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Casa Systems C2200 CMTS

Overview

The Casa Systems C2200 Cable Modem Termination System (C2200) is a new class of cable edge device that combines a third generation DOCSIS CMTS and an MPEG video Edge-QAM in a single compact 1RU platform.

As a third generation CMTS, the C2200 has several unique capabilities beyond DOCSIS 3.0 features.

First, the C2200 supports complete separation of downstream channel capacity and upstream channel capacity in a single physical chassis, and thus provides 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 which is mostly for control plane applications.

Second, the C2200 has significantly higher channel density than a second generation CMTS. The extremely high downstream channel density makes it economical to provide video-over-IP service today.

Third, the C2200 has the most extensive DOCSIS 3.0 features on the market today. It offers the highest

Feature Highlights

Full DOCSIS 3.0 qualified – Multi-channel DRFI RF for Annex A, B, & C, downstream channel bonding up to 16 channels, upstream channel bonding up to 16 channels, AES encryption/decryption, multicast QoS, bonded channel multicast, full DOCSIS 3.0 MIBs, and IPDR

Separate downstream and upstream modules – Unlike traditional CMTS with fixed downstream to upstream ratio, Casa CMTS has separate downstream modules and upstream modules that provide flexible downstream to upstream ratio

Cost effectiveness –The lowest cost per DOCSIS channel in the industry. The only economical solution for high bandwidth multimedia IP applications

Software licensing –Ability to activate additional channels as needed up to the available physical capacity of the module

Superior density – Offers the highest channel density in the industry, ranging from 48DSx16US for IP video to 32DSx32US for typical broadband service deployment in a single chassis

Best multi-channel RF performance – Exceeds DOCSIS DRFI specification

Extended frequency range – Downstream frequency range up to 1GHz (48~1002MHz)

DOCSIS 1.1 and 2.0 features – Complete DOCSIS/**EuroDOCSIS** 1.1 and 2.0 feature sets; PacketCable and PCMM support, L2VPN, and DSG

Rich operational features – Rich operational features such as show cable modem, flap list, spectral management and IP bundling ready for deployment

channel bonding capability in both downstream (up to 16) and upstream (up to 16).

The revolutionary DOCSIS bandwidth capacity and cost per-bit of DOCSIS bandwidth of the C2200 provides an unprecedented opportunity for cable operators to cost-effectively provision high-bandwidth IP services such as IPTV or video-over-IP and interactive gaming in addition to traditional broadband access and VoIP services.

The integrated MPEG video capacity of the C2200 provides cable operators the flexibility to offer MPEG or DVB-based broadcast digital cable TV, video-on-demand (VOD), and interactive services in the same platform. The flexibility, multi-functionality and economics of the platform eliminate the need to deploy multiple parallel systems for MPEG TV, IPTV bypass and DOCSIS broadband access. The following sections detail the unique capabilities of the C2200.

Modular and Flexible Architecture

The C2200 CMTS comes in a compact 1RU chassis. It is based on a modular architecture that gives cable operators the maximum flexibility in tailoring their networks according to the requirements of their services. The C2200 consists of a base system with built-in L2/L3 switch and 4 GbE (SFP) ports and four slots for DOCSIS interface modules (downstream modules or upstream modules).

Any combination of downstream modules and upstream modules are supported by the platform. This enables flexible downstream to upstream channel ratio. The DOCSIS QAM Module (DQM) is a complete DOCSIS downstream unit that includes DOCSIS packet processing, QoS, DOCSIS downstream MAC, PHY, and RF up-conversion. The DOCSIS Control and Upstream module (DCU) is a complete DOCSIS upstream unit that includes DOCSIS packet processing, DOCSIS upstream MAC and burst mode receivers. A typical configuration for channel-bonded deployment can be 32DSx32US for a 1:1 channel ratio or 16DSx32US for a 1:2 channel ratio. In the minimum configuration, C2200 can have one DQM08 downstream module (8 channels of QAM) and one DCU04 upstream module (8 channels of burst mode receivers). Each downstream QAM channel can be configured to support DOCSIS or MPEG/DVB-C video or a combination of the two.

Rich Operational Features

The C2200 supports industry standard Command Line Interface (CLI) and SNMP for configuration and management. Operational features such as show cable modem, 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..

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.

The C2200 functions as a Layer 3 routing device and supports static as well as dynamic routing protocols.. For route redundancy, multiple default routes can be configured. Layer 2 bridging, VLAN, RIP,BGP, OSPF, IS-IS, and PIM-SM are supported.

Applications

The applications of the C2200 in a cable network can be divided into two categories. The first category the C2200 provides is DOCSIS-based IP applications, such as broadband access, VoIP, and IPTV and video-over-IP etc. The second category the C2200 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.

C2200 Specifications

System

4x2 Gbps switching capacity
MPEG switching from any port to any port
Four DOCSIS interface slots per system
1~3 Downstream modules per system
1~3 Upstream modules per system

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 Multicast
Complete DOCSIS/EuroDOCSIS 1.1 features
DOCSIS/EuroDOCSIS 2.0 A-TDMA (standard)
DOCSIS/EuroDOCSIS 2.0 S-CDMA (optional)
PacketCable 1.5 compliant
PacketCable MultiMedia (PCMM) 1.0
DSG
L2VPN

IP Features

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

Management

RS232 Serial port (DB9)
10/100BASE-T management port
Command line interface (CLI)
Telnet and SSH
SNMPv1, v2, and v3
Standard DOCSIS and IETF MIBs
IPDR
Casa Systems Enterprise MIBs
Event logging through syslog
Electronic mail notification
Resource usage reporting
TACACS+ and RADIUS

Additional Features

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

MPEG Stream Processing

MPEG de-multiplexing and re-multiplexing
Unicast to multicast conversion
PAT and PMT extraction and regeneration
PID filtering and remapping
PCR jitter removal and re-stamping
SI table generation and insertion
DVB Simulcrypt scrambling
Session-based encryption

GigE Interfaces

10/100/1000 Mbps
4-port copper or fiber SFP
CWDM
Full line-rate support

DOCSIS QAM Module (DQM)

Number of ports	4 ports per module
DQM04	4 channels, 1, channel per port
DQM08	8 channels, 2 channels per port
DQM16	16 channels, 4 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 (center)	91 to 867 MHz (standard)
	48 to 999 MHz (optional)
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

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	1RU
Height	1.75 in. /44.45 mm
Width	19 in. /482.6 mm
Depth	23.5 in. / 597 mm
Weight	30 lbs / 13.62 kg
Mounting	19 inch, 1 rack unit high
Front Panel LED	Power, alarm, I/O status

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
Optional DC	-36 to –60 V (redundant)
Power consumption	< 400 W (nominal)

Regulatory Compliance

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

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