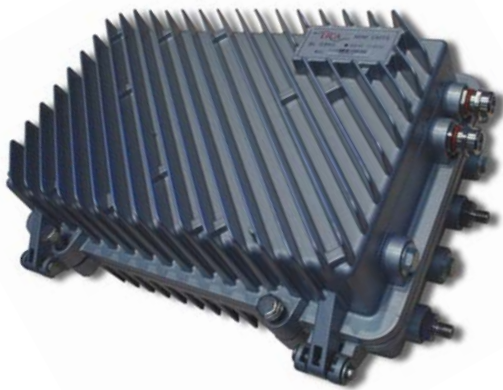# LICA

High-speed Internet over Coaxial Networks

miniCMTS DOCSIS 3.0 & EuroDOCSIS 3.0

EuroDOCSIS 3.0 PERFORMANCE IN A MINICMTS

LICA is pleased to introduce the mature and field-proven EuroDOCSIS 3.0 miniCMTS.

Targeted at Operators, Internet Service Providers and property developers seeking a solution for high-speed Internet in MDU and hospitality environments, but facing technical, economic or political constraints limiting the options for using fiber and twisted-pair.

LEVERAGING EXISTING COAX

Coaxial cabling is a reliable medium offering the fastest broadband performance after fiber, and widely installed in buildings of all ages.

The DOCSIS 3.0 miniCMTS enables cost effective 800 Mbps access over existing coaxial cables, making it possible to deliver a full complement of TV channels, together with telephony and high-speed Internet at 800Mbps.

To date, the use of EoC (Ethernet over Coax) technology for in-building deployments has resulted in closed, proprietary systems with limited choice of vendor and CPE.

DOCSIS (Data Over Coax Service Interface Specifi cation) is a well established and proven standard. Offering speeds up to 50 Mbps per channel, the DOCSIS 3.0 release allows channel bonding up to 16 channels. This enables a downstream performance of 800 Mbps at the Ethernet output.

AVOIDING THE COSTS OF A TRADITIONAL CMTS

Until today, the use of DOCSIS in smaller networks has been limited by costs associated with the traditional CMTS (Cable Modem Termination System). The **miniCMTS** challenges this model.

The **miniCMTS** is a Broadcom based Layer 2 bridge compatible with all current DOCSIS 2.0 and DOCSIS 3.0 cable modems. Offering 1Gbps input, it supports 4 / 2 channels upstream and 16 channels downstream with throughput of 800 Mbps when using QAM256.

miniCMTS RF connections
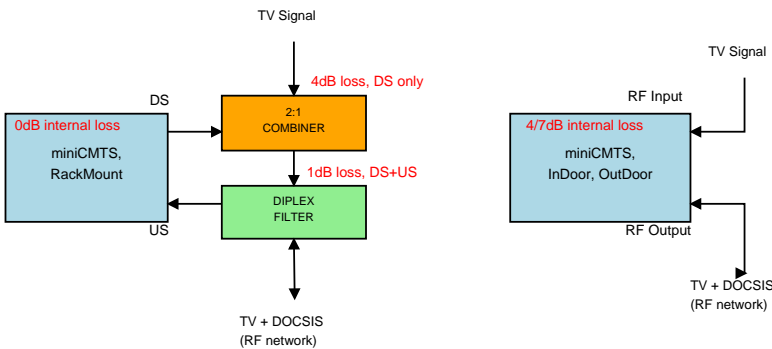

LMC-2TU diagram
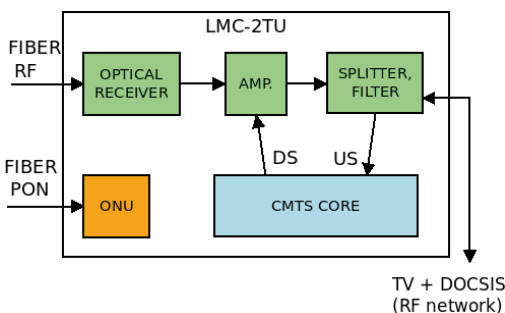
The LMC-1OU and LMC-2IU, housed in a very compact enclosure and having a power consumption of only 36 W, supporting a temperature range of -20 °C up to +70 °C so that no fans are needed. The LMC-2IU is the smallest size HW version and targets indoor installations. The LMC-1OU with higher IP protection is meant for harsh environments. The LMC-1RU miniCMTS is designed for high-density rack installations and thus fans are used. The LMC-2TU integrates in its outdoor housing also optical node, RF amplifier and xPON ONU.

Combining TV (DVB-T or DVB-C) channels with modulated DOCSIS down/upstreams can be done in the unit. The combined channel pattern is then distributed over the common coaxial cable infrastructure. The miniCMTS also features an integrated QAM modulator which can be used to provide DVB-C linear TV broadcast over 8 channels of the 16 available channels.

IPTV Multicast video distribution is supported allowing yet another way to deliver video streams to the customers.

Common frequency channels:

5 to 65 MHz	DOCSIS upstream channels (2 or 4 channels, offering 32 Mbps up to 120 Mbps)
87 to 108 MHz	FM radio
230 to 470 MHz	DOCSIS downstream channels (800Mbps with 16 channels and QAM256 modulation; 560Mbps with 16 channels and QAM64 modulation)
470 to 862 MHz	DVB-T or DVB-C paid/free to air TV channels
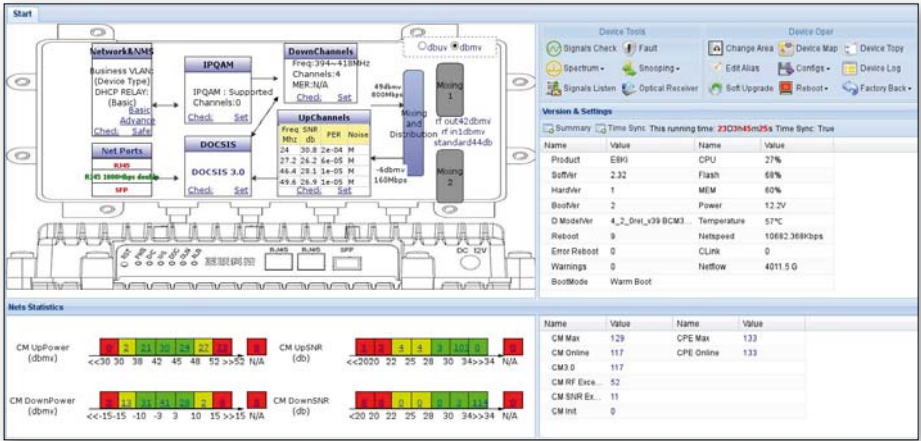
EASY SETUP

The **miniCMTS** has an internal, web-based configuration GUI allowing easy setup of the HFC and IP configuration.

Central CDNMS management application for Windows is also available, allowing GUI-based configuration and monitoring for over 100 units.
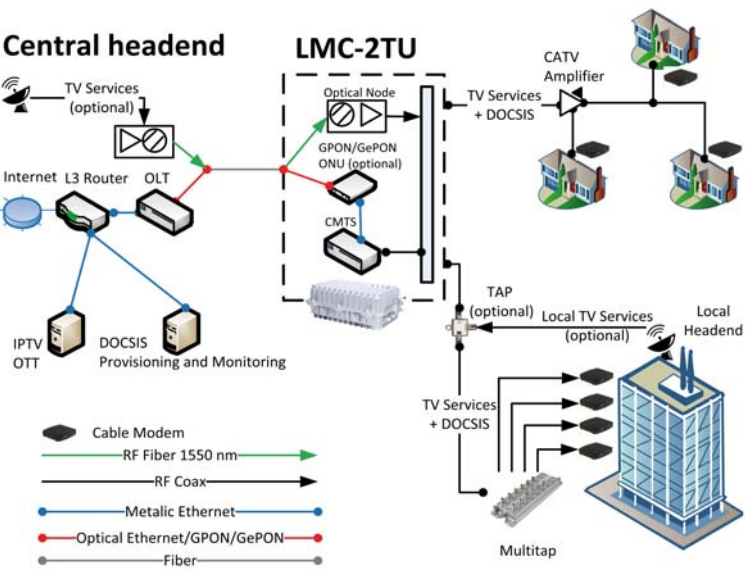
Internal **miniCMTS** Command Line Interface (CLI) offers text-based full-scale configuration tools and also basic monitoring. Standardized SNMP interface is available allowing integration into many available DOCSIS provisioning systems.

SIMPLE INSTALLATION

Customer premises installation is simple, making use of existing TV outlets fitted with an „internet optimizer". This provides a diplex filter and an F-connector for connecting a standard cable modem. The diplex filter provides isolation for non-data frequencies, ensuring good Signal to Noise Ratio (SNR).

In order to guarantee performance, the use of triple or quad shielded coax patch cords with „signal tight" connectors is recommended to minimize ingress between wall outlet and cable modem.

Installation into existing TV outlet

Network design using miniCMTS

Internal miniCMTS Command Line Interface (CLI) offers text-based fullscale configuration tools and also basic monitoring. Standardized SNMP interface is available, allowing integration into many available DOCSIS provisioning systems.

The miniCMTS supports 1Gbps Ethernet at the input, and the use of a PON ONU or optical/electrical SFP is also possible. This allows a fiber optic trunk line to be leveraged providing Fast Ethernet in small and large coaxial networks. Being a L2 device, an external L3 router is required to complete the architecture. DHCP & TFTP servers, that support the cable modem setup procedure, can be external, for simple setups also internal miniCMTS tools are offered.

Integration into the IP environment needs basic IP and networking knowledge, commonly available within an ISP or asa service from your integrator.

The supported number of EuroDOCSIS 3.0 Cable modems is up to 300 (bonding 8x4) and up to 500 in case of EuroDOCSIS 2.0 modems. The unit is only available in a fixed configuration of 16 Downstreams and 4 Upstreams. LMC-2TU supports 100 D3.0 or 200 D2.0 Cable Modems in configuration of 16 DS and 2 US channels.

DELIVERING HIGH-VALUE INTERNET SERVICES

For an Operator, the **miniCMTS** offers a compelling solution for the delivery of high-speed Internet and telephony services over small and medium CATV networks. The **miniCMTS** offers a cost-effective alternative to the installation of fiber optics, and is particularly attractive for environments where coaxial cabling is already in place.

Through compatibility with existing cable modems and the widely used DOCSIS and EuroDOCSIS standards, a high-performance and future proof solution can be created for MDU, Campus and Hospitality environments. CDNMS monitoring and setup SW Network design using miniCMTS Installation into existing TV outlet.

LMC-1OU   LMC-2IU   LMC-1RU   LMC-2TU

Specifications

Module	Parameter	LMC-1OU	LMC-2IU	LMC-1RU	LMC-2TU
Main	DOCSIS compatibility	EuroDOCSIS 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.)	45 dBmV/105dBµV	42 dBmV/102dBµV	49 dBmV/109dBµV	50 dBmV/110dBµV (amplified, AGC)
	on RF port (16 ch.)	41 dBmV/101dBµV	38 dBmV/98dBµV	45 dBmV/105dBµV	50 dBmV/110dBµV (amplified, AGC)
	MER after equalisation	43 dB			
	Out Of Band Noise	< -20 dBmV/40dBµV			–
Upstream	Upstream modulation	QPSK, 16QAM, 64QAM, 256QAM ; ATDMA, SCDMA			
	Channels	4			2
	Throughput (customers)	100 Mbps (4x 6,4MHz, QAM64)			50 Mbps (2x 6,4MHz, QAM64)
	Frequency range	5 MHz – 65 MHz			
	Internal Input Levels	-13 dBmV to +23 dBmV / 47-83 dBµV			
RF part	RF ports	1 RF in + 1 RF out	2 RF in + 2 RF out	1 DS in + 1 US out	fiber in + 2 RF out
	Internal RF loss	4 dB	7 dB	0 dB	–
Network	Port speed	1 Gbps			
	Port Types	2x RJ45 + 1x SFP			1x RJ45 (occupied if ONU present) + 1x SFP
	Management protocols	HTTP, SNMP, (SSH, TELNET)			
xPON ONU	PON Interface	–			1Gbps symmetrical, SC / PC
	Optical Receiver	–			Sensitivity -26dBm
	Optical Transmitter	–			Power Level 2 .. 7 dBm
	Security	–			ONU authentication mechanism
Functions	Max. Cable Modems	DOCSIS 2.0 up to 500; DOCSIS 3.0 up to 300 with bonding 8x4			DOCSIS 2.0: 200; DOCSIS 3.0: 100 with bonding 8x4
	Dynamic load balancing	Supported			
	DHCP Relay	Option 60, Option 82			
	DHCP & TFTP	Internal DHCP & TFTP server for CM Included			
	QoS	Supported			
	VLANs (802.1q)	Supported			
Other	Housing	Outdoor, IP54	Indoor	RackMount, 1RU	Outdoor, IP54
	Environment	Operating Temperature: -20 °C to +70 °C			
		Humidity: 10% - 90%			
	Power supply	28-60V AC	12V DC, Ext. PS 100-240V AC available	100-240V AC, 50/60 Hz	40-75V AC 90-260V AC 50/60 Hz
		Power consumption <= 36 W		44W	Power consumption <= 50 W
	Dimensions	384×271×162 mm	331.2×259.4x56.5 mm	482.6*405.5*43 mm(1U)	331×245×150 mm
	Weight	6.7 kg	4.7 kg	5.8 kg	5.7 Kg

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