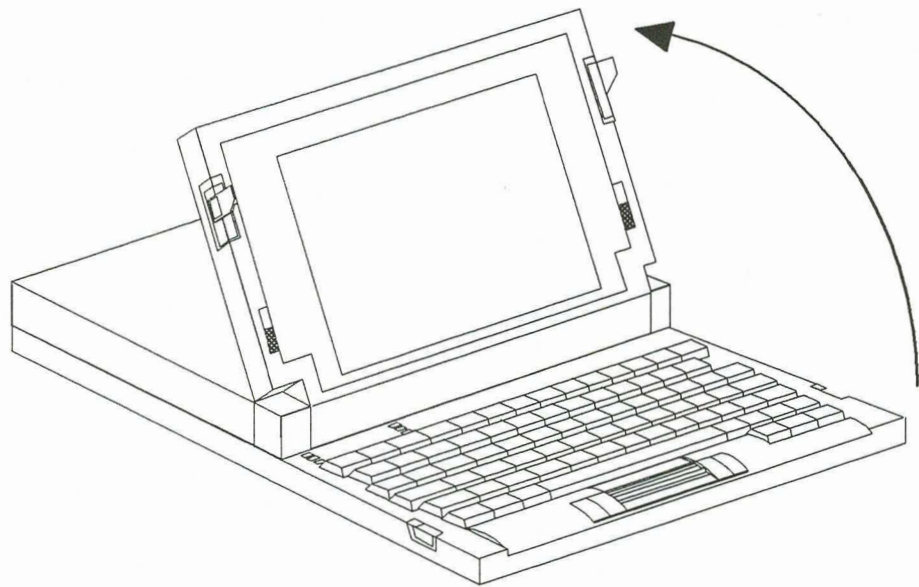


Figure 2-4. Opening Display Screen

Controls and Indicators

This section explains the computer controls and indicators that are used when running the diagnostics. See Figure 2-5 for controls and indicators visible from the front of the computer.

Contrast Control (LCD Screen Only)

The contrast of the LCD screen is controlled by a slide switch at the right of the screen. This control increases the contrast of the screen when pushed toward the top of the screen, and decreases the contrast when pushed toward the bottom of the screen.

Brightness Control

The switch at the left of the screen, controls the brightness or intensity of the screen.

On an LCD screen, this slide control adjusts the backlight brightness. Push the control all the way to the bottom position to turn off the backlight; push the control all the way to the top position for maximum brightness.

On a plasma screen, this control is a four-position switch. Push the switch to the top for maximum intensity or brightness; push the switch to the bottom for minimum intensity or brightness.

Isopoint Control Bar

The Isopoint control bar is a pointing device built into the front edge of the computer keyboard. This device is used like a mouse to control the pointer in graphical software. The Isopoint control bar emulates a Microsoft bus mouse.

The Isopoint control bar can be operated with the side of your thumb or your fingertips. With your hands over the keyboard in typing position, the sides of your thumbs are naturally positioned over the Isopoint control bar. Rest one of your thumbs on the pencil-like rod in the center of the control bar.

To move the pointer up and down on the screen, roll the rod away from you or towards you. To move the pointer from side to side on the screen, slide the rod to the left or the right.

The Isopoint control bar emulates a two-button mouse. The control bar itself, including the two inside buttons, is equivalent to the left mouse button. Pressing any part of the bar or the two inside buttons is the same as clicking the left mouse button.

If you press down on the rod itself, the pointer may move on the screen as you click, depending on how careful you are to prevent the rod from rolling. You may find it better to press down on the part of the control bar just above or below the rod, or on one of the inside buttons.

For information on how to install the Isopoint driver software and additional operating information for the pointing device, refer to Using the Isopoint Control Bar in the *GRiDCASE 1550sx User's Guide*.

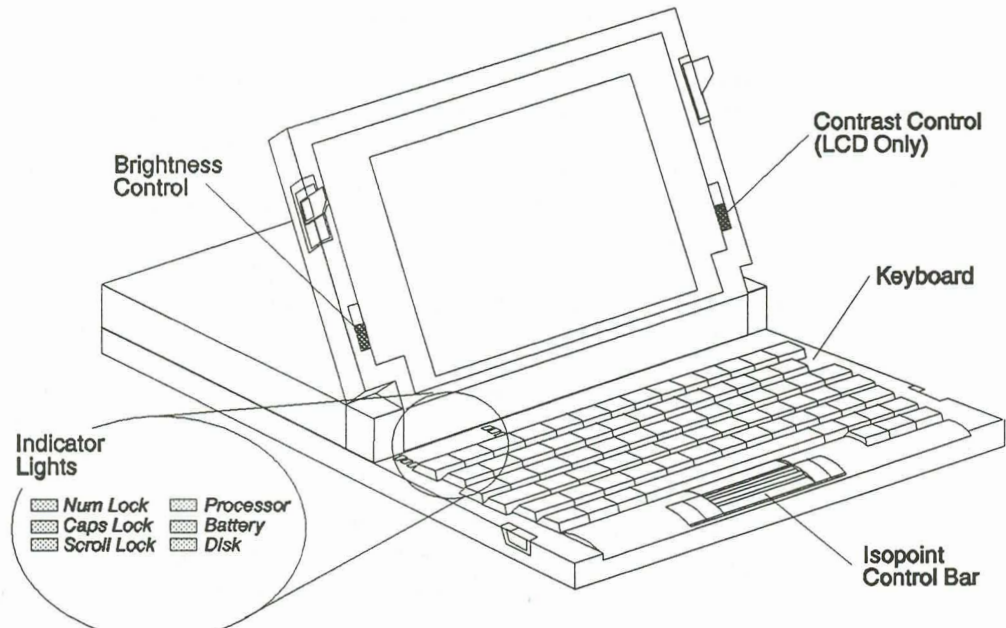


Figure 2-5. Computer Front View

Indicator Lights

Six indicator lights are located above the keyboard near the left side of the computer. These are labeled Num Lock, Caps Lock, Scroll Lock, Processor, Battery, and Disk. The following paragraphs describe each indicator.

Processor

This indicator glows green when the microprocessor is running at slow speed. The GRiDCASE 1550sx computer is equipped with a dual-speed 80386sx microprocessor that ordinarily runs at 20 MHz. However, it can be slowed to 8 MHz. Press **Fn-Speed** to toggle between the two speeds.

This indicator flashes green when the computer is in standby mode. (In standby mode, the screen is blank and the computer appears to be off; this flashing indicator shows that it is in standby mode.) Press the **spacebar** to exit standby mode.

Refer to the *GRiDCASE 1550sx User's Guide* for more information on the standby mode.

Battery

This indicator flashes red when the battery pack becomes nearly exhausted. At this point, there may be as little as two minutes of battery power remaining. Immediately save any files being worked on, and then either supply external power or put the computer into standby mode and change battery packs.

If the Battery indicator is flashing red and the Processor indicator is flashing green at the same time, the computer is in low-power standby mode. (The computer is in standby mode and the battery is so low that there is not enough power to exit standby mode and return to operating mode.) If this happens, connect external power or insert a charged battery pack to furnish enough power to exit standby mode.

If a battery is in the power pack/accessory slot and the power supply is connected externally, the battery pack starts to recharge, either in a rapid or normal charge mode. The Battery indicator flashes green when a battery pack is rapid-charging inside the computer. (This happens when the computer power switch is turned off or the computer is in standby mode.) The indicator glows steady green (indicating normal charge) when a battery pack is in place, and the computer is operating.

In some early production models, the normal charge operation will not take place when the computer is operating. (The steady green light will not turn on if this happens.) To recharge the battery in this situation, the computer must be turned off or placed in standby mode to activate the rapid charge mode (with the flashing indicator).

Disk

This indicator glows green when the hard disk drive is in use and yellow when the floppy diskette drive is in use. When both drives are accessed rapidly, the indicator shows both green and yellow.

CAUTION

Do not turn off the computer, move the computer, or remove a diskette from the drive while the Disk indicator is lit. This could cause the loss of data stored on the disk.

Num Lock

This indicator glows green when the keyboard is in NumLock mode. To put the keyboard into NumLock mode, press **NmLk**. In NumLock mode the numeric keypad embedded in the keyboard returns numeric values only. The computer is

toggled out of NumLock mode by pressing **NmLk** again. For information on the use of the numeric keypad, refer to Numeric Keypad in the *GRiDCASE 1550sx User's Guide*.

Caps Lock

This indicator glows green when the keyboard is in CapsLock mode. To put the keyboard into CapsLock mode, press **CpLk**. In CapsLock mode, all alphabetic keys return capital letters. Toggle the computer out of CapsLock mode by pressing **CpLk** again.

Scroll Lock

This indicator glows green when the keyboard is in ScrollLock mode. To put the keyboard into ScrollLock mode, press **ScrLk**. The effect of ScrollLock mode is dependent on the application being used. The computer is toggled out of ScrollLock mode by pressing **ScrLk** again.

Keyboard

Figure 2-6 shows the GRiDCASE 1550sx U.S. keyboard. The keyboard provides all of the functionality of the IBM AT 101-key keyboard. The keys marked in blue are used with the **Fn** key to provide some functions.

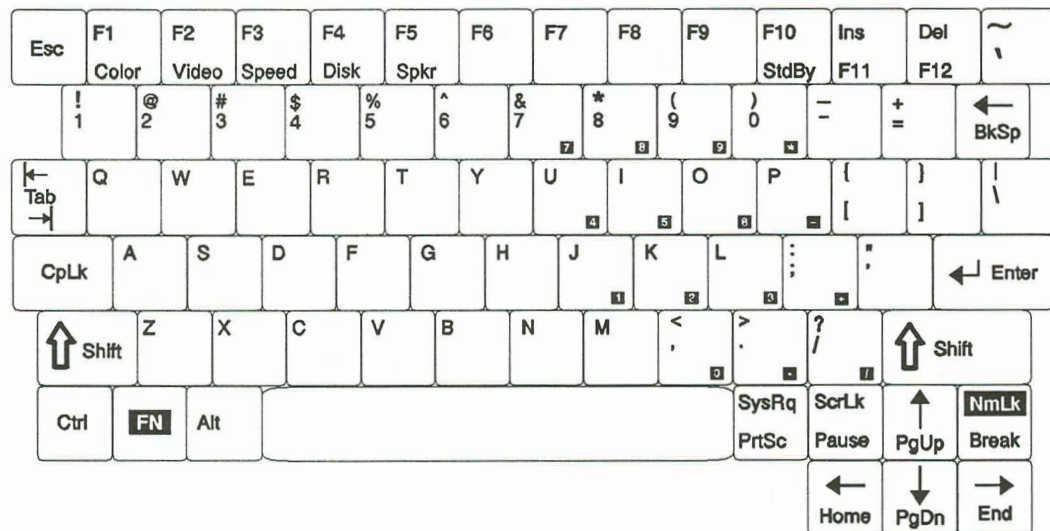


Figure 2-6. GRiDCASE 1550sx Keyboard

The six special functions marked in blue on keys **F1** through **F5** and **F10** are used to take advantage of some of the special features of the GRIDCASE 1550sx computer, such as changing the color mapping or processor speed. These are explained in more detail under Special Function Keys in the *GRIDCASE 1550sx User's Guide*.

The other keys marked in blue provide the additional functions found on the IBM keyboard. For example, to use the **F11** IBM PC function key, hold down the **Fn** key (in the lower left-hand corner of the keyboard) and press the **F11** key.

Internal Diskette Drive

Figure 2-7 shows the controls and indicators visible from the side of the computer. Each item is discussed in the following paragraphs.

The internal diskette drive uses 3.5-inch double-sided, high-density floppy diskettes capable of storing 1.44 megabytes (MB) of data each. This drive also can read, write, and format double-density 720 kilobyte (kB) diskettes. For more detailed information about using the drive and about floppy diskettes, refer to the *GRIDCASE 1550sx User's Guide*.

Diskette Eject Button

The diskette eject button is located on the lower right corner of the internal diskette drive. Press this button to remove a diskette from the diskette drive. When the diskette eject button is pressed, the diskette pops part way out of the drive, allowing it to be grasped and fully removed.

In-Use Light

The in-use light is located on the lower left corner of the internal diskette drive. This indicator is lit whenever the drive is active. The Disk indicator at the upper left of the keyboard also glows yellow whenever the diskette in-use light is lit.

CAUTION

Never eject a floppy diskette when the in-use light is lit (unless you are prompted by the computer to do so). The in-use light indicates that file access is taking place. Ejecting the floppy diskette during file access can damage files.

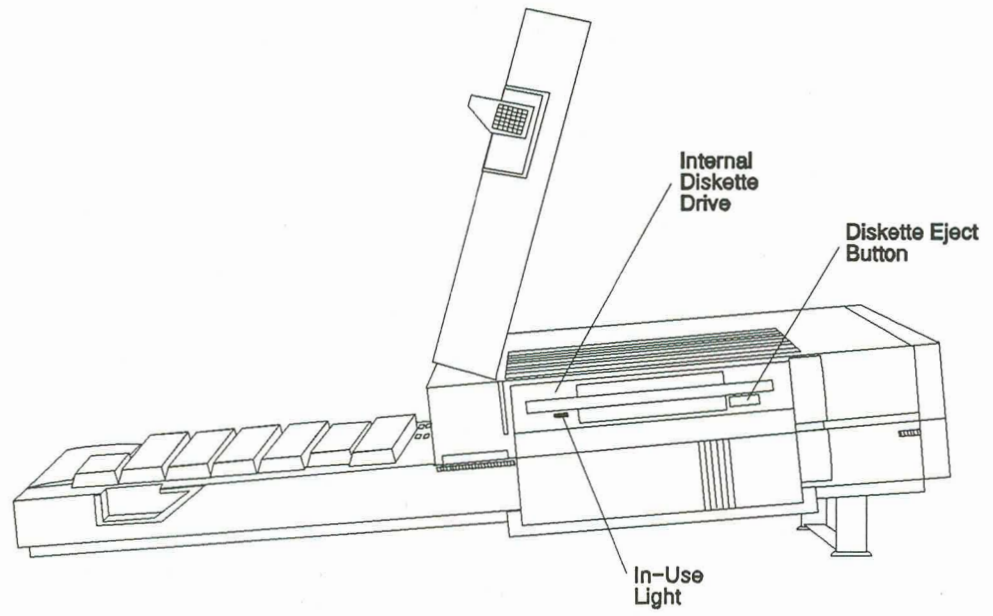


Figure 2-7. Computer Side View

Rear Connector Panel

The rear connector panel of the GRiDCASE 1550sx computer is shown in Figure 2-8. This panel has the following connectors and switches that are used in the operation of the computer:

- Power switch
- Keyboard DIN connector
- Telephone connectors (optional)
- Serial connectors
- Parallel connector
- GRiD peripheral connector
- Monitor connector
- Power pack/accessory slot w/expansion connectors for cartridges
- DC input connector
- Power pack eject button

CAUTION

Before connecting or disconnecting a keyboard, keypad, or any other external device, turn off the power to both the computer and (if applicable) the external device. Failure to do so may damage your unit.

Refer to the *GRiDCASE 1500sx User's Guide* for more information and detailed steps on connecting peripheral devices to the rear panel connectors.

NOTE: The GRiDCASE 1550sx computer has been FCC-certified under test conditions which include the use of SHIELDED cables between the computer and peripherals. GRiD-supplied cables are shielded. To reduce the possibility of causing interference to radio, television, and other electronic devices, it is important to use shielded cables when connecting peripherals to the computer. Telephone cables do not require shielding

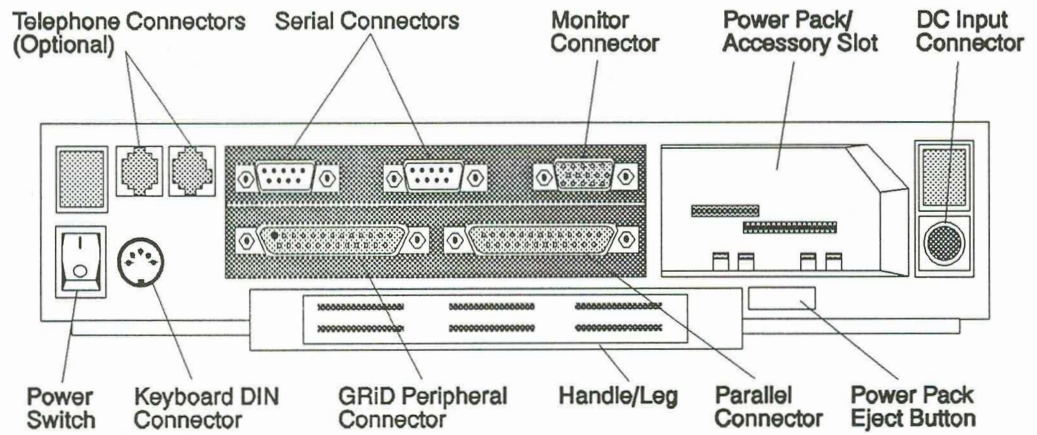


Figure 2-8. Rear Connector Panel

Operation

The operating instructions included here are only those necessary to operate the computer while running the diagnostic programs and tests. For complete operating instructions, refer to the *GRiDCASE 1550sx User's Guide*.

Perform the following steps to turn on the computer and prepare it for running the diagnostic programs:

1. Turn on the computer. The power switch is located on the back of the computer. Press the top of this switch to turn it on (see Figure 2-9).

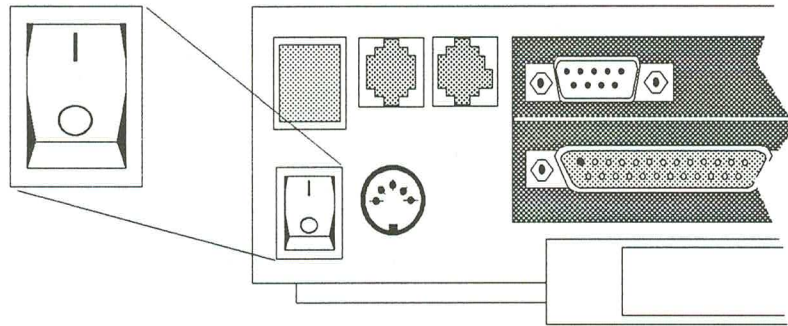


Figure 2-9. Power Switch On

NOTE: If the operating system is not on the hard disk, continue with steps 2 and 3. If it is on the hard disk, skip to step 4.

2. Insert the operating system diskette into the floppy drive.
3. Press the **F** key when you hear the beep after turning on the power.
4. Adjust the brightness and contrast controls if the sound of the hard disk motor is heard but there is no screen activity. (If necessary, review their operation under Controls and Indicators.)
5. Check for screen activity or hard disk motor sound. If neither is present, check the dc power and perform any necessary corrective action. (Refer to DC Power Check in Chapter 3.)
6. Listen and watch for any problems in the system booting procedure, as indicated by the system beep codes or the display.

POST Beep Test

When the computer is turned on, it performs a self-test and then loads the MS-DOS operating system into main memory (RAM) from the hard disk. This process takes 15 to 20 seconds. During this booting, a series of internal diagnostics (located in the Boot/BIOS ROMs) is performed. These diagnostics comprise the Power-On-Self-Test (POST). Should an error occur in one of these diagnostics, the system boot fails, and the system speaker indicates the failing test with a series of beeps, somewhat like Morse code.

The code has three groups of beeps, with short pauses between each group. For instance, a group of two beeps, then a group of three beeps, and then a group of four beeps (2-3-4) indicates a RAM chip or data line failure of bit B (hex) in the first 64 kB of RAM. The codes are transmitted quickly, and learning to distinguish the sound pattern may take some time. Once the display circuits have been tested, the beep codes are disabled, and any errors in the POST are displayed on the screen.

Table 2-1 lists the POST beep codes.

CAUTION

These POST beep codes and their error descriptions are listed for reference purposes only. If there is any failure, replace the main logic board, and retest.

Table 2-1. POST Beep Codes

Beep Code	Error Description
1-1-3	CMOS write/read failure
1-1-4	BIOS ROM checksum failure
1-2-1	Programmable interval timer failure
1-2-2	DMA initialization failure
1-2-3	DMA page register failure
1-3-1	RAM refresh verification failure
1-3-3	1st 64 kB RAM chip or data line failure—multiple bit
1-3-4	1st 64 kB RAM odd/even logic failure
1-4-1	1st 64 kB RAM address line failure
1-4-2	1st 64 kB RAM parity test failure
2-1-1	1st 64 kB RAM chip or data line failure—bit 0
2-1-2	1st 64 kB RAM chip or data line failure—bit 1
2-1-3	1st 64 kB RAM chip or data line failure—bit 2
2-1-4	1st 64 kB RAM chip or data line failure—bit 3
2-2-1	1st 64 kB RAM chip or data line failure—bit 4
2-2-2	1st 64 kB RAM chip or data line failure—bit 5
2-2-3	1st 64 kB RAM chip or data line failure—bit 6
2-2-4	1st 64 kB RAM chip or data line failure—bit 7
2-3-1	1st 64 kB RAM chip or data line failure—bit 8
2-3-2	1st 64 kB RAM chip or data line failure—bit 9
2-3-3	1st 64 kB RAM chip or data line failure—bit A
2-3-4	1st 64 kB RAM chip or data line failure—bit B
2-4-1	1st 64 kB RAM chip or data line failure—bit C
2-4-2	1st 64 kB RAM chip or data line failure—bit D
2-4-3	1st 64 kB RAM chip or data line failure—bit E
2-4-4	1st 64 kB RAM chip or data line failure—bit F
3-1-1	Slave DMA register failure
3-1-2	Master DMA register failure
3-1-3	Master interrupt mask register failure
3-1-4	Slave interrupt mask register failure
3-2-4	Keyboard controller failure
3-3-4	Screen initialization failure
3-4-1	Screen retrace test failure
3-4-2	Search for video ROM in progress

When the loading is finished, the initial operating system screen is displayed. The screen can be adjusted to the most convenient viewing angle.

VGA BIOS Beep Codes

During initialization, the video subsystem also uses beep codes, which are given in a series of long and short beeps. The significant beep codes issued by the video BIOS are:

- Long-short-short-short Failure in the VGA area of the video subsystem
- Long-short-short Failure in the video subsystem in other than the VGA area

CHAPTER 3: TROUBLESHOOTING/TEST

The diagnostic procedures in this chapter allow you to find and remedy problems encountered when using the GRiDCASE 1550sx Computer. Follow the procedures in each section, in the order presented, to obtain important information that may be analyzed. If possible, print out a copy of the information received from running the tests.

These diagnostic tests are designed for use by trained technicians.

CAUTION

Before starting any maintenance procedures, be sure to save your files and remove all power from the computer.

Never move or turn off your computer when the hard disk in-use indicator light is on; this could cause loss of data.

Diagnostic Test Descriptions

The following paragraphs describe the diagnostics that are performed later in this chapter. These tests are required to analyze problems in the computer. When the test isolates a potential problem area, the faulty assembly should be replaced.

The test names followed by *.exe* are the file names of the tests. Any name following this in parentheses is the menu name of the test. If there is no name in parentheses, the file name and the menu name are the same.

<i>1550fd.exe</i>	This is the master control program for testing. If used with the MENU argument, the user can see the test lists.
<i>1550test.exe</i> (1550 PWR)	This program tests backlite, display power, modem power, hard disk standby, system standby, and processor speed. The test needs <i>stby.com</i> to put the system into standby mode.
<i>chk8087.exe</i>	This test checks for the presence of a numeric data processor (NDP). It then runs a series of calculations through the NDP and compares the result against pre-calculated data.
<i>config.exe</i>	This is a utility.

delay.com This program causes a one-second delay during standalone tests.

CAUTION

The diagnostic *disktest.exe* will DESTROY data on the inner tracks of both hard and floppy drives unless the argument **ndt** is used.

When this test is chosen from the menu (using DRIVE), the **ndt** argument is automatically added.

disktest.exe
(DRIVE) This test checks the integrity of the hard disk and floppy diskette drives. The test consists of three subtests, as follows:

- Disk media scan (read) test
- Disk inner track write/read test
- Disk random seek test

Arguments to be used when running *disktest.exe* include:

ndt—Non-destructive

fdonly—Tests floppy drive only

hdonly—Tests hard disk only

track—Performs the disk media scan test by reading the disk a whole track at a time instead of by single sectors. Test time is reduced.

loop—Performs the test repeatedly until **Esc** is pressed

?—Lists all of the previous arguments

display.exe
(VIDEO DISPLAY) The display test consists of the following subtests:

- VGA extension BIOS ROM test
- Video controller test
- DAC register test
- Video RAM test

Visual checks for color, shimmering, and all display modes are also performed.

errorlog.exe This is an error decipher program. It decipheres the errors of the tests in detail. It also reads and analyzes the data that is placed in the *passes.txt* file during the standalone test mode. If a printer is attached, the program will print the results .

<i>extended.exe</i> (EXT RAM)	This extended memory test consists of the following four subtests: <ul style="list-style-type: none"> • Memory size test • Memory address test • Read/write walking bit data test • Read/write random patterns data test
<i>isotest.exe</i>	This program tests Isopoint movement position. The system needs <i>mouse.com</i> installed as the mouse driver.
<i>keytest.exe</i> (KEYBOARD)	This test checks the scan code of each key. A key map is displayed so that the keycap placement can be checked.
<i>ledchk.exe</i>	This test checks the Processor and the Disk Access LEDs by illuminating each one. Run the test with a color monitor to verify that the LED color is correct. The correct color is shown on the monitor and the keyboard LED. The argument noext can be used to direct that the video does not go out to the external monitor.
<i>modemtst.exe</i> (MODEM CONN) (MODEM INT LOOP)	This diagnostic tests the function of the internal modem. To fully test the modem, a “host” system is needed. However, the test can be used in the field with the sa argument, and no host will be required. The test will perform a serial controller response check, a modem response check, and analog loopback tests.
<i>passes.exe</i>	This test is used when testing in a “standalone” mode. It keeps track of the number of passes completed, elapsed time, and errors that may have occurred.
<i>prncheck.exe</i> (PRINT CHECK)	This test sends five lines of the full character set to a printer. To perform this test, the printer loopback fixture must be disconnected, and the printer installed. Refer to Procedures in the Running the Diagnostics section of this chapter.

CAUTION

The diagnostic *quickchk.exe* is a destructive test. It destroys data on the floppy diskette, and can destroy it on the hard disk. Be certain that you have both disks backed up before performing this diagnostic.

<i>quickchk.exe</i>	This test checks internal and external hard disk and/or floppy diskette drives. It performs a format, write, read and verify of the inner and outer tracks. It also performs a random read/write of high and low density diskettes. Use scratch disks for this test as data is destroyed.
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ramtest.exe
(RAM) This test checks the integrity of the first 640 kB of RAM. It is destructive in nature, so the system will have to be rebooted after the diagnostic is finished. The test runs a data/address integrity check, an inverse pattern check, and a random pattern check.

NOTE: When individual tests are run, *ramtest.exe* should be the last one, as the computer will have to be rebooted after its completion.

reboot.exe This program calls for a system soft reboot.

romcheck.exe
(ROM CHECK) This program performs a checksum test of the ROM BIOS and displays the date of the BIOS.

rr206.exe
(RTC) This program performs a clock chip register read/write test, clock rollover check, and interrupt test.

rr601.exe
(SIO) This diagnostic tests I/O of the 82C601 serial port A/B registers, internal/external loopback, baud rate, and interrupt. This test needs 2 nine-pin loopback connectors.

rr601lpt.exe
(PIO & LINE
PRINTER) This diagnostic tests I/O of the 82C601 parallel port register and data/status loopback. This test needs a 25-pin printer loopback connector.

spkrchk.exe
(SPEAKER) This is a three-part test. The first tone is a smooth tone going high and low in frequency. The second tone is the same high and low tone, but with a stuttering effect. The third test prompts the user to verify that the speaker has been turned off.

xcopy.exe This is a utility.

Test Equipment Required

Table 3-1 lists the test equipment required to perform the diagnostic tests.

Table 3-1. Test Equipment Required for Diagnostic Tests

Part Number	Description
991001-01	Field diagnostics diskette
105130-00	RS-232C 9-pin loopback fixture (two required) See Figure 5-3 for fixture wiring diagram.
103162-00	Printer loopback fixture See Figure 5-4 for fixture wiring diagram.
N/A	Centronics compatible printer (i.e., H.P. Thinkjet, Kodak Diconix, Epson MX or FX) with connecting cable
N/A	Formatted high density diskette (scratch disk)
N/A	Formatted low density diskette (scratch disk)
N/A	Any analog VGA monitor
N/A	IBM AT-compatible external keyboard
N/A	Multimeter (Fluke 8020B or equivalent)

DC Power Check

The computer must have power to be capable of running the diagnostics. The initial check must make certain the output voltages, from both the external power supply and the dc/dc converter, are available.

External Power Supply Voltage Check

The computer must have power from the external power supply. Follow these steps to check the ac voltages:

1. Check to make certain that power is available from the power outlet. External power supply requirements are 100 to 240 Vac (+6%, -15%), 47-63 Hz. Alternate supply is 120 Vac (+6%, -15%), 400 Hz.

2. Connect the power cord to the external power supply (see Figure 3-1). Then plug the cord into the power outlet. Measure for 16.25 Vdc ($\pm 5\%$) between the two flat contacts on the end of the power supply (close to the round dc output connector). If this voltage is not present, replace the external power supply and/or the power cord, and retest.
3. Connect the external power supply output connector to the computer input power connector, using the computer power cable.

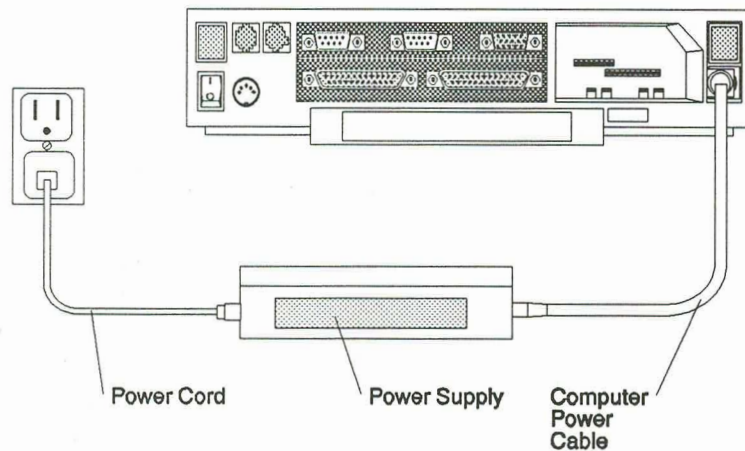


Figure 3-1. Computer Power Connections

DC/DC Converter Voltage Check

Voltage must be available from the internal dc/dc converter before the diagnostic tests can be performed. Follow these steps to check the dc voltage.

1. Turn the computer on using the switch located on the rear panel.

CAUTION

Be sure to disconnect the power and turn off the computer before changing any assemblies

2. Check for -12V ($\pm 2\%$) between pin 2 and pin 5 (ground) on rear panel connector 1 (serial connector), using the test points shown in Figure 3-2.
3. Check for +5V ($\pm 2\%$) between pin 1 and pin 18 (ground) on rear panel connector 5 (parallel port), also shown in Figure 3-2.

If the voltages are not within tolerance, replace the dc/dc converter, and retest the voltages.

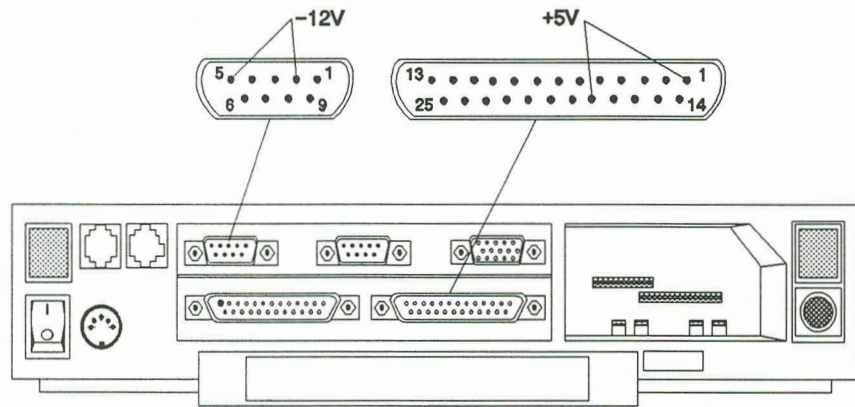


Figure 3-2. DC Voltage Test Points

After voltage tests are complete, turn off the computer and disconnect it from the power source.

Running the Diagnostics

The diagnostic tests are used to isolate problem areas in computers that are not working properly. After setting up the equipment, follow the procedures given.

After finding a failure in any of these tests, refer to the troubleshooting guidelines in the subsequent paragraphs. This will further isolate the problem area, and suggest remedies.

Setup

The equipment used in the tests needs to be set up at the test station (see Figure 3-3). To do this, perform the following steps:

1. Connect the external keyboard and the external monitor. The label on the folding handle indicates where these devices are connected.
2. Plug the two RS-232C fixtures and the printer loopback fixture into rear panel connectors 1, 2, and 5, respectively.
3. Plug one end of the computer power cable into the power connector on the rear connector panel of the computer. Plug the other end into the external power supply.
4. Plug the power cord into the external power supply. Then connect the other end to the power outlet.

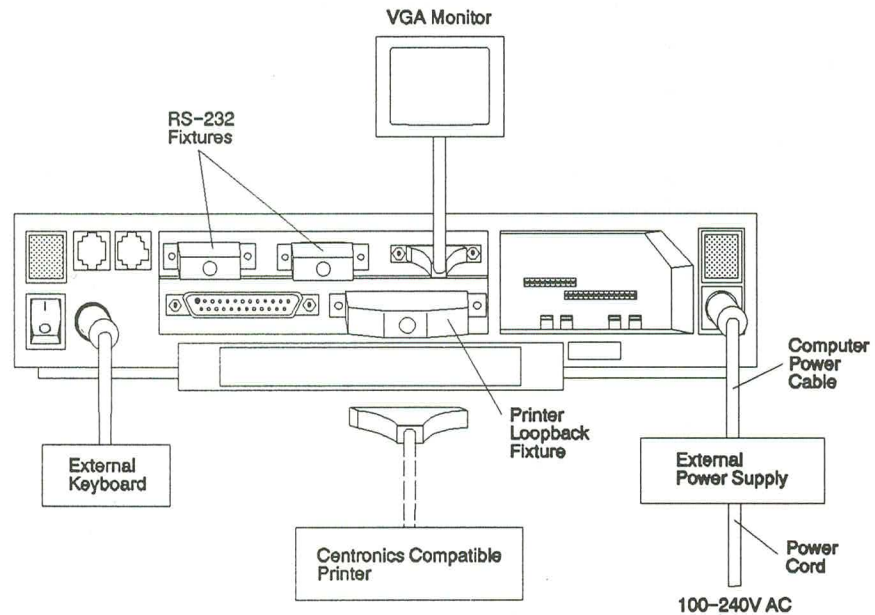


Figure 3-3. Diagnostic Test Setup

Procedures

The following procedures are used to run the diagnostics:

1. Turn on the power to the computer by pressing the top portion of the power supply switch on the rear panel. A prompt from a program on the hard drive is then displayed on the screen.
2. Insert the field diagnostics test diskette into the floppy (A) drive.
3. Type **A:\RUNNER\1550FD**; then press **Enter**.

A menu comes up on the screen, listing several different ways of running the diagnostics.

Selection (1) runs the complete set of 15 diagnostics. When a test fails, the diagnostic tests stop automatically. The system prompts as to what further actions to take. The test cycle can be manually stopped at any time by pressing **Esc**. The test that is running will finish before the cycle is stopped.

Selection (2) allows you to run selected diagnostics, and a menu of all 15 tests is displayed. The tests can be run in order or at random. Only one test runs with each selection.

Selection (3) allows a continuous looping of the complete set of 15 diagnostics. (In other words, selection 1 in a continuous loop mode.) The test cycle can be manually stopped at any time by pressing **Esc**. The test that is running will finish before the cycle is stopped.

Selection (4) provides the same choice of diagnostics as selection 2, but each test will loop repeatedly until manually stopped by pressing **Esc**. The screen will then show the menu, and a new diagnostic may be chosen, or the menu exited.

When *rr6011pt.exe* (PIO) is run, either alone or in the complete diagnostic run, *prncheck.exe* (PRINT CHECK) must also be run. Both of these tests are needed to completely check the printer operation. To run *prncheck.exe*, continue with the following steps:

4. Turn off the power to the computer.
5. Unplug the printer loopback fixture (rear panel connector 5), and install the printer and printer cable. Then turn on power to the computer, and using either selection 2 or selection 4 of the menu, run *prncheck.exe*.
6. Turn off the power to the computer after the successful completion of *prncheck.exe*.
7. Unplug the printer cable and printer, and reinstall the printer loopback fixture if more diagnostics will be run.

8. Turn off the power to the computer, and disconnect all power connections as well as the test fixtures, external monitor, keyboard, etc. when the testing is complete.

Some of the tests run and then notify you that they pass or fail. Other tests prompt, with messages on the screen, for actions to be taken during the test.

If failures occur, follow the action suggested in the Troubleshooting section.

Troubleshooting

Errors or failures in the diagnostic tests indicate the assemblies that may be at fault. Table 3-2 lists the tests and the corrective actions to take if the tests fail.

The steps taken with each diagnostic test should be as follows:

1. Run the diagnostic.
2. Proceed to the next diagnostic test if the diagnostic test passes.

CAUTION

Turn the computer off before unplugging or replugging any fixtures, assemblies, printer, keyboard, or monitor in the testing and troubleshooting operations.

3. Replace the first suspected assembly listed in the Corrective Action column if the diagnostic test fails.
4. Run the diagnostic again to check whether or not the replacement assembly cured the problem.

If the test fails again, it signifies the first replaced assembly was not at fault. The replacement assembly can then be removed, and the original assembly replaced.

6. Replace the second suspected assembly in the Corrective Action column.
7. Run the diagnostic to see if the second assembly replacement will cure the problem.
8. Continue the replace and retest procedure until the problem is cured.

NOTE: After any corrective actions or assembly replacements, choose menu selection 1, and run all of the diagnostic tests again. All tests must pass before returning the unit to service.

If failures cannot be corrected, and you are in the United States, call the GRiD Resource Center at 1-800-654-GRID (4743). If you are outside the United States, call your local GRiD representative or a distributor for assistance. Make sure you know the tracking number of the computer; it is located on the back of the computer, under the handle (it is visible only when the handle is pulled out or down).

Table 3-2. Troubleshooting Tests

Failed Test	Corrective Action
1550TEST	Replace main logic board if any portion of the test fails.
CHKX87	Replace the main logic board.

CAUTION

DISKTEST is a destructive test. It can destroy data on the floppy diskette or on the hard disk. Be certain to back up both disks before performing this diagnostic.

DISKTEST	<p>(For floppy diskette drive.)</p> <p>Reformat the disk.</p> <p>Check the connector from the drive cable to the logic board.</p> <p>Replace the drive.</p> <p>Replace the main logic board.</p> <p>(For hard disk drive.)</p> <p>Reformat the hard disk.</p> <p>Check the connector from the drive cable to the logic board.</p> <p>Replace the hard disk drive.</p> <p>Replace the main logic board.</p>
DISPLAY	<p>Reseat the display plug if the failure is for display modes. If the failure repeats after retesting, replace the display.</p> <p>Retest with a known good rear panel printed wiring assembly (PWA) if the failure is for color (as indicated on the external monitor). Retest. If the failure repeats, replace the main logic board.</p> <p>If the failure is the Video RAM test, the DAC Register test, or Video test, replace the main logic board .</p>

Table 3-2. Troubleshooting Tests (Continued)

Failed Test	Corrective Action
EXTENDED	<p>Check that the RAM sticks are properly seated with no bent pins.</p> <p>Replace the main logic board.</p>
ISOPOINT	<p>Clean the Isopoint assembly. See the Cleaning the Isopoint Mechanism section of Chapter 4.</p> <p>Check that the Isopoint cable is properly seated.</p> <p>Replace the Isopoint assembly.</p>
KEYTEST	<p>If a keycap is wrong, use a keycap puller and replace the keycap.</p> <p>If a key does not work, check the cable. If the problem persists, replace the keyboard assembly.</p> <p>Replace the main logic board.</p>
LEDCHK	<p>If the color is wrong, or if the LED does not light, replace the main logic board.</p>
MODEMTST	<p>Check modem and rear panel phone connector for bent pins.</p> <p>Replace the modem.</p> <p>Replace the main logic board</p>
PRNCHECK	<p>Check for bent pins on printer loopback fixture and/or printer connector.</p> <p>Check that the rear panel printer connector or the printer loopback fixture is seated completely.</p> <p>Replace the main logic board.</p>

Table 3-2. Troubleshooting Tests (Continued)

Failed Test	Corrective Action
CAUTION	
QUICKCHK is a destructive test. It can destroy data on the floppy diskette or on the hard disk. Be certain to back up both disks before performing this diagnostic.	
QUICKCHK	(For floppy diskette drive.)
	Reformat the disk.
	Check the connector from the drive cable to the logic board.
	Replace the drive.
	Replace the main logic board.
QUICKCHK	(For hard disk drive.)
	Reformat the hard disk.
	Check the connector from the drive cable to the logic board.
	Replace the hard disk.
	Replace the main logic board.
RAMTEST	Make certain the RAM sticks are properly seated with no bent pins.
	Replace the main logic board.
ROMCHECK	Replace the main logic board.
CLOCK	Replace the main logic board.
SPKRCHK	Replace the main logic board.

CHAPTER 4: MAINTENANCE

This chapter covers preventive and corrective maintenance for the GRiDCASE 1550sx computer. Safety information is provided, followed by preventive maintenance procedures. Detailed descriptions for disassembly and reassembly procedures necessary to perform repairs, are then furnished.

A list of parts that can be replaced in the field is also included in the chapter.

Safety Instructions

This product is designed and tested to comply with various national and international safety agency standards that reflect the current state-of-the-art at the time of manufacture. Use of the product requires exercising common sense. It is an electrical device.

The GRiDCASE 1550sx computer is intended to be electrically grounded when connected through the external power supply to an external source of ac power.

The power supply is equipped with a three-wire grounding-type power receptacle and is supplied with a mating power cord that has a plug at each end. Both plugs have a third (grounding) pin that fits only grounding-type ac power receptacles. This is a safety feature.

If you are unable to insert the plug into a power outlet, contact a licensed electrician to replace the outlet with one that is properly grounded.

Do not defeat the purpose of the grounding-type plug.

WARNING

Electrical equipment may be hazardous if misused. Operation of this product, or similar products, must always be supervised by an adult. Do not allow children access to the interior of any electrical product or permit them to handle any cables.
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Warnings

Always observe the following warnings. Ignoring these warnings could lead to physical injury or death.

- Be sure to read all installation instructions carefully before plugging the external power supply into a power outlet.
- Do not allow the computer to get wet or operate in a moist environment. Electrical equipment may be hazardous when operated in this situation. Keep the computer away from sources of liquids such as washbasins, bathtubs, shower stalls, etc. If the computer gets wet, immediately disconnect power and dry the computer as quickly as possible.
- Do not operate the computer in any potentially flammable or explosive atmosphere. It is not approved for use in hazardous locations.
- Do not operate the computer with the cover or rear panel removed.
- Arrange power cords and cables so they will not be pulled out or tripped over when the computer is in use.
- Make certain the adapter plug is properly grounded if an adapter is used with your computer or any attached devices.
- Remove the power cord from the wall socket before disconnecting the external power supply from the computer; failure to do this could result in a shock.
- Always turn off the computer before unplugging it.
- Disconnect the power plug if the power cord or plug is frayed or otherwise damaged, if the computer performs such that you suspect it needs servicing, if anything has been spilled into the case, if the computer has been exposed to rain or other excess moisture, or if the computer has been dropped or the case is otherwise damaged.

Cautions

Always observe the following cautions. Ignoring these cautions could damage the computer.

- Turn off both the device and the computer, in that order, before connecting any device to the computer or disconnecting any device from the computer,
- Operate the computer only when the surrounding temperature is between 5° C and 40° C (41° F and 104° F).
- Operate the computer only when the relative humidity level is between 20% and 80% noncondensing.
- Store the computer where the surrounding temperature remains between -20° C and 60° C (-4° F and 140° F).
- Do not store or set up the computer or any of its peripheral devices in direct sunlight.
- Do not operate the computer in an excessively dirty or dusty environment.
- Do not subject the computer to unnecessary shock or vibration.
- Never use any cleaning agent such as dust wax, spray cleaner, or any abrasive substance when cleaning the computer.
- Make sure the cables are securely attached at both ends and are not likely to be bumped or pulled, when using any external peripherals.
- Never turn off the computer when the in-use light for any diskette or hard disk drive is lit. Doing so can destroy data on the disk.
- Include a grounded anti-static pad at the workstation when disassembling and reassembling the computer. An anti-static wristlet (attached to the pad by a ground wire) must be worn when working on the machine. If this grounding procedure is not used, the subassemblies will be damaged by any electrostatic discharge.

Preventive Maintenance

This computer is a precision device with mechanical components as well as electronics. To avoid problems with the computer, keep it clean and operate it in a clean, dry, dust-free environment. Exercise normal precautions such as keeping liquids away from the computer. Clean the computer as described in the following section.

Cleaning the GRiDCASE 1550sx Computer

Before cleaning the computer, turn it off. If using an external power supply, disconnect the power plug from the wall outlet. (Pull the plug and not the cord.)

To clean the case, use a clean, lint-free, soft cloth that has been dampened and wrung out as dry as possible. If necessary, use a mild, nonabrasive detergent.

CAUTION

Never clean the computer with any chemical cleaning agent such as dust wax, spray cleaner, or any abrasive substance.

Wipe the case surface lightly and then dry it. Then dust the rear panel of the computer with a dry cloth.

WARNING

To prevent electrical shock, never apply any liquid to the rear panel of the computer or inside the battery or cartridge slots.

Cleaning the Computer Display

To clean the screen, use a dry, soft cloth. A cloth made especially for cleaning glass is best. If necessary, slightly dampen the cloth with an ammonia-based glass cleaner and gently wipe the screen. Use the cleaner sparingly so that no fluid runs down the screen and into the frame.

Cleaning the Fan

If the computer is disassembled for other maintenance and the fan blades show a collection of dust or dirt, clean them using a cotton swab dampened with alcohol. No lubrication of the fan is needed.

NOTE: Remove any excess alcohol from the swab before cleaning, to make certain that the liquid does not drip into the fan bearing.

Cleaning the Isopoint Mechanism

The 1550sx computer Isopoint has two small magnetic cores that attract ferrous particles. These can cause the Isopoint to stick, and cause jerky movements of the cursor. These particles may come from screws in the system or other external sources.

The particles adhere to the magnetic cores that drive the encoders on the Isopoint and interfere with their correct operation. Symptoms include physical difficulty in rolling or sliding the bar. Sliding is the most common failure since the encoder magnetic core is in direct contact with the slider. Follow these steps to clean the Isopoint (see Figure 4-1).

1. Remove the keyboard bezel. (Refer to Removing the Keyboard Bezel in this chapter.)
2. Remove the ferrous particles from the roller encoder magnetic core [1] and the slider encoder magnetic core [2], by cleaning with a small cotton swab and rubbing alcohol. Because the cores are magnetic, the particles may not wipe off easily.

NOTE: Remove any excess alcohol from the swab before cleaning, to make certain that the liquid does not drip onto the roller assembly—especially into the bearing of the roller.

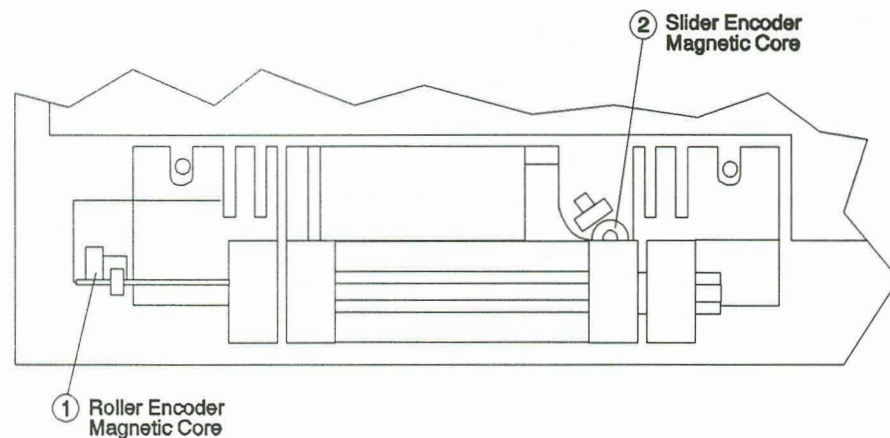


Figure 4-1. Isopoint Assembly Cleaning Areas

If the sliding is not smooth after this initial cleaning, a more thorough cleaning may be accomplished by removing the inner button mechanism. See Figure 4-2 and perform the following steps to continue the cleaning:

CAUTION

Be very careful when removing or replacing the bezel on this mechanism, as it is attached by very small tabs that can be broken easily.

3. Slide the Isopoint bezel [1] to the right. (It will only move approximately 1/32 inch.)
4. Remove it by first carefully prying up the front edge with your fingers. The tabs on this edge will come free of their keeper slots. Then release the tabs on the rear of the bezel, and the small bezel can be removed.
5. Slide the roller mechanism [2] and its holder [3] to the left, so that its right end is clear of the right button area [4]. The roller and its holder may then be lifted slightly on the right side.
6. Slide them carefully to the right, off of the black drive bar [5] for the roller encoder.
7. Remove the roller from its holder, and clean it.
8. Clean the bottom of the holder.
9. Clean the nylon slide [6] in which the holder moves.

CAUTION

Use the compressed air cleaning in the following step **ONLY** if the keyboard and Isopoint assemblies are removed from the computer. If step 10 is done with the assemblies in the computer, particles could get blown into other areas of the computer.

10. Blow any particles off of the roller assemblies or slide area with compressed air if it is available. (This procedure can be used in addition to cleaning with a swab.)
11. Replace the roller, in its holder, onto the black drive bar. The holder can then seat into the slide area again.
12. Replace the bezel, positioned as far to the right as possible, in its opening. After getting the rear tabs into their slots, carefully work the forward tabs into their slots. Avoid pressure, for the tabs are very small, and easy to break.
13. Slide the bezel back to the left when the tabs are seated. This locks the tabs.

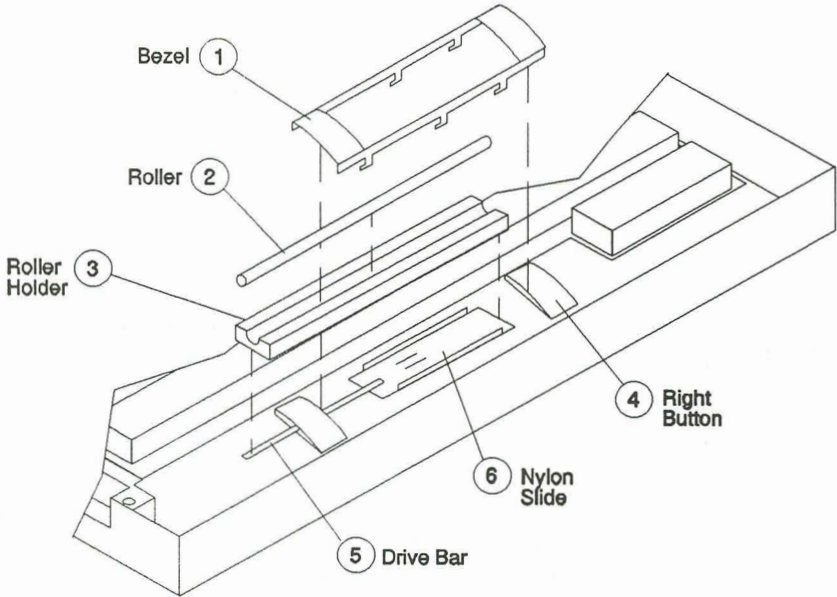


Figure 4-2. Isopoint Assembly Components

Cleaning Key Cap Slots

On rare occasions, a key cap may pop off. Before replacing it, be sure to clean the slots on the underside with alcohol.

Bridge Battery

The 7.2-volt bridge battery, attached to the main logic board (MLB), is automatically recharged whenever the computer is in use. Although it is listed as a replaceable assembly in Table 1-1, it should seldom, if ever, need replacing.

Miscellaneous Hardware Requirements

Table 4-1 lists the hardware that may be needed during the procedures covered in this chapter. While nuts, screws, and washers are normally reused, this table lists their replacements if they are damaged or misplaced.

Table 4-1. Hardware Used in the 1550sx Computer

Part No.	Description
700009-00	6-32 x 1/4 inch screw <ul style="list-style-type: none"> • 1 Used for retaining backlight P.S.
700021-00	6-32 x 1/2 inch screw w/lock washer <ul style="list-style-type: none"> • 2 Used for retaining rear panel casting
700025-00	4-40 x 1/4 inch screw <ul style="list-style-type: none"> • 2 Used for battery case backplane
700027-00	6-32 x 3/8 inch screw w/lock washer <ul style="list-style-type: none"> • 1 Used for disk drive case (and right hinge ear)
700030-00	6-32 x 1/4 inch screw w/lock washer <ul style="list-style-type: none"> • 1 Used for right display ground wire • 2 Used for keyboard retainer tabs • 1 Used for battery case (and MLB) • 3 Used for rear panel printed wiring assembly (PWA) • 2 Used for rear panel PWA (and MLB) • 5 Used for MLB • 2 Used for disk drive case (and MLB) • 1 Used for disk drive case • 4 Used for hard disk drive

NOTE: All screws are pan head Phillips unless otherwise noted.

Table 4-1. Hardware Used in the 1550sx Computer (continued)

Part No.	Description
700031-00	6-32 x 5/16 inch screw w/lock washer <ul style="list-style-type: none"> • 2 Used for Isopoint assembly • 1 Used for left display ground wire (and battery case)
701605-00	6-32 x 5/16 inch fillister head Phillips screw w/washer <ul style="list-style-type: none"> • 3 Used for hinge ears • 4 Used for latch pockets
700606-00	6-32 x 3/8 inch screw <ul style="list-style-type: none"> • 2 Used for top cover
702002-00	4-40 x 5/16 inch flat head 100 Phillips screw (black) <ul style="list-style-type: none"> • 1 Used for rear panel casting
702006-00	3 x 6mm flat head Phillips screw <ul style="list-style-type: none"> • 4 Used for diskette drive
711507-00	4-40 self-locking nut <ul style="list-style-type: none"> • 2 Used for battery case backplane
710006-00	6-32 x 1/32 inch thick nylon washer <ul style="list-style-type: none"> • 1 Used for battery case backplane • 1 Used for backlight power supply
785011-00	Standoff serial connector <ul style="list-style-type: none"> • 10 Used for rear panel casting
785040-00	Standoff serial connector <ul style="list-style-type: none"> • 1 Used for right display ground wire (and MLB)
790315-00	Gasket, 2-sided adhesive <ul style="list-style-type: none"> • 1 Used for fan assembly
200388-00	Plastic cap <ul style="list-style-type: none"> • 1 Used for rear panel connector #5
100075-00	Plastic screw covers <ul style="list-style-type: none"> • 2 Used for top cover screws
100119-00	Computer foot <ul style="list-style-type: none"> • 2 Used for base assembly
102326-00	Hinge ear, left
105968-00	Hinge ear, right

Table 4-1. Hardware Used in the 1550sx Computer (continued)

Part No.	Description
100068-00	Latch pocket, left
100069-00	Latch pocket, right
101331-00	Release button, battery pack
102135-00	Latch, battery
104127-00	Board clamp
280081-00	Spring, 0.5 inch length, 0.24 O.D.

Tools Required

Table 4-2 lists the tools required for the disassembly and reassembly of the computer.

Table 4-2. Tools Required for Service

Description
Nutdriver, 1/8 inch
Nutdriver, thin-wall 3/16 inch
Screwdriver, Phillips # 1
Screwdriver, flat blade

Disassembly Instructions

CAUTION

The workstation should include a grounded anti-static pad to use when disassembling and reassembling the computer. An anti-static wristlet (attached to the pad by a ground wire) must be worn when working on the machine. If this grounding procedure is not used, the subassemblies will be damaged by any electrostatic discharge.

The instructions given in this chapter are given in the order required to disassemble the computer. When an assembly needs replacing, go only as far as needed in the disassembly procedures. In some cases, it may not be necessary to remove a listed assembly. After replacing the part, skip to the appropriate reassembly procedures to return the computer to its operating condition.

CAUTION

Before starting any maintenance procedures, be sure to save your files and remove all power from the computer

Never move or turn off your computer when the disk in-use indicator light is on; this could cause loss of data.

Preparing for Computer Disassembly

The following preparations are suggested before starting the disassembly of this computer:

1. Prepare a clean workspace.
2. Place some padding under and around the computer to protect the assembly surfaces.
3. Secure anti-static packing for storing static sensitive boards and assemblies.
4. Place a cup or tray nearby for removed screws and other small parts.
5. Remove all connector plugs for external devices after disconnecting all power sources (and removing the battery pack if one is present).

Removing the Top Cover

The top cover is removed to gain access to the inner assemblies of the computer. Follow these steps to remove the top cover (see Figure 4-3).

1. Remove the two plastic screw covers [1] from the rear of the computer. Do this with your fingernails, or by using a scribe or a small flat-blade screwdriver under the edge of the cap to pop it off. (Be careful not to scratch the paint if a tool is used.) A screw head is visible under each cover.
2. Remove the two 6-32 x 3/8 inch screws [2] under the screw covers using a #1 Phillips screwdriver.
3. Turn the computer so that the front faces you. Then slide the top cover [3] towards you about 1/8 inch.
4. Pry the cover off the computer with your fingers, starting at the back and then carefully releasing the sides.
5. Place the cover aside where it will not be scratched.

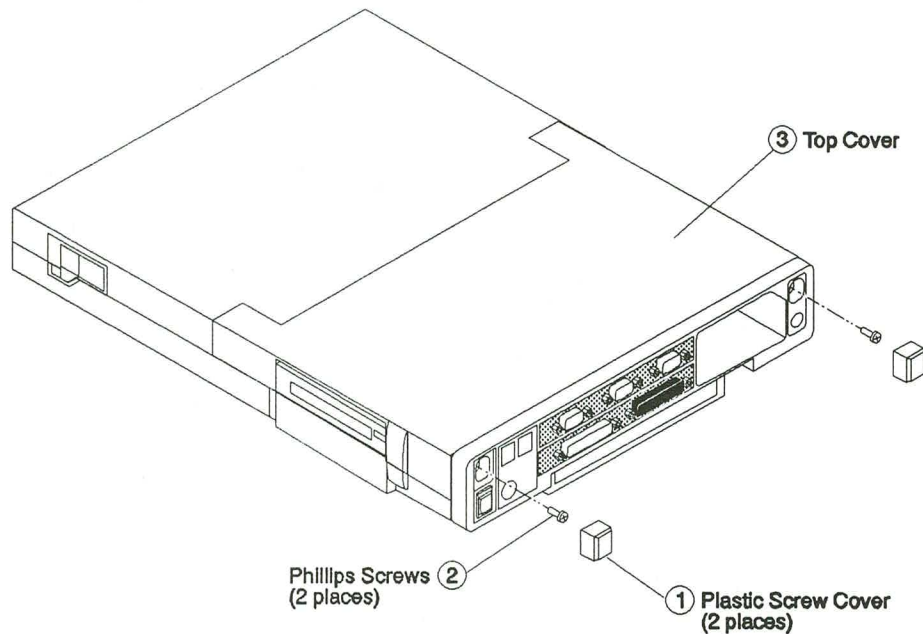


Figure 4-3. Top Cover Removal

Preparing for Display Assembly Removal

To open the display assembly and prepare it for removal, proceed with the following steps (see Figure 4-4):

1. Place some padding on the portion of the computer that was exposed when the top cover was removed.
2. Move the latches [1] on each side of the display assembly [2] toward you, releasing the latch locks on the display assembly so that it can open slightly. **DO NOT COMPLETELY OPEN IT YET AS THIS COULD BREAK THE HINGE EARS!**
3. Lift the cable [3] out of the left hinge ear assembly cable trough.
4. Lift the cable [4] out of the right hinge ear assembly cable trough.
5. Lift the hinge pivot bearings [5] straight up out of the hinge ear assemblies [6].

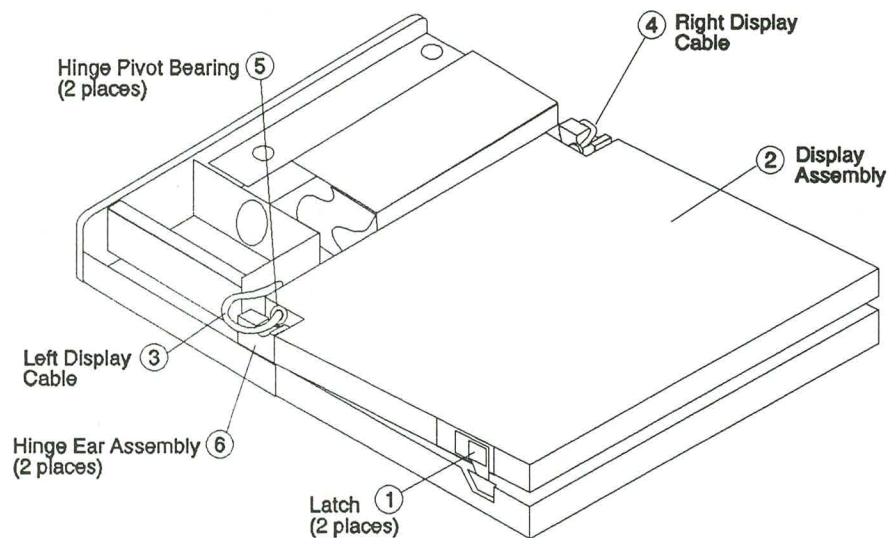


Figure 4-4. Preparation for Display Removal

- Pivot the display back, face up, and place it on the padding (see Figure 4-5). Be careful not to put strain on the cables from either end of the display. The right cable [1] will be tight, and it may be difficult to get extra slack in it. It may be pinched between the hinge ear [2] and the disk stack [3]. At this point, the display cables and their ground wires are still attached to the computer.

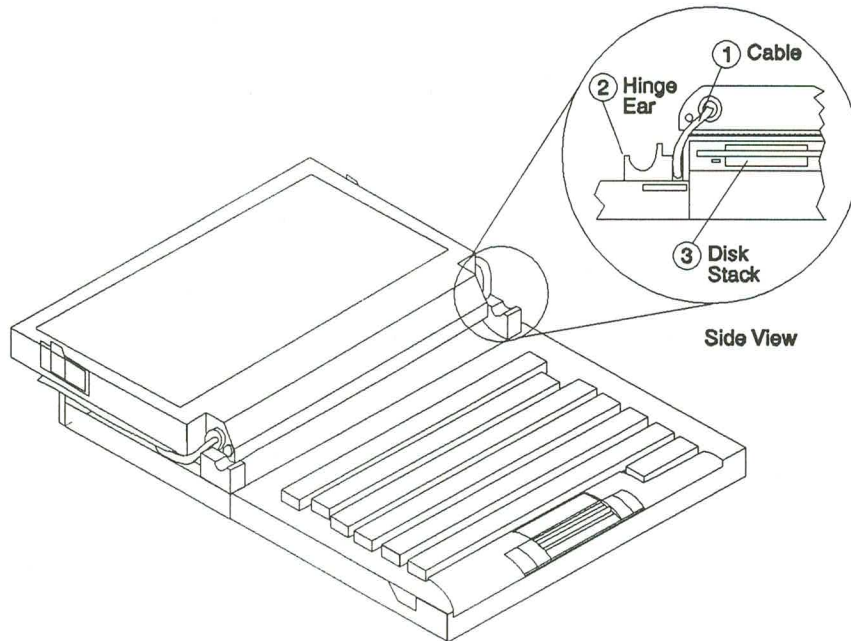


Figure 4-5. Display Cable Access

Removing the Keyboard Bezel

Before the display assembly is completely disconnected from the computer, the keyboard bezel is removed to allow access to the display cable plugs. Follow these steps to remove the bezel (see Figure 4-6).

1. Remove the keyboard bezel [1] by grasping it by the curved rear edge, and carefully prying it upwards with your fingers, one side at a time. Do this until the side keepers [2] snap out of the base.
2. Move the bezel slightly towards the rear so that the keepers along the front edge detach.
3. Lift the bezel out and set it aside, taking care not to scratch or break it.

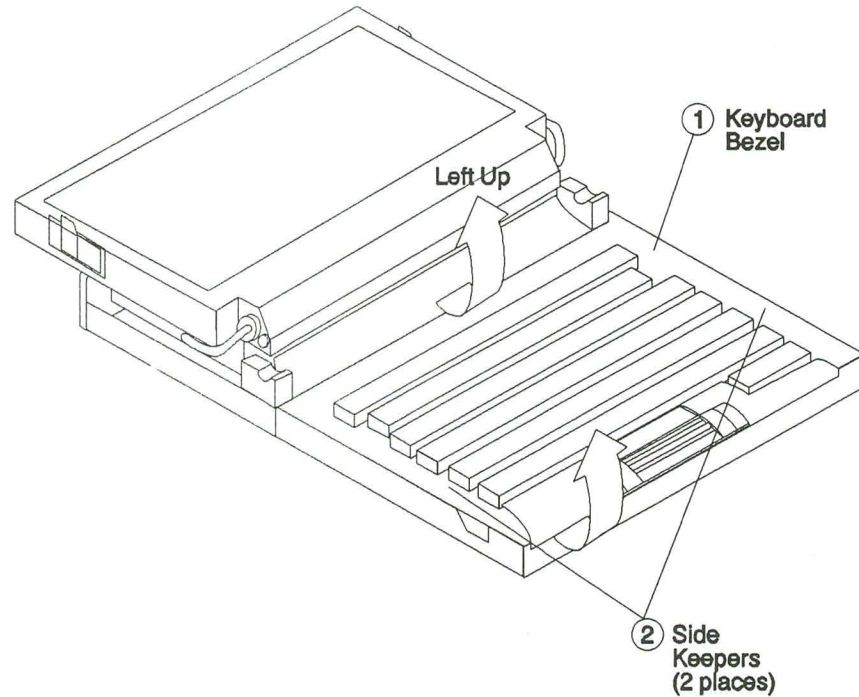


Figure 4-6. Removing the Keyboard Bezel

Main Logic Board Locator Diagram

Many of the following procedures require the removal of plugs from connectors on the main logic board (MLB). Some also require the removal of securing screws that, in addition to securing the assembly, also secure the MLB to the base of the computer. For this reason, Figure 4-7 is included at this point. It shows the locations and numbers of all connectors on the MLB, as well as the locations of all MLB securing screws.

Make certain that each removed screw has a board clamp. These clamps, plus the screws holding them, can be set aside as a group when they are removed during disassembly of the computer.

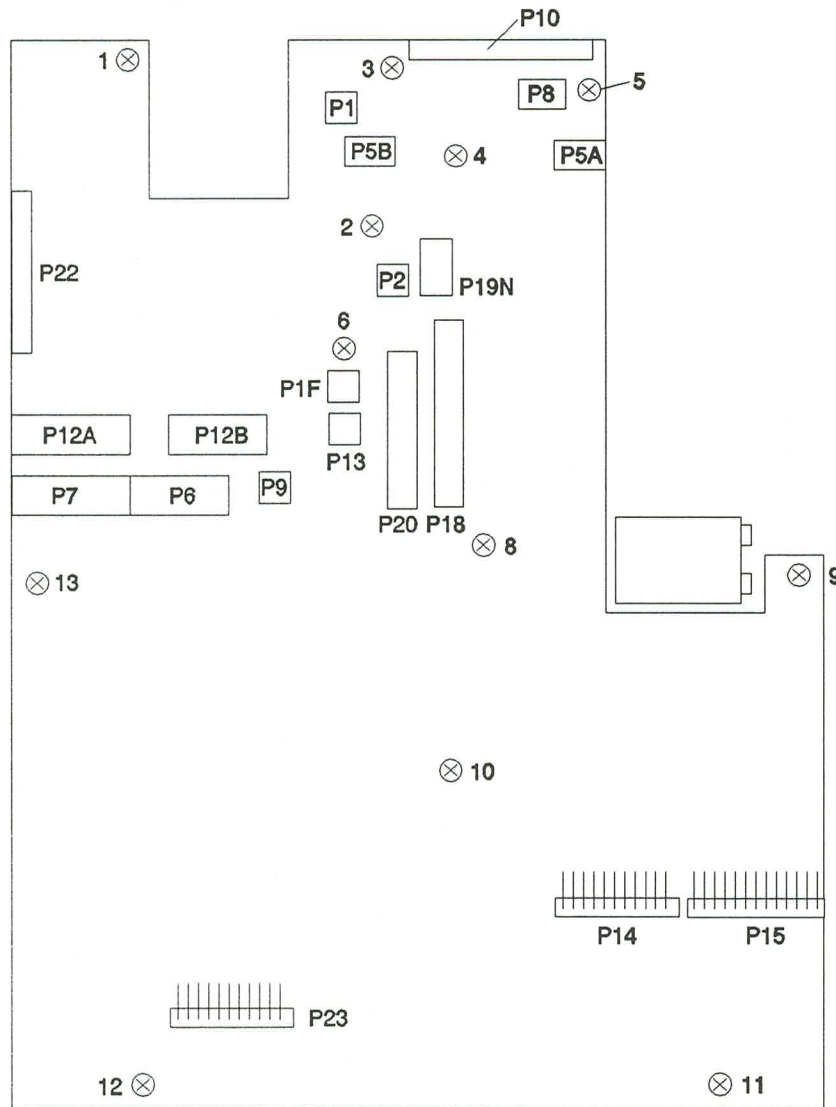


Figure 4-7. Main Logic Board (MLB) Locator Diagram

Removing the Display Assembly

Figure 4-8 shows the portion of the MLB where the left display assembly cable plug is attached. To remove the display, follow these steps.

NOTE: The following procedure indicates LCD display connector P7. For a plasma display, the plug is in connector P6 [6].

1. Pull the two connector unseating levers [1] (one at each end of the display/MLB connector P7) towards the front of the computer. This pries the plug out of the connector socket, allowing easier removal from the connector.
2. Unplug the display cable plug [2] from P7. Note that there is still a display cable ground wire [3] attached to the computer.
3. Remove the 6-32 X 5/16 inch screw [4] holding the display cable ground wire. The left side of the display assembly [5] is now detached

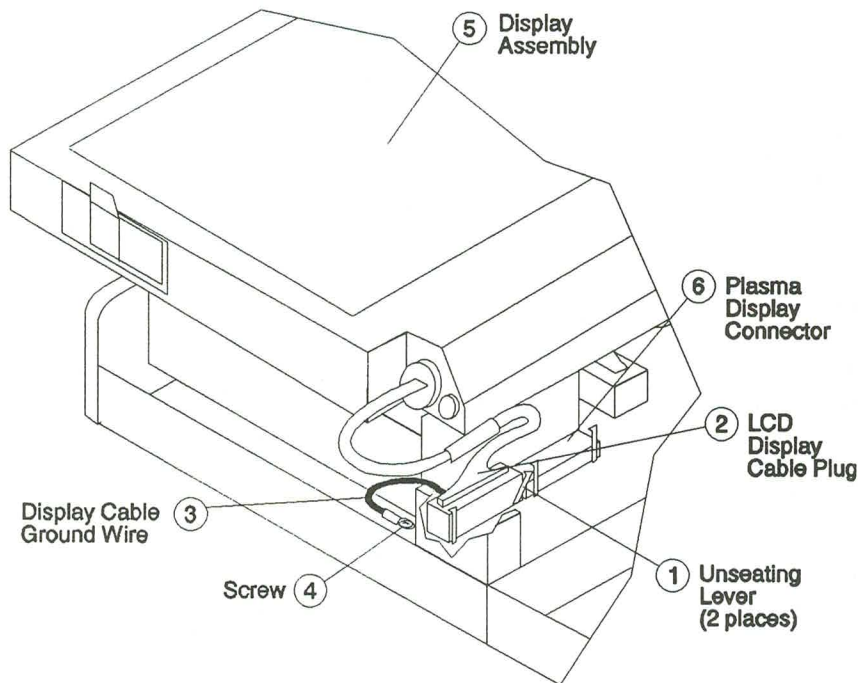


Figure 4-8. Removing the Left Display Assembly Cable

Figure 4-9 shows the portion of the computer where the right display cable is attached. The following steps allow you to disconnect this side of the display.

NOTE: Computers with a plasma display have the display power wire [1] plugged into P9 [2] on the MLB. There is no extension cable [3] with this display.

4. Remove the 6-32 x 5/16 inch screw [4] from the front side of the right hinge ear.
5. Loosen the 6-32 x 3/8 inch screw [5] that fastens the back side of the right hinge ear.
6. Remove the hinge ear. This will allow access to the ground wire and power wires that form the right display cable.
7. Remove the 6-32 x 1/4 inch screw fastening the ground wire to the to the ground connection [6] on the MLB.
8. Unplug the power wire [1] from the extension cable [3], located at the rear of the battery. (This connector has a small releasing lever that must be pressed.) The display is now detached and may be set aside on some padding.

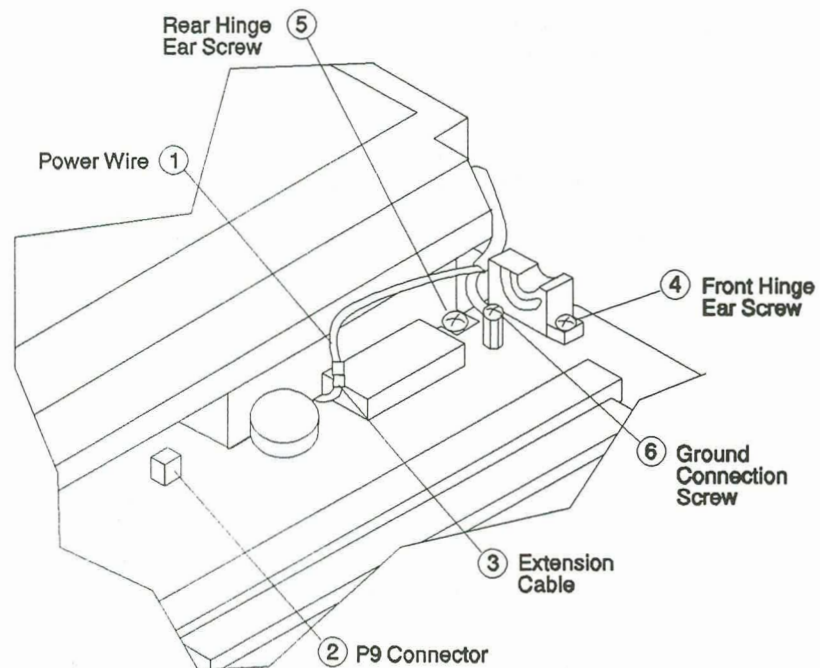


Figure 4-9. Removing the Right Display Assembly Cable

Removing the Keyboard

Perform the following steps to remove the keyboard (see Figure 4-10):

CAUTION

When handling the keyboard assembly, be very careful of the Isopoint mechanism on the front of the keyboard. It is fairly fragile, and care must be taken not to bend the rods or apply undue pressure to the switches.

1. Remove the four 6-32 x 5/16 inch fillister head Phillips screws [1] holding the latch pockets [2] on each side of the keyboard. Remove the pockets.
2. Remove the two 6-32 x 1/4 inch screws [3] from the keyboard retainer tabs.

CAUTION

Perform the following steps with care. There will be some resistance from the three keyboard cables which are attached to the MLB. Do not raise the keyboard assembly high enough to put a strain on the cables and/or the connectors.

3. Tilt the keyboard assembly [4] up on the right side until you can reach in and disconnect the two blue keyboard cable connectors [5] from the MLB connectors P14 and P15. To do this, carefully push the connectors towards the rear of the computer, off of the wire pins.
4. Lift the keyboard up and move it towards the rear. The black Isopoint cable plug [6] is now accessible and can be pushed to the rear. This releases it from the MLB connector P23.

The keyboard is now free and can be set aside.

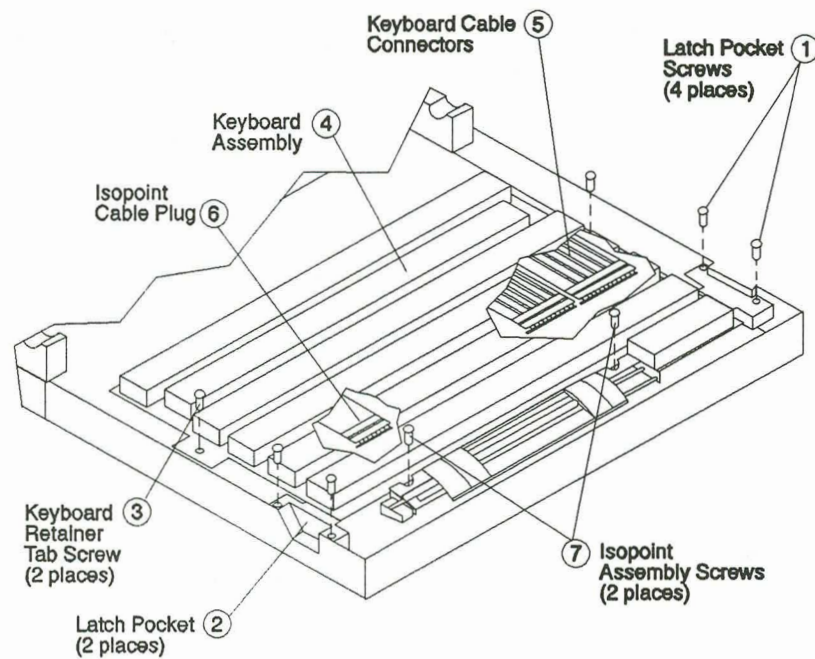


Figure 4-10. Keyboard and Isopoint Removal

Removing the Isopoint Assembly

If the Isopoint assembly needs to be replaced, proceed with this procedure (still referring to Figure 4-10). If replacement is not needed, leave the assembly attached to the keyboard assembly, and skip to the next procedure, Removing the Modem Card and Battery Case.

1. Remove the two 6-32 x 5/16 inch screws [7] holding the Isopoint assembly in place.
2. Lift the assembly, with attached cable and plug, and remove it from the keyboard assembly frame.

Removing the Modem Card and Battery Case

Before the battery case is removed, the modem card should be removed (if one is present in the computer) to allow better access for removal of the case. The circuit board forming the backplane of the case can also be unfastened and unplugged from its connectors. Follow these steps to remove the case (see Figure 4-11).

1. Grasp the modem board [1] and gently lift it straight up, out of connector P22 [2].
2. Remove the two 4-40 x 1/4 inch screws with their self-locking nuts [3] securing the backplane printed wiring assembly to the battery case. Note the nylon washer [4] on the outside screw, as it must be replaced in this position when reinstalling the assembly.
3. Lift the backplane assembly straight up, removing it from the connectors P12A and P12B on the MLB.
4. Remove the 6-32 x 1/4 inch securing screw [5] from the battery case. (This is screw 6, Figure 4-7.) Note the board clamp under the securing lug, and take care not to misplace it.
5. Check that the 6-32 x 5/16 inch screw [6] securing the case has been removed. (This screw should already be out, since it was removed when unfastening the left display cable ground wire.)
6. Disconnect the 2-wire plug [7] that connects the fan to connector P1F on the MLB.
7. Lift the battery case [8] out of the computer and set it aside.

Underneath the battery case are two small black plastic parts, secured by the case. These are the battery pack release button [9] and the battery release latch (with attached spring) [10].

9. Remove the battery release button and the battery release latch.

NOTE: This is a good time to clean the fan blades if they are dirty. See the cleaning procedure under Preventive Maintenance, presented earlier in this chapter.

The fan assembly can be replaced at this time if it is inoperative. (This can be determined by operating the computer with the ac/dc power supply installed internally. The fan motor can be heard under these conditions.)

10. Remove the fan assembly (with wire harness) by pulling the assembly free from the battery case. It is held in place by a gasket with 2-sided adhesive. A new gasket should be used when installing or reinstalling a fan assembly.

NOTE: Some fan assemblies are attached to the battery case by two 4-40 self-locking nuts. Remove these nuts to remove the assembly. Use the adhesive gasket, rather than the nuts, to secure the case when installing or reinstalling the fan assembly.

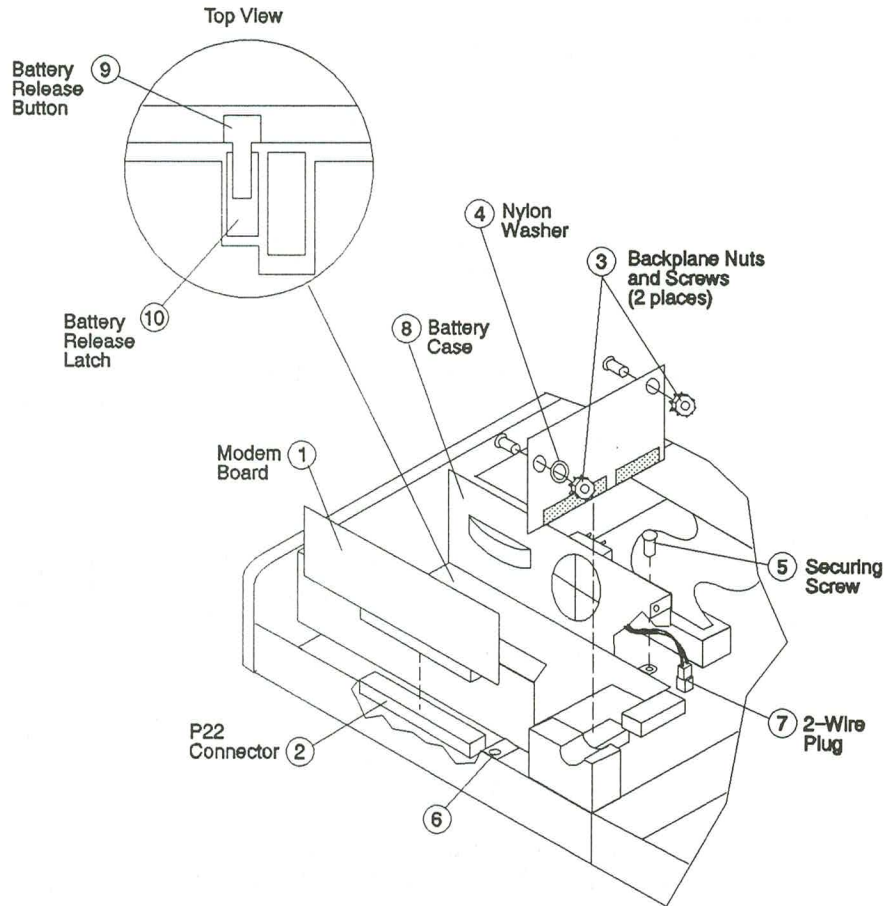


Figure 4-11. Battery Case Removal

Removing the Hard and Floppy Drive Case

This case holds the hard disk drive and the floppy diskette drive. The case also has a shielded section attached, containing the backlight power supply assembly and the dc/dc converter assembly. (When the computer is configured with a plasma screen, there is no backlight power supply assembly.) Perform the following steps to remove the case (see Figure 4-12):

CAUTION

Be sure to wear an anti-static wristlet (attached to an anti-static pad by a ground wire) when handling the hard disk drive, the diskette drive, or the case containing them. There are several exposed connector pins, and a static discharge to the pins will damage the drives.

1. Remove the 6-32 x 1/4 inch screw [1] and the 6/32 x 3/8 inch screw [2] on the side of the drive case. Note that screw [1] (screw 8, Figure 4-7) has a board clamp under it.
2. Remove the two 6-32 x 1/4 inch screws [3 and 4] on the other side of the drive case. These are accessible through the holes [5] in the top of the assembly shield.
3. Remove the cable plug for the diskette drive [6] from connector P20 on the MLB. To do this, pull the two plug release levers [7] sideways. These levers are located on each end of the plug. This lifts the plug out of the connector enough that it can be easily disconnected with the fingers.
4. Remove the cable plug for the hard disk drive [8] from connector P18 on the MLB. This plug also has release levers, similar to those in step 3.
5. Remove the 2-wire plug [9] from connector P2 on the MLB. (This allows access for removal of the next plug.)
6. Remove the 6-wire plug [10] from connector P19N on the MLB. (This is directly behind the P2 connector socket.)

CAUTION

Lift the drive case straight up in the following step, as the dc/dc converter assembly has two attached plugs [11]. The pins on these plugs (that plug into connector sockets P5A and P5B) will be damaged if they are not unplugged before the case is moved forward.

7. Lift the drive case up carefully, and move it forward enough to disconnect the plug [12] from connector socket P8. The case is now free to lift out of the computer and be set aside.

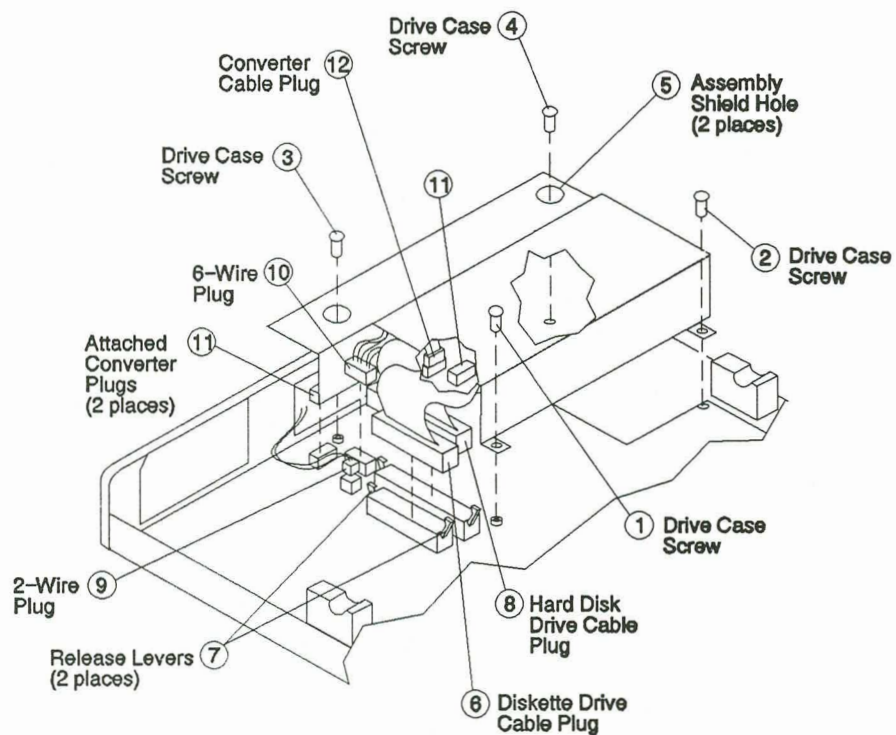


Figure 4-12. Drive Case Removal

Removing the Drive Case Printed Wiring Assemblies

The dc/dc converter assembly and the backlight power supply assembly are attached to the shielded section at the side of the drive case.

NOTE: If a plasma screen is installed, steps 1 and 2 are omitted as there is no backlight power supply assembly.

Perform the following steps to remove these two assemblies (see Figure 4-13):

1. Remove the 6-32 x 1/4 inch screw and its plastic washer [1] that holds the backlight power supply assembly [2] to the side of the drive case. (Note there are still two snap-type standoff retainers holding the board to the case.)

NOTE: Some power supplies may have one or more of the snap-type standoff retainers replaced by standoffs with retaining screws. All retaining screws are the same as [1], above.

CAUTION

When unsnapping the assemblies, use only your fingers. **Do not pry the board free from the standoff retainers with tools** as the bottom of the board, or the components on it, may be damaged.

2. Unsnap the power supply from the two remaining standoff retainers [3]. The assembly can then be set aside.

The dc/dc converter assembly [4] is also attached to the disk drive case. The next step removes this assembly.

3. Unsnap the assembly from the two standoff retainers [5]. The assembly can then be set aside.

Removing the Hard Disk and Diskette Drives

CAUTION

Be sure to wear an anti-static wristlet (attached to an anti-static pad by a ground wire) when handling the hard disk drive, the diskette drive, or the case containing them. There are several exposed connector pins, and a static discharge to the pins will damage the drives.

Removal of the individual drives may be needed after running their individual diagnostic tests. If this is not necessary, the drives may be left in the drive case. If their removal is necessary, perform the following steps:

1. Place the drive case in the position shown in Figure 4-14.
2. Remove the four 3 x 6mm flat head screws [1] holding the floppy diskette drive in the case [2].

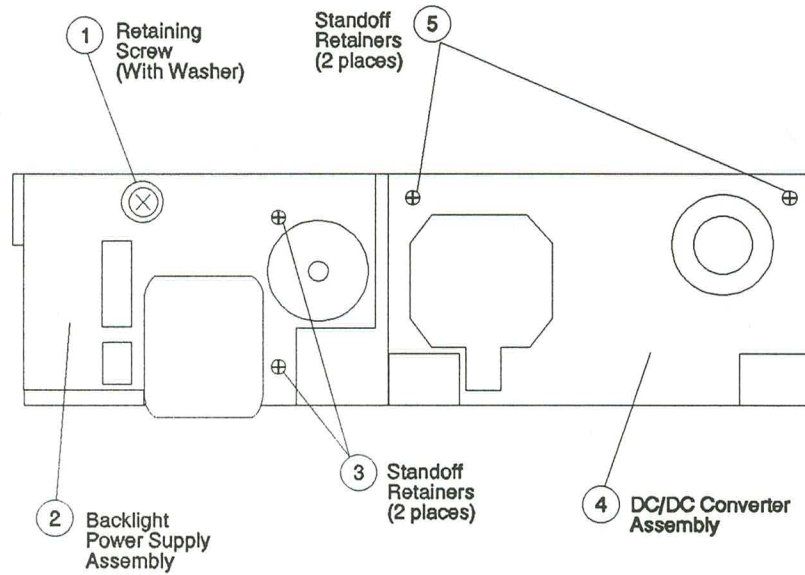


Figure 4-13. Drive Case Printed Wiring Assemblies

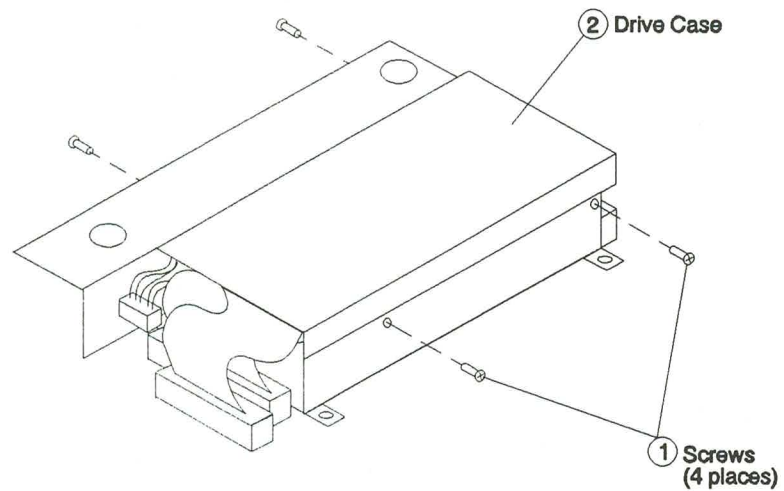


Figure 4-14. Floppy Diskette Drive Removal

3. Turn the case over (with the loose floppy diskette drive still in place) to the position shown in Figure 4-15.
4. Remove the four 6-32 x 1/4 inch screws [1] holding the hard drive in place. The drive case is now free, and can be lifted straight up and set aside.

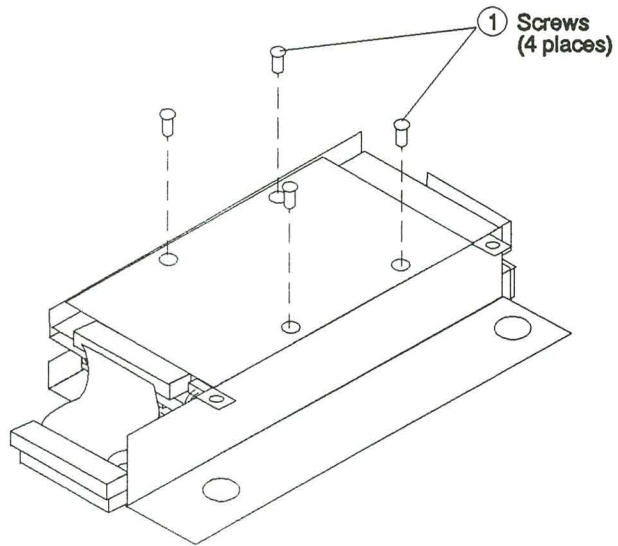


Figure 4-15. Hard Disk Drive Removal

The 2 drives and the case cover are shown in Figure 4-16.

5. Disconnect the hard drive connector [1] (which is a part of the drive interconnect harness [2]) from the hard drive [3]. Be sure to grasp the plug to remove it; do not grasp the wires.
6. Lift the hard drive free and set it aside.
7. Disconnect the floppy drive connector [4] from the floppy diskette drive [5]. (This is necessary only if the diskette drive is going to be replaced.) This now frees the drive interconnect harness and the floppy drive, along with the drive case cover, [6], allowing them to be set aside.

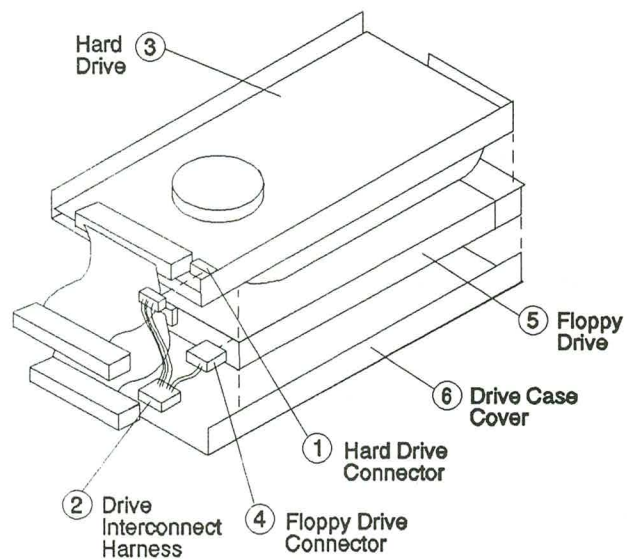


Figure 4-16. Drive Harness Removal

Removing the Rear Panel Casting

The rear panel printed wiring assembly is attached to the rear panel casting. Since the assembly is also attached to the MLB by a long connector, it is easier and safer to detach the casting from the wiring assembly before removing it. Perform the following steps to remove the casting (see Figure 4-17):

1. Remove the plastic connector cap [1] from the parallel connector.
2. Remove the ten standoff connectors [2] that hold the rear panel casting [3] to the five connectors. Use the 3/16-inch nutdriver for this.

NOTE: The nutdriver used in this procedure may have to be machined to a smaller outside diameter to allow its use in the restricted space around the connectors. As an alternative, special thin-walled nutdrivers are available at some hardware stores.

4. Remove the two 6-32 x 1/2 inch securing screws [4] from the back of the rear panel casting.
5. Remove the black 4-40 x 5/16 inch flat head screw [5] fastening the bottom of the assembly. (The carrying handle will have to be swiveled down, and the back of the computer tilted up to gain access to this screw.)
6. Remove the three 6-32 x 1/4 inch screws [6] securing the rear panel wiring assembly to the casting.
7. Disconnect the 2-wire plug [7] that connects the dc input plug on the rear panel casting to connector P1 on the MLB.
8. Remove the rear panel casting, pulling it towards the rear and up, and set it aside.

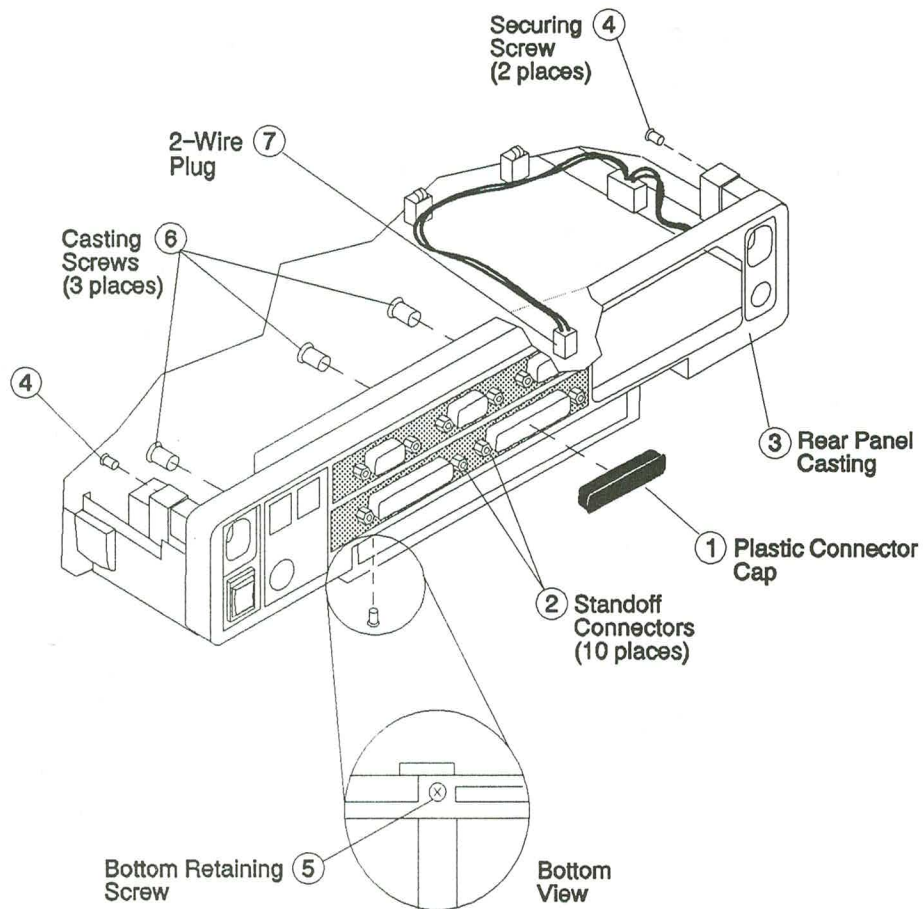


Figure 4-17. Rear Panel Casting Removal

Removing the Rear Panel Assembly

Perform the following steps to remove the rear panel printed wiring assembly (see Figure 4-18):

1. Remove the two 6-32 x 1/4 inch screws [1] and [2] that hold the assembly to the MLB. Screw [1] (screw 3, Figure 4-7) has a board clamp under it.

NOTE: Screw [2] (screw 5, Figure 4-7) fastens the rear panel assembly to the MLB, but it is not a securing screw for the MLB.

2. Check that the 2-wire plug [3] going to P2 on the MLB is unplugged. (This should have been done in a previous step, Removing the Hard and Floppy Drive Case.)

CAUTION

When performing the following step, use your thumb to hold down the corner of the MLB that is near the connector. This will prevent the MLB from bending upwards, and possibly breaking a trace on the board.

3. Lift the assembly straight up, removing the connecting plug [4] from P10, the long connector on the MLB. The assembly can be set aside.

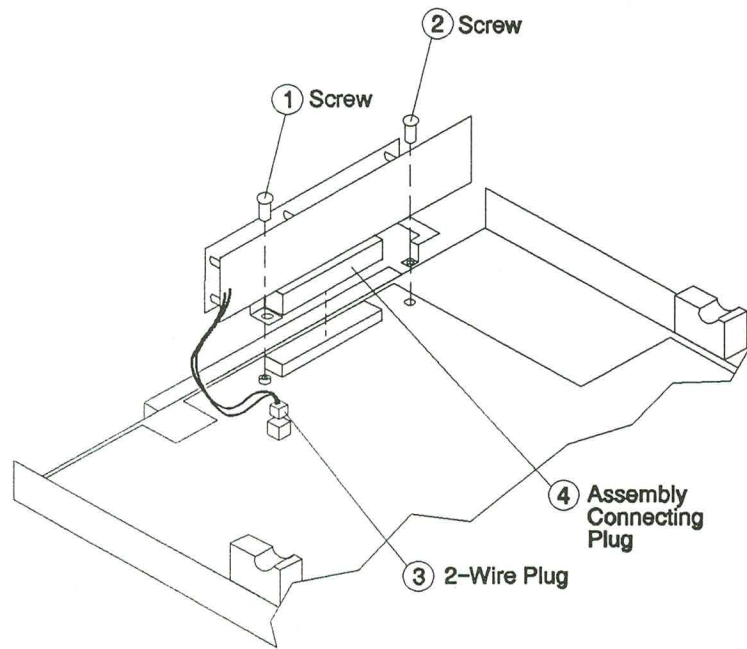


Figure 4-18. Rear Panel Assembly Removal

Removing the Main Logic Board

The main logic board (MLB) is secured to the computer base by 10 screws and a standoff serial connector, all with keeper-sleeves under them (see Figure 4-19).

1. Remove the six 6-32 x 1/4 inch screws [1, 2, 10, 11, 12, and 13] along with the standoff serial connector [9] from the main logic board. (The remaining 4 screws have been previously removed when removing assemblies.)
2. Remove the battery [7] which is secured to the base with a velcro fastener. It need not be disconnected at this time. Move it, with its connecting wire, to an open space on the MLB.
3. Lift the MLB up and out of the base and place it in anti-static packaging.

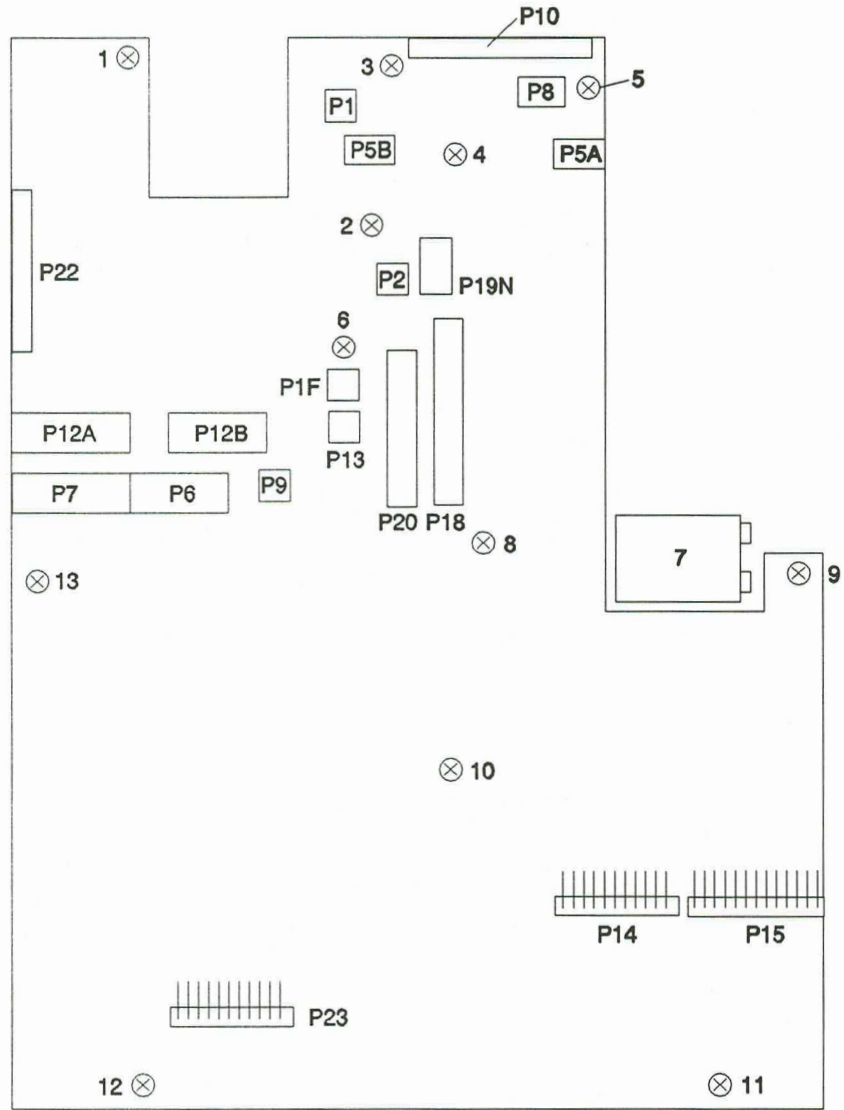


Figure 4-19. Main Logic Board Removal

Reassembly Instructions

It is not necessary to go through the entire previously covered disassembly procedure each time the computer is serviced. Only go through the steps, in order, until the problem area is reached. By the same logic, reassembly may start at any point.

When installing the assemblies on the computer, tighten all screws firmly. Be careful, however, not to overtighten them, as threads can be stripped in the magnesium case as well as in any plastic fastening points.

To reassemble the computer, perform the disassembly steps in reverse order. The following sections give suggestions or hints to aid in the reassembly.

Replacing Parts on the Computer Base

The removal of the main logic board (MLB) offers a good opportunity to check for any problems with the computer base. Following are some of the areas that should be inspected and corrected, if necessary:

1. Check the base, making certain that the plastic insulator sheet, which is under the MLB, does not fall out and get lost.
2. Check the two plastic feet on the bottom of the base assembly. If a foot is cracked or broken, or if the retaining tabs (inside the base) are damaged, remove the foot, and press in a new one.
3. Check that the display hinge ear assemblies are not broken nor cracked. If they are, they should be replaced by removing the two screws that hold the damaged ear assembly. Note that there is a left and a right assembly.

Installing the Main Logic Board

Refer to Removing the Main Logic Board in this chapter. Perform the steps in reverse order and see Figure 4-19.

Check to make certain the plastic insulator sheet is in place beneath the MLB. Secure the MLB to the computer base with board clamps and screws. When the MLB is secure, move the battery to its proper position, and press it into the velcro fastening.

Installing the Rear Panel Assembly

Refer to Removing the Rear Panel Assembly in this chapter. Perform the steps in reverse order and see Figure 4-18.

Plug the long plug into the MLB connector P10 very carefully, as there are many small pins, and they could get bent or broken if care is not taken. If all screws were replaced when fastening the MLB, screw 3 will have to be removed to secure the assembly bracket.

If a new assembly is being installed, be sure to install the plastic connector cap (connector #5) and the plastic pin plug (connector #4) onto the new assembly.

Installing the Rear Panel Casting

Refer to Removing the Rear Panel Casting in this chapter. Perform the steps in reverse order and see Figure 4-17.

Installing the Hard Disk and Diskette Drives

CAUTION

Be sure to wear an anti-static wristlet (attached to the pad by a ground wire) when handling the hard disk drive, the diskette drive, or the case containing them. There are several exposed connector pins, and a static discharge from you will damage the drives.

Refer to Removing the Hard Disk and Diskette Drives in this chapter. Perform the steps in reverse order and see Figures 4-14, 4-15, and 4-16.

Installing the Drive Case Assemblies

Refer to Removing the Drive Case Assemblies in this chapter. Perform the steps in reverse order and see Figure 4-13.

Inspect the snap-type standoffs after each assembly has been reattached. Make certain the assembly is completely seated against the flange on the standoffs..

Installing the Hard and Floppy Drive Case

CAUTION

Be sure to wear an anti-static wristlet (attached to the pad by a ground wire) when handling the hard disk drive, the diskette drive, or the case containing them. There are several exposed connector pins, and a static discharge from you will damage the drives.

Refer to Removing the Hard and Floppy Drive Case in this chapter. Perform the steps in reverse order and see Figure 4-12.

Plug the connector into P8 on the MLB. Then carefully lower the case straight down into position to be sure that the plugs on the assembly line up with connectors P5A and P5B on the MLB. When seating the connectors into P18 and P20 on the MLB, push them completely down until the release levers snap in to lock the connectors in place.

Installing the Battery Case and Modem Card

If a fan assembly is to be installed, attach it to the battery case with the 2-sided adhesive gasket shown in Table 4-1.

Refer to Removing the Modem Card and Battery Case in this chapter. Perform the steps in reverse order and see Figure 4-11.

Seat the connectors on the battery case back plane very carefully into connectors P12A and P12B on the MLB. These connections have very small pins, which could be bent or damaged if care is not taken.

If a modem card is to be installed, note that it can only be seated one way (with the major components facing outwards) because of the placement of the plug and connector.

Installing the Isopoint Assembly

Refer to Removing the Isopoint Assembly in this chapter. Perform the steps in reverse order and see Figure 4-10.

Place the Isopoint assembly (with the connecting cable position the same as the one that was removed) on the keyboard assembly frame and secure it with the two screws.

Installing the Keyboard

Refer to Removing the Keyboard in this chapter. Perform the steps in reverse order and see Figure 4-10.

When all three cable connectors are plugged into the MLB connectors, reach in under the keyboard assembly from the rear and make sure that the cables are folded as compactly as possible. Take special care with the Isopoint cable, and make sure it is doubled back as far as possible towards the front of the keyboard assembly. Take care, however, not to kink the cable.

When the latch pockets have been reinstalled and the screws tightened, place the screws in the two keyboard mounting tabs, but do not tighten them yet. Lay the keyboard bezel in position (but do not snap it completely into place). Then make sure the keyboard assembly is centered in the bezel area before removing the bezel and tightening the screws in the tabs.

Preparing to Install the Display Assembly

After placing padding over the disk stack and battery case, lay the display on top of the padding, face up (see Figure 4-5). Refer to Removing the Display Assembly in this chapter. Perform the steps in reverse order and see Figures 4-8 and 4-9.

The screw [4] to secure the battery case tab will have to be removed, the ground wire placed under it, and the screw reinstalled.

The display connectors on both the LCD and plasma displays are of different sizes, and keyed so that either display plug can only be inserted correctly.

Seat the display connector plug and push it down firmly so that the unseating levers go back to the vertical position, and lock the plug in place.

Installing the Keyboard Bezel

Refer to Removing the Keyboard Bezel in this chapter. Perform the steps in reverse order and see Figure 4-6. Make sure the front edge keepers as well as the side keepers are firmly in place.

Installing the Display Assembly

Refer to Preparing for Display Assembly Removal in this chapter. Perform the steps in reverse order and see Figure 4-4.

When the display is placed into position, it may be closed and latched.

Installing the Top Cover

Refer to Removing the Top Cover in this chapter. Perform the steps in reverse order and see Figure 4-3.

CAUTION

Take care not to pinch the display cables when installing the cover. If the cables are correctly routed through the passageways in the hinge ear assemblies, this will not happen.

When tightening the screws to hold the cover, hold the cover down tightly over the computer hinge area. You should feel it snap onto a holding lug. Continued tightening of the screws retains the cover in place by pulling it tighter against the lug. At the same time, the rear edge of the cover will be pulled by the tightening screw until it is secured under the lip of the rear connector panel.

When the screws are tight, inspect the rear cover; it should be the same level as the closed display. If the cover appears higher, loosen the screws, and repeat the tightening procedure. When done correctly, the retaining lug holds the cover flush with the display assembly.

CHAPTER 5: DIAGRAMS

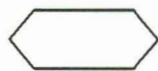
This chapter contains copies of the main logic board schematic and the rear connector panel schematic. The schematics are controlled drawings, and the drawing revision in the manual is the current revision at the time of publication.

This chapter also includes wiring diagrams for the test fixtures.

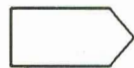
Also referenced in the chapter are the applicable assembly drawings. These drawings are listed by title and by number, and are available from GRiD Systems Corporation. However, copies of these drawings are not included in the manual.

Schematics

The interconnection symbols used on the schematics are as follows:



indicates a signal or information flow in both directions



indicates a signal or information flow in the direction of the arrow

Both of the above symbols indicate interconnection with another section of the same functional block.



indicates (when the symbol is bold) interconnection with another functional block



indicates no connection



indicates a connection on the same schematic page



indicates a test point

Main Logic Board Schematic

The main logic board schematic (Figure 5-1) is a multiple-page drawing, consisting of 62 pages.

Table 5-2 provides a listing of the area covered by each page of the 62-page schematic.

Rear Connector Panel Schematic

The rear connector panel schematic (Figure 5-2) is a multiple-page drawing, consisting of 6 pages.

Table 5-3 provides a listing of the area covered by each page of the 6-page schematic.

Expansion Bus Connector Schematic

Figure 5-5 is a schematic of the expansion bus connector, located on the backplane of the internal battery case.

Wiring Diagrams

Figures 5-3 and 5-4 are wiring diagrams of the loopback fixtures. These fixtures are used when running the diagnostic tests for the 1550sx computer.

Assembly Drawings

Table 5-1 is a listing of the assembly drawings associated with the GRIDCASE 1550sx computer. It includes the drawing number, and the title of the drawings. These drawings are listed for reference only, and are not included in this manual.

Table 5-1. Computer Assembly Drawings

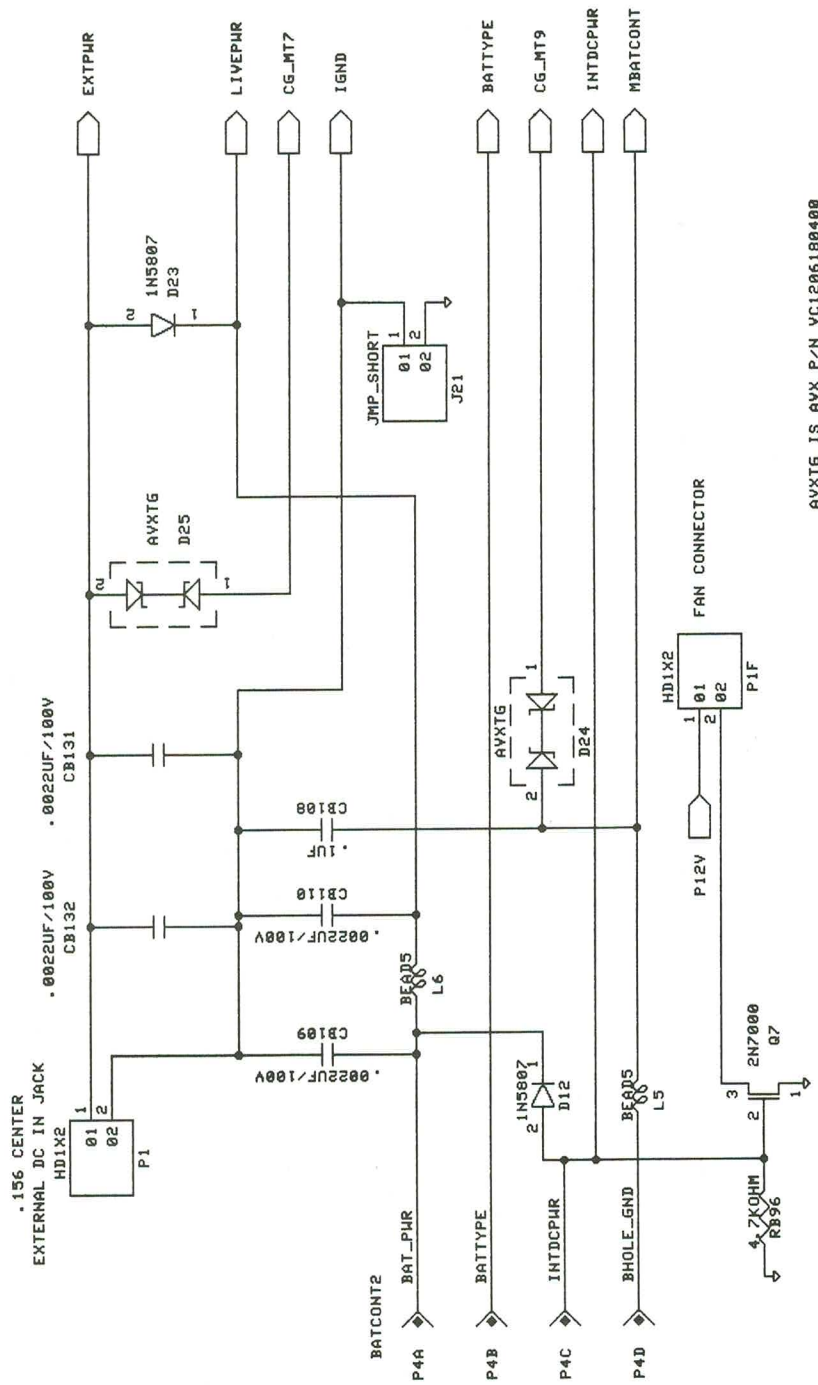
Drawing Number	Title
106231-00	Base Assembly 1550
106232-00	Rear Panel Assembly 1550
106233-00	Unit Assembly 1550
106234-00	Battery Tray Assembly

Table 5-2. Main Logic Board (MLB) Schematic Coverage

Schematic Page Number	Area of Coverage
1-4	Power
5	LEDs
6	Spare—Filter Caps
7	Mounting Holes
8	Filter Caps
9	BIOS
10-23	CPU
24	Decode
25	Ext Bus
26-28	Keyboard
29-31	Mass Storage
32	30 Volt Generator
33-37	RAM
38-39	Rear Panel
40-48	SPIO—Modem—Isopoint
49-57	Video
58-62	VT Monitor—Battery Management

Table 5-3. Rear Connector Panel Schematic Coverage

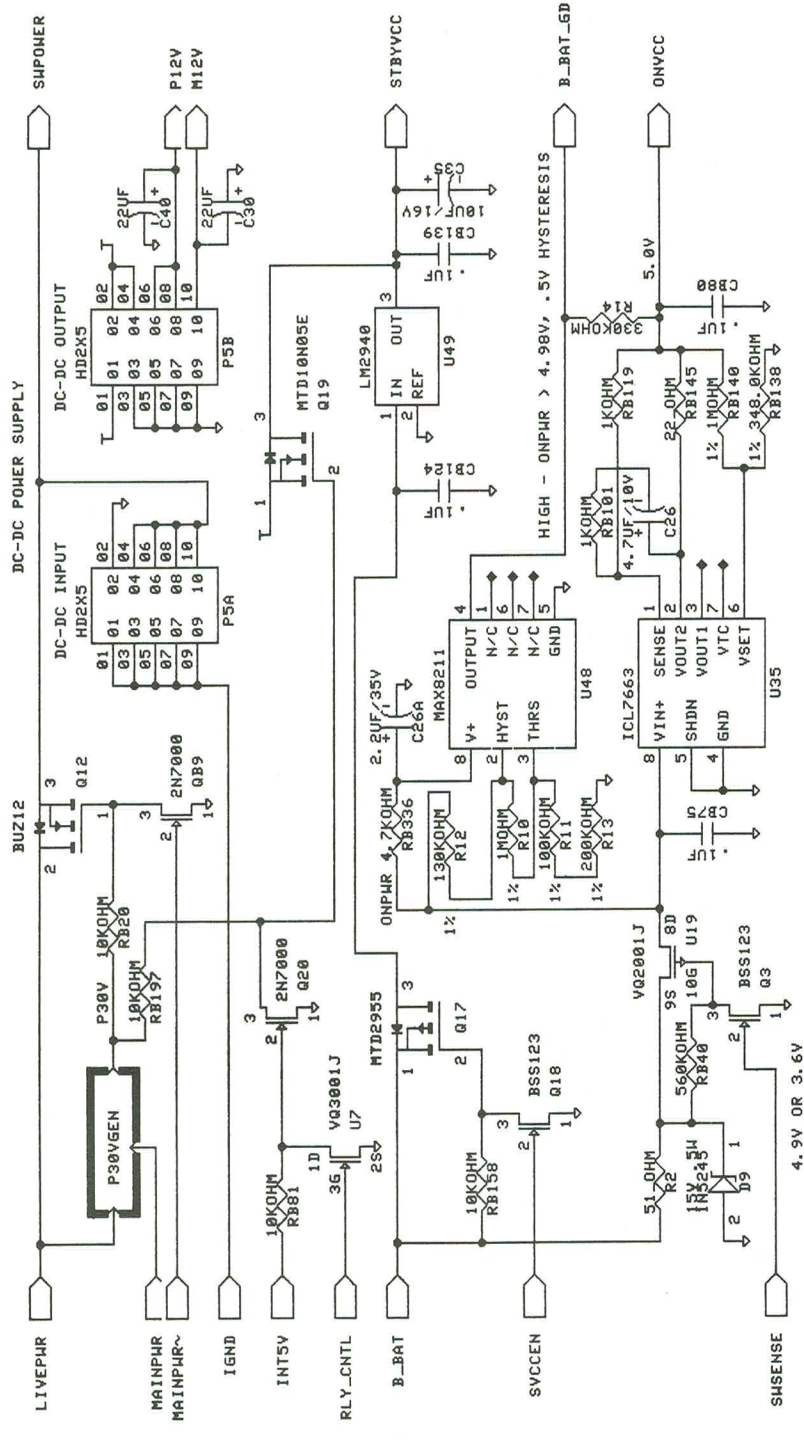
Schematic Page Number	Area of Coverage
1-2	MLB Connector
3	Serial Port A—Serial Port B
4	Monitor Connector—Keyboard Connector
5	Printer Port—Pocket Floppy Port
6	Phone Jacks



AVXTG IS AVX P/N VC1206180400

Power

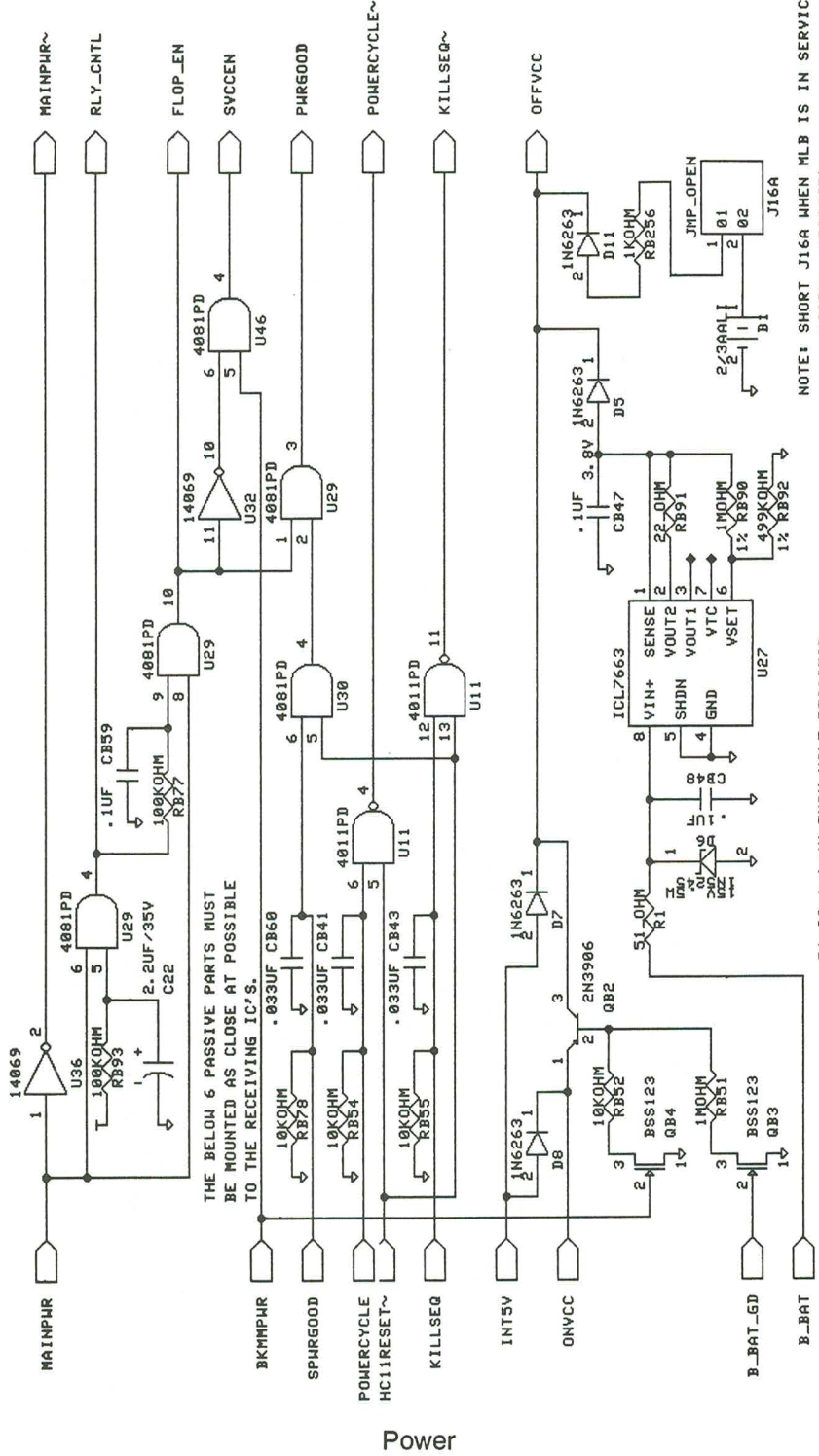
Figure 5-1. Main Logic Board Schematic (Page 1 of 62)



R2 IS A 1/4W THRU-HOLE RESISTOR

Power

Figure 5-1. Main Logic Board Schematic (Page 2 of 62)



Power

Figure 5-1. Main Logic Board Schematic (Page 3 of 62)

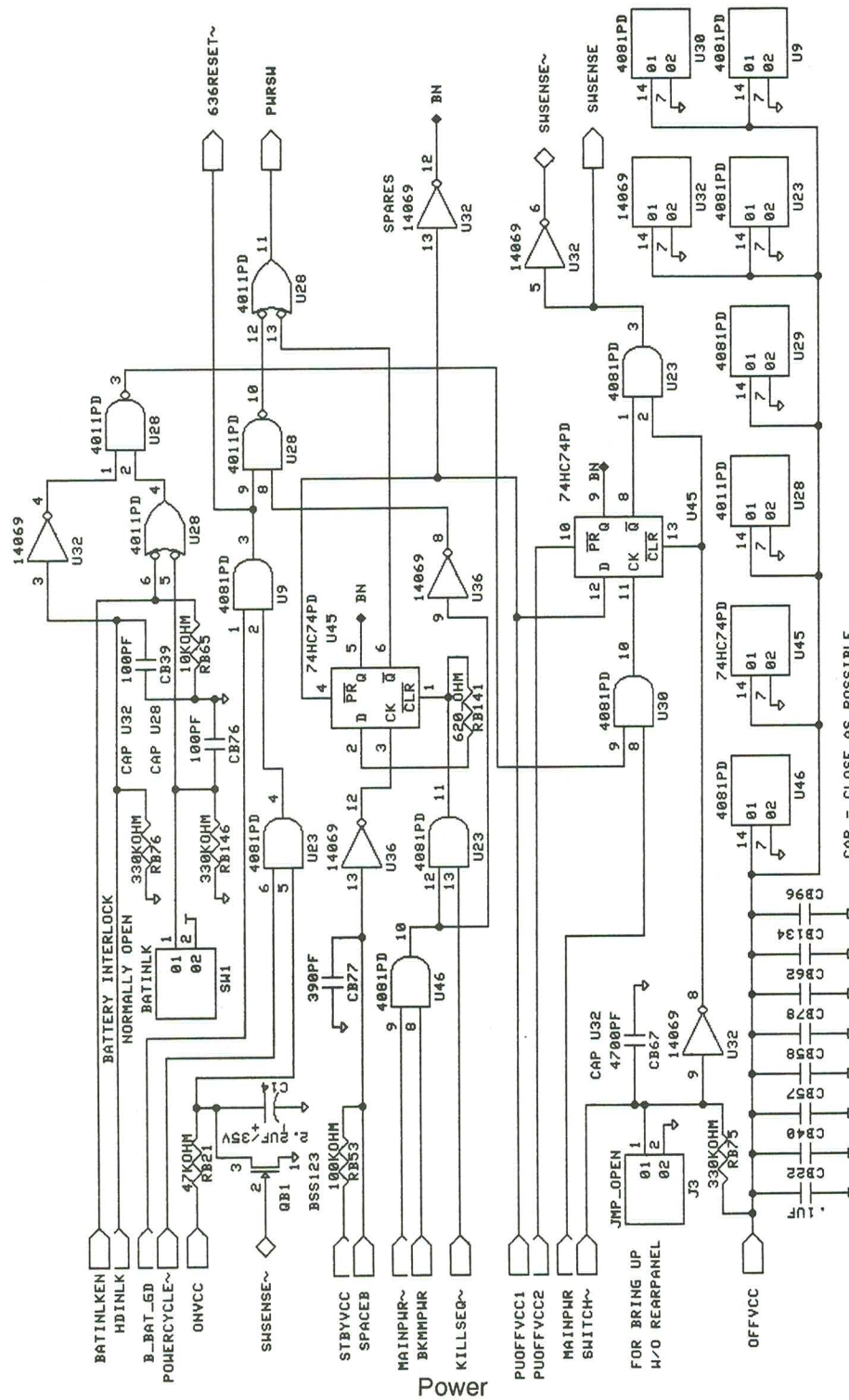
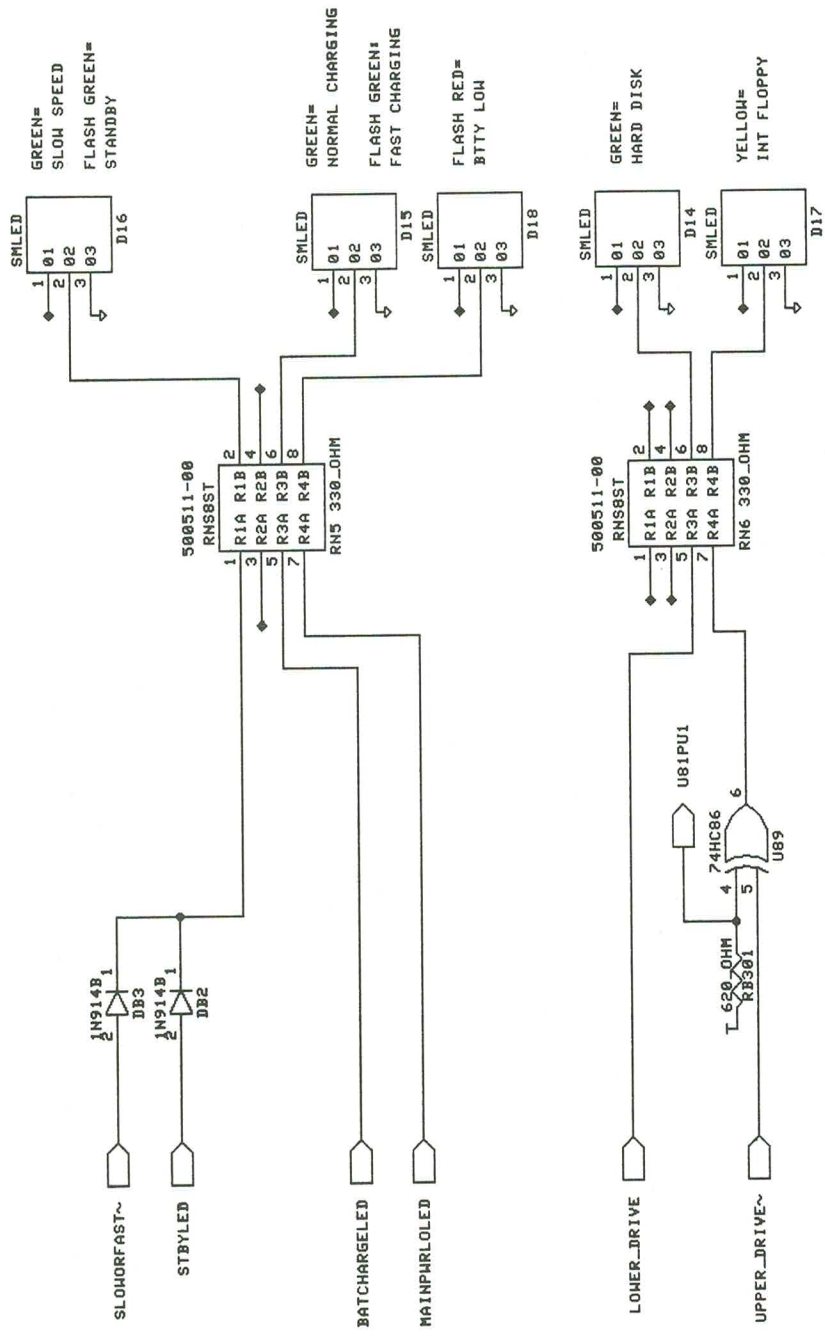


Figure 5-1. Main Logic Board Schematic (Page 4 of 62)



LEDs

Figure 5-1. Main Logic Board Schematic (Page 5 of 62)

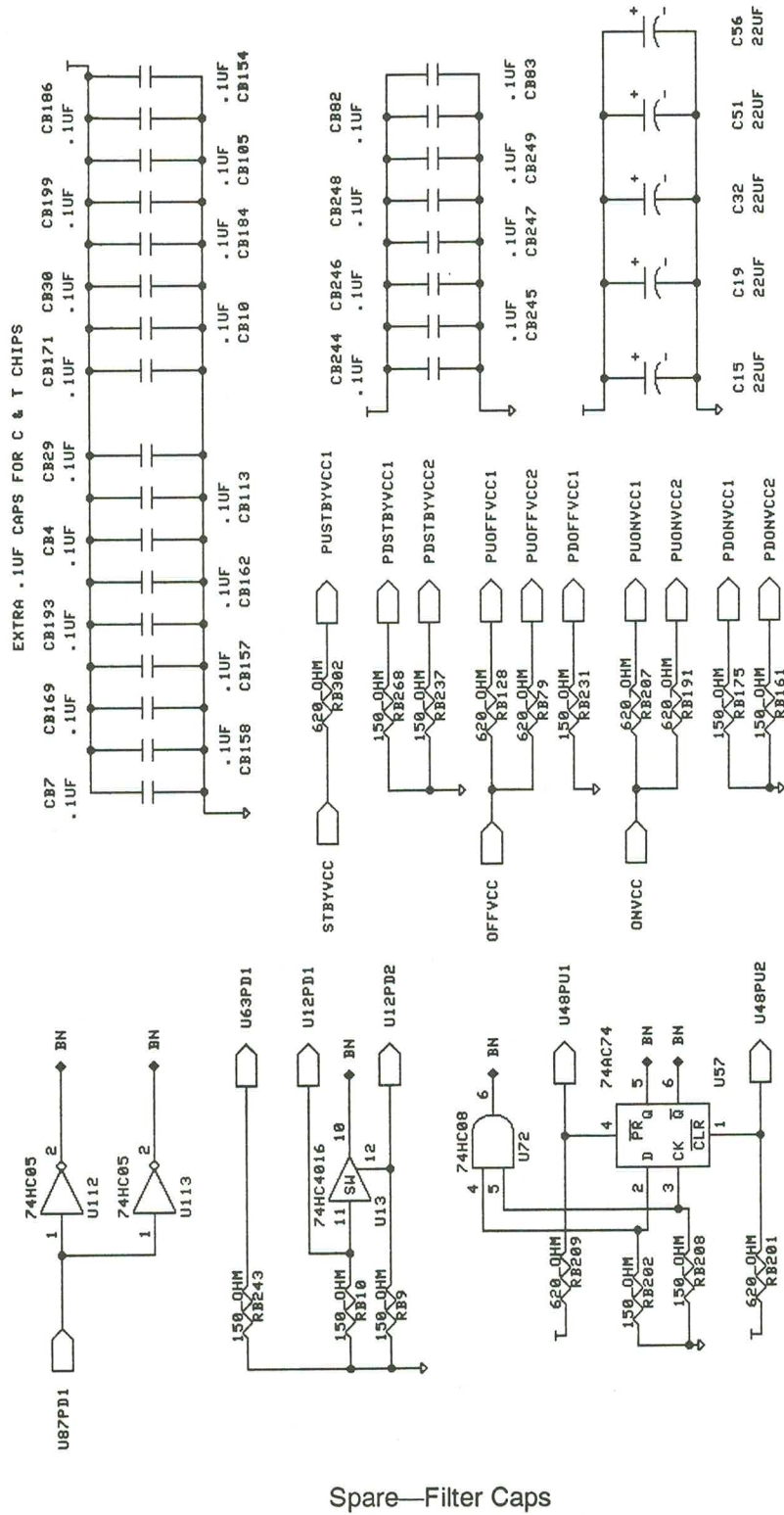


Figure 5-1. Main Logic Board Schematic (Page 6 of 62)

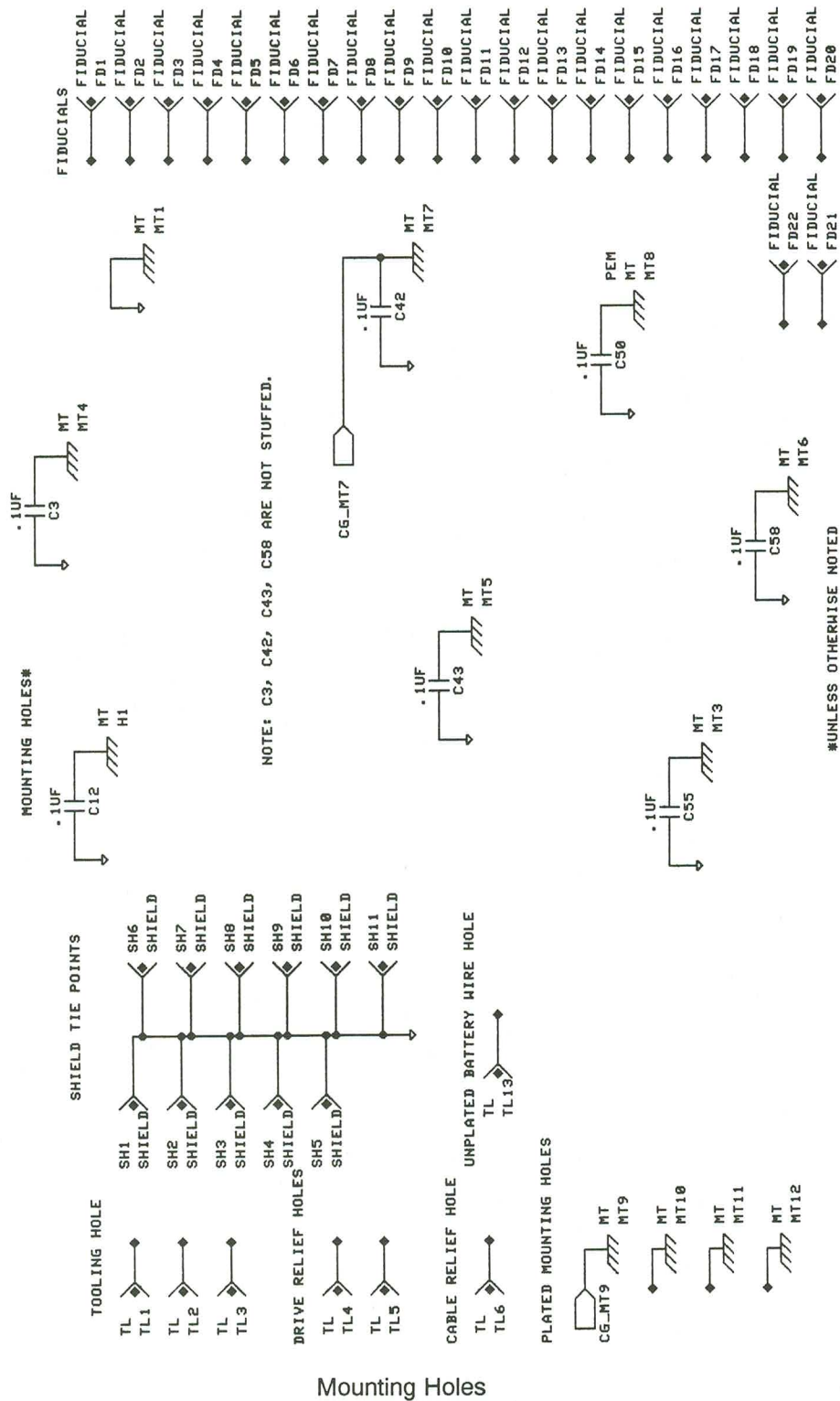
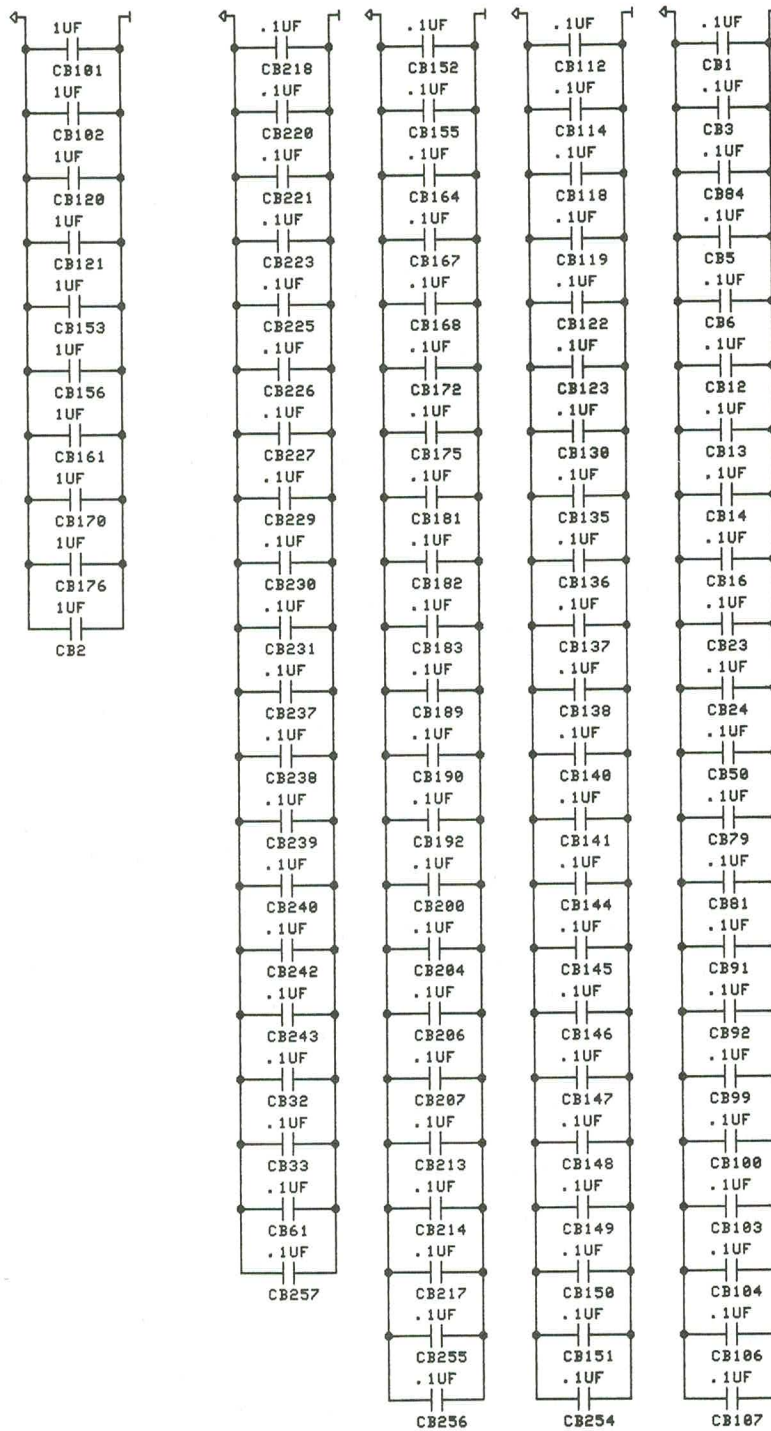


Figure 5-1. Main Logic Board Schematic (Page 7 of 62)



Filter Caps

Figure 5-1. Main Logic Board Schematic (Page 8 of 62)

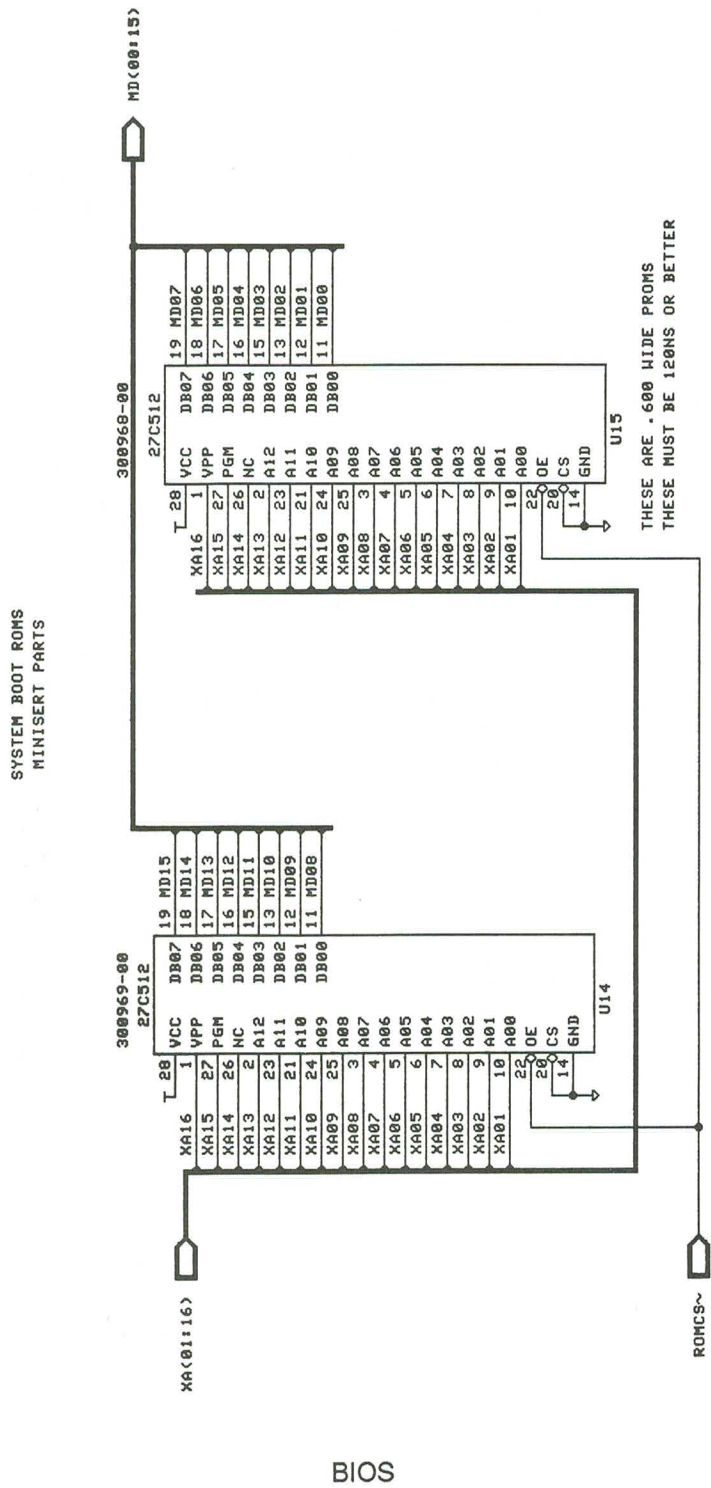


Figure 5-1. Main Logic Board Schematic (Page 9 of 62)

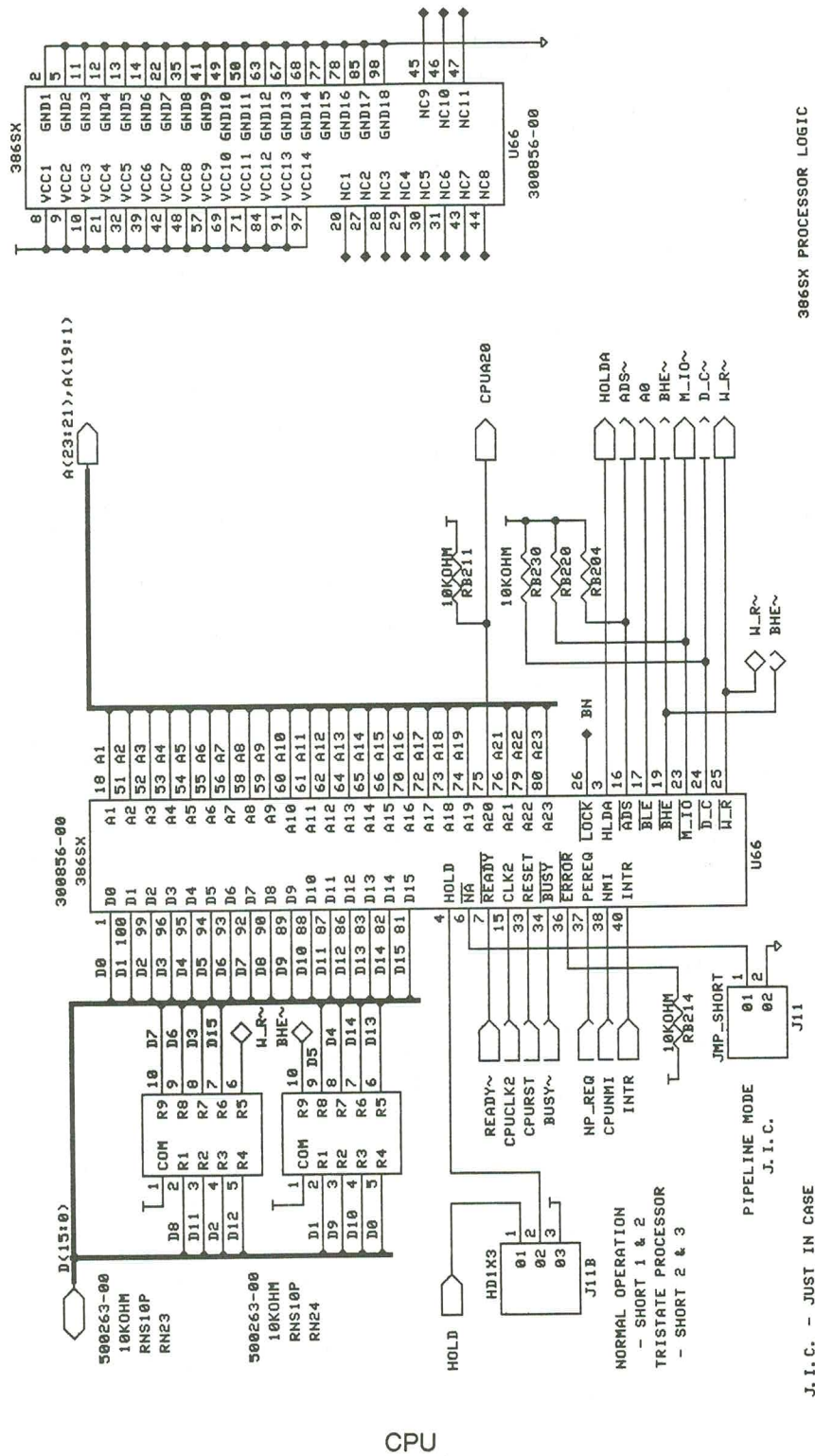


Figure 5-1. Main Logic Board Schematic (Page 10 of 62)

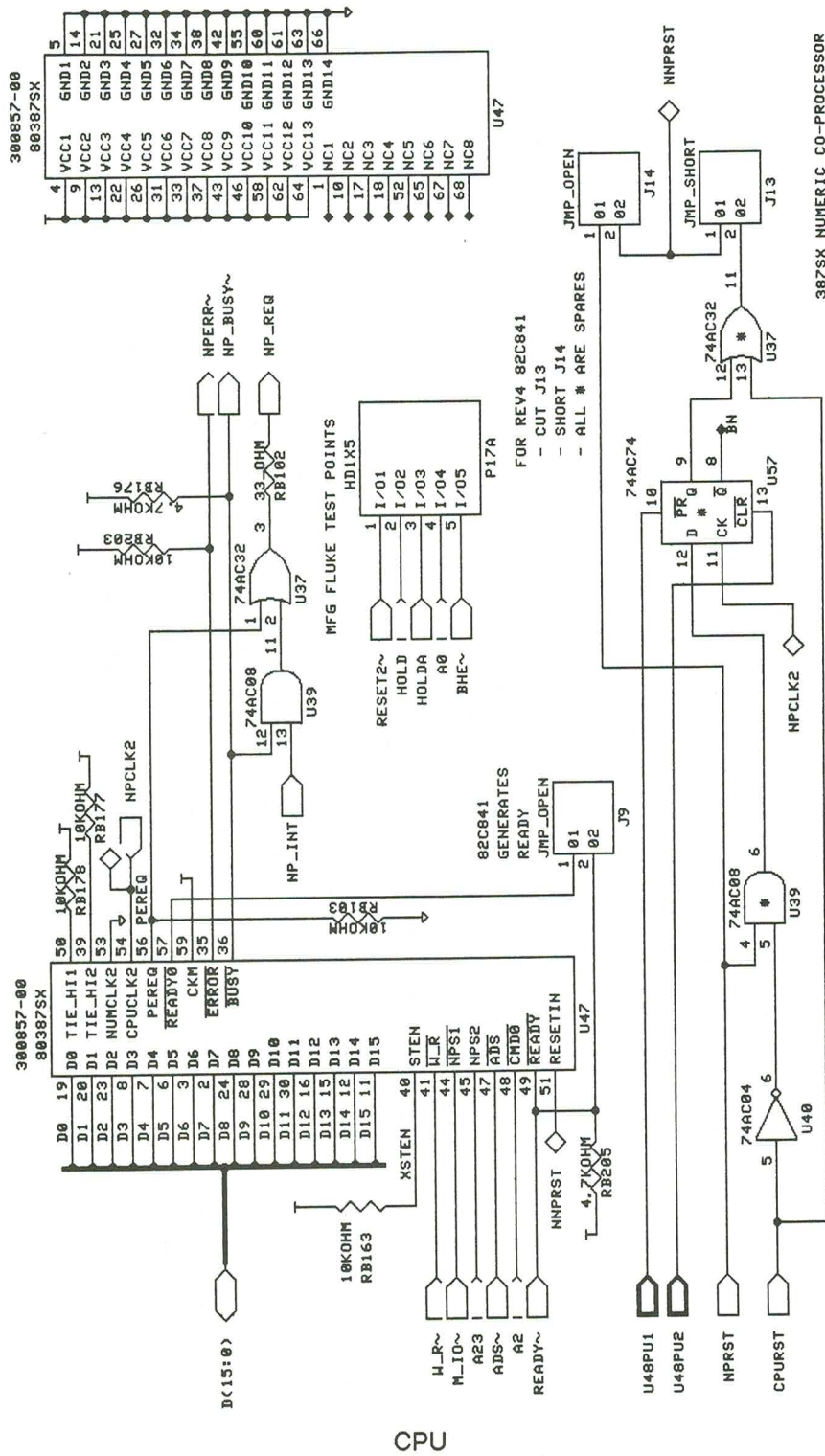


Figure 5-1. Main Logic Board Schematic (Page 11 of 62)

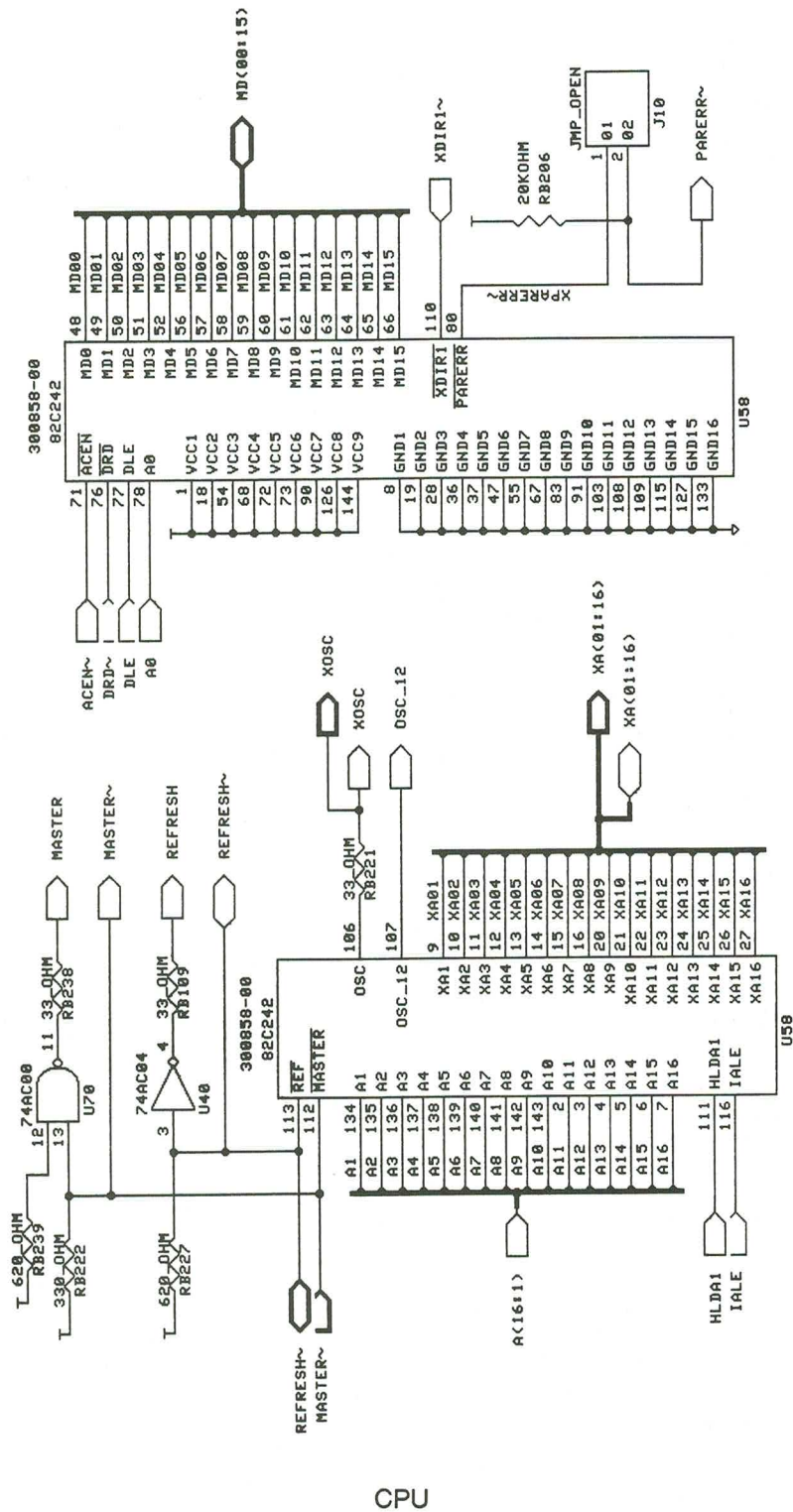


Figure 5-1. Main Logic Board Schematic (Page 12 of 62)

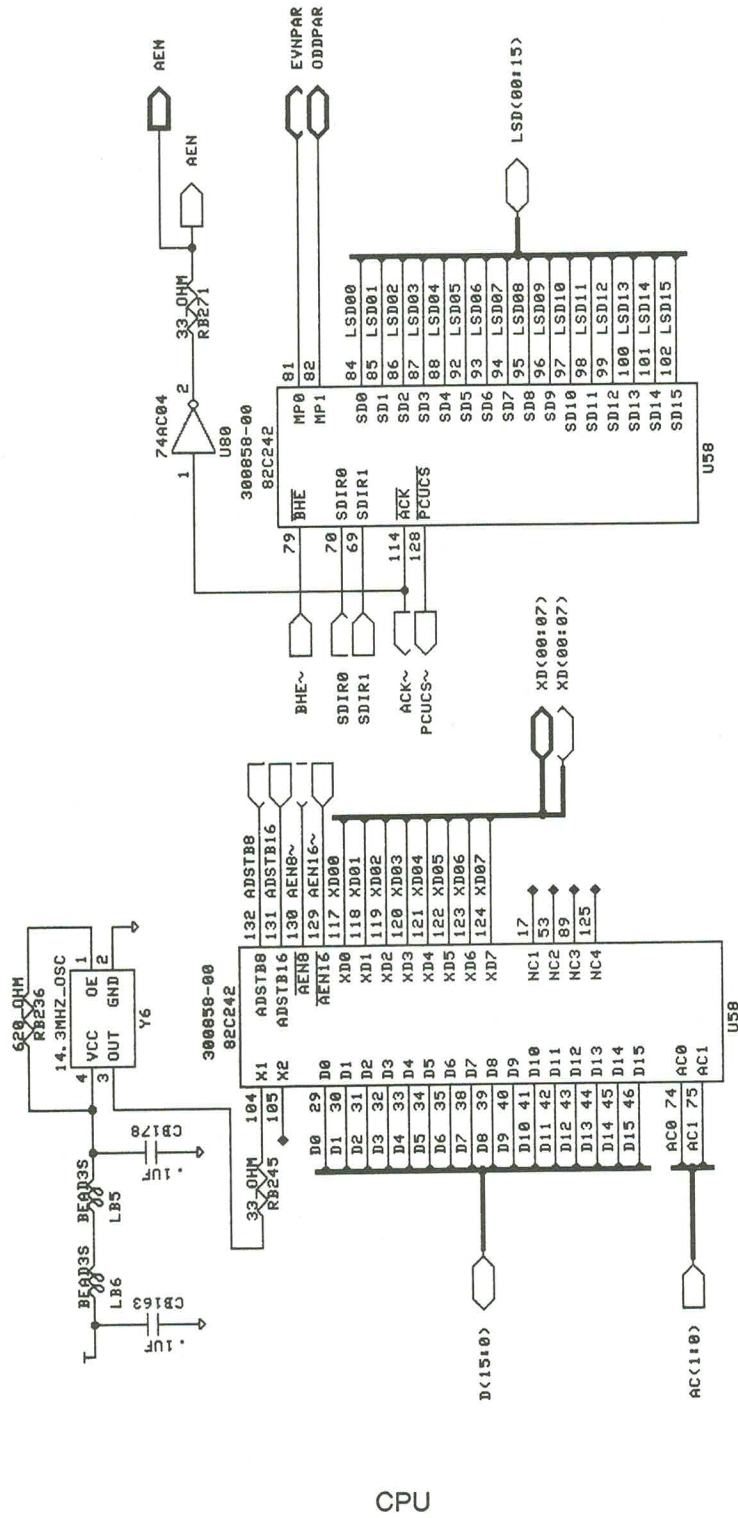


Figure 5-1. Main Logic Board Schematic (Page 13 of 62)

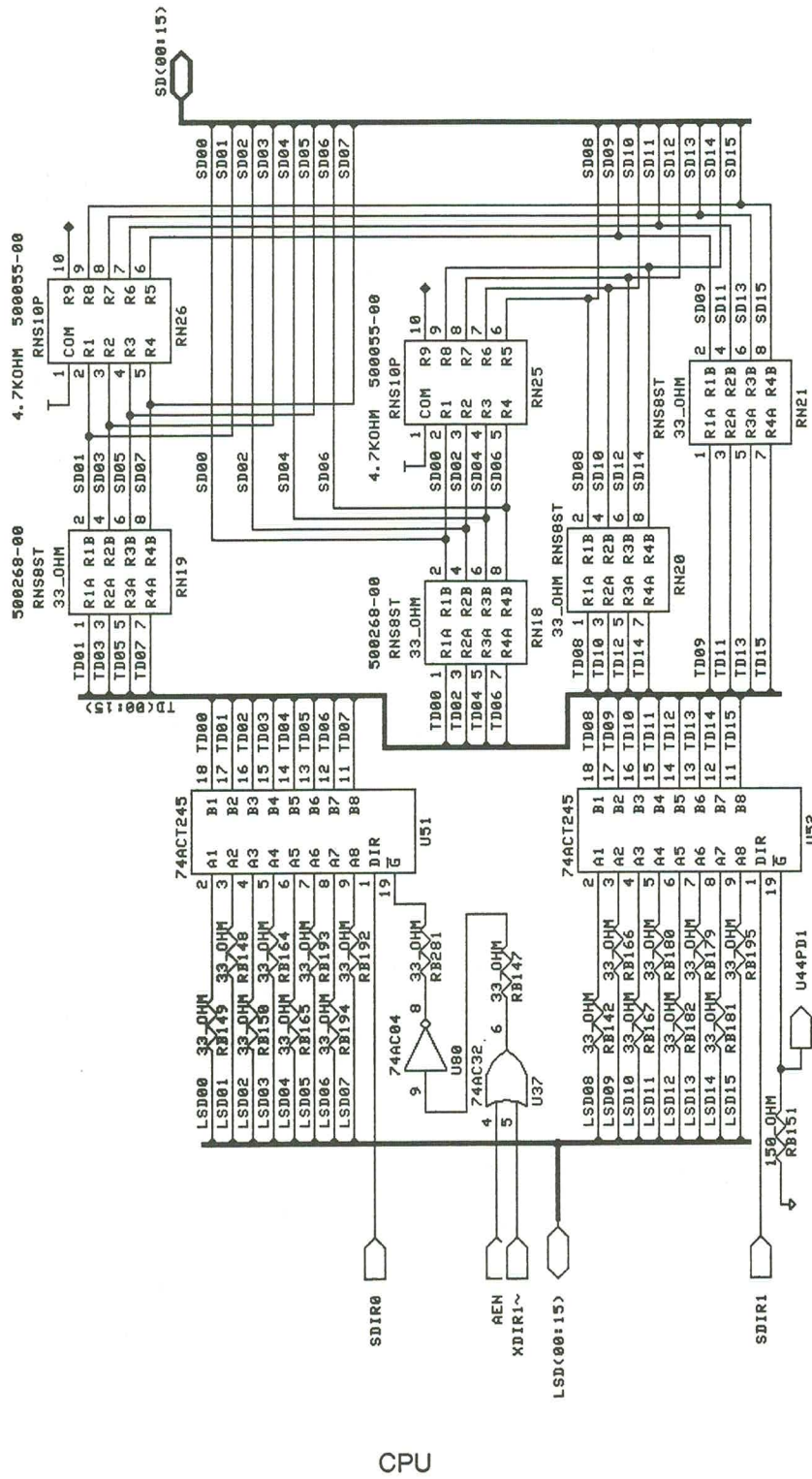


Figure 5-1. Main Logic Board Schematic (Page 14 of 62)

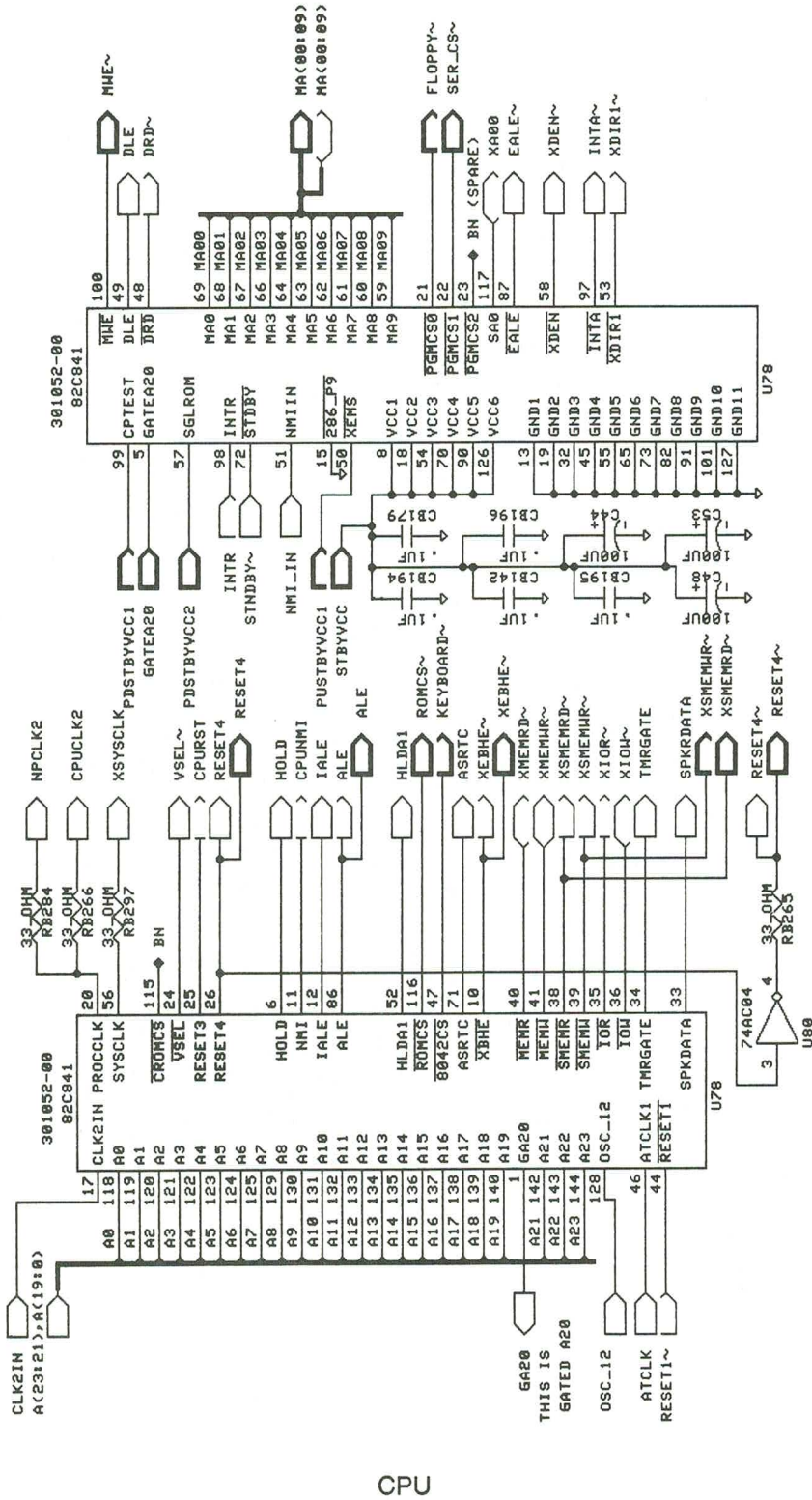


Figure 5-1. Main Logic Board Schematic (Page 15 of 62)

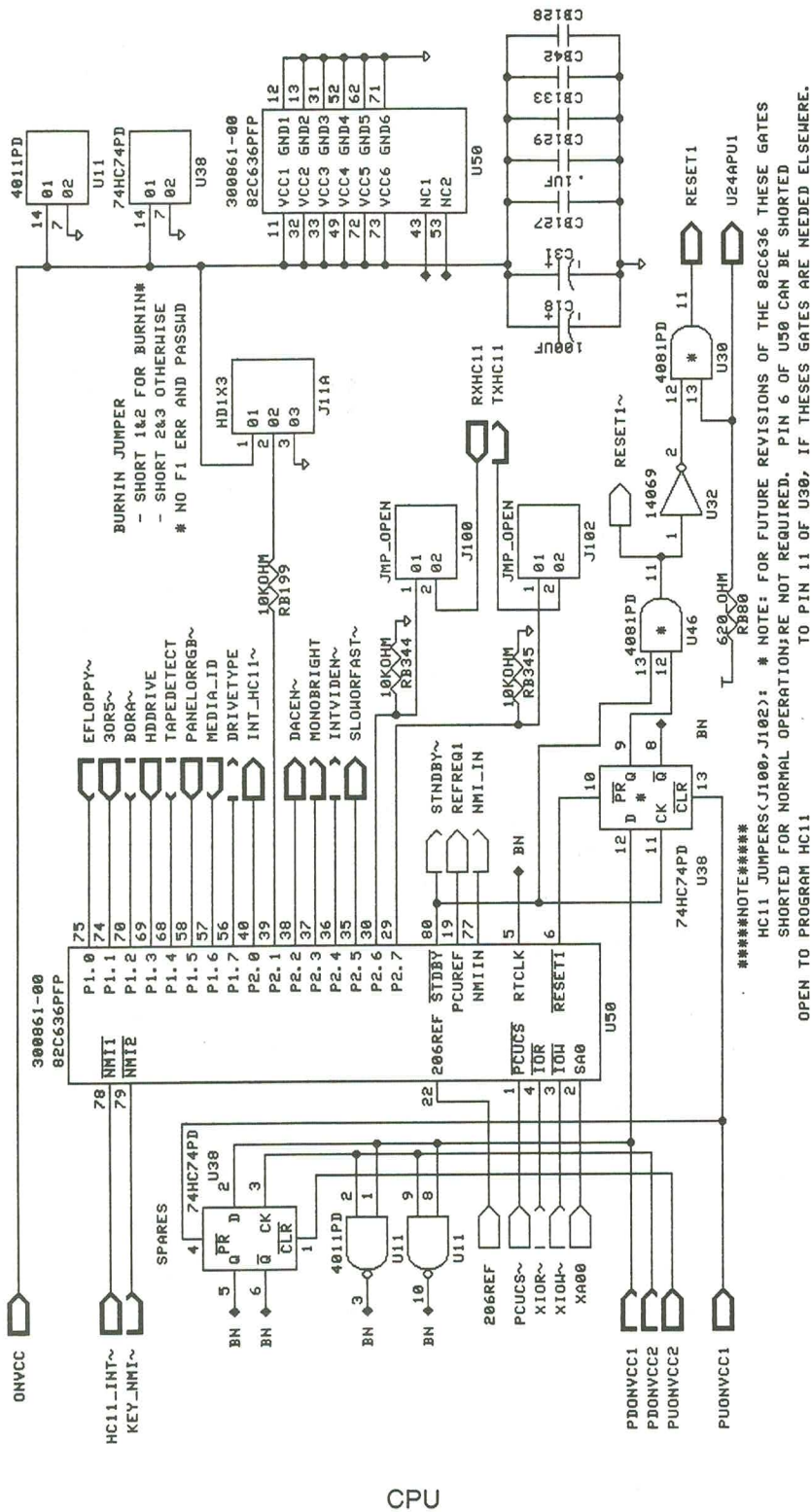


Figure 5-1. Main Logic Board Schematic (Page 17 of 62)

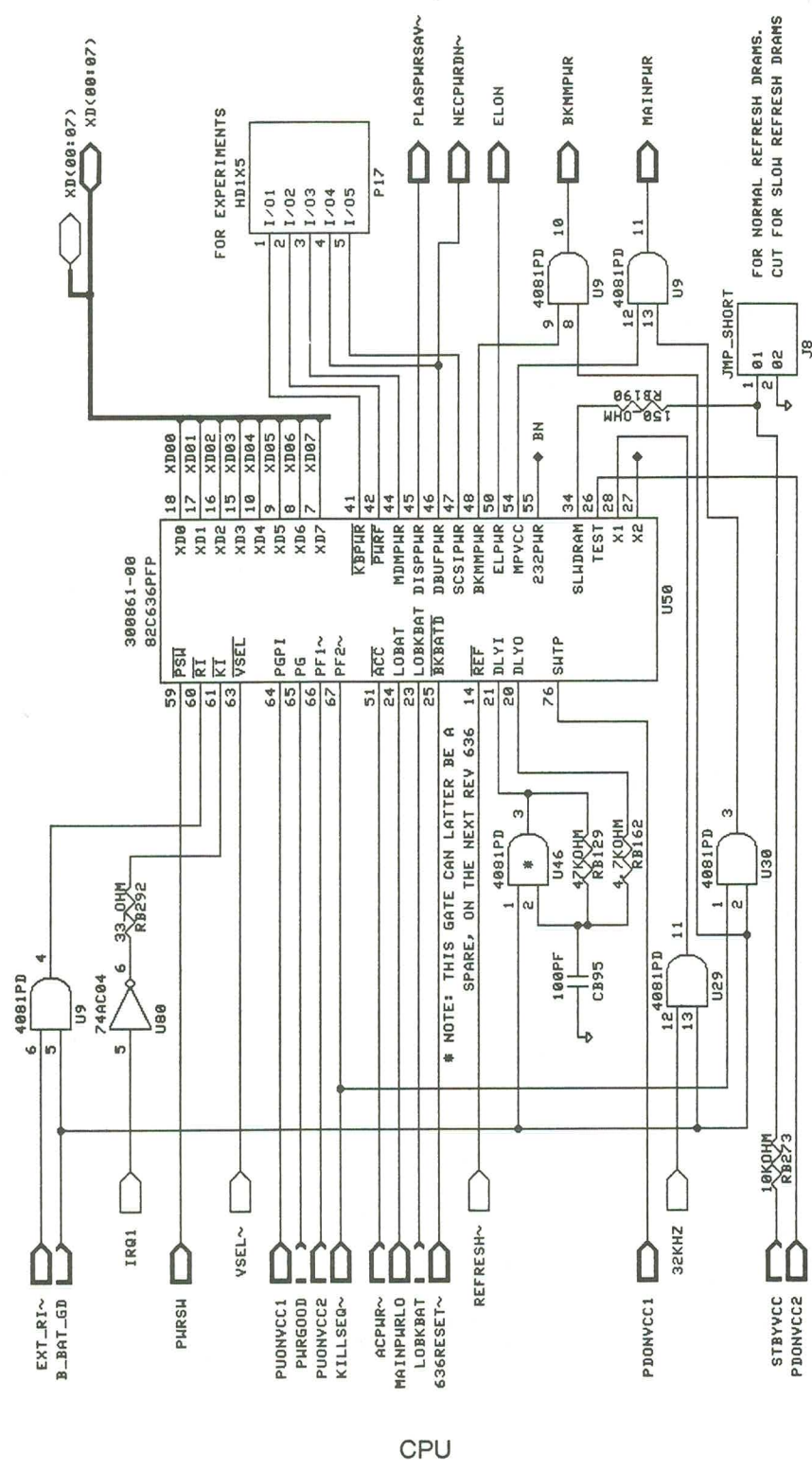


Figure 5-1. Main Logic Board Schematic (Page 18 of 62)

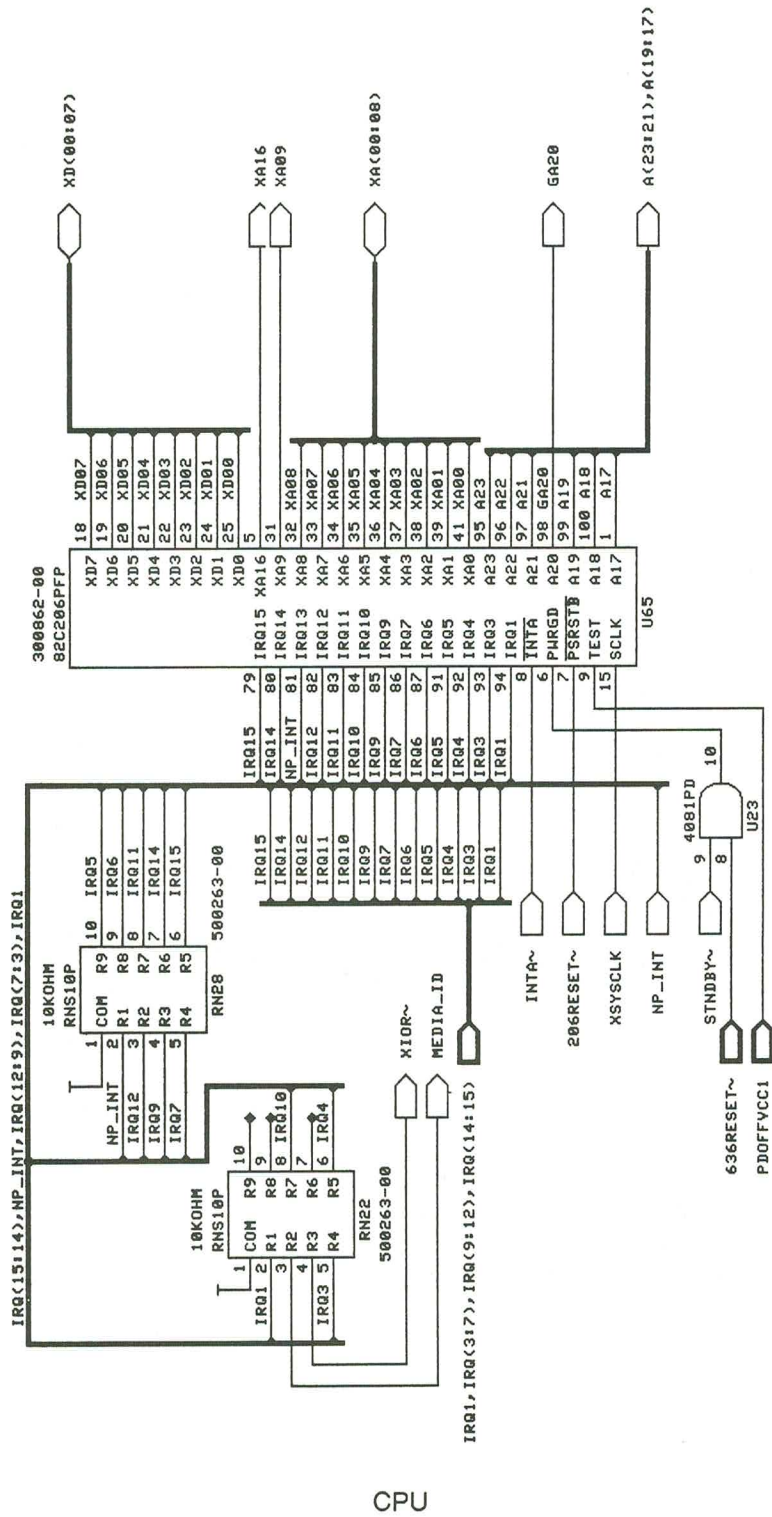


Figure 5-1. Main Logic Board Schematic (Page 19 of 62)

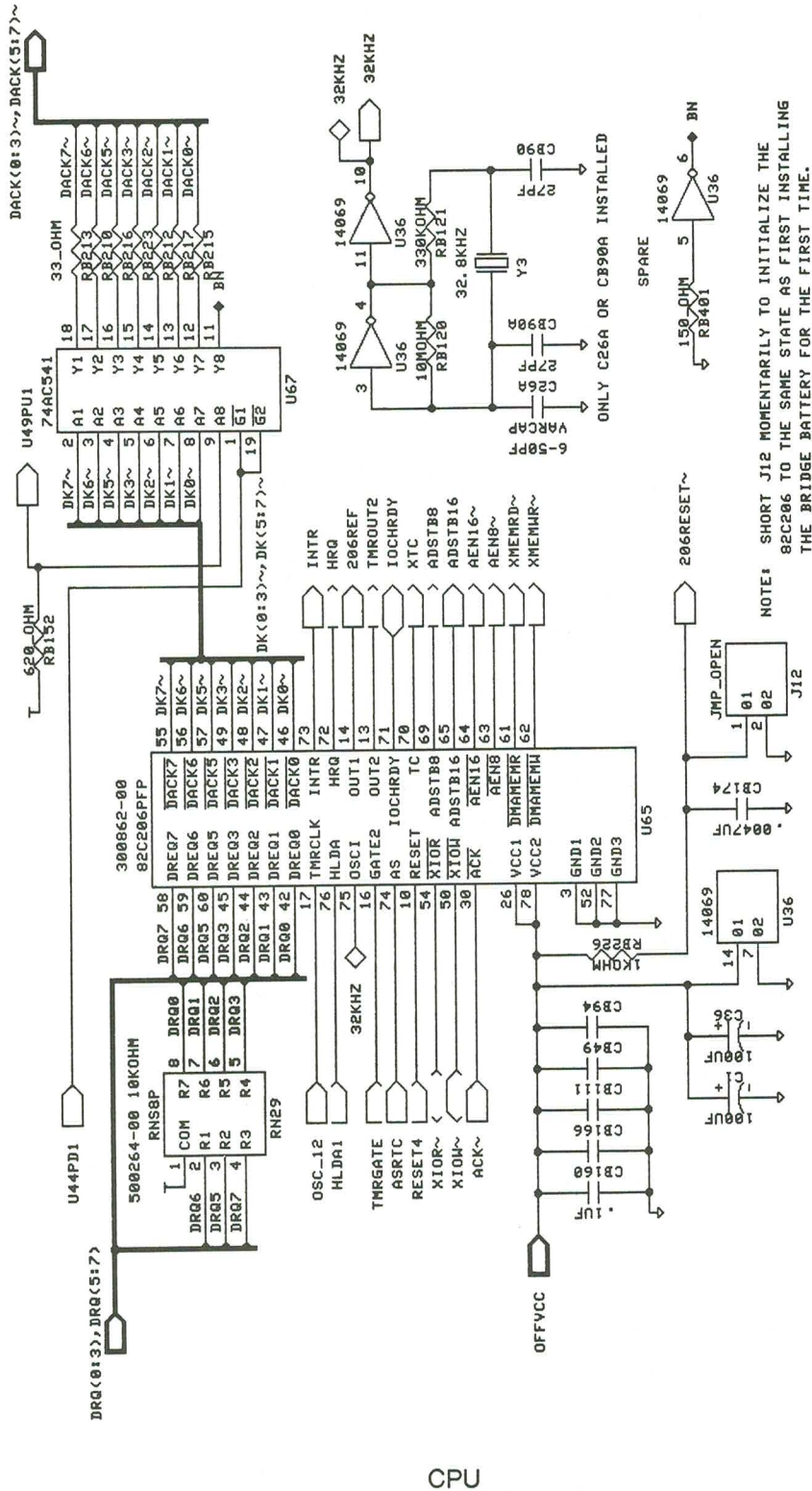


Figure 5-1. Main Logic Board Schematic (Page 20 of 62)

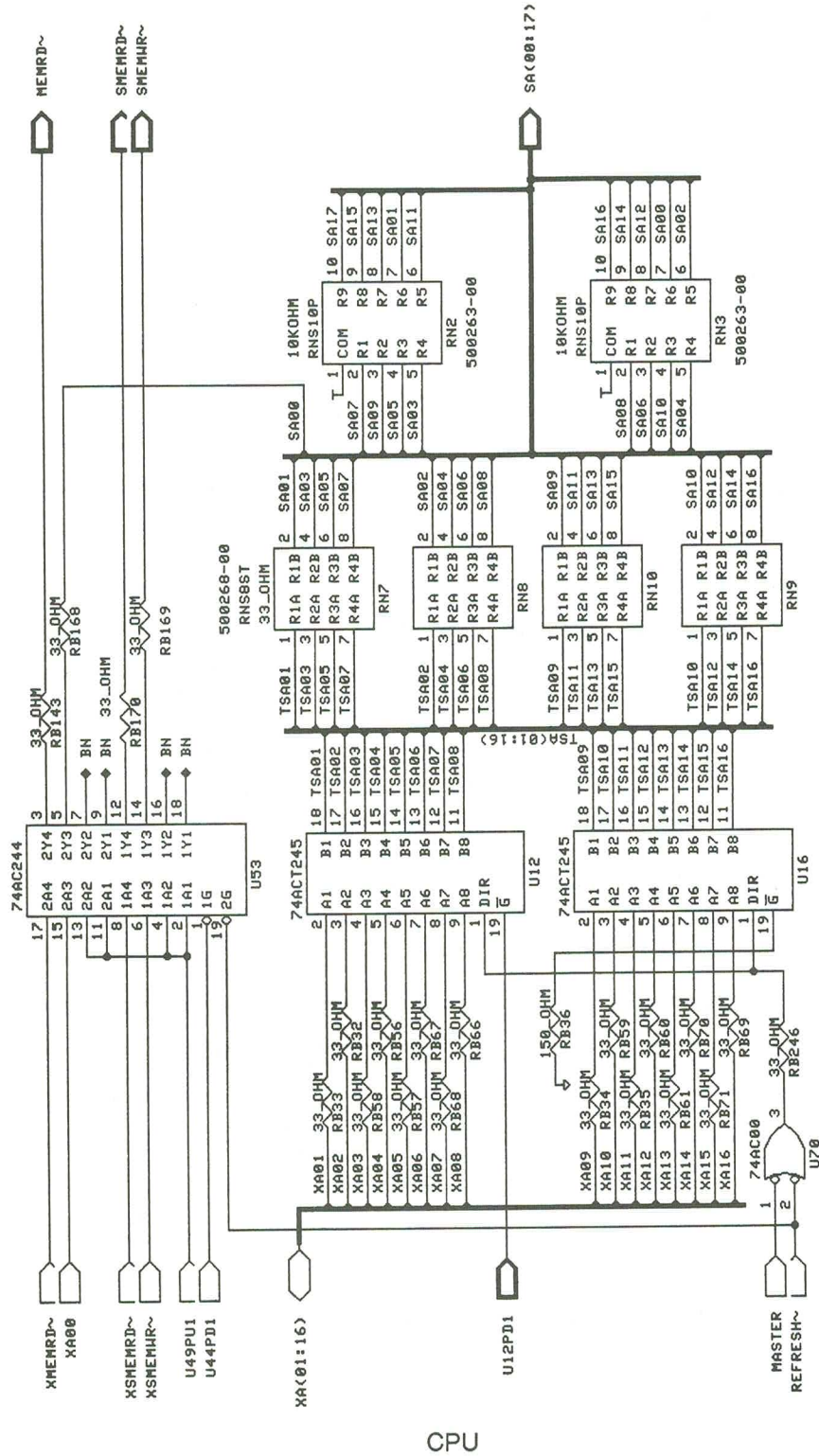


Figure 5-1. Main Logic Board Schematic (Page 21 of 62)

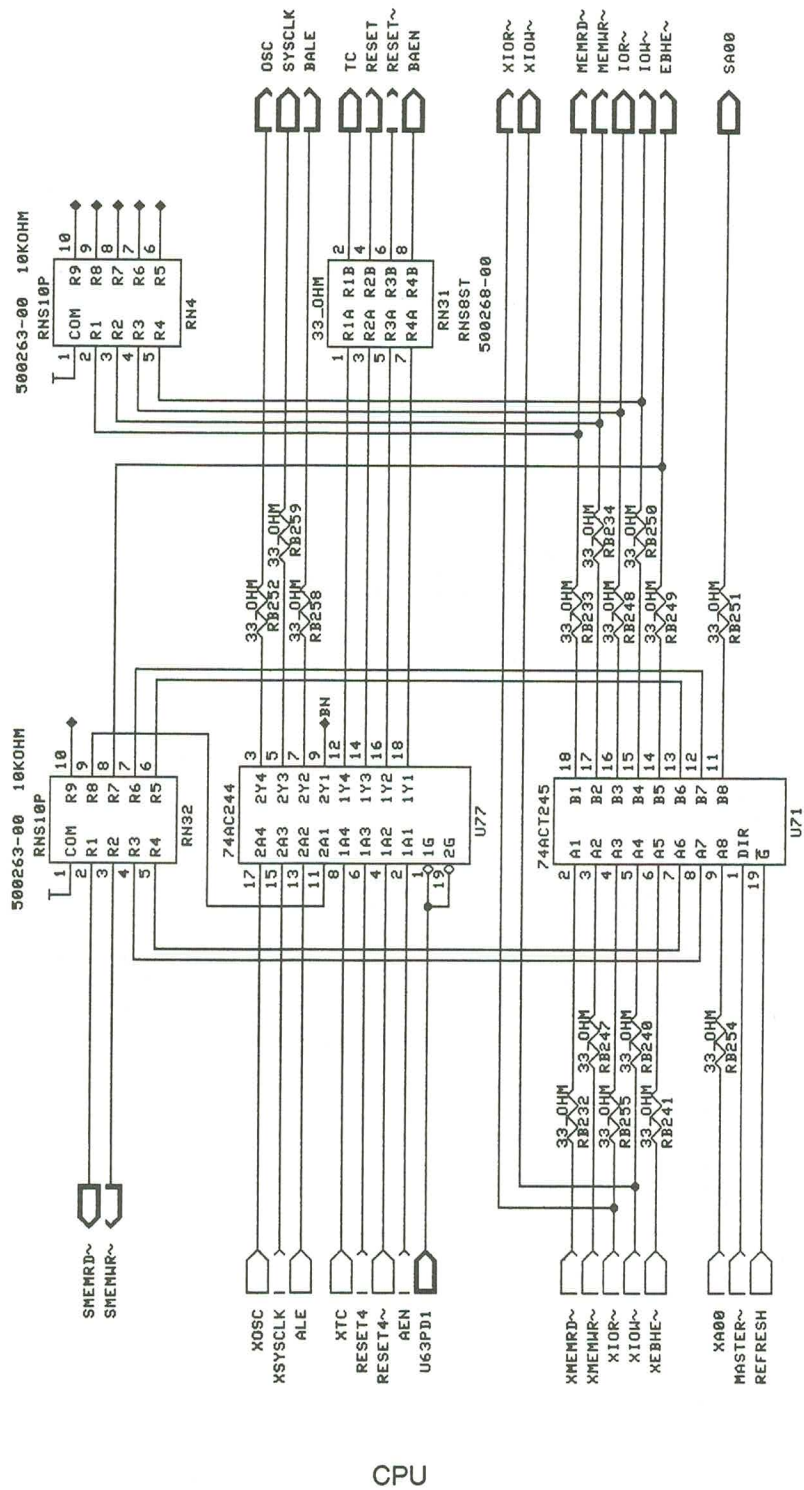
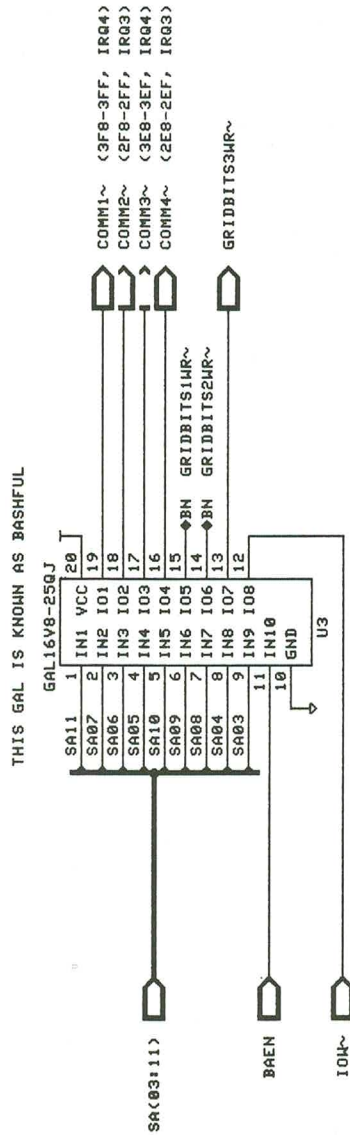
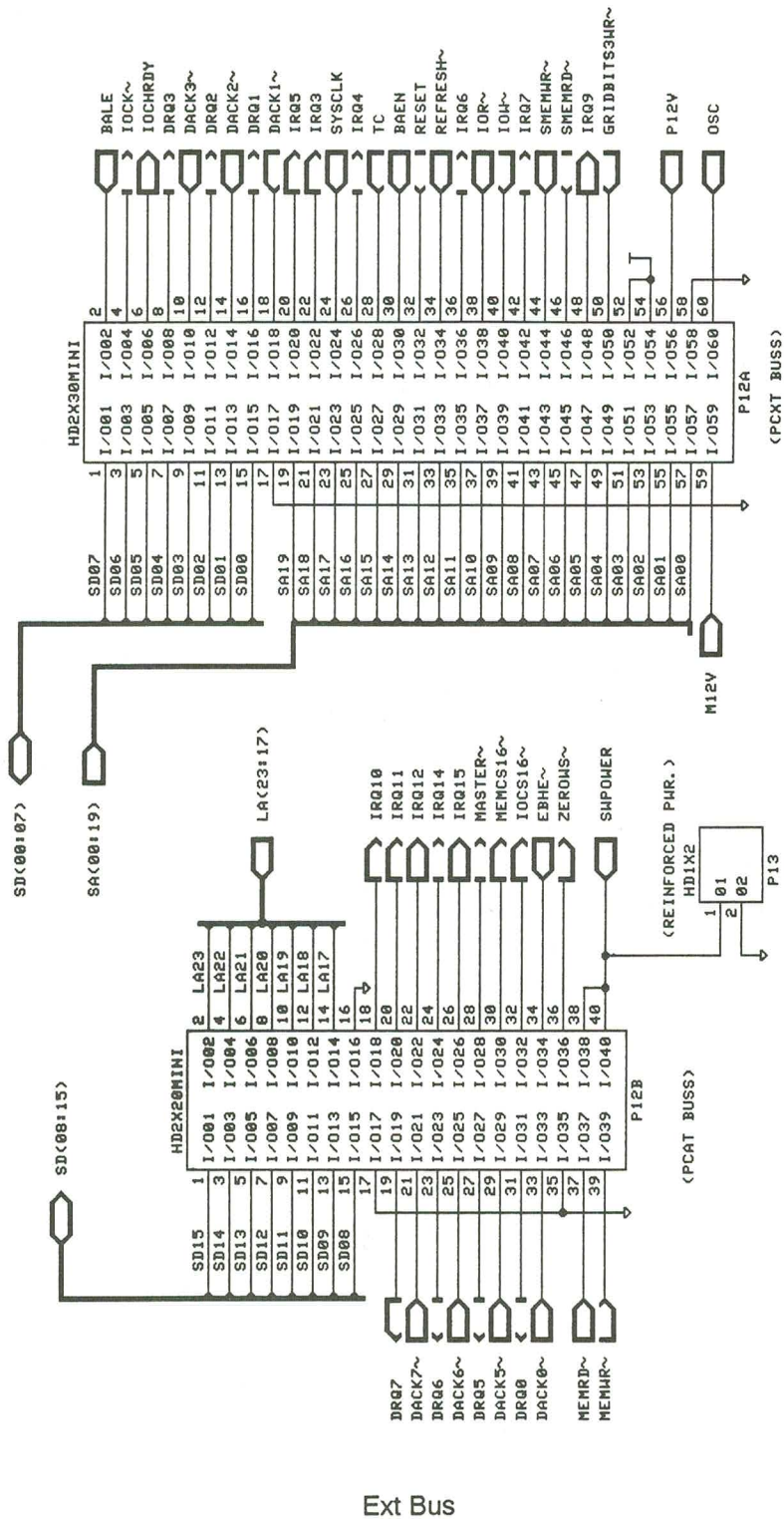


Figure 5-1. Main Logic Board Schematic (Page 22 of 62)



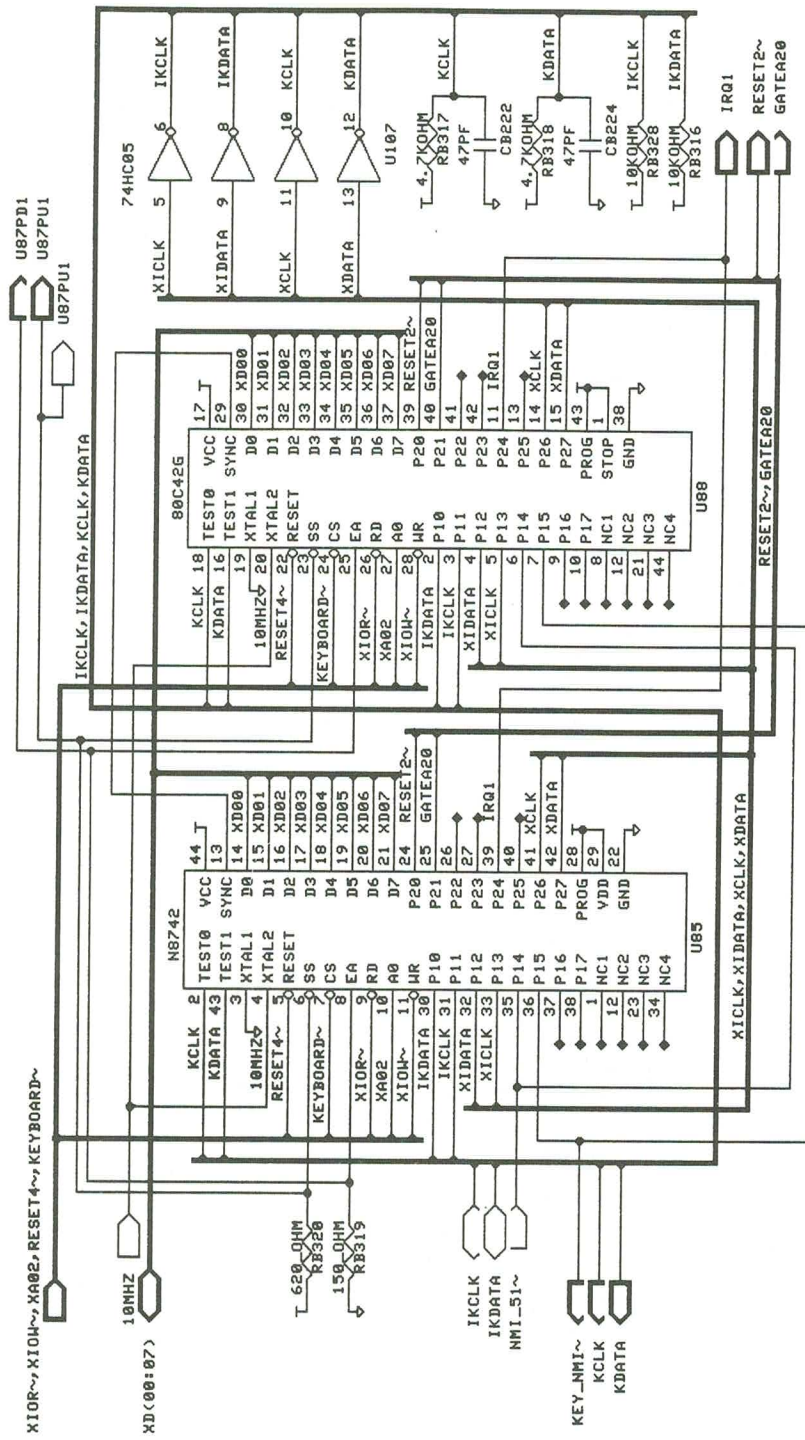
Decode

Figure 5-1. Main Logic Board Schematic (Page 24 of 62)



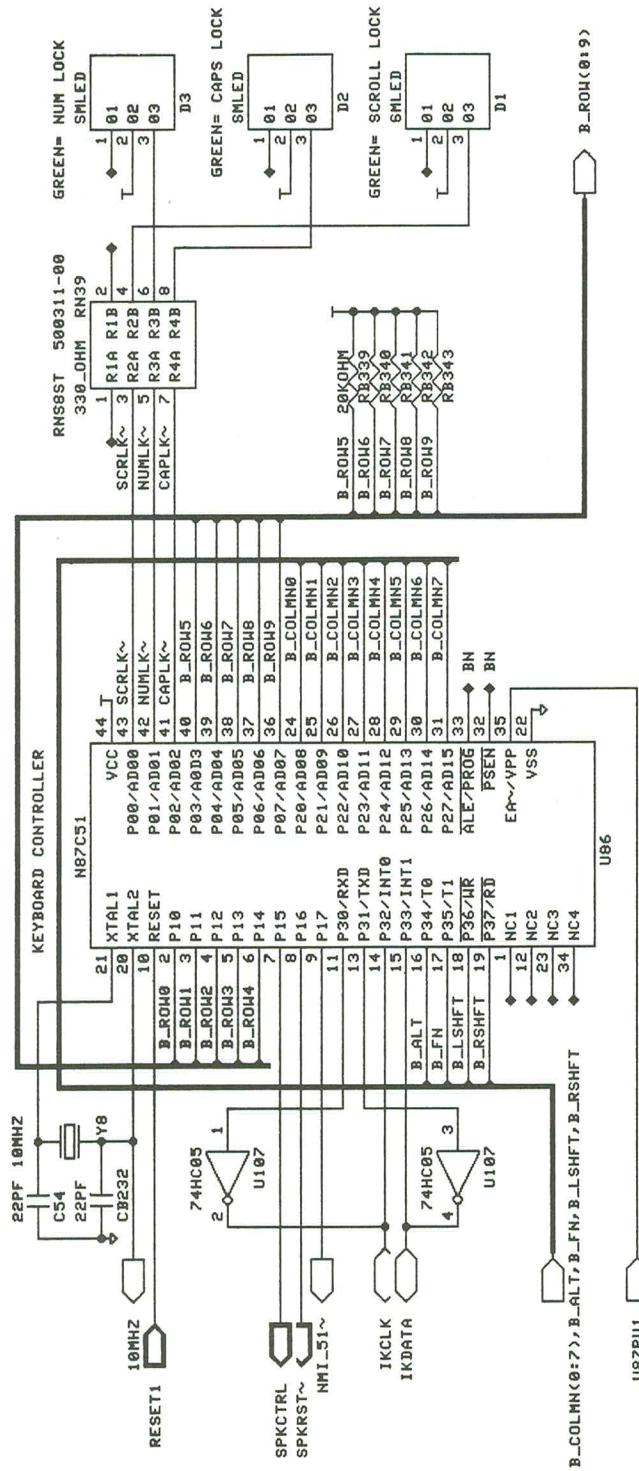
Ext Bus

Figure 5-1. Main Logic Board Schematic (Page 25 of 62)



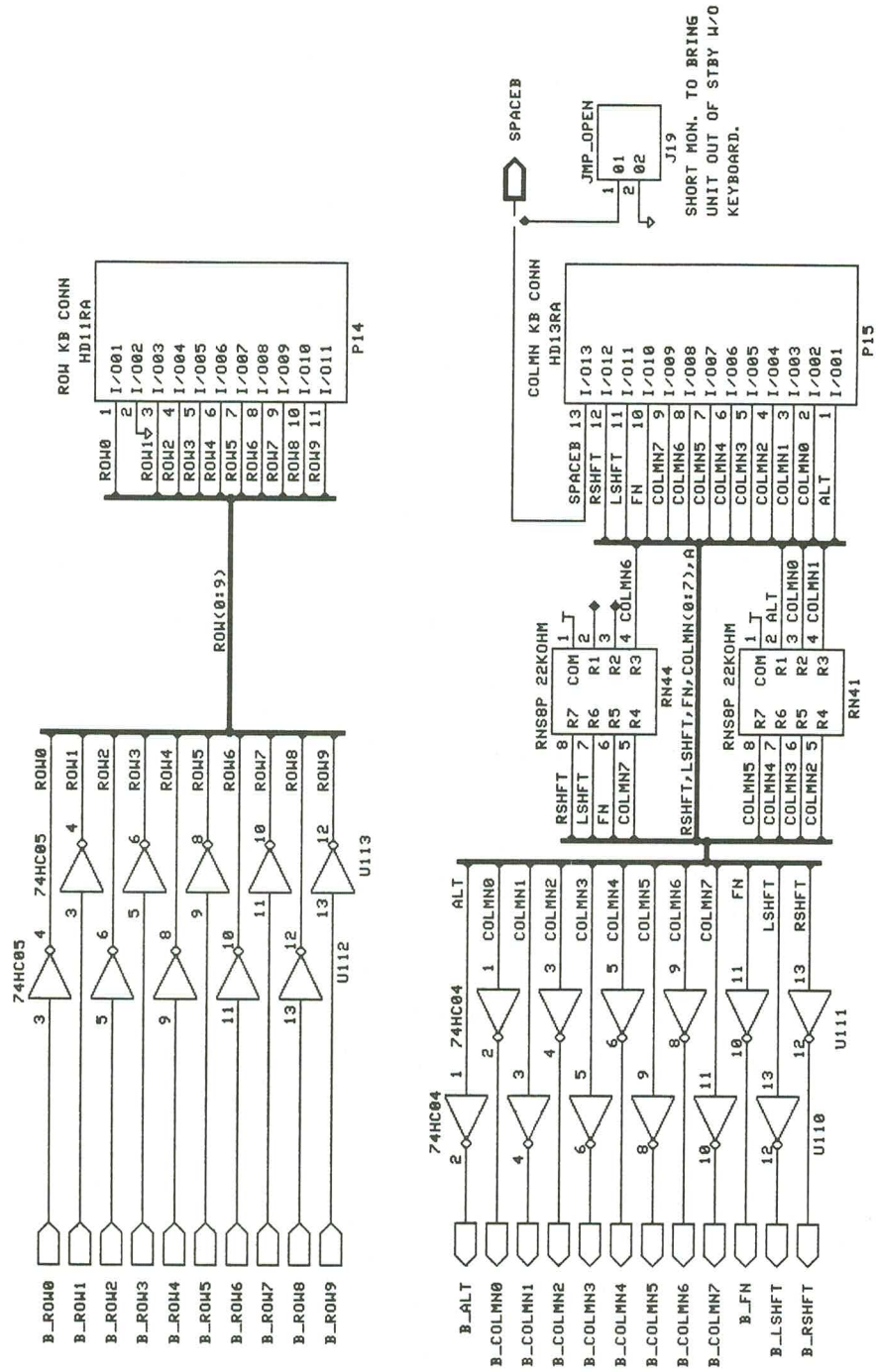
Keyboard

Figure 5-1. Main Logic Board Schematic (Page 26 of 62)



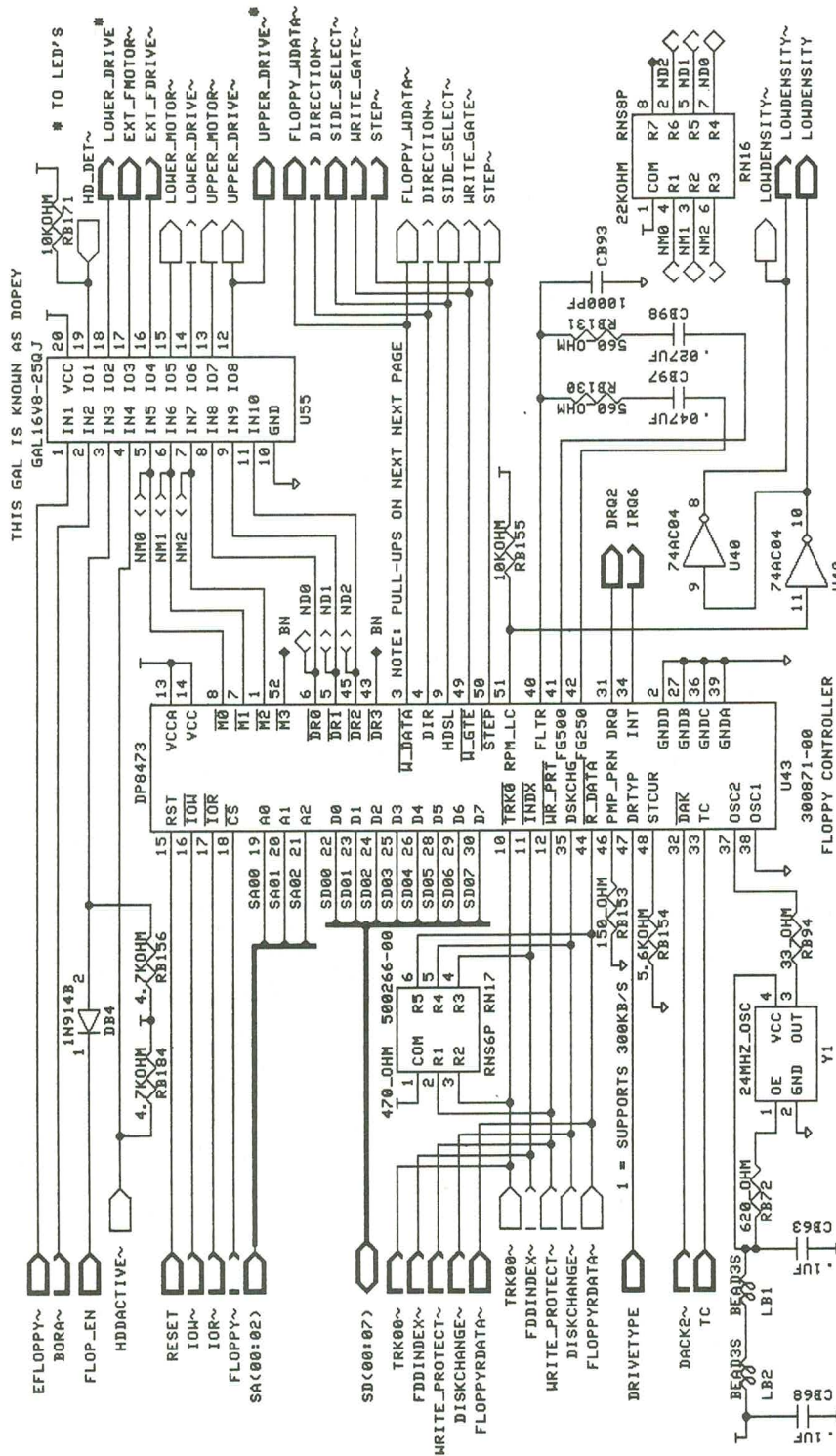
Keyboard

Figure 5-1. Main Logic Board Schematic (Page 27 of 62)



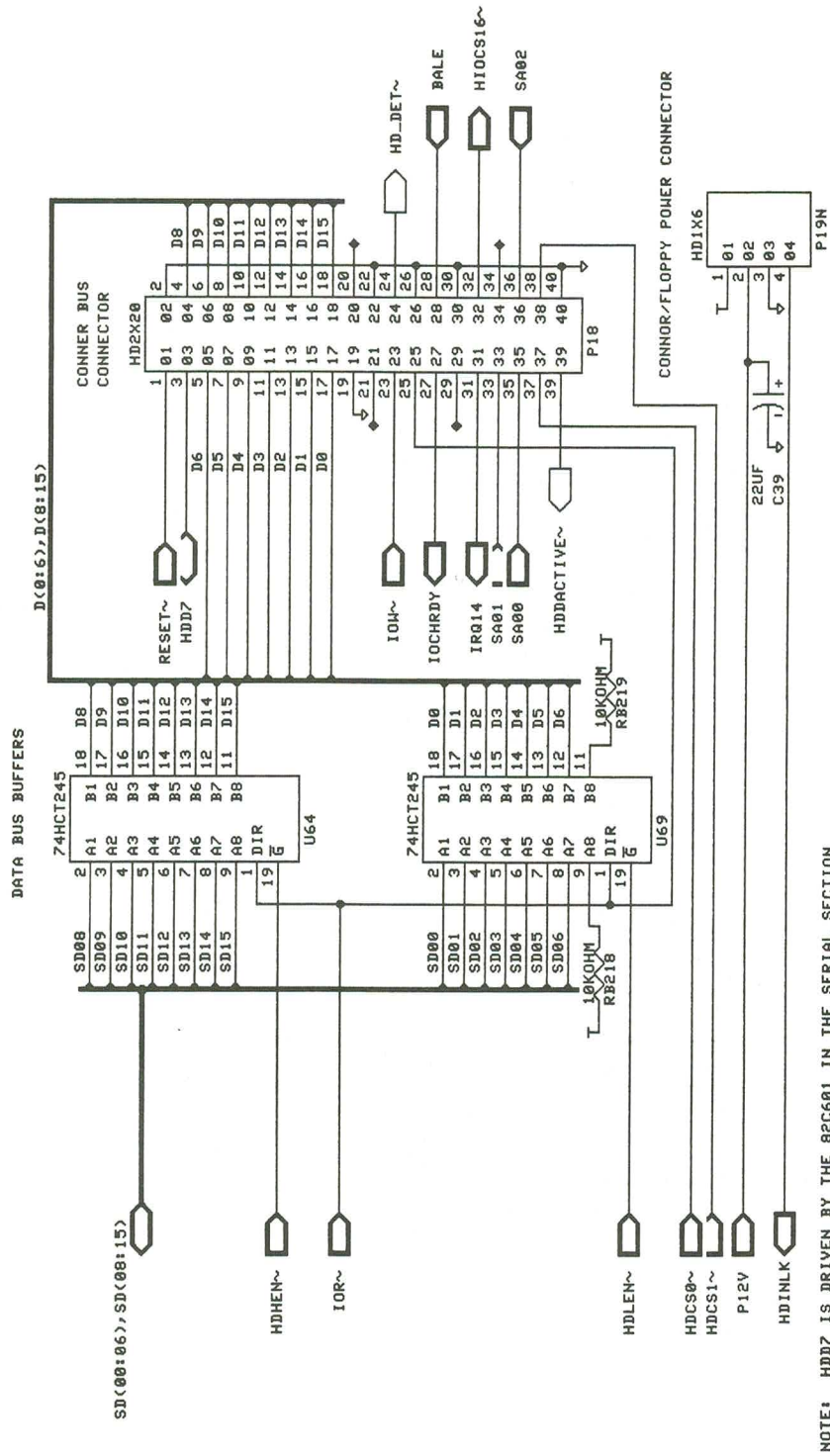
Keyboard

Figure 5-1. Main Logic Board Schematic (Page 28 of 62)



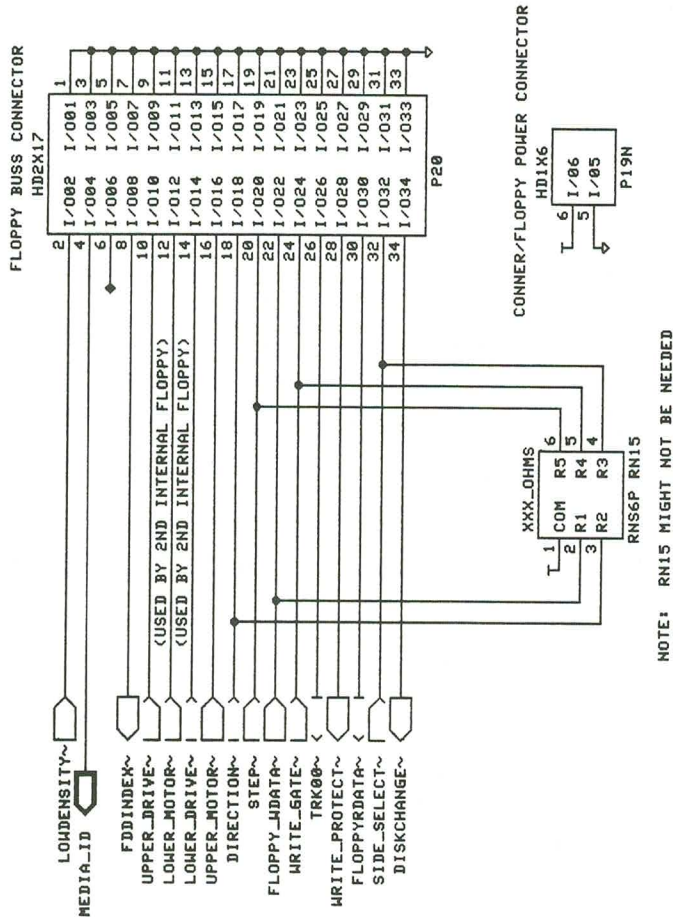
Mass Storage

Figure 5-1. Main Logic Board Schematic (Page 29 of 62)



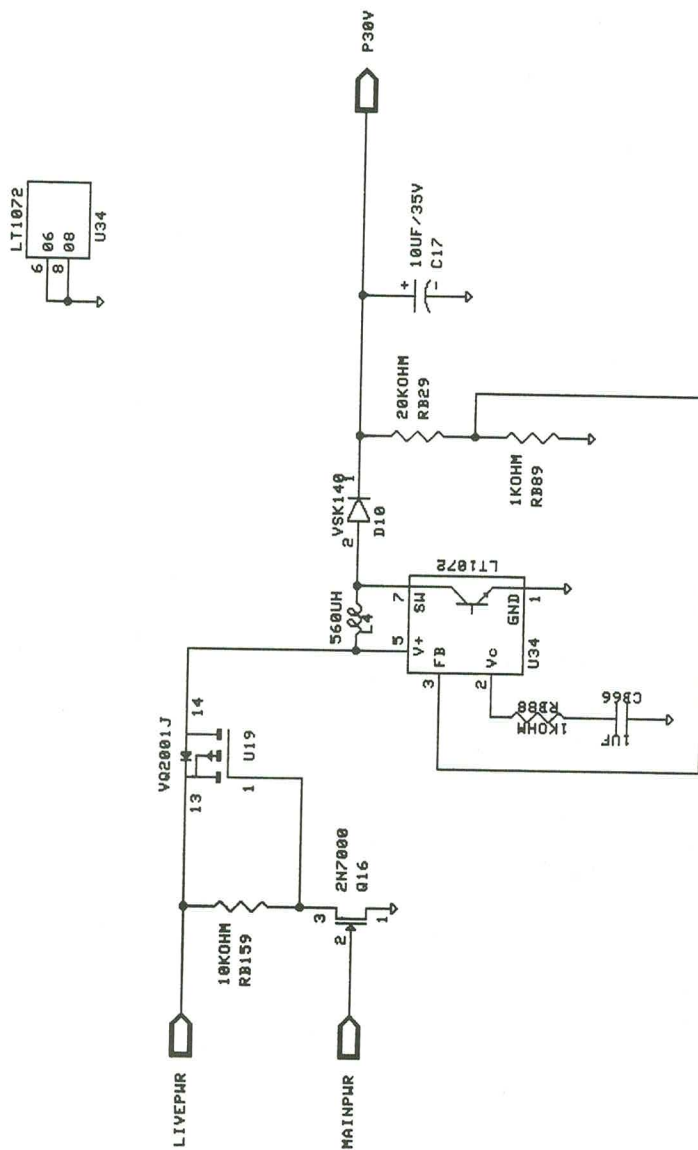
Mass Storage

Figure 5-1. Main Logic Board Schematic (Page 30 of 62)



Mass Storage

Figure 5-1. Main Logic Board Schematic (Page 31 of 62)



30 Volt Generator

Figure 5-1. Main Logic Board Schematic (Page 32 of 62)

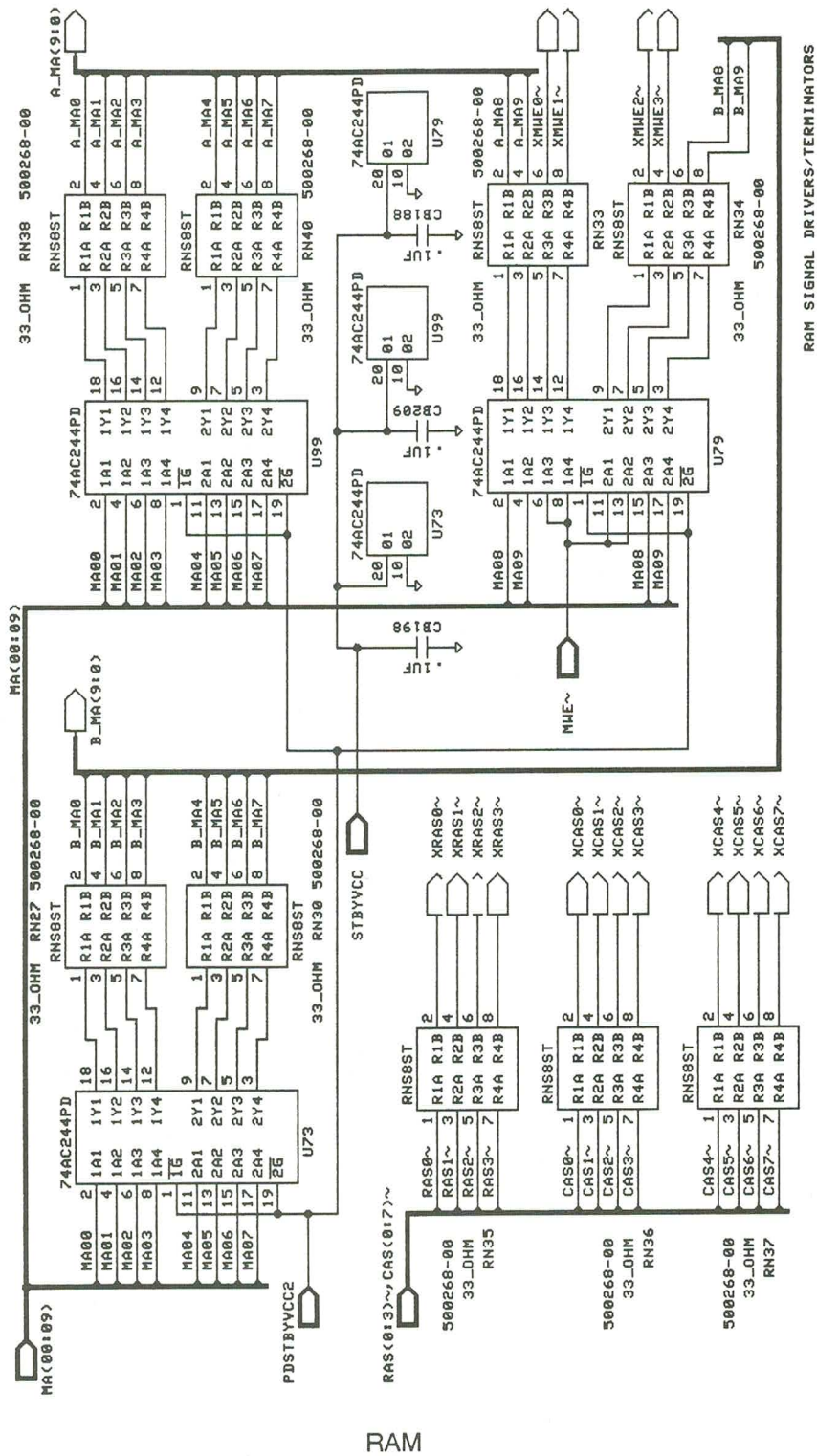


Figure 5-1. Main Logic Board Schematic (Page 33 of 62)

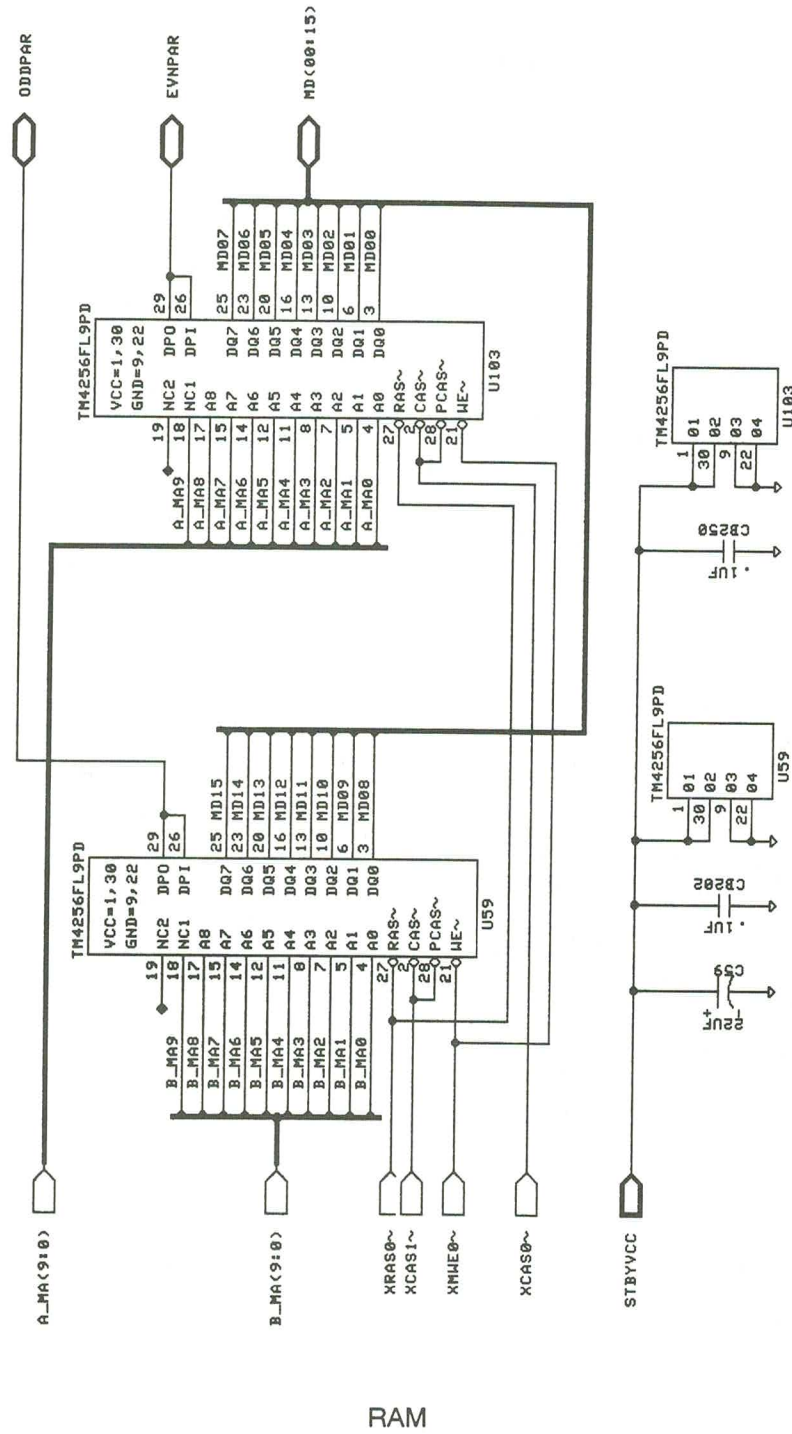
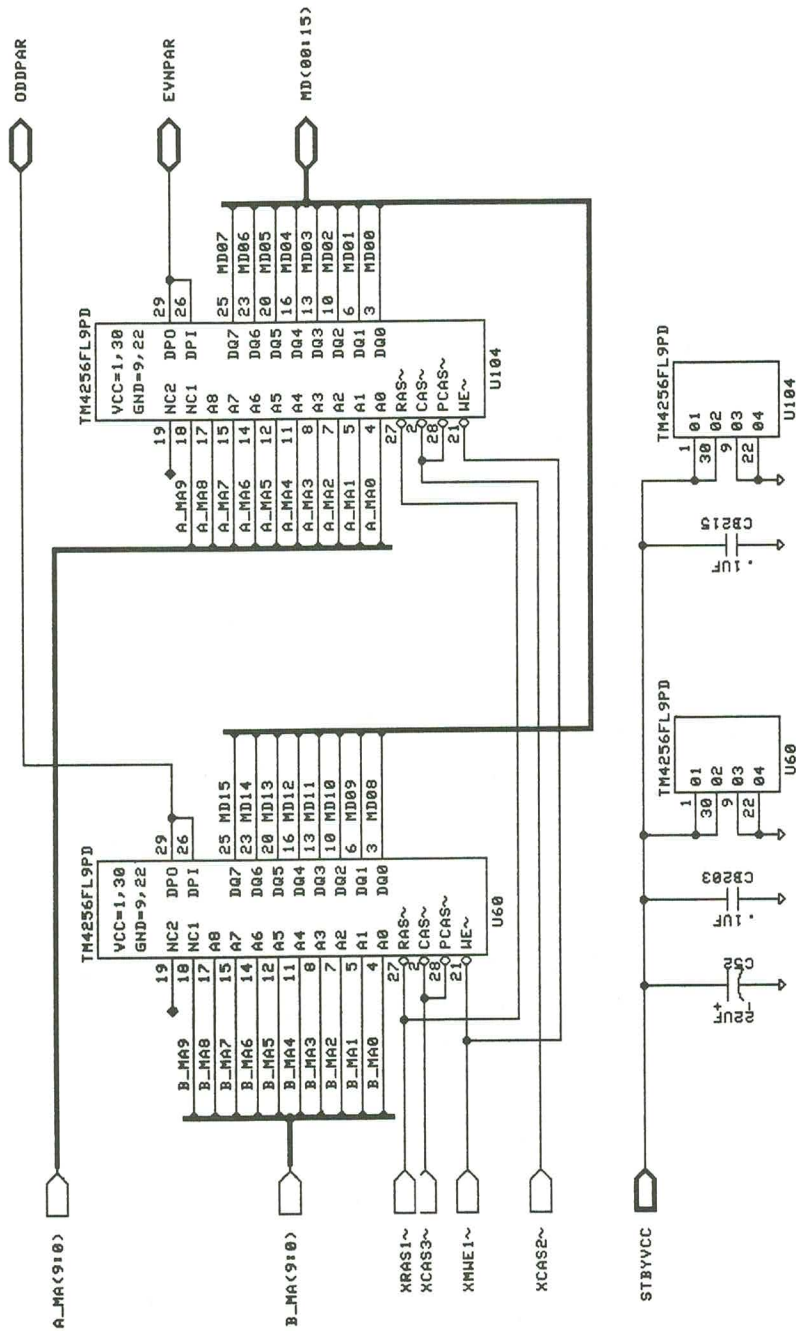
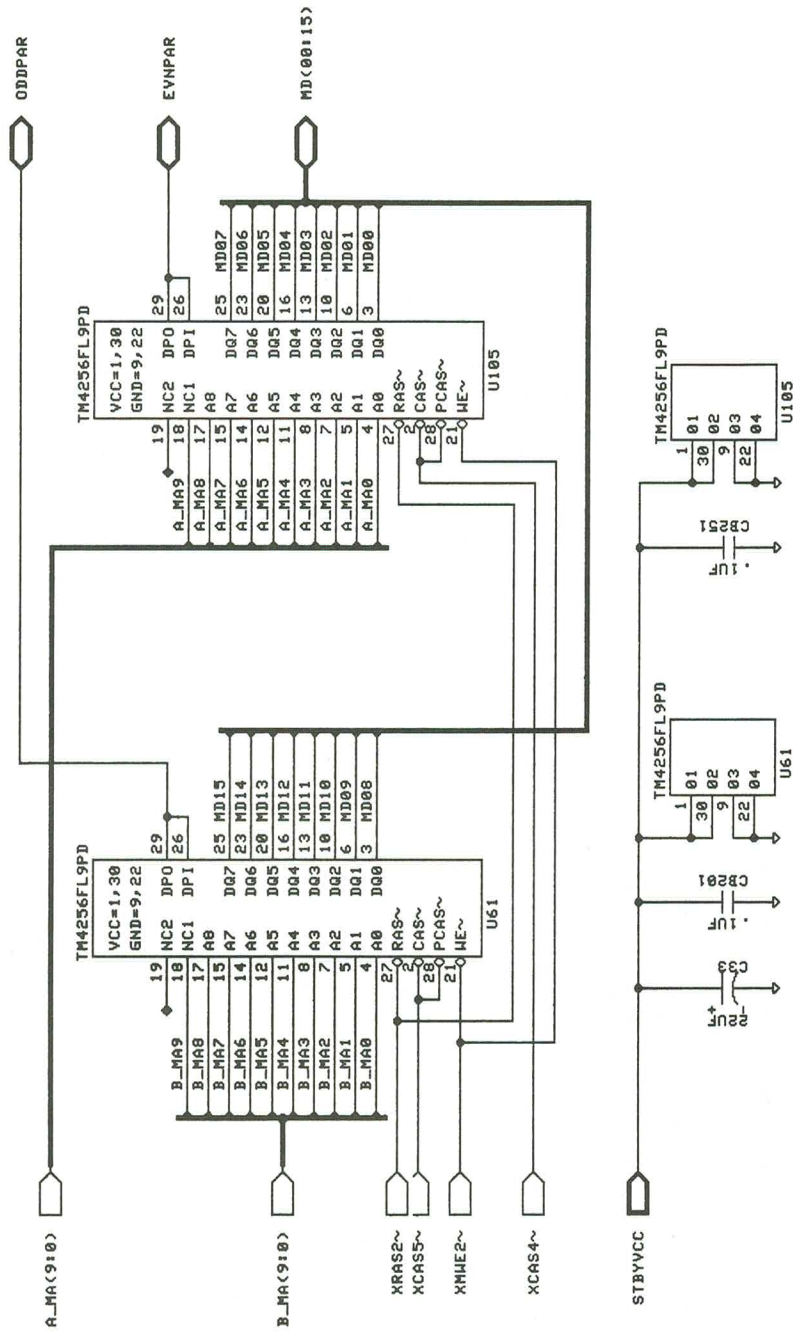


Figure 5-1. Main Logic Board Schematic (Page 34 of 62)



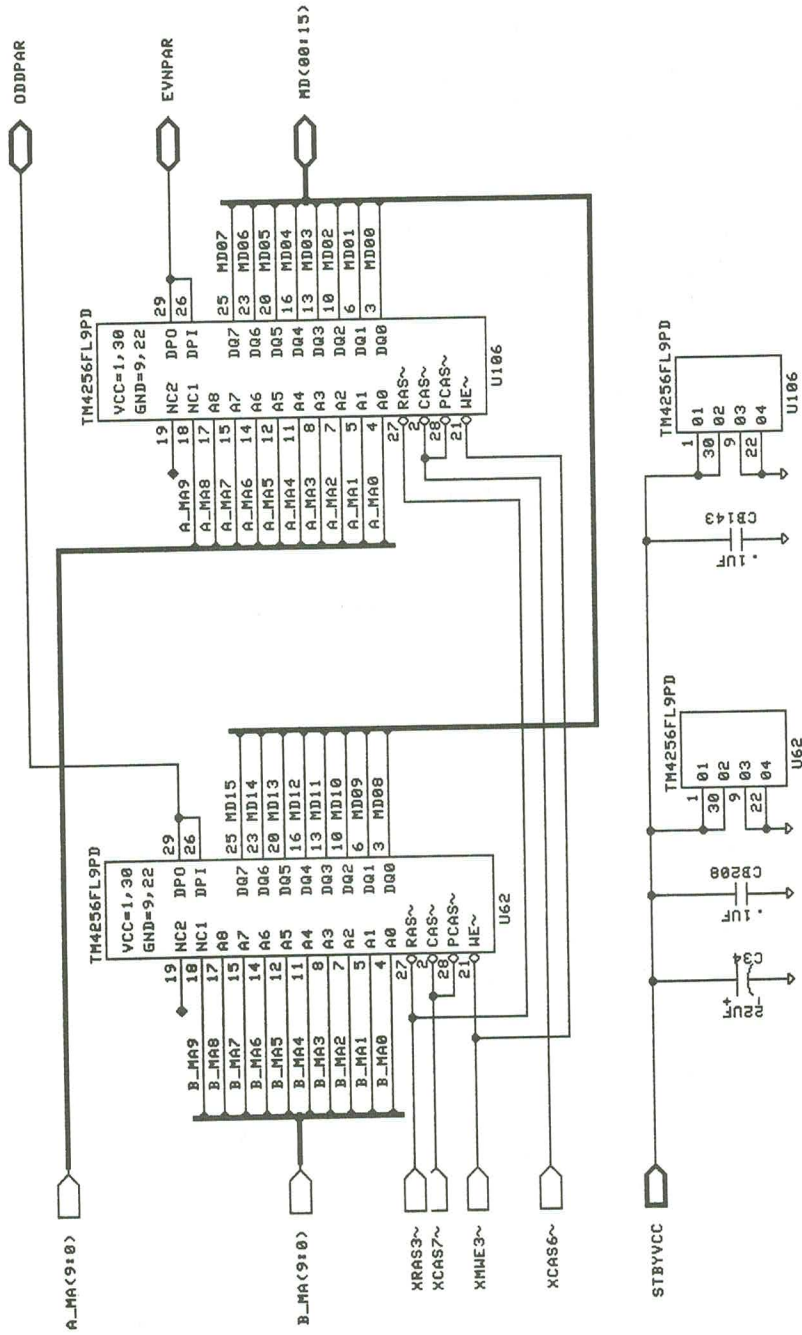
RAM

Figure 5-1. Main Logic Board Schematic (Page 35 of 62)



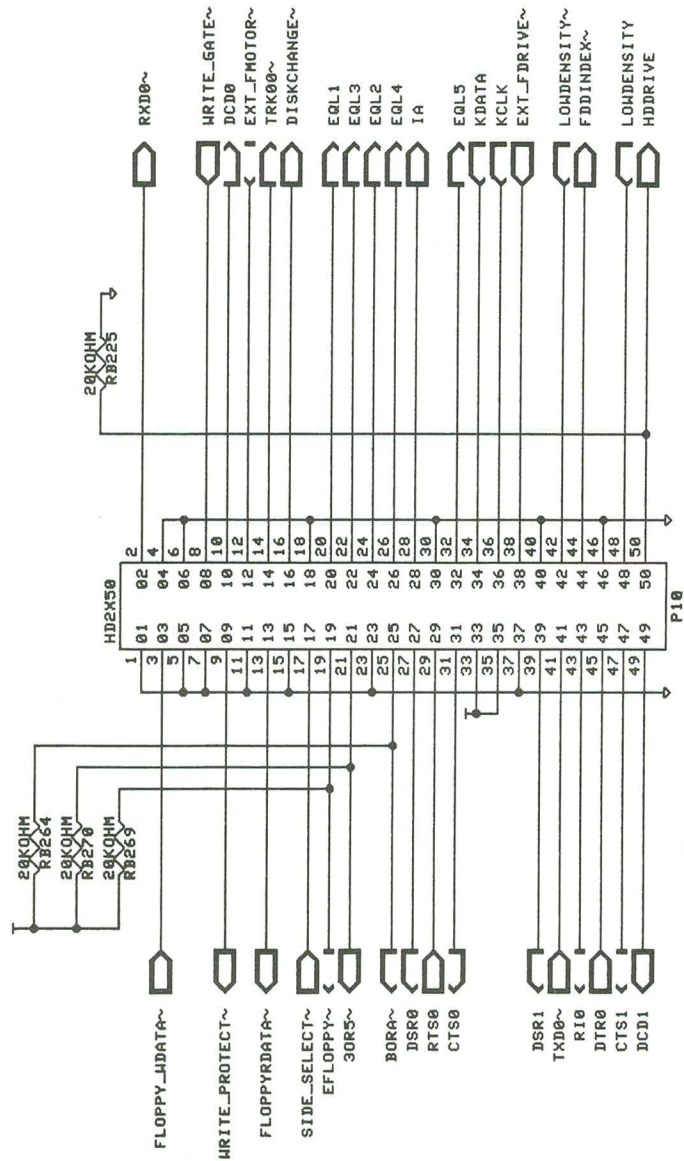
RAM

Figure 5-1. Main Logic Board Schematic (Page 36 of 62)



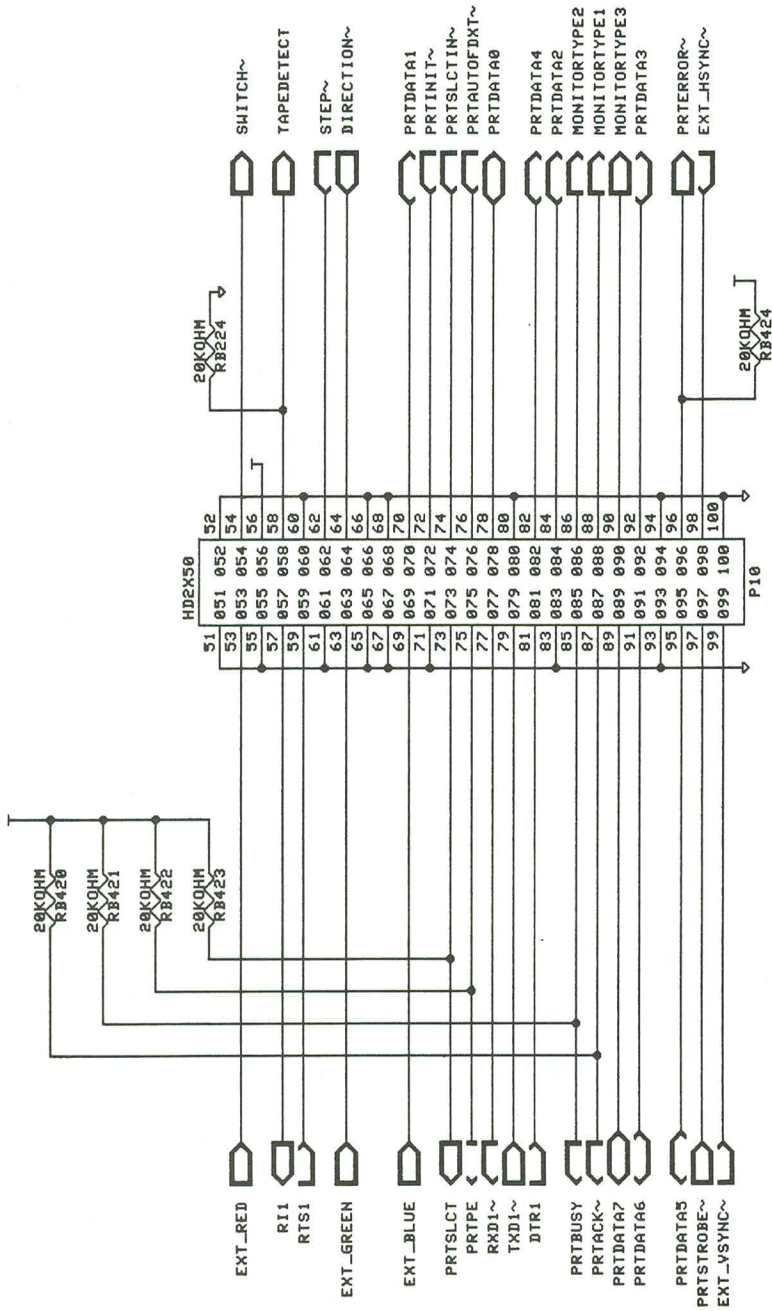
RAM

Figure 5-1. Main Logic Board Schematic (Page 37 of 62)



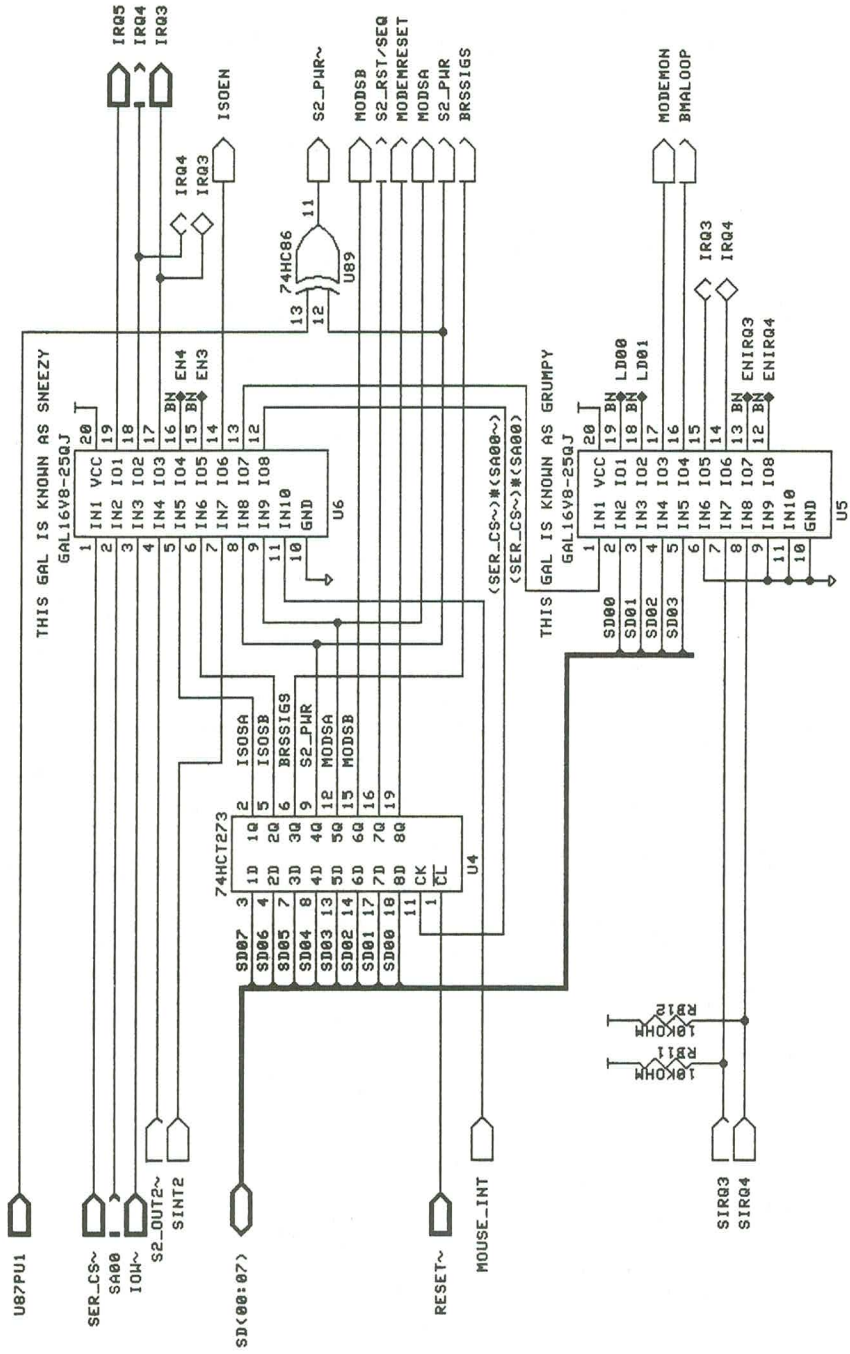
Rear Panel

Figure 5-1. Main Logic Board Schematic (Page 38 of 62)



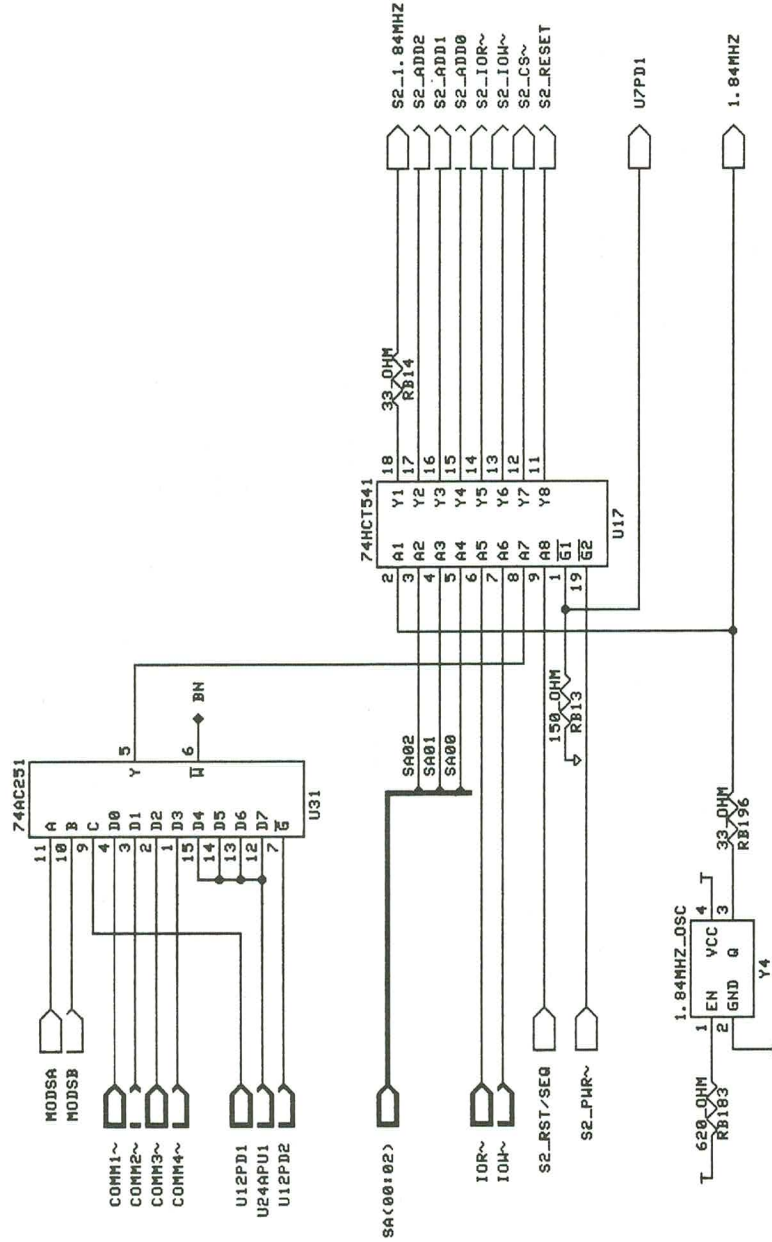
Rear Panel

Figure 5-1. Main Logic Board Schematic (Page 39 of 62)



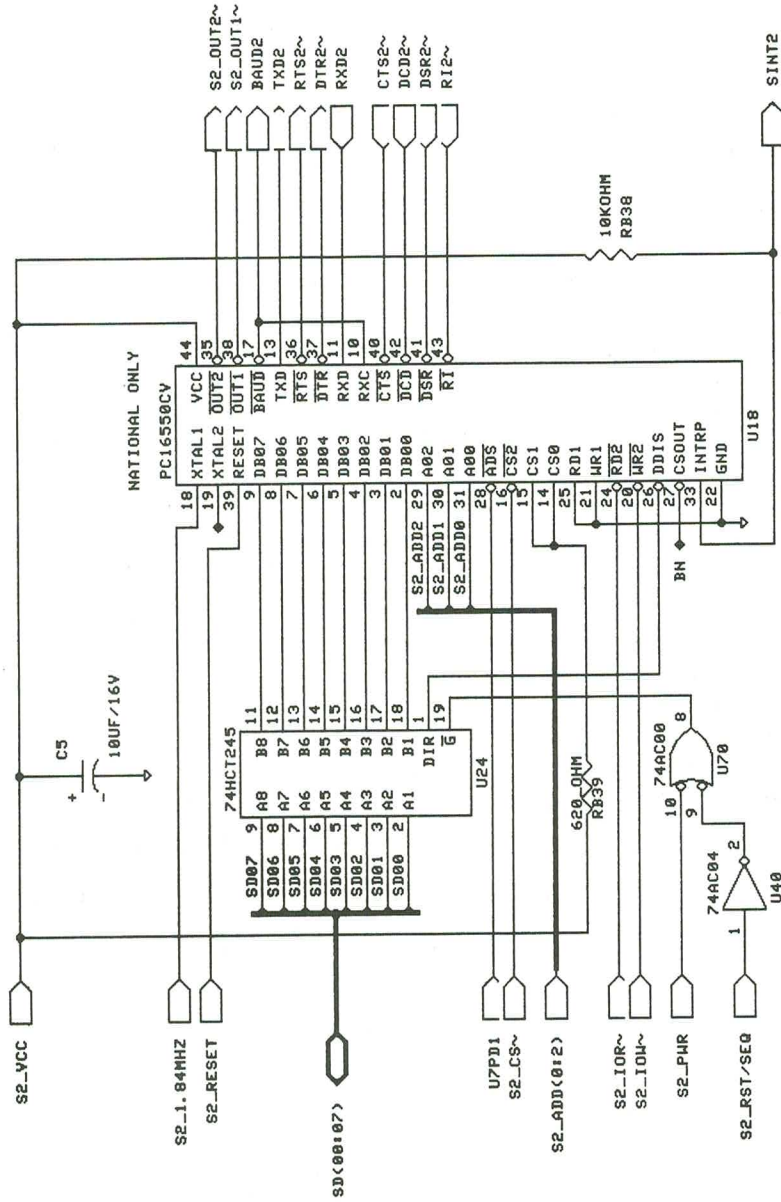
SPIO—Modem—Isopoint

Figure 5-1. Main Logic Board Schematic (Page 40 of 62)



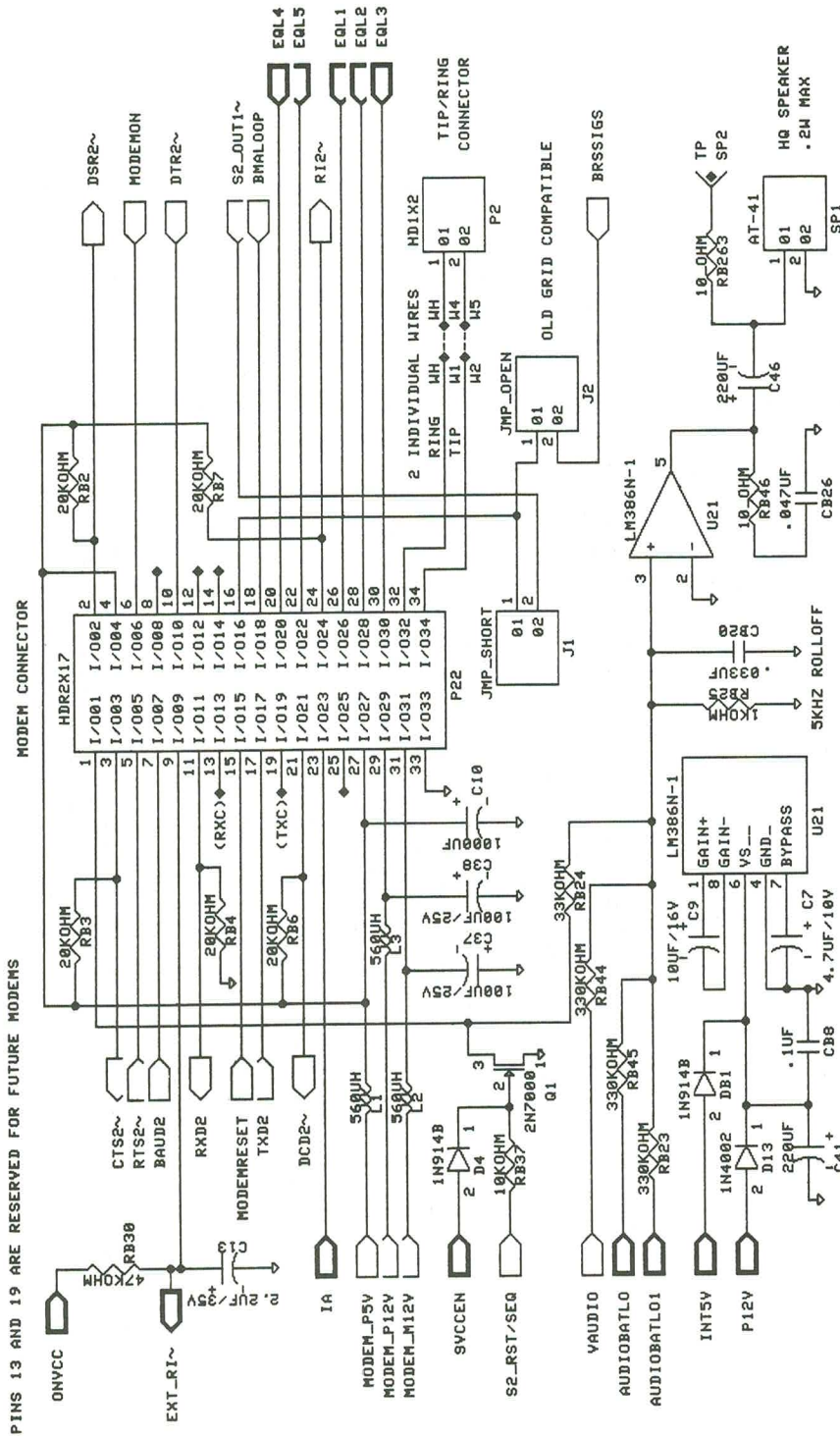
SPIO—Modem—Isopoint

Figure 5-1. Main Logic Board Schematic (Page 41 of 62)



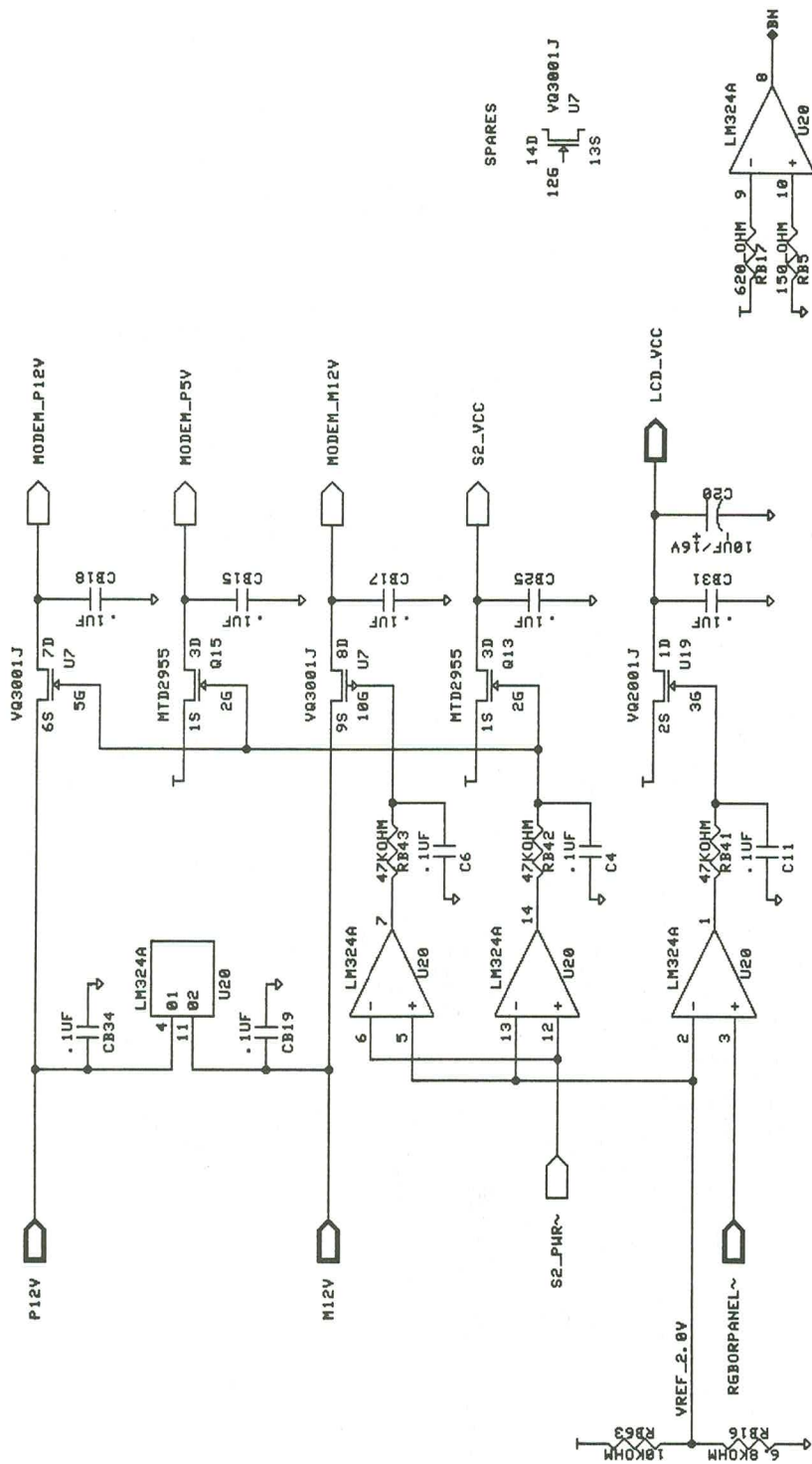
SPIO—Modem—Isopoint

Figure 5-1. Main Logic Board Schematic (Page 42 of 62)



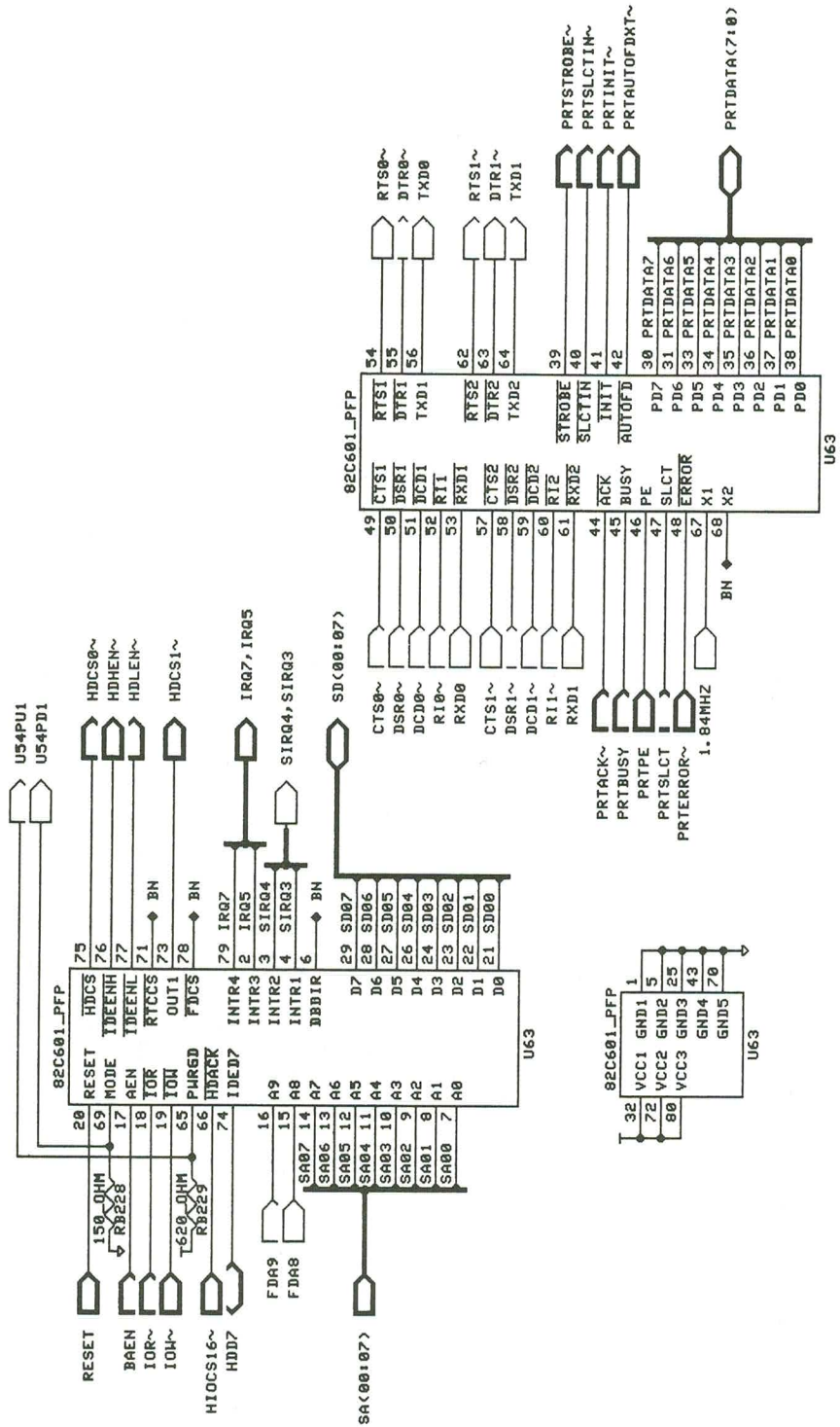
SPIO—Modem—Isopoint

Figure 5-1. Main Logic Board Schematic (Page 43 of 62)



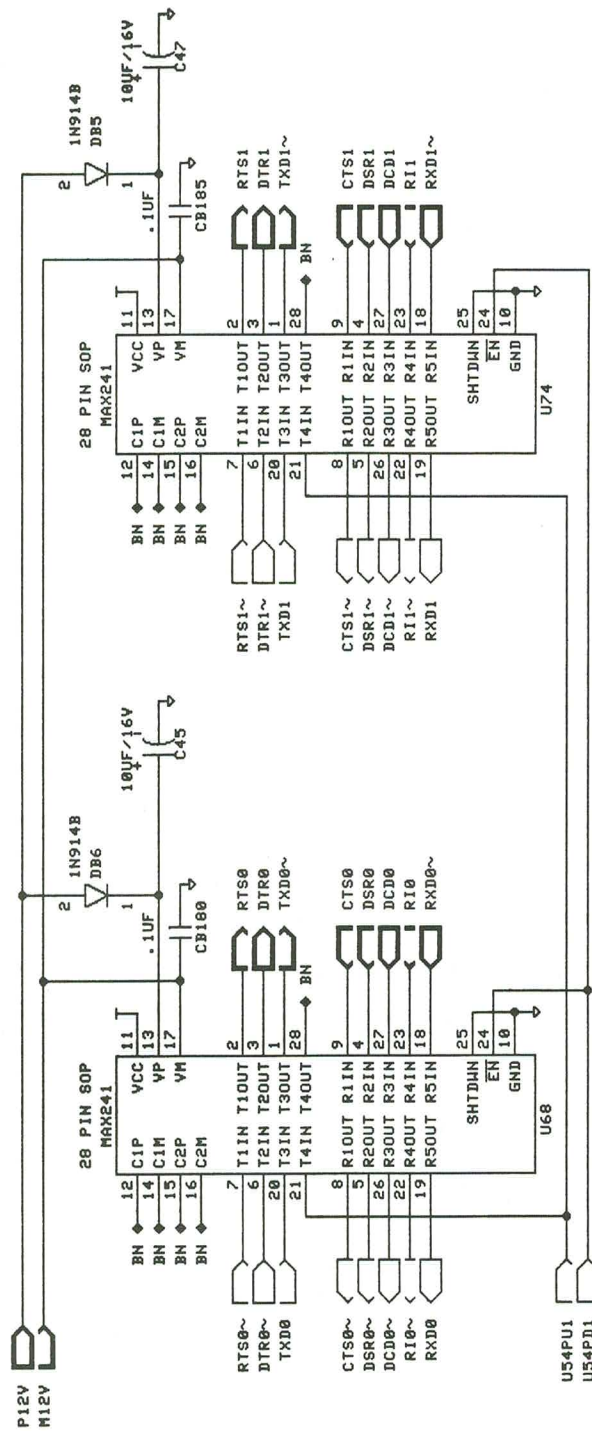
SPIO—Modem—Isopoint

Figure 5-1. Main Logic Board Schematic (Page 44 of 62)



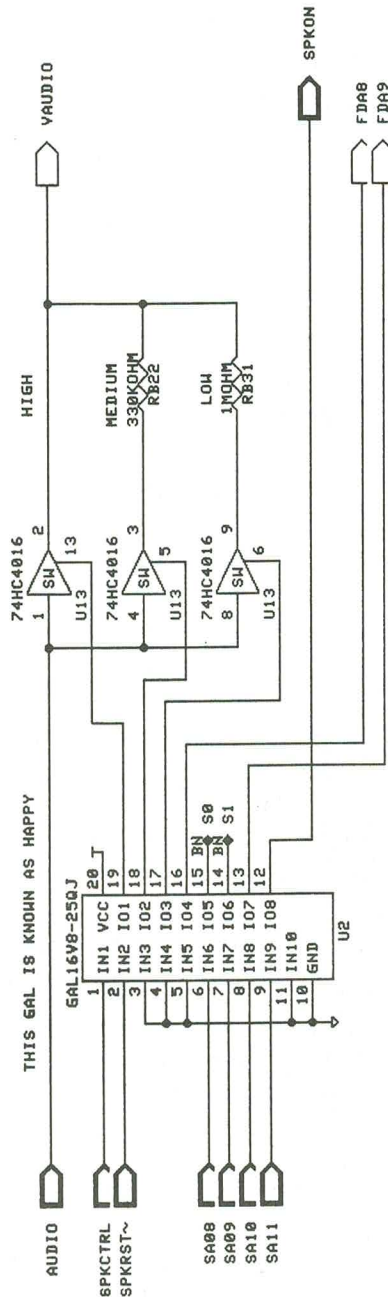
SPIO—Modem—Isopoint

Figure 5-1. Main Logic Board Schematic (Page 45 of 62)



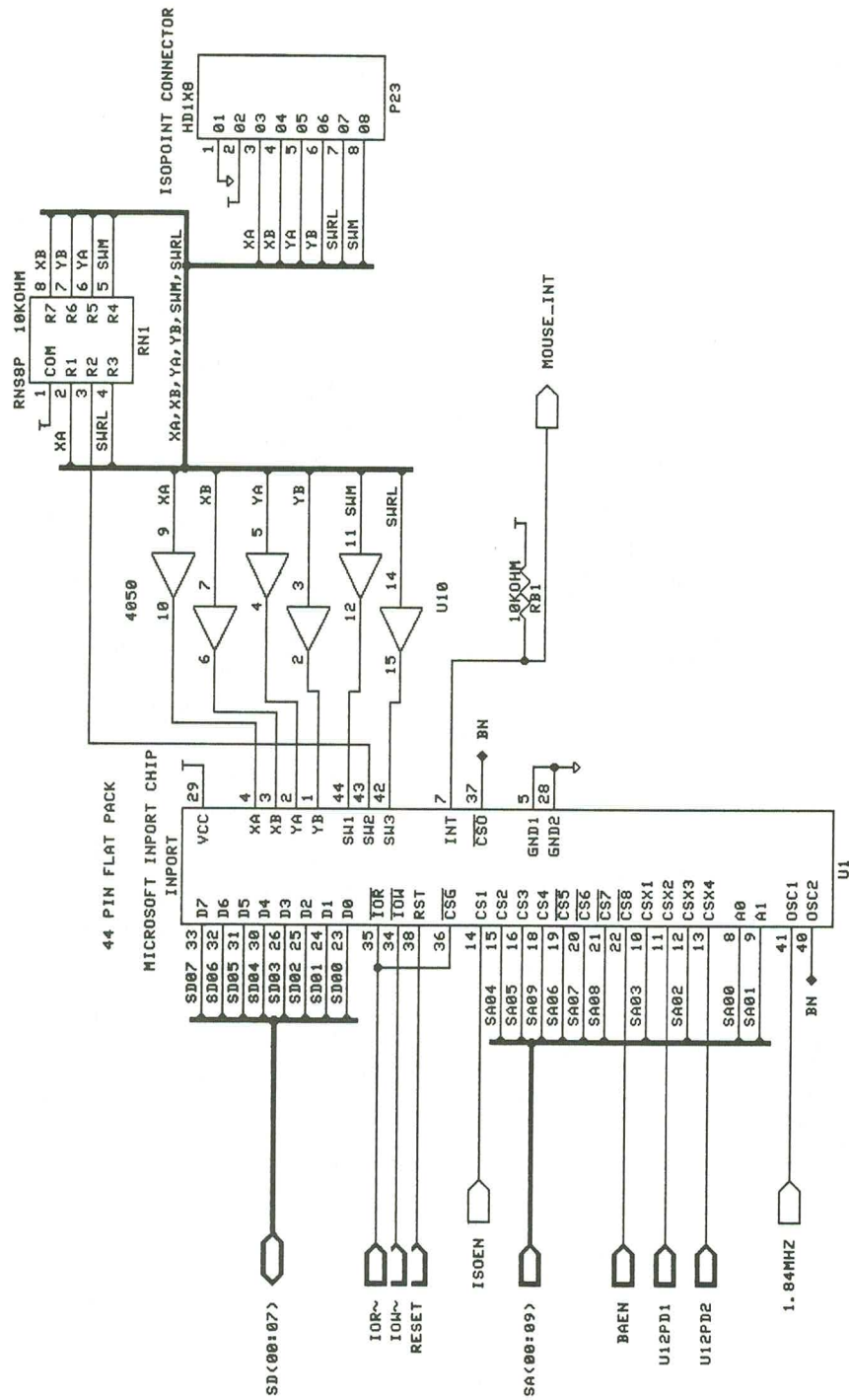
SPIO—Modem—Isopoint

Figure 5-1. Main Logic Board Schematic (Page 46 of 62)



SPIO—Modem—Isopoint

Figure 5-1. Main Logic Board Schematic (Page 47 of 62)



SPIO—Modem—Isopoint

Figure 5-1. Main Logic Board Schematic (Page 48 of 62)

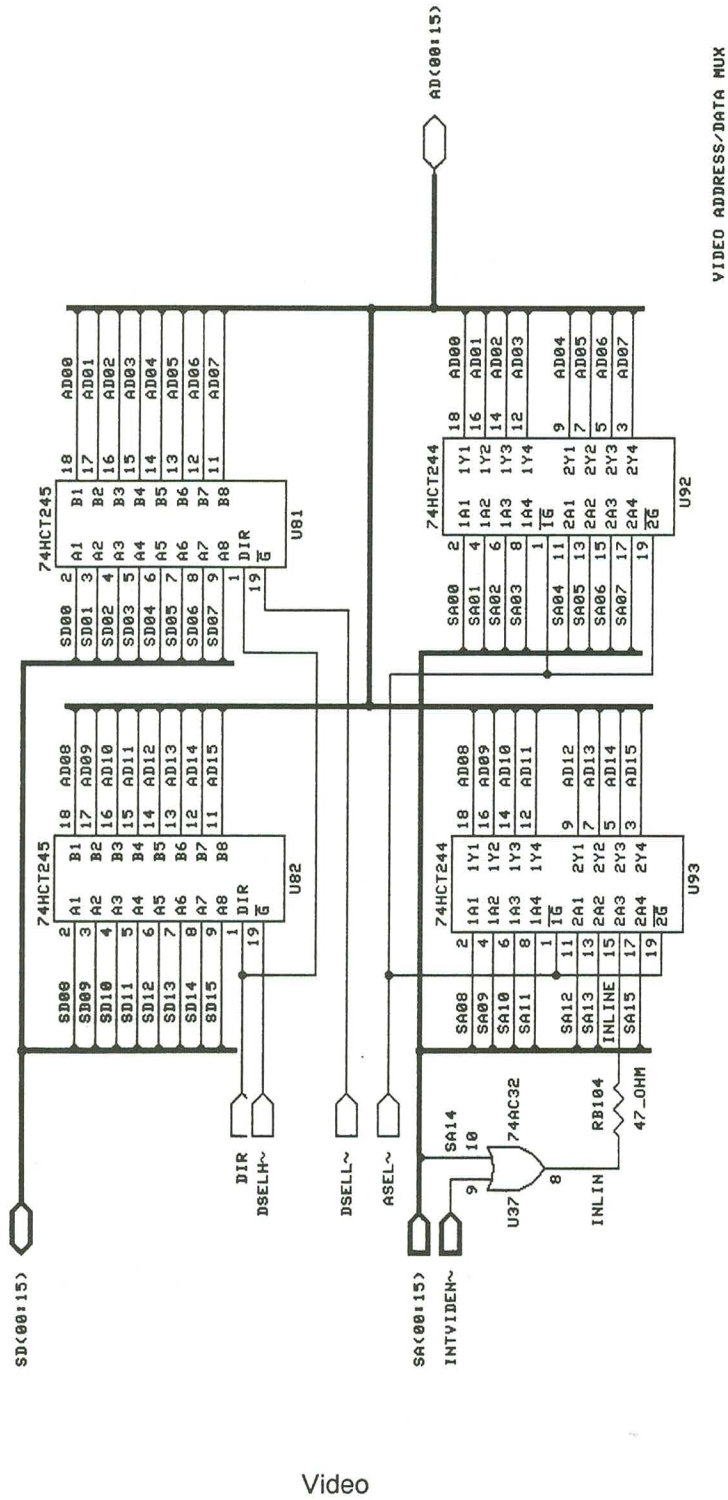


Figure 5-1. Main Logic Board Schematic (Page 49 of 62)

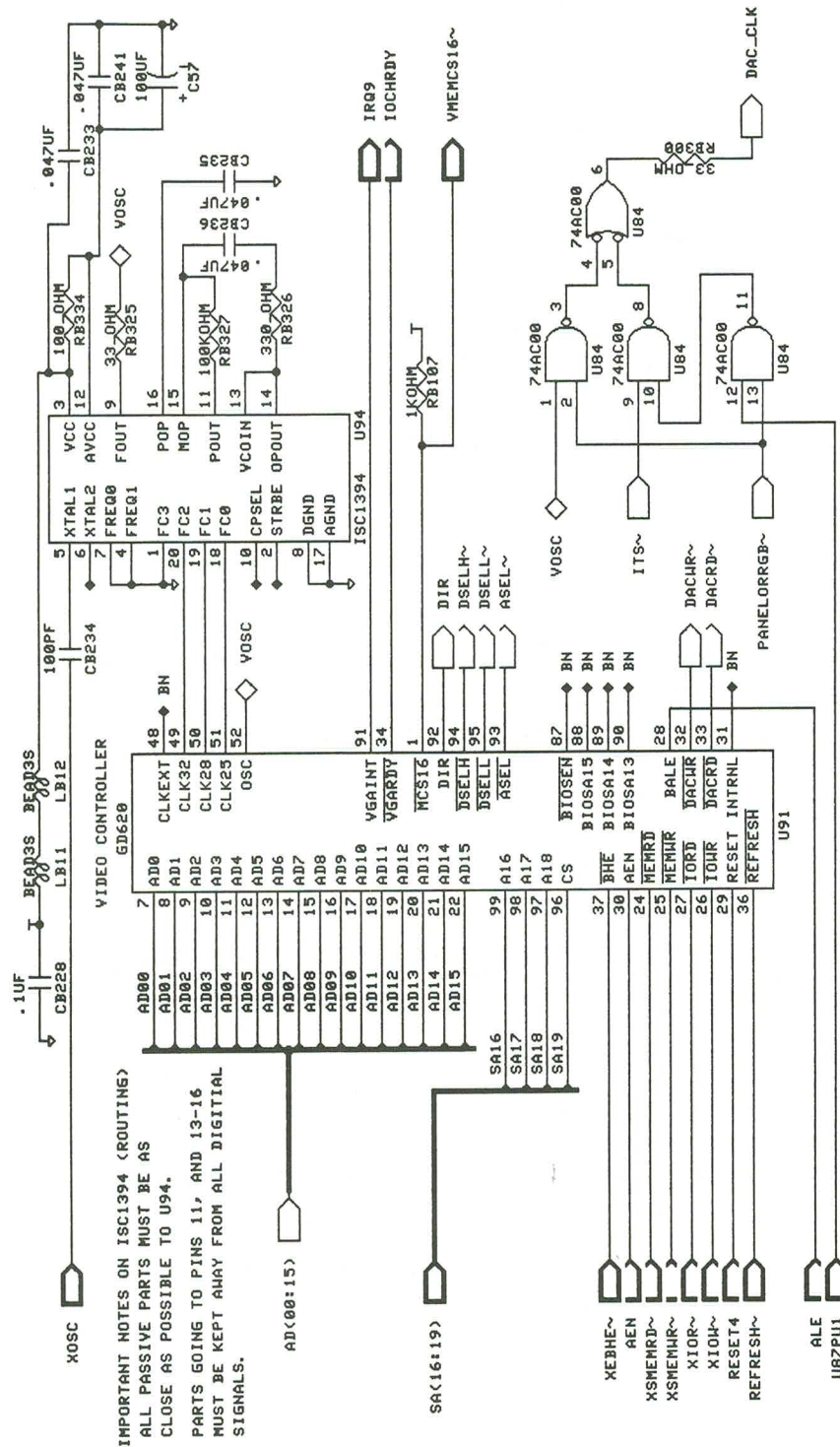
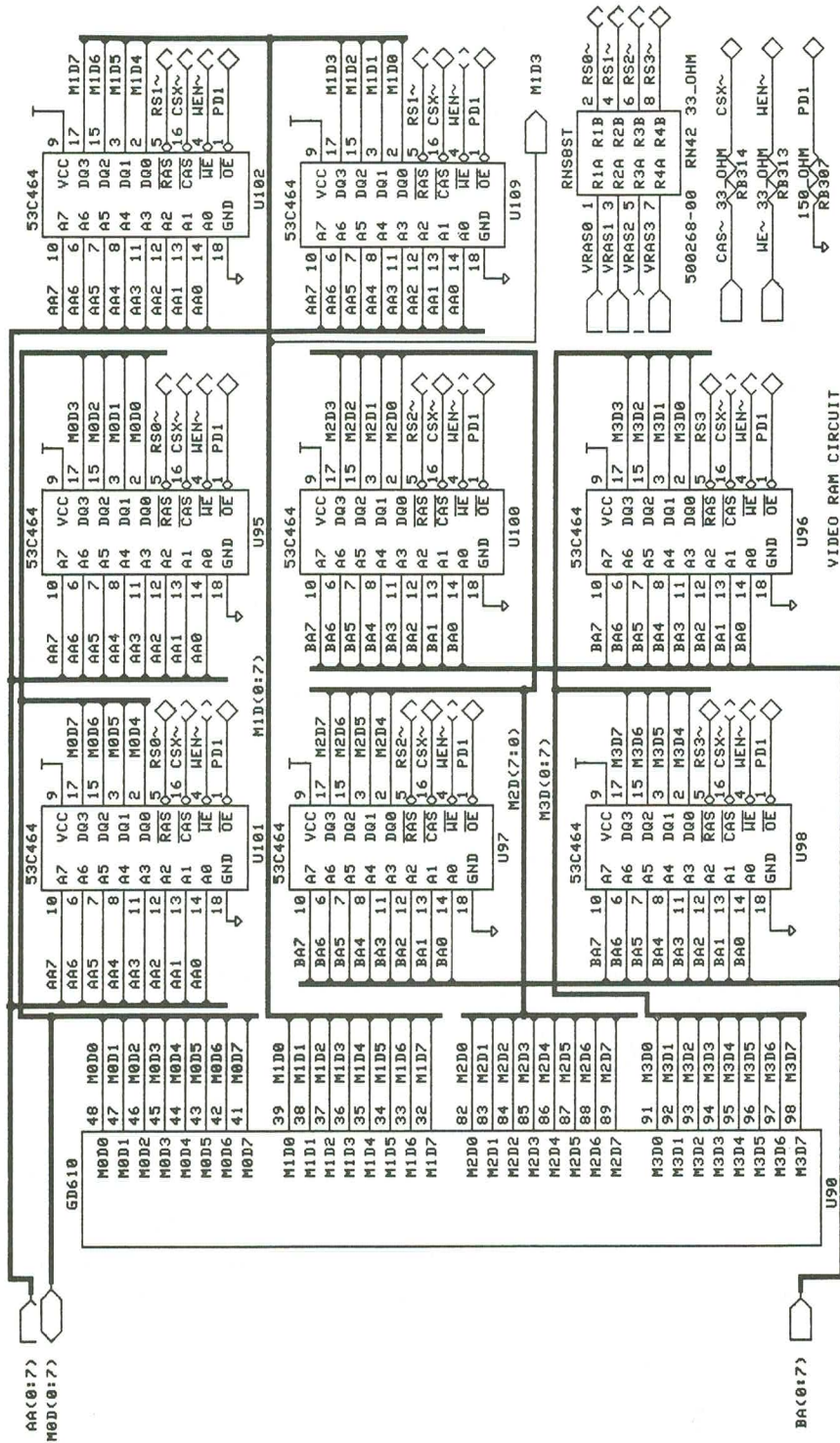
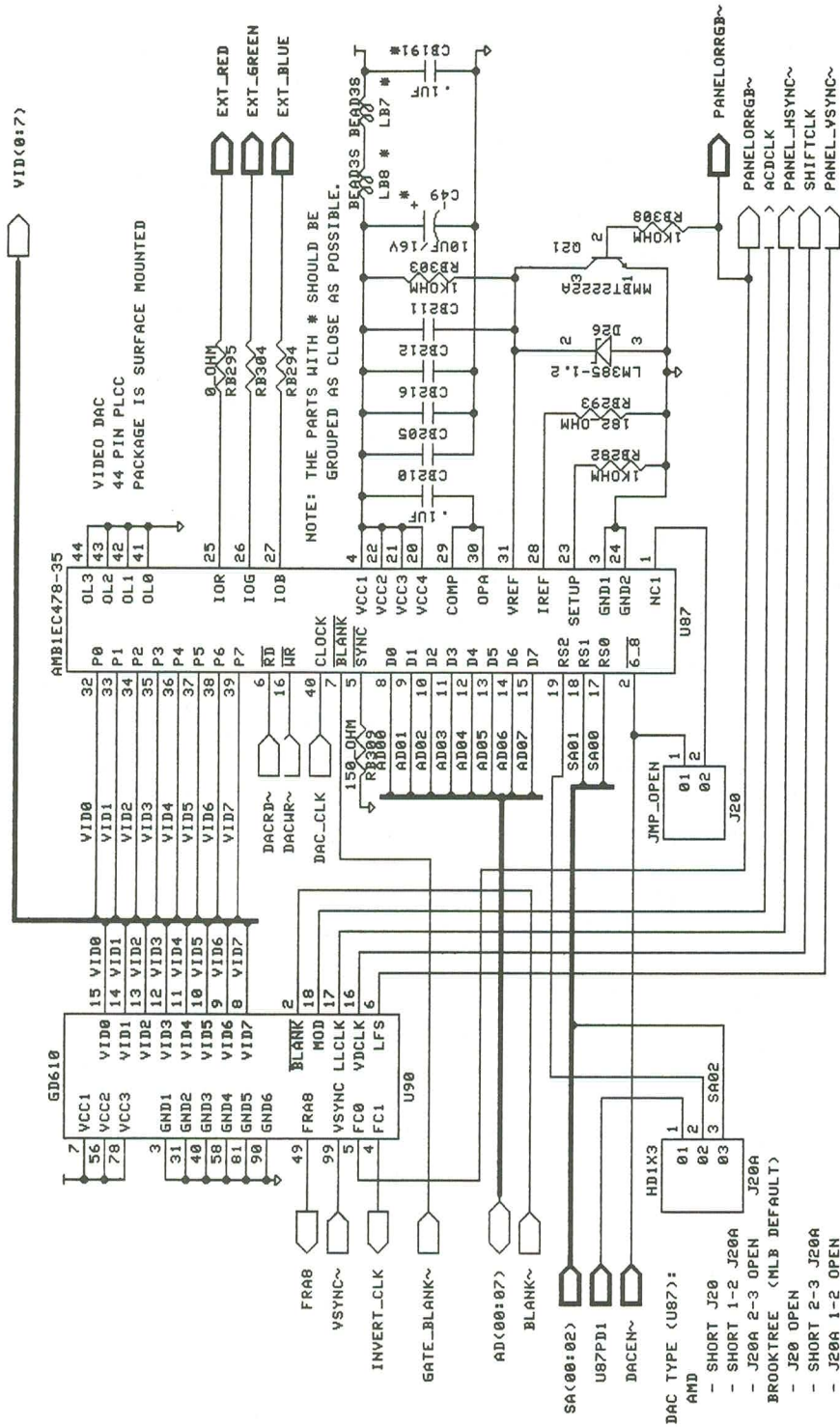


Figure 5-1. Main Logic Board Schematic (Page 50 of 62)



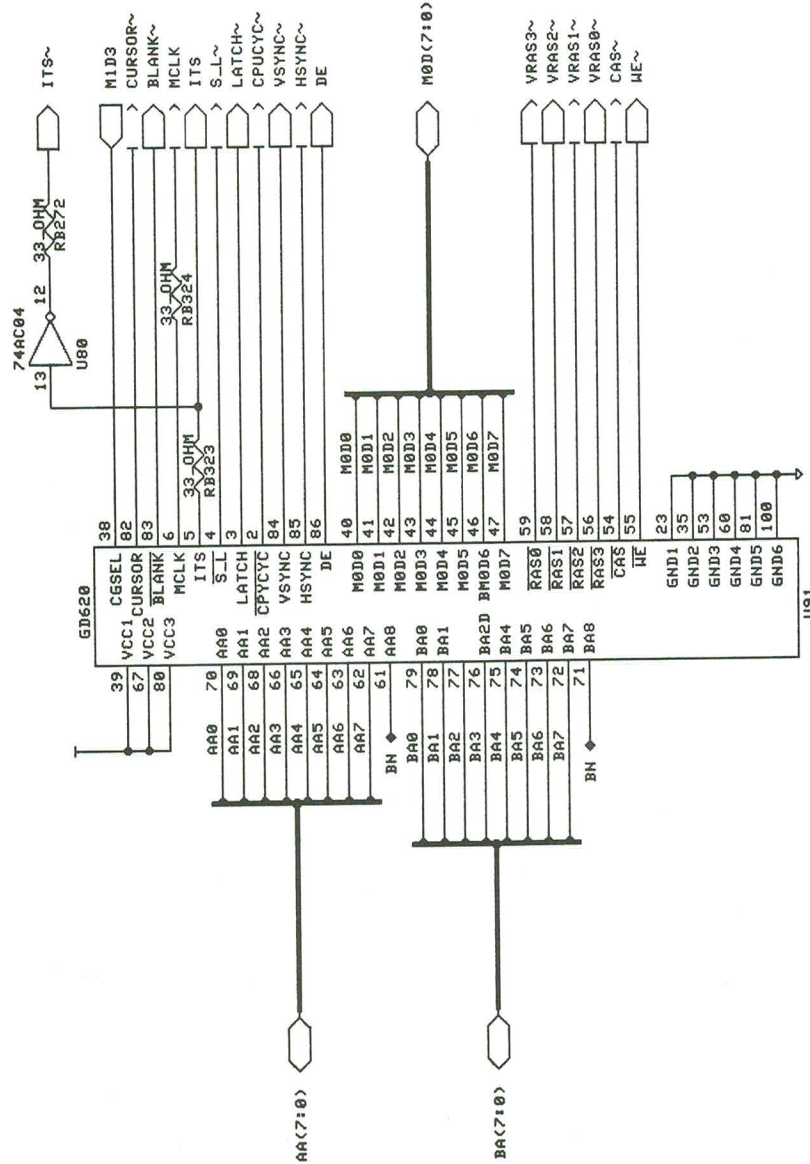
Video

Figure 5-1. Main Logic Board Schematic (Page 51 of 62)



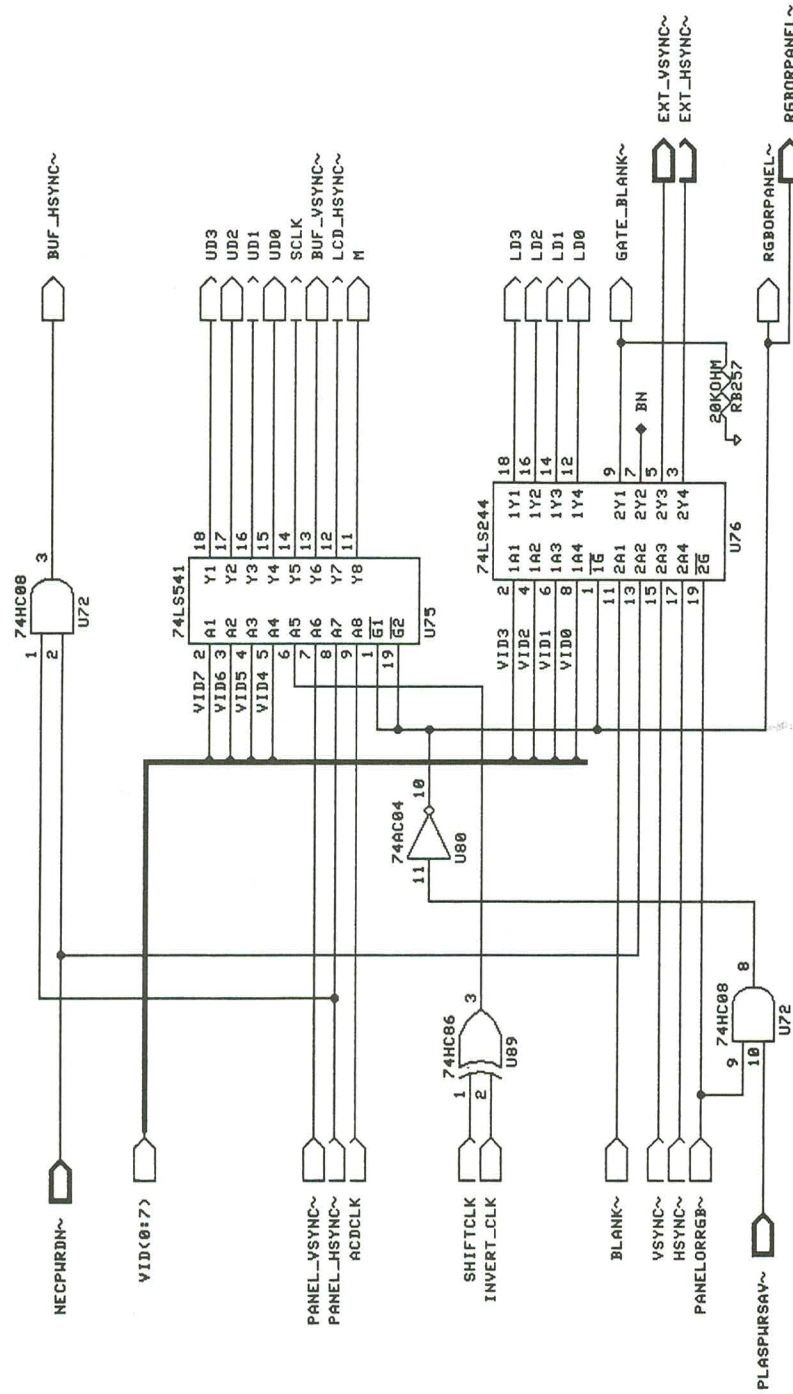
Video

Figure 5-1. Main Logic Board Schematic (Page 52 of 62)



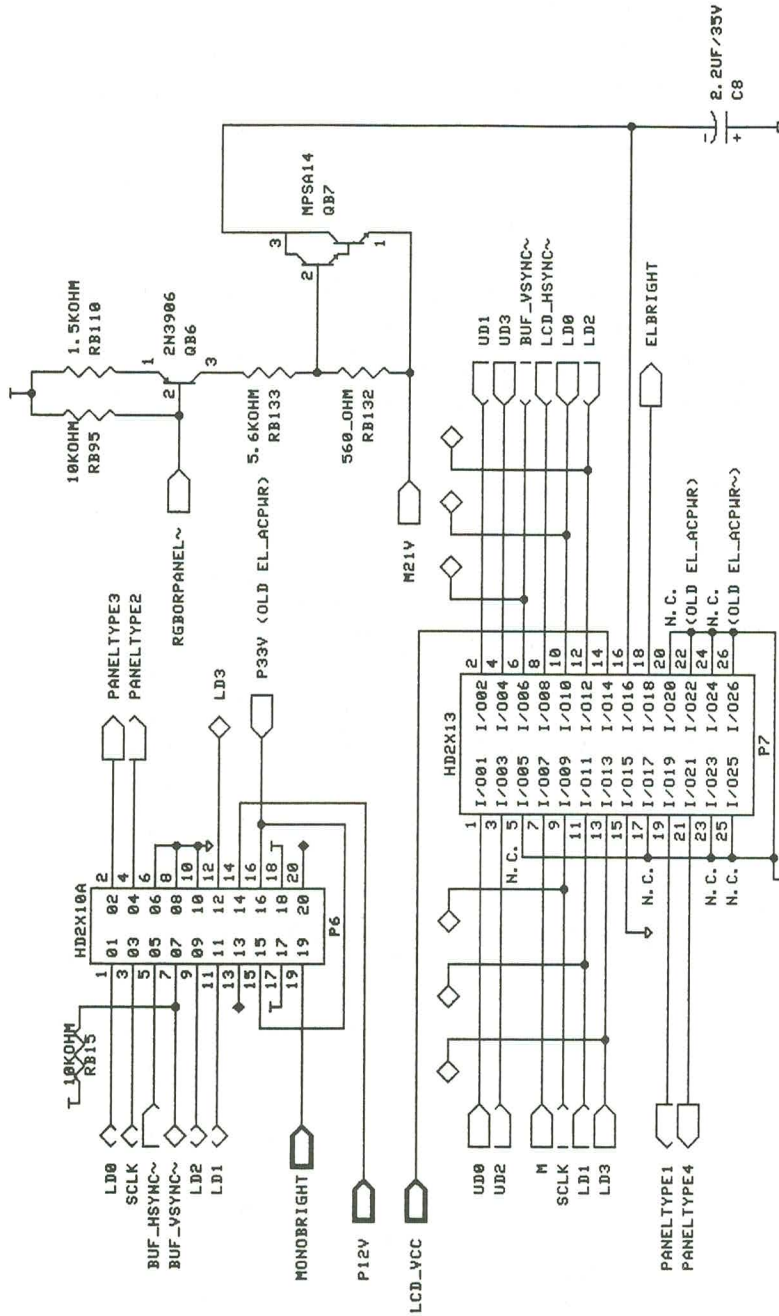
Video

Figure 5-1. Main Logic Board Schematic (Page 53 of 62)



Video

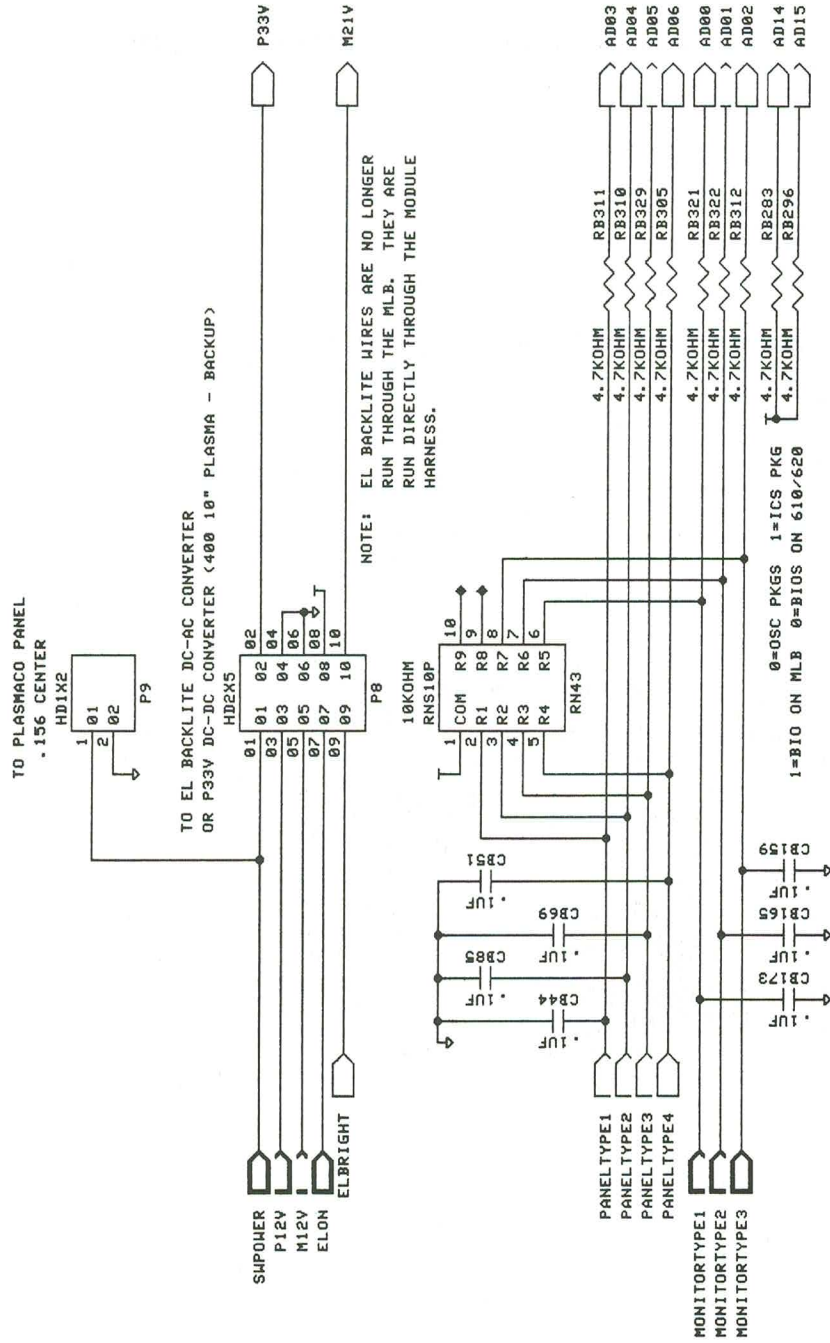
Figure 5-1. Main Logic Board Schematic (Page 54 of 62)



NOTE: EL_ACPHR USE TO BE THE RETURN FOR THE BACKLITE FOR LCD OPERATION.
 IT HAS ALSO USED FOR BACKUP (P33V) ON OLD 400 LINE PLASMAS.
 EL_ACPHR~ USED TO BE THE HOT LINE FOR THE BACKLITE FOR LCD OPERATION ONLY.

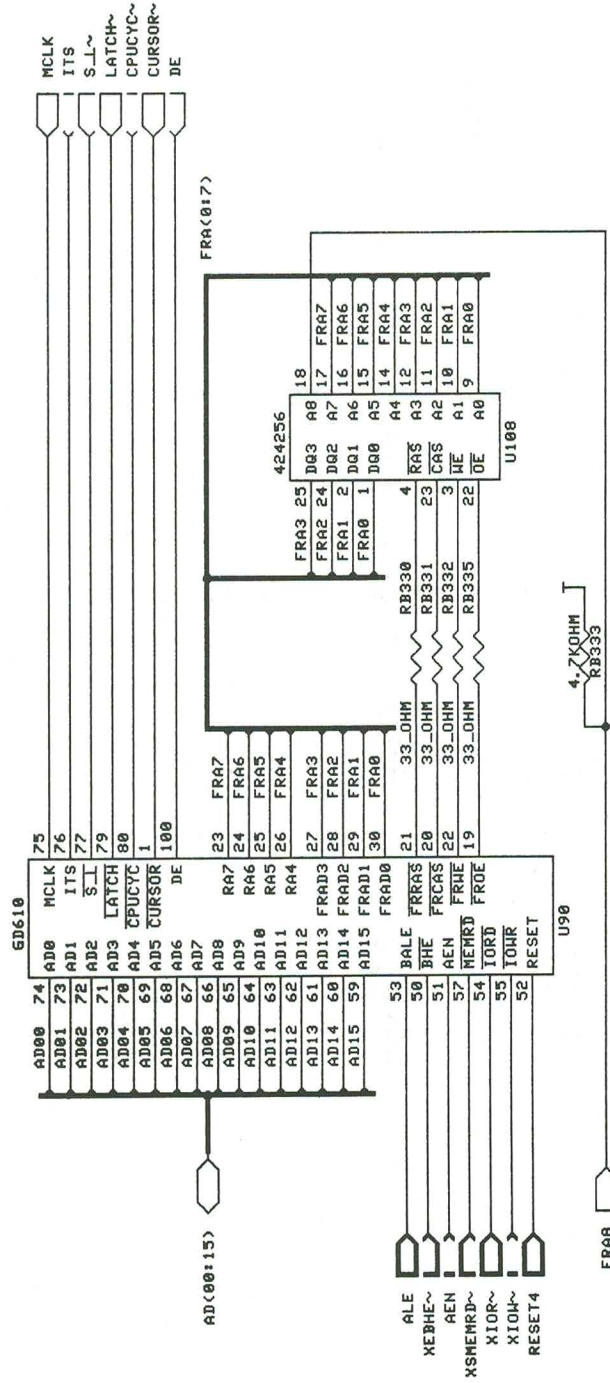
Video

Figure 5-1. Main Logic Board Schematic (Page 55 of 62)



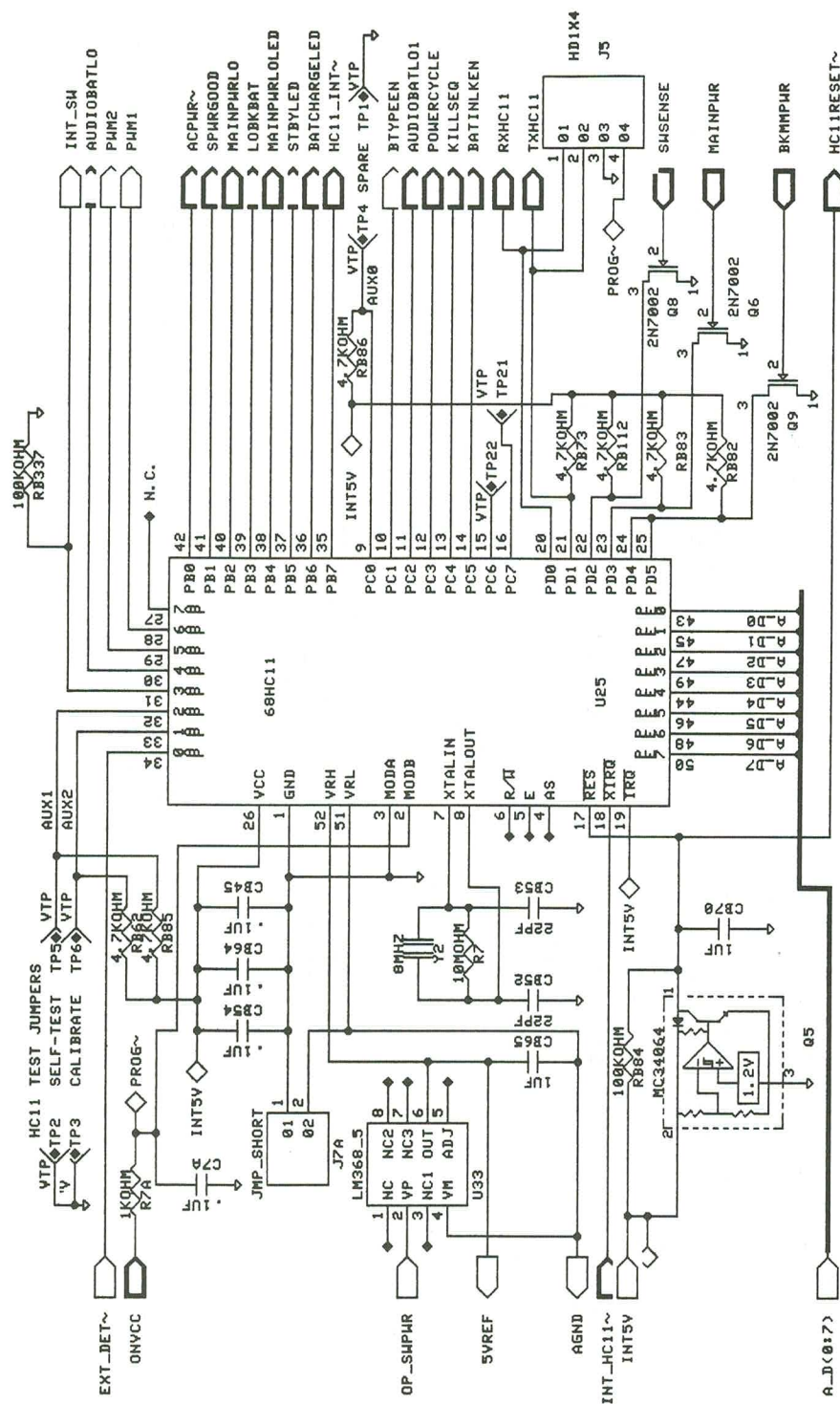
Video

Figure 5-1. Main Logic Board Schematic (Page 56 of 62)



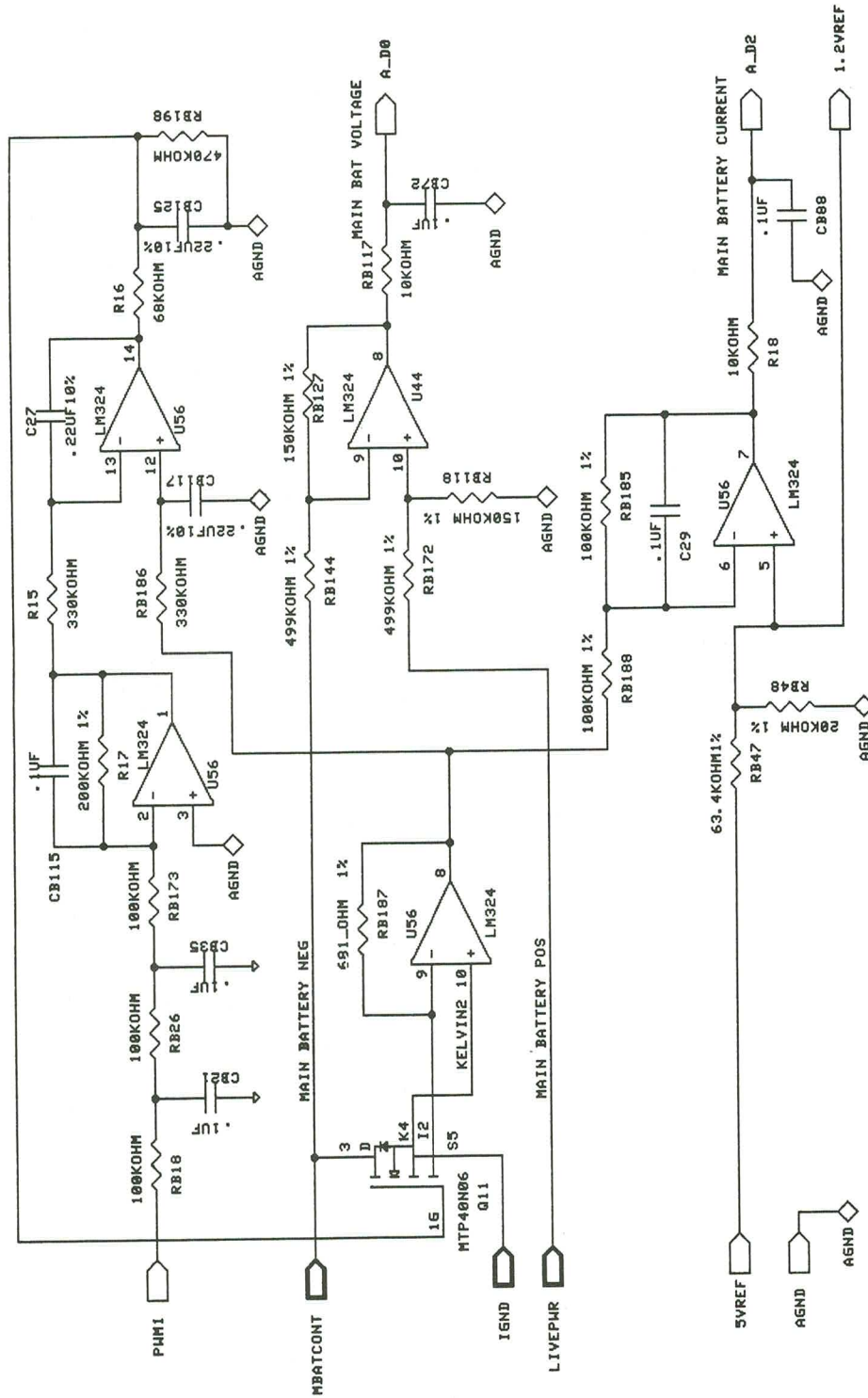
Video

Figure 5-1. Main Logic Board Schematic (Page 57 of 62)



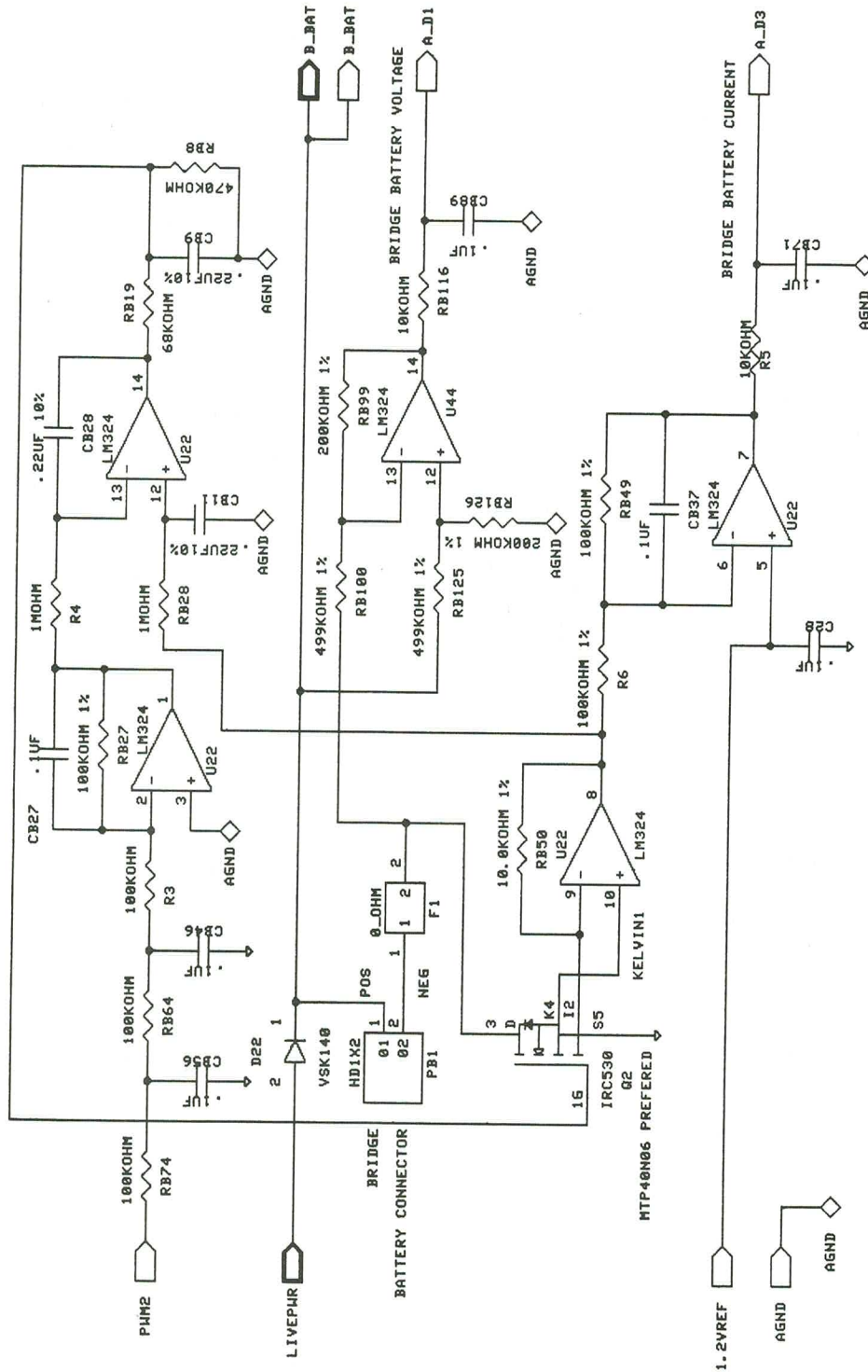
VT Monitor—Battery Management

Figure 5-1. Main Logic Board Schematic (Page 58 of 62)



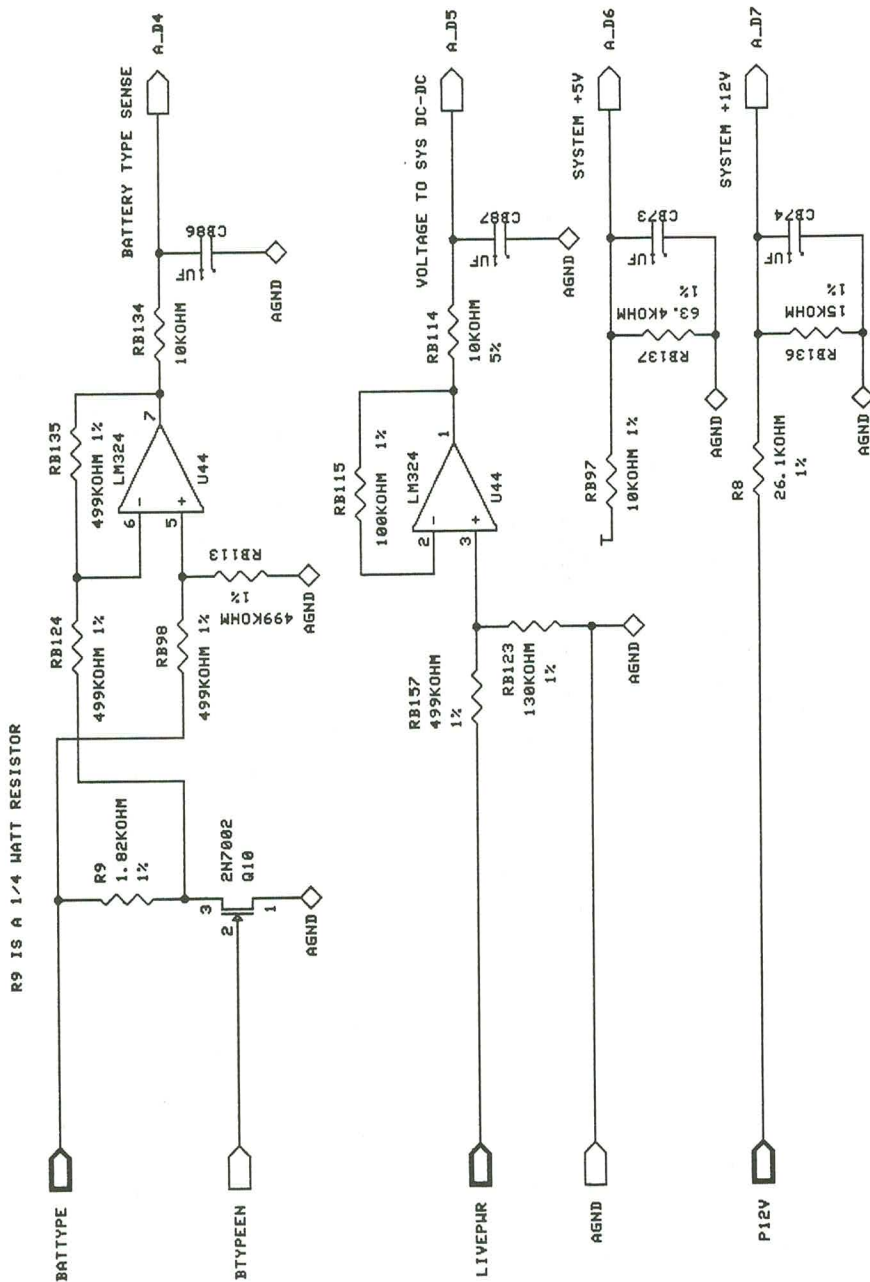
VT Monitor—Battery Management

Figure 5-1. Main Logic Board Schematic (Page 59 of 62)



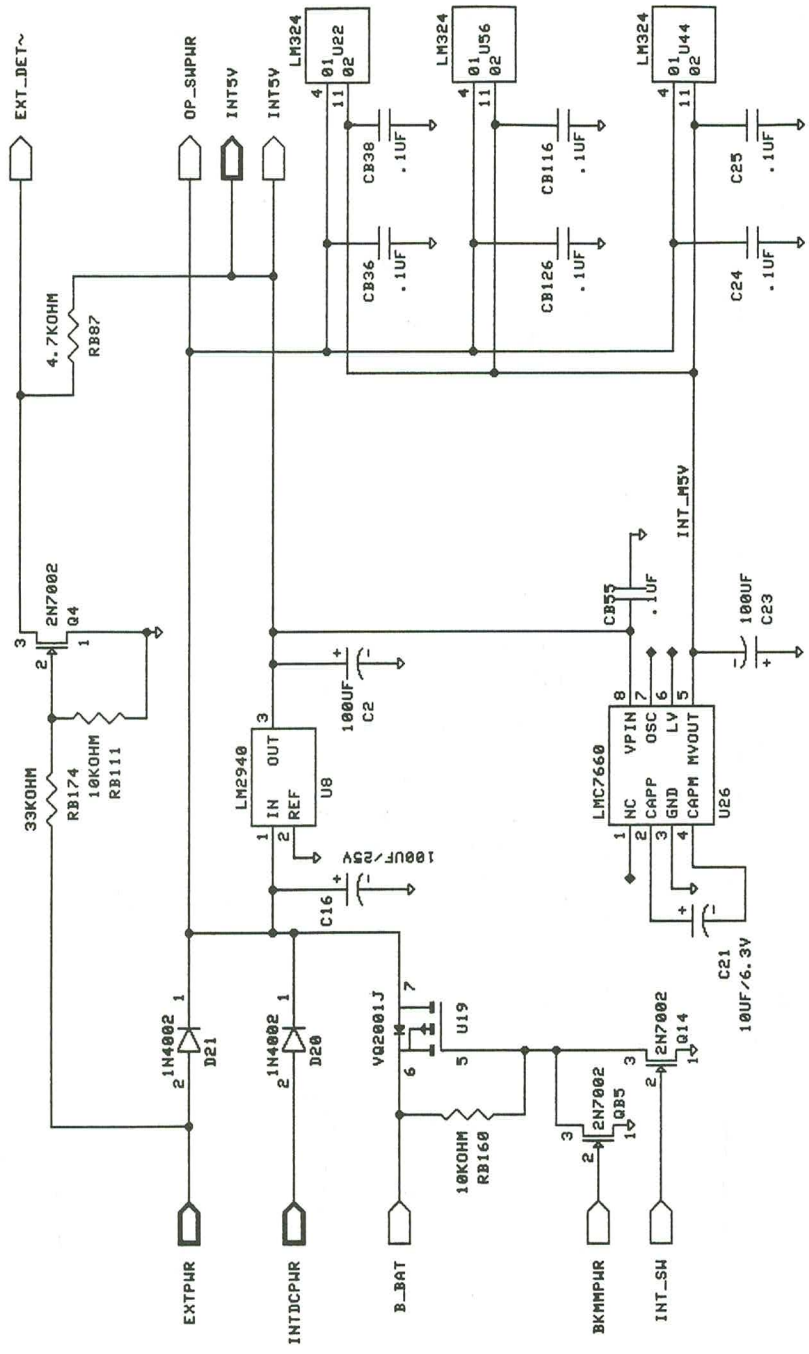
VT Monitor—Battery Management

Figure 5-1. Main Logic Board Schematic (Page 60 of 62)



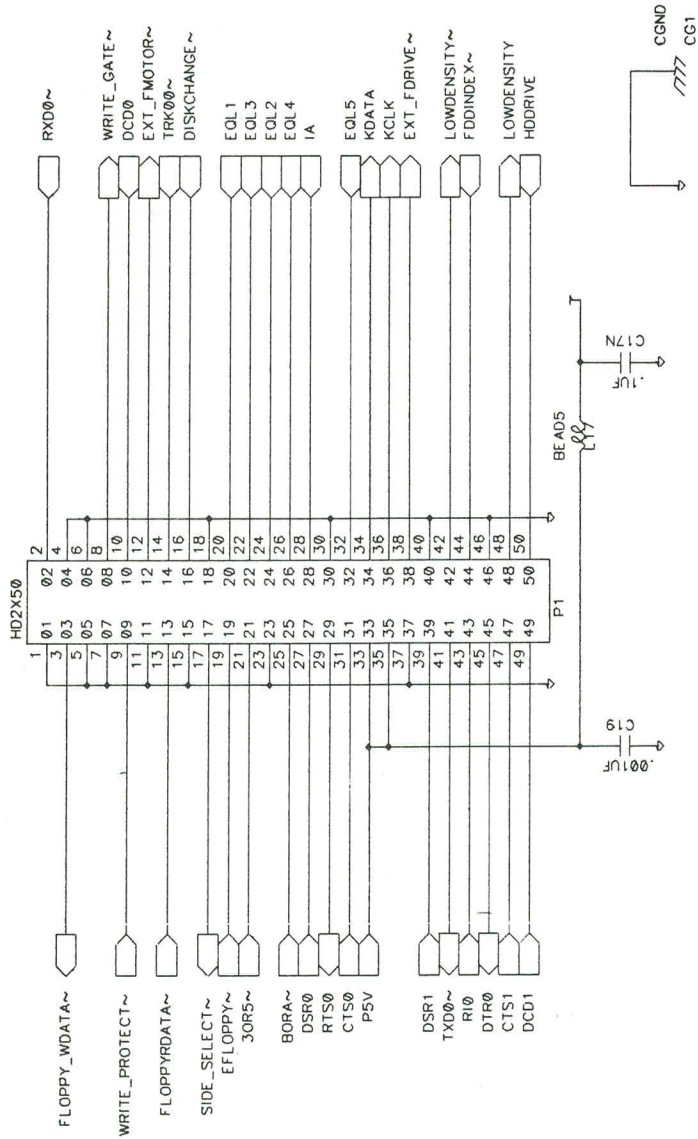
VT Monitor—Battery Management

Figure 5-1. Main Logic Board Schematic (Page 61 of 62)



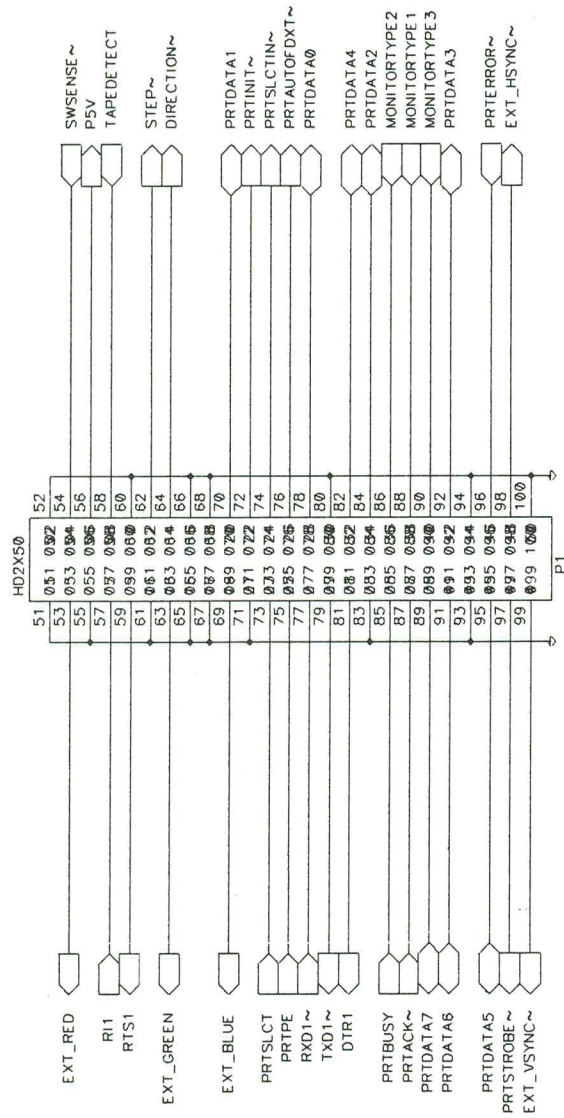
VT Monitor—Battery Management

Figure 5-1. Main Logic Board Schematic (Page 62 of 62)



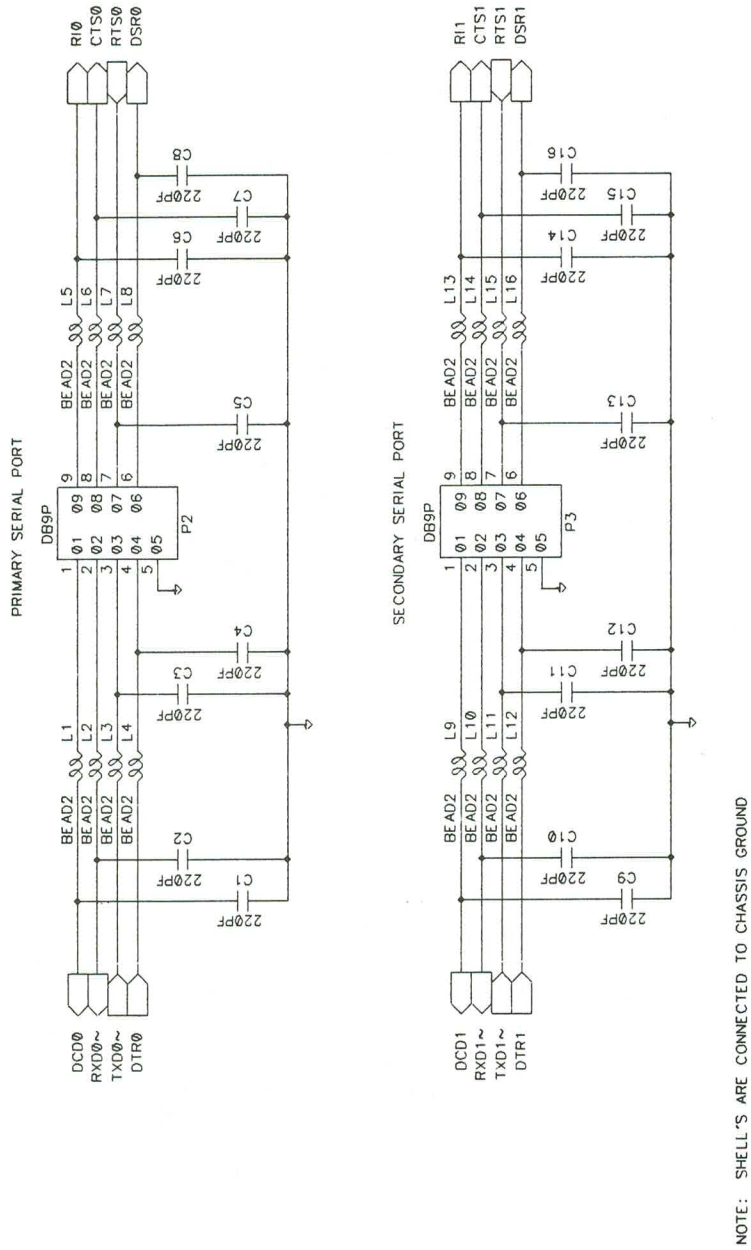
MLB Connector

Figure 5-2. Rear Connector Panel Schematic (Page 1 of 6)



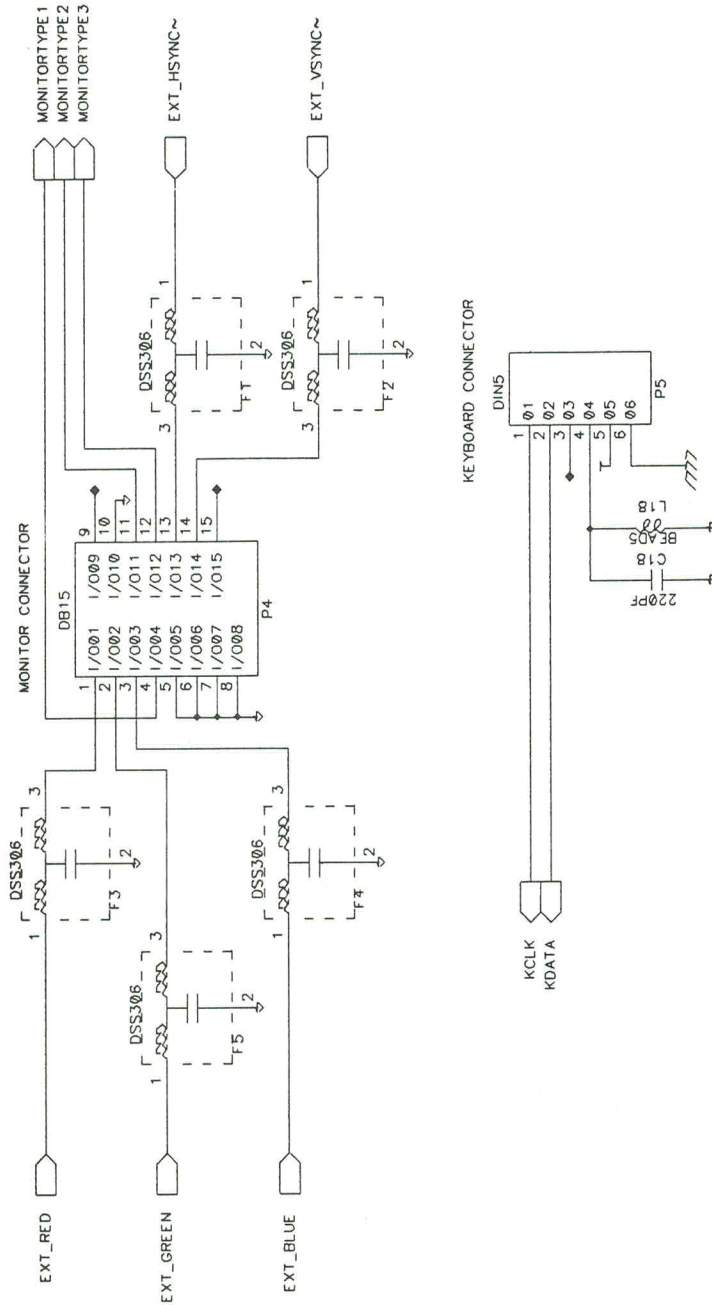
MLB Connector

Figure 5-2. Rear Connector Panel Schematic (Page 2 of 6)



Serial Port A—Serial Port B

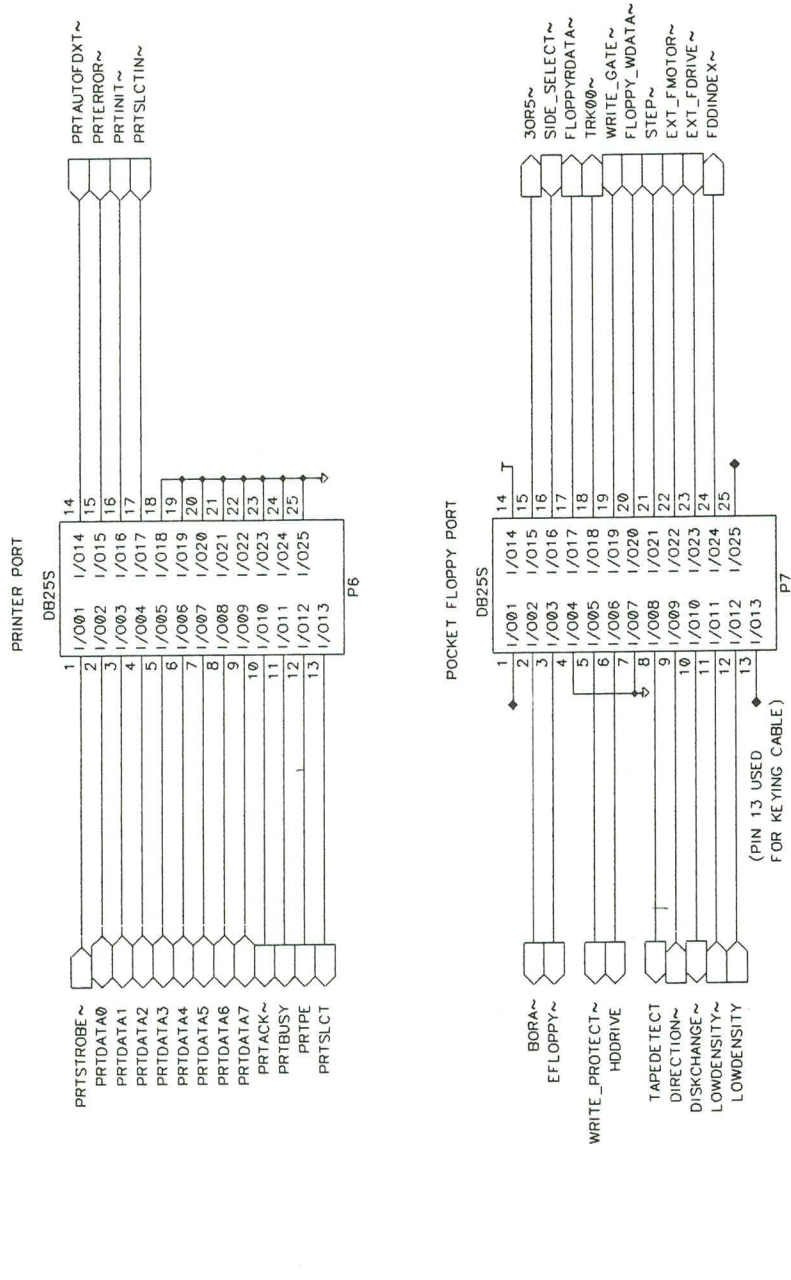
Figure 5-2. Rear Connector Panel Schematic (Page 3 of 6)



NOTE: SHELL'S ARE CONNECTED TO CHASSIS GROUND

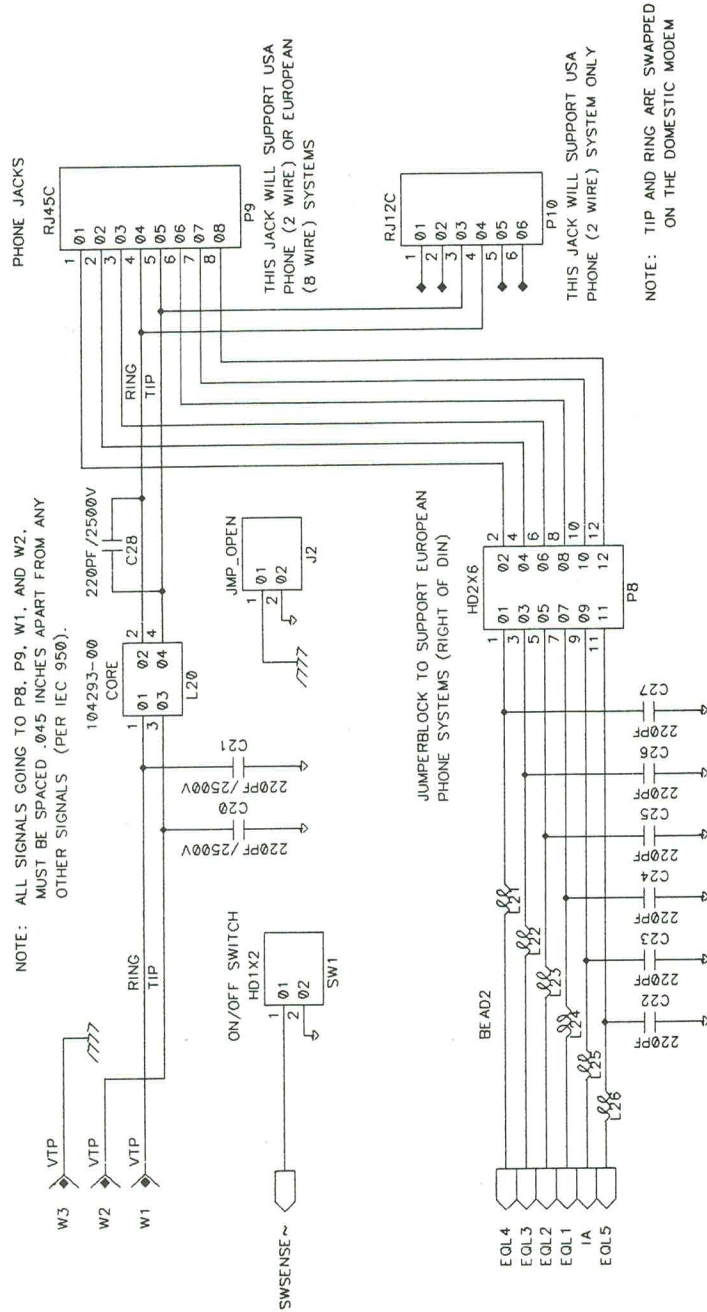
Monitor Connector—Keyboard Connector

Figure 5-2. Rear Connector Panel Schematic (Page 4 of 6)



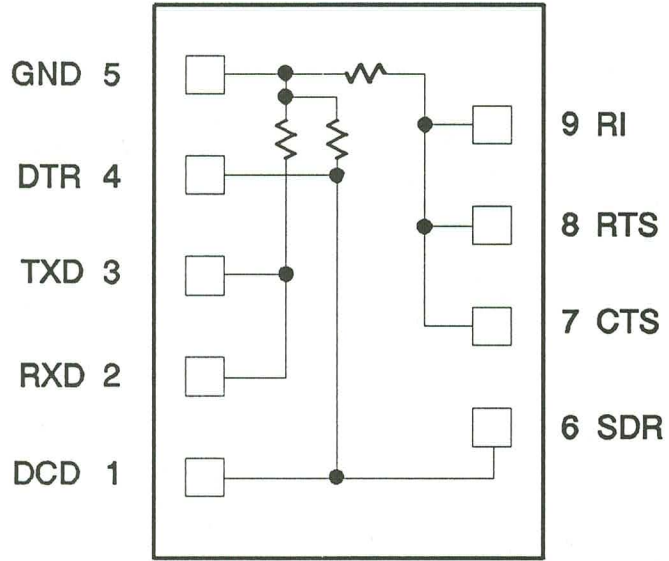
Printer Port—Pocket Floppy Port

Figure 5-2. Rear Connector Panel Schematic (Page 5 of 6)



Phone Jacks

Figure 5-2. Rear Connector Panel Schematic (Page 6 of 6)



All resistors are 1/4W, 1K ohm

Figure 5-3. RS-232C Loopback Fixture Wiring Diagram

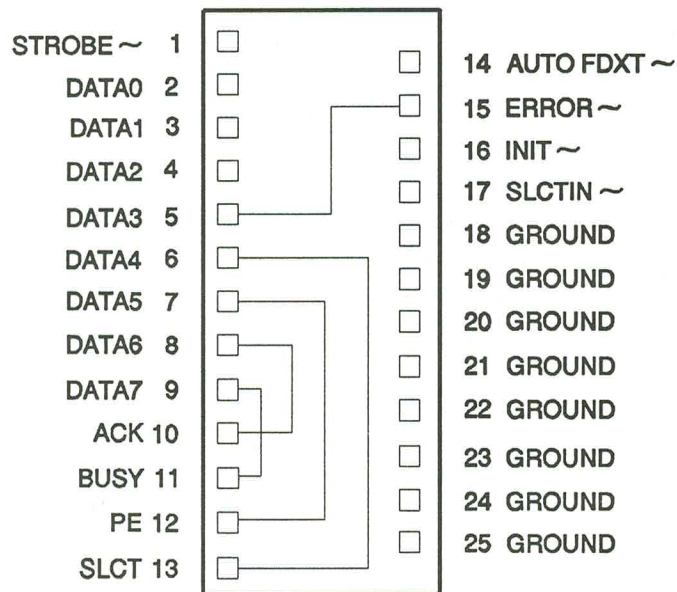


Figure 5-4. Printer Loopback Fixture Wiring Diagram

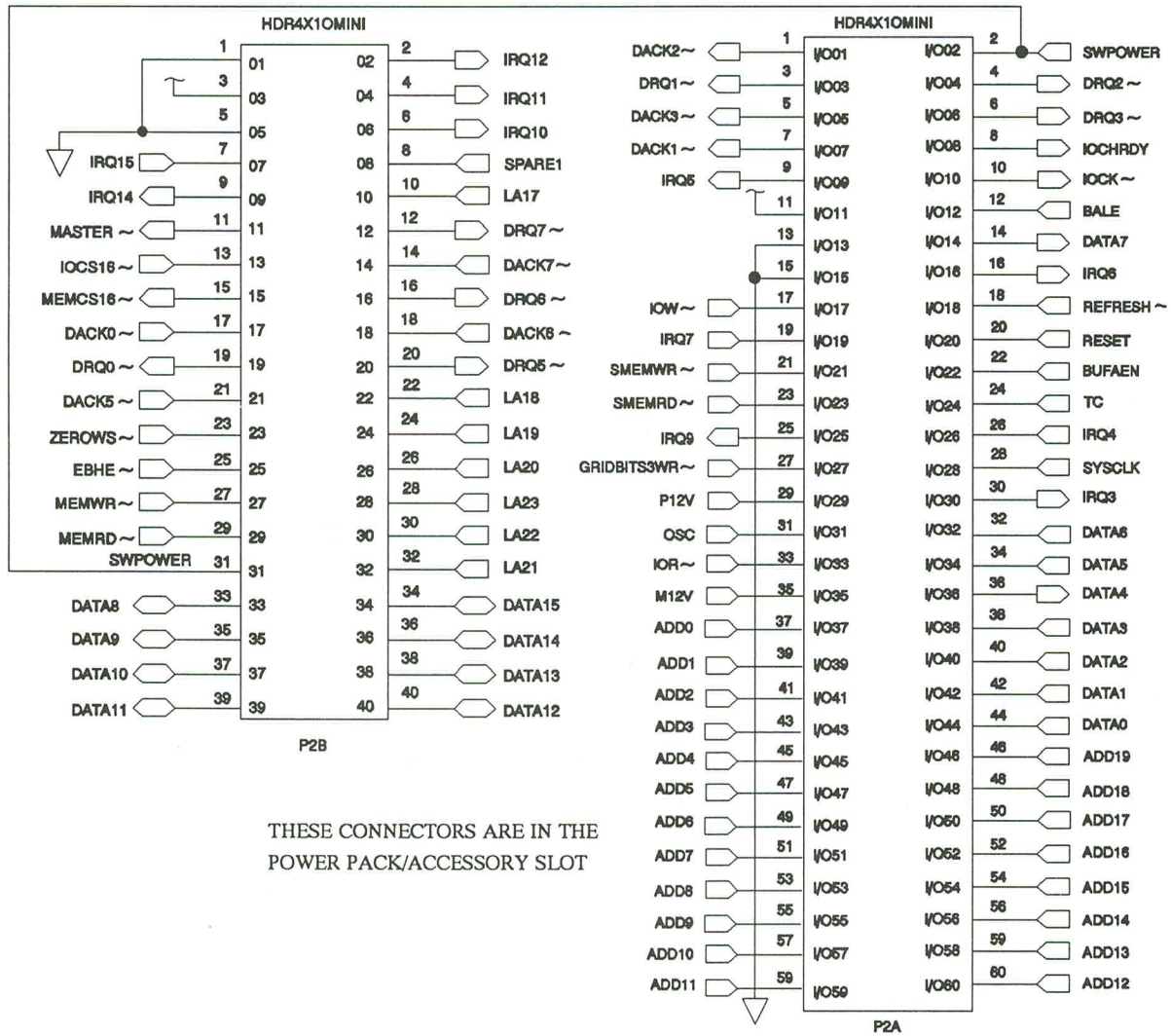


Figure 5-5. Expansion Bus Connector Schematic

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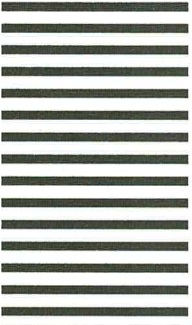


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