Macintosh: SCSI Data Transfer Rates (6/96)

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TOPIC ----------

What is the maximum sustained asynchronous data transfer rate for the various Macintosh models? What SCSI chip is used inside the various Macintosh models?

DISCUSSION ----------

Begin_Table

MACINTOSH MODEL	SCSI CHIP	MAX DTR *	NOTES
Macintosh 128K	none	0	
Macintosh 512K	none	0	
Macintosh 512Ke	none	0	
Mac Plus	NCR 53C80	1.25 MB/sec	
Macintosh SE	NCR 53C80	1.25 MB/sec	
Macintosh SE/30	NCR 53C80	1.25 MB/sec	
Macintosh Classic	NCR 53C80	1.25 MB/sec	
Macintosh Classic II	NCR AM85C80	1.25 MB/sec	
Macintosh Color Classic	NCR AM85C80	1.25 MB/sec	
Macintosh LC	NCR AM85C80	1.5 MB/sec	
Macintosh LC II	NCR AM85C80	1.5 MB/sec	
Macintosh LC III	NCR AM85C80	1.5 MB/sec	
Macintosh LC 475	NCR 53C96	5 MB/sec	(1),(2)
Macintosh LC 520	NCR AM85C80	1.5 MB/sec	
Macintosh TV	NCR AM85C80	1.5 MB/sec	
Macintosh II	NCR 53C80	1.25 MB/sec	
Macintosh IIx	NCR 53C80	1.25 MB/sec	
Macintosh IIcx	NCR 53C80	1.25 MB/sec	
Macintosh IIci	NCR 53C80	1.25 MB/sec	
Macintosh IIfx	Apple SCSI DMA	3 MB/sec	

Macintosh IIsi	NCR AM85C80	1.25 MB/sec	
Macintosh IIvi	NCR AM85C80	1.5 MB/sec	
Macintosh IIvx	NCR AM85C80	1.5 MB/sec	
Macintosh Centris 610	NCR 53C96	5 MB/sec	(1),(2)
Macintosh Centris 650	NCR 53C96	5 MB/sec	(1),(2)
Macintosh Quadra 605	NCR 53C96	5 MB/sec	(1),(2)
Macintosh Quadra 610	NCR 53C96	5 MB/sec	(1),(2)
Macintosh 630 Family	Custom IC		(5)
Macintosh Quadra 650	NCR 53C96	5 MB/sec	(1) (2)
Macintosh Quadra 660AV	NCR 53C96	5 MB/sec	(1),(2)
Macintosh Quadra 700	NCR 53C96	5 MB/sec	(1)
Macintosh Quadra 800	NCR 53C96	5 MB/sec	(1),(2)
Macintosh Quadra 840AV	NCR 53C96	5 MB/sec	(1),(2)
Macintosh Quadra 900	NCR 53C96	5 MB/sec	(1),(2),(3)
Macintosh Quadra 950	NCR 53C96	5 MB/sec	(1),(2),(3)
Power Macintosh 6100	Custom IC	5 MB/sec	(2)
Power Macintosh 7100	Custom IC	5 MB/sec	(2)
Power Macintosh 7200	Custom IC	5 MB/sec	
Power Macintosh 7500			(2),(6)
Internal/external	Custom IC	5 MB/sec	
Fast SCSI (internal)	MESH Custom IC	10 MB/sec	
Power Macintosh 7600			(2),(6)
Internal/external	Custom IC	5 MB/sec	
Fast SCSI (internal)	MESH Custom IC	10 MB/sec	
Power Macintosh 8100	Custom IC	5 MB/sec	(2)
Power Macintosh 8500			(2),(6)
Internal/external	Custom IC	5 MB/sec	
Fast SCSI (internal)	MESH Custom IC	10 MB/sec	
Power Macintosh 9500			(2),(6)
Internal/external	Custom IC	5 MB/sec	
Fast SCSI (internal)	Custom IC	10 MB/sec	
Macintosh Portable	NCR 53C80	1.25 MB/sec	
Macintosh PowerBook 100	NCR AM85C80	1.5MB/sec	
Macintosh PowerBook 140	NCR AM85C80	1.5MB/sec	
Macintosh PowerBook 145	NCR AM85C80	1.5MB/sec	
Macintosh PowerBook 145B	NCR AM85C80	1.5MB/sec	
Macintosh PowerBook 150	NCR AM85C80	1.5MB/sec	(4)
Macintosh PowerBook 160	NCR AM85C80	1.5MB/sec	
Macintosh PowerBook 165c	NCR AM85C80	1.5MB/sec	
Macintosh PowerBook 170	NCR AM85C80	1.5MB/sec	
Macintosh PowerBook 180	NCR AM85C80	1.5MB/sec	
Macintosh PowerBook 180c	NCR AM85C80	1.5MB/sec	
Macintosh Duo 210	NCR AM85C80	1.5MB/sec	
Macintosh Duo 230	NCR AM85C80	1.5MB/sec	
Macintosh Duo 250	NCR AM85C80	1.5MB/sec	
Macintosh Duo 270c	NCR AM85C80	1.5MB/sec	
Macintosh Duo 280c	Custom IC	1.5MB/sec	

Macintosh PowerBook 520	Custom IC	1.5MB/sec
Macintosh PowerBook 540	Custom IC	1.5MB/sec

End_Table

Notes
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* This is a theoretical maximum synchronous sustained data transfer rate. The practical data transfer rate varies depending on many factors, such as SCSI chip transfer rate limit, SCSI driver used, hard drive performance, software applications, cables, and other configurations.

Note (1)
The transfer rate of the 53C96 can reach 6MB/sec when using a fast hard drive, provided the cabling is capable of supporting that speed. The cabling and termination of the internal SCSI bus are optimized so that the 53C96 that controls the internal bus can support data transfers at a faster rate (up to 5MB per second with existing faster third-party hard drives). Externally with standard Apple cables, SCSI throughput was rated at 4 MB per second. The improved SCSI performance results in increased system responsiveness when accessing large amounts of data on a fast hard drive.

Note (2)
The internal SCSI channel also supports active termination which improves SCSI bus signal quality and reliability through improved transmission line and terminator design. This means that only one terminator is needed at the end of the external SCSI chain. The external channel's termination also offers a more uniform impedance and cleaner termination scheme. However, because external cabling and termination are less predictable, performance on the external bus could be lower than the internal. Electrically isolating the two channels ensures that changes in external cabling and termination don't impact the performance of the internal devices.

Note (3)
Even though the internal and external SCSI chains are physically different, they are still logically the same, and can therefore, like all Macintosh systems, accommodate up to seven SCSI devices. The added value of the Macintosh Quadra 950 dual-controller design is that the internal hard drive(s) performance won't be affected by problematic devices (like a scanner) attached to the external SCSI connector. Improvements in signal quality on the SCSI bus result in higher SCSI reliability.

Note (4)
The PowerBook 150 only supports external SCSI devices, the internal hard drive is an IDE type drive.

Note (5)
The Macintosh 630 family utilizes an internal IDE hard drive, SCSI is only valid for external drives. The transfer rate external approaches 5 MB/sec.

Note (6)
These computers have dual-channel asynchronous SCSI. There are two completely separate SCSI buses. The Fast SCSI bus is for internal SCSI connections only.

The other SCSI bus is for both internal and external SCSI connections.

Article Change History:
26 Jun 1996 - Added additional PCI computer.
30 Nov 1995 - Added added PCI Power Macintosh computers; made minor revisions.
18 May 1995 - Made minor corrections.

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