VadaTech VT86x (0,1,2,3,4 series)

User Manual

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vadatech inc

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Revision History

Doc Rev	Description of Change	Revision Date
1.0	Document Created	08/06/2010

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Tables

1 Overview

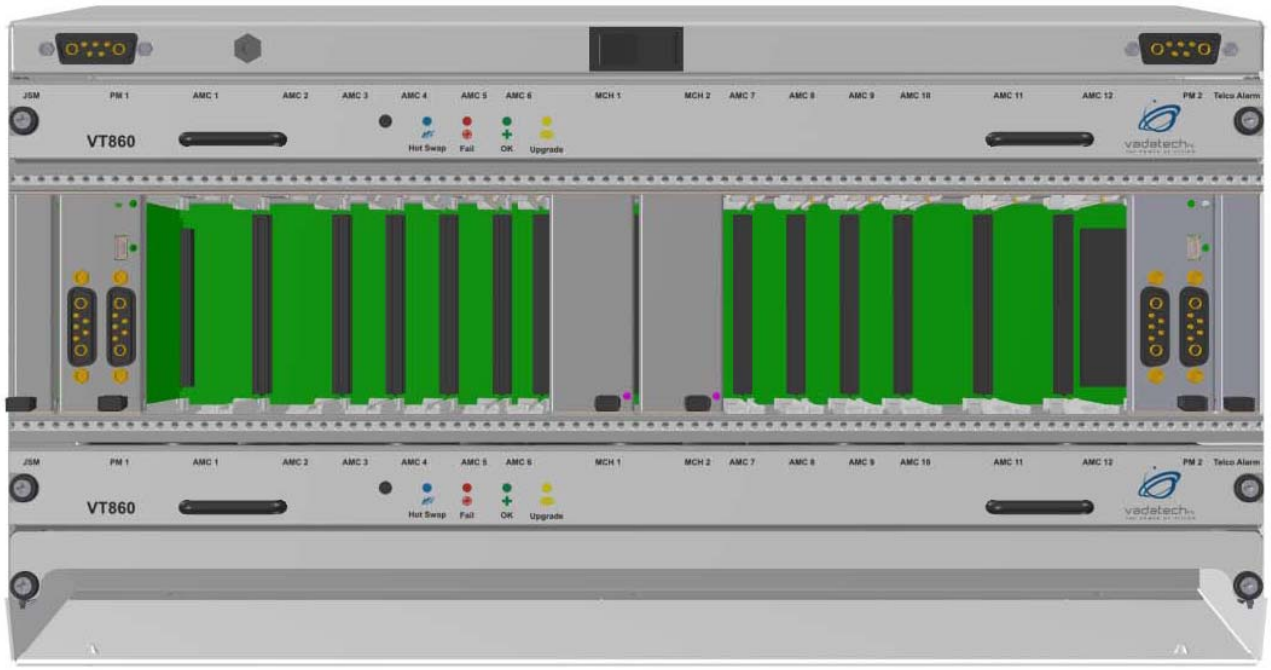

Figure 1: Typical VT86x Chassis.

The VT86x series, shown in **Figure 1**, are 5U MicroTCA carriers offering a variety of chassis, AMC and MCH combinatorial options. Current production comprises VT86x models x=[0 1 2 3 4]. This document describes the common VT86x 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 slot	Telco Alarm	# of AMC FH Slots	# of AMC MH Slots	# of AMC CH Slots	Dual Redundant Fan Tray	1000W Power Supply
VT860	2	2	Yes	Yes	4	6	2	Yes	Yes
VT861	1	1	No	No	12	0	0	Yes	Yes
VT862	2	2	No	Yes	10	0	0	Yes	Yes
VT863	2	2	No	Yes	6	6	0	Yes	Yes
VT864	2	2	No	Yes	10	0	0	Yes	Yes

Table 1: Model Comparison Chart

1.1 Document References

- PICMG Specification MTCA.0 R1.0 (MicroTCA)
- VadaTech VT860 data sheet
- VadaTech VT861 data sheet
- VadaTech VT862 data sheet
- VadaTech VT863 data sheet
- VadaTech VT864 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 VT86x carrier's components include an optional 1000W AC power supply, two Cooling Units, temp sensors, a removable JTAG Switch Module (JSM), and a removable Telco Alarm Interface board. The removable Telco Alarm Boards contain the Carrier Locator and Carrier FRU Information devices.

2.1 Power Supply

The optional power supply supplies 1000W, 48V power to the chassis Power Module(s).

2.2 VT095 Cooling Units

The VT860 carrier includes two redundant VT095 MicroTCA Cooling Units (CUs), as shown in the following table.

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

Table 3: Cooling Units

The bottom unit is considered the intake air unit and the top unit considered the exhaust air unit. A chassis air filter is located underneath the bottom unit.

2.3 Chassis Sensors

Chassis sensors available on the VT86x series are monitored by the Carrier Manager running on an MCH. The sensors available are as follows:

2.3.1 Temperature

Temperature sensors are incorporated in the VT095 Cooling Units to monitor operating conditions. Each VT095 contains 4 temp sensors for:

1. TEMP1 – distributed on fan tray
2. TEMP2 – monitors fan motor controller internal temps
3. TEMP3 – distributed on fan tray
4. TEMP4 – distributed on fan tray

The temperature sensor differential between intake and exhaust air provides an indication of heat dissipation for the chassis. Distributed sensors TEMP1, TEMP3, and TEMP4 indicate hot/cool zones within the chassis.

VadaTech MCH software sets operating conditions for the temp sensors:

- Lower Non Recoverable -5 C
- Upper Non Critical 65 C
- Upper Critical 80 C

2.3.2 Filter Present

A sensor on the lower Cooling Unit detects the absence/presence of the intake air filter.

2.3.3 Telco Active Sensor

One Cooling Unit manages the Telco Alarm and the Telco Active Sensor is used to determine which Cooling Unit is in control.

2.3.4 Power Switch Sensor

The Cooling Unit controlling the Telco Alarm monitors the Chassis Power Switch.

2.4 Telco Alarm

Most VT86x chassis offer Telco alarm functionality to provide the end user with information concerning operational anomalies detected. (See Appendix for model-specific information.)

2.5 FRU Information and Carrier Locator

FRU information describes the carrier backplane topology to the chassis MCH controllers. The information is typically held in an EPROM attached to the chassis Telco board or attached to the chassis backplane. (See Appendix for model-specific information.)

The Carrier Locator can be assigned via mechanical dip switches located on the Telco board or the chassis backplane. (See Appendix for model-specific information and switch settings Table.)

2.6 Clock Options

The VT86x 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 2**). 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.)

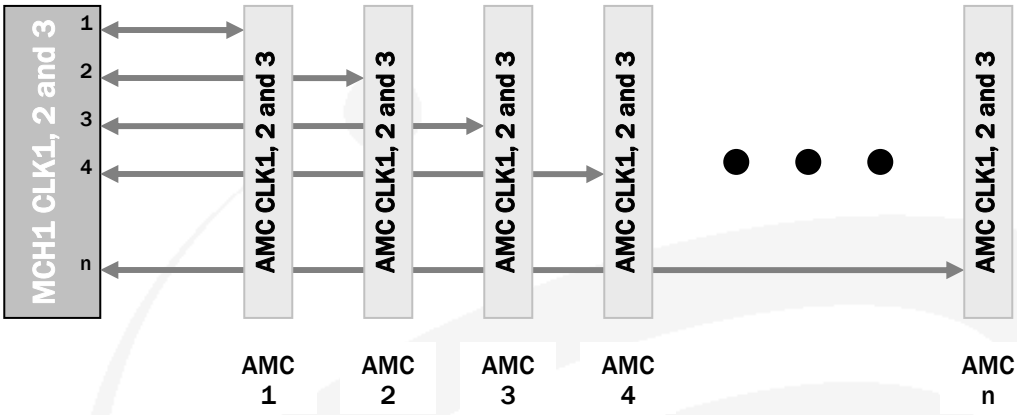

Figure 2: VT86x non-redundant clock topology, CLK3 can run as Fabric Clock (e.g. PCIe clock).

2.7 Backplane Topology

Common VT86x backplane connectivity is shown here. Check model-specific information in Appendix.

Depending on the clock options selected, some fabrics may not be routed. Refer to the VT86x data sheet for details.

2.7.1 IPMB Busses

The VT86x 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 3**.

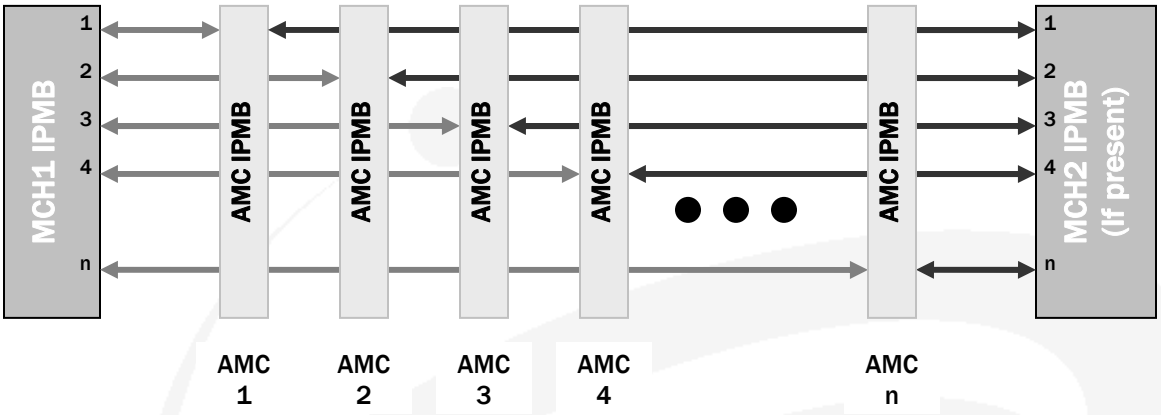

Figure 3: VT86x AMC I2C bus topology.

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 4**.

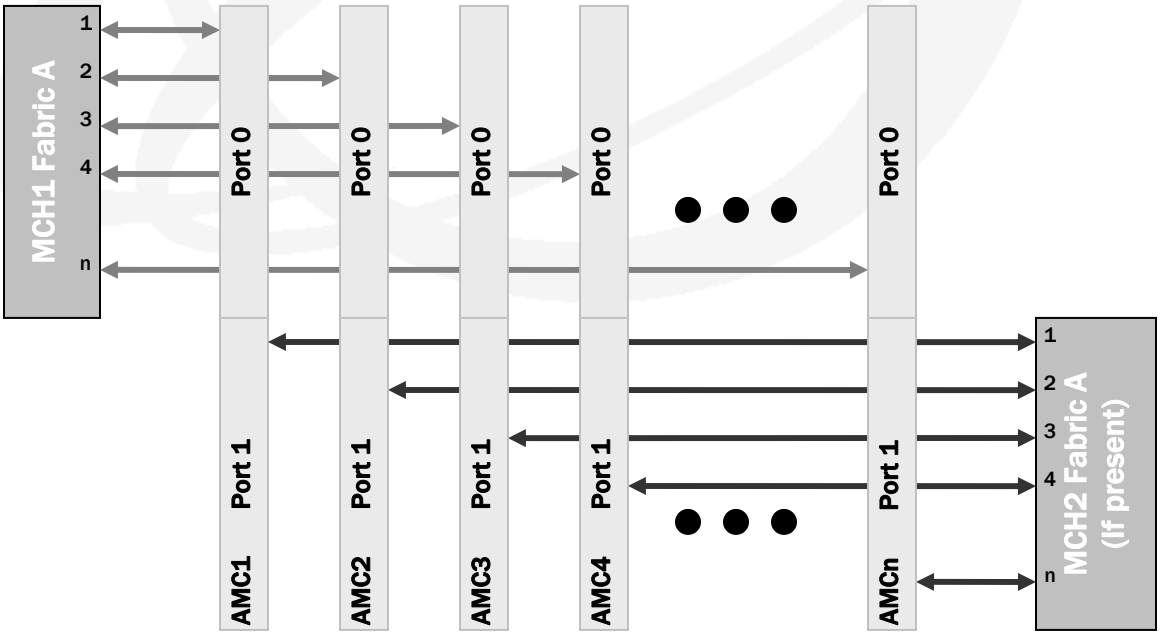

Figure 4: VT86x AMC Port 0 and 1 Topology.

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 2, 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 5**.

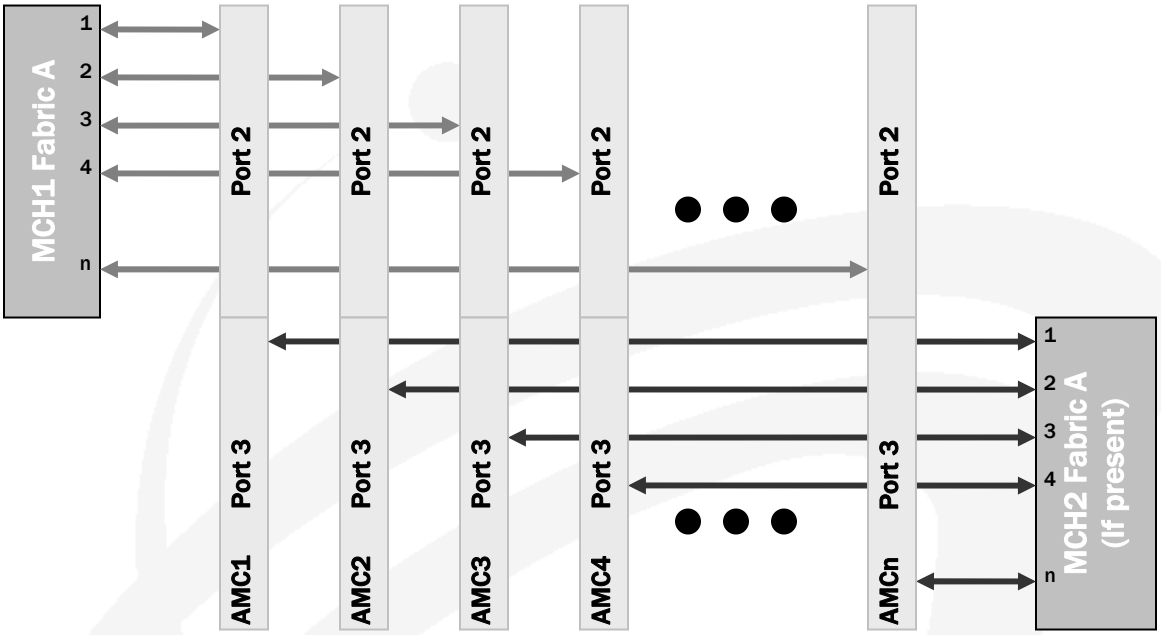

Figure 5: VT86x AMC Port 2 and 3 Topology with Ordering Option 2.

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 6**.

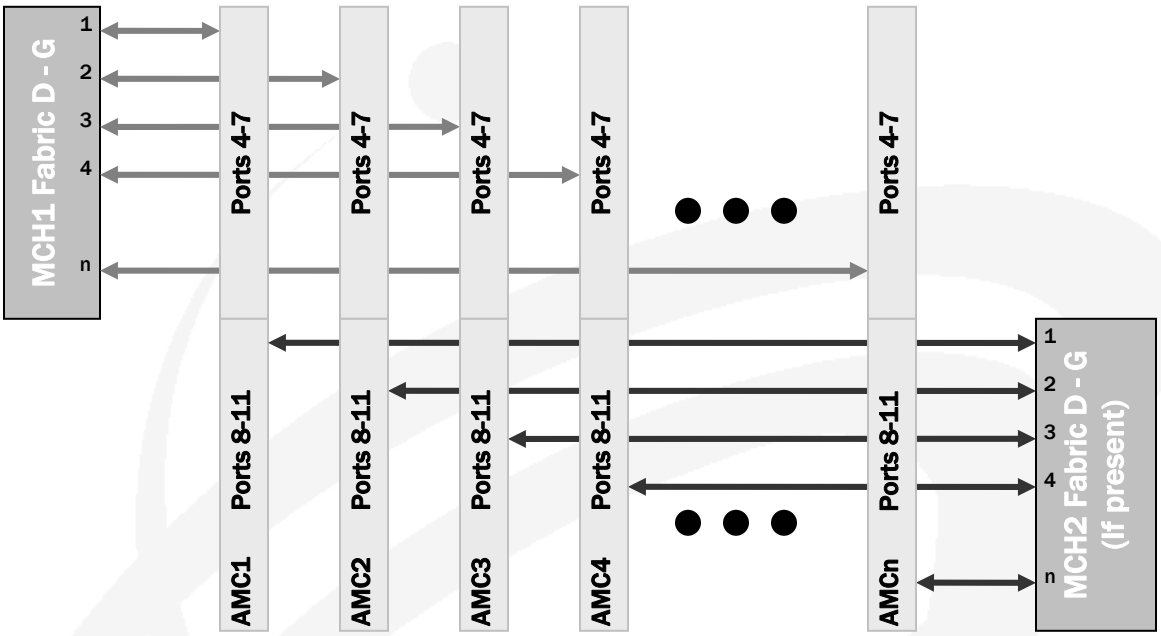

Figure 6: VT86x AMC Ports 4-7 Topology with Ordering Option 2.

3 Physical Description

3.1 Front Panel

Each VT095 provides four LEDs and a hot swap button, as shown in Figure 7.

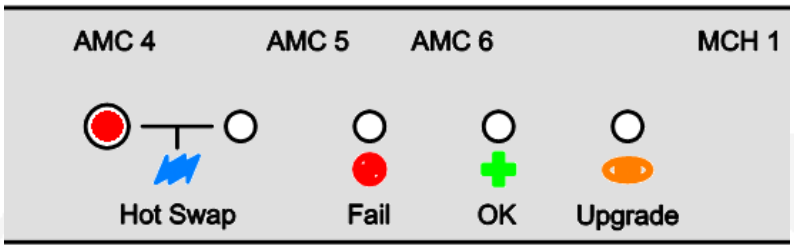

Figure 7: VT095 Front Panel

The VT095 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 4: VT095 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.

3.1.1 Telco Interface

Telco alarms are handled per model, see Appendices for model information.

3.1.2 Telco Support and Failover

Either CU can act as the Telco Device for the Carrier, but only one CU at a time will do so. The active CU will respond to Telco requests from the Carrier, and will include the TELCO STATUS sensor record in its SDR. If the active CU is removed, the other CU will become active and will act as the Telco Device. The MicroTCA specification does not cover

redundant Telco Devices, so third-party Carrier Managers may not support this failover behavior.

4 Appendices

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

- Appendix **4.1**– Model VT860
- Appendix **4.2** – Model VT861
- Appendix **4.3** – Model VT862
- Appendix **4.4** – Model VT863
- Appendix **4.5** – Model VT864
- Appendix **4.6** – Telco Alarm Chassis
- Appendix **4.7** – JTAG Module
- Appendix **4.8** – Carrier Locator Switches

4.1 VT860

4.1.1 Components

4.1.1.1 Slot Layout

The VT860 chassis supports two MCHs, two PMs, four full height AMC, four mid height AMC, four compact height AMC, a JSM, and a Telco module. The layout is shown in **Figure 8**.

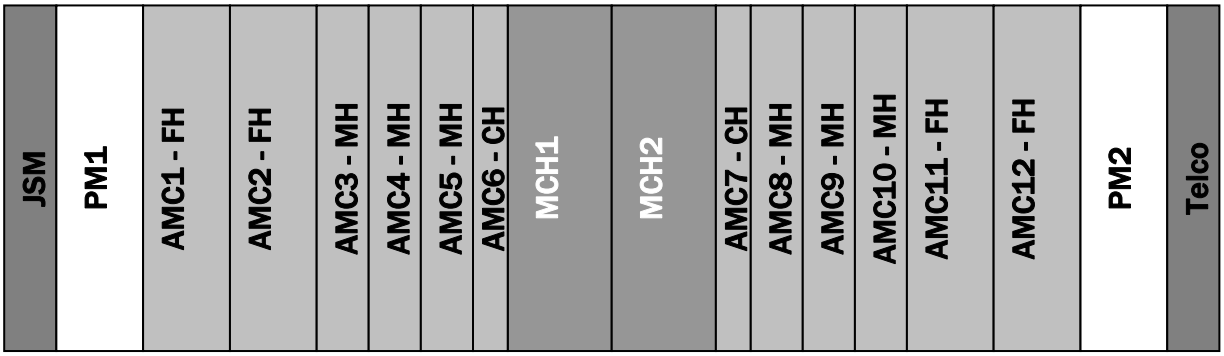

Figure 8: VT860 Slot Layout.

4.1.2 Telco Alarm Interface

The UTC009 Telco Alarm Interface board goes in the rightmost slot in the VT860. It provides an 8KB FRU EEPROM on each private MCH I2C bus. Each EEPROM is at address 0x52, per the MicroTCA specification. It also provides an 8574A I/O expander on the same buses to access the Carrier Locator Devices described in **Appendix Section 4.6**. Each I/O expander is at address 0x3E, per the MicroTCA specification.

See **Appendix Section 4.6.1** for UTC009 specifics.

4.1.3 FRU Information

The Carrier FRU information is stored in the EEPROM at address 0x52, per the MicroTCA specification. The EEPROM can be partitioned to contain both the Shelf and Carrier FRU Information in some configurations.

4.1.4 Carrier Number Configuration

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 VT860, set the Chassis Locator switches on the UTC009 according to Table 8 in **Appendix Section 4.8**Make sure both the MCH1 and MCH2 switches are set the same.

4.1.5 JTAG

The VT860 enables JTAG bus to each AMC using UTC008 (See **Appendix Section 4.71.1.1** for details).

4.1.5.1 JTAG Backplane Topology

The UTC008 is fully connected point-to-point with each AMC as shown in **Figure 9**.

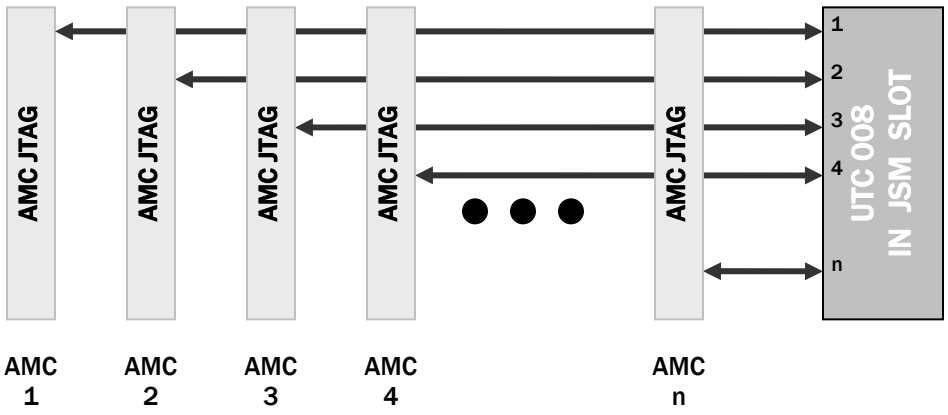

Figure 9: VT860 JTAG to AMC backplane topology.

4.1.6 VT860 Redundant Clock Topology

The VT860 may be ordered with redundant clock topology shown in **Figure 10**.

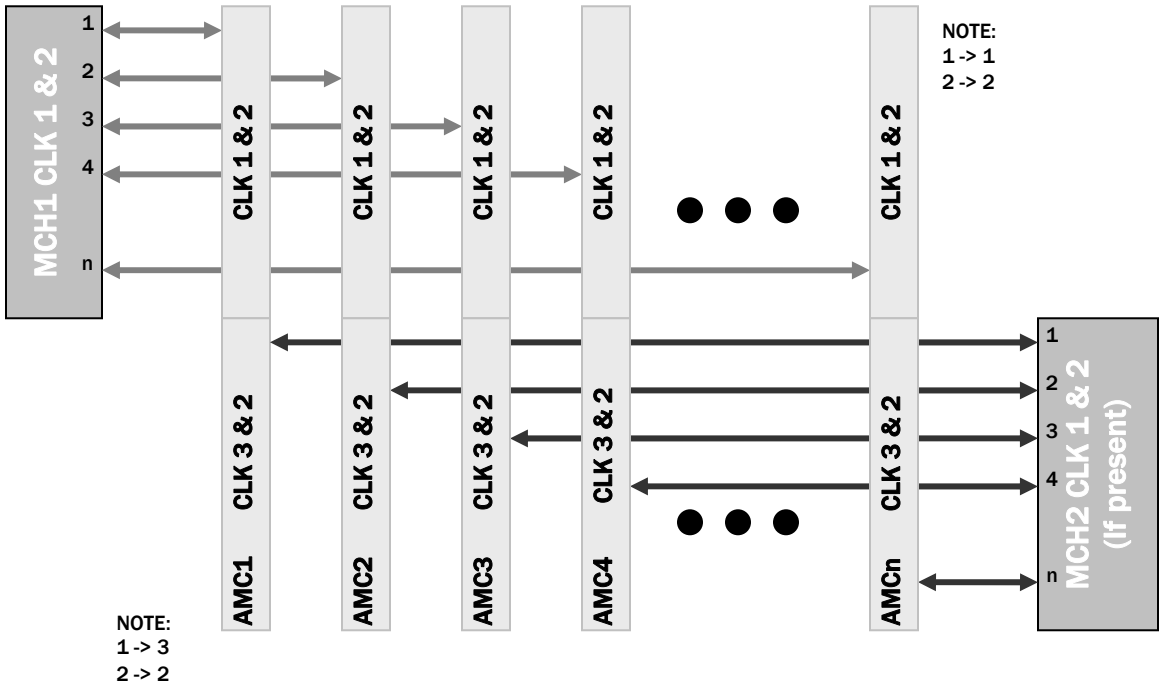

Figure 10: VT860 Redundant Clock Topology.

4.1.7 VT860 Backplane Direct Connect Topology (ordering option 1)

With ordering option 2, AMC ports 2 and 3 are interconnected as shown in **Figure 11**.

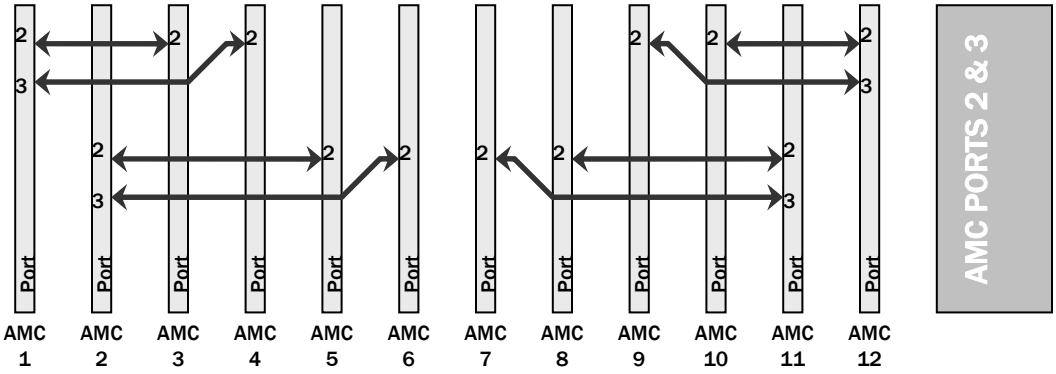

Figure 11: VT860 AMC direct connections with ordering option 1.

4.2 VT861

4.2.1 Components

4.2.1.1 Slot Layout

The VT861 offers the following slots: 1-MCH, 1-PM, 12-AMC (FH-full height) with layout shown in **Figure 12**.

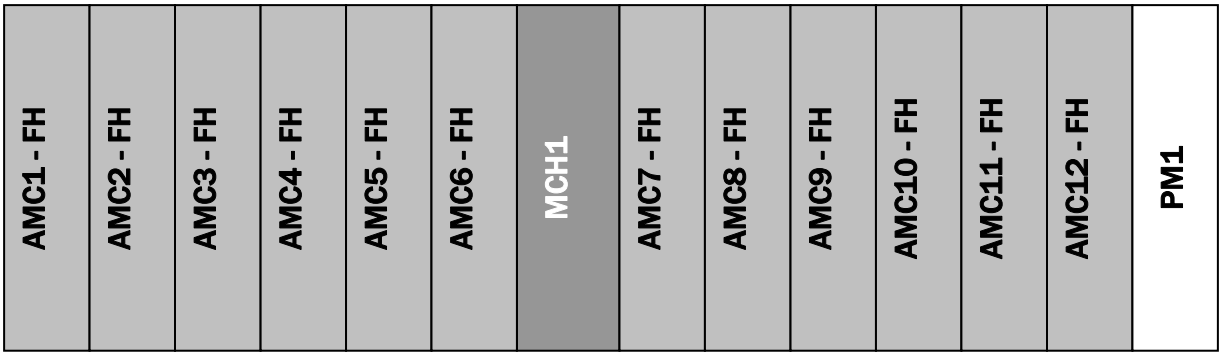

Figure 12: VT861 Slot Layout.

4.2.2 Telco Alarm Interface

No Telco alarm interface available on model VT861.

4.2.3 FRU Information

The Carrier FRU information is stored in the EEPROM at address 0x52, per the MicroTCA specification. The EEPROM can be partitioned to contain both the Shelf and Carrier FRU Information in some configurations.

4.2.4 Carrier Number Configuration

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 VT861, set the Chassis Locator switches located on the VT861 backplane at SW1. The backplane is shown in **Figure 13**. Switch settings are covered in **Appendix Section 4.8**.

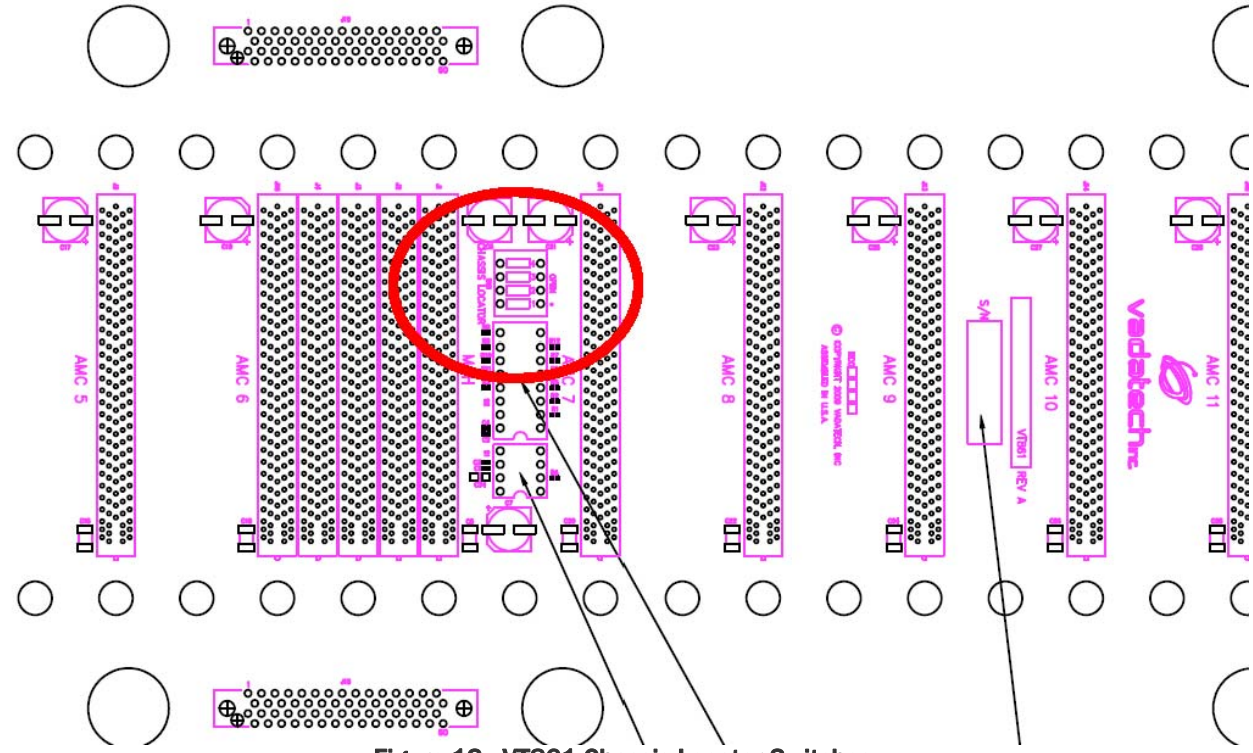

Figure 13: VT861 Chassis Locator Switches.

4.2.5 JTAG

JTAG not available on VT861.

4.2.6 VT861 Redundant Clock Topology

Model VT861 not offered with redundant clock option.

4.2.7 VT861 Backplane Direct Connect Topology (ordering option 1)

With ordering option 2, AMC ports 2 and 3 are interconnected as shown in **Figure 14**.

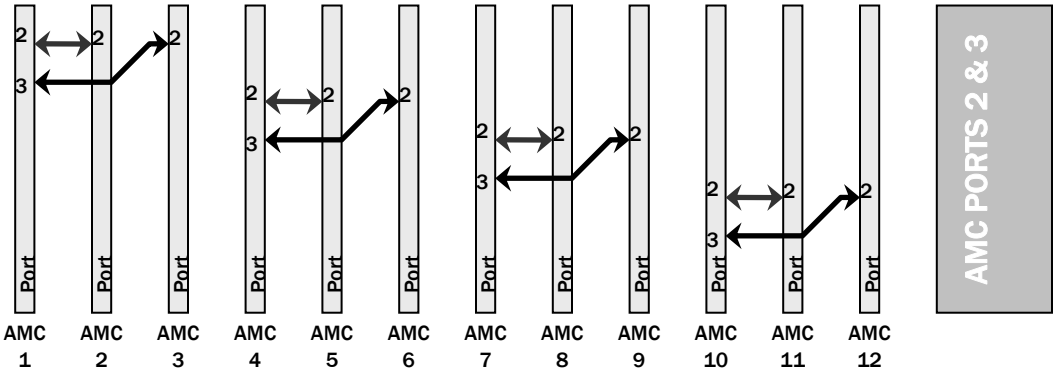

Figure 14: VT861 AMC direct connections with ordering option 1.

4.3 VT862

4.3.1 Components

4.3.1.1 Slot Layout

The VT862 offers the following slots: 2-MCH, 2-PM, 10-AMC (FH-full height) with layout shown in **Figure 15**.

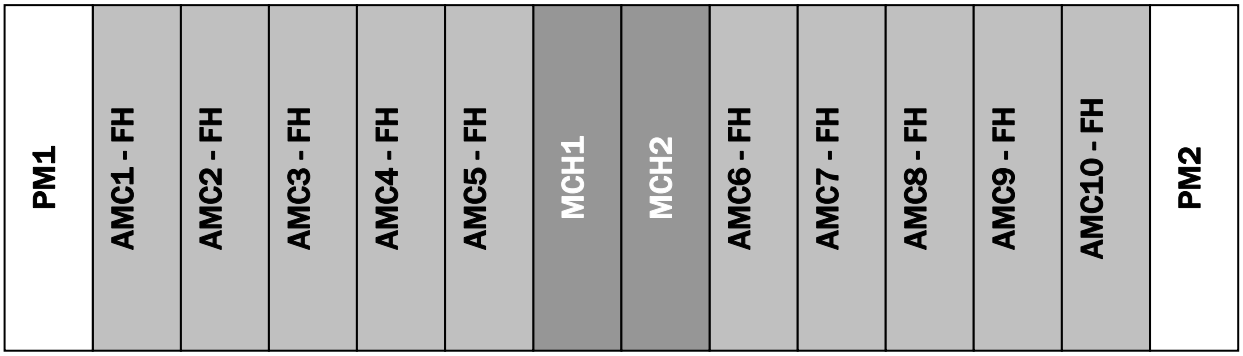

Figure 15: VT862 Slot Layout.

4.3.2 Telco Alarm Interface

Uses DA200 Telco Alarm, see **Appendix Section 4.6**.

4.3.3 FRU Information

The Carrier FRU information is stored in the EEPROM at address 0x52, per the MicroTCA specification. The EEPROM can be partitioned to contain both the Shelf and Carrier FRU Information in some configurations.

4.3.4 Carrier Number Configuration

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 VT862, set the Chassis Locator switches on the DA200 according to Table 8 in **Appendix Section 4.6**. Make sure both the switches are set the same. The Chassis Locator switches are on the top side of the DA200. Switch settings are covered in **Appendix Section 4.8**.

4.3.5 JTAG

JTAG is not available on the VT862.

4.3.6 VT862 Redundant Clock Topology

The VT862 may be ordered with redundant clock topology shown in **Figure 16**.

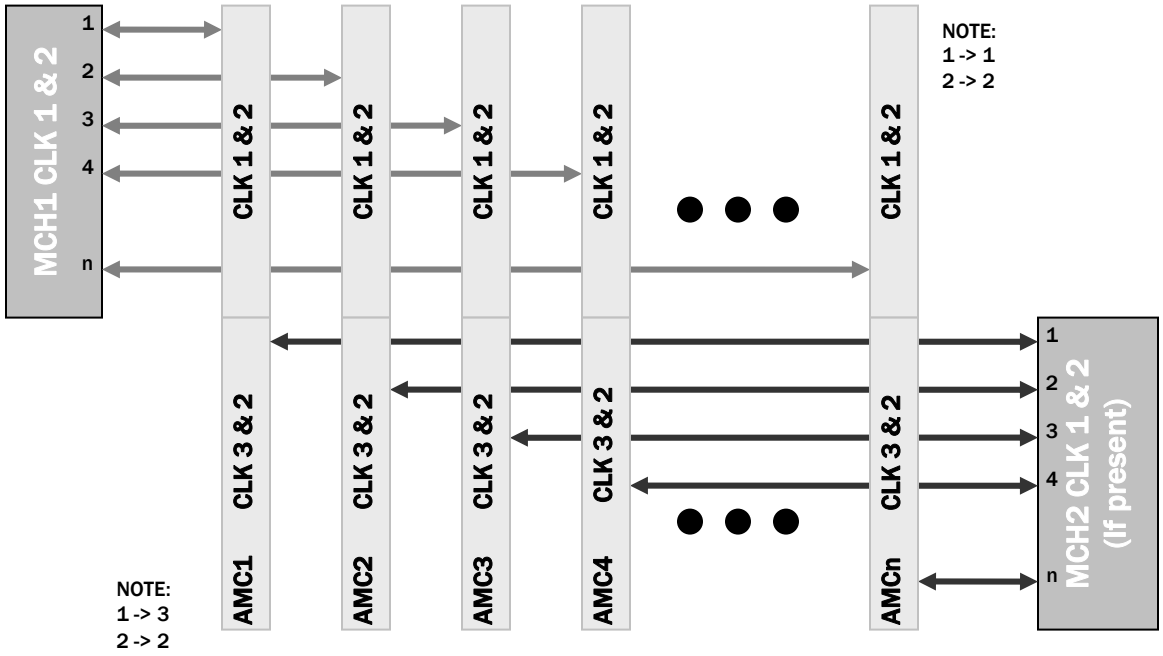

Figure 16: VT862 Redundant Clock Topology.

4.3.7 VT862 Backplane Direct Connect Topology (ordering option 1)

With ordering option 2, AMC ports 2 and 3 are interconnected as shown in **Figure 17**.

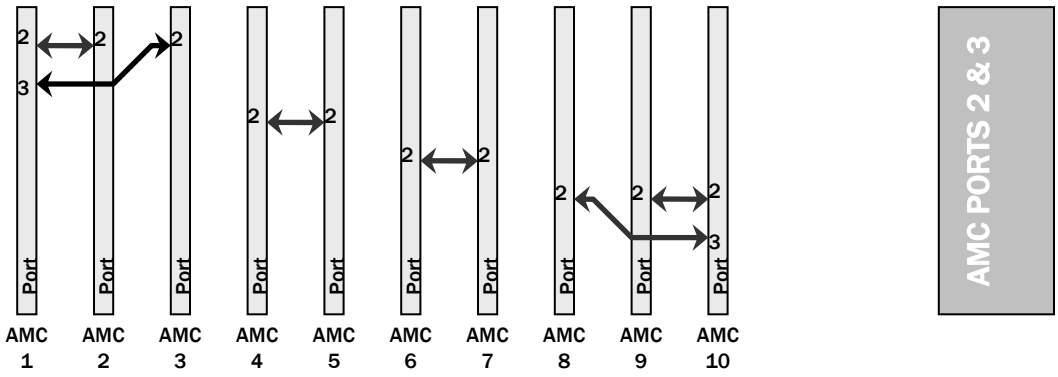

Figure 17: VT862 AMC direct connections with ordering option 1.

4.4 VT863

4.4.1 Components

4.4.1.1 Slot Layout

The VT861 offers the following slots: 2-MCH, 2-PM, 6-AMC (FH-full height) and 6-AMC(MH-mid height) with layout shown in **Figure 18**.

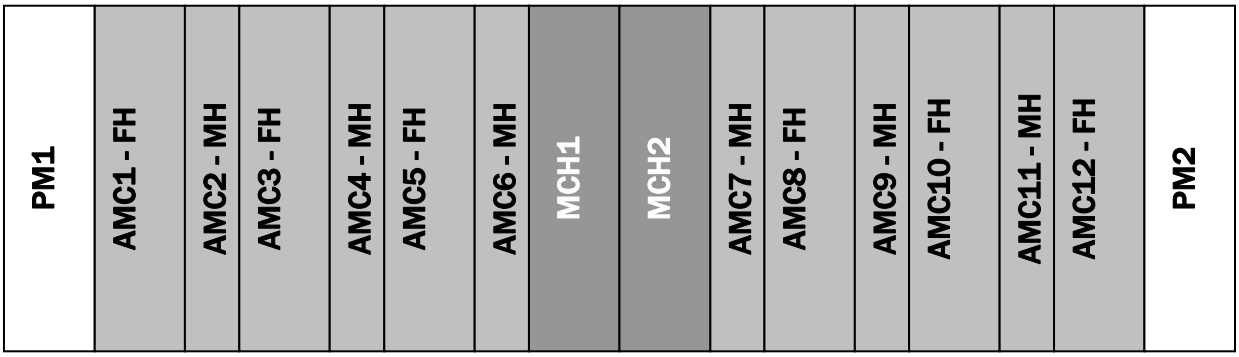

Figure 18: VT861 Slot Layout.

4.4.2 Telco Alarm Interface

Uses DA200 Telco Alarm, see **Appendix Section 4.6**.

4.4.3 FRU Information

The Carrier FRU information is stored in the EEPROM at address 0x52, per the MicroTCA specification. The EEPROM can be partitioned to contain both the Shelf and Carrier FRU Information in some configurations.

4.4.4 Carrier Number Configuration

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 VT863, set the Chassis Locator switches on the DA200 according to Table 8 in **Appendix Section 4.6**. Make sure both the switches are set the same. The Chassis Locator switches are on the side of the DA200.

4.4.5 JTAG

JTAG is not available on the VT863.

4.4.6 VT863 Redundant Clock Topology

The VT863 may be ordered with redundant clock topology shown in **Figure 19**.

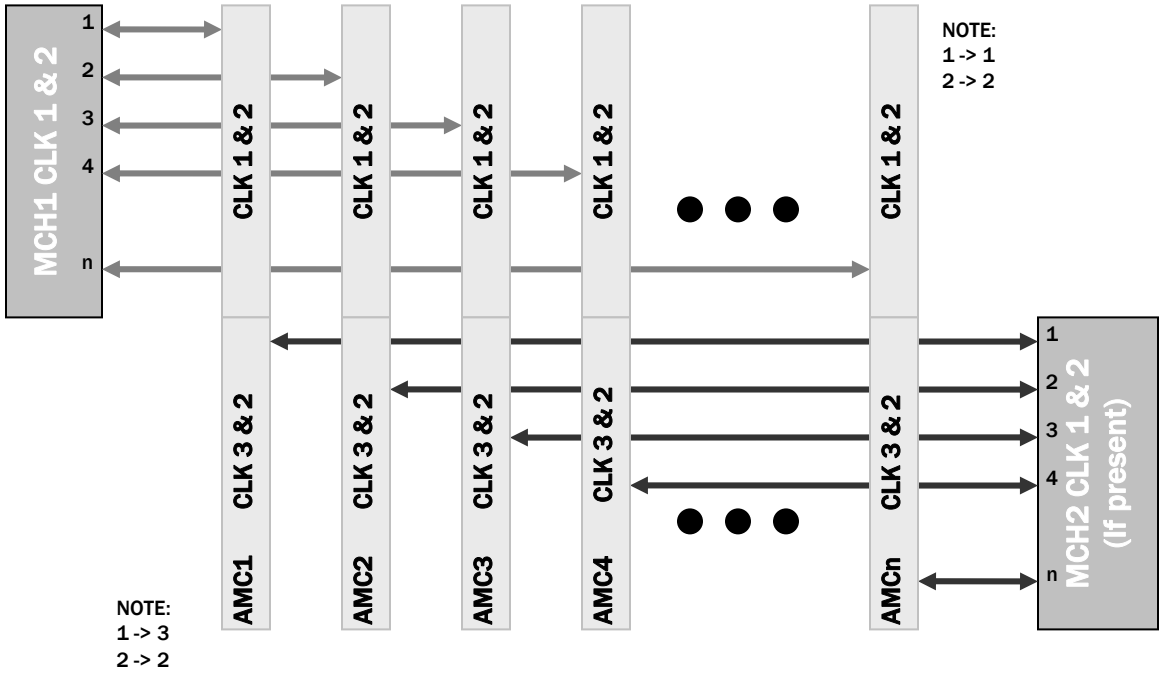

Figure 19: VT863 Redundant Clock Topology.

4.4.7 VT863 Backplane Direct Connect Topology (ordering option 1)

With ordering option 2, AMC ports 2 and 3 are interconnected as shown in **Figure 20**.

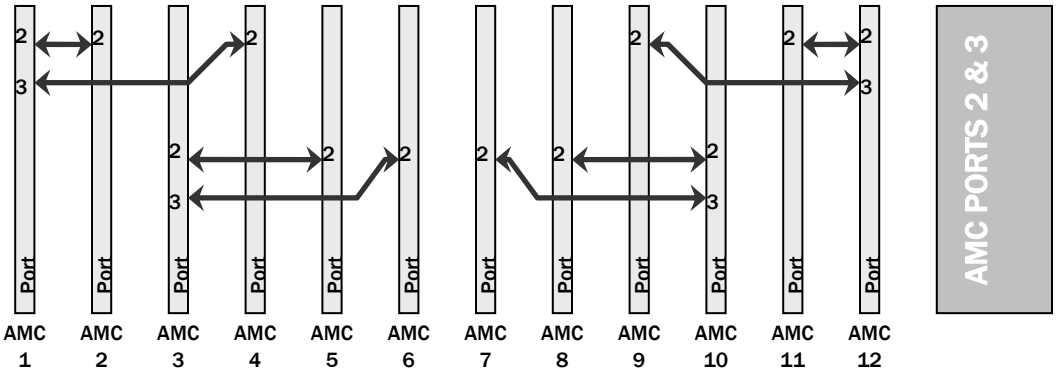

Figure 20: VT863 AMC direct connections with ordering option 1.

4.5 VT864

4.5.1 Components

4.5.1.1 Slot Layout

The VT861 offers the following slots: 2-MCH, 2-PM, 10-AMC (FH-full height) with layout shown in **Figure 21**.

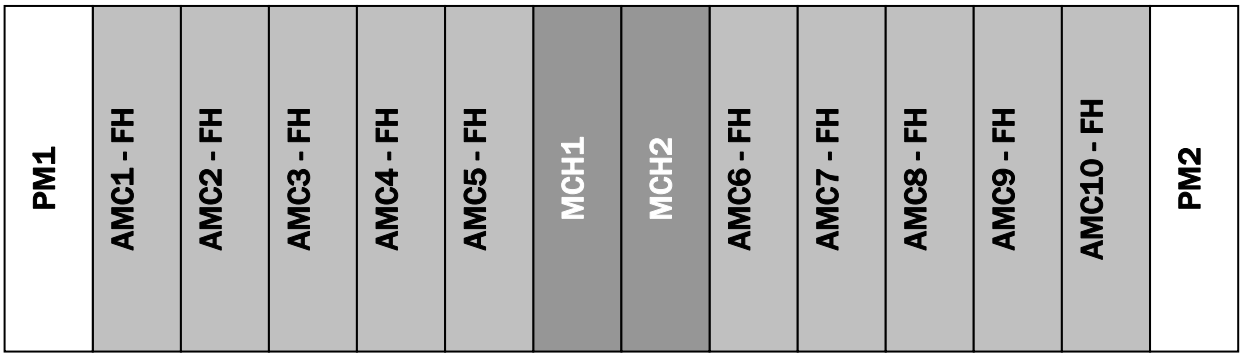

Figure 21: VT864 Slot Layout.

4.5.2 Telco Alarm Interface

Uses DA200 Telco Alarm, see **Appendix Section 4.6**.

4.5.3 FRU Information

The Carrier FRU information is stored in the EEPROM at address 0x52, per the MicroTCA specification. The EEPROM can be partitioned to contain both the Shelf and Carrier FRU Information in some configurations.

4.5.4 Carrier Number Configuration

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 VT864, set the Chassis Locator switches on the DA200 according to Table 8 in **Appendix Section 4.6**. Make sure both the switches are set the same. The Chassis Locator switches are on the side of the DA200.

4.5.5 JTAG

JTAG is not available on the VT864.

4.5.6 VT864 Redundant Clock Topology

The VT864 may be ordered with redundant clock topology shown in **Figure 22**.

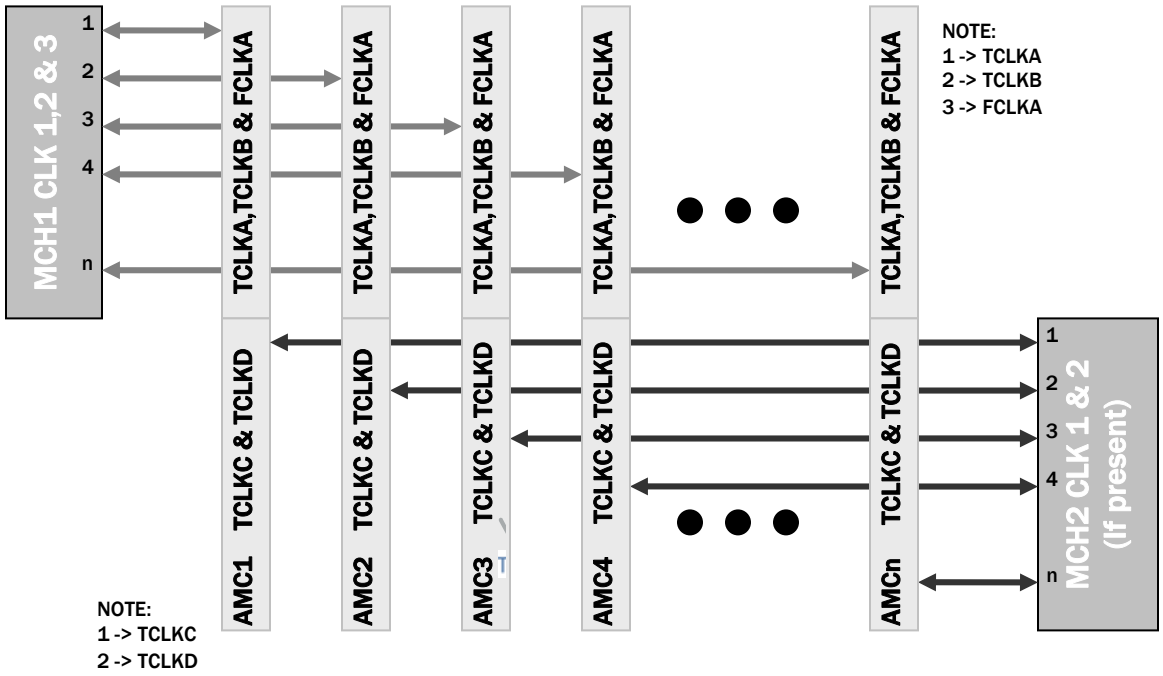

Figure 22: VT864 Redundant Clock Topology.

4.5.7 VT864 Backplane Direct Connect Topology (ordering option 1)

With ordering option 2, AMC ports 2 and 3 are interconnected as shown in **Figure 23**.

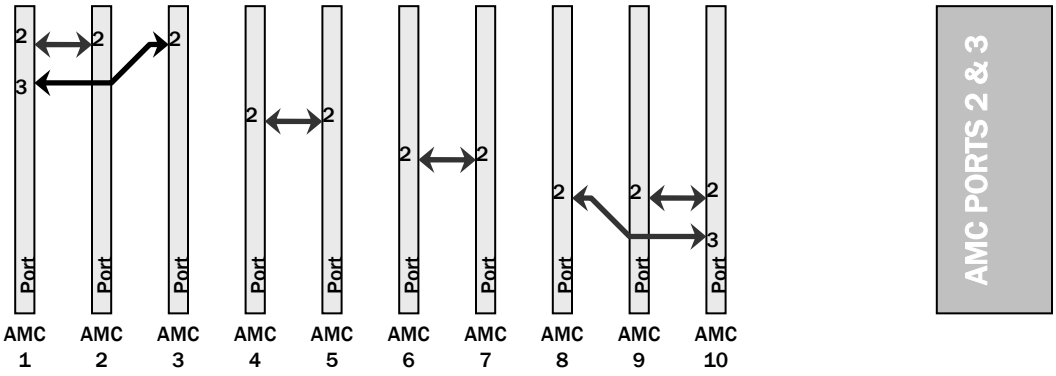

Figure 23: VT864 AMC direct connections with ordering option 1.

4.6 Telco Alarm Modules

The VT86x series uses two types of Telco Alarm Modules, the UTC009 and the DA200. Operational characteristics for each are identical with differences only in the form factor. The Telco Alarm Connector is used to relay alarm information to an external alarm device.

- The "Active 1" and "Active 2" LEDs indicate which Cooling Unit is representing the Telco device to the Carrier Manager. Normally, "Active 1" will be on, indicating that the lower CU is active.
- The Critical, Major, and Minor Alarm LEDs indicate the state of the alarms. When an alarm is active, the corresponding LED will be on.
- The Chassis Power Switch 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 reflects the state of the "Chassis Power Switch".
- The Power Good LED reflects the power state of the UTC009.
- The Telco Alarm Cutoff button 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.

4.6.1 UTC009

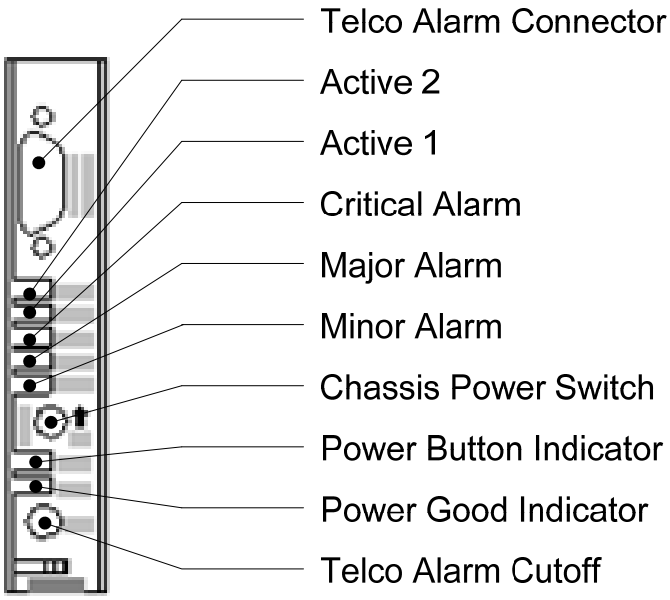

Figure 24: UTC009 Front Panel

4.6.1.1 FRU Information

The Carrier FRU information is stored in the EEPROM at address 0x52

4.6.1.2 Chassis Locator

Chassis locator switches on the UTC009 module are shown in Figure 25.

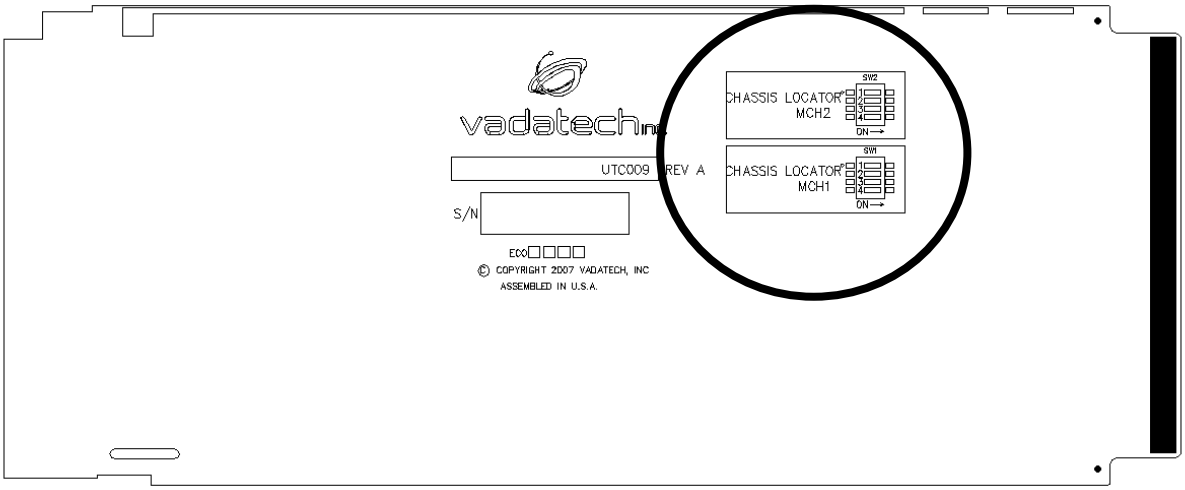

Figure 25: UTC009 Chassis Locator Switches.

4.6.2 DA200

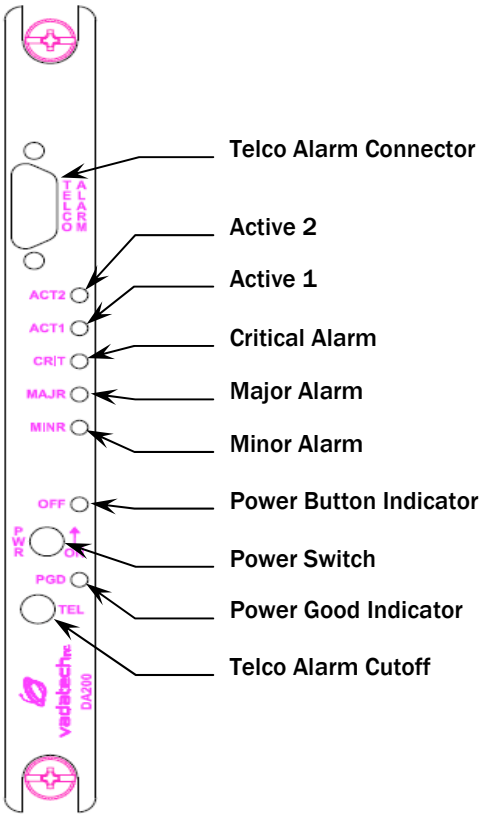

Figure 26: DA200 Front Panel.

4.6.2.1 FRU Information

The Carrier FRU information is stored in the EEPROM at address 0x52

4.6.2.2 Chassis Locator

Chassis Locator switches for the DA200 are located on the top of the board as shown in **Figure 27**.

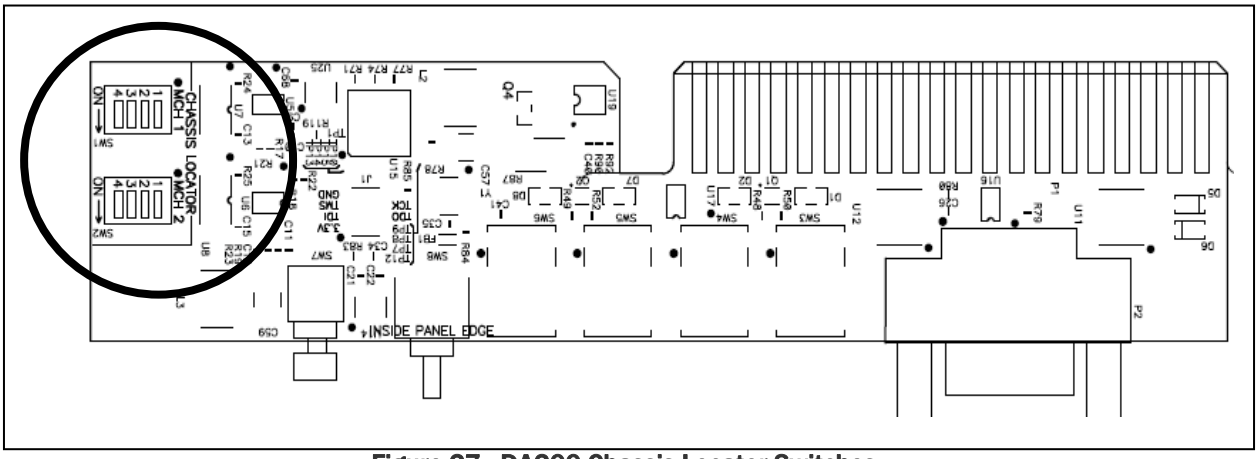

Figure 27: DA200 Chassis Locator Switches.

4.6.3 Telco Alarm Connector

Micro DSUB-15 male connector is used to drive an external alarm device.

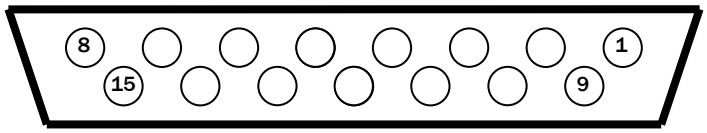

Figure 28: Telco Alarm Connector

Pin	Name	Description
1	Minor Reset +	minor alarm reset, positive polarity
2	Minor Reset -	minor alarm reset, negative polarity
3	Major Reset +	major alarm reset, positive polarity
4	Major Reset -	major alarm reset, negative polarity
5	Critical Alarm NO	critical alarm relay, normally open
6	Critical Alarm NC	critical alarm relay, normally closed
7	Critical Alarm COM	critical alarm relay, common path
8	Minor Alarm NO	minor alarm relay, normally open
9	Minor Alarm NC	minor alarm relay, normally closed
10	Minor Alarm COM	minor alarm relay, common path
11	Major Alarm NO	major alarm relay, normally open
12	Major Alarm NC	major alarm relay, normally closed
13	Major Alarm COM	major alarm relay, common path
14	Power Alarm NO	power alarm relay, normally open
15	Power Alarm COM	power alarm relay, common path

Table 5: Telco Connector Pins

4.7 JTAG Module

The UTC008 JTAG Switch Module (JSM) 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.

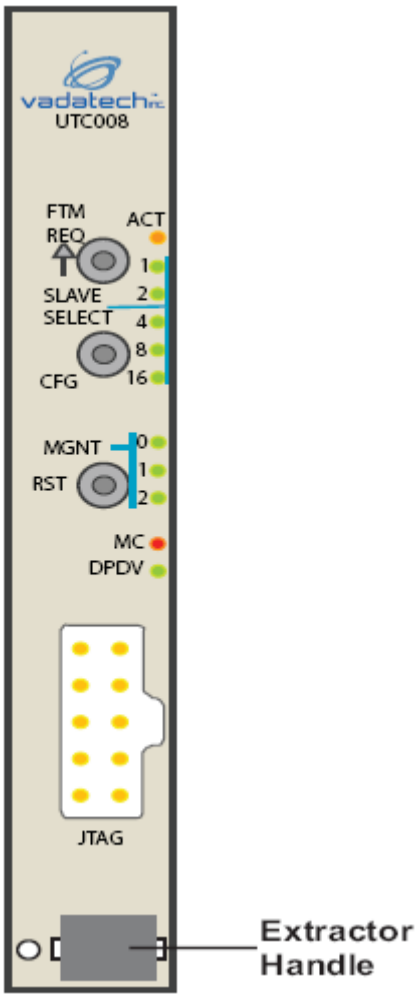

Figure 29: UTC008 JSM Front Panel

4.7.1 UTC008 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.

4.7.2 UTC008 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 6: 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 7: MGNT LEDs

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

4.8 Carrier Locator Switch Logic

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 8: Carrier Number Configuration