

Application Note: Trenton System Host Board (SHB), IOB33 and PEX10 Compatibility
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Introduction

This application note explains which version of the optional I/O and/or PCI Express link expansion board (IOB33) should be used with specific Trenton PICMG 1.3 system host boards or SHBs. Trenton PICMG 1.3 backplane compatibility is also explained when using the PCI Express expansion link capabilities of the IOB33 and PEX10 boards. The PEX10 is a PCIe link expansion board that takes advantage of the additional PCI Express interfaces supported by the second Intel® Xeon® E5-2400 v2 or Intel® Xeon® EC5500 series processor (CPU1) used on Trenton’s BXT7059 and JXT6966 system host board respectively.

Trenton SHB and IOB33 Compatibility Chart

IOB33 Module	TKL8255 <small>(8255 Available Q1, '17)</small>	THD8141, TSB7053, BXT/BXTS & JXT/JXTS <small>(8141,7053, 7059, 6966)</small>	TQ9 & MCG/MCX* Series <small>(6731, 6680, 6690, 6675, 6695, 6633, 6685, 6638, 6700)</small>	T4L*, TML*, & NLI/NLT*, SLI/SLT* Series <small>(6483, 6490, 6313, 6396, 6515, 6521)</small>
IOB33TKL <small>(92-701500800000)</small>	X			
IOB33HJX <small>(92-701500500000)</small>		X		
IOB33JX <small>(92-701500400000)</small>		X		
IOB33MC <small>(92-701500200000)</small>			X	
IOB33 <small>(92-701500000000)</small>				X

*Indicates a system host board that is End of Life (EOL)

IOB33 Product Description

The IOB33 is Trenton’s latest optional I/O module and is a universal I/O expansion module because it combines the functionality of the previous IOB30 and IOB31 boards into a single board that will function on any Trenton PICMG 1.3 system host board. There are five versions of the IOB33 to accommodate the I/O bracket differences of the Trenton PICMG 1.3 SHBs listed above in the compatibility chart.

The IOB33 also has a x4 PCIe mechanical edge card connector that plugs into the PCIe Expansion slot on select Trenton PICMG 1.3 backplanes. The PCI Express electrical interface that the IOB33 delivers to a backplane’s PCIe Expansion slot varies by the board architecture of the system host board. The following chart defines the PCIe link expansion interface supplied by specific Trenton SHBs.

IOB33 PCIe electrical interface expansion link	TKL8255 <small>(Available Q1, '17)</small>	BXT/ BXTS	THD8141, & TSB7053	TSB7053	MCG/MCX* NLI/NLT*, SLI/SLT*	JXT/JXTS, TQ9, T4L*, TML*
x4 PCIe 3.0		X				
x4 PCIe 2.0				X		
x4 PCIe 1.1					X	
x1 PCIe 3.0	X					
x1 PCIe 2.0			X			
x1 PCIe 1.1						X

The following section lists all of the Trenton Systems PICMG 1.3 backplanes that have a PCIe expansion slot for use with an IOB33 module.

PICMG 1.3 backplanes with a PCI Express Expansion Slot

The additional PCI Express backplane interface provided by the IOB33 is either a x1 or x4 PCIe electrical link depending on the SHB selected. Likewise, this PCIe expansion link will operate at a PCIe 3.0, 2.0, or 1.1 link speed depending on the SHB and the PCI Express end point device, i.e. the PCIe option card itself. This extra PCIe link to the backplane expands the capabilities of the PICMG 1.3 backplanes by extending the number of PCI Express links allowed in the PICMG 1.3 specification. This design approach increases the number of backplane card slots supported in a PICMG 1.3 rackmount computer system. The IOB33's mechanical x4 PCI Express edge connector connects to the **PCI Express expansion slot** on the following PICMG 1.3 Trenton backplanes:

Trenton Backplane	PCIe Expansion Slot	Option Card Slot Configuration
BPX8093	Yes	6 [^] - x8 PCI Express 3.0/2.0/1.1 electrical/x16 mech. connectors 2 - x4 PCI Express 3.0/2.0/1.1 electrical/x16 mech. connectors 1 - x4 PCI Express 2.0/1.1 electrical/x16 mech. connector 1 - x4/x1 PCI Express 3.0/2.0/1.1 elect./x16 mech. connector
BPG7087	Yes	4 - x16 PCI Express 2.0/1.1 electrical/x16 mech. connectors 4 - x4 PCI Express 2.0/1.1 electrical/x16 mech. connectors 1 - x4 PCI Express 2.0/1.1 electrical/x16 mech. connector 1 - x4/x1 PCI Express 3.0/2.0/1.1 elect./x16 mech. connector
BPC7041	Yes	5 - x4 PCI Express 2.0/1.1 electrical/x16 mech. connectors 4 [^] - x4 PCI Express 2.0/1.1 electrical/x16 mech. connectors 1 - x4/x1 PCI Express 3.0/2.0/1.1 elect./x16 mech. connector
BPX6806	Yes	4 - x8 PCI Express 2.0/1.1 electrical/x16 mech. connectors 13 - x4 PCI Express 2.0/1.1 electrical/x16 mech. connectors 1 - x4/x1 PCI 3.0/2.0/1.1 elect./x16 mech. connector
BPX6719	Yes	1 - x8 PCI Express electrical/x16 mech. Connector 1 - x8 PCI Express electrical/x8 mech. Connector 1 - x4/x1 PCI 3.0/2.0/1.1 elect./x8 mech. Connector 1 - PCI-X slot, 64-bit/133MHz 2 - PCI-X/PCI slots, 64-bit/100MHz
BPG6714	Yes	1 - x16 PCI Express electrical/x16 mech. Connector 1 - x4/x1 PCI 3.0/2.0/1.1 elect./x8 mech. Connector 1 - PCI-X slot, 64-bit/133MHz 2 - PCI-X/PCI slots, 64-bit/100MHz
BPX6620	Yes	1 - x8 PCI Express electrical/x16 mech. Connector 1 - x4/x1 PCI 3.0/2.0/1.1 elect./x8 mech. Connector 2 - PCI-X slots, 64-bit/133MHz 8 - PCI-X/PCI slots, 64-bit/100MHz
BPX6600	Yes	1 - x16 PCI Express electrical/x16 mech. Connector 1 - x4/x1 PCI 3.0/2.0/1.1 elect./x8 mech. Connector 4 - PCI-X/PCI slots, 64-bit/66MHz 2 - PCI-X/PCI slots, 64-bit/100MHz 4 - PCI slots, 32-bit/33MHz
BPG6544	Yes	1 - x16 PCI Express electrical/x16 mech. Connector 1 - x4/x1 PCI 3.0/2.0/1.1 elect./x8 mech. Connector 4 - PCI-X/PCI slots, 64-bit/66MHz 1 - PCI-X slot, 64-bit/133MHz 2 - PCI slots, 32-bit/33MHz 2 - 8-bit ISA slots
BPX3/14	Yes	1 - x4 PCI Express electrical/x16 mech. connector 1 - x4/x1 PCI 3.0/2.0/1.1 elect./x8 mech. Connector 2 - 64-bit/133MHz PCI-X 12 - 64-bit/100MHz PCI-X
BPX5	Yes	2 - x8 PCIe Express electrical/x16 mechanical 1 - x4 PCI Express electrical/x8 mechanical 1 - x4/x1 PCI 3.0/2.0/1.1 elect./x8 mech. Connector
BPG4	Yes	1 - x16 PCIe Express electrical/x16 mechanical 1 - x4 PCI Express electrical/x8 mechanical 1 - x4/x1 PCI 3.0/2.0/1.1 elect./x8 mech. Connector

[^]Requires PEX10 option card on BXT7059/IJT6966 to drive all or some of these card slots

#From IOB33 on SHB, PCIe link width SHB dependent

The IOB33 also complements the advanced USB and SATA I/O capability of the SHBs by providing on-board headers to support additional I/O such as serial communication ports, legacy parallel printer interfaces, PS/2 pointing devices and keyboards. Cables are needed to go from the IOB33 headers to these additional system I/O devices.

PEX10 Product Description

Direct PCI Express 3.0 or 2.0 interfaces from the second processor (CPU1) on dual-processor BXT7059 or JXT6966 PICMG 1.3 system host boards offer a compelling system integration feature. The BXT7059 and JXT6966 dual-processor SHBs provide more available PCIe lanes than the twenty PCIe lanes defined in the PICMG® 1.3 SHB Express® specification. Many system designers can now utilize the additional sixteen PCIe lanes offered by CPU1 on the Trenton BXT7059 and JXT6966 SHBs to increase a PICMG 1.3 rackmount computer's system bandwidth and information throughput. The optional PEX10 PCI Express expansion board makes these additional lanes available to the system designer.

Trenton PICMG 1.3 Dual Processor SHB and PEX10 Compatibility Chart

PEX10 Module	BXT7059 (x16 PCIe 3.0 Link)	JXT6966 (x16 PCIe 2.0 Link)
PEX10BXT1 (92-702000000000)	X	X

PEX10 Backplane Routing and Compatibility Chart

The PEX10 board mounts to the back of a Trenton BXT7059 or JXT6966 and is a passive interface card that routes four additional PCIe 3.0 or 2.0 x4 electrical links from CPU1 on the BXT7059 or JXT6966 down to a mechanical x16 PCIe link expansion slot on the backplane. The Trenton BPG8150, BPX8093, and BPC7041 backplanes feature this additional PCI Express x16 link expansion slot. The four x4 PCIe links that makeup the x16 expansion link are either routed directly to option card slots or combined in a switch for routing to the backplane slots. The chart below illustrates the backplane link routing of the PEX10 as well as SHB/Backplane compatibility.

Trenton PICMG 1.3 Dual Processor SHB and PEX10 Compatibility Chart

Trenton Backplane	Required Trenton SHB	PEX10 Slot	Option Card Slot Configuration
BPG8150	BXT7059 or JXT6966	Yes	4 [^] – x16 PCI Express 3.0/2.0/1.1 electrical/x16 mech. connectors [~] 2 of these x16 slots are available via the PEX10 and backplane's PCIe switch 2 – x8 PCI Express 3.0/2.0/1.1 electrical/x16 mech. connectors 1 – x4 PCI Express 2.0/1.1 electrical/x16 mech. connector
BPX8093	BXT7059 or JXT6966	Yes	6 [^] – x8 PCI Express 3.0/2.0/1.1 electrical/x16 mech. connectors [~] 2 of these x8 slots are available via the PEX10 2 – x4 PCI Express 3.0/2.0/1.1 electrical/x16 mech. connectors 1 – x4 PCI Express 2.0/1.1 electrical/x16 mech. connector 1 – x4/x1 PCI Express 3.0/2.0/1.1 elect.#/x16 mech. connector
BPC7041	BXT7059 or JXT6966	Yes	5 – x4 PCI Express 2.0/1.1 electrical/x16 mech. connectors 4 [^] – x4 PCI Express 2.0/1.1 electrical/x16 mech. connectors [~] All 4 of these x4 slots are available via the PEX10 1 – x4/x1 PCI Express 3.0/2.0/1.1 elect.#/x16 mech. connector

[^]Requires PEX10 option card on BXT7059/JXT6966 to drive all or some of these card slots

[#]From IOB33 on SHB, PCIe link width SHB dependent