V1153

12-Port Rugged XMC FPGA Card

Benefits

High-density FPGA XMC card for next generation data distribution and signal intelligence systems

VITA 20 compliant and built for harsh embedded environments

Versatile hardware design supports Ethernet, Fibre Channel, sFPDP, and ARINC 818-2

A COTS solution optimized for SWaP (size, weight and power)

Modular optics for greatest field flexibility from 1G to 25G

Real-time data streaming directly from sensors

Rx/Tx optical transceivers with standard flyover fiber cables to front panel MPO connector or backplane MT connector

Features

Twelve 1G to 25G optical ports via MPO front panel I/O or VITA 66 optical backplane I/O. Electrical I/O via Pn6 also available. See table below for available channel-count based on I/O configuration.

Protocol	*Optical 4-Port*	*Optical 12-Port*	*Electrical 8-Port*
100G Ethernet	1	3	N/A
40G Ethernet	1	3	2
25G Ethernet	4	12	N/A
10G Ethernet	4	12	8
1G Ethernet	4	12	8
1/2/4/8/16G Fibre Channel	4	12	8
1/2/2.5/10G sFPDP	4	12	8
ARINC 818-2 (Up to 16G)	4	12	8

Xilinx Virtex/Kintex UltraScale+ FPGA

Supports PCIe Gen3 x 16 and Gen4 x 8

PPS time synchronization with µSec resolution

Thermal sensors for monitoring card temperature

Robust FPGA development framework

Advanced APIs that support multi-core and multi-processor architectures

Optimized Linux drivers and libraries

UDP offload engine for real time communication

Streaming front-end FPGA core for quick sensor integration

Available in air- and conduction-cooled XMC form factors

Conformal coating options available

Overview

Purpose-built for extreme, high-bandwidth networking and interface applications, the V1153 will withstand harsh environments while staying within your SWaP and budget requirements. Despite the challenges posed to engineering architects to create boards with higher port density, bandwidth, and processing power for radar, signal intelligence, remote sensing, medical imaging, and embedded telecommunications systems, New Wave DV's V1153 satisfies these requirements while dramatically increasing bandwidth and providing plenty of FPGA resources to process data and support PCIe host connectivity. Supporting temperature ranges from -40°C to +85°C and complying with VITA 20 standards, each V1153 XMC card delivers a reliable, long-lasting solution for your rugged embedded needs.

Multiple Configuration Options

- **4-Port optical (Front Panel or Backplane Options)**
- **12-Port optical (Front Panel or Backplane Options)**
- **8-Port electrical backplane (1G to 16G)**

Increased Bandwidth & Flexibility

The V1153 is the industry's most advanced XMC solution designed to provide a real time high-bandwidth network interface and processing module for next generation radar, signal intelligence, and medical imaging systems. It comes with a range of Xilinx Virtex/Kintex UltraScale+ FPGAs, different memory configurations to meet application requirements, and support host interfaces using PCIe, Ethernet, and XAUI. Design flexibility to meet application requirements results in optimized SWaP, shorter development cycle, and enhanced performance.

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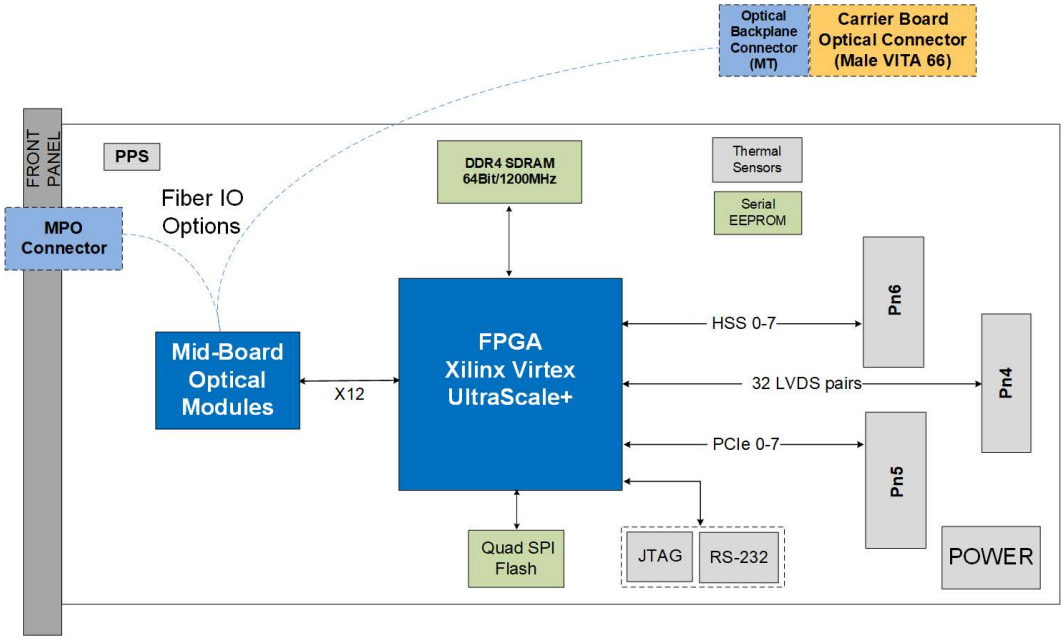


> V1153 XMC Block Diagram

Optional Protocol Engines

The V1153 is an extremely flexible FPGA-based interface card. The card features all of the necessary hardware, FPGA IP cores, plus software drivers to support Ethernet, Fibre Channel, sFPDP, and ARINC 818. New Wave also offers options for custom high-speed serial protocols or user-developed IP cores.

Simplified Programmability Framework

The V1153 can optionally ship with a Development Framework, a fully-integrated and flexible toolset that provides the infrastructure necessary to ensure rapid deployment of custom applications. The framework abstracts the details of the protocol and interfaces, memory controllers and host fabric interfaces, thereby reducing the development effort and schedule for designers to implement custom solutions.

Multi-Processor Multi-Core Support

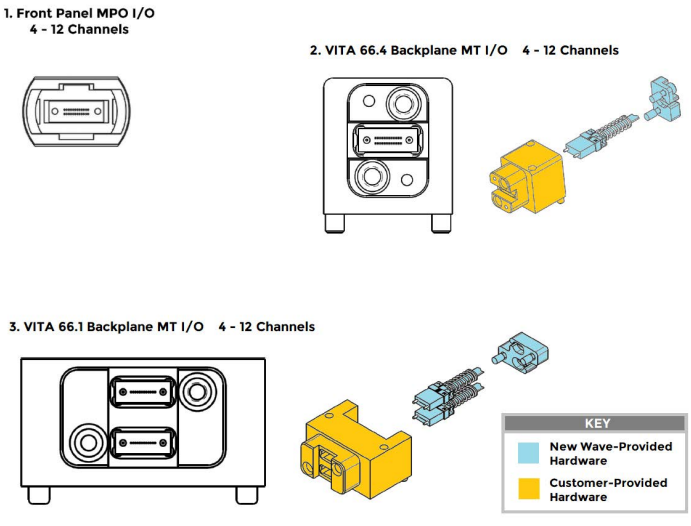
The V1153 is uniquely suited to system architectures involving multiple processing cards on a common switched data plane. Specifically, the V1153 supports shared access from multiple host processors, enabling it to function as a cost-effective, high performance gateway. This feature enables a single high-speed pipe to carry multiple virtual channels in systems that need to spread or load-balance sensor data across processor farms.

Connector Types

The V1153 offers five different I/O options:

- **Electrical Backplane Connector via Pn6**
- **Optical Front Panel MPO Connector**
- **Optical Backplane MT Connector for VITA 66.1**
- **Optical Backplane MT Connector for VITA 66.4**
- **Custom Optical Cabling/Connector Options**

Each optical connector provides both the 4-Port and 12-Port option. Only one optical connector style can be used at a time. It is possible to use both the Pn6 electrical and optical interface simultaneously.



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Operation Customization

The V1153 is an FPGA-based network card that can be customized to fit your requirements. New Wave provides access to the FPGA for customers to customize, however New Wave can also modify existing cores or develop new cores for your applications. If you have specific networking requirements, New Wave can help you accomplish your goals.

Complete Product Support Program

New Wave DV prides itself on its excellent customer support, a fact that is echoed by our customers. New Wave DV provides industry standard warranty on its products, but it is the human factor that makes our support so valuable to our customers. Our team takes the time and effort to ensure that the customer experience with our products is a positive one.

Our Commitment

New Wave DV is committed to providing the latest innovations in technology, architectures, and techniques to keep our customers one step ahead of the rest. Our products, complete with the Development Framework, are intended to offer our customers an entirely unique out-of-the-box experience.

Ordering Information

300-01153-01-00: V1153 Quad-Port XMC FPGA Card, Virtex UltraScale+ VU3P, front-panel 1-10G optics, Conduction Cooled

300-01153-03-00: V1153 12-Port XMC FPGA Card, Virtex UltraScale+ VU3P, front-panel 1-10G optics, Conduction Cooled

300-01153-05-00: V1153 Quad-Port XMC FPGA Card, Virtex UltraScale+ VU3P, front-panel 1-25G optics, Conduction Cooled

Other product configurations are available. Please contact us.

Technical Specifications

NETWORK INTERFACE
Twelve 1G to 25G optical ports (front and backplane options)
Eight electrical ports to Pn6 (high-speed mezzanine connector)

ETHERNET PROTOCOLS
TCP, UDP, ARP, ICMP, Multicast, Broadcast

FIBRE CHANNEL PROTOCOLS
RDMA, ASM, AV

ADDITIONAL PROTOCOLS
sFPDP, ARINC 818-2

FPGA DEVICE
Xilinx Virtex UltraScale+ (VU3P)
Xilinx Virtex UltraScale (VU065 to VU095)
Xilinx Kintex UltraScale (KU095)

MEMORY
One bank of 4GB 64-bit up to 1200MHz DDR4 SDRAM

FLASH
One 1Gb memory for storing a default and recovery configuration images

HOST INTERFACE
PCI Express (Gen4) x8 (Pn5)
PCI Express (Gen3) x16 (Pn5 & Pn6)
Two XAUI (Pn5), Two XAUI (Pn6)

EXTERNAL INTERFACE
32 differential pairs (user configurable)
PPS Interface for time synchronization with µsecond resolution
RS-232 serial interface for debug

THERMAL SENSORS
2 digital temperature sensors

COMPLIANCE
VITA 20, 42.2, 42.3, 42.6 VITA 61.0
IEEE 802.3ae 2002
IEEE 802.3ba 2010
FC-FS-3 INCITS 470-2011

PHYSICAL CHARACTERISTICS
Dimensions: 74 mm (width) x 143.75 mm (length)
Weight: 0.276 lbs

POWER CHARACTERISTICS
Power Draw: Maximum 25W
Power Supply: 3.3V

TEMPERATURE
Operating: 0˚C to 45˚C at 600 LFM (air-cooled)
Operating: -40˚C to 85˚C (conduction-cooled)
Storage: -40˚C to 85˚C

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