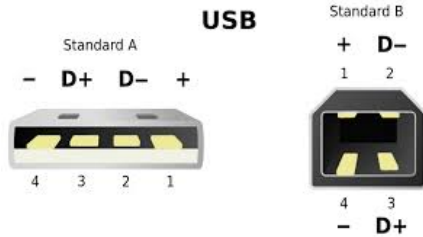


Appendix A: Camera connectors



[USB:](#)

Standard Type A (provides power) and Type B (consumes power) USB 2.0 connectors



+ and - terminals provide 5V @ 500mA and ground respectively for USB2.0 and up to 2A for USB 3.0

- is referenced to EARTH GROUND!!!

D+ and D- handle data communication

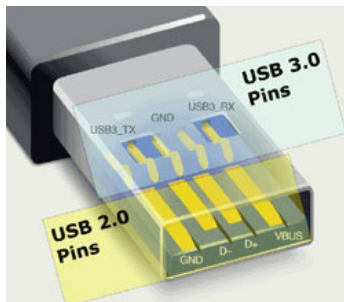
USB 3.0 connectors have BLUE insulator while USB 2.0 have WHITE insulator.




USB 2.0 micro, USB3.0 micro, USB 2.0 Type B and USB 3.0 type B connectors



USB 3.0 connectors are backwards compatible with USB 2.0 and USB 1.1 (legacy) connectors

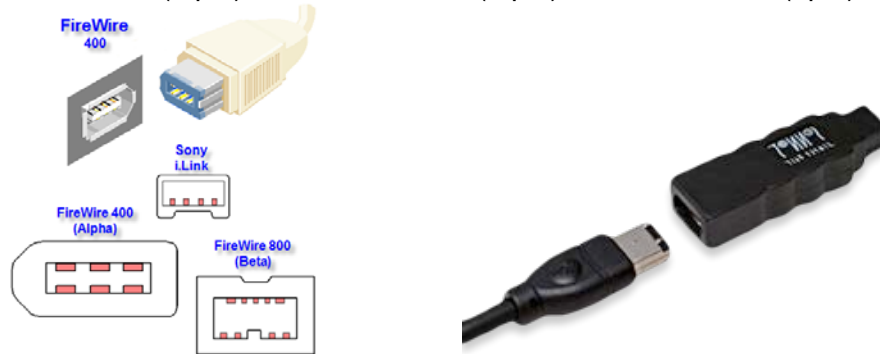


The extra pins on a USB 3.0 connector handle the faster modes of communication this protocol can switch to.

 [IEEE1394 \(Firewire\)](#)

Several “versions” of IEEE1394 compatible connector exist:

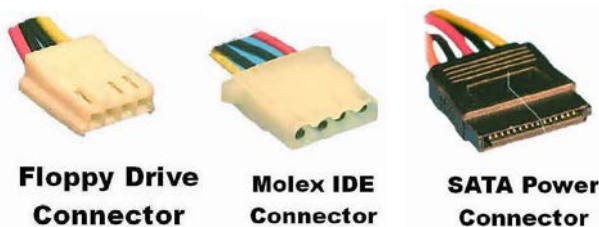
IEEE1394a (6 pin), IEEE1394 i.Link (4 pin) and IEEE1394b (9pin) or bilingual.



Pins 1 and 2 on the a and 8 and 6 on the b connector provide power while the rest of them handle data.

While the newer IEEE1394b has more pins to support higher transfer rates (800MBps as compared 400MBps for the IEEE1394a, you can use adapters to run an IEEE1394a camera on IEEE1394b at 400MBps.

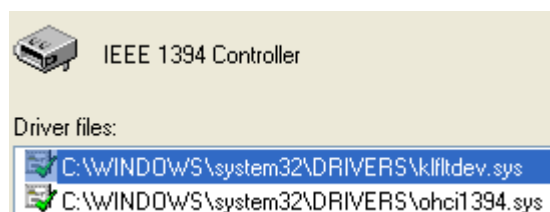
Voltage is unregulated and can range from 9V (on a laptop) all the way up to 30V for a typical power output of 5 to 8W. The firewire card you use should have one of the following connectors to draw power straight from the PC PSU instead of taxing the PCI backplane. USE IT!!!!



All of them provide 12V (Yellow cable), 5V (red cable) and ground (black cable) connections.

Firewire chipsets compatible with our cards and recommended by other camera manufacturers include those from Texas Instruments, LSI and NEC. Chipsets from VIA and Pinnacle have been shown to have poor performance.

Kaspersky antivirus has be shown to interfere with IEEE1394 communications by installing its own driver. Make sure to uninstall it if you have problems with firewire cameras on a system with Kaspersky antivirus installed.



Camera Link

This is a fast and efficient camera connection developed specifically for digital camera to frame grabber connectivity. It utilizes a multichannel LVDS signaling scheme which allows fast, error resistant communication between the camera and PC interface card.

Different implementations of the Camera Link protocol (base, medium, full, decca) allow connections with cameras with increasing bandwidth.

While “standard” Camera Link connectors (SDR) use 26 pins there are other types using more or even less (reduced bandwidth) connectors so many different connectors (even proprietary) are available for different cameras.



Examples of Shrunken Delta Ribbon (SDR) cable assemblies for Camera Link connections, full size (left) and mini (right)

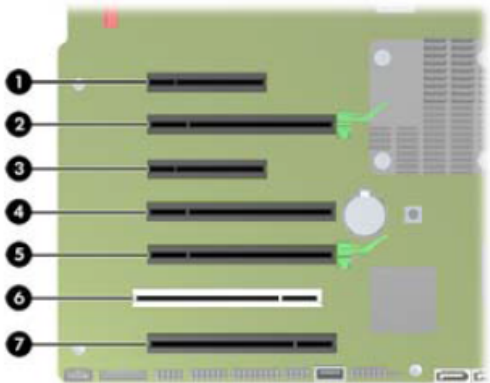
Always use PCIe Camera Link frame grabbers with newer systems to ensure optimum performance. Use the guidelines for connecting PCIe expansion cards to your PC on Appendix B and identifying expansion card connections on Appendix C.



Although some Camera Link cards support PoCL (Power over Camera Link), most cameras do not depend on it to power the camera as most cameras have external power supplies. Still using a high power PCIe slot or direct connection to the PSU if available, is advised.

Appendix B: Computer expansion card connections

Z800



Install PCIe 1X cards on any available PCIe expansion slot. If PCIe 16X slots are available (slot 2 or slot 5) they should be preferred, followed by slot 4 and 1, 3, 7.

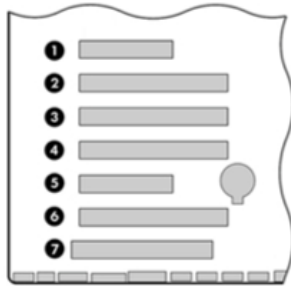
Usually slot 2 will be occupied by the graphics card so the preferred slot would be no. 5.

Slot description

- 1-PCIe2 x8(4) 25W
 - 2-PCIe2 x16 75W
 - 3-PCIe x8(4) 25W
 - 4-PCIe2 x16(8) 25W
 - 5-PCIe2 x16 75W
 - 6-PCI 32/33 25W
 - 7-PCIe x16(8) 25W
-

HP Z820 Workstation slot identification and description

Maximum power used by all slots must not exceed total system power and is subject to cor limitations.



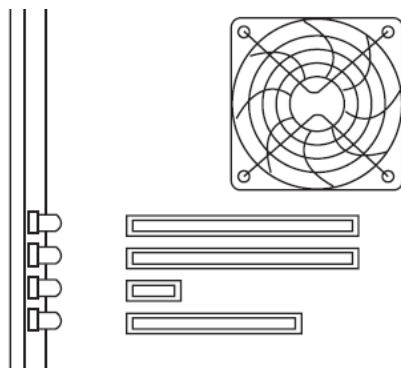
Slot	Type	Mechanical compatibility	Electrical compatibility
1	PCIe3 x8 (4) — CPU0	x8	x4
2	PCIe3 x16 — CPU0	x16	x16
3	PCIe3 x16 (8) — CPU1	x16	x8
4	PCIe3 x16 — CPU1	x16	x16
5	PCIe2 x8 (4) — CPU0	x8	x4
6	PCIe3 x16 — CPU0	x16	x16
7	PCI 32/33 — CPU0	PCI	PCI

On Z820 computers, the slots available depend on the number of installed CPU's. Workstations with only one CPU installed (mid range) will have only slots 1,2,5 and 6 available. Slots 2 and 6 are recommended for installing firewire or frame grabber cards followed by slots 1 and 5.

If two CPU's are installed (high end) then slots 3 and 4 are also available and slot 3 is preferred over slot 4.

Do not use PCI slot 7 for anything even if you have a PCI firewire card you think could be used.

Fujitsu Siemens Esprimo P900/910/920

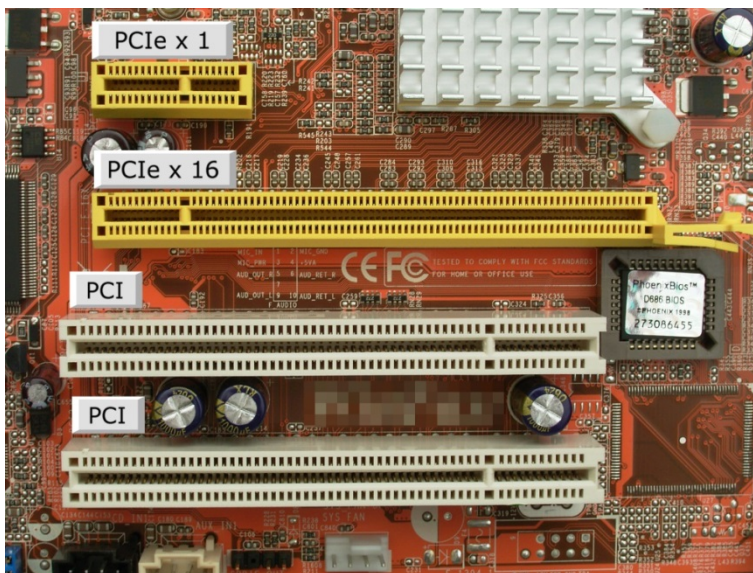


Install PCIe 1X cards on any available PCIe expansion slot. If PCIe 16X slot are available it should be preferred. Older Esprimos have PCI slots for use with legacy PCI firewire cards. There are no PCI slots available on the newer Esprimo PC's.

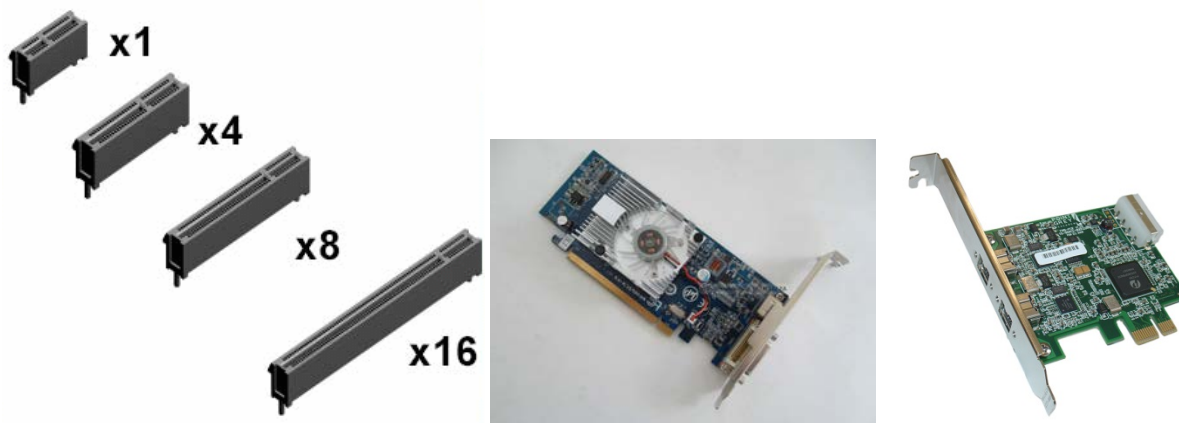
ALWAYS CONSULT THE DOCUMENTATION OF YOUR COMPUTER TO MAKE SURE THE PCIe SLOTS DO INFACT OPERATE AT THE SPEED INDICATED BY THEIR PHYSICAL SIZE AND THAT 16x SLOTS ARE NOT DEDICATED GRAPHICS ADAPTER SLOTS THAT WILL NOT WORK WITH OTHER CARDS.

Appendix C: PCI and PCIe expansion card formats

Peripherals (I/O devices) in PC's can be either integrated on the motherboard or installed on expansion slots. Most modern motherboards come with PCIe (PCI express) expansion slots while the older PCI is still present on older systems. Legacy connectors (ISA, EISA, AGP, NuBus) are no longer used or supported by modern OS's. It is strongly recommended to use only PCIe expansion slots for all critical expansion cards such as USB 2.0 and USB 3.0, IEEE1394 and Camera Link frame grabbers.



PCIe (Peripheral Component Interconnect Express)

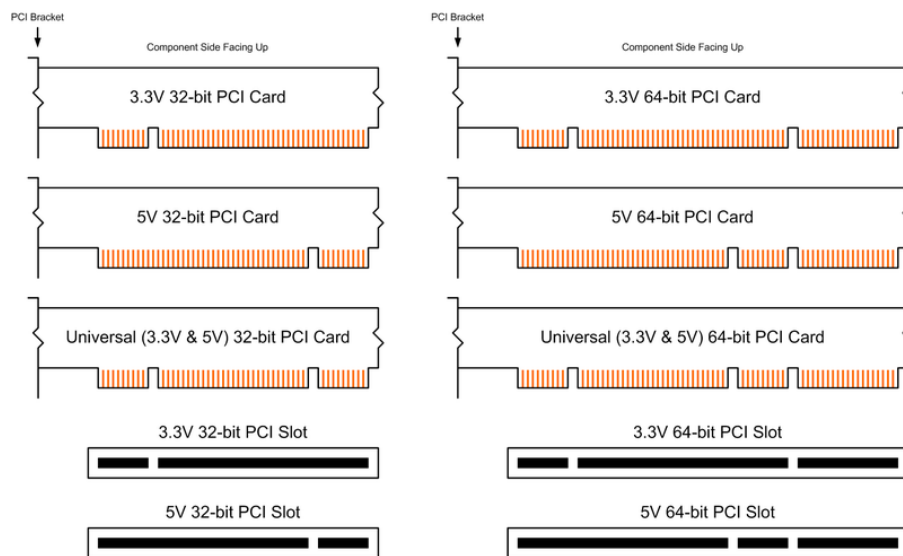


PCIe is scalable to accommodate larger bandwidths from 1X to 16X. For this reason a 1x card CAN be inserted and WILL work on a 4X, 8X or 16X slot, etc. The opposite is most of the times true too but requires an open back slot and the card will operate at reduced bandwidth.

PCI (Peripheral Component Interconnect)

This legacy expansion slot is slowly phased out but there are still PC's that use them and many available cards for them. The most common is the 32bit 5V type, while most cards feature a universal pinout allowing them to connect to both types of slot.

The much bigger PCI-X or 64bit PCI, was only used on a limited number of workstations and has been phased out. You can connect 32bit PCI cards on a 64bit PCI slot but only do so if no other PCI-X cards are connected as this will drop the PCI-X bus speed to that of the slowest PCI card connected. Connecting PCI-X cards to a 32bit PCI bus is possible only for cards that can work at half bandwidth. Read your card's documentation.



ALWAYS CONSULT THE DOCUMENTATION OF YOUR COMPUTER TO MAKE SURE THE PCIe SLOTS DO IN FACT OPERATE AT THE SPEED INDICATED BY THEIR PHYSICAL SIZE AND THAT 16x SLOTS ARE NOT DEDICATED GRAPHICS ADAPTER SLOTS THAT WILL NOT WORK WITH OTHER CARDS.