**PEX431**
Multi-Fabric Switch and PMC/XMC Carrier Card

**PCIe Features**
- Up to six x4 PCIe Gen 2.0 ports via non-blocking switch
- Non-transparent bridging mode for multi-host systems

**Ethernet Features**
- Up to nine ports Gigabit Ethernet Switch
  - Build Options Include:
    - Up to 8x 1000BaseBX with 1x 1000BaseT
    - Up to 6x 1000BaseBX with 2x 1000BaseT

**Mezzanine Features**
- Supports PMC or XMC Modules
- Mezzanine I/O routed to VPX backplane
- XMC IO via P16 x24s+x8d+x12d
- PMC IO via P14 x64s

The PEX431 Multi-Fabric Switch and PMC/XMC Carrier Card allow designers to build complex VPX systems with multiple single board computers and multiple I/O modules. PEX431 supports PCIe switching, GigE switching and the ability to host a PMC or XMC mezzanine.

The PCIe switch supports non-transparent bridging mode, allowing multiple intelligent hosts to be connected together. Non-transparent bridges allow systems to isolate memory domains by presenting the processor subsystem as an endpoint, rather than another memory system. To facilitate inter-processor communication, base address registers (BARs) are used to translate addresses, doorbell registers are used to transmit interrupts between the address domains, and scratchpad registers are accessible from both address domains.

The PCIe switch also supports transparent bridging mode in order to expand the I/O capability of the VPX single board computers.

A broad range of PMC and XMC daughter boards exist to provide a variety of I/O functionality. The PEX431 bridges from 4-lane PCI Express to 64-bit 133 MHz PCI-X for the PMC site, providing a peak bandwidth of 1 GB/s to the mezzanine. All 64 bits of PMC I/O are routed to the VPX backplane connector.

Alternatively, the PEX431 can be configured to carry an XMC card, with eight lanes of PCI Express routed from the PCI Express switch to the mezzanine size.

For mezzanines that require maximum bandwidth, the PEX431 can be configured for 8-lane PCI Express at the VPX backplane connector. 64 bits of XMC I/O are routed to the VPX backplane connector.

Additionally, PEX431 has a Layer 2 Gigabit Ethernet Switch that offers up to nine ports, of which up to eight can be in 1000BaseBX and up to two can be in 1000BaseT.

From a software perspective, each PCI Express port is a virtual PCI-to-PCI bridge device, with its own set of PCI Express configuration registers. The host can configure the other ports by way of the upstream port, using conventional PCI enumeration. The virtual PCI-to-PCI bridges within the PEX431 are compliant with the PCI and PCI Express system models.
Specifications

**PCI Express**
- Up to 6 ports x4 PCIe Gen 2.0, in accordance with VITA 46.4 (4 ports if mezzanine is supported)
- Firmware configurable for x8 operation from XMC site to backplane

**Ethernet**
- 1000BaseBX and 1000BaseT switching in following combinations
  - 8 x 1000BaseBX plus 1 x 1000BaseT or
  - 6 x 1000BaseBX plus 2 x 1000BaseT

**PMC interface**
- PCI-X (v 1.0b): 64 bits at 133, 100 or 66 MHz
- PCI 3.0: 32- or 64 bits at 66- or 33 MHz
- 3V3 I/O signaling

**XMC interface**
- 8-lane PCI Express

**Mezzanine I/O**
- 64 bits routed from mezzanine I/O connector to VPX backplane.
- Note: selection of PMC or XMC I/O is a factory build option.

**Mezzanine interface**
- PMC or XMC, in accordance with VITA 46.9
- Routing from mezzanine I/O connector to the VPX backplane connector is a factory-build option.

**VPX Switch Module Profiles Supported**
- Primary: MOD3-SWH-6F8U-16.4.10-2
- Secondary: MOD3-SWH-6F6U-16.4.1-3
- Mezzanine: MOD3-SWH-4F-16.4.5-2

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**Block Diagram**

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**About GE Intelligent Platforms**

GE Intelligent Platforms is a division of GE that offers software, control systems, services, and expertise in automation and embedded computing. We offer a unique foundation of agile and reliable technology providing customers a sustainable competitive advantage in the industries they serve, including energy, water, consumer packaged goods, oil and gas, government and defense, and telecommunications. Military and Aerospace division of GE Intelligent Platforms is headquartered in Huntsville, AL. For more information, visit [http://defense.ge-ip.com/](http://defense.ge-ip.com/).

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