

MACHSpeed ZIF™

G3 and G4 ZIF Daughtercard upgrades for the PowerMac G3 and the 400 MHz PowerMac G4

← MACHSpeed G4Z™ →

← MACHSpeed G3Z™ →



XLR8 Standard ZIF Settings

1. Install the latest version of XLR8 MACH Speed Control.
2. Locate CPU base settings.
3. Remove and adjust card switches jumpers and/or dials (all available) to the related settings of THE DESIRED SPEED.
4. Remove motherboard cache from motherboard if possible.
5. Press CUDA reset on motherboard (with CarrierZIF only)
6. Reinstall card – boot system.

50 MHz SYSTEMS – WITH CARRIERZIF ADAPTER

Base Settings	Switches in the "ON" position	Jumper Settings	Bus Speed	Bus ratio
300	1,3,4,6 & 10,11,12		40.0	7.5 to 1
333	3,4,6,7,8 & 9,11,12		48.0	7.0 to 1
366	1,6,7,8 & 11,12		49.0	8.0 to 1
400	1,2,4,6,7,8 & 9,10		50.0	8.0 to 1
450	1,2,4,6,7,8 & 9,10,11,12,12		50.0	9.0 to 1 (G4 Only)
466	1,2,6,7 & 9,12		46.6	10.0 to 1 (G3 Only)
500	1,2,4,6,7,8 & 9,12		50.0	10.0 to 1 (G3 Only)
550	1,4,6,7 & 9,10,12		46.0	12.0 to 1*
600	1,2,4,6,7,8 & 9,10,12		50.0	12.0 to 1*

** Verify CPU multiplier with product – 9.0x, 10.0x and 12.0x based speeds not available on all CPU's.

66 MHz SYSTEMS POWERMAC G3 (BEIGE Systems)

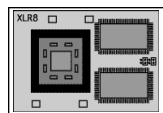
Default / Actual Setting / Speed	Jumper Settings	Bus ratio
300 / 300		4.5 to 1
333 / 333		5.0 to 1
350 / 333		5.0 to 1
366 / 366		5.5 to 1
400 / 400		6.0 to 1
450 / 466		7.0 to 1
466 / 466		7.0 to 1
500 / 500		7.5 to 1
533 / 533		8.0 to 1
550 / 533	N/A	N/A
600 / 599		9.0 to 1*

* Verify CPU multiplier with product – 9.0x, 10.0x and 12.0x based speeds not available on all CPU's.

100 MHz SYSTEMS POWERMAC G3 (Blue & White) POWERMAC G4 (PCI PowerMac)

Default / Actual Setting / Speed	Jumper Settings	Bus ratio
300 / 300		3.0 to 1
333 / 300		3.0 to 1
350 / 350		3.5 to 1
366 / 350		3.5 to 1
400 / 400		4.0 to 1
450 / 450		4.5 to 1
466 / 450		4.5 to 1
500 / 500		5.0 to 1
533 / 500		5.0 to 1
550 / 550		5.5 to 1
600 / 600		6.0 to 1

ZIF Daughtercards



Set jumpers with card oriented with CPU to left and XLR8 right side up

Preface

Thank you for choosing the MACH Speed™ ZIF upgrade. This manual is designed for two XLR8 processor upgrades:

- **MACH Speed G3 ZIF:** G3 Processor upgrade
- **MACH Speed G4 ZIF MPE:** Multiprocessing Enabled G4 Processor upgrade

This manual contains the following sections:

Installing the software - Detailed information on the installation and use of XLR8's exclusive XLR8 MACH Speed Control software.

Installing the MACH Speed Card - Detailed information on the installation of the ZIF daughtercard in various systems

Technical Support - This section includes support information and troubleshooting techniques.

About performance tuning

Your MACH Speed processor card was preset from the factory to the default setting. You may choose to change the CPU ratio setting at a later time to optimize the performance of your upgrade.

It is highly recommended that the initial installation of the card be performed with default settings. Refer to the Advance Performance Tuning section of this manual to fine tune your system performance when your system has been running for a suitable period of time.

Included with your package

Your package includes:

- The MACH Speed ZIF processor upgrade card
- In-box notice
- XLR8 MACH Speed Control software & documentation on CD
- XLR8 Firmware updater (for PowerMac G3 B&W systems and G4 upgrades)
- Arctic-Silver Thermal Grease and application tools

Important Information

Before installing your MACH Speed upgrade card, carefully read the instructions covering your machine.

Installing and Using the Software



This chapter provides installation instructions for XLR8's exclusive and fully-automated XLR8 MACH Speed Control and will provide detailed instructions on:

- Installing XLR8 MACH Speed Control
- Using XLR8 MACH Speed Control

Your package includes the XLR8 Universal Install CD which includes everything needed to enable and periodically review your upgrade card's status, additional information, and electronic documentation. The latest updates are available via <http://www.xlr8.com>.

Installing XLR8 MACH Speed Control

Installation of XLR8 MACH Speed Control is fully automatic. Installing this software prior to installing the processor upgrade is highly recommended.

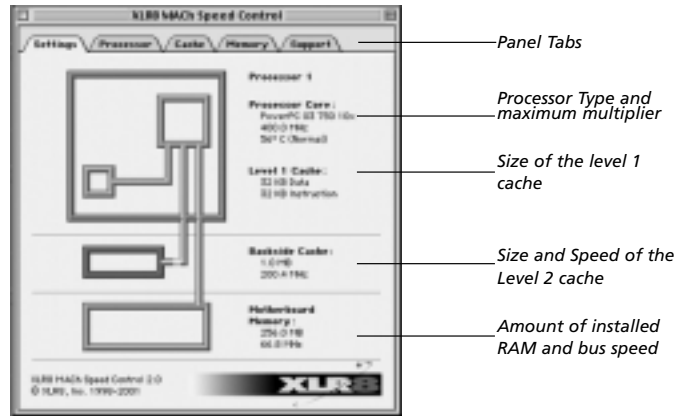
1. Install the software:
 - After booting your Macintosh, insert the XLR8 Universal Install CD.
 - Navigate to the MACHSpeed Control - OS9 Installer.
Note that the following instructions relate to an OS9 install. If you have OS X, the operation and use is basically the same, except that the app is installed in Applications/Utilities
 - Launch the XLR8 MACH Speed Control installer by double-clicking the XLR8 MACH Speed Control installer icon.
 - Read the text and follow the on-screen instructions until you have completed the installation.
 - Restart your computer. You will be prompted to enter the serial number located on the CD.

Using XLR8 MACH Speed Control

Checking the status of your card

In the Control Panels folder of your start-up disk, open XLR8 MACH Speed Control by selecting it in the Control Panels hierarchical menu in the Apple Menu. In addition to controlling the backside cache of the upgrade card, XLR8 MACH Speed Control also provides dynamic information on the status of your card and the configuration of your computer.

Navigating the Control Panel is accomplished via the tabs at the top of the dialog. Information for each of the tabs is shown below. Interactive help is always available by clicking on the Help icons.



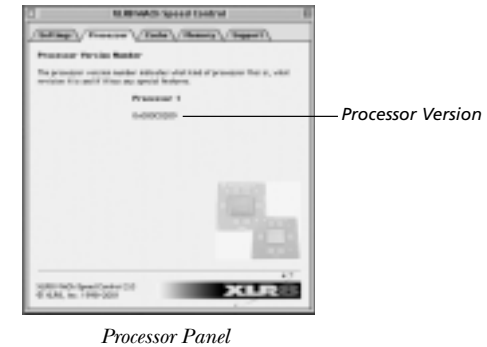
1. **Settings panel:** Displays the current settings for the processor upgrade.

Processor: Identifies the number of processors installed, its/their type, its/their speed (in Mhz) and its/their temperature. Also indicates the amount of level 1 cache on the processor(s).

Backside Cache: Provides information on the backside cache size and access speed (in MHz)

Memory: Amount of physical installed RAM and bus speed of the motherboard.

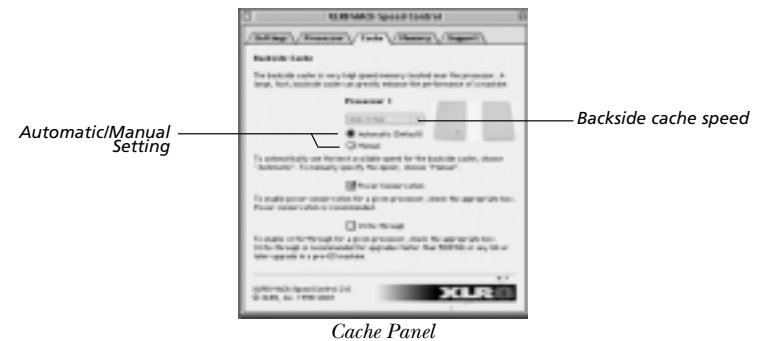
2. **Processor panel:** This panel gives information on the processor revision number and special features it may have.



Processor Panel

3. **Cache panel:** This panel allows to modify the options for the G3/G4 processor(s) backside cache and motherboard cache.

Backside Cache Speed: Selecting the “Manual” setting allows you to select any available speed. Speeds selected manually will remain in effect until changed. Selecting the “Automatic” setting will cause the cache to run at the default working speed. Please note that sometimes this is not the fastest speed that may be available.



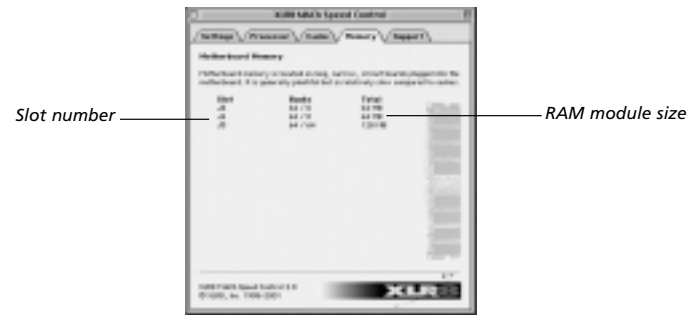
Cache Panel

Power Conservation: Enabling Power conservation is recommended for all processors.

2

Preparing the MACH Speed ZIF Card for Installation

4. **Memory Panel:** The memory panel gives extensive information on the RAM configuration of your computer. This panel shows the location of each RAM module - A RAM bank has a unique identifier.



Cache Panel

4. **Support Panel:** The support panel contains contact information for technical and/or general inquiries about XLR8 products.



Support Panel

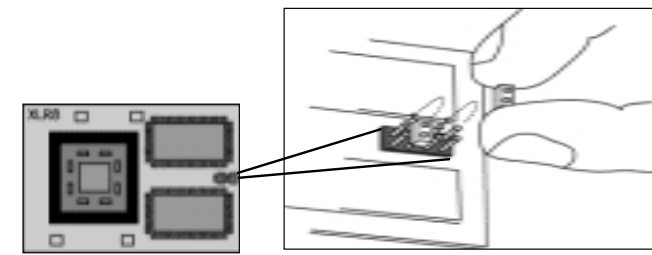
Before installing the MACH Speed ZIF card into your system, it is necessary to prepare the card for the installation.

Adjusting the Jumpers on the MACH Speed card

Before installing the MACH Speed card, you need to adjust the jumpers in order to set the speed of your upgrade card.

The jumpers are adjusted on the card itself, you do not need to change the jumpers on the motherboard of your PowerMac.

The jumpers are set from the left to the right, when the XLR8 logo is at the top left corner and the jumper block at the right side of the card.



The default settings are the following:

POWERMAC G3 (BEIGE)

Default Setting	Jumper Settings
300	
333	
366	
400	
433	
466	
500	
533	

POWERMAC G3 (BLUE&WHITE) POWERMAC G4/PCI

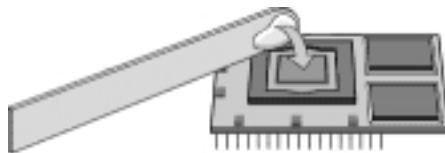
Default Setting	Jumper Settings
300	
350	
400	
450	
500	
550	

Installing the MACH Speed ZIF Upgrade Card

Applying the thermal grease

The MACH Speed ZIF upgrade card ships with a box containing thermal grease. The thermal grease needs to be applied onto the processor in order to improve the heat transfer to the heatsink.

1. Attach the anti-static wrist strap to the end of a plugged-in power cable, such as the one used for your computer. The wrist strap will ensure that you are well grounded and avoid any unexpected static discharges.
2. Apply a small amount of heatsink thermal grease to the center of the CPU.



3. Your CPU is now ready to be installed.

This chapter provides information for installing the MACH Speed ZIF card into individual systems.

General Installation Instructions

Before installing your MACH Speed ZIF upgrade card, you should review this short section.

1. Attach the anti-static wrist strap to the end of a plugged-in power cable, such as the one used for your computer. The wrist strap will ensure that you are well grounded and avoid any unexpected static discharges.
2. Prepare the system and work area.
 - Prepare your work area by ensuring that you have a well-lighted space, preferably not on carpet (static), and away from all magnetic devices.
 - Turn off the computer and disconnect all cables.

Installing the CPU card is technically challenging. If you prefer, you can ask an Apple-authorized dealer or service provider to install it for a fee.

If you attempt to install the card yourself but experience difficulties, it is recommended that you have an Apple-authorized service provider complete the process. Apple does not warranty damage caused by improper removal or installation of CPU cards.

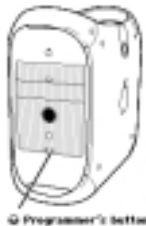
Installation in a Power Macintosh G3 Blue & White and PowerMac G4 (PCI Graphics)

IMPORTANT: If you are installing a G4 processor into your PowerMac G3 Blue&White, you will have to update the firmware of your computer first. Updating/patching the firmware is not necessary on PowerMacs G3 Beige and G4.

Updating the firmware version 1.0 to version 1.1:

The XLR8 Firmware updater works only with version 1.1 of the original Apple firmware. If you have not updated your firmware to version 1.1, it will be necessary to update your firmware. **YOU MUST BOOT INTO MAC OS 9!**

1. Insert the XLR8 Universal CD into your CD-ROM drive
2. Open the folder "For B&W G3s..."
3. Double-click the file "1-G3 Firware Update..." if you DO NOT have the latest 1.1f4.
4. This will open a disk image on your desktop.
5. Open the disk image and double-click on the installer file.
6. Launch the installer
7. Follow the on screen instructions.
8. Click the shutdown button
9. While holding down the Programmer's button on the front of the computer, power up your computer (this is the indented button).
10. You will hear a long tone. Once the tone stops, you can release the programmer's button. The firmware has been updated.



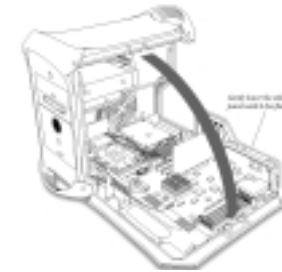
Applying the XLR8 Firmware patch:

The Apple Firmware v.1.1 of the PowerMac G3 B&W has been designed not to run with G4 processors. Applying the XLR8 firmware patch allows you to install your G4 upgrade.

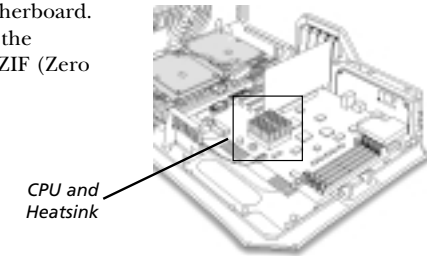
1. Insert the XLR8 Universal CD into your CD-ROM drive
2. Open the folder "For B&W G3s..."
3. Launch the "2-XLR8 Firmware updater...". You will be prompted to shutdown your computer
4. Startup the computer while holding down the programmer's switch depressed until the long tone stops, then release the switch.

Note: The XLR8 Firmware updater works only with version 1.1 of the original Apple firmware. If you get an error message while applying the XLR8 Firmware updater, you are probably running version 1.0 of the firmware. You will have to first update your Apple firmware to version 1.1.

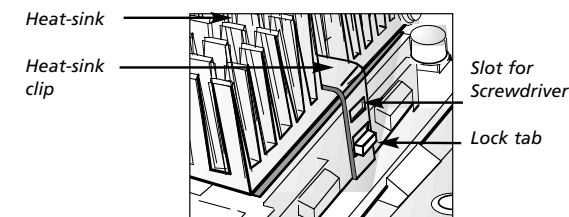
1. Lift the latch on the side of the computer and gently lower the panel onto a clean, flat surface



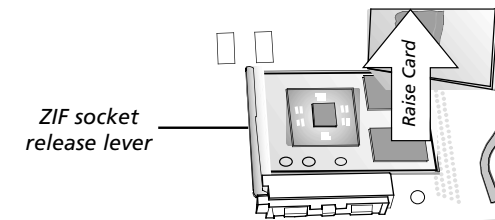
2. Locate the heat-sink and CPU on the motherboard.
 - The CPU card is located to the right of the memory sockets. It rests in a dedicated ZIF (Zero Insertion Force) socket.



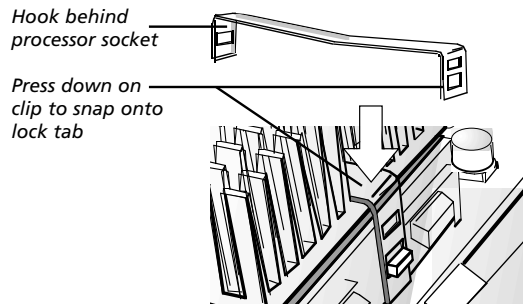
3. Remove the heat-sink.
 - Insert the small screwdriver that ships with your card into the slot on the heat-sink clip. **NOTE:** A razor is included to clean the bottom of the heatsink.
 - Press down and rock the handle of the screwdriver towards the heat-sink fins, releasing the heat-sink's clip from the lock tab.



4. Remove the CPU Card.
 - Carefully raise the ZIF Socket Release Lever and lift the CPU card from the socket.



5. Install the MACH Speed ZIF into your system.
 - The MACH Speed ZIF Upgrade will face the same direction as the older card that you just removed (note the missing pin.)
 - Holding the card by the edges (do not depress the center of the card), line up the pins and insert the card straight down. Insertion should require only minimal force.
 - Lower the ZIF Socket release lever to lock the card into the socket.
 - Replace the heat-sink on the MACH Speed ZIF card.
 - Reattach the heat-sink clip by first “hooking” the end of the clip with the single hole to the back of the processor socket.
 - Press down on the front end of the clip to snap onto the lock tab on the front of the processor socket.



6. Raise the computer's side panel and press it against the case. Squeeze the side panel until it snaps securely into place.
7. Package the old CPU card for later.
 - Put the used card into MACH Speed anti-static box. If you ever have a problem, it may be handy to be able to use the old card while troubleshooting the system.
8. Reconnect all cables and reboot your system. The installation is finished.

Installation in a Power Macintosh G3 Beige Desktop or Mini-Tower

Getting access to the processor

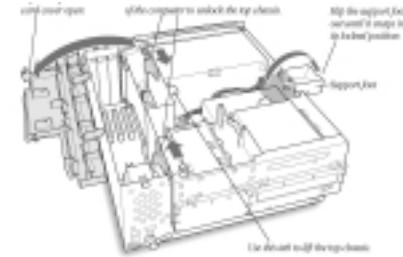
Desktop: Press the two release buttons under the front panel and slide the cover toward you approximately two inches, lift it straight up and off the computer.

Mini-Tower: Lay the computer on its side with cover and buttons facing up and remove the cover from the computer. Press the green

Desktop

Unlock the chassis and open the support foot.

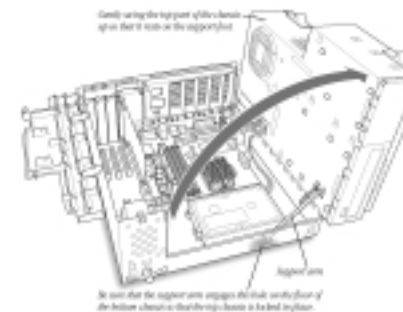
- Open the expansion card cover.
- Slide the chassis release switches inward.
- Flip out the support foot until it locks into the open position.



Desktop

Swing the chassis up and insert the support arm.

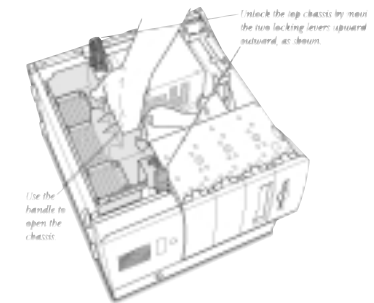
- Lift the chassis by the tab until the support foot rests securely on a flat surface.



Mini-Tower

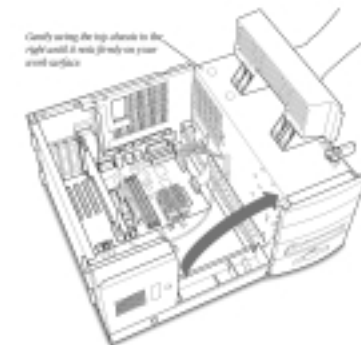
Open the chassis.

- Unlock the top chassis by moving the two locking levers upward and outward.



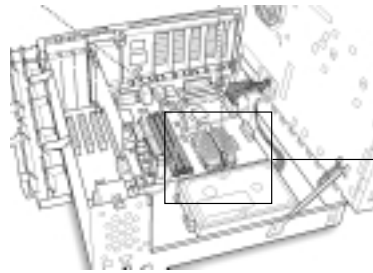
Mini-Tower

- Use the handle to open the chassis.
- Gently swing the top chassis to the right until it rests firmly on your work surface.



Desktop

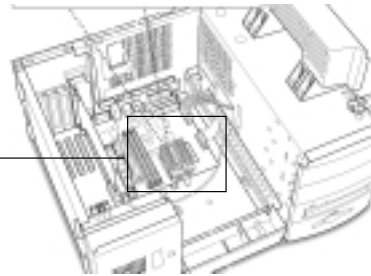
Locate the processor and heatsink



CPU and Heatsink

Mini-Tower

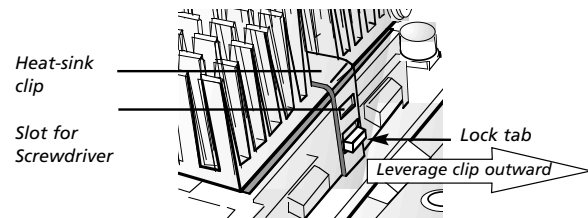
Locate the processor and heatsink



Removing the old processor

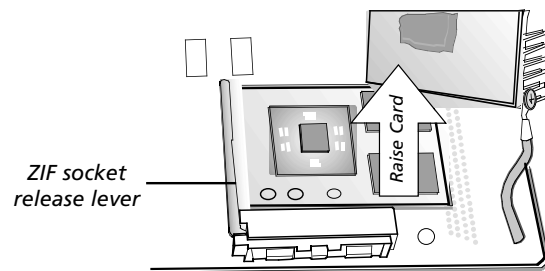
5. Remove the heat-sink.

- Insert the small screw-driver into the slot on the heat-sink clip.
- Press down and rock the handle of the screwdriver towards the heat-sink fins, releasing the heat-sink's clip from the lock tab.



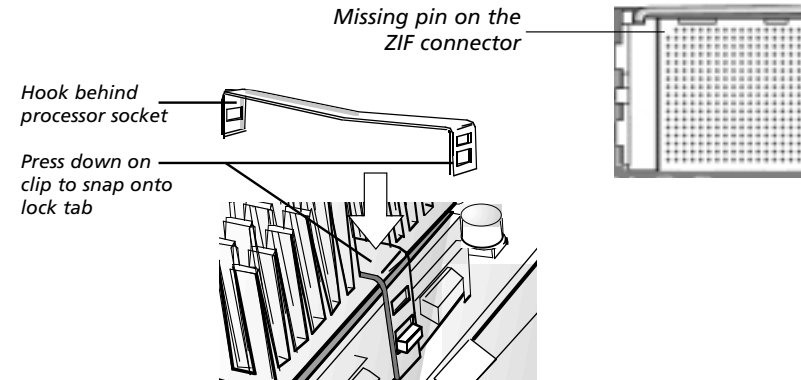
6. Remove the CPU Card.

- Carefully raise the ZIF Socket Release Lever and lift the CPU card from the socket. NOTE: A razor is included to clean the bottom of the heatsink.
- Put the used card into MACH Speed anti-static box. If you ever have a problem, it may be handy to be able to use the old card while troubleshooting the system.



7. Install the MACH Speed ZIF into your system.

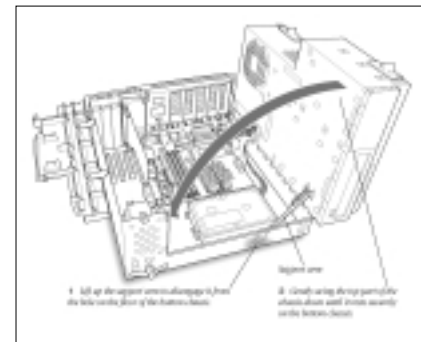
- The MACH Speed ZIF Upgrade will face the same direction as the older card that you just removed (note the missing pin.)
- Holding the card by the edges (do not depress the center of the card), line up the pins and insert the card straight down. Insertion should require only minimal force.
- Lower the ZIF Socket release lever to lock the card into the socket.
- Replace the heat-sink on the MACH Speed ZIF card.
- Reattach the heat-sink clip by first "hooking" the end of the clip with the single hole to the back of the processor socket.
- Press down on the front end of the clip to snap onto the lock tab on the front of the processor socket.



Desktop

Close the chassis by disengaging the support arm and gently swing the chassis back into place.

- Lift up the support arm to disengage it from the hole on the floor of the bottom chassis.
- Gently swing the top part of the chassis down until it rests securely on the bottom chassis.
- Close the expansion card cover and put back the main cover onto the computer.



Mini-Tower

Replace the chassis by swinging it back into place and lock it with the two green levers.

- Replace the cover on the computer



Technical Support

4

Technical Support E-mail Address:
support@xlr8.com

Web Address:
www.xlr8.com

About troubleshooting the MACH Speed ZIF upgrade card

This section provides information on troubleshooting your system with the MACH Speed ZIF upgrade and software installed. Additional Troubleshooting information is available on the web at www.xlr8.com/support or www.xlr8.com/osc

Note that most problems associated with the MACH Speed ZIF Upgrade are usually related to software conflicts or corruption that manifests itself only while running at the faster speeds. To test a problem system, always attempt to return the system to its simplest configuration. Disable all unneeded software, and disconnect all optional devices.

Key Commands for XLR8 MACH Speed Control

The MACH Speed Control Software includes a series of key commands and useful identifiers if the problem is due to the card itself.

To disable the cache on boot-up:

- Depress the “shift” key on boot-up to disable extensions, or
- Depress “command-option-x-d” until the XLR8 extension is displayed.

To disable the cache during normal operation:

- Select “Disable” in the Manual settings of the Advanced tab in XLR8 MACH Speed Control

To retest the cache on boot-up: (the cache is tested on the first boot after changing the CPU speed)

- Depress “command-option-x-r” on boot-up until the XLR8 extension appears.

To disable the cache test on boot-up:

- Depress “command-option-x-d” on boot-up until the XLR8 extension appears.

Troubleshooting the MACH Speed ZIF card

If your computer does not power up (Three tones? Redo the Firware Patch!)

- Make sure the cables, video and/or other PCI cards are properly seated and connected.
- Check the MACH Speed ZIF card to see if it is properly and fully seated and that the heat-sink is properly installed and seated on the CPU card.
- If your computer still does not power up, try removing and reinstalling the MACH Speed ZIF card.

If your computer powers up, but freezes during startup

- ZAP the P-Ram. This is an area of memory on the motherboard that retains card settings/date/motherboard devices/etc. To refresh/ZAP, depress the “command-option-P-R” keys simultaneously, immediately after the boot chime (a second chime should occur.)
- If you are still having problems, try starting up with extensions disabled. This will also disable the backside cache on the upgrade card.
- If you system did not freeze when booting with extensions off, reboot holding the Space Bar down. During the boot sequence the Apple Extension Manager dialog will be displayed. Select Base OS settings, then scroll to re-enable the MACH Speed Control. Press Continue. If you are able to boot at this point, you have a software conflict. Reboot and re-enable extensions one at a time, until you find the conflict. You can then change the first letter of the Extension’s name to change its load order, and usually fix the conflict.
- If you have installed a MACH Speed G4 ZIF MPE in a PowerMac G3 Blue&White, make sure you have updated your Apple firmware to version 1.1 and applied the XLR8 firmware patch before installing your upgrade card.
- Perform a “Clean Install” of your system software. You can select the “Clean Install” in the option of the MacOS installer. Performing a clean install, does not delete your current system folder, but will keep it on your hard drive with the name “Previous System Folder”

If your system is unstable:

- If you have used MVP to boost the processor upgrade beyond its default settings, i.e. running at a faster bus speed or a faster processor speed, you may have boosted it beyond its capabilities. Back the speeds down to the default settings and try again.
- Boot the computer and restart. Then erase (ZAP) the P-RAM. This is an area of memory on the motherboard that retains card settings/date/motherboard devices/etc. To erase/ZAP, depress the “command-option-p-r” keys simultaneously, immediately after the boot chime. Wait for a second chime to occur, then release the keys.
- Try running the backside cache at a slower speed. The automatic setting used by the MACH Speed software should generally be safe, but it is not foolproof. In particular, if MVP is being used to squeeze extra performance out of the processor upgrade, the software may select a speed that is unsustainable. Use “Manual” to select the next lowest speed from the pop-up menu and restart the machine. If stability returns, then the backside cache was running too fast. If you are using MVP, move the processor upgrade back towards its default speed in order to regain cache performance. An extra 50MHz of backside cache performance is far more beneficial than an extra 10 MHz of processor performance.
- Depress “command-option-x-r” on reboot until the XLR8 extension is displayed. This will rerun the cache test and assist in setting the correct cache speed.
- Verify all connections and SCSI Termination settings.
- Open the “Extension Manager” control panel and select “MacOS all” in the “Selected set” pop-up menu. Then activate the XLR8 MACH Speed Extension and the XLR8 MACH Speed Control. You will be asked to create a new set of extensions. Restart your computer. If you do not experience any stability problems, you have an extension conflict. You will have to activate the third-party extensions one by one to find out which one is conflicting.

Default settings for the MACH Speed G3 ZIF and MACH Speed G4 ZIF MPE upgrade cards

POWERMAC G3 (BEIGE)

Default Setting	Jumper Settings
300	
333	
366	
400	
433	
466	
500	
533	

**POWERMAC G3 (BLUE&WHITE)
POWERMAC G4/PCI**

Default Setting	Jumper Settings
300	
350	
400	
450	
500	
550	

Adjusting the jumpers on the MACH Speed ZIF card

Before installing the MACH Speed card, you need to adjust the jumpers in order to set the speed of your upgrade card.

The jumpers are adjusted on the card itself, you do not need to change the jumpers on the motherboard of your PowerMac.

The jumpers are set from the left to the right, when the XLR8 logo is at the top left corner and the jumper block at the right side of the card.

