Q7788

Quad-Port Rugged XMC FPGA High Speed Data Processing Card

Overview

Purpose-built for extreme, high-bandwidth interface and FPGA data processing applications, the Q7788 will withstand harsh environments while staying within your SWaP and budget requirements. OLMEC's Q7788 card provides high port density, bandwidth, and processing power for radar, signal intelligence, remote sensing, medical imaging, and embedded telecommunications systems in a single XMC form factor.

OLMEC DV's Q7788 provides high interface bandwidth via single-mode or multi-mode optics at various wavelengths. The Kintex UltraScale provides plenty of 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 Q7788 XMC card delivers a reliable, long-lasting solution for your rugged embedded needs

Multiple Configuration Options
- 2-Port optical (Front Panel)
- 4-Port optical (Front Panel)

Increased Bandwidth & Flexibility

The Q7788 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 Xilinx Kintex UltraScale FPGA, memory 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.

Highlights

High-density FPGA XMC card for next generation data processing, 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 125Mb to 5Gb

Real-time data streaming directly from sensors

Optical transceivers with standard front panel LC connector

Features

Two (2) or four (4) 125Mb to 5Gb optical ports via LC front panel I/O. See table below for available channel-count based on I/O configuration.

Xilinx Kintex UltraScale FPGA

COTSWORKS RJ Module Jack Rugged Optical Transceivers

Supports PCIe Gen3 x 16 and Gen3 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 & Windows drivers and libraries

Available in air- and conduction-cooled XMC form factors

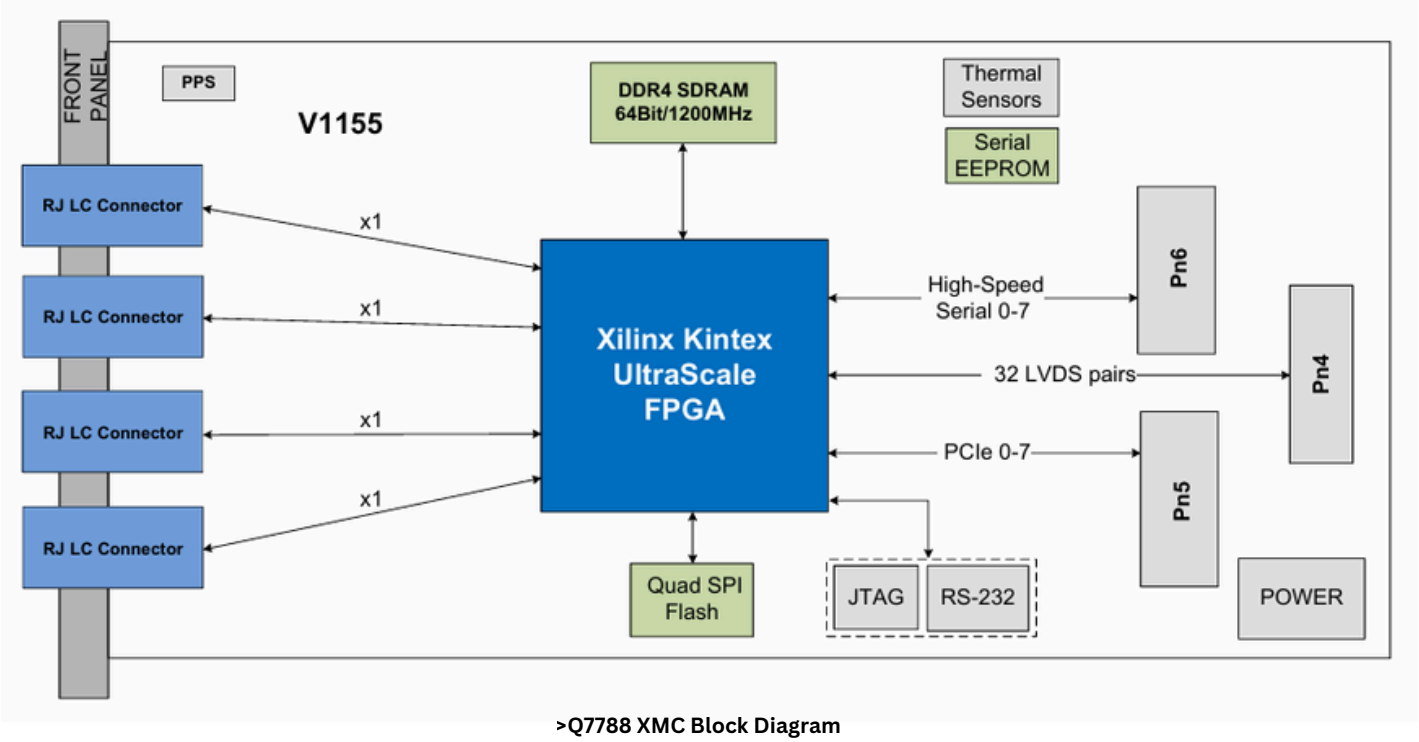
Conformal coating options available

V1155 Interface Configuration Options

Protocol	Data Rates	Optical	
		2-Port	*4-Port*
Ethernet	1Gbs	2	4
Fibre Channel	1/2/4Gbs	2	4
sFPDP	1-5Gbs	2	4
ARINC 818	Up to 4 Gbs	2	4
Aurora	1-5Gbs	2	4

Q7788

Quad-Port Rugged XMC FPGA Card with LC Fiber Connectors



>Q7788 XMC Block Diagram

Optional Protocol Engines

The Q7788 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. OLMEC also offers options for custom high-speed serial protocols or user-developed IP cores.

Simplified Programmability Framework

The Q7788 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 Q7788 is uniquely suited to system architectures involving multiple processing cards on a common switched data plane. Specifically, the Q7788 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 Q7788 offers two different I/O options:

- 2-Port Optical Front Panel LC Connector
- 4-Port Optical Front Panel LC Connector

Information on RJ LC Connector at:
https://cotsworks.com/product/rj-5g-sx

Q7788

12-Port Rugged XMC FPGA Card

Technical Specifications

NETWORK INTERFACE
Up to four (4) 1G to 5G optical ports, paralyne-coated
• RJ-5G-SX, 850nm, multi-mode, 768Mb - 5G
• RJ-3G-EX, 1310nm, single-mode, 125Mb - 3G
• RJ-1G-DX, 1310nm multi-mode, 1.25G

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

FIBRE CHANNEL PROTOCOLS
RDMA, AV, ASM

ADDITIONAL PROTOCOLS
sFPDP, ARINC 818-2 , HSDB, FOTR

FPGA DEVICE
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 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
OMG RTPS DDS Interoperability Protocol 2.2

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

Alternate Form Factors

The Q7788 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 (double-width), PXIe, or others, we're happy to help accommodate your needs and provide you with the solution best suited for your success.