

ProG3™

The Ultimate Processor Upgrade for Your Mac

User Guide

ProG3 Installation and Software



 Formac

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ProG3™

User's Guide



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About this Manual

This manual contains installation procedures for both the **ProG3 board** for G3 Macintoshes and the **ProG3 Carrier board** for PCI based Macintoshes.



- ProG3 users should skip chapter 4 which provides installation information on the ProG3 Carrier board.
- ProG3 Carrier board users can skip chapters 1-3 (they apply only to ProG3 installation) and go to p.11, *Ch. 4: ProG3 Carrier Board*.

The rest of the information applies to both products.

ProG3 Introduction

Congratulations on your decision to purchase the ProG3 processor from Formac. The ProG3 is the ultimate in processor upgrades, utilizing the latest IBM/Motorola PowerPC G3 750 technology, so when you plug-in the ProG3, you will be able to outperform any of the latest G3s. The ProG3 is easy to install and its plug and play auto-configuration means that it requires no software or permanent modifications.

Package Contents

Your ProG3 package contains the following components. Check to make sure that no parts are missing.

- ProG3 board.
- ProG3 Software CD.
- Complete User's Guide.

System Requirements

Mac OS 7.6 or higher

Technical Specifications

	ProG3 366	ProG3 400
Part Number	PAG310-0	PAG312-0
Processor	IBM PowerPC G3 750	IBM PowerPC G3 750
Processor Speed	366MHz	400MHz
Bus Speed	66MHz -100MHz	66MHz - 100MHz
Backside Cache Size	1024k	1024k
Cache Speed	183MHz	200MHz
Cache Ratio	2/1	2/1

	ProG3 450	ProG3 500
Part Number	PAG314-0	PAG316-0
Processor	IBM PowerPC G3 750	IBM PowerPC G3 750
Processor Speed	450MHz	500MHz
Bus Speed	66MHz -100MHz	66MHz - 100MHz
Backside Cache Size	1024k	1024k
Cache Speed	225MHz	250MHz
Cache Ratio	2/1	2/1

ProG3 Installation

Installation Guidelines



Please read this section before proceeding. Note the following points before installing the ProG3 board.

- Do not remove the ProG3 from its anti-static bag until you are ready to perform the installation.
- We recommend proper grounding by using a grounding strap, or by touching the power supply of the computer to release any static build-up. The computer must be kept plugged into an AC outlet for this to work properly. Make sure to work in a clean and static-free area, and remove any clothing that retains static charges.
- Do not change any of the configuration settings unless instructed by the manual or by a Formac Technical Support Representative. Doing so could result in permanent damage to your computer and will also void your ProG3 warranty.
- Do not operate your ProG3 above 65 degree celcius. Doing so could result in permanent damage to your computer and ProG3.
- Although the installation is pretty straight forward and should be able to be accomplished by most users, if you do not feel comfortable installing you ProG3, consult your local dealer for assistance.
- When the Macintosh is powered on, do not attempt to open or close the Macintosh case.

Installing the ProG3 Processor

- 1) Discharge any static electricity in your body (Follow the “Installation Guidelines” listed above).
- 2) Shut down your computer and unplug the power cord and monitor cable.
- 3) Carefully remove your computer’s cover (its outside case). On a Macintosh G3 computer this is done by simply lifting the access handle on the top right side of the minitower unit. The computer will open from the side, providing unobstructed access to the internal add-on slots (**fig. 2.1**).

figure 2.1
Removing the Cover



4) Locate the heatsink covering your original processor (**fig. 2.2**).

figure 2.2
Locate the Heatsink



- Using a small screwdriver, remove the screw attached to the heatsink which holds on the grounding strap (**fig. 2.3**).

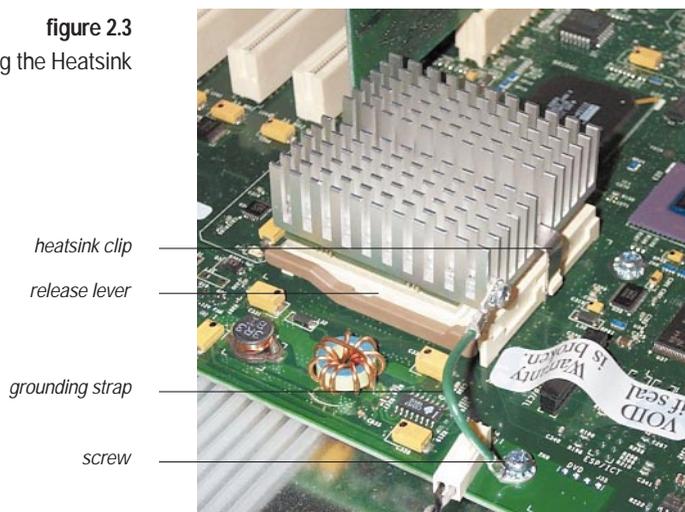
Note: the processor and ground wire on your unit may be in a different location than shown.

- Lift the release lever gently up and to the left. While pressing down on the top of the heatsink clip, use a small flatblade screwdriver to lift up and out on the front tab of the clip to release the heatsink clip (**fig. 2.3**).

Warning: The heatsink may be hot to the touch.

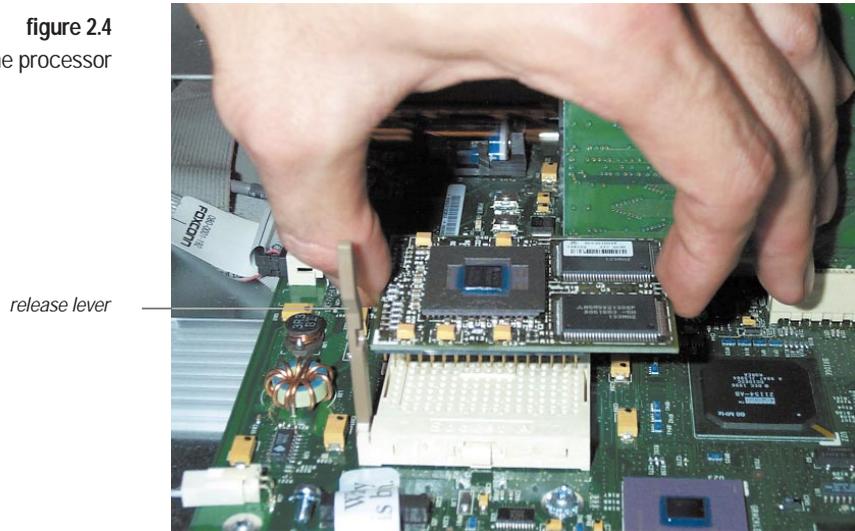
- Remove heatsink clip.
- Lift the heatsink off of the processor module.

figure 2.3
Removing the Heatsink



- 9) Lift the lever to release the old processor module (**fig. 2.4**).
- 10) Handle the processor by the edges and gently lift it straight up to remove. Be careful not to bend the pins underneath the module. Remove the old processor and store it in an anti-static environment.

figure 2.4
Remove the processor



The ProG3 board for the new B&W G3 computers has already been properly configured and ready to install. However, if you have a G3 Classic, you may have to re-configure the jumper settings located on the ProG3 processor. Please go to “ProG3 Settings”, pg.10, for detailed instructions.

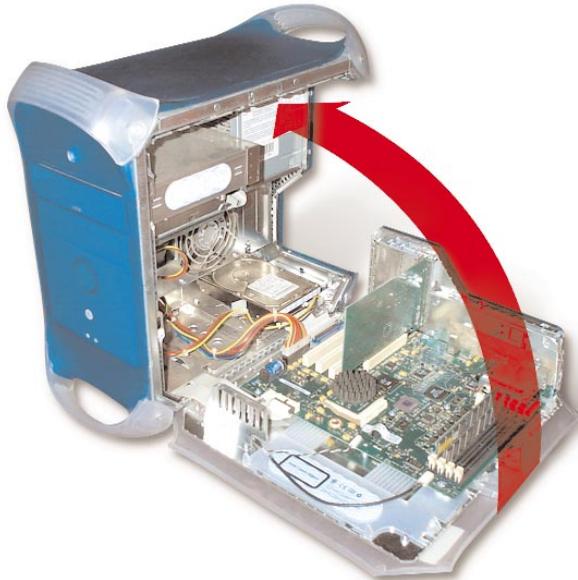
- 11) Insert the new ProG3 processor, being careful to align the pins identical to the original processor (*Note, bending the pins will void you warranty*). Lower the lever to its original and locked position by gently pushing down and to the right (**fig 2.5**).
- 12) Re-attach the grounding strap to the new heatsink using the screw removed in **fig. 2.3**.

figure 2.5
Insert the ProG3 processor



- 13) Replace your cover and re-attach all cables (**fig. 2.6**). Power-up your new accelerated Mac. You should hear the normal start-up chime.

figure 2.6
Replace the cover



Troubleshooting

If the machine doesn't boot try the following:

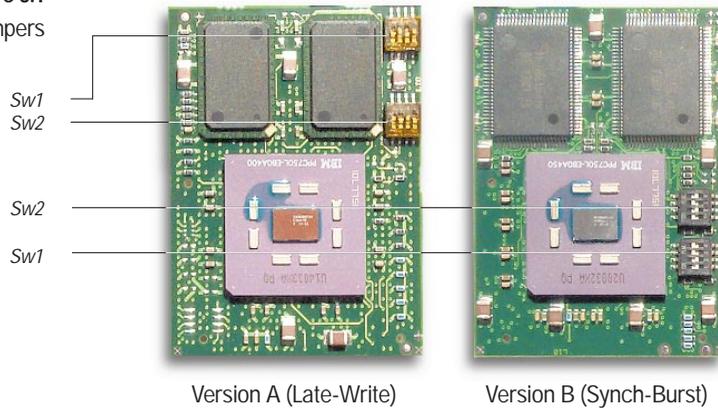
1. Check to make sure the machine cables are plugged in correctly and that they are plugged into a working AC Outlet.
2. Check to insure that your ProG3 is properly seated in the Ziff Socket and that the lever is in its down and locked position.
3. Press the CUDA Reset on the motherboard and restart.

ProG3 Settings



If you own a new B&W G3, your ProG3 processor has been pre-programmed by Formac and ready to install – no settings need to be switched. However, if you are installing your ProG3 card in a G3 Classic, please configure the jumpers SW1, SW2 (**fig. 3.1**) in accordance with the table below.

figure 3.1
Setting the jumpers



G3 Classic

CPU Speed Settings

	SW1.1	SW1.2	SW1.3	SW1.4
366MHz	OFF	ON	ON	OFF
400MHz	OFF	ON	ON	OFF
466MHz	OFF	ON	OFF	ON
500MHz	ON	ON	ON	OFF

Synch-Burst SRAMs

	SW2.1	SW2.2	SW2.3	SW2.4
366MHz	ON	OFF	ON	OFF
400MHz	ON	OFF	ON	OFF
466MHz	ON	OFF	ON	OFF
500MHz	ON	OFF	ON	OFF

Late-Write SRAMs (Cache disable – see info below)

	SW2.1	SW2.2	SW2.3	SW2.4
366MHz	OFF	OFF	ON	OFF
400MHz	OFF	OFF	ON	OFF
466MHz	OFF	OFF	ON	OFF
500MHz	OFF	OFF	ON	OFF

Info: For the ProG3 450 MHz (Late-Write) and 500 MHz (Late-Write) you need to disable the cache. This procedure is only for the Classic G3.

G3 B&W

The proper settings for the B&W G3s have been preprogrammed by Formac on all ProG3 processors. The following specifications are for your information only.

CPU Speed Settings

	SW1.1	SW1.2	SW1.3	SW1.4
350MHz	OFF	OFF	OFF	ON
400MHz	OFF	ON	OFF	ON
450MHz	ON	OFF	OFF	OFF
500MHz	OFF	ON	OFF	OFF
550MHz	ON	OFF	OFF	ON
600MHz	OFF	OFF	ON	OFF

Synch-Burst SRAMs

	SW2.1	SW2.2	SW2.3	SW2.4
366MHz	ON	OFF	ON	OFF
400MHz	ON	OFF	ON	OFF
466MHz	ON	OFF	ON	OFF
500MHz	ON	OFF	ON	OFF
550MHz	ON	OFF	ON	OFF
600MHz	ON	OFF	ON	OFF

Late-Write SRAMs (see info below)

	SW2.1	SW2.2	SW2.3	SW2.4
350MHz	-	-	-	-
400MHz	-	-	-	-
450MHz	OFF	OFF	OFF	OFF
500MHz	OFF	OFF	OFF	OFF
550MHz	OFF	OFF	OFF	OFF
600MHz	OFF	OFF	OFF	OFF

The ProG3 Carrier Board

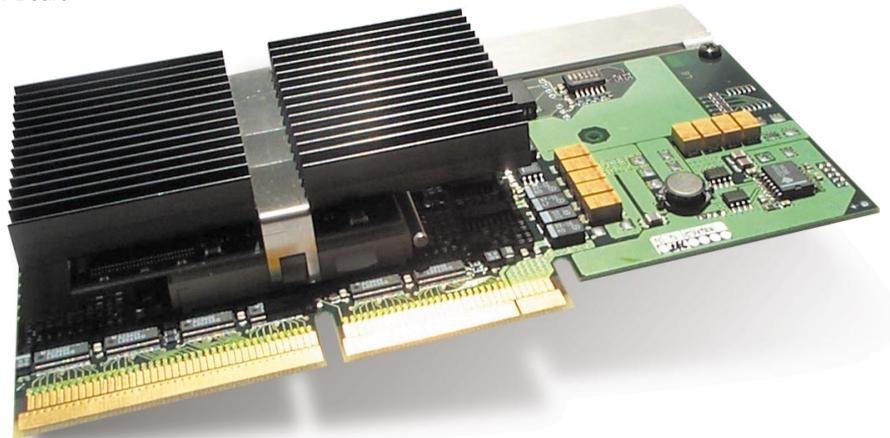
Welcome to the ProG3 Carrier Board section of this manual. The ProG3 Carrier Board is a complete Plug & Play solution for those users who want to upgrade their PCI-based Mac systems with the power of the latest G3 processors – at a fraction of the cost of a new G3 system (see “Technical Specifications”, pg 19, for a list of pre-configured versions available from Formac). This section provides information you need to quickly install the ProG3 Carrier Board 320-400 for PCI-based Mac systems.

Chapter Contents

This chapter will provide detailed instructions on:

- Installing the ProG3 Carrier card on Apple PowerMacintosh models 7300-9600.
- Upgrading your ProG3 Carrier card.
- Technical specifications for advanced users.

Figure 4.1
ProG3 Carrier Board



Prior to Installation



Please read this section before proceeding. Note the following points before installing the ProG3 Carrier board.

- As with any hardware upgrade, back up your hard drive prior to installation.
- Do not remove the ProG3 from its anti-static bag until you are ready to perform the installation.
- We recommend proper grounding by using a grounding strap, or by touching the power supply of the computer to release any static build-up. The computer must be kept plugged into an AC outlet for this to work properly. Make sure to work in a clean and static-free area, and remove any clothing that retains static charges.
- Do not change any of the configuration settings unless instructed by the manual or a Formac Technical Support Representative. Doing so could result in permanent damage to your computer and will also void your ProG3 warranty.
- Do not operate your ProG3 above 65 degree celcius. Doing so could result in permanent damage to your computer and ProG3.
- Although the installation is pretty straight forward and should be able to be accomplished by most users, if you do not feel comfortable installing you ProG3, consult your local dealer for assistance.
- When the Macintosh is powered on, do not attempt to open or close the Macintosh case.

Installing the Carrier Board

The ProG3 Carrier boards are shipped pre-configured from the factory with all the settings tested and confirmed. The following section provides instructions on how to open and install the ProG3 Carrier into your PowerMacintosh model.

Please locate your PowerMacintosh model for installation instructions:

Apple PowerMacintosh 7500	p. 13
Apple PowerMacintosh 8500-9600	p. 16

7300, 7500, 7600 Installation

- 1) Discharge any static electricity in your body (Follow the *Prior to Installation* Guidelines, pg. 13).
- 2) Shut down your computer and unplug the power cord and monitor cable.
- 3) Press the two tabs that hold the plastic cover on the front of the case (fig 4.2).

Figure 4.2
Unlocking the Case

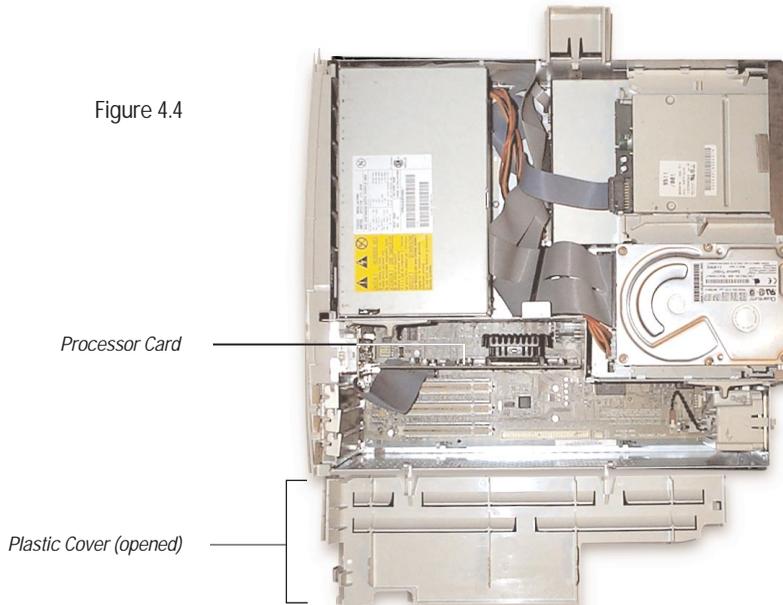


Gently pull the cover off in the direction shown in **figure 4.3**

Figure 4.3
Removing the Case



- 4) Remove the plastic cover on the left side of the computer by lifting the inner edge. The cover will swivel to an open position (**fig. 4.4**) providing access to the 7500 processor card.



- 5) Gently but firmly pull the old processor card (fig. 5.3) straight up without rocking it side to side. Do not pull on the heat sink or you may damage the processor.
- 6) Locate the motherboard reset button (“CUDA” switch) which is under the processor card (**fig. 4.5**). Depress this button for 5 seconds with a small tool or pen point. This will allow your computer to recognize the new ProG3 processor.

Figure 4.5
Locating the Motherboard
Reset Switch

Motherboard reset switch



- 7) Remove the ProG3 Carrier card from its protective packaging. Install the board into the slot the original processor used to reside. When the card is properly installed, you should not see any of the gold contacts.



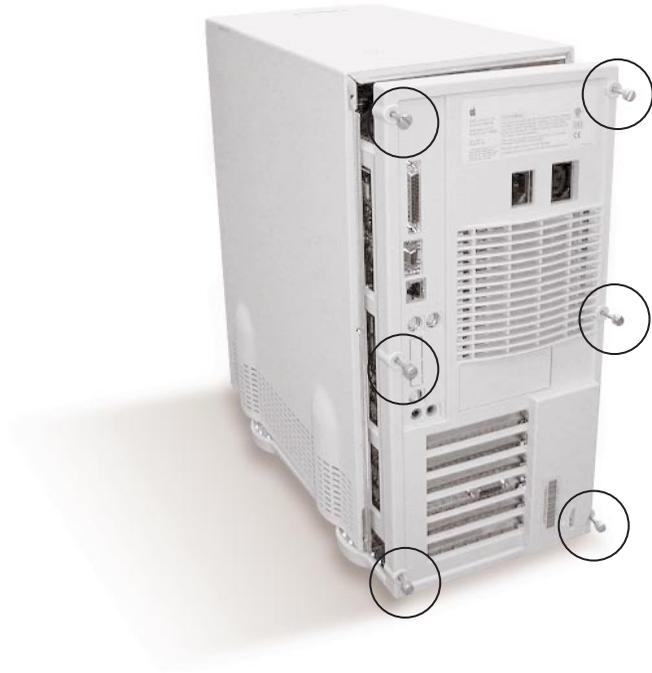
Handle your ProG3 Carrier board by the edges only! Do not push or apply force to the heat sink. Doing so may damage your processor/computer and void your warranty.

- 8) Plug-in your power cord and keyboard and boot your Mac to test the new card. The start-up chime should sound. If you do not hear the chime, refer to “Troubleshooting”.
- 9) Replace the cover and reconnect all the cables.

8500-9600 Installation

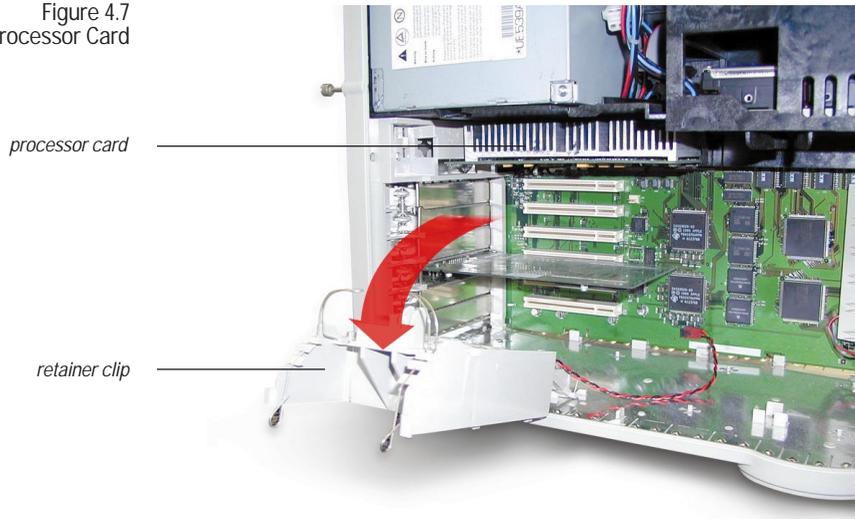
- 1) Discharge any static electricity in your body (Follow the *Prior to Installation* Guidelines, pg. 13).
- 2) Shut down your computer and unplug the power cord and monitor cable.
- 2) Loosen the four screws (9500 & 9600 computers have 6 screws) on the back of the computer and slide the case off the chassis (**fig 4.6**).

Figure 4.6
Loosen the Screws



- 3) Move the retainer clip (fig 4.7) by squeezing the sides and pulling it down. Locate the processor board.

Figure 4.7
Retainer Clip & Processor Card



- 5) Gently but firmly pull the old processor card straight up without rocking it side to side. Do not pull on the heat sink or you may damage the processor.
- 6) Locate the motherboard reset button (“CUDA” switch) which is directly above the card slot at the back of the computer. Depress this button for 5 seconds with a small tool or pen point. This will allow your computer to recognize the new ProG3 processor.
- 7) Remove the ProG3 Carrier card from its protective packaging. Install the board into the original processor slot. When the card is properly installed, you should not see any of the gold contacts.



Handle your ProG3 Carrier board by the edges only! Do not push or apply force to the heat sink. Doing so may damage your processor/computer and void your warranty.

- 8) Plug-in your power cord and keyboard and boot your Mac to test the new card. The start-up chime should sound. If you do not hear the chime, refer to *Troubleshooting*.
- 9) Replace the cover and reconnect all the cables.

Advanced Tuning: Upgrading ProG3

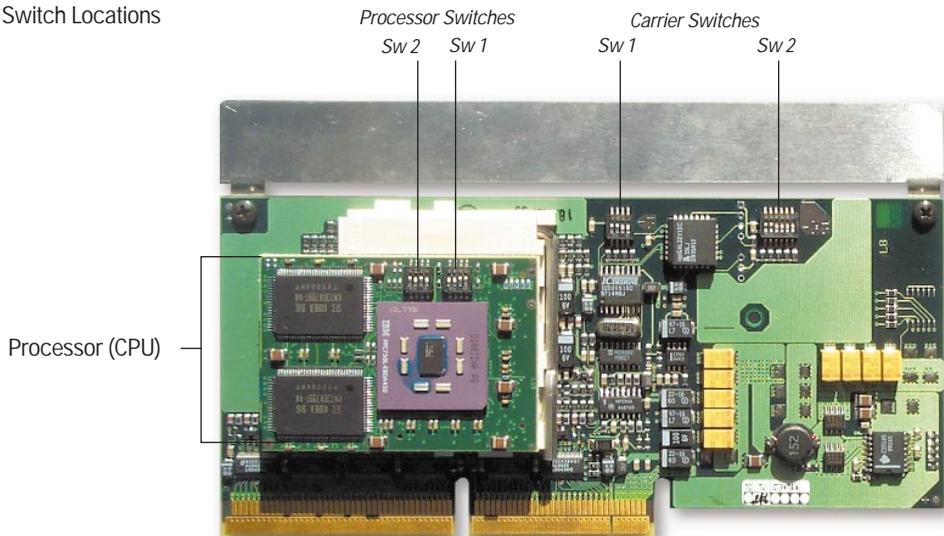
The ProG3 Carrier board is designed to be a simple Plug & Play solution. Each card has been pre-configured specifically for your model computer. However, there are times when you may want to re-configure these factory settings. For example, you may want to install the ProG3 board into a different computer or upgrade your processor – it is even possible to tap into additional performance by optimizing the ProG3 Carrier's bus ratios and the CPU multiplier settings. Before you begin, this chapter assumes that you are familiar with installing/removing expansion cards, terminology and general troubleshooting procedures.

The performance of your ProG3 card is determined by three dependent variables:

- 1) RAM-to-CPU bus speed.
- 2) CPU multiplier ratio.
- 3) CPU-to-Cache bus speed.

To maximize performance of your system, you must find an optimal balance between these variables and your system limitations. This is done by configuring the switch settings on your ProG3 processor and Carrier board (**fig. 4.8**) and by setting the backside cache speed with your ProG3 control panel.

Figure 4.8
Switch Locations



Adjusting the Switches

The ProG3 Carrier board utilizes a series of switch settings to adjust the **RAM-to-CPU bus** speed and the **ratio of the CPU multiplier** in order to set the actual CPU speed.

- Processor Switch 1 (Sw1) and Carrier Switch 1 (Sw1) set the CPU multiplier.
- Carrier Switch 2 (Sw2) sets the RAM-to-CPU speed (**fig.4.8**).

Should you choose to upgrade, optimize, or use your ProG3 Carrier board in another computer, please configure the switches in accordance with the “Technical Specifications” and “Frequency Chart” (**fig 4.9, 4.10**).

Figure 4.9
Technical Specifications

Technical Specifications

	ProG3 366-40 carrier	ProG3 366-44 carrier	ProG3 366-45 carrier	ProG3 400-50 carrier
Part Number	PAG310-1	PAG310-2	PAG310-3	PAG312-1
Processor	IBM PowerPC G3 750	IBM PowerPC G3 750	IBM PowerPC G3 750	IBM PowerPC G3 750
Processor Speed	366 MHz	366 MHz	366 MHz	400 MHz
Configured Bus Speed	40 MHz	44MHz	45MHz	50MHz
Configured Processor Speed	320 MHz	350 MHz	360MHz	400MHz
Backside Cache Size	1024 k	1024 k	1024 k	1024 k
Preconfigured for Apple PowerMacintosh	7600/120 8515/120 9500/120	7600/132 8500/132 9500/132, 9515/132	7300/180 8500/180 9500/180MP	7300/166, 7300/200, 7500/100, 7600/200, 8500/150, 8600/200, 8600/250, 8600/300, 9500/150, 9500/200, 9600/200, 9600/233, 9600/350, 9600/200MP

Figure 4.10
Frequency Chart

Frequency Chart

CPU Multiplier		3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	10*	
Processor Sw1 ON		2,3,4	4	2,4	1	2	2,3	3	1,3	1,2,4	1,2,3	3,4	1,2	
Carrier Sw1 ON ►		1	1,2,3	1,3	2,3,4	1,3,4	1,4	1,2,4	2,4	3	4	1,2	2,3	
Carrier Sw2 ON ▼		Processor (CPU) Speed ▼												
RAM to BUS Speed in MHz	40	-	120	140	160	180	200	220	240	260	280	300	320	400
	41	1	123	143.5	164	184.5	205	225.5	246	266.5	287	307.5	328	410
	42	2	126	147	168	189	210	231	252	273	294	315	336	420
	42.6	1.2	127.8	149.1	170.4	191.7	213	234.3	255.6	276.9	298.2	319.5	340.8	426
	43	3	129	150.5	172	193.5	215	236.5	258	279.5	301	322.5	344	430
	43.8	3.1	131.4	153.3	175.2	197.1	219	240.9	262.8	284.7	306.6	328.5	350.4	438
	44.6	3.2	133.8	156.1	178.4	200.7	223	245.3	267.6	289.9	312.2	334.5	356.8	446
	45	3,2,1	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360	450
	46	4	138	161	184	207	230	253	276	299	322	345	368	460
	46.6	4.1	139.8	163.1	186.4	209.7	233	256.3	279.6	302.9	326.2	349.5	372.8	466
	47	4,2	141	164.5	188	211.5	235	258.5	282	305.5	329	352.5	376	470
	48	4,2,1	144	168	192	216	240	264	288	312	336	360	384	480
	48.5	4,3	145.5	169.75	194	218.25	242.5	266.75	291	315.25	339.5	363.75	388	485
	49	4,3,1	147	171.5	196	220.5	245	269.5	294	318.5	343	367.5	392	490
	49.6	4,3,2	148.8	173.6	198.4	223.2	248	272.8	297.6	322.4	347.2	372	396.8	496
	50	4,3,2,1	150	175	200	225	250	275	300	325	350	375	400	500
	50.6	-	-	-	-	-	-	-	-	-	-	-	-	-
	51	5,1	153	178.5	204	229.5	255	280.5	306	331.5	357	382.5	408	510
	51.6	-	-	-	-	-	-	-	-	-	-	-	-	-
	52	5,2,1	156	182	208	234	260	286	312	338	364	390	416	520
52.6	-	-	-	-	-	-	-	-	-	-	-	-	-	
53	-	-	-	-	-	-	-	-	-	-	-	-	-	
53.6	-	-	-	-	-	-	-	-	-	-	-	-	-	
54	-	-	-	-	-	-	-	-	-	-	-	-	-	
54.6	-	-	-	-	-	-	-	-	-	-	-	-	-	
55	-	-	-	-	-	-	-	-	-	-	-	-	-	
56.25	5,4,2	168.75	196.875	225	253.125	281.25	309.38	337.5	365.63	393.8	421.88	450	562	
57	-	-	-	-	-	-	-	-	-	-	-	-	-	
58	-	-	-	-	-	-	-	-	-	-	-	-	-	
59	-	-	-	-	-	-	-	-	-	-	-	-	-	
60	-	-	-	-	-	-	-	-	-	-	-	-	-	
66	-	-	-	-	-	-	-	-	-	-	-	-	-	
100	5,4,3,2,1	300	350	400	450	500	550	600	650	700	750	800	1000	

Example for 400MHz speed: CPU-Speed/CPU-Multiplier = BUS-Speed = (400MHz/8=50MHz)

* Note: the CPU Multiplier 10 is not available for all CPU boards. To check whether your board is compatible with this multiple, locate the IBM part number on the processor (e.g., IBM PPC750L-EBOA366). If the letter after the hyphen is an "F", then your board can use the CPU Multiplier 10. If the letter is an "E", the highest multiplier you can use is 8.

Tutorial: Upgrading Your Processor

This short tutorial will show you how to configure the ProG3 Carrier switch settings when you want to upgrade the board with a faster processor.

For the purposes of this example, let's say that you currently own a ProG3 Carrier 350 MHz that is installed in a PowerPC 7500. Now you want to upgrade your carrier board with a new ProG3 400 processor.

- 1) Replace the original processor on the carrier board with the ProG3 400 processor.
- 2) On the left column of the "Frequency Chart" (**fig 4.10**), look up the 7500 computer's **RAM-to-CPU bus** speed which is 50 MHz (See "Technical Specifications" **fig 4.9**).
- 3) Find the highest **CPU-Multiplier** setting that combines with the **RAM-to-CPU bus** speed on the table to create the fastest processor speed. In this example, a 7500 machine with a 50 MHz **RAM-to-CPU Bus** speed and a **CPU Multiplier** of 8 creates a CPU speed of 400. *Note: you cannot exceed the actual speed of your processor, but often times the RAM-to-CPU bus and the CPU Multiplier combinations will produce actual CPU speeds that are less than the rated Processor clock speed.*
- 4) Now you have to configure the switches. On the Frequency Chart, a 400 MHz CPU speed requires the following switch settings (*see figure 5.15 for a diagram of the switch locations*):

Processor Switch 1 on: 3,4

Carrier Switch 1 on: 1,2

Carrier Switch 2 on: 4,3,2,1

Each Switch contains 4-6 jumper switches that need to be set to the "on" position.

- 5) Insert your card into your computer and start-up the machine. Open the ProG3 control panel to verify that the processor speed is set to 400 MHz.

Troubleshooting

Symptom: The computer doesn't boot. There is no start-up chime.

- Make sure the processor card is plugged in properly.
- ZAP the P-Ram “control-command-p-r” (see the computer installation manual for further information on zapping the P-Ram).
- Press the “Motherboard Reset” button (CUDA and try starting up again).
- Check the Bus Ratio and Bus Speed switches to make sure they are properly set (See the “Frequency Chart”, Fig 5.16).
- Remove the L3 cache.

ProG3 Software

Now that you have installed your ProG3 card, it is time to install the software. The ProG3 software provides everything you need to monitor or review the cards upgrade status and also lets you configure the card, such as adjusting the backside cache, for optimized operation. *Note: the ProG3 Control Panel is not necessary for the newer Blue & White G3s.*

Software Installation

Your package includes the ProG3 Software CD.

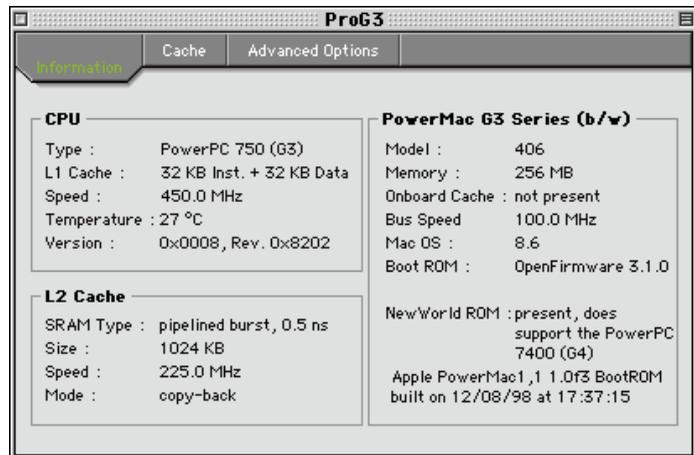
To install:

- 1) Insert the CD and drag the ProG3 control panel onto the System Folder of your computer.
- 2) Restart your computer.

Using Your ProG3 Control Panel

Launch your ProG3 control panel. From the **Apple Menu**, select **Control Panels**. From the pop-menu that appears, select **ProG3 2.x**. The following window should appear (**fig 5.1**).

Figure 5.1
ProG3 Carrier Control Panel



The ProG3 window consists of three panels or windows: The Information panel, the Cache panel and an Advanced Options panel that can be accessed by clicking on their respective tabs (**fig 5.2**).

Figure 5.2
Panels Tabs



Information Panel

The Information panel displays relevant processor and system information as well as the L2 or backside cache settings for your computer (**fig 5.3**).

Figure 5.3
Processor Information field

CPU	
Type :	PowerPC 750 (G3)
L1 Cache :	32 KB Inst. + 32 KB Data
Speed :	450.0 MHz
Temperature :	27 °C
Version :	0x0008, Rev. 0x8202

Processor Information

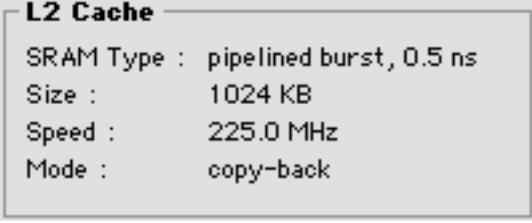
The following information is displayed:

- The type of the CPU.
- The size and architecture of the first level cache.
- The actual frequency of the processor.
- The measured temperature of the processor (only available with PPC-740/750 and the PPC07400).
- The version and revision of the processor.

L2-Cache Information

This field displays the current parameters of the second level cache of your G3/G4 processor (**fig. 5.4**).

Figure 5.4
L2 cache field



L2 Cache	
SRAM Type :	pipelined burst, 0.5 ns
Size :	1024 KB
Speed :	225.0 MHz
Mode :	copy-back

- The used Cacheramtype (SRAM Type) and the used time for the Output Hold is displayed here.
- The size of the L2 cache.
- The current frequency of the L2 cache, this is the speed with which the processor accesses data in the L2 cache.
- The mode for write accesses. The processor uses either a “write-through” mode or a “copy-back” mode. In the “write-through” mode, the processor writes data both into the L2 cache and the RAM. In the slightly faster “copy-back” mode, the data is into the L2 cache. It only gets flushed into the RAM, if the L2 cache is needed otherwise or disabled. This mode may lead to problems with older hardware such as older ROMs and device drivers.

Machine Specific Information

The additional computer information displays several software versions and some hardware information concerning the motherboard that are relevant to the processor upgrade (**fig. 5.5**).

Figure 5.5
Machine Specific Field

```
PowerMac G3 Series (b/w)
Model :          406
Memory :        256 MB
Onboard Cache : not present
Bus Speed       100.0 MHz
Mac OS :        8.6
Boot ROM :      OpenFirmware 3.1.0

NewWorld ROM : present, does
                support the PowerPC
                7400 (G4)

Apple PowerMac1,1 1.0f3 BootROM
built on 12/08/98 at 17:37:15
```

Model: the model number of the system. This model number is unique for a model series but not for all models (e.g. 7500 and 7600 have the same model number).

Memory: displays the installed and used physical RAM.

Onboard Cache: the motherboards of the first PCI-Macintosh generations support an onboard cache to “speed-up” the memory access. However, since the G3/G4 processors have a much faster second level cache this onboard cache is no longer useful. In fact, the presence of this cache can even slow down your G3/G4.

Bus Speed: the frequency of the memory bus.

Mac OS: the version of the Mac OS used

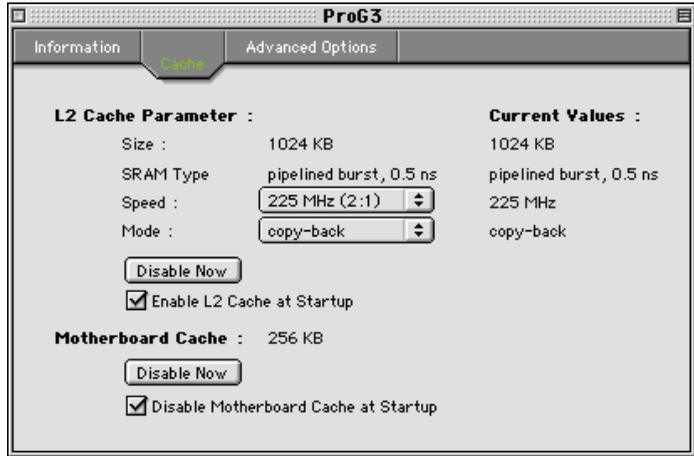
Boot ROM: the version of the installed BootROM. All PCI-Macintoshs use a small boot operating system.

NewWorld ROM: Since the introduction of the iMacs, the ROM of the Macs only consists of the BootROM. The actual Mac “ROM” is loaded from another device such as a hard-disk or a network. The version string of this so-called NewWorld BootROM is shown. If a B/W ROM is know to support the G4 or not, this information is added.

The Cache Panel

The cache panel is subdivided into three parts: the **L2 cache Parameter**, **Current Values** and the **Motherboard Cache** (if accessible) as shown below (fig 5.6).

Figure 5.6
Cache Panel



L2 Cache Parameter

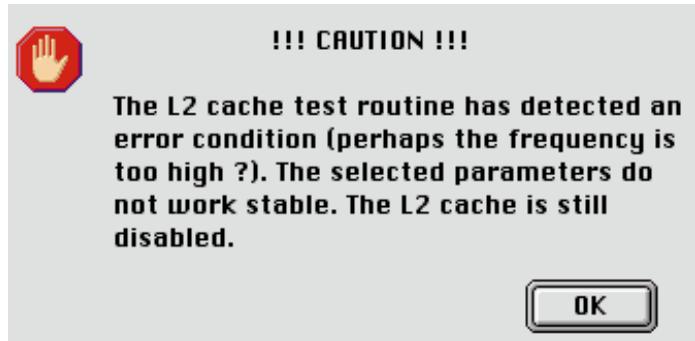
The ProG3 parameters for “Size” and “SRAM Type” can be changed manually. They are determined upon the first start-up of the ProG3 application with a new processor and saved in the preferences. The frequency of the L2 cache and the mode of write access can be changed manually. The processor uses either a “write-through” mode or a “copy-back” mode. In the “write-through” mode, the processor writes data both into the L2 cache and the RAM. In the slightly faster “copy-back” mode, the data is under certain circumstances only written into the L2 cache. It only gets flushed into the RAM, if the L2 cache is needed otherwise or disabled. This mode may lead to problems with older hardware such as older ROMs and device drivers. The parameters can be set upon restart (if the ProG3 application is inside the control panels folder and “Enable L2 Cache at Start-up” is set or if the L2 cache is disabled and afterwards enabled).



The faster you set the backside cache speed, the faster your machine will operate. However, if the speed is set too high, your system may become unstable. Prior to setting the L2 cache parameters, ProG3 tests the functionality of the L2 cache with the new parameters. However this cannot guarantee a stable, working system if the

SRAM parameters are wrong (e.g., the frequency is too high). The L2 cache may work throughout the test and even a while afterwards. This may lead to an unstable system with problems like freezing and crashing, or erratic behavior of applications. If an error condition is detected, the ProG3 application will not enable the L2 cache with these parameters, an error message will be displayed (fig 5.7).

Figure 5.7
L2 Cache Error Message

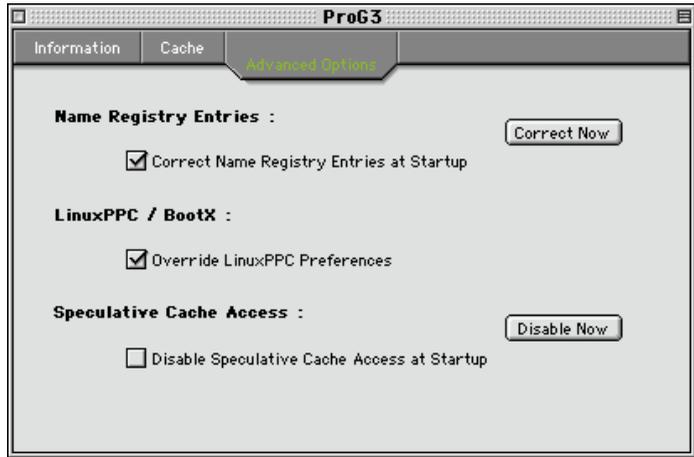


The motherboards of the first PCI-Macintosh generations support an onboard cache to “speed-up” the memory access. However, since the G3/G4 processors have a much faster second level cache this onboard cache is no longer useful. In fact, the presence of this cache can even slow down your G3/G4. If a motherboard cache is installed, it can be disabled here. Since the Boot ROM will enable the motherboard cache after reset, the option “Disable Motherboard Cache at Start-up” should be set.

Advanced Options

The Advanced Options panel (**fig. 5.8**) contains three useful selections: “Correct Name Registry Entries at Start-up”, “Override LinuxPPC Preferences” and “Disable Speculative Cache Access at Start-up”.

Figure 5.8
Advanced Options Field



Name Registry Entries

PCI Macintosh's save information in a name registry. The name of the processor, the frequencies of the CPU, caches, the bus and other information is saved inside this name registry. If the current parameters are changed (e.g., the second level cache speed) and especially if a G3 CPU is inserted into a pre-G3 Macintosh, several entries will be incorrect. If the correct values differ from the ones in the name registry, they can be set here by clicking the “Correct Now” button.

LinuxPPC / BootX

BootX saves the current L2 cache values so LinuxPPC can use them. If this option is enabled, ProG3 also overrides the LinuxPPC L2 cache preferences (while quitting ProG3). This option is not supported by our technical support.

Speculative Cache Access

This option disables the speculative cache accesses of the G3/G4 CPU. These accesses may lead to problems with the first generations of PCI Macs (not G3/G4 Macs).

Warranty

By breaking the seal on the CD package, you accept the terms and conditions of the End User License agreement.

Hardware Warranty

Formac, Inc. (Formac) warrants this hardware product against defects in materials and workmanship for a period of one (1) year from the date of original retail purchase. If a defect exists, Formac will, at its option:

- (1) Repair the product at no charge, using new or refurbished replacement parts,
- (2) Exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product, or
- (3) Refund the purchase price of the product.

A Replacement product assumes the remaining warranty of the original product, or 90 days, whichever provides greater coverage.

When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes Formac's property. When a refund is given, your product becomes Formac's property.

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Using Your Service

Please see the Formac web site at www.formac.com for the latest information about your service for the ProG3 board.

Communications Regulation Information

FCC Compliance Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Radio and Television Interference

The equipment described in this manual generates, uses, and can radiate radio-frequency energy. If it is not installed and used properly—that is, in strict accordance with Formac's instructions—it may cause interference with radio and television reception.

This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in Part 15 of FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

You can determine whether your device is causing interference by turning it off. If the interference stops, it was probably caused by the device.

If the device does cause interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops
- Move the computer to one side or the other of the television or radio.
- Move the computer farther away from the television or radio.
- Plug the computer into an outlet that is on a different circuit from the television or radio. (That is, make certain the computer and the television or radio are on circuits controlled by different circuit breakers or fuses.)

Changes or modifications to this product not authorized by Formac could void the FCC Compliance and negate your authority to operate the product.