teletronik®

30 years in cable communication...

DOCSIS 3.0 & 3.1 CMTS

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Full DOCSIS 3.0 Features

As a Full featured DOCSIS 3.0 CMTS, the Casa CMTS offers the highest channel bonding capability on the market today. In the downstream direction, up to 16 QAM channels can be bonded yielding up to 800Mbps of instantaneous bandwidth per subscriber (Annex A). In the upstream direction, up to 8 channels can be bonded to yield 240Mbps instantaneous bandwidth.

Rich Operational Features

The Casa CMTS supports industry standard Command Line Interface (CLI) and SNMP for configuration and management. Operational features such as show cable modem, show ARP, spectral management, CPU and memory resource reporting, user privilege management are available in the current release. Advanced features such as load balancing for bonded channels is also available in the current release. Extensive IP features such as DHCP Relay and option 82, multiple DHCP servers, proxy ARP, IP subnet bundling, IGMP snooping, IGMP v2 and v3, access control list (ACL) are also available in the current release. In the current release, the CMTS is functioning as a Layer 3 routing device. Static routes and default route are supported. For route redundancy, multiple default routes can be configured. In subsequent software releases, Layer 2 bridging, VLAN, RIP, OSPF, and PIM-SM will be supported through firmware upgrade.

Applications

The applications of the Casa CMTS in a cable network can be divided into two categories. The first category the Casa CMTS provides is DOCSIS-based IP applications, such as broadband access, VoIP, and IPTV and videoover- IP etc. The second category the Casa CMTS provides is digital video applications that include SDTV Broadcast over Cable, HDTV broadcast over Cable, VOD, Network Digital Video Recorder (nDVR), interactive gaming, and switched digital video.

OVERVIEW





Casa Systems	C1G	C3200	C40G	C10G	C100G
DOCSIS 3.1 compatible	-	-	✓	✓	✓
Switch & Mgmt card	1	1	2	2	2
RF Linecards	-	6	4	12	12
# ports /DS Linecard	1	4	8	8	8
# channels/ DS Linecard	8	16	64	64	1024
# ports/ US Linecard	2	8	16	16	16
# channels/ US Linecard	8	16	128	128	128
Min. configuration	2DS x 2US	4DS x 4US	32DS x 32US	32DS x 32US	32DS x 32US
Line card max. symmetric config	8DS x 8US	48DS x 48US	2048DS x 256US	6144DS x 768US	6144DS x 768US
Physical size	1RU	3RU	6RU	12RU	13RU
AC	Dual	Dual	-	-	-
-48V DC	-	Dual	Dual	Dual	Dual
NEBS	-	-	✓	✓	✓
Hot-swap AC power	✓	✓	-	-	-
Hot-swap Fan tray	-	✓	✓	✓	✓
Hot-swap Linecards	-	✓	✓	✓	✓
Switch & Mgmt Redund.	-	-	1+1	1+1	1+1
RF redundancy	-	-	N+1	N+1	N+1
GbE/10GbE Redund.	-	✓	✓	✓	✓
Max. Operating Temp.	50°C	50°C	50°C	50°C	50°C
# of GbE	2	12	8 or 2	8 or 2	8 or 2
# of 10GbE	-	-	2 or 8	2 or 8	2 or 8
Console port	1	1	1	1	1
10/100BaseT mgmt port	1	1	1	1	1

CASA C1G

DOCSIS 3.0 CMTS

- Min. configuration: 2DS x 2US
- Max. Symmetric config: **8DS x 8US**

The Casa Systems C1G Cable Modem Termination System (CMTS) is a new class of cable edge device that implements all of the DOCSIS 3.0 features enabling service providers to cost effectively offer highly scalable broadband services such as IPTV, video-over-IP, interactive gaming, as well as traditional broadband access and VoIP services.

Due to its extremely compact size (15 in x 8.75 in x 1RU), the C1G can be easily deployed in locations such as Multi-Dwelling Units (MDU), hotels and motels (hospitality), and small hubs.

The C1G supports 1 downstream QAM port, 2 DOCSIS upstream ports and 2 GbE (SFP) network ports. Configurations for the C1G range from 2DS x 2US up to 8DS x 8US. Additional features supported include upstream and downstream channel bonding, AES encryption/ decryption, Quality of Service (QoS) and a rich IP feature set.

The C1G's revolutionary compact size and cost per bit of DOCSIS bandwidth provides an unprecedented opportunity for service providers to cost-effectively provision highly scalable broadband services to locations that were thought to be cost ineffective.

SPECIFICATIONS

System

2x1 Gbps network interfaces
1 downstream interface per system
2 upstream interfaces per system

DOCSIS Features

Full DOCSIS 3.0 compliant
Full EuroDOCSIS 3.0 compliant
DOCSIS 3.0 downstream channelbonding from 2 to 8 channels
DOCSIS 3.0 upstream channelbonding from 2 to 8 channels
DOCSIS 3.0 AES encryption/decryption
DOCSIS 3.0 Multicast
Complete DOCSIS/EuroDOCSIS1.1 features
DOCSIS/EuroDOCSIS 2.0 A-TDMA
PacketCable 1.5 compliant
PacketCable MultiMedia
DSG
L2VPN

IP Features

DHCP Relay & option 82
Multiple DHCP servers
Proxy ARP
IP subnet bundling
Static IP routing
Multiple default routes
IGMP snooping
IGMP v2 & v3
Access control list
RIPv2, OSPFv2
PIM-SM
L2VPN VLAN tagging

GigE Interfaces

Dual SFP fiber/copper 1GigE
CWDM
Full line-rate support

Management

RS232 Serial port (RJ45)
Command line interface (CLI)
Telnet & SSH
SNMPv1, v2 & v3
Standard DOCSIS & IETF MIBs
IPDR
Casa Systems Enterprise MIBs
Event logging through syslog
Electronic mail notification
Resource usage reporting
TACACS+ & RADIUS

DOCSIS QAM Interface

Number of ports	1 port per system
Number of channels	2-8 channels per port
QAM modulation	Annex A, B or C
QAM constellations	64, 128 & 256 QAM
Data rates (DOCSIS)	27 Mbps @ 64 QAM 38 Mbps @ 256 QAM
Data rates (EuroDOCSIS)	36 Mbps @ 64 QAM 51 Mbps @ 256 QAM
Connector	F-type, 75 Ω
Frequency range	48 to 999 MHz (standard)(center)
Frequency accuracy	+/- 5 ppm
Frequency step size	5 kHz
Channel width	6 to 8 MHz (tunable)
Maximum output power per channel	61 dBmV @ 1-ch/port 57 dBmV @ 2-ch/port 53 dBmV @ 4-ch/port
Output step size	0.1 dB
Return loss	50 ~ 870 MHz, 14 dB 870 ~ 1002 MHz, 10 dB
Modulation error rate	43 dB (equalized)
Wideband noise	-73 dBc

Additional Features

Dynamic upstream & downstream load balancing
Spectrum management
Software-defined MAC domains
Software channel licensing
Ingress cancellation filtering

DOCSIS Upstream Interface

Number of ports	2 ports per system
Number of channels	1-4 channels per port
Logical channels	2 logical per physical channel
Modulation	QPSK, 8, 16, 32 & 64 QAM
Data rate per channel	0.32 – 30.72 Mbps
Input frequency range	5 – 42 MHz (DOCSIS) 5 – 65 MHz (EuroDOCSIS) 5 – 55 MHz (J-DOCSIS)
Connector	F-type, 75 Ω
Input range	-4 to 26 dBmV

Mechanical

Form Factor	1RU
Height	1.75 in. / 4.4 cm
Width	8.75 in. / 22.2 cm
Depth	15 in. / 38.1 cm
Weight	6 lbs / 2.72 kg
Mounting	19 in., 1 rack unit high
Front Panel LED	Power, alarm

Environmental

Operating Temperature	0° to 50° C
Storage Temperature	-40° to 70° C
Operating Humidity	5% to 95%, non-cond.
Power Supply	90 to 264 VAC
AC operating range	(Dual external)
Power consumption	< 80 W (max)

Regulatory Compliance

Safety: UL/CSA/EN60950-1
EMC: FCC Part 15, Subpart B
EN55022
EN55024

CASA C3200

DOCSIS 3.0 CMTS

- Min. configuration: 4DS x 4US
- Max. Symmetric config: **48DS x 48US**
- AC power: Hot-swap
- Linecards: Hot-swap
- GbE / 10GbE Redundancy

Casa System's C3200 Cable Modem Termination System (CMTS) is a DOCSIS 3.0 qualified cable edge device in a high density, 3RU platform. As a third-generation CMTS, the C3200 has several unique capabilities in addition to it's complete DOCSIS 3.0 features.

The C3200 supports complete separation of downstream channel capacity from upstream channel capacity in a single physical chassis providing a flexible downstream to upstream channel ratio. This flexibility allows cable operators to add downstream channels and upstream channels completely independently within the same chassis allowing them to address specific end user requirements. For example, business users typically require a symmetrical downstream to upstream traffic ratio while residential users require a more asymmetric ratio. For IPTV or video-over-IP applications, significantly more downstream traffic is required than the upstream traffic.

The C3200 delivers very high channel density, supporting up to 80 downstream QAM channels per platform. The superior downstream channel density makes it extremely cost effective for cable operators to enable next generation services such as video-over-IP. In addition to channel density, the C3200 goes beyond the DOCSIS 3.0 specification by delivering dynamic channel bonding capability in both the downstream (up to 16) and the upstream (up to 16) directions. The C3200 provides an unprecedented opportunity for cable operators to cost-effectively provision high- bandwidth IP services such as IPTV, interactive gaming, traditional broadband access and Voice over IP (VoIP) services.

SPECIFICATIONS

System

18x2 Gbps switching capacity
Six DOCSIS module slots per system
1~5 Downstream modules per system
1~5 Upstream modules per system

IP Features

OSPFv2
IS-IS (IPv4 & IPv6)
RIPv2
BGP (IPv4 & IPv6)
PIM-SM
IGMP snooping
IGMP v2 and v3
Static IP routing
DHCP Relay and option 82
DHCPv6
DHCP prefix delegation
Multiple DHCP servers
Proxy ARP
IP subnet bundling
Multiple default routes
Access Control Lists
L2VPN VLAN tagging

DOCSIS Features

Full DOCSIS 3.0 qualified (May 2008)
Full Euro-DOCSIS 3.0 compliant
DOCSIS 3.0 downstream channel bonding up to 16 channels
DOCSIS 3.0 upstream channel bonding up to 16 channels
DOCSIS 3.0 AES encryption/decryption
DOCSIS 3.0 IPv6
DOCSIS 3.0 multicast
Complete DOCSIS/EuroDOCSIS 1.1 features
DOCSIS/EuroDOCSIS A-TDMA (standard)
DOCSIS/EuroDOCSIS S-CDMA (optional)
PacketCable 1.5 compliant
PacketCable MultiMedia (PCMM) 1.0
DSG
L2VPN

Management

RS232 Serial port (RJ45)
10/100BASE-T management port
Command line interface (CLI)
Telnet
SNMPv1, v2, and v3
Standard DOCSIS and IETF MIBs
Casa Systems Enterprise MIBs
IPDR
Event logging through syslog
Resource usage reporting
TACACS+ and RADIUS

Additional Features

Dynamic upstream & downstreamload balancing
Spectrum management
Software defined MAC domains
Software channel licensing
Ingress cancellation filtering

Switch and Management Module (SMM)

10/100/1000 Mbps interfaces
12-port GigE copper or fiber SFP
Full line-rate support

DOCSIS QAM Module (DQM)

Num of ports	4 ports per module
DQM04	4 channels (ch), 1 ch per port
DQM08	8 channels, 2 ch per port
DQM16	16 channels, 4 ch per port
QAM modulation	Annex A, B or C
QAM constellations	64, 128 & 256 QAM
Data rates (DOCSIS)	27 Mbps @ 64 QAM
	38 Mbps @ 256 QAM
Data rates (EuroDOCSIS)	36 Mbps @ 64 QAM
	51 Mbps @ 256 QAM
Connector	F-type, 75 Ω
Frequency range	48 to 1002 MHz
Frequency accuracy	+/- 5 ppm
Frequency step size	5 kHz
Channel width	6 to 8 MHz (tunable)
Max output power	61 dBmV@1-ch/port
per channel	57 dBmV @2-ch/port
	53 dBmV @4-ch/port
Output step size	0.1 dB
Return loss	50 ~ 870 MHz, 14 dB
	870 ~ 1002 MHz, 10 dB
Modulation error rate	43 dB (equalized)
Wideband noise	-73 dBc

DOCSIS Control and Upstream Module (DCU)

DCU04	4 channels in 4 ports
DCU08	8 channels in 8 ports
DCU16	16 channels in 8 ports
Modulation	QPSK, 16, 32 & 64 QAM
Data rate per channel	0.32 – 30.72 Mbps
Input frequency range	5 – 42 MHz (DOCSIS)
	5 – 65 MHz (EuroDOCSIS)
	5 – 55 MHz (J-DOCSIS)
Connector	F-type, 75 Ω
Input range	-4 to 26 dBmV

Mechanical

Form Factor	3RU
Height	5.25 in. / 133.35 mm
Width	19 in. / 482.6 mm
Depth	23.5 in. / 597 mm
Weight	70 lbs
Mounting	19 inch, 3 rack unit high
Front Panel	LED power, alarm

Regulatory Compliance

Safety: UL/IEC/CSA 60950-1
EMC: FCC Part 15 Class A & CISPR Class A
Immunity: EN61000-4

Environmental

Operating temperature	0° to 50° C
Storage temperature	-40° to 70° C
Operating humidity	5% to 95%, non-cond.
Power supply:	
AC operating range	90 to 264 V (dual)
DC operating range	-36 to –60 V (dual)
Power consumption	< 700 W (nominal)

CASA C40G

DOCSIS 3.0 & 3.1 Ready CMTS

- Min. configuration: 32DS x 32US
- Max. Symmetric config: **2048DS x 256US**
- Up to 64 DS Channel bonding
- Up to 64 US Channel bonding
- Linecards: Hot-swap
- Switch & Mgmnt Redundancy
- RF redundancy
- GbE / 10GbE Redundancy

The C40G utilies all of the existing C100G CCAP modules including: the downstream module (DS8X96); switching module (SMM8X10G); upstream modules (US16X4 & US16X8). This platform solution, combined with Casa's time-tested and unique Software Defined Cable Architecture (SDCA) allows the company to quickly adapt to new features and functionality.

The C40G has separate modules for downstream and upstream traffic in one physical chassis. Now multiple system operators (MSOs) can provision downstream and upstream channels independently, managing the different traffic patterns of business users versus residential subscribers. Our product's flexible architecture enables MSOs to easily allocate more downstream traffic for IPTV and video-over-IP.

Industry-Leading DOCSIS 3.0 & 3.1 Ready The C40G has the most extensive DOCSIS 3.0 feature set of any 6RU chassis on the market. It provides the highest channel bonding capability for downstream traffic and upstream traffic.

The C40G's revolutionary DOCSIS bandwidth capacity and low cost-per-bit enables MSOs to cost-effectively provision IPTV or video-over-IP and interactive gaming along with traditional broadband access, VoIP and interactive services with one platform.

SPECIFICATIONS

System

2x280 Gbps switching capacity
MPEG switching from any port to any port
4 DOCSIS/CCAP module slots per system
1~3 Downstream modules per system
1~3 Upstream modules per system

DOCSIS Features

Full DOCSIS 3.0 compliant and 3.1 ready
Full EuroDOCSIS 3.0
DOCSIS 3.0 downstream channel bonding up to 64 channels
DOCSIS 3.0 upstream channel bonding up to 64 channels
DOCSIS 3.0 AES encryption/decryption
DOCSIS 3.0 IPv6
DOCSIS 3.0 Multicast
Complete DOCSIS/EuroDOCSIS 1.1 features
DOCSIS/EuroDOCSIS 2.0 A-TDMA (standard)
PacketCable 2.0 compliant
PacketCable MultiMedia (PCMM) I.06
DSG
L2VPN

IP Features

OSPFv2, OSPFv3
IS-IS (IPv4 & IPv6)
RIPv2, RIPng
BGP (IPv4 & IPv6)
PIM-SM
IGMP snooping
IGMP v2 and v3
Static IP routing
DHCP Relay and option 82
DHCPv6
DHCP prefix delegation
Multiple DHCP servers
Proxy ARP
IP subnet bundling
Multiple default routes
Access Control Lists
L2 MPLS, L3 MPLS

Management

RS232 serial port (RJ45)
10/100BASE-T management port
Command line interface (CLI)
Telnet
SSH
SNMPv1, v2 & v3
Standard DOCSIS & IETF MIBs
IPDR
Casa Systems Enterprise MIBs
Event logging through Syslog
Electronic mail notification
Resource usage reporting
TACACS+ and RADIUS

DOCSIS QAM Module (DQM)

DS8X4	32 channels, 4 channels/port
DS8X8	64 channels, 8 channels/port
DS8X96	1024 channels, 128 channels/port
QAM modulation	Annex A, B & C
QAM constellations	64, 128 & 256 QAM
Data rates (DOCSIS)	27 Mbps @ 64 QAM
	38 Mbps @ 256 QAM
Data rates (EuroDOCSIS)	36 Mbps @ 64 QAM
	51 Mbps @ 256 QAM
Frequency range	48 to 1000 MHz (center)
Frequency step size	5 kHz Channel
	width 6 to 8 MHz (tunable)
Maximum output/ch	60 dBmV @ 1-ch/port
	56 dBmV @ 2-ch/port
	52 dBmV @ 4-ch/port
	49 dBmV @ 8-ch/port
Output step size	0.1 dB
Output accuracy	± 3ppm
Return loss	14 dB
Modulation error rate	43 dB (equalized)
Wideband noise	-73 dBc

DOCSIS Control and Upstream Module (DCU)

US16X2	32 ch, 2 ch/port	5-65Mhz
US16X4	64 ch, 4 ch/port	5-65Mhz
US16X8	128 ch, 8 ch/port	5-100Mhz
Modulation	QPSK, 8, 16, 32 & 64 QAM	
Data rate/channel	0.32 – 30.72 Mbps	
Input range	-10 to 29 dBmV	

Switch and Management Modules (SMM)

SMM2X10G	
	Two 10 GigE interfaces
	Eight GigE inter- faces
	GigE copper or fiber SFP
	Full line-rate support
SMM8X10G	
	Eight 10 GigE interfaces
	Two GigE inter- faces
	GigE copper or fiber SFP
	Full line-rate support

RF I/O Downstream Module (RFD)

Number of ports	8 ports per module
Connector	F-type, 75 Ω

RF I/O Upstream Module (RFU)

Number of ports	16 ports per module
Connector	F-type, 75 Ω

Additional Features

Dynamic upstream & downstream load balancing
Spectrum Management
Software-defined MAC domains
Software channel licensing
Ingress cancellation filtering

Mechanical

Form factor	6RU
Height	10.5 in. / 266 mm
Width	19 in. / 482 mm
Depth	18.3 in. / 466 mm
Weight	60 lbs (fully loaded)
Mounting	19 inch, 6 rack unit high
Front panel LED	Power & alarm

Environmental

Operating temperature	0° to 50° C
Storage temperature	-40° to 70° C
Operating humidity	5% to 95%, non-cond.
Power requirements)	DC -40.5 to –60 V (dual)
	AC 90 to 264 V (dual)
Power consumption	< 1700 W (nominal)

CASA C10G

DOCSIS 3.0 CMTS

- Min. configuration: 32DS x 32US
- Max. Symmetric config: **384DS x 384US**
- Linecards: Hot-swap
- Switch & Mgmnt Redundancy
- RF redundancy
- GbE / 10GbE Redundancy

The Casa Systems C10G Cable Modem Termination System (CMTS) is a new class of DOCSIS 3.0 cable edge device that delivers unprecedented performance and scalability in a 12RU platform.

As a third-generation CMTS, the C10G has several unique capabilities beyond DOCSIS 3.0 features. The C10G supports complete separation of downstream (DS) channel capacity and upstream (US) channel capacity in a single physical chassis, providing a flexible downstream to upstream channel ratio. Cable operators can add downstream channels and upstream channels completely independently within the same chassis. Business users may require more symmetric downstream to upstream traffic ratios, while residential broadband is typically more asymmetric. For IPTV or video-over-IP applications, significantly more downstream traffic is required than the upstream traffic.

The C10G delivers unprecedented channel density compared to a second generation CMTS. It supports up to 704 DS and 64 US channels. This extremely high downstream channel density makes it economical to provide video-over-IP service or IPTV today.

In addition to channel density, the C10G goes beyond the DOCSIS 3.0 specification by delivering dynamic channel bonding capability in both the downstream and the upstream directions. The C10G's revolutionary DOCSIS bandwidth capacity and cost per bit of DOCSIS bandwidth provides an unprecedented opportunity for cable operators to cost-effectively provision high-bandwidth IP services such as IPTV, interactive gaming, traditional broadband access and voice over IP (VoIP) services.

SPECIFICATIONS

System

480x2 Gbps switching capacity
MPEG switching from any port to any port
12 DOCSIS module slots per system
1~11 Downstream modules per system
1~11 Upstream modules per system

DOCSIS Features

Full DOCSIS 3.0 compliant
Full EuroDOCSIS 3.0
DOCSIS 3.0 downstream channelbonding up to 64 channels
DOCSIS 3.0 upstream channelbonding up to 64 channels
DOCSIS 3.0 AES encryption/decryption
DOCSIS 3.0 IPv6, DOCSIS 3.0 Multicast
Complete DOCSIS/EuroDOCSIS1.1 features
DOCSIS/EuroDOCSIS 2.0A-TDMA (standard)
PacketCable 1.5 qualified
PacketCable MultiMedia (PCMM) 1.0
DSG
L2VPN

IP Features

OSPFv2
IS-IS (IPv4 & IPv6)
RIPv2
BGP (IPv4 & IPv6)
PIM-SM
IGMP snooping, IGMP v2 and v3
Static IP routing
DHCP Relay and option 82
DHCPv6
DHCP prefix delegation
Multiple DHCP servers
Proxy ARP
IP subnet bundling
Multiple default routes
Access Control Lists
L2VPN VLAN tagging

Management

RS232 serial port (RJ45)
10/100BASE-T management port
Command line interface (CLI)
Telnet
SSH
SNMPv1, v2 & v3
Standard DOCSIS & IETF MIBs
IPDR
Casa Systems Enterprise MIBs
Event logging through Syslog
Electronic mail notification
Resource usage reporting
TACACS+ and RADIUS

DOCSIS QAM Module (DQM)

DQM32	32 channels, 4 channels/port
DQM64	64 channels, 8 channels/port
QAM modulation	Annex A, B or C
QAM constellations	64, 128 & 256 QAM
Data rates (DOCSIS)	27 Mbps @ 64 QAM 38 Mbps @ 256 QAM
Data rates (EuroDOCSIS)	36 Mbps @ 64 QAM 51 Mbps @ 256 QAM
Frequency range	48 to 1000 MHz (center)
Frequency step size	5 kHz
Channel width	6 to 8 MHz (tunable)
Maximum output power per channel	60 dBmV @ 1-ch/port 56 dBmV @ 2-ch/port 52 dBmV @ 4-ch/port 49 dBmV @ 8-ch/port
Output step size	0.1 dB
Output accuracy	± 5ppm
Return loss	50 ~ 870 MHz, 14 dB 870 ~ 1002 MHz 10 dB
Modulation error rate 4	3 dB (equalized)
Wideband noise	-73 dBc

DOCSIS Control and Upstream Module (DCU)

DCU32	32 channels, 2 channels per port
DCU64	64 channels, 4 channels per port
Modulation	QPSK, 8, 16, 32 & 64 QAM
Data rate/channel	0.32 – 30.72 Mbps
Input frequency range	5 – 42 MHz (DOCSIS) 5 – 65 MHz (EuroDOCSIS) 5 – 55 MHz (J-DOCSIS)
Input range	-16 to 26 dBmV

Switch and Management Module (SMM)

Two 10 GigE interfaces
Eight GigE interfaces
GigE copper or fiber SFP
Full line-rate support

RF I/O Downstream Module (RFD)

Number of ports	8 ports per module
Connector	F-type, 75 Ω

RF I/O Upstream Module (RFU)

Number of ports	16 ports per module
Connector	F-type, 75 Ω

Additional Features

Dynamic upstream & downstream load balancing
Spectrum Management
Software-defined MAC domains, Software channel licensing
Ingress cancellation filtering

Mechanical

Form factor	12RU
Height	21 in. / 533 mm
Width	19 in. / 482 mm
Depth	16 in. / 406 mm
Weight	120 lbs (fully loaded)
Mounting	19 inch, 12 rack unit high
Front panel	LED Power & alarm

Environmental

Operating temperature	0° to 50° C
Storage temperature	-40° to 70° C
Operating humidity	5% to 95%, non-cond.
Power requirements	(DC) -40.5 to –60 V (dual)
Power consumption	< 2700 W (nominal)

Regulatory Compliance

Designed to NEBS level 3 requirements
Safety: EN/UL/IEC/CAN/CSA/C22.2 60950-1
EMC: FCC Part 15 Class A & CISPR Class A
Immunity: EN61000-4

CASA C100G

DOCSIS 3.0 CMTS

- Min. configuration: 32DS x 32US
- Max. config: either **8000DS OR 1500US**
- Linecards: Hot-swap
- Switch & Mgmnt Redundancy
- RF redundancy
- GbE / 10GbE Redundancy

CCAP is here! Casa's C100G next generation, highly available, fully redundant, I-CCAP platform enables MSOs to deploy MPEG video, IPTV, and DOCSIS over a single port. The C100G delivers the industry's highest CCAP density while consuming the lowest average power per channel, minimizing both expenses and space requirements in the cable head end.

The C100G platform consists of the following new modules: downstream module (DS8X96); switching module (SMM8X10G); and the existing upstream module (US16X4). With the introduction of this platform, Casa continues to lead the way by providing solutions with the greatest capacity in the industry. The platform currently supports over 8,000 downstream channels. This platform solution, combined with Casa's time-tested and unique Software Defined Cable Architecture (SDCA) allows the company to quickly adapt to new features and functionality.

SPECIFICATIONS

System

2x600 Gbps switching capacity
MPEG switching from any port to any port
12 DOCSIS module slots per system
1~11 Downstream modules per system
1~11 Upstream modules per system

DOCSIS Features

Full DOCSIS 3.0 compliant, Full EuroDOCSIS 3.0
DOCSIS 3.0 downstream channelbonding up to 64 channels
DOCSIS 3.0 upstream channelbonding up to 64 channels
DOCSIS 3.0 AES encryption/decryption
DOCSIS 3.0 IPv6, DOCSIS 3.0 Multicast
Complete DOCSIS/EuroDOCSIS1.1 features
DOCSIS/EuroDOCSIS 2.0A-TDMA (standard)
PacketCable 1.5 compliant
PacketCable MultiMedia (PCMM) 1.0
DSG, L2VPN

IP Features

OSPFv2
IS-IS (IPv4 & IPv6)
RIPv2
BGP (IPv4 & IPv6)
PIM-SM
IGMP snooping, IGMP v2 and v3
Static IP routing
DHCP Relay and option 82
DHCPv, 6DHCP prefix delegation
Multiple DHCP servers
Proxy ARP
IP subnet bundling
Multiple default routes
Access Control Lists
MPLS

Management

RS232 serial port (RJ45)
10/100BASE-T management port
Command line interface (CLI)
Telnet
SSH
SNMPv1, v2 & v3
Standard DOCSIS & IETF MIBs
IPDR
Casa Systems Enterprise MIBs
Event logging through Syslog
Electronic mail notification, Resource usage reporting
TACACS+ and RADIUS

DOCSIS QAM Module (DQM)

DS8X4	32 channels, 4 channels/port
DS8X8	64 channels, 8 channels/port
DS8X96	1024 channels 128 channels/port
QAM modulation	Annex A or B
QAM constellations	64, 128 & 256 QAM
Data rates (DOCSIS)	27 Mbps @ 64 QAM 38 Mbps @ 256 QAM
Data rates (EuroDOCSIS)	36 Mbps @ 64 QAM 51 Mbps @ 256 QAM
Frequency range	48 to 1000 MHz (center)
Frequency step size	5 kHz
Channel width	6 to 8 MHz (tunable)
Maximum output/ch	60 dBmV @ 1-ch/port 56 dBmV @ 2-ch/port 52 dBmV @ 4-ch/port 49 dBmV @ 8-ch/port
Output step size	0.1 dB
Output accuracy	± 5ppm
Return loss	50 ~ 870 MHz, 14 dB 870 ~ 1002 MHz 10 dB

DOCSIS Control and Upstream Module (DCU)

US16X2	32 channels, 2 channels/port 5-65Mhz
US16X4	64 channels, 4 channels/port 5-65Mhz
US16X8	128 channels, 8 channels/port 5-100Mhz
Modulation	QPSK, 8, 16, 32 & 64 QAM
Data rate/channel	0.32 – 30.72 Mbps
Input range	-4 to 26 dBmV

Switch and Management Modules (SMM)

SMM2X10G	
	Two 10 GigE interfaces Eight GigE inter-faces GigE copper or fiber SFP Full line-rate support
SMM8X10G	
	Eight 10 GigE interfaces Two GigE inter-faces GigE copper or fiber SFP Full line-rate support

RF I/O Downstream Module (RFD)

Number of ports	8 ports per module
Connector	F-type, 75 Ω

RF I/O Upstream Module (RFU)

Number of ports	16 ports per module
Connector	F-type, 75 Ω

Additional Features

Dynamic upstream & downstream load balancing
Spectrum Management
Software-defined MAC domains, Software channel licensing
Ingress cancellation filtering

Mechanical

Form factor	13RU
Height	21 in. / 533 mm
Width	19 in. / 482 mm
Depth	16 in. / 406 mm
Weight	120 lbs (fully loaded)
Mounting	19 inch, 13 rack unit high
Front panel	LED Power & alarm

Environmental

Operating temperature	0° to 50° C
Storage temperature	-40° to 70° C
Operating humidity	5% to 95%, non-cond.
Power requirements	(DC) -40.5 to –60 V (dual)
Power consumption	< 3600 W (nominal)

Regulatory Compliance

Designed to NEBS level 3 requirements

CASA DS8X96

CCAP Module

Casa Systems' downstream DS8x96 module delivers unprecedented density and performance. The DS8x96 module delivers an industry leading 96 channels per port including 32 unique channels per port of narrowcast and 64 channels of broadcast for a total of 768 channels per module. Designed to be deployed today in the carrier class C10G Cable Modem Termination System (CMTS) platform, the platform supports up to eleven primary DS8x96 modules and one protection module, yielding a total combination of over 8000 narrowcast and broadcast channels supported in the downstream direction.

The DS8x96 DOCSIS module is a complete DOCSIS downstream unit that includes DOCSIS packet processing, QoS, DOCSIS downstream MAC, PHY, and RF up-conversion. Each downstream QAM channel can be configured to support DOCSIS or MPEG/DVB-C video.

Converged Cable Access Platform (CCAP) Functionality

The CCAP specification calls for improved density and increased functionality and the DS8x96 delivers. The DS8x96 module brings Full CCAP functionality to its C10G CMTS platform by enabling MSOs to immediately deploy DOCSIS, IPTV and digital video over a single RF port and greatly increasing channel density over existing CMTS modules on the market.

Superior Channel Density

Industry leading 96 channels per port including 32 unique channels per port of narrowcast and 64 channels of broadcast for a total of 768 channels per module.

Channel Bonding

The DS8x96 has 256 variable size DOCSIS channels that can be used for bonding. These bonded channels can be grouped together, delivering numerous channel configurations and maximum flexibility.

Cost Effectiveness

Industries lowest cost per DOCSIS 3.0 channel for this class of product, delivering an economical solution for high bandwidth multimedia applications.

SPECIFICATIONS

Number of Channels	768 channels, 96 channels/port
QAM modulation	Annex A, B or C
QAM constellations	64, 128, & 256 QAM
Data rates (DOCSIS)	27 Mbps @ 64 QAM
	38 Mbps @ 256 QAM
Data rates (EuroDOCSIS)	36 Mbps @ 64 QAM
	51 Mbps @ 256 QAM
Frequency range (center)	48 to 1000 MHz
Frequency step size	1 Hz
Channel width	6 to 8 MHz (tunable)
Maximum output power	
(sum total of all channels)	60 dBmV @ 1 ch/port
	59 dBmV @ 2 ch/port
	58 dBmV @ 4+ ch/ port
Output step size	0.1 dB
Output accuracy	± 5ppm
Return loss	50 ~ 870 MHz, 14 dB
	870 ~ 1002 MHz 10 dB
Modulation error rate	43 dB (equalized)
Wideband noise	-73 dBc

CASA DS8X192

DOCSIS 3.1 CCAP Module

Casa Systems' C100G award winning CCAP solution combines DOCSIS 3.1 CMTS and an MPEG video Edge-QAM in a high density, high availability 13 RU platform. The platform and modules support the CableLabs DOCSIS 3.1 standard, and are backward compatible with DOCSIS 3.0. Deployed by some of the worlds' leading service providers, the C100G's software defined architecture, industry-leading density, and integrated video capabilities provide a clear competitive edge in the delivery of ultra-broadband services.

Casa has long been the leader in CCAP channel density, both upstream and downstream owing to our unique design approach. We are continuing our leadership with a new downstream module, the DS8x192, which delivers speeds beyond 1G, and which supports the entire 1.2GHz spectrum required by DOCSIS 3.1, including both the SC-QAM and OFDM channels. With this latest addition to the family, Casa's C100G can now offer service providers more bandwidth at lower OPEX.

Converged Cable Access Platform (CCAP) Functionality

The industry's first full DOCSIS 3.1 CCAP line-card, the DS8x192, is the downstream module in the C100G. It supports DOCSIS 3.1, EuroDOCSIS 3.0, and DOCSIS 3.0 standards for service provider flexibility. The 8 physical RF F-connector ports each support the entire 1.2GHz spectrum (48MHz to 1.218GHz) for OFDM channels, and support SC-QAM. The narrowcast channels on each port can be used to transmit DOCSIS packets, SDV stream, and VOD stream on the same port. The DS8x192 also provides a pool of shared channels, which can be used to support linear broadcast, or as narrowcast channels by dividing the pool and assigning the channels to each individual RF port.

SPECIFICATIONS

Standards Supported	DOCSIS 3.1, EuroDOCIS 3.0, DOCSIS 3.0
Frequency Range	48 MHz to 1.218 GHz
SC-QAM Channels	Up to 128 channels per port
OFDM Channels	Exceeds DOCSIS 3.1 modemcapabilities of 2 OFDM (192 Mhz) channels per port
QAM Modulation	Annex A, B, or C
QAM Constellations	64, 128, 256 QAM
OFDM Constellations	BPSK, QPSK, 16, 64, 128, 256, 512, 1024, 2048, 4096 QAM
Data Rates (DOCSIS 3.0)	27 Mbps @ 64 QAM 38 Mbps @ 256 QAM
Data Rates (EuroDOCSIS 3.0)	36 Mbps @ 64 QAM 51 Mbps @ 256 QAM
Data Rates (DOCSIS 3.1, full OFDM block)	1.5 Gbps @ 1024 QAM 1.8 Gbps @ 4096 QAM
DS Channel Width	SC-QAM 6 MHz / 8 MHz OFDM Up to 192 Mhz
Frequency Step Size	1 Hz
Maximum Output Power (sum of all channels)	60 dBmV @ 1 ch / port 59 dBmV @ 2 ch / port 58 dBmV @ 4+ ch / port
Output step size	0.1 dB
Output accuracy	+/- 3 ppm
Return Loss	50 - 870 MHz, 14 dB 870 - 1218 MHz, 10 dB
Modulation Error Rate	43 dB (equalized)
Wideband Noise	- 73 dBc
Total Power	350W

CASA US16X8

DOCSIS 3.0/3. 1 Upstream Module

Casa Systems' upstream US16X8 module delivers unprecedented density and performance. The module suports a 16 port RF I/O module and can be provisioned to support up to 8 channels per port delievering a total of 128 channles per card.

The US16X8 DOCSIS (DCU) module is a complete DOCSIS upstream unit that includes RF burst receiving, signal demodulation, DOCSIS upstream MAC, PHY, as well as packet processing and QoS.

Together with RF Upstream I/O (RFU) module, it serves as the RF upstream interface between the cable headend and DOCSIS-based cable modems. The DCU is a single-slot module, supports 16 DOCSIS burst receivers, and is a hot-swappable unit.

Superior Channel Density

Software upgradeable to a maximum 8 channels per port and 128 channels per module.

Complete DOCSIS unit

Complete DOCSIS upstream unit that includes RF burst receiv-ing, signal demodulation, DOCSIS upstream MAC, PHY, as well as packet processing and QoS.

Cost Effectiveness

Industries lowest cost per DOCSIS 3.0/3.1 channel for this class of product, delivering an economical solution for high bandwidth multimedia applications.

SPECIFICATIONS

Number of Channels	128 max number channels per card, 8 channels/port
	16 OFDM channels, 1 channel/port
QAM modulation	QPSK, 8, 16, 32 and 64 QAM
OFDM modulation	BPSK, 8, 16, 32, 64, 128, 256, 512, 1024 QAM
QAM Data rate/channel	0.32 - 30.72 Mbps
OFDM Data rate/channel	950 Mbps
Input frequency range	5 - 100 MHz
Input range	-10 to 29 dBmV
Power consumption:	200W
Industry Specifications:	DOCSIS 3.0/3.1
	EuroDOCSIS 3.0

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

www.inca-nms.com

Mini CMTS series are available with optional **InCa Provisioning** and **Network Management System** & **24/7 support service**

LMC series products are designed according to DOCSIS3.0 as well as EuroDOCSIS 3.0 standards. They support up to 511 cable modems, typically 200 online cable modems. Cable modems can be (Euro)DOCSIS 2.0 or 3.0. It can be used as EdgeQAM and CMTS together. It is available in both indoor and outdoor housings with very low power consumption. Outdoor unit is designed with passive cooling system, that means fans free.

Integrated magamement

The MiniCMTS has integrated intuitive WebGUI for simple management. It can be connected to operator's NMS via SNMP protocol.

(Euro)DOCSIS3.0 standard

Supports (Euro)DOCSIS 2.0 and 3.0 cable modems and have fixed ratio of bonded 16 downstream and 4 upstream channels. Overall throughput is 800Mbps in downstream and 160Mbps in upstream. Downstream channel width can be set to 8 MHz or 6 MHz from management system. Support unicast, multicast, QoS, channel bonding multicast.

EdgeQAM function

Downstream can be shared between CMTS and Edge QAM functionality.

Installation without additional components

Can be optionally equipped with optical receiver module for direct connection to HFC network, built in diplex filter, ONU module, RJ45 or SFP.

LMC-1RU

www.inca-nms.com

Mini CMTS series are available with optional **InCa Provisioning** & **Network Management System** and **24/7 support service**

SPECIFICATIONS

Module	Parameter	LMC-1RU
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.) **on RF port (16 ch.)**	49 dBmV 45 dBmV
	MER after equalisation	43 dB
	Out Of Band Noise	< -20 dBmV
Upstream	**Upstream modulation**	QPSK, 16QAM, 64QAM; ATDMA, SCDMA
	Channels	4
	Throughput (customers)	100 Mbps (4x 6,4MHz, QAM64)
	Frequency range	5 MHz – 65 MHz
	Internal Input Levels	-13 dBmv ... +23 dBmv
RF part	**RF ports**	1 RF in + 1 RF out
	Internal RF loss	4 dB
Network	**Port speed**	1 Gbps
	Port Types	2x RJ45 + 1x SFP
	Management protocols	HTTP, SNMP, (SSH, TELNET)
Functions	**Max / Typical CM online**	511 / 200
	Dynamic load balancing	Supported
	DHCP Relay	Option 60, Option 82
	QoS	Supported
	VLANs (802.1q)	Supported
Other	**Housing**	Indoor, 1RU
	Environment	Operating Temperature: -20 °C ... +70 °C Humidity: 10% - 90%
	Power supply	230V AC
	Power consumption	~ 44 W
	Dimensions	482.6 x 405.5 x 43mm
	Weight	5,8kg

LMC-2IU

www.inca-nms.com

Mini CMTS series are available with optional **InCa Provisioning** & **Network Management System** and **24/7 support service**

SPECIFICATIONS

Module	Parameter	LMC-21U
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.) **on RF port (16 ch.)**	42 dBmV 38 dBmV
	MER after equalisation	43 dB
	Out Of Band Noise	< -20 dBmV
Upstream	**Upstream modulation**	QPSK, 16QAM, 64QAM; ATDMA, SCDMA
	Channels	4
	Throughput (customers)	100 Mbps (4x 6,4MHz, QAM64)
	Frequency range	5 MHz – 65 MHz
	Internal Input Levels	-13 dBmv ... +23 dBmv
RF part	**RF ports**	2 RF in + 2 RF out
	Internal RF loss	7 dB
Network	**Port speed**	1 Gbps
	Port Types	2x RJ45 + 1x SFP
	Management protocols	HTTP, SNMP, (SSH, TELNET)
Functions	**Max / Typical CM online**	511 / 200
	Dynamic load balancing	Supported
	DHCP Relay	Option 60, Option 82
	QoS	Supported
	VLANs (802.1q)	Supported
Other	**Housing**	Indoor
	Environment	Operating Temperature: -20 °C ... +70 °C Humidity: 10% - 90%
	Power supply	230V AC
	Power consumption	~ 36 W
	Dimensions	331.2 x 259.4 x 56.5mm
	Weight	4,7kg

LMC-10U

www.inca-nms.com

Mini CMTS series are available with optional **InCa Provisioning** & **Network Management System** and **24/7 support service**

SPECIFICATIONS

Module	Parameter	LMC-10U
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.) **on RF port (16 ch.)**	45 dBmV 41 dBmV
	MER after equalisation	43 dB
	Out Of Band Noise	< -20 dBmV
Upstream	**Upstream modulation**	QPSK, 16QAM, 64QAM; ATDMA, SCDMA
	Channels	4
	Throughput (customers)	100 Mbps (4x 6,4MHz, QAM64)
	Frequency range	5 MHz – 65 MHz
	Internal Input Levels	-13 dBmv ... +23 dBmv
RF part	**RF ports**	1 RF in + 1 RF out
	Internal RF loss	4 dB
Network	**Port speed**	1 Gbps
	Port Types	2x RJ45 + 1x SFP
	Management protocols	HTTP, SNMP, (SSH, TELNET)
Functions	**Max / Typical CM online**	511 / 200
	Dynamic load balancing	Supported
	DHCP Relay	Option 60, Option 82
	QoS	Supported
	VLANs (802.1q)	Supported
Other	**Housing**	Outdoor, IP66
	Environment	Operating Temperature: -20 °C ... +70 °C Humidity: 10% - 90%
	Power supply	48V AC
	Power consumption	~ 36 W
	Dimensions	384 x 271 x 162mm
	Weight	6,7 kg

For in depth information please visit our webpage

Für mehr Information bitte besuchen Sie unsere Webseite

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