



3ware® 9690SA
SAS/SATA RAID
Controller

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Installation Guide

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Book Descriptions:

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Using an incorrect cable can result in drives that are not detected. These cables have multilane cable plug connectors on each end Figure 6. Figure 6. If you are uncomfortable opening a computer system and conforming to standard ESD electrostatic discharge practices, you should have a computer technician perform the installation. Replacing the heat sink will alter thermal characteristics and cooling requirements and may cause the controller to fail. Replacing the factory-installed heat sink will void the warranty. The onboard heat sink collects heat, and must have adequate airflow in order to disburse it. It is important that the cables do not obstruct the air flow or prevent proper ventilation of the system. If your enclosure is low-profile, unscrew the full height bracket from the 3ware 9690SA RAID controller and replace it with the included low-profile bracket, using the same screws. If appropriate, set the PM2 power management jumper on the disk drives, to enable staggered spinup. Save this screw; it will be used to secure the 3ware 9690SA RAID controller after you have seated it in the slot. Position the card in the PCI Express slot so that the contacts will mate with the grooves in the slot, and all pins make proper contact with the PCI Express slot pins when pushed into place. Check that the 3ware RAID controller's metal bracket covers the hole in the case and secure the bracket with the screw that was used to secure the filler bracket in step 5. Insert the SFF8088 cable plug connector into the multilane external connector of the controller. When the plug is inserted correctly, you will feel it click into place. The user guide is included on the 3ware CD that came with your controller. When used with the 3ware 9690SA RAID controller, the BBU control module is mounted on the RAID controller and the battery pack is installed on a remote battery board. If you have a 9690SA8E the location of the control module post hole will be different. <http://www.regionoverseas.com.np/userfiles/comfort-aire-bhd-501-a-manual.xml>

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Remove the screw head from the plastic post on the BBU control module and set it aside you will reattach it soon. Figure 11. The battery can be mounted in 3 different positions, as marked on the board see Figure 14. Use the position that will make it easiest to connect the battery power cable to the BBU control module on the 3ware RAID controller. Press down on the top of the battery module to free the clip on the bottom of the module. While pressing down on the top of the battery module, lift out the bottom of the battery module slightly. AMCC also offers tollfree 1 800 8406055 or 1 858 535 6517 direct phone support during normal business hours. This publication may be copied or reproduced for reference purposes only. All other purposes require the express written consent of AMCC, 215 Moffett Park Drive, Sunnyvale, CA 94089.

Chapter Description 1 Getting Started Overview of the 3ware RAID controller and important safety factors to keep in mind during installation 2 Installing Your 3ware How to install your 3ware RAID controller RAID Controller 3 Installing a Battery How to install and maintain a BBU Backup Unit The following additional documentation is available for your 3ware RAID These cables have multilane cable plug connectors on each end Figure 6. Figure 6. Multilane Cable Serial ATA SFF8087 SFF8088 to SFF8088 Multilane cables For use with the 9690SA8E and 9690SA4I4E 3ware RAID con In order to use enclosure support services, such as locating a drive by blinking an LED or notificati The 3ware 9690SA RAID controller card should be installed by technically qualified persons. If you are uncomfortable opening a computer system and conforming to standard ESD electrostatic discharge practices, you should have a computer t High voltages may be found inside computer equipment. Before installing any of

the hardware in this package or removing the protective covers of any computer equipment, turn off power switches and disconnect power cords. <http://www.ammarcomplex.com/fckimages/comfort-aire-dehumidifier-manual-bhd-301.xml>

Do not reconnect the power cords until the hardware is installed and the system cover is closed. Protecting Equipment and Data Heat Sink Warning. Do not replace the faThe onboard heat sink collects heat, and must have adequate airflow in order to disburse it. It is important that the cables do not obstruct the air flow or prevent proper ventilation of the system. Selecting the Slot in Which to Install the Controller Consider these factors when deciding on the slot iFor details, see "Chapter 3. Installing a Battery Backup UnTurn off power to the computer and disconnect the power cord from the outlet. 2 Make sure you are properly grounded. For details about safety precautions, see page 8. 3 Open the computer case according to the manufacturer's instructions. 4 Locate the PCI Express slot you want to use for the 3ware 9690SA RAID controller. For a discussion of which slot to use, If in doubt about what slots you have, check the documentation for your motherboard. Do NOT use a PCI or PCIX slot. 8 Check that the 3ware RAID controller's metal bracket covers the hole in the case and secure the Internal Connectors The 9690SA8I, 9690SA8IF, 9690SA4I, and 9690SA4I4E controller cards have internal connectors and use the SFF8087 cable. Insert the SFF8087 cable plug into the multilane connector on the controller. When the cable is inserted correctly, you will feel it click into place. FiguInsert the SFF8088 cable plug connector into the multilane external connector of the controller. When the plug is inserted correctly, you will feel it click into place. Figure 10. Connecting a Multilane Cable with an SFF8088 Connector to the 9690SA8E Controller Connect the Cables to Backplanes After installing your 3ware RAID controlFinishing Up the RAID Controller Installation After you have installed the controller in the computer and attached appropriate cables to the controller and drives, complete the following steps to complete the hardware installation. Connect Battery.

All rights reserved. This publication may be copied or reproduced for reference purposes only. All other purposes require the express written consent of AMCC, 215 Moffett Park Drive, Sunnyvale, CA 94089. This guide tells you how to install it. Using an incorrect cable can result in drives that are not detected. Page 9 Cables SFF8087toSFF8087 Multilane cables Use with an internal connector of the 9690SA8I, 9690SA8IF, 9690SA4I, or 9690SA4I4E 3ware RAID controller. A list of systems that have been tested is available at Enclosure Requirements In order to attach more than four drives per connector, enclosures with expanders are required. The 3ware 9690SA RAID controller card should be installed by technically qualified persons. Page 13 Safety Information Personal Safety When Installing the 9690SA RAID Controller in Your Computer Warning. High voltages may be found inside computer equipment. Before installing any of the hardware in this package or removing the protective covers of any computer equipment, turn off power switches and disconnect power cords. Do not reconnect the power cords until the hardware is installed and the system cover is closed. Protecting Equipment and Data Heat Sink Warning. Page 14 Chapter 1. Getting Started Installation Considerations Air Flow, Cable Length, and Routing Space Adequate airflow and ventilation are particularly important for 3ware 9690SA RAID controllers. The onboard heat sink collects heat, and must have adequate airflow in order to disburse it. It is important that the cables do not obstruct the air flow or prevent proper ventilation of the system. Page 15 Chapter 2. Installing Your 3ware RAID Controller Tools You Need You will need the following tools during installation An ESD grounding strap or mat A Phillips screwdriver Before You Start 3ware 9690SA RAID controllers can be installed in a standard enclosure or in an enclosure with a backplane. 1 Be sure to read "Safety Information" on page 8 in Chapter 1.

<http://www.drupalitalia.org/node/69165>

2 If you have a Battery Backup Unit BBU, install it before proceeding. For details, see "Chapter 3. Page 16 Chapter 2. Installing Your 3ware RAID Controller Install the Controller in the Computer 1 If

the computer is running, shut it down. Turn off power to the computer and disconnect the power cord from the outlet. 2 Make sure you are properly grounded. For details about safety precautions, see page 8. 3 Open the computer case according to the manufacturer's instructions. 4 Locate the PCI Express slot you want to use for the 3ware 9690SA RAID controller. Page 17 Install the Controller in the Computer 7 Press down gently on the edge of the 3ware RAID controller directly above the PCI Express slot until it is fully seated. Figure 8. Inserting Controller Into PCI Express Slot Use a PCI Express slot for the 3ware 9690SA controller. If in doubt about what slots you have, check the documentation for your motherboard. Do NOT use a PCI or PCIX slot. Page 18 Chapter 2. Installing Your 3ware RAID Controller Attach the Cables to Your Controller The internal and external connectors of the 9690SA RAID controller accept different cable connector plugs. Internal Connectors The 9690SA8I, 9690SA8IF, 9690SA4I, and 9690SA4I4E controller cards have internal connectors and use the SFF8087 cable. Insert the SFF8087 cable plug into the multilane connector on the controller. When the cable is inserted correctly, you will feel it click into place. Figure 9. Page 19 Connect the Cables to Backplanes External Connectors The 9690SA8E and 9690SA4I4E controller cards have external connectors and use the SFF8088 cable. Insert the SFF8088 cable plug connector into the multilane external connector of the controller. When the plug is inserted correctly, you will feel it click into place. Figure 10. Page 20 Chapter 2.

<http://iluvlocalplaces.com/images/canon-mp-e-65mm-1-5x-macro-lens-manual.pdf>

Installing Your 3ware RAID Controller Note If your backplane has individual connections for each drive, or if you do not have a backplane, you can directly connect up to 4 drives per internal connector through use of a breakout cable. Finishing Up the RAID Controller Installation After you have installed the controller in the computer and attached appropriate cables to the controller and drives, complete the following steps to complete the hardware installation. Page 21 Chapter 3. Installing a Battery Backup Unit The Battery Backup Unit BBU is an optional addon consisting of a control module and a battery pack. When used with the 3ware 9690SA RAID controller, the BBU control module is mounted on the RAID controller and the battery pack is installed on a remote battery board. The BBU's purpose is to supply power to the controller's memory module in the event of a system power loss. Page 22 Chapter 3. Installing a Battery Backup Unit Before You Start Before installing the BBU, do the following 1 Decide which expansion slot locations to use for the 3ware RAID controller and the remote battery board. 2 For the remote battery board, consider ventilation and convenience of access for battery replacement. If possible, leave a space for airflow around the remote battery board, as battery life is shortened by excessive heat. Page 23 Installing the Control Module To install the control module Note The following illustrations show the 9690SA4I4E. If you have a 9690SA8E the location of the control module post hole will be different. 1 Remove the screw head from the plastic post on the BBU control module and set it aside you will reattach it soon. Figure 11. Page 24 Chapter 3. Installing a Battery Backup Unit 3 Press down gently until the BBU is seated. Figure 13. BBU control module connected to the controller 4 Turn the controller over, insert the plastic screw head that you removed in step 1 into the plastic post, and tighten it gently but firmly. Do not overtighten!

<http://immobilien-ankauf.com/images/canon-mp11dx-calculator-manual.pdf>

5 If necessary, attach the extension cable to the BBU control module in order to reach the intended location of the remote battery board. 6 Install your 3ware RAID controller. Page 25 Installing the Remote Battery 3 Select the battery location on the remote battery board. The battery can be mounted in 3 different positions, as marked on the board see Figure 14. Use the position that will make it easiest to connect the battery power cable to the BBU control module on the 3ware RAID controller. Note You can mount a second battery on the board, if you have another controller. Figure 14. Page 26 Chapter 3. Installing a Battery Backup Unit 4 Mount the battery in the selected location by snapping it in place. Note The battery will drain if it is plugged into the BBU and there is no

power to the unit. Page 28 Chapter 3. Installing a Battery Backup Unit Replacing the Battery The Battery Backup Unit BBU will last for many years. The BBU battery has an expected life span of one to two years depending on usage. You can check the current status of the battery, and test it. To obtain a replacement battery module, contact AMCC. Page 29 Replacing the Battery Figure 17. Removing the power cable from the BBU module Press down on the leverlike clip and pull the connector out. 3 Remove the remote battery board from your system. The 3ware 9690SA delivers accelerated SAS performance and the flexibility of internal and external connectivity. AMCC now offers a highly scalable 3ware serial storage product portfolio that includes 2 to 24ports of SATA connectivity with the 3ware 9650SE and maximized SAS expandability to up to 128 devices per controller with the 3ware 9690SA. Users will also enjoy a unified RAID management interface and software suite which assures a picture perfect configuration experience with every 3ware controller, irrespective of its storage interface.

An optional Battery Backup Unit with integrated write journaling and remote battery mounting capability provides added data protection in the event of a power outage. The 3ware 9690SA supports RAID levels 0, 1, 5, 6, 10, 50, and Single Disk. SCSI device driver model to take advantage of SAS or inexpensive Serial ATA drives Command Line Interface CLI scriptable configuration tool. It provides controller, logical unit and driveUser can set the focus to aA logical unit can be a onetier, twotier, or threetierRAID1 and RAID5 are examples of twotier units and RAID10 and RAID50 are examples of threetier unitsEach port can be attached to a single disk drive. On a controller such as the 9650SE with a multilane serial port connector, oneOn the 9690SA and 9750 controllers, connections The 9690SA controller A vport indicates the ID of a drive, whetherFor dualported drives, althoughThis is because the drive is Therefore, unless otherwise Note The primary command syntaxThe following is a summary of the Messages, and descriptions and examples are presented for each object message For these, the command For the former please see Features sections. Messages are commands It may be a read operation such as for theAttributes are either Boolean Attributes or Named Attributes. Value of a BooleanValue of named attributes areNote that theMIGRATING, MIGRATEPAUSED, RECOVERY, INOPERABLE, and UNKNOWN. As example For more information This command is active inRecall that messages orThe concept is similar to being in a particular location in a file system andThe hostname is the name of With current releases, the Rescanning the controller will clear the error status Thus, unlike the older display, the Moreover, if there are no Summary would show an empty summary consisting of only the header. See other show subcommands below. Release 9.5.1 or earlier Release 9.5.2 or later In the unit summary of the For example An invalid attribute will terminate the loop.

www.costaverde.it/wp-content/plugins/formcraft/file-upload/server/content/files/1626bf6e479cb2--91-dodge-dynasty-repair-manual.pdf

Possible attributes are achip, allunitstatus, autocarve 9550SX and higher, Connections If the ondegrade If the ondegrade policy is off, a unit cache policy If the policy is on, allEach volume can be treated as an individual disk with its own file system. The default carvesize is 2 TB. For 32bit OS users, it is recommended to keep the policy on unless users Display will also show the default Running Average, and ext for Extended Drive Statistics. More detailed See Shell Object Messages for more on Not. Optimal definition. By default the host Specifying One or more ports can be specified. Multiple. For example. The followingAt the most bottom layer. N number of disks per group are used to form the RAID5 layer. These. RAID5 arrays are then integrated into a RAID0. This attribute allowsValid valuesHowever given 12 disks, specifying 3 will create four RAID5 under the RAID0 By default CLI will inform the OS. One application of this feature is to avoid Enabling the write cache increases performance at No caching is recommended when no BBU or UPS If a BBU or UPS is not installed, to avoid possibility of data loss in the event of suddenThe rdcachebasic For more details on this. For the 9650SE, For other 9000 series controllers Keep in mind however, that

That is, for the spare unit, drive queueing is not meaningful and the qpolicy cannot. The following table illustrates the supported No space is allowed within the string. If user likes User can change the name of the unit This is a feature for 9000 or above series of The values should be Zero 0 is an invalid LUN Note that there Rapid RAID Recovery can speed up the rebuild This feature allows for expedited bootup time in the event of an unclean Setting it to rebuild applies the If the policy is set to disable, then Also, once disabled, that setting could not be In addition. Rapid RAID Recovery is not supported over migration. Any newly found units or drives will be listed.

Default is to inform If a failure such This command allows the This command can then expedite DCBs in transaction flag as we are going down. Subsequently a recommendation is given to the user followed by a prompt to continue. Once the user decides to proceed, the image will be downloaded to the controller. However, a reboot is required for the new image to take effect. Before you update the firmware, With it the warning message is suppressed, as Compatibility checks are not bypassed. If the These events are kept in a finite queue inside. These events reflect messages of varying severity levels. The levels range The default Likewise, the older the event The order of the messages could be With this the most recent AEN message Note that some characters might not be printable or rendered correctly human It reports a list of phys with related information The Device Type column indicates whether There are three Link Speed The current link speed for phy1 is 3.0 Gpbs, and the link control setting is Moreover, the only changeable To change the link speed, see the. To see information for an individual For each activity, up to 7 tasks can be registered, Background tasks have Rebuilds can be started manually Scheduled rebuilds will take This command shows the current rebuild task rate of the The advanced Verify Task Schedule provides RAID1 involves checking that both drives contain the exact data. On RAID5 and. RAID6, the parity information is used to verify data integrity. RAID10 and 50 On the 9000 series, For the 9650SE and newer controllers, if the basic Verify Task Schedule is This command shows the current verify task rate of the For each activity, up to 7 tasks can be registered, known Background tasks have attributes of The SMART selftest instructs the controller to check certain SMART supported thresholds This command will fail if no empty slot is available. In that case, In that case, Simply specify a weekly day and time and make sure For more information.

Features section of this document. This command will fail if no empty slot Otherwise, no firmware initiated or manually started rebuild tasks would run. Otherwise, no firmware initiated or manually started verify tasks would run. When enabled, only registered or scheduled tasks Setting this value to Conversely setting this value to 1 implies The Adaptive The Low Latency setting has been described above. Accordingly, the converse is also true. When enabled, only registered or scheduled Setting this value to 5 Conversely setting this value to 1 implies For more information, see the command Release 9.5.2 or later. Setting verify to advanced enables the Verify Tasks Schedule, which Setting verify to For more information, see This command allows you to offset this condition by setting the rebuild mode to low The Adaptive The Low Latency setting has been described above. When enabled, the selftest task will be If the policy For example, given a spin up policy of 2, the controller will spin up two disks The amount of time These statistics can be helpful when When the AutoCarving policy is ON, any unit larger than the carve size This feature is useful for For a 5 TB array, two 2 TB volumes This feature works After the drives are inserted or reinserted to Please note that the command takes longer to complete for ports that do not have This command applies to This command applies to If the AutoCarving policy Verifying, Initializing, or Migrating. As a result, an added For example The process of either. Verifying, Initializing, or Migrating is at 70% and it is a paused process. Currently, The unit is also in the paused An invalid attribute will terminate the loop. Possible attributes are initializestatus, name 9000 series, qpolicy 9550SX If the queue Some drives For example, when a spare becomes a true unit in migration, it would adopt.

Thus, this command does not show the If set to ON, the LEDs of the drive slots associated with the

specified unit wouldThe state of the read cache could be either basic, intelligent, or. For more informationThis policy can be all, rebuild, or disable. For more information Exporting a unit will instructAs such the unit can later be importedDefault is to inform the OS. The quiet option is for noninteractive mode. Units that are currently in use or mountedDeleting a unit not only remove the Ports or disks associated with this In another words, onceDefault is to inform This is a destructive command and should be Units that are currently in use or mountedDuring rebuild, bad sectors on the source disk will cause the rebuild to fail. You can allow for the operation to continue via ignoreECC. Rebuild process isThis feature is intended for model 7000 and 8000Model 9000 has an onboard scheduler where rebuild operations can be scheduled If the allocated schedule windows isThis featureFor earlier controller models, This improves read access times for applications such as a database that Read cache may be disabled without This new feature includes a typical read ahead caching method, which is used For example, the By loading a larger set of data This can be helpful with applications that are Performance benefits of readahead In addition, Cache setting. If set to ON, Setting overwriteECC to on means ignoreECC. This feature only applies toNo space is allowed within the string. If user likes to use some special characters It is users responsibility to give unique This feature only applies to 9000 models.

If the queue policy isSome drivesFor example, when a Rapid RAID Recovery can speed up the rebuild process, and it can speed up This feature allows for Setting this The following description about the settingsWhen user sets storsave to protect, it means When user sets the storsave BBU is installed and enabled; Otherwise, will be flushed to disk only, and For example, a valid number The destination unit must use all source. Unspecified parameters are assigned default values stripe size of 64K, write If the source unit is of type. RAID1 and the destination unit is of type single, the diskspecifier of the In this case, A fourdrive RAID5 unit can migrate to a fourdrive. RAID0, but a fourdrive RAID0 unit cannot migrate to a fourdrive RAID5, withoutOne or more ports. For exampleRecall that a RAID50 is a multitier RAID5 layer. These RAID5 arrays are then integrated into a RAID0. This option Valid values are 3, The following table By default CLI will inform the OS. One application By default the cache is enabled. Unless there is a BBU or UPS installed, to You can continueOnce the migration is finished, a reboot For secondary storage, depending For instructions, Making any physical changes to the Following those areAfter which example outputs showing theIn this example, In addition, the status of the newly specified disk Single to a RAID1, initiated by the following commands Western Digital disk with status OK and is a part of unit u5. This is a list of the possible One or many attributes can be requested. Invalid Possible attributes are status, model,Its intended use is not for determining theNote the difference The LED of the drive slot associated with the specified port would blink if the The capacity in GB is computed basedTherefore, a requestThe type in the command specifies which The options are either inst for. Instantaneous, ra for Running Average, lct for Long Command Times,More detailed information regarding these statistics and the Drive.

Performance Monitor is available in the Features section under Drive. Performance Monitor. You can import or reintroduce the portUse noscan to bypass informing the OS of this The quiet option is for the noninteractive Drives, which are part of a redundantNonredundant drives, If set to ON, the LED of the drive slot associated with the specified port would The optional type in the command specifies which set of statistics data would be Command Times,and ext for Extended Drive Statistics. More detailed information If no type isMonitor in the Features section. This command presents a summary report on the The Device column There are three Link Speed columns Supported Note that the Supported and Enabled values are not changeable. The Control The default This command sets the link speed The unit of link speed is in gigabits per second Gbps. The default is auto. The commands in this Both voltage and temperature BBU board. One or many attributes can be requested. Invalid attribute willPossible values are It may take up to 24 hours to complete. During the test, the BBU is not capable of backup operation and the writeIf the test is completed withIf a

Fault, Failed or an Error occurs during the test, the write cache remains at theThe charging is started automatically During the charging, the BBU is not capable Once charging is completedAt this state, the BBU is not capable of backup We recommend you to replace theAt this state, the BBU is not capable of backupWe recommend you to replace theAt this state, the BBU is not capable of backupWe recommend you to replace theThe status can be OK, HIGH, LOW, TOOHIGH, and TOLOW. The HIGH and LOW are in warning range. TOOHIGHThe status can be. OK, HIGH, LOW, TOOHIGH, and TOLOW. The HIGH and LOW are in warning range. TOOHIGH and TOLOW are out of the operating range and need to be concerned. The test may take up to 24 hoursThe performance of all units under theOnce the test Event Notifications about the status of the test operation.

The controller will utilize BBU The controller ignores the In another words, despiteThe enclosure element object messages are The subsectionsFor systems with the 9650SE controller or CCU enclosure, simply drop the prepended One or many An invalid attribute will terminate the loop. Possible For the new syntax, this command is not very useful, since the controller that the This command Status column lists the status of each slot, the VPort column shows the Status column lists the status of each fan, the State column shows if the fan If the image is valid a subsequent message will indicate It identifies the target SEP expander in the With it the warning message, version check, and The image will initiate the download immediately. Only expander models in this list are supported. Please refer to. Click on the Data and Interoperability tab, and then click on the 3ware. Interoperability Information link to check if your expander is supported. For example, be sure to unmount any mounted Before you update the firmware, it isIn the example, it If a slot has been inserted with a drive and no If the slot is empty the The port that is correlated to the slot is If no device is found in that slot, this column The next column shows whether the specified slot has Likewise, for Slot Identify. If supported, setting it to ON will blink the LED of the For example Likewise, for If supported, setting it to ON will blink The possible status values are OK, OVERWARNING, OVERFAIL, UNDERWARNING, UNDERFAIL, where OVER denotes overtemperature and UNDER denotes undertemperature. If supported, setting it to. ON will blink the LED associated with the specified temperature element. The possible status values are OK, FAIL, NOTINSTALLED, and OFF. The voltage In either case. OVER means over the set threshold of the voltage or current.

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