

Metro2000

miniCMTS *User Documentation*

Based on MiniCMTS Software Release: 2.32

Version: 1.1

September 28th, 2014

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Specifications

Module	Parameter	m20CMTS30
Main	DOCSIS compatibility	DOCSIS 2.0 and 3.0
	IPQAM (DVB-C)	Up to 8 Downstream channels
Downstream	QAM standards	Annex A, B
	QAM modulation	64QAM, 256QAM
	Channels	16
	Throughput (customers)	800 Mbps (16x Annex A, QAM256)
	Frequency range	87 MHz – 1000 MHz
	Channel width	8 MHz (Annex A) or 6 MHz (Annex B)
	Max. Output Power (8 ch)	49 dBmV/109dB μ V
	RF port (16 ch)	45 dBmV/105dB μ V
	MER after equalization	43 dB
	Out of Band Noise	< -20 dBmV/40dB μ V
Upstream	Upstream modulation	QPSK, 16QAM, 64QAM, 256QAM, ATDMA, SCDMA
	Channels	4
	Throughput (customers)	100 Mbps (4x 6.4MHz, QAM64)
	Frequency range	5 MHz – 65 MHz
	Internal Input Levels	-13 dBmV to +23 dBmV / 47-83 dB μ V
RF part	RF ports	1 DS in + 1 US out
	Internal RF loss	0 dB
Network	Port speed	1 Gbps
	Port Types	1x SFP
	Management protocols	HTTP, SNMP, (SSH, TELNET)
Debug Port	Port Types	2x RJ45
Functions	Max. Cable Modems	500 Maximum, 250 Recommended
	Dynamic load balancing	Supported
	DHCP Relay	Option 60, Option 82
	QoS	Supported
	VLANs (802.1q)	Supported
Other	Housing	RackMount, 1RU
	Environment	Operating Temperature: -20 °C to +70 °C
		Humidity: 10% - 90%
	Power supply	100-240V AC, 50/60 Hz
		30W
	Dimensions	483*381*44mm(1U)
Weight	5.0 Kg	

HW Description

m20CMTS30



Interface description – m20CMTS30

- i. **Grounding Port** – Chassis grounding connection point
- ii. **US** – Upstream Port
- iii. **DS** – Downstream Port
- iv. **ETH0, ETH1, SFP0** – Network ports (2x RJ45, 1x SFP)
- v. **Power Supply Input** –Power Supply Input - 100-240V AC, 50-60 Hz
- vi. **Power Switch**
- vii. **System LEDs** - LEDs indicate CMTS state
- viii. **ETH0, ETH1** – Debug ports 2x RJ45

Label	Colour	State	Explanation
Power symbol	Green	On	System Powered
“i”	Green	On	Ready to service
Other LEDs			LEDs not in use (Reserved)

Installation Requirements

CMTS Positioning and Cooling

- The miniCMTS heat is dissipated by the fans inside the 19" 1RU housing.
- Choose a position for miniCMTS so that proper air-flow around the unit is adequate for cooling.
- It is recommended that the miniCMTS is mounted in a fixed position.

CMTS Grounding

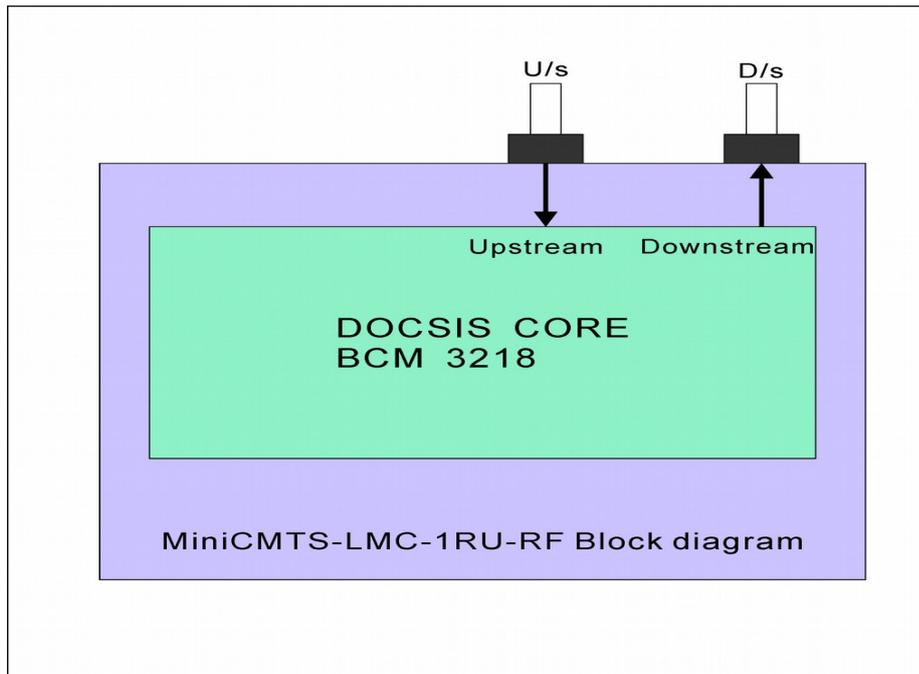
- Securely connect the "Grounding Port" to a protective earth grounding accordance with the local legal and safety regulations.

CMTS Network Connection

- Connect miniCMTS to the network either via UTP cable or via fiber cable (depending on the availability of physical ports and your network requirements).

CMTS RF Connection

- Connect the miniCMTS RF DS port to a downstream TV distribution signal via a two-way RF combiner. Additional RF attenuator or splitter, installed right after the DS port of miniCMTS, would be necessary to reach the proper downstream CMTS RF level compatible with the downstream TV RF level.
- Connect the miniCMTS RF US port to the upstream RF signal from the Cable Network. Additional RF attenuator or splitter, installed before the US port of miniCMTS, would be necessary to reach the proper upstream RF level to miniCMTS.
- All unused F-connectors (RF Inputs & RF Outputs) must be properly terminated. Failure to do so may result in RF signal ingress (lower SNR levels) and performance impact.



Features in version 2.32

- SNMP support – high performance and stability, main DOCSIS and interface OIDs available.
- UGS + UGS/AD Scheduler Types for Upstream Service Flows are now supported.
- Up to 200Mbps of Multicast traffic is now supported – either for IPQAM input or for customer's IPTV.
- CM Flap list added
- WebGUICM_list
 - HW type + SW version, Flap count added
 - faster CM details update
 - Manual move of CM to another channel added
- MAC address aging configuration added
- Cable Security– blocking CPE access to miniCMTS IPs
- Default CM/CPE VLAN removed – use Business Model settings
- BPI+ supported (directive "Global Privacy Enable 1;" in CM config file).
- SNMP support - DOCSIS and environment MIBs - many OIDs are already supported.
- CM SNMP communities can be set - these communities are used to poll SNMP for RF values
- Network integration changed – DHCP Relay and VLAN tagging functions are now moved into "Business Model Settings" & "Business IP" tabs.
- IPQAM: MPTS and Multicast distribution supported for several QAM channels

Basic Setup Guide

Login & Language

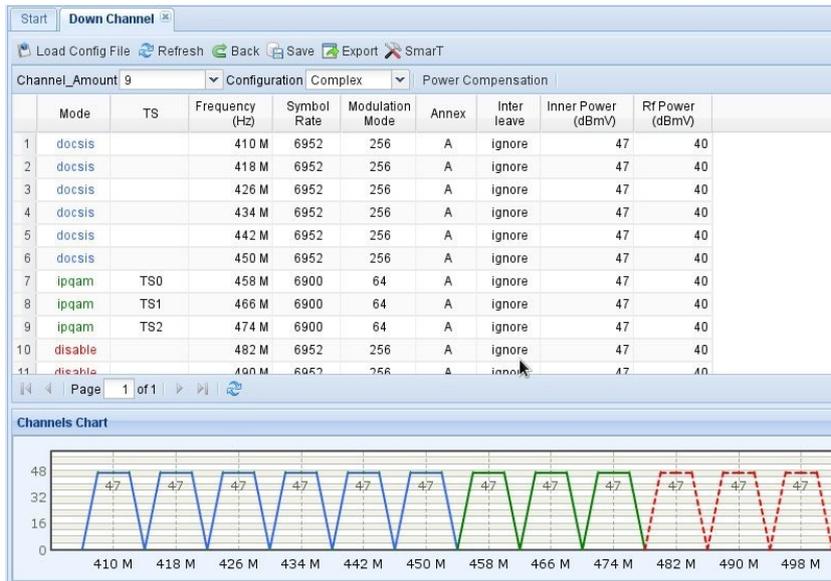
- During the initial login into the miniCMTS web interface, select the required language from the drop-down menu.
 - English and Chinese are supported.
- Default miniCMTS IP address is 10.7.1.77/16, GW 10.7.1.1
- Default username / password is “admin” / “admin”.
- An emergency (Back Door) IP is available: 192.168.2.200/24
 - This IP address is a fixed static address and always untagged.
 - In the event you lose IP connectivity to the miniCMTS, access to the miniCMTS Web GUI can be made via this address from a local subnet 192.168.2.0/24.

Start Page



- 1. Guides on the left**
 - Provide configuration and monitoring features
- 2. Middle Top picture of miniCMTS**
 - Direct access to some configuration and monitoring features
 - Presentation of basic operational information
- 3. Middle Bottom**
 - RF value distribution bar graphs
 - By clicking on the displayed values, the CM list can be opened
- 4. Right Top**
 - Advanced Feature icons
- 5. Right Middle**
 - Main operational information
- 6. Right Bottom**
 - Main Cable Modem statistics
- 7. Left Bottom**
 - Logout
 - Change Language

RF Settings – Downstream Channels



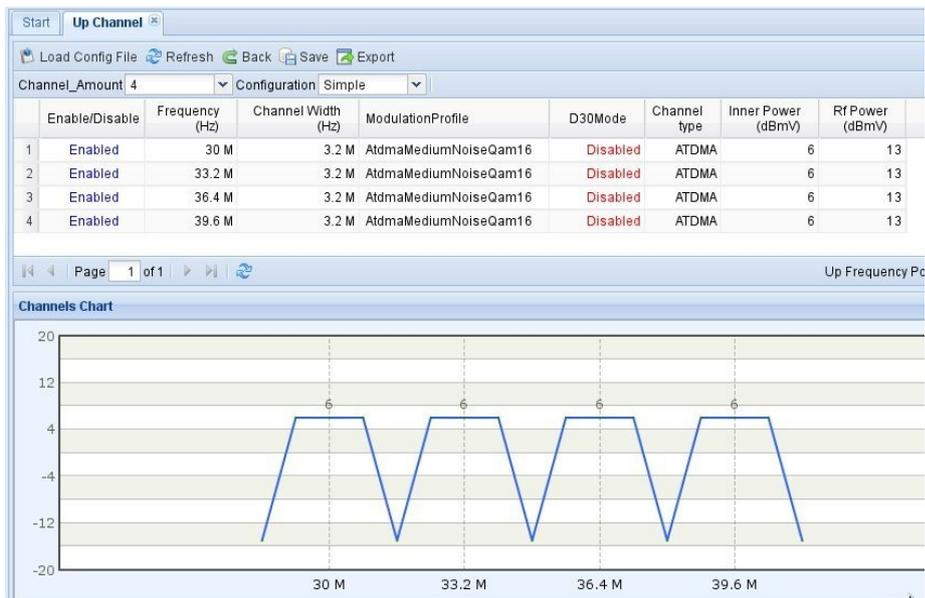
Toolbar

- **Channel_Amount** – allows setting the number of Downstream channels that shall be enabled
- **Configuration**
 - in “Simple” mode only first downstream is configured, with the remainder being set automatically adjacent to the first downstream channel,
 - in “Complex” mode each downstream can be configured separately. IPQAM channels should be configured in “Complex” mode.
- **Power Compensation**– for the configuration of tilt compensation. Downstream channels at higher frequencies can be set to transmit at higher output levels relative to downstream channels at lower frequencies.

Table and Columns

- **Mode**– set “docsis” for DOCSIS Downstream or “ipqam” for IPQAM channel
- **TS**– displays Transport Stream name for Downstream channels set as “ipqam”
- **Frequency**– set center frequency for Downstream channel
- **Symbol Rate**– ignore in case of “Annex A”, set in case of “Annex B”
- **Modulation Mode**– choose QAM64 or QAM256
- **Annex** - “A” means EuroDOCSIS, “B” means DOCSIS
- **Interleave**– in case of “Annex A”, Interleave is set automatically to “ignore”. Set desired value in case of “Annex B”.
- **Inner Power**– the power level configured for the internal DOCSIS chipset output
- **RF Power**– indicates RF power level available on CMTS RF connector. This is lower than “Inner Power” due to the internal RF combining and splitting.

RF Settings – Upstream Channels

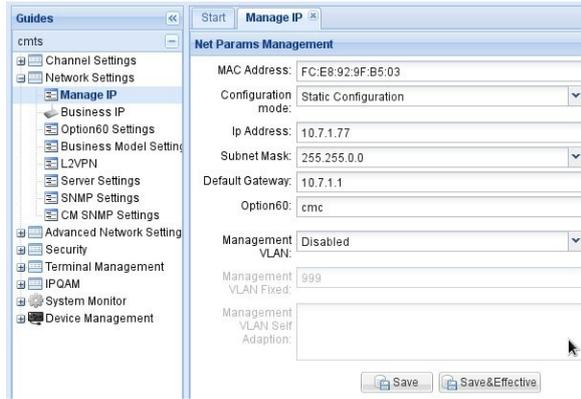
**Toolbar**

- **Channel_Amount** – allows setting the number of Upstreams that shall be enabled.
- **Configuration**
 - in “Simple” mode only first Upstream is configured, with the remainder being set automatically adjacent to the first upstream channel,
 - in “Complex” mode each Upstream can be configured separately.

Tables & Columns

- **Enable/Disable** – each Upstream channel can be enabled or disabled individually.
- **Frequency** – set center frequency for Upstream channel from available range. For EuroDOCSIS the available frequency range is 5-65 MHz side-to-side.
- **Channel Width** – choose from 1.6MHz, 3.2MHz or 6.4MHz. 0.8MHz and smaller channel widths are not available.
- **ModulationProfile** – choose from predefined modulation profiles. Custom modulation profiles are not available.
- **D30Mode** – this option is reserved for future releases, and must be set to DISABLED.
- **Channel type** – choose either “SCDMA” or “ATDMA”. The type must match the channel type chosen for “ModulationProfile”.
- **Power** – the power level configured for the internal DOCSIS chipset input. The available power range is related to configured channel width.
- **RF power** – indicates RF power level expected on CMTS RF connector. This is higher than “Inner Power” due to the internal RF combining and splitting.

Network Setup– Management IP and VLAN



Field names

Configuration Mode – choose Static IP or DHCP

IP Address, Subnet Mask, Default Gateway – required to be set in case of choosing “Static IP”

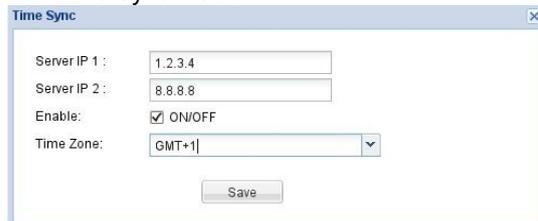
Management VLAN –set for dot1.q tagging of CMTS IP management traffic

Management VLAN Fixed – set VLAN tag.

miniCMTS Time Synchronisation

- Configurable via the “Time Sync” icon under “Version & Settings” on the right side of miniCMTS Start page.

- Time Sync Fields:



- TIME protocol (TCP port 37) is used for miniCMTS Time Synchronisation.
- Time Zone for Europe: Winter time GMT +1, Summer time GMT +2.

Network Setup– DHCP Relay, VLAN tagging

Business IP

- Business IPs are used as **GIADDR and as source IPv4 addresses for the DHCP Relay function.**
- Business IPs MUST BE from the same IP subnet as IPs assigned by DHCP server. One Business IP is required for each IP subnet for which miniCMTS relays DHCP packets.
- Business IPs are reconfigured as new IPs from the miniCMTS configuration, and require a valid **NetMask**.
- NOTE: Business IPs are created inside miniCMTS as new IP addresses. Enabling “Cable Security” is recommended to protect access to Business IPs from CPEs
- The example below shows three addresses to be used as GIADDR: 10.0.1.2, 10.0.2.2 and 10.0.3.2.

Vlan ID	IP Address	Net Mask	Gateway
1	10.0.1.2	255.255.255.0	10.0.1.1
2	10.0.2.2	255.255.255.0	10.0.2.1
3	10.0.3.2	255.255.255.0	10.0.3.1

- The “**Gateway**” field in the Business IP configuration page is optional, but needs to be set when:
 - a VLAN is assigned to Business IP, or
 - a Default Gateway is not provided under “Manage IP”.
- Setting / Changing of Business IPs does not require MiniCMTS restart.

Option60 Settings

- Option 60 identification strings can be configured.

Business Model Settings – “Relay Model”

- “Relay Model” **provides DHCP Relay function**, and can also be used to **tag CM, CPE and other traffic** based on VLANs assigned to Business IPs.
- DHCP relay can be configured for specific device types, as identified by the “Option 60” parameter. Standard device types are predefined, including CM, STB, MTA and CPE. Option 60 for “CPE” is set to “NULL” so as to capture all device types not explicitly matched by other rules.

Device Name	OPTION60	Server Addr List	GIADDR	for_l2vpn
1 CM	docsis	10.10.10.10	10.0.1.2	
2 CPE		10.10.10.20	10.0.2.2	<input type="checkbox"/>
3 mta	pktc	10.10.10.30	10.0.3.2	<input type="checkbox"/>

- In the example above, **DHCP relay** is enabled for the following three element types:
 - **Cable Modems** (IPs assigned for CMs are from subnet 10.0.1.0/24), relayed to DHCP server IP 10.10.10.10, with GIADDR set to 10.0.1.2.
 - **CPEs** (IPs assigned for CPEs are from subnet 10.0.2.0/24), relayed to DHCP server IP 10.10.10.20, with GIADDR set to 10.0.2.2
 - **MTAs** (IPs assigned for MTAs are from subnet 10.0.3.0/24), relayed to DHCP server IP 10.10.10.30, with GIADDR set to 10.0.3.2
 The example shows three different DHCP server IPs, but it is also possible to use a single DHCP server IP for all relayed elements.
- **VLAN tagging** for CM, CPE, MTA or other traffic is done based on “Business IP” VLAN ID. The following screen shows mapping of Business IP addresses to VLAN IDs
- - For CPE tagging to operate correctly, a DHCP packet must be generated by CPE and seen by miniCMTS. - If DHCP is not used for CPEs, a “Default VLAN ID” must be configured for all CPEs with the same VLAN

ID.

	Vlan ID	IP Address	Net Mask	Gateway
1	100	10.0.1.2	255.255.255.0	10.0.1.1
2	200	10.0.2.2	255.255.255.0	10.0.2.1
3	300	10.0.3.2	255.255.255.0	10.0.3.1

Option 82 is populated automatically into relayed DHCP packets when operating in “Relay Mode”.

Business Model: Relay Model

Default VLAN ID: 200 Default VLAN Priority: 0

- A miniCMTS **restart is recommended** after making changes to “Business Model Settings”.

Business Model Settings – “Option60 Model”

- “Option60 Model” is designed to provide **VLAN tagging** for CM, CPE and other traffic types based on Option60 in scenarios where **DHCP Relay functionality is not required**.
- This mode can also add Option 82 into broadcasted DHCP packets. If “ADD OPTION82” is enabled, then a copy of broadcast DHCP packet is generated with Option82 filled (The “original” DHCP broadcast packet without the Option82 can not be changed, it will still ALWAYS be generated).
- The screen below shows the VLAN tagging configuration based on “Option60 Model”.

	Device Name	OPTION60	VLAN ID	VLAN Priority
1	CM	docsis	100	0
2	CPE		200	0
3	mta	pktc	300	0

IPQAM Setup

The IPQAM modulator feature is ready for pilot deployments.

- MPTS & Multicast distribution is the recommended input stream delivery method.
- Please contact Technical Support to discuss deployment details.

Deployment options – input stream delivery:

- Multicast Transport + MPTS + up to 8 QAM Channels – configuration example provided below.
- Unicast Transport + SPTS + up to 8 QAM Channel – optional method (lab use only).
- Other configurations – please contact Technical Support to discuss requirements.

IPQAM Setup Procedure – Multicast, MPTS, up to 8 QAM Channels

1. **Change the “Channel Settings” - “Down Channel” mode to “ipqam” for the target DS channels.**
Configuration should be performed in “Complex” configuration mode.
 - Up to 8 downstream channels can be assigned to the IPQAM function.
 - Choose “Symbol Rate” from predefined list, along with Modulation and Annex. Set Frequency and Inner Power.
 - The following fields must be set equal for all ipqam channels, but may differ between ipqam and DOCSIS channels:
Symbol Rate, Modulation

2. IPQAM IP Setting – IP addresses

- Set enable flag for “**Global**”.
- “**IP Address**” is used as Unicast Destination IPv4 address. This IP address is mandatory.

Multicast IP Settings:

- Set “**enable**” flag.
- Set “**Mode**” to “Global”.
- **IP0 – IP7:** Destination Multicast IP addresses.

3. Quick Set

- Set **“UDP Port Start”** –the “BASE” destinationUDP port for Unicast streams
- **“PortCountPer Channel”** –defines how many UDP ports will be available for the miniCMTS to accept streams for one QAM channel. Predefined as 32 (can not be changed in this version).
- **“Initial PID”** –the “BASE” PID that will be used for the QAM channel.
- **“PID Step”** – step between PIDs within a QAM channel.
- **“Initial programid”** –the “BASE” SID that will be used for the QAM channel.
- **“Program Step”**– step between SIDs within a QAM channel.
- **“group1”, “group2” , “group3” and “group4”** – Special base ports used for MPTS transport to the miniCMTS .

4. Mapconfig – will be generated based on “Quick Set”

TS Index	TS	UDP Port Start	UDP Port Setp
1	TS0	49156	2
2	TS1	49412	2
3	TS2	49668	2

Output QAM C...	Channel Freq...	QAM Type	UDP Port	PMT PID	Program ID	Data Copy	PID Remap	Cache Capacity(...)	Input Rate(kb...	Total Input R...	Total Output R
1	TS0	418 M	SPTS	49156	48	2		1535	0.00	0.00	0.00
2	TS0	418 M	SPTS	49158	64	3		1535	0.00		
3	TS0	418 M	SPTS	49160	80	4		1535	0.00		
4	TS0	418 M	SPTS	49162	96	5		1535	0.00		
5	TS0	418 M	SPTS	49164	112	6		1535	0.00		
33	TS0	418 M	DATA(Group1)	9008		TS0			0.00		
34	TS0	418 M	DATA(Group2)	9108		TS0			0.00		
35	TS0	418 M	DATA(Group3)	9208		TS0			0.00		
36	TS0	418 M	DATA(Group4)	9308		TS0			0.00		

NOTE: settings will not be saved automatically, please click **“Save”** to save the configuration.
 NOTE: MPTS streams must be sent to **“DATA(Group)”** ports.

Column Names:

- **Output QAM Channel** – QAM Channel Identification
- **Channel Freq** – QAM Channel Frequency
- **QAM Type** – “SPTS” or “DATA(Group)” for MPTS
- **UDP Port** – Generated UDP Port number; CMTS expects streams on these ports
- **PMT PID** – CMTS assigns this PMT PID
- **Program id** – CMTS assigns this SID

- Input Rate, Total Input Rate, Total Output Rate

5. Known issues & Current limitations

- Multicast traffic up to 200 Mbps at the miniCMTS Ethernet inputs is supported in this FW version. A maximum of 8 IPQAM are supported utilizing QAM64 or QAM256, provided that the 200 Mbps is divided across the enabled channels.
- This multicast traffic limitation applies to sum of the IPQAM input stream delivery plus customer IPTV Multicast traffic.
- The QAM64 channel can contain up to 38 Mbps of DVB-C traffic; The QAM256 channel can contain up to 55 Mbps.
- If more than 200 Mbps of Multicast traffic is delivered to miniCMTS, packet loss may occur inside Multicast data flows. DOCSIS traffic is not affected.
- All created destination Multicast IP addresses are available to all QAM channels.
- Each QAM channel must use unique UDP ports.
NOTE: it is not possible to use the same UDP port for input stream delivery to more than one QAM channel.

6. Remarks

- IGMP Join packets are generated by the MiniCMTS automatically every couple of seconds.

IPQAM Setup Procedure – Unicast, SPTS, 1 or more QAM Channels

1. **Downstream setup is the same as for Multicast+MPTS** described in the previous example.
2. **IPQAM IP Setting – destination Unicast IP address**

- “**IP Address**” is used as Unicast Destination IPv4 address, and is the address that the CMTS listens to Unicast streams on. This IP address is mandatory.
- Set enable flag for “Global”

3. Quick Set

- See “Multicast + MPTS mode” above
- NOTE: all UDP ports that belong to one QAM channel, must have the same upper byte of UDP port number. For example, SPTS UDP streams for one QAM channel can be sent to port numbers between 49152 and 49407 ($192 \times 256 = 49152$, $193 \times 256 = 49408$).

4. Mapconfig – will be generated based on “Quick Set”

- SPTS streams must be sent to “SPTS” ports.
- QAM channels are distinguished by UDP port numbers.

IPQAM Setup – General information

MPTS transport:

- IP HeadEnd device sends one MPTS stream as All-In-One stream for one QAM channel, including all service tables (PAT, PMT, SDT, NIT). MiniCMTS in turn listens to these streams on “Group” UDP ports.
- MiniCMTS does not change any MPTS stream content, and modulates it into the QAM channel as is.
- MPTS streams are sent to “Group” UDP ports.
- MiniCMTS does not change PIDs for MPTS streams.
- One unique MPTS stream is required for each QAM channel.

SPTS transport :

- IP HeadEnd device sends video streams including PAT and PMT to miniCMTS, which in turn listens to these streams on “SPTS” UDP ports.
- MiniCMTS flushes possible SDT and NIT tables sent within the Video SPTS streams.
- Other SI Tables are sent to “DATA” UDP ports – these streams are not changed, only added to the QAM channels.
- MiniCMTS changes PIDs for SPTS streams.
- PAT and PMT tables are generated by miniCMTS.

Other Information:

- No fragmentation is allowed for Unicast: 1 TS packet must be contained in 1 UDP packet
- Both SD and HD channels are supported.
- Sending of either SPTS or MPTS is required. Processing both together is not supported.

Cable Modem Analysis – basic tools

The primary screen for showing the Cable Modem overview and analysis is found in the “Guides” menu:

Guides – Terminal Management – CM List

	SID	MAC Addr	IP Addr	conne...	docsis version	Soft Version	Up Power(dbm)	Up SNR(db)	Down Power(dbm)	Down SNR(db)	Down Total octets	Up Total octets	Drops num	Last Drop time	Primary Us Channel	Primary Ds Channel	Us Channel	Ds Channel
9	10	00111a037dda	10.56.142.213	Online	Docsis20	SB5100E-2...	61.4	42.1	-0.2	39.9	57,900,105	0	0		3	3	3	3
10	15	00111a48b7a	10.56.142.67	Online	Docsis20	SB5100E-2...	49.7	41.8	-2.5	37.9	181,976,122	6,019,902	0		3	2	3	2
23	22	e448c7b6e9ee	10.56.142.74	Online	Docsis30	e3000-v302...	47.5/47.5/48.0/4...	42.1/43.6/4...	-2.1/-2.7/-3.2/3.8/2...	41.9/42.5/42.6...	974,664,863	1,135,639,621	0		3	1	1,2,3,4	1,2,3,4,5,6,7,8
24	12	e448c7b974ac	10.56.142.53	Online	Docsis30	e3000-v302...	41.7/42.0/42.5/4...	41.9/42.1/4...	-1.5/0.1/0.5/0.1/3...	43.9/45.4/45.2...	-639498704	910,999,682	0		3	1	1,2,3,4	1,2,3,4,5,6,7,8

Toolbar

- **CM Details** – opens a window showing CM details when clicked.
- **Reboot** – performs Cable Modem reboot. CM reboot is initiated via DOCSIS command.
- **Clear Modem History** – clears Cable Modem History.
- **PING CM** – performs an ICMP ping to the Cable Modem.
The ICMP ping is executed from the miniCMTS and results are displayed in a Web-Browser window.
- **SNMP Test** – opens a window that allows an SNMP command to be sent to the selected Cable Modem.
- **Move Freq** – moves selected Cable Modem to particular Downstream or Upstream channel.
Move Downstream and Upstream separately, do not move both at the same time.
- **MAC Filter** – filters the list of cable modems to a particular MAC substring, e.g. “01ef”.
- **Refresh Power** – polls selected Cable Modem for actual information via SNMP.
- **Refresh** – refreshes information on the web-page.

Table and Columns

- **SID** – internal DOCSIS Cable Modem ID.
- **MAC Addr** – MAC address of the CM.
- **IP Addr** – IP address assigned to the CM.
- **Connect state** – actual state of the CM.
- **Docsis version** – DOCSIS version of the CM as identified by CMTS.
- **Up Power, Up SNR, Down Power, Down SNR** – RF values. Up SNR is measured at the CMTS input. Up Power (transmit), Down Power (receive), Down SNR (receive) are read from the Cable Modem via SNMP.
The CM SNMP read community can be set in “Terminal Management” → “CM SNMP Settings”.
- **Down Total octets and Up Total octets**
- **Drops num, Last Drop time**
- **Primary Us Chanel, Primary Ds Channel** – list of CMTS channels that serve as primary channels for the CM.
- **Us Channel, Ds Channel** – list of CMTS channels that the CM is ranged to.

List of Main Features

DOCSIS features

See "Specifications" for details

- ✓ QoS supported
- ✓ Load Balancing supported
- ✓ BPI+ supported
- ✓ Upstream Scheduler supported: BestEffort, UGS, UGS/AD

IPQAM Modulator

- ✓ Maximum of 8 QAM channels
- ✓ QAM64 and QAM256 supported
- ✓ IPQAM module Inputs – preferred way is IPv4 MPTS+Multicast.
 - SPTS or MPTS
 - IPv4 Multicast or IPv4 Unicast
- ✓ MiniCMTS Multicast input limited to maximum of 200Mbps in this FW version.

Network features

- ✓ CMTS IP - static or DHCP based
- ✓ DHCP relay, Option 60 tuning, Option 82 insertion
- ✓ VLAN assignment for Management traffic
- ✓ VLANs assignment for Cable Modems, CPEs and MTAs.
- ✓ L2VPN based on DOCSIS standard "BSoD"
- ✓ Complex VLAN setup separating CM and CPE traffic into VLANs per individual CM and CPE

IPTV and Multicast features

- ✓ IPv4 Multicast supported, enabling IPTV over DOCSIS through miniCMTS.
- ✓ MiniCMTS Multicast input limited to maximum of 200Mbps in this FW version.

Security features

- ✓ IP Address Check based on DHCP snooping- blocking of IPs not assigned by DHCP.
- ✓ Cable Security – blocks access from CPEs to internal miniCMTS IPs.
- ✓ Broadcast Storm Control – preliminary, development and testing phase.
- ✓ IP Filter, Firewall – preliminary, development & testing phase

Monitoring and Management features

- ✓ GUI tool monitoring US SNR and FEC per US and per CM.
- ✓ Cable modem monitoring – via CMTS web interface, includes main RF values read from Cable Modems via SNMP.
- ✓ SNMP support for main DOCSIS OIDs.
- ✓ SNMP support for miniCMTS environment monitoring.
- ✓ DHCP snooping log – provides DHCP diagnostics.
- ✓ MiniCMTS Time Synchronisation.
- ✓ Hardware monitoring – temperature, voltage etc.
- ✓ Software upgrades
- ✓ Alarming
- ✓ TCPDUMP - Packet tracing

HW enabled features – for future SW development

- **IPv6** – miniCMTS hardware is prepared to support IPv6 customer (CPE) traffic.

MiniCMTS Web Interface

Start page

See "Basic Setup Guide".

Guides – Channel Settings

See "Basic Setup Guide".

Guides – Network Settings

Manage IP

- See "Basic Setup Guide".

Business IP

- Business IPs are configured to enable DHCP Relay feature.
- See "Basic setup Guide" for more details.

Option60 Settings

- Allows configuration of user-defined DHCP Option 60 distinctive strings.

Business Model Settings

- This tab allows to configure Network model setup in relation to **DHCP Relay function** and **VLAN tagging for CMs, CPEs, MTAs** (and others).
- See "Basic Setup Guide" for more details.
- *Available options:*
 - None**–No DHCP Relay, No CM & CPE VLAN tagging
 - Relay Model**–DHCP Relay active, CM & CPE VLAN tagging available, Option 82 filled
 - OPTION60 Model**–No DHCP Relay, CM & CPE VLAN tagging, Option 82 optionally filled
 - Bundle**–No DHCP Relay, Cable Bundles (more complex VLAN setup)available
 - Advance Relay Model**–DHCP Relay active, Cable Bundles (more complex VLAN setup) available

L2VPN

- L2VPNforBusiness Services over DOCSIS (BSoD).
- Please contact Technical Support to discuss implementation requirements related to L2VPN.

Server Settings

- **Time Sync** – Allows configuration of the miniCMTS time synchronization. TCP port 37 is used. See "Basic Setup Guide" for more details.
- **Device Log Server** – When enabled, exports internal SYSLOG messages also to external SYSLOG server via UDP port 514 standard messages. A MiniCMTS restart is not needed after changing "Device Log Server" configuration.

SNMP Settings

- Allows configuration of the **miniCMTS SNMP community**.
- Default community is "public".
- **Trap Server** – when enabled, generates SNMP traps.
- The MiniCMTS must be restarted after changing miniCMTS SNMP community.

CM SNMP Settings

- The MiniCMTS will automatically try to read RF values via SNMP from Cable Modems, and display them on the CM_list page.
- Set "Read Only Community" in "Network Settings" → "CM SNMP Settings" to see Cable Modem RF values on CM_list page.
- Pre-defined CM community is "public".

Guides – Advanced Network Settings

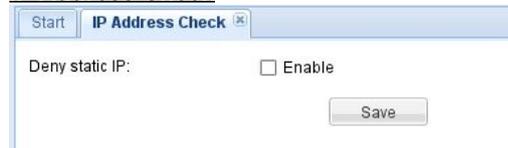
Uplink Settings

- Uplink Settings enable to manipulate VLAN tagging and trunking on Ethernet ports.
- Be careful not to block management VLAN, as the CMTS management IP may become inaccessible.

VLAN Remap - development & testing phase

Guides – Security

IP Address Check



- When enabled, the miniCMTS blocks any MAC-IP pair that was not assigned by the DHCP server.
- CMTS uses DHCP Snooping to create the internal database of allowed MAC-IP pairs.

Broadcast Storm Settings - DO NOT USE: development & testing phase

- miniCMTS can limit broadcast storms of several types

IP Filter - DO NOT USE: development & testing phase

Firewall - DO NOT USE: development & testing phase

- miniCMTS can block defined IP traffic
- miniCMTS can block access to internal IP addresses

Cable Security

- When enabled, CPE traffic to the miniCMTS internal IP addresses (Manage IP, Business IPs, BackDoor IP) is blocked.
- Only ICMP ping packets are allowed, allowing the miniCMTS to respond to ICMP Echo Requests.

Guides – Terminal Management

CM List

- See “Basic Setup Guide”.

CPE List& CPE List Advance

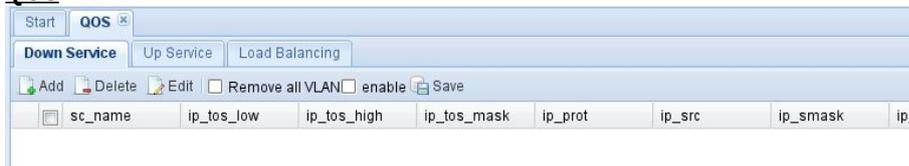
- These lists show CPE details.

Load Balancing



1. General LoadBalancingconfiguration - the most typical configuration is “Dynamic”
Disabled – LoadBalancing is disabled
Dynamic – Dynamic LoadBalancing is activated
Static – Static LoadBalancing is activated
2. Restricted LoadBalancingGroups configuration

QOS



- From version 2.26 onwards, DS Packet Classification is configurable via the Cable Modem config files using DOCSIS TLVs. DS&US Packet Classification via the MiniCMTS is no longer supported.
- NOTE: It is recommended that the Cable Modem config files are used to configure QoS Packet Classification in preference to configuring QoS via this tab.
- A maximum of 7 unique Downstream Packet Classes are supported by the MiniCMTS, identified by unique ClassifierRef's.

MAC Aging

- The ARP table size is 4000 records.
- Enabling “MAC Aging” and configuring “Aging Time” is possible for scenarios where MAC addresses churn could result in ARP table exhaustion.

Flap List

- Displays Cable Modem Flaps.

Guides – IPQAM

- see “Basic Setup Guide” – this feature is in pilot phase, please consult Technical Support to discuss implementation requirements.

Guides – System Monitor

Hardware Status

Realtime monitoring of:

- CPU, RAM and internal Flash-disk usage
- miniCMTS temperature
- Internal Power Supply Voltages
- UpTime

Log Record

- Displays miniCMTS log.

Warning Record - development phase

Optical Receiver –not available

- Monitors optical receiver when installed in miniCMTS.
- The rackmount version miniCMTS does not have the option to include an optical receiver.

Guides – Device Management

Version Upgrade

- Please refer to the Upgrade Guide distributed with the FW package.

Users Management

- Allows the creation of new users and the changing of user passwords.

Config Management

Restore Settings – used to return miniCMTS configuration to factory defaults

- “Restore Factory Settings” – restore all settings, set default IP address,
- “Restore Factory Settings, Keep Current IP” – restore all settings, but currently configured IP address is not changed,

Alarm Settings

- Allows to configure Alarm generation.
- This tool is still in development & testing phase.

Device Tools (Right Top of Start Page)

Signal Check

Displays realtime graphs for:

- Upstream channel SNR
- Upstream channel Error Rate
- Per Cable Modem US SNR
- Per Cable Modem US Error Rate

Spectrum

- Available only from CDNMS
- Starts US Spectrum Analyzer

Signals Listen

- Available only from CDNMS
- Displays US SNR

Fault - development & testing phase

Snooping

- **Snooping**
 - Displays log of DHCP events that the miniCMTS has recognized during DHCP Snooping
- **TCP Dump**
 - Lab use only
 - TCP dump window is a FrontEnd for Linux tcpdump sitting inside miniCMTS

Optical Receiver

- Optical Receiver is not available in the rackmount miniCMTS versions.