ENCORE™/MDX G4 DUET

Dual Processor Upgrade Card for Power Mac® G4 (MDD) and Xserve® G4 Computers

Computer and Operating System Compatibility

The Encore/MDX G4 Duet processor upgrade card is compatible only with Power Mac G4 Mirrored Drive Doors (MDD) and Xserve G4 computers. **If you own a Power Mac G4 computer and are unsure which model you have, refer to Apple's online support article that describes the differences at http://docs.info.apple.com/article.html?artnum=42739.** This article lists model numbers, and describes the physical differences of the various Power Mac G4 models.

At this printing, this Encore/MDX G4 Duet processor upgrade is compatible with Mac OS® 9.2 and Mac OS X Version 10.3.5 and later. For up-to-date Mac OS compatibility information, check our web site.

⚠️ **WARNING:** If you use Mac OS X, you must ensure that it is Version 10.3.5 or later; earlier versions are NOT compatible. If your system does not meet this standard, you must upgrade to the correct OS version before installing this upgrade. Otherwise, your system will not operate with the Duet installed. Instructions follow.

Encore/MDX G4 Duet processor upgrades do not cause sleep issues in computers that support sleep with the original processor installed. If a computer experiences sleep issues with the original processor installed, installing this upgrade is unlikely to change that condition. In the very rare instance where a computer begins to have sleep issues after a Duet upgrade is installed, the problem is isolated to that specific card and can be resolved by replacing it.

You Should Have

The following items should be included in your product package:

• Encore/MDX G4 Duet processor upgrade card*
• Heat sink cover for certain Xserve installations
• Mounting screws for Xserve installation
• Sonnet Installer CD

The following items are required for installation:

• Medium Phillips screwdriver

* Card shown without fan assembly.

☎ **Support Notes:** Please familiarize yourself with the following instructions before beginning the installation. If you feel you are unable to install the computer hardware, please contact a qualified computer technician. Sonnet strongly recommends that a qualified technician perform this installation.

Before proceeding with the installation, we recommend that you backup important information on your hard drive(s) prior to installing new hardware or software.

Multiple Upgrade Recommendation

If you intend to perform multiple hardware upgrades to your computer, we recommend that you complete the installation of the Encore/MDX G4 Duet first, and then install the remaining upgrades; *complete each upgrade and test it before proceeding to the next.*

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Install Software... FIRST

A. Power Mac G4 (MDD) Users ONLY—Verify and Update Power Mac Firmware (if Necessary)

If your computer is a Xserve G4 model, skip to section C on page 2. Otherwise, before installing the Duet, you must ensure your system's firmware has been updated to version 4.4.8f2 or higher (e.g. "4.5.7f1"). Please note, *your system may need to connect to the Internet to perform some of the steps.*

Figure 1

1. *OS X users*: Open System Profiler (located within the Utilities folder found in the Applications folder). Find the Boot ROM information listed in the Hardware Overview pane **(Figure 1)**. If it reads "**4.4.8f2**" or higher (e.g. "4.5.7f1"), skip the rest of the steps in this section and proceed to section C on page 2. Otherwise, go to step 2.

   OS 9 users: Select and open Apple System Profiler from the Apple Menu. Click the triangle next to Production Information, and find the Boot ROM version information **(Figure 2)**. If it reads "**$0004.48f2**" or higher (e.g. "4.5.7f1"), skip the rest of the steps in this section and proceed to section C on page 2. Otherwise, go to step 2.

2. *OS X users*: Log on to the Internet and type the following in your browser window's address bar:
   http://docs.info.apple.com/article.html?artnum=120186

   OS 9 users: Log on to the Internet and type the following in your browser window's address bar:
   http://docs.info.apple.com/article.html?artnum=120171

Figure 2

3. Click on the appropriate link to download the firmware.

4. Double-click the G4FWUpdate.dmg.bin or G4FWUpdate4.4.8.smi file icon to mount the G4 Firmware Update disk image. Double-click the disk image icon, and then double-click the enclosed file to launch the updater application. Print the read me file, and then following the directions on the pages you printed, update the firmware on your system.

> ⚠ **Mac OS X Alert:** Due to technical issues that arise from the operation of the latest G4 processors (used on this Encore/MDX G4 Duet card) in an older system, you must use Mac OS X Version 10.3.5 or later to ensure compatibility; earlier versions of Mac OS X lack the proper processor support.

B. ALL USERS—Install or Upgrade to Mac OS X Version 10.3.5 or Later, If Necessary

For Mac OS X compatibility, the Encore/MDX G4 Duet card requires Mac OS X Version 10.3.5 or later. If you are upgrading to Mac OS X as part of this installation, or need to update Mac OS X to the latest version, do so now; complete the Mac OS upgrade, and then restart your computer.
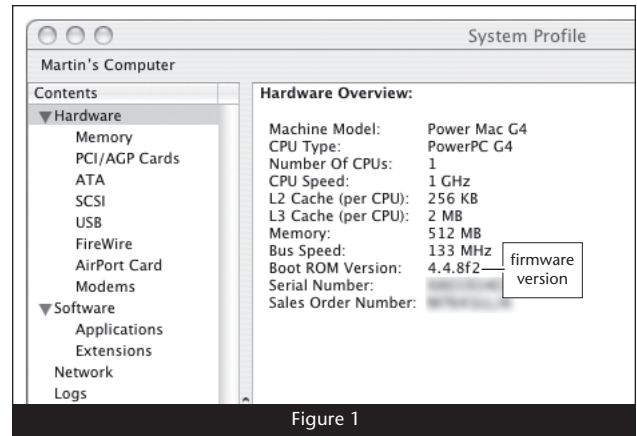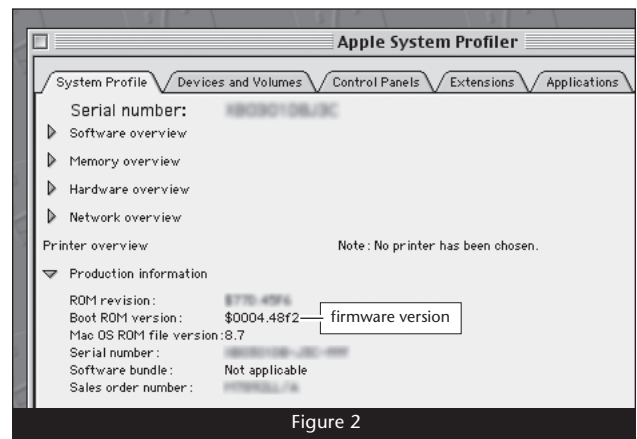
Install Software... First!

C. MAC OS X USERS—Install Sonnet Firmware Patch

This section describes the installation of software required to support this Encore/MDX G4 Duet in your computer. Please note **you MUST run the Sonnet Firmware Updater before you install this upgrade card. If you do not run the updater, your computer will not operate with the processor upgrade installed.**

1. Insert the Sonnet Installer CD into the CD-ROM drive. Double-click the Sonnet Install CD icon. When the *Sonnet Install CD* window appears, double-click the Mac OS X ONLY folder.

2. Double-click the *Sonnet Firmware Updater* icon; Mac OS X's built-in Install program will launch. Follow the onscreen directions to complete the installation of the Sonnet Firmware Updater and Sonnet Firmware Remover applications to your Applications folder.

3. Shut down your computer.

4. *Power Mac G4 (MDD) users*: Press *and hold* the Power button until you hear a long tone; release the button when you hear the tone.

   Xserve G4 users: Press *and hold* the Power button until the System Activity LEDs flash rapidly; release the button when you see the LEDs flash.

5. Once the startup process is complete and you have logged in (if necessary), go the Finder and select Go > Applications from the Apple menu.

6. Locate Sonnet Firmware Updater, and then double-click its icon to launch the application.

7. When the *Sonnet Firmware Updater* window appears, click OK.

8. When the *Authenticate* window appears, enter the Administrator password, and then click OK.

9. When the Wait message appears, **DO NOT CLICK OK**; just wait. Clicking the OK button will cause the application to quit. After the Wait message disappears, another message will appear indicating that the ROM is being patched. **Do not turn the power off; this process may take several minutes**.

10. When the message stating that the ROM has been patched appears, click OK. Shut down your computer; you may now install the Encore/MDX G4 Duet processor upgrade card.

> **Support Note:** After updating your system's firmware with the Sonnet firmware installer, you do not need to install the other software located in the Mac OS X ONLY folder on the Sonnet Installer CD; that software is used for other processor upgrade cards by Sonnet.

C. MAC OS 9 USERS—Sonnet Software Installation

This section describes the installation of software required to support this Encore/MDX G4 Duet in your computer under Mac OS 9.2 when it is a selectable OS in Startup Disk (in System Preferences). Please note **you MUST run the Crescendo/Encore Installer before you install this upgrade card. If you do not run the application, your computer will not operate with the processor upgrade installed.**

1. Start your computer under Mac OS 9.2, and then insert the Sonnet Installer CD into its CD-ROM drive. Double-click the *Mac OS 7-9 ONLY, not Classic* folder, and then double-click the Crescendo/Encore Install icon. By default, with "Easy Install" selected from the pop-up menu, the required software will be installed into the active System Folder on the boot drive. If this is okay, click the Install button; otherwise, select "Custom Install" from the pop-up menu for more options or to select another drive to install the software. The installer will install the appropriate software into your computer's System Folder.

2. If the installation was successful, a dialog box will appear; the program will then install a firmware patch that enables the use of the Duet in your computer. (*If you ran the Sonnet Firmware Updater application under Mac OS X, the patch was already installed; skip to step 6.*) The Sonnet firmware patch may be uninstalled. However, doing so prevents your system from working with the Duet. Read the instructions in the dialog box, and click OK to shut down your computer.

3. Press *and hold* the Power button until you hear a long tone; release the button when you hear the tone.

4. After releasing the Power button, a progress bar will appear at the bottom of your display screen. **Do not do anything with your computer until after it restarts**.

5. If an error occurred, a message will appear; you must rerun the installer. Otherwise, once the firmware update is complete and your system restarts a dialog box will appear, stating it is okay to install the Duet; click OK.

6. After your system shuts down, proceed to the hardware installation steps.

> **Support Note:** After updating your system's firmware with the Sonnet firmware installer, you do not need to install the other software located in the Mac OS X ONLY folder on the Sonnet Installer CD; that software is used for other processor upgrade cards by Sonnet.

Installation—Mirrored Drive Doors Models

This section covers the installation of the Encore/MDX G4 Duet into all Power Mac G4 Mirrored Drive Doors (MDD) models. If you are installing this product into an Xserve server with a tray load CD mechanism, skip to page 7. If you are installing this product into an Xserve with a slot load CD mechanism, skip to page 10.

⚠️ **WARNING:** When handling computer products, take care to prevent components from being damaged by static electricity; avoid working in carpeted areas. Handle processor upgrade cards only by their edges and avoid touching connector traces and component pins. Also, avoid touching the logic board and any of its components.

Shut Down and Open Computer

1. Shut down your Power Mac. If the computer has been on for a while, allow a few minutes for it to completely cool before beginning the installation.

2. If you need to move the computer to a different area where you can work freely, disconnect any connected cables, move the computer, then reconnect the power cord to the computer and an electrical outlet.

3. Touch a port access cover on the back of the computer **(Figure 3)** to discharge any potentially damaging static electricity.

4. Disconnect the power cord, and if necessary, any remaining cables, from the computer.

📞 **Support Note:** To avoid generating a static charge in your body, do not walk around the room until after you finish installing the Encore card and close the computer.

5. With the right side of the case facing you, open your Power Mac by lifting the release latch and lowering the side panel away from the computer's case **(Figure 4)**.

Remove Heat Sink

1. Locate the processor heat sink on the logic board **(Figure 5)**; your heat sink may appear different from what is pictured.

2. Locate the four screws securing the processor heat sink in place **(Figure 5)**. Using caution to avoid touching the logic board with the screwdriver, carefully remove the screws and set them aside for use in installing the Duet card.

3. Lift the heat sink straight up and out of the computer, taking care not to touch the DIMMs. Set aside the heat sink with its top face down.

4. Note how the edge of the processor card is inserted into the support bracket **(Figure 6)**.
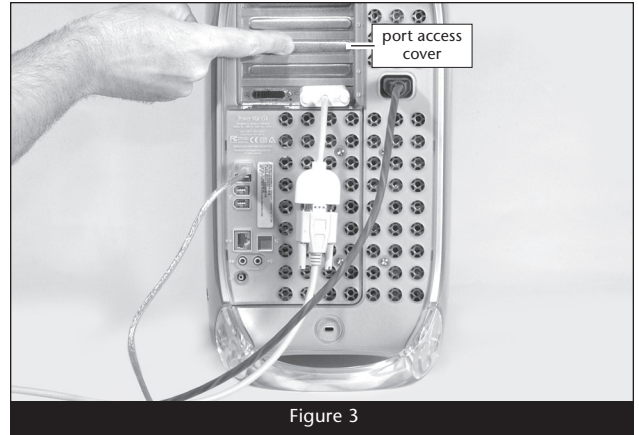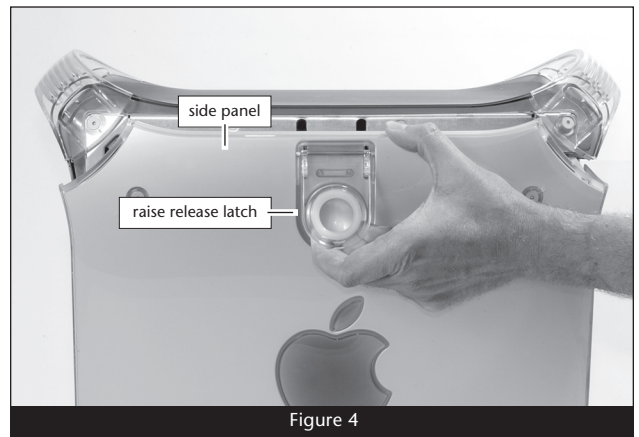

port access cover
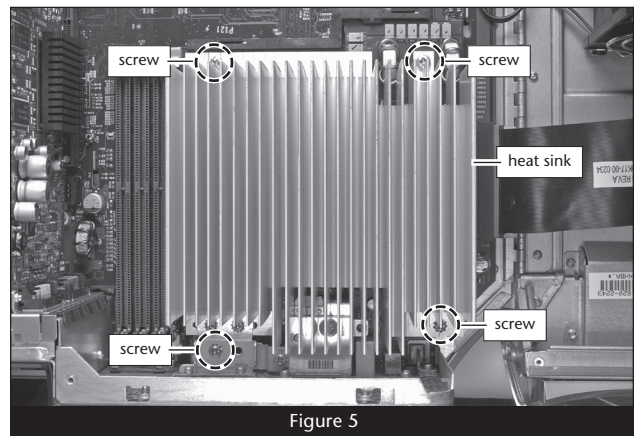
Figure 3

side panel

raise release latch

Figure 4

screw   screw

heat sink

screw   screw

Figure 5

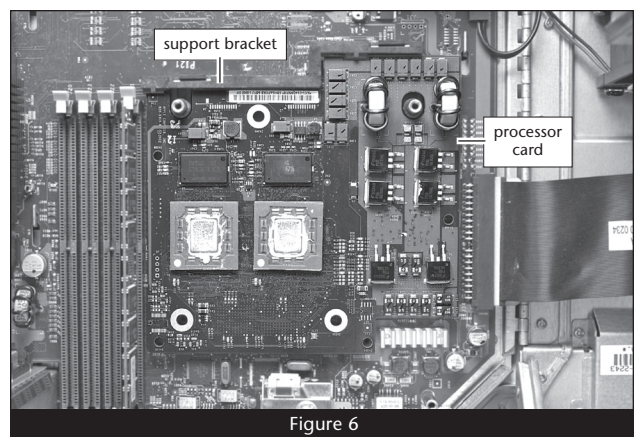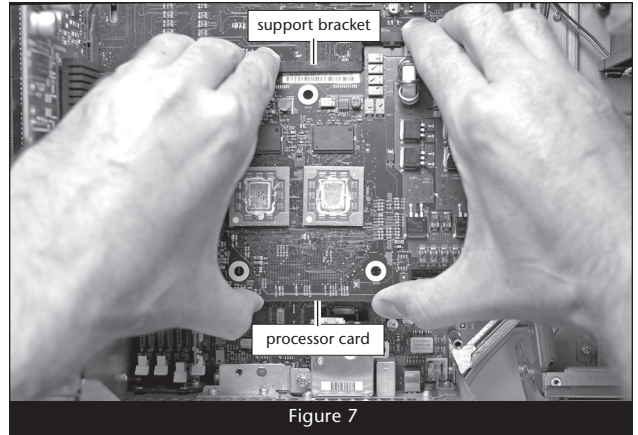support bracket

processor card

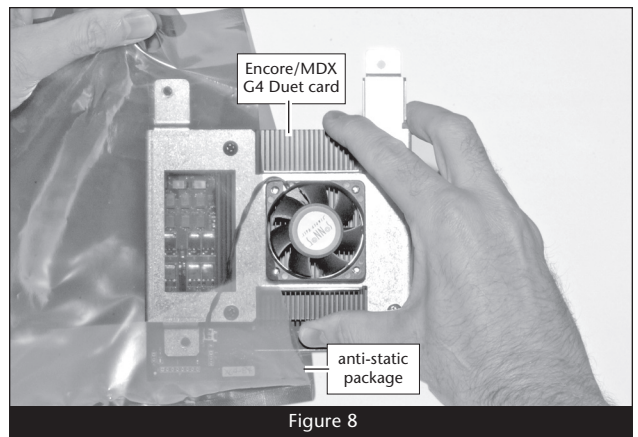Figure 6

Installation—Mirrored Drive Doors Models

Remove Processor Card

Taking care to not touch any components in the computer, grasp the support bracket and the edge of the processor card opposite the bracket as shown **(Figure 7)**. Using your thumbs, *carefully* pull up on the edge of the processor card to separate it from the logic board, and then take it out the computer. Set the card aside.
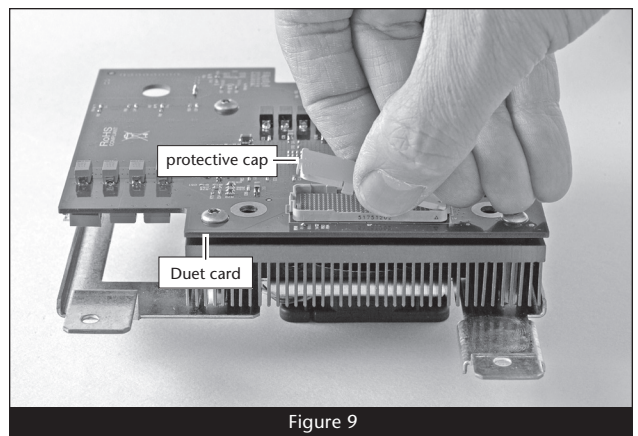

Figure 7

Install Encore/MDX G4 Duet Processor Upgrade Card

1. Remove the Encore/MDX G4 Duet processor upgrade card from its anti-static package; make sure to handle the card by its edges **(Figure 8)**. **Note:** The DIP switches on the top of the card serve no purpose when the Duet is installed into Power Mac G4 (MDD) computers; moving the switches has no effect on the card's operation.
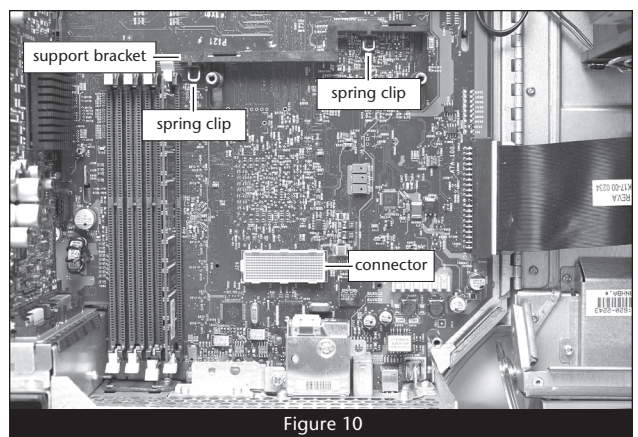

Figure 8

2. Carefully remove the cap covering the connector on the bottom of the Duet card **(Figure 9)**, and then place the cap on the original processor card's connector.

3. Place the processor card you removed from the computer into the anti-static package, and then store it and the heat sink in a safe place.
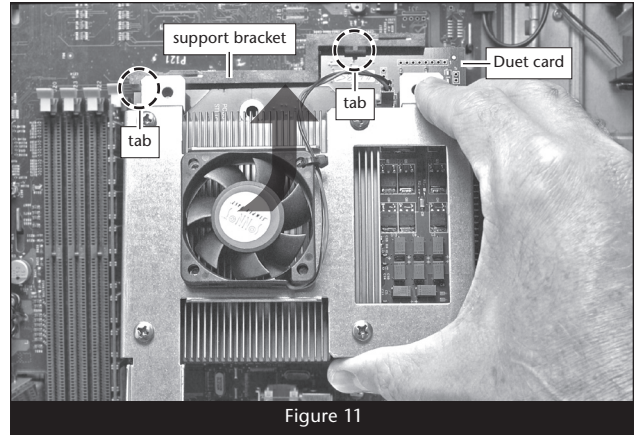
> **Support Note:** Sonnet recommends that you keep the original processor card and heat sink in case you ever need them.

Figure 9

4. Note the location of the processor card connector on the logic board, and the spring clips on the support bracket **(Figure 10)**.
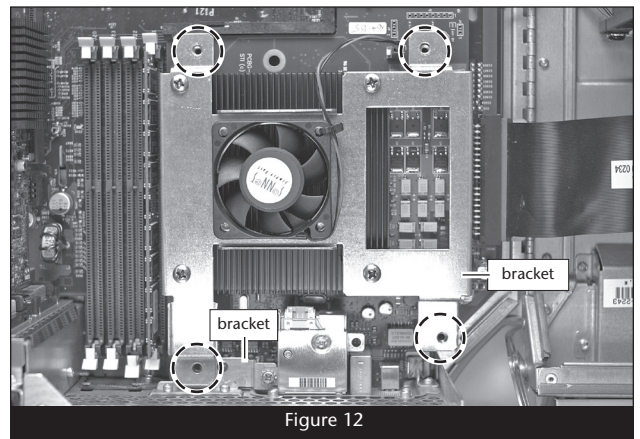

Figure 10

Installation—Mirrored Drive Doors Models

5. Holding the Duet by its bracket, insert the edge of the card into the support bracket between the spring clips and plastic tabs, and lay the card down **(Figure 11)**.
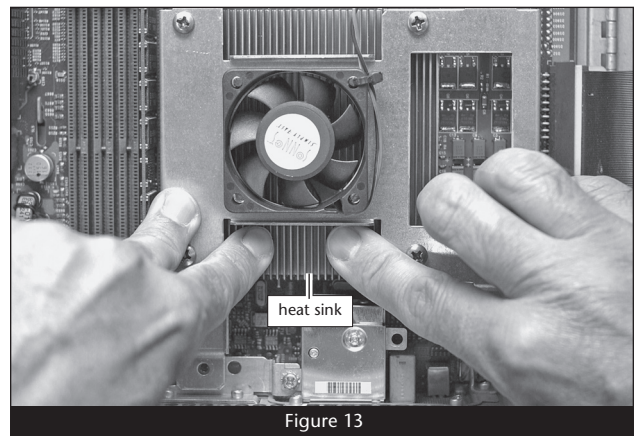

Figure 11

6. Verify the screw holes on the Duet's bracket are aligned with the mounting posts and bracket on the logic board, and confirm the connectors on the Duet and the logic board are engaged **(Figure 12)**.
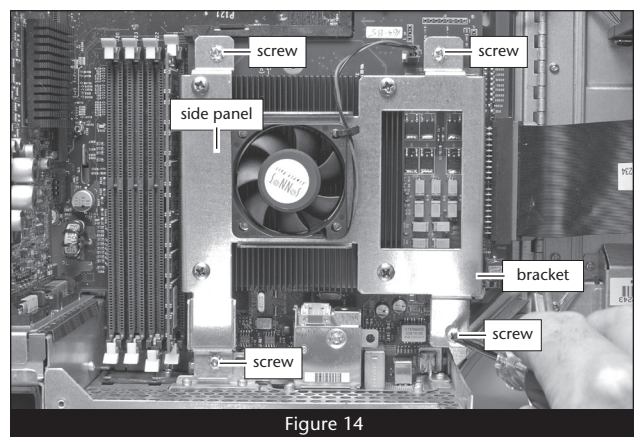

Figure 12

⚠ **WARNING:** The connectors are very fragile components. Make sure the connectors on the logic board and Duet are aligned before applying pressure to the heat sink.

7. Gently press straight down on the heat sink as shown **(Figure 13)** until the connectors snap together. Verify the connectors are completely coupled by gently pulling up on the edges of the Duet board; the board should remain firmly in place.

8. Verify again that the screw holes on the Duet's bracket are aligned with the mounting posts and bracket on the logic board, and if necessary, move the Duet's bracket to fix the alignment.

Figure 13

9. Using the four screws you removed earlier, secure the Duet to the logic board; do not overtighten the screws **(Figure 14)**.

⚠ **WARNING:** When your computer is operating, the Duet's heat sink will become VERY hot to the touch; take care to not touch the heat sink, or you may get burned.
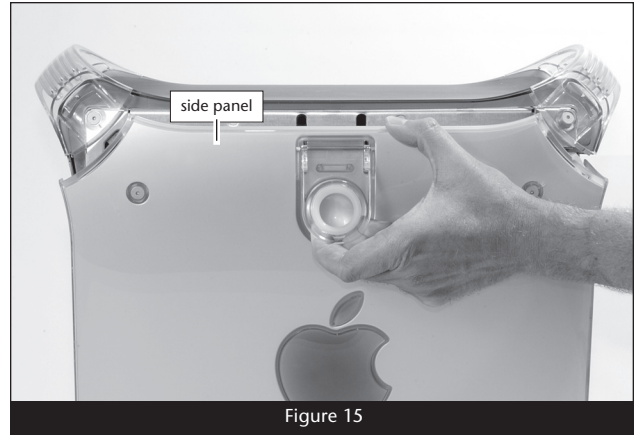

Figure 14

Installation—Mirrored Drive Doors Models

Close Computer

1. Raise the side panel back into place **(Figure 15)**.

2. Return the computer to your computing area if necessary, and reconnect the power cord and peripheral cables to the computer.

Turn On Computer

Turn on your Power Mac; your accelerated machine should boot normally.

Figure 15

Installation—Xserve G4 with Tray Load CD-ROM

This section covers the installation of the Encore/MDX G4 Duet into an Xserve G4 server with a tray load CD-ROM mechanism. These models can be identified by the CD tray door on the front right corner of the server. If you are installing this product into an Xserve with a slot load CD mechanism, go to page 10. If you are installing this product into a Power Mac G4 Mirrored Drive Doors (MDD) model, go back to page 3.

⚠️ **WARNING:** When handling computer products, take care to prevent components from being damaged by static electricity; avoid working in carpeted areas. Handle processor upgrade cards only by their edges and avoid touching connector traces and component pins. Also, avoid touching the logic board and any of its components.

Figure 16

Shut Down and Remove Server from its Rack

1. Shut down your Xserve. If the server has been on for a while, allow a few minutes for it to completely cool before beginning the installation.

2. Disconnect any connected cables and remove the Xserve from its rack. Place the Xserve on a flat, level surface, and then reconnect the power cord to the server and an electrical outlet.

3. Touch the metal enclosure to discharge any potential damaging static electricity.

4. Disconnect the power cord from the Xserve.

📞 **Support Note:** To avoid generating a static charge in your body, do not walk around the room until after you finish installing the Encore card and close the computer.

Remove Processor Card

1. Remove the plastic shroud covering the processor card's heat sink **(Figure 16)**.

2. Remove the three screws securing the processor card heat sink to the logic board **(Figure 17)**.

3. Lift the heat sink off the processor card and set it aside **(Figure 18)**.

4. Grasping its edges, gently lift the side of the processor card opposite the fan to separate it from the logic board, and then carefully lift it straight up and away **(Figure 19)**. Set the card aside.
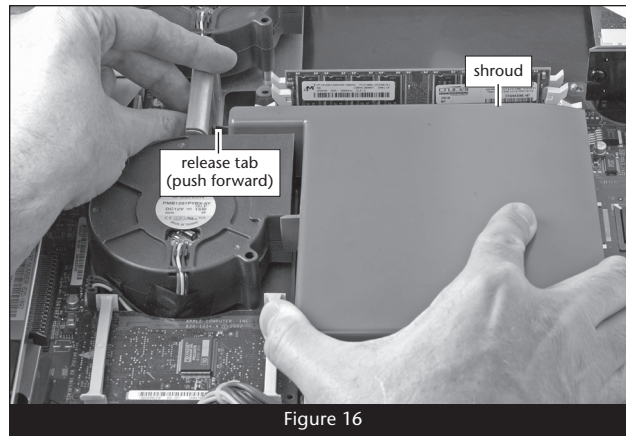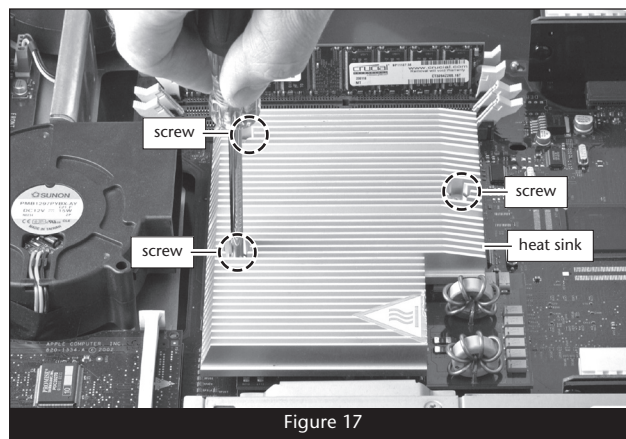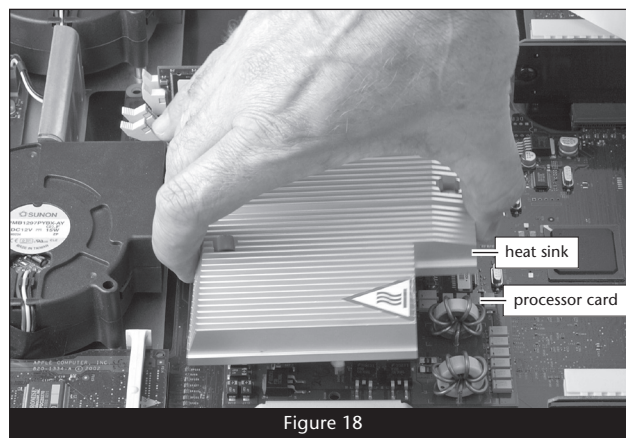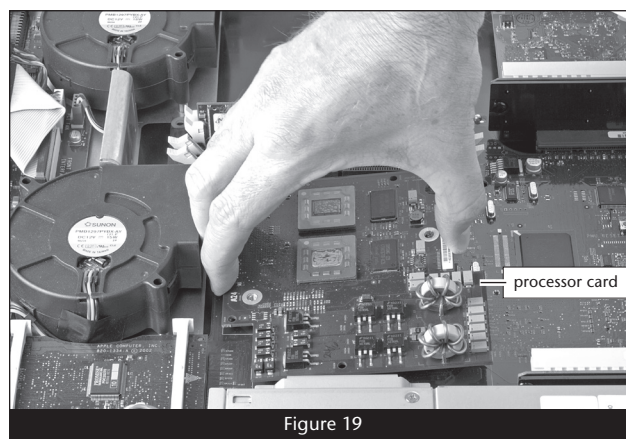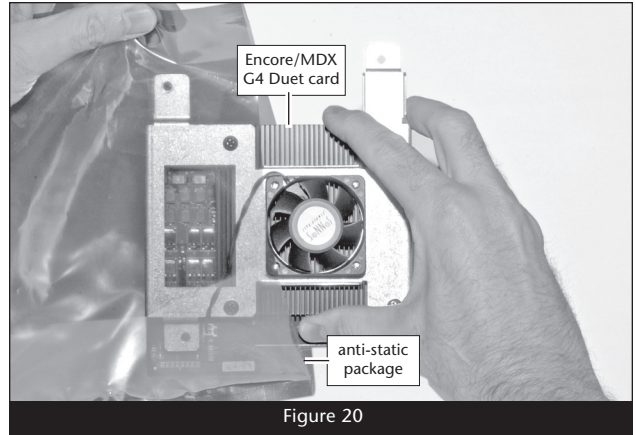

Figure 17

Figure 18

Figure 19

Installation—Xserve G4 with Tray Load CD-ROM
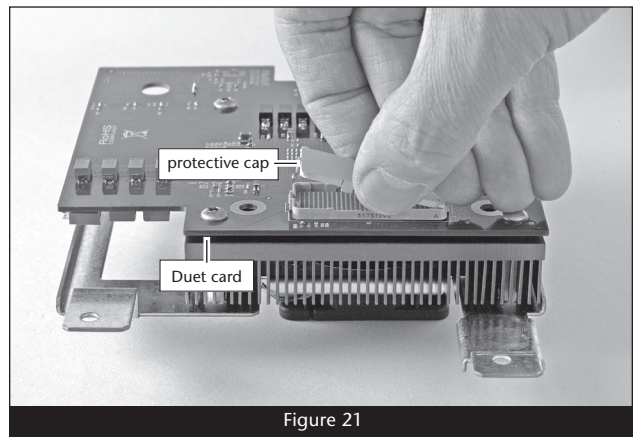
Prepare Encore/MDX G4 Duet for Installation

Before you install the Duet processor upgrade into your Xserve, you must remove the attached fan assembly; they are not used when this upgrade is installed in an Xserve.

1. Remove the Encore/MDX G4 Duet processor upgrade card from its anti-static package; make sure to handle the card by its edges **(Figure 20)**.
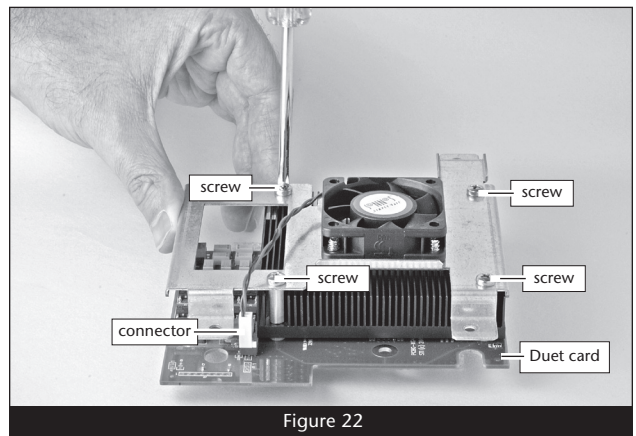

Figure 20

2. Carefully remove the cap covering the connector on the bottom of the Duet card **(Figure 21)**, and then place the cap on the original processor card's connector.

3. Place the processor card you removed from the computer into the anti-static package, and then store it, the original heat sink, and the screws you removed, in a safe place.

Support Note: Sonnet recommends that you keep the original processor card, heat sink, and screws in case you ever need them.
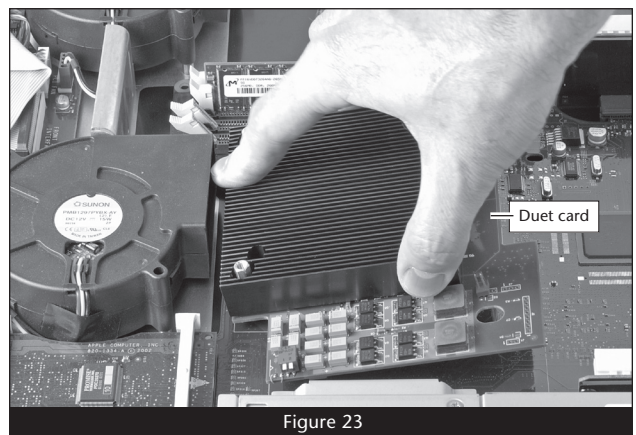

Figure 21

4. Place the Duet card on a flat, level surface, with the bottom of the card resting on the piece of foam that was in the anti-static package. Remove the four screws securing the fan assembly to the top of the card and set them aside **(Figure 22)**.

5. Carefully disconnect the fan connector from the Duet card, and then remove the fan assembly **(Figure 22)**.

WARNING: Do not change the position of the DIP switches on the top edge of the Duet card; they must be left in the Up position. *If they are set to the down position, your Xserve will not boot with the Duet card installed.*
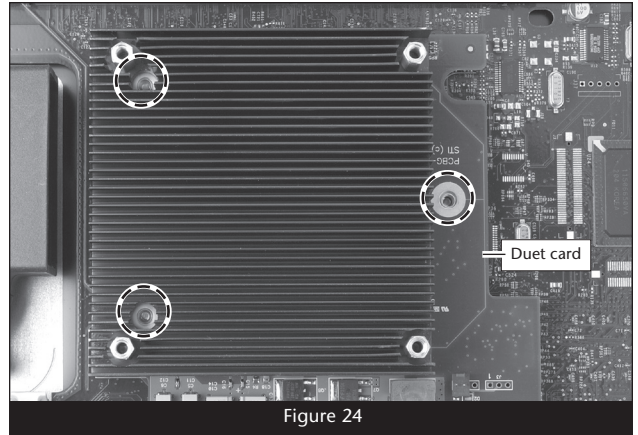

Figure 22

Install Encore/MDX G4 Duet Processor Upgrade Card

1. Align the connector on the bottom of the Duet card with the connector on the logic board, and then set the card down on top of the three threaded posts **(Figure 23)**.
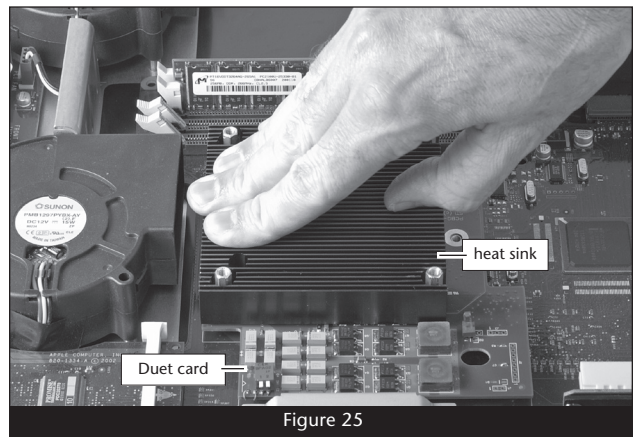

Figure 23

Installation—Xserve G4 with Tray Load CD-ROM

2. Verify the screw holes on the Duet card are aligned with the mounting posts on the logic board, and confirm the connectors on the Duet and the logic board are engaged **(Figure 24)**.
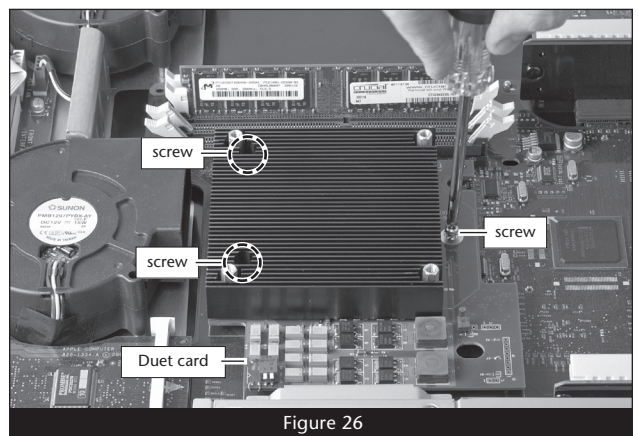

Duet card

Figure 24

⚠️ **WARNING:** The connectors are very fragile components. Make sure the connectors on the logic board and Duet are aligned before applying pressure to the heat sink.

3. Gently press straight down on the Duet's heat sink as shown **(Figure 25)** until the connectors snap together. Verify the connectors are completely coupled by gently pulling up on the edges of the Duet card; the board should remain firmly in place.

heat sink
Duet card

Figure 25

4. Using the three screws provided in the Duet package, secure the Duet card snugly to the logic board; **do not overtighten the screws (Figure 26).**
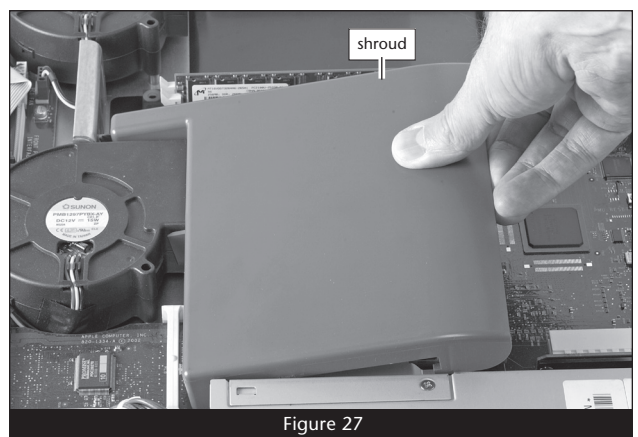

screw
screw
screw
Duet card

Figure 26

5. Replace the plastic shroud on top of the Duet card **(Figure 27)**.

Return Server to Rack

1. Slide the Xserve back into its rack, making sure to tighten the front thumbscrews to secure it in place.

2. Reconnect the power cord and other cables to the server.

Turn On Server

Turn on your Xserve; your accelerated machine should boot normally.

shroud

Figure 27

Installation—Xserve G4 (Slot Load) Models

This section covers the installation of the Encore/MDX G4 Duet into an Xserve G4 (Slot Load) server. These models can be identified by the CD slot on the front right corner of the server. If you are installing this product into an Xserve with a tray load CD mechanism, go back to page 7. If you are installing this product into a Power Mac G4 Mirrored Drive Doors (MDD) model, go back to page 3.

⚠ **WARNING:** When handling computer products, take care to prevent components from being damaged by static electricity; avoid working in carpeted areas. Handle processor upgrade cards only by their edges and avoid touching connector traces and component pins. Also, avoid touching the logic board and any of its components.

Shut Down and Remove Server from its Rack

1. Shut down your Xserve. If the server has been on for a while, allow a few minutes for it to completely cool before beginning the installation.

2. Disconnect any connected cables and remove the Xserve from its rack. Place the Xserve on a flat, level surface, and then reconnect the power cord to the server and an electrical outlet.

3. Touch the metal enclosure to discharge any potential damaging static electricity.

4. Disconnect the power cord from the Xserve.

☎ **Support Note:** To avoid generating a static charge in your body, do not walk around the room until after you finish installing the Encore card and close the computer.

Remove Processor Card Assembly

1. Remove the three screws securing the processor card assembly to the logic board **(Figure 28)**.

2. Grasping its edges, gently lift the side of the processor card assembly opposite the fan to separate it from the logic board, and then carefully lift it straight up and away **(Figure 29)**. Set the assembly aside.

Prepare Encore/MDX G4 Duet for Installation

Before you install the Duet processor upgrade into your Xserve, you must replace the attached fan assembly with the included heat sink cover, and set the DIP switches on the top surface of the card to ensure full system performance.

1. Remove the Encore/MDX G4 Duet processor upgrade card from its anti-static package; make sure to handle the card by its edges **(Figure 30)**.

2. Carefully remove the cap covering the connector on the bottom of the Duet card **(Figure 31)**, and then place the cap on the original processor card's connector.
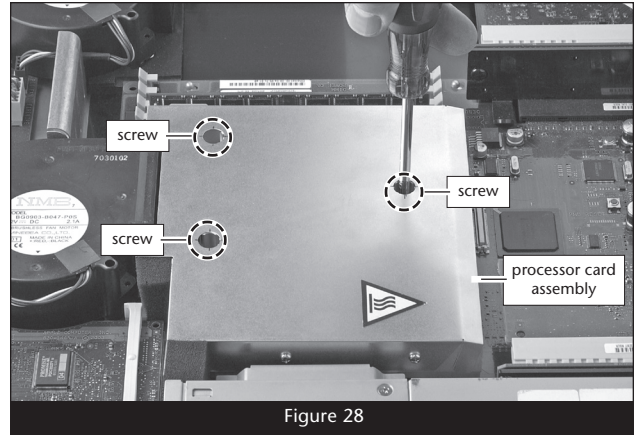

screw
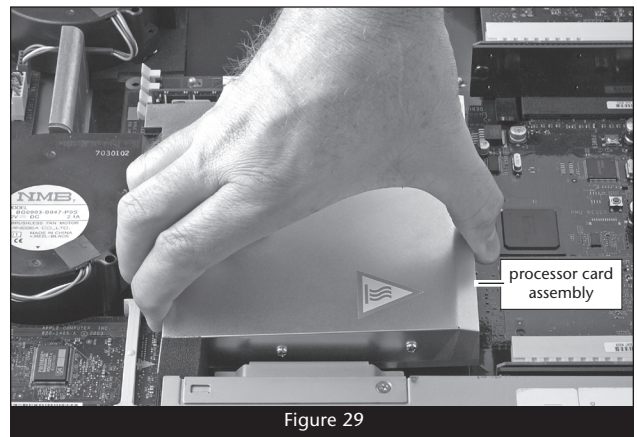screw
screw
processor card assembly

Figure 28

processor card assembly

Figure 29

Encore/MDX G4 Duet card
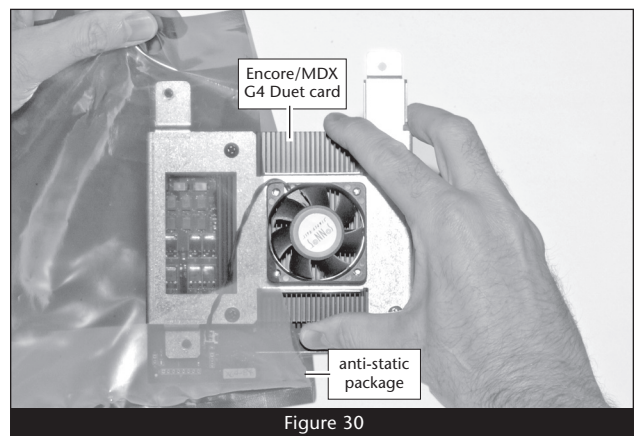
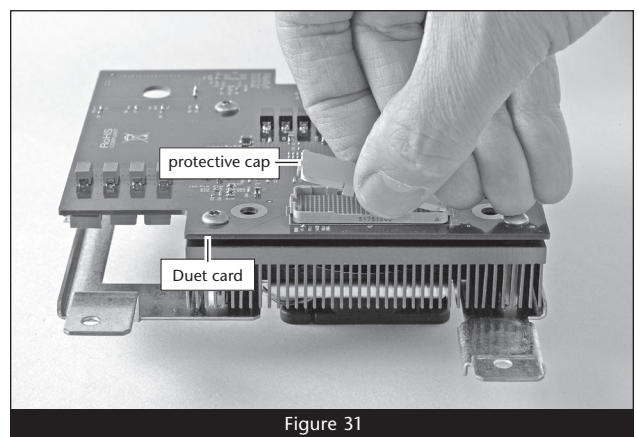anti-static package

Figure 30

protective cap

Duet card

Figure 31

Installation—Xserve G4 (Slot Load) Models

3. Place the processor card you removed from the computer into the anti-static package, and then store it and the original heat sink in a safe place.

> **Support Note:** Sonnet recommends that you keep the original processor card assembly and the screws you removed in case you ever need them.

4. Place the Duet card on a flat, level surface, with the bottom of the card resting on the piece of foam that was in the anti-static package. Remove the four screws securing the fan assembly to the top of the card and set them aside (**Figure 32**).

5. Carefully disconnect the fan connector from the Duet card, and then remove the fan assembly (**Figure 32**).

6. Remove the included heat sink cover from its bag. Using the two large holes in the cover and two holes in the Duet's heat sink for reference, place the cover on the heat sink (**Figure 33**).

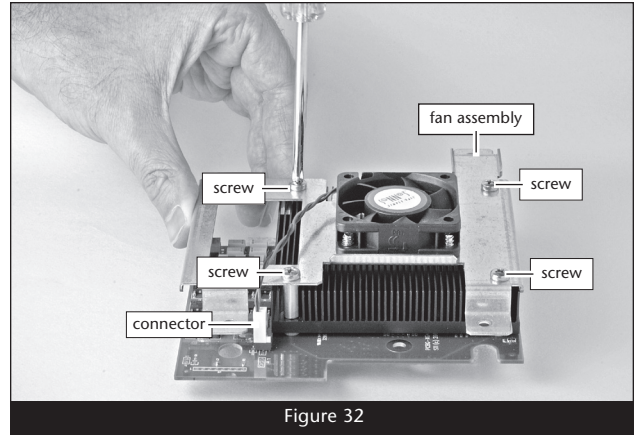7. Using the four screws you removed previously, attach the heat sink cover to the heat sink (**Figure 33**).
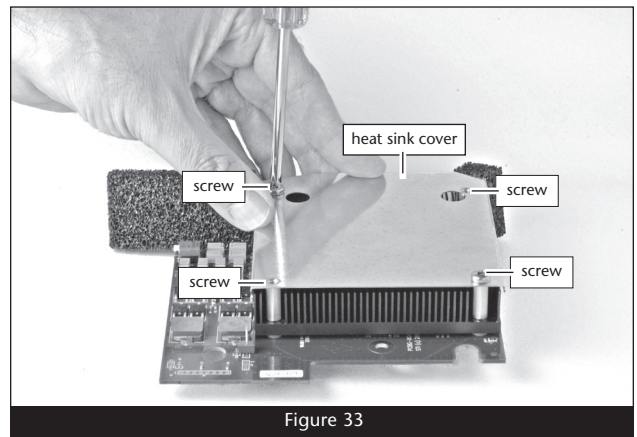

Figure 32

Figure 33

> **⚠ WARNING: Be sure to change the position of the DIP switches on the top edge of the Duet card as instructed below**; *if they are set to the wrong position, the system bus will not operate at full speed.*

8. Locate the DIP switches on the top surface of the Duet card (**Figure 34**). **Push both switches to the down position.**
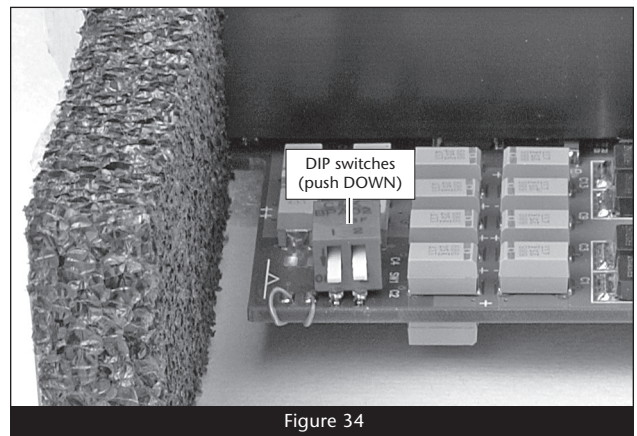

Figure 34

Install Encore/MDX G4 Duet Processor Upgrade Card

1. Align the connector on the bottom of the Duet card with the connector on the logic board, and then set the card down on top of the three threaded posts (**Figure 35**).
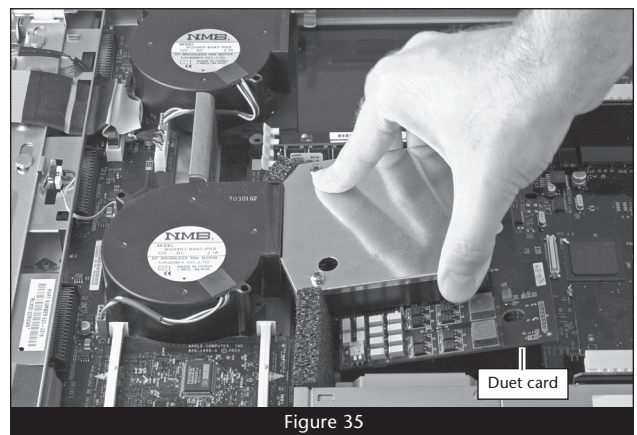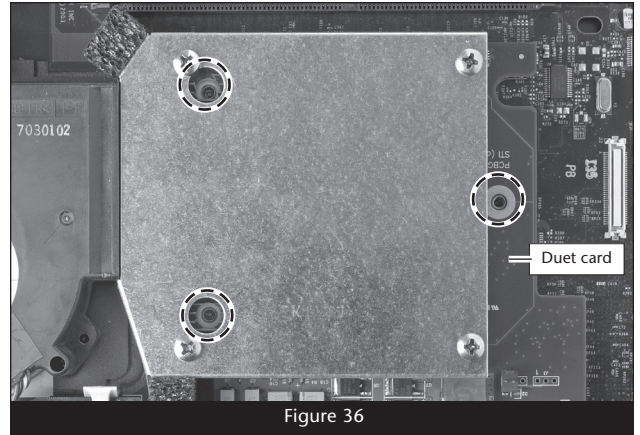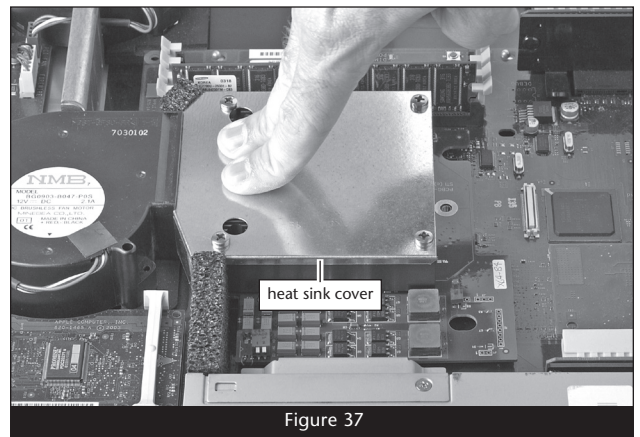

Figure 35

Installation—Xserve G4 (Slot Load) Models

2. Verify the screw holes on the Duet card are aligned with the mounting posts on the logic board, and confirm the connectors on the Duet and the logic board are engaged **(Figure 36)**.

Duet card

Figure 36

⚠ **WARNING:** The connectors are very fragile components. Make sure the connectors on the logic board and Duet are aligned before applying pressure to the heat sink.

3. Gently press straight down on the Duet's heat sink cover as shown **(Figure 37)** until the connectors snap together. Verify the connectors are completely coupled by gently pulling up on the edges of the Duet board; the board should remain firmly in place.

4. Verify the long piece of foam attached to the heat sink cover is positioned as shown **(Figure 37)**.

heat sink cover

Figure 37

5. Using the three screws provided in the Duet package, secure the Duet card snugly to the logic board; **do not overtighten the screws (Figure 38).**

Return Server to Rack

1. Slide the Xserve back into its rack, making sure to tighten the front thumbscrews to secure it in place.

2. Reconnect the power cord and other cables to the server.

Turn On Server

Turn on your Xserve; your accelerated machine should boot normally.

screw

screw

screw

Duet card

foam

Figure 38