advanced media technologies®

MODEL

E6000™ CER

CONVERGED EDGE ROUTER

ARRIS

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 and voice services. ARRIS will deliver 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 1.1 provides an additional set of CMTS capabilities for the E6000 CER. Operators deploying the E6000 CER with Rel. 1.1. software will be able to double their downstream channel density – with no hardware changes – simply by applying a license available for ARRIS. This is another example of the tremendous advantages in rack space savings, power efficiency, and price per downstream that the E6000 CER provides. A number of additional features in Rel. 1.1 provide operational enhancements for cable operators, including Multi-Protocol BGP with IPv6 Address Family Support, Automated Hitless Patching, Multi-Tuner Cable Modem Support, and others.

FEATURES

- Enhanced Scaling
- 32 Annex B / 24 Annex A QAMs per F
- Extended modem Tx power for USCB
- Dual Shared Secret
- Enhanced USCB Scaling per CAM
- Integrated Service Class Agility
- Dynamic Service Class Modifications
- IPv6 PCMM for Voice Services
- Upstream Drop Classifier Support
- Support for Modem Loss of AC Power
- Improved Partial Service
- PBR Recursive Next Hop
- DSG Reset to Null
- TCS Optimization for Static Upstream Bonding Groups
- Multi-tuner Cable Modem Support
- IS-IS Point-to-Point Adjacencies
- IS-IS Dynamic Hostname Support
- RADIUS Authentication
- CM Status SOOR Handling
- Annex A Mixed 256 QAM / 64 QAM per F Connector
- Automated Hitless Patching
- Load Balancing via SNMP MIB
- UCAM Hitless Sparing Expansion to 6+1
- MP-BGP + IPv6 Address Family
- Secure NTP
- Intelligent Channel Optimizer (ICO) Support
- Copy FTP Source IP on Same Command Line
- IPv6 Route Scaling Enhancement
- Intelligent RCS Assignment/Balancing Control

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 1.1)
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)	13.8 x 1.2 x 17. 8 (35.0 x 3.0 x 45.3)
Weight lbs. (kg) (full-fill system)	approx. 235 (107)

RF Upstream	
Frequency Range (MHz)	5 to 85 (5 to 65 with Software Release 1.0)
Modulation	QPSK, 8 QAM, 16 QAM, 32 QAM, 64 QAM (No 8 QAM Support in Release 1.1)
Channel Type	TDMA, ATDMA, TDMA/ATDMA, SCDMA (No SCDMA Support in Release 1.1)
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 1.1)
Dedicated Ethernet interface on RPIC for Conditional Access System (CAS)
Active and Stand-by DTI interfaces on RPIC

E6000 Converged Edge Router Release 1.1

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 1.1 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 Sparing	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
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

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

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.