**IOxOS TECHNOLOGIES**
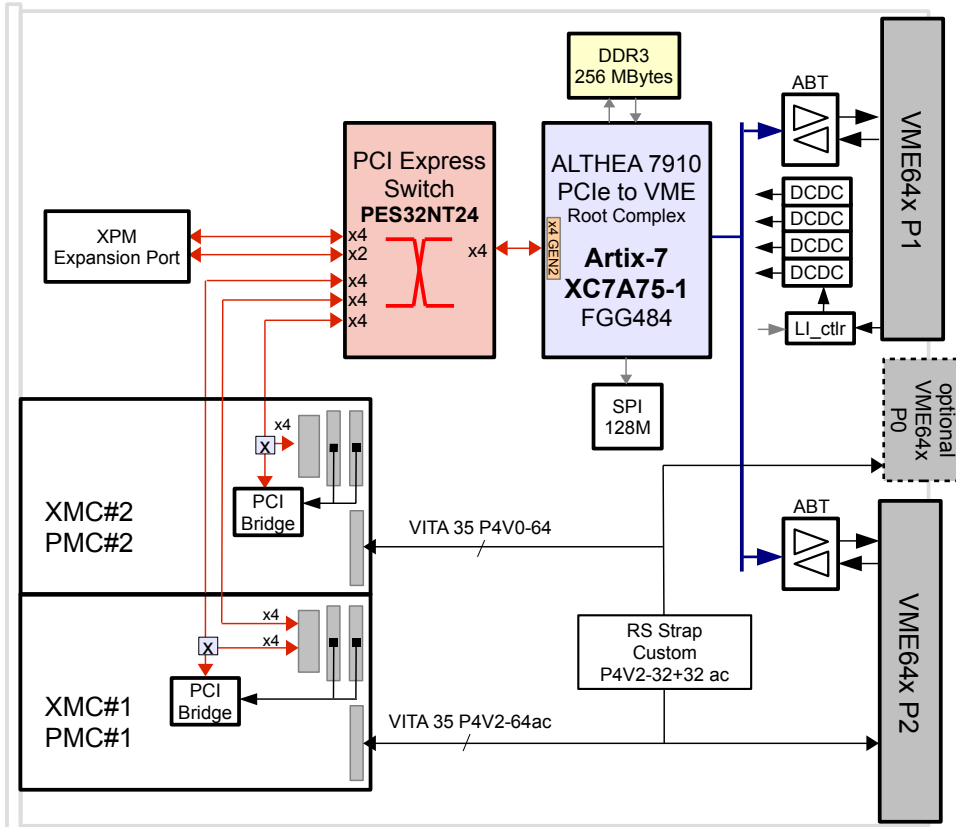RELIABILITY BY DESIGN

# VDC_7920 VME64x Dual Carrier
## VME64x Dual PMC/XMC Carrier                    Data Sheet



## Key Features

- 6U VME64x Dual VITA XMC/PMC Carrier with expansion capabilities
- ALTHEA 7910 FPGA based PCI Express to VME64x transparent bridge:
  - Implemented in Xilinx Artix-7 device
  - VME64x Master/Slave interface with Slot-1 functions
  - PCI Express x4 GEN1/GEN2 Root Complex capability to perform configuration cycles directly from VME
  - Supports VME Data D08, D16, D32, BLT32, MBLT64, 2eVME, 2eSST and 2eSST Broadcast
  - High-performance DMA
- 256 MBytes DDR3 Shared Memory
- Optional P0 extension
- VITA 35 compliant (PMC/XMC Jn14/Jn24 mapping to VME P0/P2)
- Enhanced I/O and storage expansion capabilities
  - Optional XPM_1262 module to control two additional XMC/PMC slots
  - PCI Express GEN2 links
- PCIe GEN2 24-port switch PES32NT24
  - Eight NTB ports
  - Embedded DMA Controller
- Thermal and Power supplies monitoring
- Linux and Windows 7 Device Drivers

## Overview

IOxOS Technologies introduces the VDC_7920, a 6U VME64x dual PMC/XMC carrier board with enhanced expansion capabilities allowing to control up to four PMC/XMC slots and additional storage media through a high-performance PCI Express GEN2 and SATA connection.

The VDC_7920 forms part of the new line of IOxOS Technologies VME64x products featuring its proprietary ALTHEA 7910 solution, a PCI Express to VME64x Bridge implemented in a Xilinx Artix-7 FPGA to deliver an extremely competitive COTS in terms of cost, performance and power consumption. This field proven solution natively supports all Master/Slave VME64x modes of operation with Slot_1 System Controller function, including VME64x data transport 2eVME and 2eSST modes with maximal burst length capability, while guaranteeing very long term availability of the board as a result of not depending on already obsolete third party VME interfaces.

The VDC_7920 operates as PCI Express Root Complex, that allows to perform configuration cycles of onboard XMC/PMC modules directly from VME.

An optional P0 connector enables additional connection capabilities.

The onboard Xilinx Artix-7 FPGA also provides health status of the board by monitoring temperature and power supply parameters.

A true VME Renaissance.

## Introduction

The VDC_7920 is a 6U VME64x dual PMC/XMC carrier board with enhanced expansion capabilities featuring the following major improvements over its predecessor:

- FPGA based PCI Express to VME64x transparent bridge implemented in Xilinx Artix-7 device
- True PCI Express x4 Root Complex (RC) capability allowing to configure onboard XMC/PMC modules directly from VME
- Expansion port to double the number of PMC/XMC slots through a PCI Express GEN2 link
- VITA 35 compliance through user configurable static I/O selector (small 0 Ω resistor networks)
- Optional VME P0 connector VITA 35 compliant for additional connectivity
- Lower power consumption
- Much long term availability

## ALTHEA 7910 FPGA based VME64x Interface

The VME64x interface is implemented using IOxOS Technologies proprietary ALTHEA 7910 solution, a Xilinx Artix-7 based PCI Express to VME64x Bridge. Since 2014, this interface is marketed and used by relevant VME manufacturers worldwide to replace the obsolete TSI148 VME interface.

The PCI Express to VME64x interface includes new features such as:

- Embedded SRAM Shared Memory SMEM 64K/128K
- Direct IDMA PCIe-VME64x without intermediate copy in SMEM
- Message Passing FIFO and Semaphores
- VME A24, A16 Slave windows mapping
- Integration of TSI148 specific functions

## VITA 35 Compliance

The connection between the PMC/XMC Jn14 and Jn24 I/Os and VME P2 is done through a user configurable static I/O selector that is implemented with several small SMD 0 Ω resistor networks in order to ensure compliance with VITA 35 standards while providing flexibility for custom configurations and backward compatibility with IPV_1102 rev.C Single Board Computer.

Following connection configurations are supported:

- P0 connector mounted:
  - P4V0-64:  64 Jn24 I/Os mapped to VME P0
  - P4V2-64ac: 64 Jn14 I/Os mapped to VME P2 rows a and c
- P0 connector not mounted:
  - Custom configurable P4V2-32+32ac: 32 Jn14 I/Os and 32 Jn24 I/Os mapped to VME P2 rows a and c

## XPM Expansion Port

The VDC_7920 implements an expansion port to increase the number of PMC/XMC slots from two up to four, by attaching the XPM_1262 expansion module.

The XPM_1262 is connected to the VDC_7920 PCI Express infrastructure with a high speed coax flat cable, SAMTEC HLCD, that fulfills PCI Express GEN2 performance requirements.

The VDC_7920 / XPM_1262 interconnect link includes a dedicated mechanism supporting easy insertion/extraction in/from the VME64x backplane.

## Built-In Health Monitor

The VDC_7920 provides health status of the board by monitoring temperature (ambient and junction) with its built-in XADC System Monitor hard macro, and by monitoring power supply parameters through dedicated PMBus.

## Software Support

The VDC_7920 is supported with the following software items:

- IOxOS Technologies XprsMON with C user's library
- Linux ELDK distribution
- Linux and Windows 7 device drivers

## Environmental Specifications

| | |
|---|---|
| Estimated Power (PMC/XMC not plugged) | +5V → 6[A] (VITA 1.7 max 7.5[A]) +3.3V locally generated from +5V ±12V not used onboard |
| Compliance | VME64x VITA 1.1 +  VITA 1.5-2003 XMC VITA 42.3 VITA 35: <br>• P0 mounted: → P4V0-64 → P4V2-64ac <br>• P0 not mounted: → Custom P4V2-32+32ac |
| Operating Temperature | Commercial: 0°C to +55°C 400 LFM Industrial: -40°C to +55°C 400 LFM |
| Regulatory Compliance | Immunity: EN50082-2 / EN55024 Emission: EN55022 Class A Safety: EN60950 |

## Ordering Information

| Article Reference | Product Description |
|---|---|
| VDC_7920-A0 | VME64x Dual PMC/XMC Carrier featuring Xilinx Artix-7 XC7A75T, populated with P0 and 5 row VME P1, P2 connectors Factory settings: VITA 35 P4V0-64, P4V2-64ac |
| VDC_7920-C0 | VME64 Dual PMC/XMC Carrier featuring Xilinx Artix-7 XC7A75T, populated with 3 row VME P1, P2 connectors. P0 not mounted Factory settings: Custom P4V2-32+32ac |

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