

## VT951 – 1U Rugged Chassis Platform, 6 AMC Slots, PCIe Gen 3, Dual PSU

1U Rugged Chassis, 6 AMCs



### KEY FEATURES

- MicroTCA rugged 1U 19" rackmount chassis platform
- Designed to meet MIL-STD-810F, MIL-STD-901D for shock/vibration
- Designed to meet MIL-STD-461E for EMI
- Supports up to six single module mid-size
- Full Layer 2 or 3 managed Ethernet switch
- Dual x4 or single x8 PCIe Gen 3 per AMC Slot
- Chassis accepts AMCs with single retention screw opposite of ejector handle on each slot
- Management can run as Shelf/MCMC (MicroTCA Carrier Management Controller) or MCMC
- Dual redundant PSUs located in the rear of the chassis
- AMC.1, AMC.2, AMC.3 and AMC.4 compliant
- Front-to-back cooling
- Lightweight aluminum construction
- RoHS compliant

### Benefits of Choosing VadaTech

- Ruggedized 1U chassis in 19" rackmount
- Designed to meet MIL specifications for shock/vibration and EMI
- High performance density with six AMC slots with front-to-rear cooling
- Scorpionware Shelf Management Software included at no additional cost
- Advanced GPS clocking/receiver options including IEEE 1588, SyncE, and NTP clocking
- Electrical, mechanical, software, and system-level expertise in house
- Full ecosystem of front and rear boards, enclosures, specialty modules, and test/dev products from one source
- AS9100 and ISO9001 certified company

The VT951 is a rugged 1U chassis used in Mil/Aero or other applications that need to withstand shock/vibration. The lightweight aluminium construction provides 6 single module mid-size AMC slots. For front panel retention, there is a single MicroTCA.1 screw on the opposite side of the ejector handle on each module slot. The chassis offers dual redundant PSUs, hot-swappable from the rear of the chassis.

The front-to-rear cooled chassis utilizes the VadaTech 3rd generation MCH (UTC004 product) for its shelf manager, crossbar clocking for low jitter, GPS/IEEE1588/SyncE/NTP, etc. The VT951 has PCIe Gen3 dual x4 or single x8 routed to each AMC slot. There are also dual SFF-8644 ports for x8 PCIe Gen3 expansion.

The VT951 backplane provides direct connection between adjacent AMC slots on ports 2-3 and on ports 12-20.

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## POWER SUPPLY

The VT951 offers dual redundant AC or DC power supplies that are hot pluggable from the rear of the chassis.

## COOLING AND TEMPERATURE SENSORS

The VT951 has intelligent Cooling Units that are built into the removable power supply trays. The cooling airflow is from front to back. There are Temperature sensors throughout the chassis that monitors the intake and the outtake air temperature.

## BASE CHANNEL ETHERNET SWITCH

The VT951 provides a standard a GbE base channel switch which includes two 10GbE uplink 100/1000/10G RJ45 ports. This switch is fully Layer 2 or Layer 3 managed enabling a comprehensive enterprise-grade routing and switching feature set. It supports Synchronous Ethernet (SyncE) and IEEE1588.

## SCORPIONWARE™ SOFTWARE

VadaTech's Scorpionware software can be used to access information about the current state of the Shelf or the Carrier, obtain information such as the FRU population, or monitor alarms, power management, current sensor values, and the overall health of the Shelf. The software GUI is very powerful, providing a Virtual Carrier and FRU construct for a simple, effective interface.

## GPS AND GENERAL PURPOSE CLOCKS

The  $\mu$ TCA specification defines a set of clocks for telecom and non-telecom applications. The VadaTech VT951 has the most sophisticated clocking distribution in the market to meet the most stringent requirements such as wireless infrastructure, high speed A/D, etc. The VT951 supports the following GPS and general-purpose clocking features:

- Low-jitter/low-skew backplane crossbar clock routing matrix for TCLKA(CLK1)/TCLKB(CLK2)/TCLKC/TCLKD for all AMCs
- FCLKA is provided as a 100 MHz HCSL clock
- Clock disciplining with arbitrary clock frequency output and holdover (Stratum-3 option) including 1PPS regeneration and holdover
- Flexible integration and synchronization between GPS, IEEE1588 / SyncE, and NTP clocking enabling Grand Master clock functionality
- 'Any Frequency' high-quality clock generation/jitter cleaning for up to two user clocks
- Supports hitless automatic clock failover for improved reliability
- Optional built-in GPS receiver enables direct time/clock synchronization to the GPS satellite constellation

The VT951 supports flexible front panel clock port ordering options:

- Two DC-coupled LVCMOS Inputs/Outputs, or two AC-coupled Sine-wave Inputs, or one of each
- Built-in GPS receiver for time/location/clock synchronization plus a DC-coupled LVCMOS Input/Output

## GPS RECEIVER ENABLED FEATURES

The VT951 can be ordered with a GPS Receiver option. The receiver disciplines an on-board high-quality DPLL which is phase/frequency aligned to the atomic clocks in the GPS satellite constellation. The on-board clock synthesis/jitter cleaning capability can be utilized to convert this frequency into any frequency desired while still remaining locked to the GPS atomic clocks.

When the GPS Receiver option is purchased the VT951 has the capability to re-transmit the incoming GPS data via Ethernet to other nodes in the network in the Trimble TSIP binary protocol format. This GPS data is also sent out the front panel GPS RS-232 serial port in the standard NMEA format for use by external equipment. When the GPS Receiver option is purchased along with the PCIe Fat Pipes fabric, the MCH also provides a precision PCIe Time-stamping Engine capability to a PrAMC PCIe Root Complex on the backplane. This engine appears as a PCIe device to the AMC card and a device driver is available which will allow the AMC card to read all GPS status including position, velocity, status, etc., in addition to precision timestamps, time trigger, and time event interrupt functionalities.

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## IEEE1588 PTP AND NTP GRAND MASTER CLOCK

The VT951 can provide Ethernet time services to the chassis networks on both the GbE fabric. It can be subordinate to an external PTP or NTP master server or when the GPS receiver option is purchased can act as a Grand Master clock utilizing the precision timing information provided via the GPS receiver and on-board disciplined oscillator.

## SYNCHRONOUS ETHERNET

The VT951 provides a Synchronous Ethernet (SyncE) on the GbE fabric port. With this feature, ports on the 1G Ethernet switch can be designated as master or slave ports and the Ethernet fabrics within the chassis can be synchronized from end-to-end with external equipment. This feature utilizes advanced telecom-grade network synchronization PLLs to provide exceptional SyncE performance.

## JTAG MASTER / JTAG VIA ETHERNET VIRTUAL PROBE

The VT951 provides JTAG Master Capability to send out configuration data streams via the chassis JTAG Switch Module (JSM) to configure arbitrary JTAG Slave devices on AMC cards. Virtual Probe services are also available to provide JTAG via Ethernet for specific vendors such as Xilinx and Altera. This allows for standard development tools such as Xilinx iMPACT/ChipScope and Altera Programmer/SignalTap to treat the MCH/JSM combination as if it was a standard JTAG probe. This approach frees the developer from having to attach JTAG probes directly to the AMC or JSM which can be difficult when systems are already fully assembled. It also allows for remote debugging across long distances when required without the need to install additional JTAG equipment on-site. The Master test/configuration port is easily accessible via the front panel header.

## VADATECH SLF DESIGN

The VadaTech SLF (Single Latching Flange) design is a space-saving solution for rugged environments and is compatible with the VT951. It provides one latching flange and screw on the opposite side of the standard AMC latching handle. With the latch handle on one side and screw on the other, the front panel solution provides improved retention strength and stability. MicroTCA.1 compliant AMCs have latching flanges on both sides of the board, providing up to 25g shock and 8g random vibration resistance. However, in horizontal-mount enclosures the dual flanges take up considerable space. The SLF design from VadaTech reduces the space utilized, allowing more performance density to be offered in specially-designed enclosures. The SLF solution's screw spacing is compatible with MicroTCA.1. Therefore, this design can be utilized in all of VadaTech's standard 3U to 5U horizontal-mount chassis that accept both MicroTCA.0 and MicroTCA.1 panels.

There are also Latching Tabs available to provide extra secure mounting for standard MicroTCA.0 AMCs.

## INTEGRATION SERVICES AND APPLICATION-READY PLATFORMS

VadaTech has a full ecosystem of ATCA and  $\mu$ TCA products including chassis platforms, shelf managers, AMC modules, Switch and Payload Boards, Rear Transition Modules (RTM), Power Modules, and more. The company also offers integration services as well as pre-configured Application-Ready Platforms. Please contact VadaTech Sales for more information.

**FRONT PANEL SLF DESIGN EXAMPLE**



Figure 1: Single Latching Flange Panel Design Example



Figure 2: Latching Tab for standard MTCA.0 AMCs

## BACKPLANE CONNECTIONS

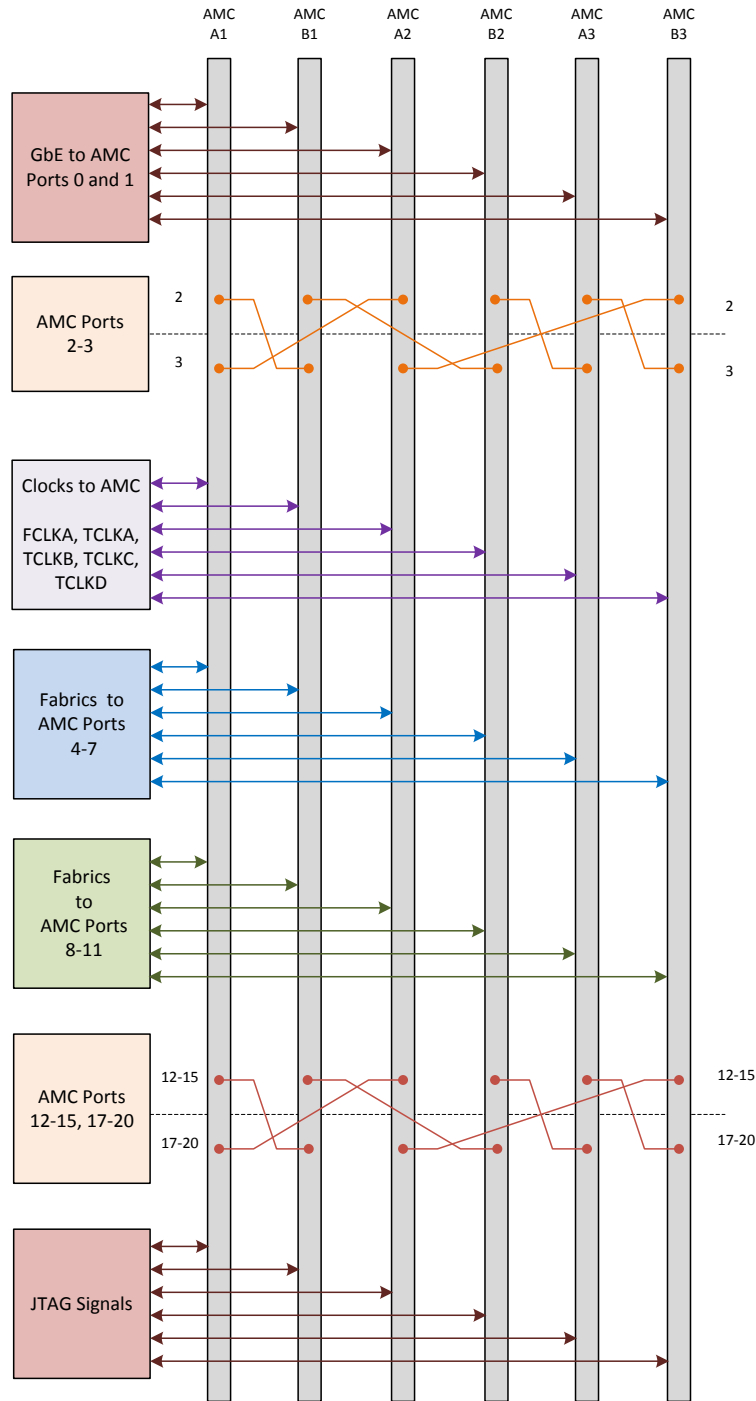


Figure 3: VT951 Backplane Connections

## BLOCK DIAGRAM

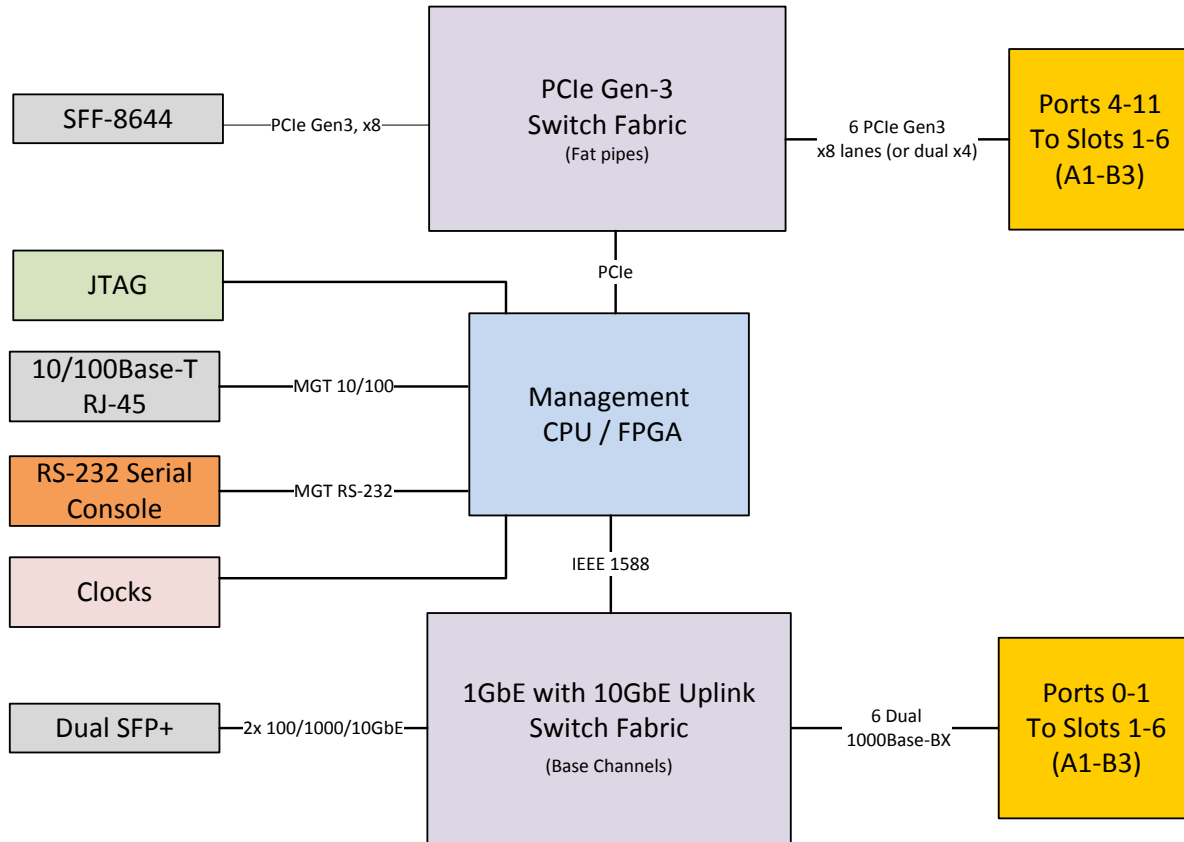


Figure 4: VT951 Top Level Block Diagram

## CHASSIS CONFIGURATION

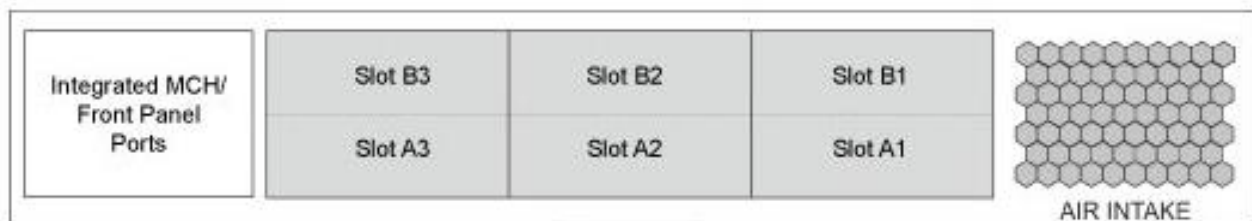


Figure 5: Chassis Configuration - Front View

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## SPECIFICATIONS

Architecture		
Physical	Dimensions	Height 1U
		Width 19"
		Depth 21.5"
Type	µTCA Chassis	Six AMC.0 single module, mid-size slots
AMC	Type	AMC.0, AMC.1, AMC.2, AMC.3 and AMC.4
µTCA	Type	MicroTCA.0
Power	VT951	Single or dual 500 W, Universal AC
		Single or dual 460W, DC -36V to -75V or +18V to +36V
Environmental	Temperature	Operating Temperature: -5° to 70° C
		Storage Temperature: -40° to +85° C
	Altitude	10,000 ft operating
		40,000 ft non-operating
Relative Humidity	5 to 95 percent, non-condensing	
Front Panel	LEDs	IPMI management LEDs, Activity, Link and PCIe Good Lane
	Interface	MGT 10/100, MGT RS-232, JTAG, Clocks, dual PCIe via SFF-8644, and GbE/10 GbE via Dual SFP+
Conformal Coating	Humiseal 1A33 Polyurethane (Optional)	
	Humiseal 1B31 Acrylic (Optional)	
Other		
MTBF	MIL Hand book 217-F @ TBD Hrs	
Certifications	Designed to meet FCC, CE and UL certifications where applicable	
Standards	VadaTech is certified to both the ISO9001:2000 and AS9100B:2004 standards	
Warranty	Two (2) years	
Trademarks and Disclaimer	The VadaTech logo is a registered trademark of VadaTech, Inc. Other registered trademarks are the property of their respective owners. AdvancedTCA™ and the AdvancedMC™ logo are trademarks of the PCI Industrial Computers Manufacturers Group. All rights reserved. Specification subject to change without notice	

## REAR CHASSIS VIEW



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## ORDERING OPTIONS

### VT951 – ABC – DE0 – 0HJ

#### A = Power Module

- 0 = AC Universal 500W, dual PSU
- 1 = AC Universal 500W, single PSU
- 2 = DC -36 to -75V 460W, dual PSU
- 3 = DC -36 to -75V 460W, single PSU

#### B = JTAG Switch Module

- 0 = Without JSM
- 1 = With JSM

#### C = Front Panel Clocking

- 0 = None (*Backplane clocking only*)
- 1 = Dual LVCMOS Clock In/Out
- 2 = Sine Wave In + LVCMOS In/Out
- 3 = Built-in GPS receiver + LVCMOS In/Out
- 4 = Dual Sine Wave In
- 5 = GPS receiver + Sine Wave In

#### D = Clock Holdover Stability

- 0 = Standard (XO)
- 1 = Stratum-3 (TCXO)

#### E = JTAG Virtual Probe

- 0 = None
- 1 = Included

#### H = Temperature Range

- 0 = Commercial
- 1 = Industrial

#### J = Conformal Coating

- 0 = None
- 1 = Humiseal 1A33 Polyurethane
- 2 = Humiseal 1B31 Acrylic

## RELATED PRODUCTS



VT872 1/2 ATR  
Rugged Chassis



AMC515 Virtex-7  
FPGA



FMC223 FMC  
For ADC

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