

MITEL

3300 | Integrated Communications Platform

SATA Controller Operations Manual



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3300 Integrated Communications Platform
SATA Raid Controller Operations Manual
Release 1.0

11-5191-00213, Rev. A

March 2011

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Table of Contents

Purpose of this Handbook.....	5
Safety Instructions.....	5
Introduction.....	5
SATA RAID Controller Features.....	6
SATA RAID Controller Installation.....	7
Basic Operation	8
Clearing RAID Controller Sockets	8
I2C Cable/Alarm.....	9
RAID1/Mirror Definition	9
RAID Controller Panel.....	9
Advanced Operations	9
Maintenance Commands.....	9
Drive Types and Sizes	10
LEDs.....	10
System Installation and Upgrade with RAID Controller.....	10
Install One Hard Drive in a SATA RAID System	10
Install Both Hard Drives in a SATA RAID System	11
Hard Disk Failures.....	12
System Troubleshooting.....	12

Purpose of this Handbook

This document provides basic operation instructions to install, upgrade, and maintain the SATA RAID controller for the Mitel® 3300 Integrated Communications Platform (ICP).

This handbook is written for certified 3300 ICP technicians. For information on programming tasks, please refer to the System Administration Tool Online Help.

Safety Instructions

A printable version of the Safety Instructions is available on the Mitel Customer Documentation web site.

Introduction

With the introduction of the MXe III controller in MCD Release 4.2, Serial ATA (SATA) connectors have replaced Parallel ATA (PATA) connectors for the interfaces between the RTC/E2T compute card, RAID controller, and hard drives. In addition, a new RAID controller card and SATA hard drives have been introduced and the interconnect card has been discontinued.



Note: To avoid losing data, Mitel recommends backing up your operating system and applications prior to installing/replacing hard drives.

SATA RAID Controller Features

The SATA RAID controller provides the following:

- ATA/ATAPI-5 compliant and supports PIO, and Ultra DMA interfaces and transfer rates.
- RAID 1, redundant and mirrored disk drives with media hot swapping independent of host CPU.
- Hot swap of hard disks supported.
- Estimate of time to complete the mirror operation.
- Alarm indication if disk fails.
- Maintenance logs of RAID operation. Reports disk failing/mirroring/mirrored.
- Drive information (type, model, serial number, etc.) available using maintenance command.
- Mirror operation starts automatically when a new drive is installed.
- Drive size compatibility is verified before mirror operation starts.
- SATA controller does not verify that drive contents are mirrored copies when system boots.
- Mirror operation is independent of the operating system and file system being used.
- Mirror operation works with dissimilar drives (different models or manufacturers). However, the replacement drive capacity must be equal to or larger than the RAID size. (Use "SHOW STATUS RAID" to determine RAID size.)

Differences between SATA and PAID RAID controllers:

- Hard drive status is indicated by a single blue LED in SATA, and by two green LEDs in PATA.
- The mirroring operation starts automatically in SATA, and by pressing the Mirror Ctrl button in PATA.
- Clearing sockets takes slightly longer in SATA than in PATA.
- Rebuild is completed eight times faster in SATA than in PATA.
- A new maintenance command has been added for SATA and PATA: SHOW STATUS RAID.
- An interconnect card is not used in a MXe III without a SATA RAID controller. It remains required for MXe II systems without a PATA RAID controller.

SATA RAID Controller Installation

Refer to the 3300 ICP Technician's Handbook for detailed installation instructions.



There is no need to remove an interconnect card to install RAID controller card as part of the installation process.

To install a SATA RAID controller and a second hard drive in an MXe III:

1. Remove the MXe III cover (refer to the Technicians Handbook for instructions).
2. Remove the grey plastic bezel that covers the RAID controller LEDs located on the rear panel of the controller.
3. On the inside of the cover, insert a thin, pointed object through an LED hole. Push the bezel cover out far enough to allow you to grasp the top and bottom edges. Pull the bezel cover off the controller cover.
4. Remove the Stratum 3 clock module and keep the screws.
5. Install the RAID controller board into MXe III controller:
 - Insert the LED indicators into the holes in the controller rear panel.
 - Secure the board to the standoffs with the three (3) screws.
6. Cut the cable tie joining the I2C (small ribbon) cable to the SATA cable.
7. Connect the I2C (small ribbon) cable to the P5 RAID I2C connector on the RAID controller.
8. Disconnect the SATA cable from the HD1 connector on the HD backplane and reconnect it to the Host P1 connector on the RAID controller.
9. Using one of the supplied SATA cables, connect the HD1 connector on the HD backplane to the HD1 P3 connector on the RAID controller.
10. Using the second SATA cable, connect the HD2 connector on the HD backplane to the HD2 P2 connector on the RAID controller.
11. Using the supplied power cable, connect the RAID POWER OUT connector on the HD backplane to the SATA BCKPLNE POWER connector on the RAID controller.
12. Gently push the SATA, I2C and power cables out of the way so that they are not pinched by the top cover.
13. Reinstall the Stratum 3 clock module with the screws.

Do NOT install second hard drive.

14. Replace the top cover and secure with screw.
15. Power on controller with the existing drive installed. If the system fails to boot, check the cables and/or try clearing the sockets.
16. While you are waiting for the system to boot, install the second hard drive in the hard

- drive carrier with the four screws. Make sure it is correctly oriented (right side up).
17. Before installing the second hard drive, use maintenance command "SHOW REDUNDANT STATUS" to confirm that the HD1 drive is connected as HD1.
 18. Slide the hard drive carrier containing the second hard drive into the controller.
 19. Push to seat the hard drive carrier into the hard drive backplane.
 20. Tighten the thumb screw.
 21. The rebuild process starts automatically. Mirroring is indicated by the HD LEDs. The source drive LED flashes quickly (indicating that the disk is being accessed) while the destination drive flashes slowly. The rebuild is complete when the destination drive LED no longer flashes slowly (approximately 160G per hour).

Basic Operation

To the MXe controller, the RAID controller looks like a single disk drive. All RAID 1 functions occurring on the RAID controller are transparent to the MXe controller.

Files such as voice mail, database saving and restore, all operate in the same manner.

Installation of the hard disks into system, and getting the data on the disks to be the same requires additional steps compared to a system that does not have a RAID controller. The following sections give some basic information about the RAID controller operation. See the section "System Installation and Upgrade with RAID controller" for the complete list of steps to bring up a system with the RAID controller.

Clearing RAID Controller Sockets

The RAID controller stores the model number and a serial number of the disks in what is called sockets. This information is used to detect when a disk has been changed. When a RAID controller is shipped, this socket information is clear. There are times this information must be cleared, for example, when you want to install a hard disk that already has a different version of software or configuration, or if you start up the system with one drive installed and that drive is defective.

In a SATA system, you may need to clear the RAID controller sockets if one (only one hard drive installed) or both hard drive (two hard drives installed) LEDs flash the Morse code for SOS: a repeating pattern of three slow flashes and three fast flashes.

LED Method to Clear Sockets

To clear SATA controller sockets with the LED method:

1. Power off the system.
2. Remove the SATA hard drives.
3. Power on the system and wait from alarm LED to change from flashing red to solid red. This takes about 90 seconds.
4. The RAID controller sockets are now clear. Proceed with the installation/upgrade.

Serial Port Method to Clear Sockets

To clear SATA controller sockets with the serial port method:

1. Power off system.
2. Connect a terminal emulator to the system's serial port.
3. Power on the system. Press space bar to skip power up test.
4. Wait until the system reports that sockets have been cleared or the system reboots. This takes about 35 seconds.
5. The RAID controller sockets are now clear. Proceed with the installation/upgrade.

I2C Cable/Alarm

SATA RAID requires an I2C cable so the system can monitor the status of the SATA RAID controller card. If this cable is not connected, an alarm is raised.

Systems are shipped from the factory with the I2C cable already connected between the SATA RAID controller card and the RTC.

RAID1/Mirror Definition

The SATA RAID controller implements RAID 1 functionality. This means that when data is written, the same data is written to both disks; the disks are mirrors or clones of each other. If the MXe is powered on without one of the disks installed, or if a disk is put off-line, the RAID controller assumes that the data on the disks is no longer the same. A rebuild must be performed to restore the mirror.

RAID Controller Panel

Refer to the 3300 ICP Technician's Handbook for a description of the LEDs.

Advanced Operations

Maintenance Commands

- ***SHOW STATUS REDUNDANT***

Use this command to identify which redundant hardware component has failed. If the system is equipped with a SATA controller, the response includes additional status information (such as the time left for a rebuild to complete) plus the model and serial numbers of the SATA hard drives.

- ***SHOW STATUS RAID***

- . Use it to debug the RAID controller and identify the following:
 - Link Speed - Data transfer rates for Host, HD1, and HD2 connections.
 - Link Detect Status - SATA physical connection status: No Device, No Comm, Okay, or Disabled.
 - NVM Detect State - HD 1 and HD 2 state in the RAID controller memory: Good, Bad, Rebuilding, or Broken.
 - Device State: HD 1 and HD 2 state: Good, Bad, Rebuilding, or Broken.
 - Device Status: HD 1 and HD 2 status: Idle, Device Init, SN Matches, SN Mismatch, ATAPI plugged in, Device Timeout, No device Plugged, Rebuild Failure
 - Match Status: As above.
 - RAID Size: Disk size available to the controller. (This can be smaller than the actual disk size.)

- HD Drive Capacity: HD 1 and HD 2 actual disk size.
- Model | Serial Number: Model and serial numbers of the RAID disks, which is used to protect the disks from corruption during installation.
- Error Logs: Error logs used for troubleshooting.

Drive Types and Sizes

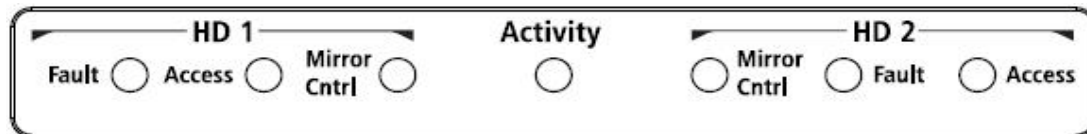
The SATA controller will work with different drive types and sizes.

As with the PATA RAID controller, the SATA RAID controller sets the RAID controller size the first time a drive is installed after the sockets are cleared.

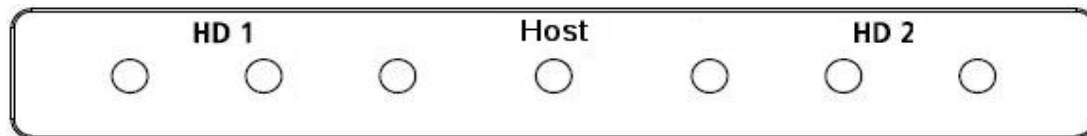
LEDs

The following diagrams show the back panels for the PATA and SATA RAID controllers. As the diagrams show, the LEDs are very different between the controllers. See the ICP 3300 Technician's Handbook for a complete description of the LEDs.

PATA LEDs



SATA LEDs



System Installation and Upgrade with RAID Controller

The following sections describe the installation/upgrade of existing MXe systems followed by a troubleshooting section. Refer to the Upgrades and FRU's chapter in the 3300 ICP Technician's Handbook for additional information on installing the RAID controller and installing and replacing hard drives with a RAID controller.

The SATA RAID controller rebuilds the drives at a rate of about 160G per hour, approximately eight times faster than the PATA RAID controller. Host disk activity will increase the time to mirror the drive.

Install One Hard Drive in a SATA RAID System

Replace one hard drive in a RAID configuration if only one hard drive is defective and the system is no longer under warranty.

To replace one hard drive in an SATA RAID system:

The defective hard drive is indicated by a flashing SOS (three quick flashes, three slow flashes) blue HD. Refer to the Technician's Handbook for a complete description of LED activity.

1. Release the retaining screw securing the hard drive carrier to the controller.
2. Slide the defective hard drive out of the hard drive carrier.
3. Remove the four screws securing the hard drive to the hard drive carrier.
4. Install the new hard drive in the hard drive carrier with the four screws. Make sure it is correctly oriented. (Note that the SATA drive is upside down compared to PATA drive. Accordingly, install the SATA drive with label facing down.)
5. Slide the hard drive carrier into the controller.
6. Push to seat the hard drive carrier into the hard drive backplane.
7. Tighten the thumb screw.

The rebuild process starts automatically. Mirroring is indicated by the HD LEDs. The source drive LED flashes quickly (indicating that the disk is being accessed) while the destination drive flashes slowly. The rebuild is complete when the destination drive LED no longer flashes slowly (approximately 160G per hour).

If the new drive is smaller than the RAID size, the HD LED will flash a constant SOS pattern. Confirm this error by running the SHOW STATUS RAID maintenance command.

8. If desired, enter the SHOW STATUS REDUNDANT maintenance command to learn the approximate time left for the rebuild to complete.
9. After the rebuild is complete, reconnect the controller to the network.

Install Both Hard Drives in a SATA RAID System

Replace both hard drives if they are both defective, or if the system is still under warranty.

You must install only the first hard drive before you boot the system. After the system is fully booted, slide the second hard drive into the HD2 position.

To replace both hard drives in a SATA RAID system:

1. Ensure that you have a database backup, if possible.
2. Loosen the captive screws and slide the hard drives from the hard drive carrier.
3. Clear the sockets.
4. Replace the old hard drive with the new hard drive in the hard drive carrier and secure with the four screws. Make sure it is correctly oriented. (Note that the SATA drive is upside down compared to PATA drive. Accordingly, install the SATA drive with label facing down.)

5. Slide the first hard drive into the HD1 position. DO NOT INSTALL the second hard drive at this time.
6. Push to seat the first hard drive into the hard drive backplane.
7. Tighten the thumb screw.
8. Manually install the software on the hard drive.
9. Replace the second old hard drive with the second new hard drive in the hard drive carrier and secure with the four screws.
10. Slide the second hard drive into the HD2 position.
11. Push to seat the hard drive into the hard drive backplane.
12. Tighten the thumb screw.
13. Install the controller cover and power up the controller.

The rebuild process starts automatically. The source drive LED (HD1) flashes quickly while the destination drive LED (HD2) flashes slowly. The rebuild is complete when the HD2 LED no longer flashes slowly (approximately 160G per hour).

If the new drive is smaller than the RAID size, the HD LED will flash a constant SOS pattern. Confirm this error by running the SHOW STATUS RAID maintenance command.

14. If desired, enter the SHOW STATUS REDUNDANT maintenance command to learn the approximate time left for the rebuild to complete.
15. After the rebuild is complete, reconnect the controller to the network.

Hard Disk Failures

Alarms are generated when a failure is detected. The type of failure is detailed in the maintenance logs or can be determined using the "SHOW STATUS RAID" maintenance command. For maintenance logs, to search for the log entry, specify source in the goto field and REDUNDANT in the value field.

If the RAID controller reports a hard fault, the hard disk may need to be replaced. Before replacing the drive, ensure that the source of the fault is not caused by one of the following conditions:

- hard disk was removed from drive bay
- rebuild attempt with hard disk that is smaller than on-line hard disk
- first time install.

If none of the above applies, then the hard disk needs to be replaced.

System Troubleshooting

The modular design of the MXe allows for more system troubleshooting to be done on site. The hard disk and power supplies are swappable. It is expected that dealers will carry the field upgrade components with them to troubleshoot failed systems. This will include both SATA hard drives RAID controller cards.

SATA RAID controller LEDS always off

Possible causes:

1. Host SATA cable not connected.
2. Power cable not connected.
3. No hard drives installed.

Rebuild Fails

Possible causes:

1. New drive is smaller the RAID size.
2. New drive is defective.
3. Source drive has a faulty sector.