

SATA II 2-channel RAID PCIe

Quick Installation Guide

1. Introduction

The SATA II 2-channel RAID PCIe is an ultra high-speed dual channel Serial ATA Generation 2 RAID controller for PCI Express-enabled system.

1-1 Features and Benefits

- Compliant with PCI Express Base Specification 1.0a
- Compliant with Serial ATA 1.0a specification with support for full complement of SATA II optional features
- PCI Express 1-lane (x1) SATA II adapter works with PCI Express slots with different lane width
- Support Serial ATA II data transfer rate up to 300MB/s (3.0Gb/s)
- Support Native Command Queuing (NCQ), Non-zero offsets NCQ and Out-of-order data delivery NCQ
- Supports RAID 0 (striping) for performance and RAID 1 (mirroring) for reliability!
- Provides LED indication for device access per channel
- Works with various brands of large capacity SATA II hard disk drives

1-2 System Requirements

- PCI Express-enabled system with one available PCI Express slot
- Windows 2000/XP/Server 2003/Vista

1-3 Board Layout

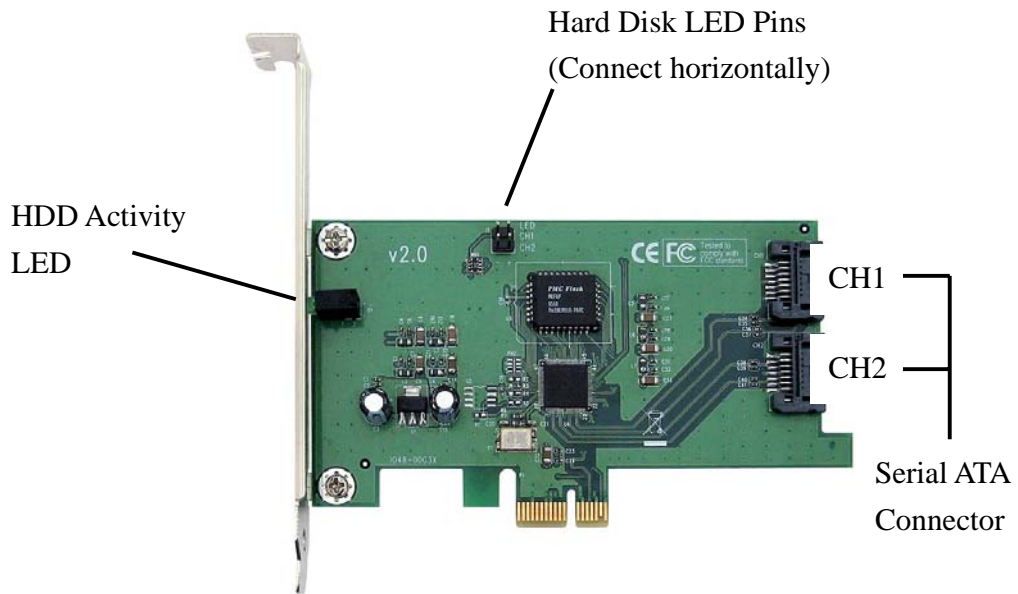


Figure 1. SATA II 2-channel RAID PCIe

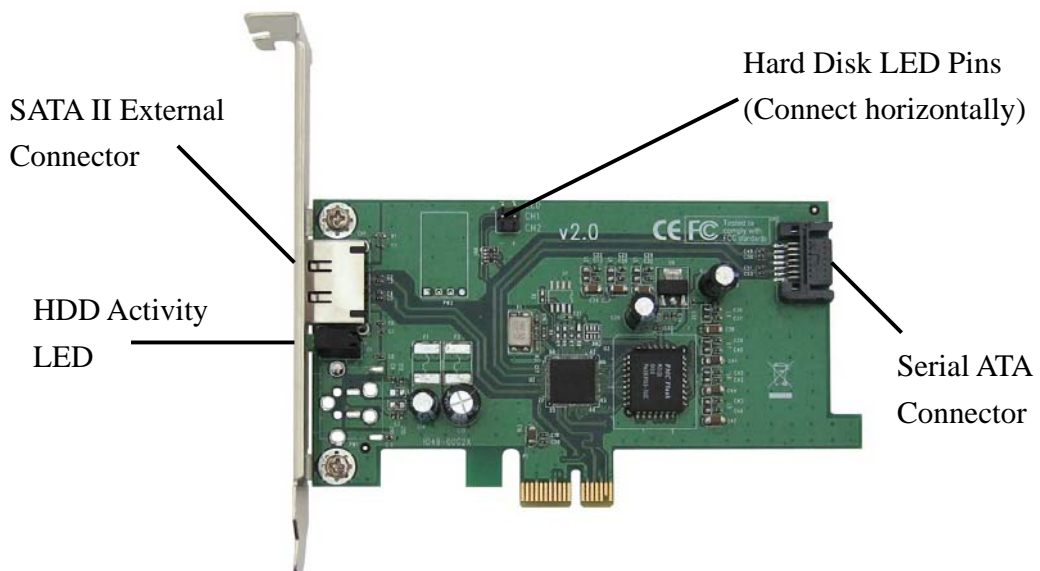


Figure 2. SATA II 1+1 channel RAID PCIe

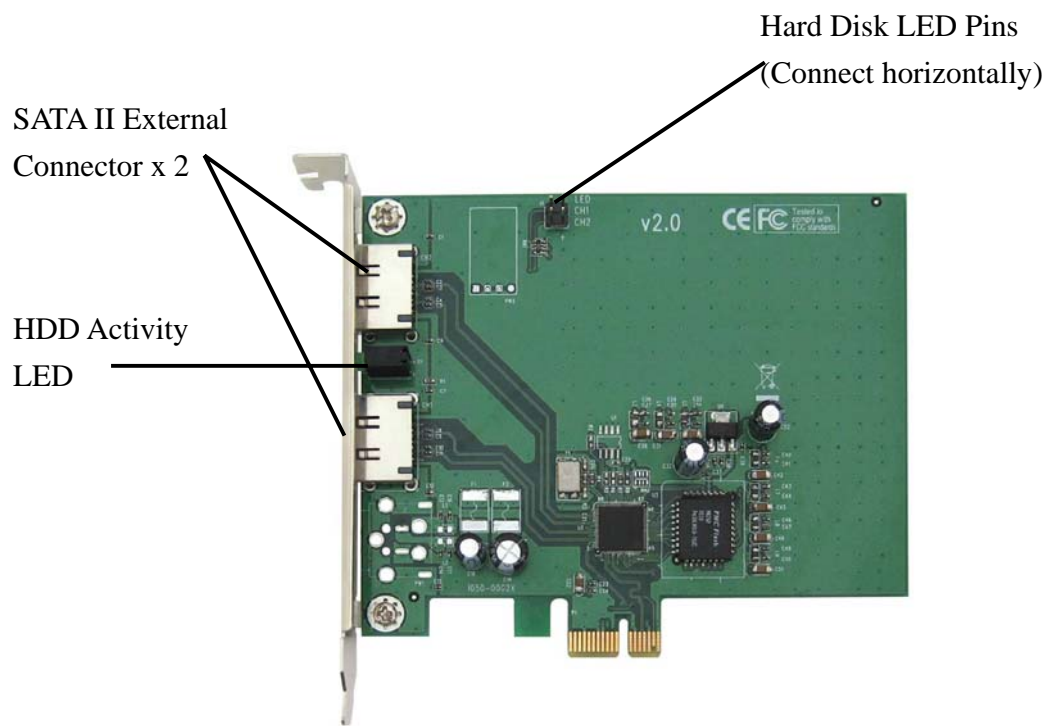


Figure 3. SATA II 2-ext.-channel RAID PCIe

Remark: This QIG is applied for the above 3 items.

2. Hardware Installation

General instructions for installing the card are provided below, since the design of computer cases and motherboards vary. Refer to your computer's manual for further information, if needed.

Static Electricity Discharge may permanently damage your system. Discharge any static electricity build up in your body by touching your computer's case for a few seconds. Avoid any contact with internal parts and handle cards only by their external edges.

1. Turn OFF the power to your computer and any other connected peripheral devices.
2. Unplug the power cord from the back of the computer.
3. Remove your computer's cover.
4. Remove the slot bracket from an available PCI Express slot.
5. To install the card, carefully align the card's bus connector with the selected PCI Express slot on the motherboard.
6. Push the board down firmly, but gently, until it is well seated.
7. Replace the slot bracket holding screw to secure the board.
8. Connect the SATA data cable and SATA power cable to the SATA HDD.
9. Replace the computer cover and reconnect the power cord.
10. Restart the system and refer to the next section for Software Installation.

3. RAID Arrays

RAID Arrays are setup in the SATA II 2-channel RAID PCIe's BIOS. Please refer to the following section to setup your RAID set accordingly.

3-1 RAID 0 (Striping)

This RAID array is used on **New/Blank** hard disk drives. Striping will destroy existing data on the hard disk drives. **Auto Configuration** is recommended. For applications that require custom chunk size, **Manual Configuration** is offered.

Auto Configuration (recommended)

1. As the BIOS boots, press **Ctrl+S** or **F4** when prompted to enter the **RAID BIOS**.
2. At the following screen, select **Create RAID Set**, then press **Enter**.
3. Select **RAID 0**, then press **Enter**.
4. Select **Auto configuration**, then press **Enter**.
5. Input the RAID size, press **Enter**.
6. When asked **Are You Sure (Y/N)?**, press **Y** to accept.
7. Press **Ctrl+E** to exit the BIOS.
8. When asked **Are You Sure (Y/N)?**, press **Y** to exit and reboot.
9. Continue with Fdisk and Format steps as if you were installing a conventional hard disk drive.

Manual Configuration

1. As the BIOS boots, press **Ctrl+S** or **F4** when prompted to enter the **RAID BIOS**.
2. At the following screen, select **Create RAID Set**, then press **Enter**.

3. Select **RAID 0**, then press **Enter**.
4. Select **Manual configuration**, then press **Enter**.
5. Select chunk size from **8k, 16k, 32k, 64k, or 128k**, then press **Enter**.
6. Select the **first drive**, press **Enter**.
7. Select the **second drive**, press **Enter**.
8. Input the RAID size, press **Enter**.
9. When asked **Are You Sure (Y/N)?**, press **Y** to accept.
10. Press **Ctrl+E** to exit the BIOS.
11. When asked **Are You Sure (Y/N)?**, press **Y** to exit and reboot.
12. Continue with Fdisk and Format steps as if you were installing a conventional hard disk drive.

3-2 RAID 1 (mirroring)

For New/Blank Hard Disk Drives

1. As the BIOS boots, press **Ctrl+S** or **F4** when prompted to enter the **RAID BIOS**.
2. At the next screen select **Create RAID Set**, then press **Enter**.
3. At the next screen select **RAID 1**, then press **Enter**.
4. At the next screen choose **Auto configuration**, then press **Enter**.
5. Input the RAID size, press **Enter**.
6. When asked **Are You Sure (Y/N)?**, press **Y** to accept.
7. Press **Ctrl+E** to exit the BIOS.
8. When asked **Are You Sure (Y/N)?**, press **Y** to exit and reboot.
9. Continue with Fdisk and Format steps as if you were installing a conventional hard disk drive.

For Existing Hard Disk Drives with Data

1. As the BIOS boots, press **Ctrl+S** or **F4** when prompted to enter the **RAID BIOS**.
2. At the next screen select **Create RAID Set**, then press **Enter**.
3. At the next screen select **RAID 1**, then press **Enter**.
4. Select **Manual configuration**, then press **Enter**.
5. Select **Source** drive, press **Enter**.
6. Select **Target** drive, press **Enter**.
7. Select **Create with data copy**, then press **Enter**.
8. Select **Online copy**, then press **Enter**.

<p>Note: Selecting Online Copy builds the mirror while in Windows. Selecting Offline copy builds the mirror before exiting the RAID BIOS.</p>
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9. Input the RAID size, press **Enter**.
10. Press **Ctrl+E** to exit the BIOS.
11. When asked **Are You Sure (Y/N)?**, press **Y** to exit and reboot.

3-3 Rebuilding a Failed Mirror Set

When a failure to one member occurs, you will be notified either by the **RAID BIOS** during boot or by the **SATA Raid5 GUI** while in Windows. The steps below will guide you in rebuilding a failed mirror set.

For Offline Mirror Rebuild (SATA RAID BIOS)

1. Replace the failed drive(s) with one of equal or greater capacity, then start the computer.
2. During boot, press **Ctrl+S** or **F4** to enter the **RAID BIOS**.
3. Select **Create RAID Set**, then press **Enter**.

4. Select **SPARE DRIVE**, then press **Enter**.
5. Select the single hard disk drive, then press **Enter**.
6. Input the RAID size, press **Enter**. When asked **Are You Sure (Y/N)?**, press **Y** to confirm.
7. Select **Rebuild Raid 1 Set**, press **Enter**.
8. When asked **Are You Sure (Y/N)?**, press **Y** to confirm. The mirror will begin rebuilding. Do not interfere with the process.
9. When rebuilding is finished, press **Ctrl+E**.
10. When asked **Are You Sure (Y/N)?**, press **Y** to exit and reboot.

For Online Mirror Rebuild (in Windows)

1. Replace the failed drive(s) with one of equal or greater capacity, then start the computer.
2. When Windows resumes, at the SATA SoftRaid 5 screen, click **Legacy Support, Rebuild Legacy RAID Group**.

<p>Note: If Legacy Support does not show, click File, Configuration, Advanced Options. Check Legacy (Bootable) Support, then click OK.</p>

3. At **Rebuild Legacy RAID Group** box, select both hard disk drives, click **Rebuild**.
4. Click **OK**, click **Cancel** to close the window.
5. The mirror will rebuild. Rebuild time is dependent on the size of the mirror set.

3-4 Deleting RAID Arrays

1. As the BIOS boots, press **Ctrl+S** or **F4** when prompted to enter the **RAID BIOS**.
2. Select **Delete RAID Set**, then press **Enter**.
3. Select the RAID set, then press **Enter**.
4. When asked **Are You Sure (Y/N)?**, press **Y** to confirm.

3-5 Resolving Conflicts

When a RAID set is created, the metadata written to the disk includes drive connection information. If, after a disk failure, the replacement disk was previously part of a RAID set (or used in another system), it may have conflicting metadata. If so, this will prohibit the RAID set from being either created or rebuilt, in order for the RAID set to function properly, this old metadata must be first overwritten with the new metadata. To resolve this, from the main BIOS window select **Resolve Conflicts**, then press **Enter**, the correct metadata, including the correct drive connection information, will be written to the replacement disk.

3-6 Low Level Format

Low Level Format is built into the RAID BIOS to make it more convenient to erase the entire contents of a hard disk drive, including data, drive and partition information. The Low Level Format utility works on single hard disk drive only, before the RAID set is configured.

3-7 Logical Drive Info

This menu item allows the display of the assignment of physical drives within a logical set (RAID 0, RAID 1, etc.). This is only a display function.

4. Software Installation

4-1 Windows 2000 Driver Installation

A new installation of Windows 2000 requires a floppy diskette for the driver installation. To make this driver floppy diskette, copy the contents of the **32bit** folder found on the driver CD, onto a blank floppy diskette then follow the directions below.

For a New Installation

1. Setup the RAID array prior to Windows installation.
2. Follow Windows 2000 installation procedure.
3. Restart the computer when prompted by the installation.
4. At the **Windows 2000 Setup** screen, press **F6** to install the RAID driver.
5. When prompted, press **S** to specify the location of the driver.
6. Insert the driver diskette and press **Enter**.
7. Select **Silicon Image Sil 3123 SoftRaid 5 Controller for Windows 2000** then press **Enter**.
8. Press **Enter** again to finish driver installation, then follow the on-screen instructions to complete the Windows installation.

For an Existing Installation

1. Setup the RAID array prior to driver installation and boot up to Windows.
2. When **Found New Hardware Wizard** displays, click **Next**.
3. Check **Search for a suitable driver for my device (recommended)**, click **Next**.
4. Insert the driver CD, check **CD-ROM drives**, uncheck the other check boxes and click **Next**, then click **Next** again.

5. When **Silicon Image Sil 3123 SoftRaid 5 Controller** displays, click **Next**, then **Finish**.
6. Remove the driver CD, restart Windows and complete driver installation.

4-2 32-bit Windows XP/Server 2003 Driver Installation

A new installation of Windows XP/Server 2003 requires a floppy diskette for the driver installation. To make this driver floppy diskette, copy the contents of the **32bit** folder, found on the driver CD, onto a blank floppy diskette then follow the directions below.

For a New Installation

1. Setup the RAID array prior to Windows installation.
2. Follow Microsoft's Windows installation procedure.
3. Restart your system when prompted by Windows installation.
4. At the **Windows Setup** screen, press **F6** to install the RAID driver.
5. When prompted, press **S** to specify the location of the driver.
6. Insert the driver diskette, then press **Enter**.
7. Select **Silicon Image Sil 3123 SoftRaid 5 Controller for Windows XP/Server 2003**, then press **Enter**.
8. Press **Enter** to finish driver installation and follow the on-screen instructions to complete Windows installation.

For an Existing Installation

1. Setup the RAID array prior to driver installation and boot up to Windows.
2. When **Found New Hardware Wizard** displays,
XP (w/SP1 or earlier)/Server 2003: continue to step #3
XP (w/SP2 or later)/Server 2003 (w/SP1 or later): select **No, not at this time**, then click **Next**.
3. Insert the driver CD, check **Install the software automatically (Recommended)**, and click **Next**.
4. Accept the default entry, then click **Next**.
5. Click **Finish**.
6. Repeat steps 2-5.
7. Click **Yes** to restart Windows and complete the installation.

4-3 64-bit Windows XP/Server 2003 Driver Installation

A new installation of Windows XP/Server 2003 requires a floppy diskette for the driver installation. To make this driver floppy diskette, copy the contents of the **64bit** folder, found on the driver CD, onto a blank floppy diskette then follow the directions below.

For a New Installation

9. Setup the RAID array prior to Windows installation.
10. Follow Microsoft's Windows installation procedure.
11. Restart your system when prompted by Windows installation.
12. At the **Windows Setup** screen, press **F6** to install the RAID driver.
13. When prompted, press **S** to specify the location of the driver.

14. Insert the driver diskette, then press **Enter**.
15. Select **Silicon Image Sil 3123 SoftRaid 5 Controller (64-bit Extended)**, then press **Enter**.
16. Press **Enter** to finish driver installation and follow the on-screen instructions to complete Windows installation.

For an Existing Installation

8. Setup the RAID array prior to driver installation and boot up to Windows.
9. When **Found New Hardware Wizard** displays,
XP (w/SP1 or earlier)/Server 2003: continue to step #3
XP (w/SP2 or later)/Server 2003 (w/SP1 or later): select **No, not at this time**, then click **Next**.
10. Insert the driver CD, check **Install the software automatically (Recommended)**, and click **Next**.
11. Accept the default entry, then click **Next**.
12. Click **Finish**.
13. Repeat steps 2-5.
14. Click **Yes** to restart Windows and complete the installation.

To Verify Windows 2000/XP/Server 2003 Installation

1. Right click **My Computer** and click **Manage**.
2. Select **Device Manager**.
3. Double click SCSI and RAID controllers, then double click **Silicon Image Sil 3123 SoftRaid 5 Controller** to display driver properties.
4. A message *This device is working properly* is displayed in the dialog box, the driver has been correctly installed.

4-3 Windows Vista 32bit / 64bit Driver Installation

For New Windows installation

1. Install the board and boot up you system.
2. Setup the RAID array prior to Windows installation.
3. Follow Microsoft procedures to install Windows Vista accordingly.
4. At **Where do you want to install Windows?** Click **Load Drivers**.
5. Insert the driver CD, click **Browse**.
6. Double click your CD-ROM drive,
*For 32-bit Windows Vista: select **32-bit**, then click **OK**.*
*For 64-bit Windows Vista: select **64-bit**, then click **OK**.*
7. **Select Silicon Image SiI 3132 SoftRaid5 Controller** then click **Next**.
8. Follow the on-screen instructions to complete Windows Vista operating system installation.

For Existing installation

1. Setup the RAID array prior to Windows installation.
2. At the **Found New Hardware** windows, click **Locate and install the driver automatically (recommended)**.
3. Insert the driver **CD**, click **Continue**.
4. Click **Next**, then Close to complete the installation.

To Verify Vista Installation

1. Right click **My Computer** and click **Manage**.
2. Click **Continue**.
3. Select **Device Manager**.

4. Double click **Storage controllers**, then double click **Silicon Image Sil 3132 SoftRaid 5 Controller** to display driver properties.
5. A message *This device is working properly* is displayed in the dialog box, the driver has been correctly installed.

5. SATARaid5 GUI

The SATARaid5 GUI provides the user an easy way to monitor your RAID set.

Installing the SATARaid5 GUI

1. Place the driver CD into the CD-ROM drive.
2. At the Windows desktop click **Start**, then **Run**.

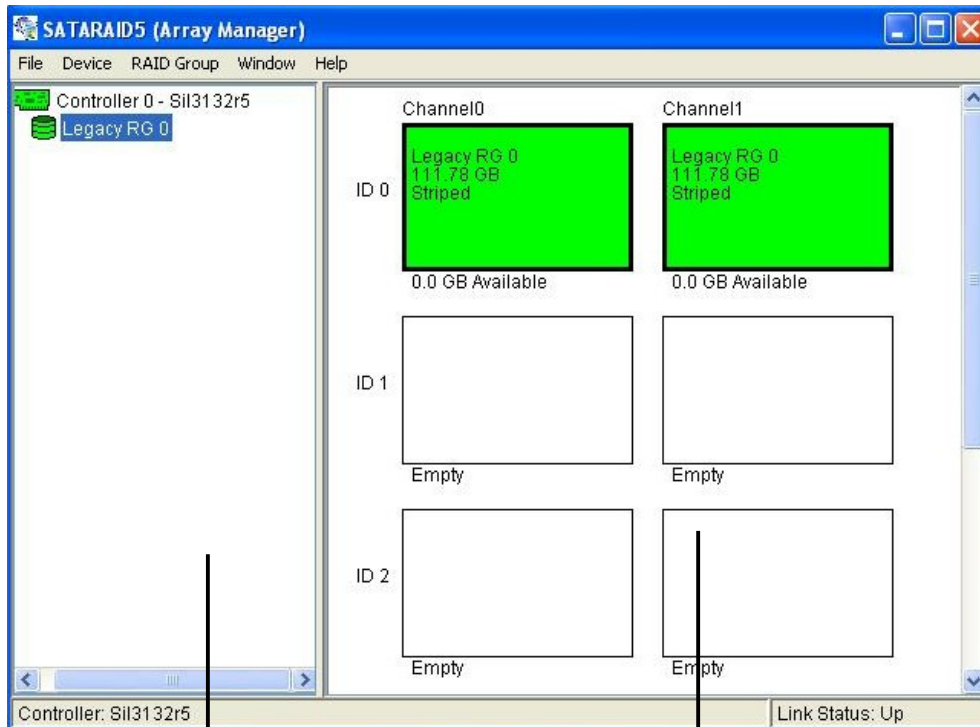
For Windows 2000: Type **D:\gui\setup2000.msi**, then click **OK**.
(Change D: to match your CD-ROM drive letter)

For XP/Server2003/Vista: Type **D:\gui\setup.msi**, then click **OK**.
(Change D: to match your CD-ROM drive letter)

3. Follow on-screen instructions to complete the installation.

SATARaid5 GUI Overview

The installation program configures the SATARaid5 GUI to automatically start when Windows is started. If the GUI does not automatically start or is closed by the user, choose the SATARaid5 program from the start menu to launch the program. Upon launching the GUI, the main windows should appear similar to the following.



RAID Groups window

Device Configuration window

RAID Groups window

This window identifies SATA host adapters and configured RAID groups. Selecting each RAID group in the RAID Groups window, members consisting of the RAID group will be highlighted in the Device Configuration window.

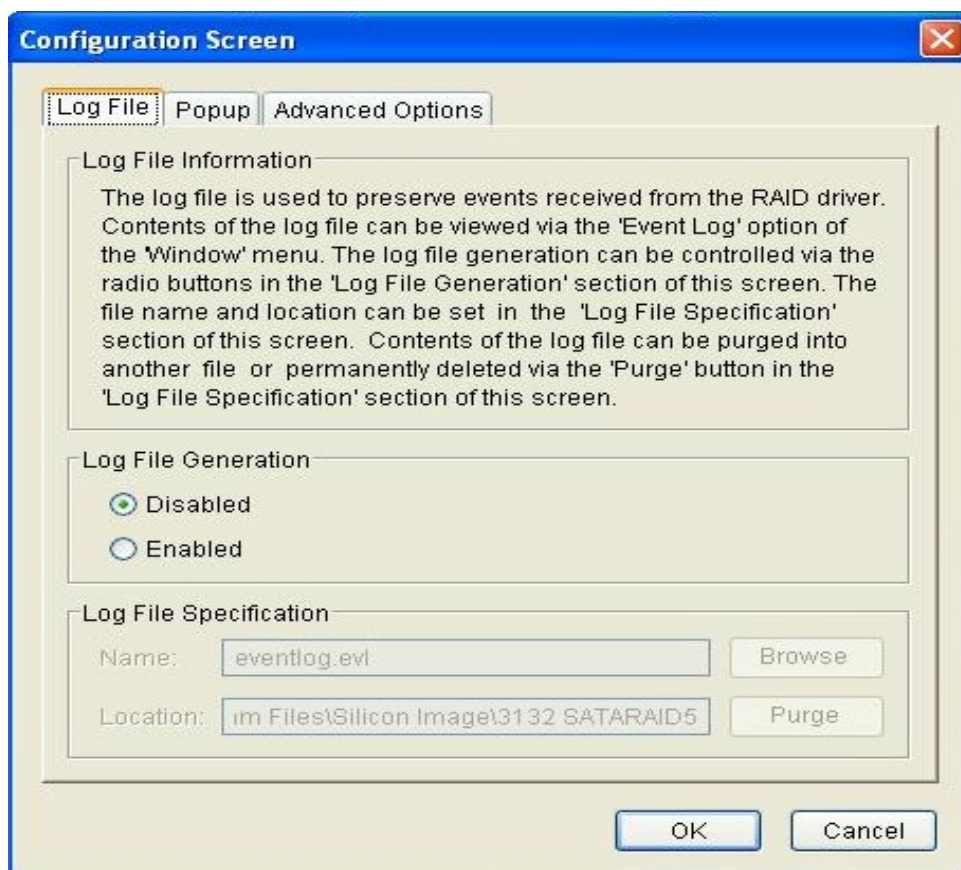
Right clicking on each node in the RAID Groups window, a popup menu will be displayed to let the user select an action to be performed for the selected controller or RAID group.

Device Configuration window

This window identifies all physical drives and their partitions. A physical drive can be partitioned into several portions and each portion can be a RAID group member.

SATARAID5 Configuration Menu

SATARAID5 configuration menu includes customization of the settings for Log File, Popup and Advanced Options. By clicking on File, then Configuration, the user may customize the settings for Log File, Popup and Advanced Options tabs.



Log File

The log file is used to store event information received from all the RAID drivers. The log file can be viewed with any text viewer (such as Notepad) or with the Event Log window of the SATARAID5 GUI. Use the Log File tab to enable/disable the log file, set where the log file should be stored and the name of the file as well.

Popup

The popup window is a visual notification that an event has occurred. The popup window can be disabled or set to popup for only certain event levels.

The different levels are:

Informational - The popup window will be displayed for the following events:

- Informational
- Warnings
- Errors

Warning - The popup window will be displayed for the following events:

- Warnings
- Errors

Errors - The popup window will be displayed for the following events:

- Errors

Disabled - No popup will occur.

Advanced Options

The advanced options tab is used to control advanced feature of the RAID driver. By default, all advanced options are disabled.

Legacy (Bootable) Support: When this feature is selected, legacy Support menu will be available in the menu bar. The Legacy Support menu includes a list of menu items to support RAID functions for legacy RAID groups.

Delete Member Support: When this feature is selected, Delete Member menu item will be available under the Device menu. The Delete Member menu item allows the user to delete a member from RAID 1 group.

Advanced RAID Features: When this feature is selected and the user selects to create RAID group, if the RAID group to be created is fault tolerant group (RAID 1), the user will be able to select Improper Shutdown Policy in the Create RAID Group dialog box. The Advanced RAID Features are not supported for Legacy RAID groups.

Resources Info Support: When this feature is selected, Resources menu item will be available under the Window menu. This feature is for debugging purpose only.

Device Menu Commands

Create Spare and Delete Spare

This command displays a dialog box to let the user create or delete a spare drive. This feature is not used with the *SATA II 2-channel RAID PCIe*.

Delete Member

This command displays a dialog box to let the user choose RAID groups' members to delete.

Delete Orphan

An orphan device segment is part of a RAID group that cannot access another device segment within the same RAID group. When a member of a RAID group fails (such as a loss of power or a complete hard disk failure), it becomes an orphan. This command displays the Delete Orphan Segment window to show all orphan segments and allows the user to delete selected orphan segments.

Device Summary

This command displays the Segment Summary window to show all physical devices' segments.

RAID Group Menu Commands

Create RAID Group

This command displays a dialog box to let the user create a RAID group, the user needs to specify the following parameters:

RAID Group Label: Provides a name for the RAID group.

RAID Group: Select a group ID from the available ID list.

Configuration: *Striped:* for RAID 0; *Mirrored:* for RAID 1

Capacity: Select from a list of RAID group sizes. Selecting MAX will create the largest RAID set possible with the drives selected.

Chunk Size: select one size from the available list. This setting is for RAID 0 (Stripe) set only.

Rebuild Priority: select one size from the available list. RAID 0 and virtual disk do not require this. 10 is the highest level of rebuild priority which means that rebuild times will be faster but will take more CPU resources to rebuild.

Devices: select RAID member devices from the available device segment list.

Rebuild RAID Group

This command displays a dialog box to let the user choose a replacement segment to rebuild a non-fault tolerant RAID group.

Delete RAID Group

This command displays a dialog box to let the user choose RAID group to delete.

RAID Group Summary

This command displays a dialog box to show all RAID groups' group ID, configuration and status. The RAID Group Summary window has its own menu bar. All options available via the menu bar are shown below.

Sorting: This command displays a dialog box to let the user choose up to 3 items to sort RAID group items in the RAID Group Summary window.

Fields: This command displays a dialog box to let the user choose which fields will be shown in the RAID Group Summary window.

Windows Menu Commands

Task Manager

This command displays the Task Manager window. The Task Manager window lists all RAID and disk management tasks that have been started and/or done. This window provides the user with the ability to schedule any RAID and disk management operations including RAID group creation, rebuild and test. The Task Manager window had its own menu bar. All options available via the menu bar are shown below.

Open, Save and Print: These options will be available in future revisions.

Sorting: This command displays a dialog box to let the user choose up to 3 items to sort task items in the task list.

Fields: This command displays a dialog box to let the user choose which fields will be shown in the task list.

Modify: This command allows the user to modify parameter of the selected task items.

Suspend: This command allows the user to suspend the selected task items.

Resume: This command allows the user to resume the suspended task items.

Cancel: This command allows the user to cancel the selected task items.

Delete: This command displays a dialog box to let the user delete the selected task items.

Event Log

This command displays the Event Log window. The Event Log window displays SATA device-related events that occur while SATARAID5 GUI is running. The Event Log window has its own menu bar. All options available via the menu bar are shown below.

Sorting: This command displays a dialog box to let the user choose up to 3 items to sort event items in the event log.

Fields: This command displays a dialog box to let the user choose which fields will be shown in the event log.

Resources

This command displays the Resources Information window. This feature is for debugging purpose only.

Legacy Support Menu Commands

Create Legacy RAID Group

This command displays a dialog box to let the user create legacy (bootable) RAID groups. This item is disabled if new RAID groups exist. The parameters are discussed below.

RAID Group: Select a group ID from the available list.

Configuration: *Striped:* for RAID 0; *Mirrored:* for RAID 1

Capacity: Select from a list of RAID group sizes.

Chunk Size: Select one size from the available list.

Rebuild Priority: Select from the available list. RAID 0 and virtual disk do not require this. 10 is the highest level of rebuild priority which means that rebuild times will be faster but will take more CPU resources to rebuild.

Devices: select RAID member devices from the available device segment list.

Rebuild Legacy RAID Group

This command displays a dialog box to let the user choose a replacement segment to rebuild a non-fault tolerant legacy RAID group.

Delete Legacy RAID Group

This command displays a dialog box to let the user choose legacy RAID groups to delete. This item is disabled if no legacy RAID group exists.

Convert Legacy RAID Group

This command displays a dialog box to let the user choose legacy RAID groups to convert to new RAID groups of the sample RAID type. This item is disabled if no legacy RAID group exists.

Create/Delete/Convert Legacy Spare

These commands display a dialog box to let the user configure a legacy spare. These features are not used with the *SATA II 2-channel RAID PCIe*.



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