User's Manual

INTRODUCTION

The PCI-Express SATA controller card brings a high performance 6.0Gbps hardware RAID 0/RAID 1 solution to desktop/consumer storage applications utilizing a native 1-Lane PCI Express 2.0 interface. The card supports SATA 6Gbps devices compliant with Serial-ATA Revision 3.0 specification and ATA/ATAPI-7 specification. It is also backward compatible with SATA 1.5Gbps and 3.0Gbps devices.

The LED indicator headers on the card are specially designed so that the front panel LED indicator can show Read/Write activities of any hard disk drives connected to the card or to the motherboard.

The orientation and position of the two internal SATA ports are well designed so that the cable wiring fits easily in small form factor computer chassis. 2-port eSATA version for external storage connectivity is also available on specific models.

The card also comes with an internal Parallel-ATA port (Optional, available on specific models) providing support for up to two legacy ATA/ATAPI storage devices such as IDE hard drives.

FEATURES & SPECIFICATION

General

- Based on Marvel 88SE9128 PCI-Express 2.0 SATA 6Gbps hardware RAID controller
- 1-Lane PCI-Express 2.0 interface supports communication speed of 2.5Gbps and 5.0Gbps
- Compliant with PCI-Express 2.0 Base Specification
- Unique Hard Drive Activity LED indicator circuit design: The LED blinks when there is read/write activity on any one of the hard drive connected to the motherboard SATA port or to this add-on card
- Supports Low Profile computer case only with the optional low profile bracket
- Supports Windows 7/Vista/XP/Server 2003-2008 32/64-bit, and Linux

Serial-ATA (SATA) Interface

- Two SATA 6.0Gbps ports (internally, externally or their combination)
- Compliant with Serial-ATA Specification 3.0
- Supports communication speed of 6.0Gbps, 3.0Gbps, and 1.5Gbps
- Compatible with SATA-III (6Gbps), SATA-II (3Gbps), SATA-I (1.5Gbps) hard drives and SSD's
- Supports Gen 1i, Gen 1x, Gen 2i, Gen 2m, Gen 2x, and Gen 3i
- Supports Hardware RAID 0 and RAID 1
- Supports Native Command Queue (NCQ)
- Supports SATA Port Multiplier FIS based switching or command based switching
- Supports SATA port Hot-Plug
- Supports AHCI 1.0 and IDE programming interface
- Supports ATA and ATAPI commands
- Provide 5V, 500mA power on eSATA port (for Power-over-eSATA ports only) (Optional)
- Extended USB on eSATA port (for Power-over-eSATA ports only) (Optional)

Parallel-ATA (PATA / IDE) Interface [1]

- One PATA port supporting 2 ATA/ATAPI/IDE devices (Master and Slave)
- Compliant with ATA/ATAPI-7 specification
- Supports DMA protocols, and up to UDMA 150 Mbps data transfer rate
- Supports Multiword DMA and PIO modes for data transfer
- Supports IDE programming interface

[1] Available on specific models only

PACKAGE CONTENTS

- PCI-Express SATA RAID card x 1
- Driver CD x 1
- User's manual x 1
- LED cable x 1
- Low Profile Bracket x 1 (Available on specific models only)

BEFORE INSTALLATION

- The user must have basic knowledge of installing an add-on card and its driver to a desktop PC. If you have any queries, please call your local dealer, or find somebody who is experienced in computer hardware installation.
- Motherboard with a free PCI-Express 2.0 slot and a supported operating system installed.

WARNING

Before installing and activating this controller card, please make sure you have a complete backup of your existing data from your hard drives. Manufacturer is not responsible for data loss due to abuse, misuse, or neglect. Should you have any installation problem, please contact your dealer for assistance.

HARDWARE INSTALLATION

1. Turn off your computer and all external devices connected to it
2. Disconnect your computer from the power sources.
3. Open the computer case. Refer to your computer user manual for more details.
4. Find an available PCI-Express 2.0 slot and remove the slot bracket. Save the bracket screw for later use.
5. Align the controller card horizontally with respect to the slot and insert it into the slot firmly and evenly. Take care not to force it into the slot. Once you have properly positioned the controller card into the slot, fasten it to the computer case with the screw you have just saved.
6. Mount the hard disk(s) on the computer case.
7. Connect the power cable to the hard disk(s).
8. Connect the SATA hard disk(s) to the controller card with the SATA cable.
9. Connect the computer case's front panel Hard Disk LED cable to pin header **JP4** (See **Figure 1**)

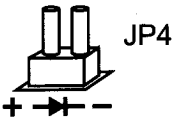


Figure 1

10. Connect the one end of the LED cable (included) to pin header JP5, and the other end to your motherboard's HDD LED connector
11. Secure the computer case and switch on your computer.

Power-over-eSATA INSTALLATION (only available on models with eSATA)

1. Connect the floppy disk power header from the power supply to J1 on the SATA-III controller card

J1: Power connector form power supply

Figure 2

2. Connect the USB extend cable with 2x5 9 pin header on both end (not provided) from the motherboard or other USB controller card to J2 on the SATA-III controller card

J2: Extended USB port

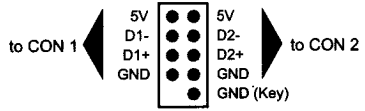
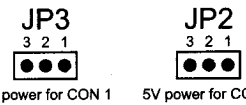


Figure 3

3. Choose a suitable power source on JP2 and JP3, either the 5V power from the power supply or 5V power from the motherboard/USB controller card, for the external devices



PIN	5V Power Source
1-2	Power Supply
2-3	USB Extension

Figure 4

RAID BIOS SETUP

To create a RAID virtual disk (all data will be lost on the HDD connected to the controller card)

1. Skip this section if you are not going to create a RAID virtual disk
2. Press the **[Ctrl]** + **[M]** key on the keyboard at the same time to enter the Marvell BIOS Setup utility.
3. Figure 5 shows the messages displayed during the POST of the SATA controller card

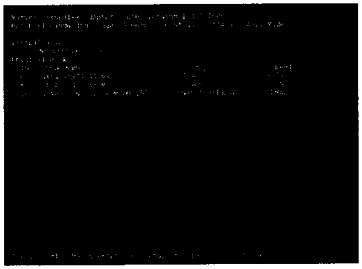


Figure 5

4. Once the BIOS Setup utility is entered, move the cursor to HBA0: Marvell 0 in the Topology pane by the up and arrow key on the keyboard and press Enter
5. Choose Configuration Wizard and press Enter to start creating the RAID Virtual Disk
6. Select the free physical disks available by moving the cursor to the disk and press Space Bar. After selecting all the disk needed, press Enter to continue.
7. Choose the RAID option

RAID Level: RAID 0 – Striping
RAID 1 – Disk Mirroring

Stripe Size: 32K, 64K
It defines the size of the single data block on the virtual disk. The larger the stripe size, the longer it takes to read and write data blocks on the physical disks. A large size is recommended for applications requiring large data transfers, e.g. audio, video and graphics. A smaller size is suitable for applications with smaller size files, e.g. emails and documents.

Gigabyte Rounding: none, 1G, 10G
It defines the maximum allowable size for the replacement disk which can be smaller than the size of the exiting physical disk when rebuilding a degraded RAID 1 virtual disk.

Quick Init: Yes, No
Enable or disable the quick initialization of the virtual disk

VD Name: any value for the users to input
Input an user defined identifier for the virtual disk

8. Choose Next or F10 and press Yes to start creating the virtual disk
9. Press F10 to exit the BIOS

To rebuild a RAID 1 virtual disk

1. When a hard disk in a RAID 1 virtual disk is defective or the data inside are corrupted, the Marvell BIOS Setup utility will mark the virtual disk as Degrade
2. Replace the defective hard disk with an identical hard disk or a hard disk which has a smaller size within the allowable value set for the virtual disk in the Gigabyte Rounding option
3. Enter the Marvell BIOS Setup utility
4. In the Topology pane, Move the cursor to the Virtual Disks ID and select the Rebuild option
5. Move the cursor and select the available replacement hard disk to be rebuilt to by pressing Space Bar and then Enter
6. Press Y to start. The utility will show the rebuild status and the completed percentage. This will take a long time to finish the whole process and it is depend on the size to be rebuilt.

Note: *The PATA (IDE) interface does not support RAID function*

DRIVER INSTALLATION

(A) Installing Driver for Windows 7/Vista/Server 2008 32/64bit:

1. Start Windows and insert the driver CD into the CD-ROM drive, assume drive D.
2. The SATA card is initially installed with the inbox AHCI drivers and recognized as a Standard AHCI 1.0 Serial ATA controller.
3. From the Start Menu, right click My Computer, and select Manage to open the Computer Management utility.
4. Browse to System Tools, then Device Manager in the navigation tree.
5. Select IDE ATA/ATAPI controllers in the list of devices, then right click Standard AHCI 1.0 Serial ATA Controller and select Update Driver.
6. Click on: Browse my computer for driver software, and then browse to the following folder on the driver CD according to your operating system:

   - Windows Vista 32-bit, Server 2008 32-bit and Windows 7 32-bit:
     D:\Marvell\88SE91xx\Windows\Win_32bit\
   - Windows Vista 64-bit, Server 2008 64-bit and Windows 7 64-bit:
     D:\Marvell\88SE91xx\Windows\Win_64bit\

7. Follow the on-screen instructions to install the driver.
8. After successful installation, the SATA card is listed under Storage controllers as Marvell 91xx SATA 6G Controller.
9. For the RAID controller, an additional device Marvell 91xx Config SCSI Processor Device is detected. Select "Locate and install driver software (recommended)" and click Continue. And then select "I don't have the disc. Show me other options".
10. Click on: Browse my computer for driver software, and then browse to the following folder on the driver CD according to your operating system:

    - Windows Vista 32-bit, Server 2008 32-bit and Windows 7 32-bit:
      D:\Marvell\88SE91xx\Windows\RAID\Win_32bit\
    - Windows Vista 64-bit, Server 2008 64-bit and Windows 7 64-bit:
      D:\Marvell\88SE91xx\Windows\RAID\Win_64bit\

11. Follow the on-screen instructions to install the driver.
12. After successful installation, the device is listed in the Device Manager as Marvell 91xx Config Device (under System devices).
13. Once driver installation is completed, you can now connect your external devices to the SATA card. To install the driver for the external devices, please refer to the external device user's manuals.

(B) Installing Driver for Windows XP/Server 2003 32/64bit:

1. Start Windows and insert the driver CD into the CD-ROM drive, assume drive D.

2. Windows will automatically detect the SATA card. Select "No, not this time" and click the Next button to continue.
3. Select "Install from a list or specific location (Advanced)" and click on the Next button.
4. Browse to the following folder on the driver CD according to your operating system:

   - Windows XP 32-bit and Server 2003 32-bit:
     D:\Marvell\88SE91xx\Windows\Win_32bit\
   - Windows XP 64-bit and Server 2003 64-bit:
     D:\Marvell\88SE91xx\Windows\Win_64bit\

5. Follow the on-screen instructions to install the driver.
6. After successful installation, the SATA controller is listed in the Device Manager as Marvell 91xx SATA 6G Controller (under SCSI and RAID controllers).
7. For RAID controller, an additional device Marvell 91xx Config SCSI Processor Device is detected. Select "No, not this time" and click the Next button to continue.
8. Select "Install from a list or specific location (Advanced)" and click on the Next button.
9. Browse to the following folder on the driver CD according to your operating system:

   - Windows XP 32-bit and Server 2003 32-bit:
     D:\Marvell\88SE91xx\Windows\RAID\Win_32bit\
   - Windows XP 64-bit and Server 2003 64-bit:
     D:\Marvell\88SE91xx\Windows\RAID\Win_64bit\

10. Follow the on-screen instructions to install the driver.
11. After successful installation, the device is listed in the Device Manager as Marvell 91xx Config Device (under System devices).
12. Once driver installation is completed, you can now connect your external devices to the SATA card. To install the driver for the external devices, please refer to the external device user's manuals.

(C) Installing Driver for Linux:

Note: *Marvell does not provide Linux drivers for AHCI and IDE/ATA devices*

Drivers for AHCI devices

Linux distributions contain Inbox drivers for AHCI devices. The drivers are installed automatically during the Linux OS installation.

Drivers for IDE/ATA devices

Linux distributions with kernel version 2.6.19 and above include inbox drivers for IDE/ATA devices (Source: http://www.kernel.org/pub/linux/kernel/v2.6/ChangeLog-2.6.19). In most distributions, the kernel does not load the inbox drivers for IDE/ATA devices by default. The procedure for enabling support for IDE/ATA devices in Linux is as follows:

Enabling Support for IDE/ATA Devices during a Clean Installation of Linux

This section describes the procedure for enabling support for IDE/ATA devices during a clean installation of Linux.

To enable support for IDE/ATA devices during a clean installation of Linux:

1. Boot from the Linux installation CD / DVD
2. Select Installation and press Enter
3. Type the following command into the Boot Options command line:
   ata_generic.all_generic_ide=1
4. Press Enter to continue with the Linux OS installation

Enabling Support for IDE/ATA Devices on an Existing Installation of Linux

This section describes the procedure for enabling support for IDE/ATA devices on an existing installation of Linux.

To enable support for IDE/ATA devices on an existing installation of Linux:

1. Login as root.

2. Right-click the Desktop and select Open In Terminal.
3. Type the following commands:

   ls
   cd /boot/grub/
   vim menu.lst

4. Type the following command at the end of the kernel line for the title paragraph that lists the version information for the Linux distribution.

   ata_generic.all_generic_ide=1

5. Browse to File and select Save.
6. Reboot the system for the changes to take effect.

D) Updating Drivers and Manual:

The latest drivers, full version manual and last-minute changes document are available on the website below:

http://www.drivers-download.com

earch for the following Download Code from **"Drivers Search"**:

Chipset.	Description	Download Code
Marvell 88SE9128	PCI-Express to SATA 6Gbps Hardware RAID controller card	DL-0141101