1394 OHCI

DCAM Versions

DCAM Module	16.2.322.4843	(for 32-bit)
	16.2.642.4843	(for 64-bit)
DRIVER	9.28.14.4843	

Cameras

Cameras	Nickname	400Mbps Max Card Speed	**800Mbps Max Card Speed**	Support OS	**Note**
C9100-24B	ImagEM X2 1K	n/a	**BEST**	**Windows 8 / 8.1 / 10** 32-bit / 64-bit (x64) **Windows 7** (*20)/(*21) 32-bit / 64-bit (x64)	
C11090-22B	ORCA-II	n/a	**BEST**		
C9100-23B	ImagEM X2	n/a	**BEST**		
C10600-10B	ORCA-R2	poor	**BEST**		(*1)
C11254-10B	ORCA-D2	poor	**BEST**		(*1)
C4742-80-12AG	ORCA-AG	good	**BEST**		(*Legacy)
C4742-95-12ERG	ORCA-ERG	good	**BEST**		
C4742-95-12NRG	ORCA-NRG	good	**BEST**		
C4742-95-12G04 C4742-96-12G04	ORCA-285G	good	**BEST**		
C4742-98-ERG(2)	ORCA-II ERG	good	**BEST**		
C4742-98-EWG(2)	ORCA-II EWG	good	**BEST**		
C4742-98-2xKAG(2) C4742-98-2xKWG(2)	ORCA-II BTG 1024	good	**BEST**		
C4742-98-2xLAG(2) C4742-98-2xLWG(2)	ORCA-II BTG 512	good	**BEST**		
C8484-xxG	ORCA-xxG	good	**BEST**		
C8484-xxG01	ORCA-xxG	good	**BEST**		
C8484-xxG02	ORCA-xxG	good	**BEST**		
C9440-05G		good	**BEST**		(*Legacy)
C9440-05G01		good	**BEST**		
C9440-05G02		good	**BEST**		
C9664-01G02		good	**BEST**		

Required

The IEEE-1394 card must have OHCI compatibility with Microsoft's Inbox Drivers.

Recommendations

- PCI Express x1 cards are better than PCI 32-bit/64-bit cards in desktops.
- ExpressCard is better than CardBus and PCMCIA cards in notebooks.
- Avago Technologies / LSI FW643 is the best PHY/Link IC for an IEEE-1394 interface card.
- It is highly recommended to disable C-state processor control in your PC's BIOS else you may get sporadic corrupted images transferred to the PC. See Note (*23).

Active Silicon Phoenix and FireBird (CameraLink)

DCAM Version

DCAM Module	16.2.322.4843	(for 32-bit)
	16.2.642.4843	(for 64-bit)
DRIVER	5.58.240.4843	(for PHX; D24CL-PE1)
	7.05.140.4843	(for FBD; FireBird)

Cards

Cards	Camera Link Configuration	PC Bus Type	Support OS	Note
AS-PHX-D24CL-PE1	Base	PCI Express x1	**Windows 7 / 8 / 8.1 / 10** 32-bit / 64-bit (x64)	Half Length
AS-FBD-1XCLD-2PE8	Deca	PCI Express x8 Gen2 (*15)(*22)		
AS-FBD-2XCLD-2PE8	Dual Deca			Half Length / Dual Slot

Cameras

Fast speed CameraLink cameras

Cameras	Nickname	Supported Card	Note
C11440-22C(U)	ORCA-Flash4.0 (V2)	**AS-FBD-1XCLD-2PE8** AS-FBD-2XCLD-2PE8	
C11440-10C	ORCA-Flash2.8	**AS-PHX-D24CL-PE1**	(*18)
C10000-A01	TDI Board Camera		
C10000-801	TDI Camera		
C10000-401			(*Legacy)

CameraLink cameras

Cameras	Nickname	Supported Card	Note
C8000-30		**AS-PHX-D24CL-PE1**	
C8484-xxC(P)			
C8800-xxC			(*Legacy)
C9100-13	ImagEM		
C9100-14	ImagEM 1K		
C9300-024/124/201/221			
C9750-xxxx(N-C)	X-Ray Line		
C10400-xx			
C10650-xx	X-Ray TDI		
C12200-321/461			
C10800-xx-C	X-Ray Line Dual Energy		

Recommendation

It is highly recommended to disable C-state processor control in your PC's BIOS else you may get sporadic corrupted images transferred to the PC. See Note (*23).

Active Silicon Phoenix (LVDS/RS422)

DCAM Version

DCAM Module	16.2.322.4843	(for 32-bit)
	16.2.642.4843	(for 64-bit)
DRIVER	6.68.00.4843	

Cards

Cards	PC Bus Type	Support OS	Note
AS-PHX-D36-PE1	PCI Express x1	**Windows 7 / 8 / 8.1 / 10** 32-bit / 64-bit (x64)	Half Length

Cameras

LVDS/RS-422 cameras

Cameras	Nickname	Supported Cards	Note
C9750-xx	X-Ray Line	**AS-PHX-D36-PE1**	
C10400-xx			
C4742-95-12NR(B)	ORCA-100 or ORCA-NR(B)		(*Legacy)
C4742-95-12ER	ORCA-ER		
C4742-95-12HR	ORCA-HR		
C4742-98-2xER	ORCA-II ER		
C4742-98-2xKA / -2xKW	ORCA-II BT 1024		
C4742-98-2xLA / -2xLW	ORCA-II BT 512		

LVDS Color camera

Cameras	Nickname	Supported Cards	Note
C7780-xx	ORCA-3CCD	**AS-PHX-D36-PE1**	

Recommendation

It is highly recommended to disable C-state processor control in your PC's BIOS else you may get sporadic corrupted images transferred to the PC. See Note (*23).

GigE

DCAM Version

DCAM Module	16.2.339.4843	(for 32-bit)
	16.2.659.4843	(for 64-bit)
DRIVER	4.0.5.3150	

Cameras

Cameras	Nickname	Support OS	Note
C10500D-42/43	Flat panel sensor	**Windows 7 / 8 / 8.1** 32-bit / 64-bit (x64)	
C10502D-42/43			
C10900D-40			
C10901D-40			
C11700DK-40			
C11701DK-40			

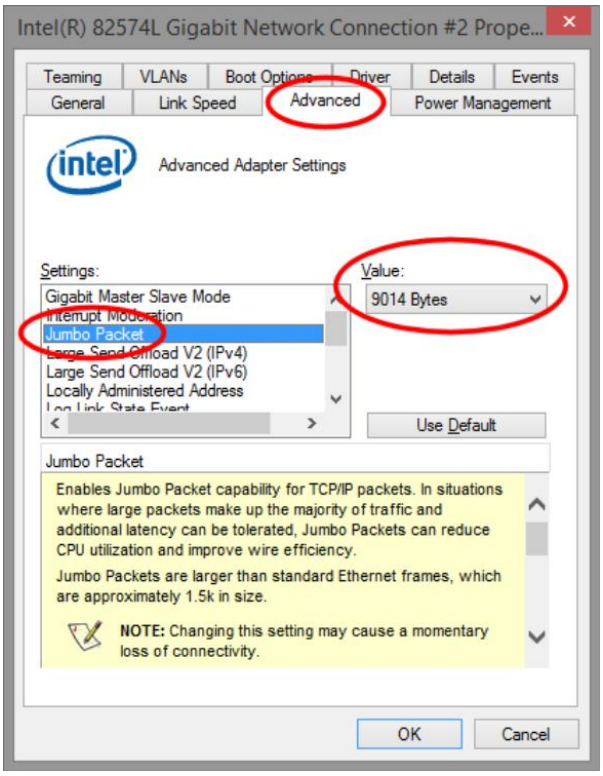
Recommendations

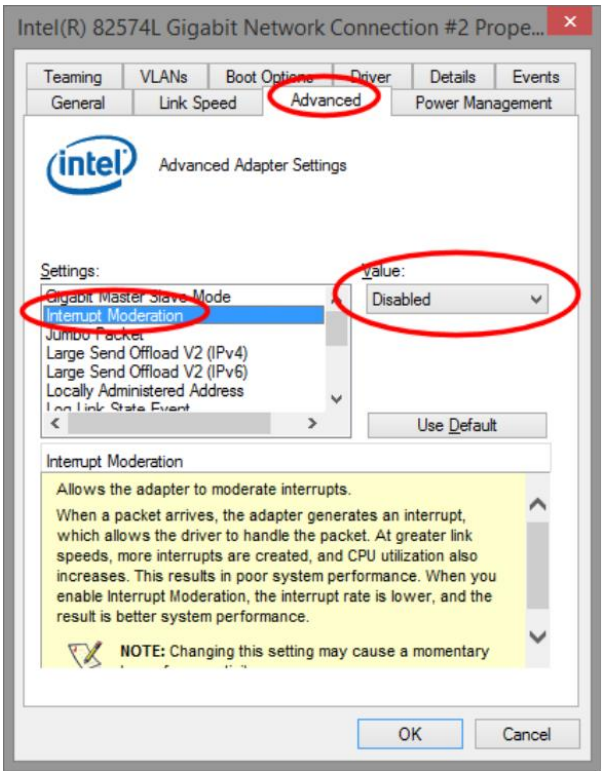
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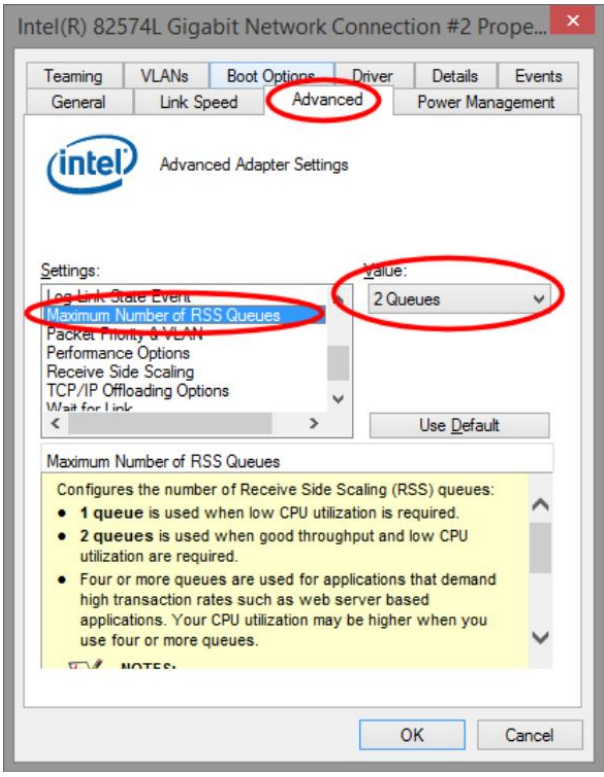
GigE – Cont'd

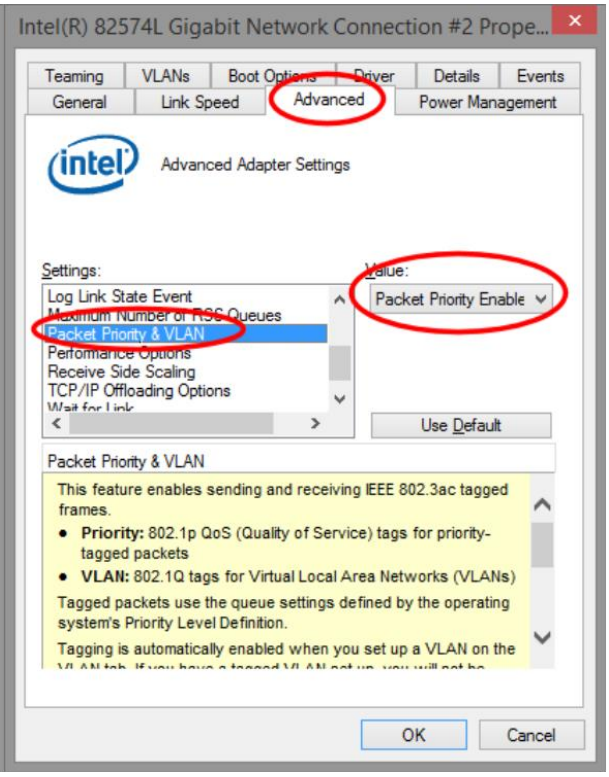
Recommendations

It is highly recommended to tweak these settings for the Gigabit Network Adapter for which the GigE device is connected, provided they are available for adjustment in Device Manager \ Properties for the adapter driver:





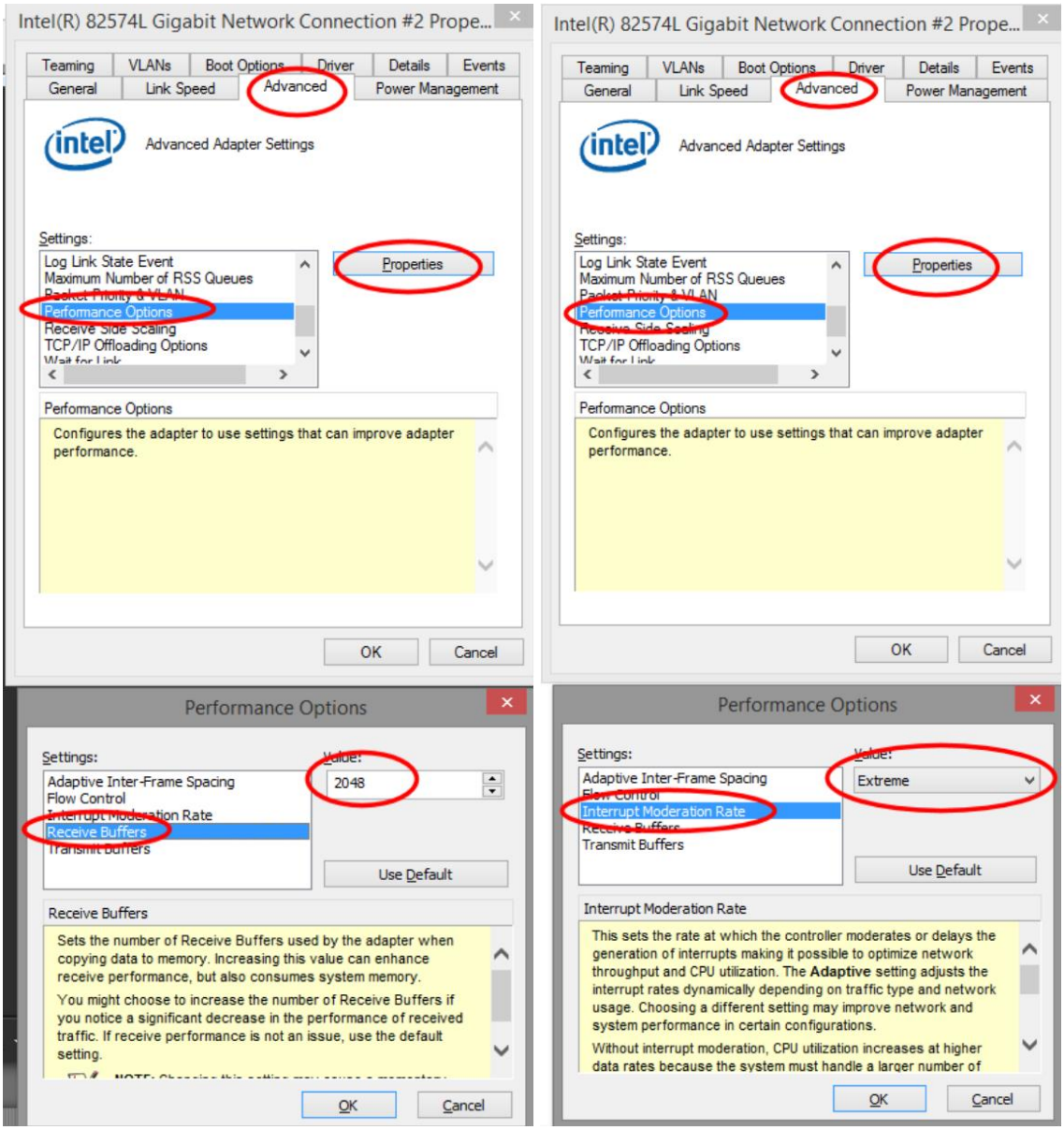




GigE – Cont'd

Recommendations

It is highly recommended to tweak these settings for the Gigabit Network Adapter for which the GigE device is connected, provided they are available for adjustment in Device Manager \ Properties for the adapter driver:



Notables:

a. Jumbo Packets has the biggest effect to sustainable FPS and bandwidth. Set this setting to the highest possible by the adapter driver.
b. Receive buffers should be set to maximum allowed by the driver if the setting exists.
c. Interrupt Moderation Disabled and\or Interrupt Moderate Rate Extreme may cause a single CPU stress to increase, but FPS is very stable at high rates.

USB

DCAM Version

DCAM Module	16.2.322.4843	(for 32-bit)
	16.2.642.4843	(for 64-bit)
DRIVER	1 2.6.4843	(for USB 3.0 and C10633)
	2.12.2.4843	(for others)

Cameras

Cameras	Nickname	USB2.0	USB3.0	Support OS	Note
C12741-03	InGaAs VGA Camera		✓	**Windows 7 / 8 / 8.1 / 10** 32-bit / 64-bit (x64)	(*New)
C11440-36U	Global Shutter CMOS Camera		✓		
C11440-42U	ORCA-Flash4.0 LT		✓		(*24)
C11440-22CU	ORCA-Flash4.0 (V2)		✓		(*24)
C10633-13/23	InGaAs camera	✓			
C12849-101U **C12849-102U**	X-Ray CMOS		✓		
C10400	X-Ray	✓			
C10650	X-Ray TDI	✓			
C10990	CCD Board camera	✓			
C9728DK-10	Flat panel sensor	✓		**Windows 7 / 8 / 8.1** 32-bit / 64-bit (x64)	
C9730DK-10		✓			
C9732DK-11		✓			

Notes

*New: New supported hardware or OS from the 15.12.4823 release.

*Legacy: Old supported hardware from prior releases.
They should work against the hardware and operating systems they were tested previously, and may work in newer operating systems where applicable, as we have not pulled them from the driver. However, this is not guaranteed, as these legacy devices are no longer part of the official validation process.

*1: C10600-10B (ORCA-R2) and C11254-10B(ORCA-D2) have limitations for full performance with IEEE-1394 400Mbps port.

*2: This note is deprecated.
*3: This note is deprecated.
*4: This note is deprecated.
*5: This note is deprecated.
*6: This note is deprecated.
*7: This note is deprecated.
*8: This note is deprecated.
*9: This note is deprecated.
*10: This note is deprecated.
*11: This note is deprecated.
*12: This note is deprecated.
*13: This note is deprecated.
*14: This note is deprecated.

*15: PCIe x4 and x8 slot compatibility - For example, this is information comparing PCIe slot compatibility for some known Dell Precision Workstations and Dell Optiplex Desktops:

>Workstation T3600 or newer series
All slots are clearly labeled on the motherboard with their maximum link negotiation speed, width, as well as max power.

>Workstation T7500
Slot 2 PCI Express Gen2 x16 with support for up to 300W, full length, full height. Can support x8, x4 and x1 down shift.
(All Class Code cards should work, but certain cards may fall outside of spec. Report any issues.)
Slot 4 PCI Express Gen2 x16 with support for up to 225W, full length, full height. Can support x8, x4 and x1 down shift.
(All Class Code cards should work, but certain cards may fall outside of spec. Report any issues.)
Slot 1 PCI Express Gen2 x16 wired as x8 slot with support for up to 75W – half length, full height.
Can support x8, x4 and x1 down shift.
Slot 3 PCI Express Gen2 x16 wired as x8 slot with support for up to 75W – full length, full height.
Can support x8, x4 and x1 down shift.
Slot 6 PCI Express Gen2 x16 wired as x4 slot with support for up to 75W - full length, full height.
Can support x4, x1 down shift.

>Workstation T5500
Slots 2,4 PCI Express x16 with support for up to 225W – full length, full height. Can support x8, x4 and x1 down shift.
(All Class Code cards should work, but certain cards may fall outside of spec. Report any issues.)
Slot 1 PCI Express Gen2 x16 wired as x8 slot with support for up to 75W – half length, full height.
Can support x8, x4 and x1 down shift.
Slot 3 PCI Express Gen2 x16 wired as x8 slot with support for up to 75W – full length, full height.
Can support x8, x4 and x1 down shift.

>Workstation T3500
Slots 2,4 PCI Express x16 with support for up to 225W – full length, full height. Can support x8, x4 and x1 down shift.
(All Class Code cards should work, but certain cards may fall outside of spec. Report any issues.)
Slots 1,3 PCI Express x8 wired as x4 slot with support for up to 75W – half length, full height.
Can support x4 and x1 down shift.

>Workstation T1500
Slot 1 PCI Express x16 with support for up to 75W – half length, full height. Can support x8, x4, and x1 down shift.
(All Class Code cards should work, but certain cards may fall outside of spec. Report any issues.)

Here is some compatibility information for some known HP Workstations:

> HP Z220, Z420, Z620, and Z820 Workstations
- View the Maintenance and Service Guide
  - Component replacement guidelines
    - Expansion slots

> HP Z210 CMT Workstation
- View the Maintenance and Service Guide
  - Component replacement guidelines
    - Expansion slots

Notes – Cont'd

>Z400 Workstation (Taken from the HP Z400 Maintenance and Service Guide)

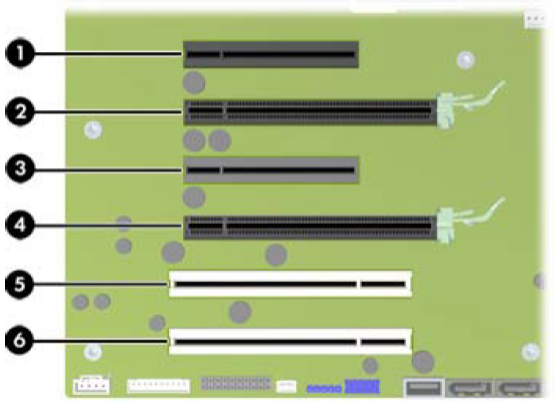
Expansion card slot identification

This section identifies and describes workstation expansion card slots, and presents card configuration information.

Slot identification and description

The following figure identifies workstation expansion card slots.

Identifying expansion card slots



The following table describes the workstation PCIe card slots.

Slot	Type	Slot power (Maximum)
1	PCIe2 - x8(4)	25W
2	PCIe2 - x16	75W
3	PCIe - x8(4)	25W
4	PCIe2 - x16	75W

NOTE: The x1, x4, x8, and x16 designators describe the mechanical length of the slot. The number in parentheses shows how many electrical PCIe lanes are routed to the expansion slot. For example, x16(8) means that the expansion slot is mechanically a x16 length connector, with eight PCIe lanes connected. A x16 PCIe card runs at the bandwidth of the slot it is plugged into.

Slots one and three use open-ended PCIe connectors, so a PCIe x16 card can be inserted. Graphics cards greater than 75 watts require the use of an auxiliary power cable adapter.

Expansion card

PCIe I/O slots can support other PCIe cards with less bus bandwidth than what is physically defined for the slot.

Expansion card slot description

NOTE: The x1, x4, x8, and x16 designators describe the mechanical length of the slot. The number in parentheses shows how many electrical PCIe lanes are routed to the expansion slot. For example, x16(8) means that the expansion slot is mechanically a x16 length connector, with eight PCIe lanes connected. A x16 PCIe card runs at the bandwidth of the slot it is plugged into.

Use the following table to determine PCIe card compatibility.

Workstation PCIe compatibility matrix

Slot	Mechanical compatibility	Electrical compatibility
1	x8 connector, open-ended*	PCIe2 (x1, x4)
2	x16 connector	PCIe2 (x1, x4, x8, x16)
3	x8 connector, open-ended*	PCIe (x1, x4)
4	x16 connector	PCIe2 (x1, x4, x8, x16)

* This slot is open-ended so a PCIe x16 card can be inserted.

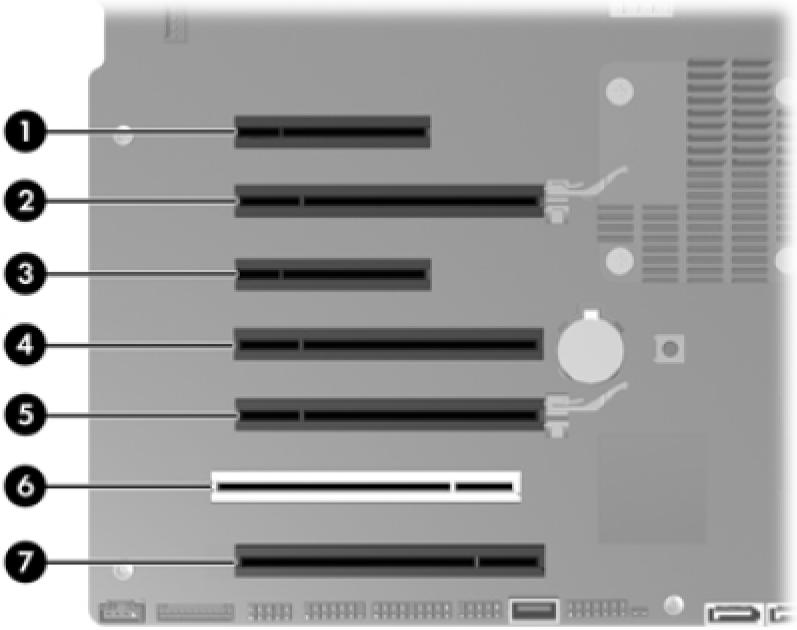
- Slots one, two, and four are PCIe GEN2 slots.
- Graphics cards greater than 75 watts require the use of an auxiliary power cable adapter.

>Z800 Workstation (Taken from the HP Z800 Maintenance and Service Guide)

Expansion card slot description

The following figure identifies workstation expansion card slots.

Identifying expansion card slots



The following table describes the workstation expansion card slots.

Expansion card slot description and compatibility

Slot	Type	Mechanical compatibility	Electrical compatibility	Slot power (Maximum)
1[1]	PCIe2 x8(4) open-ended	x1, x4, x8, x16	x1, x4	25W
2[1]	PCIe2 x16[3]	x1, x4, x8, x16	x1, x4, x8, x16	75W
3	PCIe x8(4) open-ended	x1, x4, x8, x16	x1, x4	25W
4[1]	PCIe2 x16(8)	x1, x4, x8, x16	x1, x4, x8	25W
5[1]	PCIe2 -x16[4]	x1, x4, x8, x16	x1, x4, x8, x16	75W
7	PCIe2 x16(8)	x1, x4, x8, x16	x1, x4, x8	25W

[1] PCIe GEN2 slot.
[3] Primary graphics slot
[4] Secondary graphics slot

NOTE: The x1, x4, x8, and x16 designators describe the number of electrical PCIe lanes routed to an expansion slot. For example, x16(8) means that the expansion slot is mechanically a x16 length connector, with eight PCIe lanes connected.

Slots one and three use open-ended PCIe connectors, so a PCIe x16 card can inserted. This allows the workstation to support more PCIe x16 expansion cards. A x16 card typically trains and runs at the maximum lane width available by the expansion slot. The card runs at the reduced lane width, with a corresponding performance decrease.

A x16 graphics card runs at the bandwidth of the slot it is plugged into. The slot bandwidth can be x1, x4, x8, or x16. A PCIe card can be plugged into a slot with a lesser speed. It runs at that speed with a commensurate performance decrease. (Older graphics cards may not comply with this.)

*16: This note is deprecated.
*17: This note is deprecated.

*18: The C11440-10C (ORCA-Flash 2.8) with a Phoenix PE1 card requires the camera firmware version to be 1.1 or newer.

*19: This note is deprecated.

*20 For 1394 and Windows 7 only, it is recommended that you install Service Pack 1:

http://support.microsoft.com/kb/976932

Microsoft has made many improvements to their 1394 driver stack which are incorporated in SP1 and not necessarily documented or included in RTM hotfixes.

*21 For 1394 and Windows 7 only, if your experiment requires you to make many captures with various binning, sub-array, scan speed, and/or data type settings over hours of operation (usually more than 1 hour), there is a known bug inside Microsoft's latest driver standard driver stack which could present itself through our API to the host application as an "Out of Resource" or "No Resource" error. When this happens, there is no way to recover capturing again from our 1394 device unless you exit your current application, power cycle the device, and restart the experiment manually. We have traced the root cause of the problem. It happens when our lower drivers cannot free 1394 Isochronous bandwidth properly through the Microsoft drivers, we can no longer re-use that bandwidth, and further allocations we require will fail.

If you experience the above known issue, it is recommended you install SP1 if you are not at this level:

http://support.microsoft.com/kb/976932

Microsoft has released an official hotfix to address this issue:

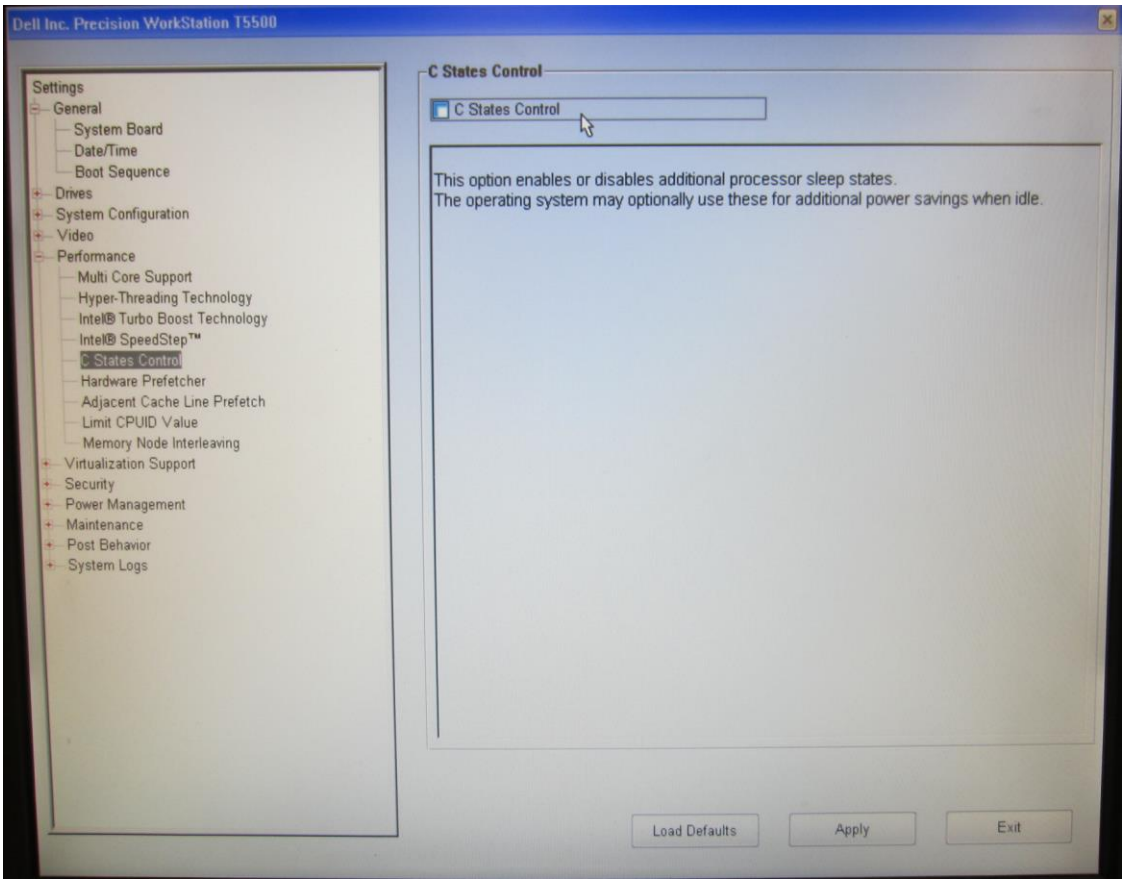
http://support.microsoft.com/kb/2524249

If you configured your IEEE1394 Bus controller driver for Legacy per a previous Compatibility Note recommendation, you should revert your IEEE 1394 Bus Controller driver away from Legacy and back to the Standard driver to use this hotfix and be the most stable. The Legacy driver is provided in Windows 7 only for backward driver compatibility. It will likely not evolve in stability and function beyond its current state.

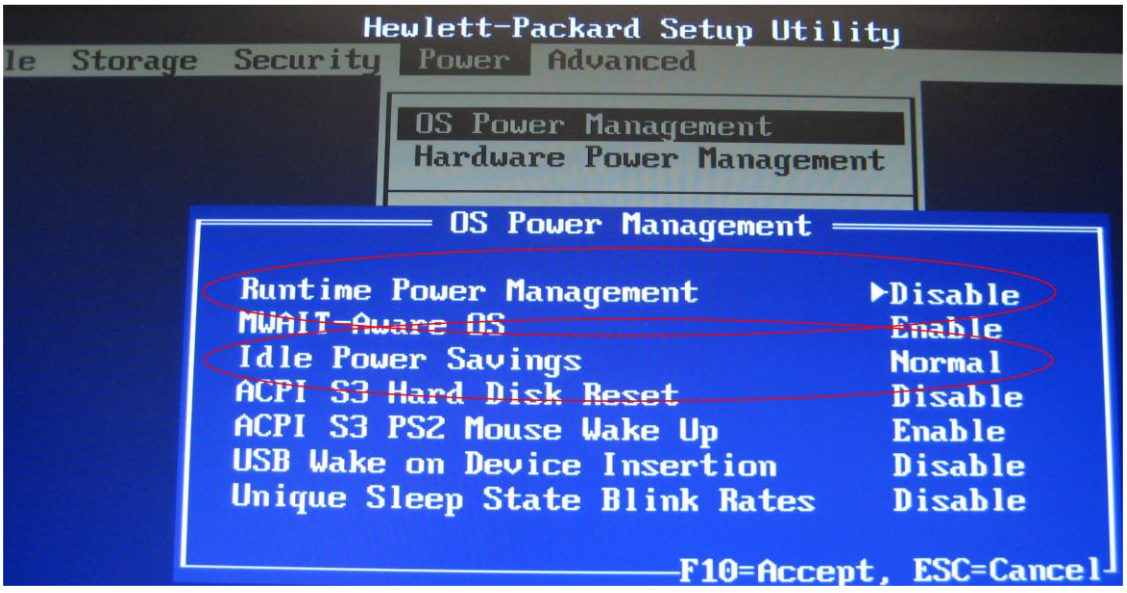
*22 The FireBird 2PE8 cards operate optimally with PCIe x8 Gen2 slots. Please make sure you install this card into an electrically compatible PCIe x8 Gen2 slot. If you have a Dell or HP Workstation, please reference to (*15) above.

*23 For all PCIe interface options, it is highly recommended to disable C-state processor control in your PC's BIOS. Most PC manufacturers (such as Dell and HP) ship with C-state processor control enabled from the factory. When this is enabled, the processor may drop in and out of S0 maximum power state – when this happens, if you are transferring image data across the PCIe bus, it may get interrupted to the point where data becomes corrupted or lost. It is also known that C-state being enabled can affect the overall maximum bandwidth of particular PCIe slots on the motherboard. For critical image capturing, insure S0 power state is always maximum – the best way to do it is to tweak the BIOS for such control.

For example, if you have a Dell T3500, T5500, and/or T7500, the setting appears in the BIOS under Performance:



If you have an HP Z400 or Z800 Workstation, it appears in the BIOS here:



Set Runtime Power Management to Disable and Idle Power Savings to Normal. For a further description from HP (Taken from Computer Setup(F10) Utility):

Computer Setup—Power

Option	Description
OS Power Management	• Runtime Power Management— Enable/Disable. Allows certain operating systems to reduce processor voltage and frequency when the current software load does not require the full capabilities of the processor. • Idle Power Savings—Extended/Normal. Allows certain operating systems to decrease the processors power consumption when the processor is idle.

*24 For C11440-22CU with USB and C11440-42U, they must be connected to a USB 3.0 compliant bus, the drivers for the USB 3.0 chipset controller must be operational in Device Manager (check the card or PC manufacturer's website for proper drivers if Windows 7. Windows 8 and higher ship with in-box USB xHCI compliant drivers from Microsoft that can work with any known USB3 chipset controller), and the USB 3.0 chipset controller must be installed/operating on a PCI Express / ExpressCard **Gen2** (5GT/s) capable slot / bus. Renesas µPD720202 is the most compatible USB host controller chipset with our hardware.

*25 This note is deprecated.