VadaTech VT88x (0,1 series)
User Manual

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Revision History

Doc Rev	Description of Change	Revision Date
1.0	Document Created	02/12/2011

Table of Contents

Figures

Tables

1 Overview

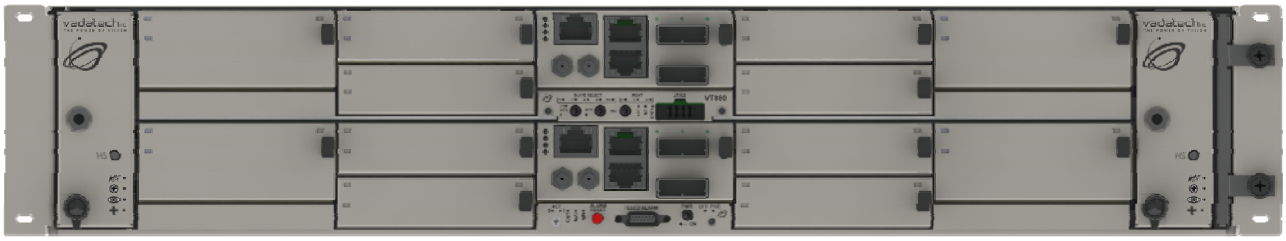


Figure 1: Typical Front View for VT88x Cassis.

The VT88x series, shown in **Figure 1**, are 2U MicroTCA Carriers offering a variety of chassis, AMC and MCH configurations. Current production comprises VT88x models x=[0 1]. This document describes the common VT88x chassis, configuration and operation. Attached Appendices describe each model's individual characteristics with configuration and operational characteristics. **Table 1** provides shows a comparison chart for each model's features.

Model	# of MCH Slots	# of Power Module slots	JSM	Telco Alarm	# of AMC FH Slots	# of AMC MH Slots	# of AMC CH Slots	Dual Redundant Fan Tray	Type of Power Input	Redundant Power Modules
VT880	2	2	Yes	Yes	4	8	0	Yes	AC	Yes
VT881	2	2	Yes	Yes	4	8	0	Yes	DC	Yes

Table 1: Model Comparison Chart

1.1 Document References

- PICMG Specification MTCA.0 R1.0 (MicroTCA)
- VadaTech VT880 data sheet
- VadaTech VT881 data sheet

1.2 Acronyms Used in this Document

Acronym	Description
AMC	Advanced Mezzanine Card
CU	Cooling Unit
JTAG	Joint Test Action Group
MCH	MicroTCA Carrier Hub
PM	Power Module
FH	Full Height
MH	Mid Height
CH	Compact Height

Table 2: Acronyms

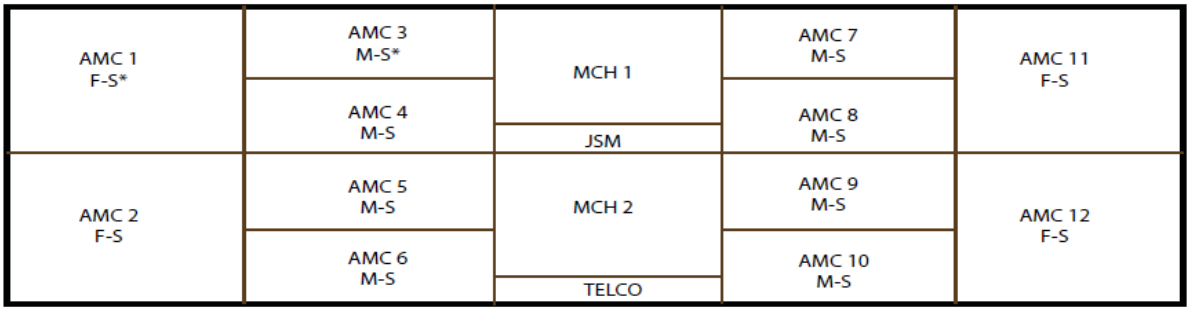
2 Components

The VT88x carrier's components include redundant Power Entry Modules, two Cooling Units, temperature sensors, a JTAG Switch Module (JSM), and a removable Telco Alarm Interface board. The removable Telco Alarm Board contains the Carrier Locator and Carrier FRU Information devices. Unlike other MicroTCA chassis in the market, the VT88x Models have no active components on its backplane, for ease of serviceability.

The VT88x carriers are designed for a Right-To-Left airflow and are equipped with removable Fan Trays on both intake and outtake sides of the chassis.

2.1 Slot Layout

The VT88X carriers share the same Slot layout, shown in **Figure 2**.



*F-S (Full-Size), *M-S (Mid-Size),

Figure 2: VT88x Slot Layout (Front View). Cooling Units not shown.

Slot	IPMB-L Address	FRU
1	0x72	5
2	0x74	6
3	0x76	7
4	0x78	8
5	0x7A	9
6	0x7C	10
7	0x7E	11
8	0x80	12
9	0x82	13
10	0x84	14
11	0x86	15
12	0x88	16

Table 3: AMC Slot Numbering

2.2 Power Modules

For Power Module faceplate and connector information, see the model-specific sections in the appendix.

2.2.1 Sensors

Each VT88x PM provides the following sensors:

Number	Type	Name	Description
0x10	0x01	PM tCRIT1	FET or Brick temperature, depending on AC/DC
0x11	0x01	PM tCRIT2	FET or Brick temperature, depending on AC/DC
0x12	0x01	PM tCRIT3	FET or Brick temperature, depending on AC/DC
0x13	0x01	PM tIN	Incoming Air Temperature (Out on PM 2)
0x14	0x01	PM tOUT	Outgoing Air Temperature (In on PM 2)
0x28	0x02	88x PM 12V	12V DC Power Output
0x90	0xF2	PM HOT SWAP	AMC Hot Swap Handle
0x91	0xF1	VT88x IPMB	ATCA IPMB-0 Status
0x94	0x08	PM STATUS	MicroTCA Power Module Status
0x95	0xF3	PM NOTIFICATION	MicroTCA Power Module Notification (Event-Only)
0x96	0x08	88x PM PWR IN	Input Power Redundancy
0x97	0xC0	FPGA Version	OEM FPGA Version sensor
0xA0	0x03	AMC 1 Current	AMC 1 Current Draw
0xA1	0x03	AMC 2 Current	AMC 2 Current Draw
0xA2	0x03	AMC 3 Current	AMC 3 Current Draw
0xA3	0x03	AMC 4 Current	AMC 4 Current Draw
0xA4	0x03	AMC 5 Current	AMC 5 Current Draw
0xA5	0x03	AMC 6 Current	AMC 6 Current Draw
0xA6	0x03	AMC 7 Current	AMC 7 Current Draw
0xA7	0x03	AMC 8 Current	AMC 8 Current Draw
0xA8	0x03	AMC 9 Current	AMC 9 Current Draw
0xA9	0x03	AMC 10 Current	AMC 10 Current Draw
0xAA	0x03	AMC 11 Current	AMC 11 Current Draw
0xAB	0x03	AMC 12 Current	AMC 12 Current Draw
0xAC	0x03	MCH 1 Current	MCH 1 Current Draw
0xAD	0x03	MCH 2 Current	MCH 2 Current Draw
0xAE	0x03	CU 1 Current	Cooling Unit 1 Current Draw
0xAF	0x03	CU 1 Current	Cooling Unit 2 Current Draw

Table 4: VT88x's PM Sensors

2.2.2 LEDs

The LEDs on the front panel indicate the state of the PM.

Group	LED Name	Color	Description
ATCA	Hot Swap	Blue	Indicates PM hot-swap state, per AMC.0
	Fault	Red	ON when PM cannot provide power on any power channels. Reflects the state of PM_OK, per MicroTCA. This usually indicates a recoverable fault. For example, input power is not present, or the PM is over temperature.
	OK	Green	ON when PM is operating normally. This LED will be ON when the Fault LED is OFF, and vice versa.
	Upgrade	Amber	This LED blinks during operations that modify the firmware configuration. This includes SDR and FRU writes, and HPM.1 upgrade operations. The PM should not be removed or turned off while this LED is blinking.

Table 5: VT88x PM Front Panel LEDs.

Some Power Modules allow two redundant power sources to be connected to the PM. Note that if only one power source is active, the -48V RET LED will blink. This indicates that the input power is not redundant, and is not a fault condition.

2.3 Cooling Units

The VT88X carrier includes two redundant MicroTCA Cooling Units (CUs), as shown in the following table.

Position	Name	Power Channel	IPMB Address	FRU ID
Right	CU1	3	0xA8	40
Left	CU2	4	0xAA	41

Table 6: Cooling Units

The right unit is considered the intake air unit and the left unit considered the exhaust air unit. A chassis air filter is located before the right unit.

The Cooling Units provide the following sensors:

Number	Type	Name	Description
0x10	0x01	VT 88x CU T1	Temperature (LM75)
0x33	0x01	VT 88x CU T2	Temperature (ADT 7462 internal)
0x48	0x04	FAN1 RPM	RPM
0x49	0x04	FAN2 RPM	RPM
0x4A	0x04	FAN3 RPM	RPM
0x4B	0x04	FAN4 RPM	RPM
0x4C	0x04	FAN5 RPM	RPM
0x4D	0x04	FAN6 RPM	RPM
0x30	0x01	VT 88x CU T3	Temperature (ADT 7462 external)
0x31	0x01	VT 88x CU T4	Temperature (ADT 7462 external)
0x32	0x01	VT 88x CU T5	Temperature (ADT 7462 external)
0x3E	0xD7	TELCO ACTIVE	Telco Alarm support sensor
0x90	0xF2	VT 880 CU HS	AMC Hot Swap Handle
0x91	0xF1	VT 880 CU IPMB	ATCA IPMB-0 Status
0x3F	0xF4	TELCO ALARM	Telco Alarm Status

Table 7: Common Cooling Unit Sensors

2.3.1 Fan Trays

Each Fan Tray provides four LEDs, a hot swap button, and a Latching screw to allow for locking and removal of the fan tray, as shown in Figure 3.

Figure 3: Typical Fan Tray Front Panel

The LEDs indicate the state of the CU, as described in the following table.

Name	Color	Description
Hot Swap	Blue	indicates hot-swap state, per AMC.0 and MicroTCA specifications
Fail	Red	ON indicates failure. For example, the geographic address pins are invalid, or payload power has failed. BLINKING indicates that one or more fans have stalled, or are still spinning up. OFF indicates normal operation.

OK	Green	ON indicates normal operation.
Upgrade	Amber	ON while the CU operation is interrupted during a firmware upgrade.

Table 8: Cooling Unit LEDs

At power-on, the hot swap handle state is Closed. Pushing the Hot Swap button once toggles the handle state to Open. Pushing the Hot Swap button again toggles the handle state to Closed.

See Appendix for model-specific information for location and quantity of Removable Fan Trays.

2.3.1.1 Fan Tray Replacement

A fan tray must be replaced if any of its fans fail. Fan trays may also be replaced if more powerful or more efficient fans become available. Fan trays may be replaced during chassis operation, with two limitations. First, do not touch the fan blades when taking the fan tray out of the chassis. Second, put the new fan tray into the chassis quickly to prevent overheating.

Figure 4: Fan Tray Extraction

The mechanism used on all VT88x chassis uses a captive screw with a retention tab. Normally, the tab is pointing downward, as shown in **Figure 4**. Loosen the screw until the tab points to the right. Then pull on the screw to take the fan tray out of the chassis. To put a new fan tray into the chassis, make sure the tab is pointing to the right. Push the fan tray firmly into the chassis, then firmly hand-tighten the screw. The tab should be pointing down.

2.3.2 Air Filter Replacement

The chassis air filter must be replaced if dust has accumulated in the filter, reducing the cooling capacity of the chassis. The air filter may be replaced during normal chassis operation. The air filter is held in place by two captive screws, as shown on **Figure 5**. Loosen the screws, and then pull on the air filter to remove it from the chassis. Put the new air filter into the chassis, then firmly hand-tighten the screws.

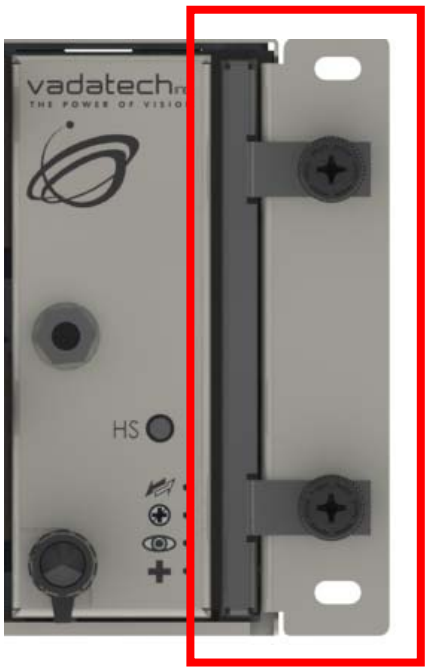


Figure 5: Air Filter Location and Assembly

2.4 Telco Alarm Module

The VT88x series use the DA232 as the Telco Alarm Interface. The Telco Alarm Connector is used to relay alarm information to an external alarm device.

- The “ACT 0” and “ACT 1” LEDs indicate which Cooling Unit is representing the Telco device to the Carrier Manager. Normally, “ACT 0” will be on, indicating that the right CU is active.
- The Critical (CRIT), Major (MAJ), and Minor (MIN) Alarm LEDs indicate the state of the alarms. When an alarm is active, the corresponding LED will be on.
- The Chassis Power Switch (PWR) is used to send a “Chassis Control” request to the Carrier Manager. This will cause a controlled power-down (or power-up) of all of the FRUs in the Carrier.
- The Power Button LED (OFF) reflects the state of the “Chassis Power Switch”.
- The Power Good LED (PGD) reflects the power state of the DA232.
- The Telco Alarm Cutoff button (ALARM RESET) is used to engage the Telco Cutoff, turning off the external Telco alarms. The alarm LEDs will not change, but the external alarm device, if any, will be turned off. The Telco Cutoff can be disengaged using the Set Telco Alarm State ATCA Command. When disengaged, the external Telco alarms will turn back on.

Figure 6: DA232 Front Panel

2.4.1 FRU Information

There are two EEPROMs on the module that is used to store the Carrier FRU information. Both the EEPROMs are located at address 0x52 and accessible by each MCH respectively.

2.4.2 Chassis Locator

Chassis locator switches on the DA232 module are shown in **Figure 7**. The chassis locator switches can be configured to provide a carrier number ranging from 1..16 as shown in **Table 9**.

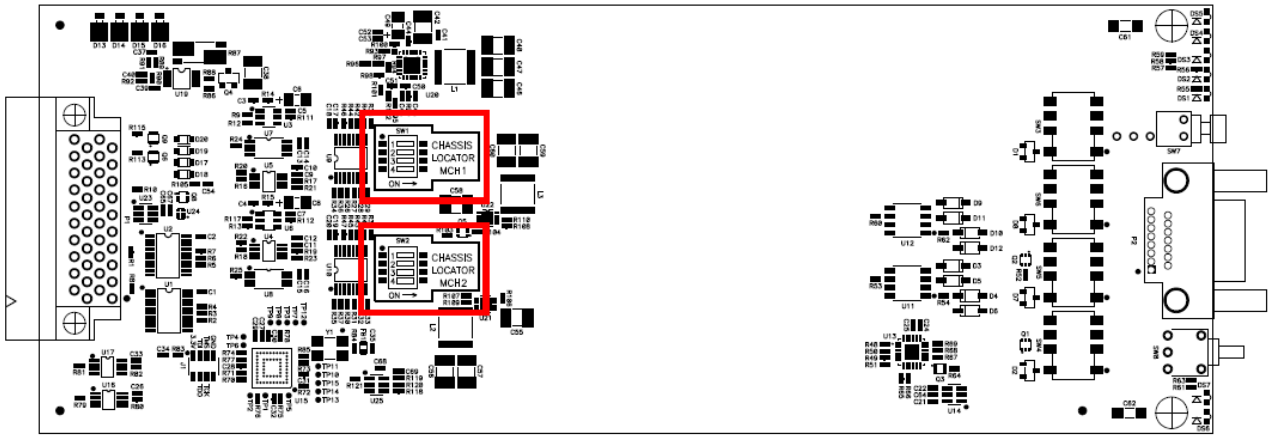


Figure 7: DA232 Chassis Locator Switches

2.4.3 Carrier Locator Switch Logic

If multiple Carriers are configured with an external Shelf Manager, make sure that each Carrier has a unique Carrier number. To set the Carrier number for the VT88X, set the Chassis Locator switches on the Telco Alarm Module (DA232) according to **Table 9**. Make sure both the MCH1 and MCH2 switches are set the same.

The Table shows switch positions to set Carrier number.

Carrier Number	Switch 1	Switch 2	Switch 3	Switch 4
1	On	On	On	On
2	On	On	On	Off
3	On	On	Off	On
4	On	On	Off	Off
5	On	Off	On	On
6	On	Off	On	Off
7	On	Off	Off	On
8	On	Off	Off	Off
9	Off	On	On	On
10	Off	On	On	Off
11	Off	On	Off	On
12	Off	On	Off	Off
13	Off	Off	On	On
14	Off	Off	On	Off
15	Off	Off	Off	On
16	Off	Off	Off	Off

Table 9: Carrier Number Configuration

2.5 JTAG Module

The Models in the VT88X Series have a JTAG Switch Module (JSM) interface which provides JTAG support to all JTAG-capable Modules in the system. The front connector is a standard 0.1 header which mates to most JTAG modules. There are three Arbitrated Master ports (2 MCH and the front/rear connector). The secondary ports are auto-detected if they are present. The module provides transparent communication between the Master and a selected secondary port. All configuration modes use an IEEE1149.1 TAP controller. The JTAG can operate with a clock up to 50MhZ.

Figure 8: JSM Module Front Panel

2.5.1 JSM Switches

- The FTM REQ switch is used to request JTAG Master access for the front connector.
- The CFG switch allows configuration of the JTAG switch to occur through the front connector.
- The RST switch resets the JTAG switch.

2.5.2 JSM Module LEDs

The ACT LED indicates that the JSM is active.

The Slave Select LEDs indicate which secondary port is selected. If no LEDs are on, no secondary port is selected. Otherwise, add the numbers next to the illuminated LEDs together and use the following table.

Value	JTAG Target
1	AMC 1
2	AMC 2
3	AMC 3
4	AMC 4
5	AMC 5
6	AMC 6
7	AMC 7
8	AMC 8
9	AMC 9
10	AMC 10
11	AMC 11
12	AMC 12
13	CU 1
14	CU 2
15	PM 1
16	PM 2

Table 10: Slave Select LEDs

The MGNT LEDs indicate which master is currently granted access. If no LEDs are on, no master has access.

LED	JTAG Master
0	Front Panel or Rear Connector
1	MCH 1
2	MCH 2

Table 11: MGNT LEDs

The DPDV LED directly indicates the state of the DPDV bit in the Device Configuration Register.

2.5.3 JTAG Backplane Topology

The JSM Module is fully connected point-to-point with each AMC as shown in Figure 9.

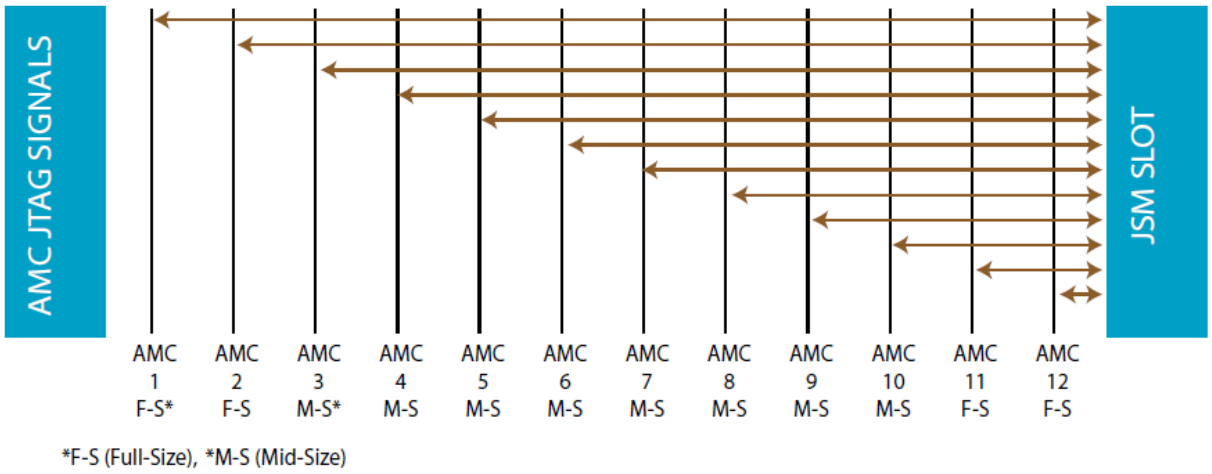


Figure 9: VT88x Topology for AMC JTAG Signals

2.6 Clock Options

The VT88x series provide non-redundant clock networks connecting MCH clocks CLK1, CLK2 and CLK3 to the AMC clocks CLK1, CLK2 and CLK3 by a dedicated line (Shown in **Figure 10**). CLK3 can be assigned a Telco clock or become the Fabric clock per AMC.1 specification. Fabric B will be partially provided on ports 1 – 6 and CLK6 is routed to Fabric B on ports 1 – 12.

Redundant options connect CLK1 of MCH1 point-to-point to each AMC CLK1 and CLK1 of MCH2 point-to-point to each AMC CLK3. (See Appendix for model-specific redundant clock information.)

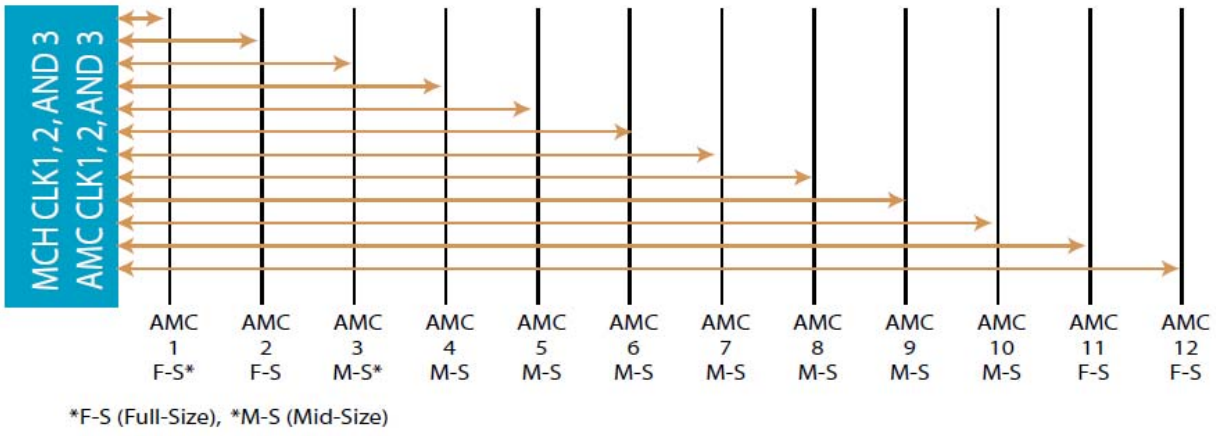


Figure 10: VT88x non-redundant clock topology, CLK3 can run as Fabric Clock (e.g. PCIe clock).

2.7 Backplane Topology

Common VT88x backplane connectivity is shown here.

Depending on the clock options selected, some fabrics may not be routed. Refer to the VT88x data sheet for details.

2.7.1 IPMB Busses

The VT88x provides a dual-redundant IPMB-0 bus among the MCH1, MCH2, CU1, CU2, PM1, and PM2 modules. The IPMB-L is a radial dual-star with each MCH connected to all AMCs as shown in **Figure 11**.

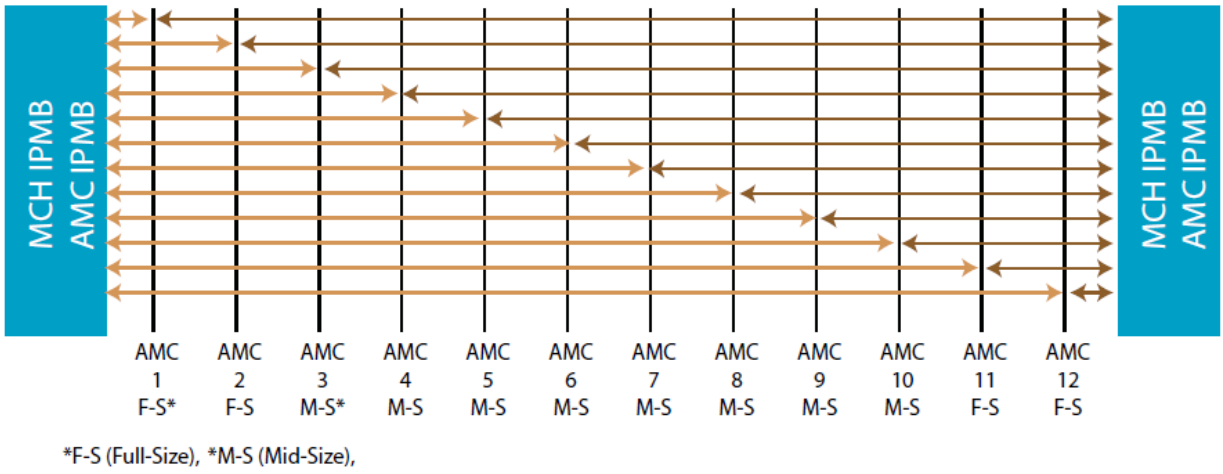


Figure 11: VT88x AMC I2C bus topology.

2.7.2 Ports 0 and 1

MCH1 Fabric A is connected to port 0 on all of the AMCs and MCH2 Fabric A is connected to port 1 on all AMCs as shown in **Figure 12**.

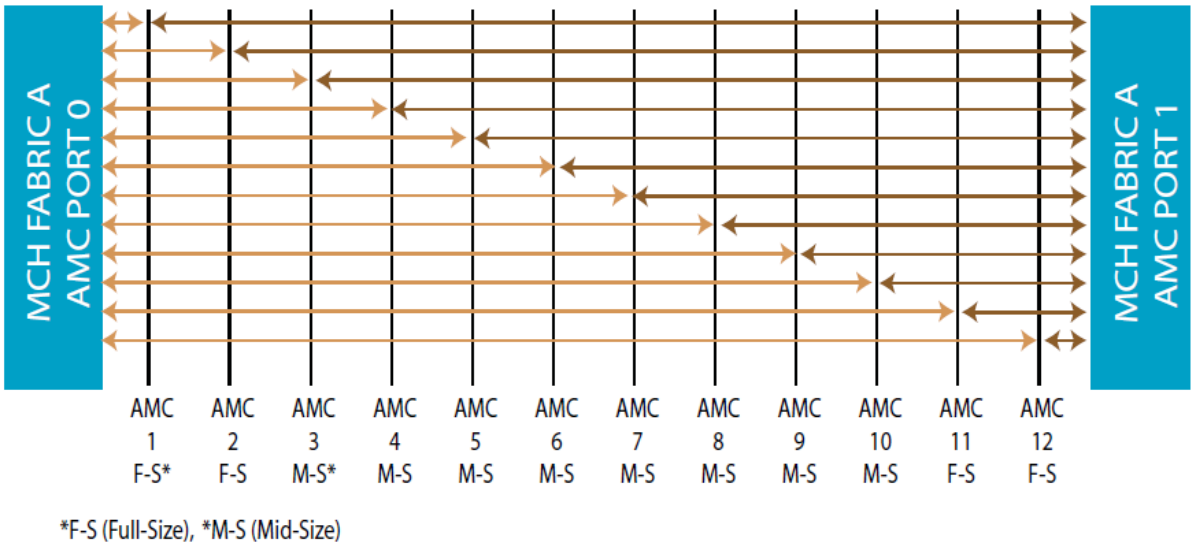


Figure 12: VT88x AMC Port 0 and 1 Topology.

2.7.3 Ports 2 and 3

AMC ports 2 and 3 (SAS / SATA) are routed depending on the ordering option. Under option 1, AMCs are connected directly together (See Appendix for model-specific information). Under option 0, MCH1 Fabric B is connected to port 2 on all of the AMCs, and MCH2 Fabric B is connected to port 3 on all of the AMCs as shown in **Figure 13**.

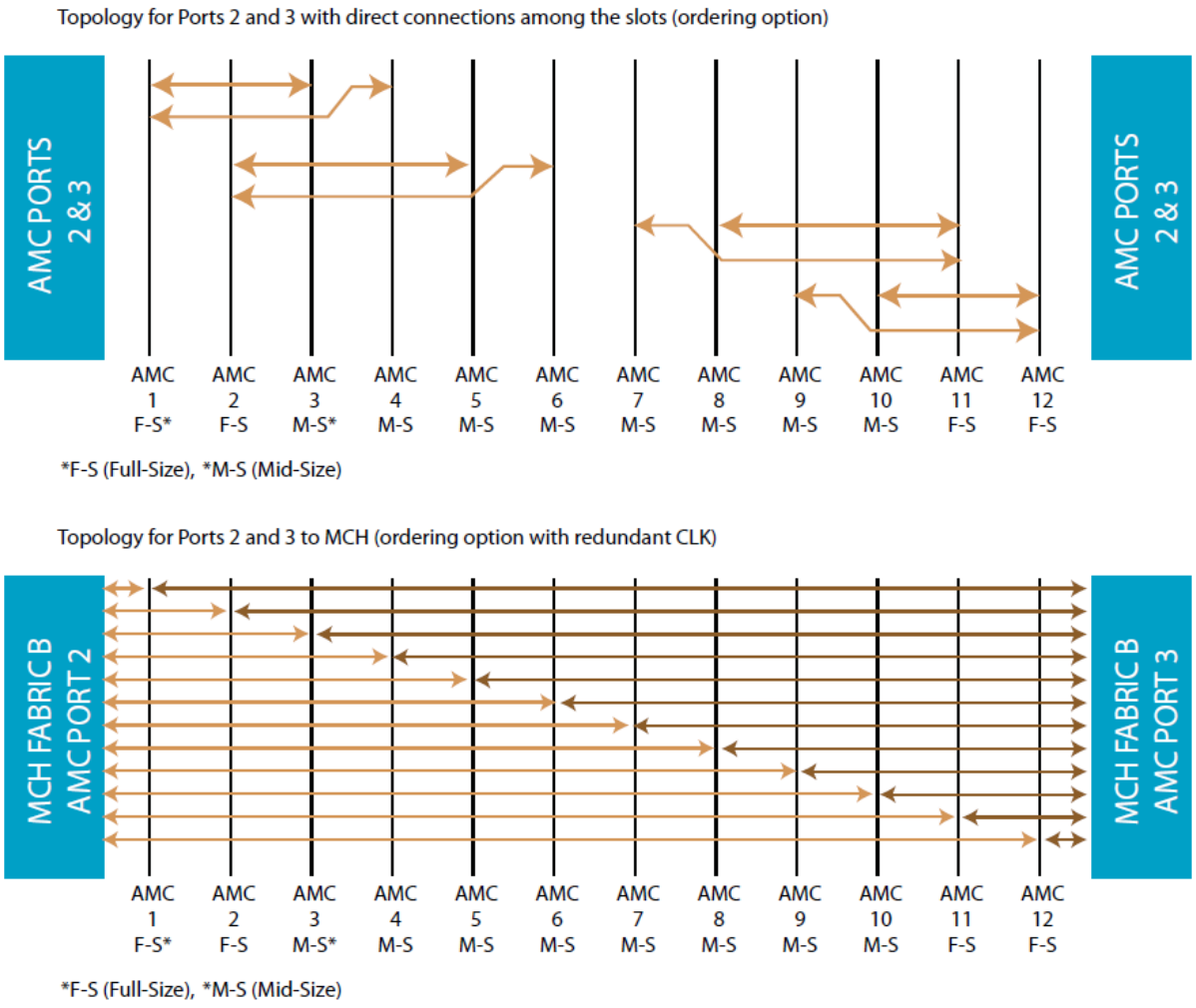
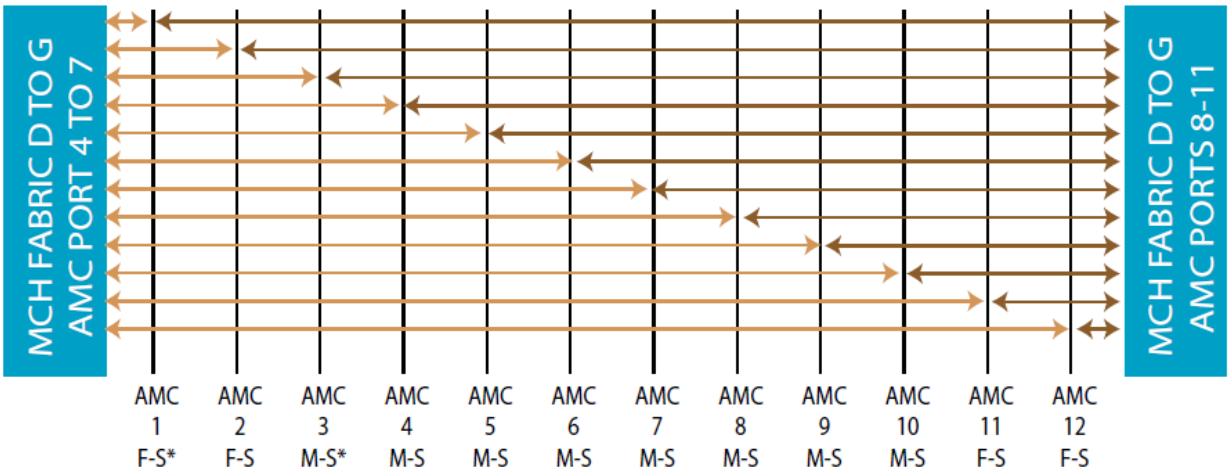


Figure 13: VT88x AMC Port 2 and 3 Topology for Ordering Options 1 and 0.

2.7.4 Ports 4 – 7 and 8 – 11

In the fat pipes region, MCH1 Fabrics D, E, F, and G are connected to ports 4, 5, 6, and 7, respectively, on all AMCs. MCH2 Fabric D, E, F, and G are connected to ports 8, 9, 10, and 11, respectively, on all AMCs as shown in **Figure 14**.



*F-S (Full-Size), *M-S (Mid-Size)

Figure 14: VT88x AMC Ports 4-7 and 8-11 Topology.

3 Appendices

The Appendices contain model-specific information for each product followed by configuration information and tables.

- Appendix 3.1 – Model VT880
- Appendix 3.2 – Model VT881

3.1 VT880

3.1.1 Components

The layout and module locations for the VT880 are shown in **Figure** 15.

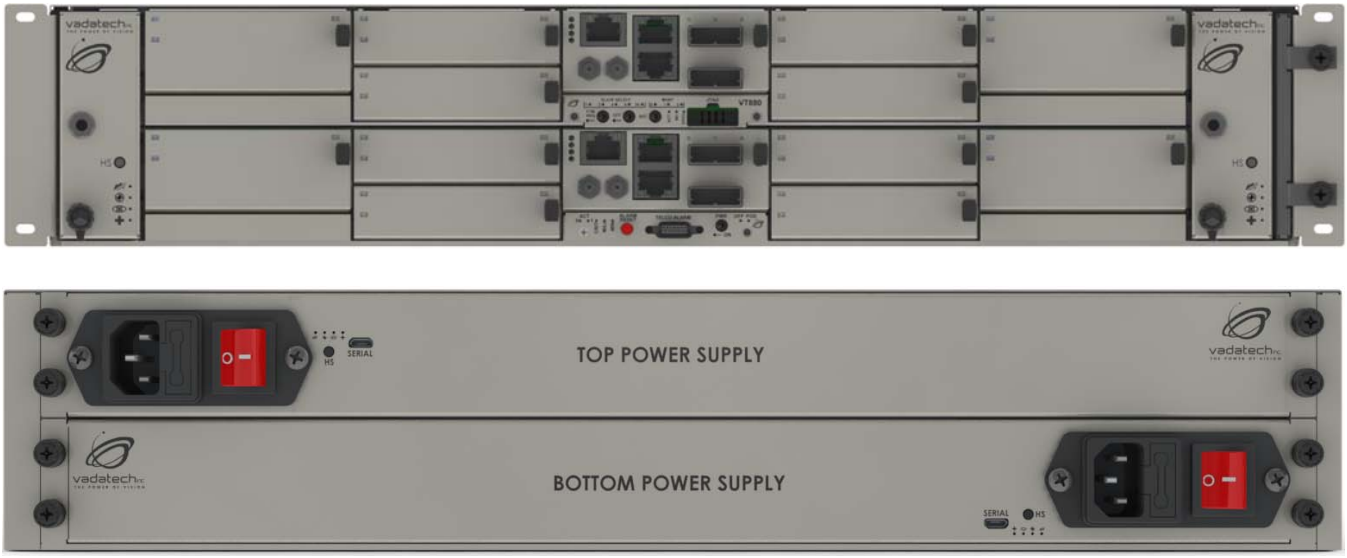


Figure 15: VT880 Layout.

3.1.2 Power Supplies

The VT880 is an AC-Only Chassis and it will take a universal AC input, 110-240VAC @ 47-63Hz per Power Supply.
Due to its redundancy capabilities, the VT880 comes with a TOP and BOTTOM Power Supply tray. Both Power Supplies are fully removable and can be Field-Replaced if needed.

Each Power Supply includes an integrated MicroTCA PM. The Power Entry Module (PEM) FRU Inventory is read when the power is first turned on to determine the PM power capability.

At power-on, the hot swap handle state is Closed. Pushing the Hot Swap button once toggles the handle state to Open. Pushing the Hot Swap button again toggles the handle state to Closed.

3.1.2.1 Command Line Interface

The integrated PM implements a Command Line Interface (CLI) to provide power and temperature status independently of the MCH. Access to this interface is provided by the serial RS232 port on the main panel (PM RS-232). The serial port is a female micro-USB connector, as shown on **Figure 16**. To connect this serial port to a standard DB9 connector,

use the cable provided with the carrier, part number CBL-DB9MUSB1. The serial interface is RS-232, running at 115200 baud, 8 data bits, no parity, one stop bit (115200, N81).

Figure 16: VT880 Integrated PM's RS-232 Connector.

The common CLI provided by VadaTech MicroTCA Power Modules is described in the VadaTech MicroTCA Power Module Command Line Interface Reference Manual

3.1.3 Fan Trays

The VT880 has two Fan Trays located on the front side of the chassis, as shown in **Figure 15.**

3.2 VT881

3.2.1 Components

The layout standard layout and module locations for the VT881 are shown in **Figure 15**

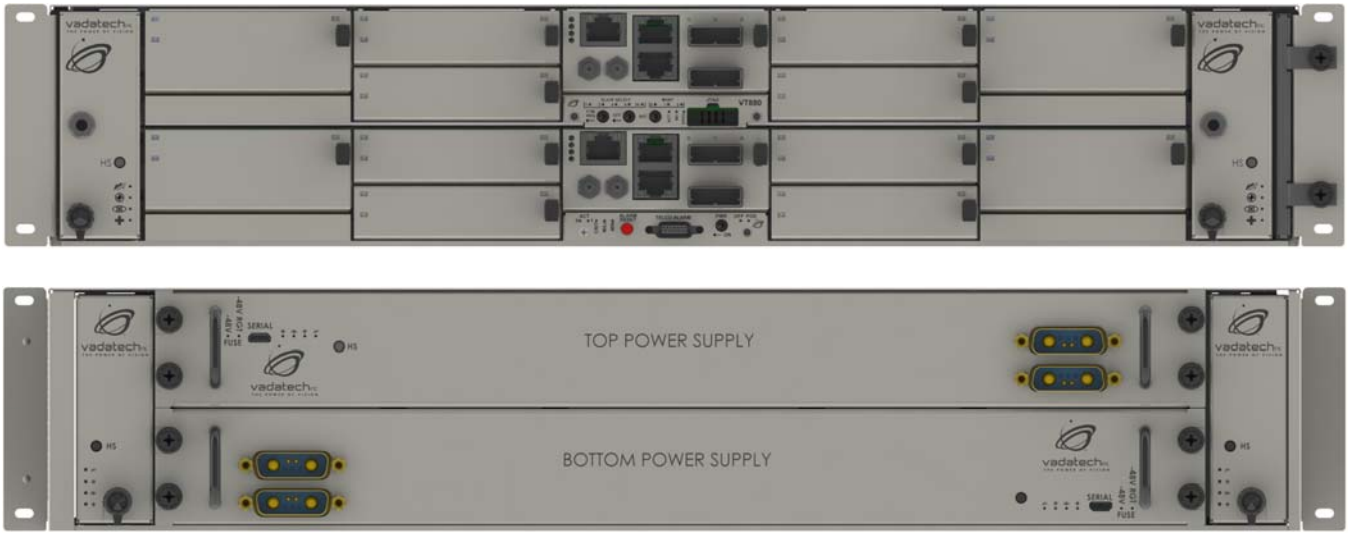


Figure 17: VT881 Layout.

3.2.2 Power Supplies

The VT881 is a DC-Only Chassis and it will take a two -35V to -75V DC Inputs per Power Supply.
Due to its redundancy capabilities, the VT881 comes with a TOP and BOTTOM Power Supply tray. Both Power Supplies are fully removable and can be Field-Replaced if needed.

Each Power Supply includes an integrated MicroTCA PM. The Power Entry Module (PEM) FRU Inventory is read when the power is first turned on to determine the PM power capability.

At power-on, the hot swap handle state is Closed. Pushing the Hot Swap button once toggles the handle state to Open. Pushing the Hot Swap button again toggles the handle state to Closed.

3.2.2.1 Command Line Interface

The integrated PM implements a Command Line Interface (CLI) to provide power and temperature status independently of the MCH. Access to this interface is provided by the serial RS232 port on the main panel (PM RS-232). The serial port is a female micro-USB connector, as shown on **Figure 18**. To connect this serial port to a standard DB9 connector, use the cable provided with the carrier, part number CBL-DB9MUSB1. The serial interface is RS-232, running at 115200 baud, 8 data bits, no parity, one stop bit (115200, N81).

Figure 18: VT881 Integrated PM's RS-232 Connector.

The common CLI provided by VadaTech MicroTCA Power Modules is described in the VadaTech MicroTCA Power Module Command Line Interface Reference Manual

3.2.3 Fan Trays

The VT881 has a total of four removable Fan Trays. The two fan trays on the right side of the chassis, one facing the front and one the rear, act as the Air Intake Trays while the two on the left (front and rear as well) act as the Air Outtake ones.