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TITLE

Power Macintosh G3 (Blue and White): SCSI FAQ

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TOPIC

This article provides information on the various SCSI standards and how they relate to the SCSI cards currently available from Apple for the Power Macintosh G3 (Blue and White) and Power Mac G4 (AGP Graphics).

DISCUSSION

Apple SCSI FAQ

Question: What is SCSI?

Answer: SCSI, or Small Computer System Interface, is a standard for connecting peripherals to your computer, including disk and cartridge drives, CD-ROM drives, scanners, and other devices. A SCSI port was included on most Macintosh systems up until the iMac and the 1999 models of the Power Macintosh G3 and Macintosh Server G3.

Question: What are the differences between the various types of SCSI?

Answer: SCSI implementations vary depending on a number of different characteristics. Each type of SCSI can support the transfer of data at a certain speed, measured in megabytes per second. SCSI types are also characterized by the number of devices that can be connected to each channel or bus and the HPBs maximum cable length supported. Different types of SCSI also use different connectors. The chart below summarizes the difference:

Type of SCSI	Max. Transfer Rate (MBps)	Max. Devices	Max. Cable Length	Connector Types Used
SCSI-1	5	7	3 meters	25-pin 50-pin Centronics
SCSI-2 (Fast)	10	7	3 meters	50-pin high density 50-pin standard 50-pin Centronics
Ultra Narrow	20	15	1.5 meters	50-pin high density 50-pin standard 50-pin Centronics
Ultra Wide	40	15	1.5 meters	68-pin high density
Ultra2 LVD	80	15	12 meters	68-pin high density

You'll find good reference for many SCSI-related terms on the Adaptec Web site at <http://www.adaptec.com/tools/glossary/general.html>.

Question: Why did Apple remove the SCSI port from the logic board of the new Power Macintosh G3 (Blue and White) and Macintosh Server G3 systems?

Answer: Apple has provided a new method of connecting peripherals, called FireWire, on every Power Macintosh G3 (Blue and White) and Macintosh Server G3 system. FireWire will revolutionize the way individuals connect high-speed devices to their Macintosh. It provides such features as hot pluggability, support for up to 63 devices, easy cable connectivity, and even bus-supplied power, which make it the perfect successor to SCSI as a means to connect external peripherals. By including FireWire in every Power Macintosh, Apple is providing its customers with high-performance and easy-to-use I/O technology that will be used far into the future.

Question: What SCSI options are available from Apple for the new Power Macintosh G3 (Blue and White) and G3 Server systems?

Answer: Apple offers a number of SCSI options for optimal hard disk performance and connectivity to older SCSI devices. The following options are available from Apple:

Ultra SCSI PCI card

The Ultra SCSI PCI card is offered as a build-to-order option at the Apple Store. It works in any new (1999 model) Power Macintosh G3 or Macintosh Server G3 configuration. The card allows users to connect external SCSI peripherals to the Macintosh, such as scanners, tape drives, and hard disks that use standard SCSI (SCSI-1), Fast SCSI (SCSI-2), and Ultra SCSI (also called Ultra Narrow SCSI). It supports booting the Macintosh from externally connected devices. The card comes with a high-density 50-pin external connector and a 50-pin to 25-pin female SCSI adapter to ensure compatibility with existing SCSI cabling. The card also comes with a 50-pin internal connector that is unsupported by Apple. You can connect up to seven external Ultra Narrow devices to the card with a total cable length of 1.5 meters. You can connect up to seven SCSI-1 and SCSI-2 devices to the card with a total cable length of 3 meters. You can also connect a mix of SCSI-1, SCSI-2, and Ultra Narrow external devices, but you will be limited to a total cable length of 1.5 meters.

Single-channel SCSI card (Ultra2 LVD)

The single-channel SCSI card is installed in some configurations of the Power Macintosh G3 and Macintosh Server G3. It is also available through the Apple Store, with a number of hard drive configurations to choose from. This card connects to internal and external Ultra2 LVD SCSI devices. The cable connected to the card provides support for up to three internal Ultra2 LVD SCSI devices. The card supports booting the Macintosh from internal or external devices. It comes with a 68-pin internal connector and a 68-pin external connector. You can connect up to 15 Ultra2 devices to the single-channel SCSI card with a total cable length, both internally and externally, of 12 meters. Apple does not recommend connecting other types of SCSI devices to the single-channel card due to possible cabling limitations or effects on the performance of the internal Ultra2 LVD SCSI hard drives.

Dual-channel SCSI card (Ultra2 LVD) Version 1

The dual-channel SCSI card is offered as a configure-to-order option at the Apple Store with certain hard drive configurations, including the option of three 36GB hard drives, for the Power Macintosh G3 (Blue and White) and Macintosh Server G3. The dual-channel card provides two independent Ultra2 LVD SCSI channels, Channel A and Channel B. Internal Ultra2 LVD SCSI hard drives are connected to the internal Channel B connector. External or internal SCSI devices can be connected to the external or internal Channel A connectors. This card is the perfect all-in-one solution for customers who want to use high-performance internal Ultra2 disk drives and external SCSI peripherals at the same time.

The card comes with two 68-pin internal connectors (Channels A and B), a 50-pin internal connector (Channel B), and a 68-pin external connector (Channel A). You can connect up to 30 Ultra2 SCSI devices to the card with a total cable length, both internally and externally, of twelve meters. You can connect up to 11 Ultra Narrow or Ultra Wide devices with a total cable length, both internally and externally, of 1.5 meters. You can connect up to seven SCSI-1 or SCSI-2 devices to the external channel (Channel A) with a total cable length, both internally and externally, of 3 meters. You can also connect a mix of SCSI-1, SCSI-2, Ultra Narrow, and Ultra Wide devices on the external channel (Channel A), but you will be limited to a total cable length, both internally and externally, of 1.5 meters. The internal 50-pin connector (Channel B) is unsupported by Apple.

Dual-channel SCSI card (Ultra2 LVD) Version 2

The version 2 dual channel SCSI card is functionally equivalent to the version1 card, though it has been tested and approved for use with the Power Mac G4 (AGP Graphics) computer. Refer to the chart below for more specific technical information. The card is based on the ATTO ExpressPCI UL2D card. You may refer to the ATTO Web site at <http://www.attotech.com> for more information on it.

The chart below illustrates many of the technical differences between the various Apple SCSI cards.

Specification	Ultra SCSI	Single Channel	Dual Channel version 1	Dual Channel version 2
Supported Computer	Power Macintosh G3 (Blue and White) and Power Mac G4	Power Macintosh G3 (Blue and White)	Power Macintosh G3 (Blue and White)	Power Mac G4 (AGP Graphics)
Max. Transfer Rate (MB/Sec)	20	80	80 per channel	80 per channel
Apple Supported Types	SCSI-1, SCSI-2 (Fast), Ultra Narrow	Ultra2 LVD	Channel A: SCSI-1, SCSI-2 (Fast), Ultra Narrow, Ultra Wide, Ultra2 LVD Channel B: Ultra2 LVD	Channel 1: SCSI-1, SCSI-2 (Fast), Ultra Narrow, Ultra Wide, Ultra2 LVD Channel 2: Ultra2 LVD
Internal Connector	50-pin standard (Male) (Not Apple Supported)	68-pin high-density Ultra2 (Female)	Channel A: 68-pin high-density Ultra2 (Female) Channel B: 68-pin high-density Ultra2 (Female), and 50-pin standard (Male) *	Channel 2: 68-pin high-density Ultra2 (Female)

External Connector	50-pin high-density (Female) Includes a high density 50-pin to DB25 adapter	68-pin high-density Ultra2 (Female)	Channel A: 68-pin high-density Ultra2 (Female) **	Channel 1: 68-pin VHDCI Ultra2 (Female)
Max. Devices Int/Ext	Up to 7 total	Up to 15 total	Up to 30 total	Up to 30 total
Maximum Cable Length Internal/External	3 meters w/non-Ultra devices; 1.5 meters w/Ultra devices or a mix of Ultra and non-Ultra devices	12 meters w/only Ultra2 LVD devices	Channel A: 3 meters w/non-Ultra devices; 1.5 meters w/Ultra devices or a mix of Ultra and non-Ultra devices; 12 meters w/only Ultra2 LVD devices Channel B: 12 meters w/only Ultra2 LVD devices	Channel 1: 3 meters w/non-Ultra devices; 1.5 meters w/Ultra devices or a mix of Ultra and non-Ultra devices; 12 meters w/only Ultra2 LVD devices Channel 2: 12 meters w/only Ultra2 LVD devices
PCI System Bus	32 bit	32 bit	64 bit	64 bit
Driver Compatibility	Compatible with SCSI Manager 4.3, and earlier drivers	Requires SCSI Manager 4.3 compliant driver	Requires SCSI Manager 4.3 compliant driver	Requires SCSI Manager 4.3 compliant driver

* 50-pin standard (Male) (Not Apple Supported)

Question: What do I do about my older SCSI devices that I want to use?

Answer: Apple offers two SCSI solutions to accommodate the transition between older SCSI devices and FireWire devices. Those options, the Ultra SCSI PCI card and the dual-channel SCSI card, are described in detail above. In addition, a number of vendors are delivering SCSI card solutions for the Power Macintosh G3.

The Adaptec PowerDomain 2930 is an Ultra Narrow SCSI PCI card that supports devices with an external high-density 50-pin connector and an internal standard 50-pin connector (the card ships with an internal SCSI cable). The PowerDomain 2930 supports up to seven internal or external SCSI-1, SCSI-2, and Ultra Narrow SCSI devices. You can boot the new Power Macintosh G3 from internal or external devices with the PowerDomain 2930. For more information, see <http://www.adaptec.com/products/overview/pd2930u.html>.

See Adaptec's Web site for more information on Macintosh SCSI solutions:
<http://www.adaptec.com/products/solutions/macintosh.html>.

Question: What happens if I connect older SCSI devices to the single-channel SCSI Ultra2 LVD card that ships in my Power Macintosh G3 or Macintosh Server G3?

Answer: Depending on the type of SCSI device that you connect to the external 68-pin connector on the single-channel SCSI Ultra2 LVD card, you may exceed cable length limitations or slow down the speed of your SCSI bus. For example, connecting an external SCSI-2 drive to the single-channel SCSI card will slow the entire Ultra2 SCSI bus from a maximum throughput of 80 MBps to 40 MBps. It also may exceed the maximum cable length of 1.5 meters supported by Ultra Narrow SCSI because the cable connecting the internal Ultra2 hard drive is already nearly 1 meter long. Therefore, Apple strongly recommends that customers do not connect slower SCSI devices to the single-channel SCSI card.

Question: What happens when I mix different types of SCSI devices on the same SCSI channel or bus?

Answer: Both the speed and cable length limitations of different devices can be affected by mixed SCSI types on a single bus or channel. Any mix of SCSI-1, SCSI-2, Ultra Narrow, and Ultra Wide devices does not affect the maximum throughput of any non-Ultra2 LVD SCSI bus or channel. For example, a SCSI-1 CD-ROM drive, a SCSI-2 Jaz drive, and an Ultra Wide hard drive all connected to an Ultra Wide SCSI bus, will all operate at their respective speeds (5 MBps for SCSI-1, 10MBps for SCSI-2, and 40 MBps for Ultra Wide) because the Ultra Wide SCSI bus supports up to 40 MBps. Mixing SCSI-1 and SCSI-2 devices with Ultra Narrow and Ultra Wide devices always results in a maximum cable length, both internally and externally, of 1.5 meters.

An Ultra2 LVD SCSI bus or channel with a mix of Ultra2 LVD and non-Ultra2 LVD devices will operate at a maximum throughput of 40 MBps, instead of 80 MBps. For example, a SCSI-1 CD-ROM drive, a SCSI-2 Jaz drive, an Ultra-Wide hard drive, and an Ultra2 LVD hard drive all connected to an Ultra2 LVD SCSI bus, will operate at their respective speeds except for the Ultra2 LVD hard drive, which will be limited to 40MBps. Mixing Ultra2 LVD devices with non-Ultra2 LVD devices always results in a maximum cable length, both internally and externally, of 1.5 meters.

Question: Do the Apple SCSI cards support all SCSI devices?

Answer: The single-channel and dual-channel SCSI cards do not support all SCSI devices. These cards support only devices that are SCSI Manager 4.3-compliant. The Ultra SCSI PCI card is specifically designed to support older SCSI devices and will work with most older

devices. To find out whether a specific SCSI peripheral is SCSI Manager 4.3-compliant, contact the vendor of the peripheral for more information.

EXTENDED Information - [Apple Internal Use - Service Providers and Support Professional](#)

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