VadaTech MicroTCA Power Module

Command Line Interface Reference Manual

March 18, 2009
Version 1.0

vadatech inc.
THE POWER OF VISION

Notice

While reasonable efforts have been made to assure the accuracy of this document, VadaTech, Inc. assumes no liability resulting from any omissions in this document or from the use of the information obtained herein. VadaTech reserves the right to revise this document and to make changes periodically and the content hereof without obligation of VadaTech to notify any person of such revision or changes.

Electronic versions of this material may be read online, downloaded for personal use, or referenced in another document as a URL to the VadaTech Incorporated Web site. The text itself may not be published commercially in print or electronic form, edited, translated, or otherwise altered without the permission of VadaTech, Inc.

It is possible that this publication may contain reference to or information about VadaTech products (machines and programs), programming, or services that are not available in your country. Such references or information must not be construed to mean that VadaTech intends to announce such products, programming, or services in your country.

Trademarks

Revision History

Doc Rev	Description of Change	Revision Date
1.0.0	Initial Release This document is based on UTC010 Command Line Interface Manual version 1.0.5.	03/18/2009

Table of Contents

Figures

Tables

1 Overview

This document describes the Command Line Interface (CLI) available on VadaTech MicroTCA Power Modules. This interface can be used to monitor the Power Module and to configure autonomous operation.

The CLI allows the operator to:

- Monitor input power status
- Monitor internal management power and external management power availability
- Monitor management power status for MCHs, CUs, and AMCs
- Monitor payload power status and current draw for MCHs, CUs, and AMCs
- Monitor PM temperature
- Temporarily override temperature alarm thresholds
- Configure AMC power channels for autonomous operation

1.1 Document References

- PICMG Specification MTCA.0 R1.0 (MicroTCA)

1.2 Acronyms Used in this Document

Acronym	Description
AMC	AdvancedMC
CU	MicroTCA Cooling Unit
MCH	MicroTCA Carrier Hub
PM	MicroTCA Power Module

Table 1: Acronyms

2 CLI Serial Interface

The CLI is provided via an RS-232 serial port. The location and pin-out of the RS-232 connector varies according to the Power Module hardware. Refer to the hardware user manual for details. The communication protocol is 115200 baud, no parity, 8 data bits, 1 stop bit (115200, N81).

The CLI uses color-coded text in the following manner:

- Normal (default terminal color) indicates constant text. For example, a row or column header, or a menu option, will display in the default terminal color.
- Green indicates normal operation. For a power channel, it indicates that no power faults have been detected. For a temperature sensor, it indicates that the temperature has not exceeded any threshold.
- Red indicates a failure condition. This would include an over-current on a power channel, or a temperature sensor that is exceeding its upper critical alarm threshold.
- Orange indicates a warning condition. For example, a temperature sensor that is exceeding its upper non-critical (UNC) alarm threshold would be displayed in orange.
- Yellow indicates that the status is unavailable. For example, a power channel for which no module is present.

The CLI provides a screen-oriented interface. Each screen displays information and provides one or more menu options. The '**Enter**' or '**Spacebar**' key will refresh the screen. Menu options are selected with a single letter. The menu is case-insensitive, although upper-case letters are used throughout this document. Invalid menu entries to the CLI will be ignored. Some menu options will prompt the user for additional data. The format and range of the data will be described in the prompt. Invalid data will be rejected. In this case, the operation will be aborted or the prompt will be repeated.

The PM Firmware will asynchronously report power status changes. These messages may cause the CLI screens to be misaligned. If this happens, use the Enter or Spacebar key to refresh the screen.

3 CLI Reference

3.1 PM Version Information

When the PM is first turned on, it displays version information. This information will depend on the hardware and firmware on the PM. A typical example is shown below:

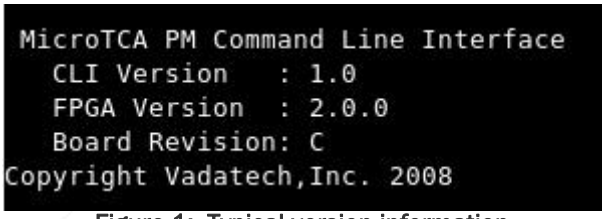

Figure 1: Typical version information

To view the version information, make sure the CLI Serial Interface is working and then cycle the PM power.

3.2 Load Power Status Display

The Load Power Status Display (henceforth known as LPSD) is the main status display of the CLI. It shows the current status of all of the power channels, and provides a summary of the input power and temperature status. This display can be accessed from most other displays by pressing '**P**'. A typical example of this display is shown in Figure 2.

```
Load Power Status                                             Payload    Payload
                    Management       Payload                  Draw       Required
Module    Present   Power to Load    Power to Load            in Amps    in Amps
------    -------   -------------    -------------            -------    --------
MCH1      Yes       Good             Good                     1.0        4.0
MCH2      No        -------          -------                  -----      -----
CU1       Yes       Good             Good                     2.0        7.6
CU2       No        -------          -------                  -----      -----
AMC1      Yes       Good             Good                     0.1        0.3
AMC2      Yes       Good             Good                     0.1        0.3
AMC3      Yes       Good             Good                     0.1        0.3
AMC4      Yes       Good             Good                     0.1        0.3
AMC5      Yes       Good             Good                     0.1        0.3
AMC6      Yes       Good             Good                     0.1        0.3
AMC7      Yes       Good             Good                     0.1        0.3
AMC8      Yes       Good             Good                     0.1        0.3
AMC9      Yes       Good             Good                     0.1        0.3
AMC10     Yes       Good             Good                     0.1        0.3
AMC11     Yes       Good             Good                     0.1        0.3
AMC12     Yes       Good             Good                     0.1        0.3
'E' - Power Entry Status: Good          'T' - Temperature Sensors: Good
'C' - Clear Faults                      'S' - Autonomous Power Sequencing
```

Figure 2: Load Power Status Display

This screen provides the following information:

- **Management Power to Load** and **Payload Power to Load** describe the state of the management and payload power, respectively. Possible states are "Good", "Off", and "Over Current".
- **Payload Draw** is the payload current being drawn as measured by the PM.
- **Payload Required** is the payload current limit for the given channel. In normal operation, this value is set by the MCH, based on the module's Current Requirement Record. In Autonomous mode, this value is determined by the sequencing configuration. (See section 3.5)
- **Power Entry Status** is a summary of the hardware's power status.
- **Temperature Sensors** shows a combined status for all of the temperature sensors on the PM.

Note that the payload draw is based on an A-to-D converter on the Management Controller, while the current limit is enforced by external hardware. It is possible for the draw to exceed the current limit, especially for power levels below 2 amps.

This screen provides the following menu options:

- **'E'** will show the Power Entry Status display, described in Section 3.3: Power Entry Status Display.
- **'T'** will show the Temperature Sensor Status Display, described in Section 3.4: Temperature Sensor Status Display.
- **'C'** will clear over-current faults. Normally, faults are only cleared when a module is extracted.
- **'S'** will show the Power Sequencing Display, described in Section 3.5: Power Sequencing Display.

3.3 Power Entry Status Display

The Power Entry Status Display (PESD) is selected by the user when a more detailed view of the power entry fuse status and the management power status is desired. The display shows hardware specific information. For a description of this display, refer to the hardware user manual. To return to the LPSD, press '**P**'.

3.4 Temperature Sensor Status Display

The user can access the Temperature Sensor Status display to read current temperature values for the various temperature sensors and configure thresholds for these sensors. A typical display is shown below.

```
Temperature Sensor Status

                                                 Upper          Upper
                                                 Non-Critical   Critical
       Sensor   Sensor            Sensor         Alarm          Alarm
Item   Number   Name              Reading        Threshold      Threshold
----   ------   ----------------  -------        ------------   ---------
A      0x10     FET TEMP           28C            45C            60C
B      0x11     BRICK 1 TEMP       29C            45C            60C
C      0x12     BRICK 2 TEMP       30C            45C            60C
D      0x13     UTC010 tIN         25C            60C            75C
E      0x14     UTC010 tOUT        26C            45C            60C
'A' to 'E' - Modify Sensor Thresholds
       'P' - Load Power Status Display
```

Figure 3: Typical Temperature Status Display

The Sensor Number and Sensor Name are retrieved from the Sensor Data Repository (SDR). These values are hardware-specific. For more information, refer to the hardware user

manual. To temporarily override a threshold value, press the letter shown in the **Item** column for the sensor. To return to the LPSD, press '**P**'.

An example of modifying a sensor threshold is shown below. In this example, the user is modifying the FET TEMP thresholds. The units are degrees Celsius.

```
Temperature Sensor Status
                                                 Upper          Upper
                                                 Non-Critical   Critical
       Sensor   Sensor              Sensor       Alarm          Alarm
Item   Number   Name                Reading      Threshold      Threshold
----   ------   ----------------    -------      ------------   ---------
A      0x10     FET TEMP             28C          45C            60C
B      0x11     BRICK 1 TEMP         29C          45C            60C
C      0x12     BRICK 2 TEMP         30C          45C            60C
D      0x13     UTC010 tIN           25C          60C            75C
E      0x14     UTC010 tOUT          26C          45C            60C
'A' to 'E' - Modify Sensor Thresholds
       'P' - Load Power Status Display
Enter new sensor 0 Upper Non-Critical Threshold: 40
Enter new sensor 0 Upper Critical Threshold: 55

Temperature Sensor Status
                                                 Upper          Upper
                                                 Non-Critical   Critical
       Sensor   Sensor              Sensor       Alarm          Alarm
Item   Number   Name                Reading      Threshold      Threshold
----   ------   ----------------    -------      ------------   ---------
A      0x10     FET TEMP             28C          40C            55C
B      0x11     BRICK 1 TEMP         29C          45C            60C
C      0x12     BRICK 2 TEMP         30C          45C            60C
D      0x13     UTC010 tIN           25C          60C            75C
E      0x14     UTC010 tOUT          26C          45C            60C
'A' to 'E' - Modify Sensor Thresholds
       'P' - Load Power Status Display
```

Figure 4: Overriding temperature alarm thresholds

The threshold modification will be canceled if an invalid temperature is entered. After the values have been entered or the modification has been canceled, the temperature status display will be refreshed.

3.5 Power Sequencing Display

Pressing '**S**' on the LPSD displays the Power Sequencing Display. This screen shows the autonomous power sequencing configuration.

```
Power Sequencing

Item   Present   Module   Order   Amps
----   -------   ------   -----   ----
A      No        AMC1     0       0.0
B      No        AMC2     0       0.0
C      No        AMC3     0       0.0
D      No        AMC4     0       0.0
E      No        AMC5     0       0.0
F      No        AMC6     0       0.0
G      No        AMC7     0       0.0
H      No        AMC8     0       0.0
I      No        AMC9     0       0.0
J      No        AMC10    0       0.0
K      No        AMC11    0       0.0
L      No        AMC12    0       0.0

Sequencing Time (milliseconds): 1000
Verbose Mode: Disabled

'A' to 'L' - Modify parameters for a module   'T' - Modify sequencing time
       'S' - Save configuration               'R' - Clear Configuration
       'P' - Load Power Status Display
? 
```

Figure 5: Initial Power Sequencing Display

The values in the table are as follows:

- The **Order** column is the order in which the AMCs will be powered on. A value of zero indicates that the MCH is in control of the power channel.
- The **Amps** column shows the current limit for the AMC in autonomous mode.
- **Sequencing Time** is the delay before powering on the first group of AMCs, and between groups of AMCs.

The menu options are as follows:

- 'A' to 'L', Modify the sequencing parameters for an AMC. 'A' will modify AMC1, 'B' will modify AMC2, etc. Configuration changes will not take effect until the next power cycle. Configuration changes will be lost if the configuration is not saved.
- 'T', Modify the sequencing time and verbose mode setting.
- 'S', Write the current configuration to flash. If the configuration is not saved, the changes will be lost when the power is turned off.
- 'R', Clear the sequencing configuration. This option will set the order and amps to zero for all channels and automatically save the cleared configuration to flash.

3.5.1 How Autonomous Sequencing Works

VadaTech PMs can be configured to turn on one or more AMCs without relying on the MCH. This feature is provided to support non-standard Carriers. For example, a Carrier may be designed with an OEM module connected to an AMC power channel.

The power sequencing algorithm uses an activation order to turn on AMCs in stages. AMCs with the same order number are turned on at approximately the same time. The lowest-numbered group is turned on first, followed by the next-lowest-numbered group, and so on. For example, consider the configuration shown in Figure 6.

- If present, AMC1 will be turned on after an initial delay of 100 milliseconds.
- 100 ms later, AMC3 and AMC4 will be turned on, if present.
- 100 ms later, AMC2 will be turned on, if present.
- 100 ms later, AMC5 will be turned on, if present.

```
Power Sequencing

Item   Present   Module   Order   Amps
----   -------   ------   -----   ----
A      No        AMC1     1       4.0
B      No        AMC2     4       4.0
C      No        AMC3     2       4.0
D      No        AMC4     2       4.0
E      No        AMC5     5       4.0
F      No        AMC6     0       0.0
G      No        AMC7     0       0.0
H      No        AMC8     0       0.0
I      No        AMC9     0       0.0
J      No        AMC10    0       0.0
K      No        AMC11    0       0.0
L      No        AMC12    0       0.0

Sequencing Time (milliseconds): 100
Verbose Mode: Disabled
```

Figure 6: Example Configuration

Note that the presence or absence of AMCs does not affect the timing of autonomous sequencing. After the last group is powered on, all autonomous channels are monitored. If an AMC is inserted into a monitored slot it will be turned on immediately.

3.5.2 Autonomous Sequencing Limitations

Autonomous sequencing is a non-standard feature. Please note the following limitations.

- Autonomous activation of AMCs by the PM is a violation of the MicroTCA specification. This feature can interfere with the operation of the MCH, if an MCH is present.
- This feature should only be used to accommodate non-standard Carriers or Modules.
- In order to minimize unwanted interactions with the MCH, autonomous AMC channels will not generate power channel status events. The power channel status will always be reported to the MCH as 'not present'. The PM CLI must be used to monitor autonomous channels.
- Autonomously powered Modules are not accounted for by the MCH when allocating power.
- The MCH will not monitor the temperature of autonomously powered Modules.
- Conforming AMCs will not enable their fabric interfaces unless a "Set AMC Port State" command is sent by an MCH. Autonomous sequencing is not a substitute for an MCH.

3.5.3 Power Sequencing Menu Options

To set the sequencing option for an AMC, press the corresponding letter. The CLI will ask for a sequencing order and current limit, as shown in Figure 7. After the information is entered, the new configuration will be displayed.

```
? Sequencing Order; 0=unpowered, 1=first to be powered, 12=last.
Duplicate entries allowed.
Enter Sequencing Order 0-12 for AMC1 [0] ? 1
order = 1
Enter AMC1 current requirements in Amperes.
(Rounded to nearest tenth of an Ampere) [0.0] ? 2.5
Current limit is 2.5 amps

Power Sequencing

Item   Present   Module   Order   Amps
----   -------   ------   -----   ----
A      No        AMC1     1       2.5
B      No        AMC2     0       0.0
C      No        AMC3     0       0.0
D      No        AMC4     0       0.0
E      No        AMC5     0       0.0
F      No        AMC6     0       0.0
G      No        AMC7     0       0.0
H      No        AMC8     0       0.0
I      No        AMC9     0       0.0
J      No        AMC10    0       0.0
K      No        AMC11    0       0.0
L      No        AMC12    0       0.0

Sequencing Time (milliseconds): 100
Verbose Mode: Disabled

'A' to 'L' - Modify parameters for a module   'T' - Modify sequencing time
       'S' - Save configuration               'R' - Clear Configuration
       'P' - Load Power Status Display
? 
```

Figure 7: Enabling Autonomous Sequencing for AMC1

If the user enters a sequence number that is greater than the number of Modules allowed or enters a required current that is greater than the current per slot allowed by the MicroTCA specification (9.6 amperes), the value will be rejected. To retain the previous order or limit, press '**Enter**'.

Note that the current limit is approximate, and the range and accuracy of over-current protection depends on the hardware.

To change the sequencing time and verbose output option, press '**T**'. Verbose output provides information during autonomous sequencing, such as which group is being turned on. This information may vary between different versions of the firmware. The sequencing time is the time, in milliseconds, before the first group, and between groups during activation. The range is 100 to 25500, in 100 millisecond increments.

To save any changes that have been made to the sequencing order, sequencing time, or verbosity, press '**S**'. The changes are retained while viewing other screens, but will be lost if the power is turned off prior to saving the changes.

To disable power sequencing for all channels, press '**R**'. This is an easy way to return the PM to a standard-conforming state.

Once power sequencing configuration is complete, press '**P**' to go back to the LPSD.