



3ware[®]

SATA RAID Controller

Supports the 9550SX Series

PN 720-0124-03
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Quick Install Guide

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Chapter 1. Installing an AMCC 3ware 9550SX RAID Controller

This document describes the physical installation of the AMCC 3ware 9550SX RAID controllers. It contains the following topics:

- **“Before You Begin”** provides important information about things you should consider before starting installation, and tools and equipment you will need.
- **“Safety Factors”** describes important precautions for your personal safety and to protect your equipment and data. **Be sure to read this section.**
- **“Installing a Serial ATA RAID Controller”** and **“Installing a 9550SX RAID Controller with Multilane Internal Connectors”** provide step-by-step instructions for installing a Serial ATA RAID controller.
- **“Finishing Up”** describes the final steps required when installing a serial controller.

Before You Begin

Contents of Package

- 3ware 9550SX RAID controller
- SATA interface cables, one for each port on the controller
Note: With the exception of the 9550SX-16ML RAID controller, which ships with a multilane break-out cable (SFF-8087), multilane controllers (such as the 9550SX-12MI, 9500S-12MI, and 9500S-8MI) do not ship with cables. Multilane cables are sold separately.
- This document, *3ware 9550SX Serial ATA RAID Controller Quick Install Guide*

Other Documentation

The following additional documentation is available for your 3ware 9550SX RAID Controller:

In PDF format, on the CD that came with your controller, and available through the 3ware website:

- *3ware 9550SX Serial ATA RAID Controller User Guide*
- *3ware 9000 Series Serial ATA RAID Controller CLI Guide*

In HTML format:

- Online help is available from 3DM 2 (3ware Disk Manager)
- Additional support information is available in the 3ware Knowledgebase, at this website: <http://www.3ware.com/KB>

Installation Considerations

Cable Length, Routing Space, and Air Flow

When you are installing multiple drives with a controller, make sure there is adequate space in the chassis for the required cables. 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 in which to insert the controller:

- Cable routing may be easier if you install the 3ware RAID controller next to an open slot.

The amount of clearance you need will depend on the number of drives you will be connecting to the controller.

- While the 3ware 9550SX RAID controller can be installed in both 64-bit PCI and PCI-X slots, not all slots give equal performance.

The 3ware 9550SX controller performs best when installed in a PCI-X 133MHz 64-bit slot. However, it can also operate at 66MHz or 100MHz.

Whether to Use the LED Status Connector

3ware RAID controllers include two types of LED status connectors:

- Overall indicator, which lights when any drive is active.
- Individual LED indicators, for each drive. (Not supported on chassis that have a common ground.)

If you are building a system from scratch, you may want to consider using a chassis or drive carrier that is compatible with the 3ware RAID controller activity LEDs, such as the AMCC RDC-400-SATA drive carrier, available through AMCC. Please check the 3ware web site (www.3ware.com) for chassis and drive carrier compatibility list.

For more information, see “Connecting Drive Activity LED Indicators” on page 17.

Most chassis have a single drive activity cable that you can connect to the overall activity indicator on the 3ware 9550SX controller. For the location of the overall drive activity connector, see the figure for the appropriate controller in the installation sections starting on page 18, and refer to Table 1, “LED Indicator Pin Positions,” on page 20.



Note: If you are using a chassis that includes a Chassis Control Unit (CCU), follow the instructions that came with the chassis to connect the I²C cable from the CCU to the I²C connector on the 9550SX.

Drive Installation Considerations

- **Selecting an enclosure.** If you are planning to use RAID 1, 5, 10, or 50, you may want to consider installing drives into hot-swappable enclosures, so that they can be easily removed in the event of a drive failure.
- **When to install the drives.** If the drives are not already installed in your computer, you can choose to install them either before or after connecting the SATA cables to them.

What You Need: Tools and Equipment

Tools Required

You will need the following tools during installation:

- An ESD grounding strap or mat
- Standard hand tools to open your system's case and install the 3ware RAID controller into an available PCI expansion slot. Often a philip screen driver is all that is required.

Safety Factors

Be sure to follow the guidelines presented on the next few pages to insure your own safety, and that of your equipment.

Personal Safety



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 you have replaced the covers.

Protecting Equipment and Data

Backing Up Your Data



Back up your data! Creating or deleting disk arrays destroys existing files on the member drives. If your drives contain valuable data, back them up and save the data elsewhere before attaching the drives to the controller.

ESD (Electrostatic Discharge) Precautions

To avoid damaging computer components and accessories when installing or removing the 3ware RAID controller, follow standard electrostatic discharge (ESD) precautions:

- When your computer case is open and its internal parts are exposed, do not touch any internal part unnecessarily.
- Always wear a grounded strap or work on an ESD-protective mat.
- Do not remove the 3ware RAID controller from its protective bag until you are properly grounded.
- Handle the 3ware RAID controller by its edges or by the black rail and metal bracket at its two ends.
- Do not touch any pin, contact, lead or component on the 3ware RAID controller.

Things to Watch Out For

Be careful when installing the 3ware RAID controller into your system. **Excessive force can damage the board or your system.**

- Be sure the board is aligned with its slot on the motherboard before installing. Do not flex the board excessively.
- SATA cable connectors must be mated carefully with the connectors in the controller. The connectors provided are keyed to prevent you from inserting them upside-down.
- SATA cables are fragile and must not be crimped or pinched. Ensure that they do not impede the flow of cooling air from fans or heat sinks in the system case.

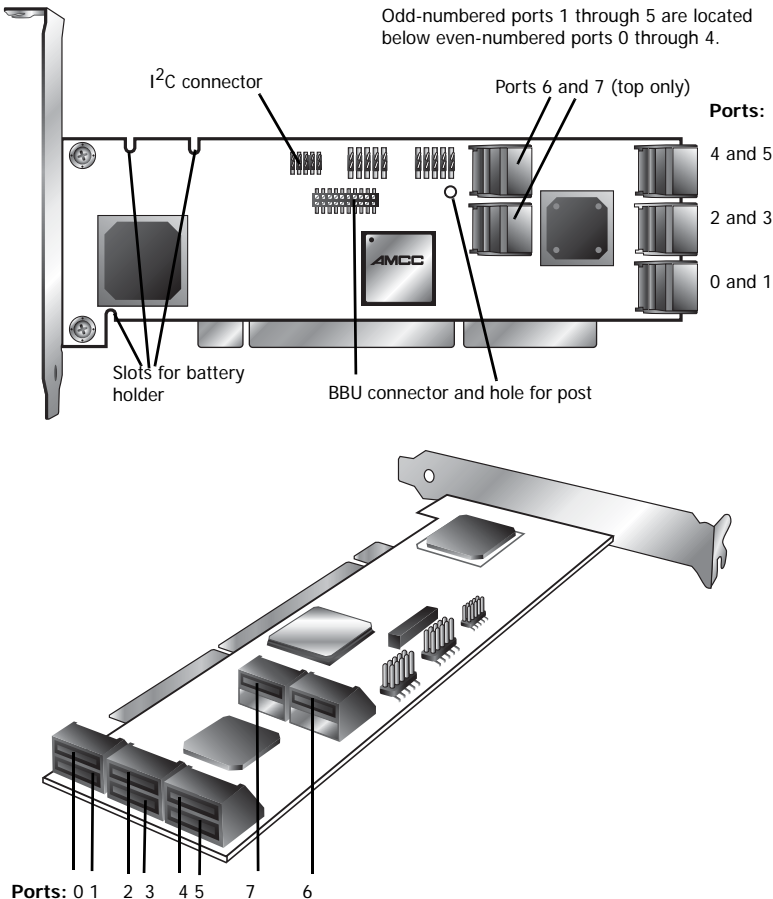
9550SX RAID Controller Cards

Serial ATA ports are usually double-stacked connectors. Odd-numbered ports are usually located below even-numbered ports. On the 8-port controller shown below, ports 6 and 7 are both on top.

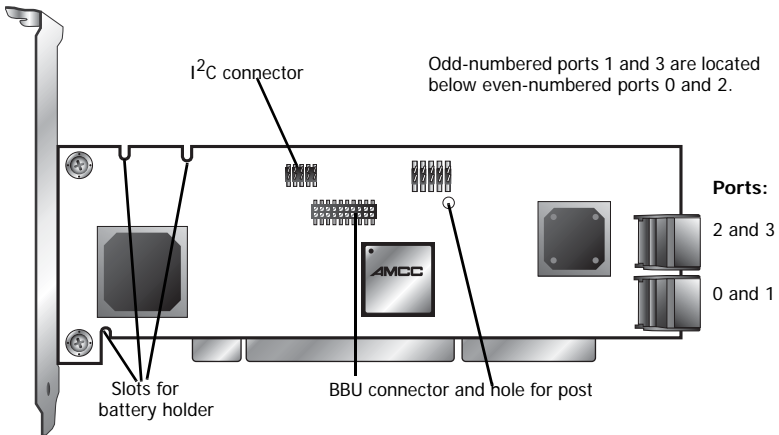
9550SX 8-Port with Standard SATA Connectors

Note: For details about LED connectors, see page 17.

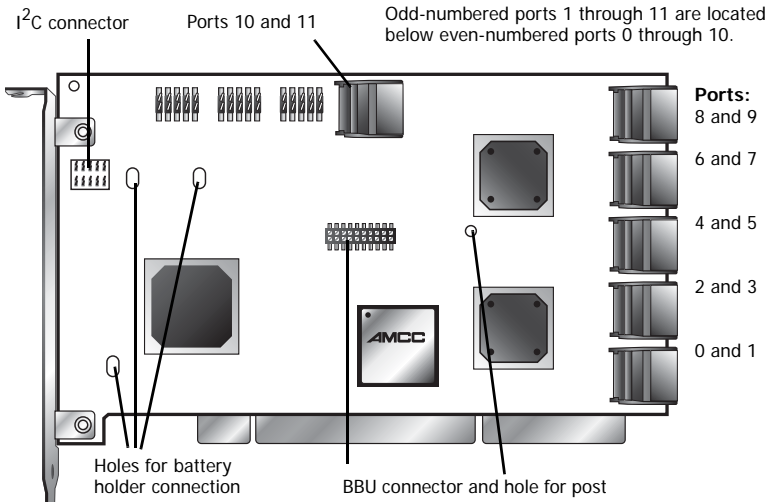
Figure 1. 8-Port 3ware 9550SX-8LP Serial ATA RAID Controller



9550SX 4-Port with Standard SATA Connectors

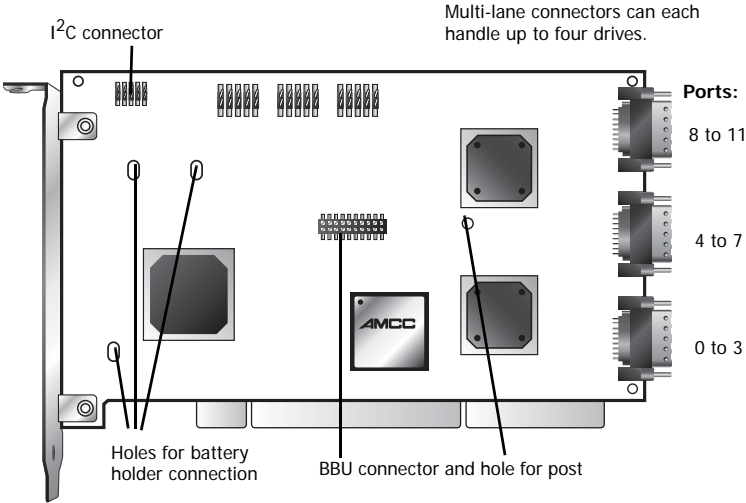
Figure 2. 4-Port 3ware 9550SX-4LP Serial ATA RAID Controller

9550SX 12-Port with Standard SATA Connectors

Figure 3. 12-Port 3ware 9550SX-12 Serial ATA RAID Controller

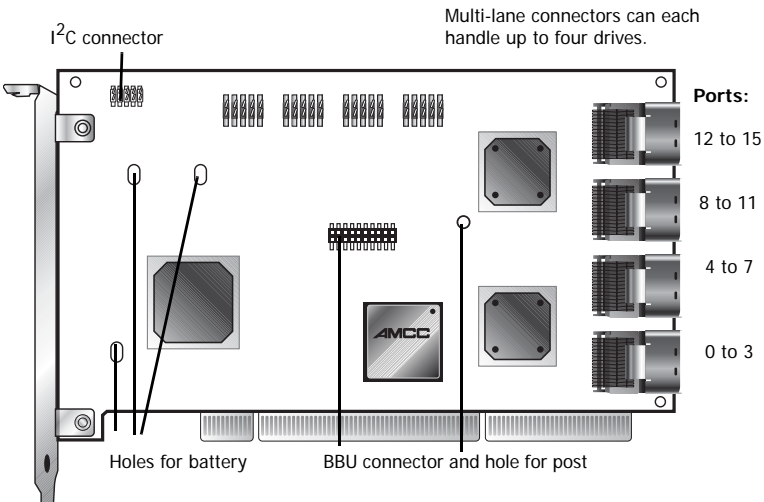
9550SX 12-Port with Multilane Internal SATA Connectors

Figure 4. 12-Port 3ware 9550SX-12MI Serial ATA RAID Controller



9550SX 16-Port with Multilane Internal SATA Connectors

Figure 5. 16-Port 3ware 9550SX-16ML Serial ATA RAID Controller



Installing a Serial ATA RAID Controller



Note: The illustrations in this section show a 9550SX-8LP. If you have a different model of controller, the location of the ports will be slightly different, but the steps are very similar. For location of the ports on all boards, see the illustrations on page 6 through page 8.



Note: If you have a Battery Backup Unit (BBU), install it on the controller before proceeding. For details, see “Chapter 2. Installing the Battery Backup Unit”.

To connect SATA cables to the controller



Note: If you have a multilane controller, turn to page 13.

- 1 Take out the SATA cables provided with the 3ware SATA RAID controller.

One edge of each SATA cable connector is keyed so that it can only be inserted in one direction. This helps to ensure proper orientation and installation

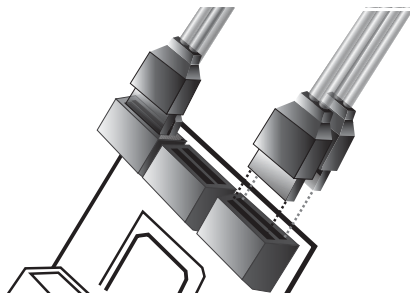
- 2 Decide to which port you want to connect the first cable.

- 3 Align the cable connector with the connector on the controller, matching the slotted key and carefully mate the connectors.



Note: The connectors on the end of the serial controller and the drive are susceptible to damage from excessive bending. Be careful not to insert or remove the SATA cable connector at an angle.

Figure 6. SATA Cables Being Inserted Into Port



- 5 Repeat steps 2 and 3 for each additional SATA cable. (You will connect one cable for each hard drive you will attach.)

To 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 4.)
- 3 Open the computer case according to the manufacturer's instructions.
- 4 Find the PCI or PCI-X slot you want to use for the serial 3ware RAID controller.

For a discussion of which slot to use, see “Selecting the Slot in Which to Install the Controller” on page 2.

- 5 Remove the metal filler bracket for the slot.

Save this screw; it will be used to secure the serial 3ware RAID controller after you have seated it in the slot.

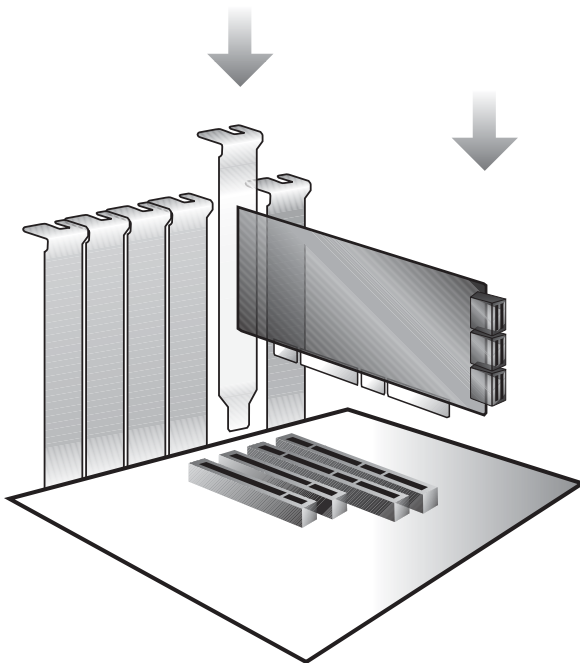
- 6 Position the card in the slot so that the contacts will mate with the grooves in the slot, and all pins make proper contact with the PCI slot pins when pushed into place.

The 3ware RAID controller is keyed to ensure proper installation into a full-sized 3.3-volt PCI or PCI-X slot.

Make sure that the contacts will mate with the grooves in the slot.

- 7 Press down gently on the edge of the 3ware RAID controller directly above the slot until it is fully seated.

Figure 7. Inserting Controller Into PCI Slot



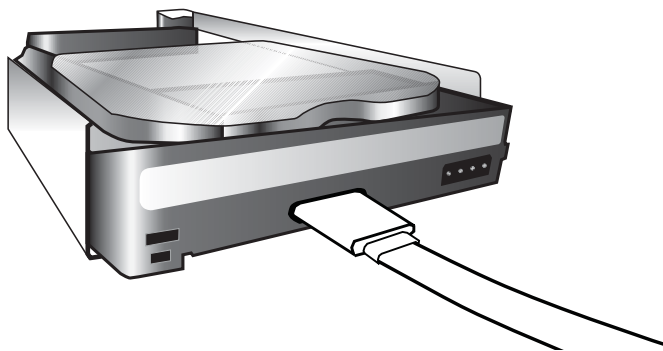
- 8 Check that the 3ware RAID controller's metal bracket covers the hole in the case and secure the bracket with the screw that was used to secure the filler bracket in step 5.

To connect the SATA cables to the drives

- 1 If your drives are not already installed in the computer chassis or hot swap carriers, install them now. Be sure that the drives are connected to the power supply, either by cable or through the drive cage.
- 2 For each drive, select the end of an SATA cable not connected to the 3ware RAID Controller and plug it into the drive or drive carrier.

One edge of each SATA cable connector is keyed to ensure proper installation.

Figure 8. SATA Cable Connecting to Drive



- 3 (Optional) Connect the drive activity LED connectors. For details, see the connection details on “Connecting Drive Activity LED Indicators” on page 17.

For a discussion of whether to make these connections, see “Whether to Use the LED Status Connector” on page 3.

- 4 Turn to “Check Installation and Close the Case” on page 21.

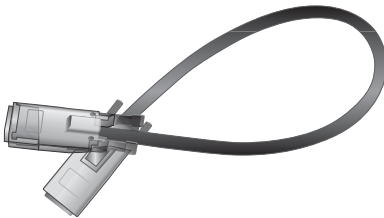
Installing a 9550SX RAID Controller with Multilane Internal Connectors

Models 9550SX-12MI and 9550SX-16ML come with multilane internal connectors, each of which can handle up to four drives. These controllers can be installed in an enclosure with a backplane. The type of cable you need will depend on whether you have a 12- or 16-port card and the type of enclosure you have.

9550SX-12MI

- With a backplane that has the InfiniBand 4x connectors (SFF-8470), use the InfiniBand 4x cable, which has multilane connectors on each end (see Figure 9).

Figure 9. Multilane Serial ATA Cable (InfiniBand 4x, SFF-8470)



- With a backplane that has individual SATA connectors or individual serial ATA drives, use the multilane break-out cable, which has an SFF-8470 multilane connector on one end, and 4 individual SATA connectors on the other end (see Figure 10).

Figure 10. Multilane Serial ATA Break-out Cable (SFF-8470)



9550SX-16ML

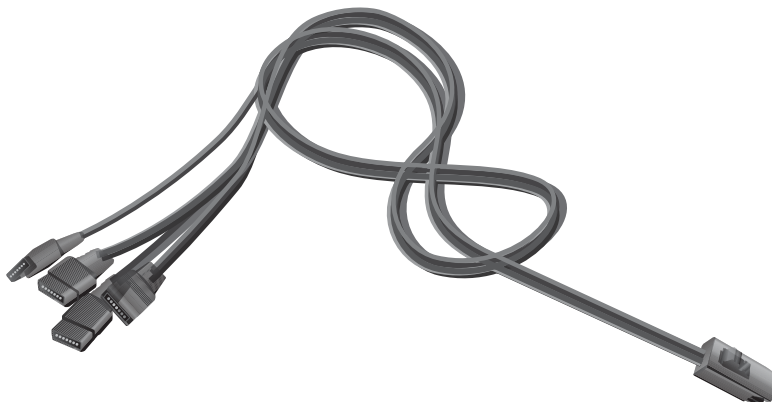
- With a multilane-enabled drive backplane that has the SFF-8087 mini SAS 4i connectors, use the double-ended 4x cable, which has multilane connectors on each end (see Figure 11).

Figure 11. Multilane Cable Serial ATA (SFF-8087)



- With a backplane that has individual SATA connectors or individual serial ATA drives, use the multilane break-out cable, which has an SFF-8087 multilane connector on one end, and four individual SATA connectors on the other end (see Figure 12).

Figure 12. Multi-lane Serial ATA Break-out Cable (SFF-8087)



To connect the multilane cables and install the controller in the computer

Depending on the number of drives you will be connecting, you will connect one to three multilane cables (for the 12-port card) or one to four multilane cables (for the 16-port card). Each cable supports up to four serial ATA ports.

- 1 Connect each multilane cable to a multilane connector on the controller.

When the cable is inserted correctly, you will feel it click into place.

Figure 13. Connecting an InfiniBand Multilane Cable with an SFF-8470 Connector to the 9550SX-12MI Controller

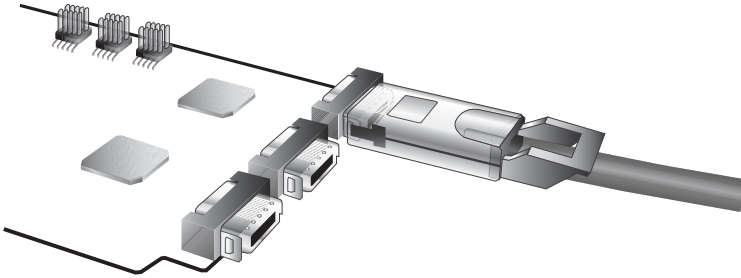
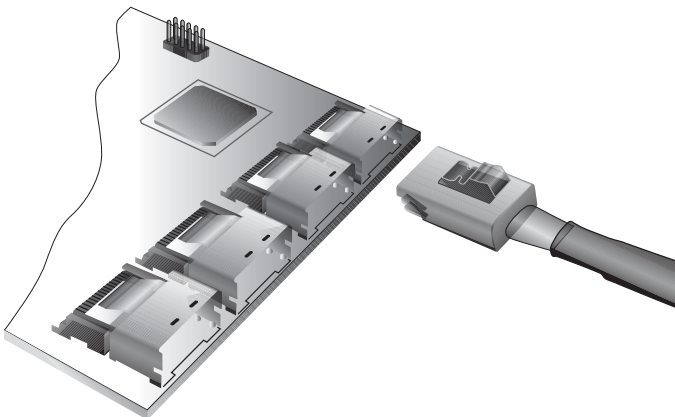


Figure 14. Connecting a Multilane Cable with an SFF-8087 Connector to the 9550SX-16ML Controller



- 2 Insert the controller into the computer. For details, see “To install the controller in the computer” on page 10.
- 3 If your enclosure has a backplane, connect the other end of each multilane cable to the backplane.

If you are using a standard enclosure, connect each of the individual SATA connectors to a drive.

To install the drives

- 1 If your drives are not already installed, install them now, either by attaching them to the backplane, or by installing them in the computer chassis.
- 2 Be sure that the power supply is connected to either the backplane or the individual drives.

Connecting Drive Activity LED Indicators

Figure 15, 10, and 11 show the location of LED indicators on the different 9550SX controllers.

Figure 15. 8-Port 3ware 9550SX-8LP Serial ATA RAID Controller

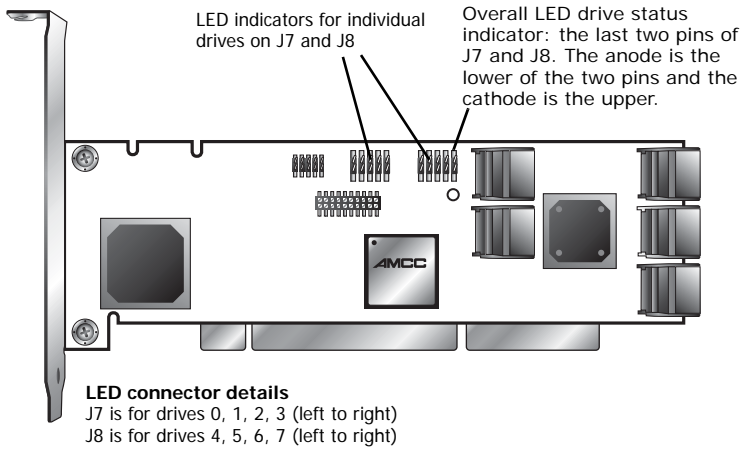
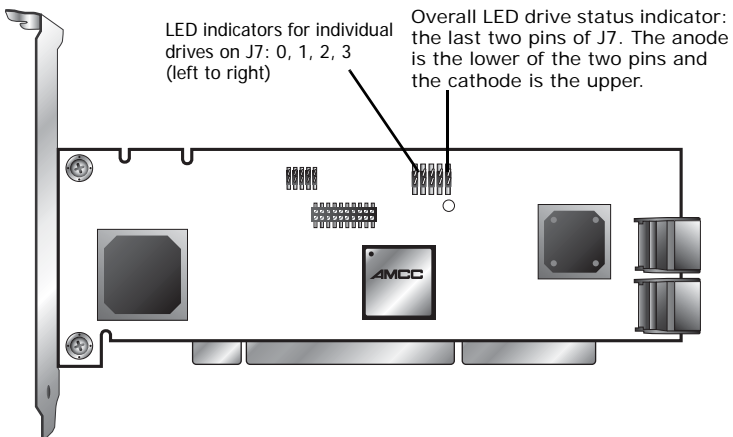


Figure 16. 4-Port 3ware 9550SX-4LP Serial ATA RAID Controller



Note: The LED headers on the 9550SX-12 and the 9550SX-12MI are in a very similar place.

Figure 17. 12-Port 3ware 9550SX-12 Serial ATA RAID Controller

LED indicators for individual drives
J7 is for drives 0, 1, 2, 3 (left to right)
J8 is for drives 4, 5, 6, 7 (left to right)
J9 is for drives 8, 9, 10, 11 (left to right)

Overall LED drive status indicator is the right-most LED header pin pair on each LED connector (J7, J8, and J9). The anode is the lower of the two pins and the cathode is the upper.

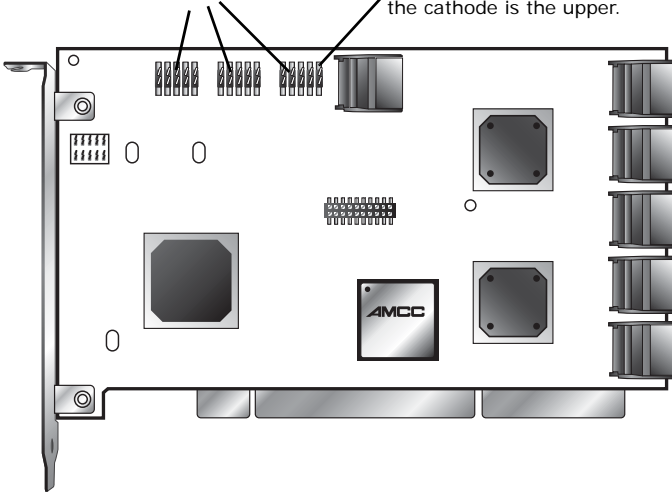
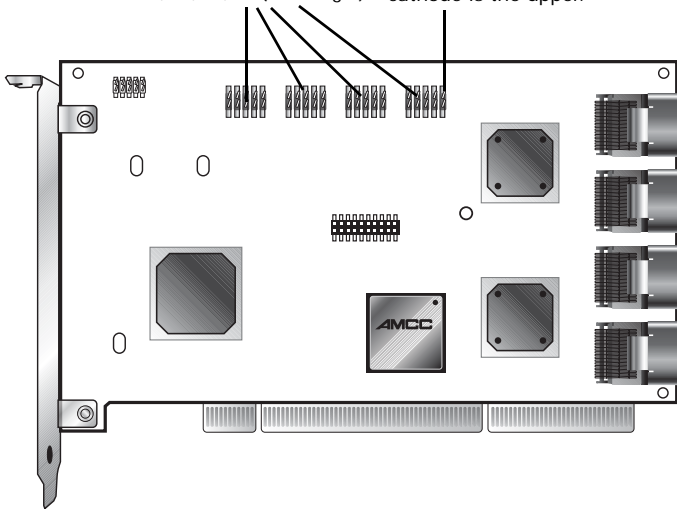


Figure 18. 16-Port 3ware 9550SX-16ML Serial ATA RAID Controller**LED indicators for individual drives**

J7 is for drives 0, 1, 2, 3 (left to right)
 J8 is for drives 4, 5, 6, 7 (left to right)
 J9 is for drives 8, 9, 10, 11 (left to right)
 J1 is for drives 12, 13, 14, 15 (left to right)

Overall LED drive status indicator is the right-most LED header pin pair on each LED connector (J7, J8, J9, J1). The anode is the lower of the two pins and the cathode is the upper.

**Additional Details About the LED Status Connectors**

As shown in Figure 15 through Figure 18, LED connectors for individual drives are on J7, J8, J9, and J1 for the full-size 16 port card, on J7, J8, and J9 for the full-size 12-port cards, on J7 and J8 for the half-size 8-port, and on J7 for the 4-port cards.

Pin 1 is located in the lower left-hand corner of each 10-pin connector. The odd-numbered pins, located on the bottom row, are 3.3V for the anode (+) side of each LED to be connected. The even-numbered pins are on the top or cathode (-) side.

Table 1 summarizes the LED indicator pin positions for the different controllers.

Warning: If using a chassis that has a common or shared LED ground, be sure to only connect LED cables to the anode pins on the controller. Do not connect any common ground to any cathode pins on the controller.

Table 1: LED Indicator Pin Positions

Controller	LED Header	Pin Pair	Comment
9550SX-4LP	J7	: : : : : 0 1 2 3 A11	Orientation Horizontal Port number/All (all activity indicator) k-cathode-minus is on the top a-anode-plus is on the bottom
9550SX-8LP	J7	: : : : : 0 1 2 3 A11	Orientation Horizontal Port number/All (all activity indicator)
	J8	: : : : : 4 5 6 7 A11	Orientation Horizontal Port number / NU (Not Used) k-cathode-minus is on the top a-anode-plus is on the bottom
9550SX-12/12MI	J7	: : : : : 0 1 2 3 A11	Orientation Horizontal Port number/NU (Not Used)
	J8	: : : : : 4 5 6 7 A11	Orientation Horizontal Port number/NU (Not Used)
	J9	: : : : : 8 9 10 11 A11	Orientation Horizontal Port number/All (all activity indicator) k-cathode-minus is on the top a-anode-plus is on the bottom

Table 1: LED Indicator Pin Positions

Controller	LED Header	Pin Pair	Comment
9550SX-16ML	J7	: : : : :	Orientation Horizontal
		0 1 2 3 A11	Port number/NU (Not Used)
	J8	: : : : :	Orientation Horizontal
		4 5 6 7 A11	Port number/NU (Not Used)
J9	: : : : :	Orientation Horizontal	
	8 9 10 11 A11	Port number/All (all activity indicator)	
J1	: : : : :	: : : : :	Orientation Horizontal
		12 13 14 15 A11	Port number/All (all activity indicator)
	k-cathode-minus is on the top a-anode-plus is on the bottom		

Finishing Up

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.

Check Installation and Close the Case

- 1 Verify that the cables do not interfere with the operation of any other components in the case or block the flow of cooling air.
- 2 Close the case and reconnect the power cables.

Configure your RAID Arrays

Turn to “Configuring Units” in *3ware 9550SX Serial ATA RAID Controller User Guide* for information about configuring RAID arrays.

Chapter 2. Installing the Battery Backup Unit

The Battery Backup Unit (BBU) is an add-on that can be attached to a 3ware 9550SX RAID controller to supply power to the memory module from an attached battery pack in the event of a system power loss. This allows the controller to use write-caching for optimal performance and not be exposed to data loss in the event of a system power failure. When fully charged, the battery preserves the contents of the controller cache memory for a limited period of time (up to 72 hours). When power is restored, cached data is flushed to disks.



Caution: Both the 3ware RAID controller and the BBU are sensitive electronic equipment and can be damaged through electrostatic discharge. When installing the BBU on the controller, be sure you are grounded. Use a grounding strap, or work on an ESD-protective mat.

- Do not remove the 3ware controller or BBU from their protective bags until you are properly grounded.
- Handle the 3ware RAID controller by its edges or by the metal bracket at its end.
- Do not touch any pin, contact, lead, or component on the 3ware RAID controller.



Important: The battery is a heat-sensitive component. The cooler the battery, the longer the battery lasts. If possible, place the controller with the BBU in a slot with good airflow, away from components that generate the most heat in the system, such as video cards.

Note: The battery will drain if it is plugged into the BBU and there is no power to the unit. Wait to plug the battery into the BBU until the system is ready for use.

Tools and equipment required

- Slot-head screwdriver
- Grounding strap
- Battery Backup Unit (BBU) and battery
- 3ware 9550SX series controller

Installation Overview

The Battery Backup Unit (BBU) is comprised of two pieces: the battery module and the BBU control module.

These pieces attach to the controller at the points illustrated in Figures 12 through 13:

- Clips on the battery module match to slots on the half-height controllers (4-port and 8-port) and holes on the full-height controllers (12-port and 16-port).
- Connector on the BBU mates to receptacle on the controller.
- Post on the BBU mates to post hole on the controller.

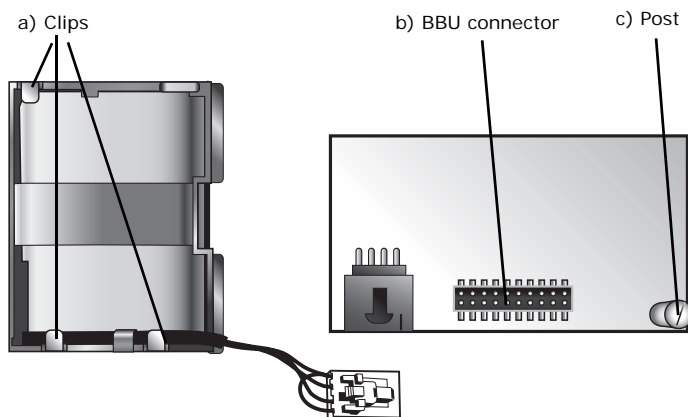


Figure 19. Points of connection on the BBU

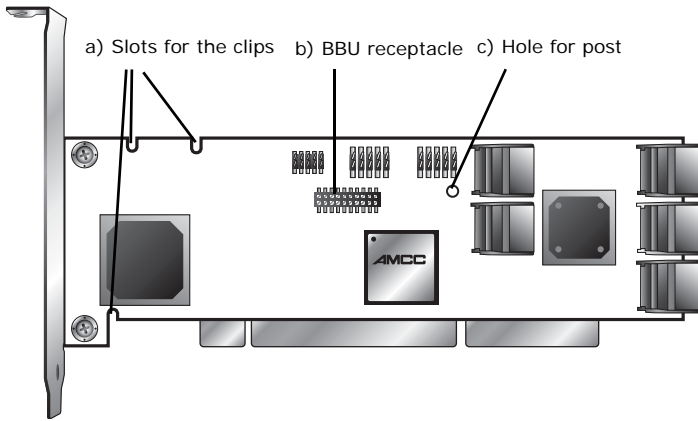


Figure 20. Points of connection on the half-height controller

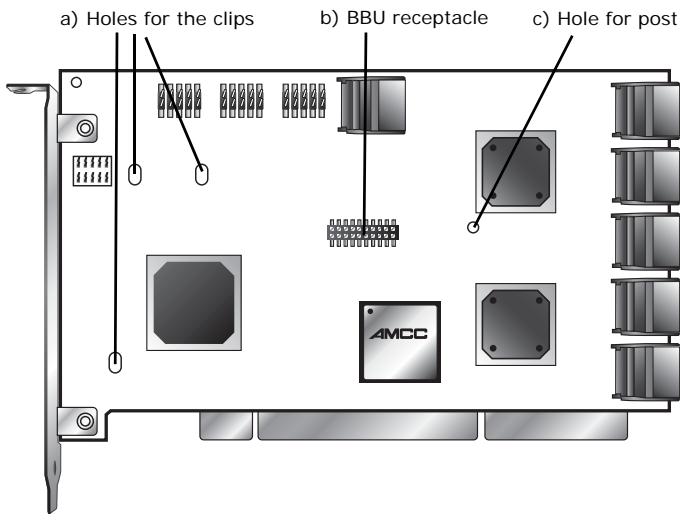


Figure 21. Points of connection on the full-height controller

Installation Instructions

- 1 Remove the screw head from the plastic post on the BBU control module and set it aside (you will reattach it soon.)

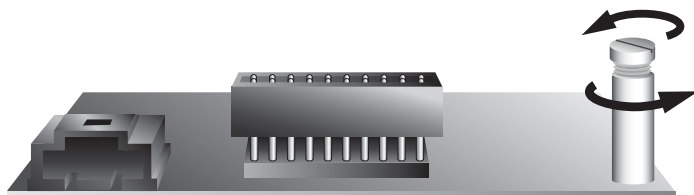


Figure 22. Removing the head from the plastic post

- 2 Position the BBU control module above the controller and align the BBU control module and the controller, making sure to:
 - Mate the connector on the BBU control module with the receptacle on the controller.
 - Match the plastic post on the BBU with the hole on the controller.

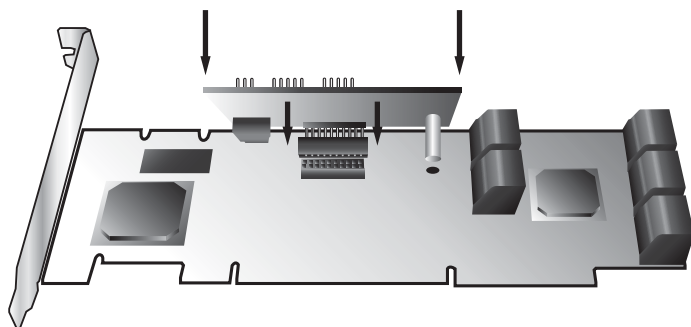


Figure 23. BBU control module ready to connect to the controller

- 3 Press down gently until the BBU is seated.

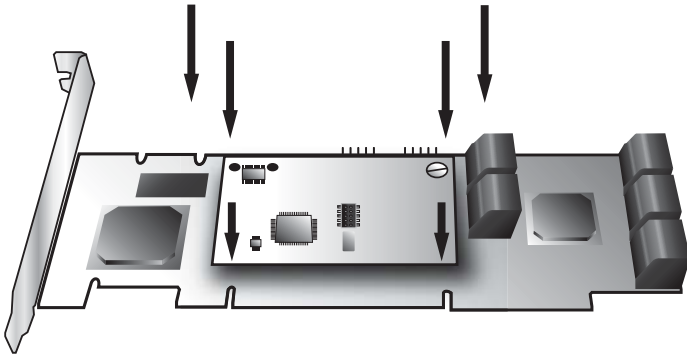


Figure 24. BBU control module connected to the controller

- 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 over-tighten!)



Warning! To avoid possible damage to the controller and the motherboard, make sure the module is connected in the proper orientation, and that the plastic post is attached.

When the plastic post and the connector are attached correctly, the module is in the correct orientation.

5 If you have a 4-port or 8-port 9550SX:

- a Hook the clips on the top of the battery module over the slots on the top edge of the controller.

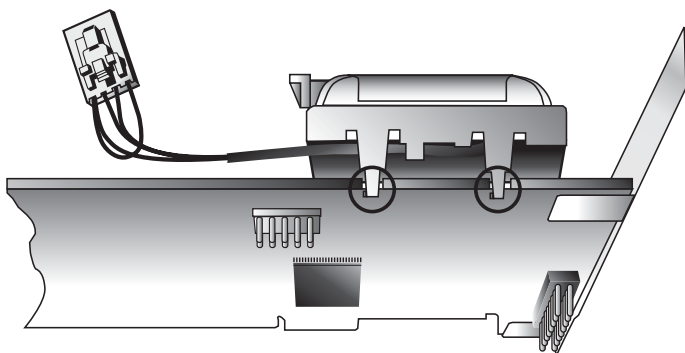


Figure 25. Clips on the battery module hook over slots on the top edge of the half-height controller

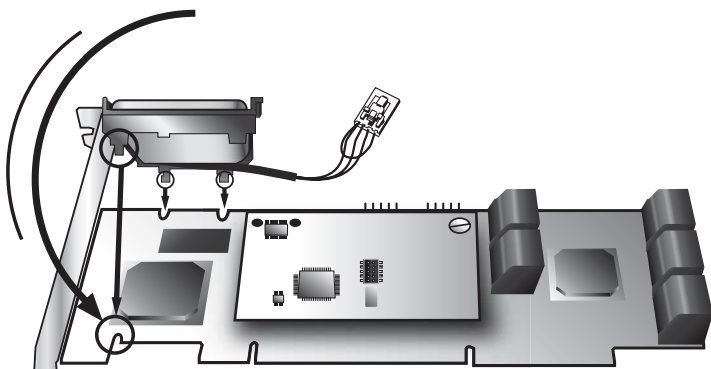


Figure 26. Attaching the battery module to the half-height controller

- b Press down gently on the top of the battery unit so that the battery holder flexes slightly and the clip on the bottom slips over the slot on the bottom edge of the controller.

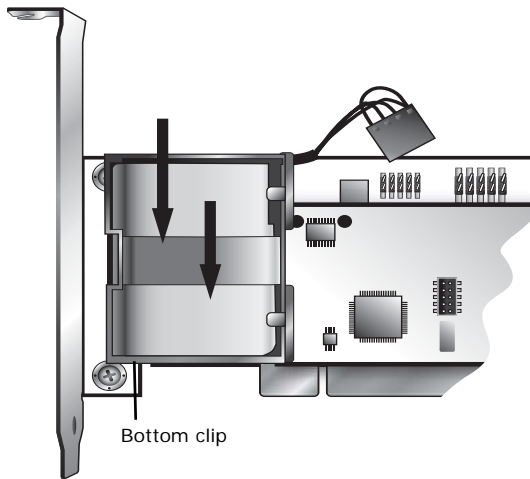


Figure 27. Pressing down gently on the battery unit flexes the holder slightly so that the bottom clip can be inserted

If you have a 12-port or 16-port 9550SX:

- a Insert the clips on the top of the battery module into the holes on the controller.

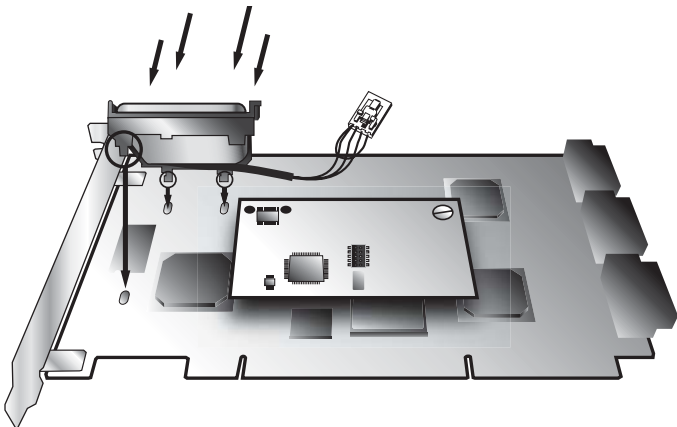


Figure 28. Attaching the battery module to the full-height controller

- b Press down gently on the battery module until the bottom clip snaps into place in the lower hole.
- 3 Insert the battery power connector into the power receptacle on the BBU.



Note: The battery will drain if it is plugged in and there is no power to the unit. If the system will not be used right away, wait to do this step until the system is ready for use.

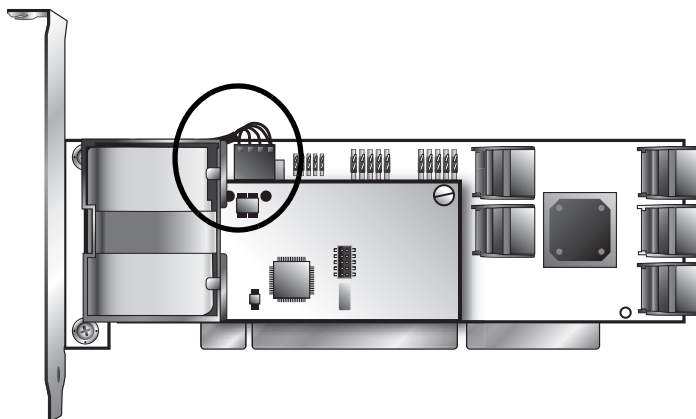


Figure 29. Battery power connector inserted in power receptacle

The controller is now ready to install in your system.

Figure 23 shows the BBU fully installed on 3ware controllers.



Figure 30. BBU installed on controllers

Replacing the Battery

The Battery Backup Unit (BBU) will last for many years. The 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. For details, see instructions in *3ware 9550SX Serial ATA RAID Controller User Guide*.



Caution: There is a risk of explosion if the battery is replaced by an incorrect type. To obtain a replacement battery module, contact AMCC.

For proper battery disposal resources, contact RBRC, the Rechargeable Battery Recycling Corporation (www.rbrc.com).



Vorsicht: Es entsteht Explosionsgefahr bei Auswechslung der Batterie mit einer des falschen Typs. Um eine Ersatzbatterie zu erhalten, wenden Sie sich an die AMCC.

Um Ressourcen zur korrekten Entsorgung der Batterie in Erfahrung zu bringen, wenden Sie sich an die RBRC (the Rechargeable Battery Recycling Corporation) (www.rbrc.com).

To replace the battery

- 1 Make sure the system is powered down, that you are grounded, and follow all appropriate safety procedures.
- 2 Remove the 3ware RAID controller from your system.
- 3 Press down on the top of the battery module to free the clip on the bottom of the module.

- 4 While pressing down on the top of the battery module, lift out the bottom of the battery module slightly.
- 5 Once the bottom of the module is free, slide the module up to release the clips on the top.

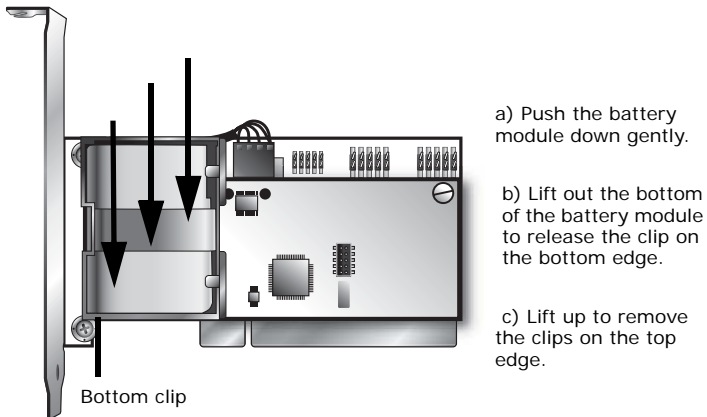


Figure 31. Removing the battery module

- 6 Disconnect the battery power cable from the BBU.
To do so, press down on the lever-like clip on the battery power connector and slide it out of the slot.
(If desired, you can remove the BBU control module to facilitate disconnecting the power cable.)

Figure 32 shows how removing the connector looks if you remove the BBU control module from the controller.

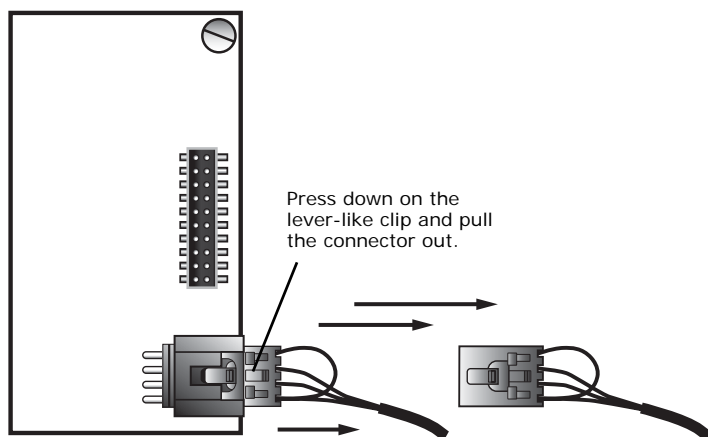


Figure 32. Removing the power cable from the BBU module

- 7 If you removed the BBU control module in step 6, reattach it now.
- 8 Insert the new battery module and cable it up.
- 9 Reinstall the 3ware RAID controller, close up your system, and restart it.
- 10 Run a battery test to compute the estimated battery capacity of this new battery.

You can run the battery test from the BBU page of either 3BM or 3DM 2, or by using the 3ware CLI. For detailed instructions, see the *3ware 9550SX Serial ATA RAID Controller User Guide* and the *3ware 9000 Series Serial ATA RAID Controller CLI Guide*.

Appendix: Technical Support

For support, troubleshooting tips, frequently asked questions, software releases, and compatibility information related to 3ware RAID controllers, refer to:

- 3ware support page at:
<http://www.3ware.com/support/>
- 3ware knowledgebase:
<http://www.3ware.com/KB/kb.asp>
- 3ware software downloads:
<http://www.3ware.com/support/download.asp>
- 3ware documentation:
<http://www.3ware.com/support/userdocs.asp>
- 3ware Compatibility Lists:
http://www.3ware.com/support/sys_compatibility.asp

For specific answers to questions or to give feedback about the product, visit our Web site at <http://www.3ware.com/support> and use our convenient e-mail form. AMCC also offers toll-free 1 (800) 840-6055 or 1 (408) 542-8800 direct phone support during normal business hours.

Sales and ordering information

For sales information, send an electronic mail message to 3wareSales@amcc.com.

Feedback on this manual

Your feedback is welcome. If anything in the guide seems unclear please let us know by using the email form at <http://www.3ware.com/support>.

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