

# E6000<sup>®</sup> CER

## Release 3.0

### FEATURES

Release 3.0 delivers a significant set of value-added capabilities for E6000<sup>®</sup> CER customers. With Rel. 3.0, cable operators can converge their DOCSIS and Video services and configure them on the same service group / F connector (for Annex B). In order to support the convergence, Annex B density has been increased up to 48 channels per F connector, with a maximum of 32 of those being used for DOCSIS<sup>®</sup> and a maximum of 32 of those being used for video (not 32 simultaneously). Rel. 3.0 also includes various other major features, such as Ethernet Link Aggregation, AES encryption support and enhanced scaling. Additional features include IPv6 addressing for sub-interfaces, Filter Group entry increase to 128, RIPv2 as a PE-CE Routing Protocol (to be used with MPLS L3VPN), and other features listed below.



### PRODUCT OVERVIEW

The E6000 Converged Edge Router (CER) is a next-generation CCAP<sup>™</sup> platform that provides cable operators unprecedented advances in channel density, power efficiency, and cost savings in a redundant, integrated architecture designed from the ground up for high availability. This powerful design enables operators to converge all services (video, high speed data, and voice) on a single physical connector thus enabling additional savings in capital and operational expenditures along with increased operational efficiency. Operators that converge services with the E6000 CER economize rack space, powering, and cooling in their facilities. The E6000 CER software benefits from over ten years of refinements in stability, hitless failover, and performance at high scale via its predecessor, the C4<sup>®</sup> CMTS. This software re-use also provides the E6000 CER with a proven set of features for IPv6. No other CCAP platform today enjoys a proven software code base for these critical functional areas.



## SOFTWARE RELEASE 3.0 FEATURES (PARTIAL LISTING)

- Downstream Density Increase
  - Up to 48 Annex B QAMs per F Connector (max 32 for DOCSIS)
- Integrated Edge QAM (IEQ) Feature Set
  - Table-based VOD
  - SDV + Session-based VOD (ISA)
  - Video Privacy Mode Encryption (VPME)
  - Max 32 DOCSIS QAMs, max 32 Video
- RF Agility Enhancement
- Enhanced Scaling
- Ethernet Link Aggregation
- RF Tilt Configuration
- Q-tag Encapsulation on MPLS Traffic
- MPLS Ping and Traceroute
- MPLS L2VPN – PW Signaling via LDP with MP-BGP Auto-Discovery (Lab Support)
- MPLS L3VPN – RIPv2 as a PE-CE Routing Protocol
- DSCP Marking for Downstream Subscriber Traffic
- Enhanced Scalability Monitoring (SNMP or CLI)
- New IPDR Schemas (CM US STATS and CM REG STATUS)
- AES Encryption Support
- IPv6 Addressing for Sub-interfaces
- IPv6 Device Classes
  - Subscriber Management Filtering by Device Class
  - Supports MTA / DVA, STB, and PS Classes
- Cable-Side IGMP Throttling
- PCMM ECN MM-N-13.0697-1 Support (IPv4 and IPv6 Classifiers in Single Gate)
- DHCP Option 82.9 Support for MSO Defined Text
- RADIUS Password Challenge
- Downstream Annex A Roll-Off Adjustment
- Disable Cable Upstream Destination MAC Address Verification
- Enhanced Ping Statistics
- Filter Group Entry Increase to 128
- Configurable Tag Protocol Identifier (TPID) in NSI Upstream Packets

Managing the E6000® CER is typically done via the SNMP or CLI interfaces. The E6000 CER has multiple options available for IPDR, a useful tool for measuring bandwidth usage. Physical maintenance of the E6000 CER is very simple. Air filters, one in the front and another in the rear of the chassis, should be inspected and/or replaced per recommendations in the E6000 CER User Guides.

## GENERAL SPECIFICATIONS

### RF Downstream

Frequency Range (MHz)	57 to 999 (DOCSIS 3.0); 90 to 1002 (EuroDOCSIS 3.0)
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Modulation (QAM)	64, 256
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Data Rate (Mbps) (Max.)	30.34 to 55.62 per channel (42.89 to 55.62 in Release 1.0)
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RF Output Level (dBmV)	38 to 60
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Typical Modulation Error Ratio (MER) (dB)	47
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Symbol Rate (Msym/sec)	5.361 (DOCSIS); 6.952 (EuroDOCSIS)
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Bandwidth (MHz)	6 (DOCSIS), 8 (EuroDOCSIS)
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Output (load) impedance (ohms)	75
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### Physical

Power	-48 VDC (-40 to -72 VDC)
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Power Consumption (full-fill system)	3,800 W nominal at -48 VDC, 77°F (25°C)
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Operating Temperature:	
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Short Term °F (°C)	+23 to +131 (-5 to +55)
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Long Term °F (°C)	+41 to +104 (+5 to +40)
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Storage Temperature °F (°C)	-40 to +158 (-40 to +70)
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Operating Humidity (Min.-Max.)	5 to 85% (Non condensing)
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Dimensions (H x W x D) in. (cm)	28 x 17.4 x 32.5 (72.0 x 44.2 x 82.6)
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Weight lbs. (kg) (full-fill system)	Approx. 235 (107)
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## GENERAL SPECIFICATIONS (CONT'D)

### RF Upstream

Frequency Range (MHz)	5 to 85 MHz
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Modulation	QPSK, 16 QAM, 32 QAM, 64 QAM
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Channel Type	TDMA, ATDMA, TDMA/ATDMA
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Data Rate (Mbps) (Max.)	30.72 per channel
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RF Input Level (dBmV)	-16 to +29
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Frequency Resolution (KHz)	< 1
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Symbol Rate (Ksym/sec)	160, 320, 640, 1280, 2560, 5120
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Bandwidth per Channel (MHz)	0.2, 0.4, 0.8, 1.6, 3.2, 6.4
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### Installation Environment

Management Interfaces	10/100/1000 Mbps Ethernet (RJ-45) plus Console (serial port, RJ45)
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Network-side Interfaces	10 Gigabit Ethernet (SFP+) auto-baud, eight per card
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Connector Access	NSI Ethernet ports via front of chassis, management ports via rear (RSM PIC)
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### Management Access

In-band Management with Access Control Lists via any NSI port	
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Out-of-Band Management via dedicated Ethernet port on RSM PIC	
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Console (serial) port on RSM PIC	
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### Future Capabilities (not supported in Release 3.0)

Dedicated Ethernet interface on RPIC for Conditional Access System (CAS)	
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Active and Stand-by DTI interfaces on RPIC	
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## ORDERING INFORMATION

Part Number	Description
801023	Duplex Chassis Kit - Two RSMs, No CAMs, Rel. 1.x
801022	Simplex Chassis Kit - One RSM, No CAMs, Rel. 1.x
799012	Router System Module Kit - 1 RSM and RSM PIC
796836	Router System Module (796836)
796847	RPIC - Physical Interface Card for RSM (796847)
801146	SFP+ Optical Interface, 10GBASE-LR/LW, 1310nm
801147	SFP+ Optical Interface, 10GBASE-SR, 850nm
781346	SFP+ Optical Interface, 10GBASE-ER, 1550nm
781347	SFP+ Optical Interface, 10GBASE-ZR, 1550nm
801025	128 DS DCAM Kit (Active) - 1 DCAM, Active DCAM PIC, and 128 DOCSIS DS Licenses
801021	128 DS DCAM Kit (Spare) - 1 DCAM, Spare CAM PIC, and 128 DOCSIS DS Licenses
782208	256 DS DCAM Kit (Active) - 1 DCAM, Active DCAM PIC, and 256 DOCSIS DS Licenses
782209	256 DS DCAM Kit (Spare) - 1 DCAM, Spare CAM PIC, and 256 DOCSIS DS Licenses
782210	192 DS DCAM Kit (Active) - 1 DCAM, Active DCAM PIC, and 192 EuroDOCSIS DS Licenses
782211	192 DS DCAM Kit (Spare) - 1 DCAM, Spare DCAM PIC, and 192 EuroDOCSIS DS Licenses
801169	E6000 Software Maintenance – Phone Plus Gold

## ORDERING INFORMATION (CONT'D)

Part Number	Description
781304	Annex B 32 DOCSIS DS License Bundle
781296	Annex A 32 EuroDOCSIS DS License Bundle
799008	48 US UCAM Kit (Active) - 1 UCAM, Active UCAM PIC, and 48 DOCSIS US
801026	48 US UCAM Kit (Active) - 1 UCAM, Active UCAM PIC, and 48 DOCSIS US
781245	72 US UCAM Kit (Active) - 1 UCAM, Active UCAM PIC, and 72 DOCSIS US
781246	72 US UCAM Kit (Spare) - 1 UCAM, Spare UCAM PIC, and 72 DOCSIS US
802221	96 US UCAM Kit (Active) - 1 UCAM, Active UCAM PIC, and 96 DOCSIS US
802222	96 US UCAM Kit (Spare) - 1 UCAM, Spare UCAM PIC, and 96 DOCSIS US
781268	24 US License Bundle - applicable only with 48 & 72 US UCAM Kits
801062	48 US License Bundle - applicable only with 48 US UCAM Kits

Full price list available from ARRIS.

## CUSTOMER CARE

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