



Developer Note

Macintosh Server G3



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About This Developer Note

This developer note provides an overview of the new Macintosh Server G3 models, which are based on the Power Macintosh G3 computer. For information about the Power Macintosh G3 computer, see “Supplemental Reference Documents,” later in this preface.

This developer note is intended to help hardware and software developers design products that are compatible with the Macintosh products described here. If you are not already familiar with Macintosh computers or if you would simply like additional technical information, you may wish to read the supplementary reference documents described in this preface.

This note is published only in electronic form, as an Adobe™ Acrobat™ PDF (portable document file). The file is available from two sources:

- on the World Wide Web at <<http://devworld.apple.com/techinfo/techdocs/hardware>>
- on the Reference Library Edition of the Developer CD Series, which is distributed as part of the monthly mailing to registered developers

IMPORTANT

The information in this note is subject to change; no representation or guarantee is made about its accuracy or completeness. ▲

Contents of This Note

This note has only one chapter: an introduction to the Macintosh Server G3 models. Because the note is so short, it has no index.

Supplemental Reference Documents

Developers should have the *Power Macintosh G3 Computer* developer note.

Acrobat PDF versions of developer notes are available on the Developer CD and on the World Wide Web at <http://devworld.apple.com/techinfo/techdocs/hardware>.

Note

Developer notes are not available in printed form. The PDF files are designed so that developers may print them for their own use. ♦

For a description of the version of the Mac OS that comes with the new models, developers should refer to the Technotes about Mac OS 8.1. Technotes are available on the Developer CD Series and on the Technote web site at <http://devworld.apple.com/dev/technotes.shtml>. Printed copies of Technotes are available from Field Copy and Printing, telephone 1-415-323-3155.

Developers should also have copies of the relevant books of the *Inside Macintosh* series, available in technical bookstores.

Additional information about Apple server products can be found on the Apple Product Information web site at <http://www.servers.apple.com>.

Conventions and Abbreviations

This developer note uses the following typographical conventions and abbreviations.

Typographical Conventions

Note

A note like this contains information that is of interest but is not essential for an understanding of the text. ♦

IMPORTANT

A note like this contains important information that you should read before proceeding. ▲

Abbreviations

When unusual abbreviations appear in this developer note, the corresponding terms are also spelled out. Standard units of measure and other widely used abbreviations are not spelled out.

Here are the standard units of measure used in this developer note:

GB	gigabytes	MB	megabytes
Hz	hertz	MHz	megahertz
KB	kilobytes	V	volts

Other abbreviations used in this note include:

ATA	advanced technology attachment
ATAPI	ATA packet interface
CD-ROM	compact disc read-only memory
CPU	central processing unit, the PowerPC microprocessor is a CPU
DAT	digital audio tape, a high capacity storage medium
DIMM	Dual Inline Memory Module
DRAM	dynamic RAM
EDO	extended data out
FPM	fast page mode
GCR	group code recording, a floppy disk format
IC	integrated circuit
I/O	input/output
JEDEC	Joint Electron Device Engineering Council
L2	level 2 or second level, a type of cache
MESH	macintosh enhanced SCSI hardware
PCI	Peripheral Component Interconnect, an industry-standard expansion bus

P R E F A C E

PDF	portable document file
RAM	random-access memory
ROM	read-only memory
SCSI	Small Computer System Interface
SDRAM	synchronous dynamic random access memory
SGRAM	synchronous graphics random access memory

Macintosh Server G3 Introduction

The Macintosh Server G3 is new Macintosh server based on the Power Macintosh G3 computer architecture. This chapter is a delta guide—it lists the standard feature set and then describes only the changes in features from the Power Macintosh G3 counterpart. For a description of the Power Macintosh G3 computer, you can download the Power Macintosh G3 Developer Note at <http://devworld.apple.com/techinfo/techdocs/hardware/ppc_desktop.html>.

Features

The Macintosh Server G3 computer is shipped in two base configurations; one with a 233 Mhz PowerPC™ 750 generation three (G3) processor and the other with a 266 MHz G3 processor. Both configurations have a system bus with a 66 MHz clock frequency. The features for each Macintosh Server G3 configuration are listed in Table 1-1.

Table 1-1 Macintosh Server G3 configurations

233 MHZ G3 processor configuration	266 MHZ G3 processor configuration
64 MB of RAM, one SDRAM DIMM	128 MB of RAM , two 64 MB SDRAM DIMMs
4 GB Ultra Wide SCSI-3 hard disk drive	Dual 4 GB Ultra Wide SCSI-3 hard disk drives

The Macintosh Server G3 models share the following features:

- 3-slot mini-tower enclosure
- PowerPC™ 750 (G3) processor with 512K back-side level 2 cache running at half the microprocessor clock frequency
- high-speed SDRAM for system memory
- Ultra Wide SCSI-3 PCI card, supports 3 internal SCSI-3 devices
- 10/100Base-Tx Fast-Ethernet PCI card
- a built-in 24X-speed ATAPI CD-ROM drive

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- built-in display graphics subsystem with 2D and 3D accelerated graphics
- Whisper Personality card for stereo sound I/O
- 1.4 MB floppy drive
- built-in 10Base-T Ethernet port
- SCSI-1 bus with 50-pin internal and 25-pin external connectors
- Macintosh 9-pin printer and modem serial ports

The Macintosh Server G3 computers incorporate network software improvements that increase the overall performance of the Power Macintosh G3 computer in a server network environment. The improvements made to the Power Macintosh G3 configuration to meet the performance requirements for the Macintosh Server G3 models are:

- Apple Server Ethernet drivers for improved I/O performance
- network application software designed for Apple Macintosh servers
- Video terminator for headless server operation

Ultra Wide SCSI Hard Disk Drives

The 266 MHz configuration of the Macintosh Server G3 computer has two 4 GB hard disk drives, providing a total of 8 GB of storage capacity. The 233 MHz configuration has a single 4 GB hard disk drive. The hard disks are Ultra Wide SCSI-3 with a 16-bit wide data path. The Ultra Wide SCSI controller card supports a maximum data transfer rate of 40 MB per second.

The dual 4 GB hard drive configuration has one 4 GB hard drive as the primary boot volume and the other 4 GB hard drive as a secondary volume. RAID software is supplied in the server software bundle for RAID striping by the server administrator. See the documentation that accompanies the RAID software for information related to volume preparation and striping procedures.

For information about maintaining the best performance using the Ultra Wide SCSI devices in a Macintosh Server G3 computer, see “Ultra Wide SCSI-3 Channel Configuration” (page 1-17).

10/100Base-T Ethernet Card

The 10/100Base-T Ethernet card supports Open Transport: Mac OS 7.5.2 or later, AppleShare, AppleTalk, NetWare for Macintosh, and TCP-IP.

The specifications for the card are as follows:

- Connector: RJ-45 (for 10Base-T and 100Base-T)
- Media, 10Base-T: Cat 3, 4, or 5 UTP on 2 pairs up to 100M
- Media, 100Base-T: Cat 5 UTP on 2 pairs up to 100M
- Bus interface: PCI revision 2.0 and 2.1, share interrupt A
- Channel speeds: IEEE Auto Negotiation of 10Base-T and 100Base-TX
- Communications: IEEE 802.3u 100Base-TX; IEEE 802.3i 10Base-T
- Controllers: DECchip 21140, 32-bit internal processor per channel
- Power: 1.2A @ 5V typical

Video Terminator

The video terminator can be attached to the video graphics display port to allow system booting and server operation without having a display monitor connected to the Macintosh Server G3 computer.

Expansion Options

Ultra Wide SCSI and Ethernet PCI expansion cards, SDRAM DIMMs, and storage device options are available through the online Apple Store at

<<http://www.apple.com/store/>>

Configurations

The Macintosh Server G3 computers have 512K of back-side L2 cache on the PowerPC 750 processor module and 64 MB or 128 MB of SDRAM. System memory can be expanded to 384 MB. The Macintosh Server G3 computer has either one or two 4 GB internal Ultra Wide SCSI-3 hard disks, a built-in

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24X-speed ATAPI CD-ROM drive, a 1.4 MB GCR floppy drive, built-in 2D/3D accelerated graphics, a 10/100Base-Tx Ethernet PCI card, a built-in 10Base-T port, and two serial ports.

The Macintosh Server G3 computers include two SCSI buses: Ultra Wide SCSI-3 on a PCI card, and Narrow SCSI-1. The 4 GB hard drives are on the 68-pin Ultra Wide SCSI-3 bus, a 50-pin connector on the internal Narrow SCSI-1 bus supports additional internal SCSI-1 or SCSI-2 storage devices, and a 25-pin connector on the same Narrow SCSI-1 bus is provided for external devices.

The Macintosh Server G3 mini-tower enclosure includes five drive bays, one drive bay above the power supply, the floppy drive bay, the CD-ROM drive bay, and two drive bays below the CD-ROM drive bay. One of the Ultra Wide SCSI-3 hard drives is configured as ID-0 with bus termination enabled. It is located at the end of the SCSI cable in the drive bay above the power supply. This drive, or any drive in at the end of the SCSI cable, must remain terminated. The 266 MHz configuration of the Macintosh Server G3 computer has a second Ultra Wide SCSI-3 hard drive configured as ID-1, it is not terminated and is located in the drive bay below the CD-ROM drive.

In dual Ultra Wide drive configurations, one additional Ultra Wide SCSI-3 device can be added to the 68-pin Ultra Wide bus, for a total of 3 Ultra Wide SCSI-3 devices. In single drive configurations, two additional Ultra Wide SCSI-3 devices can be added to the 68-pin Ultra Wide bus. For additional information about proper use of the Ultra Wide SCSI bus in a Macintosh Server G3 series computer, see “Ultra Wide SCSI-3 Channel Configuration” (page 1-17).

Additional SCSI-2 storage devices, such as Zip or DAT drives, can be added to the internal SCSI bus by connecting the devices to the 50-pin SCSI cable and power connectors.

The ATAPI CD-ROM is connected to the built-in internal ATA bus. One additional ATA channel remains for ATA device expansion. The ATA bus is also referred to as an EIDE bus.

System Software

The system software installed on the Macintosh Server G3 series computers is Mac OS 8.1. For a list of the features of Mac OS 8.1, see the technote that describes Mac OS 8.1. To find out how to obtain Technotes, see “Supplemental Reference Documents” (page -vii).

Server Software

Macintosh Server G3 series computers include bundled software specifically for Apple Macintosh servers.

- AppleShare IP 5.0.2 provides full Mac OS 8 support and several performance improvements to the AppleShare IP Mail services. Additional information about the improvements made to the AppleShare IP, see the AppleShare IP 5.0.2 Read Me file.
- SoftRAID™ software from Conley Corporation provides an easy to use software solution for configuring and administering a RAID multidisk array on the Macintosh platform. The software supports any combination of striping RAID 0 or mirroring RAID 1.
- Apple Network Administrator Toolkit provides software tools that help manage and maintain the servers and workstations on your network and the users who use those workstations.
- Virex® software from Datawatch Corporation provides a variety of options for protecting the server from files that may be infected by software viruses.

Compatibility Issues

Except for the changes described in this developer note, the features of the Macintosh Server G3 series computer are the same as those of the Power Macintosh G3 computer. There should be no compatibility problems with applications and peripherals that operate correctly with the Power Macintosh G3 computer.

Machine Identification

Applications can find out which computer they are running on by using the Gestalt Manager. For the Macintosh Server G3 series computers, the `gestaltMachineType` value returned is 510 (hexadecimal 1FE). This is the same machine type value returned for the Power Macintosh G3 computer, because the system ROM is not modified for its Macintosh Server G3

counterpart. *Inside Macintosh: Overview* describes the Gestalt Manager and defines how to use the `gestaltMachInfoType` value to obtain the machine name string.

RAM DIMM Specifications

The method of RAM expansion in the Macintosh Server G3 series computer is the same as in the Power Macintosh G3 computer counterpart: 168-pin, 64-bit, 3.3-volt, unbuffered SDRAM DIMMs with a 100 MHz/10ns cycle time or faster.

IMPORTANT

The Macintosh Server G3 series computers accommodate SDRAM DIMMs of up to 1.5 inches in height. Extended data out (EDO) and fast page mode (FPM) DIMMs are not supported. ▲

Ultra Wide SCSI-3 Channel Configuration

The signaling rates for Ultra Wide SCSI-3 bus greatly exceed those of SCSI-2 and SCSI-1 busses. To ensure data integrity the cable impedance must be tightly controlled. The Macintosh Server G3 series computers use a 0.025-inch pitch teflon-jacketed 68-pin SCSI cable with a characteristic impedance of 90 Ohms. Standard PVC-jacketed cables have a characteristic impedance of 75 Ohms, which is outside the 84 to 96 Ohm specification for SCSI-3 implementations.

If a new cable is required for the Ultra Wide SCSI-3 bus in a Macintosh Server G3 series computer, PVC cabling is not recommended for Apple server configurations. The cable should be a high-impedance design of 90 Ohms ± 6 Ohms, such as Temp-Flex 0.025-inch cable part number F3001S-68-125-85.

The total length of the Ultra Wide SCSI-3 bus cable must be limited to 5 feet or less. Because the length of the factory installed internal cable is already over 3 feet, the addition of cabling necessary for external SCSI-3 devices is not supported when the internal SCSI-3 devices are also connected to the SCSI-3 PCI card and supplied internal cable.

If support for external Ultra Wide devices is required, a second Ultra Wide PCI card must be installed. The internal connector on the second card must not be used when external Ultra Wide SCSI devices are connected.

PCI Slots

The main logic board and enclosure for the Macintosh Server G3 series computer includes 3 PCI expansion slots. The system is configured with an Ultra Wide SCSI PCI expansion card and a 10/100Base-Tx Ethernet PCI card that occupy two of the three available PCI slots in the computer, which leaves one PCI slot for an I/O expansion card.

Power Supply

The power supply is not self-configuring for different input voltages. The voltage switch is delivered preconfigured for the input voltage of the region in which the unit is originally purchased. If the computer is moved to another location where the input voltage is different, a voltage switch must be adjusted to accommodate the voltage change. The switch has two positions that support voltage ranges of 100 to 130 V or 220 to 270 V.

The monitor power socket is not switched. Anytime power is connected to the power supply, power is available on the monitor power socket. A monitor connected to the monitor power socket will not power off when the computer is shut down. Monitor power has to be switched manually.

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