

4 Port PCIe 2.0 SATA III 6Gbps RAID Controller Card with HyperDuo



Actual product may vary from photos

User Manual SKU#: PEXSAT34RH

> For the latest information and specifications visit www.startech.com/PEXSAT34RH

> > Manual Revision: 01/07/2019



Compliance Statements

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- · Reorient or relocate the receiving antenna
- · Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to
 which the receiver is connected
- · Consult the dealer or an experienced radio/TV technician for help

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Safety Statements

Safety Measures

- Wiring terminations should not be made with the product and/or electric lines under power.
- Product installation and/or mounting should be completed by a certified professional as per the local safety and building code guidelines.
- Cables (including power and charging cables) should be placed and routed to avoid creating electric, tripping or safety hazards.

Mesures de sécurité

- Les terminaisons de câblâge ne doivent pas être effectuées lorsque le produit et/ou les câbles électriques sont sous tension.
- L'installation et/ou le montage du produit doit être réalisé par un professionnel certifié et dans le respect des normes locales et du code de construction local.
- Les câbles (y compris les câbles d'alimentation et de chargement) doivent être placés et acheminés de façon à éviter tout risque électrique, de chute ou de sécurité

安全対策

- 電源が入っている状態の製品または電線の終端処理を行わないでください。
- 製品の設置やマウントは、使用地域の安全ガイドラインおよび建築基準に 従い、有資格の専門業者が行うようにしてください。
- ゲーブル(電源ゲーブルど充電ケーブルを含む)は、適切な配置と引き回し を行い、電気障害やつまづきの危険性など、安全上のリスクを回避するよう にしてください。

Misure di sicurezza

- I terminiali dei fili elettrici non devono essere realizzate con il prodotto e/o le linee elettriche sotto tensione.
- L'installazione e/o il montaggio dei prodotti devono essere eseguiti da un tecnico professionale certificato che conosca le linee guida locali sulle norme edilizie e sulla sicurezza.
- I cavi (inclusi i cavi di alimentazione e di ricarica) devono essere posizionati e stesi in modo da evitare pericoli di inciampo, rischi di scosse elettriche o pericoli per la sicurezza.

Säkerhetsåtgärder

- Montering av kabelavslutningar får inte göras när produkten och/eller elledningarna är strömförda.
- Installation och/eller montering får endast göras av behöriga yrkespersoner och enligt gällande lokala förordningar för säkerhet och byggnormer.
- Kablar (inklusive elkablar och laddningskablar) ska dras och placeras på så sätt att risk för snubblingsolyckor och andra olyckor kan undvikas.



Table of Contents

Compliance Statements	1
Safety Statements	2
Product Diagram	5
Product Information	6
Packaging Contents	б
System Requirements	6
Installation	6
Hardware Installation	6
Driver Installation	
Management Utility Installation - Windows Only	9
Operation	10
RAID Configuration	
HyperDuo Configuration	
Software Operation	15
Create a RAID Array	
Create a HyperDuo Array	
Managing Your Array	



Product Diagram





Product Information

Packaging Contents

- PCIe SATA Controller Card x 1
- Low Profile Bracket x 1
- Driver CD x 1
- User Manual x 1

System Requirements

Host Computer

PCI Express enabled computer with an available PCI Express x2 slot

Operating System

- Windows[®] XP (32/64-bit), Server 2003(32/64-bit), Vista (32/64-bit), 7 (32/64-bit), Server 2008 R2, or 8 (32/64-bit),
- Mac OS[®] 10.6, 10.7, or 10.8
- Linux®

Installation

Hardware Installation

Warning! PCI Express cards, like all computer equipment, can be severely damaged by static electricity. Be sure that you are properly grounded before opening your computer case or touching your PCI Express card. StarTech.com recommends that you wear an anti-static strap when installing any computer component. If an anti-static strap is unavailable, discharge yourself of any static electricity build-up by touching a large grounded metal surface (such as the computer

case) for several seconds. Also be careful to handle the PCI Express card by its edges and not the gold connectors.

- Turn your computer off and any peripherals connected to the computer (i.e. Printers, external hard drives, etc.). Unplug the power cable from the rear of the power supply on the back of the computer and disconnect all peripheral devices.
- 2. Remove the cover from the computer case. See documentation for your computer system for details.
- 3. Locate an open PCI Express x2 slot and remove the metal cover plate on the rear of the computer case (Refer to documentation for your computer system for details).

Note: This card will work in PCI Express slots of additional lanes (i.e.x4, x8, or x16 slots).

4. Gently insert the card into the open PCI Express slot and fasten the bracket to the rear of the case.

Note: If installing the card into a small form factor/low profile system, replacing the pre-installed full profile bracket with the included low profile installation bracket may be necessary.

- 5. Connect SATA cables from the ports on the card to the SATA devices inside the computer.
- 6. Place the cover back onto the computer case.
- 7. Insert the power cable into the socket on the power supply and reconnect all other connectors removed in Step 1.



Driver Installation

Windows XP

Note: The latest driver is available from www.startech.com.

- 1. Once the computer has started and the operating system is fully loaded, insert the provided Driver CD into the computer's CD/DVD drive.
- 2. AutoPlay should give you the option to browse the files on the CD or automatically open the CD.



Autoplay screen



3. If AutoPlay does not start, go into "My Computer" and access the CD/DVD drive that the CD is in.

2 Ply Computer			- ¤ ×
Proceedings Proceedin	And Control Polder Hard Disk Driv Control Control Control Devices with Devices with Network Drive	Address () Hy Computer	
	Other HI	l Bietooth Places	

My Computer screen

4. Open the folder "SATA6G_M9128". Run the file 'drvSetup. exe'. Follow the onscreen instructions to complete the driver installation.

Windows Vista/ 7/ 8

The driver is natively supported by newer Operating Systems. The driver should automatically install through Windows Update.

Management Utility Installation - Windows Only

RAID and/or HyperDuo configuration can be accomplished either through the integrated card-BIOS utility, or through the Marvell Storage Utility (MSU). Details for installing the MSU are below.



- Download the RAID Management Tool from: StarTech.com/ Support.
- 2. Open the **"Win"** folder from the main directory and launch the **MSUSetupX.X.XXXX(.exe)** setup file. You may receive a Windows Security Warning alerting you that the application has been launched. Click **Run**.
- 3. The windows installation wizard will walk you through the remaining installation steps. To complete the installation, click the **Next** button on each window, and accept the License Agreement when displayed.
- 4. Once installation is complete, click the **Finish** button. The Marvell Storage Utility has now been installed.

Operation

RAID Configuration

Card BIOS Method

Warning! Creating a RAID virtual disk destroys all data on the physical disks included in the virtual disk set. Make sure to back up all data before continuing.

- 1. When prompted on startup, press **Ctrl+M** to enter the card BIOS utility. Press <Ctrl>+<M> to enter BIOS Setup or <Space> to continue.
- 2. Using the arrow keys to navigate, move to "HBA0: Marvell 0" and press **Enter** to select
- 3. Press Enter again to open the Configuration Wizard

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Marvell BIOS Set	up (c) 2009 Marvell Technology Group Ltd.—————
—— Topology———	Information
í	
HBA 0: Marvell 0 - Virtual Disks [Configura	: 1848 ation Wizard] : 91xx
HDD 0: WDC WD1002FAEX	: B1 BIOS Version : 1.0.0.1029
L HUD 1: NDC NDIOUZFAEX	PCIe Speed Rate : 5.06bps Configure SATA as: AHCT Mode
	Supported Mode : RAIDO RAID1 Safe Capacity

Configuration Wizard

 Use the arrow keys to scroll through the list of free physical disks to select the drives that will be part of the RAID set. Press Space to select/de-select a disk.

Note: When a disk is selected, an asterisk (*) appears to the left of the disk label.

- 5. After selecting the required disks, press Enter to continue.
- 6. The "Create Virtual Disk" configuration options appear in the "Information" pane (right-side), here you are able to select the RAID level and other configuration options:
 - Select 2 HDDs for RAID 0 or RAID 1
 - Select 3 HDDs for RAID 0
 - Select 4 HDDs for RAID 0 or RAID 10



Hard-to-find made easy

Marvell BIOS Set	up (c) 2009 Marvell Te	chnology Group Ltd.=
Configure->Select free disk	sCreate Virtual Disk—	
HBA 0: Marvell 0 + Virtual Disks - Free Physical Disks * - HDD 0: WDC WD1002FAEX * HDD 1: WDC WD1002FAEX	RAID Level Max Size (MB) Stripe Size Quick init Name Threshold(%) Next	: RAID 1 : 0 : 64KB : Yes : 90

Create Virtual Disk option

7. After configuring the virtual disk, highlight "Next" and press Enter. Press Y to confirm the creation of the virtual disk. It will now be listed in the Topology Pane (left).

HyperDuo Configuration

HyperDuo offers the following two modes that you can configure using either of the procedures outlined in the following sections:

 Safe mode creates a virtual disk that is optimized for best fault tolerance – the frequently accessed files copied to the SSD for performance are also stored on the HDD. It is safe to use with hard drives that contain existing data. Virtual disks created in safe mode can also be partially rebuilt if the SSD fails, but not if the HDD fails.



 Capacity mode creates a virtual disk that is optimized for maximum utilization of the SSD – the frequently accessed files are moved to the SSD (not copied). Virtual disks created in capacity mode have better read and write performance than those created in safe mode. However, they cannot be rebuilt.

Warning! Capacity mode is a data-destructive process. Please back up all data before using capacity mode.

Card BIOS Method

- 1. When prompted on startup, press Ctrl+M to enter the card BIOS utility. Press <Ctrl>+<M> to enter BIOS Setup or <Space> to continue.
- Using the arrow keys to navigate, move to "HBA0: Marvell 0" and press Enter to select
- 3. Press Enter again to open the Configuration Wizard.



Configuration Wizard screen



 Use the arrow keys to scroll through the list of free physical disks to select the drives that will be part of the HyperDuo set. Press Space to select/de-select a disk.

Note: When a disk is selected, an asterisk (*) appears to the left of the disk label.

- 5. After selecting the required disks, press Enter to continue.
- 6. The "Create Virtual Disk" configuration options appear in the "Information" pane (right-side), here you are able to select HyperDuo or RAID options

Note: The default HyperDuo mode is Safe mode.

7. Highlight "Keep original data" and press Enter to select. Select Yes or No and press Enter.

Warning! Selecting "No" will destroy all data on the disks included in the virtual disk set. Make sure to back up all data before continuing. The "Keep original data" option is disabled when you choose Capacity mode, as it is inherently datadestructive.



Create Virtual Disk option



8. After configuring the virtual disk, highlight "Next" and press Enter. Press Y to confirm the creation of the virtual disk. It will now be listed in the Topology Pane (left).

Software Operation

The Marvell Storage Utility (MSU) is a browser-based management utility that can create and manage RAID and HyperDuo virtual disks using your Thunderbolt hard drive enclosure.

Note: Active Scripting or JavaScript must be enabled in your default web browser.

Create a RAID Array

Warning!: In order to prepare your drives for RAID operation, this enclosure will configure newly installed drives into your desired RAID configuration. Please be aware that any data currently on the drives may be lost during this process. It is recommended that you back up all data prior to setting your RAID configuration.

1. Launch the MSU software using the icon on your desktop.



MSU Software icon

2. Once the application window is opened you will need to login using your OS account user name and password.

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3. Select Adapter from the Marvell Storage menu, then hoverover the operation tab, and select Create RAID.

Marvell Sto	brage	Property	Operation				
Marvell Storage Man	agement	Create HyperDuo				Modify	Restore
Service	ervice	Max PCIe Link Create RAID					í
Protection Protection Protection Physical Disk: port 1 Physical Disk: port 1		Current PCIe L	Quick Create	Wizard			
		Supported MAID Modes		RAIDO	RAID1, HyperDuo (Capa	city), HyperDuo (Safe)	
		Supported Stripe Size		32K 64	4K		
		Supported VD C	tache	None	None		
Management		Maximum PD pe	r Adapter	6			
Email Notify	Setting	Maximum VD pe	r Adapter	2			
		Maximum PD pe	r VD	2			
		Maximum Port N	Aultiplier	1			
Event Logs(0-	0/Total Ever	ats:0)	4	save (Clear	0	000
Adapter	Class	Time			Descrip	tion	

Operations tab

4. The Create New VD window is now displayed, using the Select RAID Level drop down menu choose your desired RAID mode.

Marvell Storage	Property Option	1001		
Service Servi	Create New VD	Select RAID 1 08 08)	ALC 0	
	Max number of disks for o Useable Capacity of Volum	treate VD me	Select disk()	2 s)
· · · · · · · · · · · · · · · · · · ·				Cancel
Event Logs(0~0/Total E	vents:0)	Save Clear		0000
Adapter Class	Time		Description	

Select Raid Level drop-down menu

- 5. Physically installed hard drives will be represented on the Create New VD screen.
- 6. Select each drive you would like included in your RAID array.
- 7. Click the Next Button, a default name will now be assigned to your RAID array.

Note: The Next button will not be selectable, until the correct number of physical hard drives have been selected to build your desired array.

Marvell Stora	ge /	Property Option	ration	
Marvell Storage Manager	ment	Create New VD	Select RAID Leve	RAD1 +
Service Service Device Device Device Device Device Device		SATA SA 921.5 08 931. (933.5 C8) (934. ID 1 0 ID	7A 5 G6 5 G8 1 8	
Management	Disk: port (Disk: port 1 ing	Max number of disks for Useable Capacity of Vol	r create VD lume	2 2
	-			Next Cancel
-		Contraction of the second s		
Event Logs(0~0/1	Total Event	ts:0)	Clear	0000
Event Logs(0~0/1 Adapter	Class	ts:0) Time	Clear	Description
Event Logs(0~0/1 Adapter	Class	Time	Cave Gear	Description

Create New VD screen

8. To rename the array, click the Name field and type your desired name.



9. Select the Initialization method for your choice from the drop-down menu.

Marvell Storage	Property Opt	ration								
Marvell Storage Management	Create New VD	Create New VD								
Service General Service	Name : Initialize : Write Cache Mode : ert (ret i	VD_R1_1 Fast Initialization No Initialization Fast Initialization Fast Initialization No Read Ahead	RAID Set Size : Stripe Size : Gigabyte Rounding	931.4 G8 64K • 9: None •						
Email Notify Setting	Selected RAID Level : Useable Capacity of Vo	olume 1		RAID 1 931.4 GB						
x (· ·		Previous	Submit Cancel						
Event Logs(0~0/Total E	Events:0)	Clear		0000						
Adapter Class	Time		Description							
				į						

Select Initialization method

- 10. Select your desired stripe size using the Stripe size drop down menu.
- 11. Click the Submit button, to rename the array.

Marvell Storage	Property Opto	TONISH							
Marvell Storage Nanagement	Create New VD	Create New VD							
Service	Name : Initialize :	VD_R1_1 Fast Initialization	RAID Set Size : Stripe Size :	931.4 G8					
 Madapter D Physical Disks 	Write Cache Mode :	Write Through(Reliable) -	Gigabyte Rounding :	64K					
B. Management	Selected RAID Level : Useable Capacity of Vol	Selected RAID Level : Useable Capacity of Volume :		RAID 1 931.4 GB					
	(*)		Previous Sul	amit Cancel					
Event Logs(0~0/Total	Events:0)	Ciear		0000					
Adapter Clas	s Time		Description	Description					

Submit button



Note: a number of advanced options can also be changed such as Name, Initialize setting, Cache Modes, RAID Set Size, Stripe Size, and Gigabyte Rounding (It is recommended that they are left as their defaults).

12. Your RAID array has now been created. The Property tab will now be displayed for your newly created RAID array.

Marvell Stor	age 📠	reparty Open	ation	
Marvell Storage Manag	ement			Madily Castore
Service	10		0	
Device	CB N	ime	VD_R1_1	
🚊 💋 Adapter 0	RJ	ID Level	RAID 1	
Virtual Disks	9 8	atus	Functional	
e 👔 Materia	Sisk Die Si	20	931.4 GB	
A Phys	sical Disk	ember Count	2	
Physical Disks	9	ripe Size	64 K	
Physical	Disk: po-			
Physical Physical	Disk: po			
Event Logs(00)	Total Events:))	Gauce Clear	0000
Adapter	Class	Time	Descripti	on

Property tab



Create a HyperDuo Array

Warning! In order to prepare your drives for HyperDuo operation, this enclosure will configure newly installed drives into HyperDuo configuration. Please be aware that any data currently on the drives may be lost during this process. It is recommended that you back up all data prior to setting your HyperDuo configuration.

1. Select Adapter from the Marvell Storage menu, then hoverover the operation tab, and select Create HyperDuo.

Marvell Sto	orage	Property	Operation				
Marvell Storage Man	agement	Create HyperDuo		Modify	(Resto	ωĬ	
Service	nine .						
		Current PCIe L Quick Crea		Wizard			
		Supported MAID Modes		RAIDO	RAID1, HyperDuo (Capacity), HyperDuo (Safe)	
E Physical Disk		Supported Strip	e Size	32K 6	4K		
Phys	cal Disk: port 1	Supported VD C	Cache	None			
Management		Maximum PD pe	er Adapter	6			
Email Notify	Setting	Maximum VD pe	er Adapter	2			
		Maximum PD pe	r VD	2			
		Maximum Port M	Aultiplier	1			
vent Logs(0-	0/Total Even	ts:0)	-	(Clear_	000	4
Adapter	Class	Time	e		Description		

Operation tab

- 2. The Create HyperDuo screen is now displayed. Using the Mode drop down menu, select:
 - Safe: Creates an array for optimal fault tolerance.
 - **Capacity:** Creates an array for optimal performance (Capacity Mode will delete all content currently saved on your drives).



3. Click the Submit button, to create the HyperDuo array.

Marvell Storage	(PI	operty Opera	tion						
Marvell Storage Management	Cre	Create HyperDuo							
Service Service Service Service Service Service Service Service Service Service Service Service Service Service Service Service Service Service Service Service Service S	SS			Size : 238,4 GB					
Management	port C HD	D ID 1 (SATA 931.5 GB)		Cache Size(GB)	Threshold(%) 90	Mode Safe v Safe Cepacity	Keep Original Data		
·						Submit	Cancel		
Event Logs(0~0/Tota	Events:0)	Save	Clear		_	0000		
Adapter Cla	55	Time			Description				

Submit button

4. The Property tab will now be displayed for your newly created HyperDuo array.

Note: It can take up to 30 minutes for the HyperDuo array to be created.

Managing Your Array

View Properties of your RAID/HyperDuo Array

1. Select the desired array from list of Virtual Disks in the Marvell Storage Menu.



2. The Property tab will appear, listing the Properties for your array.

Adapter	Class	Time	Descript	ion
Event Logs(0	~0/Total Events:	0)	Save Clear	0000
Management				
Phys	sical Disk: po			
Adapter 0 Mana Disks Mana Disks Mana Disks Mana Disks Physical Disk Physical Disks Physical Disks		ripe Size	64 K	
		ember Count	2	
		ze	931.4 08	
		acus	Puncoonal	
		ab Letter	Continent	
		UD Level	PAID 1	
HyperDuo S	lervice N	ame	VD_81_1	
Service	10		0	
Marvell Storage Ma	nagement			(Modify) Restore

Property tab

Rename Your Array

- 1. Select the Name field on the Property tab and type your desired Name in the field.
- 2. Click the Modify button, to rename the selected array.

Marvell Storage	Dioperate Operate	non	
Marvell Storage Management			Modify Restore
Service	ID	0	
Device	Name	TEST	
🚊 💋 Adapter 0	RAID Level	RAID 1	
- Virtual Disks	Status	Functional	
B WRITER Disk Conta	Size	931.4 GB	
Physical Disk	Member Count	2	
Physical Disks	Stripe Size	64 K	
Physical Disk: po			
Event Logs(0~0/Total Eve	nts:0)	Save Clear	0000
Adapter Class	Time	Descrip	tion

Modify button

Delete Your Array

Warning! Deleting your RAID array permanently erases any data on your virtual disk. However, you can choose to keep partition information on the virtual disk.

1. Hover-over the Operation tab at the top of the Property page and select Delete.



Delete function

- 2. A warning will be displayed alerting you that all data on the virtual disk will be erased. Select OK to acknowledge the warning.
- 3. An additional pop-up message will appear, warning you that drive data will be lost, click Ok to continue.
- 4. A message will now be displayed asking: Do you want to delete the partition information if this has one? Click OK to delete the partition information or Cancel to keep the partition information stored on the drive.

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View Properties of your Physical Hard Drives

• Select your desired physical disk from list of Physical Disks in the Marvell Storage Menu. The Property tab is now displayed, listing the Properties for your disk.

Marvell Storage		projectivy Opera	tion		
Marvell Storage Managemen					
.Service		ID		0	
Device	7	Туре		SSD	
Adapter 0	M	Model		C300-MTFDDAC256MAG	
Physical Disks		Size		238.5 GB	
		Status		Unconfigured	
Management		Current speed		6Gb/s	
		dapter ID		0	
		arent Device		HBA	
	P	arent Device Port ID		0	
A.W.			100.00		
Event Logs(0~0/Tot	al Events:	0)	Save Clear	,	0000
Adapter Cl	a55	Time		Description	

Property tab

Note: Your physical disk properties cannot be edited.

Erase Foreign RAID Configuration

Warning! When erasing previously configured RAID Data, this enclosure will erase all drive data. Please be aware that any data currently on the drives will be lost during this process. It is recommended that you back up all data prior to erasing previously configured RAID data.

RAID controllers store data on any drive within a RAID array. If your drives have been previously configured in a different RAID array, this data must be deleted before a new array can be built. Please follow the below steps to erase previously configured RAID data.

1. Select your desired physical disk from list of Physical Disks in



the Marvell Storage Menu. Hover-over the Operation tab and select Erase Foreign Configuration.

Marvell Storage	Property	Operation		
Marvell Storage Management		Erase Foreign Configurati	ion	
Service	ID	<u> </u>	0	
Device	Type		SATA	
🚊 💋 Adapter 0	Model		WD1002FAEX-0023A0	
Physical Disks	Size		931.5 GB	
Contraction of the	Status		Foreign	
Management	Current spee	đ	6Gb/s	
Email Notify Setting	Adapter ID		0	
	Parent Device		HBA	
	Parent Device	e Port ID	1	
AT			there is	0000
Event Logs(0~0/Total	Events:0)	Same G	Hear .	0000
Adapter Clas	s n	me	Description	
				â

Erase Foreign Configuration function

2. Your previously installed RAID data will now be deleted.



Warranty Information

This product is backed by a two-year warranty.

For further information on product warranty terms and conditions, please refer to <u>www.startech.com/warranty</u>.

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