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

Perfect for on-board data processing via resource-rich Xilinx FPGAs

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

Up to twelve (12) 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.

V1153 Interface Configuration Options

Protocol	Optical			Electrical	
	4-Port	*8-Port*	*12-Port*	*Pn5*	*Pn6*
100G Ethernet	1	2	N/A	N/A	N/A
40G Ethernet	1	2	3	2	2
25G Ethernet	4	8	N/A	N/A	N/A
10G Ethernet	4	8	12	8	8
1G Ethernet	4	8	12	8	8
1/2/4/8/16Gbs Fibre Channel	4	8	12	8	8
1/2/2.5/4.25/5Gbs sFPDP	4	8	12	8	8
ARINC 818 (Up to 16Gbs)	4	8	12	8	8
Aurora (Up to 16Gbs)	4	8	12	8	8
PCIe (Gen3 x 8)	N/A	N/A	N/A	1	1

Xilinx Virtex/Kintex UltraScale/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 interface and FPGA co-processing applications, the V1153 will withstand harsh environments while staying within your SWaP and budget requirements. New Wave's V1153 card provides the highest port density, bandwidth, and processing power for radar, signal intelligence, remote sensing, medical imaging, and embedded telecommunications systems in a single XMC form factor.

New Wave DV's V1153 dramatically increases interface bandwidth and provides plenty of user FPGA resources for custom signal processing and data acquisition. 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 to 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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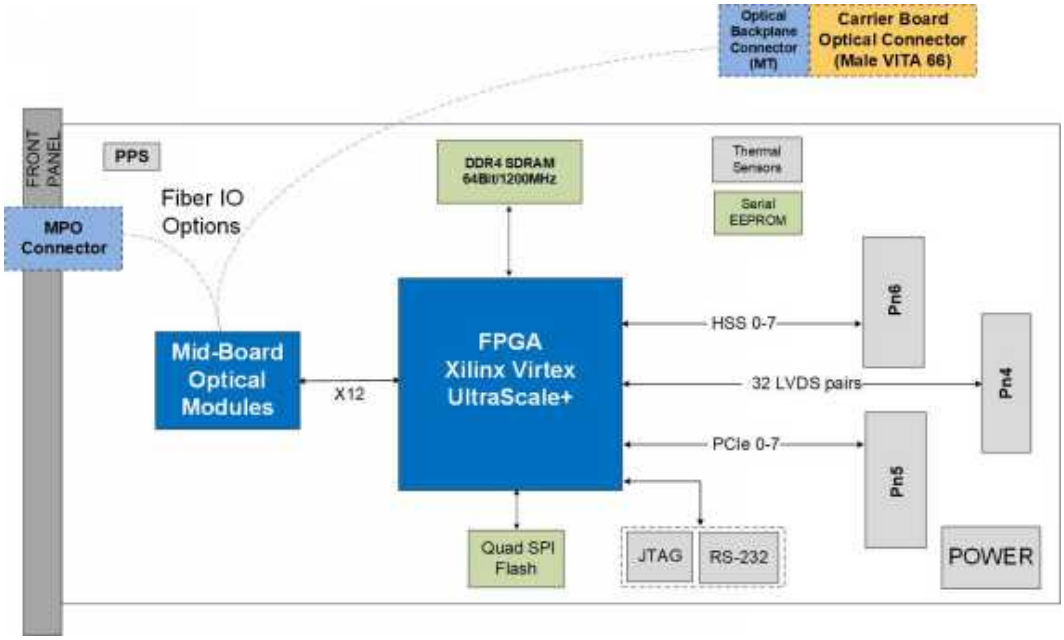


> V1153 XMC Block Diagram

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

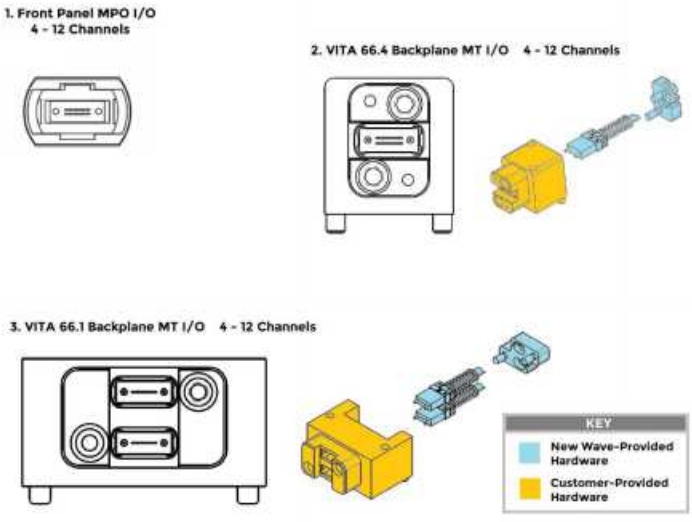
The V1153 is uniquely suited to system architectures involving multiple processing cards on a common switched data plane. Specifically, the V1153 supports shared access from multiple host processors, enabling it to function as a cost-effective, high performance gateway. This feature enables a single 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 from 1 to 12 ports. 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.

Alternate Form Factors

The V1153 is designed for use in a variety of mission-critical applications. Whether you need its capabilities in XMC or other form factors such as VPX, PCIe, PXIe, or others, we're happy to help accommodate your needs and provide you with the solution best suited for your success.


PXIe


VPX


PCIe

Technical Specifications

NETWORK INTERFACE
Up to twelve (12) 1G to 25G optical ports (front & backplane options)
- 850nm multi-mode optics

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 8GB up to 1200MHz DDR4 SDRAM

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

HOST INTERFACE
PCI Express (Gen4) x8 (Pn5); (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, 47.1 (ECC4), 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: 12V

TEMPERATURE
Operating: -40˚ C to 55˚ C at 250 LFM (air-cooled)
Operating: -40˚ C to 85˚ C (conduction-cooled)
Storage: -55˚ C to 105˚C

ALTITUDE
Up to 60,000ft incl. Rapid Decompression

V1153 Hardware Part Number Configuration

Optional

400	-	01153	-	"W"	-	"X"	-	"Y"	-	"Z"
Series		Model		Board Configuration		IP Configuration		Coating Configuration		Carrier Configuration
				Select 1 Board Config		Select 1 IP Option		Select 1 Coating Option		Select 1 Carrier Option

W

Config #		Configuration Option Details					
VITA42	VITA61	FPGA	DDR4	P14*	Optical IO*	Ports	Rate
00	38	VU3P	N	P	DNP	-	-
01	39	VU3P	N	P	Front Panel MPO	4	1-10G
02	40	VU3P	N	DNP	VITA66 Backplane	4	1-10G
03	41	VU3P	N	P	Front Panel MPO	12	1-10G
04	42	VU3P	N	DNP	VITA66 Backplane	12	1-10G
05	43	VU3P	N	P	Front Panel MPO	4	1-25G
06	44	VU3P	N	DNP	VITA66 Backplane	4	1-25G
07	45	VU3P	N	P	Front Panel MPO	8	1-25G
08	46	VU3P	N	DNP	VITA66 Backplane	8	1-25G
10	47	VU3P	Y	P	DNP	-	-
11	48	VU3P	Y	P	Front Panel MPO	4	1-10G
12	49	VU3P	Y	DNP	VITA66 Backplane	4	1-10G
13	50	VU3P	Y	P	Front Panel MPO	12	1-10G
14	51	VU3P	Y	DNP	VITA66 Backplane	12	1-10G
15	52	VU3P	Y	P	Front Panel MPO	4	1-25G
16	53	VU3P	Y	DNP	VITA66 Backplane	4	1-25G
17	54	VU3P	Y	P	Front Panel MPO	8	1-25G
18	55	VU3P	Y	DNP	VITA66 Backplane	8	1-25G
20	56	KU095	N	P	DNP	-	-
21	57	KU095	N	P	Front Panel MPO	4	1-10G
22	58	KU095	N	DNP	VITA66 Backplane	4	1-10G
23	59	KU095	N	P	Front Panel MPO	12	1-10G
24	60	KU095	N	DNP	VITA66 Backplane	12	1-10G
25	61	KU095	N	P	Front Panel MPO	8	1-10G
26	62	KU095	N	DNP	VITA66 Backplane	8	1-10G
30	63	KU095	Y	P	DNP	-	-
31	64	KU095	Y	P	Front Panel MPO	4	1-10G
32	65	KU095	Y	DNP	VITA66 Backplane	4	1-10G
33	66	KU095	Y	P	Front Panel MPO	12	1-10G
34	67	KU095	Y	DNP	VITA66 Backplane	12	1-10G
35	68	KU095	Y	P	Front Panel MPO	8	1-10G
36	69	KU095	Y	DNP	VITA66 Backplane	8	1-10G
#70 - #87		*Reserved*		*Reserved*	*Reserved*		
90	97	VU3P	Y	DNP	DNP	-	-
93	91	KU095	N	DNP	DNP	-	-
98	92	KU095	Y	DNP	DNP	-	-
99	94	KU095	Y	DNP	Front Panel MPO	4	1-10G
89	95	VU3P	N	DNP	DNP	-	-
88	96	KU095	Y	DNP	Front Panel MPO	12	1-10G

*P = Populate; DNP = Do Not Populate

400-01153-[W][X][Y][Z]

X

Config #	Description
02	Fibre Channel ASM IP Core
17	sFPDP IP Core
21	Fibre Channel ULP IP Core
22	ARINC-818 IP Core
00	No IP

Y

Config #	Description
AR	Acrylic conformal coat
UR	Urethane conformal coat
ER	Epoxy conformal coat
SR	Silicone conformal coat
XY	Parylene conformal coat
BLANK	No conformal coat

Z

Config #	Description
PE	XMC delivered in PCIe form factor via carrier card
3V	XMC delivered in conduction-cooled 3U VPX form factor
3A	XMC delivered in air-cooled 3U VPX form factor
PX	XMC delivered in PXIe form factor via carrier card
BLANK	XMC delivered in XMC form factor without carrier card
Additional options available. Please inquire.	

FOR MORE INFORMATION

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