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EVM3206
TELEPHONY
MSO MANUAL

VERSION 1.1

Revision History

Issue	Date	Author/Prime	Description of changes
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Contents

AUDIENCE VII
ABOUT THE EVM3206 TELEPHONY FIRMWARE VII
IN THIS DOCUMENT VIII
TERMINOLOGY VIII

OVERVIEW **13**

1.1 EVM3206 TELEPHONY MODEMS 14
1.2 CORE FUNCTIONALITY 15
1.3 FIRMWARE FUNCTIONALITY 15

PROVISIONING **17**

2.1 CONFIGURING CABLE MODEM BEHAVIOR 19
2.1.1 Disabling the CM miniFirewall 19
2.1.2 Resetting non-volatile Memory to Factory Default 19
2.1.3 Non-PacketCable DSx Messaging 20
2.2 CONFIGURING EMTA BEHAVIOR 21
2.2.1 Management Provisioning 21
2.2.2 Disabling the eMTA firewall 29
2.2.3 MTA DHCP Option 122/177 29
2.2.4 Software Upgrade During Calls 29
2.2.5 Configuring the Jitter Buffer 30
2.2.6 Configuring for Network Maintenance Operations 33
2.2.7 Configuring Stuck Service-Flow Cleanup Control 37
2.2.8 EndPoint Provisioning 38
2.2.9 Telephony Port Diagnostics 42
2.2.10 Audible Tone Tables 48
2.2.11 DQoS Lite Enable 51
2.2.12 RFC2833 Enable 52
2.2.13 Configure MTA syslog server Ip address. 52

WEB INTERFACE **54**

3.1 ACCESSING THE WEB USER INTERFACE 55
3.2 WEB USER INTERFACE BASIC PAGE 56
3.2.1 Docsis – Display startup procedure and channels information 56
3.2.2 Fimware – Display software version and serial number 56
3.2.3 Status – Display system up time and CM/CPE MAC address 57
3.3 WEB USER INTERFACE ADVANCED PAGE 58
3.3.1 MTA Status – Display MTA startup procedure 58
3.3.2 Line Status – Display MTA line status 58
3.3.3 DHCP – Display CM and MTA DHCP information 59
3.3.4 MTA QoS – Display service flow information 59
3.3.5 Provisioning – Display MTA configuration file contents 60
3.3.6 Event Log – Display CM and MTA event logs 61

TELNET CLI 62

4.1 CM 63
4.2 EMTA 64
4.3 ETHERNET 66
4.4 FTPLITE 66
4.5 PINGHELPER 67
4.6 SYSTEM 68

VSIFS 70

5.1 CONFIGURING VSIF 71
5.1.1 VSIF.61-- Maximum Downstream Channel Bonding Number 71
5.1.2 VSIF.63-- Secure SW Download CVC Control 71
5.1.3 VSIF.64-- Downstream Resequencing TLV 71
5.1.4 VSIF.88-- MTA Debug Level Configuration 72
5.1.5 VSIF.89-- Console Input/Output Configuration 72
5.1.6 VSIF.94-- MTA Configuration File Hash Verification 72
5.1.7 VSIF.95-- MTA Configuration File Encryption 73
5.1.8 VSIF.96-- DOCSIS Security Download Control 73
5.1.9 VSIF.97-- Switch E-MTA Signaling Protocol 73

TROBULESHOOTING 75

6.1 UBEE EMTA SUPPORTS FOLLOWING TROUBLESHOOTING INTERFACE: 76
6.2 USING MIB FOR TROUBLESHOOTING 76
6.3 LED VERIFICATION 89

6.4 TROUBLESHOOTING THE ETHERNET INSTALLATION 89
6.5 DIGITAL LOOPBACK SUPPORT 90

APPENDIX A: LED BEHAVIOR 91

About This Document

This document describes standards compliance, telephony features, and data features of EVM3206 Telephony firmware, and how to manage it via MIBs/Web-Interface/Telent-CLI/VSIFs.

Some features described in this document may not be fully tested and supported in your specific firmware release version. Where possible, features supported only by specific versions are indicated in this document. See the Release Notes/Letter of Operational Considerations accompanying your firmware for further details.

AUDIENCE

If you are evaluating EVM3206 Telephony products for use in your VoIP network, you should read this entire manual.

This manual assumes that you have a basic understanding of Euro-DOCSIS and Euro-PacketCable standards, and a working knowledge of cable data and telephony networks.

ABOUT THE EVM3206 TELEPHONY FIRMWARE

EVM3206 Telephony firmware provides operating, maintenance and troubleshooting functions for the following Ubee eMTA:

- EVM3206 Telephony Modem

IN THIS DOCUMENT

This document contains the following information:

- Chapter 1, ‘‘Overview,’’ provides a brief overview of the EVM3206 MSO User’s Manual.
- Chapter 2, ‘‘Provisioning’’ gives a detail descriptions on Ubee private Mibs to show you how to use this modem, while which includes new features required by customer.
- Chapter 3, “Web Interface” outlines all supported web information in current EVM3206 firmware.
- Chapter 4, ‘‘Telnet CLI,’’ outlines all tenet commands in current EVM3206 fimware.
- Chapter 5, ‘‘VSIFs,’’ outlines all VSIFs configuration in current EVM3206 firmware.
- Chapter 6, ‘‘Troubleshooting,’’ describes the troubleshooting procedures.

TERMINOLOGY

The following is a list of terms and abbreviations used in this manual.

AckCel

A Broadcom-proprietary protocol which is to increase TCP-based performance.

AES

Advanced Encryption Standard. A symmetric 128-bit block cipher that has been adopted by the US Federal Government as its symmetric data encryption standard in October 2000, replacing the DES encryption it used.

BV-16

Broadcom’s BroadVoice 16 codec. The codec is narrowband codec that provides toll quality service with a bit rate of 16kbps.

CM

Cable Modem. Typically a device installed at the subscriber premises

that provides a high-speed data (Internet) connection through the HFC network.

CMS

Call Management Server. A generic term for the devices connecting a VoIP network to the PSTN. A CMS includes both a Call Agent and the PSTN gateway, and controls audio call connections.

CMTS

Cable Modem Termination System. A device at a cable headend that connects to cable modems over an HFC network to an IP network.

CPE

Customer Premises Equipment. Subscriber-owned equipment connected to the network. Technically, a cable modem, MTA, or eMTA falls into this category, although many operators do not designate them as such.

CODEC

COder-DECoder. In VoIP products, one of several possible schemes of converting audio (i.e. a phone call) to digital data and vice versa. Attributes of a CODEC include fidelity (e.g. voice quality), bandwidth, and latency.

DHCP

Dynamic Host Configuration Protocol. An IP protocol used to provide an IP address and location of services (such as DNS and TFTP) needed by a device connecting to the network.

DNS

Domain Name Service (Server). An IP service that associates a domain name (such as www.example.com) with an IP address.

Downstream

In an HFC network, the direction from the headend to the subscriber. Some older cable documentation may refer to this as the forward path.

DOCSIS

Data Over Cable Service Interface Specification. The interoperability standards used for data communications equipment on an HFC network.

DTMF

Dual Tone Multi-Frequency. The tones generated by touching the keys

on the phone are used for a variety of purposes including voice mail systems and voice messaging. Also known as Touchtone.

eMTA

Embedded MTA. A device, such as the Ubee EVM3206 Telephony Modem, that contains both an MTA and a Cable Modem.

Euro-DOCSIS

The European version of DOCSIS. Euro-DOCSIS specifies an 8 MHz downstream bandwidth (vs. 6 MHz for DOCSIS); other minor differences exist as well.

FQDN

Fully Qualified Domain Name. The name used to identify a single device on the Internet. See RFC2821 for details.

G.711

G.711 is an ITU-T standard for audio companding. It is primarily used in telephony. This audio standard is mandatory for all video conferencing systems. It requires a data rate of 56 or 64 kbit/s and provides an audio bandwidth of 300 ... 3400 Hz.

HFC

Hybrid Fiber-Coaxial. A broadband, bi-directional shared media transmission system using fiber trunks between the headend and fiber nodes, and coaxial distribution cable between the fiber nodes and subscriber premises.

iLBC

internet Low Bitrate Codec. The codec is designed for narrowband speech and operates either with 30ms or 20ms frame sizes. The bit rate is 13.3 kbit/s for 30 ms frames (400 bits per block) or 15.2 kbit/s for 20 ms frames (304 bits per block). The iLBC codec enables graceful speech quality degradation in the case of lost frames, which occurs in connection with lost or delayed IP packets.

MIB

Management Information Base. The data representing the state of a managed object in an SNMP-based network management system.

MTA

Multimedia Terminal Adapter. A subscriber premises device that

contains the network interface, CODECs, and all signaling and encapsulation functions required for telephony support, CLASS features signaling, and QoS signaling. The MTA is an integral part of EVM3206 Telephony embedded MTA (eMTA) products.

NCS

Network Call Signaling. The PacketCable protocol used to control calls.

NIC

Network Interface Unit. A generic term for a device providing data and telephony connections at a subscriber site. Also referred to as embedded MTA.

PacketCable

A CableLabs-led initiative aimed at developing interoperable interface specifications for delivering advanced, real-time multimedia services over two-way cable plant.

PHS

Payload Header Suppression. A technology used to describe the process of suppressing the repetitive portion of payload headers at sender and restoring the headers at the receiver.

QoS

Quality of Service. An attribute of a Service Flow, defining limitations or guarantees for data rate, latency, and jitter.

Quarantine

A state where an endpoint (phone line) may potentially buffer events. Events not quarantined are processed normally. Processing of quarantined events may be delayed, potentially indefinitely.

REN

Ringer Equivalency Number. It is a somewhat arbitrary number which denotes the loading a telephone ringer has on the line

RF

Radio Frequency

SHA-1

Secure Hash Algorithm. A one-way cryptographic function which takes a message procedures to a 160-bit message digest.

SIP

Session Initiation Protocol. A signaling protocol for internet conferencing, telephony, presence, events notification and instant messaging.

SNMP

Simple Network Management Protocol.

TDD

Telecommunication Device for the Deaf. An electronic device for text communication via a telephone line, used when one or more the parties has hearing or speech difficulties. Other names for TDD include TTY (Telephone TYpewriter), textphone (common in Europe), and minicom (U.K.).

TFTP

Trivial File transfer Protocol. Used in DOCSIS networks to transfer software and provisioning files to network devices.

VoIP

Telephony over IP. The Ubee implementation of Euro-PacketCable-compliant telephony services over an HFC network..

UGS

Unsolicited Grant Service. A Service Flow type used for applications such as telephony in which latency and jitter are critical. Packets have a fixed size and interval. Within the constraints of IP networking, UGS flows attempt to deliver a constant bit rate stream of data.

Upstream

The path from a subscriber device to the headend. Some older cable documentation may refer to this as the return path or reverse path.

1 Overview

This chapter describes EVM3206 Telephony hardware and firmware features.

EVM3206 Telephony eMTA (also referred to as Embedded MTAs or eMTA), provide the subscriber connection to the HFC IP network.

EVM3206 eMTA firmware complies to following standards:

- Euro-DOCSIS 1.1, Euro-DOCSIS 2.0 and Euro-DOCSIS 3.0
- Euro-PacketCable 1.0/1.1/1.5
- RFC 3261(Session Initiation Protocol)

1.1 EVM3206 TELEPHONY MODEMS

This section describes the Telephony Modems supported by the current release of EVM3206 firmware.

EVM3206 Telephony Modems are the latest generation of Ubee eMTA, providing improved technology and features. As with previous generations, EVM3206 Telephony Modems provide telephony via MGCP/SIP and 10/100/1000BaseT Ethernet data connections.

1.2 CORE FUNCTIONALITY

EVM3206 firmware provides the following core functionality:

- Supports multiple provisioning methods.
- Supports for up to 8 downstream channel bonding.
- Supports for up to 4 upstream channel bonding.
- Supports for up to 16 Upstream Service Flows (SIDs).
- Supports for various packetization rates.
- Supports of SNMP v1/v2c and v3 coexistence.
- CPE Ethernet — 10/100/1000 BaseT / full-duplex / auto-negotiate functionality.

1.3 FIRMWARE FUNCTIONALITY

The firmware provides the following functionality:

- Standards compatibility as follows:
  - Euro-DOCSIS 1.1, Euro-DOCSIS 2.0 and Euro-DOCSIS 3.0
  - Euro-PacketCable 1.0/1.1/1.5
  - ECW#34 Certified
- Interoperability with main CMTS products.
- Secure firmware downloading, conforming to the Euro-DOCSIS 1.1 specification.
- Supports Ethernet interfaces to CPE.
- Supports 2 VoIP channels.
- Supports MGCP 1.0 / NCS 1.0 and SIP for VoIP signaling protocol.
- Supports G.711u/G.711a/BV-16/iLBC.
- Supports fax pass-through and T.38 fax relay.
- Full Euro-PacketCable provisioning with SNMPv2 Network Management capabilities.

- Supports RFC 2833 functionality. RFC 2833 defines a method for carrying DTMF and other telephony signals and events in RTP packets, instead of sending audio tones over the network.
- Supports for dialup fax and modem connections, disabling echo cancellation and (if necessary) switching to the G.711 CODEC upon detecting fax or modem start tones.
- An adaptive jitter buffer minimizes voice delay based on network condition.
- Supports MGCP and RTP statistics.
- Supports multiple country code profiles.
- Supports Telnet access to a troubleshooting command line interface.
- Supports for automatically timing out Telnet sessions after a certain amount of idle time.
- Supports the AckCel technology, increasing performance of TCP application such as FTP.

2 Provisioning

Ubee private MIBs provide extensive support for configuring and controlling Euro-PacketCable NCS based eMTAs where additional functionality has been added to software above and beyond Cable Europe Labs and other industry specifications. Ubee's private enterprise MIBs for Cable data products(1.3.6.1.4.1.4684) currently consist of the class of devices adhering to Cablelabs and Excentis specifications for DOCSIS, PacketCable, and eDOCSIS based devices. Normally the MIB definitions themselves provide a good overview and enough information for understanding the purpose and how to control objects but additional details will be provided where appropriate. Throughout the descriptions to MIB objects are references to interfaces. Ubee's software can support 8 IP stacks or interfaces. The assignments of IP addresses is different if an ePS is included in conjunction with an eMTA but for the purposes of this document the follow assignment shows the combined functionality of DOCSIS or a cable modem along with an eMTA:

- IP Stack (1) = Cable Modem's public WAN IP address
- IP Stack (2) = eMTA public WAN IP address
- IP Stack (3) = Cable Modem's private LAN IP address 192.168.1.1

Ubee CM Proprietary MIBS

- ubee-telnet-mgmt.mib
- ubee-http-mgmt.mib
- ubee-cm-mgmt.mib
- ubee-bfc-mgmt.mib

Ubee eMTA Proprietary MIBS

- ubee-emta-mgmt.mib
- ubee-VCMSIP-Cfg-v1.7.mib
- AmbitTxRxGainMib-v1.1.mib
- Ambit-VCM-Security-v1_0.mib
- Ambit-VCM-SwUpgrade-v1.1.mib

2.1 Configuring Cable Modem Behavior

2.1.1 Disabling the CM miniFirewall

ubee-cm-mgmt.mib		
MIB	Default Value	Access
cmMiniFirewallEnable	true	read-write

cmMiniFirewallEnable

(1.3.6.1.4.1.4684.38.2.2.2.1.2.1.3.0 Integer32)

This specifies whether the CM mini-firewall will be enabled, provided the mini-firewall feature is supported. If the feature is not supported, this object will always report false(2) and an attempt to set it to true(1) will be rejected with an inconsistent error.

2.1.2 Resetting non-volatile Memory to Factory Default

ubee-cm-mgmt.mib		
MIB	Default Value	Access
cmResetFactoryDefaults ubeeResetFactoryDefault	NA	read-write

cmResetFactoryDefaults / ubeeResetFactoryDefault

(1.3.6.1.4.1.4684.38.2.2.2.1.2.1.6.0 Integer32) / (1.3.6.1.4.1.4684.2.13.1.1.0 Integer32)

Setting this object to true(1) will cause the device to reset all non-volatile settings to their factory default state. Note that only dynamic settings will be affected; permanent settings (MAC addresses, etc) will remain unchanged. When read, this object always returns false(2)."

2.1.3 Non-PacketCable DSx Messaging

ubee-cm-mgmt.mib		
MIB	Default Value	Access
cmDsdExtendedRetryEnable	false	read-write

cmDsdExtendedRetryEnable

(1.3.6.1.4.1.4684.38.2.2.2.1.2.1.4.0 Integer32)

Specifies the behavior of the CM with regards to retrying DSD requests when no reply is received. If set to true(1), the CM will continue to retry the request until a reply is received or roughly one hour of time has passed. If set to false(2), the CM will stop retrying after three retries as required by the DOCSIS specification. Note that this setting is not persistent across reboot."

2.2 Configuring EMTA Behavior

2.2.1 Management Provisioning

ubee-emta-mgmt.mib		
MIB	Default Value	Access
emtaIncludedInCmMaxCpe	false	read-write
emtaUseAlternateTelephonyRootCert	false	read-write
emtaInhibitNcsSyslog	true	read-write
emtaPhsConfiguration	disabled(2)	read-write
emtaMaxResetDelay	0	read-write
emtaPostCallCompletionResetDelay	0	read-write
emtaDhcpRebindRule	strict(1)	read-write
emtaDhcpIgnoreNaks	disabled(2)	read-write
emtaPhsUpstreamMask	BITS (11111011110111100000000)	read-write
emtaPhsDownstreamMask	BITS (110000010110100000000000)	read-writ
emtaPhsDownstreamVerification	disabled(2)	read-write
emtaSignalingMaxNumberQueuedNcsEvents	100	read-write
emtaSignalingRtpBaseReceiveUdpPort	53456	read-write
emtaSignalingT38FaxRelaySupport	true	read-write
emtaSignalingEcanTailLength	ecanTail32ms(4)	read-write
emtaSignalingDQoSActivationModel	twoPhase(2)	read
emtaSignalingGR303Support	disabled(2)	read

emtaSignalingDefRtcpDSCP	0	read-write

emtaMaxResetDelay

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.11.0 Unsigned32)

This object identifies the length of time, in seconds, that the MTA should wait after the software download for syslog event and reset there after. MTA will start a timer with this value after the completion of the SW download and an active phone call, upon expiry it will send an event notifying of the reset and restart the timer with the same value and upon second expiry MTA will be reset. This prevents software download reset from interrupting an active phone call. The default value of zero disables the reset delay and resets the unit immediately after the software download.

emtaPostCallCompletionResetDelay

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.12.0 Unsigned32)

This object identifies the length of time, in seconds, that the MTA should wait after terminating a call before resetting the MTA if a reset is pending after the software download completion. The default value of zero disables the reset delay and reset the unit immediately after a software download.

emtaIncludedInCmMaxCpe

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.4.0 Integer32)

This object specifies whether the EMTA MAC address will be included when calculating the number of CPEs allowed by the CM as specified in the CM configuration file. Setting of the MIB takes effect on the next re-boot. Note that the eDOCSIS specification requires the value of this object to be true(1) and setting it to false(2) will violate the spec and render the device uncertifiable.

emtaUseAlternateTelephonyRootCert

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.6.0 Integer32)

This object controls which telephony root certificate the MTA will be using during its authentication phases. As per PacketCable 1.x, the telephony root certificate

should be used so that it can be modified by way of a firmware upgrade if necessary. However, the alternate certificate may sometimes be required for testing, development, or other special situations. If set to true(1), the EMTA will use the alternate telephony root certificate provisioned in non-volatile storage. If set to false(2), the EMTA will use the telephony root certificate which is embedded in the firmware image.

emtaInhibitNcsSyslog

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.8.0 Integer32)

This object controls the logging of the NCS messages to Syslog. Generally, reporting of the events with NCS messages is following the PacketCable 1.x MEM Specification and Event MIB Specification. However, if this object has a value of true(1), logging of the NCS messages to syslog is inhibited. Otherwise, NCS logging control logic follows the requirements of the PacketCable 1.x Event MIB. The MTA must not persist this MIB object.

emtaPhsConfiguration

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.10.0 Integer32)

This object controls the application of Payload Header Suppression (PHS) to voice RTP traffic. When disabled(1), PHS is not applied to either upstream or downstream RTP traffic. When enabled(2), PHS is applied to both upstream and downstream RTP traffic."

- enabled(1)
- disabled(2)

emtaDhcpRebindRule

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.13.0 Integer32)

This object is used to control the DHCP client behavior for the MTA when a DHCP REBIND (T2 timeout) occurs. The value strict(1) will only allow the MTA to accept a valid DHCP ACK only from the DHCP server that provided the initial lease. The value relaxed(2) will allow the MTA to accept a valid DHCP ACK from any DHCP server.

- strict(1)
- relaxed(2)

emtaDhcpIgnoreNaks

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.14.0 Integer32)

This object controls the DhcpIgnoreNaks Feature. When set to enabled(1) the mta dhcp client will ignore DHCP Naks when a line is offhook. When set to disabled(2) the mta DHCP client will operate normally.

- enabled(1),
- disabled(2)

emtaPhsUpstreamMask

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.16.0 BITS)

This object sets the PHS mask for upstream voice DQoS flows using IPv4 addressing. Setting a bit to '1' will cause the MTA to suppress this field for upstream voice flows.

The default configuration is all bits set except for ipTotalLength(5), ipHeaderChecksum(10), and udpLength(15) since these fields are required to properly handle connections using silence suppression.

If silence suppression will never be enabled by the CMS, all bits may be set.

Note that this setting only applies if emtaPhsConfiguration is set to enabled(1). If emtaPhsConfiguration is set to disabled(2), then the value of this object will be ignored.

- ethDA(0),
- ethSA(1),
- ethEtherType(2),
- ipVersionIHL(3),
- ipTOS(4),
- ipTotalLength(5),
- ipIdent(6),

- ipFlagsFragOffset(7),
- ipTTL(8),
- ipProtocol(9),
- ipHeaderChecksum(10),
- ipSA(11),
- ipDA(12),
- udpSourcePort(13),
- udpDestPort(14),
- udpLength(15),
- udpChecksum(16)

emtaPhsDownstreamMask

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.17.0 BITS)

This object sets the PHS mask for downstream voice DQoS flows using IPv4 addressing. Setting a bit to '1' will cause the CMTS to suppress this field for downstream voice flows.

The default configuration is the ethEthertype(0), ipVersionIHL(1), ipIdent(4), ipFlagsFragOffset(5), ipProtocol(7), ipSA(9), ipDA(10), and udpDestPort(12) bits are set.

If silence suppression will never be enabled by the CMS, ipTotalLength(3) and udpLength(13) may also be set.

If silence suppression will never be enabled by the CMS and emtaPhsDownstreamVerification is set to either disabled(2) or auto(3), all bits may be set.

Note that this setting only applies if emtaPhsConfiguration is set to enabled(1). If emtaPhsConfiguration is set to disabled(2), then the value of this object will be ignored.

- ethEtherType(0),
- ipVersionIHL(1),
- ipTOS(2),

- ipTotalLength(3),
- ipIdent(4),
- ipFlagsFragOffset(5),
- ipTTL(6),
- ipProtocol(7),
- ipHeaderChecksum(8),
- ipSA(9),
- ipDA(10),
- udpSourcePort(11),
- udpDestPort(12),
- udpLength(13),
- udpChecksum(14)

emtaPhsDownstreamVerification

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.18.0 Integer32)

This object controls whether or not the MTA requests PHS verification (PHSV) by the CMTS on downstream PHS operations. The default is auto(3).

When set to auto(3), the MTA will automatically disable PHSV if the ipTOS(2), ipTTL(6), ipHeaderChecksum(8) or udpChecksum(14) bits are set in emtaPhsDownstreamMask.

When set to disabled(2), the MTA will disable PHSV at all times.

When set to enabled(1), the MTA will enable PHSV at all times.

This setting should be used with caution as it is possible to create a non-working configuration if verification is enabled and a non-predictable downstream field (e.g. ipTTL) is suppressed.

Note that this setting only applies if emtaPhsConfiguration is set to enabled(1). If emtaPhsConfiguration is set to disabled(2), then the value of this object will be ignored.

- enabled(1),

- disabled(2),
- auto(3)

emtaSignalingMaxNumberQueuedNcsEvents

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.10.0 Unsigned32)

This object contains the max number of queued NCS events that the MTA can store during the lock step.

emtaSignalingRtpBaseReceiveUdpPort

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.11.0 Unsigned32)

This object contains the UDP Port Number used by the EMTA for RTP connection. RTP (and RTCP) ports for all connections will be based on this port.

emtaSignalingT38FaxRelaySupport

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.14.0 Integer32)

This object contains the value which controls the usage of the T38 Fax Relay. Setting this object to 'true(1)' causes the EMTA to use the T38 Fax Relay if supported by the DSP image. Setting this object to 'false(2)' causes the EMTA not to use T38 Fax Relay, but to use voice-band data mode for fax transmission instead.

emtaSignalingEcanTailLength

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.15.0 Integer32)

This object specifies the echo cancellation tail length. If the echo cancellation tail length is changed through SNMP, then those changes take effect starting with the next phone call (in process calls are not affected). Also note that the value of this object will persist across a MTA reset."

- ecanTail8ms(1)
- ecanTail16ms(2)
- ecanTail24ms(3)
- ecanTail32ms(4)

emtaSignalingDQoSActivationModel

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.16.0 Integer32)

This object controls the DQoS activation model. Setting this object to singlePhase(1) causes the eMTA to employ the single phase model where both reservation and commitment occur as a single autonomous operation. Setting this object to twoPhase(2) causes the eMTA to employ the two-phase model where the application reserves the resource, and later commits it. This object should only be changed by the configuration file.

- singlePhase(1)
- twoPhase(2)

emtaSignalingGR303Support

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.17.0 Integer32)

Setting this object to enabled(1) causes the eMTA to switch to GR303 mode. The MTA will generate RTP on-hook event packets in the media stream until off-hook is detected or the connection is deleted. Also MTA will treat flash hook as separate on-hook and off-hook events, and send each event triple redundantly, replacing voice packets in the RTPstream. Setting this object to disabled(2) causes the eMTA not to use GR303 mode. This object should only be changed by the configuration file.

- enabled(1)
- disabled(2)

emtaSignalingDefRtcpDSCP

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.23.0 Integer32)

This object contains the default value used in the IP header for setting the DSCP for RTCP packets. When the value of this object is updated by SNMP, the MTA MUST use the new value as a default starting from the new connection. Existing connections are not affected by the value’s update.

2.2.2 Disabling the eMTA firewall

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.2.0 Integer32)

The eMTA stack has what is referred to as a lightweight firewall that has a default value of enabled (true), but can be set to disabled (false) when necessary.

ubee-emta-mgmt.mib		
MIB	Default Value	Access
emtaFirewallEnable	true	read-write

2.2.3 MTA DHCP Option 122/177

ubee-cm-mgmt-ext.mib		
MIB	Default Value	Access
emtaDhcpOption	cableLabsClientConfiguration(122)	read-write

emtaDhcpOption

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.5.0 OCTET STRING)

This object specifies the value of the PacketCable DHCP option which will be used in MTA provisioning. Current PacketCable 1.x Provisioning Specification requires value 122, but certain legacy systems still use the currently obsolete value of 177.

- cableLabsClientConfiguraton(122),
- packetCableAndCableHomeObsolete(177)

2.2.4 Software Upgrade During Calls

ubee-emta-mgmt.mib		
MIB	Default Value	Access
emtaInhibitSwDownloadDuringCall	True	read-write

emtaInhibitSwDownloadDuringCall

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.1.0 Integer32)

This object controls the processing logic of software downloading requests when there are specific telephony related EMTA activities. If this object has a value of true(1), DOCSIS software download by way of the docsDevSwAdminStatus MIB object

will be inhibited if the value of esafeDevServiceIntImpact for the eMTA entry has a value of significant(1), indicating a call in progress. If docsDevSwAdminStatus is set to upgradeFromMgt(1) under these conditions, an error code of resourceUnavailable(13) will be returned and an appropriate event logged to the CM.

2.2.5 Configuring the Jitter Buffer

There are 4 MIBs that constitute the control of the jitter buffer which can be configured as either fixed or adaptive by the emtaSignalingVoiceJitterBufferType MIB. The jitter buffer holds RTP frames for a configurable period of time in order to smooth out network jitter. In the case of a fixed jitter buffer the frames are held for a fixed period of time. A fixed jitter buffer with a high holding period is appropriate for VBD because delay is not as important as reducing packet loss, but in the case of voice calls where minimizing delay is more important than reducing packet loss an adaptive jitter buffer is appropriate. The adaptive jitter buffer adjusts the holding time as required based on the detected network jitter. The default values controlling the jitter buffer are for an adaptive jitter buffer with a maximum hold time of 200ms. The MIB default of 0 for emtaSignalingVoiceJitterBufferNomValue and emtaSignalingVoiceJitterBufferMinValue means they can adjust up to the maximum which is 200ms. The nominal hold time will be adjusted immediately when a voice call starts up. If you freeze the voice jitter buffer it uses the emtaSignalingVoiceJitterNomValue for the fixed size of the jitter buffer.
There are three MIBs for configuring the jitter buffer:

- emtaSignalingVoiceJitterNomValue
- emtaSignalingVoiceJitterMinValue
- emtaSignalingVoiceJitterMaxValue

ubee-emta-mgmt.mib		
MIB	Default Value	Access
emtaSignalingVoiceJitterBufferType	jitterBufferTypeAdaptive(2)	read-write
emtaSignalingVoiceJitterNomValue	0	read-write
emtaSignalingVoiceJitterMinValue	0	read-write
emtaSignalingVoiceJitterMaxValue	0	read-write

emtaSignalingDataJitterNomValue	60	read-write
emtaSignalingDataJitterMaxValue	0	read-write
emtaStatsAvgJitterMeasurement	-	read
emtaStatsMaxJitterMeasurement	-	read

emtaSignalingVoiceJitterBufferType

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.3.0 Integer32)

This object contains the type of the jitter buffer. Setting this object to jitterBufferTypeFixed(1) causes the eMTA to employ a fixed jitter buffer. Setting this object to jitterBufferTypeAdaptive(2) causes the eMTA to use an adaptive jitter buffer. If the jitter buffer type value is changed through SNMP, then those changes take affect starting with the next phone call (in process calls are not affected). When the voice jitter buffer is frozen it uses the emtaSignalingVoiceJitterNomValue for the fixed size of the jitter buffer."

- jitterBufferTypeFixed(1),
- jitterBufferTypeAdaptive(2)

emtaSignalingVoiceJitterNomValue

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.4.0 Unsigned32)

If the voice jitter buffer value is changed through SNMP, then those changes take affect starting with the next phone call (in process calls are not affected). This MIB sets the target hold time for the voice jitter buffer in milliseconds. This is the initial hold time for the adaptive jitter buffer. The actual target holding time will adapt above or below this in response to observed network jitter. The MTA will reject all attempts to set the value which is not within the interval defined by the emtaSignalingVoiceJitterMinValue and emtaSignalingVoiceJitterMaxValue MIB Objects. When the jitter buffer is frozen, this MIB controls the static size of the voice jitter buffer. The default value is 0 which is interpreted as the maximum jitter buffer size for the product.

emtaSignalingVoiceJitterMinValue

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.5.0 Unsigned32)

If the voice jitter buffer value is changed through SNMP, then those changes

take affect starting with the next phone call (in process calls are not affected). This MIB sets the minimum hold time for the voice jitter buffer in milliseconds. The target hold time cannot take on a value below the minimum either through a MIB setting or through adaptation. That is, packets will be held in the jitter buffer for at least this duration (on average). When a packet is received late it may be held for less than this time.

emtaSignalingVoiceJitterMaxValue

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.6.0 Unsigned32)

If the voice jitter buffer value is changed through SNMP, then those changes take affect starting with the next phone call (in process calls are not affected). This MIB sets the maximum hold time for the voice jitter buffer in milliseconds. The maximum size of the jitter buffer is only relevant for an adaptive jitter buffer. The target hold time cannot take on a value greater than the maximum either through a MIB setting or through adaptation. On average, packets will not be held longer than this time. However, if a packet is received quite early it may be held longer than the max hold time. The default value is 0 which is interpreted as the maximum jitter buffer size for the product.

emtaSignalingDataJitterNomValue

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.7.0 Unsigned32)

If the jitter buffer value is changed through SNMP, then those changes take affect starting with the next phone call (in process calls are not affected). This object controls the hold time for a fixed VBD jitter buffer. The jitter buffer always fixes itself when VBD is detected and never adapts below this level, so this value serves as a minimum too. The default value is 60 msec..

emtaSignalingDataJitterMaxValue

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.19.0 Unsigned32)

If the voice buffer value is changed through SNMP, then those changes take affect starting with the next phone call (in process calls are not affected). This MIB sets the maximum hold time for the fixed VBD jitter buffer and is only relevant when emtaSignalingVoiceJitterBufferType is set to 'jitterbufferTypeFixed(1)'.

The default value is 0 which is interpreted as the maximum jitter buffer size for the product.

emtaStatsAvgJitterMeasurement

(1.3.6.1.4.1.4684.38.2.2.2.1.6.5.8.0 Unsigned32)

This objects contains the average jitter measurements for the last 24 hours.

emtaStatsMaxJitterMeasurement

(1.3.6.1.4.1.4684.38.2.2.2.1.6.5.9.0 Unsigned32)

This objects contains the maximum jitter measurements for the last 24 hours.

2.2.6 Configuring for Network Maintenance Operations

The network maintenance operations provide control over the loop voltage behavior of the eMTA, and they can be done by either the private emtaMgmtMaintenance MIBs or the EuroPacketCable pktcEnNcsEndPntLVMgmtTable MIBs. By default, the private MIBs are used. The EuroPacketCable MIBs are used only for EuroPacketCable 1.5 builds without vendor-specific build option.

ubee-emta-mgmt.mib		
MIB	Default Value	Access
emtaMaintenanceWindowBegin	-	read-write
emtaMaintenanceWindowDuration	0	read-write
emtaMaintenanceControlMask	maintenanceOnCMSLoss(3),	read-write
emtaMaintenanceQuarantineTimeout	120	read-write
emtaMaintenanceDisconnectedTimeout	120	read-write
emtaMaintenanceRFDisconnectTimeout	300	read-write

emtaMaintenanceWindowBegin

(1.3.6.1.4.1.4684.38.2.2.2.1.6.2.1.0 OCTET STRING)

This object identifies the start of an eMTA maintenance window. A maintenance

window is a period of time during which the ISP may perform network maintenance operations and network outages or software resets may occur. During a maintenance window, the eMTA will maintain the line voltage of an MTA regardless of CM resets, MTA resets, or RF losses. If any of these conditions occurs or persists outside of the scheduled maintenance window then the line voltage will be dropped unless the corresponding bit for the condition in question is set in the emtaMaintenanceControlMask MIB. If this object has never been set, it will have the value of midnight, January 1, 1970. Note that the time value used here is the local time as known by the device, as opposed to UTC. Also note that the value of this object will persist across a system reboot.

emtaMaintenanceWindowDuration

(1.3.6.1.4.1.4684.38.2.2.2.1.6.2.2.0 Unsigned32)

This object identifies the duration, in seconds, of an eMTA maintenance window. Setting the value of this object to the default value of zero will cancel the maintenance window. Note that the value of this object will persist across a system reboot.

emtaMaintenanceControlMask

(1.3.6.1.4.1.4684.38.2.2.2.1.6.2.3.0 BITS)

This object identifies the bit mask to control the line voltage behavior of the eMTA in various scenarios: maintenanceOnCmReset(0) - if this bit is set to 1 it requires the line voltage be maintained in the case when the CM has been reset, regardless of the reason (reset after downloading a new firmware, or hard reboot, or SNMP induced CM reset), and regardless of whether the MTA is in a valid maintenance window maintenanceOnRFLoss(1) - if this bit is set to 1 it requires the line voltage be maintained in the case when RF communication is lost, regardless of the reason, and regardless of whether the MTA is in a valid maintenance window maintenanceOnMtaReset(2) - if this bit is set to 1 it requires the line voltage be maintained in the case when the eMTA is being reset, regardless of the reason (e.g. SNMP induced eMTA reset, etc), and regardless of whether the MTA is in a valid maintenance window maintenanceOnCMSLoss(3) - if this bit is set to 1 it requires the line voltage be maintained in the case when communication is lost with the CMS, regardless of the reason (e.g. endpoint disconnected, etc),

and regardless of whether the duration of the communication loss has exceeded the value in the MIB emtaMaintenanceQuarantineTimeout and/or emtaMaintenanceDisconnectedTimeout.

The default value of this object may change based on build specific options. However, it's highly recommended that the default value in the image submitted for (E)PC 1.x Certification be chosen in such a way that it will correspond to the functionality compliant with the PacketCable requirements and will preserve the backward compatibility with the previously certified behavior. Note that to satisfy the latter, 'maintenanceOnCMSLoss(3)' bit should be set by default.

- maintenanceOnCmReset(0),
- maintenanceOnRFLoss(1),
- maintenanceOnMtaReset(2),
- maintenanceOnCMSLoss(3)

emtaMaintenanceQuarantineTimeout

(1.3.6.1.4.1.4684.38.2.2.2.1.6.2.4.0 Unsigned32)

This object identifies the length of time, in seconds, that the MTA should maintain the line voltage after any of the endpoints enters the quarantine state. If any of the endpoints remains in the quarantine state for longer than this period the line voltage is dropped unless the maintenanceOnCMSLoss bit is set in the emtaMaintenanceControlMask MIB. Note that the value of this object will persist across a system reboot.

emtaMaintenanceDisconnectedTimeout

(1.3.6.1.4.1.4684.38.2.2.2.1.6.2.5.0 Unsigned32)

This object identifies the length of time, in seconds, that the MTA should maintain the line voltage after any of the endpoints is disconnected. If any of the endpoints remains disconnected for longer than this period the line voltage is dropped unless the maintenanceOnCMSLoss bit is set in the emtaMaintenanceControlMask MIB. Note that the value of this object will persist across a system reboot.

emtaMaintenanceRFDisconnectTimeout

(1.3.6.1.4.1.4684.38.2.2.2.1.6.2.6.0 Unsigned32)

This object identifies the length of time, in seconds, that the MTA should maintain the line voltage after the RF lock with the CMTS is lost. If the MTA remains disconnected from the CMTS for longer than this period the line voltage is dropped unless the maintenanceOnRFLoss bit is set in the emtaMaintenanceControlMask MIB. Note that the value of this object will persist across a system reboot.

Differences between the private MIB feature and the PacketCable MIB feature:

- Private MIBs allow one or more of the conditions of CM reset, RF loss, MTA reset, and CMS loss to be configured. The configurability for CMS Loss is not available for PacketCable MIBs.
- The pktcEnNcsEndPntLVMgmtResetTimer applies to all the conditions of CM reset, RF loss, MTA reset, and CMS loss. The timers (the timeout MIBs) from private MIBs can apply to individual condition for CMS loss and RF loss, but there is no timer specific to CM reset and MTA reset.
- In the event of a RF Loss, the PacketCable MIB feature will complete a full scan on the spectrum after the T4 timeout before dropping the line voltage. The Private MIB feature will drop the line voltage as soon as there is a T4 timeout.
- The PacketCable MIBs provide control on whether line voltage should be maintained if MTA fails provisioning. The Private MIBs do not.
- The PacketCable MIBs provide control on the reset timer value for CM reset and MTA reset. The Private MIBs do not.

PacketCable Policy	PacketCable Timers	emtaMaintenanceControlMask	emtaMaintenance Timers
Policy 1	None	OnCmReset(0), OnRFLoss(1), OnMtaReset(2), OnCMSLoss(3)	None
Policy 2	None	OnCmReset(0), OnMtaReset(2),	emtaMaintenanceRF-DisconnectTimeout

		OnCMSLoss(3)	
Policy 3	pktcEnNcsEndPntLVMgmtMaintTimer	Not Required	emtaMaintenanceWindowBegin, emtaMaintenanceWindowDuration, emtaMaintenance QuarantineTimeout, emtaMaintenance DisconnectTimeout, emtaMaintenance RFDisconnectTimeout
Policy 4	None	Not Required	None required.
N/A	N/A	Any other bit settings	Any combination of the emtaMaintenanceWindow-Begin, emtaMaintenanceWindow-Duration, and the Timeout MIB settings.

2.2.7 Configuring Stuck Service-Flow Cleanup Control

ubee-emta-mgmt.mib		
MIB	Default Value	Access
emtaSignalingEndptConnectionCleanupTimeout	0	Read
emtaSignalingEmtaResetCleanupTimeout	0	Read

emtaSignalingEndptConnectionCleanupTimeout

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.12.0 Unsigned32)

This object causes the EMTA to tear down and clean up connections and the associated service flows on any endpoint that detects a transition from off-hook to on-hook, remains onhook for a period longer than the value set in this MB object, and has connections that were active prior to the endpoint going onhook. If the MIB object is set to 0 then this function is disabled. If the MIB is set from 1 to 64000 seconds then the feature is enabled and this value is used for the timeout.

This object should only be changed by the configuration file.

emtaSignalingEmtaResetCleanupTimeout

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.13.0 Unsigned32)

This object causes the entire EMTA to reset if voice connections have been active and both voice lines have been on-hook for a period greater than the value defined via this MIB object. This will guarantee that orphaned connections and/or service flows are properly cleaned up and freed when the CMTS and CMS fail to perform the correct clean up operations. It will also ensure that the EMTA state machine, DSP voice channels, NCS connection handling, etc. are also restored to a default state. This protects against any unknown case that could possibly cause stuck service flows and/or connections. If the MIB object is set to 0 then this function is disabled. If the MIB is set from 1 to 64000 minutes then the feature is enabled and this value is used for the timeout. This object should only be changed by the configuration file.

2.2.8 EndPoint Provisioning

ubee-emta-mgmt.mib		
MIB	Default Value	Access
emtaRingWithDCOffset	false	read-write
emtaSignalingEndptCtrlAnalogLoopback	false	read-write
emtaSignalingEndptCtrlLineReset	false	read-write
emtaSignalingEndptCtrlBoostedLoopCurrent	false	read-write
emtaSignalingEndptCtrlTxGain	0	read-write
emtaSignalingEndptCtrlRxGain	0	read-write
emtaSignalingEndptCtrlDialToneMsecTO	0	read-write
emtaSignalingEndptCtrlToneDetectionControlExt	v18BaudotDisabled(2) v18PreambleDisabled(3) v18AsciiBell103V22bitDisabled(4)	read-write

emtaSignalingPowerRingFrequency	f20Hz(1),	read
emtaSignalingRingWaveform	Sinusoidal(1)	read-write

emtaRingWithDCOffset

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.3.0 Integer32)

This object specifies whether the ring with DC offset option is enabled.

emtaSignalingEndptCtrlAnalogLoopback

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.1.x Integer32)

This object controls the implementation of the analog loopback by the MTA. When the object is set to true(1), the MTA MUST implement analog loopback operations. When the object is set to false(2), the MTA MUST stop loopback operations immediately. The default value of this object corresponds to the functionality compliant with the PacketCable requirements.

emtaSignalingEndptCtrlLineReset

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.2.x Integer32)

This object controls the resetting the telephone line. Setting this object to true(1) causes the eMTA to reset the telephone line of the corresponding endpoint. Setting this object to false(2) does not have any affect. Reading this object always returns 'false(2)'.

emtaSignalingEndptCtrlBoostedLoopCurrent

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.8.x Integer32)

This object indicates whether the loop current should be boosted (true(1)) or not (false(2)). The particular value for the loop current depends on the particular hardware (SLIC) being used.

emtaSignalingEndptCtrlTxGain

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.9.x Integer32)

This Object represents the per line transmitter (A/D) gain. A positive number

reflects a signal gain; a negative number reflects a signal loss. This Object does not reflect the desired level at the Telco (POTS) a-b (T/R) terminals as it does not include the affects of the gain settings on the analog interfaces which are pre-configured for a given country specification. The gain setting specified in this MIB object will be applied on top of the preconfigured settings and therefore represents a relative level, while ubeeTxGain will overwrite the preconfigured settings and represents an absolute level.

emtaSignalingEndptCtrlRxGain

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.10.x Integer32)

This Object represents the per line receiver (D/A) gain. A positive number reflects a signal gain; a negative number reflects a signal loss. This MIB Object does not reflect the desired level at the Telco (POTS) a-b (T/R) terminals as it does not include the affects of the gain settings on the analog interfaces which are pre configured for a given country specification. The gain setting specified in this MIB will be applied on top of the preconfigured settings and therefore represents a relative level, while ubeeRxGain will overwrite the preconfigured settings and represents an absolute level

emtaSignalingEndptCtrlDialToneMsecTO

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.11.x Integer32)

This Object contains the timeout value for dial tone that provides millisecond resolution. If the value of the object is modified by the SNMP Management Station to a non zero value, the MTA MUST use the new value as a default only for a new signal requested by the NCS message. If the value of this object is set to 0, then 'pktcNcsEndPntConfigDialToneTO' from PKTC-SIG-MIB MUST be used, and not this value. If set to a non-zero value this object takes precedence over 'pktcNcsEndPntConfigDialToneTO' object. Only increments of 100ms are allowed. Note that the value of this object will persist across a system reboot.

emtaSignalingEndptCtrlToneDetectionControlExt

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.15.x Bits)

This MIB object is used to control individual tone detectors on an EMTA endpoint.

If bit faxDetectionDisabled(0) is set, the EMTA must disable the fax portion of tone detection (1100Hz CNG tone) on the specific endpoint.
If bit modemDetectionDisabled(1) is set, the EMTA must disable the modem portion of tone detection (2100Hz CED tone) on the specific endpoint.
If bit V18BaudotDisabled(2) is set, the EMTA must disable V18 Baudot (1400 Hz) detection on the specific endpoint.
If bit V18PreambleDisabled(3) is set, the EMTA must disable V18 Preamble(980, 1650 Hz) detection on the specific endpoint.
If bit V18AsciiBell103V22bisDisabled(4) is set, the EMTA must disable V18 Ascii/Bell103 (1275, 2225 Hz) and V22bis (2250 Hz) detection on the specific endpoint (mostly used for Alarm Panels and Point of Sale terminals).
If a connection already exists on the endpoint when this MIB Object is modified, then the setting needs to take effect on the next connection.
The default value of this object has the v18AsciiBell103V22bisDisabled(4) bit set, which is compliant with PacketCable requirements.
Note that the default value of this object may change based on build specific options, which could be PacketCable non-compliant.
If a configuration file contains both emtaSignalingEndptCtrlToneDetectionControl and emtaSignalingEndptCtrlToneDetectionControlExt, the mib that is processed last will take precedence.

emtaSignalingPowerRingFrequency

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.18.0 Integer32)

This object must only be provided via the configuration file during the provisioning process. The power ring frequency is the frequency at which the sinusoidal voltage must travel down the twisted pair to make terminal equipment ring. Different countries define different electrical characteristics to make terminal equipment ring.

- f20Hz(1)
- f25Hz(2)
- f33Point33Hz(3)
- f50Hz(4)
- f15Hz(5)
- f16Hz(6)
- f22Hz(7)

- f23Hz(8)
- f45Hz(9)
- f17Hz(10)

emtaSignalingRingWaveform

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.20.0 Integer32)

This MIB object is controls the shape of the ring waveform. The setting of sinusoidal(1) would result in a sinusoidal ring waveform with crest factor of 1.414, while the setting of trapezoidal(2) would result in a trapezoidal ring waveform with crest factor of 1.25.

- Sinusoidal(1)
- Trapezoidal(2)

2.2.9 Telephony Port Diagnostics

TPD testing can be used to diagnose problems with customer cabling, terminations and unexpected foreign voltages sources. Testing encompasses the ability to detect the hook state, the ability to communicate with a CMS, detect shorts, opens and foreign voltages. Sense inputs connected directly to tip and ring are provided to the eMTA for direct access to the telephony interface. The pin of the SLIC which gives a voltage representation of the loop current also has a sense input. These inputs allow TPD tests to be performed in order to fully diagnose the loop condition. The resources in the codec and SLIC are available to perform loop diagnostics (i.e. be able to stimulate and measure the loop).

The different telephony test available and their explanation consist of the following:

Hazardous Potential Test

This test checks for high voltage levels on the Tip and Ring pins. Hazardous potential is based on two terminal T-G and R-G AC voltage and two terminal T-G and R-G DC voltage. The system shall provide a fail indication if the T-G or R-G AC voltage is greater than 50 volts RMS or the T-G or R-G DC voltage is greater than 135 volts. This is accomplished by putting the SLIC into the high impedance disconnected mode. The tip and ring sense inputs are then read to see if a hazardous potential voltage is present. This test fails if the voltages are greater than the thresholds stated meaning that a hazardous voltage has been detected.

Foreign Electromotive Force Test (FEMF)

This test checks for high voltage levels on the Tip and Ring pins. FEMF is based on two terminal T-G and R-G AC voltage and two terminal T-G and R-G DC voltage. The system shall provide a fail indication if the T-G or R-G AC voltage is greater than 10 volts or the T-G or R-G DC voltage is greater than 6 volts. This is accomplished by using the results from the previous hazardous potential test. This test fails if the voltages are greater than the thresholds stated.

Notes:

In this test, if the T-G or R-G DC voltage is greater than 6 volts, this test will be failed in normal way, but due to the hardware design, there has tolerance detected by our SW.

Receiver Off hook Test (ROH)

This test determines if the telephone receiver is in the off hook state. A receiver off hook is identified by sequentially generating two AC voltages across Tip and Ring, one at approximately 10 Vrms and one at approximately 5 Vrms. The tip and ring voltages are measured at each voltage setting to look for a non-linear relationship. If the second set of voltage readings is less than 85% of the intended value the test fails. This test differentiates between an off hook condition and a simple resistive fault.

Tip to Ring Resistive Faults Test

This test checks for resistive faults which are DC resistance faults across Tip and Ring. The test provides a fail indication if the measured resistance is less than 150 K Ohms.

Tip to Ground Resistive Faults Test

This test checks for resistive faults which are DC resistance faults across Tip and Ground. The test provides a fail indication if the measured resistance is less than 150 K Ohms.

Ring to Ground Resistive Faults Test

This test checks for resistive faults which are DC resistance faults across Ring and Ground. The test provides a fail indication if the measured resistance is less than 150 K Ohms.

Ringers Test

This test determines the presence of appropriate ringer terminations on the customer line. The test provides a fail indication when the equivalent ringer load across tip and ring is

less than 0.175 REN or greater than 5 REN. During this test a low voltage AC signal is applied to the line. The voltage and current across the load are measured as the AC signal is applied. The ringing voltage is below the required level to activate a ring so audible ringing will not occur. The measured AC resistance is linearly proportional to the load on the endpoint in question and is converted to REN units. If this value is below 0.175 REN or above 5 REN the test fails. If not, this test passes.

Off hook Simulation Test

This test simulates an off hook condition by utilizing an external relay. The test provides a pass indication if the following sequence of events occurs successfully. First, the MTA causes the external relay to simulate an off hook condition. Second, the MTA detects the off hook condition and sends a NTFY event to the CMS. Third the CMS acknowledges this NTFY and sends an RQNT to play dial tone. If all of these conditions occur within two second the test passes. After the test is completed the relay is disabled and the off hook condition ceases regardless of whether the test was successful or not. Note: this test will not pass unless a CMS is active that will request dial tone upon receiving a notification of off hook from the MTA.

Self Check Test

This test verifies that several of the voice support modules of the MTA are operating correctly. In particular this test uses a variety of methods to verify that the APM, the DSP core software, and the HVG are all functioning as expected. If any of these modules is not operating as expected this test fails and an error is reported in the MIB. If each module is functioning as expected the test passes

The below table enumerates the applicable MIBS for conducting the telephony port diagnostics. When executing any of these tests you must always set the startForceTestExecution bit which tells the software that I am running a line diagnostic test as opposed to an actual call.

ubee-emta-mgmt.mib		
MIB	Default Value	Access
emtaSignalingEndptCtrlDiagTestsStart		read-write
emtaSignalingEndptCtrlDiagTestsStop		read-write
emtaSignalingEndptCtrlDiagTestValid		read

emtaSignalingEndptCtrlDiagTestValue		read

emtaSignalingEndptCtrlDiagTestsStart

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.3.x BITS)

This object is used to start one or more diagnostic tests associated with a corresponding endpoint. Thus, whenever one or more BITS corresponding to diagnostic test are set to a value of '1', the MTA will conduct those tests. Before starting the test, the MTA clears all the BITS of the following MIBS:

- emtaSignalingEndptCtrlDiagTestValid
- emtaSignalingEndptCtrlDiagTestResult
- emtaSignalingEndptCtrlDiagTestsStop

Once the designated tests are completed the MTA updates the corresponding BITS in the MIBS:

- emtaSignalingEndptCtrlDiagTestValid
- emtaSignalingEndptCtrlDiagTestResult

Whenever a test is being run on an endpoint the corresponding 'ifOperStatus' MIB object is set to a value of 'testing(3)' for the duration of the test. When the test is completed, the MTA sets ifOperStatus to the value corresponding to the current state of the line. The selected tests will not run if the corresponding endpoint is offhook. To force execution of the selected tests regardless of the endpoint status set the corresponding startForceTestExecution(11) BIT.

- startTipToGroundShortDetection(0)
- startRingToGroundShortDetection(1)
- startTipToRingShortDetection(2)
- startRingerEquivalenceNetwork(3)
- startSelfTestNoReboot(4)
- startOffHookSimulationTest(5)
- startTip1ToRing2Short(6), -- Not currently implemented
- startTip2ToRing1Short(7), -- Not currently implemented
- startHazardousPotentialsTest(8),
- startstartForeignElectromotiveForceTest(9),

- startReceiverOffhook(10),
- startForceTestExecution(11)

emtaSignalingEndptCtrlDiagTestsStop

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.4.x BITS)

This object is used to stop the test corresponding to the bit being set if the test is not complete yet by the time when the bit is set.

- stopTipToGroundShortDetection(0),
- stopRingToGroundShortDetection(1),
- stopTipToRingShortDetection(2),
- stopRingerEquivalenceNetwork(3),
- stopSelfTestNoReboot(4),
- stopOffHookSimulationTest(5),
- stopTip1ToRing2Short(6), -- Not currently implemented
- stopTip2ToRing1Short(7), -- Not currently implemented
- stopHazardousPotentialsTest(8),
- stopForeignElectromotiveForceTest(9),
- stopReceiverOffhook(10)

emtaSignalingEndptCtrlDiagTestValid

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.5.x BITS)

This object indicates the validity of the corresponding test case that was initiated in the emtaSignalingEndptCtrlDiagTestsStart MIB. The corresponding bit will be set if the test was able to run and the test result is valid. Clear the corresponding bit if the MTA was not able to run the test or the test was not initiated or the test was not complete for any reason and hence, the result is invalid.

emtaSignalingEndptCtrlDiagTestResult(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.6.x BITS)

This object indicates the result of the corresponding test that was initiated using emtaSignalingEndptCtrlDiagTestsStart MIB. If the corresponding completed successfully the bit will be set and if the test failed the bit will be cleared or 0.

- stopTipToGroundShortDetection(0),
- stopRingToGroundShortDetection(1),

- stopTipToRingShortDetection(2),
- stopRingerEquivalenceNetwork(3),
- stopSelfTestNoReboot(4),
- stopOffHookSimulationTest(5),
- stopTip1ToRing2Short(6), -- Not currently implemented
- stopTip2ToRing1Short(7), -- Not currently implemented
- stopHazardousPotentialsTest(8),
- stopForeignElectromotiveForceTest(9),
- stopReceiverOffhook(10)

emtaSignalingEndptCtrlDiagTestValue

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.1.1.7.x OCTET STRING)

This object contains the value which represents the results of the corresponding test. Each value of the result is represented as a human readable string indicating the value of the particular parameter used to evaluate the testing results.

The format of the string containing the results is as follows:

[P=<param>,V=<value>,U=<unit>]

where:

<param> - is the name of the particular parameter evaluated during the test,

<value> - is the human readable representation of the testing result of the particular parameter (e.g. '3.5', 'state is on-hook', etc),

<unit> - is the human readable representation of the unit describing the <value>.

If there are several parameters constituting the result of the individual test, then all values will be presented in the following format:

[P=<param-1>,V=<value-1>,U=<unit-1>][P=<param-2>,V=<value-2>,U=<unit-2>]...
..

If the test is not represented by the measurable value, or the test has not been complete for any reason, then the object must contain zero-length string.

2.2.10 Audible Tone Tables

Audible tone tables can be used to configure the settings for each audible tone for service interruptions or UPS battery conditions. Whether these tones are played is controlled by the MIB emtaSignalingAnnouncementCtrl, and the settings for the tones can be configured by the MIBs within the emtaSignalingDevToneTable and the emtaSignalingDevMultiFreqToneTable. The emtaSignalingDevToneTable is indexed by tone type, which is the pre-defined service interruptions of “RF Loss”, “Endpoint Disabled”, and “Endpoint Disconnected”, and the pre-defined UPS battery condition of “Loss of AC Power”, “Low Battery”, “Bad Battery”, and “Battery Over Temp”. The emtaSignalingDevMultiFreqToneTable is indexed by tone type and a frequency number.

ubee-emta-mgmt.mib		
MIB	Default Value	Access
emtaSignalingAnnouncementCtrl	BITS (000)	read-write
emtaSignalingDevToneWholeToneRepeatCount	-	read
emtaSignalingDevToneSteady	-	read
emtaSignalingDevToneFirstFreqValue	-	read
emtaSignalingDevToneSecondFreqValue	-	read
emtaSignalingDevToneDbLevel	-	read
emtaSignalingDevToneFreqOnDuration	-	read
emtaSignalingDevToneOffDuration	-	read
emtaSignalingDevToneFreqRepeatCount	-	read

emtaSignalingAnnouncementCtrl

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.2.0 BITS)

This object contains the value controlling the announcements being played by the MTA in case of service interruption or UPS battery condition. The service interruptions announcements are required to be played if the phone is off-hook.

If bit announcementOnRfLoss(0) is set, the MTA MUST play an Announcement on all endpoints upon the RF loss. Otherwise (the bit is cleared) - the MTA MUST NOT play the announcement.

If bit announcementOnEndptDisabled(1) is set, the MTA MUST play the announcement

on the end-point which has been disabled by one of the PacketCable compliant means: ifOperStatus/ifAdmingStatus becomes down(2), or end-point is not assigned to the particular CMS, or 'pktcMtaDevEnabled' MIB object is set to false(2). Otherwise - the MTA MUST NOT play the announcement.

If bit announcementOnEndptDisconnected(2) is set, the MTA MUST play the announcement on the end-point which becomes NCS disconnected (pktcNcsEndPntStatusError is in disconnected(3) state). Otherwise - the MTA MUST NOT play the announcement.

The UPS battery condition announcements are required to be played if the phone is off-hook and before dial tone.

If bit announcementOnACLoss(3) is set, the MTA MUST play an audible tone announcement upon detecting the loss of AC Power. The announcements are required to be played if the phone is off-hook and before dial tone. Otherwise (the bit is cleared) - the MTA MUST NOT play the announcement.

If bit announcementOnLowBatt(4) is set, the MTA MUST play an audible tone announcement upon detecting the low battery condition. The announcements are required to be played if the phone is off-hook and before dial tone. Otherwise (the bit is cleared) - the MTA MUST NOT play the announcement.

If bit announcementOnBadBatt(5) is set, the MTA MUST play an audible tone announcement upon detecting the bad battery condition. The announcements are required to be played if the phone is off-hook and before dial tone. Otherwise (the bit is cleared) - the MTA MUST NOT play the announcement.

If bit announcementOnBattOverTemp(6) is set, the MTA MUST play an audible tone announcement upon detecting the battery over temperature condition. The announcements are required to be played if the phone is off-hook and before dial tone. Otherwise (the bit is cleared) - the MTA MUST NOT play the announcement.

The default value of this object corresponds to the functionality compliant with the PacketCable requirements - all bits are cleared.

- announcementOnRfLoss(0)
- announcementOnEndptDisabled(1),
- announcementOnEndptDisconnected(2)
- announcementOnACLoss(3)

- announcementOnLowBatt(4)
- announcementOnBadBatt(5)
- announcementOnBattOverTemp(6)

emtaSignalingDevToneWholeToneRepeatCount

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.24.1.2.x Unsigned32)

This is the repeat count which signifies how many times to repeat the entire on-off cadence sequence. This object should only be changed by the configuration file.

emtaSignalingDevToneSteady

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.24.1.3.x Integer32)

This is the steady tone. Device must play out the on-off cadence sequence for pktcSigDevToneWholeRepeatCount times and then apply the last tone forever. This object should only be changed by the configuration file.

emtaSignalingDevToneFirstFreqValue

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.25.1.2.x Unsigned32)

This object represents the value of the first frequency of a tone type. This object should only be changed by the configuration file.

emtaSignalingDevToneSecondFreqValue

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.25.1.3.x Unsigned32)

This object represents the value of the second frequency of a tone type. This object should only be changed by the configuration file.

emtaSignalingDevToneDbLevel

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.25.1.4.x Integer32)

This object contains the decibel level for each analog signal (tone) that is locally generated (versus in band supervisory tones) and sourced to the a-b terminals (TE connection point). Each tone in itself may consist of multiple

frequencies as defined by the MIB table 'emtaSignalingDevMultiFreqToneTable'. This object should only be changed by the configuration file.

emtaSignalingDevToneFreqOnDuration

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.25.1.5.x Unsigned32)

This object contains the duration for which the frequency reference corresponding to the tone type is turned on. This object should only be changed by the configuration file.

emtaSignalingDevToneFreqOffDuration

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.25.1.6.x Unsigned32)

This object contains the duration for which the frequency reference corresponding to the tone type is turned off. This object should only be changed by the configuration file.

emtaSignalingDevToneFreqRepeatCount

(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.25.1.7.x Unsigned32)

This object indicates the number of times to repeat the cadence cycle represented by the on/off durations (represented by emtaSignalingDevToneFreqOnDuration and emtaSignalingDevToneFreqOffDuration). This object should only be changed by the configuration file.

2.2.11 DQoS Lite Enable

ubee-emta-mgmt.mib		
MIB	Default Value	Access
emtaEnableDQoSLite	True	read-write

emtaEnableDQoSLite

(1.3.6.1.4.1.4684.38.2.2.2.1.6.1.7.0 Integer32)

This object specifies whether DQoS Lite is enabled. When enabled, gateid enforcement is disabled, which makes the EMTA use service flows (lite DQoS) even in absence of gate IDs. When DQoS lite is disabled, gate

ID enforcement on the EMTA is enabled, which makes the EMTA use real DQoS (no lite DQoS).

2.2.12 RFC2833 Enable

ubee-emta-mgmt.mib		
MIB	Default Value	Access
emtaSignalingDtmfToneRelayRFC2833Support	enabled(1)	read-write

emtaSignalingDtmfToneRelayRFC2833Support
(1.3.6.1.4.1.4684.38.2.2.2.1.6.4.8.0 Integer32)
This object contains the value which controls the usage of the RFC2833 DTMF Relay. Setting this object to 'enabled(1)' causes the MTA to use the DTMF Tone Relay as per RFC2833. Setting this object to 'disabled(2)' causes the eMTA not to use RFC2833 for DTMF Tone Relay. Setting this object to 'subtract(3)' causes eMTA to subtract DTMF tones from the encoded audio but not generate RFC2833 packets.

- enabled(1),
- disabled(2),
- subtract(3)

2.2.13 Configure MTA syslog server Ip address.

pktcEvent.mib		
MIB	Default Value	Access
pktcDevEvSyslogAddress	Prov. Server IP	read-write

pktcDevEvSyslogAddress
(1.3.6.1.4.1.4491.2.2.3.1.3.0 InetAddress)

This MIB Object contains the IP address of the Syslog server. If this is set to either 0.0.0.0 or 255.255.255.255 the device MUST inhibit syslogtransmission. The use of FQDNs is syntactically allowed, but discouraged since a failure to resolve them in a timely manner may leave the device without access to the Syslog daemon during critical network events. The type of address this object represents is defined by the MIB Object pktDevEvSyslogAddressType.

If an SNMP SET results in a type that does not match that indicated by the MIB Object pktcDevEvSyslogAddressType, the PacketCable device MUST reject the SNMP SET with an 'inconsistent value' error.

3 Web Interface

MTA supports web interface for remote administrator or local installer for debugging. The web page is presented into two categories. One is basic web page information without password protected and another one is advanced web page information with password protected. The default username/password is MSO/changeme.

3.1 Accessing the Web User Interface

Open the web browser and set the address to: http://192.168.1.1 for local access or

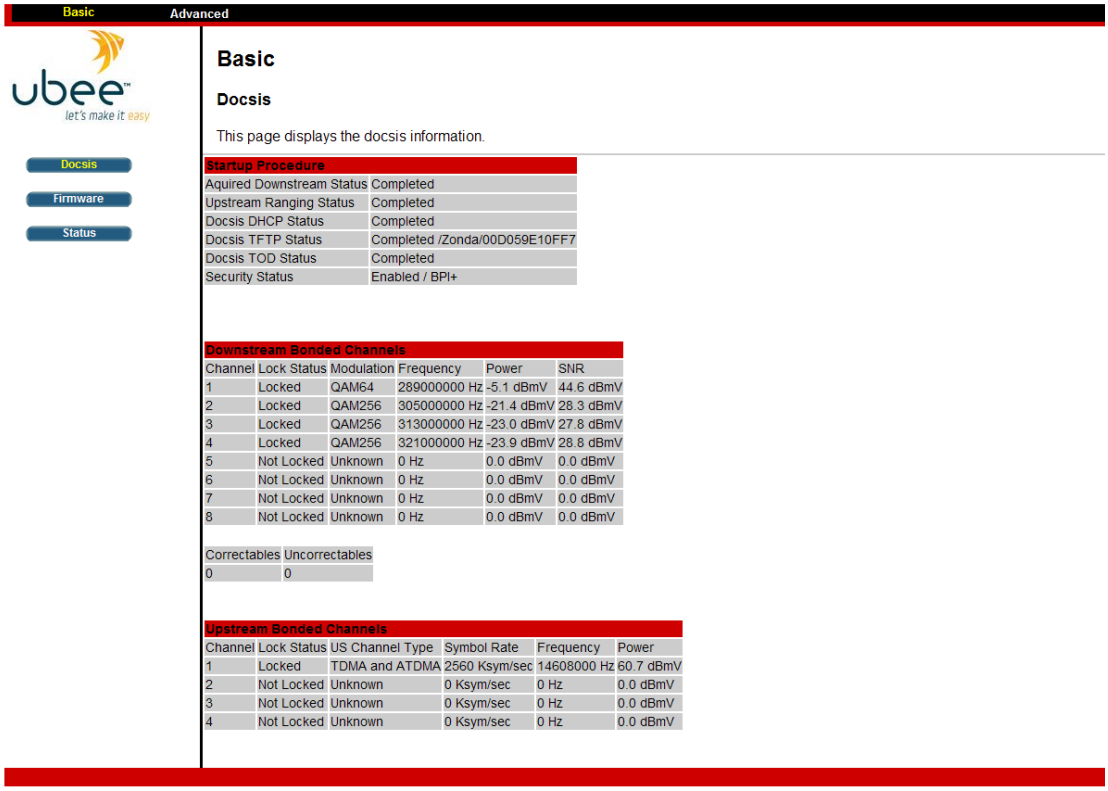
Open the web browser and set the address to: http://Cable-RF-IP-address for remote access.

Only the basic web page information can be accessed by LAN interface until registration.

3.2 Web User Interface Basic Page

The basic web page is available for local and remote access without password protect

3.2.1 Docsis – Display startup procedure and channels information



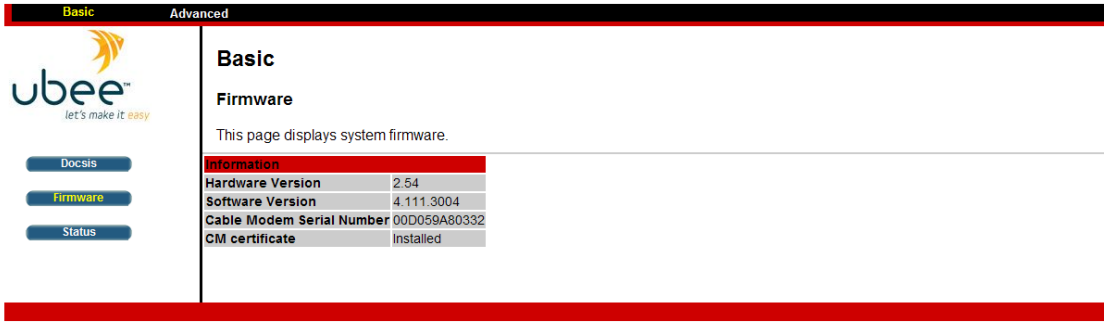
Startup Procedure	
Aquired Downstream Status	Completed
Upstream Ranging Status	Completed
Docsis DHCP Status	Completed
Docsis TFTP Status	Completed /Zonda/00D059E10FF7
Docsis TOD Status	Completed
Security Status	Enabled / BPI+

Downstream Bonded Channels					
Channel	Lock Status	Modulation	Frequency	Power	SNR
1	Locked	QAM64	289000000 Hz	-5.1 dBmV	44.6 dBmV
2	Locked	QAM256	305000000 Hz	-21.4 dBmV	28.3 dBmV
3	Locked	QAM256	313000000 Hz	-23.0 dBmV	27.8 dBmV
4	Locked	QAM256	321000000 Hz	-23.9 dBmV	28.8 dBmV
5	Not Locked	Unknown	0 Hz	0.0 dBmV	0.0 dBmV
6	Not Locked	Unknown	0 Hz	0.0 dBmV	0.0 dBmV
7	Not Locked	Unknown	0 Hz	0.0 dBmV	0.0 dBmV
8	Not Locked	Unknown	0 Hz	0.0 dBmV	0.0 dBmV

Correctables	Uncorrectables
0	0

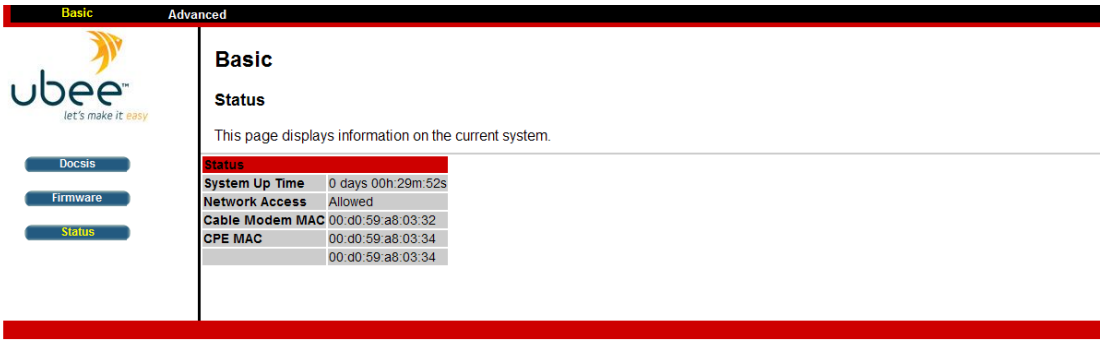
Upstream Bonded Channels					
Channel	Lock Status	US Channel Type	Symbol Rate	Frequency	Power
1	Locked	TDMA and ATDMA	2560 Ksym/sec	14608000 Hz	60.7 dBmV
2	Not Locked	Unknown	0 Ksym/sec	0 Hz	0.0 dBmV
3	Not Locked	Unknown	0 Ksym/sec	0 Hz	0.0 dBmV
4	Not Locked	Unknown	0 Ksym/sec	0 Hz	0.0 dBmV

3.2.2 Fimware – Display software version and serial number



Information	
Hardware Version	2.54
Software Version	4.111.3004
Cable Modem Serial Number	00D059A80332
CM certificate	Installed

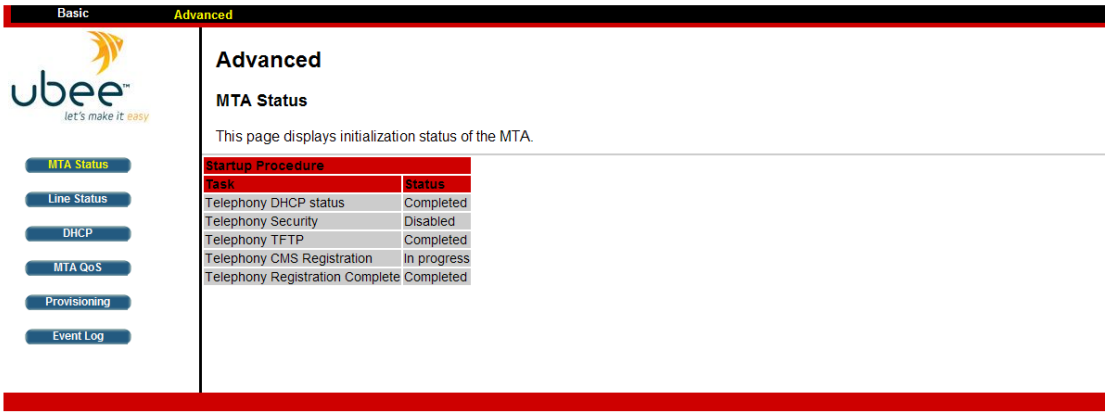
3.2.3 Status – Display system up time and CM/CPE MAC address



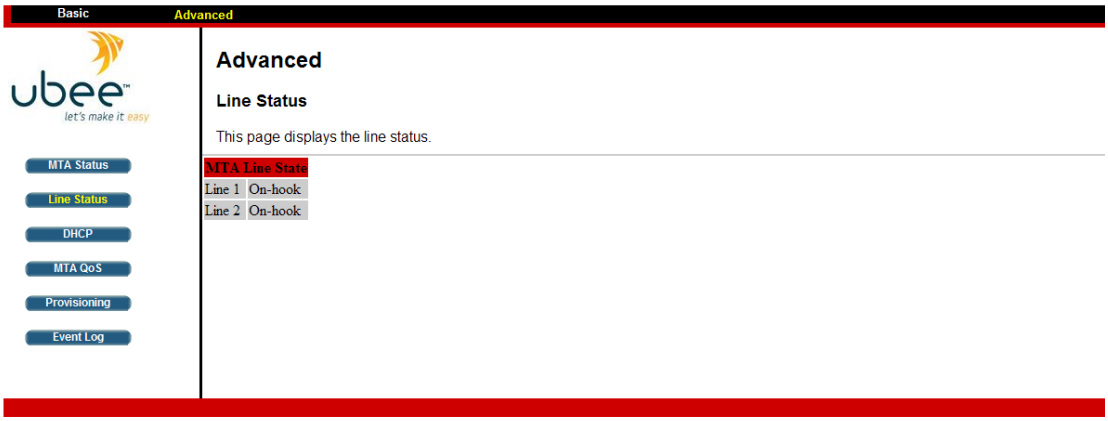
3.3 Web User Interface Advanced Page

The advanced web page is only available for remote access with password protected.

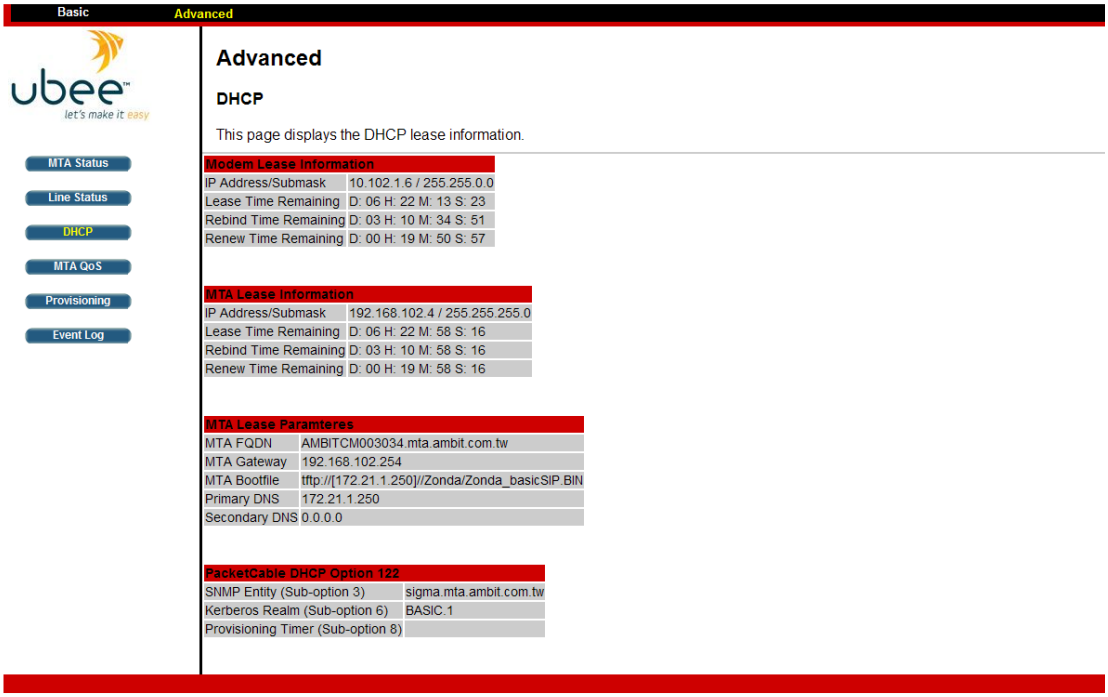
3.3.1 MTA Status – Display MTA startup procedure



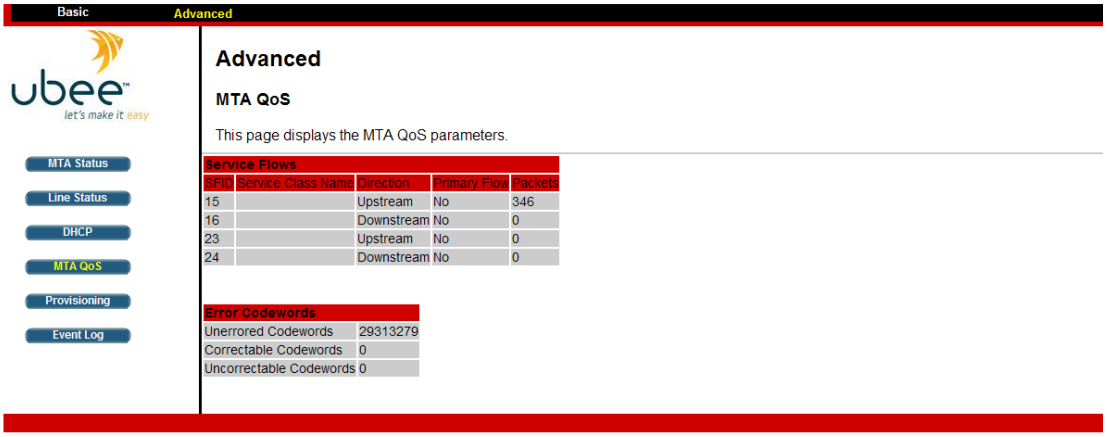
3.3.2 Line Status – Display MTA line status



3.3.3 DHCP – Display CM and MTA DHCP information



3.3.4 MTA QoS – Display service flow information



3.3.5 Provisioning – Display MTA configuration file contents

Basic Advanced

ubee let's make it easy

MTA Status
Line Status
DHCP
MTA QoS
Provisioning
Event Log

Advanced

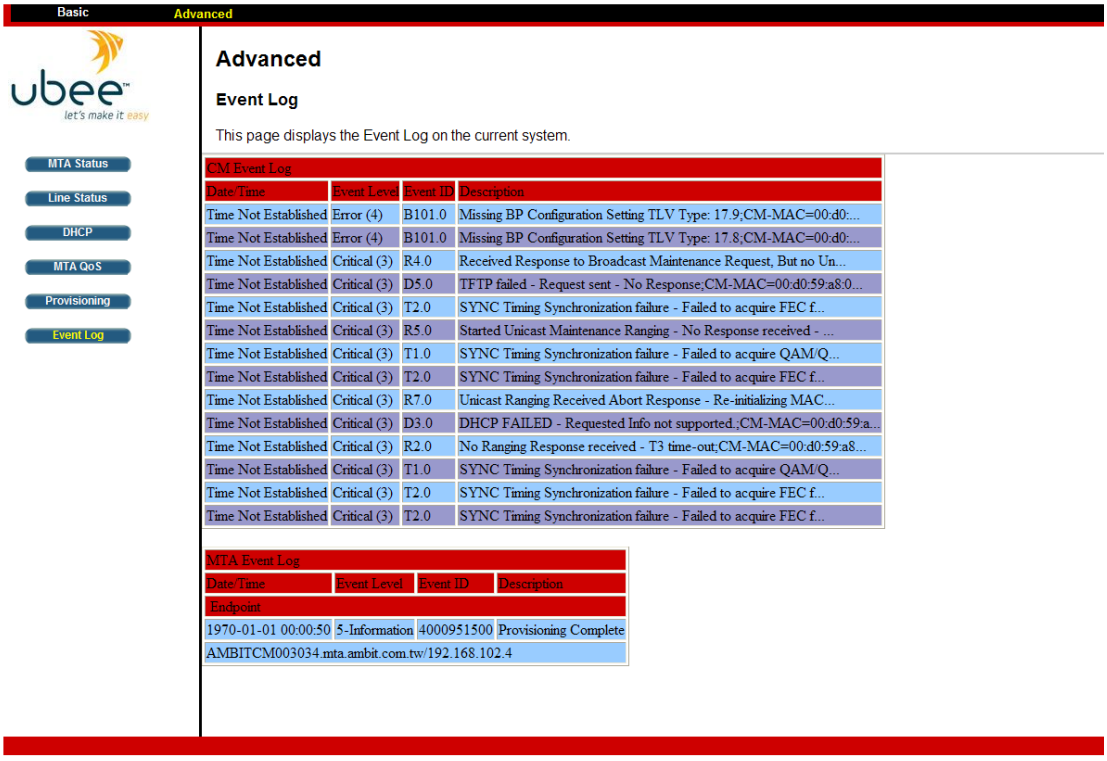
Provisioning

This page displays the MTA provisioning details.

MTA Config File	
Filename	tftp://[172.21.1.250]//Zonda/Zonda_basicSIP.BIN
Contents	MTA Config File Contents ========== .1.3.6.1.4.1.7432.1.1.1.6.0 1 .1.3.6.1.2.1.2.2.1.7.10 2 .1.3.6.1.2.1.2.2.1.7.9 1 .1.3.6.1.4.1.7432.1.1.3.6.1.2.1 mta.ambit.com.tw .1.3.6.1.4.1.7432.2.1.2.1.1.1.9 ca@sigma.mta.ambit.com.tw .1.3.6.1.4.1.7432.2.1.2.1.1.1.10 ca@sigma.mta.ambit.com.tw .1.3.6.1.4.1.7432.1.1.3.8.1.2.1 sigma.mta.ambit.com.tw .1.3.6.1.4.1.7432.1.1.3.6.1.5.1 cableProvider .1.3.6.1.4.1.7432.1.1.3.8.1.3.1 mta.ambit.com.tw .1.3.6.1.4.1.7432.1.1.3.8.1.9.1 2 .1.3.6.1.4.1.7432.2.1.2.1.1.2.9 2427 .1.3.6.1.4.1.7432.2.1.2.1.1.2.10 2427 .1.3.6.1.4.1.7432.2.1.2.1.1.18.9 3 .1.3.6.1.4.1.7432.2.1.2.1.1.18.10 3 .1.3.6.1.4.1.7432.2.1.1.4.0 1 .1.3.6.1.4.1.7432.2.1.1.21.0 1

Enterprise MIBs	
OID	Value
emtaInhibitSwDownloadDuringCall	true(1)
emtaFirewallEnable	true(1)
emtaRingWithDCOffset	false(2)
emtaIncludedInCmMaxCpe	false(2)
emtaDhcpOption	cableLabsClientConfiguraton(122)
emtaUseAlternateTelephonyRootCert	false(2)
emtaEnableDQoSLite	true(1)
emtaInhibitNcsSyslog	true(1)
emtaMaintenanceWindowBegin	Thu Jan 01 00:00:00 1970
emtaMaintenanceWindowDuration	0
emtaMaintenanceControlMask	0x10 [maintenanceOnCMSLoss(3)]
emtaMaintenanceQuarantineTimeout	120
emtaMaintenanceDisconnectedTimeout	120
emtaMaintenanceRFDisconnectTimeout	300
emtaSignalingAnnouncementCtrl	0x00
emtaSignalingVoiceJitterBufferType	jitterBufferTypeAdaptive(2)
emtaSignalingVoiceJitterNomValue	0
emtaSignalingVoiceJitterMinValue	0
emtaSignalingVoiceJitterMaxValue	0
emtaSignalingDataJitterNomValue	60
emtaSignalingDtmfToneRelayRFC2833Support	true(1)
emtaSignalingRtpBaseReceiveUdpPort	53456
emtaSignalingEndptConnectionCleanupTimeout	0
emtaSignalingEmtaResetCleanupTimeout	0
emtaSignalingT38FaxRelaySupport	true(1)

3.3.6 Event Log – Display CM and MTA event logs



CM Event Log

Date/Time	Event Level	Event ID	Description
Time Not Established	Error (4)	B101.0	Missing BP Configuration Setting TLV Type: 17.9;CM-MAC=00:d0:...
Time Not Established	Error (4)	B101.0	Missing BP Configuration Setting TLV Type: 17.8;CM-MAC=00:d0:...
Time Not Established	Critical (3)	R4.0	Received Response to Broadcast Maintenance Request, But no Un...
Time Not Established	Critical (3)	D5.0	TFTP failed - Request sent - No Response;CM-MAC=00:d0:59:a8:0...
Time Not Established	Critical (3)	T2.0	SYNC Timing Synchronization failure - Failed to acquire FEC f...
Time Not Established	Critical (3)	R5.0	Started Unicast Maintenance Ranging - No Response received - ...
Time Not Established	Critical (3)	T1.0	SYNC Timing Synchronization failure - Failed to acquire QAM/Q...
Time Not Established	Critical (3)	T2.0	SYNC Timing Synchronization failure - Failed to acquire FEC f...
Time Not Established	Critical (3)	R7.0	Unicast Ranging Received Abort Response - Re-initializing MAC...
Time Not Established	Critical (3)	D3.0	DHCP FAILED - Requested Info not supported.;CM-MAC=00:d0:59:a...
Time Not Established	Critical (3)	R2.0	No Ranging Response received - T3 time-out;CM-MAC=00:d0:59:a8...
Time Not Established	Critical (3)	T1.0	SYNC Timing Synchronization failure - Failed to acquire QAM/Q...
Time Not Established	Critical (3)	T2.0	SYNC Timing Synchronization failure - Failed to acquire FEC f...
Time Not Established	Critical (3)	T2.0	SYNC Timing Synchronization failure - Failed to acquire FEC f...

MTA Event Log

Date/Time	Event Level	Event ID	Description
Endpoint			
1970-01-01 00:00:50	5-Information	4000951500	Provisioning Complete
AMBITCM003034.mta.ambit.com.tw/192.168.102.4			

4 Telnet CLI

Ubee EMTA can be configured via Telnet, but the Telnet access is disabled by default. The default username/password is cable/cable.

4.1 CM

Provides the commands to show Cable Modem relative information and control downstream channel, upstream channel, log display ON or off and firewall.

diag
Changes downstream and upstream frequency.

log
Enable or disable message logging.

ping
Pings to the specific IP address from CM IP stack.

set
Enable or disable CM mini firewall.

show
Show various information including:

- ARP table
- BPI status
- CM certificates
- DOCSIS classifiers
- CM config file name and contents
- CPE info/table
- Downstream status and signal quality
- Downstream codeword error rate
- DSx message history
- CM event log
- DOCSIS service flows
- CM IP and DHCP options
- Routing table
- Docsis registration status
- Time of day
- Upstream descriptors
- Upstream status

HW Counters
Hal debug

4.2 EMTA

Provides the commands to show and control EMTA relative information and settings.

diag

Runs various MTA diagnostics including:

Enable analog loopback on a line
Reset a line
Run line diagnostics and report results
Sends HD and HU NCS message to the call agent
Simulates line off hook for a short interval of time
Ring a line
Triggers a Log Event in the MTA, sending a SysLog or SNMP Trap if necessary
Force one of the processor to assert and crash
Prints voice statistics at specified intervals
Enable BOS Status detail mode
Configure socket status timer for un-serviced socket check
Configure log history setting
Configure HAPI log module setting

log

Enable or disable message logging.

ping

Pings to the specific IP address from the EMTA IP stack.

reset

Reset the mta now

set

Many MTA parameters could be configured like:

Set requested DHCP option number [122|177]
Inhibit SW download during call

RFC2833 DTMF Tone Relay
T.38 Fax Relay
Enable the EMTA IP stack firewall
Jitter buffer type and parameters
Line voltage maintenance on reboot, sync loss and CMS down
Boosted loop current
Inclusion of MTA in CM max CPE limit
Set up PHS enabled and suppressed fields
Set MGCP lockstep and quarantine behavior
Set MGCP quarantine mode
Set depth of the NCS message quarantine buffer
Ring with DC offset
RTP port number for MTA
Root certificate for use during provisioning
Enable the logging of extended Events
Enhanced tone detection control on an endpoint
Reset (CMS / Prov) Kerberos tickets
Set Ring Waveform shape to sinusoidal(1) or trapezoidal(2)
Enable or Disable DQoS-lite for the EMTA
Set the delay in seconds before Power Mgmt Mode
Enable or Disable UGS-AD Control for the EMTA
Configure Emta Router Keep Alive Setting

show

Show various information including:

Show unserviced socket stats
Show opened socket
Call history/count
MTA certificates
Supported codec list
MTA config file content
Kerberos ticket and state
Last Kerberos message
MTA IP address and DHCP options for the current lease
Line states
NCS message history

NCS Digit map
Shows PHS settings for voice calls
Provisioning state
RTP info
Security association info
Emta settings
State of any NCS connections
Show list of supported countries and active country
Show the status of all EMTA BOS synchronized task resources
Show list of last calls info stored
Show processor debug information
Show IPC Statistics for a channel
Show FAXR Statistics for a channel
Show heartbeat state for a channel
Show ECAN state for a channel
Show save log history
Show call client state information
Show HGCP info
Show HGCP transaction state info

4.3 ETHERNET

Provides the command to show the debug state of the Ethernet interface.

show
Shows debug state of Ethernet RX/TX DMA rings.

4.4 FTPLITE

Provide the command to begin FTP to the specified IP address.

ftp
Initiates FTP.

4.5 PINGHELPER

Provides all ping relative commands.

all_sizes
Configures the settings for sweeping all packet sizes from 64-1518.

end_size
Sets or shows the size of the largest ping packet that will be sent.

hs_nowait
Configures the settings for doing high-speed pings, without waiting for the reply.

hs_wait
Configures the settings for doing high-speed pings (infinite), waiting for the reply.

ip_address
Sets or shows the IP address of the device to be pinged.

ip_stack
Sets the IP stack number that the pings should be sent to.

ip_sweep
Pings all IP addresses on the specified subnet.

number_of_pings
Sets or shows the number of pings to be sent.

ping
Begins pinging the specified IP address, using the current settings.

restore_defaults
Restores all of the options to their default values.

show_settings
Displays the current ping settings.

start_size
Sets or shows the size of the first ping packet that will be sent.

stats
Displays the ping statistics summary from the last set of pings.

step_amount
Sets or shows the amount that the packet size will be increased for each packet.

stop
Stops the ping that is currently running.

time_between_pings
Sets or shows the number of milliseconds that the ping helper will wait before sending the next ping.

verbosity
Sets the level of information that will be displayed while pinging.

verify_enable
Enables/disables verification of ping replies.

wait_enable
Enables/disables waiting for ping replies.

wait_time
Sets or shows the number of milliseconds that the ping helper will wait for a ping response before continuing.

4.6 SYSTEM

The system commands have two major functions. First one is the log packets function. Packets are logged when receiving from the specific interfaces sending to the specific interfaces. Another function is to show all system relative information like flash, memory…, etc.

pktlog

This enables/disables logging for packets received from the specified interfaces and being sent to the specified interfaces.

set

Set state of the system and system functionality:

Enables/disable the watchdog timer

Enables/Disables exception logging

show

Show system information including:

Show flash memory info

Show RAM and buffer info

Shows the state of active threads in the system

Shows the forwarder's learning tables and forwarder's HAL interfaces

Shows the number of serial driver writes blocked due to transmiting too much at once

Shows the eCos ip/tcp/udp statistics

Shows the eCos socket out of mbuf/cluster socket history tracking logs

Displays the configuration settings and statistics of the Hardware Free Pool Manager Object

Displays the internal state of the DQM interface

Displays the current non-volatile settings values for both the permanent and dynamic sections

5 VSIFs

Ubee eMTA supports standard DOCSIS VSIF (Vendor Specific Information Field) mechanism for DOCSIS and PacketCable configuration. There are two methods to use the VSIF configuration, one is to put the VSIF data into DOCSIS configuration file TLV43, and another is to use VSIF MIB object in PacketCable configuration file.

5.1 CONFIGURING VSIF

When using TLV43 in DOCSIS configuration file, all VSIFs must be under the unique Vendor ID. The Vendor ID is always 00:D0:59 for EVM3206 E-MTA and the OUI of MAC address of MTA might be different from Vendor ID.

5.1.1 VSIF.61-- Maximum Downstream Channel Bonding Number

Type: 61
Length: 1 byte
Value:
0: Support 4 downstream channel bonding
1: Support 8 downstream channel bonding
Default Value: 0
Description:
If set the value to 0, the CM will support 4 downstream channel bonding.
If set the value to 1, the CM will support 8 downstream channel bonding.

5.1.2 VSIF.63-- Secure SW Download CVC Control

Type: 63
Length: 1 byte
Value:
0 : support US CVC for security download - Default for UPC/Cablecom
1 : support Euro CVC for security download
2 : by nonvol setting
Default Value: 0
Description:
If set the value to 0 US CVC will be used for secure SW download verification. This value can be changed to 1 for Euro CVC support.

5.1.3 VSIF.64-- Downstream Resequencing TLV

Type: 64
Length: 1 byte
Value:
0: Enable downstream resequencing support
1: Disable downstream resequencing support
Default Value: 0

Description:

If set the value to 0 and the CM is operating in multiple receive channel mode, then the E-MTA will include the downstream resequencing TLV with a value of 1 in DSA/DSC message.

If set the value to 1, the CM will not include the downstream resequencing TLV in DSA/DSC message.

5.1.4 VSIF.88-- MTA Debug Level Configuration

Type: 88

Length: 1 byte

Value:

0x80: Enable SIP debugging

Default Value: 0

Description:

E-MTA supports module debugging feature.

5.1.5 VSIF.89-- Console Input/Output Configuration

Type: 89

Length: 1 byte

Value:

1: Disable console input and output

2: Reserved

3: Enable console input and output

Default Value: 1

Description:

E-MAT console includes useful information for hacker. If it is necessary, the VSIF can be used to enable console for debugging.

5.1.6 VSIF.94-- MTA Configuration File Hash Verification

Type: 94

Length: 1 byte

Value:

0: Verify the MTA configuration file hash data

1: Ignore the MTA configuration file hash data

Default Value: 0

Description:

If set the value to 0, the MTA will check the MTA configuration file hash data when MTA

provisioning.

If set the value to 1, the MTA will ignore the MTA configuration file hash data when MTA provisioning.

5.1.7 VSIF.95-- MTA Configuration File Encryption

Type: 95

Length: 1 byte

Value:

0: Disable the E-MTA configuration file encryption

1: Enable the E-MTA configuration file encryption

Default Value: 0

Description:

If set the value to 0, the E-MTA will assume the MTA configuration file is not encrypted, so it will not perform decryption.

If set the value to 1, the E-MTA will decrypt the MTA configuration file.

5.1.8 VSIF.96-- DOCSIS Security Download Control

Type: 96

Length: 1 byte

Value:

0: Disable CM security download and unsigned image is allowed

1: Enable CM security download and unsigned image is not allowed

Default Value: 1

Description:

If set the value to 0, the CM will use normal download, i.e. allow unsigned EVM3206 software to download. The unsigned software's extension filename is **'cpr'**.

If set the value to 1, the CM will be allowed to download signed software with security download procedure. The signed software's extension filename is **'cdf'**.

5.1.9 VSIF.97-- Switch E-MTA Signaling Protocol

Type: 97

Length: 1 byte

Value:

0: MGCP mode

1: SIP mode

Default Value: 0

Description:

If set the value to 0, the E-MTA will use MGCP protocol.

If set the value to 1, the E-MTA will use SIP protocol.

6 Trobuleshooting

This Chapter defines how to run troubleshooting procedures in EVM3206 product.

6.1 UBEE EMTA SUPPORTS FOLLOWING TROUBLESHOOTING INTERFACE:

- SNMP MIB Interface
  Using an SNMP-based network management system, you can read cable modem and MTA MIB to determine the status of EMTA.
- LED Interface
  Each EMTA has a group of LEDs on its front panel. These LEDs are especially useful to track the configuration and registration process of the EMTA attempting to connect to the network.
- Web-based Interface
  The EMTA includes a simple HTTP (web) server that provides several pages showing status and other information about the EMTA. You can access the web pages from either the subscriber (CPE) side or network (cable) side.

6.2 USING MIB FOR TROUBLESHOOTING

Using an SNMP manager to read cable modem and MTA MIB variables can be useful for troubleshooting. The following are MIBs that can provide information to resolve many common issues.

Cable Device MIB

The following MIB are part of the DOCS-CABLE-DEVICE-MIB, they provide status and control for the cable modem as a system (as opposed to interface MIBs, which operate on a single interface).

DocsDevServer MIB

These variables display and control the status of communications with network servers (CMTS, DHCP server, and so forth).

docsDevServerBootState

If **operational(1),** the cable modem has completed loading and processing of configuration parameters and the CMTS has completed the registration exchange.

If **disabled(2),** then the cable modem was administratively disabled, possibly by being refused network access in the configuration file.

If **waitingForDhcpOffer(3),** then a DHCP Discover has been transmitted and no offer has yet been received.

If **waitingForDhcpResponse(4),** then a DHCP Request has been transmitted and no response has yet been received.

If **waitingForTimeServer(5),** then a Time request has been transmitted and no response has yet been received.

If **waitingForTftp(6),** then a request to the TFTP parameter server has been made and no response received.

If **refusedByCmts(7),** then the Registration Request/Response exchange with the CMTS failed.

If **forwardingDenied(8),** then the registration process completed, but the network access option in the received configuration file prohibits forwarding.

docsDevServerDhcp

The IP address of the DHCP server that assigned an IP address to this cable modem. Returns **0.0.0.0** if DHCP was not used for IP address assignment.

docsDevServerTime

The IP address of the Time server (RFC-868). Returns **0.0.0.0** if the time server IP address is unknown.

docsDevServerTftp

The IP address of the TFTP server responsible for downloading provisioning and configuration parameters to this cable modem. Returns **0.0.0.0** if the TFTP server address is unknown.

docsDevServerConfig File

The name of the configuration file read from the TFTP server. Returns an empty string if the configuration file name is unknown.

docsDevServerDhcpAddressType

The type of address of docsDevServerDhcpAddress. If DHCP was not used, this value should return unknown(0).

docsDevServerDhcpAddress

The internet address of the DHCP server that assigned an IP address to this device. Returns the zero length octet string if DHCP was not used for IP address assignment.

docsDevServerTimeAddressType

The type of address of docsDevServerTimeAddress. If no time server exists, this value should return unknown(0).

docsDevServerTimeAddress

The Internet address of the RFC 868 Time server, as provided by DHCP option 4. Returns the zero-length octet string if the time server IP address is not provisioned.

docsDevServerConfigTftpAddressType

The type of address of docsDevServerConfigTftpAddress. If no TFTP server exists, this value should return unknown(0).

docsDevServerConfigTftpAddress

The internet address of the TFTP server responsible for downloading provisioning and

configuration parameters to this device. Returns the zero-length octet string if the config server address is unknown. There are certain security risks that are involved with using TFTP.

DocsDevEvent MIB

These variables control event reporting, and describe network or device events that may be of interest in fault isolation and troubleshooting. Multiple sequential identical events are represented by incrementing **docsDevEvCounts** and setting **docsDevEvLastTime** to the current time rather than creating multiple rows. Entries are created with the first occurrence of an event.

Use **docsDevEvControl** to clear the table. Individual events can not be deleted.

docsDevEvControl

Set this object to **resetLog**(1) to erase the event log. Set this object to **useDefaultReporting**(2) to restore all event priorities to their factory-default reporting.Reading this object always returns **useDefaultReporting(2).**

docsDevEvSyslog

The IP address of the Syslog server. If **0.0.0.0,** Syslog transmission is inhibited.

docsDevEvIndex

Provides relative ordering of the objects in the event log. This object always increases except when the log is reset via **docsDevEvControl**, the cable modem reboots and does not keep the event log in non-volatile storage, or the value reaches **2^31.** The next entry for all the above cases is **1**.

docsDevEvFirstTime

The time that a particular event log entry was created. Multiple identical events can be reported using a single entry.

docsDevEvLastTime

If multiple events are reported using the same entry, the time that the last event for this entry occurred. Otherwise this should have the same value as **docsDevEvFirstTime**.

docsDevEvCounts

The number of consecutive event instances reported by this entry. This starts at **1** with the creation of this entry and increments by 1 for each subsequent duplicate event.

docsDevEvLevel

The priority level of this event. These are ordered from most serious **(emergency)** to least serious **(debug).**

docsDevEvId

For a particular device, uniquely identifies the type of event that is reported by this entry.

docsDevEvText

A text string describing the event, including all relevant contexts.

PacketCable Event MIB

The following variables are part of the PKTC-EVENT-MIB. They supply the basic management objects for reporting events.

pktcDevEventControl MIB

The following variables control PacketCable event reporting

pktcDevEvControl

Defines actions related to the event log configuration. Settings are :

resetEventLogTable(0) bit—setting the bit to a value of '1' clear the entire event log (deletes all entries in **pktcDevEventLogTable**).

resetEventDescrTable(1) bit—setting the bit to a value of '1' reset the **pktcDevEventDescrTable** to the factory default value.

pktcDevEvSyslogAddressType

The type of Internet address of the Syslog server.

pktcDevEvSyslogAddress

The IP address of the Syslog server. Use **0.0.0.0** to specify no Syslog server. Using an FQDN is allowed but not recommended.

pktcDevEvSyslogUdpPort

The UDP port number that the MTA uses to send requests to the Syslog server.

pktcDevEventThrottle MIB

The following variables control event throttling.

pktcDevEvThrottleAdminStatus

This MIB Object controls the throttling of the transmitted messages upon generation of an event (SNMP/Syslog).

unconstrained (1)–transmitted without regard to the threshold settings.

maintainBelowThreshold (2)–suppressed if the number of transmissions would otherwise exceed the threshold.

stopAtThreshold (3)–transmission to cease at the threshold, and not resume until directed to do so.

inhibited (4)–all event message Transmission to be suppressed.

pktcDevEvThrottleThreshold

This MIB Object contains the number of events per pktcDevEvThrottleInterval to be transmitted before throttling.

pktcDevEvThrottleInterval

The MIB Object contains the interval over which the throttle threshold applies.

pktcDevEventStatus MIB

The following variables control event status.

pktcDevEvTransmissionStatus

Reflects the status of the event transmission.

syslogThrottled (0) bit

snmpThrottled (1) bit

validSyslogServerAbsent(2) bit

validSnmpManagerAbsent(3) bit

syslogTransmitError(4) bit

snmpTransmitError(5) bit

If a bit corresponding to a state is set to a value of:

'1', it indicates that the state is true

'0', it indicates that the state is false

'Event throttling' is based on thresholds and the current setting of pktcDevEvThrottleAdminStatus.

'Server/Manager' indicators must be based on the availability of valid Syslog server/SNMP managers.

'Transmit Errors' must only be used in cases where the PacketCable Device can identify unavailable servers.

pktcDevEventDescrTable MIB

This table contains all the possible events that can be generated by the device. This includes both PacketCable defined and vendor-specific events.

pktcDevEventDescrId

ID for the specific event to which the priority and display strings belong. The event identifier can either be PacketCable defined or vendor-specific.

pktcDevEventDescrEnterprise

Provides the IANA enterprise number of the Organization defining the event. Thus, all PacketCable defined events will contain the CableLabs IANA enterprise number and for vendor-specific events it will contain the IANA enterprise number of the defining organization.

pktcDevEventDescrFacility

Contains the facility for the event. For PacketCable events this MUST be set to local0(16).

pktcDevEventDescrLevel

The priority level that is controlled by this entry. The levels are:

emergency(0) —A condition that makes the system unusable.

alert(1) —A service-affecting condition for which immediate action must be taken.

critical(2)—A service-affecting condition.

error(3)—An error condition.

warning(4)—A warning condition.

notice(5)—A normal but significant condition.

info(6) —An informational message.

debug(7) —A debug message.

pktcDevEventDescrReporting

Defines the action to be taken on occurrence of this event class. Setting a bit to a value of '1' indicates that the corresponding action will be taken upon occurrence of this event, provided the required parameters are present. (e.g.: Syslog Server for Syslog messages, SNMP targets for SNMP traps and SNMP INFORMs etc). If none of the bits are set then no action is taken upon occurrence of the event.

The default value of this MIB OBject is dependent on the value of the MIB Object **'pktcDevEventDescrLevel'**, for the corresponding event.

For the following values of **'pktcDevEventDescrLevel'**: emergency(0), alert(1), critical(2) and error(3), the PacketCable device MUST set the bits for local(0), syslog(1) and snmpInform(3) to a value of '1' and the rest to a value of '0'.

For all the remaining values of **'pktcDevEventDescrLevel'**, the PacketCable device MUST set the bits for local(0) and syslog(1) to a value of '1' and the rest to a value of '0'. The value is a collection of bits:

local(0) bit

syslog (1) bit

snmpTrap(2) bit

snmpInform(3) bit

pktcDevEventDescrText

Contains event display string providing a human-readable description of the event.

pktcDevEventLog MIB

This MIB provides the **pktcDevEventLog** table, that contains a log of the events generated by the PacketCable device. A description of all the events that can be generated by the device can be obtained from the MIB table **'pktcDevEventDescrTable'**.

pktcDevEvLogIndex

Provides relative ordering of the objects in the event log. This object will always increase except when

a. the log is reset via pktcDevEvControl.

b. the device reboots and does not implement non-volatile storage for this log.

c. It reaches the value **2^31.**

PktcDevEvLogTime

Provides a human-readable description of the time at which the event occurred.

pktcDevEvLogEnterprise

Provides the IANA enterprise number of the Organization defining the event. Thus, all PacketCable defined events will contain the CableLabs IANA enterprise number and for vendor-specific events it will contain the IANA enterprise number of the defining organization.

pktcDevEvLogId

ID for the specific event to which the priority and display strings belong. The event identifier can either be PacketCable defined or vendor-specific.

pktcDevEvLogText

Contains the contents of **pktcDevEventDescrText**, corresponding to the event, at the moment of generation.

pktcDevEvLogEndpointName

Provides the endpoint identifier followed by the PacketCable MTA's Fully Qualified Domain Name (FQDN) and the IP Address (IP) of the PacketCable MTA device.

pktcDevEvLogType

Contains the kind of actions taken by the PacketCable device when the event under consideration occurred. A bit with a value of 1 indicates the corresponding action was taken. Setting it to a value of 0 indicates that the corresponding action was not taken. An event may trigger one or more actions (e.g.: Syslog and SNMP) or may remain as a local event since transmissions could be disabled or inhibited as defined by the Throttle MIB Objects.

local(0) bit

traps(1) bit

syslog(2) bit

inform(3) bit

pktcDevEvLogTargetInfo

Contains a comma separated list of the actions taken, along with the target IP address for the generated event.

pktcDevEvLogCorrelationId

Contains the correlation ID generated by the MTA as per section 5.4.5 of [7] that was being used by the MTA when the event was generated.

pktcDevEvLogAdditionalInfo

Contains additional, useful information in relation to the corresponding event that a PacketCable device might wish to report (for example: parameterized data or debugging information). The format is vendor-specific. However, the PacketCable device is not required to implement this functionality.

MTA MIB

This MIB module supplies the basic management objects for the MTA Device. The MTA MIB only supports a single provisioning server.

pktcMtaDevResetNow

Setting this object to **true**(1) causes the eMTA to reset. Reading this object always returns **false(2).** When set to **true,** the following actions occur:

1. All connections (if present) are flushed locally.
2. All current actions such as ringing immediately terminate.
3. Requests for notifications such as notification based on digit map recognition are flushed.
4. All endpoints are disabled in resetting state.
5. The provisioning flow is started at step MTA-1 of the provisioning process.

pktcMtaDevFQDN

The Fully Qualified Domain Name for this MTA.

pktcMtaDevEndPntCount

The physical end points for this MTA.

pktcMtaDevEnabled

The MTA Administrative Status of this device, where **true**(1) means the voice feature is enabled and **false**(2) indicates that it is disabled.

pktcMtaDevProvisioningState

The completion state of the initialization process, sent as part of the final INFORM (step MTA-25 of the provisioning process). The states are:

pass(1)—the configuration file could be parsed successfully and the MTA is able to reflect the same in its MIB.

inProgress(2)—the configuration file is currently being processed.

failConfigFileError(3)—the configuration file was in error due to incorrect values in the mandatory parameters.

passWithWarnings(4)—the configuration file had proper values for all the mandatory parameters but had errors in the optional parameters (including any vendor specific OIDs which are incorrect or not known to the MTA).

passWithIncompleteParsing(5)—the configuration file is proper, but the MTA cannot reflect the same in its MIB (for example, too many entries leading to memory exhaustion).

failureInternalError(6)—the configuration file cannot be parsed due to an internal error.

failOtherReason(7)—the MTA cannot accept the configuration file.

pktcMtaDevHttpAccess

Indicates whether HTTP file access is supported for MTA configuration file transfer.

pktcMtaDevProvisioningTimer

Enables setting the duration of the provisioning timeout timer. The timer covers the provisioning sequence from step MTA-1 to step MTA-23. The value is in minutes and setting the timer to **0** disables this timer. The default value for the timer is **10.**

pktcMtaDevProvisioningCounter

This object is the count of the number of times the provisioning cycle has looped through step MTA-1 since the last reboot.

pktcMtaDevErrorOidsTable

If **pktcMtaDevProvisioningState** is reported with anything other than a **pass(1),** then this table is populated with the necessary information, each pertaining to observations of the configuration file. Even if different parameters share the same error (for example, all Realm Names are invalid), all recognized errors must be reported as different instances. This contains the necessary information an MTA must attempt to provide in case the configuration file is not parsed and/or accepted in its entirety.

pktcMtaDevErrorOidIndex

This is the index to **pktcMtaDevErrorOidsEntry.** This is an integer value and will start from the value 1 and be incremented for each error encountered in the configuration file. The indices need not necessarily reflect the order of error occurrences in the configuration file.

pktcMtaDevErrorOid

This is the OID associated with the particular error. If the error was not due to an identifiable OID, then this can be populated with impartial identifiers, in hexadecimal or numeric format.

pktcMtaDevErrorValue

This object contains the value of the OID corresponding to the configuration file parameter that caused the error. If the MTA cannot recognize the OID of the configuration parameter causing the error, then this object instance contains the OID itself as interpreted by the MTA in human readable representation. If the MTA can recognize the OID but generate an error due to a wrong value of the parameter, then the object instance contains the erroneous value of the parameter as read from the configuration file. In both cases, the value of this object must be represented in human readable form as a character string.

pktcMtaDevErrorReason

This indicates the reason for the error, as per the MTA's interpretation, in human readable form. For example:

VALUE NOT IN RANGE

VALUE DOES NOT MATCH TYPE

UNSUPPORTED VALUE

LAST 4 BITS MUST BE SET TO ZERO

OUT OF MEMORY—CANNOT STORE

This MAY also contain vendor specific errors for vendor specific OIDs and any proprietary error codes/messages which can help diagnose errors better, in a manner the vendor deems fit.

pktcMtaDevConfigFile

The URL of the TFTP/HTTP file for downloading provisioning and configuration parameters to this device. Returns **NULL** if the server address is unknown. Supports both TFTP and HTTP.

pktcMtaDevSnmpEntity

The FQDN of the SNMP entity of the Provisioning Server to which the MTA has to communicate in order to receive the access method, location and the name of the Configuration file during MTA provisioning. This would also be the entity which caters to the Endpoint provisioning needs of the MTA and is the destination for all provisioning informs. It may be also used for post-provisioning SNMP operations.

pktcMtaDevProvState

operational(1)—the device has completed loading and processing of initialization parameters.

waitingForSnmpSetInfo(2)—the device is waiting on configuration file download access information.

waitingForTftpAddrResponse(3)—a DNS request has been transmitted and no reply has yet been received.

waitingForConfigFile(4)—a TFTP request has been transmitted and no reply has yet been received or a download is in progress.

pktcMtaDevServerDhcp1

The IP address of the primary DHCP server which would cater to the MTA during its provisioning. Contains **255.255.255.255** if there was no preference given with respect to the DHCP servers for MTA provisioning.

pktcMtaDevServerDhcp2

The IP address of the Secondary DHCP server which could cater to the MTA during its provisioning. Contains **0.0.0.0** if there is no specific secondary DHCP server to be considered during MTA provisioning.

pktcMtaDevTimeServer

IP address of the Time Server from which to obtain the time. Contains **0.0.0.0** if the Time Protocol is not used for time synchronization.

pktcMtaDevRealmOrgName

The value of the X.500 organization name attribute in the subject name of the Service provider certificate.

pktcMtaDevRealmUnsolicitedKeyMaxTimeout

This timeout applies only when the MTA initiated key management. The maximum timeout is the value which may not be exceeded in the exponential backoff algorithm. DHCP Option 122

sub-option 4 overrides this value, if provided. The default is **30.**

pktcMtaDevRealmUnsolicitedKeyNomTimeout

Defines the starting value of the timeout for the AS-REQ/REP Backoff and Retry mechanism with exponential timeout. If provided, DHCP Option 122 Sub-option 4 overrides this value. The default is **10000.**

pktcMtaDevRealmUnsolicitedKeyMaxRetries

The maximum number of retries before the MTA gives up attempting to establish a security association. DHCP Option 122 suboption 4 overrides this value, if provided.

pktcMtaDevRealmStatus

Contains the Row Status associated with the **pktcMtaDevRealmTable.**

pktcMtaDevCmsTable

Shows the IPSec key management policy relating to a particular CMS. The table is indexed with **pktcMtaDevCmsFqdn.** Contains per CMS key management policy.

pktcMtaDevCmsFqdn

The fully qualified domain name of the CMS. This is the index into the **pktcMtaDevCmsTable.** When used as an index, the upper case ASCII representation of the associated CMS FQDN MUST be used by both the Manager (SNMPv3 Entity) and the MTA.

pktcMtaDevCmsKerbRealmName

Identifies the Kerberos realm name in upper case characters associated with the CMS defined in this conceptual row. The object value is a reference point to the corresponding Kerberos realm name in the realm table (**pktcMtaDevRealmTable**).

pktcMtaDevCmsMaxClockSkew

The maximum allowable clock skew between the MTA and CMS.

pktcMtaDevCmsSolicitedKeyTimeout

This timeout applies only when the CMS initiated key management (with a Wake Up or Rekey message). It is the period during which the MTA will save a nonce (inside the sequence number field) from the sent out AP Request and wait for the matching AP Reply from the CMS.

pktcMtaDevCmsUnsolicitedKeyMaxTimeout

This timeout applies only when the MTA initiated key management. The maximum timeout is the value which may not be exceeded in the exponential backoff algorithm.

pktcMtaDevCmsUnsolicitedKeyNomTimeout

Defines the starting value of the timeout for the AP-REQ/REP Backoff and Retry mechanism

with exponential timeout for CMS.

pktcMtaDevCmsUnsolicitedKeyMaxRetries

The maximum number of retries before the MTA gives up attempting to establish a security association.

pktcMtaDevCmsIpsecCtrl

If **true(1),** IPSEC and IPSEC Key Management MUST be used to communicate with the CMS.

If **false(2),** IPSEC Signaling Security is disabled for both the IPSEC Key Management and IPSEC protocol (for the specific CMS).

pktcMtaDevCmsStatus

Contains the Row Status associated with the **pktcMtaDevCmsTable.**

Signaling MIB

This MIB module supplies the basic management object for the PacketCable Signaling protocols. This version of the MIB includes common signaling and Network Call Signaling (NCS) related signaling objects.

pktcSigDevCodecTable

This table describes the MTA supported CODEC types.

pktcSigDevCodecComboIndex

The index value which enumerates a particular codec combination in the **pktcSigDevCodecTable.**

pktcSigDevCodecType

A CODEC type supported by this MTA.

pktcSigDevCodecMax

The maximum number of simultaneous sessions of the specific CODEC that the MTA can support.

pktcSigDefNcsReceiveUdpPort

Contains the MTA User Datagram Protocol (UDP) receive port that is being used for NCS call signaling. This object should only be changed by the configuration file, default value is **2427.**

pktcNcsEndPntConfigCallAgentId

Contains a string indicating the call agent name (for example, **ca@abc.def.com).** The call agent name after the character @ MUST be a fully qualified domain name and MUST have a corresponding **pktcMtaDevCmsFqdn** entry in the **pktcMtaDevCmsTable.**

pktcNcsEndPntConfigCallAgentUdpPort

Contains the call agent User Datagram Protocol (UDP) receive port that is being used for this instance of call signaling, i.e. the default port on which the call agent receives NCS signaling from the gateway. The default port number is **2727**.

pktcNcsEndPntConfigStatus

Contains the Row Status associated with the **pktsNcsEndPntTable.**

pktcNcsEndPntConfigCallWaitingMaxRep

Contains the maximum number of repetitions of the call waiting tone that the MTA plays from a single CMS request. A value of zero **(0)** can be used if the CMS is to control the repetitions of the call waiting tone.

pktcNcsEndPntConfigCallWaitingDelay

Contains the delay between repetitions of the call waiting tone that the MTA plays from a single CMS request.

pktcNcsEndPntStatusCallIpAddress

Contains the IP address of the CMS currently being used for this endpoint. This IP address creates the appropriate security association.

pktcNcsEndPntStatusError

Contains the error status for this interface. The operational state indicates that all operations necessary to put the line in service have occurred.

Operation state:

operational (1)

noSecurityAssociation (2)

disconnected (3)

The **noSecurityAssociation** status indicates that no security association yet exists for this endpoint.

The disconnected status indicates one of the following:

1. If **pktcMtaDevCmsIpsecCtrl** is disabled, then no security association is involved with this endpoint; the NCS signaling firmware is in the process of establishing the NCS signaling link through an RSIP exchange.
2. Otherwise, **pktcMtaDevCmsIpsecCtrl** is enabled, the security association has been established and the NCS signaling firmware is in the process of establishing the NCS signaling link through an RSIP exchange.

6.3 LED VERIFICATION

Installer can check the LED pattern table to know which state modem kept. If modem has registered CMTS, PWR, DS, US and Online must be lit. If Tel1 is always flash and Tel2 is always unlit, it means that MTA can not receive a valid offer from DHCP server. If Tel1 is always unlit and Tel2 is always flash, it means that MTA can not download configuration file. If Tel1 and Tel2 are flash, it means that the MTA does not send RSIP to CMS yet (waiting for MWD timeout).

6.4 TROUBLESHOOTING THE ETHERNET INSTALLATION

Q: None of the LEDs are on when I power on the Cable Modem.

A: Check the connection between the power adapter and the cable modem. Power off the Cable Modem and wait for 5 seconds and power on the modem again. If the problem still exists, you may have a hardware problem.

Q: The Link LED on my cable modem is not lit.

A:

- Try restarting the computer so that is could re-establish a connection with the cable modem.
- Check for a resource conflict (Windows users only). To do this:
  1. Right-click on the *My Computer* icon on your desktop and choose *Properties.*
  2. Click the *Device Manager* tab and look for a yellow exclamation point or red X over the NIC in the *Network Adapters* field. If you see either one, you may have an IRQ conflict. Refer to the manufacturer' documentation or you cable service provider for further assistance.
- Verify that TCP/IP is the default protocol for your network interface card (NIC)
- Power cycle the cable modem by removing the power adapter from the electrical outlet and plugging it back in. Wait several minutes for the cable modem to re-establish communications with your cable service provider.
- Your Ethernet cable may be damaged. Try another cable.

Q: All of the LEDs on the front of my modem look correct, but I cannot access the Internet.

A:

- If the POWER, DS, US, Online and Link LEDs are solidly lit, the cable modem is working properly. Try restarting the computer so that is could re-establish a connection with the cable modem.

- Power cycle the cable modem by removing the power adapter from the electrical outlet and plugging it back in. Wait several minutes for the cable modem to re-establish communications with your cable service provider.
- If your PC is connected to a hub or gateway, try connecting the PC directly into the cable modem.
- If you are using a cable splitter, try removing the splitter and connect the cable modem directly to the cable wall outlet. Wait several minutes for the cable modem to re-establish communications with your cable service provider.
- Your Ethernet or coaxial cable may be damaged. Try using another cable.
- If none of these suggestions work, contact your cable service provider for further assistance.

6.5 DIGITAL LOOPBACK SUPPORT

The model can support digital loopback support by two connection MGCP/NCS modes, "network loopback," and “network continuity”. If the mode is set to "network loopback," the audio signals received from the connection will be echoed back on the same connection. The "network loopback" mode SHOULD simply operate as an RTP packet reflector. The "network continuity test" mode is used for continuity checking across the IP network. An endpoint-type specific signal is sent to the endpoints over the IP network, and the endpoint is then supposed to echo the signal over the IP network after passing it through the gateway's internal equipment to verify proper operation. The signal MUST go through internal decoding and re-encoding prior to being passed back. For analog access lines, the signal will be an audio signal, and the signal MUST NOT be passed on to a telephone connected to the analog access line, regardless of the current hook-state of that handset, i.e., on-hook or off-hook.

New and existing connections for the endpoint MUST NOT be affected by connections placed in "network loopback" or "network continuity test" mode. However, local resource constraints may limit the number of new connections that can be made.

The detail procedure should be described in CMS user’s manual.

7 Appendix A: LED Behavior

			LED Position	**LED1**	**LED2**	**LED3**	**LED4**	**LED5**	**LED6**	**LED7**	**LED8**
			LED Label	**Power**	**REVC**	**SEND**	**READY**	**PC**	**VOIP**	**LINE1**	**LINE2**
	Self test			Lit	Flash	Flash	Flash	Off	Off	Off	Off
EMTA Initialization *(A)	**Step**	**1**	DHCP	Lit	Lit (Green– DS bonding) (Orange– single)	Lit (Green– US bonding) (Orange– single)	Lit	*(1)	Off	Flash	Unlit
		2	SNMP/TFTP	Lit	Lit (Green– DS bonding) (Orange– single)	Lit (Green– US bonding) (Orange– single)	Lit		Off	Unlit	Flash
		3	RSIP/REGISTRATION	Lit	Lit (Green– DS bonding) (Orange– single)	Lit (Green– US bonding) (Orange– single)	Lit		On	Flash	Flash
Voice Operation *(B)	**Step**	**1**	Both Lines On-Hook	Lit	CM Normal Operation	CM Normal Operation	CM Normal Operation		On	Lit	Lit
		2	LINE1 Off-hook, LINE2 On-hook						On	Flash	Lit
		3	LINE1 On-hook, LINE2 Off-hook						On	Lit	Flash
		4	Both Lines Off-Hook						On	Flash	Flash
		***(1)**	CPE Connected	Lit	*(A) *(B)			Lit	*(A) *(B)		
			CPE Traffic	Lit				Flash			
			Firmware Upgrade	Lit	Flash	Flash	*(A) *(B)	*(1)			

Power: Indicates that the EMTA has successfully completed internal power-on tests.

RECV: The LED is lit when the EMTA locks the downstream channel.

SEND: The LED is lit when the EMTA locks the upstream channel.

READY: Indicates that the EMTA has completed the ranging/registration and is ready to send/receive data.

EVM3206

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