

E6000[®] CER

Release 2.0



PRODUCT OVERVIEW:

The E6000[®] Converged Edge Router (CER) is a next-generation CCAP-ready 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. Operators deploy the E6000 today as a dense, high-availability CMTS for data, voice, and commercial services. ARRIS is delivering a series of software upgrades beginning in early 2015 that will provide for Integrated Edge QAM (IEQ) functionality with today's E6000 CER hardware. The E6000 CER software is based on that of the C4 CMTS, meaning that the E6000 benefits from over ten years of refinements in stability, hitless failover, and performance at high scale. This software re-use also provides the E6000 CER with a proven set of features for IPv6. No other CCAP-ready platform today enjoys a proven software code base for these critical functional areas.



Release 2.0 delivers a significant set of value-added capabilities for E6000® CER customers. With Rel. 2.0, cable operators deploying the E6000 CER can use MPLS L2 VPN or MPLS L3 VPN to facilitate commercial services offerings. In addition to MPLS VPN, Rel. 2.0 contains a number of other important additions. 5 – 85 MHz operation is supported with the UCAM, as is bonding of up to eight (8) upstream channels. Intelligent TCS Assignment, Intelligent RCS Assignment, and TCS Reduction are included in Rel. 2.0 and are intended to help the operator efficiently utilize all available channels. Also provided in Rel. 2.0 are increased flexibility for the assignment of UCAM receivers to physical connectors, /31 addressing support for IPv4, /127 prefix support for IPv6, and hitless dynamic load balancing for bonded cable modems.

FEATURES

- MPLS L2 VPN
 - Point-to-point architecture (VPWS)
 - Remote LDP Signaling
 - PE router operation
 - 16,000 VPNs per chassis
- MPLS L3 VPN
 - 31 non-default VRFs
 - Static and local routing
- Hitless Bonded Modem Load Balancing via Dynamic Bonding Change (DBC)
- Hitless Bonded Modem Movement via DBC initiated by CLI
- Intelligent TCS Assignment/Balancing
- Intelligent RCS Assignment/Balancing Control
- Upstream Channel Bonding with up to 8 Channels in the Bonding Group
- 5 to 85 MHz Upstream Support
- Ability to Assign Upstream Channels Across Connector Groups
- IPv6 Extended ACLs
- IPv4 /31 Subnet Support on NSI
- IPv6 /127 Prefix Support on NSI
- Lawful Intercept with Replication up to 3 Mediation Devices (MDs)
- TCS Reduction Enhancement
- Flap-List Insertions
- Partial Service Enhancement
- SAI/TAI Support for MPLS L2 VPN
- ARP/ND Reduction

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Managing the E6000® CER is typically done via the SNMP or CLI interfaces. The E6000 has multiple options available for IPDR, a useful tool for measuring bandwidth usage. Physical maintenance of the E6000 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)
Modulation (QAM)	64, 256 (256 Only in Release 2.0)
Data Rate (Mbps) (Max.)	30.34 to 55.62 per channel (42.89 to 55.62 in Release 1.0)
RF Output Level (dBmV)	41 to 60
Typical Modulation Error Ratio (MER) (dB)	47
Symbol Rate (Msym/sec)	5.361 (DOCSIS); 6.952 (EuroDOCSIS)
Bandwidth (MHz)	6 (DOCSIS), 8 (EuroDOCSIS)
Output (load) impedance (ohms)	75

Physical

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

RF Upstream

Frequency Range (MHz)	5 to 85 MHz
Modulation	QPSK, 8 QAM, 16 QAM, 32 QAM, 64 QAM (No 8 QAM Support in Release 2.0)
Channel Type	TDMA, ATDMA, TDMA/ATDMA, SCDMA (No SCDMA Support in Release 2.0)
Data Rate (Mbps) (Max.)	30.72 per channel
RF Input Level (dBmV)	-16 to +29
Frequency Resolution (KHz)	< 1
Symbol Rate (Ksym/sec)	160, 320, 640, 1280, 2560, 5120
Bandwidth per Channel (MHz)	0.2, 0.4, 0.8, 1.6, 3.2, 6.4

Installation Environment

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

Management Access

In-band Management with Access Control Lists via any NSI port
Out-of-Band Management via dedicated Ethernet port on RSM PIC
Console (serial) port on RSM PIC

Future Capabilities (not supported in Release 2.0)

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



The E6000® CER provides cable operators with unprecedented efficiencies in DC power consumption per downstream channel. This leads to reduced powering and cooling requirements for the operators' facilities, which can provide significant savings in operational and capital expenditures.

SOFTWARE RELEASE 2.0 FEATURES (PARTIAL LISTING)

DCAM	Policy-Based Routing
8 RF (F-Connectors) per slot	24 Channel Bonding (Downstream)
256 Channels (Annex B) per card	Four Channel Bonding (Upstream)
192 Channels (Annex A) per card	BGPv4, MP-BGP with IPv6 Address Fam.
Max 32 Channels per RF connector	PacketCable™ Multimedia Support
Up to 7+1 RF Sparring	Dynamic Cable Modem Load Balancing
IPv6 Features	SII Lawful Intercept (RFC 3924)
Cable modem management	802.1Q VLAN tagging
Dual-Stack CPE	Extended ACLs & Named ACLs
IS-IS Routing with Multi-topology support	Secure Shell v2 (SSHv2)
Cable Source Verify with DHCP Lease Query	Automated Hitless Patching
Prefix Delegation Route Injection	DHCP Relay Agent (Option 82)
OSPFv3	DNS Client
Prefix Stability	TFTP Enforce and Dynamic Shared Secret
Distribute Lists	BSoD L2 VPN
TFTP Enforce / Dynamic Shared Secret	BPI+ Enforce
DS and US Subscriber Management Filters	IPDR/SP
/127 Prefix Support	Intelligent TCS Assignment/Control
IPv6 Extended ACLs	Intelligent RCS Assignment/Control
DOCSIS 3.0 Multicast IP Video Support (via IGMPv3 Control)	CM Status SOOR Support
Extended CM TX Power Support	DSG Reset to Null
Integrated Service Class Agility	Multi-Tuner CM Support
MPLS L2 VPN	5 – 85 MHz Upstream Support
MPLS L3 VPN	Hitless Dynamic Load Balancing for Bonded Modems
/31 IPv4 Addressing Support	TCS Reduction

ORDERING INFORMATION

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
799011	64 DS DCAM Kit (Active) - 1 DCAM, Active DCAM PIC, and 64 DOCSIS DS Licenses
801019	64 DS DCAM Kit (Spare) - 1 DCAM, Spare CAM PIC, and 64 DOCSIS DS Licenses
802117	128 DS DCAM Kit (Active) - 1 DCAM, Active DCAM PIC, and 128 EuroDOCSIS DS Licenses
802118	128 DS DCAM Kit (Spare) - 1 DCAM, Spare DCAM PIC, and 128 EuroDOCSIS DS Licenses
801169	E6000 Software Maintenance – Phone Plus Gold

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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.

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