

# *ftServer 3200 Technical Service Guide*

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## **Revision History Since FCS**

*8/02/01 - Updated Section 4A.*

*8/22/01 – Added firmware update procedure for front panel board to Section 4A.3.10.*

*10/24/01 – Added ftServer 3100 Rack-Mounted information, updated Section 8.*

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Manual Name: *ftServer 3200 Technical Service Guide*

Stratus Technologies, Incorporated

Customer Service Documentation Department

## Warning

The equipment documented in this manual generates and uses radio frequency energy, which if not installed and used in strict accordance with the instructions in this manual, may cause harmful interference to radio communications. The equipment has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

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# Preface

The *ftServer 3200 Technical Service Guide* contains technical information pertinent to ftServer systems operating under Microsoft Windows 2000 Advanced Server operating systems .

This document is organized as follows:

Section 1 - Introduction

Section 2 - Operation and Maintenance Procedures

Section 3 - Fault Isolation

Section 4A - FRU Removal and Replacement (Pedestal System)

Section 4B - DRU Removal and Replacement(Pedestal System)

Section 4C - FRU Removal and Replacement (Rack-Mount System)

Section 4D - DRU Removal and Replacement(Rack-Mount System)

Section 5 - Theory of Operation

Section 6 - Upgrades

Section 7 - Related Documentation

Section 8 - Part Numbers

## Audience

This guide is intended for authorized service personnel who install and maintain Stratus systems, and who have completed Stratus field-service training courses.

# 1. Introduction

This section describes the requirements, components, configurations, and specifications for each model of the Stratus ftServer 3200 systems.

## 1.1 Overview

The ftServer 3200 is an entry-level fault tolerant system based on the Intel IA-32 architecture (32-bit, 800-MHz processor, 256 KB L2 cache). It incorporates Intel Pentium III technology into a rack-mounted platform. Fault tolerance is achieved through double modular redundancy (DMR), which is two CPU modules running in lockstep.

The ftServer 3200 system is available as a standalone pedestal unit or in a standard 19" rack-mount configuration. The unit houses the device module (contains the super floppy disk and CD ROM drive), two independent CPU subsystems in support of DMR configurations, two fault redundant I/O subsystems (two I/O enclosures), one mirrored SCSI disk subsystem, a fault tolerant power subsystem, and a system control and monitoring (M&D) subsystem. A fibre channel disk subsystem is also available.

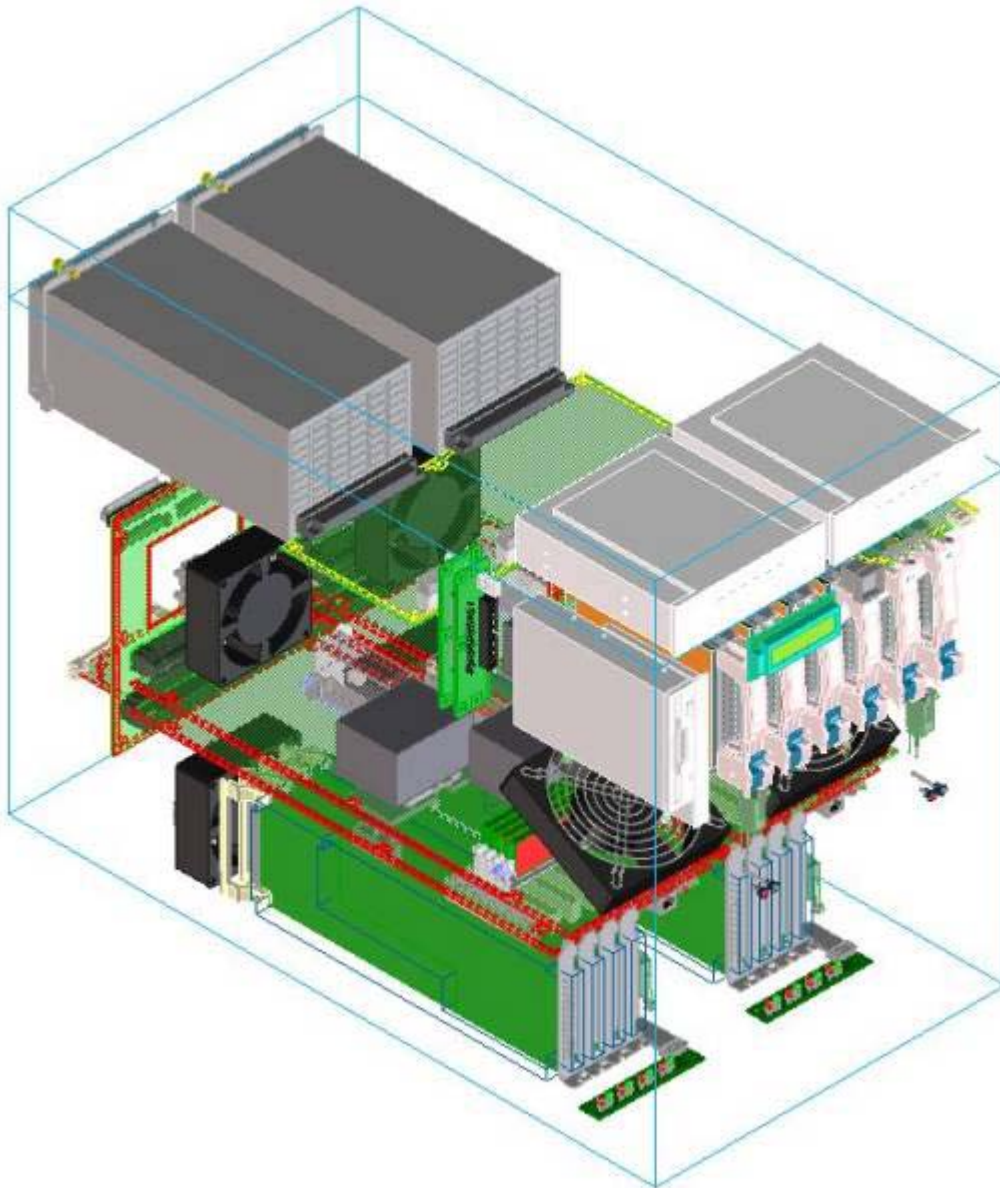
Tape drives are supported in an enclosure mounted on top of the cabinet in the pedestal models.

ftServer 3200 systems can be installed in an office or computer room environment.

The ftServer 3200 product line consists of the ftServer 3210 and ftServer 3220. The primary hardware difference between the ftServer 3220 and ftServer 3210 is that the ftServer 3220 incorporates an ftServer Access adapter, which is a Web-based interface that allows an authorized person to remotely control, monitor, and diagnose problems on ftServer 3220 systems.

Figure 1-1 is a pictorial representation of the ftServer 3200.

Figure 1-1. ftServer 3200.



## 1.2 Operating System Requirements

The ftServer 3200 is currently supported by the following operating systems:

- Microsoft Windows 2000Advanced Server
- ftServer System Software Release 1.0.1 or greater for 3210 (Release 1.02 for the 2-way 3210)

## 1.3 Hardware Components

### 1.3.1 CPU Enclosure

The CPU enclosure supports one or two Intel Pentium III processors operating at 800 MHz. The system bus operates at 100 MHz. Up to four 256-MB or 512-MB SDRAM DIMMs (memory modules) are supported in configurations of 256 MB, 512 MB, 1 GB, and 2 GB.

The CPU enclosure has an integrated 450-Watt AC power supply. Power fault detection is provided .

For a detailed description of the CPU enclosure, refer to [Section 5.1](#).

The following table lists model numbers and gives a brief description of the CPUs and memory modules supported in ftServer 3200 systems.

<b>Model</b>	<b>Description</b>
<b>G910</b>	<b>850 MHz, 256 MB cache CPU</b>
<b>M863</b>	<b>256-MB memory module</b>
<b>M864</b>	<b>512-MB memory module</b>

### 1.3.2 PCI Subsystem

The PCI subsystem supports two I/O enclosures. Each I/O enclosure has four 32bit-33MHz PCI slots. Each I/O enclosure has an Intel 82559 NIC and a Qlogic 1280 disk SCSI processor embedded in its base board (PCI board). Since the ftServer 3200 does not have clock cards, the PCI board contains a real-time clock.

In the ftServer 3220, a U460 ftServer Access adapter must reside in slot 1. In the ftServer 3210, a 69000-based video adapter resides in slot 1. The remaining three slots are user-configurable. For a detailed description of the PCI subsystem, refer to [Section 5.2](#).

The following table lists the PCI adapters/cables supported on ftServer 3200 systems.

<b>Model</b>	<b>Description</b>
<b>U514</b>	<b>64bit/33MHz fibre channel Adapter</b>
<b>U515</b>	<b>1-port 10/100 Mbps ethernet adapter</b>
<b>U516</b>	<b>1-port Ultra2 SCSI adapter</b>
<b>E928</b>	<b>Video adapter (4MB VRAM) (ftServer 3210 only)</b>
<b>U460</b>	<b>ftServer Access adapter (ftServer 3220 only)</b>
<b>U480</b>	<b>2-Port Synchronous PCI Adapter</b>
<b>U485</b>	<b>4-Port Synchronous PCI Adapter</b>
<b>U486</b>	<b>8-port Asynchronous PCI Adapter</b>
<b>U517</b>	<b>Fiber Channel PCI Adapter</b>
<b>U570</b>	<b>1-Port 1000BaseSx Ethernet PCI Adapter</b>
<b>U571</b>	<b>1-Port 1000Base-T Ethernet PCI Adapter</b>

### 1.3.3 Storage Subsystems

#### 1.3.3.1 SCSI Storage Enclosure

The SCSI storage enclosure houses up to six hot-pluggable 3.5” Ultra3 SCSI disk drives. All disk drives are powered using 1+1 redundant power supplies. Each disk drive has a dedicated fan, which is located in the CPU enclosure.

The maximum number of SCSI storage enclosures is one; therefore, the maximum number of disk drives in the system is 6 (three duplexed).

For a detailed description of the SCSI storage enclosure, refer to [Section 5.5](#)

The following table lists the disk drives supported on ftServer 3200 systems.

<b>Model</b>	<b>Description</b>
<b>D865</b>	<b>18-GB disk drive</b>
<b>D866</b>	<b>36-GB disk drive</b>

### 1.3.3.2 Fibre Channel RAID Storage Subsystem

The optional Fibre Channel RAID disk subsystem is an option available for the rack-mounted 3200 systems. It consists of a pair of host bus adapters (PCI cards) and at least one Fibre Channel Storage enclosure (maximum of three). The Fibre Channel RAID disk subsystem is a complete, fully redundant, rack mountable, Fibre Channel storage solution. Each enclosure is 3U in height and can contain up to 14 Fibre Channel disk drives. The first (main) enclosure (D570) contains the following components:

- two RAID controllers (each with 128MB of ECC cache)
- two Advanced Cooling Modules (ACMs), each with battery backup unit (BBU)
- two Power Supply Modules (PSMs)
- two Loop Resiliency and SES Modules (LSMs)
- two to 14 disk drives

The second and third enclosures (D580) are daisy chained to the first. Each D580 contains the following components:

- two I/O modules
- two Advanced Cooling Modules (ACMs), with no battery
- two Power Supply Modules (PSMs)
- two Loop Resiliency and SES Modules (LSMs)
- two to 14 disk drives

The two ACMs in the D570 contain BBUs for maintaining memory content in the RAID Controllers' cache in case of an AC power failure.

One or two D580 Fibre Channel RAID expansion enclosures, each with a maximum capacity of 14 Fibre Channel drives, can also be added to the Fibre Channel RAID disk subsystem. This provides for a maximum capacity of 42 Fibre Channel drives.

A pair of U514 host bus adapters (HBA) is required for fault tolerant operation. The Qlogic 2300 with copper connectors is the fibre channel HBA, along with a Stratus hardened driver.

The following table lists the fibre channel disk drives supported on ftServer 3200 systems.

<b>Model</b>	<b>Description</b>
<b>D574</b>	<b>36-GB 10K RPM disk drive</b>
<b>D575</b>	<b>73-GB 10K RPM disk drive</b>

### 1.3.4 Tape Drives

ftServer 3200 pedestal systems support AIT and DDS-4 tape drives housed in the tape drive bay on top of the system. T51X tape drives can be connected externally.



For a detailed description of the tape drives, refer to [Section 5.6](#)

The following table lists the tape drive currently supported on ftServer 3200 systems.

<b>Model</b>	<b>Description</b>	<b>Internal/External</b>
<b>T811</b>	<b>DDS-4 DAT tape drive</b>	<b>Internal (Pedestal System)</b>
<b>T512</b>	<b>DDS-4 DAT tape drive with autoloader</b>	<b>External</b>
<b>T513</b>	<b>DLT 8000 tape drive</b>	<b>External</b>
<b>T514</b>	<b>DLT 8000 tape drive with autoloader</b>	<b>External</b>

### 1.3.5 Power Subsystem

The system has two power supplies, which are redundant, hot swappable and interchangeable. The supplies are capable of auto-selecting for 100~240VAC +/-10% 50/60Hz operation. ftServer 3200 systems have no internal battery back-up or power ride through capability; therefore, the customer must use an external UPS to provide this functionality.

The system requires two power cords connected to two independent AC sources and two exclusive branch circuits.

For a detailed description of the power subsystem, refer to [Section 5.7](#).

## 1.4 System Configurations

<b>Model</b>	<b>3210</b>	<b>3210</b>	<b>3210</b>	<b>3220</b>
<b>Marketing ID</b>	<b>P3204-1D-AS</b>	<b>P3204-2D-AS</b>	<b>P3204R-2D-AS</b>	<b>P3304-1D-AS</b>
<b>Operating System</b>	<b>MS Advanced Server</b>	<b>MS Advanced Server</b>	<b>MS Advanced Server</b>	<b>MS Advanced Server</b>
<b>Processor</b>	<b>DMR</b>	<b>DMR</b>	<b>DMR</b>	<b>DMR</b>
<b>Symmetric Multiprocessor Protocol (SMP)</b>	<b>1-way</b>	<b>2-way</b>	<b>2-way</b>	<b>1-way</b>
<b>Processor speed</b>	<b>800 MHz</b>	<b>800 MHz</b>	<b>800 MHz</b>	<b>800 MHz</b>
<b>Cache size</b>	<b>256 KB</b>	<b>256 KB</b>	<b>256 KB</b>	<b>256 KB</b>
<b>CPU Enclosures</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>

Physical CPUs	2	4	4	2
No. memory modules/CPU enclosure	Min. = 1 Max. = 4	Min. = 1 Max. = 4	Min. = 1 Max. = 4	Min. = 1 Max. = 4
Total duplexed memory	Min. = 256 MB Max. = 2 GB	Min. = 256 MB Max. = 2 GB	Min. = 256 MB Max. = 2 GB	Min. = 256 MB Max. = 2 GB
No. SCSI disk drives per system	Min. = 2 Max. = 6	Min. = 2 Max. = 6	Min. = 2 Max. = 6	Min. = 2 Max. = 6
Total duplexed SCSI disk storage per system	Min. = 18 GB Max. = 108 GB	Min. = 18 GB Max. = 108 GB	Min. = 18 GB Max. = 108 GB	Min. = 18 GB Max. = 108 GB
Internal tape drives per system (pedestal model)	Min. = 0 Max. = 2	Min. = 0 Max. = 2	Min. = 0 Max. = 2	Min. = 0 Max. = 2
External tape drives per system	Min. = 0 Max. = 2	Min. = 0 Max. = 2	Min. = 0 Max. = 2	Min. = 0 Max. = 2
I/O enclosures per system	Min. = 2 Max. = 2	Min. = 2 Max. = 2	Min. = 2 Max. = 2	Min. = 2 Max. = 2
U515 1-port Ethernet adapters per system	Min. = 0 Max. = 2	Min. = 0 Max. = 2	Min. = 0 Max. = 2	Min. = 0 Max. = 2
U516 1-port SCSI adapters per system	Min. = 0 Max. = 2	Min. = 0 Max. = 2	Min. = 0 Max. = 2	Min. = 0 Max. = 2
E928 Video adapters per system	Min. = 2 Max. = 2	Min. = 2 Max. = 2	Min. = 2 Max. = 2	NA
U460 ftServer Access adapters per system	NA	NA	NA	Min. = 2 Max. = 2
U480 2-port synchronous adapters	Min. = 0 Max. = 6	Min. = 0 Max. = 6	Min. = 0 Max. = 6	Min. = 0 Max. = 6
U485 4-port synchronous adapters	Min. = 0 Max. = 6	Min. = 0 Max. = 6	Min. = 0 Max. = 6	Min. = 0 Max. = 6
U486 8-port synchronous adapters	Min. = 0 Max. = 6	Min. = 0 Max. = 6	Min. = 0 Max. = 6	Min. = 0 Max. = 6
U517 Fiber Channel adapters	Min. = 0 Max. = 2	Min. = 0 Max. = 2	Min. = 0 Max. = 2	Min. = 0 Max. = 2
U570 1-Port 1000BaseSx Ethernet adapters	Min. = 0 Max. =	Min. = 0 Max. =	Min. = 0 Max. =	Min. = 0 Max. =
U571 1-Port 1000Base-T Ethernet Adapter	Min. = 0 Max. =	Min. = 0 Max. =	Min. = 0 Max. =	Min. = 0 Max. =

## 1.5 System Specifications

### 1.5.1 Physical

Dimension	Pedestal	Rack Mount
Height	520 mm (Including feet and tape drive bay) (20.4 in)	350 mm (13.8 in)
Width	350 mm (13.8 in)	450 mm (17.7 in)
Depth	680 mm (26.8 in)	680 mm (26.8 in)
Weight	64 kg (141 lbs) (max.)	

### 1.5.2 Environmental

<b>Operating Temperature</b>  -200 to 6,000 ft.  6,000 to 8,000 ft.  8,000 to 10,000 ft.	+5° C to +35° C (41° F to 95° F)  +5° C to +30° C (41° F to 86° F)  +5° C to +25° C (41° F to 77° F)
<b>Maximum Rate of Temperature Change</b>	12° C (21.6° F) per hour or 0.2° C (0.36° F) per minute
<b>Storage Temperature (To 40,000ft.)</b>	-40° C to +70° C (unvented)  -40° C to +60° C (vented)
<b>Relative Humidity:</b>  Operating  Storage	20% to 80% Non-condensing  10% to 95% (max. absolute humidity of 0.024 water/lb. of dry air)
<b>Heat Dissipation</b>	
<b>Acoustical Noise:</b>	55 dB (max)

### 1.5.3 Electrical

<b>AC input voltage</b>	<b>120-240 VAC RMS, maximum 10% harmonic distortion</b>
<b>AC input frequency</b>	<b>47-63 Hz</b>
<b>Power Consumption</b>	<b>750 W (max)</b>

## 2. Operation and Maintenance Procedures

This section describes software procedures related to service maintenance of the ftServer 3200. It covers various topics, including the following:

- System Power
- System Startup
- System Shutdown
- Device IDs

### 2.1 System Power

Whenever the system is plugged into live AC outlets, low-level power is present in the ftServer system. This standby power enables the BMC controller to monitor the status of the system components, even when the system's power is off.

The system power button is located on the front of the system and functions as follows:

- If the system power is off and standby power is on, pressing the front panel power button turns the system power on and boots Windows 2000.
- If the system power is on and Windows 2000 or the system BIOS is starting, stopping, or running, pressing the system power button will turn the system off.
- If the system power is on and Windows 2000 is completely shut down, pressing the front panel power button shuts down system power. (Standby power remains on.)

### 2.2 System Startup

To start up an ftServer 3210 system perform the following steps:

1. Make sure the system power cords are plugged into live AC outlets.
2. Turn on the monitor and any other peripheral devices.
3. Open the front door. Lift the plastic cover and press the system power button (Figures 2-1 and 2-2) to power-on the rest of the system and boot Windows 2000.

*Figure 2-1. System Power Button (Pedestal System)*



*Figure 2-2. System Power Button (Rack-Mount System)*



4. When the system has booted the LCD will display the following message: System Ready.

## 2.3 System Shutdown

If the ftServer system has a monitor, keyboard, and mouse, use Windows 2000 to shut down the system.

If the ftServer system does not have a monitor, you can access the system remotely through the ftSAC Remote Console or through the Virtual Network Computing (VNC) service, and perform the preceding procedure.

Before shutting down the ftServer, warn all users that a shutdown is imminent so that they have time to save their files and exit their applications. Give users sufficient time to exit.

Perform the following procedure to gracefully shut down an ftServer system running Windows 2000. Any Windows settings will be saved and the contents of memory are saved to disk. The operating system should always be shut down in this manner if at all possible.

1. Click the **Start** button on the Windows 2000 desktop and click **Shut Down**.
2. In the Shut Down Windows dialog box, select **Shut Down** in the dropdown list and then click **OK**.  
A message states that your system is shutting down. After the system shuts down, a message appears stating that the power is off.

## 2.4 Device IDs

A device ID is an identifier used to physically locate hardware components within a Stratus system. This section describes the scheme used to identify all devices in ftServer systems running the Windows 2000 operating system. The basis of the scheme is a unique device ID that is assigned to each physical device in the system.

A component's device ID specifies the address of all the hardware components leading to a device. It is a hierarchical number where each level is used to represent a different layer of the physical hardware in the system. Each level in the device ID represents a CRU or FRU. The following subsections describe the device IDs.

### 2.4.1 Level 1 Devices

Level 1 devices are CPU enclosures, I/O enclosures, and storage enclosures. They are shown in the following table.

**NOTE:** Notice that there isn't much consistency in the numbering scheme. Also, some devices are numbered right to left, some are numbered left to right, and others are numbered top to bottom.

Level 1 Device	Possible Device IDs
----------------	---------------------

<b>CPU Enclosures</b>	<b>0</b> <b>1</b>
<b>I/O enclosure</b>	<b>10</b> <b>11</b>
<b>Storage Enclosure (each half is considered a separate enclosure)</b>	<b>41</b> <b>42</b>



## 2.4.2 Level 2 Devices

Level 2 devices connect to level 1 devices. Level 2 devices include memory modules, processors, I/O enclosure slots, storage enclosure slots, embedded adapters, and environmental devices (fans, temperature, voltage). They are shown in the following table.

<b>Level 2 Device</b>	<b>Possible Device IDs</b>
<b>CPU Enclosure processors</b>	0/20, 0/21 1/20, 1/21
<b>CPU Enclosure Memory Modules</b>	0/0, 0/1, 0/2, 0/3 1/0, 1/1, 1/2, 1/3
<b>CPU Enclosure Power Supplies</b>	0/100 1/100
<b>CPU Enclosure Fans</b>	0/110 1/110
<b>I/O enclosure Slots</b>	10/0, 10/1, 10/2, 10/3 11/0, 11/1, 11/2, 11/3
<b>I/O Enclosure Embedded Ethernet Adapter</b>	10/6 11/6
<b>I/O Enclosure Embedded SCSI Adapter</b>	10/5 11/5
<b>I/O Enclosure Power Supplies</b>	10/100 11/100
<b>I/O Enclosure Fans</b>	10/110 11/110
<b>Storage Enclosure Fans</b>	41/110, 41/111, 41/112 42/110, 42/111, 42/112
<b>Storage Enclosure SES</b>	41/120 42/120
<b>Storage Enclosure Slots</b>	41/1, 41/2, 41/3 42/1, 42/2, 42/3

## 2.4.3 Level 3 Devices

Level 3 devices connect to level 2 devices. An example of a level 3 device is the SCSI buses.

<b>Level 3 Device</b>	<b>Possible Device IDs</b>
<b>SCSI Bus on I/O Enclosure Embedded SCSI Adapter</b>	10/5/0, 10/5/1 11/5/0, 11/5/1

## 3. Fault Isolation

This section provides general information and guidelines for troubleshooting hardware failures in the ftServer system. For more information about monitoring and troubleshooting the system, refer to the *Stratus ftServer System Administration (R001W)* manual.

The section contains the following topics:

- Status LEDs
- System Handling of Hardware Events
- Troubleshooting Failed Components

### 3.1 Status LEDs

#### 3.1.1 System (Front Panel) LEDs

There are four LEDs located on the front bezel.

##### 3.1.1.1 Power LED

Power LED is lit green when power is applied to the system. The LED turns off when power is turned off.

##### 3.1.1.2 Status 1 and Status 2 LED

These two LED's display the status of the system as a whole. The Status 1 LED corresponds to group 1 (ie., "left half" of the system). The Status 2 LED corresponds to group 2.

Status LED	Description	Recommended Action
Lit green	Normal	
Blinking green	Memory or CPU is offline	
Off	Power is off	
	During POST	Wait. LED should turn on after POST is completed.
	CPU Error detected	Turn system off and then on.  Record any error message during POST and contact your service center
	CPU Temperature Error detected	
	Watchdog Timer Timeout detected	
	Uncorrectable Memory Error detected	
	PCI System Error detected	
PCI Parity Error detected		
Lit amber	Temperature Error detected	Confirm that all fans are functioning. Clean fans if necessary. If error persists, contact your service center.
	Voltage Error detected	Contact your service center.

<b>Blinking amber</b>	<b>Failed device detected</b>	<b>Contact your service center.</b>
	<b>Fan Alarm detected</b>	<b>Confirm that all fans are functioning. Clean fans if necessary. If error persists, contact your service center.</b>
	<b>Redundant Power Supply Alarm detected</b>	<b>Confirm failed power supply unit by observing the power supply LED's on the rear of the system.</b>
	<b>Front bezel is open</b>	<b>Close the front bezel.</b>
<b>Lit red</b>	<b>BMC failure detected</b>	
<b>Blinking red</b>	<b>One of the BMCs is offline.</b>	

### 3.1.1.3 Disk Access LED

The disk LED turns on green when the SCSI bus for the internal hard disk drives is accessed.

## 3.1.2 Hard Disk Drive LEDs

There are two LEDs located on each disk drive, green and amber.

### 3.1.2.1 Disk Power/Access LED

Turns on green when power is provided to the hard disk drive.

Blinks green when SCSI accesses are made to that specific drive.

### 3.1.2.2 Disk Failure LED

Turns on amber when an error or failure condition is detected.

## 3.1.3 Power Supply LEDs

There are three LEDs located on each power supply.

### 3.1.3.1 Power Supply LED

Turns on when power is being supplied

### 3.1.3.2 Power Low LED

Turns on when abnormal AC input voltages are detected.

### 3.1.3.3 Power Alarm LED

Turns on red when a failure with the power supply is detected.

### 3.1.4 CPU Enclosure LEDs

LED		Description	Recommended Action
Fail LED	State LED		
Off	Lit green	Normal operation	-
Off	Off	No power to CPU Enclosure	<ul style="list-style-type: none"> <li>- Check whether enclosure is inserted correctly.</li> <li>- Check power supply</li> <li>- Check power cords</li> <li>- Check UPS</li> </ul>
Lit red	Lit green	Failure with CPU, memory or VRM... Operating in a degraded mode.	Verify the failed component using ESMPPro and replace.
Lit red	Off	Standby mode. AC provided, but DC switch off. CPU Enclosure failure preventing power being provided.	Turn on power to system Re-insert the CPU enclosure; if condition is not fixed, contact your service center

### 3.1.5 I/O Enclosure LEDs

LED		Description	Recommended Action
Fail LED	State LED		
Off	Lit green	Normal operation	-
Off	Off	No power to I/O Enclosure	<ul style="list-style-type: none"> <li>- Check whether chassis is inserted correctly.</li> <li>- Check power supply</li> <li>- Check power cords</li> <li>- Check UPS</li> </ul>
Lit red	Lit green	Failure with PCI board	Verify the failed component using ESMPPro and replace.
Lit red	Off	Standby mode. AC provided, but DC switch off. CPU enclosure failure preventing power being provided.	Turn on power to system Re-insert the I/O Enclosure; if condition is not fixed, contact your service center

### 3.1.6 PCI Slot LEDs

LED		Description	Recommended Action
Fail LED	State LED		
Off	Lit amber	PCI option board correctly installed, but in simplex mode	Insert identical PCI option board in the same slot in the other I/O Enclosure
Off	Lit green	PCI option board correctly installed, and in duplex mode	Normal operation
Off	Off	No PCI option board installed, or installed incorrectly	Re-insert PCI option board
Lit red	Off	PCI option board correctly installed, but not functioning or offline	- Use ESMPPro to turn the PCI option board online.
Lit red	Lit amber	PCI option board under software control testing or preparing for operation	Wait for the LED display to change.  If the LED display does not change, use ESMPPro to check the status of the option board.
Lit red	Lit green	Memory dump	Wait until the memory dump is completed

## 3.2 System Handling of Hardware Events

When a fault or some other event occurs at a hardware device, for example, a PCI card failure or an environmental monitor exceeding a threshold, the device driver notifies the ftServer Manager. If the ftServer Manager determines that the event is significant, as defined by the ftServer's Policy Service, it forwards the event notification to the Alarm Service for processing. The Alarm Service then forwards the notification as follows:

- Event information is recorded in the Windows 2000 Event Log.
- An alarm message is displayed on the front panel LCD.
- The user is notified by email or pager, depending on user configuration of the ftServer Manager.

ftServer Manager continuously copies the ftServer Windows 2000 Event Log to the ftServer Access Host Log on both ftServer Access adapters so that support personnel can retrieve the log in the event of a failure of the ftServer system.

## 3.3 Troubleshooting Failed Components

Use theftSMC to accomplish tasks related to:

- Windows Not Responding
- Determining that a unit failed

- Taking a Component Offline
- Bringing a Component Online

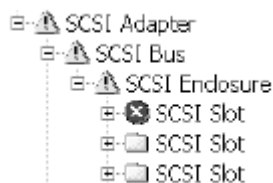
### 3.3.1 Windows Not Responding

If the Windows 2000 operating system does not respond, that is, the system appears hung, use ftServer Access to reset or reboot. For information about using ftServer Access, see the *Stratus ftServer Access User's Guide* (R003W).

### 3.3.2 Determining that a unit failed

1. In ftSMC, expand the **System Inventory** by clicking the **ftServer** node in the Console tree and pressing the asterisk (\*) key on the numeric keypad.
2. Look for **Warning** or **Error** icons. If you see a **Warning** icon, click on the plus sign (+) in front of nodes that have a **Warning** icon until you see an **Error** icon.

For example, **Warning** icons appear in these three nodes and the **Error** icon appears beside the SCSI Slot that has a problem, as follows:



3. Click on the problem node and check the MTBF: Current value in the **Details** pane. If it is less than the MTBF: Threshold value, that node has failed and the system takes it out of service. For example:

MTBF: Time of Last Fault May 30, 2000 15:07:24

MTBF: Threshold 300 seconds

MTBF: Number of Faults 2

MTBF: Current 220 seconds

### 3.3.3 Taking a Component Offline

1. In the **ftSMC** Console tree, select and right-click the failed component.
2. From the pop-up menu, select **Initiate Bring Down**. This results in shutting down the component.

**NOTE:** If the failed component is a mirrored disk, break the mirror before shutting the failed disk down.

3. If you are going to remove a disk, first confirm that the disk's mirror is present and functioning. If the mirror is present, go to Windows 2000 Disk Management and break the mirror. To break a mirror, right-click one of the disks and select **Break Mirror**.

To determine what disks are mirrored, go to Windows 2000 **Disk Management**. The logical disks that have the same drive letter are a mirrored pair. If the mirrors are set as Stratus recommends, then the disks in slots 1 and 5, 2 and 6, 3 and 7, and 4 and 8 are mirrors.

4. If the component is a field-replaceable unit (FRU) or distributor-replaceable unit (DRU) remove the failed component and replace it with a new FRU or DRU. See Section 4A or Section 4B.
5. Bring the replaced component back online. See the next subsection.

### **3.3.4 Bringing a Component Online**

1. In **ftSMC**, select and right-click the new component.
2. From the pop-up menu, click **Initiate Bring Up**. This results in bringing the component online.

## 4A. FRU Hardware Removal and Replacement Procedures (Pedestal System)

This section lists the Field Replaceable Units (FRUs) in the ftServer 3200 system and describes the removal and replacement procedures for each one. FRUs that are duplexed may be removed and replaced without total removal of power, and thus, without loss of continuous processing. However, if a FRU is simplexed, the system must be shut down and both power supplies turned off prior to removal and replacement of the FRU.

### 4A.1 List of FRUs

The following table lists the FRUs in the ftServer 3200 system.

Component	Part Number
<a href="#"><u>Front Fan in CPU Enclosure (Fan A)</u></a>	802-860106-040A
<a href="#"><u>Rear Fan in CPU Enclosure (Fan B)</u></a>	802-860110-140A
<a href="#"><u>Memory Module</u></a>	609-01531-000 609-1532-000
<a href="#"><u>800MHz Pentium III Processor</u></a>	802-143781-247A
<a href="#"><u>Voltage Regulator</u></a>	802-187937-001A
<a href="#"><u>Processor Heat Sink with Thermal Interface</u></a>	808-815085-656A
<a href="#"><u>Front Panel Board (G7FRJ)</u></a>	243-630263-A
<a href="#"><u>Power Switch and Cable (010)</u></a>	808-744469-010A
<a href="#"><u>WD-C1602E LCD W/Cable and Sheet metal</u></a>	120-01519-000
<a href="#"><u>CPU Terminator (FC-PGA)</u></a>	804-091375-0010
<a href="#"><u>I/O Board (G7FQJ)</u></a>	243-630238-C
<a href="#"><u>Power Board (G7FQA)</u></a>	243-630227-C
<a href="#"><u>PCI Fan B</u></a>	802-860110-140A
<a href="#"><u>DDS-4 Tape Drive</u></a>	808-895268-002A
<a href="#"><u>IDE-S Board (G7EPC)</u></a>	133-639658-B



## 4A.2 Power Removal

If total power removal is required, the system must be shut down prior to removing power and rebooted after the replacement unit is installed. Refer to [Section 2.3](#) for the shutdown procedure.

Total power is removed from one side of the system by removing the power cord from the power supply at the rear of the cabinet.

*Figure 4A-1. Power Supply Cords*



**CAUTION:** If the system needs to be simplex (power removed from one side of the cabinet), verify that there are no red LEDs or system messages indicating a failed duplexed component on the side of the system that will remain powered on. If both components in a duplexed pair are removed, a system crash will occur.

## 4A.3 Hardware Removal Procedures

### 4A.3.1 Tape Drive Bay

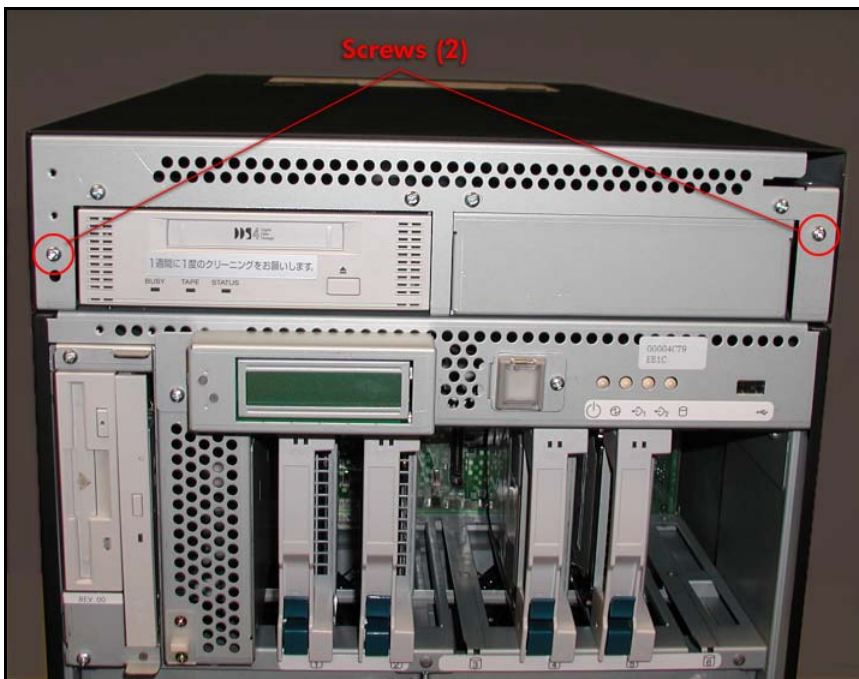
1. Open the cabinet front door and remove it.
2. Remove the two screws securing the tape drive bay cover at the rear of the cabinet. (Figure 4A-2)

Figure 4A-2. Tape Drive Bay Rear Screws



3. Remove the two screws securing the tape drive bay cover at the front of the system. (Figure 4A-3)

Figure 4A-3. Tape Drive Bay Front Screws



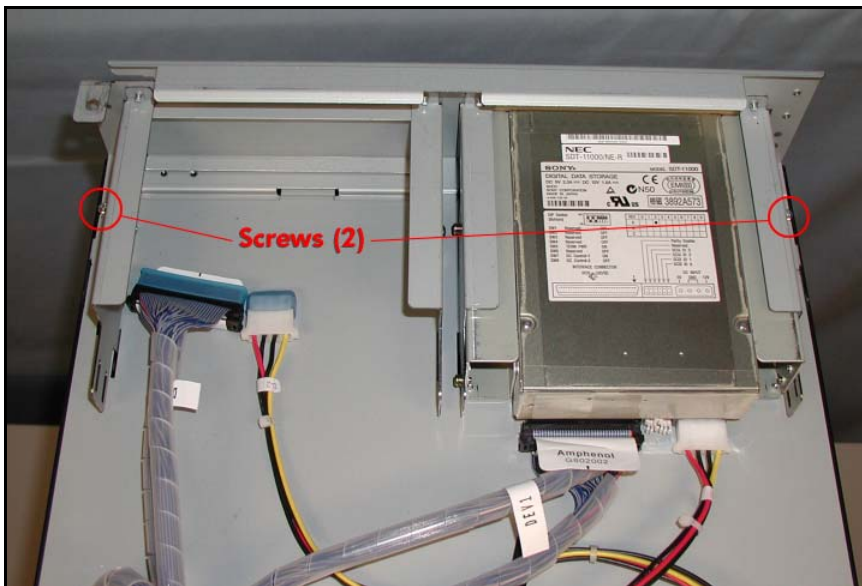
4. Lift the rear portion of the cover and slide the cover toward the rear and lift it off.
5. Disconnect the tape drive cables and power cord from the tape drive bay. (Figure 4A-4)

Figure 4A-4. Tape Drive Bay Cable and Power Cord



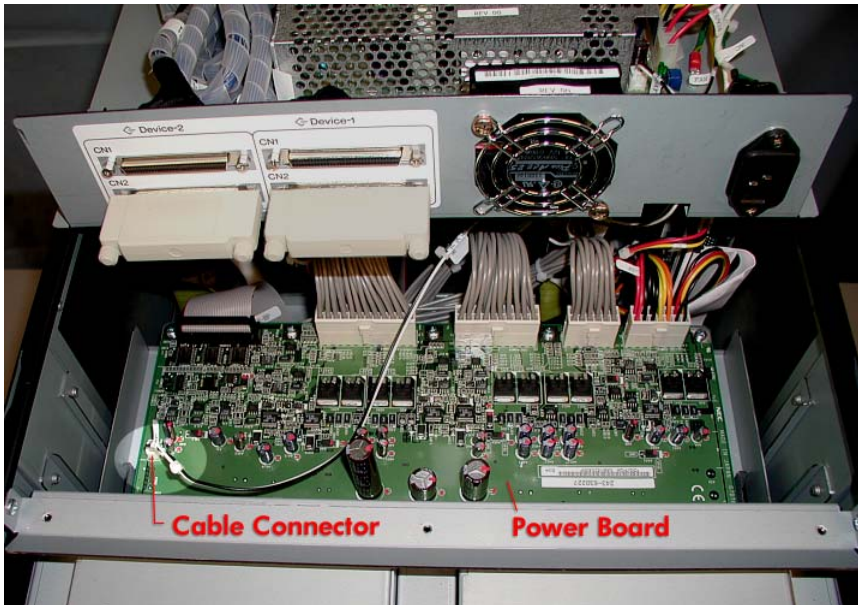
6. Remove the two screws securing the tape drive bay to the chassis. (Figure 4A-5)

Figure 4A-5. Tape Drive Bay Bottom Screws



7. Slide the tape drive bay slightly toward the rear and carefully lift it up a few inches and rest it on the top of the system as shown in Figure 4A- 6.
8. Disconnect the sensor cable from the power board.

Figure 4A-6. Power Board Cable



### 4A.3.2 CPU Enclosure Front Fan (Fan A)

1. Remove the CPU Enclosure (CRU).
2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4A-7)

Figure 4A-7. CPU Enclosure Cover Screws



3. Pull the fan out of the enclosure and disconnect the cable at connector FAN2. (Figures 4A-8 and 4A-9)

Figure 4A-8. Fan A

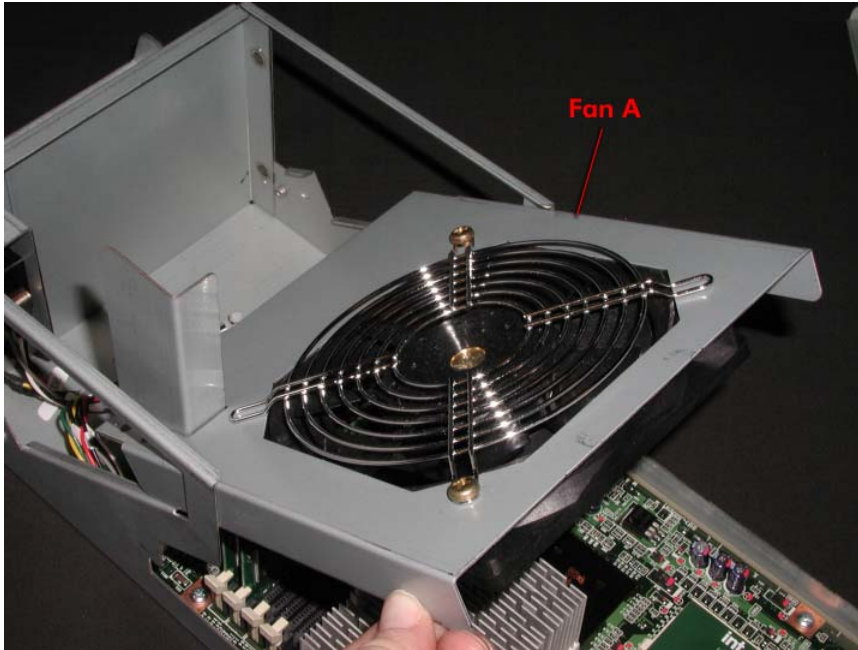
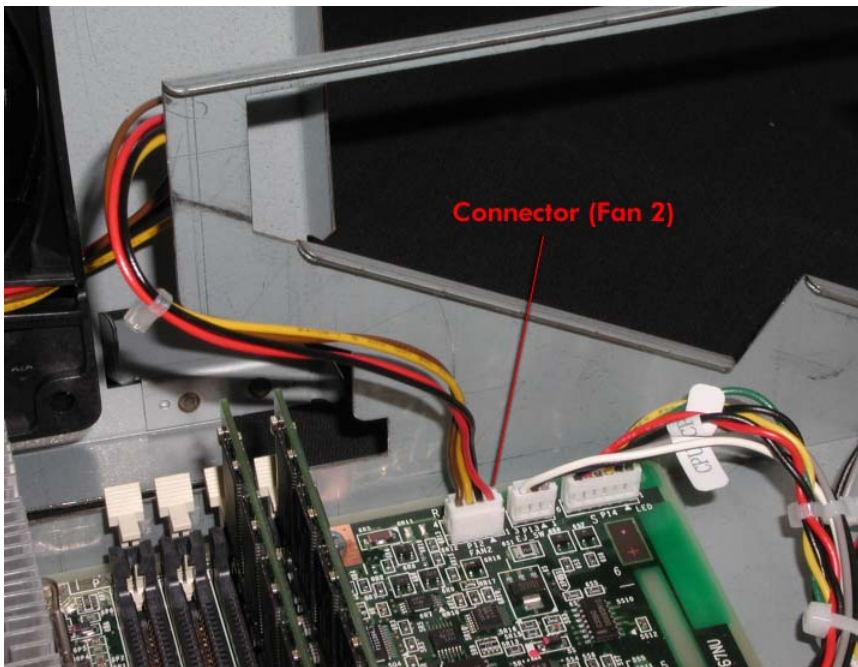


Figure 4A-9. Connector at FAN2



4. Remove the two screws securing the fan to the sheet metal.

### 4A.3.3 CPU Enclosure Rear Fan (Fan B)

1. Remove the CPU Enclosure (CRU).

2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4A-10)

*Figure 4A-10. CPU Enclosure Cover Screws.*



3. Pull the fan straight up and out of the enclosure and disconnect the cable at the connector labeled *FAN1*. (Figure 4A-11)

*Figure 4A-11. Fan B and Connector at FAN1.*



4. Remove the two screws securing the fan to the sheet metal.

**REPLACEMENT NOTE:** When installing the replacement fan, be sure to slide it into the tabs as shown in Figure 4-11.

#### 4A.3.4 Memory Module

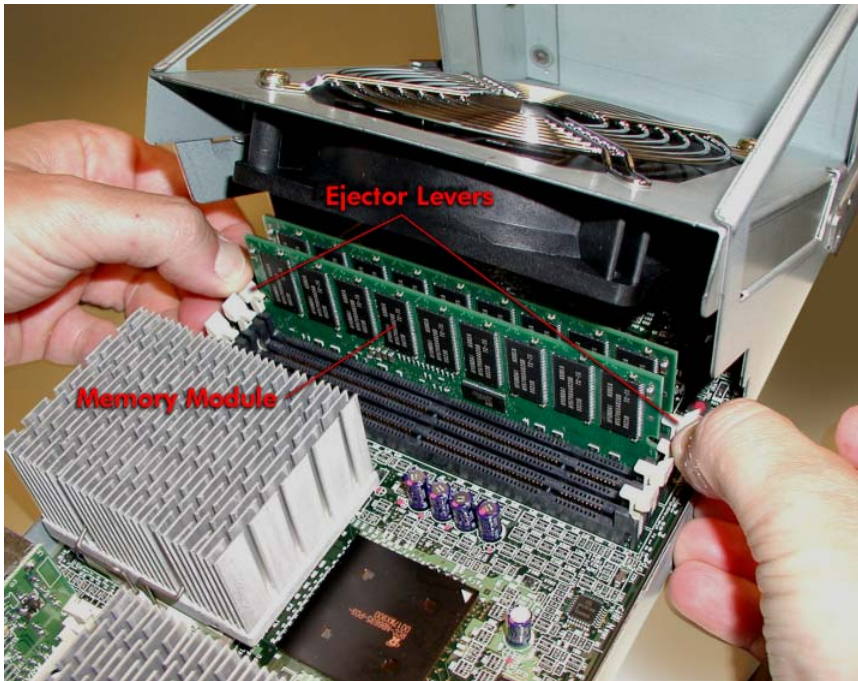
1. Remove the CPU Enclosure (CRU).
2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4A-12)

*Figure 4A-12. CPU Enclosure Cover Screws*



3. Release the ejector levers and pull the memory module straight up out of the connector. (Figure 4A-13)

Figure 4A-13. Removing a Memory Module



**REPLACEMENT NOTE:** Make sure the ejector levers are open before inserting the replacement enclosure. After inserting the enclosure, make sure it is fully seated and close the levers completely.

#### 4A.3.5 Processor Heat Sink with Thermal Interface

1. Remove the CPU Enclosure (CRU).
2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4A-14)

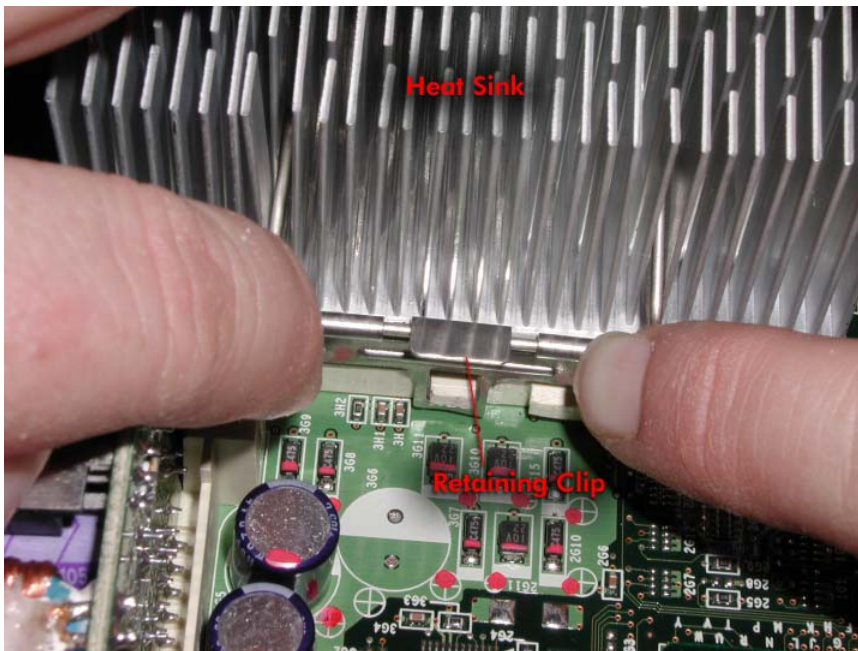


Figure 4A-14. CPU Enclosure Cover Screws.



3. Grasp the heat sink as shown in Figure 4A-14 and press down and out on the retaining clip until it disengages from the tab as shown in Figure 4A-15.

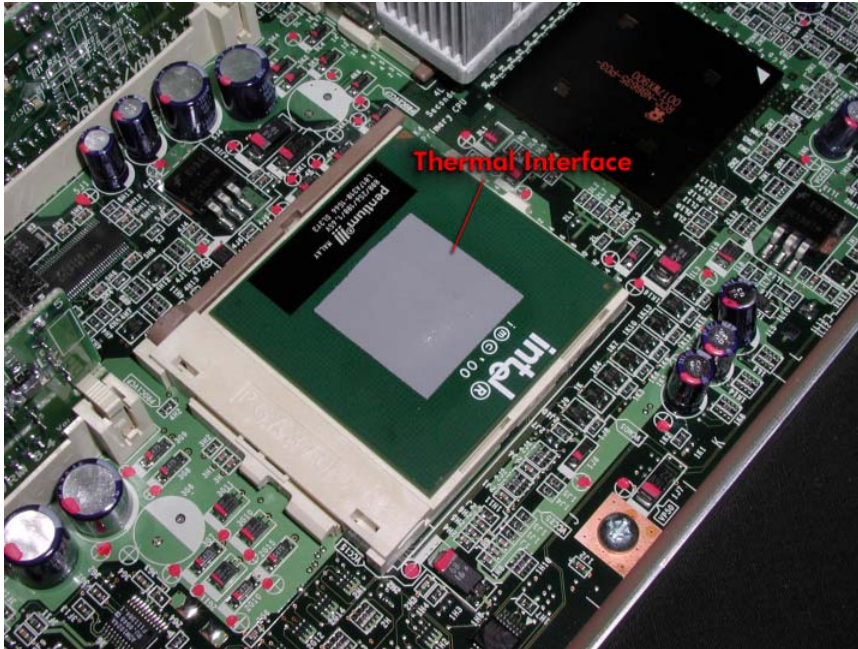
Figure 4A-15. Removing a Heat Sink.



4. Carefully lift it off the processor and wipe off the remains of the thermal interface (gray putty-like residue) from the processor.

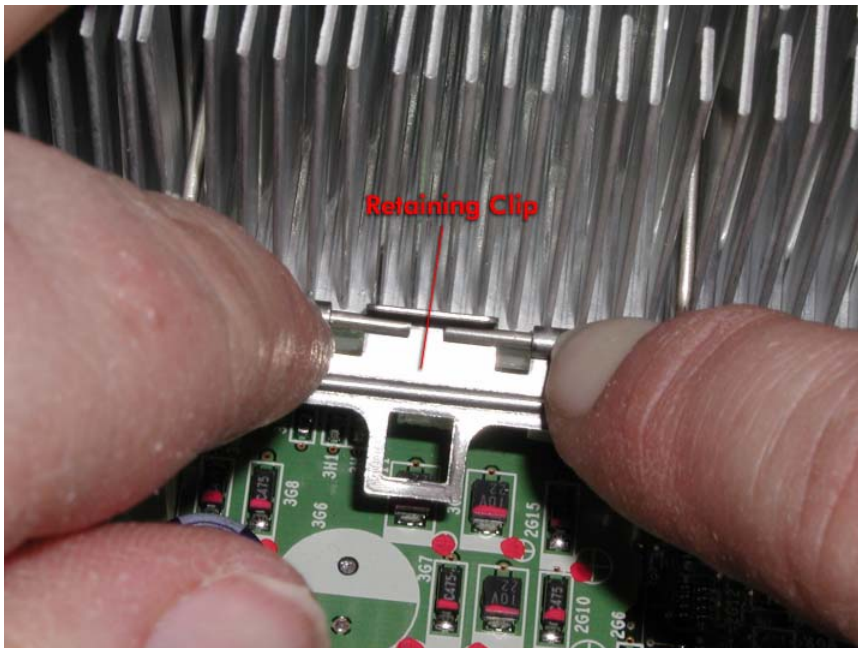
**REPLACEMENT NOTE:** Before the replacement heat sink is installed, set the replacement thermal interface on the middle of the processor and gently press it in place. (Figure 4A-16.)

*Figure 4A-16. Thermal Interface.*



Position the heat sink above the processor. Place the heat sink's front retaining clip under the tab on the processor holder as shown in Figure 4A-16. Then press down on the rear retaining clip and slip it over the tab. (Figure 4A-17)

*Figure 4A-17. Heat Sink Retaining Clip.*



### 4A.3.6 800MHz Pentium III CPU Processor

1. Remove the CPU Enclosure (CRU).
2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4A-18)

Figure 4A-18. CPU Enclosure Cover Screws

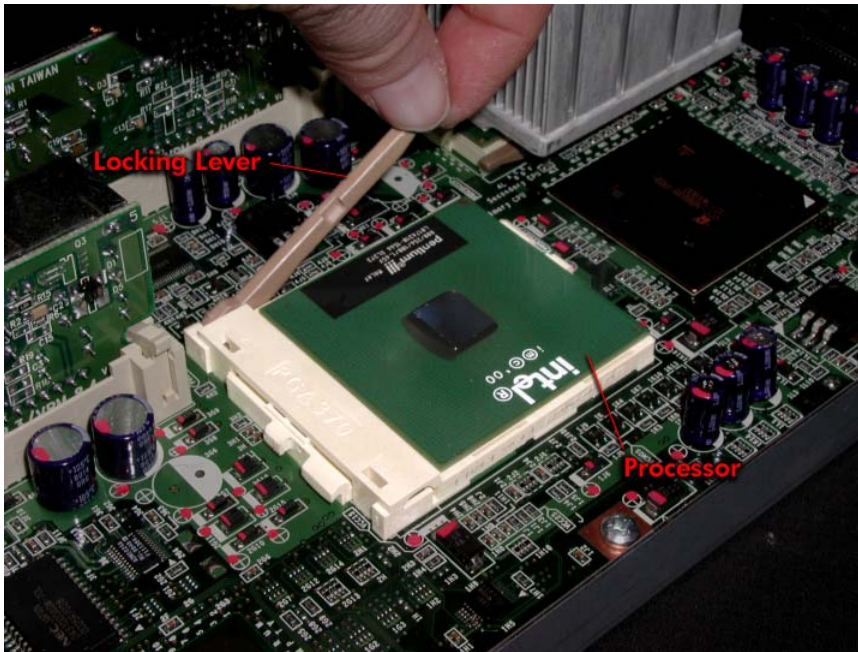


**NOTE:** When removing the processor closest to the memory modules it may help to first remove the voltage regulator in front of it. (See Section 4A.3.6)

3. Remove the processor's heat sink. (See [Section 4A.3.5](#))
4. Carefully wipe off the remains of the thermal interface (gray putty-like residue) from the heat sink and processor.
5. Release the processor by raising the locking lever on its side. (Figure 4A-19)

**NOTE:** When removing the processor closest to the memory modules, it may help to remove the voltage regulator first.

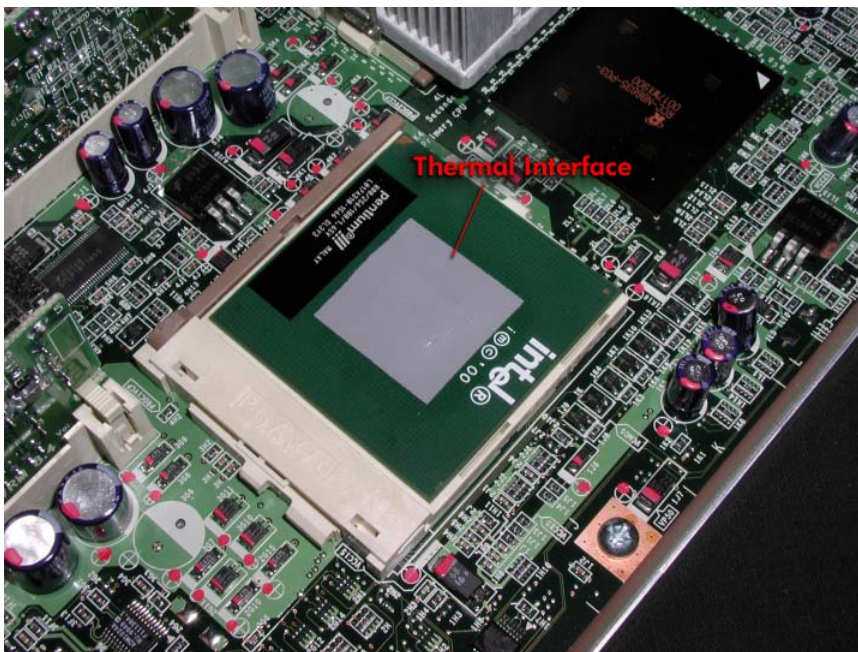
Figure 4A-19. Opening the Processor Lever.



6. Carefully pull the processor straight up out of the connector.

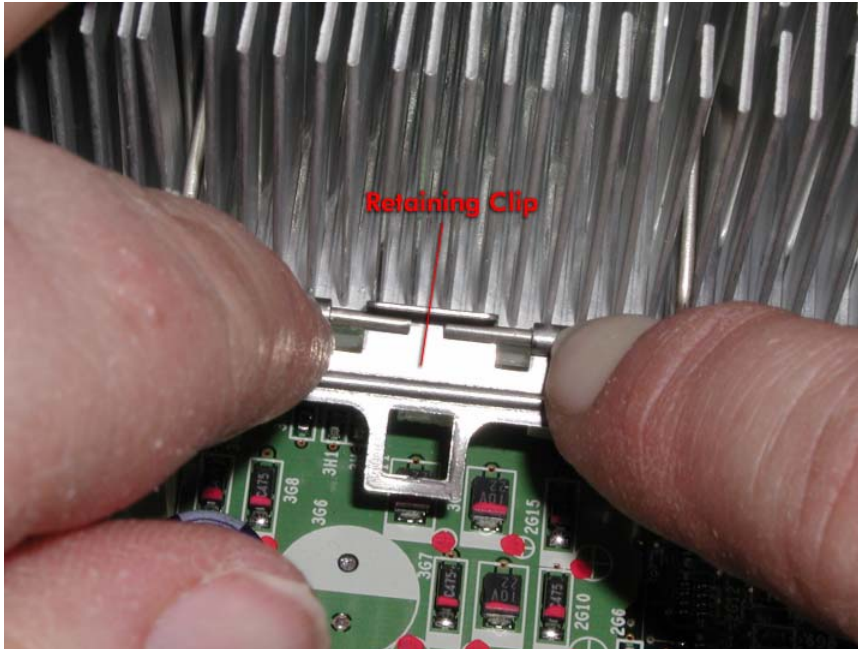
**REPLACEMENT NOTE:** After the replacement processor has been inserted in the connector (and before the heat sink is installed), set the replacement thermal interface on the middle of the processor and gently press it in place. (Figure 4A-20)

Figure 4A-20. Thermal Interface.



Position the heat sink above the processor. Place the heat sink's front retaining clip under the tab on the processor holder as shown in Figure 4A-21. Then press down on the rear retaining clip and slip it over the tab.

*Figure 4A-21. Heat Sink Retaining Clip.*



#### **4A.3.14 CPU Terminator**

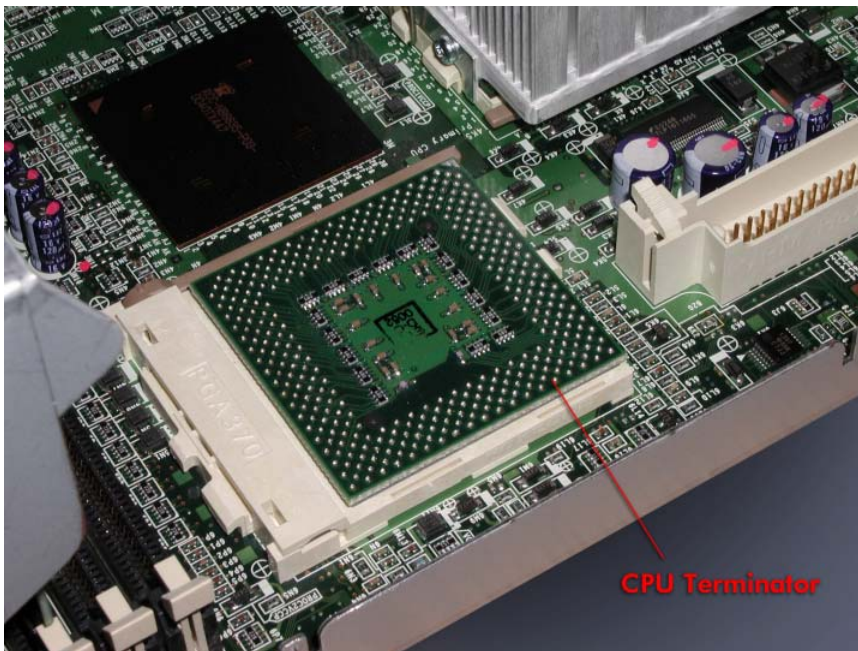
1. Remove the CPU Enclosure (CRU).
2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4A-22)

Figure 4A-22. CPU Enclosure Cover Screws.



3. Grasp the CPU terminator and carefully pull it straight up out of the socket. (Figure 4A-23)

Figure 4A-23. Removing the CPU Terminator



### 4A.3.7 Voltage Regulator

1. Remove the CPU Enclosure (CRU).

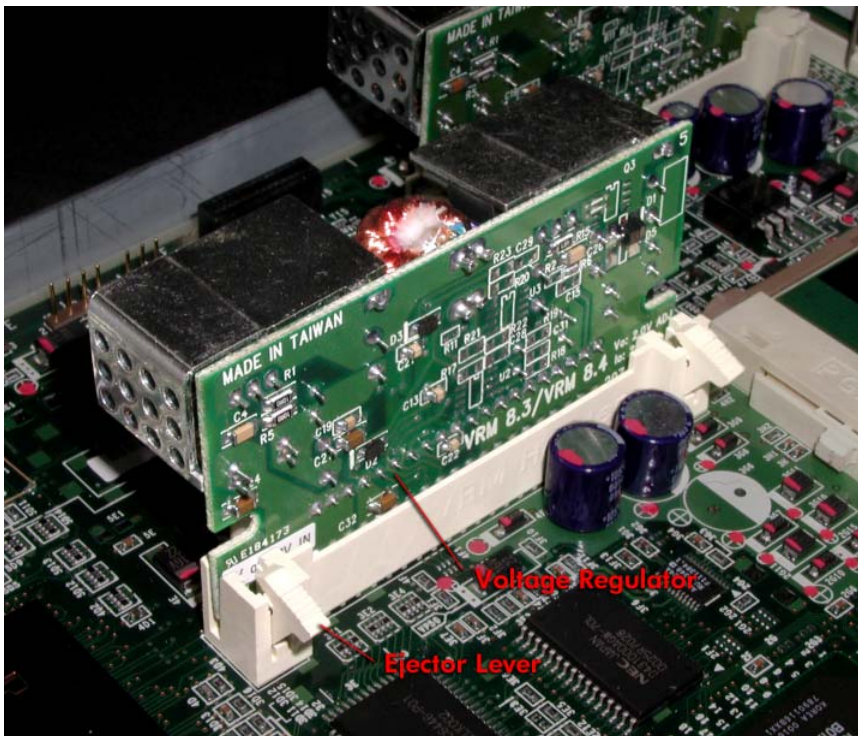
2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4A-24)

Figure 4A-24. CPU Enclosure Cover Screws.



3. Push on the ejector levers to unseat the voltage regulator. (Figure 4A-25)

Figure 4A-25. Removing a Voltage Regulator



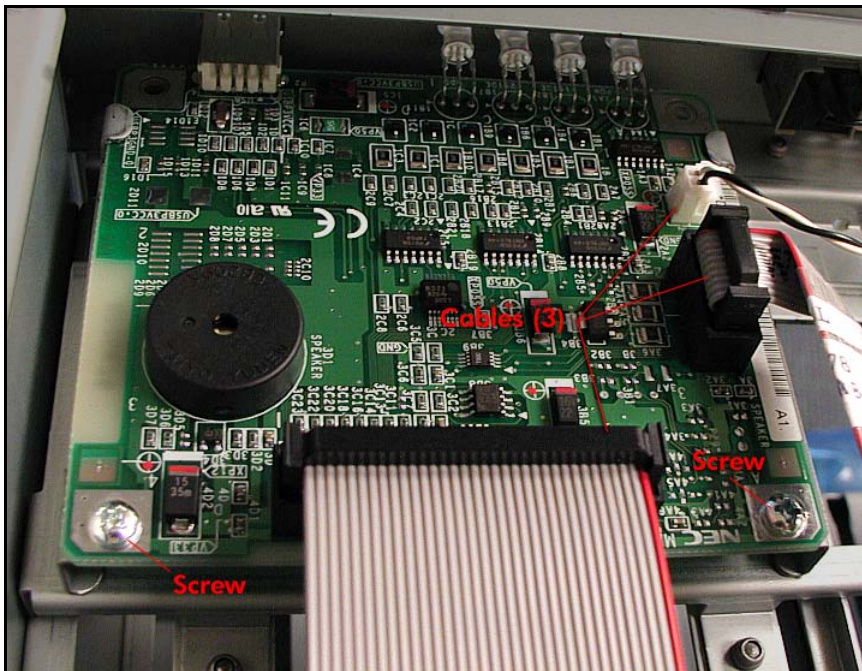
4. Pull the voltage regulator straight up.

**REPLACEMENT NOTE:** When inserting the replacement voltage regulator, push it in until the levers lock in place.

#### 4A.3.10 Front Panel Board

1. Remove the tape drive bay. (See [Section 4A.3.1](#))
2. Disconnect the three cables from the front panel board. (Figure 4A-26)
3. Remove the two screws securing the front panel board.

*Figure 4A-26. Front Panel Board Screws*



4. Slide the board toward the rear until it is out from under the tabs and lift it out.

**REPLACEMENT NOTE:** When installing the replacement front panel board, make sure the board is inserted correctly between the tabs and the LEDs are aligned with the holes in the chassis.

#### **IMPORTANT REPLACEMENT INFORMATION:**

The replacement front panel board must have the following firmware information updated: MAC Address, Serial Number, and Model Number.

This is required because the MAC address is used by the embedded ENET controllers and the other two are used by SSN for authentication.

A DOS floppy disk containing the file `ft3210ftpnl.exe` is used to burn the firmware.

Before beginning to burn the firmware, write down the MAC address, serial number, and model number of the system.



The MAC address is on a silver label on the front of the system above the disk drives.

Example: MAC: 00 00 3C 79 EB 5C

The Serial & Model numbers are on a white label on the bottom of the cabinet at the rear of the system.

Example: STRATUS S/N: xxxxxxxxxx

MODEL: 3200(Pxxxx-xx-xx)

Perform the following procedure to burn the firmware on the replacement front panel board.

1. Insure replacement front panel is installed in system.
2. Install the floppy containing the ft3210ftpnl.exe file in the floppy drive.
3. Reboot the system and hit the **F2** key to get into **BIOS SETUP**.  
Another Option is to remove ALL HDD boot devices from the system and reboot system and skip to step 5.
4. In **BIOS SETUP** screen, change the device boot order to **Removable media first, F10 - save settings and exit** (reboot).
5. The floppy will boot up to the tools menu, which provides help and is easy to use.

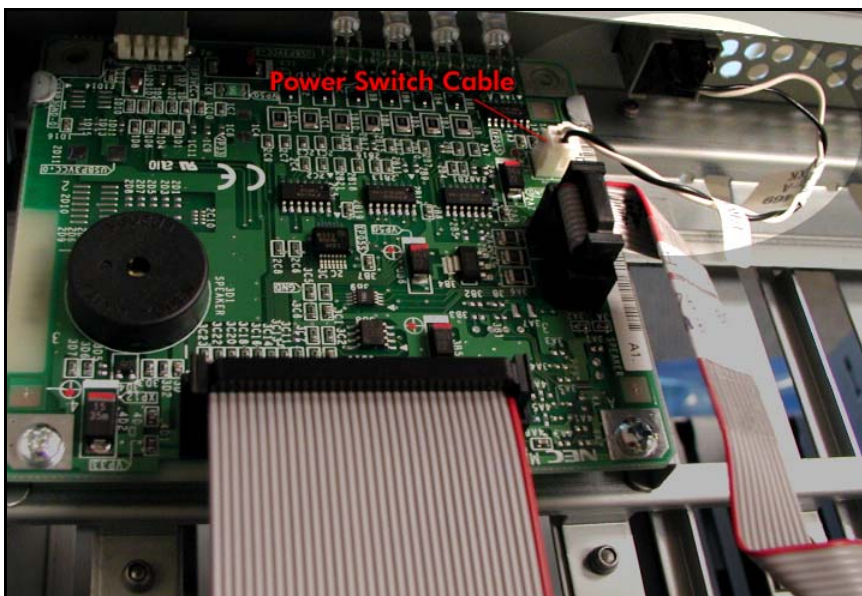
When completed, if device boot order was changed, reboot, hit **F2**, change back to **Hard Disk first, F10, save and exit**.

OR, if hard disks were removed, re-insert ALL HDD boot devices.

### 4A.3.11 Power Switch and Cable

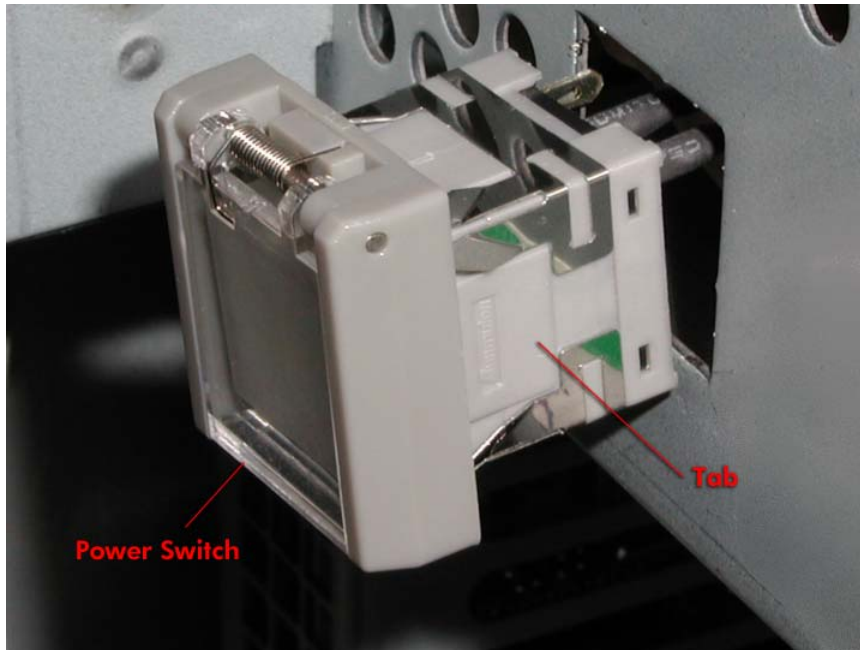
1. Remove the tape drive bay. (See [Section 4A.3.1](#))
2. Disconnect the power switch cable from the front panel board. (Figure 4A-27)

*Figure 4A-27. Power Switch Cable*



3. From the inside of the cabinet, push in on the retaining tabs on the side of the switch and push the switch forward and out of the cabinet. . (Figure 4A-28)

*Figure 4A-28. Removing the Power Switch*

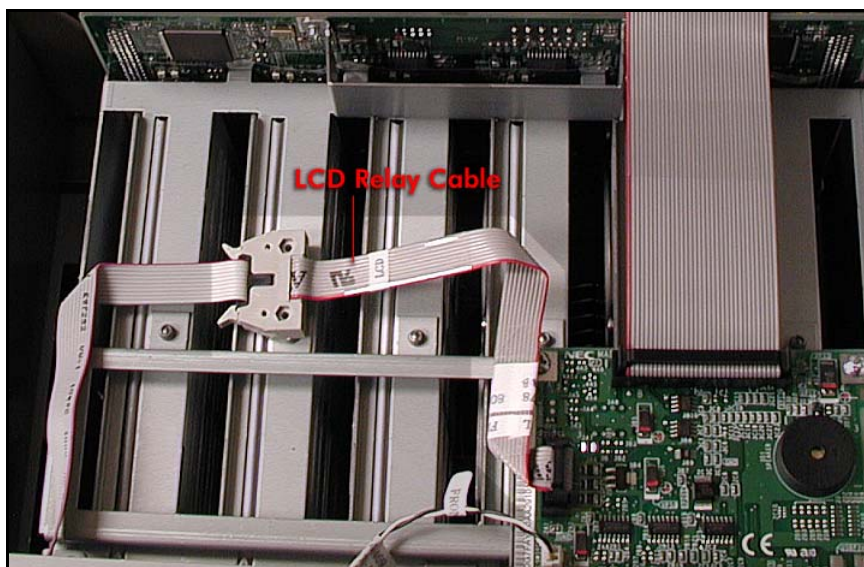


**REPLACEMENT NOTE:** When installing the replacement switch, make sure the switch is oriented so that its plastic door flips upward.

### **4A.3.12 WD-C1602E LCD W/Cable and Sheet metal**

1. Remove the tape drive bay. (See [Section 4A.3.1](#))
2. Disconnect the LCD relay cable from the front panel board. (Figure 4A-29)

*Figure 4A-29. LCD Relay Cable*



3. Remove the screw securing the LCD to the chassis. (Figure 4A-30)

*Figure 4A-30. LCD Screw*



4. Swing the LCD outward and disengage the tab from the chassis. (Figure 4A-31)

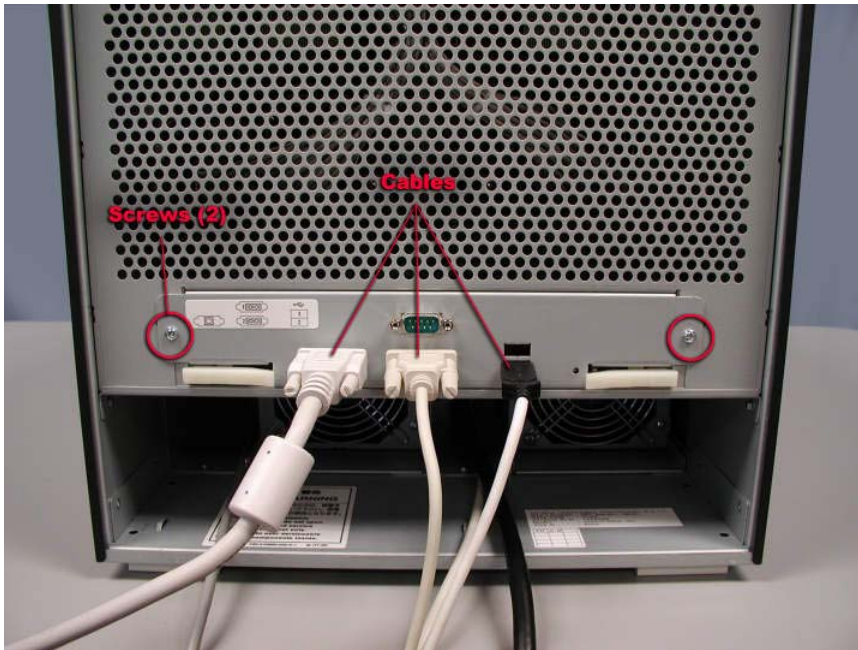
*Figure 4A-31. Removing the LCD*



### **4A.3.13 I/O Board**

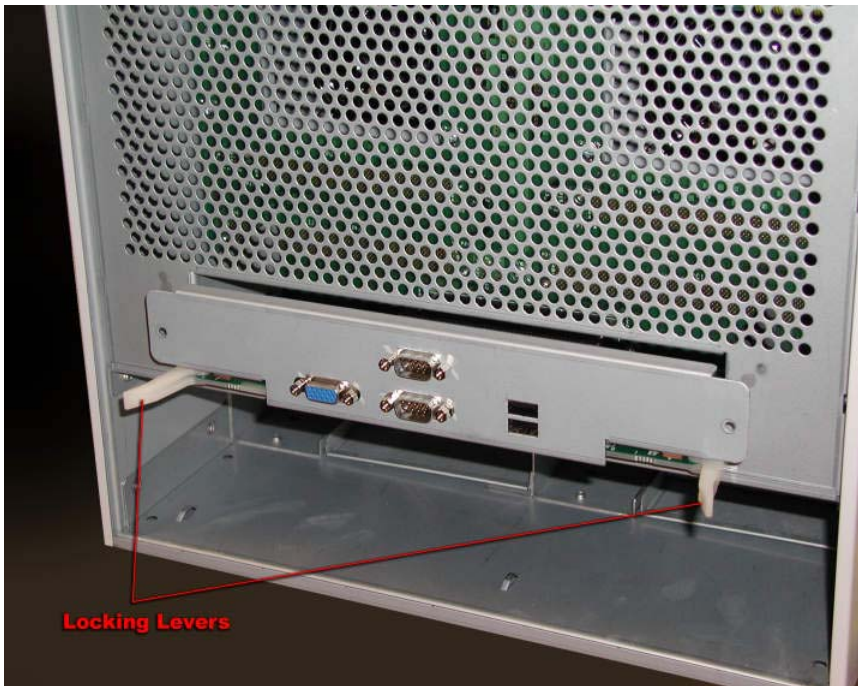
1. Disconnect all cables from the I/O board. (Figure 4A-32)
2. Remove the two screws securing the I/O board at the rear of the cabinet.

Figure 4A-32. I/O Board Cables and Screws



3. Release the locking levers and pull the board straight out. (Figure 4A-33)

Figure 4A-33. Removing the I/O Board



**REPLACEMENT NOTE:** When inserting the replacement I/O board, make sure the board is aligned properly on the tracks.

## 4B. DRU

# Hardware Removal/Replacement Procedures (Pedestal Model)

This section lists the Distributor Replaceable Units (DRUs) in the ftServer 3200 system and describes the removal and replacement procedures for each one. DRUs that are duplexed may be removed and replaced without total removal of power, and thus, without loss of continuous processing. However, if a DRU is simplexed, the system must be shut down and both main power switches turned off prior to removal and replacement of the DRU.

### 4B.1 List of DRUs

The following table lists the DRUs in the ftServer 3200 system.

<b>Component</b>	<b>Part Number</b>
CPU Board (G7FMU)	243-630153-C
CPU LED Cable	808-744496-021A
PCI Open Sensor Cable	808-744495-028A
PCI Board (G7FMV)	243-630154-AD
PCI LED Board (G7DTG)	133-639369-B
PCI LED Relay Cable	808-744497-028A
Super Floppy Drive	804-091490-5010
CD-ROM Drive	808-879312-101A
CD-ROM Adapter (G7EPE)	133-639660-B
IDE-M Board (G7EPD)	133-639659-B
Plugin DC Cable	808-744499-001A
Ultra ATA66 IDE2 Cable (014)	808-744608-014B
Tape Drive Bay Fan	802-860107-221A
JWT75-522/RC Power Supply	808-892443-0010
Dev-bay DC Cable (400)	808-744622-400A
AC Inlet Cable (140)	808-744623-140A
SCSI-Wide 3conn Cable (001)	808-744621-001A

<b>SCSI-Wide 3conn Cable (002)</b>	<b>808-744621-002A</b>
<b>SCSI-Wide EX Long Cable (150)</b>	<b>808-744640-150A</b>
<b>SCSI-Wide EX Short Cable (030)</b>	<b>808-744624-030A</b>
<b>PWRGD Sensor Cable</b>	<b>808-744625-500B</b>
<b>SCSI Converter</b>	<b>802-710586-001A</b>
<b>Wide-SCSI Terminator</b>	<b>802-710524-568A</b>
<b>SCSI Backplane</b>	<b>243-630262-A</b>
<b>Main Board (G7QK)</b>	<b>243-630239-A</b>
<b>Main DC Cable</b>	<b>804-062920-070A</b>
<b>24-pin DC Cable (080)</b>	<b>808-744573-080A</b>
<b>20-pin DC Cable (070)</b>	<b>808-744572-070A</b>
<b>Box-10P Cable (075)</b>	<b>808-744570-075A</b>
<b>Box-34P Cable (070)</b>	<b>808-744465-070A</b>
<b>Box-30P Cable (080)</b>	<b>808-744466-080A</b>
<b>12-pin DC Cable (080)</b>	<b>808-744467-080B</b>
<b>Internal LVD SCSI Cable (001)</b>	<b>808-744571-001A</b>
<b>Internal LVD SCSI Cable (002)</b>	<b>808-744571-002A</b>
<b>Internal LVD SCSI Cable (003)</b>	<b>808-744571-003A</b>
<b>Internal LVD SCSI Cable (004)</b>	<b>808-744571-004A</b>
<b>Ultra ATA66 IDE Cable (050)</b>	<b>808-744609-050B</b>
<b>Device DC Cable (001)</b>	<b>808-744616-001A</b>

## **4B.2 Power Removal**

See [Section 4A.2](#).

## **4B.3 Hardware Removal Procedures**

### **4B.3.1 Tape Drive Bay**

See [Section 4A.3.1](#).

### 4B.3.2 CPU Board

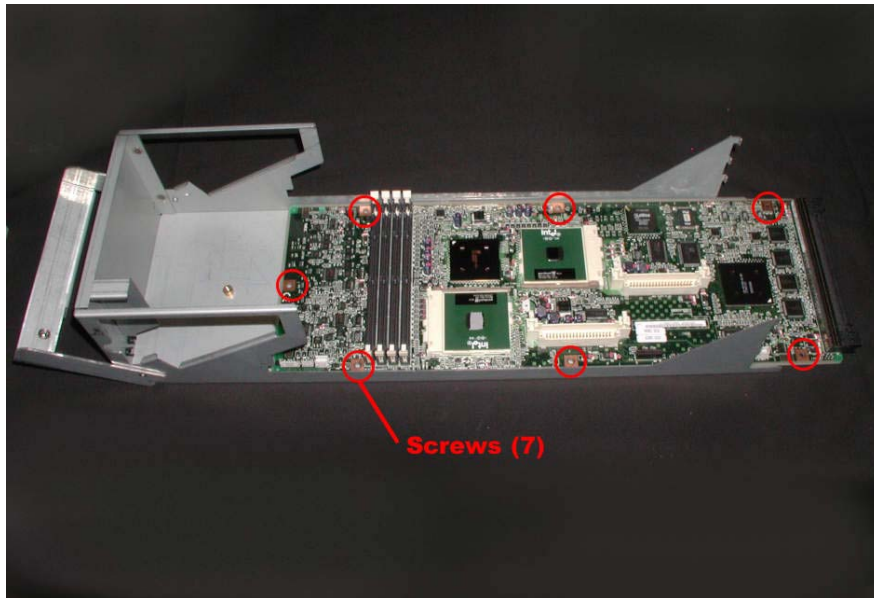
1. Remove the CPU enclosure. (CRU)
2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4B-1)

*Figure 4B-1. CPU Enclosure Cover Screws*



3. Remove the fans (Fan A and Fan B). (FRUs)
4. Remove the LED cables. (Section 4B.3.3)
5. Remove the processors, memory modules, and voltage regulators. (FRUs)
6. Remove the seven screws securing the CPU board and carefully lift it out of the enclosure. (Figure 4B-2)

*Figure 4B-2. CPU Board Screws*



### **4B.3.3 CPU LED Cable**

1. Remove the CPU enclosure. (CRU)
2. Remove the two screws securing the CPU enclosure cover.
3. Slide the cover toward the rear to release the tabs and carefully lift it off. (Figure 4B-3)

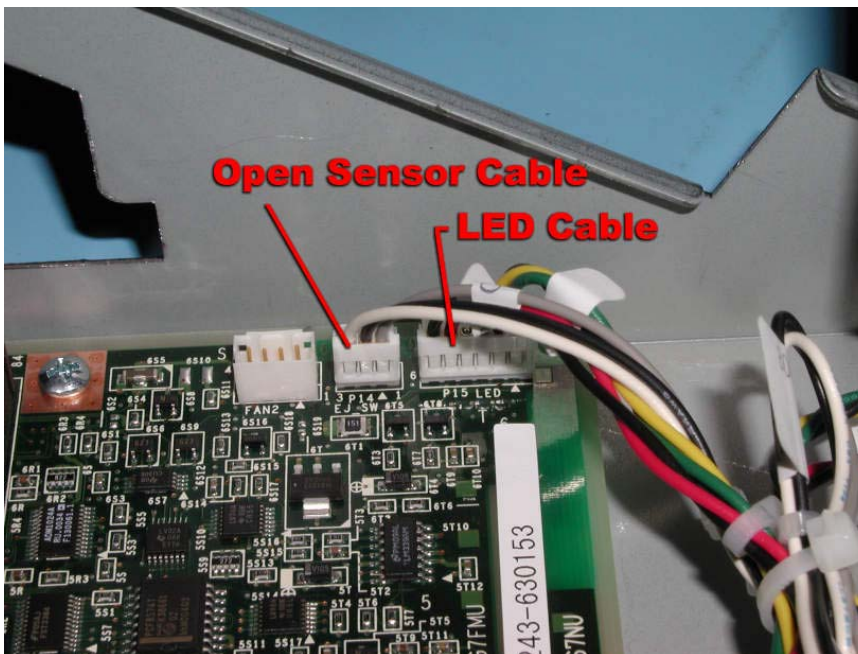


Figure 4B-3. CPU Enclosure Cover Screw



4. Remove Fan A (front fan). (FRU)
5. Disconnect the LED cables at P14 and P15. (Figure 4B-4)

Figure 4B-4. LED and Open Sensor Cables



### 4B.3.4 PCI Board (G7EPB)

1. Remove the I/O enclosure (CRU) and turn it over.

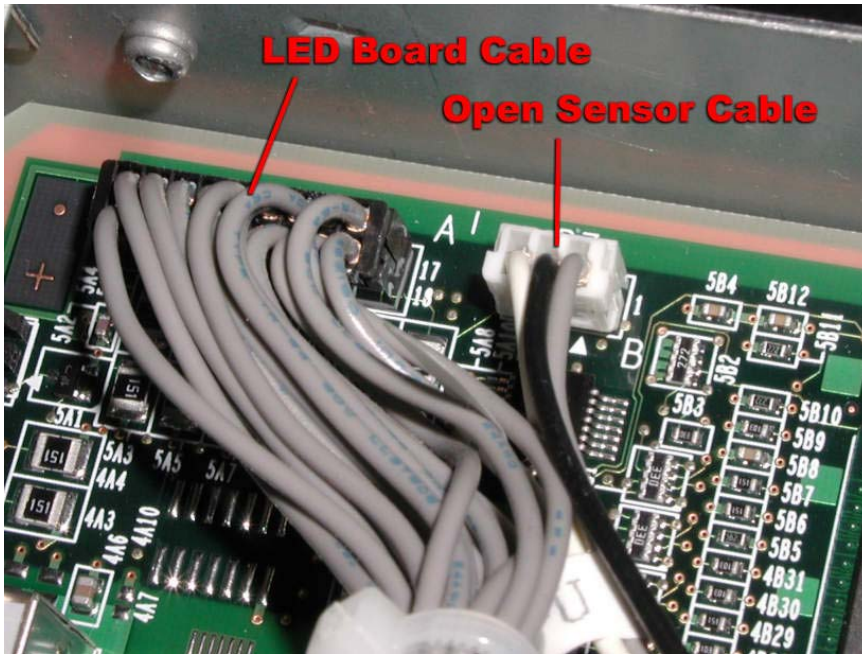
2. Remove the two screws securing the I/O enclosure cover. (Figure 4B-5)

*Figure 4B-5. I/O Enclosure Cover Screws*



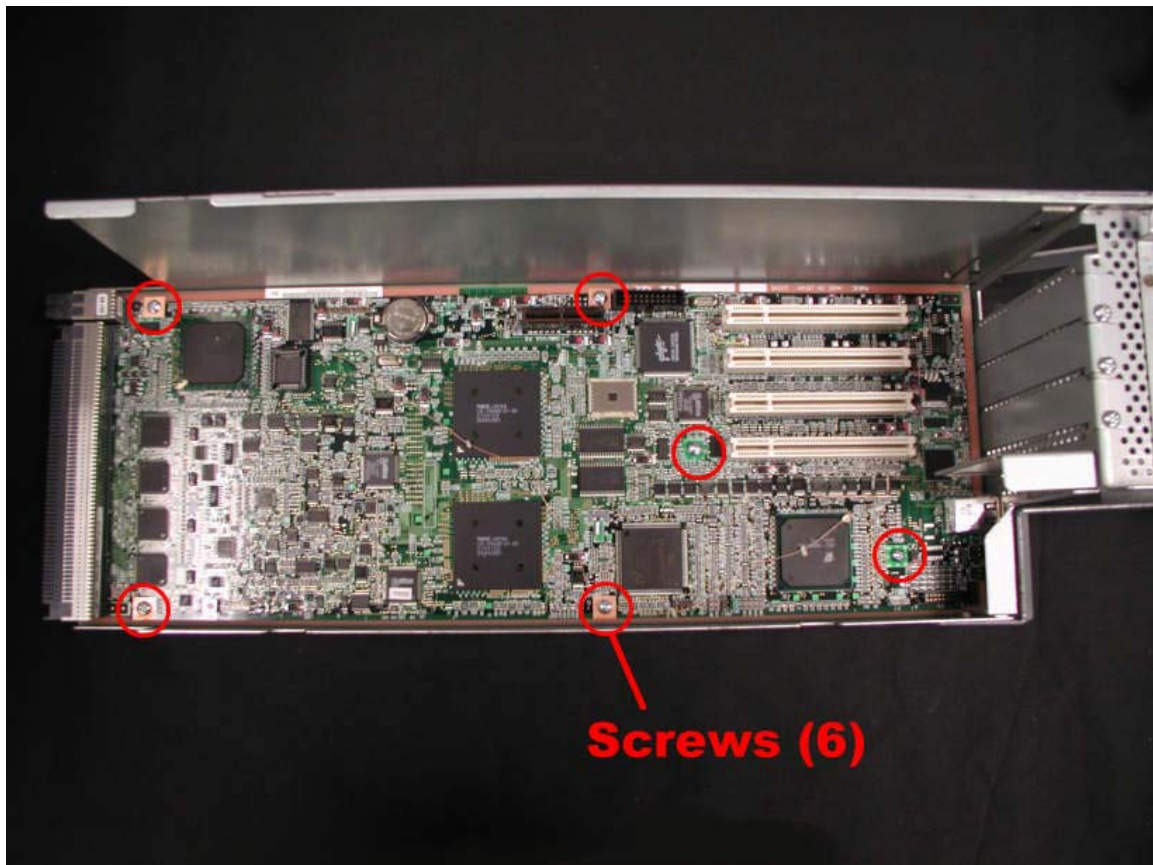
3. Slide the cover toward the rear to release the tabs and carefully lift it off.
4. Remove all PCI adapters.
5. Remove Fan B. (Section 4B- )
6. Disconnect the open sensor cable and LED board cable from the PCI board. (Figure 4B-6)

Figure 4B-6. LED Board and Open Sensor Cables



7. Remove the six remaining screws. (Figure 4B-7)

Figure 4B-7. I/O Board Screws



8. Slide the PCI board to the rear and lift it out.

#### **4B.3.5 PCI LED Board (G7DTG)**

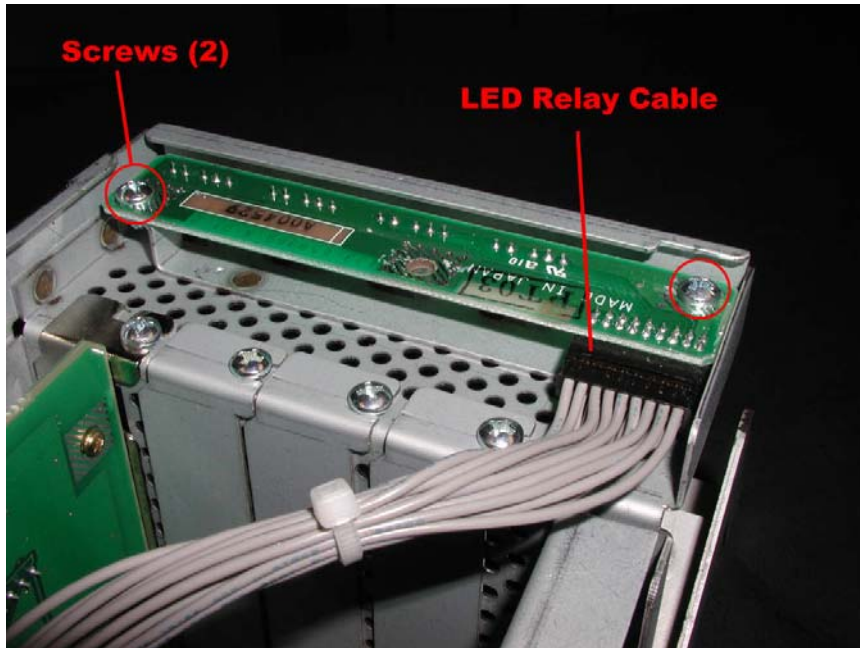
1. Remove the I/O enclosure (CRU) and turn it over.
2. Remove the two screws securing the I/O enclosure cover. (Figure 4B-8)

*Figure 4B -8. I/O Enclosure Cover Screws*



3. Slide the cover toward the rear to release the tabs and carefully lift it off.
4. Disconnect the LED relay cable from the LED board. (Figure 4B-9)
5. Remove the two screws securing the LED board to the chassis and lift out the board.

Figure 4B-9. LED Relay Cable and Screws



**REPLACEMENT NOTE:** When inserting the replacement board, make sure the board fits under the lip on the chassis and the LEDs are in the openings.

### 4B.3.6 PCI LED Relay Cable

1. Remove the I/O enclosure (CRU) and turn it over.
2. Remove the two screws securing the I/O enclosure cover. (Figure 4B-10)

*Figure 4B -10. I/O Enclosure Cover Screws*



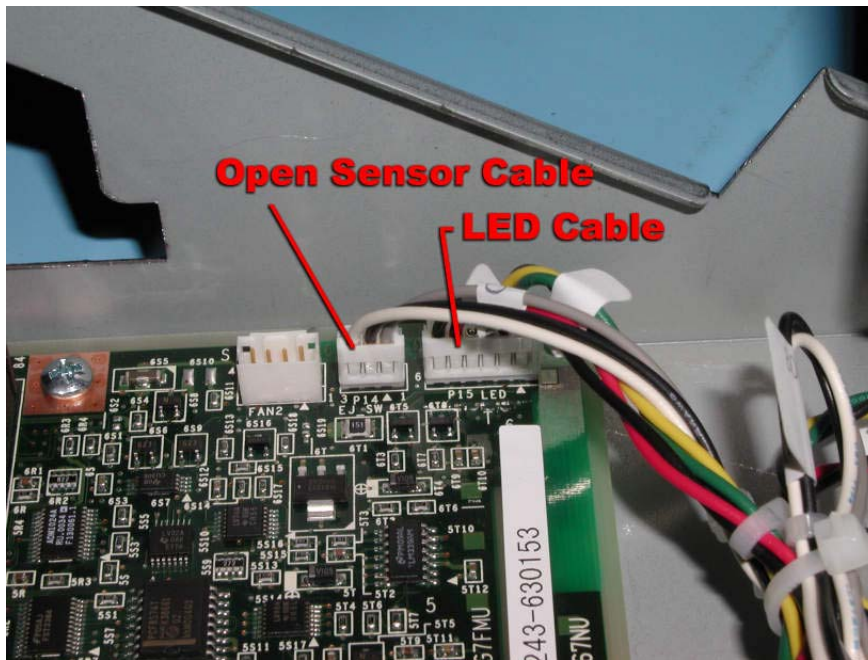
3. Slide the cover toward the rear to release the tabs and carefully lift it off.
4. Disconnect the LED relay cable from the LED board. (Figure 4B-11)

*Figure 4B-11. LED Relay Cable Connection at LED Board*



5. Disconnect the LED relay cable from the PCI board. (Figure 4B-12)

Figure 4B-12. LED Relay and Open Sensor Cable Connections at PCI Board



#### 4B.3.7 PCI Open Sensor and Cable

1. Remove the I/O enclosure (CRU) and turn it over.
2. Remove the two screws securing the I/O enclosure cover. (Figure 4B-13)

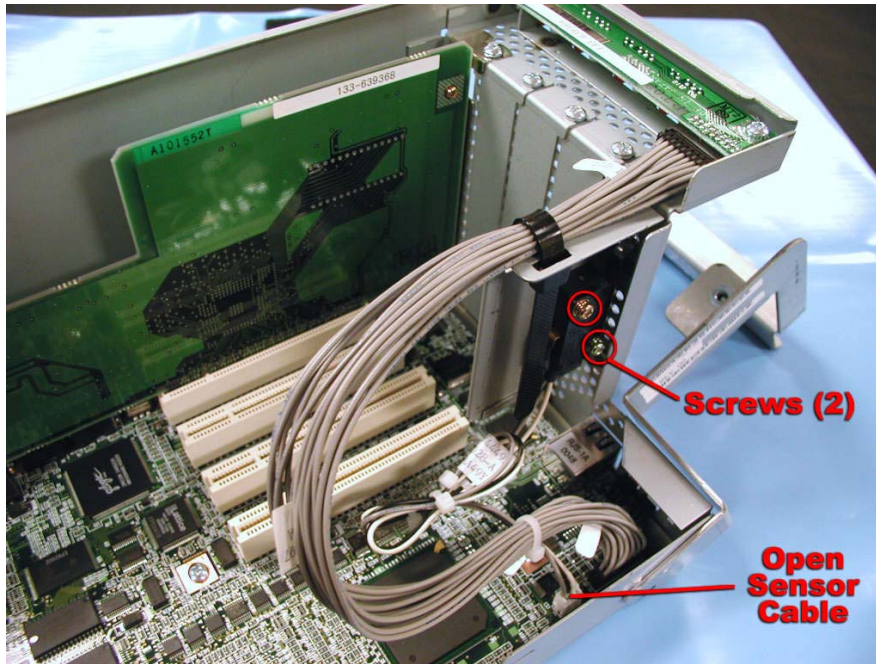
Figure 4B -13. I/O Enclosure Cover Screws



3. Slide the cover toward the rear to release the tabs and carefully lift it off.
4. Disconnect the cable from the P7 on the PCI board. (Figure 4B-14)
5. Remove the two screws securing the sensor to the chassis.



Figure 4B -14. Open Sensor Cable and Screws



### 4B.3.8 Main Board Cables

Several cables connect to the main board. The following table shows all the cables connected to the main board and indicates where each one goes from there. It also indicates the procedure associated with disconnecting the other end of the cable. This section describes the procedure for disconnecting the cables from the main board. Refer to the associated procedure to complete the removal of each cable.

Cable Number	Cable Name	Other End of Cable Connects to
804-062920-070A	Main DC Cable	Power Board
808-744570-075A	Box-10P Cable (075)	SCSI Backplane
808-744465-070A	Box-34P Cable (070)	Front Panel Board
808-744466-080A	Box-30P Cable (080)	Power Board
808-744467-080B	12-pin DC Cable (080)	Power Board
808-744571-001A	Internal LVD SCSI Cable (001)	SCSI Backplane
808-744571-002A	Internal LVD SCSI Cable (002)	SCSI Backplane
808-744571-003A	Internal LVD SCSI Cable (003)	SCSI Backplane
808-744571-004A	Internal LVD SCSI Cable (004)	SCSI Backplane

808-744609-050B	Ultra ATA66 IDE Cable	IDE M Board
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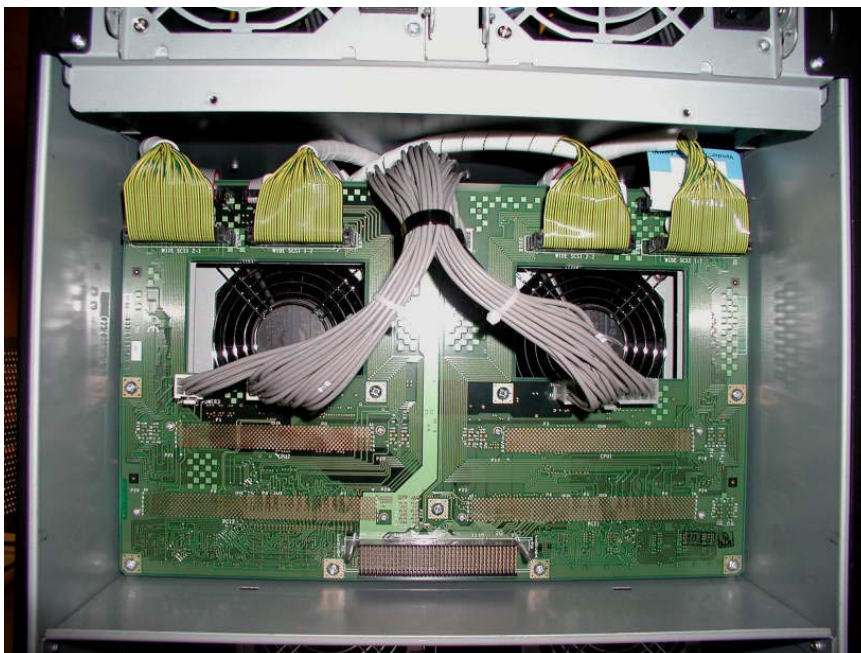
1. At the rear of the cabinet, remove the I/O board. (FRU)
2. Remove the two screws securing the EMI shield and lift it off. (Figure 4B-12)

*Figure 4B-12. EMI Shield Screws*



3. Disconnect the failed cable from the main board. (Figure 4B-13)

*Figure 4B-13. Main Board Cables*



**REPLACEMENT NOTE:** When reconnecting the cables to the main board, make sure they are connected to the proper connectors. Each LVD SCSI cable and its connector are labeled the same (2-1, 1-2, 2-2, and 1-1).

### 4B.3.9 Main Board

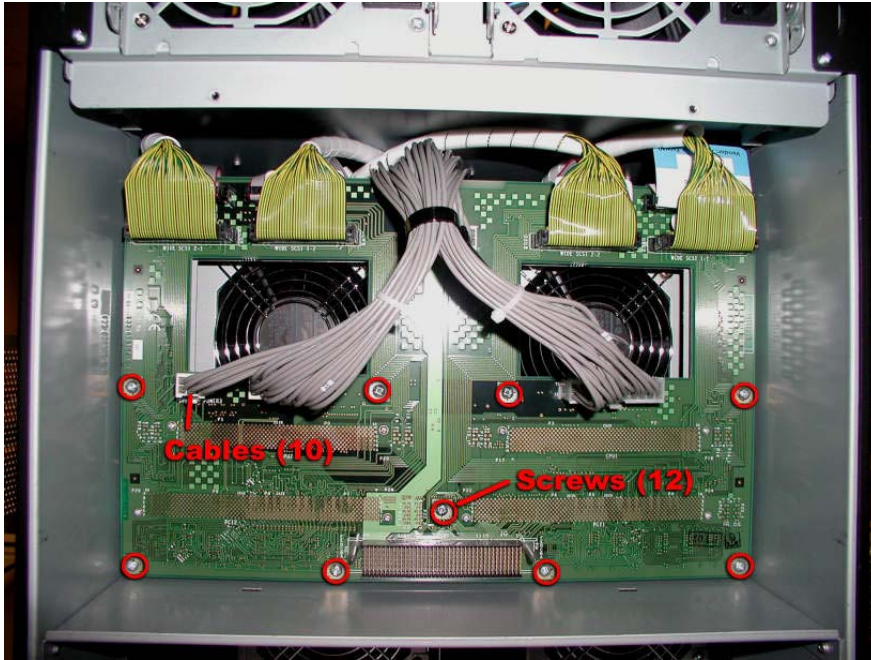
1. At the rear of the cabinet, remove the I/O board. (FRU)
2. Remove the two screws securing the EMI shield and lift it off. (Figure 4B-14)

*Figure 4B-14. EMI Shield Screws*



3. Disconnect the 10 cables from the main board. (Figure 4B-15)
4. Remove the 12 screws securing the main board.

Figure 4B-15. Main Board Cables

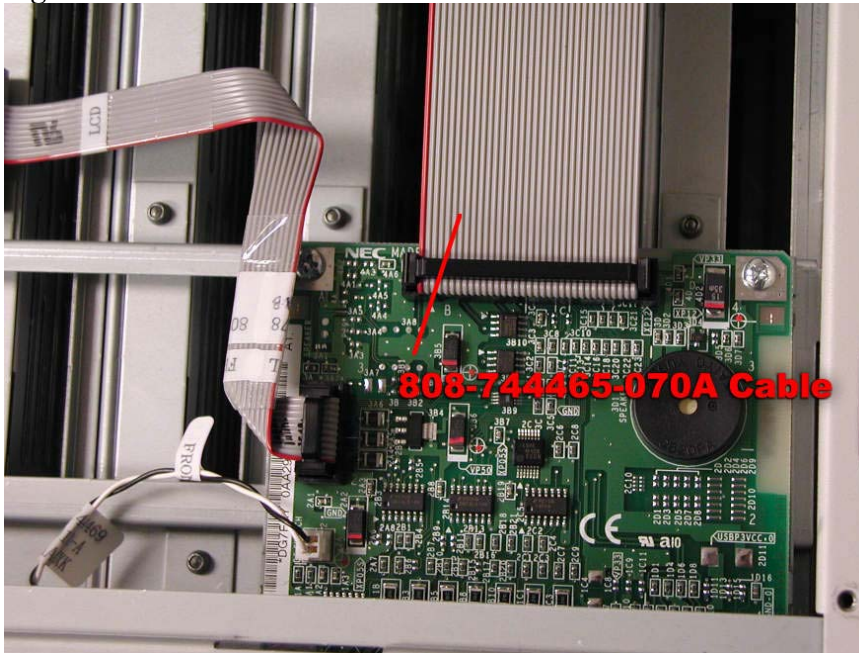


5. Grasp the main board and pull it straight out from the connectors.

#### **4B.3.10 SCSI Backplane**

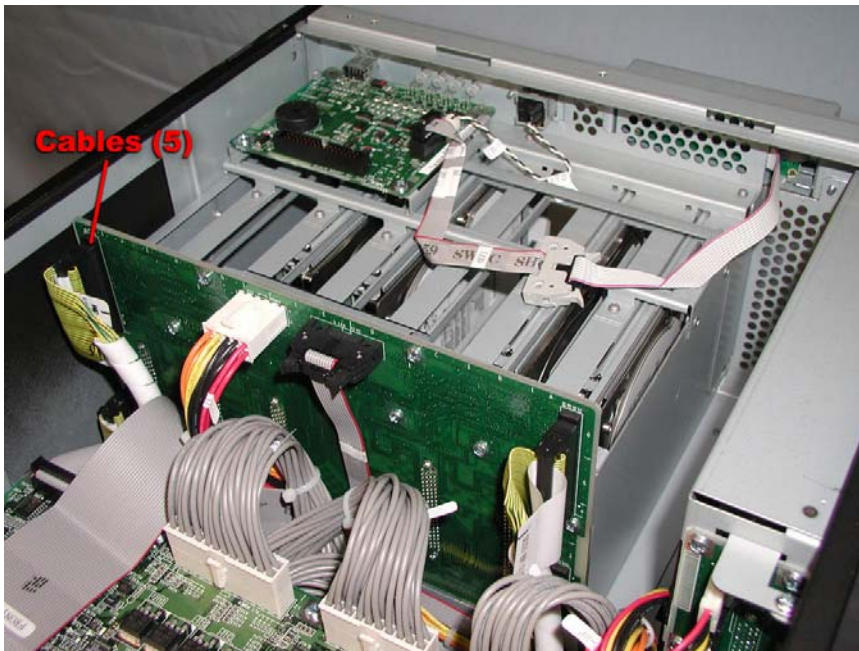
1. Pull the tape drives out slightly to disconnect them from the SCSI backplane.
2. Remove the tape drive bay. ([Section 4A.3.1.](#))
3. Disconnect the 808-744465-070A cable from the front panel board. (Figure 4B-16)

Figure 4B-16. 808-744465-070A Cable



4. Disconnect the five cables from the SCSI backplane. (Figure 4B-17)

Figure 4B-17. . SCSI Backplane Cables



5. Remove the seven screws securing the SCSI backplane and carefully lift it out of the cabinet. (Figure 4B-18)

*Figure 4B-18. SCSI Backplane Screws*



**REPLACEMENT NOTE:** When installing the replacement SCSI backplane, make sure it is inserted in the channel in the bottom of the chassis.

### **4B.3.11 Super Disk**

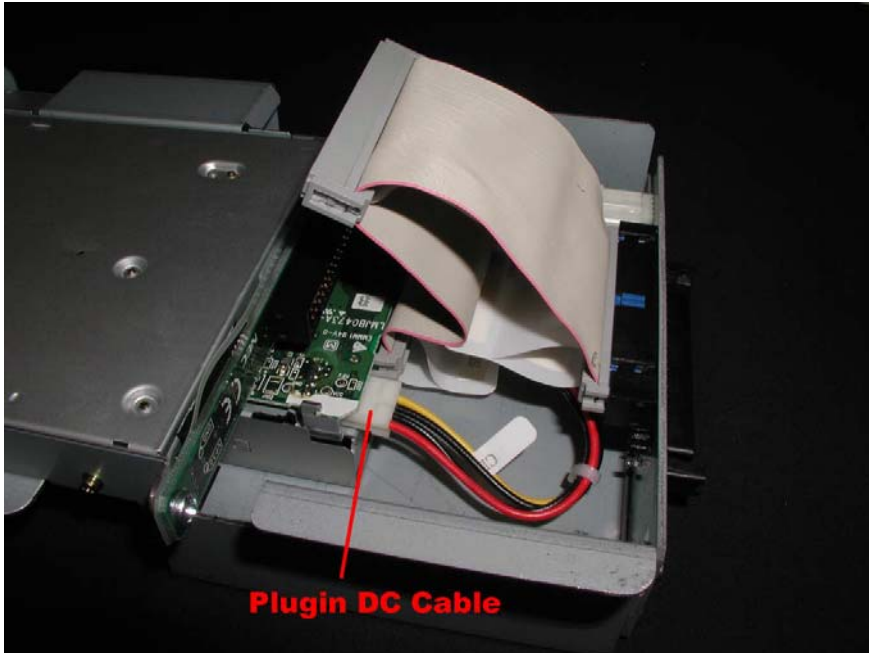
1. Remove the device module (CRU).
2. Disconnect the Ultra ATA66 IDE2 cable from the super disk. (Figure 4B-19)

*Figure 4B-19. Ultra ATA66 IDE2 Cable*



3. Disconnect the Plugin DC cable from the super disk. (Figure 4B-20)

*Figure 4B-20. Plugin DC Cable*



4. Remove the four screws securing the super disk to the device module. (Figure 4B-21)

*Figure 4B-21. Super Disk Screws*



5. Pull the super disk out the front of the device module.

### 4B.3.12 CD-ROM Drive

1. Remove the device module (CRU).
2. Disconnect the Plugin DC cable and the Ultra ATA66 IDE2 cable from the CD-ROM adapter. (Figure 4B-22)

*Figure 4B-22. Plugin DC and Ultra ATA66 IDE2 Cables*



3. Remove the four screws securing the CD-ROM drive to the device module. (Figure 4B-23)



Figure 4B-23. CD-ROM Drive Screws

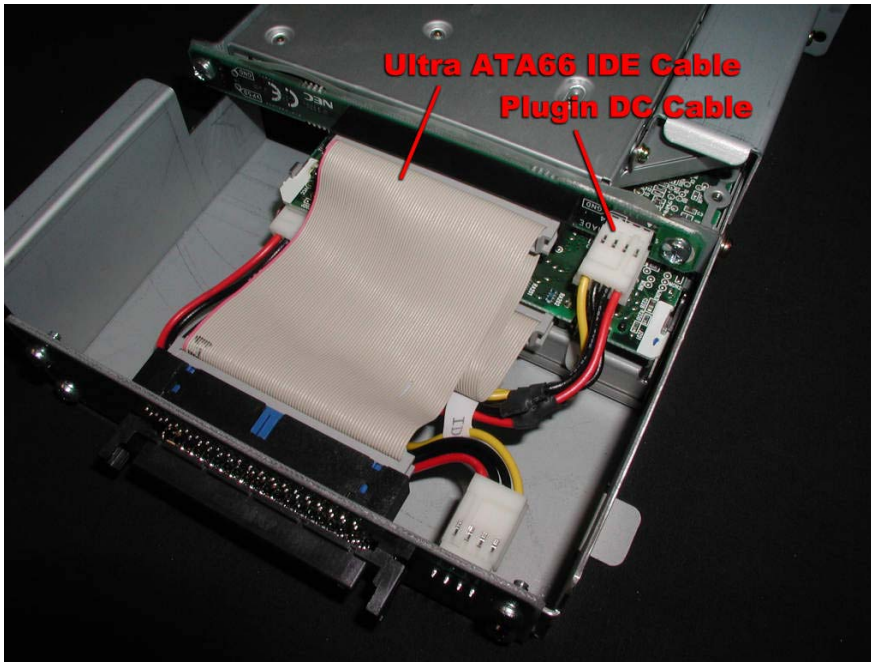


4. Pull the CD-ROM drive out of the CD-ROM adapter and through the front of the device module

### **4B.3.13 CD-ROM Adapter**

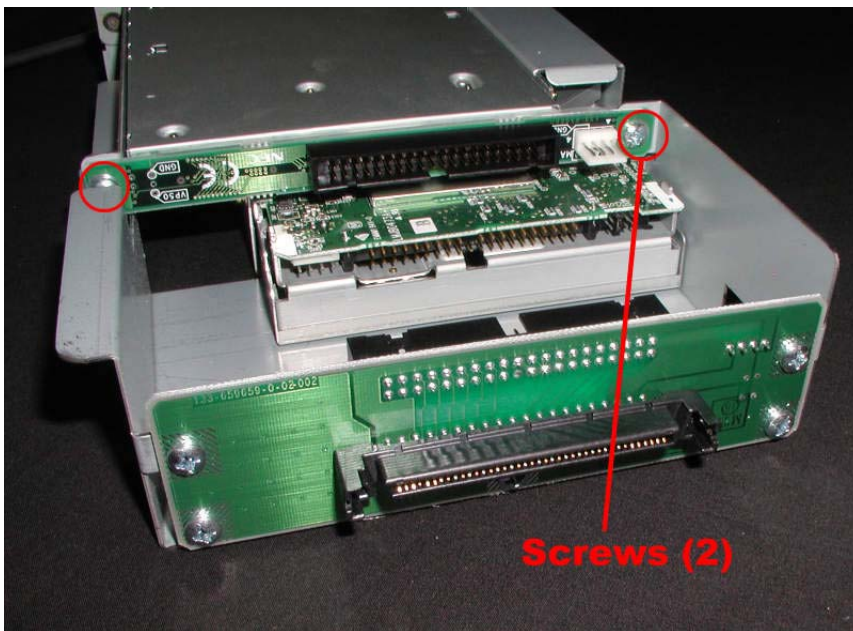
1. Remove the device module (CRU).
2. Disconnect the Plugin DC cable and the Ultra ATA66 IDE2 cable from the CD-ROM adapter. (Figure 4B-24)

Figure 4B-24. Plugin DC and Ultra ATA66 IDE Cables



3. Remove the two screws securing the CD-ROM adapter and lift it out. (Figure 4B-25)

Figure 4B-25. CD-ROM Adapter Screws

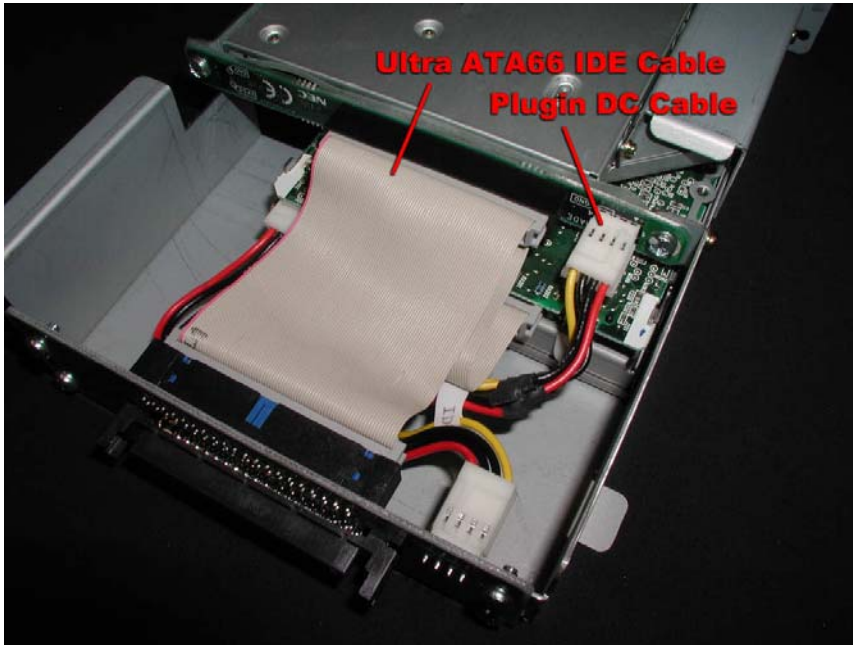


**REPLACEMENT NOTE:** When installing the replacement CD-ROM adapter, make sure the plastic insulator is in place.

### 4B.3.14 IDE-M Board

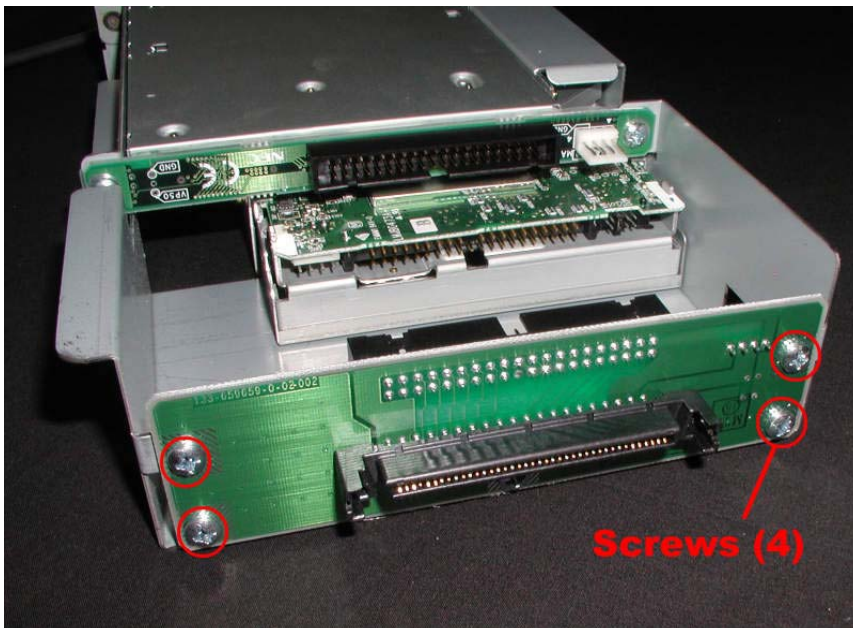
1. Remove the device module (CRU).
2. Disconnect the Plugin DC cable and the Ultra ATA66 IDE2 cable from the IDE-M board. (Figure 4B-26)

*Figure 4-26. Plugin DC and Ultra ATA66 IDE2 Cables*



3. Remove the four screws securing the IDE-M board and lift it out. (Figure 4B-27)

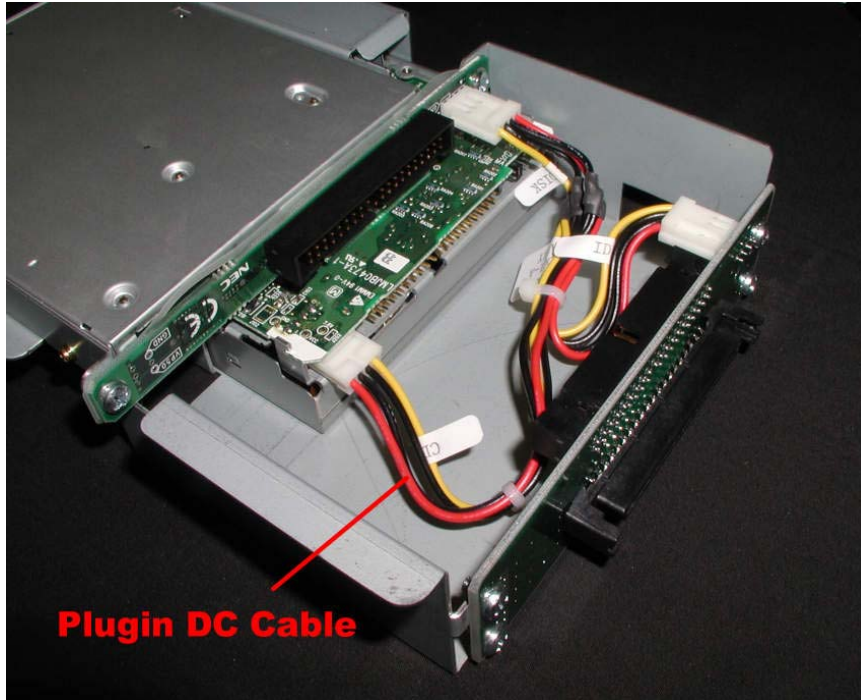
*Figure 4B-27. IDE-M Board Screws*



### 4B.3.15 Plugin DC Cable

1. Remove the device module (CRU).
2. Disconnect the Plugin DC cable from the CD-ROM adapter, super disk, and IDE-M board. (Figure 4B-28)

*Figure 4B-28. Plugin DC Cable*



### 4B.3.16 Ultra ATA66 IDE2 Cable

1. Remove the device module (CRU).
2. Disconnect the Ultra ATA66 IDE2 cable from the CD-ROM adapter, super disk, and IDE-M board. (Figure 4B-29)

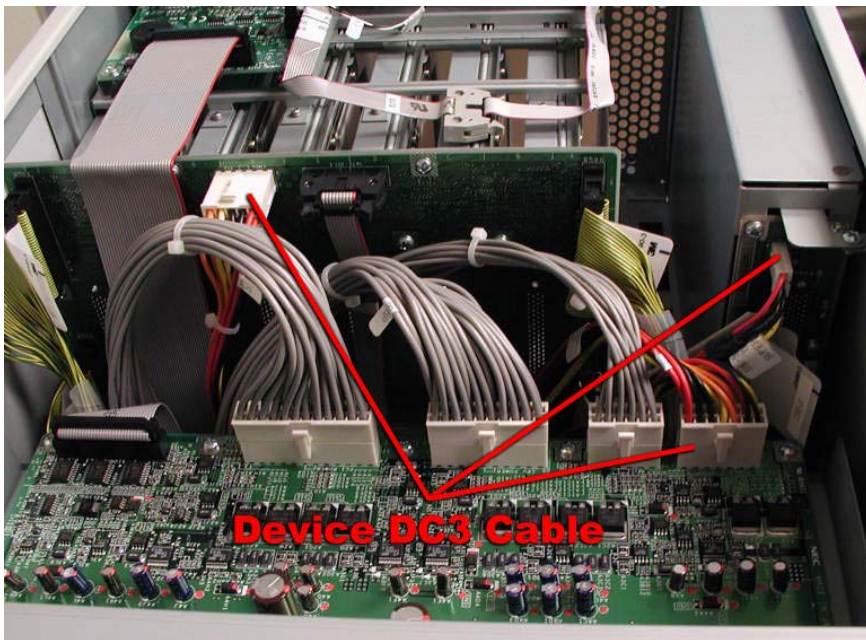
Figure 4-29. Ultra ATA66 IDE2 Cable



#### 4B.3.17 Device DC3 Cable

1. Remove the tape drive bay. ([Section 4A.3.1.](#))
2. Disconnect the device DC3 cable from the power board, SCSI backplane, and the IDE-S board. (Figure 4B-30)

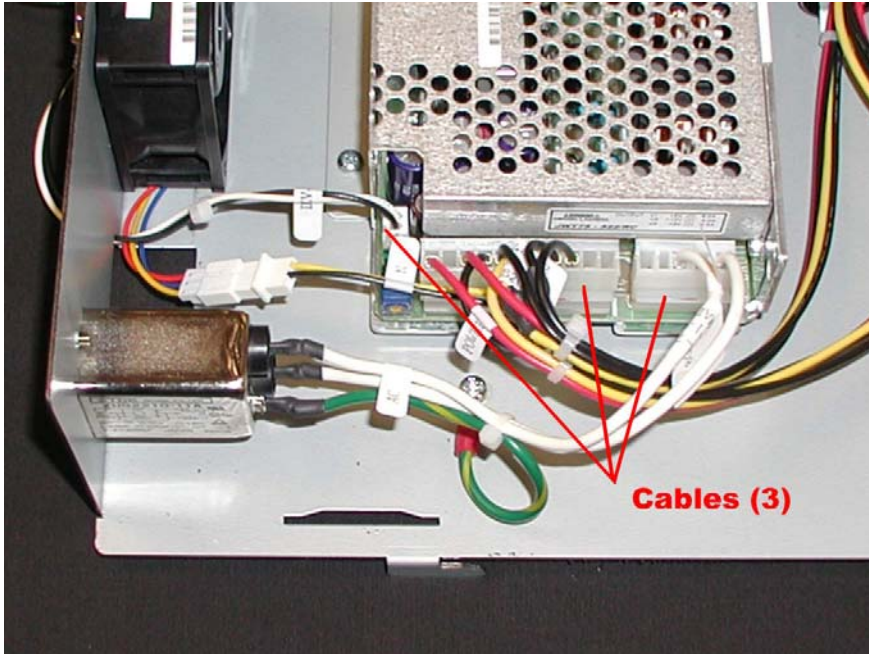
Figure 4B-30. DC3 Cable



### 4B.3.18 Tape Drive Power Supply

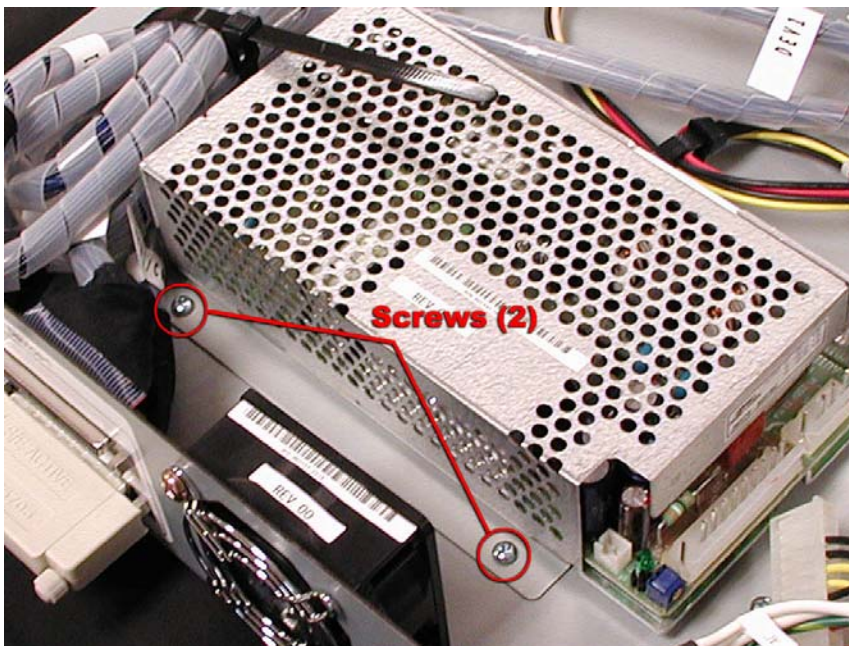
1. Remove the tape drive bay cover. (Refer to [Section 4B.3.1](#), Steps 1-4.)
2. Disconnect the cables the power supply. (Figure 4B-31)

*Figure 4B-31.*



3. Remove the two screws securing the power supply. (Figure 4B-32)

*Figure 4B-32.*

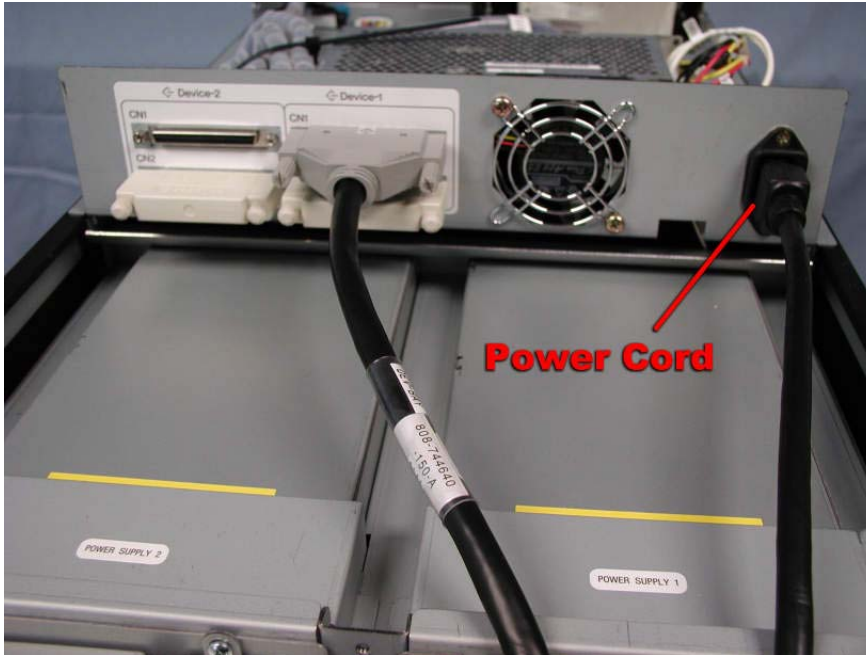


4. Slide the power supply out from under the tabs and lift it out.

### 4B.3.19 Tape Drive Bay DC Power Cable

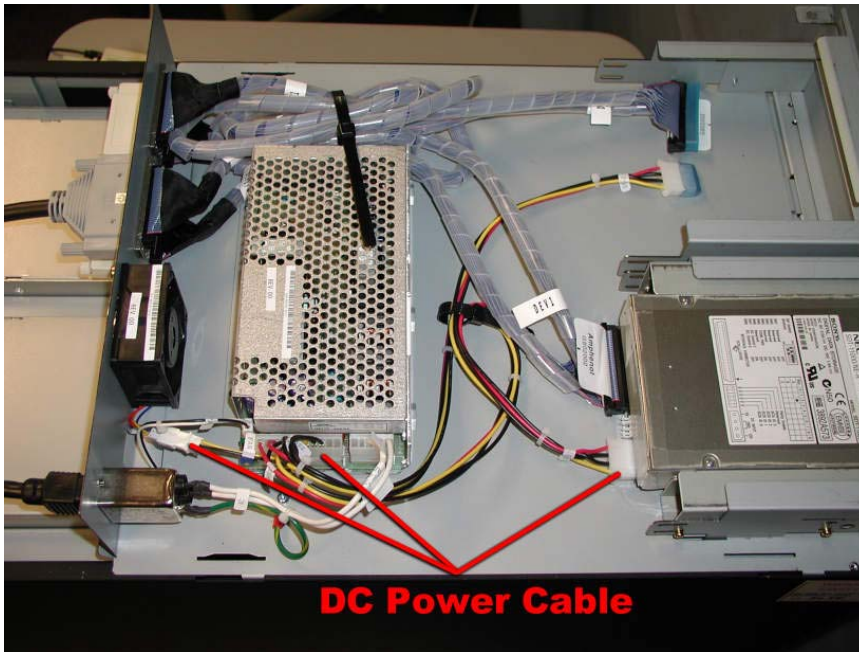
1. Remove the tape drive bay cover. (Refer to [Section 4B.3.1](#), Steps 1-4.)
2. Disconnect the tape drive bay power cord. (Figure 4B-33)

*Figure 4-33.*



3. Disconnect the tape drive bay DC power cable from the tape drive(s), fan cable, and power supply. (Figure 4B-34)

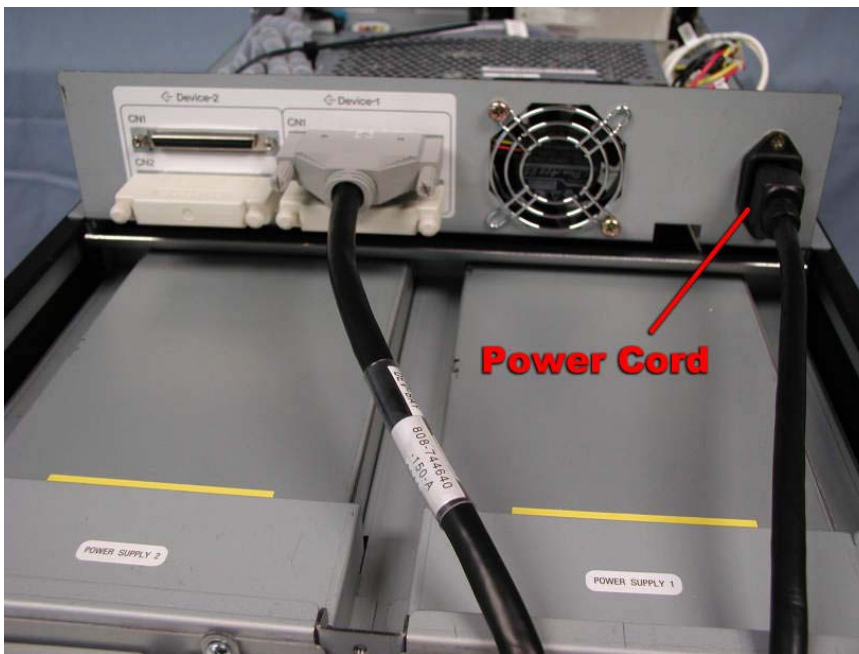
Figure 4B-34.



#### 4B.3.20 AC Inlet

1. Remove the tape drive bay cover. (Refer to [Section 4B.3.1](#), Steps 1-4.)
2. Disconnect the tape drive bay power cord. (Figure 4B-35)

Figure 4B-35.

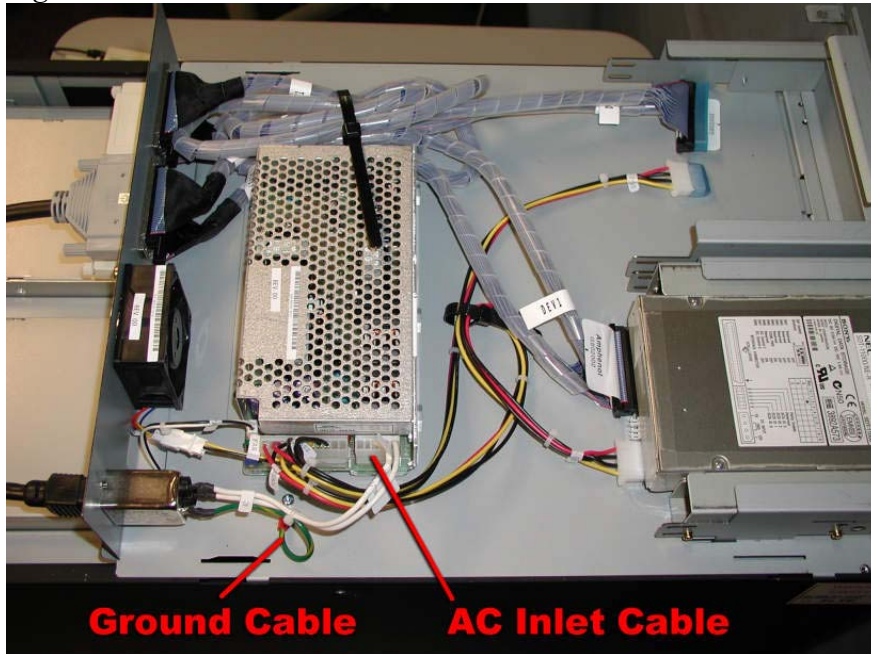


3. Disconnect the AC inlet cable from the power supply. (Figure 4B-36)



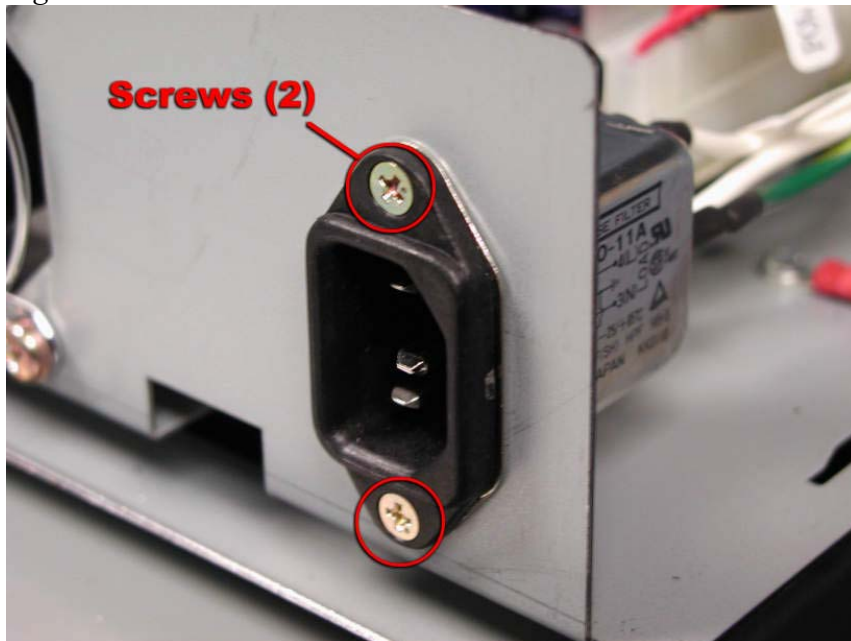
4. Disconnect the ground cable.

Figure 4B-36.



5. At the rear of the tape drive bay remove the two screws securing the AC inlet to the chassis. (Figure 4B-37)

Figure 4B-37.

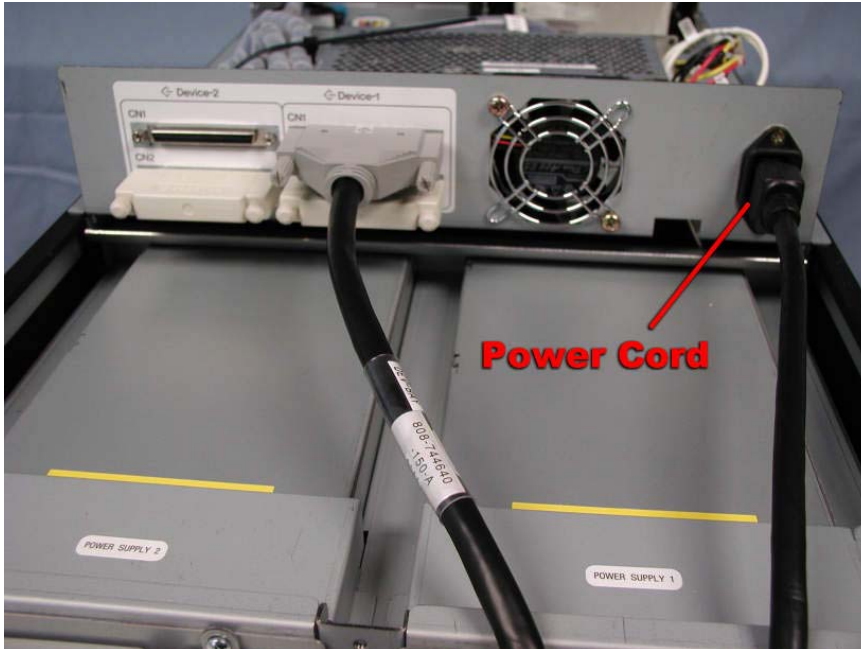


### 4B.3.21 Tape Drive Bay Fan

1. Remove the tape drive bay cover. (Refer to [Section 4B.3.1](#), Steps 1-4.)

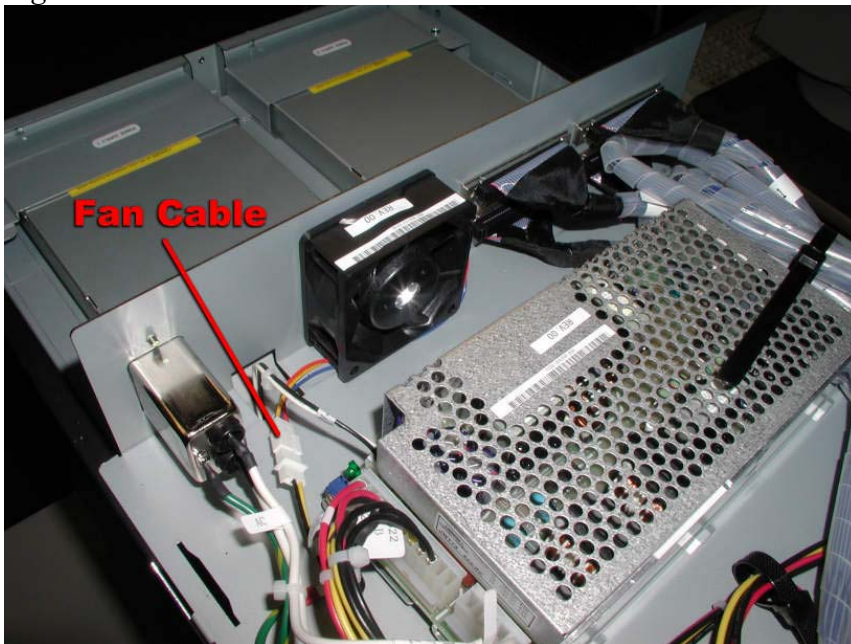
2. Disconnect the tape drive bay power cord. (Figure 4B-38)

*Figure 4B-38.*



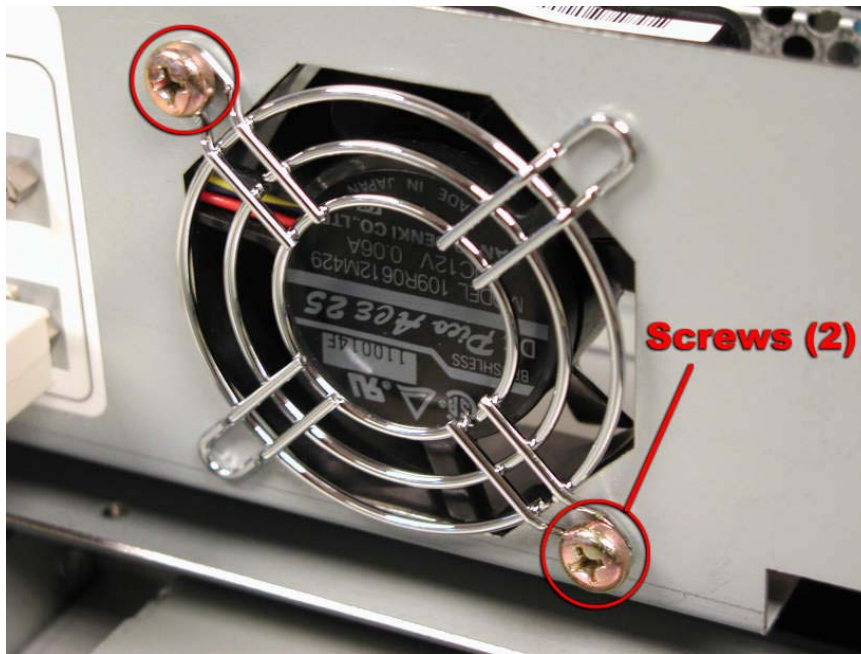
3. Disconnect the fan cable. (Figure 4B-39)

*Figure 4-39.*



4. Remove the two screws securing the fan at the rear of the tape drive bay. (Figure 4B-40)

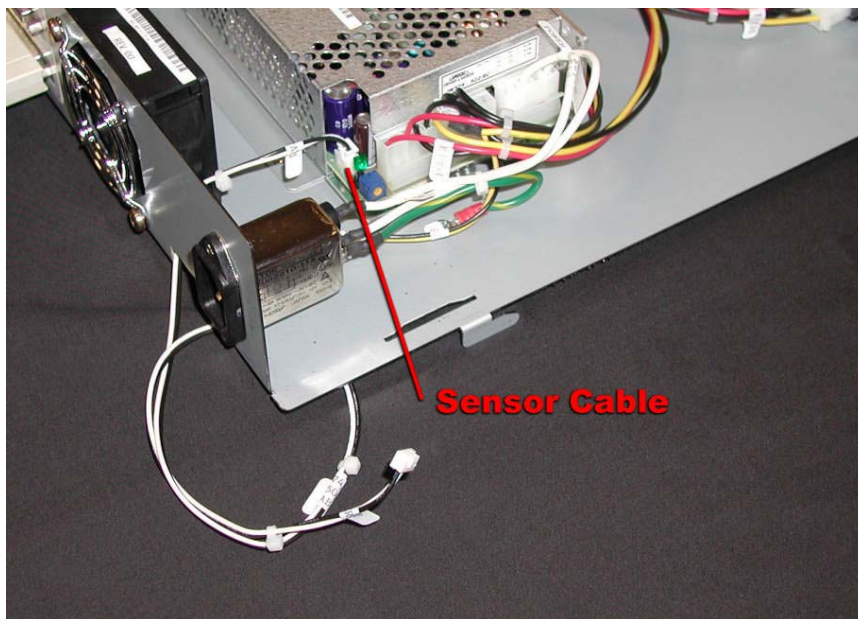
Figure 4B-40.



### 4B.3.2 PWRGD Sensor Cable

1. Remove the tape drive bay. (Refer to [Section 4B.3.1](#))
2. Disconnect the sensor cable from the tape drive bay. (Figure 4B-41)

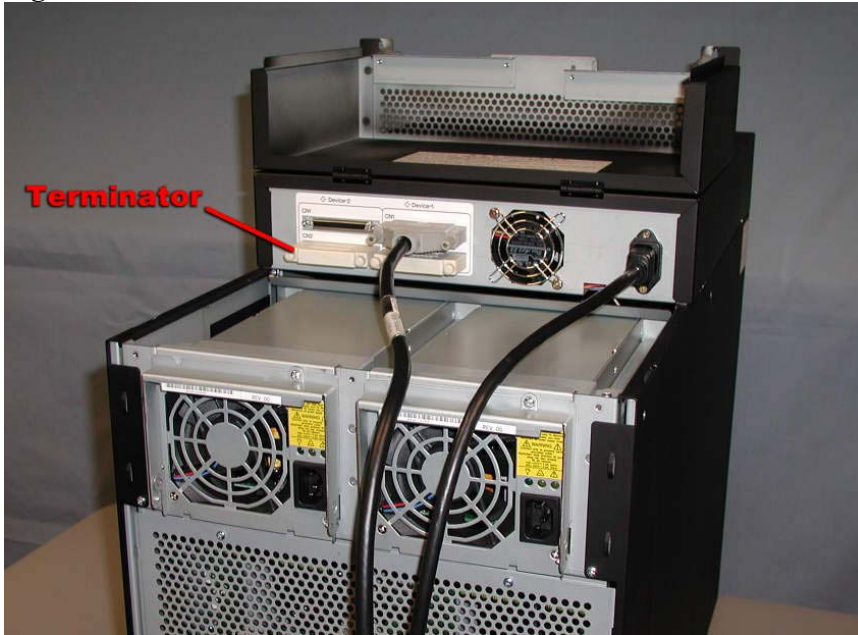
Figure 4-41. (T1)



### 4B.3.23 Wide-SCSI Terminator

1. Remove the two screws securing the tape drive bay cover at the rear of the cabinet and flip open the cover.
2. Loosen the thumbscrews securing the terminator. (Figure 4B-42)

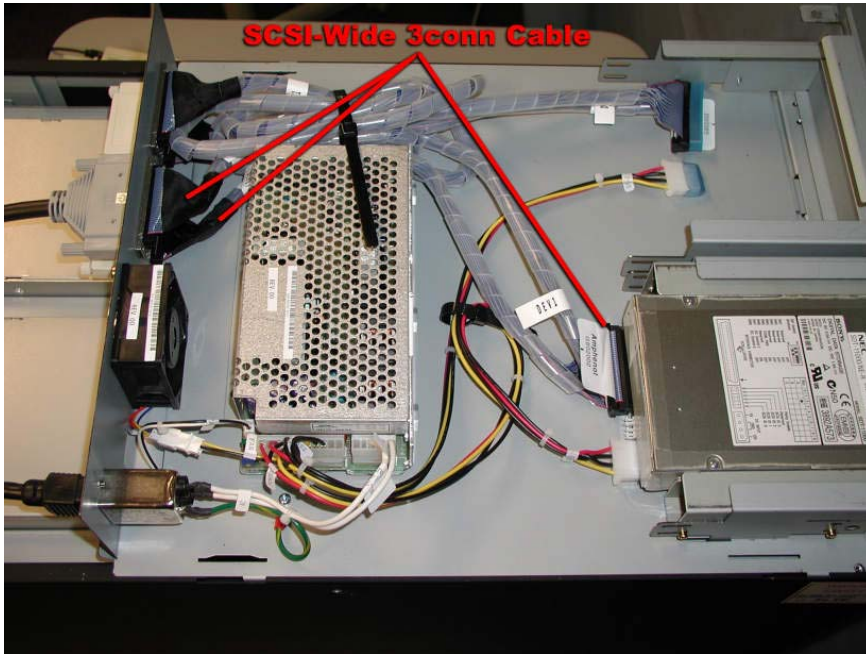
*Figure 4B-42.*



### 4B.3.24 SCSI-Wide 3conn Cable (001/002)

1. Remove the tape drive bay cover. (Refer to [Section 4A.3.1.](#), Steps 1-4.)
2. Disconnect the cable from the tape drive and the connector at the inside rear of the tape drive bay. (Figure 4B-43)

Figure 4B-43. (T2)



### 4B.3.25 SCSI-Wide EX Long /Short Cable

1. Remove the two screws securing the tape drive bay cover at the rear of the cabinet. (Figure 4B44)

Figure 4B-44. Tape Drive Bay Rear Screws



2. Flip open the rear portion of the cover.
3. Disconnect the cable from the rear of the tape drive bay.(Figure 4B-45)

Figure 4B-45. (T1)



4. Disconnect the other end of the cable from the U516 PCI adapter.

## 4C. FRU Hardware Removal and Replacement Procedures (Rack-Mount System)

This section lists the Field Replaceable Units (FRUs) in the ftServer 3200 rack-mount system and describes the removal and replacement procedures for each one. FRUs that are duplexed may be removed and replaced without total removal of power, and thus, without loss of continuous processing. However, if a FRU is simplexed, the system must be shut down and both power supplies turned off prior to removal and replacement of the FRU.

### 4C.1 List of FRUs

The following table lists the FRUs in the ftServer 3200 system.

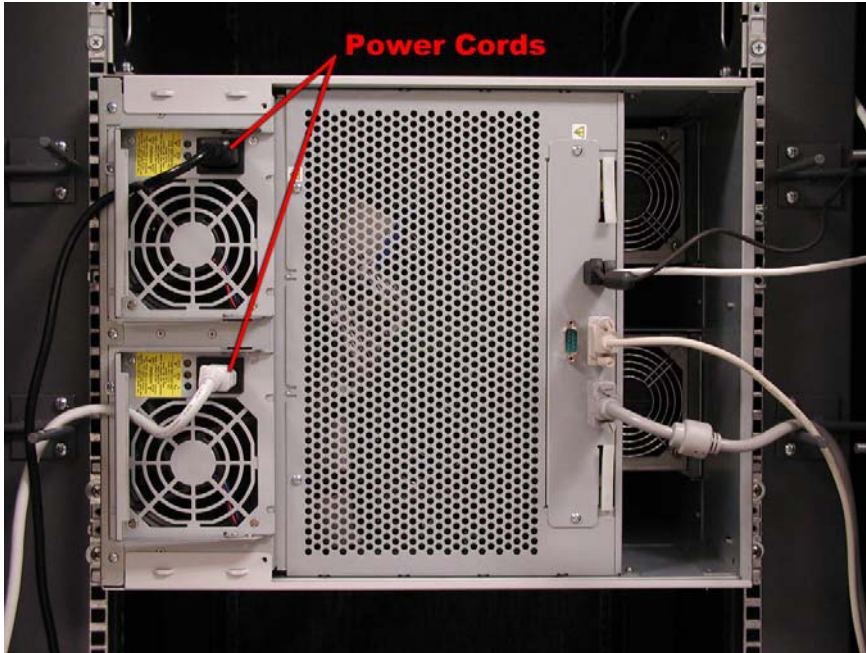
Component	Part Number
<a href="#">Front Fan in CPU Enclosure (Fan A)</a>	802-860106-040A
<a href="#">Rear Fan in CPU Enclosure (Fan B)</a>	802-860110-140A
<a href="#">Memory Module</a>	609-01531-000 609-1532-000
<a href="#">800MHz Pentium III Processor</a>	802-143781-247A
<a href="#">Voltage Regulator</a>	802-187937-001A
<a href="#">Processor Heat Sink with Thermal Interface</a>	808-815085-656A
<a href="#">Front Panel Board (G7FRJ)</a>	243-630263-A
<a href="#">Power Switch and Cable (010)</a>	808-744469-010A
<a href="#">WD-C1602E LCD W/Cable and Sheet metal</a>	120-01519-000
<a href="#">LCD Relay Cable (012)</a>	808-744578-012B
<a href="#">CPU Terminator (FC-PGA)</a>	804-091375-0010
<a href="#">I/O Board (G7FQJ)</a>	243-630238-C
<a href="#">Power Board (G7FQA)</a>	243-630227-C
<a href="#">PCI Fan B</a>	802-860110-140A
<a href="#">DDS-4 Tape Drive</a>	808-895268-002A
<a href="#">IDE-S Board (G7EPC)</a>	133-639658-B

## 4C.2 Power Removal

If total power removal is required, the system must be shut down prior to removing power and rebooted after the replacement unit is installed. Refer to [Section 2.3](#) for the shutdown procedure.

Total power is removed from one side of the system by removing the power cord from the power supply at the rear of the cabinet.

*Figure 4C-1. Power Supply Cords*



**CAUTION:** If the system needs to be simplex (power removed from one side of the cabinet), verify that there are no red LEDs or system messages indicating a failed duplexed component on the side of the system that will remain powered on. If both components in a duplexed pair are removed, a system crash will occur.

## 4C.3 Hardware Removal Procedures

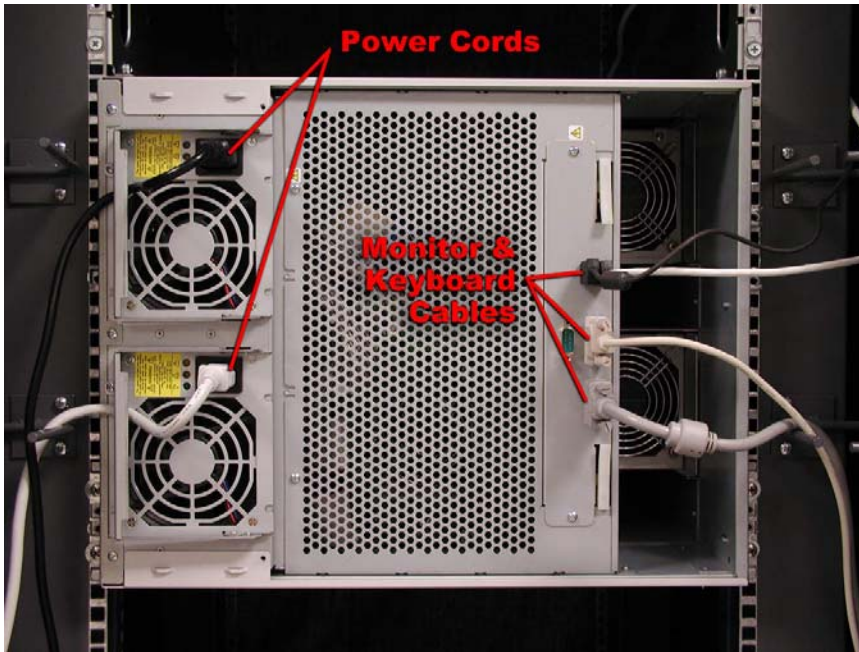
### 4C.3.1 ftServer Chassis

Removal of the ftServer 3200 chassis from the rack-mount cabinet is necessary for most of the FRU removal/replacement procedures. The following procedure describes its removal from the cabinet.

1. At the rear of the cabinet, open the door and disconnect all the cables to the chassis. (Figure 4C-2)

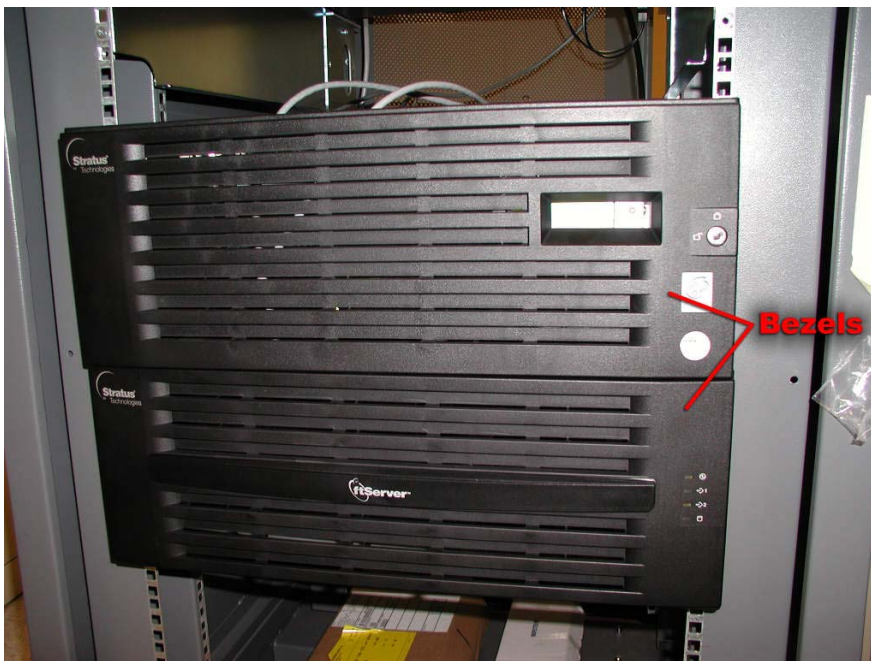


Figure 4C-2.



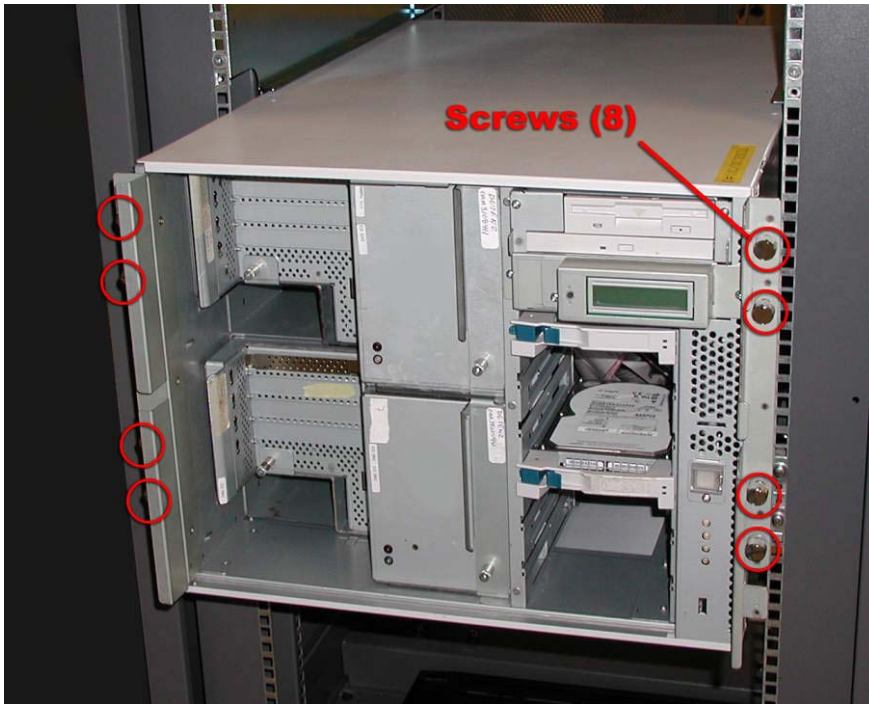
2. Remove the bezels from the front of the ftServer 3200 chassis. (Figure 4C-3)

Figure 4C-3.



3. Remove all communications cables from the PCI adapters.
4. Remove the eight screws securing the chassis at the front of the cabinet. (Figure 4C-4)

Figure 4C-4.



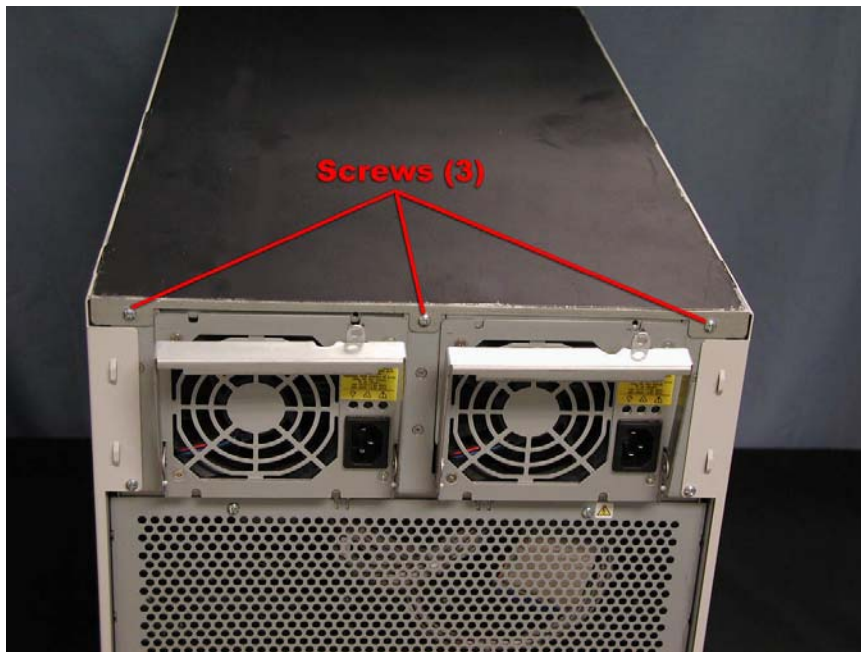
5. Carefully slide the chassis out the front of the cabinet and lay it on its left side on a solid surface. (Figure 4C-5)

*Figure 4C-5.*



6. Remove the three screws securing the side panel (now on top as viewed in present orientation). Slide the panel to the rear and lift it off to gain access to the internal components. . (Figure 4C-6)

Figure 4C-6.



#### 4C.3.2 CPU Enclosure Front Fan (Fan A)

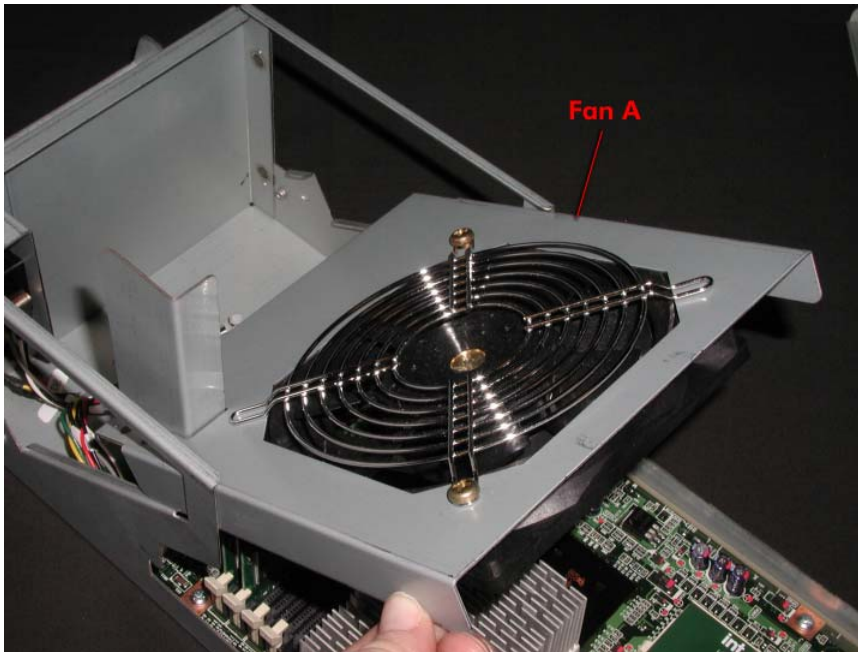
1. Remove the CPU Enclosure (CRU).
2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4C-7)

Figure 4C-7. CPU Enclosure Cover Screws

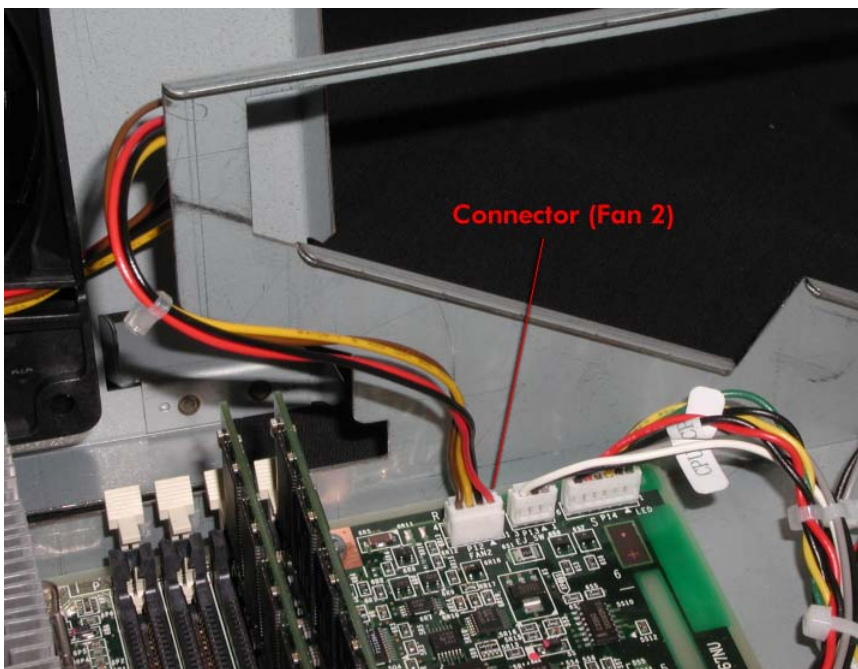


3. Pull the fan out of the enclosure and disconnect the cable at connector FAN2.  
(Figures 4C-8 and 4C-9)

*Figure 4C-8. Fan A*



*Figure 4C-9. Connector at FAN2*



4. Remove the two screws securing the fan to the sheet metal.

### 4C.3.3 CPU Enclosure Rear Fan (Fan B)

1. Remove the CPU Enclosure (CRU).

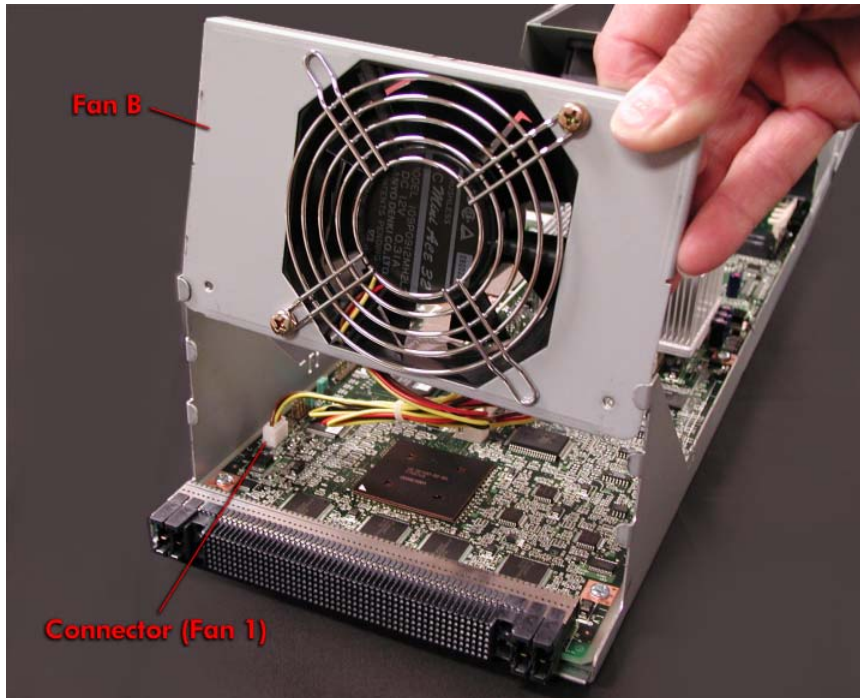
Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4C-10)

Figure 4C-10. CPU Enclosure Cover Screws.



2. Pull the fan straight up and out of the enclosure and disconnect the cable at the connector labeled *FANI*. (Figure 4C-11)

Figure 4C-11. Fan B and Connector at FAN1.



3. Remove the two screws securing the fan to the sheet metal.

**REPLACEMENT NOTE:** When installing the replacement fan, be sure to slide it into the tabs as shown in Figure 4-11.

#### 4C.3.4 Memory Module

1. Remove the CPU Enclosure (CRU).

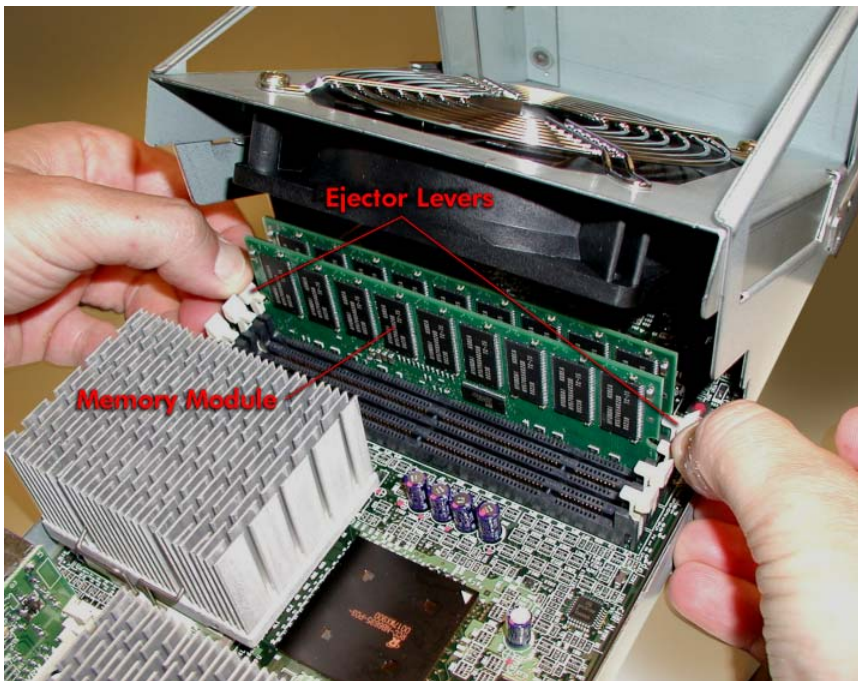
Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4C-12)

Figure 4C-12. CPU Enclosure Cover Screws



2. Release the ejector levers and pull the memory module straight up out of the connector. (Figure 4C-13)

Figure 4C-13. Removing a Memory Module



**REPLACEMENT NOTE:** Make sure the ejector levers are open before inserting the replacement enclosure. After inserting the enclosure, make sure it is fully seated and close the levers completely.



### 4C.3.5 Processor Heat Sink with Thermal Interface

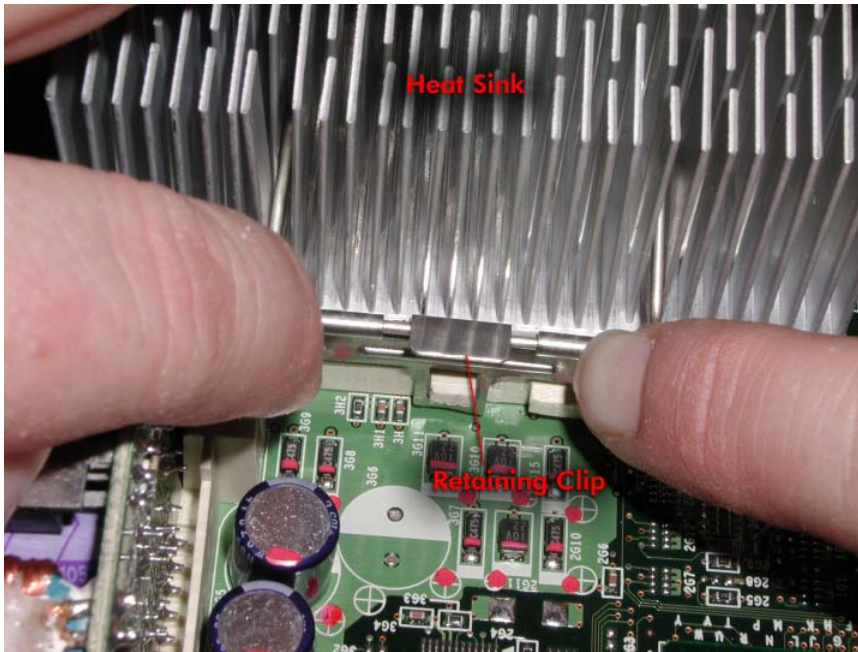
1. Remove the CPU Enclosure (CRU).
2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4C-14)

Figure 4C-14. CPU Enclosure Cover Screws.



3. Grasp the heat sink as shown in Figure 4C-14 and press down and out on the retaining clip until it disengages from the tab as shown in Figure 4C-15.

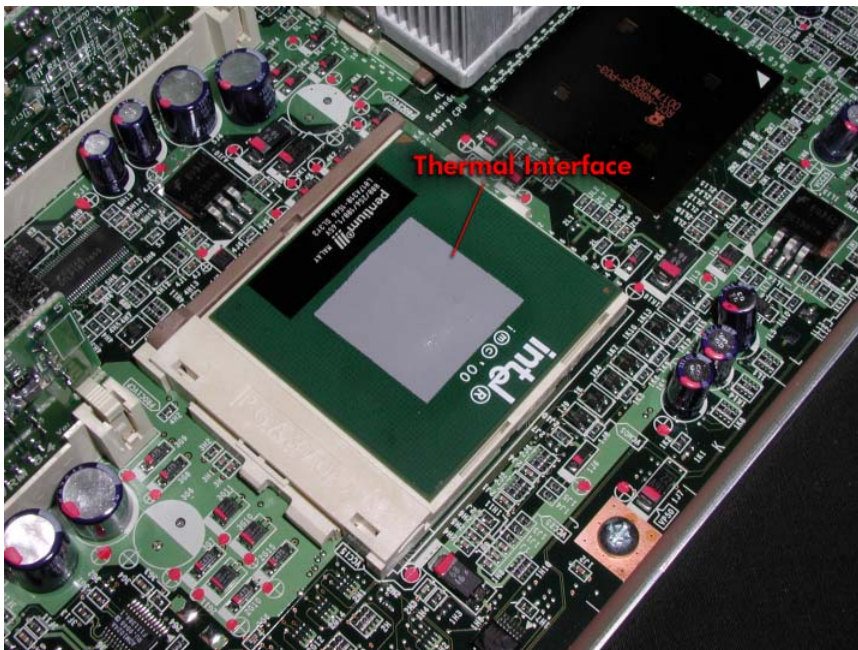
Figure 4C-15. Removing a Heat Sink.



4. Carefully lift it off the processor and wipe off the remains of the thermal interface (gray putty-like residue) from the processor.

**REPLACEMENT NOTE:** Before the replacement heat sink is installed, set the replacement thermal interface on the middle of the processor and gently press it in place. (Figure 4C-16.)

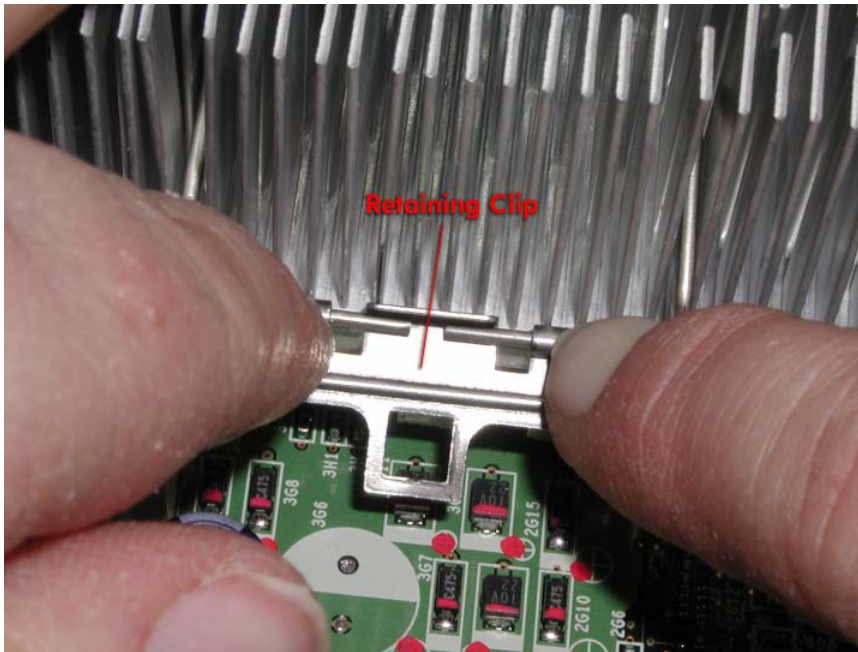
Figure 4C-16. Thermal Interface.



Position the heat sink above the processor. Place the heat sink's front retaining clip under the tab on the processor holder as shown in Figure 4C-16. Then press

down on the rear retaining clip and slip it over the tab.  
(Figure 4C-17)

*Figure 4C-17. Heat Sink Retaining Clip.*



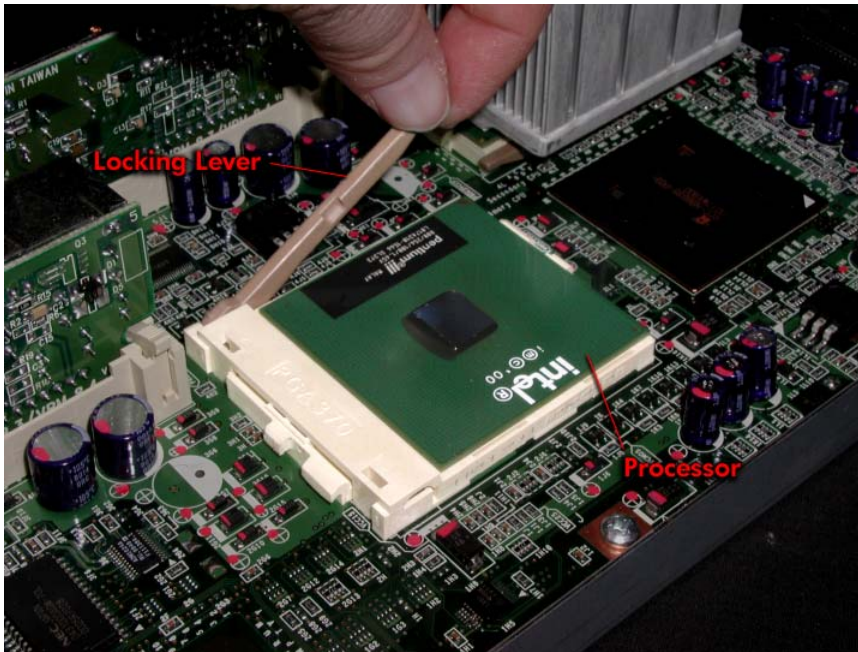
#### **4C.3.6 800MHz Pentium III CPU Processor**

1. Remove the CPU Enclosure (CRU).

Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4C-18)



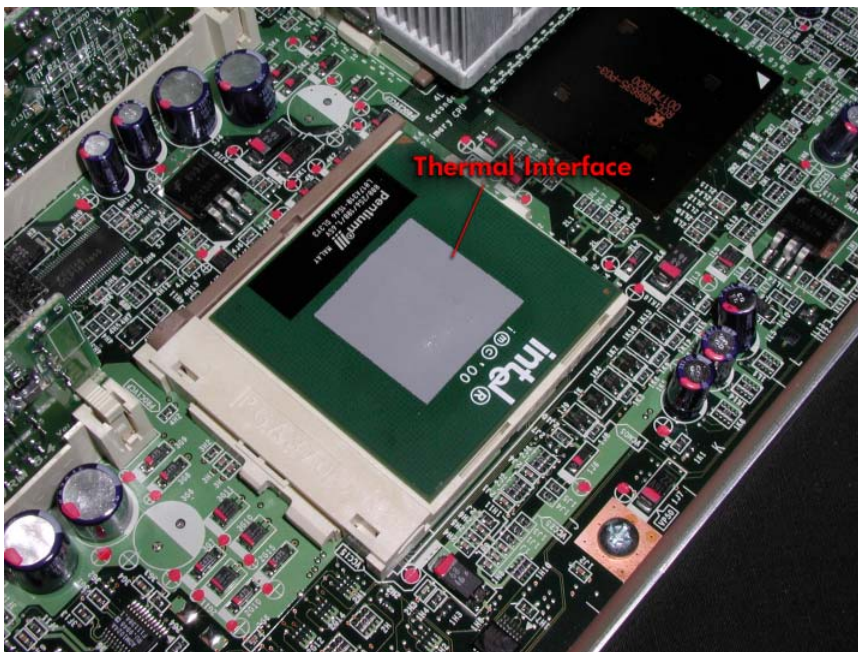
Figure 4C-19. Opening the Processor Lever.



5. Carefully pull the processor straight up out of the connector.

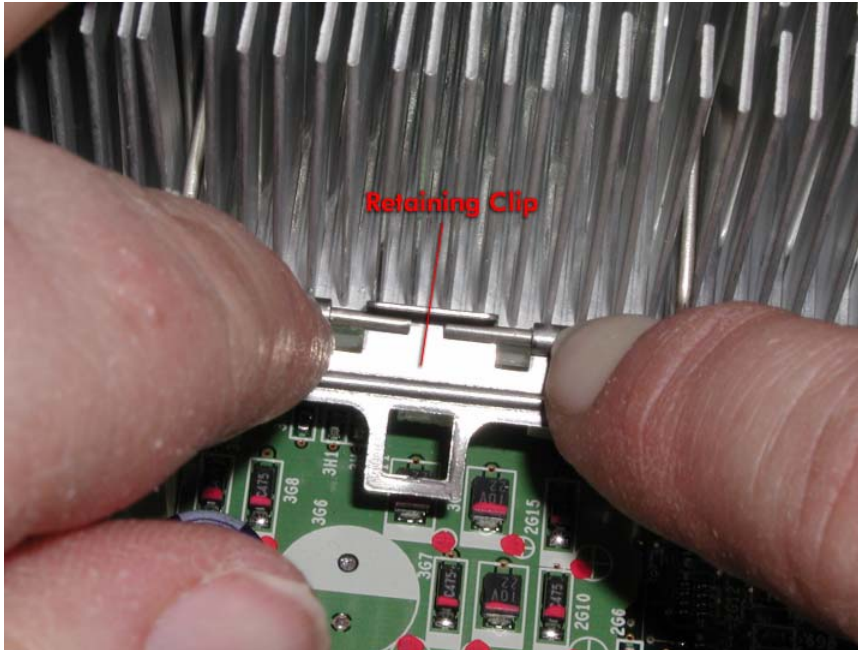
**REPLACEMENT NOTE:** After the replacement processor has been inserted in the connector (and before the heat sink is installed), set the replacement thermal interface on the middle of the processor and gently press it in place. (Figure 4C-20)

Figure 4C-20. Thermal Interface.



Position the heat sink above the processor. Place the heat sink's front retaining clip under the tab on the processor holder as shown in Figure 4C-21. Then press down on the rear retaining clip and slip it over the tab.

Figure 4C-21. Heat Sink Retaining Clip.



### 4C.3.7 CPU Terminator

1. Remove the CPU Enclosure (CRU).

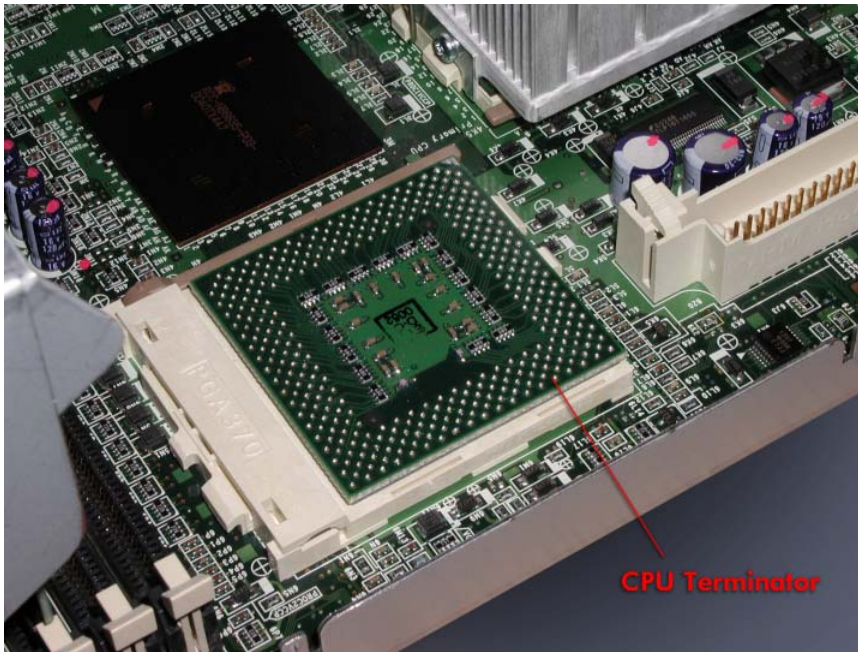
Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4C-22)

Figure 4C-22. CPU Enclosure Cover Screws.



2. Grasp the CPU terminator and carefully pull it straight up out of the socket. (Figure 4C-23)

*Figure 4C-23. Removing the CPU Terminator*



### **4C.3.8 Voltage Regulator**

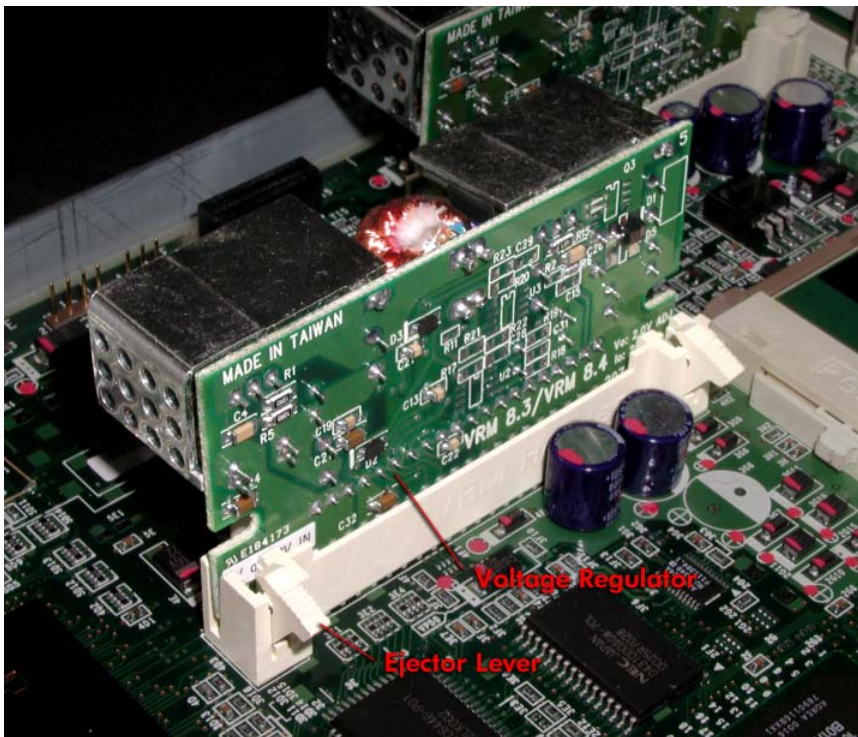
1. Remove the CPU Enclosure (CRU).
2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4C-24)

Figure 4C-24. CPU Enclosure Cover Screws.



3. Push on the ejector levers to unseat the voltage regulator. (Figure 4C-25)

Figure 4C-25. Removing a Voltage Regulator



4. Pull the voltage regulator straight up.

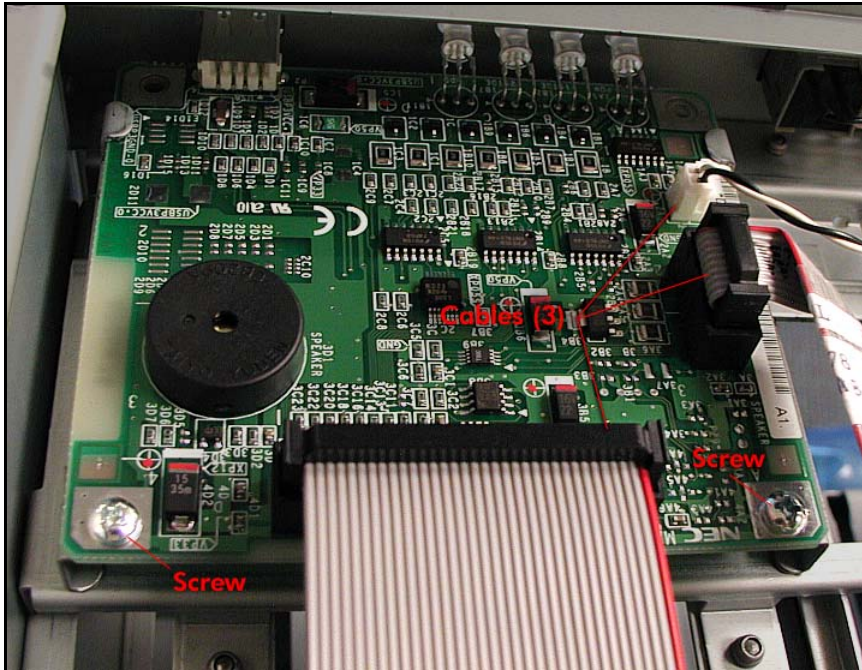


**REPLACEMENT NOTE:** When inserting the replacement voltage regulator, push it in until the levers lock in place.

### 4C.3.9 Front Panel Board

1. Remove the ftServer chassis from the cabinet (See [Section 4C.3.1](#))
2. Disconnect the three cables from the front panel board. (Figure 4C-26)
3. Remove the two screws securing the front panel board.

*Figure 4C-26. Front Panel Board Screws*



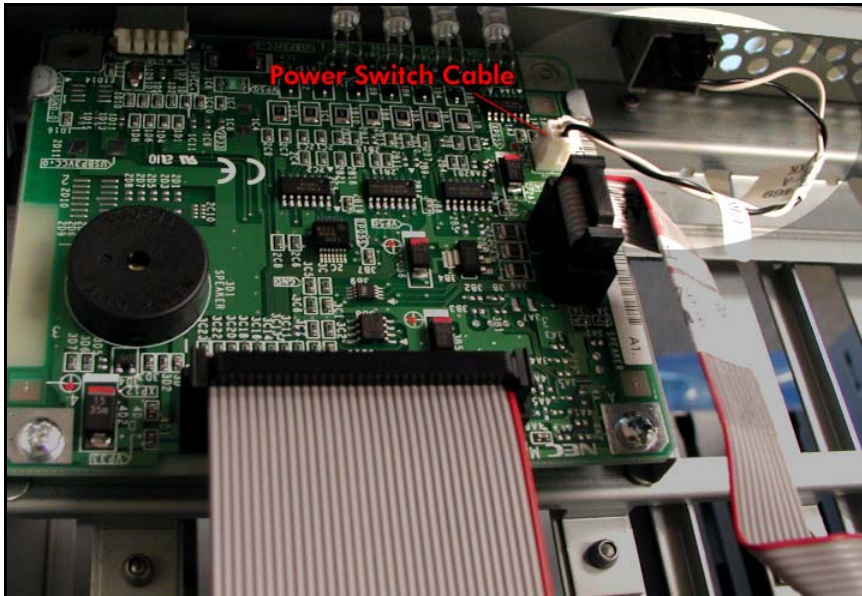
4. Slide the board toward the rear until it is out from under the tabs and lift it out.

**REPLACEMENT NOTE:** When installing the replacement front panel board, make sure the board is inserted correctly between the tabs and the LEDs are aligned with the holes in the chassis.

### 4C.3.10 Power Switch and Cable

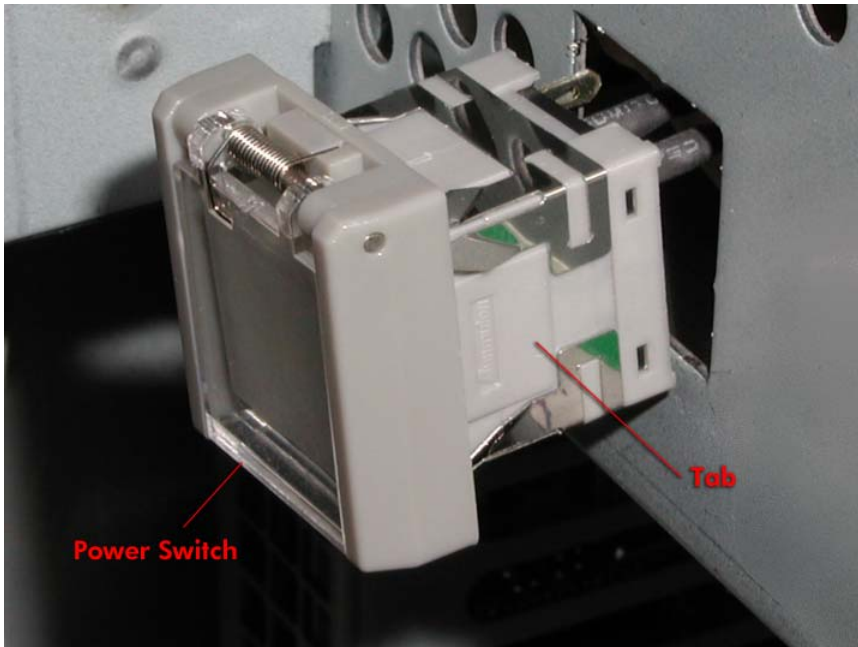
1. Remove the ftServer chassis from the cabinet (See [Section 4C.3.1](#))
2. Disconnect the power switch cable from the front panel board. (Figure 4C-27)

Figure 4C-27. Power Switch Cable



3. From the inside of the cabinet, push in on the retaining tabs on the side of the switch and push the switch forward and out of the cabinet. . (Figure 4C-28)

Figure 4C-28. Removing the Power Switch

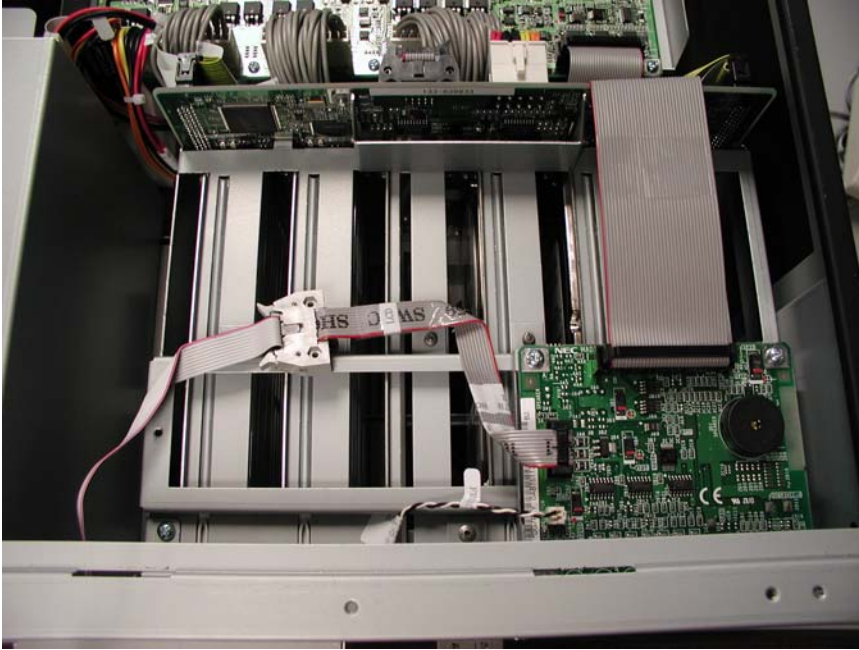


**REPLACEMENT NOTE:** When installing the replacement switch, make sure the switch is oriented so that its plastic door flips upward.

#### 4C.3.11 WD-C1602E LCD W/Cable and Sheet metal

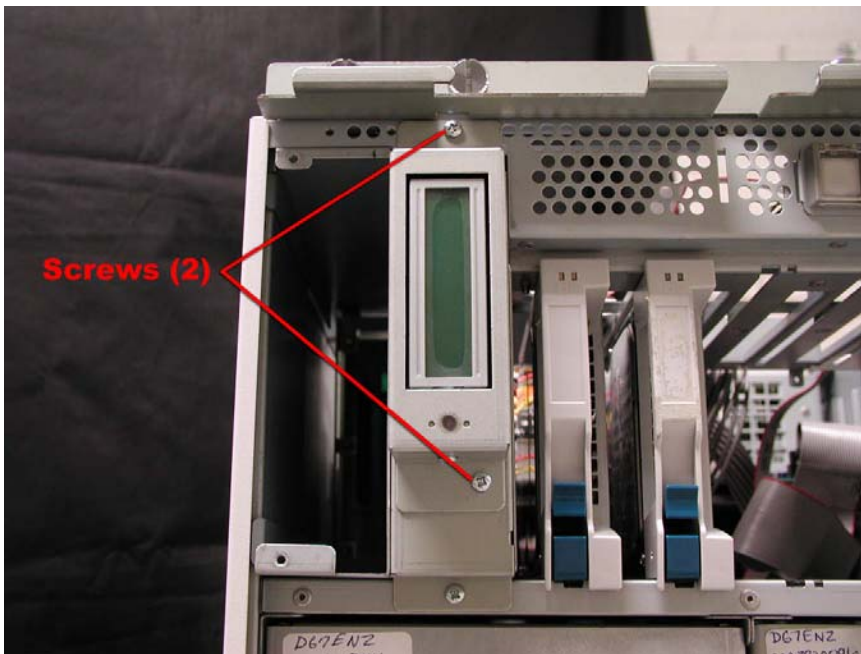
1. Remove the ftServer chassis from the cabinet (See [Section 4C.3.1](#))
2. Disconnect the LCD cable from the LCD relay cable as shown in Figure 4C-29.

*Figure 4C-29. LCD Cable*



3. Remove the screws securing the LCD to the chassis. (Figure 4C-30)

*Figure 4C-30. LCD Screws*



4. Swing the LCD outward and disengage the tab from the chassis. (Figure 4C-31)

*Figure 4C-31. Removing the LCD*



### **4C.3.11 I/O Board**

1. Disconnect all cables from the I/O board. (Figure 4C-32)
2. Remove the two screws securing the I/O board at the rear of the cabinet.

*Figure 4C-32. I/O Board Cables and Screws*



3. Release the locking levers and pull the board straight out. (Figure 4C-33)

Figure 4C-33. Removing the I/O Board

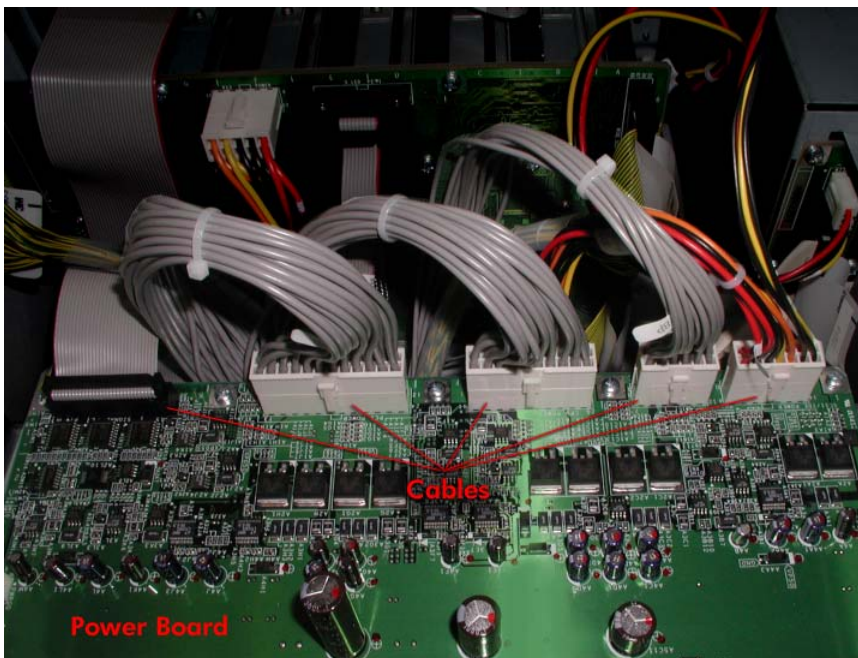


**REPLACEMENT NOTE:** When inserting the replacement I/O board, make sure the board is aligned properly on the tracks.

#### 4C.3.12 Power Board

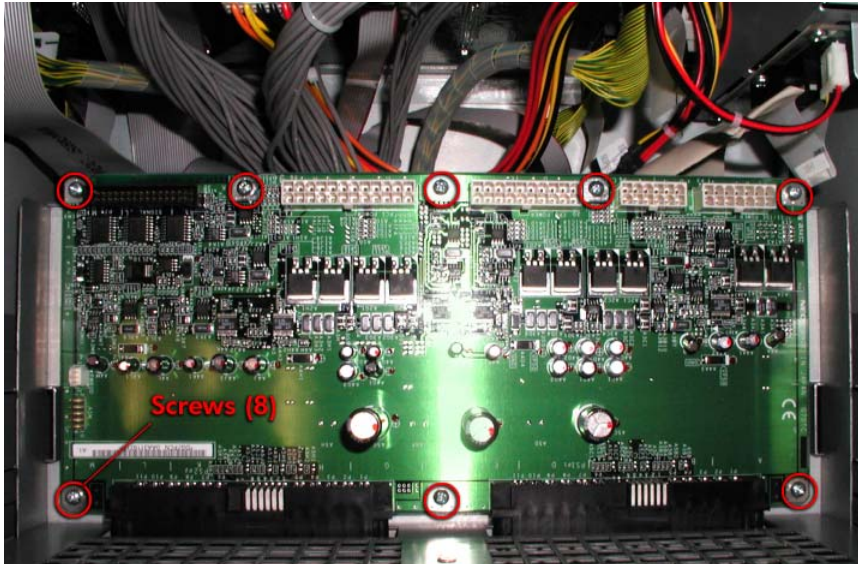
1. Remove the ftServer chassis from the cabinet (See [Section 4C.3.1](#))
2. Disconnect all cables from the power board. (Figure 4C- 34)

Figure 4C-34. Power Board Cables



Remove the eight screws securing the power board. (Figure 4C-36)

*Figure 4C-35. Power Board Screws*



3. Carefully lift the power board up and out of the cabinet.

### **4C.3.13 PCI Fan B**

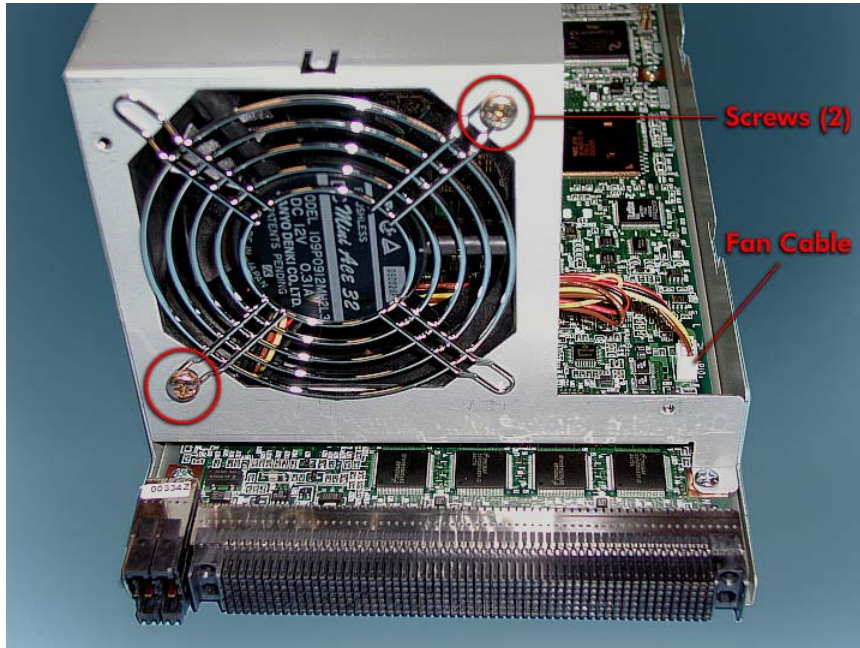
1. Disconnect all cables from the PCI adapters.
2. Remove the I/O enclosure (CRU) and turn it over.
3. Remove the two screws securing the I/O enclosure cover. (Figure 4C-36)

*Figure 4C-36. I/O Enclosure Cover Screws*



4. Disconnect the fan cable from P10 on the PCI board. (Figure 4C-37)
5. Remove the two screws securing the fan to the sheet metal and carefully lift it out. (Figure 4C-37)

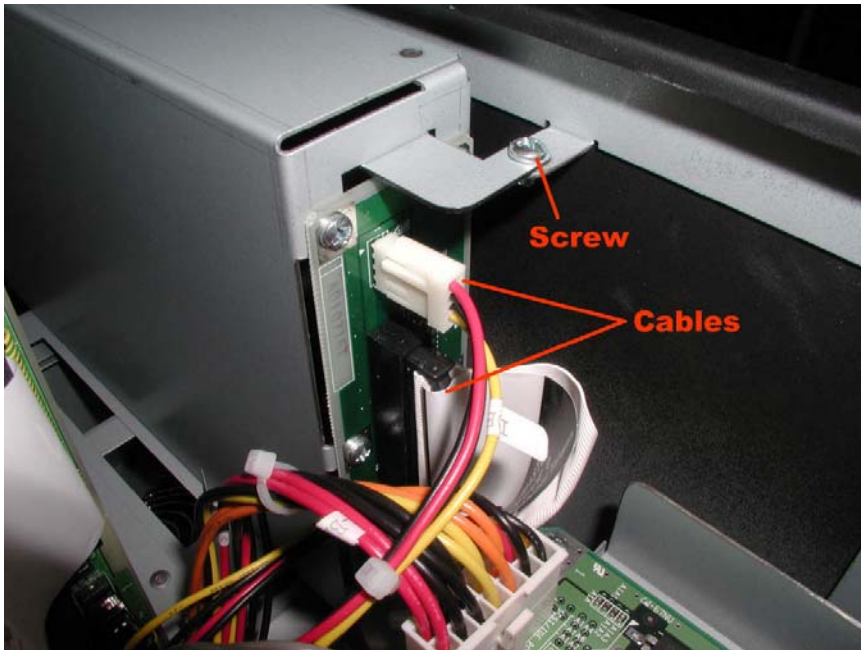
*Figure 4A -37. Removing the I/O Enclosure Fan.*



#### **4.3.14 IDE-S Board**

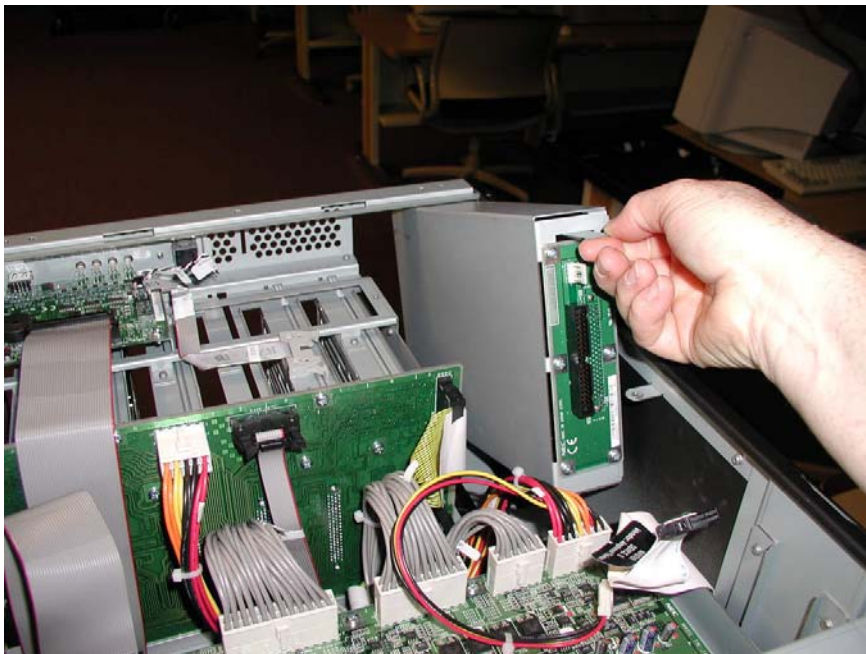
1. Remove the ftServer chassis from the cabinet (See [Section 4C.3.1](#))
2. Remove the device module. (CRU)
3. Remove the LCD display and bracket. (Section 4C.3.11)
4. Disconnect the two cables from the IDE-S board. (Figure 4C-38)
5. Remove the screw securing the sheet metal holding the IDE-S board.

*Figure 4C-38. IDE-S Board Cables.*



6. Carefully tilt and remove the device module holder as shown in Figure 4C-39.

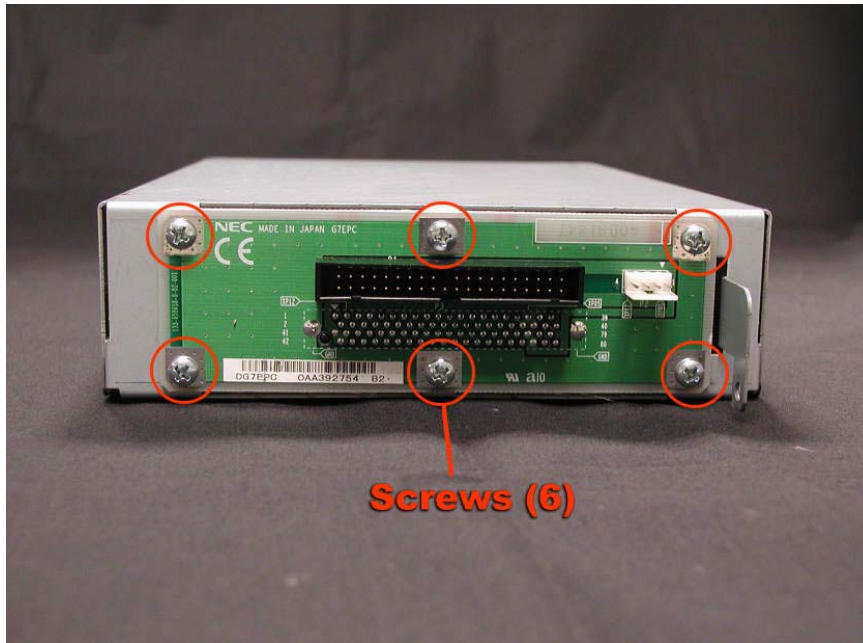
*Figure 4C-39. Removing the Device Module Holder*



7. Remove the six screws securing the IDE-S board to the holder. (Figure 4C-40)



Figure 4C-40. IDE-S Board Screws



**REPLACEMENT NOTE:** When installing the replacement IDE-S board, orient the board so that the 4-pin connector is at the top.

# 4D. DRU Hardware Removal and Replacement Procedures (Rack-Mount System)

This section lists the Distributor Replaceable Units (DRUs) in the ftServer 3200 rack-mount system and describes the removal and replacement procedures for each one. DRUs that are duplexed may be removed and replaced without total removal of power, and thus, without loss of continuous processing. However, if a DRU is simplexed, the system must be shut down and both main power switches turned off prior to removal and replacement of the DRU.

## 4D.1 List of DRUs

The following table lists the DRUs in the ftServer 3200 system.

<b>Component</b>	<b>Part Number</b>
CPU Board (G7FMU)	243-630153-C
CPU LED Cable	808-744496-021A
PCI Open Sensor Cable	808-744495-028A
PCI Board (G7FMV)	243-630154-AD
PCI LED Board (G7DTG)	133-639369-B
PCI LED Relay Cable	808-744497-028A
Super Floppy Drive	804-091490-5010
CD-ROM Drive	808-879312-101A
CD-ROM Adapter (G7EPE)	133-639660-B
IDE-M Board (G7EPD)	133-639659-B
Plugin DC Cable	808-744499-001A
Ultra ATA66 IDE2 Cable (014)	808-744608-014D
Tape Drive Bay Fan	802-860107-221A
JWT75-522/RC Power Supply	808-892443-0010
Dev-bay DC Cable (400)	808-744622-400A
AC Inlet Cable (140)	808-744623-140A
SCSI-Wide 3conn Cable (001)	808-744621-001A

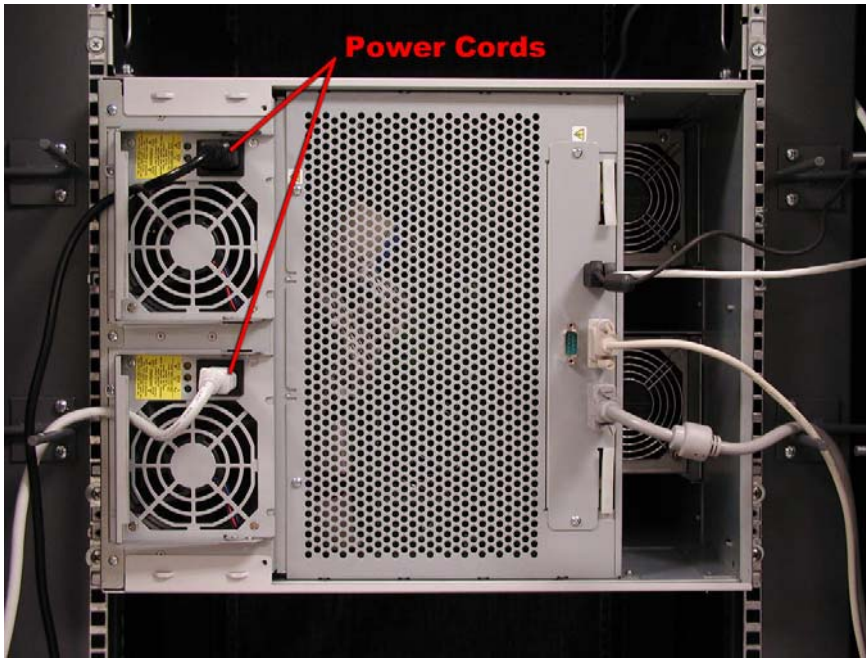
<b>SCSI-Wide 3conn Cable (002)</b>	<b>808-744621-002A</b>
<b>SCSI-Wide EX Long Cable (150)</b>	<b>808-744640-150A</b>
<b>SCSI-Wide EX Short Cable (030)</b>	<b>808-744624-030A</b>
<b>PWRGD Sensor Cable</b>	<b>808-744625-500B</b>
<b>SCSI Converter</b>	<b>802-710586-001A</b>
<b>Wide-SCSI Terminator</b>	<b>802-710524-568A</b>
<b>SCSI Backplane</b>	<b>243-630262-A</b>
<b>Main Board (G7QK)</b>	<b>243-630239-A</b>
<b>Main DC Cable</b>	<b>804-062920-070A</b>
<b>24-pin DC Cable (080)</b>	<b>808-744573-080A</b>
<b>20-pin DC Cable (070)</b>	<b>808-744572-070A</b>
<b>Box-10P Cable (075)</b>	<b>808-744570-075A</b>
<b>Box-34P Cable (070)</b>	<b>808-744465-070A</b>
<b>Box-30P Cable (080)</b>	<b>808-744466-080A</b>
<b>12-pin DC Cable (080)</b>	<b>808-744467-080B</b>
<b>Internal LVD SCSI Cable (001)</b>	<b>808-744571-001A</b>
<b>Internal LVD SCSI Cable (002)</b>	<b>808-744571-002A</b>
<b>Internal LVD SCSI Cable (003)</b>	<b>808-744571-003A</b>
<b>Internal LVD SCSI Cable (004)</b>	<b>808-744571-004A</b>
<b>Ultra ATA66 IDE Cable (050)</b>	<b>808-744609-050B</b>
<b>Device DC Cable (001)</b>	<b>808-744616-001A</b>

## 4D.2 Power Removal

If total power removal is required, the system must be shut down prior to removing power and rebooted after the replacement unit is installed. Refer to [Section 2.3](#) for the shutdown procedure.

Total power is removed from one side of the system by removing the power cord from the power supply at the rear of the cabinet.

Figure 4D-1. Power Supply Cords



**CAUTION:** If the system needs to be simplex (power removed from one side of the cabinet), verify that there are no red LEDs or system messages indicating a failed duplexed component on the side of the system that will remain powered on. If both components in a duplexed pair are removed, a system crash will occur.

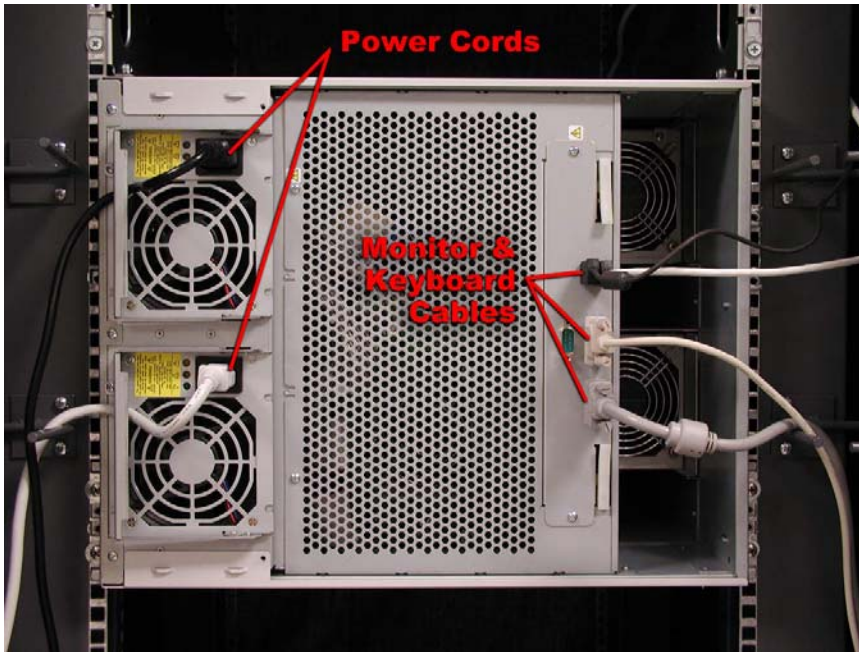
## 4D.3 Hardware Removal Procedures

### 4D.3.1 ftServer Chassis

Removal of the ftServer 3200 chassis from the rack-mount cabinet is necessary for most of the DRU removal/replacement procedures. The following procedure describes its removal from the cabinet.

1. At the rear of the cabinet, open the door and disconnect all the cables to the chassis. (Figure 4D-2)

*Figure 4D-2. Power Cords and Cables.*



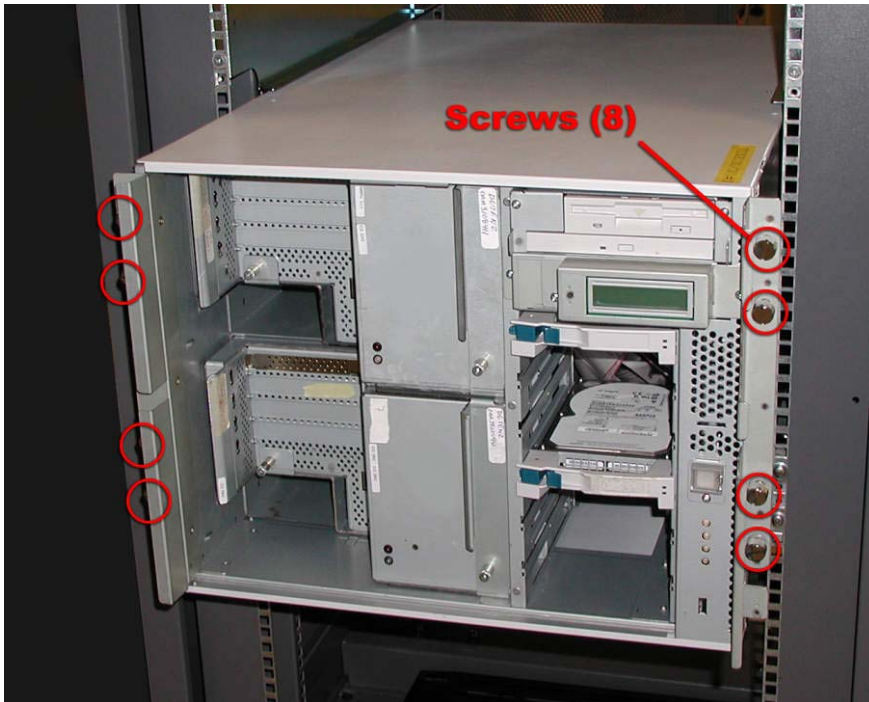
2. Remove the bezels from the front of the ftServer 3200 chassis. (Figure 4D-3)

*Figure 4D-3. Front Bezels.*



3. Remove all communications cables from the PCI adapters.
4. Remove the eight screws securing the chassis at the front of the cabinet. (Figure 4D-4)

Figure 4D-4. Chassis Front Screws



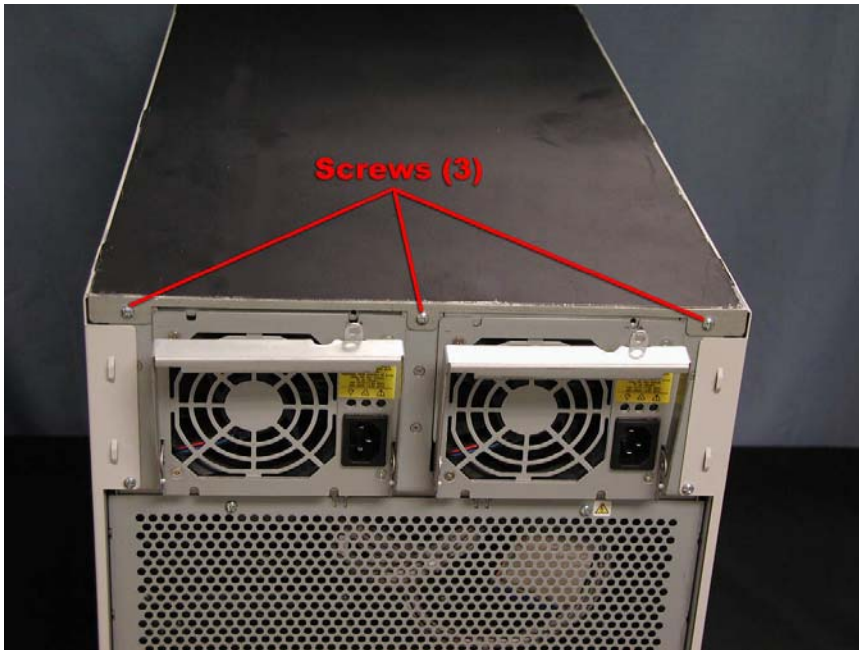
5. Carefully slide the chassis out the front of the cabinet and lay it on its left side on a solid surface. (Figure 4D-5)

Figure 4D-5. Chassis Removed From Cabinet and Rotated.



6. Remove the three screws securing the side panel (now on top as viewed in present orientation). Slide the panel to the rear and lift it off to gain access to the internal components. (Figure 4D-6)

Figure 4D-6. Side Panel Screws.



### 4D.3.2 CPU Board

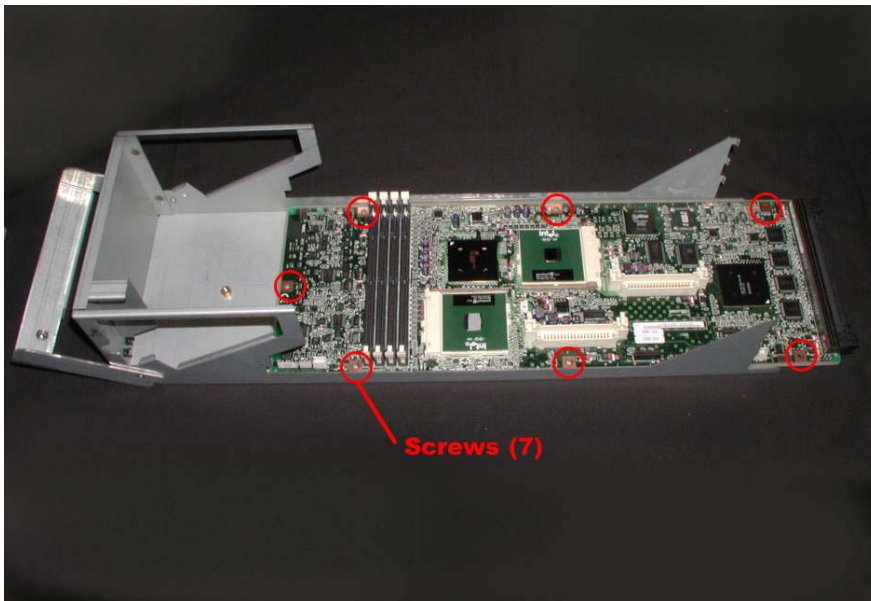
1. Remove the CPU enclosure. (CRU)
2. Remove the two screws securing the CPU enclosure cover and carefully lift it off. (Figure 4D-7)

Figure 4D-7. CPU Enclosure Cover Screws



3. Remove the fans (Fan A and Fan B). (FRUs)
4. Remove the LED cables. (Section 4D.3.3)
5. Remove the processors, memory modules, and voltage regulators. (FRUs)
6. Remove the seven screws securing the CPU board and carefully lift it out of the enclosure. (Figure 4D-8)

*Figure 4D-8. CPU Board Screws*



### **4D.3.3 CPU LED Cable**

1. Remove the CPU enclosure. (CRU)
2. Remove the two screws securing the CPU enclosure cover.
3. Slide the cover toward the rear to release the tabs and carefully lift it off. (Figure 4D-9)

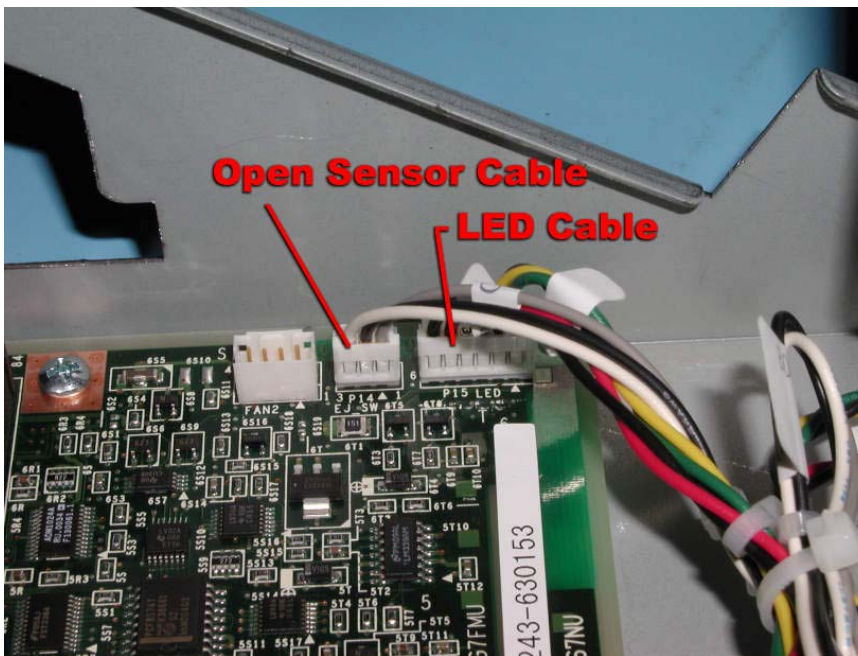


Figure 4D-9. CPU Enclosure Cover Screws.



4. Remove Fan A (front fan). (FRU)
5. Disconnect the LED and open sensor cables at P14 and P15. (Figure 4D-10)

Figure 4D-10. LED and Open Sensor Cables



### 4D.3.4 PCI Board (G7EPB)

1. Remove the I/O enclosure (CRU) and turn it over.

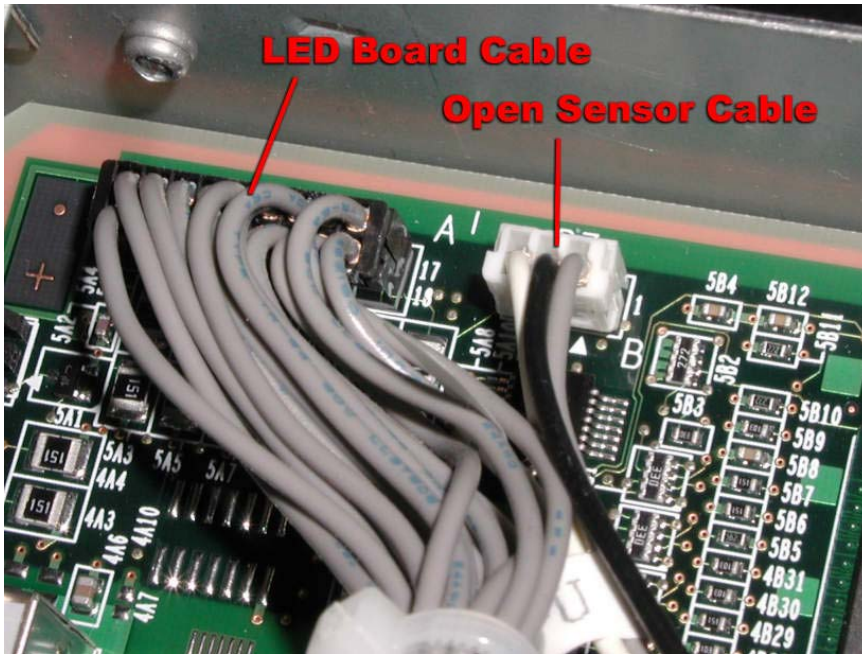
2. Remove the two screws securing the I/O enclosure cover. (Figure 4D-11)

*Figure 4D-11. I/O Enclosure Cover Screws*



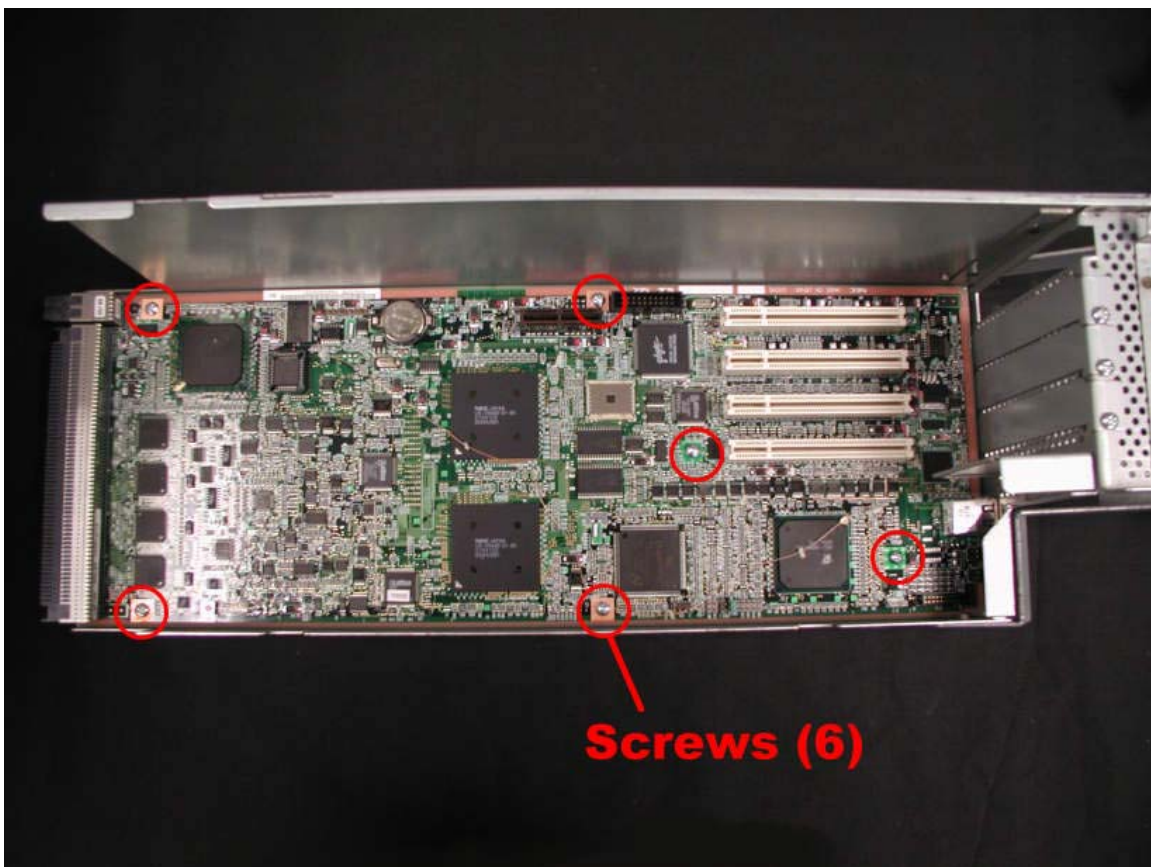
3. Slide the cover toward the rear to release the tabs and carefully lift it off.
4. Remove all PCI adapters.
5. Remove Fan B (FRU)
6. Disconnect the open sensor cable and LED board cable from the PCI board. (Figure 4D-12)

Figure 4D-12.LED Board and Open Sensor Cables



7. Remove the six remaining screws. (Figure 4D-13)

Figure 4D-13.I/O Board Screws



8. Slide the PCI board to the rear and lift it out.

#### **4D.3.5 PCI LED Board (G7DTG)**

9. Remove the I/O enclosure (CRU) and turn it over.

10. Remove the two screws securing the I/O enclosure cover. (Figure 4D-14)

*Figure 4D -14. I/O Enclosure Cover Screws*

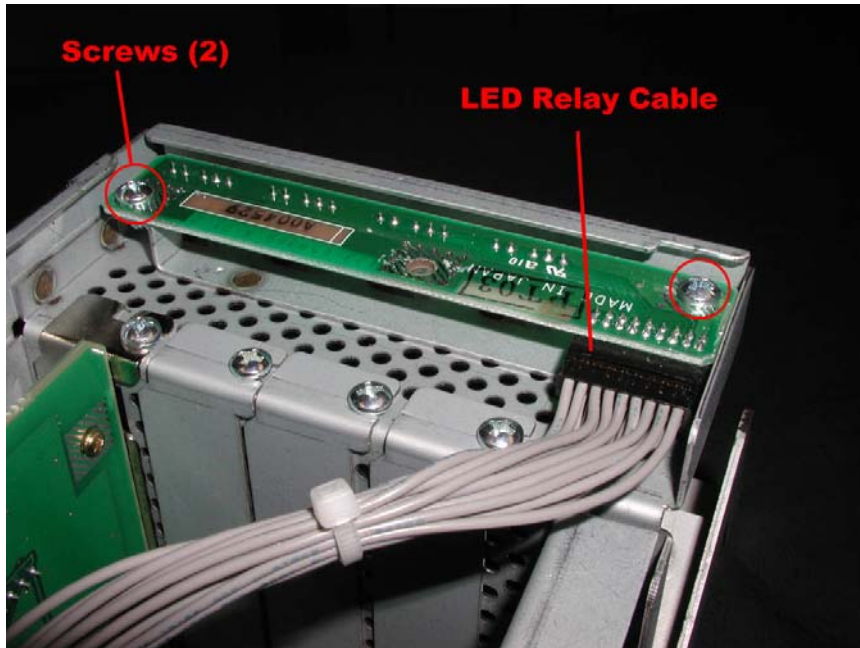


11. Slide the cover toward the rear to release the tabs and carefully lift it off.

12. Disconnect the LED relay cable from the LED board. (Figure 4D-15)

13. Remove the two screws securing the LED board to the chassis and lift out the board.

Figure 4D-15. LED Relay Cable and Screws



**REPLACEMENT NOTE:** When inserting the replacement board, make sure the board fits under the lip on the chassis and the LEDs are in the openings.

#### 4D.3.6 PCI LED Relay Cable

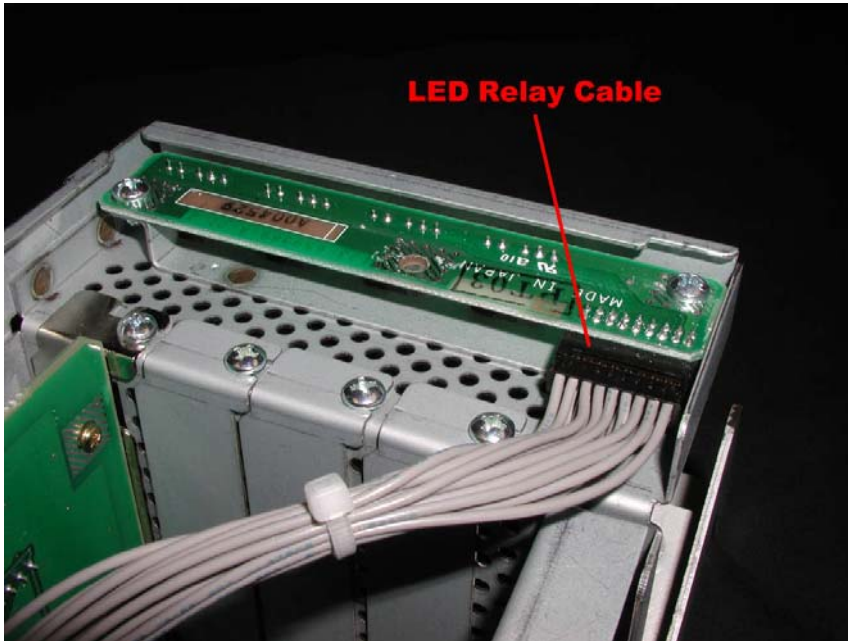
1. Remove the I/O enclosure (CRU) and turn it over.
2. Remove the two screws securing the I/O enclosure cover. (Figure 4D-16)

Figure 4D -16. I/O Enclosure Cover Screws



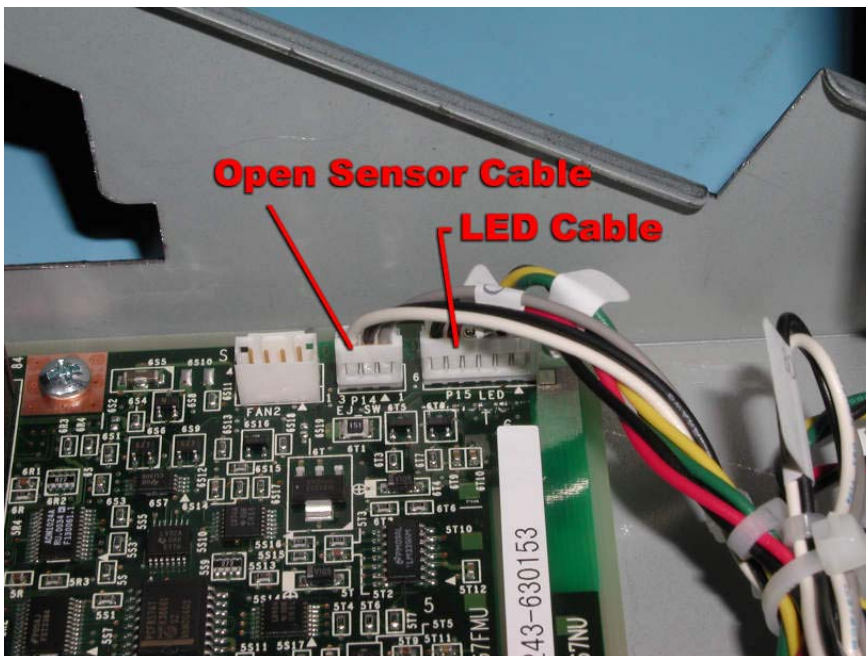
3. Slide the cover toward the rear to release the tabs and carefully lift it off.
4. Disconnect the LED relay cable from the LED board. (Figure 4D-17)

*Figure 4D-17. LED Relay Cable Connection at LED Board*



5. Disconnect the LED relay cable from the PCI board. (Figure 4D-18)

*Figure 4D-18. . LED Relay and Open Sensor Cable Connections at PCI Board*



### 4D.3.7 PCI Open Sensor and Cable

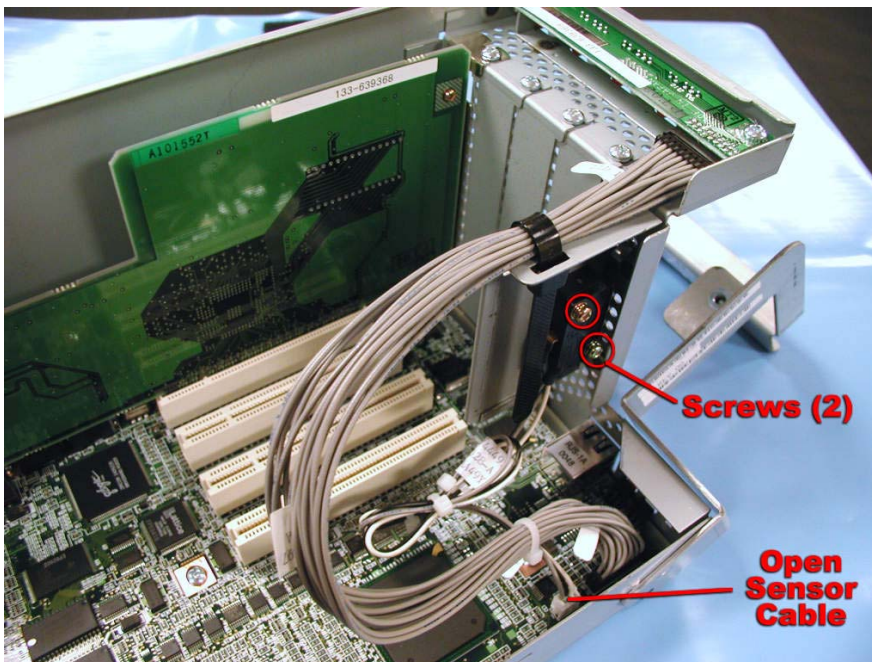
1. Remove the I/O enclosure (CRU) and turn it over.
2. Remove the two screws securing the I/O enclosure cover. (Figure 4D-19)

*Figure 4D -19. I/O Enclosure Cover Screws*



3. Slide the cover toward the rear to release the tabs and carefully lift it off.
4. Disconnect the cable from the P7 on the PCI board. (Figure 4D-20)
5. Remove the two screws securing the sensor to the chassis.

*Figure 4D -20. Open Sensor Cable and Screws*



### 4D.3.8 Main Board Cables

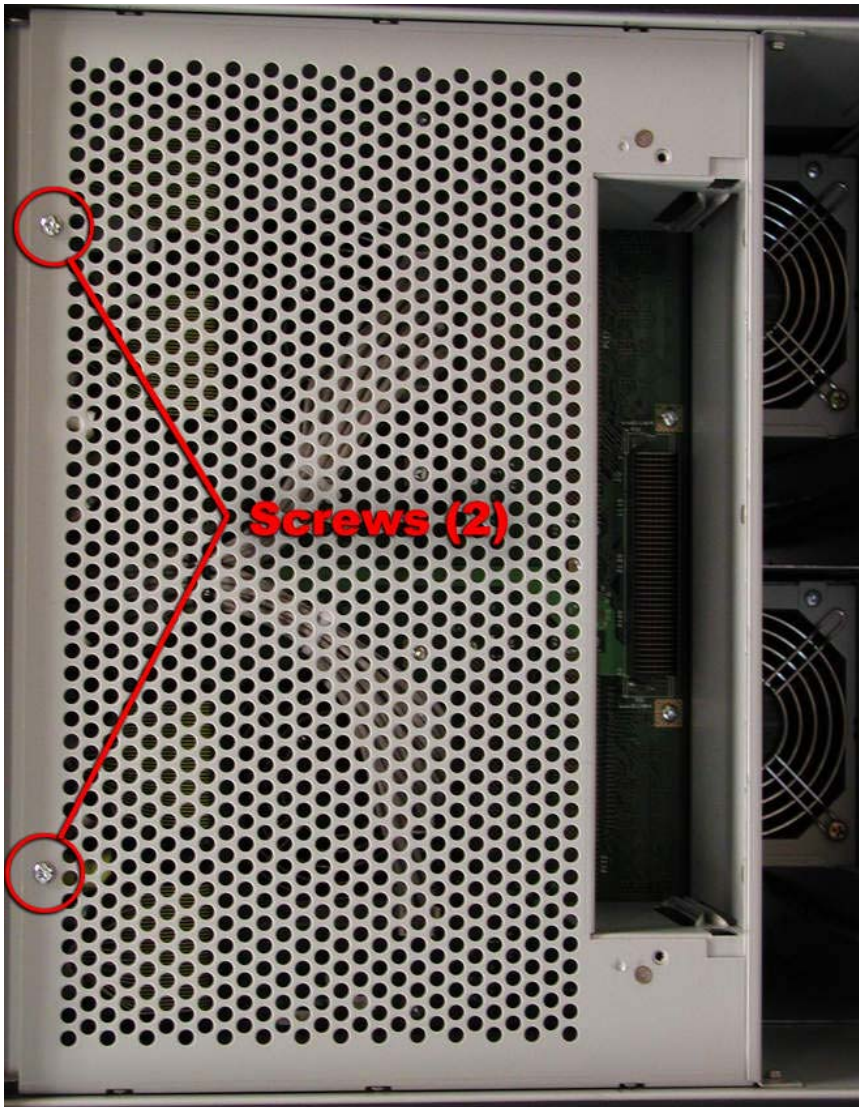
Several cables connect to the main board. The following table shows all the cables connected to the main board and indicates where each one goes from there. It also indicates the procedure associated with disconnecting the other end of the cable. This section describes the procedure for disconnecting the cables from the main board. Refer to the associated procedure to complete the removal of each cable.

<b>Cable Number</b>	<b>Cable Name</b>	<b>Other End of Cable Connects to</b>
804-062920-070A	Main DC Cable	Power Board
808-744570-075A	Box-10P Cable (075)	SCSI Backplane
808-744465-070A	Box-34P Cable (070)	Front Panel Board
808-744466-080A	Box-30P Cable (080)	Power Board
808-744467-080B	12-pin DC Cable (080)	Power Board
808-744571-001A	Internal LVD SCSI Cable (001)	SCSI Backplane
808-744571-002A	Internal LVD SCSI Cable (002)	SCSI Backplane
808-744571-003A	Internal LVD SCSI Cable (003)	SCSI Backplane
808-744571-004A	Internal LVD SCSI Cable (004)	SCSI Backplane
808-744609-050B	Ultra ATA66 IDE Cable	IDE M Board

1. At the rear of the cabinet, remove the I/O board. (FRU)
2. Remove the two screws securing the EMI shield and lift it off. (Figure 4D-21)

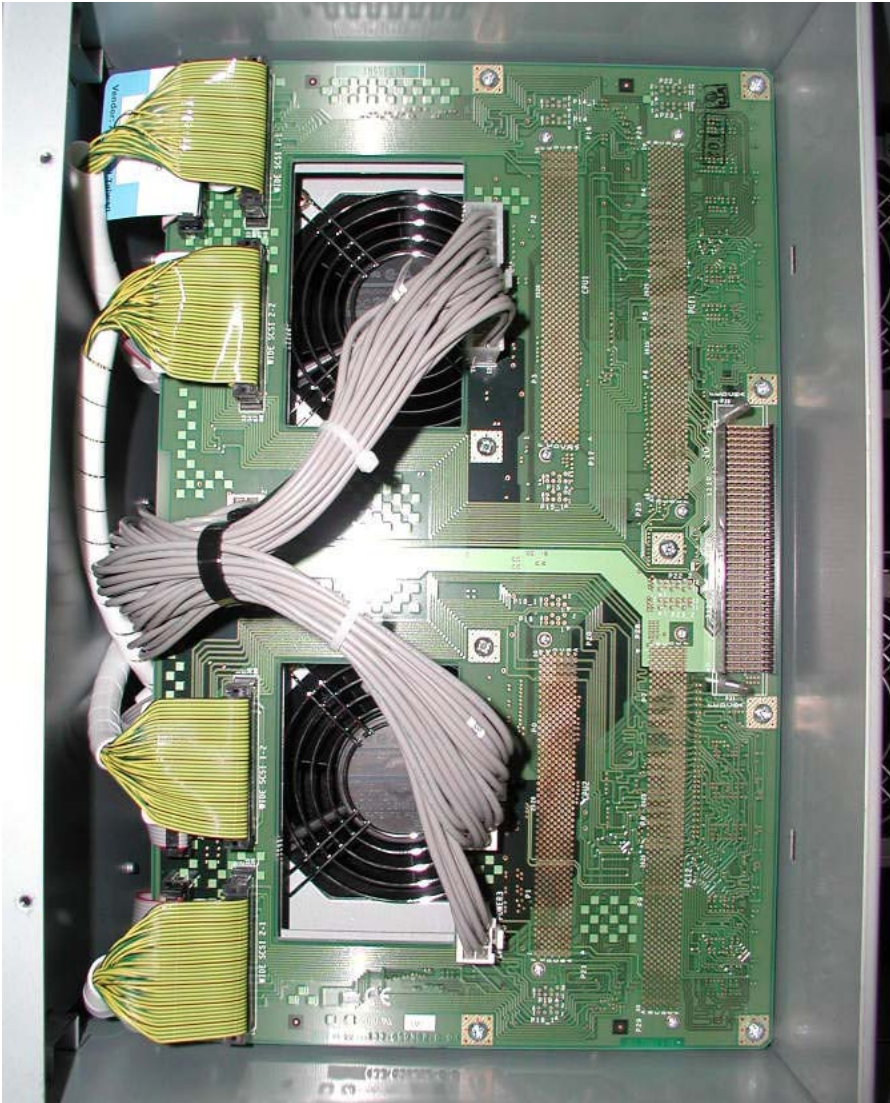


Figure 4D-21. EMI Shield Screws



3. Disconnect the failed cable from the main board. (Figure 4D-22)

Figure 4D-22. Main Board Cables

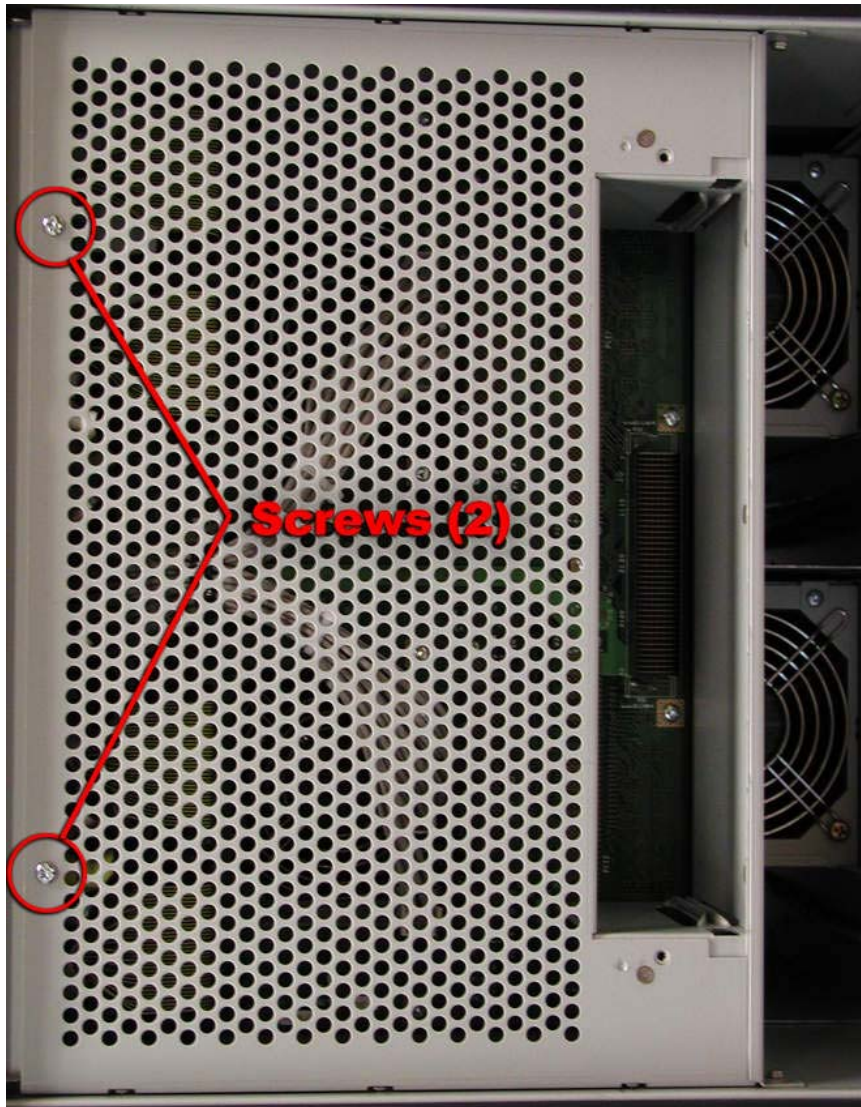


**REPLACEMENT NOTE:** When reconnecting the cables to the main board, make sure they are connected to the proper connectors. Each LVD SCSI cable and its connector are labeled the same (2-1, 1-2, 2-2, and 1-1).

### 4D.3.9 Main Board

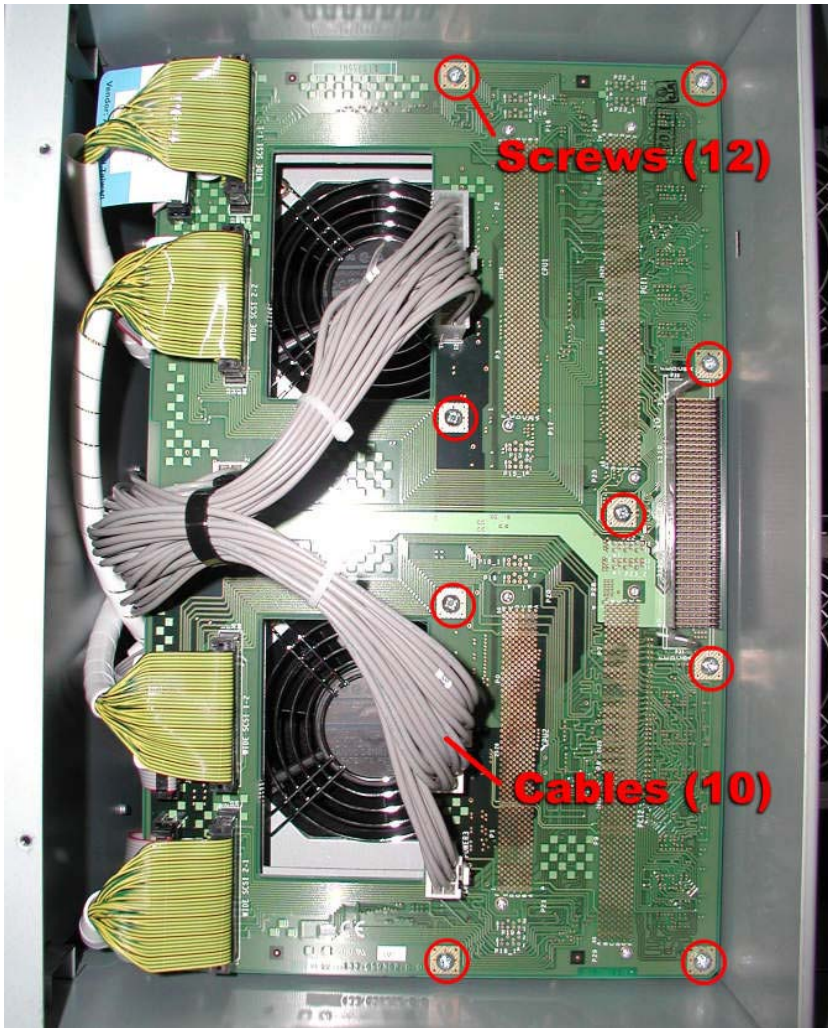
1. At the front of the cabinet, pull the CPU enclosures out a few inches to disengage them from the main board.
2. At the rear of the cabinet, remove the I/O board. (FRU)
3. Remove the two screws securing the EMI shield and lift it off. (Figure 4D-23)

Figure 4D-23. EMI Shield Screws



4. Disconnect the 10 cables from the main board. (Figure 4D-24)
5. Remove the 12 screws securing the main board.

Figure 4D-24. Main Board Screws

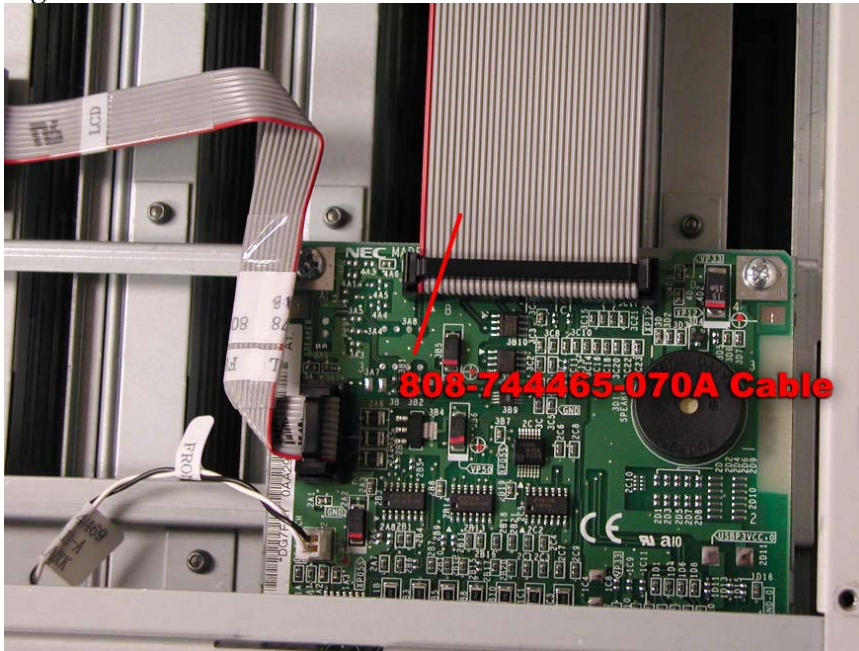


6. Grasp the main board and pull it straight out from the connectors.

#### 4D.3.10 SCSI Backplane

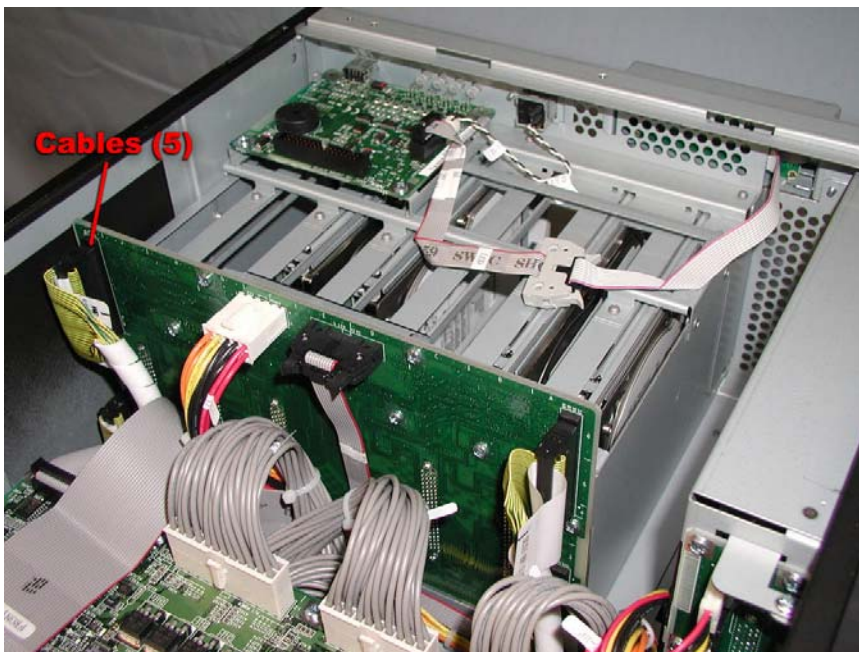
1. Remove the ftServer chassis from the cabinet (See [Section 4D.3.1](#))
2. Pull the disk drives out slightly to disconnect them from the SCSI backplane.
3. Disconnect the 808-744465-070A cable from the front panel board. (Figure 4D-25)

Figure 4D-25. 808-744465-070A Cable



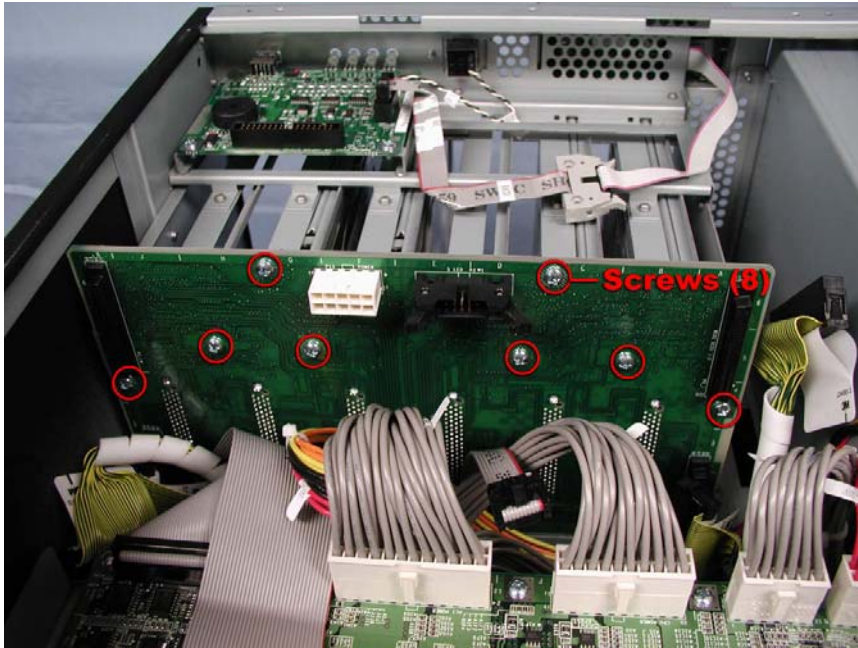
4. Disconnect the five cables from the SCSI backplane. (Figure 4D-26)

Figure 4D-26. SCSI Backplane Cables



5. Remove the eight screws securing the SCSI backplane and carefully lift it out of the cabinet. (Figure 4D-27)

Figure 4D-27. SCSI Backplane Screws



**REPLACEMENT NOTE:** When installing the replacement SCSI backplane, make sure it is inserted in the channel in the bottom of the chassis.

### 4D.3.11 Super Disk

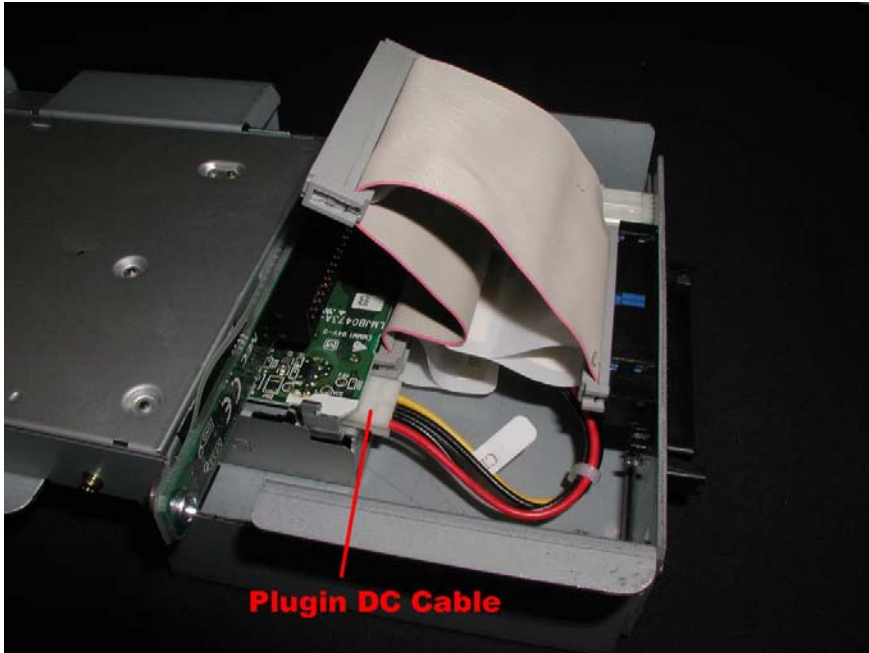
1. Remove the device module (CRU).
2. Disconnect the Ultra ATA66 IDE2 cable from the super disk. (Figure 4D-28)

Figure 4D-28. Ultra ATA66 IDE2 Cable



3. Disconnect the Plugin DC cable from the super disk. (Figure 4D-29)

*Figure 4D-29. Plugin DC Cable*



4. Remove the four screws securing the super disk to the device module. (Figure 4D-30)

*Figure 4D-30. Super Disk Screws*



5. Pull the super disk out the front of the device module.

### 4D.3.12 CD-ROM Drive

1. Remove the device module (CRU).
2. Disconnect the Plugin DC cable and the Ultra ATA66 IDE2 cable from the CD-ROM adapter. (Figure 4D-31)

*Figure 4D-31. Plugin DC and Ultra ATA66 IDE2 Cables*



3. Remove the four screws securing the CD-ROM drive to the device module. (Figure 4D-32)



Figure 4D-32. CD-ROM Drive Screws

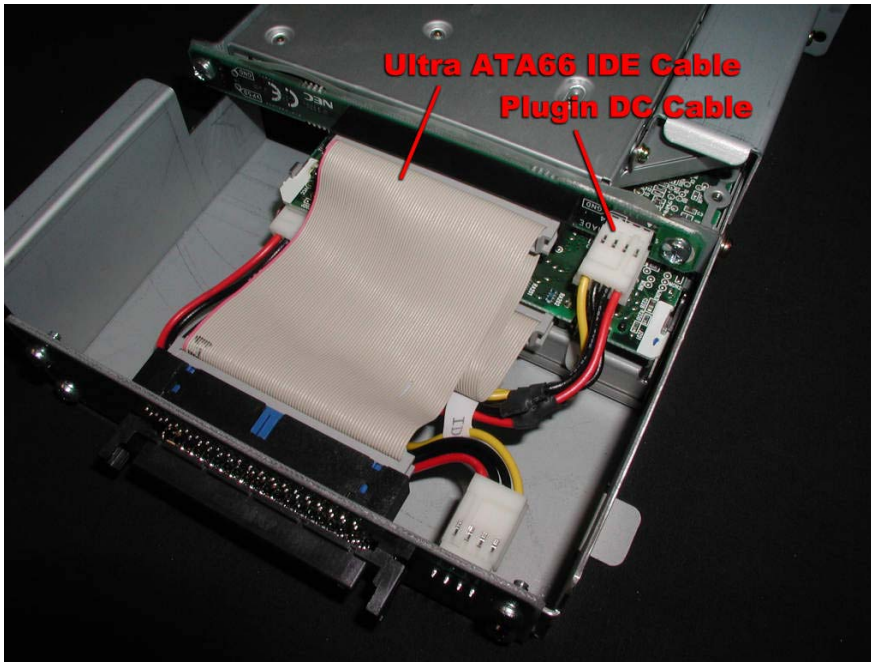


4. Pull the CD-ROM drive out of the CD-ROM adapter and through the front of the device module

#### **4D.3.13 CD-ROM Adapter**

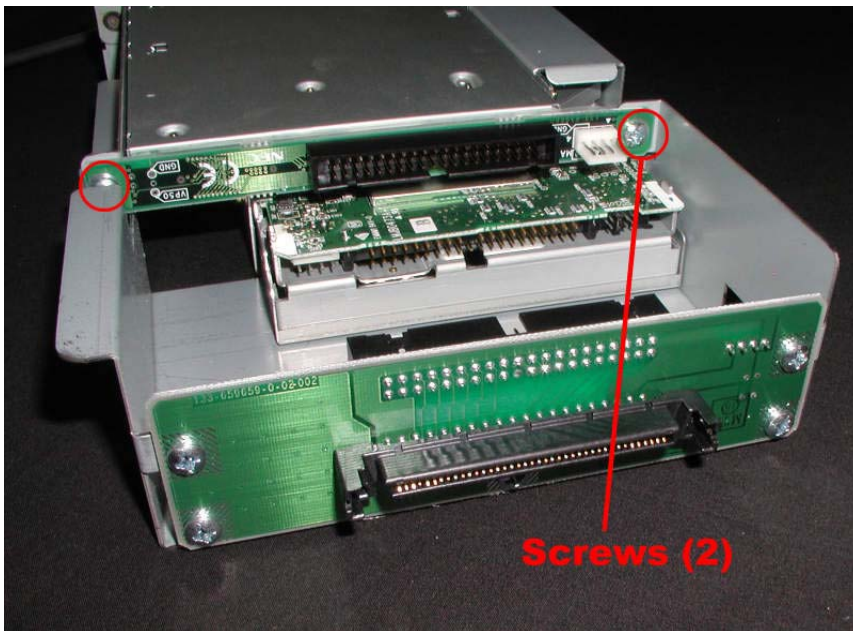
1. Remove the device module (CRU).
2. Disconnect the Plugin DC cable and the Ultra ATA66 IDE2 cable from the CD-ROM adapter. (Figure 4D-33)

Figure 4D-33. Plugin DC and Ultra ATA66 IDE2 Cables



3. Remove the two screws securing the CD-ROM adapter and lift it out. (Figure 4D-34)

Figure 4D-34. CD-ROM Adapter Screws



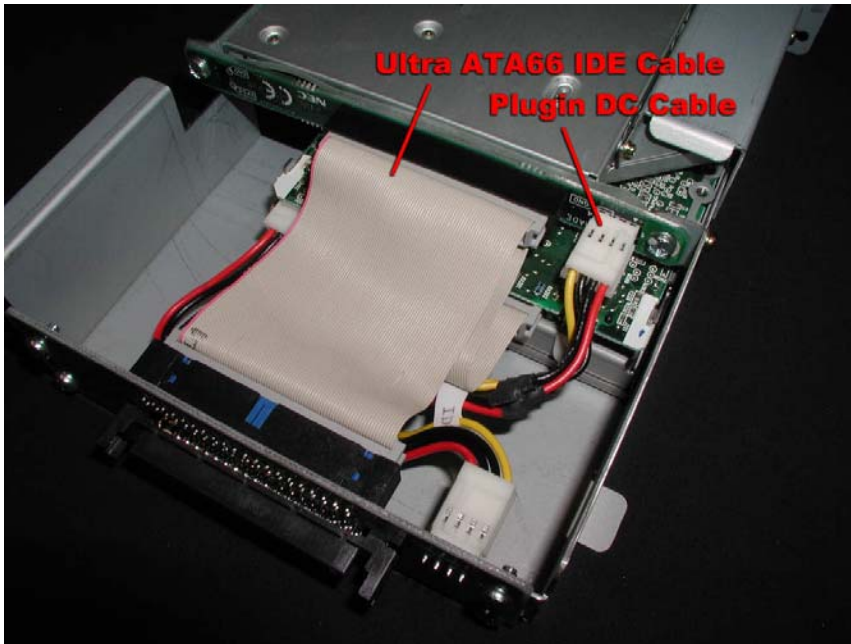
**REPLACEMENT NOTE:** When installing the replacement CD-ROM adapter, make sure the plastic insulator is in place.

#### 4D.3.14 IDE-M Board

1. Remove the device module (CRU).

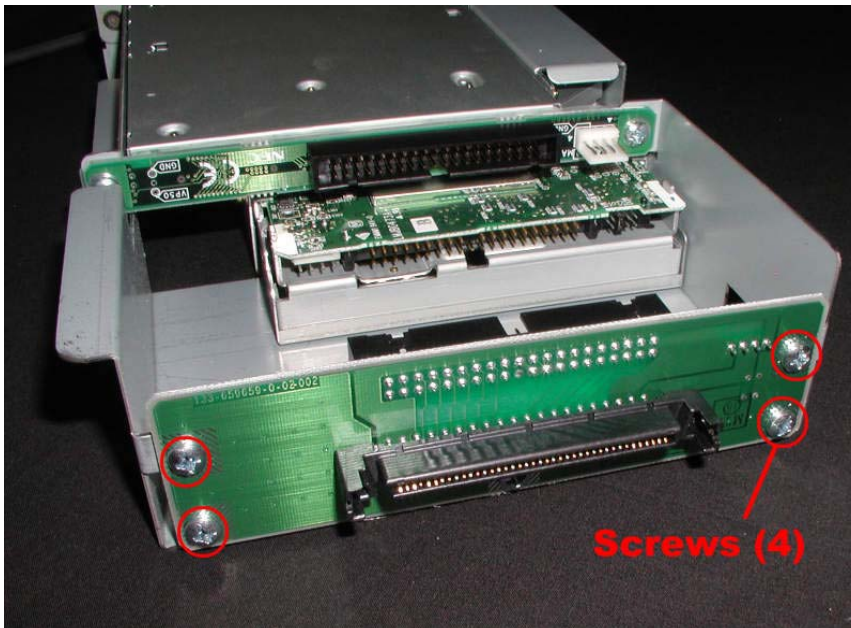
2. Disconnect the Plugin DC cable and the Ultra ATA66 IDE2 cable from the IDE-M board. (Figure 4D-35)

*Figure 4-35. Plugin DC and Ultra ATA66 IDE2 Cables*



3. Remove the four screws securing the IDE-M board and lift it out. (Figure 4D-36)

*Figure 4D-36. IDE-M Board Screws*

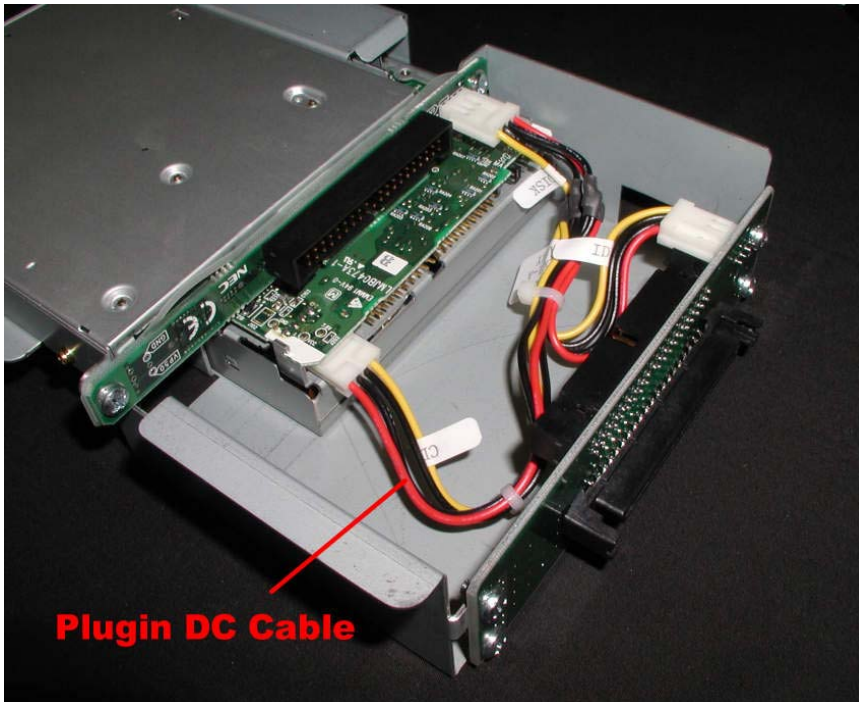


### **4D.3.15 Plugin DC Cable**

1. Remove the device module (CRU).

2. Disconnect the Plugin DC cable from the CD-ROM adapter, super disk, and IDE-M board. (Figure 4D-37)

*Figure 4D-37. Plugin DC Cable*



#### **4D.3.16 Ultra ATA66 IDE2 Cable**

1. Remove the device module (CRU).
2. Disconnect the Ultra ATA66 IDE2 cable from the CD-ROM adapter, super disk, and IDE-M board. (Figure 4D-38)

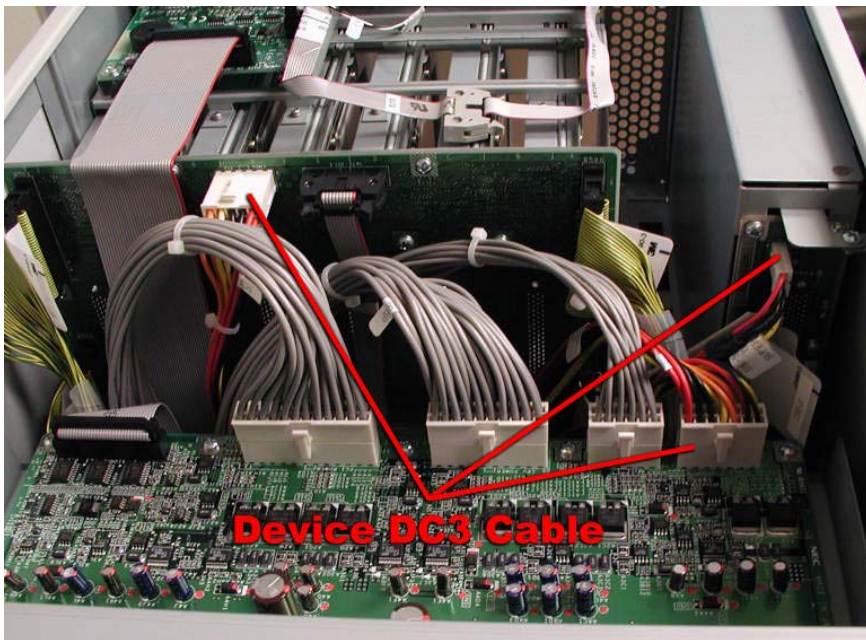
Figure 4-38. Ultra ATA66 IDE2 Cable



#### 4D.3.17 Device DC3 Cable

1. Remove the ftServer chassis from the cabinet (See [Section 4D.3.1](#))
2. Disconnect the device DC3 cable from the power board, SCSI backplane, and the IDE-S board. (Figure 4D-39)

Figure 4D-39. DC3 Cable



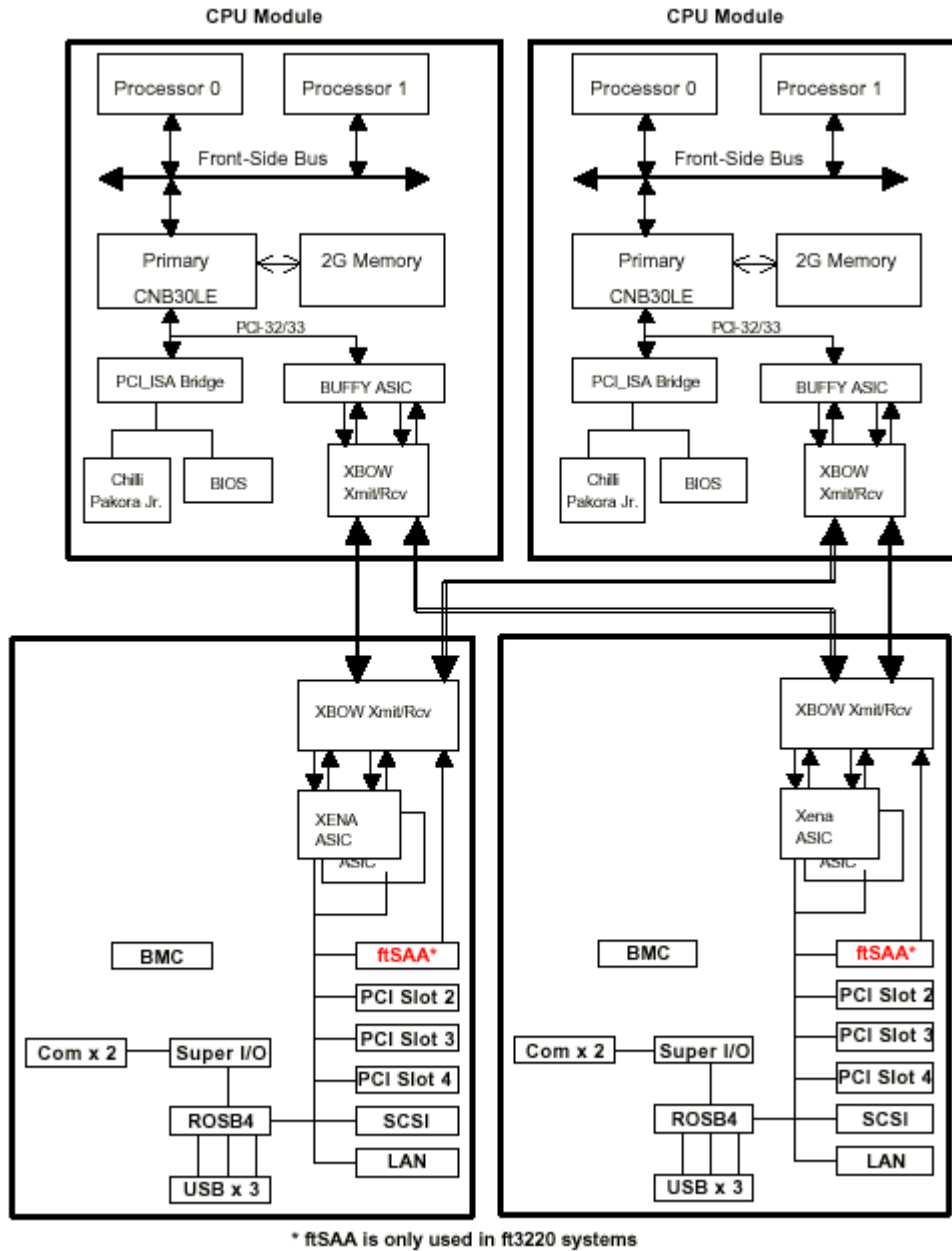
## 5. Theory of Operation

This section contains an overview of the theory of operation for the ftServer 3200 system. It provides information on how the system operates and includes a description of each of the following major assemblies/subsystems.

- CPU Enclosure
- I/O Subsystem
- CPU-to-PCI Bus
- Device Module
- Disk Subsystem
- Tape Subsystem
- Power Subsystem
- Cooling Subsystem

A high-level block diagram of the ftServer 3200 system is shown in Figure 5-1.

Figure 5-1. FtServer 3200 Block Diagram



## 5.1 CPU Enclosure

The CPU enclosure supports one or two Intel Coppermine Pentium III processors operating at 800 MHz .

The processors, which fit in a 370 pin socket, use the Intel specified FC-PGA packaging option. The processors share a 100-MHz bus, known as the system bus or the Front Side Bus (FSB), with the ServerWorks North Bridge/Controllers (CNB30LE).

The CNB30LE is the hub of the CPU Module. It has the following interfaces:

- 100-MHz Processor/System Bus Support
- Integrated DRAM Controller with 100/133-MHz SDRAM Interface to SDRAM DIMMs (memory modules)
- Peripheral Component Interface (PCI) bus interface (rev 2.1 compliant) 32-bit, 33-MHz)

The CNB30LE DRAM controller can interface to a maximum of 2GB contiguous SDRAM memory using the four available DIMM modules. ftServer 3200 supports 256MB, 512MB, 1 GB and 2GB memory configurations. The DIMMs should occupy the slots in numerical order. For a given configuration, different sized DIMMs cannot be installed.

The PCI interface is known as the compatibility bus since the traditional PC legacy components reside on this bus. The 32-bit, 33-MHz PCI bus supports the BIOS PROM and the Chilli Pakora Jr. Interrupt Controller. The PCI bus is fed directly to the CPU-to-PCI bus via the Buffy ASIC, which handles the CPU half of the CPU-to-PCI protocol, and a Low Voltage Differential Signaling (LVDS) device. This technology significantly reduces the number of connections required to implement the CPU-to-PCI interface. The remainder of the PC legacy components (IDE, USB, serial ports etc.) reside in the I/O subsystem.

The System Management software provides control of the power supply and the reset circuitry. It also monitors the power supply status, controls the LEDs and can interface to the processor and to the memory modules. The CNB30LE has an I2C interface, which is compatible with INTEL's SMB protocol, thereby allowing its status to be read for system management or diagnostic purposes. Currently no software exists to make use of the SMBus access to the CNB30LE chipset.

## 5.2 I/O Subsystem

ftServer 3200 systems support two I/O enclosures.

Each I/O enclosure has a Baseboard Management Controller (BMC), an Intel i82559 NIC (U515) adapter, and a Qlogic ISP12160 (U518) disk SCSI processor embedded in its base board (PCI board). Failure of any embedded PCI adapter fails the entire I/O board.

Each I/O enclosure supports four PCI slots. In the ftServer 3220, a U460 ftServer Access adapter must reside in slot 1. In the ftServer 3210, a 69000-based video adapter resides in slot 1. Any type of PCI adapter, which is listed on the Microsoft Hardware Compatibility list, can be employed in any of the remaining three slots with the restriction that only 32-bit adapters which are compliant with PCI 2.0 and 2.1 specification can be used. There is no support for 64-bit adapters; however 64-bit adapters can be used in 32-bit mode. The total maximum power/voltage for the three user-configurable slots in each I/O enclosure



is 75watts / 5 volts. For each user-configurable slot the maximum power allowed is 25 watts, 5 amps at 5 volts or 7.6 amps at 3.3 volts.

System management functions are accessible locally (for customer) and remotely for Stratus 'call home' via Remote Services Network (RSN) except where specified. These functions support remote control of the system, including power on and off. On the ftServer 3210 this is only available while the OS is running; on the ftServer 3220 it is available, even if there is an OS failure. .

The BMC performs the following functions:

- Monitors processor presence and controls Fault Resilient Boot (FRB)
- Controls state-sensitive recovery
- Monitors server board temperature and voltage
- Detects and indicates baseboard fan failure
- Monitors the system management watchdog timer
- Manages the SEL interface
- Manages the SDR Repository interface
- Monitors the SDR/SEL timestamp clock
- Monitors the periodic SMI timer
- Monitors the event receiver
- Controls secure mode, including video blanking, diskette write-protect monitoring, and front panel lock/unlock initiation
- Controls Wake On LAN via Magic Packet support.

In addition to the embedded ethernet and SCSI controllers, the ftServer 3200 supports the following PCI adapters:

- U515 - 1-port 10/100 Mbps ethernet adapter
- U516 - 1-port differential SCSI adapter (QLA1080)
- U460 - ftServer Access adapter (ftServer 3220 only)
- E928 - Video adapter (ftServer 3210 only)

## **U515**

The U515 Ethernet PCI adapter is a single-port, Intel ® Network Interface Card (NIC), based on the Intel 82559 Local Area Network (LAN) controller. The U515 supports 10BASE-T and 100BASE-TX Ethernet network topologies for data rates of 10 and 100 megabits-per-second (Mbps) with a data-path width of 32 bits. It uses auto-negotiation and/or automatic sensing to automatically select half- and full-duplex line speeds of 100BASE-TX or 10BASE-T. The U515 contains 6 kilobytes of on-board memory. It uses standard RJ-45 Category-5 unshielded twisted pair (UTP) cable connections.

## U516

The U516 QLA1080 SCSI controller is a single-port Ultra 2 SCSI adapter (HBA) board manufactured by Qlogics.. The QLA1080 is configured as a single-initiator supporting tape drive operation. This means that a single controller is connected to a SCSI bus.

The QLA1080 has a 64-bit Direct Memory Access (DMA) bus master. Its Instruction Set Processor (ISP) chip provides intelligence and high performance by combining a Reduced Instruction Set Computing (RISC) processor, a SCSI executive processor (SXP), and a peripheral component interconnect (PCI) local bus.

The QLA1080 supports transfer rates up to 80 MB/sec of Ultra2 Low Voltage Differential (LVD) Signalling. It is compatible with SCSI-2, SCSI-3, Ultra SCSI, and Ultra2 SCSI peripherals. The card supports both 32-bit and 64-bit PCI buses at 33 megahertz (MHz).

## U460

Each I/O enclosure in the ftServer 3220 houses an ftServer Access adapter. The ftServer Access adapter is a Web-based interface that allows an authorized person to remotely control, monitor, and diagnose problems on ftServer 3220 systems. It can call home if the ftServer 3220 server crashes; that is, the ftServer Access adapter automatically contacts the Stratus Support Network (SSN) if the server crashes. The card enables an authorized person to access the ftServer 3220 console and keyboard remotely through the SSN or a local network, providing access that is independent of the states of the host power and operating systems. The ftServer Access adapter also implements the Stratus System Controller (SSC), which is a central part of the Maintenance and Diagnostics subsystem of a ftServer 3220 system.

The ftServer Access adapter can operate independently of the host system because it contains its own processor and memory, and it has access to a backup power supply for housekeeping power (receives constant 5VDC input). The ftServer Access adapter contains its own Motorola ® PowerQUICC ® processor, an integrated PowerPC ® microprocessor and peripheral controller. It also contains 16 MB of parity-protected Synchronous Dynamic Random Access Memory (SDRAM). The ftServer Access adapter includes subsystems for video, monitoring, and power.

The ftServer Access adapter supports dual independent I<sup>2</sup>C bus connections, UART and debug ports, network/telecommunication interfaces including a local 10/100 connector with pass-thru functionality. It also implements the system's VGA subsystem as well as providing a real time clock, NVRAM for logging OS state, and local voltage/temperature sensing capabilities. The I<sup>2</sup>C bus is a 2-bit standard serial interface to all the boards which allows the ftServer Access adapter to obtain their status. It also allows the adapter to power on and off components in the system.

Each ftServer 3220 system requires two ftServer Access adapters for fault tolerance. If one ftServer Access adapter fails or is removed, or if the I/O enclosure that contains an ftServer Access adapter is removed, the second ftServer Access adapter detects the problem and takes over monitoring the server.

The ftServer Access adapter contains a reset button, which is intended primarily for debugging.

**WARNING:** The U460 ftServer Access adapter contains a battery. Danger of explosion exists if the battery is incorrectly replaced. Replace only with the same or equivalent type of battery recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

## **E928**

The E928 Video adapter used in the ftServer 3210 is a NEC card. It is an Intel CT69000-based board with 4MB of VRAM

The ftServer 3210 can phone home via the internet or an external modem. It only supports Remote Access/Restart while the OS is running via a modem using W2K Remote Access Service (RAS). Likewise, System Management is only available while the OS is running. It supports a subset of the Windows System Management (WSM) functionality. It provides component level information as well as HTTP and email notification of events. Environmental status information on the temperature, voltage, fans, power supplies and chassis is provided via the LCD.

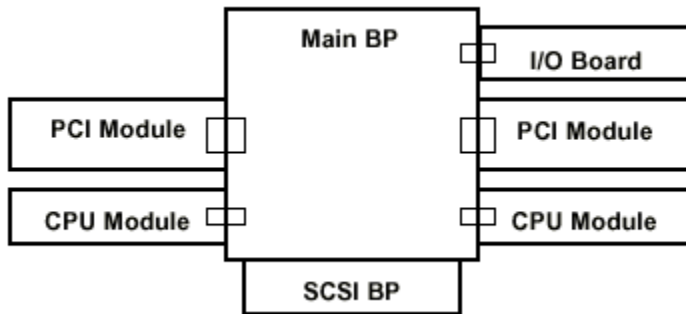
The I/O board has a 33.333 MHz clock that is divided by 4 on the I/O Board to generate an 8.333 MHz clock, which is distributed to the CPU enclosure and PCI subsystem. This distributed clock is then used by the CPU enclosure to generate its locally required 100, 66.666, 33.333, 25 and 8.333 MHz clocks, while the PCI subsystem uses it to generate its locally required 33.333 and 8.333 MHz clocks. It should be noted that all of the clocks are generated from a single source and that this does represent a Single Point Of Failure.

## **5.3 CPU-to-PCI Bus**

The CPU enclosure is connected, via the main backplane, to the I/O subsystem using Crossbow links with the signals being transmitted using LVDS (Low Voltage Differential Signaling). The technology significantly reduces the number of connections required to implement the crossbow interface.

Figure 5-2 shows the ftServer 3200 interconnections.

Figure 5-2. *ftServer System Interconnections.*



Each Buffy ASIC in the CPU enclosure interfaces to two Xena ASICs in the I/O enclosure over half of the CPU-to-PCI bus, which consists of point-to-point LVDS links, forming two separate PCI-to-PCI bridges.

These PCI bridges connect to their counterparts across the CPU-to-PCI bus, one to the first I/O enclosure and the other to the second I/O enclosure. The Buffy ASIC 0 link feeds a LVDS receiver/transmitter pair as does the Buffy ASIC 1. The Buffy ASIC passes the I/O interrupts and the Intel sideband signals from the I/O enclosure through the CPU-to-PCI bus. The Intel sideband signals are a set of signals that are used in legacy Intel architecture. These signals originate in the I/O subsystem and need to be passed to the processor for compatibility purposes

## 5.4 Device Module

The device module, is a simplex component that contains a 3.5-inch high-capacity floppy drive and a CD-ROM drive. These components plug into the IDE-M board. The IDE-M board interfaces with the IDE-S board, which plugs into the main board and the power board.

The device module is not hot-pluggable. The system must be powered down to replace it.

## 5.5 Disk Subsystem

The major component in the disk subsystem is the SCSI storage enclosure, which contains the disk drives. Devices in the storage enclosure are controlled by U518 QLA1280 SCSI controllers embedded on the PCI board.

The SCSI storage enclosure supports from two to six hot-pluggable, 3.5", Ultra2 and Ultra3 SCSI disk drives of 9-GB, 18-GB, and 36-GB capacities. The disk drives are connected directly to the enclosure backplane. The SCSI storage enclosure interconnect is a multi-mode SCSI interface.

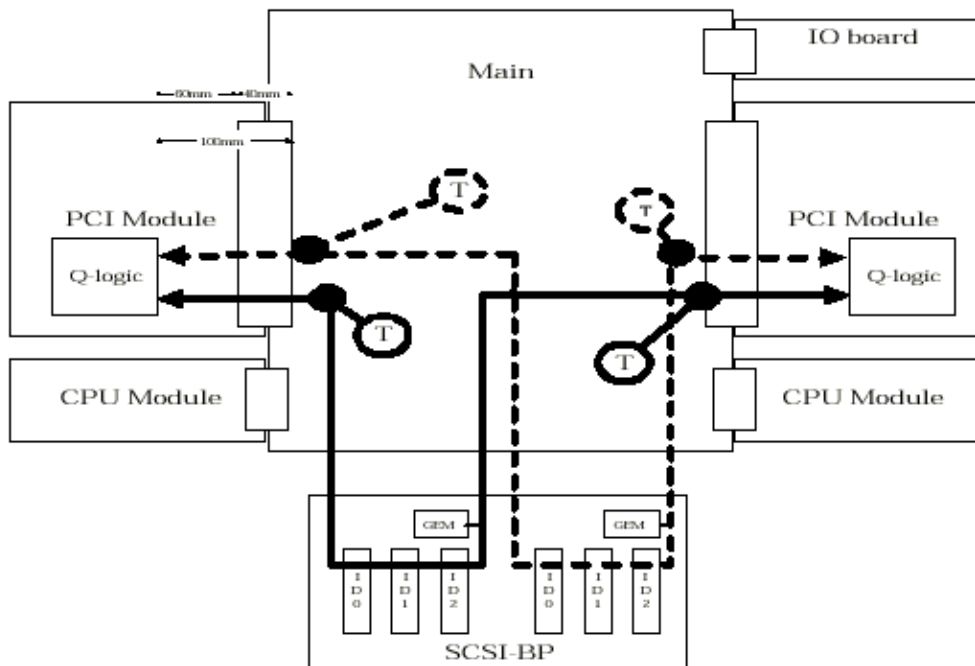
All of the drives are powered using 1+1 redundant power supplies. Each disk drive has a dedicated fan, which is located in the CPU enclosure. Power for the fans is separate from

the CPU enclosure. The drives support RAID-1 and disk mirroring; the six physical disk drives represent three logical disk drives.

The embedded SCSI controller interfaces the 32-bit PCI bus to two LVD Ultra2 SCSI buses in a dual-initiated environment. The SCSI bus is a multi-mode Low Voltage Differential (LVD) interface. It is automatically configured as a split bus (3 drives per bus) with proper internal termination.

The SCSI backplane supports the split bus configuration. Split bus supports three disk drives per SCSI bus in a single storage enclosure. SCSI IDs are 0, 1, and 2. The following figure shows the SCSI IDs for split bus mode. The SCSI ID number listed for each drive is the ID assigned to that slot position in the split bus configuration.

Figure 5-3. SCSI Bus Configuration



As shown in the figures above, each slot on the SCSI storage enclosure has a unique SCSI ID assigned to it. The SES has a SCSI ID assignment of 8.

## SCSI ID mapping

Slot #	Bus 1 IDs	Bus 2 IDs
Slot 1	0	
Slot 2	1	
Slot 3	2	
Slot 4		0
Slot 5		1
Slot 6		2
SES	8	8

## 5.6 Tape Subsystem

ftServer 3200 systems support DDS-4 tape drives housed in the tape drive bay on top of the system. Tape drives are controlled by the U516 QLA1080 SCSI controllers configured as a single-initiators. Each U516 supports one tape drive. A maximum of two tape drives can be configured on the ftServer 3210.

Each tape drive must have a unique SCSI ID assigned. Failure to do so will create SCSI bus conflicts.

The DDS-4 tape drive is the 4<sup>th</sup> generation of DDS products. DDS-4 has all of the benefits of previous DDS products with faster transfer speeds (3-6 MB/sec sustained), higher capacity and increased reliability. To achieve the speed and capacity benefits, DDS-4 150M media must be used. Cartridge capacity is 20 MB per cartridge native (40 MB per cartridge assuming 2:1 data compression). Previously archived data is easily accessible with read/write backward compatibility. The drives implement the LVD interface.

## 5.7 Power Subsystem

ftServer 3210 is an AC-powered unit. It has two 450W SSI power supplies, which are 1+1 redundant, interchangeable, and hot swappable. If one fails, the remaining power supply unit can power the entire system. These units draw less than 20 amperes, thereby allowing them to be powered from a normal AC wall socket. The supplies are capable of auto-selecting for 100~240VAC/50/60Hz operation. ftServer 3210 does not have any back-up batteries; therefore the customer should use an external UPS in case of an AC power failure.

## **5.8 Cooling Subsystem**

Air flow in the ftServer 3200 is from front to back. The CPU enclosure has two fans that cool both the CPUs and disk drives.

The PCI enclosure has one fan that draws air in from the front and discharges it through the rear.

## 6. Upgrades

The upgrade kits supported on ftServer 3200 systems are listed in the following table.

**NOTE:** Two configured CPU enclosures are included in each kit.

<b>Mktg ID</b>	<b>Description</b>
<b>UPG3301</b>	<b>Upgrade from 1-way SMP to 2-way SMP (for field upgrades only)</b>
<b>UPG3302</b>	<b>Upgrade from ftServer 3210 to ftServer 3220</b>
<b>UPM7735</b>	<b>Upgrade from 256MB DIMM to 512MB DIMM</b>
<b>UPM7736</b>	<b>Upgrade from 256MB DIMM to 1GB DIMM</b>
<b>UPM7737</b>	<b>Upgrade from 256MB DIMM to 2GB DIMM</b>
<b>UPM7738</b>	<b>Upgrade from 512MB DIMM to 1GB DIMM</b>
<b>UPM7739</b>	<b>Upgrade from 512MB DIMM to 2GB DIMM</b>
<b>UPM7740</b>	<b>Upgrade from 1GB DIMM to 2GB DIMM</b>



## **7. Related Documentation**

### **7.1 Customer Service Documentation**

ftServer 3200 Technical Service Guide

ftServer 3200 Illustrated Parts Catalog

### **7.2 Customer Documentation**

*Stratus ftServer: PCI Adapter Guide (R461)*

Stratus ftServer Software Availability Manager User's Guide (R007W)

Stratus ftServer Software Installation and Upgrade Guide (R002W)

Stratus ftServer 3210: System Administrator's Guide (R008W)

Stratus ftServer 3210: Release Notes (R010W)

Stratus ftServer 3210: Site Planning Guide (R472)

Stratus ftServer 3210: Operation and Maintenance Guide(R473)

Stratus ftServer 3210: CRU Reference Guide (R474)

Stratus ftServer 3210: Hardware Installation Instructions (R475)

Read Me First: Unpacking the ftServer 3210 System (R477)

### **7.3 Engineering Documentation**

Stratus Configuration Specification Document No. ES-000125 Stratus ftServer 3200

ftServer 3200 Hardware System Functional Specification (SED-2503)

## 8. Part Numbers

The tables in the following subsections list the part numbers for the Customer Replaceable Units (CRUs), Field Replaceable Units (FRUs), and Distributor Replaceable Units (DRUs) in ftServer 3200 systems. (Rev. 11)

### 8.1 CPU Enclosure

Description	CRU/FRU/DRU	Part Number
CPU Enclosure (with 800Mhz CPU, NOMEM)	C	062-01885-000
CPU Enclosure (NOMEM OR CPU)	F	062-01887-000
CPU Board (G7FMU)	D	243-630153-C
Fan A (Front Fan)	F	802-860106-040A
Fan B (Rear Fan)	F	802-860110-140A
CPU LED Cable	D	808-744496-021A
Open Sensor Cable	F	808-744495-028A
256-MB Memory Module	F	609-01531-000
512-MB Memory Module	F	609-1532-000
800MHz Pentium III CPU	F	802-143781-247A
Voltage Regulator	F	802-187937-001A
Heat Sink with Thermal Interface	F	808-815085-656A

### 8.2 I/O Subsystem

Description	CRU/FRU/DRU	Part Number
I/O Enclosure ( No PCI Cards)	C	062-01886-000
PCI Board (G7FMV)	D	243-630154-D
PCI LED Board (G7DTG)	D	133-639369-B
PCI LED Relay Cable	D	808-744497-028A
PCI Open Sensor Cable	D	808-744495-028A
PCI Fan B	F	802-860110-140A
56K Modem (ftServer 3210 only)	C	AA-C719XX
Server Monitor Module Adapter (ftServer 3220 only)	C	AA-U46010
U515 1-port Ethernet adapter	C	AA-U51500
U516 1-port SCSI adapter (for tape drives)	C	AA-U51600

Video adapter (G7DTF) (tServer 3210 only)	C	
PCB, Intel pro/1000 F Server Adapter 1000base-sx (Fiber Gigabit)	C	AA-U57000
PCB, Intel pro/1000 T Server Adapter (Copper Gigabit)	C	AA-U57100
PCB, 2-Port Sync Adapter	C	AA-U48000
PCB, 4-Port Sync Adapter	C	AA-U48500
PCB, 8-Port Async Adapter	C	AA-U48600
CBL, V.24/EIA-232 Sync Cable	C	AW-B40100
CBL, EIA-530 Sync Cable	C	AW-B40200
CBL, V.36/EIA-449 Sync Cable	C	AW-B40300
CBL, V.11/X.21 Sync Cable	C	AW-B40400

## 8.3 Device Module

Description	CRU/FRU/DRU	Part Number
Device Module (Contains CD & Floppy)	C	062-01884-000
Super Floppy Drive	D	804-091490-5010
CD-ROM Drive	D	808-879312-101A
CD-ROM Adapter (G7EPE)	D	133-639660-B
IDE-M Board (G7EPD)	D	133-639659-B
Plugin DC Cable	D	808-744499-001A
Ultra ATA66 IDE2 Cable (014)	D	804-744608-014B

## 8.4 Storage Enclosure

Description	CRU/FRU/DRU	Part Number
18GB 10K Ultra3 Disk Drive	C	120-01520-000
36GB 10K Ultra3 Disk Drive	C	120-01521-000

## 8.5 Tape Drive Bay

Description	CRU/FRU/DRU	Part Number
DDS-4 Drive	F	808-895268-002A
JWT75-522/RC Power Supply	D	808-892443-0010
Dev-bay DC Cable (400)	D	808-744622-400A
AC Inlet Cable (140)	D	808-744623-140A

SCSI-Wide 3conn Cable (001)	D	808-744571-001A
SCSI-Wide 3conn Cable (002)	D	808-744571-002A
SCSI-Wide EX Long Cable (150)	D	808-744640-150A
SCSI-Wide EX Short Cable (030)	D	808-744624-030A
PWRGD Sensor Cable	D	808-744625-500B
60mm Fan	D	802-860107-221A
SCSI Converter	D	802-710586-001A
Wide-SCSI Terminator	D	802-710524-568A
CBL, 10 Ft. 68 Pos. SCSI to 0.8 mnVHD Ext. SCSI	C	AW-001046-01
CBL, 30 Ft. 68 Pos. SCSI to 0.8 mnVHD Ext. SCSI	C	AW-001046-02
CBL, SCSI, tape daisy chain (3 ft)	C	AW-001072

## 8.6 Additional Parts

Description	CRU/FRU/DRU	Part Number
IDE-S Board (G7EPC)	F	133-639658-B
Front Panel Board (G7FARJ)	F	243-630263-A
Power Switch and Cable (010)	F	808-744469-010A
WD-C1602E LCD W/Cable and Sheet metal	F	120-01519-000
LCD Relay Cable (012)	F	808-744578-012B
450W Power Supply forftServer	C	804-021719-001B
CPU Terminator (FC-PGA)	F	804-091375-0010
SCSI Backplane (G7FRH)	D	243-630262-A
Insulator (for SCSIBackplane)	D	137-324755-501A
Main Board (G7FQK)	D	243-630239-A
I/O Board (G7FQJ)	F	243-630238-C
Power Board (G7FQA)	F	243-630227-C
24-pin DC Cable (080)	D	808-744573-080A
20-pin DC Cable (070)	D	808-744572-070A
Box-10P Cable (075)	D	808-744570-075A
Box-34P Cable (070)	D	808-744465-070A
Box-30P Cable (080)	D	808-744466-080A
12-pin DC Cable (080)	D	808-744467-080B
Internal LVD SCSI Cable (001)	D	808-744571-001A
Internal LVD SCSI Cable (002)	D	808-744571-002A

<b>Internal LVD SCSI Cable (003)</b>	<b>D</b>	<b>808-744571-003A</b>
<b>Internal LVD SCSI Cable (004)</b>	<b>D</b>	<b>808-744571-004A</b>
<b>Ultra ATA66 IDE Cable (050)</b>	<b>D</b>	<b>808-744609-050B</b>
<b>Device DC Cable (001)</b>	<b>D</b>	<b>808-744498-001A</b>
<b>Keyboard (USB) (Serial Mouse included)</b>	<b>C</b>	<b>AA-V11510 &amp; AA-V11610</b>
<b>Mouse (Serial)</b>	<b>C</b>	<b>AA-V11610</b>
<b>Monitor, 17" Color VGA (cost is for the 15 monitor)</b>	<b>C</b>	<b>AA-V10610</b>

## 8.7 System Power Cords

<b>Description</b>	<b>CRU/FRU/DRU</b>	<b>Part Number</b>
<b>U.S. Domestic Power Cord Set (120V/15A)</b>	<b>C</b>	<b>307-00012-000</b>
<b>Great Britain Power Cord (250V/10A)</b>	<b>C</b>	<b>307-00013-000</b>
<b>Continental European Power Cord (250V/10A)</b>	<b>C</b>	<b>307-00014-000</b>
<b>Israel Power Cord (250V/10A)</b>	<b>C</b>	<b>307-00015-000</b>
<b>Australian Power Cords (250V/10A)</b>	<b>C</b>	<b>307-00018-000</b>
<b>Japanese Power Cord Set (100V/15A)</b>	<b>C</b>	<b>307-00019-000</b>
<b>Japanese Power Cord (200V/13A)</b>	<b>C</b>	<b>307-00021-000</b>
<b>South Africa 259V/10A (2m or 2.5m C13 to ZA-3 Power Cord)</b>	<b>C</b>	<b>307-01501-000</b>