VadaTech MicroTCA

Management Interface Specification

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1 Overview

This document provides a summary of the VadaTech MicroTCA Management Software Interface Specification.

1.1 References

- Intelligent Platform Management (IPMI) Interface Specification v2.0
- PICMG® 3.0 Revision 3.0 AdvancedTCA® Base Specification
- PICMG Specification MTCA.0 R1.0 (MicroTCA)
- VadaTech MicroTCA Shelf Manager Command Line Interface
- VadaTech MicroTCA Carrier Manager Command Line Interface
- VadaTech ATC Core SNMP Interface Reference Manual
- VadaTech MicroTCA Shelf Manager SNMP Interface
- VadaTech MicroTCA Carrier Manager SNMP Interface

2 MicroTCA Management Architecture

The MicroTCA hardware platform management includes Module management via the MicroTCA Carrier Management Controller (MCMC), MicroTCA Carrier management, and MicroTCA Shelf management. The MicroTCA Carrier leverages the AdvancedMC Carrier Board management architecture, which is defined in the AMC.0 specification.

A MicroTCA Shelf consists of at least one MicroTCA Carrier. Up to sixteen MicroTCA Carriers can be grouped together to form a single MicroTCA Shelf.

The Carrier Manager function resides with an MCMC on the MCH. Depending on the MCH configuration and active status, the management software functions discussed in this document, along with their associated functions, will be active in the MCH. Each of these functions has a specific role in the MicroTCA Chassis management. For more information, please refer to the PICMG MicroTCA Base Specification document.

The MicroTCA Shelf Manager manages up to sixteen MicroTCA Carriers. Each Carrier Manager interfaces to the Shelf Manager using a logical Shelf-Carrier Manager Interface, which is an IP-based interface. The Shelf Manager monitors managed entities such as AdvancedMCs, MCHs, PMs, CUs, and OEM Modules. One of the tasks of the Shelf Manager is to report anomalous conditions to the System Manager and take corrective actions where appropriate. The Shelf Manager can determine the collective hardware health status of the MicroTCA Carriers that comprise the MicroTCA Shelf and use the Telco alarms for visual and audible indications of that health.

The Carrier Manager, representing the entire MicroTCA Carrier, is a logical function that manages the MicroTCA Carrier. It is possible to have redundant instances of the Carrier Manager. However, there can be only one active manager on a MicroTCA Chassis at any given time. The Carrier Manager provides management interfaces to managed entities within a MicroTCA Carrier. The Carrier Manager manages its AdvancedMCs, MCHs, PMs, CUs and OEM Modules, and represents these entities to the Shelf Manager. The Carrier Manager communicates with the Shelf Manager using the Shelf IP address configured in the Carrier IP Link record.

The MCMC is a variant of an AdvancedTCA-defined IPM Controller on the MCH and communicates with the Carrier Manager to provide management interfaces to managed entities within a MicroTCA Carrier.

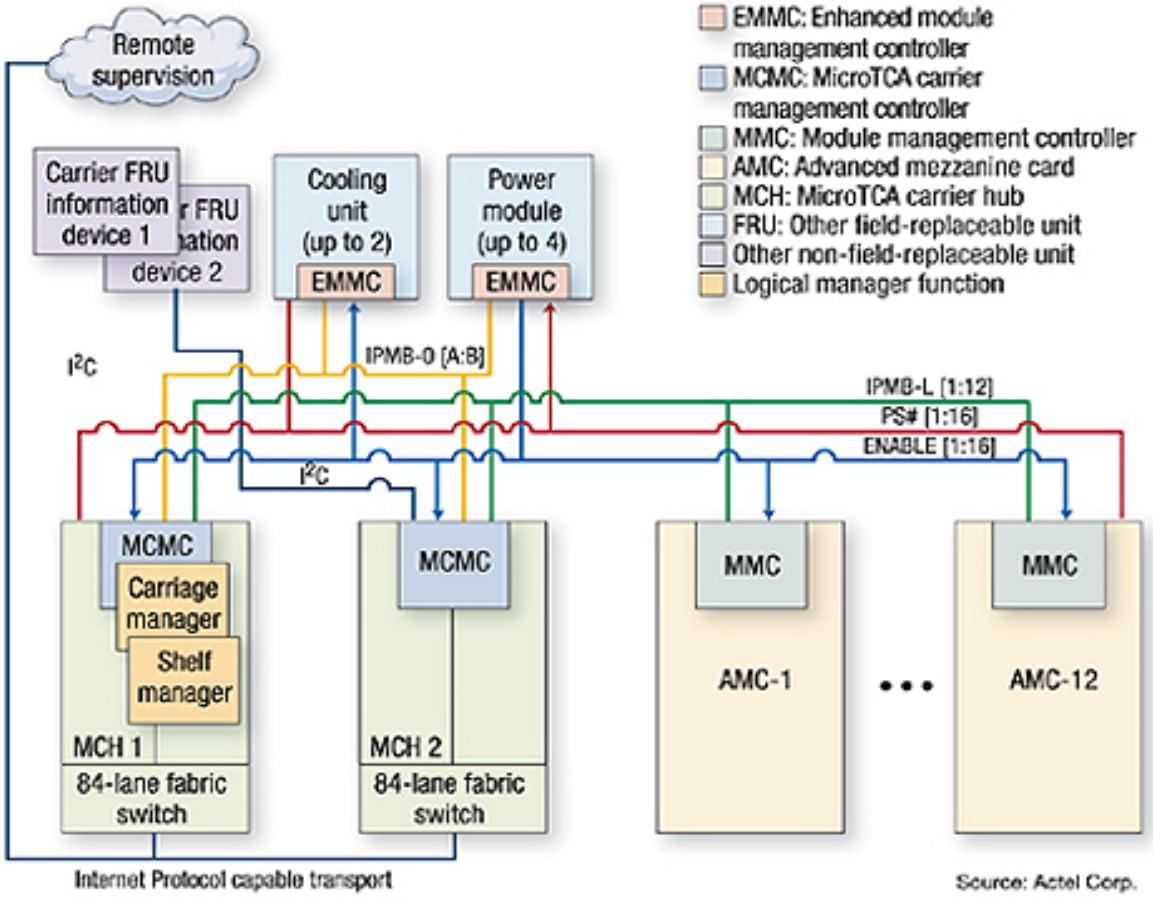

Figure 1: Example MicroTCA Shelf Management diagram

The VadaTech Carrier Manager activates and manages the MicroTCA Carrier on which it is installed by using the Carrier backplane information. The Carrier backplane information is stored in the Carrier FRU Information Device, and is provided by the Carrier Manufacturer.

In a MicroTCA Shelf, the Shelf Manager can be implemented in any FRU, including the VadaTech MCH, as shown in Figure 1. The VadaTech MCH provides this capability if such a configuration is desired. Please refer to the VadaTech MicroTCA MCH Getting Started Document.

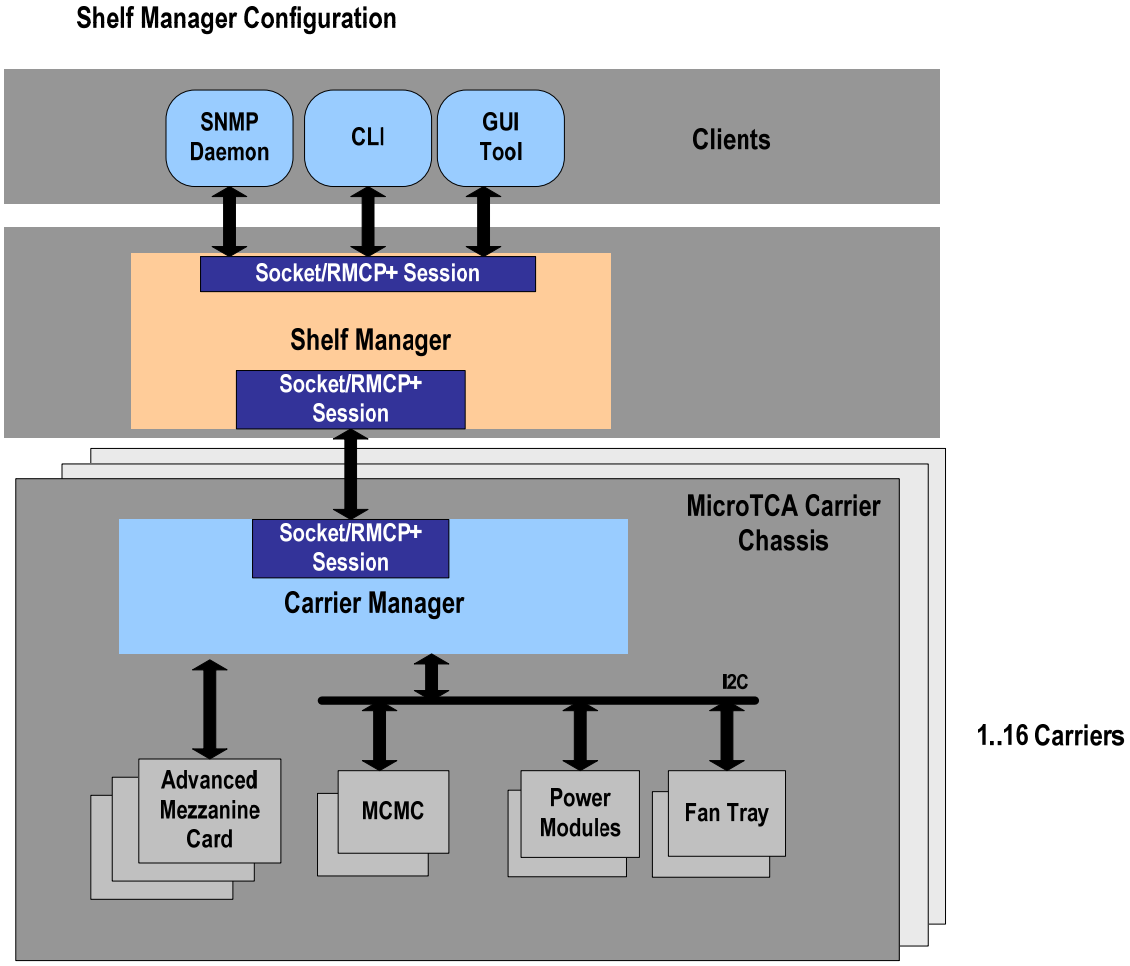

Figure 2: Configuration with Shelf Manager enabled

In Figure 2 above, the Shelf Manager is a remote entity that is communicating with and managing up to 16 Carriers. Typically, the Shelf Manager can be hosted by any FRU on the MicroTCA System. Using the VadaTech MCH, any one Carrier in the Shelf can be designated to run the Shelf Manager. On the designated Carrier, both the active and redundant MCHs must be configured to run as a Shelf Manager. However, only the active MCH will have the Carrier and Shelf Manager active. With the Shelf Manager option enabled, clients such as the SNMP, CLI, and GUI tools will always interface with the Shelf Manager.

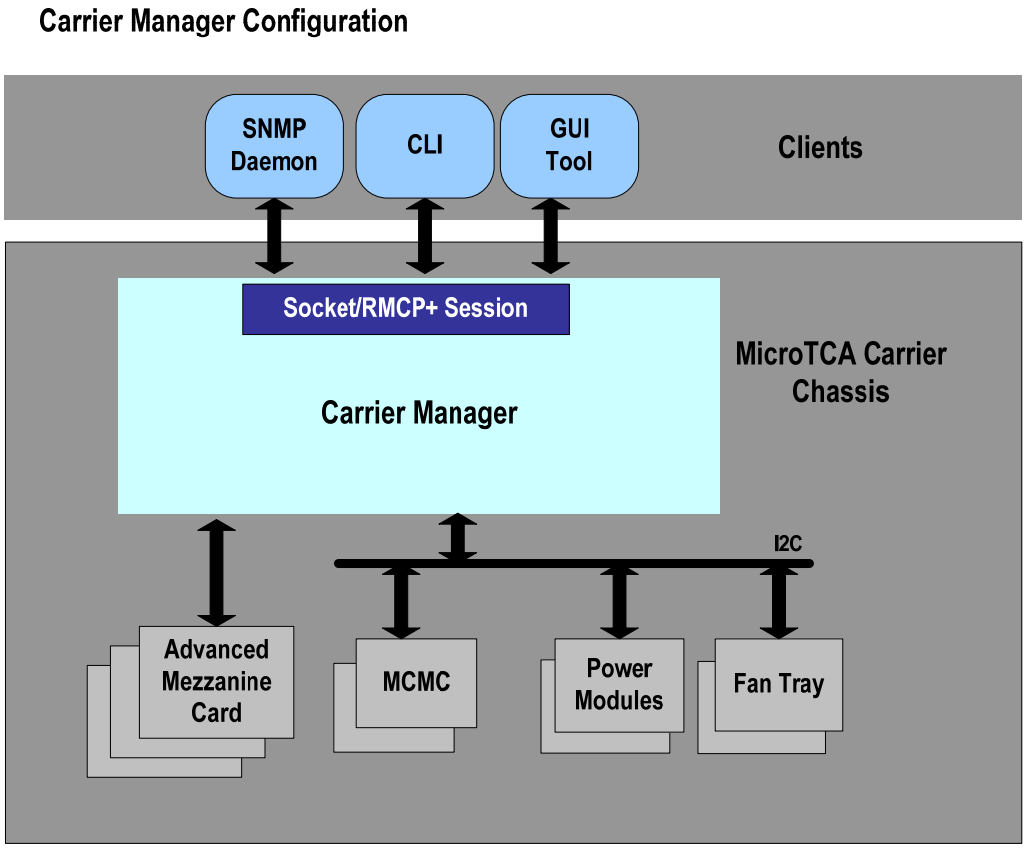

Figure 3: Configuration with Shelf Manager disabled

In Figure 3, the MCH has the Shelf Manager option disabled. In this configuration, the Carrier Manager will communicate with a remote Shelf Manager at a designated Shelf IP address. With the Carrier Manager option enabled, clients such as the SNMP, CLI, and GUI tools will always interface with the Carrier Manager.

3 Management Interfaces

The following Management Interfaces are available on the VadaTech Carrier and Shelf Managers. These interfaces are used to query the status of the MCH and FRUs managed by them, respectively.

If the Shelf Manager option is enabled, the Shelf IP connection interface shall be used to connect to the Shelf Manager. The Shelf IP connection is specified in the Shelf Manager IP Link record. For more information on the Shelf Manager IP Link record, please refer to the PICMG MicroTCA Base Specification document.

3.1 RMCP+ Interface

IPMI v2.0 defines extended packet formats and capabilities that are collectively referred to as “RMCP+”. RMCP+ is actually defined under the IPMI-specific portion of an RMCP packet. RMCP+ utilizes authentication algorithms that are more closely aligned with the mechanisms used for the ASF 2.0 specification. In addition, RMCP+ adds data confidentiality (encryption) and a ‘payloads’ capability. Remote clients can connect with the Shelf Manager using a secure RMCP+ session and interface with the Shelf or the Carrier Manager. RMCP+ adds the ability to enable IPMI over IP sessions to other types of traffic in addition to IPMI messages.

The following Authentication, Integrity, and Encryption algorithms are supported by the Shelf and Carrier Managers.

3.1.1 Authentication Algorithms

The Authentication Algorithm Number specifies the type of authentication “handshake” process that is to be used and identifies any particular variation of hashing or signature algorithm that is to be used as part of the process.

Type	Description
RAKP-NONE	RAKP-none uses the same steps and messages as RAKP-HMAC-SHA1, but the Key Exchange Authentication Code field in RAKP Message 2 and RAKP Message 3 and the Integrity Check Value field in RAKP Message 4 are absent since they are not used. The RAKP steps establish Session IDs and privilege level for the given username/role. The MCH is configured with a null username that has a null (all 0's) password thus provides a way to enable access the BMC without requiring a username and password.
RAKP-HMAC-SHA1	RAKP-HMAC-SHA1 specifies the use of RAKP messages for the key exchange portion of establishing the session, and that HMAC-SHA1 is used to create the Key Exchange 20-byte Authentication Code fields in RAKP Message 2 and RAKP Message 3. HMAC-SHA1-96 (per RFC2404) is used for generating a 12-byte Integrity Check Value field for RAKP Message 4.
RAKP-HMAC-MD5	This authentication algorithm operates the same way as RAKP-HMAC-SHA1 except that the HMAC with MD5 (per [RFC2104]) is used for RAKP authentication operations in place of SHA-1. Thus, the Key Exchange Authentication Code fields in RAKP Message 3 and RAKP Message 4 and the Integrity Check Value field in RAKP Message 4 are all 16-byte fields (128-bit MD5). Since MD5 requires fewer computational steps than SHA-1, this option can be used to offer quicker session activation.

3.1.2 Integrity Algorithms

The Integrity Algorithm Number specifies the algorithm used to generate the contents for the AuthCode "signature" field that accompanies authenticated IPMI v2.0/RMCP+ messages once the session has been established.

Type	Description
NONE	RAKP-none uses the same steps and messages as RAKP-HMAC-SHA1, but the Key Exchange Authentication Code field in RAKP Message 2 and RAKP Message 3 and the Integrity Check Value field in RAKP Message 4 are absent since they are not used. The RAKP steps establish Session IDs and privilege level for the given username/role. The MCH is configured with a null username that has a null (all 0's) password thus provides a way to enable access the BMC without requiring a username and password.
HMAC-SHA1-96	Utilizes the Session Integrity Key as the key for use in HMAC
HMAC-MD5-128	Utilizes the Session Integrity Key as the key for use in HMAC
MD5-128	Uses a straight MD5 signature with the user's key information appended at the beginning and the end of the packet

3.1.3 Confidentiality Algorithms

The Confidentiality Algorithm Number specifies the encryption/decryption algorithm field that is used for encrypted payload data under the session. Confidentiality none and AES-CBS-120 algorithms are supported.

3.1.4 IPMI Commands

The following IPMI/ATCA/MicroTCA commands are accessible through LUN OOb on Carrier Manager and Shelf Manager IP interfaces or MCMC IPMB.

	NetFn	CMD	Shelf	Carrier	MCMC
IPMI Device "Global" Commands					
Get Device ID	App	01h	✓	✓	✓
Cold Reset	App	02h	✓	✓	✓
Warm Reset	App	03h	✓	✓	✓
Get Shelf Test Results	App	04h	✓	✓	✓
Manufacturing Test On	App	05h	×	×	×
Set ACPI Power State	App	06h	×	×	×
Get ACPI Power State	App	07h	×	×	×
Get Device GUID	App	08h	✓	✓	✓
Broadcast "Get Device ID"	App	01h	×	✓	✓
BMC Watchdog Timer Commands					
Reset Watchdog Timer	App	22h	×	×	×
Set Watchdog Timer	App	24h	×	×	×
Get Watchdog Timer	App	25h	×	×	×
BMC Device and Messaging Commands					
Set BMC Global Enables	App	2Eh	×	×	×
Get BMC Global Enables	App	2Fh	×	×	×
Clear Message Flags	App	30h	×	×	×
Get Message Flags	App	31h	×	×	×
Enable Message Channel Receive	App	32h	×	×	×
Get Message	App	33h	×	×	×
Send Message	App	34h	✓	✓	✓
Read Event Message Buffer	App	35h	×	×	×
Get BT Interface Capabilities	App	36h	×	×	×
Master Write-Read	App	52h	✓	✓	✓
Get System GUID	App	37h	✓	✓	×
Get Channel Authentication Capabilities	App	38h	✓	✓	×
Get Session Challenge	App	39h	✓	✓	×
Activate Session	App	3Ah	✓	✓	×
Set Session Privilege Level	App	3Bh	✓	✓	×
Close Session	App	3Ch	✓	✓	×
Get Session Info	App	3Dh	✓	✓	×

✓ Command supported
× Command not supported
N/A Command not applicable for this Controller

Get AuthCode	App	3Fh	✓	✓	✗
Set Channel Access	App	40h	✓	✓	✗
Get Channel Access	App	41h	✓	✓	✗
Get Channel Info	App	42h	✓	✓	✗
Set User Access	App	43h	✓	✓	✗
Get User Access	App	44h	✓	✓	✗
Set User Name	App	45h	✓	✓	✗
Get User Name	App	46h	✓	✓	✗
Set User Password	App	47h	✓	✓	✗
Chassis Device Commands					
Get Chassis Capabilities	Chassis	00h	✗	✗	✗
Get Chassis Status	Chassis	01h	✗	✗	✗
Chassis Control	Chassis	02h	✓	✓	✓
Chassis Reset	Chassis	03h	✗	✗	✗
Chassis Identify	Chassis	04h	✗	✗	✗
Set Chassis Capabilities	Chassis	05h	✗	✗	✗
Set Power Restore Policy	Chassis	06h	✗	✗	✗
Get System Restart Cause	Chassis	07h	✗	✗	✗
Set System Reboot Options	Chassis	08h	✗	✗	✗
Get System Boot Options	Chassis	09h	✗	✗	✗
Get POH Counter	Chassis	0Fh	✗	✗	✗
Event Commands					
Set Event Receiver	S/E	00h	✓	✓	✓
Get Event Receiver	S/E	01h	✓	✓	✓
Platform Event (a.k.a Event Message)	S/E	02h	✓	✓	✓
PEF and Alerting Commands					
Get PEF Capabilities	S/E	10h	✓	✓	✓
Arm PEF Postpone Timer	S/E	11h	✗	✗	✗
Set PEF Configuration Parameters	S/E	12h	✓	✓	✓
Get PEF Configuration Parameters	S/E	13h	✓	✓	✓
Set Last Processed Event ID	S/E	14h	✗	✗	✗
Get Last Processed Event ID	S/E	15h	✗	✗	✗
Alert Immediate	S/E	16h	✓	✓	✓
PET Acknowledge	S/E	17h	✗	✗	✗
Sensor Device Commands					
Get Device SDR Info	S/E	20h	✓	✓	✓
Get Device SDR	S/E	21h	✓	✓	✓
Reserve Device SDR Repository	S/E	22h	✓	✓	✓
Get Sensor Reading Factors	S/E	23h	✓	✓	✓
Set Sensor Hysteresis	S/E	24h	✓	✓	✓
Get Sensor Hysteresis	S/E	25h	✓	✓	✓
Set Sensor Threshold	S/E	26h	✓	✓	✓
Get Sensor Threshold	S/E	27h	✓	✓	✓
Set Sensor Event Enable	S/E	28h	✓	✓	✓
Get Sensor Event Enable	S/E	29h	✓	✓	✓
Re-arm sensor Events	S/E	2Ah	✓	✓	✓
Get Sensor Event Status	S/E	2Bh	✓	✓	✓
Get Sensor Reading	S/E	2Dh	✓	✓	✓

Set Sensor Type	S/E	2Eh	✘	✘	✘
Get Sensor Type	S/E	2Fh	✘	✘	✘
FRU Device Commands					
FRU Device Commands					
Get FRU Inventory Area Info	Storage	10h	✓	✓	✓
Read FRU Data	Storage	10h	✓	✓	✓
Write FRU Data	Storage	10h	✓	✓	✓
SDR Device Commands					
Get SDR Repository Info	Storage	20h	✓	✓	✓
Get SDR Repository Allocation Info	Storage	21h	✓	✓	✓
Reserve SDR Repository	Storage	22h	✓	✓	✓
Get SDR	Storage	23h	✓	✓	✓
Add SDR	Storage	24h	✓	✓	✓
Partial Add SDR	Storage	25h	✘	✘	✘
Delete SDR	Storage	26h	✘	✘	✘
Clear SDR Repository	Storage	27h	✘	✘	✘
Get SDR Repository Time	Storage	28h	✓	✓	✓
Set SDR Repository Time	Storage	29h	✓	✓	✓
Enter SDR Repository Update Mode	Storage	2Ah	✘	✘	✘
Exit SDR Repository Update Mode	Storage	2Bh	✘	✘	✘
Run Initialization Agent	Storage	2Ch	✓	✓	✓
SEL Device Commands					
Get SEL Info	Storage	40h	✓	✓	✓
Get SEL Allocation Info	Storage	41h	✓	✓	✓
Reserve SEL	Storage	42h	✓	✓	✓
Get SEL Entry	Storage	43h	✓	✓	✓
Add SEL Entry	Storage	44h	✓	✓	✓
Partial Add SEL Entry	Storage	45h	✘	✘	✘
Delete SEL Entry	Storage	46h	✘	✘	✘
Clear SEL	Storage	47h	✓	✓	✓
Get SEL Time	Storage	48h	✓	✓	✓
Set SEL Time	Storage	49h	✓	✓	✓
Get Auxiliary Log Status	Storage	5Ah	✘	✘	✘
Set Auxiliary log Status	Storage	5Bh	✘	✘	✘
LAN Device Commands					
Set LAN Configuration Parameters	Transport	01h	✓	✓	✓
Get LAN Configuration Parameters	Transport	02h	✓	✓	✓
Suspend BMC ARPs	Transport	03h	✘	✘	✘
Get IP/UDP/RMCP Statistics	Transport	04h	✘	✘	✘
AdvancedATCA PICMG 3.0					
Get PICMG Properties	PICMG	00h	✓	✓	✓
Get Address Info	PICMG	01h	✓	✓	✓
Get Shelf Address Info	PICMG	02h	✓	N/A	N/A
Set Shelf Address Info	PICMG	03h	✓	N/A	N/A
FRU Control	PICMG	04h	✓	✓	✓
Get FRU LED Properties	PICMG	05h	✓	✓	✓
Get LED Color Capabilities	PICMG	06h	✓	✓	✓
Set FRU LED State	PICMG	07h	✓	✓	✓

Get FRU LED State	PICMG	08h	✓	✓	✓
Set IPMB State	PICMG	09h	✓	✓	✓
Set FRU Activation Policy	PICMG	0Ah	✓	✓	N/A
Get FRU Activation Policy	PICMG	0Bh	✓	✓	N/A
Set FRU Activation	PICMG	0Ch	✓	✓	N/A
Get Device Locator Record ID	PICMG	0Dh	✓	✓	✓
Set Port State	PICMG	0Eh	N/A	N/A	N/A
Get Port State	PICMG	0Fh	N/A	N/A	N/A
Compute Power Properties	PICMG	10h	N/A	N/A	N/A
Set FRU Power Level	PICMG	11h	N/A	N/A	N/A
Get FRU Power Level	PICMG	12h	N/A	N/A	N/A
Renegotiate Power	PICMG	13h	N/A	N/A	N/A
Get Fan Speed Properties	PICMG	14h	✓	✓	N/A
Set Fan Level	PICMG	15h	✓	✓	N/A
Get Fan Level	PICMG	16h	✓	✓	N/A
Bused Resource	PICMG	17h	N/A	N/A	N/A
Get IPMB Link Info	PICMG	18h	✗	✓	✓
Get Shelf Manager IPMB Address	PICMG	1Bh	N/A	N/A	N/A
Set Fan Policy	PICMG	1Ch	✗	N/A	N/A
Get Fan Policy	PICMG	1Dh	✗	N/A	N/A
Get FRU Control Capabilities	PICMG	1Eh	✗	✗	✗
FRU Inventory Device Lock Control	PICMG	1Fh	✗	✗	N/A
FRU Inventory Device Write	PICMG	20h	✗	✗	N/A
Get Shelf Manager IP Address	PICMG	21h	✗	N/A	N/A
Get Shelf Power Allocation	PICMG	22h	N/A	N/A	N/A
AdvancedMC AMC.0					
Set AMC Port State	PICMG	19h	N/A	✓	✓
Get AMC Port State	PICMG	1Ah	N/A	✓	✓
MicroTCA					
Get Location Information	PICMG	23h	✓	✓	✓
Power Channel Control	PICMG	24h	N/A	✓	N/A
Get Power Channel Status	PICMG	25h	N/A	✓	N/A
PM Reset	PICMG	26h	N/A	✓	N/A
Get PM Status	PICMG	27h	N/A	✓	N/A
PM Heartbeat	PICMG	28h	N/A	✓	N/A
Get Telco Alarm Capability	PICMG	29h	✓	✓	N/A
Set Telco Alarm State	PICMG	2Ah	✓	✓	N/A
Get Telco Alarm State	PICMG	2Bh	✓	✓	N/A

4 Interface and Services

4.1 Command Line Interface

The Command Line Interface uses an RMCP+ session with the Shelf or the Carrier Manager to obtain the current status of the FRUs, the sensor readings, enabled alarms, and diagnostics of the MicroTCA system. Depending on the configuration, whether the Shelf Manager is active on the MCH or not, the respective Shelf or Carrier CLI provides a rich command set that can be used to query and view the management and status information.

The following table illustrates the command set available for Shelf and Carrier Managers. For more information on each command please refer to the VadaTech MicroTCA Shelf Manager Command Line Interface and VadaTech MicroTCA Carrier Manger Command Line Interface documents.

Group	Command	Carrier	Shelf	Description
Alerting	**alarm_clear**	✓	✓✓	remove or clear a triggered alarm from the list of active alarms
	alarm_reset	✓	✓	clear alarms for a specified amount of minutes
	alarm_status	✓	✓	display the active alarms and whether the alarm cut-off is enabled
	alarm_test	✓	✓	test alarm subsystem
	get_pef_config_parameters	✓	✓	display parameters related to Platform Event Filter (PEF) alerting, such as the configuration of the event filter table and alert strings, as well as whether PEF is enabled/disabled
	get_snmp_trap_info	✓	✓	display status of SNMP trap and available trap destinations
	get_telco_alarm_state	✓	✓	display the state of the Telco alarms for the MicroTCA Carrier
	get_telco_capabilities	✓	✓	display the Telco alarm states and modes available
	set_pef_config_parameters	✓	✓	modify parameters such as PEF enable/disable and set the configuration of the event filter table and alert strings
	set_telco_alarm_state	✓	✓	configure active Telco alarms
	snmp_trap_disable	✓	✓	disable SNMP traps (PEF alerting)
	snmp_trap_enable	✓	✓	enable SNMP traps (PEF alerting)

✓ Command supported
× Command not supported
N/A Command not applicable for this Controller

	snmp_trap_get_address	✓	✓	display a list of SNMP trap destinations for a given channel
	snmp_trap_remove_address	✓	✓	remove an SNMP trap destination from a given channel
	snmp_trap_set_address	✓	✓	modify an SNMP trap destination for a given channel
	snmp_trap_test	✓	✓	send a test SNMP trap to the specified destination; get/clear status of test alert sent to the specified destination
Chassis	**chassis_control**	✓	✓	change the power state of the Chassis or issue diagnostic interrupt
	cli_commands	✓	✓	list all available commands
	cli_options	✓	✓	describes shorthand notation for CLI options
CLI	**exit**	✓	✓	exit the CLI
	get_version	✓	✓	display the application and CLI versions
	help	✓	✓	display help for a specified command, or display all commands, separated by group
	quit	✓	✓	exit the CLI
Cooling Management	**get_cooling_parameters**	✓	✓	display the MicroTCA Carrier cooling management parameters
	get_fan_geography	✓	✓	displays the Fan Tray to FRU connections
	get_fan_info	✓	✓	display the Fan Tray properties and hot-swap status
	get_fan_level	✓	✓	display current Fan Tray operating speed level
	list_fan_trays	✓	✓	display the locations of all the Fan Trays installed in the MicroTCA Carrier
	set_cooling_parameters	✓	✓	set the MircoTCA Carrier cooling management parameters
	set_fan_level	✓	✓	set the current operating speed level for a Fan Tray
E-Keying	**get_amc_ptp**	✓	✓	display e-keying information for an AMC
	get_carrier_ptp	✓	✓	display Carrier point-to-point connectivity information
	get_clock_configuration	✓	✓	display e-keying information for clocks
	get_clock_ptp	✓	✓	display available clocks in the system and their properties
	get_clock_state	✓	✓	display current state information for a specified clock ID
	get_port_state	✓	✓	display link status for a given FRU
	set_clock_state	✓	✓	set clock configuration

FRU Management	**activate**	✓	✓	activate a FRU, bring it to M4 state
	deactivate	✓	✓	deactivate a FRU, bring it to M1 state
	failover	✓	N/A	Initiate MicroTCA Carrier Manager failover
	fru_control	✓	✓	change the state of a FRU's payload
	get_address_info	✓	✓	display the FRU address information
	get_device_id	✓	✓	retrieve device information from a specified FRU
	get_event_receiver	✓	✓	display the location of the event receiver
	get_fru_activation_policy	✓	✓	display current FRU activation policy
	get_fru_power_levels	✓	✓	display the power levels for a given FRU
	get_fru_state	✓	✓	display the hot-swap information for a given FRU
	get_fru_temperature	✓	✓	display the status of all temperature sensors for the specified FRU
	get_health	✓	✓	provide a summary of the FRU alarm and health status
	get_led_color_capabilities	✓	✓	display a list of LEDs and the colors supported by the given FRU
	get_led_properties	✓	✓	display a list of LEDs controlled by the given FRU
	get_led_state	✓	✓	display the state of a given LED
	get_module_info	✓	✓	display the configuration and hot-swap information for a AdvancedMC at a specified Carrier location
	list_device_sdr	✓	✓	display a list of SDRs in the specified FRU's Device SDR Repository
	list_fru_storages	✓	✓	display a list of all the FRU Inventory Devices located in the MicroTCA Carrier
	list_frus_present	✓	✓	provide a summary of the installed FRUs in the MicroTCA Carrier
	list_sdr	✓	✓	display a list of SDRs in the SDR Repository
	read_fru_storage	✓	✓	display content from a FRU Inventory Device
	set_event_receiver	✓	✓	change the location of the event receiver
	set_fru_power_level	✓	✓	set the FRU power level for the given FRU
	set_led_state	✓	✓	set the state for a given LED
	update_fru_version	✓	✓	change the product version number for the given FRU

LAN Interface	**get_channel_access**	✓	✓	display whether channel is enabled or disabled, whether alerting is enabled or disabled, and under what system modes the channel can be accessed
	get_channel_cipher_suites	✓	✓	display supported authentication, integrity, and confidentiality algorithms
	get_channel_info	✓	✓	display media and protocol information about a given channel
	get_lan_config_parameters	✓	✓	display parameters related to IPMI LAN operation, such as network addressing information
	get_session_info	✓	✓	display session information
	get_system_guid	✓	✓	display the globally unique ID (GUID) of the system
	get_user_access	✓	✓	display privilege level and channel accessibility for a given user
	list_active_sessions	✓	✓	display a list of active sessions
	list_users	✓	✓	display a list of available users for a given channel
	set_channel_access	✓	✓	modify whether channel is enabled or disabled, whether alerting is enabled or disabled, and privilege level limit
	set_lan_config_parameters	✓	✓	modify parameters required for IPMI LAN operation, such as the network addressing information
	set_session_privilege_level	✓	✓	request ability to perform operations at a particular level for the active session
	set_user_access	✓	✓	configure privilege level and channel accessibility associated with a given user
	set_user_info	✓	✓	add user, change user name, set/change password, and/or enable/disable user
MicroTCA System	**check_ipmb0_status**	✓	N/A	report current status of all IPMB-0 links on the MicroTCA Carrier Manager
	get_address_table	✓	N/A	display the MicroTCA Carrier address table
	get_diagnostics	✓	✓	run diagnostics and display the results
	get_event_code_description	✓	✓	translate the MicroTCA Carrier diagnostics event codes
	get_fru_activation_sequence	✓	✓	display FRU activation sequence
	get_ip_connection	✓	✓	display available network interfaces to a MicroTCA Carrier
	get_location_info	✓	✓	display location information for a specified FRU
	set_fru_extracted	✓	✓	inform the MicroTCA Carrier Manager that the specified Power Module is no longer installed
	set_ip_connection	✓	✓	add or modify available network interfaces to a MicroTCA Carrier

	set_shelf_address_info	N/A	✓	set the MicroTCA Shelf address field in Shelf FRU Information record
Power Management	**get_power_channel_status**	✓	✓	display global and local power status information for the specified channel
	get_power_feed_info	✓	N/A	display the power information for a specified Power Feed
	get_power_feed_status	✓	✓	display the Power Feed status information, such as the hot-swap status, role, and power status
	get_power_management_info	✓	✓	see **get_fru_activation_sequence**
	get_power_policy	✓	✓	display configured information on Power Feed control, such as role, current limit, and associated channels for each Power Feed
	power_feed_control	✓	✓	requests a Chassis control request be sent to the specified Power Feed
	power_feed_reset	✓	✓	resets the specified Power Feed(requires redundancy)
Sensor Management	**get_ipmb0_info**	✓	N/A	get FRU IPMB-0 link status information
	get_ipmb0_status	✓	✓	get FRU IPMB-0 sensor data
	get_sensor_event_enable	✓	✓	display sensor's event generation capabilities
	get_sensor_hysteresis	✓	✓	display sensor hysteresis values
	get_sensor_info	✓	✓	display sensor information
	get_sensor_reading	✓	✓	display sensor reading
	get_sensor_threshold	✓	✓	display sensor threshold
	list_sensors	✓	✓	display a list of sensors on a FRU
	set_sensor_event_enable	✓	✓	set sensor's event generation capabilities
	set_sensor_hysteresis	✓	✓	set sensor hysteresis values for a given sensor
	set_sensor_threshold	✓	✓	set sensor thresholds for a given sensor
System Event Log	**clear_sel**	✓	✓	erase the contents of the System Event Log
	get_sel	✓	✓	display the contents of the System Event Log
	get_sel_info	✓	✓	display information about a Management Controller's System Event Log

4.2 SNMP Interface

The MicroTCA Shelf and Carrier Management Controller (MC) come with a Management Information Base (MIB) file (**VT-UTCSH.mib** and **VT-UTCC.mib**) that describes the Shelf MC and Carrier MC Platform objects to be managed. A remote application, such as an SNMP/MIB manager, can compile files (using a MIBs compiler) and utilize this information to manage devices in the Shelf and Carrier.

For more information on the Shelf and Carrier MIB tree refer to the VadaTech MicroTCA Shelf Manager SNMP Interface Reference Manual and VadaTech MicroTCA Carrier Manager SNMP Interface Reference Manual.

In order to access the SNMP agent in SNMPv3 mode, users and passwords must be configured. This configuration is beyond the scope of this document. The VadaTech SNMP agent is based on net-snmp 5.3.1, and complete configuration instructions can be found at http://net-snmp.sourceforge.net/docs/readmefiles.html.

4.3 MicroTCA MIB Groups

Group Name	Carrier	Shelf	Description
PEF Configuration	✓	✓	provide variables to configure the PEF parameters
Manager Information	✓	✓	provide variables to obtain the health and reset the active Manager
Fan Trays	✓	✓	provide variables to obtain information regarding a Fan Tray and other controls to the fans
FRU Devices	✓	✓	provide variables to obtain FRU information and to control a specific FRU payload using FRU control parameters
Sensors and Sensor Data Record Information	✓	✓	provide variables to obtain the Sensor Information (SDR) and Sensor Reading
System Event Log	✓	✓	provide variables to obtain the SEL Entries and to delete entries or clear SEL
LAN Configuration	✓	✓	provide variables to configure the LAN parameters
Event Filter Table Configuration	✓	✓	provide variables to configure the Event Filter Table
Alert Policy Table Configuration	✓	✓	provide variables to configure the Alert Policy Table
Alarms	✓	✓	provide variables to view alarm status and to reset or clear alarms
LED Properties	✓	✓	provide variables to get LED properties
LED Control	✓	✓	provide variables to control LEDs on a specified FRU
Chassis Control	✓	✓	provides variable to power up, power down and reset control
Alert String Table Configuration	✓	✓	provide variables to configure the Alert String Table
Management Controllers	✓	✓	provide variables to obtain information regarding a Management Controller and controls to reset

			and remove a Management Controller
Carrier Manager Information	✓	N/A	provide variables to obtain information regarding the active and passive MicroTCA Carrier Managers and to initiate failover between them
Shelf Manager Location	N/A	✓	provide variables to obtain information regarding the physical location of the MicroTCA Shelf
Carrier Location	✓	N/A	provide variables to obtain information regarding the physical location of a MicroTCA Carrier within the MicroTCA Shelf
Active Carrier Manager MCH	✓	N/A	provide variables to obtain address information regarding an active manager MCH
Telco Alarm	✓	✓	provide variables to obtain capabilities and status information regarding a MicroTCA Carrier's Telco Alarms and to initiate an alarm reset
Site Map	✓	N/A	provide variables to get parameters defined in the Address Table
Chassis Identifier	N/A	✓	
Power Modules	✓	✓	provide variables to obtain information regarding a Power Module and to reset a Power module
Power Feeds	✓	N/A	provide variables to obtain information regarding the available and consumed power of a Power Module
Power Channels Status	✓	✓	provide variables to obtain information regarding a Power Channel
Power Channels Info	✓	N/A	provide variables to obtain information regarding a Power Channel and the available and consumed power on that channel
Module Location	✓	✓	provide variables to obtain information regarding the physical locations of a Module within a MicroTCA Carrier

4.3.1 SNMP Trap Utility

The SNMP trap utility is utilized by the MicroTCA Carrier MC to send SNMP trap messages to a remote application regarding any abnormal system events. When enabled, the MicroTCA Carrier MC will issue SNMP v2c traps on port 162.

The SNMP can be configured using the Carrier Manager CLI Interface. For more information on configuring the SNMP Trap Utility, please refer to respective Management Controller's SNMP Interface documentation.
Web Interface

The MicroTCA Shelf Manager and Carrier Manger Web Interface supports commands specified in the respective Management Controller Command Line Interface document. The interface interacts with the Command Line Interface (CLI) to connect to the Intelligent Management devices on the Shelf. The Web Interface is based on the IPMI 2.0, AdvancedTCA™ PICMG 3.0 and MicroTCA PICMG subset of commands that can be accessed directly or through a higher-level Management Application. An example of the Web Interface home page is displayed in Error! Reference source not found..

Figure 4: MicroTCA Shelf Web Interface

4.3.2 Open HPI

The Hardware Platform Interface (HPI) specification separates the hardware from management middleware and makes each independent of the other. HPI includes resource modeling; access to and control over sensor, control, watchdog, and inventory data associated with resources; abstracted System Event Log interfaces; hardware events and alarms; and a managed hot swap interface.

Open HPI is an open source implementation of the SA Forum's HPI. OpenHPI's architecture contains a modular mechanism intended to simplify adding new hardware support. Open

HPI provides the IPMI plug-in to interface with chassis that support IPMI- and ATCA-based command interface.

The Open HPI is fully integrated with the VadaTech Shelf and Carrier Managers. Open HPI clients such as the HPI view provides a complete API to access and control these MicroTCA Carrier resources in addition to hot swap, managed hot swap, and Chassis power controls.