

Choosing a Macintosh PCI Serial Card

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Do I need a PCI serial expansion cards?

If you have too many serial devices for the number of serial ports built into your Macintosh, you have three alternatives:

- manually swap cables (and possibly wear out the connectors on your Mac),
- use a mechanical switchbox (and restart your computer a lot), or
- add additional serial ports to your Macintosh.

The latter choice allows simultaneous use of multiple serial devices without rebooting your machine and is often the most satisfying approach. You get additional serial ports without sacrificing simultaneous use of the built-in ports.

Who makes PCI serial expansion cards for the Mac?

As of mid-1997, there are 4 vendors with PCI serial expansion cards, and a total of eleven models shipping now or expected shortly. This makes selecting a card for your requirements a bit confusing. This note will try and make your decision easier by comparing and contrasting the available choices.

The four vendors of Macintosh PCI serial cards are:

Creative Solutions, Inc.	410-766-4080	http://www.scsn.net.com/
Keyspan	510 222 0131	http://www.keyspace.com/
MegaWolf, Inc.	203-562-1243	http://www.megawolf.com/
Silicon Valley Bus Co.	408-623-2300	http://www.svbus.com/

Keyspan and MegaWolf have been shipping serial cards since early 1996, Creative Solutions has been shipping their PCI card since 2/97, and Silicon Valley Bus Co. has shown a sample card, but is not actually shipping as of mid-1997. A couple of other companies have announced plans for Mac PCI serial cards, but have neither described any definite date nor provided enough information for comparison.

Will a PCI card work in my situation?

Put simply, if a serial device is to be used with a PCI serial port, then it must include software that uses the Communication Toolbox (CTB). Apple introduced the CTB almost 8 years ago, with the advent of 3rd party NuBus serial cards. The CTB provides programmers and end users a simple, standardized method of keeping track of available serial ports and selecting among them. Nearly all Mac modem software takes advantage of this, so that software for the Internet, faxing, on-line services, BBS'es, etc. generally has no trouble using 3rd party serial ports (PCI or other).

Non-modem serial devices vary considerably as to whether their software takes advantage of the CTB, and hence can use 3rd party ports. Some (like Wacom serial graphics tablets or CoStar label printers) do use the CTB and are nicely compatible. Some (like GeoPort™ modems and most digital cameras) use software that requires direct communication with the hardware on the motherboard. Others (like many printer

drivers) inherit pre-CTB code that is only slightly simpler than CTB compatible code. MegaWolf offers a free utility (PortView) for examining the CTB, and for checking the CTB-compatibility of any software you are unsure about after rereading the manual or checking with the supplier. Software that only shows buttons or check boxes for port selection are likely not to use the CTB; software that uses a popup menu or a scrolling list is likely to be CTB compatible.

Some devices that will not work with PCI Serial Ports and will have to remain on your Mac's internal Modem or Printer port.:

- Apple GeoPort™ modems
- Apple QuickTake™ cameras
- LocalTalk (networks or printers)
- Connectix QuickCam™

Some devices that will likely not work with PCI Serial Ports and may have to remain on the internal Modem or Printer port:

- Printers, graphic tablets, etc. without CTB compatible drivers
- Devices whose controlling software does not use the CTB, including some graphic tablets and PDA's
- MIDI (needs a card that supports external clocking and special card-level drivers)
- Specialized devices using synchronous (e.g, SDLC) serial protocols

Most other serial devices are CTB compatible and so work nicely, including:

- Nearly all modem and serial ISDN software
- Wacom serial graphic tablets
- CoStar label printers
- Home automation devices (although only with recent software)

Which card should I get?

Tables 1 & 2 compare a number of features of the eleven Mac compatible PCI serial cards. How some of the factors listed in the table might affect you:

- Number of ports should usually be at least one or two more than you currently require to allow you the option of easily adding more devices later. Naturally, adding a single extra device requires a lot fewer ports than setting up a 16 modem Internet mail server.
- Coprocessor or "Smart" cards are more expensive than "dumb" cards (no coprocessor). A coprocessor or adequate on-board port buffer size is desirable in high load situations (such as a busy server supporting multiple modems). At least 32 bytes of port buffer size is necessary to minimize data losses when receiving high speed (>9600 baud) data without handshaking. Generally with dumb cards, the larger the port buffer size, the better.
- Maximum speed is not usually an important issue at the present time. All the cards listed can do 115 kbaud, which is sufficient for nearly all modem applications. A few of the faster modems and ISDN adaptors support (and benefit from) using 230 kbaud. Considering the increase in average serial speeds in the past few years, faster speeds may prove useful with future modems and other devices.
- External Clocking is only an issue for ports that connect to Visioneer PaperPort™ scanners, MIDI, or a couple of uncommon devices that supply the baud rate clock.
- Connectors can be an important issue. When you have devices that only use Mac-style Mini-DIN connectors (recent Global Village modems, for example), then

having Mini-DIN connectors on the card is very useful, if not necessary. Nearly all other modems and many devices (particularly ones that are also sold to non-Mac PC's) use DB or RJ connectors, and the choice of connector is less important. In those cases, Mac adaptor cables are available for easy conversion to Mini-DIN, or conventional PC cabling can be used for DB25 or RJ45 connectors.

- Ship Date gives a rough indication of stability of the driver software. Usually, the longer a card has been shipping, the more likely all its bugs have been found and fixed. This factor is most important with the first PCI card that a vendor develops, as "practice makes (nearly) perfect" for subsequent cards.
- Warranty duration is probably not a big factor, as late hardware failures are fairly uncommon. More important is the return privilege, so you can evaluate performance and compatibility with minimal risk. Return privileges are 30 days for CSI and Keyspan and 6 weeks for MegaWolf.

General Notes on Tables 1 & 2:

Data in Tables 1 & 2 were derived from current company literature available as of mid-July 1996.

All of the listed cards supply native PowerPC drivers for MacOS and support Apple's Communication Toolbox. All should work with conventional (non-GeoPort™) modems. None support LocalTalk, GeoPort™ modems, Connectix QuickCam™ cameras, or Apple QuickTake™ Cameras. None currently offer drivers for MIDI, Linux, AIX, or BE. MegaWolf plans MIDI drivers for Romulus & Remus. Keyspan is developing SDLC synchronous drivers for their Smart Serial 6 card.

Maximum port speed #3 (single port, not using handshaking) on non-coprocessor cards is typically less than the maximum baud rate that same port is capable of when using handshaking. Limitations of the current MacOS requires that a card be able to buffer at least 10 msec of 8 bit data to ensure no serial data losses. A good estimate of the relationship between the size of a port's receive buffer and the maximum baud rate supported without handshaking is given by:

$$\text{max baud rate} = \text{max bits/sec} = (10 \text{ bits/char}) * (\text{port buffer size}) / (10^{-2} \text{ sec})$$

This should allow loss-free reception of data nearly all of the time. Specific applications with packet sizes smaller than the port buffer size would not be limited by this value. Most modem software uses DTR (RTS) handshaking and would not have a problem with small buffers (FirstClass™ is a notable exception that does not use DTR handshaking and may incur more packet resends with small port buffers).



Comments, corrections, complaints to:

Ward McFarland
ward@megawolf.com

MegaWolf, Inc.

1771 Grasso Boulevard
New Haven, CT 06511
203-562-1243 voice/fax

Table 1 - General Comparison of Mac PCI Serial Expansion Cards

Model Name	# Ports	Retail Price*	Retail \$ per port	Connectors	Ship Date	Warranty	Vendor
Remus	2	\$249	\$125	MiniDIN or RJ45	7/97	5 years	MegaWolf
SX-2 Serial	2	\$229	\$115	MiniDIN	1/97	5 years	Keyspan
Romulus	4	\$349	\$87	MiniDIN or RJ45	7/97	5 years	MegaWolf
SX-4 Serial	4	\$329	\$82	MiniDIN	1/97	5 years	Keyspan
MultiPort	4	\$400	\$100	MiniDIN	???	???	SVBCo**
Lightning	4	\$479	\$107	MiniDIN	2/97	1 year	CSI***
SmartSerial 6	6	\$614	\$105	MiniDIN or DB25	1/96	5 years	Keyspan
Rufus	8	\$695	\$87	DB25	10/96	5 years	MegaWolf
Fenris8	8	\$1192	\$149	DB25 or RJ45	3/96	5 years	MegaWolf
Fenris16	16	\$1744	\$109	DB25 or RJ45	3/96	5 years	MegaWolf
Fenris32	32	\$2528	\$79	DB25 or RJ45	3/96	5 years	MegaWolf

Notes:

- * Prices are Suggested Retail Pricing. MegaWolf and CSI "street prices" are typically 15-20% less.
- ** SVBCo is abbreviation for Silicon Valley Bus Company.
- *** CSI is abbreviation for Creative Solutions, Inc.

Table 2 - Technical Comparison of Mac PCI Serial Expansion Cards.

Model Name	# Ports	Max Speed (1)	Max Speed (2)	Max Speed (3)	Copro-processor	External Clocking? (4)	Usable for Servers?	Port Buffer Size (5)
Remus	2	920	230	115	no	yes	yes (6)	128
SX-2 Serial	2	230	230	57	no	no	yes (6)	64
Romulus	4	920	230	115	no	yes	yes (6)	128
SX-4 Serial	4	230	230	57	no	no	yes (6)	64
MultiPort	4	115	115	9.6	no	no	no	12
Lightning	4	230 (7)	115 (7)	230	yes	yes	yes	4K
SmartSerial 6	6	230 (8)	115 (8)	230	yes	yes	yes	(8)
Rufus	8	460	230	460	yes	no	yes	4K
Fenris/8	8	115	115	115	yes	no	yes	16K
Fenris/16	16	115	115	115	yes	no	yes	8K
Fenris/32	32	115	115	115	yes	no	yes	4k

Notes: (also see accompanying article)

- (1) Maximum baud rate for a single port full duplex, with handshaking enabled.
- (2) Maximum baud rate for all ports together full duplex, with handshaking enabled.
- (3) Maximum baud rate for a single port, with handshaking disabled (assuming no data loss even with a 10 msec worst case Mac interrupt response).
- (4) External clocking required for MIDI, Visioneer PaperPort™, and a few other non-modem devices.
- (5) Available buffer size for received data in bytes - larger is usually better.
- (6) Small port buffers require use of handshaking to prevent data losses. Most servers use DTR handshaking, but FirstClass™ does not, so there will likely be some increase of packet resends when >Max Speed (3).
- (7) Lightning can support a single port up to ~500 kbaud when externally clocked. It can also manage 230 kbaud on all 4 ports when running half-duplex, or two ports full duplex.
- (8) SS6 has big on-board buffers & ability to DMA data directly to/from Mac memory. When all 6 ports are in use, the first 4 can do 115k and the last 2 only 57k. Custom s/w can achieve speeds >1mb on ports 1&2 alone.